

CHAPTER 4: PROJECT SCOPE MANAGEMENT

Information Technology Project Management, Sixth Edition



LEARNING OBJECTIVES

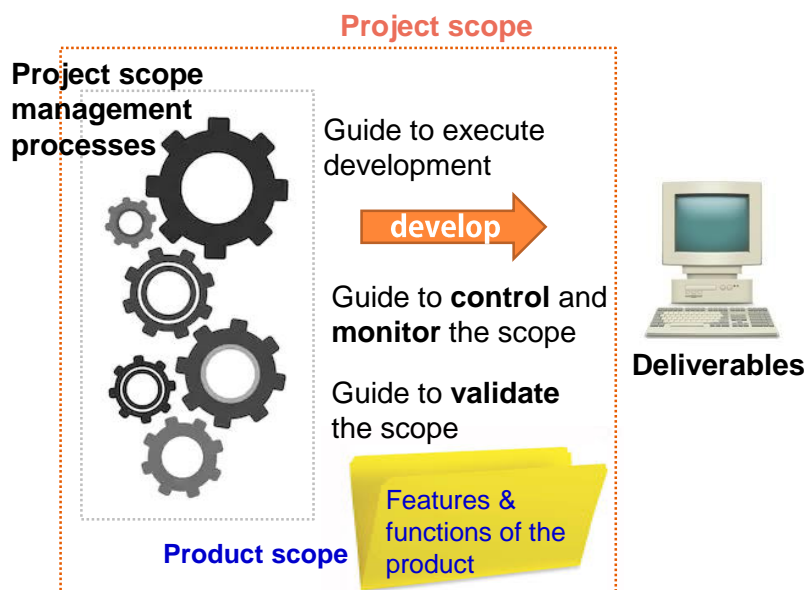
- Understand the importance of good project scope management
- Discuss methods for collecting and documenting requirements in order to meet stakeholder needs and expectations
- Explain the scope definition process and describe the contents of a project scope statement
- Discuss the process for creating a work breakdown structure using the analogy, top-down, bottom-up, and mind-mapping approaches
- Explain the importance of verifying scope and how it relates to defining and controlling scope
- Understand the importance of controlling scope and approaches for preventing scope-related problems on information technology projects

WHAT IS PROJECT SCOPE MANAGEMENT?

- **Project Scope** refers to *all* the work involved in creating the products of the project
- A **deliverable** is a product produced as part of a 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

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WHAT IS PROJECT SCOPE MANAGEMENT?



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PROJECT SCOPE MANAGEMENT PROCESSES

○ 5.1 Plan Scope Management

- Creating a **scope management plan** that documents how the project scope will be defined, validated and controlled.

○ 5.2 Collect requirements

- Determining and documenting the features and functions of the products to be produced to meet the project objectives

○ 5.3 Define scope

- Reviewing the **project charter**, requirements documents, and **organizational process assets** to create a **scope statement**

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PROJECT SCOPE MANAGEMENT PROCESSES (CONT.)

○ 5.4 Create the WBS

- Subdividing the major project deliverables into smaller, more manageable components

○ 5.5 Validate scope

- Formalizing acceptance of the project deliverables

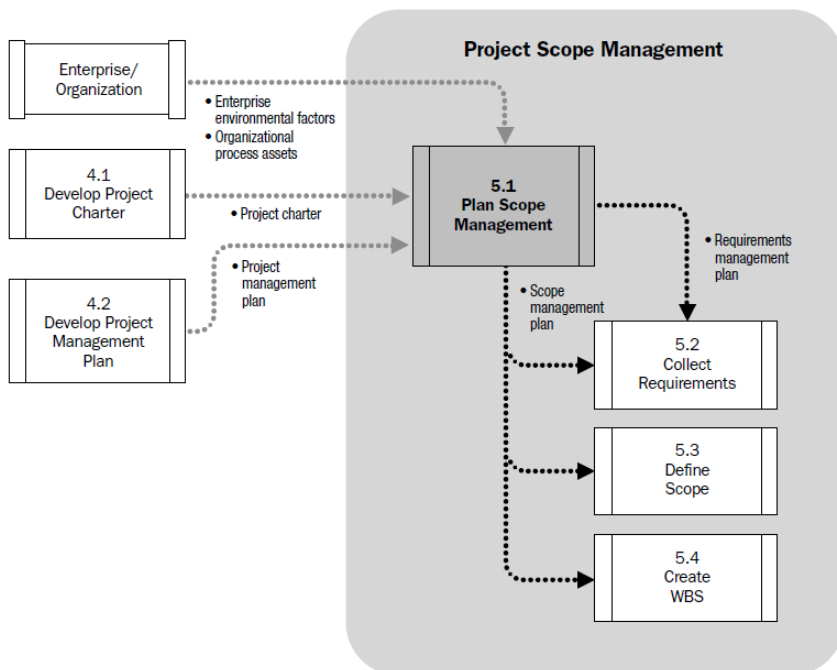
○ 5.6 Control scope

- Controlling changes to **project scope baseline**

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5.1 Plan Scope Management

- The process of creating a **scope management plan** that documents how the project scope will be defined, validated and controlled.
- It provides guidance and direction on how scope will be managed throughout the project.
- The output includes:
 - **Scope management plan**
 - Describes how the scope will be defined, developed, monitored, controlled, and validated.
 - **Requirement management plan**
 - Describes how project and product requirements will be collected, analyzed, documented, and managed.



SCOPE VS REQUIREMENTS

○ Scope

- Works to be done in order to fulfill the requirements
- From the developers' point of view
- Produced in “**5.3 Define Scope**” process

○ Requirements

- Indicates what features and functions users want from the product (*plus the project requirements*)
- From the other stakeholders' (*user, sponsor, etc.*) point of view
- Collected in “**5.2 Collect Requirements**” process

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REQUIREMENTS (USER)



I am a driver and
I want a vehicle that is:

- Safe
- Fast
- Looking nice
- ...

affecting

fulfilling

SCOPE



SCOPE VS REQUIREMENT (EXAMPLE)

Academic management system

Scope

The description of the modules that aim at fulfilling the requirements: course, class, programme, payment of tuition fee, grade, syllabus, student portal, teacher portal, attendance, student study, scholarship, ...

Requirements (user)

- Teachers can view students' grades.
- Admin staff can maintain the curriculum of a program.
- Students can use credit card to pay tuition fees.
- Students can add/drop a class with the approval of programme director.
- Admin staff can merge the grades of the old system with the new system.
- The data of the previous system can be assessed by the admin staff.
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SCOPE MANAGEMENT PLAN

The **scope management plan** is a component of the **project management plan** that describes how the scope will be defined, developed, monitored, controlled, and validated.

It includes:

- Process for **preparing a project scope statement**;
- Process that enables the **creation of the WBS (Work Breakdown Structure)** from the detailed **project scope statement**;
- Process that **establishes how the scope baseline will be approved and maintained**; and
- Process **that specifies how formal acceptance of the completed project deliverables will be obtained**

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SAMPLE SCOPE MANAGEMENT PLAN

Project Name: Information Technology (IT) Upgrade Project

Introduction

The purpose of this document is to provide suggestions and guidance for preparing several important scope management documents related to this project.

Preparing the Scope Statement

The preliminary scope statement will provide the basis for preparing more detailed scope statements. The scope statement needs to be reviewed with key stakeholders, especially the project sponsor, potential suppliers, and users of the project deliverables. Follow corporate templates when available, and be sure to have expert input in defining the scope. Since the scope statement becomes more detailed and therefore longer as the project progresses, limit the length and complexity of the scope statement by placing details in attachments, such as product descriptions, specifications, corporate standards, etc. Each version of the scope statement must be clearly labeled and dated to ensure that everyone uses the most recent version. Changes and additions will be highlighted and communicated to the appropriate personnel. The scope statement will be available on the password-protected project Web site.

Creating the Work Breakdown Structure (WBS)

The project team will work together to create the WBS. The project sponsor and steering committee will review the WBS to ensure that all of the work required to complete the project is included in the WBS. The project team will review WBSs of similar projects, review the company's corporate guidelines for creating WBSs, and focus on determining all of the deliverables required for the project. The project team will determine the tasks required to complete each deliverable, which will be reviewed and agreed to by the project manager, sponsor, and steering committee. These tasks should include product- and process-related tasks. A general guideline to follow for determining the level of detail is that the lowest level of the WBS should normally take no longer than two weeks to complete. The WBS can be revised as needed, and the sponsor and steering committee must approve these revisions.

Verifying Completion of Project Deliverables

The project manager will work with the sponsor and steering committee to develop a process for verifying successful completion of project deliverables. In general, the project sponsor will be responsible for verifying the completion of major deliverables. The contract administrator will also be involved in verifying successful completion of deliverables received from outside sources. Contracts will include clauses describing the scope verification process.

Managing Requests for Changes to Project Scope

All requests for changes to project scope that may have a significant effect on meetings and project requirements must follow the formal change control procedures specified in Attachment 1. A change request form will be completed and reviewed by the designated group. It is crucial to follow these procedures to prevent scope creep.

REQUIREMENTS MANAGEMENT PLAN

The **requirements management plan** is a component of the **project management plan** that describes how project and product requirements will be collected, analyzed, documented, and managed.

- It includes, but not limited to:
 - How requirements activities will be planned, tracked, and reported;
 - How to perform change management activities (i.e. *how changes to the product will be initiated; how impacts will be analyzed; how the authorization levels will be required to approve these changes*)
 - How to prioritize requirements
 - How to use product metrics
 - How to trace attributes of requirements

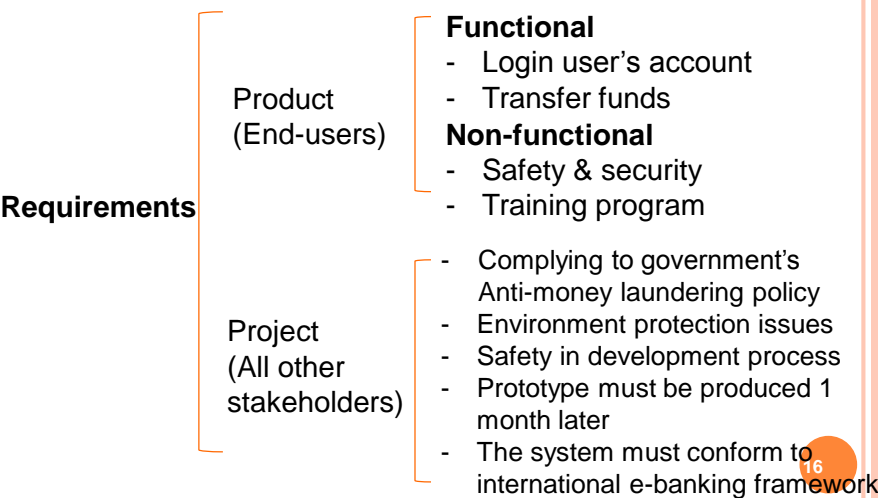
5.2 COLLECT REQUIREMENTS

A **requirement** is “a condition or capability that must be met or possessed by a system, product, service, result, or component to satisfy a contract, standard, specification, or other formal document” (PMBOK® Guide, v5)

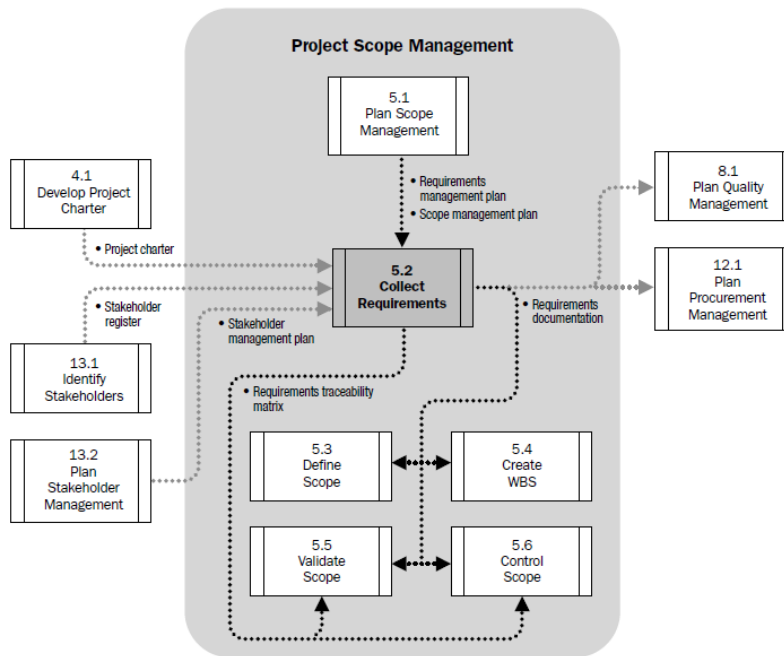
- For some IT projects, it is helpful to divide requirements development into categories called elicitation, analysis, specification, and validation
- It is important to use an *iterative approach* to defining requirements since they are often unclear early in a project

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EXAMPLES OF REQUIREMENTS



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METHODS FOR COLLECTING REQUIREMENTS (TOOLS & TECHNIQUES)

- Interviewing
- Focus groups and facilitated workshops
- Using group creativity and decision-making techniques
- Questionnaires and surveys
- Observation
- Prototyping

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DOCUMENTING REQUIREMENTS

- **Requirements documents** describe how individual requirements meet the business need for the project.
- They are often broken down into different categories such as *functional*, *non-functional* (performance, user-interface, ease-of-use, security & safety, other qualities), *standards & compliance*, *training requirements* and also the requirements from other stakeholders.
- A **requirements traceability matrix (RTM)** is a table that lists requirements, various attributes of each requirement, and the status of the requirements to ensure that all requirements are addressed

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TABLE 5-1. SAMPLE REQUIREMENTS TRACEABILITY MATRIX

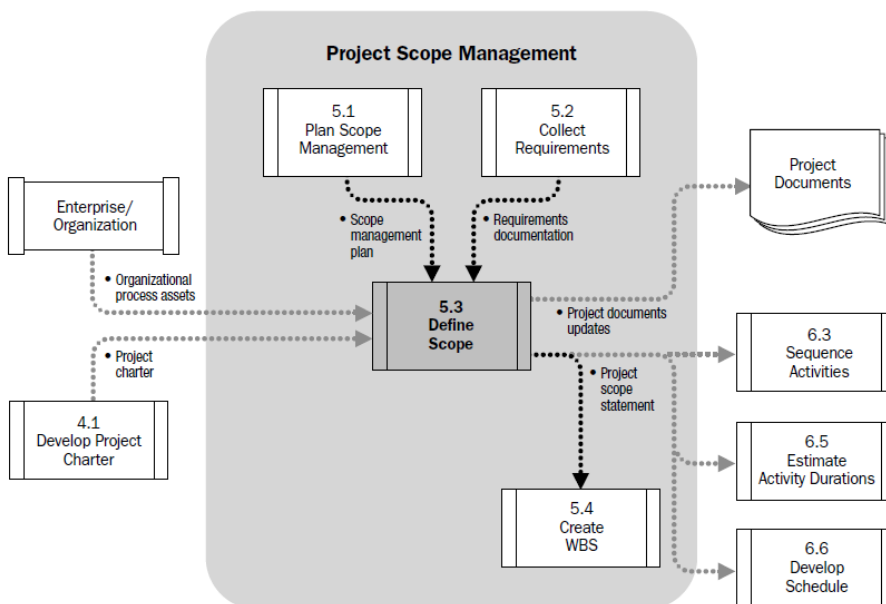
Requirement No.	Name	Category	Source	Status
R32	Laptop memory	Hardware	Project charter and corporate laptop specifications	Complete. Laptops ordered meet requirement by having 4GB of memory.

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5.3 DEFINE SCOPE

- Define Scope is a process developing a detailed descriptions of the project and product
- It describes the product, service and result boundaries by defining which of the requirements collected are included or excluded from the project scope.
- As time progresses, the scope of a project should become more clear and specific

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PROJECT SCOPE STATEMENT

- The output of the process is **Project Scope Statement** that provides:
 - A detailed description of the project
 - Deliverables
 - Constraints
 - Exclusions
 - Assumptions and;
 - Acceptance criteria.

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Project Scope Statement

- **Product scope description**
 - Characteristics of product, service and result
- **Product acceptance criteria**
 - A set of conditions that is required to be met before deliverables are accepted
- **Project deliverables**
- **Project exclusions**
 - Generally identifies what is excluded from the project.
- **Project constraints**
 - Limiting factors/conditions that affect the execution of a project or process. (i.e. resource or technology constraints, you have only 2 computers)
- **Project assumptions**
 - The factors in the planning process that are considered to be true. (i.e. users are very supportive to the project; the network bandwidth will be high enough for the video transmission.)

Constraints and Assumptions

Project constraints

- This must be finished before the commencement of the opening ceremony.
- The amount of funding is around 100,000.
- Use Paypal as the payment gateway.
- We do not have the domain knowledge and past experience for that project.
- We must use the Linux OS for the software.
- The software must support Java 1.12 or above.
- The core part of the system can only be revealed to a few appointed persons – biz secret.
- The weather in this region is rainy and windy quite often in this season.
- The network bandwidth is quite low for smooth video transmission.
- The delivery of the needed equipment will take at least 3 weeks.
- The effort relies on voluntary participation by multiple government agencies.

Project assumptions

- The weather in this region will be fine in this season.
- Customers will provide necessary business expertise as needed during development.
- The network bandwidth will be high enough for smooth video transmission.
- All imported data will be in XML format.
- Government regulation will not be changed in these 2 years.
- The 5G networks will be widespread in the region.
- Users will fully support the project.
- The sponsor really desires the project to finish with high quality and allows the high quality to justify the budget.
- **The sun will rise from the east tomorrow.**
(Does it matter to your project?)

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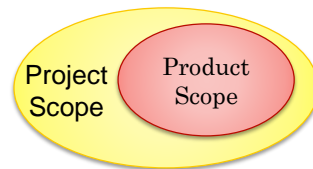
SCOPE DESCRIPTION (EXAMPLE)

This project is to develop and deliver an online shop. It focuses on facilitating the online shopping experience. Most of the functional requirements are about browsing and maintaining the product catalog, and placing and processing purchase orders. Besides, this project needs to handle payment processing and inventory management. However, the delivery process is assumed to be handled by the existing logistic processing system. Since the shop has been running for 5 years, the data conversion must be conducted to ensure the transition from the old to the new system. This software should be maintained in 3 year.

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PRODUCT SCOPE VS PROJECT SCOPE

- Product Scope
 - The features and functions that characterize a product, service or result
- Project Scope
 - The work performed to deliver a product, service or result with the specified features and functions.

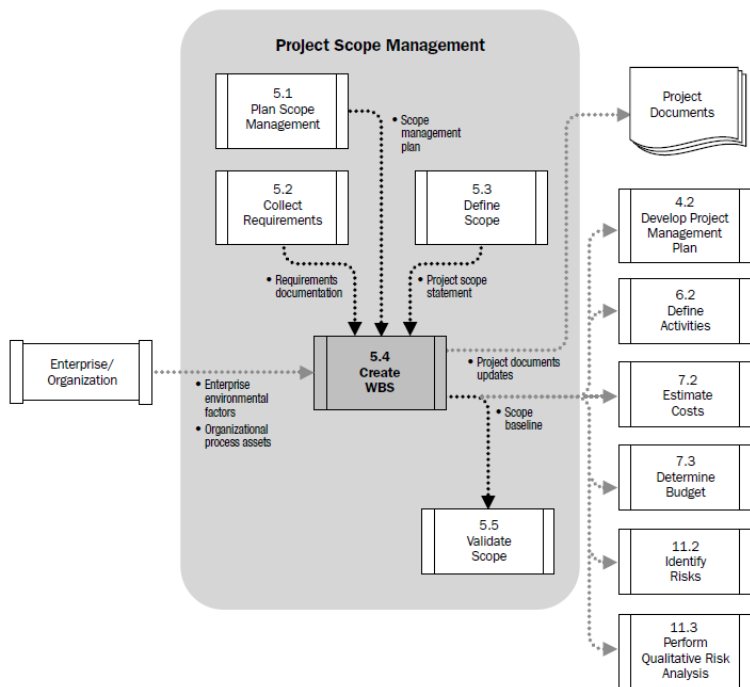


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5.4 CREATE WORK BREAKDOWN STRUCTURE (WBS)

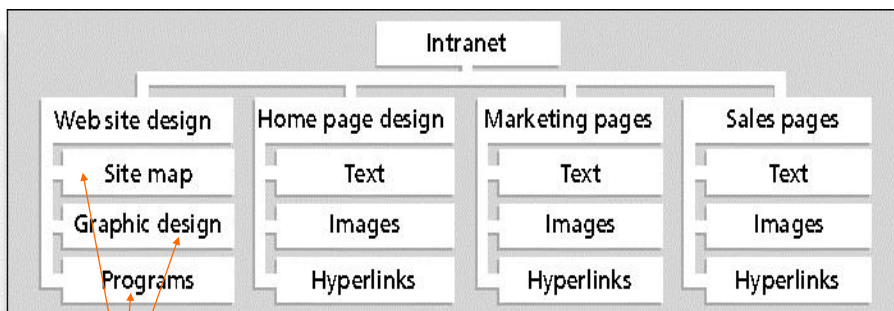
- A **WBS** is a deliverable-oriented grouping of the work involved in a project that defines the total scope of the project
- WBS is a foundation document that provides the basis for planning and managing project schedules, costs, resources, and changes
- **Decomposition** is subdividing project deliverables into smaller pieces
- A **work package** is a task at the lowest level of the WBS

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FIGURE 5-3. SAMPLE INTRANET WBS ORGANIZED BY PRODUCT



Work package

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FACILITATING COST AND TIME ESTIMATIONS

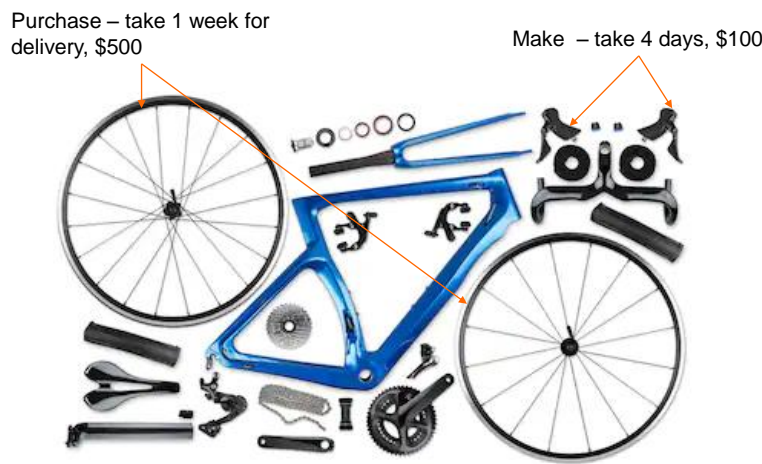


FIGURE 5-4. SAMPLE INTRANET WBS ORGANIZED BY PHASE

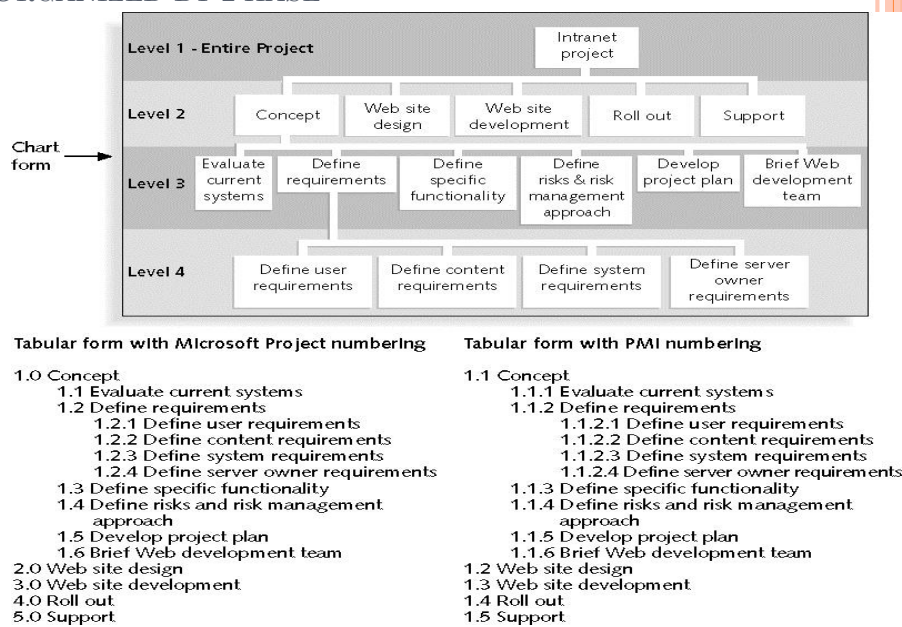
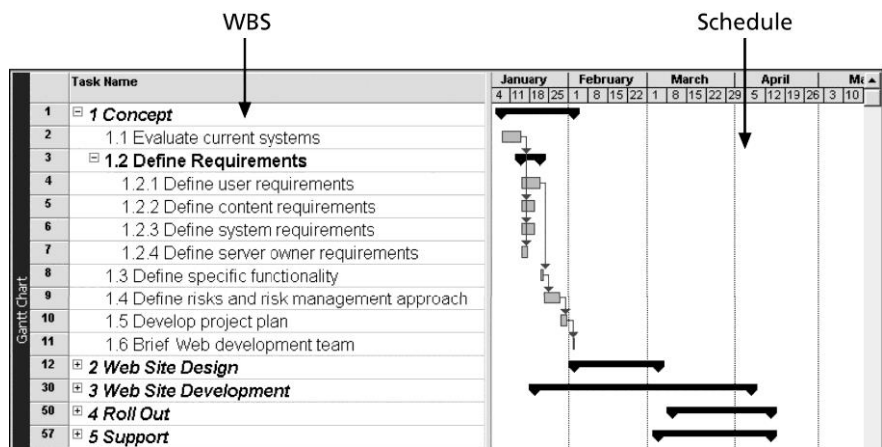
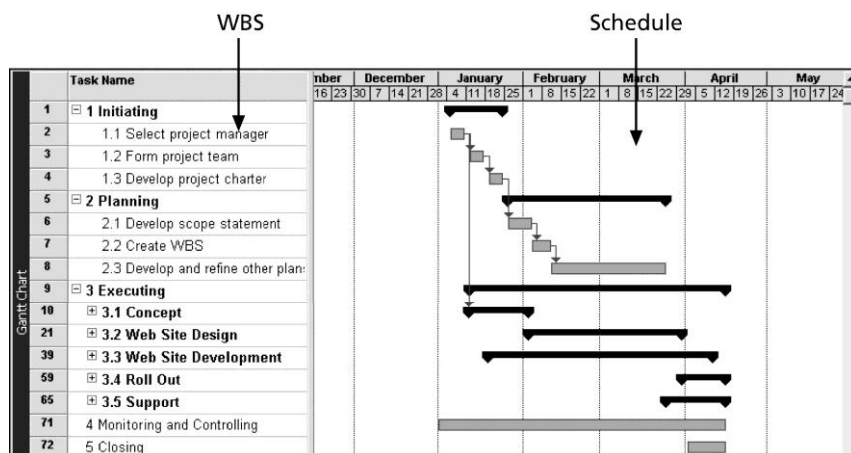


FIGURE 5-5. INTRANET WBS AND GANTT CHART IN MICROSOFT PROJECT



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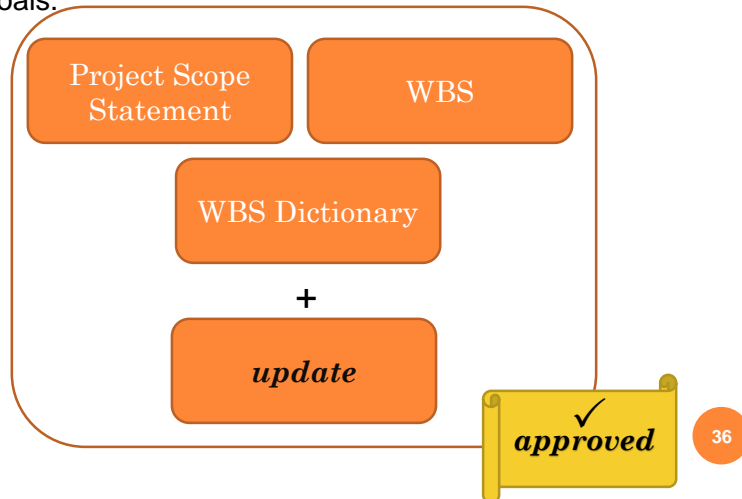
FIGURE 5-6. INTRANET GANTT CHART ORGANIZED BY PROJECT MANAGEMENT PROCESS GROUPS



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SCOPE BASELINE

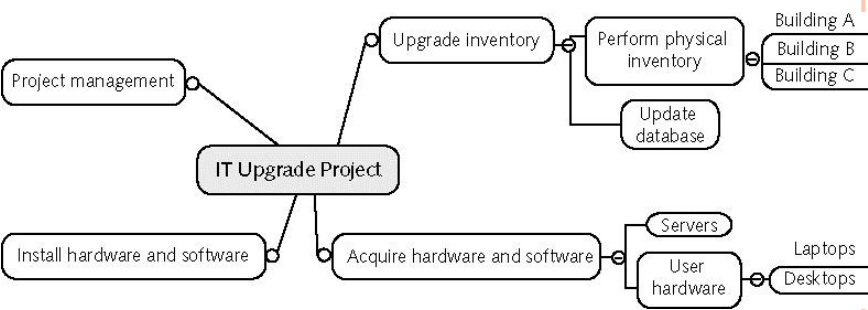
The approved **project scope statement** and its **WBS** and **WBS dictionary** form the **scope baseline** (update version), which is used to measure performance in meeting project scope goals.



APPROACHES TO DEVELOPING WBSs

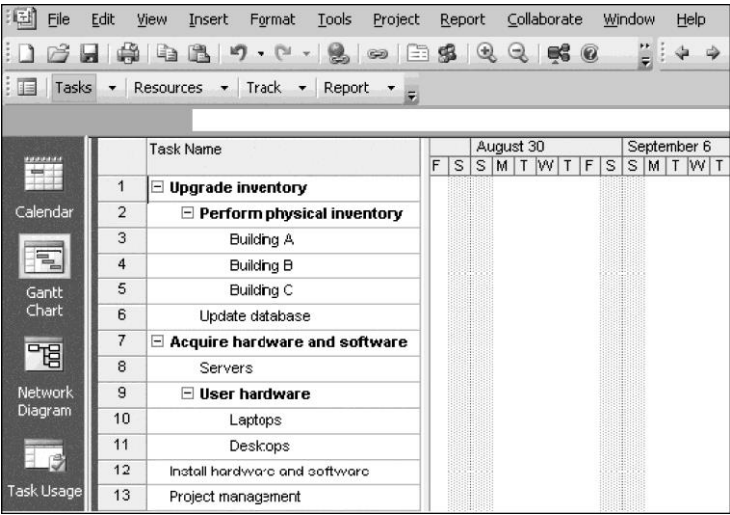
- The **analogy approach**: review WBSs of similar projects and tailor to your project
- The **top-down approach**: start with the largest items of the project and break them down
- The **bottom-up approach**: start with the specific tasks and roll them up
- Mind-mapping approach: **mind mapping** is a technique that uses branches radiating out from a core idea to structure thoughts and ideas

FIGURE 5-7. SAMPLE MIND-MAPPING
APPROACH FOR CREATING A WBS



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FIGURE 5-8. PROJECT 2007 FILE WITH WBS
GENERATED FROM A MIND MAP



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THE WBS DICTIONARY

- 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

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WBS DICTIONARY ATTRIBUTES

- Description of work
- Responsible person
- Assumptions and constraints
- Deliverables (*what the work produces?*)
- Quality requirements
- Acceptance criteria
- Resources required
- Cost estimates
- WBS dependencies
- etc.

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ADVICE FOR CREATING A WBS AND WBS DICTIONARY

- A unit of work should 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

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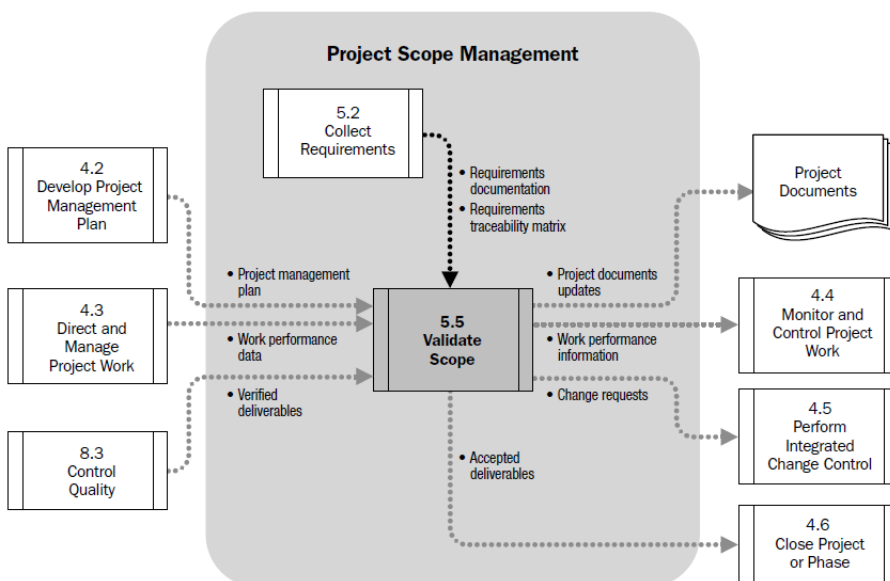
ADVICE FOR CREATING A WBS AND WBS DICTIONARY (CONT.)

- Project team members should be involved in developing the WBS to ensure consistency and buy-in
- Each WBS item must be documented in a WBS dictionary to ensure accurate understanding of the scope of work included and not included in that item
- The WBS must be a flexible tool to accommodate inevitable changes while properly maintaining control of the work content in the project according to the scope statement

5.5 VALIDATE SCOPE

- **Scope validation** involves formal acceptance of the completed project scope by the stakeholders
- Acceptance is often achieved by a customer inspection and then sign-off on key deliverables

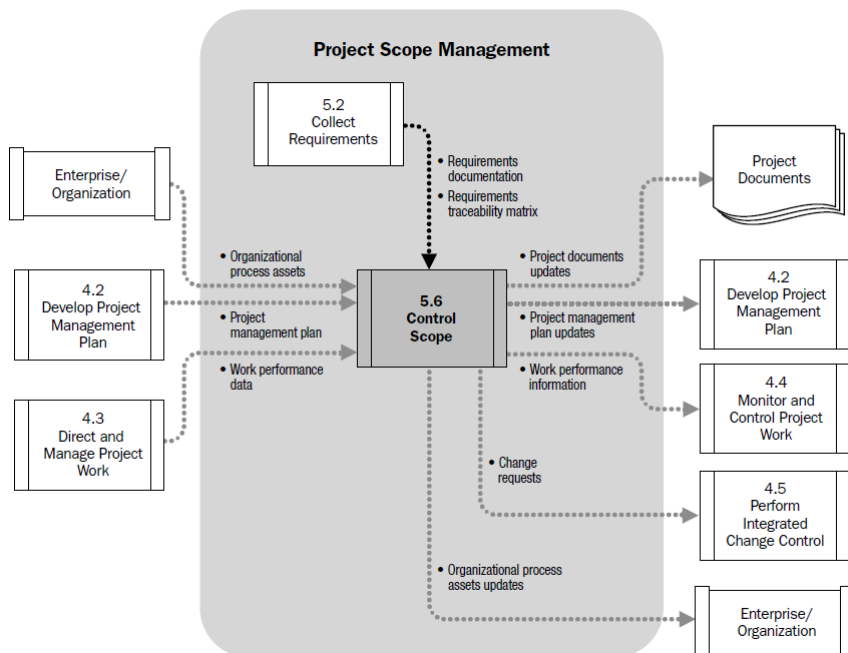
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5.6 CONTROL SCOPE

- Scope control involves controlling changes to the project scope
- Goals of scope control are to:
 - Identify the factors that cause scope changes
 - Assure changes are processed according to procedures developed as part of integrated change control
 - Manage changes when they occur (able to identify, control and think of a way to make change.)
 - Maintain the project scope baseline (avoid **Scope creep**)

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CHAPTER SUMMARY

- Project scope management includes the processes required to ensure that the project addresses all the work required, and only the work required, to complete the project successfully
- Main processes include:
 - Collect requirements
 - Define scope
 - Create WBS
 - Validate scope
 - Control scope