

Discrete Simulation of Distributed Systems — Performance Evaluation of a Notification Channel Federation

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Event notification is essential in network management. Many components in a distributed network management system need an event notification mechanism, and so an event notification framework is expected to facilitate the development of the components. CORBA (Common Object Request Broker Architecture [OMG98]) provides an object-oriented platform to build such a framework, but its performance is not always sufficient for monitoring large-scale networks. The need for higher performance is rather necessary when message filters are applied in network elements.

CORBA is a distributed object middleware standard, on which client objects invoke operations on server objects in a location transparent fashion. CORBA provides various services named CORBA services that are useful in developing distributed applications [OMG95]. The CORBA Event Service included in the CORBA services can be used to implement event notification in CORBA-based network management systems. [Tom99] presents an event notification framework based on Java and CORBA providing a solution for high performance implementation of such a service, and meet very good results.

Performance evaluation of CORBA-based systems usually applies benchmarks. Tests are carried out using remote method calls and data transfer. [Bösz99] introduces a portable benchmark toolkit and reports measurements on a number of actual middleware products.

This paper presents how discrete simulation can be used for performance evaluation of distributed systems. With this methodology it is not needed to implement the system itself, only a model of proper specification is required. Simulation models for distributed systems can be easily adopted from other models, which are already used in network simulations with good results. The tool that supports our measurements is a powerful telecom simulation platform, a simulations development environment that supports object-oriented programming. The model used for demonstration represents a notification channel federation including an arbitrary number of event suppliers and event consumers connected to a scalable network. Performance and run-time behaviour are evaluated for various configurations, and results are presented.

References

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