

SMP

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Why Use SMP?

- most managers use (*at least*) **3** different tools to manage a project
 - one for effort estimation
 - one for planning (eg, MicroSoft Project)
 - one for time tracking (usually in house)
- this is, *undoubtedly*, a waste of time
- **SMP** coherently integrates these 3 tasks into a single tool, providing you with valuable guidance for managing a project

SMP

- **SMP** is a software tool that *coherently integrates* the following project management functions
 - effort estimation, planning, tracking, control
- **SMP** supports object-oriented software development processes (e.g. RUP - Rational Unified Process)
- **SMP** is inspired from Watts Humphrey's PSP (Personal Software Process), but *lifted* to manage *large* software projects
- project management process is driven by the notion of *use case*

Effort Estimation and Project Tracking

- since
 - you need effort estimation early in a project
 - the only information early available are use cases
- then, why not
 - plan & track projects by use case
 - include process model in planning and tracking (e.g., RUP)
 - estimate new projects using historical effort by use case for completed projects

Effort Tracking

- best effort estimation models are calibrated using in-house historical data
- *problems*
 - general purpose project planning and tracking tools do not adequately support data gathering (eg MicroSoft Project)
 - SMP collects data with the objective of re-using it for effort estimation of future (not just for project control)

Planning & Tracking by Use Case

- project tracking by use case
- project planning by use case

Project Tracking by Use Case

<u>project</u>	<u>resource</u>	<u>date</u>	<u>phase</u>	<u>process component</u>	<u>task</u>	<u>use case</u>	<u>effort</u>
project 1	person A	98-06-01	inception	requirements analysis	define use case1	use case 1	3
project 1	person B	98-06-01	inception	requirements analysis	define use case2	use case 2	4
project 1	person B	98-06-01	inception	requirements analysis	define use case3	use case 3	2
project 1	person A	98-06-02	inception	requirements analysis	define use case4	use case 4	3
project 1	person B	98-06-02	inception	requirements analysis	class diagram	use case 2	8
project 1	person A	98-06-03	inception	requirements analysis	class diagram	use case 1	3
project 1	person A	98-06-03	inception	requirements analysis	class diagram	use case 4	4
project 1	person B	98-06-03	inception	requirements analysis	class diagram	use case 2	5
project 1	person B	98-06-03	inception	requirements analysis	class diagram	use case 3	3
project 1	person A	98-06-04	elaboration	design	design pattern A	use case 1	6
project 1	person B	98-06-04	elaboration	design	design pattern D	use case 2	10
project 1	person A	98-06-05	elaboration	design	design pattern B	use case 4	7
project 1	person B	98-06-05	elaboration	design	design pattern E	use case 3	5

Estimating Effort by Use Case

- build a list of use cases
- determine the type of each use case
- estimate complexity of each use case
- estimate estimate precision

List of Use Cases

use case	complexity	category
use case 1	M	data mgmt
use case 2	S	data mgmt
use case 3	S	data mgmt
use case 4	VS	data mgmt
use case 5	M	data mgmt
use case 6	M	algorithmic
use case 7	M	data mgmt
use case 8	M	data mgmt
use case 9	C	data mgmt
use case 10	C	algorithmic
use case 11	VC	data mgmt

Use Case Complexity

- Five levels determined by statistical analysis

Category	data mgmt
use case complexity	effort
VS	42
S	61
M	81
C	100
VC	119

Complexity levels

- μ = mean use case effort for category
 σ = standard deviation for category
- VS = $\mu - 2*\sigma$ (6 %)
- S = $\mu - \sigma$ (24 %)
- M = μ (38 %)
- C = $\mu + \sigma$ (24 %)
- VC = $\mu + 2*\sigma$ (6 %)

Estimating Use Case Effort

use case	complexity	category	effort
use case 1	M	data mgmt	81
use case 2	S	data mgmt	61
use case 3	S	data mgmt	61
use case 4	VS	data mgmt	42
use case 5	M	data mgmt	81
use case 6	M	algorithmic	81
use case 7	M	data mgmt	81
use case 8	M	data mgmt	81
use case 9	C	data mgmt	100
use case 10	C	algorithmic	100
use case 11	VC	data mgmt	119

Estimate Precision

	Estimated	Actual		Relative
Project	Effort	Effort	Error	Error
project 1	1400	1600	200	14%
project 8	600	700	100	17%
project 2	800	650	-150	19%
project 9	850	1020	170	20%
project 5	1200	900	-300	25%
project 6	500	375	-125	25%
project 7	700	900	200	29%
project 4	800	1300	500	63%
project 3	700	1300	600	86%
prediction level				
relative	pct			
error	projects			
20%	44%			
25%	67%			
29%	78%			
63%	89%			
86%	100%			

What if the use case concept is not adequate for planning a particular phase or project?

- use something else !!!
- in **SMP**, a use case is just an instance of a more general concept called a *project unit*
- you may define other project unit
 - eg, framework, patterns, etc
- you may estimate, plan, track and control using any project unit

Estimating Project Schedule

		no. of	effort	duration	duration	start	end
Phase	pct	ressources	(p-h)	(days)	(months)	date	date
inception	10%	1,5	133	12	0,6	98-09-07	98-09-26
elaboration	30%	2	400	27	1,4	98-09-26	98-11-08
construction	40%	3,5	534	20	1,1	98-11-08	98-12-10
transition	20%	2	267	18	0,9	98-12-10	99-01-08
	-----	-----	-----	-----	-----	-----	-----
total	100%	2,3	1334	77	4,1	98-09-07	99-01-08
hours per day	7,5						
days per month	19						

Iteration Planning

- identify the use cases to undertake
- determine the process components to realize
- estimate process component effort by use case based on historical process components percentage

Iteration Planning

<u>phase</u>	<u>process component</u>	<u>use case</u>	<u>effort</u>
inception	requirements analysis	use case 1	12
inception	requirements analysis	use case 2	9
inception	requirements analysis	use case 3	9
inception	requirements analysis	use case 4	6
inception	design	use case 1	20
inception	design	use case 2	15
inception	implementation	use case 1	32
inception	implementation	use case 2	24
inception	test	use case 1	16
inception	test	use case 2	12

Task Planning

- allocate use case process component effort to several tasks in an iteration
- use “estimate to complete” to adjust estimate according to current knowledge
 - yes, the *estimate to complete* technique works fine, if your tasks are small enough (at most a week)

			est	estimate to
process component	use case	task	effort	complete
implementation	use case 1	code class A	16	20
implementation	use case 1	code class B	16	20
implementation	use case 2	code class C	15	15
implementation	use case 2	code class D	9	9

Assigning Tasks to Resources

project	task	use case	resource
project 1	define use case1	use case 1	John Smith
project 1	define use case2	use case 2	John Smith
project 1	define use case3	use case 3	Murphy Brown
project 1	define use case4	use case 4	Murphy Brown
project 1	class diagram	use case 2	John Smith
project 1	class diagram	use case 1	John Smith
project 1	class diagram	use case 4	Murphy Brown
project 1	class diagram	use case 2	John Smith
project 1	class diagram	use case 3	Murphy Brown
project 1	design pattern A	use case 1	John Smith
project 1	design pattern D	use case 2	John Smith

Project Control

<u>use case</u>	<u>estimated effort</u>	<u>actual effort</u>	<u>estimate to complete</u>	<u>forecast</u>	<u>error</u>
use case 1	81	90	0	90	11%
use case 2	61	50	0	50	-18%
use case 3	61	75	0	75	23%
use case 4	42	25	10	35	-17%
use case 5	81	50	40	90	11%
use case 6	81	0	81	81	0%
use case 7	81	0	100	100	23%
use case 8	81	0	60	60	-26%
use case 9	100	0	100	100	0%
use case 10	100	0	100	100	0%
use case 11	119	0	119	119	0%
use case 12	81	0	81	81	0%
use case 13	42	0	42	42	0%
use case 14	61	0	61	61	0%
use case 15	100	0	100	100	0%
use case 16	81	0	81	81	0%
use case 17	100	0	100	100	0%
	-----	-----	-----	-----	-----
total project	1353	290	1075	1365	1%
percentage of completion		21%			

Project Control

<u>project</u>	<u>task</u>	<u>use case</u>	<u>estimated effort</u>	<u>actual effort</u>	<u>estimate to complete</u>	<u>forecast</u>	<u>error</u>
project 1	define use case1	use case 1	3	3	0	3	0%
project 1	define use case2	use case 2	4,5	4	0	4	-11%
project 1	define use case3	use case 3	1,5	2	0	2	33%
project 1	define use case4	use case 4	5	3	0	3	-40%
project 1	class diagram	use case 2	7,5	8	0	8	7%
project 1	class diagram	use case 1	2,5	3	0	3	20%
project 1	class diagram	use case 4	4	4	0	4	0%
project 1	class diagram	use case 2	5,5	5	0	5	-9%
project 1	class diagram	use case 3	3,5	3	0	3	-14%
project 1	design pattern A	use case 1	4	6	0	6	50%
project 1	design pattern D	use case 2	9	10	0	10	11%
project 1	design pattern B	use case 4	6,5	7	0	7	8%
project 1	design pattern E	use case 3	7	5	3	8	14%
project 1	design pattern C	use case 4	8	0	8	8	0%
project 1	design pattern F	use case 3	6	0	9	9	50%
project 1	code class A	use case 1	10	2	6	8	-20%
			-----	-----	-----	-----	-----
total			87,5	65	26	91	4%

The SMP Tool

- interface look and feel inspired from
 - Windows 2000
 - Clear Case (among others)
- java & jdbc based

Process

The screenshot displays the Smp software interface. The title bar reads "Smp" and the menu bar includes "File", "Edit", "View", and "Help". The toolbar contains icons for file operations. The left sidebar, titled "Folders", shows a tree structure with "Smp Toolbox" expanded to "Process Management", which includes "Rational Unified Process" (highlighted), "In House Process", "Projects", "Use Cases", "Iterations", "Elements", "Tasks", "Tracking", "Schedule", "Toolbox Management", and "Recycle Bin".

The main content area is titled "Rational Unified Process" and contains the following text:

You can create a new Process by entering its name in the textbox and by clicking on the Create Process button.

Process Name:

You can also modify its content using the Process grid in the right screen.

[Modify Process name...](#)

The right side of the interface features a grid with columns for process phases: "Inception", "Elaboration", "Construction", and "Transition". The rows represent process components: "Business Modeling", "Requirements", "Analysis & Design", "Implementation" (highlighted), "Test", and "Deployment".

At the bottom, there are two management panels:

- Phase Management:** Description: ; Order In Process: ; Total Effort %: . Buttons: [Save](#) [Update](#) [Delete](#).
- Component Management:** Description: ; Order In Process: ; Total Effort %: . Buttons: [Save](#) [Update](#) [Delete](#).

The status bar at the bottom left shows "Ready..."

Project

The screenshot shows the Smp software interface. On the left is a 'Folders' tree view with the following items: Smp Toolbox, Process Management (expanded), Rational Unified Process, In House Process, Projects (selected), Use Cases, Iterations, Elements, Tasks, Tracking, Schedule, Toolbox Management, and Recycle Bin. The main area is titled 'Projects' and contains the text: 'Use the form to create, modify or delete Projects.' Below this is a table of projects:

Description	Process	Language	Hour per Day	Day per Month	Start Date	Comple
Project 1	In House Process	Java	7.5	20	12-DEC-1999	Yes
Project 2	In House Process	Java	7.5	20	9-MAY-1997	Yes
Project 3	Rational Unified Process	C++	7.5	20	01-JUL-2000	No
Project 4	Rational Unified Process	Java	7.5	20	23-JAN-1998	No

At the bottom right, a 'Project Management' form is open, showing details for Project 3:

Project Management

Description: Hour per Day:

Process: Day per Month:

Language: Start Date:

Completed

[Save](#) [Update](#) [Delete](#)

Ready...

Use Case

The screenshot displays the Smp software interface. On the left, a 'Folders' pane shows a tree structure with 'Project 2' selected under 'Use Cases'. The main workspace is titled 'Project 2' and contains instructions: 'Use the form to create, modify or delete Use Case list.' Below this, there is a 'Project Total Effort' input field, a 'Complete Estimation:' section with radio buttons for 'Yes' and 'No' (where 'No' is selected), and a 'Load Rose model...' link.

Use Case	Complexity	Category	Use Case Parent	Plan Effort
use case 1	medium	data mgmt	none	21
use case 2	simple	data mgmt	none	12
use case 3	very simple	data mgmt	use case 1	23
use case 4	complex	algorithmic	none	56

At the bottom right, the 'Use Case Management' section includes a form with the following fields:

- Description: use case 1
- Complexity: medium
- Category: data mgmt
- Plan Effort: 21
- Use Case Parent: none

Buttons for 'Save', 'Update', and 'Delete' are located below the form.

Ready...

Iteration

The screenshot shows the Smp software interface. The main workspace displays "Project 2" with instructions: "Use the form to create, modify or delete Iterations." and "Select a phase in the list to view filtered information." Below these instructions is a list of phases: Inception, **Elaboration** (selected), Construction, and Transition.

Phase	Iteration Description	Order in Phase
Elaboration	Iter 1	1
Elaboration	Iter 2	2
Elaboration	Iter 2.1	3
Elaboration	Iter 3	4

The Iteration Management form at the bottom right contains the following fields:

- Description:
- Order in Phase:
- Phase:

Buttons: [Save](#) [Update](#) [Delete](#)

Ready...