

Performance brief for SAS Enterprise BI Server 9.1.3 on HP Integrity servers, Microsoft Windows and HP StorageWorks EVA storage

1000 User Enterprise BI Server Test Suite



Overview.....	2
Target audience	2
Test description	2
Scenarios.....	2
User base.....	2
Reports	3
Test execution.....	3
Application environments.....	3
Data.....	4
Key findings.....	5
System resource utilization	6
Recommendations.....	6
For more information.....	7

Overview

Enterprise customers demand a reliable Business Intelligence platform that can scale to meet their business requirements. This report details a proof point demonstrating a robust 1000 user SAS Enterprise Business Intelligence (Enterprise BI) workload being executed on powerful HP servers and storage. The testing performed by both HP and SAS demonstrates that HP Integrity servers and storage deliver a dependable, scalable platform for Microsoft® Windows® based SAS customers that are looking for an Enterprise BI solution.

This brief highlights the key findings from running the SAS Enterprise BI Server architecture using the 1000 user test suite running on Intel® Itanium® 2-based HP Integrity servers, HP BladeSystem servers and an HP StorageWorks Enterprise Virtual Array (EVA) storage system. This test showcased the SAS backend servers running on HP Integrity 64-bit servers. The HP Integrity based servers provided highly optimized response times, substantially lower IO throughput as well as eliminating the 2GB metadata limit that 32bit architectures enforce. The results were achieved with an 8 processor HP Integrity rx7620 server used for back-end processing and a 4 processor HP Integrity rx4640 server for metadata – both running Microsoft Windows Server 2003 for Itanium-based Systems (64-bit). The midtier was run on HP ProLiant BL20p servers running Windows Server 2003 (32-bit version) (midtier is not supported on 64bit versions of Microsoft Windows).

SAS has certified that the test suite was run correctly, and that the benchmark criteria, including response times, meet the needs of a typical SAS customer.

Target audience

The target audience for this performance brief is the IT community studying solutions for their environment. Business users and IT professionals who are interested in implementing the SAS Enterprise Business Intelligence solution bundle may find this report useful for a sample SAS Enterprise BI configuration and a demonstration of the HP Integrity server's scalability.

Test description

The SAS 1000 Enterprise BI user test suite, developed by the SAS Enterprise Excellency Center (EEC), is based on SAS customer scenarios addressing their data reporting needs. This test suite has a heavy emphasis on traditional business intelligence functions delivered via web including Multi-Dimensional OLAP views and builds, queries and reporting, some of which utilized a web portal. While the data used in this scenario is retail based, the workload is representative of other industries. The data and workloads (including user mix) are defined by SAS.

Scenarios

This Enterprise BI benchmark scenario utilizes different ways that a retail organization may leverage Business Intelligence to increase revenue and lower costs. Whether in marketing, sales, purchasing or distribution, Business Intelligence will allow decision makers to spend less time looking for answers and more time making decisions.

User base

The 1000 user SAS Enterprise BI Server workload represents a variety of users that are typically found in Enterprise BI implementations. These users include a combination of simple and highly complex users. The distribution of these 1000 Enterprise BI users is as follows:

- 15 SAS Enterprise Guide software client users

- 90 users accessing SAS Stored Processes simulating SAS Add-In for Microsoft Office use
- 120 users building dynamic reports based on relational data via SAS Web Report Studio
- 125 users viewing OLAP cubes via SAS Web Report Studio
- 650 users viewing static reports through SAS Information Delivery Portal, HTTP and SAS Web Report Studio

SAS Enterprise BI Server reporting components included: SAS Enterprise Guide, SAS Add-In for Microsoft Office, SAS Information Delivery Portal and SAS Web Report Studio.

Reports

SAS Enterprise BI implementations typically include both dynamic and static reports. The Enterprise BI workload included 43 dynamic reports and 50 static. These reports provided users with the following information:

- Detection of low product inventory levels
- Detailed sales performance of product vs. location
- Comparison of item sales with and without marketing effects and effort
- Identification of high-value customers
- Cube views of sales performance by marketing effort, markdown and other causes and effects

Report format and content varied. Simple tabular formats on small data were presented. Additionally, cross tabulation reports with graphs were filtered and then that data joined against 36 million record detail tables.

Test execution

The workload simulated a sample Enterprise BI customers' morning business activity. The number of users increased over a 40-minute period, reaching a constant level of use for several hours. Upon completion, users then exited the system. Users logged on and consistently followed a cycle of report navigating, launching and viewing reports for 45 to 90 seconds. When these tasks were completed, users logged off the system. Delays occurred at various intervals. Once a user cycle was completed, a new user cycle was started. The system maintained 1000 concurrent users and approximately one million http transactions per hour.

Application environments

The application environment under test included several different software components including:

- SAS Enterprise BI Server version 9.1.3 with Service Pack 3
- SAS Web Report Studio 2.1
- BEA WebLogic as the main Web application server
- Apache as a load balancer for WebLogic Instances
- Xythos as the WebDAV server
- Microsoft SQL Server 2000 for WebDAV database
- SAS Workspace
- SAS OLAP Server
- SAS Middle Tier server
- SAS Metadata Server

Data

Data storage totals are more than 120GBs of uncompressed data including:

- Transaction or fact tables totaling 4.9GBs each, with an average of 36 million rows
- Dimension tables of 252 and 42,273 rows that are directly joined to the fact tables
- Fact and support data
- OLAP cubes ranging in size from 1GB to 7GB
- Cardinality was as high as the 42,273 row table but more typically was 252 rows or less

Figure 1. High-level diagram of test architecture

SAS Enterprise BI 1000 User Test with HP Servers and HP StorageWorks EVA Storage Running with Microsoft Windows Server 2003

SAS Mid Tier Servers



Two HP BL20p Blade Servers
With two 3.2 GHz Xeon cpu, 6 GB RAM

Microsoft SQL, Xythos WFS WebDAV,
Apache and WebLogic Server



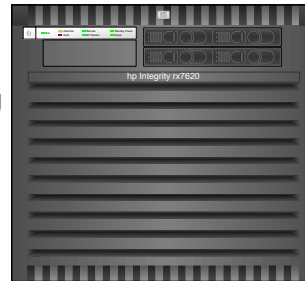
HP BL20p Blade Server
With two 3.2 GHz Xeon cpu, 4 GB RAM

SAS Metadata Server



HP Integrity rx4640 Server
With three 1.6 GHz Itanium 2 cpu, 2 GB RAM

SAS Backend Server running
Stored Process, Workspace
and OLAP Server



HP Integrity rx7620 Server
With eight 1.5 GHz Itanium 2 cpu, 8 GB RAM



HP Storageworks EVA 5000 Storage Array
With 28 36GB @15k rpm Disks

Key findings

The execution of the workload demonstrated a scalable Windows-based Enterprise BI configuration. The HP Integrity servers optimally supported the 1000 Enterprise BI users with room to support usage peaks and typical growth.

System resource utilization

- Back-end Server: HP Integrity rx7620 server with eight 1.5 GHz Itanium 2 CPUs utilized 75% CPU and 8GB RAM
- Metadata Server: HP Integrity rx4640 server with three 1.6 GHz Itanium 2 CPUs utilized 65% CPU and 2GB RAM
- DAV server: HP ProLiant BL20p server with two 3.2 GHz Intel Xeon® CPUs utilized 70% CPU and 4GB RAM
- Midtier Servers: Two HP ProLiant BL20p servers, each with two 3.2 GHz Intel Xeon CPUs utilized 65% CPU and 6GB RAM

The SAS Enterprise BI Server benchmark load clearly showed how HP Integrity servers were able to support the back-end server loads necessary for a typical customer solution. The SAS code makes efficient use of the 64-bit memory architecture, and this helps greatly reduce IO and system CPU utilization.

Recommendations

HP recommends HP Integrity servers for SAS backend server functions. HP Integrity servers are based on Intel Itanium 2 processors allowing for 64bit memory addressability. The 64bit architecture provides low IO resource utilization and highly optimized response times. HP Integrity servers also provide significant scalability (up to 128 CPUs) – the type of scalability necessary to handle daily peaks as well as the availability necessary for SAS enterprise customers. Further, HP Integrity servers provide outstanding investment protection with various expansion capabilities helping to meet your future growth needs.

For the SAS Metadata Server, HP Integrity 64-bit servers eliminate the 2GB metadata limit that 32bit architectures enforce. The HP Integrity servers also provide high availability that is essential for a SAS Metadata server.

HP BladeSystem servers offer a combination of performance, reliability and low TCO for the mid tier components that a SAS customer requires.

HP StorageWorks storage systems such as the Enterprise Virtual Array are an excellent solution for backend server storage for both SAS data and temporary space. It provides high-availability, unparalleled performance and massive capacity necessary for any size SAS Enterprise BI implementation. The StorageWorks storage systems also ease the management through automation and an intuitive user interface which helps lower complexity. With HP's variety of storage systems there is a cost-effective solution that would meet any size SAS implementations.

While this report demonstrates a sample SAS Enterprise BI solution, SAS solutions will vary greatly between implementations. HP recommends that you get a sizing that is specific to your environment. HP provides this as a complementary service at sastech@hp.com.

For more information

HP and SAS: www.hp.com/go/sas

HP Complimentary Customized Sizing: sastech@hp.com

HP Integrity server family overview: <http://www.hp.com/products1/servers/integrity/index.html>

HP BladeSystem family overview: <http://h71028.www7.hp.com/enterprise/cache/80316-0-0-0-121.aspx>

HP Storage Array Systems: <http://h18006.www1.hp.com/storage/array systems.html>

SAS Partner Directory: www.sas.com/partners/directory/hp

SAS Business Intelligence Technologies: <http://www.sas.com/technologies/bi/>

© 2006 Hewlett-Packard Development Company, L.P. The information contained herein is subject to change without notice. The only warranties for HP products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. HP shall not be liable for technical or editorial errors or omissions contained herein.

Microsoft and Windows are U.S. registered trademarks of Microsoft Corporation.

Intel, Xeon, and Itanium are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries.

[1/2006]-1

