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Case Study: How Modeling Revealed Serious Performance Problems in Distributed (DCE) Systems

A. M. Khandker
masud@citi.umich.edu

T. J. Teorey
teorey@eecs.umich.edu

ABSTRACT

We present a case study to illustrate how modeling a distributed system can reveal serious performance problems and lead to performance improvement.

We developed a simple queueing model for the Remote Procedure Calls (RPC) that run over the connectionless user datagram protocol (UDP) in Open Software Foundation's Distributed Computing Environment (OSF/DCE). Initially, the model-predicted RPC round trip times for a multithreaded client didn't match the measured round trip times. We investigated the reason and showed that the mechanism built into the runtime DCE RPC for improving the RPC performance over UDP, which works in a single-threaded environment, fails in a multithreaded environment.

We suggested solutions to the problem and modified our system. The measured round trip times in the modified system matched closely with the model-predicted round trip times.

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Center for Information Technology Integration
University of Michigan
519 West William Street
Ann Arbor, MI 48103-4943