SPM

Project Scope Management

Day 5: Project Scope Management

Er. Pratik Shrestha, IIMS College | Lincoln University

Last Class We Discussed

- The 7 Steps in Project Integration Management
- SWOT Analysis and SWOT Matrix
- Information Technology Planning Process
- Five methods for selecting projects
- Net Present Value (NPV)
- Return on Investment (ROI), IRR and Required Rate of Return
- Payback Analysis
- Weighted Score and Balanced Scorecard

Today’s Learning Objectives

- What is Project Scope Management ?
- Project Scope Management Processes
- Defining scope management
- Collecting requirements
- Defining scope
- Creating WBS
- Validating scope
- Controlling scope
- Guidelines/Case studies

What is Scope Management ?

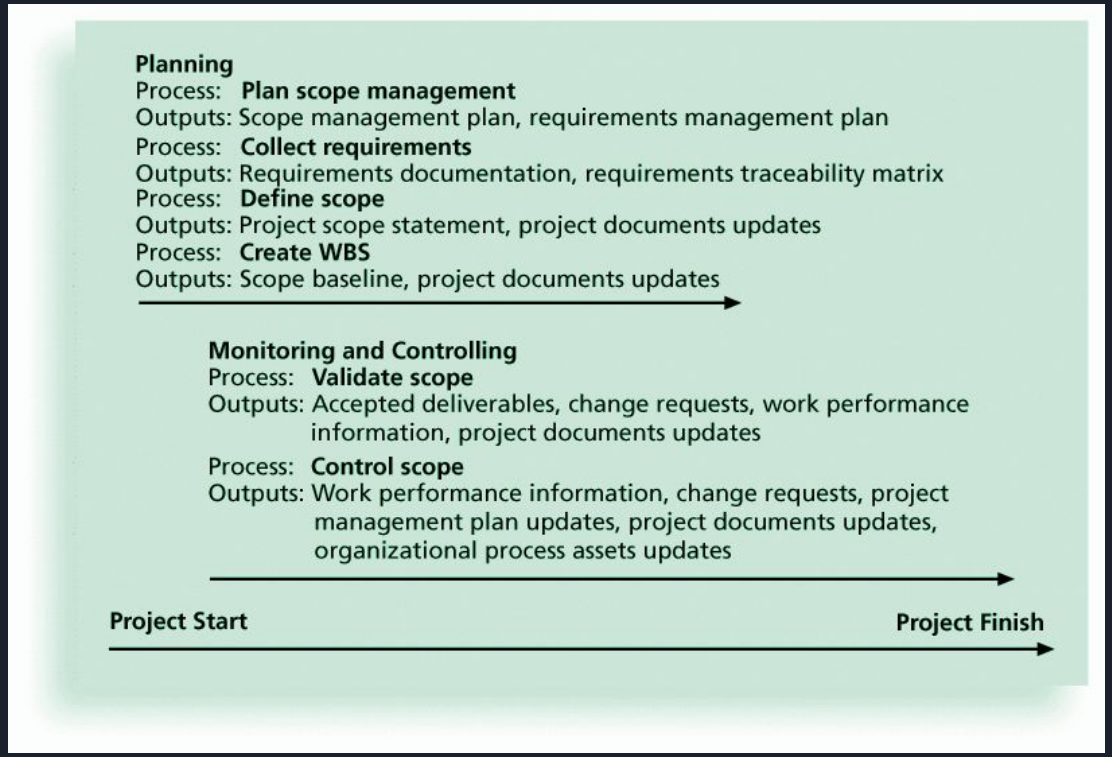
- **Scope** refers to all the work involved in creating the products of the project and the processes used to create them
- A ‘deliverable’ is a product produced as part of project, such as hardware or software, planning documents or meeting minutes
- Project scope management includes the processes involved in defining and controlling what is or is not included in a project

Project Scope Management

Project Scope Management Processes

1. Planning Scope: Determining how the project's scope and requirements will be managed.
2. Collecting requirements: defining and documenting the features and functions of the products produced during the project as well as the processes used for creating them.
3. Defining scope: reviewing the project charter, requirements documents and organizational process assets to create a scope statement.
4. Creating the WBS: subdividing the major project deliverables into smaller, more manageable components.
5. Validating scope: formalizing acceptance of the project deliverables
6. Controlling scope: controlling changes to project scope throughout the life of the project

Project Scope Management Summarized



1) Planning Scope

Prerequisites to review for planning scope management:

PMP, Project Charter, Enterprise environmental factors, organizational process assets

2 core OUTPUTS:

- Scope Management Plan
- Requirements Management Plan

Scope Management plan is a subsidiary part of the project management plan

Scope Management Plan Contents

Questions answered while/after preparing scope management plan :

- How to prepare a detailed project scope statement ?
- How to create a WBS ?
- How to maintain and approve the WBS ?
- How to obtain formal acceptance of the completed project deliverables?
- How to control requests for changes to the project scope

Requirements Management Plan (formal)

PMBOK Guide, Fifth Edition, describes requirements as “conditions or capabilities that must be met by the project or present in the product, service, or result to satisfy an agreement or other formally imposed specification”

It is further explained that requirements “include the quantified and documented **needs** and expectations of the sponsor, customer, and other stakeholders. These requirements need to be elicited, analyzed, and recorded in enough detail to be included in the scope baseline and be measured once project execution begins.”

For some IT Projects, it is helpful to divide requirements development into categories as:

Elicitation, analysis, specification and validation

It is important to use an iterative approach to defining requirement as they are often unclear in the early stages of a project


Interviews
Observation
Prototyping
Document Analysis
Workshops
Elicitation

Requirements Management Plan simplified

The requirements management plan documents how project requirements will be analyzed, documented and managed. It can include the following information:

- How to plan, track and report requirements activities
- How to perform configuration management activities
- How to prioritize requirements
- How to use product metrics
- How to trace and capture attributes of requirements

Case Study: What went Right ?

CASE: Projected number of jobs for business analysts expected to increase 19 percent by 2022

Only 49% of survey respondents had resources in place to do requirements management properly

53% failed to use a formal process to validate requirements

There are several certification available for business analysis to help meet this need.

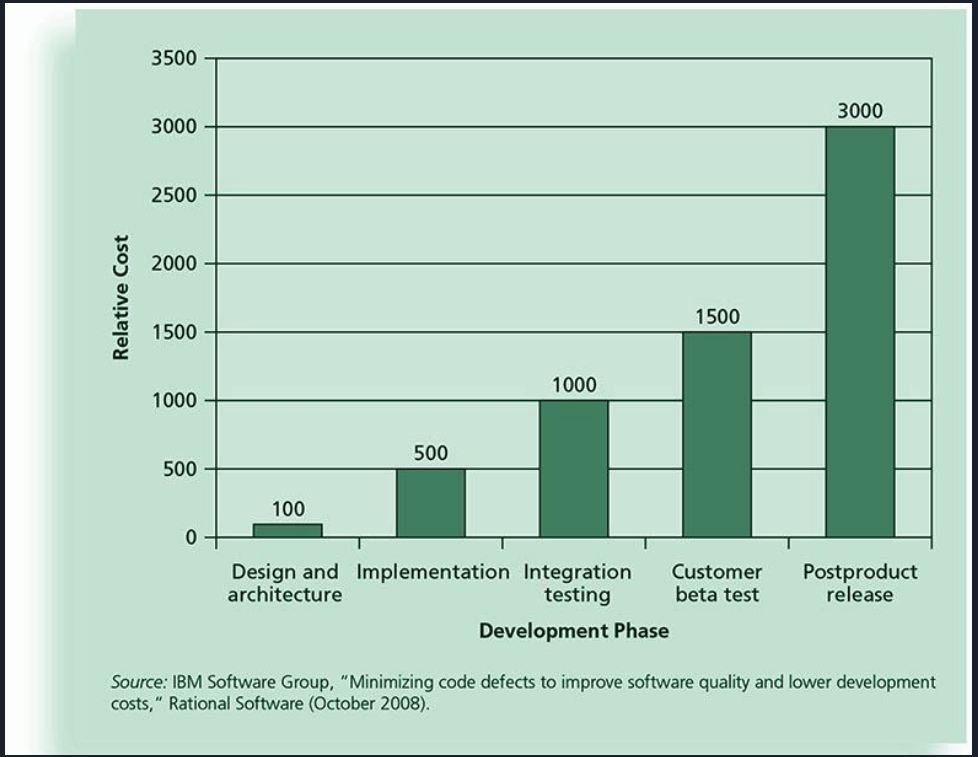
Collecting requirements is often most difficult step during scope management

Messing this step leads to rework, which not only consumes time but up to half of project costs specially for software development projects. Sample chart in next slide..

Relative cost to correct a software requirement defect

As the chart illustrates, it costs far more to correct a software defect in later development phases than to fix it in the requirements phase.

A lack of proper process for collecting and documenting project requirements is often the cause of such catastrophe !



Source: IBM Software Group, "Minimizing code defects to improve software quality and lower development costs," Rational Software (October 2008).

A notable culture in terms of Best Practice for ensuring quality

A book called “How Google Tests Software” describes how GOOGLE changed their culture as quality rests on the shoulders of those writing the code; they don’t specifically rely on testers to ensure quality.

GOOGLE is also said to not believe in fads of buzzwords, including even Agile.

To choose your own path to proper project management, your organization needs to first earn the privilege or confidence to think outside the box.

2) Methods for collecting requirements

- Requirements Gathering Process: As-is > To be > Implementation
- Interviewing
- Focus Groups and Facilitated Workshops
- Using Group Creativity and Decision making techniques
- Questionnaires and surveys
- Observation
- Prototyping and Document Analysis
- Context Diagrams
- Benchmarking


WIKI
What Is Benchmarking?
Benchmarking is a process where you measure your company's success against competitors to discover how to improve your performance.

Case Study - 2011 Survey Statistics on Requirements for Software Projects

88% of software projects involved enhancing existing products instead of creating new ones

86% of respondents said customer satisfaction was the most important metric for measuring the success of development projects

82% said feedback from customers and partners was main source of product ideas and requirements

73% said the most important challenge for their teams was gaining a clear understanding of what customers wanted, followed by documenting and managing requirements.

- *John Simpson 2011 Survey: The State of Requirements Management*

Case Study - 2011 Survey Statistics on Requirements for Software Projects .. contd

75% respondents respondents were managing projects with at least 100 requirements; 20% were managing projects with over 1,000 requirements.

70% of respondents spent at least 10% of their time managing changes to requirements; 30% spent more than 25% of their time on such changes.

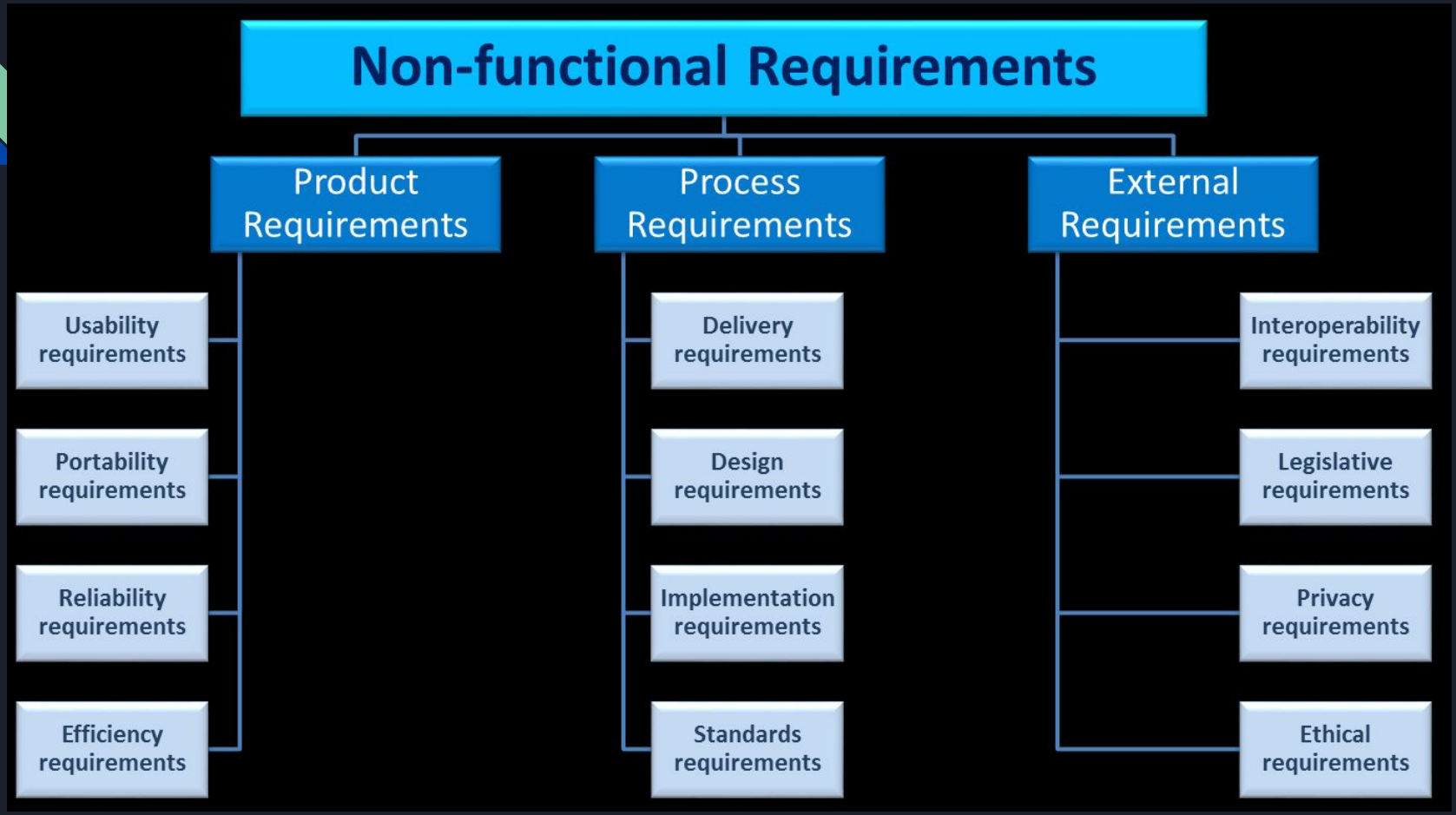
The majority of software development teams used a hybrid methodology, 26% used waterfall or modified waterfall techniques and 19% used agile techniques

83% of software development teams still use Microsoft Office applications such as Word and Excel as their main tools to communicate requirements

- *John Simpson 2011 Survey: The State of Requirements Management*

Requirements Categories

- FUNCTIONAL requirements
- Non-FUNCTIONAL requirements
  - SERVICE requirements
  - PERFORMANCE requirements
  - QUALITY requirements and
  - TRAINING requirements


Non-functional Requirements
Product Requirements
Process Requirements
External Requirements
Usability requirements
Portability requirements
Reliability requirements
Efficiency requirements
Delivery requirements
Design requirements
Implementation requirements
Standards requirements
Interoperability requirements
Legislative requirements
Privacy requirements
Ethical requirements

Requirements Traceability Matrix

A **RTM(Requirements Traceability Matrix)** is a table that lists requirements, various attributes of each requirement, and the status of the requirements to ensure that all requirements are addressed.

Sample entry in an RTM :

Requirement No.	Name	Category	Source	Status
R32	Laptop memory	Hardware	Project charter and corporate laptop specifications	Complete. Laptops ordered meet requirement by having 4GB of memory.

3) Defining Scope

Proper scope definition helps improve the accuracy of time, cost and resource estimates, it defines a baseline for performance measurement and project control and it aids in communicating clear work responsibilities.

Main tools and techniques used in defining scope include expert judgement, product analysis, alternatives generation and facilitated workshops.

Key inputs: project charter, scope management plan, requirements documentation, organizational assets such as policies and procedures as well as project files and lessons learned from similar projects in past.

Main outputs of scope definition are:

Project Scope Statement and

Project Documents Updates

Role of Project Charter in Scope Management

As discussed in last class, charter describes

- high level triple constraint goals for the project objectives and success criteria,
- a general approach to accomplishing the project's goals and
- the main roles and responsibilities of important project stakeholders.

Project Title: Information Technology (IT) Upgrade Project

Project Start Date: March 4 **Projected Finish Date:** December 4

Key Schedule Milestones:

- Inventory update completed April 15
- Hardware and software acquired August 1
- Installation completed October 1
- Testing completed November 15

Budget Information: Budgeted $1,000,000 for hardware and software costs and $500,000 for labor costs.

Project Manager: Kim Nguyen, (310) 555–2784, knguyen@course.com

Project Objectives: Upgrade hardware and software for all employees (approximately 2,000) within nine months based on new corporate standards. See attached sheet describing the new standards. Upgrades may affect servers as well as associated network hardware and software.

Main Project Success Criteria: The hardware, software, and network upgrades must meet all written specifications, be thoroughly tested, and be completed in nine months. Employee work disruptions will be minimal.

Approach:

- Update the IT inventory database to determine upgrade needs
- Develop detailed cost estimate for project and report to CIO
- Issue a request for quote to obtain hardware and software
- Use internal staff as much as possible for planning, analysis, and installation

Project Scope Statement

It should include at least

- a product scope description,
- product user acceptance criteria and
- detailed information on all project deliverables.

It is also helpful to document other scope-related information, such as the project boundaries, constraints, and assumptions. The project scope statement should also reference supporting documents such as product specifications.

With the passage of time, the scope of the project should become more clear and specific. The precise the better !!

Project Charter:

Upgrades may affect servers . . . (listed under Project Objectives)

Project Scope Statement, Version 1:

Servers: If additional servers are required to support this project, they must be compatible with existing servers. If it is more economical to enhance existing servers, a detailed description of enhancements must be submitted to the CIO for approval. See current server specifications provided in Attachment 6. The CEO must approve a detailed plan describing the servers and their location at least two weeks before installation.

Project Scope Statement, Version 2:

Servers: This project will require purchasing ten new servers to support Web, network, database, application, and printing functions. Virtualization will be used to maximize efficiency. Detailed descriptions of the servers are provided in a product brochure in Appendix 8 along with a plan describing where they will be located.

Data from the market

Inaccurate requirements gathering continues to be one of the main causes of project failure

For every dollar spent on projects and programs, 5.1% is wasted due to poor requirements management

Organizations need to develop

people, processes and culture

to improve requirements management.

4) Creating the WBS

WBS (Work Breakdown Structure) is a deliverable-oriented grouping of the work involved in a project that defines the total scope of the project.

It is a foundation document that provides the basis for planning and managing project schedules, costs, resources and changes.

USEFUL TERMINOLOGIES:

Decomposition is subdividing project deliverables into smaller pieces

Work package is a task at the lowest level of the WBS

Scope Baseline includes the approved project scope statement and its associated WBS and WBS Dictionary

WBS Sample from JWD's Intranet Case Study

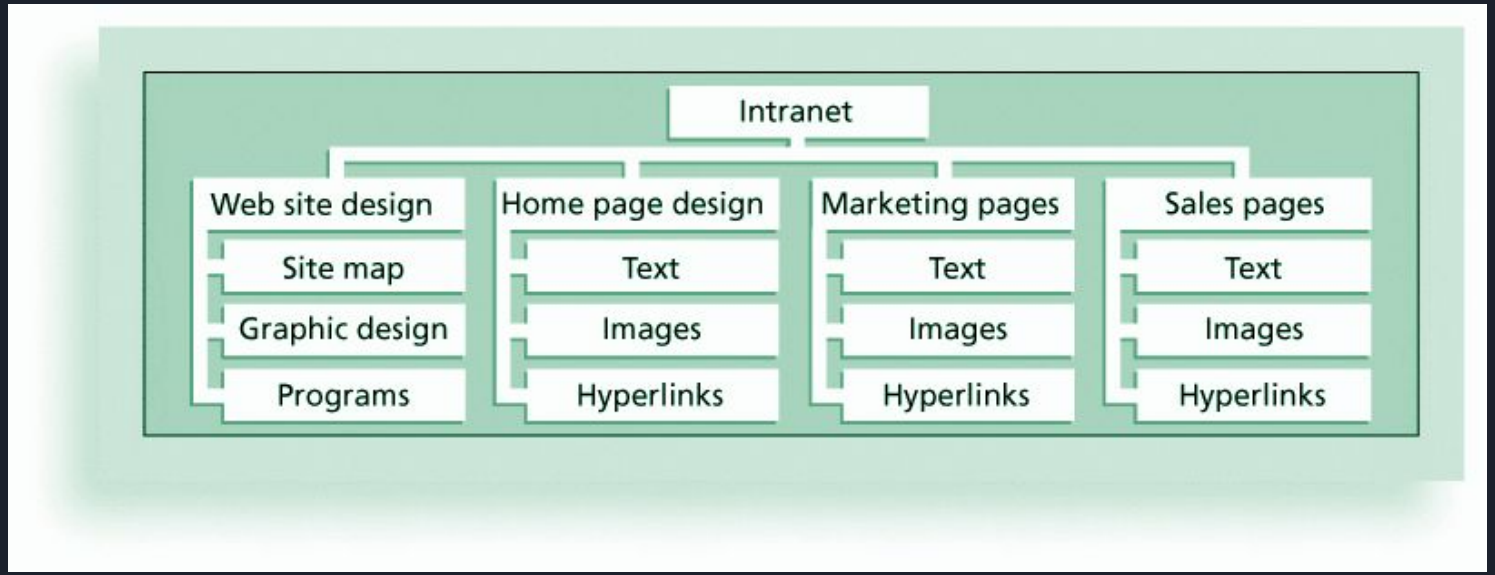
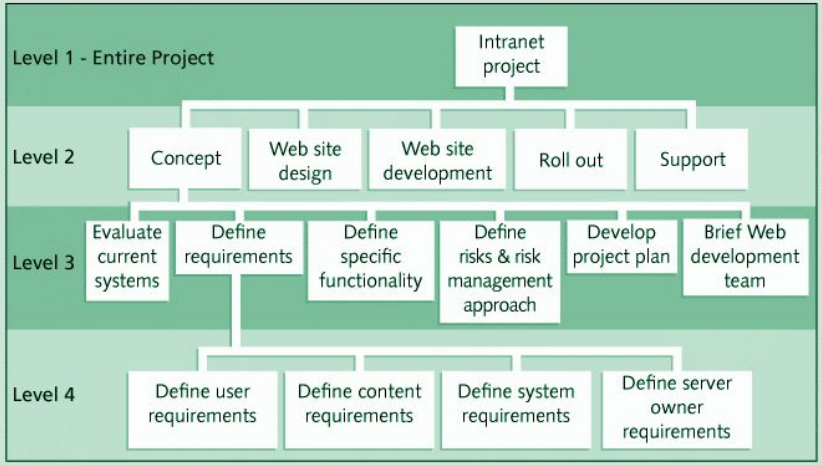


Chart form →

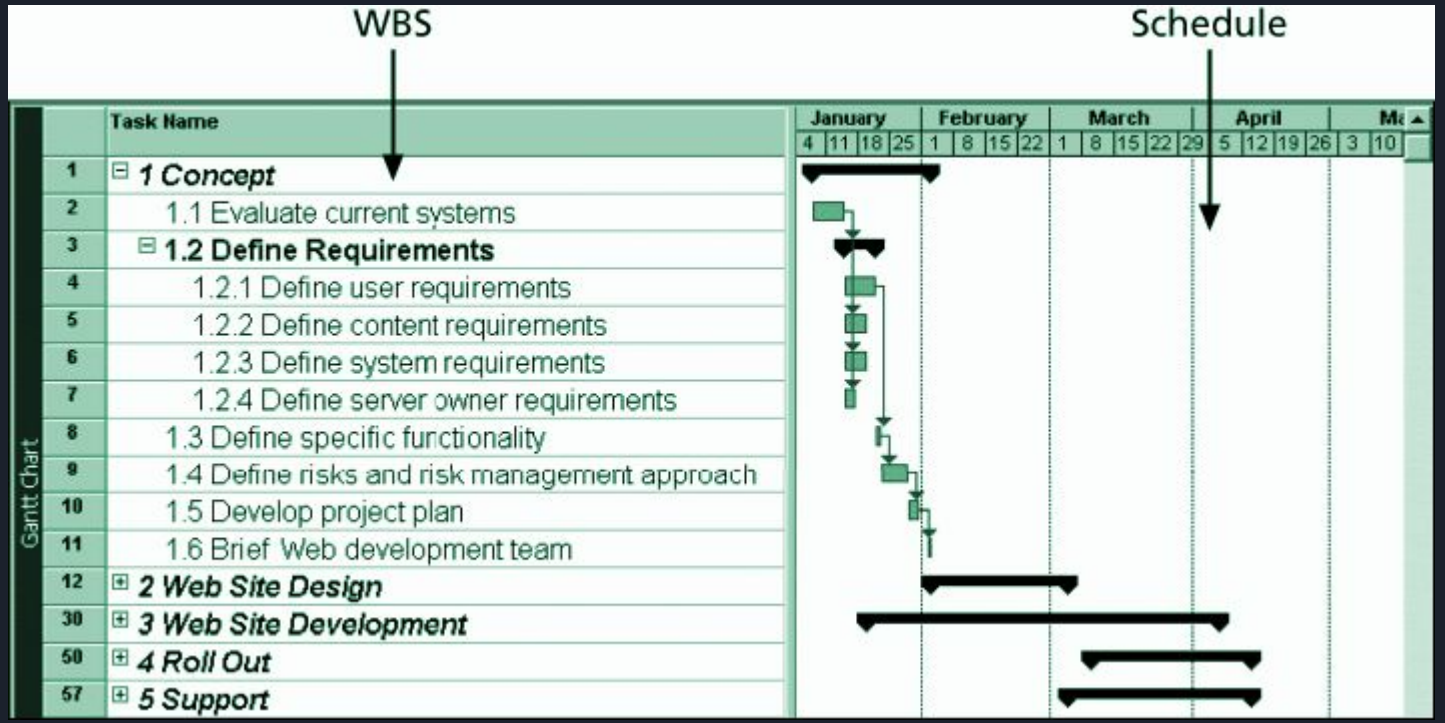


Tabular form with PMI numbering

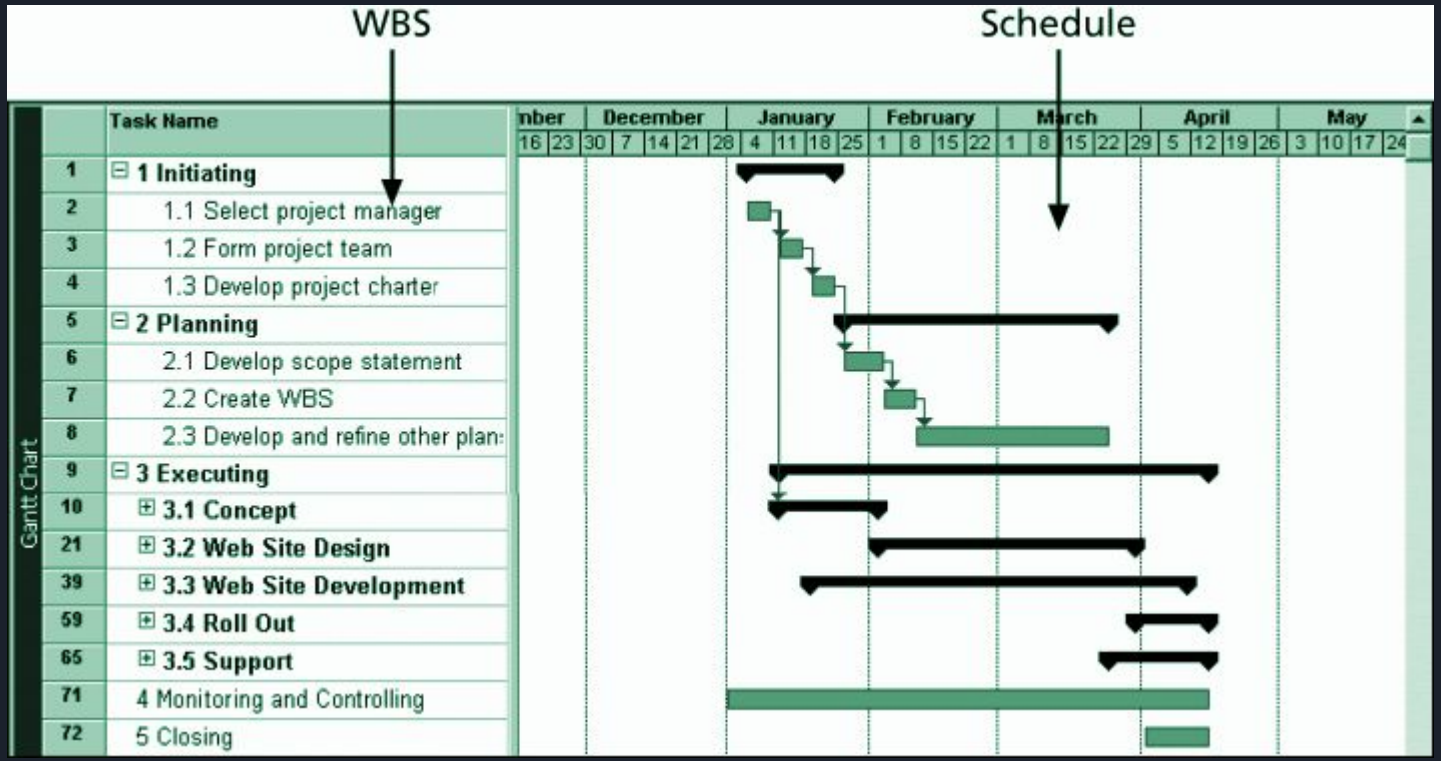
1.1 Concept
- 1.1.1 Evaluate current systems
- 1.1.2 Define requirements
  - 1.1.2.1 Define user requirements
  - 1.1.2.2 Define content requirements
  - 1.1.2.3 Define system requirements
  - 1.1.2.4 Define server owner requirements
- 1.1.3 Define specific functionality
- 1.1.4 Define risks and risk management approach
- 1.1.5 Develop project plan
- 1.1.6 Brief Web development team

1.2 Web site design
1.3 Web site development
1.4 Roll out
1.5 Support

WBS and Gantt Chart often go side by side



It’s a good idea to organize Gantt Chart by PM Process Groups



Approaches to Developing WBS(s)

Using guidelines: Some organizations provide specific guidelines for preparing WBS

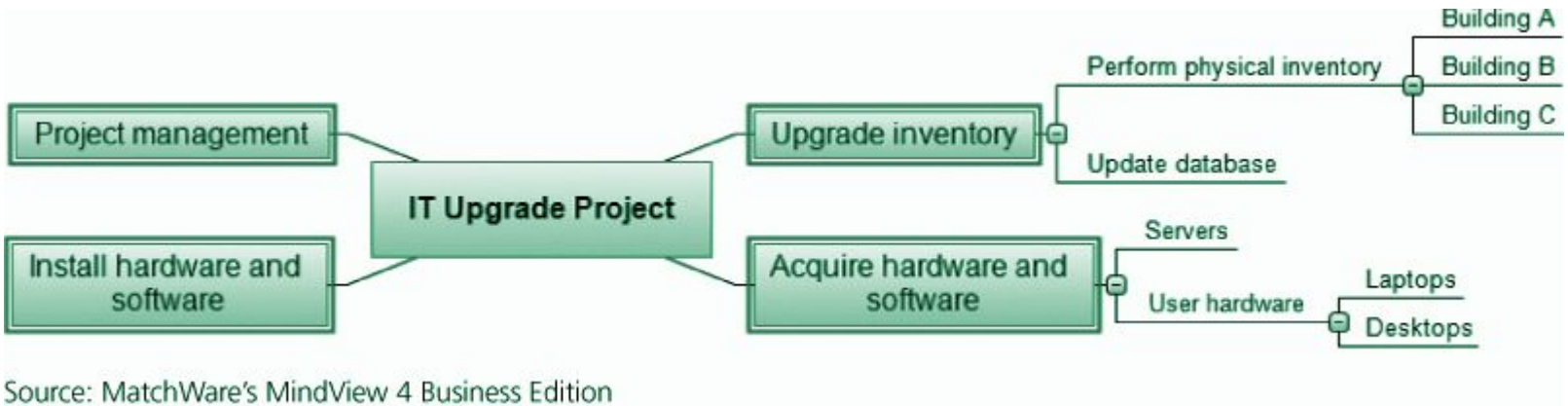
The analogy approach: review WBS(s) of similar projects and tailor to your project

The top-down approach: Start with largest items of the project and break them down

The bottom-up approach: Start with specific tasks and roll them up

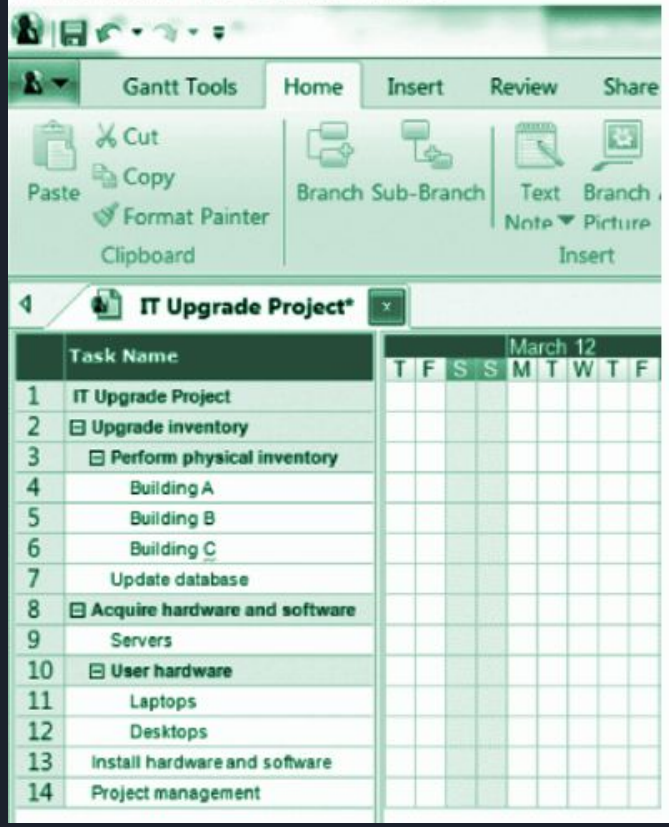
Mind Mapping approach: This is a technique that uses branches radiating out from a core idea to structure thoughts and ideas

Case Study Sample - Mind mapping approach

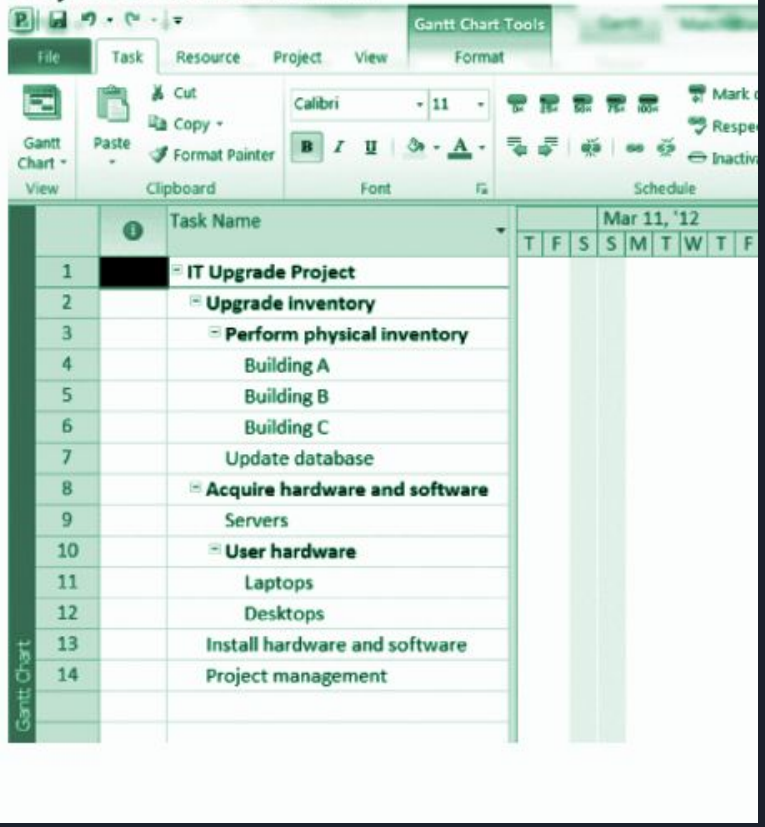


Source: MatchWare's MindView 4 Business Edition

MindView 4.0 Gantt Chart



Project 2010 Gantt Chart



WBS Dictionary and Scope Baseline

Many WBS tasks are vague and must be explained more so people know what to do and can estimate how long it will take and what it will cost to do the work. A WBS Dictionary is a document that describes detailed information about each WBS item

WBS Dictionary Entry March 20
Project Title: Information Technology (IT) Upgrade Project
WBS Item Number: 2.2
WBS Item Name: Update Database
Description: The IT department maintains an online database of hardware and software on the corporate intranet. However, we need to make sure that we know exactly what hardware and software employees are currently using and if they have any unique needs before we decide what to order for the upgrade. This task will involve reviewing information from the current database, producing reports that list each department's employees and location, and updating the data after performing the physical inventory and receiving inputs from department managers. Our project sponsor will send a notice to all department managers to communicate the importance of this project and this particular task. In addition to general hardware and software upgrades, the project sponsors will ask the department managers to provide information for any unique requirements they might have that could affect the upgrades. This task also includes updating the inventory data for network hardware and software. After updating the inventory database, we will send an e-mail to each department manager to verify the information and make changes online as needed. Department managers will be responsible for ensuring that their people are available and cooperative during the physical inventory. Completing this task is dependent on WBS Item Number 2.1, Perform Physical Inventory, and must precede WBS Item Number 3.0, Acquire Hardware and Software.

Guidelines for creating WBS and WBS Dictionary

- A unit of work should only appear at only one place in the WBS
- The work content of a WBS item is the sum of the WBS items below it
- A WBS item is the responsibility of only one individual, even though many people may be working on it.
- The WBS must be consistent with the way in which work is actually going to be performed; it should serve the project team first, and other purposes only if practical
- Team Members should be involved in developing the WBS to ensure consistency
- Each WBS item must be documented in a WBS dictionary for accurate understanding of scope
- WBS must be a flexible tool to accommodate inevitable changes while maintaining control a/c to scope statement

CASE STUDY: What went wrong ?

Project scope that is too broad and grandiose can cause severe problems

Scope creep and over emphasis on technology for technology's sake resulted in the bankruptcy of a large pharmaceutical firm FoxMeyer Drug.

In 2001, McDonald’s fast food chain initiated a project to create an intranet for connecting all its restaurants and provide real time operational information. After having spent $170 million on consultants and initial implementation planning , they realized the scope was too much to handle and therefore terminated it.

It can therefore, be a challenge to validate scope for any given project.

5) Validating Scope

As much difficult it may be to create a good scope statement and WBS for a project, it is even more difficult to verify project scope and minimize scope changes

SCOPE VALIDATION involves formal acceptance of the completed project deliverables.

Acceptance is often achieved by a customer inspection and then sign-off on key deliverables.

Main OUTPUTS of scope validation:

Accepted deliverables, Change Requests, Work performance information, and project documents updates.

6) Controlling Scope

Scope Control involves controlling changes to the project scope

Goals of Scope Control:

- Influence the factors that cause scope changes
- Assure changes are processed according to procedures developed as part of integrated change control and
- Manage changes as they occur

The difference between planned and actual performance is called Variance.

OUTPUTS of scope control:

Work performance information, Change Request, PMP updates, project document updates and organizational assets updates.

Guidelines for improving user input

- Develop a good project selection process and insist sponsors are from user organization
- Have users on project team in important roles
- Have regular meetings with defined agendas and have users sign off on key deliverables
- Deliver something to users and sponsors on a regular basis
- Don’t make promises you can’t keep. Always better to Outperform requested deliverable than to underperform a feature or deliverable.
- Co-locate users with developers

Guidelines for reducing changing requirements

- Develop and follow requirements management process
- Use techniques like prototyping, use case modeling and JAD (Joint Application Development) to get more user involvement
- Put requirements in writing and keep them up to date
- Create a requirements management database for controlling and documenting requirements
- Perform adequate testing and review changes from systems perspective
- Emphasize completion dates to help focus on what's important
- Allocate resources specifically for handling change requests. (Refer to case study of NWA for ResNet.)
- Use assistive softwares (Word, Excel, Gantt Charts, Email, Charts/Graphs,etc)

References

https://asana.com/resources/project-integration-management

https://www.smartsheet.com/project-integration-management

https://www.ayoa.com/ourblog/what-is-swot-analysis-and-are-you-doing-it-right/

https://www.efinancialmodels.com/2019/06/10/how-simple-payback-analysis-can-improve-the-quality-of-your-financial-decision-making/

PS: If you haven't already started working on research assignment, it might be too late !

THANK YOU

happy weekends