# Abstract

of attestation master's degree work

subject:

" Simulation of ukrainian grid-infrastructure "

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## Actuality of work

Grid computing is the application of several computers to a single problem at the same time— usually to a scientific or technical problem that requires a great number of computer processing cycles or access to large amount of data.

The management and scheduling of resources in such a large-scale distributed systems is complex and therefore demands sophisticated tools for analysing and fine-tuning  the algorithms before applying them to the real systems. Simulation appears to be the only feasible way to analyse algorithms on large-scale distributed systems of  heterogenous resources. Unlike using the real system in real time, simulation works well without making the analysis mechanism unnecessary complex.

## The purpose of work

The purpose of work is simulation of ukrainian Grid-system using a GridSim toolkit, simulation of  loading , investigation of  ukrainian grid-infrastructure and detection of  "weaknesses" of  the system.

**Tasks solved in work**

1. Creating a model of network and testing its performance under different loads should be determined: overloaded channels, site of an emerging large queues and other bottlenecks.
2. Comparison of time-shared and space-shared scheduling strategies.

**The achieved results**

Solving the tasks put in-process, an author protects:

1. Results of analysis of experiments concerning influence of different loads on computational resources and grid-network.
2. Results of analysis of comparation space-shared and time-shared modes.
3. Modification of task-grouping scheduling algorithm.
4. Results of analysis of influence of granularity time on task-grouping scheduling.

**Scientific novelty**

1. Modeled ukrainian grid-infrastructure using the latest data about configuration of computational resourses, network characteristics and processing elements evaluation.
2. Modification of task-grouping scheduling algorithm is used for modelling.
3. Efficiency of task-grouping algorithm is analyzed depending on of granularity time.

**Practical value**

Practical value of work consists in the following:

1. Experimentally investigated model of Ukrainian Grid infrastructure and tested the reaction to different loads.
2. Experimentally investigated scheduling task-grouping algorithm.

**Conclusions**

1.  Ukrainian grid-infrastructure was analyzed  and modeled using the latest data about configuration of computational resourses, network characteristics and processing elements evaluation.

2.  Model of a network was created and its performance was tested under different loads: overloaded channels, site of an emerging large queues and other bottlenecks.

3.  Task-grouping algorithm was experimentally investigated with different values of granularity time.

4.  Comparison of  time-shared and space-shared scheduling strategies was done.

The work contains 125 pages, 43 images, 20 sources.

Keywords:  GRID-INFRASTRUCTURE,  TIME-SHARED  AND  SPACE-SHARED   SCHEDULING,   COMPUTATIONAL   RESOURCES,   TASK-GROUPING ALGORITHM, GRIDSIM, SCHEDULER.