Assigning resources to tasks

The tips and tricks below are taken from Project Mentor, the smart way to learn Microsoft Project. For further information, please go to: www.projectlearning.net/project_mentor.htm

More useful tips and tricks can be found on the Project Learning blog: www.projectknowledge.net

Related Document(s)
Using effort-driven tasks www.projectlearning.net/pdf/D2.2.pdf
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Introduction

A fundamental Microsoft Project Skill (especially if you are working in an Enterprise environment) is to understand the nature of resource assignments. On many training courses, we’ve had requests for a ‘back to basics’ introduction to how assignments (and hence work and cost) are scheduled.

These tips and tricks illustrate how assignments are created, work is aggregated and costs are calculated. In addition, resource conflicts are examined. All the examples below were created using Microsoft Excel for illustrative purposes, but would be scheduled in exactly the same manner by Microsoft Project.

Background

Once the project's schedule has been calculated (with critical path analysis) and a Gantt chart created, the next step in the planning process is to create some resource assignments. These assignments add the people dimension - someone doing something. Assignments can be simple or they can be complex. What is important is a general understanding of the relationship between the task (something that needs to be achieved) and the resource (the individual that performs the work to achieve the task’s objective). Once the basics of assignment and aggregation are understood, more sophisticated use can be made of the (often expensive) people that work upon projects.
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Resource assignments defined

An assignment is the relationship between a task and a resource. This relationship creates work - somebody doing something to achieve the objective of the task. The most common types of assignment are:

An individual full-time

- Tim Brown

An individual part-time

- Tim Brown[50%]

Multiple individuals full-time

- John Garner, Sally Beaumont

Multiple individuals part-time

- Tim Brown[50%], Sally Beaumont[50%]

When an assignment is created, Microsoft Project calculates work according to a scheduling formula:

\[
\text{Assigned Work} = \text{Assigned Units} \times \text{Task Duration}
\]

For example; 80 hours work = 100% of (resource) x 80 hours duration (10 days @ 8 hours per day).

Hints

- When tasks have just one resource assigned to them, their scheduled start and the start of the assignment are the same. The scheduled finish of the task is equal to the end of the assignment.
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Assigning individual people to tasks

When an individual is assigned to a task, the work for that resource is apportioned over the task’s duration. This apportionment is commonly referred to as aggregation.

- Tim assigned to the Design Structure task for 5 days full time:

![Diagram showing Tim's assignment to Design Structure task]

- An additional assignment of 15 days work for Tim on the Write body text task:

![Diagram showing Tim's additional assignment on Write body text]

- Subsequent 5 day assignments for Tim on the Set page layouts and Create contents & index tasks:

![Diagram showing Tim's subsequent assignments]

Hints

- Assignments should be made against normal tasks and not summary tasks or milestones.
- As the assignments above are sequential, Tim is able to carry out the assignments within his available working time and his availability profile.
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Assigning several people to tasks

When more than one person is assigned to a task, there are more options to consider:

- Is the task effort-driven or not?
- What is the task's type?

Take the example below:

| Task Name            | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 |
|----------------------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Design structure     |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Write body text      |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Set page layouts     |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Create exercises     |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Test exercises       |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Create contents & index |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |

Sally 2 1

- Sally has been assigned 80 hours (10 days) of work against the Test exercises task.
- The total work for the task is therefore calculated as 80 hours (from the initial assignment of Sally).

- If another resource (John) is assigned to the same task as Sally:

If the task is effort-driven, its duration will be halved. This is because the total work (defined by the initial assignment) is now shared as assigned work for the two resources assigned to the task:

Before: 80 hours = 100% (assigned units) of Sally x 10 days task duration.

After: 80 hours = 100% of Sally x 5 days duration PLUS 100% of John x 5 days duration.
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If the task were not effort-driven, each assignment would be 80 hours. The total work for the task would be 160 hours and the task's duration would be 10 days.

- If the task type were fixed duration, the scheduling formula would share the work over the task's duration:

  The total work for the task is 80 hours. The task duration will remain constant at 10 days.

  - Sally's assigned work would be 40 hours at an assigned units of 50% (or 0.5 as shown above).
  - John's assigned work would also be 40 hours at an assigned units of 50% (or 0.5).

  Hints
  - Within Microsoft Project the default settings for tasks is that they are effort-driven with a task type of fixed units.
  - The assigned units for an assignment is usually equal to the resource's max units value. This is the default for new assignments within Microsoft Project.
  - Where the aggregated units are less than max units, the resource has additional capacity to carry out other tasks.
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Creating a resource conflict

Quite often, resource demand will exceed supply. This is known as a resource conflict. These conflicts usually occur for the following reasons:

- Assigned units > max units.
- A resource is assigned outside the boundaries of its availability profile.
- Resource assignments are in parallel.

The conflict for Tim in the example above is caused by:

- His full-time assignment against the Test exercises task conflicting with his full-time commitment to the Write body text task on days 16 through 20.

Sometimes, a resource conflict can't be avoided. There are some simple steps that can be taken to minimize the chance of creating conflicts:

- Ensure that assigned units are always less than or equal to a resource's max units.
- Don't assign a resource to a task outside of a resource's availability profile.
- Don't assign resources to summary tasks.
- Beware of having resources assigned to recurring tasks happening in parallel with normal tasks.
- Consider assigning generic resources to tasks in the future, or tasks that aren't fully defined.
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Hints

- Parallel assignments are the commonest cause of resource conflicts.
- Although the Test exercises task possesses free slack any delay to it would cause a resource conflict with Tim's commitment to the Set page layouts task.

Creating a cost schedule

When resources are assigned to tasks, they create measurable work. This work in turn can incur cost. The standard rate for each of the three resources described above is:

- **Tim**: 300 cost units ($, £) per day.
- **Sally**: 400 per day.
- **John**: 320 per day.

The weekly costs for the project above are derived as follows:

- **Week 1**: 5 days of Tim @ 300/day = 1500
- **Week 2**: 5 days of Tim plus 5 days for 50% of Sally (@ 400/day) plus 5 days for 50% of John (@ 320/day) = 3300
- **Week 3**: 5 days of Tim plus 5 days for 50% of Sally plus 5 days for 50% of John = 3300
- **Week 4**: 5 days of Tim plus a further 5 days for Tim = 3000
- **Week 5**: 5 days for Tim = 1500
- **Week 6**: 5 days for Tim = 1500
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These costs could also be displayed as a cumulative curve:

The total cost for the project is 14,100. This is the sum of the costs for weeks 1 through 6.

Hints

- Costs for tasks and resources can have a number of accrual methods.