DIMANAGER: A TOOL FOR DISTRIBUTED SOFTWARE DEVELOPMENT MANAGEMENT

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Keywords: distributed software, management, tool

Abstract: In a competitive world, is very important that to have tools that offer an adequate support to the project manager with information about the development process. However at the moment, there is no a complete environment offering the adequate resources to develop distributed software, integrating both technical aspects related to software development and the management aspects. So it is very interesting to develop tools that offer an adequate support to project manager with technical and managerial information. This paper presents DIMANAGER - a tool to manage the distributed software development, including planning and monitoring aspects. It is part of the DiSEN environment and offers the adequate technical and managerial information for the project manager. These information can be used to make decision about how the resources can be better used and also make decision regarding the actions that need to be taken to obtain a software with quality.

1 INTRODUCTION

The large dissemination of computer network, the hardware's cost reduction and the large diffusion of Internet have encouraged studies about distributed systems and also the development of corresponding software. From now we will use the term distributed software to refer for one that is executed in an environment with several nodes that are in geographically different places. Particularly, the distributed software requires an efficient management during their development and it becomes more interesting if we have tools that offer the necessary support. These tools should offer support to define cost estimation, effort for development and duration estimate of the project development and also the definition of an adequate distribution of the tasks among team members. Also it is necessary plan a viable program to develop the project activities and a way of controlling them on a continuous base. However at the moment, there is no a complete environment that offers the adequate resources to develop distributed software, integrating both technical aspects related to software development and the managerial aspects. So it is

very interesting to develop tools that offer an adequate support to project manager with technical and management information. This paper presents DIMANAGER – a Distributed software development management tool - to support the software developer to manage the development of distributed software at the context of DiSEN – Distributed Software Environment (Pascutti, 2002) that is an environment in which the MDSODI Distributed Software Development Methodology (Huzita, 2001) is part of and is being developed as a research project. The DIMANAGER contributes offering to the project manager very important information related to the technical and managerial aspects and thus support adequately the decision making during the software development. Its prototype version, its validation, the conclusions and the future directions for our research are also presented.

2 THE SOFTWARE PROJECT MANAGEMENT

The project management aims to guarantee that the established process is executed, coordinating and monitoring the software engineering activities. Generally, the project management is little approached/practiced and the development teams are unable to measure the project performance, verify the failures points and establish improvement.

On the other hand, several difficulties are inherent to the project management, such as: a) the process dynamic; b) adaptation for the environment depending on the existing resources, tools, personal or team ability; c) the software development is difficult to control and measured because it is a creative and intellectual activity; d) several variables that are involved, such as methodologies, tools, technologies and others.

There are several tools, such as: ToolManager (Oliveira, Rouiller and Vasconcelos, 2001), tool to manage the cooperative software development at the PROSOFT context (Lima, Reis e Nunes, 1998), tool to support the component development (Pfaffenseller, Pfaffenseller e Kroth, 2001) among others.

However they are tools that support only some aspects during the software development. The DIMANAGER, presented in this paper, differs of them because it is part of DiSEN environment. It will be integrated with others tools that offer support to the MDSODI. The integration will occur through a repository (Moro, 2003).

3 DIMANAGER TOOL

The DIMANAGER (Pedras, 2003) was developed considering concepts related to CASE tools and relevant aspects for the project such as: planning; organization of the activities in order to achieve the established objectives; control; people allocation; and coordination. Also, some other characteristics were considered: distributed software; managerial information and WEB. DIMANAGER considers the distributed software characteristics such as: concurrence/parallelism; communication, synchronization and distribution, throughout the process. The architecture is presented disposed in layers. As DiSEN, is a distributed environment, it can have many workspaces and tools depending on what is available in each workspace. As a tool, the DIMANAGER might be available in one or more of these workspaces. See figure 01.
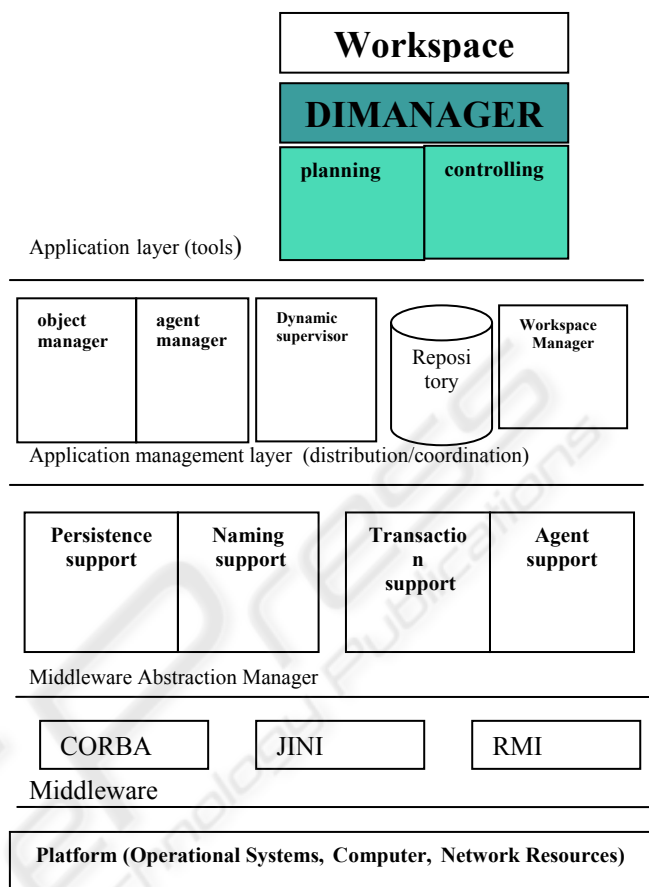

Figure 1: DIMANAGER representation in DiSEN.

DIMANAGER tool must send and receive information about the projects that are being developed in the DiSEN. The information interchange between DIMANAGER and DiSEN occurs through the data repository (Moro, 2003). The relevant data about the project which can be stored in this repository are: the activity executed in each phase; the teams and their participants; the chronogram; the participant's technical performance and the problems identified in each activity.

3.1 The DIMANAGER Main Functionalities

The DIMANAGER functional requisites are: planning and controlling the project (figure 02).

In the project planning the activities involve: project and users inclusion. In this planning is included the information that will be used to control the project: phase; activity; chronogram; participant; function; participation; situation, and problems.

In the project control are deal information about the project related to participants and the activities that are performed.
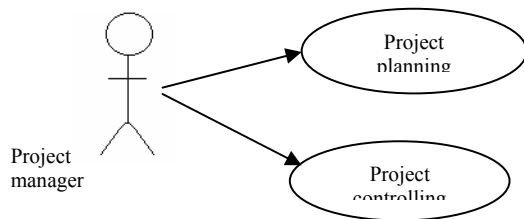

Figure 2: DIMANAGER domain model.

Other specific aspects are considered by DIMANAGER tool: identification of the activities within project, metrics identification, participants, activities, and chronogram.

Each participant must document the activities performed and so generating data to project controlling.

Related to the human resources, the DIMANAGER tool presents the participants coordinator and the activities coordinator, along project manager are responsible for analysing the project results. Thus, based on data about participants, activities and metrics, the project manager can visualize the results related to the activities performed for each participant, analyse the performance of each one and verify if project is developed according the established budget and time.

3.2 DIMANAGER Tool Presentation

Elements are disposed in DIMANAGER tool in three main components: presentation; services and users, as seen on figure 03.

The Presentation component contains a brief description with concepts, characteristics, structure, purpose and functionalities that the tool offers. The Users component, shows to the project manager all users that work in the project. They are classified as: manager or participant. Manager has a greater level of access permission

The Services component, as see on figure 04, offers to the project manager three functionalities: project planning; project updating and project controlling. Relevant information related to: activities; problems; chronogram; team; participation can be supplied to DIMANAGER tool.
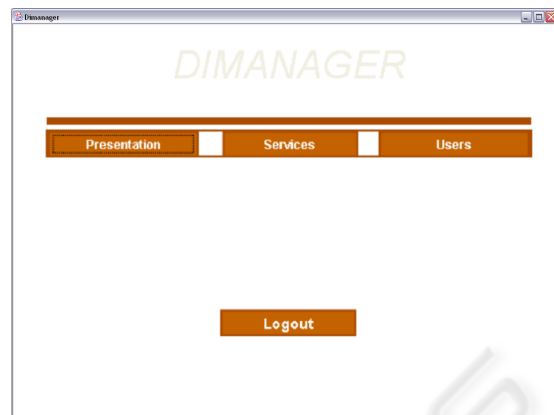

Figure 3: DIMANAGER components.

Activities

They can be specified according to each project phase: requisite; analysis; project; implementation and test. Each activity is related with chronogram and participants. Also, the sequence of activities must be established as well as the classification of activities states that can be: in progress, in planning, stopped, cancelled, and finished.

Problems

Problems are classified in: technical and organizational. Technical problems involve, for instance, the communication fault whereas organizational problems are related to: human resources; business and strategies; questions related to outsourcing among others.

Chronogram

This indicator make possible for user to have a general vision of the situation of the project. Each activity will be defined according to necessary effort for its execution (participant/hour); result; initial and final date and state.

Team

This indicator identifies the teams of the project as well as its situation. DIMANAGER deals with teams by their characterization for distributed software, which are defined by geographic localization or activity.

4 DIMANAGER VALIDATION

The validation process was defined and performed aiming at verifying viability and acceptance of DIMANAGER tool by professional of the area. Two aspects were approached in the validation process: (a) managerial aspects indicators and (b) DIMANAGER tool.

The first one – managerial aspects indicators (Santiago & Tait, 2003) have been applied and they were accepted well and considered relevant by participants of the validation process. However, some aspects were pointed out as important: show an indicator for restrictions related to time and costs; present an automatic control of projects with message for the manager to know about possible chronogram delay.

The second aspect – DIMANAGER tool - evaluated points as: visualization; usefulness of the project management; applicability and of development of projects in areas geographically apart were asked for the participants. Interviewers considered this tool relevant and pointed out that: it controls each project phase and promotes an adequate project control.

5 FINAL CONSIDERATIONS

DIMANAGER tool token into consideration three important aspects: distributed software management; organizational and technical aspects and metrics. This tool is directed to the project management in the distributed software development.

In the project development data about technical and organizational aspects are generated by DIMANAGER for a specific project and it can be used as part of historic data. DIMANAGER uses human/hour effort as metric.

From DIMANAGER tool, five elements must be more considered for the future researches: (1) costs; (2) data repository interface; (3) version control; (4) managerial reports and (5) an evaluation of the DIMANAGER tool in the DiSEN environment as altogether.

Finally, an important aspect considered in the development of the DIMANAGER tool was the approach of management aspects in the distributed software management. Thus, besides DIMANAGER tool construction and its integration with DiSEN environment, this research brings management aspects in the distributed software management as consolidate approach and certainly, can be an area that will bring many contributions linking management aspects and distributed software engineering.

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