

NotesBench Disclosure Report
for
IBM @server xSeries 235
using
Lotus Domino Server 6.0
and
Red Hat Linux 7.3

Results Submitted February 10, 2003

Results Certified March 4, 2003

IBM Corporation



Table of Contents

Section 1: Executive Summary

Section 2: Benchmarking Objectives

Section 3: Test Methodologies

Section 4: Data

Section 5: Analysis

Section 6: Conclusions

Section 7: Statement by Auditor

Appendix A: Overall Test Setup and Software Versions

Appendix B: System Configurations

Appendix C: Operating System Parameters Values

Appendix D: Notes Parameters (NOTES.INI file)

Appendix E: Network Configuration File(s)

Appendix F: Guidelines for Information Usage

Appendix G: Pricing

Appendix H: Optional (vendor-defined information)

Appendix I: Domino “Show Statistics” Output

Edition Notice

Executive Summary

The IBM® @server xSeries 235 server demonstrated leadership performance and price/performance running Lotus® Domino® Server Release 6.0 on Red Hat Linux 7.3. 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	3,000	2,583	0.325	\$7.10	\$8.24

The xSeries 235 server was configured with two 2.8GHz¹ Intel® Xeon™ Processor DP, 4GB PC2100 memory, and 17 hard disk drives. The Domino server contained more than 6,000 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 iNotes-Only workload of 3,000 active mail users (see price/performance results² above).

IBM's xSeries Server Performance Laboratory in Research Triangle Park, NC, conducted the benchmark in February, and KMDS Technical Associates, Inc., audited the results in February 2003.

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 235 system as a Domino Server 6.0 mail server configured with the ServeRAID-4Mx Ultra160 SCSI Adapter for RAID-1 data redundancy.

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

² The price/performance results are based on IBM's published list prices.

Test Methodologies

Test Setup and Hardware/Software Configuration

The x235 system under test (SUT) was configured with two 2.8GHz Xeon processors (512KB of ECC full-speed L2 write-back cache with Intel Hyper_Threading Technology), 4GB of PC2100 memory, and seventeen 18.2GB 15K rpm Ultra160 SCSI hard drives. One RAID-1 array, composed of 14 hard drives (18.2GB), which contained the mail database files, was connected to the external channel on the ServeRAID-4Mx Ultra160 SCSI Adapter. Three hard drives, one of which as RAID-0 was used as the boot disk and two of which in a RAID-1 array were used to hold the Domino executable code and Domino data directory, were connected to the other channel on the ServeRAID-4Mx Ultra160 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 Cisco Catalyst 3500-XL switch. The x235 server's embedded Gigabit Ethernet interface was used.

The x235 ran Red Hat Linux 7.3 and Domino Server 6.0.

The RAID controller configuration value for Stripe Unit Size was set at 16KB. Write-back cache was enabled for the RAID-1 array.

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

R6 iNotes-Only Workload
Server_Max_Concurrent_Trans=300
NSF_DBCache_MaxEntries=5000
NSF_Buffer_Pool_Size_MB=256
MailLogToEventsOnly=1
Log_MailRouting=10
Log_Sessions=0
Server_Pool_Tasks=60
Max_Users=4000

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-1 array and were mounted as directory /data1. The Domino executable code, data directory, and mail database file links were located on the two-drives RAID-1 array and were mounted as directories /opt/lotus and /local/notesdata.

Test Procedures

Several trial runs were conducted to attempt 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 3,000 users were distributed over four clients. Each client added 750 users to the system under test. The test ran for 8 hours, including ramp-up. The actual ramp-up period from startup of child 1 to the point when all 3,000 users were shown on the server console was approximately 80 minutes. The test ran for more than 6 hours after ramp-up. During the test runs, 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.

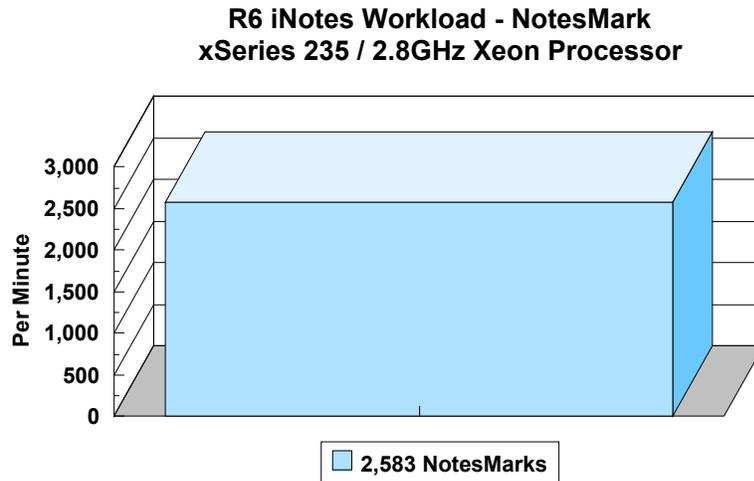
Other NotesBench Tests

IBM intends to continue conducting NotesBench measurements to further optimize and exploit the performance capability of the xSeries product line running Domino Server 6.0.

Data

xSeries 235 NotesMark Value for R6 iNotes Test

The x235 server demonstrated that it can support 3,000 concurrent, active users with this workload. The NotesMark throughput value was 2,583. Average response time was 0.325 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.

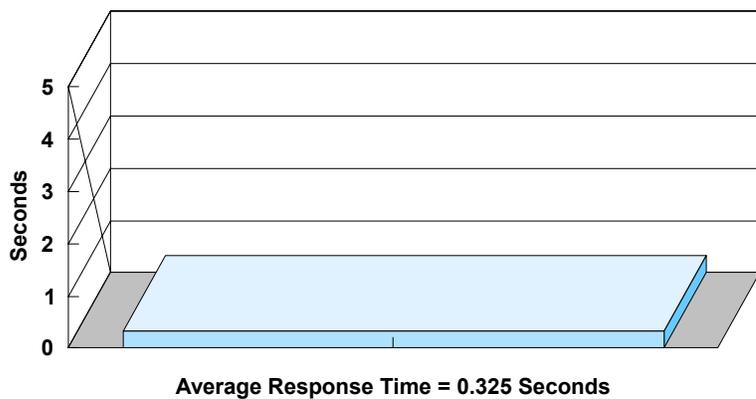
The NotesBench R6 iNotes workload models an active user sending, receiving, and deleting mail via a browser interface. This workload also incorporates variable mail message sizes and attachments (50KB and 10MB). An average user will execute the simulation script four times an hour. Each time the script 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

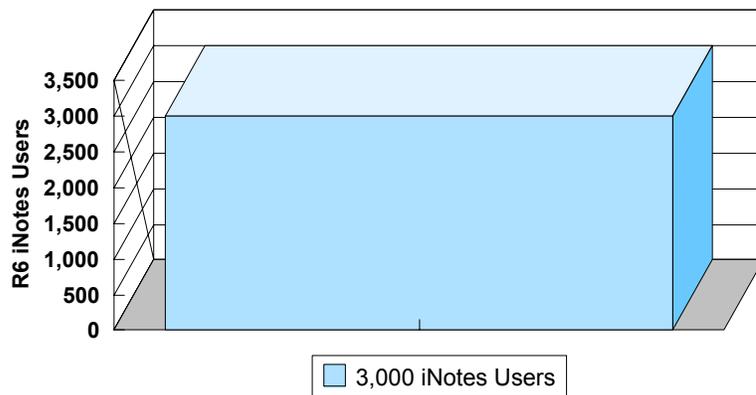
Min Start Time = 02/20/2003 12:26:24 AM Max Stop Time = 02/20/2003 08:18:52 AM
Total Test Errors = 0
Total Test Time = 28320 sec

Test Run: Users = 3000 NotesMark = 2583 Response Time = 325 msec (02/20/2003
01:35:00 AM to 02/20/2003 08:14:00 AM)

**R6 iNotes Workload - Average Response Time
xSeries 235 / 2.8GHz Xeon Processor**



**R6 iNotes Workload - Users
xSeries 235 / 2.8GHz Xeon Processor**



Analysis

When configured as described in this report, the x235 server demonstrated that it can manage the intense resource usage during ramp-up to 3,000 concurrent R6 iNotes users with no errors at the clients. During the steady-state period on one of the successful 3,000-user runs, the average CPU utilization was 45.28 percent and the memory utilization was 99.74 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.

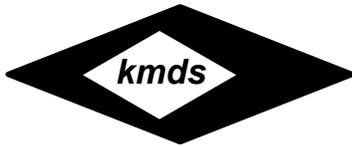
Conclusions

The test results demonstrate that the x235 configured as described in this report can support up to 3,000 concurrent, active R6 iNotes users with a response time well below that permitted by the test criteria.

These results are based on running the x235 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 attached.



Lotus NotesBench Tests Results Report Certification Letter

March 4, 2003

Report Title: NotesBench Disclosure Report for IBM @server xSeries 235 using Lotus Domino Server 6.0 and Red Hat Linux 7.3

Report Date: February 2003

Company: IBM Corporation

Auditor's Statement

This report's contents and the actual data files from the test runs have been audited for accuracy and completeness. The version of NotesBench used was compatible with the Notes Server code that was run on the server under test. The workloads were run correctly. The configuration of the test environment and system under test were verified. The NotesBench scaling rules were correctly applied. The tests did reach steady state. The capacity and performance information were direct outputs from the **notesnum.exe** program. All costs for the system under test were included in the price documented in this report. The driver systems were properly configured.

This report accurately reflects the test environment and results of the NotesBench benchmark tests described herein. This report **passes** the audit performed and its contents are approved for publication.

The certified report results are summarized below:

System Under Test Configuration	List Price	NotesBench Workload	Concurrent Users	Average Response Time (seconds)	NotesMark (transactions per minute)
IBM @server xSeries 235 (2*Pentium Xeon/ 2.8 GHz, 4GB RAM)	\$21,295.00	R6iNotes	3,000	0.325	2,583

Signed,

Daryl K. Thompson
NotesBench Auditor
KMDS Technical Associates, Inc.

Appendix A: Overall Test Setup and Software Versions

Number of Client Systems

For the R6 iNotes test, five driver systems were used. Four systems were configured as child drivers 1 through 4; one system was used as the parent driver to control the run.

The configuration used for the driver systems follows:

Child drivers 1-4:

- Pentium III 500MHz with 512MB memory
- C: Partition (2GB - NTFS) - Windows 2000/SP3
- D: Partition (6.5GB - NTFS) - Notes 6.0 clients

Parent driver:

- Pentium III 500MHz with 512MB memory
- C: Partition (9GB - NTFS) - Windows 2000/SP3 and Notes 6.0 clients

Number of Server Platforms

One server platform, the x235 with two 2.8GHz Xeon processors and 4GB of memory, was benchmarked.

The disk configuration used for the system under test follows:

- /: Single disk drive (18.2GB - Ultra160) - Red Hat Linux 7.3 (Boot Partition)
- /opt/lotus and /local/notesdata: two-drive array (18.2GB - RAID-1) - Domino executables and Domino mail data subdirectory
- /data1: 14-drive array (121GB, RAID-1) - Domino mail files

Network

The network consisted of one segments. All child drivers, parents and SUT were connected to one of 24 ports on the Cisco Catalyst 3500-XL switch. The x235 server's embedded Gigabit Ethernet interface was used.

Software Versions

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

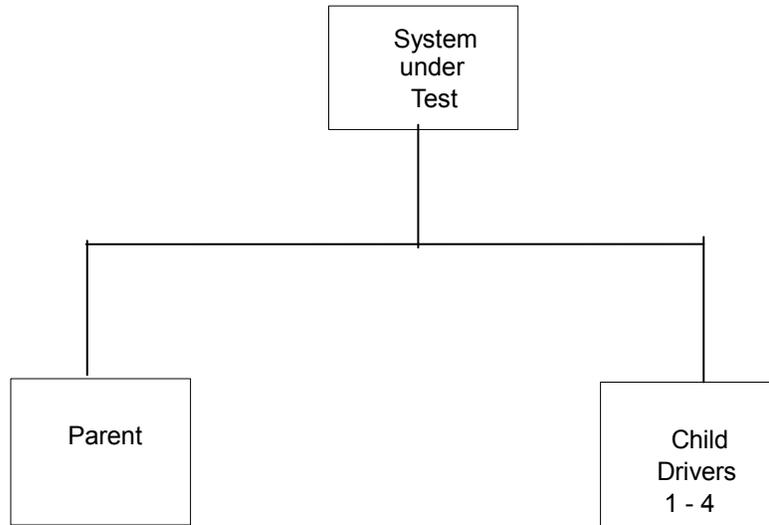
- Red Hat Linux 7.3
- Lotus Domino Server Release 6.0 for Linux

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

- Microsoft Windows 2000 Professional for child drivers and Windows 2000 Server for the parent systems
- Lotus Domino Client Release 6.0 for Windows 2000

- NotesBench Version 6.0 - Windows/32

Test Setup Diagram



Appendix B: System Configuration

Server under Test	
System	xSeries 235
Processor	2 x 2.8GHz Xeon Processor
Memory	4GB
Cache	512KB ECC Full-Speed L2 Cache per Processor
RAID Controller	1 x ServeRAID-4Mx Ultra160 SCSI Adapter
Disk Drive	17 x 18.2GB 15K rpm (configured as one 14-drives RAID-1 array, one two-drives RAID-1 array, and one single RAID 0 drive)
Network Interface	Embedded 10/100/1000Mbps Ethernet controller
I/O	PCI Bus (64-Bit)
Operating System	Red Hat Linux 7.3
Notes	Lotus Domino Server Release 6.0 for Linux

Parent Source Drivers and Child Drivers 1 - 4	
System	IBM IntelliStation M Pro
Processor	1 x 500MHz Pentium III
Memory	512MB
Disk Drive	1 x 9.1GB
Network Interface	Embedded 10/100 Ethernet Controller
I/O	PCI Bus
Operating System	Microsoft Windows 2000 Professional with Service Pack 3
Notes	Lotus Domino Client Release 6.0 for Windows 2000
NotesBench	NotesBench Version 6.0 - Windows/32

Appendix C: Operating System Parameters

The Linux kernel used for this benchmark was 2.4.18-3bigmem. The following non-default parameter setting were added:

/etc/sysctl.conf

```
kernel.shmmni=8192
kernel.sem=250 32000 32 1024
```

/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, /data1, /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
```

The following glibc source file was modified and rebuild:

`/usr/src/redhat/SOURCES/glibc-2.2.5/linuxthreads/sysdeps/unix/sysv/linux/bits/local_lim.h,`

Original line:

```
#define PTHREADS_THREADS_MAX 1024
```

New line:

```
#define PTHREADS_THREADS_MAX 8192
```

The new glibc library was using by the following steps:

```
cd /usr/src/redhat/BUILD/glibc-2.2.5/build-i386-linux/linuxthreads
mkdir /home/notes/lib
cp libpthread.so /home/notes/lib/libpthread.so.domino
cd ../rt
cp librt.so /home/notes/lib/librt.so.domino
cd /home/notes/lib
ln -s /home/notes/lib/libpthread.so.domino libpthread.so.0
ln -s /home/notes/lib/librt.so.domino librt.so.1/
chown notes.notes *
```

A script (`go`, in the `/opt/lotus/bin` directory) was created to load the new library before test:

```
LD_PRELOAD_SAV=$LD_PRELOAD
LD_PRELOAD=/home/notes_user/lib/libpthread.so.0:/home/notes_user/lib/librt.so.
1:$LD_PRELOAD
export LD_PRELOAD
/opt/lotus/bin/server
LD_PRELOAD=$LD_PRELOAD_SAV
export LD_PRELOAD
```

Appendix D: NOTES.INI Settings

NOTES.INI for Server

```
[Notes]
Directory=/local/notesdata
KitType=2
UserName=
CompanyName=
NotesProgram=/opt/lotus/notes/60000/linux
ASPInstall=0
CleanupScriptPath=/opt/lotus/notes/latest/linux/nsd.sh -batch
FaultRecovery_Build=Build V60_09252002
DSTLAW=4,1,1,10,-1,1
SHARED_MAIL=0
DisableLDAPOnAdmin=1
Passthru_LogLevel=0
Console_LogLevel=2
DefaultMailTemplate=mail6.ntf
Preferences=32
ServerTasks=Router,HTTP
;ServerTasks=Update,Replica,Router,AMgr,AdminP,CalConn,Sched,HTTP
;ServerTasksAt1=Catalog,Design
;ServerTasksAt2=UpdAll
;ServerTasksAt3=Object Info -Full
;ServerTasksAt5=Statlog
TCPIP=TCP, 0, 15, 0
Serial1=XPC,1,15,0,
Serial2=XPC,2,15,0,
Timezone=5
DST=1
MailType=0
$$HasLANPort=1
Ports=TCPIP,TCPIP
DisabledPorts=Serial1,Serial2
LOG_REPLICATION=1
LOG_SESSIONS=0
KeyFilename=/local/notesdata/server.id
CertifierIDFile=/local/notesdata/cert.id
MailServer=CN=sut/O=ibm
NAMELOOKUP_TRUST_DIRCAT=0
PhoneLog=2
Log=log.nsf, 1, 0, 7, 40000
ServerKeyFileName=server.id
Domain=ibm
Admin=CN=administrator/O=ibm
TemplateSetup=6010
Setup=6023
ServerSetup=6010
CleanSetup=1
ServerName=sut/ibm
ServerNameNative=02C302C37375742F69626D
FormulaTimeout=120
NSF_QUOTA_METHOD=2
TRANSLOG_AutoFixup=1
TRANSLOG_UseAll=0
TRANSLOG_Style=0
```

```

TRANSLOG_Performance=2
TRANSLOG_Status=0
ServerController=0
FaultRecovery=0
MTEnabled=0
EventSetup=600
WebAdminSetup=600
DominoConfigLevel=1
;=====
server_show_performance=1
mailuseprocesses=1
Log_mailRouting=10
maillogtoeventsonly=1
;DBMaxEntries=2000
Max_users=4000
NSF_DBCache_MaxEntries=5000
Server_Pool_Tasks=60
Server_max_Concurrent_Trans=300
No_Force_Activity_Logging=1
NSF_Buffer_Pool_Size_MB=256
Update_No_Fulltext=1
MailCompactDisabled=1
Debug_OutFile=/home/notes/sut_info.txt
;=====
CONSOLE_LOG_ENABLED=1

```

NOTES.INI for Child 1

```

[Notes]
Directory=D:\Notes\data
KitType=1
InstallType=2
;=====
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
;=====iNotes=====
MailTemplate=sut!!iNotes60.ntf
;NBiNotes=1
;HTTPNABView=$People/M
WebAuthenticationOff=1
WebPreferencesOff=1
WebDebugOn=0
HTTPHost=sut.ibm.com
RecipientDomain=ibm.com
Domail=ibm.com
;=====
USESERNAB=1
ResultsDirectory=\\parent1\c$\results
DEBUG_OUTFILE=\\parent1\c$\results\res1

```

```

;NumNotesLocalReplica=90
;NumSharedNotes=900
ThreadStagger=1.5
;nopause=1
;
=====
;
FaultRecovery_Build=Build V60_09252002
CONSOLE_LOG_ENABLED=1
DSTLAW=4,1,1,10,-1,1
UPDATE_TIMER=02/06/2003 08:41:16 AM
SUDIALOG_ON=0
Timezone=5
DST=1
MailType=0
$$HasLANPort=1
WWWDSP_SYNC_BROWSERCACHE=0
WWWDSP_PREFETCH_OBJECT=0
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,_IWKSV,,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=Lotus 1-2-3,0,_XWKS,,123,.WK1,.WK3,.WK4,.WKS,.WR1,.WRK,,4,
VIEWEXP2=Structured Text,0,_XSTR,,CGN,LTR,.STR,,1,
VIEWEXP3=Tabular Text,1,_XTAB,,CGN,LTR,.RPT,.TAB,,1,
VIEWEXP4=vCard 2.1,0,_XVCRD,,VCF,,1,
VIEWEXP5=vCard 3.0,0,_XVCRD3,,VCF,,1,
EDITIMP1=ASCII Text,0,_ITEXT,,C,H,.PRN,.RIP,.TXT,,1,
EDITIMP2=Binary with Text,0,_ISTRNGS,,*,,1,
EDITIMP3=BMP Image,0,_IBMP,,BMP,,18,
EDITIMP4=CGM Image,0,_IFL,,CGM,.GMF,,8,
EDITIMP5=GIF Image,0,_IGIF,,GIF,,18,
EDITIMP6=HTML File,0,_IHTML,,HTM,.HTML,,1,
EDITIMP7=JPEG Image,0,_IJPEG,,JPG,,18,
EDITIMP8=Lotus 1-2-3,0,_IW4W,_IWKSE,.123,.WK1,.WK3,.WK4,.WKS,.WR1,.WRK,,4,
EDITIMP9=Lotus PIC,0,_IPIC,,PIC,,8,
EDITIMP10=Lotus Word Pro,0,_IW4W,,LWP,,2,
EDITIMP11=Microsoft Excel,0,_IW4W,,XLS,,4,
EDITIMP12=Microsoft RTF,0,_IW4W,_IRTF,.DOC,.RTF,,2,
EDITIMP13=Microsoft Word,0,_IW4W,,DOC,,2,
EDITIMP14=PCX Image,0,_IPCX,,PCX,,18,
EDITIMP15=TIFF 5.0 Image,0,_ITIFF,,TIF,,18,
EDITIMP16=WordPerfect 5.x,0,_IW4W,,DOC,.WPD,,2,
EDITIMP17=WordPerfect 6.0/6.1,0,_IW4W,,DOC,.WPD,.WPT,,2,
EDITEXP1=ASCII Text,2,_XTEXT,,C,H,.PRN,.RIP,.TXT,,1,
EDITEXP2=CGM Image,2,_XCGM,,CGM,.GMF,,8,
EDITEXP3=Microsoft RTF,2,_XRTF,,DOC,.RTF,,4,

```



```
EmptyTrash=0
UNICODE_Display=1
AltCalendar=0
MIMEPromptMultilingual=1
MIMEMultilingualMode=1
QuotePrefix=>
QuoteLineLength=70
EnableActiveXInBrowser=1
EnableJavaScript=1
EnableJavaScriptErrorDialogs=1
EnableLiveConnect=1
BackgroundPrinting=1
ShowAccelerators=1
```

NOTES.INI for Parent Source Driver

```
[Notes]
Directory=C:\notes\data
KitType=1
InstallType=2
;-----
;
; Begin Notesbench variables for parent 1
;
; *****
;
; NodeName=parent1
;
; Runtime=510
; ChildStagger=1,1;30,2;38,3;48,4;58,5
; ChildStagger=1,1;29,2;31,3;33,4;35,5;35,6;37,7;39,8;41,9
; NumClients1=750
; NumClients2=750
; NumClients3=750
; NumClients4=750
; NumClients5=600
; NumClients6=300
; NumClients7=500
; NumClients8=500
; NumClients9=500
; NumClients10=500
; NumClients11=500
; NumClients12=500
; NumClients13=500
; NumClients14=500
; NumClients15=500
; NumClients16=500
; NumClients17=500
; NumClients18=500
; NumClients19=500
; NumClients20=500
; ResultsDirectory=c:\results
; DEBUG_OUTFILE=c:\results\notesnum_sut.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
; ProbeInterval=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
FaultRecovery_Build=Build V60_09252002
CONSOLE_LOG_ENABLED=1
DSTLAW=4,1,1,10,-1,1
UPDATE_TIMER=02/06/2003 08:18:25 AM
SUDIALOG_ON=0
Timezone=5
DST=1
MailType=0
$$HasLANPort=1
WWWDSP_SYNC_BROWSERCACHE=0
WWWDSP_PREFETCH_OBJECT=0
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,_IWKSV,,.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=Lotus 1-2-3,0,_XWKS,,.123,.WK1,.WK3,.WK4,.WKS,.WR1,.WRK,,4,
VIEWEXP2=Structured Text,0,_XSTR,,.CGN,.LTR,.STR,,1,
VIEWEXP3=Tabular Text,1,_XTAB,,.CGN,.LTR,.RPT,.TAB,,1,
VIEWEXP4=vCard 2.1,0,_XVCRD,,.VCF,,1,
VIEWEXP5=vCard 3.0,0,_XVCRD3,,.VCF,,1,
EDITIMP1=ASCII Text,0,_ITEXT,,.C,.H,.PRN,.RIP,.TXT,,1,
EDITIMP2=Binary with Text,0,_ISTRNGS,,.*,,1,
EDITIMP3=BMP Image,0,_IBMP,,.BMP,,18,
EDITIMP4=CGM Image,0,_IFL,,.CGM,.GMF,,8,
EDITIMP5=GIF Image,0,_IGIF,,.GIF,,18,
EDITIMP6=HTML File,0,_IHTML,,.HTM,.HTML,,1,
EDITIMP7=JPEG Image,0,_IJPEG,,.JPG,,18,
EDITIMP8=Lotus 1-2-3,0,_IW4W,_IWKSE,.123,.WK1,.WK3,.WK4,.WKS,.WR1,.WRK,,4,

```


NAMES=names.nsf
ReplDefFullDocs=1
ReplDefPartDocsLimit=0
ReplDefPartDocsLimitAmt=40
ReplDefPartAtchLimit=0
ReplDefPartAtchLimitAmt=40
ReplDefFullText=0
ReplDefEncrypt=1
ReplDefEncryptType=2
ReplDefReplImmed=1
\$headlineDisableHeadlines=0
PromptForLocation=0
EmptyTrash=0
UNICODE_Display=1
AltCalendar=0
MIMEPromptMultilingual=1
MIMEMultilingualMode=1
QuotePrefix=>
QuoteLineLength=70
EnableActiveXInBrowser=1
EnableJavaScript=1
EnableJavaScriptErrorDialogs=1
EnableLiveConnect=1
BackgroundPrinting=1
ShowAccelerators=1

Appendix E: Network Configuration

The standard TCP/IP stack provided by Red Hat Linux 7.3 was used.

The default settings of the embedded Full Duplex 10/100/1000 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

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	IBM List Price	Extended Price
IBM xSeries 235 One 2.8GHz Xeon Processor Embedded 10/100/1000 Ethernet Controller	8671-71X	1	\$2,659	\$2,659
2.8GHz Xeon Processor	71P8967	1	999	999
1GB PC2100 DDR SDRAM RDIMM Memory	33L5039	4	779	3,116
ServeRAID-4Mx Ultra160 SCSI Adapter	06P5736	1	879	879
18.2GB 15K Ultra160 SCSI Hard Disk Drives	06P5767	17	329	5,593
EXP300 Rack Storage Expansion Enclosure	3531-1RU	1	3,179	3,179
E54 15" (13.8" Viewable) Color Monitor	633147N	1	139	139
Software				
Red Hat Linux 7.3		1	115	115
Lotus Domino D6 Enterprise Server (List Price per Processor)		2	2,308	4,616
Total System Price				\$21,295

Appendix H: Vendor-Defined Information

None.

Appendix I: Domino “Show Statistics” Output

```
> sh stat
Database.DAFailoverCount = 0
Database.DARefreshServerInfoCount = 0
Database.DAReloadCount = 0
Database.Database.BufferPool.Maximum.Megabytes = 256
Database.Database.BufferPool.MM.Reads = 15
Database.Database.BufferPool.MM.Writes = 0
Database.Database.BufferPool.Peak.Megabytes = 255
Database.Database.BufferPool.PerCentReadsInBuffer = 94.27
Database.DbCache.CurrentEntries = 2621
Database.DbCache.HighWaterMark = 3003
Database.DbCache.Hits = 277377
Database.DbCache.InitialDbOpens = 281190
Database.DbCache.Lookups = 5126186
Database.DbCache.MaxEntries = 5000
Database.DbCache.OvercrowdingRejections = 0
Database.ExtMgrPool.Peak = 65,406
Database.ExtMgrPool.Used = 148
Database.FreeHandleStack.FreeHandleStackHits = 6524167
Database.FreeHandleStack.HandleAllocations = 6531568
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 = 14,493,648
Database.NAMElookupCacheHashSize = 1,171,362
Database.NAMElookupCacheHits = 74,620
Database.NAMElookupCacheLookups = 386,443
Database.NAMElookupCacheMaxSize = 16,777,216
Database.NAMElookupCacheMisses = 281,404
Database.NAMElookupCacheNoHitHits = 30,419
Database.NAMElookupCachePool.Peak = 16,777,216
Database.NAMElookupCachePool.Used = 16,771,744
Database.NAMElookupCacheResets = 0
Database.NAMElookupMisses = 52
Database.NAMElookupTotal = 386459
Database.NAMElookupTotalLookupTime = 1,232.187
Database.NIFPool.Peak = 1,048,576
Database.NIFPool.Used = 487,712
Database.NSFPool.Peak = 69,206,016
Database.NSFPool.Used = 37,712,320
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.SignatureCache.Hits = 1
Database.NSF.SignatureCache.Tries = 2
Database.RM.Sys.Logged = Disabled
Disk.Fixed = 7
Disk.Remote = 0
Disk./boot.Free = 78,433,280
Disk./boot.Size = 103,108,608
Disk./boot.Type = ext3
Disk./data1.Free = 55,342,727,168
Disk./data1.Size = 125,392,666,624
```

Disk./data1.Type = ext3
Disk./dev/shm.Free = 2,110,128,128
Disk./dev/shm.Size = 2,110,128,128
Disk./dev/shm.Type = tmpfs
Disk./local.Free = 6,925,991,936
Disk./local.Size = 7,902,982,144
Disk./local.Type = ext3
Disk./opt.Free = 7,222,915,072
Disk./opt.Size = 7,895,064,576
Disk./opt.Type = ext3
Disk./tmp.Free = 1,970,819,072
Disk./tmp.Size = 2,112,802,816
Disk./tmp.Type = ext3
Disk./Free = 10,142,531,584
Disk./Size = 13,580,541,952
Disk./Type = ext3
Domino.Cache.Database.HitRate = 31.9301578639831
Domino.Cache.Design.Count = 128
Domino.Cache.Design.DisplaceRate = 10.5348777964018
Domino.Cache.Design.HitRate = 89.4629797197162
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 = 100.000442055014
Domino.Cache.FormsCache.Count = 0
Domino.Cache.FormsCache.MaxSize = 256
Domino.Cache.iNote WA Forms file.Count = 1
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 = 0
Domino.Cache.User.DisplaceRate = 0
Domino.Cache.User.HitRate = 99.9999250587727
Domino.Cache.User.MaxSize = 4,000
Domino.Command.CopyToFolder = 0
Domino.Command.CreateDocument = 0
Domino.Command.DeleteDocument = 0
Domino.Command.DeleteDocuments = 0
Domino.Command.EditDocument = 486969
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 = 735562
Domino.Command.OpenElement = 17975
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 = 1334131
Domino.Command.Unknown = 0
Domino.Config.ActiveThreads.Max = 70
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 = sut.ibm.com
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 = 1,334,126
Domino.Requests.Per1Day.PeakTime = 02/20/2003 08:23:19 EST
Domino.Requests.Per1Day.Total = 1,334,126
Domino.Requests.Per1Hour.Peak = 189,233
Domino.Requests.Per1Hour.PeakTime = 02/20/2003 02:01:34 EST
Domino.Requests.Per1Hour.Total = 113,786
Domino.Requests.Per1Minute.Peak = 4,290
Domino.Requests.Per1Minute.PeakTime = 02/20/2003 01:33:45 EST
Domino.Requests.Per1Minute.Total = 0
Domino.Requests.Per5Minute.Peak = 20,810
Domino.Requests.Per5Minute.PeakTime = 02/20/2003 01:36:49 EST
Domino.Requests.Per5Minute.Total = 0
Domino.Requests.Total = 1,334,139
Domino.ThreadPool.average = 65821
Domino.ThreadPool.max = 458752
Domino.Threads.Active.Peak = 48
Http.Accept.ConnectionsAccepted = 1334379
Http.Accept.ConnectionsDenied = 0
Http.Accept.ConnectionsRefused = 0
Http.Accept.Errors = 0
Http.Accept.Polls = 1342025
Http.Accept.PollTimeouts = 7645
Http.Accept.ServerBusy = 0
Http.CurrentConnections = 0
Http.MaxConnections = 2040
Http.Workers = 70
Http.Worker.Total.BytesRead = 626,923,757
Http.Worker.Total.BytesWritten = 26,756,583,515
Http.Worker.Total.Cgi.Requests = 0
Http.Worker.Total.Cgi.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 = 2662719
Http.Worker.Total.InputTimeouts = 0
Http.Worker.Total.Notes.Requests = 1334379
Http.Worker.Total.Notes.RequestTime = 200,101,235
Http.Worker.Total.OutputTimeouts = 0
Http.Worker.Total.RequestsProcessed = 1334379
Http.Worker.Total.TotalRequestTime = 200,101,235
Mail.AverageDeliverTime = 1
Mail.AverageServerHops = 0
Mail.AverageSizeDelivered = 47
Mail.CurrentByteDeliveryRate = 0
Mail.CurrentByteTransferRate = 0
Mail.CurrentMessageDeliveryRate = 0
Mail.CurrentMessageTransferRate = 0
Mail.DBCacheEntries = 767
Mail.DBCacheHits = 41941
Mail.DBCacheReads = 110095
MAIL.Dead = 0
Mail.Delivered = 104808
Mail.DeliveredSize.100KB_to_1MB = 4512
Mail.DeliveredSize.10KB_to_100KB = 36610
Mail.DeliveredSize.1KB_to_10KB = 49732
Mail.DeliveredSize.1MB_to_10MB = 224
Mail.DeliveredSize.Under_1KB = 13730
Mail.Deliveries = 110060
Mail.DeliveryThreads.Active = 0
Mail.DeliveryThreads.Max = 11
Mail.DeliveryThreads.Total = 11
Mail.Domain = IBM
MAIL.Hold = 0
Mail.Mailbox.AccessConflicts = 0
Mail.Mailbox.Accesses = 44135
Mail.Mailbox.AccessWarnings = 189
Mail.Mailbox.CurrentAccesses = 0
Mail.Mailbox.MaxConcurrentAccesses = 3
Mail.Mailbox.Opens = 0
Mail.MaximumDeliverTime = 17
Mail.MaximumServerHops = 1
Mail.MaximumSizeDelivered = 9767
Mail.MinimumDeliverTime = 1
Mail.MinimumServerHops = 1
Mail.MinimumSizeDelivered = 1
Mail.PeakByteDeliveryRate = 76066
Mail.PeakMessageDeliveryRate = 5
Mail.PeakMessageDeliveryTime = 02/20/2003 03:01:36 EST
Mail.PeakMessagesDelivered = 302
Mail.PeakTotalBytesDelivered = 4563986
Mail.TotalKBDelivered = 4,439,887
Mail.TotalPending = 0
Mail.TotalRouted = 104808
Mail.TotalRouted.NRPC = 104808
Mail.TransferThreads.Concurrent.Highest = 0
Mail.TransferThreads.Concurrent.Max = 5
Mail.TransferThreads.Max = 11
Mail.TransferThreads.Total = 0
MAIL.Waiting = 0
MAIL.WaitingForDIR = 0
MAIL.WaitingForDNS = 0
MAIL.WaitingRecipients = 0
Mem.Allocated = 82707874
Mem.Allocated.Process = -426837444
Mem.Allocated.Shared = 509545318
Mem.Availability = Plentiful
Mem.PhysicalRAM = 2147483647
NET.GroupCache.Hits = 28
NET.GroupCache.Misses = 4

NET.GroupCache.NumEntries = 3
NET.GroupCache.Size = 65,406
NET.GroupCache.Used = 2,048
NET.Log.sut/ibm.PeakUnwrittenEntries = 3
NET.Log.sut/ibm.UnwrittenEntries = 2
NET.TCPIP.BytesReceived = 9,712
NET.TCPIP.BytesSent = 1,534,650
NET.TCPIP.Sessions.Established.Incoming = 5
NET.TCPIP.Sessions.Established.Outgoing = 0
NET.TCPIP.Sessions.Limit = 65535
NET.TCPIP.Sessions.LimitMax = 65535
NET.TCPIP.Sessions.LimitMin = 10
NET.TCPIP.Sessions.Peak = 3
NET.TCPIP.Sessions.Recycled = 0
NET.TCPIP.Sessions.Recycling = 0
Server.Administrators = CN=administrator/O=ibm
Server.Administrators.Access = CN=administrator/O=ibm
Server.Administrators.FullAccess = CN=administrator/O=ibm
Server.AvailabilityIndex = 100
Server.AvailabilityThreshold = 0
Server.BootID = 1876639
Server.BusyTimeQuery.ReceivedCount = 0
Server.CPU.Count = 4
Server.ElapsedTime = 08:25:56
Server.ExpansionFactor = 1
Server.MailBoxes = 3
Server.Monitor.Start = 02/20/2003 00:13:09 EST
Server.Name = CN=sut/O=ibm
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 = Router: Searching for mail to deliver: [02/20/2003 08:20:14 EST]
Server.Task = Router: Searching for mail to deliver: [02/20/2003 08:20:15 EST]
Server.Task = Router: Searching for mail to deliver: [02/20/2003 08:20:15 EST]
Server.Task = Router: Searching for mail to deliver: [02/20/2003 08:20:17 EST]
Server.Task = Router: Searching for mail to deliver: [02/20/2003 08:20:25 EST]
Server.Task = Router: Searching for mail to deliver: [02/20/2003 08:20:14 EST]
Server.Task = Router: Searching for mail to deliver: [02/20/2003 08:20:24 EST]
Server.Task = Router: Searching for mail to deliver: [02/20/2003 08:20:16 EST]
Server.Task = Router: Searching for mail to deliver: [02/20/2003 08:20:14 EST]
Server.Task = Router: Searching for mail to deliver: [02/20/2003 08:20:25 EST]
Server.Task = Router: Searching for mail to deliver: [02/20/2003 08:20:14 EST]
Server.Task = HTTP Server: Listen for connect requests on TCP Port:80: [02/20/2003 08:39:04 EST]
Server.Task = Router: Idle: [02/20/2003 08:39:02 EST]
Server.Task = Event Monitor: Idle: [02/20/2003 08:39:06 EST]
Server.Tasks = 30
Server.Task.DB = Database Server: Idle: [02/20/2003 08:39:06 EST]
Server.Time.Start = 02/20/2003 00:13:09 EST
Server.Title =
Server.Trans.PerMinute = 0
Server.Trans.PerMinute.Peak = 10
Server.Trans.PerMinute.Peak.Time = 02/20/2003 07:32:05 EST
Server.Trans.Total = 153
Server.Users = 0
Server.Users.1MinPeak = 1
Server.Users.1MinPeakTime = 02/20/2003 00:18:12 EST
Server.Users.5MinPeak = 1
Server.Users.5MinPeakTime = 02/20/2003 00:18:12 EST
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 = 2
Server.Users.Peak.Time = 02/20/2003 00:36:12 EST
Server.Version.Notes = Release 6.0
Server.Version.Notes.BuildNumber = 190
Server.Version.OS = Linux 2.4.18-3bigmem #1 SMP Thu
Stats.Time.Current = 02/20/2003 08:39:28 EST
Stats.Time.Start = 02/20/2003 00:12:45 EST
345 statistics found

> q

02/20/2003 08:39:36 AM Event Monitor shutdown
02/20/2003 08:39:40 AM Domino Off-Line Services HTTP extension unloaded.
02/20/2003 08:39:41 AM HTTP Server: Shutdown
02/20/2003 08:39:43 AM Server shutdown complete

First Edition - February 2003

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