Project Management, Risk, and Reliability

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Learning Objectives

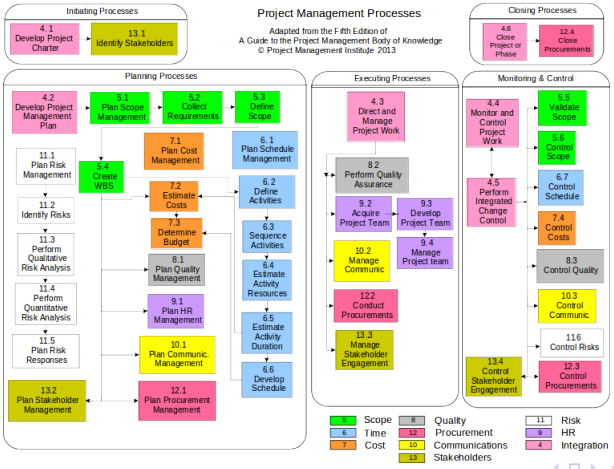
- Describe the importance of creating plans to guide project execution, and list several planning tasks and outputs for project integration, scope, time, and cost management.
- Discuss project integration management planning tasks, and explain the purpose and contents of a team contract and a project management plan.
- Explain the project scope management planning tasks, and create a scope management plan, scope statement, work breakdown structure (WBS), and WBS dictionary.

Second Process Group: Planning

- Planning is often the most difficult and under-appreciated process in project management
- Often, people do not want to take the time to plan well, but theory and practice show that good planning is crucial to good execution
- The main purpose of project planning is to guide project execution
- Project plans must be realistic and useful

Second Process Group: Planning

Figure: This lecture will focus on the **Planning** process group.



Restricting the Focus

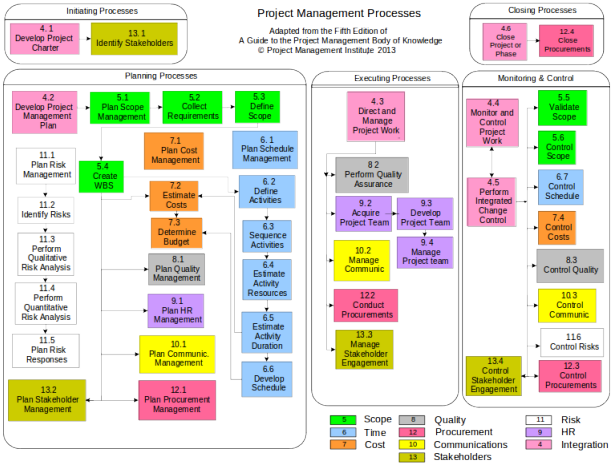
Unfortnately, we cannot focus on every task in the **Planning** process group in a single week. This week we will be looking at two knowledge areas: **Integration**, and **Scope**.

Knowledge area	Task	Outputs
Project integration management	Develop project management plan	Project management plan
Project scope management	Plan scope management	Scope management plan
	Collect requirements	Requirements management plan Requirements documentation
	Define scope	Requirements traceability matrix Project scope statement
	Create WBS	Project documents updates Scope baseline Project documents updates

Figure: Our attention will be restricted to 2 knowledge areas

Project Management Plan

Figure: The task of developing a project management plan is in the **Integration** knowledge area, and belongs to the **Planning** process group.



Project Management Plan

Definition: **Project Management Plan**

A **project management plan** is a document used to coordinate all project planning documents and to help guide a project's execution and control

- Plans created in the other knowledge areas are subsidiary parts of the overall project management plan and provide more detailed information about that knowledge area
- Project management plans facilitate communication among stakeholders and provide a **baseline** for progress measurement and project control

Definition: **Baseline**

A **baseline** is a starting point, a measurement, or an observation that is documented so that it can be used for future comparison

Attributes of Project Management Plans

- Project management plans should be dynamic, flexible, and receptive to change when the environment or project changes
- Just as projects are unique, so are project plans.
  - For a small project involving a few people over a couple of months, a project charter, team contract, scope statement, and Gantt chart might be the only project planning documents needed; there would not be a need for a separate project management plan
  - A large project involving 100 people over three years would benefit from having a detailed project management plan and separate plans for each knowledge area
- It is important to tailor all planning documentation to fit the needs of specific projects

Project Management Plans

Elements in Project Management Plans

1. Introduction/Overview
2. Project Organisation
3. Management
4. Technical processes
5. Work to be performed
6. Schedule information
7. Budget information
8. References to other documents

Sample Project Management Plan (Partial)

Management:

1. *Management Review Process*: The project steering committee will meet at least monthly to provide inputs and review progress on this project.
2. *Progress Measurement Process*: The project steering committee will review project progress during project review meetings, and they can also review information as needed by viewing reports on the enterprise project management software. Post project progress will also be measured to see if the project met its goals. These goals include reducing the training cost per employee by \$100/person/year and receiving positive results from survey participants on the effectiveness of the training.
3. *Change Approval Process*: See Attachment 1 based on corporate standards.
4. *Supplier Management Process*: See Attachment 2 based on corporate standards.

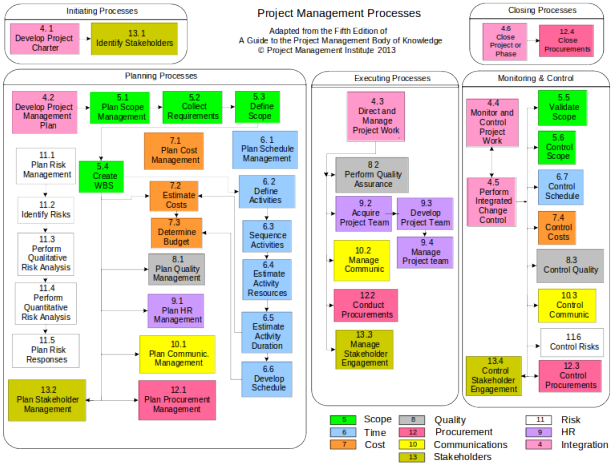
Sample Project Management Plan (Partial)

Technical Processes:

1. *Enterprise Project Management Software*: All tasks, costs, resources, issues, and risks will be tracked for this project using our enterprise project management software. Data must be entered on a weekly basis, at a minimum, to provide timely information.
2. *Supplier Evaluation*: The project team will coordinate with the purchasing department to follow our standard procedures for selecting and working with suppliers. See Attachment 2 for corporate standards.

Plan Scope Mangement

Figure: The task of developing a scope management plan is in the **Scope** knowledge area, and belongs to the **Planning** process group.



Plan Scope Management

- The purpose of the plan scope management task is to determine how the project scope will be defined, validated, and controlled.
- Project teams usually have several meetings with key stakeholders and experts to help them develop a **scope management plan** and **requirements management plan**.

Plan Scope Management

Elements in a Requirements Management Plan

1. Planning, tracking, and reporting requirements
2. Performing configuration management activities, such as initiating, analysing, tracking, and reporting changes to requirements
3. Prioritising requirements
4. Using product metrics
5. Tracing requirements

Sample Requirements Management Plan (Partial)

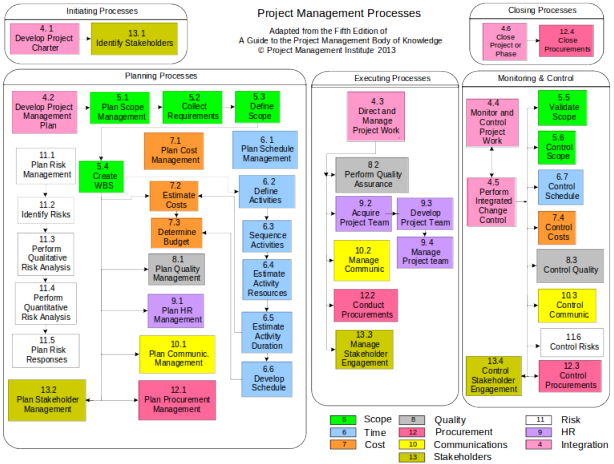
Requirements Management Plan Version 1.0
September 30

Project Name: Just-In-Time Training Project
Planning, tracking, and reporting requirements:
Information from the Phase I project, the business case, and the project charter will provide valuable information in determining requirements for this project, as will many existing corporate standards and processes. A survey will also be used to gather requirements. All requirements will be documented where appropriate. For example, requirements related to course prerequisites will be documented in course descriptions. Requirements related to facilities, class size etc. will be documented in the scope statement. Requirements will be tracked by the person in charge of each related deliverable and reported as part of our normal reporting processes (i.e. weekly status reports, monthly review meetings, etc.)
Performing configuration management activities:
Requirements can be introduced by several means, such as existing written requirements, suggestions provided from our survey, or direct suggestions from stakeholders. Appropriate project stakeholders will analyze, authorize, track, and report changes to requirements. The project manager must be informed in advance of potential changes to requirements and be involved in the decision process to approve those changes. Any change that will impact the project's cost or schedule significantly must be approved by the project steering committee.
Prioritizing requirements:
All requirements will be designated as 1, 2 or 3, for mandatory, desirable, or nice-to-have, respectively. Emphasis will be placed on meeting all mandatory requirements, followed by desirable and then nice-to-have requirements.
Using product metrics:
Tracing requirements:

Figure: An example of a requirements management plan

Collecting Requirements

Figure: The task of developing a scope management plan is in the **Scope** knowledge area, and belongs to the **Planning** process group.



Definition: Requirements

The *PMBOK Guide*, Fifth Edition, defines 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

- A projects size, complexity, importance, as well as other factors affect how much effort is spent on collecting requirements
- Requirements must be documented in enough detail so that they can be measured during project execution

Outputs of Collecting Requirements

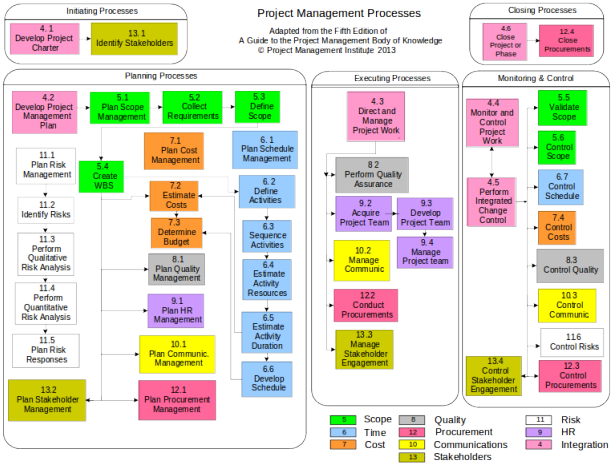
The main output is a **requirements traceability matrix (RTM)**, which is a table that lists requirements, various attributes of each requirement, and the status of the requirements to ensure that all of them are addressed.

Requirement no.	Name	Category	Source	Status
R26	Survey questions	Survey	Project steering committee minutes	Complete. The survey questions were reviewed and approved by the steering committee.
R31	Course evaluations	Assessment	Corporate training standards	In process. The course evaluations have not been created yet.

Figure: An example of a requirements matrix.

Define Scope

Figure: The task of defining the scope is in the **Scope** knowledge area, and belongs to the **Planning** process group.



Define Scope

The purpose of the defining the scope is so:

- Estimates of time, cost, and resources can be made more accurate
- A baseline can be clearly defined for effective performance management
- Transparency is created surrounding work responsibilities - work that is not included in the scope should not be done

The main output from this task is the **scope statement**. To effectively create this document, the following are required:

- Project charter
- Requirements documentation
- **Organisational process assets**

Definition: Orgaisational Process Assets

Orgaisational Process Assets are documents which include policies and procedures related to project management, past project files, and lessons learned from similar projects

Define Scope

Elements in a Scope Statement

1. Product scope description
2. Product user acceptance criteria
3. Detailed information on project deliverables
4. Project boundaries, constraints, and assumptions
5. Reference to all supporting documentation such as corporate policies, and product specifications

Sample Scope Statement

Scope Statement, Version 1.0
August 1

Project Title: Just-In-Time Training Project

Product Characteristics and Requirements:

This project will produce three levels of courses, executive, introductory, and advanced, in the following subject areas: supplier management, negotiating skills, project management, and software applications (spreadsheets and Web development). Details on each course are provided below:

1. Supplier management training: The Supplier Management Director estimates the need to train at least 200 employees each year. There should be three levels of courses: an executive course, an introductory course, and an advanced course. Course materials should be developed as a joint effort with internal experts, outside training experts, if needed, and key suppliers. A partnership might be developed to maximize the effectiveness of the training and minimize development costs. Different delivery methods should be explored, including instructor-led, CD/ROM, and Web-based training. About half of employees would prefer an instructor-led approach, and about half would prefer a self-paced course they could take at their convenience.

Product User Acceptance Criteria

The courses produced as part of this project will be considered successful if they are all available within one year and the average course evaluations for each course are at least 3.0 or a 5.0 scale.

Figure: An example of a scope statement

Sample Scope Statement (Continued)

Deliverables

Project Management-Related Deliverables

Project charter, project management plan, scope statement, WBS, etc.

Product-Related Deliverables:

1. Supplier management training:

1.1. Needs assessment: A survey will be conducted to determine the learning objectives for the executive, introductory, and advanced courses. The corporate online survey software will be used and coordinated with IT and HR. Results will be documented in a detailed report (8-10 pages) and presentation (15-20 minutes long).

1.2 Research of existing training: A study will be done to identify current training courses and materials available. Results will be documented in a detailed report and presentation.

1.3. Partnerships: Partnership agreements will be explored to get outside training organizations and suppliers to work on developing and providing training.

1.4. Course development: Appropriate materials will be developed for each course. Materials could take various formats, including written, video, CD/ROM, or Web-based. Materials should include interactivity to keep learners engaged.

1.5. Pilot course: A pilot course will be provided for the introductory supplier management course. Feedback from the pilot course will be incorporated into following courses.

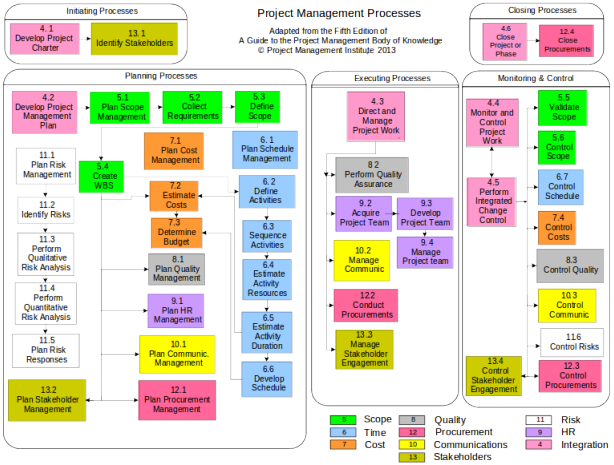
Figure: An example of a scope statement

Keep Scope Information Current

- The project team should update the project scope statement as new information becomes available
- Name different iterations of the scope statement, for example Version 1.0, Version 2.0, etc
- A good, up-to-date scope statement helps prevent scope creep, which is the tendency for project scope to continually increase.

Creating the Work Breakdown Strucuture (WBS)

Figure: The task of creating the WBS is in the **Scope** knowledge area, and belongs to the **Planning** process group.



Creating the Work Breakdown Strucuture (WBS)

Definition: 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

A WBS is a document that breaks all the work required for the project into:

- discrete tasks; and
- groups those tasks into a logical hierarchy with the lowest level being the **work package**

Definition: Work Package

A **work package** is a deliverable at the lowest level of the WBS, where it can be appropriately assigned to and managed by a single accountable person.

Creating the Work Breakdown Strucuture (WBS)

The Importance of a Good WBS

- Foundational document in project management because it provides the basis for planning and managing project schedules, costs, resources, and changes
- The WBS contains 100% of the deliverables (often called work) of the project
- Often the WBS is shown in two different forms: **graphical (chart) form**, or **tabular (list) form**.

WBS Attributes

A WBS shows:

- the various elements of the project,
- how work is distributed between project elements,
- how the cost or budget is distributed between project elements
- how the larger elements are subdivided into smaller ones

Creating the Work Breakdown Strucuture (WBS)

WBS Attributes

Included in the WBS:

- Description of the end goal
- All aspects of the goal in increasing detail
- Basis for task list

Not included in the WBS:

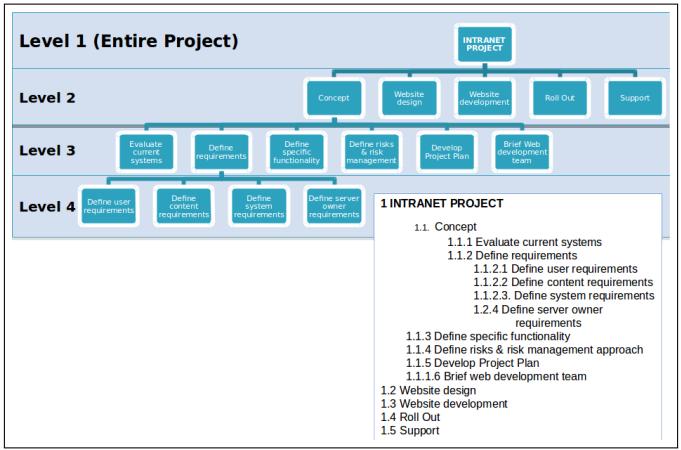
- The means of reaching that goal
- Detail of how to undertake the details
- Allocation of task lists

Creating the Work Breakdown Strucuture (WBS)

An Example of a Graphical WBS

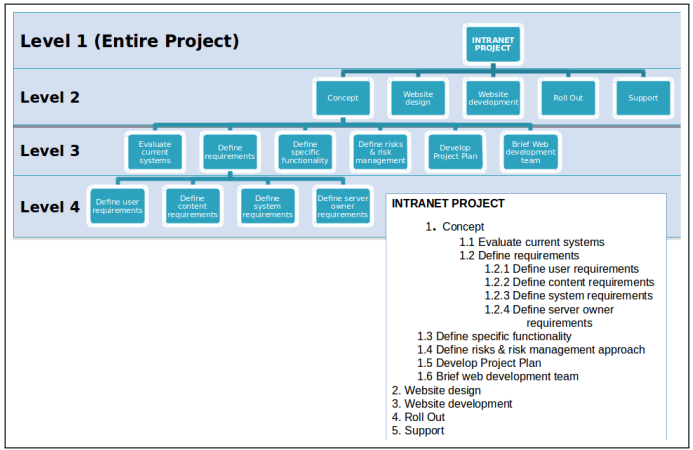
Figure: An example of a WBS in graphical form.

WBS PMI Numbering



Creating the Work Breakdown Strucuture (WBS)

WBS MS Project Numbering



Best Practice for Creating a WBS

- If you look closely at the WBS example shown you will notice that there are no verbs, as verbs represent action, and a WBS is not about action, but rather about deliverables.
- It is incorrect to show activities on the WBS, according to PMI, so try to consistently use deliverables on your WBS. Activities should be shown on the schedule and not on the WBS itself.
- Several project management software packages use the WBS to create the activities, which may also cause some confusion. Use your judgement to decide the best way to create a WBS and the wording on it.

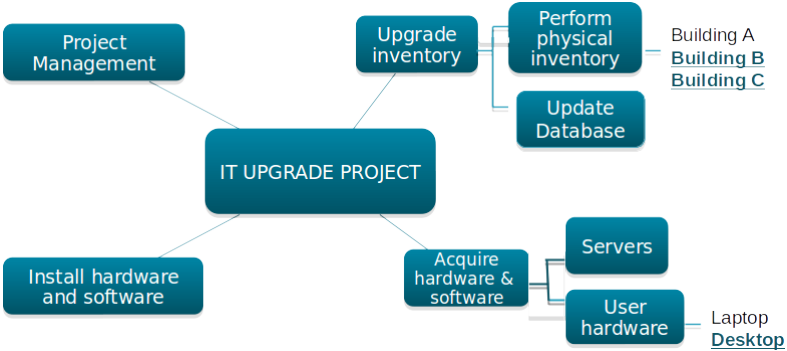
How to Create a Good WBS

- It is difficult to create a good WBS
- The project manager and the project team must decide as a group how to organise the work and how many levels to include in the WBS
- It is often better to focus on getting the top levels of the WBS done well to avoid being distracted by too much detail
- Many people confuse tasks on a WBS with specifications or think it must reflect a sequential list of steps
- You should focus on what work needs to be delivered, not when or exactly how it will be done

Approaches to Developing a WBS

Using guidelines:	• Some organisations, like Defence, provide guidelines for preparing WBS
The analogy approach:	• Review WBS 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

Sample Mindmapping Technique for Creating a WBS



Creating the Work Breakdown Strucuture (WBS)

Gantt Chart with WBS Generated from Mind Map

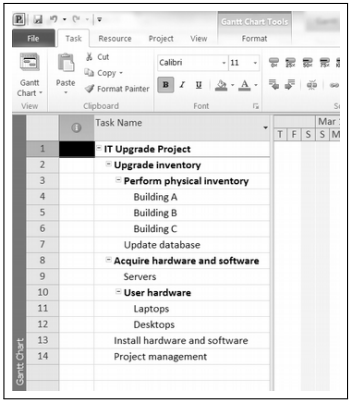


Figure: Gantt chart from mindmap with Mindview software

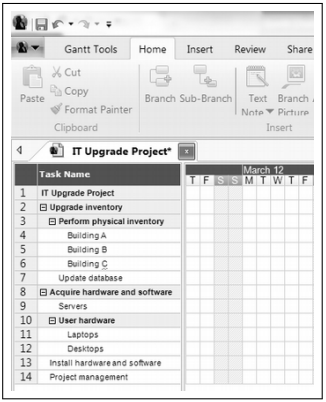


Figure: Gantt chart from mindmap with MS Project software

Creating the WBS Dictionary

Definintion: WBS Dictionary

A **WBS dictionary** is a document that describes each WBS task in detail.

The format of the WBS dictionary can vary based on the projects needs:

- The WBS dictionary may just be a short paragraph that describes each **work package**.
- If the project is complex then an entire page or more might be required to describe the work package.

Some common elements that are included in the work package description:

- The responsible person or organisation;
- The resource requirements;
- The estimated costs of the work package;

Sample of a WBS Dictionary Entry

Project Name: Customer Help Desk	
Work Package ID: 1.4.1.1	
Work Package Name: Designed User Screen	
Work Package Description: Using the customer's User Screen Specification, a new top-level layout design is to be created. Based on this a non-functioning layout demonstrator is to be prepared to collect feedback from the customer. A fully functional prototype will be created for the client to review and approve.	
Assigned To: Dave Litten	**Group/Dept**: IT Systems
Date Assigned: 7/30/09	**Date Due**: 15/9/09
Estimated Cost: $3,800.00	**Account Code**: CHD/1/4/33
Acceptance Criteria:	**Resources Assigned:**
Deliverables:	**Assumptions:**

The End