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Synergy between PMBOK® and MS Project 2007®
A Schedule Management Perspective

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1. Abstract

MS Project 2007® (MSP) and the 3rd edition of Project Management Body of Knowledge (PMBOK® Guide) very much go hand in hand. While PMBOK® addresses the theoretical aspects, MSP seeks to implement them in a practical manner. However, there are some differences between the terms and terminologies, but the core concepts remain the same. This paper focuses on - how best a PMP® or a professional with sound understanding on PMBOK® Guide can use and apply MSP for Schedule Management, by exploiting the synergy between MSP and PMBOK® Guide.

2. Introduction

The major comparisons between PMI-PMP®/PMBOK® and MSP are outlined with primary focus on the Schedule Management, which corresponds to the Time Management Knowledge Area (KA) of PMBOK® guide. Schedule or Time is one of the major constraints out of the traditional triple constraints in management. To have a complete understanding, certain Input, Tools and Techniques and Outputs of other KAs, such as Scope Management KA and Integration Management KA from PMBOK® guide, have been used.

In some places of the document, PMBOK® and PMBOK® Guide are used interchangeably.

3. The Synergy

3.1. Where PMBOK® and MSP Differ?

It must be noted that by differences, it means that certain terms and terminologies are different, but conceptually MSP® and PMBOK® Guide follow the same course.

3.1.1. Project (PMBOK®) Vs Project Summary Task (MSP):

A “Project” is at the highest level when a WBS is created in the “Create WBS” Knowledge Area Process (KAP) of “Scope Management” KA as per PMBOK® guide. A project can be further broken down into phases or deliverables and it is considered to be at Level-0 in the WBS.

Similarly in MSP, a Project is known as "Project Summary Task" and it can be viewed by selecting the "Show Project Summary Task" option in the View tab of Tools → Options menu.

3.1.2 Work Package (PMBOK®) Vs Summary Task (MSP):

A "Work Package" is created in the "Create WBS" KAP of "Scope Management" KA. As per PMBOK®, a work package can be assigned to multiple people and can be broken down to "Activity" level. A "Work Package" in PMBOK® corresponds to "Summary Task" in MSP. A Summary Task can also be broken down to individual task levels.

Note: The duration, start date and end date of a Project Summary Task or a Summary Task can not be edited as it is calculated from the Summary Tasks or Activities, respectively. It is a bottom up estimation.

3.1.3 Activity (PMBOK®) Vs Task (MSP):

Activities are created in "Activity Definition" KPA under "Time Management" KA. An "Activity" is the smallest unit which can be assigned to person. Generally, one person is assigned to an activity, though more people can also be assigned.

Similarly a "Task" in MSP is a unit of work, which is normally assigned to an individual and it is the smallest unit for which time, cost and scope can be definitively determined. Activities are rolled up to form the Work Package and similarly Tasks are rolled up to form the Summary Task.

3.1.4 Activity List (PMBOK®) Vs Task List (MSP):

A collection of activity is called Activity List and it is created in "Activity Definition" KPA of "Time Management" KA.

In MSP, a collection of Tasks is called "Task List".

3.1.5. Activity Duration (PMBOK®) Vs Duration (MSP):

Activity Duration is estimated in "Activity Duration Estimating" KAP of "Time Management" KA as defined in PMBOK®.

In MSP, duration is calculated as Duration = Finish Date – Start Date + 1. In PMBOK® though the concept of duration same, it comes with as variants, such as:

Duration = Early Finish – Early Start + 1 OR
Duration = Late Finish – Late Start + 1

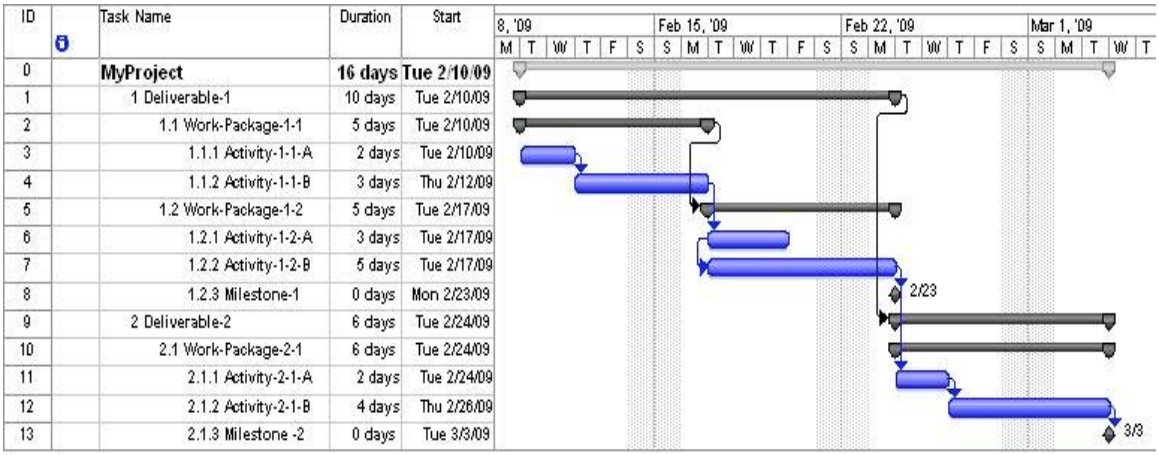
Note: In MSP, the duration is dependent on the work and unit and is driven by the formula, which is Work = Duration * Unit.

3.1.6. Sequencing (PMBOK®) Vs Linking (MSP)

Sequencing is a operation which is defined as "Activity Sequencing" KAP in the "Time Management " KA in the PMBOK®. Here, the activities are sequenced in the order in which they will be executed by the team members of a project. While sequencing the activities, dependencies between the activities are defined. Dependencies can in the form of mandatory or discretionary or external dependencies.

Similarly in "Task Linking" of MSP, a sequencing of tasks and linking with other tasks is done with one type of aforementioned dependency. After linking is performed on each task, a "Predecessor Task" field will be available for each "Successor Task".

By applying the aforementioned concepts, a PMP® or management professional can create a Gantt Chart via MS Project 2007®. A sample project will look like as below.



ID	Task Name	Duration	Start
0	**MyProject**	**16 days**	**Tue 2/10/09**
1	1 Deliverable-1	10 days	Tue 2/10/09
2	1.1 Work-Package-1-1	5 days	Tue 2/10/09
3	1.1.1 Activity-1-1-A	2 days	Tue 2/10/09
4	1.1.2 Activity-1-1-B	3 days	Thu 2/12/09
5	1.2 Work-Package-1-2	5 days	Tue 2/17/09
6	1.2.1 Activity-1-2-A	3 days	Tue 2/17/09
7	1.2.2 Activity-1-2-B	5 days	Tue 2/17/09
8	1.2.3 Milestone-1	0 days	Mon 2/23/09
9	2 Deliverable-2	6 days	Tue 2/24/09
10	2.1 Work-Package-2-1	6 days	Tue 2/24/09
11	2.1.1 Activity-2-1-A	2 days	Tue 2/24/09
12	2.1.2 Activity-2-1-B	4 days	Thu 2/26/09
13	2.1.3 Milestone -2	0 days	Tue 3/3/09

From the above Gantt Chart, it can be referenced that:

- Work Packages in PMBOK® are similar to Summary Tasks in MSP, e.g., Work Package – 1-1; Activities are similar to Tasks.
- The Milestones are of 0 duration and they are represented as filled up diamonds, e.g., Milestone – 1.
- The dependencies are formed between the Activities or Tasks (Finish to Start or Start to Start) with linked arrow marks in the Chart portion of the Gantt Chart.

3.1.7. Resource Breakdown Structure – RBS (PMBOK®) Vs Linking (MSP):

RBS is an output from "Activity Resource Estimating" KAP of "Time Management" KA of PMBOK®. It structures the resources based on Category and Type.

In similar lines, resources defined in MSP are of 3 types: [namely] work, material, and cost resources.

Work → People/Human Resources and Equipment Resources. It is defined as "Work Resources", as these resources actually do the work.

Material → This resource will be consumed, like DVD for final software that will be burned. This does not perform any work on its own, but they are used for your project.

Cost → There is another type of resource which is known as "Cost Resource" and it is newly introduced in MS Project 2007®. It is a type of expenses in the project, e.g., travel of a staff to his new office location or an onsite coordinator who will have to travel to the client location. This does not perform any work. The sole purpose of it is to assign the cost to a task.

3.1.8 Activity Resources (PMBOK®) Vs Work Resources (MSP)

Activity Resource requirement is an output from "Activity Resource Estimating" KAP of "Time Management" KA. Resources as defined by PMBOK® guide can be Human resources or Equipment Resources. Activities will be performed by work resources and aided by other resources material. In MSP, Activity Resources are mapped to Work Resources, which are of 2 types, i.e., People/Human Resources and Equipment Resources.

After identifying resources along with their types in MSP, a PMP® or management professional can create a Resource Sheet, which will look like as shown below.

ID		Resource Name	Type	Material Label	Initials	Group	Max. Units	Std. Rate	Ovt. Rate	Cost/Use	Accrue At	Base Calendar	Code
1		Satya Dash	Work		S		100%	$20.00/hr	$0.00/hr	$0.00	Prorated	Standard	
2		Uttam Singh	Work		U		100%	$20.00/hr	$0.00/hr	$0.00	Prorated	Standard	
3		Vivek Mohan	Work		V		100%	$10.00/hr	$0.00/hr	$0.00	Prorated	Standard	
4		John Rodman	Work		J		100%	$20.00/hr	$0.00/hr	$0.00	Prorated	Standard	
5		Sam Mistry	Work		S		100%	$15.00/hr	$0.00/hr	$0.00	Prorated	Standard	
6		Hari Prasad	Work		H		100%	$15.00/hr	$0.00/hr	$0.00	Prorated	Standard	
7		Gerry Krodosky	Work		G		100%	$20.00/hr	$0.00/hr	$0.00	Prorated	Standard	
8		Partha Panda	Work		P		100%	$15.00/hr	$0.00/hr	$0.00	Prorated	Standard	
9		Broadband Connection	Work		B		800%	$0.50/hr	$0.00/hr	$0.00	Prorated	Standard	
10		DVD for Software Burn	Material		D			$0.00		$0.00	Prorated		
11		Travel	Cost		T						Prorated		

As it can be seen from the Resource Sheet view:

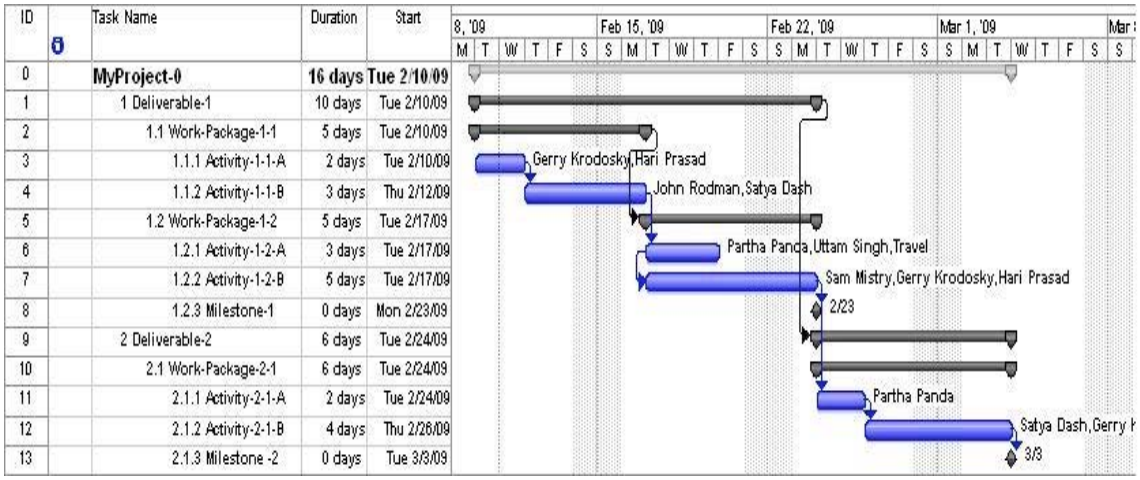
- Only Human Resources and Equipment Resources (=Work) have rates and max units.
- Material resources have a rate and they can be consumed
- Cost resources do not have a rate – as they will have only cost when they are associated with a task.

3.1.9 Resource Calendar (PMBOK) Vs Standard Calendar (MSP)

Resource Calendar is initially created in the "Develop Project Management Plan" KAP of "Integration Management" KA. It is then updated in the "Activity Resource Estimating" KAP. As defined in PMBOK®, Resource Calendar applies both to Human Resources as well as Material Resources.

In similar lines, for MSP, Standard Calendar or Calendar is applicable to only Work Resources, i.e., People Resources and Equipment Resources. It is not applicable to Material Resources or Cost Resources.

After assigning various resources to tasks, the Gantt Chart view will be as below.



3.1.10 Schedule Baseline (PMBOK®) Vs Baseline (MSP)

"Schedule Baseline" is created in the "Schedule Development" KAP of "Time Management KA" as defined in PMBOK®. As the name suggests, base-lining is done when enough planning for the schedule has been done and the manager of the project has been given the go ahead from the concerned stakeholders. At this stage, the actual percentage of completion or the current status of the project is not entered.

Similarly, the Baseline concept in MSP applies to all the above rules mentioned.

Note: After performing a baseline, there will not be any visible reflection of it in the Gantt Chart.

Only when start tracking (after assigning the actual finish percentage) is performed, then the tasks which are completed will be shown via a tick mark.

3.2. Where PMBOK and MSP Converge?

3.2.1. Milestone/Milestone List (PMBOK®/MSP)

Milestone List is created in "Activity Definition" KAP of "Time Management" KA. Milestone list is a set of milestones.

The meaning of word Milestone is same for both PMBOK® and MSP. It is an activity which of "zero duration". It is a time in the project where a significant event happened (say Phase – 1 is complete) and it is normally imposed from outside.

3.2.2 Dependencies (PMBOK®/MSP)

As per PMBOK®, there are 3 kinds of dependencies: [namely] mandatory dependency (or hard logic), discretionary dependency (soft logic), and external dependency. The most common mandatory dependency is Finish-to-Start (F-2-S) dependency. The other 3 are: [namely] S-2-S (Start-to-Start), S-2-F (Start-to-Finish), and F-2-F (Finish-to-Finish).

In MSP, dependencies are known as relationships and they will be one of the aforementioned four types. For a particular task, the relationship of it with the predecessor task can be viewed in the Task Driver pane - by selecting the Task Drivers button on the Standard toolbar or selecting the Project → Task Driver menu. It can also be viewed in the Task Information dialog box.

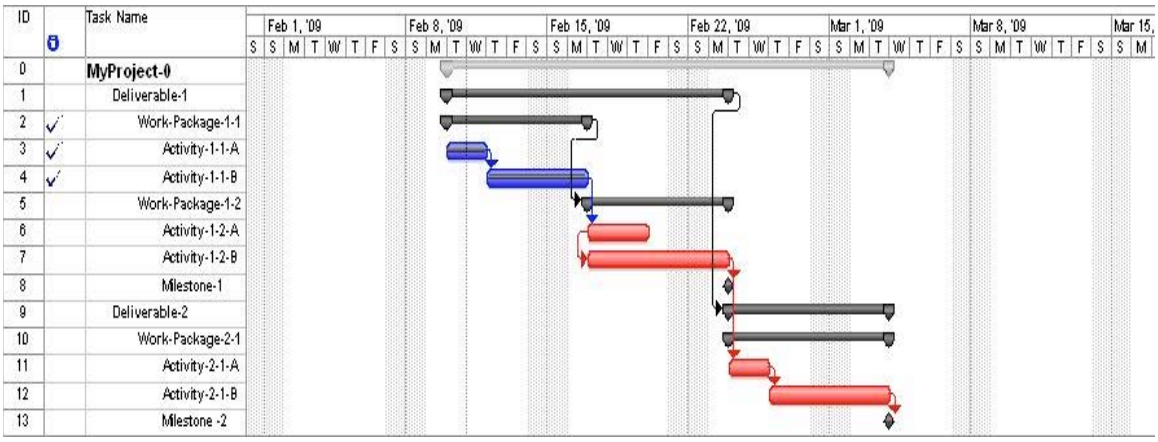
3.2.3 Critical Path (PMBOK®/MSP)

Critical Path method is defined as one of the Tools and Techniques in "Schedule Development" KAP of Time Management KA of PMBOK® guide.

A project's critical path is the combination of activities that, if any are delayed, will delay the project's finish. The primary objective of it is to determine the project's finish date and to determine the extent to which an activity can be delayed without delaying the project. The tasks or activities on a critical path have zero slack.

The concept of critical path is same in MSP.

Below is snap of critical path in the Detail Gantt view.



The tasks or activities marked in red are in critical path. Any delay in these activities will result in the delay of the project's finish date.

3.2.4 Resource Levelling (PMBOK®/MSP)

"Resource Levelling" is one of the Tools and Technique defined in "Schedule Development" KAP of Time Management KA as defined in PMBOK® guide. In order to level the resource, first the critical path of the project is analyzed, the ability of the organization's to supply resources is determined and over allocated or under allocated resources are properly assigned.
In MSP, the concept of resource levelling is same and it can be done manually or automatically. Additional resources can be assigned to task, a task can be delayed or a resource assignment can be delayed.

Conclusion

PMBOK® is one of the most widely used reference books for PMP® and many management professionals across the globe. However, it is quite theoretical in its approach. A PMI-PMP® or a project management professional while using the best principles and practices of PMBOK® finds it somewhat difficult to apply them in real time. MS Project 2007®, from Microsoft®, is one of the most popular tools used by management professionals.

Though there are certain differences between terms and terminologies of PMBOK® and MSP, MS Project® can be used as a tool to apply the principles of PMBOK® guide.

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