Contents

How To Use This Book

Conventions Used in this Book

Legend of Icons

A number of icons are used in this book to highlight important information.

PMBOK

The PMBOK icon and call-out box refers you to where you can find a concept or term in the Project Management Institute's Project Management Body of Knowledge – The PMBOK.

The Note Icon and call-out box indicates a key fact or insight to help participants better understand helpful background information, quirks, explanations for the way things work, answers to Frequently Asked Questions (FAQs), and helpful things to remember.

The Tip, Trick and Shortcut icon and call-out box presents quick ways to do things faster and impress colleagues.

The Warning Icon and call-out box will draw your attention to important risks, pitfalls, potential issues, and alternate concepts that may assist you with managing your project processes.

The Meaning of the Fonts

This book uses a few conventions to display meaning within the text.

Bold text indicates the title of a button, menu item, or file name, that should be clicked on or selected to complete a step. Bold text also indicates a key word or phrase worthy of consideration.

Text that is set in a `monospace` font indicates text that needs to be typed in (like a `URL`, or code).

Navigating this Book

This book has been organized so that each chapter can build upon the concepts and skills learned in the previous chapters. However, each chapter is designed to be relatively self contained. Keep an eye out for any cross-references to find more information on a subject.

Chapter 2
Overview of Microsoft Project

Benefits of Scheduling Software

Project is a scheduling software used to manage projects. The software is flexible to allow for a variety of uses for different industries and different project management processes, or methodologies. The concept of scheduling is the coordination of activities, resources, money, time, and other variables that factor into completing a list of tasks containing task and resource relationships. Often scheduling involves working with limitations and date goals that are driven by the organization.

Throughout this book, you will become familiar with features available in Microsoft Project 2013. Below is a list of some of those features:

1. The ability to plan and manage a project using Work Breakdown Structure (outline) format
2. Work, duration and cost planning, forecasting and tracking
3. Flexible reporting capabilities and customization
4. Ability to integrate with Project Server/Project
5. Manual and automatic project scheduling
6. Resource management planning and forecasting
7. Budget forecasting and tracking
8. Baseline and variance reporting
9. Schedule predictability and what-if scenarios
10. Dynamic schedule management

Scheduling software has a flow of activities which compliments an overall project management process in an organization. Refer to the following steps as an example of how this might be applied.

1. The project are defined and the decision is made to perform the project
2. More indepth planning is conducted to elaborate the tasks, resources and work required to complete the project
3. The Project work will be initiated
4. Information of how the work is getting accomplished is feed back to the project manager and updated into the schedule
5. Stakeholders request a change to the project
6. Reports are produced to reflect project status and schedule

7. Steps 4-6 are repeated until the project is completed
8. When the project is completed a transition will be made to move the results of the project into ongoing business operations or business processes
9. Time is set aside to reflect on how the project was executed and opportunities for process improvement are collected.
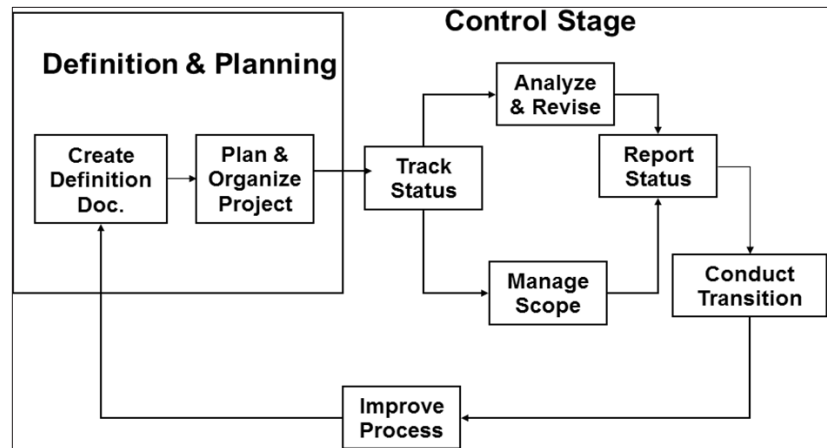
Figure 2-1   Scheduling software flow of activities.

Overview of Project as a Database

Although Project may in some ways looks like Excel, it is actually a very complex database. Below are some reasons to use a database:

- Eliminates the need to have information duplicated in multiple locations
- Creates a structure of information that can be organized by subject
- Creates the ability to have information related to each other
- Simplifies the ability the report on related information crossing multiple subjects

If Project was set up like a single file is in Excel, each time you assigned a resource to a task, you would have to duplicate all the details about the resource on every single task. This would create a lot of unnecessary information. In addition, every time a resource detail was changed, this would have to be duplicated on every single task. Duplicate information is a good reason to use a database structure.

By using a database structure within Project, the resource is instead connected to a task but all the details about the resource are stored in another location. This way when a report is needed, details can be pulled from multiple locations. This book is not designed to teach everything that you need to know about databases but please refer to the following chart for an example of how all of this information works together.

Task Table

Unique ID	Task
1	Eat lunch
2	Mow lawn
3	Take out garbage
4	End world hunger

Resource Table

Unique ID	Resource
1	Pete
2	Jim
3	Sally

Assignment Table

Unique ID	Task	Resource
1	Eat lunch	Pete
2	Mow lawn	Jim
3	Take out garbage	Pete
4	Eat lunch	Jim
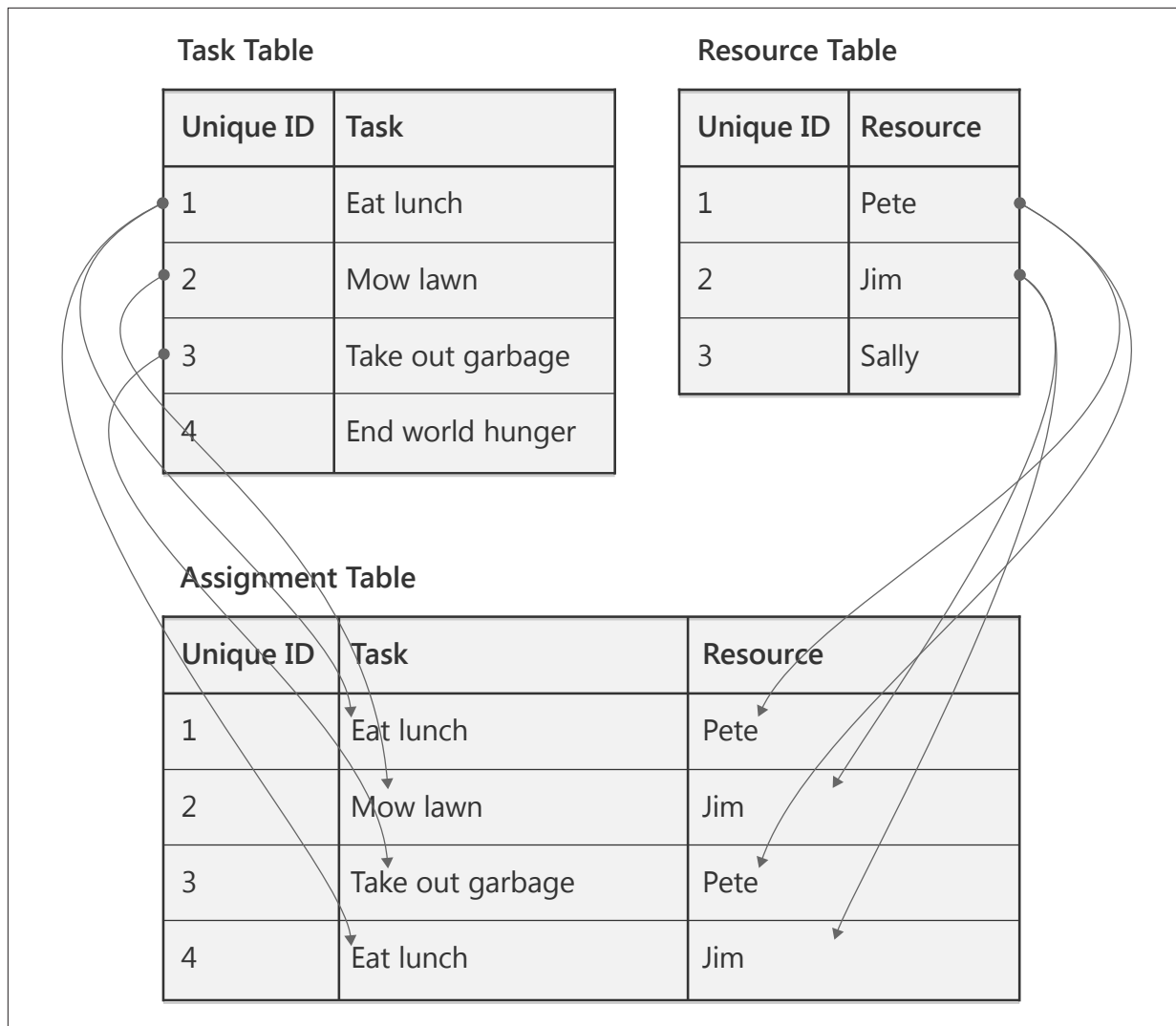
Figure 2-2   Illustration of Project Tables.

Notice that Project has three main tables of information – Task, Resource and Assignment. When a resource is assigned to a task, Project draws a connection/link between a unique resource field with a unique task field. Normally the unique field is not displayed in views, but can be added if desired.

Additional information about this database approach in Project:

- All the fields or columns of information are pre-defined when you create a project plan. Creating a plan is simply editing the information in fields/columns.
- Hiding a column in Project does not delete the information, it simply removes it from the current view
- Inserting a column is simply adding the information to a particular view
- Changing a field of information in one view is changing the information in the database and any other view that uses that field will display the change
- Some views are designed for a specific purpose and may display task information only, resource information only or some combination of task, resource, and assignment information. For example, the Resource Sheet view does not allow you to display task names in it. That is because it is a specific view to show resource details. If you want to see how those resources are assigned, you should consider another view such as Task Usage, Resource Usage, or Gantt Chart.

This brief discussion should start you on your way to learning more about Project and how its database structure work well when managing schedules.

Project Usage

When working with information in Project, you can view data at a high-level or drill down to a detail level. Project offers timescaled views ranging from yearly all the way down to each minute. Schedulers, project managers, and other professionals using this tool will need to determine what level of information is needed to produce the desired output of information. You also need to determine how granular you want to be in maintaining that information.

For example, some organizations manage resource assignments by looking at the week as a whole and ensuring resources have 40 hours of work assigned to them. These organizations do not care if one day shows 6 hours and another day shows 12, they simply look at the total weekly hours. Other organizations drill into the daily view and ensure resources have 8 hours a day.

As you might realize, working with information drilled into the daily view will require you to manage tasks on a daily basis, while working with information on a weekly view only requires you to manage tasks on a weekly basis. This also drives the accuracy of your reports. Management of work on a daily basis gives you accurate reports for each day while management of work on a weekly basis only gives you accurate reports on a weekly basis.

When deciding your usage of project, keep in mind the following:

More Detail = More Work = More Results

Less Detail = Less Work = Less Results

Create a strategy for managing to a specific level of detail and stick with it to be most efficient in Project. For example – do not manage one task on a daily basis and another task on a weekly basis.

Formulate a Strategy

Before a project schedule is created, define what information you are hoping your schedule will return for the work and time you devote to the using the schedule. .

Set your goals for the project schedule:

1. Define the type of information your project schedule should return?
    a. When performing home remodeling you might be interested in when to schedule the contractors.
    b. When developing a software module you might be interested in estimating work hours of resources and costing.
    c. When performing annual maintenance of machinery you might be interested in the timeline and the number of resources needed to accomplish the project.
2. Different projects, by nature, require different levels of detail and tracking. Decide what is right for the project you need to accomplish. The more detail the more complex the schedule will become.
3. What type of metrics (field values ie: work, cost, duration, earned value, etc) will your project management and post-project reporting require?
4. How will you track your project?
5. What are your Stakeholders status reporting expectations? Define at the column level.
6. How much work are you as a project manager willing to do to achieve desired results?

If Project Managers preplan the requirements and the outputs of the project schedule, the schedule will be more productive and result in more valid data.

Project Managers have a tendency to make the project schedule become the project. Preplanning will help project managers avoid this pitfall.

—

Success Checklist

Checklist to help plan a schedule more effectively:

1. **Goals**: Set the output goals of the schedule. Ask yourself: Management of the schedule is useful when I get what type of information from the schedule?
2. **Schedule**: Is the schedule a checklist of activities or is it tasks that will be managed? If it is a checklist, should it be an Excel list? If one task is late, should it change the dates for future related tasks?
3. **Reporting**: Request details of the content of status reporting required for the project from management. This will help in knowing which pieces of information you will need to focus on during schedule creation and management. It will also help set expectations for stakeholders.
4. **Data**: Gather requirements for data reports: by week? by department? by variance to baseline? etc. Some of this information will be standard in Project 2013 and some will be created using customization features.
5. **Tracking**: Are tasks required to be tracked by the number of hours worked per task or is tracking by percent complete sufficient? Defining the tracking of the project will be tied to the type of metrics that the project schedule will produce.
6. **Earned Value (EV)**: if measuring EV is a requirement, more task details, estimating, baseline and tracking details will be required. This will likely result in more work for the project manager. Is help available for managing the project schedule?
7. **Resources**: What kind of reporting requirements will resources be responsible for during the project and how will the data be used. Will resource availability be updated collected and updated to the project schedule?

Defining output requirements of the schedule will in turn define the benefits of creating and maintaining the schedule. Establishing these goals will help the project manager focus on the benefits of the schedule for each specific project.

Project Desktop 2013 Overview of Versions

Microsoft offers three different versions of Project

Project Standard – This is the base scheduling software product which provides functionality that supports a majority of individuals needing a robust schedule tool. Project Standard also provides the following:

- Integration with the Office Store so you can purchase Apps for Project 2013
- Integration with SkyDrive for cloud storage of your project plan

Project Professional – The version offers the same features as Project Standard but provides these additional functions:

- Ability to inactivate tasks for various business scenarios and to support agile project management
- Lync integration (2013 or later) to support team collaboration within Project
- Visual resource management using Team Planner view
- Ability to integrate with SharePoint 2013/SharePoint Online for storing of project plans and task syncing
- Ability to connect to Project Server 2013/Project Online to support an enterprise project and portfolio management system

Project Pro for Office 365 – The version offers the same features as Project Professional but provides these additional functions:

- Delivers the software as a subscription service so it is always up to date with updates to the software being applied on a regular basis through Office 365
- Provides the ability to stream software to up to 5 devices (e.g. home PC, work PC, and tablet) using a connected Office 365 account

Internet access will be required to have access to all of the functions listed above.

For current pricing and a comparison chart of features, visit `www.micro-soft.com/project`.

Review of the Ribbon, Back Stage View, Quick Launch

Can you do a find and replace? Quick Launch is actually called Quick Access toolbar in Project.

To take advantage of Project's many features, you need to be proficient in accessing schedule commands and file commands. In this section, we will review the organization of the Ribbon, the benefits of the Quick Access toolbar, and when to access commands in Backstage view.

Exploring the Ribbon

The Ribbon is the user interface which you will find across Microsoft products. Features are easy to find and there are new features available right at your fingertips. The series of tabs located at the top of the Ribbon represent the different sectors of work, such as resource management or task management. Starting with the Task tab, you will see it is divided into logical sections called groups. The group names are listed just below a collection of buttons. Buttons that are larger indicate a feature that is frequently used. Some of the important advantages to the Ribbon include:

- Everything is organized on tabs by subject area.
- Information on the Format tab automatically responds to the current working environment and provides "view" relevant buttons. Notice the view-specific heading above the Format tab.
- The size of the buttons adjust based on your available window or screen size so you don't lose any capabilities, while maintaining maximum work area screen real estate.
- Features are available in a quick one- or two-click fashion.

• You can tailor the Ribbon by adding and/or removing features or by adding a new tab.

The File tab is unique and will be addressed in the next section.
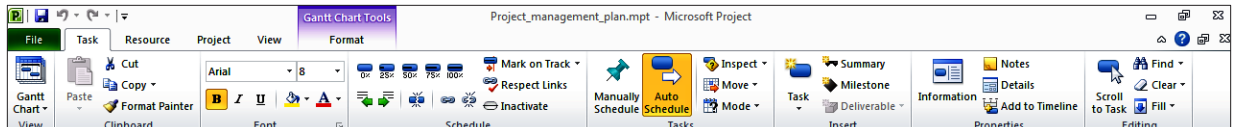
Figure 2-3   Microsoft Project 2013 Ribbon.

The Ribbon can be configured to auto-hide or auto-display giving you valuable screen space as you work on your schedule. To set this, click the "minimize the Ribbon" symbol in the upper right-hand corner of the screen.
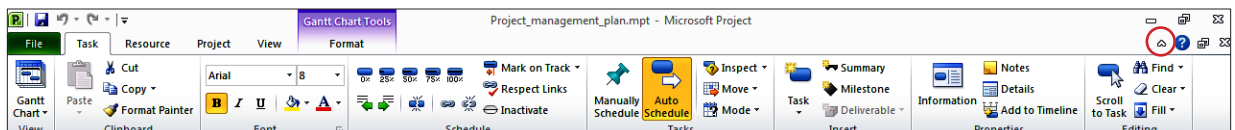
Figure 2-4   Project Ribbon – Expanded.

To disable this feature, click the "Expand the Ribbon" symbol in the upper right-hand corner of the screen.

Figure 2-5   Project Ribbon – Minimized.

Backstage View (File Tab)

To centrally locate file management activities, they are located on the File tab. Think of what you "do to the entire file" when you enter this area. This area is now known as the Backstage View. Some of the features available include:

- New, open, save, print, share and export.
- Connect with SharePoint , Skydrive, Office 365, and Project Server/ Project Online..
- Project Options – aligning options to all new projects or only specific projects.
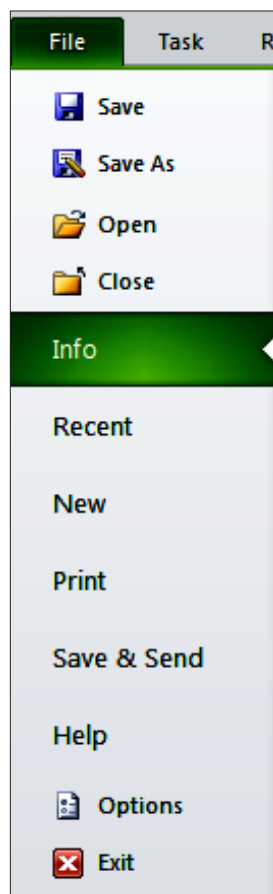
Figure 2-6   Backstage View (File Tab).

To exit Backstage View click the return arrow pointing left at the top of Backstage View.

Overview of Common Views

Project organizes views into two major categories: Task views and Resource views. A task view has a primary focus on showing task information while a resource view has a primary focus on showing resource information. Within those categories may be integrated views that showcase both task and resource information through resource assignments. This section is going to give you an introduction to common views that you should become familiar with to be successful in managing projects.

Task Views

Task views are accessed in a number of ways including through various tabs on the ribbon, through right-click short-cuts and through the view bar. You should find the option that you prefer.

Project lists 11 popular task views: Calendar, Detail Gantt, Gantt Chart, Gantt with Timeline, Milestone Rollup, Network Diagram, Task Form, Task Sheet, Task Usage, Timeline, Timeline, and Tracking Gantt. Some of these will be illustrated below.

To display a task view:

1. Click **Task** tab.
2. Click the drop-down arrow on **Gantt Chart** in the View group.
3. Click the desired view.

Figure 2-7   PLACEHOLDER

Gantt Chart – the Gantt Chart is a graphic representation of the start and finish dates for a task. In addition to graphic bars, relationship arrows are also displayed. The advantage of the Gantt chart is it includes an Entry table on the left for easy data entry and it shows a graphical model on the right of the proposed plan for your project. This is the most popular view in Project.
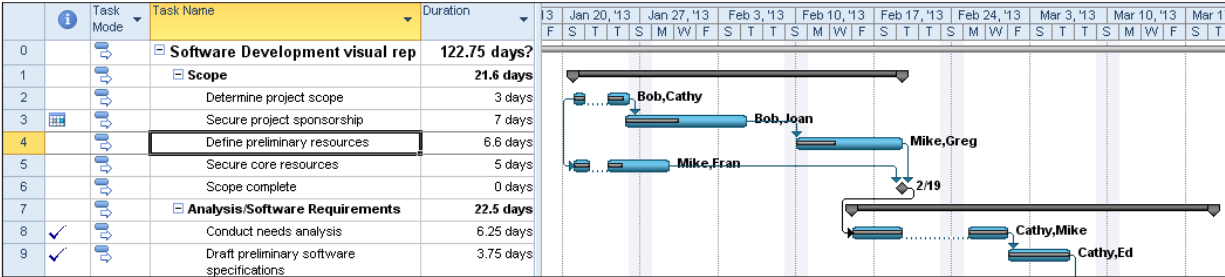
Figure 2-8   PLACEHOLDER

Tracking Gantt – this view will graphically represent the start and finish dates of a task like the Gantt Chart but is designed to help during the tracking phase of the project schedule. The advantage of this view is the variance between the baseline plan and the current plan are show visually.
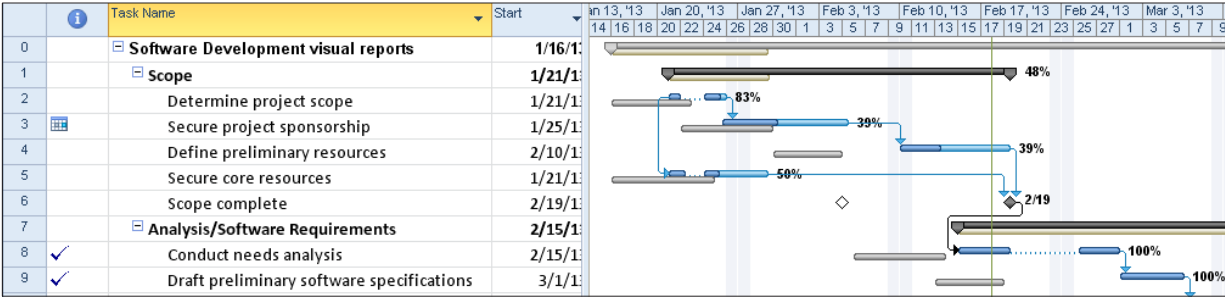
Figure 2-9   PLACEHOLDER

Network Diagram – The Network diagram is designed as a precedence diagram. It shows the predecessors and successors of tasks without regard to timeframe. This view is useful to see the layout of your schedule to and easily follow links.
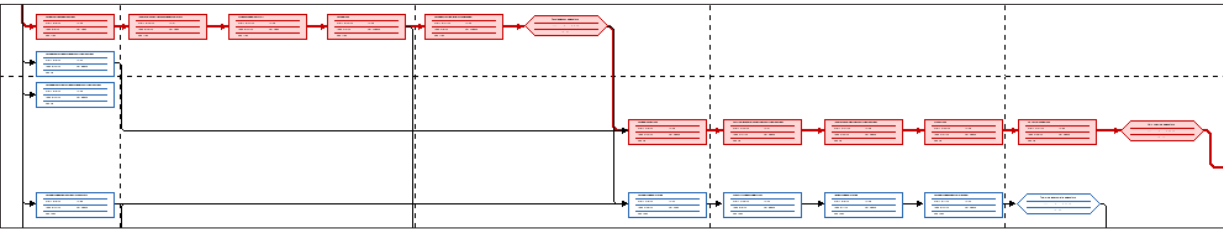
Figure 2-10   PLACEHOLDER

Calendar view – The calendar view shows the project schedule in a calendar layout. This format is useful when presenting to individuals not familiar with how to read a Gantt Chart view.
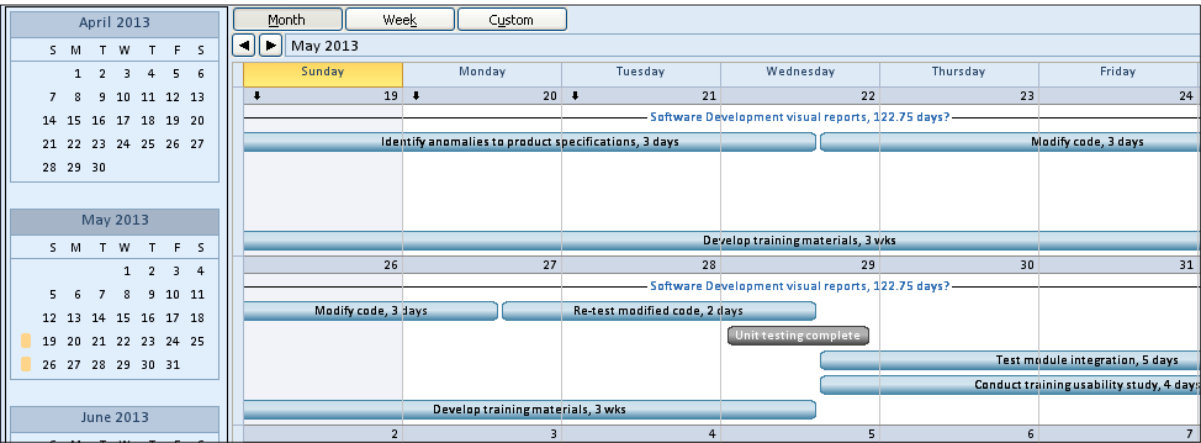
Figure 2-11   PLACEHOLDER

Timeline View – The Timeline View is a very flexible and customizable view. Tasks may be selected to appear on the timeline to give high level reporting capability. In addition, the timeline has the ability to highlight the timeframe it is representing. The Timeline view will be discussed in Chapter 11, *Printing and Reporting*.
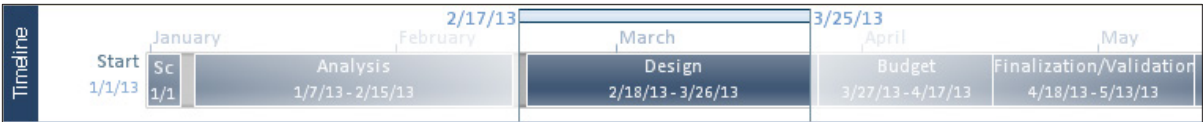
Figure 2-12   PLACEHOLDER

Task Usage – The Task Usage view shows tasks and the resources assigned to the task. The advantage of this view is it includes resource assignments and shows numerically the resource needs to complete each task. Tailoring of this view provides cost or other fields of information.

Figure 2-13   PLACEHOLDER

Resource Views

Resource views are accessed in a number of ways including through various tabs on the ribbon, through right-click short-cuts and through the view bar. You should find the option that you prefer.

Project lists 5 popular resource views: Resource Form, Resource Graph, Resource Sheet, Resource Usage, and Tam Planner Some of these will be illustrated below.

To display a resource view:

1. Click **Task** tab.
2. Click the drop-down arrow on **Gantt Chart** in the View group.
3. Click the desired view.

Figure 2-14   PLACEHOLDER

Resource Sheet – The resource sheet provides the table where resources are added into Project. The advantage of this view is the most popular fields needed to describe a resource are located here.

		Resource Name	Type	Material	Initials	Group	Max.	Std. Rate	Ovt. Rate	Cost/Use	Accrue	Base
1	⬦	**Architecture analyst**	**Work**		**A**		**100%**	**$0.00/hr**	**$0.00/hr**	**$0.00**	**Prorated**	**Standard**
2	⬦	**Project management**	**Work**		**P**		**100%**	**$0.00/hr**	**$0.00/hr**	**$0.00**	**Prorated**	**Standard**
3		Deployment resc	Work		D		100%	$0.00/hr	$0.00/hr	$0.00	Prorated	Standard
4	⬦	**Procurement**	**Work**		**P**		**100%**	**$0.00/hr**	**$0.00/hr**	**$0.00**	**Prorated**	**Standard**
5		Management	Work		M		100%	$0.00/hr	$0.00/hr	$0.00	Prorated	Standard

Figure 2-15   PLACEHOLDER

Resource Graph – The Resource Graph graphically displays information about each resource. The advantage of this view is it can easily identify visually where a resource might be overallocated and by how much based on the length of the bar above the units available line.
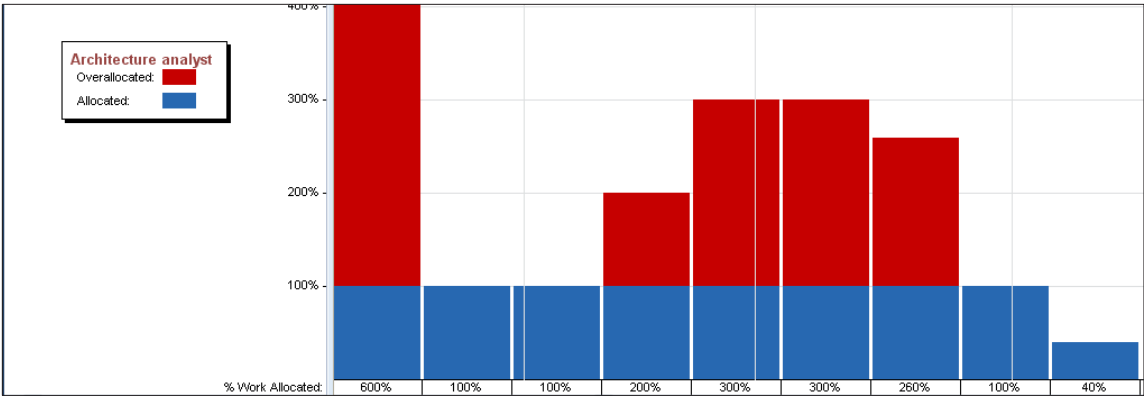
Figure 2-16   PLACEHOLDER

Team Planner – the Team Planner view is a resource focused view that showcases work assignments in a graphical timeline format. The advantage of this view is the focus is on the resource and graphically what work is scheduled at what time.

This feature is only available in Project Professional or Project Pro for Office 365.

Project management			Train deployment resources in depl	Sele ct in	Review deployment team tasks and timeline	Deploy infrastructure co	Test infrastructure co	R e	Obtain feedback	Eval uate	Dete rmin
Deployment resources			Train deployment resources in depl	Sele ct in	Review deployment team tasks and timeline	Deploy infrastructure co	Test infrastructure co	R e	Obtain feedback	Eval uate	

Figure 2-17   PLACEHOLDER

Resource Usage– The Resource Usage view shows every resource on the project and what tasks they have been assigned. The advantage of this view is it shows hours scheduled to accomplish each task. This view is a reversal of Task Usage view. Both of these views are useful in team meetings.

3	⊟ Deployment resources	Work	40h	40h	36h	40h	40h	32h	40h	40h	40h	40h	40h	18h
		Rem. Avail.	0h	0h	4h	0h	0h	8h	0h	0h	0h	0h	0h	22h
	Develop detailed implementation strategy	Work	40h											
		Rem. Avail.												
	Validate implementation strategy in test environment	Work		24h										
		Rem. Avail.												
	Review implementation strategy noting other initiatives	Work		16h										
		Rem. Avail.												

Figure 2-18   PLACEHOLDER

Popular View Adjustments and Navigation

The most proficient schedulers and project managers jump through schedules very quickly to access the information they need. In this section, we will explore shortcuts to change the level of detail, display additional fields of information, jump quickly throughout Gantt chart view and shortcuts to locate a task.

Zooming In and Out

Zooming in or out is the way to adjust the bar chart or time scale portion of a view to show more or less detail. For example, you can display Gantt bars across a daily time scale or across a quarterly time scale.

Two popular methods for zooming in and out are using the Zoom Slider and the Zoom options on the View tab. The Zoom Slider is recommended since that option is always displayed even when you navigate to another view.

- You can click the minus and plus buttons to zoom out and zoom in.
- You can drag the zoom indicator in between the zoom out and zoom in buttons.

Figure 2-19   Zoom Slider.

Hide or Insert a Column

When you hide a column in Project 2013, the column is only removed from view, not deleted from your plan. Keep in mind that hiding a column doesn't remove any information from your plan.

Hide a Column

To hide a column from a sheet view:

1. In a sheet view, select the column you want to hide by clicking its title.
2. This displays the **Gantt Chart Tools** tab with the **Format** tab underneath in the Ribbon.
3. Click the **Format** tab.
4. Click the drop-down arrow on **Column Settings** in the Columns group.
5. Click **Hide Column**.

> You can also press the `delete` key on your keyboard.

Figure 2-20   Hide or Remove Column Icons.
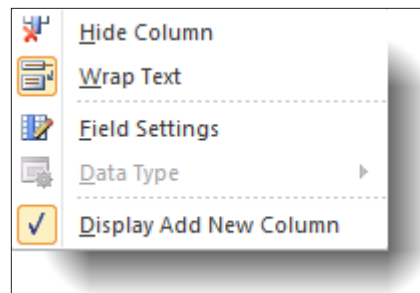
Figure 2-21   Column Settings Dropdown Menu.

Insert a Column

To insert or add a column:

1. In a sheet view, select the column to the right of where you want to insert the column.
2. This displays the **Gantt Chart Tools** tab with the **Format** tab underneath in the Ribbon.
3. Click the **Format** tab.
4. Click **Insert Column** in the Columns group.
5. A new blank column is displayed to the left of the column that you had selected. Click the dropdown arrow in the title box to specify the type of information from the list of possible column types (or fields) that the column will contain.
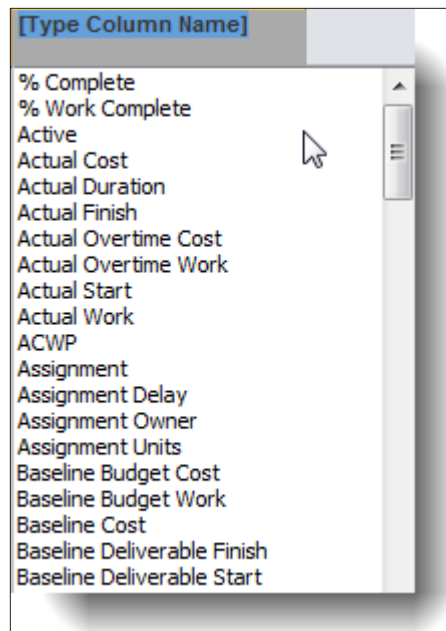
Figure 2-22   Add New Column.

Also at the end of every table in a Sheet view (the far right) there is an **Add New Column** option available.

Figure 2-23   Add New Column in View.

To unhide a previously hidden column, insert the column as you would with any new column.

Using the Scroll to Task Button

The Scroll to Task is a shortcut feature to bring information to you quickly. It is useful in views like Gantt Chart, Task Usage, and Resource Usage where there is a table of information on the left and an associated timescale of information on the right. The main advantage of this feature is to reduce time spent scrolling or looking for information.

To use Scroll to Task:

1. Click the task name or row ID number.
2. Click the **Task** tab.
3. Click **Scroll to Task** in the Editing group.
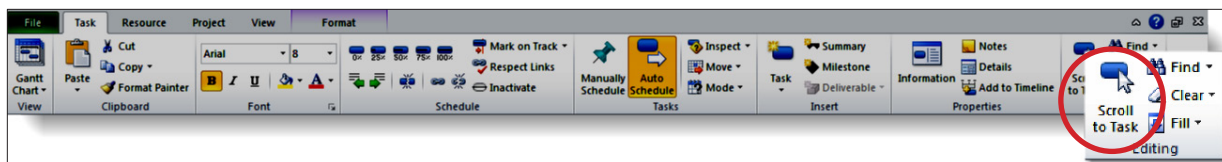
Figure 2-24   Scroll to Task Icon.

Project displays the date or dates where the selected task occurs on the timeline.

Go To and Find

As schedules begin to get larger, it is useful to have shortcuts to navigate through the information. In this topic, we will illustrate the advantages of Go To and Find within Gantt Chart view.

To Go To information:

1. Press the **F5** key or `Ctrl+G`.
2. In the Go To dialog box, enter a row ID number or choose or enter the date and click **OK**.

To Find information:

1. Click the **Task** tab.
2. Click **Find** in the Editing group.
3. In the **Find** dialog box, enter or set the desired options and click **Find Next**.

Keyboard Shortcuts

Key Tips allow you to use your keyboard to navigate through the Quick Access Toolbar and the Ribbon. To turn on Key Tips, simply tap the `Alt` key. You can also press `F10` twice. Follow the letters and numbers that are displayed to use the function you desire.

You can also use keyboard shortcuts to navigate through your project. The following table lists keys that are useful when navigating within views and windows.

Table 2.1   Key Tips and Keyboard Shortcuts

Key Tips & Shortcut	Outcome
`Tab`	Move right one field in an Entry table or dialog box.
`Shift+Tab`	Moves left one field in an Entry table or dialog box.
`Home`	Moves to the beginning of a row or field of information.
`End`	Moves to the end of a row or field of information.
`Page Up`	Moves up one screen.
`Page Down`	Moves down one screen.
`Alt + Page Up / Alt + Page Down`	Moves left or right one screen on the time scale.

Table 2.1   Key Tips and Keyboard Shortcuts

Key Tips & Shortcut	Outcome
`Alt +` ⇐ `/ Alt +` ⇒	Moves the time scale one unit left or right (as defined by the bottom time scale tier).
`Alt + Home`	Moves to the project start date in the bar chart.
`Alt + End`	Moves to the project finish date in the bar chart.
`Ctrl + Home`	Moves to the first field in the first row of the Entry table or the same location in any other sheet view.
`Ctrl + End, Home`	Moves to the first field in the last row of the Entry table or the same location in any other sheet view.
`Ctrl +` ⇧	Moves to the First Row.
`Ctrl +` ⇩	Moves to the Last Row.
`F1`	Turns on Project Help.
`F2`	Activates in-cell editing for the selected field.
`F3`	Displays all tasks or resources when a prior filter was applied.
`F5`	Goes to a specific row ID number or a date on the time scale.
`F6`	Activates the other pane in a combination or dual-pane view.

Table 2.1   Key Tips and Keyboard Shortcuts

Key Tips & Shortcut	Outcome
`F10`	Press twice to turns on Key Tips. You can also tap the `Alt` key.
`Ctrl + Shift + F5`	Displays the Gantt bar for the selected task.
`Ctrl + F4`	Closes the Project window.
`Ctrl + F5`	Changes the Gantt Chart view from maximized to previous size (i.e., view window is separated from Project window).
`Ctrl + F10`	Maximizes the Gantt Chart view and combines it with the Project window.
`Ctrl + F9`	Allows you to turn on and off Auto Calculate.
`Ctrl + F6`	Displays the next open Project window.
`Ctrl + Shift + F6`	Displays the previous open Project window.
`Alt + Spacebar / Alt + Hyphen`	Displays the application control menu.
`Insert`	When the Task ID is selected, a new blank row is added in the Entry table.
`Delete`	When the Task ID is selected, a row is deleted from the Entry table.
`Alt + F3`	Displays the Field Settings dialog box for the active column.

Table 2.1 Key Tips and Keyboard Shortcuts

Key Tips & Shortcut	Outcome
`Alt + F4`	Closes Project.
`Shift + F2`	Displays Task Information in Gantt Chart view. Displays Resource Information in Resource Sheet view.
`Shift + F3`	Sorts by ID number.
`Shift + F6`	Enables the horizontal and vertical split bars in Gantt Chart view.
`Shift + F11 / Alt + Shift + F1`	Creates a new version of your schedule (e.g., Project: 2).

Help

Within Project, there are easy options to get help on features and functions. The default setting of the Ribbon provides detailed feature descriptions when you pause on a button. Should you need more assistance, a detailed help search is recommended.

The detailed help feature automatically assumes you are connected online, but you have the option to switch it to search on your computer only.

Navigation through help is just like a website and you will notice the home button, back button, and hyperlinks as being familiar to you.

To access Help

1. Press the **F1** key or click the help icon in the top right-corner (question mark).
2. Click the drop-down arrow on **Project Help** and choose the desired help option (online or not).
3. Enter the terms you want to search on in the text box and press the **Enter** key or magnifier icon

Chapter 6

Constraints and Deadlines

Constraints

As discussed throughout this book, you should take advantage of Project's scheduling features to illustrate schedules that are dynamic and forecast results. However, most organizations want to include restrictions to the schedule that are due to sponsor needs. In this section we will illustrate the occasional need to include a constraint and the benefits and disadvantage f this feature.

What are Constraints?

Constraints are defined as conditions upon which a project must be managed against which can negatively affect budget, quality, schedule and scope.

Some typical constraints might include a lack of:

- Money
- Skilled resources
- Requirements for the project
- Equipment
- Management support
- Time

Even though the above constraints are important to the success of a project, Project 2013 cannot account for these constraints. However, the constraints Project 2013 can help you with are dates.

Tasks may require a target date or start at a specific date, end at a specific date, or require scheduling at the beginning or ending of a timeframe.

Date constraints can be used to refine the project schedule when greater control is needed for specific tasks start or finish dates. Using date constraints, however, will also remove flexibility from the schedule. It is for this reason that the use of constraints be kept to a minimum. Some of the date constraints are more flexiable than others available. The flexible constraints will be the most beneficial during scheduling.

> Manual Scheduled tasks can not use contraints. They are used for Auto Scheduled tasks only.

Constraint Types

Constraints are used when a task must be scheduled with a specific date in mind or within a specific time period. When setting constraints, the following pieces of information must be known:

- Constraint type
- Date for the constraint

There are 8 constraint types available in the Project 2013 and all are date dependent:

1. **As Soon As Possible (ASAP)** - default constraint applied to all tasks when a project is scheduled from the project start date. Tasks will be scheduled as early as possible within a timeframe.
2. **As Late As Possible (ALAP)** - default constraint applied to tasks when a project is scheduled from the finish date of the project. Tasks will be scheduled as late as possible within a timeframe.
3. **Finish No Earlier Than (FNET)** - applied to a task that must finish no earlier than a specified date. The constraint date will be applied to the finish date of the task and the task will move forward in time to the date specified for this constraint.
4. **Finish No Later Than (FNLT)** - applied to a task that must finish no later than a specified date. During tracking, tasks will move forward in

the schedule. Tasks with Finish No Later Than constraints will move forward and stop at the constraint date.

5. **Start No Earlier Than (SNET)** - applied to a task that must start no earlier than a specified date. The constraint date will be applied to the start date of the task and the task will move forward in time to the date specified for this constraint.
6. **Start No Later Than (SNLT)** - applied to a task that must be started by a specified date. During tracking, tasks will move forward in the schedule. Tasks with a Start No Later Than constraints will move forward and stop at the constraint date.
7. **Must Start On** – applied when a task has a hard start date. The task will move to the constraint date and is fixed on that date.
8. **Must Finish On** - applied when a task has a hard finish date. The task will move to the constraint date and is fixed on that date.

To Add a Task Constraint

Method 1

1. Double-click any cell in the desired task row to launch Task Information.
2. Click the **Advanced** tab
3. In the **Constraint type** drop-down list, choose the desired constraint
4. In the **Constraint date** field, enter or choose the desired date (optional)
5. Click **OK**

If the planning wizard appears because you are creating a constraint on a task with a link to another task, you must select: **Continue. A XX constraint will be set**. Any of the other choices will alter or cancel the constraint type you selected.

To Remove a Task Constraint

Method 1

1. Double-click any cell in the desired task row to launch Task Information.
2. Click the **Advanced** tab
3. In the **Constraint type** drop-down list, choose **As Soon As Possible**
4. Click **OK**

> The Constraint date will be automatically cleared.

> As Soon As Possible is for schedules calculated from a Project Start Date.

Method 2

1. Highlight cell with either the Start or Finish date
2. Press the **Delete** key

> This method is typically used when you accidentally enter in the Start or Finish fields

> If you do not have a predecessor link to a task and remove a constraint, the task simply moves to the start of the project and you may lose information related to the desired date for the task. Be sure to create the appropriate links first.

Avoiding Accidental Constraints

The project manager creates constraints when entering a constraint type and date for a task. Constraints can be created in other ways as well, often accidentally.

The most common mistake made in Project is entering dates on auto-scheduled tasks directly in the Entry table portion of the view so that task constraints are created. Unnecessary constraints make it extremely difficult to manage project schedules, and track and update activities within your project.

Constraints on auto-scheduled tasks are set when you do any of the following:

- Enter or select from the date picker pop-up a Start Date directly in the Entry table.
- Enter or select from the date picker pop-up a Finish Date directly in the Entry table.
- Drag a Task Bar in the bar chart left or right.

By setting constraints, you effectively lock those tasks from moving in the future. As your project progress has an ebb and flow of activity that takes the timeline forward or backward, these tasks will remain unmoved and unmovable, and will tend to bring up error messages.

> If a Start date is entered for an Automatically scheduled task, a **Start No Earlier Than** constraint will be applied to the task. If a finish date is entered a **Finish No Earlier Than** constraint will be applied.

When working with constraints you may be prompted with a Planning Wizard message. These messages are optional can be turned off individually or globally as desired.

How to Disable the Planning Wizard Messages

Method 1 – Disable an Individual Message

1. In the Planning Wizard dialog box that appears, click **Don't tell me about this again**.

Method 2 – Disable All Messages

1. Click the **File** tab
2. Click **Options**
3. Click **Advanced** in the Project Options dialog box
4. Uncheck **Advice from Planning Wizard**

> You can use this process to enable groups of messages that you individually disabled.
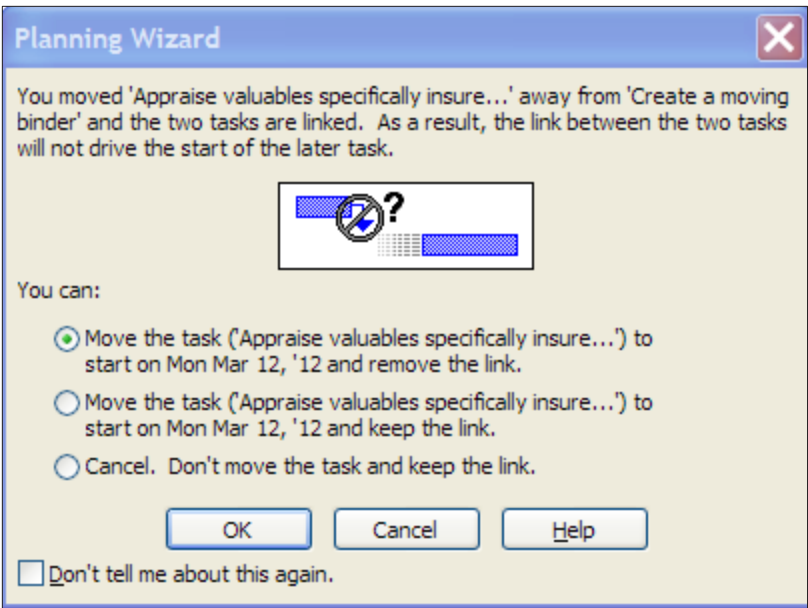
Figure 6-1   PLACEHOLDER

> If Planning Wizard messages are turned off, you will not be alerted to possible scheduling errors that might be created as a result of creating a constraint or other scheduling issues.

You may also notice smart tags appearing in cells as you work with constraints. You may click the drop-down arrow next to the caution indicator to review available options.
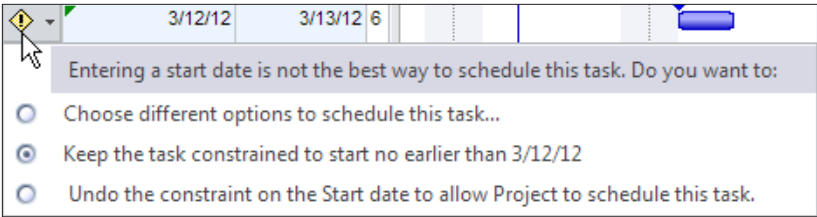
Figure 6-2   PLACEHOLDER

Selecting an option (even the suggested one by Microsoft Project) may alter your previously applied constraint.

If your scheduling style is to enter dates on each task, it is recommended that you use a manual scheduling approach instead of automatic scheduling. This will allow for tasks to be scheduled to the dates entered and will not be subject to the automatic scheduling engine of the software. If a task is scheduled using manual scheduling, the tasks can be changed to automatic scheduling at any time.

Constraints will also be entered as a result of the tracking process which will be discussed in a future module.

Effects of Constraints

Constraints may cause errors in the scheduling of a project that are not readily apparent. Refer to the example below.

		Task Mode	Task Name	Duration	Apr 15, '12
	ⓘ				11 12 13 14 15 16 17 18 19 2
1	📘	⇨	⊟ **Annual Report Preparation**	**68.5 days?**	
2		⇨	⊟ **Perform Initial Planning**	**20 days**	
3		⇨	Review project file/lessons learned from last year's Annual Report process	3 days	
4		⇨	Confirm changes, if any, to financial reporting requirements	3 days	
5	📝	⇨	Identify Annual Report Theme and Section Requirements	5 days	
6		⇨	Confirm other sections to be added or removed	3 days	
7		⇨	Confirm SEC filing and Annual Report Checkpoints	3 days	
8		⇨	Selection of Internal Auditors	3 days	
9	▦	⇨	Initial Planning Complete	0 days	4/16
10		⇨	⊟ **Design Annual Report**	**19 days?**	
11		⇨	Assign resources to preliminary design	3 days	

Figure 6-3   PLACEHOLDER

There is an error in the calculation of the date for the task 9 "Initial Planning Complete". The relationship line after task 8, "Selection of Internal Auditors" flows backwards in time. The reason for this is that task 8 is scheduled to complete on April 17, one day later than the milestone target date of April 16. Tasks that are dependent on task 9 will also be miscalculated.

Monitoring for date calculation errors in your schedule is important.

Constraints should be used sparingly and the reason for a constraint should be document.

If you feel you must use constraints or enter start or finish dates for most of your tasks, manual scheduling might be your scheduling style.

Deadlines

An alternative to a constraint is a deadline which is a great way to include a restriction from the sponsor without changing how the schedule is calculated in Gantt Chart view. Deadlines should be used more frequently than constraints. In this section you will learn how to use deadlines as a warning system for your schedule.

Task Deadlines

Deadlines represent a finish date goal or objective for a task. Using a deadline on a task will still allow it to flow with changes to the schedule and will not restrict its start or finish date like a constraint will.

Use deadlines over constraints to eliminate pop-up error messages when planning or executing your schedule.

A project manager should use deadlines to mark targets in the schedule and to provide simple visual cues when a deadline is missed.

To Set a Task Deadline:

1. Double-click any cell in the desired task row to launch Task Information.
2. Click the **Advanced** tab
3. In the **Deadline field**, choose or enter the desired date
4. Click **OK**

Figure 6-4   PLACEHOLDER

Refer to the following scenarios to further understand deadlines.

A deadline of April 23, 2013 has been assigned to the "Scope Complete" task below. The deadline is represented by the green arrow on the Gantt Chart and does not appear in the Indicator column.
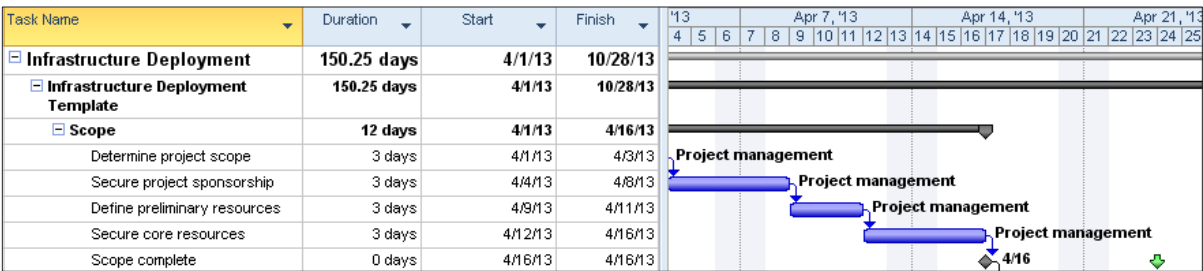
Figure 6-5   PLACEHOLDER

During project execution and tracking of the schedule, tasks will move forward in time. If a task with a deadline moves beyond the deadline arrow, the task will be considered late. Below is an example of the warning that will appear in the Indicator column if a deadline is not met. Notice the red diamond in the indicator column explaining that the task date has exceeded the deadline date.
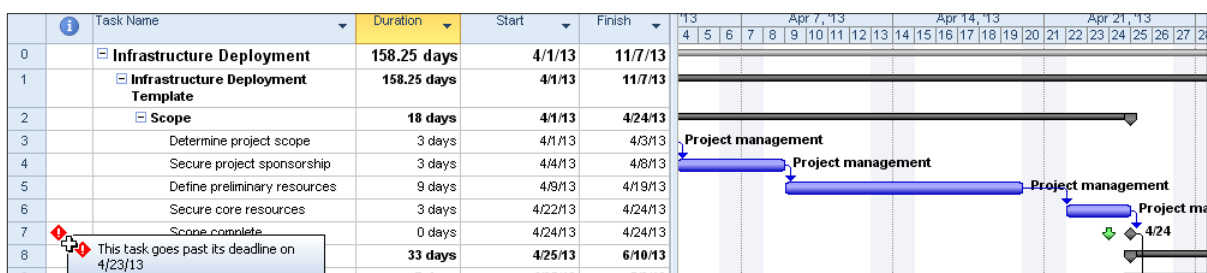
Figure 6-6   PLACEHOLDER

Another indicator to watch would be the Total Slack column. A negative value indicates that tasks are late and have missed or exceeded the dead-line. The negative value indicates how many days the deadline was missed by. It is also an indicator of the amount of recovery time required to get the project back on track.

> The Total Slack field provides information on auto scheduled tasks.
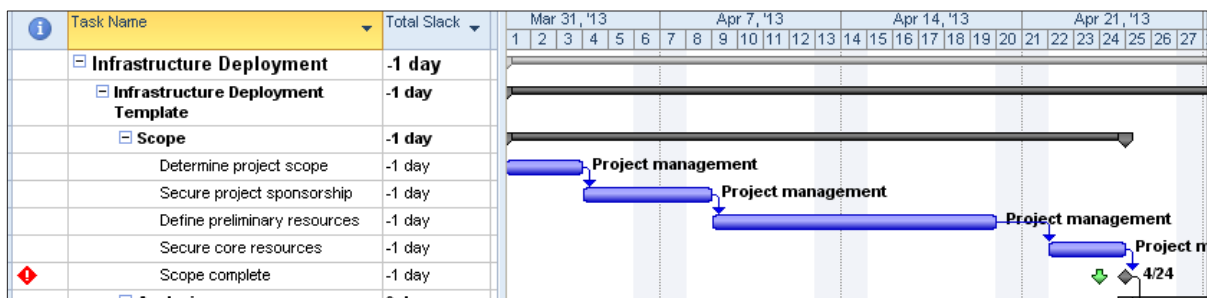
Figure 6-7   PLACEHOLDER

Unlike constraints, do not create date calculation errors in the schedule. Instead, they provide a visual indicator which flags you when deadline targets are missed.

Deadlines can be used in both manual or automatic scheduling mode.

To Remove a Task Deadline

1. Double-click any cell in the desired task row to launch Task Information.
2. Click the **Advanced** tab
3. In the **Deadline field**, select the date and press **Delete**
4. Click **OK**

Substitute deadlines for constraints when possible.

Place deadlines on milestones to help manage short term goals. As long as the deadlines stay on the left side of the milestones, you are doing well.

If a deadline date has been exceeded, check the Total Slack column or indicators column on auto scheduled tasks to see how much time needs to be made up to get back on schedule.

Split Tasks

Project's scheduling flexibility includes an option to divide a task into sections to represent various business scenarios. These sections are called splits. In this section, you will learn how to create a split and when it might be used.

Splitting Tasks

There will be times during project scheduling that will require an interruption of work for a particular task. For example when planning a task, some of the work will occur on Monday and the remainder will occur on Monday the following week. In this situation two tasks could be entered or creating a split task would also work. Split tasks are designed for scheduling tasks that start then stop and start again.

When to use split tasks:

- When the work of a long task is required to work around other tasks. Some of the work would be done before a hard date and the remaining portion of the work would be scheduled after the hard date.
- Splits tasks may be used to help even out the resource work load
- 100% of the work for a task is not required to be performed without interruption and could be broken up over time.

To Split a Task

1. Click the Task tab
2. Click the Split Task icon
3. Position the mouse pointer in the middle of the Gantt bar for the desired task
4. Click and drag to the right until the desired split is achieved

Figure 6-8   PLACEHOLDER

Refer to the following tips and guidelines regarding task splitting.

> Repeat the above steps to create additional splits.

> Both auto and manually scheduled tasks can be split.

- Hover the split task mouse pointer over the Gantt bar of the task to be split.
    The screen below will show the information box that will appear.
- As the mouse pointer is dragged the length of the Gantt bar, the date will change in the box. Clicking the mouse pointer will split the task and leave a gap between tasks.
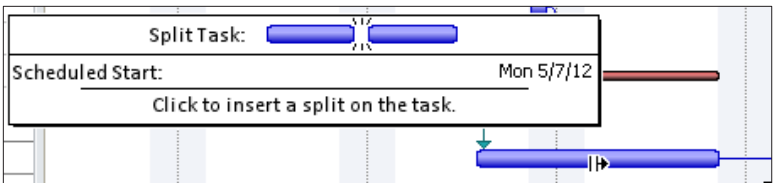
Figure 6-9   PLACEHOLDER

If the schedule has used "day" durations of tasks as the default scheduling increment, the gap in the split task will advance in 1 day increments or 1 week increments if "weeks" was used. A split task is shown in the view below.

⊟ **Notifications**	**2 days**
Notify your employer of your moving dates and new address	1 day
Transfer, sell, or discontinue any memberships	7 days
⊟ **Vital Services and Records**	**2 days**
Organize important records	2 days

Figure 6-10   PLACEHOLDER

The dots between the sections of the task are the split task indicators showing that the task has been split. The individual parts may be dragged back and forth as necessary to achieve timeframes that will work best for the task. Drag the pieces back together will eliminate the split status for the task.

To Unsplit a Task

1. Position the mouse pointer on the left side of a right most bar segment
2. Drag the segment to the left until it connects to the bar segment

> Repeat the above steps to reconnect additional segments if needed.

There are a few rules, however that you should be aware of when working with split tasks:

- When a task is split, it is still one task and will be treated as such.
- Relationships will be applied to the beginning and ending of the entire split tasks only and not to the individual pieces. The individual parts are not separate tasks and cannot have discrete relationships.
- When resources are assigned, the work will be distributed over the total task duration and task as a whole.
- Constraints are applied to the start or the finish of the entire task and cannot be applied to the individual parts.
- The parts of the task may be dragged back together when needed.
- Tasks may be split multiple times.
- Splitting will refine the workload and the duration of the task.

> Hiding bar splits will conceal separations of a task and may create confusion when the task duration does not match the Gantt bar length of the task.

Split bars will occur during the tracking process to represent a task which stopped and restarted or a period of inactivity.

Task Calendar

As discovered earlier in this book, Project uses calendars to schedule a task on the timeline and take into account corporate holidays. In this section, you will learn about another use for calendars to control the scheduling of a specific task.

Applying Task Calendars

There will be times when a task must occur within a unique timeframe and outside of the project calendar parameters. In order to accommodate such instances, users can create a distinctive calendar that can be assigned to a task. In doing so the task will be scheduled in the unique timeframe and not affect the scheduling of the entire project.

Below are some examples of when a task calendar would be used:

- Testing at a bank can only occur after the bank is closed 9pm to 6 am
- A weekend cut over of a software package or upgrade
- Testing of a product that requires a 24/7 test
- A task that must occur on second shift
- Task applied to an resource in an alternate time zone

The first step in using task calendars is creating the calendar using the same process described in Chapter 3, *Start a Project* to create a base calendar. After the calendar is created, it then may be applied to task. There is an option to ignore the resource calendars and allow the scheduling of the resources to be directed by the task calendar for the specific task only.

To Assign a Calendar to a Task

1. Double-click any cell in the desired task row to launch Task Information.
2. Click the **Advanced** tab
3. In the **Calendar** drop-down list, choose the desired calendar
4. If desired, click **Scheduling ignores resource calendars**
5. Click **OK**

Figure 6-11   PLACEHOLDER

A visual indicator will appear in the Indicator column in the Gantt chart view.

Figure 6-12   PLACEHOLDER

> Task calendars may only be applied to automatically scheduled tasks or manually scheduled tasks.

Move Project

When a project's start date needs to be altered, you should determine if there are deadlines in the schedules and if those need to be taken into account. In this section, you will learn about the two techniques to move a project's start date and what to use if your schedule incorporates deadlines.

Moving the Entire Project Timeline

Typically a project start date might change between the time the project is planned and the project actually starts. There are several methods available to change the project start date. It is important that the tasks are re-scheduled to adjust to the new start date.

The easiest way to change the project start date is use the Project Information box. Changing the start date using this method will move all tasks **without entered dates or constraints** to be rescheduled as of the new start date.

To Change the Project Start Date

1. Click the **Project** tab
2. Click **Project Information** in the Properties group
3. In the **Start date** field, enter or choose the desired new date
4. Click **OK**

Figure 6-13   PLACEHOLDER

Changing the project start date will **not** reschedule tasks which have entered dates or constraints. Project 2013 provides a function called **Move Project** which will move **all** of the tasks to the new project start date. When tasks with constraints are moved using this function, the constraint dates will be adjusted based on the new project start date.

For example: if a task has a constraint 3 months from the start date of the project and the project start date is moved 6 months the constraint date will be re-scheduled 3 months from the new project start date.

The **Move Project** function also has an option to move project deadlines. If this option is not selected, the Deadlines will remain at the orignial dates and will need to be udpated manually.

To the project start date and move tasks with dates to a new timeframe:

To Move a Project

1. Click the **Project** tab
2. Click **Move Project** in the Schedule group
3. In the **New project start date** field, enter or choose the desired new date
4. Click **Move deadlines**
5. Click **OK**
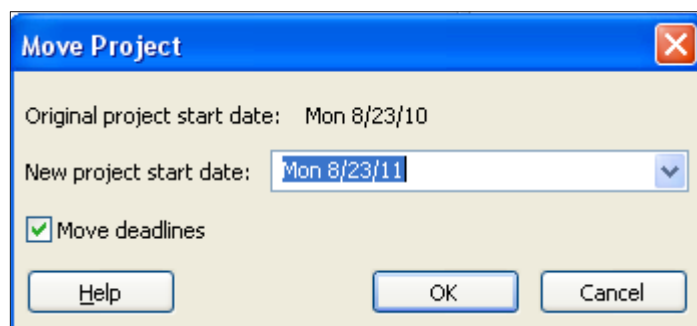
Figure 6-14 PLACEHOLDER

Any task that is not already linked in the schedule will move to the new start date that you enter using either of the methods above.

When you start a project as either a blank schedule or from a template, changing the project start date is recommended as a first step. If your project is fully planned out and has any type of task-related locked dates including deadlines or constraints, moving the project is recommended. This is especially useful when funding for a fully planned project has been delayed.

Task Notes

Providing comments or notes on a task could be a useful way to record business situations or explanatory details in your schedule. In this section, you will learn how experienced schedulers create notes very quickly.

Adding Notes to Tasks

Each task has a freeform notes field. The notes field may contain several types of information such as objects, hyperlinks, bulleted lists, etc. Notes may be printed on reports, exported to Excel and may be used as needed throughout the life of the project schedule.

To Add a Task Note

1. Method 1
    a. Double-click any cell in the desired task row to launch Task Information.
    b. Click the **Notes** tab
    c. Enter the note
    d. Click **OK**
2. Method 2
    a. Select any cell in the desired task row
    b. Click the **Task** tab
    c. Click **Task Notes** in the Properties group
    d. Enter the note
    e. Click **OK**
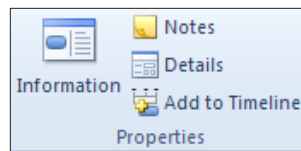
Figure 6-15 PLACEHOLDER

The notes view for a task is shown below:
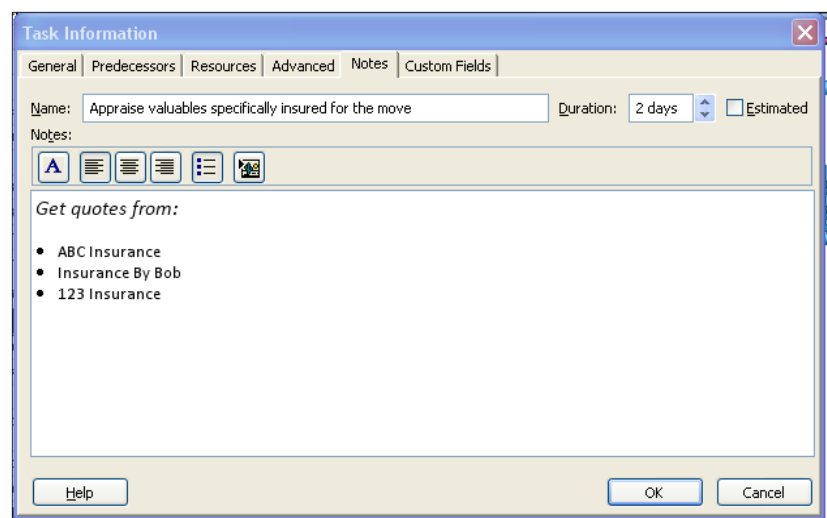
Figure 6-16 PLACEHOLDER

The Indicator column provides a visual indicator that a task note exists. Hovering the pointer over the icon will display the note preview to give the reader an idea of its content.
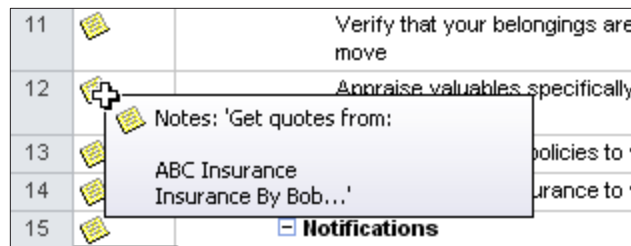
Figure 6-17 PLACEHOLDER

Notes can be invaluable and should be used during the planning and execution of the project. After the project is completed and a post-project review is conducted, task note information will help in recalling details of what occurred during the performance of tasks.

Lengthy task notes might be better suited for storage in an external document that is hyperlinked to your schedule.

Chapter 7

Resources

Work, Material, Cost: Resource Types

Resources are an important part of a planned schedule. Project 2013 has the ability to offer multiple types of resources to help accomplish the work of a project. The different types of resources are intended to provide flexibility to address most types of resources required during the planning and management of a project.

In this chapter we will discuss the resource types and their intended use:

1. Work resources
2. Cost resources
3. Materials resources

Work Resources

Assigning work resources to a project will allow for resource requirement forcasting and project scheduling based on resource availability. Work resources are usually human resources but can also be facilities, equipment rental and other types of resources. Work resources are given an hourly rate. Resource costs can be forecasted using resource assignments to provide projected project budgets.

Effective uses of Work Resources are:

- Individual people – actual named resources
- Generic resources – these are job titles that can be used as placeholders to identify resources by skill type, skill level or if a resource is unknown. For example: DBA, Developer Level 1, Event Planner, Plumber

- Consolidated resources – used to state the quantity of a specific type of resource. For example: Helpdesk, Movers, Painters, Attendees, Members
- Facilities – a room or area that must be reserved for a period of time
- Contracted resources – external contracted labor
- Equipment – a machine that is priced by the hour

Cost Resources

Cost Resources are defined as a type of cost that occurs one or more times during the project but has a variable amount. Use of Cost resources enables the scheduler to add estimated costs during the planning phase of the project and the ability to categorize these costs. These costs will be updated into the baseline. When actual costs become available during tracking, the actual costs will be updated and compared against the original estimates to provide a variance.

Cost resources will inherently increase the cost for a task and for the project. Cost resources have no effect on work or duration. The cost amount is applied to tasks as a flat amount at the time of assigning the cost resource to a task.

Effective uses of Cost resources are:

- Travel expenses estimated in advance
- Meal expenses estimated In advance
- Expenses for something used on the project that has a varying value each time it is used, such as a permit or license renewal

Project allows for as many cost resources as needed but for simplicity try to consolidate cost resources and keep them to a limited number. The type of reporting required for the project would drive the quantity of cost resources that will be needed.

If your project includes fixed price contracts and you would like to include those on the project, you may want to consider assigning the vendor as a cost resource to a task and entering the value of the contract. If it you do not need to incorporate the vendor name, you should probbly use the Fixed Cost field to record the value.

Material Resources

Material resources are defined as consumables. For example: Reference books for a new product might cost $50 each and 20 books are needed. A material resource would be created with a cost of $50 per book. An assignment would be entered for a task for 20 books. As a result $1,000 is added to the cost of the project. During tracking, the actual cost of the books purchased would be provided.

The cost of the material resources are added to the total cost of the project and updated into the project baseline. Material resources do not affect work or duration.

Effective uses of Material resources are:

- Construction: create a material resource for the cost of 1 foot of trim. Enter the number of feet required for the task
- Conference: create a material resource for the cost of giveaway bags. Enter the number of giveaway bags needed for the conference

If your project will be using a large quantity of materials such as a construction project, using Excel might be less work and a more effective means of keeping track of materials.

All resource and fixed costs are summed into the Cost field which becomes the planned budget for the project and is captured in the baseline cost.

Resource Sheet

The Resource Sheet is where all resource records are stored. Work and material resources store their costs on the resource sheet; while cost resources have a unique cost added each time they are assigned to a task.

> The quantity of a resource is determined when the resource is assigned to the task. For example, the number of hours a work resource will be needed comes from the task estimate. The number of units of a material resource is modified when the resource is assigned to the task. Normally a cost resource is always assigned at one unit on a task.

To display the Resource Sheet:

1. Click the **Task** tab
2. Click the drop-down arrow on **Gantt Chart** in the **View** group
3. Click **Resource Sheet**

The default table of the Resource Sheet is called the entry table which is shown below. This table is a subset of many of the resource fields of information that are available. This table represents the most common fields that are needed for a resource. More information is accessible through the Resource Information dialog box which will be discussed later in this chapter.

ⓘ	Resource Name ▼	Type ▼	Material ▼	Initials ▼	Group ▼	Max. ▼	Std. Rate ▼	Ovt. Rate ▼	Cost/Use ▼	Accrue ▼	Base ▼

Figure 7-1   PLACEHOLDER

To enter a resource, type the resource name in the "Resource Name" field. The Resource Name is the key field for the resource data.

Project does not allow commas in the resource name field.

Many reports and assignment views will display resources in alphabetical order. A standard of last name first name allows for easy location of resources while making assignments.

After the resource name is entered, several fields will be populated with default information.

Change the resource type before entering any information to enable/disable the appropriate fields on the resource sheet.

		Resource Name	▼	Type	▼	Material	▼	Initials	▼	Group	▼	Max.	▼	Std. Rate	▼	Ovt. Rate	▼	Cost/Use	▼	Accrue At ▼	Base Calendar ▼	Code
1		Smith Robert		Work	▼			S				100%		$0.00/hr		$0.00/hr		$0.00		Prorated	Standard	

Figure 7-2   PLACEHOLDER

Descriptions of the fields on the resource sheet are provided below:

Type: Work is the default and will establish the value entered in the resource name field as a work resource. Other values are material and cost and can be changed by clicking the drop down arrow and changing the type selection.

Material: Used for Material resources only – skip for work and cost resources.

Initials: If desired, enter initials for resources. Initials may be substituted on Gantt Charts or reports as needed to shorten reports.

Group: Group is an optional field which supports the entry of numbers and text. It is usually used for department, location or skill set. This information is used to generate reports by groupings of resources.

Organizations should set a standard for the use of this field to help schedulers work with different projects more effectively.

Max units: The Max units' value is an indicator of the quantity of a resource that is available. For work resources you should enter the value for the resource on the project. The default value is 100%. When entering a group resource such as the number of people on the Helpdesk, enter the number of resources in the group. Each resource represents 1 unit. For example if there are 5 people on the Helpdesk, enter 500% in the Max Units column. For material resources, this field is unavailable since the assumption is you can purchase more materials, For cost resources, this field is also unavailable since you manually provide a cost, no calculation is needed with units. The value shown above is in the default percentage format but can also be viewed as a decimal value.

The default value for max units is a percentage format, but can also be displayed In a decimal format as desired.

Standard rate: Enter the desired rate for the resource that you want to have used in calculations.

Overtime rate: Enter an overtime rate for the resource. Keep in mind, it will affect only overtime hours entered.

If your overtime rate is a value calculated against the standard rate (e.g. time and 1/2), you need to figure out the calculation and enter the grand total in the overtime rate. Project with use the overtime rate value in place of the standard rate value not in addition to.

Cost per use: An extra value that may be added to a task over and above the Standard Rate for the resource. For example: A repairman is called to fix a refrigerator. The repairman charges a transportation charge, and hourly rate, plus parts. The cost per use is the transportation charge and

would be applied to every task the repairman would be assigned to.

Accrue at: Cost accrual is an indicator of a point in time when costs are incurred. Cost accrual settings have 3 options: incur costs at the start of the task, incur costs at the end of the task, or incur costs throughout the task (prorated). Prorated accrual is the default option.

Base calendar: Each work resource will have a resource calendar associated with it. The resource calendar is based on calendars that have been previously established for the project. The Standard Calendar is the default resource Base Calendar. If the base calendar contains company non-working time it is not necessary to reestablish company holidays, statutory holidays, etc. as all of these will be applied to the resources. Use the dropdown list to select the appropriate calendar for a resource.

Code: This field is available for additional information about a resource that you might want to track such as a cost center or department code.

The Resource Information dialog box is used to record information about a resource that is not captured in the Resource Sheet.

To view Resource Information dialog box:

1. Click the **Resource** tab
2. Click **Information** in the View group

An alternate method is to right-click the resource name and click Information. You can also double-click some empty white space next to a resource name to open the same dialog box.

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Figure 7-3   PLACEHOLDER

General tab data:

Email: optional

Logon Account: optional

Booking Type, Default Assignment Owner, Inactive: Project Server only

Generic: Optional. Select this option to indicate that the resource is a generic resource. A generic resource is a skill or role type resource to be used as a holding value until a human resource is assigned. When generic resources are used, the default base calendar is used for scheduling.

Budget: An attribute applied to a resource to limit it to project-level budgeted.

This feature is discussed in <ADVANCED BOOK TITLE>.

Resource availability: Enter dates if the resource is only available for a particular period of time or has limited availability for a particular period of time. For example: An outside contractor is hired for a specific length of time. Enter the date ranges the resource will be available.

Calendar

Change Working Time button:

Use this option to create a specific calendar exception for a resource. This could incorporate vacation time or alternate working hours.

This dialog box is identical to the one used to change project and base calendars discussed in an earlier chapter. The calendar displayed automatically includes the settings based on the calendar you selected for the resource base calendar. This saves time since corporate exceptions are already included. Changes to this calendar are made in the same way that changes were made to the project calendar.

Click **OK** to save changes and return to the Resource Information dialog box.

Figure 7-4   PLACEHOLDER

Cost tab data:

This tab is reserved for recording increases to costs of resources.

Most organizations using costing experience periodic rate changes. The effective date allows early storage of future rate adjustments that become active based on a cut off date. If a project spans the cut off date, the tasks before the cut off date of the project will be costed at the earlier date rate and the remaining tasks which exceed the cut off date will contain increased rate. It is easy to see that if a project runs late, the cost of the project will increase when resource rates increase.

Figure 7-5   PLACEHOLDER

Notes tab data:

Resource notes are treated the same as task notes within Project 2013. Resource note data has the same formatting and flexibility as task notes.
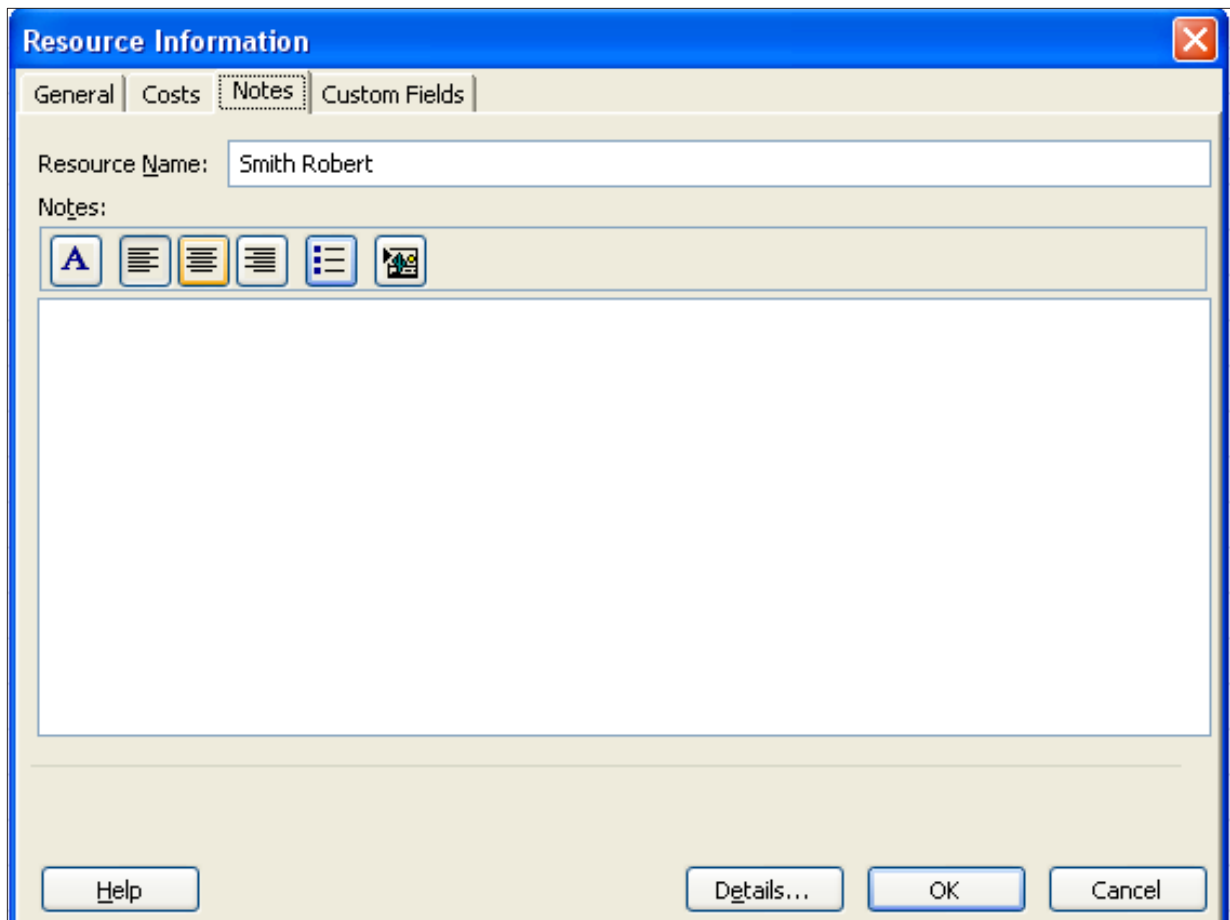
Figure 7-6   PLACEHOLDER

Custom Fields tab data:

This tab is reserved for Project Server or other applications that integrate with Project.
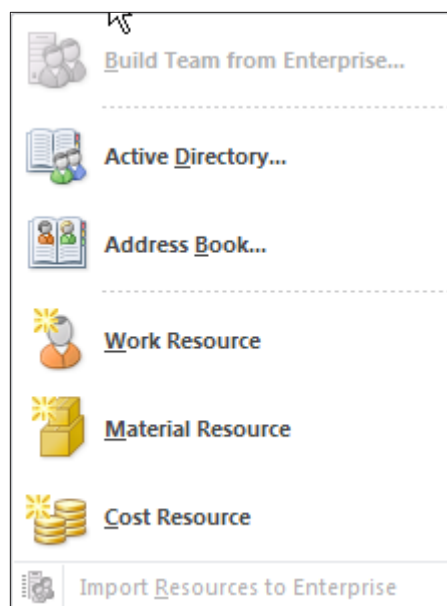
Figure 7-7   PLACEHOLDER

Material Resources

Material resources are supplies to be used by the project, such as paint, building materials, equipment, etc. Material resources are valued based on the quantity of material to be used which is assigned to a task.

Below are the fields associated with Material resources.

Resource name: name of the consumable item

Type: Material

Material label: boxes, gallons, feet, each – the label that describes the material

Standard rate: the per unit/each price

Resource Name ▼	Type ▼	Material ▼	Initials ▼	Group ▼	Max. ▼	Std. Rate ▼	Ovt. Rate ▼	Cost/Use ▼	Accrue At ▼
Smith Robert	Work		RS		100%	$100.00/hr	$0.00/hr	$0.00	Prorated
Paint	Material	gallons	P			$25.00		$0.00	End
PC's	Material	desktops	PC			$2,000.00		$0.00	Prorated
Boxes	Material	each	B			$10.00		$0.00	Prorated

Figure 7-8　PLACEHOLDER

Cost Resource: Lite

Cost resources are used to apply estimated costs specific tasks in a project. Estimated costs are entered during the planning stage and tracked when actual costs are entered during the execution or control stage of the project.

To enter a cost resource:

Resource name: For example: Cost travel, Cost food, Cost room rental, etc.

Type: Cost

No other information is required. The amount of the cost will be added at the time the assignment is created.

> When naming cost resources include "Cost" as the first word in the name. It will be helpful when assigning cost resources for the name to give an indication of the resource type. Resources appear in alphabetical order when creating assignments and including "Cost" as the first word ensures all Cost resources will be grouped together in the list.

	ⓘ	Resource Name ▼	Type ▼	Material ▼	Initials ▼	Group ▼	Max. ▼	Std. Rate ▼	Ovt. Rate ▼	Cost/Use ▼	Accrue At ▼	Base Calendar ▼
1		Smith Robert	Work		RS		100%	$100.00/hr	$0.00/hr	$0.00	Prorated	Standard
2		Paint	Material	gallons	P			$25.00		$0.00	End	
3		PC's	Material	desktops	PC			$2,000.00		$0.00	Prorated	
4		Boxes	Material	each	B			$10.00		$0.00	Prorated	
5		Cost travel	Cost		C						Prorated	
6		Cost food	Cost		C						Prorated	
7		Cost room rental	Cost		C						Prorated	

Figure 7-9   PLACEHOLDER

Note to Cindy – find assignment information.

Chapter 8
Work Assignments

What is an Assignment?

The "what" of the project are the tasks which represent what work needs to be accomplished. The resources are the "who" or who will perform the work. The assignment is applying the resource to the task to create the "when" and for "how much " (cost and time). How the assignment is created will result in different outcomes for the values in the assignment. The values used in creating the assignment will drive the result for the duration, work and quantity of the resource assigned to the task. In this chapter, we will discuss techniques you can apply to generate the desired calculation result.

Review of Task Types and Effort-Driven Scheduling

Understanding task types and effort-driven settings are essential to understanding how Project performs calculations. Earlier we discussed what these terms mean and it would be helpful to review them before we create work assignments.

Effort-driven: A task set to effort driven means resources are able to work together on a task and therefore hours should be divided across the resources. Effort-driven can be turned on or off with Fixed Duration and Fixed Units tasks.

Project 2013 allows for 3 task types for scheduling:

- **Fixed Duration**: A fixed duration task is a task created with a fixed length of time.

- **Fixed Units**: Fixed Units is the quantity of resource assigned to a task and is the default task type. The quantity can be expressed in hours or a percentage of a whole resource.
- **Fixed Work**: The work of the task is fixed. Fixed work tasks are always effort-driven by default. The more resources assigned to the task, the less time the task will take to be completed because the work is divided over the resources.

When coupled with the effort-driven option, the scheduling engine allows for 5 combinations of task type, effort-driven settings:

- Fixed Duration, Effort-driven on
- Fixed Duration, Effort-driven off
- Fixed Units, Effort-driven on
- Fixed Units, Effort-driven off
- Fixed Work, Effort-driven on

To create effective resource scheduling assignments it is imperative that the task types and effect-driven settings for the tasks are correct. Different settings deliver different results during assignment creation.

Summary tasks are always Fixed Duration and can not be changed.

- Manually scheduled tasks vs. Automatic scheduled tasks:
- The scheduling engine ignores task type and effort-driven flags for manually scheduled tasks. These values apply only to automatically scheduled tasks.

If a task is changed from manual scheduling to automatic scheduling, the task type and effort-driven values become meaningful. The value for these fields will be picked up from the options default settings when the task is entered. These values should be rechecked when switching modes to ensure correctness.

Task Type Scenarios

As discussed in *Scheduling Options* on page 74, Project is set up for planning tasks by duration. This is the reason why there are question mark icons in each duration cell: they are a reminder that you did not enter a value for that task. The question mark symbol goes away after a number is entered. Typically, new and beginning users follow this approach. If a schedule is created that will not use resources, this is also the recommended approach.

This chapter introduces you to creating resources and assigning them to tasks. With the introduction of resources, your task estimating approach becomes important because as soon as a resource is assigned the scheduling engine performs a calculation.

The following scenarios will help you ensure that your preferred approach is applied when resources are assigned.

Scenario 1: Entering a Constant Duration Value

Let's say you would like to enter a duration value that remains constant regardless of the resources that are added or subtracted.

The recommended practice is to estimate the task by entering a duration value, set the task type to Fixed Duration and then assign the resources.

This will cause total work for the task to be calculated.

		Task Name	Duration	Type	Effort Driven
1		Prepare Facilities	1 day?	Fixed Duration	No
2		Begin Registration	5 days	Fixed Duration	No
3					

Figure 8-1   Entry Table with Duration and Optional Fields

The Effort Driven option provides a shortcut to divide the total work for the task across the resources assigned. This is useful for organizations that track costs or track resource assignments in detail.

To follow this approach, insert the Type and Effort Driven columns in the Entry table of Gantt Chart view or display Task Entry view which provides these fields in the lower pane. For more information about modifying views, refer to *Overview of Common Views* on page 18 and *Popular View Adjustments and Navigation* on page 24.

Scenario 2: Entering a Constant Work Value

You also have the choice to enter a total work value for the task that remains constant regardless of the resources that are added or subtracted. This is also called effort-driven estimating.

The recommended practice is to estimate the task by entering a Work value, set the task type to Fixed Work, and then assign the resources.

This will cause total duration for the task to be calculated.

		Task Name		Duration	Work	
	ℹ		▾	▾		▾
1		Prepare Facilities		1 day?	40 hrs	
2						

Figure 8-2   Entry Table with Work Field

To follow this approach, insert the Work column in the Entry table of Gantt Chart view. This is where you will enter your total Work estimate.

Do not enter anything in the Duration field. The Type field is also needed and may be inserted as a column or displayed in Task Entry view.

For more information about modifying views, refer to *Overview of Common Views* on page 18 and *Popular View Adjustments and Navigation* on page 24.

For a more detailed discussion of Task Types, refer to Chapter 3, *Advanced Work with Task Types* in our <ADVANCED BOOK TITLE>.

Techniques to Assign Resources

Project provides multiple techniques to assign resources to tasks. Some methods are very quick, while other methods are more involved. Each method has advantages and disadvantages. You should decide which approach you prefer when making an assignment.

> Task Entry view or a custom Entry table with added columns are preferred when you want to see Duration, Work, Task Type, and Effort Driven fields displayed at the same time.

Assignments Using the Resource Names Column

This technique is the quickest way to make an assignment; however, additional options such as units and work for the resource are not editable.

1. Click the **Task** tab
2. Click **Gantt Chart** in the View group
3. For the desired task, click the drop-down arrow in the Resource Names column and click to assign each desired resource

Assignments Using Task Information

This technique is also a fast way to make an assignment. It is especially useful when working with cost resources so you can enter the value following the assignment.

1. Click the **Task** tab
2. Click **Gantt Chart** in the View group
3. Double-click the desired task
4. Click the Resources tab
5. On a blank row, click the drop-down arrow in the **Resource Name** column and click to assign one resource
6. Modify the values in **Units** or **Cost** if desired
7. Repeat if needed
8. Click **OK**

Assignments Using the Assign Resources Dialog Box

This technique is a good way to make an assignment when you want to assign one resource to multiple tasks or multiple resources to multiple tasks. The dialog box remains open after you complete an assignment to allow you to immediately make an additional assignment. Either a Work or Units value can be manually entered in the Units field if desired when assigning a resource.

1. Click the **Task** tab
2. Click **Gantt Chart** in the View group
3. Click the **Resource** tab
4. Click **Assign Resources** in the Assignments group

5. Highlight the desired tasks, highlight the desired resources and click **Assign**
6. Modify the **Units** value if desired
7. Repeat if needed
8. Click **Close** when done

> Use the Shift key to select adjacent tasks or resources. Use the `Ctrl` key to select non-adjacent tasks or resources.

Assignments Using Task Entry View

This technique is a good way to make an assignment when you want to focus on one task but create one or several resource assignments. It is a useful view because both the Work and Units fields are displayed an editable if desired. This option allows you to make multiple changes before you trigger the recalculation by Project. Notice the `OK` button is shown which indicates Project is waiting for you to finish your edits.

1. Click the **Task** tab
2. Click the drop-down arrow on **Gantt Chart** in the View group
3. Click **More Views**
4. Click **Task Entry** in the Views list
5. Click **Apply**
6. Click the desired task in the upper pane
7. On a blank row, click the drop-down arrow in the **Resource Name** column and click to assign one resource
8. Modify the values in **Units** or **Work** if desired
9. Repeat if needed
10. Click **OK**

> Clicking another task or pressing the `Enter` key twice on the keyboard is the same as clicking the `OK` button.

Fixed Work Assignments

Fixed work tasks are tasks where the value entered in the work column is a fixed value for the task. Duration is always calculated based on the number of resource units assigned to the task and the status of resource availability.

The following examples continue to use the Task entry view with the sub-view Work. In the example below, the automatic scheduled task "Pack the boxes" is estimated at 200 hours of work. It is also a fixed work task which is always effort-driven. Notice that the task duration is 1 day. Since the duration is always calculated for a fixed work task, the value in the duration field is not important.
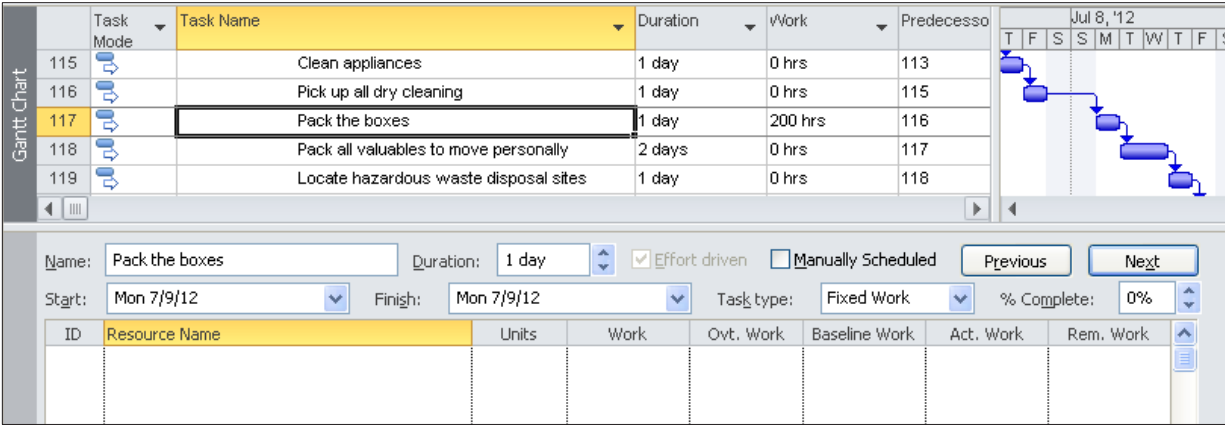
Figure 8-3   PLACEHOLDER

In the example below, 1 resource has been assigned to "Pack the boxes". As a result, Eric will be assigned to work for 25 days at 8 hours a day packing boxes.
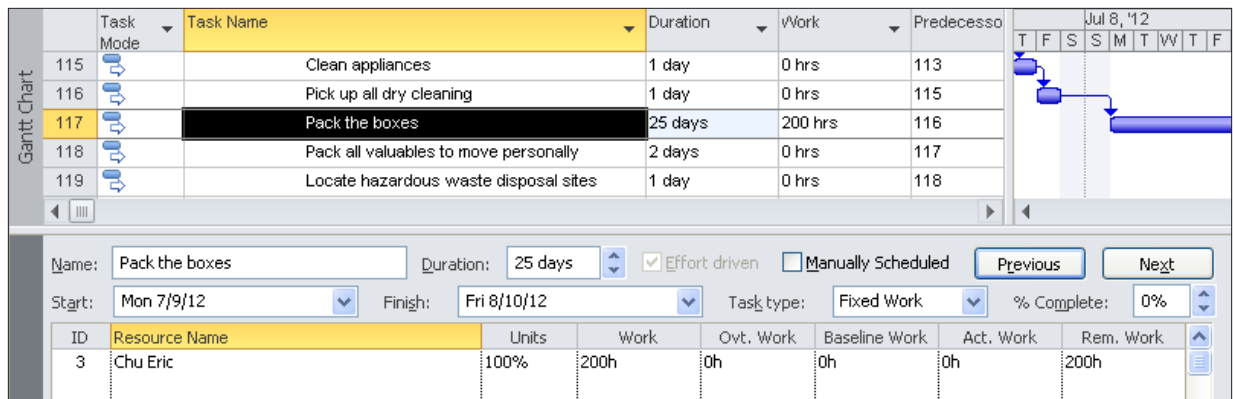
Figure 8-4   PLACEHOLDER

In the example below Eric has been given 2 people to help him with this task. The task will now take 8.33 business days to accomplish the work with each resource working 66.67 hours on this task. The work for the task has not changed. It does not make a difference whether all resources are assigned at one time or individually.
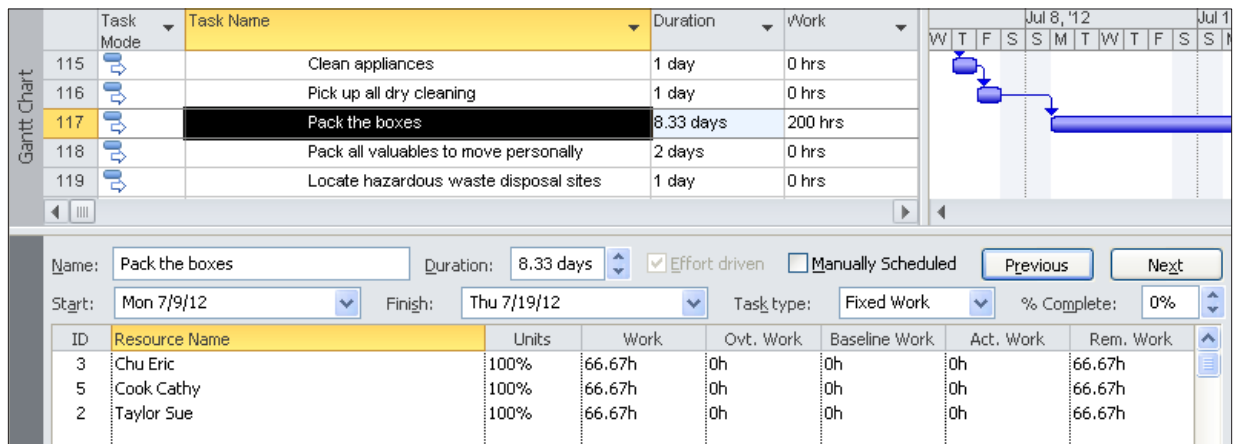
Figure 8-5   PLACEHOLDER

Fixed Duration Assignments

Fixed duration task assignments have a fixed length of time. The amount of work that is accomplished between the task dates will be dependent upon the number of resources assigned to a task, number of resource units and the availability of the resources.

The following examples will continue to use the Task Entry view with the Work subview in the lower pane. In the example below, the automatic scheduled task "Verify that your belongings are insured for the move" will take 5 days to accomplish. This example is fixed duration, effort-driven off. The assigned dates are May 1 to May 7. The dates span more than 5 days because it crosses over non-working weekend days. There are also zero hours of work entered for the task.
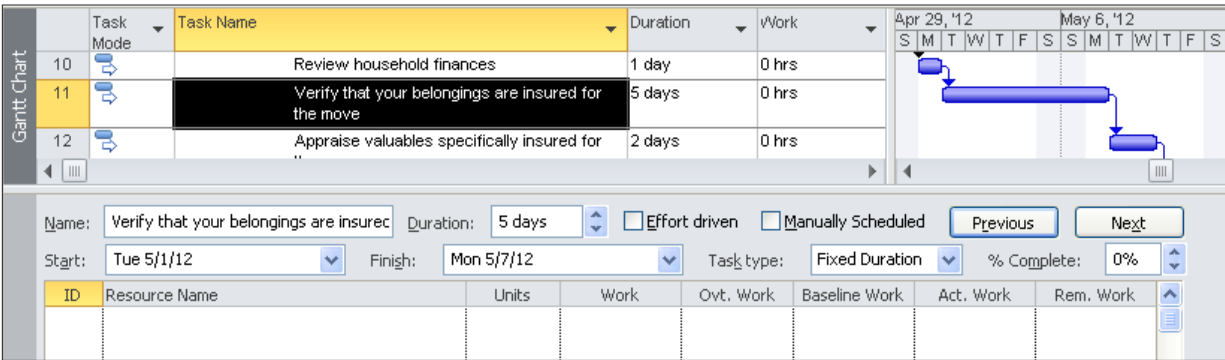
Figure 8-6   PLACEHOLDER

When one resource is assigned to the task the duration will remain the same and the work is increased to 40 hours. Note the work and duration in the view below.
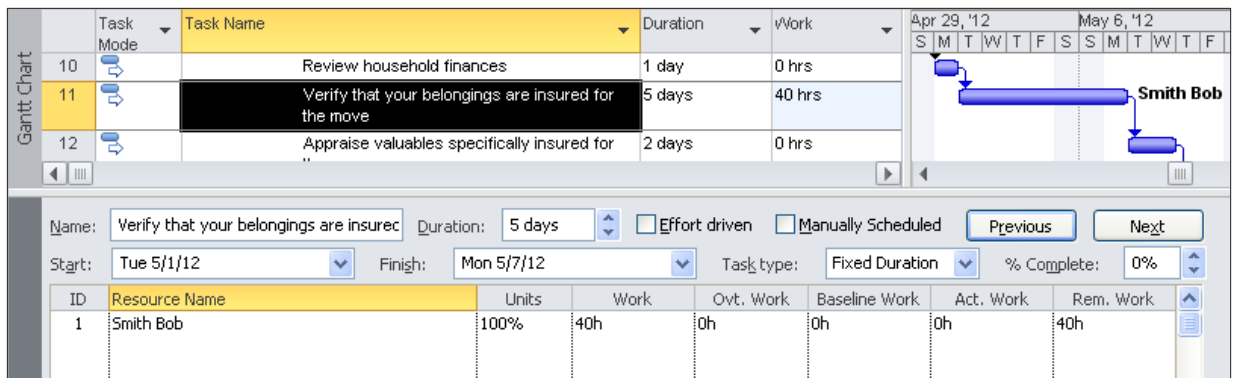
Figure 8-7   PLACEHOLDER

When an additional resources are added, the duration remains the same and the work increases again. The three assignments result in 120 hours of work for the task. The dates have not changed.
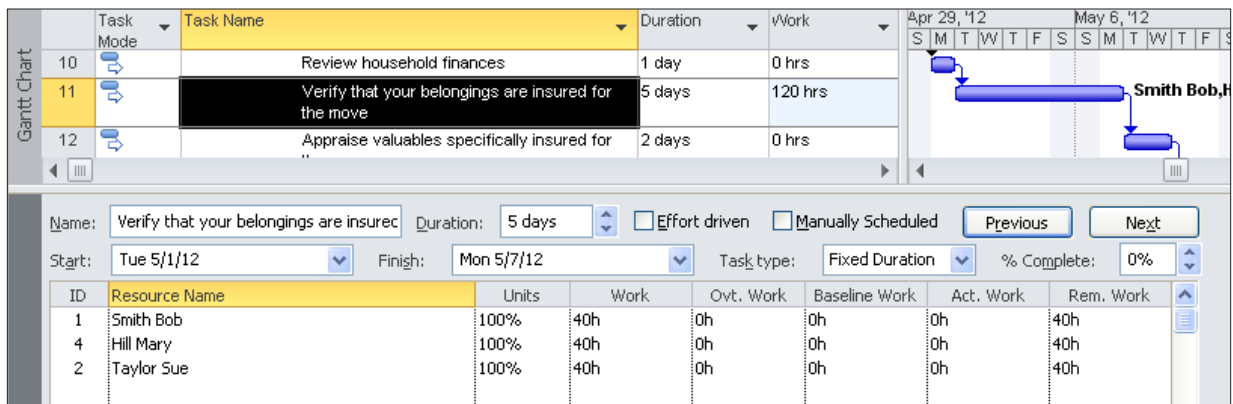
Figure 8-8   PLACEHOLDER

In the following example, all 3 resources have removed and the task type effort-driven flag has been turned on. One resource was then assigned to the task.
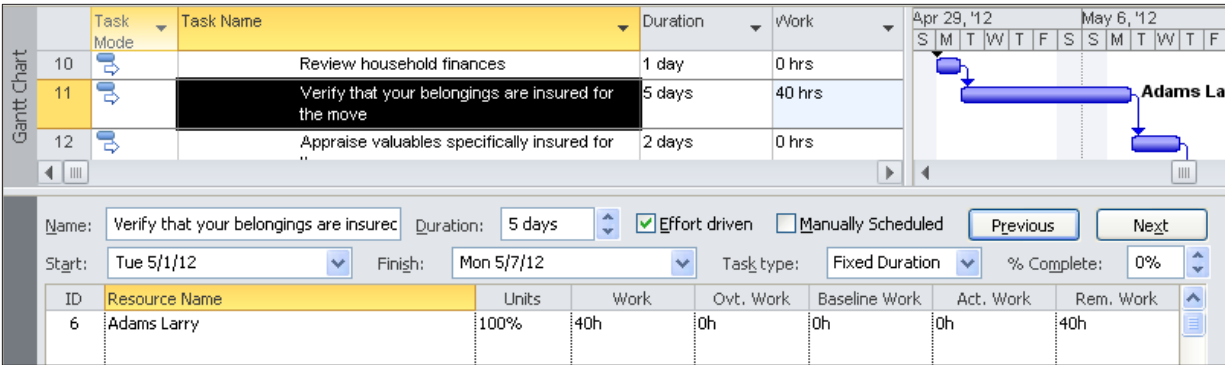
Figure 8-9   PLACEHOLDER

In the example below 2 more resources were added to the task. The task remains at 5 days duration and the work also remained at 40 hours. The work was divided between the resources. In this example, the resources were assigned one at a time.
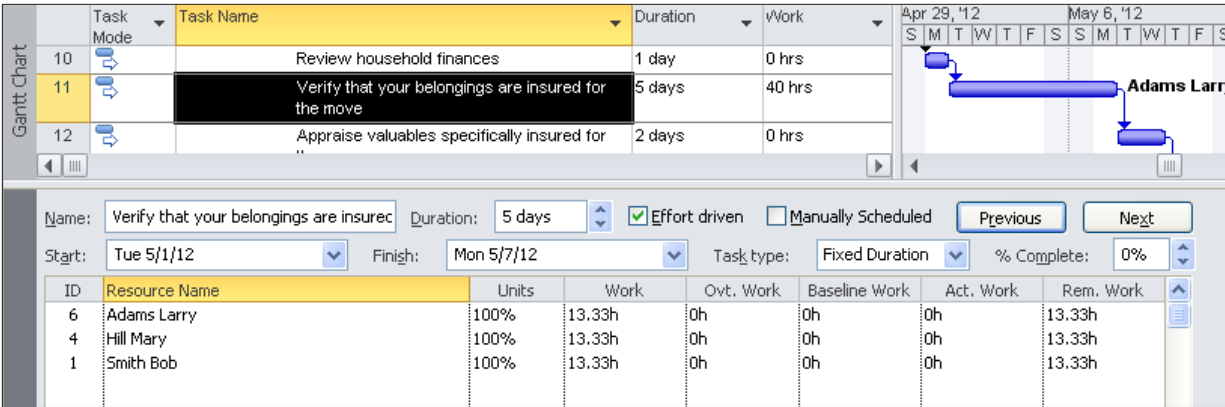
Figure 8-10   PLACEHOLDER

In the example below, the resources were removed and all 3 resources were assigned at the same time. The 3 names were selected and then OK was clicked. Note that each resource is assigned at 100% to the task. The total amount of work is 120 hours and will carry a higher cost due to the increased hours. Any additional resources assigned to this task will take a portion of the original 120 hours.
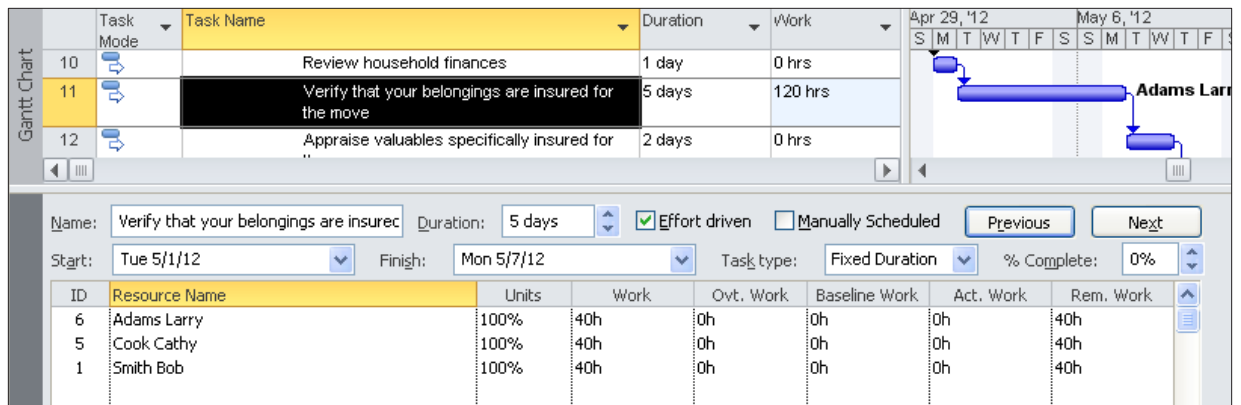
Figure 8-11   PLACEHOLDER

Fixed Unit Assignments

When creating fixed unit assignments, the amount or quantity of the resource assigned to the task is fixed and will not change.

> In the examples below, the Resource Sheet entries for each resource are Max Units of 1 or 100% and $100 per hour is the Standard Rate. Each resource also has 8 hours per day on their availability calendar.

The following examples will use the Task Entry view with the Work subview in the lower pane.

In the example below an automatic scheduled task called "Determine the best method of moving" is a fixed unit, effort-driven off task with a duration of 5 days. Work is zero and the original schedule dates are April 23-27, 2012. The view below shows the subview in the Task Form of Work.
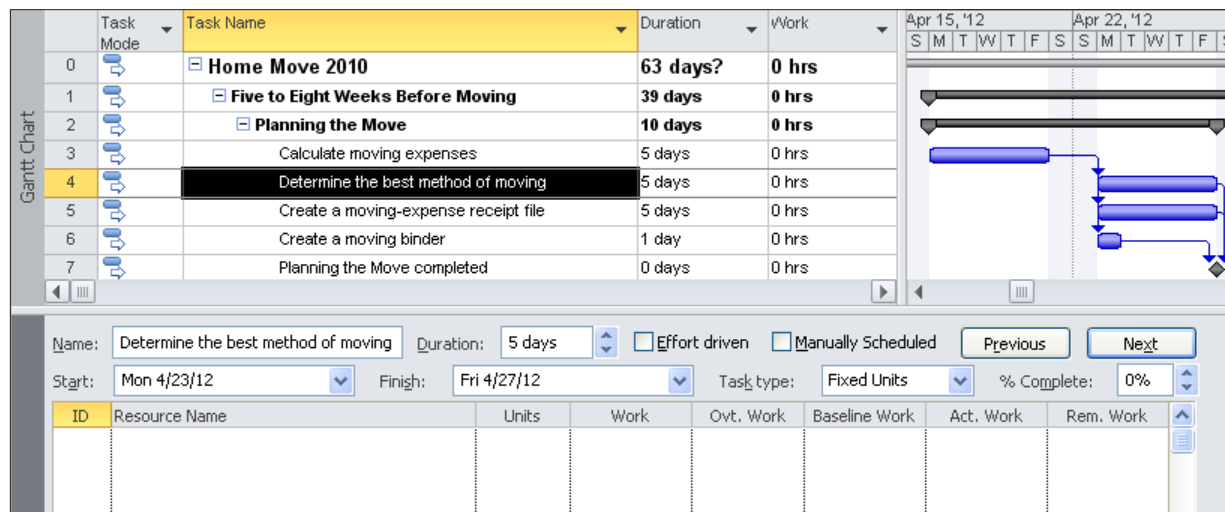
Figure 8-12   PLACEHOLDER

Click in the Resource Name area in the lower pane of the view and select a

resource from the alphabetical list of resources. The button called "Previous" will change to "OK" and was clicked to enter the assignment. Note below the affect of this assignment. Larry Adams has been assigned to the task for 40 hours of work. There are no changes to the dates or duration of the task.
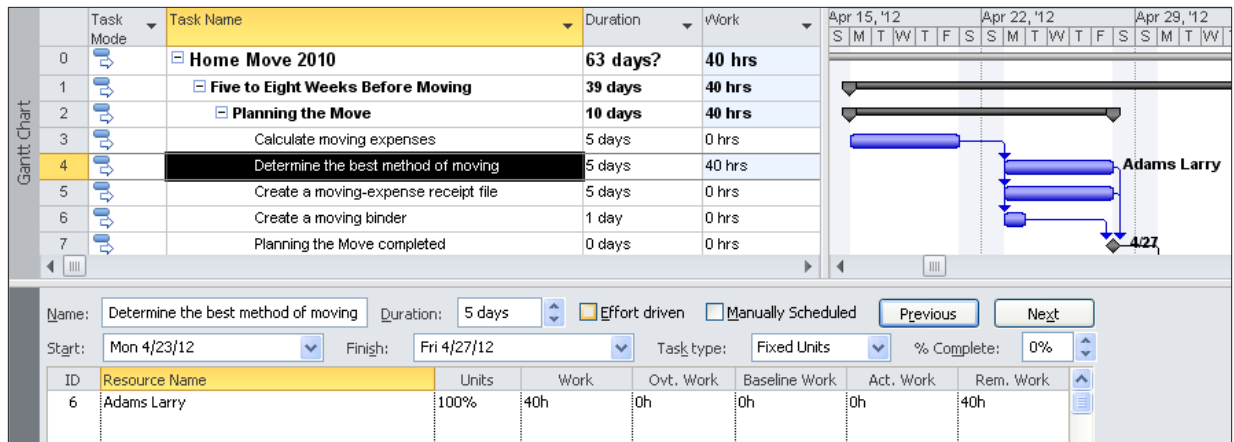
Figure 8-13 PLACEHOLDER

Assigning a second resource to the task will increase the hours to 80 hours and the duration is unchanged. There is an increased cost to the task for the additional 40 hours of work:
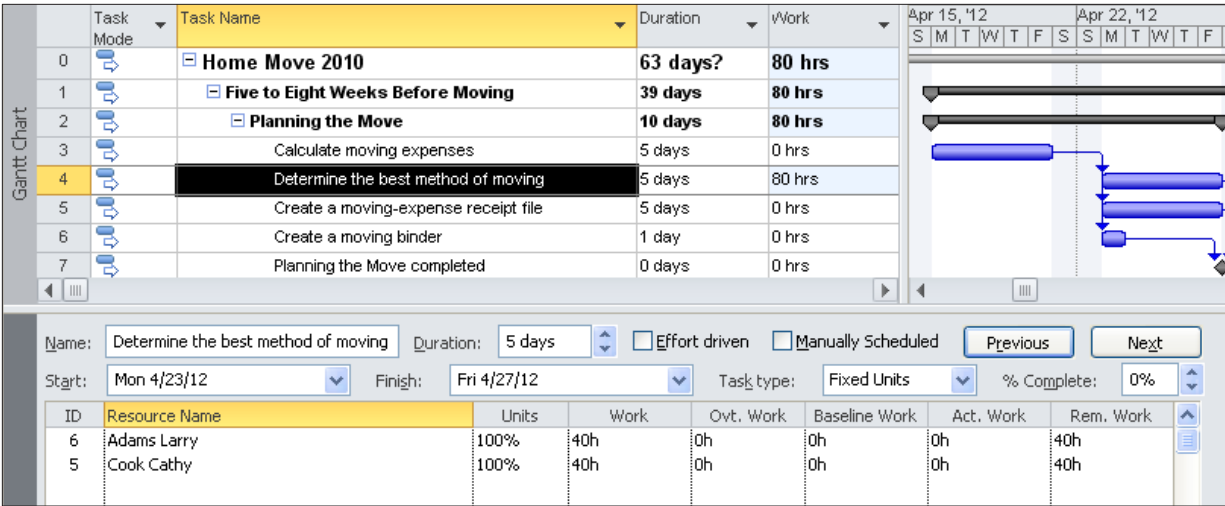
Figure 8-14   PLACEHOLDER

In the next example, the resources have removed from the assignment. An easy way to remove all resource assignments is to click on the top resource name and click the **Delete** key on the keyboard until the assignments are removed. Click **OK** to update.

In the example below the situation is exactly the same as the first example above except the effort-driven flag has been turned on. The first assignment has been created.
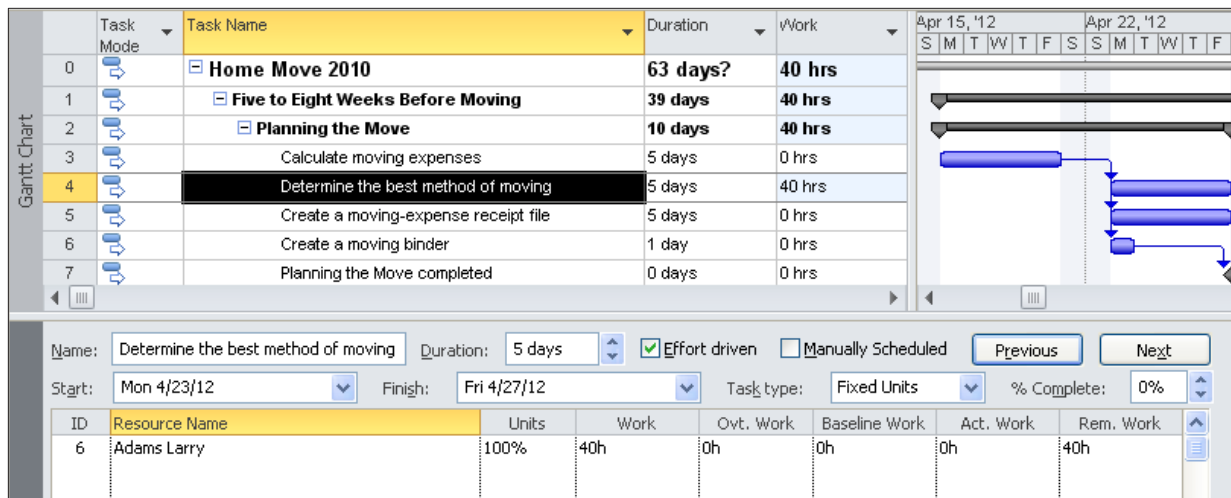
Figure 8-15   PLACEHOLDER

With only one resource, this assignment will look the same as the first example. Dates have not changed and the work is 40 hours. If a second resource is added, the total work of the task is 40 hours and will now be divided between the 2 resources assigned to the task. The task duration has been changed to 2.5 days from the original 5 days and the ending date is now April 25.
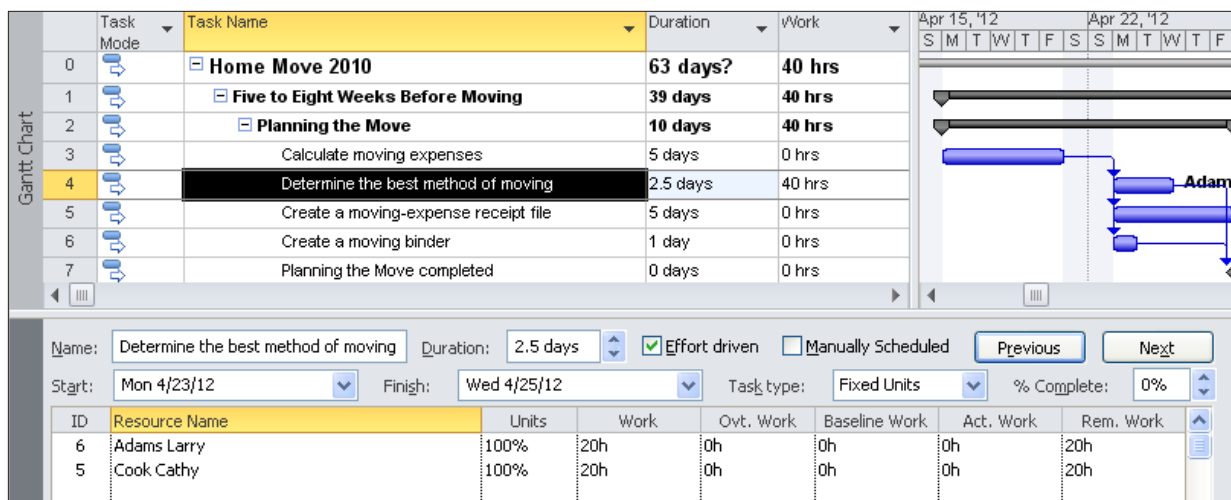
Figure 8-16   PLACEHOLDER

A third resource is assigned to the task. The work is again divided between 3 resources with each working 13.33 hours on the task. The task duration has again changed to 1.67 days and the task now ends on Tuesday, April 24. As additional resources are assigned to the task the work will continue to divide among the resources.
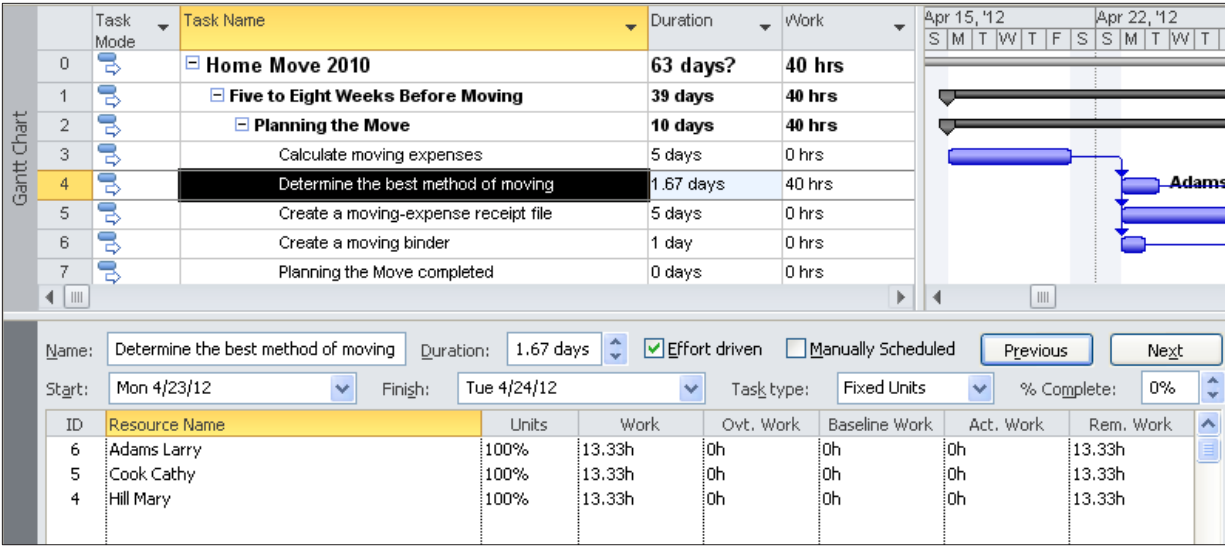
Figure 8-17   PLACEHOLDER

Multiple changes may be made in the Task Form and all changes will be updated when the OK button is clicked. This is usually not a concern for non-effort-driven tasks. However, for effort-driven tasks this will result in a difference in the amount of work assigned to a task. In the previous effort-driven task example, each resource was added one at a time clicking OK after each addition to update the assignment. In the example below, all resources were deleted. All 3 resources were added to the task and then the OK key was clicked and all 3 additions were updated simultaneously. 120 hours of work was calculated for the task for this example. The number of hours is calculated based on the first transaction. Subsequent transactions will divide the number of hours over all of the resources.
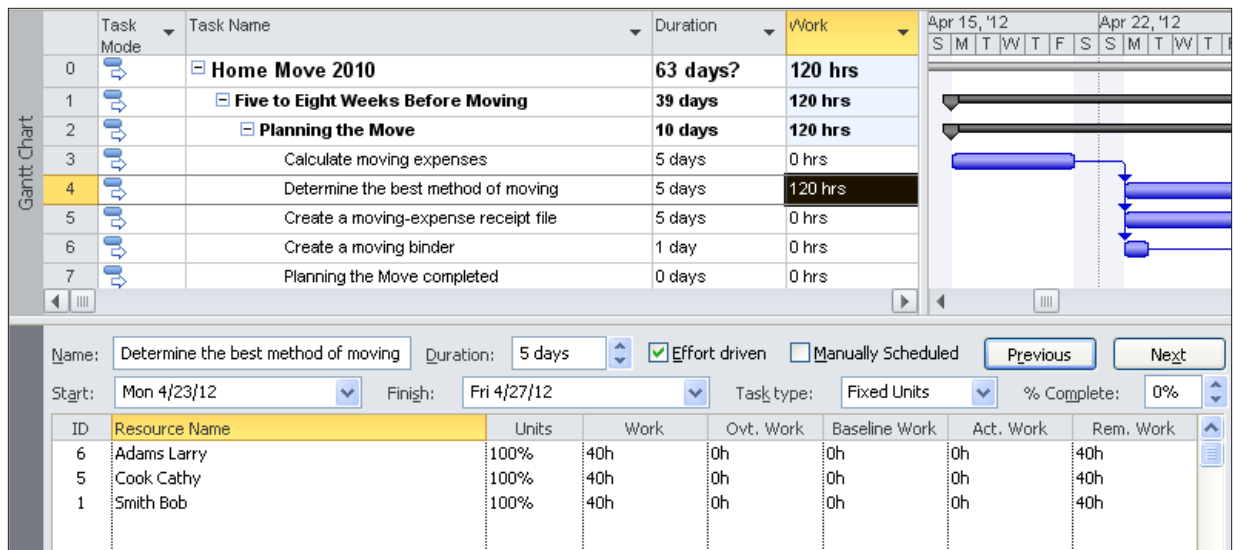
Figure 8-18   PLACEHOLDER

Care needs to be taken in creating effort-driven assignments as they could have a substantial impact on resource allocations and cost estimates for a project. Using other assignment views will not allow the scheduler to see the results of an assignment.

If the automatic calculation for an assignment returns an incorrect hours result for a task, do not hestiate to enter the number of work hours for a resource to correct the values. Click OK to update the changes.

Right clicking in the Task Form in the bottom pane will return options to see the assignment using other views. The Cost and Schedule views are very helpful to see the resource costs or dates when tasks are scheduled.

Group assignments: To create assignments for more than one resource within a group, increase the value in the unit's column.

Example: 3 Helpdesk workers are needed to work for 5 days (40 hours each). Enter 3 in the units field in the Work view. The result will be 3 people will provide a total of 120 hours of Helpdesk labor for the task.

Generic resources: When the actual resource is not known, assign a skill type or generic resource to a task as a holding value. Using a generic

resource will create the demand for the resource and add an estimated cost to the project schedule. When the human resource is acquired, substitute the human resource name for the generic name on the Resource Sheet and all assignments will transfer to the human resource.

When using generic resources, the default base calendar is used to schedule the resource. When a human resource is substituted for a generic resource and their availability is taken into consideration, there is a high probability that the tasks will lengthen. As a rule of thumb, projects could double in length when human resources are substituted for generic resources.

Chapter 9

Fine Tune the Project Schedule

Applying Groups and Filters to Views

Most views in Project contain a table which provides a collection of columns/fields for display. These fields can be used to further refine the information displayed and potentially printed. Grouping and filtering are techniques to refine a view.

A group is a way to categorize and view information. A filter is a way to provide a subset of a collection of data. Filters hide rows of information that do not meet the condition of the filter. A highlight filter is an alternative to a regular filter and it is used to display all information, but visually shade the rows that meet the filter condition.

Groups and filters can applied together or separately.

If you apply a built-in group or filter option, you can tailor a view even if the field(s) used is not displayed.

Filters apply to information that is currently displayed. If you have a previous filter applied or an outline level applied, your filter may not produce the desired results.

How to Apply a Group

1. Click the **View** tab
2. Click the drop-down arrow on **No Group** in the Data group
3. Click the desired group or click **More Groups**

How to Apply a Column-Based Group

1. Locate the column/field you wish to group on
2. Click the drop-down arrown on the column heading and click Group by to display a menu of choices
3. Click the desired option

Click the column heading to select it and then click the drop-down arrow to generate a new choice Group on this field.

How to Remove a Group

1. Click the **View** tab
2. Click the drop-down arrow on **Group Name** in the Data group
3. Click **No Group** or **Clear Group**

How to Apply a Filter

1. Click the **View** tab
2. Click the drop-down arrow on **No Filter** in the Data group
3. Click the desired filter or click **More Filters**
4. If a dialog box appears requesting specific information, complete the information and click **OK**

How to Apply an AutoFilter

1. Locate the column/field you wish to filter on
2. Click the drop-down arrow onthe column heading and select or dese-lect the appropriate check boxes to set the filter conditions
3. Click **OK** to apply the filter

How to Apply a Highlight Filter

1. Click the **View** tab
2. Click the drop-down arrow on **No Highlight** in the Data group
3. Click the desired filter or click **More Filters**
4. If a dialog box appears requesting specific information, complete the information and click **OK**

How to Remove All Filters

1. Click the **View** tab
2. Click the drop-down arrow on **Filter Name** in the Data group
3. Click **No Filter** or **Clear Filter**

A fast way to remove all filters is to press **F3**.

What are Groups?

A group is a way to categorize and view information. A filter is a way to provide a subset of a collection of data.

Built-in Groups

Groups and filters can applied together or separately.

Table 9.1   Task Groups Provided by Default

Group name	Fields/Colums using in the Group
Active vs. Inactive	Active
Auto scheduled vs. Manually scheduled	Task Mode
Complete vs. Incomplete	% Complete
Constraint Type	Constraint Type
Critical	Critical
Duration	Duration
Duration then Priority	Duration, Priority
Milestone	Milestone
Priority	Priority
Priority keeping outline structure	Project, Outline number, Priority
Resource	Resource Name

Table 9.1 Task Groups Provided by Default

Group name	Fields/Colums using in the Group
Status	Status

Table 9.2 Resource Groups Provided by Default

Group name	Fields/columns used in the group
Complete and Incomplete Resources	% Work Complete
Resource Group	Group
Resource Type	Type
Standard Rate	Standard Rate
Work vs. Material	Type

Table 9.3 Assignment Groups Provided by Default

Group Name	Fields/columns used in the group	Comments
Assignments keeping outline structure	Name, Task outline number	May only be used from Resource Usage view

Built-in Filters

Table 9.4   Task Filters Provided by Default

Filter	Fields/Columns used in the Filter	Generates a Dialog Box for Input
Active Tasks	Active	
Automatic scheduled tasks	Task Mode	
Completed Tasks	% complete	
Costs Greater Than…	Cost	X
Cost Overbudget	Cost v Baseline cost	
Created After…	Created	X
Critical	Critical	
Date Range…	Start, Finish	X
In Progress Tasks	Actual start, Actual finish	
Incomplete tasks	% complete, % work complete for the assignment	
Late tasks	Status	
Late/Overbudget Tasks Assigned To…	Resource Name, baseline finish, Finish v Baseline finish, Cost v Baseline cost	X
Linked fields	Linked fields	

Table 9.4   Task Filters Provided by Default

Filter	Fields/Columns used in the Filter	Generates a Dialog Box for Input
Manually Scheduled Tasks	Task Mode	
Milestones	Milestone	
Resource Groups…	Resource Groups	X
Should Start By…	Start v Actual Start	X
Slipped/ Late Tasks	Baseline Finish, Finish v baseline finish, BCWS v BCWP	
Slipping Tasks	Actual finish, Baseline finish, Finish v Baseline finish	
Summary tasks	Summary	
Task range…	ID (range of task ID numbers)	X
Tasks with a Task Calendar Assigned	Task Calendar	
Tasks with Attachments	Objects, Notes	
Tasks with Deadlines	Deadline	
Tasks with estimated Durations	Estimated	
Tasks with Fixed Dates	Constraint type, actual start	
Tasks without Dates	Start, Finish	

Table 9.4   Task Filters Provided by Default

Filter	Fields/Columns used in the Filter	Generates a Dialog Box for Input
Tasks/Assignments with Overtime	Overtime Work	
Top level tasks	Outline level	
Unstarted tasks	Actual Start	
Using Resource In Date Range…	Resource name, Start, Finish	X
Using Resource…	Resource Name	X
Work overbudget	Actual Work vs. Baseline Work	

Resource filters provided are:

Table 9.5   Resource Filters Provided by Default

Filter	Fields/Columns used in the Filter	Generates a Dialog Box for Input
Budget Resources	Budget	
Costs Greater Than…	Cost	X
Cost Overbudget	Cost v Baseline cost	
Created After…	Created	X

Table 9.5   Resource Filters Provided by Default

Filter	Fields/Columns used in the Filter	Generates a Dialog Box for Input
Date Range…	Start, Finish	X
Group…	Group	X
In Progress Assignments	Actual start, Actual finish	
Linked Fields	Linked fields	
Non-budget Resources	Budget	
Overallocated Resources	Overallocated, Assignment	
Resource Range…	ID	X
Resource - Cost…	Type	X
Resource - Material	Type	
Resource - Work	Type	
Resources With Attachments	Objects, Notes	
Resource/Assignments With Overtime	Overtime Work	
Should Start By…	Assignments, Actual Start	X
Should Start/Finish by…	Start, Finish	X
Slipped/Late Progress	Baseline finish, Finish, WCWS	
Slipping Assignments	Actual finish, Baseline finish, Finish	

Table 9.5   Resource Filters Provided by Default

Filter	Fields/Columns used in the Filter	Generates a Dialog Box for Input
Unstarted Assignments	Actual start	
Work Complete	% complete	
Work Incomplete	% complete, Work	
Work Overbudget	Work v Baseline Work	

Sorting Tasks or Resources in a View

Project initially arranges tasks according to ID number which is located in the far left column of the Gantt Chart view. To make it easier to work with your tasks, you may want to temporarily or permanently rearrange them. You can rearrange the order of tasks based on a particular type of information, including start date, finish date, priority, cost, and ID.

When you sort a project that contains summary tasks, Project maintains the outline levels and bases the sort on the summary task values. For example, if you sort a group of summary tasks by start date, Project bases the order on the start date of each summary task. Project then sorts the tasks within each summary task.

You can also sort resources in most resource views. By default, resources are arranged in ascending order based on the ID number, but you can sort

resources by cost or name.

You can also perform a custom sort by specifying up to three sort fields. Sorting by more than one field is helpful when more than one task contains the same information in some fields. For example, if you sort by the duration and more than one task has the same duration, you can determine the order of those tasks by sorting by an additional field, such as the start date.

To sort information within a view:

1. Click the **View** tab
2. Click the drop-down arrow on **Sort** in the Data group
3. Click the desired option or click **Sort By** for more options

How to Sort Information

1. Click the **View** tab
2. Click the drop-down arrow on **Sort** in the Data group
3. Click the desired sort option or click **Sort by**

Choosing Permanently renumber tasks in the Sort By dialog box will renumber all rows in the view. This option is not recommended in a task view, such as Gantt Chart , since that will permanently change the order of items in your schedule.

How to Apply a Column Based Sort

1. Locate the column/field you wish to sort on
2. Click the drop-down arrow on the column heading and select **Sort A to Z** or **Sort Z to A**

How to Reset a Sort Back to Default

1. Click the **View** tab
2. Click the drop-down arrow on **Sort** in the Data group
3. Click **by ID**

Critical Path

An extremely important concept in scheduling is the critical path. This should drive business decisions in your schedule. In this section you will learn more about the definition of this concept and how to use it when making decisions such as the need to apply more resources to your schedule.

What is a Critical Path

The Critical Path is the longest path of tasks through the network of tasks for the schedule. It represents the timeline of the schedule and establishes the end date for the project. It is the minimum time that it will take to complete the project. Tasks not included in the network of tasks will not be included in critical path calculation.

> For a more accurate critical path calculation, all tasks should have a predecessor and a successor except the first and last tasks of a project.

Checking the contents of the predecessor and successor columns to make sure all tasks have valid entries is helpful.

Any task on the critical path is known as a Critical Task. If a critical task slips, the end date of the project will be negatively affected.

Scheduling factors contributing to the Critical Path calculation include:

- Relationships between tasks
- Lead and Lag time

- Duration of tasks
- Constraints
- Task Calendars
- Resource Availability
- Resource Assignments

Project will automatically recalculate the critical path each time a task is changed. The calculation is making a forward and backward pass through the schedule looking for time gaps between tasks. This time gap is called slack which is also known as float. If a task has slack, it is considered non-critical. When a task has no slack, it is considered critical. Slack can be both a positive or negative value.

Every project schedule should include float or slack in order to address contingencies. No project will run exactly as planned. Float or slack will provide the extra time needed to handle unknown problems that will arise during the execution of a project.

There are 2 types of slack calculated in Project 2013:

- Total slack is the amount of time a task can slip without affecting the end date of the project.
- Free slack is the amount of time a task can slip before it affects its immediate successor task. If a task only has one successor, free slack will be the same as total slack.

This type of critcal path calculation is based on tasks.

Resources can also be critical within a project schedule. During the execution of the project, different resources will become critical at different points within the schedule. If a critical resource is not available at a critical point, the entire project could be affected as well as the ending date.

Frequently, during the execution of a project, a task that was not originally on the critical path will become critical. Careful tracking and monitoring of the critical path during the management of the project will help keep the project manager on track to achieve the goal of the projected end date.

Formatting Views to Display Critical Path

Slack is essentially scheduling breathing space for a project and occurs when a particular task can be delayed without affecting the end of the project. The greater the slack, the more breathing space you will have to help manage problems that may occur during the performance of the project. If a schedule fails to include slack, the plan for the schedule might be unobtainable. Since projects are typically never performed exactly as scheduled, slack becomes essential to achieving the goal date for the project.

Each time a task is changed in Project, the critical path is recalculated automatically.

Project provides the ability to format the Gantt Chart view to identify critical tasks and tasks with slack time.

To turn on Critical Task and Slack formatting:

1. Click the **Format** tab
2. Click **Critical Tasks** and click **Slack** as desired in the Bar Styles group
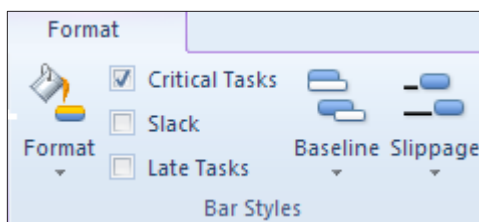
Figure 9-1   PLACEHOLDER

The critical path is shown as red Gantt bars and the non-critical tasks appear a blue Gantt bars. Once you have displayed the critical path, you will have a better understanding of the specific tasks which are driving the ending date of your project schedule.

Viewing Resource Assignments

Once assignments are created, refining them and looking at them from different points of view is not only helpful but necessary. If resource allocations and future resource demands are your goals for using Project, taking a deeper look at the results of how the assignments were created will be essential.

Resource Usage View

The purpose of the Resource Usage view is to allow viewing and updating of assignments from the resource point of view. This view displays all assignments created for a resource as well as assignment details. Information may be viewed at any level of timescale detail that is appropriate for your project.

You will be able to use this view to answer the following questions:

- How much availability does a resource have?
- What is the cost of having a resource work on a task?
- Are all of the tasks assigned to a resource?
- How many hours is a resource assigned to a task?
- Is a resource overallocated? (Overbooked)
- What is the future demand for a resource for this project?
- What is the total number of hours for a resource assigned to the project?

> The Resource Usage view may be used for resource work distribution worksheets. When this view is printed, a timeframe may be added to allow for more focused printing. Insert a page break between resources to print separate reports for each resource.

Task Usage View

Task Usage view is very similar to the Resource Usage view, however, the content is shown from the task perspective. Each task is displayed with the resources assigned to the task. The scheduler will be able to see a complete picture of the details of assignments. This view may also be used for changing or fine tuning assignments. Information may be viewed at any level of timescale detail that is appropriate for your project.

- What resources are assigned to a task?
- Which tasks do not have a resource assigned?
- What is the total cost and number of hours of a task?
- What is the remaining work of a task?
- What percent allocations are my resources assigned to tasks?
- What is the distribution of work for all the resources on the task?

How to Display Resource Usage View

1. Click the **View** tab
2. Click **Resource Usage** in the Resource Views group

How to Display Task Usage View

1. Click the **View** tab
2. Click **Task Usage** in the Tasks Views group

How to Adjust Information in the TimePhased Grid on Resource Usage or Task Usage View

1. Click the **Format** tab
2. Click **Add Details** in the Details group
3. Select the desired field(s) on the left and click **Show** or select the desired field(s) on the right and click **Hide**
4. Click **OK** to apply the changes

Team Planner View

The purpose of this view is to show resources and their assignments using a Gantt style format. The team planner view will help the scheduler identify overallocations within the schedule, level workloads, reassign resources to tasks and identify problems in the schedule from the resource point of view.

Team Planner view is only available in Project 2013 Professional.

Team Planner view is divided into 2 sections. The upper section contains one row for each resource, with bars to the right representing assigned work. The lower section contains bars representing tasks without resources.

How to Display Team Planner View

1. Click the **View** tab
2. Click **Team Planner** in the Resoure Views group
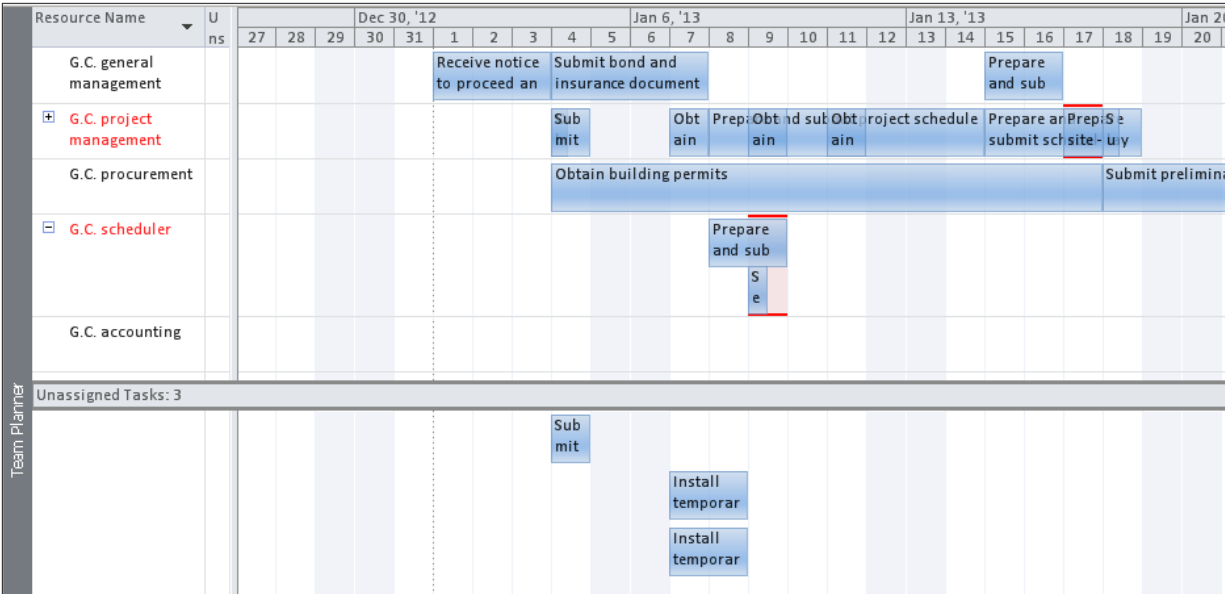
Figure 9-2   PLACEHOLDER

Below is a chart to help with understanding how to interpret the informationin the view:

Table 9.6   Team Planner View Legend

Feature	Description
A vertical orange line	Today's date
Tasks colored in darker blue	Progress on the task
Teal colored tasks	Manually scheduled tasks

Table 9.6   Team Planner View Legend

Feature	Description
Gray colored tasks	External tasks
Light blue colored tasks	Un-started tasks
Gaps in timelines for resources	Under-allocated resource or unavailable
Red lines on the top and bottom of the task	Overallocated tasks
Resource name in red	Overallocated resource
Task bars colored black	Tasks that are late
Shaded day on calendar	Non-working day for the resource. This data is coming from the resource availability calendar
Top pane – pink blocks of time	Overallocated time

Below are some of the mouse shortcuts that will help you work with the information in this view.

Table 9.7   Mouse Shortcuts for Team Planner View

Action	Result
Double click the resource name	Resource Information dialog box

Table 9.7   Mouse Shortcuts for Team Planner View

Action	Result
Double click a work task bar	Task Information dialog box
Timescale density	Adjust as needed – lower right corner
Hover over task	Pop up of task details
Double click on timescale	Opens the timescale box to alter scale values
Right click on a task	More options:
Right click on an assignment – Reassign to:	This option presents a list of all resources in the schedule, including resources already assigned to the task. Select a resource to reassign to the task or select unassigned option and all assignments will be removed from the task.
Right click on an assignment – Inactivate:	Task will disappear from the Team Planner view. To reactive, return to Gantt chart view.

Only active tasks will show in the team planner view.

Understanding Overallocations

Each resource is assigned a calendar when entered on the Resource Sheet. The calendar is customized to contain the availability of the resource. When more work is assigned to a resource than time available on their resource calendar, the resource is considered to be overallocated. The overallocation calculation is looking at resource assignments on a minute by minute basis. If a resource is overbooked for even 1 minute, the resource is considered overallocated.

When a resource is overallocated, a red person symbol appears in the indicator column. This indicates that there is an overallocated resource assigned to the task but will not indicate which resource is affected. Even though resources are overallocated, assignments can continue to be created.
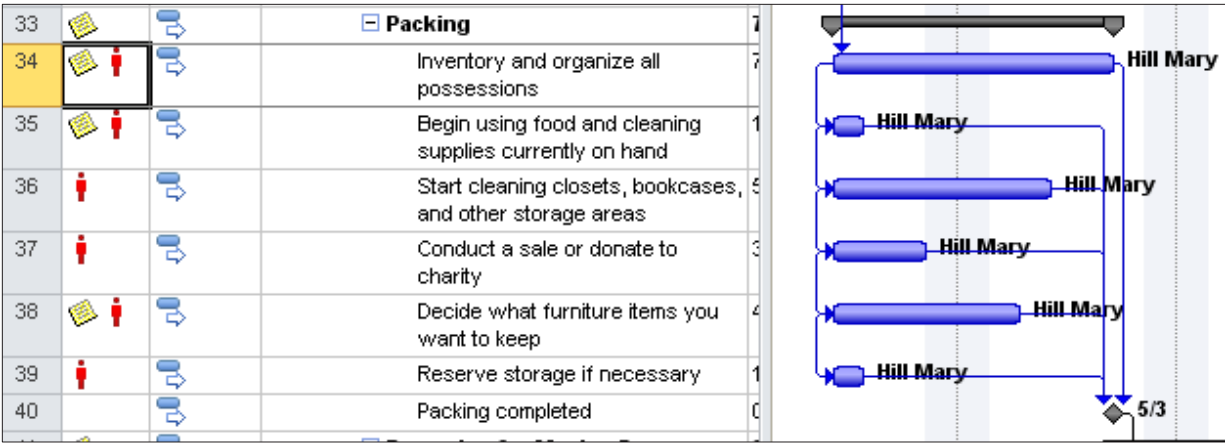
Figure 9-3   PLACEHOLDER

Real World Application of Scheduling: Shortening the Schedule and Resolving Resource Conflicts

Scheduling involves not only creating a detailed schedule and assigning resources, but it involves modifying the schedule to meet goals and to work with limitations. Typically there is a goal to complete the schedule on time and a common limitation is availability of resources. This section will address those areas.

Shortening the Schedule

Once you create your schedule, arrange the tasks, and assign resources to the tasks, you may realize that the schedule does not meet your original goals. You may have a deadline or a budget that you must meet. Listed below are several ways to shorten your schedule. The method you choose depends on your individual project and resources.

The best way to shorten your project is to shorten the critical path. The critical path includes those tasks that affect the duration of the project. If a critical task finishes late, it delays the entire project. If a critical task finishes early, it shortens the duration of the project. If you shorten the length of the critical path, you shorten the duration of your project, and your project finishes sooner.

Some options to consider for shortening the project schedule are:

- Assign additional resources

- Assign a resource to work overtime
- Increase working time (calendar)
- Break task into smaller tasks
- Overlap key activities (multi-tasking)
- Delete tasks
- Redefine quality (less time on activities)
- Break project into phases
- Change dependencies of tasks

Resolving Resource Conflicts

The most common resource conflict is that a resource is overallocated. This means they have more work assigned to them then they can realistically complete in the given time frame.

While there are multiple ways to manage resource allocation, it is important to find and analyze resource overallocation and evaluate the overall effect on the project schedule.

Some options to consider for solving resource conflicts are:

- Hire additional resources
- Replace a resource on a task
- Assign a resource to work overtime
- Increase work time (calendar)
- Break a task up and move a portion of a task till a resource is available
- Delay the entire task until a resource is available
- Adjust the division of work across the task (work contour)
- Move or create a constraint on the task until the resource is available
- Delete tasks
- Change overlapping tasks into sequential tasks
- Use Project's leveling feature
- Use Task Inspector to solve the problem
- Use Team Planner to solve the problem

Notice the similarly with features already mentioned to shorten the schedule.

Views to Identify Overallocations

There are several views in Project that will help analyze resource overallocations. After an overallocation situation is discovered, research should be carried out to understand where the overallocation exists.

The views below will help locate these problems:

- Gantt Chart view
- Resource sheet
- Resource graph
- Resource allocation view
- Team Planner
- Task Usage view
- Resource Usage view

Techniques to help work with overallocations will be illustrated next. You may have already discovered some of these on your own while using Project.

Using Indicators

In the Gantt Chart view, you will immediately be notified if there is an over-allocated resource on a task when the red stick figure appears. If you hover the cursor on this icon, the display indicates resources are overallocated. This indicator is a handy and quick visual cue to identify overallocated

resources.
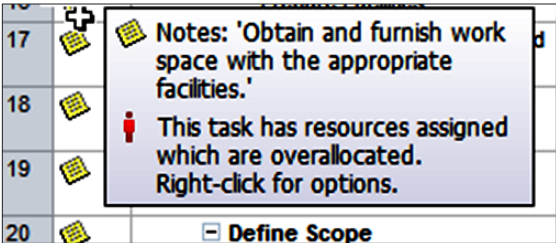
Figure 9-4   Overallocated Resource

Using the Resource Allocation View

The Resource Allocation view is a combination view that shows resource assignments in a Resource Usage pane along with a personal Gantt chart in the lower pane. The advantage of this view is you can see both numerically and visually what a resource is working on and use either the upper or lower pane to quickly make modifications.

To use the Resource Allocation view to identify resource commitment issues:

How to Display Resource Allocation View

1. Click the **View** tab
2. Click the drop down arrow on **Other Views** in the Resource Views group
3. Click **More Views**
4. Click **Resource Allocation**
5. Click **Apply**

Methods for Resolving Resource Conflicts

In this section, you will be exposed to many different methods for analyzing and resolving resource conflicts. It will be up to you to determine the correct mix of options for the schedule. Some methods will be more manually driven, while other methods will take advantage of some automatic features in Project. Methods that are more automated may have more of a ripple effect that aren't expected so be sure to carefully choose the appropriate method. This list of methods is not meant to cover every possible scenario, but instead is presented to give suggested scenarios that are popular and easy to use. No order of priority is indicated with this list.

Using Indicator Suggestions

For tasks that have a red stick figure in the indicators column, that means there is a resource conflict on the task. You can use shortcuts in Project to help fix that. Simply right click on the indicator field or name of the task and apply one of the options listed such as: **Fix in Task Inspector** or **Reschedule to Available Date**.

🔾	**Fix in Task Inspector...**
🔾	**Reschedule to Available Date**
	Ignore Problems for This Task
✂	Cut Cell
🔾	Copy Cell
🔾	Paste
	Paste Special...
🔾	Scroll to Task
	Insert Task
	Delete Task
	Inactivate Task
📌	Manually Schedule
🔾	Auto Schedule
🔾	Assign Resources...
	Fill Down
	Clear Contents
🔾	Information...
🔾	Notes...
🔾	Add to Timeline
🔾	Hyperlink...
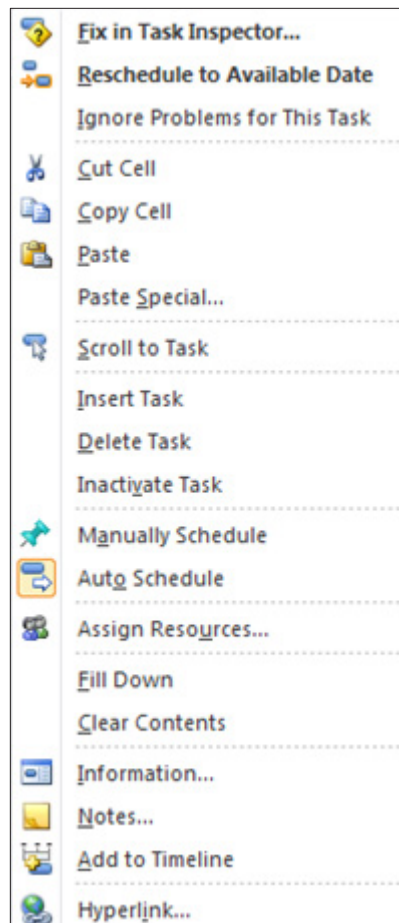
Figure 9-5   Context Menu from Overallocated Resource

Using Task Inspector

Another option to evaluate and solve problems with the schedule is Task Inspector. Using this option gives you a pane to the left side of the Entry table. The advantage of Task Inspector is it provides critical information about the task and information about what is occurring at a specific time

and gives you options to correct any issues, including hyperlinks to the feature or area where you can make a change.

How to Apply Task Inspector

1. Click the **Task** tab
2. Click **Inspect** in the Tasks group
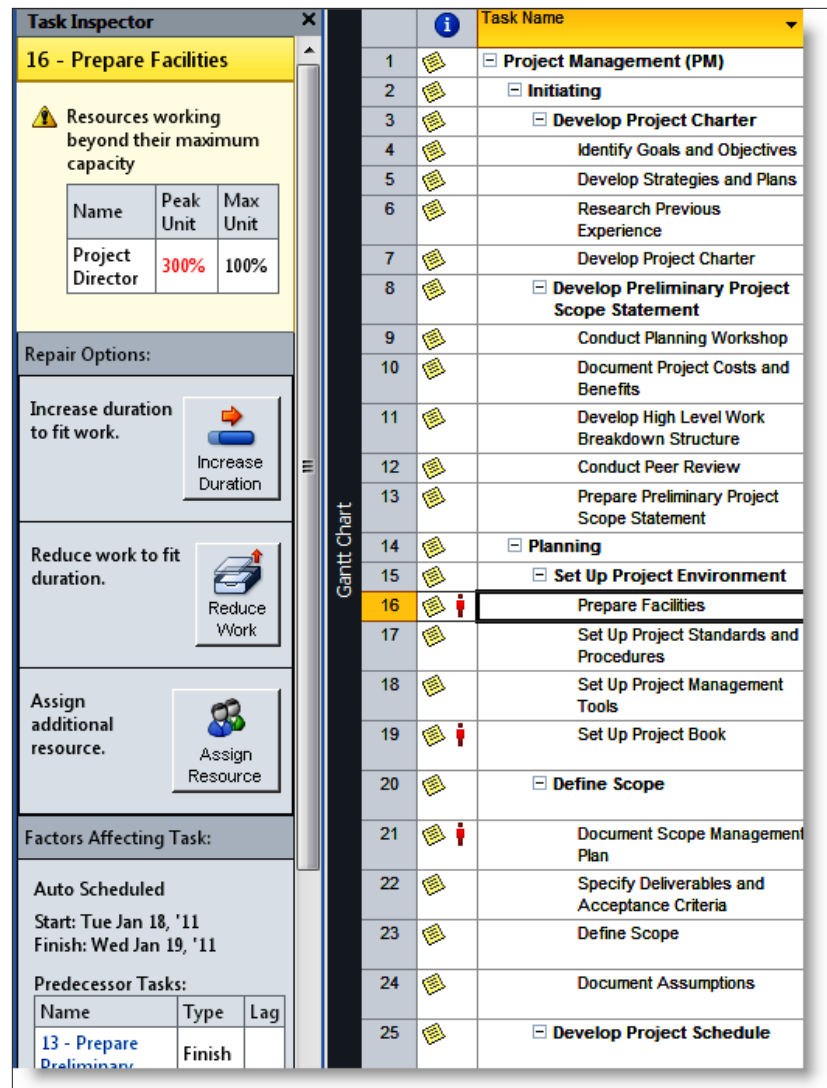
Figure 9-6   Task Inspector

Don't forget to consider the ripple effect of making a change to one task. As other tasks respond to this change, you may see a change in the critical path or introduce other resource conflicts.

Changing Resource Assignments

When you look at resource assignments individually, you might see that one resource is very overworked; however, when you look at resources collectively, you might notice that some resources are underworked. One of the best ways to solve resource issues is to more equitably distribute the work. For example, Ricardo is assigned to a task at 150% while Angelica is assigned to a task at the exact same time at 25%. If you can find a way to shift some of Ricardo's work to Angelica, you will take better advantage of the availability of both resources. Changing assignments can be done in many different views sch as Task Usage or Resource Usage view.

> When you return to the Resource Allocation view, it will recalculate and remove that task from the resource you had selected. You may need to reselect that resource again if you want to see an updated lower pane and be able to continue making adjustments.

Move a Task Until a Resource is Available

Sometimes the resource assigned to a task is the only person with the skill set that can do the work. In this case the only option is to move the task until the resource is available. One technique for moving a task is to shift by a timeperiod (e.g. week), another technique is to reschedule the task until the resource is available.

> Moving a task will create a constraint on the task. To delay a resource assignment:

How to Move Tasks to Account for Resource Limitations

1. Select the desired task (clck on the row ID number or task name)
2. Click the **Task** tab
3. Click the drop down arrow on **Move** in the Tasks group
4. Click the desired option

Assigning a Work Contour

When you assign a resource to a task, Project spreads the work out evenly over the duration of the task unless you specify otherwise. For example, if you assign a resource 100% to work 80 hours on a ten-day task, Project assigns eight hours of work per day. This is a flat contour.

Not all tasks require that the work be spread equally (a flat contour). For example, consider the building of a fine custom wooden cabinet, which is one task in a project that involves furnishing a house. The carpenter purchases the wood and other components, which requires trips to several specialty stores. He spreads the trip out over several days, while using some of his time to finish his previous project. Then he works full days for three weeks cutting and assembling the cabinet. In the middle of construction, he puts in some overtime.

After the construction phase is completed, he stains the wood, which takes two hours. The stain has to dry overnight. The next day, he applies a coat of varnish, which takes two hours. It, too, has to dry overnight.

The next day, he sands the varnish and applies another coat, which takes three hours. He applies three more coats of varnish, repeating the progress.

On the last day, he buffs the final coat, which takes an hour. Most of the work on the cabinet occurs during the middle of the project, peaking during a few days of overtime. Work at the beginning and end of the task is part-time.

You can change the work contour by manually modify the working hours in the timephased grid on the right side of the Task Usage or Resource Usage views.

Using the Team Planner View

The Team Planner view is very visually pleasing and allows you to manage your schedule by resources instead of by task. Overallocations can be quickly corrected here and the impact on the resource or other resources is also quickly visible.

To use the Team Planner View to solve an overallocation:

- Locate the task that is causing a conflict (red lines above/below high-light the task), and simply drag the task to a new time period for the same resource or drag it to another resource.
    Optionally – You can right click on the task and take advantage of features available in the short-cut menu (such as reassign to another resource).

Figure 9-7 Team Planner View

The Team Planner view is also an easy way to assign tasks that currently do not have resources assigned to them. Unassigned tasks will appear at the bottom of the Team Planner view and can be dragged and dropped to the appropriate resource.

> Dragging a task to a new location will create a constraint on that task since you are essentially forcing it to happen a particular time. If you want to avoid constraints, use the Gantt Chart view and make other adjustments such as changing links or reassigning tasks.

Applying Leveling Features

Leveling is a feature in Project that can be used to solve overallocations. While the software can't dream up a creative solution, it is able to shift, delay, and split tasks to take advantage of open spaces in your project where resources might be underallocated or where tasks can be delayed without shifting the end date. Should you choose, you can also indicate that your end date is flexible so there are more options for leveling to correct overallocations. Before you use leveling, be sure to consider the following scenarios and options.

These are three leveling scenarios you can choose:

Level Selection – use this option when you are in a task view and want to fix overallocated resources on specific tasks. This will leave overallocations for those same resources on other tasks untouched. Typically this option can help when you need to make sure you meet your commitments on the selected task(s), but do not want to address other tasks at the same time.

Level Resource – use this option when you are in a resource view and want to fix overallocations by resource. This choice would be suggested when you know that the availability of a specific resource will not change and you have to get the work done using this limited availability.

Level All – this option is when you want to fix overallocations across the entire project across all resources.

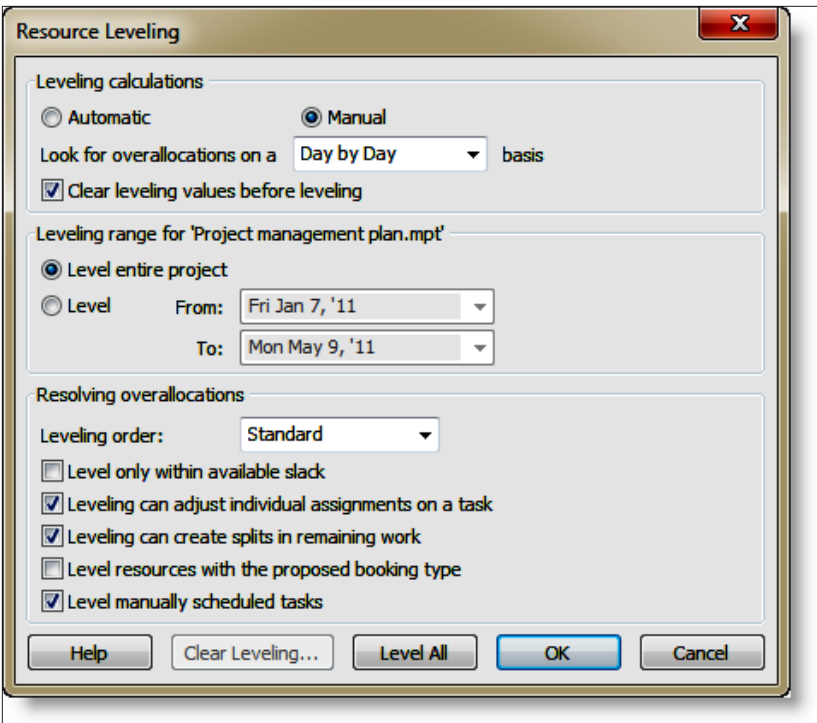When you click Leveling Options, the following dialog box appears:

Figure 9-8   Resource Leveling Diagram

Please consider the following when selecting your options:

- Automatic is not recommended since it will level your project continuously without warning. Tasks will be delayed before you realize anything has happened.
- While Project offers an auto leveling feature to resolve overallocation, it is recommended that the project manager resolve overallocation manually. Overallocation can be a complex issue and requires analysis. Utilizing the auto leveling feature can diminish your ability to analyze and uncover the root cause of the overallocation.
- Consider changing Leveling order to "Priority, Standard" if you have set priority numbers on your tasks.
- Best Practice – Only use priority numbers to lock exception tasks down. For example, setting a task to a priority number of 1000 will make sure that they task does not move when you level. Essentially you are setting the task to be highest priority.

The Team Planner view is an interactive format allowing you to drag and drop activities directly on the right portion of the screen to alleviate overallocations. Also of note is that unassigned tasks will appear at the bottom and can be assigned to resources by dragging and dropping them on the grid on the right.
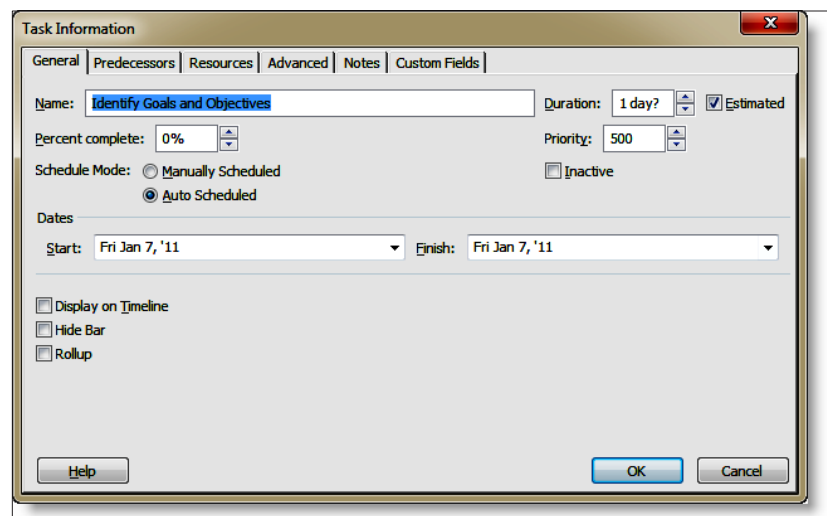
Figure 9-9   Task Information Dialog – General Tab

- "Level only within available slack" attempts to delay only non-critical tasks. The drawback to this feature is it limits Project's ability to fix things.
- Best Practice – Run leveling first with the "Level only within available slack" option enabled to protect your critical path and observe the benefits before turning this option off and running leveling.
- "Leveling can adjust individual assignments on a task" means when a task is staffed with multiple resources, Project has the flexibility to move work resource by resource instead of moving the entire task and all resources at once.
- "Leveling can create splits in remaining work" means a task can be split as needed to get around other tasks that can't be moved.

> Be sure to review the splits created in your Project and undo the action if necessary. For example, if the result of this is a task that is split into 10 pieces, this is probably not a good result.
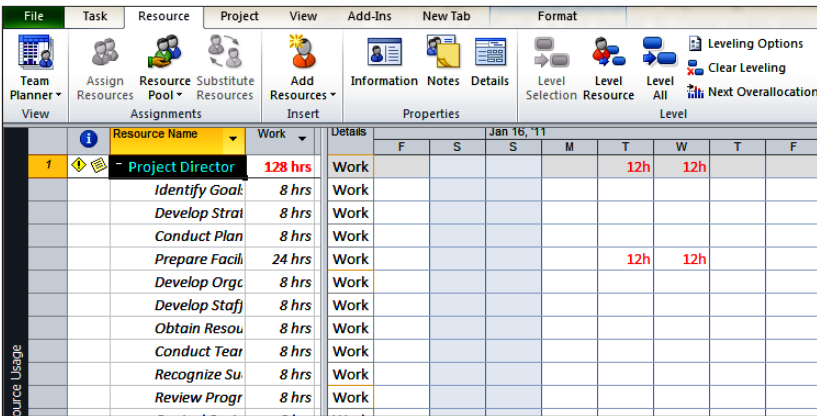

Figure 9-10   Leveling

How to Apply Resource Leveling

1. Click the **Resource** tab
2. Click Leveling Options in the Level group

3. Choose desired options and click **OK** to save the settings or click **Level Now** to apply resource leveling immediately

> To level by a specific resource, click **OK** on the leveling options and click Level Resource to choose a specific resource.

How to Clear Resource Leveling

1. Click the **Resource** tab
2. Click **Clear Leveling** in the Level group

Chapter 10
Baseline and Tracking

The Importance of Baselining

One of the integral parts of the decision making process is being aware of where the schedule stands against its original plan. The baseline is the original plan.

After the schedule has been adjusted, discussed and negotiated with the stakeholders of the project, a schedule will be agreed upon. That orginal approved schedule will be set as the project baseline. The project baseline becomes the schedule that the metrics for the project will measure against. It is also the plan that the stakeholders are expecting the project performers to adhere to during the project.

When an event occurs to put the project off schedule, the difference between the actual performance values and the baseline values is known as the **variance**. Variances can have either a positive or negative effect on the schedule. Monitoring variances gives the project manager more knowledge regarding the project which in turn results in better decision making to adjust the project schedule if needed or help the project get back on track.

Without a baseline, this knowledge would be lost. You would not be aware of how off track the schedule is from the original planned finish date and you would not have a finish date to manage the schedule against.

Project requires a baseline to calculate earned value. More information about this topic is in the advanced course.

Setting a Baseline

A critical component before you begin tracking is to set the baseline. After your project is formally approved and right before work is ready to begin, setting a baseline will capture information about what you have planned so you can use it as a measure against how the project actually performs. Because it is available for comparison purposes at any point during the project, the baseline provides an effective way to check your progress throughout the project. Project deals with three levels of time when working with projects: baseline, current, and actual.

> You should not set the baseline until you are finished entering tasks and creating the schedule. The goal is to have the schedule as complete as possible before setting a baseline for comparison purposes.

The act of setting a baseline creates a copy of the following fields into equivalent baseline fields (e.g., Baseline Start):

- Start
- Finish
- Duration
- Work
- Cost

Baseline information is always maintained unless you set a subsequent baseline again for the entire project. In many cases you will not need to use Baseline 1–10, but very lengthy projects may want to use the additional baselines to capture a snapshot at the end of each year (as an example).

To set the baseline:

1. Click the **Project** tab.
2. Click the drop-down arrow on **Set Baseline** in the Schedule group.
3. Click **Set Baseline**.
4. Click **OK**.
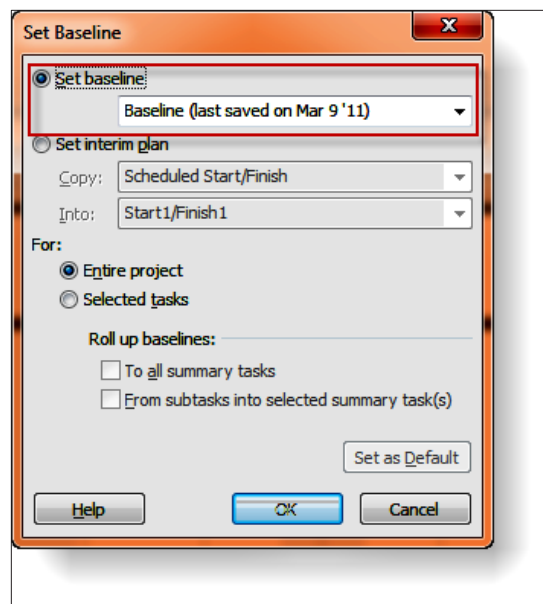
Figure 10-1   Set Baseline Dialog Box – Setting Baseline

To utilize the variance calculations, you must record the current baseline using the first option from the dropdown menu listed as just "Baseline." Project calculates from this Baseline only. This Baseline is also known as Baseline 0. Baselines 1–10 are for historical purposes only, but you may use any numbered baseline in a view.

As a best practice, create a backup copy of your original baseline data by immediately setting the baseline again and using an empty baseline 1–10. This way even if you accidentally overwrite the information in the first Baseline, you can still retrieve it by going to your backup baseline. This also provides historical information about previous baselines.

Setting an Interim Plan

Setting an interim plan follows the same procedures as setting the baseline except that you chose Interim as the option. The main purpose for the interim plan is to capture historical snapshots of the current state of a project at specific points in time. The best practice for this feature is to use it for projects that are very lengthy where you might need a snapshot every 6 or 12 months for future comparison purposes. Another alternative use for this feature to extend the number of baselines available to the project manager.
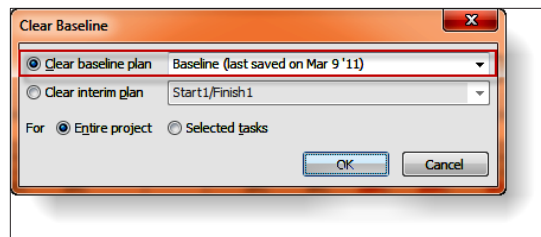
Clearing a Baseline

While it is best practice to maintain copies of baselines for historical purposes, it may be necessary to clear a baseline. For example, a baseline set by mistake.

To clear a baseline:

1. Click the **Project** Tab.
2. Click the drop-down arrow on **Set Baseline** in the Schedule group.
3. Click **Clear Baseline**.
4. Click **OK**.

Figure 10-2   Clear Baseline Dialog Box

Updating Baseline

When approved changes are made to the schedule, the changes might result in a change to the baseline. Each organization should have a policy in place as to when or how baselines should be updated. Baselines, at times, are misunderstood by project schedulers and organizations should clarify their policies and intended usage. Management may want to be alerted when baselines have been updated or overwritten.

Baselines updates may include seleced tasks, overwriting the existing Baseline 0, or capturing a new baseline in Baseline 1-10 fields.

> Project views such as Tracking Gantt view display Baseline 0 as default. If you want another Baseline to display, you will need to modify the desired view.

Updating an Existing Baseline or Capturing an Additonal Baseline

1. Select the desired tasks (optional).
2. Click the **Project** tab.
3. Click the drop-down arrow on **Set Baseline** in the Schedule group.
4. Click **Set Baseline**.
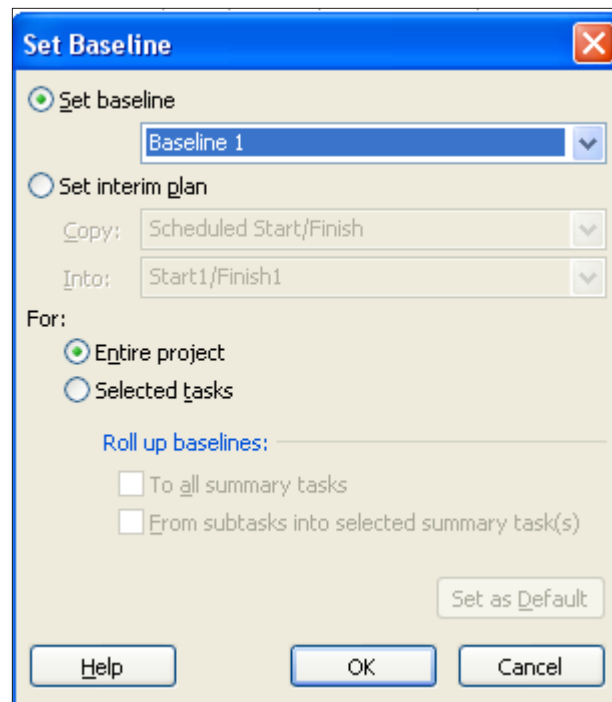5. Choose the desired options.
6. Click **OK**.

Figure 10-3   PLACEHOLDER

Overwriting Baseline 0 will replace planned task information with current task information and eliminate all historical variance values. Be sure this is your intent before overwriting Baseline 0.

Overview of Tracking

As your project progresses, you should track the completion of tasks to determine if the tasks followed the expected schedule. You often have changes that occur once the project begins. You may, for example, have tasks that must be postponed, tasks that start early or late, or tasks that take longer than expected, so you should update your project often.

When the project is updated, you enter what actually happened. Items to be updated include when tasks start and finish, and how long tasks take to complete. You can also make any necessary changes to the schedule. The schedule is meant to guide you through the completion of the project, but it does not have to be inflexible. The schedule should change as necessary to reflect what is most likely to happen in the project.

There are many different ways to update the status of your project. For each task in your project, you can enter the actual start and finish dates, percent complete, actual duration, remaining duration, and so on, or you can have Project enter the information automatically.

If you enter the percent complete, actual duration, or remaining duration, Project calculates and updates the entries for the other fields. For example, if you specify that a two-day task is 50% complete, Project automatically transfers the current start date into the field for the actual start date, enters the actual duration as one day, and calculates the Cost and Work fields based on the task and resource information. You can change any of the information Project enters automatically.

When you update the information for subordinate tasks, Project automatically updates the summary task. You cannot update a summary task directly.

Tracking Activities With Project

Tracking is one of the simplest functions that you can perform in Project. Unfortunately, most managers have sub-optimized their plans by setting constraints, or they do not understand Effort Driven Scheduling and undermine the simple part of tracking actual progress.

Before you begin the mechanics of tracking, there are several things to consider that will affect the tracking process and how variances are calculated.

Setting the Status Date

When you update tasks, some of the automatic tracking features work based on the status date. For example, if uncompleted work on a task is rescheduled, Project uses the Status Date as the current point in time and therefore, the past is to the left of the status date and the future is to the right of the status date.

To set the status date, complete the following steps:

1. Click the **Project** tab.
2. Click date to the right of **Status Date** in the Status group.
3. Choose or type the desired date
4. Click **OK**.
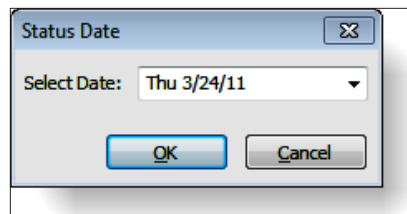
Figure 10-4   Status Date Dialog Box

If you forget to set the Status Date, Project will use the Current Date for any features that typically require the Status Date, such as rescheduling a task and Earned Value calculations.

When you are ready to do the update for the next period, be sure to change the Status Date if you do not want Project to use the Current Date for this period. This is useful when you are a week behind in updating your schedule and you want it to reflect last week's progress.

Displaying the Tracking Gantt View

The Tracking Gantt view displays both the baseline and current Gantt bars for every task and is very useful when doing variance analysis.

To display Tracking Gantt Chart view:

1. Click the **Task** tab.
2. Click the drop-down arrow on **Gantt Chart** in the View group.
3. Click **Tracking Gantt**.
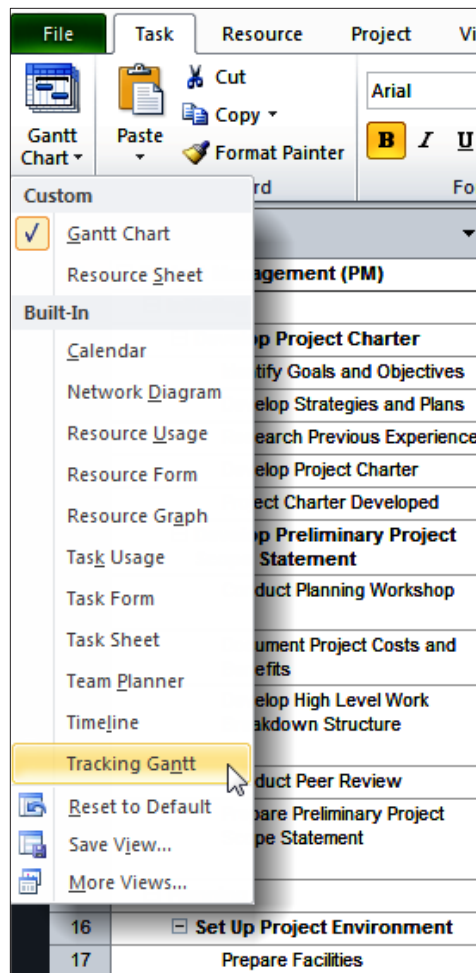
Figure 10-5   Gantt Chart Menu – Tracking Gantt Option

This view uses the default Baseline fields. To display an alternate baseline such as Baseline1, the view will need to be customized.

Marking a Task by Percent Complete

This is the simplest task update method, but it is based on the assumption that you are able to determine what percent complete a task is and that the task is going according to schedule.

If you use this method, it is suggested that general benchmarks be established for what is meant by certain percent complete levels. For example, 25% complete means that work has actually started on the task. This will help avoid confusion and falling behind on tasks.

To update a task by percent complete:

1. Select the desired task(s).
2. Click the **Task** tab.
3. Click **Gantt Chart** in the View group (optional).
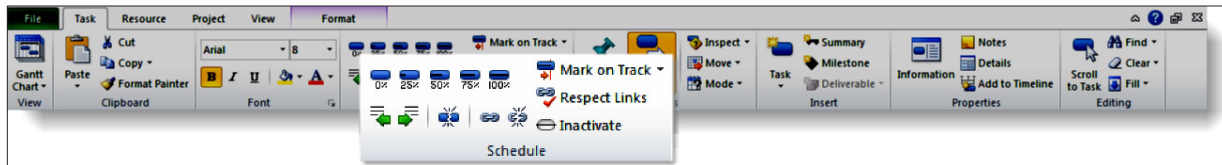4. Click the desired percentage button in the Schedule group.

Figure 10-6   Project Ribbon – Schedule Group – Percent Complete

This method may be useful to quickly update a large portion of the schedule and then you can go back and individually modify tasks that did not go according to schedule. Zero percent (0%) will essentially reset the task to incomplete.

Marking a Task on Track

Instead of choosing the percent complete, this method figures out the percent complete for you by marking the task complete to the status date (e.g., if the task should be done by the status date, the task will be marked 100% complete), but if only a portion of the task should be done by the status date, the percent complete will be calculated.

To mark a task on track:

1. Select the desired task(s).
2. Click **Mark on Track** in the Schedule group.

Figure 10-7   Project Ribbon – Schedule Group – Mark on Track

Updating a Task That is Not on Schedule

When a task is not progressing as scheduled, you typically have information about what is occurring, such as a delayed start date, or an extended remaining duration. This method allows you to fill in the information you do have and remaining pieces will automatically calculate. For example, if you enter an actual Finish Date, Project will automatically record the task as 100% complete. If you enter 2 days of actual duration on a 5 day task, Project will automatically reduce remaining duration to 3 days.

To update a task that is not progressing according to schedule:

1. Select the desired task(s).
2. Click the drop-down arrow on **Mark on Track** in the Schedule group.

3. Click **Update Tasks**.

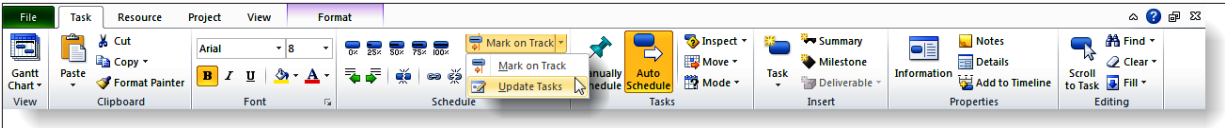4. Choose or type the desired updates.

5. Click **OK**.

Figure 10-8   Project Ribbon – Schedule Group – Update Tasks
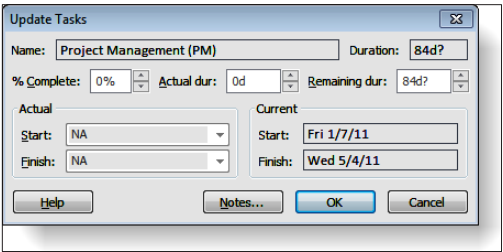

Figure 10-9   Update Tasks Dialog Box

Suggestions:

- If the task has not started, but the duration is now going to take more or less time, simply adjust **Remaining dur**.
- If the task has started, but not on the planned date, enter the **Actual Start**.
- If the task is in progress, but the total duration is incorrect, enter both **Actual dur** and **Remaining dur**.
- If the task finished on a different date, simply enter **Actual Finish**. This will trigger 100 to be assigned to % Complete.

Although you can use this feature for multiple task updates, all the fields in the Update Tasks dialog box will display blank. Update tasks individually if you wish to see the current information about the task such as duration, and remaining duration.

Include notes to record the circumstances behind the update. Notes are also a great way to document your schedule for others to review.
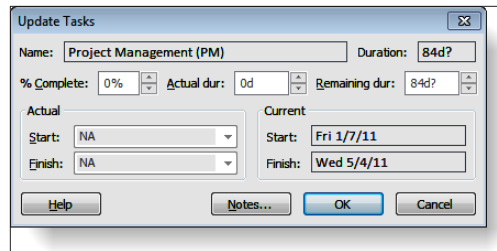
Figure 10-10   Update Tasks Dialog Box – Notes

Rescheduling/Moving a Task

If you have not turned on calculation options as described later in this chapter to automatically move a task, you may need to do that manually to adjust the bars in the Tracking Gantt view so only uncompleted work is shown in the future. When a task is moved, it can be moved either forward or backward.

To reschedule/move a task:

1. Select the desired task(s).
2. Click the **Task** tab.
3. Click the drop-down arrow on Move in the Tasks group.
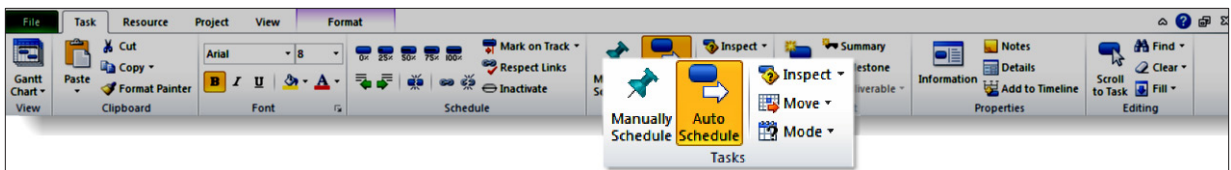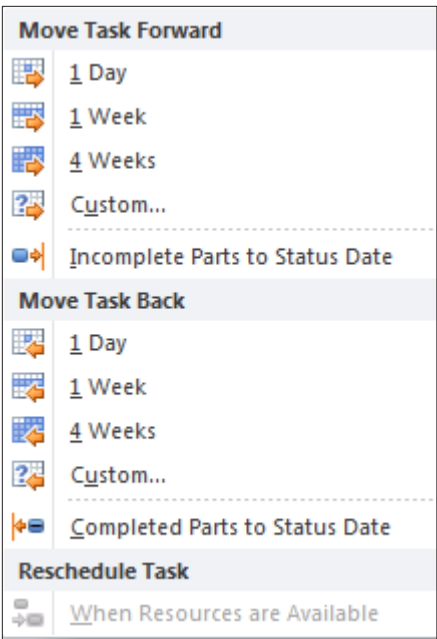4. Click the desired option.

Figure 10-11   Project Ribbon – Task Group – Move

Figure 10-12   Move Task Menu

Moving a task forward or backward puts a constraint on the task in its new location. Rescheduling a task postpones a task until resources are available, but does not put a constraint on the task.