

NotesBench Disclosure Report
for
IBM® @server® xSeries® 346
Using
Lotus® Domino® Server 6.5.3
and
SUSE Linux 8.0 SP3

Results Submitted December 22, 2004

Results Certified January 13, 2005

IBM Corporation

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Edition Notice

Executive Summary

The IBM® @server® xSeries® 346 server demonstrated leadership performance and price/performance running Lotus® Domino® Server Release 6.5.3 on SUSE Linux 8.0 SP3. The results detailed in this report were obtained using the NotesBench R6 iNotes-Only workload.

Test Script	Maximum Users	NotesMark (tpm)	Ave. Response Time (sec)	\$/User	\$/NotesMark
R6 iNotes-Only	6,050	5,109	0.569	\$9.07	\$10.75

The xSeries 346 server was configured with two 3.4GHz¹ Intel® Xeon™ Processor DP, 8GB of memory (8 x 1GB PC2-3200 DDR2 ECC SDRAM RDIMM), and 84 hard disk drives. The Domino server contained more than 12,100 person documents in a single Domino partition. For complete configuration details, see Appendix A: Overall Test Setup and Software Versions.

The server under test supported an R6 iNotes-Only workload of 6,050 active mail users (see price/performance results above).

Intel Corporation's Enterprise Technology Enabling Laboratory in Rio Rancho, NM, conducted the benchmark in December 2004, and KMDS Technical Associates, Inc., audited and certified the results in January 2005.

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.

Benchmarking Objectives

The benchmark objective was to provide customers with information on how to utilize the capability of the xSeries 346 system as a Domino Server 6.5.3 mail server configured with the Adaptec SANbloc 2Gb RAID FC2502 for RAID-5 data redundancy.

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

Test Methodologies

Test Setup and Hardware/Software Configuration

The x346 system under test (SUT) was configured with two 3.4GHz Xeon processors (1MB of ECC full-speed L2 write-back cache with Intel Hyper-Threading Technology), 8GB PC2-3200 (8 x 1GB DDR2 ECC SDRAM RDIMM) memory, and eighty-four 36.7GB 15K rpm, Ultra320 SCSI, 2 Gbit/sec Fibre Channel hard drives. One RAID-5 array, composed of 78 hard drives (36.7GB), which contained the mail database files, was connected to the external channel on the Ultra320 SCSI Adapter. A more detailed description of the configuration is provided in Appendix A.

The network consisted of one LAN segment and used one 24-port switch. The x346 server's embedded Gigabit Ethernet interface was used.

The x346 ran SUSE Linux 8.0 SP3 and Domino Server 6.5.3.

The RAID controller configuration value for Stripe Unit Size was set at 64KB. Write-back cache was enabled for the RAID-5 array.

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

R6 iNotes-Only Workload
Server_Max_Concurrent_Trans=100
NSF_DBCache_MaxEntries=6050
NSF_Buffer_Pool_Size_MB=325
MailLogToEventsOnly=1
Log_MailRouting=10
Log_Sessions=0
Server_Pool_Tasks=100
Max_Users=6025
ConstrainedSHMSizeMB=1738

In the Server-Configuration document, three mail boxes were used 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  
Debug_Outfile=/home/notes/sut_info.txt
```

All Notes server tasks were disabled except Router and HTTP.

All Domino mail database files were located on the RAID-5 array and were mounted as directory /mail. The Domino executable code was installed on the 36.4GB hard drive on the x346 server. The data directory and mail database files were located on the RAID-5 array and were mounted as directories /local/notesdata/ and /local/notesdata/mail.

Test Procedures

Several trial runs were conducted in an attempt to reach the maximum numbers of users supported within a threshold Response Time of 1 second and to exhaust at least one of the system resources: processor, memory or disk subsystem. System resource utilization was monitored using standard Linux tool of *sar*.

The 6,050 users were distributed over six clients. Clients 1 through 5 each added 1,100 users to the system under test, and Client 6 added 550 users. The test ran for 12 hours, including ramp-up. The actual ramp-up period from startup of Client 1 to the point when all 6,050 users were shown on the server console was approximately 180 minutes. The test ran for more than 6 hours after ramp-up. During the test runs, the user load was verified using the client output (RES files).

To confirm steady state, we verified the number of users at the server and its logs. We confirmed steady state when the number of intended users was reached by monitoring the client output (RES files) on the parent drive. 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.

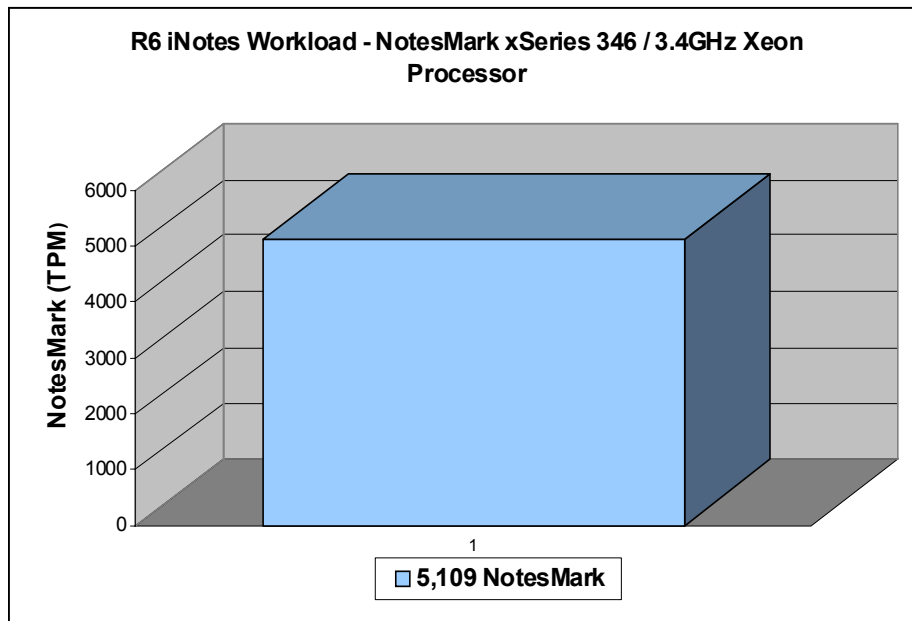
Other NotesBench Tests

IBM intends to continue conducting NotesBench measurements to further optimize and exploit the performance capability of the xSeries product line running Domino Server 6.5.3.

Data

NotesMark Value for R6 iNotes Test

The x346 server demonstrated that it can support 6,050 concurrent, active users with this workload. The NotesMark throughput value was 5,109. Average response time was 0.569 seconds. The test ran error-free for a period of more than 6 hours.



The iNotes Web Access workload executes Notes transactions that model a server for mail users that access their mail via the Web. The resulting capacity metric for a server is the maximum number of users that can be supported before the average user response time becomes unacceptable.

The NotesBench R6 iNotes workload models an active user sending, receiving, and deleting mail via a browser interface. This workload also incorporates variable mail message sizes and attachments (50KB and 10MB). An average user will execute the simulation script four times an hour. Each time the script is performed, it checks and retrieves mail messages. Each user sends a mail message to three recipients no more than 90 minutes. Within a 15-minute period, each user will read five documents and delete two documents. Messages sent by each user are delivered to the mail database of the other users on the System Under Test.

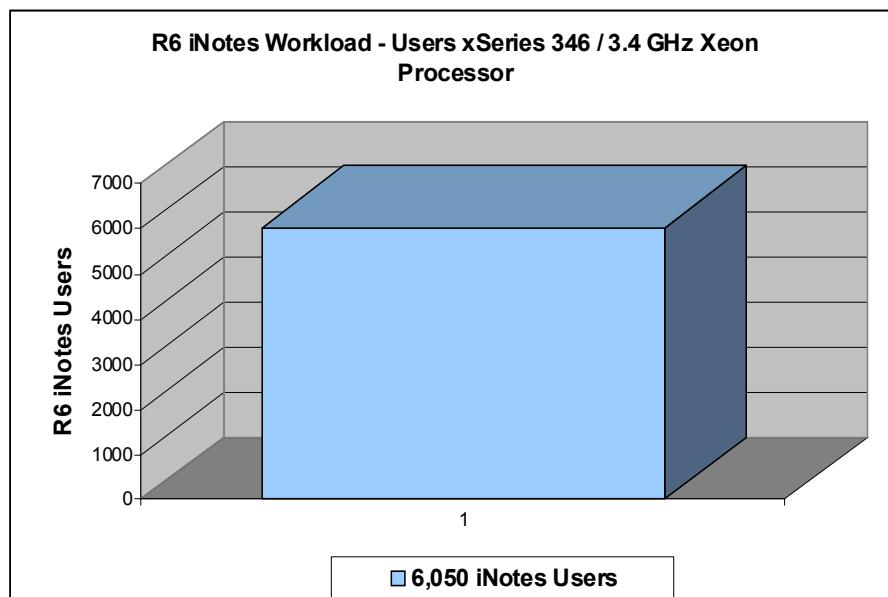
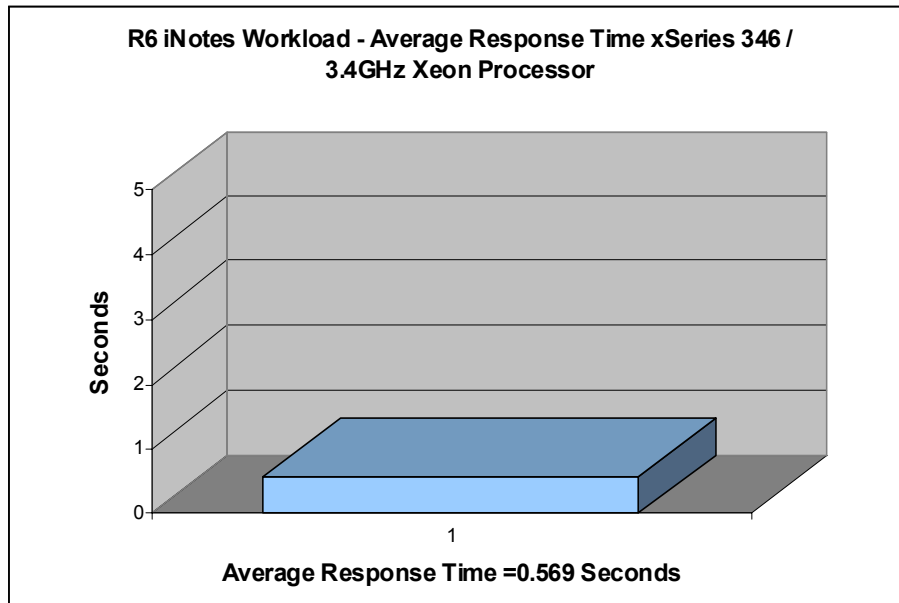
NotesNum Output for R6 iNotes Test

Min Start Time = 12/15/2004 10:30:56 AM Max Stop Time = 12/15/2004 08:06:11 PM

Total Test Errors = 0

Total Test Time = 34560 sec

Test Run: Users = 6050 NotesMark = 5109 Response Time = 569 msec (12/15/2004 12:54:00 PM to 12/15/2004 08:03:00 PM)



Analysis

When configured as described in this report, the x346 server demonstrated that it can manage the intense resource usage during ramp-up to 6,050 concurrent R6 iNotes users with no errors at the clients. During the steady-state period on one of the successful 6,050-user runs, the average CPU utilization was 85 percent and the memory utilization was 96.6 percent.

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.

Conclusions

The test results demonstrate that the x346 configured as described in this report can support up to 6,050 concurrent, active R6 iNotes users with a response time well below that permitted by the test criteria.

These results are based on running the x346 as a dedicated Domino server. 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.

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.

Appendix A: Overall Test Setup and Software Versions

Number of Client Systems

For the R6 iNotes test, seven driver systems were used. Six systems were configured as child drivers 1 through 6; one system was used as the parent driver to control the run.

The configuration used for the driver systems follows:

Child drivers 1-6:

- Pentium 4 3.0GHz with 2GB memory
 - C: Partition (80GB - NTFS) - Windows XP and Notes 6.5.3 clients.

Parent driver:

- Pentium 4 3.0GHz with 2GB memory
- C: Partition (80GB - NTFS) - Windows XP and Notes 6.5.3 client.

Number of Server Platforms

One server platform, the x346 with two 3.4GHz Xeon processors and 8GB of memory, was benchmarked. The disk configuration used for the system under test follows:

- /: Single disk drive (36.4GB Ultra320) – SUSE Linux 8.0 SP3 (Boot Partition)
- /opt/lotus (36.7GB Ultra320) – Domino executables
- /local/notesdata: RAID-5 array – Domino executables and Domino mail data subdirectory
- /mail: 78-drive array (2862GB, RAID-5) – Domino mail files

Network

The network consisted of one segment. All child drivers, parents and SUT were connected to one port on a 24-port 1GB switch. The x346 server's embedded Gigabit Ethernet interface was used.

Software Versions

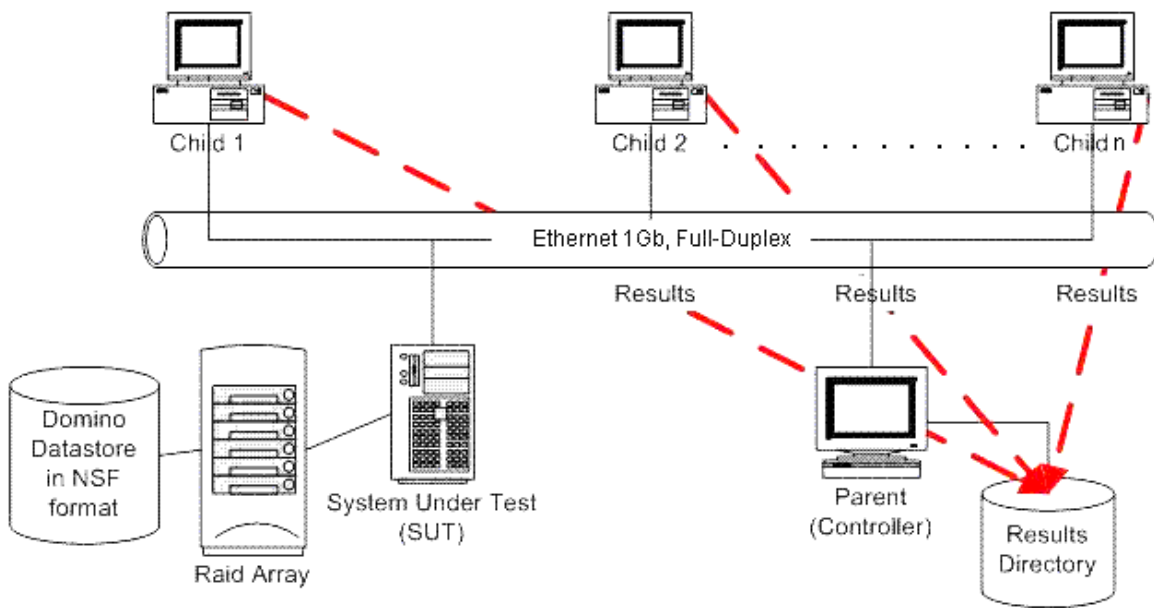
Software versions used on the system under test were as follows:

- SUSE Linux 8.0 SP3
- Lotus Domino Server Release 6.5.3 for Linux

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

- Microsoft Windows XP Professional SP1 for the child drivers and for the parent systems
- Lotus Domino Client Release 6.5.3 for Windows XP
- NotesBench Version 6.5 – Windows/32

Test Setup Diagram



Appendix B: System Configuration

Server under Test	
System	IBM eServer xSeries 346
Processor	2 x 3.4GHz Xeon Processor
Memory	8GB (8 x 1GB) PC2-3200 DDR2 ECC SDRAM RDIMM
Cache	1MB ECC Full-Speed L3 Cache per Processor
RAID Controller	Two Fibre Channel controllers with dual optical connections, 200 MB/s each (400 MB/s total)
Disk Drive	1 x 36.4 GB 15K SCSI U320 and 84 x 36.7GB 15K rpm (Configured as RAID-5)
Network Interface Adapter	Embedded dual 10/100/1000Mbps Ethernet controllers
I/O	PCI-X
Operating System	SUSE Linux 8.0 SP3
Notes	Lotus Domino Server Release 6.5.3 for Linux

Parent Source Driver and Child Drivers 1 - 6	
System	Intel P4 1P Rack Mount Blade
Processor	1 x 3.0GHz Pentium 4
Memory	2GB
Disk Drive	1 x 80GB, 7200 rpm, ATA133
Network Interface Adapter	Embedded 100/1000 Ethernet Controller
I/O	PCI Bus
Operating System	Microsoft Windows XP Professional SP1 Build 2600
Notes	Lotus Domino Client Release 6.5.3 for Windows XP
NotesBench	NotesBench Version 6.5 - Windows/32

Appendix C: Operating System Parameters

The Linux kernel used for this benchmark was 2.4.21-133. The following non-default parameter settings were added:

/etc/security/limits.conf

Notes soft nfile 432537
Notes hard no file 432537
Notes soft nproc 8192
Notes hard nproc 8192

/etc/fstab

Add noatime to attribute flag to /opt, /local

/etc/pam.d/login

Session required /lib/security/pam_limits.so

/home/notes/.bash_profile

Ulimit -n 432537
Ulimit -s 512
Export Notes_PRIVATE_DPOOLSIZE=1000000

Appendix D: NOTES.INI Settings

```
[Notes]
Directory=/local/notesdata
KitType=2
UserName=
CompanyName=
NotesProgram=/opt/lotus/notes/65030/linux
ASPInstall=0
FaultRecovery_Build=Release 6.5.3
Timezone=7
DSTLAW=4,1,1,10,-1,1
SHARED_MAIL=0
FileDlgDirectory=/opt/lotus/notes/65030/linux
DisableLDAPOnAdmin=1
Passthru_LogLevel=0
Console_LogLevel=2
DefaultMailTemplate=mail6.ntf
MailTemplate=SUT!!iNotes6.ntf
Preferences=32
ServerTasks=Router,HTTP
;ServerTasksAt1=Catalog,Design
;ServerTasksAt2=UpdAll
;ServerTasksAt3=Object Info -Full
;ServerTasksAt5=Statlog
Server_Max_Concurrent_Trans=100
NSF_DBcache_MaxEntries=6050
NSF_Buffer_Pool_Size_MB=325
Server_Pool_Tasks=100
ConstrainedSHMSizeMB=1738
TCPIP=TCP, 0, 15, 0
Serial1=XPC,1,15,0,
Serial2=XPC,2,15,0,
DST=1
MailType=0
$$HasLANPort=1
Ports=TCPIP,TCPIP
DisabledPorts=Serial1,Serial2
LOG_REPLICATION=0
LOG_SESSIONS=0
KeyFilename=/local/notesdata/server.id
CertifierIDFile=/local/notesdata/cert.id
MailServer=CN=SUT/O=Intel
NAMELOOKUP_TRUST_DIRCAT=0
ServerKeyFileName=server.id
Domain=Intel
Admin=CN=SIE STAFF/O=Intel
TemplateSetup=600400
Setup=650200
ServerSetup=6010
;
=====
Log_MailRouting=10
maillogtoeventsonly=1
DBMaxEntries=6050
Max_Users=6050
No_Force_Activity_Logging=1
Log_Disable_Session_Info=1
Update_No_Fulltext=1
MailCompactDisabled=1
Debug_OutFile=/home/notes/sut_info.txt
;
=====
PhoneLog=2
Log=log.nsf, 1, 0, 7, 40000
CleanSetup=1
ServerName=SUT/Intel
```

ServerNameNative=03270327535542F496E74656C
FormulaTimeout=120
NSF_QUOTA_METHOD=2
TRANSLOG_AutoFixup=1
TRANSLOG_UseAll=0
TRANSLOG_Style=0
TRANSLOG_Performance=2
TRANSLOG_Status=0
server_show_performance=1
mailuseprocesses=0
ServerController=0
MTEEnabled=0
EventSetup=600
WebAdminSetup=609
DominoConfigLevel=1
CRASH_REMOVE_DATA=0
CRASH_LOGFILE_KB=10240
FILE_RETENTION_DAYS=365
FaultRecovery=0
CONSOLE_LOG_ENABLED=1
JrnlEnbl=0

NOTES.INI for Child 1

[Notes]
KitType=1
Directory=C:\Program Files\lotus\notes\data
InstallType=2
NodeName=Winterpark-02
ResultsDirectory=r:\
DEBUG_OUTFILE=r:\res1
FaultRecovery_Build=Release 6.5.3
CONSOLE_LOG_ENABLED=1
Timezone=7
DSTLAW=4,1,1,10,-1,1
DST=1
MailType=0
\$\$HasLANPort=1
WWWDSync_BROWSERCACHE=1
WWWDSync_PREFETCH_OBJECT=1
EnableJavaApplets=1
EnablePlugins=1
Preferences=-2147480463
AltNameLanguage=en
ContentLanguage=en-US
WeekStart=1
ViewWeekStart=2
NavWeekStart=1
XLATE_CSID=52
SPELL_LANG=1033
SPELL_PREFERENCES=0
Region=en-US
DatePickerDirection=0
Passthru_LogLevel=0
Console_LogLevel=2
VIEWIMP1=Lotus 1-2-3,0,_IWKS,,123,,WK1,,WK3,,WK4,,WKS,,WR1,,WRK,,4,
VIEWIMP2=Structured Text,0,_ISTR,,CGN,,LTR,,STR,,1,
VIEWIMP3=Tabular Text,0,_ITAB,,PRN,,RPT,,TAB,,TXT,,1,
VIEWIMP4=vCard,0,_IVCRD,,VCF,,1,
VIEWEXP1=Comma Separated Value,0,_XCSV,,CSV,,1,
VIEWEXP2=Lotus 1-2-3,0,_XWKS,,123,,WK1,,WK3,,WK4,,WKS,,WR1,,WRK,,4,
VIEWEXP3=Structured Text,0,_XSTR,,CGN,,LTR,,STR,,1,
VIEWEXP4=Tabular Text,1,_XTAB,,CGN,,LTR,,RPT,,TAB,,1,
VIEWEXP5=vCard 2.1,0,_XVCRD,,VCF,,1,
VIEWEXP6=vCard 3.0,0,_XVCRD3,,VCF,,1,
EDITIMP1=ASCII Text,0,_ITEXT,,C,,H,,PRN,,RIP,,TXT,,1,

SERVERS_FRAME_PERCENT=21
MONITOR_DATA_STORAGE_HOURS=168
MONITOR_SCALE=1
ADMINWINDOWSIZEWIN=20 15 984 715
ADMINMAXIMIZED=0
WindowSizeBrowse=351 161 322 325
DESIGNWINDOWSIZEWIN=20 15 984 715
DESIGNMAXIMIZED=0
MailSetup=650200
MailUpgradeFolder=650200
WindowSizeRunAgent=343 161 338 294
DESKWINDOWSIZE=37 45 984 693
WINDOWSIZEWIN=20 15 984 715
MAXIMIZED=0
AdminSetup=6100
WindowSizeKeywords=362 161 299 275
Domain=Intel
SUTMachineID=SUT
SMTPHost=192.168.10.1
LDAPHost=192.168.10.1
HTTPHost=192.168.10.1
IMAPHost=192.168.10.1
RecipientDomain=192.168.10.1
nopause=0
tmp=c:\temp
nb_dbdir=mail\
UseServerNAB=1
MailTemplate=SUT\!Notes6.ntf
NormalMessageSize=10000
MessageLineSize=100
NumMailNotesPerUser=100
NumMessageRecipients=3
NthIteration=6
nabentries=6050
Runtime=720
ThreadStagger=1
NumClients1=1100
webauthenticationoff=0
webpreferencesoff=0
WebDebugOn=0
WebRequestTimeout=600000
R5IMAP_LOOP_N=1000
IMAIL_NO_APC=1
MailRecipientPercentUser=50
MailRecipientPercentVolume=50
MailRecipientBeginNumber=1
MailRecipientEndNumber=6050
ChildStagger=60
NumClients2=1100
NumClients3=1100
NumClients4=1100
NumClients5=1100
NumClients6=550
\$DialogMode=0
SU_IN_PROGRESS=0
SU_NEXT_UPDATE=12/16/2004 09:30:49 PM
SUT_NEXT_UPDATE=12/16/2004 09:30:49 PM

NOTES.INI for Parent Source Driver

[Notes]
KitType=1
Directory=C:\Program Files\lotus\notes\data
InstallType=2
FaultRecovery_Build=Release 6.5.3
Timezone=7
DSTLAW=4,1,1,10,-1,1
DST=1

SPX=NWSPX, 0, 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=TCP,LAN0,COM1,COM2
DisabledPorts=SPX,COM3,COM4,COM5
KeyFilename=admin.id
CertificateExpChecked=admin.id 12/14/2004
FileDlgDirectory=C:\Program Files\lotus\notes\data
MailFile=mail\sstaff.nsf
MailServer=CN=SUT/O=Intel
RequestCertTableUpdate=admin.id 11/14/2004
PhoneLog=2
Log=log.nsf, 1, 0, 7, 40000
DYNINFOCR_OFA6C41A5A:A385EA03-ONE22076F6:85DB4093=OFF9269A04:C466120B-ONAC7D2806:93E88985
TemplateSetup=600400
Setup=650200
Location=Office (Network),9DA,CN=SIE STAFF/O=Intel
SIEVersionMajor=6
ECLSetup=3
SheadlineClientId=3D3BBCA7:1F967294-87256F4A:006C6426
EventSetup=600
AdminLastServer=SUT/Intel
DontCheckDefaultMail=1
WindowSizeBrowse=415 142 322 325
AdminLastDomain=INTEL
SERVERS_FRAME_PERCENT=18
MONITOR_DATA_STORAGE_HOURS=168
MONITOR_SCALE=1
ADMINWINDOWSIZEWIN=20 15 984 715
ADMINMAXIMIZED=1
NodeName=Winterpark-01
ResultsDirectory=r:\
DEBUG_OUTFILE=r:\resparent
CONSOLE_LOG_ENABLED=1
AdminSetup=6100
LastHistoryPruneTime=12/13/2004 06:56:57 PM
SelectNamesDialogSize=214,810,161,515,
Domain=Intel
SUTMachineID=SUT
SMTPHost=192.168.10.1
LDAPHost=192.168.10.1
HTTPHost=192.168.10.1
IMAPHost=192.168.10.1
RecipientDomain=192.168.10.1
nopause=0
tmp=c:\temp
nb_dbdir=mail\
UseServerNAB=1
MailTemplate=SUT!!iNotes6.ntf
NormalMessageSize=10000
MessageLineSize=100
NumMailNotesPerUser=100
NumMessageRecipients=3
NthIteration=6
nabentries=6050
Runtime=720
ThreadStagger=1
NumClients1=1100
webauthenticationoff=0
webpreferencesoff=0
WebDebugOn=0
WebRequestTimeout=600000
R5IMAP_LOOP_N=1000
IMAIL_NO_APC=1
MailRecipientPercentUser=50

MailRecipientPercentVolume=50
MailRecipientBeginNumber=1
MailRecipientEndNumber=6050
ChildStagger=60
NumClients2=1100
NumClients3=1100
NumClients4=1100
NumClients5=1100
NumClients6=550
WindowSizeFolders=404 142 343 214
WindowSizeNewDatabase=381 142 389 434
\$DialogMode=0
SU_IN_PROGRESS=0
SU_NEXT_UPDATE=12/16/2004 10:10:54 AM
SUT_NEXT_UPDATE=12/16/2004 10:10:54 AM
WindowSizeRunAgent=407 142 338 294

NBCONFIG.INI for Parent Source Driver

```
===== NotesBench Settings =====  
----- Server Under Test -----  
Domain=Intel  
MailServer=CN=SUT/O=Intel  
SUTMachineID=SUT  
SMTPHost=192.168.10.1  
LDAPHost=192.168.10.1  
HTTPHost=192.168.10.1  
IMAPHost=192.168.10.1  
RecipientDomain=192.168.10.1  
----- Test Definition -----  
nopause=0  
tmp=c:\temp  
nb_dbdir=mail\  
UseServerNAB=1  
MailTemplate=SUT!!iNotes6.ntf  
NormalMessageSize=10000  
MessageLineSize=100  
NumMailNotesPerUser=100  
MessageLineSize=100  
NumMessageRecipients=3  
NthIteration=6  
nabentries=6050  
----- Child Settings -----  
Runtime=600  
ThreadStagger=1  
ChildStagger=30  
NumClients1=1100  
NumClients2=1100  
NumClients3=1100  
NumClients4=1100  
NumClients5=1100  
NumClients6=550  
;NumClients7=1000  
;NumClients8=1000  
----- Web Related Settings -----  
webauthenticationoff=0  
webpreferencesoff=0  
WebDebugOn=0  
WebRequestTimeout=600000  
  
----- IMAP Related Settings -----  
R5IMAP_LOOP_N=1000  
IMAIL_NO_APC=1  
MailRecipientPercentUser=50  
MailRecipientPercentVolume=50  
MailRecipientBeginNumber=1  
MailRecipientEndNumber=6050  
===== End of NotesBench Settings =====
```

Appendix E: Network Configuration

The standard TCP/IP stack provided by SUSE Linux 8.0 SP3 was used.

The default settings of the embedded Full Duplex 100/1000 Mbps Ethernet controller in the system under test were used.

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

For the IBM products, the table provides the IBM List Price for the U.S. only. Actual 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	Unit Price	Extended Price
IBM eServer xSeries 346 One 3.4GHz Xeon Processors Embedded 100/1000 Ethernet Controller	8840-31U	1	\$2,999	\$2,999
3.4GHz Xeon Processor	13N0684	1	1,099	1,099
2GB (2 x 1GB) PC2-3200 DDR2 ECC SDRAM RDIMM	73P2866	4	1,019	4,076
36.4GB 15K Ultra320 SCSI Disk Drive	90P1318	1	349	349
14-slot Rackmount, dual RAID controllers each with 128MB of ECC cache and a battery, dual PSMs with dual AC inputs, dual ACMs and dual LSMs. Includes Spheras Storage Director RAID configuration software, SAN mapping, manual on CD and quick install guide, and power cords.	SANbloc FC2501DR2-AC by Adaptec		8,550	8,550
14-slot Rackmount, JBOD, dual Copper I/O modules, dual PSMs with dual AC inputs, dual ACMs, and dual LSMs. Includes Spheras Storage Examiner (SSE) JBOD software, manual on CD and quick install guide, and power cords. Does not include disk drive blanks, drives/carriers, cables and rackmount rail kit.	SANbloc FC2501DR2-AC by Adaptec	5	1,888	9,440
30 Meter 2Gb Fibre Channel Optical Cable, Multi-Mode, LC to LC (Mfg part number OA33333-30M)	CBL-OPTML CL C-30	4	90	360
36.7GB 15K Fibre Channel Drive in Carrier	ST336753FC	84	260	21,840
E54 15" (13.8" Viewable) Color Monitor	633147N	1	149	149
Qlogic Dual-Channel Host Bus Adapter	Qlogic 2342	1	1,290	1,290
Software				
SUSE Linux 8.0 SP3		1	135	135
Lotus Domino D6 Enterprise Server for Linux (List Price per Processor)		2	2,308	4,616
Total System Price				\$54,903

Appendix H: Vendor-Defined Information

None.

Appendix I: Domino “Show Statistics” Output

Database.DAFailoverCount = 0
Database.DARefreshServerInfoCount = 0
Database.DAReloadCount = 0
Database.Database.BufferPool.Maximum.Megabytes = 325
Database.Database.BufferPool.MM.Reads = 49
Database.Database.BufferPool.MM.Writes = 72
Database.Database.BufferPool.Peak.Megabytes = 322
Database.Database.BufferPool.PerCentReadsInBuffer = 91.52
Database.DbCache.CurrentEntries = 1
Database.DbCache.HighWaterMark = 6053
Database.DbCache.Hits = 810340
Database.DbCache.InitialDbOpens = 826621
Database.DbCache.Lookups = 1020999
Database.DbCache.MaxEntries = 7000
Database.DbCache.OvercrowdingRejections = 0
Database.ExtMgrPool.Peak = 65,406
Database.ExtMgrPool.Used = 148
Database.FreeHandleStack.FreeHandleStackHits = 15820238
Database.FreeHandleStack.HandleAllocations = 15900646
Database.FreeHandleStack.MissRate = 0
Database.LDAP.NAMELookupBindFailures = 0
Database.LDAP.NAMELookupBinds = 0
Database.LDAP.NAMELookupBytesReceived = 0
Database.LDAP.NAMELookupEntries = 0
Database.LDAP.NAMELookupFailures = 0
Database.LDAP.NAMELookupTotal = 0
Database.LDAP.NAMELookupTotalLookupTime = 0
Database.NAMElookupCacheCacheSize = 15,515,816
Database.NAMElookupCacheHashSize = 1,040,371
Database.NAMElookupCacheHits = 993,647
Database.NAMElookupCacheLookups = 1,976,641
Database.NAMElookupCacheMaxSize = 16,777,216
Database.NAMElookupCacheMisses = 928,539
Database.NAMElookupCacheNoHitHits = 54,455
Database.NAMElookupCachePool.Peak = 16,777,216
Database.NAMElookupCachePool.Used = 16,771,360
Database.NAMElookupCacheResets = 0
Database.NAMElookupMisses = 18,188
Database.NAMElookupTotal = 1976452
Database.NAMElookupTotalLookupTime = 4,080.991
Database.NIFPool.Peak = 1,048,576
Database.NIFPool.Used = 410,080
Database.NSFPool.Peak = 146,800,640
Database.NSFPool.Used = 373,408
Database.NSF.ClusterHashTable.EntriesWithSameIndex = 0
Database.NSF.ClusterHashTable.FreedEntriesOnCleanup = 0
Database.NSF.ClusterHashTable.HashedEntries = 0
Database.NSF.ClusterHashTable.HashIsFull = 0
Database.NSF.ClusterHashTable.MissedHashHits = 0
Database.NSF.ClusterHashTable.SuccessfullHashHits = 0
Database.NSF.Replicate.NotesMergedBack = 0
Database.NSF.Replicate.NotesReceived = 0
Database.NSF.Replicate.NotesReopened = 0
Database.NSF.Replicate.NotesSent = 0
Database.NSF.Replicate.UnreadMarks.ChunkLookups = 0
Database.NSF.Replicate.UnreadMarks.ChunksScanned = 0
Database.NSF.Replicate.UnreadMarks.ChunksSkimmed = 0
Database.NSF.Replicate.UnreadMarks.DroppedFutureEntries = 0
Database.NSF.Replicate.UnreadMarks.DroppedOldEntries = 0
Database.NSF.Replicate.UnreadMarks.FullReplications = 0
Database.NSF.Replicate.UnreadMarks.LocalMaxChunks = 0
Database.NSF.Replicate.UnreadMarks.LocalUnreadOperations = 0
Database.NSF.Replicate.UnreadMarks.MessagesReceived = 0
Database.NSF.Replicate.UnreadMarks.MessagesSent = 0

Database.NSF.Replicate.UnreadMarks.OperationsReceived = 0
Database.NSF.Replicate.UnreadMarks.OperationsSent = 0
Database.NSF.Replicate.UnreadMarks.UsersActive = 0
Database.NSF.Replicate.UnreadMarks.UsersActiveMax = 0
Database.NSF.SignatureCache.Hits = 18151
Database.NSF.SignatureCache.Tries = 42352
Database.RM.Sys.Logged = Disabled
Disk.Fixed = 2
Disk.Remote = 0
Disk./boot.Free = 91,972,608
Disk./boot.Size = 103,515,136
Disk./boot.Type = ext2
Disk./Free = 29,125,660,672
Disk./Size = 34,133,860,352
Disk./Type = reiserfs
Domino.Cache.Command.Count = 0
Domino.Cache.Command.DisplaceRate = 0
Domino.Cache.Command.HitRate = 0
Domino.Cache.Command.MaxSize = 128
Domino.Cache.Database.HitRate = 31.7893093169818
Domino.Cache.Design.Count = 128
Domino.Cache.Design.DisplaceRate = 12.654327804946
Domino.Cache.Design.HitRate = 87.344445082543
Domino.Cache.Design.MaxSize = 128
Domino.Cache.Forms View Summary.Count = 1
Domino.Cache.Forms View Summary.DisplaceRate = 0
Domino.Cache.Forms View Summary.HitRate = 100.000156717301
Domino.Cache.FormsCache.Count = 0
Domino.Cache.FormsCache.MaxSize = 256
Domino.Cache.iNote WA Forms file.Count = 1
Domino.Cache.NNotesID.Count = 0
Domino.Cache.NNotesID.MaxSize = 7,200
Domino.Cache.Note Cache.HitRate = 0
Domino.Cache.Session.Count = 0
Domino.Cache.Session.MaxSize = 1,000
Domino.Cache.SkinGroupsCache.Count = 0
Domino.Cache.SkinGroupsCache.MaxSize = 256
Domino.Cache.User.Count = 1,365
Domino.Cache.User.DisplaceRate = 0
Domino.Cache.User.HitRate = 67.5808456241996
Domino.Cache.User.MaxSize = 7,200
Domino.Command.CopyToFolder = 0
Domino.Command.CreateDocument = 0
Domino.Command.DeleteDocument = 0
Domino.Command.DeleteDocuments = 0
Domino.Command.EditDocument = 1215961
Domino.Command.GetOrbCookie = 0
Domino.Command.MoveToFolder = 0
Domino.Command.Navigate = 0
Domino.Command.OpenAbout = 0
Domino.Command.OpenAgent = 0
Domino.Command.OpenCssResource = 0
Domino.Command.OpenDatabase = 0
Domino.Command.OpenDocument = 1702060
Domino.Command.OpenElement = 10
Domino.Command.OpenFileResource = 0
Domino.Command.OpenForm = 0
Domino.Command.OpenHelp = 0
Domino.Command.OpenIcon = 0
Domino.Command.OpenImageResource = 0
Domino.Command.OpenJavascriptLib = 0
Domino.Command.OpenNavigator = 0
Domino.Command.OpenPreferences = 0
Domino.Command.OpenServer = 0
Domino.Command.OpenView = 0
Domino.Command.ReadForm = 0
Domino.Command.Redirect = 0
Domino.Command.RemoveFromFolder = 0

Domino.Command.RequestCert = 0
Domino.Command.SaveDocument = 0
Domino.Command.SearchDomain = 0
Domino.Command.SearchSite = 0
Domino.Command.SearchView = 0
Domino.Command.Total = 3152517
Domino.Command.Unknown = 0
Domino.Config.ActiveThreads.Max = 80
Domino.Config.ActiveThreads.Min = 20
Domino.Config.AllowDirectoryLinks = 1
Domino.Config.Directory.CGI = /local/notesdata/domino/cgi-bin
Domino.Config.Directory.HTML = /local/notesdata/domino/html
Domino.Config.Directory.Icons = /local/notesdata/domino/icons
Domino.Config.Directory.JavaRoot = /local/notesdata/domino/java
Domino.Config.DNSLookup = 0
Domino.Config.EnforceAccess = 0
Domino.Config.HomeURL = /homepage.nsf?Open
Domino.Config.HostName =
Domino.Config.Image.Format = GIF
Domino.Config.Image.Interlaced = 1
Domino.Config.Log.Access = access
Domino.Config.Log.Error = error
Domino.Config.Log.Filter =
Domino.Config.Log.TimeStamp = 0
Domino.Config.PortNumber = 80
Domino.Config.PortStatus = 1
Domino.Config.SSL.KeyFile = /local/notesdata/keyfile.kyr
Domino.Config.SSL.PortNumber = 443
Domino.Config.SSL.Status = 0
Domino.Config.Timeout.CGI = 5
Domino.Config.Timeout.IdleThread = 0
Domino.Config.Timeout.Input = 2
Domino.Config.Timeout.Output = 20
Domino.Config.URLpath.CGI = /cgi-bin
Domino.Config.URLpath.Icons = /icons
Domino.Config.URLpath.JavaRoot = /domjava
Domino.Config.URLpath.Servlet = /servlet
Domino.Config.View.Lines = 30
Domino.Config.WelcomePage = default.htm
Domino.Requests.Per1Day.Peak = 3,149,713
Domino.Requests.Per1Day.PeakTime = 12/15/2004 18:50:18 MST
Domino.Requests.Per1Day.Total = 3,149,713
Domino.Requests.Per1Hour.Peak = 331,637
Domino.Requests.Per1Hour.PeakTime = 12/15/2004 16:14:33 MST
Domino.Requests.Per1Hour.Total = 0
Domino.Requests.Per1Minute.Peak = 5,940
Domino.Requests.Per1Minute.PeakTime = 12/15/2004 18:37:38 MST
Domino.Requests.Per1Minute.Total = 0
Domino.Requests.Per5Minute.Peak = 29,039
Domino.Requests.Per5Minute.PeakTime = 12/15/2004 18:37:53 MST
Domino.Requests.Per5Minute.Total = 0
Domino.Requests.Total = 3,149,760
Domino.ThreadPool.average = 65536
Domino.ThreadPool.max = 524288
Domino.Threads.Active.Peak = 79
FT.Index.Bytes.PerHour = 0
FT.Index.Count = 1
FT.Index.Documents.Added = 0
FT.Index.Documents.Deleted = 0
FT.Index.Documents.Updated = 0
FT.Index.Total.Bytes = 0
FT.Index.Total.TimeMS = 1
Http.Accept.ConnectionsAccepted = 3302969
Http.Accept.ConnectionsDenied = 0
Http.Accept.ConnectionsRefused = 0
Http.Accept.Errors = 0
Http.Accept.Polls = 3475887
Http.Accept.PollTimeouts = 172917

Http.Accept.ServerBusy = 0
Http.CurrentConnections = 0
Http.MaxConnections = 2000
Http.Workers = 80
Http.Worker.Total.BytesRead = 1,774,027,212
Http.Worker.Total.BytesWritten = 48,617,107,060
Http.Worker.Total.Cgi.Requests = 0
Http.Worker.Total.Cgi.RequestTime = 0
Http.Worker.Total.DomWS.Requests = 0
Http.Worker.Total.DomWS.RequestTime = 0
Http.Worker.Total.Dsapi.Requests = 0
Http.Worker.Total.Dsapi.RequestTime = 0
Http.Worker.Total.File.Requests = 0
Http.Worker.Total.File.RequestTime = 0
Http.Worker.Total.Http.Requests = 0
Http.Worker.Total.Http.RequestTime = 0
Http.Worker.Total.IdleSessionTimeouts = 1
Http.Worker.Total.InputTimeouts = 0
Http.Worker.Total.Notes.Requests = 3302969
Http.Worker.Total.Notes.RequestTime = 1,260,409,931
Http.Worker.Total.OutputTimeouts = 0
Http.Worker.Total.QuickPlace.Requests = 0
Http.Worker.Total.QuickPlace.RequestTime = 0
Http.Worker.Total.RequestsProcessed = 3302969
Http.Worker.Total.TotalRequestTime = 1,260,409,931
Mail.AverageDeliverTime = 1
Mail.AverageServerHops = 0
Mail.AverageSizeDelivered = 57
Mail.CurrentByteDeliveryRate = 0
Mail.CurrentByteTransferRate = 0
Mail.CurrentMessageDeliveryRate = 0
Mail.CurrentMessageTransferRate = 0
Mail.DBCacheEntries = 0
Mail.DBCacheHits = 62787
Mail.DBCacheReads = 237456
MAIL.Dead = 0
Mail.Delivered = 208146
Mail.DeliveredSize.100KB_to_1MB = 11161
Mail.DeliveredSize.10KB_to_100KB = 93467
Mail.DeliveredSize.1KB_to_10KB = 102871
Mail.DeliveredSize.1MB_to_10MB = 645
Mail.DeliveredSize.Under_1KB = 2
Mail.Deliveries = 237456
Mail.DeliveryThreads.Active = 0
Mail.DeliveryThreads.Max = 13
Mail.DeliveryThreads.Total = 13
Mail.Domain = INTEL
MAIL.Hold = 0
Mail.Mailbox.AccessConflicts = 174
Mail.Mailbox.Accesses = 69397
Mail.Mailbox.AccessWarnings = 6161
Mail.Mailbox.CurrentAccesses = 0
Mail.Mailbox.MaxConcurrentAccesses = 7
Mail.Mailbox.Opens = 0
Mail.MaximumDeliverTime = 12
Mail.MaximumServerHops = 1
Mail.MaximumSizeDelivered = 9768
Mail.MinimumDeliverTime = 1
Mail.MinimumServerHops = 1
Mail.MinimumSizeDelivered = 1
Mail.PeakByteDeliveryRate = 803951
Mail.PeakMessageDeliveryRate = 9
Mail.PeakMessageDeliveryTime = 12/15/2004 16:16:07 MST
Mail.PeakMessagesDelivered = 573
Mail.PeakTotalBytesDelivered = 48237108
Mail.TotalKBDelivered = 11,989,487
Mail.TotalPending = 0
Mail.TotalRouted = 208146

Mail.TotalRouted.NRPC = 208146
Mail.TransferThreads.Concurrent.Highest = 0
Mail.TransferThreads.Concurrent.Max = 6
Mail.TransferThreads.Max = 13
Mail.TransferThreads.Total = 0
MAIL.Waiting = 0
MAIL.WaitingForDIR = 0
MAIL.WaitingForDNS = 0
MAIL.WaitingRecipients = 0
Mem.Allocated = -6878108
Mem.Allocated.Process = -546607648
Mem.Allocated.Shared = 539729540
Mem.Availability = Plentiful
Mem.PhysicalRAM = 1822425088
NET.GroupCache.Hits = 6,155
NET.GroupCache.Misses = 2
NET.GroupCache.NumEntries = 6,051
NET.GroupCache.Size = 457,842
NET.GroupCache.Used = 373,004
NET.Log.SUT/Intel.PeakUnwrittenEntries = 4
NET.Log.SUT/Intel.UnwrittenEntries = 2
NET.TCPIP.BytesReceived = 17,632,778
NET.TCPIP.BytesSent = 17,633,018
NET.TCPIP.Sessions.Established.Incoming = 86
NET.TCPIP.Sessions.Established.Outgoing = 80
NET.TCPIP.Sessions.Limit = 65535
NET.TCPIP.Sessions.LimitMax = 65535
NET.TCPIP.Sessions.LimitMin = 10
NET.TCPIP.Sessions.Peak = 162
NET.TCPIP.Sessions.Recycled = 0
NET.TCPIP.Sessions.Recycling = 0
Platform.LogicalDisk.1.AssignedName = sda
Platform.LogicalDisk.1.AvgQueueLen = 0
Platform.LogicalDisk.1.AvgQueueLen.Avg = 0
Platform.LogicalDisk.1.AvgQueueLen.Peak = 0
Platform.LogicalDisk.1.PctUtil = 0
Platform.LogicalDisk.1.PctUtil.Avg = 0
Platform.LogicalDisk.1.PctUtil.Peak = 0
Platform.LogicalDisk.1.ServiceTime = 0
Platform.LogicalDisk.1.ServiceTime.Avg = 0
Platform.LogicalDisk.1.ServiceTime.Peak = 0
Platform.LogicalDisk.2.AssignedName = sdb
Platform.LogicalDisk.2.AvgQueueLen = 0
Platform.LogicalDisk.2.AvgQueueLen.Avg = 0
Platform.LogicalDisk.2.AvgQueueLen.Peak = 0
Platform.LogicalDisk.2.PctUtil = 0
Platform.LogicalDisk.2.PctUtil.Avg = 0
Platform.LogicalDisk.2.PctUtil.Peak = 0
Platform.LogicalDisk.2.ServiceTime = 0
Platform.LogicalDisk.2.ServiceTime.Avg = 0
Platform.LogicalDisk.2.ServiceTime.Peak = 0
Platform.LogicalDisk.3.AssignedName = sdc
Platform.LogicalDisk.3.AvgQueueLen = 360
Platform.LogicalDisk.3.AvgQueueLen.Avg = 98,593.98
Platform.LogicalDisk.3.AvgQueueLen.Peak = 715,826.64
Platform.LogicalDisk.3.PctUtil = 100
Platform.LogicalDisk.3.PctUtil.Avg = 97.4
Platform.LogicalDisk.3.PctUtil.Peak = 100
Platform.LogicalDisk.3.ServiceTime = 24,000
Platform.LogicalDisk.3.ServiceTime.Avg = 830,298.63
Platform.LogicalDisk.3.ServiceTime.Peak = 988,855,261.16
Platform.LogicalDisk.4.AssignedName = sdd
Platform.LogicalDisk.4.AvgQueueLen = 0
Platform.LogicalDisk.4.AvgQueueLen.Avg = 0
Platform.LogicalDisk.4.AvgQueueLen.Peak = 0
Platform.LogicalDisk.4.PctUtil = 0
Platform.LogicalDisk.4.PctUtil.Avg = 0
Platform.LogicalDisk.4.PctUtil.Peak = 0

Platform.LogicalDisk.4.ServiceTime = 0
Platform.LogicalDisk.4.ServiceTime.Avg = 0
Platform.LogicalDisk.4.ServiceTime.Peak = 0
Platform.LogicalDisk.TotalNumofDisks = 4
Platform.Memory.PagesPerSec = 0
Platform.Memory.RAM.AvailMBytes = 497
Platform.Memory.RAM.AvailMBytes.Avg = 136
Platform.Memory.RAM.AvailMBytes.Min = 33
Platform.Memory.RAM.AvailMBytes.Peak = 566
Platform.Memory.RAM.PctUtil = 93
Platform.Memory.RAM.TotalMBytes = 8,078
Platform.Network.1.AdapterName = eth0
Platform.Network.1.BytesRecvdPerSec = 28
Platform.Network.1.BytesSentPerSec = 0
Platform.Network.1.PctCollisionRate = 0
Platform.Network.1.TotalBytesPerSec = 28
Platform.Network.2.AdapterName = eth1
Platform.Network.2.BytesRecvdPerSec = 0
Platform.Network.2.BytesSentPerSec = 0
Platform.Network.2.PctCollisionRate = 0
Platform.Network.2.TotalBytesPerSec = 0
Platform.Network.3.AdapterName = sit0
Platform.Network.3.BytesRecvdPerSec = 0
Platform.Network.3.BytesSentPerSec = 0
Platform.Network.3.PctCollisionRate = 0
Platform.Network.3.TotalBytesPerSec = 0
Platform.Network.TotalNumofAdapters = 3
Platform.Network.Total.BytesRecvdPerSec = 28
Platform.Network.Total.BytesSentPerSec = 0
Platform.Network.Total.NetworkBytesPerSec = 28
Platform.Network.Total.PctCollisionRate = 0
Platform.PagingFile.Free.SizeMBytes = 1,994
Platform.PagingFile.Total.PctUtil = 2
Platform.PagingFile.Total.PctUtil.Avg = 0
Platform.PagingFile.Total.PctUtil.Peak = 2
Platform.PagingFile.Total.SizeMBytes = 2,047
Platform.System.ContextSwitchesPerSec = 864
Platform.System.ContextSwitchesPerSec.Avg = 1,690
Platform.System.ContextSwitchesPerSec.Min = 782
Platform.System.ContextSwitchesPerSec.Peak = 4,665
Platform.System.PctCombinedCpuUtil = 0
Platform.System.PctCombinedCpuUtil.Avg = 36.91
Platform.System.PctCombinedCpuUtil.Peak = 96
Platform.System.PctTotalPrivilegedCpuUtil = 0
Platform.System.PctTotalPrivilegedCpuUtil.Avg = 3.06
Platform.System.PctTotalPrivilegedCpuUtil.Peak = 34
Platform.System.PctTotalUserCpuUtil = 0
Platform.System.PctTotalUserCpuUtil.Avg = 34.8
Platform.System.PctTotalUserCpuUtil.Peak = 91
Platform.Time.LastSample = 12/15/2004 20:32:26 MST
Platform.Time.SampleRateInMins = 1
Server.Administrators = CN=SIE STAFF/O=Intel
Server.Administrators.Access = CN=SIE STAFF/O=Intel
Server.Administrators.NeededHelp = 1
Server.AvailabilityIndex = 100
Server.AvailabilityThreshold = 0
Server.BootID = 7110901
Server.BusyTimeQuery.ReceivedCount = 0
Server.CPU.Count = 4
Server.ElapsedTime = 09:53:29
Server.ExpansionFactor = 1
Server.MailBoxes = 3
Server.Monitor.Start = 12/15/2004 10:35:11 MST
Server.Name = CN=SUT/O=Intel
Server.OpenRequest.MaxUsers = 0
Server.OpenRequest.Restricted = 0
Server.Path.Configfile = /local/notesdata/notes.ini
Server.Path.Data = /local/notesdata

Server.Path.Executable = /opt/lotus/notes/latest/linux/
Server.Ports = TCPIP,TCPIP
Server.PoweredBy = Notes
Server.Sessions.Dropped = 0
Server.SharedMail = 0
Server.Task = Event Monitor: Idle: [12/15/2004 19:58:35 MST]
Server.Tasks = 33
Server.Task.DB = Database Server: Idle:12/15/2004 19:58:35 MST]
Server.Time.Start = 12/15/2004 10:14:11 MST
Server.Title = sys und test
Server.Trans.PerMinute = 0
Server.Trans.PerMinute.Peak = 832
Server.Trans.PerMinute.Peak.Time = 12/15/2004 16:06:11 MST
Server.Trans.Total = 66891
Server.Users = 0
Server.Users.1MinPeak = 53
Server.Users.1MinPeakTime = 12/15/2004 17:47:03 MST
Server.Users.5MinPeak = 80
Server.Users.5MinPeakTime = 12/15/2004 18:54:03 MST
Server.Users.Active = 0
Server.Users.Active15Min = 0
Server.Users.Active1Min = 0
Server.Users.Active30Min = 0
Server.Users.Active3Min = 0
Server.Users.Active5Min = 0
Server.Users.Peak = 81
Server.Users.Peak.Time = 12/15/2004 16:51:54 MST
Server.Version.Notes = Release 6.5.3
Server.Version.Notes.BuildNumber = 195
Server.Version.OS = Linux 2.4.21-133-smp #1 SMP Tue
Stats.Time.Current = 12/15/2004 20:07:10 MST
Stats.Time.Start = 12/15/2004 10:14:09 MST
436 statistics found

First Edition - January 2005

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