DeBOT – An Approach for Constructing High Performance, Scalable Distributed Object Systems

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ABSTRACT
This poster describes a practical and novel approach to the construction distributed object systems that exhibit high performance and good scalability features. Such distributed applications are important especially in present day’s e-commerce world, where performance and scalability are critical issues in attracting and keeping web clients. The poster session illustrates the DeBOT approach through a case study of building an On-line Stock Ordering system using a CORBA compliant Object Transaction Monitor WebLogic Enterprise from BEA Systems.

Keywords
Distributed Object Systems, Transaction Processing Systems, Performance Testing

1 INTRODUCTION AND MOTIVATION
With the wide use of Internet technologies, distributed systems have unprecedented demands on them in terms of performance and scalability. These large distributed systems often lie behind large web site such as Amazon.com, handling millions of on-line transactions daily, any failure to accept and process user requests can have detrimental effects on the e-business. The DeBOT approach is a practical and novel approach that ensures high performance and scalable distributed systems are constructed.

2 THE DEBOT METHODOLOGY
The DeBOT approach promotes an iterative and progressive prototyping method, interleaved with the activities of gradually scaled up performance tests, followed by the activities of bottleneck elimination. The end result is a system architecture that exhibits high throughput, fast response time and good scalability.

3 CASE STUDY
A typical On-line Stock ordering system has been constructed using the DeBOT Methodology. This Online Transaction Processing (OLTP) system is capable of performing both read and write transactions such as: query stock values, create new account, buy, sell, and update.

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Figure 1. The DeBOT Approach

System Setup
The stock online system is developed and tested on 2 dual Pentium 450 MHz NT 4.0 machines. The Oracle resource manager has been used, as well as the BEA WebLogic Enterprise as the Transaction Manager coordinating transactions using the XA 2-phase commit protocol. Progressive scaled up tests simulated from 1 client up to 500 fully loaded clients with no think times.

DeBOT Process
The largest risks of the system construction were reduced early on by building skeleton code that enabled a single transaction to be initiated at client side, processed through the business logic implemented by the application server, through to the resource manager or database. This quickly validated the correctness of the integration of various system components. Early performance tests could also be run at this stage to give indicative figures of transaction times. This process is iterated by increasing the number of transaction implementations, coupled with scaling up the performance tests through an increased number of simulated clients.

Final System and Results
The final system was capable of handling approximately 8.6 million transactions a day, with a single transaction having a response time of less than 100 milliseconds.