



successful project management



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

BONNIE BIAFORE

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Applying Best Practices and Real-World Techniques with Microsoft® Project

BONNIE BIAFORE

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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:

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About the Author

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.

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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.

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CHAPTER 4

Building a Work Breakdown Structure

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

“*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.

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.

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.

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.

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.

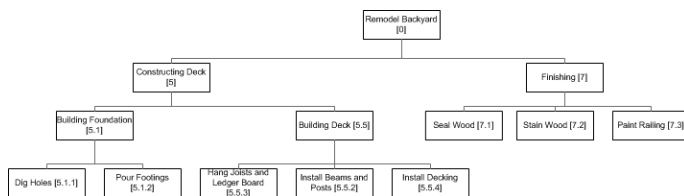


FIGURE 4-1 A WBS diagram shows the hierarchy of project tasks from the overall project at the top to work packages at the bottom.

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.

	WBS	Task Name
0		0 Remodel Backyard
1		1 Identifying Project Constraints
19		2 Project Constraints Identified
20		3 Designing Remodel
50		4 Design Complete
51		5 Constructing Deck
52		5.1 Building Foundation
53	5.1.1	Dig Holes
54	5.1.2	Pour Footings
55	5.1.3	Inspect Footings
56	5.2	Footings Passed Inspection
57	5.3	Lumber Delivered
58		5.4 Preparing Lumber
59	5.4.1	Cut Lumber
60	5.4.2	Treat Lumber
61	5.4.3	Pre-drill Holes in Lumber
62		5.5 Framing Deck
63	5.5.1	Run Wiring
64	5.5.2	Install Beams and Posts
65	5.5.3	Hang Joists and Ledger board
66	5.5.4	Install Decking
67	5.5.5	Assemble and Install Railing
68	5.5.6	Assemble and Install Stairs
69	5.6	Deck Construction Complete

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.

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.

For more information about project files, see “Companion Content,” on page xxiii.

■ 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.

SEE ALSO

The section “The Scope Statement,” on page 33, describes a scope statement and provides tips for creating one.

- **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.

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.

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.

TIP

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.

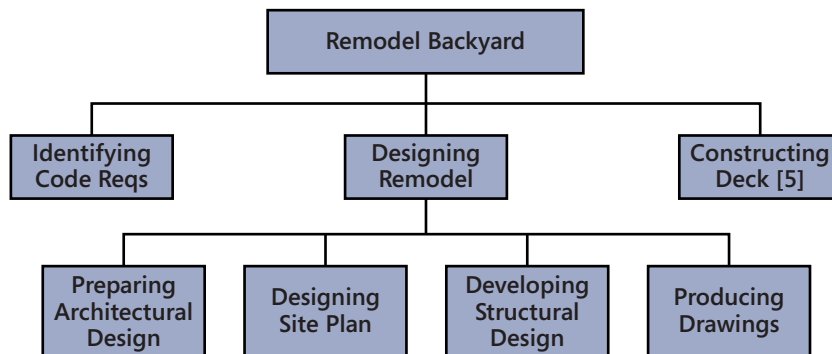


FIGURE 4-3 Project deliverables and the scope statement can provide ideas for the high-level tasks in a WBS.

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



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.

See the section “Creating the WBS in Project,” on page 80, for tips on how to incorporate tasks from other teams into your project-wide WBS.

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.

Regardless of the structure you choose for higher levels of a WBS, the work packages remain the same.

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,

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.

TIP

■ 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**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.

The section "Pasting Tasks into Project," on page 83, explains how to copy tasks from another program into Project.

TIP

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.



Summary

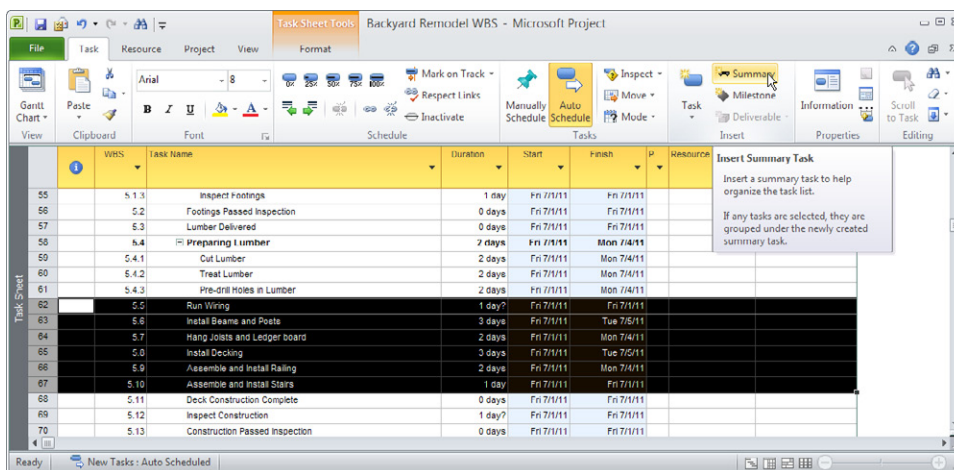


FIGURE 4-4 To insert a summary task for several existing tasks, select the tasks, and then use the Insert Summary Task command.



- **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



- **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).

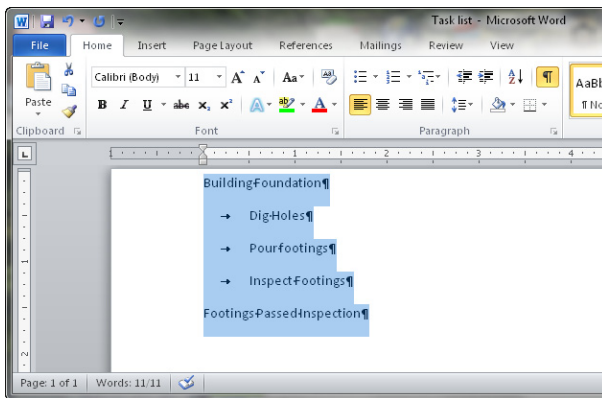


FIGURE 4-5 Select the tasks that you want to paste into Project 2010 in a Word 2010 document or an Outlook 2010 email message.

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).

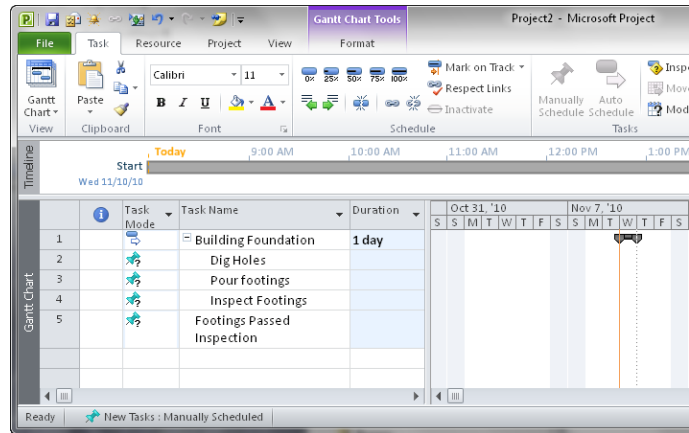


FIGURE 4-6 Project uses the indenting from the Word document or Outlook email message to determine the WBS level in the task list.

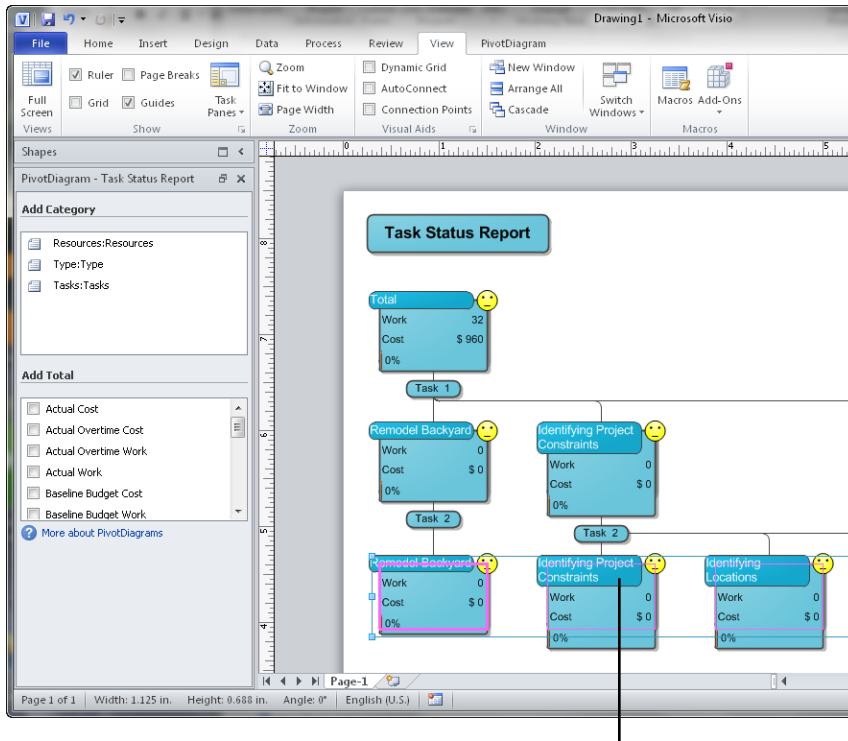
DISPLAYING A WBS AS A TREE

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:

SEE ALSO

For more information about generating and customizing visual reports, see the section “Working with Visual Reports,” on page 233.

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.



First select the tasks to expand to a lower level

FIGURE 4-7 Click the Tasks:Tasks category to show another level of tasks in the WBS.

The Chapter04 folder on the companion website contains a Visio visual report, WBS.vsd, which displays the WBS for the backyard remodel project.

Detailing Work Packages

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.

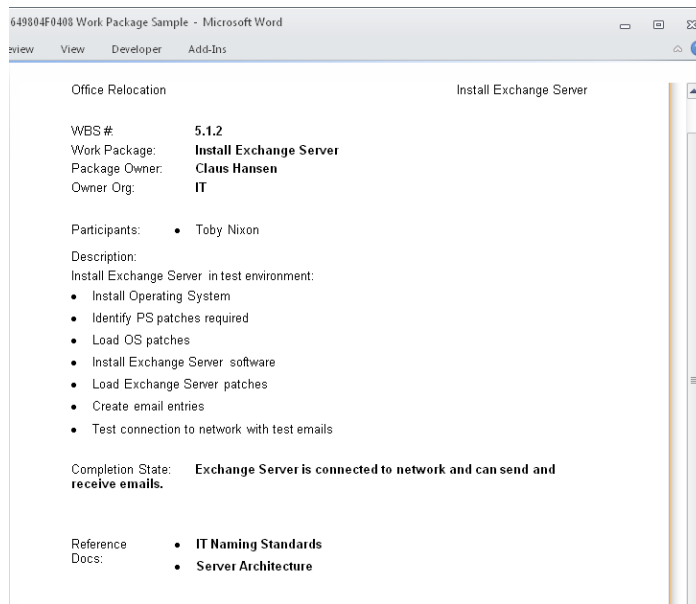


FIGURE 4-8 Work package documents provide the detail that team members need to complete their tasks successfully.

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.)

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.

CHAPTER 13

Modifying the Project Schedule

IN THIS CHAPTER, YOU WILL:

- Review several ways to shorten a schedule
- Discover methods for adjusting resource assignments
- Learn how to assign overtime
- Learn how to substitute resources
- Save and view additional baselines

“The more alternatives, the more difficult the choice.”—*ABBE 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.

TIP

■ 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.

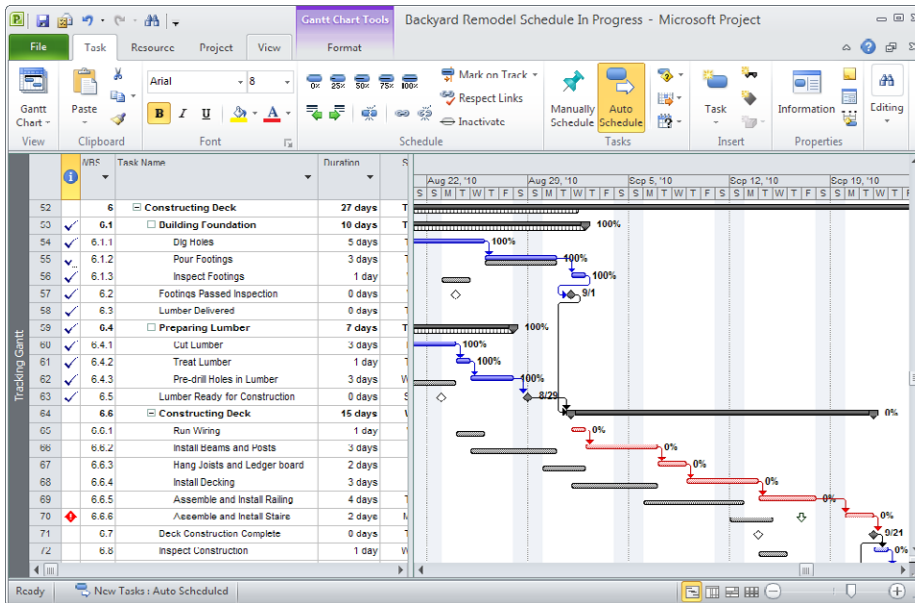


FIGURE 13-1 The Tracking Gantt view displays the critical path and includes taskbars for the baseline so you can compare actual progress to your plan.

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.

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.

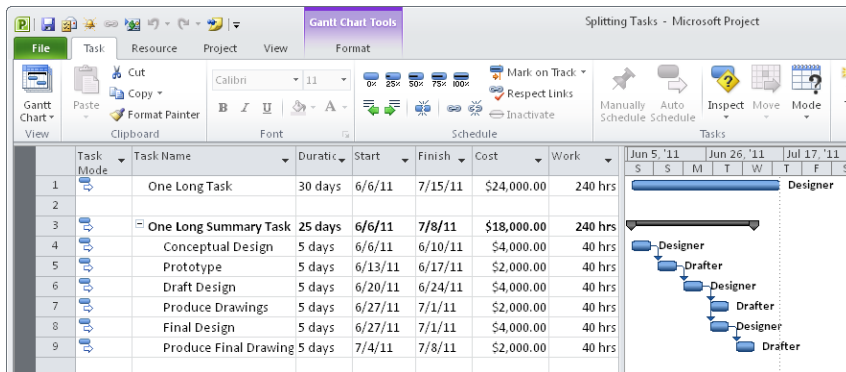


FIGURE 13-2 By breaking up long tasks into several shorter ones, you might be able to reduce the duration and the cost of the work.

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:

Duration = Work / Units

Work = Duration x Units

Units = Work / 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 13-1 Project Recalculates Different Fields Depending on the Task Type

TASK TYPE	CHANGE DURATION	CHANGE ASSIGNMENT UNITS	CHANGE WORK
Fixed Units	Work	Duration	Duration
Fixed Work	Peak Units	Duration	Duration
Fixed Duration	Work	Work	Peak Units

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

Details

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.

The image shows two screenshots of the Microsoft Project Task Form for a task named 'Assemble and Install Railing'. The top screenshot shows the task with a duration of 8 days and 50% units for Crew Member 1. The bottom screenshot shows the same task with a duration of 4 days and 100% units for Crew Member 1. The Task Type is set to Fixed Work in both.

ID	Resource Name	Units	Work	Ovt. Work	Baseline Work	Act. Work	Rem. Work
5	Crew Member 1	50%	32h	0h	128h	0h	32h

ID	Resource Name	Units	Work	Ovt. Work	Baseline Work	Act. Work	Rem. Work
5	Crew Member 1	100%	32h	0h	128h	0h	32h

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.

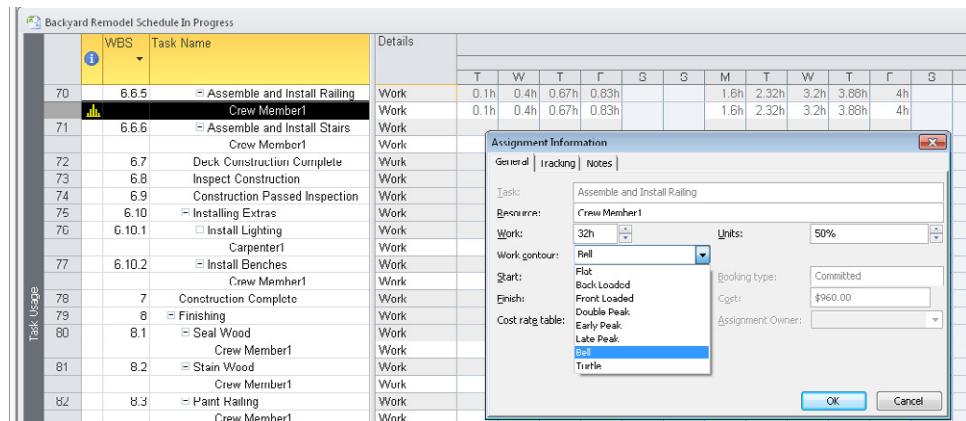


FIGURE 13-4 Work contours adjust the allocation of work for resources over the duration of their assignment.

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



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.

Available From	Available To	Units
5/30/2011	9/2/2011	110%

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.

The screenshot shows the 'Resource Usage' table for a project named 'Backyard Remodel Schedule In Progress'. The table has columns for Resource Name, % Comp, Work, Regular Work, Overtime, Baseline, Variance, and Actual. The 'Assemble and Install Railing' task is highlighted, showing 4% completion, 32 hrs of total work, 24 hrs of regular work, and 8 hrs of overtime. Below the table is the 'Task Form' for the selected task, showing a duration of 12 days, start date of 10/19/10, and finish date of 11/4/10. The 'Task type' is 'Fixed Units' and '% Complete' is 0%. A summary table below the form shows the breakdown of work hours for resource 'Crew Member 1': 50% units, 32h work, 6h overtime, 128h baseline work, 0h actual work, and 32h remaining work.

Resource Name	% Comp	Work	Regular Work	Overtime	Baseline	Variance	Actual
5 - Crew Member 1	4%	32 hrs	24 hrs	8 hrs	328 hrs	-96 hrs	9.6 hrs
Assemble and Install Railing	0%	32 hrs	24 hrs	8 hrs	128 hrs	-96 hrs	0 hrs
Assemble and Install Stairs	0%	16 hrs	16 hrs	0 hrs	16 hrs	0 hrs	0 hrs
Clean Site	0%	8 hrs	8 hrs	0 hrs	8 hrs	0 hrs	0 hrs
Cut Lumber	60%	16 hrs	16 hrs	0 hrs	16 hrs	0 hrs	0.6 hrs

ID	Resource Name	Units	Work	Ovt. Work	Baseline Work	Act. Work	Rem. Work
5	Crew Member 1	50%	32h	6h	128h	0h	32h

FIGURE 13-6 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:

The section “Using the Assign Resources Dialog Box,” on page 142, describes how to find replacement resources with the characteristics you want.



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.

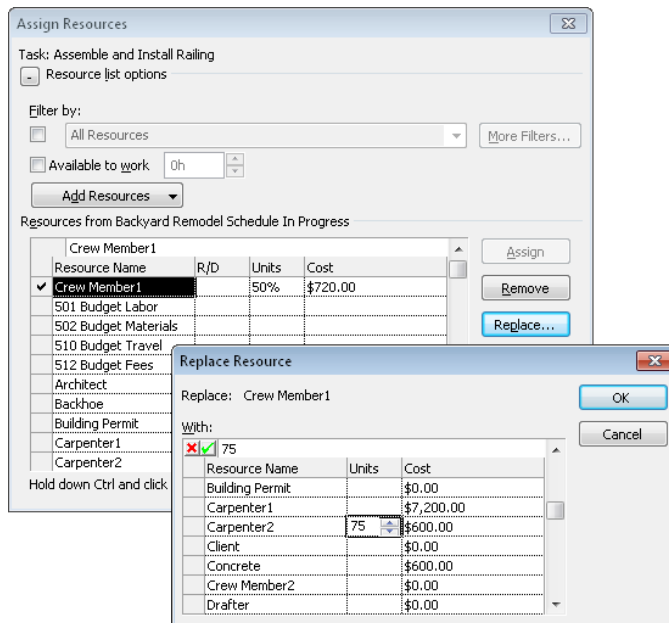


FIGURE 13-7 You can select a replacement and assign the units in the Replace Resource dialog box.

■ 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).

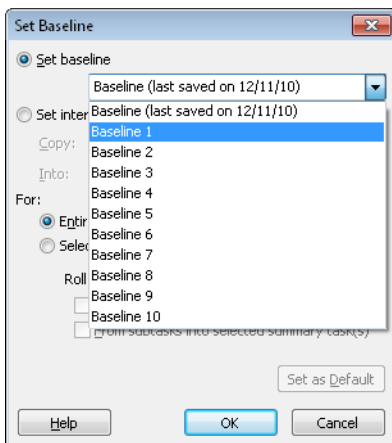
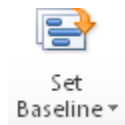


FIGURE 13-8 You can set up to 11 baselines, including Baseline, Baseline1 through Baseline10.

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.

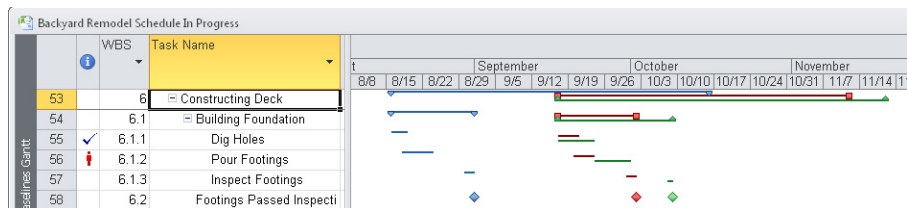


FIGURE 13-9 Compare the schedules for three baselines in the Multiple Baselines Gantt view.

TIP

■ 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.

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