EMC DOCUMENTUM CONTENT MANAGEMENT BENCHMARK

EMC® DOCUMENTUM® WEBTOP 6.5 SP1 WITH 100,000 USERS ON MICROSOFT SQL SERVER 2008 RUNNING ON HP SUPERDOME SERVER

As a global leader in content management applications, EMC is committed to delivering high-performance solutions that deliver rich functionality with robust performance at volumes that are representative of customer environments.

EMC benchmarks demonstrate our software's performance characteristics for a range of processing volumes in a specific configuration. Customers and prospects can use this information to determine the software, hardware, and network configurations necessary to support their processing volumes.

The primary objective of our benchmarking effort is to provide as many data points as possible to support this important decision.

SUMMARY OF RESULTS

Benchmark	EMC Documentum Webtop 6.5 SP1	
(English)	Users	100,000
	Transactions per hour	748,800
	Average response time (seconds)	0.86
	Application server hits (each second)	878
Référence d'exécution	EMC Documentum Webtop 6.5 SP1	
(Français)	actifs	100,000
	Transactions par heure	748,800
	Temps de réponse moyen (secondes)	0.86
	Coups de serveur d'application (par seconde)	878
Benchmark-Test	EMC Documentum Webtop 6.5 SP1	
(Deutsch)	benutzer	100,000
	Verhandlungen pro stunde	748,800
	Durchschnittliche antwortzeit (sekunden)	0.86
	Anwendung bedienererfolge (pro Sekunde)	878
Patrón de rendimiento	EMC Documentum Webtop 6.5 SP1	
(Español)	activos	100,000
	Transacciones por hora	748,800
	Tiempo de reacción medio (segundos)	0.86
	Golpes del servidor del uso (por segundo)	878
基准	EMC Documentum Webtop 6.5 SP1	
(中文)	用户	100,000
	交易每小时	748,800
	平均响应时间 - 秒	0.86
	应用服务器安打 - 每秒	878

BENCHMARK PROFILE

In November 2008, EMC® Documentum® partnered with Microsoft and HP to conduct the largest ever Enterprise Content Management (ECM) industry benchmark. This record-setting benchmark was conducted in partnership with EMC, HP, and Microsoft at Microsoft's Enterprise Engineering Center (EEC) in Redmond, Washington.

As corporations face the accelerated growth of information, and must deal with the need to reduce costs in our struggling worldwide economy, EMC offers Documentum 6.5 as a proven enterprise scalable solution at the lowest total cost of ownership (TCO) of all ECM vendors. Documentum, the leader in ECM, raises the bar on scalability, performance, and TCO for worldwide content management solutions.

This benchmark demonstrates a tremendous reduction in the hardware resources required per transaction when compared to prior Documentum 5.3 releases. Improvements have been made at all tiers of the application and improved third-party software integration, eliminating many bottlenecks. **The EMC Documentum 6.5 SP1 benchmark results demarcate a reduction in TCO greater than 50% over prior 5.3 releases.**

The goal of this benchmark was to simulate 100,000 users of EMC Documentum's Webtop 6.5 SP1 interface engaging in a variety of content management related transactions and to sustain that load over the course of an entire work day. The environment was built on HP's latest server technology running Microsoft Enterprise Edition server software.

Workday (12 hours) highlights:

- ***100,000 users***
- ***9 million transactions***
- ***38 million application server hits***
- ***Average response time less than one second***

Highlighting throughput and sustainability, the benchmark environment was able to process around 9 million Documentum Webtop transactions during a 12-hour workday.

All Documentum software applications were installed on HP Proliant blade servers at Microsoft's Enterprise Engineering Center. Microsoft's EEC can tackle the most complex re-creations of real enterprise production environments. Creating a real-world scenario in a controlled environment allows customers to put Microsoft and third-party technologies to the test before implementing solutions in their own environments.

The database server tier was installed on an HP Integrity SuperDome running Microsoft Windows Server 2008 64 bit for Itanium-based systems and SQL Server 2008 64-bit Enterprise Edition. The SQL Server Database and Documentum file store was Fibre Channel attached to an EMC CLARiiON® CX3-80 storage subsystem.

Forty-eight HP Proliant multi-processor blade servers were used to simulate the workload of 100,000 users. HP LoadRunner has been EMC Documentum's load generation tool of choice and was used to conduct this benchmark.

Multiple tests were conducted and used to collect the metrics reported in this summary. Transaction processing times and system utilization were measured for all tests.

All tests were conducted in a controlled environment with no other applications running. The test scenario designed was sustained for more than 12 hours. Tuning changes (if any) were approved by EMC Documentum development and will be generally available in a future update or release.

BUSINESS PROCESSES

EMC Documentum defines a business process as a series of user operations against structured and unstructured data. In these processes the user is guided through any number of transactions that incrementally bring the business process to completion. Eight different types of Documentum Webtop "based" business processes were exercised in this benchmark:

Log on: The user logged on to the Classic Cabinets view within Webtop. The user is placed into his home cabinet. Then, the user navigates to Cabinets and views all the Cabinets.

Checkin: The user navigated to the MyFiles view, selected a checked out document at random, and checked it in. The user then returned to the Cabinets view.

Checkout: The user navigated to the MyFiles view, selected a document at random, and checked it out. The user then returned to the Cabinets view.

Import: The user navigated to the Home cabinet and imported a document. The user then returned to the Cabinets view.

Inbox: The user navigated to the Inbox, selected a task, opened it, and exported the attached file. The user then returned to the Cabinets view.

Navigation: The user navigated to a random cabinet, navigated to two folders down, and selected a document at random for export. The user then returned to the Cabinets view.

Subscriptions: The user navigated to the Subscriptions view and selected a document at random to export. The user then returned to the Cabinets view.

Log off: The user logged off from the Classic Cabinets view of Webtop.

Table 1 provides average response times in seconds for 100,000 users performing various actions contained within each of the business processes exercised in the Webtop benchmark:

Business Process	Transaction	Average Response Time (in seconds)
Login	Display Login Page	0.04
	Connect	3.45
	Display Cabinets	0.86
Checkin	Display MyFiles	0.37
	Update version	1.05
	Checkin a document	1.19
	Go back to Cabinets	0.94
Checkout	Display MyFiles	0.38
	Checkout a document	1.46
	Go back to Cabinets	0.96
Import	Access Home Cabinet	0.41
	Import a file	2.35
	Go back to Cabinets	0.95
Inbox	View Inbox List	0.41
	Open a task	0.58
	Export a document	0.76
	Go back to Cabinets	0.57
Navigation	Get Cabinet List	0.38
	Navigate to Cabinet	0.77
	Navigate to Folder Level 1	1.04
	Navigate to Folder Level 2	1.14
	Export a document	0.82
	Go back to Cabinets	0.57
Subscription	View Subscription List	0.51
	Select Export document	0.25
	Export a document	0.59
	Go back to Cabinets	0.58
Logout	Logout	0.84

Table 1. Average Response Times in Seconds

METHODOLOGY

The test scenarios used were exercised via HP's LoadRunner load generators using Documentum's 6.5 SP1 benchmark kit scripts and data expansion tools.

HP LoadRunner was used as the load driver to simulate the presence of 100,000 users on the system. The software submitted a business process at an average rate of once every five minutes for each concurrent user.

Measurements were recorded on all of the servers when the user load was attained and the environment reached a steady state.

Figure 1 illustrates the multi-tiered benchmark environment used for testing.

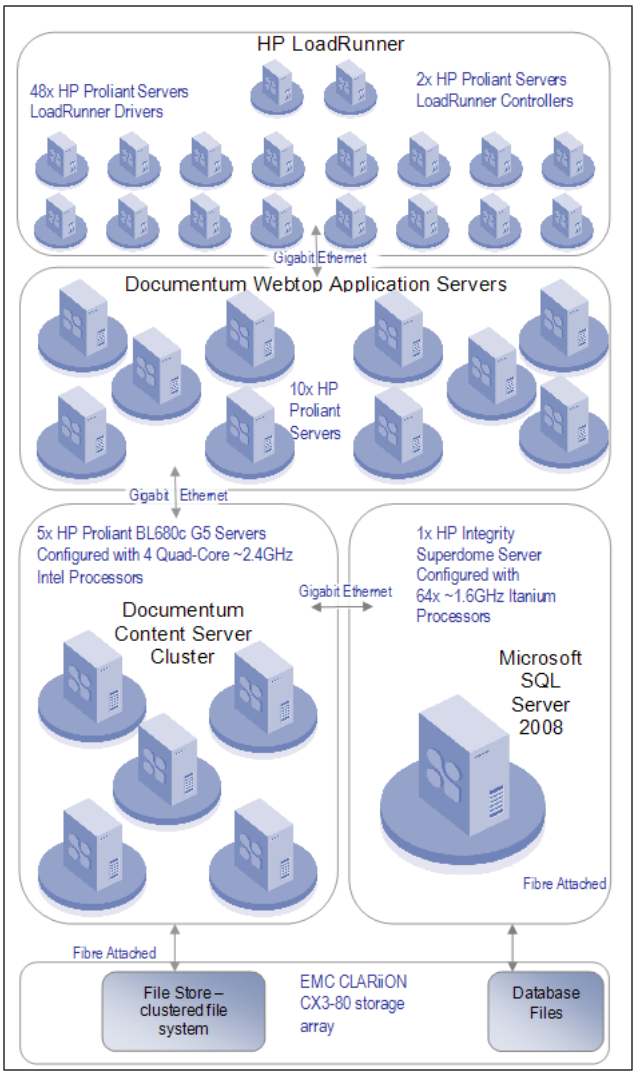

Figure 1. Test environment configuration

DATA COMPOSITION

The data composition for this benchmark was built using a LoadRunner kit, which is available on EMC's Developer Network website (http://developer.emc.com). A summary of the data composition follows in Table 2:

	Data composition summary
1	Over 100,000 user accounts.
2	10 cabinets and 2,550 folders each with 510,000 documents. 38 KB document size.
3	5,100,000 documents in total.
	LoadRunner Definition
1	Simulated 100,000 users.
2	Pacing of 240-360 seconds. Think time of 15 seconds randomized to 75%-225%
3	Steady state of one hour is used for compiling results

Table 2. Data composition and load summary

SERVER PERFORMANCE

PATCH/UPDATE COMPLIANCE

The execution of this benchmark generated several performance specific enhancements. These enhancements will all be made available via Service Packs (or Patches).

Performance may vary on other hardware and software platforms and with other data composition models.

SERVER UTILIZATION

Figure 2 summarizes CPU utilization for all tiers:

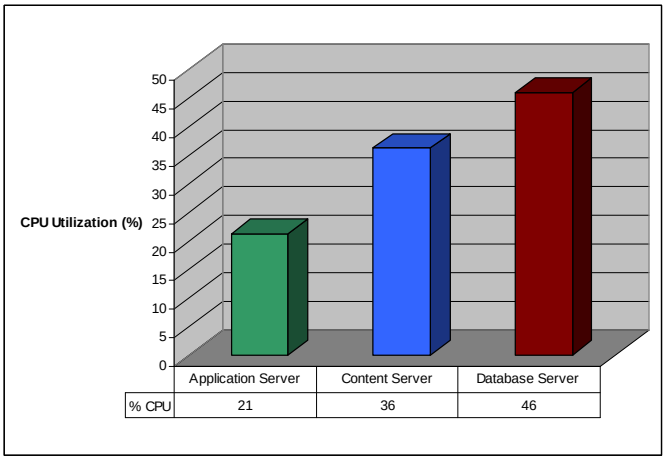

Figure 2. Average CPU utilization

BENCHMARK ENVIRONMENT

HARDWARE CONFIGURATION

LoadRunner Controller(s):

Two HP Proliant DL380 G5 servers hosted HP LoadRunner controllers. The machines are equipped as follows:

- Four quad-core Intel® Xeon™ 2.6 GHz processors
- 16 GB Memory
- 136 GB Internal HDD
- Two dual-port Gigabit Ethernet adapters

LoadRunner Generator(s):

In total, 48 HP Proliant servers hosted LoadRunner agents. All of the servers are equipped with at least two CPUs, more than 3 GB of memory, and two dual-port Gigabit Ethernet adapters. A detailed list of the machines are as follows:

- Eight DL380 G5 servers
- Ten DL380 G4 servers
- Fifteen DL380 G3 servers
- Two BL465c G1 servers
- Thirteen BL460c G1 servers

Application server(s):

In total, 10 HP Proliant servers hosted Tomcat running with Webtop application.
Five HP Proliant BL685c G1 servers are as follows:

- Four dual-core, 2.8 GHz, AMD processors
- ~ 136 GB of Internal HDD
- 32 GB of memory
- Two dual-port Gigabit Ethernet adapters

Two HP Proliant BL685c G1 servers are as follows:

- Four dual-core, 1.8 GHz, AMD processors
- ~ 136 GB of Internal HDD
- 32 GB of memory
- Two dual-port Gigabit Ethernet adapters

Three HP Proliant BL680c G1 servers are as follows:

- Four dual-core, 2.4 GHz, Intel processors
- ~ 136 GB of Internal HDD
- 32 GB of memory
- Two dual-port Gigabit Ethernet adapters

Content server(s):

Five HP Proliant BL680c G5 servers are as follows:

- Four Quad-Core 2.4 GHz, Intel Xeon processors
- ~136 GB of Internal HDD
- 64 GB of memory
- Four dual-port Gigabit Ethernet adapters
- One EMC CLARiiON CX3-80 storage array connected via two FC host bus adapters (HBA) delivering a total of 4 gigabit/second to:
  - ~1.17 TB GB LUN clustered between all content servers, spread across 18 spindles, RAID 1+0 to store file store
  - ~1.17 TB LUN spread across 18 spindles on each Content Server, RAID 1+0 for backups

Database server:

One HP Integrity Superdome server with the following:

- 64 cores 1.6 GHz, Itanium processors
- ~73 GB of Internal HDD
- 256 GB of memory
- Six Intel dual-port Gigabit Ethernet adapters
- One EMC CLARiiON CX3-80 storage array connected via two FC host bus adapters (HBA) delivering a total of 4 gigabit/second to:
  - Eight 267 GB LUNs spread across four spindles each, for a total of 32 spindles, RAID 1+0 to store SQL data
  - One 267 GB LUN spread across four spindles, RAID 1+0 to store SQL logs
  - One 267 LUN spread across four spindles, RAID 1+0 to store TempDB

Database files and Documentum file store:

One EMC CLARiiON CX3-80 networked storage array hosted database files and Documentum file stores. The Documentum file stores were clustered between five Content Servers. EMC CLARiiON CX3-80 is equipped as follows:

- ~22 TB with 160 drives of 146 GB disk size
- Eight 4 GB Fibre Channel ports
- 8 GB of Cache

SOFTWARE VERSIONS

EMC Documentum 6.5 SP1 with updates to support Windows/SQL Server 2008

Microsoft Windows Server 2008 64 bit for Itanium-Based Systems Version 6.0.6001 Service Pack 1 Build 6001

Microsoft Windows Server 2008 Enterprise SP1, Build 6001

Microsoft Windows Server 2003 Enterprise SP2, Build 3790

Microsoft SQL Server 2008 64 bit Enterprise Edition

HP PolyServe 3.6.0 Clustering software

Java 1.5.0_14

Apache Tomcat 5.5.25

HP LoadRunner 9.1

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