

**NotesBench Disclosure Report**  
**for**  
**TotalStorage Network Attached Storage 300 and**  
**IBM @server xSeries 350**  
**using**  
**Lotus Domino Server 5.04a**  
**running**  
**Windows 2000 Advanced Server**

**Results Submitted December 18, 2001**



**IBM Corporation**

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***Edition Notice***

## Executive Summary

The IBM® TotalStorage Network Attached Storage 300 (NAS 300) and the xSeries 350 demonstrated leadership performance running Lotus® Domino® Server Release 5.04a on Microsoft® Windows® 2000 Advanced Server. The results detailed in this report were obtained using the NotesBench R5Mail-Only workload.

Test Script	Maximum Users	NotesMark (tpm)	Ave. Response Time (sec)	\$/User	\$/NotesMark
R5Mail-Only	8,300	10,578	3.536	\$20.32	\$15.95

The NAS 300 (Model 325) system included:

- Two IBM 5187 NAS Engines (Model 5RZ), each of which used two 933MHz<sup>1</sup> Intel® Pentium® III processors, 1GB of memory, one 9.1GB<sup>2</sup> hard disk, one integrated IBM 10/100 Ethernet Adapter, one IBM 10/100 Ethernet Server Adapter, and one IBM Gigabit Ethernet SX Adapter. Microsoft Cluster Service was run for failover control for the two engines.
- Two IBM 5191 NAS RAID Storage Controller units (Model 2RU), each of which held ten 36.4GB 10K rpm hard disks
- Two IBM 5192 NAS Storage Units (Model 1RU), each of which held ten 36.4GB 10K rpm hard disks
- Two 3534 SAN Fibre Channel Managed Hubs (Model 1RU).

The xSeries 350 (Model 8682-6RY) server was configured with four 900MHz<sup>1</sup> Intel Pentium III Xeon™ processors, 4GB<sup>2</sup> of memory, and five hard disk drives. Two Domino partitions, which were part of the same domain, shared an address book containing more than 18,000 person documents. For complete configuration details, see Appendix A: Overall Test Setup and Software Versions.

Configured with two Domino partitions, the server under test (SUT) supported an R5Mail-Only workload of 8,300 active mail users (see price/performance results above).

The IBM xSeries Server Performance Laboratory in Research Triangle Park, NC, conducted the benchmark in December, and KMDS Technical Associates, Inc., audited the results in December 2001.

NotesBench provides an objective method for evaluating the performance of different platforms running Lotus Domino Server. 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.

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

<sup>2</sup> When referring to hard drive capacity, GB stands for one thousand million bytes. Total user-accessible capacity may be less.

## **Benchmarking Objectives**

The benchmark objective is to provide customers with information on how to utilize the capability of the xSeries 350 system as a Domino Server 5.04 mail server, using mapped drives on the IBM TotalStorage Network Attached Storage 300 equipped with Fibre Channel RAID-5 data redundancy for mail database.

## **Test Methodologies**

### ***Test Setup and Hardware/Software Configuration***

The xSeries 350 system under test (SUT) was configured with four 900MHz Pentium III Xeon processors (2MB of ECC full-speed L2 write-back cache and 100MHz frontside bus per processor), 4GB of memory, five 9.1GB10K rpm hard disk drives, two of which were contained in a RAID-0 array that was used as the boot disk and three of which were contained in a RAID-1 array that was used as Domino program drive, were connected to a ServeRAID-4Lx Ultra160 SCSI Adapter. A more detailed description of the configuration of the RAID-1 arrays is provided in Appendix A.

The network consisted of three LAN segments of which:

- Two 10/100 Mbps Ethernet segments consisted of two 16-port IBM Type 8371-A16 switches and one 10/100 Dual-Port Server Adapter installed in the xSeries 350 system under test
- One gigabit Ethernet segment consisted of a 9-port Alteon 180 Gigabit switch and two IBM Gigabit Ethernet SX Server Adapters installed in the xSeries 350 system under test..

The LAN segments were configured as follows:

- One 10/100 Mbps segment was connected to partition 1 on the SUT to child drivers 1, 3, 5, 7, 9, and parent 1.
- Another 10/100 Mbps segment was connected to partition 2 on the SUT to child drivers 2, 4, 6, 8, 10, and parent 2.
- The gigabit segment was connected to system under test and the NAS 300.

The IBM xSeries 350 system under test ran Microsoft Windows 2000 Advanced Server and Domino Server 5.04a. The NAS 300 ran a customized Microsoft Window 2000 Server and was configured with Microsoft Cluster Service for failover of the two engines. The RAID controllers were configured with four 9-disk RAID-5 arrays.

The following notes.ini parameters were modified as recommended in the NotesBench operator's manual.

<b>R5Mail-Only Workload</b>
Server_Max_Concurrent_Trans=1000
NSF_DBCache_MaxEntries=10000
NSF_Buffer_Pool_Size_MB=400
MailLogToEventsOnly=1
Log_MailRouting=10
Log_Sessions=0
Server_Pool_Tasks=100
Max_Users=5000
DBMaxEntries=10000

In the Server-Configuration document for both partitions, two mail.boxes were used on each partition for mail routing.

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

```
No_Force_Activity_Logging=1
Server_Show_Performance=1
TcpIp_TcpIpAddress=0,192.1.2.x:1352
Debug_Outfile=j:\tmp\SUTy\INFO.TXT
```

In the last two lines above, x is the net address and y is the partition number for the corresponding partition.

All Notes server tasks were disabled except Router.

All Domino data files were located on the D:, E:, M:, N:, and J: drives. The Domino executable codes and data link files were located on the J: RAID-1 array local drive. The first partition used the D: and E: mapped drives for the mail file; partition 2 used the M: and N: mapped drives.

## ***Test Procedures***

Several trial runs were conducted starting with a single Domino server to attempt to exhaust at least one of the system resources: processor, memory or disk subsystem. When average user response time reached an unacceptable level before any one of these resources had been fully utilized, an additional resource was installed. System resource utilization was monitored using Windows 2000 Performance Monitor (PERFMON), which enabled the system configuration to be optimized while balancing system resources.

The 8,300 users were distributed over 10 clients. Each client added 150 to 1,000 users to the system under test. The test ran for 17 hours, including ramp-up. Child 1 through child 8 simulated 1,000 users each; child 9 and child 10 simulated 150 users each. The actual ramp-up

period from startup of child 1 to the point when all 8,300 users were shown on the server console was approximately 7 hours. The test ran for more than 6 hours after ramp-up. During the test runs, the tools used to determine steady state included the child driver RES files, Notesizer command outputs, 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 the server and its logs. We confirmed steady state when the number of users on the SUT Domino Server console reached the intended number of users. We also used the Show Stat Mail command on the server to verify that at least 90 percent of the mail generated during the test period was delivered to the local mail databases during the test period.

To ensure that the test results were reproducible, all tests were repeated, and the results were compared and were found to be consistent.

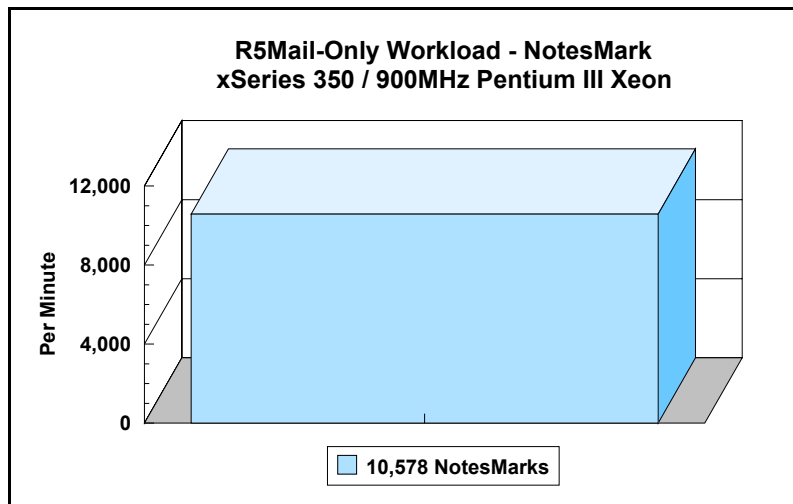
### ***Other NotesBench Tests***

IBM intends to continue conducting NotesBench measurements to further optimize and exploit the performance capability of the xSeries and Network Attached Storage product line running Domino Server 5.04a.

## Data

### ***xSeries 350 NotesMark Value for R5Mail-Only Test***

The xSeries 350 server demonstrated that it can support 8,300 concurrent, active users with this workload. The NotesMark throughput value was 10,578. Average response time was 3.536 seconds. The test ran error-free for a period of 17 hours.



The R5Mail 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 Domino R5Mail-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, 2 documents added, 1 view scrolling operation, 1 database opened and closed, 1 view opened and closed, looking up of recipients and sending an invitation every 30 minutes, as well as some miscellaneous operations. In sending messages, each user creates and sends a mail message to NumMessageRecipients no more frequently than every 90 minutes. About every 90 minutes, each user creates a meeting invitation and responds to an invitation.

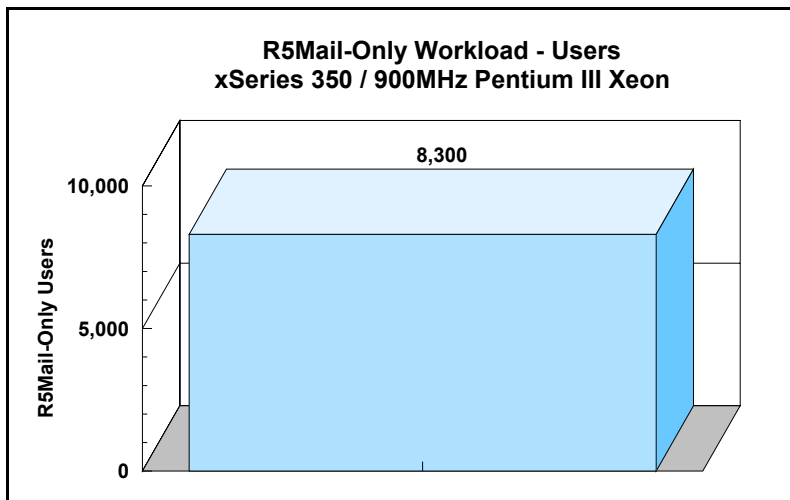
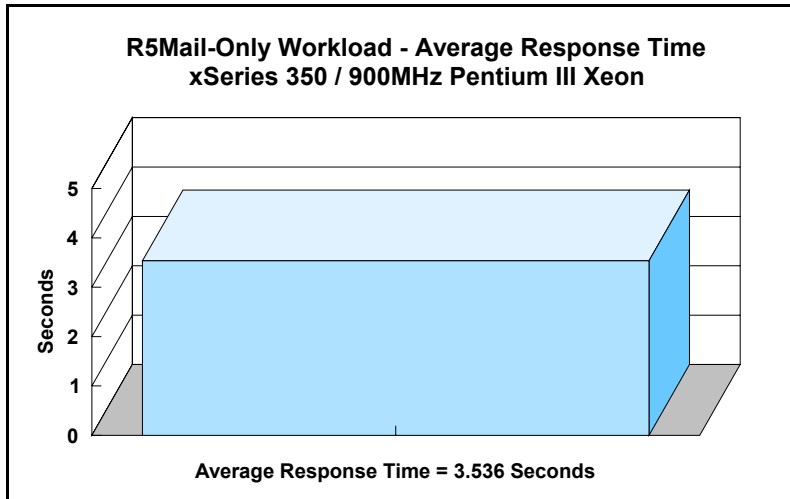
### NotesNum Output for R5Mail-Only Test

Min Start Time = 12/14/2001 11:59:19 AM Max Stop Time = 12/15/2001 04:20:52 AM

Total Test Errors = 0

Total Test Time = 58860 sec

Test Run: Users = 8300 NotesMark = 10578 Response Time = 3536 msec (12/14/2001 8:21:00 PM to 12/15/2001 04:08:00 AM)





## **Analysis**

When configured as described in this report, the IBM TotalStorage Network Attached Storage 300 and xSeries 350 server demonstrated the ability to manage the intense resource usage that occurs during ramp-up to 8,300 concurrent R5Mail users with no errors at the clients. During the steady-state period on one of the successful 8,300-user runs, the average CPU utilization was 48.4 percent. The average available memory was 1.286GB.

The transaction logging option was not enabled for this audit run. When this option is enabled, we recommend placing the transaction logging directory on a dedicated disk that is attached to a less-busy adapter on a less-busy PCI bus to improve response time.

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## Conclusions

The test results demonstrate that the IBM TotalStorage Network Attached Storage 300 and xSeries 350 configured as described in this report can support up to 8,300 concurrent, active R5Mail users with a response time within the range permitted by the test criteria.

The IBM TotalStorage Network Attached Storage 300 (Model 325) provides a solution for customers requiring a robust, fault tolerant network attached storage device for use in mission-critical applications, including Lotus Domino. Its value is enhanced by its support of multiple file protocols, which allows seamless file sharing across dissimilar platforms. Its excellent Windows performance provides high levels of client productivity while simultaneously protecting the customer's investment with its exceptional scalability. The NAS 300's data-protection feature further enhances its value by increasing the customer's assurance of business continuation.

These results are based on running the xSeries 350 as a dedicated Domino server and the NAS 300 as a shared data storage. The addition of other application workloads and storage demand 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.

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## **Statement by Auditor**

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

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## **Appendix A: Overall Test Setup and Software Versions**

### ***Number of Client Systems***

For the R5Mail-Only test, 12 driver systems were used. Ten of those systems were configured as child drivers 1 - 10. Two parent systems were used to control the run.

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

- Child drivers 1-10
  - C: Partition (2GB - NTFS) - Windows 2000
  - D: Partition (6.5GB - NTFS) - Notes 5.04a code and data

### ***Number of Server Platforms***

One server platform, the xSeries 350 with four 900MHz Pentium III Xeon processors and 4GB of memory, was benchmarked.

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

- C: Single disk drive (8.5GB - NTFS) - Windows 2000 Advanced Server (Boot Partition)
- D: Partition (270GB - NTFS) - Domino mail files
- E: Partition (270GB - NTFS) - Domino mail files
- 
- M: Partition (270GB - NTFS) - Domino mail files
- N: Partition (270GB - NTFS) - Domino mail files
- J: Partition (12.7GB - NTFS) - Domino executables and Domino mail data subdirectory

### ***Network Attached Storage***

The NAS 300 (Model 325) system included:

- Two IBM 5187 NAS Engines (Model 5RZ), each of which used two 933MHz Intel Pentium III processors, 1GB of memory, one 9.1GB<sup>2</sup> hard disk, one integrated IBM 10/100 Ethernet Adapter, one IBM 10/100 Ethernet Server Adapter, and one IBM Gigabit Ethernet SX Adapter. Microsoft Cluster Service was run for failover control for the two engines.
- Two IBM 5191 NAS RAID Storage Controller units (Model 2RU), each of which held ten 36.4GB 10K rpm hard disks
- Two IBM 5192 NAS Storage Units (Model 1RU), each of which held ten 36.4GB 10K rpm hard disks
- Two 3534 SAN Fibre Channel Managed Hubs (Model 1RU).

The Fibre Channel RAID controllers were each configured to control two 9-disk RAID-5 arrays. Three disks were not configured for array and one disk was configured as the Quorum disk for Cluster Services.

## **Network**

The network consisted of three segments. All child drivers, parents and SUT were connected to one of 16 ports on two IBM TYPE 8371 A-16 switches. One 10/100 Ethernet Dual-Port Server Adapter was installed in the xSeries 350 system under test. The NAS 300 and the xSeries 350 system under test were connected with IBM Gigabit Ethernet SX Server Adapters installed in both Engines in the NAS 300 and system under test with a 9-port Alteon 180 Switch. The LAN segments were configured as follow:

- Segment 1 was connected to partition 1 on the SUT to child drivers 1, 3, 5, 7, 9, and parent 1.
- Segment 2 was connected to partition 2 on the SUT to child drivers 2, 4, 6, 8, 10, and parent 2.
- Segment 3 was connected to the system under test to Network Attached Storage 300.

## **Software Versions**

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

- Microsoft Windows 2000 Advanced Server and Service Pack 2
- Lotus Domino Server Release 5.04a for Windows 2000

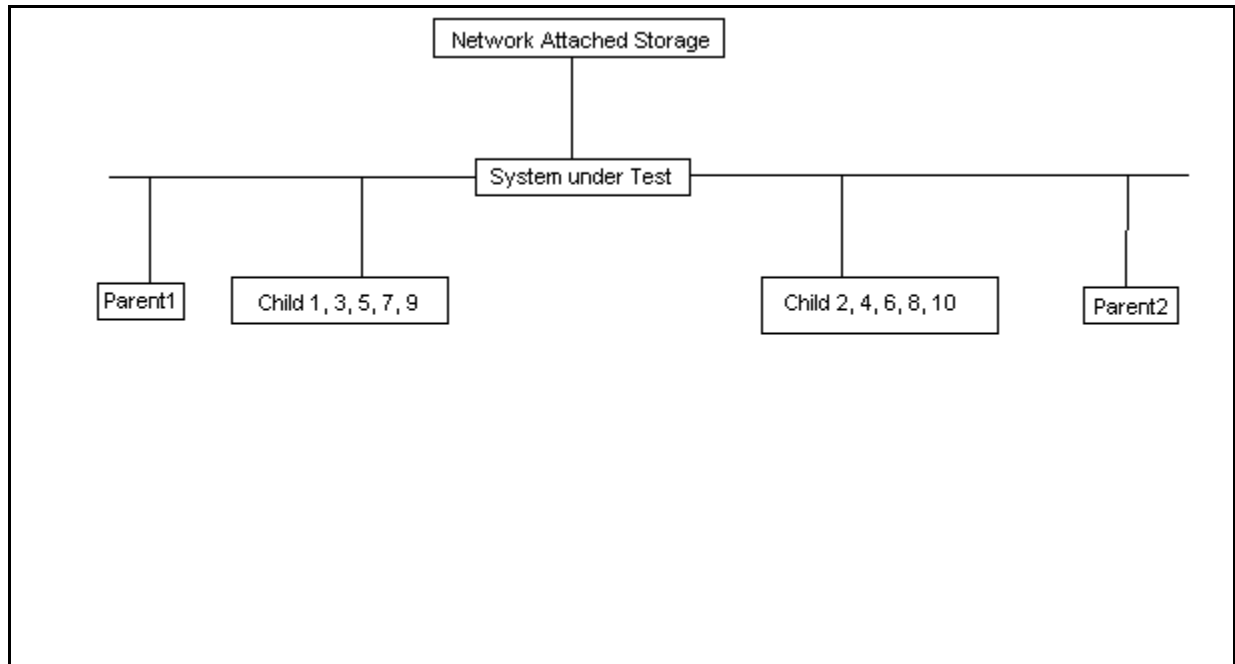
Software version used on the engines of the NAS 300 were as follows:

- Customized Microsoft Windows 2000 Advanced Server and Service Pack 2
- Microsoft Cluster Services

Software versions used on the child and parent drivers were as follows:

- Microsoft Windows 2000 Professional for the child drivers and Windows 2000 Server for the parent systems
- Lotus Domino Client Release 5.04a for Windows 2000 NotesBench Version 5.04 - Windows/32, released August 10, 2000

## Test Setup Diagram



## Details of Configuration

System Under Test	Parents 1 - 2 Source Drivers and Child Drivers 1-10
xSeries 350	IBM IntelliStation M Pro
4 x 900MHz Pentium III Xeon Processor	1 x 500MHz Pentium III
4GB Memory	256MB Memory
5 x 9.1GB Drives (7 RAID-1 arrays)	1 x 9.1GB Drive
1 x ServeRAID-4Lx Ultra160 SCSI Adapter	
1 x 10/100 Ethernet Server Adapter 2 x Gigabit Ethernet SX ServerAdapter	Integrated 10/100 Ethernet Controller
Microsoft Windows 2000 Advanced Server	Microsoft Windows 2000 Professional

## Appendix B: System Configurations

Server under Test	
<b>System</b>	xSeries 350
<b>Processor</b>	4 x 900 MHz Pentium III Xeon
<b>Memory</b>	4GB
<b>Cache</b>	2MB ECC Full-Speed L2 Cache per Processor
<b>RAID Controller</b>	1 x ServeRAID-4Lx Adapter
<b>Disk Drive</b>	5 x 9.1GB 10K rpm (configured as one RAID-1 array, plus a RAID-0 for system boot drive)
<b>Network Interface Adapter</b>	1 x 10/100 Dual -Port Ethernet Server Adapter 2 x Gigabit Ethernet SX Server Adapter
<b>I/O</b>	PCI Bus (64-Bit / 33MHz and 64-Bit / 66MHz)
<b>Operating System</b>	Microsoft Windows 2000 Advanced Server
<b>Notes</b>	Lotus Domino Server Release 5.04a for Windows 2000

Parents 1-2 Source Driver and Child Drivers 1-10	
<b>System</b>	IBM IntelliStation M Pro
<b>Processor</b>	1 x 500MHz Pentium III
<b>Memory</b>	256MB
<b>Disk Drive</b>	1 x 9.1GB
<b>Network Interface</b>	Integrated 10/100 Ethernet Controller
<b>I/O</b>	PCI Bus
<b>Operating System</b>	Microsoft Windows 2000 Professional
<b>Notes</b>	Lotus Domino Client Release 5.04a for Windows 2000
<b>NotesBench</b>	NotesBench Version 5.04 - Windows/32, released August 10, 2000

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## 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



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## Appendix D: NOTES.INI Settings

### *NOTES.INI for First Partition Server*

[Notes]

Directory=j:\notesr5\sut1  
KitType=2  
SetupDB=Setup.nsf  
UserName=administrator  
CompanyName=ibm  
NotesProgram=j:\notesr5  
InstallType=4

=====

Server\_Show\_Performance=1  
MailUseProcesses=0  
TCPIP\_TCPIPAddress=0,192.1.2.220:1352  
MailLogToEventsOnly=1  
Log\_mailRouting=10  
DBMaxEntries=10000  
Max\_users=5000  
NSF\_DBCache\_MaxEntries=10000  
Server\_Pool\_Tasks=100  
Server\_max\_Concurrent\_Trans=1000  
No\_Force\_Activity\_Logging=1  
NSF\_Buffer\_Pool\_Size\_MB=400  
Debug\_OutFile=j:\temp\sut1info.txt

=====

CONSOLE\_Lotus\_Domino\_Server=80 300 7 143 7 811 338  
WinNTIconPath=j:\notesr5\sut1\W32  
Timezone=5  
DST=1  
\$\$HasLANPort=1  
WWWDSPP\_SYNC\_BROWSERCACHE=0  
WWWDSPP\_PREFETCH\_OBJECT=0  
EnablePlugins=1  
Preferences=2147486833  
AltNameLanguage=en  
ContentLanguage=en-US  
WeekStart=1  
ViewWeekStart=2  
NavWeekStart=2  
XLATE\_CSID=52  
SPELL\_LANG=1033  
Region=en-US  
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,



AppleTalk=ATALK, 0, 15, 0  
LAN0=NETBIOS, 0, 15, 0  
LAN1=NETBIOS, 1, 15, 0  
LAN2=NETBIOS, 2, 15, 0  
LAN3=NETBIOS, 3, 15, 0  
LAN4=NETBIOS, 4, 15, 0  
LAN8=NETBIOS, 8, 15, 0  
COM1=XPC,1,15,0,  
COM2=XPC,2,15,0,  
COM3=XPC,3,15,0,  
COM4=XPC,4,15,0,  
COM5=XPC,5,15,0,  
Ports=TCPIP  
;Ports=TCPIP,LAN5,LAN6,LAN7  
DisabledPorts=VINES,SPX,AppleTalk,LAN0,LAN1,LAN2,LAN3,LAN4,LAN8,COM1,COM2,COM3,COM4,COM5  
LOG\_REPLICATION=0  
LOG\_SESSIONS=0  
ExistingServerName=CN=sut/O=ibm  
KeyFilename=J:\notesr5\data\sut1.id  
CertificateExpChecked=J:\notesr5\data\sut1.id 11/08/2001  
ServerKeyFileName=sut1.id  
MailServer=CN=sut1/O=ibm  
Domain=ibm  
Admin=CN=administrator/O=ibm  
TemplateSetup=62  
Setup=60  
ServerSetup=50  
DESKWINDOWSIZE=-4 -4 1032 748  
MAXIMIZED=1  
CleanSetup=1  
PhoneLog=2  
Log=log.nsf, 1, 0, 7, 40000  
TRANSLOG\_AutoFixup=1  
TRANSLOG\_UseAll=0  
TRANSLOG\_Style=0  
TRANSLOG\_Performance=2  
TRANSLOG\_Status=0  
MTEnabled=0  
ECLSetup=3  
SERVERS\_FRAME\_PERCENT=20  
MONITOR\_SCALE=1  
ADMINWINDOWSIZEWIN=20 15 984 715  
ADMINMAXIMIZED=0  
WinNTIconCommonConfig=Universal  
WinNTIconSize=2  
WinNTIconPos=2  
WinNTIconHidden=1  
WinNTIconRect=0 0 0 24  
AdminSetup=502  
FileDlgDirectory=J:\notesr5\data  
AdminLastDomain=IBM  
AdminLastServer=sut1/ibm

### ***NOTES.INI for Second Partition Server***

The only differences between the Notes.ini files for partition servers 1 and 2 are the following lines:

TCPIP\_TCPIPAddress=0,192.1.2.221:1352

Debug\_OutFile=j:\temp\sut2info.txt

### **NOTES.INI for Child 1**

[Notes]

Directory=d:\notes\data

KitType=1

InstallType=6

;

NthIteration=6

Tmp=Notestmp

MaxSessions=100

NumAddLocalReplica=1

NumDeleteLocalReplica=1

NumStampLocalReplica=1

NumUpdateLocalReplica=1

NormalMessageSize=10000

NumMessageRecipients=3

NumMailNotesPerUser=100

AttachmentSize=500000

LargeMessageSize=32000

NodeName=nchild2

MailTemplate=mail50.ntf

USESERVERNAB=1

ResultsDirectory=\\parent1\c\$\results

DEBUG\_OUTFILE=\\parent1\c\$\results\res1

NumNotesLocalReplica=90

NumSharedNotes=900

NormalMessageSize=10000

ThreadStagger=3

;

;

WinNTIconPath=d:\notes\data\W32

Timezone=5

DST=1

\$\$HasLANPort=1

WWWDSPP\_SYNC\_BROWSERCACHE=0

WWWDSPP\_PREFETCH\_OBJECT=0

EnableJavaApplets=1

EnablePlugins=1

Preferences=-2147480463

AltNameLanguage=en

ContentLanguage=en-US

WeekStart=1

ViewWeekStart=2

NavWeekStart=2

XLATE\_CSID=52

SPELL\_LANG=1033

Region=en-US



COM3=XPC,3,15,0,  
COM4=XPC,4,15,0,  
COM5=XPC,5,15,0,  
Ports=TCPIP  
DisabledPorts=LAN0,COM1,COM2,VINES,SPX,COM3,COM4,COM5  
KeyFilename=nchild2.id  
CertificateExpChecked=nchild2.id 11/08/2001  
\$headlineClientId=B1261714:BC53DBF4-85256AFE:0059E644  
MailServer=CN=sut1/O=ibm  
MailFile=mail\nchild2.nsf  
TemplateSetup=61  
Setup=60  
Location=Office (Network),9A2,CN=nchild2/O=ibm  
\$IEVersionMajor=5  
DESKWINDOWSIZE=20 15 984 715  
WINDOWSIZEWIN=20 15 984 715  
MAXIMIZED=0  
WinNTIconCommonConfig=Universal  
WinNTIconSize=2  
WinNTIconPos=2  
WinNTIconHidden=1  
WinNTIconRect=0 0 0 24  
FileDlgDirectory=Y:\assault  
PhoneLog=2  
Log=log.nsf, 1, 0, 7, 40000  
ECLSetup=3  
NAMES=names.nsf  
\$headlineDisableHeadlines=0  
EmptyTrash=0  
MIMEPromptMultilingual=1  
MIMEMultilingualMode=1  
EnableActiveXInBrowser=1  
EnableJavaScript=1  
EnableJavaScriptErrorDialogs=1  
EnableLiveConnect=1  
ShowAccelerators=1  
DisableImageDithering=1  
MaxDocToDelete=10000

### ***NOTES.INI for Parent Source Driver***

[Notes]

```
;  
; Begin Notesbench variables for PARTITION 1  
;  
; *****  
NodeName=parent1  
  
Runtime=1020  
ChildStagger=1,1;65,2-9;20,10  
  
NumClients1=1000  
NumClients2=1000
```

```

NumClients3=1000
NumClients4=1000
NumClients5=1000
NumClients6=1000
NumClients7=1000
NumClients8=1000
NumClients9=150
NumClients10=150
NumClients11=1000
NumClients12=1000
NumClients13=1000
NumClients14=1000
NumClients15=1000
NumClients16=1000
;NumClients17=1000
;NumClients18=1000
;NumClients19=1000
;NumClients20=1000
ResultsDirectory=c:\results
DEBUG_OUTFILE=c:\results\notesnum_sut1.txt
;-----End
;*****
;
;           Multirun Variables
;*****
;
; ProbeIntervalDelay=wait after end of one run before starting next
; ProbeWaitTime=wait to start Probe (default=15mins)
; ProbeRunTime=#minutes probe will collect stats
;;Probe_Interval=2800,2900,3000
;;ProbeIntervalDelay=30
;;ProbeWaitTime=30
;;ProbeRunTime=180
; ProbeRunTime=2 because we want 240 minutes of runtime after ramp-up
; without overhead of PROBE
; Next line cause command 'show stat' to execute on SUT console
; before start of each multi-run and when ramped up for that run
; Mail statistics required for audit at ramp-up and before ramp-down
;;ProbeTestIncrementCMD=show stat mail
;;ProbeTestIncrementCMD=show stat database
;;NBTestReset=1
;*****
;
;           Server.Planner Variables
;*****
;
;;CPDatabase=c:\notesb3\data\Server.Planner.nsf
;;SUTMachineID=Teton600
;-----End
;-----End
Directory=C:\Notes\Data
KitType=1
InstallType=2
;-----
;-----
WinNTIconPath=C:\Notes\Data\W32
Timezone=5
DST=1
Location=Office (Network),9A2,CN=administrator/O=ibm

```

MailServer=CN=sut2/O=ibm  
 MailFile=mail\administ.nsf  
 \$\$HasLANPort=1  
 \$IEVersionMajor=5  
 WWWDSP\_SYNC\_BROWSERCACHE=0  
 WWWDSP\_PREFETCH\_OBJECT=0  
 EnableJavaApplets=1  
 EnablePlugins=1  
 Preferences=-2147480463  
 AltNameLanguage=en  
 ContentLanguage=en-US  
 WeekStart=1  
 ViewWeekStart=2  
 NavWeekStart=2  
 XLATE\_CSID=52  
 SPELL\_LANG=1033  
 Region=en-US  
 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=Microsoft RTF,0,\_IW4W,\_IRTF,.DOC,.RTF,,2,  
 EDITIMP3=Lotus 1-2-3,0,\_IW4W,\_IWKSE,.WKS,.WK1,.WR1,.WRK,.WK3,.WK4,.123,,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=Lotus Ami Pro,0,\_IW4W,W4W33F/V0,.SAM,,2,  
 EDITIMP9=HTML File,0,\_IHTML,,HTM,.HTML,,1,  
 EDITIMP17=WordPerfect 5.x,0,\_IW4W,W4W07F/V1,.DOC,.WPD,,2,  
 EDITIMP21=Lotus Word Pro,0,\_IW4W,W4W12F/V0,.LWP,,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=Microsoft Excel,0,\_IW4W,W4W21F/V4C,.XLS,,4,  
 EDITIMP31=Microsoft Word,0,\_IW4W,W4W49F/V0,.DOC,,2,  
 EDITIMP32=GIF Image,0,\_IGIF,,GIF,,18,  
 EDITIMP33=JPEG Image,0,\_IJPEG,,JPG,,18,  
 EDITEXP1=ASCII Text,2,\_XTTEXT,,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,  
 EDITEXP22=WordPerfect 6.1,2,\_XW4W,W4W48T/V1,.WPD,.WPT,.DOC,,2,  
 EDITEXP23=Word for Windows 6.0,2,\_XW4W,W4W49T/V0,.DOC,,2,  
 DDETimeout=10





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## **Appendix E: Network Configuration**

The standard TCP/IP stack provided by Microsoft Windows 2000 Advanced Server was used.

In the system under test, the network adapter speed for the 10/100 Ethernet Server Adapter was changed from the default 'Auto' to 100Mbps. This forced the Duplex Mode to 'full'.

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## **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 List Price for the U.S. only. Prices are subject to change without notice. For additional information and current prices, contact your local IBM representative.

Item Description	Order Number	Qty	IBM List Price	IBM Extended Price
<b>IBM xSeries 350 with one 900MHz / 2MB Pentium III Xeon</b>	8682-6RY	1	8,199	8,199
900MHz / 2 MB L2 Cache Processor Upgrade	19K4633	3	6,189	18,567
1GB 133MHz ECC SDRAM RDIMM Memory	33L3119	4	989	3,956
ServeRAID-4Lx Ultra160 SCSI Adapter	06P5740	1	659	659
9.1GB 10K Ultra160 SCSI Hard Disk Drives	37L7204	5	275	1,375
Gigabit Ethernet SX Server Adapter	06P3701	2	635	1,270
10/100 Dual-Port Server Adapter	22P4901	1	209	209
E54 15" (13.8" Viewable) Color Monitor	6331N2N	1	149	149
<b>Subtotal</b>				34,384
<b>IBM TotalStorage Network Attached Storage System includes:</b>	Model 325	1	195,236	126,904
<ul style="list-style-type: none"> <li>• Two IBM 5187 NAS Engines (Model 5RZ)</li> <li>• Two IBM 5191 NAS RAID Storage Controllers (Model 2RU)</li> <li>• Two IBM 5192 NAS Storage Units (Model 1RU)</li> <li>• Two 3534 SAN Fibre Channel Managed Hubs (Model 1RU)</li> <li>• Windows 2000 Advanced Server and Microsoft Cluster Services software</li> </ul>				
Standard Discount of 35% Off List Price			(68,332)	
<b>Other Software</b>				
Windows 2000 Advanced Server		1	2,399	\$2,399
Lotus Domino R5 Enterprise Server (List Price)		1	4,995	4,995
<b>Total System Price</b>				<b>\$168,682</b>

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## Appendix H: Vendor-Defined Information

### *What is NAS?*

Network Attached Storage (NAS) is a task-optimized storage device directly attached to IP networks, working independently of multi-purpose servers, with one specific purpose ... file serving. NAS provides pooled storage that allows data to be shared by multiple clients and other servers in a heterogeneous (multi-protocol) environment. Storage is freed from its direct attachment to a specific server, facilitating “any-to-any” connectivity. In principle, any user running any supported operating system can access files on the remote NAS storage device.

### **NAS 300**

The NAS 300 provides a solution for customers requiring a robust, fault-tolerant network attached storage device for use in mission-critical applications. Its value is enhanced by its support of multiple file protocols, which allows seamless file sharing across dissimilar platforms. Its excellent Windows performance provides high levels of client productivity while simultaneously protecting the customers’ investment with its exceptional scalability. The data-protection features of the NAS 300 further enhance its value by increasing the customer’s assurance of business continuation.

Highlights of the NAS 300 are summarized here:

- **Affordable**—Designed for low initial investment, and low total cost of ownership
- **Fault tolerant**—Dual engines and redundant components help support continuation of mission-critical processes
- **Performance**—Exceptional performance for multi-protocol environments
- **Versatile**—Open-system design helps support easy integration into existing networks
- **Data protection**—Instant file and volume restore capability utilizing any one of a possible 250 True Images to help recover corrupted/deleted data
- **Scalable**—Storage capacity from 109.2GB up to 6.61TB to help meet current and future storage requirements
- **Reliable/available**—Hot-swap, redundant components and IBM Advanced Systems Management are designed to help keep these systems up and running for 24 x 7 operation
- **Manageable**—A tightly integrated suite of software helps support continuous operation
- **Simple**—Installed in a rack, with preloaded software for ease of setup
- **Easily serviced**—Hot-swap components can minimize downtime and service costs

## **First Edition - December 2001**

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