

Resident Module for Management of Computer Nodes in Hierarchical grid

In the thesis that will be presented is “Resident Module for Management of Computer Nodes in Hierarchical grid”.

As a result of the thesis is a software module, that should represent a computer node in a grid system. This module should represent the computer node it is installed on in such a way that communication with other system services to provide stability of the whole grid system.

The thesis is in a connection with the GrOSD project(Grid-aware Open Service Directory), because the suggested module represents basic part of the architecture of the GrOSD – the so called in the grid literature Node Service, which was designed and implemented for this grid system.

GrOSD is a project for development a platform for Light Weight Grid as part of the SUGrid project – University of Sofia “St. Kliment Ohridski”, department of Mathematics and Informatics. Partners in SUGrid project is the European research project CoreGrid(European Network of Excellence CoreGrid).

The current project describes building of a subsystem(system service) that will extract information about resources in a computer node, that will monitor the running tasks and have the ability to stop, start running tasks or just report status of scheduled tasks.

The “Resident Module for Management of Computer Nodes in Hierarchical grid” is expected to be responsible for the following subtasks:

- To retrieve software and hardware parameters of the system on which it is installed.
- To stop or start a scheduled task.
- To provide status of a running task or the result of it.

- To notify the Monitoring Service in a specific time interval that the computer node is still functioning. It interacts also with Resource Management Service, Information Service, Security Service but these interactions are described in the full version of the thesis.
- To communicate with the other system

The thesis is divided d in four main parts.

Part 1 Explanation of the term grid. Overview of the Light Weight Grids.

The aim of this chapter is to explain the term grid, main terms that are used in grid terminology and a short description of the existing grid architectures and the technologies used in the grid systems/

It is accented on the Light Weight Grids and their main characteristics that differ them most from the other types of grid

It is also reviewed the technologies used for the building of the Light Weight Grids and the management of the computer nodes in the latter type of grid systems.

Chapter 2. Presentation of the GrOSD grid system. Detailed description of the Resident Module for Management of Computer Nodes in Hierarchical grid in GrOSD.

Represents the model for management of computer nodes in the grid system GrOSD.

In the beginning it is shown the whole architecture of the system, follows detailed model of the implemented service for management of computer nodes.

Chapter 3. Description of the software implementation of the system for management of computer nodes.

Only legal copies of program environments and platforms are used for the implementation.

Main part of the software module is written in the Java programming language, which guarantees platform independence for the application. As a platform is used the J2EE.

Main IDE(development environment) used for the Java modules is JCreator Light.

Despite the other system services in the GrOSD project that are implemented as EJB(Enterprise Java Beans), the service for management of computer nodes uses RMI (Remote Method Invocation), because usage of EJB will need an application server installed on the client machine.

On the other hand IRM de facto do not need any additional component installed on the client machine than the already installed Java components.

Because Java applications are platform independent, Java as a platform for development do not provide methods for retrieval of system information(CPU usage, RAM usage, Windows registry, partitions information, etc.), information so important for the management of node service.

As a workaround of the Java limitation for system information retrieval the C++ programming language was used.

Main IDE for the development in C++ was used the MS VS 6.0 (free version).

Using the C++ language a programming module was written that retrieves system parameters of a computer with Windows operation system, the result of witch was a dll(dynamic link library).

Using JNI(Java Native Interface) the functionality of the dll was encapsulated in a java module.

For all the UML diagrams was used Visio 2003(trial version).

Chapter 4. Description of the implementation and integration phase for the "Resident Module for Management of Computer Nodes in Hierarchical grid".

Different types of installation of the service is described.

First type is for client computer nodes and second type is for computers that are running other system services.

Appendix A

It is a glossary with all the terms used in the thesis, translated from English to Bulgarian.

References

Contains all the sources used in the thesis and links to URL where the user can freely download programs used for the development of the thesis.