

# Detailed leveling parameters

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# Detailed leveling parameters

## Introduction

How many of us view the many levelling parameters within Microsoft Project as a bewildering array of options? How many of us have clicked the 'Level Now' button and wished we hadn't?

As the levelling process can reschedule both tasks and assignments, it is important to understand how levelling works and what it does to your project's schedule. Once you know the benefits and the possible pitfalls associated with levelling, you will be able to decide when and how to use this powerful tool, confident that it is trying to optimise your project and not being detrimental to it. These tips and tricks explain the options available and the impact that they can have.

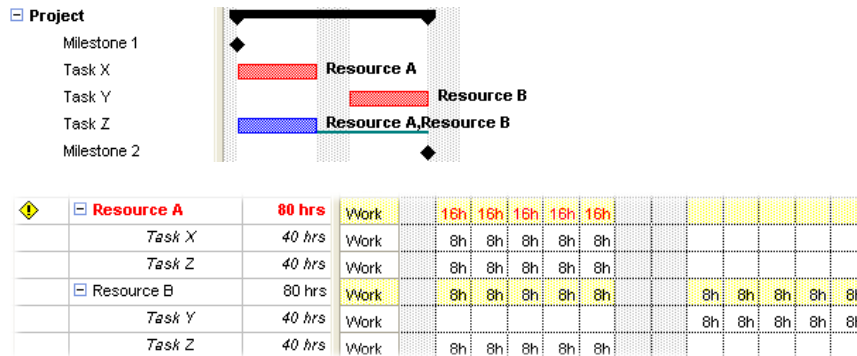
## Background

When resource leveling is carried out, the method of leveling is determined by a number of leveling parameters. Some of these parameters are general in nature, some are more detailed. The effects of making detailed parameter changes can still have wide-ranging effects upon the project's schedule.

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## Allowing assignment adjustment

When tasks have several assignments against them, leveling becomes more involved. Take the situation below:



- There is a resource conflict for Resource A in week 1 (parallel assignments on Task X and Task Z).
- Resource B has no conflicts.
- It will not be easy to apply a leveling delay to Task Z without creating a conflict for Resource B on Task Y and Task Z.

If the tasks require the resources to be working at the same time, resource leveling would resolve the conflict thus:

- From the Tools menu, choose Level Resources.
- Set the 'Resolving overallocations' options to be as below, then

Level Now

The screenshot shows the 'Resolving overallocations' dialog box with the following settings:

- Leveling order: Standard
- Level only within available slack
- Leveling can adjust individual assignments on a task
- Leveling can create splits in remaining work

- Changing the project's schedule to be:



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|            |      |    |    |    |    |    |    |    |    |    |    |    |    |    |
|------------|------|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Resource A | Work | 8h | 8h | 8h | 8h | 8h | 8h | 8h | 8h | 8h |    |    |    |    |
| Task X     | Work | 8h | 8h | 8h | 8h | 8h |    |    |    |    |    |    |    |    |
| Task Z     | Work |    |    |    |    |    | 8h | 8h | 8h | 8h |    |    |    |    |
| Resource B | Work |    |    |    |    |    | 8h | 8h | 8h | 8h |    |    |    |    |
| Task Y     | Work |    |    |    |    |    |    |    |    |    | 8h | 8h | 8h | 8h |
| Task Z     | Work |    |    |    |    |    | 8h | 8h | 8h | 8h |    |    |    |    |

- Task Z has been rescheduled so that BOTH Resource A AND Resource B are able to work upon it.
- As a result, Task Y must be rescheduled so that its assignment for Resource B is not in conflict with the rescheduled Task Z.

If a task can start as soon as either of the resources assigned to it can start, resource leveling would resolve the conflict thus:

- From the Tools menu, choose Level Resources.
- Set the 'Resolving overallocations' options to be as below, then

**Level Now**

Resolving overallocations

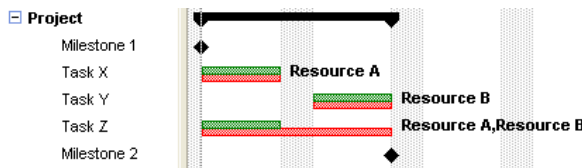
Leveling order: Standard

Level only within available slack

**Leveling can adjust individual assignments on a task:**

Leveling can create splits in remaining work

- Changing the project's schedule to be:



|            |      |    |    |    |    |    |    |    |    |    |  |  |  |  |
|------------|------|----|----|----|----|----|----|----|----|----|--|--|--|--|
| Resource A | Work | 8h | 8h | 8h | 8h | 8h | 8h | 8h | 8h | 8h |  |  |  |  |
| Task X     | Work | 8h | 8h | 8h | 8h | 8h |    |    |    |    |  |  |  |  |
| Task Z     | Work | 0h | 0h | 0h | 0h | 0h | 8h | 8h | 8h | 8h |  |  |  |  |
| Resource B | Work | 8h | 8h | 8h | 8h | 8h | 8h | 8h | 8h | 8h |  |  |  |  |
| Task Y     | Work |    |    |    |    |    | 8h | 8h | 8h | 8h |  |  |  |  |
| Task Z     | Work |    |    |    |    |    | 8h | 8h | 8h | 8h |  |  |  |  |

- Resource B can start its work on task Z immediately and be complete by day 5 (before Resource B must start work on Task Y).
- Resource A's work on Task Z can not commence until work on Task X is over and as a result Task Z can not finish until day 10.

# Detailed leveling parameters

|              |  |
|--------------|--|
| <b>Hints</b> | <ul style="list-style-type: none"><li>• Allowing assignment adjustment can result in tighter (and possibly more efficient) schedules and earlier project finish dates.</li><li>• As assignment adjustment can affect task duration values, the 'Level Assignments' field will be set to No for fixed duration tasks.</li><li>• Assignment adjustment can be set on a task-by-task basis. Simply add a column to a table including the 'Level Assignments' field.</li></ul> |
|--------------|--|

# Detailed leveling parameters

## Allowing task splitting

Often, when parallel assignments exist, one task has a higher priority than another:



| Resource A |                     | Work | 8h | 8h | 8h | 8h | 8h | 16h | 16h | 16h | 16h | 16h |
|------------|---------------------|------|----|----|----|----|----|-----|-----|-----|-----|-----|
|            | Task B              | Work |    |    |    |    |    | 8h  | 8h  | 8h  | 8h  | 8h  |
|            | Lower priority task | Work | 8h | 8h | 8h | 8h | 8h | 8h  | 8h  | 8h  | 8h  | 8h  |

- There is a resource conflict for Resource A in week 2 (parallel assignments on Task B and the Lower priority task).

If the lower priority task can not be split, resource leveling would resolve the conflict thus:

- From the Tools menu, choose Level Resources.
- Set the 'Resolving overallocations' options to be as below, then

**Level Now**

Resolving overallocations  
Leveling order: Priority, Standard  
 Level only within available slack  
 Leveling can adjust individual assignments on a task  
 Leveling can create splits in remaining work

- Changing the project's schedule to be:



- The lower priority task has a leveling delay until the beginning of the third week.
- The lower priority task must wait until there is a period of availability for Resource A (once Task B has been accomplished).
- A 2-week delay has been introduced into the project and the lower priority task has become critical.

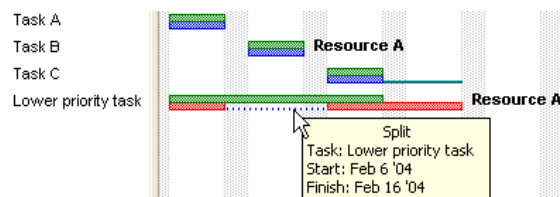
# Detailed leveling parameters

If it is possible for leveling to split tasks, the conflict could be removed thus:

- From the Tools menu, choose Level Resources.
- Set the 'Resolving overallocations' options to be as below, then

**Level Now**

- Changing the project's schedule to be:



| Resource A          |      | Work | 8h | 8h | 8h | 8h | 8h | 8h | 8h | 8h | 8h | 8h | 8h |
|---------------------|------|------|----|----|----|----|----|----|----|----|----|----|----|
| Task B              | Work |      |    |    |    |    |    |    |    |    |    |    |    |
| Lower priority task | Work |      |    |    |    |    |    | 0h | 0h | 0h | 0h |    |    |

This assignment work has been edited.

- The lower priority task can start straight away (as Resource A has no other assignments in week 1).
- Work on the Lower priority task temporarily suspends during week 2, whilst Resource A works on the higher-priority Task B.
- Work resumes on the Lower priority task once Task B is finished.
- The delay to the project is only one week.

| Hints |   |
|-------|---|
|       | <ul style="list-style-type: none"> <li>Allowing task splitting can result in tighter (and possibly more efficient) schedules and earlier project finish dates.</li> <li>Task splitting creates contoured assignments.</li> <li>The ability to split tasks can be set on a task-by-task basis. Simply add a column to a table including the 'Leveling Can Split' field. Note that although splitting is permissible for fixed duration tasks, this should really be set to 'No' as a fixed duration task shouldn't have its duration increased as a result of leveling.</li> </ul> |

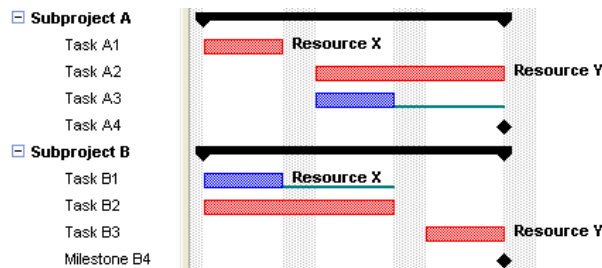
# Detailed leveling parameters

## Choosing who to level

When Microsoft Project performs resource leveling, it is possible to select just certain resources to be leveled. This can leave other resources unlevelled, even if those resources still have conflicts against them. The ability to do this depends upon the type of view that is currently active:

- In a task-based view (Gantt chart, Task Usage for example) ALL resources will be leveled.
- In a resource-based view (Resource Sheet, Resource Usage for example) it is possible to level only selected resources.

Consider the Gantt chart below. There appears to be two separate resource conflicts:



- Resource X in week 1.
- Resource Y in week 3.

To level just resource X and not resource Y:

- From the View menu, select Resource Usage (as this will also show the change to the assignments).
- Select the resource to level:

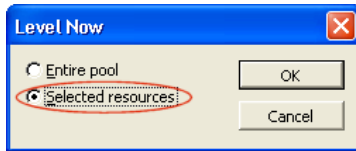
| Resource X |      | Work | 16h | 16h | 16h | 16h | 16h |    |    |    |    |  |     |     |     |     |     |  |
|------------|------|------|-----|-----|-----|-----|-----|----|----|----|----|--|-----|-----|-----|-----|-----|--|
| Task A1    | Work | 8h   | 8h  | 8h  | 8h  | 8h  |     |    |    |    |    |  |     |     |     |     |     |  |
| Task B1    | Work | 8h   | 8h  | 8h  | 8h  | 8h  |     |    |    |    |    |  |     |     |     |     |     |  |
| Resource Y |      | Work |     |     |     |     | 8h  | 8h | 8h | 8h | 8h |  | 16h | 16h | 16h | 16h | 16h |  |
| Task A2    | Work |      |     |     |     |     | 8h  | 8h | 8h | 8h | 8h |  | 8h  | 8h  | 8h  | 8h  | 8h  |  |
| Task B3    | Work |      |     |     |     |     |     |    |    |    |    |  | 8h  | 8h  | 8h  | 8h  | 8h  |  |

- From the Tools menu, choose Level Resources, then **Level Now**.



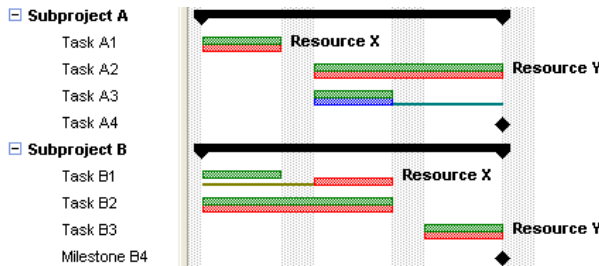
# Detailed leveling parameters

- d. Choose to level just the selected resource(s), confirmed with OK.



- e. Displayed in the Resource Usage and Leveling Gantt Views as:

|            |      |    |    |    |    |    |    |    |    |    |    |     |     |     |     |     |
|------------|------|----|----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|
| Resource X | Work | 8h | 8h | 8h | 8h | 8h | 8h | 8h | 8h | 8h | 8h |     |     |     |     |     |
| Task A1    | Work | 8h | 8h | 8h | 8h | 8h |    |    |    |    |    |     |     |     |     |     |
| Task B1    | Work |    |    |    |    |    | 8h | 8h | 8h | 8h | 8h |     |     |     |     |     |
| Resource Y | Work |    |    |    |    |    | 8h | 8h | 8h | 8h | 8h | 16h | 16h | 16h | 16h | 16h |
| Task A2    | Work |    |    |    |    |    | 8h | 8h | 8h | 8h | 8h | 8h  | 8h  | 8h  | 8h  | 8h  |
| Task B3    | Work |    |    |    |    |    |    |    |    |    |    | 8h  | 8h  | 8h  | 8h  | 8h  |



- Task B1 has the leveling delay applied to it (according to the current leveling order).
- Tasks A2 and B3 have no leveling applied as Resource Y was not selected to be leveled.

|              |  |
|--------------|--|
| <b>Hints</b> | <ul style="list-style-type: none"> <li>• Use resource-selective leveling for what-if analysis regarding the demand/availability of key people.</li> <li>• By default, all resources can qualify for leveling. This can be varied on a resource-by-resource basis. Simply add a column to a table including the 'Can Level' field.</li> </ul> |
|--------------|--|

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## Leveling beyond slack

A further leveling option is to investigate the effect that the available slack within the project has on the resource leveling process:

- Can leveling extend tasks within the project beyond their slack values?
  - Can tasks be extended / delayed beyond their latest finish dates?
  - Can the project finish date be delayed?
- Must leveling be conducted within the slack that is available?
  - Tasks must not be extended / delayed beyond their latest finishes.
  - The project finish date can not be delayed.

Consider the Gantt chart below:



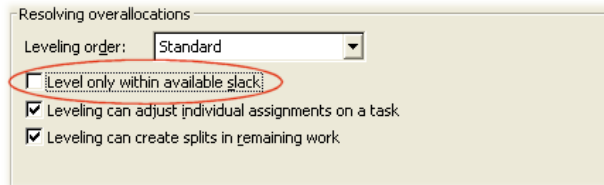
- There appears to be enough free slack on Task B1 to allow it to be levelled without it extending beyond its latest finish date.
- Both Task A2 and Task B3 are critical tasks. Any delay to them would extend the end date of the project.

# Detailed leveling parameters

To allow the project to be leveled beyond slack (float):

- a. From the Tools menu, choose Level Resources.
- b. Set the 'Resolving overallocations' options to be as below, then

**Level Now**



Resolving overallocations

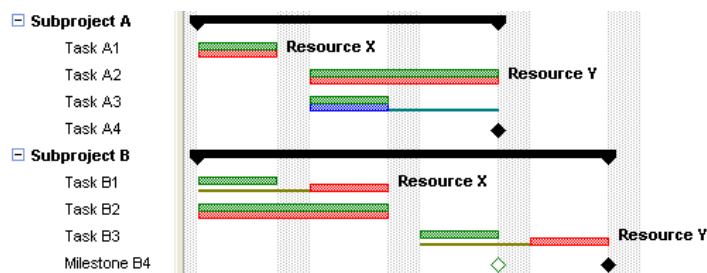
Leveling order: Standard

Level only within available slack

Leveling can adjust individual assignments on a task

Leveling can create splits in remaining work

Changing the project's schedule to be:



- Task B1 has a leveling delay applied to it that is  $\leq$  its available slack. As such it has not delayed the project (although it has become a critical task).
- The leveling delay against Task B3 has extended its scheduled finish beyond its original late finish date. It has therefore delayed Milestone B4 and hence delayed the project finish date.

## Hints

- If there is enough available slack, Microsoft Project will attempt to delay the project without extending the project finish date if it possibly can.
- If tasks or milestones have inflexible constraints against them, leveling beyond slack can create schedule conflicts.

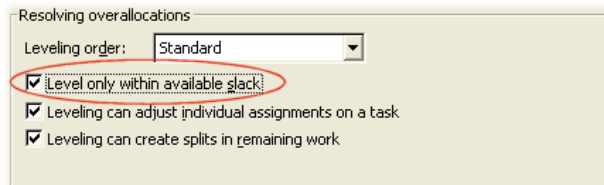
# Detailed leveling parameters

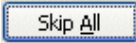
## Leveling within slack

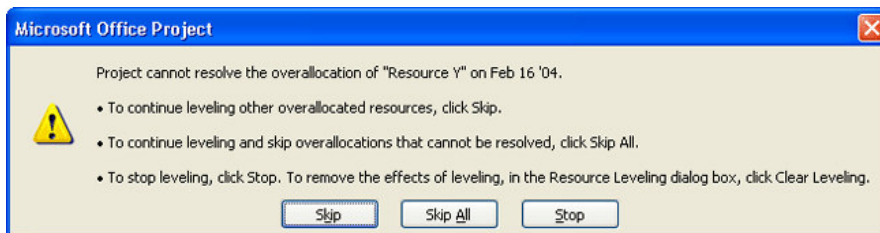
To see the effect of leveling the project within slack:

- a. From the Tools menu, choose Level Resources.
- b. Set the 'Resolving overallocations' options to be as below, then



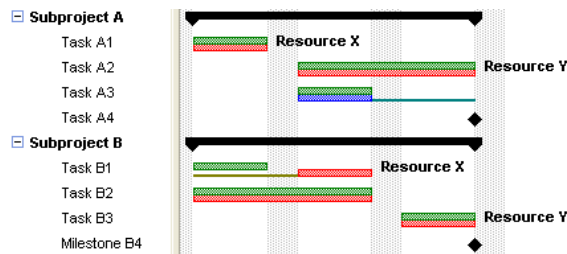


- c. As the overallocation can not be resolved within the available slack a warning message is given. To find out what amount of leveling is possible, click 



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d. Changing the project's schedule to be:



| Resource X |      | Work | 8h | 8h | 8h | 8h | 8h |  | 8h | 8h | 8h | 8h | 8h |     |     |     |     |     |
|------------|------|------|----|----|----|----|----|--|----|----|----|----|----|-----|-----|-----|-----|-----|
| Task A1    | Work |      | 8h | 8h | 8h | 8h |    |  |    |    |    |    |    |     |     |     |     |     |
| Task B1    | Work |      |    |    |    |    |    |  | 8h | 8h | 8h | 8h | 8h |     |     |     |     |     |
| Resource Y |      | Work |    |    |    |    |    |  | 8h | 8h | 8h | 8h | 8h | 16h | 16h | 16h | 16h | 16h |
| Task A2    | Work |      |    |    |    |    |    |  | 8h | 8h | 8h | 8h | 8h | 8h  | 8h  | 8h  | 8h  | 8h  |
| Task B3    | Work |      |    |    |    |    |    |  |    |    |    |    |    | 8h  | 8h  | 8h  | 8h  | 8h  |

- Task B1 can be leveled within its available slack.
- Task B3 hasn't been leveled as its late finish date can not be extended. As a result, a conflict still exists for Resource Y.

|              |   |
|--------------|---|
| <b>Hints</b> | <ul style="list-style-type: none"> <li>• If the leveling process is stopped ( <input type="button" value="Stop"/> ), leveling delays may still exist. To remove leveling delays, use the <input type="button" value="Clear Leveling..."/> button within a task-based view.</li> <li>• Changes to the 'Resolving overallocations' options are not saved within a local project document, they are saved within the PC's registry. As such, the settings will apply to all projects.</li> </ul> |
|--------------|---|