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Contents

Recap on Dependencies and Constraints

Predecessors and successors

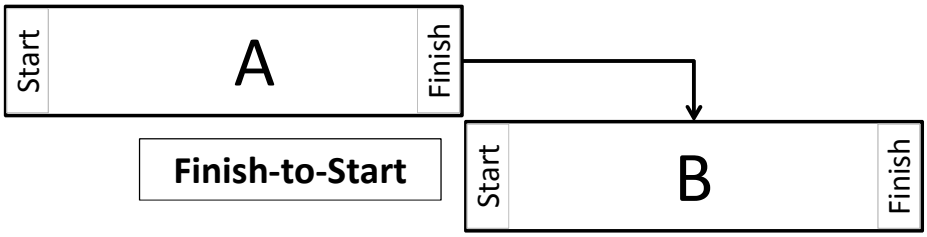
When tasks are connected they take on the following roles:

Predecessor is the task whose start or finish drives the start or finish of the successor

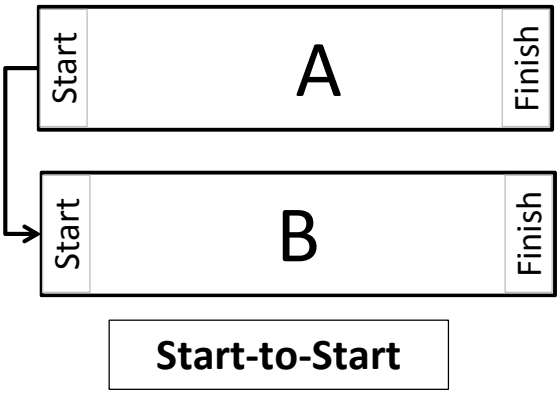
Successor is the task whose start or finish is driven by the predecessor task

There are four types of dependency that can link Predecessors and Successors. You choose the type that best describes the relationship between them:

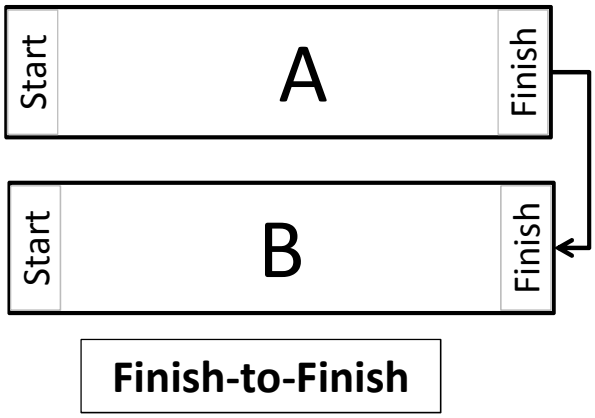
Finish to Start (FS) - **F**inish of Predecessor drives **S**tart of Successor



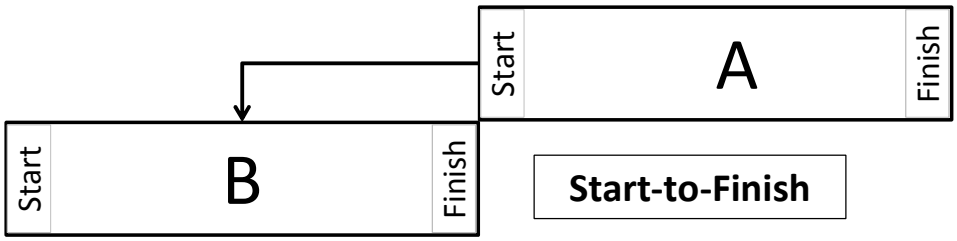
Start to Start (SS) - **S**tart of Predecessor drives **S**tart of Successor



Finish to Finish (FF) - **F**inish of Predecessor drives **F**inish of Successor



Start to Finish (SF) - **S**tart of Predecessor drives **F**inish of Successor



Constraints

Use constraints to model dates that affect the start or finish of your tasks. In addition to the constraint and date you set, Project will also take into account other factors such as calendars, resource availability and dependencies when calculating where to place the task on the chart.

All automatically scheduled tasks have a constraint. By default this is set to As Soon As Possible (ASAP). This means that unless another task or link gets in the way Project will position the task as early in the plan as it can.

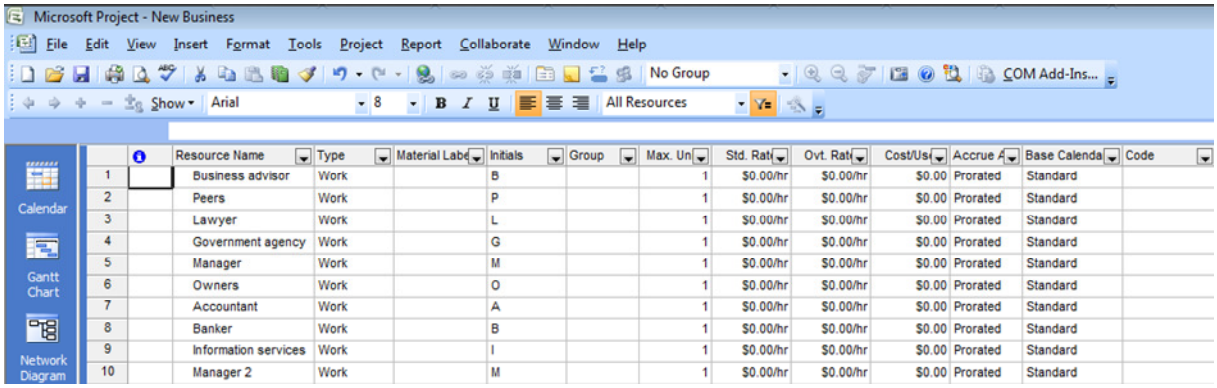
Constraints can be modified by:

Double clicking on the name of the task to be constrained then from the advanced tab choose the constraint type and if appropriate add a date:

As Late As Possible (ALAP)	the task will take place as late it can
Finish No Earlier Than (FNET)	models a task that is not able to finish before a certain date, but could be delayed beyond it
Finish No Later Than (FNLT)	is used to describe tasks that are not able to finish beyond a date, but are able to finish earlier
Must Finish On (MFO)	positions the task's finish on the specified date
Must Start On (MSO)	as MFO but positions the task's start on the specified date.
Start No Earlier Than (SNET)	the task starts on or after the specified date but no earlier
Start No Later Than (SNLT)	for activities that must start on or before a specified date.

Working with Resources

Resources are best defined using the **Resource Sheet**, which can be accessed via the View menu or the View bar.



	Resource Name	Type	Material Labe	Initials	Group	Max. Un	Std. Rat	Ovt. Rat	Cost/Us	Accrue A	Base Calenda	Code
1	Business advisor	Work		B		1	$0.00/hr	$0.00/hr	$0.00	Prorated	Standard	
2	Peers	Work		P		1	$0.00/hr	$0.00/hr	$0.00	Prorated	Standard	
3	Lawyer	Work		L		1	$0.00/hr	$0.00/hr	$0.00	Prorated	Standard	
4	Government agency	Work		G		1	$0.00/hr	$0.00/hr	$0.00	Prorated	Standard	
5	Manager	Work		M		1	$0.00/hr	$0.00/hr	$0.00	Prorated	Standard	
6	Owners	Work		O		1	$0.00/hr	$0.00/hr	$0.00	Prorated	Standard	
7	Accountant	Work		A		1	$0.00/hr	$0.00/hr	$0.00	Prorated	Standard	
8	Banker	Work		B		1	$0.00/hr	$0.00/hr	$0.00	Prorated	Standard	
9	Information services	Work		I		1	$0.00/hr	$0.00/hr	$0.00	Prorated	Standard	
10	Manager 2	Work		M		1	$0.00/hr	$0.00/hr	$0.00	Prorated	Standard	

Creating work and material resources

Each resource is entered on its own line as follows:

Basic resource properties

Name — Enter an appropriate name for the resource. This can either be the name of an individual, a job role or a team name for generic resources.

Type — Up to Project 2003 resources can be either **work** or **material**. Use the Work resource type for people and equipment whose availability is capped (Max Units) so you can see if they become over-allocated. Use the material resource type if the resource is a consumable.

Project 2007 supports **cost** resources. Use the cost resource type to track variable items such as expenses. The rate for the resource is not stored in the resource sheet. Each time cost is assigned to a task you can enter the cost that applies just to that task.

Material Label — Only applicable for material resources. This is the quantity that the resource is purchased in. For example paint might be purchased in litres.

Initials — An alternative to having the full name beside bars on the GANTT chart

Group — Can be used to categorise resources appropriately for reports, filters and grouping. Typical uses are team names, departments, subcontractors etc.

Max Units — The maximum number of units of the resource. 100% generally means one individual; 300% 3 individuals. (Work type only)

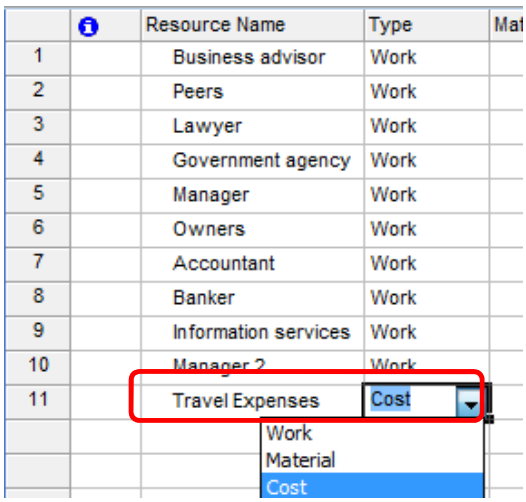
Standard Rate — Cost of standard work, can be recorded as Hourly/Daily/Weekly/Monthly e.g. £200/d for a daily rate

Overtime Rate — Cost of resource when work is specified as overtime. (work type only)

Cost/Use	A one off cost associated with the resource. Is charged every time resource is allocated to a task. Can also be used in addition to Standard Rate.
Accrue At	Determines if the resource costs are charged at the start of the task; throughout the task, or at its end.
Base Calendar	The base calendar which determines the resource's working time. (Work Type only)
Code	A general code that can be used to identify the resource or resource group. A typical example would be a cost centre code.

Creating cost resources (2007 only)

Cost resources (such as travel or accommodation) are created as a type of resource in the Resource Sheet.

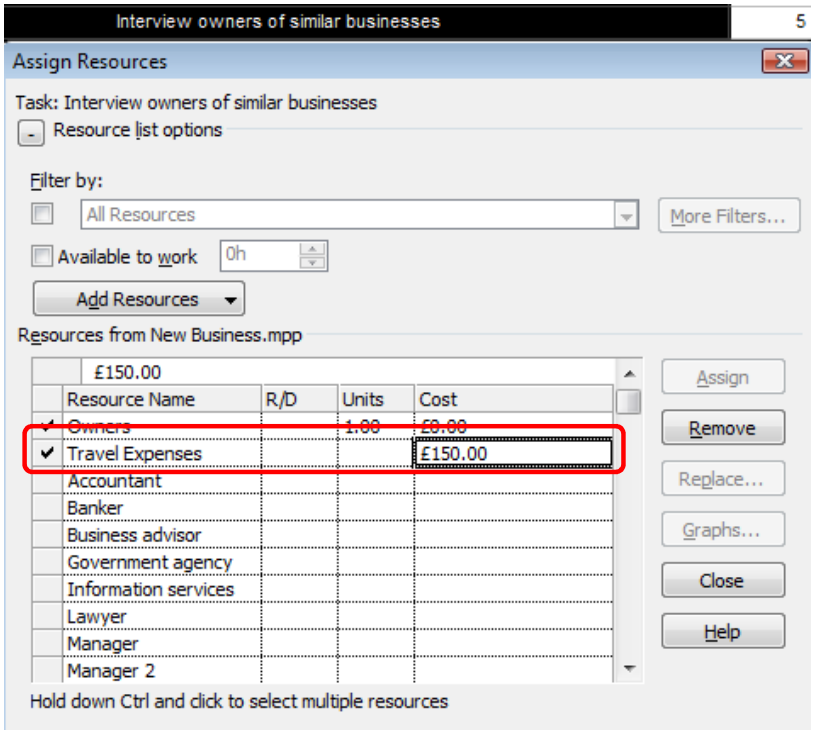


	Resource Name	Type	Mat
1	Business advisor	Work	
2	Peers	Work	
3	Lawyer	Work	
4	Government agency	Work	
5	Manager	Work	
6	Owners	Work	
7	Accountant	Work	
8	Banker	Work	
9	Information services	Work	
10	Manager 2	Work	
11	Travel Expenses	Cost	

Work
Material
Cost

Cost resources are used when you want to apply (to a single task) multiple separate miscellaneous costs that aren't changed by the amount of work performed on the task. For example, an executive working on a new project proposal might have three separate cost resources applied to him or her: one for airfare, one for food expenses, and one for hotel room expenses. In this way, several "fixed" costs can be applied to a single task. Unlike with work resources and material resources, cost rates cannot be applied to cost resources.

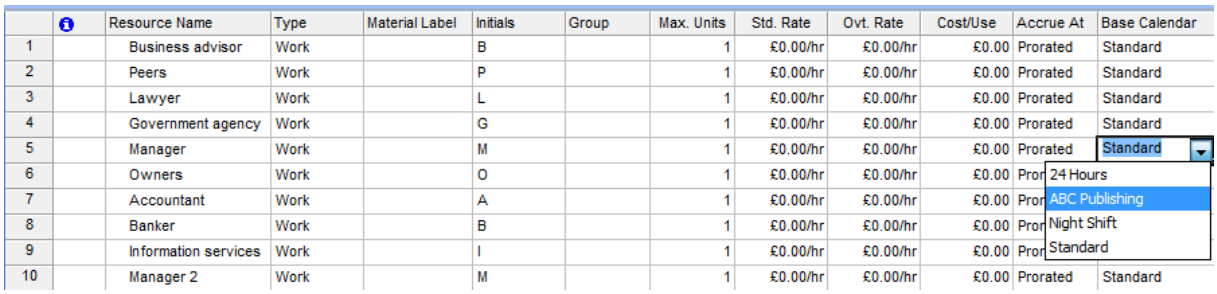
After you create the cost resource, you assign it to tasks using the Assign Resources dialog box. It is at this point that you type in the amount:



Working with multiple calendars

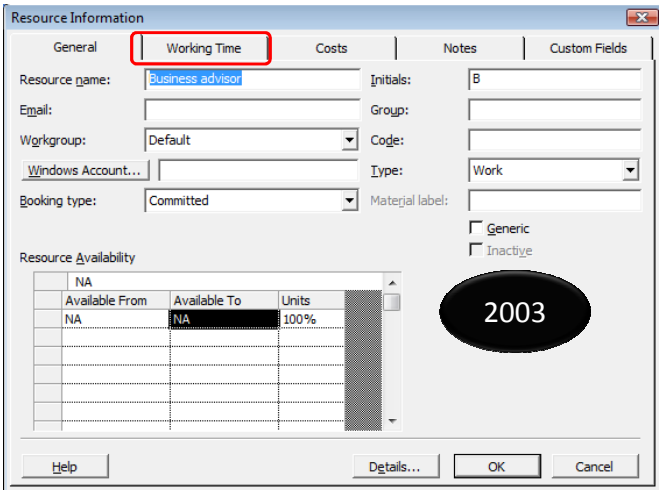
Assigning and amending a resource calendar (2003)

1. In the Resource Sheet Base Calendar column, select the relevant Base Calendar:

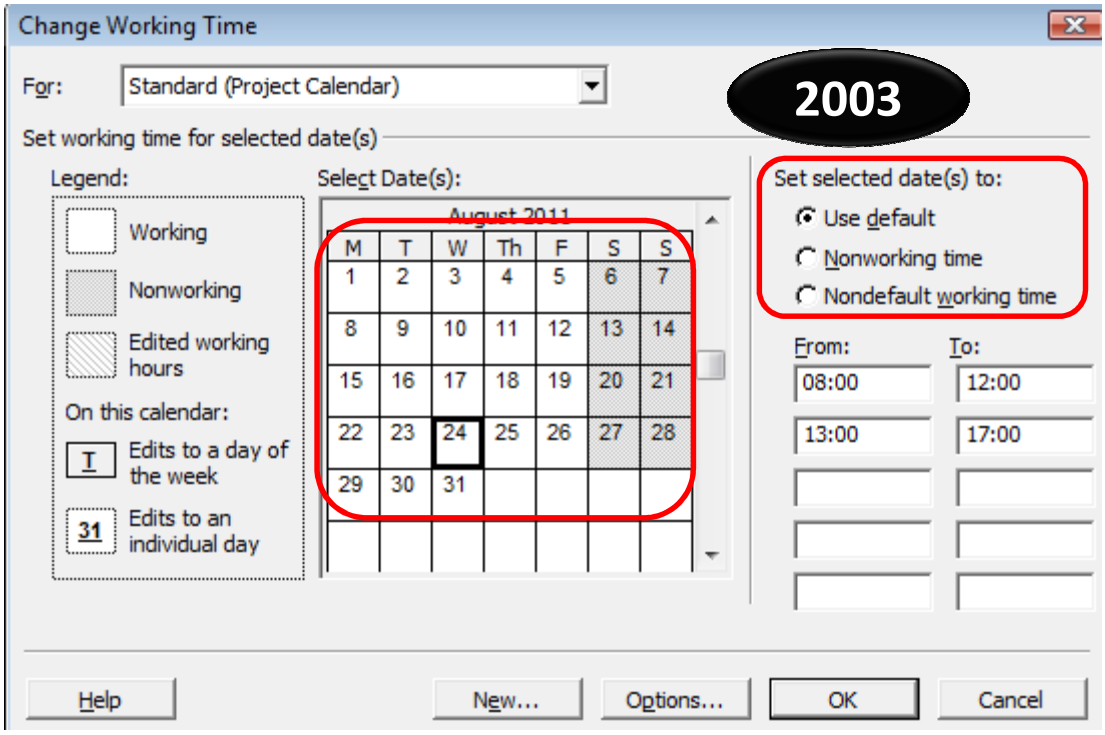


		Resource Name	Type	Material Label	Initials	Group	Max. Units	Std. Rate	Ovt. Rate	Cost/Use	Accrue At	Base Calendar
1		Business advisor	Work		B		1	£0.00/hr	£0.00/hr	£0.00	Prorated	Standard
2		Peers	Work		P		1	£0.00/hr	£0.00/hr	£0.00	Prorated	Standard
3		Lawyer	Work		L		1	£0.00/hr	£0.00/hr	£0.00	Prorated	Standard
4		Government agency	Work		G		1	£0.00/hr	£0.00/hr	£0.00	Prorated	Standard
5		Manager	Work		M		1	£0.00/hr	£0.00/hr	£0.00	Prorated	Standard
6		Owners	Work		O		1	£0.00/hr	£0.00/hr	£0.00	Pror	24 Hours
7		Accountant	Work		A		1	£0.00/hr	£0.00/hr	£0.00	Pror	ABC Publishing
8		Banker	Work		B		1	£0.00/hr	£0.00/hr	£0.00	Pror	Night Shift
9		Information services	Work		I		1	£0.00/hr	£0.00/hr	£0.00	Pror	Standard
10		Manager 2	Work		M		1	£0.00/hr	£0.00/hr	£0.00	Prorated	Standard

2. Double click the Resource to display the Resource Information Dialog Box and click the **Working Time** tab.



3. Select the relevant dates and set the selected date(s) to nonworking time or to non default working time



Note: the name of the underlying Base Calendar is displayed beneath the name of the Resource. Any subsequent changes you make to a Base Calendar will be automatically reflected in any dependant Resource Calendars.

To access the additional resource properties, double click on the resource in the resource sheet and then modify the properties in the Resource Properties Dialog.

General (Availability)

Allows user to specify different availability levels for different time periods. For example a resource might only be available for 50% of its time for the month of March. This can be modelled by selecting the start and end date, together with the level of availability during this period. *From Project 2007 this also includes the Change working time button.*

Calendar Use this to identify holidays and other non working days for the resource. Simply select the non-working day on the calendar and click on the "Non Working Time" option button. *From 2007 this has been included on the general tab under the Change working time button.*

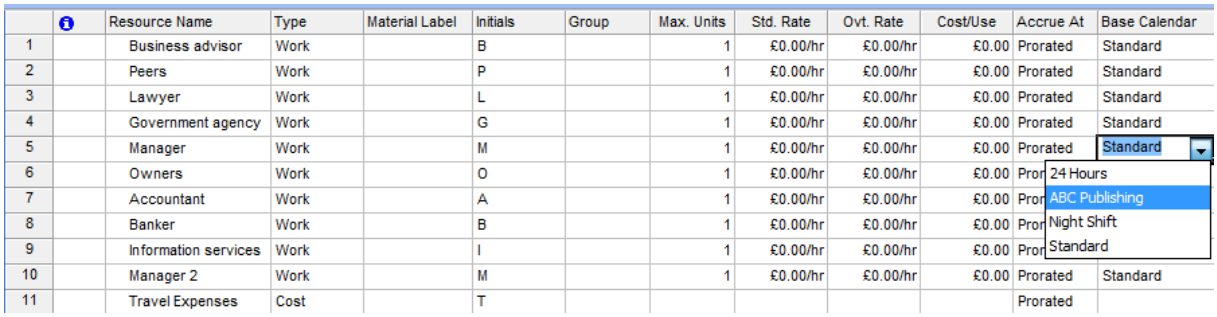
Costs Use this to:

1. Model inflation. If the resource's costs are likely to change during the course of the project, simply select the date of the change in a new row on the cost sheet, and then enter the new costs. The new costs can be entered directly, or as an increase on the previous figure e.g. +10% would increase the cost by 10%.
2. Add additional costs rates. A typical use would be for a resource that is paid different results for different tasks. For example a resource might be paid one rate for training and another for consulting. To add the rate simply select one of the additional tabs (B-E) on the cost sheet and enter the rates as appropriate.

Notes Used to add freeform notes or attach documents relating to the resource.

Assigning and amending a resource calendar (2007)

1. In the Resource Sheet Base Calendar column, select the relevant Base Calendar:



	Resource Name	Type	Material Label	Initials	Group	Max. Units	Std. Rate	Ovt. Rate	Cost/Use	Accrue At	Base Calendar
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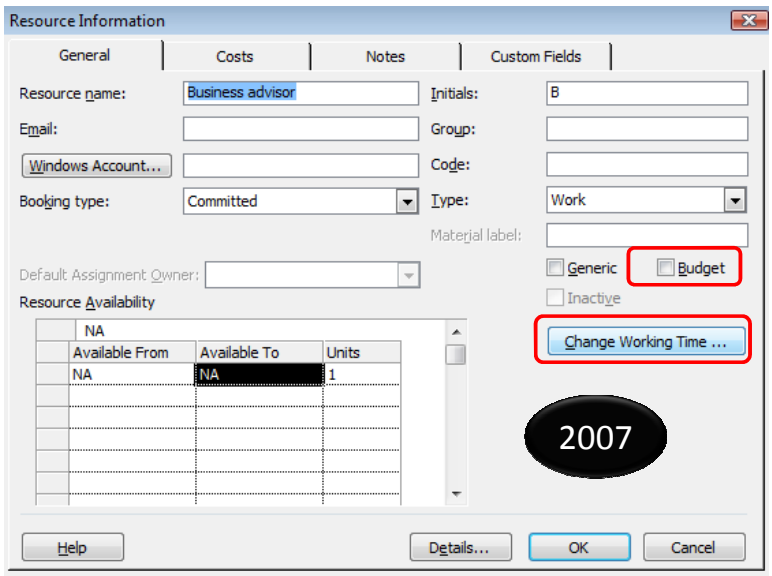
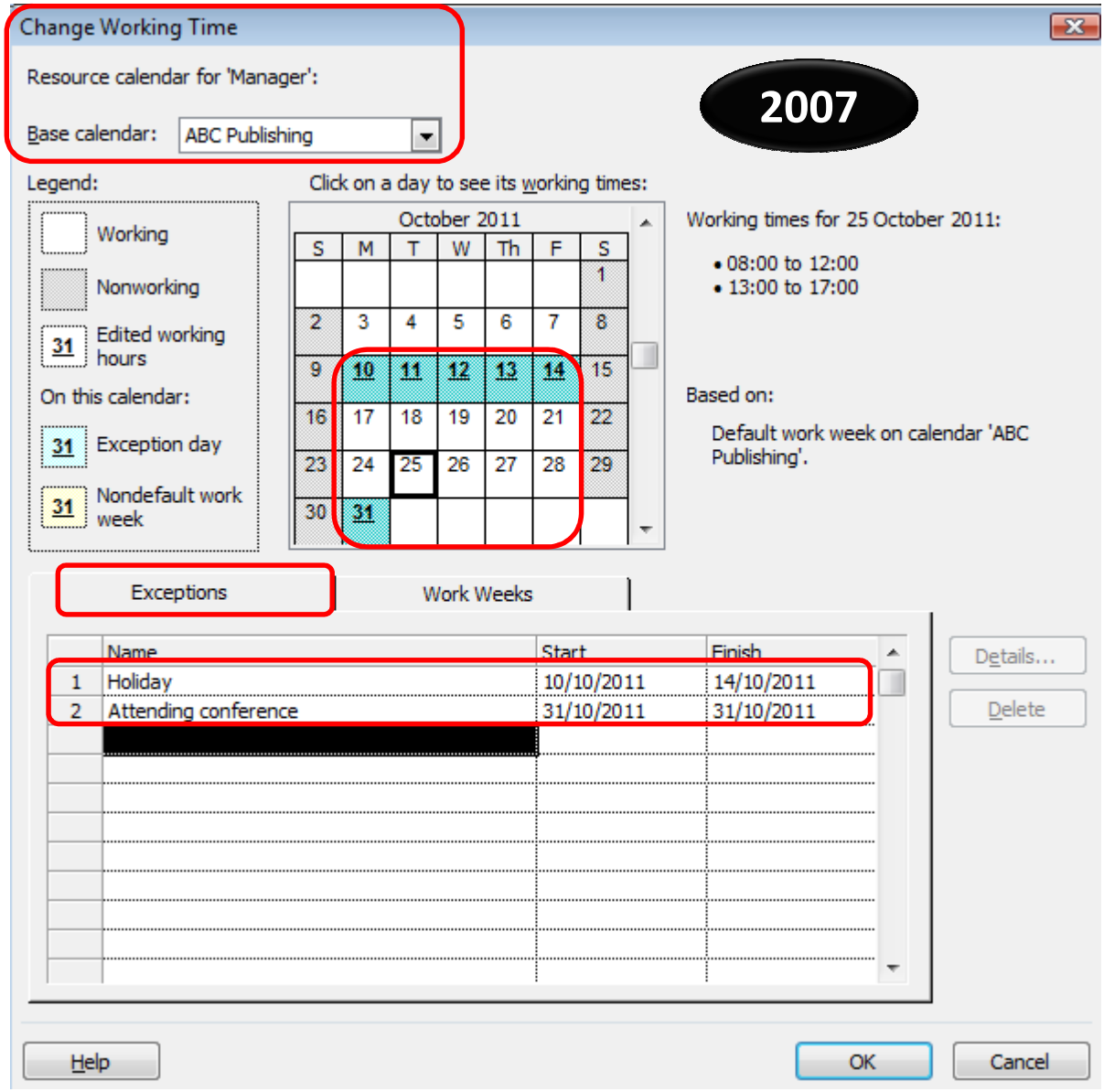
7	Accountant	Work		A		1	£0.00/hr	£0.00/hr	£0.00	Pror	ABC Publishing
8	Banker	Work		B		1	£0.00/hr	£0.00/hr	£0.00	Pror	Night Shift
9	Information services	Work		I		1	£0.00/hr	£0.00/hr	£0.00	Pror	Standard
10	Manager 2	Work		M		1	£0.00/hr	£0.00/hr	£0.00	Prorated	Standard
11	Travel Expenses	Cost		T						Prorated	

2. Double click the Resource to display the Resource Information Dialog Box and click the **Change Working Time button**



3. Edit on the Exceptions or Workweeks tabs



Note: the name of the underlying Base Calendar is displayed beneath the name of the Resource. Any subsequent changes you make to a Base Calendar will be automatically reflected in any dependant Resource Calendars.

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Notes Used to add freeform notes or attach documents relating to the resource.

Assigning Resources to Tasks

There are two stages of resource allocation. The Initial allocation, where resources are first allocated to a task; and then any changes made to that allocation, for example adding extra resources, or removing resources.

Initial allocation

The initial allocation of resources involves specifying the resources necessary to complete each task in the duration specified.

Procedure

1. In the Gantt chart view
2. Split the window to show the Task Form view below the Gantt Chart
3. Select the task which is to be resourced

Then in the lower pane, under resources:

4. Select each resource required for the task
5. Then Click OK (Note all required resources must be selected before OK is clicked)

Allocating multiple resources

When multiple resources are allocated to a task Project will assume that each resource must work on the task for the specified duration. So if two resources are to work on a 2 day task, then each resource must work on it for 2 days. If both resources can work at the same time, then the total duration of the task will remain unchanged. If however, they are working at different times then the duration of the task will likely change.

Example

A two day task starts on Monday and finishes on Tuesday. Two resources are then allocated to it.

Resource 1, works both Monday and Tuesday, thus finishing its contribution within the 2 day duration. Resource 2 however is on holiday on Monday, and therefore starts its 2 day contribution on Tuesday, finishing Wednesday.

Therefore the task starts on Monday with resource 1 and finishes on Wednesday with resource 2; thus having a new duration of 3 days.

Modifying allocations

When modifying a resource allocation, it is necessary to understand that you are changing one of three variables, *units of resource*, the other two being *task duration* and *work*.

When you change the units of resource, either the duration of the task will change, or the amount of work will change, as the three variables can the represented in the formula

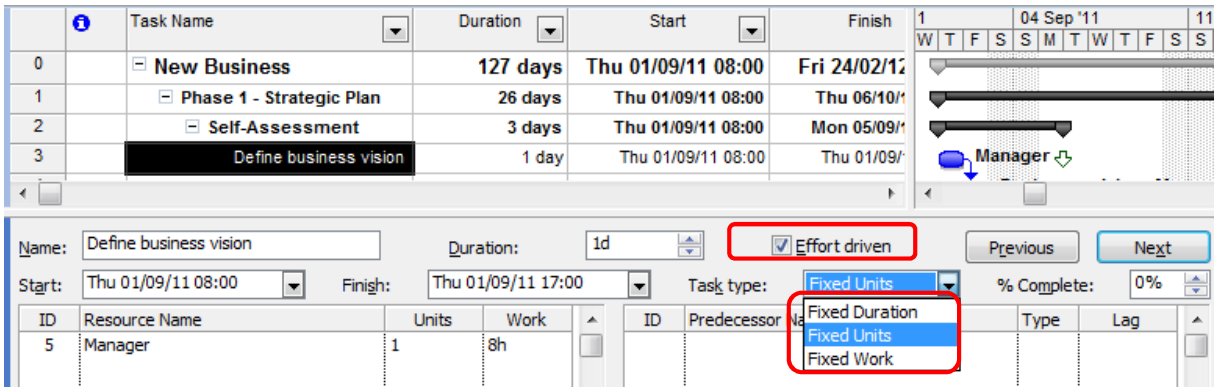
$$\underline{Duration} \times \underline{Units\ of\ Resource} = \underline{Work}$$

So, increasing the units of resource would require either the duration to decrease and work to remain fixed; or for Work to increase and duration to remain fixed.

The key is to be able to specify which option applies.

Procedure

1. Open the Gantt chart
2. Split the screen to show the details pane
3. Select the task to be modified.
4. In the lower pane ensure the "Effort Driven" tick box is empty. If there is a tick in the box remove it then click OK before proceeding (see below)
5. If you want the duration to alter change the task type to "fixed work"
6. If you want work to alter change the task type to "fixed duration"
7. Add or remove resources as required
8. Click OK



Effort Driven Scheduling

Assigning Additional Resources to a Task

When you assign resources to a task, Project shortens the task duration and when you remove resources from a task, Project lengthens the task duration. This is called **effort-driven scheduling.** It does not, however, change the total work for the task.

Effort Driven Scheduling is switched on by default in versions up to and including MS Project 2007.

If a task has the effort driven property selected, project will assume that any increase in the initial resource allocation will cause a proportionate decrease in the duration of the task.

For example, if painting the walls of a room takes 1 day with one person, adding an initial resource will reduce that time to half a day.

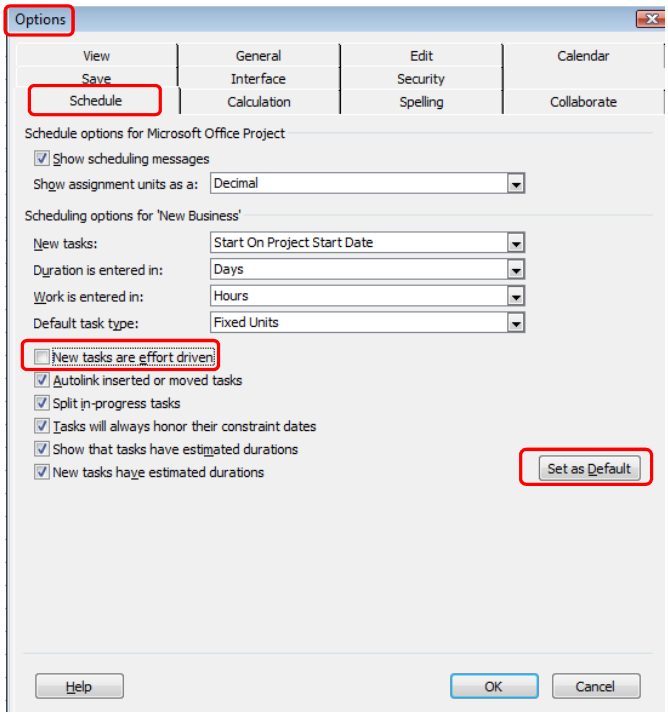
There are two issues here:

1. Some task durations do not respond to extra resources. It is unlikely that a meeting will go more quickly if more people get involved!
2. Even if a task's duration does respond to extra resources, it is unlikely to be a simple linear relationship. To take an extreme example, if it takes 1 person 1 day to paint a 100 square meter room, then according to effort driven scheduling, 100 people could do it in 38 minutes. This is clearly unrealistic as 100 people would be unable to fit into a room of that size!

It is often easier to disable effort driven scheduling, and control the process for yourself using the above method. To switch effort driven scheduling off for new tasks do the following: -

Click on Tools > Options and select the Schedule tab

1. Remove the tick in "new tasks are effort driven"
2. Click "Set as default"



Task Types

You can control the way your task schedule is managed by selecting task types. By using task types, you can make one of the following three variables—duration, work, or units—unchangeable in scheduling calculations. Setting any of the three task variables as fixed provides an extra measure of control over the project schedule. Since the duration of each task is determined by the formula Duration = Work / Units, you can choose that part of the equation that Project calculates by setting the **Task type.**

You can set any of the three task variables as fixed using the **Task type** drop-down list.

Fixed Units A task with a fixed unit value. This is the default **Task type.** Assigning additional resources to a task reduces the task's duration. For example, if one resource is assigned to complete the task of stuffing envelopes, adding another resource will shorten this task's duration.

Fixed Duration A task with a fixed value of duration. Any changes made to the work or to the assigned resources does not impact the task's duration. Assigning additional resources to this task type decreases the individual unit values for resources. For example, if a delivery is made from one site to another and only one truck is necessary to complete the task, assigning additional resources to the task does not decrease the task's duration.

Fixed Work A task in which the amount of work to be completed is fixed. If changes are made to the task's duration or to the number of assigned resources, there is no impact on work. Assigning additional resources shortens the duration of the task for this task type. If a task has a task type of **Fixed Work,** you cannot change the **Effort driven** setting for that task.

Finalising the Plan

Reviewing the schedule

Once your project plan has been set up with linked tasks, resources have been created and assigned to the relevant tasks and task relationships have been set up... you will now be ready to set the Baseline and begin tracking the project progress.

Before setting the Baseline it would be good to review your schedule and examine certain areas of your plan to make sure that everything is in place to ensure a successful outcome for your project. The following areas need to be reviewed before proceeding with setting your Baseline: -

1. Check that your calendar settings are correct (all exceptions entered).
2. Check that the correct calendar has been assigned to the project.
3. Ensure that all resource calendars have been updated (annual leave etc.).
4. Check that all 'Summary Tasks' have been inserted correctly.
5. Check that all 'Milestone Tasks' have been inserted into your project.
6. Check all durations.
7. Check that all tasks have assignments.
8. Check that the predecessor and successor links in the project are correct.
9. If there are any tasks that can be done simultaneously (Start-to-start / Finish-to-finish) edit these in the Predecessors column of the Task Entry table.
10. Tasks that should be 'Effort Driven' must be activated to allow for this procedure (Edit the Task Type in the 'Advanced' tab of the Task Information dialogue box).
11. Fixed Duration tasks should be activated to allow for this procedure (Edit the Task Type in the 'Advanced' tab of the Task Information dialogue box).
12. Check for any over allocated resources and adjust the schedule accordingly.
13. Check that all Recurring Tasks such as meetings etc. have been inserted.
14. Check that all required constraints have been set.

You are now ready for the next step of setting your Baseline and then on to tracking the progress of your project.

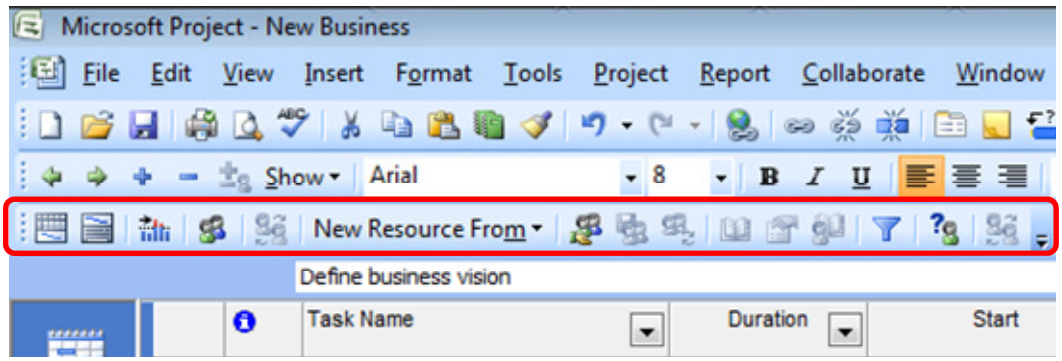
Leveling Resource over-allocation

Resource leveling is the process that ensures resource demand does not exceed resource availability.

There are two stages to this process; first identify specific over allocations, and then fix them.

Identifying over allocations

Go to the Gantt chart. Turn on the Resource Management toolbar: View > Toolbars > Resource Management



Click the Resource allocation icon (first icon from the left) on the Resource Management toolbar

Any resources which are over allocated will appear in red in the top half of the split view

To identify over allocations click on the "Go to next over allocation" button (third icon on the bar)

Fixing over allocations

There are 6 general approaches to solving over allocations

1. Increase the resource's working time for the period in question
2. Swop the resource for another resource
3. Delay the task until the resource has availability
4. Temporarily suspend work on a task (splitting)
5. Contouring resource allocation
6. Changing the logic of the program

Increasing the working time

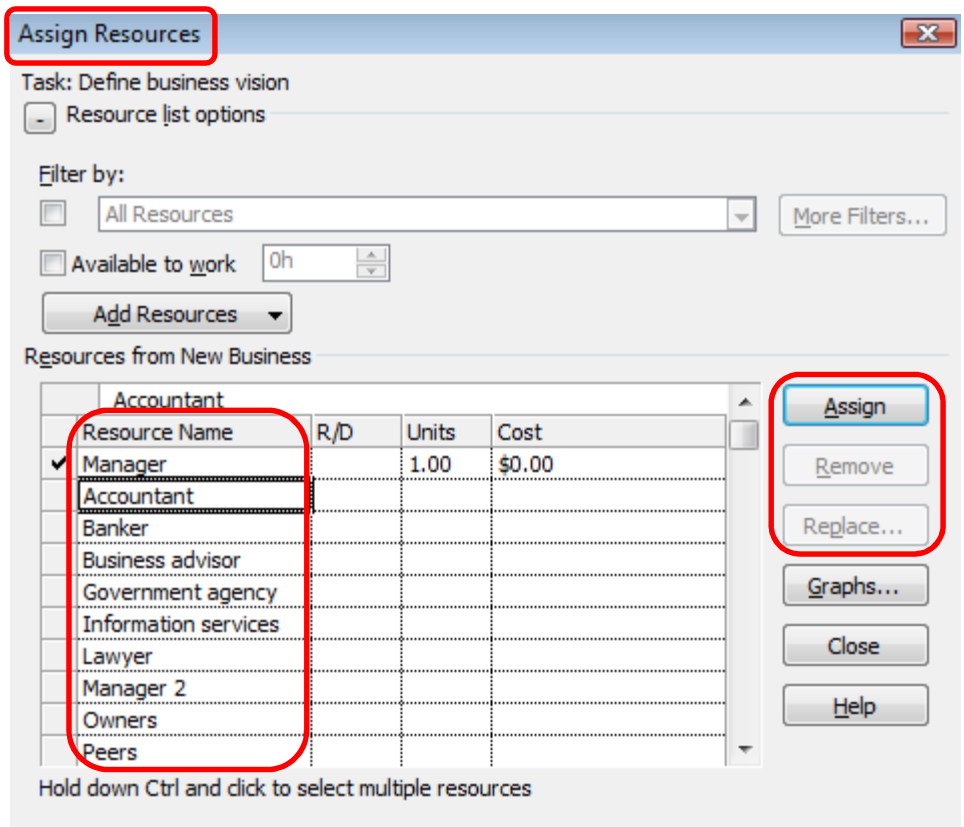
1. Go to the Resource sheet
2. Double click on the resource
3. On the general tab alter the resource's availability by:
    a. First, specify a start and end date and then,
    b. Change the percentage availability to a point where they can cover all the available work.

For example, if a resource normally works 8 hours in a day, increasing their availability to 150% would mean that on the days specified they are available for 12 hours.

Swopping the resource

Select the relevant task in the Gantt chart

Click on the "Assign Resources" button on the toolbar



1. Select the resource to be replaced
2. Click replace
3. Select the new resource
4. Click OK

Delaying the task

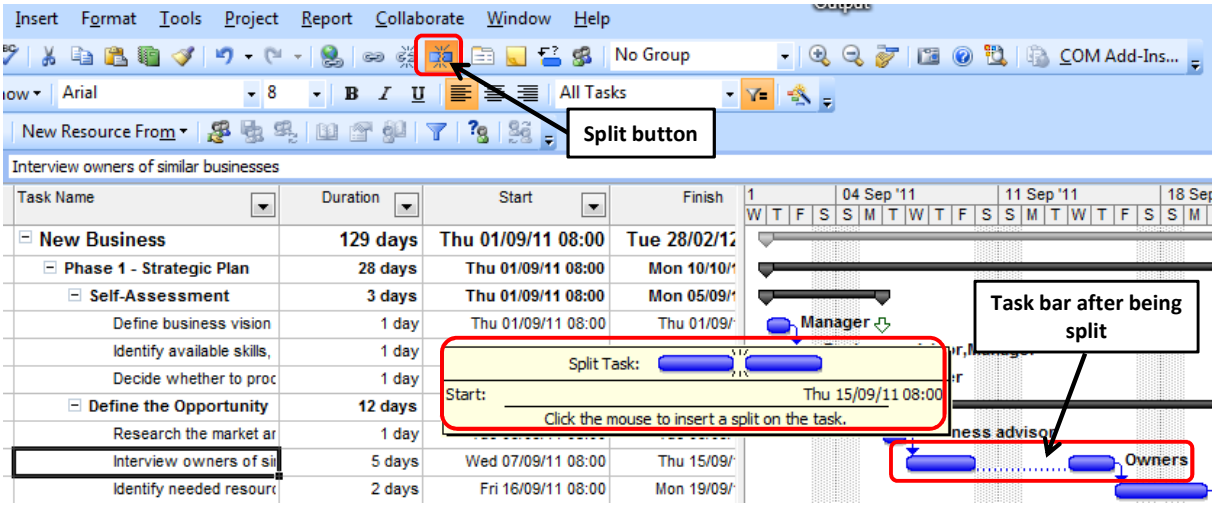
This involves using the levelling delay field. A levelling delay is a delay specifically associated with resourcing issues. We are saying that while the task can physically start at time X, we are delaying it to time Y as only then do we have the necessary resources available. The key point is it is easily identified and, in the event more resources become available, removed.

1. Go to the Gantt chart view
2. Add in the "Levelling Delay" column
3. Select the task to be delayed
4. Specify the duration of the delay in the levelling delay field

Splitting tasks

This allows you to start work on a task, and then suspend work for a period of time while the resource works on another task. To split a task:

1. Click on the Split Task button on the standard tool bar
2. Then position the mouse pointer on the task where the split should start
3. Click once to place a single day split (default) or click and drag to the right, along to the point where the split is to finish

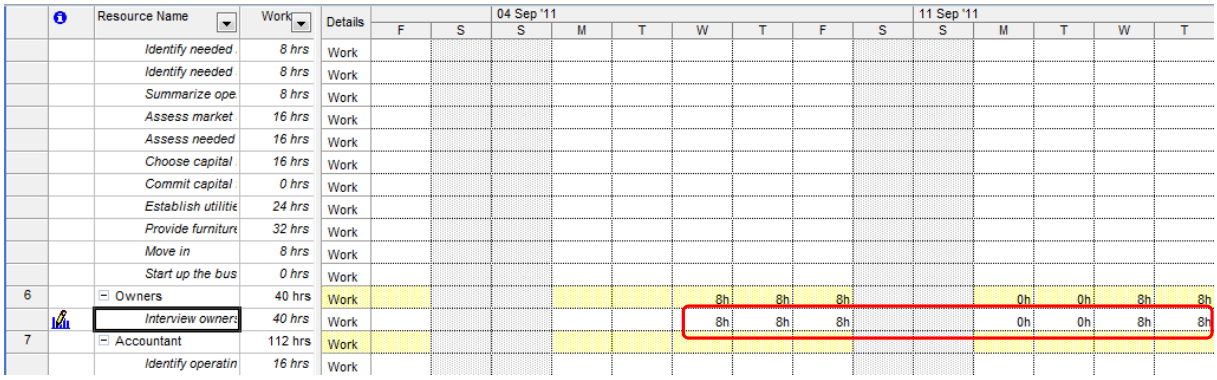


Resource contouring

It is possible to specify the number of hours per day that a resource works on a task.

For example; a resource works an 8 hour day. It is allocated to two concurrent tasks and will initially be set to work 8 hours on the first task, and 8 hours on the second; thus working 16 hours in an 8 hour day. It may be however that the resource need only work 4 hours per day on task 1 and 4 hours per day on task 2, thus resolving the over-allocation. This is known as resource contouring.

1. To contour a resource allocation, switch to the Resource Usage view by choosing it from the View Bar or
2. From the view menu choose Resource Usage
3. Then manually enter the daily hours worked alongside each resource's assignment.



		Resource Name	Work	Details	04 Sep '11									11 Sep '11				
					F	S	S	M	T	W	T	F	S	S	M	T	W	T
		Identify needed	8 hrs	Work														
		Identify needed	8 hrs	Work														
		Summarize ope	8 hrs	Work														
		Assess market	16 hrs	Work														
		Assess needed	16 hrs	Work														
		Choose capital	16 hrs	Work														
		Commit capital	0 hrs	Work														
		Establish utilitie	24 hrs	Work														
		Provide furniture	32 hrs	Work														
		Move in	8 hrs	Work														
		Start up the bus	0 hrs	Work														
6		Owners	40 hrs	Work						8h	8h	8h			0h	0h	8h	8h
		Interview owners	40 hrs	Work						8h	8h	8h			0h	0h	8h	8h
7		Accountant	112 hrs	Work														
		Identify operatin	16 hrs	Work														

Changing Project logic

Sometimes it is not possible to resolve over-allocation using the above methods. Under these circumstances it may be necessary to re-examine;

Task Dependencies

Task Constraints

In addition, if the project is to be completed on schedule, the only solution may be to bring in additional resources.

Tracking progress

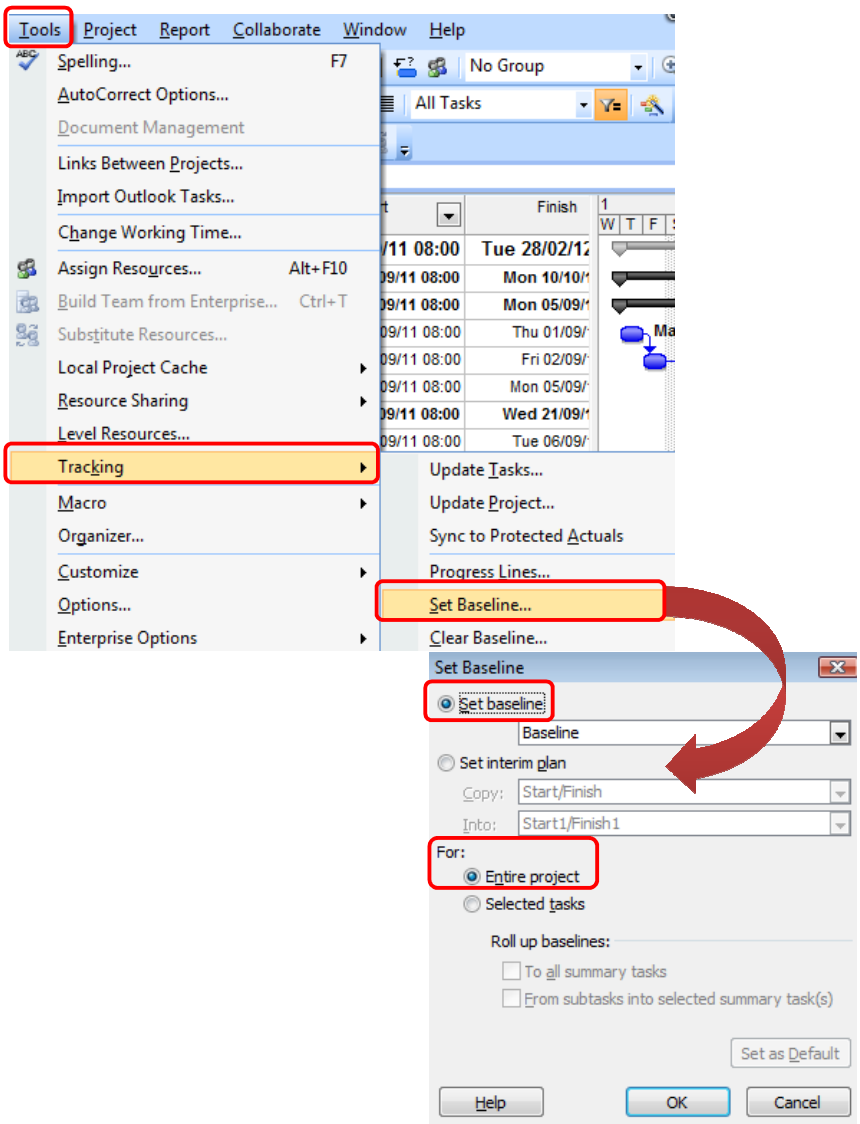
Project tracking involves measuring actual progress and performance and comparing that with the planned schedule

Saving/Setting the baseline

Once a project plan has been completed and its resources assigned, it is necessary to save/set a baseline. A Baseline is a snapshot of the project, and is used to compare what is planned to happen with what actually does happen. The baseline is very important, in that it is fundamental to analysing cost and schedule variances. If you are connecting several plans to a resource pool, save/set the baseline on each individual plan. You will be able to see the combined baselines in the master project.

To save/set the baseline:

1. Click on Tools > Tracking > Save/Set Baseline



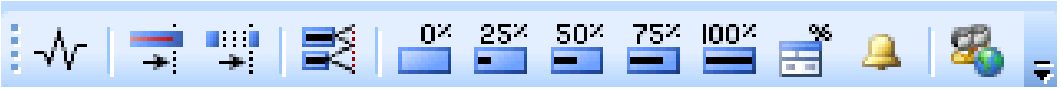
2. Select "Save/Set Baseline" and "Entire Project" option buttons > Click OK

Note: On the Tracking Gantt view, each task bar is split horizontally in two. The lower gray part represents the baseline, whilst the upper coloured bar represents actual progress.

Entering project progress

Tracking actual durations involves marking off tasks to indicate how much of the scheduled task has been completed.

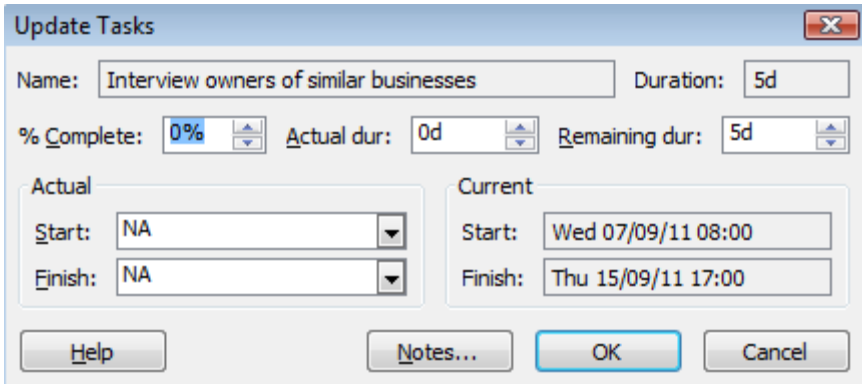
One method is to use the pre-set progress buttons. Activate the tracking toolbar by clicking on View > Toolbars > Tracking



Elementary progress can be marked off using the 25%, 50%, 75% and 100% buttons.

More detail can be accessed by clicking on the Update Tasks button, which activates the dialog box of the same name.

Update tasks is found after the 100% progress button on the tracking toolbar



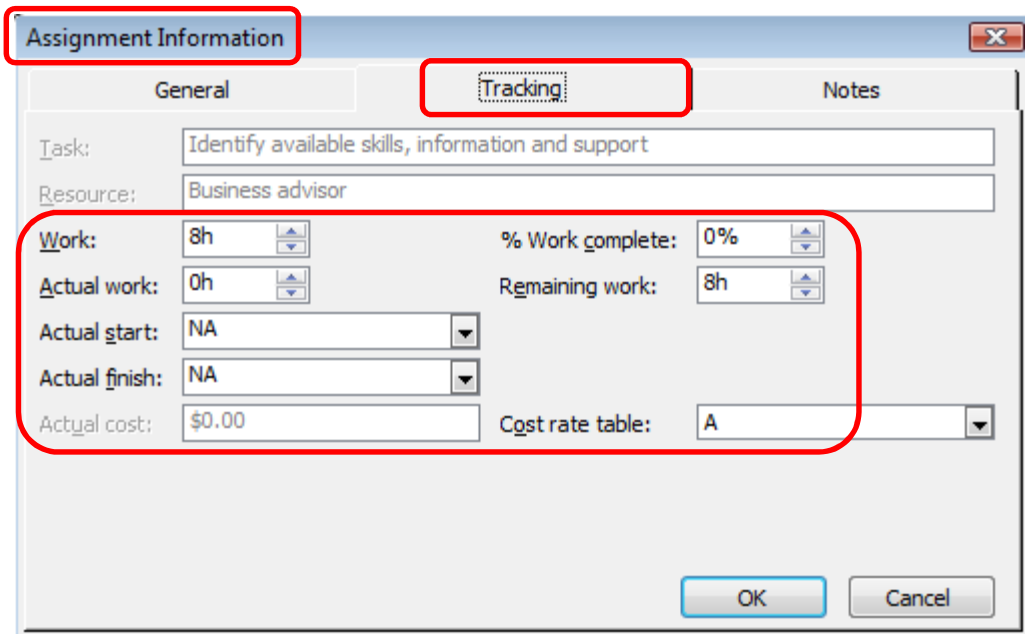
Progress can be marked off in the following ways:

Percentage Complete	Use this to mark off how much of the task's total duration has been completed.
Actual Duration	This can be used to mark off how long a task actually took to complete
Actual Start	When a task actually started
Actual Finish	When a task actually finished
Remaining Duration	How much time is actually required to complete a task

Progress - Work

It is also possible to track the amount of work carried out on a task. To do this:

1. Go to the Resource Usage view
2. Double click on a task assigned to the resource whose progress you want to record
3. From the dialog box that appears choose Tracking



4. Enter the Actual Work completed (in hours) and remaining work still to be done

Viewing Variance information

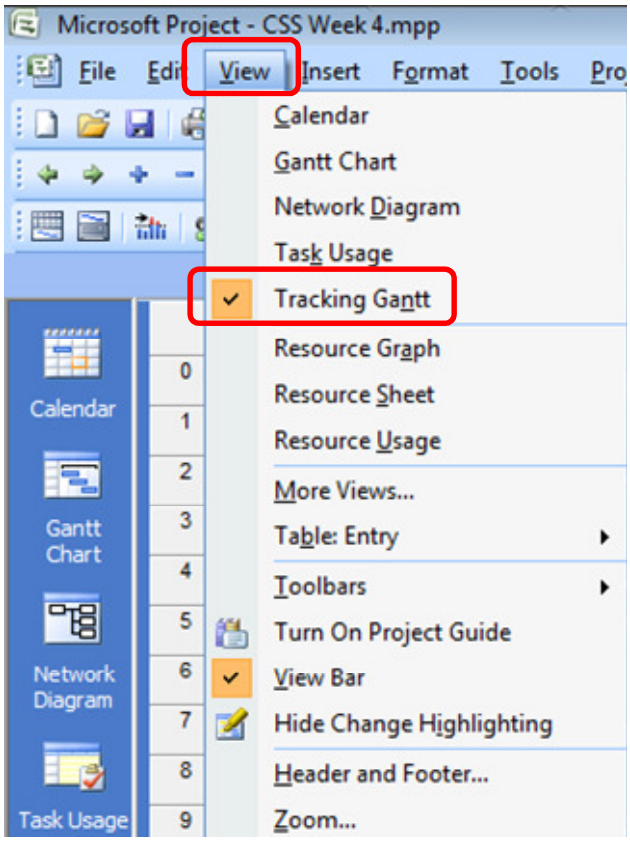
The Variance Table

The **Variance** table allows you to check if your project is on track. The **Start** and **Finish** columns display actual dates for tasks that have started and projected dates for those that have not, respectively. The **Baseline Start** and **Baseline Finish** columns display the planned start and finish dates. The **Start Var** and **Finish Var** columns show the difference between the actual and baseline dates. Negative numbers indicate tasks that are ahead of schedule, whereas positive numbers indicate tasks that are behind the schedule.

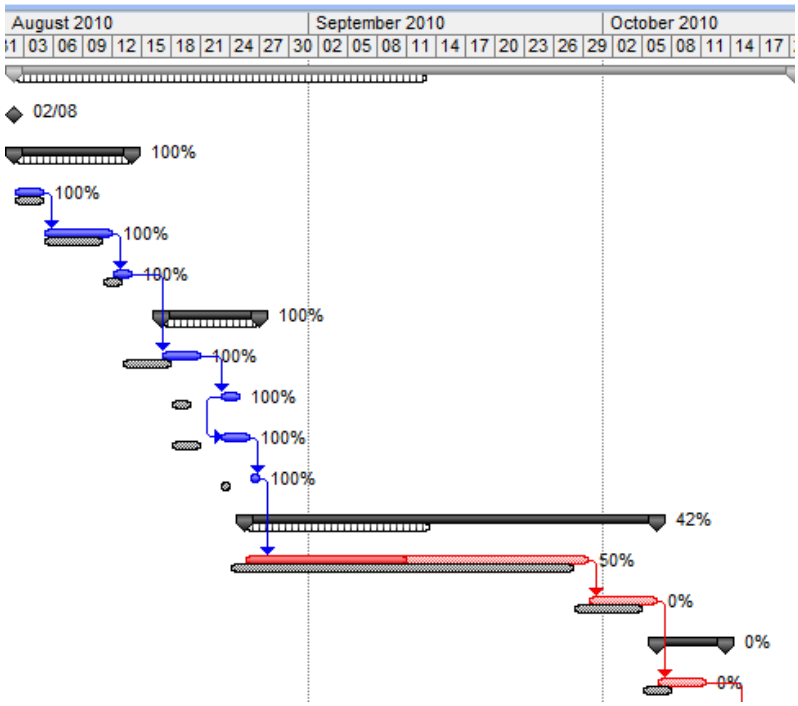
- To view variance information in a sheet view without the Gantt Chart, from the View menu, select More Views then select and apply the Task Sheet
- Then from the View menu, go to Table: and then click Variance.

  The Variance table shows start and finish dates for both scheduled information and baseline information, making it possible to evaluate your prediction of how the project would progress (baseline) by comparing that prediction with how the project is in fact progressing (actual).

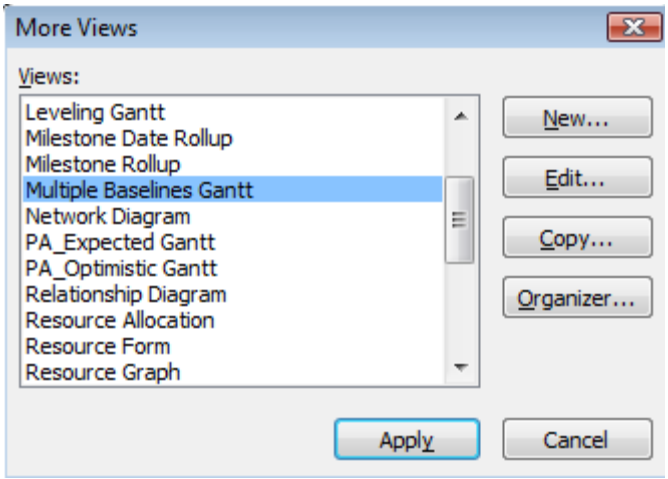
- To view variance information visually, click the View menu and select Tracking Gantt.



The baseline appears on the Gantt chart as a grey bar underneath each of the existing bars and the % complete is displayed. By default the initial baseline data is displayed and if you wish to see a different baseline, from the Format tab click the Baseline command and choose the Baseline you wish to display:



- To view multiple baselines, click the View menu, click More Views and choose Multiple Baselines Gantt:

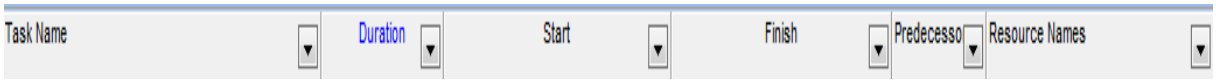


Note: The Multiple Baselines Gantt view shows the first three baselines (Baseline, Baseline1, and Baseline2).

Filters and Sort

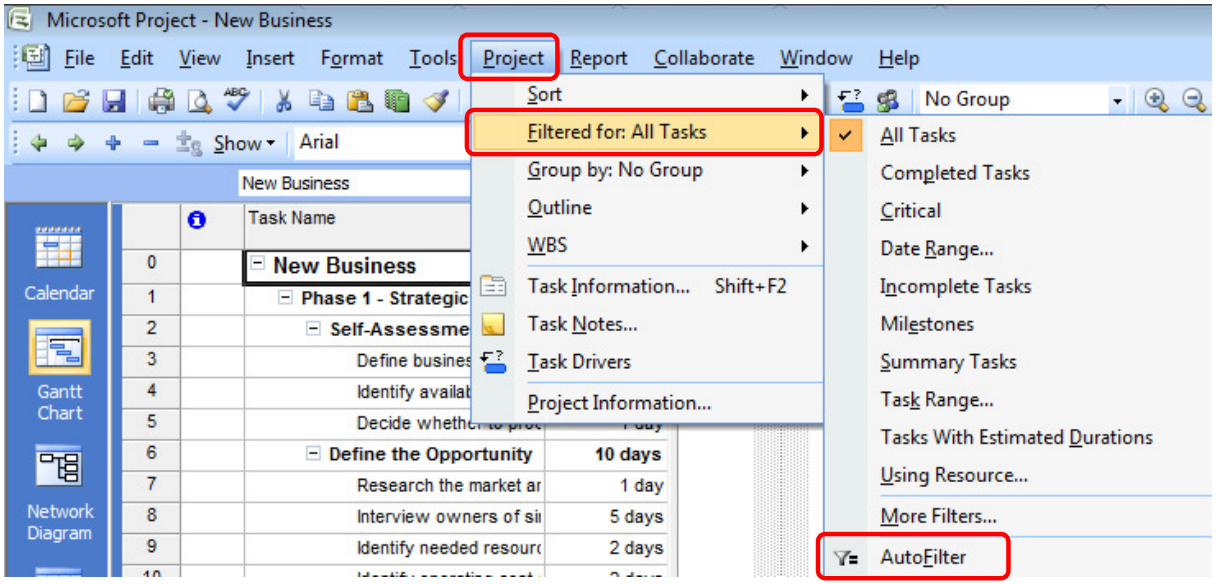
Working with auto filters

In addition to standard filters Project 2003/07 provides AutoFilters, visible in any sheet view where each column in a sheet view has its own AutoFilter indicated by the drop down arrow on each of the column headings:

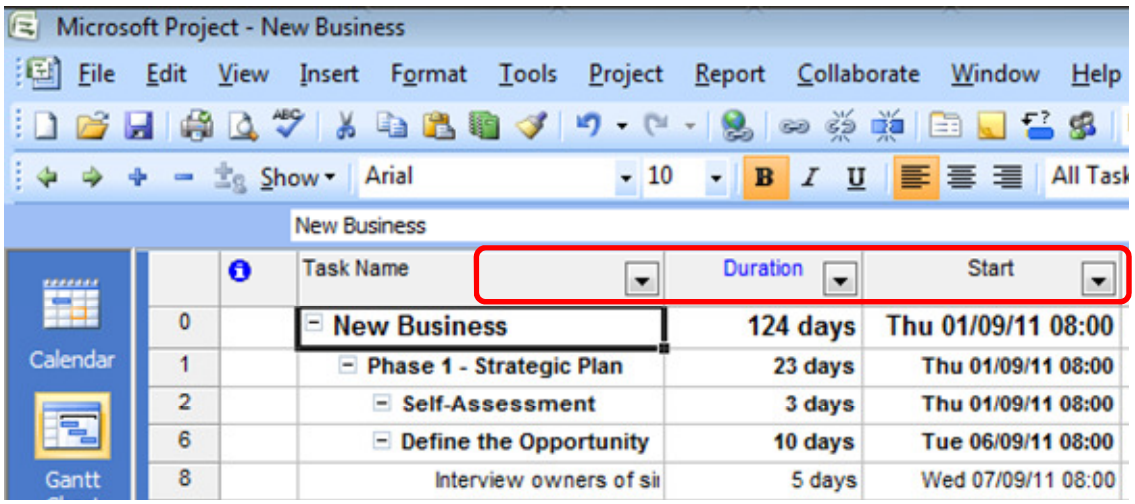


The Project menu provides access to tools that help Project Managers focus on key tasks by applying filters and sorting of tasks and resources.

From Project > Filtered For: choose AutoFilter. The same menu gives access to sorting.



The triangular buttons at the top of each column in the sheet can now be used to apply filters by column.

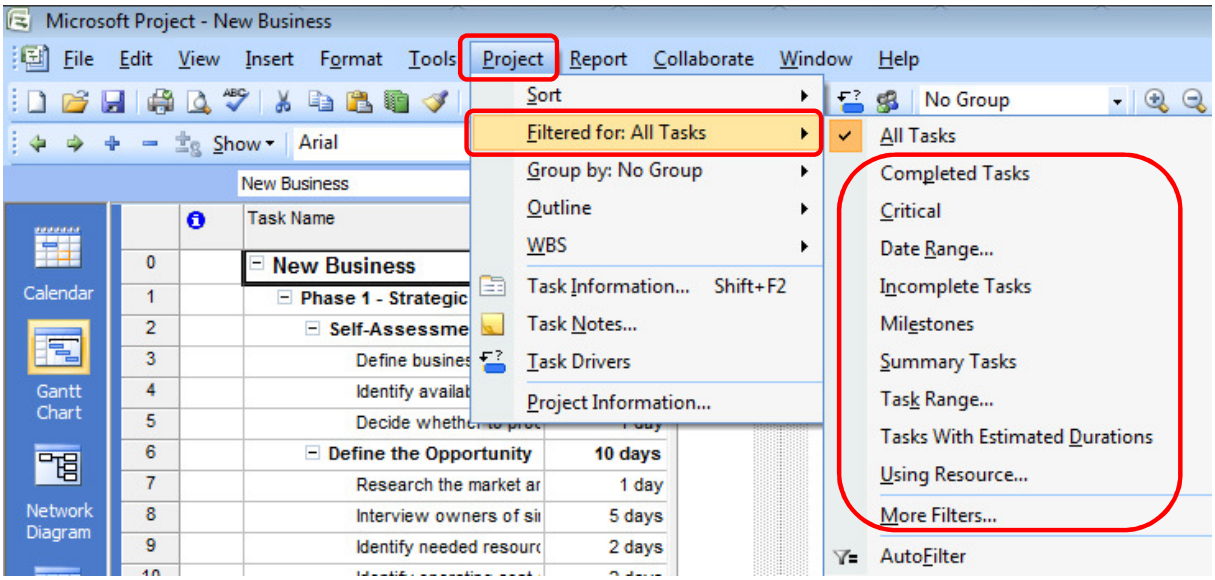


Applying built-in filters

A filter is used to screen out unwanted tasks for a particular view to identify a particular aspect of the current state of the project, for example the filter can be set to show the tasks that make up the Critical Path.

As with tables there are different filters for tasks and resources and depending on the current view the appropriate list of filters will be shown for the selection.

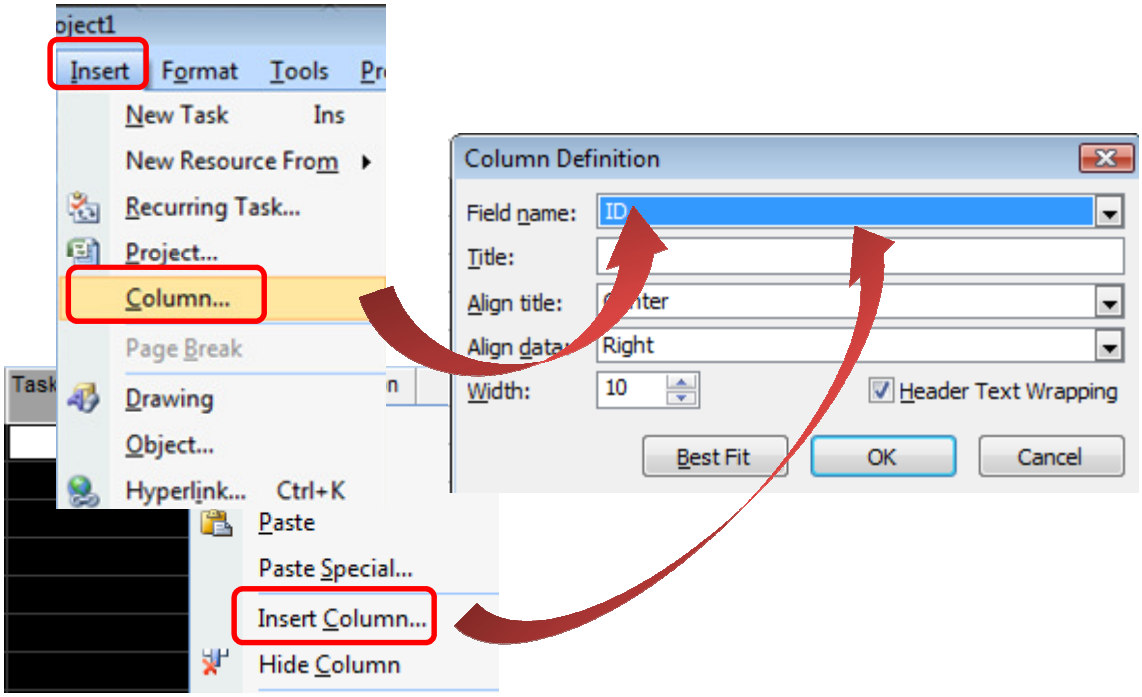
1. Select the view you want to filter (eg Gantt Chart, Resource Sheet, etc)
2. From the Project menu go to Filtered for: All Tasks
3. Choose the required Filter from the list
4. These actions can also be carried on the Formatting toolbar
5. Remove the filter by choosing All Tasks



Adding new columns

It often happens that you may wish to view additional data in a table and to do this you need to insert a new column using a specific Project field.Each table in Project has a set number of columns, the headings of which are known as field names. Column headings may be different to the actual field name if a title has been given.

It is useful to know what fields are available before adding a new column. To add a new column to a table, click the Insert menu and then click Column...



This will open the Column Definition dialogue box from which a field can be chosen using the top drop-down arrow. Choose other settings then click OK. The new column will always be inserted to the left of the selected column.

Remove a column

To remove a column from a table you will have to hide it. Right-click the necessary column and click Hide column. If you require to bring the same column back you must re-insert it as there is no unhide column facility.

Analyse and adjust a schedule

Analysing schedules

Review schedule differences

As you track progress through your project, you can review the differences between planned, scheduled, and actual work. This helps you assess whether work on your project is progressing as expected. You can compare work amounts for tasks as a whole, or for resources and their individual assignments.

The easiest way to compare work amounts with your original plan is to apply the **Work table** to a sheet view, such as the **Gantt Chart** view or **Resource Usage** view. The value in the Work field represents the current scheduled work value, showing the total of actual and remaining work for tasks that have started, and showing the latest projected work value for tasks that have not yet started.

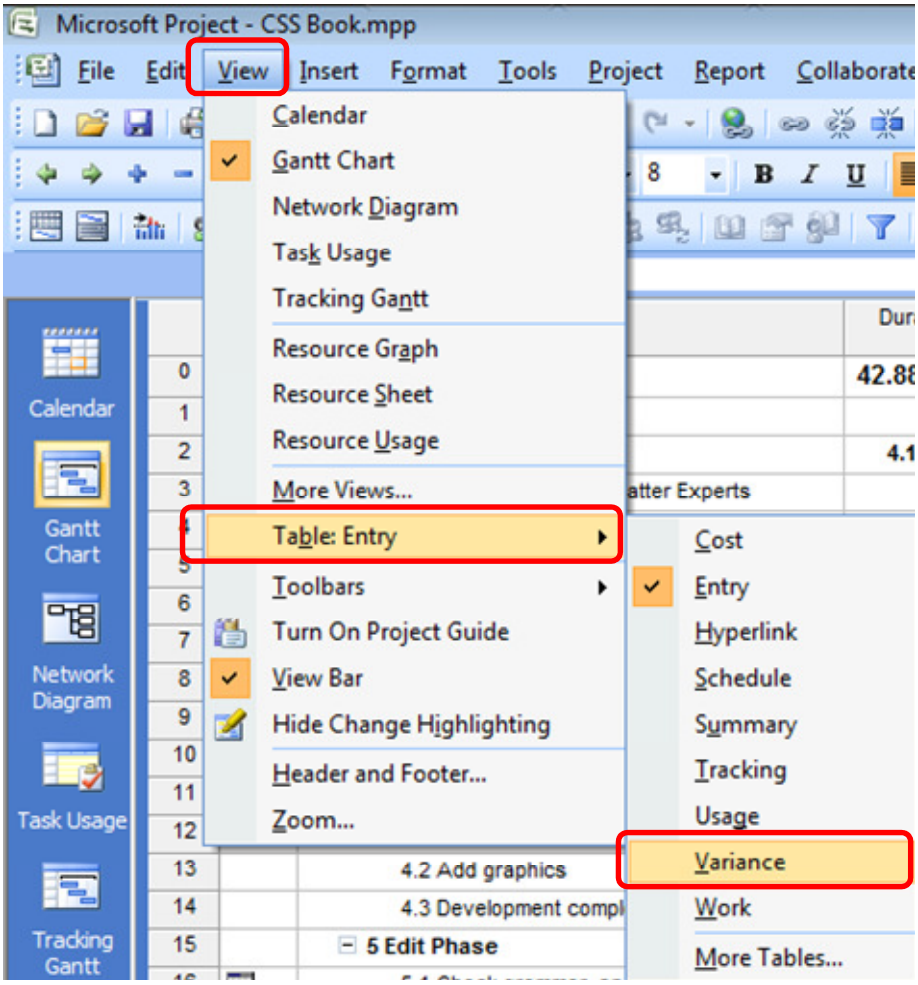
If you saved a baseline, then your original planned work amounts are stored in the **Baseline** field. With this field, you can compare work amounts in your original plan to currently scheduled work amounts. The **Variance** field shows the calculated variancebetween planned and scheduled work, that is, the difference between the **Baseline** and **Work** fields.

You can also review actual work amounts in the **Actual** fields. For completed tasks, the **Work** and **Actual** fields contain the same value.

Compare Baseline and Scheduled Information

You can compare baseline and scheduled information in either of two ways:

To view variance information in a sheet view, click the **View** menu move down to **Tables**, and then click **Variance**.



To view variance information graphically, click the View menu then click Tracking Gantt.

The Variance table shows start and finish dates for both scheduled information and baseline information, making it possible to evaluate your prediction of how the project would progress (baseline) by comparing that prediction with how the project is in fact progressing (actual).

If the variance in your project doesn't show the values that you expect, there are several possible explanations:

- You might not have set a baseline. The variance is the baseline value compared with the actual value for a field. If there is no baseline, Project calculates this difference by using a 0 value for the baseline fields, resulting in variances that are as large as the scheduled field itself. For example, suppose that you have a scheduled cost of £60 for a task. If no baseline is set, the baseline cost is $0. The **Cost Variance** field therefore shows £60.

- You might have set multiple baselines, but Project uses only the initial baseline values (that is, the values for the **Baseline** field, and not the values for **Baseline1** through **Baseline10**) when calculating variance. In this case, you might see information in variance fields, but the information might seem to be outdated and possibly too large.

- You might have added new tasks to a project but not added them to the baseline plan. In this case, you might see variances that are equal to the scheduled values.

- You might not have updated actual values for those tasks that are completed or in progress. In this case, variances might be equal to the scheduled values, or otherwise larger than you expect.

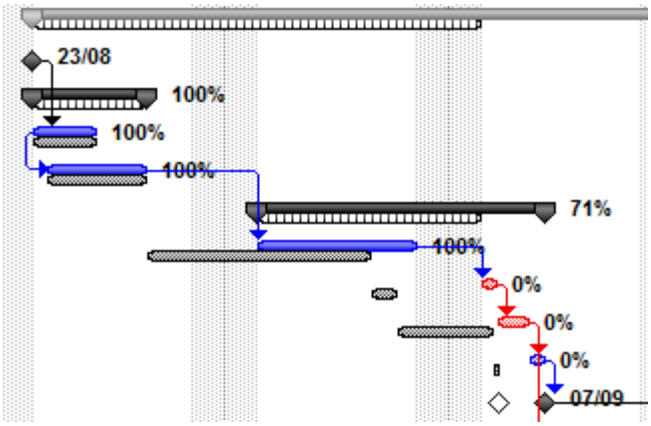
- You might have added new tasks or assigned resources and then set a baseline plan, but the baseline information for the summary task has not yet been updated. In this case, accurate variance values are showing for the individual tasks but not for summary tasks.

Identify tasks that are behind schedule

If you have set a baseline for your project, you can see how tasks progress over time and see whether their start and finish dates are slipping. You can track progress by comparing baseline and scheduled or actual start and finish dates.

1. On the View menu click Tracking Gantt.
2. In the View menu go to Tables then select Variance.

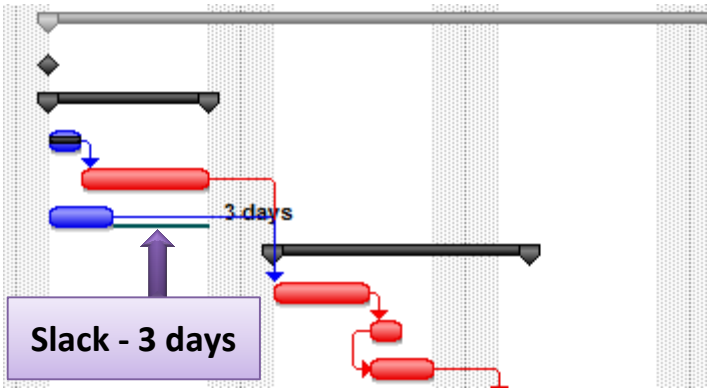
The **Tracking Gantt** view displays two task bars, one on top of the other, for each task. The lower bar shows baseline start and finish dates, and the upper bar shows scheduled start and finish dates so that you can see the difference between your plan and the current schedule.



Find slack in my schedule

The amount of slack in your schedule tells you how much you can delay tasks before other tasks or the project end date is affected.

1. On the View menu, select More Views.
2. The More Views dialog appears. In the Views list, click Detail Gantt, and then click Apply.



3. On the View menu, go to Tables, and then click Schedule.

In the chart portion of the view, slack appears as thin bars to the right of tasks, with slack values adjoining the regular Gantt bars.

Press TAB to move to the Free Slack and Total Slack fields if they are not visible in the sheet portion of the view.

> Notes: If you know where slack exists in your schedule, you can move tasks when certain phases of the schedule have no slack and other phases have too much.
>
> Slack values may also indicate a schedule inconsistency. For example, a negative slack value occurs when one task has a finish-to-start dependency with a successor task, but the successor task has a Must Start On constraint that is earlier than the end of the first task. Negative slack can also occur when a task is scheduled to finish after its deadline date.

Reschedule the project

Reschedule a Task within a project

You have split a task in your project plan. However, when work is interrupted, you may want to specify the date on which uncompleted work should resume. In this topic, you will reschedule a task to resume on a specified date.

Situations may arise wherein an employee is unable to complete work on a task as scheduled, due to a higher-priority assignment or for personal reasons. In such cases, other resources may be unavailable to complete the work, or you may wish to retain the same employee on the task in light of her qualifications, skill level, or familiarity with the task. Project helps you handle such unavoidable delays by rescheduling the task to

resume on a date of your specification with the same employee. This avoids rushing the task to completion, requiring unreasonable work hours, and assigning unqualified resources to meet the deadline.

How to Reschedule a Task

1. In the **Gantt Chart** view, select the task that is to be rescheduled.

2. If necessary, on the **Tracking** toolbar, click the appropriate **% Complete** button, so that a progress bar indicating partial completion is drawn in the selected task's task bar.

3. If necessary, on the **Standard** toolbar, click the **Scroll to Task** button to display the selected task's task bar in the Gantt chart.

4. Choose **Tools ➢ Tracking ➢ Update Project** to display the **Update Project** dialog box.

5. Select **Reschedule uncompleted work to start after** and specify the appropriate date on which uncompleted work should resume.

   - In the **Reschedule uncompleted work to start after** text box, type the appropriate date.

   - Or, from the **Reschedule uncompleted work to start after** drop-down list, select the appropriate date.

6. Select 'Selected tasks' and click OK to reschedule the selected task.

Adjustment of resource schedules

Shorten the Project Duration

With the critical tasks identified, you now know the tasks that you have to work with to shorten the total project duration. You need to identify the various techniques for modifying the project end date. In this topic, you will shorten the project duration.

Knowing how to shorten the total project duration is key to being a successful project manager. As project manager, you will have to make decisions that may include assigning additional resources to tasks on the critical path, dividing tasks, or removing project requirements to shorten the total project duration.

Slack

Slack is the amount of time that a task can slip before it affects another task or the project's finish date. **Free Slack** is the amount of time a task can slip before it delays another task. **Total Slack** is the amount of time a task can slip before it delays the project finish date. If **Total Slack** is a negative number, it indicates the amount of time that must be saved so that the project finish date is not extended. Slack is displayed by the **Detail Gantt** view and is represented by thin green bars that extend from a Gantt bar for a task.

How to Shorten the Project Duration

Assign Additional Resources to a Task on the Critical Path

1. Use the **Gantt Chart Wizard** to display the critical path in the **Gantt Chart** view.
2. Select a critical task that you wish to add additional resources to.
3. On the **Standard** toolbar, click the **Assign Resources** button.
4. In the **Assign Resources** dialog box, select the resources to be added to the critical task.
5. Click **Assign** and then click **Close** to assign the additional resource.

Divide Tasks

1. From the **Task Name**, select a task to be divided into two tasks.
2. Select the text of the task and type the desired task name and press the **Enter** key.
3. In the **Duration** column, type the desired duration and press the **Enter** key.
4. Insert a task row above the divided task to add another task.
5. Type the task name and duration for this newly created task.
6. If necessary, assign another resource to the divided task.

Removing a Task

To remove a task from the project plan, select the row indicator for the task to be deleted and press **Delete** to remove the task.

Identify Slack in the Project Plan

1. From the menu, choose **View ➢ More Views.**
2. In the **More Views** dialog box, select **Detail Gantt** and click **Apply.**
3. From the menu, choose **View ➢ Table: Schedule ➢ Schedule**
4. In the **Gantt Chart**, slack appears as thin green bars to the right of the tasks, with slack values adjoining the Gantt bars.
5. If necessary, on the **Standard** toolbar, click the **Scroll to Task** button to view the Gantt bar for the task.

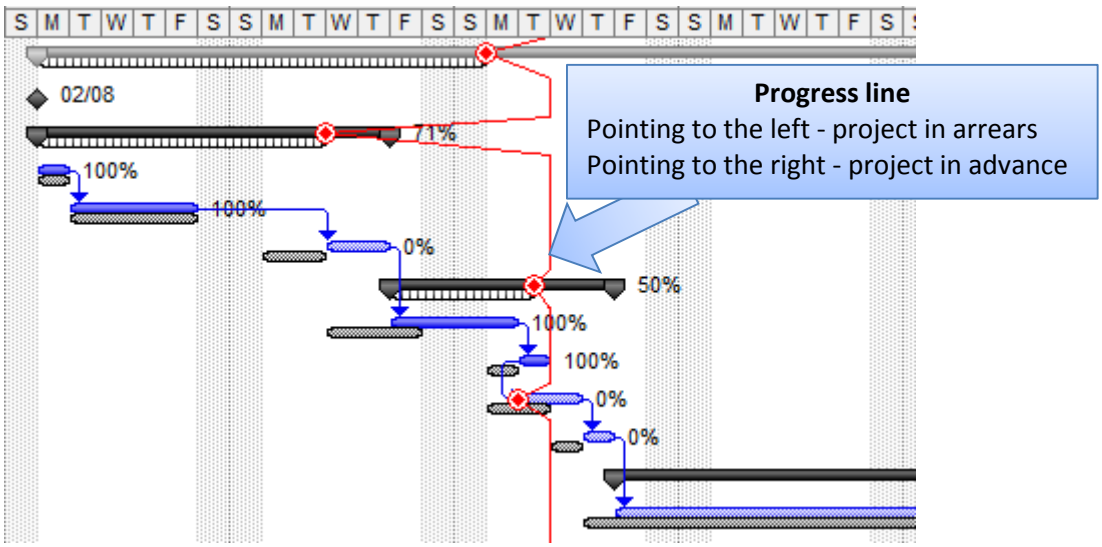
Progress lines

A Progress line is a visual representation of the progress of your project. For a given progress date, Microsoft Project draws a progress line connecting in-progress tasks, thereby creating a graph on the Gantt Chart with peaks pointing to the left for work that is behind schedule and peaks pointing to the right for work that is ahead of schedule. The distance of a peak from the vertical line indicates the degree to which the task is ahead of or behind schedule at the progress date.

To view Progress Lines

1. Right click the Gantt Chart and choose Progress Lines from the shortcut menu:
2. Click the Dates and Intervals tab and select the required **Display** options:
   - To always display the current progress line, select the Always display current progress line check box, and then click At project status date or At current date to indicate where you want the progress line drawn.
   - To display a progress line at specific time intervals, select the Display progress lines at recurring intervals check box, click Daily, Weekly, or Monthly to specify a time interval, and then click the options you want.
   - To begin progress lines at the beginning of the project, under Begin at, click Project start; otherwise, click the date option and then type or select the date on which you want the progress lines to start.
   - To display a progress line on a specific date, select the Display selected progress lines check box, and then type or select the dates for which you want progress lines displayed. To delete a date for which you have set progress lines, select it, and then click Delete.

To show progress compared with a baseline plan, under Display progress lines in relation to, click Baseline plan.



Consolidating and sharing projects

A consolidated project (also known as a master project) contains one or more inserted projects (known as subprojects). The inserted projects can retain links to their source projects so that any changes in the consolidated project are also made in the source files. The inserted projects may be linked to one another to create dependencies.

You can create a consolidated project by inserting copies of individual projects at any outline level into a single project file. With a consolidated project, you can view, print, and change information for all the projects you're working with (and even those projects "owned" by other project managers) as though they were a single project.

When to use a master project and subprojects

Creating a master project and subprojects allows you to break down a large project and delegate its parts to the appropriate people. In project management terms, assigning subprojects in this way gives responsibility to those who do the work and matches authority with accountability. In Microsoft Project terms, creating subprojects within a master project helps individual project managers gain access and control over their parts of the schedule.

To determine if you should break up a large project into a master project and subprojects, ask the following questions:

- Is the project very large and detailed? If your project will contain more than a few hundred tasks, it may be difficult to navigate and manipulate as one large file. Breaking it into subprojects can keep it more manageable because you can view each subproject individually. If some parts of the project contain work that is broken down into more detail than others, it may make sense to make those parts into separate subprojects so that most users will see only a rolled up description of the subproject, but interested parties can view it in more detail if they choose. A single file will almost always be the faster alternative, but the ability to focus on just a part of the project may be worth the trade off.

- What is the corporate culture? In a decentralised or distributed environment, a master project and subprojects give workers greater control over their own work than one centralised project file does.

- Does your company do top-down or bottom-up planning? If lower-level managers are responsible for and know which tasks are needed on the project, it may make more sense to allow them to plan their work and then consolidate their project files in a master project. If top-down planning is the norm, you may want to reorganise the initial plan into subprojects when it is implemented so that individual project managers or teams have access to and control over their own schedules.

- Are you working on multiple projects? Project managers may have a set of projects they work with all the time, whether the projects are interrelated or not. Instead of opening them one by one, all the subprojects are opened at once when the master project is opened. This approach also makes it easy to generate reports on multiple projects quickly. If the projects are interrelated, the project manager can create task dependencies between tasks in different projects. Creating dependencies between projects makes it easier for different

project managers to see how work by other project managers affects their schedules.

- Are some projects subordinate to other projects? You can accurately reflect the hierarchy of multiple projects by inserting various projects into other files. The resulting structure of subprojects should reflect the priorities and responsibilities of your team members as well as the interrelationships between tasks in different areas and the overall deadline.

- Is your project modified by several people? Ideally, one file is owned, managed, and modified by one project manager. But often a project is part of a larger program that upper-level managers may need to manage. If you have such a project, your team can retain focus on their work by viewing it as a separate file. And the project manager who controls the master project can coordinate each subproject team's schedule. It may even make sense to have the master project's milestones drive each subproject team's milestones in order to keep the schedules coordinated for a deadline. (Coordinating the milestones can be done by creating a dependency between the milestones or by copying and pasting the milestone tasks from the master project to each subproject.)

- Are there multiple stakeholders who care about different parts of the project? When people want to look at different details, project managers can put all the project files on a server and customise different views for various stakeholders. The same project file can be used as a subproject in different master projects to tailor the information displayed.

- Do you want the subprojects to be read-only? You can retain additional control over parts of a project by moving tasks to a subproject and restricting access to key people.

- Do you want to analyse the critical path for each phase as well as the overall project? Each individual project contains a critical path. Consolidating multiple projects into one master project file makes it easy to see the overall picture as multiple critical paths in the master project while retaining separate critical paths for each subproject.

Insert subprojects into a master project

1. Open the project that you want to become a master project – or create a new project.
2. In the Task Name field, click the row below where you want to insert the project.
3. From the Insert menu click Project
4. Navigate to the drive/folder of the required project
5. Select the project and click Insert.

Tips

- To insert multiple projects, hold down CTRL and click the projects in the order that you want to insert them.
- By default the sub project is linked – meaning any changes you make in the master file will also be made in the individual project – you can uncheck the Link to project option.
- To insert a project in read-only format, click the arrow on the Insert button, and then click Insert Read-Only.
- After you've inserted a subproject, you can show a subproject's hidden subtasks by clicking the subtask's outline symbol, the plus sign that appears before the subproject's name

- When consolidating projects into a master project, resources remain in the individual projects. You cannot assign a resource from one subproject to another subproject.

Resources pools - sharing resources across projects

It is very often the case that an organisation will be running multiple projects simultaneously and that as a consequence resources will be shared across those projects. It is therefore necessary to be able to allocate resources across different projects and to resolve resourcing issues as they arise.

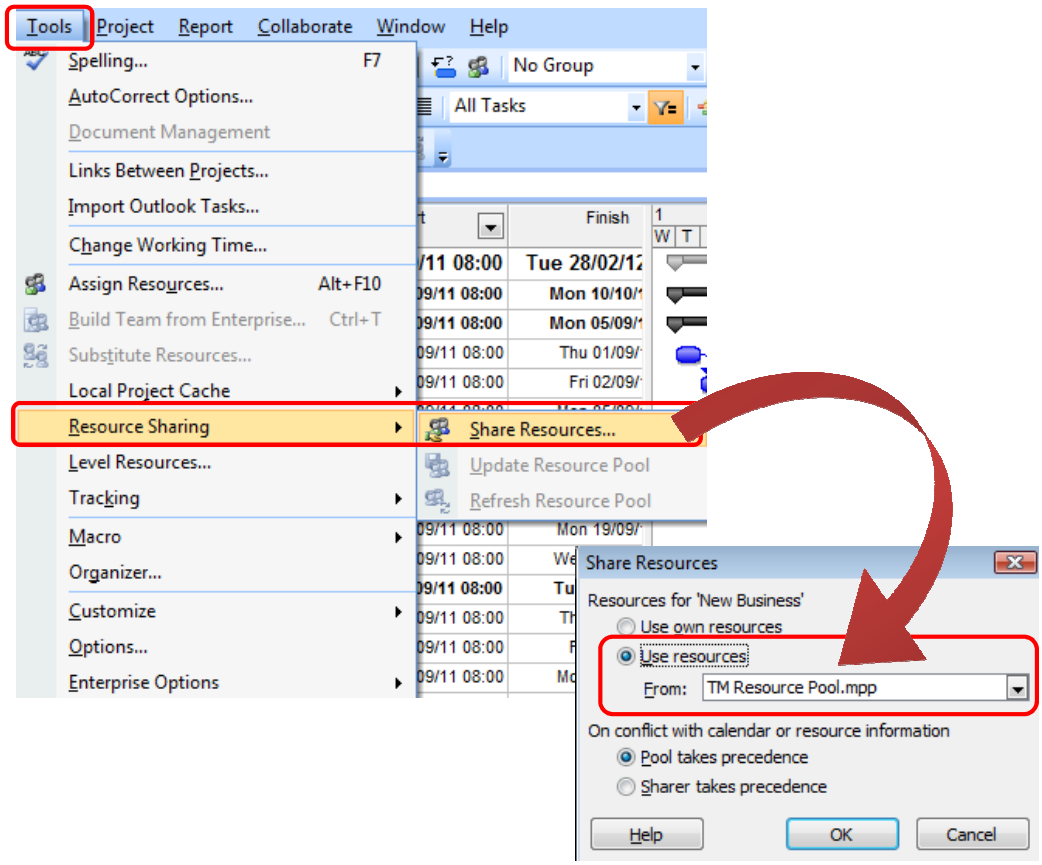
To do this it is necessary to create a shared resource pool and then set each project to get its resources from the shared pool.

Creating a resource pool

Create a new blank project and list all the organisation's resources in the resource sheet. As this will be the resource pool for all the organisation's future projects it is worth being thorough and including as much detail as possible. Then save the file in an easily accessible location with a suitable name, e.g. "Resource Pool". Existing resources can be copied from existing projects.

Linking projects to the resource pool

1. Open the resource pool plan
2. Open the project that you wish to link to the resource pool
3. Click on Tools > Resource Sharing > Share Resources



4. From the dialog box that opens select "Use Resources" and choose the resource pool file in the "From" drop-down, then click OK >Save both files
5. Repeat this for each project file that will be connected to the resource pool.

Working with the master project

1. Open the resource pool
2. In the dialog box select the third option which prompts you to create a master file.

Project will then create a master file, which shows all the projects in one Gantt chart. You can then allocate and level resources in the normal way, across individual projects.

Exchange project data

Export to Microsoft Excel

Introduction

Having created the project plan file in the Project Initiation and Project Planning phases, the file now becomes your plan's focal point, with essentially three "masters" to serve—the project manager (you), stakeholders (clients and management), and team members (resources). Each master will often have different requirements from the plan. In this lesson, you will learn how Project can help you meet these often wide-ranging requirements.

Each project involves the combined efforts of various team members. This frequently requires working with data in different formats to build the project plan and exchanging project information among team members. Fortunately, Project can exchange data with various file formats, thus saving time and avoiding the risk of committing mistakes that could occur while typing.

Export Project Plan Data into Excel

You want to share information in the project plan with your colleagues in a more user-friendly format. In this topic, you will export project plan information into an Excel workbook.

You have created an internal plan and wish to send this information to all your team mates. Since most of your team mates do not have Project installed, you decide to send the plan in a different format. Rather than recreating the data in Project, exporting the required information to the other applications will minimize your effort and save time.

The Export Wizard

Exporting is a method of transferring a copy of data from the application in use into a different application. The **Save As** dialog box, enables you to export project information with the help of the **Export Wizard.** Project can export all the data or selected data from the plan and save it in different file formats such as Excel files, Excel Pivot Tables, text files, comma-delimited text files, or XML files.

The **Export Wizard** allows you to pick the type of data to export—task, resource, or assignment. It reads the Project file and helps you map data from the source file into the destination file. Similar to importing data, once data is exported from a source file project plan to a new destination file format, no connection remains between the two files.

Maps

Definition:

In Project, a *map* is a set of instructions that traces the type of data that is to be imported or exported, as well as the location where the data is to be imported into a project plan. It enables the user to specify which fields in the source file should correspond to fields in the destination file. Maps are of two types, import maps and

export maps, which in turn may be custom or predefined.

How to Export Project Plan Cost Data into Excel Using Existing Maps

1. With the desired project plan open, choose **File ➢Save As.**

2. In the **Save As** dialog box, from the **Save as type** drop-down list, select **Excel Workbook (*.xls)**

3. Click **Save.**

4. On the **Export Wizard,** click 'Next'.

5. On the Export Wizard - Data page, select the format of the data you wish to export.

   - Select **Project Excel Template** to export the data completely into the Excel workbook.

   - Select **Selected Data** to export only the data you select into the Excel workbook and click **Next.**

     a. On the **Export Wizard - Map** page, select **Use existing map.**

     b. On the **Export Wizard - Map Selection** page, from the **Choose a map for your data** list box, choose **Cost Data by Task** map and click **'Next'.**

     c. On the **Export Wizard - Map Options** page, select the type of data— Task, Resource, or Assignments—you want to export, and click **Next**.

     d. On the **Export Wizard - Data Mapping** page, choose the names of the database fields you want to export and then map them to the corresponding fields that will receive the exported data.

6. Click **Finish** to export the data.

Export Project Plan Data to an Excel Workbook Using Custom Maps

1. Display the **Export Wizard.**

2. On the **Export Wizard,** click **'Next'.**

3. On the **Export Wizard - Data** page, select **Selected Data** to export specific information and click **Next.**

4. On the **Export Wizard - Map** page, select **New map.**

5. On the **Export Wizard - Map Options** page, select the type of data to export, and click **Next**.

6. On the **Export Wizard - Data Mapping** page, map the fields as desired.

7. If necessary, click **Next** and save the map.

8. Click **Finish** to export the selected file using the custom export map created.

Importing data from Microsoft Excel

Project can interact with other applications. This capability allows you to incorporate data into the project plan from files in different formats. In this topic, you will import project information from other applications.

Assume that you need to include task information in Project using data from an Excel worksheet. Rather than retyping the data and risking typographical errors, you can dynamically transfer the Excel worksheet containing the desired data to Project. By doing this, you not only avoid data entry mistakes but also save time. Furthermore, Project allows you to choose the content that is to be inserted into the plan, thereby preventing the potential problem of accidentally deleting some necessary data along with unnecessary data.

Import Formats

Importing is a method of fetching data from a source file in a particular application to a destination file in a different application. Project can import all the data or selected data from a file.

It can import task, resource, or assignment data into new or existing project plans. The imported data can be manipulated in the project plan without affecting the source file. Project can import file formats, such as Excel workbooks, Access databases, comma-delimited files, text files, XML files, and Outlook tasks. The **Import Wizard** is triggered for all file formats except Project files and Outlook tasks.

Note: Project now supports the XLSX file format for Excel workbooks. Hence, workbooks saved in this format can now be imported into Project.

Import Outlook Tasks

Project can also import task information from Microsoft Office Outlook. To do so, from the **Tools** menu, choose **Import Outlook Tasks** and in the **Import Outlook Tasks** dialog box, select the tasks you wish to import. However, the user must possess an Outlook account to use this option.

The Import Wizard

In Project, the **Open** dialog box enables you to import files into the project plan. When a file format other than a Project file is opened, the **Import Wizard** is displayed. The **Import Wizard** helps you map data, if mapping is required. Mapping is not required for XML files and files created with Microsoft Project import templates. This wizard can import selected data or an entire file into a new project plan, or as an addendum to an existing, open project plan.

How to Import Project Information

Import a File Based on the Project Import Template into a New Project Plan

1. Open the project plan into which the Project import template-based file is to be imported.

2. Choose **File ➢ Open.**

3. In the **Open** dialog box, from the file type drop-down list, select the format of the file you would be importing.

4. Select the desired Project Import template-based file you wish to import, and click **Open** to display the **Import Wizard.**

1. On the **Import Wizard**, click **Next.**

2. On the **Import Wizard - Data Type** page, select the format of the data you wish to import and click **Next** to import the selected format into the project plan.

> Note: Selecting the **Only Selected Data** option requires that the user map the data to the project plan.

3. On the **Import Wizard - Import Mode** page, select the format in which you wish to import the data and click **Finish** to import the file based on a Project Import Template into a new project plan.

Create a Custom Import Map

1. Display the **Open** dialog box.

2. In the **Open** dialog box, select the file that is to be imported and click **Open.**

3. On the **Import Wizard**, click **Next.**

4. If necessary, on the **Import Wizard - Map** page, select **New Map.**

5. Click **Next.**

6. On the **Import Wizard - Import Mode** page, select the format in which you wish to import the data and click **Next.**

7. On the **Import Wizard - Map Options** page, check the type of data—Task, Resource, or Assignments—you want to import, and click **Next.**

8. On the **Import Wizard - Data Mapping** page, choose the names of the database fields you want to import and then map them to the corresponding Microsoft Project fields that will receive the imported data.

9. If necessary, click **Next** and save the map.

   a. On the **Import Wizard - End of Map Definition** page, click **Save Map.**

   b. In the **Save Map** dialog box, in the **Map Name** text box, type a name of the custom map.

   c. Click **Save.**

10. Click **Finish** to import the selected file using the custom import map created.

Project 2007 additional features

In addition to updating the controls for Calendars the 2007 version of Project includes some additional features which you may find useful:

Feature	Description
Multiple undo	Makes "what if" testing of the plan much easier. Can be adjusted by going to Tools > Options > General and changing Undo Levels. If you find Project runs slowly reducing the number of steps you can undo may improve performance
Tasks drivers	Click the task drivers icon then select a task. The pane to the left of the task list displays the elements in the plan affecting the selected tasks
Change highlighting	Project highlights cells that change as a result of the most recent edit you make to the plan
Cell shading	Cells in the table can now have background colours. Go to Format > Font or Format > Text Styles to apply
Enhanced Views	Bars now have 3D shading (Tools > Options > View tab)
	Calendar view can now display in week intervals as well as by month

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