Cradle-7

From concept to creation...

3SL

Integrated Project Management from Cradle

RC049/02 June 2015

http://www.threesl.com
salesdetails@threesl.com
support@threesl.com

3SL Incorporated
Suite 123, 1500 Perimeter Parkway
Huntsville
Alabama 35806, US
Tel: +1 256 971 9500
Fax: +1 256 971 9800
DUNS: 040577129

Structured Software Systems Ltd (3SL)
Suite 2, 22a Duke Street
Barrow-in-Furness
Cumbria LA14 1HH, UK
Tel: +44 (0) 1229 838867
Fax: +44 (0) 1229 870096
Regd: 2153654 VAT: GB 473 2757 28

Contents

Introduction

Most projects have a formal project plan by which their work can be planned and the progress of this work can be monitored. A project plan will typically divide the project's work into activities which can be grouped into a hierarchy that is usually called a ***Work Breakdown Structure*** (WBS). At its simplest, the WBS is a hierarchical description of the work that is required to complete the project.

The use of, or interest in, a WBS may not be confined to the group that maintains the project plan. Often, a project will want to have a representation of the project plan that is accessible to the systems engineering data, so that:

- Parts of the project plan can be assigned to people working in the systems engineering environment
- Individuals can have task lists prepared for them from the project plan
- Information used by, or generated by, the activities in the project plan can be linked to the activities in the plan
- Updates to the project plan can be made from within the systems engineering environment

These needs are particularly apparent in those organisations that undertake a large number of small projects. It is particularly common in manufacturing companies, who will typically have many projects underway concurrently.

Subject

This paper considers how to reconcile the need to plan and manage a project's work with the contents of the requirements management and systems engineering database in which this work is done.

In particular, how can the problems traditionally associated with project management be solved to ensure that the plan accurately reflects the work being done.

The Needs 1

Project planning starts with a ***schedule***, either a Gantt chart or a network (arrow or precedence) of ***activities*** and the ***dependencies*** between them, This schedule may be extended with activities' ***resource*** demands and the resources' ***availabilities***, which may introduce delays and conflicts into the schedule. A copy of this schedule is made as a baseline ***forecast***, and the project tracks the progress of the activities, resource availability and usage against this forecast.

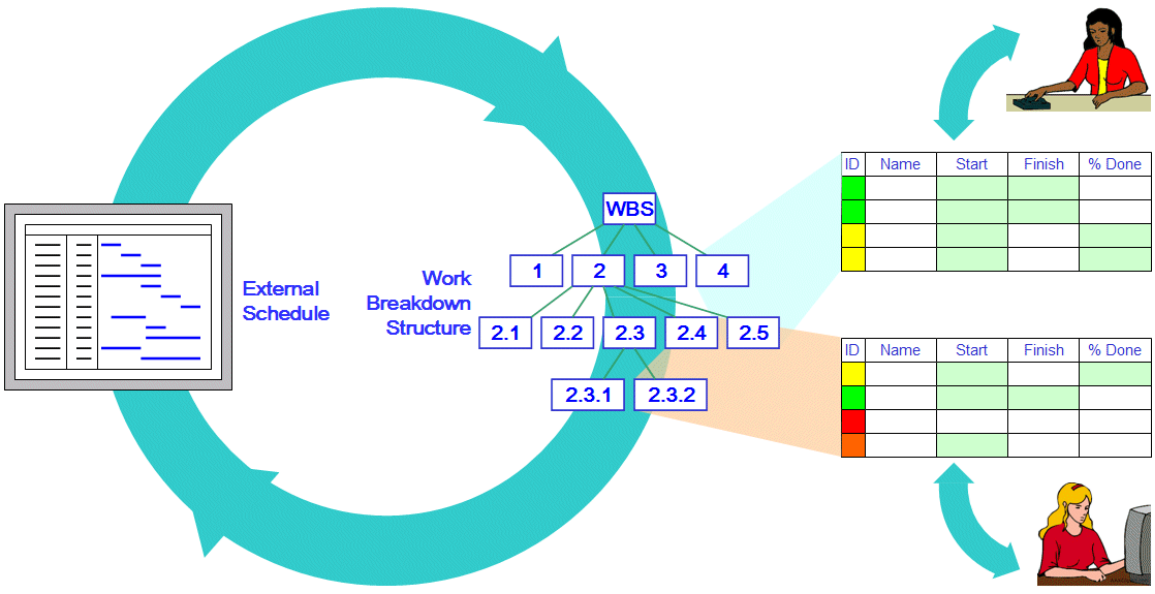
In systems engineering, a ***Work Breakdown Structure*** (WBS) is the most common means to identify the work to specify, design, build, test and deploy the system under consideration. How to synchronise the WBS and the project schedule is often a major issue.

This creates fundamental needs, to:

- Define one WBS for systems engineering and project management
- Exchange data bi-directionally between the systems engineering and project management practitioners
- Link this common WBS to the systems engineering deliverables
- Collect progress information as part of the systems engineering activity directly into the WBS
- Pass progress information from the systems engineering domain to project management
- Pass schedule updates from project management into the systems engineering domain

For example, consider the following typical project issues:

- *What is the schedule that we are working to?*
- *Which parts of the schedule am I responsible for?*
- *What are the priorities of the work that I am to do?*
- *Where are the requirements, designs or verifications associated with this project task?*
- *How do I report my progress back to project management?*
- *I know that work has slipped, where is the updated schedule?*



The Solution 2

Cradle provides a bi-directional integration with Microsoft Project® that allows:

1. A Cradle project to be associated with multiple Project schedules
2. Bi-directional data exchange between Cradle and Project, either:
   - From Cradle, pushing updates to Project or pulling updates into Cradle from Project
   - From Project, pushing updates to Cradle or pulling updates into Project from Cradle
3. Activities in each schedule to become a WBS hierarchy in Cradle
4. WBS items to be assigned to users, creating *task lists*
5. Each user to have a personal task list, colour-coded by the tasks' progress based on the current date and date information in the task, showing its immediacy or delinquency or completion
6. Updates to the plan, or progress against the plan, to be updated from Cradle into the schedule in Project

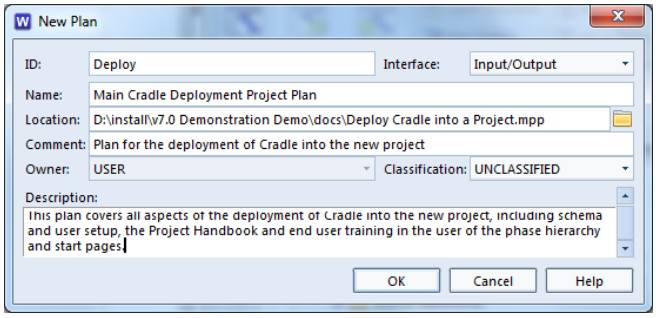
The Benefits 3

Cradle allows a project to avoid the problems that typically exist between project management and systems engineering:

- ***Inconsistency***: the structure of the project planning and the engineering activity are not aligned, so that project planning status and the engineering activities are difficult to correlate
- ***Incompleteness***: this inconsistency means that project planning's and systems engineering's perspectives of the work to be done are incomplete, creating unforeseen problems at the end of phase gate reviews of the work done and progress achieved
- ***Communication***: the lack of a direct link between the systems engineering work and the project plan creates a continual need for extra communication as project planners need to advise the engineering team of work to be done and its timescales
- ***Reporting***: if the systems engineering team cannot directly report their progress in the schedule, then the schedule can only be updated by time records or a reporting burden on the engineering team. The use of collaboration tools does not ease this burden, it merely provides an alternative to e-mail. The need to separately report progress still persists.

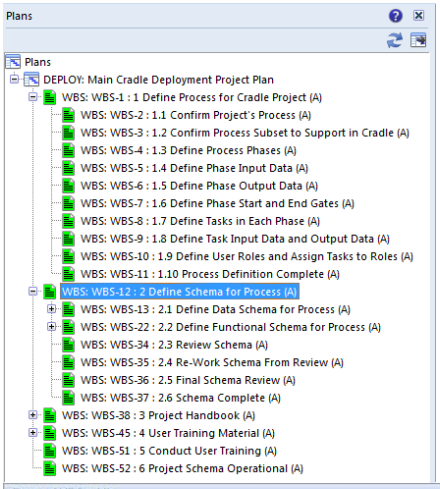
Plans 4

Any number of plans can be defined in a Cradle project, each linked to a schedule in a Project file or a URL in Project Server®.



Each plan is separately identified in the Cradle database and has its own WBS hierarchy that is an exact duplicate of the hierarchy of activities in the Project schedule. Any summary and milestone activities can be omitted, if this is preferred. All of the activity data is loaded from Project into user-defined attributes of the WBS items in Cradle.

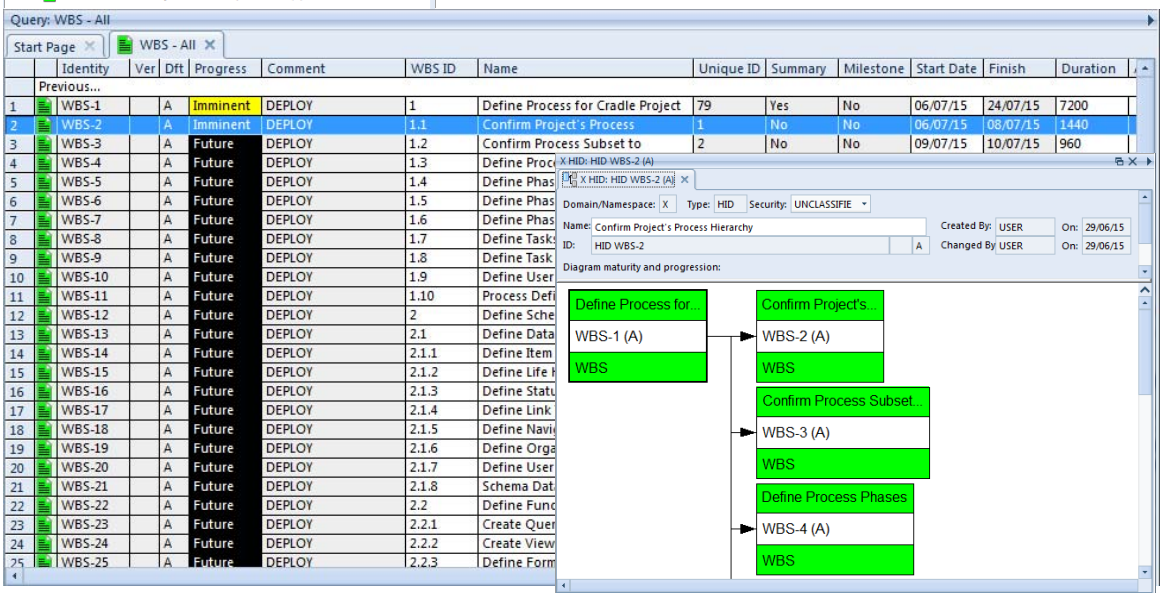
Each resulting WBS can be browsed in the



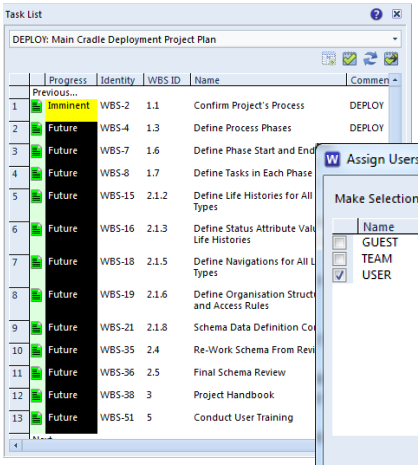
same manner as any other part of the systems engineering data. Other data can be linked to the WBS items, so that, for example, a WBS item referring to a system architecture is linked to the corresponding architecture model, and a WBS item referring to system verification is linked directly to the verifications.

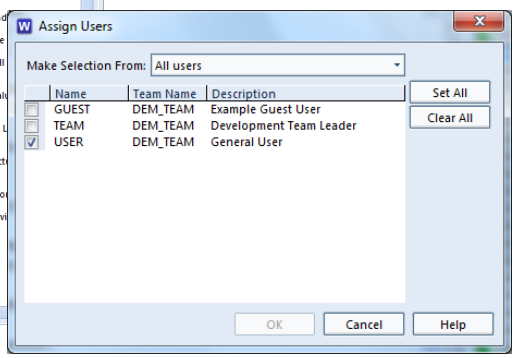
This allows users to directly access the work that they are to do from the WBS items specifying that there is work to be done. This is the simplest interface possible.

The WBS can be manipulated in the same way as any other type of information, including tabular view, graphical Hierarchy Diagrams, nested tables and matrices. The WBS data can be combined with the systems engineering data to provide integrated views of the work being done and the associated time and other constraints.



Task Lists 5





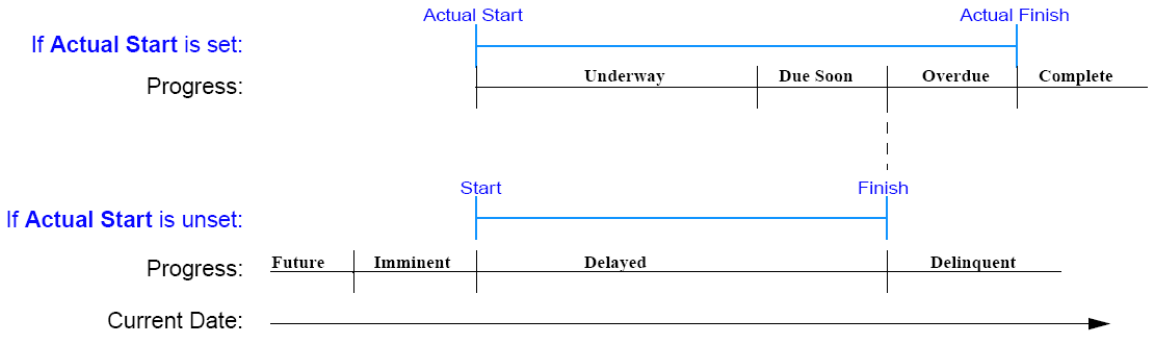
WBS items can be assigned to users, which makes that activity part of the task list for such users. Users can view their task list in the Task List sidebar, which can be their default sidebar after login. This allows users to focus specifically on the tasks that have been assigned to them.

Each task is colour-coded based on its progress which represents the combination of the task's:

- Scheduled start date
- Scheduled finish date
- Actual start date
- Actual finish date

and the current date when the task list is shown.

The progress shown for each task allows a user to know which of their assigned tasks:

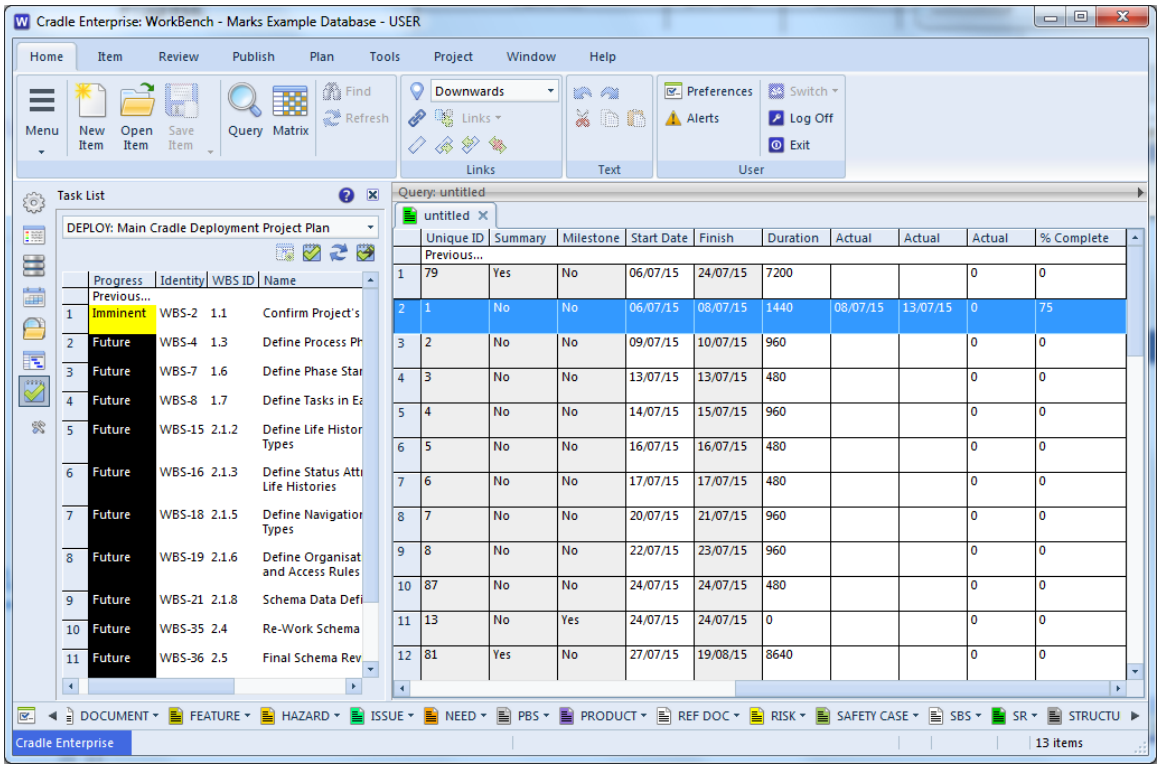


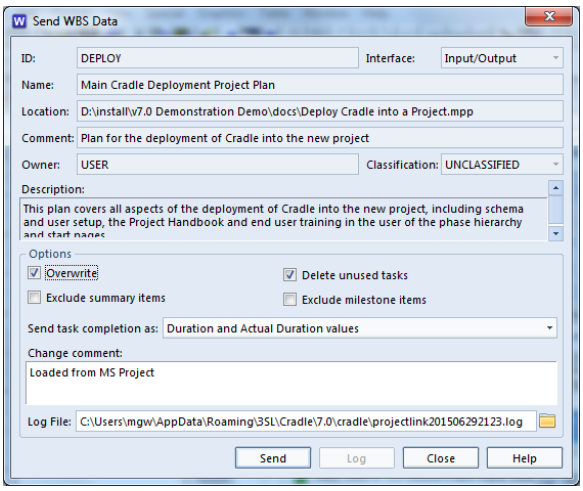
- Will start, imminently or in the future
- Should have already started, but have not
- Should have already finished, but have not even been started
- Have started and should finish soon
- Have started and should have finished by now
- Are complete

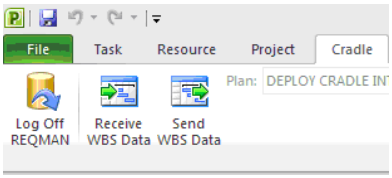
This is always valuable information. In a large or complex or highly time-critical project, it is vital.

Recording Progress 6

Since the link between Cradle and Project is bi-directional, it is entirely sensible for users to record their actual progress in Cradle and to transfer this data to update the Project schedule.







Reporting that a task has started is easy:

- Record an actual start date

Similarly, reporting progress is simple:

- Record a % complete value

There are two approaches for reporting that a task has completed:

- Record an actual finish date
- Record a % complete of 100

To avoid any confusion, a project should decide how the completion of tasks will be reported, since Project will set values based on the values that you specify. For example, Project will automatically calculate an actual finish date for a task whose completion is 100%.

It is also possible to change the basic planning data from Cradle and send it to Project, for example to change any of the:

- Start Date
- Finish Date
- Duration

The updated data can be sent to, or pulled into, Project. Once any further updates have been made by project planning personnel, the updated schedule can be loaded back into Cradle.

Summary 7

Cradle provides a bi-directional interface with Project that allows:

1. Any number of Project schedules to be referenced as plan(s) from a Cradle database
2. A WBS to be maintained in Cradle for each associated plan
3. Updates to the schedule to be pulled into Cradle or pushed into Cradle from Project
4. WBS activities to be linked to any systems engineering data, such as requirements, test cases or verifications
5. WBS activities to be assigned to users to create task lists
6. Users to record progress in the tasks assigned to them
7. Progress updates to be pushed into Project from Cradle, or pulled from Cradle by Project

In combination, these facilities allow complete integration between the requirements management and systems engineering activity in Cradle and the schedules and programmes by which such activities are planned and managed.