

Supporting time planning by enhancing an Open Source Software in Alignment with CMMI-DEV and PMBOK

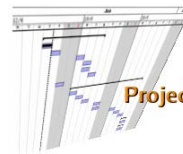
Authors:

Rafael Queiroz Gonçalves

André M. Pereira

Christiane Gresse von Wangenheim

Jean Carlos R. Hauck



 **dotProject**
Project Management Software



Summary

1. Introduction
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Introduction

Many software development **projects** still have **problems** to be delivered on **time**, **budget** and with the complete **scope** defined [CHAOS 2009].

One of the reasons:

- The **Lack of project management**.
- Establishing **effective** and **efficient** a **project management** practices is **still a challenge** for many organizations [Wangenheim et al. 2010].



Introduction

As an attempt to **improve** this situation, "**best practices**" **models** have been developed.

CMMI-DEV (Capability Maturity Model Integration for Development): that guides the **improvement** and appraisal of a software organization's **processes** [SEI 2010].

PMBOK *Guide to the Project Management Body of Knowledge*: describes the **life cycle of managing** a project and respective **knowledge areas** [PMI 2008].

Although, these models **do not require** the **adoption of software tools**, such **tools can** help to support and partially **automate steps, increasing efficiency and improving the maturity of the process** [Young, Fang, and Hu 2006].



Introduction

Today, there exist a **wide range** of project management **tools**, including **commercial** as well as **open source** and free tools [Young, Fang, and Hu 2006].

Especially in the **context** of small and medium software organizations (SME), **free/open source** tools represent an **interesting alternative**.

* According to SEBRAE (2010), **95%** software enterprises are characterized as **SME**.



Introduction

The purpose of this work is to present the **enhancements** realized on **dotProject**, an open source tool for project management, to supports the **time planning** aligned with **PMBOK** process and **CMMI-DEV** specific practices, covering processes as:

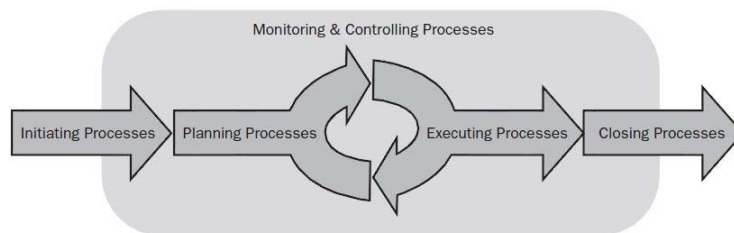
- ✓ Activities definitions
- ✓ Activities sequencing
- ✓ Effort estimations
- ✓ Resources estimation,
- ✓ Duration estimation
- ✓ Schedule development.



Background - PMBOK

Project management is the application of knowledge, skills, tools and techniques to **project activities** to **meet their requirements** [PMI 2008].

A **worldwide reference** for project management is the **PMBOK** that defines a **lifecycle** and **knowledge areas** for **successful project management**.



Background - PMBOK

PMBOK defines project management as a set of **42** processes.

Processes related to time planning:

- ✓ Define Activities
- ✓ Sequence activities
- ✓ Estimate activities resources
- ✓ Estimated activities duration
- ✓ Develop schedule

Background - CMMI

The Capability Maturity Model Integration (**CMMI**) is a framework for **process improvement** for the **development of software** products and services.

For CMMI-DEV the time planning specific practices:

- ✓ PP/SP 1.1 Estimate the Scope of the Project
- ✓ PP/SP 1.2 Establish Estimates of Work Product and Task Attributes
- ✓ PP/SP 2.1 Establish the Budget and Schedule:
- ✓ PP/SP 2.4 Plan for Project Resources
- ✓ PP/SP 1.4 Determine Estimates of Effort and Cost



DotProject

DotProject (www.dotproject.net) is a **web-based** tool for **project management**.

The software uses **MYSQL** database, and has been developed using **PHP** as programming language.

The tool is **designed in modules**. Its **basic features** are supported by **core modules** and **new features** can be built and installed as **add-on modules** using the tool's development framework.



DotProject

View Project Search:

projects list : edit this project : organize tasks : reports

PROJECT A

Details		Summary	
Company:	GQS	Status:	Not Defined
Internal Company:		Priority:	high
Short Name:	-	Type:	Unknown
Start Date:	15/09/2011	Progress:	0,0%
Target End Date:	-	Worked Hours:	
Actual End Date:	26/10/2011	Scheduled Hours:	3
Target Budget:	\$0.00	Project Hours:	7,55
Project Owner:	Person, Adm		

Tasks | Tasks (Inactive) | Forums | Gantt Chart | Task Logs | Events | Files

Expand All : Collapse All

Pin	New Log	Work	P	Task Name	Start Date	Duration	Finish Date
		Log	0%	Activity A	03/10/2011 08:30 am	1 hours	04/10/2011 05:00 pm
		Log	0%	Activity B	17/10/2011 08:45 am	1 hours	25/10/2011 05:00 pm
		Log	0%	Activity C	17/10/2011 08:45 am	1 hours	26/10/2011 05:00 pm

GQS Grupo de Qualidade de Software

UNIVERSIDADE FEDERAL DE SANTA CATARINA

Evaluation Criteria

The **evaluation criteria** adopted to evaluate dotProject are based on **PMBOK processes** and **CMMI-DEV practices** using an earlier research of the authors on **unifying and harmonizing** CMMI-DEV v1.2 (PP, PMC, SAM) and PMBOK processes.

Rating	Description
-	Does not provide any support.
*	Offers basic support, covering less than half of the UBP.
**	Covers more than half of the UBP.
***	Offers a complete set of elaborate functionalities for this UBP.

Evaluation of dotProject version 2.1.5

UBP		dotProject version 2.1.5
P1	Define Activities	**
P2	Establish Estimates of Work Product and Task Attributes	*
P3	Sequence Activities	**
P4	Plan for Project Resources	**
P5	Estimate Activity Durations	**
P6	Estimate Effort	*
P7	Develop Schedule	***

Enhancements on dotProject

Defining Work Breakdown Structure (WBS/EAP):

ive) Forums Gantt Chart Task Logs Events Files **WBS** Derivation PDM Estimations

Add

WBS					
ID	Order	Indentation	WBS Item		
1	↑ ↓	← →	Time planning enhancement for dotProject		X
1.1	↑ ↓	← →	Time planning best practices		X
1.1.1 *	↑ ↓	← →	CMMI practices for time plannig		X
1.1.2 *	↑ ↓	← →	PMBOK process for time planning		X

Deriving activities from work packages

Activities Definition:

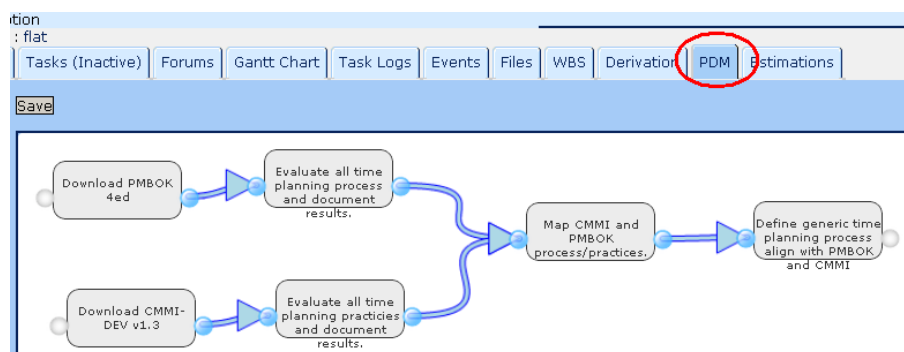
Tasks (Inactive) Forums Gantt Chart Task Logs Events Files WBS Derivation PDM Estimations

Activities Definition

WBS	Description	Move
1	Time planning enhancement for dotProject	
1.1	Time planning best practices	
1.1.1	CMMI practices for time planning	
	Download CMMI-DEV v1.3 guide.	X -- Move--
	Evaluate all time planning practices and document results.	X -- Move--
1.1.2	PMBOK process for time planning	
	Download PMBOK 4ed	X -- Move--
	Evaluate all time planning practices and document results.	X -- Move--

Sequence activities

Sequence activities using PDM (Precedence diagram method):



Creating a minute for estimations meetings

Type: Effort Duration Resources (roles) Size

Date:

All members
 Person,Admin
 Queiroz Goncalves,Rafael
 Marques Pereira,Andre
 Gresse von Wangenheim,Christiane

Participants

> <

Report

B *I* U **ABC** | Styles | Format | Font family | Font size

Save Close

Registering estimations for size, effort, duration and resources.

Tasks (Inactive) Forums Gantt Chart Task Logs Events Files WBS Derivation PDM **Estimations**

Create Minute

ID	Date	Description	Edit
4	05/03/2012	was estimated for coding activities that...	Exclude

WBS	ID	Activity	Effort	Duration (days)	Resources (roles)	Size
1		Time planning enhancement for dotProject				
1.1		Time planning best practices				
1.1.1		CMMI practices for time plannig				7 UCP
	114	Download CMMI-DEV v1.3	1 Hours	1	System analyst 1 X	
	115	Evaluate all time planning practices and document results.	3 Hours	1	System analyst 1 X	

- Estimations are documented and registered.
- The project estimations are maintained.

Schedule development

Schedule development

This action calculates activities starts and end dates based on project start date, estimated efforts and logic dependencies between activities.



Schedule semi-auto building based on CPM technique.

bed : flat

From: To:
 Show captions
 Show work instead of duration
 Sort by Ta

show this month : show full project

Time planning on dotProject				2012								
				Jan								
Task name	Dur.	Start	Finish	23/1						30/1		
				M	T	W	T	F	S	S	M	T
Download CMMI-DEV v1.3	1 h	27/01/2012	27/01/2012									
Download PMBOK 4ed	1 h	27/01/2012	27/01/2012									
Evaluate all time planning practi.	3 h	27/01/2012	27/01/2012									
Evaluate all time planning proces.	3 h	27/01/2012	27/01/2012									
Map CMMI and PMBOK process/practi.	8 h	27/01/2012	27/01/2012									
Define generic time planning proc.	16 h	27/01/2012	31/01/2012									

Discussion and results

UBP		dotProject version 2.1.5	dotProject with add-on
P1	Define Activities	**	***
P2	Establish Estimates of Work Product and Task Attributes	*	***
P3	Sequence Activities	**	***
P4	Plan for Project Resources	**	***
P5	Estimate Activity Durations	**	***
P6	Estimate Effort	*	***
P7	Develop Schedule	***	***



Download

The add-on module for time planning is an **official add-on** dotProject module.

It is available on **dotmods**:
(<https://sourceforge.net/projects/dotmods/>)

Within the section: “**Alignment with PMBOK and CMMI-DEV**”.

It is also under **GPL v3** license, what means it could be customized and redistributed.



Conclusions

The enhancements of open source tools for project management aligned to “best practices” models are considered of **great importance**.

It could assist organizations that use these tools to **increase the quality** of their time planning, and consequently the **quality of products** delivered.

The importance of this work is that the **enhancements** were done **based** in “**best practices**” **models**, accepted and validated worldwide.

Other researches already are **under development**, as the **alignment of dotProject** with for others project management processes, as **monitoring and controlling**, **human resources management**, **project closure**, **project initiating**, and **project communication**.



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