Project Scope Management
Objective

- Project Scope Management is primarily concerned with defining and controlling what is included and what is not included in the Project.
- Gathering Requirements, Managing Scope and meeting customer expectations are a major part of a Project Manager's work.
- How to achieve Project success by mastering to manage Project Scope.
What is Scope?

- The term Scope refers to the deliverables of the Project.
- In Project context Scope can refer to both Product Scope and Project Scope.

Product Scope
- The features and functions that characterize a product, service, or result

Project Scope
- The work that needs to be accomplished to deliver a product, service, or result with the specified features and functions. Project scope includes the planning, coordination and management activities that ensure that the Product Scope is achieved.
What is Scope?

- Provides a clear understanding of the problem domain
- Establishes a context of the need/problem

- Scope Defines
  - What the system must do
    - What characteristics of properties the system must have
    - What information is involved
    - What degree of quality is expected
    - What constraints apply to the solution
  - Who will use the system

- Well defined Scope is measurable and provides the basis for defining Project success
Key Terms

In Scope
What is included in the Project?

Out of Scope
What is not included in the Project?

Scope creep
Uncontrolled changes to Project Scope without approval from customer or without addressing the effect on time, cost and resources.

Deliverables
An unique and verifiable product, result or service that must be produced to complete a process, phase or project.

WBS(Work Breakdown Structure)
A deliverable oriented hierarchical decomposition of the work to be executed by the Project team to achieve Project objective.
Key Terms

WBS Dictionary
A document which describes each component in the WBS.

Work package
A deliverable or work component at the lowest level of each branch of WBS.

Control Account
A Management point where Scope, budget, actual cost and schedule are integrated and compared to earned value for performance measurement.

Code of Account Identifier
Any numbering system used to identify each component of the WBS.
Project Scope Management

- Project Scope Management is meticulous Planning, Monitoring and Controlling of the work necessary to complete the Project.

- The successful Project Scope Management starts from properly identifying, defining and documenting the requirements of the Project Stakeholders.

- The Project Scope will cover all the work and only the work required to complete the Project successfully.
Project Scope Management

Key Processes

• Plan Scope Management
• Collect Requirements
• Define Scope
• Create WBS
• Validate Scope
• Control Scope
PLAN SCOPE MANAGEMENT

Planning Process Group

• Plan Scope Management
• Collect Requirements
• Define Scope
• Create WBS
• Validate Scope
• Control Scope
Plan Scope Management

- Process of creating 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 thought the Project
Plan Scope Management

**INPUTS**
- Project Management plan
- Project charter
- Enterprise environmental factor
- Organizational process assets

**TOOLS and TECHNIQUES**
- Expert judgment
- Meetings

**OUTPUTS**
- Scope Management plan
- Requirements Management plan

Plan Scope Management – Inputs, Tools and Techniques and Outputs
Plan Scope Management

Inputs

- **Project Management Plan**
  - Documents how each step of the Project is executed, monitored, controlled and closed
  - Incorporates and consolidates all the subsidiary plans and baselines

- **Project Charter**
  - Is the formal document authorizing the Project.
  - It will contain the high level Project and product requirements

- **Enterprise Environmental Factor**

- **Organizational Process Assets**
  - Organizational Process, Procedure, Guidelines, Work instructions, Proposal evaluation criteria and Measurement criteria etc..
  - Project Management Plan templates
  - Change control procedures
  - Project files and data from the past Projects
  - Historical information and lessons learned knowledge base
  - Configuration Management knowledge base
Plan Scope Management
Tools and Techniques

Expert Judgment

- Getting the opinion of an expert on the particular field.
- Will be useful to understand
  - What level of tailoring is required to Project process?
  - To develop and include technical and Management details in the Project Management plan
  - To decide on the resource and skill level required to perform a Project work
  - To decide what level of configuration Management is required for this Project
  - To decide on the change control process and the documents which must follow this process?
Plan Scope Management
Tools and Techniques

Meetings
- Project team may attend Project meetings to develop the Scope Management Plan
- Attendees at these meetings
  - Project Manager
  - Project Sponsor
  - Selected Project team members
  - Selected Stakeholders, etc.,
Plan Scope Management

Scope Management Plan

- How the Scope will be defined, developed, monitored, controlled and verified.
- Process for preparing a detailed Project Scope statement
- Process that enables the creation of the WBS from the detailed Project Scope statement
- Process that establishes how the WBS will be maintained and approved
- Process that control how requests for changes to detailed Project Scope statement will be processed
- Formal or informal, broadly framed or highly detailed based on the needs of the Project.
Plan Scope Management

Outputs

Requirement Management Plan
- How requirements activities will be planned, tracked and reported
- Configuration Management activities
- Requirements prioritization process
- Product metrics that will be used and a rationale for using them
- Traceability structure to reflect which requirement attributes will be captured on the traceability matrix
COLLECT REQUIREMENTS

Planning Process Group

- Plan Scope Management
- **Collect Requirements**
- Define Scope
- Create WBS
- Validate Scope
- Control Scope
Collect Requirements

- Is the process of elicitation of the stated and implied needs of the Project Stakeholders.
- The requirements collected should include both Project and Product requirements.
- The requirement development starts from analyzing the Project charter and the Stakeholder registers.
- Element of Project Planning Process group.
Collect Requirements

**Inputs**
- Project Scope
- Management plan
- Requirement Management Plan
- Stakeholder Management plan
- Project Charter
- Stake Holder Register

**Tools and Techniques**
- Interviews
- Focus Groups
- Facilitated Workshop
- Group Creativity Techniques
- Group Decision Making Technique
- Questionnaires and surveys
- Observations
- Prototypes
- Benchmarking
- Context diagrams
- Document analysis

**Outputs**
- Requirements Documentation
- Requirement traceability matrix

Collect Requirements – Inputs, Tools and Techniques and Outputs
Collect Requirements

Inputs

- Scope Management Plan
- Requirement Management Plan
- Stakeholder Management plan
  - Is used to understand Stakeholder communication requirements and the level of Stakeholder engagement

- Project Charter
  - Is the formal document authorizing the Project.
  - It will contain the high level Project and product requirements

- Stake Holder Register
  - Contains information about the Project stake holders
  - The Project team can identify Stakeholders, who will give inputs to the Project and product requirements.
Collect Requirements
Tools and Techniques

- **Interviews**
  - Is a formal or informal meeting between the Project team member(s) and the Project Stakeholder(s), Project participant(s) or subject matter experts
  - With a purpose of obtaining information about the Project / product requirements

- **Focus Groups**
  - Is a form of group discussion in identifying the Project requirements
  - The group can consist Project team members, Project Stakeholders or SMEs
  - Different types of suggestions, views are exchanged within an interactive group
  - Controlled by a moderator, who guides the discussions in order to obtain the group’s opinion

- **Facilitated Workshop**
  - Conducted with key cross functional Stakeholders to define product requirements.
  - Primary tool for defining cross functional requirements and settle Stakeholder differences.
  - Joint Application Development (JAD) workshop with Users and Development team is an example of Facilitated workshop
Collect Requirements
Tools and Techniques

- Group Creativity Techniques
  - Brainstorming
  - Nominal group techniques
  - Idea Mind mapping
  - Affinity diagram
  - Multi-criteria decision analysis

- Group Decision Making Technique
  - The requirements/features will be discussed in a group and decisions can be taken based on
    - Unanimity
    - Majority
    - Plurality
    - Dictatorship.

- Questionnaires and surveys
  - Predefined set of questionnaire and survey to collect information form a broad audience base
Collect Requirements
Tools and Techniques

- **Observations**
  - Directly watching the process being performed / product being used in their intended environment
  - Helpful when the user could not articulate the requirements.
  - Also known as job shadowing.

- **Prototypes**
  - Is a modeling method
  - Full model or scale model of an existing or a new product is created to understand the design challenges, user related issues
  - Provides early feedback on the requirements

- **Benchmarking**
  - Involves comparing actual or planned practices, such as processes and operations.
  - The organizations compared during benchmarking can be internal or external
Collect Requirements
Tools and Techniques

- **Context Diagram**
  - Visually depict the product Scope by showing a business system (process, equipment, computer system, etc)
  - Shows inputs to the business system, the stakeholders providing the input and the outputs from the business system and the stakeholder receiving the output.

- **Document Analysis**
  - Is used to elicit requirement by analyzing existing documentation and identifying information relevant to the requirements.
  - Ex. : Business plans, marketing literature, agreements, request for proposal, current process flows, logical data models, business rules, use cases, other requirement documentation, problem/Issue log, policies, procedures, and regulatory documentation.
Collect Requirements

 Outputs

- Requirements Documentation
  - Business requirement
  - Stakeholder requirements
  - Solution requirements
  - Project requirements
  - Transition requirement
  - Requirements assumptions
  - Dependencies and constrains
Collect Requirements
Outputs

Requirement traceability matrix

- Helps to trace a requirement throughout the life cycle.
- Helps tracing requirements with respect to business needs, Project Scope, Project objectives, WBS, deliverables, product design, product development and product testing.
- Will consist of
  - A unique identifier for each requirement
  - Description of the requirement
  - Rationale behind inclusion
  - Requirement owner
  - Source of origination
  - Priority
  - Version no.
  - Current status - etc....
Requirements Characteristics

- Well defined requirements are
  - Unambiguous
  - Verifiable
  - Clear
  - Concise
  - Complete
  - Necessary
  - Independent
  - Correct
  - Feasible
  - Atomic
  - Traceable
  - Consistent
  - Implementation free
  - Non-redundant

- Requirements can be stated, unstated or derived
  - Stated Requirements: Requirements stated in the Statement of Work (SOW) or similar documentation identifying specific problems to be solved
  - Unstated Requirements: Requirements implied or understood although not apparent in the SOW or similar documentation
  - Derived Requirements: Requirements identified during the analysis effort
Factors which complicate Requirements Management

- Multiple Requirements Set
- Large number of requirements
- Different Levels of requirements
- Version Control
- Change Control
- Product Lines
- Distributed Teams
- Different processes
Requirements Pitfalls

- Not defining and communicating terminology to the Project team
- Not building what the Project Stakeholders want
- Not planning the requirements roles, activities and approach
- Improper language in the requirement
- Neglecting to tailor the structure, detail, and format of requirements to match the type of system under development
- Not clarifying ambiguities.
- Focusing on requirements tools and templates rather than the requirement quality.
- Mixing user interface details with the requirements
- No quality assurance of requirements
Problems faced while gathering Requirements

- Contradicting / Conflicting requirements
- Communication problems
- Undocumented processes
- Lack of access to end users
- Bad Requirements
Requirements Management
DEFINE SCOPE

Planning Process Group

• Plan Scope Management
• Collect Requirements
• Define Scope
• Create WBS
• Validate Scope
• Control Scope
Define Scope

- Is the process of developing a detailed description of the Project and the product
- The Project deliverables, assumptions and constraints identified during the Project initiation are further refined
- Is an element of Project Planning Process group
Define Scope – Inputs, Tools and Techniques and Outputs

**INPUTS**
- Scope Management plan
- Project Charter
- Requirements Documentation
- Organizational Process Assets

**TOOLS and TECHNIQUES**
- Expert Judgment
- Product Analysis
- Alternative generation
- Facilitated Workshops

**OUTPUTS**
- Project Scope Statement
- Project Document Updates
Define Scope

Inputs

- **Scope Management Plan**
- **Project Charter**
  - Is the formal document authorizing the Project.
  - It will contain the high level Project and product requirements
- **Requirements Documentation**
  - Document containing the detailed requirements and approved by the Stakeholders
- **Organizational Process Assets**
  - Organizational Policies, Procedures, guidelines and lessons learned from the previous Projects.
Define Scope
Tools and Techniques

Expert Judgment
- Getting the opinion of an expert on the particular field to define the Scope.
- Can be from a single person or from a group
- Experts can be from
  - Within the organization or outside the organization
  - Within the Project or outside the Project
  - Consultants
  - Subject matter Experts
  - Stakeholders
Product Analysis

– Done by using techniques like
  • product breakdown analysis,
  • systems analysis,
  • systems engineering,
  • value engineering,
  • value analysis, and
  • functional analysis.

– Useful for Project which has a product as its deliverable
Define Scope
Tools and Techniques

- **Alternative Generations**
  - Considering the different approaches or methods available to perform/execute a Project work
  - Employs general management tools such as Brainstorming, Lateral thinking etc…. To find alternate ways

- **Facilitated Workshops**
Define Scope

Outputs

- **Project Scope Statement**
  - A document that defines a Project and what it does and does not need to accomplish
  - Must be as detailed as possible
  - Must mention what is included and what is excluded.
  - Must include the following either directly or as a reference to other documents:
    - Product Scope Description
    - Project Deliverables
    - Project Constraints

- **Project Document Updates**
  - May include
    - Stakeholder register
    - Requirements documentation
    - Requirement Traceability Matrix etc…
CREATE WBS

Planning Process Group

• Plan Scope Management
• Collect Requirements
• Define Scope
• **Create WBS**
• Validate Scope
• Control Scope
Create WBS

- Process of subdividing the deliverables and Project work into smaller and more manageable component
- WBS helps the Project Management team to define deliverables more precisely
- It helps with assigning responsibilities, allocating resources, monitoring and controlling the Project.
- It facilitates better estimation of cost, risk, and time.
- Element of Planning Process Group
Create WBS – Inputs, Tools and Techniques and Outputs

**INPUTS**
- Scope
- Management plan
- Project Scope Statement
- Requirements Documentation
- Enterprise environmental factors
- Organizational Process Assets

**TOOLS and TECHNIQUES**
- Decomposition
- Expert Judgment

**OUTPUTS**
- Scope Baseline
- Project Document Updates
Create WBS

Inputs

• Scope Management Plan

• Project Scope Statement
  – The document that contains details about
    • Product Scope Description
    • Product Acceptance Criteria
    • Project Deliverables
    • Project Exclusions

• Requirements Documentation
  – Document containing the detailed requirements as approved by the Stakeholders
Create WBS

Inputs

- Enterprise Environmental Factors
  - Industry specific WBS standards, relevant to the nature of Project, may serve as external reference sources for creation of the WBS

- Organizational Process Assets
  - Organization’s policies, procedures, guidelines and templates, Previous Project documents and lessons learned from the past Project with respect to creation of WBS
**Create WBS**

**Tools and Techniques**

- **Decomposition**
  - Technique used to break down the Project deliverables into smaller manageable components
  - Takes a top-down approach
  - Deliverables are broken down to a level of work that can be both realistically estimated and managed
  - Work packages are the lowest level components of WBS

- **Expert judgment**
Scope Baseline

- Component of Project Management Plan, which includes
  - Project Scope statement
  - WBS
  - WBS dictionary
WBS

- A hierarchical structure in which Project deliverables are decomposed into smaller components.
- The deliverables and sub-deliverables are represented in levels of descending order.
- The WBS defines the total Scope of work required to complete a Project. This is called 100% rule.
- The WBS is finalized by establishing control of accounts for the work packages and a unique identifier from a code of accounts.
- Allows Project Managers to track individual WBS components easily and facilitates Project performance reporting and costing.
Control Account

- A control account is a Management control point where Scope, Cost and schedule are integrated and compared to the earned value performance measurement.

- A Control Account can have one or more work packages.
WBS is the foundation of a Project

- Procurement Management
- Risk Management
- Quality Management
- Budgeting
- Scheduling
- Project Control
- Activity List
- Network Diagram
- Resources
- Estimating
Create WBS

Outputs

• WBS dictionary
  - A Companion document of WBS, containing details about each element in WBS
  - Contains information such as code of accounts identifier, milestones, contract information, cost, quality requirements, time estimates and resource information

• Project Document Updates
  - Requirement documents
The WBS is illustrative only. It is not intended to represent the full project scope of any specific project, nor to imply that this is the only way to organize a WBS on this type of project.
Group Activity

Discuss the Work Breakdown Structure for the Project defined in the Case Study
VALIDATE SCOPE

Monitoring and Controlling Process Group

- Plan Scope Management
- Collect Requirements
- Define Scope
- Create WBS
- Validate Scope
- Control Scope
Validate Scope

- Process of obtaining the formal acceptance for deliverables from Project sponsor / customer
- Generally, quality control is performed before Scope verification, but in case of small Projects, they can be performed in parallel
Validate the Scope by assessing if it is:

- Unambiguous (not subject to interpretation)
- Granular (right level of abstraction)
- Unique Set (each stated only once)
- Normalized (should not overlap)
- Linked set (shows relationships)
- Bounded (specifies non-negotiable constraints)
- Modifiable (amenable to change and usable during Operations)
- Configurable (traceable changes)
- Traceable (to a customer need)
Validate Scope

**INPUTS**
- Project Management Plan
- Requirements Documentation
- Requirements Traceability Matrix
- Verified deliverable
- Work Performance data

**TOOLS and TECHNIQUES**
- Inspection
- Group decision-making techniques

**OUTPUTS**
- Accepted deliverables
- Change requests
- Work performance information
- Project document updates

Validate Scope – Inputs, Tools and Techniques and Outputs
- Project Management Plan
- Requirements Documentation
  - Document containing the detailed requirements as approved by the Stakeholders
- Requirements Traceability Matrix
  - Helps to trace a requirement throughout the life cycle
- Verified Deliverables
  - Deliverables which are completed and checked for their correctness through the Control Quality process
- Work Performance Data
  - Degree of compliance with requirements, number of nonconformities, severity of the nonconformities
Validate Scope
Tools and Techniques

- Inspection
  - An activity for measuring, examining and verifying the work done towards the deliverables.
  - Also referred to as a review, product review, audit, or walkthrough

- Group decision-making Techniques
  - Used to reach a conclusion when the validation is performed by the Project team and other Stakeholders
Acceptance Criteria

Evaluation Criteria

Problem Tracking

Structured walkthrough

Checklists

Minimum number of requirements needed to ensure feasible solution. Typically used when there is only one possible solution. Which requirements will be used to achieve a solution. Typically used to compare various possible solutions within Project Scope. Used for verification of closure for all problems reported. A formal meeting with all relevant Stakeholders to review the documented requirements, seek feedback, incorporate feedback, and obtain consensus. Set of elements defined for systematic evaluation of the requirements collected to ensure they meet the defined goals.
- **Accepted deliverables**
  - Deliverables that are validated and accepted by the customer / sponsor by formal signoff
  - Formal acceptance document is required for closing the Project or Project phase.
- **Change requests**
  - Deliverables that failed to meet the requirements may require a defect repair or workaround.
  - This will be initiated through change requests
  - Change requests should be processed through the Perform Integrated Change Control process of the Project
- **Work Performance Information**
  - Information about Project progress
  - Deliverables have started, their progress and which are finished
- **Project document updates**
  - Documents defining the product or their status report or product completion.
CONTROL SCOPE

Monitoring and Controlling Process Group

• Plan Scope Management
• Collect Requirements
• Define Scope
• Create WBS
• Validate Scope
• Control Scope
Control Scope

- Is the process of monitoring the Project and Product Scope and managing the changes to the Scope Baseline

- Ensures that all the requested changes to the Scope are processed through the Integrated Change control process

- Uncontrolled changes can result in Scope Creep, jeopardizing the Project.

- Is an element of Monitoring and Controlling Process Group
Control Scope

INPUTS
- Project Management Plan
- Requirement Documentation
- Requirement traceability matrix
- Work Performance data
- Organizational process assets

TOOLS and TECHNIQUES

OUTPUTS
- Work Performance information
- Change request
- Project Management plan updates
- Project document updates
- Organizational process assets updates

Control Scope – Inputs, Tools and Techniques and Outputs
Control Scope Inputs

- Project Management Plan
  - PM plan contains
    - Scope Base line,
    - Scope Management Plan,
    - Change Management Plan,
    - Configuration Management plan and
    - Requirement Management plan
  - These plans provides inputs on how to perform Scope Control.
Control Scope

Inputs

- **Requirements Documentation**
  - Document containing the detailed requirements as approved by the Stakeholders

- **Requirements Traceability Matrix**
  - Helps to trace a requirement throughout the life cycle

- **Work Performance Data**
  - Include the number of change request received, accepted or deliverables completed

- **Organizational Process Assets**
  - Policies, Procedure, Guidelines and other monitoring and reporting methods
Control Scope
Tools and techniques

- Variance Analysis
  - Tool to analyze the difference between planned and actual results
  - Project performance measurements are used to analyze variation from the original Scope baseline or to quantify the variance from the original Scope baseline
Control Scope

Outputs

- **Work Performance Information**
  - Measurements with respect to planned vs. actual
  - Information provides a foundation for making Scope decisions

- **Change request**
  - Arise as a result of variance analysis with respect to Scope baseline vs. actual or due to any other components
  - May include the corrective or preventive actions
  - shall be processed through the integrated change control process.

- **Organizational process assets updates**
  - Will include
    - The causes for variations
    - The chosen corrective action
    - Its justifications for selection
    - lessons learned
Control Scope
Outputs

- Project Management Plan updates
  - The approved change requests as part of the Scope control process may result in
    - Scope Baseline Updates
    - Cost baseline updates and
    - Schedule Baseline updates

- Project document updates
  - Some of the documents that may get updated include
    - Requirements document,
    - Requirement traceability matrix
Summary

- Discussion topics
- Q and A