

management, and your key stakeholders to see the needed resources to complete each work package in the WBS. Specifically, at the end of this process you'll have:

- **Resource requirements for each activity** You'll know what resources are needed, the assumption your project management team used to create the requirements, and the basis for each estimate.
- **Updates to the project documents** You may have errors and omissions, change requests, and discoveries about and around the activities that you're estimating. If the activities or their attributes change, you'll have to update your original activity list to reflect these changes. Updates to the calendar are based on the creation of the activity resource requirements. If change requests enter the project, the resource availability and demand may shift, which could affect the resource calendar.
- **Resource breakdown structure** This is a hierarchical breakdown of the project resources by category and resource type. For example, you could have a category of equipment, a category of human resources, and a category of materials. Within each category, you could identify the types of equipment your project will use, the types of human resources, and the types of materials.

Estimating Activity Durations

How many times have you heard management ask, "Now how long will all of this take?" Countless times, right? And maybe right after that: "How much will all of this cost?" We'll talk about cost estimates in Chapter 7. For now, let's talk about time.

The answer to the question "How long will it take?" depends on the accuracy of the estimates, the consistency of the work, and other variables within the project. The best a project manager can do is to create honest estimates based on the information provided. Until the schedule is finalized, no one will know the duration of the project.

First, you identify the activities, sequence the activities, define the resources, and then estimate durations. These processes are needed to complete the project schedule and the project duration estimate. These four processes are iterated as more information becomes available. If the proposed schedule is acceptable, the project can move forward. If the proposed schedule takes too long, the scheduler can use a few strategies to compress the project. We'll discuss the art of scheduling in a few moments.

Activity duration estimates, like the activity list and the WBS, don't come from the project manager—they come from the people completing the work. The estimates may also undergo progressive elaboration. In this section, we'll examine the approach to completing activity duration estimates, the basis of these estimates, and allow for activity list updates.

Considering the Activity Duration Estimate Inputs

The importance of accurate estimates is paramount. The activity duration estimates will be used to create the project schedule and to predict when the project should end. Inaccurate

ple, employees or consultants, junior or senior engineers
: Such as power tools or hand-held tools, newer versus

or example, oak versus plywood

is For instance, build your own software or buy a

or

ernative analysis is used throughout the PMBOK, so you'll
on the PMP exam. Whenever you have two feasible choices
n your project, you're working with alternative analysis.

Estimating Data

construction, the cost of the labor you use, the materials
seasonal factors you consider for each project typically
of the country, or even the world, your project is operat-
provide estimating data on the resources your project can
physical locales the project takes place in, supply and de-
r purchases. Published estimating data helps the project
an exact cost of the resources the project will utilize.

Estimating

up estimating in one of my seminars, someone snickers
hot of booze. Ha-ha.

the most accurate time-and-cost estimating approach a
estimating approach starts at "the bottom" of the project
its predecessor and successor activities, and the exact
to complete each activity. Bottom-up estimating accounts
d to complete all of the project work. While it is the most
it is also the most time-consuming.

I see bottom-up estimating again in Chapter 7, which
imating. To complete bottom-up estimating, especially for
be present. Bottom-up estimating for costs is also known
finite estimate.

Activity Resource Estimates

a project manager, the project team, and all your experts
e process? You get the requirements for all the project re-
The process allows the project manager, the project team,