

NotesBench Disclosure Report
for
IBM Netfinity 7000
with RAID-5
and
Lotus Domino Server 4.6 for Windows NT 4.0

Audited January 13, 1998

Performance results obtained using NotesBench 4.6 on a system configured with RAID-5 should not be compared with results from previous versions of NotesBench, which used RAID-0. While RAID-5 implementations provide substantial data redundancy, the increased I/O overhead consumes disk subsystem bandwidth, which could otherwise be used to support additional users.



IBM Corporation

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Edition Notice

Executive Summary

The IBM Netfinity* 7000 server demonstrated leadership performance running Lotus** Domino Server Release 4.6 on Microsoft** Windows** NT Server Version 4.0 with Service Pack 3. The results for the IBM Netfinity 7000 reported here are based on the NotesBench Mail-only workload.

Test Script	Maximum Users	NotesMark (tpm)	Ave. Response Time (sec)	\$/User	\$/NotesMark
Mail-Only	4,650	6,071	1.453	\$20.73	\$15.88

The IBM Netfinity 7000 was configured as a partitioned server with four 200MHz¹ Intel** Pentium** Pro processors, 2GB² of memory, three RAID-5 arrays with eight 4.51GB 10K rpm hard disk drives per array for full data redundancy. The server under test supported a Mail-only workload of 4,650 active mail users (see price/performance results³ above). Three Domino 4.6 Partitioned Servers ran on the IBM Netfinity 7000 system, using identical copies of the Public Name & Address Book. Mail messages generated by users connected to the three partitioned servers were all routed to three destination servers.

In addition to the server under test, the benchmarked client/server network used three destination servers, 27 client driver systems, and one controller client system. All systems were connected via three 100Mbps Ethernet LAN segments, using the TCP/IP network protocol. Configuration details are provided in Appendix A: Overall Test Setup and Software Versions.

IBM's Server Performance Laboratory in Research Triangle Park, NC, conducted the benchmark in December, and KMDS Technical Associates, Inc., audited the results in January 1998.

NotesBench provides an objective method for evaluating the performance of different platforms running Lotus Domino Server Release 4.6. NotesBench generates a transactions-per-minute (tpm) throughput metric, called a NotesMark, for each test, along with a value for the maximum capacity (number of users) supported, and the average response time.

Benchmarking Objectives

The benchmark objective was to provide customers with information on how to fully utilize the capability of the IBM Netfinity 7000 system as a Domino Server 4.6 mail server with data redundancy provided by RAID-5 technology on the IBM ServeRAID II Ultra SCSI Adapter.

Performance measurements on IBM Netfinity 7000 and other IBM PC Servers using NotesBench for the Domino Server Release 4.6 are ongoing.

¹ MHz only measures microprocessor internal clock speed, not application performance. Many factors affect application performance.

² When referring to hard drive capacity, GB stands for one thousand million bytes. Total user-accessible capacity may vary depending on operating environments.

³ The price/performance results are based on IBM's Estimated Reseller Price. IBM resellers set their own prices, and actual prices may vary.

Test Methodologies

Test Setup and Hardware/Software Configuration

The IBM Netfinity 7000 system under test (SUT) for Mail-only used four 200MHz Pentium Pro processors (1MB of L2 write-back cache per processor); 2GB of memory; and three identically configured RAID-5 arrays with eight 4.51GB 10K rpm hard disk drives per array. Each RAID-5 array was connected to the processor through its own IBM ServeRAID II Ultra SCSI Adapter.

Each of the three Partitioned Servers was connected to its own LAN segment through its own EtherJet 100/10 PCI Adapter. Nine child drivers were connected to each of the three LAN segments. One of the three destination servers was placed on each of the three LAN segments. In a production environment, we recommend placing the destination servers (which are in turn connected to their own clients through their own client-to-server LAN) on a separate LAN forming a hub domain that contains all the mail servers and possibly a mail hub server. This arrangement provides more network bandwidth for the higher server-to-server replication traffic not present in the Mail-only benchmark script. A Windows NT 4.0 Static Router is used to connect the three LAN segments.

The IBM Netfinity 7000 system under test ran Microsoft Windows NT Server 4.0 with Service Pack 3 and Domino Server Release 4.6. Each LAN segment consisted of two 12-port AsanteFAST 100 Hub connecting all child drivers driving a server partition. One destination server, one port of the router, and a port on the SUT dedicated to the server partition being driven by the child drivers on the LAN. Six hubs were used.

For the IBM Netfinity 7000, the following Power-on Setup parameters were changed from their default settings:

- IOQ Depth = 8
- Outbound Posting = Enable
- PCI Line Prefetch = Enable
- Address Bit Permitting = Enable

The RAID controller configuration value for Stripe Unit Size was set at 16KB.

The following NOTES.INI parameters were modified as recommended in the NotesBench operator's manual:

Mail-Only Workload	MailDB Workload
LOG_MAILROUTING=10	LOG_MAILROUTING=10
MAILLOGTOEVENTSONLY=1	MAILLOGTOEVENTSONLY=1
MAILUSEPROCESS=0	MAILUSEPROCESS=0
MAILUSETHEADS=1	MAILUSETHEADS=1
MAILMAXTHREADS=3	MAILMAXTHREADS=3
SERVER_SHOW_PERFORMANCE=1	SERVER_SHOW_PERFORMANCE=1

The following parameters were added to suppress database activity logging after long runs and to capture server console output:

```
NO_FORCE_ACTIVITY_LOGGING=1
DEBUG_OUTFILE=\\FILESERV\LASTRUM\SUTINFO.TXT
```

All Notes server tasks were disabled except Replica, Router and Update.

All Domino data files were located on the D disk-partition for Partition Server 1; E disk-partition for Partition Server 2; and F disk-partition for Partition Server 3. All three data disk-partitions were formatted with an Allocation Unit Size of 512 bytes. The Domino executables were placed on the C - partition.

Test Procedures

Several trial test runs were conducted and system resource utilization was monitored using Windows NT Performance Monitor (PERFMON). This enabled the system configuration to be optimized while maximizing balanced system resources. The number of processors used determined the configuration of the memory and disk subsystems. Audited runs were conducted with no performance monitoring to avoid the performance penalty incurred in the use of the system performance monitor.

The number of users was distributed over 27 clients. Each client added 270 to 300 users to the system under test. The first client to be started added the most users. The test was run continuously for approximately 12 hours, including ramp-up.

The starting of successive child drivers was staggered by a 'Child Stagger' value shown in minutes in the table below. The numbers of users introduced by each child driver are also shown. Child 1 added 270 users to Partition Server 1. Child 2 added 270 users to Partition Server 2. Child 3 added 270 users to Partition Server 3. Child 4 added 260 users to Partition Server 1 and so on. See the table below for details.

The actual ramp-up period from startup of child 1 to when all 4,650 users were shown on any of the three partitioned server consoles was 5 hours and 1 minute. The test ran for a minimum of 6 hours after ramp-up. During the test runs, the tools used to determine steady state included the Domino Server SHOW command, the child driver RES files, and Domino Server statistics output to the server console on a minute-by-minute basis. To confirm steady state, we verified the number of users at each server partition and their server logs. We confirmed steady state when the:

- Number of users on the SUT Domino Server console reached the intended number of connected users
- Pending mail did not become backlogged, as seen from the server mail routing log.

To ensure that the test results were reproducible, all tests were repeated, and the results were compared for consistency.

Child Number	Child Stagger (Mins)	Users per Child	Thread Stagger (Mins)
1	0	270	1
2	5	270	1
3	5	270	1
4	10	260	1
5	8	260	1
6	8	260	1
7	11	250	1
8	9	250	1
9	9	250	1
10	11	250	2
11	13	250	2
12	13	250	2
13	12	150	2
14	10	200	2
15	11	200	2
16	11	130	3
17	12	120	3
18	11	120	3
19	12	110	3
20	12	100	3
21	20	90	3
22	13	80	3
23	13	80	3
24	14	60	3
25	12	50	3
26	15	20	3
27	10	50	3

Partition Server 1 total number of users = 1,550

Partition Server 2 total number of users = 1,550

Partition Server 3 total number of users = 1,550

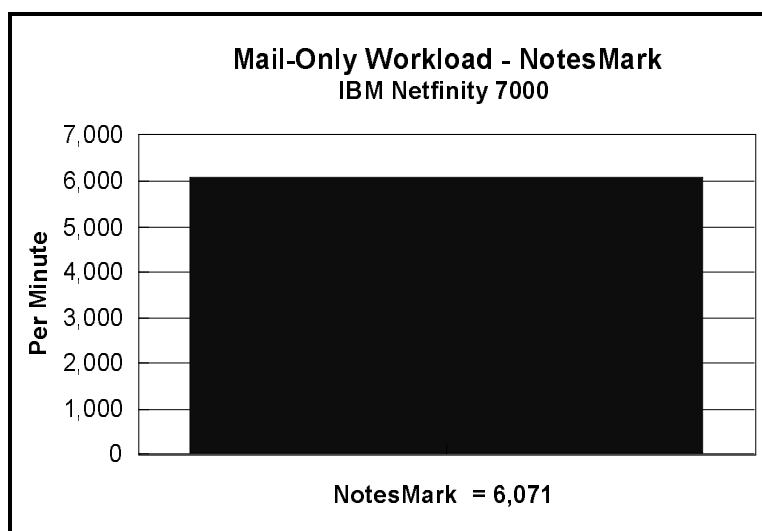
Other NotesBench Tests

Other Lotus NotesBench tests, such as WebWalker, WebBuyer and Calendar and Scheduling are planned for future disclosure reports.

Data

IBM Netfinity 7000 NotesMark Value for Mail-Only Test

The IBM Netfinity 7000 server demonstrated that it can support 4,650 concurrent active users with this workload. The NotesMark throughput value was 6,071. Average response time was 1.453 seconds. The test procedure used only one parent driver and 'notesnum.exe' produced average statistics for all three server partitions as one single unit. The average response time is the average for 4,650 mail users, regardless of which server partition they were connected to.



The Mail workload executes Notes transactions that model a server for mail users at sites that rely only on mail for communication. The resulting capacity metric for a mail-only server is the maximum number of users that can be supported before the average user response time becomes unacceptable.

The mail-only test script models an active user who is reading and sending mail. The script contains an average of 15 minutes of waiting; thus, the average user would execute this script a maximum of four times each hour. For each iteration of the test script, there are 5 documents read, 2 documents updated, 2 documents deleted, 1 view scrolling operation, 1 database opened and closed, 1 view opened and closed, and some miscellaneous operations. In sending messages, each user sends a mail message to NumMessageRecipients no more frequently than every 90 minutes.

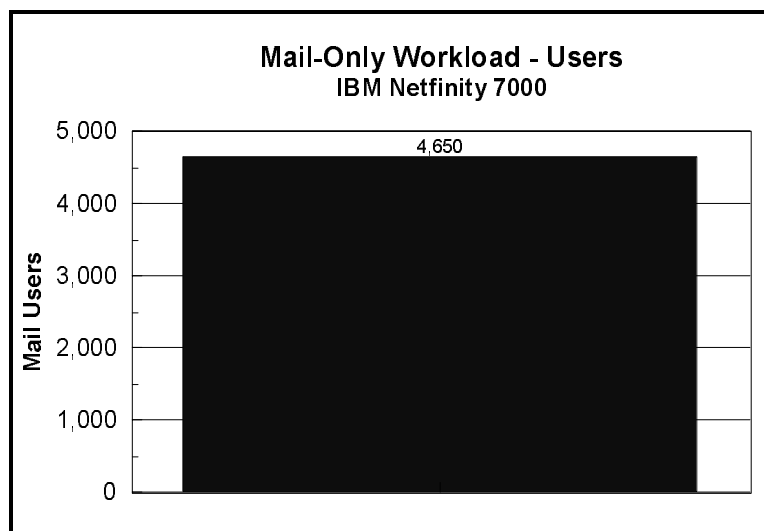
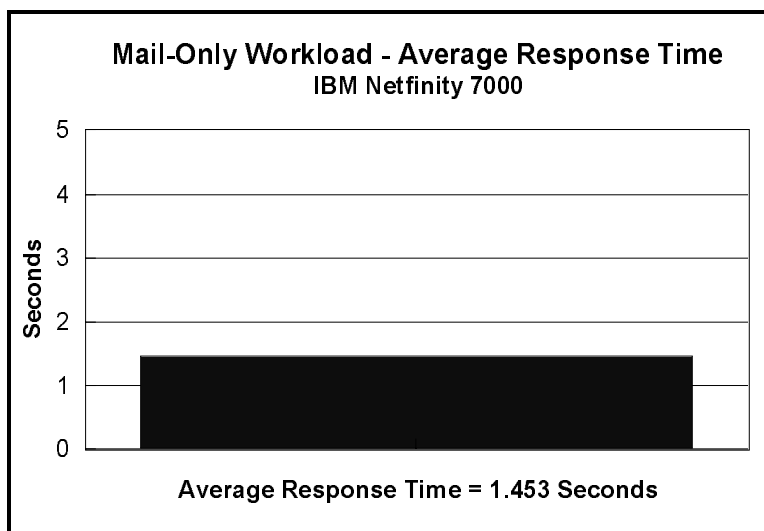
NotesNum Output for Mail-Only Test

Min Start Time = 12/16/97 07:32:30 AM Max Stop Time = 12/16/97 07:31:06 PM

Total Test Errors = 0

Total Test Time = 43140 sec

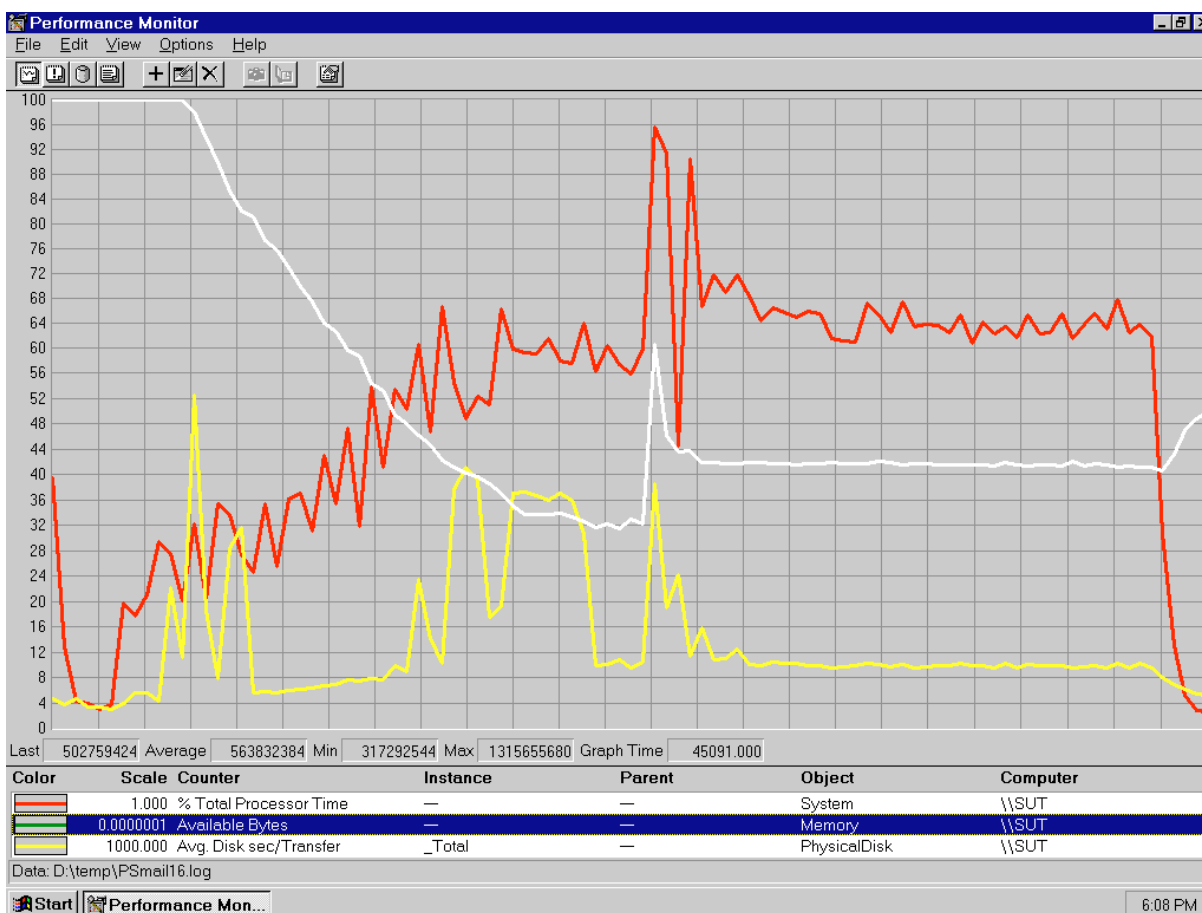
Test Run: Users = 4650 NotesMark = 6071 Response Time = 1453 msec (12/16/97
12:25:00 PM to 12/16/97 06:56:00 PM)



Analysis

When configured optimally as described in this disclosure, the IBM Netfinity 7000 with three IBM ServeRAID II Ultra SCSI Adapters has demonstrated that it can manage the intense resource usage during ramp-up to as many as 4,650 concurrent Mail-only users with no errors at the clients. As can be seen in the following PERFMON chart captured in a trial run for the Mail-only test, average processor utilization during ramp-up rose momentarily above average processor utilization after ramp-up. We minimized this spike of activity by reducing the rate of user connection in our final run.

While providing data redundancy, RAID-5 created more disk activity per transaction than if RAID-0 had been used. The generous amount of memory used in the measured configuration provided Windows NT Server with abundant disk-cache space and helped to maintain acceptable user response time.



Conclusions

The test results demonstrate that the IBM Netfinity 7000 configured as described within this report can support 4,650 Mail-only users with a response time well below what the test criteria permit. These results are based on running the IBM Netfinity 7000 as three dedicated partitioned Domino servers. The addition of other application workloads will affect the number of users supported as well as the response time. Achieving optimum performance in a customer environment is highly dependent upon selecting adequate processor power, memory and disk storage as well as balancing the configuration of that hardware and appropriately tuning the operating system and Domino software.

These results demonstrate that the IBM Netfinity 7000 system provides leadership performance and price/performance as a hardware platform for the Domino Server environment.

Statement by Auditor

The original “Lotus NotesBench Test Results Report Certification Letter” was signed by Dana M. Thompson, NotesBench Auditor for KMDS Technical Associates, Inc., and is on file at IBM.

Appendix A: Overall Test Setup and Software Versions

Number of Client Systems

For the Mail-only test, 28 driver systems were used. Twenty-seven of those systems were configured as child drivers (child 1 through child 27). One system was configured as the parent (source driver).

The disk configuration used for the child systems is as follows:

- Child drivers 1-18
 - C: Partition (512MB - NTFS) - Windows NT 4.0 and Notes 4.6 Workstation code
 - D: Partition (2MB - NTFS) - Notes 4.6 Workstation data
- Child drivers 19-27
 - C: Partition (1.5GB - NTFS) Windows NT 4.0 Workstation, Notes 4.6 Workstation

Number of Server Platforms

One server platform, the IBM Netfinity 7000 with four 200MHz Pentium Pro processors and 2GB of memory was benchmarked.

The disk configuration used for the system under test is as follows:

- C: Partition (4GB - NTFS) - Windows NT Server Version 4.0 (Boot Partition) Domino executables
- D: Partition (5GB - NTFS) - Domino data for Partitioned Server 1
- E: Partition (8GB - NTFS) - Domino data for Partitioned Server 2
- F: Partition (8GB - NTFS) - Domino data for Partitioned Server 3
- H: Partition (4GB - NTFS RAID-0) - Windows NT Server pagefile

Although 31GB of disk space was available in the RAID-5 array used for the Domino data partition for Partitioned Servers 1, 2 and 3, only 8GB was formatted for NotesBench; the rest was left as spare disk storage.

The disk configuration used for destination servers 1, 2 and 3 is as follows:

- C: Partition (4GB - NTFS) - Windows NT Server Version 4.0 (Boot Partition) and Domino executables
- E: Partition (18.5GB - NTFS) - Domino data

Network

Three 100Mbps Ethernet LAN segments were used. Two 12-port AsanteFAST 100 Stacked Hubs were used to connect nine child drivers, the parent driver and destination server 1. A second such pair of stacked hubs was used to connect another nine child drivers and destination server 2. A third such pair of stacked hubs was used to connect the last group of child drivers

and destination server 3. All three LAN segments were connected together through a Windows NT-based static router. The SUT was connected to all three LAN segments through three IBM EtherJet 100/10 PCI Adapters. One network interface card was dedicated to each of the three Domino Partition Servers.

Software Versions

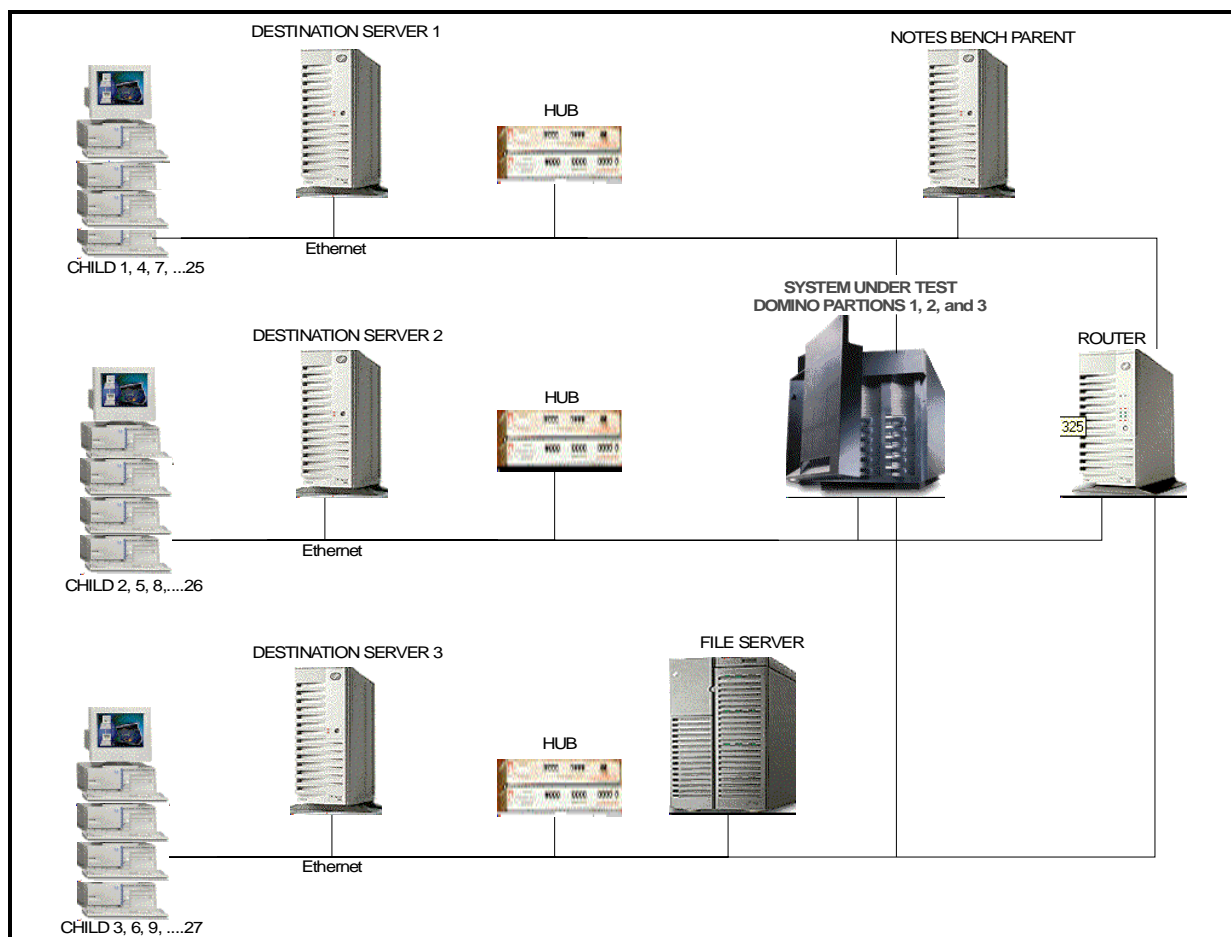
Software versions used on the system under test were as follows:

- Microsoft Windows NT Server Version 4.0 and Service Pack 3
- Lotus Domino Server Release 4.6
- NotesBench Version 4.6 - Windows/32, released November 28, 1997

Software versions used on the child drivers were as follows:

- Microsoft Windows NT Workstation Version 4.0 and Service Pack 3
- Lotus Domino Client for Windows NT Release 4.6
- NotesBench Version 4.6 - Windows/32, released November 28, 1997

High-Level Test Setup Diagram



Details of Configuration

System Under Test	Destination Servers 1-3	Child Drivers 1-18	Child Drivers 19-27	Parent Source Driver
IBM Netfinity 7000	IBM PC Server 330	IBM PC 365	IBM PC 750	IBM PC Server 325
4 x 200MHz Pentium Pro Processors	1 x 200MHz Pentium Pro Processor	1 x 200MHz Pentium Pro Processor	1 x 133MHz Pentium Processor	1 x 200MHz Pentium Pro Processor
2GB Memory	256MB Memory	64MB Memory	64MB Memory	128MB Memory
24 x 4.51GB Drives (RAID-5)	6 x 4.5GB Drives (RAID-0)	1 x 2GB Drive	1 x 1.5GB Drive	1 x 4.5GB Drive
3 x IBM ServeRAID II Ultra SCSI Adapters	IBM SCSI-2 Fast/Wide Streaming RAID Adapter			
3 x EtherJet 100/10 PCI Adapters	Intel EtherExpress 10/100 PCI TX Adapter	Intel EtherExpress 10/100 PCI TX Adapter	IBM 100/10 Ethernet PCI TX Adapter	Intel EtherExpress 10/100 PCI TX Adapter
Windows NT Server 4.0 and Service Pack 3	Windows NT 4.0 and Service Pack 3	Windows NT 4.0 and Service Pack 3	Windows NT 4.0 and Service Pack 3	Windows NT 4.0 and Service Pack 3

Appendix B: System Configurations

Server under Test	
System	IBM Netfinity 7000
Processor	4 x 200MHz Pentium Pro with 1MB L2 Cache
Memory	2GB
Cache	1MB L2 Write-Back Cache per Processor
RAID Controller	3 x IBM ServeRAID II Ultra SCSI Adapter
Disk Drive	24 x 4.51GB 10K rpm Hard Disks Configured As a RAID-5 array
Network Interface	3 x IBM EtherJet 100/10 PCI Adaptes
I/O	PCI Bus
Operating System	Microsoft Windows NT Server 4.0 with Service Pack 3
Notes	Lotus Domino Server for Windows NT Release 4.6 for SMF

Clients 1- 18	
System	IBM PC 365
Processor	1 x 200MHz Pentium Pro
Memory	64MB
Disk Drive	1 x 2GB
Network Interface	Intel EtherExpress 10/100 PCI TX Adapter
I/O	PCI Bus
Operating System	Microsoft Windows NT Workstation 4.0 with Service Pack 3
Notes	Domino Client for Windows NT Release 4.6

Clients 19- 27	
System	IBM PC 750
Processor	1 x 133MHz Pentium
Memory	64MB
Disk Drive	1 x 1.5GB
Network Interface	IBM 100/10 Ethernet PCI TX Adapter
I/O	PCI Bus
Operating System	Microsoft Windows NT Workstation 4.0 with Service Pack 3
Notes	Domino Client for Windows NT Release 4.6

Appendix C: Operating System Parameters

In the system under test, the following registry variables were changed from their default values of 2 to 0:

HKEY_LOCAL_MACHINE/System/CurrentControlSet/Control/PriorityControl/Win32PrioritySeparation:
REG_DWORD:0

HKEY_LOCAL_MACHINE/System/CurrentControlSet/Control/SessionManager/MemoryManager/
LargeSystemCache: REG_DWORD:0

NT Default Services stopped:

- Computer Browser
- License Logging Service
- Plug and Play
- Spooler

Appendix D: NOTES.INI Settings

System under Test Notes.INI for Partition Server 1

```
[Notes]
NOTESPROGRAM=c:\notes\
KitType=2
Directory=d:\notes\sut1
SETUPDB=SETUP.NSF
USERNAME=Me
COMPANYNAME=MyPlace
MTATEMP=C:\TEMP
NPN=1
WinNTIconPath=d:\notes\sut1\W32
$$HasLANPort=1
OldRegKey_MAILTO="c:\notes\notes.exe" =f:\notes\sut3\notes.ini %1
WWWDSPP_SYNC_BROWSERCACHE=0
WWWDSPP_PREFETCH_OBJECT=0
EnableJavaApplets=1
EnablePlugins=1
Preferences=-2146956175
Passthru_LogLevel=0
Console_LogLevel=2
VIEWIMP1=Lotus 1-2-3 Worksheet,0,_IWKSV,,WKS,.WK1,.WR1,.WRK,.WK3,.WK4,,4,
VIEWIMP3=Structured Text,0,_ISTR,,LTR,.CGN,.STR,,1,
VIEWIMP4=Tabular Text,0,_ITAB,,PRN,.RPT,.TXT,.TAB,,1,
VIEWEXP1=Lotus 1-2-3 Worksheet,0,_XWKS,,WKS,.WK1,.WR1,.WRK,,4,
VIEWEXP3=Structured Text,0,_XSTR,,LTR,.CGN,.STR,,1,
VIEWEXP4=Tabular Text,1,_XTAB,,LTR,.RPT,.CGN,.TAB,,1,
EDITIMP1=ASCII Text,0,_ITEXT,,TXT,.PRN,.C,.H,.RIP,,1,
EDITIMP2=MicrosoftWord RTF,0,_IRTF,,DOC,.RTF,,2,
EDITIMP3=Lotus 1-2-3 Worksheet,0,_IWKSE,,WKS,.WK1,.WR1,.WRK,.WK3,.WK4,,4,
EDITIMP4=Lotus PIC,0,_IPIC,,PIC,,8,
EDITIMP5=CGM Image,0,_IFL,,GMF,.CGM,,8,
EDITIMP6=TIFF 5.0 Image,0,_ITIFF,,TIF,,18,
EDITIMP7=BMP Image,0,_IBMP,,BMP,,18,
EDITIMP8=Ami Pro,0,_IW4W,W4W33F/V0,.SAM,,2,
EDITIMP17=WordPerfect 5.x,0,_IW4W,W4W07F/V1,.DOC,,2,
EDITIMP22=PCX Image,0,_IPCX,,PCX,,18,
EDITIMP28=Binary with Text,0,_ISTRNGS,,*,1,
EDITIMP29=WordPerfect 6.0/6.1,0,_IW4W,W4W48F/V0,.WPD,.WPT,.DOC,,2,
EDITIMP30=Excel 4.0/5.0,0,_IW4W,W4W21F/V4C,.XLS,,4,
EDITIMP31=Word for Windows 6.0,0,_IW4W,W4W49F/V0,.DOC,,2,
EDITIMP32=GIF Image,0,_IGIF,,GIF,,18,
EDITIMP33=JPEG Image,0,_IJPEG,,JPG,,18,
EDITEXP1=ASCII Text,2,_XTXT,,TXT,.PRN,.C,.H,.RIP,,1,
EDITEXP2=MicrosoftWord RTF,2,_XRTF,,DOC,.RTF,,4,
EDITEXP3=CGM Image,2,_XCGM,,CGM,.GMF,,8,
EDITEXP4=TIFF 5.0 Image,2,_XTIFF,,TIF,,18,
EDITEXP5=Ami Pro,2,_XW4W,W4W33T/V0,.SAM,,2,
EDITEXP14=WordPerfect 5.1,2,_XW4W,W4W07T/V1,.DOC,,2,
EDITEXP21=WordPerfect 6.0,2,_XW4W,W4W48T/V0,.DOC,,2,
```



```

Setup=51
ServerSetup=8
PhoneLog=2
Log=log.nsf, 1, 0, 7, 40000
DESKWINDOWSIZE=16 23 420 288
MAXIMIZED=1
WinNTIconCommonConfig=Universal
WinNTIconSize=2
WinNTIconPos=2
WinNTIconHidden=0
WinNTIconRect=-1 -1 641 25
FileDlgDirectory=\\filesevr\nb-code
ECLSetup=3
CONSOLE_Lotus_Domino_Server=80 25 7 2 0 478 131
TCP_TcpIPAddress=0,192.1.3.221:1352
WAN2_TcpIPAddress=0,192.1.3.221:1352
NAMES=names.nsf
EmptyTrash=0
WeekStart=1
SDI_WINDOW=0
WAN2=TCP,0,15,0,,12288,
ADMINWINDOWSIZE=48 69 326 453
CertifierIDFile=D:\notes\sut1\cert.id
Win32InfoboxPos=2 110
WINDOWSIZEWIN=49 4 574 470
;
;
; NotesBench parm changes
;
SERVER_SHOW_PERFORMANCE=1
MAILUSEPROCESSES=0
MAILUSETHEADS=1
MAILMAXTHREADS=3
MAILLOGTOEVENTSONLY=1
Log_MailRouting=10
No_Force_Activity_Logging=1
DEBUG_OUTFILE=\\filesevr\lastrun\sut1info.txt
;
;

```

System under Test Notes.INI for Partition Server 2

```

KitType=2
Directory=e:\notes\sut2
.....
TCP_TcpIPAddress=0,192.1.13.221:1352

```

System under Test Notes.INI for Partition Server 3

```

KitType=2
Directory=f:\notes\sut3
.....
TCP_TcpIPAddress=0,192.1.23.221:1352

```



```

FileDlgDirectory=E:\notes\data
CONSOLE_Lotus_Domino_Server=80 25 7 90 135 742 466
NewUserServer=CN=S1/O=NotesBench
Win32InfoboxPos=2 110
BCASEWINDOWSIZE=16 23 420 288
WWWDSP_SYNC_BROWSERCACHE=0
WWWDSP_PREFETCH_OBJECT=0
NAMES=names.nsf
EmptyTrash=0
WeekStart=1
SDI_WINDOW=0
WAN2_TcpConnectTimeout=0,5
MDICHILDRENRESTORED=0
WAN2=TCP,0,15,0,,12288,
;
;
; NotesBench parm for Destination server
No_Forced_Activity_Logging=1
;
;
;

```

The Sample Child Notes.INI

[Notes]

```

KitType=1
Directory=d:\notes\data
SETUPDB=SETUP.NSF
USERNAME=Child1
COMPANYNAME=Hiho
MTATEMP=C:\TEMP
NOTESPROGRAM=d:\notes\
WinNTIconPath=d:\notes\data\W32
$$HasLANPort=1
EnableJavaApplets=1
EnablePlugins=1
Preferences=-2146956175
Passthru_LogLevel=0
Console_LogLevel=2
VIEWIMP1=Lotus 1-2-3 Worksheet,0,_IWKSV,,WKS,.WK1,.WR1,.WRK,.WK3,.WK4,,4,
VIEWIMP3=Structured Text,0,_ISTR,,LTR,.CGN,.STR,,1,
VIEWIMP4=Tabular Text,0,_ITAB,,PRN,.RPT,.TXT,.TAB,,1,
VIEWEXP1=Lotus 1-2-3 Worksheet,0,_XWKS,,WKS,.WK1,.WR1,.WRK,,4,
VIEWEXP3=Structured Text,0,_XSTR,,LTR,.CGN,.STR,,1,
VIEWEXP4=Tabular Text,1,_XTAB,,LTR,.RPT,.CGN,.TAB,,1,
EDITIMP1=ASCII Text,0,_ITEXT,,TXT,.PRN,.C..H..RIP,,1,
EDITIMP2=MicrosoftWord RTF,0,_IRTF,,DOC,.RTF,,2,
EDITIMP3=Lotus 1-2-3 Worksheet,0,_IWKSE,,WKS,.WK1,.WR1,.WRK,.WK3,.WK4,,4,
EDITIMP4=Lotus PIC,0,_IPIC,,PIC,,8,
EDITIMP5=CGM Image,0,_IFL,,GMF,.CGM,,8,
EDITIMP6=TIFF 5.0 Image,0,_ITIFF,,TIF,,18,

```



```

DST=1
Location=Office (Network),2106,CN=Child1/O=NotesBench
ECLSetup=3
PhoneLog=2
Log=log.nsf, 1, 0, 7, 40000
DESKWINDOWSIZE=16 23 420 288
MAXIMIZED=1
WinNTIconCommonConfig=Universal
WinNTIconSize=2
WinNTIconPos=2
WinNTIconHidden=0
WinNTIconRect=-1 -1 641 25
FileDialogDirectory=D:\notes\data
;
; *****
;
; BEGIN NOTESBENCH VARIABLES
;
; *****
;
ResultsDirectory=\\parent\results
DEBUG_OUTFILE=d:\results\res1
; Send stats to parent ... DEBUG_OUTFILE=\\parent\results\res1
NodeName=child1
Tmp=Notestmp
ThreadStagger=1
; *****
; * MaxUsers=1500 *
; * NumNotesLocaReplica=1% MaxUsers *
; * NumSharedNotes=10% MaxUsers *
; *****
;
; IDLE workload
;
MaxSessions=100
;
; REPLHUB workload
;
NumAddLocalReplica=1
NumDeleteLocalReplica=1
NumNotesLocalReplica=15
NumStampLocalReplica=1
NumUpdateLocalReplica=1
;
; MAILHUB workload
;
NormalMessageSize=1000
NumMessageRecipients=3
;
; MAIL workload
;
NumMailNotesPerUser=100
;

```



```
ProgramMode=0
HomeSite=favorite.nsf
MailServer=CN=S1/O=NotesBench
MailFile=mail\admin.nsf
TemplateSetup=15
Setup=51
ZONE_SET=1
Timezone=5
DST=1
Location=Office (Network),2106,CN=Admin/O=NotesBench
ECLSetup=3
NewMailSeqNum=1
DESKWINDOWSIZE=16 23 420 288
WINDOWSIZEWIN=33 5 574 470
MAXIMIZED=0
WinNTIconCommonConfig=Universal
WinNTIconSize=2
WinNTIconPos=2
WinNTIconHidden=0
WinNTIconRect=-1 -1 567 25
FileDlgDirectory=F:\
;
;
;
NodeName=parent
; Runtime=12 hrs
RunTime=720
; ChildStagger=10
; ChildStart=4
; sut1 ...
NumClients1=270
NumClients4=260
NumClients7=250
NumClients10=250
NumClients13=150
NumClients16=130
NumClients19=110
NumClients22=80
NumClients25=70
; sut2 ...
NumClients2=270
NumClients5=260
NumClients8=250
NumClients11=250
NumClients14=200
NumClients17=120
NumClients20=100
NumClients23=80
NumClients26=30
; sut3
NumClients3=270
NumClients6=260
NumClients9=250
```

NumClients12=250
NumClients15=200
NumClients18=120
NumClients21=90
NumClients24=60
NumClients27=70
ResultsDirectory=c:\results
DEBUG_OUTFILE=c:\results\notesnum.txt
;
PhoneLog=2
Log=log.nsf, 1, 0, 7, 40000

Appendix E: Network Configuration

The standard TCP/IP stack provided by Microsoft Windows NT Server 4.0 was used.

SUT

In the system under test, the network adapter speed for the IBM EtherJet 100/10 PCI Adapter was changed from the default 'Auto' to 100Mbps. This forced the Duplex Mode to 'Half'.

In addition, under 'Advanced' configuration options for the Ethernet adapter, the following three parameters were changed from their default values at the destination servers:

- Coalesce Buffers = 16
- Receive Buffers = 64
- Transmit Control Block = 32

Child Drivers

Connection attempt time-out duration in the TCP/IP Option (TCP/IP Port Setup) of User Preferences was set to 15 seconds for child drivers 1-18 and 10 seconds for child drivers 19-27.

Domain Name & Address Book Server-to-Server Connection Documents

For the connection documents controlling mail routing between the SUT and the destination servers, the Route-at-Once parameter is set to 20 seconds versus the default of 5 seconds. The effective time of the document was set at "7:00 AM to 5:00 PM." After 5:00 PM, mail routing from the SUT to the destination servers is controlled by Domino's default values. This represents a reasonable scenario for a customer installation where normal-priority mail is routed with the same frequency after hours to ensure timely mail delivery.

Server-to-server file replications are initiated by only one of the destination servers, with replication between the initiator to each of the other Domino servers being staggered.

Appendix F: Guidelines for Information Usage

This report is intended for IBM Business Partners, customers, and IBM marketing and technical support personnel. The report may be distributed in accordance with the requirements stated in the Edition notice.

Appendix G: Pricing

The table provides the IBM Estimated Reseller Price to end users for the U.S. only. Actual Reseller prices may vary, and prices may also vary by country. Prices are subject to change without notice. For additional information and current prices, contact your local IBM representative.

Item Description	Order Number	Qty	IBM Estimated Reseller Unit Price	Extended Price
IBM Netfinity 7000	8651-TH0	1	\$14,469	\$14,469
1 x 200MHz Pentium Pro Processor / 1MB L2 Cache				
Standard 256MB ECC Memory (4 x 64MB)				
PC Server 200MHz / 1MB L2 Cache Upgrade	94G7147	3	5,245	15,735
512MB Memory Expansion Kit	94G7385	4	5,265	21,060
IBM ServeRAID II Ultra SCSI Adapter	76H3584	3	1,949	5,847
IBM Netfinity EXP10 4.51GB 10K Wide Ultra SCSI SCA-2 Hard Disk Drives	01K7960	24	1,139	27,336
IBM Netfinity EXP10 Rack Storage Expansion Enclosure	35201RU	3	2,947	8,841
IBM EtherJet 100/10 PCI Adapter	86H2342	3	109	327
IBM G42 14" (13.2" Viewable) Color Monitor	654000N	1	249	249
Software				
Windows NT Server 4.0 (Service Pack 3 free on Internet)		1	723	723
Lotus Domino Server Release 4.6 for SMP ⁴		1	1,836	1,836
Total System Price				\$96,423

⁴ A single-processor edition of Domino Server Release 4.6 is included with the IBM Netfinity 7000 system on ServerGuide*. The price quoted here is for an upgrade to Domino Server 4.6 for SMP.