Software Project Management

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Resource Allocation

- Introduction
- Nature of resources
- Identifying resource requirements

Introduction

- In project scheduling, activity network analysis techniques are used to plan when the different activities should take place.
- But, these plans do not take into account the availability of resources.
- Now, we will discuss how to match the activity plan to available resources.
- We will also assess the efficacy of changing the plan to fit the resources, wherever necessary.

Introduction cont …

Final result of resource allocation will be a number of schedules such as:

- **Activity schedule:** indicates the planned start and completion dates for each activity. It can be prepared by using precedence network (activity plan).
- **Resource schedule:** shows the dates on which each resource will be required and level of that requirement
- **Cost schedule:** shows the planned cumulative expenditure incurred by the use of resources over time.

The Nature of Resources

- **Resource:** any item or person required for execution of the project
- Some resources such as project manager will be required for whole duration of the project, whereas others such as programmer, might be required for a single activity.
- Project manager is very much vital to success of the project.
- Does not require the same level of scheduling as a programmer.
- Manager may request for the use of a programmer who belongs to a pool of resources at programme level.

Categories of Resources

- **Labour:** Members of the development project, such as project manager, systems analyst, programmers etc.
- **Equipment:** Computing and other equipment (e.g. servers, workstations, desktops, keyboards, printers, scanners etc.)
- **Materials:** Items that are consumed, rather than used (e.g. disks, CDs, papers etc.)
- **Space:** Office space / working space

Categories of Resources

- **Services:** Some projects may require procurement of specialized services, e.g. development of a wide area distributed system, may require scheduling of telecommunication services; postal/courier services etc.
- **Time:** elapsed time can be reduced by adding more staff
- **Money:** It is a secondary resource, used to buy the other resources. Similar to other resources in that it is available at a cost – in this case interest charges.

Resource allocation - Steps

- Identify the resources needed for each activity and create a *resource requirement list*
- Identify *resource types* - individuals are interchangeable within the group (e.g. 'VB programmers' as opposed to 'software developers')
- Allocate resource types to activities and examine the *resource histogram*

Identify the resource requirements

- Identify hardware
- Identify software
- Identify support

Identify hardware

Steps:

1. List all the hardware needs of the project (e.g. desktops, servers, backup media, keyboards, switches, ports and cables, display devices, printers, plotters, touch screens etc.)
2. For each piece of hardware, specify what it needs to do
3. For each piece of hardware, specify what it needs in order to function properly (e.g. the required software, cables etc.)
4. Specify who needs what hardware to do his task (Do not provide everyone with every piece of hardware, if they do not require it)
5. Specify, when the team needs the hardware, may be in advance

Identify software

- Many other supporting software are needed to develop a software project.
- Basic software like operating systems, compilers etc. may cause project delays if installed incorrectly or upgraded randomly.
- Different versions of software, mismatched service packs, and different releases of libraries may also create problems.
- Ignoring these issues may lead to problems.

Identify software cont…

- Experienced project managers know that software upgrades during a project cost the team productivity and may create serious problems.
- So, there is a need to plan for upgrades and schedule them, when the impact on the team and the project can be minimized.
- Project managers can get a handle on software support by following below steps.

Identify software cont…

Steps:

- List the Software Requirements
- Specify the Software Versions
- Identify Upgrades and Service Packs
- Identify Who Upgrades Which Software
- Specify When to Upgrade Which Software

List Software Requirements.

- The team may need a well-specified set of software products so that product inconsistencies can be minimized, upgrades can be planned, and licensing can be done properly.
- To get this set, the project manager needs to manage the details of all the software to be used.
- He may start by specifying the software that the team will need, including the followings:

List Software Requirements cont…

- Operating systems
- Compilers
- Configuration management system
- Email systems
- Supporting software (FTPp, web browser, etc.)
- Libraries (dynamic link libraries, standard template libraries, graphic user interface libraries, etc.)
- Office software (word processing, excel sheet, presentation, etc.)
- Software tools (CASE tools, Design tools, Testing tools, SPM tools)

Specify the Software Versions.

- Given the list of existing software products, specify the team needs exactly which version of each of these pieces of software.

- Also, specify when changes to these might become available.

Identify Upgrades and Service Packs

- Software is not a static entity. There will be upgrades and enhancements from time to time.
- The project manager needs to know which pieces of software need these upgrades and when they will occur during the project.
- Answer the following questions for each software product the team will use:
  1) What is the length of your project in relation to upgrades, service packs, or new versions of these software products?
  2) Will the team need to upgrade?
  3) When will the upgrade be available?

Identify Who Upgrades Which Software

- Identify who is responsible for installing and upgrading of each piece of software (e.g. system administrator or project team).

- Make sure that the project manager has identified who does what and everyone agrees on who performs installations and upgrades.

Specify When to Upgrade Which Software

- Once the project manager has a handle on the list of software and an idea of what upgrades the team will need to make during the project, he can decide when to upgrade.
- Upgrades just before a major milestone are very risky. Up grading immediately after a milestone will allow time to troubleshoot problems that arise but may invalidate testing done prior to the milestone.

Specify When to Upgrade Which Software cont…

- Consider all the software that the team will use in the project. If you want to upgrade the software, plan to upgrade when the team and project can best handle unexpected problems.
- Never plan on a best-case scenario when upgrading software. Expect problems to occur and plan time to handle them. If problems don't pop up, the team has extra time. If they do pop up, the planning provides time to handle problems.

Identify support

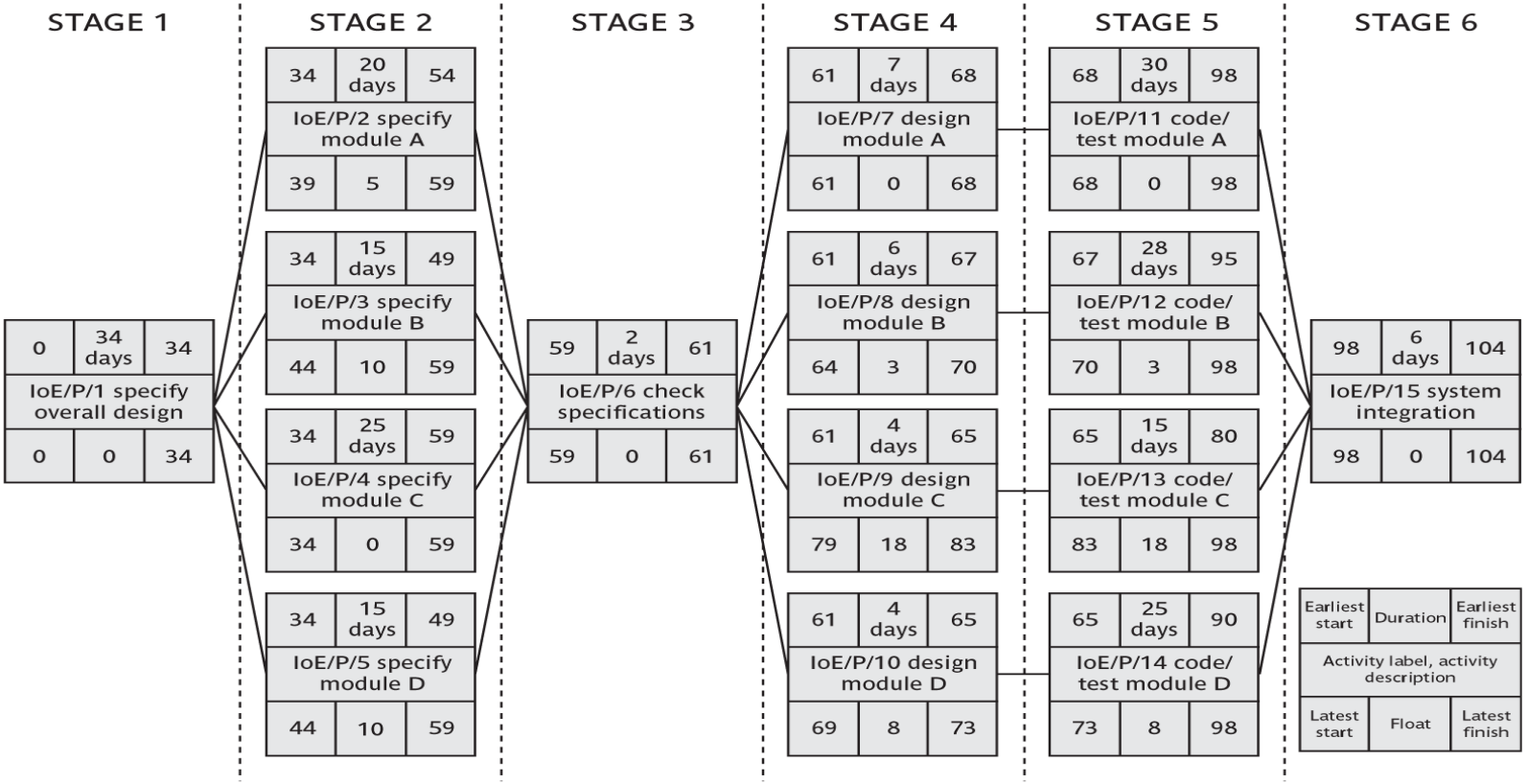
Steps:

1. Identify the support needed from each group.
2. Specify when support will be required, so that the project can make progress without any delay.
3. Specify how support occurs (e.g. will the staff be available via phone, email, or in person?)
4. Gain commitment from each group for the support required (e.g. through a verbal commitment or a contract or a commitment letter).
5. Maintain a good relationship with support staff

Prepare a resource requirement list

- First step in producing a resource allocation plan is to prepare a resource requirement list containing the resources that will be required along with the expected level of demand.
- This can be done by considering each activity present in a precedence network & identifying the resources required by it.
- There can be some resources that are not activity specific, but are part of the project infrastructure (for example project manager) or required to support other resources (for example office space).

An Example of Precedence Network



A sample resource requirements list

Stage	Activity	Resource	Days	Quantity	Notes
All	All	Project Manager	104 F/T		
1	All	Workstation	---	34	Check software availability
	IoE/P/1	Senior analyst	34F/T		
2	All	Workstation	---	3	One per person essential
	IoE/P/2	Analyst/Designer	20F/T		
	IoE/P/3	Analyst/Designer	15F/T		
	IoE/P/4	Analyst/Designer	25F/T		
	IoE/P/5	Analyst/Designer	15F/T		Could use analyst/programmer
3	All	Workstation	---	2	
	IoE/P/6	Senior analyst*	2F/T		
4	All	Workstation	---	3	As stage 2
	IoE/P/7	Analyst/Designer	7F/T		

A sample resource requirements list cont…

Stage	Activity	Resource	Days	Quantity	Notes
	IoE/P/8	Analyst/Designer	6 F/T		
	IoE/P/9	Analyst/Designer	4 F/T		
	IoE/P/10	Analyst/Designer	4F/T		
5	All	Workstation	---	4	One per programmer
	All	Office space	---		If contract programmers used
	IoE/P/11	Programmer	30F/T		
	IoE/P/12	Programmer	28F/T		
	IoE/P/13	Programmer	15F/T		
	IoE/P/14	Programmer	25F/T		
6	All	Full system access	---	3	Approx. 16 hours for full system test
	IoE/P/15	Analyst/Designer	6F/T		

Summary

- Discussed the different categories of resources
- Explained the identification of resource requirements
- Presented the steps for identifying hardware, software and support staff
- Discussed preparation of resource requirements list

References :

1. B. Hughes, M. Cotterell, R. Mall, *Software Project Management*, Sixth Edition, McGraw Hill Education (India) Pvt. Ltd., 2018.
2. R. Mall, *Fundamentals of Software Engineering*, Fifth Edition, PHI Learning Pvt. Ltd., 2018.

Thank you