## INTRODUCTION: Plan and Schedule Development –
Create a Work Breakdown Structure (WBS)

The detailed guidelines and examples start on the following page.

What This Is

First of a series of guidelines for project plan and schedule development. This guideline covers **the steps for developing a Work Breakdown Structure (WBS)** to identify all the activities that must be executed to fulfill the objectives of the project. Several WBS examples are provided.
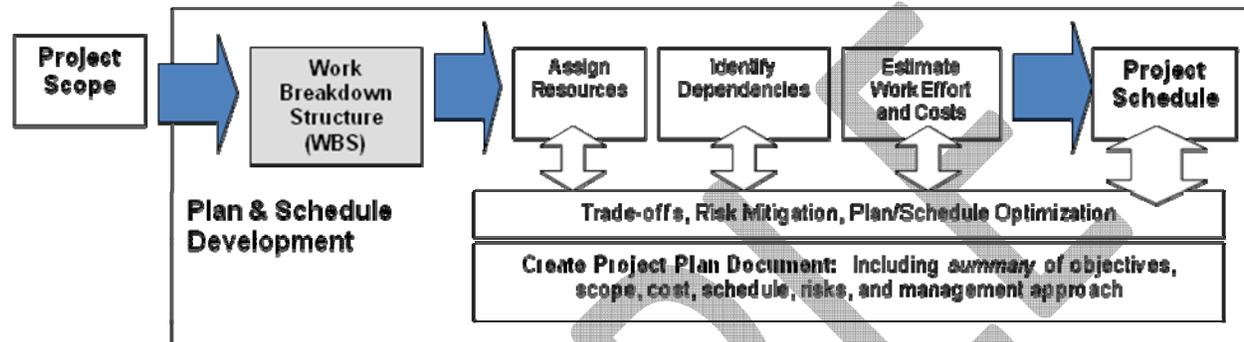
Content in this guideline was contributed by:
ProjectConnections staff, IPSolutions - www.ipsassociates.com, and ICS Group www.icsgrp.com

Why It's Useful

A key to successful project scheduling is to identify all the work of the project *before* you consider delivery dates and resource constraints. This helps a team objectively identify everything that needs to be done without subconsciously leaving out real work in order to fit pre-determined dates.

The WBS step helps accomplish the following key objectives:

- Develops an objective, rational view of the amount of work required.
- Provides a basis for next identifying the skills and resources required for the project.
- Provides a framework for clearly defining pieces of the work and delegating responsibility.
- Lays a foundation for analyzing dependencies and for isolating and managing risks.
- Lays a foundation for developing a bottom-up estimate for the project schedule.
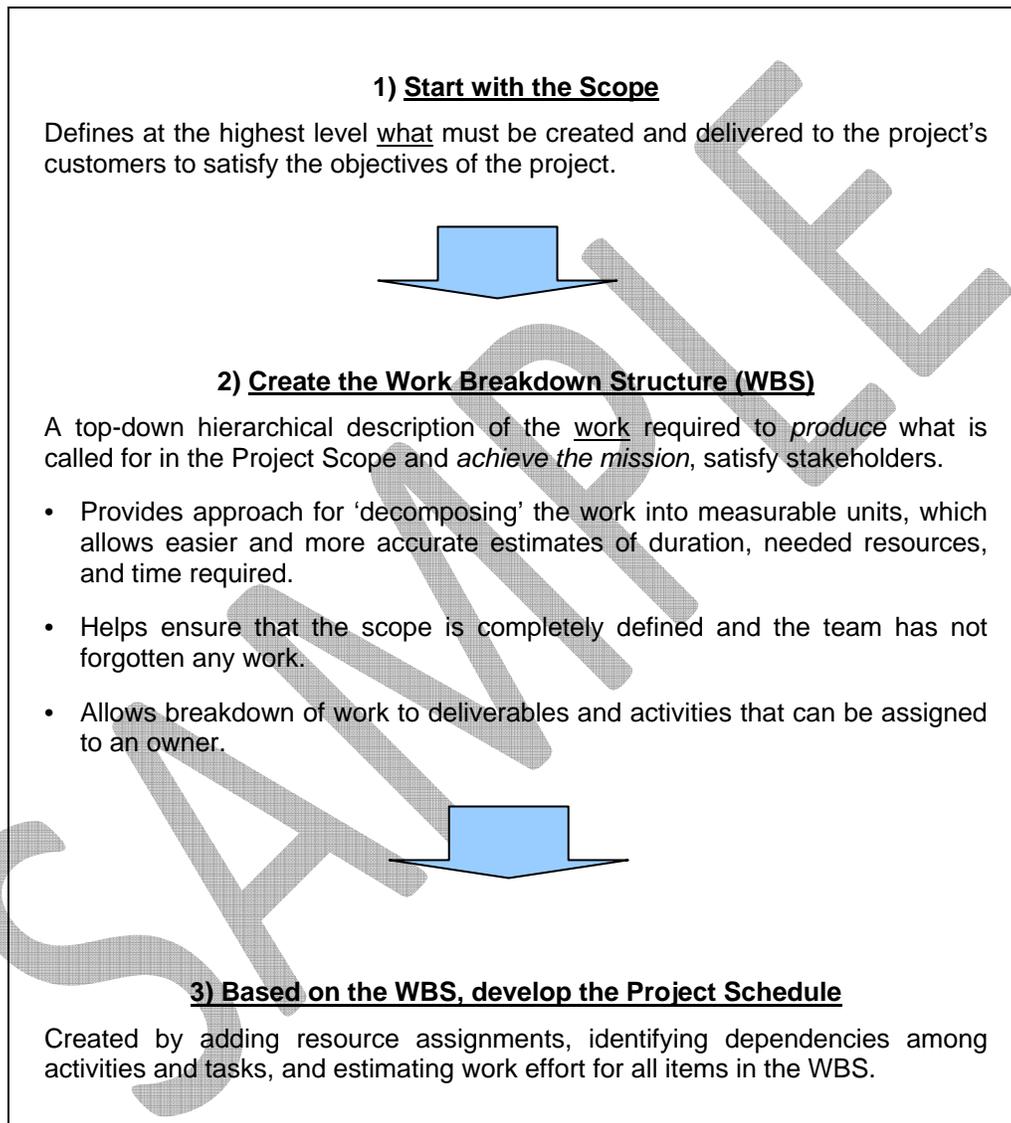
How to Use It

1. Review the overview and steps for creating a Work Breakdown Structure starting on the next page.

2. Identify how team members will be involved in creating the WBS and educate them on their role. The primary objective is to get all of the team participants to contribute to the definition of the work.

3. Decide how you'll record the items in your WBS (e.g., worksheet, spreadsheet, scheduling tool). See the table on the last page of this file for one example of a worksheet. This format can be carried forward into the next few steps of scheduling to systematically build the pieces of the schedule (resource assignments, estimates, etc.) onto the foundation of the WBS items.

4. Determine an appropriate organization for your WBS and begin identifying major work efforts. See the detailed guidelines that begin on the following page for ways your WBS can be organized.

5. Break the top level of your WBS further into a hierarchical set of activities. Use the guidelines starting on the next page to decide how far your WBS must be broken down to ensure that you've defined enough detail for scheduling your project.

6. The WBS is the basis for all the next steps in the planning and scheduling process.

The guideline and template content for creating a WBS starts on the following page.

Plan and Schedule Development – Create a Work Breakdown Structure

Overview of WBS Creation

The WBS is the first step in developing a detailed work plan for the project. It bridges from the early Scope definition to creation of a detailed project schedule.

1) Start with the Scope

Defines at the highest level <u>what</u> must be created and delivered to the project's customers to satisfy the objectives of the project.

2) Create the Work Breakdown Structure (WBS)

A top-down hierarchical description of the <u>work</u> required to *produce* what is called for in the Project Scope and *achieve the mission*, satisfy stakeholders.

- Provides approach for 'decomposing' the work into measurable units, which allows easier and more accurate estimates of duration, needed resources, and time required.

- Helps ensure that the scope is completely defined and the team has not forgotten any work.

- Allows breakdown of work to deliverables and activities that can be assigned to an owner.

3) Based on the WBS, develop the Project Schedule

Created by adding resource assignments, identifying dependencies among activities and tasks, and estimating work effort for all items in the WBS.

Overview of the Work Breakdown Process: From the Top Down

Use the following top-down approach to iteratively create your WBS:

1. Identify the major components of work to be accomplished.

Identify 5-10 major work groups to form the top level of your WBS. Select these based on the best way to organize the work for this project given the project complexity, how the work is spread across your organization, and how the work will be tracked and managed. Here are seven possible approaches for your overall WBS organization. (Reference: *Effective Project Management,* Wysoki et al, pg. 120)

Noun-Type

    Physical Decomposition – The pieces of a product

    Functional Decomposition – Areas of system functionality
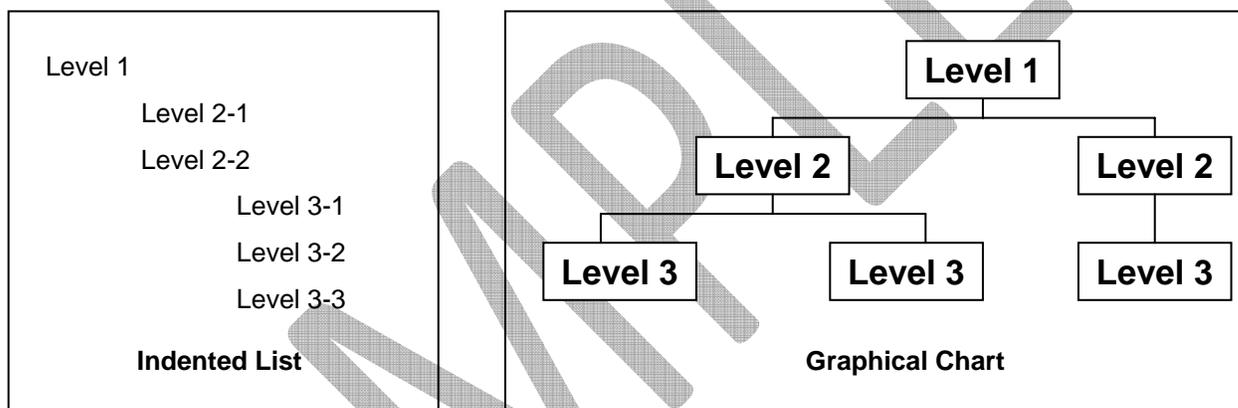
Verb-Type

    Design-Build-Test-Implement – Methodology or lifecycle phase focus

    Objectives – Senior management or customer focus on reporting to deliverables

Others

    Geographical – Coordination and communication focus across locations

    Business Function – Focus on business process with integration complications

    Departmental – Focus on organizational control of one manager

2. **Identify the next level of work (Level 2) under each major component and list them under their top-level groups.** This can be done with indented lists or graphically in an organization chart.

```
Level 1
        Level 2-1
        Level 2-2
                Level 3-1
                Level 3-2
                Level 3-3
```
Indented List

Level 1 — Level 2 — Level 3; Level 2 — Level 3; Level 3

Graphical Chart

3. **Continue to break down the work under each Level 2 item.**

Break down to the level of activity detail. Continue until the top-level components are broken down far enough to identify all the work that needs to get done. Details under some may break into three or four levels. Others may require no more detail, or only one additional level. Further guidelines for WBS completeness are given later in this file.

Examples and Definitions of Typical WBS Levels

This section contains material contributed by ICS Group www.icsgrp.com

The following is one possible work breakdown approach starting with project lifecycle phases at Level 1, major deliverables of each phase as Level 2, and the activities and tasks to create each deliverable.

Phases	Identify major phases of work (e.g. specify, design, build, test…)
Major Project Deliverables	Identify the major component deliverables of work required (e.g., subsystems that must be designed, built, tested, during each phase.)
Activities	Identify the activities needed to create those deliverables. (Some interim, smaller deliverables such as documents may be involved.)
[Activities]	Some WBSs will have multiple levels of activities to break the work down to an appropriate level of detail.
Tasks	Break the activities down to an appropriate level of task detail.

Level 1 – Phases: A project plan, or schedule, is made up of the deliverables and milestones of the project, and depending on the level of detail required, the activities/tasks. Typically, this information can be organized into a number of natural groupings. In project planning, each group is called a phase and a name is given to it for ease of communication and reporting.

Level 2 – Deliverables: Deliverables are the clearly defined and recognizable results or tangible work products of successfully completed activities performed during the project. They appear in the past tense, to represent the completed activity and the accomplished result.

"Receivables" should also be included. They are deliverables owed to the project by others outside of the project (usually other project teams), and upon which the project is dependent.

Levels 3 and 4+ – Activities & Tasks: Each phase of a project is composed of a number of major activities that will lead to achieving one or more deliverables. Activities may be broken into a smaller set of activities at the next level in the WBS, which is typical in larger projects.

The bottom-level activities in a WBS may break down further into very detailed tasks that express the smallest pieces of work needed to complete the activity and produce the deliverable or output of that activity. NOTE: Project management standards call for WBSs to be created to the activity level, with very detailed tasks NOT listed in the WBS but instead left as lower-level detail to be handled by the owner of each activity. In practice, the terms "activity" and "task" may be used interchangeably. No matter what the terminology, what matters is getting the WBS to the right level of detail for accurate planning and tracking. The lowest-level items in the WBS form the schedule used by the project manager and team to estimate the project work and costs, then later track project progress. By definition, then, the WBS must be broken down far enough to yield accurate work and cost estimates and accurate measures of progress.

See the WBS Completion Criteria Checklist later in this file for how to test the bottom level of your WBS to ensure you've broken the work down far enough.

The brief WBS excerpt on the next page illustrates the Phase-Deliverable-Activity breakdown.

Example: WBS Excerpt for Creating a Promotional DVD

CONCEPT	(Phase)
(Detailed deliverables and activities here)	
DESIGN	(Phase)
(Detailed deliverables and activities here)	

This section of the WBS broken out to activity detail:

PROTOTYPE AND TEST DVD	(Phase)
DVD Prototype	*(Deliverable)*
Develop Video	(Activity)
Shoot sections	
Review video	
Edit video sections	
Edit video – full sequence	
Develop Narrative	(Activity)
Write narrative text	
Review and update text	
Record voice-over narrative	
Review prototype DVD	(Activity)
Update prototype DVD	(Activity)
Tested DVD	*(Deliverable)*
(Detailed activities go here)	
SELECT VENDOR	**(Phase)**
DVD Fulfillment Vendor commitment (Deliverable)	
Research options	(Activity)
Define selection criteria	
Identify potential vendors	
Select and sign vendor	(Activity)
Send requirements to fulfillment houses	
Get quotes and sample contracts	
Decide fulfillment house	
Sign contract	
PRODUCE AND SEND	**(Phase)**
DVD First-Article for QA	*(Deliverable)*
(Activity detail here)	(Activity)
DVD First Mailing Out	*(Deliverable)*
(Activity detail here)	(Activity)

How to Engage the Team in Creating the WBS

This is a team process and should *not* be done by the Project Manager alone.

Plan to engage the project team to analyze and break down the work into a sequence of deliverables and activities until the detail defines a project that can be accurately scheduled and managed.

Here is a suggested process:

1) **The Project Manager can propose** what the top level of the WBS should be.

2) **Call a core team meeting** to review the suggested top level of the WBS and define the next level of detail. In the meeting, agree on the top level of the WBS and brainstorm a list of items to include at Level 2 (e.g. deliverables that would show up for each major phase).

3) **Work collaboratively in the meeting** to identify subsequent levels of WBS detail, by drafting WBS activities and tasks onto a whiteboard or flipchart paper on the walls, or by writing deliverables and activities on sticky notes and sticking them to the whiteboard or wall underneath the appropriate top-level section of the WBS.

4) **Have individual team members thoroughly consider their own work** to identify potential missing items, covering everything they are involved in during the project including 'secondary work' such as reviews, through the entire project timeline.

5) **Draft early plans for particular major activities** to help think through lower-level activities that might need to show up in the WBS. For example, write preliminary plans to help break down later cross-functional efforts such as documentation, manufacturing, testing, etc.

6) **Create a "WBS dictionary" entry—**descriptions of each activity in the WBS, including explicit