successful project management

Applying best practices and real-world techniques with Microsoft® Project

BONNIE BIAFORE
Successful Project Management
Applying Best Practices and Real-World Techniques with Microsoft® Project

BONNIE BIAFORE
Acknowledgments

Publishing a book is a project, and for Successful Project Management, I was fortunate to work with a team that has the can-do attitude that every project manager dreams of.

My thanks go to Kenyon Brown, the acquisitions and project editor, who shepherded the manuscript through several iterations; Nancy Sixsmith, the copy editor; Sumita Mukherji, the production manager; and Angela Howard, the indexer, for polishing the manuscript to the pages you’re reading now.

I also want to thank the reviewers who made sure that I was clear; provided useful information; and, most important, didn’t make things up. For sharing his uncanny project management sense as well as his sense of humor, I thank my friend, Bob McGannon. I also thank Ciprian Rusen for his thorough technical review and valuable suggestions.

In this edition of the book, I have included best practices generously offered by project managers from a variety of industries. I learned a lot from their experiences and suggestions, and, even better, have made some new friends. I would like to introduce you to these contributors:

Max Dufour is a principal with SunGard Global Services. He has been managing global projects for more than 10 years with a focus on strategy formulation, operational effectiveness, risk management, and corporate social responsibility. He holds an MBA from Duke University, has a BA from Northeastern University, and is a PMP.

Jeff Furman (www.jeff-furman.com) has 15 years experience as an IT project manager and is author of The Project Management Answer Book (Management Concepts, 2011). He teaches PMP prep and Train-the-Trainer courses for the Microsoft Certified Trainer and CompTIA CTT+ certifications.

Tres Roeder is founder and president of Roeder Consulting, a company that offers A Sixth Sense for Project Management®, a system for helping people work through change. The company clients include several Fortune 500 companies. Tres regularly presents at Project Management Institute meetings.
Dr. Robyn Odegaard is the president/owner of Champion Performance Development (http://champperformance.com). Robyn speaks nationally on team-building and leadership. She regularly consults with leaders to create and maintain high-performing teams in business and athletics.

Joann Perahia is a business systems facilitator specializing in the requirements analysis and data defining phases of application development. She has saved corporations millions of dollars in software development using her facilitating skills. Joann is currently the Vice-President of Sales and Marketing at Systemic Solutions, while managing her twins’ acting careers.

Niloufer Tamboly, CPA, is a vice president of and project manager for Open Information Systems Security Group (www.oissg.org). She uncovers simple and profitable solutions for her clients and streamlines processes and workable solutions in business, finance, and technology areas of organizations.

Ron Taylor, PMP, is a project manager, lecturer, author, and consultant. He is the principal and founder of the Ron Taylor Group and past president of PMI’s Washington D.C. chapter. During Ron’s tenure as president, the chapter was named PMI Chapter of the Year, and Ron was named PMI’s Leader of the Year. Ron is a contributing author with PMForum, Adjunct Professor of Management at George Mason University, and co–author of 77 Deadly Sins of Project Management and author of Nurturing Trust. His latest book on leadership will be published in 2011. Ron has an MBA from the University of Kentucky.

Dr. Arthur P. Thomas, Assistant Professor of Practice and Professor of Record for the Project Management Curriculum, has taught in Syracuse University’s School of Information Studies since 2001. Dr. Thomas’s career has included IT positions from programmer to chief information officer (CIO) and corporate training positions from training specialist to chief learning officer (CLO). Art is also Chairman and CEO of Counterpoint Holdings LLC, a performance improvement consultancy.
Bonnie Biafore began working at an engineering firm after graduating with a master of science in structural engineering. Her first assignment was to help select a computer-aided design system for the company and then implement it to help produce engineering drawings. Little did she know that this was her first crack at managing a project. That she had no idea what she was doing was no doubt obvious to everyone else involved.

As it turns out, with training and experience, Bonnie became pretty good at managing projects. In 2003, she received her Project Management Professional Certification (PMP) from the Project Management Institute (PMI).

When she isn’t managing projects for clients, Bonnie writes about project management, personal finance, and investing. Her friendly writing style and irrepressible sense of humor help turn dry subjects that people have to read into something they want to read. Her NAIC Stock Selection Handbook won awards from both the Society of Technical Communication and APEX Awards for Publication Excellence. Project Certification Insider, her monthly column for the Microsoft Project Users Group, explains the ins and outs of topics on Microsoft Project’s desktop certification exam.

When not chained to her computer, Bonnie hikes with her dogs, organizes gourmet meals, and works on a comedic novel about stupid criminals. You can learn more at her website, www.bonniebiafore.com, or email Bonnie at bonnie.biafore@gmail.com.
## Contents

*Acknowledgments*  
*About the Author*  
*Introduction*

### Part 1  Getting a Project Started

#### Chapter 1  Meet Project Management
- **What Is a Project?**  
  - A Unique Endeavor  
  - A Specific Goal  
  - Clear-Cut Start and Finish Dates  
  - Within Budget  
  - Something’s Gotta Give  
- **What Is Project Management?**  
  - Project Management Processes  
- **The Benefits of Project Management**  
  - Bottom-Line Benefits  
  - Benefits for the Project Team  
- **Summary**

#### Chapter 2  Obtaining Approval for a Project
- **Summarizing a Project**

---

**What do you think of this book? We want to hear from you!**  
Microsoft is interested in hearing your feedback so we can continually improve our books and learning resources for you. To participate in a brief online survey, please visit:  
[microsoft.com/learning/booksurvey](microsoft.com/learning/booksurvey)
■ Defining the Problem 18
  Identifying the Problem 18
  Documenting the Problem 20
■ Project Goal and Objectives 21
  Types of Objectives 22
  Characteristics of Good Objectives 23
■ Project Strategy 24
  Identifying Alternatives 25
  Factors for Selecting a Project Strategy 26
  Choosing the Project Strategy 26
■ Gathering Requirements 28
■ Deliverables 30
■ Success Criteria 33
■ The Scope Statement 33
  Preventing Scope Creep 35
■ Assumptions and Risks 36
■ Working with Project Stakeholders 39
  Identifying Stakeholders 39
  How Planning Tasks Help Identify Stakeholders 41
  Project Customer 42
  Project Sponsor 43
  Functional Manager 45
  Team Member 46
  Project Manager 47
  Documenting Project Stakeholders 47
  Obtaining and Maintaining Commitment 48
■ The Project Charter: Publicizing a Project 51
■ Summary 53
Part 2 Planning a Project

Chapter 3 Planning to Achieve Success

- What Is Project Planning? 58
  - Pointing the Team in the Right Direction 59
  - Tracking Progress 59
- Plans Change 60
  - Project Planning Step by Step 61
  - The Components of a Project Implementation Plan 62
- Summary 66

Chapter 4 Building a Work Breakdown Structure

- What’s a Work Breakdown Structure? 68
- The Benefits of a WBS 71
- Building a WBS 72
  - How to Build a WBS from the Top Down 72
- When to Stop Building a WBS 77
- Building a WBS from the Bottom Up 79
- Recording a WBS 79
  - Creating the WBS in Project 80
  - Pasting Tasks into Project 83
- Detailing Work Packages 85
- Summary 87

Chapter 5 Project Resources

- The Responsibility Matrix 90
  - Responsibility Levels 91
  - Creating a Responsibility Matrix 92
- The Project Organization Chart 94
Chapter 6  Building a Project Schedule  111

- Estimating  112
  - Duration or Effort?  114
  - Sensible Estimating Practices  115
- Top-Down Planning  123
- Defining the Sequence of Work  125
  - Types of Task Dependencies  125
  - Identifying the Correct Dependency Type  126
  - Creating Task Dependencies  127
  - Keeping Dependencies Flexible  129
  - Setting Specific Start and Finish Dates  130
  - Setting Deadlines  132
- Adding Schedule Milestones  133
  - Types of Milestones  133
  - Creating Milestones  136
- Assigning Resources to Tasks  137
  - Assigning Resources in the Task Sheet  137
  - Assigning Resources in the Task Form  139
  - Using the Assign Resources Dialog Box  142
- Building Reality into a Schedule  143
  - Accounting for Nonproject Time  144
  - Adjusting Tasks for Resource Productivity  145
### Managing Part-Time Workers and Multitaskers 146
- Scheduling Around Nonworking Time 147

#### Shortening a Project Schedule 150
- The Fast-Track to an Early Finish 150
- Choosing Tasks to Fast-Track 151
- Partial Overlaps 152
- Running Tasks in Parallel 152
- A Crash Course on Project Crashing 154
- Reducing Scope 157

#### Summary 158

### Chapter 7 Working with a Budget 159

#### Understanding Financial Measures 161
- Payback Period 161
- Net Present Value or Discounted Cash Flow 162
- Internal Rate of Return 164

#### Understanding Capital Budgets 165
- Putting Capital Budgeting into Practice 165
- Using a Capital Budgeting Tool 166

#### Calculating Costs in a Project Schedule 168
- Specifying Rates for Work Resources in Project 171
- Entering Rates and Quantities for Material Resources 172
- Assigning a Cost Resource to a Task 173

#### Comparing Project Costs with the Budget 174
- Creating Budget Resources 174
- Assigning Budget Resources to the Project Summary Task 175
- Filling in Budgeted Values 176
- Flagging Resources by Budget Type 178
- Comparing Budget Resource Values 179
Part 3  Carrying Out a Project

Chapter 8  Executing the Project Plan  187

- Procuring Resources  188
  - Soliciting Vendors  189
  - Selecting Vendors  190
  - Contracting  190
- Kicking Off a Project  191
- A Final Checklist  192
  - Approvals and Commitments  192
  - The Project Notebook  193
  - Project Baselines  194
- Summary  196

Chapter 9  Evaluating Project Performance  197

- Gathering Data  198
  - The Data You Need  198
  - Obtaining Time and Status  201
- Updating Tasks in Your Schedule  203
  - Setting the Status Date  203
  - Setting Up Project to Reschedule Incomplete Tasks  204
  - Quickly Updating Tasks  205
  - Recording Progress  206
  - Recording Actual Costs  209
- Tracking Schedule Progress  210
Contents

Reviewing Schedule Progress 212
Tables with Schedule-Related Fields 214
Filters for Checking Schedule Progress 215

■ Reviewing Cost and Cost Variance 216
  Viewing Cost and Cost Variance 217
  Finding Costs That Are Over Budget 219

■ Reporting on Project Performance 219
  Looking at High-Level Status 220
  Evaluating Cost and Work 221
  Earned Value Analysis: Schedule and Cost Performance 223
  Earned Value Status Measures 224
  Analyzing an Earned Value Graph 224
  Earned Value Performance 226
  Earned Value in Microsoft Project 228

■ Working with Visual Reports 233
  Generating Visual Reports 233
  Modifying Excel-Based Visual Reports 233
  Modifying Visio-Based Visual Reports 240

■ Summary 242

Chapter 10 Managing Project Resources 243

■ Motivating Project Resources 244

■ Developing a Team 250

■ Evaluating People’s Performance 253
  Watching for People’s Performance 253
  What to Do with Problem People 254
  Reviewing People’s Performance Compared to the Plan 255

■ Summary 257
Chapter 11  Communicating Information  259

- Knowledge Is Power  260
- The Communication Plan  261
  - Who Needs to Know?  262
  - What Do You Communicate to Audiences?  264
  - What Communication Method Should You Use?  269
  - Building a Communication Plan  272
  - Creating Communication Reminders  273
- Guidelines for Good Communication  275
  - What Is Communication?  275
- How to Get Messages Through  277
  - Learning to Listen  280
- Meetings That Work  283
  - Guidelines for Good Meetings  283
  - Kickoff Meetings  288
  - Project Status Meetings  289
  - Management Meetings  290
- Project Status Reports  291
- Taming Email  293
- Summary  295

Part 4  Controlling Projects

Chapter 12  Managing Project Changes  299

- An Overview of the Change Management Process  300
  - What Do You Control with the Change Management Process?  302
  - The Change Request Form  302
  - The Change Request Impact Statement  304
  - The Change Request Log  305
  - Managing Change Requests  305
Who Belongs on the Change Review Board? 308

Chapter 13  Modifying the Project Schedule 309

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simplifying Solution Hunting</td>
<td>310</td>
</tr>
<tr>
<td>Shortening a Project Schedule</td>
<td>311</td>
</tr>
<tr>
<td>Splitting Long Tasks into Short Ones</td>
<td>313</td>
</tr>
<tr>
<td>Adjusting Resource Allocation</td>
<td>314</td>
</tr>
<tr>
<td>Changing Units</td>
<td>315</td>
</tr>
<tr>
<td>Adjusting Work Contours</td>
<td>318</td>
</tr>
<tr>
<td>Assigning Overtime</td>
<td>319</td>
</tr>
<tr>
<td>Substituting Resources</td>
<td>321</td>
</tr>
<tr>
<td>Modifying Baselines</td>
<td>323</td>
</tr>
<tr>
<td>Saving Additional Baselines</td>
<td>323</td>
</tr>
<tr>
<td>Clearing a Baseline</td>
<td>324</td>
</tr>
<tr>
<td>Viewing Multiple Baselines</td>
<td>324</td>
</tr>
<tr>
<td>Summary</td>
<td>325</td>
</tr>
</tbody>
</table>

Chapter 14  Balancing the Budget and Other Project Variables 327

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost, Scope, Quality, and Schedule</td>
<td>328</td>
</tr>
<tr>
<td>Balancing Acts</td>
<td>329</td>
</tr>
<tr>
<td>Reassigning Resources</td>
<td>330</td>
</tr>
<tr>
<td>Optimizing the Schedule</td>
<td>332</td>
</tr>
<tr>
<td>Business Decisions</td>
<td>334</td>
</tr>
<tr>
<td>Summary</td>
<td>335</td>
</tr>
</tbody>
</table>

Chapter 15  Managing Risk 337

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Benefits of Managing Risk</td>
<td>338</td>
</tr>
<tr>
<td>The Risk-Management Plan</td>
<td>339</td>
</tr>
</tbody>
</table>
Contents

- Identifying and Describing Risks 342
  - Assessing Risks 345
- Choosing the Risks You’ll Manage 346
- Responding to Risks 349
  - Setting Up Contingency Funds 351
- Tracking Risks 353
- Summary 354

Part 5  Closing Projects

Chapter 16  Learning Lessons 357
- The Importance of Lessons Learned 358
- Collecting Lessons Learned 360
  - Meeting Participants and What They Do 361
  - Ground Rules 364
- Documenting Lessons Learned 369
- Summary 371

Chapter 17  Closing a Project 373
- Obtaining Customer Acceptance 374
- Documenting the Project 376
  - Project Closeout Reports 378
- Closing Out Contracts 381
- Project Transitions 382
  - Transitioning Resources 382
  - Handing Off Information 383
- Summary 384

Chapter 18  Archiving Historical Information 385
- Information to Store about Projects 386
Part 6  Beyond Projects

Chapter 19  Selecting and Prioritizing Projects  393

- Project Selection and the Project Manager  394
- Criteria for Selecting Projects  395
  - Criteria You Can’t Ignore  395
  - Linking Projects to Objectives  396
  - Risks and Opportunities  397
- How a Project Review Board Works  398
- Summary  399

Chapter 20  Other Project Management Approaches  401

- Managing the Critical Chain  402
  - Defining the Critical Chain  402
  - Using Time Buffers Effectively  404
  - How to Use Buffers  406
- Agile Project Management  406
- Summary  407

Glossary  409

Index  415

What do you think of this book? We want to hear from you!
Microsoft is interested in hearing your feedback so we can continually improve our books and learning resources for you. To participate in a brief online survey, please visit:
microsoft.com/learning/booksurvey
Introduction

PROJECT MANAGEMENT has been around for centuries. After all, how do you think the Pyramids were built? Organizations have come to recognize that a lot of the work they do is project-oriented. And when they realize that good project management can save both time and money, that’s about the time that people like you receive the call to be a project manager.

You aren’t the only one. Membership in the Project Management Institute (PMI), a professional organization for project managers founded in 1969, reached 8,500 in 1990. Its membership topped 100,000 in 2003 and, by the end of 2010, was 330,000. More than 400,000 people have earned the Project Management Professional (PMP) credential.

If you have little or no formal education in project management, congratulations, you’ve become an accidental project manager. You probably earned the assignment because you’re dependable and good at organizing your work. However, you may have only a vague idea of what you’re supposed to do or what it takes to succeed. To compound the challenge, Microsoft Project can seem like a Japanese puzzle box—getting a handle on one feature leads to another feature that you don’t understand.

Even if you know your way around a Gantt chart and can build a decent schedule in Project, chances are that nagging problems come up on the projects you manage. That’s why project managers are so valuable. Nagging problems always come up on projects. By learning more about how to manage projects, you can prevent many problems and you can reduce the impact of many others. For example, scope creep is an all-too-common problem in which one small change to project scope after another sneaks into your plan until you have no chance of meeting your schedule or budget. Setting up a process for managing changes gives the project team the opportunity to say no to changes that aren’t that important and to say yes to important changes even if they require a little more time or a little more money.
Although project management includes some techniques that are relatively straightforward, such as defining which task is the predecessor and which is the successor, most of what you do to manage projects is more touchy-feely. Communicating, negotiating, leading, and all other aspects of working with people can consume a lifetime of study, and you'd still have situations that make you stop and think.

The good news is that, as a project manager, you provide a highly valuable service to your organization, and your days will always bring something new and interesting. The bad news is that you’re trying to learn new skills while you’re overworked—you’re trying to corral an untamed project, recover from mistakes you’ve made, and learn how to use Project as well. Training would help, but you don’t have the time, and the training dollars in your organization are probably scarce.

*Successful Project Management* is here to help. This book tackles two broad topics that many project managers need:

- A practical education in project management
- Instructions for making the most of Project and other Microsoft Office applications to manage projects successfully

*Successful Project Management* isn’t some ponderous textbook about project management. It’s an easy-to-read guide to managing projects from start to finish. If you’re managing projects for the first time, it acts as your mentor by providing practical advice for managing projects more successfully and avoiding the more common project management mistakes. If you’re already managing projects, you can jump directly to a chapter to prepare for your next project management task or respond effectively to the latest project situation. The book uses plain English to explain project management tools, techniques, and terminology, so you can learn the lingo as you learn what to do.

Unlike many product-oriented books with chapter after chapter devoted to Project features, no matter how obscure, the primary focus of *Successful Project Management* is how to manage projects. However, you will find plenty of instructions for making the most of Microsoft products for project management. You’ll learn how to choose the most appropriate feature for the situation you face. And you’ll master Project features that are incredibly helpful but also incredibly confusing—until you know their secrets.
The organization of this book follows the PMI methodology and is broken into five parts that correspond to the PMI process groups: initiating, planning, executing, controlling, and closing.

- **Part 1, “Getting a Project Started,”** corresponds to PMI’s initiating process group and describes how to get a project off the ground. The first chapter is an introduction to projects and project management. The other chapter in this part of the book explains how to define what a project is supposed to accomplish, gain commitment to move forward, and work effectively with project stakeholders—people who have a vested interest in the successful outcome of the project.

- **Part 2, “Planning a Project,”** describes how to define and prepare a plan for achieving project objectives. This part corresponds to PMI’s planning process group. The first chapter is an introduction to project planning and explains all the components of a project plan and how they contribute to success. The other chapters in this part of the book explain in detail how to develop different parts of a project plan from the work breakdown structure (WBS) to a project schedule and budget. You’ll also learn about some of the financial measures that executives use to evaluate projects. In this part of the book, you’ll learn how to use Microsoft Word to author project plan documents, Project to build the project schedule, Microsoft Excel to develop a budget and analyze financial measures, and Microsoft Visio to construct project diagrams.

- **Part 3, “Carrying Out a Project,”** corresponds to PMI’s executing process group and describes what you do when you begin to implement the project plan you developed in Part 2. You’ll learn how to evaluate project performance and manage the resources working on your project. Perhaps the most important chapter in the book, Chapter 11, “Communicating Information,” not only describes how to build a communication plan for your project but also offers advice for communicating effectively in writing, in meetings, and via email. You can apply the techniques described in this chapter to every phase of your projects.

- **Part 4, “Controlling Projects,”** covers the work you do almost immediately upon beginning to execute a project. This part corresponds to PMI’s controlling process group and describes how you manage the changes that are an inevitable part of every project. You’ll learn how to control change requests so they don’t overwhelm your original schedule and budget. You’ll also learn how to modify the project schedule in response to changes, balance the budget with other project performance measures to make good business decisions, and manage risks.
Part 5, “Closing Projects,” consists of three short chapters that correspond to PMI’s closing process group. Although closing a project doesn’t represent much of the time and effort in a project, the work you do is incredibly valuable to future projects. In this part of the book, you’ll learn how to collect the lessons that people learned while working on a project, perform the tasks to tie up the loose ends at the end of a project, and store the results of a project for others to refer to in the future.

Part 6, “Beyond Projects,” describes how to select and prioritize the projects your organization undertakes when you don’t have enough time, money, or resources to run them all. In this section, you also learn about additional methodologies for managing projects, including the critical chain approach and agile project management.

The Glossary at the end of the book is a quick reference to the project management terms used in the book.

Chapters in the book describe what project managers do and how these activities help deliver projects successfully. You’ll find practical advice about steps to take on large projects and steps that might be omitted for small projects. Many chapters include step-by-step instructions or recommended features for Project and other Office applications. In addition, this book includes several helpful features of its own:

- Sidebars provide in-depth discussion of project management techniques.
- Best Practices sidebars describe particularly effective practices used by many project managers to prevent problems or dramatically improve project performance.
- Tips highlight shortcuts and other simple but helpful techniques.
- Warnings represent minor problems and how to prevent them.
- Notes provide additional information about topics in the text.
- Project Files represent content that is available on the companion website.
Companion Content

All the project files discussed in this book can be found at the following address:

http://aka.ms/649804/files

Please follow the directions.

Support for This Book

Every effort has been made to ensure the accuracy of this book and the companion content. Microsoft Press provides support for books and companion content at the following website:

http://www.microsoftpressstore.com/about/support

You can also look for updates and a list of errata at the following website:

http://aka.ms/649804/files

Questions and Comments

If you have comments, questions, or ideas regarding the book or the companion content, or questions that are not answered by visiting the sites above, please send them to Microsoft Press via email to mspinput@microsoft.com.
CHAPTER 4

Building a Work Breakdown Structure

The work was like peeling an onion. The outer skin came off with difficulty . . . but in no time you’d be down to its innards, tears streaming from your eyes as more and more beautiful reductions became possible. —Edward Blishen

THE DIVISION OF LABOR for dinner could be you microwaving a couple of frozen dinners while your spouse gets out the plates, forks, and napkins. But the surprise party for your parents’ fortieth wedding anniversary is another story. You want the party to be amazing—like their marriage—so you don’t want to forget anything. The best way to make sure that everything gets done is to break the project down into small, manageable pieces. You could divide the work into planning the party, buying the supplies, preparing the food, and decorating the backyard. Or you could keep track of the work that you’ve hired the caterer, bartender, florist, and tent wrangler to do.

IN THIS CHAPTER, YOU WILL:

■ Learn what a breakdown structure is and how it helps plan a project
■ Identify several methods for building a work breakdown structure
■ Learn how to document a work breakdown structure
■ Learn how to define work packages in detail
Regardless of the way you break down the work, the important point is that smaller servings of work help the project manager (or party host, in this example) keep track of what’s been done and what’s on deck, and it also helps everyone working on the project perform their parts successfully. A work breakdown structure (WBS) is the tool that project managers use to divide a project into tasks called work packages. But a WBS helps everyone involved see the scope and organization of the work in one easy-to-read chart.

This chapter describes a WBS and how it helps you to plan and manage a project. You’ll learn how to build one that effectively communicates the work to be done. This chapter also explains methods for decomposing work into properly-sized portions as well as techniques for getting your WBS into Microsoft Project so that you can begin building a project schedule.

**SEE ALSO** Chapter 6, “Building a Project Schedule,” describes how to link tasks and assign resources to turn a WBS into a project schedule.

### What’s a Work Breakdown Structure?

A WBS is a simple though aptly named component of project planning. It shows the work in a project broken down into progressively smaller tasks. The tasks at the lowest level represent work you can assign to team members to perform.

A WBS is project management’s answer to the proverbial question, “How do you eat an elephant?” The answer is “One bite at a time.” In essence, a WBS details the bites—the list of tasks you must perform to complete a project. You use the work packages in the WBS to estimate the time and resources each deliverable takes, identify the types of resources you need, and link the work packages (tasks) to create the project schedule.

**SEE ALSO** The section “Estimating,” on page 112, discusses several methods for estimating effort. Chapter 5, “Project Resources,” describes the different types of resources you may use on your project and how to add them to your project. The section “Defining the Sequence of Work,” on page 125, shows you how to create dependencies between tasks to put the tasks into sequence.
A WBS contains two kinds of tasks: summary tasks and work packages. As you can see in Figures 4-1 and 4-2, differentiating the two is easy:

- **Work packages**  These are the lowest-level tasks that represent actual work that people perform, such as digging holes, pouring footings, and installing decking. Throughout this book, these tasks are called work packages or simply tasks.

- **Summary tasks**  These comprise all higher-level tasks, which summarize several work packages or several lower-level summary tasks. For example, a summary task called Preparing Lumber, shown in the WBS in Figure 4-2, could include work packages of Cut Lumber, Treat Lumber, and Pre-Drill Holes in Lumber. But the Preparing Lumber summary task is also a part of a higher-level summary task called Constructing Deck.

**NOTE**

Some project managers refer to higher-level tasks as activities and bottom-level tasks as tasks, while others swap those definitions. Others use the terms activity and task interchangeably.

You can show a WBS either as a diagram or as an outline. A WBS diagram looks like an inverted tree, starting with the project summary task at the top and ending with the work packages at the bottom, as Figure 4-1 illustrates.

**FIGURE 4-1** A WBS diagram shows the hierarchy of project tasks from the overall project at the top to work packages at the bottom.

**SEE ALSO**

The sidebar “Displaying a WBS as a Tree,” on page 84, explains how to create a tree diagram in Project 2010.
A WBS in outline form shows the same information as a WBS diagram, but it takes up a lot less space. If you’ve built a list of tasks in the Task Sheet view in Project, the WBS outline shown in Figure 4-2 is an old friend. Each level in the outline is indented a bit more to the right. The first column in Figure 4-2 shows another component of a WBS: the WBS code. Following an outline-oriented numbering scheme, WBS codes show the level of the hierarchy to which tasks belong as well as which lower-level tasks belong to higher-level (parent) summary tasks.

**FIGURE 4-2** A WBS outline indents tasks at each level of the hierarchy to show summary tasks and work packages in a compact space.

**PROJECT FILE** The Project file for the WBS that’s shown in Figure 4-2 is Backyard Remodel WBS.mpp and is found in the Chapter04 folder on the companion website.
The Benefits of a WBS

If you try to perform a project with only a vague direction, like “Remodel the backyard,” chances are good that you’ll forget to complete an important task, or the workers won’t understand exactly what they’re supposed to do. Part of the power of a WBS is that it presents project work in portions that people can handle. But more than that, a WBS does the following:

- **Helps the project planners identify the work to be done and determine the best way to decompose the work**  
  For example, as you identify summary tasks and work packages, you can evaluate different ways to summarize the work to find one that works best for the project and your organization.

- **Helps stakeholders visualize the scope of the project**  
  A WBS provides an overview of the project, which stakeholders can review at any level of detail they want.

- **Shows the work defined by the scope statement in more detail**  
  A scope statement is only a high-level view of the boundaries of a project. A WBS exposes the detailed tasks that comprise the overall project scope.

- **Helps people understand their work assignments**  
  Team members appreciate clear instructions about what they are supposed to deliver. A work package communicates the extent of an assignment. The relationship of the work package to the rest of the WBS increases workers’ commitment by showing how their efforts contribute to success.

- **Exposes additional work to be done**  
  Project deliverables that don’t have corresponding summary tasks or work packages in the WBS are a warning that you haven’t yet identified all the work that the project requires.
- Helps the planners develop more accurate estimates of a project schedule and costs  With smaller tasks, team members can better estimate the level of effort and the materials and equipment needed.

- Provides a foundation for measuring progress  Once you begin executing the project, work packages and summary tasks are not yet started, in progress, or complete. By breaking work into smaller components, you have more points at which you can accurately measure progress.

Building a WBS

Constructing a WBS can be a challenge, because you can often break down projects in different ways, even if the work you ultimately perform is the same. You can tame WBS creation by applying the same divide-and-conquer technique that the WBS itself represents.

How to Build a WBS from the Top Down

You can create a WBS more easily and more accurately with a few simple steps. The procedure boils down to starting at the top and working your way down, and then fine-tuning and verifying the WBS by working your way back up to the top.

Step One: Identify High-Level Tasks Using Project Deliverables and the Scope Statement

Because project deliverables document the tangible results that a project is supposed to provide, you start your WBS by creating high-level tasks for every project deliverable you’ve identified. For example, if a deck in the backyard is one project deliverable, create a high-level task for constructing that deck.

You break down high-level tasks by detailing intermediate deliverables. For example, a construction permit and blueprints aren’t end results for the backyard project, but you need tasks in the WBS to produce them.

See Also

The sections “Deliverables,” on page 30, and “Success Criteria,” on page 33, describe project deliverables and success criteria and why they are important to managing a project successfully.
A scope statement is a high-level view of what a project will do. Compare the scope statement to the tasks you’ve already added to the WBS. If an item in the scope statement isn’t yet present in your WBS, add a task for it now. For example, the scope statement in Figure 2-3 includes “Design the deck and patio, including lighting and landscaping; and produce detailed design drawings.” This one scope item identifies several project tasks:

- Summary task for the design phase of the project
- Task for designing the deck
- Task for designing the patio
- Task for designing lighting and landscaping
- Task to produce detailed design drawings

Figure 4-3 shows a high-level WBS created by reviewing deliverables and the scope statement for the backyard remodel project.

**FIGURE 4-3** Project deliverables and the scope statement can provide ideas for the high-level tasks in a WBS.
Step Two: Fill In the Remaining Levels of Tasks That Make Up the Work in the Top-Level Tasks

For small projects, this step might be as simple as adding a few more tasks under each high-level task. The basic approach for identifying tasks at the next level is to ask what deliverables and tasks are needed to complete the summary task (sometimes called the parent task). Consider the top-level task Designing Remodel. What is involved in designing a new backyard? An architectural design, a site plan, engineering drawings for the structure, construction permits, and the approval of the client are all deliverables for the overall design. Add tasks to produce each of these deliverables.

**TIP**

If you’re working on a large project and don’t have a lot of time, the entire planning team can determine the top-level summary tasks for the WBS. Then, you can delegate decomposition of those top-level summary tasks to members of the planning team.

**GOOD TASK NAMES**

Task names that effectively communicate work are like poetry; they make their point in only a few well-chosen words. Every task name includes the desired result and the action that produces it. The deliverable is the noun in each task name, such as Site Plan. The action to produce the deliverable is the verb. For example, Identify Top 5 Risks clearly states the action and the desired result.

Weak task names reduce the effectiveness of a WBS. Task names without a verb leave the work to be performed in doubt. For example, a task name like Deck doesn’t indicate whether the task is to design a deck, build it, or buy a new deck of cards for the Friday night poker game.

Vague verbs aren’t much better. A task to analyze risks could go on forever, if you assign it to the worrywart on your team. Action verbs, such as identify or prioritize, communicate work more clearly.

Some project managers prefer to differentiate summary tasks from work packages by name. Because summary tasks represent ongoing activity, you can name summary tasks using the “ing” form of a verb (called a gerund if you want to impress your friends) and work packages with the present tense of the verb. For example, the design summary task might be Developing Structural Design, whereas one of the work packages is Select Components.
Consider the high-level task Designing Backyard Remodel. Here is the initial decomposition:

- **Preparing Architectural Design** The design includes a deck, which means that the project needs an architectural design.
- **Designing Site Plan** The project includes a design for landscaping the yard, although performing the landscaping is out of project scope.
- **Developing Structural Design** Building a safe deck requires a structural design for the wood framing and foundation.
- **Preparing Final Drawing Set** A set of drawings is required to show the client the design and to obtain a building permit.
- **Obtaining Building Permit** The building permit is essential to begin construction.

Don’t forget to include the project management tasks that you perform in the WBS. Although many project management tasks continue from project beginning to end, you need tasks to track the work you do.

### BEST PRACTICES

Working initially in small teams is one of the best ways to build a WBS. If you have too many people involved at the beginning, you’ll be herding cats: redefining work packages, changing approaches, and re-arranging summary tasks, yet rarely making visible progress.

Very large projects typically require a dozen or more levels to break down work into small enough pieces. In fact, the higher WBS levels often represent projects in their own right, each contributing major deliverables to the parent project—like the booster rockets, computers, communication system, and lunar module in the early space program. Put together a small group of people familiar with the entire project and knowledgeable in at least one of its aspects. This team can build the top two or three levels of the WBS. For instance, the managers from each department or company involved in the project can focus on the big picture tasks at the top.

When you reach the third or fourth level of the WBS, you’ll need people with specific expertise to identify the work that is required. Delegate the further decomposition of these lower-level summary tasks to a smaller team, such as the structural engineering team that knows all the steps to preparing a structural design.
Step Three: Revise the Structure of the WBS

You can decompose most projects in more than one way. For example, one project manager might break a project into phases, such as planning, design, construction, and cleanup; whereas another might prefer to focus on completed products, such as houses, streets, and neighborhoods; or another likes to break work down by the department doing the work.

The groupings you use depend on your organization, the project objectives, and how you want to track progress. For example, breaking down work into construction phases makes it easy to track the work for different types of workers, such as carpenters, plumbers, painters, and landscapers. For massive construction projects such as building an airport, different companies are usually responsible for major deliverables. In situations such as these, you might break down the work into the subprojects that each vendor delivers: the terminal building, the runway, the baggage handling system, the parking garages, and final integration.

Revising the structure of the WBS provides a great opportunity to assemble the people who contributed to its construction. True, you’ll have to play traffic cop to facilitate the meeting, but the interactions between experts and stakeholders can produce a more effective WBS and build more commitment to the project at the same time. In addition, the questions and discussions that people ask and talk about help identify missing work packages.

Step Four: Verify the Structure of the WBS

The whole point of choosing a particular structure for a WBS is communication. The WBS is meant to help team members understand their assignments and help you to track progress. After you’ve revised the WBS, check that a summary task exists for each deliverable and that each summary task is important to at least one stakeholder. If not, you can safely move its work packages to another location in the WBS. For example,
When to Stop Building a WBS

if a project includes a significant quantity of documentation, and the technical writing group manages documentation deliverables, a summary task called Producing Product Documentation makes sense. For a smaller project with one technical writer who works directly with the development team, you might include a work package for writing the users’ guide within the summary task for developing the program.

In Project 2010, you can estimate from the top down using manually scheduled tasks, as described on page 123.

When to Stop Building a WBS

Work packages are like bowls of porridge in the fairy tale *Goldilocks and the Three Bears*. Work packages that are too big or too small are unacceptable—you want work packages that are just the right size. Large work packages make it difficult to get an accurate picture of progress. The team lead could reassure you that everything is on track for weeks only to ask for a two-month extension at the last minute. Work packages that are too small waste valuable time due to micromanagement. But how can you tell that a work package is just right?

Here are a few criteria for determining whether the WBS is at the right level of detail:

- **Progress and completion are measurable**  Work is broken down to a level so that status is easy to gauge at any point during the project.

- **Task duration is a reasonable length**  Break the work down to match your reporting periods (for instance, weekly or every other week). If you limit work packages to the length of your reporting period, work packages will be complete within two status-reporting periods. Many project managers like to break down work into packages that take between 8 and 80 hours (at least 1 day to no more than 2 work weeks).

- **Time and cost are easy to estimate**  Break work into portions that you can accurately estimate. For instance, you might have no idea how long it will take to build a house, but you do know that you’ll need two days to tile the kitchen floor. After you’ve estimated the work packages, you can add up all your estimates to obtain totals for the whole project.
- **The work package has a clearly defined start and finish**  Decompose project work so that the start of each work package is triggered by another work package. In addition, a work package should have a clear indication of when it is complete, such as a deliverable or notifying a team member that a program is ready to test.

- **Work packages can continue without input from another task**  Once a work package starts, the work can proceed uninterrupted without the need for information or input from another work package.

- **The detail is at a level that you can manage**  Decompose project work only to the level of detail that you can and want to manage.

---

**TIP**

Most people can remember and work on up to five tasks without forgetting something. Even the most agile jugglers can rarely handle more than eight tasks, regardless of the help they get. To maintain focus on the work, limit your WBS to no more than eight levels. If the size of the project requires more than eight levels to reach the right amount of detail or duration, consider breaking the project into subprojects. The top-level project can have five to eight levels in its WBS, and each subproject can have its own multilevel WBS.

---

**WHEN TINY TASKS ARE OKAY**

Although tracking tasks that take less than a day would overwhelm most projects with excessive supervision and near-paralysis from nonstop status reporting, short tasks have their purposes. Consider a television nightly news show. In 30 minutes, the show hands off the limelight from the anchor to reporters in the field, the weatherperson, the sportscaster, and several commercial interruptions. Complex projects that must finish within very short time frames require a detailed execution plan, and work packages of very short duration are the answer. For example, installing software programs in a production environment with limited downtime is one example where short duration tasks are necessary. Besides identifying the intricacies of teamwork, short duration work packages quickly highlight delays.

Of course, a lot of planning goes into a television news show, and that planning isn’t broken into minute-long segments. For projects with some complexity, only a small number of tasks will be short in duration.
Building a WBS from the Bottom Up

With small projects, you can identify project work from the bottom up. You assemble your team for a rousing session of brainstorming. If the project is small enough, the entire team can collaborate to identify work packages and assemble them into a WBS. For example, the team on the backyard remodel project identifies work package tasks, such as digging holes, pouring footings, cutting lumber, and so on. Then, you can then add summary tasks to group the work packages to make them easier to plan and manage.

An alternative approach is to work as a team to identify top-level summary tasks. Then, the team breaks up into smaller groups to identify the work for each top-level summary task. When the subteams are done, the entire team gets together to review the WBS, and add missing tasks, or remove redundant ones.

WARNING Building a WBS from the bottom up has a few disadvantages. When you start at the bottom, you might define work at too high or too low a level of detail. In addition, it’s easier to forget some of the work when you don’t use an organized approach to identifying tasks.

Recording a WBS

You can choose from several techniques for assembling the summary tasks and work packages for a WBS, depending on your work environment, the size of your team, and the programs that you prefer to use. Low-tech methods such as sticky notes on a whiteboard to high-tech methods such as using an LCD projector to show tasks as you build them in a Microsoft Office application can work equally well. Here are some methods to consider for your WBS deconstruction sessions:

- Sticky notes Although sticky notes are low-tech, they’re great for capturing tasks as your team shouts them out in rapid-fire fashion. Sticky notes are easy to move around as you search for the ideal structure for your project. Every team member can have a pad of sticky notes, so no one person is stranded as stenographer.

  You can use sticky flip chart pages to act as summary tasks. When you assign a work package to a particular summary task, place the small sticky note on the big sticky page containing that summary task.

  WARNING Adhesive is the primary downside to the sticky note approach—specifically, its tendency to grow less sticky with time. Ideally, you should transfer the results of a sticky note session to Project or another program before you leave the meeting room. If you must transport your large sticky pages, fold and carry them very carefully so the WBS doesn’t get rearranged during the journey back to your office.
Microsoft Project  If you plan a project on your own, you can build the WBS directly in Project, which saves you the step of transferring the WBS from another program when it’s time to build the project schedule.

In Project, the Task Sheet pane on the left side of the Gantt Chart view is perfect for building an outline of your tasks. (On the Task tab, in the View group, click Gantt Chart to display the Gantt Chart view.) In the Task Sheet pane, you indent and outdent tasks to represent summary tasks and work packages. And you can move individual tasks or groups of tasks around as you rearrange the WBS structure.

SEE ALSO The next section, “Creating the WBS in Project,” describes the steps you use to create a WBS in Project.

Microsoft Word or Microsoft Outlook  Because many team members don’t have Project, they can use Word or Outlook to build task lists. Most team members are familiar with these programs. Team members can easily indent, outdent, insert, move, or delete tasks. In Project 2010, you can readily copy tasks from a Word document or Outlook email message and paste them into Project.

SEE ALSO The section “Pasting Tasks into Project,” on page 83, explains how to copy tasks from another program into Project.

TIP As an alternative, you can use mind-mapping software, such as XMind or MindManager, during brainstorming sessions to capture the tasks identified by the team.

Creating the WBS in Project
Regardless of the method you choose to capture work packages and summary tasks, ultimately, you want your WBS in Project so you can turn it into a schedule. But before you can use Project task dependencies to link tasks to build a schedule, you need those tasks in Project at the correct level of the WBS. If you capture work on a white board or with sticky notes, you can type the tasks directly into Project.
The section “Defining the Sequence of Work,” on page 125, explains how to link tasks to put them into the correct sequence.

For all but the smallest projects, transferring handwritten tasks into Project represents a marathon of typing names and indenting tasks. In Project 2010, you can easily insert, rearrange, promote or demote, and delete tasks in the WBS as you go. Here are several techniques you can use to build your WBS in Project:

- **Insert a new summary task for subtasks you select.** To create a summary task that comprises several existing tasks, select the subtasks, as shown in Figure 4-4. On the Task tab, in the Insert group, click Insert Summary Task. (The icon label is “Summary” and the icon looks like a summary taskbar with a yellow asterisk.) Project inserts a summary task at the level of the selected tasks, indents the selected tasks to the next lower level, fills in the new task’s Task Name cell with the text “<New Summary Task>”, and selects the text so you can type the name of the new summary task.

- **Insert a new subtask.** In the row below an existing subtask, click the Task Name cell and press Insert. The new task is at the same outline level as the task you clicked.

- **Insert a new stand-alone summary task.** Click the Task Name cell in the row below the new summary task and then press Insert. Fill in the task name and press Enter. Select the task you just created, and then on the Task tab, in the Schedule group, click Outdent Task (a green left arrow) until the task is at the level you want.

**Figure 4-4** To insert a summary task for several existing tasks, select the tasks, and then use the Insert Summary Task command.
■ **Change a summary task into a subtask.** Select the first subtask for the summary task. On the Task tab, in the Schedule group, click Outdent Task (the green left arrow).

■ **Demote a subtask to the next lower level.** Select the task, and then on the Task tab, in the Schedule group, click Indent Task (the green right arrow). The task moves to the next lower level. The task above it changes into a summary task.

■ **Promote a subtask to the next higher level.** Select the task, and then on the Task tab in the Schedule group, click Outdent Task (the green left arrow).

■ **Move a subtask to another summary task.** Click the ID cell, which is the first column in the table, for the task that you want to move. When the pointer changes to a four-headed arrow, drag the task to its new location below the summary task that you want.

**TIP**

To indent, outdent, move, or delete several tasks at once, select all the tasks you want to work on simultaneously. (To select adjacent tasks in the outline, drag across the tasks; to select individual tasks, press and hold Ctrl, and then click each task.) Then use the methods in this section to modify the tasks.

■ **Delete a subtask.** Click the ID number for the task to select the entire task row and then press Delete.

**NOTE**

If you select the Task Name cell and press Delete, Project deletes the text in the cell. However, if you click the Smart Tag with an X that appears to the left of the Task Name cell, choose the “Delete the entire task” option.

■ **Delete a summary task.** To delete a summary task and all its subtasks, select the summary task, and then press Delete. Or right-click the summary task and choose Delete Task from the shortcut menu.
Pasting Tasks into Project

Pasting tasks is a real time-saver when team members build portions of the WBS in Word or Outlook. When you paste tasks from a Word 2010 document or an Outlook 2010 email message into a Project 2010 file, either program inserts the tasks and indents them based on the indenting in the Word document or email message.

1. To paste tasks into Project, open the Word document or Outlook email and select the tasks that you want to paste into Project (see Figure 4-5).

2. Press Ctrl+C to copy the tasks to the Windows Clipboard.

3. In Project 2010, click the blank Name cell in the table where you want to paste the tasks, and then press Ctrl+V.

Projects inserts the task names into the Task Name cells and indents the tasks to the same level they were in the Word document or Outlook email (see Figure 4-6).
DISPLAYING A WBS AS A TREE

If you build a WBS in Project, you can transform it into a tree diagram using a Microsoft Visio–based Visual Report (if you use Project 2007 or later and also have Visio installed on your computer). The built-in Task Status Visual Report template gets you started, but you have to tweak the report to show the WBS levels you want to see:

1. With the Project file open, on the Project tab, in the Reports group, click Visual Reports.
2. In the Visual Reports - Create Report dialog box, click Task Status Report, and then click View.
3. Select all the top-level tasks in the Visio diagram.
4. To expand the top-level tasks to show the next lower level in the WBS, in the Visio PivotDiagram task pane, in the Add Category section, click Tasks:Tasks (see Figure 4-7).
5. Repeat step 4 until you see all the WBS levels you want.

See Also

For more information about generating and customizing visual reports, see the section “Working with Visual Reports,” on page 233.
If you ask your teenage son to clean his room, the results might not be what you had in mind. You can improve the chances that your son will meet your expectations by specifying that cleaning a room includes hanging up clothes, making the bed, vacuuming the carpet, dusting the furniture, and neatening the papers on his desk. Similarly, a brief name for a work package in a WBS isn’t enough to tell team members about the project work they’re supposed to perform. Documents that describe work packages in more detail help the team members assigned to the tasks do their work correctly and completely.
A work package document identifies the work to perform, how to tell that the task is complete, and how to tell if it was done correctly. If the details of work are documented elsewhere, a work package can be quite simple. For example, blueprints describe exactly how to frame a building or where to run wires. The work package can briefly describe the extent of the work, such as Frame First Floor Walls, but reference the blueprints or specifications for details.

Sometimes, work packages do require more detail. If work isn’t described elsewhere, or the person assigned to the task is new, you should make the work package more specific. Creating a checklist of the subtasks that comprise a work package can guide junior team members through the work, but checklists also help more experienced workers to remember all the steps. For example, the work package for installing a new server in Figure 4-8 includes a checklist of tasks to perform, a completion state, and reference documents that the assigned resource could turn to should questions arise.

![Figure 4-8](example_url)

**FIGURE 4-8** Work package documents provide the detail that team members need to complete their tasks successfully.
FAST ACCESS TO WORK PACKAGES

As the project manager, you can keep work package documents close at hand by adding a hyperlink from the task in the Project file to the work package document. To create a hyperlink in a Project task, do the following:

1. In Project, right-click the task that you want to link to a work package document, and then choose Hyperlink on the shortcut menu.
2. In the Insert Hyperlink dialog box, in the Link To pane, verify that Existing File Or Web Page is selected.
3. Navigate to the folder that holds the work package document and double-click the name of the work package file.

After you create a hyperlink, in the Indicators cell of the Task Sheet, you’ll see a hyperlink icon, which looks like the earth with one link of chain. (If the Indicators column isn’t visible, right-click the heading row of the table and choose Insert Column on the shortcut menu. In the drop-down list, choose Indicators.)

PROJECT FILE

In the Chapter04 folder on the companion website, you’ll find a Microsoft Word template for a work package, which is called Work Package.dotx.

Summary

A WBS is an organized list of tasks required to complete a project, broken down from the highest-level summary tasks to the specific work packages that the project team must perform. It is the foundation for estimating work, choosing resources, building a project schedule, and eventually tracking progress. Small teams of people can tackle different areas of a WBS. A management team might work on the high-level WBS, whereas teams of experts might flesh out the lower levels and work packages. Regardless of how you develop a WBS, you can choose from several methods for getting the WBS into Project so it’s ready for the next planning steps.
The more alternatives, the more difficult the choice.
— Abbé D’Allanival

Getting the project schedule just the way stakeholders want it is like juggling chainsaws. You have to pay attention to every detail or the results could be disastrous. One of the challenges is that you have so many alternatives from which to choose. Do you shorten the schedule and increase the cost? Do you sacrifice quality or reduce the scope? Do you look for more resources or look at how you can use the ones you already have more effectively?

But you have to start somewhere. This chapter reviews different alternatives for optimizing your project schedule and how they affect duration, cost, scope, and quality (and whether the people who work on your project ever get to go home). Each section explains how to apply these alternatives to your project schedule using Microsoft Project features.
Chapter 14, “Balancing the Budget and Other Project Variables,” looks at the options you have from a business perspective. You must take into account the effects changes have on every aspect of your project and, in many cases, other projects or business objectives at higher levels in your organization.

**Simplifying Solution Hunting**

Setting up views and selecting options can make your search for solutions easier. Here are some setup tasks to complete before you start looking for ways to improve your schedule.

Here are the steps for displaying summary tasks and the project summary task:

- **Display summary tasks**  On the Format tab, in the Show/Hide group, select the Summary tasks check box, and then the Project Summary Task check box. Whether you’re trying to shorten duration or cut costs, summary tasks make it easy to see if you’re getting the results you want. The project summary task shows start and finish dates, total duration, work, and cost for your project. Summary tasks show similar fields for portions of your project. As you make changes, you can check these fields to see whether you are obtaining the results you want.

- **Display the critical path and the baseline**  The Tracking Gantt view displays gray taskbars for your baseline schedule (as shown in Figure 13-1), blue taskbars for noncritical tasks in your current schedule, and red taskbars for critical path tasks in your current schedule.
Shortening a Project Schedule

If the project duration expands beyond the desired finish date, you can shorten it in several ways:

- **Shortening lag time between tasks**  If tasks on the critical path include lag time between them, reducing that lag time is an easy way to shorten the project duration. It won’t cost any more; resources don’t have to work harder; and risk is low. The difficulty with this approach is that the lag time is often due to a dependency on other groups. For example, lag time might indicate the delay until stakeholders meet to approve documents. Or a vendor requires two months between your equipment order and delivery. If you can convince the stakeholders to hold an emergency meeting or expedite shipping, you can reduce the lag time in Project by following these steps:

SEE ALSO  Lag time is a delay you can add between tasks, as described in the sidebar “Lag and Lead,” on page 127.
1. Double-click the link line between two tasks in the Gantt Chart view.

2. In the Task Dependency dialog box, in the Lag box, change the number of hours, days, or other time period to the new lag time you obtained. For example, if the lag has decreased from 30 days to 20, type 20d.

3. Click OK.

- **Fast-tracking a project compresses the schedule by running tasks concurrently instead of in sequence**  
  Fast-tracking can introduce risk because you start some tasks before their predecessors finish. However, fast-tracking can often shorten a schedule without increasing cost.

  SEE ALSO  
  To learn how to fast-track a project, see the section “A Fast Track to an Early Finish,” on page 150.

- **Crashing is a technique in which you spend additional money to reduce duration**  
  The trick is to reduce the duration as much as possible for the least amount of money.

  SEE ALSO  
  The section “A Crash Course on Project Crashing,” on page 154, describes how to choose tasks to reduce duration cost-effectively.

- **Reducing scope**  
  If stakeholders decide to reduce the project scope, you might think that the solution is simply to delete the tasks for the scope you’re removing. But that’s not a good idea because you probably know that decisions that go one way on Monday are as likely to go the other way by Friday. In Project 2010, the Inactivate command leaves task values in place but removes them for inactivated tasks from the project’s rolled-up duration and cost and removes resource assignments from the assigned resources’ availability.

  SEE ALSO  
  To learn how to use the Inactivate command, see the section “Reducing Scope,” on page 157.
Splitting Long Tasks into Short Ones

You might be able to improve your schedule and reduce cost by splitting a long task into several shorter tasks. Instead of the same person performing the entire task, you might be able to assign different resources to the shorter tasks, so you can overlap the tasks. And if you can assign less expensive people to some of the shorter tasks, you can reduce the overall cost. Figure 13-2 demonstrates breaking up a long task to achieve both of these benefits. The original task in the top window takes 30 days and costs $24,000. By splitting the task into work that a designer and drafter can do, as illustrated in the bottom window, the new duration is 25 days and the cost is $18,000.

![Figure 13-2](image)

To change a long task into several shorter ones, the easiest approach is to treat the original long task as a summary task and create the shorter tasks as subordinate tasks. Here are the steps:

1. Insert a blank row below the long task by clicking the Task Name cell immediately below the long task in the Task Sheet. For example, in Figure 13-2, you click the Task Name cell in row 4.
2. To insert blank rows for the new subtasks, press Insert as many times as needed.
3. The insertion point appears in the Task Name cell for the first blank task below the summary task, so you can type the name for the first subordinate task.
4. Press Enter to save the name.
5. Select the task you just created and, on the Task tab, in the Schedule group, click the Indent Task button.

6. After the first subordinate task is indented, add the remaining subordinate tasks by pressing the down arrow and typing the task names.

7. Link the subordinate tasks based on the dependencies between the smaller packages of work and assign resources to the smaller tasks.

SEE ALSO To learn how to create links between tasks, read the section “Creating Task Dependencies,” on page 127.

8. To remove the resource assigned to the summary task, double-click the summary task to open the Task Information dialog box.

NOTE If you don’t remove the resource assigned to the summary task, your summary task will double up on hours and cost—some from the resource assigned to the summary task and some from the resources assigned to the subordinate tasks.

9. Click the Resource tab.

10. Click the cell with the original resource name in it and press Delete to remove the resource assignment from the summary task.

11. Click OK to close the dialog box.

Adjusting Resource Allocation

Changing the percentage that you allocate resources to tasks may change the schedule duration and cost, depending on whether you reduce the percentage to remove resource overallocations or increase the percentage to shorten duration. In Project, you can take two approaches to modifying the allocation of people to tasks, and the following sections explain how to do both:

- Changing the units that resources are assigned to a task This approach changes the number of hours that resources work on that task each day. If you increase the units, the task takes fewer days to complete. Increasing units is easy in Project, but in the real world, it only works for so long. People get tired of working long hours and they begin to make mistakes. And if they don’t earn overtime pay, morale decreases even faster still.
Contouring resource assignments  Contours adjust how much people work on their assignments at different times during the task duration, such as starting off slow, working full time in the middle, and tapering off near the end. These contours are often a more realistic model of the time that people spend on tasks than all or nothing.

Changing Units

Modifying resource assignments can be a game of hide-and-seek with Project if you don’t understand how the program calculates resource assignment fields. If you create a task with the Task Type set to Fixed Units, you can type a task name and duration, choose a resource, and click OK. Project sets the units to the resource’s maximum units (for example, 100 percent for full time) and calculates the work. If you want to change units (or make other modifications), assignments may seem less cooperative. This section explains how Project calculates the fields for resource assignments, so you can change units or other values and get the results you want.

Resource calculations depend on the relationships among task duration, work, and units. You can calculate any one of the values as long as the other two fields are set:

\[ \text{Duration} = \frac{\text{Work}}{\text{Units}} \]
\[ \text{Work} = \text{Duration} \times \text{Units} \]
\[ \text{Units} = \frac{\text{Work}}{\text{Duration}} \]

But how do you know which one Project calculates? Hidden inside the program is a bias for which value it changes. Project tries to change duration before changing work. Because stakeholders almost always want a project finished sooner, duration is always a good guess at the value you want to change. Besides, the work that a task requires doesn’t change that often (unless it increases as you learn more about what is required), and the allocation of resources tends to stay the same as well.

Most of the time, deciding what to do is easy. If you specify duration and units, Project uses them to calculate work. If you specify work and units, Project uses them to calculate duration. You can even leave units blank and specify a value for work; Project simply sets the units to 100 percent and then calculates the duration.
Project 2010 keeps track of the original assignment units and the peak units. When you first assign a resource to a task, you set the units or Project calculates the units based on the work and duration. Project uses this value if you reschedule the task later on. Peak units come into play if the actual work that a resource performs translates into higher units. For example, suppose a resource works several 10-hour days, which represents units of 120 percent. Project sets peak units to 120 percent. However, if you initially assigned a resource at 100 percent and later increase the task duration, Project uses 100 percent for the additional duration, even though peak units are 120 percent.

Sometimes, you want to change values for a task assignment in a way that conflicts with Project’s bias. In these situations, the Task Type field tells Project which field to keep fixed when you assign resources. For example, a Task Type of Fixed Duration tells Project to change work or peak units. For fixed-work tasks, Project keeps the value for work the same and instead recalculates duration or peak units. Table 13-1 shows the relationship between task types and field calculations.

<table>
<thead>
<tr>
<th>TASK TYPE</th>
<th>CHANGE DURATION</th>
<th>CHANGE ASSIGNMENT UNITS</th>
<th>CHANGE WORK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed Units</td>
<td>Work</td>
<td>Duration</td>
<td>Duration</td>
</tr>
<tr>
<td>Fixed Work</td>
<td>Peak Units</td>
<td>Duration</td>
<td>Duration</td>
</tr>
<tr>
<td>Fixed Duration</td>
<td>Work</td>
<td>Work</td>
<td>Peak Units</td>
</tr>
</tbody>
</table>

Armed with this newfound knowledge, you can now change assignment units on a task with ease. Here are the steps:

1. If necessary, display the Task Form in the bottom pane of the Gantt Chart view. (If the Gantt Chart view shows only one pane, on the View tab, in the Split View group, select the Details check box. In the drop-down list, choose Task Form.)
2. In the top pane of the Gantt Chart view, select the task you want to modify.
3. In the Task Form, in the Task Type list, choose the task type for the field you want to keep. For example, if you want the number of work hours to stay the same and the duration to change, choose Fixed Work.

4. In the section of the Task Form that shows resource assignments, select the person’s Units cell, and change the value to the new percentage that the person is available. For example, if someone was assigned at 50 percent, type 100% to change it to full time.

5. Click OK. For a fixed-work task, Project recalculates the task duration.

6. To keep your tasks consistent, change the Task Type back to Fixed Units.

In the top window in Figure 13-3, the crew member works half-time (50 percent) for 8 days to complete 32 hours of work. In the bottom window, by setting the Task Type to Fixed Work and changing the units to 100 percent, the crew member performs 32 hours of work in only 4 days.

**FIGURE 13-3** Change the Task Type to tell Project which field you want to keep the same value.
Adjusting Work Contours

The Work Contour feature in Project changes the allocation of resources over the course of their assignments. For example, you can apply the Bell work contour, which starts someone’s assignment slowly, increases to a higher allocation in the middle and then tapers off the assignment at the end, as demonstrated in Figure 13-4. Contouring tasks can help you optimize your schedule by modeling assigned time more realistically. For example, the work that people have to do on a task often dwindles at the end, so you might be able to start a new assignment before the previous one is complete without overallocating anyone.

**FIGURE 13-4** Work contours adjust the allocation of work for resources over the duration of their assignment.

Here are the steps for applying a work contour to a resource assignment:

1. On the View tab, in the Task Views group, choose Task Usage. (Or in the Resource Views group, choose Resource Usage.) These are the only two views that show detailed assignment information.

2. For the task whose assignment you want to contour, double-click the name of the resource, Crew Member in Figure 13-4.

3. In the Assignment Information dialog box, in the Work Contour list, choose the contour that you want. For example, Back Loaded adds more time at the end of the assignment, which is similar to a crunch at the end. Front Loaded adds more time up front.

4. Click OK to contour the hours.
## Assigning Overtime

Asking people to work longer hours is another strategy for shortening a project schedule. By working beyond the normal day, they can complete tasks in fewer days. If people earn a salary and don’t earn any extra for working longer hours, the project price tag doesn’t go up. However, this sort of overtime abuse won’t work for long. Employees get tired of long hours. Morale decreases and employee turnover increases—both of which negatively affect your project. If people are paid overtime rates, your project costs do increase. In addition, you have to consider whether people could do more beneficial work with that time.

**TIP**

Don’t resort to assigning overtime during planning. If you plan for overtime and the project runs into trouble, more overtime probably isn’t an option.

You can assign resources to work overtime in a couple of ways. You use the Overtime Work field only when you pay resources more for overtime hours. Here are some of the techniques you can use:

- **Increase work hours for a period**  If resources don’t earn premium overtime rates, you can assign longer hours for a period of time. To do this, in the Resource Sheet view, double-click the resource you want to set up for overtime. In the Resource Information dialog box, in the Resource Availability section, specify the start and end date for the overtime and the units, as shown in Figure 13-5.

  **NOTE**

  If you assign percentages in the Resource Availability section, the resource’s availability for all other time periods remains at the Max. Units value you specify in the Resource Sheet.

- **Modify the working hours in a resource’s calendar**  For example, you could specify the work hours for one Monday to start at 7:00 A.M. and end at 7:00 P.M.

  **SEE ALSO**

  The section “Scheduling Around Nonworking Time,” on page 147, describes how to set working and nonworking times in a calendar.
Figure 13-5 You can specify a resource's availability at different times.

- **Assign overtime hours paid at an overtime rate** If you pay more for overtime hours, you use overtime hours and the overtime rate in Project to calculate labor costs correctly. You set a resource’s overtime rate in the Resource Sheet’s Overtime Rate field.

OVERTIME HOURS PAID AT AN OVERTIME RATE

Project doesn’t automatically assign hours that people work as overtime hours. If people receive premium pay for overtime hours, you must set up a few things before Project can calculate the cost accurately. In the Resource Sheet, be sure to fill in the Ovt. Rate cell with the amount that the person is paid for overtime. For example, resources with a standard rate (Std. Rate) of $50 an hour might receive $60 an hour for overtime.

Then, for each assignment, you must specify the number of overtime hours. To do this, follow these steps:

1. If the Task Form isn’t visible in the bottom pane, on the View tab, in the Split View group, select the Details check box, and then in the drop-down menu, choose Task Form.

2. Right-click the Task Form pane and select Work on the shortcut menu.

In the resource assignment table, Project displays the Units, Work, and Ovt. Work fields along with a few others.
3. Type the number of overtime hours for the assignment in the Ovt. Work field, as shown in Figure 13-6.

![Figure 13-6](image)

The Work value equals the hours of regular and overtime work. The Work field represents the total work hours for the assignment, both regular and overtime work. Project subtracts the overtime hours from the hours in the Regular Work field for the assignment. For example, if a task’s Work equals 32 hours, and you assign 8 hours of overtime, the Overtime Work field changes to 8 hours, and the Regular Work field changes to 24 hours.

### Substituting Resources

Whether you have to replace a resource who can’t work on your project anymore or you’re looking to assign less expensive resources to cut costs, you can replace resources in assignments.

If you know the resource that you want to replace, you can simply choose a new resource in the Task Form. In the Resource Name section, select the name of the resource you want to replace and then, in the Resource Name list, select the new resource you want to assign. Project changes the resource assigned, but keeps the units, work, and duration the same. If you selected a person with more or less experience or who works faster or slower, you should consider changing the values in the Work and Duration fields to reflect the new person’s productivity. In the background, Project recalculates the cost with the new resource’s Std. Rate in the Resource Sheet.
To substitute a resource with someone similar, the Assign Resources dialog box provides several features for finding suitable replacements. Here are the steps for replacing a resource using the Assign Resources dialog box:

**1.** In the Gantt Chart view, select the task in which you want to replace a resource.

**2.** On the Resource tab, in the Assignments group, click Assign Resources.

**3.** To replace a resource, in the Assign Resources dialog box, select the resource and then click Replace.

**4.** In the Replace Resource dialog box, shown in Figure 13-7, in the Units field for the resource you want to use as a replacement, type the percentage you want and click OK.

Project adds a check mark to the left of the resource name and moves the assigned resource above all the unassigned resources in the list.

![Assign Resources](image)

*FIGURE 13-7* You can select a replacement and assign the units in the Replace Resource dialog box.
Modifying Baselines

The typical approach to baselines in project management is to save one when the stakeholders approve the project plan and compare project performance to that baseline from then on. However, one of the reasons you might be reading this chapter is because something significant has happened to your project, and you've had to adjust the schedule in response. The original baseline is still important, but it might not be as helpful for measuring performance now that you've fast-tracked some tasks, crashed a few others, and removed some scope as well. In situations such as these, you can save a new baseline after you make major revisions to your Project schedule.

Saving Additional Baselines

In Project, you can tell if you have an initial baseline saved in the Set Baseline dialog box. On the Project tab, in the Schedule group, click Set Baseline, and then choose Set Baseline on the drop-down menu. A saved baseline displays text such as *(last saved on 11/1/2011)* after the baseline name. Because the Variance table displays value for only the first baseline in the list (named Baseline), saving additional baselines requires a couple of steps:

1. On the Project tab, in the Schedule group, click Set Baseline, and then choose Set Baseline on the drop-down menu.

2. In the Set Baseline dialog box, make sure that the Set Baseline option is selected.

3. In the Set Baseline list, choose the first baseline name *without* a last saved on date, such as Baseline 1 (see Figure 13-8).

![Set Baseline](image)

**FIGURE 13-8** You can set up to 11 baselines, including Baseline, Baseline1 through Baseline10.
4. Under the For heading, select the Entire Project option.

5. Click OK. Project stores the current scheduled values in baseline fields, such as Baseline1 Duration.

6. Before you do anything else, open the Set Baseline dialog box once more (see step 1).

7. In the Set Baseline list, choose Baseline, and then click OK to store the same baseline values in Baseline. By doing this, values you see in the Variance table compare the scheduled values to your current baseline.

8. A message box appears, warning that you are about to overwrite a baseline that you’ve already saved. Click Yes.

Clearing a Baseline

If you decide that you want to remove a baseline that you’ve saved, do the following:

1. On the Project tab, in the Schedule group, click Set Baseline, and then choose Clear Baseline.

2. In the Clear Baseline dialog box, make sure that the Clear Baseline Plan option is selected.

3. In the Clear Baseline list, choose the baseline name you want to remove.

4. Under the For heading, select the Entire Project option.

5. Click OK. Project removes the values in the fields for the baseline you selected.

Viewing Multiple Baselines

If you want to see several baselines, the Multiple Baselines Gantt view shows taskbars in different colors for Baseline, Baseline 1, and Baseline 2, as shown in Figure 13-9. On the View tab, in the Task Views group, click Other Views, and then choose More Views. In the More Views dialog box, double-click Multiple Baselines Gantt.

![Figure 13-9](image-url) Compare the schedules for three baselines in the Multiple Baselines Gantt view.
If you want to modify the Multiple Baselines Gantt view to show different baselines, such as Baseline 4, right-click the Gantt Chart and choose Bar Styles on the shortcut menu. In the Bar Styles dialog box, you can replace the baseline start and finish date fields with the fields for the baseline you want to display.

Summary

Tweaking a project schedule to deliver the combination of scope, schedule, and budget is a balancing act. Depending on which measures are more important, you can choose different techniques for modifying the schedule. Some techniques focus on rearranging tasks, whereas others look at reassigning resources. This chapter explained the alternatives and showed how to apply them using features in Project.
A (accountable) level of responsibility, 92
Access (Microsoft)
  exporting Project data to, 181
  importing Access data into Project, 101
  importing Access data into Visio, 95
  lessons learned tracked in, 370
accounting applications, problems with, 202
accounting department, work hours tracked differently by, 202
acclor method, 107, 169, 218–219, 409
Accrue At field, Resource Sheet, 107, 169
activities, 409. See also summary tasks; tasks; work packages
  actual cost, 209, 218, 409
  actual cost of work performed (ACWP), 224, 226, 409
  actual duration, 199, 207, 409
  Actual field, Cost table, 218
  actual finish date, 207, 409
  actual start date, 199, 409
  actual work, 199, 409
  ACWP (actual cost of work performed), 224, 226, 409
agile project management, 406–407
  optimizing schedule using, 333
Alice’s Adventures in Wonderland, quotation from, 38
allocation, 314–318, 409
annual percentage yield (APY), 164
approvals
  as decision milestones, 135
  for project implementation plan, 59, 192
  for project, 16–18
APY (annual percentage yield), 164
archives
  contents of, 386–388
  creating, 388–390
  project summary list for, 388
  storage of, 389–390
assignment, 137–143, 330–332, 409
Assign Resources dialog, Project, 142–143
assumptions, 17, 36–38
at-risk tasks, filtering for, 215
BCWP (budgeted cost of work performed), 224, 226, 409
BCWS (budgeted cost of work scheduled), 224, 225, 409
Bernstein, Al, quotation by, 401
Berra, Yogi, quotation by, 57
bidders’ conference, 189
Blishen, Edward, quotation by, 67
books
Agile Project Management (Highsmith), 407
Agile Project Management with Scrum (Schwaber), 407
Critical Chain (Goldratt), 402
Critical Chain Project Management (Leach), 402
Microsoft Office Project 2010 Inside Out (Stover), 310
Software Requirements (Wiegers), 29
bottom-up estimating, 122
brainstorming, 25
budget, 6, 64, 159–160, 165–167. See also costs; financial objectives
balancing with other constraints, 6–7, 10, 328–336
comparing to costs, 174–180
as financial objective, 22
increasing, 39, 333
budget at completion (BAC), 227, 409
budgeted cost of work performed (BCWP), 224, 226, 409
budgeted cost of work scheduled (BCWS), 224, 225, 409
budget resource feature, Project, 174–180
assigning budget resources to project summary task, 175–176
comparing budget resources to costs, 179–180
creating budget resources, 174–175
entering budget values by project, 176–177
entering budget values by time period, 177–178
linking resource costs to budget resources, 178–179
budget resources, 174–180. See also costs; resources
burdened rates, 170
business decisions, 328, 334–335
business objectives, 22, 23
building commitment using, 396
linking project to, 396–397, 398
problem statement revealing, 20
business process modeling, 29

C
C (consult) level of responsibility, 91
calendars, 147–149, 409
capital budgeting, 159, 165–167. See also budget
Carroll, Lewis, quotation from Alice’s Adventures in Wonderland, 38
Cash Flow report, 222
cchange control board. See change review/control board
cchange control plan. See change management plan
cchange management, 410
documents for, 302–305
change management plan, 65–66, 410
change order, 410
change request form, 302–303, 305, 410
change request impact statement, 304–305, 306
change request log, 305, 306
in project binder, 193
stakeholders receiving, 267
summary of changes, at close of project, 381
process for, 35, 300–302, 307
review/control board for, 305, 306, 308, 410
change management plan, 65–66, 410
change order, 410
change request form, 302–303, 305, 410
change request impact statement, 304–305, 306
change request log, 305, 306
change review/control board, 305, 306, 308, 410
charter. See project charter
Churchill, Winston, quotation by, 337
closeout reports, 378–381
closing phase, xxii, 10, 373–384, 410
closing out contracts, 381–382
customer acceptance, 374–376
documents for, 373, 376–381, 383
success criteria, meeting, 375
transitions after, 374, 382–383
commitment. See also motivating team members
business objectives, building, 396
documents showing, 192
kickoff meeting, building, 191, 288
mission statement, building, 38
publicity, building, 266
by resource managers, 97
by sponsor, 52
to strategy, 26
by team members, 48–51
WBS, building, 71, 76
communication
assumptions in, 279
benefits of, 260–261
correspondence, 193
documents for, in project notebook, 193
e-mail for, 293–295
ensuring responses from, 271
with external audiences, 263
with functional managers, 268
with geographically dispersed team members, 282
guidelines for, 275–277
honesty in, 50–51
importance of, 11, 13, 49
listening skills for, 280–282
methods of, appropriate to recipient, 269–272
minutes of meetings, 193, 286, 287
nonverbal, 277
plan for, 65, 272–273, 410
with project team, 263, 268–269
about feedback, 247
about goals, 245
about performance expectations, 250
about roles and responsibilities, 244–245
honesty of, 247
in interviews, 249
respectfulness of, 246
reminders for, 273–275
with sponsor, 263
with stakeholders, 263, 266–268
status reports, 269, 291–293
with supporting groups, 263
tasks as milestones, in Project, 273
variance reports, 193
what information is needed, determining, 264–266
who needs information, determining, 262–264
competition
advantage over, project management benefits, 12
among team members, 248
business decisions affected by, 328, 334
objectives influenced by, 10, 22
completion date. See finish date
collection calls, 270
constraints, 410. See also budget; quality; resources; schedule
date constraints for tasks, 130–132
for project, balancing, 6–7, 10, 328–336
consult (C) level of responsibility, 91
contingency plan, 350, 410
contingency reserve funds, 121, 333, 351–352, 410. See also management reserve
contractors. See also vendors; work resources
on change review board, 308
contracts with, 192
rate for, 168, 380
contracts, 188, 190–191, 192
closing out, 381–382
controlling phase, xxi, 10, 410. See also communication; change management; meetings; risk management
baselines, modifying, 323–325
constraints, balancing, 328–336
schedule, modifying, 310–322
core team, 97
correspondence, 193
cost of capital, 167
cost performance index (CPI), 227, 410
cost plus contracts, 191
cost resources, 410. See also resources (for project)
assigning to tasks, 173, 209
linking to budget resources, 178–179
costs, 410. See also budget; financial objectives
adding, authority for, 333
balancing with other constraints, 6–7, 10, 328–336
baselines for, 194, 217–218, 221
calculating in Project, 160, 168–173
Cash Flow report, 222
comparing to budget, 160, 174–180
of crashing a project, 155–157
estimates of, 160
exporting from Project to Excel, 180–184
fields in Project for, 168–170
final results of, at close of project, 380
over budget, viewing, 219
reducing
  adjusting resource allocations, 314–318
  splitting tasks, 313–314
  with less expensive resources, 331
tracking, 216–219
Cost table, Project, 217–218
Cost/Use field, Resource Sheet, 106, 169
cost variance (CV), 218, 226, 410
Covey, Stephen, on communication tailored to the audience, 277
CPI (cost performance index), 227, 410
CPM (critical path method), 127, 410
crashing a project, 154–157, 312, 331, 410
critical chain project management, 402–406
critical path, 150, 410
  displaying, 310–311
  overlapping tasks in, 151
  reassigning resources to, 330–331
critical path method (CPM), 127, 410
critical tasks
  in critical chain, 402
  longest, finding, 151
  status of, 221
  in Tracking Gantt view, 212, 213
Critical Tasks Status report, 221
culture
  fun as part of, 248–249
  of organization, 26
  reluctance to discuss mistakes in, 366–367
  of team, 249, 250, 282
customers, 42, 96
  acceptance of project deliverables, 374–376
  on change review board, 308
  resources provided by, 332
  satisfaction of, surveys regarding, 376
CV (cost variance), 218, 226, 410
D
D’Allanival, Abbe, quotation by, 309
date constraints for tasks, 130–132
Davenport, Rita, quotation by, 165
deadlines for tasks, 132–133
decision matrix, 26–28
decisions
  business decisions, 328, 334–335
  go/no-go decisions, 119, 134, 395
  milestones at, 133–136
deliverables, 17, 30–32, 410
customer acceptance of, 374–376
WBS created using, 72–73
Delphi technique for estimating, 117
dependencies between tasks, 410
creating, 127–129
flexibility of, 129–130
lag time in, 127, 152
types of, 125–127
discounted cash flow. See net present value (NPV) documents. See also reports
for approvals and commitments, 192
archives of, 386–388, 388–390
budget and funding documents, 192
for change management, 302–305
change management plan, 65–66, 410
change order, 410
change request form, 302–303, 305, 410
change request impact statement, 304–305, 306
change request log, 305, 306
summary of changes, 381
for closing phase, 373, 376–381, 383
communication plan, 65, 272–273, 410
contingency plan, 350, 410
contracts with vendors, 190–191
minutes of meetings, 193, 286, 287
mission statement, 38
organization chart, 94–95
problem statement, 20–21, 38, 41
project charter, 51–53, 192
project implementation plan, 60–66
project notebook, 193–194, 386–387
project overview, 16–18
project summary, 379–380
quality plan, 65
quantitative results of project performance, 380–381
request for proposal (RFP), 189
responsibility matrix, 90–93
for risk management, 64, 194, 340–345, 353–354
scope, completed, 381
scope statement, 33–36, 71, 73
stakeholder descriptions, 47–48
statement of work, 413
status reports, 269, 291–293
storing during project, 270, 282
who receives during project, 264–271
duration, 410. See also estimating actual duration, 199, 207, 409
compared to effort, 114–115
using for estimates, 116

E
EAC (estimate at completion), 227, 411
Earle, Bill, quotation by, 168
earned value, 411
earned value analysis, 223–232, 411
actual cost of work performed (ACWP), 224
budget at completion (BAC), 227
budgeted cost of work performed (BCWP), 224
budgeted cost of work scheduled (BCWS), 224
calculating in Project, 228–232
cost performance index (CPI), 227
cost variance (CV), 226
earned value graph for, 224–226
estimate at completion (EAC), 227
estimate to complete (ETC), 227
performance measures, 226–228
schedule performance index (SPI), 227
schedule variance (SV), 227
to complete performance index (TCPI), 227
variance at completion (VAC), 227
Earned Value Cost Indicators table, Project, 231
Earned Value Graph, Project, 231–232
Earned Value table, Project, 231
Excel (Microsoft)
Baseline Cost report, 221
capital budgeting, template for, 166–167
Cash Flow report, 222
estimating using, 117–120
exporting costs from Project to, 180–184
exporting resources to Project, 102–104
importing Excel data into Project, 101
importing Excel data into Visio, 95
IRR, calculating, 164
lessons learned tracked in, 370–371
NPV, calculating, 163
project summary list in, 388
ranking risks, 346–348
resource table worksheet, 102
visual reports, 233–240

exceptions in calendars, Project, 149
executing phase, xxi, 9, 411. See also baselines; budget; performance
approvals and commitments, 192
kickoff meeting, 187, 191
project notebook, creating, 193–194
resources, procuring, 188–191
tracking progress during, 59–60

external events, risks involving, 340

F
fast-tracking, 150–153, 312, 333, 411
Feirstein, Bruce, quotation by, 376
financial measures, 161–164
  Internal Rate of Return (IRR), 164
  Net Present Value (NPV), 162–164
  payback period, 161–162
financial objectives, 12, 22. See also budget; costs
changing, 334
money saved, 216
return on investment (ROI), 22, 216
status of, stakeholders receiving, 267
Index 421

finish date, 5, 411
finish to finish dependencies, 126
finish to start dependencies, 125
fixed cost, 411
Fixed Cost Accrual, Cost table, 218
Fixed Cost field, Cost table, 217
fixed price contracts, 190
flexibility, improving, 12, 13
float (slack), 411, 413
    in critical chain approach, 404
    in Schedule table, 214
    in Tracking Gantt view, 213
folders, shared, archives in, 389
forming stage of team development, 251
Fruman, Jeff, on quality assurance, 365
functional managers, 45–46, 97, 308, 411
functional/specification workshops, 30

G
Gantt chart, 411
    Multiple Baselines Gantt view, 324–325
    resource initials used in, 106
    Tracking Gantt view, 212–214
geographically dispersed team members, 282, 340
goals, 5, 17, 21–24. See also objectives
go/no-go decisions
    estimation accuracy required for, 119
    milestones at, 134
    project selection criteria for, 395
Group field, Resource sheet, 108

c
high-level (summary) tasks, 69, 413
    creating from deliverables, 72
    creating from scope statement, 73
    deleting in Project, 82
demoting in Project, 82
displaying, 310–311
    inserting in Project, 81
    naming, 74, 78
    project management tasks included in, 75
Hubbard, Elbert, quotation by, 187
hyperlinking task to work package document in Project, 87

I
I (inform) level of responsibility, 91
implementation plan, 60–66, 411
    approvals for, 59, 192
    budget, 64
    change control plan, 65–66
    changes to, 60–61
    communication plan, 65
    components of, 62–66
    functional managers receiving, 268
    organization, 63
    in project notebook, 193
    quality plan, 65
    resources, 63
    risk management plan, 64
    schedule, 63
    stakeholders receiving, 267
    work breakdown structure (WBS), 62–63
incomplete tasks, rescheduling in Project, 204–205
incremental development
    optimizing schedule using, 333
    project management for, 406–407
indirect costs, 170
inform (I) level of responsibility, 91
Initials field, Resource Sheet, 106
initiating phase, xxi, 8, 16, 411
    approvals for project, 16–18
    assumptions, 36–38
deliverables, 17, 30–32
goals and objectives, 17, 21–24
M
management meetings, 290
management of project. See project management
management reserve, 121, 352, 411. See also con-
tingency reserve funds
Mark on Track command, Project, 205
Material Label field, Resource Sheet, 105
material resources, 99, 411. See also resources
(for project)
costs of, 169, 172
limited options for, risks involving, 340
linking to budget resources, 178–179
maximum units of, 106
milestones at deliveries of, 136
units for, 105
matrix organization, 411
Max. Units field, Resource Sheet, 106
McGuire, Al, quotation by, 373
meetings
agenda for, 284
attendees, determining, 284
bidders’ conference, 189
facilitator for, 96
follow-up after, 287
guidelines for, 283–287
kickoff meeting, 187, 191, 288
length of, 284, 287
for lessons learned, 360–369
management meetings, 290
notes/minutes for, 193, 286, 287
preparation for, 283–284
purpose of, 283
running, 285–287
starting, 285
status meetings, 289–290
when to communicate using, 270–271
Menen, Aubre, quotation by, 357
Microsoft Access
exporting Project data to, 181
importing Access data into Project, 101

K
KaiZen, 365. See also lessons learned from past
projects
kickoff meeting, 187, 191, 288

L
labor. See work resources
lag, 127, 311, 411
Lang, Andrew, quotation by, 197
Lao-tzu, quotation by, 244
late tasks, in Tracking Gantt view, 213
lead, 127, 411
lessons learned from past projects. See
also archives
benefits of, 358–360, 369
collecting, meetings for, 360–369
agenda for, 367–368
participants’ roles in, 361–364
preparation for, 361
documenting, 362, 363–364, 369–371
mistakes, analyzing, 366–367
successes, analyzing, 364–365
leveling, 411
link, 411. See also dependencies between tasks
Link command, Project, 128
listening skills, 280–282
Lombardi, Vincent T., quotation by, 48

initiating phase (continued)
problem solved by project, 7, 17, 18–21
requirements, 28–30
risks, 17, 36–38
scope statement, 33–36
strategy, 17, 24–28
success criteria, 8, 33
internal rate of return (IRR), 164, 166, 411
importing Access data into Visio, 95
lessons learned tracked in, 370
Microsoft Excel
Baseline Cost report, 221
capital budgeting, template for, 166–167
Cash Flow report, 222
estimating using, 117–120
exporting costs from Project to, 180–184
exporting resources to Project, 102–104
importing Excel data into Project, 101
importing Excel data into Visio, 95
IRR, calculating, 164
lessons learned tracked in, 370–371
NPV, calculating, 163
project summary list in, 388
ranking risks, 346–348
resource table worksheet, 102
visual reports, 233–240
Microsoft Office Project 2010 Inside Out (Stover), 310
Microsoft Outlook
communication reminders in, 273–275
pasting tasks into Project from, 83–85
recording WBS in, 80
Microsoft Project
baselines
adding, 323–325
removing, 324
setting, 194
viewing, 310–311, 324–325
budget resource feature, 174–180
calendars, 147–149
communication tasks as milestones, 273
costs, 168–170
calculating, 160
comparing to budget, 160
exporting to Excel, 180–184
tracking, 216–219
critical path, displaying, 310–311
date constraints for tasks, 130–132
deadlines for tasks, 132–133
earned value analysis, 228–232
hyperlinking task to work package document, 87
incomplete tasks, rescheduling, 204–205
lag time, reducing, 311
milestones
creating, 136–137
icon for, 133, 137
performance of work resources, evaluating, 255–256
resources
allocations for, adjusting, 314–318
assigning overtime to, 319–321
assigning to tasks, 137–143
creating, 99–108
fields for, 104–108
importing, 101–104
substituting, 321–322
schedule progress, tracking, 210–215
status date, setting, 203–204
summary tasks
displaying, 310–311
manually scheduled, 123–125
task dependencies
automated, 129
creating, 127–129
tasks
inactivating, 312
splitting, 313–314
WBS in
recording, 80–85
tree diagram of, 84
Work Countour feature, 318
Microsoft SharePoint
archives stored with, 390
lessons learned tracked with, 370
Microsoft Word
change request form, template for, 303
pasting tasks into Project from, 83–85
recording WBS in, 80
milestones, 133–137, 412
  at deliveries of materials, 136
  communication tasks at, 273
  at decision points, 133–136
  at events, 136
  at handoffs between teams, 135
  naming, 137
  at progress checkpoints, 135
  revising estimates at, 119–120
  at start of project, 135
Miller, Margaret, quotation by, 275
minutes of meetings, 193, 286, 287
mission statement, 38
mistakes, learning from. See lessons learned from past projects
motivating team members, 244–250. See also commitment

N
net present value (NPV), 162–164, 166, 412
network diagram, 412
newsletters, 271
nonverbal communication, 277
norming stage of team development, 252
NPV (net present value), 162–164, 166, 412

O
objectives, 17, 21–24. See also goals; requirements
  adjusting during planning, 24
  business objectives, 22, 23
    building commitment using, 396
    linking project to, 396–397, 398
    problem statement revealing, 20
  characteristics of, 23–24
  competition influencing, 10, 22
  financial objectives, 12, 22
    changing, 334
    money saved, 216
  return on investment (ROI), 216
  status of, stakeholders receiving, 267
  identifying stakeholders using, 41
  performance objectives, 22
  prioritizing, 21
  quality objectives, 22
  strategy satisfying, 26
  technical objectives, 22
  types of, 22–23
Odegaard, Robyn, on interviewing team members, 249
opportunities
  addressed in project overview, 17
  defining, 18–21
  evaluating, 397–398
opportunity cost, 167–168
Orben, Robert, quotation by, 111
organizational objectives. See business objectives
organization chart
  identifying stakeholders using, 41
  for project, 94–95, 412
outlines, 70, 412. See also work breakdown structure (WBS)
Outline Code fields, Resource Sheet, 108
Outlook (Microsoft)
  communication reminders in, 273–275
  pasting tasks into Project from, 83–85
  recording WBS in, 80
Overbudget Resources report, Project, 255–256
overhead, 170
overtime, 106, 168, 319–321, 412
overview of project. See project overview
Ovt. Rate field, Resource Sheet, 106, 168

P
parametric models for estimating, 117
past performance. See lessons learned from past projects
payback period, 161–162, 166, 412
Perahia, Joanna, on functional/specification work- 
shops, 30
percent complete, 412
% Complete field, Project, 228, 229
percent work complete, 412. See also Physical %
Complete field, Project
performance
compared with budget, 160
earned value analysis, 223–232
information about, stakeholders receiving, 267
of past projects. See lessons learned from past
projects
quantitative results of, at close of proj-
ect, 380–381
reports for, 219–242
Baseline Cost report, 221
Cash Flow report, 222
Critical Tasks Status report, 221
Project Summary report, 220
Task Status report, 220
visual reports, 233–242
of team, evaluating, 253–256
time and status data for, obtaining, 201–202
tracking costs and cost variance, 216–219
tracking quality of work completed, 200
tracking quantity of work completed, 198–199
tracking risks, 200–201
tracking schedule progress, 210–215
updating schedule with current status
data, 203–210
performance objectives, 22
performance of work resources, evaluating in
Project, 255
performing stage of team development, 252
PERT (Program Evaluation and Review Tech-
nique), 118, 412
Peter, Laurence J., quotation by, 15
Peters, Tom, quotation by, 3
Physical % Complete field, Project, 228, 229
pivot charts, Excel, 233–240
pivot diagrams, Visio, 240–242
planned value, 412
planning phase, xxi, 9, 58–60, 412. See also proj-
ect implementation plan; resources; schedule;
work breakdown structure (WBS)
management wanting to skip, 61
people involved in, 58
stakeholders signing off on, 59
tracking progress using, 59–60
PMI process groups, xxi–xxii
PMI (Project Management Institute), xix
Powell, John, quotation by, 358
predecessor, 412
problems. See lessons learned from past projects;
risks
problem solved by project, 7, 17, 18–21, 41
problem statement, 20–21, 38, 41
process owners, 97
Program Evaluation and Review Technique
(PERT), 118, 412
progress, tracking. See performance
project, 3–7, 412
approval for, 16–18
archives of
contents of, 386–388
creating, 388–390
project summary list for, 388
storage of, 389–390
assumptions of, 17, 36–38
baselines for, 194–196, 409
adding, 323–325
for costs, 217–218, 409
displaying, 310–311
in Multiple Baselines Gantt view, 324–325
removing, 324
in Tracking Gantt view, 214
tracking progress using, 211–212
project (continued)
  budget for, 6, 64, 159–160, 165–167
    comparing to costs, 174–180
      as financial objective, 22
    increasing, 39, 333
  constraints of, 6–7, 10, 328–336, 410
  crashing, 154–157, 312, 331, 410
  fast-tracking, 150–153, 312, 333, 411
  finish date of, 5, 411
  goals of, 5, 17, 21–24
  linking to business objectives, 396–397, 398
  objectives of. See objectives
  opportunities of, 17, 18–21, 397–398
  past projects, learning from. See lessons
    learned from past projects
  performance of, analyzing. See performance
    phases of. See initiating phase; planning phase;
      executing phase; controlling phase; closing phase
  problem solved by, 7, 18–21, 41
  requirements of. See requirements
  risks of. See risk management
  schedule for. See schedule
  scope of, 413
    completed scope, 381
      identifying stakeholders using, 41
    preventing scope creep, 35–36
    reducing, 157–158, 312, 333, 334
  selecting, 394–400
  starting
    actual date of, 199, 409
    date of, 5, 413
    kickoff meeting for, 187, 191, 288
      milestone for, 135
  strategy for, 17, 24–28
  success criteria for, 8, 17, 160, 375
  uniqueness of, 4–5
  whether to do, estimates affecting, 113, 119
Project (Microsoft)
  baselines
    adding, 323–325
  removing, 324
  setting, 194
  viewing, 310–311, 324–325
  budget resource feature, 174–180
  calendars, 147–149
  communication tasks as milestones, 273
  costs, 168–170
    calculating, 160
    comparing to budget, 160
    exporting to Excel, 180–184
    tracking, 216–219
  critical path, displaying, 310–311
  date constraints for tasks, 130–132
  deadlines for tasks, 132–133
  earned value analysis, 228–232
  hyperlinking task to work package document, 87
  incomplete tasks, rescheduling, 204–205
  lag time, reducing, 311
  milestones
    creating, 136–137
    icon for, 133, 137
  performance of work resources, evaluating, 255–256
  resources
    allocations for, adjusting, 314–318
    assigning overtime to, 319–321
    assigning to tasks, 137–143
    creating, 99–108
    fields for, 104–108
    importing, 101–104
    substituting, 321–322
  schedule progress, tracking, 210–215
  status date, setting, 203–204
  summary tasks
    displaying, 310–311
    manually scheduled, 123–125
  task dependencies
    automated, 129
    creating, 127–129
tasks
  inactivating, 312
  splitting, 313–314
WBS in
  recording, 80–85
  tree diagram of, 84
Work Countour feature, 318
project charter, 51–53, 192, 412
project implementation plan, 60–66, 412
  approvals for, 59, 192
  budget, 64
  change control plan, 65–66
  changes to, 60–61
  communication plan, 65
  components of, 62–66
  functional managers receiving, 268
  organization, 63
  in project notebook, 193
  quality plan, 65
  resources, 65
  risk management plan, 64
  schedule, 63
  stakeholders receiving, 267
  work breakdown structure (WBS), 62–63
Project Information dialog, Project, 211
project management, 7–11
  agile method for, 406–407
  benefits of, 11–13, 360
  critical chain method for, 402–406
  processes of, 8–11. See also initiating phase;
    planning phase; executing phase; controlling phase;
    closing phase
Project Management Institute (PMI), xix
project manager, 96
  responsibility for business results, 23
  roles of
    on change review board, 308
    in lessons learned meetings, 361–362
    as stakeholder, 47
skills needed by, 48–51
project notebook
  in archives, 386–387
  creating, 193–194
project overview, 16–18, 412
  assumptions, 36–38
  deliverables, 30–32
  goal and objectives, 21–24
  problem statement, 18–21
  requirements, 28–30
  risks, 36–38
  scope statement, 33–36
  strategy, 24–28
  success criteria, 33
project summary, 379–380
Project Summary report, 220
project summary task, budget resources for, 175–176
project team. See team
project triangle, 6–7

Q
quality
  balancing with other constraints, 6–7, 10, 328–336
  measurements of, at close of project, 381
  of work completed so far, 200
quality assurance, 412
quality control, 412
quality objectives, 22
quality plan, 65
quantitative results of project performance, 380–381

R
R (responsible) level of responsibility, 91
Remaining field, Cost table, 218
reports. See also documents
  closeout reports, 378–381
  on project performance, 219–242
    Baseline Cost report, 221
    Cash Flow report, 222
    Critical Tasks Status report, 221
    Project Summary report, 220
    Task Status report, 220
  Overbudget Resources report, 255–256
  status reports, 269, 291–293
  variance reports, 193
  visual reports, 233–242
request for proposal (RFP), 189
requirements, 28–30. See also objectives
  business process modeling for, 29
  existing, reusing, 28
  functional/specification workshops for, 30
  identifying stakeholders using, 41
  interviewing end users for, 29
  prototypes for, 29
  use cases for, 29
Resource calendars, Project, 148
resource managers, 97
Resource Name field, Resource Sheet, 105
resource pool, 413
Resource Sheet, Project, 100–108
resources (information)
  Microsoft Office Project 2010 Inside Out (Stover), 310
  Software Requirements (Wiegers), 29
resources (for project), 63
  adding, 100–104
  allocations, adjusting, 314–318
  assigning to tasks, 137–143
  availability of, 107–108
  budget resources, 174–180
  categorizing, 108
  commitments for, 192
  as constraint, 6
  cost of, 106–107
  cost resources, 410
    assigning to tasks, 173, 209
    linking to budget resources, 178–179
  customer providing, 332
  estimating amount needed, 98
  importing into Project, 101–104
  initials to use in Gantt Chart, 106
  keeping assigned to project, 98
  material resources, 99, 411
    costs of, 169, 172
    limited options for, risks involving, 340
    linking to budget resources, 178–179
    maximum units of, 106
    milestones at deliveries of, 136
    units for, 105
  naming, 105
  procuring, 188–191
  reassigning, 330–332
  substituting, 321–322
  transitioning at close of project, 382
  types of, 99–100, 105
  when cost incurred for, 107
  work resources, 99, 413
    costs of, 106–107, 168–172
    effort by, 168
    experience of, affecting productivity and cost, 332
    identifying as skill sets, 100
    limited experience of, risks involving, 340
    limited options for, risks involving, 340
    linking to budget resources, 178–179
    multi-tasking, accounting for, 146–147
    outsourcing, 332–333
    part-time, accounting for, 146–147
    reassigning, 330–332
    substituting, 321–322
    working overtime, 106, 168, 319–321, 331
  responsibility matrix, 90–93, 413
  creating, 92–93
identifying stakeholders using, 41
levels of responsibility in, 91–92
responsible (R) level of responsibility, 91
retainers, with vendors, 191
return on investment (ROI)
changing financial goals of, 334
cost of capital affecting, 167
as financial objective, 22, 216
high or low estimates affecting, 113
project management benefiting, 12
RFP (request for proposal), 189
RICA acronym for responsibility levels, 91–92
risk management, 337–354, 413
acceptability of risks, determining, 26
assessing risks, 345–351
benefits of, 338
contingency funds for, 351–352
contingency plans for, 350
describing risks, 17, 342–345
documents for, 64, 194, 340–345, 353–354
evaluating risks, 397–398
identifying risks, 36–38, 339–344
management reserve for, 352
prioritizing risks to manage, 346–351
responding to risks, 349–351
for similar projects, 349
tracking risks, 200–201, 353–354
Roeder, Tres
on nonverbal consulting, 277
on responsibilities of project manager, 23
ROI. See return on investment
Russell, Bertrand, quotation by, 299

S
schedule, 63, 111–112, 413
balancing with other constraints, 6–7, 10, 328–336
baselines for, 194
crashing, 154–157, 312, 331, 410
estimating. See estimating
fast-tracking, 150–153
filtering for at-risk tasks, 215
final results of, at close of project, 381
incomplete tasks, rescheduling, 204
lengthening, 334
milestones, 133–137
nonproject time, accounting for, 144–145
nonworking time, accounting for, 147–149
Schedule table for, 214
scope reductions affecting, 157–158
sequencing tasks, 125–133
shortening, 150–158
adjusting resource allocations, 314–318
assigning overtime, 319–321
breaking project into phases, 333
fast-tracking project, 312, 333
Project views for, 310–311
reassigning resources to critical path, 330
reducing lag time, 311
reducing scope, 312
splitting tasks, 313–314
with more experienced resources, 332
working overtime, 331
Summary table for, 214
Tracking Gantt view of, 212–214
tracking progress based on, 210–215
updating after tracking current progress, 203–210
vague timing in, risks involving, 339
Variance table for, 214
schedule performance index (SPI), 227, 413
Schedule table, Project, 214
schedule variance (SV), 227, 413
scope, 413
balancing with other constraints, 6–7, 10, 328–336
completed scope, 381
identifying stakeholders using, 41
preventing scope creep, 35–36
reducing, 157–158, 312, 333, 334
scope statement, 33–36, 71, 73
scope triangle. See project triangle
shared folders, archives in, 389
shared workspaces, archives in, 390
SharePoint (Microsoft)
    archives stored with, 390
    lessons learned tracked with, 370
Shaw, George Bernard, quotations by, 259, 393
Should Start By filter, Project, 215
Should Start/Finish By filter, Project, 215
skill sets, work resources as, 100
slack (float), 411, 413
    in critical chain approach, 404
    in Schedule table, 214
    in Tracking Gantt view, 213
slippage, 214
Slipped/Late Progress filter, Project, 215
Slipping Assignments filter, Project, 215
Slipping Tasks filter, Project, 215
Software Requirements (Wiegers), 29
sponsor, 43–45, 96, 412
    charter published by, 51
    communication with, 263
    performance of, project affecting, 395
spreadsheets. See Excel (Microsoft)
stakeholders, 39–51, 413. See also customers;
    functional managers; project manager; spon-
    sor; team
    on change review board, 308
    communicating with, 11, 263
    conflicting solutions wanted by, 19, 24
    decisions on project changes by, 329–330
documenting, 47–48
    expectations of
        estimates affecting, 120
        expectations of, understanding, 49
    identifying, 39–41
    interaction between, in responsibility
        matrix, 91
    in responsibility matrix, 93
role in planning, 58
signing off on project implementation plan, 59
support of, affecting project selection, 398
uninvolved, risks of, 339
unsupportive, winning over, 40
Standard calendar, Project, 147
standard rate (Std. Rate), 106, 168, 169, 413
start date, 5, 413
start to finish dependencies, 126
start to start dependencies, 126
statement of work, 413
status meetings, 289–290
status reports, 269, 291–293
    people receiving, 267, 268
    in project notebook, 193
Std. Rate field, Resource Sheet, 106, 168, 169
sticky notes, recording WBS with, 79
storming stage of team development, 252
Stover, Teresa (author, Microsoft Office Project
    2010 Inside Out), 310
strategy for project, 17, 24–28
    brainstorming for, 25
    feasibility of, 26
    identifying stakeholders using, 41
    selecting, 26–28
subtasks
    deleting, 82
    demoting and promoting, 82
    inserting, 81
    moving to another summary task, 82
    selecting groups of, 82
success
    criteria for, 8, 33, 160, 375, 413
    evaluating. See closing phase; performance
    learning from. See lessons learned from past
    projects
    successor, 413
summary of project. See project overview; project
    summary
    Summary table, Project, 214
summary tasks, 69, 413
  creating from deliverables, 72
  creating from scope statement, 73
  deleting, 82
  demoting, 82
  displaying, 310–311
  inserting, 81
  naming, 74, 78
  project management tasks included in, 75
SV (schedule variance), 227, 413

T
Tamboly, Niloufer, on managing team members, 250–251
Task calendars, Project, 149
Task Details form, Project, 207–210, 212
Task form, Project, 212
  resources, assigning to tasks, 139–142
  task dependencies, creating, 127
tasks, 413
  assigning resources to, 137–143
  at-risk tasks, filtering for, 215
  cost resources for, 173
  date constraints for, 130–132
  deadlines for, 132–133
  dependencies between
    creating, 127–129
    flexibility of, 129–130
    lag time in, 127, 152
    types of, 125–127
  inactivating, 312
  incomplete, rescheduling, 204–205
list of. See work breakdown structure (WBS)
overlapping, 150–153
running in parallel, 152–154
sequencing, 125–133
splitting into shorter tasks, 313–314
subtasks
  deleting, 82
demoting and promoting, 82
inserting, 81
moving to another summary task, 82
selecting groups of, 82
summary tasks, 69, 413
  creating from deliverables, 72
  creating from scope statement, 73
  deleting, 82
  demoting, 82
  displaying, 310–311
  inserting, 81
  naming, 74, 78
  project management tasks included in, 75
updating with current status data, 203–210
work packages, 69, 413
detailed descriptions for, 85–87
hyperlinking tasks to, 87
naming, 74, 78
project management tasks included in, 75
size of, 77–78
tracking quality of work completed, 200
tracking quantity of work completed, 198–199
Task Sheet, Project, 137–138
Task Status report, 220
Taylor, Ron, on communicating information, 264
TCPI (to complete performance index), 227
team, 46–47. See also work resources
  attitude of, problems with, 255
  benefits of project management for, 12–13
  burnout of, avoiding, 9, 12, 13
  commitment of, building, 48–51
  communication with. See communication, with project team
  core team, 97
  culture of, 282
  different work styles of, managing, 250–251
  educating based on past projects, 359
  feedback for, providing, 247
  fitting in with other team members, 249–250
team (continued)
  geographically dispersed, 340
  honest communication with, 247
  identifying, 96–98
  individual goals of, determining, 244, 246
  interviewing, 249
  low estimates affecting, 113
  motivating, 244–250
  new members, orienting to the group, 250
  new teams, developing, 250–253
  nonworking time, accounting for, 147–149
  obstacles to success of, removing, 246–247
  organization chart for, 94–95
  part-time, accounting for, 146–147
  performance of, evaluating, 253–256
  priorities of, communicating, 247
  productivity of, 12, 144–145, 145–146
  qualifications of, problems with, 254
  reluctance to discuss problems, 366–367
  reporting time and status, 201–202
  respecting and valuing, 246
  responsibilities of, communicating, 244–245
  responsibility matrix for, 90–93
  rewarding, 248
  role in lessons learned meeting, 364
  role in planning, 58, 59
  roles of, communicating, 244–245
  tools needed by, providing, 246
  trust among members, building, 282
  work goals for, 245–246, 253

technical objectives, 22
  technology issues, risks involving, 339
Thomas, Arthur P., on rewarding employees, 248
  time and materials contracts, 190
  time buffers, in critical chain, 404–406
  time estimates. See estimating
time-tracking applications, 202
to complete performance index (TCPI), 227
top-down estimating, 123
top-down planning, 123–125
  Total Cost field, Cost table, 218
Tracking Gantt view, Project, 212–214
Tracking table, Project, 207
tree diagram of WBS, 69, 84
triangle for project constraints. See project triangle
triple constraint. See project triangle
Tuckman, Bruce, on team development, 250, 251–253
Type field, Resource Sheet, 105

U
uniqueness of project, 4–5
Update Tasks dialog, Project, 206–207
use cases, 29
users
  interviewing to identify requirements, 29
  representatives for, identifying requirements, 43
  test lead as advocate of, 49

V
Vare, Danielle, quotation by, 277
  variance, 413
    cost variance (CV), 218, 226, 410
    schedule variance (SV), 227, 413
  variance at completion (VAC), 227
  Variance field, Cost table, 218
  variance reports, 193
  Variance table, Project, 214
vendors. See also contractors
  negotiating contracts with, 190–191
  selecting, 190
  soliciting, 189
videoconferencing, 270
virtual team members. See geographically dispersed team members
Visio (Microsoft)
  Baseline Cost report, 221
Critical Tasks Status report, 221
organization chart, 94
Task Status report, 220
tree diagram of WBS in, 84
visual reports, 240–242
visual reports, 233–242
Excel-based, 233–240
generating, 233
tree diagram of WBS in, 84
Visio-based, 240–242

W
WBS. See work breakdown structure
Wiegers, Karl (author, Software Requirements), 29
Wilson, Woodrow, quotation by, 283
Wolfe, James, quotation by, 327
Word (Microsoft)
  change request form, template for, 303
  pasting tasks into Project from, 83–85
  recording WBS in, 80
work, 413. See also effort
work breakdown structure (WBS), 62–63, 68–70, 413
  benefits of, 71–72
  creating
    from bottom up, 79
    from top down, 72–77
  format of
    as outline, 70
    as tree diagram, 69, 84
  level of detail in, 77–78
  number of levels in, 75
  number of people working on, 75
  recording, 79–85
    in Outlook, 80
    in Project, 80, 80–85
    with sticky notes, 79
    in Word, 80
  structure of, options for, 76
  summary tasks in, 69
  verifying, 76
  work packages in, 69
Work Countour feature, Project, 318
working environment
  culture of organization, 26
  culture of team, 249, 250, 282
  fun as part of, 248–249
  reluctance to discuss mistakes in, 366–367
Work Overbudget filter, Project, 215
work packages, 69, 413
  detailed descriptions for, 85–87
  hyperlinking tasks to, 87
  naming, 74, 78
  project management tasks included in, 75
  size of, 77–78
  tracking quality of work completed, 200
  tracking quantity of work completed, 198–199
work resources, 99, 413. See also contractors; resources; team
costs of, 106–107, 168–172
effort by. See effort
experience of, affecting productivity and cost, 332
identifying as skill sets, 100
limited experience of, risks involving, 340
limited options for, risks involving, 340
linking to budget resources, 178–179
multi-tasking, accounting for, 146–147
outsourcing, 332–333
part-time, accounting for, 146–147
reassigning, 330–332
substituting, 321–322
working overtime, 106, 168, 319–321, 331
worksheets. See Excel (Microsoft)
workspaces, shared. See shared workspaces
work weeks, Project, 149

X
XIRR function, Excel, 164
XNPV function, Excel, 163