Rational. software

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IBM® Rational® Rapid Developer Scalability and Performance Benchmark

1 Executive Summary

This document describes a performance benchmark for Rational's eStore application created with IBM® Rational® Rapid Developer, performed by Applied Testing and Technology, Inc. (ApTest). Benchmarking was done with IBM® Rational® TestManager, and IBM® Rational® Robot automated test tools to simulate Web user activity. Various sustained user loads were simulated against various server configurations, as described below. These results demonstrate a solution that scales well when put under relatively heavy stress, as might be typical of an enterprise-class business application. Note that in these results, user "think time" was minimized to increase the stress on the servers. In a real world situation, performance under similar loads should be even better than the numbers shown here.
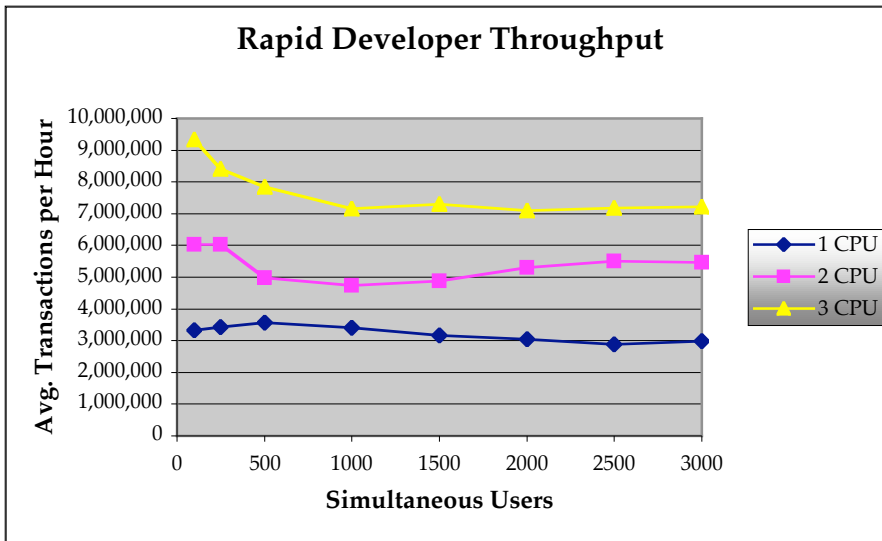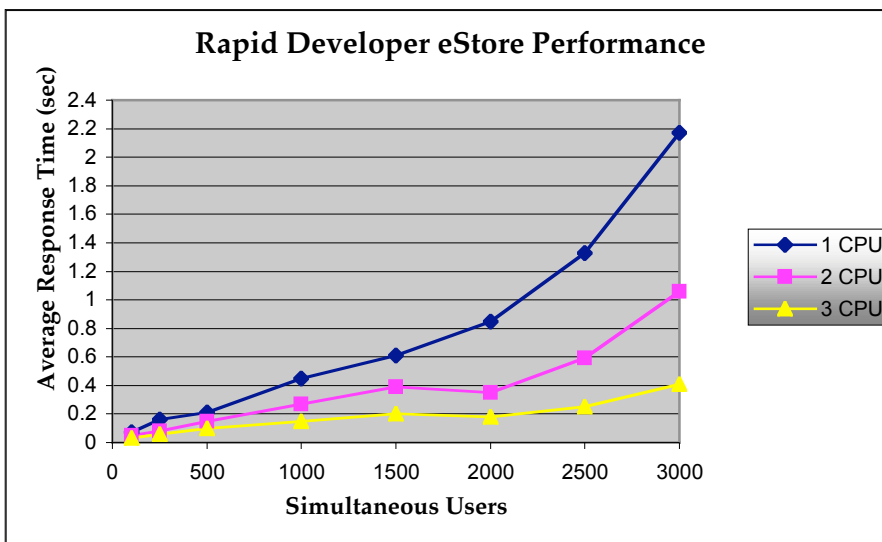
Figure 1

Figure 2

2 eStore Overview

The tested application is an application known as eStore. This application has similar characteristics to Sun's Pet Store application in that it is an application for conducting commerce over the Web – the primary difference is Sun's application sells pets and the IBM Rational application sells computer hardware and software.   Rational's eStore was designed with Rational Rapid Developer to demonstrate that applications that are designed visually and automatically constructed via Rational Rapid Developer perform and scale on par with manually generated code, yet can be developed in significantly less time, and thus, at lower cost. Rational's eStore was crafted strictly with Rational Rapid Developer's machine-generated code.

3 Benchmark Overview

This benchmark was undertaken to characterize the performance of eStore under enterprise-class loads.

Rational Robot from IBM Rational – a scriptable performance testing tool for simulating multiple user loads in an automated fashion, was employed in the benchmark. Rational TestManager, was used to drive the tests.

A typical eStore application user performs three operations: browse, buy, or account management. To reflect this usage model, the performance benchmark Rational Robot scripts simulated the following behavior:

> browsing orders (2% load)
>
> browsing hot products (40% load)
>
> buying hot products (4% load)
>
> creating new accounts (2% load)
>
> updating accounts (2% load)
>
> searching the catalog (20% load)
>
> browsing the catalog (30% load)

4 Software configuration

Software configuration used for the benchmark testing environment was as follows:

> Five IBM Rational Test Agent computers, driven by a Rational TestManager computer, making HTTP requests to the application server.
>
> Application Server: IBM WebSphere® Application Server 4.0 running on Linux
>
> Database: IBM DB2® 7.2 running on a separate server

In the benchmark environment Web page graphics and decorations were minimized to focus on the performance of eStore rather than the Web server.

A minor amount of tuning was done on WebSphere and DB2 to increase the number of threads and number of connections in the database connection pool.

5   Hardware configuration

Hardware configuration used for the benchmark testing was as follows:

Application-Server hardware:

One 2.4 GHZ Dual Xeon, with 2GB memory, Linux Redhat 8.0, IBM's HTTP server, WebSphere 4.0, and an RTLink 8139 network adapter, configured to act as a single CPU machine and as a dual CPU system.

One 2.4 GHZ Pentium® 4, with 1 GB memory, Linux Redhat 8.0, DB2 7.2, and RTLink 8139 network adapter.

Database hardware:

One 2.4 GHZ Pentium 4, with 1 GB memory, Linux Redhat 8.0, DB2 7.2, and RTLink 8139 network adapter.

Test Agent hardware:

Three identically configured AMD/K6-2 500 MHZ systems with 768 MB memory, Windows 2000 sp3, and an RTLink 8139 network adapter.

Two identically configured Intel Pentium 4 2.4 GHZ systems with 1.25 GB memory, Windows 2000 sp3, and an RTLink 8139 network adapter.

Rational TestManager hardware: One AMD/K6-2 500 MHZ system with 768 MB memory, Windows 2000 sp3, and a RTLink 8139 network adapter.

6   Testing Methodology

The benchmark test measured the time for an HTTP request to be completed. The time measurement started at the time a validation request was initiated and ended when the resulting Web page was completely received.

Several independent users were simulated concurrently during the benchmark to reflect real world multi-user scenarios. Testing loads were initiated at 100 users and incrementally increased to capture data points at 250, 500, 1000, 1500, 2000, 2500 and 3000 users respectively.   The test suite was run to completion, defined as 3000 users all accessing the site.

During the benchmark each simulated user performed their task, and subsequently finished running. At that end of the test run, the average response times for a validation request and validation transactional rate were determined.

7   Results

There are a total of eight separate transactions described in the test suite. Each of these transactions interacts with the server a number of times in order to model a typical user activity, concentrating on activities that would stress the database and the application server. These activities, and the number of steps involved in them, are summarized below. Dynamic data was used to ensure that each individual transaction was unique, thereby placing a representative load on the application.

The script transaction breakdown is as follows:

Action script performs	Percentage of Overall Load	Number of HTTP requests per script
Search catalog	20%	4
New Account	2%	7
Buy Products	4%	12
Browse Orders	2%	5
Browse Hot Products	40%	7
Browse Catalog	15%	7
Browse Catalog 2	15%	7
Account Update	2%	7
Total		56

Figure 3

8 Certification

Applied Testing and Technology, Inc. certifies that the performance benchmark described above was run by ApTest staff and that the results summarized above were observed. The testing methodology abides by accepted industry practice for benchmarking eCommerce applications.

Applied Testing and Technology, Inc.
59 N. Santa Cruz Avenue
Suite U
Los Gatos, CA 95030
www.aptest.com

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• *Tivoli® software helps you manage the technology that runs your e-business infrastructure.*

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