

Energy Efficiency in Large Scale Distributed Systems – The Role of Simulation

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ABSTRACT

Recent advances in networks and computing systems have led many aspects of our daily life to depend on distributed interconnected computing resources. Large scale distributed systems such as computational and data grids and clouds are used for serving large and complex applications [1].

Grids and clouds performance became more important due to the increase of users and computationally intensive applications. However, the usage of energy has become a major source of concern for these systems due to the price of electricity and the impact on the environment.

Energy efficiency in large scale distributed systems reduces energy consumption and operational costs [2]. However, energy conservation should be considered together with users' satisfaction regarding QoS. Complex multiple-task applications may have precedence constraints and specific deadlines and may impose several restrictions and QoS requirements [3, 4], therefore energy-efficient job scheduling is a difficult task in grids and clouds where there are many alternative heterogeneous computers. Advanced modelling and simulation techniques are a basic aspect of performance evaluation that is needed before the costly prototyping actions required for large scale distributed systems [5].

In this talk we will present state-of-the-art research covering a variety of concepts on resource allocation and job scheduling in large scale existing or simulated distributed systems that provide insight into energy conservation problems solving. We will also provide future directions in the area of energy efficiency in grids and clouds.

Keywords

Distributed systems; energy efficiency; performance; simulation

BIOGRAPHY

Helen Karatza is a Professor in the Department of Informatics at the Aristotle University of Thessaloniki, Greece. Dr. Karatza's

research interests include Computer Systems Modeling and Simulation, Performance Evaluation, Grid and Cloud Computing, Energy Efficiency in Large Scale Distributed Systems, Resource Allocation and Scheduling and Real-time Distributed Systems. Professor Karatza is the Editor-in-Chief of the Elsevier Journal "Simulation Modeling Practice and Theory", Associate Editor of the "Journal of Systems and Software" of Elsevier, and she has been Guest Editor of Special Issues in multiple International Journals.

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