



**Project Scope Management**

## Product Scope

### ➤ *Product scope*

- ❖ The features and functions that are to be included in your products or service or result of the project.
- ❖ Completion is measured against the product requirements.

### ➤ **Project Scope**

- ❖ The work that must be done to deliver the specified product.
- ❖ Completion is measured against the project management plan.

## Project Scope Management

### ➤ Scope Management means:

- ❖ Processes required to ensure that project includes all the work required, and only the work required, to complete the project.
- ❖ Managing a project scope is primarily concerned with defining and controlling what is and is not included in the project.
- ❖ Scope management defines how the deliverables of project will be verified and accepted.
- ❖ Develop project management plan under integration produces scope management plan which will define how the scope shall be defined, verified and controlled.
- ❖ Uncontrolled scope is called Scope Creep

## Project Scope Management Processes

- **Collect Requirements** : the process of defining and documenting stakeholder's needs to meet the project objectives
- **Define Scope** : the process of developing a detailed description of the project and the product
- **Create WBS**: the process of subdividing the project deliverables and the project work into smaller, more manageable components
- **Verify Scope** : the process of formalizing acceptance of the completed project deliverables
- **Control Scope** : the process of monitoring the status of the project and product scope and managing changes to the scope baseline

## 5.1 Collect Requirements

- Collect requirements is the process of defining and documenting stakeholders' needs to meet the project objectives .
- 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 measured once project execution begins .
- Collecting requirements is defining and managing customer expectations . Requirements become the foundation of the WBS. Cost , Schedule, and quality planning are all built upon these requirements .

## 5.1 Collect Requirements

- The development of requirements begins with an analysis of the information contained in the project charter and the stakeholder register .
- Many organizations categorize requirements into project requirements and product requirements
- Project requirements : business requirements, project management requirements ,delivery requirements etc
- Product requirements : technical,security,performance , etc

## 5.1 Collect Requirements

Inputs	Tools & Techniques	Outputs
<ol style="list-style-type: none"> <li>1. Project charter</li> <li>2. Stakeholder Register</li> </ol>	<ol style="list-style-type: none"> <li>1. Interviews</li> <li>2. Focus Groups</li> <li>3. Facilitated workshops</li> <li>4. Group creativity techniques</li> <li>5. Questionnaires and surveys</li> <li>6. Observations</li> <li>7. Prototypes</li> </ol>	<ol style="list-style-type: none"> <li>1. Requirements documentation</li> <li>2. Requirements management plan</li> <li>3. Requirements traceability matrix</li> </ol>



## 5.1 Collect Requirements - Inputs

1. Project Charter
2. Stakeholder Register :
  - The stakeholder register is used to identify stakeholders that can provide information on detailed project and product requirements .



## 5.1 Collect Requirements – Tools & Techniques

### 1. Interviews :

- Is a formal or informal approach to discover information from stakeholders by talking to them directly
- It is typically performed by asking prepared and spontaneous questions and recording the responses .
- Interviews are often conducted **one –on –one** , but may involve multiple interviewers and/or interviewees.
- Interviewing experienced project participants, stakeholders and subject matter experts can aid in identifying and the defining the features and the functions of the desired project deliverables .

## 5.1 Collect Requirements – Tools & Techniques

### 2. Focus Groups :

- Focus groups bring together prequalified stakeholders and the subject matter experts to learn about their expectations and attitudes about a proposed product, service, or result .
- A trained moderator guides the group through an interactive discussion , designed to be more **conversational than a one-on-one interview**

## 5.1 Collect Requirements – Tools & Techniques

### 3. Facilitated Workshops :

- Requirements workshops are focused sessions that bring key cross – functional stakeholders together to **define the product requirements** and reconcile stakeholders differences on the same
- Benefit of this technique is that issues can be discovered and resolved more quickly than in individual sessions

## 5.1 Collect Requirements – Tools & Techniques

### 4. Group Creativity Techniques :

- **Brainstorming** : a technique used to generate and collect multiple ideas related to the project and product requirements
- **Nominal Group Technique** : enhances brainstorming with a voting process used to rank the most useful ideas for further brainstorming or prioritization (Brainstorming + Voting)

## 5.1 Collect Requirements – Tools & Techniques

### 4. Group Creativity Techniques :

- **The Delphi Technique** is an anonymous method to query experts. Delphi technique uses an experienced Facilitator.
- The responses are only available to the facilitator.
- Participants can express ideas or opinions without fear or getting intimidated.

## 5.1 Collect Requirements – Tools & Techniques

### 4. Group Creativity Techniques :

- **Idea/mind mapping** : ideas created through individual brainstorming are consolidated into a single map to reflect commonality and differences in understanding , generate new ideas (Brainstorming +Map).
- **Affinity Diagram** : this technique allows large number of ideas to be sorted into groups for review and analysis

## 5.1 Collect Requirements – Tools & Techniques

5. Group Decision Making Techniques : there are multiple methods of reaching a group decision :

- **Unanimity** : everyone agrees on a single course of action
- **Majority** : support from more than 50% of the members of the group
- **Plurality** : the largest block in a group decides even if a majority is not achieved
- **Dictatorship** : one individual makes the decision for the group



## 5.1 Collect Requirements – Tools & Techniques

### 6. Questionnaires and Surveys :

- Questionnaires and surveys are written sets of questions designed to quickly accumulate information from a wide number of respondents .



## 5.1 Collect Requirements – Tools & Techniques

### 6. Observations :

- Observations provide a direct way of viewing individuals in their environment and how they perform their jobs or tasks and carry out processes
- It is particularly helpful for detailed processes when the people that use the product have difficulty or are reluctant to articulate their requirements
- Observation ( also called “job shadowing”) is usually done externally by the observer viewing the user performing his or her job .
- It can also be done by a “participant observer” who actually performs a process to experience how it is done to uncover hidden requirements

## 5.1 Collect Requirements – Tools & Techniques

### 7. Prototypes :

- Is a method of obtaining early feedback on requirements by providing a working model of the expected product before actually building it
- Prototypes support the concept of progressive elaboration because they are used in iterative cycles of mock up creation, user experimentation, feedback generation, and prototype revision.
- When enough feedback cycles have been performed , the requirements obtained from the prototype are sufficiently complete to move to a design or a build phase

## 5.1 Collect Requirements – Outputs

### 1. Requirements Documentation :

- Describe how individual requirements meet the business need for the project
- Requirements may start out at a high level and become progressively more detailed as more is known
- Before being baselined, requirements shall be made measurable, traceable, complete and acceptable to the stakeholders.

## 5.1 Collect Requirements – Outputs

### 2. Requirements Management Plan :

- Documents how requirements will be analyzed , documented and managed throughout the project.
- The phase to phase relationship strongly influences how requirements are managed.
- Configuration management is often used manage and track changes to deliverable (product, service or result) requirements

## 5.1 Collect Requirements – Outputs

### 3. Requirements Traceability Matrix :

- It is a matrix that links requirements to their origin and traces them throughout the project life cycle .
- It provides structure for managing changes to the project scope
- Each requirements origin and its attributes are recorded
- Matrix helps to ensure that requirements approved in requirements documentation are delivered at the end of the project.

## 5.2 Define Scope

- Define Scope is the process of developing a detailed description of the project and the product (SOW is now elaborated)
- Initial scope, risks, constraints and assumptions documented during project initiation are analyzed for completeness and defined in more detail.



## 5.2 Define Scope

Inputs	Tools & Techniques	Outputs
<ol style="list-style-type: none"> <li>1. Organizational process assets</li> <li>2. Project charter</li> <li>3. Requirements Documentation</li> </ol>	<ol style="list-style-type: none"> <li>1. Product analysis</li> <li>2. Alternatives identification</li> <li>3. Expert Judgement</li> <li>4. Facilitated Workshops</li> </ol>	<ol style="list-style-type: none"> <li>1. Project scope statement</li> <li>2. Project Document Updates</li> </ol>

## 5.2 Define Scope – Tools and Techniques

### 1. Product Analysis

- The purpose of product analysis is to analyze the objectives stated by the customer or sponsor and turn them into real requirements. (Product breakdown, systems analysis, value engineering, requirements analysis and value analysis)

### 2. Alternative Identification

- ❖ Identifying alternatives is a technique used to generate different approaches to execute and perform the work of the project.
  - ✓ Brainstorming
  - ✓ Lateral Thinking
  - ✓ Pair wise comparison

## **5.2 Define Scope**

3. Expert Judgement
4. Facilitated Workshops



## 5.2 Define Scope - Outputs

### 1. Project Scope Statement

- ❖ Project scope statements describes, in detail (remember SOW), project deliverables and work required to create these deliverables
- ❖ It helps to create a common understanding among stakeholders (avoid scope creep)
- ❖ Project team can perform detailed planning now

## 5.2 Scope Definition - Outputs

Project scope statement will normally have

- ✓ Product scope description
- ✓ Product acceptance criteria
- ✓ Project deliverables
- ✓ Project exclusions (will define project boundaries)
- ✓ Project constraints
- ✓ Project assumptions

## 5.2 Scope Definition - Outputs

### 2. Project Document Updates :

➤ Project documents that may be updated include

1. Stakeholder register
2. Requirements documentation
3. Requirements traceability matrix

## 5.3 Create WBS

- What is Work Breakdown Structure (WBS)
  - ❖ The WBS is a deliverables-orientated decomposition of the work to be executed by project team in a project. WBS is not an organization structure of project or product breakdown.
  - ❖ ***Work that doesn't fit into the WBS does not fit within the project.***
  - ❖ Projects are normally too big to manage and WBS breaks the project works into smaller more manageable components arranged according to deliverables.
  - ❖ This is a top down effort, break works from top to down



## 5.3 Create WBS

### ➤ More about WBS

- ❖ Each level of WBS is a smaller piece of level above.
- ❖ The top most level of each WBS is the total project itself
- ❖ Work is broken down to the lowest level possible till further division is logically not possible or the work can be confidently estimated and scheduled.
- ❖ WBS represents total work specified in the current approved scope statement and shall be revised if a major scope change occurs.

## 5.3 Create WBS

Inputs	Tools & Techniques	Outputs
<ol style="list-style-type: none"> <li>1. Organizational process assets</li> <li>2. Project scope statement</li> <li>3. Requirements Documentation</li> </ol>	<ol style="list-style-type: none"> <li>1. Decomposition</li> </ol>	<ol style="list-style-type: none"> <li>1. Work breakdown structure (WBS)</li> <li>2. WBS dictionary</li> <li>3. Scope baseline</li> <li>4. Project Documentation Updates</li> </ol>

## 5.3 Create WBS – Tools & Techniques

### 1. Decomposition

- This technique involves breaking down the deliverables into smaller, more manageable components of work.
- The idea here is to break down the deliverables to a point where you can easily plan, execute, monitor and control, and close out the project deliverables.
- Each level of WBS is a more detailed definition of the level above it.

## **5.3 Create WBS**

### ➤ Merits of Decomposition

- ❖ Improves estimates
- ❖ Better performance measures and controls
- ❖ Baselines to compare against throughout the project or phase
- ❖ Assigning resources and responsibility to work package

## 5.3 Create WBS

- According to PMBOK, Decomposition is five step process:

IDENTIFY ALL THE MAJOR PROJECT DELIVERABLES



ORGANIZE THE WORK AND DETERMINE WBS STRUCTURE



DECOMPOSE



ASSIGN IDENTIFICATION CODES OR NUMBERS

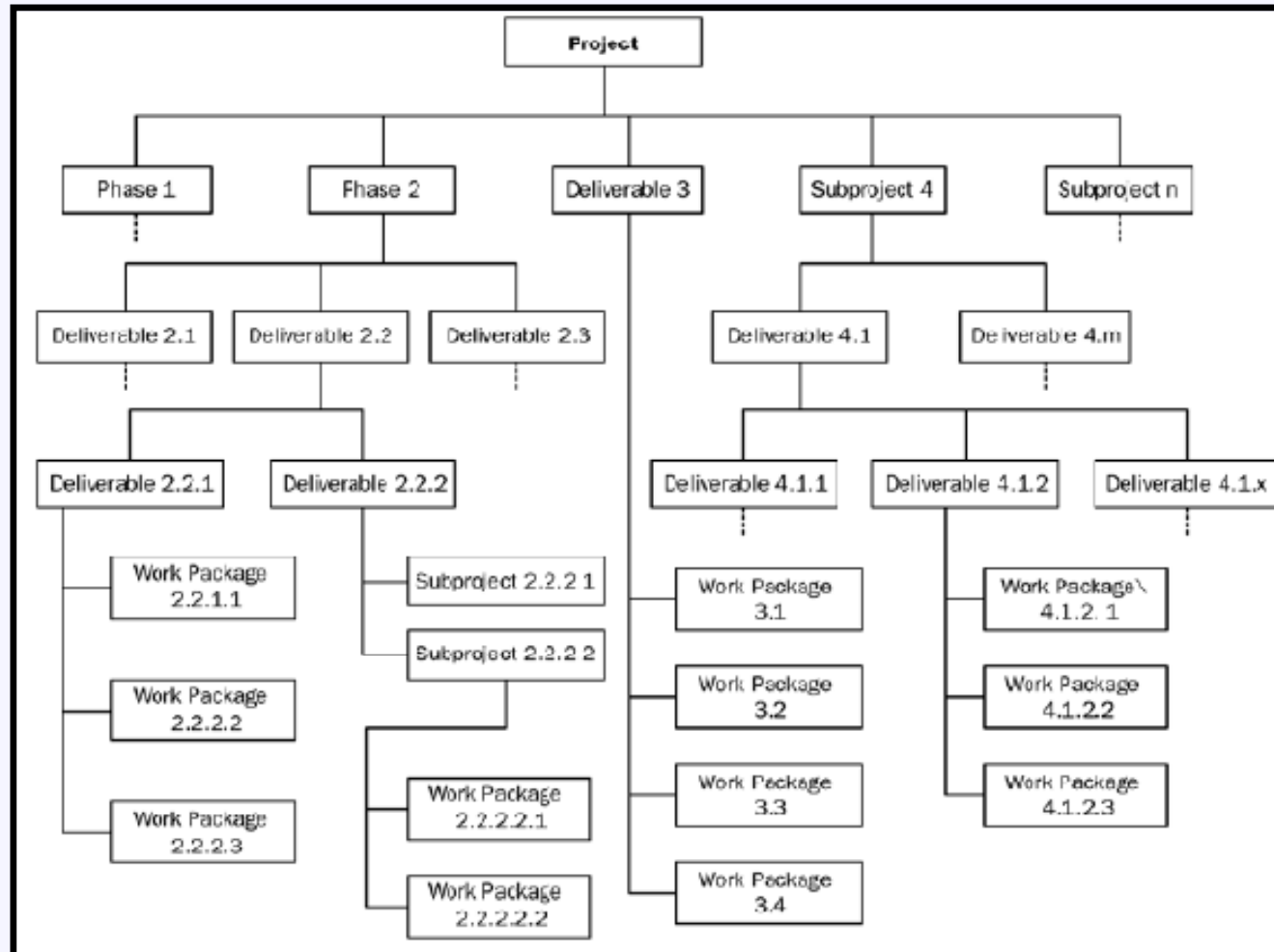


VERIFICATION STEP

## 5.3 Create WBS

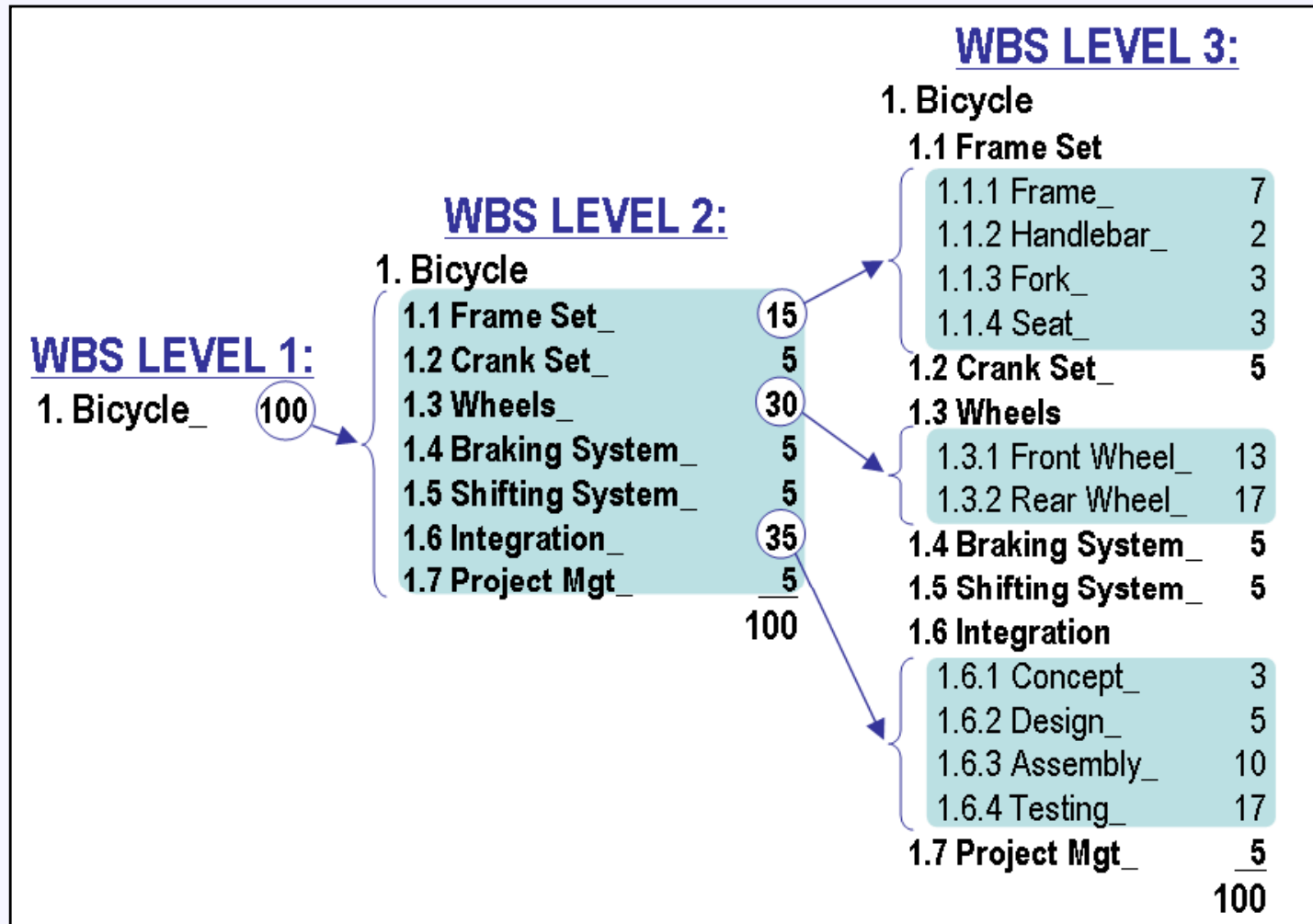
- According to the A Guide to the PMBOK, there are also several ways you can organize the WBS.
  - ❖ Major deliverables and subprojects
  - ❖ Subproject executed outside the project team
  - ❖ Project phases
  - ❖ Combination approach

## 5.3 Create WBS





## 5.3 Create WBS



## 5.3 Create WBS – Rolling Wave Plan

- Detailed decomposition of work may not be possible for works that will be completed in the future since project team is not fully aware of details of work. Team waits for the more details and only work in the near future is decomposed. This is called Rolling Wave Planning
- Work in the near term is elaborated in more detail than work to performed in the future.

## 5.3 100% Rule

- Each WBS levels represents a breakdown of WBS level above.
- Lowest level is called work package
- If the lowest levels are rolled up to the higher levels, the total must represents the total work of the project. This is called 100% rule.
- This ensures that no work is left out or extra work is added.

## 5.3 Create WBS - Outputs

1. Work Breakdown Structure
2. WBS Dictionary
3. Scope Baseline
4. Project Document Updates

## 5.3 WBS

- WBS is
  - ❖ WBS represents all product and project works including the project management work decomposed based on deliverables
  - ❖ Each descending level of WBS represents increasingly detailed definition of project work.
  - ❖ Lowest level of WBS is work package which may again be broken down for scheduling.
  - ❖ WBS is completed by establishing control accounts for work packages and a unique identifier from a code of accounts

## 5.3 Control Accounts

- Each element at each level of the WBS is generally assigned a unique identifier. Unique identifiers are normally taken from organization's code of accounts to track cost by category.
- Each item in WBS need to be estimated, resourced, budgeted and controlled. If management need to measures performance (budget & time), WBS shall be linked to accounting system. Normally control account is placed in WBS for this purpose.
- Control account is placed above work package level in WBS
- Each control account may have more than one work package but one work package shall only be linked to one control account.

## 5.3 WBS Dictionary

- The WBS dictionary is where work component descriptions are documented.
- WBS dictionary should include the following elements for each component of the WBS.
  - ❖ Code of accounts identifier
  - ❖ Statement of work, which describes the work of the component
  - ❖ Organization responsible for completing the component
  - ❖ List of Schedule Milestones
  - ❖ Associated Schedule Activities
  - ❖ Resources required
  - ❖ Cost estimates
  - ❖ Quality requirements
  - ❖ Acceptance criteria
  - ❖ Technical references



## 5.3 Scope Baseline

- The scope baseline is defined as the detailed project scope statement, the WBS, and the WBS dictionary.
- From these documents, you'll document schedules, assign resources, and monitor and control the work of the project according to what's described here.

## 5.3 Project Document Update

- Creation of WBS may update project documents
- Any update has to follow integrative change control processes



## 5.4 Verify Scope

- Scope Verification is the process of the project customer accepting the project deliverables.
- Scope verification is ensuring that the deliverables is concerned with the acceptance of the work.
- Scope verification is concerned with acceptance of deliverables but Quality control is concerned with meeting the quality requirements specified.
- Quality control is normally performed prior to scope verification but both may be performed in parallel.

## 5.4 Verify Scope

Inputs	Tools & Techniques	Outputs
<ol style="list-style-type: none"> <li>1. Project Management Plan</li> <li>2. Requirements Documentation</li> <li>3. Requirements Traceability matrix</li> <li>4. Validated deliverables</li> </ol>	<ol style="list-style-type: none"> <li>1. Inspection</li> </ol>	<ol style="list-style-type: none"> <li>1. Accepted deliverables</li> <li>2. Change requests</li> <li>3. Project document updates</li> </ol>

## 5.4 Verify Scope : Inputs

- Project Management Plan : as it contains the scope baseline (Project scope + WBS + WBS Dictionary)
- Requirements Documentation
- Requirements Traceability matrix : this matrix links requirements to their origin and tracks them throughout the project life cycle.
- Validated deliverables : validated deliverables have been completed and checked for correctness by the perform quality control process

## 5.4 Verify Scope : Tools & Techniques

### 1. Inspection

- ❖ To complete scope verification, the work must be inspected.
- ❖ This may require measuring, examining, and testing the product to prove it meets customer requirements.
- ❖ Inspection usually involves the project manager and customer inspecting the project work for verification, which in turn results in acceptance.
- ❖ Depending on the industry, inspection may also be known as:
  - ✓ Reviews, Product Reviews, Audits & Walkthrough

## 5.4 Verify Scope : Tools & Techniques

### ➤ Inspection vs Audit

- ❖ Inspection involves measuring, examining, and testing the product to prove it meets requirements.
- ❖ Audit is normally an independent review (normally third party) to determine whether a process comply with policies and procedures.
- ❖ Inspection need measurements



## 5.4 Verify Scope : Outputs

1. **Accepted Deliverables:** This is a formal process that requires signed documentation of the acceptance by the sponsor or customer.
2. **Change Requests :** those completed deliverables that have not been accepted are documented , along with the reasons for non acceptance . Those deliverables may require a change request for defect repair .
3. **Project Document Updates :** Project documents that may be updated include any documents that define the product or report status on product completion

## 5.5 Control Scope

- Control Scope :
  - ❖ Monitor the status of project and product scope and manages any changes to scope baseline.
  - ❖ Is part of integrative change control.
  - ❖ Uncontrolled scope changes result in scope creep.

## 5.5 Control Scope

Inputs	Tools & Techniques	Outputs
<ol style="list-style-type: none"> <li>1. Project Management Plan</li> <li>2. Work performance information</li> <li>3. Requirements documentation</li> <li>4. Requirements traceability matrix</li> <li>5. Organizational process assets</li> </ol>	<ol style="list-style-type: none"> <li>1. <b>Variance analysis</b></li> </ol>	<ol style="list-style-type: none"> <li>1. Work performance measurements</li> <li>2. Organizational process assets updates</li> <li>3. Change requests</li> <li>4. Project management plan updates</li> <li>5. Project document updates</li> </ol>

## **5.5 Control Scope - Inputs**

### **1. Project Management Plan :**

It contains the following information that is used to control scope :

- Scope Baseline
- Scope Management Plan
- Change Management Plan : defines the process for managing change on the project
- Configuration Management Plan : defines those items that are configurable, those items that require formal change control, and the process for controlling changes to such items
- Requirements Management Plan

## **5.5 Control Scope - Inputs**

### 2. Work Performance Information :

Information about the project progress , such as which deliverables have started , their progress and which deliverables have been finished

### 3. Requirements documentation

### 4. Requirements traceability matrix

### 5. Organizational process assets

## 5.5 Control Scope – Tools & Techniques

1. Variance Analysis :
  - Project performance measurements are used to assess the magnitude of variation from the original scope baseline .
  - Important aspects of the project scope control include determining the cause and the degree of variance relative to the scope baseline and deciding whether corrective or preventive action is required

## 5.5 Control Scope - Outputs

### 1. **Work Performance Measurements :**

- Measurements can include planned vs. actual technical performance or other scope performance measurements .
- This information is documented and communicated to the stakeholders

### 2. **Change Requests :** change requests to the scope baseline or other components of the project management plan. Change requests can include preventive or corrective actions or defect repairs .

### 3. **Project Management Plan Updates :**

- Scope Baseline Updates
- Other Baseline Updates

### 4. **Project Document Updates :** requirements documentation update, requirements traceability matrix updates , etc