

## Microsoft Project Constraints

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What do they mean and what do they do?

As you may have discovered to your cost if you enter a date into your schedule Microsoft Project applies what is known as a constraint to the task. For a lot of new users the introduction of a constraint was not what they had intended – it happened by accident as a result of the temptation offered by Microsoft Project. It is just far too easy to select a date from the drop down selectors available in either a table, task information Dialogue Box or task from and for the unawares this trap can cause untold problems with their schedules.

When Microsoft Project 98 was introduced it had the useful feature of the indicator column in the Entry table, it will show a calendar icon if there is a constraint applied to a task. Prior to this the only way of finding out if a constraint was in force was to either run a filter (see below), create a table to show the constraint applied to tasks as one of the columns or check the advanced tab of each tasks information dialogue box to see if there was a constraint. For a lot of users upgrading to Project 98 it was evident from the indicator column that their schedules had in the main been created by entering dates manually rather than by being calculated by virtue of the dependencies between tasks, whilst this may produce what looks like a plausible schedule it is not the ideal method and is inadequate when complex and changeable projects are being scheduled.

A useful method to test for constraints is to apply the “Tasks with Fixed Dates” filter; the name of this filter in itself would suggest that constrained tasks may not be what the user had in mind. The resulting displayed tasks will have a calendar icon displayed in the indicator column of the Entry table displayed by default with the Gantt chart.

So how do these constraints get applied?

If you enter a start date, click and drag to create a task from left to right on the timescaled part of the Gantt chart or move a bar rightwards relative to the timescale at the top of the Gantt chart Microsoft Project will apply a Start no Earlier than (SNET) constraint.

If you enter a finish date or click and drag to create a task from right to left on the timescaled part of the Gantt chart relative to the timescale Microsoft Project will apply a Finish no Earlier than (FNET) constraint.

These 2 constraints will be the most commonly occurring constraints that users do not wish to have influence their schedule. Later I will explain how to remove constraints from more than 1 task at the same time, before that though how about an explanation of each of the constraints as they are displayed in the drop down list on the Advanced tab of the Task Information Dialogue Box.

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### As Late as Possible: (ALAP)

This is the default constraint if you schedule your project from the finish date, in the main you will not want to employ this constraint or to schedule in this fashion as all tasks will be left to the last minute and as a result will become critical as they must happen as and when scheduled. The drawback to this approach to project scheduling is that if one thing goes wrong the knock on delay will impact on the completion date. This approach is best left to those who prefer to manage by the “just in time” method, it is highly risky.

A screenshot of the "Project Information for 'Project2'" dialog box. The "Schedule from:" dropdown menu is open, showing three options: "Project Start Date" (selected), "Project Start Date", and "Project Finish Date". Other fields include: Start date: 10/01/02 08:00; Finish date: 10/01/02 08:00; Current date: 10/01/02 08:00; Status date: NA; Calendar: Standard; Priority: 500. Buttons for Help, Statistics..., OK, and Cancel are at the bottom.

The option to schedule from the project finish date is made available to you when you create a new project; it is the alternative option to the default method displayed in the Project information Dialogue Box and for the unfamiliar it **may** appear to be the logical choice if you know when your project has to finish by. **It is not** and there is a much better way to model such a constraint deadline when putting a project schedule together which is explained later in this document. If you do select this option the slogan “all tasks begin as

late as possible” will be displayed in the dialog box.

### As Soon as Possible: (ASAP)

The default constraint if you schedule your project from the start date, in the main you should employ this constraint whenever you create a new project plan. All tasks will begin as soon as they can with reference to their predecessors. If you had a series of five tasks and linked them using the default dependency FS the very last task would be shown to be happening as soon as possible, once tasks that precede it have finished.

### Finish No Earlier Than: (FNET)

A bit of a peculiar beast this one, do not finish the task before the specified date, delay completion for a particular reason. A good example where it may be appropriate to delay the completion of a task may be where finishing earlier may result in re-work being required due to changes elsewhere (typically external to the project otherwise the issue could be addressed by making the influencing activity a predecessor to the task in question) that affect the project.

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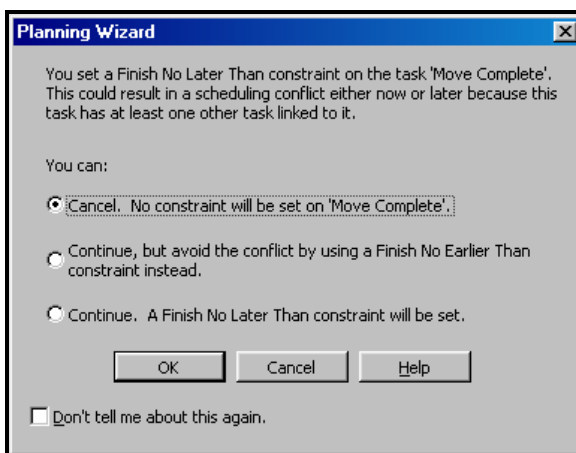


Other examples may be where completing the task sooner rather than later could mean funds are committed too early and there is a delay before they are recovered or it is known that the customer will not be making a payment until a certain date so why incur the expense until absolutely necessary.

I have had some cynics suggest that it is appropriate to delay the completion of a task beyond its earliest completion date in order to convince the customer that what they are receiving is worth the extortionate sum they are being charged, delivering when completed could lead to the customer wondering why they are paying so much for the deliverable. Something is reassuringly expensive as I believe the advertising industry would have us believe.

### Finish No Later Than: (FNLТ)

This is the ideal constraint to apply to a task at the end of your project if you have a deadline to work to; it remains the ideal even though it has been joined by the introduction of a deadline date in Microsoft Project 2000.



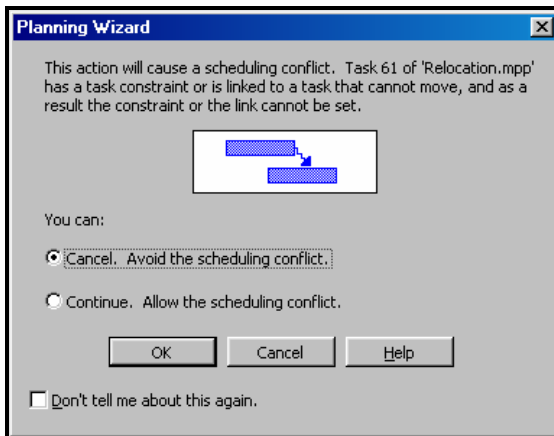
FNLТ however still works as a deadline should you wish to employ it. With FNLТ the task needs to be finished by the date specified, simple as that. If the task can be completed earlier than the constraint date so much the better and as long as the task is scheduled to occur up to the constrained date there are no problems.

When you apply a FNLТ constraint to a task if it has predecessors and if you have advice from the planning wizard still turned on you will get the message shown

here advising you that this action could have consequences.

The first suggestion is a bit daft as this Dialogue Box would only appear had you elected to apply the constraint, why would you then want to not apply it? The second suggestion is even more ridiculous than the first, whatever you do finish later than this date – as a deadline it is of no benefit whatsoever. The third option is the correct one to choose if you want to be finished by the date specified at the very latest.

If you have a deadline to work to and you have a continuous sequence running through your schedule (for advice on ensuring a continuous sequence check out our LOGIC view document on how to avoid the failure to plan) as long as you are achieving your target date there will be no problems.



However as soon as the constrained date is in jeopardy Microsoft Project will warn you (provided of course that you still allow prompts from the planning wizard) that there is a schedule conflict, in other words unless you take corrective action in your schedule now you will not achieve the target completion date, in this respect Microsoft Project behaves like an early warning system. Whilst this constraint is useful it will only be of use to you if there is an unbroken sequence of dependencies running through your project from the start to the

finish, if you have tasks with no successors and they are delayed there will be no knock on effect as far as subsequent tasks are concerned.

The benefit of this approach over using the “Deadline” feature available in Microsoft Project is that you will be warned as soon as your project deadline is in jeopardy, using the deadline all you get would you be an icon in the indicator column warning you that you have missed the deadline. Sometimes the Indicator column is not visible meaning you could be oblivious to the problems existing in your schedule.

## Must Finish On (MFO)

With this constraint the task must finish when scheduled, on the exact date specified. The drawback to this constraint is that it prevents earlier completion of the task. If the preceding task is completed ahead of schedule the time gained will not pull forward the constrained task. Conversely as soon as the constrained date is in jeopardy Microsoft Project will warn you (again provided that you still allow prompts from the planning wizard) that there is a schedule conflict, again unless you take corrective action in your schedule immediately you will not achieve the target completion date.

## Must Start On (MSO)

With this constraint the task must start when scheduled, on the exact date specified. Typically it will apply in circumstances where you have no influence over the event, an exhibition or conference for instance. The drawback to this constraint is that it prevents earlier commencement of the task. If the preceding task is completed ahead of schedule the time gained will not pull forward the constrained task. Conversely as soon as the constrained date is in jeopardy Microsoft Project will again alert you (provided of course that you still allow prompts from the planning wizard) that there is a schedule conflict, again unless you take corrective action in your schedule immediately you will not achieve the target commencement date.

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### Start No Earlier Than (SNET)

In this instance the task will not start any earlier than the date specified, for example it may be decided to defer action on a phase of your project until the start of the next financial year. This constraint infers that the task is being delayed deliberately, we could start this task before this date but we are not going to because of factors we are aware of.

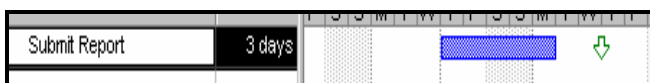
### Start No Later Than (SNLT)

This constraint can be applied when you know that no matter what happens the task will take as long as it takes, consequently if we have not started the task by this date at the very latest we may not complete in time. Experienced managers may well set this constraint on a task with a date earlier than the absolute latest start date in order to give themselves some contingency, if they miss the constraint date there is still some time in hand but their schedule may be more at risk, it can be considered to have moved from condition green to condition amber, not yet in jeopardy (condition red) but more at risk than it was previously.

### Deadlines

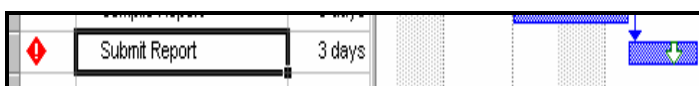
The deadline date feature allows an icon in the indicator column to be displayed if a task finishes after the deadline (no icon is displayed if the task finishes before the deadline). A deadline is different to a constraint in that it is not used when calculating a project's schedule. It does however affect the Late Finish date of a task and the calculation of Total Slack. In essence a deadline date behaves like a FNLT constraint in a project scheduled from the start date in regards to slack. However, a task with a deadline date can also have a constraint applied that effects the calculation of the tasks Early Start. In a Scheduled from Finish project, tasks with a deadline date will finish on the deadline unless a constraint or successor/predecessor forces them to an earlier date.

A deadline date can be set in the Task Information dialog box on the advanced tab. In conjunction with this feature, a new filter called "Tasks with Deadlines" has been added.



In the Gantt chart if you are looking at the standard bar styles and a deadline has been assigned to a task

that is later than the current scheduled finish date the deadline will be displayed as a green arrow to the right of the task bar.



If the task is delayed the deadline arrow will remain where it is against the timescale

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and will appear over the task bar and an icon will be displayed in the indicator column showing that the deadline is now being missed.

**NOTE:**

If you change the bar styles displayed by using the Gantt Chart Wizard (GCW) to format the styles to anything other than the Standard styles the bar depicting the deadline will be mislaid, even if you run the GCW again to reinstate the standard bar styles the deadline bar style will not be reinstated. To manually create the deadline bar style go to the format menu in the bar styles dialogue box create a new style called deadline and use the settings as shown below.



You may wish to save the view in which this bar style has been created so that it is available in your file and other files in future rather than having to go through this process repetitively.

### FNLT & Deadlines – the difference

I personally favour the FNLT constraint if I have a deadline to work to as Microsoft Project will warn you as soon as the deadline is in jeopardy whereas with the deadline option all you will get is the icon displayed in the indicator column, if you are not in the entry table or worse still have removed the indicator column from the entry table.

In either case if you suffer a delay the tasks will have negative Total Slack which is the factor which triggers either the planning wizard message or the warning icon next to the task.

**NOTE:**

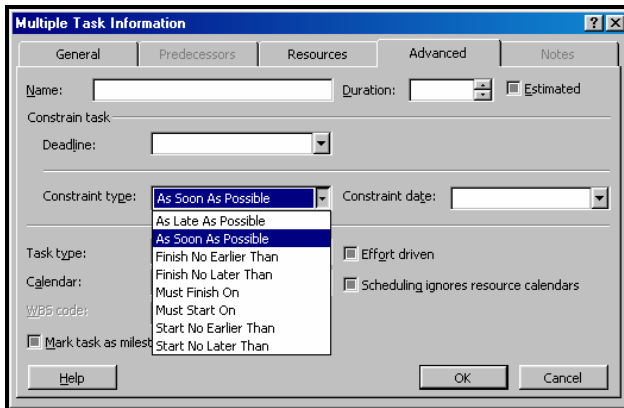
If you assign a deadline or a FNLT constraint to a milestone which is also a “Top Level Task” this can corrupt the calculation of the critical path in your project. It is advisable when using Microsoft Project to have a degree of structure to your schedule with summary tasks being the only “Top Level Tasks”, tasks that are not indented beneath any other tasks.

### Hard and Soft Constraints

You may have noticed that the calendar icons displayed next to constrained tasks can be either blue or red, this colour coding identifies whether the constraints are soft or hard. Soft constraints invariably do not imply any adverse consequence should they not be honoured, SNET if you start later than the constraint date so what – you have not started before the constrained date. With a hard constraint the implication is that if the constraint date is missed there *will* be a consequence to your schedule.

## Removing Constraints

If you have managed to inadvertently introduce constraints you can remove them all simultaneously by left clicking on any column header in a table to highlight all the tasks in your plan and then selecting the task information dialogue box to display multiple task information.



You will notice that 2 of the 5 tabs, predecessors and notes, are inactive as you have selected multiple tasks and cannot assign predecessors or attach notes to more than 1 task at a time.

On the Advanced tab the constraint selection will be shown blank, click on the drop down arrow and chose ASAP. When you click the OK button all your constraints will revert to ASAP and

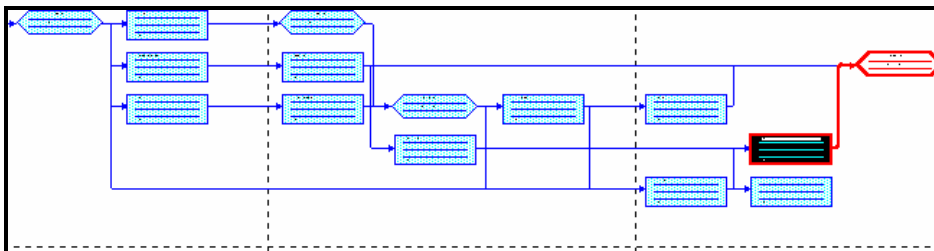
any calendar icons that were displayed in the indicator column will disappear.

### NOTE:

This action to remove multiple constraints will only remove constraints from constrained tasks that are “visible”. If you have multiple outline levels in your schedule and have some summary tasks rolled up the hidden sub-tasks will not have their constraints changed to ASAP. To ensure that you are removing **all** constraints make sure to display all subtasks before performing this process. If you have any recurring events in your schedule you may want to ensure these are “rolled up” before performing this process as recurrent tasks are scheduled by virtue of a fixed date.

## Constraints and the Critical Path

If you have got constraints applied in your schedule they can have an impact on the critical path. Critical tasks are the tasks which together determine the overall duration or end date of your schedule. If you have a task with a SNET constraint towards the end of your schedule and it is a predecessor to the remaining tasks(s) it can introduce an element of slack to its predecessors rendering them non-critical.



In this example the last but one task has had a SNET constraint applied and as

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a result the critical path has been “corrupted” only the last 2 tasks are critical, all other tasks could be delayed without affecting the end date due to the constraint. This can give a false impression of the project and is not ideal by any means.

### Using Constraints

My advice when using constraints is to employ them **sparingly**, only apply a constraint if there is a good reason to do so as it can have an adverse impact on your schedule. Constraints do serve a purpose but they can also cause problems to the critical path.

I also advise that when applying constraints that it is good practise to attach a note to the constrained task explaining why the constraint is being employed so that you and anyone else inspecting your schedule understand and appreciate why the constraint has been employed. A note on a constrained task can also serve as a prompt or reminder should factors influencing the schedule change prompting the question “are my constraints still valid or have they been rendered redundant by the changes encountered?”

If you employ a formal methodology such as **PRINCE2** you may wish to keep a log of constrained events for monitoring in addition to monitoring such key issues as assumptions, risks and change.