Microsoft Office SharePoint Server 2007 with Windows 2008 and SQL Server 2008 on HP servers and storage technologies

Executive summary

As part of characterizing the performance of Microsoft® Office SharePoint 2007 solutions running on HP servers and storage technologies, HP Solutions Alliance Engineering (SAE) labs runs tests to ascertain performance on newly released HP server and storage technologies and also on new versions of Microsoft software that form part of the solution. This is to determine if best-practice configurations, sizing and configuration guidelines, or deployment recommendations need to be updated to reflect any important changes in performance or product features. Such test results are documented in white papers, providing up-to-date information to the HP field, partners and customers and also result in updates to the HP SAE SharePoint solution sizing tool.

With the release of Microsoft Windows® Server 2008 and of Microsoft SQL Server 2008, HP SAE has run tests using these new product versions comparing results to deployments on Windows Server 2003 and SQL Server 2005. HP SAE perceives these are important new software releases, and many customers will update their SharePoint deployments to take advantage of the new product features. These Windows Server and SQL Server versions will also be requirements when deploying or migrating to the new version of SharePoint as part of Microsoft Office 14, the working title of the next version of Microsoft Office; thus many customers may wish to gain familiarity with these versions and update before migrating their SharePoint environment.

This white paper describes the performance differences observed by the HP SAE labs when comparing the performance of Microsoft Office SharePoint Server 2007 SP1 running on Windows Server 2008 and SQL Server 2008 versus current deployments running Windows Server 2003 and SQL Server 2005. HP SAE testing revealed that the Internet Information Services (IIS) 7 dynamic compression provided in Windows Server 2008 significantly reduces Web Front End (WFE)-Client network traffic, but is achieved at an increase in WFE server CPU consumption to perform that compression. The net result is that the effective throughput (requests per second, or RPS) remains the same, although user perceived response times and the network bandwidth required are both reduced. The paper provides details of the testing performed, the workload and the test results; and an analysis of key differences in various areas of performance that lead to these overall observations.

Target audience: This paper is intended for people who will be proposing solutions, providing installation services or consulting, and who may be assisting in deploying Microsoft Office SharePoint Server 2007 on HP ProLiant systems, HP BladeSystem servers and HP StorageWorks storage technologies. It will also be of interest to IT professionals who may be deploying and/or managing Office SharePoint Server 2007 solutions. This paper will be of particular interest to companies planning on migrating to Windows Server 2008 and SQL Server 2008 to take advantage of new product features, and/or in preparation for upgrade to the Office 14 release of SharePoint.

HP recommends that the information provided herein be used in conjunction with the product solution documentation, information contained in additional white papers and TechNet articles authored by Microsoft, as noted in the section titled For more information.

This white paper describes testing performed in 2008 at the HP SAE labs.

Overview

SharePoint deployments require that various software pre-requisites be configured (as detailed in the Microsoft Office SharePoint Server 2007 deployment documentation), and there are several changes in the way that both Windows Server 2008 roles/features setup and SQL Server 2008 configuration (e.g., surface area configuration) in the new product versions with new terminology and GUIs. This paper documents those changes and the required roles/features setup for Windows Server 2008 and SQL Server 2008 in the section titled Software installation.

A key new feature in Windows Server 2008 is the inclusion of IIS 7. This new version of IIS provides a built-in data compression capability for both static and dynamic data. By default, the static compression (at the web server level) and dynamic compression (at the individual website level) are enabled. There is also the ability to set the minimum size of static items to be compressed, and the size of disk space to be allocated. HP left these IIS 7 compression settings at their default values. The dynamic data compression is especially relevant for SharePoint, as some SharePoint web parts can provoke high network traffic levels between the Web Front End (WFE) servers and clients. HP tests revealed that IIS 7 dynamic compression provides significant reductions in WFE-to-client traffic, these levels varying according to the functions being used. This traffic reduction produces a potentially large benefit in terms of user-perceived response times, improvements in throughput; and will be of great value to customers with solutions deployed over wide-area networks (WANs). The dynamic compression does come at a cost of increased CPU consumption on the WFE servers, but tests showed this to be well handled by the available power of HP ProLiant and BladeSystem server configurations. Upgrading to faster HP server CPUs and/or deploying newer generation HP servers will provide increased CPU capacity should your current servers be close to their performance limits.

The overall results when running the same mixed workload on the 2008 software versions, compared to Windows Server 2003 and SQL Server 2005, show virtually identical throughput as measured in Requests per second (RPS) achievable at maximum WFE server capacity. Scale-out when adding WFE servers shows highly linear throughput scaling. This overall throughput similarity is explained by the combination of increased WFE CPU consumption (to support dynamic compression) which would normally reduce throughput, in conjunction with reduced WFE-Client network traffic and reduced response times which regain overall throughput. The throughput costs and benefits essentially balance out; however, it should be noted that the key significant difference is greatly reduced network traffic. IT professionals can therefore determine which SharePoint web sites will most benefit from enabling dynamic compression, and which can do without in order to determine network traffic versus CPU tradeoffs. Thus an optimal solution specific to business needs and service level agreements can be realized by appropriate IIS 7 configuring; and will be especially significant in WAN deployments. HP also noted that different SharePoint functions (web parts) exhibit different performance behavior as a result of dynamic compression, and thus an alternative workload mix may result in slightly different performance from that for the mixed workload presented in this paper. The results and analysis sections provide details, such that an estimation of likely performance difference as a result of workload changes can be estimated.

Important:
As with any laboratory testing, the performance metrics quoted in this paper are idealized. In a production environment, these metrics may be impacted by a variety of factors.

HP recommends proof-of-concept testing in a non-production environment using the actual target application as a matter of best practice for all application deployments. Testing the actual target application in a test/staging environment identical to, but isolated from, the production environment is the most effective way to characterize system behavior.

This following sections present a description of the test environment, the testing performed, the results and analysis, and summary of key findings and recommendations when upgrading to these new software versions on HP server and storage technologies.

Performance tests

Tests were run on the 2008 software versions using identical workloads, load levels and HP server/storage configurations previously used to evaluate Windows Server 2003/SQL Server 2005 deployments. The workloads comprised of a range of common SharePoint functions and also a mix of these functions intended to be representative of typical collaboration/document management activity. Analysis of the data collected provided a set of key metrics that collectively described the key characteristics of the functions and mix as regards to CPU, throughput, network activity, etc. These are presented later in this document. Analysis of the data provided a detailed comparison illustrating the effects of the new software versions and their features with regards to the observed key performance metrics.

Test hardware/software configuration

The test configuration was a simple four-server HP ProLiant deployment, similar to a typical medium-sized non-high availability (HA) SharePoint configuration. A single SQL Server and three WFE/Query servers were used to support sufficient throughput capacity for purposes of these tests. The Index Search (crawl) role was hosted on a separate server but was neither relevant to, nor active during these tests.

SQL Server

- Number of servers: 1
- Server type: HP ProLiant DL380 G5
- CPU: Dual-Core Intel® Xeon® 5150 @ 2.66 GHz
- Memory : 2GB *
- Windows Server 2008 Enterprise x64 Edition
- SQL Server 2008
- HP StorageWorks Modular Smart Array (MSA) storage

SharePoint servers

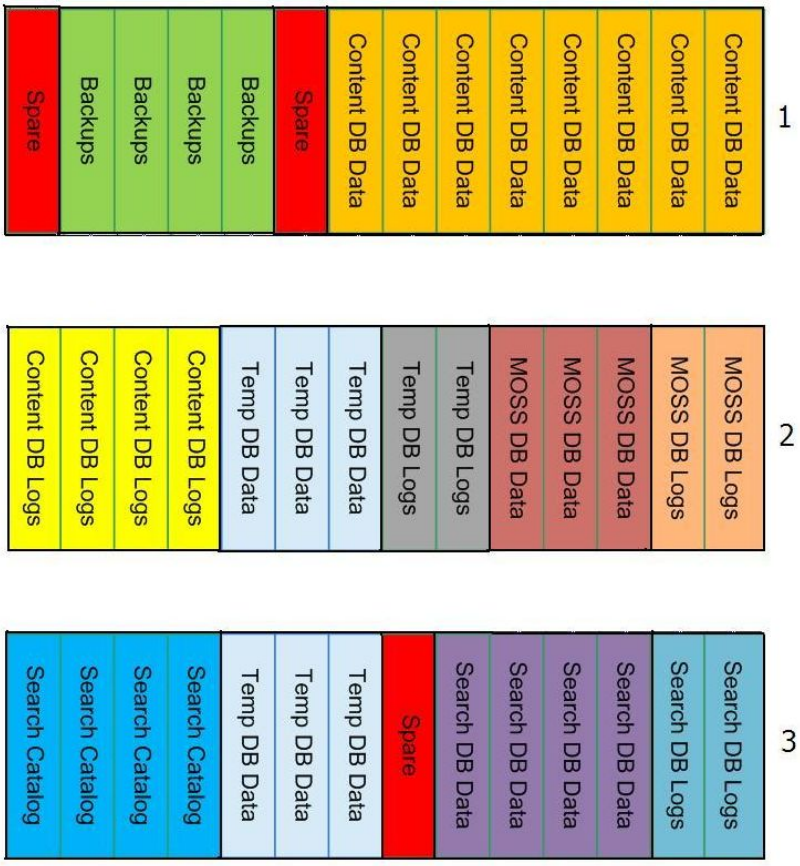
- Number of servers: 3
- Server type: HP ProLiant DL385 G2
- CPU: Dual-Core AMD Opteron™ processors 2218 @ 2.66 GHz
- Memory: 8GB
- Windows Server 2008 Enterprise x64 Edition
- Microsoft Office SharePoint Server 2007 SP1 (MOSS)
- Server internal storage

* **Note**: The SQL server in this configuration would usually be configured with 8GB memory; however, tests were also deliberately performed with 2GB memory so as to provide direct comparison to other test results.

Test storage logical volume layout

The test storage logical volume design was based on the SAE "large" design, where all the key data structures are separated onto their own logical volume. Each logical volume also employed appropriate RAID levels. This would be "overkill" in a typical real-world medium-sized deployment, but was used in the lab environment to enable direct comparison to recently-run tests using Windows Server 2003 and SQL Server 2005. The section For more information includes pointers to HP SAE white papers describing this and other storage deployment designs suitable for a range of SharePoint solutions. Figure 1 shows the test logical volume layout using three storage enclosures (42 disks).

Figure 1. Storage logical volume layout



Software installation

In order to correctly install SQL 2008, IIS needs to be included in the operating system. With Windows Server 2008, this is accomplished by using the Server Manager application, and adding the Web Server (IIS) Role. The following components must be selected during the addition of the Web Server Role:

- Common HTTP Features – Static Content
- Common HTTP Features – Default Document
- Common HTTP Features – HTTP Redirection
- Common HTTP Features – Directory Browsing

- Application Development – ASP.Net
- Application Development – ISAPI Extension
- Application Development – ISAPI Filters
- Security – Windows Authentication
- Management Tools – IIS 6 Metabase
- Management Tools – IIS 6 WMI

Windows Server 2008 also provides the option of configuring and using both IP4 and IP6 on each network adapter (NIC). HP disabled IP6 on all the test servers, as guidelines have not yet been determined for using IP6 with SharePoint deployments.

The Windows Server 2008 IIS 7 dynamic compression was enabled for the SharePoint site tests reported herein – one validation test was run with dynamic compression disabled to confirm operation and network traffic impact. The user emulation software was configured to support compression so the emulated Internet Explorer 6 web browser was performing "received network traffic de-compression" on the emulated users' desktops.

SharePoint requires that the SQL Server surface area (network security) be configured to enable both TCP/IP and Named Pipes for connections. In SQL Server 2008, this is accomplished using the new *SQL 2008 Configuration Manager*. Expand the left-side tree named **SQL Server Network Configuration**, then select (click on) **Protocols for MSSQLSERVER**. A list will appear in the right-side pane. Within that list, right-click on **Named Pipes** and select **Enable**.

Key function characteristics

Tests were run in order to determine the characteristics of various SharePoint functions. These data provide an overview of how each function uses various system resources and its typical performance. The key metrics are:

- Typical throughput per WFE server (requests per second [RPS] @ 85% average CPU busy) – generally, the more throughput achievable, the less resource-intense the function.
- WFE: SQL CPU ratio – different functions will require more or less WFE or SQL resources. A low ratio will typically indicate that higher SQL CPU resources are used (more database activity). This number also indicates how many WFE servers can be supported by a single active SQL server.
- Typical response times – these may be classed into three groups: functions that are sub-second, that take a few seconds, or that take "many" seconds. Functions with longer response times are more complex and will require more server resources.
- HTTP hits per page – pages can take several packets of data (HTTP hits) to fully render. Those taking more hits are usually more complex (pages include more web parts, or more complex functions).
- Client-WFE Network traffic – the network traffic volume sent from the client to WFEs due to a user request, and the data volume returned to the client to render the page. The data returned volume can often be very high.
- Storage subsystem volume I/O rates (read/write) – read and write I/O rates, volume and transfer time for the more significant storage volumes.

The set of metrics above define the characteristics of the tested SharePoint functions and indicates their resource consumption and typical performance. The data tables also show results for individual function response times, HTTP pages/sec, network traffic, server CPU consumption, etc. and thus highlight detailed differences due to the different software versions. A set of key observations and analysis accompanies each results section.

Workloads and results

A range of workloads were used, exposing the characteristics of individual SharePoint functions, and also of a mixed function workload as might be used in a typical collaboration and document management solution scenario.

The workloads were applied using an automated client emulation test system which also collected relevant resource consumption, throughput and response time data, and provided analysis and reporting. The emulation toolset replicates the network traffic generated and received by browser-based SharePoint clients. The client emulation systems and the SharePoint farm were connected on the same subnet via a 1GB network backbone.

The following pages presents a description of the individual SharePoint functions and the mixed workload, a summary of the results, and a brief summary of the key findings for each workload with regards to comparing the results for the different Windows Server and SQL Server versions. The data tables show the key function characteristics, as described earlier.

For each workload, the first data table (set of tables in the mixed workload case) shows observed response time results for the same workload run on the different software versions. Note that the Appendix provides a detailed description of each response timer. Then following table shows the Throughput, Network and CPU% for the same workload run on the two different software versions. The final table expresses the results normalized to a single WFE/Query server running at 85% CPU average (nominal maximum capacity for good performance).

Events and announcements

Events: A simulated user navigates into a calendar events list that contains upcoming events. The user chooses an event at random, opens it and simulates reading the event information for a period of time. The user then closes the calendar event, and navigates back to the home page.

Announcements: A simulated user navigates into announcement events that contain general announcements. The user randomly chooses an announcement and opens it and simulates reading the event information for a period of time. The user then closes the announcement and navigates back to the home page.

Table 1. Events and Announcements -- Response times (seconds)

Test	Overall Response Time	Announce	Events	Home
Win2003 & SQL2005	0.03	0.02	0.02	0.03
Win2008 & SQL2008	0.04	0.03	0.02	0.04

Table 2. Events and Announcements – Throughput, Network and CPU%

Test	HTTP Hits/sec	HTTP Pages/sec	Request Data sent (KB/sec)	Request Data Received (KB/sec)	WFE 1 CPU%	WFE 2 CPU%	WFE 3 CPU%	SQL CPU%
Win2003 SQL2005	98.14	98.14	40.61	5135	17.99	22.86	23.15	10.44
Win2008 SQL2008	97.83	97.83	40.48	1441	28.57	30.60	29.57	12.17

Table 3. Events and Announcements characteristics – normalized results (85% CPU)

Test	Average (Avg) RPS @ 85% CPU (WFE)	WFE CPU : SQL CPU	Hits per page	Data TX @ Avg RPS	Data RX @ Avg RPS
Win2003 SQL2005	130.31	6.13	1.00	53.92	6818
Win2008 SQL2008	93.69	7.29	1.00	38.77	1380

Summary of test observations:

- These are simple list functions, are not resource intensive and exhibit sub-second response times.
- Average WFE server CPU consumption (Table 2) increased by 8-10% CPU busy, due to IIS 7 dynamic data compression being active. SQL CPU increased slightly.
- HTTP pages/sec (Table 2) was essentially the same, as there was plenty of CPU headroom. However, when factoring in the CPU cost of the function (Table 3), the typical throughput at 85% average was reduced from 130 RPS to 94 RPS per WFE.
- The network data received rate (Table 3) was significantly reduced to less than 25% of the non-compressed result (1380 KB/sec vs. 6818 KB/sec).

Document library

A simulated user navigates from the home page to the document library (named "Topics") and chooses a folder at random from the list. The user then opens a document at random within that folder 25% of the time.

Table 4. Document library – Response times, Network and CPU%

Test	Overall Response Time	Home	Topic Folder	Topic Open Doc	Topic Open Page
Win2003 SQL2005	0.07	0.07	0.09	0.03	0.05
Win2008 SQL2008	0.05	0.06	0.06	0.04	0.04

Table 5. Document library – Throughput, Network, and CPU%

Test	HTTP Hits/sec	HTTP Pages/sec	Request Data sent (KB/sec)	Request Data Received (KB/sec)	WFE 1 CPU%	WFE 2 CPU%	WFE 3 CPU%	SQL CPU%
Win2003 SQL2005	433.04	225.83	499.97	22870	41.84	45.61	43.83	18.31
Win2008 SQL2008	382.44	171.39	201.46	11698	49.33	53.88	51.42	20.98

Table 6. Document Library characteristics – normalized results (85% CPU)

Test	Average RPS @ 85% CPU (WFE)	WFE CPU : SQL CPU	Hits per page	Data TX @ Avg RPS	Data RX @ Avg RPS
Win2003 SQL2005	135.12	4.70	1.92	300.26	13772
Win2008 SQL2008	98.64	7.04	2.23	115.95	6732

Summary of test observations:

- These is also a list function, but is more complex than the previous as the DocLib web part is displaying a list of folders and documents that must go through fine-grained security checks while the list is being assembled. The list content is also more complex than the previous with more columns of information.
- Average WFE server %CPU busy (Table 5) increased by about 8% and SQL CPU increased about 2%.
- Normalized throughput (Table 6) dropped from 135 RPS to 98 RPS due to the CPU increase.
- The network data received rate (Table 5) was significantly reduced to about 50% of the non-compressed result (11,698 KB/sec vs. 22870 KB/sec). The normalized result (Table 6) shows about the same ratio.

Search

A simulated user employs the Search web part on the home page, using one of a range of random strings for the search text. The user then opens the document randomly chosen from the search results page 25% of the time (click-through).

Table 7. Search – Response times

Test	Overall	Home	Search	Search Open Doc
Win2003 SQL2005	0.06	0.06	0.06	0.07
Win2008 SQL2008	0.06	0.05	0.07	0.09

Table 8. Search – Throughput, Network, and CPU%

Test	HTTP Hits/sec	HTTP Pages/sec	Request Data sent (KB/sec)	Request Data Received (KB/sec)	WFE 1 CPU%	WFE 2 CPU%	WFE 3 CPU%	SQL CPU%
Win2003 SQL2005	212.83	150.25	93.39	20520	35.57	37.03	38.80	26.42
Win2008 SQL2008	180.23	124.65	78.91	7182	42.68	43.12	45.40	30.14

Table 9. Search characteristics – normalized results (85% CPU)

Test	Average RPS @ 85% CPU (WFE)	WFE CPU : SQL CPU	Hits per page	Data TX @ Avg RPS	Data RX @ Avg RPS
Win2003 SQL2005	120.99	4.25	1.42	74.95	16420
Win2008 SQL2008	80.75	4.18	1.45	51.12	5419

Summary of test observations:

- Search is generally a sub-second function. It provides the user with a results set list of documents that are relevant to the search query string, but these are also passed through fine-grained security to present only that information that the user's role (security settings) permits.
- Average WFE server %CPU busy (Table 8) increased by about 7%, due to IIS 7 dynamic data compression being active. SQL CPU increased 4%.
- Normalized throughput (Table 9) was reduced from 121 RPS to 81 RPS due to the CPU increase.
- Network data received was reduced to about 35% of the un-compressed result.

Document check-out/-in

A simulated user navigates to the "Checkin" folder in the document library. The user then checks out a random document, causing a change to the state of the document in the list view. The user then optionally opens the document 25% of the time, and then checks the document back in, updating the version number before navigating back to the home page.

Table 10. Check-out/-in – Response times

Test	Overall	Checkin1	Checkin2	Checkout	Checkout Open Doc	Home	Topic Checkout	Topic Page
Win2003 SQL2005	9.27	10.00	12.070	10.40	5.68	7.12	8.99	7.91
Win2008 SQL2008	3.61	4.43	4.454	2.85	1.73	3.47	2.75	4.16

Table 11. Check-out/-in – Throughput, Network and CPU%

Test	HTTP Hits/sec	HTTP Pages/sec	Request Data sent (KB/sec)	Request Data Received (KB/sec)	WFE 1 CPU%	WFE 2 CPU%	WFE 3 CPU%	SQL CPU%
Win2003 SQL2005	91.54	49.24	119.85	9357	19.22	20.00	20.05	19.10
Win2008 SQL2008	163.07	80.61	196.87	4424	30.01	31.58	31.03	25.74

Table 12. Check-out/-in characteristics – normalized results (85% CPU)

Test	Average RPS @ 85% CPU (WFE)	WFE CPU : SQL CPU	Hits per page	Data TX @ Avg RPS	Data RX @ Avg RPS
Win2003 SQL2005	70.62	3.10	1.86	171.88	13419
Win2008 SQL2008	73.98	3.60	2.02	180.68	4060

Summary of test observations:

- Document check-out/-in functions are usually resource intensive and have a typical response time of "many seconds." Test results show the response times were noticeably reduced, resulting in increased throughput (RPS). It is likely that SQL Server 2008 features and improvements positively affected this function, which performs multiple database reads/writes (to the Content DB, TempDB, etc.).
- WFE server %CPU busy (Table 11) increased by about 10%, and SQL CPU increased by about 5%.
- Data TX (sent) at average RPS increased due to higher throughput.
- Data RX (received) was reduced to about 50% as seen in the Table 11 (4424 KB/sec vs. 9357 KB/sec) due to IIS 7 dynamic data compression. The normalized result (Table 12) takes into account improvements in throughput (due to better response times and compression) and the CPU cost shows the compressed network result is about 35% of the non-compressed traffic.
- This is also a more storage I/O intense function, and despite an increase in throughput, some reduction of I/O rates to key storage volumes was also noted – likely due to new efficiencies in SQL Server 2008. In particular:

– Content DB Data:

- Windows 2003 & SQL 2005 - Read 16.9 IO/sec (183KB/sec); Write 3.42 IO/sec (290KB/sec)
- Windows 2008 & SQL 2008 – Read 11.8 IO/sec (124.8KB/sec); Write 1.8 IO/sec (260.8KB/sec)

– Content DB Logs:

- Windows 2003 & SQL 2005 - Write 7.50 IO/sec (770KB/sec)
- Windows 2008 & SQL 2008 - Write 8.9 IO/sec (901.17KB/sec)

– TempDB Data:

- Windows 2003 & SQL 2005 - Write 0.417 IO/sec (7KB/sec)
- Windows 2008 & SQL 2008 - Write 0.688 IO/sec (48.8KB/sec)

Mixed workload

The following shows the mixed workload used for testing and the percentages of each function used. The percentages do not sum to 100%, but are rather the percentage likelihood of a given function occurring for each pass of the workload script. The script loops continuously during the test duration. The function mix for the mixed workload was:

- Home – 100%
- Browse announcements list and opening a random announcement – 70%
- Browse events calendar list and opening a random event – 70%
- Execute Search – 30%
  – Open Random Document from the search result – 25%
- Browse a Document Library – 70%
  – Open a Document within the Library – 25%
- Document library check out/in – 20%
  – Open checked-out document – 25%

Table 13. Mixed workload – Response times (1)

Test	Overall	Announce	Events	Home	Search	Search Open doc	Topic Open Doc	Topic Page	Topic Folder
Win2003 SQL2005	2.06	0.84	0.97	2.35	0.75	1.82	1.29	2.17	3.00
Win2008 SQL2008	0.53	0.20	0.23	0.68	0.27	0.55	0.33	0.62	0.46

Table 14. Mixed workload -- Response times (2)

Test	Topic Checkout	Checkout	Checkout Open Doc	Checkin1	Checkin2
Win2003 SQL2005	2.61	2.75	1.59	2.92	3.99
Win2008 SQL2008	0.55	0.64	0.41	0.76	0.93

Table 15. Mixed workload – Throughput, Network and CPU%

Test	HTTP Hits/sec	HTTP Pages/sec	Request Data sent (KB/sec)	Request Data Received (KB/sec)	WFE 1 CPU%	WFE 2 CPU%	WFE 3 CPU%	SQL CPU%
Win2003 SQL2005	158.28	100.60	155.21	14255	30.47	34.97	34.65	23.03
Win2008 SQL2008	201.03	120.23	146.94	6998	38.44	40.92	40.10	26.11

Table 16. Mixed workload characteristics – normalized results (85% CPU)

Test	Average RPS @ 85% CPU (WFE)	WFE CPU : SQL CPU	Hits per page	Data TX @ Avg RPS	Data RX @ Avg RPS
Win2003 SQL2005	85.43	4.35	1.57	131.81	12106
Win2008 SQL2008	85.54	4.58	1.67	104.55	4979

Summary of test observations:

- These results depict the changes that would be expected when running a typical collaboration and document management workload, with the function mixes as noted above. Should your workload mix be different (e.g. a higher percentage of, say, search) then examining the results and characteristics of that function will allow estimating how your mixed workload results might differ from those presented here.
- All response times decreased significantly, and raw throughput (HTTP pages/sec in Table 15) increased by about 20%, due to the dynamic data compression.
- WFE %CPU busy (Table 15) increased by about 6-8% overall (cost of IIS 7 dynamic data compression), and SQL CPU% increased by 3%.
- Network traffic received (Table 15) was reduced to about half (from 14,255 KB/sec to 6,998 KB/sec) due to IIS 7 dynamic compression.
- Table 16 shows the net results of the mixed workload, when results are normalized to 85% average WFE CPU. Throughput is essentially the same, and the key benefit is the greatly reduced network traffic. Data received reduced to almost 40% (4959 KB/sec compressed, compared to 12106 KB/sec un-compressed).
- The overall benefits as shown by the mixed workload are therefore improved response times and decreased network traffic, at a slight increase in WFE server CPU.

Summary

- Several SharePoint workloads were applied to a typical medium-sized, non-HA farm deployment to determine the effect of running the solution on Windows Server 2008 and SQL Server 2008; versus running on Windows Server 2003 and SQL Server 2005.
- The implementation of IIS 7 dynamic data compression appears to have a very positive effect on SharePoint network traffic between the WFE/Query servers and the user clients, but comes at the cost of increased WFE server CPU to perform that dynamic compression in real time.
- Normally an increase in CPU usage in and of itself would result in a throughput decrease; however, the positive impact of the data compression causes reduced network data propagation time and thus reduced response times. The net effect in terms of achievable throughput is shown in Table 16. The combined effects of the CPU increase (cost) and the compression (benefit) gives essentially a net zero difference in throughput RPS when normalized to a single WFE server at full capacity (Average RPS at WFE 85% average CPU busy).
- Despite an apparent equivalent throughput capacity, the response times are noticeably improved (direct positive impact to the user) and the WFE-client network traffic is substantially decreased (less network bandwidth required – especially important with WAN deployments).
- Note that the results presented herein were obtained when running the SharePoint WFE/Query roles on HP ProLiant DL385 G2 servers equipped with AMD™ dual-core processors. HP has previously documented that performance on AMD and Intel-based DL360/DL385 ProLiant dual-core servers and HP ProLiant BL460c/BL465c Intel/AMD dual-core blade servers is broadly equivalent. Previous HP SAE testing has also shown performance on Intel-based quad-core HP ProLiant DL380 G5 and quad-core HP ProLiant BL460c G5 Blade servers will yield very close to twice the performance of equivalent HP dual-core systems.
- HP concludes that updating your SharePoint farm servers to these new software versions would be beneficial, providing the servers are not currently operating close to the maximum capacity limits. HP SAE tests and reports maximum recommended throughput capacity at a server load of 85% average CPU busy. Should your servers be operating within about 10% of this figure, the increased overhead of IIS 7 dynamic compression may load the server beyond HP's recommended levels. In that event, you may consider scaling-out the WFE/Query server role by adding an appropriate HP ProLiant or BladeSystem server, upgrading to a newer generation HP server; or scaling up from a dual-core to a quad-core server where possible to provide increased capacity. Increasing the number of WFE servers may further load your SQL server such that it approaches its capacity limit. Scaling up to quad-core or to an HP 4-socket server (e.g. DL580/DL585) will provide increased capacity and room for growth.

Implementing a proof-of-concept

As a matter of best practice for all deployments, HP recommends implementing a proof-of-concept using a test environment that matches as closely as possible the planned production environment. In this way, appropriate performance and scalability characterizations can be obtained. For help with a proof-of-concept, contact an HP Services representative (http://www.hp.com/hps/contacts/index.html) or your HP partner (http://www.hpmsfrontlinepartners.com/find-partner.aspx).

Appendix

Performance metrics

The following describes the results data table column headings, response timer names and other metrics, to assist you in understanding the data:

- HTTP Hits/sec – generally, an HTTP page will require multiple HTTP "hits" to render. This will vary depending on page complexity (number of SharePoint web parts, etc.).
- HTTP Pages/sec – average number of HTTP pages/second. This is a key throughput metric equivalent to SharePoint Requests per second (RPS) and to .NET requests/second.
- Overall Response time – average of all function timers collected during the test (an average of averages). Individual function response time metrics are defined below.
- Announcement – average time to open a randomly selected announcement.
- Event – average time to open a randomly selected Event.
- Home – average time to display the site home page
- Request Data Sent (TX) – the amount of data (in Kilobytes/sec) sent to the WFE server from the emulated client as a result of the user request.
- Request Data Received (RX) – the amount of data (in Kilobytes/sec) received from the WFE server to present the new page requested by the user.
- WFE CPU % – average CPU percentage used by Web Front End (WFE) servers
- SQL CPU % – average CPU percentage used by SQL Server
- WFE CPU: SQL CPU – ratio of the total WFE CPU (all WFE servers) to the SQL CPU. This also indicates the number of WFE servers that can be supported by a single active SQL server for a given workload.
- Topic Open Page – the average response time (seconds) to open the document library (Doclib) and display the content list.
- Topic Folder – average time required to open a randomly selected folder in the Doclib and display the list of documents. Multiple folders with differing content were used.
- Topic Checkout – average time to open the folder named "Checkout" in the document library. This contains the documents used by the emulated users for the check-out/-in functions.
- Topic Open Doc – average time required to open a randomly selected document in the folder. Response time varies depending on document type and size.
- Search – average response time for the Search function to return a results set page to the user. A range of different search keywords was used; thus, the response time for this varies.
- Search Open Doc – average time required to open a randomly selected document from the search results page.
- Checkin 1 – average time required from the user clicking the check-in function on the drop down menu to when a page is presented requesting optional check-in version information.
- Checkin 2 – average time required from when the user clicks **OK** on the optional information page to when the document check-in is complete.
- Checkout Open Doc – average time required to open a randomly selected document from the Checkout folder, following the Checkout function.

For more information

HP ActiveAnswers resources for Microsoft Office SharePoint Server	http://www.hp.com/solutions/activeanswers/sharepoint
HP and Microsoft Office SharePoint Server	http://www.hp.com/go/sharepoint
Best practices for deploying Microsoft Office SharePoint Server 2007 on HP storage technologies	http://h71019.www7.hp.com/ActiveAnswers/library/GetPage.aspx?pageid=604466&statusid=0&audienceid=0&ccid=225&langid=121
HP ProLiant servers	http://www.hp.com/go/proliant
HP BladeSystem c-Class servers	http://www.hp.com/go/bladesystem
HP StorageWorks technologies	http://www.hp.com/go/storage
Microsoft Office SharePoint Server 2007 TechNet landing page	http://technet.microsoft.com/en-us/office/sharepointserver/default.aspx
Microsoft SQL Server 2008	http://www.microsoft.com/sqlserver/2008/en/us/overview.aspx
Microsoft Windows Server 2008	http://www.microsoft.com/windowsserver2008/en/us/overview.aspx

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