MSP How to guide – session 2 (Resources & Cost)

1. Introduction

Before considering resourcing the schedule it is important to ask yourself one key question as it will require effort from the scheduler or Project Manager. The benefit must outweigh the effort.

**Why resource the schedule?**

Typical reasons for resourcing a schedule are to:

- Help task people – that is help communicate to people what they need to do
- Help estimate – provide an indication of manhours per task
- Ensure the schedule is achievable – we believe this should be the primary focus

To resource a project you basically assign one or more resources to each task using the assign resources function, typically at a % of full time effort. You don’t resource milestones and avoid resourcing summaries.

2. Getting started

We need to start using other views when working with Resources, the views to use from the View menu are:

- Resource sheet view – to set up the basic attributes of resources
- Gantt chart view – to assign resources to tasks using the “Assign Resources” icon
- Resource usage view – to review resource allocation and spot over allocation
- Resource graph – handy on the lower half of the screen to see usage graphically

3. Understand the tool

The keys to resourcing are:

1. WORK = DURATION X % ALLOCATION X HRS/DAY (typically 8)
2. When changes are made MS Project looks at which variable is fixed
3. If in doubt, MS Project maintains work

% Allocation is also referred to as units when expressed as a decimal, it represents a % of an 8 hr day (assuming calendar isn’t changed). There are three variables in the work formula shown above. We have to fix one variable to allow Microsoft Project to calculate the other variable when we change something. Microsoft Project lets you choose which one to fix. If you double click a task, you will see a drop menu **Task type** which is where we tell Microsoft Project which attribute to fix. By default the Units are fixed. **Tools, Options, Schedule** tab allows you to change the default for new tasks.

When you enter an assignment, eg when you select a Resource and click Assign, you establish the formula. From then on Microsoft Project follows the formula. If you halve the work for example, Microsoft Project will halve the duration (assuming the Task type is the (default) fixed units).
In absence of any other information Microsoft Project by default will maintain the work. That means if you have the % Allocation, Microsoft Project, assuming the task type is the (default) fixed units, will double the duration.

*Users often get frustrated when durations change but Microsoft Project is just doing what it is told, it is just the user who doesn’t understand the instructions they are giving the tool.*

There is also an attribute called **Effort driven**. In MS Project, this means if two different resources are assigned to a task then the work or effort is shared between the two. When assigning a second resource using default settings users will often see Duration halved. In IT projects it is rarely the case that resources are interchangeable so we always turn this off. See session 1 part 3 for details. If you double click a task, and see the check box **Effort driven** ticked you will need to change **Tools, Options, Schedule** as well as change existing tasks in your schedule (Hint enter Effort Driven” column in Gantt Chart and ensure they are all “No”).

Tips for resourcing:
- 100% equals 8hrs per day, 50% equals 4hrs per day, 25% equals 2hrs per day
- Durations should be based on elapsed time, the % Allocation accounts for effort
- Avoid the **Assign** button, enter the % directly under **Units** on the **Assign Resources** form
- Consider using **Remove** button followed by new entry of **Units** if you are changing allocation but don’t want the Duration to change

4. Establishing the Resource sheet

From the **View** menu, select **Resource sheet**. Enter names of each resource and consider changing the following attributes of each resource. The best way is to double click each resource and use the Resource information form, alternatively add columns as necessary.
- Resource availability – the maximum a resource is available to work on the project (used to assess whether or not resource is over allocated)
- Cost rate – hourly rate for each resource if you are estimating costs
- Working time – the resource calendar, handy for leave etc (note Base Calendar feature)

Note: Resources can be shared across multiple projects, this is a more advanced concept and not covered in these notes.
5. Assigning resources

Assigning resources is reasonably easy. The best way is to:

1. Click the **Assign Resources** icon to see the Assign Resources form
2. Select one or more tasks
3. In the Units field on the Assign Resources form against the desired resource enter a percentage value.

**Warning:** Don't use the graphical up and down functions or click Assign button then change the value, otherwise the tool will behave as outlined in section 3 and potentially change your duration.

**Hints:**
- Some resources such as Project Manager are considered Level of Effort, put a long task at the top of the schedule to represent management overhead
- People are rarely available 100%, either lower their availability to say 80% or show an overhead task for "Other work"
- Ignore accounting standards such as a standard work day being 7hrs 21mins or whatever, leave MS Project 8hr days

6. Check for errors

Use the Resources column in the table to look for:

- Tasks without a resource assigned (you can also see these in the Resource usage view under the heading “unassigned”)
- Milestones or summaries with resources assigned – they shouldn’t be
- Be careful about double counting resources, particularly Project Managers and support staff
7. Resource conflict

Resource conflict is where there is too much work scheduled to occur in one day.

The first step is to identify areas of over or under allocated resources. Conflict is where you have scheduled more work to be done in a day than there is resource capacity to do. The best way to identify this is to use the Resource Usage view in the top half of the screen. Over allocated resources will be shown in **Bold Red**. In the time scaled section of the view you can see the amount of work scheduled against each activity. You can **Format, Detail Styles** to show other things such as peak units or % allocation. Timescale can be modified so show daily or weekly values.

Resolving resource conflict is effectively problem solving and is quite difficult to do as it requires skills in presentation and analysis of data, problem identification as well as response strategies and ultimately solution development. The solution then needs implementation and then the process of review starts again. Options available are:

- Consider your estimates and logic model. Are your estimates accurate (look at estimates of duration, % assignment and effort) ? Is your logic correct ?
- Consider float. Can you stretch the task (keep effort the same but lower the assignment) ? Can you split tasks (start task then finish after higher priority task is done – avoid this if you can) ? Can you delay one or more tasks (to move effort to a time of higher availability) ?
• Consider other resources. Are there any other similar resources who are available (swap assignments)? Remember if you are swapping the assignment, consider efficiency and experience of the resources.

• Consider overtime. Can you make more working time available for the resource (overtime – often has a cost)?

Obviously the solution to resource conflict can be complex. Consider the following approach:

1. In **Resource Usage** view identify the resource with the biggest problem or what you consider a key resource

2. Determine when the problem occurs and which tasks are involved (hint show a Gantt Chart in the bottom half of the screen)

3. Determine the root cause of the problem and consider solution options. This may take some time as it may involve discussion and stakeholder consultation.

4. In **Gantt Chart** view implement the proposed solution, which could be by
   - Delaying task(s) – adding a dependency or constraint (for resource reasons)
   - Stretching task(s) – by altering % allocation/duration
   - Re-distributing work for the resource – using manual adjustment of hours via **Task Usage** view or **Resource Usage** view (reconciling to original hours), a tedious process
   - Replacing a resource on a task – using Replace function on the **Assign Resources** form, be careful you adjust for efficiency

5. Return to the **Resource Usage** view and review results.

**Hint:** Save the schedule frequently during this process and save as it is easy to make mistakes. Don’t get too worried about minor resource spikes on longer projects, people can cope with some short term over allocation. Look for extended periods of over allocation.

**Warning** - **MS Project** has automated resource levelling capability but it is not recommended on IT projects, a Project Manager can usually do a much better job manually.

8. Costing using **MS Project**

**MS Project** has several options for doing cost control:

- Labour costs via resource hours and rate
- Fixed cost column – simple to use but of limited value, it doesn’t really support progressive actuals or earned value.
- Material costs (using assigned units and a rate/unit, only works on tasks not milestones)
- Fixed costs assigned via milestones (using Material costs at 0 units but with dollars allocated in task form, won’t work for tasks)

We recommend using labour costs for initial estimating only. If doing Earned Value Analysis we set cost rates to zero on Resources and Materials and distribute dollars to milestones following a simple Earned Value approach.
It is recommended that Project Managers use Excel for estimating costs, taking output from MS Project and modifying as necessary to provide a realistic estimate. This usually involves scaling up an MS Project estimate.

To assign Material costs to tasks:
1. Set up a new resource, eg “Server”
2. Change Type to Material.
3. Add a Material Label “Server”
4. Under the Costs tab set Standard rate to $2000 per unit or whatever a typical server costs.
5. Assign as many units to a task as required

To assign Fixed costs to tasks:
1. Set up a new resource, eg “Lump Sum”
2. Change Type to Material.
3. Add a Material Label “Dollar” (or multiple eg $K)
4. Under the Costs tab set Standard rate to $1 per unit
5. Assign as many units to a task as the dollar amount, eg 1000 units will equal $1000 in this example

To assign Fixed costs to milestones (approach used for Simple Earned Value technique):
1. Set up a new resource as per the above, you could reuse the “Lump Sum” if you want.
2. Assign the resource to milestone at 0%
3. Use Window, Split to show Task Form at the bottom and Format, Details to show “Resource Costs”
4. Change the dollar figure in the Task Form to the desired value, (remember you may need to click OK when using task form).
9. Resource Reporting

Reporting relating to resources is similar conceptually to using Gantt chart views except you tend to use “Useage” type views. Consider using the following:

- Add Resource Names column to Gantt chart or show Resource names against task bars (Format Bar Styles and use bar text against “Normal” bars)
- Use Task Usage view and format to suit. This will show each assignment against each task. Format Details to alternate between work and cost.
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- Put the Resource Graph view on the bottom half of the screen and Resource Usage or Resource Sheet up the top. You can get a graph of selected resource. You can further format to make it cumulative.
- Under Reports on the View menu there are numerous reports relating to assignments.
- Add grouping to views above to improve the report