PROJECT SCOPE MANAGEMENT

Scope Management Foundations and Overview of the
*Practice Standard for Work Breakdown Structures – Second Edition (Reaffirmed)* from PMI®

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Objectives

• Foundations of Project Scope Management
  – Per PMBOK® – Fourth Edition

• Practice Standard for Work Breakdown Structures – Second Edition (Reaffirmed)
  – What is the purpose of the practice standard?
  – How does it expand upon the PMBOK®?
  – What is the value of the WBS for your projects?
A Guide to the Project Management Body of Knowledge (PMBOK® Guide)
Fourth Edition

• The PMBOK® Guide — Fourth Edition is the preeminent global standard for project management. Like previous editions, it represents generally recognized good practices in the profession while reflecting project management’s continually evolving knowledge.

• The PMBOK® Guide
  – Provides guidelines for managing individual projects
  – Defines project management and related concepts, and
  – Describes the project management life cycle and the related processes

Translations are available in Arabic, Chinese, French, German, Italian, Japanese, Korean, Portuguese, Russian and Spanish
## Project Management Framework

### 9 PM Knowledge Areas
- Project Integration Management
- Project Scope Management
- Project Time Management
- Project Cost Management
- Project Quality Management
- Project Human Resource Management
- Project Communications Management
- Project Risk Management
- Project Procurement Management

### 42 PM Processes
- Each belonging to exactly one knowledge area
- Each process has identified inputs, tools & techniques, and outputs
- Processes interrelate with other processes within the same knowledge area and across knowledge areas
- Five (5) processes from the Project Scope Management Knowledge Area
Project Scope Management

• The project management knowledge area that relates to the processes required to ensure that the project includes all the work required, and only the work required, to complete the project successfully.

• Managing project scope is mainly concerned with defining and controlling what is and is not included in the project.
Project Scope vs. Product Scope

- **Project Scope** – defines the project work to produce the project product
  - Defined in terms of deliverables; not activities
  - Includes internal as well as external deliverables

- **Product Scope** – defines the features and functions of the project deliverables
  - Generally managed through a requirements management process
## Project/Product Scope Example

<table>
<thead>
<tr>
<th>Project Scope (Deliverable)</th>
<th>Product Scope (Requirements)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jet Engine</td>
<td>• Must operate on Jet A-1 Fuel</td>
</tr>
<tr>
<td></td>
<td>• Must not explode on ignition</td>
</tr>
<tr>
<td></td>
<td>• Must generate 90 kN of thrust</td>
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</tbody>
</table>

- Managed via the WBS
- Managed via Requirements Management Tools
Project Scope Management
Processes Overview

- **Collect Requirements:** The process of defining and documenting stakeholders’ needs to meet the project objectives.
- **Define Scope:** The process of developing a detailed description of the project and product.
- **Create WBS:** The process of subdividing project deliverables and 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.
Scope Baseline

1. Scope Statement
   – Output of the Define Scope process
2. WBS
   – Output of the Create WBS process
3. WBS Dictionary
   – Output of the Create WBS process
PMBOK Definition of WBS

“A deliverable-oriented hierarchical decomposition of the work to be executed by the project team to accomplish the project objectives and create the required deliverables. It organizes and defines the total scope of the project.” - PMBOK® - 4th Edition
Work Breakdown Structure
WBS Dictionary

- Adds detail related to the work packages and control accounts
- Includes such things as:
  - Code of account identifier
  - Work description
  - Responsible organization (or person)
  - Other things that are added later as a part of progressive elaboration
- List of schedule milestones
- Associated schedule activities
- Resources required
- Cost estimates
- Quality requirements
- Acceptance criteria
- Technical references
- Contract information
Progressive Elaboration

“Continuously improving and detailing a plan as more detailed and specific information and more accurate estimates become available as the project progresses, and thereby producing more accurate and complete plans that result from the successive iterations of the planning process.”

The Work Package

- The lowest level of decomposition in the WBS
- Decomposed to a level that is manageable
- The Work Package is a part of the WBS, a scope management tool
- Through progressive elaboration it includes information from other knowledge areas
The PMI Practice Standards

- Practice Standard for Scheduling
- Practice Standard for Project Estimating
- Practice Standard for Earned Value Management
- Practice Standard for Project Risk Management
- Practice Standard for Project Configuration Management
Hierarchy of PMI Resources

- Principles of the Specialization
- Processes
- Theory / Tools & Techniques

- Practice Standards
- PMBOK® Guide
- Handbooks, Textbooks, & Courses
Practice Standard for Work Breakdown Structures
- Second Edition (Reaffirmed)

• Work breakdown structures (WBS) are used to define project deliverables and establish the structure to manage work to completion.

• This standard supplies project managers and team members with direction for the preliminary development and implementation of work breakdown structures.

First Edition in 2001 was based upon the PMBOK® – 2nd Edition
Second Edition in 2006 was based upon the PMBOK® – 3rd Edition
Second Edition was reaffirmed upon release of the PMBOK® – 4th Edition
Content of the Practice Standard

- Introduction to the Practice Standard
- Defining the WBS
- Importance of the WBS
- Defining WBS Quality
- Considerations While Creating a WBS
- WBS Templates in Appendices
INTRODUCTION TO THE PRACTICE STANDARD
Why a Practice Standard for WBS?

• Successful project planning begins with defining the project objectives with sufficiently detailed information

• The WBS provides the foundation for defining work as it relates to the project objectives

• It establishes the framework for managing the work to its completion
Practice Standard Objectives

• Provide a **common ground for understanding** the concepts and benefits of the WBS

• Present a **standard application of the WBS** as a project management tool

• Encourage **consistency in applying this tool** to improve project planning

• It is **NOT intended to be a tutorial** on how to create a WBS
DEFINING THE WBS
PMBOK Definition of WBS

“A deliverable-oriented hierarchical decomposition of the work to be executed by the project team to accomplish the project objectives and create the required deliverables. It organizes and defines the total scope of the project.” - PMBOK® - 4th Edition
Deliverable

- Any unique and verifiable product, result, or capability to perform a service that must be produced to complete a process, phase, or project.
Definition of Work

- Something produced or accomplished by effort, exertion, or exercise of skill
- In the context of the WBS, work refers to the work products or deliverables that are the result of effort and not to the effort itself
Sample WBS – Chart Form

Example recreated from the PMI Practice Standard for Work Breakdown Structures; Second Edition
Sample WBS – Tabular Form

1 – Bicycle
   1.1 – Frame Set
      1.1.1 – Frame
      1.1.2 – Handlebar
      1.1.3 – Fork
      1.1.4 – Seat
   1.2 – Crank Set
   1.3 – Wheels
      1.3.1 – Front Wheel
      1.3.2 – Rear Wheel
   1.4 – Braking System
   1.5 – Shifting System
   1.6 – Integration
      1.6.1 – Concept
      1.6.2 – Design
      1.6.3 – Assembly
      1.6.4 – Testing
         1.6.4.1 – Component Test
         1.6.4.2 – Product Test
         1.6.4.3 – Customer Test
   1.7 - Project Management

Example recreated from the PMI Practice Standard for Work Breakdown Structures; Second Edition
“The deliverable concept and orientation of the WBS are integral to understanding the proper definition and use of the WBS and the benefits it provides within the larger context of all project management processes.”

Page 6 of the Practice Standard for Work Breakdown Structures
WBS Input to PM Processes

5.3 Create WBS

4.2 Develop Project Management Plan
5.4 Verify Scope
5.5 Control Scope
6.1 Define Activities

7.1 Estimate Costs
7.2 Determine Budget
8.1 Plan Quality
11.2 Identify Risks
12.1 Plan Procurements
Discrete Effort

• Work effort that is separate, distinct, and related to the completion of specific work breakdown structure components and deliverables, and that can be directly planned and measured

Example
Planning Document
Apportioned Effort

• Effort applied to project work that is not readily divisible into discrete for that work, but which is related in direct proportion to measurable discrete work efforts

Example

“In-Process” Audit
Level of Effort (LOE)

• Support-type activity, which does not produce definitive end products. It is generally characterized by a uniform rate of work performance over a period of time determined by the activities supported.

Example

Schedule Administration
The 100% Rule

• The WBS includes 100% of the work defined by the project scope and captures ALL deliverables in terms of work to be completed
  – Includes internal, external, and interim deliverables
• The WBS should not include any work that falls outside the actual scope of the project
  – Cannot include more than 100% of the work
IMPORTANCE OF THE WBS
Why is the WBS important?

- Defines all the work of the project, and only the work of the project, thereby clarifying the project scope
- Provides the baseline for subsequent change control
- Provides the framework for project control, performance monitoring, and the foundation for communication will all stakeholders
Results of a Poorly Constructed WBS

- Incomplete project definition leading to ongoing project extensions
- Unclear work assignments, goals, objectives, or deliverables
- Scope creep or unmanageable, frequently changing scope
- Budget overrun
- Missed deadlines on scheduled deliverables, or timeline slippage
- Unusable new product or feature
- Failure to deliver non some elements of project scope
DEFINING WBS QUALITY
Defining WBS Quality

- **WBS Quality Principle 1**
  - A *quality WBS is a WBS constructed in such a way that satisfies all of the requirements for its use in a project*
  - **WBS Quality Sub-Principle 1 – Core Characteristics**
  - **WBS Quality Sub-Principle 2 – Use-Related Characteristics**
Defining WBS Quality

• **WBS Quality Principle 2**
  
  – *WBS quality characteristics apply to all levels of scope definition*
    
    • *There is no conceptual difference in a WBS for a project, program, or portfolio*
    
    • *Differ only in breadth of content and scope*
Key WBS Core Characteristics

- **Deliverable-oriented**
- Defines the scope
- **Contains 100% of the work**
- Captures internal, external, and interim deliverables
- Contains elements that are defined using nouns and adjectives
- Arranges all major and minor deliverables in a hierarchical structure
Key WBS Core Characteristics

- Iteratively evolves along with the progressive elaboration of the project scope, **up to the point the scope has been baselined**
- Is updated in accordance with **project change control**, thereby allowing for continual improvement, **after the scope has been baselined**
WBS User-Related Characteristics

- Achieves a **sufficient level of decomposition**
- Provides sufficient detail for **communicating ALL work**
- Is **appropriate for tracking**, as required by the specific project or organization
- Is **appropriate for control activities**
- Can contain specific kinds or WBS elements, as needed for each project
- **Enables assignment of accountability at the appropriate level**
- Has a **succinct, clear, an logically oriented structure** to meet project management and oversight requirements
Problem Diagnostic Checklist

- There are frequently missed deadlines and an extended schedule
- Project is over budget
- Individuals are unable to use the new product or feature
- The project scope has changed and is unmanageable

- The project has become an ongoing project with no end in sight
- Project team members are confused about their individual responsibilities
- Some planned work does not get done
CONSIDERATIONS WHILE CREATING A WBS
Guidance for Preparing a WBS

• The Practice Standard does not provide detailed instructions, but it does discuss methods and guidance for choosing the right one
  – Top-Down
  – Bottom-Up
  – WBS Organizational Standards
  – WBS Templates
Essential Judgments in Preparing WBS

- Determining Appropriate Level of Detail
- Selection of the Type of WBS Element to be Included
- Structuring the Logic of the Decomposition
WBS Usage Continuum

Ability of the WBS to meet project needs is directly related to the level of competency within the project management team

<table>
<thead>
<tr>
<th>Limited</th>
<th>Intermediate</th>
<th>Extensive</th>
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<tbody>
<tr>
<td>• Develop a WBS that contains all Core Characteristics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Apply at least a minimal level of experience in project estimating</td>
<td></td>
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<tr>
<td>• Apply subject matter expertise if appropriate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Develop a WBS that contains all Core Characteristics</td>
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<td></td>
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<tr>
<td>• Identify and include some use-related attributes</td>
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<tr>
<td>• Apply the WBS effectively to project schedule development and resource assignment</td>
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<td></td>
</tr>
<tr>
<td>• Apply project estimating techniques to develop &amp; manage the project using the WBS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Apply the WBS effectively to Change Control Planning and Execution, Quality Planning and Control, Risk Planning and Management, Cost and Budget Planning and Control, etc.</td>
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</table>
WBS Templates

- Oil, Gas, and Petroleum (OGP)
- Environmental Management
- Process Improvement
- Pharmaceutical
- Process Plant Construction
- Web Design

- Service Industry Outsourcing
- Telecom
- Refinery Turn-Around
- Government Design-Bid-Build
- Software Implementation
- Horizontal Tree Structure
Summary

• The *Practice Standard for Work Breakdown Structures* builds upon the foundation laid by the PMBOK®

• It emphasizes the importance of proper and consistent usage of the WBS as a tool for planning and managing project scope

• The consequences of failing to use a quality WBS are also outlined

• Guidance in the creation of a WBS is also included