

Abstract

Master's degree on the theme

"Methods and algorithms for resource ontology-based management
in the Grid environment"

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The actuality

The intensive development of distributed computing technologies has led to the emergence of Grid infrastructure. Grid is a platform that enables the most efficient use of available resources, empowering activities of scientists and engineers around the world.

However, the process of resource selection in a heterogeneous and constantly changing environment cannot be done highly effective by traditional methods. But quality of methods for resource selection determines the efficiency of resource usage, and, consequently, the efficiency of the system as a whole.

Another challenge is that traditional resource matchmaking methods strive for symmetric syntactic description of resource and request properties, so it is difficult to introduce new concepts or characteristics into the system.

In this work, Semantic Web technology methods are proposed to solve these problems. Also analysis of ontology-based resource selection methods was provided.

The purpose

The aim of this work is to analyze the use of semantic technologies for grid resource management, study existing methods of semantic resource selection. Also the purpose is to develop own ontology-based matchmaking system and experimentally investigate its ability to solve this problem.

Solved problems

1. Analysis of traditional resource selection methods and their shortcomings.
2. Analysis of existing resource selection methods based on ontologies.
3. Development of a prototype ontology for resource management system.
4. Development of software implementation of the resource selection system based on ontology.
5. Experimentally investigate the ability of the implemented system to the selection grid resources.

Achieved results

Solving the problems that put in the work, the author defends:

- an analysis of shortcomings of the traditional resource selection methods;
- analysis of existing resource selection methods based on ontologies;
- the architecture of the semantic resource-selection system;
- a prototype of an ontology for the resources knowledge base.

The scientific novelty of the work

The scientific novelty of the work lies in the fact that:

- analyzed existing methods of resource selection based on ontologies;
- analyzed advantages and disadvantages of semantic methods for resource selection.

The practical value of the work

The practical value of the work lies in the fact that:

- developed a system for selecting Grid resources based on the ontology;
- developed a prototype of an ontology for the knowledge base of resources;

- experimentally investigated the ability of resource matchmaking of resource matchmaking.

Conclusions

1. The traditional methods of resource selection and their shortcomings were analyzed.
2. Analyzed the existing methods of resource selection based on ontologies. Three.
3. A prototype of ontology for resource management system was developed.
4. Program implementation of the resource selection system based on ontology was created.
5. Experimentally investigated the ability of implemented system to find resources better than traditional methods.

The work contains 85 p., 27 figures, 8 tables, 52 sources.

Keywords: GRID, SEMANTICS, ONTOLOGY, REASONING, RESOURCE, SEMANTIC GRID, INFORMATION SERVICE.