IBM System p5 510 and Express Runtime user load performance testing results

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February 2006

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Abstract

This white paper describes an affordable and scalable IBM solution that is ideal for midsized businesses. The solution discussed in this paper was tested in IBM labs on an IBM System p5™ 510 running Red Hat® Enterprise Linux® AS release 4. This was done running the middleware infrastructure of IBM Express Runtime Version 2.1.1 using the publicly available Trade6 (the IBM WebSphere® performance benchmark sample) Web application.

Introduction

A fast growing segment of IT spending today is in midsized businesses, which are generally defined as companies with 100 to 1000 employees. These companies often have a limited IT staff and budgets, which means they need complete solutions that include business applications and a total environment of hardware and software to run the applications.

This paper discusses a solution that, as tested, will scale up to handle more than 2,500 users, which typically meets the needs of midsized businesses in any industry.

This complete hardware and software solution is priced starting as low as USD $4,799 for the IBM System p5 510 and as low as USD $925 for IBM Express Runtime with only five users*.

Suggested retail price* of the resources tested:

- Hardware: System p5 510, USD $9,815
- Software: Express Runtime V2.1.1, USD $9,900 (two-processor license)
- Total: USD $19,715

Understanding IBM Express Runtime

Express Runtime is a robust and scalable integrated middleware infrastructure stack that is designed to reduce complexity and drive greater ease of use for solution providers and their mid-market clients. Pre-integrated and preconfigured, Express Runtime deploys an integrated infrastructure stack of an application server, database server, Web server and management console, either to a single hardware system or to multiple systems in an *n*-tiered environment. The deployment is done via a single installation wizard to get your solution up and running quickly and reliably. The management console provides a simple integrated console that makes it easy to monitor and administer all of the middleware through a browser interface. Supported on the Microsoft® Windows®, Linux and IBM i5/OS® (or OS/400®) operating systems, Express Runtime delivers:

- Choice of relational database server:
  - IBM DB2 Universal Database™ (DB2® UDB) Express Edition, Version 8.2
  - IBM Informix® Dynamic Server Express, Version 10.0
- IBM WebSphere Application Server Express V6.0.2
- IBM HTTP Server V6.0.2
- IBM Express Runtime console

Express Runtime also includes the solution assembly toolkit that allows solution providers (independent software vendors, regional system integrators, or IT organizations) to integrate all of the middleware (or just the needed components) as well as the application, into a single, cohesive installation package that can be quickly deployed with ease on client systems. This means solution providers can deploy the

complete solution as a single package, eliminating the need to separately install and configure the pieces. Additionally, in order to help make it easier to do business and reduce time to value, Express Runtime provides one license, one contact for support, and one competitive price that covers all of the included IBM middleware.

Express Runtime is priced using the standard per processor or per authorized user license options*.

- Per processor (limit of two processors): $4,950 (US)
- Per authorized user (minimum of five users): $185 (US)

The pricing for Express Runtime is significantly less than the cost of purchasing the IBM middleware products separately.

Market-leading middleware, aggressive pricing, flexible terms, and one-stop support make Express Runtime a great infrastructure on which solution providers can build and deploy their solutions and mid-market enterprises can run their business.

Understanding the System p5 510

The following highlights a few of the System p5 510 features:

- Choose from thousands of IBM AIX 5L™ and Linux operating system applications
- Easy to buy, install, and manage with a three-year warranty

The System p5 510 Express server provides availability, flexibility, and security features that are designed for reliable application serving in a compact 2U package. Fueled by the most advanced IBM POWER5™ 64-bit processor with simultaneous multithreading, these 19-inch, rack-mount servers deliver up to 2-core scalability, as well as outstanding price/performance.

The System p5 510 Express platform is a 1-core or 2-core database server with a 1.9 gigahertz IBM POWER5+™ dual-core module. It can function as an entry-level application server for businesses of all sizes. The performance, reliability, and affordability features of the System p5 510 Express servers can make it a strategic platform for e-commerce application serving and compute-intensive business applications.

The System p5 510 Express servers utilize logical partitioning (LPAR) technology that is implemented via optional IBM Virtualization Engine™ system technologies and the operating system. LPAR allows the processors to run separate workloads in different partitions on the same system, thereby helping to lower costs. Partitions are shielded from each other to provide a high level of data security and increased application availability. Dynamic LPAR allows clients to allocate system resources dynamically to application partitions without rebooting, thus enhancing availability.

Ask an IBM representative or IBM Business Partner about System p5 510 Express servers for application serving requirements. Solutions for the System p5 510 Express server span thousands of AIX 5L and Linux applications that are used in a wide range of industries, including: education, government, transportation, construction, wholesale and retail distribution, light manufacturing, services, and professional groups. As a part of the IBM Express Portfolio™ family of offerings, these systems are easy to buy, install, and manage. Choose the Express configuration that is appropriate for your business needs and take advantage of special IBM financing.

Understanding Trade6

The Trade6 performance benchmark is a WebSphere sample application that is publicly available from IBM. The Trade6 benchmark models an online stock brokerage application and also provides a suite of workloads for characterizing performance of a Java™ 2 Enterprise Edition (J2EE™) Web application. It is implemented as a 3-tier J2EE Web application, utilizing an application server, a database server and a Web server.

The Trade6 design spans J2EE 1.4, including:

- The Enterprise JavaBeans™ (EJB™) V2.1 component architecture
- Message-driven beans
- Transactions (1-phase and 2-phase commit)
- Web services (Simple Object Access Protocol [SOAP], Web Services Description Language [WSDL], and Java Specification Requests [JSR] 101 and 109).

Trade6 also highlights key WebSphere performance components, such as: dynamic caching, WebSphere Edge Server, Web services, and the new WebSphere Application Server V6.0 in-process Java messaging engine.

The design of Trade6 is a blueprint for good performance coding practices when writing J2EE applications. The externally available download contains the benchmark, installation instructions, source code, and architecture.

Trade6 is used in various WebSphere, DB2 UDB, AIX 5L and Linux groups for performance research. Users (both internal and external to IBM) use Trade6 to:

- Validate performance of their hardware
- Estimate sizing
- Validate product functionality of new releases

Describing the test environment

The test environment consisted of one server machine and six client machines to manage the testing and drive the load on the server. The clients and server were connected through a wide area network (WAN).

Setting up the server environment

For this test, everything measured was on the following system:

- IBM System p5 510 server with a 1.9 gigahertz, dual-core POWER5+ processor *(For software licensing this is considered a two-processor system.)*
- 8 gigabytes of memory (533 megahertz SDRAM)
- 74 gigabyte Ultra 320 disk drive (SCSI) at 15,000 rpm
- 10/100 Ethernet
- Red Hat Enterprise Linux AS release 4 (Nahant Update 2)

Express Runtime V2.1.1 was installed on the System p5 510 (as described above), deploying the following middleware components:

- Application server: WebSphere Application Server Express V6.0.2

- Database server: DB2 UDB Express Edition V8.2 FP3
- Web server: IBM HTTP Server V6.0.2
- Management console: Express Runtime console V2.1.1

The Trade6 application was installed and configured on this server environment. The only performance tuning that was done to the environment was basic database tuning as described in the DB2 UDB Trade6 benchmark paper.

Setting up the client environment

The client environment consisted of one machine running IBM Rational® Performance Tester V6.0.0.1. The environment also included five client machines running the Rational Performance Tester Agent Controller V6.0.0.1 to provide the virtual user load. These machines were standard Lenovo® ThinkCentre® PCs with an Intel® Pentium® 4, 3 gigahertz processor and 2 gigabytes of memory, running Windows XP Professional, Windows 2000 Professional, and Windows 2003 Standard Server.

Setting up the automated test environment

User interaction with the Trade6 application was emulated using the Rational Performance Tester Tool. Each client machine had the Rational Performance Tester Agent Controller installed. The load was equally distributed across the five client load machines, ranging from 20 to 500 virtual users per machine.

Setting up the test scenarios and results

The following test scenarios were used:

- Rational Performance Tester was installed on a Windows 2003 Standard Server and was used exclusively for managing and initiating all performance runs.
- The Rational Performance Tester Agent Controller was installed on the five client machines running various Windows platforms that, as mentioned, were used as load machines for providing the virtual users.
- The performance runs were executed at load levels ranging from 100 to 2,500 users in increments of 250. All performance runs were run on each of the client machines. The total virtual user load was equally distributed across all client machines for each performance run.
- The think time used for these runs was the recorded think time when the test suite was created. This is the default value for this test suite.

For these test scenarios the following test results were found:

- See Figure 1 for the user response time showing performance and scalability test results.
- As expected, the average time to load the page increased as the total load grew.
- The overall performance of the System p5 510 target machine showed a level usage of memory throughout the performance runs
- The CPU utilization ranged from five to 50% for the performance runs.

The chart in Figure 1 shows the performance and scalability for differing response times per number of concurrent users.

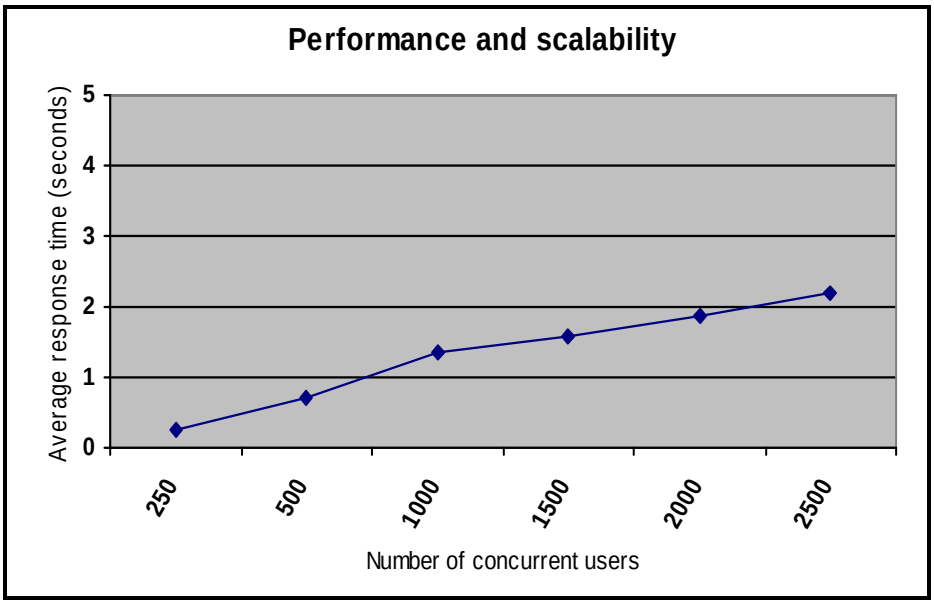

Figure 1: Average reponse time per number of concurrent users

As with any performance test, results will vary depending on many factors, such as the performance parameters of the application, network load, hardware and software configuration, other applications running on the system, and other independent factors.

The results published here are not a guarantee that your solution will perform or scale according to these results. As with any project, proper planning and validation is needed for the specifics of your environment and solution.

Summary

The System p5 510 with the Express Runtime software infrastructure stack, is a winning combination on price, performance, scalability, and ease of deployment. Scaling up to more than 2,500 users, this combination will help to provide immediate value to mid-market enterprises in any industry. Contact your IBM representative or IBM Business Partner today to place your order.

Resources

These Web sites provide useful references to supplement the information contained in this document:

- IBM System p5 510
  ibm.com/systems/p
- IBM Express Runtime
  ibm.com/software/webservers/expressruntime
- Trade6
  ibm.com/developerworks/edu/dm-dw-dm-0506lau.html

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Produced in the United States
February 2006

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