

Contact Information

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Topics of Interest

1. Cloud Architectures and Systems
4. Programming Models for the Cloud

Current Cloud Computing Research

I am currently working on a research project through NSF's IUCRC program for the Center for Excellence in Distribution and Logistics (CELDi), housed at the University of Arkansas. The project involves the exploratory investigation of cloud computing for large-scale simulations of multi-echelon supply chains. The project involves building and testing a cloud computing based application that facilitates stochastic simulation. Simulations of the size required to model realistic supply networks require large computational resources. Software as a Service (SaaS) is a method of deploying software that relies on host computers and users interacting with the software via web interfaces. SaaS is a natural extension of client-server computing that facilitates easy deployment, software updating, and software return on investment based on usage. Cloud computing takes the basic idea of SaaS and facilitates computing over a set of shared resources. Large compute intensive simulations can be distributed over multiple computers. This project is designed to give the center and its industrial members experience using this emerging technology, while still providing a solution to an important logistics problem. I am collaborating with Amy Apon, Professor, Computer Science and Computer Engineering and Director, Arkansas High Performance Computing Center, in this area.

Future Research Problems

The University of Arkansas' High Performance Computing Center has excellent background and expertise in high performance computing, especially through parallel grid computing architectures. The emergence of cloud computing as a viable alternative for large-scale scientific computing applications has motivated us to develop expertise in cloud computing at the University of Arkansas.

We are interested in pursuing research that:

- Contributes to the methods for the simulation and optimization of large-scale problems in engineering such as large-scale supply simulation, evacuation modeling, etc. by effectively leveraging cloud-computing resources.
- Develops parallel computing algorithms that take advantage of and are uniquely designed for cloud computing architectures.
- Designs, develops and tests new cloud computing architectures that facilitate large-scale scientific computing. This might include new methods to distribute computational problems over cloud computing resources, new methods to generate and test large-scale problem instances, comparing the effectiveness of traditional cluster architectures with cloud computing methods, designing hybrid solutions, and developing analytical/simulation models that can be used to design and evaluate the computer architectures.
- Developing and applying cloud computing solutions to important problems in science and engineering. This line of research should provide new insights and performance evaluation of cloud computing architectures for usage across a wide-variety of real, large-scale, engineering problems.