## **Activity Definition and Sequencing**

Initial Release 1.0 Date: January 1997

### **Develop Project Tasks**

One of the most important parts of a project planning process is the definition of activities that will be undertaken as part of the project. Activity sequencing involves dividing the project into smaller, more manageable components (activities) and then specifying the order of completion.

The list of activities is often called a Work Breakdown Structure (WBS). The goal is to integrate the WBS, the schedule, and the budget into a written plan.

The WBS reflects activities associated with overall project management, requirements, design, implementation, transition management, testing, training, installation, and maintenance. The project manager is responsible for defining all top level tasks associated with a project and then further decomposing them as planning continues.

An activities list is typically shown in one of two ways. It can be shown as an outline or it can be graphically presented. Two samples of an activities list (WBS) are shown below.

#### 1.0 MANAGEMENT

### 1.1 Plan Project

- 1.1.1 Develop Project Plan
- 1.1.2 Update Project Plan
- 1.2 Track Project
- 1.2.1 Prepare status reports
- 1.2.2 Collect/analyze project metrics
- 1.3 Perform Quality Activities
- 1.3.1 Prepare QA Plan
- 1.3.2 Conduct Reviews
- 1.3.3 Conduct Audits
- 1.4 Perform Configuration Management
- 1.4.1 Prepare CM Plan
- 1.4.2 Develop Project Library
- 1.4.3 Manage Change Board
- 1.4.4 Maintain Configuration Items

#### 2.0 DESIGN

### 2.1 Prepare Preliminary Design

- 2.1.1 Develop Enterprise Architecture
- 2.1.2 Prepare Data Flow Diagrams
- 2.1.3 Prepare Logical Data Model
- 2.2 Prepare Detailed Design
- 2.2.1 Prepare Physical Data Model
- 2.2.2 Prepare Data Dictionary
- 2.3 Document Design
- 2.3.1 Develop Design Specification

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### 2.4 Review Design

### 3.0 DEVELOPMENT/INTEGRATION

- 3.1 Develop Software
- 3.1.1 Develop Server Application
- 3.1.2 Develop User Interface
- 3.1.3 Develop XYZ Interface
- 3.2 Procure Hardware
- 3.2.1 Procure Server
- 3.2.2 Procure Workstations
- 3.3 Procure Software Packages
- 3.3.1 Procure Database
- 3.3.2 Procure User Interface Building Tool
- 3.3.3 Procure Operating System
- 3.4 Perform Integration Testing
- 3.5 Convert Data
- 3.5.1 Develop Conversion Plan
- 3.6 Develop User Manual
- 3.7 Transition Management

#### 4.0 ACCEPTANCE TESTING

- 4.1 Plan Acceptance Test
- 4.2 Conduct Acceptance Test
- 4.3 Develop Test Report

### 5.0 INSTALLATION

- 5.1 Develop Installation Plan
- 5.2 Site Preparation
- 5.3 Install at Locations
- 5.3.1 Headquarters
- 5.3.2 Site 1

#### 6.0 MAINTENANCE

- 6.1 Hardware Maintenance
- **6.2** Software Maintenance

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Sometimes, instead of depicting the WBS as an outline, it is shown graphically, as below:

#### Work Breakdown Schedule (WBS) Development/ Acceptance Management Design Installation Maintenance Integration Testing Prepare Preliminary Develop Installation Plan Hardware Develop Plan Acceptance Plan Project Software Maintenance Design -Develop Enterprise Architecture Develop Server -Develop Project Plan Conduct Acceptance Test Software Application Site Preparation -Update Project Plan Maintenance Prepare Data ·Develop User Flow Diagrams Interface Track Project Develop Test Prepare Logical Develop XYZ Install at Report Locations Data Model Interface Prepare status report Procure -Headquarters Prepare Detailed Collect/analyze Hardware project metrics Design Site One Procure Server Procure Workstations Prepare Physical Perform Quality Data Model Activities -Prepare Data Dictionary Procure Software Prepare QA Plan Packages Conduct Reviews Document Conduct Audits Procure Databases Design Procure User Interface Develop Design Specification **Building Tool** Perform CM Procure Operating System Prepare CM Plan Review Design Perform

Integration Testing

Convert Data

Develop User Manual Transition Management

Develop Conversation

**WBS** 

### **Define Project Tasks**

Develop Project Library

Manage Change Board Maintain Configuration

WBS tasks are developed by asking, "What tasks need to be done to accomplish the project objective?" The choice of WBS structure is subjective and reflects the preferences and judgment of the project manager.

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As levels of the WBS become lower, the scope, complexity, and cost of each subtask become smaller. The lowest level tasks, or work packages, are independent, manageable units that are planned, budgeted, scheduled, and controlled on their own.

As efforts of similar scope and type are planned, the basic WBS tasks remain fairly similar, but each project requires a specific set of tasks that address the uniqueness of the project's requirements. Certain top level elements, such as project management, are included in the WBS of every project, regardless of its type, size, or complexity. Other items, like installation, may not apply to every project.

There is no simple formula to define how detailed a work breakdown needs to be. There are, however, some helpful guidelines for completion:

- Break down the work until accurate estimates of cost and resources needed to perform the task are provided.
- Ensure that clearly defined starting and ending events are defined for the task. This may be the production of a deliverable or the occurrence of an event.
- Verify that the lowest level tasks can be performed within a "reasonable" period of time. Each state organization must define "reasonable." If the time period to complete a task is too long, an accurate project status in the implementation phase may not be possible. An industry standard rule of thumb is to make work packages that can be completed in timeframes of two weeks.
- Verify that people assigned to the project are all assigned a WBS task. Have a firm rule: if the task is not on the WBS, it is not worked on.

The initially developed WBS evolves over the course of the planning. It is highly probable that it will look quite different as the scheduling, estimation, and resource allocation portions of the plan are completed.

The WBS has multiple uses. It is both a task list for planning and a structure for providing report status during the implementation phase. As individual low level tasks are completed, the project progress is assessed. It also serves as a

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# Define Project Development Phases

useful management communication tool by which results can be compared with expectations.

One of the difficult parts of talking about IT projects generically, is the wide range of such projects. Typically, in a small project, there is a single project development phase. In large or complex systems, however, there are often multiple development phases, where different functional requirements are met.

Sometimes these phases are driven by the need to achieve certain levels of functionality prior to the availability of the complete system. Other times, the phases are defined to partition the development effort and to reduce the risks associated with larger project efforts.

For large systems, the decomposition of the system into smaller components needs to be done early in the planning cycle. The rationale for the decomposition must be known, otherwise, different results derived from different reasons for the system decomposition may occur. For example, if a phase is defined to accommodate user needs, the phase may cross multiple functional areas of the system. If, on the other hand, a system is divided into phases simply to reduce risk, a functional division might occur where the phases represent completion of entire functional areas of the system. The way in which the phases are handled differs with each application. Often, phases are handled as top level WBS elements, with tasks associated with each phase defined.

# Define Task Relationships

If a project is broken down into phases, be sure that the WBS reflects this. The WBS structure denotes a hierarchy of task relationship. Subtask completion eventually rolls up into task completion, which ultimately results in project completion. There can, however, also be relationships between tasks that are not within the outlined hierarchy. These relationships need to be noted, and the ultimate structuring of the tasks optimized to favor a minimum of horizontal dependencies and relationships. If the tasks are not organized efficiently, it becomes difficult to schedule and allocate resources to the tasks.

# Defining Deliverables

Deliverables associated with each task are shown in the WBS and are reflected in the Deliverables portion of the Project Plan. A sample of a Deliverables template is shown below. All deliverables are listed as they are identified. As the schedule is completed, the due date is filled in, and responsibility for the deliverable is assigned as it is known (typically when the organization chart is defined). The date delivered is a field that is filled in as deliveries are made.

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Over the course of the project, a comparison of the due date and the date delivered provides a metric for how well deliverable dates are met by the project team.

| Product<br>Name              | Due<br>Date | Date<br>Delivered | Author/<br>POC |
|------------------------------|-------------|-------------------|----------------|
| Requirement<br>Specification | 4/1/96      | 4/1/96            | G. Brown       |
| Design                       | 8/1/96      |                   | G. Brown       |
| Specification                |             |                   |                |
| Test Plan                    | 8/1/96      |                   | A. Jones       |
| Implementation               | 11/1/96     |                   | B. White       |
| Plan                         |             |                   |                |
| Source Code                  | 12/1/96     |                   | L. Brass       |
| Test Report                  | 1/30/97     |                   | A. Jones       |

While the deliverables list is a compilation of information identified in the WBS and the project schedule, it is useful to maintain a separate list since deliverable completion can be a key metric of project progress. Separate tracking of deliverables can help keep a project on track. It also serves as a useful communication tool with both stakeholders and the project team.