

## IT Project+ Study Guide

by William Heldman

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Learn fundamental IT project management skills while preparing for CompTIA's IT Project+ certification exam PK0-001.

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## IT Project+ Study Guide

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2. Register for and schedule a time to take the CompTIA certification exam(s) at a convenient location.
3. Read and sign the Candidate Agreement, which will be presented at the time of the exam(s). The text of the Candidate Agreement can be found at [www.comptia.org/certification](http://www.comptia.org/certification)
4. Take and pass the CompTIA certification exam(s).

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To Our Valued Readers:

According to CompTIA, industry research reveals that 33% of IT projects are delivered later than expected. Leading consulting firms report that 74% percent of all IT projects come in over budget or run past the original deadline; 28% of projects fail altogether. Statistics such as these prompted CompTIA to acquire the IT Project+ certification as a means to support the transition of IT professionals and organizations from “traditional” technical roles into high-value business roles.

Just as CompTIA is committed to establishing measurable standards for certifying IT professionals over a wide range of categories, Sybex is committed to providing those professionals with the skills and knowledge needed to meet those standards. It has long been Sybex’s desire to help bridge the knowledge and skills gap that currently confronts the IT industry.

Sybex expects the IT Project+ program to be well received, both by companies seeking qualified project managers and by the IT training community at large. Along with the existing line of vendor-neutral certifications from CompTIA, including A+, Network+, Server+, and I-Net+, the IT Project+ certification should prove to be an invaluable asset in the years ahead.

Our authors and editors have worked hard to ensure that this *IT Project+ Study Guide* is comprehensive, in-depth, and pedagogically sound. We’re confident that this book will meet and exceed the demanding standards of the certification marketplace and help you, the IT Project+ exam candidate, succeed in your endeavors.

Good luck in pursuit of your IT Project+ certification!

Neil Edde

Associate Publisher—Certification

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To Kimmie, the love of my life, and to God, my heart and soul

### **Acknowledgments**

This is the tenth book on which I've worked as a contributing writer, coauthor, or solo author for Sybex. All of them have been challenging and fun, and through them I've learned a lot about publishing. One thing I can tell you is that every individual affiliated with Sybex has been of great character and has gone beyond the call of duty to refine and produce a wonderful book. Their efforts can be found in everything: from the edits to the graphics to the test engines and everything in between.

For example: Pete Gaughan, the primary editor for the book you're holding, caught me this time round on a sentence concerning five-nines uptime that differed from something I'd written two books ago. Pete is a strong testimony to the power there is in being an editor. He pores over text to make sure it reads well, it's accurate, and, most importantly, it's interesting. He does it day in, day out, and is really excellent at what he does.

Elizabeth Hurley, the acquisitions and development editor, is intelligent, an incredible booster to an author's ego, and very positive about the books we're doing. She's a dynamo, just full of energy (or chai tea or something...). She puts up with the longest phone calls and e-mails you can imagine. She is the first to see the text, working with the author on the first few chapters and helping develop the book's entire outline. This is an amazingly cutthroat industry, and yet here's Elizabeth encouraging me, helping me make something better.

Production editor Kelly Winquist is the stationmaster, responsible for deadlines, traffic, and details. She reminds me when things are due—firmly but pleasantly—and keeps the text, art, and CD elements organized. It is up to Kelly to see that the final galleys are examined and OK'ed by proofreaders, technical editors, and me, all in time before the book gets printed. She's easy to work with and professional.

I'm probably an interesting specimen to our illustrator, Tony Jonick, because I request unusual graphics for a computer book. I tend to go beyond router diagrams and flowcharts; for example, in this book you'll see the tire-swing example. Yes, I got an e-mail asking what the heck I thought I was doing, but in the final run, Tony came through as always. Who else could (for one of my other books) make a bandit's mask and a moustache look good on a server?

And what about Neil Edde? Are there words to describe him? He, too, is a human dynamo—I've never seen such energy. He's enthusiastic about Sybex and the books they publish. He's an articulate, polite genius. He's fun to be around, to go out to dinner with, and to talk to about books. Thanks, Neil, for taking a chance on me.

See? You just cannot beat the caliber of folks working for Sybex. Aren't you jealous that you're not a writer for this company and don't get to work with the level of professionalism that I've been spoiled by for the last few years?

On technical books, authors have to go through the dreaded technical edit (TE)—the phase where an expert, someone who has *forgotten* more about the subject than I'll ever know, reads the book for accuracy. I constantly imagine that they're saying things like, "Pete, is this guy the best you could do?" I'm very bad about complaining about tech editors, only to find out that they're actually cool people and not evil beings from another dimension, so I repent and tell the editors that I really like my TEs. This time, I was blessed with technical editors André Patee-Huff and James Kelly.

I really like my TEs.

I should point out that the executive arm of Sybex is as dedicated as the worker-bee arm. Dr. Rodney Zaks, the company founder, and Jordan Gold, the publisher, are both wonderful men who have developed a wonderful world-class technical book company. (World-class? Sure. I have copies of three different books of mine in Chinese. Sybex gets around.)

My thanks also goes out to all the unsung folks who are involved in a project like this: the contract keepers, accountants, website wranglers, mailroom staff, and of course the server admins who keep Sybex a-rockin'.

And thanks to God, who gave me the gift of writing and helped me meet up with this team.

## Introduction

Have you ever sat back and wondered how the pyramids were built? Or the Eiffel Tower? Or the Golden Gate Bridge? How did someone have the organizational skills to put all those people together and create such magnificent structures? Coming forward to recent times—how is Microsoft capable of putting together the literally *millions* of lines of code that become Windows 2000 or Windows XP? The answer to all of these: project management.

The CompTIA IT Project+ will test your knowledge of the extraordinarily large world of IT project management (PM). The basics of PM are simple and elegant, but there are many different opinions about how project PM should be done. Some PM experts suggest PM methodologies that are very rigorous, others more casual ones. It's left up to you to decide which you'll use and how you'll use it.

Fortunately, the IT Project+ test wasn't written with any one PM methodology in mind. Instead, it's written from the perspective of understanding good PM principles and techniques—something that all PM methodologies embrace. In *IT Project+ Study Guide*, you'll find plenty of discussion of these PM concepts, such as requirements definition; the concept, charter, and scope documents; the project planning process itself; risk assessment and management; and closing out the project. Also, you'll find that the exam quizzes you on categories that are hard to objectively test on, such as team-building and people management, and I give you the skinny on these as well.

If you have a modicum of practical, hands-on PM experience from your work background, you'll find that the test is much more PM-oriented than IT-oriented. I've included much more IT-centric material than you'll see on the test. I do this because there's an interesting quagmire in the PM industry today. Almost all new projects, regardless of their nature, utilize information systems in one way or another. So you'll find that your PM career will always involve some sort of IT—and IT presents many interesting twists in the road, in terms of project tasks. For example, suppose that you work for a large manufacturing concern. It used to be that the machinery that ran the manufacturing line didn't have any semblance of electronics or IT gear in it, anywhere. But today, manufacturing gear is full of electronics, along with servers and software that run the various manufacturing components. Some manufacturing segments even include

lasers and robotics. I'd wager to say that regardless of your background, there is some segment of IT software and hardware running somewhere that directly affects your business.

Where should you go beyond taking your IT Project+ test? If you haven't already, and you find that you're interested in all things PM, you should enroll in a good university-level class that takes you through the heavier stages of PM. This book and this test only touch the surface of what's really out there. You'll find that there is so much more to learn that you could make a career out of managing projects. After all, that's what a project manager is, isn't it?

**Warning**

*Don't* just study the questions and answers in this book; the questions on the actual exam will be different from the practice ones included in the book and on the CD-ROM. The exam is designed to test your knowledge of a concept or objective, so use this book to learn the objective *behind* the question.

## **What Is the IT Project+ Certification?**

The CompTIA IT Project+ test was developed, in part, by Gartner Inc., a well-known consulting company and IT research and think-tank entity. Gartner has its own arm dedicated to project management.

CompTIA is a pretty cool outfit because its mission is to create tests and certifications that aren't company-specific. For example, you can take a server test that deals with the elements of servers and server operation, but doesn't ask you specifics about, say, Dell, HP, IBM, or Compaq. CompTIA got its start with what is now almost a standard in the industry, the A+ exam—a test designed to quiz you on your understanding of the guts of a PC and its associated connection to a network. But there are other tests as well: Network+, Linux+, and others. In my position as director of a group of IT operations people, I try to get my junior people interested in succeeding on the A+ test, because the level of knowledge covered is so thorough.

## **Why Become IT Project+ Certified?**

With IT Project+, CompTIA has given people who are affiliated with the IT industry the capability of proving their project management prowess. You'll find that this test will help you fill in some blanks you may have had regarding project management. You'll also find, if you're like me, that it whets your appetite for more information about PM. This exam and subsequent certification make a nice addition to any IT person's certification repertoire, and I think it is a great starting place for those interested in PM but not necessarily in heavy-duty IT.

Here are some reasons to consider the IT Project+ test and this study guide:

- It demonstrates proof of professional achievement.
- It increases your marketability.
- It provides greater opportunity for advancement in your field.
- It is a great pre-requisite for advanced PM training.
- It raises customer confidence in you and your company's services.
- It helps you talk and act professionally in front of others when it comes to project management methodologies, techniques and dialect.

### **Provides Proof of Professional Achievement**

You can put IT Project+ beside your name on your business cards, proving that you've studied hard and taken and passed a test that proves you know something about PM. You'll also get a certificate of achievement from CompTIA that you can frame, as well as a wallet card certifying you IT Project+.

## **Increases Your Marketability**

With a certification in IT project management, you may find that some positions open up to you a little easier than they did before. You should augment any IT career with a technical understanding relative to your interests (servers, databases, networks, software development, etc.), but the IT Project+ certification takes you a step beyond. It says that you understand not only the tech-talk behind an IT project; you also understand how the project should go together.

## **Provides Opportunity for Advancement**

You may find that your IT Project+ certification is just what you need to get that next step up the ladder. People who study hard and pass certification tests prove, if nothing else, that they have the tenacity to get through a difficult subject and to prove their understanding by testing out on the subject.

## **Great Prerequisite for Advanced PM Training**

Above all else, if you're considering a PM career, the IT Project+ exam is a great way to start. It uses an agnostic technique that doesn't preach about any one PM methodology and thus gives you a background on what PM is really all about, not simply what one company or organization thinks it's about. You'll find that the dialog on the Web is *tremendous* regarding this subject, and there are lots of experts—some of whom disagree with one another! To find your own way in the PM world, start by getting a handle on the basics of IT without any predilection toward one methodology or another.

## **Raises Customer Confidence Because It Raises Your Confidence**

Customers who know you're certified in project management and who hear you speak and act with confidence are more confident in the company you represent. If you're able, for example, to identify and describe the four categories of risks to prepare for in a project, you might well validate to your customer that you know what you're talking about. Being able to talk intelligently about project management techniques has worked personally for me, and I'm sure it will for you too.

## ***How to Become IT Project+ Certified***

Simply go to the CompTIA website ([www.comptia.com](http://www.comptia.com)) to visit the list of testing sites where the exam is currently conducted. I took mine at a VUE center (telephone number in the U.S., 1-877-551-PLUS), but you can also take your test at Prometric (1-877-287-6872). The test is \$140 for members of CompTIA (\$190 for nonmembers), and there's a discount if several of you decide to take the test—see the website for more details.

**Note** Prices are subject to change at anytime. Please visit CompTIA's website for the most up-to-date pricing information at [www.comptia.org](http://www.comptia.org).

You're allowed two hours to take the test and a minimum score of 63% is required to pass. There are eighty-five questions on the test, which are simple multiple-choice.

You'll need a driver's license and one other form of ID (doesn't have to have a picture on it, but must have a signature). No calculators, computers, cell phones, or other electronic devices are allowed. You'll be notified of your grade as soon as you finish the test.

You cannot take this test online.

**Note** In addition to reading the book, you might consider visiting the major project management websites: [www.ganttthead.com](http://www.ganttthead.com), [www.techrepublic.com](http://www.techrepublic.com), [www.4pm.com](http://www.4pm.com), and [www.pmi.org](http://www.pmi.org).

## **Who Should Buy This Book?**

You should buy this book if you're interested in project management and want to see what it's all about. Your IT background doesn't have to be very in-depth to take the IT Project+ test. PMs aren't typically subject matter experts in the IT area they're working in; they utilize the people around them who *are* experts to get the job done. Project management is about putting the right people (with the right attitudes) together in order to achieve the project's objectives—to create its deliverables.

I would advise you to not be afraid of this test. If you've never taken a certification test before (I've taken dozens), you'll find that this is a very pleasant way to get your feet wet. The test isn't complicated or riddled with trick questions—just good old meat-and-potatoes questions about the basics of project management. I find that CompTIA creates an excellent test and is able to thoroughly test an individual on a given subject.

## **How to Use This Book and CD**

We've included several testing features, found in both the book and on the CD-ROM bound at the front of the book. At the beginning of the book (right after this introduction, in fact) is an assessment test that you can use to check your readiness for the actual exam. Take this exam before you start reading the book; it will help you determine the areas you may need to brush up on. The answers to the assessment test appear on a separate page after the last question of the test. Each answer also includes an explanation and a note telling you which chapter this material appears in.

To test your knowledge as you progress through the book, there are review questions at the end of each chapter. As you finish each chapter, answer the review questions and then check to see whether your answers are right—the correct answers appear on the page following the last review question. You can reread the section that deals with each question you got wrong to ensure that you get the correct answer the next time you are tested on the material.

### **Note**

In this book and on the CD-ROM, you will come across some questions that are similar to Select and Place and Drag-and-Drop formats, commonly found on Microsoft or CompTIA's live exams. These kinds of question formats will not be used on the actual IT Project+ exam. Every question on the IT Project+ exam will be Multiple Choice. We used these sophisticated question formats for this Study Guide to ensure that you were tested as comprehensively as possible.

On the CD, you'll also find over 150 flashcard questions for on-the-go review. Download them right onto your Palm OS device for quick and convenient reviewing.

In addition to the assessment test and chapter review tests, you'll find a practice exam (in the back of the book and on the companion CD-ROM) and a bonus exam (only on the CD-ROM). Take these exams just as if you were actually taking the exams (i.e., without any reference material). When you have finished the first exam, move on to solidify your test-taking skills with the second exam. If you get more than 90 percent of the answers correct, you're ready to go ahead and take the real exam.

Additionally, if you are going to travel but still need to study for the IT Project+ exam, and you have a laptop with a CD-ROM drive, you can take this entire book with you just by taking the CD. This book is in PDF (Adobe Acrobat) format so it can be easily read on any computer.

## **The Exam Objectives**

Behind every computer industry exam, you can be sure to find exam objectives—the broad topics in which the exam developers want to ensure your competency. Exam

objectives are subject to change at any time without prior notice and at CompTIA's sole discretion. This study guide includes, at the start of each chapter, the test objectives covered in that chapter. But please visit the Certification page of CompTIA's website ([www.comptia.com](http://www.comptia.com)) for the most current listing of IT Project+ exam objectives.

**Warning**

Be careful about the test objectives (for any test, not just CompTIA's). My experience has been that exam objectives are sometimes hastily written and might contain misspellings and grammar errors, or might be missing information that would help you study for the test. Read the objectives carefully to make sure you understand what the objective authors were really getting at.

## ***Tips for Taking the IT Project+ Exam***

Here are some general tips for taking your exam successfully:

Bring two forms of ID with you. One must be a photo ID, such as a driver's license. The other can be a major credit card or a passport. Both forms must have a signature.

- Arrive early at the exam center so you can relax and review your study materials, particularly tables and lists of exam-related information.
- Read the questions carefully. Don't be tempted to jump to an early conclusion. Make sure you know exactly what the question is asking.
- Don't leave any unanswered questions. Unanswered questions are scored against you.
- There will be questions with multiple correct responses. When there is more than one correct answer, a message at the bottom of the screen will prompt you to "Choose all that apply." Be sure to read the messages displayed.
- When answering multiple-choice questions you're not sure about, use a process of elimination to get rid of the obviously incorrect questions first. This will improve your odds if you need to make an educated guess.
- For the latest pricing on the exam and updates to the registration procedures, refer to the CompTIA site at [www.comptia.com](http://www.comptia.com).

## ***Assessment Test***

1. How many ways can a project be declared final? ?
  - A. 1
  - B. 2
  - C. 3
  - D. 4
  - E. 5
  
2. Select all the PMI-recognized standard project management phases. ?
  - A. Activating
  - B. Initiating
  - C. Requirements gathering
  - D. Planning
  - E. Executing
  - F. Scheduling
  - G. Controlling
  - H. Budgeting

I. Closing

J. Ending

3. In what ways would not having thorough requirements identification, documentation, and metrics adversely impact your project? (Select all that apply.)

?

A. Scope may arbitrarily enlarge

B. Can't tell who the customer is

C. Don't know what deliverable to develop

D. Can't tell when the project is complete

E. Can't tell when the project is successful

F. Sponsors may back out

4. The \_\_\_\_\_ is the component that authorizes the project to begin.

?

A. Customer request

B. Concept document

C. Project charter

D. Project sponsor

5. When should you make a recommendation to kill a project? (Select all that apply.)

?

A. When costs far outreach the budgeted amount the project was originally given

B. When an activity is insurmountable

C. When the elapsed time used for one or more tasks far outreaches time estimates

D. When the enthusiasm of the project sponsor wanes

6. You're the project manager for a small project that is in closing phase. You prepare closure documents and take them to the project sponsor for sign-off. She tells you that the documents are not needed because the project is so small. What should you tell her?

?

- A. OK, sorry to bother you.
- B. You are the one who needs to sign off on the documents showing that the project is officially closed.
- C. I can have a stakeholder sign in your place.
- D. I'll just go ahead and sign them instead.

7. The \_\_\_\_\_ is the document that defines the height and breadth of the project. ?

- A. Project concept
- B. Project scope
- C. Project charter
- D. Project plan

8. A \_\_\_\_\_ budget is one predicated on assumptions and initial estimates. ?

- A. Top-down
- B. Bottom-up
- C. Cost-center
- D. Capital-expense

9. Which of these can convey that you've achieved the completion of an interim deliverable? ?

- A. Completion criteria
- B. Milestone
- C. Gantt chart
- D. Project sign-off document

10. What will be the outcome of the work breakdown structure (WBS)? ?

- A. Phase
- B. Task
- C. Deliverable
- D. Activity

11. Of these, which one thing would a customer be responsible for in the project development process? ?

- A. Review of project deliverables
- B. Sign-off of scope document

- C. Development of project schedule
- D. Prioritization of project steps
12. You're the project manager of a project in which the scope has expanded. What steps must you take to acknowledge the expansion? (Select all that apply.) ?
- A. Modify the project charter
- B. Modify the project concept definition document
- C. Obtain a new sign-off on the project charter
- D. Obtain a new sign-off on the project concept definition document
13. When taking over an incomplete project, what item should be of most interest to the new project manager? ?
- A. Project concept document
- B. Project charter
- C. Project scope document
- D. Project plan
14. In the IT world, which of these statements about a project manager is the most true? ?
- A. The PM doesn't have to have any IT background.
- B. The PM should have a minimum of IT background.
- C. The PM should be moderately IT oriented.
- D. The PM should be heavily IT oriented.
15. In the project management world, what entity is responsible for signing the project charter? ?
- A. Customer
- B. Project sponsor
- C. Stakeholder
- D. Project manager
16. Select the component that belongs in the controlling phase of the project, not the initiating (requirements formulation) ?

phase.

- A. Risk definition
- B. Risk quantification
- C. Risk response development
- D. Risk control

17. What signals the end of the planning phase?

?

- A. The project team begins to execute the tasks in the project plan
- B. The formal signing of the project scope document
- C. When the hardware and software comes in
- D. The formal signing of the project plan document
- E. When upper management frees up the money for the project budget

18. When developing the requirements for the project, what must you do to each requirement?

?

- A. Provide a place for project sponsor sign-off
- B. Provide a place for customer sign-off
- C. Link each with a specific customer need
- D. Link each with a separate project step
- E. Provide metrics by which you can assess the requirement

19. Two different sets of "criteria" must be alluded to in the project scope document. What are the names of the required criteria? (Select two.)

?

- A. Budget
- B. Project
- C. Completion
- D. Deliverable
- E. Success

20. A well-written change-control process should include which of the following components? (Select all that apply.) ?
- A. The type of change requested
  - B. The amount of time the change will take to implement
  - C. The cost of the change
  - D. How to obtain approval for additional funds and/or time
  - E. The stages at which changes are accepted
21. Given the standard IT project, which cost estimating technique would be the most beneficial? ?
- A. Top-down
  - B. Unit
  - C. Parametric
  - D. Bottom-up
  - E. Linear regression
  - F. Indexing
22. What is the best way to prevent scope creep? ?
- A. Make sure the requirements are thoroughly defined before the project begins.
  - B. Put a proviso in the charter that no additions to the project will be allowed once it's underway.
  - C. Alert the sponsor that you will not be taking any change requests after the project starts.
  - D. On your project intranet site, supply a button, labeled "Nice-To-Have," that the user can check for changes that aren't really necessary.
23. Which of the following is *not* a true statement about cost estimating? ?

- A. Cost estimates are provided by team members.
- B. Cost estimates make up the project budget.
- C. Cost estimates have a quality factor built into them.
- D. You should average all cost estimates.
24. Select all project elements that may benefit from management input. ?
- A. Review of project deliverables
- B. Sign-off of scope document
- C. Development of project schedule
- D. Prioritization of project steps
25. Who is responsible for assembling the project's team members? ?
- A. Project sponsor
- B. Project stakeholders
- C. Project customer
- D. Project manager
26. What are the main types of milestones? (Select all that apply.) ?
- A. Phase
- B. Major
- C. Task
- D. Minor
- E. Activity
27. \_\_\_\_\_ are the elements that might have a direct impact on the length of the project scope. ?
- A. Challenges
- B. Possibilities
- C. Opportunities
- D. Capabilities
- E. Constraints
28. Which of these are *not* elements of a work breakdown structure (WBS)? (Select all that apply.) ?
- A. Phase
- B. Task
- C. Activity
- D. Context

- E. Duration
- F. Dependency
- G. Vendor contracts
- H. Assigned team member(s)
- I. Hardware

29. What are the two types of charts that you might utilize in a typical project management plan to denote the project's tasks? ?

- A. Gantt
- B. GERTT
- C. PERT
- D. AVERT
- E. Critical Path

30. What are the three areas of estimation that you'll be interested in when preparing your project schedule? ?

- A. Materials
- B. Time
- C. Person-hours
- D. Skill levels

31. When would you use your negotiation skills on a project that's well underway? (Select all that apply.) ?

- A. When you want a certain set of individuals on your project team
- B. When you're running a high-level project in which you could augment the outcome by adjusting certain tasks
- C. When you want a raise
- D. When you're attempting to get better hardware for the same money

32. Suppose that a corporate organizational change occurs that affects your team. Who should handle the communication of this news, and how soon should it be communicated? ?

- A. Project sponsor, immediately
- B. Project sponsor, not immediately urgent
- C. Project manager,

- immediately
- D. Project manager, not immediately urgent
33. At a minimum, how many reviews will your project plan go through? ?
- A. 1
  - B. 2
  - C. 3
  - D. 4
  - E. 5
34. What analysis should you perform to see if the proposed scope change request should be elevated to the sponsor and stakeholders or can stay within the confines of the project manager and the project team? ?
- A. Index
  - B. Deviation
  - C. Portion
  - D. Variance
35. In which process do you compare budgeted costs versus actual? ?
- A. Capacity analysis
  - B. Metrics measurement
  - C. Variance analysis
  - D. Status measurement
36. A milestone should have, along with its description, these two components. ?
- A. Success criteria
  - B. Entry criteria
  - C. Completion criteria
  - D. Exit criteria
  - E. Deliverable criteria
37. When you want to compare the ratio of budgeted versus actual hours or dollars spent on a task, which type of financial variable will you use? ?
- A. Index
  - B. Cost
  - C. Portion
  - D. Variance
38. What are the three basic types of changes that someone might bring to a project, changes which may represent deviations in scope? ?
- A. Design change
  - B. Schedule change
  - C. Monitoring change

- D. Cost change  
E. Methodology change
39. When is it your job as project manager to also manage the people who are your team members? ?
- A. Only when authorized to do so by stakeholders  
B. Only when authorized to do so by the team member's regular supervisor  
C. Always  
D. Never
40. What are some team member issues that you will have to get involved in as a people manager? (Select all that apply.) ?
- A. Team member reports to you that another team member is performing substandard work  
B. Stakeholders come to you requesting a schedule change  
C. Top performer slacking off  
D. Management rumor mill is saying layoffs are in the offing
41. In what process do you determine whether there is enough money in the budget or if there are enough hours left to complete the project? ?
- A. Earned value analysis  
B. Earned income proration  
C. Estimated portion analysis  
D. Estimated profitability analysis
42. What are some team dynamics that might come into play as your project unfolds? (Select all that apply.) ?
- A. One team member works longer hours than the others  
B. One or more team members has to leave the team

- C. Team isn't focused—  
being going in  
divergent ways
- D. Team is fragmented  
along the lines of  
special interests
43. How many outflows are there from the closing phase? ?
- A. 1
- B. 2
- C. 3
- D. 4
44. What is one important step that new project managers might overlook when faced with a possible scope deviation? ?
- A. Telling the customer no
- B. Determining an alternative solution
- C. Alerting vendors
- D. Complaining to the sponsor
45. Select the three most common project constraints. ?
- A. Schedule
- B. Budget
- C. Priorities
- D. Time
- E. Vendors
- F. Other company projects
- G. Quality
46. What resources are released once the project has been closed? (Select all that apply.) ?
- A. Hardware
- B. Human resource
- C. Vendor
- D. Contractual
- E. Customer

## Answers

1.

D

A project can be declared complete because its deliverables have been created, or because the success and completion criteria have been met. A project can also be canceled, or the resources just wind up being depleted requiring cancellation. For more information, see [Chapter 13](#).

2.

B, D, E, G, I

You can remember the old poison antidote, syrup of IPECaC (leaving out the “a”), to assist you with this. Initiating, planning, executing, controlling, and closing are the five distinct project management phases. For more information, please see [Chapter 1](#).

[3.](#)

A, C, D, E

By not providing adequate requirements formulation, you might have a rough feel for what deliverables you’re providing, but you certainly couldn’t absolutely pinpoint them. You won’t be able to tell when the project’s complete or when it’s successful, and as a result, the scope might enlarge without you being aware of it. You’ll probably be able to tell who the customer is. For more information, please see [Chapter 6](#).

[4.](#)

C

It is the signing of the project charter that authorizes the project work to go forward. For more information, please see [Chapter 2](#)

[5.](#)

A, B

When the elapsed time taken for one or more tasks far outreaches your initial time estimates, it’s time to visit with the stakeholders and project sponsor to see if you need an extension, not to kill the project. If the sponsor loses interest, it’s time to talk with the sponsor, not necessarily to pull the plug on the project. For more information, see [Chapter 10](#).

[6.](#)

B

The sponsor is the one who must sign off on completion of the project, whether successful or unsuccessful. Just as the sponsor is authorized to expend resources to bring forth the project’s deliverables, so the sponsor must also close down the project and thus release the resources. For more information, see [Chapter 13](#).

[7.](#)

B

The project scope document details the various components that will go into the project to make it happen. The project scope document includes things like the enumeration of the deliverables, the end product that’s expected, the risks associated with the project, the budget and any spare funds that may be available to augment the budget, rules and regulations that may impact the project, and so on. For more information, please see [Chapter 3](#).

[8.](#)

A

A top-down budget is one in which you’re allocated a given amount of money in which to complete a project. Because of this you’ll have to rely on estimates and assumptions in order to apportion the money in each area in which you require it. For more information, see [Chapter 9](#).

[9.](#)

B

One of the uses for a milestone is to signal that you’ve completed one of the deliverables that are to be obtained from the project. For more information, please see [Chapter 3](#).

[10.](#)

C

The outcome of your WBS will be the project’s deliverables! For more information, see [Chapter 8](#).

- [11.](#) A  
A more formal approach to the sign-off of the deliverables is a project phase called acceptance testing, where users actually test out the new software to make sure it works correctly and that it does what they need it to do. For more information, please see [Chapter 4](#).
- [12.](#) A, C  
Anytime there's a significant expansion or modification to the project, the project charter must be modified and the project sponsor must sign off anew on it. For more information, please see [Chapter 2](#).
- [13.](#) C  
The project's scope document should be of most interest to the new project manager. First, if the project scope doesn't match the concept document and charter, the project manager has a problem. Second, the scope denotes the amount of work involved in the project and, if inaccurate, may result in project overruns both in budget and resource terms as well as schedule. For more information, please see [Chapter 5](#).
- [14.](#) A  
In an ideal project management world, the IT project manager isn't any different than the PM that's building a bridge, sinking an oil well, or mapping the Amazon. Wonderful communications skills are the biggest asset any project manager can have. For more information, please see [Chapter 1](#).
- [15.](#) B  
The project sponsor is the one who signs the project charter. For more information, please see [Chapter 2](#).
- [16.](#) D  
You go through a full-bodied risk assessment process while you're in the initiating phase of the project. You define risks associated with each requirement, try to quantify their impact on the requirement, and prepare a response for each risk that you've identified. You control risks as they appear when you're in the controlling phase of your project. For more information, please see [Chapter 5](#).
- [17.](#) D  
After the sponsor has formally signed the project plan, you've finished the planning stage and now move into executing. In the PACE methodology, you would now enter the activating phase. For more information, see [Chapter 8](#).
- [18.](#) E  
While it's good to boil the requirements down to separate project steps, that's not always possible. However, you should always strive to word the requirements in such a way that you can assess their success and completeness by some metric. Sponsors and customers don't need to sign off on individual requirements. For more information, please see [Chapter 6](#).
- [19.](#) C, E  
You should include both the success criteria and the completion criteria in your project scope document. Success criteria are the things that you'd expect to occur in order to

be able to declare the project a success. Completion criteria are the items that must be accomplished to complete the project. For more information, please see [Chapter 3](#).

[20.](#)

A, D, E

The amount of time and money a change will require are *outcomes* of a change-control process, not inputs to the process. For more information, please see [Chapter 5](#).

[21.](#)

D

The bottom-up cost estimating method is recommended for most IT projects that do not result in a product or service that your company will be reselling. The reason for this is that you're managing the project from a pure "what's it gonna' cost?" methodology, rather than "how much can we expect to make per unit?" You begin your estimating at the smallest of tasks and work your way up. For more information, see [Chapter 7](#).

[22.](#)

A

The best way to avoid scope creep as much as possible (you're never going to totally avoid it) is to make sure the project's requirements have been thoroughly fleshed out before the project starts. For more information, see [Chapter 11](#).

[23.](#)

B

Cost estimates do not make up the project budget; they act as an *input* to the budget. Cost estimates are provided by the team members who will be performing the task they're estimating. You typically build in some sort of quality factor (65%, for example) and administrative expense; and you average cost estimates, meaning that you tell your estimator to use an average, not an exact number. For more information, see [Chapter 7](#).

[24.](#)

A

In order to facilitate management buy-in to a given project, one of the options that can be considered is to allow management to review and approve project deliverables. For more information, please see [Chapter 5](#).

[25.](#)

D

The project manager is the one who will assemble the team members the project. The PM may certainly have input from the sponsor, stakeholders, or customers, but it is the PM who decides what the formation of the team should be. For more information, please see [Chapter 4](#).

[26.](#)

B, D

There are major and minor milestones. Major milestones denote a significant event in the project. Minor milestones are set for less major events, but events that need to be recognized nonetheless. For more information, see [Chapter 8](#).

[27.](#)

E

There's a long list of things that can be considered constraints— elements that could potentially lengthen the scope of the project. Corporate priorities, suitable members for the project team, and budget restrictions are a few. For more information, please see [Chapter 4](#).

[28.](#)

D, G, I

A WBS tells what you're going to do, when you're going to do it, who you'll use, how much time will be needed, and the predecessor/successor relationship. For more information, see [Chapter 8](#).

[29.](#)

A, C

Most projects will utilize a Gantt chart—basically a grouping of task blocks put together to reflect the time that each task is going to take relative to a calendar, along with any precursors or successors the task may have. If you were to take some sticky notes and stick them on a flip chart, writing on each note the task, the date it starts, the date it ends, the duration it'll take, along with all precursors and successors, you'd essentially have a PERT chart. PERT charts are capable of showing interrelationships between tasks that a Gantt chart cannot. You'll use PERT charts on very large projects, whereas most small to medium-sized projects will work fine with Gantt charts. For more information, see [Chapter 7](#).

[30.](#)

A, B, C

You're interested in what you'll use, who'll do the work and how much the effort will cost, both in terms of materials and time. For more information, see [Chapter 9](#).

[31.](#)

B

In high-level projects that have a lot at stake and are under very high visibility, you could use your negotiation skills with the stakeholders and sponsors to try to slim down some of the requirements so as to bring the project in sooner, utilizing less budget, or with greater quality. For more information, see [Chapter 12](#).

[32.](#)

A

The project sponsor will be the one who's given authority to spread the news first. She should direct you to immediately alert your team of the news. For more information, see [Chapter 9](#).

[33.](#)

B

You'll write your project plan then submit to the stakeholders for their review. After you make the recommended changes you'll then submit it to the sponsor for review. If there are no additional changes the sponsor will sign-off on the finalized project plan. For more information, see [Chapter 8](#).

[34.](#)

D

You should run a variance analysis on the proposed deviation. You do this by estimating the amount of time the additional tasks the deviation requires will take, and the additional costs. You then compare this to tasks that you've already planned and more or less fit the tasks involved with the deviation. If you can't find a fit, then the tasks represent additions to the scope. You run the variances to see how far over you would be if the new work was added in, and you then have a good feel for how far out of scope the deviation will take you. For more information, see [Chapter 11](#).

[35.](#)

C

Variance analysis consists of measuring the predicted cost of resource time, dollar expenditures, and elapsed duration of activities, then comparing these to the actual values. For more information, see [Chapter 10](#).

- [36.](#) B, D  
A milestone consists of a description, entry criteria, and exit criteria. These criteria detail how we know when we've entered an area of the project that has resulted in a milestone and how we'll exit this milestone to the next section of the project. For more information, see [Chapter 8](#).
- [37.](#) A  
There are two indexes associated with earned value analysis: cost performance index (CPI)—the budgeted monetary cost of a task versus the actual—and schedule performance index (SPI), the budgeted hours for a task versus actual. For more information, see [Chapter 10](#).
- [38.](#) A, B, D  
A scope deviation can represent itself in the form of a change in the design of the project, a schedule change (typically a reduction in schedule), or a budget change of some kind. Of these, the design change may have the most far-reaching ramifications in terms of scope alteration. For more information, see [Chapter 11](#).
- [39.](#) C  
As a project manager, your team members are under your leadership until the project's over. For more information, see [Chapter 12](#).
- [40.](#) A, C  
You'll be directly involved with team members when you find that one of your better workers is, for some reason, not getting her work done as before. You'll also wind up using your people management skills when someone else comes to you to report that another team member isn't working as well as they should be. You have to deal with stakeholders requesting a schedule change before it ever gets to the individual team member level. And you shouldn't pay attention to the gossip mill. For more information, see [Chapter 12](#).
- [41.](#) A  
The process of examining financial variables to determine where you're at in a project is called earned value analysis. For more information, see [Chapter 10](#).
- [42.](#) C, D  
When a team loses its focus, it also loses its sharpness and the project begins to go in different directions. Likewise, when teams split out into special interest groups or cliques, the project suffers as well. In either case, it's up to you as project manager to manage these very real people situations. For more information, see [Chapter 12](#).
- [43.](#) B  
You'll create closure documentation that includes items such as lessons learned and the sign-off for the closure. You'll also release the resources of the project. For more information, see [Chapter 13](#).
- [44.](#) B  
When faced with the possibility of a serious scope deviation, the PM should determine if there are alternatives that, while compromising the scope, may not have as much impact as the proposed deviation. For more information, see [Chapter](#)

[11.](#)

[45.](#)

B, D, G

Time (schedule), budget, and quality maintain a delicate see-saw balance with one another, and it is important that project managers keep close eye on the three. For more information, please see [Chapter 1](#).

[46.](#)

A, B, D

You would release resources that were allocated for the project. That would include hardware, human resources, contractors, software, and other such resources. Vendors, while a resource, are released as they supply the things that you're purchasing—they're not released at closure time. The customer isn't a resource that's released. For more information, see [Chapter 13](#).

## Chapter 1: Project Management Fundamentals

### Overview

There was a time when I had an idea for a book, and that idea was “Why IT Projects Fail.” I’ve been in the IT industry a long time (though the years seem to have flown by) and have worked for companies that launched IT projects that failed miserably. Hundreds of thousands, or even millions, of dollars were completely lost. I watched heads roll. I bet that if you’ve worked in the industry for any length of time, you too have seen one of these IT *Titanics* go down. It’s not a pretty sight—a lot of deck chairs are rearranged while the ship steadily sucks in more water and begins to go straight to the bottom. Worst of all, and most typical, the people in the center of the project aren’t even aware that the ship is sinking.

Consequently, over the years I’ve asked myself this intriguing question again and again: Why did those projects fail? The people working on them were certainly competent, the bucks were there, and the idea was solid. What happened?

Well, even though the idea was solid, the foundation of the project plan was faulty. In most cases, there wasn’t any semblance of an organization plan beyond scribbled notes from project onset meetings. Not to be too glib about it, but these doomed projects likely failed because somebody spilled iced tea on their ring binder and some of the project thoughts were destroyed as a result.

### *Feeling Good about the Project Ain’t Enough!*

Surely you’ve heard about those movies that were churned out during World War II—movies designed to show that people can rally around a problem and get it solved. A typical plot involved two young people putting together a musical show in order to raise money for their parents. When the idea sparked, you could expect a line something like, “We’ve got the barn! We can have a show!” Oh the innocent, joyous naivete of this line. These kids were going to put a show together, with some singing and dancing, and charge a nominal ticket price, then take the money they earned to get their parents out of a jam. They threw up some old sheets over a section of the barn and painted some props with some leftover paint sitting around, and the next thing you know, they had a beautiful show, worthy even of, well, Hollywood.

Sparks like these fly everywhere, *but they only work in Hollywood*. Lots of great ideas, boosted with more enthusiasm than a Judy Garland film, fail because the only real substance is in the idea. The planning and all the small details are swept away in a cloud

of painted props. In project management, I call this the “It was a great idea—why’d the project fail?” phenomenon.

This same phenomenon happens in IT industry all of the time. Your IT department and a small group of users are meeting in a conference room, and one of the users says, “(Expletives here), we need to have this software developed so we can get rid of this problem and heighten our productivity!” And suddenly, one of the IT folks stands up and says “Hey! We got the barn; we can have a show!” Okay, not really. What he really says is, “Well, Jenny is a great web developer, and we have the database software—I see no reason why we can’t get that done for you in a couple of days!” But it has the same effect as if he’d said the first sentence.

Such a strong parallel between barn-musical fundraiser and your IT administrator jumping to help out exists because you are dealing with the same components: the *desire* to solve a user’s problem, the availability of resources, and the joy that comes from being able to help. These, however, don’t always create a successful project. The combination of these components *and* some good, hard planning work gets a successful project out the door. All else is just, well, Hollywood.

## ***The Project Management Industry***

In 2001, CompTIA began offering a certification exam intended to measure an IT professional’s ability to manage projects effectively—without resorting to barn musicals. Because of the intensity of the technology being developed recently, demand is growing in today’s enterprise for IT pros with solid project management skills. There are dozens of project management courses, books, and even other certification programs out there. However, CompTIA’s IT Project+ exam is the first to focus on how well a candidate can manage or oversee IT-specific projects.

Project management is a sometimes-vague field, with many different approaches possible. The IT Project+ exam is meant to identify and test best practices, as opposed to aligning with a particular project management methodology. The test was designed by Gartner Inc. and was purposely designed to be “agnostic” as to project management methodology and software. What that means is, when developing the exam objectives, Gartner purposely did not address or reflect a particular methodology but instead designed the exam objectives to measure best practices throughout the industry.

The IT Project+ exam objectives map effectively to standard terminology and practices developed by major and leading project management firms and associations. But it is critical to bear in mind that these tenets were first established by Project Management Institute (PMI), a nonprofit organization responsible for creating project management training and documentation. PMI largely defines best practices and industry standard terminology. It established leading project management standards, seminars, educational programs, and a professional certification program. Today, a wide variety of project management organizations exist, and more often than not, their practices are rooted in PMI’s training program.

**Note** For more information on PMI, please refer to the appendix or visit their website at [www.pmi.org](http://www.pmi.org).

We designed a bonus appendix for this book, outlining key players in the project management arena, in an effort to create the appropriate context for you. You’ll find an in-depth listing of leading organizations, such as PMI, and a description of their programs, target audiences, and certification programs. Sprinkled throughout the chapters of this book, you will run into references to some of these organizations. When appropriate, you can refer to the appendix for more detailed information.

The IT Project+ exam is an ideal exam for IT personnel who understand the need for solid project management techniques, even in small-scale IT project initiatives. For example, recently where I work, we have been implementing a Microsoft Internet Security and Acceleration (ISA) Server installation that will host Exchange Server’s

Outlook Web Access and a virtual private network connection for workers telecommuting in from high-speed DSL or cable modem lines. Although we have a full-on project management office that's staffed with certified project managers and designed for enterprise-wide projects, a tiny little server deployment such as this isn't something that needs such a formal process. Instead, we developed, in-house, the project plan for implementing this ISA Server installation. Admins working on the project are required to routinely update the project plan and manage their time according to the timeline and phase tasks outlined in the project plan. A manager acts as the project manager for this mini-project.

Also, if you're serious about project management, the IT Project+ exam isn't where you'll stop. The holy grail of project management is the PMI Project Management Professional (PMP®) certification. To obtain this certification, you must document at least 4,500 hours of project management experience and take a voluminous and complex project management test. You can take entire semester-long college classes designed to prepare you for PMI certification. PMI takes project management very seriously, and it isn't something that the neophyte project manager would start out with. If you're an IT professional, you're absolutely on the right track for getting your feet wet in project management by first taking the IT Project+ test and then digging into PMI certification.

**Tip** Another wonderful company that's involved in project management training is Systemation. (I can personally vouch for the quality of their classes.) Visit their website at [www.systemation.com](http://www.systemation.com) for more information.

### **Terminology and Definitions**

Throughout this book, you will be introduced to myriad project management terms. Each chapter will cover a group of key terms and use them in context to help you better grasp the objectives at hand. At the end of each chapter, you'll find a list of those key terms for your review. Because this exam was created to measure skills associated specifically with IT projects, terminology in this book will vary slightly from leading industry project management definitions, but I'll primarily use terminology from PMI's *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)* because that's what you'll see most often. You'll recognize some of these terms in the exam as well. Fortunately, the PM-ese, as it were, is fairly standardized no matter which PM website you visit or which PM genre they're talking about.

Best practices, in the PM sense, means that you recognize when you have a project, and that you follow good project management practices to create the product or deliverable. These practices vary throughout PM organizations, PMI being the largest. There are various techniques and methodologies, but the agreement that all have is that good project management techniques lead to well-deployed projects.

Now that you are armed with the knowledge that various project management organizations exist and what to expect from terms such as "best practices," let's get started. In this chapter, I will outline the fundamentals of project management. Once the outline is constructed, I'll move on and start filling in the details.

## ***Project Management Overview***

A project is a grouping of activities that, when put together, achieves an overall goal. A project is usually distinguished by the fact that it's not an ongoing process—it's transitory in nature; and it is designed to produce some sort of result, either in the form of an invention or offering, that the requesting customers can utilize. A project always has a recognizable beginning and end.

A project is typically (though not always) requested by a customer; its components are fleshed out by you the PM, and it is then performed by the project team you assemble. Some projects can be "experimental," meaning that you've been requested to develop

something that fulfills an industry need or a strategic goal, but the results of which you may not be able to guarantee because it hasn't been tried before.

Finally, it should be noted that a project is launched to produce something new and different. Projects shouldn't reinvent the wheel; they invent something that makes the wheel better.

Here's an example of an experimental project: I once worked for a company that wrote cardiac ultrasound imaging software. You could take an ultrasound scanning device, like the one used to check the health of a baby inside the womb, and use it instead to get an image of the heart. It was very cool. The company wanted to advance the software from 2D to 3D, which meant they'd have to write a ton of C++ code to take lots of 2D images and render them in 3D fashion. The 3D part was experimental and required scads of time and effort on the part of the developers, fueled by venture capital (VC). The "customers" in this case might've been identified as the venture capitalists, but the developers weren't developing a product or service for those people. The true customers—the folks they were developing it for—were the medical community at large; the venture capitalists just happened to be the ones putting up the money.

The 3D development wasn't run very well—it certainly wasn't run as a project—and inevitably the company went out of business, simply because it never delivered the product and the VC funds finally ran dry. If the 3D development had indeed been run like a project, where it was recognized that they were developing a unique product, where there was a beginning and end to the development (you had to sell the software to somebody at some point), and where the phases were closely controlled by a project manager, the company would still be in business today.

In the IT world, we can very strictly determine a project from ongoing management by utilizing the above rule. Are you implementing a new e-mail server system? Then you can easily define a start date and an end date, and you have before you a project. How about the development of some code for a new system? Again, you have a very clear start date and an end date when the code is deployed to users, and you can treat the whole thing as a project. Code rewrites and updates involve a different project and are not thought of as an attachment to the previous project. (Though you could write the project in such a way that code rewrites might be Phase II of your initial project.) Are you replacing your network infrastructure with a brand new type of router and switch, including the re-cabling of your enterprise? Then you again have a very definite start and end date, and you can objectively treat the whole thing as a project.

A second key word in the definition of a project is the word *unique*. The project must be distinctive in some distinguishing way from other projects. You would not call the tape backup process, where by backup operator routinely changes the tapes, a project, because this is a frequent, repeated— not unique—activity.

### **Project Constraints and Phases**

Because PMI is a well-respected organization in the project management world, I'll make frequent mention of their recommendations, techniques, definitions, and so forth in the discussions in this book. PMI has developed the "Bible" of project management, the *PMBOK® Guide*, wherein you can find information you might be interested in relative to project management practices and techniques.

According to Steven Fahrenkrog, PMP, the current standards manager for PMI: The *PMBOK® Guide* is designed to provide a flexible structure and a common lexicon for talking about projects, to help people communicate using commonly accepted terminology to facilitate communication for project management professionals.... The *PMBOK® Guide* is written on a high level, the 10,000-foot view of the project. It is up to the project team to add, subtract, or supplement the processes and practices expressed, based on the specific circumstances and needs of their particular project.

The idea behind PMI is to provide a framework in which project managers involved in projects ranging from very small to huge multiyear endeavors have a way of managing their projects. Obviously, a small project may not require the heft that a large project

would require, so the *PMBOK® Guide* outlines best practices but doesn't get into exactitude relative to a given type of project.

An essential aspect of this framework is that the characteristics of any project can be shown to fall into two general categories: *constraints* and *phases*. A constraint is something that could potentially limit the progress of a project, or impede it from starting at all. There are three basic constraints that all projects face: time, quality, and budget (sometimes labeled costs). In later chapters, I'll spend time on the delicate balancing act that all projects undergo with these three constraints. There are other constraints, and I'll talk about those later as well.

There are distinct phases to any project. A phase is a part or stage of the project process. While you may not explicitly delineate a phase as such within your project planning (meaning that you may not specifically say "and now the planning phase begins"), nevertheless good project management will cause these phases to manifest themselves. The phases I'll discuss are initiating, planning, executing, controlling, and closing. These phases are called process groups by PMI in *A Guide to the Project Management Body of Knowledge*.

### Three Conventional Project Constraints

The most common project constraints are time, quality, and costs (or budget). I will discuss these constraints in more detail in later chapters, but for now let's briefly take the time here to define them and list some examples to give you a broader understanding of each term.

It turns out that a phenomenon that occurs in all project management is this: If you're limited in one of the constraint areas, the other two either will suffer as a result or must be enhanced to make up for the limitation. For example, if the project's timeline is too narrow for the kind of deliverables that are being asked for, either the quality of the deliverables falls or you have to add resources in order to maintain the quality. You cannot get around the intermarriage of these three constraints.

**Note** You may have heard of this interrelationship as, "You can have it on time, on budget, or right—pick two."

When I talk more about these later, I'll use the abbreviation TQB (time, quality, budget), where the word *budget* stands instead of *costs*.

### Time

When using the term *time* as a constraint, we mean the allotted time that you have in which to accomplish your project. Depending on the project, there may be limitations to the time you have. The Y2K project, if we can call it that for purposes of this discussion, was limited by the time constraint of December 31, 1999.

But there are other time constraints as well. Perhaps management imposes a timeline on the project that requires the project to be completed on or before a given day. Your project might be driven by competition, and you may be constrained by the need to beat the competition to the punch.

There may be a *window of opportunity event* that drives a project— another product, project, or event that your project can benefit from (or be killed by!). For example, if you are working on a project that's developing a part that will be used in the latest model of mid-size sport utility vehicles, then you have a distinct window of opportunity that's driven by the cars' model year.

### Quality

Quality is the second component of this set of project management constraints. In this context, *quality* is the overall soundness of the *deliverables* (the resulting product of the project) that arise from the project's successful outcome. This is a measure of the characteristics of the deliverables, not simply whether they were produced and on time. For example, suppose that you're working on a new driver's license system that will enable motor vehicle department personnel to create licenses more quickly. Suppose that the system works OK, but the graphics aren't as good as they could be or the

system is much slower than intended. The system's deliverables are produced, in time and to plan, but the quality is poor.

PMI's guidebook says that *scope* is the third part of the constraints triad, but it acknowledges that quality also plays a part. I differ from this view, because I don't view the scope of the project as a constraint; I view it as a malleable thing that is formulated by the PM and evaluated *from the perspective of* the time/quality/budget constraints. But you should be aware that *A Guide to the Project Management Body of Knowledge* identifies the basic trio of constraints as cost, schedule, and scope.

Also, please understand that it is perfectly safe for your opinions to differ from those expressed in *A Guide to the Project Management Body of Knowledge* in regard to the information on the IT Project+ test and your views on project management in general. There are lots of other views on project management besides PMI's—which is why the IT Project+ exam is designed to test your overall understanding of PM ideologies. However, you should look to PMI as one of your definitive, authoritative sources of information when it comes to projects, because they have thoroughly looked over the entire (vast) area of project management and have developed good notions about the subject. You should be aware that if you go on from this test to study and certify as a PMI PMP, quality won't be considered the third constraint, scope will; so some of the way that you learn to talk about projects in this book will change at PMP certification study time.

In another IT example, perhaps your system turns out just fine, but the help screens aren't populated very well. Or perhaps you deployed a wonderful system, replete with high-quality help screens, but end-user training turns out not be as well aligned to answering the questions as you might've anticipated.

## Costs (or Budget)

Suffice it to say that projects do not happen without the expenditure of some resources, whether in the form of money to purchase hardware or software, personnel to make the project happen, or inventories and supplies to facilitate the project's successful outcome. When we use the term *costs*, we're talking about the resources used to accomplish the project. (Some IT Project+ objectives use the word *cost*, others use *budget*.)

## Balancing and Monitoring Constraints

Remembering that the three constraints are in an intricate dance with one another, you can easily see that if the budget is constrained in some way, then either the quality will suffer or the time that you need to accomplish the project will increase. Herein lies the most often violated rule in project formulation: You cannot force a project to be well done, well documented, and well executed with wonderful deliverables while drastically restricting all three constraints. Something will suffer; something will give along the way. Perhaps you've heard the phrase, "Give till it hurts, then give a little more." Unfortunately, managers who issue this ultimatum when inaugurating a new project are guaranteeing its failure.

Most frequently, in the IT world, you'll find that cost overruns happen because all of the add-on costs were not recognized for a given system (see the Real World Scenario that follows). For example, you might obtain a base price for a server and build your project budget around that, but find out later that to add fault tolerance to the server, you'll have to purchase an expensive add-on card.

In another example, you may be developing an interactive voice response (IVR) system and decide to use a well-known IVR development product. It is only later that you find that the product requires the additional purchase of modules for languages other than English. Unfortunately, these add-ons are expensive.

An entire segment, almost a specialty area, of project management revolves around *estimating*, which is the task of deriving the amount of time or cost that a given activity will incur. Have you ever driven by a bridge that's being built and wondered "How on earth do they know how much concrete and rebar to purchase for this project?" That's estimating. The science (art) of estimating can be assisted by project management techniques that allow you to estimate more carefully. There aren't any estimating

questions on the IT Project+ test, but because one of the test objectives talks about estimating techniques, later in this book we'll touch lightly on the basics of estimating and utilizing estimating techniques. You should keep in mind that estimating is certainly a topic that you will need to know more about as you go forward in your project management education. Without good estimating techniques, your project may suffer from cost overruns that could've been easily avoided.

Personnel can also cause budget overruns in a project. You estimate, for example, that a certain piece of code will take so many hours to complete. Unfortunately, one of the team members who's working on the development of the code is pretty new to the development process and so is very meticulous about his work. That's fine, except he's taking much longer than you'd anticipated, and the project will suffer from time and cost overruns thanks to his inexperience.



### **The Real World Scenario: The Asynchronous Transfer Mode (ATM) Infrastructure Deployment**

Javier is a project manager for a large Internet service provider. The company has offices all over the world. In the Sao Paulo office, a recently purchased office building, the infrastructure is going to be upgraded from 100Base-T Ethernet (100 megabits per second) to OC-3e (155 megabits per second).

Javier has developed a project plan, going through several vendors' dog-and-pony shows and determining what he believes to be the best overall product for the project. He has developed the appropriate documentation he feels he needs for his project and has obtained approval from the operations manager.

The infrastructure gear has been ordered, and the technicians have been trained to manage the new gear. The fiber-optic cables have been run into the new office building, and high-speed fiber-optic connectivity has been established with the other offices around the world.

When the gear comes in and the technicians begin to install it, they come to Javier wanting to know where the fiber-optic drop cables are. "Drop cables? What do you mean by drop cables?" he asks. They tell him that he needs to have fiber-optic cables that connect the various switchgear components to one another.

This is news to Javier—it was never brought up at design time. He's thinking, "How could this component possibly have been left out? Was this my mistake or the vendor's?" But, he thinks, it's no big deal. He'll just order the drop cables—how expensive can they be?

Turns out that nine-foot fiber-optic drop cables with type SC connectors can be \$200 apiece! And he needs 49 of them. Suddenly, the project has suffered a minor setback because, while \$9,800 isn't a lot of money from the perspective of the whole project, nevertheless it's money Javier hadn't budgeted for. Now he must make an adjustment to the scope document and get approval for the expenditure from the project sponsor. The money's not a lot, but the impact is. Javier should've asked a simple question: Do we need anything more to go with this system that what you've stipulated here? He should have been aware of any additional and potential costs and asked this of the vendor.



## Project Management Phases

I listed the project phases earlier. In this section, I'll elaborate on what each of the phases are about. You should keep in mind that these phases don't need to be distinctively called out as you formulate your project documents and bind them into a project book. In other words, it's not really necessary to have a tab that says "Initiating." However, the concepts behind each phase should be discernable within a completed project: Someone with a project management background should be able to see from the documentation in the project book that you've handled the initiating phase, and so on. (Larger projects might benefit from clearly delineated project phases labeled as such.)

The five previously mentioned project phases are:

**Initiating** Recognizes and authorizes a project to begin. It also recognizes that a new phase should begin in an existing project.

**Planning** Where you define the plan you'll use to accomplish the business need that the project is going to serve or satisfy.

**Executing** Coordinating people and other resources in order to effectively carry out the plan.

**Controlling** Monitoring project progress to be certain that project objectives are met. Also, taking action to get the plan back on track when things go awry.

**Closing** The often ignored phase. Closing formalizes acceptance of the project.

**Tip** A good way to memorize the order of these phases is to remember the name of the poison remedy that your momma used to keep around the house. Remember syrup of ipecac? Well, if you take the "a" out of ipecac, you'll have an easy mnemonic for remembering the project phase order: IPECC, initiating, planning, executing, controlling, and closing.

## Initiating Phase

In the initiating phase, you are recognizing the existence of a project and authorizing it to begin. Recall from the definition at the start of the chapter that a project has to have a start and finish and that it must be unique.

In the IT world, typically a project will begin with a customer request for a given system to be developed or some sort of infrastructure to be put into place—something like that. It is up to you, the project manager, to recognize a project when you see one.

Next, you take the steps that are necessary to validate the project's existence. Not all projects make it into the project mill just because someone feels they are worthy of the effort of requesting. It is the project manager who interviews the customers requesting the project, validates that there is a business need, and then formulates the project concept documentation. In a project concept document, you're clearly delineating what the project is and what it is not. You're not yet creating any project plans, schedules, deadlines, milestones, scope documents, or other materials. You're simply stating: "This is what the project is, and what the customer wants."

Only after you've defined what the project is, are you ready to go to the planning phase and define its scope—the work that you'll be doing.

When we deal with these phases, we talk about the *inputs* and *outputs* of a given phase. Inputs are things that go into a given phase that make it operational. Things happen during the phase that produce outputs, which the next phase can utilize. In the initiating phase, typically the input will be the customer request. Various sign-offs are obtained as documents are created. We'll talk in more detail about these documents in later chapters.

An output from the initiating phase is the project charter, which authorizes the project to begin. The charter then becomes an input to the planning phase.

It's not likely that you'd label a tab in your project book as "Initiating." It's more likely that you'd label the tab "Requirements." The documentation that you create will be a requirements document (talked about in more detail in later chapters), which will detail what the customer wants—what the deliverables are.

## Planning Phase

In the planning phase, you develop a scope document that details the scope of the project and a project plan that stipulates how you're going to go about getting the project done. It is in the planning phase that you begin the design of your project. One element of your design centers around *requirements gathering*, the outlining of the requirements needed to produce the customer's product or service. The requirements and scope documents are two (of potentially many) outputs of the planning phase. Another critical outcome is the *work breakdown structure (WBS)*—a task list that specifies how you're going to meet the requirements.

Although all of the documents in your project book are important, the scope document is the most important and most fundamental—so fundamental, in fact that I'll spend three chapters talking about it.

The planning phase is also when you develop the actual project plan. In the project plan, you detail each of the steps, identify the project team members who are involved, set up milestones (those points in the project when you've achieved a significant event), elucidate dependencies (steps that hinge on the completion of a previous step), and, in general, outline the things that you'll do to accomplish the project's goals.

**Note** The project plan is typically created using special software made for just this purpose. Such software is not hard to learn how to run, but does require a little understanding of basic project management principles. Microsoft's Project software is the biggest player in this field, but there are others as well. You can learn more about Microsoft Project and Project Central at [www.microsoft.com/project](http://www.microsoft.com/project).

In the planning phase, you work hard at defining the plan you'll use to accomplish the business need that this project is going to meet. Because of the plan's important role throughout the project, the planning phase needs to be carefully worked through, complete, concise where possible, and in agreement with the customers, stakeholders, and project sponsors.

## Executing Phase

The executing phase means that your project is underway and that team members are busy building the deliverables the project calls for. You balance executing with controlling, which is the act of making sure that project team members stay on task, on time, and on budget.

These aren't necessarily chronological; the executing and controlling phases intermingle with each other throughout the life of the project. Executing is similar to controlling, in that the project manager is overseeing the project's activity. It differs from controlling in this way: The executing phase speaks to how the project manager coordinates the people and other resources involved, whereas the controlling phase simply notes that the project manager is in charge and authorizes him to get the project going.

## Controlling Phase

Once the background documentation has been created, the project moves into the controlling phase. It might be said that in this phase, the project manager becomes the most visible. The project manager begins to oversee the work of the team members, report the progress of the project back to the project sponsor and stakeholders, and keep track of the project's schedule, tasks, and budget.

It is also during the controlling phase that the project manager doesn't win many friends, because it is up to her to keep the project moving smoothly ahead. If things get off track, it is the project manager's job to get things going again—something that can be a fairly daunting task.

## Closing Phase

The closing phase of a project is the one most often ignored. During this phase, you go through a formal acceptance process where the project sponsor and customers agree to and sign off on the project and its deliverables. Recall that a project has a definite beginning and a definite end. The project's closing phase marks the official end of the project.

In some projects, when it's over, the project members go back to where they were before the project ensued. In the IT world, this may not be as true as it is in non-IT, but you could certainly expect that some project members were utilized for their unique capabilities and will now go back to their original group.

**Note** Another project management methodology—one that I think you'll use quite often in small to mid-sized IT projects—is PACE, for planning, activating, controlling, and ending. While the previously discussed five-phase method is fine for very large and complicated projects, the PACE methodology more closely fits in with most of today's IT projects, and I'll refer to both throughout the book.

### Standard Project Documentation

There are some highly important documents that will be fleshed out as a result of going through the various stages of a project. These documents should find their way into a binder called the *project book*. Here are some of the documents that I'll be talking about in later chapters that pertain to the various phases of the project process:

**Project concept document** In this document, you basically stipulate back in writing what you heard the customer say. You're conceptualizing the project as you see it from a project manager's standpoint, and you include high-level information regarding the requirements, the constraints that you see, the basic elements of the project, and the essential ingredients. Don't get incredibly specific here—that's for later. This document is discussed in [Chapter 2](#).

**Project requirements document** Here you outline what you have gathered as the requirements for the document: the project's deliverables must do this, must look like this, must be sure that this is included.... This document is covered in [Chapters 2](#) and [6](#).

**Project charter** The project charter is the document that acknowledges that the project exists, commits organizational resources to it, appoints the project manager, and gives an overview of the project. It might also include an initial resource identification and budget. This document is also covered in [Chapter 2](#).

**Project scope document** This is the Moby-Dick of the project book. Here you detail, ad infinitum, the elements and ingredients of the project: resources, project members, project sponsor, etc. This document is constructed throughout [Chapters 3](#), [4](#), and [5](#).

**Project plan** This one details in writing how you're going to go about accomplishing the project. You outline specific phases and steps, milestones, the sequencing of the steps, and so forth. This document is covered in [Chapters 7](#) and [8](#).

**Closing document** With your closing document, you're simply providing a sign-off sheet whereby sponsors and customers can commit that what you've delivered is what they requested. If there are testing efforts that need to happen, as in the case of new software that you're creating, you include a document that shows the testing results and sign-off by the users that the testing is satisfactory. This document is described in [Chapter 13](#).

**Note** In PMI, the first four are separate documents; in PACE they can be integrated into one.

Later in the book, I'll describe more documents that are only needed under certain circumstances. Such optional or ancillary documents can include a vendor's statement of work (SOW) and privacy statements.



## The Most Important Trait of a Project Manager

Arguably, the most important skill a project manager can have, even including technical skills, is outstanding communication capabilities. Projects headed by project managers with excellent communications skills will likely succeed even if the manager lacks in other skill areas.

I know of a successful, \$15 million development project undertaken by a state government that was headed by a non-IT project manager. The project manager on this project had little IT technical knowledge but had extensive experience in project management as a construction PM. Those skills, primarily communication skills, carried this project to a successful conclusion.

Project managers are not necessarily technical experts and don't need to be in all cases. However, technical expertise is needed, somewhere, on IT projects, so it's a good idea to include technical experts on your project team. If you're a nontechnical project manager, you'll rely on these folks quite heavily throughout the course of the project. Make sure they're people you can trust.

## The Traveling Case Study: Prestige Hotels

I've come up with a mock IT project that will run throughout the book, building from chapter to chapter on what you've learned. I'll start this project by giving you a little background. You can treat the project just as though you'd been approached by a customer with a project request. So let's begin by laying the groundwork for you to go on.

### Company Background

You're a brand new associate project manager (PM) working for Prestige Hotels Inc. Prestige owns thirty hotels around the world, all based upon some sort of theme—some are full-scale resorts with lavish spas, and some are high-rolling casinos. For example, the hotel in Jamaica is a spa that is designed to provide a healthy environment where visitors can lose weight, learn healthy eating habits, and enjoy the beauty of the tropics at the same time. Prestige owns several other hotels in Reno and Las Vegas, including Texas, the "rootinest, tootinest casino and gin joint in Nevada." The newest one is Beau Arbre (French for *beautiful tree*) in Paris.

Prestige's headquarter offices are in Denver, Colorado. The company's headquarters have 300 employees, and the hotels have a total of around 5,500 employees.

Prestige's project management office (PMO) consists of a senior project manager and 15 other PMs. The PMO's job is to review all incoming project requests, prioritize them, and then, if the project is merited, go forward with the project's implementation.

Although PMs are generally able to handle any project request that comes in, the senior project manager has you and your colleagues grouped into generalized categories. For example, three of the PMs usually receive building remodel requests, while three others are involved in the hotels' landscaping and recreation facility projects. Others have other kinds of generalized areas of expertise. Your general area will be IT. But the central goal of the PMO is to be able to place any available PM on any project.

### Project

After giving you a couple days to settle in, get your desk squared away, and attend the company's orientation, the senior PM visits you with your first assignment.

Your project request has come in from the Reno/Las Vegas hotel group (called RLV). The executive manager over the RLV Group wants you to develop a travel website that will entice visitors to book a reservation with one of the hotels.

There are four hotels in the RLV Group:

Hotel	Description
Texas	Has a cowboy theme, complete with Old Weststyle rooms, a real-life nightly rodeo, and lots of Texas-style cooking.
Bangkok	Captures the spice and mystery of the Far East.
Cajun Blues	Specializes in Louisiana French architecture, spicy food, and soulful Louisiana music.
Sidewinder	Based upon racing themes such as downhill skiing, dragsters, and stock car racing.

The executive manager of RLV will give you a long list of requirements for this website ... in [Chapter 2](#). As the project manager in charge of this fun, unique project, it's your job to "go sic' 'em, tiger!"

## Summary

In this chapter, I've presented the outline of what project management is all about. I talked about the main body of project management knowledge in the world, pointed you to Project Management Institute (PMI), and touched on Project Management Professional (PMP) certification. Because almost everything that happens in the project management world pivots on something that comes out of PMI, it is important to understand how big an impact the organization has on all things having to do with project management.

I began our discussion of project management with the very basic definition of a project—a process that is designed to create a unique new service or product. Projects have a definite beginning and end.

I then talked about the three most common constraints that any project faces: time, costs (budget), and quality. These three balance on each other— you cannot make a change to one without having to alter the other two.

Next I detailed the phases of a project: initiating, planning, executing, controlling, and closing. The phases basically run one after the other, and each phase feeds inputs into the succeeding phase. However, there may be some overlap between phases.

As you just noticed, I introduced a traveling sample project, Prestige Hotels, that you'll carry with you for the duration of this book.

Finally, as you read on, you will find that the end of every chapter includes a set of 20 review questions designed to quiz you on the information you have just reviewed—while it's still fresh in your mind. Because this chapter is really more of an introduction to general project management concepts, of the questions here are not keyed specifically to CompTIA's exam objectives. However, I did want to include a sampling of 10 review questions to get you more comfortable with the testing format.

## Exam Essentials

**Be prepared to define a project.** A project is any effort to develop a unique product or service. The effort is temporary and has a definite start and end date.

**Be able to denote the four main components of any project.** They are phases, deliverables, people, and constraints.

**Be able to name the three primary constraints.** You'll encounter the time, quality, and costs (budget) constraints in any project.

**Be able to name the five basic phases of any project.** They are initiating, planning, executing, controlling, and closing.

## Key Terms

Just as with any area of concentration, there are terms that are unique to project management. (See the *PMBOK® Guide* for a heavily refined project management glossary.) Following are some of the terms you encountered in this chapter.

constraint	project
deliverable	project book
estimating	requirements gathering
input	window of opportunity
output	work breakdown structure (WBS)
phases	

## Review Questions

1. You're developing the scope document and project plan for a new project. What phase are you in? ?
  - A. Initiating
  - B. Planning
  - C. Executing
  - D. Controlling
  - E. Closing
  
2. Choose the project phase that is most frequently forgotten. ?
  - A. Initiating
  - B. Planning
  - C. Executing
  - D. Controlling
  - E. Closing
  
3. Wanda, a customer in the Marketing department, comes to you with an idea for a software program she'd like the IT department to develop. You discuss with her the requirements that she'd like to see the program meet. What phase are you in? ?
  - A. Initiating
  - B. Planning
  - C. Executing
  - D. Controlling
  - E. Closing

4. Your boss approaches you to develop a project plan to install an upgrade to some existing server software. You tell your boss that this activity doesn't really qualify as a project. When he asks why, what reasons do you give him? (Select all that apply.) ?
- A. This activity doesn't create a unique product or service.
  - B. This activity isn't temporary.
  - C. This activity can't be broken out into phases.
  - D. This activity doesn't have any constraints associated with it.
5. You've developed a project plan and scope document. Now you're moving forward with the implementation of the project. What phase have you entered? ?
- A. Initiating
  - B. Planning
  - C. Executing
  - D. Controlling
  - E. Closing
6. Some of your project team members are driving you crazy! They're not adhering to the project's schedule, and they're falling way behind. You need to somehow jumpstart them. What phase of the project are you in? ?
- A. Initiating
  - B. Planning
  - C. Executing
  - D. Controlling
  - E. Closing
7. If you're stuck with a hard project end date and your budget is fixed, if you don't manage the project extremely well, which component is most likely to suffer? ?
- A. Project plan
  - B. Quality
  - C. Documentation
  - D. Project book
8. If you were interested in obtaining more in-depth information regarding formalized project management standards, techniques, training and expertise, where would you go? ?
- A. PMC

- B. PMI
- C. PMM
- D. PMP

9. Suppose that you wanted to further your certification a few years after you obtain your IT Project+ certification. You want to get your Project Management Professional (PMP) certification. What are the steps that you have to take to become a PMP? (Select all that apply.)

?

- A. Take a test.
- B. Pass an oral board.
- C. Submit a history of your project management experience.
- D. Take a mandatory college class.

10. The IT Project+ exam requires that you have a full understanding of which of the following? (Select all that apply.)

?

- A. Unique project management methodologies
- B. Project management phases
- C. Project management software
- D. Project management constraints

### Answers

1.

B

The planning phase is where you begin to define highly important documents such as the scope and project plan. The scope document arises out of the first important document that you develop, the project concept document, which is developed in the initiating phase.

2.

E

The closing phase is one that project managers often forget. In the closing phase, you're actually obtaining formal sign-off that the project sponsor and customer(s) are satisfied with the work done and that you've brought forth the deliverables that the project stipulated you would.

3.

A

In the initiating phase, you're gathering the customer's requirements for the system and developing a project concept document that highlights what the project is going to accomplish. The scope document and project plan (made during the planning phase) actually outline all of the detail items needed to accomplish the project deliverables.

4.

A

Certainly, upgrading some server software is a temporary phenomenon; however, what you're doing isn't creating anything unique, therefore you really don't have a project on your hands. That being said, it would be no big deal to whip up a quick project plan that details the steps required to systematically come up with a successful upgrade. Upgrading server software can be really scary.

5.

C

You're in the executing phase of the project plan. Executing means that your project is underway and that team members are busy building the deliverables the project calls for. You'll balance executing with controlling, which is the act of making sure that project team members stay on task, on time, and on budget.

6.

D

The controlling phase happens when you've launched the project and you're underway. Now, as project manager, you segue into the often unfortunate role of having to keep people motivated and moving forward.

7.

B

The typical balancing act is between time, quality, and budget. When the T and B are fixed, the Q has no choice but to give. The workaround to this is to recognize up front what the limitations are and not promise the moon in terms of deliverables.

8.

B

Project Management Institute (PMI) is a huge organization dedicated strictly to anything having to do with project management. You can visit their website at [www.pmi.org](http://www.pmi.org) and obtain lots of information regarding their programs, local chapters, and so forth.

9.

A, C

The PMP process requires that you submit an application that details your project management history. Then, if you meet the minimum qualifications, you're given permission to sign up for PMI certification. If you pass, you become a PMP. You have to keep up your PMP from year to year through ongoing education.

10.

B, D

The IT Project+ exam is designed to be "agnostic" regarding specific project management methodologies (of which the PMI methodologies are not the only one) and software. The idea is to capture whether you understand basic project management principles, not whether you can drive specific software or answer questions relative to a given methodology. However, since PMI is the biggest game in town, you will certainly want to pay attention to the recommendations that PMI makes and follow their proven methodologies.

## Chapter 2: Project Synthesis and Charter Creation

### **CompTIA Exam Objectives Covered in this Chapter:**

- 1.1 Given a vague or poorly worded customer request, determine the appropriate course of action in order to:
  - Generate and refine a preliminary project concept definition
  - Informally determine the business need and feasibility of the project
  - Identify project sponsors who will help obtain resources
  - Obtain formal approval by the project sponsor
  - Confirm management support
- 1.2 Given a set of criteria which outlines an enterprise's minimal requirements for a project charter, together with stakeholder input, synthesize a project charter.
- 1.3 Recognize and explain the need to obtain formal approval (sign-off) by the project sponsor(s) and confirm other relevant management support to consume organization resources as the project charter is refined and expanded.

So you're charged with the management of quite a few technical projects during the course of a year, eh? And you'd sure like to have a better feel for how projects are formally managed—what the professional project management approach might be. Well, good for you! You are very definitely taking the right step by both understanding the project management process and certifying in it.

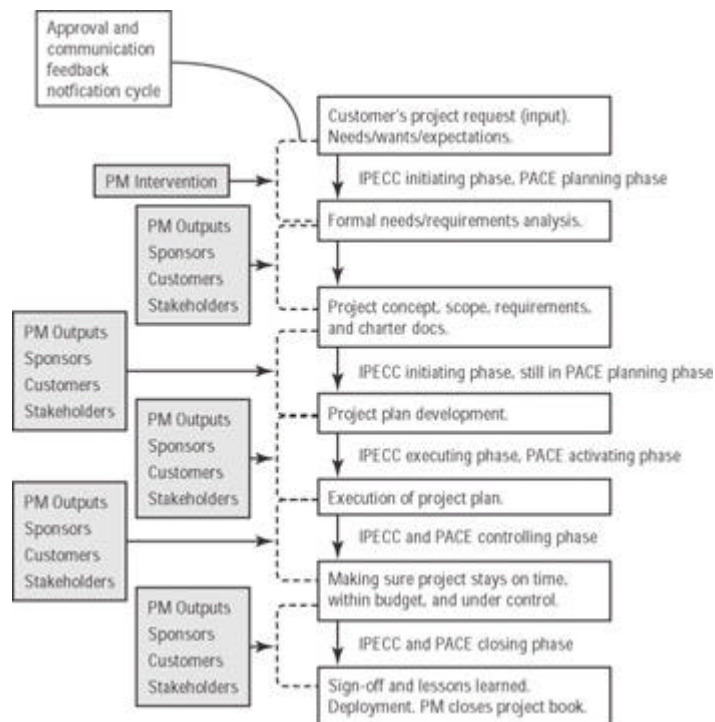
As the enterprise grows more complex and harder to understand, individuals with both the technical prowess to understand *all* of the enterprise's components, as well as the project management expertise to make new projects work well, will be successful and sought after. This book is designed to be a preparation guide for the CompTIA IT Project+ certification exam, but it's more than that. CompTIA's objectives for this exam measure and illustrate all of the skills needed in order to be a successful project manager.

As you read in [Chapter 1](#), "[Project Management Fundamentals](#)," the project management standards set by the industry at large dictate what a project is and, by doing so, give you a pretty clear picture of what it is not. In this chapter, I'll expand on the definition of a project and sketch the characteristics of a project manager. Then we'll examine the first stage of a project, the up-front needs and requirements analysis you must do.

We'll also talk about the formulation of a very critical document, the project charter, and about obtaining the formal go-ahead that officially starts the project. At that point, we will bring our sample project, Prestige Hotels, into play and set its wheels in motion.

### **Defining a Project and Its Roles**

There are many ways to examine a project: step by step through its phases, breaking it down by the series of documents you produce, or identifying the various roles involved. [Figure 2.1](#) tries to organize these somewhat. This flowchart tries to capture a lot of diverse data, so don't try to grasp it all now.



**Figure 2.1:** The project management process

The main flow of a project is from top (the customer request) to bottom (deployment of the project's output). First, a project manager steps in and begins analyzing the request for what it really means and entails. As the project moves from step to step, that movement is documented in the papers mentioned at the end of [Chapter 1](#)—the scope document, the project plan, and so forth.

At each phase, the project manager seeks information and feedback from the sponsors, customer, and stakeholders. Their comments are combined with the “PM Outputs”—the documents that the project manager is involved in creating or the effort that the PM is going through to keep the project on track—to move the project to the next phase.

Throughout the book, we'll flesh out this diagram with details of what is done by whom at each step.

Before we go further, let's define what some of the important language means, especially the nebulous term “[project](#).”

### What Makes a Project?

The industry defines a [project](#) as a temporary endeavor, undertaken to create a unique product and service. So, you will know a project when you are presented with one because it will have those identifying features:

- It's unique from any other projects or work processes.
- It's temporary—it might last several months or even years, but does inevitably come to a close. A project has a definite beginning and a definite end.

Projects are also often defined by other characteristics: They're performed by people; constrained by resources that are in some way or degree limited; and planned, executed, and controlled.

One of the key elements in differentiating between a project and a business process is that business processes are ongoing. They don't end; their purpose is to sustain day-to-day business activities. A staff of server administrators who manage the ongoing maintenance and troubleshooting of your server farm are going through ordinary business practices. A server administrator who's installing a new e-mail server is participating in a project.

Projects are temporary. They end at some point. [Table 2.1](#) lists some typical IT activities that might be construed as projects versus those that might be considered ongoing processes.

<b>Table 2.1: Some IT Projects vs. Processes (continued)</b>	
<b>Projects</b>	<b>Processes</b>
Upgrading from Exchange 5.5 to Exchange 2000	Adding mailboxes to an Exchange server
Changing out 10Base-T hubs to 1000Base-T (gigabit) switches	Keeping the hubs' firmware current
Writing a new software program to provide a GUI screen for a user's mainframe session	Configuring a 3270 emulation program to communicate with the mainframe
Installing and configuring a new enterprise systems management program such as Tivoli, CA Unicenter, Microsoft Systems Management Server, or Novell ZENWorks	Maintaining the inventory mechanism of an enterprise systems management solution
Implementing a new antivirus scanning product on all desktops	Updating the antivirus product to the latest virus signature file
Installing a new phone system	Adding new users to the telephone database
Changing out a T1 circuit with an OC-3 connection	Monitoring performance of a T1 circuit

### **What Makes a Project Manager?**

Well, then, given the definition of what's a project, not everyone who supervises work is a project manager (PM); most work is ongoing, common, and ad hoc (not specifically planned or controlled). So what traits define a PM? The *role* of a PM can be described from the definition of project itself: the person who is responsible for managing projects, making sure that they are planned, executed to the plan, and controlled. But the *skills*

needed by a PM aren't as clear-cut. A project manager typically has the following characteristics:

**Effectively balance skills and project forecasting.** They must know how to skillfully apply knowledge, tools, and techniques to project activities in order to meet the project's objectives and satisfy its requirements.

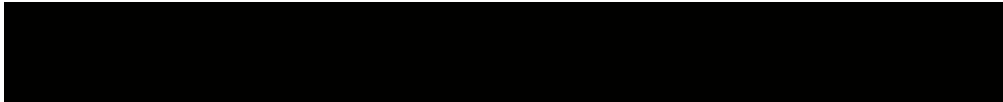
**Know how to be both firm and flexible.** A great PM wears many hats: information distributor, information gatherer, organizer, communicator, director, cheerleader, regulator, and more.

**Be able to identify and recruit project team members.** Project managers might be technical experts, but this isn't required. In fact, the team that's performing the project should include those with technical expertise in order to make the project viable and sound.

**Know how to communicate effectively by tailoring information for different people at every stage of the project.** Project managers are expected to have knowledge of procurement, contract practices, general management practices, marketing, human resource management, financial management, political savvy (and how to employ it when needed), and—most importantly—fantastic communications skills.

This book is about project management with specific regard to IT projects. We'll utilize well-known and well-documented project management ideologies and techniques, always with a slant toward IT projects.

With these definitions set out, it's time to start breaking down projects and project management into their components, starting at the beginning: analysis of what you'll need.



### The Case of the Conflicting Hours

You're a project manager for Amalgamated Shoelaces Inc., a company with 14,000 employees and 10 different sites throughout North America. Amalgamated wants to set up an intranet portal solution so that users from any site can use a browser to connect to the portal, key in their timecards for the day, submit leave slips, make changes to their 401(k), read employee notices, and perform other activities that used to be paper-based.

You have formulated the project concept document, and now you are formulating the charter. You've been given an estimate by not one, but two different contractors that the work will require 1,200 hours. The IT development team submitted a document that stipulates that they don't feel they need outside consulting help. They also wrote that they feel the work will take 300 hours.

Clearly there's a disconnect here. Before you can go forward with the project charter, you need to more thoroughly dig into the nature of what it's going to take to get the work done, then make a best-guess estimate as to what the hours will be. You're inclined to use one of the contractors, as the company has used them before and they do wonderful work; you need to find out why the IT team thinks they don't need to outsource this project.



### What Makes a Stakeholder?

The project charter contains some information that the project manager herself cannot write. It's important to work with the *stakeholders*, those people or organizations that have something to benefit or lose as a result of the project. All stakeholder input should be documented. Typically, stakeholders in an IT project include:

Project sponsor

- Project manager (you)
- Project customers
- Business units within the organization
- Contractors

Forgetting to take into consideration the needs of any stakeholder entity can result in risk to the project or even project failure. So in order to create a charter that's truthful and meets all needs, it's important to interview stakeholders and incorporate their ideas, opinions, and concerns into the project charter.

**Tip**

Here's the first fundamental project management axiom: The successful project is one that meets or exceeds stakeholder expectations.

**Real World Scenario: You Need Help from the Router Folks**

You're the project manager for a large call-routing software deployment. The software you're using will be in constant connection with your company's private branch exchange (PBX) telephone gear. The software will see an incoming call, look at the current call queues throughout your five call centers spread all over America, decide which queue is the shortest, and send the call to that center. Additionally, the call-routing software can decide which language the caller wants to use and then send the call to one of two centers with operators capable of handling non-English calls. The payback for this project is both tangible and intangible. It's intangible because you're increasing customer support, thus potentially increasing customers. It's tangible because you're answering customer calls more quickly, allowing you to trim down call support resources. The theory is that if a customer is connected with a support person quickly enough, they'll be more likely to remain a customer rather than going to one of your competitors. The business you're in is so competitive that any edge you can get, relative to customer support, is of benefit to you.

The system consists of several dedicated servers that must have their own T1 circuits connected to the call-center PBX gear. The software is highly proprietary and expensive. You arrange for thorough training for all the technicians involved in the process. You also budget enough money to cover all of the recommended consulting fees required in order to make the system functional.

You work extensively with the telephony people as well as the server operators. However, as the project reaches mid-point and the hardware is ready for deployment, one thing you hadn't thought about surfaces: your internetworking (router) experts must be involved because of the specialized TCP/IP addressing that's required by the call-routing system.

Unfortunately, you didn't include them in the early discussions, so now you're forced to bring them up to speed. They're not very happy, because their plate is already full with the company's wide area network (WAN) infrastructure demands. You're stuck going back to the project sponsors and telling them that your oversight is going to cost the project two weeks' delay.

You dropped the ball by not recognizing that the WAN team was a project stakeholder.

## ***Analyzing Initial Needs and Requirements***

Any project begins with the formulation of needs and requirements analysis documentation. Good needs/requirements analysis is especially critical in the IT genre.

You establish your customer's needs and requirements by interviewing the customer to ascertain exactly what it is they're looking for in the product or service that they're asking the project to create. Especially critical is the ability to differentiate between the "need to haves" (the requirements) and the "nice to haves" (elements that are requested but that turn out to be actually optional to the desired function, product, or service).

Often you'll use a *business analyst*, one who has expertise in the given business area that wants the project, in order to more fully capture the needs and requirements of the customer. In the IT world, a business analyst is very useful and someone you might consider to be at least a temporary team member in your IT projects. Usually, neither you nor the IT professionals who create the project deliverables can possibly know everything there is to know about every facet of the company. You can't be an accountant, a marketing expert, *and* a manufacturing genius. But you might well get a project request from the manufacturing side of the company, so you've got to somehow interpret what the customer is saying into IT dialog in such a way that the deliverables match what the customer really wants. If the language is coming from an area where you're not an expert, a business analyst who can interface for you is invaluable.

As you could see back in [Figure 2.1](#), a customer's requested deliverables come to you in the form of desires, needs, and expectations. "I need this screen to do this..." "I would expect that once this project is complete, my data-entry folks will be able to do this..." The customer explains to you, in the best language they can find, what they want the proposed system to do. It's your job as PM to analyze the needs that the customer is talking about and render them into project deliverables. You can then determine what requirements should be included in each deliverable. For example, suppose that you're going to create a car. The deliverable is a car. One of the requirements might be that the car is blue, another that the car has four-wheel drive. A requirement is a specification of the deliverable.

From the deliverables and the requirements for those deliverables, you can determine how large the project will be and develop the scope document that details the elements involved in the project. With a knowledge of the scope, deliverables, and requirements, you can then go forward and design the project plan. Executing and controlling the project plan will result in the completion of the deliverables, sign-off, and closure.

### **Defining the Project Concept**

You may find this difficult to believe, but your project begins at the beginning. You receive a request from a customer (whether an end user, a manager, or even an outside business partner trying to interact with your organization) for some capability, functionality, or product. This request triggers the initiating phase of a project.

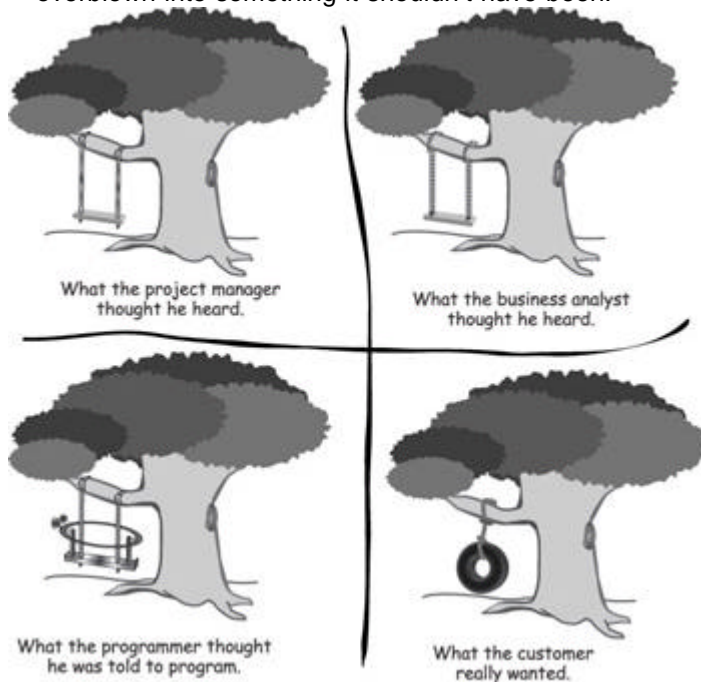
This customer request may be very nebulous or loosely worded. Your job as project manager is to receive this request, figure out what it's really saying, and then turn it into a project concept document. There are two components to the "figuring out" process: investigation of the customer request, and expressing your understanding of the request. The concept document represents your first stab at understanding the project and may well require that you do some investigative questioning of the people who initiated the project request, in order to know what they're asking for.

**Note** Of course, today's e-economy means that customer requests very often center around making an existing program work within a web browser, or coming up with new browser-based programs—the so-called "thin-client" solutions.

Sometimes a customer will be leaping ahead to the solution. They might have already studied the technology and requested a specific product or vendor. It is important for you to derive the actual needs from the customer, *then* determine the best technology that will answer this need. You'll encounter tech-savvy customers all the time, and one challenge is to make sure that their needs are fulfilled using the best technology, not just the technology that they've heard about.

You are probably thinking that clarifying the request seems very elementary, but you'd be surprised at the number of times that a group of IT professionals takes a project request and comes up with something that isn't anywhere close to what the customer

was really asking for. [Figure 2.2](#) shows how easy it is to misconstrue what the customer really wants. In the figure, you can see that all she wanted was a swing hanging from a tree. But due to overzealous engineering and design components, the tree swing gets overblown into something it shouldn't have been.



**Figure 2.2:** The (mis)communication tree

**Note**

I saw this engineering/design on a poster years ago and have cherished it since. Every time I'm involved in a design discussion with a customer, I think about the poster and try to make sure I hone in on what the customer really wants. This poster has kept me out of the over-design and over-engineering of projects numerous times.

When formulating the project concept document, you're refining and describing customer needs. Work with the customer(s) to make sure you understand exactly what it is they are requesting. Depending on the complexity of the customer request, you may require the expertise of a *subject matter expert (SME)* (business analyst) to help you to better understand the exact criteria of the request.

Once you understand, write up your initial project concept document *and have the customer approve it*. This will validate that what you've written matches what the customer is trying to accomplish.

**Determining Business Need and Project Feasibility**

Often, what a customer wants doesn't coincide with organizational goals, situations, or direction. For example, a customer might specifically request a system that she thinks meets her department's needs, without considering whether the IT department can support it. Perhaps the requested function is one that the company doesn't want to make available to users at a certain level or in a certain department. Additionally, the solution that a customer decides he needs may not coincide with *reality*: perhaps it's not feasible to build or buy—or it's not even available!

You enter into some pretty tricky territory when you must be aware of your own company's business needs as well as assess the technology needed to initiate and complete a potential project. You are at the same time expected to make a decision about the project's business worthiness and to identify the type of technology that will be used to solve the customer's problem. Is it worthwhile to take on this project? Do you have the appropriate technology, budget, and corporate culture available to make it happen in the allotted timeframe? In other words, it is *you* who must assess the overall strength of the project.

*Project feasibility*, in this sense, means "is the project doable or not?"

To do this, you establish the *business case* for the project. The business case is the means that you use to assess the project's value. You analyze several different components as you prepare the documentation that will propel the project forward, send it back to the customer for redefinition, or kill it altogether. The people who want the project, champion it, and ultimately "OK" it by picking up the tab are called the *sponsors*, or project sponsors (as opposed to the people who have a vested interest in the project—the stakeholders). Project sponsors can also be stakeholders. Following are some of the things to consider when formulating your business case. As we examine building a business case, we'll ask these questions:

- What will it cost?
- How long will it take to recoup our costs?
- What do we get if the project is successful?

**Note** In larger projects, you may have a project sponsor or sponsors and an executive project sponsor. An *executive sponsor* is one who has the capability of authorizing the project and the expenditure of resources to develop the project's deliverables. In smaller shops or with smaller projects, the executive sponsor and the sponsor are one and the same.

**Costs** Those who have power to approve the project look more closely at the cost assessment (and its associated budget) than anyone else. The sponsors undoubtedly want to see a line-by-line breakdown detailing the cost of each item that you see as being necessary to the project. Perhaps one of the biggest problems associated with assessing accurate project costs is delay between the time that you formulate the project's costs and the time that the sponsor approves the project and it's ready to begin.

For example, you receive a project and assess that two new servers will be required to house the software that you're going to use. You request a bid for the servers from a vendor, and the bid reflects a price that's good for 90 days. The project isn't approved for 180 days, and you have to have the vendor re-bid the cost of the servers. You may or may not get the same favorable bid that you had earlier, thus introducing a delay in the project implementation while you go back to the sponsors to see if they're willing to authorize the additional money.

**Payback period** Sponsors also want to know how long it will be before the project pays for itself. You spend, for example, \$100,000 on two new servers and some database software and coding that allows your customer support people to more accurately track where your customers reside. You expect to gain some valuable demographic information from this software so that you can more precisely target your catalog and website offerings. If the system is implemented and you gain a bunch of extra customers in certain targeted zones—in other words, you increase sales by virtue of the system—when will the additional sales finally pay off the initial investment in the new system? How long will it take—nine months, a year, five years? This is the answer that the sponsor will expect you to determine; they will want a very close estimate of when they can expect to hit the break-even point and start making real money.

Suppose that a project costs \$1,250,000 to implement. The cash inflows for the project are anticipated to be \$250,000 per quarter and begin at year one. The payback period would be 15 months, because the first year (four quarters) brings in \$1,000,000 and the first quarter of the second year brings in the final \$250,000. You would say the payback period is 15 months.

**Note** Payback period can be used to justify one project over another. For example, if Project A has a payback period of 15 months, and Project B has a payback period of only 6 months but costs the same, some may prefer to go with Project B, all other concerns such as project necessity and feasibility being equal.

**Benefits** The sponsors of a project weigh the cost of the project against the "what will it get us?" question. Does this project increase productivity (an intangible and often unprovable "soft" benefit)? If so, *how* will it increase productivity? Will it improve security? Speed up transaction processing? Increase the number of website visits per day? Raise customer (or, in the case of governmental organizations, citizen)

satisfaction? It's up to you as the project manager to come up with these benefits and the method(s) by which you'll validate that the benefits were actually received.

Inadequate business-case definition could result in the project not gaining sponsorship because sponsors will not understand the purpose or value of the project. It's up to you to somehow, in terms the sponsors will understand, bring forth the project's worthiness, its costs, benefits, and predicted payback period, so that sponsors can make a good decision about whether to proceed.

**Note** It's also important to note that even if you're hitting on all cylinders and the project looks like a wonderful thing on paper, that doesn't necessarily mean sponsors will automatically give you the go-ahead. There may be other equally deserving projects vying for the same money. You might run into a personnel or political issue. In these cases, it might not matter how deserving the project is; if it's being requested by a certain individual, it'll never be approved.

### Identifying Project Sponsors

Project sponsors are your friends. They're the ones who *want* this project to happen, most likely because they've got something to gain by getting the project implemented and underway. These are the people you'll go to with your project concept document and to whom you'll make the presentation in order to get the resources you need to go forward. In order to get all that done, you need to understand who your sponsors are, what kind of information they'll be looking for, what their technical level of understanding is, and what their hot buttons are (that you do and *don't* want to push). Your project concept document and associated presentation(s) need to be well formulated, clear, logically laid out, and to the point.

The project sponsor is the person who has the authority to approve the project, assign or help you obtain the resources, and, most importantly, resolve conflict. They're there to provide direction and make decisions. The project sponsor should clearly understand purpose, value, and scope of the project.

The *project champion* is the one who will keep the project in the limelight, in the forefront of things. This is the person who is going to keep it fresh in everyone's mind, keep the enthusiasm going, and keep people focused and motivated on the project's goals. The champion may not be the same as the sponsor, especially in big-league projects such as dams or high-rises, but in the IT world typically it is the same individual. The project manager usually isn't the project champion.

**Tip** Project sponsors aren't necessarily the same people as the customers requesting the project, although they can be.

It's also important to recognize that you may require resources for successful project completion from people who aren't project sponsors. You'll want to include them very early on in the project planning so that you don't blindside them with requests for resources as you're deploying the project. That kind of thing is a very good way to make a lot of enemies and wind up with an unsuccessful project.

### Obtaining Sponsors' Formal Approval

By this time you've come a long way down the road. The customer has approached you with a project request. You have done due diligence to the project request by performing good business analysis on it and have now formulated a project concept document that outlines the nature of the work to be done. You've approached the project sponsors with the concept document and given a presentation that knocked their socks off. The business case has been made, and sponsors agree that this project should go forward.

**Note** Sometimes the project sponsor is a group of people called a "project steering committee." It's always better if the project is sponsored by a single, executive sponsor. Committees can get bogged down in disagreements, resulting in lack of decision-making ability, inactivity on the project, and sometimes sabotage of the project by one unhappy committee member. If at all

possible, push for a single executive leader when formulating a project.

It is at this point that you obtain formal approval by the project sponsor to go forward. You formulate a document that's similar to the project concept document, but which much more specifically delineates the steps that are to be taken toward accomplishing the project's objectives. At this juncture, you have not yet written the project plan, but this document denotes the overall scope of the project and the resources required to finish it. This document is called a [project charter](#). We'll talk more about the project charter in the [next section](#) of this chapter.

On all projects, it's a good idea to have an explicit sign-off area on the project charter for the sponsor's signature to formally launch the project.

### **Confirming Management Support**

If you've worked in the business world for any length of time at all, you understand that there are pockets of people who have a different business or political agenda than other groups might have. For example, while one group might think that a project is highly deserving and must go forward no matter what the cost, another group might feel that the cost is too high, may think the technical expertise required to accomplish the project's completion isn't available, or for any of a host of other reasons could oppose the project's forward movement. Sometimes you might even encounter a project where one person wants it killed simply because the idea came from a different group within the company.

More important to avoid is deploying a project that all appropriate managers weren't aware of. Suppose you're approached by a customer who, in your estimation, is fairly high up in the corporate food chain. She tells you that she has a project she wants done, lists the things that need to happen, and gives you the go-ahead to prepare the project concept document. You write the document, meet with the sponsor, and get formal buy-off on the project. As soon as the order for the hardware hits the purchasing department, the corporate controller calls you and wants to know just what the heck you think you're doing. Not only does he *not* authorize the gear, he tells you that henceforth you'd better include the finance department in any future projects so that they can either approve or disapprove the tangible items that are required by the project. And, oh, by the way, there will be *no* consulting services paid for during this fiscal year.

You return to the person who initially requested the project and give her the disappointing news. She gets mad, says she'll take care of it, and you don't hear anything more about the project after that.

Bottom line? People who have the say-so to make the project happen have to agree on a project's viability (whether the project should happen at all), that its scope is correct, and that the money is available to make it happen. This is the job of the project sponsor and another good reason to obtain formal sign-off at each stage, including the project concept document and the project charter.

## ***Formulating a Project Charter***

The project charter is the formal kickoff document that starts the project going. It differs from the project concept document in that the charter is an official document that carefully stipulates the resources that will go into implementing the project. The project concept document is one that says "I have a project here and, from what I can tell, this is what the project's all about." After your project concept and requirements formulation documents are done, you have enough information to create the project charter.

### **Note**

In the PACE (planning, activating, controlling, and ending) methodology I mentioned in the [previous chapter](#), you combine the project concept, requirements, and charter documents into one paper that, when signed by the sponsor, authorizes the project to go forward and allows the use of resources to create the project's

deliverables. Once this is done, you prepare a project plan, then put your project team on the project and work toward its finish.

The project charter is a very fundamental document. It includes, but isn't necessarily limited to, the following components:

Authorization for the project to begin

- The appointment of the project manager
- A *brief* business justification for the project
- Necessary accounting criteria used to accumulate and track project costs

The charter is usually written by the PM but published by the person authorizing the project work and providing its funding.

The exam objective 1.2 says "...which outlines an *enterprise's* minimal requirements for a project charter...". This implies that people with the authority to put formal corporate documentation into place have synthesized a de facto project charter boilerplate for you to use—one that stipulates the minimum amount of information needed in a project proposal.

If such boilerplate exists, you'll have an easier time constructing your charter, of course. But you might find that a "starter" document doesn't exist and you'll have to build one yourself. I listed the components that go into a good project charter. Let's discuss them in a little bit more detail.

**Authorization** The project charter authorizes the project to officially begin. That's why it's called a "charter," because it is the formal declaration that the project exists and has been agreed to by the person or persons authorized to allow it.

**Appointment** The project charter appoints, by name, the individual(s) who will be responsible for the project. If a PM vacates a project and a new one is appointed, it's not necessary to formulate a whole new charter, but there should be room on the charter to make a note of such changes. Methods by which the charter is amended vary by company policies and guidelines. Typically they're handled under some form of change-management practices employed by the company.

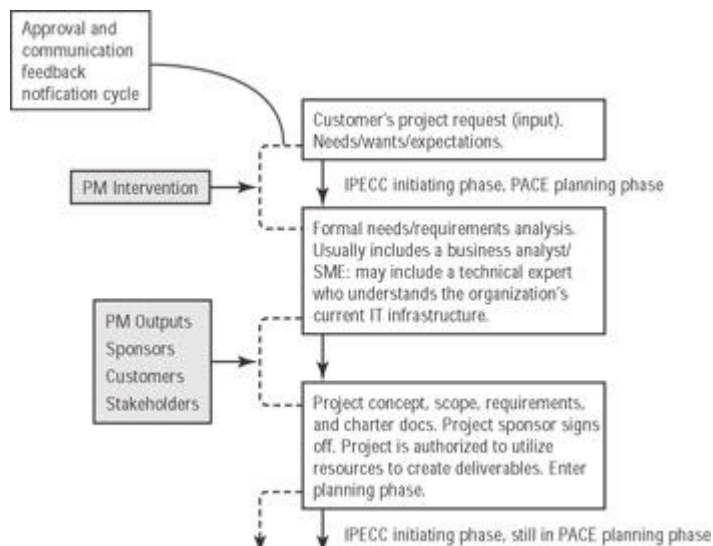
**Business justification** In this section of the charter, you describe, in business terms, why the project is being considered—how the business will benefit from the deliverables of the project. For example, you might have something like this: "The introduction of a more sophisticated call-routing program will enhance the business's customer support capabilities, reducing the wait times that customers experience while waiting for customer-service personnel."

**Account establishment** It is *always* all about money. Never forget that. It's about money. While people have a vested interest in solving a given business problem, most individuals are good stewards of corporate funds and want to make sure that the coffers aren't drained in pursuit of a project that may not produce much bang for the buck. The charter will establish an account where funds are appropriated and utilized and an accountability method so that those funds can be tracked.

**Monitoring** Although the project manager writes the charter, most often the executive sponsor is the one who publishes it. The person authorizing the work and publishing the charter is also typically funding the project.

The formal sign-off by the project sponsor(s) puts the project into motion. The sign-off sends the statement: "I agree with the scope of this project and authorize not only the consumption of financial resources, but also of organizational resources, toward the successful completion of this project." The project charter reflects the objectives of the project, agreement by management as to the requirements of the project, and input from stakeholders.

It's time to add some detail to our project management process diagram. [Figure 2.3](#) is the top portion of [Figure 2.1](#), showing everything you've read about up to this point. This is how far you've gotten once you've written the charter.



**Figure 2.3:** The IPECC initiating phase of a project

## ***Initiating a Project***

Now you have now completed two documents, the project concept document and the project charter. The charter recognizes the key objectives of the project and stipulates who the project manager is and who the sponsors are. The charter also recognizes that there are stakeholders who have valid input into the project and reflects the needs of all concerned stakeholders. You are well into the initiating phase of the project, if you're managing it according to the IPECC phases.

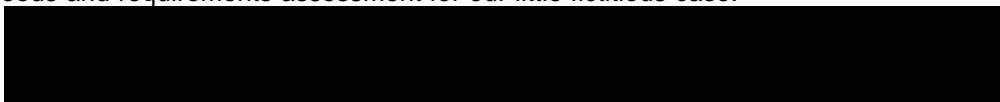
Your charter may need addenda or enhancements and a second round of signatures. If there's a need to refine and expand the project, the charter will have to be refined and expanded as well. Adjustments, corrections, deletions, or additions to the charter will require that the initial signers re-visit the charter, re-evaluate its pertinence, and re-sign it. As changes are made to the charter, it's also important to convey to the managers involved what the changes are and how they'll impact not only the project, but also the staff that's involved with the project.

You're shifting gears from the first phase of the project, the project definition/conception phase, into the scope definition phase. Defining the scope of the project often means that you'll also have to expand or refine the charter, thus requiring signature updates.

**Note** Note that if the project is performed under contract, you can opt to use the signed contract as the project charter. It's important to recognize that as the scope changes, parts of the contract may be written to account for such instances.

Now you understand the nature of the project concept document and the project charter. It is time to move into the next phase of your project plan's development.

Let's now take some time with our Prestige Hotels model project and walk through the needs and requirements assessment for our little fictitious case.



### **Prestige Hotels: Project Requirements Formulation**

Recall from [Chapter 1](#) that your project request has come in from the Reno/ Las Vegas hotel group (called RLV), which has four hotels: Texas (cowboy theme), Bangkok (Far East), Cajun Blues (Louisiana), and Sidewinder (racing). The executive manager over

the RLV Group wants you to develop a travel website that will entice visitors to book a hotel reservation. The manager wants a website that has the following:

- The entry page will provide the visitor with an electronic slot machine. The surfer should be able to click a “Spin Dials” button and see activity similar to the way that casino slot machines operate.
- The slot machine entry page will always come up with a “winner”—a combination that will determine what sort of discount or goodie the surfer will get if he or she books a room at the hotel.
- There will be one big winner: a spin that brings up three cowboy hats, giving the surfer an all-expenses-paid trip to the Texas Hotel.
- The site will offer the ability to view samples of the rooms in any of the hotels.
- The site will offer the ability to book a room in a hotel. Surfers will be required to enter their credit card number to hold the room.
- The site will offer the ability to book a plane ticket. Surfers will be required to pay for the flight before the tickets are issued. You’ll actually link to a partner airline, qLines, that has entered into an agreement with Prestige to provide low-cost airfare to travelers who stay at Prestige hotels.
- The site will allow users to print out dining and show coupons for use when they visit.
- The site will have links to other Prestige hotels.
- The site must be up and running in 180 days, in time for the normal Las Vegas conference season.

RLV does not currently have its own website, nor does it have any contracts with any Internet service providers (ISPs).

You begin by interviewing the executive manager of the RLV Group, a delightful man named Rolf, as well as the person that Rolf thinks will be of the most benefit in helping you get the project going, an intelligent and communicative woman named Brittany.

Your interviews are to develop a requirements document that clearly delineates what the customer is looking for. Your requirements document will stipulate each deliverable the customer seeks and the requirements associated with each deliverable (recall that a requirement is a specification of a deliverable—the deliverable is a car, the requirement is that it’s blue). The bulleted items above are requirements. You have a single deliverable, the website. Certainly, the list they provided is quite inclusive and will give you a good start; however, you have a conference call with Rolf and Brittany in order to get a better feel for some of the requirements listed.

You mention that some requirements may take quite a bit of time, require resources that aren’t necessarily at your disposal, and stretch the project’s completion date out too far. Specifically you’re worried about the ability to book an airline ticket with qLines, fearing that you may not have control over some necessary resources, even though RLV has an agreement with qLines. You think that 180 days may be too short to get the airline booking piece up and running.

Rolf says, “I understand your fear about qLines and the short delivery date for the project. You have a great point about whether we could get cooperation from qLines to help us generate an airline ticket, but I think they said that they’ve done this before.”

You ask about the difficulty of someone underage playing the slot game over the Internet. Brittany replies, “We thought you’d handle this just like any other web transaction where you have to validate a person’s age. You can use whatever the best practices are for this kind of site in order to assure that we’re not dealing with anyone who’s underage. If someone got the three cowboy hats and won the trip, we’d validate their age prior to awarding the trip anyway. And if they book a hotel room online using their credit card, well, anyone with a credit card could do that even if they were under twenty-one anyway, so we think we’re covered.”

Satisfied that you've covered the bullet points that had you concerned, you set up a second interview with Rolf and Brittany, this time at their location. You fly out to the RLV headquarters and spend the day going over some drawings they've made up to storyboard what they think the site should look like, as well as ironing out any last details you might need from them. While the storyboard will be helpful as a part of your requirements gathering process, you're a little early in the process to be utilizing them just yet, so you set them aside.

## **Summary**

A business project has two main characteristics: It is unique, and it is temporary (having a definite beginning and end). IT projects begin with a request from the customer desiring the project. The project request could be as simple as, "You know, it would be nice to have..." or as formal as a document that outlines in detail what the customer requires—and everything in between. It's up to you as the project manager to coalesce what the customer says into a meaningful project concept that captures the essence of what the customer really wants. Doing so requires that you understand the business process and then assess the associated feasibility of the project relative to the need.

You should also identify the project sponsor or sponsors—the ones who have the power to authorize and fund the project and finally see it to fruition. You should always identify an executive sponsor who has authoritative 'yay/nay' power to act as the primary project sponsor. You should also confirm other managerial support for the project. Additionally, identify the stakeholders—those who have a vested interest in the project. To ensure the success of your project, it is imperative that the stakeholders not only support your endeavor but also understand the aim of your project's requirements and goals.

To guarantee this kind of support, develop a project concept document and present it to the customer and sponsor. At this juncture, you're looking for approval that you, the customer, and the sponsor are all talking about the same project. Project definition time is when you iron out any misconceptions about what the customer wants. More formal projects might require formal sign-off on the project concept document. Small projects may only require everyone agreeing to the concept with no formal documentation or sign-off. But be careful of verbal agreements—you've probably experienced before that what you say isn't necessarily what people hear. Remember that the concept document identifies the benefits, costs, and paybacks.

Next, you develop a project charter. The charter has, in layman's terms, the essence of what the project is going to accomplish. It also includes the names of the project manager(s) and sponsor(s) and establishes the account by which the monies for the project will be tracked. The charter is typically written by the project manager and may be developed from a boilerplate that the corporation has worked up for all projects. You obtain formal sign-off on the project charter from the executive sponsor and may choose to include the customer in the signing as well.

If the project should experience a legitimate change in scope, you may find that you need to amend the charter. You'll need to again obtain formal sign-off from the sponsor and liberally communicate with all stakeholders what the scope changes are about.

## **Exam Essentials**

**Be able to generate a project definition.** Take the customer's project request and synthesize it into what he or she really wants to accomplish from the project.

**Be able to informally determine the business need and feasibility of the project.** In project management, communication is everything. If the project really has no merit, this fact needs to be pointed out. If the project isn't feasible, this too is something that needs to surface.

**Be able to identify project sponsors and champions who will help in the procurement of resources.** Resources—money, time, and people—are the things that get the project done. Without a project sponsor to help you stock up on the resources you need, the project won't happen.

**Be prepared to obtain formal approval from the project sponsor.** Preferably a single executive sponsor. Formal approval is required.

**Be able to confirm management support.** Communication to other managers who have an interest in the project (but who have not officially sponsored it) is vital. Never, ever blindsides a manager.

**Be able to synthesize a project charter.** Understand the components of the project charter and why one is required. Obtain formal sign-off on the charter.

**Be prepared to manage scope change and modification through the charter.** As the project changes, the charter needs to be modified.

## Key Terms

Project management, like any other business process or technology, has its own set of terminology. Be sure you are familiar with the following terms:

business analyst	project charter
business case	project feasibility
executive sponsor	(project) sponsor
project	stakeholder
project champion	subject matter expert (SME)

## Review Questions

1. Frederico, the director of the marketing department, has approached you with an idea for a project. What is your next step in getting the project going?
  - A. Business-case analysis
  - B. Project concept document
  - C. Project charter
  - D. Stakeholder determination
  
2. Frederico, the director of the marketing department, has approached you with an idea for a project. Frederico reports to Umberto, the vice president of sales. Umberto reports to the senior vice president, Marilyn, who reports to the CEO, Ross. The project concept document has been developed and the project is needed and viable. Frederico has spending authority up to \$100K. Umberto has spending authority for \$200K. Marilyn has spending authority for \$300K. Assuming that the project is estimated to cost \$195K and that the money is already within Frederico's budget, who should be the executive project sponsor?
  - A. Frederico
  - B. Umberto
  - C. Marilyn
  - D. Ross
  
3. Frederico, the director of the marketing department, has

?

?

?

approached you with an idea for a project that will help the marketing department track trade-show leads. Frederico reports to Umberto, the vice president of sales. Umberto reports to the senior vice president, Marilyn, who reports to the CEO, Ross. Frederico has been given liberal spending authority. The project concept document has been developed, and the project is needed and viable. Who are the primary stakeholders? (Select all that apply.)

- A. Frederico
- B. Umberto
- C. Marilyn
- D. Ross
- E. You

4. You've prepared a charter for a brand new project. Who will formally sign the project charter?

?

- A. Customer
- B. Executive sponsor
- C. Stakeholders
- D. Sponsor and stakeholders combined
- E. Sponsor, stakeholders, and customer combined

5. You've been given an idea for a project by a customer. After some preliminary business-case analysis, you've developed a project concept document and submitted it to the customer for review. The customer has some minor changes she'd like to make to the way you've analyzed the project. Where do the changes need to be made?

?

- A. Project concept document revision
- B. First draft of the project charter
- C. Project charter scope change
- D. Not necessary to note changes

6. At what stage should the executive project sponsor get involved?

?

- A. Customer contact with project manager
- B. Development of project concept document
- C. Development of project charter
- D. Revision of project charter
- E. Approval of the project charter

7. You've been approached by the supervisor of the law library of your company to formulate a project plan in which you develop a new intranet site that will allow people to download legal briefs from the law library via their browser. You've done the preliminary business-case analysis work on this project request and find that its scope is very large due to the heavy additional load it will place on the network infrastructure. The web development team, responsible for all Internet/intranet development, is separate from the server administration team. The internetworking team is separate from the other two technical teams. All three technical teams have different managers. All three managers report to the same technical operations director.

?

The law library reports to the finance director. Both directors report to the vice president in charge of operations. Who will be the executive sponsor(s)?

- A. Law library supervisor
- B. Finance director
- C. Technical team managers
- D. Technical operations director
- E. Vice president in charge of operations

8.

The following scenario will be used throughout the next few questions.

The network administration team has approached you with a project that, at the onset, looks very easy to accomplish but upon further inspection spells out a major project. They want to change the alias that users have when sending Internet e-mail from the first five letters of the user's last name plus their first initial (i.e., [anderb@company.com](mailto:anderb@company.com)) to first\_initial.last\_name (i.e.,

[b.anderson@company.com](mailto:b.anderson@company.com)). The reason for this is that the original e-mail alias matched the name used when logging onto the network, and represented a potential security hole. If a hacker could recognize that the user's e-mail alias was the same as his logon name, then there might be a potential for some sort of hacking shenanigans, and the network team wants to close this loophole.

Problem is, 15,000 users would have to have this change made to their account! On top of that, lots of people have printed business cards with their old e-mail address and would be very upset if their address changed.

The change is an easy one to make, at least from a computing perspective; it can be scripted and handled programmatically very quickly. The network administration team advises you that they can actually *add* the new e-mail alias to each user's account and set it as the primary alias, so that the old one stays in effect for a predetermined time. This way, communications can go out to those who need to change their business cards.

You've been asked to act as the project manager so that the project has formal buy-in from management before the network team proceeds. The network administration team reports to the operations manager. He, in turn, reports to the vice president of finance. She, in turn, reports to the CEO, and, of course, the CEO reports to the board of directors.

What will be your first step?

- A. Perform business-case analysis
- B. Identify project sponsors
- C. Identify project stakeholders
- D. Prepare a project charter

9.

In the scenario described in question 8, who are the stakeholders? (Select all that apply.)

- A. Network administration team
- B. Business card owners
- C. You
- D. Internet e-mail recipients

?

?

- E. The company's Internet service provider (ISP)
10. In the scenario described in question 8, who will be the project executive sponsor? ?
- A. Operations manager
  - B. Vice president of finance
  - C. CEO
  - D. Board of directors
11. Whose responsibility is it to obtain formal approval by the project sponsor? ?
- A. Customer
  - B. Project manager
  - C. Stakeholder representatives
  - D. All three combined
12. You've begun a project for which you've obtained formal sign-off by the project sponsor. As the project unfolds, some unexpected things crop up that necessitate that you make some modifications to the project plan. Who must approve the modifications? (Select all that apply.) ?
- A. Customer
  - B. Project sponsor
  - C. Stakeholders
  - D. Other managers involved in the project
13. In terms of resource loss, who has the most at risk with any given project? ?
- A. Customer
  - B. Stakeholders
  - C. Project sponsor
  - D. Project manager
14. Given no preset corporate criteria for a project charter, what are some of the minimum requirements you'd want to put into a charter? (Select all that apply.) ?
- A. Projected costs
  - B. Milestones
  - C. Business case
  - D. Deadlines
  - E. Project manager
15. When is a project concept document required? (Select all that apply.) ?
- A. Always
  - B. Always if required by the company as a part of their project management standards
  - C. For large projects
  - D. For projects that will be reviewed by a central committee
  - E. Never

16. Put these project management steps in chronological order. ?
- |                                       |    |  |
|---------------------------------------|----|--|
| Prepare project plan                  | 1. |  |
| Obtain project sponsor sign-off       | 2. |  |
| Obtain customer request               | 3. |  |
| Perform business-case analysis        | 4. |  |
| Prepare charter                       | 5. |  |
| Begin communication with stakeholders | 6. |  |
| Prepare project concept document      | 7. |  |
17. You are the project manager for a small company that has no preconceived project management standards. Of the projects listed, identify the ones that will likely require a project charter. (Select all that apply.) ?
- A. E-mail server upgrade
  - B. Selection of antivirus software to be used corporate-wide
  - C. Complete upgrade of telephone system
  - D. Website development including e-commerce pages
  - E. Re-cabling of network wiring throughout the building
18. What are the functions of the executive project sponsor? (Select all that apply.) ?
- A. Signs off on project charter
  - B. Authorizes the project
  - C. Names the project manager
  - D. Authorizes the use of resources for the project
  - E. Writes the project plan
19. You are managing a project that it is estimated is going to cost \$2,500,000. You estimate that the project can bring in inputs of \$500,000 per quarter starting in the second quarter after the project is completed. What is the payback period in months? ?
- A. 15
  - B. 18
  - C. 21
  - D. 24
20. How many executive project sponsors are generally preferred? ?
- A. 1
  - B. 2
  - C. Doesn't matter
  - D. As many as necessary

**Answers**

[1.](#)

A

As a project manager, you start out by running through a business-case analysis so that you can validate what the customer is requesting and whether or not the project is viable. A combination of people can help you with this analysis—technical people who understand the technology that can make the project happen, as well as people in the line of business (in this case, marketing) who understand the nuances of what's desired from a business perspective. You could certainly formulate a project concept document even if the project isn't viable, just so that everyone knows what was studied and what determinations were made.

[2.](#)

B

Generally speaking, the customer won't also be the project sponsor. In this case, even though Federico has very liberal spending authority (implying that Umberto trusts his budgeting judgment), you'll still want to pursue a higher-level authority for approval and sign-off of the project charter. The reason for seeking an executive sponsor would be because the project could easily exceed Federico's spending authority.

[3.](#)

A, B, E

You might be tempted to think of Marilyn and Ross as stakeholders as well, and indirectly they certainly are. But in the sense that this project has direct benefit for the marketing department, which in turn will have a direct effect on sales, you've found your primary stakeholders. You as project manager are always a stakeholder in the project.

[4.](#)

B

The executive sponsor is the one who authorizes the project and, along with it, authorizes you to consume the resources necessary to accomplish the project's satisfactory conclusion (based, of course, upon a well-thought-out project plan).

[5.](#)

A

Before writing the project charter, it's important to make sure you've clearly stated the business case within the project concept document. Since the customer has said to you "This is *almost* correct, but I have these things I'd like to change...", now is the time for you to update the project concept document before putting it in the charter. The charter is a document that shouldn't really be altered unless there are heavily mitigating circumstances.

[6.](#)

E

It's not necessary to get the executive sponsor involved when you're in the early stages of business analysis and formulating a solid project concept document. A well-written project concept will, in fact, often "sell" the executive sponsor on the need for the project. However, at project charter signing time, and any time after that when the charter needs to be amended, the executive sponsor gets involved.

[7.](#)

E

The vice president must be the executive sponsor in this

case. You are crossing lines of business to meet the needs of the project request. Recall that the executive sponsor is the one who has the ability to a) authorize the project and b) allow the use of the resources that are required to bring the project to fruition.

8.

A

This sort of iceberg-like project—one that appears at the onset to be very trivial but upon further inspection implies lots of work—requires that you perform some thorough business-case analysis. For example, the allegation that a hacker could potentially obtain the user's logon name from an e-mail alias is a good one, but how likely is it that the hacker would be able to gain entry to the network with this one piece of information? Further, even if the hacker did obtain a username, what sort of network authority would that person have, in the case of an ordinary user who had no administrative privileges? There are valid question marks that could well negate the need for the project. It's up to you to ask these questions and, from the answers, develop a business case that validates the project.

9.

A, C, D

This project has a ton of stakeholders. Recall that stakeholders are those who have a vested interest in the project. In fact, all of the users on the network will be affected by this change, whether they know it or not. You're included as a stakeholder because you're the project manager even if you're contracted for this role and don't have an actual corporate e-mail address that will change. The ISP couldn't care less what e-mail alias you assign to your users.

10.

A

This one's tricky. There are some resources to be utilized in the form of the network administration team, but because a script can be written to make the change, this change isn't really resource-intensive. The communications component of this project has the most sensitivity but isn't the responsibility of the executive project sponsor. Remember that the executive sponsor is the one who'll champion the project. In this case, the operations manager owns the change, believes in it, and is the most likely person to convince others that it's worthwhile.

11.

B

It is the responsibility of the project manager to formulate a concise and well-written project charter that represents the essence of the project the customer requested. The customer and any interested stakeholders could certainly represent themselves at the meeting in which the project charter is presented and (hopefully) signed, but it is the project manager who has the responsibility of getting the charter there in the first place.

12.

B

The project sponsor is the one who must sign off on the refinement or expansion to the charter. It's very wise to keep all interested parties informed of the modifications, however. It's likely that the customer or stakeholders were the ones

that revealed the “unexpected things” in the first place.

[13.](#)

C

The project sponsor is the one who authorizes the project and approves the use of the resources necessary to accomplish the project's goals. From a resource perspective, the project sponsor is the one with the most to lose. You might lose your job if the project goes very poorly, the customer won't get the refinements he asked for, and the stakeholders will be disappointed, but it's the project sponsor who'll have to answer for the waste of time, money, and resources. It's the project sponsor who will be in the hot seat when others above him are asking the hard questions about how he's going to go about fixing a broken and costly project.

[14.](#)

C, E

The project charter contains the name of the project manager and the business case for the project (as well as the name of the project sponsor). The other things listed are a part of the actual project plan— a different document than the project charter.

[15.](#)

B, C

If a corporation has no rule regarding project concept documents, then you don't need to write one. However, for large projects these documents are handy because they set up the written dialog between the project manager and the customer and provide a paper path that can be backtracked in case the project goes awry.

[16.](#)

1. Obtain customer request
2. Prepare project concept document
3. Perform business-case analysis
4. Begin communication with stakeholders
5. Prepare charter
6. Obtain project sponsor sign-off
7. Prepare project plan

Communication with stakeholders begins anywhere from the time that you've performed your business-case analysis and found the project to be viable until the time that the project plan is prepared. Since stakeholders can include consultants—and in fact the charter could well be just the consulting contract—this dialog could occur earlier rather than later. By project plan time, though, it's wise to have clearly pinpointed who your stakeholders are.

[17.](#)

A, C, D, E

Standardizing on the company's choice of antivirus software is certainly an important decision, but not one that requires the formality of a project sponsor. The others have diversified complexity and would benefit from a project sponsor and a charter. All are discrete operations—that is, with a specific beginning and end.

18.

A, D

The executive project sponsor is the one who says “Make go!” She is the person who has the ability to authorize the project and spend the money and other resources needed. She'll also sign the project charter, thus putting the project into motion.

19.

B

You don't get any money the first quarter, so you've got to automatically add three months to your payback. The rest of the payback will take fifteen months, so the total payback period is eighteen months.

20.

A

Generally, you'll want only one executive project sponsor. There may be others within the project sponsorship realm, but you'll need to identify one who can sign the charter, authorize the work, and authorize that the necessary resources can be utilized.

## Chapter 3: Developing the Project Scope's Skeleton

### ***CompTIA Exam Objectives Covered in this Chapter:***

- 1.4 Given a scope definition scenario, demonstrate awareness of the need to get written confirmation of customer expectations in the following areas:
  - The background of the project (e.g., a problem/opportunity statement, strategic alignment with organizational goals and other initiatives, why the project is being initiated at this time, etc.)
  - The deliverable from the project (i.e., what the product will look like, be able to do, who will use it, etc.)
  - The strategy for creating the deliverable
  - Targeted completion date and rationale behind that date
  - Budget dollars available and basis upon which that budget was determined
  - Areas of risks which the project client is or is not willing to accept
  - The priority of this project as it relates to all other projects being done within the organization
  - The sponsor of the project (i.e., who will provide direction and decisions)
  - Any predetermined tools or resources
  - Assumptions that resources will be available as needed
- 1.5 Given a project scope definition scenario, including a confirmed high-level scope definition and project justification, demonstrate the ability to identify and define the following elements:

- The stakeholders, including the primary project client, the ultimate end users and any other impacted parties (internal or external to the organization), their roles and special needs
- An all-inclusive set of requirements presented in specific, definitive terms which include:
  - Differentiation of mandatory versus optional requirements
  - Success criteria upon which the deliverable will be measured
  - Completion criteria (for example: what needs to be delivered; such as a fully tested system or a system after being live for three months)
  - Requirements that are excluded from the project
- Targeted completion date, including:
  - Relative to a specified start date
  - Expressed as: 1) a specific date (i.e., mm/dd/yy), 2) a range of dates, or 3) a specific quarter and year (third quarter 2000)
  - The consequences if that date is not met
  - A milestone chart including any phase reviews, if appropriate
- Anticipated budget, including any or all of the following:
  - Plus or minus tolerance
  - Contingency funds and/or any management reserves, if negotiated
  - The consequences if that budget is not met
- Which of the above three criteria—for example, technical performance (quality), completion date (schedule), or anticipated budget—is the highest priority to the project client
- All assumptions made relative to a through e above
- 1.6 Given a project scope definition scenario, including the client's highest priority between quality, time, and budget, estimate any or all of the following:
  - The potential impact of satisfying the client's highest priority at the expense of the other two
  - Worse case scenario targeted completion date, budget, and quality-level
  - Your confidence level in the projected completion date, budget, and prospects for a high-quality deliverable
- 1.7 Given a scope definition scenario, recognize and explain the need to investigate specific industry regulations requirements for their impact on the project scope definition and project plan.

Projects begin with the project concept definition and the project charter, but they're fleshed out with the evaluation and shaping of the project's scope. In this chapter, we'll assess the things that go into the formulation of an accurate project scope. I will define what a project scope document is and examine its elements, as well as the famous project management equilibrium: time, quality, and budget. We will revisit our Prestige Hotels project by gathering its key elements and presenting them in a scope document. The presentation of that document will help you to solidify some of the more intangible parts of initiating a project. Finally, I'll talk about any regulations or requirements that may enhance or detract from the project's scope.

By the time you get ready to formulate the scope of the project, the project manager (PM) has been appointed via charter and some key team members may have already been assigned. Project meetings with the customer will now begin in order to ascertain the scope. This is the appropriate time for the customer and project team to work together to reach a common, detailed understanding of what the project is and, more importantly, what it *isn't*. A great way to kick off this meeting is to have the customer give an overview of the project in 25 words or less. This little exercise accomplishes two things:

- It exposes the key functionalities of the deliverables that the customer is looking for.
- It helps shape the definition of a successful project.

**Tip**

Many times, customers think the project scope definition step is a waste of time. The project is already approved, so we're well under way, right? Actually, aside from the project plan formulation phase, this component is the most important part of the entire project, because it determines the project's likelihood of success. It's a predictor, because the granularity with which you write the scope document dictates how well you've fleshed out the project's requirements and thus understand what's involved.

## ***Creating an Accurate Scope Definition***

Scope can be defined as the purpose or goal of a given project. It's obvious that we need to ask, "What is the purpose or goal of the project before us?" When we replace the words *purpose* or *goal* with the word *scope*, the reason why we need to establish a project's scope makes more sense.

But because a project's goals determine the deliverables, the project manager must then ask herself: "What are the tasks that I must undertake to ensure that the customer's goal is met?"

The answers to these two questions expose the scope of the project.

These are not questions that the project manager himself should necessarily answer. These questions are much better suited for the customer, who needs to stipulate what they hope to gain from successful completion of the project. Certainly, the customer stated the hoped-for requirements when you did your initial interview. But scope definition time is the time when you begin to earnestly flesh out all the nuances of what the customer is driving at—couple it with the technical feasibility and arrive at some sort of series of steps that will lead to a satisfactory conclusion for all interested parties. It is up to the project manager to make sense of what the customer said, then convert it into project management grammar or define the tasks that need to be done.

When planning out your scope definition, you're concerned with four unique characteristics:

**The justification for the project** What is the business need for this project and why should it be undertaken?

**The result created by the project** What are we going to gain after completion of project? Write a short summary that details what the end result of the project will be, whether a product, a service, or something else.

**The deliverables produced by the project** What are the components that, when put together, make up the complete product? In other words, if we are planning a thin client-based project, perhaps the deliverables would be a database server, a business rules server, and some web pages that run the front-end user interface.

**Note**

The exam objectives clearly refer to the *deliverable(s)* as the outcome of the project—the products or services. You may have seen the term applied to also include documents produced during a project (as in *process deliverables*). But except where otherwise noted, that's not how it's used in this book.

**The objectives of the project** In order for the project to be successful, what are the criteria that we'd use to justify its success? Note that the criteria we're talking about here have to be *quantifiable*, or measurable. You must be able to determine the quantity of goods or services it will take to meet the objectives of the project.

Formulating the project's scope document is easy if you break it down into several different areas of information, and the following subsections will describe some of these areas for better understanding the scope. You enlist the assistance of others in gathering this information and, depending on the corporate project management policies and

boilerplates (if any) available, document each piece of information. Then you assemble it all into the project book so that readers can follow your detective's trail that leads to the project scope.

In [Chapter 1](#), I discussed the five distinct phases of a project: initiating, planning, executing, controlling, and closure. The results of your formalized requirements formulation (in the initiating phase) will act as the inputs to the planning phase of your project. The PACE methodology thinks of project management organization in much the same way, but miniaturizes the formal process into a methodology that can be used for projects that don't require the same rigor. In the subsections that follow, keep in mind that, depending on the size of your project, the "scope" may wind up consisting of several documents, or you may be able to incorporate all of the project's scope into a single document (and even merge it with a project concept document and call the whole thing "[project scope](#)"). There are no formal hard-line rules that you must follow in order to be able to say you followed a methodology. Rather, in order to practice good project management, you want to be sure you've touched on all the elements that are pertinent to your project.

Let's talk about each of the information input areas one at a time.

### **The Background of the Project**

To evaluate the project scope, you have to ascertain what kind of tangible results, if any, this project will derive and how much business may be improved. Or, alternatively, you consider what problem this project will solve. You must look at how the project will impact activities as diverse as customer service and manufacturing operations. You should be well aware of both upside and downside potential, whether it be draining customer service resources or lowering manufacturing costs. You also have to compare your project with other strategic initiatives being implemented by the company and identify possible synergy from partnering this project with them. By combining it with another project or operation, your project may create greater results than by acting separately. Understanding a project's timeliness will better help you reach its goals.

The majority of these questions and considerations should've been resolved when you formulated the project charter, and you can build on them from there.

Identifying these critical background pieces of information and then summing them up in a project scope document will go a long way toward helping the project sponsor determine whether the project is a "go," a "stop," or a "maybe later."

To tie background information together for you, it's helpful to have a project staff member who is knowledgeable about the process the project hopes to enhance. You want someone who can speak at the customer's level and "translate" into project management and technical language. Each entity in an organization has its own set of acronyms, language, dialog, and processes. Especially in larger projects, by assimilating a subject matter expert (SME) who has a strong sense of business knowledge, you have at your disposal an interpreter who can make sure that what is being said is rendered correctly to the project managers.

### **The Project's Deliverables**

The project's deliverables are the systems or programs that will be put in place once the project is completed. The scope describes what we're going to do; the deliverables describe the specific details. There could be several deliverables in any project—it's important that the project manager enumerate each one.

For example, suppose that the project before you consists of a browser-based (thin-client) solution that utilizes two back-end servers: a database server and an application server. Your deliverables will include the following components: a browser screen that contains a predetermined number of elements, a server running the network operating system (NOS) of the client's choice with the database, and a second server running a relational database management system (RDBMS) and the same NOS as the database

server. In other words, what can the sponsor expect the system to be composed of, and what will it do after the project is finished? Who will be the user of the system? The deliverables pinpoint the things that the users of the project's output will be able to utilize.

**Tip** Some IT Project+ exam objectives use the term *client*. I typically use the word *customer*. For the purposes of this book, you can consider these interchangeable.

It's important that the customer and the project management team are clear on what the deliverables are going to be so there's no finger-pointing at the end of the project. The elements that are going to be a part of the system, such as the screen and report mockups, for example, are a good thing to introduce at deliverables formulation time.

**Tip** A general statement like "reports showing the accounts receivable, inventory turnover, and distributions" that says nothing about format or interface might mean one thing to you and another to your customer. Clearing up what is meant by the terms the customer uses, as opposed to what you may think the terms mean, will go a long way toward satisfactory requirements definition.

### **Deliverable Creation Strategy**

In this component of your scope document, you say (on a general level) how you'll go about creating the deliverable(s) for the customer. You present the order in which you will execute the project's phases in order to produce the deliverables. Outlining your strategy is useful for other nontechnical eyes, because often one who has no clear feel for the technical direction of a project can still point out logic errors in the way you're going about project implementation.

In defining how you'll create the deliverables, you need to communicate with a wide variety of people and avoid "computerese" if possible. For example, suppose that you're going to create a client/server application using Visual Basic running on IBM DB2 for use on a Domino server. Most nontechnical stakeholders aren't going to have any idea what you're talking about. So you need to communicate clearly about how you're doing what you're doing and why the tools you're using are being used.

Using this Domino Server example, you could say, "We'll be using Microsoft's software development environment, Visual Basic, to communicate with a database we've created using IBM's DB2 database system. The entire thing will be hosted over our Lotus Domino e-mail system." Now, you've defined the specific product names you intend to use (very important because you cannot switch horses in midstream—better to get this dialog out of the way right away) and how you intend to deploy. However, customers may have no idea of what you just said.

Working harder to make this more generic, yet explanatory as to how you're going to go about doing what you intend, you might further refine the previous statement this way: "We're going to use Microsoft's Visual Basic software to set up some data-entry screens to communicate with a database. We're going to create the database using another product—IBM's DB2. Once we're done with the screens and the database system, we'll put the whole thing on the Lotus Domino e-mail system so it can be used via e-mail. Once we've put the data-input screens and database up on the e-mail system and we've tested it, we can safely say that we've 'deployed' the system."

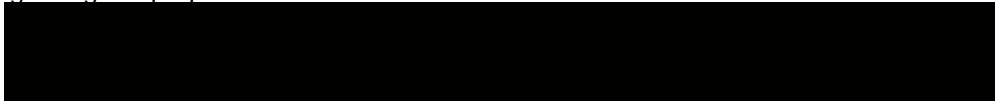
The creation strategy doesn't name the products and tools that make up the deliverables themselves. You're talking here about the tools used to *build* the deliverables. If the deliverable is a table, the creation strategy can involve lists of steps (1: Draft design. 2: Cut wood. etc.), parts (x boards of length y), and tools (circular saw, wood glue, sandpaper).

Customers aren't generally interested in your deliverable creation methodology; they're interested in how well the deliverables function. Keep your deliverable creation strategy high-level in the scope document, and communicate with stakeholders at an extremely basic user level so you don't confuse them. However, it is still important to detail the hows and whys of deliverable creation. I'd recommend giving an executive summary—

style overview of your deliverable creation strategy, then take a couple more paragraphs to provide detail for interested readers.

Communicating in this way, you'll still be left with one of two types of questions: those that are more technical in nature, from people who have a high technical expertise, or questions from those who don't understand the basest of the terms you use and need further clarification. But you've defined what it is you're using and how you intend to use it, and you did it with not many more words than you'd use if you were simply to state the tool, the database, and the server product.

Communication is the most important element a project manager can be involved in. It is critical that stakeholders are always apprised of all the important changes and thoughts regarding the project.



### **Real World Scenario: How T-REX Is Communicating**

A huge upgrade of Interstate 25 is underway in the city of Denver. The project is called the Transportation Expansion Project (T-REX) and is being co-managed by the Colorado Department of Transportation (CDOT) and the Regional Transportation District (RTD—Denver's mass transit district).

The highway, originally built 40 years ago, provides a transport mechanism to 250,000 automobiles a day in one southern area called Denver Tech Center (DTC). The project will include the demolition of several old bridges and their subsequent reconstruction, widening of the highway in several "narrows" areas, and a light-rail line running from downtown Denver to DTC, a stretch of 7–10 miles or so.

The project presents some really tough problems. Various long sections of I 25 will have to be shut down during construction. There's a noise abatement issue; many homeowners near the highway have already complained, even before the project has gotten underway, that the noise will be too much to bear, especially since the crews expect to do a lot of their work overnight.

Finally, the light rail that will move alongside the I-25 traffic will be a dream come true for many folks but a challenge for the planners and builders. The light rail itself is not the issue, but the huge amount of parking needed at the rail stations is.

All drivers are dreading the next five years because of the impact this project will have on the city's main north-south artery. So how are project announcements being handled during this tremulous time? All project updates are being posted on the websites of the city's two newspapers as well as the main T-REX website. RTD also maintains a link to T-REX on their site. Additionally, City of Denver project engineers are providing information to Denver city employees via internal e-mail broadcasts and, hopefully, eventually an intranet site. Finally, all the major television and radio stations carry routine T-REX traffic updates.

Why all the fuss over the communications aspect? Because unlike a building or a dam project, every driver on the road, and almost every resident, worker, and business in the area, is a stakeholder in the project. All the major project players understand this and have made sterling efforts to communicate what's going on.

In terms of sharing a deliverable creation strategy, non-stakeholders are not made privy to the information except at the very highest of levels. For example, a TV news anchor might say, "T-REX will be taking down two bridges tonight in order to widen the highway in that area and re-build the bridges at a later point." Folks that have project Internet or intranet site sign-ons are privy to more specific deliverable creation information.



## Estimated Completion Date

We need to be careful with this test objective because the targeted (really, at this point, *estimated*) completion date will appear in different documents depending on the project management methodology you're utilizing. In a more rigorous methodology, the estimated completion date comes about as a result of cost- and time-estimating techniques that you apply to each task (I talk about this in much more detail in a later chapter). You would *not* put an estimated completion date in a more formal methodology's scope doc; you're too early in the process for that. Instead, in your project plan, you'd supply not only the estimated completion date, but also the tasks, their durations, and their costs.

In a PACE-oriented environment, you can safely combine all this information into one document that represents the scope of the project. In this section of the scope document, you give a *completion date*, along with the rationale for how you arrived at this date. This is a calculated date derived from estimating, planning, and risk evaluation, including contingencies for identified risks. In actuality, you'll simply plug in the date you arrived at from your project plan, which we'll talk about later in the book. But suffice it to say that the completion date information also includes the way that you concluded what the date would be.

### Warning

Sometimes what drives the completion date is something other than just adding up the time required. The date might be driven by the project sponsor, a business need, a marketing strategy, a technological impetus, or simply because the CEO said "make go!" Always be well aware of what—or who—is driving the deadline.

You will probably decide to use the more rigorous PMI methodology for very large IT projects (Windows 2000 Server deployed across a large enterprise, for example) and usually *not* for smaller ones. This test objective talks about putting an estimated completion date into the scope document—implying that we're talking about a PACE-like methodology. (This is not to imply that you *cannot* use estimating techniques in a PACE-oriented document—so as to definitively detail task costs and schedules.)

Some constraints have the ability to change the completion date. The Y2K problem was an example of a project that had a *hard date*. The project had to be coded, tested, and implemented no later than 12/31/1999 at 11:59 P.M. Budget restrictions might push your targeted completion date out much further than originally anticipated. Constraints can also exist in the form of industry regulations, governmental laws, rules, and regulations. For example, if you're managing a project that will bring forth a new pharmaceutical drug, part of your project deadline calculation is the speed with which the Food and Drug Administration (FDA) is able to test and approve the new drug. Your completion date depends on the elapsed time for all the necessary processes, not just your hoped-for deadline. You may want to get the drug onto store shelves in two years, but the FDA testing process might delay the introduction well beyond that.

## Budget Information

In this section of the project scope document, you'll be talking about the [budget](#), or the planned allocation of resources and funds anticipated to cover the course of the project. Of course, project teams usually work under budget constraints. Recall that generally the project sponsor is the one who *approves* the budget and authorizes the use of those resources, but not necessarily the one who builds the budget. The project manager is responsible for assimilating the necessary budget information from the various stakeholders into a single project budget, then presenting it in the form of the scope document. Therefore, it is singularly important that you determine the various players involved in helping to make the project work its way successfully toward completion, identify the costs relative to each entity participating in the project, and produce a summary document that explains each group's costs in the project as well as the total cost. Include hardware, software, development time, and consulting dollars, and try to

ascertain hidden costs that may put the budget over its predicted number—things such as the cost a delay in the project might introduce, or legal fees. All of these numbers should be seen and agreed to by the project sponsor.

**Tip**

Note that budgets have an unusual way of being tampered with. One group might siphon off some of your project budget for a project of their own. This kind of “stakeholder sabotage” is something that routinely takes place in business.

**Risk Assessment**

When determining *risk assessment*, you are trying to examine whether the identified risks are acceptable in the proposed actions you’ve laid out over the course of the project. A commonly heard term in the halls of project managers is *showstopper*—anything that can completely sidetrack a project. Risk assessment involves putting on your Amazing Karnak persona and trying to foretell what the showstoppers are likely to be in the project at hand. Some are obvious: hardware expense, software development costs, expensive consulting help. Others are elusive, such as security considerations or the “a miracle happens here” phenomenon.



**Real World Scenario: The “A Miracle Happens Here” Phenomenon**

Imagine a scientist who has worked through some heavy -duty calculations, on her way toward a solution to a problem. What good would her effort be if part of her answer was, “A miracle happens here”?



In your project evaluations, you’ll run into situations where you’re being told that a facet of the project can happen by virtue of some capability of the software or hardware you’re considering. For example, you’ll see a problem on the horizon and query the software vendor, “I don’t see any place where we can accomplish this. Does the software really do this?” To which the salesperson (*not* the software engineer) will reply, “Oh yeah, we can do that!”

The salesperson doesn’t tell you *how* you can do that—he just stipulates that the software sure can do that. Your own development staff might be convinced that they can do that—whatever “that” is. You may have doubts, the customer might have doubts, and even the project sponsor might have doubts. Nevertheless, you let the project go forward because of the “a miracle happens here” phenomenon—you really believe that maybe the development staff can make “that” happen.

Later, you’re disappointed to find that the software cannot actually do “that.” Not, at least, without standing on your head and spinning around twelve times to get it to do that. When you phone the software engineer, you’re surprised to find that she admits

the software really can't do that, but the salesperson insisted on being the one to respond to you. In other words, you were lied to simply to make the software sale. The chances of the project being stalled—or, worse, cancelled—until you find someone who can do “that” increase dramatically.

Do you get the idea? If you sense that someone in the project group is talking about a miracle, then you need to call them on it and work out the issues. Projects aren't built on miracles but instead on cold, hard constraints of time, budget, and resources.



### **Project Priority**

In the pecking order of corporate projects, is your project a really big bird, or is it one that doesn't have much visibility from the higher-ups? How does your project relate to all others being done within the organization? Will it receive the attention it needs? Is it a high-priority, high-profile effort? Does it compete (for dollars and staff members) with other projects? These are all answers you need to know. If you know where your project stands within the organization, you will be able to better forecast when stakeholders expect deliverables and how quickly you can anticipate receiving the dollars it needs to keep it on track. You won't have to wonder when staff members are available as resources for your project.

A drawback to determining your pecking order is that you may find that your project *isn't* very high-profile and that it is indeed in competition with others for funding and staffing. Nevertheless, you must manage and promote the project. Recall that by the time you've gotten to the scope definition of the project, you've already ascertained that the project is worthy and needed. Others, as it sometimes turns out, may not know this, or may believe more strongly in another project. At this juncture, though, you *believe* in the project.

### **Project Sponsor**

As stated in [Chapter 1](#), it is best if the sponsor is one person rather than a team. This person should preferably be a member of the executive management team—one who has the muscle to enforce decisions and gain everyone's cooperation. The reason it's valuable to stay away from multiple project sponsors is due to the complexity that adds to the decision-making process. Like it or not, all people come to the table with a given agenda, usually slanted toward their area of business.

If you're working on a project in which IT is a new concept, it may be beneficial for a strong IT presence to be *available* during all project initiatives. So you might think, for example, it's a good idea to invite the deputy CIO to help sponsor the project. This person comes to the table with CIO-ish agendas, despite their desire to help the customer. If you have a sponsor who's in the business—somebody who came up in manufacturing, or sales, or whatever—and a second sponsor with an IT perspective, there may be some foot-dragging, in-fighting, or other communication stalling that goes and delays the project. A single executive sponsor, who can keep their mind on the deliverables the project is going to realize, will grease the project's sled runners and get it accomplished much faster.

It's not always possible to have a single project sponsor. In the earlier sidebar about the T-REX highway-widening project, there are several project sponsors. One sponsor might have an interest in the laying of the asphalt, while another might be completely interested in the substructure (the sewer, fiber-optic cables, etc.) of the road's surface. The size of the project will dictate the need for multiple sponsors. I would speculate that in most IT projects, a single sponsor is more than adequate and removes some of the propensity for arguments that you might encounter with multiple sponsors.

The scope document reiterates who the project sponsor is. It should be evident to all interested parties reading the document *why* the project sponsor is the one listed. If there's a question mark about the project sponsorship, that's a red flag for you to

investigate the political or monetary underpinnings associated with the designated sponsor. We're striving for a project untainted by the ambitions, moneybags, or idealism (or lack thereof) of the project sponsor. We want a project sponsor who has the goodness of the project at heart.

### **Predetermined Tools or Resources**

Is it a foregone conclusion that the database of choice is going to be Oracle? Is it assumed that you'll run on Windows 2000 servers? That you'll use Dell hardware? Is it safe to assume that all web graphics will be done by 'Doogey,' the computer science intern working in the development department? Make note of these parameters in this section of the scope document.

Some of these predeterminations are driven by the market sector. If you're running a highway project that needs maps of the asphalt, the underlying conduit structure, and the sewer or subway lines below, you probably want a geographic information system (GIS) implementation—but there are only a handful of GIS software vendors to choose from. If your project is limited in this way, the customer, stakeholders, and project team should pick the *best of breed* for a given component. Best of breed means that you're examining the available products or solutions that do exist and picking the best one for the challenges required by your project.

### **Resource Availability Assumptions**

Assumptions are an important part of the project scope document. It's important that assumptions are discussed and approved by all before the project goes forward. Take special care to confirm that your assumptions are, in fact, valid. *Assumptions* are statements taken for granted or truth; they are not necessarily supported by analysis or proof. For example, if you're planning on using Sue Smiley's talents at a particular time in the project, but her manager isn't aware of this, she might be on a plane headed for Helsinki at the precise moment she's needed most on your project. It may be important to have a document, signed by her manager, that allots the use of Sue's time to your project. It would also be wise to designate a backup just in case Sue won't be available.

Generally, the project manager assumes that resources will be available, that the resources will be able to adequately perform their duties, that vendors will deliver on time, and that money will be available as described in the budget. Up-front identification of your assumptions will help you figure out where the strengths and weaknesses in your project exist.

## ***Determining Key Scope Elements***

So far we've described the high-level components of the project scope document. Now we will go a little bit deeper and discuss some of the minutiae of the document. You will learn how to incorporate all of the background information you've gathered—your deliverable strategy, milestone and due dates, estimated funding, project priority rating within the organization, which tools and resources you'll use, and even who will be available—right into your project scope document.

We cannot forget that the scope document arises out of the assemblage of the project's requirements—the requirements function as inputs to the scope. However, with any project, certain key elements will always be required. Of the ten scope elements mentioned above, you will always include the following scope elements in any document you write, regardless of size:

- Project background
- Deliverables
- Estimated completion date (in some methodologies—others will require a separate project planning set of documents that calculate this date, a process you go through much later in the project)

- Budget information
- Project sponsor
- Assumptions

You'll formulate this document with a word processor and store it in the project book (it matters not whether the book is electronic or hard copy). When representing the document in word-processor form, denote each of the elements as a major heading.

You'll present the scope document to stakeholders, the customer, and the project sponsor to obtain buy-in. A single meeting could be effectively used to discuss the scope document after you've prepared it and are satisfied with its content.

The sponsor will review the document and sign off on it—if it's acceptable. Once the document is finished, it is up to the PM to maintain its congruity. Changes to the document are strictly disallowed without first going through a change-management process (which I talk about in [Chapter 5](#)) and being approved anew by the project sponsor.

Change is bad, bad juju for a project. By the time you get the scope document written and signed, everyone on the project should be very clear about what's going to happen without any additional required changes. Changes implemented later in the project shouldn't be happenstance; they should be predicated on real factors you could not have accounted for at the project formulation time. Implementations and modifications that weren't in the original, project scope formulation dialog—especially “touchy-feely,” “nice-to-have” ones—generally will not be available to you.

Furthermore, changes that don't fall in line with a project's requirements are not allowed at all. Recall all of the work you've done to build your project's scope thus far. At this stage, you will feel as if you've gone over mountains and swum through oceans to fully document and refine the requirements and the ensuing scope document, trusting that the sponsors, stakeholders, and customers are all in agreement. Change will not be easily tolerated.

However, unforeseeable changes will occur, and the entire team will have to bend and accommodate them. An example of a necessary change might be that you've selected a hardware vendor for a specific part of your project and, halfway through the project, when you're ready to go with the new hardware, you find that the company has suddenly gone out of business.

As the PM, you'll maintain all changes to the scope document and post the information in the agreed-upon ways (intranet, e-mail, etc.) for stakeholders to see.

### **The Stakeholders**

We talked about stakeholders in [Chapter 1](#), so you already know that the stakeholders include the primary project client (the initial customer requesting the project in the first place). Stakeholders also include the end users who will ultimately utilize the results of the project, and any other impacted parties, whether internal or external to the organization.

In your scope document, you specify the stakeholders and, by each name, detail their role in the project and any special needs they may have relative to it. You should be able to determine their roles and needs when you interview them or in some way characterize the role they would play—even if they're a resource. For example, suppose that your project is going to require a graphics guru. You quiz the IT manager and find out that old Ralph over there, he's the best, you want to use him. Ralph's name will wind up on the scope document.

It is imperative that everyone working on the project knows who the stakeholders are and how extensive their roles on the project will be. Discrepancies between stakeholder needs, specified requirements, expectations, and actual results can be a significant source of dissatisfaction with final project results.

## Requirements Definition

Another key element of a project scope document is the *requirements* section. In this section you specify some very definite items: a negotiated set of measurable customer wants and needs, that is, user requirements, system requirements, operational requirements, contract requirements, test requirements, and so forth.

Start with the differentiation between mandatory requirements and optional ones. While the idea of “optional requirements” might be oxymoronic to you at first, what you’re trying to determine are the “nice to have,” things that might take too much development time and effort given the deadline of the project, versus those things that are absolutely essential. For example, suppose that your project is developing software that will be used by orthopedic surgeons to help them perform more exact knee surgeries through robotic cable mechanisms that are inserted in the knee. A mandatory requirement is that the software always provides a method whereby the doctor can take over control of the surgery at any point. A “nice to have” might be that the surgeon can use the software to precisely measure the length of cartilage that is involved in the surgical removal process.

**Tip** A way to incorporate “nice to have” is through the deliverable revision strategy, where you revise and upgrade deliverables in a second project but don’t attempt it in the first.

Also include success criteria upon which people can measure the outcome of their project. This involves a dialog between you and the stakeholders that answers the question, “How can we measure, after the project is completed, how well the deliverables work—thus measuring, at least in part, the success of the project?”

Additionally, state the completion criteria. Ask, “What signals that the project is finished, whether successful or unsuccessful?” You may decide to not call a project complete until several months have elapsed after *go-live*. Just because a project has gone live does not mean it’s fully functional; minor alterations may be needed to make a deliverable more functional. So it’s reasonable to stipulate that the completion criteria are evaluated several weeks or months after deployment. Completion criteria might, optionally, simply state that a project is complete when *x* happens—whatever that outcome may be. However, it is important to stipulate clearly what *x* is, so that when it happens, it’s recognizable by all and signals the end of the project. Completion criteria differs from success criteria in that the former signals the *end* of the project (or activity within a project) but the latter denotes the successfulness of a given activity.

Finally, in the requirements section, list aspects that are purposely *excluded* from the project. Some “requirements” fit the “A Miracle Happens Here” scenario from earlier in this chapter—wishful thinking. Others simply aren’t feasible within the budgetary or resource constraints. It’s often wise to note some things that the project does *not* require and communicate them to stakeholders so that no one’s surprised when you declare the project complete.

## Targeted Completion Date

Another element of the scope document is the targeted completion date, which has several specific components to it. First, you can declare this date as measured from a *specific start date*. Sounds like a physics problem, doesn’t it? How can you declare a completion date when you don’t know the start date? As an elapsed time from a known date, such as “five months from the adoption of the project charter.”

You also have the option of expressing an absolute completion date, in one of three different ways:

- A definite date (e.g., “This project will conclude 7/28/2003.”)
- A range of dates (e.g., “This project will conclude between 7/1/2003 and 8/31/2003.”)
- A specific quarter and year (e.g., “This project will conclude in the third quarter of 2003.” You can abbreviate this as Q3 2003 after you’ve officially declared it.)

You also stipulate the consequences if the date is not met. Your purpose here isn't to add urgency to the project, but to simply say what will happen if you don't hit your targeted date.

Finally, you can include a milestone chart if you think it's needed. A *milestone* is a turning point or significant event in a project, such as the completion of a deliverable. Using project software, you can identify these milestones and include a chart of them so that readers of the scope document understand the critical events that shape the project. If the scope document can be thought of as shaping the project's skeleton, the milestones represent where one joint meets another in the skeleton.

A *phase review* represents a time when a milestone has been reached and you stop to evaluate the quality of the process thus far. Elements of a phase review include both "hard" data, such as where you're at in terms of the timeline and how much money you've spent, and "soft" data such as feedback you've gotten on the project thus far. Depending on the size of the project, the PM is the one who may opt for a phase review. It's not unheard of, on large projects, for PM-savvy executives to insist on phase reviews at critical points. In any size project, a phase review is a good idea because it doesn't take much time and keeps everybody headed down the same road. It's a good way to spot places where you're headed off-track.

### **Anticipated Budget**

Another very important scope document element is the budget. Within this element, you'll define your anticipated budget and include several other items of note that are pertinent to the budget:

- The plus or minus tolerance of the budget—a percentage that stipulates how far off of budget you can vary as you go forward with the project.
- Contingency funds and/or management reserves—those funds that you are *sure* you can draw on if you need to. Do not declare these if they're speculative.
- The consequences if the budget is not met.

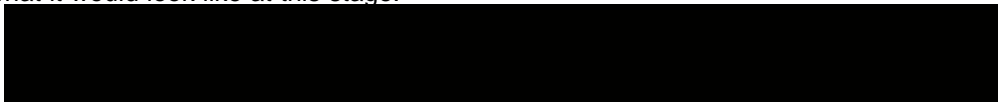
On a very large project, an executive project committee will set permitted cost and time scale limits, and those limits determine the tolerance. A server rollout isn't going to necessarily have an "executive project committee," but a project involving a full-scale conversion to PeopleSoft for the entire organization may. The method by which budget tolerance is determined often depends on the size.

Obviously, the minus tolerance (how far below the budget you can fall) is less important than the plus tolerance (how much over the budget you can go). But the minus tolerance has relevance in the form of safety. You can't put less concrete in the bridge girders just because by doing so you save \$1 per bucket and thus come in way under budget.

### **The TQB Equation**

We'll talk more in the [next section](#) about the "relativity" phenomenon of project management—the interplay of time, quality, and budget (TQB)—but you must refer to it as one of your project scope elements. The question you're answering here is this: "Of the three criteria—[time](#), quality, or budget—which has the highest priority in the mind of the customer?" The answer to this question is important because it can dramatically sway the project's emphasis one way or another, and this must be known well ahead of project implementation time.

Our scope document has taken on wonderful shape. We've not only taken time to think about all the features of a given project's scope, but we've also elucidated the most important elements of our project. Let's take a look out how our sample project is coming along. Now that we have a better idea of how to start the scope document, let's review what it would look like at this stage.



We now have enough information to formulate our Prestige Hotels scope document. In real life, you'd develop this document using a word processor, hold a formal meeting for final approval, and obtain the sponsor's sign-off. In the example here, we're listing the key elements needed for the project and including a sign-off section. Your company may have already developed project management boilerplate documents that you can utilize for this purpose.

## **Project Title**

Reno/Las Vegas (RLV) Group, Marketing Website Virtual Slot Machine (VSM)

## **Background**

This project will create a website for the RLV Group. The website will provide a mechanism whereby visitors can spin a computerized rendition of a slot machine (called the "Virtual Slot Machine" or VSM) for a chance at winning prizes, including stays at one of the RLV Group's hotels, the Texas. People visiting the site will be able to view rooms from the various hotels managed by the group, reserve rooms, and obtain flight information from the group's partner airline, qLines.

## **Deliverables**

Deliverables include the following:

- A partnership with an Internet service provider (ISP)
- Coding for a web page or pages with the requested content (see Requirements Document)
- Web graphics work to depict the slot machine
- Web-page content development
- Appropriate links to the qLines business-to-business (B2B) virtual private network (VPN) for purposes of checking airline flight status and prices

### **Deliverable Creation Strategy**

Deliverables will be created in house by Prestige Hotels' IT staff. Web developers will develop the pages utilizing their preferred software development environment (SDE). Graphics will be developed by graphics personnel, also in the IT shop. ISP connectivity will be provisioned through the IT staff's Architectural Development department. Links to qLines will be handled by IT staff.

### **Targeted Completion Date**

The project will be delivered to the project sponsor one hundred eighty (180) days after signing of this document by the sponsor.

## **Project Budget**

The budget is a total of \$106,140 and includes:

- \$100,000 for staff salaries during the web-page development process.
- ISP connectivity fees at \$380/month—an ongoing expense RLV will have to account for in their bottom line—including dedicated server space and maintenance by the ISP of the website after it has deployed. The project budget will absorb the initial three months; thereafter, RLV will absorb this expense into their financial basis. Maintenance by the ISP includes nightly backups, restoration capabilities, and promised 99.999% uptime, including scheduled maintenance windows.
- Prizes to be awarded by RLV Group, amounting to \$5,000 (\$3,000 for the grand prize and \$2,000 for remaining nine prizes).

Budget tolerances include a \$20,000 contingency budget for overruns. Budget contingencies include a 1% bonus for the project manager if the project is brought in between 95% and 100% of projected budget and schedule. There will be milestones at the graphic arts development, coding, and testing segments where the variance (if any) of the project's schedule and budget will be determined.

### **Risk Assessment**

Of the common project constraints—[time](#), quality, and budget—it appears that budget is most likely to need flexibility. The project must ship within the 180-day deadline due to the Las Vegas conference season coming up. Quality has to be representative of the quality visitors would expect to encounter when they visit one of RLV Group's hotels.

Other risks include persons under 21 years of age misrepresenting themselves, trying a spin on the VSM and winning a prize that cannot be awarded.

### **Project Priority**

Since the disaster of September 11, 2001, hotel vacancies for the RLV Group have declined by 15% (compared to an overall 10% decline across the entire Prestige Hotels venture). This represents, in real dollars, a loss to RLV Group of \$75 million for the next fiscal year.

Of the fifteen high-priority projects currently under consideration in the Prestige Hotels project management office (PMO), this project is fourth in priority and has gained Prestige executive approval to proceed.

### **Project Sponsor**

The project's executive sponsor is Mr. Rolf Montenegro, Executive Director of Operations for the RLV Group. The project's sponsor is Ms. Brittany Salvage, Director of Marketing for the RLV Group.

### **Predetermined Tools and Resources**

- Prestige Hotels' IT staff prefers to use Cold Fusion as its web development SDE.
- Prestige Hotels' IT staff prefers to use Microsoft SQL Server for the databases it creates.
- All graphics development will be done using CorelDRAW.
- Prestige Hotels uses W2U (World to You) Inc. as its ISP. W2U has provided vendor agreements for a T3 carrier circuit and dedicated server space to be utilized by the RLV Group website.
- Prestige Hotels will utilize its own internal IT staff for all development during this project.

### **Resource Availability Assumptions**

Because this is a priority four project and the other three projects ahead of this one on the list are non-IT related, it is assumed that 50% of IT staff development time will be devoted to this project. This leaves 50% developer time to be devoted to projects further down the list.

### **Approvals**

Rolf Montenegro, Executive Director Operations, RLV Group

Brittany Salvage, Director Marketing, RLV Group

Pamela Brown, Director Project Management, Prestige Hotels

## Understanding the Famous Balance: Time/Quality/Budget

When you take a close look at your project, what do you have the most of? Do you have lots of time in which to get your project done? Do you have oodles of cash? Is there a high expectation of quality relative in the project's deliverables? These three things represent the famous circle that project managers chase.

If you have plenty of cash and time, then the quality is *likely* to be very high. However, if you don't have much cash, then you have to establish how the quality will be affected. You might realize that you need a lot more time in order to bring in a high-quality deliverable. And if you have a lot of cash, it is reasonable to assume that it will take less time to produce the same quality deliverables than if you had a smaller budget.

**Note** "Budget" is a bit of a misnomer in the equation. Budget implies resources, which can include people. It's very possible that if you throw enough people at a project, you can attain the deliverable within the prescribed timeline and with the quality that you're looking for. Just remember that people represent an expense. Also, adding people sometimes simply won't produce faster or better results. Look at it this way: you can't take nine pregnant women and have a baby in a month! So, while the prudent use of the correct people for a project may enhance the TQB balance, think twice.

These three project elements are so intrinsically tied to one another that you can almost think of them as a three-bar slide rule. If you move one of the elements too far to the left, then something else has to adjust to compensate. [Figure 3.1](#) shows this imaginary slide rule.



**Figure 3.1:** The TQB slide rule

What compensates might be the overall success of the project, or one particular aspect. In the figure, you can see that an increase in time and budget results in a high-quality outcome. The slide rule is simply designed to illustrate that you can reduce budget in a project, but the quality or the time required for that project will react opposite to the reduction. The three sliders, added together, equal the project's success. Thus you *can*, in fact, move just one slider down, but only to the detriment of the overall success.

Every project will have its own values and sensitivities here. To use some imaginary numbers, your project could use a scale from 0 to 100 and then define "success" as a total of 250 on the three sliders. Or "success" could be a Quality of 100, with your project losing a point on the Q slider for every two points of reduction on the T or B sliders.

When considering TQB, there are several things we must take into account and provide an estimate for in the project scope document. Let's review some of the key areas of concern.

**Behind curtain 1: TQB impact on client satisfaction** The TQB question needs to be asked of the client: "Given the constraints of time, quality, and budget, which is your highest priority, at the expense of the other two?" Note that project implementation may well be delayed while you grapple with this question, especially if the stakeholders fail to grasp the importance of the answer.

**Behind curtain 2: The worst-case scenario** The next thing you need to ascertain is the worst-case scenario the client will accept in terms of the TQB equation. In other words, given a budget that's set in concrete, you need to determine *how much* quality deterioration the client will allow before *too much* time has elapsed. In this worst case, you need to strike a reasonable balance among the three.

**Behind curtain 3: The project manager's confidence level** Given the budget that you have to work with, the projected completion date, and input from the client, attempt to gauge your confidence level in producing a good-quality deliverable. There's a funny saying; perhaps you've seen it: "If momma ain't happy, nobody's happy!" The PM's job is like that of momma. As PM, you are the one with your finger on the pulse of the project, and you probably will have gut instincts (and paper evidence) about how well the project is doing. If you have a sense that the TQB slider is slanted too much toward cost savings and that quality's going to suffer drastically, it's red-flag time and you need to make sure the sponsor's aware of it. Otherwise, the sponsor might be thinking everything's moving ahead swimmingly and the project's going to come out just fine.

**Note** Intuitively, you must realize by now that the quality of a deliverable is usually the one thing that cannot sink too far.

### Real World Scenario—TQB in Action

You're a project manager for a clinical research facility. Your company retains the best and brightest of the scientific community, specializing in the research of cures and (hopefully) the eradication of terrible diseases. Your firm has taken on a new and formidable enemy: the human form of "mad cow disease," formally known as variant Creutzfeldt-Jakob disease, or vCJD.

You've been asked to formulate a project plan that will equip scientists with the hardware, software, staff, and facilities necessary to perform their research. Which component of the TQB equation do you consider most important? (Remember: your deliverable is the research set-up—scientists and equipment—not the cure itself.)

**Time** The bovine form of the disease has produced a crippling effect on the beef and biotech-food industries by raising consumer alarm across the globe. More than 100 deaths have already been caused by vCJD, and many people fear that it will spread outside Europe before a cure is found. Your organization is in a hurry.

**Budget** If the budget is limited, you may not be able to equip the scientists with the best research instrumentation. This might have direct impact on the resolution of the microscopes or the purity of the testing chemicals. The research and analysis team working with your scientists might be inadequate, meaning invaluable findings could be delayed or lost.

**Quality** If your project doesn't thoroughly equip these scientists with the right kind of research gear, how can you expect them to find the cure? Answer: you can't. The quality of the deliverable has a direct relationship to much they can discover and how quickly they can do it.

Because of the critical nature of the project, you're forced to budget heavily due to the expensive hardware, expert staffing, and so on. You're also very concerned about quality, because it feeds directly into what is presumably the *next* "project"—the search for a cure. While it's certainly possible that you could come up with a second-best resolution for vCJD, you're looking for the ideal solution to the disease. Quality is of paramount importance.

But nothing prevents you from spending all this money and buying all this top-notch stuff *quickly*. Because of the TQB slider, if you introduce a well-funded budget and provide excellent quality staff and materials, the deliverable will come in on time.

Recall what I said about the point of the project—outfitting the company for the task, not finding a cure itself. Scientific research isn't something that's managed well by standard project methodologies, because you can't be assured of the deliverable, no matter how hard you try. If that were the case, then we could easily assemble a project to develop an anti-gravity device or a time machine.

## ***Assessing the Impact of Regulations and Requirements***

Some projects are initiated due to an outside requirement or regulation. My wife, for example, is the director of a group of programmers who handle income tax programs for the state of Colorado. Every year the legislators mandate changes to the taxes that Coloradoans must pay, which in turn requires that changes be made to augment the tax systems. She has no choice over the fact that the changes must be made (and really doesn't have much choice about the TQB equation—usually the changes have to happen regardless of budget).

More often, projects have legislative, regulatory, or other third-party restrictions imposed upon their processes or outputs. For example, suppose that you are managing a project that will create a new IT system for a funds management company, one that's in the business of managing individual stock portfolios. You can imagine that this company is heavily regulated by the Securities and Exchange Commission (SEC) and that your new system, in turn, will encounter several regulatory guidelines that you must follow. Especially pertinent will be the security aspect of your new system. You must be able to assure the SEC and your shareholders that the system is hack-proof.

It's important that a project manager be able to not only recognize the need to investigate specific industry regulations and requirements, but also to communicate this need and its associated impact on the project scope and project plan to the stakeholders.

Regulations and external demands can take on all sorts of shapes and sizes. You may find that even small tasks and implementations associated with your project need to line up with a set of rigid guidelines. You will also have to research what kind of organizations provide required guidelines and govern standards. Here are a few examples of the many external considerations you need to account for:

**Legal and regulatory conditions** Know the statutes covering the type of activity your deliverable involves. If you collect information about customers, are you complying with privacy laws? Do you know which types of encryption can be exported legally? Also, you may face government reporting and documentation requirements or public disclosure rules.

**Licensing terms** Suppose that part of your project requires that developers write some code according to a Microsoft application programming interface (API). You need to be well aware of the licensing ramifications associated with using a Microsoft API. Trademark, copyright, and intellectual property issues all enter into this category.

**Industry standards** Your project may utilize various interfaces between systems. Is there some standard that governs such things? For example, Microsoft uses the Web-Based Enterprise Management (WBEM) standards to move management data from one place to another. You will need to find out how your new system can use the Windows Management Instrumentation (WMI) interface to provide support for a heterogeneous system that you're developing. Theoretically, you would need to determine what, if any, specific methodologies or approved coding practices should be used in the implementation of your project.

Considerations such as these will help you refine the scope of the project (and probably adjust the TQB sliders), thus producing a more accurate project timeline.

## ***Summary***

In this chapter, we talked about a very important document, the project's scope document. The scope of a project consists of four basic elements: the justification for the project, the product the project is going to produce, the deliverables that make up the product, and the criteria by which we'll judge the project's success.

In order to produce that, you have to accumulate some basic information:

- Start by describing the background of the project. Why is this project needed? What possible good can come from putting so much time and resources into the project?
- Next, delineate the deliverables of the project. With IT projects, deliverables can be esoteric, and you need to make sure you've clearly enumerated the items the customer can expect.
- Also describe the deliverables' creation strategy. What are you going to do in order to create these?
- State the targeted completion date; you can include a specific date or a range of dates such as the quarter and year.
- Identify the budgetary resources you'll require.
- Then pay quite a bit of attention to the risks that you see associated with the project. For example, if a new online catalog project stands to make only a certain amount of money in a very short time window, what are the risks if the project deploys too slowly to really recoup the expected profit?
- Pinpoint the project's priority, in the pecking order of projects.
- Name the project sponsor(s).
- Mention the tools and resources that you've already determined you'll use.
- Finally, talk about the assumptions you've made regarding the availability of necessary resources.

Certain scope elements play into a well-written scope document. You should include the stakeholders in your scope document. You should also mention the requirements needed for successful completion of the project. The requirements can include those that are mandatory and those that are optional.

The time/quality/budget slider is of importance to you when planning projects. The more you can commit to one or two of these areas, the better you can expect the third to be, and vice versa. If you have to limit one of these, you probably have to make up for that in the other areas.

Finally, we talked about the importance of evaluating rules and regulations that might play a specific role in your project's implementation.

### ***Exam Essentials***

**Be able to create an accurate scope document.** Understand the components that make up the scope document. Also be familiar with the reasons why things go into the document.

**Be able to determine the scope elements.** Be familiar with the key elements that need to be detailed in the scope document—items such as the stakeholders, specific project criteria, conclusion date, and budget.

**Possess an intellectual and practical knowledge of the balance among time, quality, and budget.** Understanding the TQB equilibrium is one of the keys to solid project management.

**Understand the role of rules and regulations in a project plan.** Be prepared to investigate the possibility of rules and regulations associated with a given system and make plans to adjust the plan accordingly.

### ***Key Terms***

Project management, like any other business process or technology, has its own set of terminology. Be sure you are familiar with the following terms:

assumptions	milestone
best of breed	phase review
budget	quantifiable

completion date	requirements
go-live	risk assessment
hard date	showstopper

## Review Questions

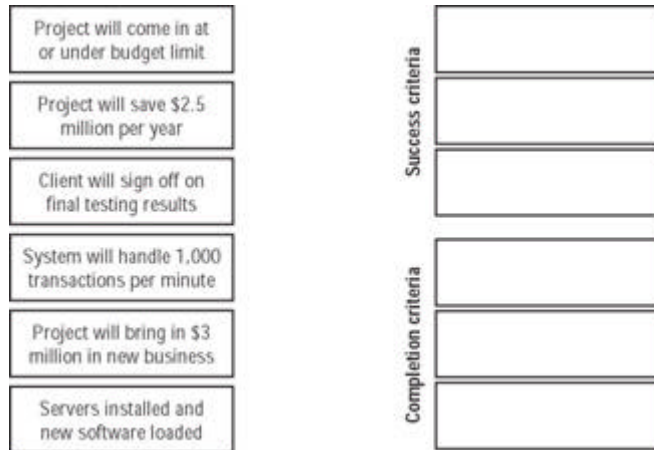
1. You're the project manager for a medical research corporation. You've been given a new project whose outcome will result in the formulation of a new cancer treatment involving precisely controlled mini-blasts of radiation using robots and computers. Which of these will most likely impact the scope of the project? ?
  - A. Assembly of key team members
  - B. Laws and government regulations
  - C. News of a competitor working on the same thing
  - D. Formulation of the requirements for the project
2. You're working on a project in which the budget has been heavily restricted. What are two of the outcomes that you might expect from such a project? Select two. ?
  - A. Short time to completion
  - B. Long time to completion
  - C. Not enough team members to help with project
  - D. Quality of deliverables may suffer
  - E. Sponsor may not sign off on project
3. What are the three main elements around which the requirements and scope documents are centered? Select three. ?
  - A. Project sponsors
  - B. Project stakeholders
  - C. Project team members
  - D. Project budget
  - E. Project completion date
4. What parts of a scope document together represent the final product that the project is supposed to produce? ?
  - A. Expected outcomes
  - B. Team members
  - C. Sponsors
  - D. Deliverables
  - E. Budget items
  - F. Stakeholders
5. What three project elements act in harmony with one another and can produce varying outcome when not balanced? Choose three. ?

- A. Budget and costs
  - B. Team members
  - C. Quality of deliverables
  - D. Time
  - E. Sponsors and stakeholders
6. You're the project manager for a client/server system that will provide online customer support people to take orders and answer questions about products using chat sessions over the Internet. Select all the *optional* requirements. ?
- A. Chat session server
  - B. Chat session software
  - C. Database server
  - D. E-mail server
  - E. Internet connection
  - F. User interface
  - G. Web servers
7. Who is responsible for identifying and mitigating risk in the project? ?
- A. Sponsors
  - B. Stakeholders
  - C. Project manager
  - D. Corporate management
8. Identify the items that might represent completion criteria for a project. (Select all that apply.) ?
- A. System will present a browser-based user interface.
  - B. System will identify items that compose the top 15% of customer orders.
  - C. System will manage incoming phone calls and present them to the customer service representative on the PC screen.
  - D. System will provide account information for 100% of returning customers calling in for assistance.
9. Which items represent milestones? (Select all that apply.) ?
- A. Assembling of team members
  - B. Key software module finished
  - C. Servers procured and shipped
  - D. Sponsors sign off on requirements
10. When considering the project's budget, which of the following items should be noted in the project scope document? (Select all that apply.) ?
- A. Location of contingency funds
  - B. Plus or minus tolerance

- C. Credit limit  
D. Consequences if budget not met  
E. Account signatories
11. Identify the items that should *not* be included in a project scope document. (Select all that apply.) ?
- A. Anticipated budget  
B. Completion date  
C. Deliverables  
D. Hardware needed  
E. Project requirements  
F. Sponsors  
G. Stakeholders  
H. Team members
12. You're one of eleven project managers working for a large company. Your staff is responsible for developing all projects company-wide. What will be one of the constraints that you might have to point out in your scope document? ?
- A. There will be budget limitations.  
B. Your project might be in competition with others.  
C. You're handling multiple projects.  
D. Other managers may nix your project.
13. When creating a project scope document, what is one of the assumptions that you will make? ?
- A. Who the project sponsor is going to be  
B. Who the stakeholders are  
C. That promised project resources will be available  
D. What the deliverables will be
14. You're well underway with a major project when one of your development engineers alerts you to an unforeseen problem—a delay in the procurement of a specific piece of hardware—that is going to require a significant addition of time to the project. What should you do? ?
- A. Adjust the timeline of the project and notify the stakeholders.  
B. Adjust the timeline of the project and notify the sponsors.  
C. Adjust the timeline of the project and obtain sign-off from the sponsors.  
D. Tell the engineer that he must complete the project on time.  
E. Add developers to the project.
15. Which of these will a project sponsor have to take into ?

account when considering your project? (Select all that apply.)

- A. The priority of your project as it relates to others
  - B. The human resources available for the project
  - C. The technology that will be used to create the deliverables
  - D. The budget dollars that are available
  - E. The equipment that will be required
- 16.** Which items could qualify as project deliverables? (Select all that apply.) **?**
- A. The way the user input screens will look
  - B. The relational database management system (RDBMS) that will be used for the data
  - C. The processing that the programs will do to the data
  - D. The servers that the programs will run on
- 17.** Who is responsible for accepting or not accepting the risks associated with a project? **?**
- A. Project sponsors
  - B. Project stakeholders
  - C. Project client
  - D. Project manager
- 18.** When preparing the project scope document's background statement, what are some of the items that you'll include? (Select all that apply.) **?**
- A. Why the project is being initiated at this time
  - B. Alignment with corporate strategic goals
  - C. Project client's name
  - D. Other corporate initiatives that this project will work well with
  - E. Projected return on investment (ROI) of the project
- 19.** Insert these project elements into the appropriate category to identify them as either success criteria or completion criteria. **?**



20.

You're the project manager for a project that is about 10% underway. You've found out that the project sponsor's boss didn't approve the budget for the project you're working on. What steps do you take? (Select all that apply.)

?

- A. Modify the scope document to show the reduction in budget
- B. Continue on with the project
- C. Consult the project sponsor
- D. Discontinue the project

**Answers**

1.

B

When your project may attract visibility because it's entrenched in a regulated technology, you'll very definitely have to take into consideration the rules and regulations associated with what you're trying to do.

2.

B, D

Recalling the time/quality/budget equilibrium, we know that if budget is short, either we must take longer to ensure the quality outcome of the deliverables or the quality will suffer.

3.

B, D, E

When formulating the scope document, you must take into consideration the estimated completion date of the project, its budget, and its stakeholders (who will drive the requirements). There are components that pivot around these elements as well.

4.

D

The deliverables, which can be thought of as "subproducts," when combined together produce the entire result of a completed project.

5.

A, C, D

The time/budget/quality equilibrium says that if one element falls short, the other two have to stretch to make up the difference. Short on budget? Then in order to successfully conclude your project with a high-quality product, you'll need to extend the time the project takes.

6.

D

When you're working on your customer support website, you'll need to develop a UI for the customer support people to use. You'll also need a variety of servers dedicated to the support of the system—chat session, database, and web servers. You'll also require a connection to the Internet and some sort of chat session software. Since nothing was mentioned in the case about e-mail, then it's officially on the “nice to have,” not “need to have,” list.

7.

C

It is the responsibility of the project manager, when assembling the scope document requirements, to identify those risks associated with the project.

8.

B, D

Completion criteria generally pinpoints a numeric method by which you can ascertain how well the system was developed and is working. The UI type and phone-to-PC feature describe requirements, not completion criteria.

9.

B

The procuring of servers is a budget item, not a milestone. The placing of a server into duty might represent a milestone, however. The assembling of team members and sponsors signing off on requirements don't represent milestones, but functional aspects of formulating the project plan and scope document, respectively.

10.

A, B, D

Within your scope document, you point out any emergency or contingency funds that may be able to be utilized, should you need them. You determine and publish the amount, plus or minus, that you're allowed to fluctuate within the budget. You also mention the consequences of not meeting the budget.

11.

D, H

The hardware you're going to order doesn't need to be in the scope document. Team members aren't considered stakeholders and don't need to appear in the scope document either (except as mentioned in the section on resources you are assuming will be available).

12.

B

In an environment where multiple projects are going, one of the constraints that may surface and needs to be pointed out at scope definition time is the fact that your project may be in competition with another.

13.

C

One assumption that you're forced to make when writing your scope document is that the promised project resources will be available as you require them. The other options are not assumptions, but actual information that's already determined.

14.

C

When the scope of the project has changed, which it has in this case due to the pushing out of the targeted completion date, you must obtain sign-off from the project sponsor.

Adding developers probably won't help in this situation because the problem's been determined and a solution proposed but there is a time requirement.

[15.](#)

A, B, D

The project sponsor will be concerned with the priority of the project as it relates to others that may be in the loop, and the resources, both budgetary and human, that will be available. It's you and your team's job to determine the equipment and technology that's required and put that in the project plan.

[16.](#)

A, C

Deliverables are those things that you expect from the project—what it will do and the way that it will look. The kind of servers and RDBMS that the programs will use are a part of the requirements document, not deliverables.

[17.](#)

C

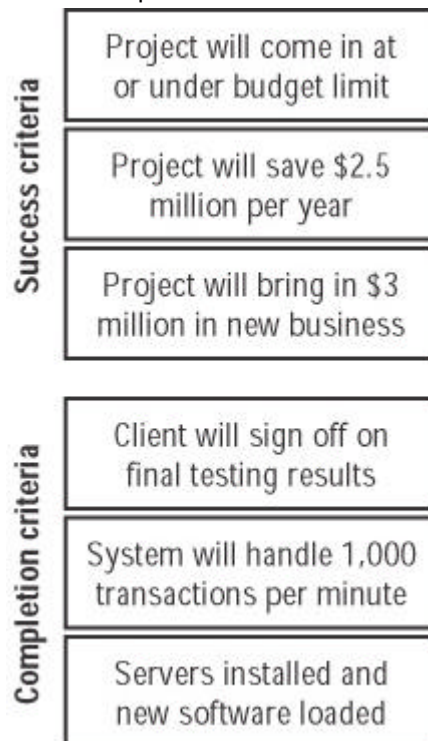
The client is the one who'll have to live with any associated risks and needs to be the one who decides whether the risks are acceptable.

[18.](#)

A, B, D

The scope document's background statement includes information about *why* the project is being undertaken. You include why the timing is right, what corporate goals and objectives this project can help achieve, and what organizational strategies this project can promote. The background statement probably doesn't include the client's name or expected ROI.

[19.](#)



The difference between success criteria and completion criteria is an esoteric one. With success criteria, you're asking yourself, "What things should happen that will cause the sponsors to declare this project a success?" On the other hand, completion criteria are hard facts about the

project that would lead you to say you've successfully brought the project to a conclusion. The success criteria deal more with the business aspects of the project, while the completion criteria talk about process details that must be in place.

20.

C

You should immediately go to the project sponsor and ask her about what you've heard. If she validates that the project isn't funded, she has no choice but to discontinue it—the project sponsor is the one who makes the decision to stop.

## Chapter 4: Further Refinement of the Project Scope

### *CompTIA Exam Objectives Covered in this Chapter:*

- 1.8 Identify the following as important roles and responsibilities that should be determined during the definition of project scope:
  - a. The role of the customer (sponsor) of the project as they relate to the project manager
  - b. The major skills required in the project team
  - c. The type of team structure; e.g., part-time matrix, full-time matrix
  - d. The role of the project manager including any or all of the following:
    - Responsibilities, accountabilities
    - Authority; formal and informal
    - Percentage of time available to this project
    - Performance appraisal process relative to this project
    - A communication plan including type of communication, purpose, recipients, and frequency
- 1.9 Given a proposed scope definition and based on the scope components, assess the viability of a given project component against a pre-determined list of constraints, including:
  - A clearly defined project end date
  - A clearly defined set of monetary resource or allocation
  - A clearly defined set of product requirements, based on a thorough decomposition of the system's hardware and software components
  - Clearly defined completion criteria
  - Clearly defined priorities
  - The relative priority of cost, schedule, and scope
  - Project ownership
  - Mandated tools, personnel, and other resources
  - The requirement that scope will change only per change control
  - Vendor terms and conditions
  - Company terms and conditions
  - A "best practices" life cycle for this type of project
  - Required reviews of deliverables by stakeholders and approvals by sponsors
- 1.10 Recognize and explain the need to obtain formal approval (sign-off) by the project sponsor(s) and confirm other relevant management support to consume organization as the project scope statement is being developed.

Having built the skeleton of your project's scope, you can now move into its refinement—the muscle, hair, teeth, eyes, and skin, if you will. In this chapter, I'll talk about things like

determining roles and responsibilities, assessing project viability, and obtaining formal buy-in for the project from its sponsor.

## ***Determining Roles and Responsibilities***

Development of the project team is an important step. Building a high-quality, professional team to implement the project will not only help bring the project in on time, with a satisfactory result, and under budget, it will also send a message that the project is important and effective. Solid team members might even point out weaknesses in a project and make recommendations that could affect its overall scope. So be it—that's your role as project manager, to be a truth-teller about the project and to bring it to a successful conclusion, rather than bring in a shabby product simply because you obeyed unreasonable timelines or worked with minimal resources. Putting together a crack project team will help you do that.

On the other hand, if you fail to take into consideration the roles and desires of the customer or sponsor, it doesn't matter how crack your project team is—your project will fall down.

### **Defining the Role of the Customer**

The CompTIA objective that handles this section might at first seem to be a bit imprecise. The objective says, in part: "The role of the customer (sponsor) of the project..." However, it's important to understand that the customer may not be the same person as the sponsor. Recall that the sponsor is the person who wants the project to succeed. The customer is one who will benefit from the project. These are not necessarily the same thing.

Suppose that you've been commissioned to act as the project manager for a project that will provide significant upgrades to the customer relationship management (CRM) software for your company's call centers. The customer or client is the direct recipient of the CRM software upgrades—in this case, the call center agents who actually use the software, along with their managers. But the sponsor might well be the vice president for customer relations, who doesn't directly benefit from the upgraded software but who is certainly interested in customer calls being answered faster and better by the enhancements the project results in.

**Tip** In project terminology, the words *client* and *customer* can be used interchangeably.

Probably the biggest problem you'll encounter as you work through a project is that many clients don't go through a formal project change process in order to get an enhancement made to some facet of the project's deliverables. The client might go directly to a team member and request "just this one little thing." The problem with this kind of activity is that the "one little thing" isn't conveyed to anyone else on the team, and the whole task addition tends to mushroom due to the lack of information. It must be clear that the IT group and/or the project team should be the only people that can request changes due to technology issues, and that *any* change must be requested through defined procedures. When clients ask for "one little thing" too often and such requests are granted, your project can quickly suffer from *scope creep*—a phenomenon in which the scope grows without anyone being aware of it until it's too late. Budget and schedules suffer when scope creep happens, and the deliverable is often late.

### **Assessing the Major Skills Required in the Project Team**

To assemble your cast of team players, you must assess the skills that need to be represented on the project team in order to make the project successful. There are several different categories you need to consider when determining the skills required. In each of these areas, it's necessary to have an expert in the specific brand or type of system, hardware, or component your project will use—or even one who can help choose the best system.

**Note** This list is necessarily tech-heavy, because we're talking about IT projects. See the last items in the list for consideration of nontechnical experts.

**Databases** If databases are going to be used in the system, will they be based on Oracle, Microsoft SQL Server, Informix, Sybase, DB2, or something else?

**System hardware** Know which devices will be involved, such as servers, tape backup machines, printers, scanners, and plotters.

**Communications gear** Many systems are integrated with telecommunications gear or utilize routers, switches, and hubs.

**Development environment** What method will you be using to write the code that will run the system? Some languages use *development environments* that provide an interface for the developers to write their programs. Perhaps the most famous of these today is Sun's Java Development Environment, but there are others such as Microsoft's Visual InterDev, Sybase's PowerBuilder, and Altova's XML Spy. It's obvious that you'll need to pick the correct development environment for the type of code that's going to be written and then staff your team with developers who are skilled in that environment. For a new environment (such as XML Spy), some time may be required to train the project members in its use, and this time should be built into the project's scope.

You should discourage the use of new languages and development environments unless you're switching user paradigms and the change necessitates the switch to the new language (moving from client/server using PowerBuilder to thin-client using XML Spy, for example).

**Warning** Most importantly, you should decide on a development language and environment and then *stick with the choice throughout the project*. To change your mind about a language or development environment during the project will probably spell the death of the project—or at the very least its protracted sickness.

**Security** With the advent of public key encryption, certificate services, and web-based applications, security has become a distinct genre that may require a specialist. Specifically, this person might be responsible for setting up a certificate hierarchy for your application so you can ascertain who's using it (and so users know they have contacted the correct server). The security specialist will also be concerned about intrusion detection, handling viruses, and other potential security problems. Security personnel usually should, at minimum, have gone through some training to understand how firewalls—very complicated software products—work.

**Web-page development** You could lump this category under development environments, unless you need someone who's able to design good-looking web pages with quality graphics. This kind of development doesn't usually fall within the capabilities of your garden-variety business-logic coder. You might have one person writing the Java code for your business rules engine and another person developing the web pages that will interface with the code.

**Application servers** A new kind of environment is something called an *application server*. Software such as BEA's WebLogic and Microsoft's BizTalk Server and AppCenter Server are just a few of the sophisticated environments available for application processing, balancing, and integration.

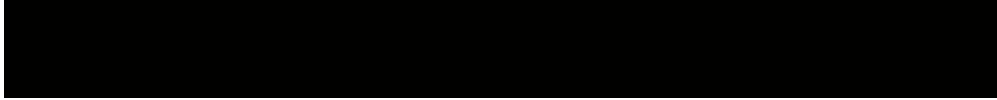
**Specialty software** Some software is so specialized in nature that an expert is needed to achieve successful project implementation and deployment. Microsoft's e-mail program, Exchange 2000 Server, is one example of a product that requires a deep understanding of the way the software works. Cisco's complex call-routing program, GeoTel, is another great example. Server network operating systems (NOS) and associated server application software will also probably require a program-specific expert.

**Business process** The most important team members may be the people who thoroughly understand the business processes the project is trying to affect. For example, if you're developing a new tax management program for a group of a tax accountants in your corporation, you must have somebody on the team who has an intimate grasp of how the company's taxes are calculated and paid. On the other hand, if

you're the PM for an enterprise-wide e-mail server deployment, you may not require a business expert.

**Adjunct skills** If the project is very large, you may need a budget person on the project team to help you with the project budget. Other functions, such as documentation, may be helpful on a project and require the assistance of a nontechnical team member.

The above list is undoubtedly not all-inclusive. Surely you can think of other categories. The point is that you must think of these categories as you assimilate the folks you need for your project.

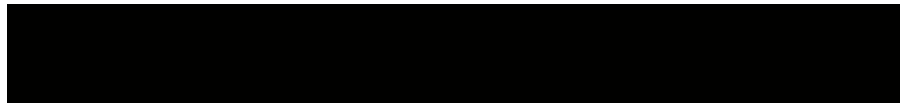


### **Real World Scenario: Finding the Balance with a Two-Skill Team Member**

Here's one other thing to think about regarding this subject: Perhaps one person has two or more skills that you need in order to accomplish a project. It will be vital that you monitor the time this person spends on the various tasks of the project so it's proportional to the need for those tasks.

Suppose you have a developer who's an expert in XML and in web-page design. You need both skills to get your project out the door. Which comes first, the XML or the page design? If the team member isn't a good manager of his time, you may find that he ping-pongs back and forth between the tasks or consumes a lot of time gearing down on one and gearing up on the other, delaying both aspects of the work.

It may be wiser in the long run to have a person devoted to each operation, thus avoiding the whole balance-of-time issue.



### **Determining the Team Structure**

There will be three different ways that you can use your team members:

- Full-time matrix
- Part-time matrix
- Mixed matrix

When staffing your team with team members, will they all be full-time or all be part-[time](#)? Or will some be full-time and some part-[time](#)? The answer to this question will shape the scope of the project and, hence, its predicted finish date.

### **Determining the Role of the Project Manager**

The project manager's role will likely change depending on the size of the project. Small projects (such as the installation of an antivirus product on an e-mail server, for example) probably don't require the full bore of project management planning, staffing, and techniques. On the other hand, implementing a systems management software package throughout an enterprise will very definitely require a more formal approach.

The larger the project, the more formalized the role of the project manager. In all but the smallest of projects, the scope document needs to reflect just what kinds of duties and powers the PM has. Following are some things to consider when describing the PM's role:

**Responsibilities and accountabilities** What are the specific responsibilities that the PM will be required to maintain? Who will the PM be accountable to?

**Authority status** What kind of authority will the project manager have? This question has great importance. If the PM doesn't have formal authority—meaning that what he says goes with regard to the project— there may be many "mutinies" throughout the

project's life cycle, the project's scope may suffer, and the project may even suffer from a quality problem. A formal authority is much more desirable on larger projects, whereas more informal authority may be fine for smaller ones.

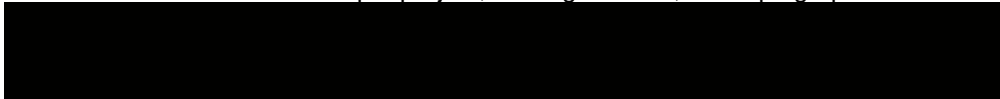
**Available time** What percentage of time will the PM be available for the project? Will she be dedicated to the project full-time, or will she need to spend a portion of her time on one project and the remainder on others? The larger the project's scope, the more obvious it will be that the project requires a full-time manager. The problem lies in mid-size projects that may not merit a full-time PM; these can get bogged down by being given to someone who needs to dedicate much more time to other duties and looks at the project as an ancillary task.

**Performance appraisal concerns** Who will provide the project manager's performance appraisal, and what items will compose the detail of the appraisal? It's probably wise to sit down with the reporting authority and hammer out an evaluation system prior to starting the project.

**Development of a communication plan** This is something you'll be questioned on when you take the test—it is so important to the success of the project. The project manager develops a communication plan that details the method (written, electronic, personal), purpose, recipients, and frequency of communications. Project sponsors cannot read minds, so it's important that PMs make sure they extensively communicate the status of the project.

**Tip** An intranet site is a great way to introduce communications that can be available on a nearly real-time status.

So far, we have defined the role of the customer; identified all of the key skills required of the team; and established the functions of the project manager. Why don't we pause now and take a look at how our sample project, Prestige Hotels, is shaping up?



### **Prestige Hotels: Roles, Skills, and Responsibilities**

In the RLV Virtual Slot Machine (VSM) project, you've identified that you need two categories of technical people: graphic artists, and website developers who can make the action happen underlying the graphic arts. You'll need some database work, testing, and marketing.

The graphic artist will be responsible for developing a slot machine, its arm, and the associated prize graphics that will make it look similar to a real Las Vegas slot machine. The arm and dials have to be separate, because code will be supplied so it appears to have been pulled. There will actually need to be different versions of the arm showing it up and down. The graphic arts segment of the project will, you believe, take a substantial portion (perhaps as much as half) of the project's time—you'll know more when you get to the task-estimating section. You feel that you only need one graphic artist to render all the necessary drawings. Prestige Hotels has a staff of several graphic artists for just such purposes.

You've also identified that there will need to be some development work that mechanizes the VSM and makes it appear to be a working "one-armed bandit." You'll use experienced website developers for such work. Prestige Hotels also has a group of website developers, among which are two dedicated database administrators (DBAs) who work on the adjunct database work that the web developers might get involved in.

You'll need to make sure that you've adequately tested the product, including the VSM itself, associated links, prize awarding, and other features.

Finally, you'll need a marketing segment that gets the site out and advertised to both the media and cyber worlds so that people begin to hit it.

## Assessing Project Viability

The key viability question at this scope-refinement stage isn't "should we do this project?"—that was asked and answered in your feasibility analysis in the project concept document. Assessing project viability now means detailed questions such as "when should we do this project?", "why are we doing this project?", and "how will we do this project?" All are valid questions; answering them requires objectivity, a conviction to meet the corporation's goals, and a view that encompasses short- and long-term perspectives. A project that doesn't have a lot of urgency may very well be important to develop toward the day when it does.

Project viability is measured against a variety of constraints, some of which are discussed here. Projects also face constraints that the PM may have no control over. A company may have a list of dozens of projects it wants to accomplish in a set timeframe, yours just one among many. A committee is charged with reviewing the projects and prioritizing them in the order that's deemed the most logical. Your project may wind up nowhere near the top of the list—a constraint that's out of your hands.

**A clearly defined project end date** A hard deadline decides many questions. It may be one that somebody pulled out of the air, but if the deadline is agreed upon by all concerned parties, it's the project manager's responsibility to do everything in her power to make sure the project is finished by then.

**Monetary allocations** Project managers may be tempted to try to increase a project's budget based on "we've gotta have this" exclamations from the technicians who are constructing the must-haves for the project. If a PM doesn't have a technical background, adhering to the budget is especially difficult, because he'll never be sure whether smoke's being blown his way. The bottom line is that a project has a defined money pot from which to draw, and it's the PM's job to make sure that other decisions are adapted to that limit, not vice versa.

The PM, if nontechnical, would have to resort to whatever resources were available in order to estimate the allocations. This is where PMI's methodology plays in more handily than PACE or other, less-complex systems. Using the more rigorous methodology, you don't get to the phase of time- and work-estimation until project planning, at which point you've also assembled your team and have technical expertise on hand to go forward with your estimations.

**Thorough understanding of required hardware and software** By decomposing the system into its fundamental parts, you can get a pretty good idea of what kind of hardware and software is required in order to make the system work. Project changes that would add to the shopping list should be suspect because they could signal reduced project viability.

### Don't Fall for the Easy Integrated-Systems Idea

You or your technical team members may be tempted to simply integrate systems. For example, you have one system on a big Unix computer and another on a Windows-based client/server system. You need the two to talk to each other. The temptation may be to try to put a "homegrown" system together by coding to integrate the two. This might be successful and might not. When considering integrated systems, it's key to make sure that you completely understand the nature of disparate systems, that there is adequate documentation about integrating them with the "outside world," and that you have the technical capacity on staff to handle the integration. Systems integration is a highly specialized genre that requires complete understanding by very capable technicians.

**Completion criteria** What do we need in order to call the project finished? That's the goal of completion criteria. They should be specific and clear: "All users will be moved from the old system A to the new system B," for example. Well-thought-out completion criteria are helpful for PMs who would otherwise be tempted to tinker with the project to get it "just right." If your project is moving into tasks, deliverables, or spending that don't address a completion criterion, the project's viability is in question.

**Priorities** The priorities of the project need to be elucidated not only in such a way as to let all participants know what the aim and intent of the project is, but also to keep in their minds how the project contributes to the corporate effort. "We're going to send paratroopers onto Normandy Beach." "Why?" "Because it's going to assist us in winning this war."

**Cost, schedule, scope** This is just another way of saying that time, quality, and budget balance against each other in putting boundaries on a project. The quality of a project may be forced to be reduced when the budget and time available are too low—not that you want quality to be reduced, but sometimes it's inevitable. Often, in situations such as this, instead of an *overall* reduction in deliverable quality, you'll leave out extras you may have added in a fully staffed and funded project (graphic arts on a web page, for example).

**Project ownership** The *owner* of the project may be different, though not usually, from the *user* of the project's deliverables. You buy a car for your son. You're the owner (because you pay the car payment and put gas in it most times), but your son's the driver. The telecommunications department may desperately need for the satellite services group to get their Iridium satellite telephone system going, because then the department can begin issuing satellite-based phones to people who travel to areas where a regular phone isn't available. The telecommunications department is both the customer and the user, in this case. But the owner of the project is usually the *financer*—typically, the project sponsor. The owner is the one who can, if politically powerful enough, influence the project's priority. Project viability can be influenced by this person—the kind of person who might say, "I really think this project should go, even if it does mean we have to invent a component." The owner guides the decision-making process. Owner essentially equals sponsor and may often also equal customer. Conversely, an owner's employees may be the end users of the system, whereas the owner never touches it. For example, a vice president in charge of customer relations, one who manages many call centers, can be the owner of a new call-center system whose mission is to drastically improve customer care. The VP will never utilize the system—her call-center folks will—but she owns it and sponsors it nonetheless.

**Mandated tools, personnel, and other resources** Typically, this constraint exists because the company already has a good, strong system in place and the managers would rather not stray from something that's working into a system that utilizes unfamiliar hardware or software. A strong Oracle shop isn't likely, for example, to readily accept a system that uses Microsoft SQL Server, and vice versa. Tooling up, in terms of training, licensing costs, and other preparations, would be very time-consuming.

This category also includes personnel who are must-haves as project team members. Suppose Sherry's a tremendous software engineer with an awesome background in XML coding. Your project requires extensive XML development. Sherry may be a very logical choice that managers, not you, recommend for placement on the project team. The point of this constraint is that the PM must understand what tools, personnel, or other resources *must* be used for satisfactory conclusion of the project.

**Change-management requirements** This is one of the constraints that the project manager must lay down—a constraint that likely will not come from the lips of the project sponsor. It is the job of the PM to put together a comprehensive change-management system and mandate its usage with a decree like, "There will be no changes made to the project unless we go through the change-management process to thoroughly evaluate the need and cost of the change." This reduces scope creep.

**Vendor terms and conditions** This constraint can arise as a result of a vendor's ability to deliver a needed product or service in a certain way at a given time. You need ten servers, configured in a specific way, for example. The vendor is able to deliver six now but won't be able to deliver the rest for two weeks. How does this affect the project?

The *statement of work (SOW)* that a vendor provides is a document that the project manager must clearly understand and interpret before the project sponsor signs it. In the SOW, the vendor clearly delineates what they will do and, more importantly, what they will *not* do. Therefore, it's important to make sure the SOW aligns with the scope of the project.

**Company terms and conditions** How does the company's situation affect the scope and viability of your project? Suppose that your corporation has offices throughout the world. What security requirements might your company put on the project due to its international nature? The phrase "terms and conditions" most often implies the company's rules regarding work, projects, spending, and so forth.

**Best practices life cycle** Looking at other projects of this scope and nature, how long did they, on average, take to complete? Of these projects, which utilized practices that are known to lead to successful completion (fostering a rigorous change-management paradigm, for example)? By reading the [lessons learned](#) from other projects, you learn what *not* to do to facilitate a successful project. The *project life cycle* is the average amount of time that you'd expect a project to move through its phases toward completion; it is shortened and improved by using best practices.

**Tip** Lessons learned, an important part of a project's completion data, is something that's hard to extract from project team members, because they often don't want to admit that anything went wrong in the course of the project. Nevertheless, gathering and publishing lessons learned data can lead to useful information for similar projects.

**Required reviews and approvals of deliverables** The scope document should also stipulate which stakeholders will review the project's deliverables and that the sponsor is required to sign off on the readiness and completeness of the deliverables. It's very important that you have a document that clearly illustrates who reviewed and accepted the deliverables. Part of your effort here is to tone down the "blamestorming" that happens when deliverables aren't what users thought they'd be and get the monkey off of the project team's back. Knowing who will approve the result helps keep the project focused on that result.

When users sit down and thoroughly test the deliverables in a live scenario, this is called acceptance testing. In the case of code, you're testing to make sure it does what was requested and that it works well. Upon finding that the code is acceptable, the deliverables can be approved. Acceptance testing is very often a formal phase of the project. By making sure you're adequately reviewing the quality of the deliverables from time to time, as well as performing a final review at closure time, you are assuring the sponsors up front that the project is viable from a quality standpoint.

All of the above elements should find their way into a well-written scope document. Note that the project's size dictates the elements that you might choose to include in a scope document. For example, "corporate terms and conditions" might not find its way into a little client/server project that affects a small group within the company. Likewise, your project might be something for which there's no industry precedence to guide a "best practices project life cycle," or small enough that you don't feel it merits the research to find such precedence.

### **Real World Scenario: The "Switching Horses in Midstream" Foul-Up**

You're the project manager for a company that, up to now, has never investigated the use of relational database management systems (RDBMS) that are capable of handling tens of thousands of records. Most of the company's current databases were built with Microsoft Access. The project involves the use of an enterprise-class RDBMS. Originally, RDBMS A was selected as the database of choice. Project developers were sent to RDBMS A class and received expensive and intensive training on the product.

Halfway (six months) into the project, the technical team came to you and made a very strong case for using RDBMS B instead. Though you had some reservations, you went to the sponsor to say that you thought the change was good, and you received the OK after you committed to *not* changing the project deadline. You then sent the development team for a new round of training in the new product. You also brought in consultants who were skilled in RDBMS B and could help you get the deliverable out the door.

Now, ninety days beyond the project deadline, your developers are still learning some of the nuances of the database system, and the end is not yet in sight! The consultants have racked up dozens of hours in charges and are coming back to you for permission to use more. The sponsor is, understandably, very angry, and you'll probably never get the opportunity to drive a project of this magnitude again. The project very likely will be killed.

In the Lessons Learned category, you write down that the death of the project can be directly attributed to the mid-project switch from RDBMS A to RDBMS B and the learning curve associated with the new product.

But in reality, it was the project manager who provided tacit approval of such a boneheaded move that is directly responsible for the death of the project (and perhaps the PM's career).

## ***Obtaining Formal Sign-Off by Project Sponsors***

Project sponsor sign-off is absolutely the most critical component of your work in developing the project scope document. Without sign-off, it's open season as to what the project consists of and what resources you'll use to accomplish it.

By presenting a well-formulated project scope document that contains all of the elements we talked about in [Chapters 2](#) and [3](#), you have accomplished the majority of the brute-force work that the project requires to get it going. Let's recap what you've accomplished up to now, noting that some or all of these documents can be incorporated into one document when utilizing a PACE methodology:

- First, you created a project concept statement (or document) that presents the basic ideas behind the project.
- Next, you created a project charter, one requiring sign-off by the executive project sponsor.
- You then developed a project scope document complete with all of the detail items associated with the project and the criteria that would denote successful conclusion and completion.

The project scope document is the legal binding authority that sets up the basis by which the project will be undertaken, states the resources to be used, restricts changes in the project plan, identifies the necessary project team skills, gives criteria by which you can estimate the success of the project and when the project has completed, and enumerates any constraints the project faces. It is at once a living document but one that's sealed and bound at signing time. By the time you get sign-off on the scope document, you should be very clear how the project will take place and when it will be done. There should be very little guesswork or need for redefinition after the scope document is signed.

Now that our project scope document for Prestige Hotels is completed, let's take a moment to see what it looks like when it's approved.



**Prestige Hotels: RLV VSM Final Scope Document**

We now have enough information to finalize the VSM scope document. You'll add final touches to this document, then present to the sponsors: Rolf Montenegro, executive director of RLV and executive project sponsor; Brittany Salvage, director of the RLV marketing group, and Pamela Brown, director of project management for Prestige Hotels. The latter two will be considered project sponsors but will not be the executive sponsor. Recall that a sponsor's definition is one who is empowered to authorize the project team to utilize the resources it needs to get the project's deliverables created and deployed.

Note the budget bonus boundaries—there's no reward for coming in two months early or 25 percent under budget. Too much ahead of schedule or under budget probably signals a loss in quality.

### **Project Title**

Reno/Las Vegas (RLV) Group, Marketing Website Virtual Slot Machine (VSM)

### **Background**

This project will create a website for the RLV Group. The website will provide a mechanism whereby visitors can spin a computerized rendition of a slot machine (called the "Virtual Slot Machine" or VSM) for a chance at winning prizes, including stays at one of the RLV Group's hotels, the Texas. People visiting the site will be able to view rooms from the various hotels managed by the RLV Group, reserve rooms, and obtain flight information from RLV Group's partner airline, qLines.

### **Deliverables**

Deliverables include the following:

- A partnership with an Internet service provider (ISP)
- Coding for a web page or pages with the requested content (see Requirements Document)
- Web graphics work to depict the slot machine
- Web-page content development
- Appropriate links to the qLines business-to-business (B2B) virtual private network (VPN) for purposes of checking airline flight status and prices

### **Deliverable Creation Strategy**

Deliverables will be created in house by Prestige Hotels' IT staff. Web developers will create the pages utilizing their preferred software development environment (SDE). Graphics will be developed by graphics personnel, also in the IT shop. ISP connectivity will be provisioned through the IT staff's Architectural Development department. Links to qLines will be handled by IT staff.

### **Estimated Completion Date**

The project will be delivered to the project sponsor one hundred eighty (180) days after signing of this document by the sponsor.

### **Project Budget**

The budget includes:

- \$100,000 for staff salaries during the web-page development process
- ISP connectivity fees at \$380/month—an ongoing expense RLV will have to account for in their bottom line—including dedicated server space and maintenance by the ISP of the website after it has deployed. The project budget will absorb the initial three months; thereafter, RLV

will absorb this expense into their financial basis. Maintenance by the ISP includes nightly backups, restoration capabilities, and promised 99.999% uptime, including scheduled maintenance windows.

- Prizes to be awarded by RLV Group, amounting to \$5,000 (\$3,000 for the Grand Prize and \$2,000 for the nine First Prizes).
- A \$20,000 budget tolerance will be allowed.
- A 1% bonus will be paid to the PM for delivery of the project up to 10 days early and up to 5% under budget. Final quality determination to be sign-off by executive project sponsor.

Total project budget: \$106,140.

### **Risk Assessment**

Of the triple common project constraints—time, quality, and budget—it appears that budget is most likely to need flexibility. The project must ship within the 180-day deadline due to the Las Vegas conference season coming up. Quality has to be representative of the quality visitors would expect to encounter when they visit one of RLV Group's hotels. Quality is the chief constraint for this project.

Other risks include persons under 21 years of age misrepresenting themselves, trying a spin on the VSM, and winning a prize that cannot be awarded.

### **Project Priority**

Since the disaster of September 11, 2001, hotel vacancies for the RLV Group have declined by 15% (compared to an overall 10% decline across the entire Prestige Hotels venture). This represents, in real dollars, a loss to RLV Group of \$75 million for the next fiscal year.

Of the fifteen high-priority projects currently under consideration in the Prestige Hotels Project Management Office (PMO), this project is fourth in priority and has gained Prestige executive approval to proceed.

### **Project Sponsor**

The project's executive sponsor is Mr. Rolf Montenegro, Executive Director of Operations for the RLV Group. The project's sponsors are Ms. Brittany Salvage, Director of Marketing for the RLV Group, and Ms. Pamela Brown, Director of Project Management for Prestige.

### **Predetermined Tools and Resources**

- Prestige Hotels' IT Staff prefers to use ColdFusion as its web development SDE.
- Prestige Hotels' IT Staff prefers to use Microsoft SQL Server for the databases it creates.
- All graphics development will be done using CorelDRAW.
- Prestige Hotels uses W2U (World to You) Inc. as its ISP. W2U has provided vendor agreements for a T3 carrier circuit and dedicated server space to be utilized by the RLV Group website.
- Prestige Hotels will utilize its own internal IT staff for all development during this project.

### **Resource Availability Assumptions**

Because this is a priority-four project and the other three projects ahead of this one on the list are non-IT related, it is assumed that 50% of IT staff development time will be devoted to this project.

### **Possible Project Constraints**

- Project priority may be a constraint if Prestige management determines that another project needs to step up the priority ladder. However, at priority four, this isn't a very likely constraint.
- Change control is an issue, due to the remote geographic separation of the Prestige and RLV. It will be important for the PM to pay close attention to any change-control cycles.
- Prestige is a company that prides itself on quality for its hotel guests. A website that denotes a lack of quality will not be acceptable. Quality is the chief constraint for this project.

### **Approvals**

Rolf Montenegro, Executive Director—Operations, RLV Group

Brittany Salvage, Director—Marketing, RLV Group

Pamela Brown, Director—Project Management, Prestige Hotels

### **Summary**

In this chapter, we continued our dialog about the scope document— that Magna Carta that gets your project authorized and rolling.

First, we talked about the roles and responsibilities that various entities associated with the project would assume. You describe the project team in the scope document. A variety of technological types may be necessary when implementing an IT project: database specialists, server gurus, even graphic artists. A very important project team member—one who's often overlooked—is the business expert who can keep the team directed toward meeting the business need the project is intended to solve. The project manager is the most important member of the team, not because he holds the technological keys to the kingdom, but because he controls the communications that makes the team work together toward the common goal. The PM is like a colonel marshaling troops around the base of a hill that they've been ordered to take. It's not incumbent on him to know everything there is to know about the technology involved, but to utilize the people who can in turn operate the technology towards the capturing of that hill.

We then moved on to discuss the overall viability assessment of the project. Several constraints may come into motion—items that can act as friction or guide rail to the forward momentum of the project. Among them are:

#### Project end date

- Monetary resources and allocations
- Project requirements
- Completion criteria
- Priorities
- Relative priority of cost, schedule, and scope
- Project ownership
- Mandated tools and other resources
- Change control
- Vendor terms and conditions
- Company terms and conditions
- Best practices life cycle
- Required reviews of deliverables

Finally, we talked about the importance of obtaining a formal sign-off of the scope document by the project sponsor.

## Exam Essentials

**Be able to name the roles and responsibilities of the various players in the project.** It's important to differentiate between the project sponsor, customers, project manager, and team members.

**Be prepared to name the constraints of a project and know how they affect it.** While the list in this chapter may not be exhaustive, it represents the most common constraints a project may face.

**Understand the importance of scope document sign-off by the project sponsor.** The scope document represents your authority to begin the project as well as the authority to say "no" when additions or magnifications to the project are requested.

## Key Terms

Project management, like any other business process or technology, has its own set of terminology. Be sure you are familiar with the following terms:

application server	project life cycle
constraints	scope creep
development environments	statement of work (SOW)
lessons learned	

## Review Questions

1. You're the project manager and are currently involved in the final stages of writing the scope document for the project. Who are the people involved in the project that you'll allude to in the scope document? (Select all that apply.)

A. Customer

B. Executive management

C. Project sponsor

D. Team members by name

E. Project manager

?
2. What are some of the things that you'll detail in the scope document regarding the project manager? (Select all that apply.)

A. Technical certifications required

B. Responsibilities and accountabilities

C. Type of authority given to the project manager

D. How performance will be evaluated

E. Communications plan

F. Percentage of time available to project

?
3. Your project team will be developing Visual Basic programs that access data in an Oracle database.

?

Which of these team members will be required?  
(Select all that apply.)

- A. Oracle database administrators (DBAs)
- B. Server administrators
- C. Visual Basic developers
- D. E-mail server administrators
- E. Web page developers
- F. Business process experts

4. Choose the types of team structure that can be denoted in a scope document. (Select all that apply.) ?

- A. Mixed matrix
- B. Mixed-duty matrix
- C. Split-duty matrix
- D. Full-time matrix
- E. Part-time matrix

5. What are the two types of criteria you'll refer to in the scope document? ?

- A. Budget
- B. Quality
- C. Success
- D. Completion
- E. Schedule

6. What component of a project's documentation will be included in the project book *after* the project is finished? ?

- A. Success criteria
- B. Lessons learned
- C. Completion criteria
- D. Customer satisfaction

7. You are the project manager for a large, complex project that is in the middle of an 18-month estimated timeline. Some key vendors are now entering into the procurement and delivery stage of key parts. The prices for these parts have gone up since scope document formulation time. The price increase is fairly hefty and may put the project in jeopardy. You go to the project sponsor to request a scope change to make up for the price differential. She is very unhappy about the news. Where in the scope did the project not account for this change? ?

- A. Vendor terms and conditions
- B. Company terms and conditions
- C. Communications
- D. Budget resources

8. You're developing a scope document for a large, complicated project that might wind up requiring the ?

utilization of resources outside the authority structure of the project sponsor, in another area of the company. How do you handle this? (Select all that apply.)

- A. Request a scope change should the additional resources be needed.
- B. Note this in the scope document and receive acknowledgment from the controlling authority over the outside resource.
- C. Note this in the scope document and obtain sign-off approval from the controlling authority over the outside resource.
- D. No scope document additions are necessary at this time.
- E. Consider appointing a second sponsor.

9. Your project is developing a new interface for a customer relationship management (CRM) solution for the customer service department. When customer service receives an incoming call, the caller will first pass through an interactive voice response (IVR) system so the user has a chance to enter his account number. The account information will then be looked up in the database and passed to the customer service representative's CRM screen at the same time the call is passed to the rep. The project was initiated by the project sponsor, the VP for customer support, who has signed the scope document. What role does the company's customer play in the project? (Select all that apply.)

?

- A. Has a direct impact on the project
- B. Has no impact on the project
- C. Will be responsible for some user acceptance testing
- D. Will be involved from start to finish

10. You've been given a project that has a very tight deadline. The project's costs must be held as low as possible. What will this scenario affect? (Select all that apply.)

?

- A. Quality of deliverable
- B. Scope of project
- C. Number of team members required
- D. Communications framework

11. The deliverables of your small project will be used by a handful of people in the marketing department. From the list of available items, drag those project constraints that belong in the scope definition

?

document for any size of a project to the Required box.

	Optional Categories
Project end date	
Monetary resources	
Product requirements	
Completion criteria	
Change control	
Vendor terms and conditions	
Company terms and conditions	
Best practices life cycle	
Required reviews of deliverables	

12. You're one of two project managers for your company. You're already working on one project that's occupying more than 50% of your time. You've been given a second project and, upon formulation of the requirements, you realize that the scope will entail that you be involved for more than 50% of your time on the second project as well. The second project manager has 100% of her time taken up with a high-priority project. What are some scope items that you can look at in order to be able to accommodate this project while not interfering with the scope of the other? (Select all that apply.) ?
- A. Project end date
  - B. Priority of the project
  - C. Communications framework for this project
  - D. Team members in the project
  - E. Project budget
13. What are some constraints that may affect the scope of the project? (Select all that apply.) ?
- A. Who the project sponsor is going to be
  - B. The required end date
  - C. The budget resources and other allocations
  - D. Lessons learned
  - E. What the completion criteria are
14. What scope feature do you have at your disposal to control scope creep? ?
- A. Sign-off of the project sponsor
  - B. Budget resource restrictions
  - C. Change-management processes
  - D. Communications framework

15. You're a project manager for a large company. You've recently been given a project that entails the development of a large, web-based application for e-commerce catalog shopping. You've never done a project like this before. What's one constraint that you could actually do some web research on to help you figure out what the scope of the project is really going to be? ?
- A. Budget resources
  - B. Best practices
  - C. Success criteria
  - D. Lessons learned
16. You've just finished a phase in a project plan in which your team members have developed an XML application that uses a Microsoft SQL Server back end. You're ready to finish the project. What's next in the scope of the project? (Select all that apply.) ?
- A. Acceptance testing by the users
  - B. Sign-off by project sponsor
  - C. Documentation of lessons learned
  - D. Development of system documentation
17. Your project involves a complicated system that enables communication between several disparate systems. What component of the scope document may require additional work in order to clearly elucidate the scope of the project? ?
- A. Deliverables
  - B. Project end date
  - C. Budget and additional resources
  - D. Project sponsor
18. You're the project manager over a preassembled project team that's working on a new client/server system. What component of the scope document that might not always be included will need to be included when you work up the project scope? ?
- A. Project deliverables
  - B. Mandated resources or personnel
  - C. Project success criteria
  - D. Management resources outside of project sponsor
19. Choose the items that represent responsibilities directly placed on the project sponsor, stakeholders, or customers. (Select all that apply.) ?
- A. Change control process
  - B. Project requirements
  - C. Reviews of deliverables
  - D. Sign-off

- E. Vendor terms and conditions
- F. Communications plan
- G. Best practices life cycle
- H. Priorities

20.

You're the project manager for a client/server project. The project's mission is stated as: "This project's end result will provide a method whereby the sales department can access sales figures from all international regions. The sales figures will be gathered by the system from the various regions and will be put into a central database where the contents can be viewed by sales personnel." Later, one of the customers wants to add this statement to the end of the project's mission statement: "Clients will utilize a browser to access the sales data." What must the project manager do to add this statement to the project's mission statement? (Select all that apply.)

?

- A. Examine the requirements to make sure the project can be adjusted to work with a browser
- B. Ascertain if there's a change in project scope
- C. Document the project scope and get sign-off from the sponsor
- D. Ask for an increase in the budget allocation
- E. Document the change in the change-management process

### Answers

1.

A, C, E

You won't refer to executives unless they're specifically involved as project sponsor. You won't refer to team members by name—only by functionality.

2.

B, C, D, E, F

Technical certifications may indeed be required for the project, but most likely not for the PM herself (though the IT Project+ certification would certainly be useful, wouldn't it?). The scope document should detail the responsibilities and accountabilities the PM will have; the type of authority, whether informal or formal; the performance appraisal process; and, most important of all, the communications plan that will be used. The communications plan should include the type, purpose, recipients, and frequency of communication. It's important to document the percentage of his time that the project manager is going to be able to give to the project.

3.

A, B, C, F

The problem doesn't refer to e-mail as being required for the system, nor does it say anything about web pages being needed. However, there are two tacit personnel that aren't

mentioned in the question, but are required: the server administrators and the business process experts. Typically, DBAs aren't responsible for the servers that the Oracle databases run on—you need someone who understands the server network operating system (NOS) and hardware. The business process expert is needed to make sure that the project matches the business needs it is trying to meet.

4.

A, D, E

There are two types of work matrices you'll allude to when you develop your scope document: part-time matrix (your team members will be working part-time on the project and devoting the rest of their time to other work) and full-time matrix (where they'll be working full-time on the project). If you have some folks devoted full-time to a project and some part-time, you have a mixed matrix.

5.

C, D

Two important criteria that you have to develop are the landmarks that point to the success of the project, and the completion criteria—data that indicate the project is indeed complete.

6.

B

Lessons learned is something that project team members don't typically want to include in the project book, because they're afraid it may appear that mistakes were made. In actuality, mistakes were probably made—no one is perfect. And it's important to note lessons learned, because if you encounter a project similar to this and refer back, perhaps you'll pick up some pointers on what not to do.

7.

A

Something went wrong in the vendor negotiations and the timing of using the parts the vendor would supply. The project manager is responsible for predicting when the parts would be needed and negotiating accordingly with the vendor. (A purchasing arm of the company might well be the negotiator in such a situation, and the project manager might have very little control over the negotiations.) The point here is that the pricing agreed to on the vendor terms and conditions sheet didn't agree with the timing of when the parts were actually going to be needed.

8.

B, E

The tricky part here is that you might not need this resource. It's just an ace in the hole for you. It is important that you receive acknowledgment from the authority who manages this resource, telling them that this possibility exists and gaining their participatory nod. The project sponsor also must know about the need. When the sponsor signs the scope document, they indicate they're aware that this outside resource may be necessary and that this has been communicated to the resource's managing authority. There's nothing automatically wrong with having a second sponsor in such a case as this. But remember that the more sponsors you appoint, the more room you leave for in-fighting, political rallying, bah-hum-bugging, and all that sort of stuff, people being people.

9.

A, C, D

Even though the sponsor brought you the project, it is still necessary to perform good business analysis on the request and develop the project in such a way as to meet the needs expressed by both the project sponsor and the project client—in this case, the company's customer. These two needs might be very different; the vice president simply wants heightened customer responsiveness, while the company's customer wants a nice, easy interface that works every time with no problems. Here is an example of differentiation of what you might at first consider a twin role, where the vice president was both the sponsor and a client. Not so: the company's customer is a project client.

[10.](#)

B, C, D

Just how much of a quality problem there will be remains to be seen. However, we know that if time and budget are both short, the scope *must* adapt. The project sponsor and customer must be told that they can't have everything from soup to nuts with these kinds of strict requirements. A tight deadline is going to require exquisite communications between the sponsor, project manager, and customer. You probably don't want this eventuality, but a tight budget will probably restrict the number of team members you're allowed to have as well.

[11.](#)

#### Optional Categories

Best practices life cycle

Company terms and conditions

Company terms and conditions and best practices life cycle might be things that you could omit from a small project's scope document. Remember that Lessons Learned will be filled in after project completion.

[12.](#)

A, B

The only leeway you have is the project's end date and the relative priority of the project. If the project needs to start immediately, but its end date is adjustable, perhaps you could continue to work on it as you have time—though this puts a damper on the team members that will be involved in the project. You could also assess the priority of the project and perhaps put it on the back burner until the first one completed.

[13.](#)

B, C, E

The project sponsor won't affect the scope of the project; neither will the lessons learned. The end date, budget, and completion criteria are just some examples of constraints that may well affect the scope of the project.

[14.](#)

C

Scope creep is singularly controlled by the implementation of a detailed and enforced change-management program. The change-control features need to be documented in the scope document, which is subsequently signed-off by the project sponsor, giving you authority to say "NO!" to project additions.

[15.](#)

B

The budget resources and success criteria will depend in large part on the request, company situation, and project priority. Doing some Web research to find out how others have handled projects like this will give you a very good feel for the time, budget, and resources you'll need in order to proceed. Lessons learned isn't a constraint; it's an outcome of a project.

[16.](#)

A

Next in line is the review of the deliverables (acceptance testing) by the stakeholders. Once the stakeholders have approved the deliverables, the project sponsor can sign off on the review. Typically, documentation of the system can take place at the same time as the system is being developed. Lessons learned is documented near the end of the project, at project closure time.

[17.](#)

A

The deliverable(s) will have to go through a software and hardware decomposition process, reducing the components down to their basic levels in order for you to be able to convey the complexity of the project. The project's end date, budget, and sponsor are affected by the way that the deliverables are described. Also directly affected in a project like this would also be the success and completion criteria.

[18.](#)

B

Projects may or may not be required to utilize preexisting resources or personnel for their completion. Thus, this is a component that you may opt to leave out of the scope document if your project is a brand new one starting out with new personnel.

[19.](#)

B, D

The customers must agree with the project requirements. The project sponsor must formally sign off on the scope document, thus approving the scope and nature of the work. It is the PM's job to create a change control process, to review the deliverables as they're being created, to note the vendor's terms and conditions, and to develop a communications plan and a best practices life cycle. The PM figures out what the project's priorities are, but does not order the project along with other corporate projects in priority order— that's a job for the sponsors and/or management.

[20.](#)

A, B, D, E

You would first examine the request for viability. If you've already launched the project and the change is too large to take on at this late stage, then you say no to the change and go on with the project; you would have to have a second project to add on the new feature. However, if the change doesn't significantly alter the project's requirements and can be safely worked into the project with little delay in time or increase in budget, then you go through the motions of documenting the change, evaluating its technical feasibilities with the development team, taking the change to the project sponsor, and obtaining formal approval to go forward with

the addition to the scope of the project.

## Chapter 5: Finalizing the Project Scope and Presenting to Stakeholders

### ***CompTIA Exam Objectives Covered in this Chapter:***

- 1.11 Given an incomplete project scope definition, complete or rewrite the definition to 1) reflect all necessary scope components or 2) explicitly state what is included in the project and what is not included. Necessary components include:
  - Project size
  - Project cost
  - Projected schedule and window of opportunity
  - Stakeholders, their roles and authorities
  - The project manager's role and authority
  - Completion criteria
  - Methodologies to be followed
  - The scope change control process
  - Mandated tools, personnel, and other resources
  - Industry or government regulations that apply
- 1.12 Identify the following as possible elements of a final project scope definition and the circumstances in which they would be appropriate:
  - A requirements change control process including how to request a change, how to analyze the impact of the change, and how to obtain approval for the additional funds and/or time to implement the change
- 1.13 Identify strategies for building consensus among project stakeholders. Given a project kick-off scenario, select an appropriate course of action involving negotiation or interviewing strategies, meetings, memos, etc.
- 1.14 Recognize and explain the need to build management buy-in and approval into the structure of the project, and describe strategies for doing so, including:
  - Involving management in up-front definitions of project concept and charter
  - Involving management in defining and approving project scope
  - Involving management in reviewing and approving all key project deliverables as they evolve
  - Providing a role for management as a spokesperson-advocate for the project, for team member participation, and for the deliverables

Finally, we finish up our project's scope and present it to the stakeholders. In the "skeleton" metaphor mentioned in earlier chapters, we're ready to put some clothes on our creation and take it to the dance. One of the components of this chapter will be a discussion on what to do if you've inherited a project that has an incomplete scope. We'll talk about a phrase you'll hear a lot in PM circles—change control (also called change management). Specifically in this chapter, we'll be dealing with the change control of the project's requirements. We'll also talk about consensus formulation among stakeholders and obtaining buy-in from management.

Clearly, the scope of the project is the most important part of any project, including an IT project. Whether you're building something as large as the Three Gorges dam on the Yangtze River or something less significant such as an Internet-based e-commerce system, good project management and a well-founded scope document will help ensure a successful conclusion to your project.

## ***Completing an Incomplete Project Scope Definition***

What happens if you're handed a project that had been started by someone else and, in digging into what's been done, you find that the scope document is incomplete? It's fair to say, if you're replacing a project manager that wasn't working out, you now know the reason why. But what do you do to fix the project? This section of the chapter talks about the things you should include in your scope document revision.

For whatever reason, as you go back through the old project scope, take a look at what's in it and compare it to the required components talked about below. In your findings, you'll want to rewrite the scope document to reflect the way that the scope should've actually been developed in the first place.

### **Including Necessary Scope Components**

Whether you include all scope options and leave some blank that don't pertain to the project, or you determine to leave some scope options out, is your prerogative. Nevertheless, here are some things you'll always include in the scope document, whether it's the initial scope development or one that you've inherited.

### **Project Size**

The project *size* denotes the overall magnitude and complexity of the project. Depending on the project's size, certain scope items may be omitted and others may need to stay. By declaring an initial size estimate for a project, you're not limited to only the scope elements that are initially included in the scope document. You can opt to include other elements if they're requested at a later time as enhancements. For example, phase two of a project may include some scope elements that were evaluated as nice to have, but not necessary, in phase one.

Obviously, the project's size might be impacted if scope changes occur.

When including a project size characteristic in your scope document, you might stipulate that the scope document "Contains these elements: ..." and "Doesn't contain these elements: ..." This, of course, depends on the overall size of the project and your estimation as to whether the document needs this level of detail or not.

### **Project Cost**

Just like other elements that are a part of the scope, the project's scope can change if the costs change.

When writing a project cost statement, you don't need to worry yourself about every jot and tittle of a project's costs. You're more interested in pointing out high-level costs such as those associated with hardware, software, and vendors. In the scope document, your goal is to give a number to project sponsors so they have a reliable ballpark figure that they can use for project justification and authorization purposes. It helps if a CIO can say to the CEO, "We estimate this project will cost around \$1 million and will require 4,500 person-hours."

**Note** Estimating detailed project costs and project hours is further discussed in [Chapter 8](#).

### **Projected Schedule and Window of Opportunity**

In this part of a scope document's elements, we're interested first in the schedule of the project. Again, you have not yet sat down and written out a detailed project plan with tasks, timelines, and milestones. You're supplying a good-faith schedule that is designed to give sponsors an accurate idea of what they're facing should they approve a given project.

More subtle is the *window of opportunity* and how it interfaces with the schedule that you supply. In business, often you need to react fast to an emerging new trend, economy, or way of doing business. Can you react fast enough—that is, will your schedule allow the quick reaction—to a new business opportunity? If so, the company can make some money by being able to turn around a project that beat others to the opportunity. If not, then why go forward in the first place? Or, more accurately, should you still go forward even though you've lost the opportunity to make a boatload of money?

An adjunct component of the window of opportunity is the concept of *opportunity costs*. What will it cost a company to implement a project that could, if skillfully implemented, make the company a bunch of money? The money made minus the opportunity costs (and some other figures that don't need to be mentioned here) result in the overall earnings that the project creates. You must remember that, from a project sponsor's point of view, decisions are more often about the first rule of business—maximizing shareholder wealth—than about whether the project is important to the end user environment or not.

## **Stakeholders' Roles and Authorities**

Remember that the stakeholders are those who have something at stake in this project. Stakeholders can be, but don't have to be, the end users of the system. Stakeholders can be, but don't have to be, the project sponsor. Stakeholders can be vendors, marketing experts who can use the project's outcome to further the goals and ambitions of the company, salespeople who can advance-sell the project's outcomes, and so forth.

In the scope document, you must identify the needs and expectations of stakeholders so that their expectations can be managed throughout the project.

Balancing stakeholder expectations can prove to be an ominous project management task. One stakeholder wants you to use the latest and greatest equipment and plenty of it. Another wants you to keep costs to a minimum. Still another requires the Everest of technical excellence with the end result. There's no pleasing them all—and it's up to the project manager to try to strike the balance.

## **Project Manager's Role and Authority**

One of the key causes for a project's failure is the lack of authority that has been given to a project manager. The project manager, for example, might need to take a serious shortcut in the road. He goes to the sponsor of the project to get the OK, only to find the sponsor is in Bali for two weeks. Since the project sponsor has made it clear that no changes are authorized without his approval or heads will roll, the PM is stuck either delaying the project until he gets the OK or going forward with the project as planned. Giving project managers liberal freedom and authority to do what they feel is best for the project not only gets projects done faster, it also lends an esprit de corps to the entire team's operations. Team members don't feel that they have to sneak around the PM to get something done.

Giving a project manager responsibility for the project, but not the authority, can result in a catastrophic project outcome. At best, the scope suffers from scope creep because the project manager lacks authority to prevent this; at worst, the project dies a cold death because the PM's hands are tied.

As an IT project manager, you need support from those who have authority over your project. Make friends with the sponsor (who is often also the client) and your management. They will have the authority to allocate resources, will make decisions and act on your behalf, or better yet, will give you the authority to act.

Sometimes you simply must take authority. You are the project manager; you are responsible to deliver the project as it was scoped. You were appointed PM because you have the skills and knowledge to get the job done. More than likely, you have a proven track record of other successes. If this is your first major project, you have proven your

project management abilities through other, smaller successes. As project manager, you exercise control over the project plans and have the responsibility when the work is veering off course or things aren't going as planned. Taking authority sometimes involves invoking the Rule of Forgiveness. You've doubtless heard this before: "It's easier to ask for forgiveness than for permission." But then again, a wise project manager needs to discern the circumstances when it's OK to invoke this rule versus when it would damage your career to do so.

The project manager's role is all-encompassing. You should possess skills and abilities in all the following areas: communication, team management and motivation, writing skills to accurately document project plans and progress, planning and organization, negotiation, leadership and supervision, finance, goal-setting, and contract and procurement procedures. In the IT world, you also need to have a clue about how IT systems work and the pieces that make up a system.

Power and authority come from many sources: knowledge, skills, previous experience and accomplishments, communications abilities, and networking (who you know, not what you know). The amount, level, and source of the PM's authority needs to be recorded in your scope document.

## Completion Criteria

Completion criteria originate with the client and are tempered by the project manager. Ask the client to define their meaning of "a successful project." Ask them, "When this project is complete, in an ideal world, what will the deliverables do?" Normally, you have to interpret their answer, but sometimes they'll be clear and specific for you. For example, they might come back with something like, "Customer service agents will be able to retrieve online answers to customer questions by typing in keywords in the lookup function and get back to the customer within a response time of fifteen seconds." (But not usually on the first try.)

## Methodologies to Be Followed

By "methodologies to be followed" we mean, "This is how we're going to go about implementing this project." It's a good idea to establish standard project procedures. Some companies do this via a *project management office (PMO)*. The PMO is responsible for coordinating all project documents, lending project planning expertise to the project, and sometimes has a pool of project managers available who can be assigned to projects.

If a PMO isn't in your company's future, the next best thing to do is take the time to design a *project binder*. Many project managers use a project binder to maintain all project documentation. (The project binder is also referred to as the *project book*.) There are several forms of project books. If you take a time to design standard project forms, all of your project books will be consistent. The other benefit to a standardized form set that's used in a standardized project book is that everyone always knows where to go for important project information—users, stakeholders, team members, and others who you may work with on multiple projects. We'll talk more about the project book later in this chapter.

## Scope Change-Control Process

Change control involves the process of receiving a change, evaluating its merit, and then approving the change. You're interested in change control because once the scope has been finalized and documented, changes that are made to the project must be formal and approved before they can be implemented, or the project will suffer from scope creep.

### Note

Remember, *scope creep* is when the scope grows without anyone being aware of it. Avoid it, because it usually puts you over budget and behind in schedule.

The scope change-control process defines how the project scope may be changed. This section of the scope document outlines procedures that must be used to request changes. All changes must be in writing. Changes need to be approved by an established Change Control Board or Steering Committee. This group is made up of project stakeholders and approves all changes to the scope. A change request must be communicated to all team members and project stakeholders.

Just because a change is requested does not mean that it must be implemented in this project. The project manager, sponsor, and stakeholders must all understand that the change may not be appropriate for this project but may happen later—in a Phase II of this project, or a Release 2 project, a next version projection, etc.

**Note** I describe good change-management policies in their own section later in this chapter.

## Mandated Tools, Personnel, and Other Resources

It's important to document any resources that are predetermined for the project. Mandated resources can take on many different contexts. Suppose, for example, that your company has standardized on Oracle as the corporate database software. Then it should not be a wonder that one of your mandated tools will be Oracle for your back-end database.

If your company relies on Bob for all graphics development for its web pages, then Bob is likely to be mandated personnel for any graphics work you're doing in your project.

**Tip** As a PM, you should be able to yay or nay a project team member whom stakeholders see as an absolute requirement for the project. Keep in mind, though, that if you nix Bob off of the team, this could be a *career-limiting move (CLM)* on your part, if the stakeholder that wants Bob has lots of power and visibility.

If all of the corporate software development work is done at your San Jose campus, then your project plan has a mandated resource requirement that your coders will be located in San Jose. An option for this kind of restriction may be to allow developers to telecommute with their work—some companies hesitate to do this, for others it's a just a routine way of doing business. The reason you want people on campus is so that they can attend meetings and you can keep up with the work they're doing.

Here's the problem with mandated resources: They may *not* be the best choice for a given project. Oracle, for example, while a fine enterprise database program, may be overkill for an application that will run just fine on Microsoft SQL Server, or vice versa. You may require some 3-D graphics that Bob can't hang with. You may have a developer who works out of her home and has made it clear that she won't work in San Jose no matter what—but she's the best there is for the kind of code you need written. How you manage mandated resources will involve your common sense to recognize what is the best business fit for the project and how to best deal with the politics that prefers one thing over another.

Another important point of note here is that if, as part of your project planning, you opt to purchase an off-the-shelf software solution, you may be forced to go with a hardware or software platform that is not part of the corporate standard. You might have a straight Windows 2000 shop, for example, but the software you're looking at for the project is written for and will only run on Sun Solaris computers. Again, the project decisions that are made must be the best decisions both for the success of the project and, more importantly, to meet the business need.

## Industry or Government Regulations

Government or industry regulations can be constraints to the project if they limit your scope, resources, or schedule and should be mentioned as such in your project scope document.

Suppose that you're developing a project plan that requires the development of some software that will assist in human genome mapping. The sponsors intend that your project will use funding from the federal government's genome research project pool of money. However, your corporation must pass several criteria before you can obtain the grant monies.

## The Project Book

By now, I've mentioned several times that you're building a project book. We've spent almost four chapters talking about the first two sections of the project book: the project charter and the scope statement. Let's take a little more detailed look at this project book to see exactly what goes into it. You prepare the documents that are important to your project (not every project might require a complete project book—the size of the project, of course, dictates the contents of the book), obtain the sign-offs required, then assemble the documents in the relevant sections of the project book.

## Project Charter

We discussed the project charter in earlier chapters. It forms the basis of the project and supplies the project's business case and justification. The charter also names the project sponsor or sponsors, stakeholders, and the primary users of the proposed system.

## Scope Statement

We've spent lots of time on the scope document, what's in it, who signs it, and why the scope doesn't get changed without good change-management policies. The scope statement contains the project's scope definition, the scope's sign-off section, and the scope change approval form.

## Requirements Document

Another document that will go into your project book is the requirements document. When you develop the requirements document, you provide four sections:

<b>Section</b>	<b>Contents</b>
Requirements description	A brief description of the customer's requirements for the system being considered
List of deliverables	A concise listing of the deliverables the system will provide
Time tables	The timelines

Section	Contents
	by which you'll follow the project
Requirements sign-off	The sign-off page that gives sponsors a place to OK the requirements

Note that this sort of breakdown is more detailed than PACE's approach. You can easily combine some or all of these sections (including deliverables and requirements) into one doc if you are using the PACE methodology.

**Note** The requirements document is detailed in [Chapter 6, "Requirements Analysis and Risk Assessment."](#)

## Assumptions and Constraints

In this document, you outline the assumptions around which you and/or the sponsors are formulating the project. For example, suppose that you're developing a system that will require some server testing. Perhaps one of your assumptions is that the company's test lab will be available for the testing of your servers.

You also outline the constraints that limit or hinder the project. We've listed some major constraints in previous chapters.

**Note** It's important to point out that you can't possibly think of all the constraints a project might run into. Nothing in life moves that easily. But what you do have to consider are the constraints that you can imagine that the project may come up against.

## Risks

In the Risks section of your project book, supply a document with the following components:

**Description of risks** Enumerate and describe the risks that undertaking the project may bring to the stakeholders, sponsors, or project team.

**Risk severity ranking** Rank the risks in order of the likelihood that they might arise. You may say, for example, that this risk is of high severity, while this risk is only of moderate severity.

**Contingency plans** Describe what you'll do in the event that you actually encounter a problem that matches a risk you've outlined above.

**Note** The content of this section is described in [Chapter 6, "Requirements Analysis and Risk Assessment."](#) It is often included in, or reproduced from, the requirements document.

## Project Plan

In [Chapters 7, 8,](#) and [9,](#) we'll take up the topic of the actual project plan. For now, suffice to say that the project plan will include the following components:

**Summary of work or statement of work** Known by either name, the *statement of work (SOW)* is essentially the vendor saying, "Here is what we're going to do" in very explicit detail. You won't include these if you're not using vendors. A vendor provides the SOW.

**Resource list** This is a list of materials, funds, and personnel that you're going to utilize, including the names of the team members.

**Work breakdown structure (WBS)** The WBS displays and defines the product to be developed or produced by hardware, software, support, and/or service element. It also relates the work scope components to each other and to the deliverables. The framework of the WBS defines all contractual work that needs to be authorized and accomplished.

**Schedule and milestones** A milestone is passed when the completion of a significant project component takes place. Your project plan includes the complete project schedule and designate the milestones.

**Time estimates** In the project plan, you include estimates of how long it will take to accomplish various portions of the project. (We'll talk about estimating in [Chapter 9, "Managing Budgets, Schedules, Estimates, and Communications."](#))

**Budget** In this project plan section, you describe the budget and detail its especially pertinent components (which money comes from federal grants, for example).

## Communications

Perhaps the most important section of the project book is the communications section. In it you detail the following components:

**Management notices** Perhaps a better term for this would be *management notifications*. This section stipulates how and when management will be notified with regard to the project: "Management will be notified weekly by e-mail," for example, or "Managers will receive a verbal report weekly and a written report monthly."

**Minutes of project meetings** A designated recorder will take down the minutes of each project meeting. The details of how the minutes are kept, where they're posted, and the information they'll contain is a part of a good communications document.

**Project progress reports** The communications document also details how project progress reports are written: what they'll contain, their frequency, and who they'll go to. You might consider supplying a copy of the format that you'll use when creating progress reports, and even instructions for reading a progress report that might otherwise be difficult to decipher.

**E-mail communications** Although written communications are certainly helpful and of long-term usage to projects, e-mail communications can greatly facilitate speedy communications. It should be stipulated in the communications document what kinds of communication will be allowed via e-mail and how they will be tracked.

**Issues log** The *issues log* sets up a forum where problems that crop up as the project is being implemented can be noted, worked on, and dealt with.

Printouts of all relevant communications should be kept in the communications section of the project book.

## User Acceptance Review

The project book should include documentation about the way that *user acceptance testing (UAT)* will occur, what steps will be taken to rectify problems that occur during testing, and some sort of review sheet that users fill out to detail their reaction to the deliverables.

After UAT has occurred (and perhaps re-occurred, if your system had a low level of acceptance during the first round), you'll include the user acceptance sheets in this section of the project book.

The great thing about UAT is that, from a user's perspective, it validates how close you got to the bull's-eye. UAT reveals the way that you heard what the user wanted and how well you were able to translate it into the system they requested. If you don't get very close to the mark, your scope's going to enlarge because you have to go back to the drawing board.

### Tip

Contrary to popular IT belief, USER is *not* a four-letter word. You're developing the requested system for end users, not necessarily for yourself. Developing a system that meets user needs (while tempering user wish lists) is the top job of any project manager.

## Project Review

Finally, the project book should include a section for project review.

The first component of the project review section is a post-project review form. This form is a synopsis of the project, including a variety of elements that stem from previous project book sections. In the post-project review form, you include things such as the members of the project team, the type of application developed, and information regarding the project (complexity, development tools utilized, training required, etc.). You include a review of your user's satisfaction with the project's deliverables. Does the application meet the user's requirements such as functional and performance requirements? Does the application fit in with corporate development standards, and is it free of defects?

Include other information that's pertinent to readers interested in the success or failure of the project. For example, in the review form you might consider describing the method you used to develop the app and an assessment of its effectiveness. You might consider describing how you deployed the app and assessing how the deployment went. What about user training? Effective? How was it accomplished?

We talked in earlier chapters about lessons learned. It is in this section that you elucidate the lessons that were learned during the implementation of the project. Talk about the problems encountered and describe how you solved them (if you did). You also detail what conclusions you derived from this project and how you'd do things differently in future projects of this kind.

The project book is the biography of the project. It tells about why the project was needed, how you went about accomplishing it, and what kind of success you had in getting the project finished and operational. Unlike the biography of some people, however, the truth will always be better than fiction when talking about a project. Do not be afraid to point out the project's weaknesses—this kind of information may be valuable to people later on—maybe even to you in a future project.

## *Performing Requirements Change Control*

Change control is important in day-to-day IT activities as well as in IT projects. Without suitable change-control policies in place, people aren't notified of changes that have taken place and things quickly get out of control. In IT projects, the scope begins to creep when changes are made that are not put through a rigorous change-management protocol first.

In this section, I talk about some elements of change control that will bring more successes to your efforts toward managing change.

The change-control process that you detail in your scope document must outline, at a minimum, the following components:

**How to request a change** Stakeholders, customers, and sponsors need to know how they can go about requesting a change in scope. You could use a small intranet site for tracking your project and including a place for change requests. There are many good, easy-to-use website development software programs that you can use to formulate a site for tracking your projects.

**How to analyze the impact of the requested change** This section could present some interesting problems to deal with. Most probably you'll just use a common-sense method to assess and analyze how the requested change will affect the project. The customer, stakeholder, or sponsor requesting the change may have no idea of the large impact the change may have on the scope. It's up to you to make wise, logical decisions about such things as:

- The value of the change
- What the change implies in terms of extra project resources or time

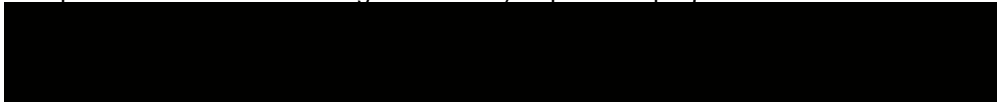
- How these balance with other aspects of the project, such as its budget and priority

**How to gain approval for the additional funds and/or time required to implement the change** So you've reviewed this change and found it to be worthy. Part of the problem with scope changes is that they often require additional funding, resources, or time—none of which may be readily available. Your change-management profile shouldn't necessarily say how *you're* going to gain approval; instead, perhaps you should make the additional resources or time a mandatory component of the change request. In other words, the safe (and effective) thing may be to leave the impetus of gaining time and/or resources up to the individuals requesting the changes.

Conversely, on bigger projects, you may find that the change is merited but that the entity requesting the change cannot provide the resources or time needed to implement it. Your change-management paradigm should provide instructions that say, "This is the approval process we'll go through if we find a change to be deserving of implementation."

While this all sounds very straightforward, changes to a project can be very difficult to manage. On the one hand, you may have a need for a change that makes sense, while on the other hand you could be under the gun in terms of the project's original resources and timelines. Your policy should be prepared to delegate some of these decisions and evaluations if the PM is not present or doesn't have the technical expertise to weigh them.

Some changes make absolute sense and should be integrated immediately. For example, you're working along on a project and one of the development engineers finds a significant security loophole in the code you're developing. The change to fix the loophole will take an additional 80 hours of coding time. This is a no-brainer (but one that nevertheless must still be run through the change-management process). Other changes require more consideration. For example, a cosmetic change to a GUI interface may have questionable merit and might adversely impact the project's timelines.



### Software for Version Control of Code

Managing changes that developers make when they are jointly working on some software modules can be very interesting. Without good change-control software—or, more accurately, version-control software—in place, it's very possible for one developer to make a change to the code and another developer to undo that change at the very next turn.

Two things are required: great documentation of all changes that are implemented, and a place where you can maintain version control of the code. Let's talk about the change documentation process first.

You probably won't want the developers to have to go through a formal change-control process as they're working on software modules. Major changes to code after it has been finalized, to be sure, must run through your change-control process, but day-to-day coding changes don't need to be. However, the changes that are made to the code need to be documented in two places: first in a change-control book, intranet site, or other place where coders can keep track of each other's coding activities; and second *in the code itself*. Not only should code be liberally commented, but changes that are made to the code should be included in some sort of header that details changes, developer doing the changes, date changes made, etc.

You also need some sort of code version software that can act as a repository for the code and as a version-control mechanism. Microsoft has a product that does this called Visual SourceSafe (<http://msdn.microsoft.com/ssafe>); another company that has one is MKS ([www.mks.com](http://www.mks.com)). There are many others, but these two can serve as examples for you.

Code versioning software allows developers to place their newly created software into a repository. There's a check-in/check-out mechanism associated with the archiving of code. New versions of the same piece of code that have been modified are given a new revision number so that a developer uploading the latest and greatest doesn't overwrite previous versions. This kind of software is a must-have for software development shops; otherwise, the code winds up on developer computers in folders that don't have any common organizational sense.

## ***Creating Consensus Among Project Stakeholders***

Stakeholders don't all have the same goals. One stakeholder, for example, might be interested in the kinds of reports that can be gotten out of the system you're developing, while another is more interested in the ability to remotely connect to the system.

Managing disparate stakeholder interests and arriving at some consensus could prove to be interesting, especially if the project is really large and the requirements are quite diverse. There are several things to consider when building stakeholder consensus.

Communicating with the stakeholders, both at project initiation time and as you progress through the project, requires that you put some thought, energy, dialog, and documentation into the process. Let's delve into the basics, with an understanding that you could provide quite a bit of refinement relative to the size of the project.

### **Project Kick-Off**

Larger projects deserve and require a formal project kick-off meeting, at which all stakeholders participate. At this meeting, be sure to do the following:

- Give an executive overview of the project charter (assuming everyone's had a chance to read the charter prior to the meeting).
- Detail briefly how you expect the project to shake out—what its phases are, who the project team members are, etc.
- Make some determinations about how the stakeholders will participate in the project process.

### **Negotiation**

One of the processes you'll need to outline for the stakeholders at your project kick-off meeting is how a stakeholder could get a change made to the project. Recall that the stakeholders are not the ones who approve changes in project scope—only the sponsor can approve the changes. Therefore, if a change is made that a stakeholder doesn't approve of, or if the stakeholder desires a change, you must have some method of airing such desires and allowing them to at least be heard, even if they're not integrated into the project.

Negotiation has impact in more than one area. First, if a stakeholder has approached the project team and has brought to light an issue that he feels strongly about, the negotiation process at the very least puts in writing that the stakeholder brought up an issue that you either chose not to deal with or chose to correct. Negotiation provides the stakeholder with the "I told ya' so" mechanism after the project has deployed and the change requested or issue brought to the fore was not handled.

Negotiation also allows for a formal process through which you can assess the viability of a stakeholder request or issue and potentially avert a project crisis point. You may have great confidence in the direction your project's headed in, but the stakeholder can see a section of rough road up ahead. Negotiation gives you, the project manager, a chance to fairly assess what the stakeholder is talking about. You may still decide to push forward without any changes, but at least you've taken time to hear out what the stakeholder has to say.

Also, negotiation mitigates stakeholder complaints after the project has completed and the system has been deployed. It's harder for a stakeholder to complain about the system if her suggestions have been heard, weighed, and evaluated according to their merits.

Finally, in some legal scenarios, negotiation helps you leave a paper trail that can support that you've considered and acted upon stakeholder requests appropriately.

Note that the decision-making process is in the hands of the PM, with the blessing of the project sponsor. The stakeholder does not have final authority on changes or issues surrounding a project; it is the project manager and sponsor who have that capacity.

### **Interviewing Strategies**

Larger projects especially demand that the majority of the stakeholders' needs are being met. Thus it is incumbent upon you to devise a way that you'll routinely contact, interview, and assess stakeholder satisfaction with the project. Keeping a finger on the pulse of the stakeholders' attitudes can be a great barometer for the successfulness of the project.

### **Meetings**

The most critical regularly scheduled meeting you can set up after you've kicked off the project is a routine stakeholders' steering committee meeting, in which you update them on the status of the project. During this meeting, you inform stakeholders about the progress of the project, stumbling blocks you've run into, change requests, scope changes, and so forth. You also field questions about the project.

#### **Tip**

Don't make the mistake of thinking that stakeholder meetings will be all sweetness and light. Many times you might be working with stakeholders who have a different agenda than the directed outcome of the project, and in such cases you may run into some abrasive dialog. It's important that you keep in mind the requirements of the project and not let someone derail you into an argument that has more to do with their philosophical outlook on the project than with its real-world management.

### **Memos**

Memos today should be electronic and probably posted on an intranet site. You and your stakeholders should be allowed to post a variety of memos. For example, you might run into a part procurement snag and want to post a memo telling stakeholders what you've run into. Stakeholders, in turn, should be able to post memos that may be of interest to project team members. To bring your project into the Information Age and put it on an intranet will greatly facilitate project communications.

### **Portal Software Can Help**

Your project can benefit from portal software. What is portal software and how does it work? Portal software allows you to set up things like document management, subscription services, application delivery, and other web components that can enhance your project's intranet site.

I've worked extensively with Microsoft's SharePoint Portal Server (SPS; [www.microsoft.com/sharepoint](http://www.microsoft.com/sharepoint)) and find it to be well-equipped for such an endeavor. There are other portal products out there, some far more expensive than others, all with the capabilities that might be looking for to enhance your project communications.

SPS uses *workspaces*. A typical SPS server can have up to 15 workspaces, each with a distinctive name and accessible by a browser. You could, for example, create an SPS workspace called MarketingDBProj, and users would be able to point their browser to this address to find updates about your Marketing Database project. You could keep in it your project schedules, the actual project document itself, and any ancillary documents associated with the project.

SPS allows users with an “author” role to create documents using Microsoft Office 2000 or Office XP directly to the SharePoint workspace. Users with the “coordinator” role can then publish the documents to the workspace. Documents are not visible to readers until they’ve been published.

SPS allows you to organize your information in categories you create. Once categorized, users can subscribe to the site in such a way that when an item in a given category is updated, changed, moved, or deleted, they are notified by e-mail of the change. SPS has a robust indexing algorithm that indexes key words in each document that has been uploaded to the site.

SPS requires a dedicated server, but is easy to set up and drive; the program is entirely drag-and-drop-oriented and very intuitive to run. SPS is an ideal candidate for a project portal intranet site.

## ***Obtaining Management Buy-In***

Developing a project could be compared to going to the prom. You go through all the motions of getting ready for your date, but until you get permission from Mom and Dad to go, you aren’t going to get much of anywhere. The same is true of a project, only more so. Without support and approval from management, it’ll be extremely difficult to get most projects underway and accomplished. In this final chapter section, we’ll talk about some ways that you can obtain management buy-in.

Management involvement may be a difficult thing to obtain—especially with the busy state of today’s corporate environment. It’s tough to get any two high-level managers in a room, let alone several. It’s also tough to get consensus from a group of managers on a methodology, project, system, dialog, or protocol. But there are techniques that you can use, and all entail the concept of ownership through direct involvement. If a manager feels that she has something to say about a project and that her involvement is critical to the successful outcome of the project, then half the battle is won.

You begin by getting management engaged in the project right at its onset. Set up a meeting with the managers who will probably have an involvement in the project. Share with them the project’s concept and its charter. Be prepared to make adjustments to the charter that are recommended by the management group and are sensible.

### **Note**

How do you deal with bad changes that are recommended by management? You can stand on the project charter’s nobility—state that the charter is well-founded and there’s little room for change at this juncture. Or maybe you simply ignore the recommendation and go on (if you can get away with this politically). Difficult managers present you with difficult ultimatums that often don’t make sense in context with where the project needs to go.

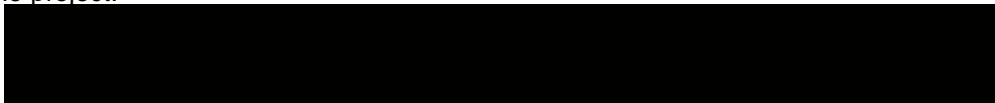
Additionally, it’s important to involve management in helping you define and approve the project’s scope. You’ll typically ask a single project sponsor for approval of the scope, though some gargantuan projects might require more than one signer. But in either case, sharing the development of a project’s scope with other managers who start out with a small interest in the project will increase their buy-in to the project.

Managers should also be involved in a high-level review of the deliverables of the project, including results of user acceptance testing.

Finally, work hard toward the goal of making sure that managers are prepared to work as project advocates. Those who have a vested stake in the project are going to be more excited about being a project advocate than those who have a mere sidelong interest in its success. You may be inclined to promise managers who don't have a direct involvement more than you can really deliver. Be a truth-teller, business-like and professional when explaining the goals of the project and what it's designed to accomplish. Don't promise a deliverable you have no intention of delivering.

The bottom line is that you must somehow give management a voice in the decision-making process. You want managers who are your friends and allies in the project process. Managers need to function as spokespersons for the project and to somehow be integrated into the project's process.

You completed the Prestige Hotels scope document in the [previous chapter](#), but this chapter has raised a few questions that you should think about as you go forward with the project.



### **Prestige Hotels: Finalizing Scope Considerations**

Here are a few considerations to make before moving into the planning and executing stages of our Prestige Hotels website project.

#### **[Completing an Incomplete Project Scope Definition](#)**

Although you feel that your project scope definition is well thought out and concise, you look back on it one more time just to make sure you've included all elements. If there were elements that were missing or needed correction, you'd have to make the additions and corrections, then run the scope doc through the sponsor for sign-off one more time. The scope doc, while etched in stone, has to be rewriteable and re-etchable.

#### **[Creating Consensus among Project Stakeholders](#)**

You invite the stakeholders to a conference call where you describe the scope, deliverables, and requirements you've identified. The sponsors, the customers (such as RLV's marketing folks), the partners (qLines and W2U)— everyone agrees to the tenets of the scope.

#### **Obtaining Management Buy-In**

The network manager for RLV, Morgan Wilson, wasn't very happy with the prospect of corporate headquarters handling the project. He has some folks on his network staff who he feels could just as easily create the site—they have the graphic arts and website creation software right there at RLV headquarters and don't need people from Prestige muddling in their affairs!

Morgan could have made quite a bit of trouble for the project—he's a very vocal and confrontational person. However, the decision to host the site on an independent ISP, essentially so that you could create a highly fault-tolerant, highly available form of a mirror site, was very attractive to all stakeholders and sponsors. Morgan admitted that he cannot provide this guarantee without substantial new equipment, and so the decision was easier from a management perspective. The VSM site will continue on as the scope document stipulates.

## Summary

This chapter deepened and finalized discussions surrounding the scope elements of the project. I started by talking about what to do if you are put in charge of a project that has already started but isn't complete. There are some mandatory elements that must go into any scope document, including (of course) the scope for the project you're taking over. It's important to examine the elements in the project's current scope document and compare it to the mandatory elements to make sure there's nothing left out. Mandatory elements include project size and cost, the schedule and window of opportunity, stakeholders (including their roles and authority), completion criteria, methodologies to be followed, the scope change control process, mandated resources, and any industry or government regulations that may apply to the project.

We also talked about elements of the final project scope definition and the circumstances in which they would be appropriate, including such things as the change-control process, building consensus among project stakeholders, and obtaining management buy-in by involving management in the decision-making process and providing a role for management as a spokesperson for the project.

## Exam Essentials

**Given an incomplete project scope definition, be able to complete or rewrite the definition.** You should be able to list all of the required elements in any given project scope document.

**Be able to identify the necessity and components of a change-control process.** Understand how the changes get made, who authorizes them, and why the impact of a change is so important.

**Understand what it takes to build consensus among project stakeholders.** Know what a project kick-off meeting is about, and understand components such as negotiation, meetings, and memos.

**Be able to recognize and explain the need for management buy-in.** Know how and why to involve management in up-front decisions regarding the project concept and charter, defining and approving the scope, and reviewing deliverables, and be prepared to provide a role for management as spokesperson, advocate, team members.

## Key Terms

In this chapter, you encountered some new terms:

career-limiting move (CLM)	project management office (PMO)
issues log	statement of work (SOW)
opportunity costs	user acceptance testing (UAT)
project binder	window of opportunity
project book	

## Review Questions

1. The IT staff for your company has started a project that was requested by a customer, but they have now found that the project's scope is larger than they'd originally anticipated and requires the assistance of a project manager. There have been no formal project documents created. You've been asked to take up that role of project manager. What is the first step you'll take in picking up responsibility for this project?
- Ascertain if a project concept document has been written
  - Determine what the scope of the project is
  - Understand what the deliverables will be
  - Determine the user requirements
  - Figure out who the project sponsor will be

?

2. Move those components that are *not* mandatory in every project scope document to the Optional Categories column.

?

	Optional Categories
Completion criteria	
Success criteria	
Methodologies to be followed	
Scope change-control process	
Projected schedule and window of opportunity	
Industry or government regulations	
Team members	
Project manager's role and authority	
Required equipment	

3. In thinking of a scope change that you've reviewed and found to be of value, who is the one who authorizes the change?
- Project manager
  - Project sponsor
  - Stakeholders
  - Senior management
  - Customer

?

4. Identify the items that you should consider involving management in when setting up your project. The goal with this question is to pinpoint those things that will help assimilate management buy-in for your project. (Select all that apply.)
- Defining project concept and charter
  - Selecting vendors
  - Reviewing and approving deliverables
  - Participating as a team member
  - Defining and approving project scope

?

5. You've been hired as the lead project manager for XYZ Corporation. You begin by developing a change-control process that will be used in all ensuing corporate projects by other staff project managers. What components should you include in your change-control process policy? (Select all that apply.) ?
- A. How a change is requested
  - B. How to obtain the approval required for additional funding or resources
  - C. How to request an emergency change
  - D. How to analyze the impact of the change
  - E. Which personnel can approve a change
6. You've been appointed as the project manager over a high-visibility project. You're replacing a PM who has been fired because the project is way over budget and behind schedule. What are the *first* steps you take in ascertaining the health of this ailing project? (Select all that apply.) ?
- A. Verify project sponsors and request new sponsorship if needed
  - B. Examine project charter for clarity and content
  - C. Validate the project concept document
  - D. Interview the project team members
  - E. Examine the scope document for completeness
7. You are the project manager for a large project that is in the middle of its projected timeline. The project sponsor approaches you with a change that she wants to make to the project's scope. What process should the sponsor go through in order to get the change made? ?
- A. None. Since she's the sponsor, she has control of the money bag and personnel resources.
  - B. She needs to go through the standard change-control process you've already outlined.
  - C. She can bypass the change-control process to some extent because she controls the project's resources.
  - D. Changes cannot be made when the project is 50% or more on the way toward completion.
8. You're the project manager for a fairly large IT project that has been moving along very well—the project is under budget and on time so far. You're going on a two-week vacation. How should the change- management process be handled while you're away? ?
- A. No changes should be made until you get back.
  - B. The project sponsor can authorize the change.

- C. A capable, designated assistant can handle the changes.
- D. The project team can democratically vote on whether to implement the change.

9. You're the project manager for a project in which you're following a specific software development methodology. Some of the developers have observed that a new coding technique could improve the speed with which the code will be developed and ready. How should you handle this recommendation?

?

- A. Since there's a cost/time-savings benefit, go with the recommendation.
- B. Obtain project sponsor approval to implement the new methodology.
- C. Run the recommendation through the change-management process.
- D. Development methodologies aren't something that the project manager needs to be concerned with.

10. What are some elements of the project's scope that *don't* need to be run through the change-management process? (Select all that apply.)

?

- A. Designated project manager
- B. Project manager's role and authority
- C. Stakeholders' roles and authorities
- D. Designated project sponsor
- E. Hardware vendor

11. You're approached by the development staff that's working on a project where you are the PM. They have noticed that a peculiar outcome of the development work they're doing is a deliverable that the customer hadn't requested, but that the customer can make great use of after the project deliverables are ready to be used. How should you handle this unusual circumstance?

?

- A. Ignore the serendipitous deliverable.
- B. Run the prospect of adding the deliverable through the change- control process.
- C. Check with the project sponsor to see if the deliverable can be utilized.
- D. Check with the customer to see if the deliverable is something they'd like to have.

12. You're preparing a kick-off meeting agenda for a brand-new project for which you'll be acting as project manager. What are some of the agenda items that you'll include in your meeting in order to obtain stakeholder consensus? (Select all that apply.)

?

- A. Dates and times of project stakeholders' meetings
- B. Methods of maintaining

communications with project management office

- C. Regular budget updates
- D. Negotiation strategies
- E. Open forum on project scope

13. You are the project manager for a high-visibility IT project, the deliverables of which will span several different departments in your corporation when finished. You recognize the need to have two managers, each from a different department that has a significant stake in the project, as project team members so that you have a managerial and political perspective on how some facets of the project should be handled. Your boss, however, is adamantly opposed to this notion, believing that they will simply lobby to get their way. What are some things that you can tell your boss that will assuage his fears? (Select all that apply.)

?

- A. All changes will be made through a rigorous change-management process.
- B. While these managers will be team members, they are not the project sponsor and do not have final say-so.
- C. You require their input, not their guidance.
- D. You cannot build consensus without having them on the team.

14. If you're involving relevant management in the review and approval of all key deliverables as they are developed, which element of the project scope is likely to need to be adjusted?

?

- A. Project cost
- B. Project priority
- C. Change-control process
- D. Communications framework
- E. Project schedule

15. Which component of the project's scope will likely alter decisions such as whether to include management input on the review and acceptance of deliverables, development of a robust management buy-in process, and the implementation of a complex change-management process?

?

- A. Project cost
- B. Project size
- C. Team members selected
- D. Project schedule
- E. Stakeholders involved in the project

16. Which of the following components might be considered to be elements of valid completion criteria? (Select all that apply.)

?

- A. Sign-off of user acceptance testing
- B. Project plan steps documented by project manager as complete

17. In the project development process, what are the roles and authorities of stakeholders? (Select all that apply.)
- C. Documentation of lessons learned
  - D. Completion of system documentation
  - A. Sign-off and acceptance of deliverables
  - B. Guidance and input on the project budget
  - C. Appointing of project team members
  - D. Signing off on all critical project documents
18. During recent biweekly management meetings, the discussion centers on the company's IT staff and the new electronic signatures that they are trying to implement. As the senior project manager for the company, you're not aware of any such project, so IT must be winging it without any formal project plans. What counsel can you provide management during these meeting discussions?
- A. The electronic signature efforts are destined for failure.
  - B. The electronic signature efforts would benefit from a well-written project book.
  - C. The electronic signature efforts are much more likely to be successful if they're managed as a project.
  - D. The IT staff has no business going forward with these efforts.
  - E. Project management techniques wouldn't help this work.
19. Move each project entity to its corresponding responsibility.
- |                     |                                       |                      |
|---------------------|---------------------------------------|----------------------|
| Project manager     | Scope sign-off                        | <input type="text"/> |
| Project stakeholder | Development of change-control process | <input type="text"/> |
| Project sponsor     | User acceptance testing               | <input type="text"/> |
| Management          | Prioritization of multiple projects   | <input type="text"/> |
20. What components help you limit the ability of stakeholders to enlarge a project beyond its initial approved scope? (Select all that apply.)
- A. Change-control process
  - B. Project sponsor veto power
  - C. Project team members' ability to say "No"
  - D. Stakeholders' commitment to a timely project implementation

## Answers

1.

D

First, you need to determine what the customer actually requested that precipitated the project in the first place. You cannot put any documentation or personnel into place until

you are sure that the efforts the IT team is making are in line with the requirements the customer was originally looking for.

2.

### Optional Categories

Success criteria

Team members

Required equipment

Although required equipment, team members, and success criteria are components that you could *opt* to include in your project scope document, they're not mandatory in every project.

3.

B

The project sponsor is the one who must approve scope changes. It is the project sponsor who has connections with senior management and who has the ability to authorize the additional resources required to implement the change.

4.

A, C, D, E

You can garner management buy-in through a variety of methods, including allowing managers to participate in the up-front definitions of the project concept and charter; in defining and approving the project's scope; in reviewing and approving project deliverables, and by acting in a participatory capacity, whether it be as a project spokesperson, team member, or simple advocate for the project.

5.

A, B, D

Good change control implies that you've already gone through good scope definition. Any change-control policy should include the change request methodology, how the approvals will be obtained for the additional funding and resources required, and what the impact of the change will be on the project. Emergency changes to the project almost automatically imply that you did not adequately plan the project in the first place so as to anticipate any "emergencies." Individual projects, not your company-wide policy, must identify who can approve changes.

6.

B, C, E

Unless there has been no project sponsor appointed, you probably do not need to worry about the sponsorship. However, you should begin at the beginning and validate the project concept, charter, and scope for accuracy, completeness, clarity, and content. It is these three documents that completely outline the project and act as the "director" for the project team.

7.

B

From the change-control perspective, the project sponsor is no different than you or anyone else on the project. The purpose of the change-control process is to thoroughly document the change, the reason it's required, and the

resources that are to be expended in making the change. Simply having the project sponsor come up and order the change made overrides good project management methodologies.

8.

C

The caveat here is that the capable, designated assistant must also have his finger on the pulse of the project plan and all of the project formulation documents that led to the plan. You as project manager are the only one who really has all of the components needed to evaluate change. If your assistant isn't familiar with every component of the project, then the answer would rightly be that no changes should be made until you get back.

9.

C

A methodology change involves in a change in the project's scope, which, in turn, requires that you utilize the change-management process to validate the merit of the change.

10.

A

You wouldn't expect a project sponsor who wants to replace a poorly performing project manager to run the change through a change-management process. This is a decision that's strictly up to the project sponsor and the project manager's management. All of the other listed items should be put through the change-control process you've developed.

11.

B

Even though the serendipitous discovery of an additional deliverable may be a welcome addition to the list of deliverables the customer will receive, it was not considered at project scope determination time and may well impact the project's scope. It must be run through a change-management process.

12.

A, B, D

While budget updates might be of informational benefit, they might not necessarily lead to stakeholder consensus on facets of the project. The coordinated sharing of memos, negotiation and interviewing strategies, and other timely information during routinely scheduled meetings will keep all stakeholders on a level playing field.

13.

A, B, C

You probably could build consensus even without the managers on the team, but management input on a high-visibility project such as this is desirable.

14.

E

The two-edged sword involved in allowing management to review and approve deliverables is this: If you take the time to go through the process of deliverables review and approval by management, you add time to the project's schedule, thus increasing its finalization date.

15.

B

The project's size will most likely determine whether you'll opt to include optional features into the project such as the

ones described in the question.

16.

A, D

Just because the project plan's steps have been documented as complete by the project manager does not imply that the project is indeed complete. When setting up completion criteria, you're stipulating the elements that signal that the project has reached finality. Two very common elements would be the signing off of the UAT process and the completion of system documentation, though there are many others.

17.

A

Stakeholders are responsible for user acceptance testing (UAT) and its subsequent sign-off. They do not make budget decisions relative to your project, appoint project team members, or sign off on important project documents such as the project charter and scope.

18.

B, C

You can't say that the IT staff is destined for failure, because it's very possible that they might succeed. Nor can you say that they have no business going forward with their digital signature efforts— they're merely reacting to a customer request, or at least the perception that they've had a customer request for this technology.

19.

Scope sign-off

Project sponsor

Development of change-control process

Project manager

User acceptance testing

Project stakeholder

Prioritization of multiple projects

Management

Stakeholders are responsible for UAT. The project sponsor should sign off on the scope document. Management must decide what the project priority is relative to other corporate projects. The project manager must develop the change-control process.

20.

A, D

The project sponsor shouldn't have veto power, provided you've set up a well-thought-out and well-deployed change-control process. Just because project team members say "No" doesn't mean the change shouldn't be implemented. The stakeholders should participate in the project formulation process from its earliest stages and should be acutely aware of the impact an arbitrary or capricious change may have.

# Chapter 6: Requirements Analysis and Risk Assessment

## **CompTIA Exam Objectives Covered in this Chapter:**

- 2.7 Given a project description/overview and a list of the project requirements, do the following:
  - Decide if the project is defined well enough to achieve a measurable outcome and metrics for success
  - Determine if the requirements include the necessary range of inputs (assumptions, expectations, technical issues, industry issues, etc.) in order to validate the input given and gaps related to scope
  - Distinguish any input provided which do not relate to the project at hand in order to achieve greater focus
  - Recognize whether the list of requirements is complete, accurate, and valid enough to move on to the planning step
  - Given a situation where the project outcomes are not possible to verify
  - Recognize the role poorly detailed requirements, assumptions, expectations play
  - Identify the high level value of the project to sponsor and users of the outcome
  - Describe the role of project value and its importance to individual and team effectiveness.
- 2.8 Describe the goals of a useful program requirements review with the client (e.g., verify mutual understanding of client's product delivery, product performance, and budget requirements, etc.) and describe when it is important to have such reviews.
- 2.9 Given the client's approved project requirements and the input of stakeholders, decompose these requirements into business and functional requirements while maintaining traceability within strict configuration control.
- 2.10 Demonstrate the ability to perform risk assessment and mitigation by doing the following given a scenario including the appropriate project documentation:
  - Identify and prioritize the most important risks that will impact the project
  - Evaluate the severity of the risks to successful completion of the project
  - Identify risks contained on a project's critical path and identify procedures to reduce potential impacts on schedule

Project management generally involves requirements analysis, but the need for accurate requirements gathering is especially critical in the IT world. If you only *think* you understand what your users want and you create something without really understanding their requirements, then you're likely to create something they either won't like or won't use or both. In this chapter, I talk about the project, program, functional, and business requirements associated with what you're trying to do. We'll also spend some time on a very key and many-faceted topic: risk assessment.

## **Analyzing Project Requirements**

It's critical that you clearly understand the project requirements and write them down so that they are as clear to any other project stakeholders as they are to you. Your requirement definitions will, in turn, contribute to all the other project documents we've spent the last four chapters on and thus need to be very accurate, precise, well understood, and well documented. If they're not, then the project is going to suffer from a

poorly formed scope document and, in turn, the scope will creep because project needs aren't accurately being met. In this section, we'll spend some time discussing the ramifications of analyzing your project requirements.

We've talked about success criteria (called [metrics](#) in this exam objective) a bit in earlier chapters. When dealing with such measurements, you're asking the question: "What objective outcome can I expect once the project is finished and the system has been deployed?"

Suppose that your project will create an e-commerce system. Internet customers will submit orders using an XML-based order-entry page in your online catalog. The orders will then live in an enterprise-class relational database management system (RDBMS) as the database repository. What would be some of the metrics you might expect to be able to measure as a result of this project?

Well, if there never was an e-commerce site prior to the implementation of this project, perhaps one of your measurable goals would be to reduce by 30 percent the amount of telephone ordering that your company experiences. Since you don't have to staff your website with real-time customer service personnel, such a reduction in phone calls could bring about real savings through the reduced need for manpower and telecommunications hardware.

On the other hand, if you have an e-commerce site already, perhaps your metric might be to increase the speed of each transaction, from 5,000 to 10,000 transactions per minute, or to reduce the transaction processing cost, from \$25 per transaction to \$15.

When assessing outcome and success criteria, you're looking for specific, measurable things. In order to do that, you can lean on the customer for the information you're looking for. Get the customer to be as specific as possible about what this system will do given certain conditions. Also, be certain that the metrics you're using are accurate. Your ultimate goal is to formulate success and completion criteria that give you honest signals as to whether the project is complete and was successful.

Gathering customer requirements and fleshing them into a concise document with good objective outcomes you can measure is foundational to a great project. There are several components to a requirements document, and it should include some detail about how you arrived at each. By including these *inputs* to the requirements document, you are able to validate the information that has been given and spot any gaps in the project's scope. In our Prestige Hotels case study, recall that one requirement is being able to get airline tickets from the qLines airline by using the Prestige website. But the customer's expectation was that you'd be done with the website in 180 days, and you were skeptical about the airline ticket deliverable because it might take you longer to work with a vendor who, despite having a strong relationship with Prestige, was still an outside party with unrelated interests. So you had to take into consideration the validity of the requirement relative to the estimated length of the project—an instance of the requirement helping define the scope.

**Assumptions** Remember that these are the things that you *presume* are true and will happen. Some examples of assumptions include the following:

- Key project members will perform adequately.
- The project plan is accurate.
- The critical components will be delivered on time.

**Expectations** An expectation is something that's typically *customer-driven*. The customer expects that this will happen or that will be an outcome of the project. In our Prestige Hotels case study, the customer had an expectation that the project would be done in 180 days.

**Technical issues** Depending on the nature of the project, your requirements document may be positively rife with technical issues. In the IT genre, you'd especially expect to run into technical issues if you were developing a project plan for a new software program or a new hardware offering—something that had not been ventured before. Along these lines, it's possible that a technical issue might also find its way into an assumption as well. For example, you might have a technical issue that says, "The software created will be able to run on all Palm OS devices." The assumption that goes

along with this technical issue would be “A Palm device lab is required for testing the software. The lab must be equipped with at least one of every Palm OS device.”

**Industry issues** Again, this is a very relevant topic in the IT world. Within this requirements document section, you point out items that pertain directly to your project and that are being affected by the industry. Perhaps one of the best-known examples in the IT world would be the effort to come up with wireless devices and software that are compatible with the Bluetooth standard. The industry has been slow to get involved with Bluetooth, so the computing public’s acceptance of Bluetooth-compatible deliverables must be considered. It’s really great if you’re one of the early-adopters of this standard, but the computing public may see your deliverable’s Bluetooth compatibility as ho-hum.

Additionally, there may be other elements that you need to put into your requirements document that I haven’t mentioned here. One of the primary elements is the issue of security. If, for example, your project involves creating an e-commerce website, one of your requirements issues will be to gather as much security-requirements information from the customer as possible. But the customer probably won’t have much of an idea about what might be important security-wise, so it’ll be up to you (or the SME assisting you) to develop proper requirements and then obtain approval of them from the customer so they can be built into the requirements documentation.

In a well-written requirements document, you want to distinguish the “nice-to-haves” that the customer is talking about from the “need-to-haves.” This could be very challenging, because even if a requirement sounds good, it may be well out of scope for a given project.

I think it’s easy to get into this situation, especially when putting up a website. Perhaps the customer brings you a requirement that says something like: “Our database is updated nightly from [www.similarcompany.org](http://www.similarcompany.org), and therefore we’ll have a linkage that will update our customer databases.” Um, yeah. I’ve been in IT a long time, and this kind of requirement sounds like a maintenance nightmare, even if you can overcome the obstacles of getting it done, because you’re relying on a linkage to a site that may or may not be up—that may or may not even exist. Listen, if it looks like a skunk and smells like a skunk, it’s probably a skunk. Be sure to keep a sharp eye out for requirements that could easily push the project out of scope.

There’s no crime in noting things like this in the scope document as well, so that if someone brings it up later on, you’ve already said that the scope would be inappropriately enlarged.

Can you develop tasks and activities based on the requirements list that you have? A good way to test the requirements document is to see if you can derive project tasks from the list. If not, your requirements are too vague— back to the drawing board.

We can talk about one step of a process acting as an input to another step—for example, requirements-gathering in the initiating phase is an input to the planning phase. Because of this, requirements that are poorly detailed or assumptions and expectations that are not correctly fleshed out can lead to disastrous results. In these cases, at a minimum you’re guaranteed to deliver a product that doesn’t do what customer had hoped it would. The customer might want you to build a four-door SUV. When you drive up in a two-door sedan and hand him the keys, the look on his face will tell you right away that you didn’t understand the requirements. But it’s a little late then, isn’t it?

It’s wise to reinforce, with the sponsor and stakeholders, the importance of requirements definition. A clearly elucidated requirements document gets everybody singing from the same song sheet. Document the assumptions and constraints and share them with the project team. Distribute them to everyone on the project’s information distribution list.

A project kickoff meeting initiates the project meetings to follow. You should identify the value of the project and its expectations and justification here. You should be able to clearly get across to sponsors, stakeholders, and users the value of the project.

If you cannot specifically state what value the project has, then there's a big question mark as to whether the project should go forward. By the time you've gotten to the requirements definition and have worked through the specifics of the project, if there isn't a warm, fuzzy feeling in your bosom about the project, how can you expect others to feel warm and fuzzy about it? That's the whole point behind project management—to identify those projects that are worth considering and to conduct those worth implementing. Wondering about a project's worth late in the game should prompt you to ask more questions. Don't bury your doubts; get the information that will resolve them—or in an extreme, the information that will help you recommend that the project be shelved.

Having gone through an elaborate requirements-gathering process and having come out the other end demonstrating the project's value should be the convincing point that others need to go forward with the project (barring, of course, matters outside the project's control: in-fighting, politics, and such).

## ***Analyzing Program Requirements***

Projects should begin with a project kick-off meeting. This is the first in a series of meetings to be held during the course of the project. The project kick-off meeting establishes the communication lines and begins the formal communication process that's vital to any project.

At this kick-off meeting, initial agreement is reached on the requirements, delivery dates, and performance and budget constraints.

Regular project status meetings should be held throughout the course of the project. These meetings should include requirements reviews, project progress compared to the project plan, delivery dates, budget updates, and other items pertaining to the success of the project. It's very easy for a development team to become myopic in their development process and stray away from the overall requirements of the projects. Routine status meetings can keep everyone on the straight and narrow.

Published status reports should cover the same information.

**Tip** Above all, be honest. Encourage team members reporting to you to be honest. There is nothing worse than reporting to your project sponsor for weeks that the project is on track only to discover (or finally 'fess up) that a critical component is behind schedule and will cause the entire project to be delayed or even canceled. Project sponsors and stakeholders would rather know the truth up front and have time to address alternatives than be lied to about project progress.

## ***Analyzing Business and Functional Requirements***

Requirements can fall into two different categories: business and functional. A business requirement asks, "What business need does this project fulfill?" For example, a project to develop a corporate tax system—one that allows accountants to prepare corporate tax returns in-house instead of outsourcing the work—would fulfill a business need and hence be a business requirement. On the other hand, a functional requirement asks, "How will this system behave when it is fulfilling the end user's request for activity?" In other words, when the user clicks the Report button, what happens in the background?

A requirements document will contain both business and functional requirements. Keep in mind that we're looking for ways to apply some metric to any requirement that we write, so that you can validate at project completion time that the project is indeed finished and how successful it was. Subjective requirements formulation results in vague or abstract decisions about the closure or success of the project.

Business requirements usually involve processes and procedures (“end user will click Reports ÿ Tax Report to generate an end-of-year tax report”). Functional requirements address things like security issues, ease of use, speed requirements, availability (24/7?), and security (“end user must enter a username and password to access the Tax portion of the new system”).

You will take the requirements that you’ve synthesized from interaction with the customer and break them further down into one of these two types. Future changes to the requirements must go through the established change- management process.

## ***Understanding Risk Assessment***

Trying to estimate the risks that a project faces helps minimize those risks. It’s highly important to go through a risk assessment period in your initial round of project document formulation and then revisit your initial risk assessment periodically as the project progresses. By doing so, you’ll detect potential trouble spots before they occur, both at project formulation time and during the project.

Risk assessment is a big topic, and there are several questions on the IT Project+ test that ask you about risk. But the single test objective 2.10, with its associated subobjectives, talks about risk effectively enough that you can cover the test’s questions. We’ll take some time here and cover the areas that you’ll be tested on that you need to be concerned about. Keep in mind that one could write an entire book on risk assessment and management—much more than I have space for here—so it’s worth your while to become familiar with risk assessment as you go forward in your project management career.

Risks can take on a variety of forms. For example, one risk that an IT project might encounter would be changing versions of software used for some facet of the project. The upgrade could require lots of new training, might not provide the capabilities that the project’s deliverables require, or in some other way could interrupt the project process. Or, as another example, a risk might be that you have only one database administrator (DBA) for the entire company and if, God forbid, that person became unavailable, any database development activity on the project would come to a screeching halt.

Consider the impact of having only a single server run the application that your users will be utilizing. The risk associated with this is obvious—if the server fails, users cannot utilize the deliverables the project provided. In your risk assessment, you have near-term and long-term risks in addition to various categories such as people, software, hardware, resource, or time risks.

We start by considering that everything we do in the realm of project management is documented, including our risk assessment documentation. As discussed in *A Guide to the Project Management Body of Knowledge* and by PACE, most risk assessment comes during the planning phase of the project. There are three essential ingredients to this part of your analysis:

- *Risk identification*, where you become aware of a potential risk to the project. (This is sometimes called simply risk assessment in *A Guide to the Project Management Body of Knowledge*.)
- *Risk quantification*, where you determine the risk, in terms of monetary, resource, or time constraints, and then apply an actual quantity to the risk: “If the project encounters this risk, the cost to the project will be x dollars.”
- *Risk response development*, where you develop the method by which you’ll respond to the risk if it rears its ugly head. (This step is referred to as risk response planning by *A Guide to the Project Management Body of Knowledge*.)

In the controlling phase, you’ll utilize risk response control, where you actually put into place the response to the risk that you developed back in the planning phase. This is

when you're forced to pull out the risk response instruction sheet and put down a risk that has materialized.

In less formal terms than those of *A Guide to the Project Management Body of Knowledge*, the essential ingredients to the risk assessment process that you should cover are, at a very minimum, identifying, prioritizing, then developing your response.

### Identifying Important Risks

This component recognizes that there are indeed risks associated with any project. You should break the risks down into the categories that you consider logical, and you should also differentiate between near-term and long-term risks. Especially in IT projects, the topic of fault tolerance—providing for the possibility that hardware might fail and, in spite of the failure, guaranteeing that users can access a given application—will be of great interest. Other key IT risk topics would include disaster recovery and business continuity. Disaster recovery restores a company's operations from backup tapes after some event that takes out the entire system. Business continuity asks the question, "How close can we get to where we were, in terms of the business day, when the disaster occurred?" In other words, can you restore the company back to one hour ago, four hours ago, one day ago, or must you go even farther back?

In formalizing your risk assessment process, it's a good idea to put team members in a room—including SMEs that understand the business process the project is associated with—and brainstorm to come up with the risks associated with the project. If you alone try to single-guess the risks, you'll doubtless come up short. By getting a variety of team members involved, you'll stand a better chance of identifying all potential risks to the project.

### Evaluating Risk Severity

Some risks pose less chance for harm to a project than others. For example, the risk of a contractor you're using quitting his job and leaving you high and dry isn't a big risk because, presumably, the company you're contracting with will backfill with someone else, though the replacement may not be as skilled as the incumbent (hey, she may be *more* skilled). Compare that with the risk that you're counting on two disparate systems to talk to each other through some middleware and finding that the battle is going to be large and long in order to get the middleware to cooperate.

It's important to evaluate risk severity. After you've gotten your list of risks, prioritize them. You have a couple of different methods by which you can do this:

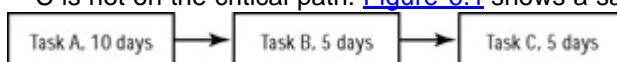
- By the likelihood that the risk will occur during the project's implementation
- By the impact the risk would have on the project if it happened

It's a good idea to show the list in both orders so that you and the team can then make decisions about how to go through the quantification and response development processes (described next).

### Developing Risk Responses

One of the exam subobjectives talks about the critical path, a topic we've not yet covered. The *critical path* of a project is the series of consecutive activities that represent the longest series of dependent actions through the project. There are critical path questions on the test and in this chapter's review questions.

If the first step in a project, Task A, must be accomplished before Task B can occur, you've defined the first step toward the critical path. If Task C can occur at the same time that Task A occurs, and it does not hinge on any *predecessor* occurring first, then Task C is not on the critical path. [Figure 6.1](#) shows a sample critical path.

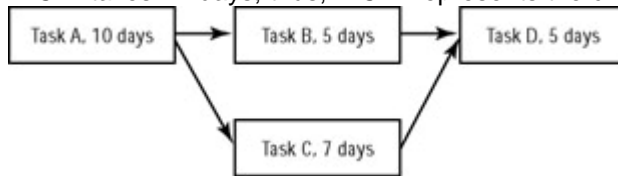


**Figure 6.1:** An elementary critical path

In [Figure 6.1](#), you can see that to move from Task A to Task B requires 10 days. Next, you use up 5 days in accomplishing Task B, but it has to be done before you can move

on to Task C, which also requires 5 days. Therefore, the entire critical path takes 20 days. A is a predecessor to B, which is a predecessor to C.

[Figure 6.2](#) shows that Task A is a predecessor to both Task B and Task C. Neither can go forward without the accomplishment of Task A. Likewise, Task B and Task C are both predecessors to Task D. To evaluate the critical path, you add up the duration that each path utilizes; the longest one is the critical path. In this case, A B D takes 20 days and A C D takes 22 days; thus, A C D represents the critical path for the project.



**Figure 6.2:** An elementary critical path with an additional subtask

Ideally, you should identify risks associated with both the critical path activities and activities that are not on the critical path. What the exam subobjective is telling you is that it's more crucial to your project's success to be prepared for critical-path risks. Once these risks are identified, you'll develop risk responses—those actions that you'll take should a specific risk occur. A *risk response* is formally defined as a plan of action to increase opportunities or decrease threats. By developing a risk response, you're proactively recognizing the possibility of something untoward occurring and then formulating a recovery strategy should that thing occur.



### Perhaps a Risk Becomes an Opportunity

The “. . . increase opportunities . . .” portion of the definition of risk response development is more interesting. Sometimes things that are perceived as risks can actually wind up being a benefit. For example, I was once involved in a project to upgrade a large enterprise from one version of server software to another. The project team thought that we were all ready to go, but we were stopped abruptly by a chief financial officer who said, in effect: “Whoa! Wait a minute. You haven't tested this out enough; you haven't convinced me that you should go forward into a production implementation.” At first, we thought of this CFO as a threat—a risk to the project. But after working through what he had to say, we were able to formulate some more robust testing plans and identify some issues we hadn't thought of earlier that would've really presented serious risks to the project! So something we observed as a risk actually wound up becoming an opportunity to improve the project.



Having covered a lot of ground about risk assessment in your requirements document, let's see how this applies to the Prestige Hotels sample project.



### Prestige Hotels: Requirements Document

We now have enough information to write our Prestige Hotels requirements document. In real life, to develop this document, you'd interview the customer to completely develop their ideas and concerns. You bring a business analyst to this interview, or ascertain if the customer has one who can be actively engaged in the project. You formulate these requirements, putting them together with your IT business practices, into a document that accurately reflects what the customer wants. You run this document by the customer first before going forward into scope development.

## Project Title

Reno/Las Vegas (RLV) Group, Marketing Website Virtual Slot Machine (VSM)

## Requirement Steps

For some requirements, user acceptance testing (UAT) will be performed to measure website visitor acceptance. For items with this measurement specified, 100 percent satisfaction will be required to certify completion.

- The website's entry page will provide the visitor with a graphical image of a slot machine, very similar to the real-life slot machines seen in Nevada's casinos. The website visitor ("surfer") should be able, after validation of his or her age, to click a "Spin Dials" button to spin the VSM's wheels. A variety of symbols can be used on each wheel, but the symbols should be taken from the marketing and website themes of the four hotels in the RLV Group. UAT and sign-off by the customer will represent completion of this requirement.
- The Prestige Hotels legal department will provide assistance with the legalities behind make sure surfers are 21 or older. Provision of one legal brief stipulating what actions the IT department must take to facilitate the legality required will meet this requirement.
- Similar to the way that a Nevada casino's slot machine works, combinations of some of the symbols create a prize. These prizes will be grouped into three categories; UAT will demonstrate that these categories are present, clearly defined, and attractive:

**Grand Prize** The big winner on the wheel is a combination of three cowboy hats. The lucky spinner will receive three nights for two at the Texas, all expenses paid (hotel stay, taxes, airport transfers, and meals at any of the Texas restaurants), and \$500 cash. First-class airfare from anywhere in the continental U.S. is included through the partnership airline qLines. Only one Grand Prize can be awarded. (If the grand prize is awarded the first day [likelihood is 1 in 20 million] we'll immediately post on the website and continue to offer the other prizes.)

**First Prizes** These are nine prizes of lesser value than the Grand Prize but greater than the Second Prizes; three of any non-Texas symbol will win a First Prize. A First Prize winner will be able to select the prize they prefer from a list of the remaining, not-yet-awarded First Prizes. (Developers will prove this component works by showing the customer a complete simulation software cycle, in which the software is run by thousands of simultaneous uses. UAT will then validate this requirement.) A First Prize consists of a free additional night at an RLV hotel when the first night is purchased by the surfer (individual prize cost is \$222). Three such First Prizes will be offered to each of the Cajun Blues, Bangkok, and Sidewinder hotels.

**Second Prizes** Smaller giveaways (cost \$15–\$25 each) will be known as Second Prizes; 25 of each of the following Second Prizes will be awarded:

- A spin of two pairs of chopsticks, representing the Bangkok hotel, will win the surfer a T-shirt from the Bangkok.
- Two race cars, representing the Sidewinder hotel, will win a DVD or VHS video of the making of the Sidewinder.
- Two Mardi Gras symbols, representing the Cajun Blues hotel, will win a bottle of Bordeaux wine labeled with the Cajun Blues label.
- The Grand Prize and each First Prize can only be awarded once. Iteration testing will be used to validate that the wheel cannot give out more one of each. One document demonstrating the results of iteration testing and guaranteeing that each prize can only be awarded once will satisfy this requirement.
- Surfers are allowed to visit as often as they want, but a surfer cannot spin the wheel more than once. This information will be validated as the user logs on to the site. The Prestige legal department will provide verbiage to put on the site for legal coverage. The logon

address will be matched to the current list of addresses of winners. If a winner has already been issued for this address, no further prizes will be awarded for this surfer. UAT will validate this requirement.

- The site will offer the ability to view samples of the rooms in any of the hotels and links to all of the individual hotels' regular websites. For example, if the surfer clicks a cowboy boot, they will be directed to the Texas site. UAT will validate this requirement.
- Surfers will have the ability to book a room at any of the four RLV hotels, or to navigate to an RLV hotel's website and book from there. A surfer booking a room will be required to enter a credit card number to hold the room. UAT will validate this requirement.
- The site will link to the partnership airlines website—qLines. UAT will validate this requirement.
- The surfer will be able to print out coupons for discounts on meals and shows. UAT will validate this requirement.
- One complete UAT document will validate that the site runs as expected and is ready for final publication.
- The site must be up and running in 180 days, in time for the Las Vegas conference season. Completion of tentative project calendar will validate this requirement.
- The site will be published to Prestige's ISP, The World To You (W2U) Communications, Incorporated. A W2U server, as specified in the W2U contract, will be used to house the website. W2U will maintain the site's databases and code for disaster recovery and fault tolerance. A copy of the W2U contract will validate this requirement.
- W2U will be responsible for getting the site listed on the major search engines of the Internet (Yahoo, Excite, Google, etc.). A copy of the W2U contract will validate this requirement.
- RLV Marketing will publish the website's address in trade journals, magazines, newspapers—anywhere that the marketing department thinks it would be beneficial to advertise the site. RLV Marketing will pay for all marketing of the site out of its budget. A copy of the agreement between RLV and its parent, Prestige Hotels, will validate this requirement.

#### **Assumptions**

- No outsourced coding or graphics development will be required.
- All surfers are over the age of 21 years old.
- W2U is capable of maintaining the site with no problems and to keep it from being hacked.

#### **Expectations**

- Any friction that might exist between RLV and Prestige in accomplishing the marketing aspects of the site will be mitigated as quickly as possible.

#### **Risks**

All risk assessments are on a scale of 1–10 for both risk likelihood and risk severity (10 being the most likely and most severe).

- Users may be unaware of the site, resulting in little use. Statistical likelihood of any one surfer who is new to the Internet being unaware of a Web site is 1:250,000,000—not very good odds! However, by advertising on the 25 top visited sites, odds are reduced to 1:10,000. There is no suitable risk response to this apart from waiting for the word to get out that the site's out there. Print media spots will help mitigate this risk further. Risk likelihood: 7; risk severity: 2.
- Prizes may not be attractive enough to users. Statistical likelihood indicates that surfers are attracted to physical prizes over “cyber” prizes (coupons, dollars-off on a purchase elsewhere, etc.) by 500:1. We feel that offering a physical prize will generate far more hits than

offering no prize or a cyber prize. No risk response is required. Risk likelihood: 5; risk severity: 5.

- Site may be ineffective for some other reason (graphics don't look good, etc.). Focus groups indicates that surfers will leave a badly developed site 75% faster than one that's been well-developed (graphics are complex, sharp, colorful and clear, site is fast, sufficient white space, etc.). Software is available that can monitor users who are hitting a test Web site in a focus-group setting to generate viewing statistics. We'll mitigate this risk by running the site through two focus groups using this software prior to putting it into production. Risk likelihood: 2; risk severity: 7.

#### **Technical Issues**

- Collaboration between W2U and the Prestige IT department may at any time become strained or unclear. No quantification required. We can mitigate this risk by making sure that someone on the project team holds regular meetings with W2U. Risk likelihood: 2; risk severity: 5.

#### **Industry Issues**

- Legal problems with gambling and e-commerce. We don't want lawsuits from states or other entities who feel we're not validating a surfer's age. No quantification required. We can mitigate this risk by running all concerns about legality through Prestige's legal department. Risk likelihood: 2; risk severity: 7.
- Labor issues with slot machine makers? This risk is minor in nature and not likely to occur. No quantification required. No risk response necessary. Risk likelihood: 0; risk severity: 7.

#### **Approval**

Rolf Montenegro, Executive Director—Operations, RLV Group (Project Sponsor)

## **Summary**

In this chapter, we talked about requirements analysis and risk assessment. When developing requirements, concern yourself with various inputs that have an impact on the project; inputs include things like assumptions, expectations, industry standards, corporate standards, etc. Requirements should be thoroughly defined and able to be represented via some metric that can quantify, at project closure time, how well you met the requirement. You should also be able to validate which requirements are unrelated—the “nice to haves” versus the “need to haves.” You should obtain formal customer agreement and buy-in to all of the requirements and get sign-off from the project sponsor for the requirements as formulated, understanding that to add requirements after sign-off will require going through the change-management process, probably a scope change, and a re-sign-off by the sponsor.

Risk assessment, a large and complex project management topic, represents the identification of risks to the project, prioritizing those risks and developing responses to the risks should they occur.

## **Exam Essentials**

**Understand the complete set of elements that make up a requirements document.** Included in this set will be assumptions, expectations, technical and industry issues, risks, the requirements themselves, stakeholders, and approvals.

**Be able to identify whether the requirements are formulated well enough for measurable outcomes.** It's important to be able to apply measurable metrics to each requirement so that you can gauge whether you've met every one.

**Be able to recognize when the requirements are well enough defined to move on to the planning phase.** You cannot proceed to project planning until you've refined and nailed down the requirements.

**Be able to explain risk assessment and identify project risks.** Be prepared to identify, evaluate, and prioritize risks and formulate risk responses.

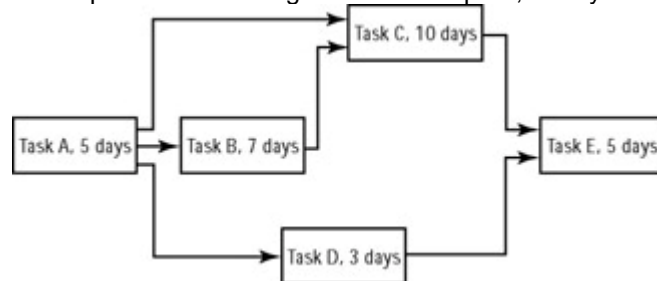
## Key Terms

In this chapter, we encountered some new terms:

critical path	risk identification
customer-driven	risk quantification
inputs	risk response
predecessor	

## Review Questions

1. The exhibit shows the steps in a project. Task B must occur before Task C. Tasks B, C, and D must all occur after Task A and must all occur before Task E can be accomplished. How long is the critical path, in days?



- A. 13 days  
 B. 20 days  
 C. 27 days  
 D. 30 days  
 E. 40 days
2. You're a project manager working on a new project. The project's deliverables will result in a customer service screen in which customer service employees taking phone call orders from a customer will access the customer's account and key in the items requested. From this list of requirements you've formulated, which aren't within the focus of the project? (Select all that apply.)

- A. The screen must display name, address, city, state, postal code, and home phone number.  
 B. The home phone number must be the primary key in the database.

- C. The customer calling in must give his correct size to access the account.
- D. The customer calling in must give his home phone number to access the account.

3. When you ask the project client for a list of requirements, you are given this paragraph:  
“We want a program in which customer service representatives can enter the customer’s name or phone number and pull up the previous purchases for the customer. We then want to be able to provide the customer with a coupon for a discount, the size of the discount depending on the amount of previous purchases within the last five years.”

?

Which of the following are true? (Select all that apply.)

- A. You have detailed enough requirements to begin planning.
- B. You’re missing certain requirements.
- C. You don’t have any requirements.
- D. The requirements you have are poorly formulated.
- E. You should meet with the client for further requirements refinement.

4. When you ask the client for a list of requirements, you are given this list:

?

- The user input screen must allow for the entry of 100% of corporate customer information requirements: first and last name, mailing address, city, state or province, postal code, billing address, billing city, billing state, billing postal code, credit card number, type of credit card, and credit card expiration date.
- The user input screen must allow for the entry of 100% of the items the customer wants to order. Whether the customer wants one item or hundreds, the input screen must be able to accept all items ordered.
- The user input screen must calculate, 100% correctly, the amount of the customer’s purchase, including taxes for the city and state or province the live in.
- The user input screen must calculate, 100% correctly, the amount the customer will pay for shipping of the products ordered.

Which of the following are true? (Select all that apply.)

- A. You have detailed enough requirements to begin planning.
- B. You’re missing certain requirements.
- C. You don’t have any requirements.
- D. The requirements you have are poorly formulated.
- E. You should meet with the client for further requirements refinement.

5. When you ask the client for a list of requirements, you are given this list:

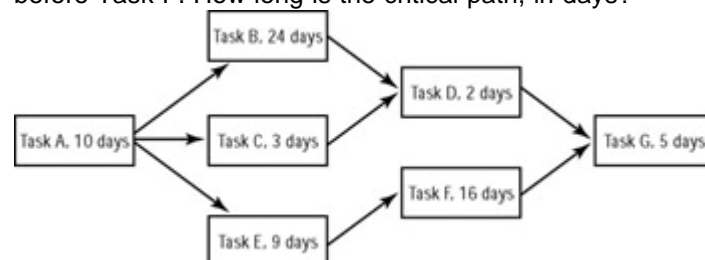
?

1. We will be 100% able to track users when they move.
2. The user input screen must allow for entry of 100% of corporate customer information requirements: first and last name, mailing address, city, state or province, postal code, billing address, billing city, billing state or province, billing postal code, credit card number, type of credit card, and credit card expiration date.
3. The user input screen must allow for the entry of 100% of the items the customer wants to order. Whether the customer wants one item or hundreds, the input screen must be able to accept all items ordered.
4. The user input screen must calculate 100% correctly the amount of the customer's purchase, including the taxes for the city and state or province they live in.
5. The user input screen must calculate 100% correctly the amount the customer will pay for shipping of the products ordered

Which requirement above will be the most difficult to represent with accurate metrics?

- A. 1
- B. 2
- C. 3
- D. 4
- E. 5

6. The exhibit shows a series of steps in a project. Tasks B through F must all wait for Task A to be completed and must all be complete before Task G can begin. Tasks B and C must occur before Task D, and Task E must occur before Task F. How long is the critical path, in days?



- A. 20 days
- B. 40 days
- C. 41 days
- D. 55 days
- E. 69 days

7. From the items shown, drag the three basic phases of risk assessment in the requirements gathering process into the

correct order.

Risk summary	1.	
Risk response development	2.	
Risk quantification	3.	
Risk outlining		
Risk mitigation		
Risk identification		

8. Select those requirements that are functional (as opposed to business requirements).

?

- A. Improve sales by 10%
- B. Improve customer response times by 35%
- C. Provide a web reporting screen
- D. Reduce personnel required by three full-time equivalents
- E. Provide sales demographics
- F. Improve productivity

9. Given an initial project requirements formulation effort, which of these are things that you should *not* take into consideration? (Select all that apply.)

?

- A. Determining if the list of requirements is complete and accurate
- B. Determining if the requirements include the necessary range of inputs
- C. Determining if the customer understands the business need well enough to formulate the requirements
- D. Determining if the requirements contain metrics that can measure success and completion criteria

10. You have worked hard to formulate a project that you think is highly important to the company and have presented it to the project's executive sponsor, a person who has the responsibility for prioritizing other projects. She gives the project a priority of four on the list of five major projects. You're shocked and want to revisit the way that you developed the project. What things should you take a look at in order to modify the project and perhaps get her to prioritize the project a bit higher on the list? (Select all that apply.)

?

- A. Provide quantitatively definable metrics in each requirement.
- B. Create more interesting graphics.
- C. Stress the importance of each requirement as you re-formulate it.
- D. Take out nonessential requirements.
- E. It's too late, there's nothing you can do.

11. During an interim project requirements review process, what are some of the things you're trying to ascertain?

?

(Select all that apply.)

- A. Product deliverables
- B. Product delivery
- C. Product performance
- D. Product usefulness
- E. Budget requirements

12. Which of these items are a result of the requirements formulation process? (Select all that apply.) ?
- A. Project focus
  - B. Project clarity of purpose
  - C. Project importance
  - D. Project value
13. In your risk assessment activities, why would it be more important for you to evaluate potential risks for steps in the critical path than for those steps that are not? (Choose the best answer.) ?
- A. Steps in the critical path directly affect the project's duration.
  - B. Steps in the critical path are the most critical to the project's successful outcome.
  - C. Steps in the critical path are those that are the most time-intensive.
  - D. Steps in the critical path are those that are the most complicated.
14. In the execution of a project, from time to time you should perform which requirements function? ?
- A. Examine requirement metrics to make sure they're correctly defined.
  - B. Review the requirements to see if the project is working toward their accomplishment.
  - C. Examine the requirements again to make sure that none of them are too vague for the project's outcome.
  - D. Make sure the requirements continue to match the customer's wishes.
15. Choose the project component that's most important to individual team effectiveness. ?
- A. Project cost
  - B. Project size
  - C. Project schedule
  - D. Project value
  - E. Project budget
16. You've inherited a project in which the requirements, assumptions, and expectations are poorly defined. If you don't modify the requirements accordingly, what outcomes might you expect from such poorly formed requirements? (Select all that apply.) ?
- A. Not sure when the project's complete

- B. Not sure how successful the project was
- C. Not sure who the stakeholders are
- D. Not sure who the project sponsor is
17. Why should you go to all the effort of developing well-defined requirements? (Select all that apply.) ?
- A. So you have a way of measuring the success of the project
- B. Because long, detail-oriented documents help keep people from interfering in your project
- C. So you can tell when the project's done
- D. So you know exactly what you're going to do in the project
- E. So you can identify exactly who the end users are going to be
18. How will you recognize when the list of requirements is complete, accurate, and valid enough to move to the planning process? ?
- A. When all of the requirements put together contain a metric by which you can measure their collective success
- B. When you've boiled each requirement down to a distinct step that you need to accomplish in the project
- C. When you've obtained sign-off on each requirement by the project sponsor
- D. When each separate requirement contains a metric by which you can measure its success
19. You're working on the requirements for a particular project you've been assigned to. You're in the risk assessment phase and have pinpointed some risks for certain requirements that are highly unlikely. What steps should you go through when evaluating these risks? (Select all that apply.) ?
- A. Document the possibility of the risk.
- B. Develop suitable risk responses for the identified risks.
- C. Ignore these unlikely risks.
- D. If the risk is on the critical path, go through normal risk assessment policies; otherwise, ignore.
20. Suppose it's not possible to adequately define the project's requirements, for whatever reason. What impact would this kind of nebulous requirement development capability have on your project? ?
- A. Little capability of validating the success or completeness of the project
- B. Lack of confidence in the completeness of the project's deliverables
- C. Inability of the project sponsor to sign

- off on the completion of the project
- D. Reduced stakeholders' commitment to a timely project implementation

## Answers

1.

C

The critical path is the series of consecutive activities that represent the longest necessary path through the project. You use up 5 days with Task A, then 7 days with B, 10 days with C, and a final 5 days with Task E, for a total of 27 days. Even though Task D cannot fire off before Task A is completed, A D E only uses 13 days.

2.

C

It does not appear that the customer's correct size has anything to do with the screen and doesn't belong in the list of requirements, unless the client would like to refine what the requirements are for this project.

3.

B, D, E

You're missing certain requirements. For example, should the client be able to search on first name, last name, or both? Further, what are breakdowns on purchases and what percentages will you apply? For example, are you going to give a 5% discount for all purchases between \$1 and \$100, or are you going to give 10% for the same range? You have no idea what range the client is thinking about. Additionally, you haven't identified any metrics by which you can measure the successful completion of each requirement. Further requirements refinement is needed before this project can proceed.

4.

B, E

This requirements list is on the right track. The list denotes metrics by which you can describe the success (or lack thereof) of each requirement. There seem to be requirements that you're missing, though. For example, what does the client want the user input screen to look like? Should there be reports? What buttons should be on the screen? You can probably think of others. This is a good start, but needs refinement.

5.

A

This requirement falls into the "impossible to verify" category, simply because there's so much lag time between the time a customer moves and the time that he or she changes their address with you. The customer may not, for example, recognize that she must tell you she used to be a customer with you when she lived in a different location. There may be a practical problem with searching the database for a given name—for example, "Mary Jones"—finding an instance or two of Mary, and then validating that the person you have on the phone who now lives in Beaverton, Oregon is the same Mary that used to live in Tuscaloosa, Alabama.

6.

C

Tasks A, B, D, and G represent the longest dependent path through the project, so the critical path requires 41 days.

7.

1. Risk identification

2. Risk quantification

3. Risk response development

You first identify project risks. Next, you attempt to quantify their affect on the project in some form of quantification method, and finally you develop a response to the risks.

8.

A, C, E

Functional requirements are those that the computer system (in the IT project world) can perform, whereas business requirements are those business functions that the system can perform. Obtaining demographics data for a user, providing a web reporting screen, and even improving customer response times are all functional requirements (though improving customer response times falls a little bit in both camps).

9.

C

The customer approaches you with a project. You are trusting the customer's ability to correctly formulate and diagnose the requirements that he or she wishes to put into the project. You would not necessarily question the customer's sense of the area of business that they're involved in.

10.

A, C

All of the action answers might help in redefining the project's requirements and goals. If you cannot apply a metric to a requirement, then the sponsor is likely to question how you can validate that you've achieved it. Likewise, if she cannot understand the importance of a requirement in context with the project, then you need to refine there as well. Requirements that don't play an essential role in the project should be considered for deletion, but this probably wouldn't change the project's priority.

11.

B, C, E

A periodic project requirements review process is a great thing to go through at regular intervals because it helps keep the project management team as well as the stakeholders and customers on track. You examine intended product's delivery date, the product's performance thus far, and the budgetary requirements that you have left. The product's usefulness and deliverables should've been ascertained at requirement development time, not as you're working through the project.

12.

A, B

Clearly defined requirements allows you to focus in on what the project is really about, which in turn clarifies the project's purpose. The importance of the project or its perceived value isn't usually an outcome of the requirements formulation.

[13.](#)

A

The critical path is the series of consecutive activities that represent the longest dependent path through the project. Since a risk to a step in the critical path could potentially increase the time it takes to get the step done, it can directly affect the project's completion date.

[14.](#)

B

Periodic requirements review is a great idea because it matches your project activities up with what the original requirements were developed to be. You can quickly see where (or whether) you've gotten off track.

[15.](#)

D

The project's value—that is, how important it's perceived by management, stakeholders, and perhaps even the corporate body at large—contributes to the team's effectiveness, simply because team members feel like they're working toward something that's held in high esteem. No one wants to work on a project that doesn't mean much to anybody. That being said, picture yourself as a project manager for a project that's going to update the internal piping in a sewage treatment plant. Chances are the overall corporate body isn't going to recognize the importance of your work, but stakeholders certainly are aware of what you're getting done.

[16.](#)

A, B, C

With poorly formed requirements, you'll probably still know who the project sponsor is. However, without metrics to measure your success, you have no way of knowing when the project's complete or how successful it was (though you might *think* you know). Nor is it necessarily possible to know who the stakeholders are. Stopping a poorly developed project in mid-stride can be painful to a company, but letting it proceed without correcting it can be even more painful.

[17.](#)

A, C, D

You may never know all of the end users that going to be using the system, so you don't develop requirements that are designed to denote that particular feature. You are, however, concerned with well-developed requirements, because they can tell you when you've successfully completed a project and exactly what you're going to do when you're in the midst of the project.

[18.](#)

B, D

You're striving to develop requirements discrete enough that each represents a single step in the project plan, and each assigned some sort of metric to signal when it's complete and how successful it was.

[19.](#)

A, B

Risks are risks. If you've identified a risk but one that's unlikely, you would be smart to document the risk as well as go forward and develop a suitable risk response should the risk actually happen.

[20.](#)

A, B, D

The project's requirements and scope could be worded in

such a way that the project sponsor could sign off on the project, and yet you still can't identify any well-defined requirements.

## Chapter 7: **Creating a Project Plan**

### **CompTIA Exam Objectives Covered in this Chapter**

- 2.1 Given an approved project scope document, and detailed schedule and budget information, demonstrate the ability to create a project management plan that illustrates the following:
  - Understanding of the roles of stakeholders, what reporting information each needs, and when it is needed
  - Knowledge of how to establish a project tracking mechanism.
- 2.2 Given a scenario with necessary project documents, and given enterprise holiday and individual resource calendars, demonstrate the ability to develop an initial project schedule by doing the following:
  - Define and sequence project tasks, activities, and phases which are needed to bring about the completion of given interim or finished project deliverables
  - Estimate durations for project tasks, activities, and phases
  - Specify resources required for the completion of each phase
  - Give informal analysis of specific project team and stakeholder requirements, determine the appropriate schedule format(s) for a given individual (Gantt, PERT, text table, milestone chart, ordinary calendar, etc.)
- 2.3 Demonstrate understanding of the following budgeting concepts, techniques, and issues:
  - The concept of bottom-up cost estimates, their purpose, and the conditions under which they are necessary
  - Standard engineering estimate techniques that can be used to solicit initial financial budget inputs based on mutual agreeable high level requirements
  - Issues to consider when transforming a project cost estimate into a budget and a plan for addressing spending requirements over time
- 2.4 Identify the characteristics of a formal project quality management plan (e.g., measured quality checkpoints, assignments for architectural control, systems test, and unit tests, user sign-off, etc.).
- 2.5 Given a team-building scenario, including a scope definition and WBS, identify selection criteria for particular team members. Demonstrate the ability to ask interview questions that will assist the team selection process. Assume project organization inclusive of:
  - Business
  - Leadership
  - Administration
  - Technical
  - Stakeholders
- 2.6 Identify methods for resolving disagreements among team members when evaluating the suitability of deliverables at each point in their evolution.

Having spent several chapters on project concept, charter, requirements, and scope formulation and refinement, and hopefully arriving at a solid scope definition, you're now ready to create your project plan. Without all that up-front work, you'd really have no way of knowing how extensive your plan should be. Now that you know the requirements and scope, creation of the plan should go much more smoothly. We'll talk about the basics of

formulating a project plan, setting up your project team (as well as resolving disagreements among team members), preparing a budget, and formulating quality control methods in this chapter.

## ***Understanding the Basics of a Project Management Plan***

So far we've talked about a project concept document, the project charter, a requirements document, and a scope document (all with their associated sign-offs). Your project may have all of these documents and perhaps even more, including such supporting documents as a vendor's statement of work; or your project may be small enough that you can comfortably pare down the information into a couple of documents.

Either way, the effort of fleshing out the project concept, charter, requirements, and scope has taken place. By this time you would expect to have very highly refined requirements and a well-positioned scope document. Your goal at this point is to be rock-steady, with little to dissuade you, with the completion of the project as developed in previous documents in mind.

Now we go forward with the actual project planning process; we will lay down the way that we're going to actually get this thing done.

### **Stakeholder Reporting Needs**

Recall that a stakeholder is defined as someone who has a share or an interest in your project. A stakeholder might not directly interact with the deliverables of your project. For example, the manager of a marketing department might never use the demographic software that you created for use by his marketing personnel, but he is a stakeholder because he will benefit from (or be hurt by) the project.

- Your customer is a stakeholder.
- The project sponsor is a stakeholder.
- Your team members are stakeholders.
- The users of the deliverable are stakeholders.
- Those affected by the project, whether they'll use the deliverable or not, are stakeholders. For example, suppose you're working on a project that's going to require heavy use of the company's telephone system. Even though the telecommunications department may not be using your new deliverable, they will nevertheless be involved in the project and are thus stakeholders.
- A stakeholder could be a vendor who has a keen interest in seeing a project succeed. I've seen this in very large and very small companies, so there seems to be no company size boundary that gets in the way of a vendor being a stakeholder.
- You are a stakeholder.

Identification of all the stakeholders of the project is critical. If you do not identify all of them, you could harm the project plan by not identifying a given stakeholder's needs early on. In the preceding telecommunications example, suppose that you had not identified the telecomm area as a stakeholder in your project. When the time arrives that you need their assistance, they might have far more pressing items to be concerned about, or they might be very put out to learn so late about your project and its goals. Having been there before, I can tell you firsthand that stakeholders don't like finding out they're involved at the very moment that their services are needed, especially if they require resources to assist you.

So, how do we figure out who the stakeholders are? Probably the best way is to have a brainstorming session with the people already assembled on the project. Perform your brainstorming early and ask, "Who do you think the stakeholders are in this project?" You might be surprised with the answers you'll get, and you may not recognize some of the names. As new stakeholders come on board, ask them same question.

However, it's up to the project manager to avoid the "cast of thousands" momentum that might arise from asking stakeholder after stakeholder who they think might also be a stakeholder in the project, only to garner tons of them because no one wants to disappoint you. Use your good judgment when assessing who is and who is not a stakeholder and assess the "reality quotient" behind the stakeholder claim.

**Tip** A vendor who's bidding on your project isn't a stakeholder until they get the bid!

At some point, you might hear, "No one asked *me* about this!" You've abruptly and unpleasantly found a stakeholder who was not notified of the project. You may run into situations where a stakeholder is actually *not* on your side when it comes to the project. She might be out rallying forces to stop the project or to outsource your efforts, even as you are arranging the stakeholder meeting agenda and e-mailing everyone with the next meeting time. It's extremely wise to judge the political lay of the land so that you're not caught off guard with such two-faced activities. It happens, so be prepared for it.

## Communicating with Stakeholders

Generally, when communicating with stakeholders, it's better to err on the side of too much communication than too little. That's why an intranet site is a great way to dispense your information. Just create a folder where you drop in a read-only copy of all of your project management documents, set up a URL that points to the folder, and stakeholders can visit as often as they like for updates. Use a portal solution, and you can actually set up document subscription services so that stakeholders are notified when something on the site changes.

What do you share when you're communicating with stakeholders? Well, basically everything, but let's give some concrete examples. Share your project status notes. Honesty is a great policy to maintain as a project manager, and your status notes need to honestly reflect the current state of the project. That doesn't mean you have to knock stakeholders over the head with depression and gloom about facets of the project—just that you need to be sure you communicate, in orderly, professional business language, where the project sits, whether it's in the rough, in the water, or on the fairway.

You'll also share the project meeting notes. Project meetings need to have someone taking notes, and the notes need to be orderly, accurate, concise, and complete. If not, you'll run the risk of a stakeholder raising issues with you over something that was discussed in a project meeting. The famous line, "That's not what I heard you say," acts as a politically correct way of communicating, "You didn't phrase that correctly" or, even worse, "You're lying." So be careful to say what you mean and mean what you say when you're setting up these documents.

Project meeting notes will include things like the status of the project; the people who attended the meeting; questions, comments, and concerns raised by stakeholders, and the answers handed back in return; delays, additional expenses, wins, losses, and so forth. Careful, concise consideration for the information you obtain and share from project meetings keeps all players on the same page.

Information should hold these common elements regardless of the stakeholder or the method of communication. Communication should be regular, timely, and complete.

## Communicating with Stakeholders Who Are Vendors

Working with non-company stakeholders such as vendors can be a challenge. You have a couple of ways that you can go about establishing solid communicative relationships with vendors. First, you can consider putting up a virtual private network (VPN) connection for them. With a VPN nailed up, you can simply give the vendor partners that are stakeholders in the project a valid logon name and password, and they can reach across their network to yours to download and read important project information. Also, you can use e-mail tracking strategies, where you routinely send out *e-zines* that keep people apprised of project status. Surely you've seen an e-zine before; they are simply

e-mails made up of headlines with the high points and text that gives the details. You could routinely formulate and e-mail e-zines to those stakeholders who aren't able to attend regular stakeholder meetings.

Another more exotic methodology would be to use remote collaboration techniques to bring stakeholders to you for your regular meetings. Conference calling is appropriate and is quick, easy, and inexpensive to set up. You could implement virtual collaboration software, such as Microsoft NetMeeting or CUSeeMe ([www.cuseeme.com](http://www.cuseeme.com)), to set up a camera and microphone and even share a virtual whiteboard and standard office automation products such as word processors and spreadsheets.

### **Establishing a Project Tracking Mechanism**

You also need to determine how you're going to track the project as it moves forward. There are several elements of the project that you'll want to keep track of, lest something drive off into the weeds. The PM's job, when the project is fully underway, is to manage the execution of the project's steps and control things when a step goes awry. Let's talk about some of the things you would employ in a project tracking mechanism.

### **Metrics**

Remember those metrics that you developed when you were busy writing the project's requirements? Now you can begin to use them. Suppose, for example, that you developed a requirement that when a user hits the Checkout button in an e-commerce site you're developing, the behind-the-scenes code will calculate the quantity for a given item times its price, plus the shipping rate for the items. A metric for this requirement would be that it accurately performs this calculation 100% of the time.

A fundamental function of good project managers involves frequently revisiting the requirements, measuring them against the metrics, and validating that they're on track and complete.

Something to consider when developing tracking requirements metrics is your level of acceptance for a given requirement. Suppose, for example, that one of the requirements you've developed is this: "When user clicks the Demographics button, the user will be presented with a pie-chart graphic that depicts a percentage separation calculated from the Student-T variable. This percentage can be within +/- 5% of actual." This metric allows for some flexibility in the acceptability of the requirement's outcome. Most requirements will have hard and fast metrics, but some might present an opportunity for leeway.

### **Budget**

Budget is always of concern to a PM. You'll want to watch it closely, making sure that expenditures are close to your estimates. Remember that budget is a project constraint that's balanced with time and quality—so if the costs go up, something else has to give. If the project is also constrained by time, then it has no choice but to suffer in quality.

On the other hand, it's hard to manage costs effectively without getting vendor bids that are locked in with a certain time limit. This, too, can be problematic. If you are a good steward and obtain bids that are valid for ninety days, but your project doesn't start until sixty have elapsed and you don't get to ordering gear . . . well, it's very possible you'll go beyond the expiration date of the vendor's bid. This is precisely how projects get into trouble. That, of course, and contractor hour overruns—that is, contractors who bill you for more hours than you had originally budgeted.

### **Tracking**

There are several ways by which you might track a project. You can track by costs, for example. In a cost tracking model, you manage the requirements very closely to the

projected costs so that the project comes out on or under budget. (Road projects are often managed this way.) Tracking projects by costs may wind up reducing quality, though, because you get trapped in the TQB equilibrium.

Alternatively, you might track strictly by project requirements. If you're not meeting requirements, you won't have a deliverable! You won't concern yourself as much with costs as with making sure that the requirements are being met according to the way they were written. In this tracking methodology, you study the activities required to accomplish a requirement, then gauge how well you've met the objective by its metric.

You might also track to the project plan—keeping track of the activities within the plan. There's a subtle difference between tracking to requirements and tracking to the project plan. Requirements might necessitate several different activities to be completed before you could say that a requirement was complete. Managing to the project plan means managing each of the activities or tasks associated with the plan rather than specific requirements. The good thing about this tracking style is that you have your finger on the pulse of virtually every component of the project. However, this isn't feasible with large projects.

You may decide to track by team member. This would be a useful method if your project had very unique deliverables that required specialized individuals. It would be especially important if one person's work had to be finished before another person's efforts could begin. For example, you could have a web developer working on a web page and a graphics expert developing some stunning art for the entry page. The page wouldn't be available until the graphic artist was finished with the required graphics.

## **Reassessment**

No matter what kind of tracking methodology you use, you need to constantly be in diligent reassessment mode. The question you ask yourself is, "Are we still on track?" You look at your team members, requirements, activities, and milestones and make an educated, qualified estimate of how well off the project is. In order to perform these reassessments, you'll routinely examine the project charter, requirements, and scope documents.

One thing that's important to keep in mind is that there's a deterioration effect that happens with projects, especially with the critical path. Suppose you are aware that a certain individual is a tiny bit behind with his part of the project—a part that happens to be a predecessor to another step in the critical path. If you don't keep an eye on this lag and even urge him to get back on track, then his part will wind up lagging the next, and so forth. If there are any other lagging components to the project, or if the lag that he created causes other things to be delayed, then you'll begin to see the project delayed further and further.

Suppose, for example, that you cannot order a certain hardware component until your slowpoke is finished with his activity. But because he takes a bit more time than usual, when you get ready to order the hardware, there's an out-of-stock delay that costs a day because they have to get the part from a different warehouse than usual. Next thing you know, the estimated completion time of the whole project has shifted ahead by several days simply because one person stalled a little bit. Keep an eye on this compounding effect.

## ***Developing a Project Schedule***

You've defined how you're going to track the project and how you're going to communicate with stakeholders. Next, let's work on the things that you'll do to develop the project's schedule.

You do not develop the project's calendar until the project initiation documents have been approved and you're chartered to go forward. At this juncture, we know that you've chosen the members of the team and that you've received approval for these members to work on the team.

In developing the project's schedule, you must first gather together several different calendars:

- Officially mandated corporate holidays
- Individual calendars of those that are working the project
- Any special days that have been reserved for business-unit or company-wide functions (such as the annual marketing department brainstorming and pancake breakfast off-site)

You next either collate all of the calendars into a single project calendar (preferred) or opt to work with the separate calendars. The reason it's preferable to work with a single project calendar is simply that it's easier on the PM. However, it makes project team members' lives a bit harder if they have to maintain their regular calendar and then duplicate everything in the project calendar. If the team member is dedicated to the project full-time until its completion, then it's no big deal. But for part-time team members, balancing the calendars could get pretty complicated.

You should probably standardize on an electronic calendar that's associated with an e-mail system, if possible. Keeping a paper calendar doesn't lend itself well to others staying on top of it from any location.

Some e-mail systems allow users to update their normal calendar, and then replicate the information to other online calendars. Whatever the situation, you need to have a way to assign people to activities and do it using free dates based upon the project calendar. If you have to view your team members' individual calendars to get things scheduled, you'll have a very rough time accomplishing your goals.

### **Defining and Sequencing Project Phases, Activities, and Tasks**

There are three levels of elements to a project plan: tasks, activities, and phases. An *activity* is something that you do in order to produce a project deliverable. In our Prestige Hotels case study, the main activity involves creating a Virtual Slot Machine (VSM). An activity has several elements associated with it: linkage to other activities (whether as predecessors or successors), a cost, some duration of time, and resources (including people).

The duration of all the project's activities should be noted using the same measurement of time: minutes, hours, days, weeks, etc. Typically, activities are denoted in the number of days that each takes to accomplish. Activities that take six hours are listed as 0.25 days, for example. You can then define two components that take their cue from the duration: *milestones*, which are activities with 0 duration, and *hammocks*, which are activities that have a very long duration. For example, if your duration scale runs from 0–99 days, your hammocks would be of 95–99 days duration. Hammocks, as you can see, are “lazy” activities—those that require a great amount of time to accomplish.

A *task* is a single element of work that must be accomplished in order to complete an activity. There may be one task or several involved in the completion of any activity. For example, in our Prestige Hotels case study, a graphic artist must create a graphic image of a slot machine, another of a cowboy boot, and so forth in order to provide all the images needed for the web-page VSM. The activity would be to create the VSM; the tasks include the development of all the graphics that make up the VSM.

A *phase* in a project is a grouping of related activities that make up the completion of a deliverable. In the Prestige Hotels case study, one phase might be defined as building the web pages; activities within this might include creating a VSM and developing programmatic links to the partner airline. If this were a long-term project, a second phase could then be marked off to signal the start of web-page testing.

One last interesting element of this discussion: You may have a deliverable that will be put together with others in order to bring about one of your project's main deliverables.

This “sub-deliverable,” if you will, is called an *interim deliverable*. For example, suppose that you work on a development team that’s putting together a brand new operating system (OS). You’re involved with the development of the printing code that the OS will use. Several interim deliverables might include the software module that receives a document and spools it for printing, another that maintains communications with a printer, and still another that manages any errors that the printer might send back. The three interim deliverables, put together with others, make up the complete printing deliverable.

*Sequencing* of project tasks, activities, and phases means putting them in order so that they logically proceed from one to another. If one task must be accomplished before another can begin, we say that the first task is a *predecessor* and the second task is a *successor*. The combination of activities that are successors to one another and that represent the longest duration is said to be the *critical path* of the project.

**Note** I talk in a lot more detail about the actual decomposition of the deliverables, to arrive at tasks, activities, and phases, in [Chapter 8](#).

## Estimating Durations for Tasks, Activities, and Phases

You should put some effort into elucidating the various tasks, activities, and phases in your project, taking time to carefully evaluate the subcomponents of each and bring each down to its lowest common denominator. Though this is a loose analogy, a database administrator might say you’re “normalizing” the data—the “data” in this case being the duration of the activities.

Now you must take some time to estimate how long each of these segments is going to take. Once you know their durations, then you have a really solid idea about how long the project is going to take, and you have also identified the critical path.

There are two different estimating methods that you can pick from: time estimating and cost estimating. Each involves a slightly different approach and results in a different useful outcome. You use time estimating methods to estimate how long your project’s going to take; you use cost estimating methods to figure out how much your project’s going to cost. Let’s look at how we perform time estimating.

**Tip** There’s more about cost estimating methods later in this chapter, in the section on budgeting.

## Time Estimating

You begin your time estimation by assessing a given activity. Start with assessing the skill level of the person (or persons) who’ll be working on it. This person will provide an estimate for how long it will take to accomplish the activity.

If there isn’t a resource available in-house for the task, then as PM you have to identify who’ll accomplish this task for you and obtain your activity time estimate from them. Most likely in these cases, you’ll outsource the activity to a contractor. But there may be instances in which you can utilize a business partner’s resource to accomplish a goal. Other times, a vendor may agree to provide a resource for the activity. This is especially true in activities that involve assessing current hardware for trade-in.

Another interesting component of time estimating involves determining whether the effort required to accomplish this task is continuous or is something that the performer will have to go back to from time to time in an incremental fashion. For example, a software developer that’s working on the code for a printing module might work continuously on the activity. But a tester who’s performing acceptance testing might work on several different components in a day and only do further work on the same component every other day.

Some segments might take more time than others. If you're developing a new software product, perhaps the coding phase will take longer than the testing phase. Your estimation efforts should reveal the duration that a given phase will take.

The assumptions that you make regarding the project might also affect the duration of an activity. For example, in a software development project, you could have an assumption that says, "Software developers all have moderate to expert capabilities." But in the middle of the project, if one of your developers leaves and is replaced with a much more junior worker, the time required to accomplish a given activity could increase.

Likewise, the constraints that you've noted (or a constraint that you hadn't anticipated) will play into your time estimates. Perhaps one of the constraints the project is under is the fact that some of your software modules will be coded in a foreign country. You may run into a problem with the availability of resources to work on the code in that country, increasing the time needed.

## Estimating Principles

There are some basic principles you'll utilize when formulating these time estimates. First of all, you won't be the one who estimates the time for a given activity. Assign this duty to the team member who'll be working on the activity; that person is the expert in this area, not you. However, you need to caution the people who are providing estimates that they should use average production time for a given activity and not try to get within a nanosecond of the activity's actual duration. If you lack a resource for a given activity, try to get an outside expert to give you the estimate. Get all the estimates before you total them up.

Be sure that you factor in things that might affect your time estimates— things such as overtime that people need to work in order to accomplish the activity. It's important to let project members know that it is critical for you to be notified if there are changes to time estimates.

You should always have your time estimates reviewed by someone who understands the activities involved but who is *objective* about those estimates. It doesn't help to have someone review your time estimates who has a bone to pick regarding the project.

**Tip** A vendor's technical support person may be able to back up certain time estimates.

You shouldn't perform the review process with the wrong attitude. Don't be suspicious that your estimators are lying; you are simply validating that their estimate is close to the mark. Think of it as having two people count your poker winnings. Remember that the time estimate you put to the project impacts the scope and that you don't want to modify the scope unless you absolutely have to, so when you put the time estimate out there, you want it to be correct.

There are things that the project manager can do to facilitate good time estimates. Validate the criteria by which the estimator went about giving you the estimate. Also, when you resolve issues with your estimates, do so with the smallest first. The reason you do this is because one activity's estimate may have ballooned due to an enlarged estimate from a component task or predecessor activity. The two feed off each other, so if you go back and correct the first, smaller, estimate, the second one may adjust itself downward.

Be vigilant about revisiting time estimates. Try to determine potential risks that may arise from estimates. Team leads don't usually remember to add time to their estimates for administrative overhead (such as time cards and documentation). You can safely add 25 percent to your team leads' estimates in order to account for this shortfall. You should automatically add this on top of the time already given you. Time estimates that seem far out of range should be questioned; it doesn't cost anything to ask a person if he's sure of that time estimate—it could've been a typo.

Many projects need a *fudge factor*—a percentage that you add to a time estimate in order to give yourself a comfortable zone in which to work. Some project managers recommend that if you're a skilled PM but your team is not experienced at project processes, you should multiply all time estimates by a fudge factor of 1.5 to 2. If you're not an experienced PM and your team is inexperienced as well, you might want to consider a fudge factor of 3 (that is, add 200% to your estimate). In other words, if your total project estimate for a given project is 30 days, and you're skilled but your project team is not, then you might quote a total of 45–60 days for project completion. However, if you are new to the project management process and so is your team, then you might quote a total of 90 days for project completion.

Also, be sure to add some time, perhaps 10 to 25 percent, for quality control.

Some key things to remember are that your project time estimates will be inputs to your project management software. Finish your time-estimating process before keying activities into your project management software or developing your schedule. Acknowledge that your time estimates are based upon resource availability. Also try to acknowledge how your time estimates will affect your cost estimates. If a contract software developer costs you \$225/hour, an underestimation of just 10 hours means that your activity cost skyrockets by \$2,250. Be careful to acknowledge the impact that your procurement process will have on time estimates.

Finally, understand that your time estimates will be affected by nonproject budget cycles. For example, perhaps your project will need to have a couple of new software developers start working on May 23, a Thursday. However, HR isn't willing to start new people every day—it's more efficient to do paperwork and conduct orientation for several people at once. They ask that you bring in new hires only on the first Monday of a payroll cycle; the cycle begins on the first and fifteenth of each month. Because of these restrictions, you either have to start these new coders on May 20, or you won't be allowed to bring them on board until June 3.

Let's take time to review for a minute. You start your project by gathering the requirements and applying a metric to those requirements so that you can judge how successfully you've met them. You also have list of deliverables that the requirements are characteristics of.

Next you identify the various phases needed to produce a deliverable, break each phase down into its distinct activities, and then subdivide the activities into the tasks needed to finish one activity. When you finish this examination, you can turn it around into a build-up flow, like so:



As a result of this breakdown, you come up with a list of folks for each task, activity, and phase—at least one person for each—and you ask them to provide you with their time estimates for each task. Note that you have a lot of leeway in the manner that you note who the people are that are working on the project. For example, I've seen project plans where all the people working on a phase are mentioned in the phase section. Then, the people who are working on an activity or task are mentioned again at those levels, like so:

Project Segment	Team Members
Phase A	Bob, Carol, Ted, Alice
Activity A	Bob, Carol

Task A	Bob
Task B	Carol
Activity B	Alice, Ted
Task C	Alice
Task D	Ted

This shows you that these four folks are all working on the same phase, and the individuals working on the various activities and tasks are identified. Sometimes phases are listed as simple titles with no associated duration or people, just to serve as placeholders for various divisions of the project. The names are then only included in the activities and tasks.

Where there are gaps in the resource list, you're going to have to come up with a workaround. Perhaps you talk to one of the resources involved in another task to see if they can take on an additional task. Or you might consider a contractor to fill in. Or you might have a vendor or business-partner relationship that can provide a resource.

### **Specifying Required Resources**

In general, a *required resource* is something that someone is going to require you to utilize in your project. Specific resources might be required by the internetworking department (the router and WAN circuit folks), by the telecommunications people, by a corporate standard (Unix/Oracle, Windows 2000/SQL Server), by the IT department, or even by the narrow field that you're operating in. If your project will help out the manufacturing arm of your company with a new app, you may not have much choice in the type of software that you can buy.

There may be other required resources in a project. Companies that are heavily invested in Oracle, for example, will require that you use it for the database back end. This might create problems if you're thinking of buying some canned software that requires SQL Server. If the company's requirement is rigid enough, you'll have to either figure out whether the product you want can talk to Oracle or find a different product.

Some companies require that a given network operating system (NOS) be utilized, such as Unix or Windows 2000 Server. You'll have to plan your project accordingly. Protocols are often overlooked and can create a lot of problems during the development of a project. If, for example, you buy a software product that uses a proprietary protocol, you may have to get the router folks involved to open up ports on the firewall (something they'll be *very* reticent to do) or to allow this protocol to traverse the network. It may be that a "required resource" is a standards-based product that doesn't do anything strange or hazardous with certain protocols.

You may find that you're not able to go out and buy servers—the company has a specific asset pool, and the IT department knows which servers are going to host which applications. You might be told that your application is going to run on Server A, for example. This can create tremendous problems if your new app is a resource hog and IT personnel not associated with the project underestimated your deliverable's tenacious appetite for server resources. I've seen, over and over again, emergency decisions made for new server hardware because an app that was supposed to run on an existing server didn't play well with others or over-utilized the server's resources.

WAN circuitry is something else that hides behind the scenes at project formulation time. You may have an integrated services digital network (ISDN) circuit running from Campus A to Campus B, for example, at 128 Mb and, not knowing any differently, your team assumes that this bandwidth will be more than adequate for your new app. Then the project delivers the new app, the bandwidth shoots up to 80 percent utilization 100 percent of the time that users are on, and the complaints just keep a-comin' into the help

desk. Had you raised the red flag on this problem, the project would have cost more because it would have included a WAN circuit upgrade—but in the long run, it would've been much more successful.

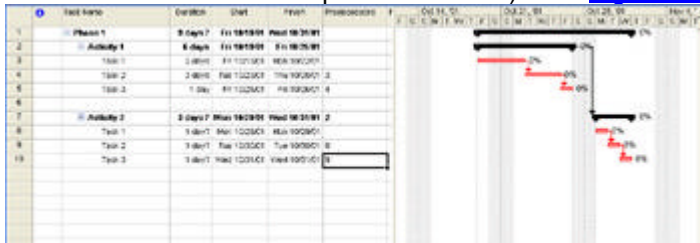
**Note** Most internetworkers strive for a max of 30 percent utilization on any given circuit, though they tolerate spikes to between 80 and 100 percent for short times.

### Determining Appropriate Schedule Formats

Finally, you determine, based upon the input you've received relative to scheduling and time data, the best way of reflecting a team member's schedule.

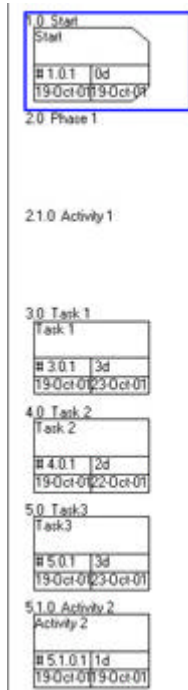
The test objective implies that you'd determine the best schedule format for each individual working on the team. However, this may represent too much work for the project manager, and you may decide to represent everyone's schedule in one single format. That's your call as the PM. Let's examine some of the options mentioned in the objective.

**Gantt chart** This is the default view in Microsoft Project. A Gantt view is pretty cool because you're given a series of bars that show the project tasks rendered over time. The graph gives you a good visual of how long each task lasts, notes predecessors and successors, and is able to instantly give you a grasp of the length of the project (and even a little about the depth of each task). See [Figure 7.1](#) as an example.



**Figure 7.1:** A sample Gantt chart rendered in Microsoft Project

**PERT chart** A Project Evaluation Review Technique (PERT) chart puts together tasks in a logical, effective order. PERT charts, such as the one in [Figure 7.2](#), can be likened to software development flow charts. They graphically illustrate the flow of completion that the tasks will follow, predecessor/successor relationships, and durations. This all sounds like a Gantt chart, but a PERT chart can carry a great deal more detail. Some tasks' outcomes have such a large influence on the outcome of a host of other tasks that it's critical to be able to monitor these tasks and their flows. You'll use PERT for large projects with many tasks and activities, especially when some key tasks are of extreme importance to the rest of the tasks in the project, when tasks have multiple dependencies, or when some task dependencies only show up far down the road in the project's development stages.



**Figure 7.2:** A sample PERT chart rendered in MinuteMan Project Management Software

### Project Management Software

Dedicated project management software, such as Microsoft Project, provides specialized functions for project planning and tracking. Most notably, such programs automate the calculation and updating of things like project costs and time. For example, if you change the duration of a single task that has predecessors and successors, the other, related tasks' start and end dates are automatically updated, as well as the project completion date. Also, commercially available project management software allows you to easily toggle from one view to another, so you can gain the advantages of every type of chart.

The PERT chart in [Figure 7.2](#) was generated by a shareware project management software program from MinuteMan Systems ([www.minuteman-systems.com](http://www.minuteman-systems.com)). It shows that you don't have to buy expensive project management software in order to accomplish your project management needs. MinuteMan costs \$49.95, and though it isn't nearly as robust as a full-featured program such as Microsoft Project 2002 (shown in [Figure 7.1](#)), it will certainly allow PMs to handle the bulk of their project management work. MinuteMan gives you a 21-day evaluation period before you're required to purchase the software. The opposite end of the PM software spectrum is a product called Niku Workbench ([www.niku.com](http://www.niku.com)). This software allows enterprise PMs to coordinate lots of huge projects at one time. Of course, it's more pricey (by an order of magnitude) than more common project management software.

**Text table** You don't have to have expensive (or shareware) project management software program to manage your project's schedule (but it helps). You could use a basic word-processor or spreadsheet program to do the same thing that you'd use project management software for. However, you won't have the benefits of the automated update, calculation, and report capabilities that project management software

brings you. [Figure 7.3](#) shows a sample project plan listing tasks, activities, and phases using ordinary spreadsheet software.

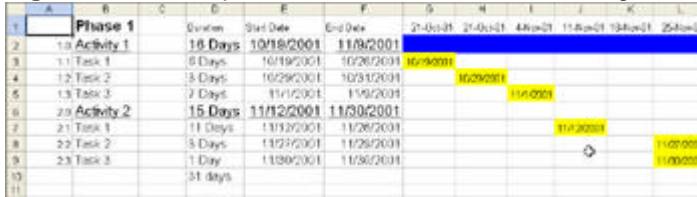
	A	B	C	D	E	F	G	H
1	1.0	Phase 1	Duration	Start Date	End Date	Predecessor	Successor	
2	2.0	Activity 1					2.1	
3	2.1	Task 1	2 Days	10/19/2001	10/23/2001			2.2
4	2.2	Task 2	4 Days	10/24/2001	10/30/2001	2.1		2.3
5	2.3	Task 3	1 Days	10/31/2001	11/1/2001	2.2		
6	3.0	Activity 2				2.0		3.1
7	3.1	Task 1	10 Days	11/2/2001	11/15/2001			3.2
8	3.2	Task 2	4 Days	11/16/2001	11/21/2001	3.1		3.3
9	3.3	Task 3	3 Days	11/22/2001	11/27/2001	3.2		
10								
11								

**Figure 7.3:** A sample text table rendered using Microsoft Excel

**Milestone chart** A milestone chart is similar to a Gantt chart but doesn't show the start or end dates of a task. Instead, it displays the milestones that occur in a project, the date they occur, and perhaps the dates and durations of associated tasks. The exact arrangement of information depends on the software used. [Figure 7.4](#) shows how Microsoft Project 2000 renders a milestone chart; in Project, you must denote a particular task as a milestone. In Microsoft Project, black diamonds represent milestones. [Figure 7.5](#) shows how you'd do the same chart in Excel.



**Figure 7.4:** A sample milestone chart rendered using Microsoft Project



**Figure 7.5:** A sample milestone chart rendered using Microsoft Excel

**Ordinary calendar** Finally, you can opt to keep track of the tasks, milestones, predecessors, successors, and Gantt and PERT charts on a regular calendar, whether on paper or digitally.

There may be other ways that you can think of to represent your schedule, but these are the most common and probably the ones that you'll find the most flexible.

**Tip** Now is the time to denote the type of project management software you'll be using to track the project. Make sure that all stakeholders who will view the project's phases, activities, and tasks have the same kind of software so the project doesn't have a file-format problem.

## Estimating Costs

Estimating the costs of each activity is the second portion of proper project planning. You predict each activity's cost using standard techniques, which we'll talk about shortly. You then translate that information into a budget that you can track while the project is under way.

Essentially, cost estimating is the process of predicting the cost associated with a given activity, while taking into consideration the assumptions and constraints associated with the project—both of which were outlined earlier in your project concept, charter, requirements, and scope formulation.

## Cost Estimating Overview

Proper cost estimating has an impact on many areas of the project, including things like activity sequencing, the risks associated with a project, the project's schedule, the budget, metrics associated with project requirements, time estimates, and planning for the use of resources. So, to know and understand cost estimating is a skill that's mandatory for good project managers.

You usually start your cost estimating from the very smallest estimates and move toward the largest. This so-called *bottom-up cost estimating* function gets rid of the bloat that happens when you try to estimate from one huge overall glob of a project (we need twelve widgets, three servers, three coders . . .). More time-intensive in its nature, bottom-up cost estimating results in more accurate projections of costs. We'll talk more about the actual methodology utilized with this technique in the [next section](#).

You should note that there's a difference between cost estimating and budgeting. Cost estimating acts as an *input* to the budget. Budget items act as *inputs* to the budget's various accounts or tables. The budget is reviewed by the authoritative body charged with its management, whether that entity is a budget management office, *strategic project manager* (someone who oversees all of the projects within a business from a purely strategic and budgetary perspective), *project management office (PMO)*, executive project sponsor, or other designated budget manager. As a project manager, you probably won't control the budget, but you will control the inputs to the budget based upon the results of your cost estimating activities.

When working with cost estimating, just as with activity development, you are not the one who'll do the actual estimating. You probably can't say, "Based on my experience, the step to develop this printing module will require 72.5 hours." That's the job of Sarah, your senior developer. You should get the person who will actually perform the task to do the estimating. However, as with activity and task development, ask them to average their estimate. You don't need extremely detailed numbers; nor do you need a wild guess. If you're estimating a step that you do not feel can be handled by internal folks, get an external expert. (Keep in mind that experts such as this might cost up to \$250/hour.) By soliciting the person who's going to perform the activity to provide the cost estimate, you're not relying on head count (that is, simply having a large enough workforce to accomplish a task) but on the skill level of the person from whom you're requesting the information.

Some additional information needs to surface from your cost estimating efforts. This includes decisions such as what funding source the various activities will be funded through. You should compare your initial estimates with the finalized version you get from your estimators and add in components that your estimators did not take into consideration (see the example in the "[Bottom-Up, or Factor, Technique](#)" section, later in this chapter).

### The PM's Role in Estimating

So, if you as a PM don't do the majority of the cost estimating, but merely assimilate the estimates, what is your responsibility in the cost estimating function? When it comes to cost estimating, you're a busy person!

It turns out that there are costs bundled into the final estimate that any one cost estimator would not include. You provide these costs; for instance, you should include the costs of keeping people informed about the project's status. You also validate that the criteria used by each estimator are accurate. You collect the estimates and total them. You examine the time estimates discussed previously and make sure the cost and time estimates are in alignment with one another. In the event you need to procure outside resources, you need to ascertain the impact of obtaining those resources. You take into account the corporate budget cycle and also determine the risks associated with the cost estimates. It's even your responsibility to pick the cost estimating method utilized. You conduct meetings with sponsors in which you discuss the costs you've derived and how you derived them.

You should keep a sharp eye out for costs that everyone might've overlooked (remember the fiber-optic cables from the Real-World Scenario in [Chapter 1](#)?). You'll obtain formal bids from vendors for any outside work you're going to utilize in the project. You utilize the cost estimates to formulate the budget. Most importantly, you resolve any concerns or issues that arise from your cost estimating far ahead of the actual time to spend the money.

It's also important that you realize there may be (at least) three levels of cost estimating that go on as your project unfolds:

- At project evaluation time, you'll produce some estimates that are in the constellation, but not the galaxy.
- In the project's design stage, you'll come up semi-detailed costs, essentially moving from the constellation to the galaxy.
- At the cost estimating (design/construction) stage, you'll try to nail down the costs, moving from the galaxy to the planet.

**Tip** Final cost estimates are not so granular that you have no leeway, nor are they so broad that there's no meaning to them.

## Estimating Methods

The test's objective "Standard engineering estimate techniques . . ." seems to imply some scientifically developed, Einsteinian methodology that's going to require you to learn calculus and differential equations. Not to fear! When PMs talk about "scientific" or "engineering" estimate techniques, they're talking about an orderly methodology that allows you to arrive at a cost estimate that has a good chance of being accurate. And, yes, in some of them there's some math (even some basic calculus), but for our purposes we're dealing with arithmetic.

For IT project managers, thankfully, cost estimating efforts aren't nearly as complicated as they might be for a project that's going to result in a new automobile type, for example. Essentially, you need to keep in mind that you are not the one coming up with each specific cost estimate—the people doing the work provide that for you—and then you use the bottom-up or unit method to provide the calculations that result in the project's final cost estimate. Let's discuss some of the estimating methods, starting with the one you'll most likely use in your projects.

## Bottom-Up, or Factor, Technique

In most projects where design, rather than construction, is the key element, bottom-up estimating turns out to be the most effective.

Bottom-up estimating requires that you sum the direct and indirect costs associated with the production of your deliverables. In a business where you would be designing something that you're going to manufacture for sale, you would factor in an additional percentage that acts as a profit margin. Some basic costs include such things as the cost of labor (including contract labor) and materials you'll utilize (in the case of IT you might include things such as servers, infrastructure, routers, software etc.) in the development of your project. In some cases, corporate directives for a PMO might require that you factor in the overhead associated with maintaining the building and workstations, providing electricity, and the other things needed to develop your software or put together your IT project. In such cases, the overhead will be stipulated as some percentage of your labor costs. Generally you'll also want to factor in a quality control (QC) percentage of some kind. If the corporate directives don't state a percentage, use the one suggested below.

Here are some typical figures used in bottom-up estimating:

- Direct labor costs (average, software developer) = \$40 per hour per senior developer
- Contract labor costs (average, database consultant) = \$225 per hour per IT contractor

- Supervisory labor costs (average) = 25% of combined labor (direct and contract)
- Server costs (average) =
  - \$8,000 per file and print server-class server
  - \$16,000 per database-class server
  - \$32,000 per cluster-class server (always a minimum of two required because you're setting up a cluster array)
  - \$64,000 per enterprise-class server
  - \$3,500 per team member per project, maintenance of software development environment (SDE), including development software
- Quality control (QC) average = 65% of direct labor
- Administrative expense = 50% of total labor (direct and contract)

For a project that requires two senior employees for 40 hours each, one database consultant contractor for 15 hours, and a database-class server, you'd run the following calculation. Let's assume that *direct + contract = labor*. Then, estimated costs are

$$\text{labor} + (\text{labor} \times \text{admin}) + (\text{labor} \times \text{superv}) + \text{server} + \text{SDE} + (\text{direct} \times \text{QC})$$

$$\text{labor} = (2 \times 40 \times 40) + (1 \times 15 \times 225) = 6,575; \text{ we can substitute figures then as follows:}$$

$$6,575 + (6,575 \times 0.50) + (6,575 \times 0.25) + 16,000 + 10,500 + (3,200 \times 0.65)$$

So total estimated costs come to \$40,086.25. This can be expanded in tabular form, as seen here:

Category	Calculation	Subtotal
Direct labor (employee developers)	2 x 40 x 40	3,200.00
Contract labor (database consultant)	1 x 15 x 225	3,375.00
Supervisory labor	(3,200 + 3,375) x 0.25	1,643.75
Administrative labor	(3,200 + 3,375) x 0.5	3,287.50
Quality control	3,200 x 0.65	2,080.00
Software development environment	3 x 3,500	10,500.00
Server	1 x 16,000	16,000.00
<b>Total</b>		<b>\$40,086.25</b>

Obviously, this is a simple example. It's important to note here that you'll include labor costs that vary depending on the skill level associated with a labor component that your require in the project. For example, a senior developer will cost more than a junior developer. If you have a project that utilizes a junior and a senior, you'll need to include both hourly costs in your estimates. A skilled Java consultant might cost more than a consultant who's skilled in Visual Basic. Differentiating between the skill levels is important in your cost estimating efforts.

## Indexing Technique

In the indexing technique, your goal is to reflect how a cost has changed. You're not pinning a *type* to the cost (such as cost per machine or cost per hour); instead, you're attempting to come up with an index number that reflects the relative change in cost in comparison to a base year. For example, perhaps your company established a robust software development office to get ready for Y2K. Afterward, rather than dismantle that office, the company has continued to use the office's services for software development. The ongoing costs of that development entity were known at its inception in 1999. By

calculating how the labor and equipment costs have changed over the years, you can come up with a matrix that reflects today's costs and that you can apply directly on any project you're estimating for which you're going to use that office.

Perhaps the best example of the indexing technique is the Bureau of Labor Statistics Consumer Price Index (CPI). The CPI is a comparison of how a standard set of goods has changed in price over the years. See [www.bls.gov/cpi](http://www.bls.gov/cpi) for further info.

## Unit Technique

This technique is utilized chiefly by construction-type projects, rather than design projects you find in a typical IT environment. However, there's a possibility that you might use it as an alternative method of viewing your cost model. The unit technique requires that you provide some factor that gauges the per-unit cost of your estimates. The power plant construction industry might estimate the cost of building a new plant at so many dollars per kilowatt of capacity the plant will generate. Another unit model might describe costs in terms of the amount of revenue generated per customer served. Perhaps you'll see a cost estimate that gauges the cost of maintenance per hour of operation.

You might have some success utilizing the unit technique in IT projects where you estimate new e-commerce applications on the basis of items ordered per customer visiting the site.

The unit technique is a metamorphosis of parametric cost estimating (discussed later).

## Linear Regression Technique

Linear regression is a statistical tool that you can use to compare the relationship between two variables. This technique finds its usefulness in project estimating in the form of comparing a cost driver to the project's cost.

A *cost driver* is any item, process, or event that has a direct relation to a cost. A server, an added human resource, a software program, a network connection—all of these are cost drivers. These are obvious, but a cost driver might be a fairly esoteric thing. Here's an example: For years, there was a rumor floating around in IT circles that a random access memory (RAM) factory somewhere in Asia had burned down, and that this explained why the cost of memory was so high. If you were an expert in the RAM business, perhaps you would've been able to validate or disprove this rumor, but if you were a RAM buyer, the price was high enough to justify the rumor. This rumor, itself, was a cost driver. There are other cost drivers in IT—some put in place to keep prices high, and still others due to a technological shortcoming of some kind.

Linear regression tries to make sense of cost drivers to dependent costs. For example, the price of RAM is high, therefore that has an input to the price of the PCs we build—the price of our PCs are, to some extent, dependent on the price of the RAM we put in them.

## Parametric Technique

A blend of the linear regression and unit techniques, you use parametric cost estimating to take a handful of components that may serve as inputs to the cost of a project to come up with a per-unit cost. Typically you'll utilize units that have some dependency on a cost driver. Parametric cost estimating is used heavily in the construction or manufacturing segments of project management, areas in which it's important to understand your cost basis in comparison to the expected output of the new building or the number of products that will flow off the assembly line. For example, your final product is the result of the assembly of several parts, the per-unit costs of which are driven by the manufacturers of those parts.

A very interesting sub-application of this technique describes the learning curve that assembly line employees will encounter when assembling a new product. Employees might, in the first twenty units to be assembled, take two hours to assemble each one. In subsequent instances—say, the next twenty—the effort goes down to one hour each;

and finally, thereafter, the learning curve has been rounded and employees have arrived at a fairly consistent 45-minute assembly time.

## Top-Down Technique

Top-down estimating involves setting the target price of the deliverable your project is going to result in, then designing the project in such a way that costs do not exceed that target price.

You might, for example, be working on a software product that has competitors. You utilize the top-down technique by saying, “We have the ability to build this product as well. What kind of production cost leeway do we have if we take our competitor’s price and subtract out a profit margin?”

### Budgetary and Spending Issues

Some issues arise out of the cost estimating function. Recall that the cost estimates you derive act as inputs to the project’s budget, which, in turn, might act as an input to budgets throughout your company. For example, if you’re utilizing human resources from various areas in the company, various timekeeping and budgeting entities will have to be apprised of the usage of that resource so they can track their time accordingly. Lots of companies use the budgeting concept of *cost centers*, uniquely enumerated categories of a company’s complete cost of operation. If you’re using a resource from marketing, the marketing budget will have to reflect this usage in a specific cost center they have assigned for such an occasion. Also, this person’s time will have to be tracked by marketing so that they know how many hours were worked on each assignment.

In larger corporations where major projects are, at the very least, overseen through a PMO (if not completely run through the office), your budget won’t be overseen by you. In fact, in all but the smallest of companies, you will rarely handle your budget. As a result, there must be a constant tracking of actual costs to budget expenditures, initiated by you and maintained by the person responsible for your budget. We’re talking routine meetings that keep your budget folks up to date. Also, you manage cost overruns—immediately communicate them first through the budgetary office, then through the project sponsor.

Vendors will supply specific detailed bids and contracts from which you’ll develop some of your estimates. Budgetary folks need to retain a copy of these documents. There are tremendous legal implications involved in any agreement you have with contractors, and people have to be aware of the SOWs, bids, and contracts associated with the vendors for your project. If there’s any doubt, run the contracts by your legal department to make sure everything’s on the up-and-up.

Additionally, you have to detail *when* you’re going to spend the dough. Prepare a plan that specifically details your spending intentions, when you’re going to spend the money, how much you’ll spend on a given occasion, how you’ll spend it, and who you’ll be purchasing from. Keep a spreadsheet as a handy way of monitoring your spending.

## Understanding Quality Management

In order to finish your project with high-quality deliverables, you need to keep your eyes focused on the development of those deliverables. You cannot simply assume that because Joe’s working on a piece of code, it’s going to function correctly. Joe might’ve had a bad day when he wrote it.

Managing the quality of your project’s output is of extreme importance, because you don’t want a black eye as a result of a poor deliverable, nor do you want a black eye for your sponsor (unless you don’t want to work there anymore!) Fortunately, there are some techniques you can use that will help you manage the quality of the project. I detail

them in this section because of the test objectives, but you won't put them into play until your project's executing phase.

Entire books and four-week training classes are devoted to quality control and quality management processes. These notions are well beyond the scope of this study guide, and you won't find deep, dark questions on the IT Project+ test that delve into the esotericism associated with quality management.

**Tip** As one example of the many programs available, see [www.sixsigmaforum.com](http://www.sixsigmaforum.com) for information about the ASQ Six Sigma course in quality management.

What you will find, both in IT and possibly on the test, are questions about how you manage the deliverables of IT projects in order to maintain a high quality. There are some elements that you can pay attention to that will allow for judicious quality management.

### Quality Checkpoints

There are points in any system development process where you can stop, take a look at what's been accomplished so far, and make sure that you've done things in a qualitative way. We call these stopping places *quality checkpoints*.

For example, one company I worked for had what they called a "burn doc": a standardized document that walked administrators through the installation of network operating system (NOS) software on new servers. The document was very elaborate, down to making sure the computer's BIOS was updated with the latest firmware. Administrators following this burn doc were able to uniformly turn out a quality product because they followed highly definitive steps. The administrator still had to know and understand server software, so you didn't actually detach the level of the knowledge the person had to have from the activity (in other words, the CIO couldn't say, "a trained chimp could do this"), but the process was uniform and generated the same look and feel on all servers. You had a known quantity. There were burn docs for different kinds of servers: web, intranet, file and print, etc.

A quality checkpoint in an IT system that required the burning of new servers would be to ascertain that the administrators had installed the NOS according to a specific burn doc.

In the software development process, a component that most developers overlook if they can at all get away with it is the concept of commenting. Being liberal with comments throughout the code that describe what each code section does can be enormously helpful at software revision time (or troubleshooting time, as the case may be). A quality checkpoint might be that you examine pieces of code that have been developed to ascertain whether the code has been well documented.

**Note** Most developers include a code comment header in any piece of code they write. The header typically includes the initial author, original date, revision author, revision date, modification comments, purpose, and other relevant information that helps those who work on the code after it has been released to understand what the intent was. (Or sometimes to hunt down and assail the nincompoop who wrote the code in the first place!)

### Assigning Architectural Control Responsibilities

An architect is one who designs something and then oversees, at a high level, its construction to make sure that the thing is built according to the blueprints originally developed.

In any IT project, you need people who have at least read the blueprints and are technically able to oversee those who are building the deliverable. In most IT implementations, this architectural oversight person is a team leader. By "read the blueprints," the implication isn't that there's an actual set of blueprints, but that in

architectural terms this person has attended key project planning meetings, read the associated documentation, and understands what needs to be built. This person is empowered to stop team members from going down a path that's clearly out of line with the scope of the project and its stated deliverables.

Also, this person is responsible for making judgment calls that may arise in the building of the project.

Suppose that you're in the position of providing architectural control. You're approached by a software developer who is puzzled by the question of whether to use an IF THEN ELSE phrase in a particular piece of code or a CASE statement, where the code would evaluate multiple cases and then make a decision. He would have to nest several IF statements underneath one another; although this is speedy in terms of its operation, the logic could get pretty hard to read. CASE statements, on the other hand, are easy to read but not nearly as efficient as IF statements. There may be a minor slowdown in the code while the CASE statements are evaluated. As an architectural person, it's up to you to figure out the best route to go.

Suppose, in another example, that you're an architectural oversight person for a project that's going to extract data from a set of Oracle databases. There's a choice of using either pl-SQL statements or Java code to extract this data. The requirements may not necessitate a particular method by which you provide the data—in which case, it's up to you to make the best architectural decision.

### **Performing Unit Testing**

Unit testing involves the independent testing of each unit that's a result of the efforts to produce a project's deliverables. For example, your deliverable might consist of a client/server system that uses Visual Basic (VB) to create a client computer interface with a back-end database. Part of the unit testing that you will do involves testing the user interface (UI) created by the VB developers to make sure it's consistent with the requirements that were formulated for the project.

Testing usually isn't done by the same people that do the development or installation work. You want a fresh set of eyes looking at the results of development so that you get a fresh perspective on how well the work was done. If you're constantly tasting your own cooking, you can't tell whether others will think the food's any good.

### **Performing a Systems Test**

The key to IT project rollouts is the amount of testing that you do. Some projects require the use of a dedicated testing department to thoroughly test the resulting code. Other projects don't mandate the efforts of a testing unit, but still require that someone liberally test the code for bugs.

But systems testing goes beyond software development. Systems testing reaches into every facet of IT project rollout and management.

Suppose your project involves replacing an aging infrastructure with a brand new system. You'll be replacing cabling, switches, WAN gear, the works. As installers take new devices out of the box, you'll want them to test the devices to make sure they're working correctly (unit testing). The way that you do this testing needs to be determined by the subject matter experts (SMEs) who are doing the work. But you need, at any rate, to assure that all devices are working. You'll test each component of the new system to make sure it's working. If new fiber-optic runs are required, the vendor that's installing the fiber for you will run a test on the cable to make sure it's operational (that you can "light it up").

After the system has been completely assembled, you'll perform a test of the system as a whole. You want to find the slow spots, the incongruous links between systems, the

pieces of code that aren't working as planned, and the hardware that isn't functioning correctly (or as planned).

### **Performing User Acceptance Testing**

User acceptance testing (UAT) is an absolute mandate for any software development project that you're involved with. The idea is simple: Get a business expert or two to drive the system you've created. Your goal is to make sure that your customers like what you've done.

Likely as not, your first round of UAT will poke holes in what you've done. That's fine—it's to be expected. So you place your first round of UAT up front, at a point when the UI and back-end databases are ready to go, but maybe long before all the bells and whistles are in place. Let the users poke holes in the product. Go back and fix. Provide a second round of UAT. Fixed the problem? Yes, but there are two new ones that were undiscovered the first time. Fix again, test again, etc.

Only you can figure out how much testing is too much—where you reach that declining economy of scale that says, "For all practical purposes, this code is very close to what the user requested—we're going with it." UAT and unit testing could be considered one and the same thing, especially in the arena of UI testing. Unit testing diverges when you consider testing components that users don't care about.

Users will sign off on a formal UAT approval document that officially decrees their satisfaction with the results of your project deliverable development efforts. In IT projects that result in a user-based deliverable, you cannot close the project without a user sign-off document.

### **Testing Simulation Software**

In some cases, you need to test a system that's loaded to its projected capacity. You want to try to simulate the load so you can see how the system behaves when it has a ton of users hitting it. An e-commerce site might be one product that needs this kind of stress testing.

You can obtain stress-testing software that will put a test load on your system so you can how it reacts before you deploy. Based upon the results of the testing, you can make any necessary tuning or adjustments before you close the project. The deliver of finely crafted deliverables keeps the project manager gainfully employed.

Just do a search on the Web (Yahoo!, Excite, Google, etc.) using the search string "stress testing software", and you'll get hits that will lead you to the testing software company of your choice.

Balancing your testing with a smattering of "OK, we're getting too perfectionist here and it's becoming a time-waster" will yield spectacular quality in your deliverable results. Without thorough, ambitious quality control in your project, your deliverables are going to be amateurish and will result in a "back to the drawing board" phase that you hadn't anticipated. Avoid this black eye and implement good quality control procedures!

## ***Formulating a Project Team***

Project team formulation requires a host of creative inputs. You're going to bring together a team whose collective mission is to produce the project's deliverables. You'll need business experts, IT experts in every genre the project is involved with, testers, architectural experts, and so forth. On top of that, there's the whole reporting-structure question: Do your team members report to you during the project, or do they continue to report to their ordinary supervisor? Do you prepare their reviews, does their original boss, or do you come up with some sort of compromise? Additionally, motivating team

members can be a very difficult challenge (especially for a project that team members don't believe in).

**Note** In the exam objectives, *team-building* means assembling your team, not "teambuilding" in the current HR sense of working to increase unity and morale.

**Tip** Objective 2.5 says you begin your team-building scenario with a WBS. This stands for work breakdown structure, an integral component of any project and a topic we'll talk about in [Chapter 8](#).

Doubtless, your project is going to demand the use of certain IT specialties. If you're lucky enough to work in an environment large enough to have a plethora of experts within any of the specialties, and you have the liberty of picking from among them, you're very lucky indeed. All you have to do is assemble the list of names of people that qualify for each task, interview them, and pick the one that you think fits best for each area that you require. This is an ideal situation.

But this model has no resemblance to most folks' reality. In most cases, you have possibly one player who can perform some of the tasks outlined in your project, while other areas either go unfilled or you're forced to fill them with people who are, at best, only moderately qualified to do what needs done . . . which represents training required for the person doing the work, which means a time delay.

Some tasks can only be adequately fulfilled by a contractor. For example, the delivery, unpacking, setup, and configuration of hardware components as high-tech as dense wavelength division multiplexing (DWDM) multiplexors is something that only an expert in the field should be involved in. While a junior team member might be itchin' to get at the gear, you respect the fact that SMEs who could configure these things in their sleep are probably the best choice to complete the task.

There are different kinds of people that a project may require, people with various backgrounds and functional capabilities. As you research the requirements of the project and assess the tasks required, you'll identify the skills you require, pinpoint the people who may be involved, bring them in, and interview them. Your interview questions need to be written in such a way that you get at the meat of the skill you require, so that you can accurately determine whether the interviewee can do the job or not. Since you're not an SME in all areas, you may need assistance from others in some areas of expertise to formulate your interview questions.

Following are some of the kinds of folks that get involved in most projects (regardless of size):

**Business experts/SMEs** By this, we're not talking about people who are expert at the business of business; we're talking about those who understand the line of business that will use your project's deliverables. It is vital that you appoint at least one business expert or SME who can assist you in keeping on course toward the completion of deliverables that meet the business' needs. If you don't do this, and you merely assume that you understand the line of business, likely as not you'll produce a deliverable that will only be moderately satisfactory.

Here's the deal with business experts in IT projects: It's important to look for a business expert who's also IT-savvy. You don't need someone who writes C++ code in her spare time, but you need someone who has a clue about how IT works and who can drive a computer. Otherwise, you're going to spend a lot of your time translating, coming up with metaphors, and explaining IT concepts—huge time-wasters.

**Leadership** You also need leaders who are members of your team, even if they're only minor participants. You need leadership not only from a managerial standpoint, but also from the viewpoint of a technical team lead.

Managerial leaders are needed to help keep the project's visibility high and to act as cheerleaders for the project in management meetings. They're also good for helping manage hot spots or problem employees. It's important that they understand what the

project is going to do, though they don't necessarily have to have a strong technical understanding of what it will accomplish.

Technical team leaders can be helpful as cheerleaders, as architectural control personnel, and as technical advisors for their business area. While team leaders may not have a large technical background, they can certainly explain how their systems work and how your project will integrate with them.

**Administrators** You need support from executive and mid-management leaders, especially in the area of cheerleading. Keep in mind that budget leaders, the CFO, the budget czar—whatever they're called in your area—are an invaluable source of help, especially during crises; it's very important to foster good relationships with them.

Perhaps the best way that you can help yourself in this area is to be very good about communicating what the project's about and what you're doing with it. Although you don't want to beat people over the head with your project, you do want to keep it in the forefront of their minds.

**Technical experts** Typically, an IT project utilizes more technical expertise than you might at first have thought necessary. For example, with most systems in which a user crosses a wire to talk to a server and a database, there are security implications involved that may require not only the assistance of server, but also database as well as security administrators.

Up-front dialog with the primary technicians that you have working on the project will go a long way toward yielding information regarding which technical persons you might accidentally overlook.

**Stakeholders** Some stakeholders will have a presence on your team. Specifically, vendors and contractors will always be a part of your team. Other stakeholders will have an interest in the project not because of any assistance the project's deliverables will provide to them, but because of the impact the deliverables will have on them, their infrastructures, or their systems. Probably the most hidden stakeholder consists of people in the department that handles the network infrastructure—the cabling plant, switches, hubs, routers, and WAN circuitry.

Another frequently overlooked stakeholder is the corporate educator. If you're building a project intranet site, for example, designed for people to key in their projects in a centralized place, your corporate educators need to know because they'll likely be training people how to use the site. Not only that, but they might have to train people about how to utilize good project management skills before they can learn how to use the project intranet site!

Discovery meetings at project initiation time can pinpoint who the stakeholders are in a given project.

You can probably think of other folks that fit into any particular project you have going. And that's the real idea behind this little chapter section— to get you thinking about who needs to know what the project is about and where it's headed.

## ***Resolving Disagreements among Project Team Members***

Hey, it happens. Joe, the manager of the web team, doesn't like the way that Susie, the DBA for the project, has designed the databases. He says that if she'd designed them differently, they would be more responsive. She fires back that her databases are normalized just fine; it's his code that needs to be tightened up.

What's a project manager to do?

## **Standards Formulation**

First of all, when going forward with IT projects, sit down with the team and insist on the standardization of what you're about to do. Just as you're standardizing on your project management techniques, so you need to standardize, as much as possible, in all that you set about to do in the project's execution.

For example, standards have been created that detail how to go about writing code. You can use rapid application development (RAD) as one of your templates, and you can always follow software development life cycle (SDLC) norms that dictate how code's going to be written. There are standard database methodologies that DBAs follow. Good DBAs can instantly recognize when a database has been poorly formulated. Also, there are good standard practices involved in deploying networking protocols, servers, network gear, and so forth.

But more importantly, the idea of getting your technical team in a room and getting them to commit to some standards will go a long way toward solving problems that arise later. Susie can say that she anticipates developing the database, tables, indexes, stored procedures, relationships, joins, and so forth in such and such a way . . . which says a lot to Joe about her level of understanding of what she's going to do. Joe, in turn can talk about how he intends to develop the code, where he's going to store it, what modules he anticipates developing, and so forth. Your efforts are to try to build a sense of trust in one another's abilities—an esprit de corps—and to set some standards at the same time. On top of all that, dialogs such as this give you the ability to say to stakeholders that you've had some very good planning meetings and that they've resulted in some solid, standards-driven methodologies.

## **Mr. or Ms. Trouble**

But what happens if there is obviously some sort of personality problem and two team members just do not get along?

There are two possible reasons for this. First, there's some kind of history or bad karma between the two. They just flat don't like each other for whatever reason. You may have no idea of the background of the discord, and, frankly, there's really not a reason to know. You have to take steps to fix it.

You solve this kind of a problem with team building. People don't have to like each other to work on teams and still crank out a professional level of work. It happens all the time all over the world. Try your best diplomacy and team management techniques for a short time, hearing out each of the differences and seeing if you can arbitrate toward some amiable solution. Stress the importance of each person's role in the project.

When you've exhausted your efforts to get them to reconcile, consider getting your human relations department involved and see if you can get some team-building exercises going. One of the better exercises to involve a small group in is the Myers-Briggs (MB) Type Indicator instrument for evaluating personality types. Putting a team through an MB exercise causes them to find out differences about one another they had not known previously. There are other team-building efforts you can go through, each producing some sort of great motivational and inspirational fruit. Check with your HR specialists to see if they can help. This isn't a job you should feel you need to take on yourself.

The other problem that develops is that one individual simply isn't of the caliber required to accomplish the tasks set before him or her. You may be really stuck because there simply isn't anyone else out there to do the job—you're forced to use this person. A derivation of this problem is when you take a perfectly competent person and put them in front of a new technology that does the same thing as the technology they're already using. The person is fully qualified but can't drive the interface well enough to act like he or she knows what they're doing. You might, for example, take an Oracle expert and put them on a Microsoft SQL Server project—effectively blowing them out of the water while

they get used to the new interface. The basic precepts are the same, but the look and feel are totally different. And in this instance, you run the risk of generating quite a bit of resistance as well.

You fix this problem with training, if there's time, or contractual help if there's not. If neither time or money are available, then you're stuck and you have to manage it with team-building skills, which are probably going to be only marginally successful until the team member comes up to speed.

You can also fix this problem with a mentor of some kind. Perhaps there's a person with a background in SQL Server, for example, who's not assigned to the project because their job isn't working as a DBA. Maybe you could "borrow" this individual for an hour or two of mentoring from time to time. Alternatively, if Susie's the problem, perhaps you could ask Joe to see what he can do to assist her instead of fighting her.

The bottom line in all cases is effectual communication. You need to call an apple an apple and an orange an orange. What I mean by that is don't gloss over problems such as this—talk about them. But also don't be blunt and belligerent about telling someone they lack a skill. Use diplomacy and tact while being a truth-teller.

## **Prestige Hotels: Project Management Plan Formulation**

Things are going swimmingly with your Prestige Hotels (PH) project. You're now in the project plan formulation stage, just about ready to go forward and create a work breakdown structure so you can get going with the project. But there are some last-minute details that you need to mop up before going forward. We'll use the project management plan to do so.

### **Project Title**

Reno/Las Vegas (RLV) Group, Marketing Website Virtual Slot Machine (VSM)

Following are the characteristics of the RLV VSM Project Management Plan:

### **Project Team**

- Hajit Sami, team leader (RLV)
- Carolyn Pacheco, business analyst (RLV)
- Darryn Divit, SQL Server DBA (PH)
- Molly Sareen, graphics designer (PH)
- David Green, web developer (PH)
- Smiley Smith, web developer (PH)
- Renee Duluth, ISP representative (W2U)
- Pamela Brown, project cosponsor (PH)
- Brittany Salvage, project cosponsor (RLV)

### **Stakeholder Reporting Method**

All stakeholder reporting will be available from the PM intranet site. As team members perform a task, the information is posted to the site. See <http://PH/PM/RLVVSM>.

### **Project Tracking Method**

Requirements metrics will be used to track the project.

### **Project Schedule: Phase I**

#### **Activity 1:** Developing VSM graphic

- Prepare graphics that represent the items that appear on each of the slot machine's three spinners.
- Prepare an overall graphic that represents the slot machine.

- Prepare a graphic that represents the slot machine's handle in several stages of motion.
- Prepare a page-header graphic that represents a montage of all four RLV hotels, including views outside and inside each plus shots of the hotel rooms, casinos, night-clubs, and restaurants.
- Prepare a Winner! graphic.
- Prepare a Sorry! graphic.
- Prepare a graphic that links to qLines airlines.

**Activity 2:** Developing underlying code

- Prepare code that randomly selects three graphics and places them on the screen in the slot machine windows.
- Prepare code that determines whether we've selected a winner.
- Prepare code that notifies a winner.
- Prepare code that notifies a loser.
- Prepare code that presents a user response survey, invites the user to respond and become eligible for a drawing for a three nights' stay at the Texas, and posts record of information the user filled in to a SQL Server database.
- Prepare code that switches user to qLines upon clicking qLines' graphic.
- Prepare code that presents tours of RLV Group's hotel rooms and amenities.
- Prepare JavaScript code to act as banner ads on other websites.
- Document all code.

**Activity 3:** Preparing ISP website presence

- Prepare website area on W2U server.
- Validate mirror site settings.
- Document website information (IP addresses, DNS names, etc.).

**Activity 4: Testing**

- Unit testing
- User acceptance testing (UAT)
- System testing

**Activity 5:** Marketing

- Prepare print and media ads for new site.
- Negotiate agreements for placement of web banners.

**Estimating Techniques**

The cost estimating technique utilized in this project will be bottom-up.

**Schedule Format**

The schedule format used in this project will be a combined activity listing combined with a Gantt chart.

**Budgetary Issues**

- Cost center 141943 will be utilized for all coding efforts.
- Cost center 151822 will be utilized for all marketing efforts.
- Cost center 141940 will be utilize for all graphics development.
- Cost center 333000 will be utilized for RLV admin.
- Cost center 222000 will be utilized for PH admin.
- PO 9437220 was initiated for the W2U server space, one year's lease (including maintenance).
- Contract A1240 between qLines and RLV has been reviewed by PH legal and signed. Contract dictates agreement that users who click to qLines from RLV VSM site and purchase an airline ticket electronically as a result of that click-through will result in a \$50 payback to RLV Group, directed to cost center 333124.

**Quality Management Scenarios**

- Checkpoints will be handled throughout code development. Team leader (Hajit Sami) will document code checkpoints.

- Architectural control at all stages will be handled by Hajit Sami.
- Unit testing will be performed by David Green and Smiley Smith.
- Simulation software currently in use at PH will be utilized to stress-test the site prior to UAT.
- UAT to be performed by several volunteer end users at PH and RLV.
- Systems testing to be performed by Brittany Salvage and Pamela Brown.

## Summary

This chapter talked about formulation of the project management plan, a document that details how you're going to manage the project. Specifically, we talked about how you'll report to stakeholders. Communication is everything in good project management.

We also talked about tracking methods used in projects: by metrics, by cost, or by other variables. I discussed the project's schedule and how you'll handle it. Specifically, the deliverables will be accomplished by the completion of tasks. Many tasks combined together make up an activity. Many activities combined together make up a phase. Many phases make up the project. Tasks, activities, and phases have a specific duration assigned to them, the sum of which defines the overall expected length of the project. Tasks, activities, and phases can be represented in a variety of schedule-formatting mechanisms, but the most common is the one you'll find as the default in Microsoft Project, a combination of a spreadsheet that contains the task list (including duration, team members, predecessors, and successors) as well as a Gantt chart, which shows the duration of a task on a calendar with links to other tasks.

There are several interesting cost estimating techniques, but normally in IT projects we use bottom-up estimating. The idea is to start with the smallest costs first, then work your way up to the largest, taking into account salaries, equipment, contractors, and other items. Cost estimating is *not* budgeting, and your cost estimates will doubtless feed a budget mechanism of some kind, typically spread across a lot of budgetary cost centers. Quality management is highly important in any project of any size, though the quality techniques you utilize will not be as numerous in smaller projects as in bigger ones. Checkpoints serve as a method where you stop to see what you've accomplished so far; the more numerous the checkpoints, the more likely you are to arrive at a finely tuned product, but the longer the product is going to take to conclude. Architectural control is assigned to technicians who understand the technology and recognize good design characteristics. Unit testing is the singular testing of a given phase's, activity's, or task's outcomes. Systems testing involves the entire *in toto* test of the completed system. User acceptance testing (UAT) involves asking users associated with the business to test the code to see if it meets their needs. Intermittent UAT throughout code development will result in more robust, rich code that more effectively meets user needs. Simulation software can stress-test systems that will encounter heavy usage.

## Exam Essentials

**Be able to list the elements that go into a well-thought-out project management plan.** Such items include stakeholder reporting, project tracking, project schedule, estimating techniques, schedule format, budgetary issues, quality standards, and project team members.

**Understand the various cost estimating techniques and know when you'd use one over the other.** Recognize why bottom-up estimating is used in most IT projects.

**Be prepared to list the various quality control methodologies at your disposal.** Checkpoints, architectural control, simulation software, unit testing, system testing, and user acceptance testing are all useful tools.

**Recognize various schedule formats.** Gantt and PERT are the most common.

## Key Terms

This chapter had a ton of key terms in it, some of which we've used before but which showed up again here.

activity	phase
bottom-up cost estimating	predecessor
cost centers	project management office (PMO)
cost driver	quality checkpoints
critical path	sequencing
e-zines	strategic project manager
fudge factor	successor
hammocks	task
milestones	

## Review Questions

1. In the exhibit, you see a series of steps leading to completion of the deliverables for a project. Put the steps in order of their occurrence.

Task 3	1.	<input type="text"/>
Activity 1	2.	<input type="text"/>
Task 2	3.	<input type="text"/>
Phase 1	4.	<input type="text"/>
Task 1	5.	<input type="text"/>

2. You're a project manager over a project that will provide a client/ server-based system using a Visual Basic interface that communicates with a UNIX server running an Oracle database for the people in the finance office. You're now at the stage where you will have a few of the workers try out the new product to see how it works. You'll assess the quality of these tests before making a decision about finishing up closure of the project. What quality mechanism are you using?

- A. System testing
- B. Unit testing
- C. Simulation testing

?

?

- D. UAT
3. Incorrect activity sequencing could lead to which of the following problems in a project? (Select all that apply.) ?
- A. Incongruities in user acceptance testing results
  - B. Time wasted waiting for a predecessor task to complete before a successor task can start
  - C. Team member having to split time to work on two tasks
  - D. Missing the project deadline
4. Which cost estimating technique(s) utilize the mapping of one data element to another? (Select all that apply.) ?
- A. Bottom-up
  - B. Linear regression
  - C. Indexing
  - D. Unit
  - E. Parametric
  - F. Top-down
5. Which of the cost estimating techniques assesses a competitor's product, subtracts out a profit margin, and then estimates the remaining per-unit price? ?
- A. Bottom-up
  - B. Linear regression
  - C. Indexing
  - D. Unit
  - E. Parametric
  - F. Top-down
6. In developing a project's calendar, which elements do you need to take into account? (Select all that apply.) ?
- A. Team members' individual calendars
  - B. Executive project sponsor's calendar
  - C. Calendar of corporate holidays and business meetings
  - D. Stakeholders' calendars
7. Of the project tracking methods listed below, which one would concern itself with metrics? ?
- A. Cost
  - B. Team members
  - C. Requirements
  - D. Time
8. When considering the formulation of your cost estimates, who is responsible for providing each task's cost estimate? ?
- A. Project sponsor
  - B. Project budget expert
  - C. Project manager
  - D. Project team member

9. When preparing IT project cost estimates, why do you commonly use the bottom-up technique? (Select all that apply.)

?

- A. To accurately determine the complete cost of the project
- B. Because staff salary typically represents the largest cost in a standard IT project
- C. Because salary costs can be managed whereas hardware and software costs cannot
- D. Because other techniques aren't as accurate

10. Which of these team member groups is responsible for architectural control in an IT project?

?

- A. Administrative
- B. Educators
- C. Leadership
- D. Technical
- E. Stakeholders
- F. Business

11. Looking at the exhibit, how many milestones are shown on the Gantt chart?

?



- A. 1
- B. 2
- C. 3
- D. 4

12. Looking at the exhibit, which tasks represent a milestone? (Select all that apply.)

?



- A. Activity 1, Task 1
- B. Activity 1, Task 2
- C. Activity 1, Task 3
- D. Activity 2, Task 1
- E. Activity 2, Task 2
- F. Activity 2, Task 3

13. The cost estimating function serves as an input to which of the following project processes?

?

- A. Budgeting
- B. Scheduling
- C. Team member selection

14. D. Team building  
Given that you have a limited budget at the project's onset, what project management plan elements might be affected by this constraint? (Select all that apply.) ?
- A. Task duration
  - B. Cost estimate method
  - C. Team member selection
  - D. Quality control mechanisms
15. Which two pieces of project information are going to be the most likely to affect your team member selections? ?
- A. Scope
  - B. Task list (work breakdown structure)
  - C. Requirements
  - D. Schedule
16. In thinking about the time estimating process, who is responsible for estimating task durations? ?
- A. Team member
  - B. Team lead
  - C. Project manager
  - D. Project sponsor
17. You're the project manager for a large IT project that's going to take a year and require input from a vast array of IT technicians. Recently you've discovered that some fighting is going on between the person who's developing and implementing your security policies and a senior developer. You've found both to be highly credible, valuable players on your team. What's the best way to handle this situation? ?
- A. Call both to a meeting. Specify exactly what you're seeing happening between them. Ask for a plan from both to work out the differences. Stress the importance each of them contributes to the project.
  - B. Ask the HR office to put together a meeting between you and the two fighting team members. Ask HR to work out the differences between the team members. Stress the importance each of them contributes to the project.
  - C. Call both to a meeting with you and the project sponsor. Specify to the sponsor exactly what you're seeing happening between the two. Allow the sponsor to lead the group toward an amiable solution. Stress the importance each of them contributes to the project.
  - D. Replace the security specialist with someone else.
18. You're the project manager for a large IT project that's going to take a year and require input from a vast array of IT technicians. Recently you've discovered that some ?

fighting is going on between the person who's developing and implementing your security policies and a senior developer. The senior developer argues that the security specialist has no idea what she's doing and that she's not following good quality security guidelines. He produces some documentation to back up his claims. In researching the work that each is doing, along with his documentation, you find that the claims of the senior developer, while exaggerated, are not without merit. What's the best way to handle this situation?

- A. Call both to a meeting. Specify exactly what you're seeing happening between them. Ask for a plan from both to work out the differences. Stress the importance each of them contributes to the project.
- B. Call the security specialist into a meeting. Tell her that you've been looking at her work and that you'd like some input as to why she made the decisions she made. If you find the rationale to be reasonable and proper, tell the senior developer that you're behind the actions of the security specialist. If not, ask her to begin meeting some standard security guidelines and illustrate with your documentation what you're talking about. Ask if there are ways that you can assist her with her work. Stress the importance of her contributions to the project.
- C. Call both to a meeting with you and the project sponsor. Specify to the sponsor exactly what you're seeing happening between the two. Illustrate the developer's point with the documentation he has provided. Put the security specialist on a 30-day action plan to improve her processes. Stress the importance each of them contributes to the project.
- D. Replace the security specialist with someone else.

19. When would you use a PERT chart as opposed to a Gantt?

?

- A. When you want to monitor task predecessors and successors
- B. When you need to trace each tasks' duration relative to other tasks
- C. When you have a very large project
- D. When you have a small number of tasks to manage

20. From this list, select all the things that a Gantt chart will be helpful for in your project monitoring process.

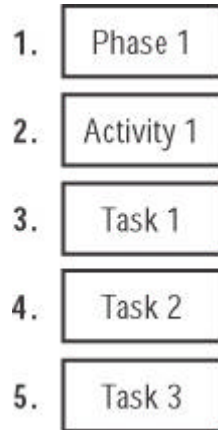
?

- A. Gives you the ability to denote the critical path of the project

- B. Shows successors and predecessors
- C. Gives you task names
- D. Shows interrelationships between tasks

**Answers**

1.



A project phase is made up of activities, each of which is accomplished by the completion of one or more tasks associated with that activity.

2.

D

When you have some of the actual users who are going to utilize the system do some testing at or near the project deliverable's completion, you're involved in user acceptance testing (UAT). UAT is valuable, not so much from an overall "how does the system perform?" standpoint but from the user's perspective of how well the system meets his or her needs. Both assessments are valid and required, but UAT gives you a feel for how close you got to the target with your customer.

3.

B, C, D

Sequencing of activities is like choreographing a dance. The dancers have to be in the right place at the right time, and they have to know their steps. Just so with your project's team members. You have to sequence the steps of your tasks so that they are accomplished in the order that most makes sense and so there are no delays in time while team members are forced to wait for someone else's task to finish to they can carry on with theirs. Too much inaccurate sequencing could lead to missing the project's deadline.

4.

B, E

Linear regression is the statistical term given to the measurement of two unlike variables, one of which may have a direct bearing on the other. Parametric cost estimating utilizes linear regression techniques, though it is a more sophisticated cost estimating method, utilizing other features as well.

5.

F

The idea with top-down is that a competitor has a product you'd like to emulate (because there are a lot of bucks in the sale of this product). In order to try to develop the same product and undercut your competitor, you opt to use the

top-down method. You take your competitor's unit price, subtract out a profit figure, then set up your project in such a way that you meet the remaining per-unit price. The difficulty lies in the balancing of the triune constraints: time, budget, quality.

[6.](#)

A, C

While it's important that you communicate from time to time with the executive project sponsor and the stakeholders, it is not necessary for their calendars to be integrated into your project calendar. It is important for your team members' calendars and the company's calendar of its official holidays and business meetings to be introduced into your project calendar. Fortunately, today's e-mail systems utilize calendar-sharing, which makes your project calendar work much easier.

[7.](#)

C

You can opt to track a project by the stipulated requirements. Because each requirement has associated with it a metric that denotes the success of the achievement of a requirement, this method yields requirements completion-oriented results. All methods are valid; you pick one depending on the most important concerns that you and the stakeholders/sponsors have relative to the project.

[8.](#)

D

Individual team members are responsible for the development of the cost estimates for the tasks they've been assigned. The reason for this revolves around the fact that they are the SMEs who understand the task before them and can best assess the costs associated with a task. However, caution each team member to use average costs when tallying cost estimates. Individuals may not have average salary information, and you may have to supply this information.

[9.](#)

A

Generally, IT projects aren't launched in order to provide a product or service that will be sold to customers (though the standard IT project will probably be used to augment customer satisfaction or to lure in more customers). With other methods, you're typically oriented toward the feeling of manufacturing or building—you're concerned about making something that compares to standard per unit costs. By the time an IT project is being seriously discussed, the implication is that the outcome is extremely beneficial to the company. Now it's a matter of keeping costs down by managing them effectively, and the bottom-up cost estimating model helps accomplish this.

[10.](#)

D

Technicians are the best choice to manage architectural choices because they're close to the technology and understand how the complexity and nuances of the architecture chosen. Folks in other groups may have a pretty good idea about IT, but the technicians are the SMEs when it comes to architectural considerations.

[11.](#)

B

The Gantt chart is in the right pane of the exhibit shown. Milestones are denoted in this particular software by a black diamond and include the projected milestone date.

[12.](#)

C, E

Looking at the Gantt chart, you can see that the normal long bar that represents a task is replaced by the black diamond. The tasks' durations don't change, but the appearance of the object in the Gantt chart changes to reflect that a given task represents a milestone. In this case, the two tasks are Activity 1, Task 3 and Activity 2, Task 2.

[13.](#)

A, C

Cost estimating *isn't* budgeting. For starters, you're probably not the one who will do the majority of the formal budgeting for the project (although you may keep a budget spreadsheet that details your expenditures and the time worked by team members). The budget is a formal document that's kept by the company's financial folks. Cost estimating, though, is an input to budgeting. Cost estimating also has a direct bearing on the team member selection that you make, because team members assist you in cost estimate formulation. This sounds circular, because it is. If you have a weak team member working on a task, the cost estimate is going to be higher because his time estimates are going to be higher, driving up the cost of the task.

[14.](#)

A, C, D

Chances are, with a limited budget, you'll try to whittle down the task durations to their bare minimums. You'll also likely not pick the same staff that you'd pick if money were not an object. Additionally, you probably won't do as much system testing as you might do if you had the time and personnel. You can easily see how the time/ budget/quality equilibrium becomes obvious when you consider the above situation.

[15.](#)

A, B

The project's scope and the list of tasks that you have to perform will be the two most important documents you'll use to pick team members. The schedule arises as a result of the delineation of the tasks and their subsequent durations. Project requirements enumerate what you're going to do, but don't talk about how you're going to do it.

[16.](#)

A

Team members are responsible for estimating the tasks or activities that they'll directly be responsible for. On larger projects, perhaps a team lead might take duration inputs from each of his team members' tasks so that he has an input for a *phase* duration. But in either case, the SME has a better idea of how long a *task* will take than the project manager and should be the one doing the estimating. It is up to the PM to add on variables that allow for things such as supervisory and quality overhead, among others.

[17.](#)

B

These are always tough situations to arbitrate. Your primary goal is to bring the two together to try to air the differences in a way that's constructive. Don't meet with them in your office; instead, choose a place that's neutral to all of you. Point out that you notice some friction going on and that

you're wondering what the elements of that friction might be, because it's having an effect, or will have shortly, on the outcome of the project. Stress how valuable each of them is to the efforts of the project. Ask questions that don't give either other person an opportunity to blame the other. Try to find creative solutions to the problems.

If this fails, the next step might be to consider asking HR to take a more active role, either through a team-building exercise (which could only occur on larger longer projects where team members work full-time on the project) or in individual counseling.

18.

B

The developer should not be a part of the conversation. He has his own work to do and is her peer, not her supervisor. Point out that you've researched some security methodologies and illustrate where you find her work to be different than the standards you've discovered. Ask her why and try to get her rationale behind the decision. If you find the rationale to be wanting, then tell her you need for her to begin to work toward the standards you're talking about. Otherwise, let it go. Speak with the developer to tell him that you've investigated the situation and dealt with it. Ask him to try to work more harmoniously with the security specialist. Be sure you tell both what an important part they play in the project.

19.

C

Large projects will be filled with a plethora of tasks. Some tasks have interrelationships, and the PERT chart can illustrate those interrelationships where the Gantt chart cannot. If you have a handful of highly important tasks, the successful outcome of which is important to other tasks far down the road in the project, then a PERT chart will help you track the interrelationships of the tasks and allow you to monitor successes. Most projects will typically utilize a Gantt chart.

20.

A, B

A Gantt chart, by virtue of the fact that it consists of blocks of tasks that may or may not have dependencies (predecessors and successors), is unable to show intricate interrelationships between tasks that are far apart from one another in a large project; PERT charts can do that. Gantt charts *don't* show the task name (though in Microsoft Project, the task name shows up in the left column); PERT charts do. The chief reason you'd use a PERT chart over a Gantt has to do with the size of the project and the need to monitor intricate interrelationships between key tasks that hinge on the successful outcome of tasks way on down the line in the project.

By virtue of a Gantt chart's limited ability to show dependencies, you in effect have a "poor man's" critical path, though the PERT chart lends itself much more easily to critical-path work.

# Chapter 8: The Work Breakdown Structure and Organizing and Finalizing the Project Planning Phase

## *CompTIA Exam Objectives Covered in this Chapter*

- 2.13 Given a project planning-scenario, demonstrate an understanding of and the ability to plan for iteration by:
  - Identifying elements likely to require it
  - Explicitly deciding to provide for iteration in the project plan (e.g., scope approval, plan approval, project design, final deliverable turnover, etc.)
- 2.14 Given a scenario involving tasks, resources (fixed or variable), and dependencies for a multi-phase IT project, demonstrate knowledge of the standards for creating a workable WBS.
  - Recognize and explain the need to creatively visualize all deliverables (interim and finished) and thoroughly decompose the system into all potential hardware and software components.
- 2.15 Recognize and explain the need to obtain 1) consensus among all stakeholders regarding project deliverables and other elements of the WBS, and 2) formal approval (sign-off) of project sponsor(s) regarding project deliverables and other elements of the WBS.
- 2.16 Given a project scenario with many phases and activities, set realistic, measurable milestones, and demonstrate understanding that measurable targets are required in order to determine if the project is proceeding on time and within budget.
- 2.17 Given a set of specific milestones and their descriptions, specify entry and exit criteria for each.
- 2.22 Identify the components of an adequate project plan and explain the function of each. Components include:
  - Table of contents
  - Overview
  - Sponsors
  - Team members
  - Requirements
  - Scheduled tasks (WRS)
  - Expected resources
  - Environmental issues
  - Business requirements
  - Implementation plans
  - Support plans
  - Training plans
- 2.23 Identify the steps involved in organizing a comprehensive project plan and using it to close out the planning phase of a project, including:
  - Assembling all project planning elements (estimates of deliverables, time, costs, etc.)
  - Creating an outline or table of contents for the comprehensive project plan
  - Reviewing the outline of the comprehensive project plan with sponsor and key stakeholders, obtaining feedback and concurrence, and revising as needed
  - Writing the comprehensive project plan by integrating all planning elements according to the outline and creating a full document with transitions, introductions, graphics, exhibits, appendices, etc., as appropriate
  - Circulating the comprehensive project plan to all stakeholders

- Obtaining top management support of the comprehensive project plan by making certain it reflects their concerns and that they have had an opportunity to provide input
- Conducting a formal review of the comprehensive project plan in which stakeholders have an opportunity to provide feedback
- Adjusting the comprehensive project plan based on stakeholder feedback
- Obtaining formal approval (sign-off) of the comprehensive project plan by sponsor(s)

Project managers live and die by the *work breakdown structure (WBS)*. It is the mortar that cements the project plan together into a cohesive unit. In this chapter, I'll talk extensively about the WBS and then a bit about finalizing your project plan.

You may have to work with a WBS for a while to know how far to go with it. It's a Zen kind of thing. You start with your list of deliverables and decompose them into the elements that will make each deliverable complete—a reverse-engineering approach. But you don't get *too* deep in the process. There's an art to finding the right balance. A WBS to build a car, for example, won't have a task as detailed as, "Screw six lug nuts onto each of the wheels." The expert performing the task knows how many lug nuts go on each wheel, so you can leave this as, "Install lug nuts." Your WBS should boil the tasks, activities, and phases that make up a deliverable down to basic elements that you can effectively manage. The WBS isn't about microscopic detail; it's about the parts, components, or factors of the deliverables.

### ***Planning for Iteration***

An *iterative process* is one that you do over and over again. Some tasks or activities in a project (testing, for example) will require you to do something many times or even in a cycle. In order for your WBS to accurately reflect task durations and cost estimates—the basic goals of deliverable decomposition and WBS construction—you'll need to understand elements that require iteration and address them accordingly.

**Note** For some people, *iteration* doesn't just mean "do often;" it also includes a meaning of *decision loop* or *cycle*. But any time you must perform the same action more than once, good project management includes analyzing whether this is time- and quality-efficient. So here, *iteration* captures all repetition.

### **Iterative Elements in Project Tasks**

Suppose your project is creating a multiscreen client/server system whose back end is a relational database management system (RDBMS) like Microsoft SQL Server, Oracle, Sybase, Informix, or DB2. When performing a quick, in-your-head decomposition of the tasks involved in creating this project's deliverables, you might spot some iterative processes:

- Placement of certain elements on any of the screens (e.g., help button, common background graphic)
- Development of certain database tables, regardless of the kind of data contained (e.g., lookup tables)
- Installation of several RDBMS servers in various sites throughout your corporate enterprise and setting up database replication between the servers

There are probably others that you could glean simply by going through a WBS brainstorming session with the team members responsible for each of the components of the deliverables. But you get the idea—certain tasks are going to require an element that was performed previously or will need to be performed again in an ensuing task. This is an iterative element, one that you'll need to specially plan for.

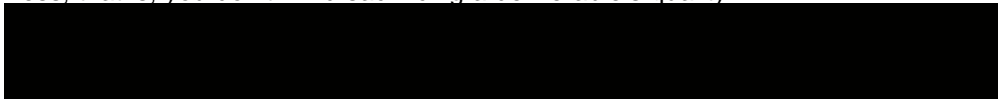
The problem with iterative elements is that, try as you might, there is little you can do to keep a team member from having to repeat steps a previous team member has already performed. So iterative processes show up as added costs in a project plan. You should do your best to reduce repetitive project steps. For example, if your screens all have some common elements, is there a way that you can develop a single master screen that contains the common elements, then allow the developer to copy this master screen and then place his task's elements on the screen? In this way, you've managed to cut down a bit on the iterative aspect of the project, though you need to recognize that the first person who develops the master screen will take some extra time to do so carefully and completely.

Lookup tables are commonly used in application systems. Good table definition might recognize that one developer's lookup tables are quite similar to another person's and, with some tweaking, you can cut down some of the iterative processes.

Reuse of common code modules helps eliminate iterative processes.

Installing servers that do a common job can be accomplished within one task simply by applying several team members to the job in order to install them all and configure replication at one time. The cost of the team members' time must be judged against the longer project duration from having servers installed and replication configured one after the other in several project steps.

Some iterative processes can be minimized a bit, but not enough to make a big difference. Testing is something that usually requires lots of unavoidable iteration—unless, that is, you don't mind sacrificing a deliverable's quality.



### **A Highly Iterative Process: Packaging**

Packaging may require some iterative elements you hadn't thought about. Have you ever installed some software and marveled at how smoothly it put itself in place? That's a fine packaging job—one in which the software installs where it's supposed to, with a minimum of user interaction, putting Registry entries and other goodies where they belong.

Packaging doesn't happen by accident, even with the most senior of package developers. Packaging is an extremely iterative process, where you develop your package, test it on a reference computer (a computer with a standard installation—one that mimics what's likely to be found out "in the wild," in the user world), find problems, rebuild the reference computer (to get rid of the bad stuff the previous package left), then retest. Very time-consuming, mundane, and often boring. It takes a real talent to be a good packager, and you have to like what you do.

People who install Microsoft Systems Management Server, CA Unicenter, IBM Tivoli, or Novell Zenworks can develop software packages that they can push to their user base. Often these package developers get a black eye (more accurately, the management software gets one) because they don't understand the iterative process of packaging. They simply develop the package and "Yoicks, and away!" they push it out the door. Without a clear understanding of iterative processes, a systems management software push such as this is doomed for failure, because you don't have a grasp on the quality control aspect of packaging. People who are new to packaging are tempted to push the package the first time it appears to work, without further testing and retesting in order to make sure it works. The quality control problem surfaces when an admin sends out the package to an operating system that he hadn't thought to test it on, and the package fails almost immediately. Oops! Back to the drawing board. An iterative QC process would've eliminated this problem.



Because of the possibly “hidden” nature of iterative processes (that is, tasks must happen, regardless of whether they’re recognized as repeating), you have the choice of whether you want to reflect this information in your project’s documents. Personally, I think it’s worth the time to examine iterative processes to see where you can make some cuts and thus save money and time in your project’s steps. The larger the project, the more important it’s going to be to identify iteration in your project’s actions.

**Iterative Elements in the Project Itself**

Your entire project has some element of iteration associated with it, simply because sometimes you’ll find yourself going back and back on a given step in the project. Perhaps the best example of this is when the scope gets widened for some reason. The iterative nature of the process requires that you revisit the scope document, refine accordingly, and then get it re-signed by the project sponsor. Also, during project execution, the process of visiting team members to find out the status for a given task will be highly repetitive.

Almost all elements of the project planning process—from initial project design to scope approval to turnover (closure) of the project’s deliverables to the owners—may require an iterative execution.

**Creating a Workable WBS**

I’ve already emphasized that if you haven’t correctly identified the deliverables, the rest of your project will be fundamentally flawed. There is a natural flow to things, all starting with the deliverables. This flow now arrives at the work breakdown structure (WBS), and your deliverables identification and requirements analysis all get captured and documented here in a new way. [Figure 8.1](#) shows how the WBS grows out of the project process so far.



**Figure 8.1:** The WBS process

The process of developing a WBS is one of combining the project’s calendar with its tasks, activities, and phases. You are performing the following tasks:

- Putting on the calendar, one at a time, each task, activity, and phase to be worked
- Assigning to each segment the people who will be working on it
- Assigning the length of time a task should take, a *duration*, to each task, based upon estimates that your team members give you
- Assigning costs, including monetary and human resource ones, to the tasks, activities, and phases
- Setting milestones that mark significant events in a project's life cycle

The WBS is the blueprint for how you're going to create the deliverables. Note that, although it's included in the project plan, it's only a part of the entire project plan. The WBS is most useful to you and your team as you work through the creation of the deliverables. Fortunately, today's project software allows you to easily create a WBS that make sense for your project, and the software keeps track of the budgeting, estimates, people, milestones, and charts as well.

In the beginning, as [Figure 8.1](#) shows, the customer came to you with a project. She had a product or products in mind. Sitting down with the customer (and probably a business analyst), you developed the list of requirements that this project is going to provide.

**Note** Recall that a business analyst is someone who can speak the language of the business area your customer is in and translate as needed into IT or PM dialect.

Once you have developed your deliverables and their requirements, you begin assigning activities and tasks to those items. As I discussed in [Chapter 7, "Creating a Project Plan,"](#) while you try to identify activities (the main actions your project takes toward building a deliverable), you are also beginning to break down the components of those activities (the tasks) and to group related activities together (into phases).

The elements of a project—activities, tasks, and phases—are all defined by the people involved, supplies needed, time required, predecessor and successor relationships, and designations of which items are milestones. These elements and their defining characteristic are captured in the WBS document.

### **Decomposing Deliverables**

With the deliverables and their requirements in hand, you now examine them one at a time, subdividing each requirement into its constituent elements. This process is called *decomposition* and involves boiling down the tasks, activities, and phases that you'll perform in order to build a given deliverable. When decomposing deliverables, you'll be concentrating on what needs to be done, how long it will take (including both total person- hours and elapsed time), and the materials and cost required.

For example, suppose you had a requirement to build a shed. How would you go about building it? You'd likely start with some sort of foundation, followed by a floor, walls, a roof, a door, and a window, then line the inside with some hooks for hanging things. Each of those elements represents one of the components of building the shed.

What are the tasks that you'd perform in order to build the foundation? You'd cut the boards to length, nail them together in a square, fasten them to the ground, etc.

What are the materials required for the foundation? You need wood, nails, and some method of hooking the foundation to the ground so the shed doesn't blow away.

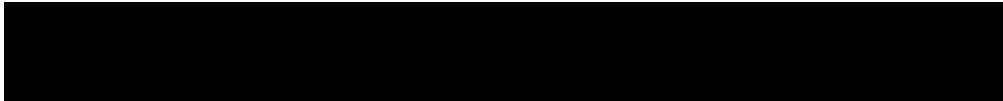
What are the time estimates required for this activity? You might spend a half hour cutting the boards, a half hour nailing them together, and maybe another half hour fastening them to the ground.

Decomposition sounds very easy, but it is a process that requires great management skills. For one thing, you don't want to reduce things to such a low level that you're telling your shed builders how many nails to put into the foundation boards. Chances are they already have a pretty good idea (remember that we're using team members who already know how to do what you need done). You're not developing an instruction set; you're

formulating a task list. Somehow you must find the balance between a breakdown that's not granular enough and one that's ridiculously nit-picky.

You also need to identify the hardware and software components required for a given deliverable. When you perform this kind of decomposition, you shouldn't feel that you have to rely on yourself for all the answers. Identifying technical team members who can assist you with the decomposition of various deliverables will make it much easier to detail the specific hardware and software components required. Team members can certainly be vendors or contractors who are providing some of the equipment or services.

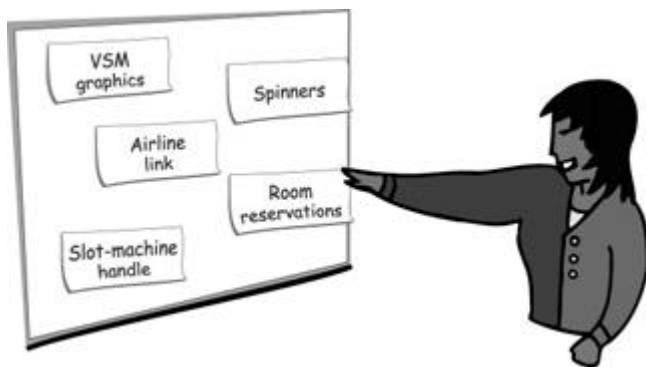
The description that comes out of this decomposition process becomes, in fact, the work breakdown structure. All that's needed is to organize the detail items into the correct order and then record them in a document.



### **Real World Scenario: The “Sticky-Note” Decomposition Method**

A decomposition technique that's often taught in project management classes utilizes the same sticky notes that you use every day in your working life—those little yellow papers that stick easily to computer screens, doors, and other surfaces but can be easily removed.

The deliverable decomposition process is an iterative one because you start with what you think is the first step in a project's deliverable, only to discover that there are other sub-steps that have to be performed to get at the initial step. You brainstorm through the components required to put together a deliverable. Since you may think of some later tasks before you do earlier ones, the best way to go about this brainstorming process is to write each thing you identify down on a separate sticky note and then slap that note on a surface, whether that's a table, a whiteboard, or a wall. The notes can be easily rearranged whenever you like, as you develop more and more items.



After you've identified all of the things you think go into making up a deliverable, check one last time that the sticky notes are all in chronological order and, voila!, you have your WBS.

For large projects, apply the sticky-note method one deliverable at a time: go through the process for one, then the next, and the next, and so on; then, when you've done them all, order the whole pile.

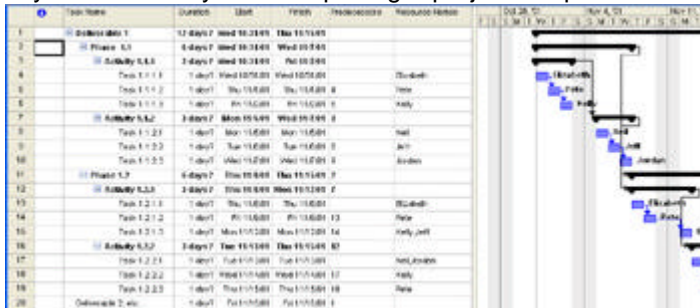


## Formulating the WBS

Once you've decomposed the project's deliverables and have arrived at what you deem to be the components that will result in each, you're ready to create your work breakdown structure. A WBS consists of a description of the task, the people working on the task, the amount of time you expect it to take (based upon estimates derived from the people who will work on the task), and the materials involved.

Format doesn't define a WBS. But a typical WBS is built in a spreadsheet, word processor, or project management software. Using PM software will make your job easier, because when you denote dependencies between tasks, the dependencies are shown graphically and project dates are automatically adjusted to reflect them. Such software keeps a listing of the people who work on the various phases of the project and tracks milestones as you achieve them. You can pull all of this off in a word processor, but it involves much more work.

[Figure 8.2](#) shows a Microsoft Project 2002 project screen where I've entered some phases, activities, and tasks associated with a deliverable. Note that you can record the people who'll be involved in each of the elements and can also mark dependencies simply by pointing to the row number of the task that must be completed prior to the task you're currently on. Completing a project template such as this formulates your WBS.



**Figure 8.2:** A sample WBS, as entered in Microsoft Project

Looking at the figure, you should also note that you can apply a hierarchical numbering system to your project's activities. This might be something you would implement in a large, complex project where you need to be able to quickly find a given task—where the row number alone won't be helpful to you.

When you create a WBS, you need to have already logically thought out your tasks, activities, and phases and have them in the order that they need to occur. You should also have a good grasp of the predecessors and successors each segment might require—noting that some that fall later in a project may have predecessors way back at the beginning. It's hard, if not impossible, to create a WBS in which you linearly go down through the tasks, activities, and phases.

Your WBS will also include the task durations and the folks working on the tasks, in addition to the cost estimates. In Microsoft Project, you can keep both the estimated and actual costs so you can generate variances. Smaller IT projects may not need to take advantage these advanced features, but it's nice to know they're there. One nice feature of Project is that it automatically generates a Gantt chart by which you can visually track your project. You can also keep notes, set milestones, and even key in multiple predecessors for one task within this software.

Do you need Microsoft Project to generate your WBS? Absolutely not. You can keep your WBS in a word processor, spreadsheet, database product, or even on paper. However, the inexpensive price of the software coupled with its functionality makes it a must-have for those who are actively engaged in IT projects.

**Tip** Tracking the tasks, activities, and phases in the WBS is the responsibility of the PM. If you get lazy and don't key in actual dates, costs, and durations at the conclusion of each task, you'll be shocked at how fast your work can pile up on you. Be very diligent about filling in the numbers, so that your WBS goes beyond being

simply a smart task list.

## Statement of Work

A vendor's statement of work (SOW) will need to have its steps rendered in the WBS. Even though a vendor is going to do the work as part of a purchasing bargain, you still need to plan for the steps and accommodate the person-hours, materials, and time that they'll take. There may well be dependencies between the tasks in your project and the steps outlined in a vendor's SOW—things you must have ready before the vendor's employees can come in and do what they need to do, or vice versa.

Include a copy of every SOW involved in the process in your project book. When delineating steps in your WBS that are accomplished by a given SOW, refer to that SOW in the WBS if more information is needed.

### Getting WBS Consensus and Sign-Off

After formulating a WBS, there are two distinct project management steps you should run it through. First, go over the WBS with stakeholders so they have a chance to review it and make sure it meets the deliverable need the customer requested. Iteration again enters into the picture, if you find that one or more of the stakeholders does not agree that you've met the need. In such a case, it's back to the drawing board to try to refine the deliverable or its component tasks in such a way as to arrive at consensus among the stakeholders.

#### Note

In a large project, consensus isn't something you necessarily want to try to garner across a huge stakeholder pool. Instead, concentrate on stakeholders who understand the deliverable and the process you went through to create its breakdown. It doesn't make sense to spend four hours to get a stakeholder to understand a deliverable, simply to obtain consensus on its development.

Second, obtain sign-off by the project sponsors of the WBS. Formal sign-off is required because, if you recall, the project sponsor is the one who can authorize the expenditure of resources (human and otherwise) to perform the work described in the WBS and to accomplish the creation of the deliverables.

## Setting Milestones

A *milestone* is a significant event in the life of the project. But there's more to a milestone than simply stating, "This is a significant event." The real purpose of a milestone is to recognize the passing of a *measurable* event by which you can judge that the project is proceeding on time and within the prescribed budget. So you must decide on milestones that are able to give you both a quantitative read (time and budget) and a qualitative read (how well the project is going). Milestones are typically represented as activities with zero duration.

Presumably, you're tracking expenses and time within your project budget as you go along. When Joe finishes a task, he keys in his time spent on the task. Additionally, the invoiced cost for any software or hardware that you utilized in a given task is compared with what was budgeted. You're summing the budget items as well as the person-hours, and you now have a total that gives you an idea of how well you're doing.

Now, should the milestone involve any more than just the summation of a project's total person-hours and money spent to date in comparison to projections? An emphatic yes! The milestone also represents a significant turn in the project. All databases have been built and are operational, for example. All of the screens have been developed. All servers throughout the corporate enterprise are replicating perfectly with one another. A milestone is a representation of a significant event or turning point in the project (the qualitative measure) as well as a set of gauges that gives you an instant read on how well you're doing from a time and budget perspective.

Generally, milestones are set at the completion of a phase, not of a task or activity, though there are exceptions to this. There are two kinds of milestones: major and minor. You'll set major milestones to denote a significant advance in the project's activities. Minor milestones mark something relevant to a specific part of the project. For example, you might be developing a large client/server front-end application that has several modules to it: printing, calculating, presentation, reporting, and so forth. You might set a minor milestone at the point when the printing module has just been finished and is ready to snap into the main body of code. A minor milestone might trigger off of a task or activity, but generally all milestones fire when a phase has elapsed. Note that there are no hard and fast rules when it comes to setting milestones. The idea is that you're supposed to analyze the project's tasks, activities, and phases, then make decisions about when you think you've reached a new apex in the project.

**Tip** Larger projects require more milestones than smaller ones.

Notice anything missing in this formula? Well, we're not tracking how well our team players are getting along with one another, are we? While you would not set a milestone that stops to evaluate the psychological well-being of your team, you should certainly be keeping an eye on this element of the project as well. Indeed, the attitude of the team tells a lot about the nature of the project itself.

### **Entry and Exit Criteria**

When setting milestones, you'll want to describe entry and exit criteria, which indicate how you know when you've left one phase of a project plan and entered another. For example, suppose that a phase of your project plan calls for the deployment of seven separate enterprise-class servers that are going to talk to each other in an e-mail server routing group scenario. The exit criterion (and milestone) that signals the end of this phase is when tests of the interconnectivity between the servers as routers are satisfactory. The very next phase might detail the creation of e-mail boxes for all users in every segment of the enterprise. Entry criteria for the new phase would start with a step that details how team members go about setting up the mailboxes.

Projects as a whole can also have entry and exit criteria. In a very formal project, you might have exit criteria that stipulate when you have left the initiating phase (sign-off of charter) and entered the planning phase.

## ***Finalizing Project Plan Components***

The project plan isn't just about the work breakdown structure. The plan consists of many separate components that, when bundled together, say, "Here's what we're going to do in order to bring in the stipulated set of deliverables." The following is the list of components of the typical project plan. Note that these items aren't necessarily in a fixed order that's recognized throughout all of PM-dom. In smaller project, you might opt to not include some of the more esoteric items, but in most cases the items listed in the order listed represent a pretty comprehensive project plan.

**Table of contents** Begin your project plan with a table of contents (TOC) that says what the reader should expect to find inside.

**Overview** The overview is an executive summary of what the project's about. Don't write in heavy detail here. Instead you're striving to provide a 30,000-foot view of the project, written in nontechnical terms that stakeholders, executives, sponsors, and others can understand.

**Sponsors** Name the sponsor (or, if you have more than one, name them all and identify the executive sponsor).

**Team members** Next, provide a list of the team members who will be involved, indicating full- or part-time capacity and whether company employees or contractors.

**Requirements** List again the requirements of the project.

**Scheduled tasks** Attach your work breakdown structure (WBS) here.

**Expected resources** State the non-human resources that you anticipate using. You can change this heading to Materials List or Expected Materials Utilization if appropriate. You can also designate any vendors in this section.

**Environmental issues** Here we're not talking about the effect your project is going to have on the Arctic tundra or Costa Rican rainforests. This section is a discussion of the overall issues the project could anticipate running into, including the overall computing environment as well as the political, geographic, and integrated systems environments.

**Business requirements** Describe the customer's stated expectations. What business requirement or requirements is this project going to solve? You'll want to fully develop the business requirements section, as this is the area that get the most attention from nontechnical people and will likely be the piece that authorizes the project. Managers aren't interested in the technical excitement of the project; they're interested in how much better the project's going to make their business run.

**Implementation plans** This is an executive overview of methodology by which you'll perform the WBS. Include here your development, hardware installation, securing, configuration, testing, and other plans that you have developed for correct implementation of the WBS.

**Support plans** Talk about how the system will be supported once it's rolled out.

**Training plans** Just as with support plans, describe the way in which end users will be trained on the system.

**Note**

The (WRS) part of exam objective 2.22 refers to a *workflow representation system*, a subset of *cooperative workflow*. *Computer-supported cooperative work (CSCW)* is the generic moniker given to this whole subject—one you'd study in the advanced stages of computer science school. The idea is that, with the world growing smaller each day, thanks to the Internet, we need a CSCW system that is able to go across language and computing platform barriers, so that individuals from anywhere in the world can work together. One of the outflows of such a hypothetical system would be a WRS describing how people do their work. For the purposes of the IT Project+ test, you don't have to worry about the WRS nomenclature—you won't be asked any questions about it. But it's interesting research reading. For more information, simply point your browser to a search engine and type in the string "cooperative workflow" or "CSCW". You'll get all the reading you ever needed on the subject.

## ***Developing the Project Plan Steps and Closing Out the Planning Phase***

We talked quite a bit in [Chapter 7](#) about the project plan and its formulation. Now we go a bit further and discuss the steps you'll take in assembling the project planning elements and then closing out the planning phase.

The project plan is more than just the listing of tasks, activities, and phases involved in creating the deliverables. It includes other informational detail items that stakeholders need to know. When you assemble your project plan, include the following things:

- Roles of stakeholders and their reporting needs
- Project calendar
- Tasks, activities, and phases
- Cost- and time-estimating methods
- Quality management plan
- Teambuilding properties and scenarios

The project plan can be extremely complex in very large projects, involving page after page of documentation regarding the project, or very elementary for quick and easy projects. The basics of developing and assembling a project plan are as follows:

Assembling all documentation necessary, including the list of tasks, activities, and phases

- Creating a formal project plan document, including a table of contents and formal writing process that moves a reader through the elements of the plan
- Review of the plan by sponsors and stakeholders
- Editing the plan to incorporate changes requested by sponsors and stakeholders
- Final review by sponsor and sign-off

### **Assemble Project Plan Elements**

You have, by now, garnered the list of project segments—tasks, activities, and phases—along with their associated durations, the people that will be working on them, and the costs for each. These elements make up the basics of your project plan.

Without formal project management software such as Microsoft Project, you could simply utilize a spreadsheet or word processor document for your project planning needs. Formal PM software bundles up the project plan elements nicely and provides many added features that allow you to track your cost and time estimates, generate charts relevant to your project, and, in some cases, even provide for peer-to-peer virtual project management sessions.

Any project plan includes the following characteristics:

**Deliverables** More accurately, include the tasks, activities, and phases that go into making the deliverables.

**Time** Known more generically as the duration, this is the amount of time that each project segment will take.

**Cost** The cost, in terms of person-hours and resources, that each segment is going to require.

When assembling your project plan elements, you'll also mark the milestones and take note of the hammocks. Remember that a milestone is basically a task with a duration of zero and that points to a significant event in the life of a project. A hammock is a task that has a long duration; I think the term is interesting, but it's not always one you'll make use of in IT projects.

### **Define an Outline for the Project Plan**

It's unfortunate, but the formal project plan and the list of tasks, activities, and phases are both called the "[project plan](#)." In this section, when I talk about the project plan, I'm referring to the entire project planning document. The list of tasks, activities, and phases is a handy way of representing the work, but in the project plan document that you submit to the sponsor, you'll include more than this simple list of tasks, as I pointed out earlier.

You'll want to start any formal project plan with either an outline or a table of contents (TOC) that lists the plan's contents. Depending on the size of the project, your TOC might be lengthy. The TOC doesn't have to be heavily detailed, but it should be comprehensive enough for readers to find the things they're looking for in the document.

Then include the documents spoken of above, including a textual representation of your tasks, activities, and phases. Most word processors today include the ability to extract a TOC from your documents. You should include your list of tasks, activities, and phases in a word processor or spreadsheet format after you've gone through the efforts of keying the details into your project plan software. The file types are interchangeable, and you can typically export to a conventional spreadsheet or even HTML format.

### **Review the Project Plan with Stakeholders**

Once the project plan is developed, you'll review it with the sponsor and stakeholders to make sure there are no final alterations, additions, or deletions. Your goal with the project plan is to make sure that all participants understand what you're doing, how

you're going to do it, how long it'll take, how much it'll cost, and when you anticipate being done. Keep in mind that requirements definition time established the deliverables that the customer desired from the project—don't let the definitions in the project plan stray away from those requirements.

### **Write the Project Plan as a Formal Document**

Writing the project plan involves more than simply listing the tasks, activities, and phases involved. You'll want to write to the outline or TOC that you created, and write in such a way that you develop your methodology and use ordinary writing elements to make sure the reader understands what you're talking about. You can use transitions, topic introductions, graphics, exhibits, appendices, and other formal writing tools as required to make your point. You might, for example, utilize a section header in a larger font and bolded so that readers know when you're moving from one section to another. Feel free to use graphics and charts liberally to make a point.

### **Finalizing Steps**

Once you've written the formal project plan, you have a few final steps to take before you're done with it. Keep in mind that these may require iterative treatment—get feedback, rewrite the plan to account for that input, then recirculate the plan for more feedback.

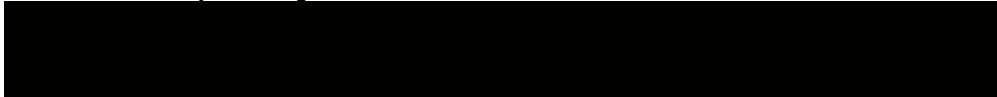
**Circulate the plan** Route the project plan to all stakeholders, as well as managers who aren't affiliated with the project but who may have a vested interest in it, for review.

**Obtain stakeholders' feedback** Obtain finalized feedback from the stakeholders and managers who have input to the project plan.

**Make final adjustments** Make your final adjustments based upon the feedback you received.

**Obtain sponsor sign-off** Once the project plan has been through the full revision process and you feel that you've obtained and addressed all concerns, submit the plan to the project sponsor for final approval.

It's time now to see how a real project plan takes shape—as real, at any rate, as our fictional case study, Prestige Hotels.



### **Prestige Hotels: Project Plan**

You arrive at the following conclusions as you prepare your Prestige Hotels Virtual Slot Machine (VSM) project plan for the Reno/Las Vegas (RLV) Group.

#### **Table of Contents**

- Overview
- Sponsors
- Team Members
- Requirements
- Scheduled Tasks
- Expected Resources
- Environmental Issues
- Business Requirements
- Implementation Plans
- Support Plans
- Training Plans

#### **[Overview](#)**

The purpose of the project is to create an advertising website for the Reno/ Las Vegas (RLV) group—something that RLV has not had in the past. In order to tie in the fun and excitement of Las Vegas, plus capitalize on the uniqueness of the RLV hotels, the site will consist of a graphical working rendition of a slot machine, called a Virtual Slot

Machine (VSM). Users of the VSM (called “surfers”) will have a chance to spin the wheels on the slot machine by clicking their mouse on the VSM’s lever. Depending on the results, a surfer will be able to win one of several prizes that RLV is offering.

The RLV site also utilizes the Prestige Hotels partner airline, qLines, so that there is a business relationship developed between the two entities. RLV points surfers to qLines’ website, which gets an opportunity to book the surfer on a flight to Las Vegas for an RLV stay. qLines helps offset some the costs of the site.

The purpose of the entire venture is to entice surfers to electronically book their entire stay at RLV and their airline flight on qLines.

The site will be hosted by Prestige Hotel’s Internet carrier, World To You (W2U) Inc.

## **Sponsors**

The project’s executive sponsor is Rolf Montenegro, Executive Director of Operations for the RLV Group. The project’s cosponsors are Brittany Salvage, Director of Marketing for the RLV Group, and Pamela Brown, Director of Project Management for Prestige Hotels.

## **Team Members**

- Hajit Sami, team leader (RLV)
- Carolyn Pacheco, business analyst (RLV)
- Darryn Divit, SQL Server DBA (PH)
- Molly Sareen, graphics designer (PH)
- David Green, web developer (PH)
- Smiley Smith, web developer (PH)
- Renee Duluth, ISP representative (W2U)
- Pamela Brown, project cosponsor (PH)
- Brittany Salvage, project cosponsor (RLV)

## **Requirements**

For some requirements, user acceptance testing (UAT) will be performed to measure website visitor acceptance. For items with this measurement specified, 100 percent satisfaction will be required to certify completion.

- The website’s entry page will provide the visitor with a graphical image of a slot machine, very similar to the real-life slot machines seen in Nevada’s casinos. The website visitor (“surfer”) should be able, after validation of his or her age, to click a “Spin Dials” button to spin the VSM’s wheels. A variety of symbols can be used on each wheel, but the symbols should be taken from the marketing and website themes of the four hotels in the RLV Group. UAT and sign-off by the customer will represent completion of this requirement.

NOTE: A score of 100% means that each of RLV’s hotels has a statistically equal chance of coming up on the VSM. In a test of 500 spins, statistically it would be expected that 450 spins would yield no prize, 40 would yield a matching combination of a single hotel, and 10 would generate the top prizes.

- The Prestige Hotels legal department will provide assistance with the legalities behind making sure surfers are 21 or older. Provision of one legal brief stipulating what actions the IT department must take to facilitate the legality required will meet this requirement.
- Similar to the way that a Nevada casino’s slot machine works, combinations of some of the symbols create a prize. These prizes will be grouped into three categories; UAT will demonstrate that these categories are present, clearly defined, and attractive:

**Grand Prize** The big winner on the wheel is a combination of three cowboy hats. The lucky spinner will receive three nights for two at the Texas, all expenses paid (hotel stay, taxes, airport transfers, and meals at any of the Texas restaurants), and \$500 cash. First-class airfare from anywhere in the continental U.S. is included through the partner airline qLines. Prize cost is \$3,000. Only one Grand Prize can be awarded.

**First Prizes** These are nine prizes of lesser value than the Grand Prize but greater than the Second Prizes; three of any non-Texas symbol will win a First Prize. A First Prize winner will be able to select the prize they prefer from a list of the remaining, not-yet-awarded First Prizes. (Developers will prove this component works by showing the customer a complete simulation software cycle, in which the software is run by thousands of simultaneous uses. UAT will then validate this requirement.) A First Prize consists of a free additional night at an RLV hotel when the first night is purchased by the surfer (individual prize cost is \$222). Three such First Prizes will be offered to each of the Cajun Blues, Bangkok, and Sidewinder hotels.

**Second Prizes** Smaller giveaways (cost \$15–\$25 each) will be known as Second Prizes; 25 of each of the following Second Prizes will be awarded:

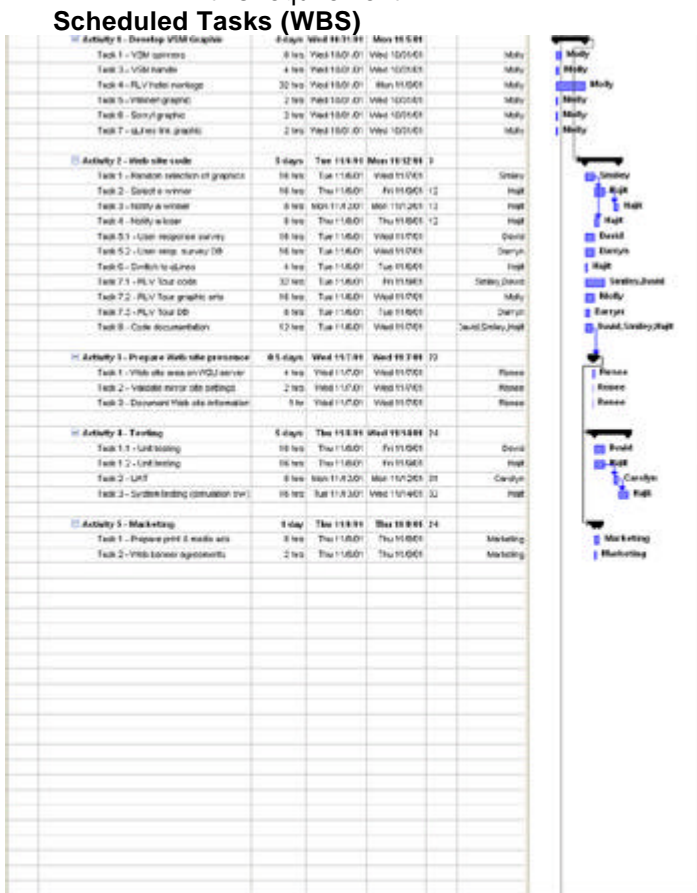
- A spin of two pairs of chopsticks, representing the Bangkok hotel, will win the surfer a T-shirt from the Bangkok.
- Two race cars, representing the Sidewinder hotel, will win a DVD or VHS video of the making of the Sidewinder.
- Two Mardi Gras symbols, representing the Cajun Blues hotel, will win a bottle of Bordeaux wine labeled with the Cajun Blues label.
- The Grand Prize and each First Prize can only be awarded once. Iteration testing will be used to validate that the wheel cannot give out more than one of each. One document demonstrating the results of iteration testing and guaranteeing that each prize can only be awarded once will satisfy this requirement.
- Surfers are allowed to visit as often as they want, but a surfer cannot spin the wheel more than once. This information will be validated as the surfer logs on to the site. The Prestige legal department will provide verbiage to put on the site for legal coverage. The logon address will be matched to the current list of addresses of winners. If a winner has already been issued for this address, no further prizes will be awarded for this surfer. UAT will validate this requirement.

NOTE: One hundred percent UAT will be accomplished first by putting the software through simulation testing over several million pulls. Using the PH website statistics that show that average hit count runs around 1,000 surfers a day, simulation testing will illustrate what five years' worth of pulls could theoretically produce. Once the Grand Prize has been awarded, the code will prevent the VSM from entering into the Grand Prize code function again.

RLV has obtained an algorithm from the manufacturer of their in-casino electronic slot machines, Slot Electronic Systems (SES) Inc. This algorithm (not a piece of code, simply a mathematical model) keeps the in-casino slots from generating two big jackpot winners within a short time of one another. The manufacturer will allow us to use this algorithm within our VSM code, provided we sign a nondisclosure agreement and submit our code to them for preapproval.

- The site will offer the ability to view samples of the rooms in any of the hotels and links to all of the individual hotels' regular websites. For example, if the surfer clicks a cowboy boot, they will be directed to the Texas site. UAT will validate this requirement.
- Surfers will have the ability to book a room at any of the four RLV hotels, or to navigate to an RLV hotel's website and book from there. A surfer booking a room will be required to enter a credit card number to hold the room. UAT will validate this requirement.
- The site will link to the partnership airlines website—qLines. UAT will validate this requirement.

- The surfer will be able to print out coupons for discounts on meals and shows. UAT will validate this requirement.
- One complete UAT document will validate that the site runs as expected and is ready for final publication.
- The site must be up and running in 180 days, in time for the Las Vegas conference season. Completion of tentative project calendar will validate this requirement.
- The site will be published to Prestige's ISP, World To You (W2U) Inc. A W2U server, as specified in the W2U contract, will be used to house the website. W2U will maintain the site's databases and code for disaster recovery and fault tolerance. A copy of the W2U contract will validate this requirement.
- W2U will be responsible for getting the site listed on the major search engines of the Internet (Yahoo, Excite, Google, etc.). A copy of the W2U contract will validate this requirement.
- RLV Marketing will publish the website's address in trade journals, magazines, newspapers—anywhere that the marketing department thinks it would be beneficial to advertise the site. RLV Marketing will pay for all marketing of the site out of its budget. A copy of the agreement between RLV and its parent, Prestige Hotels, will validate this requirement.



WBS Approvals:

Rolf Montenegro, Executive Director—Operations, RLV Group (Project Executive Sponsor)

Brittany Salvage, Director—Marketing, RLV Group (Project Cosponsor)

Pamela Brown, Director—Project Management, Prestige Hotels (Project Cosponsor)

## **Expected Resources**

Connectivity with W2U ISP.

## **Environmental Issues**

Because this is a priority-four project and the other three projects ahead of this one on the list are non-IT related, it is assumed that 50% of IT staff development time will be devoted to this project.

## **Collaboration**

There are several collaboration elements to this project. RLV is collaborating with PH as a business partner in this deployment. The PH project team is, of course, honored that our services are being utilized. Additionally, we're using W2U, a long-time ISP friend, to host the RLV website. Our partner airline, qLines, has been attracted to business opportunities that the RLV site might generate, and we're excited about more link-ups with this top-flight air carrier. Finally, we're encouraged to be working with SES to obtain a slot algorithm that we can use to make the VSM very lifelike.

## **Legal Risks**

- SES might not approve our code for the VSM and might challenge us in court if we try to use it anyway. The algorithm they're providing is well known in computer science schools, so the argument could be put forward that we're legally OK to adopt it anyway. Risk is low.
- W2U could lose its mirroring site and the normal RLV site. We have a contractual guarantee of one hour downtime per month in such instances. Beyond that, we have legal recourse. Risk is low.
- A surfer might try to challenge the VSM in court, saying that we cannot prove he was not a winner. Surfer might try to provide some evidence of a winning spin that he'd somehow modified using computer technology. Risk is low.
- A hacker might try to break into the website to modify the code or change the graphics so that thousands of surfers are Grand Prize winners. Risk is low.

## **Business Requirements**

- The entry page will provide the visitor with a Virtual Slot Machine (VSM). The surfer should be able to click a "Spin Dials" button and see activity similar to the way that the slot machines in the casinos operate. The VSM will always come up with a winning combination, which will determine what sort of discount or goodie the surfer will get if he or she books a room at the hotel. Prizes and combinations are described in the "Requirements" section of this plan.
- The site will offer the ability to view samples of the rooms in any of the hotels and to book a room. Surfers will be required to enter their credit card number to hold the room.
- The site will offer the ability to book a plane ticket on partner airline qLines. Surfers will be required to pay for the flight before the tickets are issued.
- The site will allow users to print out dining and show coupons.
- The site will have links to other Prestige hotels' sites.
- The site must be up and running in 180 days, in time for the normal Las Vegas conference season.

## **Implementation Plans**

Because of the nature of the VSM, the majority of the design work must be performed by our graphics artist before any web coding can take place. Once all of the graphics components are in place, then developers will be able to finish the logic modules that will drive the VSM. Links to the qLines airline site and to W2U must also be accounted

for. Testing and marketing phases occur within this project as well (see “Scheduled Tasks (WBS)”).

**Development** Our development plan will be three-fold:

- Create the graphics for the VSM
- Develop the underlying code that operates the VSM
- Host it on a W2U server

**Hardware installation** All hardware is hosted by W2U; we do not have to worry about server creation or administration. There is one component our PH people will be concerned about: making sure, once the VSM code is put on the W2U Web server and mirroring begins, that mirroring works correctly so we don't experience any site downtime.

**Securing** W2U handles all security monitoring for the website. However, our developers will manage the NTFS permissions in such a way that surfers have read-only access to all data but can still operate the VSM correctly. W2U maintains a 24x7x365 security team that monitors their perimeter network for any hacking or intrusion attacks. The team has a 100% success rate with barring would-be intruders.

**Configuration** Surfers' browsers will require no extra configuration. Netscape 5, Internet Explorer 5, and higher versions will work. Developers will also test Opera 1 for compatibility but do not guarantee it. The Site Compliance verbiage, a standard at the bottom of all PH websites, denotes compatibility.

**Testing** The testing regimen is a bit unusual for this particular site. We'll begin with the developers testing the actual code to make sure it works correctly. We'll then submit the entire site for testing to the users, to make sure they validate that what they see is what they want. We'll supply a standard testing documentation work booklet that helps the user navigate and test accordingly. However, to fully regression-test the statistical model we're using on the spinners—to make sure there aren't duplicate winners for one Grand Prize—we'll use simulation software testing to simulate millions of site hits over time. We've negotiated with the company that manufactures the electronic slot machines that actually sit inside the casino to provide us with the algorithm they use to guarantee that multiple large jackpots don't come up at once. It's easy to modify the algorithm so that only a single Grand Prize winner is awarded.

**Other plans** Marketing has an unusual place with this and other PH websites. Sites are only as good as people's knowledge that they're out on the Internet. We have two methodologies for getting this word out: print and media ads, and linking the RLV site to the common search engines (such as Yahoo, Excite, and Google). Marketing will begin developing their advertising campaign of the new site shortly after testing has occurred and when we're confident that the live site will be available within a week or two.

### **Support Plans**

Ongoing support for the web pages will be provided 24x7x365 by Prestige Hotels' IT group. The website itself is supported 24x7x365 by the W2U administration team. We've had good experience with them and are confident of their support capabilities. Our developers will directly support any problems with the code.

### **Training Plans**

Prestige Hotels' IT training staff will provide all needed training.

### **Project Plan Approval**

Rolf Montenegro, Executive Director—Operations, RLV Group (Project Sponsor)

## **Summary**

In this chapter, I talked about your finalized project plan preparations. We began with a discussion of iteration: the concept of repetitively going back to a process, task, or phase in order to revisit and refine its outcomes.

Next, we discussed the work breakdown structure (WBS) and its associated standards. We start with a customer's asked-for deliverables, break the deliverables down into requirements, then break the requirements into the tasks, activities, and phases required to build the deliverable. This process is called decomposition.

The WBS must go through a formal sign-off segment where the project sponsor will examine the WBS and approve it. This sign-off step also includes presenting the WBS to the stakeholders so they can review it and make sure it meets the customer's initial deliverables needs.

A vendor's statement of work (SOW) will find its way into the WBS, because the work listed there must mesh with the rest of the project work. Include a copy of the SOW with the project documentation.

We talked about milestones and how important they are for gauging how the project is going, both in terms of budget and time. We mentioned exit and entry criteria for various project phases or milestones in the project.

Finally, we talked about the final project plan and the components that will go into it: the table of contents (TOC), overview, sponsor(s), team members, requirements, scheduled tasks, expected resources, environmental issues, business requirements, implementation plans, support plans, and training plans.

**Exam Essentials**

- Understand the work breakdown structure (WBS).** You should know both its components and the reason that it exists.
- Be familiar with the numerous components that make up a completed project plan.** Especially important is the idea behind a milestone and why you'd introduce one in a project.
- Understand the elements of decomposition.** This process involves taking a customer's requested deliverables and the requirements for each, and subdefining them into the tasks, activities, and phases required.

**Key Terms**

There weren't many key terms in this chapter (and some of them have been mentioned earlier), but those that were in here are extremely important.

decomposition	milestone
iterative process	work breakdown structure (WBS)

**Review Questions**

1. For what reasons *must* you create milestones in project plans? (Select all that apply.)
  - A. To signal the end of a task
  - B. To provide a budgetary checkpoint
  - C. To indicate the



completion of a deliverable

- D. To provide a comparison of actual versus estimated time

2. What are entry and exit criteria designed to do? (Select all that apply.)

?

- A. To provide evidence that you've entered or left a project phase
- B. To provide criteria for determining when you can enter or leave a project phase
- C. To provide evidence that you've entered or left a task
- D. To provide criteria for determining when you can enter or leave a task

3. What is the project management term for a process in which you must go through several cycles—in testing, for example?

?

- A. Repetition
- B. Redundancy
- C. Echoing
- D. Iteration

4. In setting which aspects of a project would you utilize iteration or iterative elements? (Select all that apply.)

?

- A. Milestones
- B. Scope
- C. Phases
- D. Kick-off
- E. Closure
- F. Tasks

5. What is the process called in which you take a customer's deliverable and break it down into the tasks required to create it?

?

- A. Decomposting
- B. Decomposition
- C. Reverse-engineering
- D. Bottom-up analysis

6. What two things are required in order to proceed with a WBS?

?

- A. Sign-off by stakeholders
- B. Sign-off by sponsor

- C. Consensus among stakeholders
- D. Consensus among customers
- E. Consensus among budget analysts
7. What are some of the components that make up a WBS? (Select all that apply.) ?
- A. Tasks
- B. Durations
- C. Equipment bids
- D. Extremely detailed to-do list
- E. Setup of test lab
8. The lack of which of these factors prohibits the next task in the WBS from being started? ?
- A. Predecessor
- B. Successor
- C. Exit criteria
- D. Iteration
9. When would you most likely decide to establish some milestones in a project? ?
- A. When you don't have many phases, but each phase is very complicated
- B. When you have a lot of phases and activities, regardless of their complexity
- C. When the project is very small
- D. In all cases
10. What elements are you required to define for each milestone that you create? (Select all that apply.) ?
- A. Description of the milestone
- B. Duration of the milestone
- C. Predecessor and successor
- D. Exit criteria
- E. Entry criteria
11. Select all the adjunct plans that you include in your final project plan. ?
- A. Training plans
- B. Risk response control plans

- C. Implementation plans  
D. Support plans  
E. Deliverable plans
12. What component do you include at the start of your project plan? ?
- A. List of sponsors  
B. List of team members  
C. Table of contents  
D. Overview
13. To which component of the project plan do you attach your WBS? ?
- A. Requirements  
B. Overview  
C. Business Requirements  
D. Scheduled Tasks
14. Which section of the project plan describes philosophical or political situations, technological climate, strategic attitudes, and so forth? ?
- A. Business Requirements  
B. Overview  
C. Environmental Issues  
D. Expected Resources
15. What kinds of human resources must you take into consideration when formulating your WBS? (Select all that apply.) ?
- A. Fixed (full-time)  
B. Variable (part-time)  
C. Contracting  
D. Project administration  
E. General administration
16. What is a good, simple way to begin roughly decomposing your client's deliverables? ?
- A. Sticky notes  
B. Project management software  
C. Spreadsheet  
D. Database
17. Select those project steps that may or may not require iteration. (Select all that apply.) ?
- A. Plan approval  
B. Project design

- C. Final deliverable turnover
- D. Scope approval
- E. None of the above
18. Select the project sizes that *require* the formulation of a WBS. (Select all that apply.) ?
- A. Small
- B. Medium
- C. Large
- D. None
19. When will you apply one or more milestones in your project planning efforts? ?
- A. To denote when an activity has finished
- B. To denote when a phase has finished
- C. To denote when a critical component has been developed
- D. To denote a switch from one team member to another
- E. When you feel you need to trigger a switch from one task to another
20. You're the project manager for a team that's going to develop a new, large software application for the company. There are three different software modules that you've identified that you need to develop, as well as a server infrastructure that needs to be put into place. What would be the minimum number of milestones that would be adequate for such a project? ?
- A. One
- B. Two
- C. Three
- D. Four
- E. Five
- F. Six or more
21. Who will be the signer of the final project plan? ?
- A. Upper management
- B. Stakeholders
- C. Vendors
- D. Sponsor

E. Customer

F. Project manager

22.

You're the project manager for a large-sized IT project that is almost done with the planning phase. You've introduced your formal project plan to the stakeholders and have been given two different directions by two different stakeholders on a specific topic in the plan. What should you do? (Select all that apply.)

?

A. Write the project plan the way the stakeholder with the most clout says to.

B. Ask the sponsor to be the tiebreaker.

C. Try to obtain more information regarding each stakeholder's opinion, then decide.

D. The two cancel each other out, and you're free to make your own decision.

E. Ask the project team members what they think.

### Answers

1.

B, D

While the completion of a deliverable can be a milestone, it does not necessarily have to be. Your goal with a milestone is to give you a point to gauge the time and costs spent thus far, then compare them to estimates to see how far off course you are.

2.

A, B

Entry and exit criteria are used for the purpose of evaluating when you've entered a new phase or left a completed phase. Criteria are set up by you and are not generally utilized for tasks, only for new turning points in the project.

3.

D

Iteration is the process of repeating a task, an element of a task, an activity, or some other component of a project. Testing is probably the most common example of a project activity that requires iteration.

4.

B, C, F

Having to repeat yourself—either because the scope has changed and you have to go back to get new sign-off, or a task needs to be repeated again, or some other component requires repetition— is something you'll have to be prepared for throughout the project management process. Seldom will we finish each task on time, within budget, and as required.

[5.](#)

B

Decomposition is a much harder job than it might at first appear. You have to think about all of the components that might go into making up a deliverable—figuring out all the nuances that accompany its manufacture. You'll likely get the assistance of a business analyst and a technician or two in order to thoroughly decompose the elements of a deliverable. Careful decomposition results in the creation of accurate tasks that will result in the deliverable.

[6.](#)

B, C

The stakeholders must arrive at consensus on the WBS, and the project sponsor(s) must sign off on it.

[7.](#)

A, B

A vendor's bid for equipment won't be on the WBS, but a contractor's detailed SOW tasks will be. You don't want to fall into the trap of detailing every little nut and bolt of a project while formulating your WBS. Make it definitive, yes, but excessively granular, no.

[8.](#)

A

The lack of completion of a predecessor task will prevent the next (successor) task from beginning. Exit criteria indicate when you're moving from task to task; they don't decide or determine whether you do so. Iteration means a step or action is repetitive; being iterative doesn't itself prevent things from moving along.

[9.](#)

B

Small projects aren't generally going to require a milestone, though you can certainly add one. In general, large projects with lots of phases and activities are the ones that require milestones.

[10.](#)

A, D, E

Milestones typically consist of a description, the entry criteria (how you'll recognize the milestone), and the exit criteria (how you'll know when you're leaving the milestone). Usually, milestones aren't associated with predecessors or successors. Milestones are always of zero duration.

[11.](#)

A, C, D

Risk response control is an element of the controlling phase of your project and doesn't require a formal element that's submitted with the finalized project plan. You will include any training, implementation, and support plans that you've created, however.

[12.](#)

C

The project plan starts with a table of contents (TOC).

[13.](#)

D

The Scheduled Tasks section of the project plan contains your WBS. If you've set up your WBS in Microsoft Project, you could print out the task list and include it in your project plan documentation. Note that the project plan is more than the WBS—the plan is a complete report on how you're going to accomplish the deliverables. The WBS is certainly the most important part of a project plan, however.

[14.](#)

C

You utilize the Environmental Issues section of your project plan to discuss these topics.

[15.](#)

A, B, C, D

You likely won't include someone's general administration duties in your WBS, unless those duties directly impact the task that's being considered.

[16.](#)

A

The sticky-note method is very elementary, and it's a great way to sort through all of the elements of your client's deliverables, then key them into your favorite WBS-creation method (whether spreadsheet or PM software).

[17.](#)

A, B, C, D

Any of the listed components might be candidates for iterative treatment—where you have to go back and get new plan approval because you've had to modify the plan, for example, or where you refine the project's design based upon further input.

[18.](#)

A, B, C

All projects, regardless of size, require a WBS. The WBS is the description of what you're going to do, when you're going to do it, who'll work on each task, and how long it's going to take.

[19.](#)

A, B, C

The placement of milestones serves the purpose of getting a radar fix on the amount of money you've spent and the number of hours invested thus far. You can place milestones anywhere in the project, and the ends of activities or phases, or completion of components, are great places to do so. Changing personnel doesn't make any sense in terms of the definition of a milestone. As a general rule, milestones wouldn't be set to trigger the accomplishment of one task and movement into another, though there might be some minor exceptions to this. For example, when you've finished the printing module for your code and you're ready to snap it into the main modules, you might have a milestone that fires.

[20.](#)

D

At least four milestones would be a necessity in such a project. You'll stop to take a look at each module's completion, as well as the server infrastructure when it's done. That being said, however, you may opt for more milestones in places where this seems credible (completion of one software module's complex sub-module, for example).

[21.](#)

D

The sponsor is the one who's able to authorize the expenditure of the resources necessary to create the project's deliverables. As such, the sponsor has the final signing authority for the project plan, even though stakeholders have input into the draft of the plan.

[22.](#)

B, C

The way that communications work, the stakeholders may be saying the same thing, only putting it a different way; or one of them may be confused about the project plan element you're discussing. You should first try to make sure they both understand the issue. If they have a clear-cut difference in opinion, the next thing to do is to make your best decision about who's right and consult the sponsor.

## **Chapter 9: Managing Budgets, Schedules, Estimates, and Communications**

### ***CompTIA Exam Objectives Covered in this Chapter***

- 2.11 Given a project scope, timeline, cost, project team, and dependencies, demonstrate the ability to:
  - Create and manage a high level (top-down) budget based on assumptions / estimates
  - Identify and budget the level, cost, and duration of resources and dependencies (internal and external)
  - Create and manage a detailed bottom-up budget, containing actual / scheduled expenses
  - Identify, implement, and budget all project trade-offs, while understanding the implications and impacts of the trade-offs
  - Install and maintain systems for tracking budgetary expenses against the plan based on the existing enterprise systems
- 2.12 Identify and list the components needed to generate a workable project schedule.
  - Demonstrate the ability to create appropriate project schedules which meet the approved project start and finish dates, given the following information:
    - A detailed list of project deliverables (both interim and finished)
    - A detailed estimate of project tasks
    - A list of activities and phases
    - A detailed estimate of the time and resources required to complete all project tasks
    - Information about the preferences of the project team regarding schedule formats
- 2.18 Recognize and explain the issues that must be considered in creating a project cost estimate (time, effort), including:
  - Project scope
  - Various levels
  - Task requirements
  - Resource skill levels
  - Resource availability
  - Resource expense
  - The need to target elapsed time to reconcile the original budget allocation
- 2.19 Recognize and explain the issues that must be considered in creating a project time estimate, including:
  - Project scope
  - Various levels
  - Task requirements
  - Resource skill levels
  - Resource availability
  - Resource expense

- The need to reconcile with the original elapsed time estimation
- 2.20 Recognize and explain the issues that must be considered in creating an effort estimation (man hours, FTEs), including:
  - Project scope
  - Various levels
  - Task requirements
  - Resource skill levels
  - Resource availability
  - Resource expense
  - The need to reconcile with the original staffing allocation
- 2.21 Given a scenario involving project information, including timing, demonstrate the ability to clearly identify what needs to be communicated during a project, to whom, when, how, (formal, informal), without creating unnecessary turmoil in the project team, in situations such as:
  - Schedule changes
  - Resource loss
  - Personality clashes
  - Budget changes
  - Low morale
  - Organizational changes
  - Project phase completion

Once the project plan is finished, you begin executing it. In the execution stages of a project, a project manager's job changes from developing support documentation that gives structure to the project, to managing the people that create the deliverables and the budget that funds them. Everything in this chapter talks about execution, control, and management.

Your project is ramping up, and things are getting underway. Now you have to go into real PM mode and manage all of the reins that make this creature go. In this chapter, we'll talk about the project's budget, schedules, and estimates, and about maintaining communication as the project goes forward.

In the IPECC world, we'd say that we're fully engaged in the executing and controlling phases. Executing means that we're actually going forward with the project; controlling means that we're managing the way that the project tasks are being done as well as communication, schedules, and other items that fit into the project such as the budget.

## ***Managing the Project Budget***

I said in the [previous chapter](#) that you probably won't be the one managing the budget. By that I meant the actual corporate budget, the one that's capable of transferring funds between cost centers and that requires full-time staff. It's possible that a PMO may have a full-time budget person, but it's not likely that, as a project manager, you'll be expected to interface with the corporate budget.

But when I said "you won't be managing the budget," I did *not* mean that you won't operate a budget tracking mechanism of some kind—one where you keep track of the expenses involved in the project's activities. You *do* need to maintain a budget-like document that reflects the project's expenditures and compares them, as you go, to the cost estimates you've assembled. For ease of conversation, I'll call this document, file, or mechanism the "project budget." Let's talk about some of the elements you'll want to consider when creating this budget.

### **Project Budget Elements**

Keeping a project budget means knowing the difference between a formal budget as kept by the company's finance office and one that's designed to illustrate how much you've spent on any one task.

One common misconception, especially in the IT world, is that accounting is the same as budgeting. That's not true. Accounting is designed for external reporting, whereas budgeting is designed for internal informational needs. Accounting looks back on the money you've spent; budgeting looks ahead. Accounting requires a general overview report; budgeting is geared towards specific content. Accounting history is kept for much longer than budgeting history. Finally, accounting has a lot of software applications available for it, but applications that are designed for budgeting are very few (though the electronic spreadsheet is a very useful tool for budget formulation). [Table 9.1](#) captures these differences.

**Table 9.1: Differences between Accounting and Budgeting**

Feature	Accounting	Budgeting
Reporting nature	External	Internal
Place in time	Yesterday	Tomorrow
Detail of reporting	Overview	Specifics
Length of history kept	Long-term	Recent activities
Availability of tracking applications	Many	Few

Your company's finance office will handle both accounting and budgeting activities and will likely have specialists in both areas (plus auditing). Accounting isn't something the project manager will do, but budgeting (as least at a high level) is. A *bottom-up budget* is a list of money available, matched to expected outgoing expenses, that takes into account the assumptions and cost estimates developed earlier in the project planning process, puts the expenses into categories, and monitors their usage. You build up from the categories to a total. A *top-down budget* takes a preallocated pot of money and requires that you dole it out—that is, you have to figure out how best to fit the expense of your tasks, activities, and phases, and the associated hardware and software, in such a way that you don't spend more than the limit you've been given.

In a top-down budget, you're forced to prognosticate the areas in which you'll need the money and how much (assumptions/estimating). In a bottom-up budget, you have the luxury of doing your estimating and developing of hard cost figures before you tell the sponsor and stakeholders how much the project will cost them. (Once you've done so, it's up to the sponsor and stakeholders to decide whether the project's a go, depending on its cost and what the constraint drivers will be.)

Popular project management software allows you to directly manage your budget within the project plan, but you can also use a simple, separate, spreadsheet. You can get as detailed as you like, but there are some things you should always keep track of. Here's a list of some basic elements you'll want to track in any budget:

**Component or service purchased** For example, note that the thing you purchased was a server, or that the service you obtained was a graphic arts service.

**Budgeted amount** How much did your cost estimate originally lead you to believe you'd need for this item? Perhaps you estimated 100 hours at \$55 per hour for some graphic arts work. Usually, in your cost estimates, you'll have that level of detail item, showing how much each task is going to cost, then sum up the entire amount of money you'll need for a given activity.

**Actual cost incurred** List the actual price you paid for the item or the service. This number will be the same as the dollar amount of the P.O. that your budget folks cut or the actual cost if there's an overrun.

**Purchase order (P.O.) number and amount** Knowing the P.O. details is key to tracking your orders. You will probably not be the one generating the P.O.; your accounting or purchasing office will handle this function but will be able to provide a copy to you for tracking purposes.

**Date paid** Note the date that the item or service was paid for.

**Supplier or vendor** Fill in the vendor or supplier company name and contact information.

**Reason for budget variance** If there's a difference (either under or over) for a budgeted item, explain why.

**Approving authorities** List the person or people who approved the purchase.

Even if you have no accounting background, you need to realize that there's a difference between a capital item and an expense. A capital item is a physical thing that can be depreciated over time (a server, for example). An expense is something that either happens once without a tangible asset (such as the purchase of a software package) or during recurring periods (such as yearly maintenance on software or hardware). You'll need to differentiate between these categories, because they will mean something to the company's financial people. Additionally, it's very important that your budget identify which items represent expenses that occur annually, monthly, or during some other period. Only allocating funds for one-time purchases such as servers won't get you the money you need when it's time to renew the servers' annual support agreement.

Services are another item that financial people need to know about. Whether you hire a contractor to help you with a certain component of the project or utilize some other service, you'll have to indicate the budget item as such.

### **Creating and Managing a Top-Down Budget**

A top-down budget is one in which a fixed pot of money has been given to you for a project and you are expected to dole it out as you see fit. Usually this kind of doling out represents the fact that the company needs to make a particular profit on the implementation of the system and that any more money spent would represent diminished profit opportunity.

You'll have to spend some time figuring out how to appropriately allocate the money given to you, because certain tasks that must happen might have less funding than they should actually have been given. For example, perhaps you have to buy two servers out of your \$100,000 budget, but the servers you really need cost \$20,000 apiece. You find that you cannot afford the servers you need *and* accomplish the other tasks as well, so you have to find ways to cut down on expenses while somehow meeting the goals and objectives of the project. You may, for example, buy a non-Tier One vendor's server instead of the top brand, thus saving money but introducing a little sketchiness regarding the server's capabilities.

So it comes down again to the battle among the three constraints: time, budget, and quality. In a top-down budget, the chief constraint is budget. However, management might make it clear as well that you have to have a set of deliverables in a certain time frame. (Nothing like making it tough on a person, eh?) With such a situation, you intuitively realize that the quality of the deliverable is the thing that's going to suffer. Apart from really well- implemented quality control methods, there's no way you can avoid producing an output of lesser quality than you might've wanted.

With a top-down budget, you would still preface your budgeting process with cost-estimating procedures, but realize that your cost estimates must be tailored to fit a fixed total. You'll accomplish this with assumptions. In other words, the boss comes to you with a project. It's up to you to first of all roughly figure out the requirements, so you have a basic idea of what's required, then assume some things about the project: it will require some development work, new servers, whatever. Next refine the requirements and get the actual cost- and time-estimate figures for the deliverables. [Figure 9.1](#) shows what a very basic top-down budget might look like.

	Capital Items	One-time expenses	Recurring Expenses	Services
1 Top-Down Budget Example (doesn't include detailed budget item descriptions)				
2 Budget funding \$100,000				
3				
4 Servers, 2 @ 10,000 ea	\$20,000.00			
5 GIS software	\$35,000.00			
6 GIS consulting				
7 \$195/hr @ 20 hours				\$2,200.00
8 Annual support maintenance			\$3,900.00	
9 DBA team member 40 hrs @ 95/hr		\$3,800.00		
10 Server NOS software 2 @ 1600/ea		\$3,200.00		
11 Database software 1 @ 13500/ea		\$13,500.00		
12 Server admin 40 hrs @ 75/hr		\$3,000.00		
13 PM 60 hrs @ 85/hr		\$5,100.00		
14	\$55,000.00	\$28,600.00	\$3,900.00	\$2,200.00
15 Total =	\$89,700.00			

**Figure 9.1:** An elementary top-down budget spreadsheet

A top-down budget differs from a bottom-up in that an added step is required: You figure out whether you will meet or exceed the dollar figure given you and try to pare down accordingly so that your estimates match the dollar amount you have. The assumptions you make will help you get a working start in developing the budget.

### Creating and Managing a Bottom-Up Budget

A bottom-up budget, on the other hand, assumes no top starting figure (though I can guarantee you there will be one). Instead, you appropriate your funds to cover each task's requirements, whether capital items, expenses, or services. You use cost-estimating techniques to figure out how much each task you must perform will require. The top-down and bottom-up methods are a bit similar, but with bottom-up you have more leeway because you're not (yet) dealing with a fixed budget figure.

[Figure 9.2](#) shows what a simple bottom-up budget might look like. Bottom-up uses the actual expenses you've already incurred along with the scheduled (or projected) expenses.

Type of Item	Component or Svc	Budgeted Amount	Cost Incurred	PO	Date Paid	Supplier or Vendor	Contact	Budget Variance	Approving Authority
1 Bottom-Up Budget Example (doesn't include detailed budget item descriptions)									
2									
3									
4	Capital Servers - 2	20,000.00	16,384.00	GS15433		Dell	J Smith		B Deas
5	Capital GIS Software	35,000.00	32,480.00	GS1498	10/20	ESPI	D Vance		B Deas
6	Capital NOS SW 2	3,000.00	3,200.00	GS1489		Manacott	J Boscard		B Deas
7	Capital DB SW	35,000.00	31,687.00	GS1524		Oracle	S Sewell		B Deas
8	Service DBA 40 hrs @ 195/hr	7,800.00	7,600.00	CNDT300		ESPI	P Wilbur		S Mead
9	Expense DBA 40 hrs @ 95/hr	3,800.00	3,600.00				S Stuart		S Mead
10	Expense Sr Admin 40 hrs @ 75/hr	3,000.00	3,000.00				P Little		S Mead
11	Expense Proj Mgr 60 hrs @ 85/hr	5,100.00	5,100.00				R Franklin		S Mead
12									
13									
14									
15 Total =		\$114,000.00	\$105,159.00						

**Figure 9.2:** An elementary bottom-up budget spreadsheet

You can see that I've formatted the sheet to show the conventional columns you might track. Note also that without the top-down budgetary constraint, the same project looks very different, at least in terms of cost. In this budget, you have the ability to assess costs a bit more liberally.

[Table 9.2](#) describes the differences between the two budgeting styles.

Feature	Top-Down	Bottom-Up
Unknown dollar amount at budget development time	No	Yes
Requires assuming that some resources will be available	Yes	No

**Table 9.2: Differences between Top-Down and Bottom-Up Budgets**

<b>Feature</b>	<b>Top-Down</b>	<b>Bottom-Up</b>
Requires cost-estimating	Yes (but might involve more “guesstimating” than estimating)	Yes
Must work within dollar figure given	Yes	No
Might have to pare down tasks and activities to meet the budget	Yes, but before development of the budget	Yes, but after the project budget has been approved

**Additional Budgetary Considerations**

When considering the human resources you’ll use, there are some components that you’ll need to think about during your budget process. First of all, a person’s skill level makes a difference in the amount of money budgeted for a task. A senior developer might make (including fringe benefits) \$125 per hour, whereas a junior developer could make \$95 and an entry-level one \$65. So the level of the resource triggers the cost of a resource for a given task. Obviously, the length of time, the duration, that a task will take contributes directly to its human-resource cost. Likewise, the difference between obtaining the resource contractually versus using an inside person will make a tremendous difference in the cost of a task. Senior developers capable of cranking out the kind of code that you’re interested in can be in the \$250–\$450/hr range on a contract basis. The good part is that these kinds of developers usually code *very* fast and can get done more in less time than a less skilled programmer.

You should budget for project trade-offs such as these. Is it worth your while to contract with a junior-to-midlevel programmer who charges \$195/hr and will take 100 hours to write the code, or a senior developer with an impressive resume, one who charges \$300/hr but can do the work in 75 hours? The junior will cost you \$19,500, whereas the senior will cost you \$22,500. All things being equal—that is, when the junior coder finally gets the code written, it’s as good as the senior coder’s, and the extra time won’t hurt the project—the trade-off of skill level is worth the money. Analyzing the impact of such trade-offs is a valuable use of your time as a PM.

In another example, suppose that you know you need an enterprise-class server—one with lots of horsepower: six 1.5 GHz Pentium 4 processors, 12 GB of RAM, dual RAID-array controller cards, and a fault-tolerant data vault with 80 GB of storage. One vendor wants \$59,000 for the computer; the other wants \$50,000. However, the trade-off comes in when you compare the \$500 per year maintenance costs for the former box versus \$3,000 per year for the latter. You don’t have to be Isaac Newton to figure out that there’s more value in purchasing the first computer if you intend to keep it for at least three years.

Finally, keep in mind that your finance and accounting office has a certain way that they like to represent things in their budget spreadsheets. Your budgeting should have the same sort of look and feel that they utilize, for easy transfer from your spreadsheet to theirs. If you have all of your cost centers, for example, in row-wise fashion in your spreadsheet, but the finance folks show the cost centers in column-wise fashion, then

your friendly financiers are going to be not so friendly because they have to go to the work of converting your spreadsheet to their convention. If they weren't tracking 600 other cost centers besides yours, it might be easy to switch to your way of doing things, but with the huge amount of tracking they do, you're better off matching them.

### **Prestige Hotels: The Budget**

Your project team members have gotten back to you with the cost estimates for the various phases and activities. You've summarized the estimated costs using the task list developed in previous chapters. Following are the costs that you've assembled. This isn't a sample document; this is "showing your work" behind the scenes.

#### Grand Total Costs

- Person-hours: \$88,657.50 (includes direct and contract labor)
- Time: 291 hours (includes direct and contract labor)
- Materials: \$26,520.00

#### **Activity 1: Developing VSM graphic**

58 graphic artist hours @ \$125/hr; after the hourly wage is calculated, add 125%, which represents 65% for quality control, 25% for supervisory overhead, 15% for administrative overhead, and 20% for estimate variance.

- Person-hours: \$16,312.50
- Time: 58 hours
- Materials: none

Task 1: Prepare graphics that represent the items that appear on each of the three slot machine's spinners. 8 graphic artist hours

Task 2: Prepare an overall graphic that represents the slot machine. 8 graphic artist hours

Task 3: Prepare a graphic that represents the slot machine's handle in several stages of motion. 4 graphic artist hours

Task 4: Prepare a page-header graphic that represents a montage of all four RLV hotels, including views outside and inside each plus shots of the hotel rooms, casinos, night-clubs, and restaurants. 32 graphic artist hours

Task 5: Prepare a Winner! graphic. 2 graphic artist hours

Task 6: Prepare a Sorry! graphic. 2 graphic artist hours

Task 7: Prepare a graphic that links to qLines airlines. 2 graphic artist hours

#### **Activity 2: Developing underlying code**

120 development hours @ \$145/hr, 24 DBA hours @ \$135/hr, and 16 graphic artist hours @ \$125/hr; plus 125% overhead factor. (Note: Development cost per hour is averaged over junior/senior cost differences.)

- Person-hours: \$50,940.00
- Time: 120 hours development, 24 hours DBA, 16 hours graphic arts
- Materials: \$26,520.00. Consists of database license, \$3,600; ColdFusion license, \$18,500; and 20% overhead figure for shipping, cost increases at shipment time, etc. (Remember that all software resides on the W2U servers, so you don't need to purchase a server,

but you do need to purchase a license for the software that's going to run on it.)

Task 1: Prepare the code that randomly selects three graphics and places them on the screen in the slot machine windows. 16 developer hours

Task 2: Prepare code that determines whether we've selected a winner. 16 developer hours

Task 3: Prepare code that notifies a winner. 8 developer hours

Task 4: Prepare code that notifies a loser. 8 developer hours

Task 5: Prepare code that presents a user response survey, invites the user to respond and become eligible for a drawing, and posts record of information the user filled in to SQL Server database. 16 developer hours, 16 DBA hours

Task 6: Prepare code that switches user to qLines upon clicking qLines graphic. 4 developer hours

Task 7: Prepare code that presents tours of RLV groups' hotel rooms and amenities. 32 developer hours, 16 graphic artist hours, 8 DBA hours

Task 8: Prepare JavaScript code to act as banner ads on other websites. 8 developer hours

Task 9: Document all code. 12 developer hours

### **Activity 3: Preparing ISP website presence**

7 contract hours @ \$250/hr (Renee Duluth is a contractor with W2U); add 20% estimate variance

- Person-hours: \$2,100.00
- Time: 7 hours (all contract)
- Materials: none
- Task 1: Prepare website area on W2U server. 4 contract hours
- Task 2: Validate mirror site settings. 2 contract hours
- Task 3: Document website information (IP addresses, DNS names, etc.). 1 contract hour

### **Activity 4: Testing**

48 development hours @ \$145/hr, 8 user hours @ \$65/hr, plus 125% overhead

- Person-hours: \$16,830.00
- Time: 48 developer hours, 8 user hours
- Materials: none

Task 1: Unit testing. 32 developer hours

Task 2: UAT. 8 user hours

Task 3: System testing. 16 developer hours. (Note: Simulation software already owned by web development team.)

### **Activity 5: Marketing**

10 hours for marketing analyst @ \$110/hr, plus 125% overhead

- Person-hours: \$2,475.00
- Time: 10 hours
- Materials: none

Task 1: Prepare print and media ads for new site. 8 hours

Task 2: Negotiate agreements for placement of web banners. 2 hours

You prepare the following spreadsheet:

	Description	Qty	Cost	Qty	Cost	Qty	Cost	Qty	Cost	Material	Team Member
1	Activity 1										
2	Task 1	Graphics									
3	Task 1	Signage									
4	Task 2	Site machine									
5	Task 3	Handle									
6	Task 4	Workpage									
7	Task 5	Invoice									
8	Task 6	Copy									
9	Task 7	Slides									
10	Task 7	Slides									
11	Task 7	Slides									
12	Task 7	Slides									
13	Task 7	Slides									
14	Task 7	Slides									
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From this spreadsheet, you have the information you need to prepare your project management software with the necessary tasks, activities, phases, durations, and team participants. From the requirements document, you can set your predecessors and successors, which, in this case, are in almost the exact order that you need them in. With the exception of the print and web banner ads, all of the other activities must occur in the order they're numbered.

## Managing the Project Schedule

The project's schedule is the most incredibly important project planning piece you'll create. The schedule is assembled from accurate time estimates that your team members develop for each task. The schedule needs to be religiously followed, if at all possible, in order to arrive at the successful completion of deliverables and closure of the project on or before the planned date.

There are many considerations to think about when developing your schedule. Let's take some time to talk about each by asking, "What are the elements of successful project schedule creation?"

### Project Deliverables

One of the primary inputs from the initiating phase is the creation of your requirements document. This is the most important element of your project plan apart from the schedule itself, because finely honed requirements result in a finely tuned schedule. Recall that the requirements should not change after the scope document has been signed and you've been authorized to proceed. The reason for this is the compounding effects that requirements additions—even small ones—spawn in the schedule. The tiny addition that you make to an already-finalized requirements document could result in a huge delay in a task's schedule.

The project's deliverables need to be defined precisely, with clearly elucidated success metrics. In your schedule you track the deliverables, both the ones that are in progress and the ones that have finished.

## Project Tasks

Your project management software is going to come to your rescue with task creation and assignment. Your job is fourfold:

- As definitively as you can, list each of the tasks, activities, and phases required to produce a deliverable.
- Take the tasks to the people who will be doing them and obtain time estimates. (Remember that you want an average, not excessively detailed predictions, and that you're going to add a quality overhead of some standard percentage.)
- Key the tasks, activities, and phases into your project management software, including the duration that was estimated for each task and the team member who will be actually working on the task.
- Assign predecessor and successor numbers to arrive at the dates in which you should expect a team member to start a given task and when the task should complete.

**Tip** Missing here is the “watch the team members like a hawk” element, where you're paying close attention to the time being spent on the task versus the approach of its completion. This is where your title really comes into play—make sure that the tasks get done, and if they're not, find out why. In army Rangers' vernacular, it's time for “kicking butt and taking names.”

## Detailed Estimates

Another useful document—one that your project management software can also provide for you—is a detailed listing of the time your tasks will take, as well as a list of the resources that will accomplish the tasks. In some PM circles, the time estimate is called the duration. The task, person or persons working on the task, estimated duration, actual duration, estimated task cost, and actual task cost are all simply column headers on a spreadsheet, word processing document, or project management software file.

## Schedule Formats

The Gantt chart can be incredibly useful for you, because it gives you a visual read on how the project's tasks look over time. However, some team members may not wish to view the Gantt chart. Depending on the software that's being used, members can opt to view the chart a different way, or they may be forced to view it the way that you prefer to.

Most important to individual team members will be the tasks they are responsible for, their start dates, finish dates, and duration estimates.

## Estimate-Tracking Basics

I covered this in detail in the [previous chapter](#), talking about the main methods that are used for estimating the cost of your tasks. Now we drill in deeper and talk about the elements you consider when formulating your estimates in three areas:

- Materials
- Time
- Human resources—both the number of *full-time employees (FTEs)* (sometimes called full-time equivalents) needed on a given task and the number of *person-hours* that will be utilized

Good estimates lead to great budgeting, which leads to project closure at or under budget and on or before deadline. We can express these categories in terms of costs. When preparing estimates, you should consider the following elements in each of the

three listed categories. For example, when considering the project's scope, be concerned about the material costs, the costs in terms of time, and the human-resource costs for every task, activity, or phase.

### Get with the Program

Recall that a group of tasks composes an activity, several activities compose a phase, and at least one—if not more—phases compose a project. Several projects that are all associated with a larger effort can be combined together to form what is called a *program*.

In a program, each project has its own project manager or managers who report to a chief project manager, one who's responsible for choreographing all of the projects together so they come in on time. The Colorado T-REX project, the huge I-25 highway widening project mentioned earlier in this book, might fall into the program category; it could have a chief PM aligning the activities of PMs who are controlling specific projects. One PM builds a bridge, another widens a highway for light rail, and yet another handles all right-of-way procurement.

### Project Scope

Projects that suffer from scope creep also suffer budget-wise, because costs for the scope creep aren't considered. (Remember, scope creep is uncontrolled change in the project, such as when a user visits Achmed the programmer to ask him to put "just this one additional feature" into the code.) Add enough scope creep, and costs will careen far away from projections.

**Material costs** Additions to the scope may drive up material costs. For example, you might discover that you need an indexing server to help offload the efforts that your e-commerce server is using—an addition to the scope of the project and a material cost.

**Time costs** Additions to scope result in additional time spent chasing after requirements definitions that don't belong in the project unless they are certified by the change-management process.

**Human-effort costs** Some scope additions seem easy but turn out to require massive thinking and coding efforts, resulting in additional person-hours and perhaps even requiring the intervention of another person.

### Resource Skill Levels and Expense

A senior developer will cost more per hour than a junior developer but will take less time to develop the code.

**Material costs** Material costs include training individuals on new techniques or software.

**Time costs** Consider contracting out difficult elements if you don't have the internal expertise to make it happen.

**Human-effort costs** Junior people who are absolutely positive they can get the task done are a blessing because of their go-get-it-ness, but they can drive tasks down because they "spin their wheels" on things that more senior people have already done.

### Task Requirements

What is required of the people performing the task? Are they inventing a brand new process, or are they doing something that they've done twelve times before? Sometimes a task requires a good bit of systems integration that has not been tried before, so there's a scary "maybe this will work, maybe it won't" aspect to the task. The more

fundamental the task, the less risk incurred and the more likely the task will come in at the cost estimated.

**Material costs** Consider the system requirements when assessing complex tasks. Integrated systems, where you're combining two disparate systems together, might only work if you provide expensive additional middleware.

**Time costs** You'll incur time costs when you have to manage nit-picky nuances of a project requirement—something you hadn't planned on at requirements definition time. Especially watch out for this when considering integrated systems.

**Human-effort costs** Complex tasks may require teams of people who can brainstorm the most efficient way of arriving at the task's timely completion and who can subsequently work together on the task. Testing falls into this category as well—it's rarely done by one person.

### Resource Availability

It's all fine, well, and good that you've invented a really great task. But if there's no one to perform it, then, "Houston, we have a problem." Consider resorting to contractual help for tasks on the critical path or postponing non-mission-critical tasks until later in the hopes that you can get the resources needed to complete them.

**Material costs** It costs you more to overnight, drop-ship a part. It can cost even more when the part won't be available for some time, creating hold-ups in other tasks of your project.

**Time costs** Your time is a resource, and if you're working on more than one project, balancing among multiple projects will cost your project time. Waiting for resources to free up that you need for your project also winds up affecting the time it takes to get the project done.

**Human-effort costs** If everyone on your project team is hard-working, you've got to watch it so that you don't over-drive them, because they'll naturally take on more work than they really should. In a teambuilding sense, it's important to manage your team member's desire to produce a really great product at the expense of their home life.

### Elapsed Time

Here's the hard part: getting team members to somehow keep track of time spent on a project. Today's project management software is so good that team members can enter their time for a specific task, and the software will credit the time entered toward the task's overall time estimate. But getting team members to do this requires dedication on their part and yours. If people aren't keying in their time spent, and keying it accurately, all of your cost- and time-estimating efforts are for naught.

**Material costs** Poor materials tracking results in inaccurate materials- cost reporting, meaning the project might actually be costing more than you think. Licensing costs often end up in this predicament. In your project planning efforts, you took into account licensing for the big enterprise software you're going to use to get a system developed, but you may not have considered the server software license or the client access license costs, both of which can represent a significant amount of money. Some companies get so sticky about materials tracking that they track stationery and other incidentals (when you're acting as a consultant on a project you're performing for another company and billing back materials expenses, for example).

**Time costs** Know how much of the charged time is being spent actually working. Humans who are "cube-hoppers"—those who like to catch up on all the office gossip—are going to hinder the duration characteristics for tasks they've been assigned to, especially if they inaccurately report the time actually spent on the project. The duration of a task, for example, was one day, but cube-hopping took up a half day, so the task winds up getting charged for a one and a half days' worth of time.

**Human-effort costs** Know how accurate your time tracking is. A person who has too much on their plate might be staying very late and spend half his night finishing the day's task. Time reporting is the last thing on his mind at that juncture, and you can expect inaccurate results. A task that you've budgeted at one hour can take two hours if the person responsible winds up working after hours, not only because she's tired and therefore takes longer doing the work but also because her reporting is careless.

## Reconciliation

Reconciliation means that you match up the amount of time, resources, or money actually used with that which was budgeted.

**Material costs** Reconciliation of materials costs means comparing the actual dollar figure that you spent to the estimation for those materials. This is where good estimating literally pays off. If you have not predicted all of the materials items that you'll need, including any add-on components that may be required, you'll underfund your material estimates at budget time. For example, you might've estimated \$10,000 for a task's materials, but the materials reported did not include licensing for the server software, thus erroneously reflecting an \$8,400 cost instead of the actual costs incurred.

**Time costs** The same holds true for the amount of time that you've estimated your people will take on various tasks. When performing duration estimates—that is, the amount of time estimated to complete a given task—the person who'll be doing the work should generally do the estimating. That person knows their working methodology and can give you a much better time estimate than someone who might approach the task in a different way. Reconciling time costs means that you take a look at the amount, in dollars, that a person's hours spent on a task translate to, relative to their salary, compared with the estimates. For example, your team member may have estimated a duration of two days and wound up taking three to get the task completed. Reconciliation indicates a one-day overage of the duration estimate.

**Human-effort costs** Cost-estimating results indicated that you needed one FTE assigned to a task; however, halfway through the task it became apparent that you needed an additional half-FTE.

Keep in mind that not all tasks have a single person involved in them. Tasks may require the participation of several people to get something accomplished. Tasks can be tracked by their material costs, by the amount of time spent doing the task, and by the number of humans needed to finish a task within a specific duration. There is a minor relationship between the duration of a task and the number of human resources applied to it, but you should not talk yourself into thinking that if you throw more bodies at a task, it'll obviously get done sooner. There is no axiom in project management that says this is so, and you'll be guilty of faulty thinking if you allow yourself those thoughts. However, a task may benefit from an additional set of hands for a brief time. That's where the balancing act comes into play and where you rely on your team members doing the cost estimating to tell you how and why.

## Maintaining Clear Communication

Just as a well-defined project scope is the project's heart and soul, effective communication becomes a project manager's best friend, especially at task execution time. A skilled project manager is one who maintains clear, consistent communication with all team members, stakeholders, customers, and sponsors, regardless of whether the news is good, bad, or simply informational. PMs cannot sit in their cubicles and type away at project plans. They must be very involved in what authors Peters and Waterman termed *management by walking around (MBWA)*. And probably the single most important characteristic of solid project management communication entails the very same cube-hopping you don't want your team members to be doing much of—making sure that team members are aware of project happenings.

Let's look a little more at the details you'll want to be communicating during your project's life cycle. Note that some people may need to know about a particular element sooner than others. For example, a scope change must be communicated to the sponsor before anyone else. If the sponsor doesn't approve the change, then there may be no further need to communicate it after all.

### Note

There may be a political aspect affecting to whom you communicate scope change first. What if the customer really wants an addition, and you need to get stakeholders and customers pouncing on the sponsor to make the change? But you didn't read that here.

## **Schedule Changes**

Clearly the most fundamental of communication requirements, you'll always want to notify others of schedule changes. Especially high in the communication pecking order here would be the sponsor, followed closely by the customer(s). At least some of your team members or stakeholders already know about it, because they're probably the ones causing the change.

## **Resource Loss**

Especially disastrous in a project that's underway is the loss of a human resource. Somebody quits or changes jobs within the company, and the next thing you know the entire schedule is thrown off by thirty or sixty days. Assumptions play a big role in resource-allocation decisions; a roll of the dice, if you will, and you may take a turn for the worse if you hadn't adequately accounted for resource losses.

You can also experience losses in non-human resources as well. Suppose, for example, that part of your project's deliverables are predicated on a particular feature of some mainframe software. However, unbeknownst to you, the mainframe managers have upgraded that particular software product, and the feature you were counting on is no longer supported in the new version. Uh-oh! You won't experience as many resource loss problems with non-human resources, but you should not blithely assume these resources will be available, either.

The communication aspect of either of the above changes is highly critical. Team members need to understand what just happened and why. Team members may communicate this information up to you, in which case you, in turn, need to communicate to the stakeholders and sponsor; or you may find out about something and need to communicate downward the information. You're the communications conduit for the project.

## **Personality Clashes**

A particular kind of ego problem crops up from time to time and will doubtless surface in a project or two of yours. It seems to me especially predominant in IT circles. Someone has learned a unique skill in the IT world, and because others cannot rise to his level of expertise, he grows a giant head, becoming snotty and unapproachable. Problem is, you need him on your team—he's someone you cannot do without in order to bring your project to an elegant close with wonderfully crafted deliverables. How do you manage communication in an environment like this? Especially when others desire to learn what this person knows and to attain some personal growth by watching him work.

You manage this kind of thing with teambuilding. Often, a person like this is, in reality, an introvert. People who've risen to the level of excellence very often are hiding behind the arrogance façade because they don't want you to know how fragile the rest of their life might be. Teambuilding efforts, especially those that center around understanding personality types (such as Myers-Briggs and others), can bring out interesting dialog and break a lot of ice among team members.

By going through such exercises, you find out how a person likes to have information delivered, and you can thus make an effort to deliver information in the style he or she prefers. This might sound like you're bending over backward to get information to someone, but I would ask you this: If you deliver information in such a way that it's not correctly understood, and this creates results you hadn't asked for, have you helped yourself? What's your priority, communicating the way you prefer to communicate or getting things done?

## **Budget Changes**

Your project was all set to go. You had all the necessary approvals and signatures. You were formulating your project team and ready to proceed. Then a disaster happened

and, overnight, changed the complexion of your company. Sales fell sharply as people curtailed their discretionary spending, and as a result your company's earnings dropped significantly. Although your project is very high on the priority list—it's a must-have for the company—your CFO tells you the project's budget has to be cut by 30 percent. To whom do you communicate this news?

All players involved need to know about this drastic change: stakeholders, customers, the sponsor, and *especially* vendors. If you're too far into the project process, you may have no choice but to go forward with certain contractual obligations. But all of these people need to help you make the reductions that are possible.

Smaller budget changes need to be communicated to those affected by the change—certainly the team members involved, also the stakeholders involved, and always the sponsor.

### **Low Morale**

Low project morale happens in one of two ways:

- Previous experiences have led team members to believe that this project, like its precursors, won't be allowed to be successful; or
- Team members do not believe in the product this project is going to produce, or don't feel they'll be adequately rewarded for producing it.

Team members, in order to be excited and engaged with a project, need to put their arms around the entire project, to understand what you're doing, how it will benefit them (and the company—though I submit that most team members are only secondarily interested in the betterment of the company), and what they can derive from it. For most team members, it's about them as a person, not necessarily about the project as whole.

Again, communication comes to the fore. It's up to you to figure out how to engage people in the process. Why is Jim in testing so important to the project's successful outcome? How is it that Susie's single contribution to the project—configuration of a new router—is going to so positively affect its outcome? People need to understand that they are important to the project's outcome, no matter how insignificant their contribution, and additionally that they're important to you as people.

Along these lines, sometimes you'll hear people bring up money as their motivation for boosting morale. Although drastically underpaying people compared to industry averages is surely a good way to destroy corporate morale, if a person's salary is roughly commensurate with other companies, their morale isn't tied to salary. Money is an *extrinsic* motivator. Let me use an illustration to try to show you what's meant by that term. Suppose that you really want a certain kind of new car. You save and work hard for it, then one day go down and buy it. After buying it, you really like the car, but before long, as its newness dies off and with it the "gotta have it" syndrome, you find that it's just another car. The car is a motivator for a certain period of time, but then it ceases being a motivator.

Other motivators are *intrinsic* in nature: they persist. People's intrinsic motivators are the things they value over the long term, because of their individual beliefs and personality. The intrinsic desire in a person is the thing you should try to discover and then hone in on, because it is what makes a person tick. Software developers are typically the kind whose intrinsic nature is obvious—they really enjoy putting lines of code together and seeing something come to life on the computer screen... which is why they'll work for hours at a time on a coding project, well after most others have gone home. But what about Abner in the testing lab? Surely sitting there day after day going through a testing procedure over and over again isn't an intrinsic motivator. So what really makes Abner excited, energetic, and engaged? That, reader, is the intrinsic motivator you should work hard to discover in your team members. Heighten those intrinsic motivators, and you've got a pumped team.

## **Organizational Changes**

The dreaded “re-org” that you’ve heard about at the water cooler the last couple of weeks has finally been made official at this morning’s department meeting. You’ll be losing Jenny and Jiangxi—they’re being sent off to greener pastures. What now?

First things first: do some damage control. Get your team together and, if they haven’t already heard the news, get it out in the open. “Jenny and Jiangxi are headed over to the new security department.” Then, just like you’ve done with all the other working facets of your project, seek input from your team members on the best way to proceed. You might be surprised with the suggestions you get.

Next, communicate with the sponsor, who probably already knows, and seek input. Finally, discuss with the customers and stakeholders. Although the project may not necessarily need to come to a halt, you’ll doubtless have to pull back a bit to reorganize the tasks and schedules.

## **Project Phase Completion**

A great teambuilding effort would be to break out the cheese, crackers, and cola, blow up some balloons, and have a two-hour party when a phase has been met. It’s time for a celebration! You’ve successfully gotten to a point in the project where you’ve got one thing down (even if you perhaps have several yet to go). Concentrate on your successes, and for a little while get everyone’s mind off of the work ahead.

Communicate this news informally to your team members and formally to the stakeholders, sponsor, and customers.

## **The Importance of Communication**

If you study great communicators (Winston Churchill and Abraham Lincoln come to mind—you might have your own favorites), you’ll find that their central theme always revolved around the idea that it’s you and me together in this thing and we’re going to succeed. Even in heavy-handed situations where they were really up against a problem, these folks were able to get the message across that they were not going to be deterred and that the work required collective efforts on everyone’s part. Making it “us versus them” instead of “me versus them and you’re just along for the ride” will go a long way in your communicating efforts.

Lastly, don’t forget humor and important people events. People need to laugh and have a time where they get to take a deep breath and relax. No project has such critical importance, for example, that you can’t take half an hour to share some cake and coffee and help celebrate a team member’s birthday. Or send around a funny picture in an e-mail. There’s no need to go to only celebrate with extraordinary expense or to rely solely on fancy teambuilding measures such as a day of roller hockey. Most people simply appreciate the fact that you know they’re a person and that they have a life outside of the project they’re involved with.



## **Prestige Hotels: Communication and Schedule Segments**

You decide that the majority of the work you’ll be doing will involve one-on-one communication. However, since some of the stakeholders are far away, you’ll also set up an intranet site where you can post detail data regarding the progress of the project.

You’ll hold a weekly stakeholder meeting and utilize conference calls for those unable to make the meeting.

You add a detailed schedule to your project plan, captured in the executive summary and stakeholder communications as, “The work will begin no later than 2/28/02 and conclude no later than 7/31/02.”

## **Summary**

This chapter talked about project tracking elements: things such as the budget, schedule, estimates, and communication. I discussed how budgeting is a fundamentally different process than accounting and described the things you’ll keep track of in a project budget: the component, its budgeted amount, the costs incurred, the P.O. information, the supplier or vendor, any budget variances, and the approving authority. We also looked at the difference between a top-down budget—involving a sum of money from which you’re to derive your project and driven chiefly by assumptions and estimates—and bottom-up budgeting, in which you utilize cost estimates to arrive at your final figure.

We touched on the project’s schedule and talked about all the elements that you’ll track when thinking about the schedule: the deliverables, tasks, estimates, and schedule format. There are three fundamental areas in which you might develop cost estimates: in terms of materials, time, or human resources. When figuring how these areas affect the schedule, you discovered they directly affect the scope, resource skill levels, task requirements, resource availability, elapsed time, and reconciliation.

Finally, we discussed a very important project management job function—communication—and to whom you communicate certain things while the project is underway. We covered schedule changes, resource loss, personality clashes, budget changes, low morale, organizational changes, and (always a good thing) project phase completion. All of these elements call for a different communication methodology and require that you report things differently to different groups of people. We also mentioned the importance of teambuilding in solving some communication problems.

## **Exam Essentials**

**Be able to differentiate cost-estimating, budgeting, and accounting.** Understand the elements you’ll budget for and keep track of, such as the components involved in a task, their budgeted amount, the actual costs incurred, the P.O. details, the supplier or vendor, any budget variance, and the approving authority.

**Be able to recognize the differences between a top-down and a bottom-up budget.** Top-down utilizes both assumptions and estimating and involves you being given a pre-limited amount of money with which you can develop your project. The leading constraint is the money. Bottom-up budgeting doesn’t necessarily recognize money as the leading constraint (though it may well be) and allows you the luxury of developing tasks according to your best predictions, then getting the money required after the cost-estimating function is done.

**Understand that estimates include materials, time, and human effort and that various estimating components are affected by these areas.** The project’s scope, resource skill levels, resource availability, task requirements, elapsed time, and reconciliation are all affected by different estimations revolving around these three things.

**Recognize that good communication plays a very important role in successful project completion.** Understand that schedule changes, resource losses, personality clashes, low morale, budget changes, organizational changes, and project phase completions are all areas in which you’ll communicate with one party or another. The way in which you communicate will have great bearing on whether and how the news is heard.

## Key Terms

This chapter introduced the following new terms:

bottom-up budget	management by walking around (MBWA)
extrinsic	person-hours
full-time employee (FTE)	program
intrinsic	top-down budget

## Review Questions

1. Which of these problems runs the highest risk of requiring a scope change?  
A. Large budget change  
B. Personality clash  
C. Low morale  
D. Schedule change
2. What are the three categories of estimates that you'll make when considering any portion of your project's budget and scheduling?  
A. Human effort  
B. Quality control factor  
C. Time  
D. Materials  
E. Administrative and supervisory overhead
3. You're the project manager for a large software manufacturing company. Your latest project involves developing CD/DVD writing software for CD burners that are connected to Windows XP computers. You're given \$135,000 to work with for this project. What kind of budget will you prepare?  
A. Bottom-up  
B. Cost-estimating  
C. Top-down  
D. Time-estimating
4. In figuring out your time estimates for a given project, in what order should you perform your time-estimating procedures? Drag the boxes in the exhibit to their correct order.

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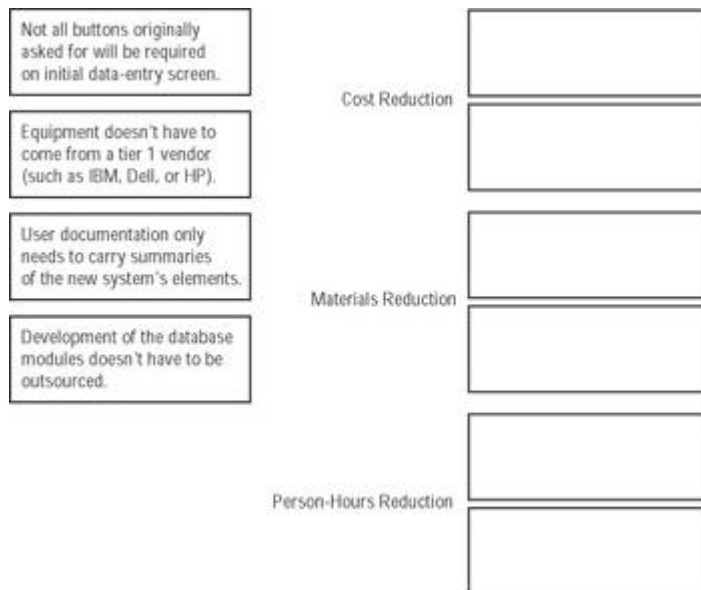
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Project	1.	<input type="text"/>
Task	2.	<input type="text"/>
Phase	3.	<input type="text"/>
Activity	4.	<input type="text"/>

5. Who should be the first to know when a project loses an important resource? ?
- A. Team members
  - B. Project sponsor
  - C. Stakeholders
  - D. Customers
  - E. Vendors
6. In your efforts to develop a project schedule that fits in with the approved start and finish dates, which of these elements will you need to take into consideration? (Select all that apply.) ?
- A. A list of project deliverables
  - B. Detailed estimates of the tasks
  - C. Opinion of relevant management
  - D. An estimate of the time and resources needed to complete the tasks
  - E. A list of project stakeholders
7. Which schedule format shows the duration of a task on a calendar, along with predecessors, successors, and milestones? ?
- A. PERT
  - B. Bottom-up
  - C. Gantt
  - D. Top-down
  - E. GERTT
8. When considering a bottom-up budget, what will you use to determine your project's expenses? (Select all that apply.) ?
- A. Fixed budget maximum
  - B. Cost estimates
  - C. Time estimates
  - D. Vendors' statement of work (SOW)
  - E. Assumptions
9. In what ways is accounting different from budgeting? (Select all that apply.) ?
- A. Accounting uses internal reporting, budgeting external.
  - B. Accounting has a generalized overview; budgeting utilizes specific content.

- C. Accounting looks at recent activities, budgeting long-term.
- D. Accounting discusses yesterday; budgeting speaks of tomorrow.
10. You've recently acquired \$20,000 worth of hardware from a server vendor for an activity in your project. Where are these expenses recorded? (Select all that apply.) ?
- A. Cost-estimates
  - B. Project budget
  - C. Corporate budget
  - D. Statement of work
11. You've recently acquired \$20,000 worth of hardware from a server vendor for an activity in your project. What kind of purchase is this? ?
- A. Capital
  - B. Expense
  - C. Amortized
  - D. Cost-estimated
12. What's the best way to handle a personality clash between two team members? (Select all that apply.) ?
- A. Teambuilding
  - B. One-on-one communication
  - C. Working through the problem with the whole group
  - D. Asking the sponsor to intervene
13. One of the more important estimating steps that you'll perform regularly on the budget as you move through the project is this. ?
- A. Schedule confirmation
  - B. Duration corrections
  - C. Reconciliation
  - D. Task step analysis
14. Insert the trade-off items shown into the correct box to indicate whether they're reductions in cost, materials, or person-hours. ?



15. When presented with a project that will utilize a top-down budget, which constraint will you most likely be forced to compromise? ?
- Time
  - Budget
  - Quality
  - Schedule
16. Select those items that are important inputs to a project schedule. Assume a bottom-up budget. (Select all that apply.) ?
- Tasks, activities, phases
  - Task durations
  - Project budget
  - Team members assigned to tasks
17. The budget analyst for your company has informed you that she needs you to accurately track your expenses while working through your project. Your accounting system breaks expenses down into cost-center categories. What information will she be looking for? (Select all that apply.) ?
- Cost centers under which various tasks were performed
  - Hours worked by each employee
  - Date equipment was purchased
  - Equipment cost
18. Of these communication situations, which would be best suited to teambuilding efforts? (Select all that apply.) ?
- Schedule changes
  - Resource loss
  - Personality clashes
  - Budget changes
  - Low morale
  - Organizational changes

19. G. Project phase completion  
Of these communication situations, which would you immediately communicate to the project sponsor? (Select all that apply.)
- A. Schedule changes
  - B. Resource loss
  - C. Personality clashes
  - D. Budget changes
  - E. Low morale
  - F. Organizational changes

?

20. G. Project phase completion  
You're working on the task and activity list for an upcoming project. You have two choices for a given task: a senior person whose cost is \$125/hr and a junior person whose rate is \$85/hr. The task is going to take 100 hours if you use the junior person, but only 80 if you use the senior person. Considering that the quality outcome will be the same regardless of whom you opt to put on the task, which should you choose? Both people are available for the project as you require them to be. This task is not on the critical path.
- A. Use the junior person
  - B. Use the senior person
  - C. Either will be fine
  - D. Not enough information to tell

?

### Answers

1.

A

Because the budget drives a project's activities, it's likely that a large budget change have the biggest effect on the project's scope.

2.

A, C, D

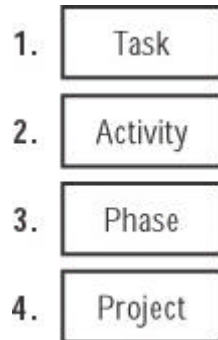
When considering a project's schedule and budget, you'll take into account materials cost, the time (duration) that a task will take to complete, and the number of person-hours (days, weeks, months, etc.) that will be required to complete the task. While you do calculate in an overhead for administrative, supervisory, and quality control purposes, you typically calculate this after you've gotten your estimates.

3.

C

A top-down budget basically assigns you a pot of money with which you're to coordinate your project's activities. You'll work from assumptions (such as, that the software needs to run on Windows XP) and cost estimates. You're budgeting toward not exceeding the amount of money you've been given.

[4.](#)



You almost always use a bottom-up approach to time- or cost- estimating. Start by figuring out the duration of the tasks you have to accomplish for a given activity. Add the duration of these tasks together to reflect the duration of an activity. Add your activities together to make up a phase. Phases make up a project. You won't see it on the test, but you also should remember that several projects rolled together make up a program.

[5.](#)

B

Your team needs to hear about this as soon as possible as well, but the sponsor should be the first to know about an important resource that you've lost in some way. The sponsor, brainstorming with you, will have to make decisions regarding the flow of the project due to the loss.

[6.](#)

A, B, D

The above items are necessary, as well as a list of activities and phases and the team's preferred schedule format.

[7.](#)

C

A Gantt chart shows a task (usually without the task's name) on a horizontal calendar. Dependencies (predecessors and successors) are shown as well as milestones. Gantt charts are useful for providing a visual image of how long each task is.

[8.](#)

B, C, E

Utilize cost- and time-estimating procedures to determine a project's cost estimates. A SOW outlines the work that a company intends to perform for you, but doesn't show any costs; you'll use the company's bid for the cost estimating. Assumptions and a fixed limit are used in top-down budgeting.

[9.](#)

B, D

If you *reverse* the definitions in the first and third options, all four would be correct answers.

[10.](#)

B, C

When you cost-estimate server hardware, you're not yet *expensing* that hardware, you're merely noting what you need and its estimated cost. When you acquire the hardware, you'll record the acquisition in your project budget and the accounting folks will record it in their corporate budget.

[11.](#)

A

A physical purchase—something that's tangible and is going to last awhile—represents a capital item. The corporate

accountants can depreciate stuff like server hardware (usually over a period of three years).

12.

B

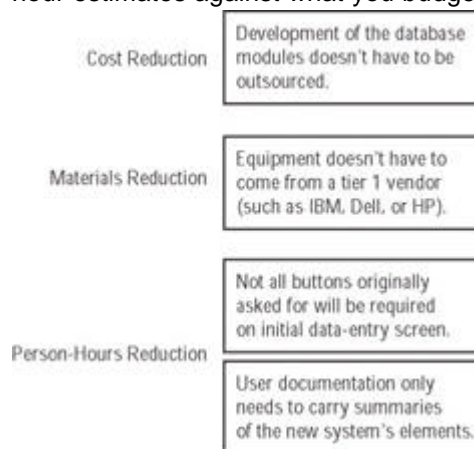
Usually the best approach is to meet with the two individuals and try to get to the bottom of the issues. You have to be a pretty good communicator yourself to get at the nitty-gritty of what's bugging two people, but it can be done. Temper this with the next-best option, teambuilding exercises that attempt to help people communicate to various personality types.

13.

C

Reconciliation is the acting of examining what you did and comparing it to what was expected in order to find out whether you're near where you should be. During project execution, you'll regularly reconcile cost, time, and person-hour estimates against what you budgeted.

14.



Trade-offs in a project's tasks affect some element of the project's budget, whether it's in terms of a cost that would've otherwise been incurred, materials that would've had to be purchased, or person-hours that would have been given to a task.

15.

C

Being presented with a top-down budget means that you're dealing with a single pot of money that you'll have to apportion to all elements of the project. Because of that, you'll likely shorten the time that you have to accomplish a given task, which will most likely result in a drop in overall quality. The phrase "time is money" is true in project management, because it costs you person-hours to pay people to accomplish tasks. Since your money is limited, you have to tightly control costs and thus the amount of time allocated to accomplish tasks is shortened. The TQB slider indicates that quality has to diminish under such circumstances.

16.

A, B, D

A bottom-up project budget won't drive the schedule. (A top-down budget might have more of an impact on the project's schedule, due to the fact that tasks are driven by the amount of money you have to complete them.) The schedule will be predominantly driven by the project's tasks, the team members working on those tasks, and the task

durations.

17.

C, D

Unless you work in a very small office, the hours an employee worked aren't usually kept by the budgeting analysts, they're kept by the payroll accountants—two different groups of people. Budget analysts are interested in the date a piece of equipment was purchased and its cost. The reason they're interested in the date has to do with figuring out how long they can depreciate it. The cost of the equipment is considered a capital expense and will probably come out of a different budget (a capital budget).

18.

C, E, F

Personality clashes and low morale can be urgent situations, but not necessarily of the type that require outside intervention. Your teambuilding skills would be useful in solving problems in these areas.

19.

A, B

Probably, the project sponsor will communicate to you any budget or organizational changes. Project phase completion isn't something you immediately need to communicate. Personality clashes and low morale should first be treated with teambuilding efforts before escalating any further.

20.

A

The junior person's time will cost \$8,500, whereas the senior person will cost \$10,000. If the quality outcome will be the same, then your budget is better off for using the junior person. If the task were on the critical path, then you'd have to consider the hours involved. By pushing a task out 20 hours (junior's 100 to senior's 80), you could adversely impact other tasks' finish times.

## Chapter 10: **Controlling the Project**

### **CompTIA Exam Objectives Covered in this Chapter**

- 3.1 Identify the following as tasks that should be accomplished on a weekly basis in the course of tracking an “up and running” project.
  - Explain the rationale for performing these tasks and explain how to adapt these tasks to different situations:
    - Check the project's scope status to determine “in scope” versus “out of scope” status of project elements
    - Check the evolution and status of project deliverables
    - Check the project schedule
    - Analyze variances (deviations from plan) by comparing “estimated” to “actual” resource time expenditures, dollar expenditures, and elapsed duration of activities
    - Handle scope changes, if needed
    - List, track, and try to resolve open issues
    - Report project status
    - Look for opportunities to and “push” for close-out of activities and sign-off of deliverables

- Decide whether it's necessary to kill the project, then do so if appropriate
- 3.2 Given an approved project and a significant budget increase in one area of the project (for example: excessive overtime, purchased items more expensive than anticipated, etc.), do the following:
  - Clearly identify the reason for and the size of the increase
  - Identify options for absorbing part of all of the increase in the overall budget (if any)
  - Identify stakeholders that must be notified or give approval and develop a plan for advising them of the change, the rationale for the change, and the consequences if not approved
- 3.3 Given a scenario in which a vendor requests a two-week delay in delivering its product, explain how to do the following:
  - Negotiate a lesser delay by identifying things the vendor might do to improve its schedule
  - Clearly identify the impact of the negotiated delivery on the project scope
  - Present this impact to the appropriate stakeholders
- 3.4 Given a scenario in which there is a disagreement between a vendor and your project team, identify methods for resolving the problem.
- 3.5 Identify issues to consider when trying to rebuild active project support from a wavering executive (e.g., the need to identify the source of doubts, interpersonal communications skills that might be employed, the need to act without creating negative impact, the need to identify and utilize various allies and influences, etc.). Given a scenario involving a wavering executive, choose an appropriate course of action.
- 3.6 Identify issues to consider when trying to get approval of a changed project plan that is still within expected budget, but has a schedule that extends outside of the original scope (e.g., the need to know and understand the proposed changes, the need to be able to justify and sell the changes, the need for alternative courses of action if the plan isn't accepted, etc.)
  - Given a scenario involving a new project with an extended schedule, choose an appropriate course of action.
- 3.7 Define and explain the function of the following financial management variables: the cost performance index (CPI), schedule performance (SPI), cost variance (CV), schedule variance (SV), percent spent, percent complete, and the to-complete performance index (TCPI).
  - Explain how to track the financial performance of a project, given the financial management baseline for a project, using these variables.

What are the five most dangerous jobs on earth? If you said snake handler, coal miner, river raft guide, electricity lineman, and project manager, you'd at least have gotten one of the five correct. Project management is all about controlling the issues that come up during the project and managing them without someone killing you or you killing someone in the process. This chapter talks about issue tracking and all the things associated with it—things like schedule and budget overruns, project delays, vendor disagreements, and waffling project sponsors. We'll also touch on the "rocket science" portion of project management: financial variables.

**Note**

If we were using the PACE methodology, we would now be in the controlling phase. In the IPECC methodology, we would now be toggling back and forth between the executing and controlling phases.

## ***Tracking an Active Project***

In the course of tracking an active project, there are certain tasks the project manager must take into account on a weekly basis:

Tracking the project's budget

- Tracking the project's scope status
- Tracking the evolution and status of project deliverables
- Tracking the project schedule
- Analyzing variances (deviations from plan)
- Managing valid scope changes
- Resolving open issues
- Reporting project status
- Promoting close-out activities and sign-off of deliverables
- Deciding whether to kill the project

### **Tracking Scope Status**

We begin with the status of the project's scope. As the project moves along its course, the project manager should be periodically examining whether the things the team members are working on are within the scope or if some things are out of scope. With items that are out of scope, you have one of two choices: You can go through the whole change-management and scope-modification process, where you officially recognize that the additions to the scope are valid; or you can stop your folks from working on things that aren't relevant to the scope. It is fully up to the PM to make the call and to correct people who are working on out-of-scope tasks.

If you don't routinely monitor the project's scope, inevitably one or many of your project team members are going to get sidetracked on things that aren't relevant to the project, whether because of an informal request of a customer or because they mistakenly think they're working within scope. When someone does get sidetracked, the project will probably miss a deadline.

### **Tracking Project Deliverables**

You must also keep tight rein on the development of the project deliverables. While team members are working on various facets of these, you must be right there so that you know the status of the deliverables—things like when something has gone wrong, when things are going really right, and when someone may need a hand getting a deliverable out the door. You know exactly what the deliverables *are*, because you were the one who worked feverishly on a highly refined requirements document that completely stipulated how you'll produce the deliverables. Along with that, you also provide a task list describing how you'd fulfill the requirements, hence building the deliverable.

Now you must abide by the task list and its associated schedule, because if you do, this will ultimately result in the deliverables the customer originally desired. You must keep your eye on the decomposition process, making sure that you correctly broke the deliverables into requirements and then into tasks and that you're fulfilling those tasks.

### **Tracking Project Schedule**

The project's schedule is also something that you'll watch like a hawk. There are several areas where the schedule can drive off into the weeds:

Team member is slow in completing his assigned tasks.

- Team member takes on work he shouldn't, thus enlarging scope and getting him off schedule.
- Team member has an illness or catastrophic event that takes his time away from the project.

- Team member falls in love with another team member and spends his time sending romantic e-mails instead of concentrating on project. (Think this doesn't happen?)
- Team member is on the team but doesn't want to be (or has similar ax to grind)—spends his time figuring out how to derail the project.
- Team member doesn't feel like he fits in with the rest of the team.
- Team member's duties have not been specifically defined; he winds up wandering.
- Team member doesn't have the skill set you thought he had—cannot meet the task deadlines, might not be able to complete the task.
- Team member is a “cube-hopper” (also known as a “gopher”) who spends more time catching up on the office gossip than he does at his desk knocking out the project's tasks.
- Team member is jealous of you—thinks he should've had the job. Hey, he passed the IT Project+ test too, didn't he?
- Vendors fail to produce goods or services on time.
- Technical snafus enlarge the project's scope (code presents an unforeseen problem, etc.).
- An integrated-systems component fights you more than you had anticipated.
- External forces, such as a change in company strategy, drive down the priority of the project.

You get the idea. Anything that could hinder the team or the project's efforts will likely result in an increase in the project's schedule. Now, if you were smart, you built a little leeway time into the schedule. However, too much leeway and your project will wind up well beyond schedule, and you'll be “called on the carpet” to find out why.

### Analyzing Variances

The idea behind variance analysis is a good one and something that you can easily calculate with today's project management software. As you go through your time- and cost-estimating efforts, you key in the costs associated with a given task. Then, when you actually incur the costs, you either key in the time spent or the cost of the procured item, and the variance is calculated for you. If you're creating a cheap project plan using ordinary spreadsheet software, it may require a little more work to set this up, but it's just as effective. To get your variance, you compare the actual to the estimated and figure out what percentage you lag or that you're ahead.

One variance that is often overlooked is the amount of time that you use a non-human resource for a task. For example, you might estimate that you'll use some load simulation software to test a website for eight hours. Since the software was purchased as an enterprise product and others need to book time on it as well, your estimate of how long your project is going to need to use this software may impact other projects. [Figure 10.1](#) shows a Microsoft Project 2000 sample project's Cost table. You can easily move from view to view by simply right-clicking the top-left corner of the project's spreadsheet screen and selecting the view you'd like to look at. [Figure 10.2](#) shows this toggle mechanism.

**Tip** The hours variance in a Microsoft Project worksheet is viewed by selecting the Variance table.

Task Name	Fixed Cost	Fixed Cost Account	Total Cost	Resource	Value
1 Orderwire 1	\$0.00	Fixed cost	\$1,320.00	\$0.00	\$1,320.00
2 Orderwire 1.1	\$0.00	Fixed cost	\$4,270.00	\$0.00	\$4,270.00
3 Orderwire 1.1.1	\$0.00	Fixed cost	\$4,270.00	\$0.00	\$4,270.00
4 Task 1.1.1.1	\$274.00	Resource	\$274.00	\$300.00	-\$26.00
5 Task 1.1.1.2	\$1,511.00	Resource	\$1,511.00	\$1,200.00	\$311.00
6 Task 1.1.1.3	\$485.00	Resource	\$485.00	\$400.00	\$85.00
7 Orderwire 1.1.2	\$0.00	Fixed cost	\$4,490.00	\$0.00	\$4,490.00
8 Task 1.1.2.1	\$1,126.00	Resource	\$1,126.00	\$1,200.00	-\$74.00
9 Task 1.1.2.2	\$370.00	Resource	\$370.00	\$300.00	\$70.00
10 Task 1.1.2.3	\$1,210.00	Resource	\$1,210.00	\$1,200.00	\$10.00
11 Orderwire 1.2	\$0.00	Fixed cost	\$4,942.00	\$0.00	\$4,942.00
12 Orderwire 1.2.1	\$0.00	Fixed cost	\$4,942.00	\$0.00	\$4,942.00
13 Task 1.2.1.1	\$690.00	Resource	\$690.00	\$600.00	\$90.00
14 Task 1.2.1.2	\$1,249.00	Resource	\$1,249.00	\$1,200.00	\$49.00
15 Task 1.2.1.3	\$790.00	Resource	\$790.00	\$700.00	\$90.00
16 Orderwire 1.2.2	\$0.00	Fixed cost	\$4,370.00	\$0.00	\$4,370.00
17 Task 1.2.2.1	\$1,410.00	Resource	\$1,410.00	\$1,400.00	\$10.00
18 Task 1.2.2.2	\$130.00	Resource	\$130.00	\$120.00	\$10.00
19 Task 1.2.2.3	\$1,250.00	Resource	\$1,250.00	\$1,200.00	\$50.00
20 Orderwire 2, etc.	\$0.00	Resource	\$0.00	\$0.00	\$0.00

Figure 10.1: Some sample fixed costs keyed into a Microsoft Project worksheet

Task Name	Fixed Cost	Fixed Cost Account	Total Cost	Resource	Value
1 Callahan Project	\$0.00	Fixed cost	\$11,894.00	\$0.00	\$11,894.00
2 Call	\$0.00	Fixed cost	\$2,228.00	\$0.00	\$2,228.00
3 Entry	\$0.00	Fixed cost	\$2,228.00	\$0.00	\$2,228.00
4 Bank	\$174.00	Resource	\$174.00	\$100.00	\$74.00
5 Schedule	\$7,211.00	Resource	\$7,211.00	\$8,200.00	-\$989.00
6 Runway	\$970.00	Resource	\$970.00	\$900.00	\$70.00
7 Safety	\$0.00	Fixed cost	\$6,400.00	\$0.00	\$6,400.00
8 Alarm	\$7,730.00	Resource	\$7,730.00	\$8,200.00	-\$470.00
9 Delivery	\$670.00	Resource	\$670.00	\$600.00	\$70.00
10 Work	\$1,700.00	Resource	\$1,700.00	\$1,200.00	\$500.00
11 Drive Sub	\$0.00	Fixed cost	\$2,754.00	\$0.00	\$2,754.00
12 Drive Sub 1.1	\$0.00	Resource	\$2,754.00	\$2,000.00	\$754.00
13 Drive 1.2.1.2	\$1,240.00	Resource	\$1,240.00	\$1,200.00	\$40.00
14 Drive 1.2.1.3	\$970.00	Resource	\$970.00	\$700.00	\$270.00
15 Orderwire 1.2.2	\$0.00	Fixed cost	\$3,322.00	\$0.00	\$3,322.00
16 Task 1.2.2.1	\$1,400.00	Resource	\$1,400.00	\$1,400.00	\$0.00
17 Task 1.2.2.2	\$530.00	Resource	\$530.00	\$500.00	\$30.00
18 Task 1.2.2.3	\$1,250.00	Resource	\$1,250.00	\$1,200.00	\$50.00
19 Orderwire 2, etc.	\$0.00	Resource	\$0.00	\$0.00	\$0.00

Figure 10.2: Toggling between table views in Microsoft Project

### Managing Valid Scope Changes

If a scope change is considered and the change is valid, then one of your tasks is to manage the change. A good change-management policy that's already in place will assist you in implementing the change. For example, a change-management policy might dictate that a proposed scope change should be brought before a steering committee prior to implementing it. That way you could talk about the proposed change with stakeholders, analyze the risks associated with it, and obtain buy-in from the group prior to moving forward with the change.

It might turn out that if someone wants a change and they find that they have to go through a rigorous process—one that requires a couple of weeks to grind through—the change may not be that important after all. Not that your job is to nix changes, but the change has to be important enough to potentially add time and cost to the original projections.

Once a change has been validated, then you have to revisit the project plan, perhaps bring additional people on board, get permission to expend additional resources and, most importantly, obtain approval from the project sponsor to integrate the change. In larger projects, you go through a scope-document revision process: when scope changes are made and the document is updated, you have the new working doc for official sign-off in addition to its earlier versions.

**Tip** Portal software lends itself well to document version control for processes such as this scope document change scenario.

### Resolving Open Issues

Open issue abatement is another task the PM will be involved in as the project rolls forward. If you set up a project intranet site, you can provide a place where open issues are posted for the PM to see and to respond to.

Open issue creation, notification, and response can be as formal as you deem the project to require. In a large project with many things firing off at once, it's very wise to set up a formal issue-notification process that does the following:

- Requires people to follow a stated methodology for filing an issue
- Supplies a reasonable time period for the issue to be resolved

- Provides for categorization of issues (for example, A means a hot issue, B warm, and C something that can wait)
- Requires acknowledgment by the PM
- Provides a method whereby the person(s) opening the issue can be given a response

On the other hand, a smaller project could easily get by with an e-mail system or some other informal open issue–notification methodology. In either case, there needs to be some way that the person opening the issue knows that you’re aware of it and are working on it. You can’t leave customers or stakeholders hanging with an open issue that you’re not going to take the time to address.

Some issues are non-issues—they only represent grouching by someone who doesn’t like the way a project is going. It’s not wise to simply put the issue “on ignore” just because you recognize it as such. You need to use official PM language that says something like, “During our project requirements definition period, this issue was brought up, and we decided that it’s not necessary to deal with it at this time.” This or some other suitable response lets an issue opener know that you’ve at least acknowledged the issue, even though you’re not going to deal with it.

Some issues are potential project killers, which is one reason that you may want to invent an issue importance scale by which people opening new issues can pinpoint what they think is the level of importance of a given issue. Crisis issues need to be immediately taken to the project sponsor and probably to an emergency stakeholder meeting.

The routine opening and closing of normal, workaday issues will require the person working on the area of concern to address them. It is up to the PM, however, to make sure that the team member handling the issue is aware of it and that she is addressing it in a timely way. You should decide how much personal time prioritization to allow a team member to utilize in such cases. For example, someone opens an issue and you pass it to Jenny, who’s the team member working on the area in which the issue applies. Jenny doesn’t do anything with the issue and keeps plugging ahead on her tasks. You know this because you don’t see any acknowledgment of or attention paid to the problem. You approach her and ask her about it. “Oh,” she says, “it’s on my list, but I wanted to get this task knocked out first. I just can’t concentrate on two things like that at once!” It’s up to the PM to set the priority at this point. If the issue’s hot, then Jenny needs to stop work on her current task and attend to the issue, resuming after she’s certain that the issue can be closed.

### **Reporting Project Status**

You must report the status of the project’s activities to a variety of players. Setting up a stakeholder’s committee meeting is a good idea, because you can set forth the project’s progress to all attendees in one swoop rather than chasing down each person one by one. You should also plan on reporting your progress back to the customer on a weekly basis as well. Additionally, semiweekly or daily sponsor briefings would be a good idea.

**Note** As with all project management, it’s possible your company has already detailed all of these best practices for use in any project the company undertakes.

An intranet or portal site is a marvelous way of imparting routine project updates without having to get a bunch of people together in a room.

### **Stepping Up Activities and Sign-Off of Deliverables**

You certainly don’t want to deliver a shoddy product, but where possible you should be actively looking for ways that you can close out an activity or sign off on one of a project’s deliverables. Sometimes things can be hurried along in this regard:

- In the world of PM, to make the effort of hurrying up the creation of a deliverable is called a *push*.

- When you decide to concentrate a lot of people on a specific area of the project so as to bring a deliverable in more quickly than originally projected, we say you're about to *crash the project*.

A famous PM axiom serves as a caveat to the “crash” idea: Getting three pregnant women together doesn't mean a baby will be born in three months. In other words, you shouldn't talk yourself into thinking that you can get an activity done faster by simply throwing people at it. Some things take as long as they take, and that's that; others just can't be done by more than one person at a time. However, some activities can indeed benefit from this type of “crash,” and you can produce a deliverable more quickly than first anticipated by crashing the project.

### **Deciding When to Kill the Project**

“I will kill da wabbit!”—Elmer Fudd

Some projects are so poorly thought out, so ill-conceived (sometimes the major players are so full of themselves), that the project is destined for failure, regardless of what you do. Let's face it, you're only one individual, there are only so many hours in a day, and sometimes your best isn't good enough.

I've been unfortunate enough to have been involved in two of these kinds of projects (not as a PM, but as a team member). The environment brings everyone down; motivation and esprit de corps fade away; the project grinds slowly to a halt. You somehow know that you're on a bicycle going nowhere, but you try to keep peddling. Until one day the big cheese steps into the room, fires the contractors, and hands out reassignment sheets to the permanent employees. “I was wrong,” he says. “One point two million dollars' wrong.”

If you're the project manager, you are in the best position to recommend when to kill a project. You're also in the most difficult position, because if you decide to sound the bell too soon, you'll be known as the person who cried “Wolf!” If you warn leadership that chooses to ignore you, then you're forced to manage a project you know is destined for failure. It's very tough to rally yourself, let alone your troops, when you're in such a position. If you choose not to raise the possibility of killing and the sponsor pulls the plug, then you look like you didn't know what you were doing. Worst of all, if you don't say anything and the company keeps throwing buckets of money at a project designed to build a whale, you might wind up delivering a guppy.

It's up to you to decide to pull the plug on the project. When a sponsor says that you must do so, your decision is easy. But how do *you* decide when it isn't so easy to see what call you should make? You have to use your common sense, your business acumen, and the variance numbers to tell you when a project has become unworkable. The variances might be your first clue that things are terribly awry. But it's also important to gauge the business worthiness of what you're trying to do. If your technicians are coming to you and telling you that they're having a hard time with this or that, and if they do this frequently enough on the same issue—extending the duration of the issue further and further out—that's your clue that you've got something unworkable in progress. Your deliverable is probably something experimental that needs to be solved in a research and development lab and not in this project, and you need to make the call to the sponsor.

Integrated systems are famous for this kind of problem. Typically, the integrated-systems problem arises when you already have a system in house that works fine for some business element. Management asks, “Why can't we couple some new software with our present system, thus solving the current business problem?” It's not the business idea of coupling two systems that creates a problem; it's the actual coupling of those two systems that generates substantial technical hurdles—the integrated systems aspect of the idea. Unfortunately, business people don't understand the difficulty that integrated systems create (and lots of times, neither do PMs—especially nontechnical PMs), so you wind up in the middle of a project trying to make two (or more) systems talk to each other that really don't want to do so. In the middle of an expensive project, managers don't buy

the excuse that “we can’t do it because it’s technically impossible, or very difficult,” so you’re simply told to figure it out.

This is a very tough problem for the PM, because she has to be a truth-teller, often in the face of managerial adversity—not a good position to be in. This is, I postulate, why PMs very often simply keep going down the project road and allow the project to die naturally. Unfortunately, this could be the kiss of death for a PM’s career, and even (as I’ve personally observed) for the sponsor’s.

**Note** Extensible Markup Language (XML) might be the godsend for the integrated-systems problem. Using XML, a database can stay where it’s at, on the platform it likes to live on. You then use application servers, such as Microsoft’s BizTalk or WebLogic’s WebLogic, to grab data out of the database and format it in XML so that it can be viewed by an ordinary browser. Using standardized protocols such as XML and Simple Object Access Protocol (SOAP), you may find that you can extract data from disparate sources and easily present them on a single browser page, eliminating the need for technicians to grapple with tremendously time-consuming and difficult integrated-systems components.

### **Real World Scenario: “Crashing” the Windows 2000 Project**

Back in January 2001, we started looking into a migration to a Windows 2000 network. When I say “we,” that’s a complex pronoun standing for eight to ten different administrative groups, each handling anywhere from

300 to 2,000 computers. All were independently responsible for their lines of business, but some spanned across lines of support. Others provided e-mailboxes but didn’t maintain the user accounts. And some even had big collections of Novell NetWare servers, which limit the Windows 2000 Active Directory arena tremendously. It was a terrific nightmare.

Well, we started out great guns. We formed a technical working group of technicians from admin areas that were interested in going forward with Windows 2000 Server. We came up with a lot of good initiatives: enterprise administrators who are strictly responsible for the root servers, strict limits on where organizational units could join the Windows 2000 forest, separate roots for test and production (“prod”), and so on.

We got off to a pretty good start, with regular meetings to talk about what to do next, problems we’d run into, and technical issues that had to be worked out. People were anxious to get the root servers in place and begin nailing up domain controllers (DCs) and migrating users.

But we had a lot of problems with the test root servers. Progress on this went slowly—so slowly, in fact, that some entities got tired of waiting and began to put DCs into the prod root, even though it wasn’t ready! We were close to having a mutiny on our hands—people wanted to go! They didn’t want to go through more and more testing. The technical team disbanded.

Then we began testing the snapping-on of a DC. The administrator in this DC’s group installed the DC using rights from the root servers that we’d temporarily given him. He went in, took administrative control over some things, and delegated the Domain Name Service (DNS) operation to his local server—in effect, causing all root servers to look at his box as the root DNS authority. In other words, this guy was a real cowboy.

We spent a couple of weeks exchanging detailed technical e-mails, trying to solve the problems. Finally, we determined that we couldn’t fix this without reburning the test

root—a delay that angered everyone. They were tired of all this test folderol and on fire to get their production machines operational.

Nevertheless, we returned, with very little help from other administrative entities (who had previously been very willing participants). As the days after the return went on, we met with a lot of inactivity on the part of anyone, a lack of interest in going forward with the project. In fact, one entity was seriously thinking about detaching and setting up their own forest! This was plainly somewhere we did not want to go; it's not a good idea to have several Windows 2000 forests floating around, especially in an environment as small as ours.

It dawned on me one morning what went wrong.

We had never treated this project like a project. Oh sure, we got some technoids together in a room and talked out the details. We hammered out a very official looking document or two (or twelve), detailing the things people had to do in order to be a part of our forest.

But for all that, we didn't know what our deliverable was! Not one person could identify it. We couldn't pick out the stakeholders versus the customers, couldn't point out the sponsors, had no project plan, wrote no schedule. In fact, it was plain to me after a few minutes that our stakeholders thought they were customers—hence, if the Windows 2000 test root needed to be returned, it wasn't their problem.

We had what I call the “build a shed” project plan. If you're going to build a shed, you kind of intuitively know that you need a hammer, saw, nails, some boards, and a tape measure. You may not think you need to work with plans. You hammer and saw away and, sooner or later, you have a presentable enough shed.

That was our Windows 2000 project thus far.

We reassembled the technical team, this time assembling it as a [project](#) team. We appointed a project manager, named the sponsors, and spent some time hammering out the details of the remainder of the work to get the roots stood up and functional, so that we could close out the project and get on with positioning specific DCs and migrating users. We did, after all, have the foundation of the house—we'd already built two roots and had months of good, solid background to go on. We just had no confidence that the roots would withstand the production load we were going to put on them.

We came up with a fantastic project plan, replete with tasks, personnel assignments, and durations. We got permission from the sponsors (there were five in this case) to allow the technicians to spend a week together in a room hammering out baselining, testing, backing up, recovering, crashing servers, and going through all the good solid pre-staging of the roots we hadn't yet accomplished—all with a very aggressive timeline.

We crashed the project—we threw a bunch of technicians at it with specific tasks and short, hardcore deadlines.

You know what? We pulled it off. Today, the roots stand, the DCs are up, and people are working on their user-migration project plans. And everyone is a huge believer in the power of project management techniques to bring people out of the technical world and into the business of putting a thing together.

## ***Managing and Documenting Budget Overruns***

Because you've likely gone through a fairly extensive cost-estimating phase in the development of your project plan, you would expect that you've identified costs and won't be hit with substantial surprises. But what if you are?

There are two distinct realms in which you may run into a budget overrun surprise:

- Too much time worked on a task
- Procured item more expensive than originally anticipated

Both of these can be accounted for somewhat in the planning process.

### **Time Overruns**

Earlier in this book, I had a section on time estimating. I indicated that you should have the person who's going to perform the task estimate the amount of time it will take. The theory behind this is that the person you've picked to perform the task is the most qualified one, and as a result, he or she should have an experiential background that dictates to them some idea of how long a given task should take. You then tack on some overhead for administrative and supervisory purposes, as well some quality-control overhead. This add-on figure could potentially be very large—perhaps double, or a little beyond double, what this person originally estimated in terms of cost. Thus, you have a substantial cushion built into the time estimate for a given task.

But what if you didn't go through this time-estimating process to begin with? Following are some things that could arise if you skipped time estimating or if you went through the estimating process but didn't think of everything.

**Blue-sky time-estimating technique** Maybe you used the "blue-sky" technique for estimating the amount of time a task would take to finish. Blue-sky means about the same thing as "guesstimate"—you simply grab a figure out of the air that seems to be close. Blue-sky is great for PMs who have done a task a thousand times and could do it in their sleep. But people who are new to the task may find that blue-sky underestimates the amount of time required for the task they're currently estimating.

**No estimators** Maybe you didn't have anyone to estimate the task, perhaps because you knew you needed to use contractors for a given task but had not yet contracted anyone.

**Team member too slow** Alternatively, you might've gone through a time-estimating procedure, but you have a person performing the task who simply isn't working as fast as he could and therefore is going to incur some overtime in getting the task finished.

**Quality too much of a concern** The person doing the work might be quite concerned about quality control and is taking extra time just to make sure "it's done right." Quality is always a concern, of course, but when she did her time-estimating, you probably expected that she'd factor in the same level of quality as would be applied during the work. Building in a quality-control overhead factor might alleviate some of this.

**Technical bugaboos** You run into technical hurdles you hadn't anticipated, and the task or tasks that you've outlined that center around this component are taking dramatically longer than anticipated, despite best-guess efforts on the part of team members. These kinds of obstacles can surface everywhere in the IT aspects of the project: from a developer who can't figure out how to get the color blue to correctly display on a special screen, to web coders who can't get a piece of JavaScript code to work correctly with a given system.

You can probably add more to this list, these are but a few. However, the point is that paying attention early on to time-estimating, making sure that your time estimates are accurate, will save you some of the problems alluded to above.

The integrated-systems problem? Well, back in [Chapter 3](#), we talked about the "a miracle happens here" phenomenon, where IT managers convince themselves that two or more systems can talk to one another through some sort of convoluted process.

Unless a given software system has built-in tools that allow it to easily talk to another system (and vice versa if required), integrated systems are a sure-fire way to deadlock

and eventually kill a project, or to produce a deliverable that is very poor in quality. Consider XML and SOAP running on applications servers when business managers begin talking about integrated systems.

## Material Overruns

Chances are you've thoroughly outlined the parts needed for a given task and have obtained bids from vendors on what the parts are going to cost. So you should have a pretty solid idea about what the costs are. Or do you really? Material overruns happen in a variety of ways:

**Incorrect materials** Specified materials aren't the correct materials for a given task, though at the time of specification you thought they were. Replacement materials are more costly.

**Add-on components** You hadn't anticipated certain add-on components to go along with your materials, and they introduce costs to the material lists. (Some typical things are power whips, fiber-optic patch cables, and termination kits.)

**Paying invoices late** Your finance department failed to pay the invoice within the stated payment guidelines, and a late fee is tacked onto the cost of the materials—to be debited from *your* project budget.

**Load-balancing redundancy** Load-balancing characteristics that you hadn't counted on require redundancy in equipment.

**Additional software** Additional software modules you didn't think you needed are actually going to be of benefit to the project or are even required for satisfactory completion of a deliverable.

**Vendor disappears** Your original vendor drops off the face of the planet, and you're forced to go with the next lowest bid at procurement time. Unfortunately, the next lowest bid is substantially higher than the winning bidder, well out of bounds of what you'd budgeted.

All these are interesting and challenging phenomena, to be sure. But how do you manage such things once they occur? There are several steps in managing overruns.

**Gather information about the overrun** You can't do anything about an overrun until you identify the reason for it. Once you've identified the reason, you may or may not be able to control the overrun, but at least you understand the why it happened and can move onto the how I'm going to fix it. It's also important to be specific and certain about the size of the increase you're dealing with.

**Increase the budget** Some increases are marginal enough that they can be absorbed in other project areas that are under budget. Other increases are so substantial that you have to convene the stakeholders and sponsors to come up with answers.

**Identify and notify the relevant parties** The extent of the time or cost overrun might be relevant to one party but not to another. Certainly, if the overrun has project-shattering proportions to it, all parties need to be notified. But some overruns, while substantial, may not affect other areas of the project.

Once you've identified to whom you should communicate the overrun, develop your message so you can convey the information to affected stakeholders, develop a plan for mitigating the overrun, provide the rationale for the change, and describe the consequences if the overrun isn't approved. Then convene the stakeholders and sponsors involved, do your dog-and-pony show, and get the go-ahead to do what you need to do.

This sounds easy, but in lots of projects, the stakeholders aren't all that easily convinced. Some stakeholders can be anti-IT (we've described this phenomenon earlier—it's probably no big surprise to you); in these and other instances, your being the bearer of bad news will not be welcomed, no matter that you couldn't possibly have anticipated the problem. Be prepared with Plan B: a simpler (though, in your mind, less acceptable) solution to the overrun. You should, in other words, be prepared to negotiate in case stakeholders aren't interested in your first proposal.

**Note** As a general rule of thumb, if a change in the project task's schedule or budget is on the critical path or the overall budget is

impacted, you'll need to authorize the change through the executive project sponsor. That's the person who is authorized to expend resources for the project.

### **Real World Scenario: The Anti-Example: The Case of the "I've Fallen and I Can't Get Back Up" Project**

It's about time to sum up everything you know about a project and how it should be planned and executed. Or, as the case may be, should *not*...

I was once with a company that had an old mainframe process—one that included tons and tons of code, had been in operation for 30 years, and was on its last legs. Hardly anyone was left who thoroughly knew or understood the system. It had labyrinths of COBOL, Natural/Adabas, and even some Assembler code all mixed in. No individual person had a clear grasp as to how the thing had been put together or how it ran.

To save the company, big time, a honcho wanted to move the whole thing to a client/server environment. He took people out of their current company roles and put them on a project team. He hired dozens of contractors. And he appointed two of the contractors as project managers (even though they had no PM experience and knew almost nothing about mainframe systems). The finalized team consisted of about a hundred people.

They had one thing in their hand—a hard deadline of Christmas, eleven months away.

The group knew they didn't know anything about client/server relational databases. The consensus was that Informix should be the database of choice. Off to training went the contractors and employees to learn about Informix and about PowerBuilder—the front-end development component that would allow them to create the screens that ran against the Informix back end.

It was quite a production. The best way I can describe it is for you to imagine Yul Brynner in *The Ten Commandments*, standing before the construction plans of the pyramids, papyrus scrolls rolled out on a huge granite stone. "Moses! Come here!" Yul cries. "See what I am going to build!" Our little mainframe project had that kind of ostentation. Sturdy foam placards were posted in the hallways, showing pictures of racehorses hurtling toward a finish line—each horse representing a project element. We had a really great project title and T-shirts with the project's logo.

There were several problems, though. Cost and material overruns were horrific. Tens of thousands of dollars went into overtime as the unqualified

PMs fought with each other and disagreed with management, and as they struggled to make sense of the mainframe code and of the project.

We drastically overestimated the ability of the servers to handle the voluminous quantities of code and database activity required. New machines were brought in—several at a time.

Project team members were completely in the dark about what they were doing *and* about how they were doing it. How could we possibly have expected people who were freshly back from training to create quality deliverables? On top of it all, a few PC-oriented programmers could have cared less about mainframe operations, had giant egos, and were really involved in trying to single-handedly create the project without benefit of the mainframe SMEs. And morale didn't exist, because corporate employee team members were required to work overtime, but contractors were released at their regular time.

Am I describing a disaster yet? It gets worse.

It became apparent that team members were going nowhere fast. Deliverables were way behind; time and cost overruns were astronomical. Through a series of highly strategic blamestorming efforts, the PMs and sponsor determined it was the database's fault that things weren't moving along. So, to get the project back on track, *the PMs decided to switch from Informix to Oracle* and sent everyone back out for training again!

Finally, around Thanksgiving, the sponsor had a meeting with the team members. He wanted to know why they deliverables weren't proceeding as expected, and he wasn't satisfied with the answers the PMs were giving him. So he brought the employees and contractors together and actually said to them, "Can't you code faster?"

You have the picture, right? We're ten months into this project. There are no deliverables. The contractors have pillaged the project's budget. Servers are sitting on the floor doing nothing. Some of the boxes scattered around say Informix, others say Oracle. And the sponsor is asking if people can code faster. Oh, the stupidity that went on with this project is breathtaking!

Finally, on Christmas Eve, the sponsor dismissed the contractors for good. He put the employees back onto their respective teams and called the project a failure. He had to go before some bigwigs and confess that he'd just burned through several million dollars and had nothing to show for it.

What went wrong here? There is a litany of mistakes, all of them classic, all of them avoidable, and any one of them potentially fatal:

- The project's deliverables were not clearly stated.
- People with no project management training were put in charge of the project.
- There were no SMEs who knew how to write the code needed to get the process off of the mainframe and onto client/server.
- Cost and time overruns were not managed (they were actually good for contractors).
- The deliverable deadline was way too short.
- Contractors were allowed to control how things got done, with no input allowed from business experts.
- The size of the project was drastically underestimated—good estimation techniques were not used.
- And—probably the straw that broke the camel's back—the switch from Informix to Oracle came way too late in the project. Once you've decided on a platform, unless there's an incredibly good reason for doing so, you should never switch horses in midstream. I think this single decision killed the project at that point, even though it wasn't officially killed until much later.

## ***Managing Project Delays***

Project delays can almost be described as an inevitability that a project manager will face. How would you handle it, for example, if a vendor came to you and said, "I need two more weeks to deliver my product"? There are some things you can do to mitigate such delays.

**Dialog with the vendor** The first thing you should do is make an appointment with the vendor and sit down to talk about the delay. See if you can find out whether there are things the vendor can do to shorten the delay. Perhaps you can't shorten the delay at all, perhaps you can. But if you don't try and simply accept the delay, you know for sure that you'll have to deal with an impact on the project's scope.

**Scope impact** Next, pinpoint the impact that the delay will have on the project's scope. The delay may have a domino effect on other activities within the project, so it's important to be careful when assessing scope impact.

**Communication to stakeholders** Finally, convene the stakeholders that will be affected by the delay and tell them what you've found out and how it will impact the scope.

With some delays, there is little that you can do. But with all delays, you should at least investigate whether there's anything that can be done to shorten the time and then communicate the delay to affected parties.

## ***Managing Vendor Disagreements***

If you haven't run into this situation, you're lucky. Managing vendor disagreements can be a very interesting situation. On the one hand, you're forced to almost blindly trust what your vendor is telling you—and yet, if team members are disagreeing with the vendor, whom should you believe?

The first element of managing vendor disagreements is the discovery component. Sit down with the team members who are in disagreement and try to get at the heart of what they're saying—what their disagreement is all about. You should also sit down with the vendor and try to understand its side of the disagreement as well.

**Misunderstanding on the part of team members** It could be that the source of the disagreement is merely a misunderstanding. Perhaps your team members have always worked with one product; this new product behaves differently, but they're expecting the same outcome as with the old.

**Misunderstanding on the part of vendors** Alternatively, perhaps the vendor has misunderstood what your actual intent is for the product it's going to supply. The vendor, after understanding the nature of the misunderstanding, might respond, "Oh, well, Widget A won't do that, but Widget B will." Sure, you should've gone through this discovery process at design time, but this kind of thing has a way of slipping through the cracks.

**Paradigm shift** It could be that the vendor's product is just fine for what you're trying to do, but there's a paradigm shift that team members have to go through in order to effectively use the new product, and they simply have not yet made that leap. Recall the mainframe project in the Real-World Scenario earlier in this chapter? In that instance, we had several mainframe programmers who were used to thinking in top-down programming format and had a hard time grappling with object-oriented (OO) technologies (where you put an object on a screen, then write the underlying code for that object). A paradigm shift was required. Unfortunately, especially in OO, that shift is a hard one to make, especially if you're coming from the old school of programming.

**The ego factor** Sadly, IT is an industry that's fraught with large egos. It could very well be that one of your team members has forgotten more about the product than the vendor will ever know, and he's prepared to tell the vendor so. Managing this kind of thing may require that you use "tough love" tactics where you tell the team member to do things the way the vendor says they need to be done. Alternatively (and most often), you may have to replace this talented team member, because he will derail the project, by doing things his own way, more than he will help to get his tasks done. In the final analysis, it is, after all, all about tasks and their timely and successful completion that makes a project successful.

**The 800-pound-gorilla vendor** Some vendors have a "my way or the highway" attitude when it comes to their product. Some products, especially enterprise-class software, are so cumbersome that companies are forced to wrap their way of doing business around the product, rather than the product wrapping itself around the way the company does business. Additionally, some companies think nothing of calling you up, telling you that the latest revision is out, that your revision will become unsupported in a few months, and asking how soon you can be converted—all at a substantial cost to you.

I think that project managers would benefit from heavily weighing this 800-pound-gorilla phenomenon to see if this is somewhere they think the project should go. In other words, if you marry into a software or hardware product that's a phenomenon all unto itself, then

you're stuck with that phenomenon. When you're on board the *Queen Elizabeth II*, you go where the captain wants you to go (unless you buy the boat).

This is a place to weigh the disadvantages of integrated systems against the advantages. Suppose that you're using an enterprise-class relational database management system (RDBMS), one that comes with its own software development environment (SDE) or perhaps even with some canned apps that may loosely fit some of the stated deliverables of your project. Should you invest your company's development environment completely in this one large offering, or should you investigate to see whether other SDEs and tool sets may do a better job—if for no other reason than simply to avoid having all of your eggs in a single vendor's basket? Normally, with integrated systems, you're worried about two different platforms (whether hardware or software) talking to one another. But don't forget to ask, "Should I sell my soul to this company?"

**Platform wars** This phenomenon is especially prevalent in the network operating system (NOS), SDE, and RDBMS camps. One guy likes Unix; another won't do anything that's not Microsoft-oriented. One gal loves Oracle; another thinks that Sybase hung the moon. Developers are really funny about stuff like this—one talented developer will insist on using the Java language and a particular Java SDE, while another says that the best code comes from C++ and has the SDE to prove it.

As a PM, it's up to you to create a standards-based environment that utilizes the best-of-breed technologies for the given task at hand—often regardless of one individual's personal preferences. This is a really difficult call to make. You can reduce the difficulty by going to websites that specialize in IT research, sites that can give you sage (and especially *agnostic*—meaning vendor-independent) advice about choosing a product. Gartner Inc. ([www.gartner.com](http://www.gartner.com)) and IDC Corp. ([www.idc.com](http://www.idc.com)) are two such companies involved in this kind of research. You can do a lot of your research for free without having to purchase a subscription to their extended services, but for heavy detail and Q&A, you'll need a subscription membership.

**Tip** Check first. Your company may have a subscription to one of the research groups, and you can set up conference calls with SMEs in the subject you're interested in researching.

### The "Planning Took Too Long and Now the Technology's Different" Phenomenon

The IT world is a very fast-paced environment... one, in fact, that often outpaces the rigors of good project management. Suppose that you're responsible for a fairly large client/server project. Because the project is large, you opt to go through the formality and rigor of PMI's recommended phases.

Your project has taken so long that, back at concept formulation and early design time, *thick clients* were hot. A thick client represents an actual executable that a technician must install on each end-user's computer in order to participate in the client/server process (clients developed, in times past, with PowerBuilder, Visual Basic, or another quality SDE). Now, thin clients—ones that connect using an ordinary browser and rely on server-side processing or, at the very maximum, a minor download of some software to the end-user computer through a first-time connection to the app's website—are hot, hot, hot.

Additionally, at concept formulation time, 100Base-T connections were usual, but now Gigabit Ethernet (1000Base-T) is expected.

As well, where you once only had to worry about passing Structured Query Language (SQL) statements back and forth between client and server, you must now think about rendering things in Extensible Markup Language (XML) so that browsers can intelligently work with your system's back-end databases (still passing SQL statements, still returning rows, but now translating into XML on the fly). The possibility of utilizing an application server to help you with the process is a very distinct one.

One of the very important talents a project manager brings to the table is “design elegance:” being able to design a project in such a way that it moves quickly through the preliminary phases, the deliverables and requirements are largely independent of the technology du jour, and the technology is decided upon at or near project implementation time—thus keeping the project at least somewhat near prevailing technological normality. The rapid changes such as those just described demand that an IT PM stay abreast of technology, or at least be able to come quickly up to speed. Otherwise, the PM is at the beck and call of vendors and team members and may wind up dealing with a vendor disagreement—or worse, a platform or app war.

## **Managing Waffling Project Sponsors**

There may be a variety of reasons why project sponsors decide they are no longer committed to the project:

- Perhaps a new CEO has come on board, and the whole strategic nature of the company has already been changed or is up for grabs.
- Perhaps personality shortcomings have led the sponsor to believe that there are problems on the team. Maybe there’s been some heavy rumor-mill activity regarding the project and the sponsor has picked up on the rumors, subsequently putting a checkmark in her mind about it.
- It could also be that you have team members who came from a different part of the company, one that the sponsor has been having quite a bit of difficulty with lately—so there’s an element of “enemy in the camp” thinking going on. Sounds immature, but it happens.
- The project sponsor may simply be going through personal problems and not have the emotional time needed to give to the project at this point in time. He may be looking for a new job or have problems at home. Who knows?

A nearly infinite variety of components can go into why a person’s support for a project becomes lackluster. How can you mitigate this difficulty?

**Identify the source of the doubts** Begin by being a truth-teller. Sit down with the sponsor and get it out on the table. “Sue, lately I’ve really noticed that your interest in and support of my project has gone downhill. Here are the reasons why I say this: Reason, reason, reason, reason. I’m interested in finding out whether you have issues with the project, and how I can work with you to correct them.” Be prepared for one of two responses:

- The truth: Sue tells you, in more or less exact terms, what she’s worried about.
- The gloss-over: Sue tells you that there’s nothing wrong...really.

**Use carefully guarded communication** Your communications skills need to be at their very height as you go through this process. Your last desire is to *further* reduce this person’s support, so you need to carefully pick your words and describe situations in such a way that you’re not placing blame on them, but you’re describing ways in which you’ve seen what you can only characterize as a reduced lack of enthusiasm about the project. Try to keep personalities out of it, though there may very well be personalities at the heart of it.

### **Tip**

It’s not altogether unreasonable to anticipate that *you* are the reason that one or more sponsors have become less excited. Perhaps they think that you’re not communicating enough, that you’re not the right PM for the job, or that you’re not handling task assignments well. Whatever. But be prepared for that eventuality as well—and be mature enough to deal with it if it comes. The turnover of PMs, especially in high-level projects, is higher than one might imagine.

**Involve allies and influences** What if your sponsor can’t really pinpoint any reason for his lack of enthusiasm—but it’s distinctly there, and continues, even after you have your discovery meeting? The next step would be to try to get cohorts and other influences to find out what truly is wrong. Perhaps if this person won’t tell you what’s up, he’ll tell another who can, in turn, relay the information to you.

**Talk to the stakeholders** Be careful here—the sponsor may have some political allies in the stakeholder group. Consulting with the stakeholders might be a good way to find out what their take is on the sponsor's diminished enthusiasm. You might be able to get them to revitalize the sponsor, or (if stakeholder belief in the project is strong enough) they might simply appoint a different sponsor.

If the difficulty remains, the project will wane to the point where you have to make a decision about whether to recommend killing it or get a new executive sponsor. There's this truth: A project that's dying on the vine must have something done with it. Either kill it and put it out of its misery, or prune away the problem spots and go on to finish it. But the project cannot hang out there as a shriveled-up raisin if it was at one time destined to be part of a bottle of fine Zinfandel.

## ***Managing Project Schedule Overruns***

Interestingly, some tasks in a project plan can suffer a schedule overrun and yet not have a financial impact on the project's budget. If you've been steadily working along and most of the project's tasks to date have come in well under budget, there's probably a budgetary cushion. But perhaps there's one task that ran into a problem and will require not only a little more time but also a little more money. No problem! You've got the budget cushion there to take care of the financial shortfall, but what about the schedule implications?

Or, alternatively, think of the earlier example where a vendor notifies you that some equipment is going to be two weeks late. If your team members have other tasks to do and won't be sitting around, on the payroll, waiting for the delivery, then there isn't any direct impact to the project's budget. But on the other hand, your schedule may be thrown off by two weeks, or perhaps even more considering ancillary impacts the delay may have on other tasks. The methodology you'll use for situations like this is exactly as it was for other similar incidents.

**Understand** Make an effort to understand why the schedule change is required. Plan your schedule change. Develop Plan B in case stakeholders and sponsors don't embrace the change.

**Mitigate** Try to avoid delays—but failing that, reduce them by as much as possible.

**Communicate** Communicate the schedule changes to stakeholders and sponsors. Get their input as to the direction you should go. Use selling tactics, if need be, to get them to understand and embrace the need for the change.

**Sign-off** Obtain sign-off acceptance for the changes to be made.

**Plan** If stakeholders and sponsors won't approve the changes, revert to Plan B.

As always, a task that requires a schedule change but doesn't impact project budget still has to go through a process where stakeholders and, ultimately, the sponsor make a decision about the proposed change's worth.

## ***Understanding Financial Management Variables***

In your future, more advanced PM studies, you'll encounter some financial management variables that you may want to pay attention to— especially if your project is one that's massive and requires that you pay special attention to all the financial details.

**Note** In spite of Objective 3.7, I wasn't tested on any of the following things in the IT Project+ test (never fear!). That being said, you might encounter a question or two on the test.

There are several variables, each of which could be easily calculated either through spreadsheet or project management software calculations. We need to take some time to build some of the numbers that you'll use to calculate these variables, so we'll start with some basic definitions, then move into how they combine with each other in real use.

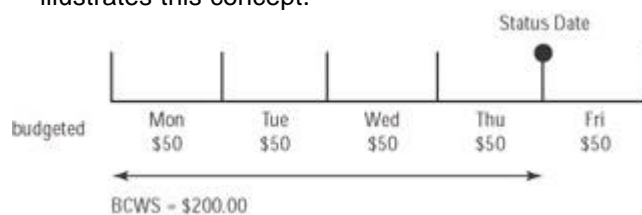
When you perform analysis on your project using the below-listed formulas and variables, you're performing *earned value analysis*. When you perform assessment on a project's *earned value*, you're measuring how much of the budget you predict that you should've spent so far, given the amount of work you've already done on the task. You're calculating the *budgeted cost of work performed (BCWP)*. (The terms *earned value* and *BCWP* can be used synonymously.)

It's important to also understand that your pristine project starting point— nobody working on any tasks yet, no money spent—represents the *baseline* of the project. It's important to fully describe your project's beginning prior to calculating any financial management variables. Project management software allows you to create save your work with a baseline before you start entering hours or materials costs.

### Earned Value Basics

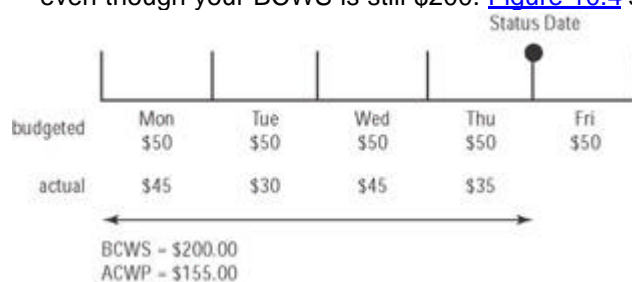
Start with a *status date*—simply, the date when you're going to take a measurement of how much has been spent on a specific task.

Next, you must understand several different ways of looking at a task's cost. The first of these is the *budgeted cost of work scheduled (BCWS)*. Generally, you apportion out a task's total cost evenly over the number of days that the task is scheduled to take. If a task is predicted to take five days and cost \$100, for example, each day represents \$20 of a task. You arrive at the BCWS by comparing the amount that's budgeted to be spent on a task between its start date and the *status date* (not necessarily the same as the end date). For example, if you have a five-day task that's going to cost \$250, then you can break the per-day cost out to fifty bucks a day. If you set your status date to Thursday, for example, you've used four days of the five and your BCWS is \$200. [Figure 10.3](#) illustrates this concept.



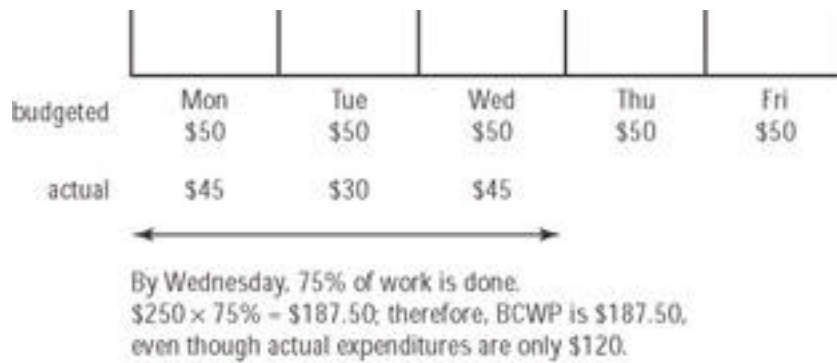
**Figure 10.3:** Budgeted cost of work scheduled (BCWS) at status date

Another component of earned value is the *actual cost of work performed (ACWP)*. This is the actual cost incurred for each day that you worked on a project within a given period. In our example in [Figure 10.3](#), the project has a budgeted cost per day of \$50, for a total of \$250 for the task. But what if you spent only \$45 on Monday, \$30 on Tuesday, \$45 on Wednesday, and \$35 on Thursday? Then your ACWP for the four days would be \$155, even though your BCWS is still \$200. [Figure 10.4](#) shows this relationship.



**Figure 10.4:** Actual cost of work performed

Finally, you have another straightforward calculation you can make: budgeted cost of work performed (BCWP, as mentioned earlier). This figure represents the comparison of the *percentage* of work performed to the *expected*, budgeted amount. If by Wednesday you've met 75% of the task's budgeted work (even though you've got clear till Friday), then the work you've done was budgeted to cost \$187.50 even though you've only really spent \$120. You're comparing the amount you've actually spent to the amount you'd expect to have spent based upon the percentage of work completed thus far. [Figure 10.5](#) demonstrates this calculation.



**Figure 10.5:** Budgeted cost of work performed

Now that we know the differences in these earned value components, we can go forward and calculate some basic financial management variables. The BCWS, ACWP, and BCWP figures you have go into the remaining calculations.

There are two other financial acronyms that you need to be aware of when considering the following formulas. The budget at completion (BAC) represents the budgeted cost of the entire project. The estimate at completion (EAC) is the currently estimated project's cost at completion. Notice the difference between the two? With the BAC, we're talking about the cost of the project (or task, as the case may be) that we projected at the very start. With the EAC, we're talking about what we currently estimate the project (or task) will have eaten up at completion. In other words, you take a look at the variances where you're really at, apply them to what you thought would happen, and come up with a new prediction. Both the BAC and EAC figures will play into an index described later.

### Financial Management Variables

All these calculations deal with comparing the current status to the budget in some way. One group simply subtracts, producing a *variance* that is the difference between actual and budgeted; the second group, the *indexes*, divide to show you the ratios relative to those measurements. All these numbers might be useful to calculate, although in smaller IT projects not all of them will be necessary.

## Variances

Variances show the difference between that which was budgeted and the actual costs expended. A positive variance shows that you've saved money or time and might be able to reappportion the savings elsewhere in the project. A negative variance states that you're either over budget or behind schedule for a given task—requiring that you take action.

### Cost variance

The *cost variance (CV)* simply represents the difference between a task's estimated (budgeted) cost and its actual cost. Here is its formula:

$$CV = BCWP - ACWP$$

### Schedule variance

The *schedule variance (SV)* simply represents the difference between a task's progress as compared to its estimated progress and is represented in terms of cost. Here is its formula:

$$SV = BCWP - BCWS$$

## Indexes (Ratios)

Indexes are designed to show a ratio between one project budgetary component and another. The most common of these numbers are extremely useful, because they are simple to gauge: either greater than 1 or less than 1. If a ratio's value is greater than 1,

the task is either ahead of schedule or under budget. A ratio less than 1 indicates that your task is behind schedule or over budget.

Note that ratios can also be expressed as percentages, which may be an easier way to think of the numbers. For example, if one of these indexes calculates to 0.971, you can multiply by 100 to state that index as 97.1%.

When you commit these formulas to memory and understand what they're representing, you can use earned value analysis to get a much better handle on where you're at with a given project. You can answer questions such as "Is there enough money in the budget so that I can finish the project?" or "Do I have enough time left to finish the project on time?" Again, you would use these calculations with very complex projects and probably wouldn't need them with simpler ones.

### **Cost performance index**

The *cost performance index (CPI)* shows the ratio between a task's budgeted and actual costs. Here is its formula:

$$\text{CPI} = \text{BCWP}/\text{ACWP}$$

A CPI of less than 1.0 means you're over budget; a value over 1.0 means you're spending less than you expected.

### **Schedule performance index**

The *schedule performance index (SPI)* is a ratio of the work performed on a task versus the work scheduled. Here is its formula:

$$\text{SPI} = \text{BCWP}/\text{BCWS}$$

An SPI of less than 1.0 means you're behind schedule; a value over 1.0 means you're taking less time than you expected.

### **To-complete performance index**

The *to-complete performance index (TCPI)* is a ratio of remaining work compared to remaining budget and is represented as a percentage. It can be viewed as an efficiency formula where the higher the percentage, the more efficiency you're currently getting out of the task. A TCPI that is more than 20 percent higher or lower than the CPI means that the current EAC is not representative of past performance. Here is the TCPI formula:

$$\text{TCPI} = \text{work remaining} / \text{funds remaining}$$

$$\text{where: work remaining} = \text{BAC} - \text{BCWP}$$

$$\text{funds remaining} = \text{BAC} - \text{ACWP}$$

For example, given the following project numbers, here's how you'd calculate the TCPI:

$$\text{BAC} = 250,000$$

$$\text{BCWP} = 175,000$$

$$\text{ACWP} = 180,000$$

$$\begin{aligned} \text{CPI} &= (175,000 / 180,000) \\ &= 0.972 \text{ (or, as a percentage, 97.2\%)} \end{aligned}$$

$$\begin{aligned} \text{TCPI} &= (250,000 - 175,000) / (250,000 - 180,000) \\ &= 75,000 / 70,000 \\ &= 1.071 \text{ (or, rendered as a percentage: 107.1\%)} \end{aligned}$$

To compare TCPI to CPI, divide one into the other. If the result is between 1.2 and 0.8, then you're within the +/- 20% guideline:

$$\text{TCPI} / \text{CPI} = \text{efficiency compared to past performance}$$

$1.071 / 0.972 = 1.102$

In this case, a comparison of 1.1 means we're essentially on track in our project relative to past performance (provided, of course, that *past* performance was in line with our expectations).

### **Prestige Hotels: Project Control**

Fully engaged now in the Prestige Hotels RLV Virtual Slot Machine (VSM) project, you find that the majority of your tasks are controlling the project. You have set up a weekly stakeholders' meeting in which you give an update to the project. Since the project won't take more than six weeks, you don't feel that you need any more rigor than that.

You have run into a minor snag with the World To You (W2U) ISP. They have come back to you to state that they require an additional \$200 per month to maintain a mirror site, though you specifically stated in your original negotiations with them that you required a mirror site and they included it in their original bid. You set up a meeting with them and take the bid with you to iron out the difficulty.

In looking at the schedule and budgetary items, you notice that for Activity 1, Task 2 (the graphic of the slot machine), Molly has already logged 10 hours on the project, and she thinks she still has 4 more to go, even though she was only allotted 8 hours for the task. By calculating budgeted hours versus what you now expect (8 / 14), you discover that even if you can get the schedule extended for this task, Molly is only at 57% of completion. The new BCWP will be  $14 \times \$125 \times 125\% = \$2,187.50$ . The CV, therefore, is  $\$2,250 - \$2,187.50 = -\$62.50$ . Recall that a negative CV means you're in the hole, money-wise.

The CPI for this task is  $\$2,250 / \$2,187.50 = 1.03$  (103%). Recall that a CPI of less than 1.0 means you're over budget, and you're essentially right on budget for this task.

You also decide that not all of the code the developers have to write is predicated upon Molly's completion of the graphics. The developers don't have to have a graphic of the slot machine developed, for example, to be able to write the random-number generator that will decide which symbols display in the VSM's output. Although you had originally designed the graphics work as a predecessor to the coding work, you think that you can now put the code developers to work before the graphics are complete.

## **Summary**

This chapter was about management of the project. If you were using the PACE methodology, you'd be in the controlling phase. If you were using the IPECC methodology, you'd be toggling between controlling and executing. In either case, you have a wide variety of management jobs that you fulfill as your project rolls forward.

We first talked about tracking an active project. Project managers are involved in several functions, managing the scope status, project deliverables, project schedule, variance analysis, scope changes, open issues, status reporting, accelerating activities and sign-off on deliverables, and if need be, killing a project.

We also covered the kinds of overruns you might wind up managing: budget, time, material, and schedule overruns. We discussed communication issues associated with vendor disagreements and waffling project sponsors.

Finally, we discussed a host of financial management variables that can be used to get a radar fix on where the project's budget and schedule are.

## Exam Essentials

**Be familiar with the tasks a project manager will be involved in when tracking an active project.** Include things like scope status, project deliverables, the project's schedule, variance analysis, scope changes, open issues, status reporting, stepping up activities and sign-off of deliverables, and killing a project.

**Understand the elements of overrun analysis.** You can be faced with budget, time, material, and schedule overruns.

**Be prepared to describe how to manage project delays.** Investigate, plan, and communicate.

**Be prepared to describe how to manage vendor disagreements.** Investigate the source, make a plan for mitigating the disagreement, communicate the issue to stakeholders.

**Be prepared to describe how to manage waffling project sponsors.** Inquire directly why the sponsor's enthusiasm is waning and try to get the project back on track.

**Understand, at a high level, the need for financial variables.** You might not need to memorize the equations, but be able to understand why you'd use a ratio instead of a variance and how the equations are derived.

## Key Terms

Lots of key terms in this chapter! Most of them center around the financial variables.

actual cost of work performed (ACWP)	earned value
agnostic	earned value analysis
baseline	push
budgeted cost of work performed (BCWP)	schedule performance index (SPI)
budgeted cost of work scheduled (BCWS)	schedule variance (SV)
cost performance index (CPI)	status date
cost variance (CV)	thick clients
crash the project	to-complete performance index (TCPI)

## Review Questions

1. You are a project manager for an IT project that's in the controlling phase. A vendor has notified you that a server you require for a given task in the project, a

?

task that's on the critical path, will not be able to ship for two weeks. What is your course of action?

- A. Set up a meeting with stakeholders. Explain the situation; ask for an extension to the project deadline.
- B. Meet with the vendor; see if you can shorten the delay. Set up a meeting with stakeholders. Explain the situation; ask for an extension to the project deadline.
- C. Meet with the vendor; see if you can shorten the delay. Set up a meeting with stakeholders. Explain the situation; ask for an extension to the project deadline. Get extension approved through project sponsor.
- D. Meet with the vendor; see if you can shorten the delay. Set up a meeting with stakeholders. Explain the situation; ask for an extension to the project deadline. Get extension approved through project sponsor. Revise project plan.

2. Your project has taken a serious turn for the worse. While your project team is working its heart out to meet deadlines, it appears that the executive project sponsor has lost all enthusiasm for the project. You're not sure why. The project is near death, and if you cannot clear up this problem, you're close to the point where you're going to have to kill the project. What steps should you take?

- A. Set up a meeting with the executive project sponsor. See if you can determine why the problem exists.
- B. Set up a meeting with the executive project sponsor. See if you

?

can determine why the problem exists. If you can't get anywhere with the executive project sponsor, try to get an ally or someone with influence on the sponsor to get at the heart of the matter. Meet with the stakeholders to apprise them of the situation—maybe you can get a new sponsor appointed. If you can't get anywhere, you're better off killing the project.

- C. Set up a meeting with the executive project sponsor. See if you can determine why the problem exists. If you can't get anywhere with the executive project sponsor, try to get an ally or someone with influence on the sponsor to get at the heart of the matter.
- D. Set up a meeting with the executive project sponsor. See if you can determine why the problem exists. If you can't get anywhere with the executive project sponsor, try to get an ally or someone with influence on the sponsor to get at the heart of the matter. If you can't get anywhere, you're better off killing the project.

3. You are a project manager for an IT project that's in the controlling phase. It turns out that a task on the critical path must utilize a hardware component that is much higher in cost than you had originally budgeted. This represents a serious budget overrun in your project, and there's little you can do about it. What is your course of action?

?

- A. Meet with the hardware vendor; see if you can get the cost reduced. Set up a meeting with stakeholders. Explain the situation; ask for an expansion to the project budget. Get expansion approved through project sponsor. Revise project plan.
- B. Set up a meeting with the executive project sponsor. Explain the situation, ask for an expansion to the project budget. Revise project plan. Advise stakeholders.
- C. Meet with the hardware vendor; see if you can get the cost reduced. Set up a meeting with the executive project sponsor. Explain the situation; ask for an expansion to the project budget. Revise project plan.
- D. Meet with the hardware vendor; see if you can get the cost reduced. Set up a meeting with stakeholders. Explain the situation; ask for an extension to the project deadline. Get extension approved through stakeholders. Revise project plan. Advise project sponsor.

4. The cost variance (CV) is defined as the difference between a task's estimated and actual cost. What does a negative CV indicate?

?

- A. Behind schedule
- B. Under budget
- C. Ahead of schedule
- D. Over budget

5. Lorraine is working on a project task that you've budgeted to take 10 hours of her

?

time, at a cost of \$150 per hour or (not including overhead) \$1,500. The task she's working on requires that she install a T1 card in a new fax server and test it to make sure it's running. You budgeted \$14,000 for the T1 card, and you've been invoiced \$13,800. Lorraine comes to you at the end of 10 hours to tell you that she thinks she is going to need one more hour to finish up the work on the task. If all goes as she says it will, what will be the overall status of this task? (Select all that apply.)

- A. Well under budget
- B. Marginally under budget
- C. Marginally over budget
- D. Well over budget
- E. Marginally behind schedule
- F. Well behind schedule

6. Lorraine is working on a project task that you've budgeted to take 10 hours of her time, at a cost of \$150 per hour or (not including overhead) \$1,500. The task she's working on requires that she install a T1 card in a new fax server and test it to make sure it's running. You budgeted \$14,000 for the T1 card, and you've been invoiced \$13,800. Lorraine comes to you at the end of 10 hours to tell you that she thinks she is going to need one more hour to finish up the work on the task. If all goes as she says it will, what will be the schedule performance index (SPI) of this task?

?

- A. 0.80
- B. 0.90
- C. 1.00
- D. 1.10

7. One of your senior network engineers, Marty, is absolutely insistent that the vendor who's supplying your routers is "all wet" when it comes to a facet of a router that he's been tasked to install. However, when you consult with the systems engineers who work for the vendor, they tell you that Marty has misunderstood the way the product works and that it works the way they've advertised it. How do you handle this problem?

?

- A. Call the vendor and Marty to a meeting.

Sit back and watch them hash it out.

- B. Call the vendor and Marty to a meeting. Act as arbitrator in an effort to get at the root of what the problem might be.
- C. Arrange to have some of the vendor's engineers meet Marty on site to work through a sample configuration on one of the routers. That way if he's right, they can see what he's talking about; if he's wrong, he'll see why.
- D. Tell Marty to listen to what the vendor has to say—after all, they invented it.

8. Which of the following items will require the attention of the executive project sponsor as you work through the controlling phase of your project? (Select all that apply.)

?

- A. Materials coming in under budget
- B. Scope expanded due to unforeseen circumstances
- C. Some tasks way over completion date, requiring scope modification
- D. Some tasks way over completion date, but manageable

9. Which of the financial variables represent ratios? (Select all that apply.)

?

- A. BCWS
- B. ACWP
- C. CV
- D. SV
- E. CPI
- F. SPI
- G. BCWP
- H. TCPI

10. Why is it beneficial to conduct an earned value analysis on a given project? (Select all that apply.)

?

- A. Tells you how close to the end of the project you really are
- B. Tells you whether you have enough money in the budget to finish the project
- C. Tells you which of the tasks are in the danger zone and must be immediately attended to
- D. Tells you whether there is enough time left in the schedule to get the project done on time

11. In a long-term project that will span many weeks, which of the following project elements do you *not* need to monitor on a weekly basis? (Select all that apply.)

?

- A. Check the project's scope
- B. Analyze variances
- C. Check the project's schedule
- D. Supply vendor reports
- E. Check the status of project deliverables
- F. Handle scope changes
- G. Run finance reports
- H. Resolve open issues
- I. Report project status

12. You are a project manager for an IT project that's well underway. You're in the controlling phase. One task on the critical path is going to come in well beyond the schedule you had originally planned for. While there is no budget overrun, there's little you can do about the schedule overrun. What is your course of action?

?

- A. Notify the stakeholders.
- B. Notify the stakeholders and executive project sponsor.
- C. Notify the stakeholders and executive project

sponsor. Obtain permission to proceed.

- D. Notify the stakeholders and executive project sponsor. Obtain permission to proceed. Implement Plan B if permission is not obtained.

13. In order to begin calculating financial management variables in your project management software, you must first do this.

?

- A. Save your work.
- B. Save your work with a baseline.
- C. Schedule your tasks.
- D. Obtain project sponsor sign-off.

14. You've come to the realization that the project you're currently involved in is going nowhere fast. You've run into a technological brick wall—one that your project team has worked extremely hard to try to overcome, but that has produced failure after failure. What should be your next steps?

?

- A. Notify the stakeholders. Kill the project.
- B. Notify the stakeholders. Crash the project.
- C. Notify the stakeholders and the executive project sponsor. Crash the project.
- D. Notify the stakeholders and the executive project sponsor. Kill the project.

15. You're working on a project in which you believe you could easily and quickly finish a critical task simply by allotting to it some more team members (who aren't currently working on anything). What is this technique called?

?

- A. Crashing the project
- B. Pushing the project
- C. Killing the project

16. D. Flying the project  
What are some of the elements of good open-issues tracking? (Select all that apply.) ?
- A. Listing open issues
  - B. Tracking open issues
  - C. Assigning an arbitrator to open issue resolution
  - D. Resolution open issues
  - E. Appointing someone outside the project team to manage open issues.
17. You're the project manager for an IT project that's well underway. You've recently become aware of a significant budget increase in an area of your project. What are some of the details that you must document in order to prepare stakeholders for the news of this overrun? (Select all that apply.) ?
- A. Reason for the increase
  - B. Size of the increase
  - C. Date of this increase
  - D. Overall budget increase
  - E. Stakeholders involved
18. When dealing with an executive project sponsor who has lost enthusiasm for the project, what is the one thing that you must try to avoid when attempting to rectify the problem? ?
- A. Enlarging the scope
  - B. Creating negative impact
  - C. Adding more hours to the project
  - D. Taking money away from the budget
19. Which parties or individuals need to be apprised of a project's status? (Select all that apply.) ?
- A. End users
  - B. Project sponsor(s)
  - C. Project stakeholders
  - D. Customers
  - E. Vendors

20. F. Team members  
Which project components will be involved in your variance analysis procedures? (Select all that apply.) ?
- A. Resource time expenditures
  - B. Vendor response times
  - C. Elapsed duration of activities
  - D. Dollar expenditures
  - E. Contingency funds

### Answers

1.

D

First, you should meet with the vendor to see whether you can negotiate a shorter delay. Working with tasks on the critical path allows for very little room for finagling other tasks without consulting with the project sponsor and stakeholders. Next, you should meet with the stakeholders to apprise them of the delay. If they're OK with the deadline extension, you should modify the project plan and obtain formal sign-off from the project sponsor.

2.

B

You start by going directly to the executive project sponsor to try to get at the heart of what's going on. Careful communication techniques are required so that you don't make the problem worse than it already is. If you can't get anywhere, you should seek out an ally or an influence that might be able to find out what's going on. Barring that, it may be worth your while to take the matter to the stakeholders, though they'll probably have little power to change the sponsor of the project. Finally, if things continue to deteriorate, you'll have to pull the plug on the project.

3.

C

You should first see what you can do to knock the price down. Next, meet with the sponsor and try to get an expansion to the budget. One of two things will happen: The sponsor will either approve the expansion or try to brainstorm with you regarding workarounds. If you get the expansion approved, modify the project plan. Keep the stakeholders under advisement on this issue, but they aren't a crucial step in the problem's resolution.

4.

D

Since we're dealing with the CV here, we're looking at budget figures. A negative CV means that you've spent more money than you had budgeted, thus for the task you're obtaining a variance on, you're over budget.

5.

A, E

You actually have to remember that you're going to track your time estimates (and their associated costs) in a different area than your materials estimates. While you came in under budget in the area of materials, you came in

over budget in the area of the time needed to complete the task. You can't necessarily borrow the extra 150 bucks from the T1 card's savings, because the two pots of money are different. So you're under budget in one area *and* over budget in another.

6.

B

The cost performance index (CPI) and schedule performance index (SPI) are essentially the same in their philosophy. You take the actual cost or hours budgeted then divide by the actual to come up with the index. A number less than 1.00 means you're over budget or behind schedule, whereas a number over 1.00 means you're under budget or ahead of schedule. Since Lorraine has had to increase her hours to 11 for the task you calculate the SPI by dividing 10 / 11 to arrive at an SPI of 0.90. (As I said, you may not see any of these on the test, but it is something CompTIA wants you to be aware of and it aligns with objective 3.7.)

7.

C

Having personally been through this kind of dilemma, I feel for you if you have ever gone through this yourself. The best way to handle this is to get some vendor SEs in a room with your engineer and let them work through a sample configuration. Hey, companies have been wrong before, and your guy might have a point. Or, if he's mature enough, he'll see what they're talking about and will have learned a great lesson about configuring this particular router. You should be there with them to make sure that the fisticuffs and name-calling are kept to a minimum.

8.

B, C

The project sponsor needs to know when resources are impacted by a shortfall in the project—whether those resources are time, material, or person-power. If you can manage some tasks that are “way” over completion date without involving the sponsor (meaning you don't have to modify the project's scope), then by all means do so. In any event, you should notify the stakeholders at their next meeting.

9.

E, F, H

An index (ratio) is different than a variance. With a variance, you're calculating exactly how much a budgeted item differs from actual. With an index, you're dividing one by the other to come up with either a positive or negative number, in order to assess whether you're ahead or behind. The cost variance (CV) and schedule variance (SV) are simple subtractions. The cost performance index (CPI), schedule performance index (SPI), and to-complete performance index (TCPI) are ratios. The budgeted cost of work scheduled (BCWS), actual cost of work performed (ACWP), and budgeted cost of work performed (BCWP) are earned value components used in the above variance and index calculations.

10.

B, C, D

Running an earned value analysis will tell you whether you have enough money to finish the project and whether you

can bring the project in on time. It'll also pinpoint those tasks that are in the danger zone—those that you'd better immediately attend to. Note that earned value analysis probably isn't necessary for the average IT project that has a small scope.

[11.](#)

D, G

Generally, supplying vendor reports and running reports for the finance office aren't things you'll do on a weekly basis. Vendor reports will occur irregularly as vendors deliver materials, and finance reports will generally happen on a monthly basis.

[12.](#)

D

Remember to communicate, communicate, communicate! Let the stakeholders know what's going on. Always notify the executive sponsor when there's an overrun of this nature. This is especially true in this case because the task is on the critical path and therefore affects many other tasks. Obtain sign-off in order to proceed, and be prepared with a backup plan in the event you're not given the approval you need.

[13.](#)

B

A baseline establishes that you've keyed in your tasks, their durations, and the materials and hours costs. Setting a baseline in your project management software allows you to begin calculating your financial management variables and performed earned value analysis.

[14.](#)

D

You've reached the unfortunate and inevitable time when you must kill the project. The executive project sponsor is actually the one who will make the decision to kill the project, so you'd better have your facts and evidence down pat. Generally, executives are going to be inclined to go down with the ship, so killing a project won't happen lightly. Taking this risk also might find you replaced as a PM so that the executive sponsor can give it one more "old college try" before coming to the realization himself that the project is dead. Unfortunately, lots of executives don't see this reality as quickly as you might—so be prepared for a rough ride.

[15.](#)

A

Crashing the project is a slang term for putting more people on a facet of a project so that you can complete a task more quickly and un-stall a stalled component.

[16.](#)

A, B, D

Open issues are those issues that surround a project that's underway. Issues can be raised by stakeholders, the project sponsor, yourself, or your team members. You must be very diligent about maintaining an issues tracking system that allows people to view the open issues and allows those who are working on an issue to post resolutions.

[17.](#)

A, B, D, E

When you're faced with such a budget overrun, it's important that you figure out the reason for the increase, estimate the size of the increase, and especially pay

attention to the increase in the overall budget that this overrun represents. Then identify the stakeholders that are involved and present the overrun to them.

18.

B

It's vital that you communicate with this executive in such a way that you don't further damage their enthusiasm level.

19.

B, C, D, F

The project sponsor(s), stakeholders, customers, and team members must be apprised of the project's status. A vendor is someone who sells you supplies for a project, so it's not really necessary that they're on the status notification list. A user who is a customer would be informed, but other users don't need to hear until the project is near completion (as training gets set to begin).

20.

A, B, D

You need to perform variance analysis procedures on the amount of time that resources are involved in an activity as well as the time an activity takes to complete as well as the dollars spent on an activity.

## Chapter 11: Change Control

### *CompTIA Exam Objectives Covered in this Chapter*

- 3.8 Given an approved project plan and a specific scope deviation (for example: design change, schedule or cost change, etc.), demonstrate your ability to:
  - Identify the cause(s)
  - Prepare a status report for the user identifying problems and corrective action
  - Determine the impact of the deviation on the scope of the project
  - Quantify the deviation in terms of time, cost, and resource
  - Distinguish between variances which will affect the budget and duration and those that will not
  - Determine and quantify at least one possible alternative solution that has less impact but requires some scope compromise
  - Distinguish between variances that should be elevated to the sponsor and those that should be handled by the PM and team
  - Develop a plan to gain stakeholder approval
- 3.9 Identify and justify the following as conditions for initiating a change control process:
  - Resource changes
  - Schedule changes
  - Cost changes
  - Requirements changes (or changes in expectations)
  - Infrastructure changes
  - As a response to scope creep
- 3.10 Given scenarios involving requests for changes from sponsors, team members or third parties, recognize and explain how to prevent scope creep.
- 3.11 Recognize and explain the importance of communicating significant proposed changes in project scope, and their impacts, to management, and getting management review and approval.

The Holy Grail of project management is well-executed change control. You just can't have people, especially stakeholders and project sponsors, walk up to you in the middle of a project and change the project's requirements or outcomes. That kind of thing is enough to drive the best PMs to drink. In this chapter, we talk about changes to the project and touch on things like scope creep, scope change control, the impact of change on the scope, and scope deviation.

**Managing Scope Deviations**

So you've got this approved project plan, and you and your team are steadfastly working away at it. You're maybe 25 to 30 percent into the project. One day a customer shows up at the project office and announces that you have to change a specific component of the project, and you have to do it right away. Unfortunately, the component they want changed happens to be one you've already worked on and that you have in the bag. So what's a PM to do?

First, we should point out that the project plan has already been approved. Prior to project plan approval, within limits, the plan is up for grabs. You'll write your plan closely to the requirements you've specified, but there's room for some give when you're in the throes of writing it. However, after the plan is approved, it shouldn't change without very good reasons.

You should identify whether the change represents one of three kinds of changes:

Design	Some task or activity of the project needs to be altered.
Schedule	Some or all of the project's deadlines change.
Cost	The budget for the project has to be modified.

Fortunately, many PMs have gone before you in such scenarios, and as a result, you have a fairly logical set of steps that you can follow to manage the change. You should recognize that *any* change represents a deviation in scope. Because of this, you must do some work to figure out how drastic the scope deviation is, so that you know whether to

escalate the news to stakeholders and sponsors, rewrite the scope, and obtain a new sign-off. In line with the exam objective here, I'll refer to the change as the *scope deviation* from here forward.

A deviation is presented to you. Regardless of the size you might deem the deviation to be at first, it's incumbent on you to take a hard look at it. Determine the size of the deviation, in terms of cost and resources; determine the impact of the deviation on the project (will it require a scope change document?); and then make the deviation known to the sponsor and stakeholders.

In larger projects, you'll have a change-control committee that handles all scope changes. Typically the sponsor sits on this committee, as well as some, but probably not all, stakeholders. In smaller projects, the sponsor and stakeholders will jointly approve or deny the deviation.

### **Identify the Cause**

Start by seeing whether you can pinpoint the cause of the deviation. For example, in the case of a project's budget being reduced, what was the underlying element that caused the budget reduction? Perhaps the company recently announced poorer performance figures for a quarter, and as a result, executives took steps to reduce costs where feasible. Your project just happened to be in the feasible camp.

Or, if the schedule needs to deviate, perhaps the deviation is being driven by some corporate customers who want your product sooner rather than later. Or perhaps there was a legislative change that mandates your deliverables be available sooner than first planned.

The most difficult to spot might be design deviations. Here is where you get into the area of *nice-to-haves* that we've been talking about—those things that would be great to have in the project, but were not required at design time—versus *need-to-haves* (those changes that are mandated). A customer approaches you with a design deviation that's going to require a modification to the scope document (and subsequent re-signing). It's up to you to determine, with the help of your project team, if this deviation is something that you really need to make in order to fulfill the requirements of the project and hence create the desired deliverables. It's possible to get into some arguments with the customer on this, so you must go carefully.

Also, some design deviations arise because the project has a problem that needs to be rectified. In other words, the requirements that you formulated aren't working out exactly as desired, and there needs to be a change to the project. You might be the one to initiate such a deviation, or a customer may come to you to point out the problem and ask for a deviation.

### **Prepare a Status Report**

In the case of a problem with the project, you should prepare a status report that definitively identifies the problem and, if possible, its underlying cause. You also map out a plan for corrective actions to rectify the problem.

### **Determine the Impact on Project Scope**

It's very critical to identify how the deviation is going to affect the project's scope. If the deviation isn't going to make a dent in the scope, then it's OK to implement the deviation and get on with your project. However, some deviations may significantly alter the scope—especially if you're altering tasks that are on the critical path. When an alteration is made to any task, activity, or phase on the critical path, if there's an adjustment to the duration, then the entire project is affected. It's highly important to define how the deviation will affect the rest of the project.

## **Quantify Deviation**

You do this by attempting to quantify the deviation in terms of time, cost, and resources. You should have a team member—the one who'll actually be doing the work—perform a time estimate on the deviation. Also map out the costs associated with the deviation and identify resources that will be occupied while the change is being made.

## **Recognize Variances**

The deviation may affect the budget or the duration of a given activity. You need to highlight the variance that the deviation will have on these project components. If the deviation will not affect the budget or task durations, say so.

## **Find Alternative Solutions**

The deviation the customer approaches you with may be more drastic than is really required. Are there alternatives to the suggested deviation—perhaps resulting in less compromise to the scope? If you can identify at least one possible alternative, you should quantify it as well, to determine what its impact on the scope will be relative to the proposed deviation. The sponsor and stakeholders or the change-control committee are going to want to see both proposals.

## **Identify Who Will Handle the Variances**

Some project variances might be so small that you don't actually have to go through the entire "notify the sponsor, rewrite the scope, and get new sign-off" procedure. Recall that your cost and time estimates include a bit of a fudge factor in them, so if the deviation isn't a big deal, you and the project team can handle it. Alternatively, the deviation might be huge—definitely requiring the attention of the sponsor and stakeholders or change-control committee and the whole scope rewrite/reapproval process.

## **Develop a Stakeholder Approval Plan**

In any case, you should notify the sponsor and stakeholders or change-control committee about the deviation. If the deviation is no big deal, simply say, "We're handling it," and move on. There will probably be no sponsor/stakeholder approval necessary.

On the other hand, a major change that has gone through revision efforts in the form of time and cost estimates, and that has had a report prepared, must be brought before the sponsor and stakeholders or change-control committee so they can approve the deviation and allow you to go forward.

Be prepared for the folks involved in approving the deviation to thoroughly query you regarding your homework relative to the requested deviation.

## ***Managing Change Control***

All projects must have some sort of change-control process, whether it's chiefly informal or highly polished and regulated. You need to have a way of accepting change requests, figuring out what kind of change is being asked for, and then responding accordingly.

This section talks about what kinds of elements you might track when setting up a change-control process. You could utilize a database of some kind, an intranet site, or even a simple spreadsheet for tracking your change requests, but you need to have a method for this.

Note that in most cases, you are not the one who approves or denies changes. In larger projects, a full change-control committee will be formed to oversee changes to the

project. You might be a member of that committee, but it's not a committee of one. Smaller projects should require that changes be at least passed through the sponsor and at least one stakeholder. In the case of indecision about whether to implement a change, the PM can be the tie-breaker.

Note that the elements described in the preceding section are certainly still pertinent. You still have to go through the process of determining the impact of the change to the scope of the project, notifying stakeholders, etc.

Following are some items that you might want to consider adding when setting up a change-control system. These items speak to specific elements of any project that may be subject to a change.

### **Physical Resource Changes**

While this element may not be affected very often, still you should provide a way to denote when a physical resource is changed. For example, you may have a room in one of your company's buildings all picked out for your project's new computer system to live in. Management changes its mind about the use of the room, requiring it for some other purpose, and offers a different room for the new system. This kind of change should be noted in your change-management tool, including but not limited to the reason for the change, person requesting the change, and impact on the scope.

### **Human Resource Changes**

Whenever a project team member is changed, it's important to document the reason for the change, the name of the replacement (if any), the person requesting the change, and the impact it will have on the scope of the project.

### **Changes to the Schedule**

Any schedule changes need to be thoroughly documented (and then approved). You need to note the specific reason for the schedule change and the person requesting it. You should also add detail items to schedule changes to show that you've studied the impact on the scope and that you are documenting it here. Unfortunately, IT projects are often subject to getting half the people they need with the same deadline as though they were fully staffed.

It's quite important to document schedule changes, because later, when people are questioning why you can't bring forth all of a project's deliverables, or your deliverables aren't of the quality that was first talked about, you can produce a schedule report that documents all of the schedule and personnel changes the project has had.

### **Budget Changes**

Changes of any kind to the finances of the project need to be noted. A part you need comes in more expensive than you'd anticipated, contractors take longer than expected, a service you're outsourcing has to be repeated in another task—anything like this that you hadn't counted on, you should track in this category.

It's important to be sure that you link these changes with your budget spreadsheet and notify finance people of the changes, in addition to the ordinary channels of sponsor and stakeholder notifications.

### **Requirements Modifications (Changes in Expectations)**

Changes to the requirements of a project, regardless of the size of the changes, represent a major departure to a project that's already underway. There are two elements to note here: What the nature of the change is about, and whether it represents scope creep. If you remember the "nice-to-haves" versus the "need-to-haves," you'll

have a lot clearer idea of what the request for modification to the requirements is all about. You'll have to get stakeholder and sponsor buy-in.

**Warning** Be prepared for a sponsor who likes the person requesting the modification to okay it, even though you don't think the change is merited.

Note that *new* requirements should *not* be allowed under any circumstances once a project's scope has been approved and is underway. New requirements should *always* be considered a new project.

## Infrastructure Changes

We've already talked about one aspect of infrastructure, that being human resources. But there are other infrastructure components that may require changing:

- Computing systems
- Software development environments (SDEs)
- Server operating system platforms
- Networking infrastructures
- Delivery methodologies

Because projects vary so much, it's impossible to list all of the infrastructure components that an IT project might require. The basic idea is this: What elements are required to accomplish this project, and which of them will remain permanently after the project is over with? These elements make up the infrastructure of the project. For example, an IT project team member may have detailed out a Sun Solaris server running Unix for your database, but as the project moves forward, you find that the company's network team has requested that you change this operating environment to Microsoft Windows 2000 Advanced Server because that's what they're trained and skilled to support when the system is put into production.

## Scope Creep Response

If it sits in a hen house, it looks like a chicken and acts like a chicken, it's probably a chicken. Scope creep should be noted for exactly what it is, and sponsors and stakeholders should be told when you think a requested change represents scope creep. We'll talk more about scope creep in the chapter section below.

[Figure 11.1](#) shows a sample change-control sheet that includes the elements we've just talked about. You could easily incorporate such a sheet in a project intranet site. This sheet is in no way comprehensive; you would want to modify its fields to match your style of project management and your corporate guidelines.

Change Management Worksheet	
<b>Project Information</b> Project Name: _____ Project Manager: _____ Project Sponsor: _____	<b>Budget Change</b> Budgeted item: _____ Old cost: _____ New cost: _____ Variance: _____ Person requesting change: _____ Reason for requested change: _____ Tactics requested: _____ Date change was requested: _____ Scope impact: _____ Approved: _____ Scope creep? _____
<b>Physical Resource Change</b> Resource currently in use: _____ Replacement resource: _____ Person requesting change: _____ Reason for requested change: _____ Date change was requested: _____ Scope impact: _____ Approved: _____ Scope creep? _____	<b>Requirements Modification</b> Requirement number (from Requirements Doc): _____ Requested change: _____ Person requesting change: _____ Reason for requested change: _____ Tactics requested: _____ Date change was requested: _____ Scope impact: _____ Approved: _____ Scope creep? _____
<b>Human Resource Change</b> Resource currently in use: _____ Replacement resource: _____ Person requesting change: _____ Reason for requested change: _____ Date change was requested: _____ Scope impact: _____ Approved: _____ Scope creep? _____	<b>Infrastructure Change</b> Infrastructure resource: _____ Person requesting change: _____ Reason for requested change: _____ Date change was requested: _____ Scope impact: _____ Approved: _____ Scope creep? _____
<b>Schedule Change</b> Old project close deadline: _____ New deadline: _____ Person requesting change: _____ Reason for requested change: _____ Tactics requested: _____ Date change was requested: _____ Scope impact: _____ Approved: _____ Scope creep? _____	

Figure 11.1: A sample change-control sheet

## Managing Scope Creep

It's important to be able to differentiate when a change request is valid from when it represents an element of scope creep. Scope creep doesn't usually consist of a single change request. Instead, scope creep happens when several changes, though inconsequential in and of themselves, added together represent a significant increase in the project's scope—whether the increase impacts the project budget or its schedule. This is why you need to be nit-picky about change requests, making sure that they are really necessary within the context of a project and then getting approval to go forward: because they have cumulative effects.

**Note** Scope creep doesn't usually occur as the result of one single change request, but it can if the change is large enough to have a major impact on the project.

You should also remember that the time when you wrote the requirements document was the time to think about all of the things that might be required of the system, so that you could include all of those elements in the scope document. Change requests shouldn't consist of things that are obvious, that you should've caught at requirements formulation time. It's a mistake on your part if this happens. Change requests that come to you should be surprises and will likely consist of one of two different types:

**Nice-to-haves** For example, a customer approaches you to tell you that she's been looking at some of the screens that are being developed. She says she'd sure like to have a button placed on one of the screens that does some function—a function way out of scope and not even talked about at requirements formulation time—but one that's doable nonetheless.

**Need-to-haves** Some change requests absolutely must be satisfied regardless of the impact on the project's scope. You cannot provide the project's deliverables otherwise. For example, a database vendor who's working with you on the implementation of your project might request a specific software component that you had not planned on purchasing—that you weren't, in fact, aware that you needed at requirements formulation time.

Here's the problem: Often customers who are turned down when they request a change to the project will go straight to the sponsor and complain that you're not being responsive to their needs. They view the entire project process as customer-driven (and it is—but the customer gets involved at the *front* of the project, not *during* the project, except at testing time), so you aren't being customer-service-oriented when you turn down their change requests. Lots of times the customer happens to be an employee of the sponsor (as a PM, you probably won't be), and if the manager's any kind of manager at all, he's sensitive to his employees' frustrations and tends to agree with your customer's point of view. The next thing you know, you're implementing the change even though you don't think it should be introduced in the project! So the whole thing pivots on politics and really has nothing to do with scope impact or all of the other PM stuff we've talked about up to now.

Which is exactly how scope creep starts.

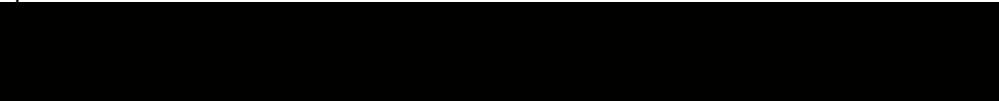
There are two ways you can manage scope creep: proactively and reactively. Proactively, you can avoid a lot of the politics by communicating up front, right at the beginning of the project, that your goal is to formulate solid requirements from which you won't want to deviate. You can spend the extra time with the customer to define the screens (on paper, if need be) and the processes they'd like to see, then use your IT specialists to translate to the actual IT system the project will produce. Be clear that you're looking for *all* the elements of the system (or at least as many as the customer can think of) ahead of time, and that there'll be little to no tolerance for changes once the project's underway. This sounds rigorous, but you're faced with the quandary of allowing for scope creep and yet bringing the project in on time and on budget if you don't set down some operating rules.

The reactive method is to simply plan in a scope-creep fudge factor and then deal with each change as it comes forward. The problem with this is that the project's budget and schedule will be far over reality, and if managers have worked with other projects, they're

going to think you're not very good at what you do (never mind that they're the same ones who will doubtless approve the many change requests that you think represent scope creep).

In either case, the best tool you can use is your communication ability. Sponsors, stakeholders, and customers need to be clearly told when a change request is a nice-to-have, wasn't negotiated at requirements formulation time and, if implemented, represents scope creep at its finest. You should not mince words (though always being ever-so-diplomatic) when it comes to calling scope creep what it is. A nice way of putting a change request denial is to say, "This change request is something that will fit nicely in a revision of our project's deliverable—unfortunately, changes like this have to take place in another project at a later date."

Dealing with third-party interference may represent some different challenges. Change requests that are made by third parties could potentially be much more difficult to turn down because they don't fall in the nice-to-have category; they're generally need-to-haves. It just turns out that you didn't anticipate the request as you were formulating the requirements.



### **Real World Scenario: Unanticipated Third-Party Costs That Require a Change in a Project's Scope**

Suppose that you're working on a new system that has as one of its components some software that uses a proprietary networking protocol—let's call it Virtual Packet Encapsulation (VPE) just for fun. When you were going through the entire design phase of the project, you had no clue that this VPE thing was out there. The IT folks didn't say anything about it—didn't, as it turns out, know anything about it until they started getting into the system. Now the router folks have paid you a visit. In order to support the VPE protocol, they need to buy some software for the routers that will use VPE. The software isn't cheap—its \$1,195 per router, and there are three routers to be concerned about!

On top of that, the IT folks had been having some mysterious problems with the system, problems they weren't able to solve but were chewing up time trying to solve. It turns out that the solution is in the addition of this router software. Because the VPE packets weren't being passed by the routers, the system your IT folks are developing wasn't working correctly. By buying the router software, you'll solve a problem, but you'll incur additional costs you hadn't counted on.



Team members can contribute to scope creep as well, especially if they're accessible to customers. Customers who know the team members and are comfortable with visiting them from time to time will think nothing of dropping by and suggesting a "minor change" to the system. Team members, not really thinking about things like scope creep, often won't have a problem with making an adjustment or two. It's great that team members are customer-oriented, but that adjustment or two might well occupy two hours' time and, when bundled with other minor adjustments, could potentially represent a large chunk of the project's schedule. It's very important to educate team members about the effects of scope creep and then advise them to refer any change requests your way.

#### **Note**

Keep in mind the politics of scope creep. You tell your team members that they are to refer change requests your way. You turn down the change request. The customer, now frustrated with your team member and with you, goes straight to their boss, who happens to be the project sponsor. The sponsor doesn't

understand why a simple little change such as this can't be made without any impact on the project and without having to go through the rigors of the whole burdensome change-management thing. There's no good answer for this, apart from your continued rhetoric that scope creep is a dangerous thing—if you allow just this one change for the customer, then you're forced to allow other changes and, like water dripping on a cave floor, eventually you have a stalagmite that occupies a healthy amount of the project's scope. This argument may or may not register with the sponsor, so be ready for any kind of response.

## ***Communicating Scope Change Impact***

Here's your chance to illustrate the effects of scope creep, and the reason why you'll be glad you kept good change-management records. Let's suppose you have a sponsor who doesn't understand the need for change management. You've turned down request after request by customers because they were not a part of the original requirements definition process and do not contribute to the production of the project's stated deliverables. And time after time, the customers have simply turned to the sponsor, who overruled you and authorized the changes. You're understandably pretty frustrated at this point, and probably questioning whether you have any power as PM for this project.

Furthermore, you can't request a new sponsor, because the project is specific to the area of the company that she's in charge of and utilizes IT people who are specialists in the systems her area utilizes. Finding another sponsor would be a fruitless endeavor in this situation, even if you could justify the need to upper management. Project stakeholders seem to side with her on most issues.

So what do you do? First of all, recall that the sponsor, by definition, is the one who is empowered to authorize the usage of resources required to accomplish this project. So maybe she knows something about the project budget you don't. (Not!) OK, so she's just really good at making sure her staff gets what they need (she says "need," you say "want").

Anyway, you've been diligently keeping track of all of these requests and now have a very good record of exactly how much the changes have impacted the project's scope, both in terms of its budget and its schedule. You have both the change requests and their subsequent denials, as well as the cost and duration figures for the changes once you were forced to implement them. The budget and schedule variances, while not earth-shattering, are substantial enough that you think people should see the concrete evidence of what scope creep is doing to your project.

The next thing you should do is present this material, either at the next stakeholders' meeting or in a specially called meeting that includes all stakeholders and the sponsor (because some stakeholders may not routinely show up for regular stakeholder's meetings, and you want to make sure everyone hears the same message). You offer the details of what has been happening to the group. Hopefully, this reality check will set in to people's minds, and you'll be instructed to not allow any more changes to the project unless they're absolutely required—and that at your discretion.

It's important to run significant changes by the stakeholders and sponsor and obtain their review and approval prior to implementing the change. Scope creep often happens because the changes are so minute that they may not need to be seen by managers. The sheer volume of these changes adds up to produce an impact on the project's scope.



**Real World Scenario: Project Philosophy Causes Scope Creep**

Another aspect of scope creep, a potentially much more subtle aspect, is that of a change in philosophy regarding the project. You started the project out with solid design principles. You established a good set of requirements, nailed up your project documents, obtained sign-off, assembled your team, and started the project.

Now, with the project well underway, you're getting a sense that the flavor of the project has changed a bit. Where the project's goals were at one time A and B, they're now A, B, and C, with more emphasis on C than you think there should be at this stage of the project. It's almost as if you've done too good of a job managing the project, and because the customers can see the deliverables and how they'll function once they're in production, they begin to see new uses for the deliverables—uses that will require a second project. Nevertheless, the change requests keep coming in, asking for changes that match elements of C, but not A or B. And you were reticent to consider changes to A and B—you weren't even considering C.

Again, communication techniques are your best friends in situations like this. It's going to be much more difficult to illustrate to stakeholders and customers what's occurring here, but you can accomplish it by using statistics that show the change requests you've had that do not match the project's deliverables, and coupling those statistics with the variances to prove that the work you're doing is costing time and money. You then point out that the need for C has indeed been suitably identified, but that finishing off C needs to happen in a revision of the deliverable—another project at another time.



Considering all that we've learned in this chapter, let's peek in on the Prestige Hotels project and see how you're doing.



### **Prestige Hotels: Managing Change**

The intranet administrators have added your RLV project to the project intranet site, thus making a pre-prepared change-request page available for visitors to the site. The change-request page doesn't allow just anyone to register a request, however. You must be a member of the list of personnel authorized to turn in a change request for a given project. You can't even bring up a project's request form if you're not a member of this list.

Morgan Wilson, your old friend from the network administration arm of RLV, happens to be on the list. He has turned in a change request asking that you add one of his servers to the list of mirror servers that the VSM website will utilize. He argues that by hosting the entire VSM site on W2U's servers, there really isn't a guarantee of fault tolerance or high availability.

Your urge is to simply deny the request, something you can quickly and easily do by clicking the Deny button on the change-request intranet set (PMs are the only ones with this authority). But you suspect that Morgan will push this upstream to Rolf if you don't handle it with a little more diplomacy than that.

You get Rolf, Brittany, and your boss, Pamela, together by conference call to discuss the situation. Brittany and Pamela are both on your side—they've dealt with W2U in the past and are fine with the way they've been treated before. Rolf's a little bit more of a sell because Morgan has done, in his words, "a fabulous job of managing the RLV network and would really like a shot at managing the VSM site." Finally, after an hour's worth of discussion, Brittany and Pamela convince him that the site needs to stay

where it's at and that it's very secure, fault-tolerant, and highly available at W2U. You're not 100 percent convinced that Rolf thinks this is the best move, but you leave the meeting thinking that he's compromising and trying to make the best of the situation.

You go back to your desk and click the Deny button.

## **Summary**

This chapter talked about an interesting subject: change control. We started by talking about scope deviations and the various deviations you might expect to see: design, schedule, and cost. We determined that when you're presented with a scope deviation, you need to gather several items of information to assist you with assessing the deviation:

- The cause of the deviation
- A status report detailing the deviation
- The impact on the project scope
- A quantification of the deviation
- The variances the deviation presents
- Alternative solutions to the deviation
- Who will handle the variance
- A stakeholder approval plan

We then discussed change control. There are several different kinds of changes that you might be presented with:

- Physical resource changes
- Human resource changes
- Schedule changes
- Budget changes
- Requirements modifications
- Infrastructure changes

Change control is all about judging the effect the change will have on the tasks, activities, and phases of your project and how much the change will impact the scope of the project, in terms of budget and schedule.

We also talked a bit about scope creep. This phenomenon occurs when people, typically project customers, request a slight addition to a project without the benefit of running it through a change-control process. The cumulative effect of enough of these is a significant increase in scope. When working with these kinds of requests, it's first important to determine whether you're dealing with a nice-to-have or a need-to-have request. You then assess the impact of the change, make your recommendations to the stakeholders and sponsor, and obtain their permission to make the change if it's a go.

Often, you'll deny the change request (because it's a nice-to-have and should appear in the next revision) but you'll be overridden by the sponsor, whose employees are your customers. This situation requires skillful communication on your part.

## **Exam Essentials**

**Be familiar with the elements of change control.** Know that there are different types of scope deviations: design, schedule, and cost.

**Be aware of the change-control methodologies you'll set up in order to track requested changes.** Know why you'd care about identification of the cause, generation of a status report, impact on scope, etc.

**Understand the changes that might be requested.** Among these are changes to physical resources, human resources, schedule, budget, requirements, and infrastructure.

**Be prepared to describe what scope creep is and how it adversely affects projects.** Be familiar with the characteristics of nice-to-haves versus need-to-haves, impact on scope, and the politics of scope creep.

## Key Terms

There are only two key terms to be familiar with in this chapter: nice-to-haves and need-to-haves.

## Review Questions

1. You are a project manager for an IT project that's well underway. You're in the controlling phase. A user approaches you with a change request that you evaluate and find necessary even though there is a large scope impact involved. What should be your next step?  
A. Meet with the sponsor and stakeholders, obtain sign-off of the change.  
B. Determine whether there are alternative solutions that have less impact on the scope.  
C. Evaluate the change request to see if it's really necessary.  
D. Discuss the change request with your team members to see if there's a way that you can minimize the impact on the scope. ?
2. When would a change request variance *not* affect the project's budget and duration?  
A. When it has been preapproved by the project sponsor  
B. When the customer agrees to absorb the cost of the change  
C. When you have enough built-in fudge factor to accommodate the variance  
D. When the team member working on the change can accomplish it during the course of work on other tasks. ?
3. Given the change-request steps shown, determine the correct order and then insert them into place by putting them into the boxes in the right-hand column. ?

Quantify the deviation	1.	<input type="text"/>
Prepare a status report	2.	<input type="text"/>
Deliver to stakeholders	3.	<input type="text"/>
Determine scope impact	4.	<input type="text"/>
Identify the cause(s)	5.	<input type="text"/>
Perform variance analysis	6.	<input type="text"/>

4. When quantifying the affect of a requested deviation, what project elements will you be concerned with? (Select all that apply.) ?
- A. Time
  - B. Sponsor
  - C. Cost
  - D. Resources
  - E. Stakeholders
5. You are a project manager for an IT project that's well underway. You're in the controlling phase. The network manager approaches you with a change request. It appears that some new cabling you ordered to be run underneath the computer room's raised surface floor is going to require special protective tubing. You had not budgeted for the protective tubing, nor had the vendor bid it out at the time. However, the network manager has documentation from another source that verifies that you definitely must install the tubing. Its cost is an additional \$1,800. The network manager said that its installation will only require a couple of hours. What category does this change fall under? (Select all that apply.) ?
- A. Resource
  - B. Schedule
  - C. Cost
  - D. Infrastructure
  - E. Requirements
6. When would you decide to send a change request to the stakeholders and sponsor? ?
- A. When the costs exceed budgeted fudge factors
  - B. Always
  - C. When there were no suitable alternatives
  - D. Never
7. What are some of the chief causes of scope creep? (Select all that apply.) ?
- A. Users frequently request nice-to-have additions.
  - B. A project's task is taking longer than you'd estimated.

- C. Team members add elements to a task that weren't planned for.
- D. The sponsor orders massive additions to the project.
8. When is it acceptable to analyze a customer's change request, determine that there's a suitable alternative that promises less scope impact, and implement the alternative? ?
- A. Always
- B. Always as long as the change is approved by stakeholders
- C. Always as long as the change is approved by the customer
- D. Never—one should always go with the customer's recommended change
9. Which variance is affected by a change that impacts a task's duration? ?
- A. Budget
- B. Infrastructure
- C. Schedule
- D. Resource
- E. Requirements
10. Which of these groups might submit a change request? (Select all that apply.) ?
- A. Stakeholders
- B. Sponsor
- C. Corporate managers unaffiliated with the project
- D. Vendors
- E. Team members
- F. Customers
11. Of the various change requests that might filter in, which represents the most significant impact to the project's scope? ?
- A. Resource changes
- B. Schedule changes
- C. Cost changes
- D. Requirements changes
- E. Infrastructure changes
12. Of the changes listed, which would you take to the stakeholders and sponsor for approval? (Select all that apply.) ?
- A. Slight modification to Activity 1, Task 3, requires 2 hours and falls well within duration variance. The task is on the

critical path.

- B. Heavy modification to Activity 1, Task 3, requires 20 hours and generates a 20% duration variance overrun. The task is on the critical path.
- C. Moderate modification to Activity 1, Task 3, requires 10 hours and brings the task's duration variance to precisely zero. The task is on the critical path.
- D. Slight modification to Activity 1, Task 3, requires an additional \$250 expenditure, but falls well within duration variance. The task is on the critical path.

13.

Of the changes listed, which would you communicate to the stakeholders and sponsor? (Select all that apply.)

?

- A. Slight modification to Activity 1, Task 3, requires 2 hours and falls well within duration variance. The task is on the critical path.
- B. Heavy modification to Activity 1, Task 3, requires 20 hours and generates a 20% duration variance overrun. The task is on the critical path.
- C. Moderate modification to Activity 1, Task 3, requires 10 hours and brings the task's duration variance to precisely zero. The task is on the critical path.
- D. Slight modification to Activity 1, Task 3, requires an additional \$250 expenditure, but falls well within duration variance. The task is on the critical path.

14.

A customer comes forward with a change request to the project— one that you hadn't identified at requirements formulation time, but that now makes perfect sense as you examine the request. You're completely behind the request. Unfortunately, the customer isn't an employee of the sponsor; in fact, he isn't very well liked by the sponsor. You fear that the change request may be axed for personality reasons and be disregarded for its project success merit. The change will definitely impact the project's scope. What should you do?

?

- A. Prepare a plan to gain stakeholder approval
- B. Submit the change through normal procedures and let the chips fall where they may
- C. Encourage the customer to withdraw the change request
- D. See if there's a way you can fudge enough from various task durations and costs to allow you to work the change without anyone knowing

15. Why is it important to quantify a proposed change in terms of its time, cost, and resource implications? (Select the best two answers.)

?

- A. So you know and can communicate what impact the change will have on the scope
- B. So you can figure out if you need stakeholder approval
- C. So you can justify the change request
- D. So you can turn down the change request

16. A customer approaches you with a change request, which you subsequently turn down. The request has nothing to do with the requirements you're currently trying to fulfill. The customer walks out your door and straight to the sponsor. The sponsor sends you an e-mail instructing you to implement the change. What's your first course of action?

?

- A. Set up an appointment with the sponsor so you can explain the reason the change has no merit
- B. Examine the change in terms of its time, cost, and resource impacts
- C. Send an e-mail back stating that you are the project manager and you will decide what changes get made
- D. Present the change proposal to the entire body of stakeholders

17. When presented with a change request that you know will have a serious impact on the project scope, one that you've validated as necessary, why would you prepare more than one alternative to look at? (Select the best answer.)

?

- A. So that the customer can pick from the list

- B. So that stakeholders can choose the best option for the project
- C. So that team members can advise you on the soundness of each
- D. So that you get the costs down as far as possible

18.

Your sponsor institutes a change request that spells a major change in expectations for the project. After meeting with her, you determine that the goals and vision of the original project are no longer in operation and she's thinking about things in a different way now. What should your approach be?

?

- A. Examine the costs associated with the change. Kill the project. Start over.
- B. Examine the costs associated with the change. Go forward with the change.
- C. Examine the costs associated with the change. Go to the stakeholder committee with the proposed change and variance analysis.
- D. Resign as project manager for this project.

19.

Of the change requests listed, which is most likely to have a negative impact on the project's budget?

?

- A. Resource changes
- B. Schedule changes
- C. Cost changes
- D. Requirements changes
- E. Infrastructure changes

20.

What is scope creep predominantly made up of?

?

- A. Nice-to-have additions that aren't registered through the change- control process
- B. Nice-to-have additions that are registered through the change- control process
- C. Team member additions that are registered through the change- control process
- D. Need-to-have additions that are registered through the change- control process

**Answers**

1.

B

Especially with change requests that have a large scope impact, it's important to determine if there are less disruptive alternatives that won't have so much influence on the scope.

2.

C

One of the reasons that you build in a little bit of quality overhead when doing your time and cost estimates is this very problem. You have a change request that comes in, and you have to spend some extra time and/or money working on it. You'll be the one that evaluates when a variance goes over the limit of what you've budgeted and requires the attention of the sponsor.

3.

1. Identify the cause(s)

2. Quantify the deviation

3. Perform variance analysis

4. Determine scope impact

5. Prepare a status report

6. Deliver to stakeholders

You receive the change request and first identify the cause for the desired change. Next, you quantify the deviation—how much impact will it have? You perform a variance analysis that shows you whether you can keep the change internal to the team or you are forced to move it to the stakeholders and sponsor. You document the scope impact and then prepare a status report. Finally, if need be, you take the change request to the stakeholders for approval.

4.

A, C, D

When quantifying a deviation, you'll be examining the effect that the deviation has in terms of its additional costs, time, and resources required to implement the change.

5.

A, C, D

The project's requirements have not changed just because the cabling has to be run inside the tubing. However, you require additional resources, at an additional cost, and there's an impact on the project's infrastructure.

6.

A

All that cost and time estimating you did serves more than one purpose. In the case of a change request, you should determine whether you can perform the change without adversely impacting your budget or duration estimates—thus negating your need to contact the stakeholders and sponsor.

7.

A, C

This question asks what some of the chief causes of scope creep are. A task that's taking longer than you'd estimated doesn't qualify as scope creep (unless it happens extremely frequently). However, users that come to team members and ask for nice-to-have additions, or team members who add elements to a task that wasn't in the plan can easily constitute scope creep. The sponsor isn't likely to order massive additions to the project, but even if she did, she's empowered to authorize the resources needed and one would presume she's fine with the adjustments required.

8.

B

If you have to make a change that impacts the project's scope, then you should first search for an acceptable alternative that doesn't have as *much* impact, and if you find that alternative, propose it to the stakeholders for approval. While it's advisable to present the alternative first, stakeholders may think the customer's approach makes more sense so you should at least mention what the customer suggested. The customer isn't involved in approving changes.

9.

C

Changes to a task's duration imply that the schedule changes, and you'll need to examine the schedule variance for this particular task to see if the variance falls within acceptable limits.

10.

A, B, E, F

It's unlikely that vendors will be submitting any change requests. Ditto for corporate managers that don't have any affiliation with your project. But stakeholders, sponsors, team members, and customers are all likely change submitters.

11.

D

Anytime you begin to mess around with the requirements of the project, you're basically forced to go back to the drawing board and go through a redesign. An added requirement might have vast impact: on tasks, the critical path, team members, and so forth. While the other changes may have a significant scope impact, a requirements change, by far, means big adjustments for the project's scope.

12.

B, C

There's no doubt about B. Item C is a close call because it is right at going over its variance allowance—meaning that if anything else untoward happens with this task, it's an overrun and you'll have to communicate that, plus the change. Both of these task additions would require approval from the stakeholders and sponsor.

13.

A, B, C, D

You always communicate changes to the stakeholders and sponsor. They should never be out of the communications loop with regard to changes—you just may not need their approval because requested changes are within variance tolerances.

14.

A

The project sponsor isn't the only stakeholder in the project. Prepare some sort of a plan that gives your best effort at communicating to the group the value of the proposed change.

[15.](#)

A, B

Quantifying a change request's impact in terms of time, cost, and resources allows you to factually communicate its impact on the project and determine if you can work the change through without formal stakeholder approval. You justify or turn down change requests based upon their fit with the current list of requirements, not strictly out of cost or time concerns.

[16.](#)

B

You can most effectively prove that the change should not be implemented by simply running it through its courses to see what kind of impact it might have on the project's scope. If the change is an easy one and can be accomplished with minimal overhead, and it isn't technically challenging, why fight city hall? Just go for it. On the other hand, if the change has dramatic impact on the scope, then you need to illustrate the variances involved to the sponsor and stakeholders. In the end, it's up to them to decide.

[17.](#)

B

The idea with more than one alternative is that you can give stakeholders some options relative to the change—then let them make the decision that makes the most sense, in terms of the project's soundness. The customer probably won't have very much input as to the alternative selected. Team members can help you prepare the alternatives. All alternatives are designed to reduce costs as much as possible, but that's not the reason you prepare multiple alternatives.

[18.](#)

C

First things first. Examine the proposed change to see what kind of effect it's going to have on the overall scope of the project. Next, prepare a report fully outlining the nature of the change request and your analysis of it. If the change is approved, there's certainly no harm in suggesting that the change is so massive that you'd recommend killing the project and starting over. As for D? Well, winners never quit and quitters never win.

[19.](#)

C

A cost change likely means that the budget's going to be reduced, which is going to force you to examine all tasks and activities and figure out where you can pare back. A requirements change might also have a significant impact on the budget, but one would presume that the budget would be increased if the requirements were increased, wouldn't one?

[20.](#)

A

The customer takes the elevator to the tenth floor, where the developers are, drops off a candy bar and a bottle of root beer, asks for a "small" change to a screen... and then does this 20 more times throughout the life of the project. Poof!

You've got your scope creep all bundled up and ready to show itself off as "over budget and behind schedule."

## Chapter 12: Managing Teams, Resources, and Quality

### ***CompTIA Exam Objectives Covered in this Chapter:***

- 3.12 Identify and explain strategies for maintaining qualified deliverables, given a large project with many team members at multiple locations (e.g., communication standards, work standards, etc.).
- 3.13 Recognize and explain the importance of quality testing in situations where tasks are being performed both by project team members and by third parties.
- 3.14 Identify and explain strategies for assuring quality during the turnover phase (e.g., user docs, user training, helpdesk training, support structure, etc.).
- 3.15 Identify strategies for providing constructive, timely performance feedback to a multi-geographical project team with diverse skills, doing it in such a way that it enhances each individual team member's value to the project.
- 3.16 Given disgruntled employees, who are effecting team morale, demonstrate an understanding of when to encourage, punish, reassign, and how to address these issues/situations within the team to restore team morale.
- 3.17 Given a management scenario in which there are individual performance problems, demonstrate how to recognize and understand issues, conditions, and underlying problems, and identify corrective actions that will help the employee return to productivity, including the following situations:
  - A top performer has started to slack off
  - An individual reports to the manager substandard performance on the part of another person
- 3.18 Given need to make up severe schedule slippage, demonstrate understanding of how to lead the project team through an extended overtime period, including how to motivate and reward, how to show sensitivity to individuals, and how to lead rather than push.
- 3.19 Given team performance problems and the causes, demonstrate the ability to develop a plan to address/correct the cause of the problem, including in the following situations:
  - The team is not focused and is pulling in different directions
  - The team is fragmented into special interests or social groups and not united
- 3.20 Recognize the need to provide leadership that is sensitive to the knowledge, skills, and abilities of team members, and to the corporate culture, while at the same time motivating the team to accomplish the goals defined in the project scope.
  - Recognize and explain the need for a project manager to do the following:
    - Perform in a manner consistent with a leadership position
    - Adapt leadership style to a specific situation or person
    - Influence or motivate others so that the requirements from a given situation are accomplished
    - Build positive relationships to be accepted as a leader
    - Provide personal leadership as well as positional leadership
- 3.21 Given an initial high level scope, budget, and resource allocation, demonstrate understanding of the need to investigate which aspects of

the project could be modified to improve outcomes (i.e., find out what is negotiable, prepare to negotiate).

- Provide evidence of the following competencies:
- Recognition that individual project team member's needs must be addressed to the extent that project activities can be modified without significant impact on final scope, budget, quality, or schedule
- The ability to evaluate alternatives to a scope change request that stakeholders may find acceptable, or the ability to recognize which aspects (schedule, budget, quality) of the project are most important to the stakeholders and be able to propose trade-offs during the project that can be made to meet or exceed those aspects
- The ability to recognize which aspects (schedule, budget, quality) of the project are more important to the stakeholders and be able to propose trade-offs during the project that can be made to meet or exceed those aspects
- The ability to identify all of the individuals and groups with which you will need to negotiate during the life of the project (sponsors, vendors, users, internal and external service organizations, other project teams, project team members, finance/accounting, etc.)

In most projects, the operating word is *disparate*. You have a variety of teams, both technical and nontechnical, all (hopefully) working toward the same project completion goal. The project manager's job is to manage all of the project's assets, the teams, the resources, and the quality of the project's outcome.

## ***Managing Teams***

Project managers often wear two hats: the project cheerleader and a manager of people. The two are naturally linked, but lots of times PMs concentrate on the project management component and don't worry very much about people management. More often than not, the people part is more important than the project itself. Effectively managing the people will go a long way toward guaranteeing a project's success.

Project managers have an unusual managerial challenge in that they are required to manage both technical and nontechnical folks. This situation doesn't crop up as much in other managerial circles, and it can provide interesting situations in which PMs must put forward their best leadership and communications skills. In any given IT project team, you may have a variety of people:

- IT specialists of various genres (web, routers and switches, servers, databases, etc.)
- Documentation experts
- Logistics personnel
- Business analysts
- Graphic artists
- Budget analysts

You may be technical, but you still might not be able to speak in straight acronyms like the complete technoids can. On the other hand, you must be able to translate what the technicians are saying into regular human-speak for the business analyst. And the budget person might only be interested in how much you spend—he's concentrating on debits and credits. So you've got your work cut out for you as an IT PM.

As a manager over a group of people, you may very likely be held accountable for writing your team members' performance reviews, disciplining those who are underperforming,

and motivating team members to reach ever forward toward the prize (the completion of the deliverables and closure of the project).

### **Team Complexities and Considerations**

The challenge is even more complicated if you have a project team that consists of people separated by large geographic distances, perhaps in different U.S. states, separate countries, or even multiple continents. Not all IT projects are isolated to a single campus where you can keep folks reined in nice and neat. Multiple-location considerations become even more complex because you may have to deal with language issues.

In a diverse geographic setting, you might want to consider appointing trusted team leads over the individuals who are at each site. That way, when a performance review or feedback is needed, there's someone local to handle it.

It's important that you take care, when giving feedback or performance reviews to team members, to give constructive and timely information in a way that enhances, not detracts from, the person's value to the team. "John, things aren't progressing as quickly as I'd hoped with your tasks. Are there obstacles that you face—can I help you in some way?" works much better than "\$&#@ John! You've got to get these tasks done! We're way behind schedule because of you!"

When giving feedback or performance reviews, it's also crucial that you recognize that each individual team member brings to the team a unique set of skills and talents that another person may not possess. You should try to sharpen your ability to pick out those skills and draw them out of team members—applying them in the best way possible to the project at hand. Team members who feel like they're a part of the action and are contributing something to the team are far more likely to produce quality results than those that don't feel like they belong to the project.

### **The Disgruntled Employee**

That being said, what do you do with a disgruntled employee? There's so much damage a person like this can do to team morale, in such a short time, that you really have to work hard to make sure you quell this kind of thing very quickly. It's important to take some time with this employee—to get to know him or her—and see if you can figure out what the issues are. Perhaps you can simply encourage this person and get them to see that you're behind them and that they're an integral part of the team. Or you might simply have a rogue on your hands whom you need to punish or reassign. In any case, you and the employee should talk it through, getting to the heart of the matter, and then you as the PM do something about the situation.

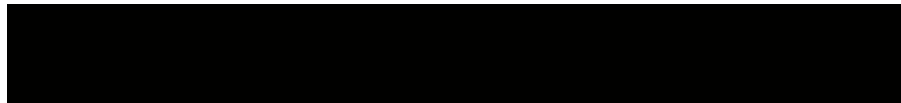
Disgruntled employees can also wreak havoc on team members simply by floating around from cubicle to cubicle (cube hopping), bad-mouthing the project, you, and the management above you—just trying as hard as they can to make sure others know how terrible the project is. You've got to nip this in the bud as soon as possible! Such negativism is not good. However, the other side of the coin is that you need to confront the employee with the statements and try to find out why he made them. Perhaps he has a great reason for saying what he's saying, and he's frustrated that neither you nor anyone else in management wants to listen to him. Maybe he has some great ideas and might wind up saving you from a lot of embarrassment, if the project were to go forward as is. In any case, you have to get the bad-mouthing stopped before it completely destroys team morale.



**Real World Scenario: Maybe It's Not the Team Member—It's You!**

I once had an employee who was already in his position when I got my job as manager over the team. At first, it was obvious there was an attitude problem with this employee. I couldn't understand why. I thought I was being nice to him—we talked in team meetings and I occasionally chatted with him in his cubicle. But there was that constant, nagging, bad attitude. He was just grouchy, irritable, and hard to be around.

One day, it became apparent what was going on. He said to me, "If I had applied for the job after you got here, you wouldn't have hired me!" I must've been coming across as arrogant, snobbish, or in some way standoffish to him, and he took it as a slight on his technical skills. I had to modify the way that I worked with him; I tried to show him that I valued his technical prowess (he's very good at what he does) and that he played a valuable role on the team. Today, he's one of our better employees and takes on a lot of extra responsibility. He's a wonderful team member! But because my disposition toward him was wrong, he was able to turn on a bad attitude, and everyone—he, his teammates, and I—paid for it!



### **Dealing with Performance Problems**

Then again, you could just have a bad apple. Face it—the world has a lot of people who are there simply to collect a paycheck, who take very little pride in their work and refuse to be involved as a team member. In such situations, you have to take some time, build a objective documentation basis, and then replace the individual who has the problem.

Here's where it gets really hard: There may be no one else to replace this person! You're stuck trying to work it out as best as you can with this individual. But if there are others available, you need to first be sure that you're not going into a meeting where you're going to fire someone from the team and say very subjective (and very dumb) things. Following are some sure-fire statements you can make in such a setting to show how little you know about management:

- You: "Everyone's talking about what a poor job you're doing!" Employee: "Oh really? Who's everyone?"
- You: "You know, I really expect more out of you than this!" Employee: "Do tell! How does it feel to expect and not be rewarded?"
- You: "You know, if I had twelve more like Sam..." Employee: "Maybe you can get Sam cloned and leave me alone!"
- You: "Why isn't this project as important to you as it is to me? Don't you understand what we're trying to accomplish here?" Employee: "Yeah, you're trying to accomplish that \$10,000 bonus you get for bringing this thing in on time and under budget!"

Use positive communications in a nonthreatening way that will help such people either give you the information you desire to help clear up the problem they're having or else allow you the leeway you need to let them go.

Conversely, what about great performers who have substantially dropped in their performance? There could be all kinds of factors driving such a thing: too much overtime, debt, family problems, loss of belief in the project, illness, etc.

With this kind of situation, you should sit down with this person over a cup of tea or coffee and try to talk things out. You should take your time— don't go in with both guns blazing! Instead, be honest: tell the team member that you've noticed a drop in productivity. Next, ask if he has any idea what the problem might be. More than likely, if you've maintained a good one-on-one relationship all along with this person, he'll open up and tell you what's happening. If not, then there's nothing that you can do other than

tell him that you'll pay a little more attention to his work, to see if there's something you can do to assist.

Sometimes you'll hear a complaint from one person on the team that another person isn't doing her job. Dealing with scenarios like this can be tricky, because you have to first substantiate what you're being told and *then* deal with the problem. If you cannot validate that the person you're told was slacking off is truly doing so, then you may have a jealousy or sabotage issue on your hands, and you must manage things from a whole different perspective. Keep in mind that you may be dealing with people who have very different skills—one might be a programmer, another a budget analyst, for example—and one person doesn't understand what the other's job is all about.

### **Managing Schedule Slippages**

Suppose that your project has, for some reason, slipped far behind. You've just now come to grips with the issue, and you're trying to determine the best way to get back on track. There's really no other way to get back on schedule than for your team to work some overtime.

You'll find that software developers are fairly used to overtime. You may have noticed that they voluntarily stay long after hours working on code. For some reason, overtime seems to be a part of the developer's shtick—they can't stand leaving a module of code five-eighths of the way done! It's the same thing musical composers deal with: If they stop in the middle of something, they're going to "lose the muse" and the rest of the song (or code) won't be as good, won't carry the same themes as what has already been done. (Or, they'll just forget where they were and what they were doing.)

Contrarily, others may not be so delighted at your suggestion that everyone must work some overtime.

First of all, assess who actually needs to work the overtime. If the web developers are the ones who are behind, it makes no sense for you to keep the server administrators after hours watching the developers slave over a keyboard and monitor. Chances are very good that if anything slips, it'll be the development side of the project that needs the extra time.

Next, you have to *ask* people to be *willing* to put in some extra hours. You can't tell people that they're expected to be there fourteen hours a day, six or seven days a week. That just won't go over very well. But what you can do is see if there are allowances you can make so that people feel more comfortable while they're working the long hours, thus helping them feel like they at least have *some* control over the problem. I've heard of software development companies that allow their developers to bring in their fish tanks, a favorite rug—one developer I knew brought in his electric guitars and played heavy metal rock 'n' roll for an hour just to shake the cobwebs out of his brain! Give people ownership over their lives while they're on the job, and you'll find that they'll be more willing to stick around through the long hours.

Also, see if you can figure out some rewards for the extra work. It doesn't have to be anything really complex—a half-day off where everyone brings a picnic lunch, throws a Frisbee, and drinks some refreshments will do. The idea is that you give folks something to strive for. Some companies who have a lot of money at stake in a project will pay out huge bonuses to people once they've brought the project in. Microsoft has generated a lot of millionaires by providing stock options as an incentive for getting code out the door. Maybe you could talk to management and see if you can sweeten the pot a little bit in order to get the project back on schedule.

Finally, it's important that you lead them through the process. That means that you probably need to put in some hours yourself—be there for your folks, working overtime with them, if for nothing else than to bring them coffee or to work through some problem-solving dialog with them. But you have to lead, not push, which means you show sensitivity to people and their needs and people see that you, too, are committed to making the project work. (Hey, who said being a PM would be easy?)

There's an opposite problem you'll have to deal with in situations like this: Some people don't know when to go home! I can remember leaving my job one night at nine o'clock and seeing a young man and his wife sitting side-by-side—he at the computer, she with her hands clasped waiting for him to finish working! Both were Oracle DBAs, and they had been plugging away at the system since early morning. She had finally put her coat on and was ready to go home, but he wasn't quite so ready. Since he had the car keys, she waited while he finished up. I thought two things at once: He's really a dedicated employee; and, if he doesn't knock it off, he's likely to be divorced soon! There's an old saying: "All work and no play makes Jack a dull boy." Truer words have never been spoken. Get your workaholics out of the office and home for dinner once in awhile.

### **Correcting Team Performance Problems**

Sometimes the team as a whole isn't working well. There's some sort of bad karma going on, and the team is stumbling around trying to find its direction. Or, alternately, the team is fragmented into cliques, and people aren't talking to each other. Both situations are bad for project deadlines.

You manage this by using communications skills to get at the root of the problem. You then develop a plan to address or correct the problem. For example, suppose that you have a project in which a few developers tend to travel in a herd, leaving the other team members out of the picture. Maybe you could solve this by having some regular potlucks where people are required to get their dinner and sit at a table with the rest of the team members (no taking your plate back to your desk!). Diversity potlucks are especially fun, because people of different backgrounds get an opportunity to bring in food that they enjoy to share with others. Almost everyone loves to eat, and it's a great way to break the ice so that your developers can meet others besides their own kind.

Or, you might schedule some teambuilding sessions (early morning or late evening, please—not during times when people are concentrating on activities) where you do something fun. You could do free-throw contests, see who can blow up the biggest balloon, or any of hundreds of other quick and fun things to do. One company I work for brought in a bunch of water squirters one hot day, and at lunchtime everyone went outside and went berserk with them. It was a fun, cooling way to relax for a while. You don't need to do anything extravagant—just think about things people like to do together.

You could also have some contests. Perhaps send around an electronic crossword puzzle and ask each team member to fill in a word. Or put up some of those poetry magnets that you can buy in the bookstores, little refrigerator magnets with all sorts of words on them, and see if you can get a poetry contest going on the team fridge.

Creativity, open communication, and the understanding that people are still people, regardless of how complex or basic their skills are, will help you unlock the mysteries of team performance. (That and beer. Lots of beer.)

### **Recognizing Different Skill Sets**

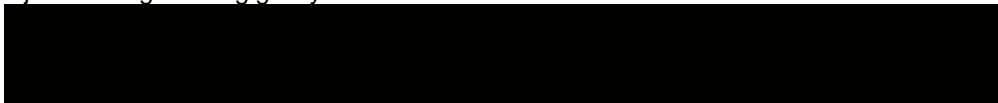
As a project manager, you're a leader who is being looked to for commitment, communications, problem-solving, tie-breaking, coaching, and occasional crying-towel skills. It's important that you recognize that each team member is, first and foremost, an individual with unique knowledge, skills, and abilities along with his or her own unique set of needs and wants. They are people first, team members second. So getting down to the people level with your team members—recognizing that they might've had a difficult night's sleep, or that they have some bills they don't know how they're going to pay, or even that they're sick of working for the company and desperately want to find a new job somewhere else—is the most important skill you can bring to the leadership table. We talked about it before; it's called management by walking around (MBWA), and it's incredibly effective. The basic idea is this: You don't talk about yourself very much; you just walk around each day and chat with your team members, trying to get a feel for what's going on in their lives. Some people won't have much to say—all's right with the world today. Others might have something serious going on, but are close-lipped about

it. Others will open right up. It doesn't matter all that much whether they say a whole lot or not—what matters is that you're there to listen. *Then* you can go back to the office and knock out that report that's overdue.

An adaptable leadership style is one that's very good to develop. People don't always need to be directed the same way. Joe, who's a marvelous C++ coder with a long history in it, for example, probably doesn't need your counsel on how to whip up a C++ program loaded with objects. With him, you're in a mode we call *coaching*: "Go get 'em, Joe! I know you can do it!" On the other hand, if you assign Joe the job of writing some extensive Java code, you can't expect him come up to speed over night simply because he knows C++. You're in *directed leadership* mode with him at this point. You tell him what you want done, giving him smaller bites to chew, and you provide him with the training and resources he needs to get the task done. You don't say, "I know you've got it in you!" because he *doesn't* have it in him. He's just starting.

People need to see that you are a person of your word, of strong stuff and able to stick to the task at hand. One of the best things you can do, if you can at all help it, is to refrain from trash-mouthing your peers or managers above you. This is difficult to do sometimes—it's easier to be a cynic than to be positive—but for the good of your employees, it's better to say nothing at all if you can't say something positive about another person. You don't need to build up someone who's truly not a good example, but you also don't need to tear them down in front of others.

Come in to work on time. Don't call in sick unless you really are. Share your team member's lives—get interested in what they're interested in. But once you find out a worker has a sick parent at home, don't let them walk all over you with that—use common sense! Be fair, be equitable, be a truth-teller. Find good ways to explain things, and if you can't find the right word, don't pick the wrong one. These are ways that you can show others your potential as a leader, never mind whether this is your first official project management gig or your one thousandth.

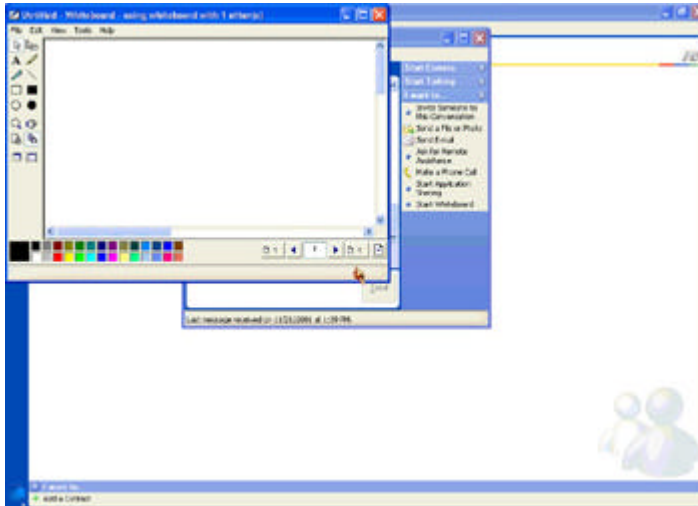


### **The Latest in Technology Helps You Manage Teams from Afar**

Electronic processes, either in the form of e-mail or instant messaging (IM), can be greatly beneficial when you have large group of individuals that you need to communicate with one or two at a time. Instant messaging, especially, is shaping up to be an online collaborative tool that can help you gain some valuable project management ground without having to waste time with e-mail, snail mail, or the telephone.

Microsoft's Windows XP includes, embedded in the operating system (OS), a version of IM called Windows Messenger. There are other IM solutions in the world—ICQ and AOL Instant Messenger chief among them—but the fact that Windows Messenger is embedded in the OS provides some very practical benefits. For example, if all of your project team members are running Windows XP and have an Internet connection, all of you can share an IM chat session, run a virtual whiteboard, transfer files from computer to computer, run a collaborative copy of Word (and other Office products), and use a camera and a microphone—all over MSN's servers! This kind of collaborative capability will really help PMs get in touch with their teams by allowing for virtual team meetings, design sessions, and even performance reviews. The PM no longer has to hold a performance review over the telephone; she can see the person she's reviewing and that person can see her.

The following graphic shows an open IM session with the virtual whiteboard open as well. You have to invite someone to participate in a virtual whiteboard session; they have to accept, and then you get the window shown here. Both (or all) participants can work on the whiteboard, and you can save the contents of your session when done. Audio, video, remote control, and other IM amenities work basically the same way.

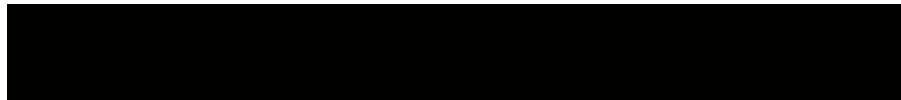


Windows Messenger supports another feature called emoticons. Most people who've used e-mail are probably familiar with the old trick of making a smiley face with a colon, dash, and right parenthesis. If you try this in a Windows Messenger session, you'll get a cute yellow smiley face. There are other emoticons as well.

You have the ability to set your Windows Messenger client to show that you're busy, at lunch, out of the office, or other statuses. Microsoft provides a downscaled Windows Messenger client for all Windows 9x and higher clients as well as Macintosh. Visit [www.msn.com](http://www.msn.com) for more information. If someone who you want to visit doesn't currently have the Windows Messenger client, you can send them an e-mail from within your client that will send them a link to the software. If you're using MSN's servers to utilize Windows Messenger, you and your team members must have a Passport account, a simple and easy thing to set up.

Exchange 2000 Server also supports, out of the box, an IM client and chat rooms as well. If you're not interested in getting into the whole Passport thing with MSN, and your network is running Windows 2000 with Active Directory and Exchange 2000, you can set up IM locally instead.

Instant messaging represents a wonderful new way to manage geographically separated team members!



## ***Managing the Output of the Project***

Some projects have enough clout that a lot of people not directly affiliated with the projects are looking at them with great interest. A project might have such far-reaching impact that many different entities are concerned about how it comes out. For this reason, it might be beneficial to assist a project in putting its best foot forward by finding ways to increase the performance or output of the project—by reducing the budget, decreasing the schedule, or somehow increasing the quality of deliverables.

First of all, you should recognize that you can't do this if your team isn't already performing at or beyond its capability. You probably can't stretch a team that's barely able to meet the current schedule to work even faster. In order to put a team into overdrive, the people on the team have to be ready to take on the additional challenge and be able to easily bear the extra burden of attempting to bring a project in with a

significant impact on the final scope's budget, quality, or schedule. This means that your leadership style is one that has the team self-actualizing: knocking out the deliverables at a rapid pace, with everyone happy, cooperative, and working toward a common goal.

Next, take a look at the scope of the project. See if you can determine the highlights of what the stakeholders are looking for. Try to determine which constraint, for example, seems to be most important to them: time, budget, or quality. Then take a look at the tasks within the project that don't seem to have as clear a fit with stakeholder expectations or aren't as important as others. Perhaps you can whittle the size of these tasks down, thus giving you room to increase your operations on the most important tasks. For example, perhaps you can reuse software modules from a code library—modules that have been already written and don't have quite the same functionality you're looking for but will work nonetheless. Taking advantage of "reusable code" allows you to save many extra steps.

Finally, if you've determined that there are suitable alternatives to the proposed project plan—alternatives that will allow you to streamline the plan and bring the project in faster, or with a lower budget, or with better quality (usually not all three)—then you have to determine whom you'll need to negotiate the proposed changes with. Stakeholders and sponsors may not be the only ones interested in your ideas for streamlining the project. You may find that you have to communicate with users, vendors, internal and external service organizations, other project teams, your own project team members, and the project's financial people.

## ***Managing Quality***

Quality control is a large part of what the PM does. It is up to the PM to validate that tasks are being performed in such a way that the deliverables being provided will be of good quality, relative, of course, to the time and budget parameters the PM and his team have at their disposal. Recall that quality pivots off of the other two constraints, so limitations on time and budget may seriously restrict a PM's ability to provide a high-quality deliverable.

Managing quality well means that someone validates code modules before they're applied to the system as a whole. Someone makes sure that liberal commenting has been applied in the code. Someone validates that a module runs as it's supposed to, by running one last time through the logic flow diagrams (following along in the code), by stepping through the code in the debugger (to make sure it goes where you think it's going to go) and, if need be, by user acceptance testing (UAT). This someone can be the PM, but it's primarily the PM's job to make sure it gets done, by scheduling someone to do it.

You can validate the same things with servers, infrastructure, router and protocol configurations, and everything else that pertains to your project. The basic question you ask is this: Has the team member done what the task said to do, and does the end result match what we're looking for?

### **Real World Scenario: Why Does Microsoft Windows XP Run Faster?**

Have you considered why Microsoft's Windows XP boots faster, runs faster, and runs apps faster than previous operating systems? Is it because Microsoft has reduced the amount of code in Windows XP? Hardly. Well then, does it have to do with new advances in hardware—faster RAM and processes make the code run faster? Only marginally. If you have an up-to-date computer system that was running Windows Me and is now running Windows XP Home or Windows XP Professional, you will certainly notice the increase in operational speed, regardless of the hardware.

So what is it?

It's in the code—the tightening of loops, closing up of `If/Else` statements, and elimination of other incongruities that make code run slower. Microsoft may have bought a company's software, but at some point they turn around, go back in, and refine the code so that it's better, faster, and leaner. Which is why Microsoft has been a leader for decades.

Do you visit those code modules one last time? Do you check those loops—making sure they're closed and that the logic is fast and tight? Do you use nested `IFs` instead of `CASE` statements? Do you cut down code that's unneeded, unmerited, and unwanted? That's what Microsoft does to beef up its quality.



One difficulty that you'll encounter with larger projects might be that team members are spread out over multiple locations. There may be a very good reason for this—servers have to be installed at each location, database replication has to take place, users have to have client components installed at each site. But you somehow must still manage the quality component. There are several ways to do this, two of which are centralization and standardization.

**Centralization** Code that is written and compiled at a central location, then deployed to users throughout the company, is much more prone to great quality than code in which some modules are written in one place and then coupled with others that were written elsewhere. The former is a much better scenario than the latter.

**Standardization** One of the best things you can do is to standardize wherever possible. For example, the process to install a server's network operating system (NOS) and associated software is called "burning." You should have your server administrators go through and prepare a standard burn document that details precisely how each server should be burned so that no one server has things installed that aren't on the others. You should also, as much as is possible, standardize on the kind of hardware you use in the system, at all locations.

You can also standardize on code modules. All modules should have basic entry and exit points that initialize common variables and clean those variables out of memory as the program exits. Variables should have a common naming nomenclature, so that programmers who need to modify a piece of code they haven't worked on before will have little difficulty recognizing the declaration of variables.

Database structures should all have standard naming nomenclatures, column names should follow a naming standard, and databases should be normalized using common techniques.

When possible, you should strive for software development teams to be located in the same area. That's not always a possibility, and e-mail makes things much simpler, but it's difficult to get everyone together to talk about standardization policies and project techniques when one person's in Boston and another's in Shanghai.

Servers can be burned at a central location and shipped to their destination, then hung in the rack at their permanent home. They can be given IP addresses when they get there. By pre-burning servers at the local project site, you save yourself the possibility of encountering trouble because an admin didn't correctly burn a server.

You should also follow good communications standards, regardless of the location of personnel. When a code module is complete, for example, it would be prudent to have a preformatted checklist the developer follows that acknowledges that certain expected items have been provided. You should also go through liberal testing, regardless of the physical location of the developer. Testers typically live at the central core of the project, so you can simply walk down the hall to talk to them.

## Testing

Testing is something you should always try to devote extra time to. Testing is a boring job—someone has to run the code over and over again, testing different things in different modules, taking notes about its performance. But it's got to be done. You should have at your disposal testers who are ready and willing to thoroughly run your new code through its paces.

There are several kinds of testing:

**Module testing** A programmer completes a module of code and needs to test it. Some modules don't lend themselves to much module testing, because they're designed to interface with other modules. Still, the programmer can check to make sure that variables load up correctly, that the code goes to the places it's supposed to go to depending on the input, and that memory gets cleaned up and the program exits correctly. Often developers can run their code through a checker that steps the code line by line to see how it behaves and how it loads up memory variables. The process can be at once very interesting and yet extremely frustrating, because the developer has something going wrong but can't figure out where—all of the code appears to be doing what she wants it to do.

At this stage of the game, dynamic link libraries (DLLs) and other informational files are also tested for complete accurate content.

**Unit testing** Once several modules that go together have been satisfactorily tested, you can test them all at once in unit testing. The idea here is that you might test an entire printing system or a set of algorithms that calculates something. You're testing the functionality of pieces that have been put together to form a cohesive something.

**System testing** Next, you test the entire system as a whole. Make sure the system flows as expected, that the user doesn't encounter unexpected loops or gotchas (such as "deer in the headlights" frozen screens), that the system is fast and functional, and that it delivers what the customer is expecting. System testing should take you a long time, because you thoroughly test each component and the whole.

**User acceptance testing (UAT)** This is the time when you actually bring in a small set of users to begin testing the deliverable. By the time you get to UAT, you should've worked out all bugs, speed or logic issues, and flow problems. The system should be at its best, most pristine state. This is the system you currently expect the user to utilize in production—until the UAT testers find the problems others missed.

Testing especially becomes important when you're outsourcing some activities through a contractor or other third party such as a business partner. Since you haven't have a chance to keep an eye on third parties while they work on elements of your project, it's even more important to follow strict testing regimens.

## Turnover

Turnover is a feature of the closing phase (in the IPECC style of project management) or ending phase (in PACE). When you get ready to turn over a new system to the customer, there are several things you must pay attention to in order to assure that the customer experiences quality in all facets of the project.

**User documentation** Any documentation that the user requires in order to utilize the system should be prepared, bound (or put into an easily readable format such as PDF), and available for all users. Help-screen documentation should be complete and thorough. There is nothing more annoying than hitting F1 for help only to find "No help is available for this topic" or extremely minimal information.

**User training** Curricula should be developed, the trainers who will provide the training should be educated on the new system and ready to go, and the training documentation should be printed and bound, ready for class. Training materials such as demonstrations and visuals should be ready. Training classes should be put on the training calendar shortly before product release, and people should be able to sign up for training so that they can be ready to use the system quickly after it has released.

**Help-desk training** IT project managers are often good about considering end-user training and getting classes ready for users, but they don't often consider the person in the trenches, the help-desk technician, who will wind up getting calls from users about how the new system works. It is quite important to take into consideration where the help desk is going to fit in terms of supporting the new system and to then prepare help-desk technicians in advance with the training they will need to support users. Especially during the early phases of new system release, users are going to have questions about how the system works and may turn to the help desk for answers. The help desk needs to be ready to go at deployment time.

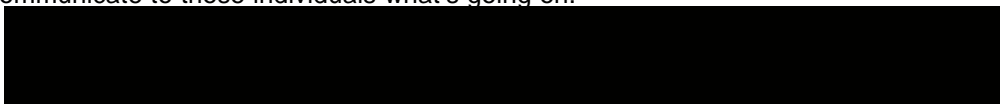
**Other support structure** Server administrators must be aware of the impact that the new system will have on servers. It is unreasonable to install new server software on existing or new servers and not relay information about it to the server admins.

PC technicians may also need to be aware of any impact the new system will have on the client computer. For example, if your new app uses Oracle forms or a Visual Basic front-end, or if a thin-client application requires the download of a Java client, there may be problems introduced to some client computers. It's important that PC technicians know how the new system impacts the client computers so they can, in turn, support the end user.

Database administrators (DBAs) must also be aware of modifications or changes in the enterprise database environment. Especially critical to DBAs is information about indexes, relationships, triggers, stored procedures, table layouts, column names, and other information pertinent to the system databases. It's not wise to put a new system out on the floor without updating DBAs on what the system is about; that amounts to expecting them to go into discovery mode on the fly, finding out how your system works (and fixing it) when you already know this.

New systems that utilize telephony or internetworking infrastructures (routers, WAN links, etc.) will require assistance from the people who are experts in these areas. During project development time, you may have interfaced with these people, but it's important that they have documentation as to how the new system will work on their equipment.

Producing quality deliverables goes well beyond fulfilling the customer's requirements just the way they had imagined it. Others are involved with the system who don't really care about the deliverables themselves but care very much how the deliverables will affect their daily business operations. Therefore, it's important to take into consideration, well in advance of the project's closure, who will be impacted and how and then to communicate to those individuals what's going on.



### **Real World Scenario: Setting Up a Dev, Test, Prod Environment**

Lots of shops utilize three different environments when they're developing new software systems. Mainframe shops are especially sensitive to make sure they do not roll new systems into production right away.

Generally, Dev, Test, and Prod represent three different servers—perhaps three different networks. However, I've seen instances where a server had different disk spaces on it that represented Dev, Test, and Prod. The idea is, as much as possible, to separate the three environments from one another so that something that happens in Dev does not interrupt the pristine Prod environment. You should not install software that may introduce unknowns on Prod servers—things like Adobe Acrobat Reader and WinZip shouldn't be included as part of a Prod burn unless they need to be there so an application can use them.

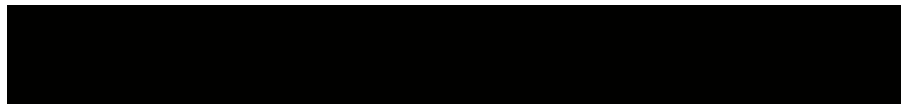
Here's how to set up a Dev, Test, Prod environment:

**Dev** This environment is the starting point for developers. When they develop code, they will do so in the Dev environment. Developers should *never* develop code in a Test or Prod environment. Understand that the Dev server might have to be returned from time to time—that's the nature of the Dev game. When the developers are satisfied that the code is good enough to test, then they will copy the code to the Test environment.

**Test** This is an area where developers copy systems that they think are close to being finished and are ready for testing by a small testing community. Code that goes into Test should not be modified by developers while in Test. Changes that need to be made are made in Dev, not Test. They're then re-rolled into Test and re-tested. Testers will run through a testing sheet that is provided by the development group (often created jointly with the help of the supervisor of the testing group). Testers will sign off on code that has been tested.

**Prod** When you're satisfied that the code is good, has been tested and signed off, you can move the code to Prod. If you're really into the separation of powers, you would have non-development person who's responsible for production code move the code from Test to Prod. Typically, developers don't move code directly from Dev to Prod.

UAT can happen when the code is in Test or in Prod—the choice is up to you and your project team. Most teams locate UAT in Test.



Let's now move on to the Prestige Hotels case study and introduce the things we've talked about in this chapter.



### **Prestige Hotels: Managing Teams, Resources, and Quality**

While this project isn't a large one, you still face the issue of some team members and stakeholders being a large distance from one another. Morgan Wilson, for example, while not a team member, has introduced some issues with the project, and you've found it difficult to manage those issues without getting on a plane and flying out to RLV headquarters. You feel that although the PH intranet site has on it all projects currently in progress, and this site is available to all PH employees who are stakeholders in a given project, nevertheless the person-to-person communication quotient is missing from certain elements of the project—Wilson's problem among them. While you were able to solve the Wilson problem (recall that he wanted to participate as a mirror site in the new website system), you want to make sure that Rolf Montenegro, the project sponsor, is aware of new issues that may surface. You set up a weekly conference call with Rolf and include other stakeholders that have an interest in the project.

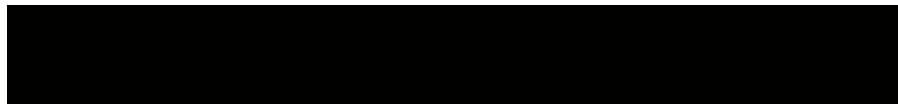
In terms of quality control, you're very happy with the work that your graphic artist has done. The slot machine graphic, the arm for the slot machine, and the various items that will show up in the slot window all look fabulous. You've had a chance to see the underlying code that allows a surfer to take a spin on the slot machine, and the whole thing works together well enough that it looks genuine—almost like the real thing.

However, you're concerned about two different aspects of the VSM: remote testing and stress testing. You wonder if the VSM will operate the same way when someone not connected to it locally—someone a long geographic distance away—“virtually” spins it over an Internet link. You hadn't originally thought about this component when you were in design mode, so you make an impromptu decision to see whether you can have a few test users, employees in some of PH's hotels, try to navigate to the site and give the VSM a spin. The second concern you have is something that you *had* planned

on testing—what happens if hundreds or thousands of users simultaneously hit the VSM? Will it behave the same way as it does when only one or two users hit it at the same time? You'll test this with some stress-testing software that PH owns for just this kind of purpose.

You talk over the idea of doing some long-distance testing with Rolf and get his OK. You then call a few people whose names were given to you by Rolf to see if they'll take a few minutes and test the site for you. You contact a person at the Beau Arbre in Paris, one in your hotel in Jerusalem, and one in the hotel in Tokyo. Because of the time delays between these people and you, it takes a couple of days to get the testing times worked out. All three people test and find that the wheels worked fine, though there was a second or two delay in the transmission of the result of the spin. You feel that you should have a developer look through the code one more time, to see if there's anything the developers can tighten up a bit, perhaps to speed up the wheels' operation, but overall you're satisfied.

Stress testing reveals that the wheel bogs down when more than 8,000 users hit the wheel simultaneously. You do some research with W2U to find out how many users simultaneously visit other PH sites and are told that no site has ever had more than 300 simultaneous hits. You discuss the results with Rolf and Pamela, and they are fine with the stress-testing performance.



### **Helping to Meet or Exceed Expected Outcomes**

There are two instances that you'll want to be concerned about trade-offs:

- When you need to meet a deadline and you're a little behind schedule
- When you see an opportunity to make a slight change in operation that will result in an improvement in expected outcomes

It's important to be able to recognize when you can propose trade-offs to stakeholders in order to help the project meet its proposed outcomes or possibly even exceed expected goals. Wouldn't it be great, for example, if during a project you realized that by simply performing a task a slightly different way, you could reduce the amount of time the task took, perhaps significantly, thus saving the project some time?

Understanding when to propose trade-offs means that you need to recognize the constraint driver for the project. You wouldn't likely, for example, propose a reduction in the time element of a task if time wasn't the chief constraint of the project. Instead, you'd look for ways to trade-off something in the tasks that met the chief constraint. If quality is the chief constraint, perhaps you could make sure that developers double-checked their loops, IF/THEN/ELSE, and CASE statements twice before compiling the module. This way you might save some time when a QA person revisits each line of code. Or, perhaps you could start each new module with a "tailgate" session in which developers talk about their intent with a module. If more people understand the intent of the developer toward creating the module, perhaps a glitch can be avoided.

### **Summary**

There are some interesting turns in the road that you encounter when considering the quality of your deliverables. One element that can introduce compromises in quality has to do with geographically dispersed team members. Frequently, developers will work from home (telecommute) and send their files to you when they're done working on code. This methodology, while workable, increases the need to heighten your communications skills with such individuals so that you can control deliverable quality.

Also, it's hard to provide adequate performance feedback to people who are far away from the center of the action.

We talked about the effect that disgruntled employees can have on project quality. I mentioned what happens with an employee who was at one time a good worker but whose performance has now slipped. We discussed schedule slippages and ways to make up for lost time (typically, by appropriately "overdriving" the team). We also discussed the perils of overdriving.

Team performance can suffer for a wide variety of reasons. The PM is the cheerleader for the project; he cannot let his emotional guard down, even in down times.

Next, we talked about managing the output of the project. What if you, for example, have a team that's doing so well that they're well ahead of schedule? Should you complete the project well ahead of time or concentrate more on the quality of the project? We talked about the ideas of centralization, especially in the creation of code—that it is better to have all resources in one location. We also talked about standardization of project elements so that your output doesn't vary from one task to another.

We also discussed the importance of testing on quality. We talked about module, unit, system, and user acceptance testing (UAT) and the importance of making sure that your testing efforts are complete in order to assure quality deliverables.

Finally, we talked about turnover quality, the idea of providing good quality documentation of the system for the end-user, user training, help-desk technician training, and training for other support structures.

## ***Exam Essentials***

**Be able to explain strategies for providing a quality project outcome, even with geographically dispersed project team members.** Be aware of the need for heightened communications and working standards.

**Recognize and explain the importance of quality testing.** Be especially cognizant of team members who are working on project tasks from afar.

**Understand the dynamics of the management of team spirit and how it can influence project quality.** Be able to deal with performance issues, either with an individual member or with the entire team; be prepared to deal with substandard performance and with team members slacking off.

**Understand why performance feedback is so important in team environments.** As a PM, you are the chief interface with the politicos in addition to being the project cheerleader and manager of a group of people with varied skill sets and personalities.

## ***Key Terms***

There are no new key terms for this chapter.

## ***Review Questions***

1. Considering the average project team, and thinking about the management of the people on the team, which complexities might you be presented with in your managing your project team? (Select all that apply.)
  - A. Diverse skill sets
  - B. Team members' salaries coming from different cost centers



- C. Some team members interested in sports, others uninterested
- D. Geographical separation of team members

2.

You're a project manager for a complex IT project that's well underway; you're in the middle of the executing/controlling phase. You have a disgruntled team member who is severely distracting the team's focus. The team member came to the team with some sort of chip on his shoulder but managed to keep it low-key until now. The team member has skills that are critical to the project's success. What's the best plan to deal with this issue?

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- A. Ask him to seek a new team to work with.
- B. Ask the team member what the issues seem to be. Tell him that things aren't working out and that you're seeking a new team to work with.
- C. Ask the team member what the issues seem to be. Try to get to the heart of what's bothering him. Ask him how you can help correct the issues, if possible. Stress the importance of the project and his role on the team.
- D. Tell the team member what you perceive the issues to be. Ask him what's bothering him. Stress the importance of the project and his role on the team.

3.

You're a project manager for a complex IT project that's well underway; you're in the middle of the executing/controlling phase. You have a team member who was at one time a star performer but has now begun to slack off. As a result, the tasks she has been working on are behind schedule. You're beginning to

?

become concerned. What's the best plan to deal with this issue?

- A. Ask the team member what the problem seems to be with the late work. Ask her if there are ways that you can help her return to her former level of productivity.
- B. Ask the team member what the problem seems to be with the late work. Tell her that she needs to get back to the level of productivity she was at before she started slacking off.
- C. Tell the team member that other team members are asking about her—wanting to know why her performance level has dropped off. Ask her if there are ways that you can help her return to her former level of productivity.
- D. Ask the team member what the problem seems to be with the late work. Ask her if you can get an assistant to help her finish her work.

4.

When presented with a multigeographic project team with diverse skills, in which ways can you provide performance feedback while enhancing each individual team member's value to the project? (Select all that apply.)

?

- A. Post feedback to the project's intranet site
- B. Try to find ways to physically visit each team member to provide feedback
- C. E-mail feedback to each team member
- D. Ask a team lead at each geographic site to provide feedback

- E. Set up a conference call to discuss geographically dispersed team members' performance

5. What are some of the things that may be required for a quality turnover of project deliverables? (Select all that apply.)

?

- A. End-user documentation
- B. End-user training
- C. Final budget figures
- D. Help-desk training
- E. Transferal of project development computers back to company departments
- F. Support structure in place

6. You're a project manager for a complex IT project that's well underway; you're in the middle of the executing/controlling phase. Your team is spread across several different geographic areas— additionally, you have some contract developers who telecommute. You have to begin testing on the new code. What's the best plan to deal with this issue?

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- A. Have testers evaluate any code coming in from telecommuting developers prior to putting the code together with other completed modules. Try to make sure that testing done at outlying locations matches the criteria you use at the central site. Centralize as much testing as possible.
- B. Have testers evaluate any code coming in from telecommuting developers prior to putting the code together with other completed modules. Try to make sure that testing is centralized— somehow evaluate all

deliverables at the central site.

- C. Try to make sure that testing is centralized— somehow evaluate all deliverables at the central site.
- D. Try to make sure that testing done at outlying locations matches the criteria you use at the central site.

7. What are some methods you can use to control the quality of server installations? (Select all that apply.)

?

- A. Obtain all the gear from the same vendor
- B. Assure that all servers have a 10 Mb or higher connection
- C. Assure that all gear comes from the same manufacturer
- D. Create a burn document against which all servers are burned

8. You're a project manager for a large, complex IT project that's well underway; you're in the middle of the executing/controlling phase. Your large team is spread across several different geographic areas— additionally, you have some contract developers who telecommute. What are some concerns you should keep at the top of your mind when thinking about the satisfactory completion and delivery of quality deliverables? (Select all that apply.)

?

- A. Holiday standards
- B. Communications standards
- C. Work standards
- D. Overtime standards

9. You're a project manager for a complex IT project that's well underway; you're in the middle of the executing/controlling phase. Team member A reports to you that team member B is performing substandard work. What's the best plan to deal with this issue?

?

- A. Call team member B

in. Ask what the problem seems to be with the substandard work. Ask if there are ways that you can help B return to the former level of productivity.

- B. Call team members A and B in together. Ask B what the problem seems to be with the late work. Tell B to work on enhancing work performance.
- C. Call team member B in. Tell B of your feeling for B's importance to the team. Ask if there are any concerns or ways that you can help B.
- D. Observer team member B's performance more closely. If you decide, based upon your own observations, that B is indeed performing substandard work, call B in and ask what the problem is. Ask B if you can assist in any way to increase the performance standard.

10.

You're the project manager on a project that has incurred a severe schedule slippage. You decide to institute some mandatory overtime hours for all of the team members in order to make up for the slippage. What are some things that you should consider when beginning such an initiative? (Select all that apply.)

?

- A. Whether overtime is paid at time and a half
- B. How to motivate and reward team members for their participation
- C. How you can be contacted after hours
- D. How to lead rather than push
- E. How to show

sensitivity to the individuals on the team

- F. How to bill the overtime to a cost center outside the project

11.

You're a project manager for a complex IT project that's well underway; you're in the middle of the executing/controlling phase. The project team seems to have separated into different cliques, and now the project's tasks aren't getting done as quickly as they should be. When you call the team together, what's the best plan to deal with this issue?

?

- A. Tell them that you've observed some cliquish activity and that you want it stopped.
- B. Tell them that you've observed some activity that has slowed down the team's energy and motivation. Encourage them by restating the goals of the project.
- C. Tell them that you've observed some cliquish activity and that you feel it's slowing down the team's energy and motivation. Encourage them by restating the goals of the project.
- D. Tell them that you've observed some cliquish activity and that you're going to switch team member partnerships so that you can more effectively address the project's tasks.

12.

When thinking about your leadership style as a project manager, you know that you must always be in touch with your team members and their knowledge, skills, and abilities. But what component of your leadership style might you overlook if you're not consciously concerned and aware of it?

?

- A. The ethnic culture of team members
- B. The education of team members
- C. The potential for bonuses from a successful project outcome
- D. The corporate culture

13.

From the list of functions, select the ones that *do not* pertain to high- quality project management.

?

- A. Perform in a manner consistent with a leadership position
- B. Perform some of the software development for the deliverables
- C. Adapt leadership style to specific situations
- D. Influence and motivate others
- E. Build positive relationships
- F. Hire and fire company employees
- G. Provide personal and positional leadership

14.

You're the project manager for a project that has high visibility throughout the company. People have their eye on your budget, resource allocations, and other facets of the project. You'd like to improve the outcome of the project. What's the first step that you should take in investigating this possibility?

?

- A. Negotiate which tasks can be modified to accomplish a more streamlined output
- B. Determine how much overtime you're authorized to allow
- C. Name the team members who are the most likely to bring success to the outcome improvement initiative.
- D. Try to negotiate a bigger budget for the

project.

15.

You're a project manager for a complex IT project that's well underway; you're in the middle of the executing/controlling phase. The project team isn't focused and is pulling in different directions. One person thinks a task should be done this way, another thinks it should go that way. When you call the team together, what's the best way to deal with this issue?

?

- A. Tell them that you've observed some non-team-like activity that has slowed down the team's energy and motivation. Tell them that you want it stopped.
- B. Tell them that you've observed some non-team-like activity that has slowed down the team's energy and motivation. Encourage them by restating the goals of the project.
- C. Tell them that you've observed some non-team-like activity that has slowed down the team's energy and motivation. Encourage them by trying some teambuilding exercises that bring them back into union.
- D. Tell them that you've observed some non-team-like activity that has slowed down the team's energy and motivation. Bring in the project sponsor to try to encourage them further.

16.

Suppose that you have an individual project member who has come to you with a problem that needs addressing. You'll have to modify his project tasks in order to accommodate his need. While attending to his need, what will be your chief concern?

?

- A. Making sure that you don't have to bring in anyone else to finish his tasks

- B. Being sure to notify the project sponsor
- C. Checking with other team members to see if his need is legitimate
- D. Modifying his tasks only to the extent that the project's scope, budget, quality, and schedule aren't significantly impacted

17. Stakeholders have come to you to tell you they want to change the scope. Before agreeing to the scope change, what things should you do next? (Select all that apply.)

?

- A. Determine which project constraint (time, budget, quality) is most important to stakeholders
- B. Discuss the proposed scope change with the sponsor
- C. Ask team members what they think about the scope change
- D. Define some alternatives and trade-offs that you can offer back to stakeholders

18. From the following list, select those individuals or groups with whom you will likely *not* have to negotiate some aspect of the project as it unfolds. (Select all that apply.)

?

- A. Sponsors
- B. Vendors
- C. CEO
- D. Users
- E. Janitorial
- F. Other project teams
- G. Internal and external service organizations
- H. Finance and accounting
- I. Project team members

19. You are close to the end of a project when you will be testing the entire system. What kind of testing will you be

?

performing?

- A. Module
- B. Unit
- C. System
- D. UAT

20.

Which two decisions can you make about your project that will simplify your ability to get your deliverables finished?

?

- A. Job sharing
- B. Standardization
- C. Centralization
- D. Cross training

### Answers

1.

A, D

While it's interesting that team members have different interests and hobbies, this isn't likely to affect anything you're doing on the project. Nor is the fact that their salaries might come out of different cost centers. You probably will never know this fact, nor care. However, the fact that people bring diverse skill sets to the team has a very dramatic effect on the way the team is shaped and works. You have to manage to the team's makeup. Also, if some members are geographically separated from the rest, this presents challenges that you'll have to manage.

2.

C

People, not equipment or code, are the most important thing your project team has going for itself. Clearly, this individual came to the team with some sort of issue. It's important that you work with him, not because he's mission-critical to the project, but because he has issues that you might be able to help him with so he can enjoy his time working on the project just like everyone else. It's important that he knows his importance to the team and the project as well.

3.

A

This team member has demonstrated that she's able to handle the level of work you've given her and can produce quality output. Now she's begun to slack off. The problem could be that she's been working too much overtime or that she's lost energy for the project. It's up to you to figure out what's bothering her, then see if you can fix it and get her back on track. You should never bring up that others are asking about her (even if they are). You also shouldn't resort to ordering someone to do something. Telling her to increase her productivity is going to result in exactly the opposite effect. She's able to do the work, an assistant isn't required—getting at the heart of the issue is what's needed.

4.

B, D

When giving a team member performance feedback, it's important that there's some "face time" with you or a designated team lead. Impersonal methods such as an intranet site, e-mail, or a conference call, while

communicating the information, don't tell the whole story.

5.

A, B, D, F

A quality turnover also includes making sure the add-ons the deliverables may require are in place (and have been well thought out). For example, it's important to have good end-user documentation in place so users know how to operate the system. Also, you should have your training methodology in place and operational at deployment time. Your help-desk and support staff should be trained and in place.

6.

A

Some project elements may not lend themselves to testing at the central site (servers put in place at remote sites, for example). But the building and testing criteria you use should be universal so you're assured of level quality throughout the project. Even though the telecommuting developers may have tested their code, it would be good to make a second pass and evaluate their incoming code before putting it with other complete modules.

7.

C, D

It's not altogether important that you get all of your gear from one vendor. While this has support implications for the servers, it won't matter much relative to the installations you're doing. On the other hand, settling on a given manufacturer and making sure all the gear is from that manufacturer may go a long way toward making sure the installations are uniform and of good quality. For example, you may have an item in your burn doc that requires that the BIOS for each computer be upgraded to the latest version before the NOS is installed. If you're working with different server manufacturers, then you have to worry about each manufacturer's implementation of BIOS updates. A standardized burn doc is mandatory—one standard burn doc for each type of server you're burning.

8.

B, C

It's important, especially with a large team, to set up standards by which you'll communicate and work. These may include such elements as using a project intranet site, standard performance reviews, and uniform hardware burn documents. The holidays are usually regulated by the company's calendar and, truthfully, may not affect the work your team members are doing, especially if they're under a deadline crunch. Ditto for overtime standards.

9.

D

Situations like this are difficult because you can't simply take at face value what another team member is telling you. You've got to find out for yourself, then make a decision about how to handle it. You should *never* tell a team member that someone else said something about them. The advice and counsel should come from your observation of the situation.

10.

B, D, E

Asking team members to work overtime on a project that's behind schedule is a big deal. It impacts lots of lives besides the team members' own (families, second jobs, etc.). It's

important that you show your support by being there with them as much as possible, by showing sensitivity to individual team members' needs, and by motivating and rewarding team members.

[11.](#)

B

Calling the activity "cliquish" or accusing folks of being involved in cliques won't make them stop doing so. What you have to do is to try to get the team to work together in a collective effort. You could use phrases such as, "We need to think not only about our team partners, but also about all others on the team," to get team members to realize in a roundabout way what you're driving at. But you shouldn't point fingers. And you should always reinforce the project's goals—the reason the team exists in the first place.

[12.](#)

D

You've already taken into account the ethnic culture and education of your team members by simply being aware of their knowledge, skills, and abilities and knowing them as people. The bonuses you collect from a successful project shouldn't affect your leadership style. But the corporate culture—how the company looks at successful teams and what's expected of team members—might have a large affect on how you do your job.

[13.](#)

B, F

A project manager is a manager, a leader. As such, the project manager is expected to perform in a way that's what you'd expect from a leadership role. PMs should be able to adapt their leadership style to a situation or person in order to best manage the situation. A PM should be someone who can influence and motivate others in order to accomplish the requirements of the project. A PM should be relationship oriented, able to build good relationships, and accepted as a leader both personally and positionally.

[14.](#)

A

Negotiation is the key word in this question, but it's a matter of negotiating with stakeholders and sponsors which tasks can be adjusted so as to produce an improved project outcome.

[15.](#)

C

Teams that are moving apart or pulling from different directions are asking for leadership from you. You can begin by putting together teambuilding exercises. These can be anywhere from very simple things like helping a team member brainstorm regarding a problem he's having, to full classroom-style sessions or "extracurricular" activities. You should also reiterate the project goals and in every way possible try to motivate team members.

[16.](#)

D

Balancing team members' needs with the elements of the project can be difficult. You want to meet people's needs, but you also have a project to get out the door. You should assess what kind of impact the need will have on the tasks associated with this person, and decide how the project's scope, budget, quality, and schedule are affected. Then

make a decision accordingly.

[17.](#)

A, D

Determining the constraint that stakeholders think is driving the project will help you determine the kinds of trade-offs or alternatives you can propose to lessen the affect of the proposed scope change.

[18.](#)

C, E

You might have to talk to the janitors if a trash can isn't being emptied out each night, but you'll likely not negotiate some aspect of the project with them. Unless your project is very high-level, or your company very small, it's doubtful that your CEO will get involved in your project. Everyone else here is a potential contributor to deciding how your project gets done.

[19.](#)

C

System testing involves the thorough testing of the entire system *before* users are allowed to test it in the user acceptance testing phase.

[20.](#)

B, C

By standardizing on the way you do a common thing (such as server burns), you create an environment in which everyone involved knows what to expect. Likewise, keeping certain processes (such as code development) in a centralized locale creates a simplified process.

## Chapter 13: Project Closure

### ***CompTIA Exam Objectives Covered in this Chapter:***

- 4.1 Recognize and explain the value of conducting a comprehensive review process that evaluates the planning, organizing, directing, controlling, execution, and budget phases of the project, identifying both the positive and negative aspects in a written report.

Whew! Your bad-boy project is done, and it has executed almost flawlessly, thanks to your well-learned project management skills. Now all you have to do is go through a post-project review process and write up a report for the sponsors and stakeholders, telling how the project process worked and describing the overall success of the project. In this chapter, we'll talk about the review process and the preparation of a written report that officially closes out the project.

### ***Collecting Project Metrics***

The completion and success criteria you formulated when you were developing the requirements metrics will now come into play. Before deciding that the project should now be officially closed out, you should examine the requirements' success criteria to make sure you've met the mark in all ways. For example, suppose that you stipulated as a measure of a requirement's success that you would install eight servers in eight different geographic locations and validate that each can communicate with the others 100 percent of the time (barring problems with WAN circuits, of course). By fulfilling the requirement and fully testing it, you have validated that the requirement has been successfully completed.

Your completion metrics can be (but don't necessarily have to be) different than your success metrics. Success metrics ask, "How do I know when I've successfully completed this requirement?" Completion metrics ask, "How do I know when I've successfully completed the project?" Once all requirements are completed according to your success metrics, then you potentially say that the project is done.

**Note** Larger projects always define completion and success criteria; smaller projects don't necessarily need that kind of detail.

Evaluate both sets of metrics to make sure that you can truthfully say the project is over. Then move the project into the closing phase (called the ending phase in PACE). When the technical tasks have been completed and the project's products and results have been produced, the project has successfully concluded.

### Other Ways That a Project Can Conclude

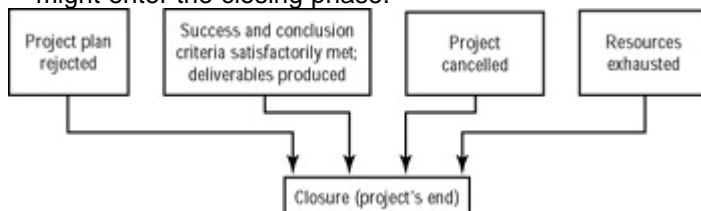
The project doesn't necessarily have to have its success and completion criteria met in order to be concluded. There are other reasons that a project might end:

**Project canceled or postponed** The project has been canceled or postponed indefinitely, regardless of whether or not the products and results have been completed. A project that's a loser going nowhere can be hard to cancel, but management will eventually make the call. Projects that should rightfully be postponed if the technology just isn't there yet, or the funding isn't available, also fall into this category.

**Project plan not approved** The project plan is not approved, and instead of sending you back to the old project management drawing board, the project is simply canceled. Projects that are *proof of concept* could easily fall into this genre—management simply feels that the project has untenable deliverables.

**Project resources have been consumed** The project's resources have been consumed: "That's all there is, there ain't no more." You've run out of money, hardware, person-power, or some other resource, and you have no choice but to conclude the project.

[Figure 13.1](#) shows all of the different flows into closure—the various ways that a project might enter the closing phase.



**Figure 13.1:** Flows into the closing phase

Note that if a project is cancelled or the project plan rejected, you could still be within the planning process, well ahead of project implementation. Even then, you would still run through the closing elements of the project, because the metrics you had developed might prove useful in another project.

### Conducting a Review Process

At the end of your project, conduct a comprehensive review process. During this process, you evaluate each phase of the project in order to determine which things went right in that phase and which things could have been improved. The reason for this kind of review is so that you can improve your overall project management quality on the next project. Not that you'll ever have a perfect project, but you can certainly get closer to the mark by evaluating your previous work and making adjustments as necessary.

The following subsections describe some of the areas in which you'll concentrate your review process. All of the information generated can be kept in a single document, or you can choose to write a document for each category. Obviously, the larger the project, the more documentation you're going to need to create for any given category. All of this

documentation will go into the project book, whether that book is electronic or paper in form.

## **Planning**

When reviewing the planning process, ask yourself first of all how well the project was planned in general. Were the tasks, activities, and phases well thought out and orderly, or did you have to backtrack to fix some things that you originally had set up in the wrong order? When you have to backtrack on things like this, you can get into a situation where you actually can't go back and fix, or at the very minimum precious time is taken up getting back to the place you can continue from.

Also, you should pay attention to the project plan itself, evaluating to see if it was too complex, if there weren't enough milestones, and if you filled it out correctly. Project plans can be laborious if they're too completely filled out and useless if they don't include enough detail.

## **Organizing**

When you examine the organizational characteristics of your now-finished project, you're interested in more than the project plan itself. Things that will be of interest to you here involve how well the overall project came together. Did the team members come in for their various tasks at just the right time, or did some of them have to wait for something else to happen before they could go to work? You should examine how well processes went into place and where you can improve next time. Things like equipment burn docs, network protocol assignments, coordination of physical equipment installations, and other orchestrated functions should be examined closely to see how you can improve them the next time.

It's especially critical to pay attention to the details of any software development that your project was involved in. Examine the coding, documentation, and testing elements of the software development process. Pay close attention to the development tools that were utilized to see whether you had problems with them or they were adequate for the process. Examine the code repository system you used to store developed modules—did it meet the developer's needs? Furthermore, was the choice of development language appropriate for the project? Often, developers have pet languages that they'll use for all their work, but some projects may be better suited for a different language.

## **Executing**

The executing phase deals with bringing future performance in line with your plans. Things such as obtaining bids from vendors, formulating the project plan, team development, stakeholder acceptance of the proposed work results, quality assurance, and information distribution happened there. Perhaps a good way to remember this is the view that before you begin directing, you execute the details needed for the project. When examining how well the project came together during this phase, you should take a look at things such as vendor relationships and how well they worked out, effectiveness of communications with stakeholders, and your quality *assurance* methodologies. Note that quality assurance happens in the executing phase, but quality *control* happens in the controlling phase.

## **Directing**

Examine yourself. Take a look at how well the project was directed through its steps. Like a movie director helping the actors play out the various shots, you should have been there for your team members at all points of the action. It's important to pay attention to the places where the project got off track and how you got it back on. Perhaps you can make adjustments to your next project to avoid such scenarios.

Look closely at the places where team members fell behind schedule. Determine whether what you had to deal with was people management or a technical issue.

Defining people issues can not only help you work more closely with team members in the future, but can also help you spot bad apples that you might not want on another project team.

### **Controlling**

Controlling differs from directing. When you have a finalized project plan that you're going forward with, and you are making sure that the deliverables you're creating meet the metrics you set down during requirements definition, you are controlling the project. For example, a piece of code that does a calculation should meet a success criterion that clearly indicates whether the code works as needed and expected. The controlling aspect of the project looks at metrics. When assessing the project, you might ask, "How well were the metrics formulated, and did they meet expectations?"

Don't forget that during the planning stages you pinpointed the risks to the project—did any of those risks materialize while in the controlling phase? If so, how did you spot them and then deal with them? Risk assessment and response control is an important facet of any project.

### **Budgeting**

This is an important end-of-project category. First of all, take a look at the variances that occurred during the project to see if you can match them to a reason for their occurrence. Spotting the reason could potentially help you avoid the same thing next time.

Also, you should evaluate the project budget compared to the way that the corporate budget outlined your budget categories. You do this to make sure that you effectively used the money the way that the company intended you to. Chances are you "robbed from Peter to pay Paul" in certain cases, and this is acceptable, but you need to reconcile that with the company's budget.

Prepare reports that represent what was spent, on what, and where your closing budget stands. You should also show the amount of hours spent on the project, compared to the salaries of the individuals working on various tasks.

### **Lessons Learned**

The most critical thing to derive from a closed-project assessment is the lessons you learned from the project. You want to assess what went wrong and why—not so you can point fingers at the guilty parties, but so that you can do better next time by avoiding the pitfalls you encountered this time. Lessons learned is something project managers (PMs) like to avoid working on, because they're afraid of backwash on the job they did as a PM, but the idea is to gain knowledge about how to better manage projects. Remember, you might be that future PM.

## ***Preparing a Written Finalized Project Assessment Report***

A finalized project assessment report needs to be prepared and given to the stakeholders and project sponsor. The size of the project will dictate how large the report should be—a small project might only contain a paragraph or two for each section, while a large project might wind up being a fairly comprehensive document of many pages.

### **Positive Aspects of the Project**

Talk about what went right with the project. Provide detail regarding specific tasks that you thought went exceptionally well and why. You'll also want to point out the stars on your team, the ones who made the project come together fabulously well. You should

also include any positive comments that customers made about the project and its progress.

It would be a good political idea to also mention any positive participation that you experienced from non-team members—people from other departments or teams who helped you get your job done. Mentioning other departments has two positive effects: It reinforces the opinions of people from those departments, putting it in the back of their minds that they'd like to work for you on another project. And it shows other departments that your team wasn't a force of one—that you needed them to help you get your job done. Isolationistic ideologies lead to factional company operations.

Also, with respect to the triple constraints of any project, if something went particularly well, it's important to point it out at this time. If your project came in well under budget, ahead of schedule, or with an output whose quality is higher than expected, this should be mentioned in your closure document.

This part of the document is where you thank the participation of the stakeholders, customers who were directly involved, vendors, and sponsors.

### **Negative Aspects of the Project**

You have to be careful if you're going to point out the lack of participation of a given team or department. It isn't wise to call them by name. Instead, the tactic you should take is to say that you ran into some communications difficulty regarding the project and leave it at that. If you've run into problems with the participation of one department or another, you doubtless dealt with the problem earlier in the project; the department's aware of it, you're aware of it, and the stakeholders are aware of it, so there's no sense in rehashing the situation in a closure doc.

It *would* be very wise to mention any hassles you encountered with vendors. Pay attention to how well the product or service sold to you matched up to what your expectations were; especially relevant are the "it'll do that" claims of the salesperson versus the "what it'll actually do" reality. You should also mention any support problems that you encountered.

Describe any problems you ran into with software or hardware that you purchased—problems that surfaced time and again and weren't a one-time thing. For example, if you had trouble with some firmware updates, software that you had to apply across a lot of the same equipment, you would mention that here. You should also talk about hardware that consistently malfunctioned the same way, regardless of the number of units you deployed.

You should also mention limitations that you encountered simply based upon the triple constraints of the project. You don't have to come across negatively when mentioning a constraint, but it's important that readers know that, if you had had more time or budget, you could've brought in a better product.

The closure document is your chance to show off what went right and grouse about what went wrong. If you took careful notes while you were working through the project, you could now refer back to them for ideas of what to mention in this document. It's important to stay away from blaming people directly, but also to not be shy about talking about processes that didn't work, promises that weren't kept, and fundamental operations that could've gone better.

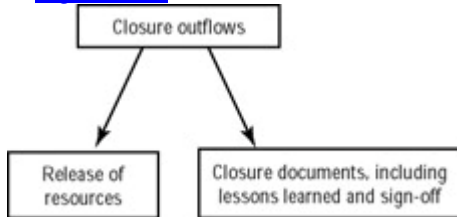
## **Sign-Off**

Finally, it's important that you share this close-out document with stakeholders and the sponsor and obtain their sign-off. Remember that the definition of a project is a unique product or service that has a definite beginning and a definite ending. By signing this document, stakeholders are signifying that the project has officially ended. Any changes,

additions, or corrections to this project now become a new project with the same phases and rules of operation that your project ran under.

Once the project has received its official sign-off, the project's resources are released.

[Figure 13.2](#) shows the flows out of the closing phase.



**Figure 13.2:** Flows out of the closing phase

## Summary

This last chapter details the ideas behind closing out the project. During project closeout, you create at least one document (but you are not limited to only one) in which you review the project and how it transpired. Include the following stages in your discussions:

- Planning
- Organizing
- Executing
- Directing
- Controlling
- Budgeting
- Lessons Learned

Additionally, discuss both the positive and negative aspects of the project. Once done with your report, obtain sign-off from the sponsor and stakeholders and put this final document in the project book, so that PMs involved in future projects can go back and review this project.

## Exam Essentials

**Understand the project stages that you'll talk about in your project closeout documentation.** These include planning, organizing, executing, directing, controlling, budgeting, and lessons learned.

**Recognize why you need formal project closeout documentation.** Be able to explain why a formal document is helpful: for organizational communication, and for future project management.

**Know why you should talk about the positive aspects of the project as well as the negative.** You should be able to touch on any of the high points of a project, but also be able to elucidate the lows as well without naming names.

**Understand what lessons learned is all about and why it's important to mention them.** Project managers frequently choose to overlook lessons learned, simply because they feel as though mentioning them somehow detracts from their capability as a PM. Lessons learned are important, because PMs involved in projects in the future that closely match what you did can learn about the pitfalls you ran into.

## Key Terms

There's only one light, little key term for this chapter: proof of concept.

## Review Questions

1. When do you formally begin your project closure steps? (Select all that apply.)

?

- A. When all of your completion criteria have been met
- B. When the stakeholders pronounce that the project is complete
- C. When customers have successfully tested the system and signed off on it
- D. When all of your success criteria have been met

2. Which element of project closure is most often overlooked by project managers creating finalized project documentation?

?

- A. Completing the project book
- B. Including all metrics comparisons
- C. Getting the signatures of all of the stakeholders
- D. Creating lessons learned documentation

3. Which aspects of the project will you review when preparing your final closure documents? (Select all that apply.)

?

- A. Unfulfilled
- B. Positive
- C. Negative
- D. Unrealistic

4. Which phase deals with bringing future performance in line with your plans?

?

- A. Directing
- B. Planning
- C. Executing
- D. Controlling

5. Which four situations indicate that the project is ready to be closed?

?

- A. Stakeholders approve final testing results
- B. Completion metrics are achieved
- C. Sponsor says it's time to use the project members on another project
- D. Project is cancelled
- E. Project plan is rejected
- F. Company priorities change
- G. Project resources are exhausted

6. Which of the following denote an *unsuccessful* conclusion to a project? (Select all that apply.)

?

- A. Resources exhausted
- B. Project plan rejected
- C. Project cancelled
- D. Project renamed
- E. Project priority reduced

7. From the list below, select those project phases in which you would expect successful project closure. (Select all that apply.) ?
- A. Initiating
  - B. Planning
  - C. Activating
  - D. Executing
  - E. Controlling
  - F. Closing
8. You're a project manager for a large, complex IT project that's just begun. You're in the middle of the executing phase. The project sponsor has looked over your requirements definition plan and decided that the project is way too complicated for the minimal deliverables the customer has requested. She decides to cancel the project. What are your next steps? (Select all that apply.) ?
- A. Change vendors to obtain a lower bid for hardware and software components
  - B. Prepare project closure documents stipulating lessons learned
  - C. Release resources
  - D. Get the sponsor to let you redesign the project
  - E. Ask for a new sponsor
9. Which phase of your closure documents will detail the project's variances? ?
- A. Controlling
  - B. Budgeting
  - C. Executing
  - D. Directing
10. When finished with the closure documents, which two things to you need to do in order to finalize the project? ?
- A. Obtain stakeholder sign-off
  - B. Obtain sponsor sign-off
  - C. Post the project on the intranet site
  - D. Compile the closure documents into the project book
11. You're a project manager for a complex IT project that's in the middle of the closing phase. Select all the elements that you will include in your closing documentation. ?
- A. Directing
  - B. Reviewing
  - C. Controlling
  - D. Coordinating
  - E. Planning
  - F. Organizing
  - G. Execution
  - H. Budget

12. Select those project stages in which you would expect unsuccessful project closure. (Select all that apply.)

?

- A. Planning
- B. Reviewing
- C. Directing
- D. Controlling
- E. Executing
- F. Closing

13. From the list of functions, select the ones that you will talk about when considering the organization of the project at closure time.

?

Elements of Project Closure Documentation	
Preparation of a status document for sponsor	
Physical equipment installations	
Preparing team for next project	
Comparison with similar completed projects	
Server burn docs	
Testing of help-desk personnel	
Release of stakeholders	
Coordinating of team members	

14. In the Directing component of your closure document, what will be your basic consideration?

?

- A. The project plan itself
- B. The budget and its variances
- C. You and how well you managed the project
- D. The team and its involvement in the project

15. What component of the requirements that you formulated early in the project will be of benefit to you in the closing phase?

?

- A. Elements
- B. Metrics
- C. Steps
- D. Resources

16. Which projects should be required to have a closing phase? (Select all that apply.)

?

- A. Small projects
- B. Medium-sized projects
- C. Large projects
- D. All projects
- E. No projects

17. Which outflow of the closing phase stipulates that team members are free to go back to their departments?

?

- A. Release of resources
- B. Lessons learned

- C. Project book  
D. Sign-off
18. You are a project manager for a medium-sized project that's close to closure. You've worked through the majority of the UAT for the deliverables, but you have a few more tests to go. Your sponsor wants you to conclude the project now, because by doing so it will look as though the project came in a few days ahead of schedule. What do you tell the sponsor? ?
- A. OK, that's doable. The last few UAT tests weren't all that critical.  
B. No can do. We have to wait through the final UAT tests to make sure we're completely successful.  
C. You're the sponsor and can conclude the project any time you want, but for successful conclusion, we need to finish the UAT tests.  
D. I'm sorry, Dave, I can't do that right now.
19. You are a project manager for a medium-sized project that's close to the closing phase. Some of the stakeholders, not including the project sponsor and a couple others, have asked to meet with you as a group. When you meet with them, they tell you that they're not happy with the deliverables, even though the metrics for each requirement have been met. They want you to immediately kill the project because any further expenditure of resources would simply be throwing good after bad. What do you tell them? ?
- A. OK, I'll close it immediately.  
B. Give me a few more days to see if we can complete the remainder of the project.  
C. We're too far into the project—we'll have to wait for closing phase.  
D. The sponsor is the only one authorized to cancel the project prior to closing phase—please talk to the sponsor about this.
20. Who is responsible for authorizing the closure of the project? ?
- A. Stakeholders  
B. Project manager  
C. Customers  
D. Sponsor

## Answers

1.

A, D

Your ability to identify that all success and completion criteria have been met signals the end of the project. Stakeholders do not pronounce that the project is complete, you do. Customer testing and sign-off of the system

represents the completion of a task.

2.

D

Lessons learned is a simple idea: You're pointing out the things that might've gone better on this project and then documenting them so that PMs in later projects have information they can refer back to. PMs like to avoid lessons learned, because they somehow associate this element with at least a modicum of project failure. In reality, no project is perfectly implemented, and all projects can offer additional information in the form of lessons learned. The project book is completed when all documentation has been signed and completed. You don't need the signatures of all of the stakeholders, only the project sponsor.

3.

B, C

You'll evaluate both the positive and the negative aspects of the project. Undoubtedly, acknowledging the negative aspects of the project will be much more difficult than the positive. Part of the reason for this is that you have to be careful to not name names of people in the company who might've had a less than positive effect on your project. The project's not complete if you have unfulfilled items. Unrealistic items should've been dealt with at requirements definition time.

4.

C

The executing phase is about the future. In this phase, you're involved in activities such as obtaining bids from vendors, formulating the actual project plan, developing your team, and so forth. One of the phases you'll talk about in your closure document revolves around what you did in the executing phase.

5.

B, D, E, G

The project is complete when the completion criteria say so, when the project is cancelled, when the project plan has been rejected for whatever reason, or when the project resources have been consumed. The project isn't necessarily complete just because the stakeholders approve the final testing results, nor if the sponsor would like to free up team members for some other project.

6.

B, C

Just because a project's resources are exhausted does not necessarily imply that the project's a failure; it may simply mean that the project utilized all of the resources allocated to it. If the project plan is rejected or the project is cancelled, then one can assume there has been an unsuccessful conclusion to the project. Renaming, or even reduced priority, aren't reasons to conclude the project.

7.

F

Successful projects can be closed out only at the closing phase. You have successfully completed the project's deliverables, met the success and completion criteria, and you're ready to finish up. You've entered the closing phase and can close out the project.

8.

B, C

If you have a sponsor who opts to cancel the project, for whatever reason, you will still want to put the project into closing phase. During this phase, you'll assemble the correct closure documents, in this case indicating why the project was closed and the metrics that were formulated for the requirements, and you'll release any resources you've already set aside for the project.

[9.](#)

B

You'll include a budgeting section that details the project's person- power and budgetary variances. You should also compare the project's budget to the categories the company utilized to allocate your project funds.

[10.](#)

B, D

After you've completed your project closure documents, you should obtain sign-off from the sponsor, then compile all of the documents into the project book. The book can be in electronic or printed form.

[11.](#)

A, C, E, F, G, H

In your closure document(s), talk about the events, both negative and positive, that transpired in the planning, organization, directing, controlling, execution, and budget aspects of your project.

[12.](#)

A, B, C, D, E

In any phase *other* than closing, an unsuccessful project could be declared concluded.

[13.](#)

#### Elements of Project Closure Documentation

Server burn docs

Physical equipment installations

Coordinating of team members

The Organizing section of your closure document talks about how well you actually went about arranging the project's elements. This would include things such as standardization of burn docs and network protocols, choreographing the installation of hardware, utilizing team members' time correctly, as well as the project plan itself.

[14.](#)

C

Directing is all about you (and perhaps your team leads if you have a large project) and how well you implemented the project, both in terms of people leadership and project management skill. You'll report on the elements of the project that seemed to go off without a hitch under your control as well as those things that could have gone better.

[15.](#)

B

The metrics that you developed for the requirements, both success and completion, will help you declare the completion of the project and will allow your closure review report to objectively detail how well you did.

- [16.](#) D  
All projects should recognize some sort of closing phase, even if it's informal with a quick little document that specifies the criteria that indicated successful project completion, associated sign-off by the sponsor, and, of course, lessons learned.
- [17.](#) A  
The completion of the closing phase results in the documents that conclude the project and authorizes the release of the project's resources, including team members.
- [18.](#) C  
The sponsor has the right to conclude the project any time he or she wants to. Remember that the sponsor is the one who can authorize the expenditure of resources in order to prepare the deliverables. However, you cannot call it a *successful* project until you've completed your testing and then have validated your success and completion metrics.
- [19.](#) D  
Since the sponsor isn't involved in these conversations, you're not authorized to cancel the project until he tells you it's OK. You'll need to have the sponsor meet with the group and get to the bottom of their grievances, then do what he says to do. You would, of course, go through a closing phase even if he cancels it, so that you can evaluate the requirement metrics, prepare a lessons learned section, and obtain formal sign-off.
- [20.](#) D  
The sponsor is the one who signs off on the closure documents. As project manager, you create them, providing supporting documentation that illustrates that all deliverables have been successfully completed.

## Appendix A: Project Management Resources

While researching this book, my editors and I came across a great many helpful websites. There are so many different ideas about project management methodologies, and new ways of solving old PM problems, that we thought it would be useful to provide a list of these sites so you have somewhere you can go when you need to research something. I'll list these sites in the order that I found most useful, and then let you make up your own mind regarding them.

[www.gantthead.com](http://www.gantthead.com)

This site was enormously useful to me in researching this book because it's focused specifically on IT project management, yet includes all of today's prevailing PM thought. Sponsored by a variety of businesses that includes MKS (a code library software company) and Oracle EBS, you'll find this site to be beautifully laid out, with great articles by people from all over the PM industry.

There are three different ways you can access this site:

- As a registered visitor (free access).
- As a Premium member. Premium membership is only for one person and costs \$350/year.
- As a Corporate member—there are varying levels of pricing for the Corporate package.

Additionally, Gantthead offers something called the Process Package, a grouping of eight customized packages that members can download for use in their company. Recall that a package is a grouping of projects, so any of the eight packages might be very useful in your environment. They're plug-and-play, in the sense that a lot of the content work has already been done and it's simply up to you to customize to meet your needs. You can get more information by visiting the website.

In particular, I found that it was easy to key in a search string on Gantthead's site search engine to find documents I was looking for. Some things I tried garnered no hits—somewhat disappointing—but for the most part I was thrilled with Gantthead's offerings. You'll find that Gantthead is very pro-PACE, a good thing I think when talking about IT projects. They've added an interesting twist to PACE: adding a *justify* phase to the start of the project; PACE now becomes JPACE. I think the justify phase is valid, because a lot of IT projects experience their hardest climb simply as admins and PMs spin their wheels trying to prove the project needs to exist.

### [www.4pm.com](http://www.4pm.com)

This site was also one that I hit heavily for research on PM. This site has partners with Colorado State University (CSU—Go Colorado!), which has been extremely proactive in providing quality PM training. CSU is noted for training educators, so it's logical that the university would be very good at educating project managers. The 4PM site is also affiliated with Project Management Institute Inc. (PMI), CompTIA, and the American Council on Education (ACE; [www.ACENET.edu](http://www.ACENET.edu)).

Because of 4PM's association with PMI, you'll find that the verbiage on the website is heavily oriented toward that point of view. Not that this is a bad thing, but the methodologies that PMI has developed are complex, somewhat difficult to learn and, I think, more than the average IT PM needs to know. Nevertheless, you'll find great information on all things PM, plus the ability to enroll for instructor-led or online PM training.

### [www.TechRepublic.com](http://www.TechRepublic.com)

This site is CNET's entry into the world of all things that have to do with IT, including project management. A beautifully crafted site full of fun to read things about IT, you'll find that you have this added to your browser Favorites in no time.

You won't find as much detail about IT project management as you do on the two preceding sites, but what you do find are great shells of starter documents (called "boilerplates") that you can download and modify to meet your needs. I've used TechRepublic for several documents that I needed to write but didn't have a clue how to begin, including a request for proposal (RFP) and various IT management documents. If you do a search on "project management" in TechRepublic's search engine (remembering to nest the words inside quotes), you'll get several hits on easy-to-use methods and boilerplates for IT project management.

My personal IT bias is toward Microsoft's offerings (which goes 180 degrees against some of you—sorry), and I find that TechRepublic has a heavier proclivity toward Linux than I'd like to read about. But I don't usually go to the site to read about technical stuff as much as I do for IT management. Whatever flavor of OS and NOS you prefer, I think you'll find TechRepublic to be an incredibly valuable web tool.

### [www.gartner.com](http://www.gartner.com)

Gartner Inc. has been recognized as an IT brain trust for many years now. In addition to its consultative activities, Gartner specializes in providing subject matter experts on just

about anything relevant to IT. Got a question about storage area networks (SANs)? Visit the Gartner site as an ordinary, non-paying visitor, and you'll get quite a bit of information. Pay to join a Gartner membership, and you'll not only be privy to the extensive amount of Gartner information on their website, but you'll also be able to set up conference calls with Gartner SMEs on the topic you're interested in.

I've used Gartner's conference calls for portal and SAN questions and have been very happy with the response I've gotten. I've also pulled up the documents pertaining to these subjects—essentially a rehash of what I found out during the call.

If you search Gartner's site using the "project management" search string, you'll get some very enticing hits, but you'll have to buy each download. If you work for a corporation, some investigation on your part might turn up the fact that you already own a Gartner subscription and you can get a logon in order to avoid paying for the documents.

Here's my take on Gartner: They're not always right, so take what they say with a grain of salt. Just because a person sets himself up as an SME does not necessarily mean he's really an SME—he may only play one on TV, if you get my drift. If you're researching new IT technologies, I would certainly pay a visit to Gartner. But I would not let Gartner be my first and final authority on any IT subject.

### [www.IDC.com](http://www.IDC.com)

Another technology forecast company similar to Gartner is IDC. This site is beautifully crafted, but it uses those annoying mouseover pull-downs that get in the way of what you're trying to read.

Use IDC as a comparison with what Gartner is saying about something, and you'll have a more well rounded idea regarding a given IT subject.

Keying in "project management" (in quotes, of course) in the IDC search engine pulls up several free documents, none of which has much relevance to actual project management. Use IDC as a research tool for new IT ventures to balance out what Gartner is saying—don't use them as a PM resource. The servers are slower than other companies around the Web, so be prepared for a little bit of a wait.

### [www.welcom.com](http://www.welcom.com)

That's right, the *e* is missing off of *welcome*, no doubt because the domain name was already sold to someone else. This company is in the business of enterprise project management—the big-daddy projects that take up rooms of people and months, if not years, to accomplish.

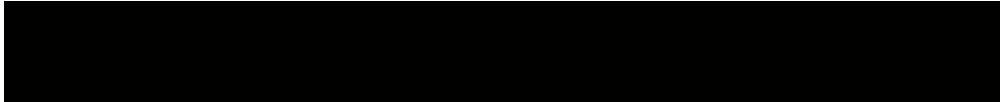
On this site, you'll find a library section and, under it, a PM glossary. The glossary is very helpful for understanding PM terminology that you might read on a PM web site or hear bandied about by PMs. Some definitions are missing—you can't find the definition for linear regression, for example—but the glossary is, for the most part, complete and highly useful.

Note that the "free" white papers require that you fill in your user information, which will in turn guarantee a phone call from one of Welcom's salespersons—which is only right—but be prepared for that eventuality.

The site is XML-based and fast.

## [www.microsoft.com](http://www.microsoft.com)

Want to have a little fun playing with XML? When you bring up your browser, key in [www.microsoft.com/project](http://www.microsoft.com/project) and see what you come up with. Under normal circumstances, your browser would generate a 404 error, because Microsoft doesn't have a link to "project" at the root of [www.microsoft.com](http://www.microsoft.com). However, due to the miracle of XML and some very savvy Microsoft XML programmers, you can key in that URL and get a list of potential hits for things having to do with Microsoft Project—all enormously useful.



### **More XML Fun**

Want to have some more fun with XML? Try keying in [www.microsoft.com/vb mobile](http://www.microsoft.com/vb mobile) (that's right, there's a space in between the words `vb` and `mobile`) then hit enter.

Spaces in a URL are a surefire way to make a browser go south for the winter, but it works when hitting the Microsoft site. And the XML parsing that's done not only brings up hits for Visual Basic (VB), but also hits for mobile applications. How's that for fancy XML coding? I should point out that behind the scenes, Microsoft doesn't have *any* references on its website to the string "vb". However, Microsoft uses a taxonomy server that acts as a translator for common Microsoft acronyms and then, using the power of XML lookups, offers you best bets for all of your search dynamics.

Next, navigate to Microsoft's main web page, [www.microsoft.com](http://www.microsoft.com). At the top of the Microsoft page, click All Products. In the Address box of your browser, you'll see this:

`www.microsoft.com/catalog/default.asp?subid=22`

The number 22 is an XML reference to the language that the page is to use when presenting the site's content. Change the number to 24, then hit Enter, and you'll be presented with the French edition of the page. Key in 3 instead of 22, and you'll be presented with the Simplified Chinese version. Key in 33, and you'll be very surprised, because you'll be presented with the Hebrew version. Hebrew is read from right to left, so the page is, naturally, read from right to left.

Hopefully, you can see the incredible power that XML has and its ability to revolutionize the way that people interact with the Internet.

Incidentally, Microsoft's U.S. website gets about 7,000,000 hits a day and is one of the top five sites being hit on a daily basis. (Oracle, Sun, MSN, and AOL usually round out the list, with Yahoo appearing very frequently.)



I wish that Microsoft would develop a site that talks about how they do project management. Of all the companies on earth today, Microsoft is probably one of the biggest that is heavily *dependent on* great project management techniques. Microsoft's PMs have to be—they release new (often completely rewritten) code on a routine basis and usually ship the code on schedule and budget. How do they do that? Wouldn't it be fun to have a Microsoft site devoted strictly to telling you how they get large software programs developed and out the door? (But then I guess that would be really interesting reading for Microsoft competitors...)

## [mielsvr2.ecs.umass.edu/virtual\\_econ/sitemapall.htm](http://mielsvr2.ecs.umass.edu/virtual_econ/sitemapall.htm)

Now that's a heck of a URL! Folks at the University of Massachusetts went to the trouble of developing an online course that talks about the nuances of project cost-estimating

techniques. It turns out that the course is pretty good. It's not heavily detailed but provides enough information to give you a feel for the estimating techniques you might utilize in any given project.

Once you navigate to this URL, click Cost Estimating Techniques and you'll get where you need to go.

When I was researching cost estimating techniques for the book, I found *no* helpful hits on Gantthead, TechRepublic, or 4PM. When I searched Yahoo, I found a lot of companies that want to sell you cost-estimating software, but this was the *only* hit I found that really helped me understand better the science of cost-estimating. Congratulations, UMass, for a great service to the PM community!

So much of project management is linked to engineering, because it is with great engineering that new products are developed or that huge undertakings such as skyscrapers, rockets, and bridges are achieved. Because of this, cost estimating is considered an engineering function and can often have what I consider to be a too-laborious nature for the majority of IT projects. My sense is that the majority of IT projects probably benefit from bottom-up estimating while the remainder utilize top-down, so the rigor of linear regression and parametric cost estimating probably won't be a part of your routine IT PM lifestyle.

### [www.pmi.org](http://www.pmi.org)

While I did find myself periodically going to PMI's website, I did not utilize very much of their information because I found the first two sites in this Appendix (Gantthead and 4PM) to be much more user-friendly. However, if you're going to go further into project management, perhaps toward the completion of your Project Management Professional (PMP) certification, you'll probably find that PMI's site will be one you frequently hit.

### **General Search Engines**

I used Yahoo! ([www.yahoo.com](http://www.yahoo.com)) as much as any of the other sites listed here, simply because sometimes I couldn't find any information within the other sites that pertained to what I needed to look for. I really pulled my hair out when writing about the Scheduled Tasks (WRS) objective (2.22) for the book. I couldn't find anything, *anywhere*, that linked the acronym WRS with project management. Finally, I found one very obscure hit on Yahoo! that led me to the right place, and I was able to get enough information to mention what WRS was. (It has little relevance to actual IT project management, by the way, and I think whoever wrote this objective threw it in there just for grins.) Anyway, I was surprised at the amount of stuff I *couldn't* find on Gantthead and 4PM, and that I had to use Yahoo! to find.

**Note** When searching Yahoo!, you probably won't be surprised to learn that the majority of PM dialog on the Web is put out by various government organizations—the military, NASA, et al. Because of the nature of the way the government does things, heavy-duty project management is critical to them, so lots of discussion centers around government projects.

Note that Yahoo! isn't the only search tool out on the Web. Google ([www.google.com](http://www.google.com)), Excite ([www.excite.com](http://www.excite.com)), and others can also provide great links to good information.

## **Appendix B: Practice Exam**

### **Practice Exam Questions**

1. Select the statement that most closely defines a project.

?

- A. A project is any service that represents an ongoing effort.
- B. A project is any short-term endeavor that provides multiple products or services.
- C. A project is any short-term endeavor that provides a single product or service. There is a definite start and end date to a project.
- D. A project is any endeavor that provides a single product or service. The start and end dates are not necessary.

2. In your requirements documentation efforts, which two elements must you consider to determine whether the project is well enough defined to provide the requirements? ?
- A. Success metrics
  - B. Task durations
  - C. Task team member assignments
  - D. Completion metrics
3. When in the controlling phase of a project, where will you be concentrating a lot of your effort? ?
- A. Developing the requirements
  - B. Checking for out-of-scope conditions
  - C. Preparing Lessons Learned documentation
  - D. Writing the project plan
4. When developing your project scope document, which characteristic of the project manager will you primarily be concerned with? ?
- A. Full-time vs. part-time
  - B. Formal vs. informal authority
  - C. Certifications
  - D. Project priority
5. Choose the time when you'd move a project to the closing phase, even though it's deliverables are not yet completed. ?
- A. Too many project team members quit
  - B. Project scope became enlarged
  - C. Project plan rejected
  - D. Wrong project plan software choice
6. When developing a project's calendar and thinking about company holidays, individual team members' calendars, and special days declared by the company, which important dates might you overlook in your multinational company if you're not careful? (Select all that apply). ?

- A. Religious festivals
- B. Holidays in other countries
- C. Team members who work weekend schedules
- D. Team members who work four ten-hour days

7. Which document will you be working on when you go through the process of deconstructing deliverables? ?

- A. Scope document
- B. Concept document
- C. Work breakdown structure
- D. Lessons learned

8. Of the following elements, which one is *not* a trait a project manager must have? ?

- A. Possess excellent public speaking capabilities
- B. Effectively balance skills and project forecasting
- C. Know how to be both adaptable and flexible
- D. Be able to recognize and implement valuable resources as your project team members
- E. Know how to communicate effectively

9. When preparing resource cost estimates, which of the following issues will need to be taken into consideration? Move the appropriate items into the Cost Estimate Consideration boxes. ?

Resource availability	Cost Estimate Considerations
Resource cost	<input type="text"/>
Task requirements	<input type="text"/>
Earned value analysis	<input type="text"/>
Project scope	<input type="text"/>
Statement of work	
Resource skill levels	
Statement of work	

10. Molly is a new project manager with Acme Widgets. She has developed a project plan and submitted it to her sponsor, but he promptly returned it to her with a sticky-note attached that says incomplete. The plan has the WBS in it. Which of these components does she still need to check, to be sure to include with her plan? (Select all that apply.) ?

- A. Stakeholders
- B. Sponsor
- C. Corporate managers unaffiliated

- with the project
- D. Requirements
  - E. Budget
  - F. Marketing plan
  - G. Scheduled tasks
11. Which of these acronyms represents the Project Management Institute's preferred methodology? ?
- A. PACE
  - B. IIII
  - C. PIECC
  - D. IPECC
  - E. PEACE
12. Of the elements listed, which ones *do not* belong in the scope definition document? (Select all that apply.) ?
- A. The sponsor of the project
  - B. The way that you will control any risks encountered
  - C. The targeted completion date
  - D. The budget dollars allocated for the project
13. In which phase of a project will you chiefly use iteration? ?
- A. Initiating
  - B. Planning
  - C. Execution
  - D. Controlling
  - E. Closing
14. When considering the team structure you'll be utilizing in your project, which two types will be the most likely? ?
- A. Part-time matrix
  - B. Shift matrix
  - C. Full-time matrix
  - D. Team matrix
15. Why would you attempt to negotiate a delay in a project's tasks? ?
- A. When you need more time for a task
  - B. When a team member isn't getting a task done quickly enough
  - C. When tasks have been added to the project after it's underway
  - D. When a stakeholder wants a change to a task that will impact the project's scope
16. Arrange the documents shown in order of occurrence. ?

Project plan	1.	<input type="text"/>
Project charter	2.	<input type="text"/>
Project scope	3.	<input type="text"/>
Project concept	4.	<input type="text"/>
Project requirements	5.	<input type="text"/>

17. From the items shown, group those scope document categories that represent people, those that represent money, and those that represent technical control decisions.

?

	People Decisions
	<input type="text"/>
	<input type="text"/>
Project cost	
Vendors	
	Money Decisions
Change control process	<input type="text"/>
Project manager's role	<input type="text"/>
Stakeholders	
	Technical Control Decisions
Team members	<input type="text"/>
Methodologies	<input type="text"/>
Projected schedule	<input type="text"/>

18. When considering a good change-control process, which three changes should be taken into account?

?

- A. Design
- B. Team member
- C. Stakeholder
- D. Schedule
- E. Cost

19. What is the most important reason why you have to immediately deal with a disgruntled employee when in the executing phase of a project?

?

- A. Because you run the risk of him bringing the entire team's morale down
- B. Because he may sabotage the project
- C. Because he may deliberately slack off
- D. Because his bad attitude will be noticed by stakeholders

20. Which type of budget do you have if you're primarily working with budget estimates and project assumptions?

?

- A. Non-finalized
- B. Cost-center
- C. Bottom-up

21. In a scope document, which requirements should you identify? (Select all that apply.) **?**
- D. Top-down
  - A. Requirements defined by team members
  - B. Optional requirements
  - C. Mandatory requirements
  - D. Requirements presented by non-customers
22. You're handed a project overview and a list of requirements. With this information in hand, which two elements should you be concerned with? **?**
- A. Success metrics
  - B. Task durations
  - C. Measurable outcomes
  - D. Team member task assignments
23. When faced with a proposed scope deviation, what will be your first order of business? **?**
- A. Say no!
  - B. Quantify the effect of the deviation in terms of cost, resources and time
  - C. Calculate budget variances
  - D. Determine the cause
24. Which roles should management play in any given project? (Select all that apply.) **?**
- A. Definition of project concept and charter
  - B. Appointing of team members
  - C. Putting you in contact with vendors
  - D. Assistance in defining and approving scope
  - E. Reviewing and approving of all deliverables
25. What elements will you need in order to be able to successfully determine the project's schedule? (Select all that apply.) **?**
- A. Detailed cost estimates for each task
  - B. Complete list of deliverables
  - C. Listing of all tasks, activities, and phases
  - D. Detailed estimates of project tasks
  - E. Vendor contact information
  - F. Information regarding team member preferences for schedule format
26. Why is it important to pay special attention to the risks that activities on the critical path might incur? **?**

- A. Because activities on the critical path are the most important
- B. Because of their possibility to affect the entire project's scope
- C. Because stakeholders pay close attention to critical path activities
- D. Because the concentration of team members is the most on critical-path activities

27. At project planning time, when you want to indicate a key turning point in the project, what project element do you use?

?

- A. New phase
- B. New activity
- C. Milestone
- D. New task
- E. Successor designation

28. You're a project manager for a project that's well into the executing phase. Which of the activities below will you be involved with during this phase? (Select all that apply.)

?

- A. Writing the project closure documents
- B. Modifying the project's schedule
- C. Comparing budget variances, estimated to actual
- D. Obtaining sign-off of the scope document

29. From the list below, place each activity to its correct PACE project phase.

?

	Planning phase
	[ ]
	[ ]
	[ ]
Development of project schedule	Activating phase
Averting a risk that has arisen	[ ]
User acceptance testing	Controlling phase
System documentation	[ ]
Development of concept and charter	Ending phase
Variance analysis	[ ]
Training of help desk	[ ]
Scope document sign-off	[ ]

30. Which project management methodology is useful because it wraps up a lot of the project documentation and formalization into fewer, easier steps?

?

- A. PACE

- B. IPECC
- C. IIII
- D. PIECC
- E. APCE

31. What elements are included in any given WBS? (Select all that apply.) ?
- A. Tasks, activities, phases
  - B. Finance department sign-off
  - C. Durations
  - D. Vendor statement of work (SOW)
  - E. Team members
  - F. Cost estimates
32. Of the various cost-estimating techniques at your disposal, which will you most likely use in most projects? ?
- A. Parametric
  - B. Linear regression
  - C. Top-down
  - D. Bottom-up
  - E. Indexing
  - F. Unit
33. You're a project manager working on a mid-sized project that's well into the executing phase. Which of the following items will you *not* be tracking during this time? (Select all that apply.) ?
- A. Project's scope
  - B. Vendor agreements
  - C. Deliverable creation
  - D. Project schedule
  - E. Variance analysis
34. When preparing a project's business case statement, which elements should you always include? (Select all that apply.) ?
- A. Estimated costs
  - B. Project duration
  - C. Payback period
  - D. Benefits
  - E. Team members involved
35. You are the project manager for a moderately sized project well into the executing/controlling phase. What is the largest risk that you will be monitoring for during this time? ?
- A. Scope creep
  - B. Vendor going out of business
  - C. Team member leaving the company
  - D. Sponsor losing interest in the

- project
36. Which two criteria are needed for any milestone that you develop in your project plan? ?
- A. Success
  - B. Entry
  - C. Exit
  - D. Completion
37. In which document should you identify the manner in which team members' performance will be reviewed? ?
- A. Concept
  - B. Charter
  - C. Scope
  - D. Project plan
38. Why don't all budget or schedule variances have an impact on the project's scope? ?
- A. Because some tasks aren't on the critical path
  - B. Because you asked for more money and time than the project really required
  - C. Because the sponsor has the ability to smooth over such variances
  - D. Because some variances don't involve money or time
39. In which area will the bulk of the project manager's work be concentrated? ?
- A. Preparatory documentation of the project
  - B. Managing the people who are performing the tasks
  - C. Interfacing with the sponsor and stakeholders
  - D. Controlling the tasks
40. In the IPECC methodology that PMI endorses, which of the following risk elements are *not* developed in the planning stage? (Select all that apply.) ?
- A. Risk response development
  - B. Risk quantification
  - C. Risk response control
  - D. Risk identification
41. You are the project manager for a mid-sized project that's well underway and is late in the executing phase. What event could occur at this point that might force you to immediately move the project into the closing phase? ?
- A. Sponsor loses interest in the project
  - B. All project resources are exhausted
  - C. A key team member leaves the

company

42. In your scope document, what would a suitable deliverable description include? (Select all that apply.) ?
- A. What the product will cost
  - B. What the product will be able to do
  - C. What the product will look like
  - D. Who will use the product
  - E. Why the product is needed
  - F. Why you have to invent a new product when off-the-shelf products will do
43. You are a new project manager for your company. The previous project manager left abruptly. When reviewing the project manager's latest project, the one he was involved in prior to his departure, you find that the scope document is poorly formulated and missing several key elements. What are the two steps you should next take? ?
- A. Scrap the scope document and start over
  - B. Gain sponsor/stakeholder sign-off on a new document
  - C. Fill in the missing scope elements
  - D. Go back to the business analysis and reformulate the requirements
  - E. Review the charter to see if it too is missing crucial elements
44. Suppose that a vendor tells you, "There was a flood in Alabama, where our parts house is at, and we can't get the parts you need to you for another three weeks." You need these parts for an activity in your project plan and, unfortunately, the activity is on the project's critical path. What should you do next? Put the listed actions in chronological order. (Note that not all actions are recommended.) ?

Present the impact to the stakeholders	1.	
Try to find a different vendor	2.	
Discern whether you can do without the parts	3.	
Determine impact, in terms of schedule and cost, on the scope	4.	
Ask the vendor if there are alternatives	5.	
Perform variance analysis to find how much leeway you have in schedule and cost		

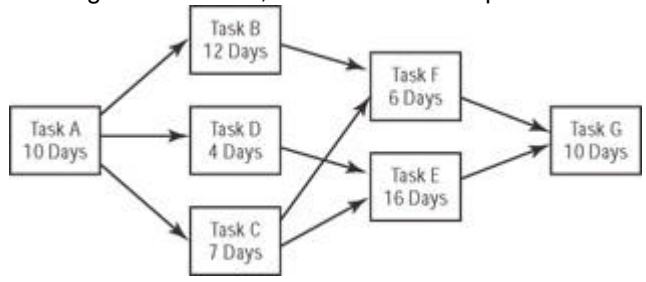
45. You are a new project manager for your company. The previous project manager left abruptly. When reviewing the project manager's latest project, the one he was involved in prior to his departure, you find that the scope document is poorly formulated and missing several key elements. Delving further into the project documentation, you realize that several requirements seem to be missing. What is your next step?

?

- A. Notify stakeholders
- B. Go back and formulate the additional requirements
- C. Add the new requirements to the scope document
- D. Ask that the project be killed

46. Looking at the exhibit, what's the critical path?

?



- A. ABFG
- B. ADEG
- C. ACFG
- D. ACEG

47. What term is given to very long tasks in a project?

?

- A. Lazy-Boys
- B. Hammocks
- C. Van Winkles
- D. Snoozers

48. When a developer is done with her piece of code, what kind testing should be done on the completed code?

?

- A. Module
- B. Unit
- C. System
- D. UAT

49. Which people associated with the project should be able to utilize your project's change-control system? (Select all that apply.)

?

- A. Stakeholders
- B. Vendors
- C. Customers
- D. Contractors
- E. Budget analysts
- F. Team members

50. Which element of your project's scope document defines resources that will be available as needed while the project moves forward?

?

- A. Risks
- B. Budget
- C. Assumptions
- D. Priority

#### Answers

1.

C

There are some key words in the definition of a project. One of the key words is *temporary*, defined by the fact that a project has a definite start date and a definite end date.

2.

A, D

When considering requirements definition, you should be concerned about success metrics, which are how you'll know when a requirement has been met, and completion metrics, which are how you'll know when the project has been completed.

3.

B

In the controlling phase, you're constantly checking for out-of-scope conditions, such as scope creep or tasks taking too long or costing too much.

4.

B

You need to figure out if you'll have the formal authority that an ordinary business manager would have, or if your authority will be more informal, meaning that you'll have to ask permissions for a great many different things.

5.

C

You'll be forced to move the project into the formal closing phase if the project plan is rejected by the sponsor and stakeholders for whatever reason and there seems to be no good alternative. You still need to move into closure, because you'll want to document the metrics you laid down for the requirements and provide a Lessons Learned section.

[6.](#)

A, B

In a multinational environment, you should remember when compiling the project calendar that there may be holidays or religious festivals in other countries that are not celebrated in yours. For example, the company's formal holidays may only be viable for the U.S., with other holidays left up to the foreign office to declare. Your job of creating a workable project schedule will be more difficult in an environment like this, but you must take these things into consideration.

[7.](#)

C

The work breakdown structure (WBS) document is derived by deconstructing deliverables in order to determine what tasks you must perform to create them. The WBS is a part of the project plan.

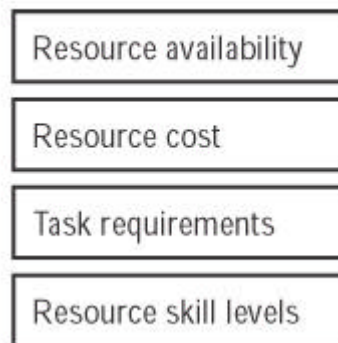
[8.](#)

A

Certainly, a PM from time to time might wind up speaking before a group of people about the project, but polished public speaking capabilities are not a trait that a PM *must* possess. Nice to have, yes. Need to have, no.

[9.](#)

#### Cost Estimate Considerations



When assessing your cost estimates for each task, take into consideration the availability of resources, experience level of the people performing the work, task requirements, and expense of the resource (among other things).

[10.](#)

A, B, D

The project plan should include a table of contents, an executive overview, the sponsors, the team members, the requirements, the scheduled tasks (WBS accounts for this), expected resources, environmental issues, business requirements, implementation, support, and training plans. It does *not* include the budget (part of your initiation documents and included in the charter), nor does it talk about potential marketing plans or corporate managers unaffiliated with the project.

[11.](#)

D

The methodology that PMI endorses encompasses five phases: initiating, planning, execution, controlling and closing.

[12.](#)

B

You will list the risks that you've come up with in the scope document, but risk *control* belongs in the controlling aspect of the project, not in planning. When a risk occurs, you'll put out the risk response you've developed and begin to control

the risk.

13.

B

Iteration will appear often, but mainly when deconstructing the project's deliverables in order to arrive at the tasks necessary to create them; you may have to repeat the process several times in order to sufficiently deconstruct a deliverable. This activity happens in the planning phase of the project.

14.

A, C

The team structure is an element that you mention in your scope document. You talk about the makeup that your team will most likely consist of, either part-time or full-time workers.

15.

D

Under normal circumstances, once you've estimated the tasks' durations, you won't need to adjust them. If a worker isn't getting a task done quickly enough, it's up to you to manage the issue, not to negotiate an increase in the task's duration. You should not add tasks to a project once it's underway—adding tasks needs to occur at project planning time. However, if a stakeholder approaches you with a change to a task and you determine that the change must take place, you should try to figure out what alternatives you have that may not present such an impact to the scope and attempt to negotiate the use of one of those alternatives instead.

16.

1. Project concept
2. Project requirements
3. Project charter
4. Project scope
5. Project plan

You begin by interviewing the customer, figuring out what the basic ideas behind the project are. You then formulate a project concept document. Next, you flesh out the requirements and develop your requirements doc, including the metrics involved with each requirement. Then you formulate a project charter that authorizes the project to begin.

Now that you've been given permission to proceed, you develop your scope document, and finally, using the scope and requirements docs, you derive your project plan. In the PACE methodology, the majority of these documents can be combined. The project plan will likely be keyed in to project management software.

[17.](#)

### People Decisions

Team members

Project manager's role

Stakeholders

### Money Decisions

Project cost

Vendors

### Technical Control Decisions

Methodologies

Change control process

Projected schedule

Some other necessary elements are left out of this list: completion criteria, industry or company regulations that may impact the project, and any mandated tools or resources that you'll be required to use on the project. Also, when presented with an incomplete scope document, you have two choices: You can add the necessary components that would appear in any ordinary scope doc, or you can simply add those things that are necessary and talk about those things that are left out.

[18.](#)

A, D, E

When setting up a change-control system, you're predominantly interested in changes to the time the project will take, its cost, or its deliverables (design). Any change to these three elements may very well require a scope change, which means you have to go through lots of extra steps to get it approved and managed.

[19.](#)

A

The other items are certainly possible, but the main reason you should deal with disgruntled employees as soon as possible is simply because their attitude will be poisonous to the rest of the team. Once that happens, tasks start slowing down, deliverables aren't created on time, and the project's in bad trouble.

[20.](#)

D

A top-down budget is one in which you're forced to budget using estimates and assumptions. You'd be working with a top-down budget, for example, in a company that designs

and builds new software products, each of which is managed in a project environment. You'd be given a pot of money for a new product and told to get the product manufactured and out the door using this budget. You'd be forced to utilize your best-guess efforts by relying on the assumptions you and your team are making regarding the new product and the estimates your team can come up with for each task. This type of budgeting can be difficult to manage.

21.

B, C

All requirements that are fleshed out at requirements definition time should be included in the scope document. However, some requirements might not fall into the mandatory category—qualifying only as nice-to-haves, not need-to-haves. You should describe the need-to-haves, including their metrics, so that if time permits they can be included, or they can be researched and utilized in a later project.

22.

A, C

The question on your mind should be whether there are objective requirements associated with this list and, if so, how you measure successful outcomes and what metrics you can judge the success of a given requirement's formulation by. It's important to somehow "objectify" requirements so that you can gauge your success with creating them.

23.

D

First order of business is to ascertain *why* the proposed scope deviation is believed to be needed. If, after validating (between you, your project team, and the stakeholders) that the proposed change is necessary, then you have to validate its impact on the scope, in terms of money, time, and resources.

24.

A, D, E

Management should be given some stake in the project. You can do so by including them in the definition of the project's concept and charter, by having them assist you in the definition and approval of the scope, and by asking them to review and approve the deliverables. It should be you who appoints team members, though management may sometimes have input to who you choose. You will be the one to contact vendors. Note that another managerial function is to act as a spokesperson/advocate for the project.

25.

B, C, D, F

In order to make intelligent decisions regarding the project's schedules you need to know what the deliverables are, which tasks, activities, and phases go into building those deliverables, how long you think it'll take to work on those segments, and how the team prefers to work. Armed with this info, you can successfully calculate a reasonable schedule estimate.

26.

B

Recall that the critical path is the longest duration of those activities that are dependent upon each other. They are not

necessarily the most important activities. Since they have predecessors and successors, if a change in an activity's duration is made because of a risk that has materialized, a domino effect might kick in that trickles down through all of the remaining activities. Activities not on the critical path certainly have dependencies (predecessors and successors), but if something happens you have a little time to react compared to activities on the critical path.

[27.](#)

C

A milestone denotes a significant event in the project's implementation. You might consider the building and deploying of several servers a key turning point and thus target completion of this activity as a milestone. Milestones are zero-length tasks. Every project should have one or more milestones in it.

[28.](#)

C

One of the project execution tasks that you as the PM will be handling will be the monitoring of the project's variances—comparing the actual expenditures to projected. You would also be conveying this expenditure information to the corporate financial people so their budget areas for your project are updated as well.

[29.](#)

#### Planning phase

Development of project schedule

Scope document sign-off

Development of concept and charter

#### Activating phase

Variance analysis

#### Controlling phase

Averting a risk that has arisen

#### Ending phase

System documentation

Training of help desk

User acceptance testing

The PACE methodology consists of the planning, activating, controlling and ending phases. Planning includes the elements of developing the project formulation documents,

such as the concept, scope, charter, and project plan. The activating phase kicks in when you're actually engaged in formulating the project's deliverables. Variance analysis is good to perform because it illustrates to you how close you are to your task estimates. The controlling phase involves things such as teambuilding, risk response control, and scope creep control. The ending phase represents the closing elements of the project— things like developing lessons learned, providing system documentation, training the help desk and support staff, and UAT. You could make an argument for putting UAT somewhere in late activating—these phases aren't written in stone, they're more gray than they are black and white—but usually the UAT lands in ending.

[30.](#)

A

The PACE project management methodology (planning, activating, controlling, and ending phases) collapses a lot of the formalization of the IPECC methodology that PMI uses into fewer documents and steps. PACE is very useful for IT shops, while IPECC would be useful for very large projects—buildings, dams, bridges, airplanes.

[31.](#)

A, C, E, F

A standard WBS should include the tasks, activities, and phases of the project. Each task, activity, or phase would also include the duration, the people working on it, and its cost. You wouldn't include any SOWs in the actual WBS (though they are included *alongside* the WBS in the project plan). Unless the finance department is a stakeholder, they don't need to sign off on the WBS.

[32.](#)

D

Most IT projects qualify for bottom-up cost estimating. You deconstruct the deliverables to derive the tasks, activities, and phases, then estimate to see what each task will actually cost, in terms of physical or logical resources and time. Once all costs are assembled, you have a pretty good feel for what the project's going to actually cost. Sometimes you'll be given a pot of money and told to make do with it to get your project done. A situation like that would involve top-down cost estimating. The other estimating techniques, while valuable in very large projects, probably don't need to be utilized in most IT projects.

[33.](#)

B

Vendor agreements should be nailed up and finalized in the planning phase. At execution time, you're pretty far into the project to be worried about any given vendor.

[34.](#)

A, C, D

A business case statement is a high-level, business-oriented overview that talks about the estimated costs of the project, how long it will take to pay back those costs, and what benefits can be derived from going forward with the project. A business case statement should not include IT tech-talk, and instead should be very business-oriented.

[35.](#)

A

By far the largest risk to the project at this stage is scope creep. Customers drop by the cube of one of your developer

and drop a hint or two that they'd like to see this and that in the code. The obliging team member, who feels that the customer is his... well, customer, tries to meet the request. The problem with this scenario is that you've already gone all the way through requirements definition and everyone has signed off on the tasks to be done. Something extra is now out of scope, and if enough of these happen, the schedule and budget of your project can go way off kilter.

[36.](#)

B, C

A milestone is a zero-length task that marks the accomplishment of something significant in the project. Because of that, you need to say how it was that you entered the milestone and where you'll go when you exit it.

[37.](#)

C

Performance review method is especially critical in larger projects in which a person's time will be wrapped up with the project for an extended period. Somebody has to give your team members their review during this time period. Working with the sponsor and stakeholders, you'll define who will be responsible for that performance review effort and will state this in your scope document.

[38.](#)

B

When performing your cost- and time-estimation efforts, you'll build in a comfort factor, typically some percentage of the estimate, so that you have some leeway in budget and schedule. In projects that are rigorously managed using IPECC methodology, this factor building effort can become very detailed.

[39.](#)

A

Well-developed preliminary preparation documentation, such as the concept, charter, scope, and project plan, will cause the project to be better simply because so much front end thought was put into the development of the project's deliverables. The trick is in the planning and documentation of the project, although the other elements mentioned above are important as well.

[40.](#)

C

Risk response control occurs at the controlling stage. In planning, you identify the risks to the project, quantify their potential impact on the scope, and then develop appropriate responses to the risks should they arise. In the controlling phase, if a risk transpires, you pull out the response you developed earlier and proceed to try to quash the risk before it creates damage to the project.

[41.](#)

B

In the event that a project's resources are exhausted, you have two choices: close the project out at the stage it's at, or go to the sponsor for more resources. While the sponsor losing interest in the project might stall it, because you're late in the execution, you would probably want your posture to be that you should complete the project. Key team members leaving the company could impair the project's scope, but since you're so late in the executing phase, you may not have much difficulty. Team member in-fighting isn't

a good reason to close out a project (or shouldn't be!).

42.

B, C, D

A deliverable description talks about what the deliverable does, who uses it and it will "look like" (meaning how the screens will appear, etc.) Your concept and charter's business case document details why the product is needed. Costs are detailed elsewhere. Justification for a new product when an off-the-shelf product will do is something you'd handle at requirements definition time.

43.

, B C

Presumably the previous project manager worked with the customers to flesh out the correct requirements, so you don't have to go back and completely reinvent the wheel. Instead, you should carefully examine what you already have, fill in the missing ingredients, then take the scope document back to the sponsor and stakeholders for re approval.

44.

1. Ask the vendor if there are alternatives
2. Discern whether you can do without the parts
3. Determine impact, in terms of schedule and cost, on the scope
4. Perform variance analysis to find how much leeway you have in schedule and cost
5. Present the impact to the stakeholders

First of all, see if there are alternatives the vendor might be able to come up with. Next, ascertain if you can do without the parts (probably not, but hey, team members can sometimes think very creatively). Next, determine the impact that the news will have on the project's scope, in terms of its schedule and cost. You do this by performing a variance analysis on the schedule and cost to see if you have any breathing room. Finally, pass the word on to stakeholders so they're aware of the delay and its cause, as well as what you did to try to tone down its impact. Generally speaking, during execution of a project it's too late to switch vendors.

45.

A

The first step you should take is to call a meeting together

with the sponsor and stakeholders. Explain the situation, including the fact that some requirements are missing. The fact that requirements are missing means that things may not be as simple as adding the new requirements to the scope document and proceeding ahead with the project. You might have to go through some more business analysis and deconstruction of the deliverables in order to arrive at a complete requirements list. The stakeholders need to know that the project was ill-formed to start with.

[46.](#)

D

The critical path is the longest contiguous segment through the project, from task to task. You can see that by traversing from A to C to E to G, you'll occupy 43 days, the longest of the four possible paths.

[47.](#)

B

A milestone is a zero-length task that denotes the accomplishment of something significant in the project. A hammock is a task with a very long duration. If, for example, you used an arbitrary scale of 0–99, milestones being 0, a hammock would be a 99.

[48.](#)

A

The basic test that a programmer will perform is module testing— validating that the code just written performs as expected. Many techniques exist for testing of modularized code that's designed to snap in with other pieces of code to make a complete program. Among the tools a developer could use would be stepping through the code line by line and occasionally breaking out to see if memory variables are populating as expected.

[49.](#)

A, C, D, F

Most people associated with the project should be able to request changes utilizing your change control system. Among them are the stakeholders, customers, contractors working on the project, you, and your team members. Vendors and budget analysts would likely not want or need to access your change-control system.

[50.](#)

C

When developing your scope document, you include a section called Assumptions. This section talks about the things that you expect to be available to you as the project proceeds. At scope sign-off time, the sponsors should realize that they're authorizing you to utilize the resources you pointed out in assumptions. Note that this is different from the Predetermined Tools And Resources. In the Predetermined Tools And Resources section, you're stating the things that the company mandates that you use in the project.

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#### **Chapter 7: Creating a Project Plan**

[Project Management Software](#)  
[Prestige Hotels: Project Management Plan Formulation](#)

#### **Chapter 8: The Work Breakdown Structure and Organizing and Finalizing the Project Planning Phase**

[A Highly Iterative Process: Packaging](#)  
[Real World Scenario: The “Sticky-Note” Decomposition Method](#)  
[Prestige Hotels: Project Plan](#)

#### **Chapter 9: Managing Budgets, Schedules, Estimates, and Communications**

[Prestige Hotels: The Budget](#)  
[Get with the Program](#)  
[Prestige Hotels: Communication and Schedule Segments](#)

#### **Chapter 10: Controlling the Project**

[Real World Scenario: “Crashing” the Windows 2000 Project](#)  
[Real World Scenario: The Anti-Example: The Case of the “I’ve Fallen and I Can’t Get Back Up” Project](#)  
[The “Planning Took Too Long and Now the Technology’s Different” Phenomenon](#)  
[Prestige Hotels: Project Control](#)

#### **Chapter 11: Change Control**

[Real World Scenario: Unanticipated Third-Party Costs That Require a Change in a Project’s Scope](#)  
[Real World Scenario: Project Philosophy Causes Scope Creep](#)  
[Prestige Hotels: Managing Change](#)

#### **Chapter 12: Managing Teams, Resources, and Quality**

[Real World Scenario: Maybe It’s Not the Team Member—It’s You!](#)  
[The Latest in Technology Helps You Manage Teams from Afar](#)  
[Real World Scenario: Why Does Microsoft Windows XP Run Faster?](#)  
[Real World Scenario: Setting Up a Dev, Test, Prod Environment](#)  
[Prestige Hotels: Managing Teams, Resources, and Quality](#)

#### **Appendix A: Project Management Resources**

[More XML Fun](#)