

Exchange 2000 MAPI Messaging Benchmark (MMB2) Performance Result – Single Server

Hardware: IBM @server BladeCenter HS20
Software: Exchange Server Enterprise Server
Test Profile: MAPI Messaging Benchmark

The new MAPI Messaging Benchmark (MMB2) measures throughput in terms of a specific profile of user actions, executed over an 8-hour working day.

This benchmark is different from the “Medium User” setting that was used with Exchange 5.5 in that the rate of client requests is significantly greater for this MMB2 profile.

Results should be interpreted as a benchmark for messaging throughput and should *not* be confused with deployment recommendations. Factors such as backup/restore, topology and other issues should be considered when planning a deployment. For information on how MMB2 results differ from deployment and configuration information refer to the note below on Benchmark vs. Production Configuration.

Summary of Results

The IBM@server BladeCenter HS20 was configured with two Intel 3.06GHz Xeon MP processors and 4GB of memory. The Microsoft LoadSim MMB2 was used, which represents the tasks typically performed by a corporate e-mail user. During the 4-hour steady state, the HS20 provided a weighted 95th Percentile response time of 293 ms for 10,000 MMB2, with average send queue size of 101 and average CPU utilization of 90.6 percent.

Benchmark vs. Production Configuration Disclosure Note

This test measures the messaging throughput of a single server, single site topology. Its purpose is to measure the maximum throughput of a Microsoft Exchange Server on this hardware configuration. This can provide a benchmark for comparing hardware and/or software products, **but cannot be used as a deployment guide for production environments.** For deployment specific information contact a Microsoft or IBM representative.

The MMB2 benchmark does not account for:

- Usage profiles not matching that of the Load Simulator MAPI Medium profile
- Per user storage and per server backup requirements
- Fault tolerance requirements
- Workloads other than MAPI private folder access, including Public Folder, NNTP, POP3 and other e-mail interfaces
- Multiple Exchange Server deployments, where additional resources are required to forward mail intra-site.
- Connectors, links and replication to remote Exchange sites

Test Results

Summary	
Supported Benchmark Load	10,000 MMB2s
Benchmark Profile	MAPI Messaging Benchmark 2 (MMB2)
Protocol	Exchange MAPI
Length of Steady State	4 Hours
Length of Test	8 Hours
Category	Single Server
<i>Unless otherwise noted, values listed below are averages over entire 4-hour, steady-state period.</i>	
Transactions in Total	
Total Messages Submitted	255,287
Total Message Recipients Delivered	929,398
Total Messages Sent	255,581
Ratio Message Recipients Delivered / Messages Submitted	3.64
Transaction Load (per Hour)	
Messages Submitted / Hour	63,452
Message Recipients Delivered / Hour	231,002
Messages Sent / Hour	63,525
Transaction Load (per Second)	
Message Opens / Second	99.6
Folder Opens / Second	42.8
RPC Read Bytes / Second	229,736
RPC Write Bytes / Second	1,655,038
Transaction Queues	
IS Send Queue Average Length	101
Processor Utilization	
System Processor Utilization (%)	90.6
System Processor Queue Length	9.02
System Context Switches / Second	17602
Process % CPU Time - Store	299.6
Process % CPU Time - Inetinfo	16.25
Exchange 2000 server is also domain controller? (Yes / No)	Yes
Process % CPU Time – LSASS (on domain controller)	26.8
Memory Utilization	
Available Bytes	2145MB
Pages / Second	1.31
Process Working Set Bytes - Store	1.391GB
Process Virtual Bytes - Store	2.077GB
Logical Drive Utilization	
IS Database Disk Reads / Second	1821
IS Database Disk Writes / Second	909
IS Database Average Disk Queue Length	9.1
IS Log Disk Reads / Second	0
IS Log Disk Writes / Second	414
IS Log Average Disk Queue Length	0.11

Descriptive Terms

Messages Submitted

Submit calls made by clients. This equates to total messages sent by users.

Messages Sent

Messages that the Store sends to the categorizer in Inetinfo (SMTP Service in particular).¹

Message Recipients Delivered

Separate mailboxes that messages have been delivered to.

Message Opens/Sec

Messages accessed for reading per second.

Folder Opens/Sec

Folders opened for browsing per second.

RPC Read Bytes/Sec

Bytes read from clients, sent via RPCs.

RPC Write Bytes/Sec

Bytes written to clients, sent via RPCs.

IS Send Queue Average Length

Send Queue Size is the number of messages in the private information store's send queue.

Response Times (Latencies)

Client Actions	95th Percentile Response Time (in Milliseconds)
Read	406
Send	234
Delete	78
Move	125
Submit	125
Weighted Total	293

Message Throughput

Summary of the MMB2 profile for an 8-hour day:

	Expected	Measured
Messages Submitted/MMB2/Day	51	50.8
Messages Delivered/MMB2/Day	185	184.8
Average Recipients per Message	3.63	3.64

No modifications were made to the default profile.

¹ All messages – even MAPI messages – are sent to the categorizer, as this replaces the MTA for all but communication via X.400, with an Exchange 5.5 server.

Server Configuration

Hardware	Exchange Server	Domain Controller (If Remote)
Vendor	International Business Machines Corporation	N/A
Model	BladeCenter HS20	N/A
Processor	3.06GHz Intel Xeon MP	N/A
Number of Processors	2, with Hyper-Threading enabled	N/A
Primary Cache	N/A	N/A
Secondary Cache	512KB	N/A
Other Cache	N/A	N/A
Memory	4GB DDR DIMMs	N/A
Disk Subsystem	112 x 36.4GB in 9 EXP300 Storage Expansion units 2 x 18.2GB SCSI disk drives	N/A
Disk Controllers	One IBM TotalStorage FAStT700 Storage system and one HS20 FC Expansion card .	N/A
Other Hardware	1 BladeCenter, 1 Ethernet switch module, 1 Fibre Channel switch module and a SCSI expansion box.	N/A
Hardware Tunings	2 x 14 disks R0 for Exchange log files 4 x 21 disks R0 for 4 mail databases. 2 SCSI disks configured as OS, Exchange software and pagefiles. FAStT700 write cache enabled.	N/A
Comments		N/A
Mail Software		
Vendor	Microsoft Corporation	N/A
Mail Server	Exchange Server 2000	N/A
Build/Release Version	Enterprise Edition + SP3	N/A
Additional Software Tuning	/3GB switch added to boot.ini msExchESEParamLogBuffers HeapDeCommitFreeBlockThreshold	N/A
OS Software		
Operating System/Version	Microsoft Windows 2000 Advanced Server	N/A
Service Pack/Patch Info	SP3	N/A
File System Type	NTFS	N/A
Other Software		
Network		
Type of Network	Ethernet	N/A
Network Speed	10/100/1000	N/A
MSL (Seconds)	120	N/A
Time-Wait (Seconds)	60	N/A

Load Generator Configuration

Number of Load Generators (LG)	8
Total Number of LG Processes	8
Simulated Users/Process	1250
Model	IBM xSeries 300
Processor	800MHz Pentium III
Number of Processors	2
Memory	512MB
Network Controller	Integrated 10/100 Ethernet Controller
Operating System	Microsoft Windows 2000 Server, SP3