Chapter 4

Fine Tune the Project Schedule

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Table Reports: Applying a Filter and or Group

The data in a Project 2010 schedule file can be manipulated to allow viewing data from alternate points of perspectives. Data criteria are entered as a request and data is extracted as a result of the query. When the criteria parameters are removed, the data will return to the original status for the schedule. Groups and filters may be applied to the same table simultaneously to refine the data required for reports.

This lesson examines:

1. What are groups
2. How to use groups
3. What are filters
4. How to use filters

Project 2010 has the ability to create customized groups and filters. This lesson will be addressing software groups and filters that are part of the standard software install. Customized groups and filters are discussed in Appendix A.

What are Groups?

Grouping data allows different ways of looking at the schedule data to help solve problems and answer questions. In a large schedule, grouping becomes a very valuable tool to group data from all task levels based on values within the schedule itself. Groups are created based on the value in a column and viewed through a table or a view. A column does not have to be contained in a table to be used as grouping criteria.

Criteria for Groups are provided for task, assignment and resource groupings and are not interchangeable. Only task groupings may be applied to task views, resource groupings to resource views and assignment groupings to assignment views.

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Task Groups provided are:

Table 4.1 PLACEHOLDER

Group name	Grouped by criteria (column name)
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
Status	Status

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Resource Groups provided are:

Table 4.2 PLACEHOLDER

Group name	Grouped by criteria (column name)
Complete and Incomplete Resources	% Work Complete
Resource Group	Group
Resource Type	Type
Standard Rate	Standard Rate
Work vs. Material	Type

Assignment Groups provided are:

Table 4.3 PLACEHOLDER

Group Name	Grouped by criteria (column name)	Comments
Assignments keeping outline structure	Name, Task outline number	May only be used from Resource Usage view

Creating custom groupings are described in Apprendix A.

How to Use Groups

To apply a Task grouping:

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- Reveal a Task based view or table
- **View → Group by** in the Data section
- Select the required grouping
  Standard groups are highlighted below:

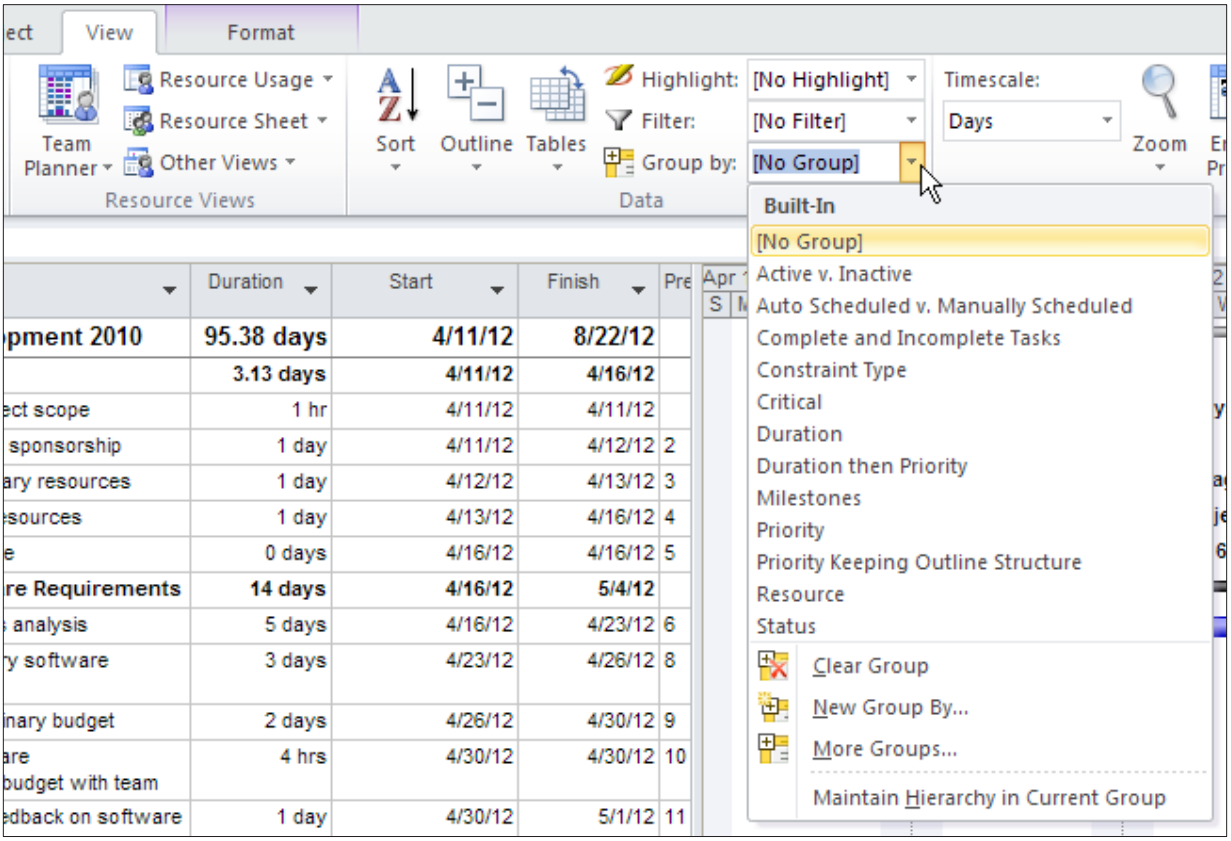

Figure 4-1 PLACEHOLDER

In the example below, the Duration grouping has been applied to the Task Entry table. The group intervals are described at the top of each grouping. Clicking the small box highlighted below to the left of each grouping level title will allow for collapsing and expanding the grouping levels. The view below has the groups expanded to reveal all detail.

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Task Mode	Task Name	Duration	Start	Finish	Predecessors
	Duration: 0 days	**0d**	**4/16/12**	**8/22/12**	
	Scope complete	0 days	4/16/12	4/16/12	5
	Analysis complete	0 days	5/4/12	5/4/12	15
	Design complete	0 days	5/24/12	5/24/12	23
	Development complete	0 days	6/25/12	6/25/12	30
	Unit testing complete	0 days	7/16/12	7/16/12	40
	Integration testing complete	0 days	8/1/12	8/1/12	46
	Training materials complete	0 days	7/27/12	7/27/12	55
	Documentation complete	0 days	7/6/12	7/6/12	65,61
	Pilot complete	0 days	8/10/12	8/10/12	72
	Deployment complete	0 days	8/17/12	8/17/12	79
	Post implementation review complete	0 days	8/22/12	8/22/12	84
	Software development template complete	0 days	8/22/12	8/22/12	85
	Duration: 0.13 days	**0.13d**	**4/11/12**	**4/11/12**	
	Determine project scope	1 hr	4/11/12	4/11/12	
	Duration: 0.5 days	**0.5d**	**4/30/12**	**5/24/12**	
	Review software specifications/budget with team	4 hrs	4/30/12	4/30/12	10
	Obtain approvals to proceed (concept, timeline, budget)	4 hrs	5/2/12	5/3/12	13
	Obtain approval to proceed	4 hrs	5/24/12	5/24/12	22
	Duration: 1 day	**1d**	**4/11/12**	**8/22/12**	

Figure 4-2 PLACEHOLDER

To collapse the groupings of data to obtain totals:

- **View → Outline → Level 1**

The collapsed view is shown below. Click the plus signs to view details within a group.

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Task Mode	Task Name	Duration	Start	Finish	Predecessors	Resource Names
	Duration: 0 days	0d	4/16/12	8/22/12		
	Duration: 0.13 days	0.13d	4/11/12	4/11/12		
	Duration: 0.5 days	0.5d	4/30/12	5/24/12		
	Duration: 1 day	1d	4/11/12	8/22/12		
	Duration: 2 days	2d	4/26/12	8/1/12		
	Duration: 3 days	3d	4/23/12	7/30/12		
	Duration: 4 days	4d	5/15/12	7/20/12		
	Duration: 5 days	5d	4/16/12	8/9/12		
	Duration: 15 days	15d	5/29/12	7/16/12		

Figure 4-3 PLACEHOLDER

To restore all groupings to full detail.

- **View → Outline → All Subtasks**

To remove a grouping:

- **View → Group → No Group** or **Clear Groups**

Grouped reports may be printed.

Groupings have the ability to be grouped using a maximum of 10 grouping values.

What are Filters?

Filters allow the scheduler to request specific data using a column value for filter critiera. Filtered data allows focusing on data that is required for a specific report or query. The column data used to filter a report does not have to be contained in the current view or table. Some filters will request data at the time they are executed to obtain run time values. Filters may also be applied to Project 2010 standard reports and used for data exports as well.

Project 2010 provides preset filters for task, assignment and resource data. Custom filters may also be created and will be addressed in Appendix A. The Autofilter, which is also a feature in Excel, is available in Project and may be used independently as a filter or in addition to other applied filters.

Filters are created as task filters or resource filters. Below is a list of

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the standard filters that are part of Project 2010.

Task filters provided are:

Table 4.4 PLACEHOLDER

Filter	Criteria to filter on is contained in field	Requires value entered at run time
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	
Manually Scheduled Tasks	Task Mode	

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Table 4.4 PLACEHOLDER

Filter	Criteria to filter on is contained in field	Requires value entered at run time
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	
Tasks/Assignments with Overtime	Overtime Work	

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Table 4.4 PLACEHOLDER

Filter	Criteria to filter on is contained in field	Requires value entered at run time
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 4.5 PLACEHOLDER

Filter	Criteria contained in field	Requires value entered at run time
Budget Resources	Budget	
Costs Greater Than…	Cost	X
Cost Overbudget	Cost v Baseline cost	
Created After…	Created	X
Date Range…	Start, Finish	X
Group…	Group	X
In Progress Assignments	Actual start, Actual finish	

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Table 4.5 PLACEHOLDER

Filter	Criteria contained in field	Requires value entered at run time
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	
Unstarted Assignments	Actual start	
Work Complete	% complete	
Work Incomplete	% complete, Work	

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Table 4.5 PLACEHOLDER

Filter	Criteria contained in field	Requires value entered at run time
Work Overbudget	Work v Baseline Work	

How to Use Filters

To apply a Task filter from the Gantt Chart View:

- **Task → Gantt Chart**
- **View → Filter → Select Filter**

  The list of filters shown is a short list of standard available task filters.

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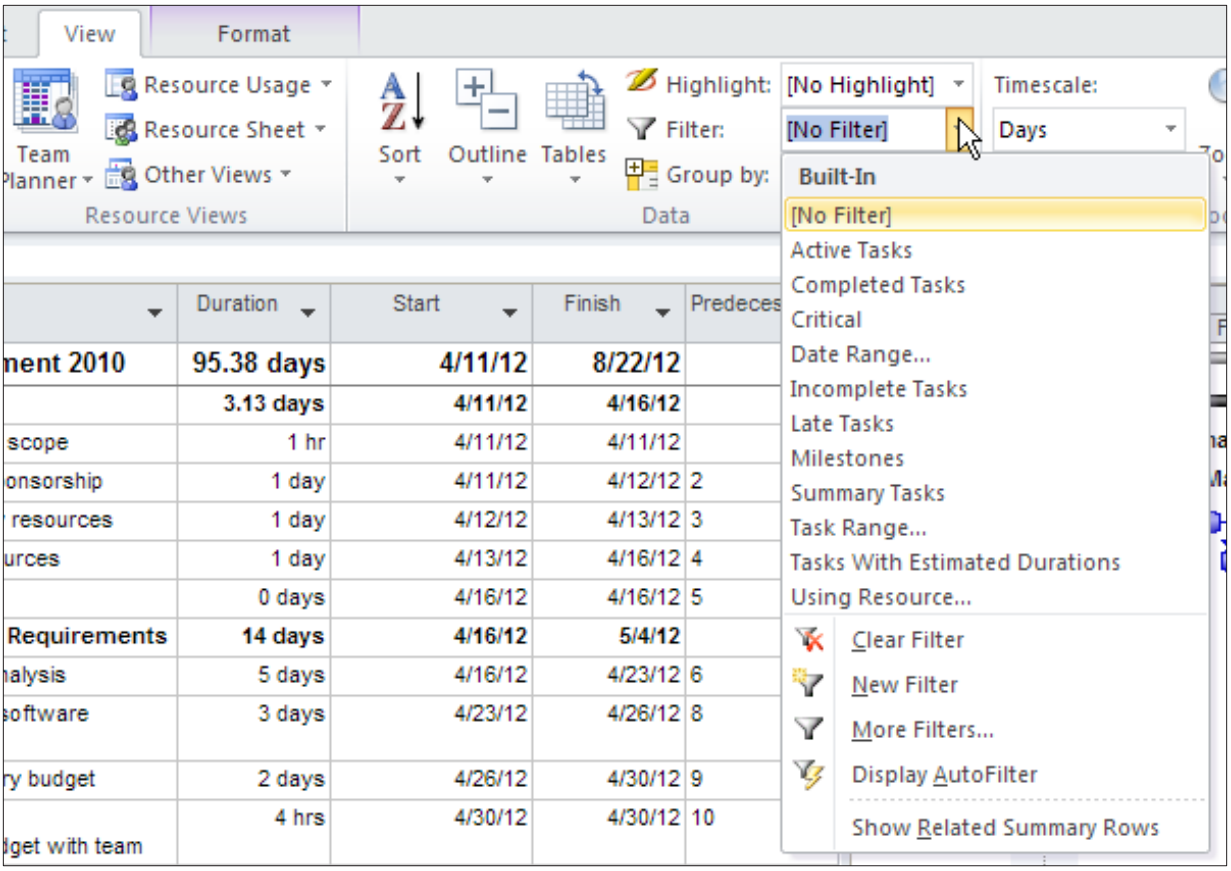

Figure 4-4 PLACEHOLDER

In the example below, the task Milestone filter has been applied. The filter contains the critieria to filter out and show only the detail tasks that contain a value of “Yes” in the Milestone column. The filter defination also indicates that the summary tasks should be included in the view. Milestone reports are very good project status reports because they hide all of the project detail and display the goal points of the project.

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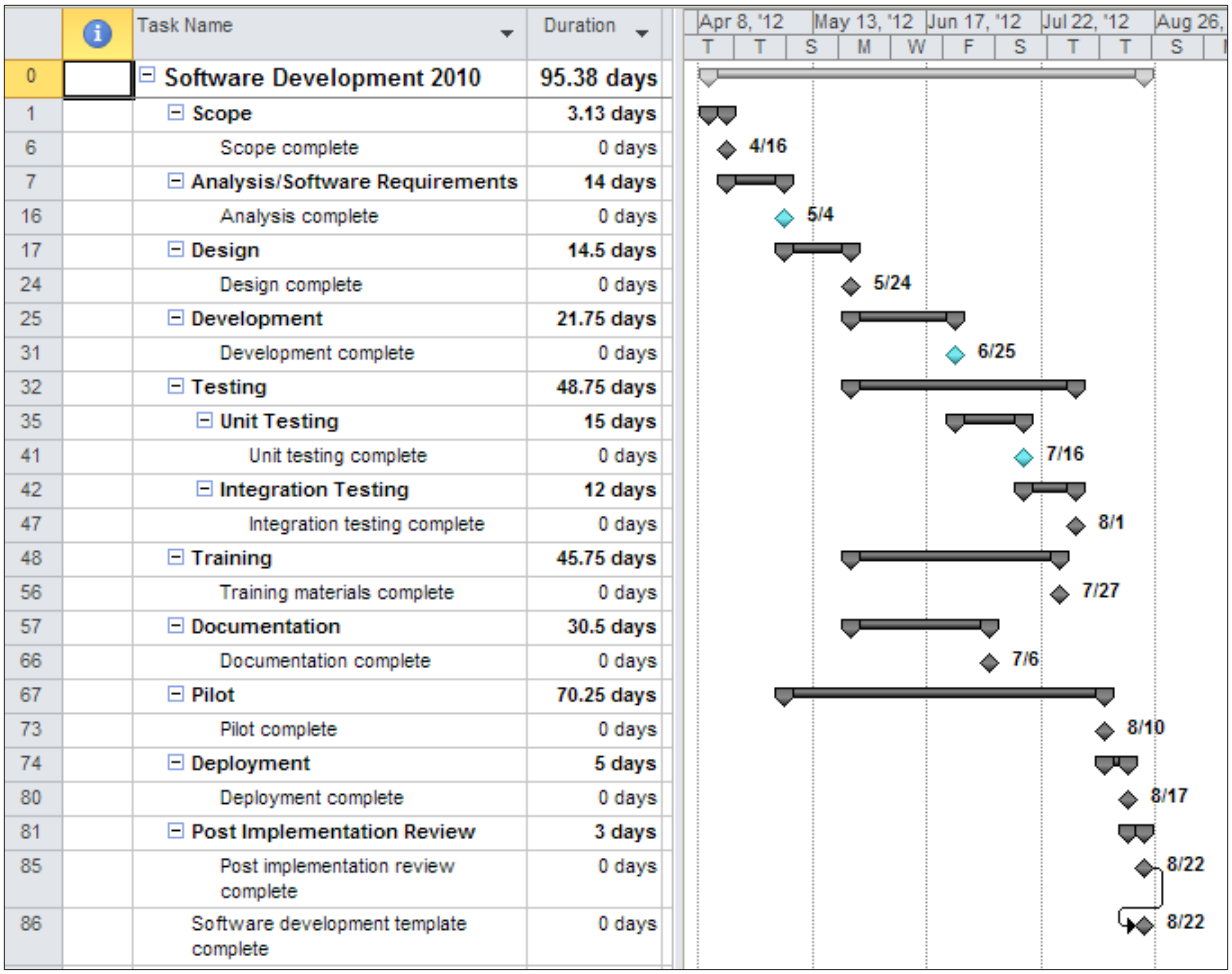

Figure 4-5 PLACEHOLDER

To remove the filter:

- Click **View** → **Filter** → **No filter** or **Clear Filter**

OR

- Click F3

More filters are available by clicking **More Filters** at the bottom of the available filter list. When this option is selected, the box below will appear. In the More Filters dialog box below, there are options to select either Task or Resource filters. The list of available filters for each will be different because the filters are designed to be applied to either task information or resource information.

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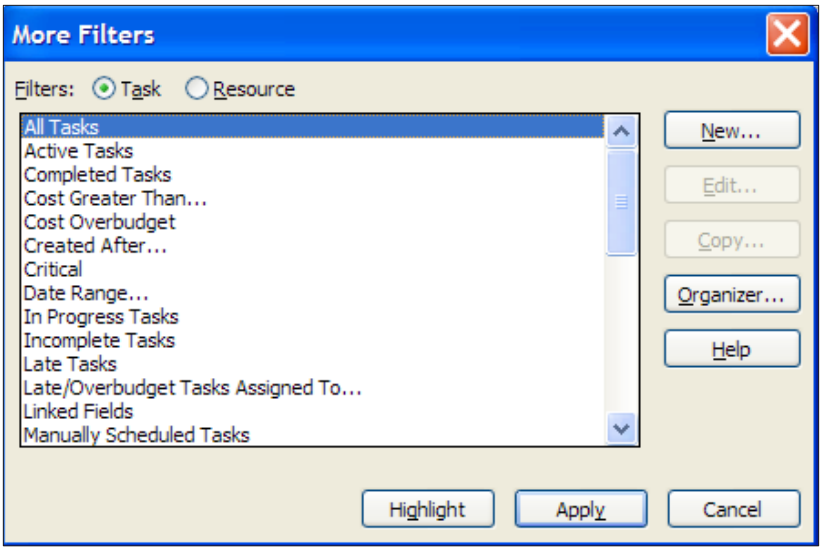

Figure 4-6 PLACEHOLDER

Another option accessable through this dialog box is to use the Highlight filter.

When the Highlight filter is applied all of the data remains visible in the view and filtered data is displayed in blue. Below the same Milestone filter was applied as above requesting the Highlight option. The Highlight filter is removed in the same way as a regular filter is removed.

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5		Secure core resources	1 day	4/13/12	4/16/12	4
6		Scope complete	0 days	4/16/12	4/16/12	5
7		**Analysis/Software Requirements**	**14 days**	**4/16/12**	**5/4/12**	
8		Conduct needs analysis	5 days	4/16/12	4/23/12	6
9		Draft preliminary software specifications	3 days	4/23/12	4/26/12	8
10		Develop preliminary budget	2 days	4/26/12	4/30/12	9
11		Review software specifications/budget with team	4 hrs	4/30/12	4/30/12	10
12		Incorporate feedback on software specifications	1 day	4/30/12	5/1/12	11
13		Develop delivery timeline	1 day	5/1/12	5/2/12	12
14		Obtain approvals to proceed (concept, timeline, budget)	4 hrs	5/2/12	5/3/12	13
15		Secure required resources	1 day	5/3/12	5/4/12	14
16		Analysis complete	0 days	5/4/12	5/4/12	15

Figure 4-7 PLACEHOLDER

The Highlight filter may also be applied from the View bar as shown below:

- **View → Highlight → Select a filter**

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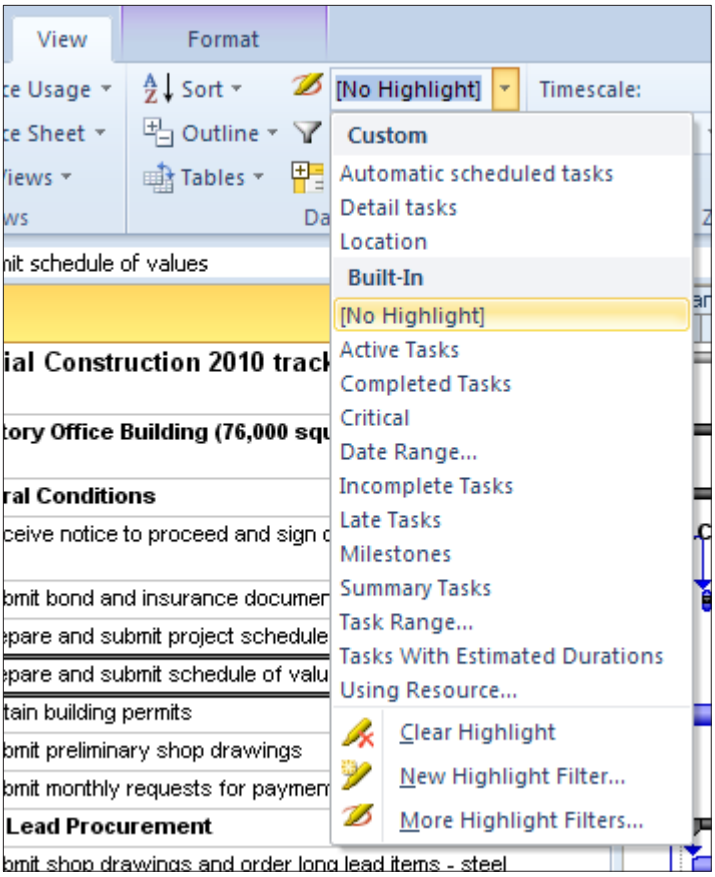

Figure 4-8 PLACEHOLDER

The Autofilter allows filtering of a specific column or multiple columns of data. The column used to filter the table must be visible in the table when using Autofilter. Autofilter cannot be applied to Project 2010 standard project reports or exports of data.

To turn on the Autofilter:

- **View → Filter → Display Autofilter**

  A down arrow will appear when Autofilter is turned on.

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		Task Name	Duration	Start	Finish	Predecessor
0		**Software Development 2010**	**95.38 days**	**4/11/12**	**8/22/12**	
1		**Scope**	**3.13 days**	**4/11/12**	**4/16/12**	
2		Determine project scope	1 hr	4/11/12	4/11/12	
3		Secure project sponsorship	1 day	4/11/12	4/12/12	2

Figure 4-9 PLACEHOLDER

To activate Autofilter:

- Click the down arrow for the column
- Select a value

Below illustrates the options of available when using the Autofilter to filter the Resource Name column in the Task Entry table. Every column will contain unique data and the Filters offered will change with the columns selected:

Multiple options become available:

- Column A-Z sort
- Column Z-A sort
- Group on this field
- Filters

To select the Project Manager resource only:

- Click **Select All** to clear all checkboxes
- Click **Project Manager**

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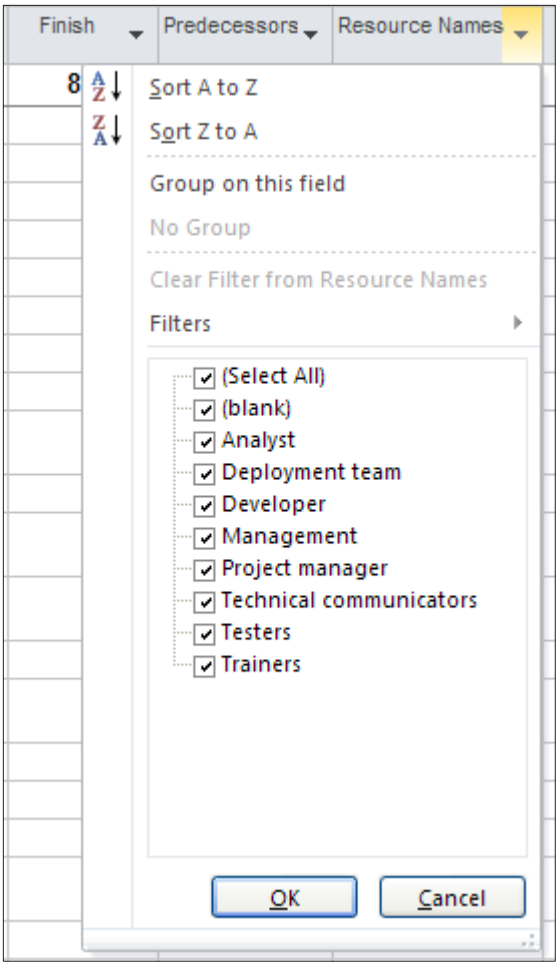

Figure 4-10 PLACEHOLDER

Below is the result of applying this filter. A funnel icon appears in the Resource Name column as an indicator to show which column is being used to filter the table. Note that all of the tasks in the Resource Name column contain the value Project Manager.

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Task Name	Duration	Start	Finish	Predecessors	Resource Names
Software Development 2010	**95.38 days**	**4/11/12**	**8/22/12**		
Scope	**3.13 days**	**4/11/12**	**4/16/12**		
Define preliminary resources	1 day	4/12/12	4/13/12	3	Project manager
Secure core resources	1 day	4/13/12	4/16/12	4	Project manager
Analysis/Software Requirements	**14 days**	**4/16/12**	**5/4/12**		
Develop preliminary budget	2 days	4/26/12	4/30/12	9	Project manager
Review software specifications/budget with team	4 hrs	4/30/12	4/30/12	10	Project manager,Analyst
Develop delivery timeline	1 day	5/1/12	5/2/12	12	Project manager
Obtain approvals to proceed (concept, timeline, budget)	4 hrs	5/2/12	5/3/12	13	Management,Project manager
Secure required resources	1 day	5/3/12	5/4/12	14	Project manager
Design	**14.5 days**	**5/4/12**	**5/24/12**		
Obtain approval to proceed	4 hrs	5/24/12	5/24/12	22	Management,Project manager
Pilot	**70.25 days**	**5/4/12**	**8/10/12**		
Identify test group	1 day	5/4/12	5/7/12	16	Project manager
Post Implementation Review	**3 days**	**8/17/12**	**8/22/12**		
Document lessons learned	1 day	8/17/12	8/20/12	80	Project manager
Distribute to team members	1 day	8/20/12	8/21/12	82	Project manager
Create software maintenance team	1 day	8/21/12	8/22/12	83	Project manager

Figure 4-11 PLACEHOLDER

To clear the filter and restore the data to its original state:

- Click F3

OR

- Click the funnel symbol
- Clear filter from <column name>

Many filters will include summary as well as detail tasks. Summary tasks may be turned off to view detail tasks only. To turn off Summary tasks:

- **Format** → uncheck the **Summary Task** checkbox

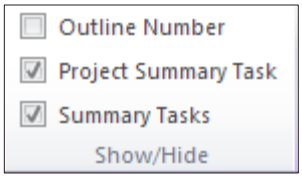

Figure 4-12 PLACEHOLDER

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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 activities:

1. Click the **Sort** dropdown arrow located in the Ribbon, **View** tab. **Data** group.
2. Select the desired option from the list.

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Practice: Working with Groups and Filters

The Practice page is where you write detailed instructions for completing work listed as Exercises.

Type the Exercise Title and write a brief summary what the student will be doing in the exercise. Then list your ideas what they will be doing.

SAMPLE

In this practice you will create a Project Server Authentication profile and then configure the local cache settings in Project Professional 2007.

Exercise 1: Create Project Server Authentication Profile

In this exercise you will create Project Server authentication profile to connect to the Project Web Access site.

Perform the following exercise on the PS07 virtual machine.

1. From the **Start** menu, click **All Programs** → **Microsoft Office** → **Microsoft Office Tools** and click **Microsoft Office Project Server 2007 Accounts**.
2. In the **Project Server Accounts** dialog box, click **Add**.
3. In the **Account Properties** dialog box, and complete the following settings and click **OK**.

Table 4.6 PLACEHOLDER

Setting	Perform the following:
Account Name	Type `Project Server`

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Table 4.6 PLACEHOLDER

Setting	Perform the following:
Project Server URL	Type `http://epm/pwa`
When connecting	Select **Use Windows user account**
Set as default account	Select check box

Lesson 4: 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 2010, taking a deeper look at the results of how the assignments were created will be essential.

In this lesson we will take a look at:

- Resource Usage view
- Task Usage view
- Team Planner view

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 for time and cost information and enables fine tuning of assignments. Details maybe viewed at any timescale density that is appropriate for your project.

Using this view will also allow access to the Assignment information box where you can adjust the rate charts used per task and resource assignment contouring.

Some of the details available in this view will answer the following questions?

- How much availability does a resource have? Per day, per week, etc.
- What is the cost of having a resource work on a task?
- Are all of the tasks assigned to a resource appropriate for the resource?
- How many hours per day/week/month is a resource assigned to a task?
- Is a resource overallocated? (Overbooked)
- What is the future demand for a resource for this project?

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- What is the total number of hours and cost for a resource assigned to the project?
- What tasks to avoid assigning resources to.
- During tracking, what is the remaining work on a task for a resource?

Looking at the view below, the G. C. Procurement manager is assigned to a quantity of work at the week level. The detail of the work is displayed to the right and the total amount of work assigned to the resource is displayed to the left. The greyed numbers at the top of each resource are the total number of hours for the timeframe. In the view below, the week of January 16, G. C. Procurement is assigned to work 36 hrs. The 36 hours is distributed over 2 detailed tasks.

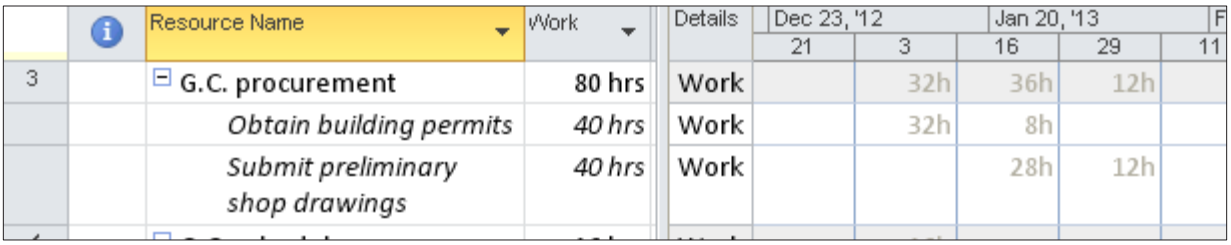

Figure 4-13 PLACEHOLDER

Using the timescale zoom in the lower right corner of the screen (or double clicking on the timescale), to zoom to a per day or per week level of detail. This view may also be customized by adding columns of additional data on both the left and right sides of the view shown below.

Figure 4-14 PLACEHOLDER

To add columns on the right side of the screen:

- Right click on the right side
- Select the desired column(s) from the short list

OR

- Right click on the right side
- Select **Detail** styles
- Click on a column on the left
- Click **Show**
- With the field selected on the right, the color may be changed

Note: the color change is for the title rows only

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- Click **OK**

While in this view, there are also buttons on the Format ribbon bar which will help customize the view. The “Add Details” is the same form as the detail styles option above. Below is a view of the Format ribbon for the Resource Usage view.

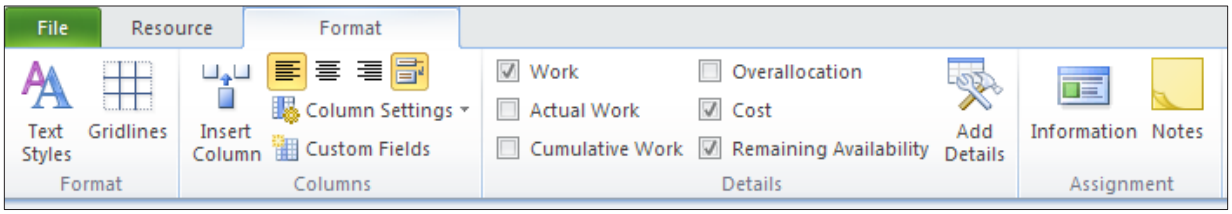

Figure 4-15 PLACEHOLDER

In the view below, the Remaining Availability and Cost fields have been added. The G. C. Procurement resource is assigned 80 hours to the project. He is also showing availability of 4 hours per day during the timeframe shown. The task “Obtaining building permits” is showing a 50% or 4 hours per day assignment. Using the resources standard rate, the daily costto the project will be $400.00 per day.

	Resource Name	Work	Details	7	8	9	10	11
3	G.C. procurement	80 hrs	Work	4h	4h	4h	4h	4h
			Rem. Avail.	4h	4h	4h	4h	4h
			Cost	$400.00	$400.00	$400.00	$400.00	$400.00
	Obtain building permits	*40 hrs*	Work	4h	4h	4h	4h	4h
			Rem. Avail.					
			Cost	$400.00	$400.00	$400.00	$400.00	$400.00
	Submit preliminary shop drawings	*40 hrs*	Work					
			Rem. Avail.					
			Cost					

Figure 4-16 PLACEHOLDER

Cost rate tables are assigned to resources through the Resource Sheet using the Resource Information dialog box, Cost tab. 5 rate scales are available per resource, however only one may be used per task. The rate scales are labeled A-E and cannot be renamed. Rates will have trigger dates to enable increases to be entered in advance. Using the option outlined below allows assignment of a specific rate table to a task.

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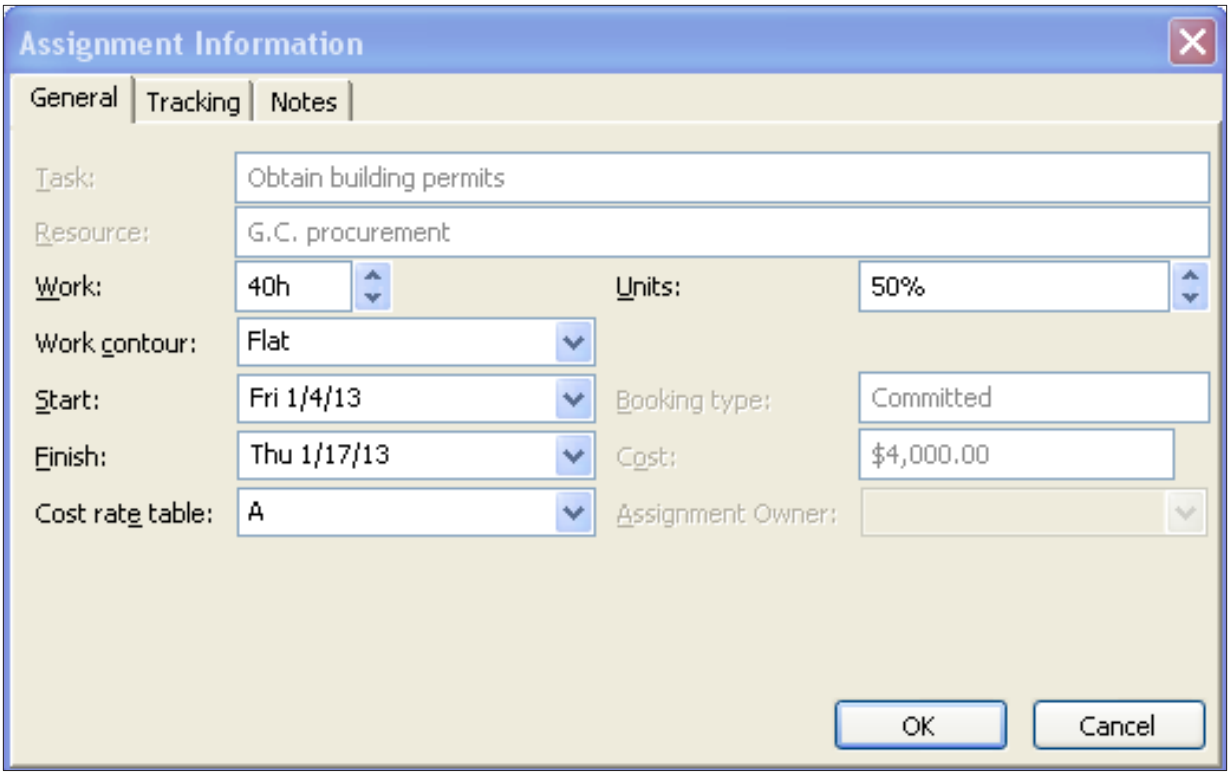
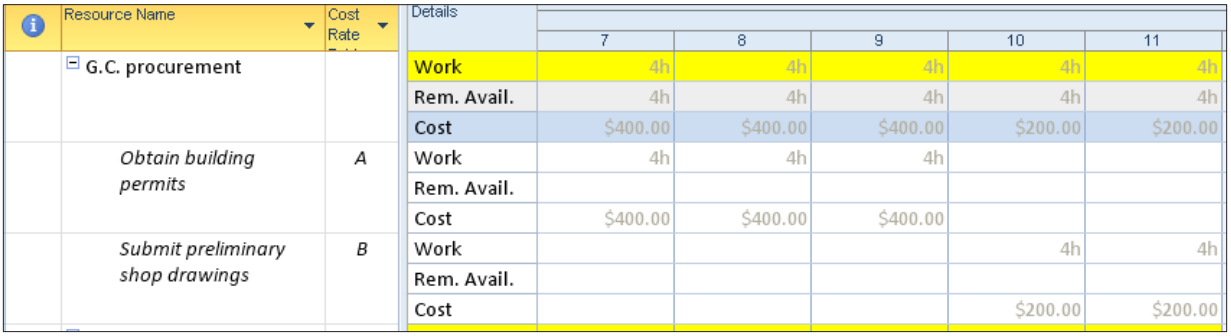


Figure 4-17 PLACEHOLDER

Below is an example of rate scale A applied to the task "Obtain building permits" and B has been assigned to "Submit Preliminary Shop Drawings". The work of the first task is at a different rate than the work of the second task.



Resource Name	Cost Rate	Details	7	8	9	10	11
G.C. procurement		Work	4h	4h	4h	4h	4h
		Rem. Avail.	4h	4h	4h	4h	4h
		Cost	$400.00	$400.00	$400.00	$200.00	$200.00
Obtain building permits	A	Work	4h	4h	4h		
		Rem. Avail.					
		Cost	$400.00	$400.00	$400.00		
Submit preliminary shop drawings	B	Work				4h	4h
		Rem. Avail.					
		Cost				$200.00	$200.00

Figure 4-18 PLACEHOLDER

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

In future modules we will discuss applying filters and groupings to views which will increase value of reports obtainable from this view.

Task Usage View

Task Usage view is very similar to the Resource Usage view, however, the content is viewed 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. Details maybe viewed at any timescale density that is appropriate for your project.

Using this view will help to answer some of the following questions:

- What resources are assigned to a task?
- Which tasks are overallocated and where?
- Which tasks do not have a resource assigned?
- What are the total cost and number of hours of a task?
- What is the remaining work of a task?
- What is the Value of Baseline vs. Actual Work and Cost for a task?
- How many resources do I need to have to complete a task?
- What percent allocations are my resources assigned to tasks?

Adding column information works the same as adding information to the Resource Usage view above:

To add columns on the right side of the screen:

- Right click on the right side
- Select one of the columns from the short list

OR

- Right click on the right side
- Select “Detail styles”

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- Click on a column on the left
- Click “Show”
- With the field selected on the right, the color may be changed
  Note: the color change is for the title rows only
- Click OK

Project 2010 has provided a ribbon bar for the Task Usage view. Buttons on this bar are available to help with formatting and changing the information viewed. The Details sections will add and remove columns on the right side of the grid.

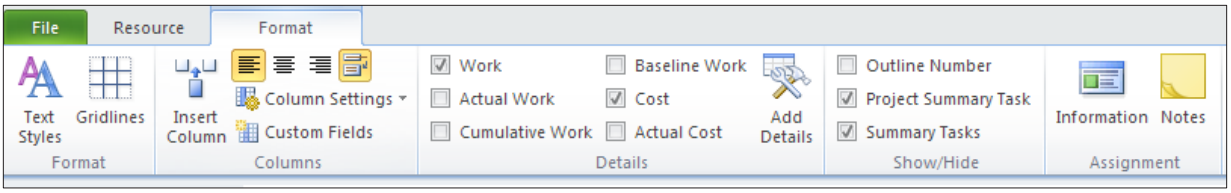

Figure 4-19 PLACEHOLDER

Below is an illustration of the Task Usage view showing work and cost for the “Obtain building permits” task. You will note that there are 2 resources assigned and they are not performing the same amount of the work and are working different times. They are also assigned different hourly rates.

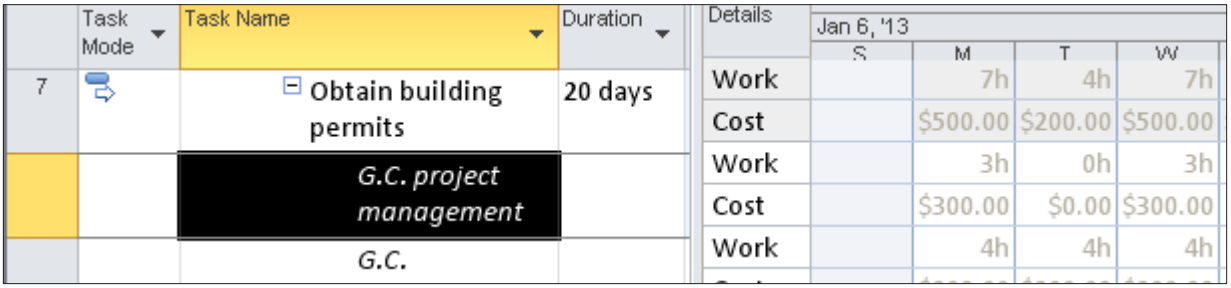

Figure 4-20 PLACEHOLDER

In future modules we will discuss using filters and groupings to give more dimension to the reports that can be obtained from this view.

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Team Planner View

The Team Planner view is new in Project 2010. 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. This type of view is also known as Swim Lanes.

Team Planner view is only available in Project 2010 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.

To view the Team Planner:

Task → Gantt chart → Team Planner

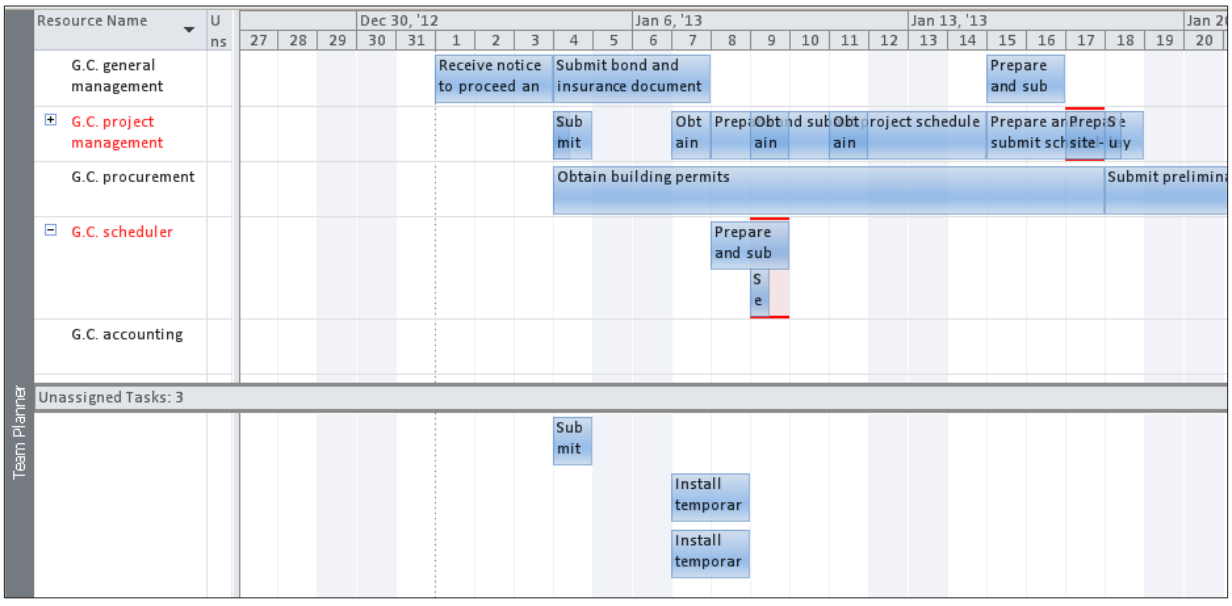

Figure 4-21 PLACEHOLDER

Below is a chart to help with understanding how to read the indicators

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of the Team Planner view:

Table 4.7 PLACEHOLDER

Feature	Meaning
A vertical orange line	Today's date
Tasks colored in darker blue	Progress on the task
Teal colored tasks	Manually scheduled tasks
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 keystrokes that will help you work with the information in this view.

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Table 4.8 PLACEHOLDER

Action	Result
Double click the resource name	Resource Information dialog box
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.

Things to know about when working with Team Planner view:

- Only active tasks will show in the team planner view.
- Bars may be dragged back and forth to even out workloads as well as move assignments from one resource to another.
- An unassigned task may also be moved (dragged) from the unassigned area (bottom) to a timeframe for a resource. The default assignment will be at 100% units.

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- Unassigned tasks in the lower pane are aligned with their planned start dates.
- If automatic scheduling is the task mode for a task, the task type will come into play for the assignment when moved from one resource to another.
- When tasks are moved from one resource to another, assignments will be created for the new resource at the same percent allocation that the original resource was assigned.
- For automatically scheduled tasks, dragging tasks to change dates will create a start no earlier than constraint. This constraint might cause problems in calculating the schedule.
- Error messages will be returned when there is a relationship conflict when moving tasks.
- When moving manually scheduled tasks, all moves will be accepted and no constraints will be set.
- Tasks may be assigned to resources without being scheduled.
- A box in the upper pane represents an assignment and not a task. If a task has several resources assigned, when you move the boxes you are moving the assignment for an individual only.
- To reactivate a task, return to the Gantt view.
- Percent complete tracking will mark the tasks completed as planned. More information regarding tracking will be discussed in the tracking module.

To the right of each resource name is a column titled “Unscheduled tasks”. Unscheduled tasks may be dragged to this column to be assigned to a resource. If there is no duration value to the task, some work will be assigned to the resource. If there is a duration value on the task, the resource will be assigned at 100% and work will be calculated. Even though a work value exists for the task, the task will be considered a duration-only task.

In the example below, the task “Calculate moving expenses” is an automatically scheduled task and is not assigned to a resource.

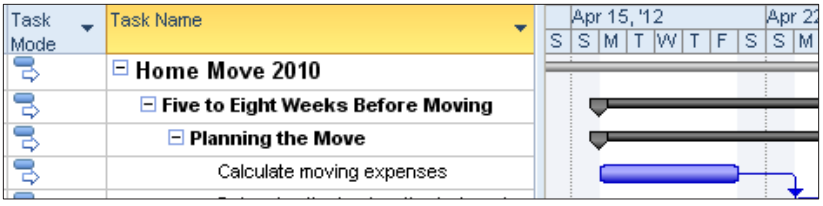

Figure 4-22 PLACEHOLDER

In the Team Planner view, a task is dragged from the unassigned area

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in the lower portion of the view to the “Unscheduled tasks” column to the right of the resource name column. The task bar changes to teal to indicate that it is a manually scheduled task. Below is the team planner view with the task reassigned but not scheduled to Bob Smith. The task is not visible in the assignment bar area of the view.

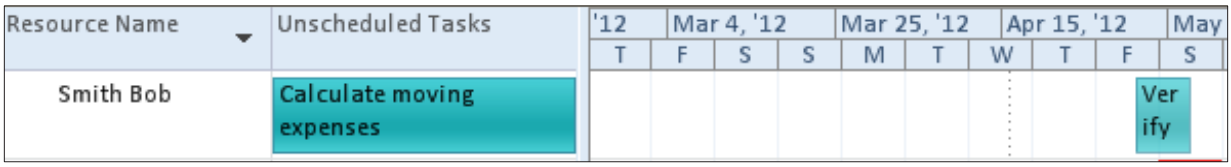

Figure 4-23 PLACEHOLDER

The Gantt chart for the assignment is shown below. Note the task type is manually scheduled and the Gantt bar is showing a format of unknown duration.

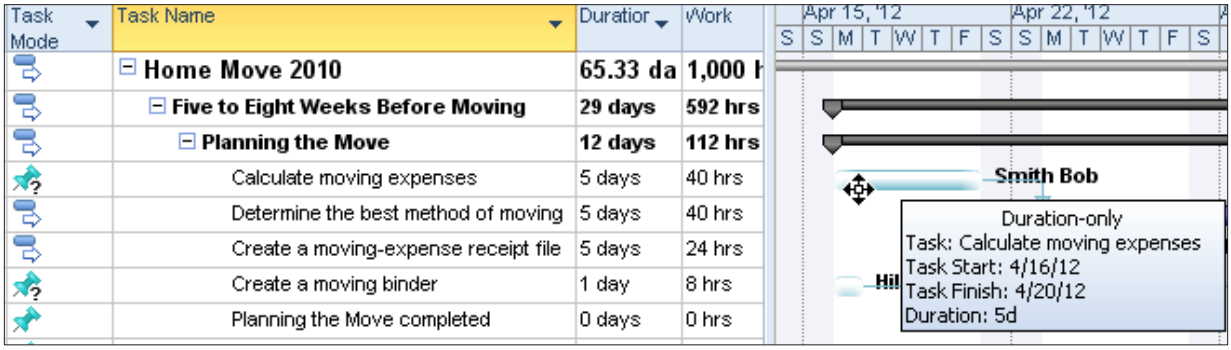

Figure 4-24 PLACEHOLDER

A ribbon formatting bar is available when using the Team Planner view. Tools are available for deeper formatting of this view. Show/Hide buttons add or remove data from the view.

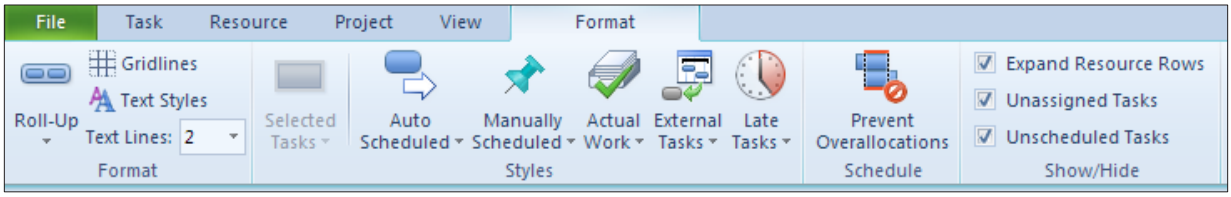

Figure 4-25 PLACEHOLDER

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In future modules we will learn how to add buttons to the ribbon bars. A helpful addition to the Resource bar is adding the Scroll to task button.

Practice: Viewing Resource Assignments

The Practice page is where you write detailed instructions for completing work listed as Exercises.

Type the Exercise Title and write a brief summary what the student will be doing in the exercise. Then list your ideas what they will be doing.

SAMPLE

In this practice you will create a Project Server Authentication profile and then configure the local cache settings in Project Professional 2007.

Exercise 1: Create Project Server Authentication Profile

In this exercise you will create Project Server authentication profile to connect to the Project Web Access site.

Perform the following exercise on the PS07 virtual machine.

1. From the **Start** menu, click **All Programs** → **Microsoft Office** → **Microsoft Office Tools** and click **Microsoft Office Project Server 2007 Accounts**.
2. In the **Project Server Accounts** dialog box, click **Add**.
3. In the **Account Properties** dialog box, and complete the following settings and click **OK**.

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Table 4.9 PLACEHOLDER

Setting	Perform the following:
Account Name	Type `Project Server`
Project Server URL	Type **`http://epm/pwa`**
When connecting	Select Use Windows user account
Set as default account	Select check box

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Leveling and Vies that Show the Assignments

Most project manger's work daily to make sure that all work is covered by appropriate resources that have enough time available to do the work necessary to complete a project. When resources are overbooked they are called Overallocated.

In this lesson we will discuss:

1. Understanding overallocations
2. Views to discover overallocations
3. Manually leveling resources
4. Automatic leveling of resources

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.

Below is a view of tasks with overallocated resources:

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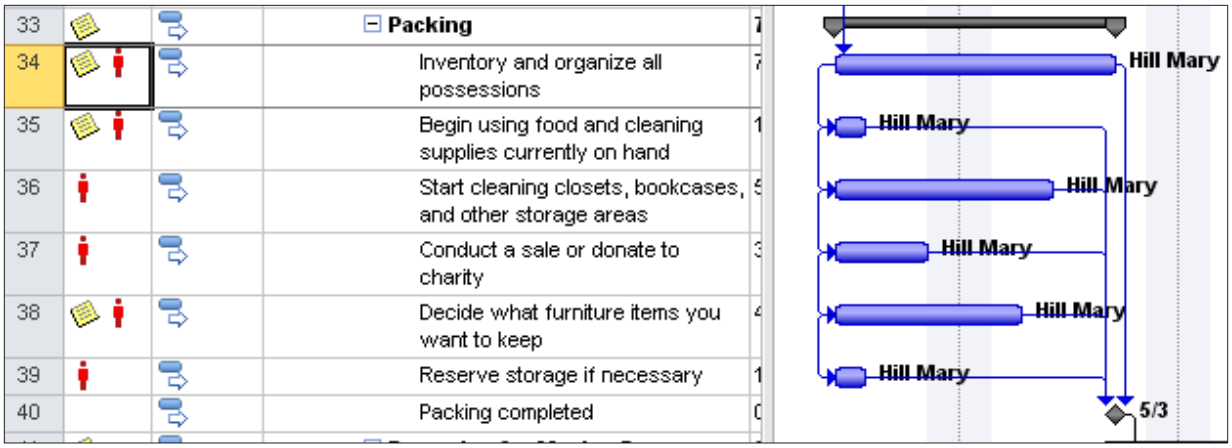

Figure 4-26 PLACEHOLDER

Views to Identifying Overallocations

There are several views in Project 2010 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:

- Resource sheet
- Resource graph
- Resource allocation view
- Team Planner

Resource Sheet: shows resources that are overallocated in red and will also display a yellow warning diamond in the indicators column. This indicates that the resource is overallocated on at least one assignment.

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	Resource Name	Type	Material	Initials	Group	Max.	Std. Rate	Ovt. Rate	Cost/Use	Accrue	Base
1	Smith Bob	Work		S		100%	$100.00/hr	$0.00/hr	$0.00	Prorated	Standard
2	Taylor Sue	Work		T		100%	$100.00/hr	$0.00/hr	$0.00	Prorated	Standard
3	Chu Eric	Work		C		100%	$100.00/hr	$0.00/hr	$0.00	Prorated	Standard
4	Hill Mary	Work		H		100%	$100.00/hr	$0.00/hr	$0.00	Prorated	Standard
5	Cook Cathy	Work		C		100%	$100.00/hr	$0.00/hr	$0.00	Prorated	Standard
6	Adams Larry	Work		A		100%	$100.00/hr	$0.00/hr	$0.00	Prorated	Standard
7	Project Mgr.	Work		P		100%	$100.00/hr	$0.00/hr	$0.00	Prorated	Standard
8	Ron	Work		R		25%	$100.00/hr	$0.00/hr	$0.00	Prorated	Standard
9	Joan	Work		J		50%	$100.00/hr	$0.00/hr	$0.00	Prorated	Standard
10	Mike	Work		M		75%	$100.00/hr	$0.00/hr	$0.00	Prorated	Standard

Figure 4-27 PLACEHOLDER

In the case of Mary Hill and Larry Adams, both are overallocated somewhere in the schedule. We will need to look at other views to get additional information.

The Resource Graph view will show what days a resource is over-allocated in a graphic format.

To view the Resource Graph:

Task → Gantt chart → Resource Graph

- Click the slider at the bottom of the left of the screen to scroll through the resources. Stop when a resource name is in red.
- **Resource → Next overallocation** button
- The graphic bars will advance to the first overallocated resource. Continue clicking the **Next Overallocation** button until all overallocations have been viewed. An error message will display when all overallocations are shown for a particular resource.

The view below shows Mary Hill's 100% capacity shows an indicator line. The blue bars below the line are within her 100% capacity limits. The red bars above the line represent her overallocations based on her resource calendar. Peak Units are displayed in the lower portion of the graphic. This represents the number of resources required to accomplish the work at the current level of assignment by this resource. This example shows that we will need 600% of Mary or 6 Mary's to complete the work.

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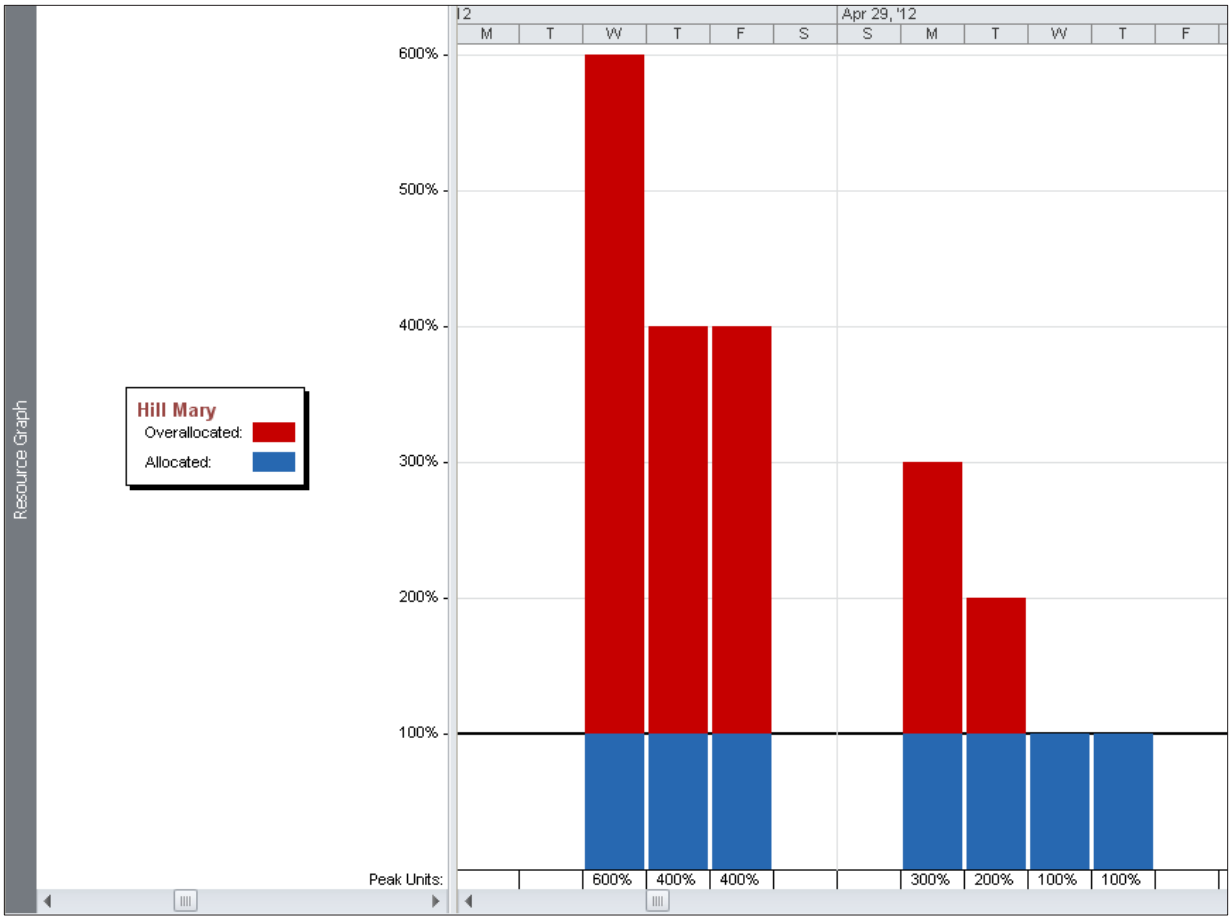

Figure 4-28 PLACEHOLDER

The Resource Graph view may also be customized by right clicking the Peak Units line and selecting other values to be shown on the graph. Below are the option choices for data that is available to be shown using this view. Further customization is also available using the format bar available for the Resource Graph shown below.

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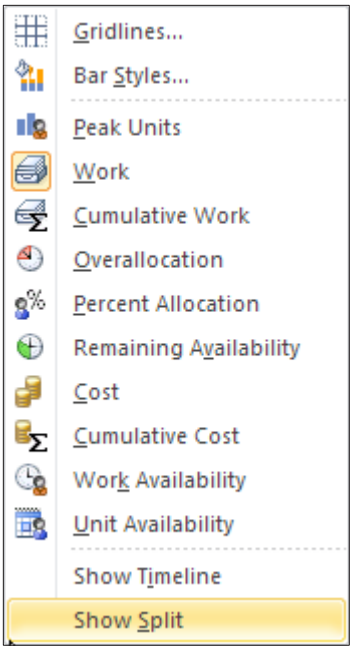

Figure 4-29 PLACEHOLDER

To resolve overallocations in the schedule, more information will be needed. We still need to find out more information about what tasks are involved and for how many hours. The Resource Allocation view is a split view with the Resource Usage view on the top and the Leveling Gantt view on the bottom. This view allows the scheduler to see what tasks are involved and when they are scheduled. Getting the full picture of what other tasks the resource is assigned to and who is assigned to the tasks with the resource, will give the scheduler more information to make an informed decision.

To reveal the Resource Allocation view:

- **Tasks → Gantt chart → More Views → Resource Allocation view → Apply**
- Click on the overallocated resource (in red)
- Click **Scroll to task** button to bring Mary's work into view

In the view below Mary is overallocated between April 25 and April 30. We can see that she is fully assigned at 100% to several tasks. Some of the tasks have a second resource assigned.

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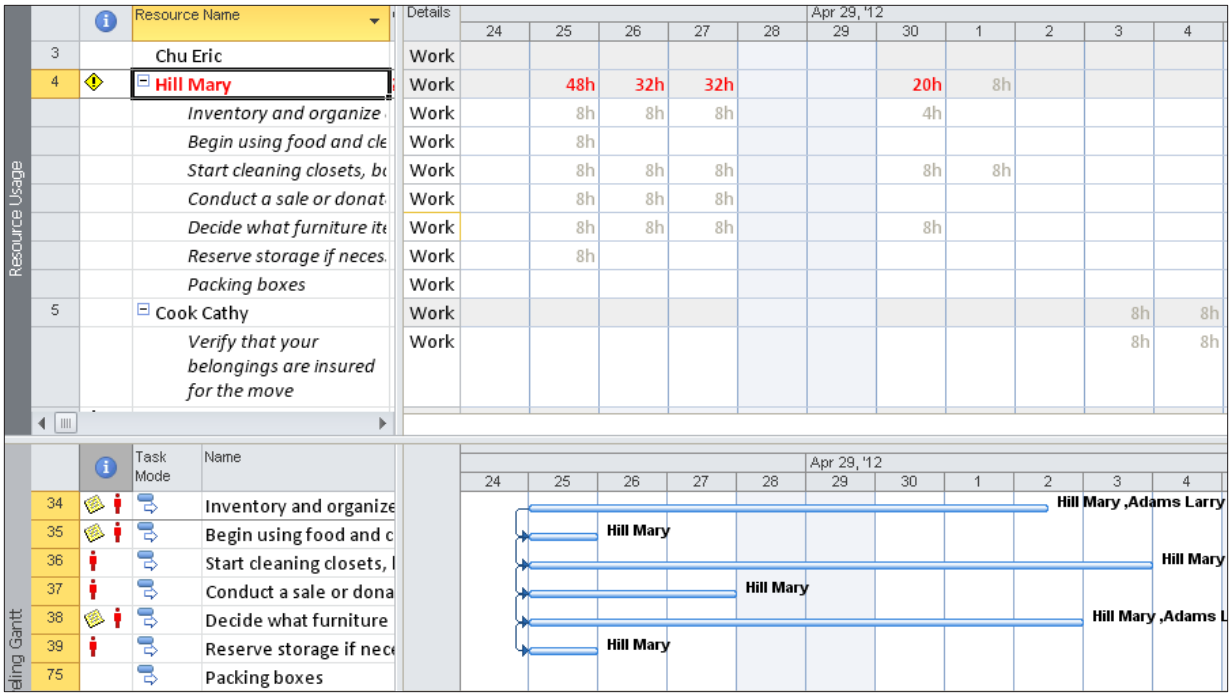

Figure 4-30 PLACEHOLDER

The following is the same information viewed through Team Planner:

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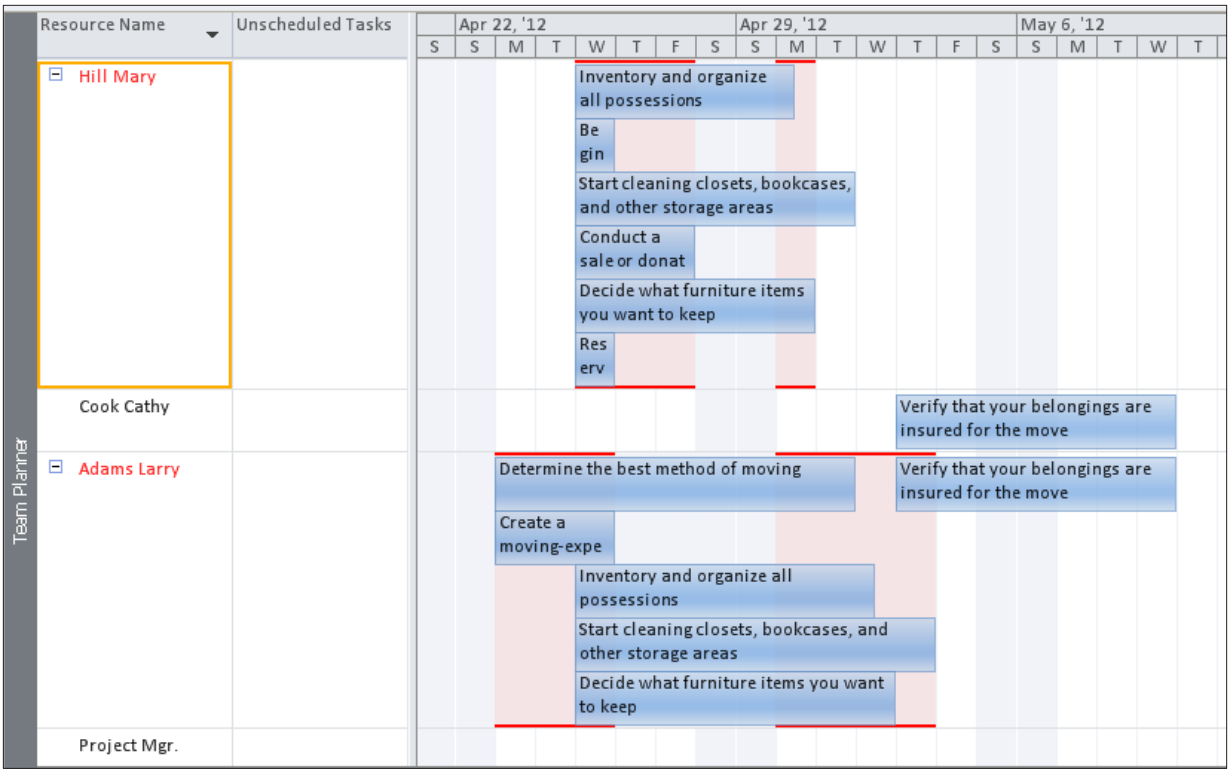

Figure 4-31 PLACEHOLDER

Mary's overallocations are flagged in red with the background in pink. Multiple task assignments may be viewed simultaneously.

Leveling Resources Manually

Project 2010 has a function called Resource Leveling that can help level the work of the resources. It is designed to move assignments forward or backward within time limits to attempt to level or smooth the workload for the resources and remove or lessen overallocations.

Automatic resource leveling in Project 2010 is designed to move resource assignments to a point in time where, based on the resource

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calendar, the resource has time available. If resources have a capacity of 160 hours of work available in a month and they are assigned to 200 hours of work, the project duration will extend outwards to schedule the work via resource leveling. To level resources, and keep to the original time line, either or both of the following should occur: the percentage of capacity of the resources is increased, or more resources are added. Failure to do either will result in an inability to complete some of the planned work.

Manual resource leveling should always be tried before attempting automatic leveling. Leveling is most effective when performed by a project manager who is most familiar with the work and the people.

The following are some suggestions for effective manual resource leveling:

- Add more people necessary skills to tasks
- Obtain more time from the people you already have (nights, weekends, etc)
- Outsource a portion of the work
- Negotiate deadlines to see if extensions are possible
- Move the best resources to the most critical tasks. There is less risk and greater probability of these resources completing the tasks on time.
- Give a lesser skilled resource to a highly skilled resource as an assistant. This is a win-win. The highly skilled resource will give the lesser skilled resource some of the lower level work. The lesser skilled resource will learn something new. Might increase cost.
- Cancel vacations
- Adjust relationships
- Break long tasks up into shorter tasks and divide the work over more resources if possible. Under-allocated resources will be better utilized
- Break long tasks around fixed dates. Do some of the work before and complete the work after.

Leveling Resources Automatically

Once the decision is made that leveling needs to occur, there are several ways to level resources within the software. The different options are:

- Team planner – manually move assignments around
- Format ribbon bar – prevent overallocations

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- Resource ribbon bar – level one or all resources
- Resource ribbon bar – leveling options to control how leveling occurs
- Resource ribbon bar – clear leveling

The Gantt chart below shows a summary group of automatically scheduled tasks. The tasks are all scheduled to complete on May 3. Each task has 2 assigned resources, Mary Hill and Larry Adams. They also have indicators that each of the tasks is overallocated.

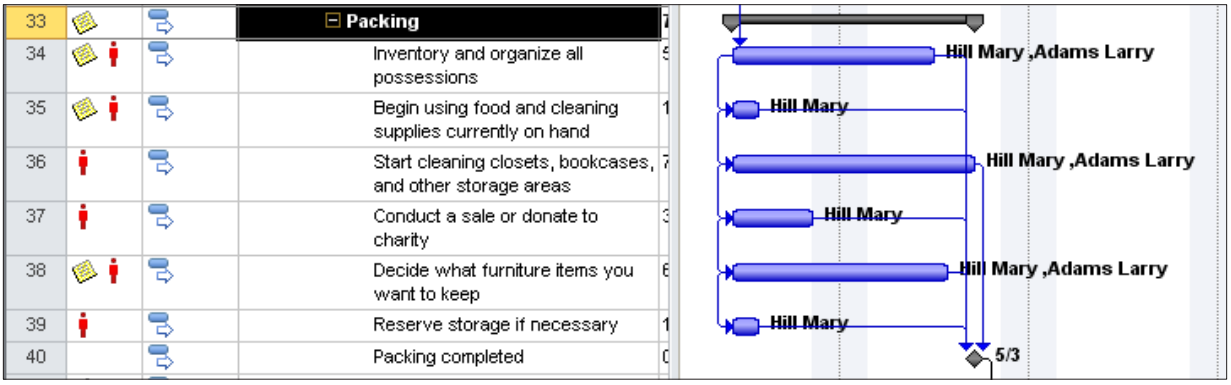

Figure 4-32 PLACEHOLDER

Team planner:

In the team planner view below, Mary Hill and Larry Adams are both overallocated and require leveling. Overallocated tasks are represented by displaying red lines around them.

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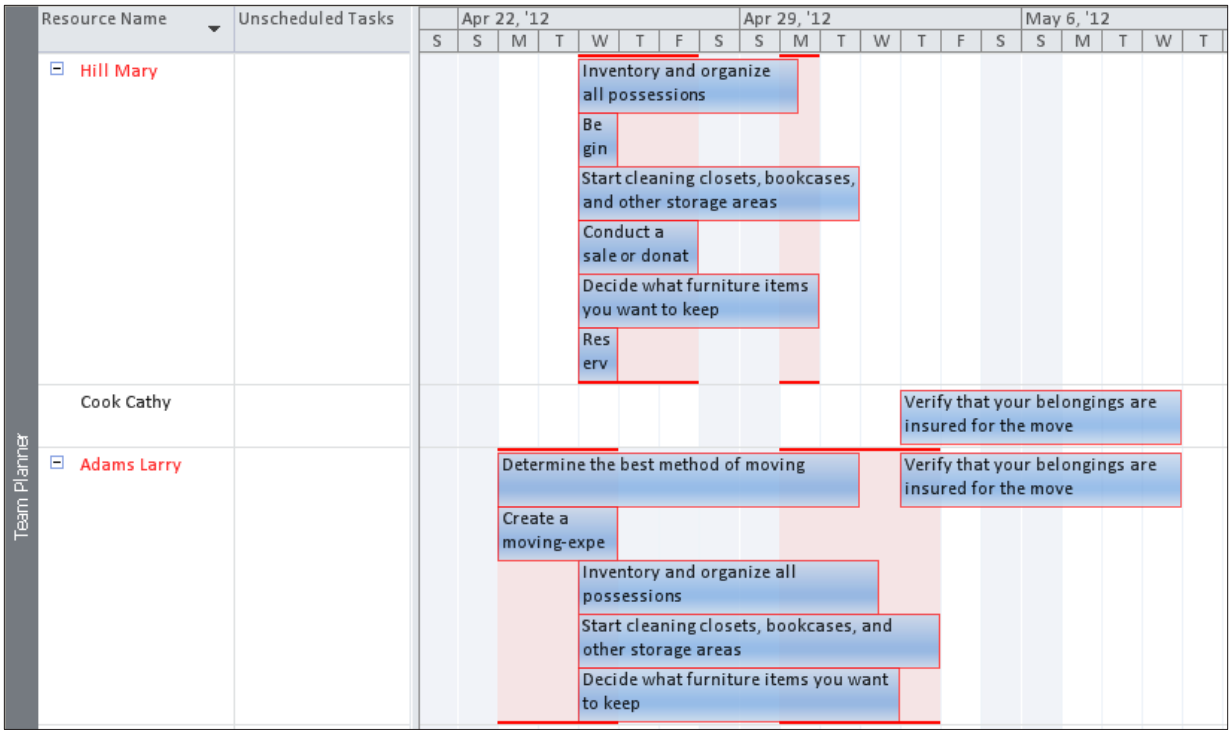

Figure 4-33 PLACEHOLDER

The resource ribbon bar offers several leveling options:

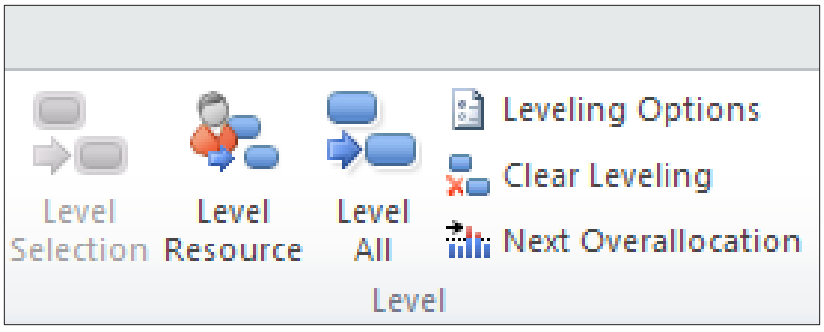

Figure 4-34 PLACEHOLDER

Select one resource and click **Level Selection**. The result is the selected resource will be leveled. When leveling resources from the Team Planner view, only the assignment is adjusted and not the entire task. Click **Level All** to level all tasks for the entire project.

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Below is the Team Planner view with all resources leveled. Before leveling, the project was scheduled to complete on May 3rd. After leveling, the project will now complete on May 23rd.

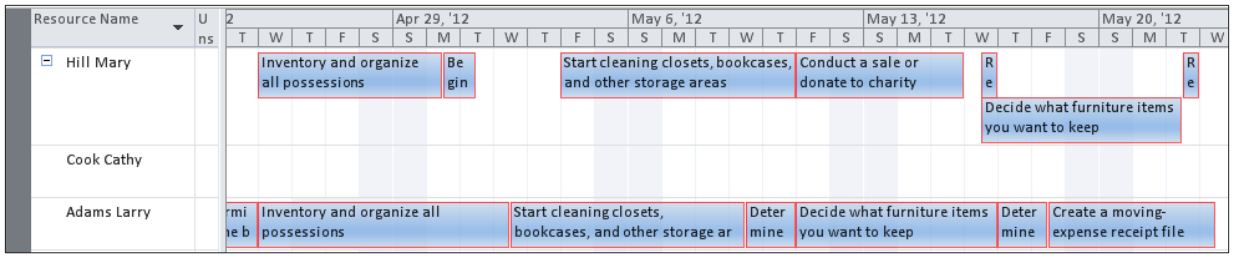

Figure 4-35 PLACEHOLDER

Leveling does not hurt the schedule and should be tested to see the results. Leveling can be removed at any time. To the right of the Level All button, there is a Clear leveling option.

In Team Planner view, click **Format** tab to view the Format menu bar. There is an option button labeled Prevent Overallocations. When this option is turned on, all resources will be leveled and continuously re-leveled with each task change. Additional assignments are created in other views. Returning to Team Planner view will refresh leveling.

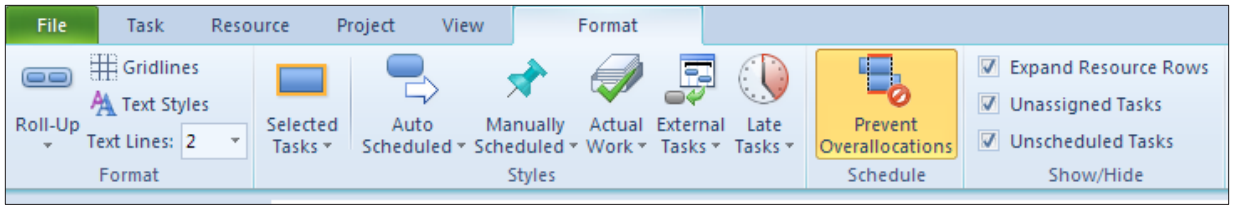

Figure 4-36 PLACEHOLDER

In the Team Planner allows drag and drop assignments to aid in the leveling process. Tasks may be manually move and reassigned as needed.

In the example below, the Resource Allocation view is shown with Mary Hill selected in the top pane. When leveling resources, the Resource Allocation view is effective for viewing the results of leveling.

To display Resource Allocation view:

Click **Task → Gantt chart → Move Views → Resource Allocation view → Apply**

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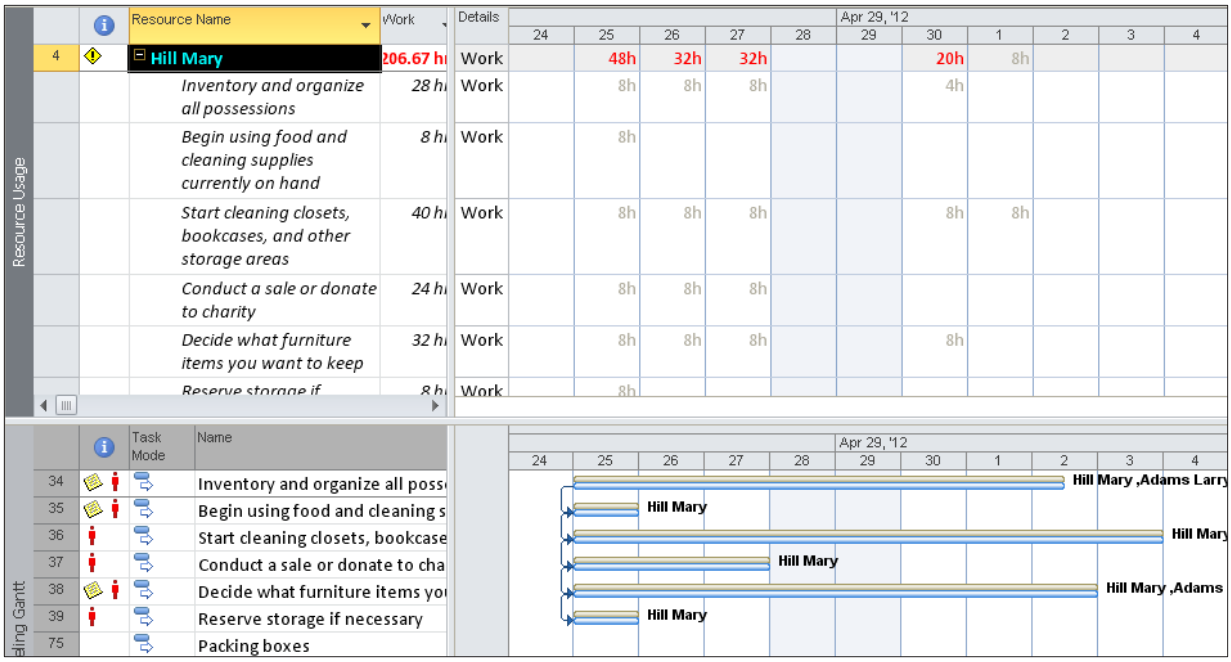

Figure 4-37 PLACEHOLDER

Another approach to leveling is Leveling Options on the Resource bar. When leveling the schedule using the Resource Leveling dialog box, leveling may be performed for resources, individual tasks or the entire project. After leveling is applied, the Leveling Gantt in the lower pane will display a comparison of the original schedule represented with tan bars and the result of leveling with blue bars.

To display Resource Leveling dialog box:

Resource → Leveling options

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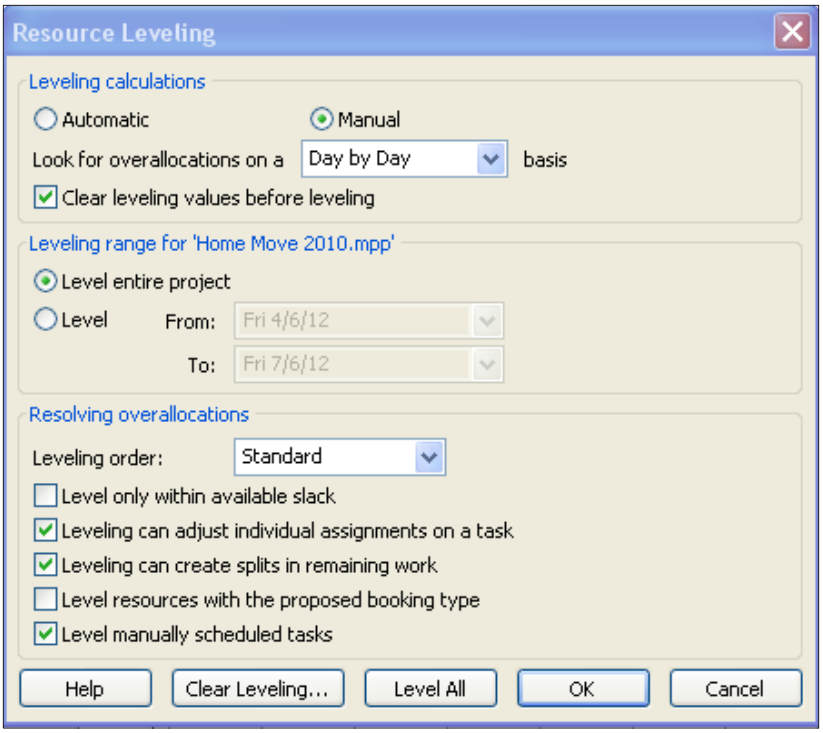

Figure 4-38 PLACEHOLDER

The values in the form are as follows:

- **Automatic or Manual**: the automatice option will level the schedule with each task change. For greater leveling control, Manual leveling is recommended.
- **Look for overallocations on a**: day by day is the default value. The program will attempt to make sure that all resources are not overbooked by even 1 minute during any day. Week by week allows some days to be longer and others may be shorter but the total hours for the week must match the availability calendar. Consider the length of the project when making this choice. Avery short project is better suited to the day by day option.
- **Clear leveling values before leveling**: Clears leveling from other leveling attempts.
- **Entire project or range of dates**: Start with the entire project. Smaller timeframes may be used for future leveling actions.
- **Leveling Order**:
  - **ID Only**: levels tasks with higher ID number first.

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  - **Standard**: uses task duration, dependencies, slack, task dates, constraints, tasks without successors and priorities to level the tasks.
  - **Priority Standard**: all tasks and projects have a priority setting of 1-1000 with 1000 being the highest. This leveling option, awards priority to the higher priority value tasks and those tasks are considered first during leveling.
- **Level within available slack**: locks the project end date and all tasks will be leveled within the current time period.
- **Leveling can adjust individual assignments on a task**: leveling will never remove or replace a resource on a task. This option refers to the concept of keeping all resources together on the task or can they perform their work individually. This option is being set for the entire schedule which might not be the case. There is a field on each task that will control this option called Level Assignments. To make this a task level value, insert the column Level Assignments and set the value for individual tasks.
- **Leveling can create splits in remaining work**: allows the remaining work of a task to be split. This option can be controlled at the individual task level using the task field Leveling Can Split.
- **Resources with Proposed booking types**: affects Project Server 2010 users only. Should planned, but uncomitted resources for the project, be included in the leveling process?
- **Level manually scheduled tasks**: includes manually scheduled tasks when leveling.

Below is a view of the post leveled tasks. Note the tan bars showing what the schedule looked like before the leveling and the blue bars representating the after status. The ending date is far beyond the original scheduled date. By dragging the split bar up to the top of the screen, the Resource Usage view will disappear and the entire view will be the Leveling Gantt. This view will show the affect of leveling for the entire project.

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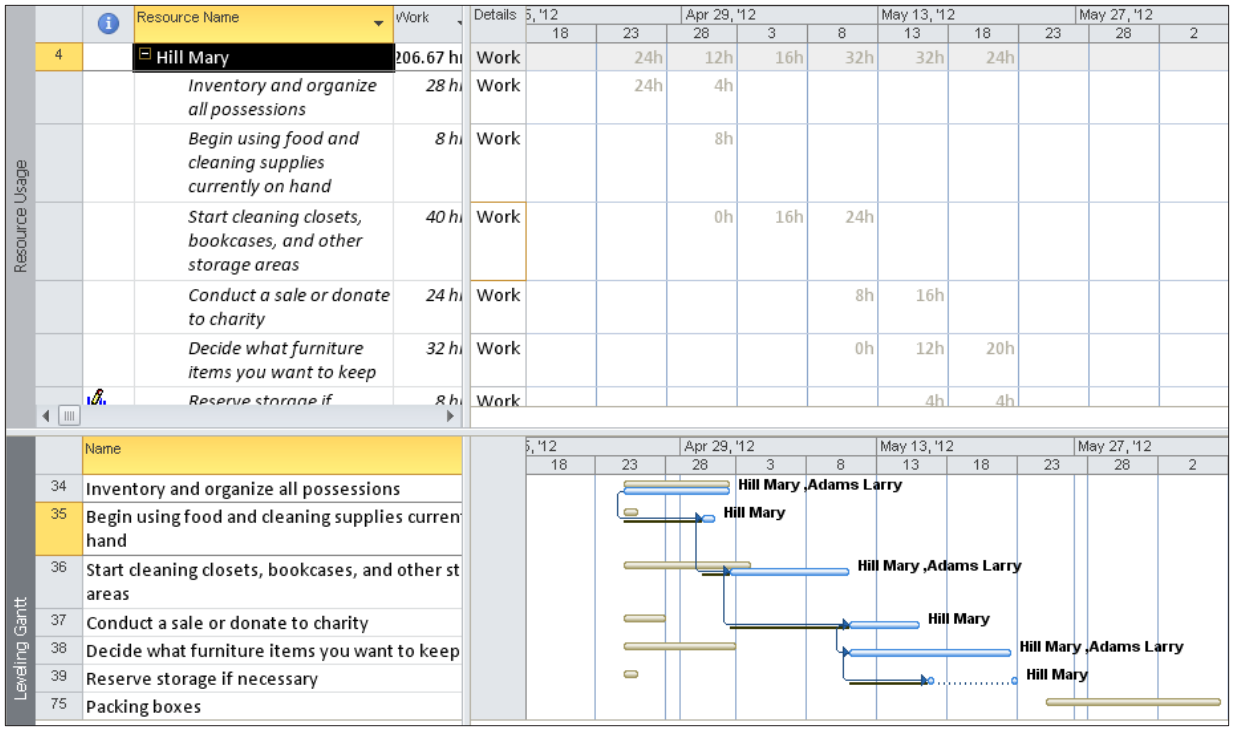

Figure 4-39 PLACEHOLDER

Practice: Resolving Resource Overallocations

The Practice page is where you write detailed instructions for completing work listed as Exercises.

Type the Exercise Title and write a brief summary what the student will be doing in the exercise. Then list your ideas what they will be doing.

SAMPLE

In this practice you will create a Project Server Authentication profile and then configure the local cache settings in Project Professional 2007.

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Exercise 1: Create Project Server Authentication Profile

In this exercise you will create Project Server authentication profile to connect to the Project Web Access site.

Perform the following exercise on the PS07 virtual machine.

1. From the **Start** menu, click **All Programs** → **Microsoft Office** → **Microsoft Office Tools** and click **Microsoft Office Project Server 2007 Accounts**.
2. In the **Project Server Accounts** dialog box, click **Add**.
3. In the **Account Properties** dialog box, and complete the following settings and click **OK**.

Table 4.10 PLACEHOLDER

Setting	Perform the following:
Account Name	Type `Project Server`
Project Server URL	Type **`http://epm/pwa`**
When connecting	Select Use Windows user account
Set as default account	Select check box

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Real World Application of Scheduling – Resolving Resource Conflicts

Resource scheduling not only involves assigning resources to tasks, it also involves keeping track of and changing resources once a project has begun.

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

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Resolving Resource Overallocation

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.

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Finding Overallocated Resources

When you assign a resource to work on tasks that overlap or occur at the same time, you overallocate the resource. The resource is overallocated when they cannot complete all of the tasks to which they are assigned during the workday as defined in the base and resource calendars.

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.

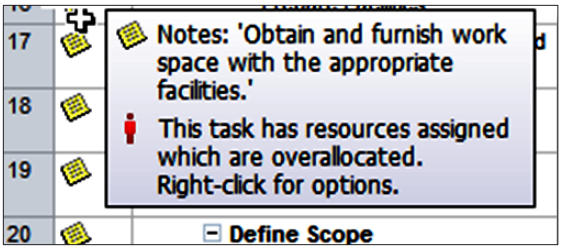


Figure 4-40 Overallocated Resource

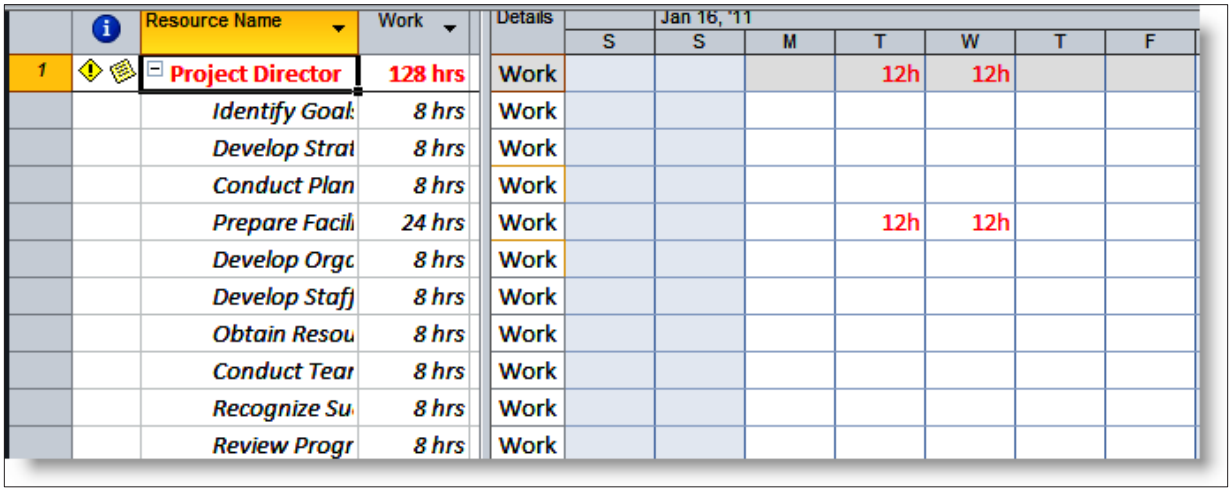
Using the Resource Usage View

You will notice that many views show that a resource is overallocated by providing red indicators or by listing the resource as bold and red. You can apply the techniques illustrated with the Resource Usage view to other views that display resources.

The Resource Usage view lists each resource in the resource pool, their collection of tasks, and the number of hours the resource is scheduled during a particular time period.

To display the Resource Usage view and locate overallocations:

4. On the **View** tab, **Resource Views** group, click the **Resource Usage** button.
5. Select the name of a resource that is overallocated (bold and red).
6. On the **Resource** tab, **Level** group, click the **Next Overallocation** button.



	Resource Name	Work	Details	Jan 16, '11						
				S	S	M	T	W	T	F
1	**Project Director**	**128 hrs**	Work				12h	12h		
	Identify Goal	*8 hrs*	Work							
	Develop Strat	*8 hrs*	Work							
	Conduct Plan	*8 hrs*	Work							
	Prepare Facil	*24 hrs*	Work				12h	12h		
	Develop Orgc	*8 hrs*	Work							
	Develop Staf	*8 hrs*	Work							
	Obtain Resou	*8 hrs*	Work							
	Conduct Tear	*8 hrs*	Work							
	Recognize Su	*8 hrs*	Work							
	Review Progr	*8 hrs*	Work							

Figure 4-41 Overallocated Resources in Resource View

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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:

1. On the **View** tab, **Resource Views** group, click **Other Views**, and click **More Views** from the dropdown list.
2. In the **More Views** dialog box, select **Resource Allocation**.
3. Click **Apply**.

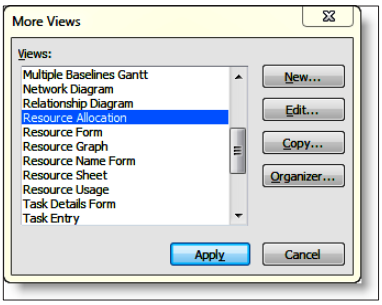

Figure 4-42 More Views Dialog

4. Select the name of a resource that is overallocated (bold and red).
5. On the **Resource** tab, **Level** group, click the **Next Overallocation** button.

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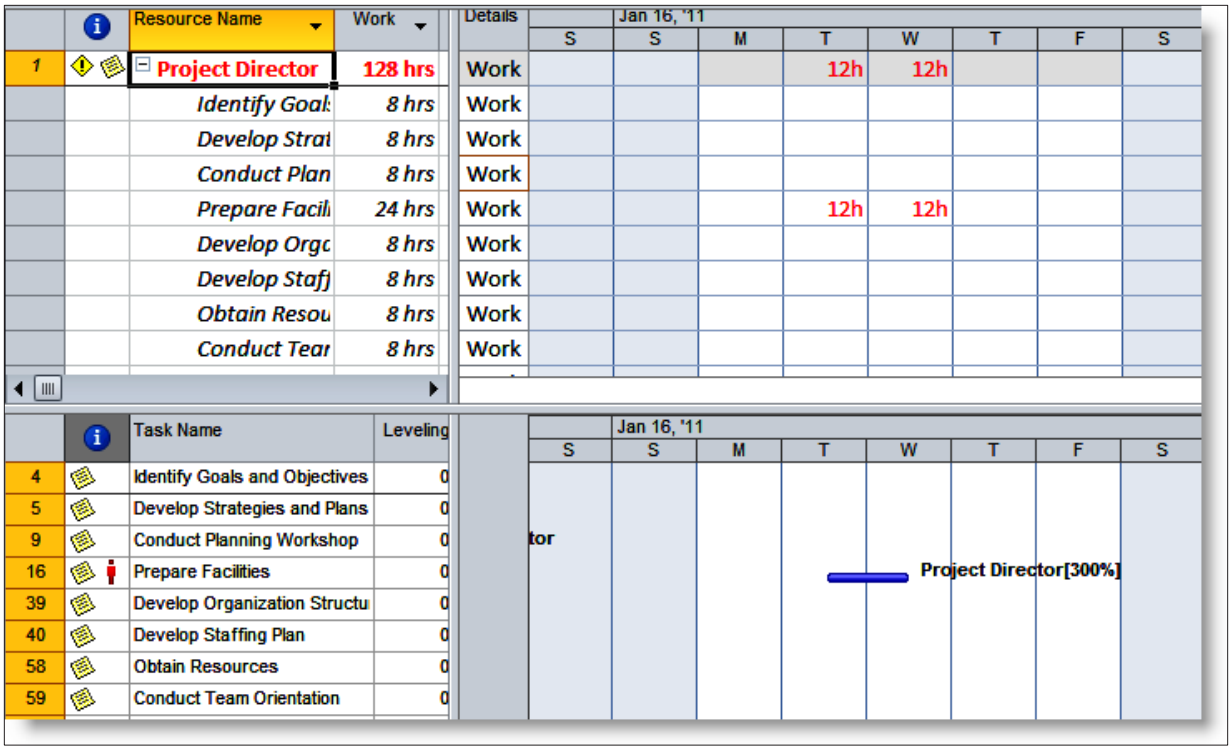

Figure 4-43 Resource Allocation View

Notice how easy it is to identify which time period is causing the resource overload issue.

You can press **Alt + Home** to shift the time scale to the beginning of the project so the Next Overallocation button looks for overallocations from day one of the project.

Using the Team Planner View

The Team Planner view displays resources on the left, and displays the tasks along a timeline in a more graphical format than the previous view.

To display the Team Planner view and locate overallocations:

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1. On the **Task** tab, **View** group, click the dropdown arrow next to **Gantt Chart**.
2. Click **Team Planner**.
3. Locate the resource that is overallocated (red) and scroll to navigate through the timeline until you see groups of tasks with red lines above/below. That is where the overregulation issue is highlighted for you.

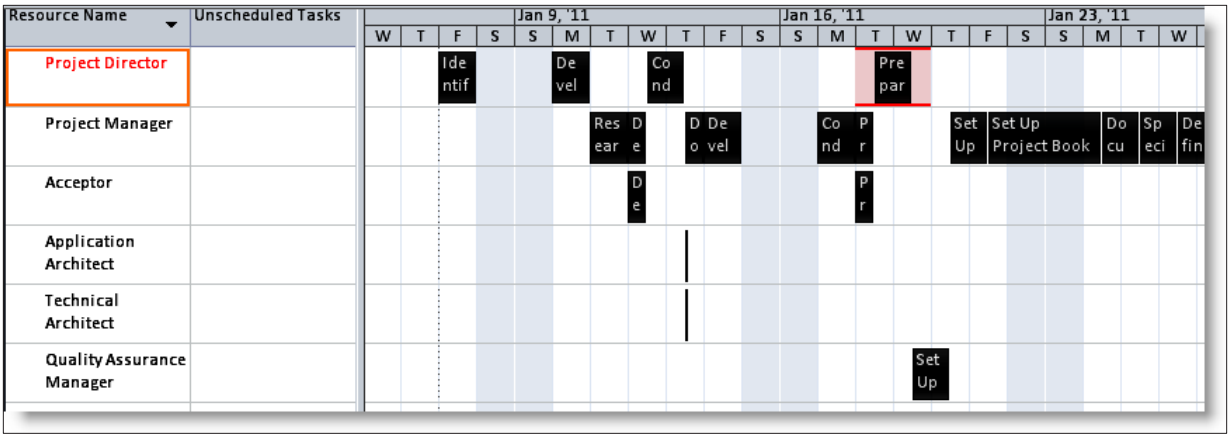

Figure 4-44 Team Planner View

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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**.

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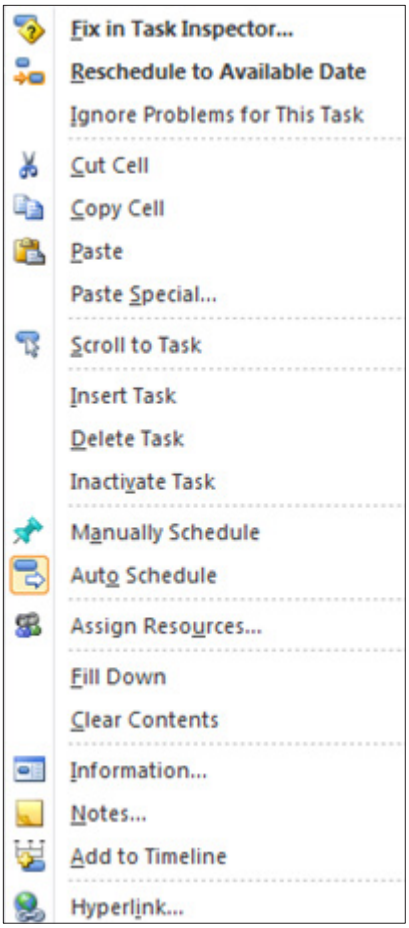

Figure 4-45 Context Menu from Overallocated Resource

Using Task Inspector

One option in the right click short-cut menu is the 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

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

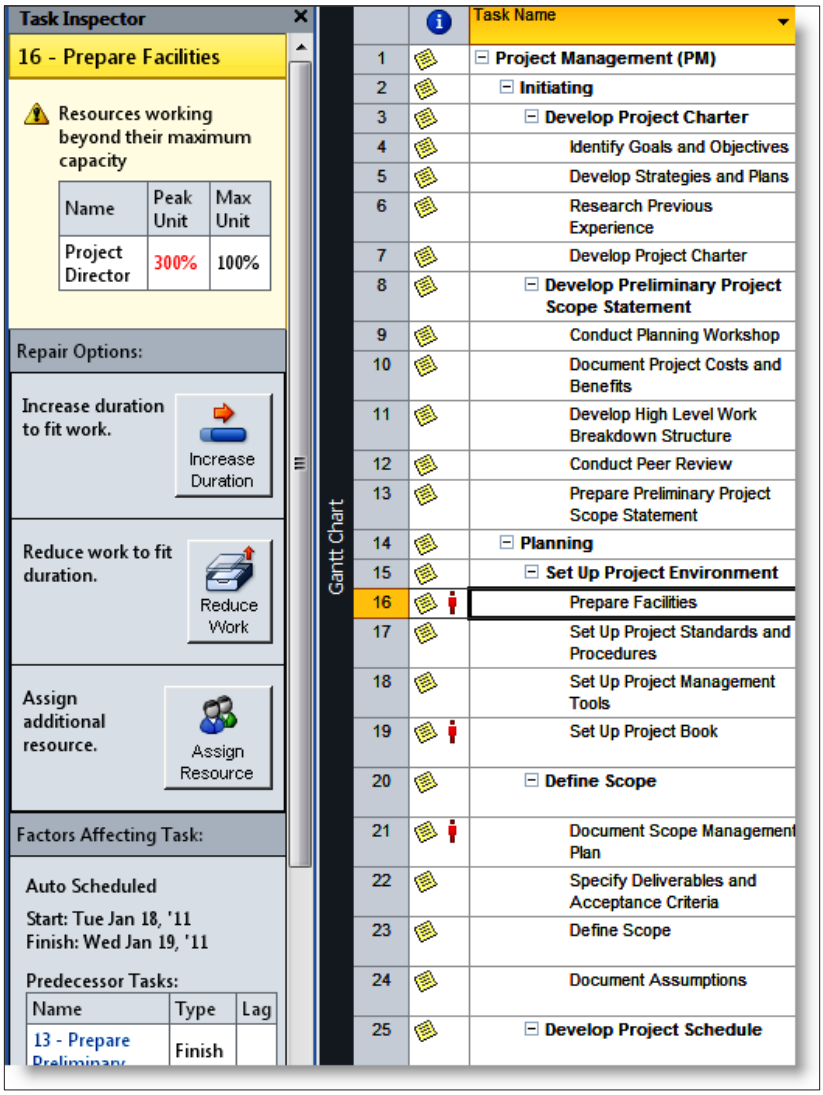

Figure 4-46 Task Inspector

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.

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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. One useful way to change assignments is to:

1. Navigate to the **Resource Allocation** view.
2. Select the overallocated resource in the upper pane.
3. Select the task in question in the lower pane.
4. Double click on the **Task Name** in the lower pane. The **Task Information** dialogue box appears.
5. Make any necessary adjustments to the task.
6. Click **OK**.

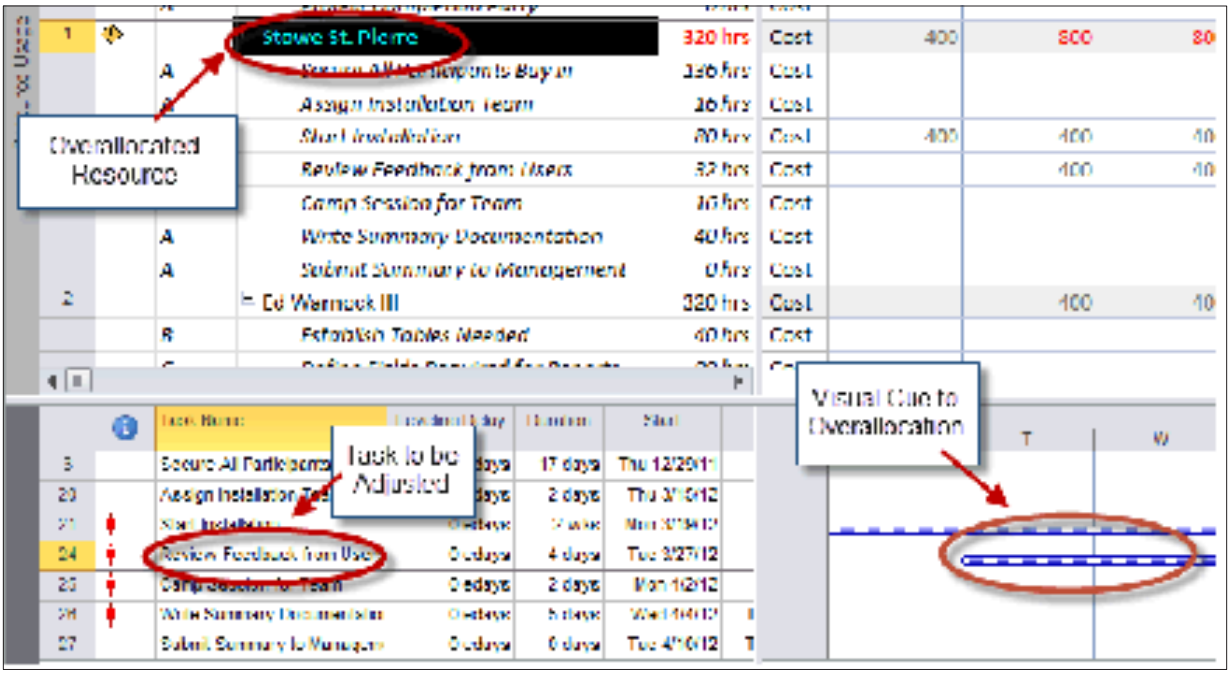

Figure 4-47 Resource Allocation View

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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.

Delaying a Resource Assignment

Instead of using the leveling techniques mentioned earlier, you can choose to individually delay work on a resource assignment. Some reasons for this could include the resource is not needed until a portion of the task is underway or the resource is simply unavailable at the beginning of the task and they are showing overallocated.

To delay a resource assignment:

1. On the **Task** tab, **View** group, click **Gantt Chart**.
2. On the **View** tab, **Split View** group, click the checkbox for **Details**. This will display the lower pane.
3. Ensure your desired task is selected in the upper pane.
4. In the lower pane, position your mouse on the empty area to the right side and right click, in the subsequent pop-up menu click **Schedule**.
5. Enter the delay in the most appropriate column.
   - **Leveling delay** – the time you want to postpone the task. If this is the only resource on the task, the entire task will move.
   - **Delay** – the time you want to postpone the work for the resource. Works best in conjunction with a reduction in the assignment work for the task. For example, let's say you have two people on an 8 hour task (duration) for a total of 16 hours (work). One person is doing design work and will be needed for all 8 hours, while the other person is doing a quality check and only needs to be on the task for 2 hours. If you change the work for the quality resource to 2 hours and enter a delay of 6 you are indicating the resource will not start until 6 hours of the task have already passed. The quality resource is now free to work on other tasks during the 6 hour wait period.
6. Click **OK**.

The OK and Previous buttons alternate as active buttons. If you see the OK button, you have changes pending that have not been accepted.

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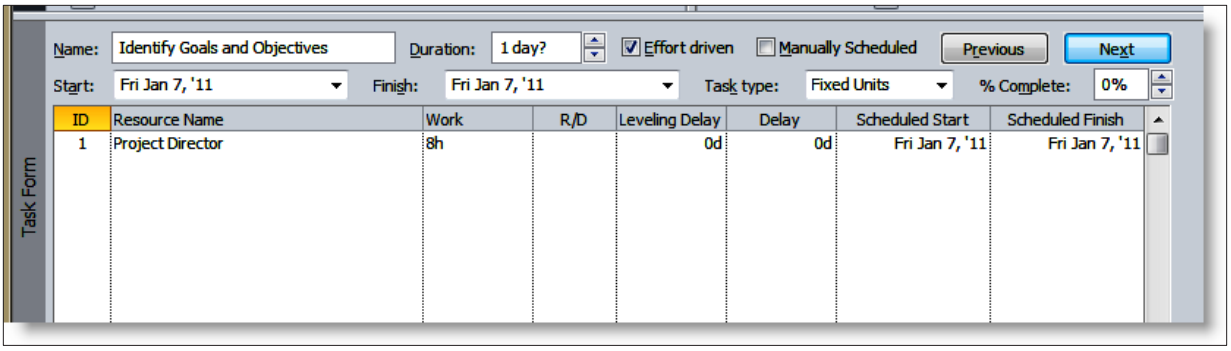

Figure 4-48 Delay a Resource

Splitting a Task

Another option for resolving resource allocation is to split a task. This keeps the beginning of a task occurring as scheduled, but the remaining work can be allotted to a different day.

As an example, a resource is assigned to two tasks occurring at overlapping times. Task one is reviewing a document and is scheduled for Monday and Tuesday. Task two is drafting a document and it is scheduled for Tuesday and Wednesday. Task two must occur on Tuesday and Wednesday as those are the only days a remote resource will actually be in the office for a face-to-face working session. Task one can be split to begin on Monday, but complete on Thursday.

Splitting a task is an important feature as it keeps an accurate history of when the task began, as well as an accurate history of the modified completion. It is also a best practice to add a note as to why the task was split. This will provide additional historical information.

To split a task:

1. In the **Gantt Chart** view, select the desired task.
2. In the **Task** tab, **Schedule** group, click the **Task Split** button. Note that the cursor changes.
3. Place the cursor at the desired point to split the task.

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4. Click and drag the remaining work to the new time.

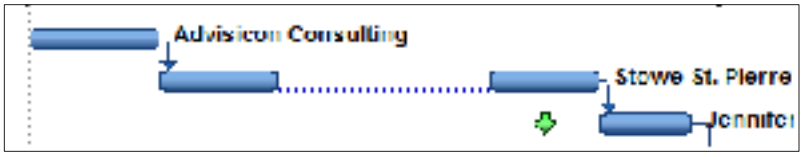

Figure 4-49 Split Task

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 in one of two ways:

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- Manually modify the working hours in the time scale grid on the right side of the Task Usage or Resource Usage views.
- Change the work contour option.

To adjust work contours:

1. On the **View** tab, **Task Views** group, click **Task Usage**.
2. Locate the task and specific resource where you want to change the contour.
   - Option 1 – On the grid on the right-hand side, change the hours for the row where the resource name is listed. Notice the edited work indicator appears.

Figure 4-50 Edited Task Icon

- Option 2- Double click the name of the resource and in the **Assignment Information** dialog box, in the **Work contour** list, choose your desired contour pattern and click **OK**. Notice the appropriate work contour indicator appears.

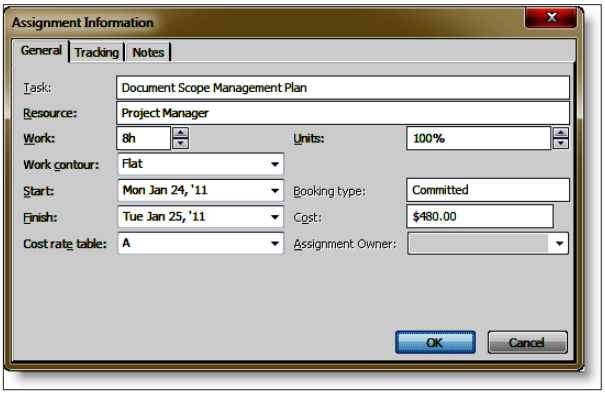

Figure 4-51 Assignment Information Dialog

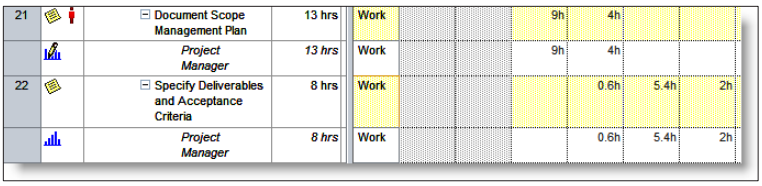

Figure 4-52 Work Contour

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:

1. On the **Task** tab, **View** group, click the dropdown arrow next to **Gantt Chart**, and click **Team Planner**.
2. Locate the task that is causing a conflict (red lines above/below highlight 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).

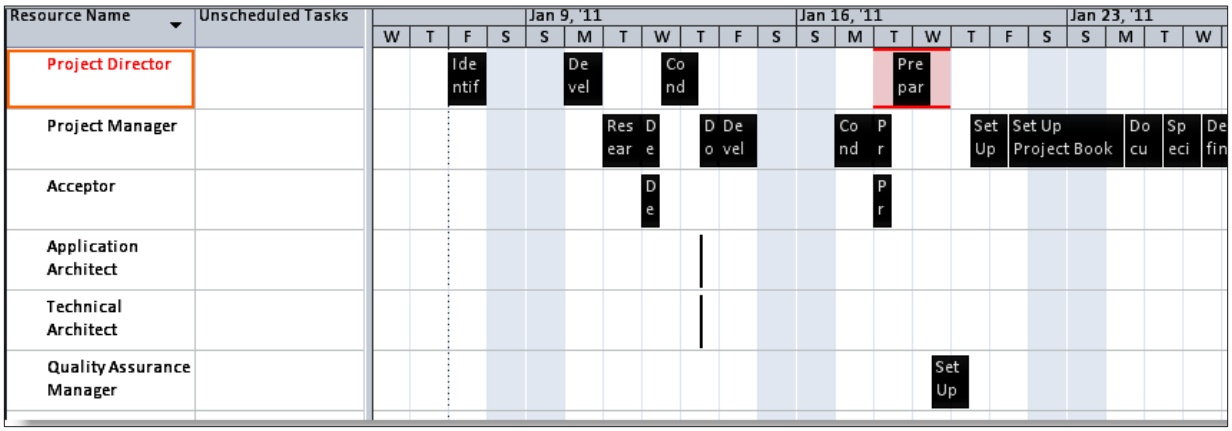

Figure 4-53 Team Planner View

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.

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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:

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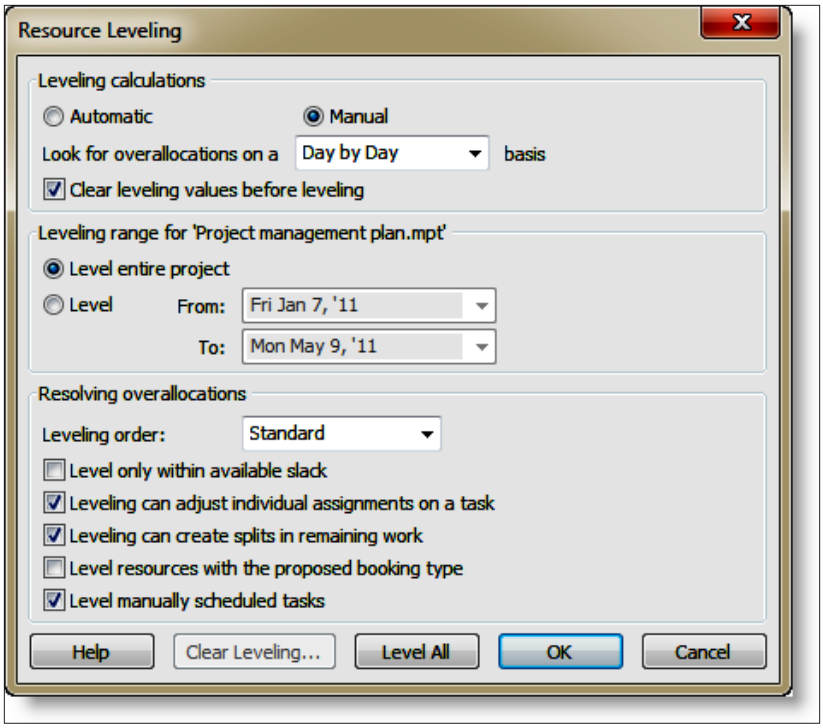

Figure 4-54 Resource Leveling Diagram

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

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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.

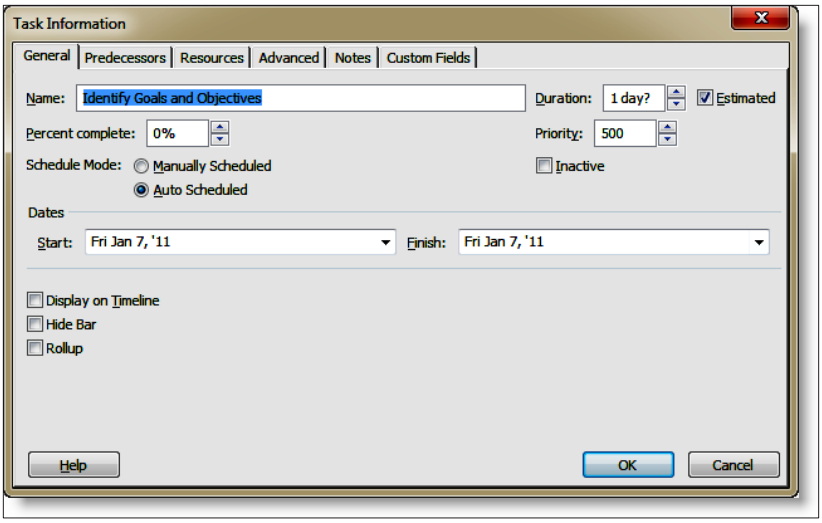

Figure 4-55 Task Information Dialog – General Tab

- "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.

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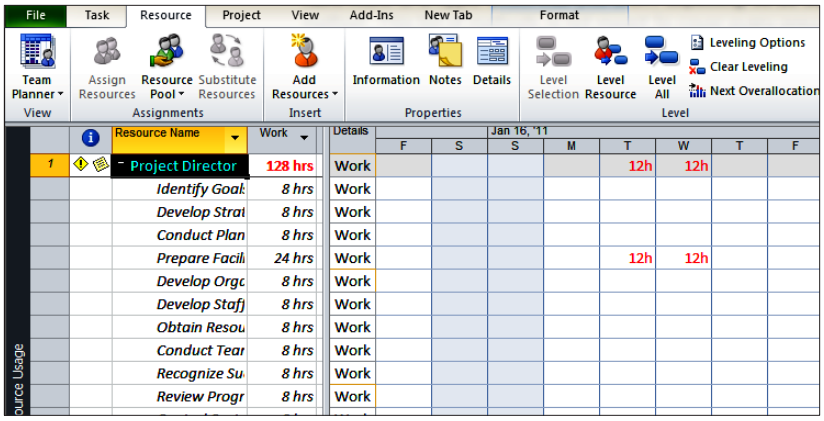

Figure 4-56 Leveling

To level your project:

1. On the **View** tab, **Resource Views** group, click **Resource Usage**.
2. On the **Resource** tab, **Level** group, click **Leveling Options** and make your desired selections.
3. If necessary, select the desired resource(s). Otherwise, choose the desired leveling option in the **Level** group on the **Resource** tab.

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Critical Path

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 Critical Path calculation include:

- Relationships between tasks
- Lead and Lag time
- Duration of tasks
- Constraints
- Task Calendars
- Resource Availability
- Resource Assignments

Project 2010 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.

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There are 2 types of slack calculated in Project 2010:

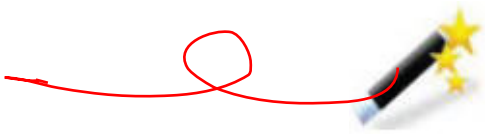
- Total slack is the amount of time a task can slip without affecting the end date of the project.
- Free slack is the amount of time a task can slip and affect only the successor task. If a task does not have a successor, free slack will be the same as total slack.

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 their projected end date.

~~Manually scheduled tasks and critical path~~

~~Manually scheduled tasks will be included in the critical path calculation if they have dependencies and duration. In the absence of dependencies, only tasks that push the end date of the schedule will appear on the critical path.~~



~~The default for Project 2010 critical path calculation is to recalculate the critical path every time a task is changed. In very large schedules, critical path recalculation can slow the schedule development process. For this reason, automatic calculation may be turned off and the calculation manually triggered when the scheduler is ready.~~

~~To turn off automatic schedule calculation:~~

- ~~**File → Options → Schedule**~~

~~Calculation option~~

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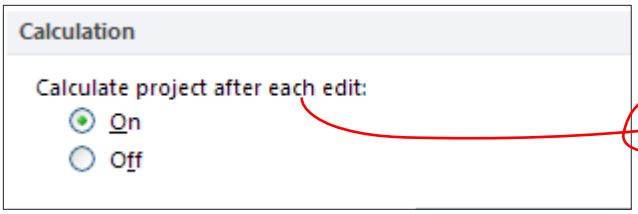
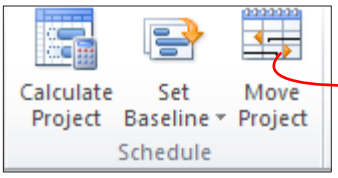


~~Figure 4-57~~ ~~PLACEHOLDER~~

~~To calculate a project on demand:~~

- ~~**Project → Calculate Project**~~



~~Figure 4-58~~ ~~PLACEHOLER~~

Formatting Views to Display Critical Path

Slack is essentially scheduling breathing space for a project. The greater the slack, the more breathing space you will have to help manage problems that will 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 never performed exactly as scheduled, slack becomes essential to achieving the goal date for the project.

Each time a task is changed in Project 2010, the critical path is recalculated automatically. There is a column labeled “Critical” that contains a Yes or No value. This column is reset as a result of critical path calculation and could change as the project progresses and changes. Formatting of Gantt Charts and other views depend on the “Critical” column to

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determine how view formatting should appear. Many of the views are not pre-formatted to show the critical path. The formatting may be turned on as necessary.

To turn on and show the critical path formatting:

- **Task → Gantt view**
- **Format → Critical Path**

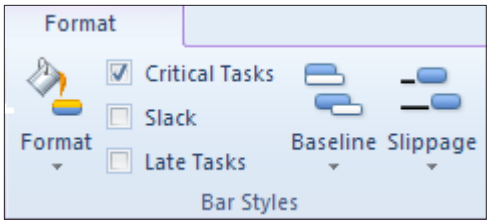

Figure 4-59 PLACEHOLDER

The critical path is shown as red Gantt bars and the non-critical tasks appear a blue Gantt bars.

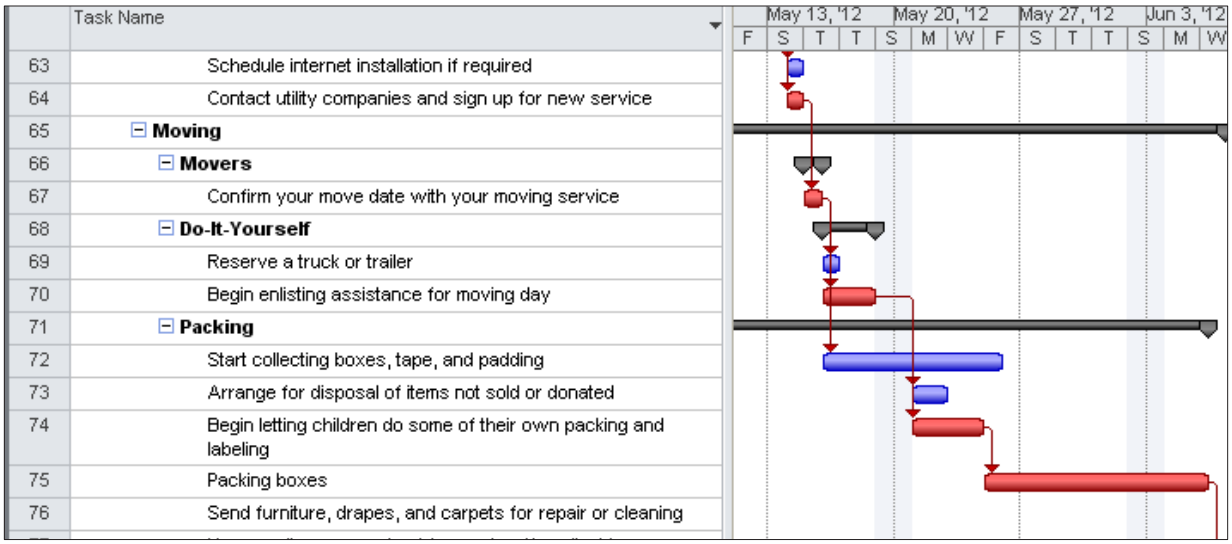

Figure 4-60 PLACEHOLDER

To get what is called a waterfall or tasks in sequence critical path, apply the critical filter and all non-critical tasks will be hidden. .

To filter the schedule for critical path:

- **Task → Gantt Chart view**
- **Format → Filter → Critical**

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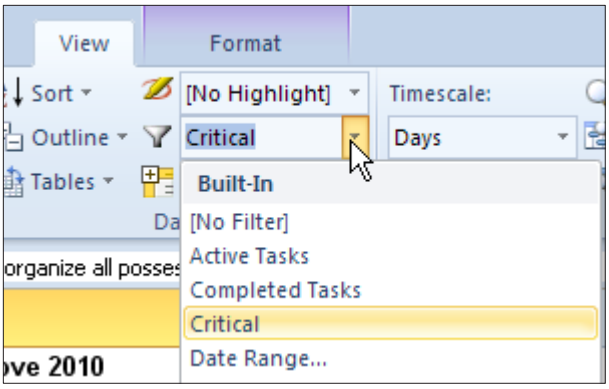

Figure 4-61 PLACEHOLDER

In the view below the Critical filter has been applied. All non-critical tasks have been hidden. The view is an example of a waterfall critical path.

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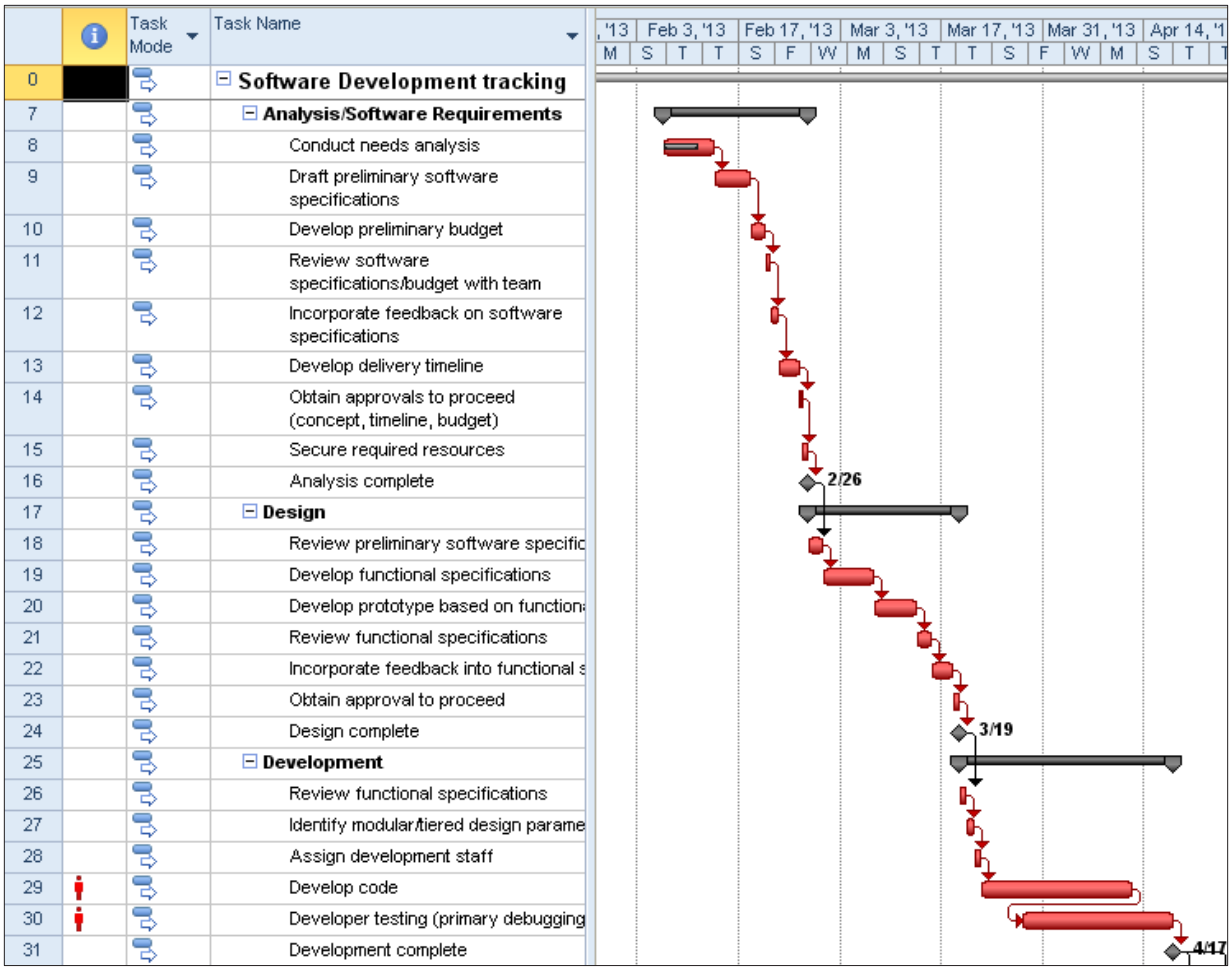

Figure 4-62 PLACEHOLDER

Turning off summary tasks is helpful as well

To turn off summary tasks shown on the Gantt Chart view:

- **Format → Summary Tasks**

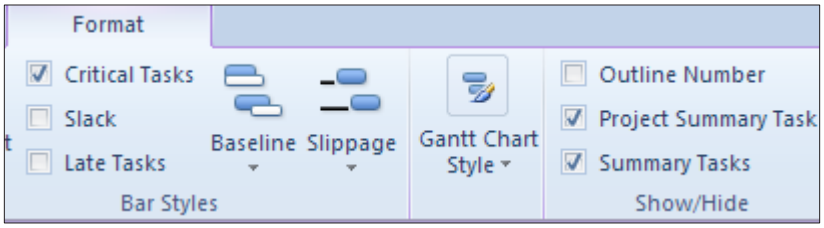

Figure 4-63 PLACEHOLDER

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Knowing where slack in your schedule is located will help when making scheduling decisions.

To view the slack in the schedule on the Gantt Chart view:

- **Format → Slack**

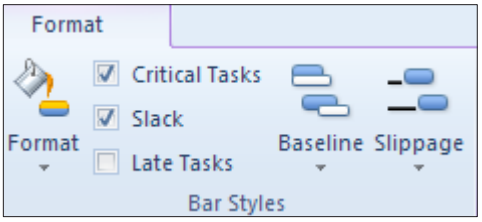

Figure 4-64 PLACEHOLDER

Below is a view formatted to show the schedule slack line indicators. Slack is represented by black lines extending to the right of the task Gantt bar. For clarity, in the example below, relationship arrow lines have been turned off.

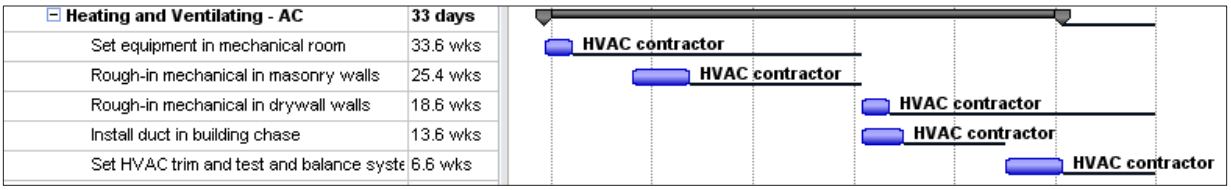

Figure 4-65 PLACEHOLDER

Setting Slack Tolerance

When a task has zero slack the task is considered critical and any change in the end date for the task will negatively affect the project end date. Tasks with slack of 1 minute or more are considered non-critical. It is unlikely that 1 minute of slack is sufficient to prevent a task from moving from a non-critical to critical state.

Project 2010 provides the ability to define a per project critical task tolerance level. This setting will allow the scheduler to control what the

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tolerance point between critical and non-critical tasks should be. Using the total duration of the project as a guide, shorter duration projects should have lower tolerance points than longer duration projects. All cutoff points are stated in number of whole days only. The result of the critical path calculation is shown in the Total Slack column. The value in this column is used when calculating the Critical Path and determining when a non-critical task becomes critical.

To insert the Total Slack column into a table:

- **Task → Gantt Chart**
- Right click a column heading
- Select **Insert Column**
- Click the **T** key
- Select **Total Slack**

In the example below, the Total Slack column has been added to the table. Critical path formatting is turned on. All tasks in view are considered non-critical. Note the values in the total slack column show several tasks have less than 1 day of slack.

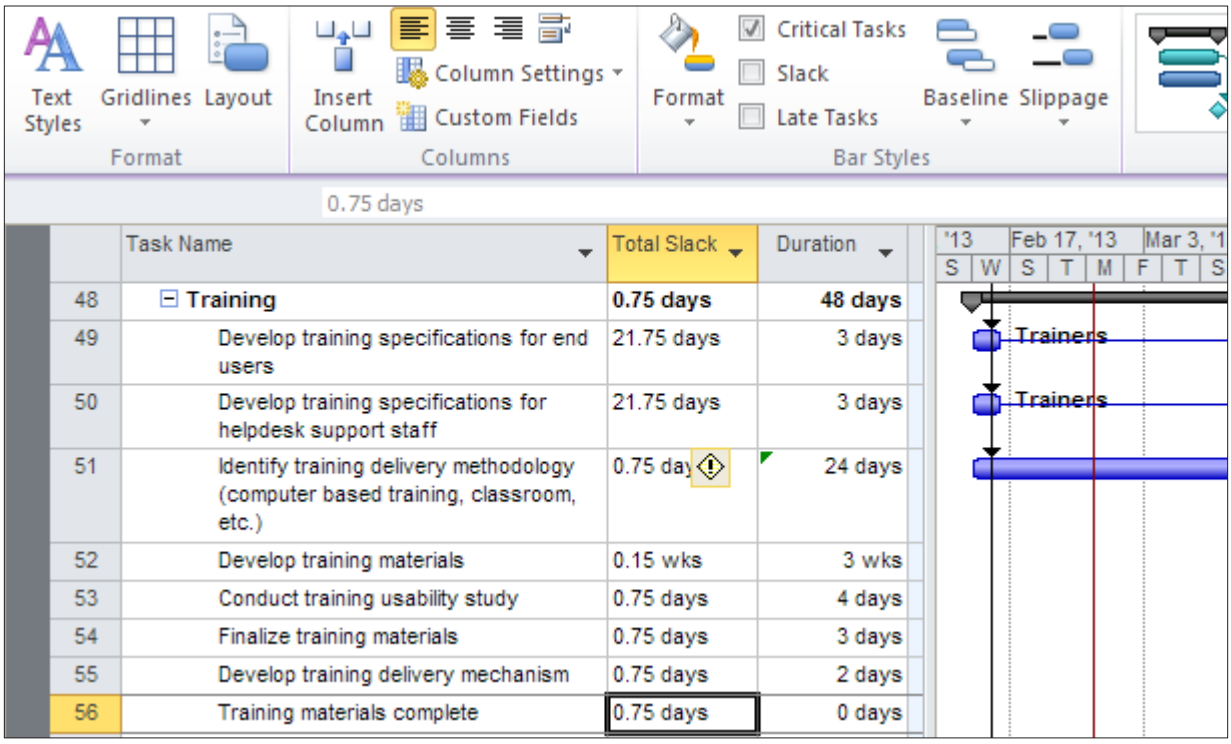

Figure 4-66 PLACEHOLDER

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The task crtical path tolerance setting is located in the Advanced Options section. The default tolerance value is zero days. Changes to the tolerance level are in whole days only. The tolerance level setting can be applied to a single specific schedule or all schedules.

To navigate to Advanced Options:

- **File → Options → Advanced**

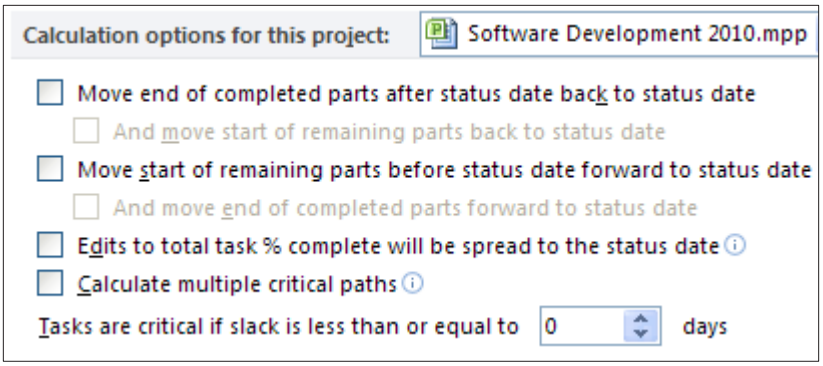

Figure 4-67 PLACEHOLDER

In the example below, the option has been changed to 3 days. Any task with less than 3 days of total slack will be considered critical. In the view below, several tasks have .75 days of slack and are not considered critical. Note the differences in the formatting of the critical path.

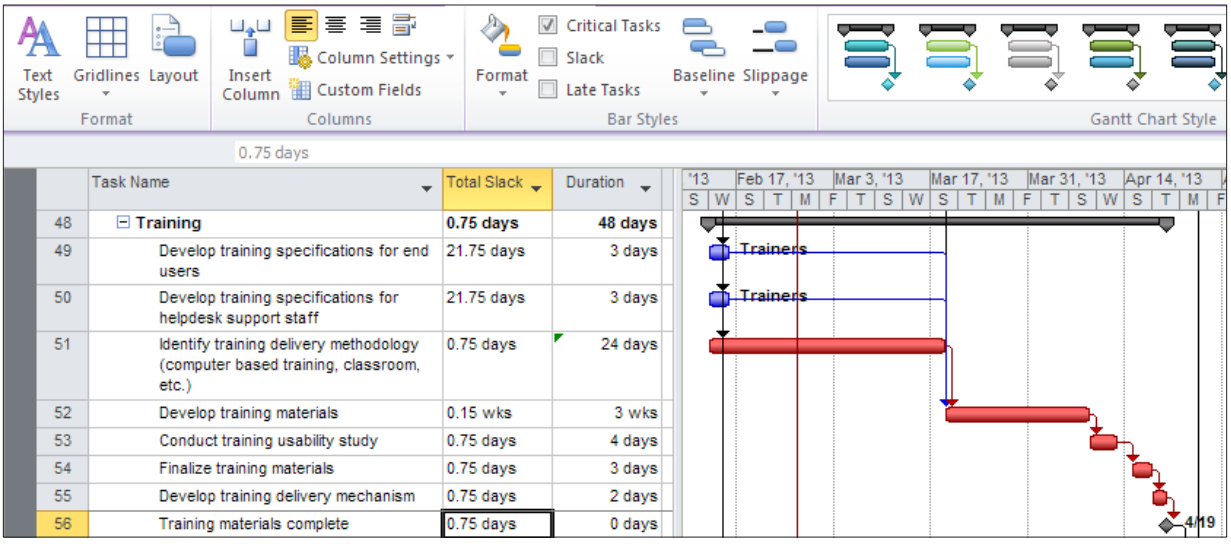

Figure 4-68 PLACEHOLDER

This formatting may be treated as an alert to knowing which tasks acould have impact on the ending date for the project. Once a task is flagged as critical, it will be included in filters, grouping, and reports as a critical task.

Negative slack was discussed earlier in the module concerning constraints. Negative slack tasks will appear as critical when formatting for the critical path.

Crashing the Critical Path

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. Project Managers are usually asked to cut time out of the project schedule to shorten the critical path or length of the project. Since the crtical path is determining the project length, cutting time from the critical tasks will affect the project ending date. Cutting time out of the timeline for the project is known as Crashing the Schedule. When crashing the schedule, automatic project calculation is preferred because the timeline will actively change with each task change.

Below are a few suggestions which could be applied to crtical tasks to help shorten the critical path.

- Create as many parallel paths as possible. Changing task relationships to start-to-start or finish-to-finish will shorten the critical path. Beware that you may need more resources which could also in turn increase cost.
- Add as much realistic lead time as possible. Additional resources may be necessary.
- Increase working time on resource calendars. When resources are working longer hours, the work should be completed sooner.
- Remove as many constraints as possible.
- Move critical resources from non-critical tasks to critical tasks. The more experienced resources can usually accomplish the work faster and with less re-work and risk.
- Group tasks by duration as shown in this module. The longest tasks have more duration and present more opportunity to save time.

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- Take long tasks and break them into smaller tasks. Try to put the smaller tasks in parallel and assign non-critical resources.
- Add evenings and weekends to gain more working time
- Question whether all tasks are really necessary and within project scope? Delete or inactivate (see below) unnecessary tasks
- Question whether the assignments are correct? Are the right people assigned to the correct amount of work? Finding errors and correcting them might reduce project time.
- Check that predecessors and successors are correct and appropriate. Blanks in the Predecessors and Successors columns indicate a missing relationship. Show all subtasks, turn off summary tasks and use the autofilter to filter for blanks. F3 to remove the filter.
- Check the Total Slack column. If the amount of Total Slack is large, there is a possibility the task is missing relationships.
- Don't be afraid to try some what-if scenarios on a copy of the file.

If it is determined that a task is might not be necessary within a project schedule, Project 2010 allows the scheduler to switch a task to inactive mode. This removes the task from the critical path calculation but leaves the task in the schedule in case it can be activated again.

In the project below, the critical path is indicated in red. The project is scheduled to end on March 22.

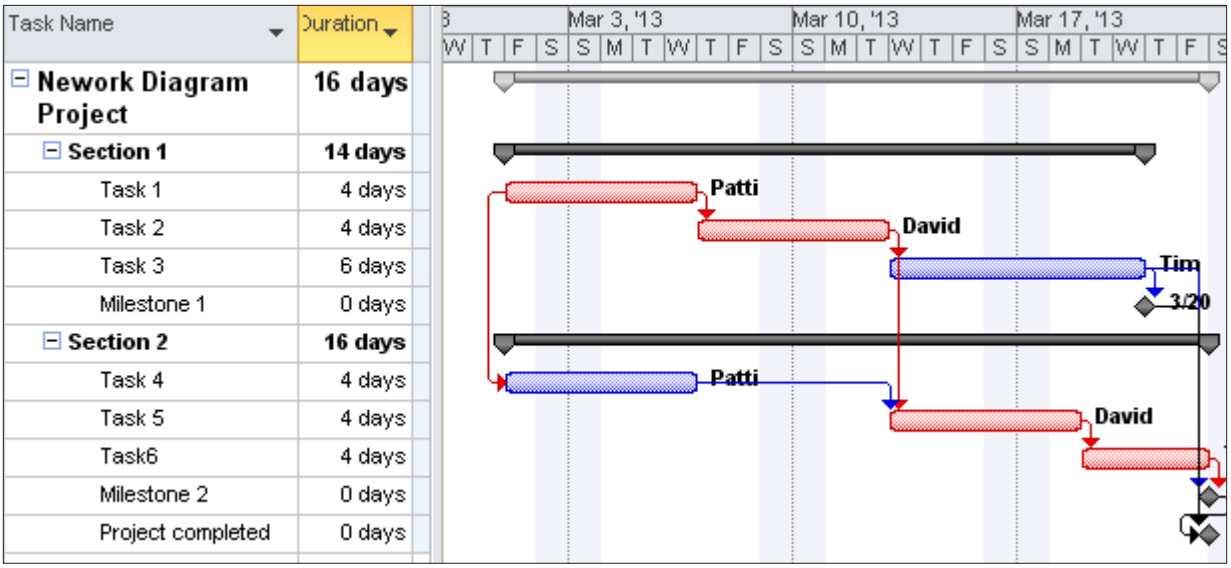

Figure 4-69 PLACEHOLDER

In the example below, we will inactivate Task 5.

To inactive a task:

- Click on the **task**
- Click on **Task → Inactivate**

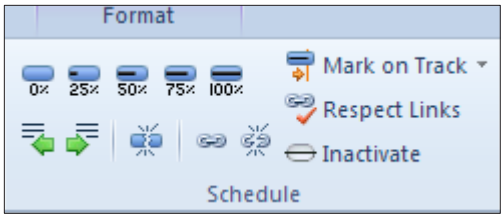

Figure 4-70 PLACEHOLDER

Below is the result of toggling the task to an inactive state:

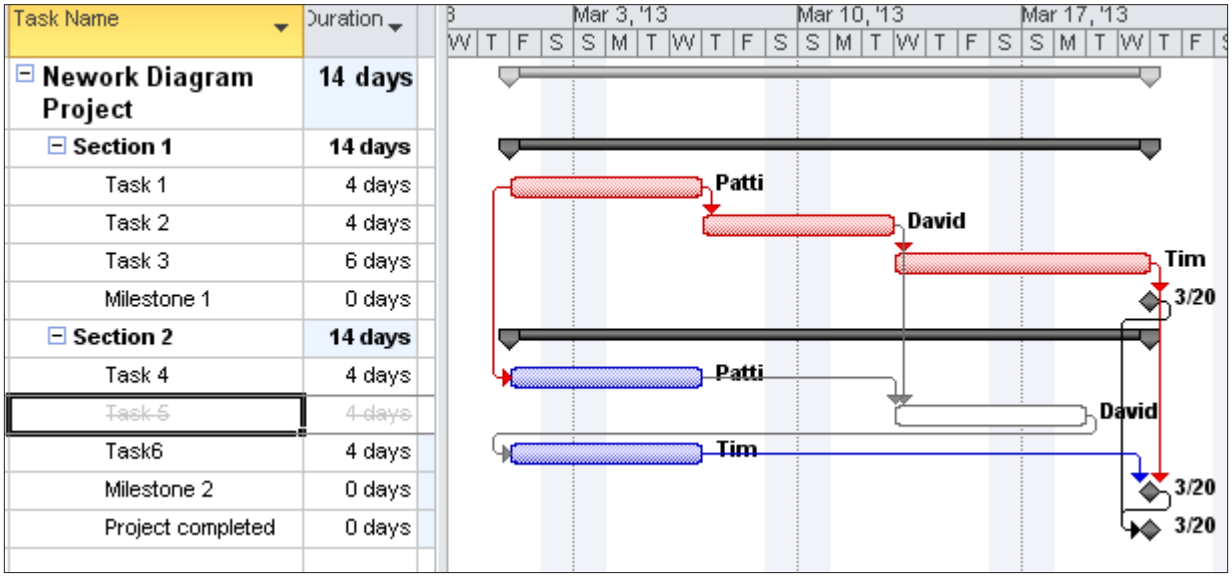

Figure 4-71 PLACEHOLDER

The task that was inactivated was on the critical path. The software now treats the task as if it is not there. The links are no longer valid and as a result the successor task returns to the start date of the project. The critical path has changed as well as the ending date. Since Task 5 is now inactive, the relationship between Task 4 and Task 6 was also eliminated and needs to be reestablished. The inactive task can remain in the schedule and may be activated if necessary.

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