

Target: PMP® Certification



Project Scope Management

8	PLAN SCOPE MANAGEMENT		
9	COLLECT REQUIREMENTS		
10	DEFINE SCOPE		
11	CREATE WBS		
12	VALIDATE SCOPE		
13	CONTROL SCOPE		

Project Scope Management

*** Project Scope Management.** Project Scope Management includes the processes required to ensure that the project includes all the work required, and only the work required, to complete the project successfully.

Project Scope	Product Scope
* Project Scope. The work performed to deliver a product, service, or result with the specified features and functions.	* Product Scope. The features and functions that characterize a product, service, or result
Measured against the project plan	Measured against the product requirements
Think about Work Breakdown Structure (WBS)	Think about Product Breakdown Structure (PBS)

Gold Plating: refers to giving customer extras scope. PMI does not recommend it.

8

PLAN SCOPE MANAGEMENT



* **Plan Scope Management.** The process of creating a scope management plan that documents how the project and product scope will be defined, validated, and controlled.

8

PLAN SCOPE MANAGEMENT



INPUTS

- » Project charter
- » Project management plan
 - Quality management plan
 - Project life cycle description
 - Development approach
- » Enterprise Environment Factors
- » Organizational Process Assets

TOOLS & TECHNIQUES

- ✓ Expert judgment
- ✓ Data analysis
 - Alternatives analysis
- ✓ Meetings

OUTPUTS

- Scope management plan »
- Requirements management plan »

8

PLAN SCOPE MANAGEMENT



OUTPUTS

Scope management plan »

* **Scope Management Plan.** A component of the project or program management plan that describes how the scope will be defined, developed, monitored, controlled, and verified.

Key elements include processes that detail **HOW**:

- A detailed Project Scope Statement will be prepared
- The WBS will be created from the detailed Project Scope Statement
- The WBS will be approved and then maintained
- Requests for changes to the Project Scope Statement will be accepted and handled

The Scope Management Plan:

- It **IS NOT** the scope baseline
- It **DOES NOT** describe what is in or out of scope

The Scope Management Plan helps reduce the risk of project scope creep.

* **Scope Creep.** The uncontrolled expansion to product or project scope without adjustments to time, cost, and resources.

8

PLAN SCOPE MANAGEMENT



OUTPUTS

Requirements management
plan »

* **Requirements Management Plan.** A component of the project or program management plan that describes how requirements will be analyzed, documented, and managed.

Key elements include:

- Methods to identify requirements
- How to analyze, prioritize, manage, track changes to requirements
- Configuration Management activities including:
 - How changes to the product will be accepted and handled
 - Tracking and tracing the changes
 - Authorization levels for change approval

The Requirements Management Plan:

- It **IS NOT** the requirements documentation
- It **DOES NOT** describe the product requirements

9

COLLECT REQUIREMENTS



* **Collect Requirements.** The process of determining, documenting, and managing stakeholder needs and requirements to meet project objectives.

* **Requirement.** A condition or capability that is required to be present in a product, service, or result to satisfy a contract or other formally imposed specification.

9

COLLECT REQUIREMENTS



The requirements can be classified as:

- **“Business requirements**, which describe the higher-level needs of the organization as a whole, such as the business issues or opportunities, and reasons why a project has been undertaken.
- **Stakeholder requirements**, which describe needs of a stakeholder or stakeholder group.
- **Solution requirements**, which describe features, functions, and characteristics of the product, service, or result that will meet the business and stakeholder requirements. Solution requirements are further grouped into functional and nonfunctional requirements:
 - **Functional requirements** describe the behaviors of the product. Examples include processes, data, and interactions with the product.
 - **Nonfunctional requirements** supplement functional requirements and describe the environmental conditions or qualities required for the product to be effective. Examples include: reliability, security, performance, safety, level of service, supportability, retention/purge, etc.
- **Transition requirements** describe temporary capabilities, such as data conversion and training requirements, needed to transition from the current “as-is” state to the future “to-be” state.
- **Project requirements**, which describe the actions, processes, or other conditions the project needs to meet.
- **Quality requirements**, which capture any condition or criteria needed to validate the successful completion of a project deliverable or fulfillment of other project requirements.”

9

COLLECT REQUIREMENTS



INPUTS

- » Project charter
- » Project management plan
 - Scope management plan
 - Requirements management plan
 - Stakeholder engagement plan
- » Project documents
 - Assumption log
 - Lessons learned register
 - Stakeholder register
- » Business documents
 - Business case
- » Agreements
- » Enterprise Environment Factors
- » Organizational Process Assets

TOOLS & TECHNIQUES

- ✓ Expert judgment
- ✓ Data gathering
 - Brainstorming
 - Interviews
 - Focus groups
 - Questionnaires and surveys
 - Benchmarking
- ✓ Data analysis
 - Document analysis
- ✓ Decision making
 - Voting
 - Multicriteria decision analysis
- ✓ Data representation
 - Affinity diagrams
 - Mind mapping
- ✓ Interpersonal and team skills
 - Nominal group technique
 - Observation/conversation
 - Facilitation
- ✓ Context diagrams
- ✓ Prototypes

OUTPUTS

- Requirements documentation »
- Requirements traceability matrix »

9

COLLECT REQUIREMENTS



INPUTS

» Stakeholder register

* **Stakeholder Register.** A project document including the identification, assessment, and classification of project stakeholders.

- It includes also the stakeholder needs and expectations. Some of them will become part of the project requirements

9

COLLECT REQUIREMENTS



TOOLS & TECHNIQUES

✓ Interviews

*** Interviews.** A formal or informal approach to elicit information from stakeholders by talking to them directly.

- It can be slow and time consuming.
- It can be one to one or many to many.

9

COLLECT REQUIREMENTS



TOOLS & TECHNIQUES

✓ Focus groups

* **Focus Groups.** An elicitation technique that brings together prequalified stakeholders and subject matter experts to learn about their expectations and attitudes about a proposed product, service, or result.

- Conducted by a trained moderator

9

COLLECT REQUIREMENTS



TOOLS & TECHNIQUES

✓ Facilitated workshops

* **Facilitated Workshops.** An elicitation technique using focused sessions that bring key cross-functional stakeholders together to define product requirements.

Allow key cross-functional stakeholders to define product/project features and to reconcile differences
Example of facilitated workshops:

- **Joint application design/development (JAD)** sessions used in the software development
- **Quality function deployment (QFD)** - determine critical characteristics for new product development and begins with understanding the voice of the customer (**VOC**)
- **User Stories** - describe functionality or features the stakeholder want and usually re written in the following format:
 - As a **“Role”**, I want **“Goal”**, so that **“Motivation”**.

9

COLLECT REQUIREMENTS



TOOLS & TECHNIQUES

✓ Group creativity techniques

* **Group Creativity Techniques.** Techniques that are used to generate ideas within a group of stakeholders.

- * **Brainstorming.** A general data gathering and creativity technique that can be used to identify risks, ideas, or solutions to issues by using a group of team members or subject matter experts.
- * **Nominal Group Technique.** A technique that enhances brainstorming with a voting process used to rank the most useful ideas for further brainstorming or for prioritization.
- * **Idea/Mind Mapping.** Technique used to consolidate ideas created through individual brainstorming sessions into a single map to reflect commonality and differences in understanding and to generate new ideas.
- * **Affinity Diagram.** A group creativity technique that allows large numbers of ideas to be classified into groups for review and analysis.
- * **Multi-Criteria Decision Analysis.** This technique utilizes a decision matrix to provide a systematic analytical approach for establishing criteria, such as risk levels, uncertainty, and valuation, to evaluate and rank many ideas.

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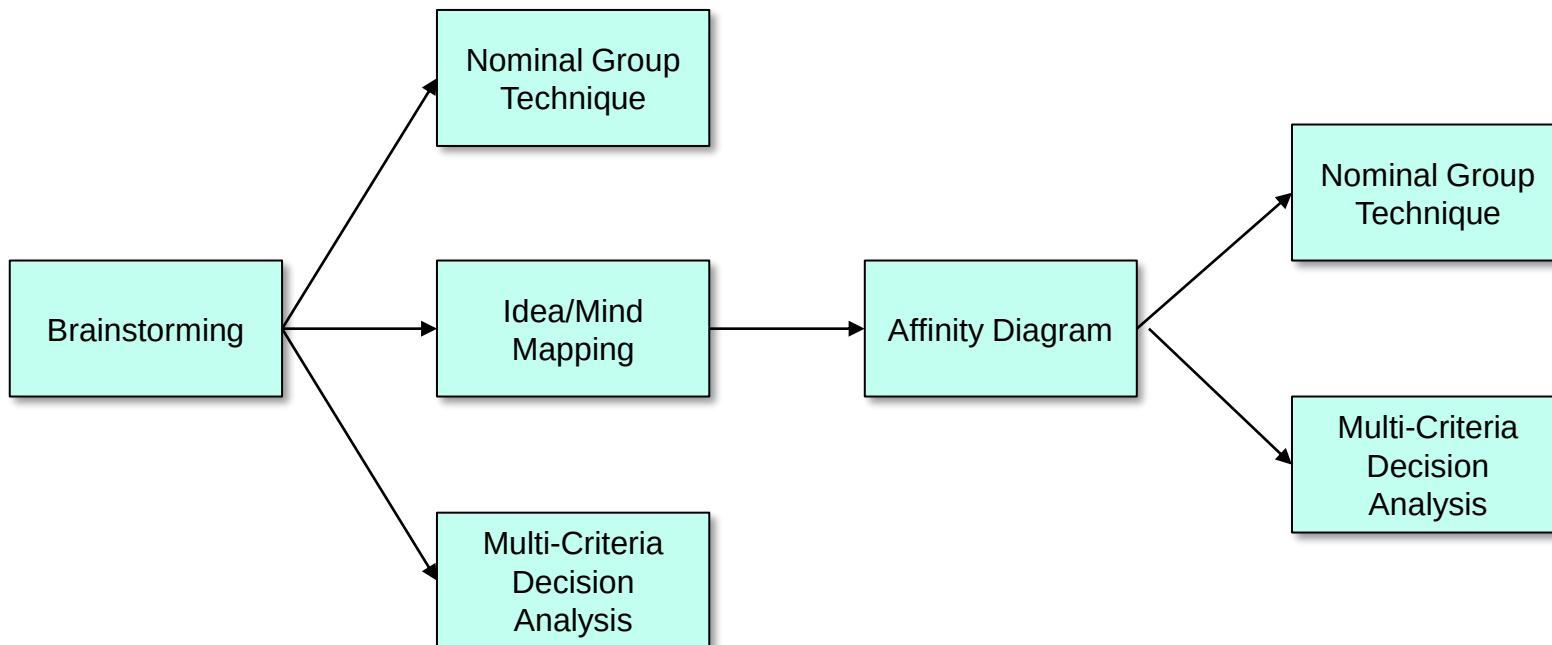
COLLECT REQUIREMENTS



TOOLS & TECHNIQUES

✓ Group creativity techniques

An example of the group creativity techniques sequence:



9

COLLECT REQUIREMENTS



TOOLS & TECHNIQUES

✓ Group decision-making techniques

* **Group Decision-Making Techniques.** Techniques to assess multiple alternatives that will be used to generate, classify, and prioritize product requirements.

- * **Unanimity.** Agreement by everyone in the group on a single course of action.
- * **Majority.** Support from more than 50 percent of the members of the group.
- * **Plurality.** Decisions made by the largest block in a group, even if a majority is not achieved.
- * **Dictatorship.** A group decision-making technique in which one individual makes the decision for the group.

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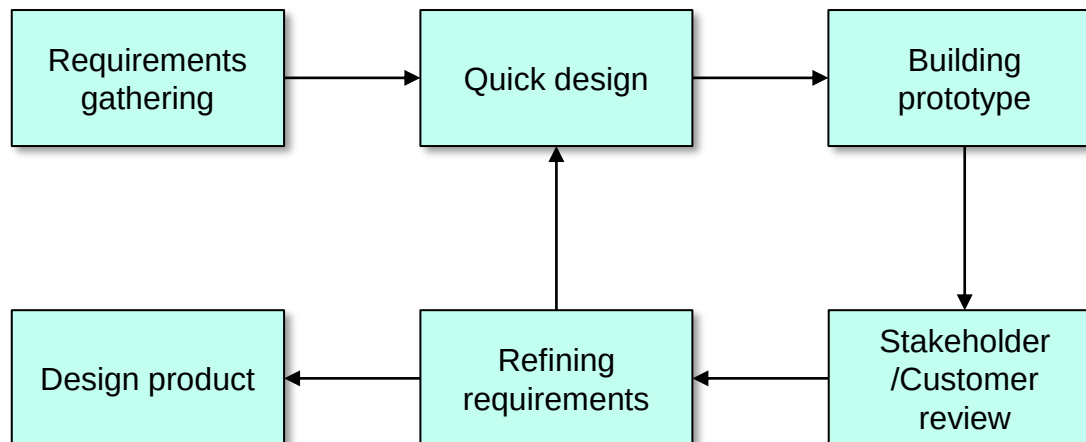
COLLECT REQUIREMENTS



TOOLS & TECHNIQUES

✓ Prototypes

* **Prototypes.** A method of obtaining early feedback on requirements by providing a working model of the expected product before actually building it.



9

COLLECT REQUIREMENTS



TOOLS & TECHNIQUES

✓ Benchmarking

* **Benchmarking.** Benchmarking is the comparison of actual or planned practices, such as processes and operations, to those of comparable organizations to identify best practices, generate ideas for improvement, and provide a basis for measuring performance.

9

COLLECT REQUIREMENTS



TOOLS & TECHNIQUES

✓ Context diagrams

* **Context Diagrams.** A visual depiction of the product scope showing a business system (process, equipment, computer system, etc.), and how people and other systems (actors) interact with it.

9

COLLECT REQUIREMENTS



OUTPUTS

Requirements
documentation »

* **Requirements Documentation.** A description of how individual requirements meet the business need for the project.

Requirements documentation can contain:

- Business requirements
- Stakeholder requirements
- Solution requirements
- Project requirements
- Transition requirements.
- Requirements assumptions, dependencies, and constraints

MoSCoW method to prioritize the requirements:

- Must have – critical, if even one MUST requirement is not included, the project delivery should be considered a failure
- Should Have - important but not necessary
- Could Have - desirable
- Won't have - agreed by stakeholders as the least-critical, lowest-payback items, or not appropriate at that time

9

COLLECT REQUIREMENTS



OUTPUTS

Requirements traceability
matrix »

- **Requirements Traceability Matrix.** A grid that links product requirements from their origin to the deliverables that satisfy them.

The Requirements Traceability Matrix is useful because helps with:

- Linking requirements to their origin
- Tracking them over the project lifecycle
- Recording and tracing requirements history
- Giving a structure for managing scope changes

Requirements attributes examples:

- | | |
|---------------------------|-----------------------|
| • A unique identifier | • Version |
| • A narrative description | • Current status |
| • The reasoning | • Time stamp |
| • Owner | • Predicted stability |
| • Source | • Level of complexity |
| • Priority | • Acceptance criteria |

9

COLLECT REQUIREMENTS



OUTPUTS

Requirements traceability matrix »

Requirements Traceability Matrix								
Project Name:								
Cost Center:								
Project Description:								
ID	Associate ID	Requirements Description	Business Needs, Opportunities, Goals, Objectives	Project Objectives	WBS Deliverables	Product Design	Product Development	Test Cases
001	1.0							
	1.1							
	1.2							
	1.2.1							
002	2.0							
	2.1							
	2.1.1							
003	3.0							
	3.1							
	3.2							
004	4.0							
005	5.0							

Figure 5-6. Example of a Requirements Traceability Matrix

10**DEFINE SCOPE**

* **Define Scope.** The process of developing a detailed description of the project and product..

10

DEFINE SCOPE



INPUTS

- » Project charter
- » Project management plan
 - Scope management plan
- » Project documents
 - Assumption log
 - Requirements documentation
 - Risk register
- » Enterprise Environment Factors
- » Organizational Process Assets

TOOLS & TECHNIQUES

- ✓ Expert judgment
- ✓ Data analysis
 - Alternatives analysis
- ✓ Decision making
 - Multicriteria decision analysis
- ✓ Interpersonal and team skills
 - Facilitation
- ✓ Product analysis

OUTPUTS

- Project scope statement »
- Project documents updates »
 - Assumption log
 - Requirements documentation
 - Requirements traceability matrix
 - Stakeholder register

10**DEFINE SCOPE****INPUTS**

» Project charter

High level information from the project charter is detailed during this process and fed into the project scope statement.

This information includes:

- Product Scope Description
- Acceptance Criteria
- Other deliverable(s) (including PM reports/documents)
- Constraints
- Assumptions

10

DEFINE SCOPE



TOOLS & TECHNIQUES

✓ Product analysis

* **Product Analysis.** For projects that have a product as a deliverable, it is a tool to define scope that generally means asking questions about a product and forming answers to describe the use, characteristics, and other the relevant aspects of what is going to be manufactured.

It is more like a reverse analysis starting from Product Breakdown Structure (PBS) and asking what work is needed to have as output that PBS.

It include techniques such as:

- Product breakdown
- System analysis
- Requirements analysis
- Systems engineering: looking at the whole system to include environmental factors to the product e.g. other hardware/software which the product must function or interact with
- Value engineering: identifying and developing the cost benefit ratio for each product function
- Value analysis: analyzing value of all functions to identify those unnecessary which increase costs

10

DEFINE SCOPE



TOOLS & TECHNIQUES

✓ Alternatives generation

* **Alternatives Generation.** A technique used to develop as many potential options as possible in order to identify different approaches to execute and perform the work of the project.

There are different ways to generate alternatives:

- Brainstorming
- Lateral Thinking
- Interdisciplinary idea fertilization

10**DEFINE SCOPE****TOOLS & TECHNIQUES**

✓ **Facilitated workshops**

The same technique as used in Collect requirements process but now used for defining scope

10

DEFINE SCOPE



OUTPUTS

Project scope statement »

* **Project Scope Statement.** The description of the project scope, major deliverables, assumptions, and constraints.

It includes:

- Project Scope
- Product Scope Description
- Acceptance Criteria
- Deliverable(s) (including PM reports/documents)
- Project boundaries and exclusions
- Constraints
- Assumptions

10

DEFINE SCOPE



OUTPUTS

Project scope statement »

A comparison between Project Scope Statement and Project Charter:

Project Scope Statement	Project Charter
Detailed	High level
It comes from project manager and key members of the team	It comes from sponsor
It describes also the work to achieve the output	It describes the work to achieve the output only if is specifically requested by contract or key stakeholders
It is a result of a PLANNING process	It is a result of a INITATING process
It can be shared with external stakeholders	It is only an internal document

10**DEFINE SCOPE****OUTPUTS****Project documents updates »**

Project documents updates examples:

- Stakeholder register
- Requirements documentation
- Requirements traceability matrix

11

CREATE WBS



* **Create WBS.** The process of subdividing project deliverables and project work into smaller, more manageable components.

11**CREATE WBS****INPUTS**

- » **Project management plan**
 - Scope management plan
- » **Project documents**
 - Project scope statement
 - Requirements documentation
- » **Enterprise Environmental Factors**
- » **Organizational Process Assets**

TOOLS & TECHNIQUES

- ✓ **Expert judgment**
- ✓ **Decomposition**

OUTPUTS

- Scope baseline »**
- Project documents updates »**
 - Assumption log
 - Requirements documentation

11

CREATE WBS



TOOLS & TECHNIQUES

✓ Decomposition

* **Decomposition.** A technique used for dividing and subdividing the project scope and project deliverables into smaller, more manageable parts.

Decomposition includes:

- Identifying deliverables and work
- Determining the WBS structure and organizing the WBS:
- Decomposing components
- Assigning identification codes
- Verifying if the WBS components are clear and complete and absolutely necessary

11

CREATE WBS



TOOLS & TECHNIQUES

✓ Expert judgment

Approaches expert judgment can use to create WBS:

- Top-down
- Organization-specific guidelines
- WBS templates

The WBS structure can be represented:

- Using phases as the second level of decomposition
- Using major deliverables as the second level of decomposition
- Incorporating subcomponents which may be developed by 3rd parties
- A mix approach

*** Rolling Wave Planning.** An iterative planning technique in which the work to be accomplished in the near term is planned in detail, while the work in the future is planned at a higher level.

100% rule. The WBS should represent all the work for the project. If a deliverable is not in the WBS, there is no plan to create it.

11

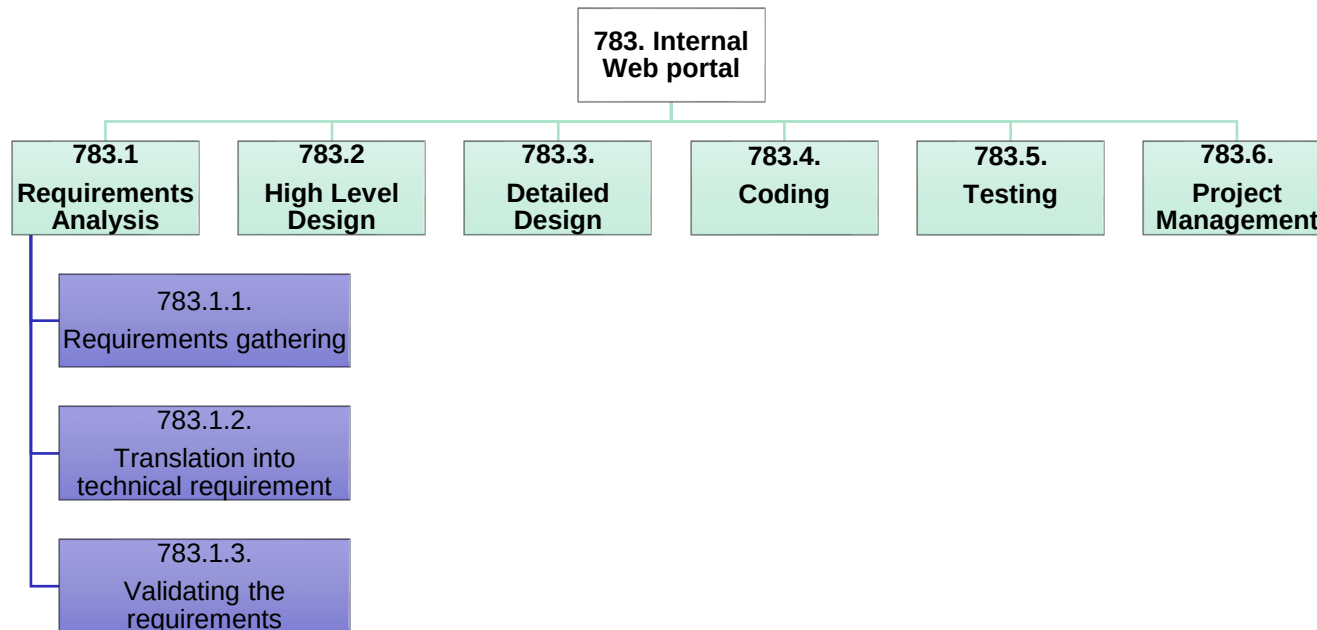
CREATE WBS



TOOLS & TECHNIQUES

✓ Expert judgment

The WBS structure represented using phases as the second level of decomposition:



11

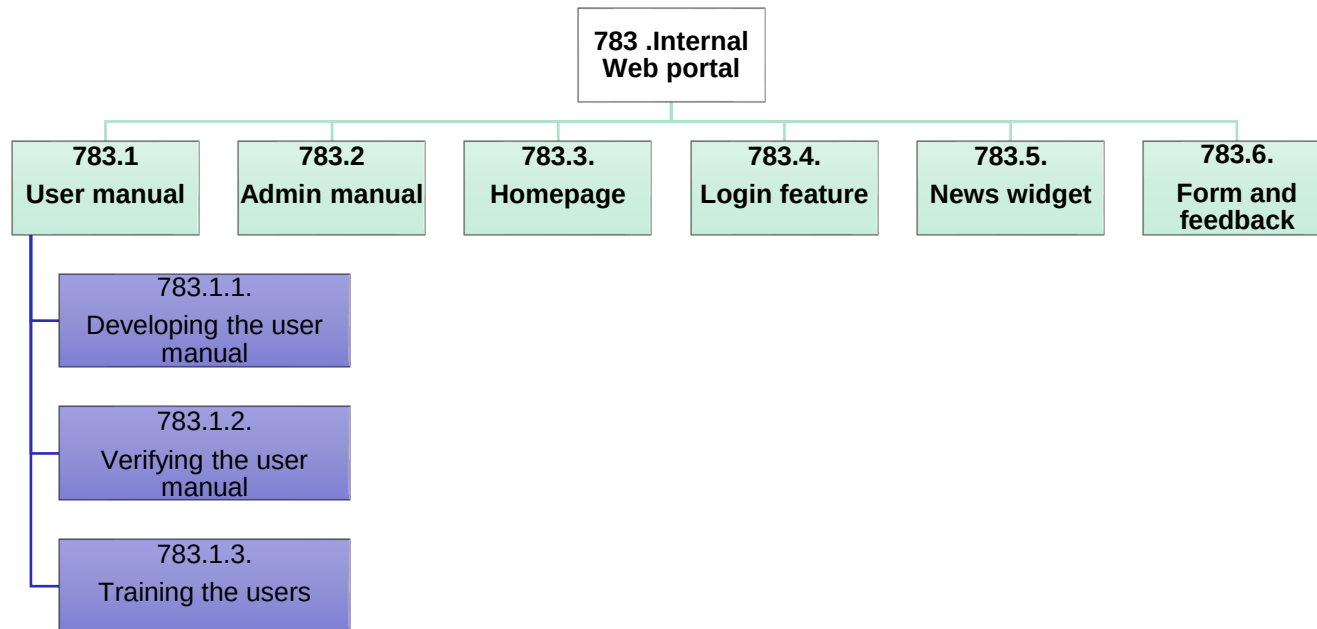
CREATE WBS



TOOLS & TECHNIQUES

✓ Expert judgment

The WBS structure represented using major deliverables as the second level of decomposition:



11

CREATE WBS



OUTPUTS

Scope baseline »

*** Scope Baseline.** The approved version of a scope statement, work breakdown structure (WBS), and its associated WBS dictionary, that can be changed only through formal change control procedures and is used as a basis for comparison.

It is composed by 3 documents:

1. Project Scope Statement (PSS)
2. Work Breakdown Structure (WBS)
3. WBS dictionary

It is the first out of three baselines from PMBOK Guide 5th edition

1. Scope Baseline
2. Schedule Baseline
3. Cost Baseline

11

CREATE WBS



OUTPUTS

Scope baseline »

- * **Work Breakdown Structure (WBS).** A hierarchical decomposition of the total scope of work to be carried out by the project team to accomplish the project objectives and create the required deliverables.
 - * **Control Account.** A management control point where scope, budget, actual cost, and schedule are integrated and compared to earned value for performance measurement.
 - * **Planning Package.** A work breakdown structure component below the control account with known work content but without detailed schedule activities.
 - * **Work Breakdown Structure Component.** An entry in the work breakdown structure that can be at any level.
 - * **Work Package.** The work defined at the lowest level of the work breakdown structure for which cost and duration can be estimated and managed.
-
- Each work package is assigned to a control account
 - Each of the work packages should be associated with only one control account
 - A control account may include one or more planning packages

11**CREATE WBS****OUTPUTS****Scope baseline »****Work Breakdown Structure (WBS)**

Best practices

- It's created with the help of the team
- It shows a complete hierarchy of the project
- It's not represented as a list, nor as a Gantt chart
- It breaks down the project into small enough pieces (8 to 80 hour rule of thumb)
- Each item has a unique identifier
- Each level is a smaller segment of the level above
- It's detailed enough to support estimation

Why to have a WBS well-developed:

- Serves as communication tool among stakeholders
- Becomes the foundation for planning
- Becomes foundation for cost control
- It is used as a tool for risk identification
- Is used as a tool to evaluate scope changes
- Allows team members to understand how their work fits in the project
- Gets team buy-in

11

CREATE WBS



OUTPUTS

Scope baseline »

* **WBS Dictionary.** A document that provides detailed deliverable, activity, and scheduling information about each component in the work breakdown structure.

It can include:

- Code of account identifier
- Work description
- Assumptions and constraints
- Who is Responsible
- Schedule milestones
- Associated schedule activities
- Predecessors and Successors
- Lead and Lags
- Resources required
- Cost estimates
- Duration
- Quality requirements
- Acceptance criteria
- Other notes: Technical references, Agreement information etc

11**CREATE WBS****OUTPUTS****Project documents updates »**

Project documents updates examples:

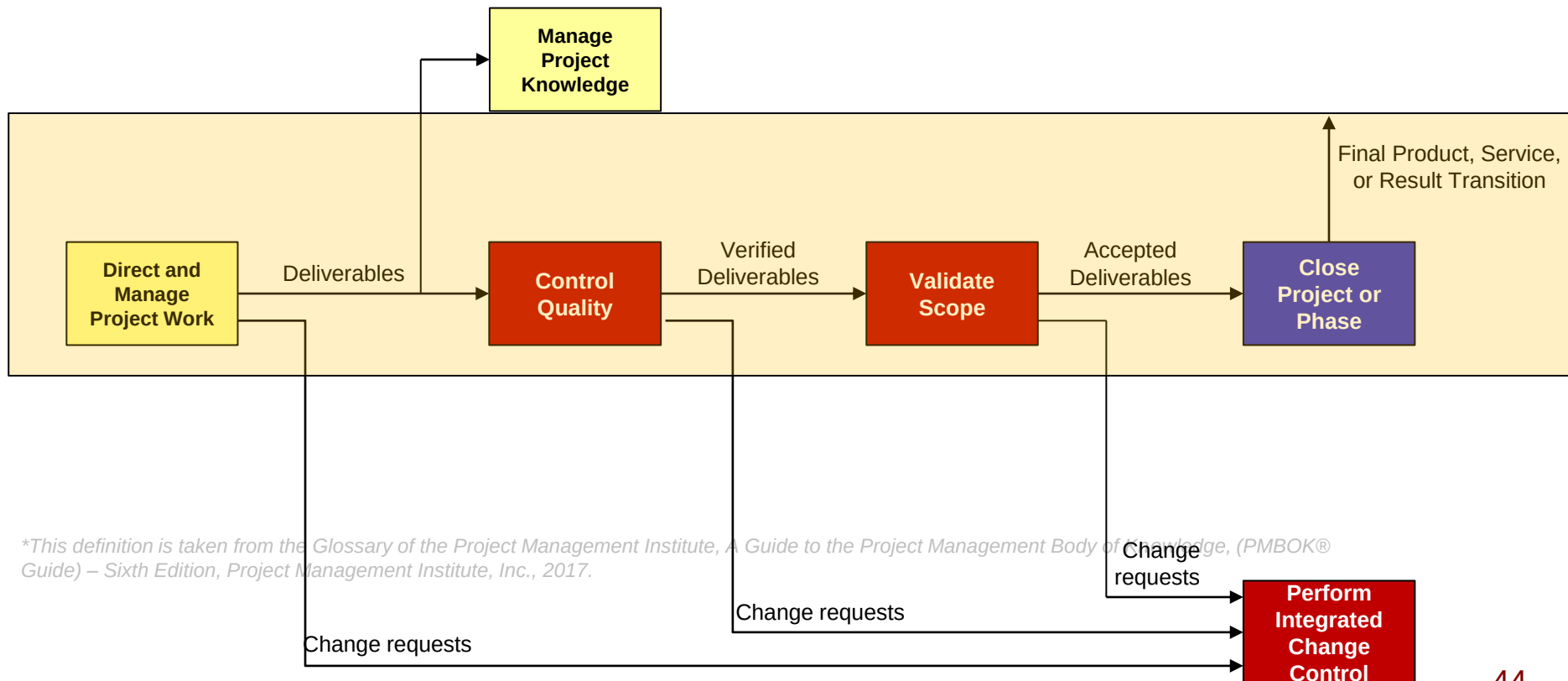
- Requirements documentation
- Requirements traceability matrix

12

VALIDATE SCOPE



* **Validate Scope.** The process of formalizing acceptance of the completed project deliverables.



*This definition is taken from the Glossary of the Project Management Institute, A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) – Sixth Edition, Project Management Institute, Inc., 2017.

12

VALIDATE SCOPE



VALIDATE SCOPE	CONTROL QUALITY
The process of formalizing acceptance of the completed project deliverables.	The process of monitoring and recording results of executing the quality activities to assess performance and recommend necessary changes.
Have as output ACCEPTED DELIVERABLES	Have as output VERIFIED DELIVERABLES
COMPLETENESS AND ACCEPTANCE	CORRECTNESS
Performed for a specific deliverable after Control Quality; however the process is iterative and can overlap with Control Quality	Performed for a specific deliverable after before Validate Scope; however the process is iterative and can overlap with Validate Scope

12

VALIDATE SCOPE



INPUTS

- » Project management plan
 - Scope management plan
 - Requirements management plan
 - Scope baseline
- » Project documents
 - Lessons learned register
 - Quality reports
 - Requirements documentation
 - Requirements traceability matrix
- » Verified deliverables
- » Work performance data

TOOLS & TECHNIQUES

- ✓ Inspection
- ✓ Decision making
 - Voting

OUTPUTS

- Accepted deliverables »
- Work performance information »
- Change requests »
- Project documents updates »
 - Lessons learned register
 - Requirements documentation
 - Requirements traceability matrix

12

VALIDATE SCOPE



TOOLS & TECHNIQUES

✓ Inspection

*** Inspection.** Examining or measuring to verify whether an activity, component, product, result, or service conforms to specified requirements.

Inspection	Audit
Inspect a deliverable (and not a process)	Audit a process (and not a deliverable)

12

VALIDATE SCOPE



OUTPUTS

Accepted deliverables »

* **Accepted Deliverables.** Products, results, or capabilities produced by a project and validated by the project customer or sponsors as meeting their specified acceptance criteria.

12

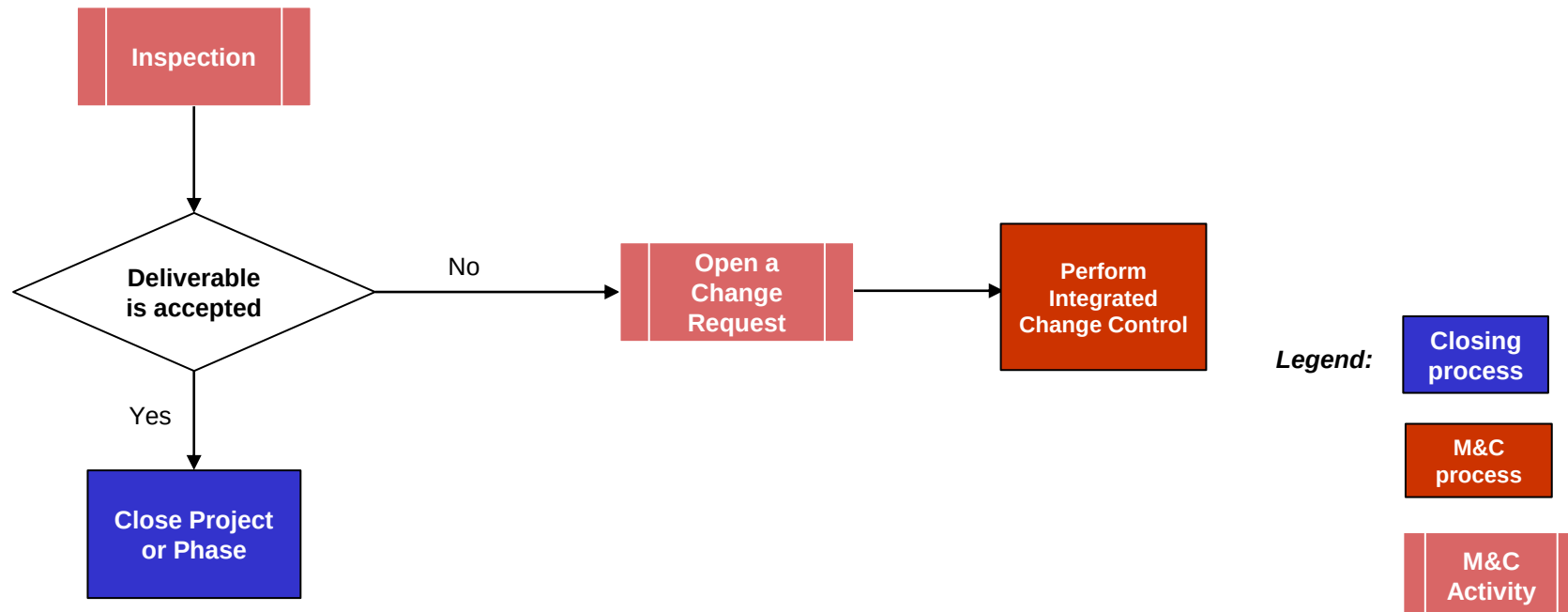
VALIDATE SCOPE



OUTPUTS

Change requests »

If the deliverables are not accepted, a change requests could be opened and the reasons for non acceptance is documented.



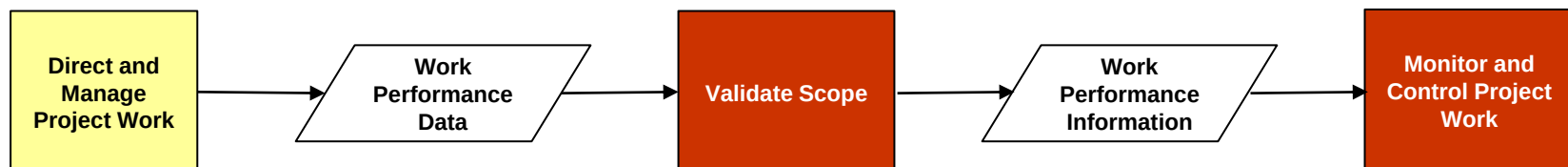
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VALIDATE SCOPE



OUTPUTS

Work performance
information »



* **Work Performance Data.** The raw observations and measurements identified during activities being performed to carry out the project work.

* **Work Performance Information.** The performance data collected from various controlling processes, analyzed in context and integrated based on relationships across areas.

Legend:

Executing
process

M&C
process

12**VALIDATE SCOPE****OUTPUTS****Project documents updates »**

Project documents updates examples:

- Requirements documentation
- Requirements traceability matrix
- Change log

13

CONTROL SCOPE

* **Control Scope.** The process of monitoring the status of the project and product scope and managing changes to the scope baseline.

13

CONTROL SCOPE



INPUTS

- » Project management plan
 - Scope management plan
 - Requirements management plan
 - Change management plan
 - Configuration management plan
 - Scope baseline
 - Performance measurement baseline
- » Project documents
 - Lessons learned register
 - Requirements documentation
 - Requirements traceability matrix
- » Work performance data
- » Organizational Process Assets

TOOLS & TECHNIQUES

- ✓ Data analysis
 - Variance analysis
 - Trend analysis

OUTPUTS

- Work performance information »
- Change requests »
- Project management plan Updates »
 - Scope management plan
 - Scope baseline
 - Schedule baseline
 - Cost baseline
 - Performance measurement baseline
- Project documents updates »
 - Lessons learned register
 - Requirements documentation
 - Requirements traceability matrix

13

CONTROL SCOPE



The pattern of the CONTROL PROCESS:

- **Inputs:** „Baseline” and „Actual”
- Analyze the gap between „Actual” and „Baseline”
- **Outputs:** „Change requests”, „Project documents updates”, „PMP Updates”, „OPA updates”, „Work Performance Information”

13

CONTROL SCOPE



CONTROL SCOPE	VALIDATE SCOPE
The process of monitoring the status of the project and product scope and managing changes to the scope baseline.	The process of formalizing acceptance of the completed project deliverables.
Focus of project scope (work)	Focus on project deliverables
Usually performed internally	Includes validating with the customer

13

CONTROL SCOPE



TOOLS & TECHNIQUES

✓ Variance analysis

* **Variance Analysis.** A technique for determining the cause and degree of difference between the baseline and actual performance.

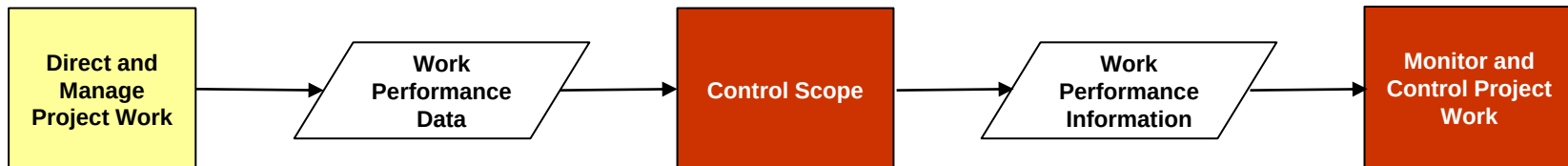
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CONTROL SCOPE



OUTPUTS

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information »



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Legend:

Executing
process

M&C
process

13**CONTROL SCOPE****OUTPUTS****Project documents updates »**

Project documents updates examples:

- Requirements documentation
- Requirements traceability matrix
- Change log

13**CONTROL SCOPE****OUTPUTS**

Organizational Process Assets
updates »

OPA updates examples:

- Causes of variances
- Corrective action chosen and the reasons
- Other types of lessons learned from project scope control

Project Scope Management

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Project Scope Management



- Project Scope vs Product Scope
- Gold Plating
- Scope Management Plan content
- Scope Creep
- Requirements Management Plan content
- Requirements classification
- Requirements Documentation
- Requirements Traceability Matrix
- facilitated Workshops
- JAD
- QFD
- VOC
- User Stories
- Group Creativity Techniques
- Group Decision-Making Techniques
- Prototypes
- Benchmarking
- Context Diagrams
- Product Analysis
- Alternatives generation
- Project Scope Statement content
- WBS
- WBS dictionary content
- Control account
- Planning Component
- Work Package
- Decomposition approaches
- Scope baseline
- 100% rule
- Rolling wave planning
- Validate Scope vs Control Scope
- Deliverables workflow

Project Scope Management

**Even if you have Questions
still**

**25 Questions
30 minutes**