Cradle-7

From concept to creation...

3SL

Integrated Project Management from Cradle

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Introduction

Most projects have a formal project plan to plan their work and monitor its progress. A project plan will typically divide the project's work into activities that is usually grouped in a hierarchical ***Work Breakdown Structure*** (WBS). At its simplest, the WBS is a hierarchical description of the work that is required to complete the project.

In agile projects, the WBS will be structured as ***sprints*** or ***iterations***. Due to their short duration, the WBS for each iteration may be limited to design, implementation, test and user sign-off.

The use of, or interest in, a WBS may not be limited to the group maintaining the project plan. Often, the plan should be linked to the systems engineering data, so that:

- The plan can be assigned to engineers in the systems engineering environment
- Individuals can be given a task list as a personal subset of the plan
- Information used, or generated, by tasks in the plan can be linked to these tasks
- Updates to the project plan can be made in the systems engineering environment

These needs are important in organisations who have many small projects. It is very common in manufacturing companies, who will have many projects underway at the same time.

Subject

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

In particular, how can problems 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*** needs and ***availabilities***, that 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.

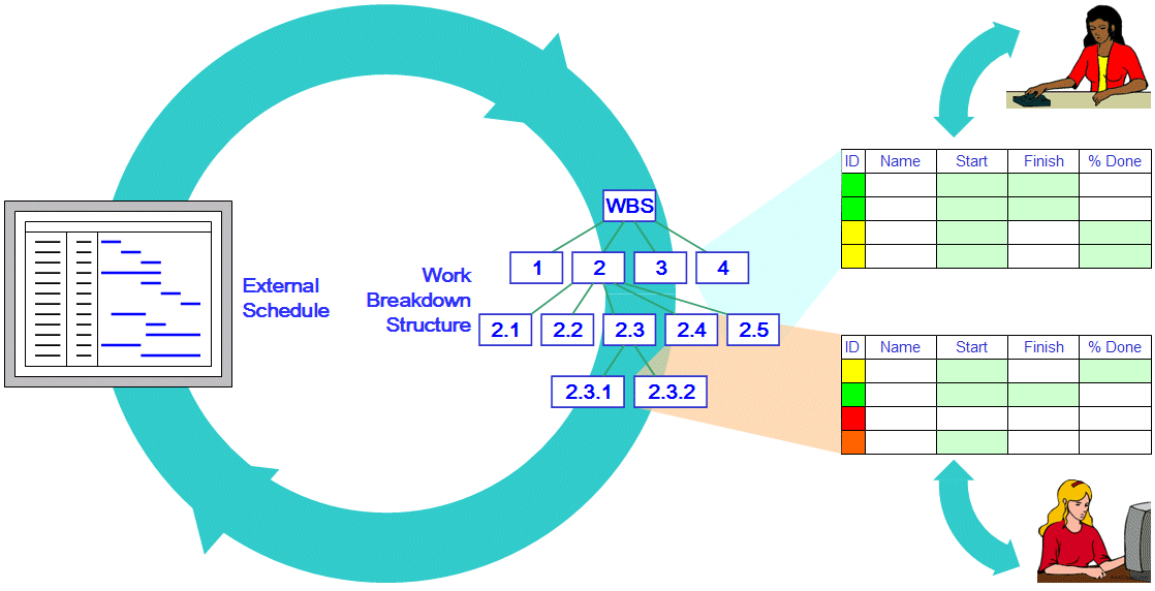
A ***Work Breakdown Structure*** (WBS) is the most common means to identify the work to specify, design, build, test and deploy the project. How to synchronise the WBS and the project schedule is often a major issue.

This creates fundamental needs, to:

- Have one WBS for engineering and management
- Exchange data bi-directionally between engineering and project management teams
- Link this WBS to the engineering deliverables
- Collect progress data as part of the engineering work directly into the WBS
- Pass progress data 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 task?***
- ***How do I report progress to management?***
- ***I know work has slipped, where is the new schedule?***



The Solution 2

Cradle has a bi-directional link to Microsoft® Project so:

1. A database can be linked to many Project schedules
2. Data can be exchanged between Cradle and Project:
   - From Cradle, pushing updates to Project or pulling updates from Project into Cradle
   - From Project, pushing updates to Cradle or pulling updates from Cradle into Project
3. Each schedule to become a WBS hierarchy in Cradle
4. WBS items can be assigned to users, creating ***task lists***
5. Each user has a task list, colour-coded based on the current date and the tasks' dates, showing urgency, delinquency or completion
6. Updates to the plan, or progress against the plan, to be updated from Cradle into the schedule in Project

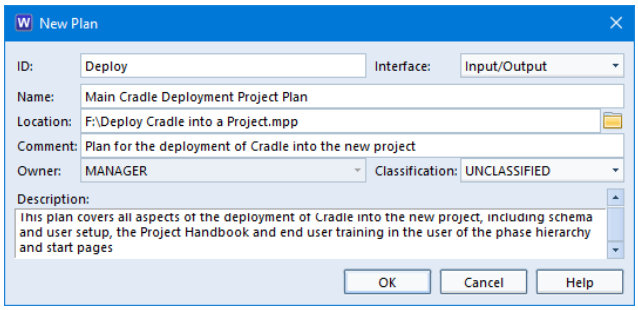
The Benefits 3

Cradle helps projects avoid problems that typically arise between project management and systems engineering:

- ***Inconsistency***: the structure of the planning and the engineering activity are not aligned, so that planning and the engineering work are difficult to correlate
- ***Incompleteness***: inconsistency means that planning's and engineering's perspectives of the work to be done are incomplete, creating problems at the end of phase gate reviews of the work done and progress achieved
- ***Communication***: the lack of a link between the plan and the engineering creates a continual need for planners to advise the engineering team of work to be done and its timescales
- ***Reporting***: if the engineering team cannot report their progress in the schedule, the schedule can only be updated by timecards or other reporting burden on the engineering team. Collaboration tools do not ease this burden, they are merely an alternative to e-mail. The need to report progress persists.

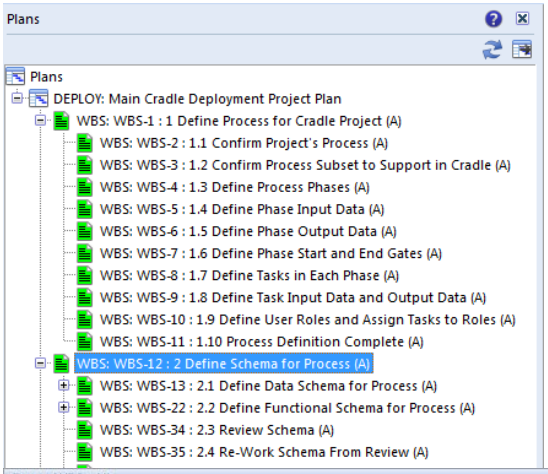
Plans 4

Any number of plans can be defined in a Cradle database, each linked to 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 duplicates the hierarchy of activities in the Project schedule. Any summary and milestone activities can be omitted. All of the activity data is loaded from Project into user-defined attributes of the WBS items in Cradle.

The schedule can be pulled by Cradle from Project, or pushed from Project into



Cradle. This will be done when the schedule is created, and whenever it is changed in Project.

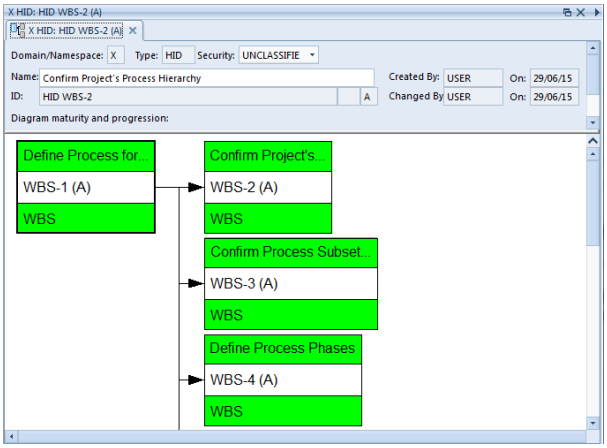
A plan and WBS can be created in Cradle and pushed into Project from Cradle. Project does not need to be the origin of the plan. The plan and WBS hierarchy can be updated in Cradle, and the changes pushed into Project, or they can be pulled into Project from Cradle.

In effect, the schedule in Project and the WBS hierarchy in Cradle can be changed in either tool, and kept synchronised by pushing data from one tool into the other, or pulling data from either tool into the other.

Query: WBS - All

Start Page | WBS - All

	Identity	Ver	Dft	Progress	Comment	WBS ID	Name	Unique ID	Summary	Milestone	Start Date	Finish	Duration
	Previous...												
1	WBS-1		A	Imminent	DEPLOY	1	Define Process for Cradle Project	79	Yes	No	06/07/15	24/07/15	7200
2	WBS-2		A	Imminent	DEPLOY	1.1	Confirm Project's Process	1	No	No	06/07/15	08/07/15	1440
3	WBS-3		A	Future	DEPLOY	1.2	Confirm Process Subset to	2	No	No	09/07/15	10/07/15	960
4	WBS-4		A	Future	DEPLOY	1.3	Define Process Phases	3	No	No	13/07/15	13/07/15	480
5	WBS-5		A	Future	DEPLOY	1.4	Define Phase Input Data	4	No	No	14/07/15	15/07/15	960
6	WBS-6		A	Future	DEPLOY	1.5	Define Phase Output Data	5	No	No	16/07/15	16/07/15	480
7	WBS-7		A	Future	DEPLOY	1.6	Define Phase Start and End Gates	6	No	No	17/07/15	17/07/15	480
8	WBS-8		A	Future	DEPLOY	1.7	Define Tasks in Each Phase	7	No	No	20/07/15	21/07/15	960
9	WBS-9		A	Future	DEPLOY	1.8	Define Task Input Data and	8	No	No	22/07/15	23/07/15	960
10	WBS-10		A	Future	DEPLOY	1.9	Define User Roles and Assign	87	No	No	24/07/15	24/07/15	480
11	WBS-11		A	Future	DEPLOY	1.10	Process Definition Complete	13	No	Yes	24/07/15	24/07/15	0
12	WBS-12		A	Future	DEPLOY	2	Define Schema for Process	81	Yes	No	27/07/15	19/08/15	8640
13	WBS-13		A	Future	DEPLOY	2.1	Define Data Schema for Process	82	Yes	No	27/07/15	31/07/15	2400
14	WBS-14		A	Future	DEPLOY	2.1.1	Define Item Types and Attributes	14	No	No	27/07/15	27/07/15	480
15	WBS-15		A	Future	DEPLOY	2.1.2	Define Life Histories for All Item	29	No	No	28/07/15	28/07/15	240
16	WBS-16		A	Future	DEPLOY	2.1.3	Define Status Attribute Values for	30	No	No	28/07/15	28/07/15	240
17	WBS-17		A	Future	DEPLOY	2.1.4	Define Link Types and Link Rules	31	No	No	29/07/15	29/07/15	240
18	WBS-18		A	Future	DEPLOY	2.1.5	Define Navigations for All Link	32	No	No	29/07/15	29/07/15	240
19	WBS-19		A	Future	DEPLOY	2.1.6	Define Organisation Structure	54	No	No	30/07/15	30/07/15	480
20	WBS-20		A	Future	DEPLOY	2.1.7	Define User Roles and Privileges	55	No	No	31/07/15	31/07/15	480
21	WBS-21		A	Future	DEPLOY	2.1.8	Schema Data Definition Complete	33	No	Yes	31/07/15	31/07/15	0
22	WBS-22		A	Future	DEPLOY	2.2	Define Functional Schema for	83	Yes	No	03/08/15	12/08/15	3840
23	WBS-23		A	Future	DEPLOY	2.2.1	Create Queries for Item Life	34	No	No	03/08/15	03/08/15	480
24	WBS-24		A	Future	DEPLOY	2.2.2	Create Views for All Item Types	35	No	No	04/08/15	04/08/15	480
25	WBS-25		A	Future	DEPLOY	2.2.3	Define Forms for All Item Types	36	No	No	05/08/15	05/08/15	480



A WBS can be browsed in the same way as any other systems engineering data:

- Running queries on the WBS
- Defining views on the WBS
- Generating pivot tables and matrices using the WBS
- Producing metrics and dashboard KPIs from the WBS
- Reporting progress in the WBS using burn-down or earned-value charts
- Reviewing the WBS into a baseline and raising Change Requests and Change Tasks on a WBS in the Configuration Management System (CMS)

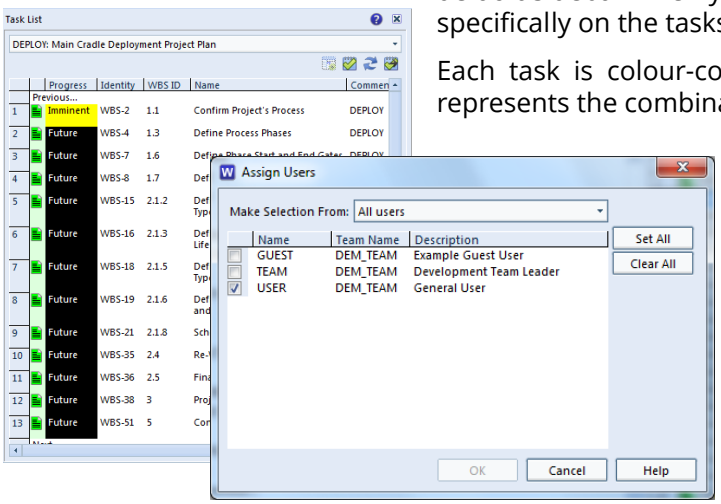
Other data can be linked to the WBS items, so that, for example, a WBS item referring to a system architecture is linked to the architecture model, and a WBS item referring to system verification is linked to these verifications.

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 possible link between project management and the data.

The WBS can be manipulated in the same way as all other types of information, including tabular views, 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 a ***task list*** for each user. Users can view their task list in the **Task List** sidebar. This can be your default sidebar when you 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:

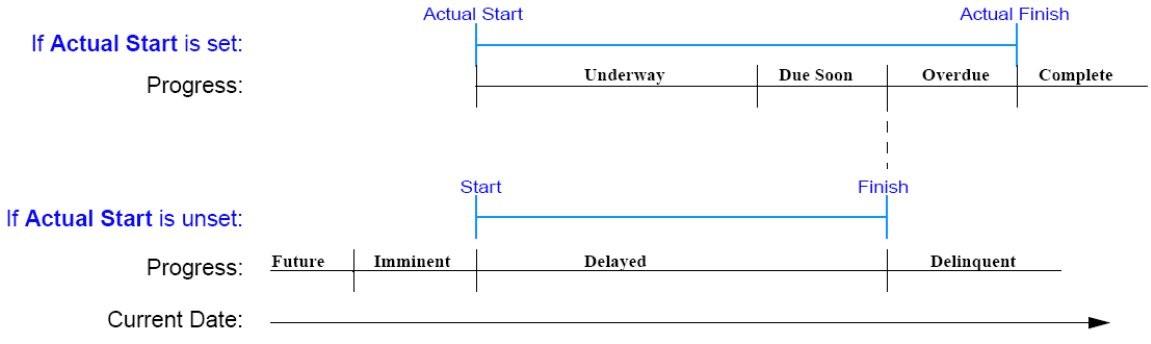
- Scheduled start date
- Scheduled finish date
- Actual start date
- Actual finish date

all relative to 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:

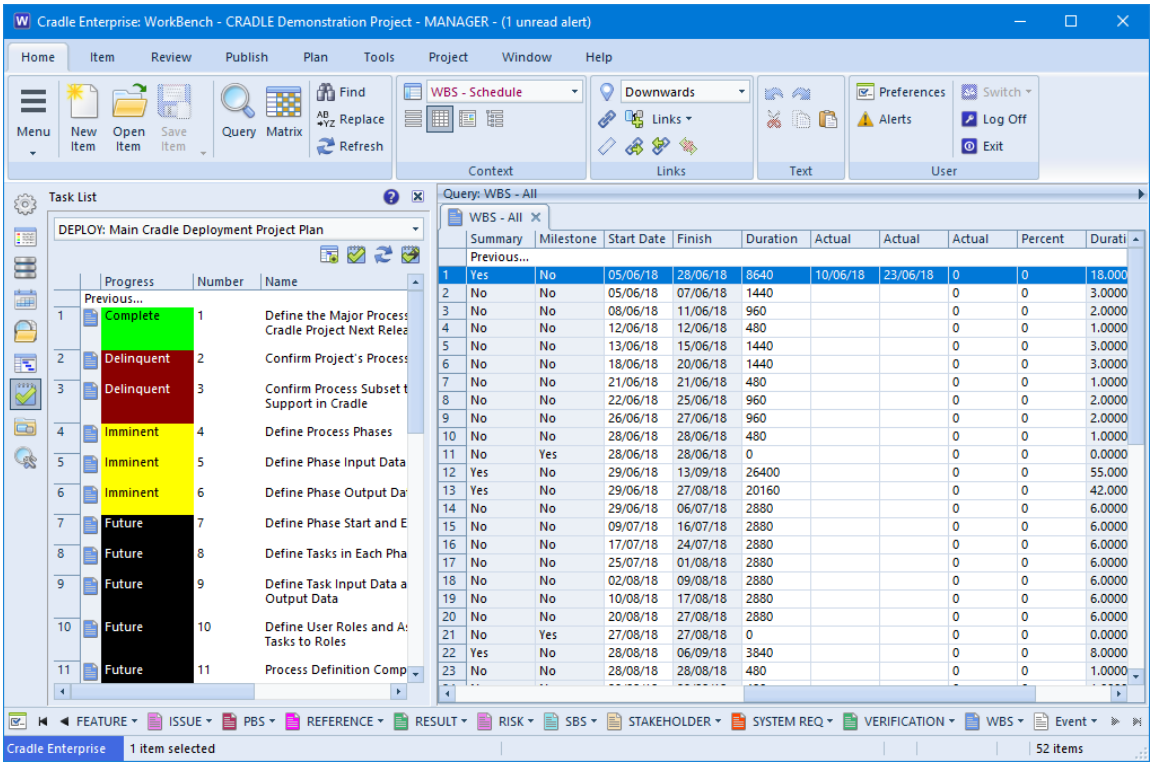
- Will start, imminently or in the future
- Should have started, but have not
- Should have finished, but have not been started
- Have started and should finish soon
- Have started and should have finished by now
- Are complete

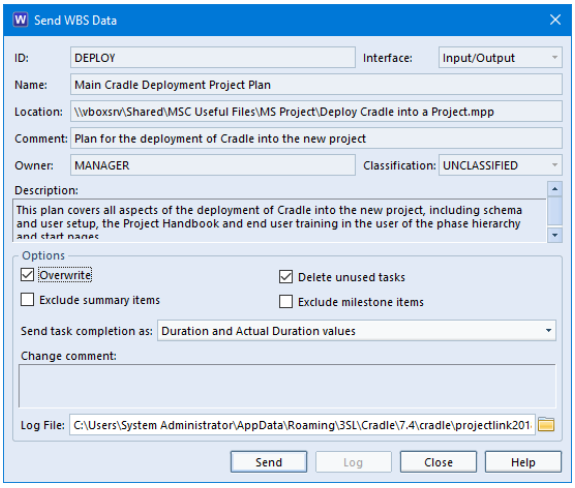
This information is always valuable. In a large or complex or highly time-critical project, it is vital.



Recording Progress 6

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





Reporting that a task has started is easy:

- Record an actual start date

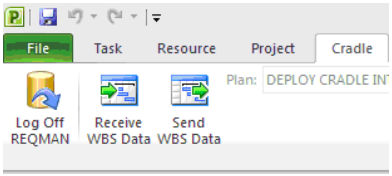
Similarly, reporting progress is simple:

- Record a % complete value

To report that a task has ended, either:

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

You should choose one method as Project will set values based on what you provide. For example, Project will calculate an actual finish date for a task whose completion is 100%. Hence supplying both values is pointless, one of your values will be overwritten by Project.



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 plan
3. Updates to the schedule to be synchronised either from Cradle to Project, or from Project to Cradle
4. WBS activities to be linked to any 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 synchronised either from Cradle to Project, or from Project to Cradle

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.