

## Unit 3: Scope Management (PMBOK® Guide, Chapter 5)

Scope management ensures that a project includes all the work required **but only the work required** to complete the project successfully. In other words, proper scope management carefully identifies **what is** and **what is not** included in the project. The following six processes comprise scope management and **course slide #3-1 also provides an overview of scope management.**

### Major Processes

- 5.1 Plan Scope Management (*creating a scope management plan that documents how project scope will be defined, validated, and controlled*)
- 5.2 Collect Requirements (*defining and documenting stakeholders' needs to meet project objectives*)
- 5.3 Define Scope (*developing a detailed description of the project and product*)
- 5.4 Create WBS (*subdividing project deliverables into smaller components*)
- 5.5 Validate Scope (*formalizing acceptance of completed project deliverables*)
- 5.6 Control Scope (*monitoring status of the project and product scope, and managing changes to the scope baseline*)

There are two kinds of scope (PMBOK® Guide, p. 105):

- *Product scope:* The features and functions embodied in the product, service, or result. Product scope is measured against the product requirements (Sections 5.2 and 5.3: Collect Requirements and Define Scope).
- *Project scope:* The management activities required to deliver the product, service, or result. Project scope is measured against the project management plan (Section 4.2).

The scope baseline consists of the approved versions of the project scope statement, the WBS (work breakdown structure), and the WBS dictionary. The approved scope baseline should only be changed using formal change control procedures. The approved baseline is the basis for deciding whether scope requirements are being met (especially relevant during the processes for validating and controlling scope).

### 5.1 Plan Scope Management (PMBOK® Guide, p. 107)

The scope management plan documents how project scope will be defined, validated, and controlled. In essence, it provides guidance on how the other five scope management processes are to be accomplished.

Plan Scope Management		
Inputs	Tools	Outputs
1. Project management plan 2. Project charter 3. Enterprise environmental factors 4. Organizational process assets	1. Expert judgment 2. Meetings	1. Scope management plan 2. Requirements management plan

**Four Key Inputs for Plan Scope Management (*PMBOK® Guide*, p. 108):**

**1. Project Management Plan:** The most recently approved subsidiary plans of the project management plan (scope, schedule, cost, quality, human resource, and so on) are used to help create the scope management plan. The information in the project charter (next input) is also considered at this point.

**2. Project Charter:** Described in the *PMBOK® Guide*, p. 66, Section 4.1, the charter provides high-level project and product requirements. As such, it forms a starting point for the development of detailed requirements.

**3. Enterprise Environmental Factors:** Environmental factors that may influence scope management planning include:

- Organizational culture
- Infrastructure (resource availability)
- Personnel administration
- Marketplace conditions

**4. Organizational Process Assets:** Organizational process assets that may influence scope management planning include:

- Policies and procedures
- Historical information and lessons learned

**Two Key Tools for Plan Scope Management (PMBOK® Guide, p. 109):**

- 1. Expert Judgment:** Used to elicit information from knowledgeable and experienced parties.
- 2. Meetings:** The project manager, sponsor, selected team members, and other selected stakeholders may attend meetings to develop the scope management plan.

**Two Key Outputs for Plan Scope Management (PMBOK® Guide, p. 109):**

**1. Scope Management Plan:** Is part of the overall project management plan and describes how scope will be defined, monitored, controlled, and verified. Components of the scope management plan include:

- Process for preparing a detailed scope statement
- Process for creating the WBS from the scope statement
- Process for maintaining the WBS
- Process for formal acceptance of project deliverables
- Process for how scope changes will be handled

**2. Requirements Management Plan:** Documents **how** requirements will be analyzed, documented, and continuously managed throughout the project. A requirements management plan may include, but is not limited to:

- How requirements will be planned, tracked, and reported
- Configuration management process for handling changes to the requirements
- Requirements prioritization processes
- Product metrics
- Traceability structure: which requirements will be traced and to which other requirements documents

**5.2 Collect Requirements (PMBOK® Guide, p. 110)**

Collecting requirements involves determining, documenting, and managing stakeholders' needs and requirements. These requirements must be captured in sufficient detail to be measured during project execution. Requirements become the foundation for many other vital project management activities:

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- Requirements become the foundation of the WBS.
- Cost, schedule, quality, and procurement plans are built upon these requirements.

PMI groups requirements into the following categories:

- **Business requirements:** Higher-level needs of the organization such as business opportunities and purpose of the project.
- **Stakeholder requirements:** Perceived needs of specific stakeholders. Includes impacts to various organizational areas and stakeholder reporting requirements.
- **Solution requirements:** Features, functions, and characteristics of the product, service, or result that will satisfy business and stakeholder requirements (similar to the notion of product scope mentioned at the beginning of the unit). Includes functional, non-functional, technology, compliance, support, training, quality, and reporting requirements.
- **Project requirements:** Levels of service, performance, and safety. Also includes acceptance criteria and delivery requirements.
- **Transition requirements:** Activities such as training and data conversion to move from the previous “as-is” state to the future “to-be” outcome.

<b>Collect Requirements</b>		
<b>Inputs</b>	<b>Tools</b>	<b>Outputs</b>
1. Scope management plan 2. Requirements management plan 3. Stakeholder management plan 4. Project charter 5. Stakeholder register	1. Interviews 2. Focus groups 3. Facilitated workshops 4. Group creativity techniques 5. Group decision-making techniques 6. Questionnaires and surveys 7. Observations 8. Prototypes 9. Benchmarking 10. Context diagrams 11. Document analysis	1. Requirements documentation 2. Requirements traceability matrix

**Five Key Inputs for Collect Requirements (PMBOK® Guide, p. 113):**

- 1. Scope Management Plan:** Clarifies which types of requirements need to be collected for the specific project.
- 2. Requirements Management Plan:** Identifies the processes to be used in defining and documenting stakeholder needs. Specific elements of the requirements were provided in the outputs to Plan Scope Management, Section 5.1.3.2.
- 3. Stakeholder Management Plan:** Established in Section 13.2.3.1, the stakeholder management plan identifies required levels of stakeholder communication and stakeholder engagement.
- 4. Project Charter:** Described in *PMBOK® Guide*, p. 66, Section 4.1, the charter provides high-level project and product requirements. As such, it forms a starting point for the development of detailed requirements.
- 5. Stakeholder register:** Described in Section 13.1, the stakeholder register identifies key stakeholders who can provide information needed to develop detailed requirements.

**Eleven Key Tools for Collect Requirements (PMBOK® Guide, p. 114):**

- 1. Interviews:** Used to elicit information from stakeholders by talking to them directly. One-on-one or group interviews with appropriate subject matter experts are used to identify features and functions of desired deliverables.
- 2. Focus Groups:** Interactive, conversational discussions guided by trained moderators with pre-selected stakeholders and subject matter experts. The purpose of this exercise is to document stakeholder expectations and attitudes about a proposed product, service, or result.
- 3. Facilitated Workshops:** Workshops are interactive, group-oriented discussions aimed at quickly defining cross-functional requirements and, hopefully, reconciling stakeholder differences. Well-facilitated sessions can build trust, improve communications, and uncover issues more quickly than numerous individual sessions. The *PMBOK® Guide* provides two examples:
  - **Joint Application Development (JAD):** Sometimes called Joint Application Design, these joint sessions bring users and developers together to improve requirements in the software development industry.

- **Quality Function Deployment (QFD):** QFD is used by engineers to develop requirements for new product developments. The process first determines customer needs, then prioritizes them, and establishes goals for achieving them. User stories describe the stakeholder who benefits (role), what the stakeholder needs to accomplish (goal), and the resulting benefit (motivation).

**4. Group Creativity Techniques:** The following examples are all ways for groups to generate ideas about any desired topic. In this case, the groups are identifying and documenting requirements.

- **Brainstorming:** A group-oriented technique for quickly generating ideas about both project and product requirements.
- **Nominal Group Technique:** An enhanced version of brainstorming which includes voting and prioritizing the group's ideas.
- **Idea/Mind Mapping:** The non-linear diagramming of different ideas in a group into a single map for the purpose of highlighting agreements and differences and also generating new ideas.
- **Affinity Diagram:** A technique for sorting a large number of detailed, specific ideas into logical groups.
- **Multicriteria Decision Analysis:** Uses a decision matrix to establish and apply criteria such as risk levels and uncertainty.

**5. Group Decision-Making Techniques:** Assessment of multiple alternatives using one of the following decision techniques:

- **Unanimity:** Everyone (100%) agrees on a course of action.
- **Majority:** A decision made with support from more than 50% of the group.
- **Plurality:** Decision determined by the largest voting block in the group (even if it represents less than 50%).
- **Dictatorship:** One individual makes the decision for the group (much like the autocratic form of leadership).

**6. Questionnaires and Surveys:** Written sets of questions that help reach large audiences quickly and also enable statistical analysis of data.

**7. Observations:** Directly viewing individuals performing project activities and carrying out processes (sometimes called "job shadowing"). This technique is especially helpful when people are experiencing difficulty in articulating requirements.

**8. Prototypes:** The use of mock-ups and physical working models to assist stakeholders in progressively elaborating requirements. Rapid prototyping is a technique used specifically for elaborating requirements during the development phase of a project.

**9. Benchmarking:** Compares planned or actual practices to other organizations to 1) generate ideas for improvement and 2) provide standards for measuring performance.

**10. Context Diagrams:** Context diagrams are visual depictions of product scope such as processes, equipment or computer systems. The diagram shows how various entities (people and other systems) interact to produce inputs and outputs.

**11. Document Analysis:** A variety of documents may contain information relevant to project requirements, including but not limited to:

- Business plans and marketing literature
- RFPs (requests for proposal), agreements (contracts, MOAs, etc.)
- Policy, procedure, and regulatory documentation
- Laws, codes, or ordinances
- Business process documentation

### **Two Key Outputs for Collect Requirements (*PMBOK® Guide*, p. 117):**

**1. Requirements Documentation:** Describes how individual requirements meet business needs. Requirements often start as high-level information and become progressively more detailed as more becomes known. Before requirements are accepted as baselines, they should be measurable, testable, traceable, complete, and acceptable to stakeholders. The format may be a simple listing of requirements categorized by stakeholders; or a more detailed, elaborate approach including an executive summary, detailed descriptions, and attachments. As previously described on study guide, p. 4, requirements may be grouped into the following categories:

- Business
- Stakeholder
- Solution (product, service, or result)
- Project
- Transition

**2. Requirements Traceability Matrix:** A table that links each requirement to a business need or project objective. The matrix provides a way to track requirements during the project and also provides assistance in checking that requirements have been met for purposes of project closure. The matrix must be updated when there are changes to requirements. The tracing matches requirements to:

- Business needs or opportunities
- Project objectives
- Project scope and WBS deliverables
- Product design and development
- Testing of deliverables

Finally, high-level requirements are matched to the more detailed requirements that follow. An example of a traceability matrix is shown in Figure 5-6, p. 119, *PMBOK® Guide*.

### 5.3 Define Scope (*PMBOK® Guide*, p. 120)

Scope definition produces a written, detailed scope statement that is crucial to project success. This statement represents an agreement between the project team and the customer and defines which requirements collected earlier will actually be included in the scope and which will be excluded. The project team and appropriate stakeholders conduct a needs assessment and use it as the basis to develop written project requirements. Assumptions, constraints, and risks are identified and validated as necessary. The level of uncertainty (difficulty) in defining scope will naturally be greater with more complex projects.

<b>Define Scope</b>		
<b>Inputs</b>	<b>Tools</b>	<b>Outputs</b>
1. Scope management plan 2. Project charter 3. Requirements documentation 4. Organizational process assets	1. Expert judgment 2. Product analysis 3. Alternatives generation 4. Facilitated workshops	1. Project scope statement 2. Project documents updates

**Four Key Inputs for Define Scope (PMBOK® Guide, p. 121):**

- 1. Scope Management Plan:** Described previously, this plan establishes how project scope will be developed, monitored, and controlled.
- 2. Project Charter:** The high-level project description in the charter is used as a basis for developing the detailed project scope statement.
- 3. Requirements Documentation:** Produced by the previous process as described in Section 5.2.
- 4. Organizational Process Assets:** Organizational Process Assets that may affect detailed scope definition include:
  - Existing procedures and templates for project scope statements
  - Project files from previous projects
  - Lessons learned from previous phases or similar projects

**Four Key Tools for Define Scope (PMBOK® Guide, p. 122):**

- 1. Expert Judgment:** At this step, expert judgment with respect to technical details is especially relevant.
- 2. Product Analysis:** This tool is helpful when the project is producing a product rather than a service or other result. These techniques help translate project objectives into measurable deliverables and requirements. Examples of these techniques include product breakdown, requirements analysis, systems engineering, value engineering, and value analysis. Project engineers use these techniques to better understand and develop product requirements.
- 3. Alternatives Generation:** Techniques such as brainstorming, lateral thinking (“thinking outside the box”), and analysis of alternatives are used to identify different possible approaches to the project.
- 4. Facilitated Workshops:** Described previously as a tool of Collect Requirements, *PMBOK® Guide*, Section 5.2.

**Two Key Outputs for Define Scope (PMBOK® Guide, p. 123):**

- 1. Project Scope Statement:** The scope statement provides a detailed description of project deliverables and the work required to create those deliverables. Importantly, it may identify specific exclusions from project scope,

which helps improve the accuracy of stakeholder expectations. The scope statement:

- Provides a common understanding of project scope for key stakeholders
- Describes major objectives
- Supports subsequent detailed planning
- Guides execution of the project work and provides a basis for making future project decisions
- Provides a baseline to evaluate whether requested changes are within the original scope or not

The scope statement typically includes directly or by reference:

- **Product scope description:** Characteristics of the product, service, or result. The characteristics are subject to progressive elaboration (less detail in earlier phases and more detail in later phases).
- **Product acceptance criteria:** Defines the process and explicit criteria for acceptance of the finished work.
- **Project deliverables:** Includes major product deliverables and project management deliverables such as reports and documentation.
- **Project exclusions:** States explicitly what is **excluded** from the project.
- **Project constraints:** Lists any restrictions on the project such as funding limits, imposed deadlines, or limitations on work calendars for the team (e.g. can't work in client facility at night)
- **Project assumptions:** Factors believed to be true so that planning can be completed. The analysis also considers the resulting impact in the event that an assumption proves to be incorrect. Assumptions potentially pose risks both because any assumption might be incorrect and because they are dealing with unknowns. The assumptions at this point in the project life cycle are usually more numerous and detailed than those listed earlier in the charter.

**2. Project Documents Updates:** Specific documents that may be updated include:

- Stakeholder register
- Requirements documentation
- Requirements traceability matrix

## 5.4 Create WBS (PMBOK® Guide, p. 125)

The WBS is a hierarchical decomposition of the work to be accomplished. The WBS *organizes* and defines the *total scope* of the project. Work that is not in the WBS is outside the scope of the project!

### Key points:

- The WBS subdivides the work into smaller components (this process is called decomposition). Each descending level of the WBS represents an increasingly detailed description of the work.
- Tasks (items) at the lowest level of the WBS are called *work packages*.
- The work package is the level at which the work can be adequately scheduled, cost estimated, monitored, and controlled. **Accurate work packages are a major factor in accurate project planning.**
- The recommended size of a work package is *80 hours*.
- A detailed description of each work package is contained in a *WBS dictionary*.
- A code of accounts provides a unique numerical identifier for each task in the WBS. Similarly, a *chart of accounts* groups project expenses into specific categories for the accounting system in the performing organization. Even though this distinction exists, some people use the terms interchangeably.
- An OBS (organizational breakdown structure) shows which work packages have been assigned to which organizational units.
- An important *benefit* of decomposing the project into smaller components is that project participants are forced to *carefully think through* all aspects of the pending effort. This process reduces the chance that activities might be overlooked during the initial planning.

Create WBS		
Inputs	Tools	Outputs
1. Scope management plan 2. Project scope statement 3. Requirements documentation 4. Enterprise environmental factors 5. Organizational process assets	1. Decomposition 2. Expert judgment	1. Scope baseline 2. Project documents updates

**Five Key Inputs for Create WBS (*PMBOK® Guide*, p. 127):**

- 1. Scope Management Plan:** Specifies how to create the WBS from the detailed scope statement (previous process) and how to maintain the WBS throughout the project.
- 2. Project Scope Statement:** Described in *PMBOK® Guide*, Section 5.3.3.1, the scope statement identifies major project deliverables which, in turn, may assist in developing the high-level portion of the WBS.
- 3. Requirements Documentation:** Establishes objectives and basic requirements that make it possible to break the work into smaller components.
- 4. Enterprise Environmental Factors:** Industry-specific standards for developing a WBS are available in some instances, e.g., engineering projects may use ISO/IEC 15288 which provides guidelines for systems engineering.
- 5. Organizational Process Assets:** Organizational Process Assets that may affect creation of the WBS include:
  - Existing procedures and templates for the WBS
  - Project files from previous projects
  - Lessons learned from previous projects

**Two Key Tools for Create WBS (*PMBOK® Guide*, p. 128):**

- 1. Decomposition:** The process of breaking project deliverables into smaller and smaller pieces, in other words, finding the level of detail at which tasks can be adequately planned and managed. Again, the desired level of detail is the work package and is the level at which the cost and schedule for the work can be reliably estimated. Be familiar with the following key factors about decomposition:
  - Generally, greater levels of decomposition improve the ability to plan, manage, and control the work.
  - However, excessive decomposition can lead to non-productive management (tracking and reporting at an excessive level of detail).
  - The WBS represents **all** work to be accomplished:
    - Project management work is included in the WBS.

- When all detailed work is rolled up into higher levels, all the work should be accounted for (PMI refers to this as the 100% rule).
- Work should be decomposed to a level at which:
  - It can be accurately estimated.
  - It is not logical to subdivide it further.
  - Individual responsibility can be assigned.
- Different deliverables can have different levels of decomposition (one deliverable may be at level 4 while another is at level 6). **Course slide #3-5** shows an example.

The *PMBOK® Guide* indicates that the first level of decomposition can be displayed in the following ways:

- Major deliverables
- Major subprojects done by organizations outside the project team
- Phases of the project life cycle
- Hybrid mixtures of all the above (e.g., phases at the first level of decomposition and then deliverables within each phase)

**2. Expert Judgment:** Technical knowledge of the work is helpful in determining the appropriate level of decomposition. Also, templates are often available and may represent previous experience on similar projects. PMI has a document called the *Practice Standard for Work Breakdown Structures* and other industry-specific WBS guides also exist.

The WBS may be displayed variously as an outline (appropriately indented task list in your project management software), an organization chart, or any other hierarchical method so that the levels of detail are visible. The correctness of the decomposition must be verified by those who understand the work sufficiently.

### **Two Key Outputs for Create WBS (*PMBOK® Guide*, p. 131):**

**1. Scope Baseline:** The scope baseline includes the following components:

- **Project Scope Statement:** The approved detailed **scope statement** from the define scope process (identifies project scope, major deliverables, assumptions, and constraints).

- **WBS:**

The WBS is a hierarchical decomposition of the total scope of the work and includes:

- **Work packages:** the lowest level of detail shown in the WBS and is also the level at which individual responsibility for the work is assigned. Work packages must be assigned to a control account.
- **Control accounts:** also historically referred to as cost accounts, is the lowest level in the WBS at which **organizational responsibility** is assigned. Control accounts are management control points where cost, schedule, and scope data are summarized and compared to earned value for performance management. Control accounts contain one or more work packages and may also contain planning packages.
- **Planning packages:** a WBS component below the control account with known work content but lacking detailed schedule activities associated with work packages. Some practitioners use planning packages for estimating work farther in the future (rolling wave planning).
- **Code of accounts:** provides a unique numerical identifier for each WBS activity. Some people use the term “chart of accounts” interchangeably.

**Note:** The numerical identifiers provide a mechanism for summarizing cost, schedule, and resource information.

- **WBS dictionary:** A companion document to the WBS, containing a detailed description of each work package and including information such as:

- Description of the work and technical requirements
- Estimated cost and duration, list of schedule milestones
- Responsible resources, deliverables
- Predecessor activities (for sequencing the work)
- Code of accounts identifier (the numbering system)
- Acceptance criteria and quality requirements

**2. Project Documents Updates:** Approved change requests may require updates to the requirements documentation.

**See course slides #3-2 through #3-6 for more WBS information.**

**5.5 Validate Scope (PMBOK® Guide, p. 133)**

Scope validation is the *process of obtaining formal acceptance of the project scope by stakeholders*. It involves reviewing work results to see whether tasks were completed correctly. If a project is terminated early, scope verification should document the extent of the work completed. Scope verification differs from quality control in that verification is primarily concerned with *acceptance* of the work whereas quality control is primarily concerned with *correctness* of the work. Quality control is usually performed slightly ahead of verification, but the two processes may overlap somewhat.

Validate Scope		
Inputs	Tools	Outputs
1. Project management plan 2. Requirements documentation 3. Requirements traceability matrix 4. Verified deliverables 5. Work performance data	1. Inspection 2. Group decision-making techniques	1. Accepted deliverables 2. Change requests 3. Work performance information 4. Project documents updates

**Five Key Inputs for Validate Scope (PMBOK® Guide, p. 134):**

**1. Project Management Plan:** The project management plan contains the scope baseline which identifies all the work that must be performed. This process verifies that the required work has, in fact, been completed correctly. Components of the project management plan that may be used at this point include:

- **Scope management plan:** The scope management plan specifies how formal acceptance of completed deliverables will be obtained.
- **Scope baseline:** The scope baseline contains the scope statement (product description and product acceptance criteria), the WBS (deliverables and associated decomposition), and the WBS dictionary (detailed description for each work package).

**2. Requirements Documentation:** Lists all requirements and acceptance criteria for the project to be considered complete.

**3. Requirements Traceability Matrix:** Described in *PMBOK® Guide*, Section 5.2.3.2, this matrix links requirements to their origin (business need or opportunity).

**4. Verified Deliverables:** Verified deliverables have been completed and checked for correctness as part of the Control Quality process.

**5. Work Performance Data:** Described in Section 4.3.3.2, data collected at this point may include:

- Number of nonconformities and degree of compliance
- Severity of the nonconformities

**Two Key Tools for Validate Scope (*PMBOK® Guide*, p. 135):**

**1. Inspection:** Activities such as measuring, examining, and validating undertaken to determine whether work results conform to requirements. Alternative names for inspection include reviews, product reviews, audits, and walkthroughs.

**2. Group Decision-Making Techniques:** Described previously as part of Collect Requirements, these techniques help the project team and other stakeholders reach conclusions during validation decisions (unanimity, majority, plurality, and dictatorship).

**Four Key Outputs for Validate Scope (*PMBOK® Guide*, p. 135):**

**1. Accepted Deliverables:** Accepted deliverables have met the acceptance criteria and are formally signed off by an authorized person. The formal documentation is forwarded to the Close Project or Phase process.

**2. Change Requests:** Deliverables that are not accepted must be documented as such, including the reasons for non-acceptance. In some cases, those deliverables may require a change request for defect repair. As usual, these change requests are processed using integrated change control.

**3. Work Performance Information:** Relevant information would include 1) which tasks have started and the extent of progress and 2) which activities have finished and have been accepted.

**4. Project Documents Updates:** Any documents that describe the product or report on actual status of the work may be updated.

**5.6 Control Scope (PMBOK® Guide, p. 136)**

This process monitors the status of project and product scope and also manages any changes to the scope baseline. This process uses integrated change control to deal with all requested changes and recommended corrective or preventive actions. As described in the integrated change control process, scope change control is concerned with:

- Assuring that requested changes and recommended corrective or preventive actions are processed through integrated change control (uncontrolled changes are known as “scope creep”).
- Managing changes when they occur (following established processes). Establishing proper documentation, tracking, and approval levels.
- Always evaluating changes and never automatically accepting or rejecting.

<b>Control Scope</b>		
<b>Inputs</b>	<b>Tools</b>	<b>Outputs</b>
1. Project management plan 2. Requirements documentation 3. Requirements traceability matrix 4. Work performance data 5. Organizational process assets	1. Variance analysis	1. Work performance information 2. Change requests 3. Project management plan updates 4. Project documents updates 5. OPA updates

**Five Key Inputs for Control Scope (PMBOK® Guide, p. 138):**

**1. Project Management Plan:** The scope baseline is the object being controlled and it consists of the scope statement, WBS, and WBS dictionary. Other relevant portions of the project management plan include the scope, change, configuration, and requirements management plans.

**2. Requirements Documentation:** Described in Section 5.2.3.1. Requirements should ideally be measurable, testable, traceable, consistent, complete, and acceptable to stakeholders.

**3. Requirements Traceability Matrix:** Described in Section 5.2.3.2. The traceability is useful in understanding the potential effect of changes in requirements upon project needs/objectives. Recall that this matrix links each requirement to a business opportunity or need.

**4. Work Performance Data:** Relevant work performance data at this point may include the number of change requests received, number of requests accepted, and the number of deliverables completed.

**5. Organizational Process Assets:** Organizational Process Assets that may affect scope control include:

- Existing formal and informal procedures for scope control
- Monitoring and reporting methods

**One Key Tool for Control Scope (*PMBOK® Guide*, p. 139):**

**1. Variance Analysis:** Used to assess the magnitude of variations from the planned scope baseline and decide whether corrective action is necessary.

**Five Key Outputs for Control Scope (*PMBOK® Guide*, p. 139):**

**1. Work Performance Information:** Addresses how project scope is progressing compared to the scope baseline. The information includes scope variances, scope changes, and forecasts of future scope performance.

**2. Change Requests:** If change requests occur during scope control activities, they should be processed using integrated change control. Change requests may result in preventive or corrective action, defect repair, or enhancement requests. Change requests may either expand or reduce the scope of the project.

Change requests are often the result of:

- An external event (change in a regulation)
- An error in defining the scope (omitted a required feature of the product or omitted required tasks)
- A value-adding change (a way is found to do something better, faster, or cheaper; for example, new technology becomes available). Value analysis or value engineering are common examples.

**3. Project Management Plan Updates:** Approved changes may affect the project triple constraint and, accordingly, the scope, cost, and schedule baselines should be updated as required.

**4. Project Documents Updates:** Specific documents that may require updating because of scope changes include requirements documentation and the requirements traceability matrix.

**5. Organizational Process Assets Updates:** The historical database should be updated with the causes of variances that have occurred, the corrective action employed, and any other lessons learned associated with scope change control.

**Other Topics:** There are no additional topics for this chapter!

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**Self-Study  
Drill Practice: Scope Management**

Question	Answer
<p>1. Product specifications should be developed by _____.</p> <p><i>All page references are to the study guide or course slides.</i></p>	<p>1. project engineers or technical staff <i>(p. 3-9, Tool #2)</i></p>
<p>2. What is Define Scope?</p>	<p>2. Developing a detailed description of the project and product. Results in a detailed, written scope statement <i>(p. 3-8)</i>.</p>
<p>3. As project complexity increases, what will happen to the level of uncertainty in defining the project scope?</p>	<p>3. It will probably increase <i>(p. 3-8)</i>.</p>
<p>4. What is the difference between product scope and project scope?</p>	<p>4. Product scope is the features and functions designed into the product or service (measured against product requirements). Project scope is management activities performed by the team (measured against the project management plan) <i>(p. 3-1)</i>.</p>
<p>5. What is the primary tool for scope validation?</p>	<p>5. Inspection <i>(p. 3-16)</i></p>
<p>6. What is scope creep?</p>	<p>6. Scope creep is a common name used for uncontrolled changes that are not managed in accordance with the guidelines of scope control <i>(p. 3-17)</i>.</p>
<p>7. What is a WBS dictionary?</p>	<p>7. It contains a detailed description of each work package <i>(pp. 3-11/14)</i>.</p>
<p>8. As used in a WBS, what does the term "cost account" mean?</p>	<p>8. A cost category that represents the work assigned to a single responsible organizational unit, i.e., the lowest level in the WBS at which organizational responsibility is assigned. Also called a control account <i>(p. 3-14)</i>.</p>

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<p>9. What is the WBS numbering system called and what does it provide?</p>	<p>9. Code of Accounts or Chart of Accounts</p> <p>Provides:</p> <ol style="list-style-type: none"> <li>1. Allocation of budget to specific tasks</li> <li>2. Tracking of performance/spending against specific work packages (tasks)</li> <li>3. Identifying the level of detail for specific tasks (pp. 3-11/14)</li> </ol>
<p>10. What role do stakeholders play in collecting requirements?</p>	<p>10. Defining stakeholders' needs is the primary purpose of the process called Collect Requirements. Knowing who the stakeholders are and interviewing them in various ways is how requirements are documented (pp. 3-3 and 3-5, inputs #3 &amp; #5).</p>
<p>11. What are the tools of collect requirements?</p>	<p>11.</p> <ul style="list-style-type: none"> <li>Interviews and Focus groups</li> <li>Facilitated workshops</li> <li>Group creativity techniques</li> <li>Group decision-making techniques</li> <li>Questionnaires and surveys</li> <li>Observations</li> <li>Prototypes</li> <li>Benchmarking</li> <li>Context diagrams</li> <li>Document analysis (pp. 3-5 to 3-7).</li> </ul>
<p>12. How does an OBS differ from a WBS?</p>	<p>12. OBS = Organizational breakdown structure and is used to show which work elements (tasks) have been assigned to which organizational units (p. 3-11)</p>
<p>13. Activities at the lowest level of the WBS are referred to as _____.</p>	<p>13. work packages (pp. 3-11/13)</p>
<p>14. A recommended size for work packages is _____.</p>	<p>14. 80 hours (p. 3-11)</p>
<p>15. What is scope validation?</p>	<p>15. The process of formalizing acceptance of completed project deliverables (p. 3-15).</p>

16. What is the difference between scope validation and quality control?	16. Scope validation is primarily concerned with <i>acceptance</i> of the work; quality control is concerned with the <i>correctness</i> of the work (p. 3-15).
17. What is scope control (the formal name of the process is control scope)?	17. Monitoring the status of the project and product scope <b>and</b> managing changes to the scope baseline (p. 3-17)
18. What is a WBS?	18. A hierarchical decomposition of the work to be accomplished and defines the total scope of the project -- <i>work not in the WBS is outside the scope of the project</i> (p. 3-11).
19. What is the tool for control scope?	19. Variance analysis (p. 3-18)
20. What is the scope management plan?	20. Documents how project scope will be defined, validated, and controlled (pp. 3-1/3)
21. What two important issues does performance measurement deal with?	21. As part of control scope: a ) Identifying the magnitude of variances (plan versus actual)  b) Deciding whether corrective action is needed (p. 3-18)
22. Change requests are outputs for which two scope management processes?	22. Validate scope and control scope. Change requests may be issued as a result of either of these activities and should be handled using integrated change procedures (pp. 3-16/18).
23. Collecting requirements is fundamentally about _____.	23. Defining and managing stakeholder expectations (p. 3-3).
24. The subdivision of project deliverables into smaller components is called _____.	24. decomposition (pp. 3-11/12)
25. What are the inputs for collect requirements?	25. The scope management plan, requirements management plan, stakeholder management plan, project charter and stakeholder register (p. 3-5).

Unit 3: Scope Management

<p>26. What is the Code of Accounts and what is another name for it?</p>	<p>26. A numbering system used to identify each element of the WBS. Also known as a Chart of Accounts (pp. 3-11/14).</p>
<p>27. What is a requirements traceability matrix?</p>	<p>27. A table that links each requirement to its origin such as business needs or opportunities, project goals, etc. (p. 3-8)</p>
<p>28. What is the scope baseline composed of?</p>	<p>28. The scope statement, the WBS, and the WBS dictionary (pp. 3-13/14).</p>
<p>29. What is alternatives generation and what is it used for?</p>	<p>29. Alternatives generation is a tool of define scope and is used to ensure that all approaches to doing the work have been considered. The <i>PMBOK® Guide</i>, p. 123, identifies brainstorming, lateral thinking, and analysis of alternatives as examples of how to perform alternatives generation. (p. 3-9).</p>
<p>30. Changes in the scope may affect the other components of the triple constraint. The triple constraint of project management includes _____.</p>	<p>30. scope, schedule, and cost. (p. 3-19, output #3, control scope)</p>