IBM

Ariba Buyer 7.06 Testing on Netfinity 8500R with Windows NT

IBM/Ariba International Competency Center

Prepared By: Joe Meerscheidt

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Chapter 1: Netfinity/Ariba Buyer Testing Overview

Introduction

The purpose of this document is to describe the test results from running the Ariba Buyer 7.06 product on an IBM Netfinity 8500 which also applies to the equivalent x370 server. This project is focused on Obtaining the maximum number of concurrent users possible running on a single 8 way server.   A sizing for this task is taken as the number of "user" sessions which   .

 The tests included:

- Maximum users supported

- Requisition Throughput

Hardware

Netfinity 8500 Model 8681-8RY, 8-way, 700 MHZ, with 4G of memory:

- 10 9.1G disk drives

  - Raid 5

XSeries 220 Model 8645-3AX, 2-way, 866 MHZ, with 2 G of memory:
- 1 LoadRunner controller/host
  - 2 36.4.2G disk drives

10 mbps Ethernet Network

Software

The system hosting Ariba Buyer 7.06 was installed with Windows NT 4.0 sp6a (optimized for maximize throughtput for file sharing), SUN JRE 1.3.1 and WebSphere 3.5.4. The Database was installed with DB2 UDB 7.2.

LoadRunner was installed on the test machine, with one system acting as the controller to start and spawn the tests as well as the host for the virtual users for the Ariba client tests.

Environment

Since Ariba Buyer does not support multiple servers connecting to the same database instance, only 1 Ariba Server can connect to the database at a time.

A single server configuration was used:

- Ariba Buyer and the DB2 UDB database installed on the same system

8500 8way

N I 4.0, SP6
Ariba Buyer 7.0.6
Sun JRE 1.3.1
WebSphere
3.5.4
D B2 UDB 7.2
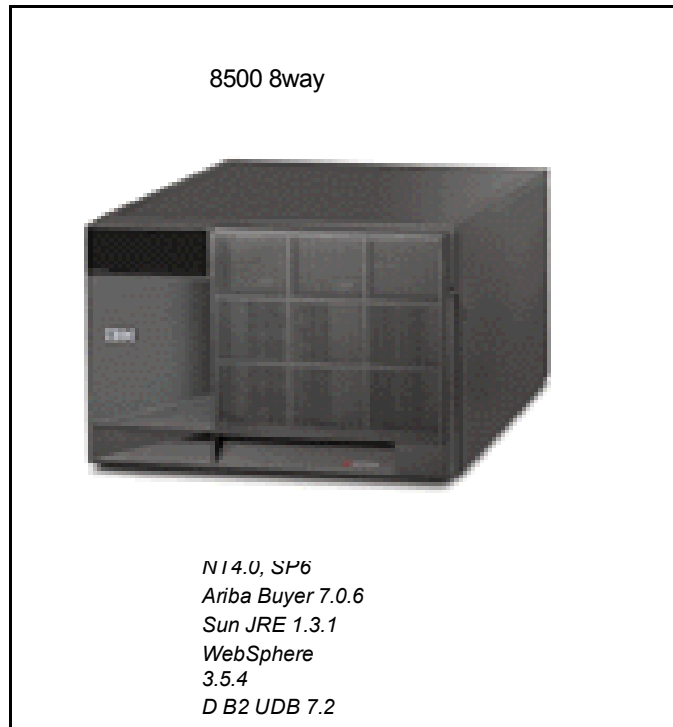
The LoadRunner test system was configured with 1 system as the LoadRunner controller as well as simulating
the Virtual Users of Ariba Buyer clients which login
orders.

LoadRunner Controller/Virtual Host
Windows 2000 w/SP2
LoadRunner 6.5, Service Pack 1b

Chapter 2: Results

Following the "Ariba Buyer Windows NT Installation Guide" we were able to successfully install the Ariba Buyer 7.0.6 product on the Netfinity 8500R system:

The installation was verified by loading the Tibco and Ariba databases with the demo files shipped with the product and successfully being able to create and approve a requisition.

It should also be noted that WinZip must be installed on the system for the installation to complete successfully.

Maximum Users Supported

The Ariba Buyer Server was configured according to the "Ariba Buyer 7.0 Scalability Certification Program, V0.99", issued by Jason Ding of Ariba. Test variables (RunTime settings) were also set with the values specified in this document. The test scripts and test scenarios were also provided by Ariba and we chose to use the database import files and scripts provide by Kenneth Chen from Data Management in IBM Toronto.

We established our results based on the "Transaction
"Ariba Buyer 7.0 Scalability Certification Program, V0.99" document, which states the following:

> *If any of the average transaction response times exceed 6 seconds, or any of the "90th Percentile" transaction response times (the mean response time of 90% of the transactions) exceed 5 seconds, the test fails.*

Based on this criteria, here are the results for the number of concurrent users. Equal numbers of requesters and approvers were specified.

Netfinity System	#Concurrent Users
8500R 8-way	600

Note that during the tests, CPU utilization averaged 28% on the 8500 8-way. No excessive page swapping or I/O was observed and memory usage was 2.3G.

Supported User Population

Referencing Section 4.3 of the "Ariba Buyer 7.0 Scalability Certification Program, V0.99":

"Concurrent User Population" is used as an input variable only and may not be published.

- *Supported User Population*

This result can be reported either in the format of range or in a single value (i.e., the mid-point of the range). The lower-point, mid-point, and upper-point of the Supported User Population range can be derived as follows:

The lower-point of Supported User Population = Maximum Number of Concurrent Users * 50

The mid-point of Supported User Population = Maximum Number of Concurrent Users * 75

The upper-point of Supported User Population = Maximum Number of Concurrent Users * 100

For example, if the test result of the Maximum Number of Concurrent User is 1,200 (i.e., 600 requesters plus 600 approvers), then the Supported User Population can be reported as 90,000, or in the range of 60,000 – 120,000.

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Maximum Requisition Throughput

Another Test Result indicated in the Certification Program is described as:

- *Maximum Requisition Throughput*

The maximum requisition throughput, `Number of Requisitions Processed Per Hour,` *is the number of requisitions processed by Ariba Buyer during the one hour of steady-state-run at the maximum level of concurrent users. You can get the number of requisitions submitted every* `15` *minutes from the* `Submit` *column in the Server Metrics File. Add* `submit` *column of 4 consecutive lines of the Server Metrics file during the one hour of steady   state run at the maximum current user level, and you will get the* `Requisition Throughput Per hour.`

Here are the results for the Maximum Requisition Throughput based on the calculation described above:

Netfinity System	Requisition Throughput Per Hour
8500R 8 -way	2,200

Transaction Performance Summary Report produced by the LoadRunner Analysis tool for the **Netfinity 8500 R 8-way** system running with 600 concurrent users.

Transaction Performance Summary Report

Scenario:	E:\Program Files\Mercury Interactive\LoadRunner\scenario\test.lrs
Result:	C:\DOCUME~1\ADMINI~1\LOCALS~1\Temp\res
Start Time:	28 - Aug - 01 09:15:56
End Time:	28 - Aug - 01 15:16:33
Duration:	06:00:37 (21,637sec)

| | | | | | | | Performance (sec) | |
Transaction	Pass	Fail	Min	Avg	Max	90th Percentile	PopStdDev
Actions_Transaction	16,755	300	151.33	337.29	6,262.80	532.19	309.752
AddItemPage	8,253	0	0.19	0.53	15.25	0.36	1.274
ApprovalPage	9,511	0	0.09	0.36	14.23	0.25	1.013
ApproveOK	14,371	0	0.13	0.54	15.98	0.49	1.395
BackToCatalog	4,095	2	0.25	0.90	17.25	0.70	1.854
BringURL	25,767	0	0.03	0.22	8.24	0.08	0.855
ChooseReq	8,278	0	0.11	0.33	8.98	0.20	0.903
EnterSearch	12,306	1	0.27	0.84	20.13	0.64	1.759
Login	25,688	0	0.05	0.84	19.02	0.64	1.807
Logout	24,807	0	0.03	0.28	9.97	0.09	1.056
ReqCatalogSrch_Transaction	8,052	300	571.44	741.83	1,041.97	864.49	108.674
SelectItem	12,271	2	0.19	0.56	15.05	0.36	1.414
SelectPR	14,468	0	0.14	0.74	13.95	0.56	1.691
Submit	8,093	0	0.17	0.53	12.58	0.36	1.310
Summary	8,132	0	0.20	0.70	17.09	0.45	1.705
ViewPR	14,417	1	0.08	0.39	11.02	0.25	1.171
vuser_end_Transaction	600	0	0.00	0.00	0.02	0.00	0.000
vuser_init_Transaction	600	0	0.00	0.19	0.80	0.50	0.208
Total:	**216,464**	**606**					

Failed transactions indicated in the *Transaction Performance Summary Report* are due to requester and approver test cases that were aborted when then run was stopped. Stopping these test cases caused the tests to incorrectly indicate failures.

Chapter 3: DB2

Configuration Parameters for the DB2 Database Manager

Database Manager Configuration

Node type = Database Server with local and remote clients

Database manager configuration release level = 0x0900

Maximum total of files open (MAXTOTFILOP) = 16000

CPU speed (millisec/instruction) (CPUSPEED) = 1.047030e-006

Max number of concurrently active databases (NUMDB) = 8

Data Links support (DATALINKS) = NO

Federated Database System Support (FEDERATED) = YES

Transaction processor monitor name (TP_MON_NAME) =

Default charge-back account (DFT_ACCOUNT_STR) =

Java Development Kit 1.1 installation path (JDK11_PATH) =

Diagnostic error capture level (DIAGLEVEL) = 3

Notify Level (NOTIFYLEVEL) = 2

Diagnostic data directory path (DIAGPATH) =

Default database monitor switches

Buffer pool (DFT_MON_BUFPOOL) = OFF

Lock (DFT_MON_LOCK) = OFF

Sort (DFT_MON_SORT) = OFF

Statement (DFT_MON_STMT) = OFF

Table (DFT_MON_TABLE) = OFF

Unit of work (DFT_MON_UOW) = OFF

SYSADM group name (SYSADM_GROUP) =

SYSCTRL group name (SYSCTRL_GROUP) =

SYSMAINT group name (SYSMAINT_GROUP) =

Database manager authentication (AUTHENTICATION) = SERVER

Cataloging allowed without authority (CATALOG_NOAUTH) = NO

Trust all clients (TRUST_ALLCLNTS) = YES

Trusted client authentication (TRUST_CLNTAUTH) = CLIENT

Default database path (DFTDBPATH) = C:

Database monitor heap size (4KB) (MON_HEAP_SZ) = 1024

UDF shared memory set size (4KB)	(UDF_MEM_SZ) = 256
Java Virtual Machine heap size (4KB)	(JAVA_HEAP_SZ) = 2048
Audit buffer size (4KB)	(AUDIT_BUF_SZ) = 0
Backup buffer default size (4KB)	(BACKBUFSZ) = 1024
Restore buffer default size (4KB)	(RESTBUFSZ) = 1024
Agent stack size	(AGENT_STACK_SZ) = 16
Minimum committed private memory	(4KB (MIN_PRIV_MEM) = 32
Private memory threshold (4KB)	(PRIV_MEM_THRESH) = 1296
Sort heap threshold (4KB)	(SHEAPTHRES) = 150000
Directory cache support	(DIR_CACHE) = YES
Application support layer heap size (4KB)	(ASLHEAPSZ) = 15
Max requester I/O block size (bytes)	(RQRIOBLK) = 65535
DOS requester I/O block size (bytes)	(DOS_RQRIOBLK) = 4096
Query heap size (4KB)	(QUERY_HEAP_SZ) = 1000
DRDA services heap size (4KB)	(DRDA_HEAP_SZ) = 128
Priority of agents	(AGENTPRI) = SYSTEM
Max number of existing agents	(MAXAGENTS) = 400
Agent pool size	(NUM_POOLAGENTS) = 40
Initial number of agents in pool	(NUM_INITAGENTS) = 4
Max number of coordinating agents	(MAX_COORDAGENTS) = (MAXAGENTS - NUM_INITAGENTS)
Max no. of concurrent coordinating agents	(MAXCAGENTS) = MAX_COORDAGENTS
Max number of logical agents	(MAX_LOGICAGENTS) = MAX_COORDAGENTS
Keep DARI process	(KEEPDARI) = YES
Max number of DARI processes	(MAXDARI) = MAX_COORDAGENTS
Initialize DARI process with JVM	(INITDARI_JVM) = NO
Initial number of fenced DARI process	(NUM_INITDARIS) = 0
Index re-creation time	(INDEXREC) = ACCESS
Transaction manager database name	(TM_DATABASE) = 1ST_CONN
Transaction resync interval (sec)	(RESYNC_INTERVAL) = 180
SPM name	(SPM_NAME) = ARIBA3
SPM log size	(SPM_LOG_FILE_SZ) = 256
SPM resync agent limit	(SPM_MAX_RESYNC) = 20
SPM log path	(SPM_LOG_PATH) =
NetBIOS Workstation name	(NNAME) = N00507EB
TCP/IP Service name	(SVCENAME) = db2cDB2
APPC Transaction program name	(TPNAME) =
IPX/SPX File server name	(FILESERVER) =

IPX/SPX DB2 server object name	(OBJECTNAME) =	
IPX/SPX Socket number	(IPX_SOCKET) = 879E	
Discovery mode	(DISCOVER) = SEARCH	
Discovery communication protocols	(DISCOVER_COMM) = NETBIOS,TCPIP	
Discover server instance	(DISCOVER_INST) = ENABLE	
Directory services type	(DIR_TYPE) = NONE	
Directory path name	(DIR_PATH_NAME) = /.:/subsys/database/	
Directory object name	(DIR_OBJ_NAME) =	
Routing information object name	(ROUTE_OBJ_NAME) =	
Default client comm. Protocols	(DFT_CLIENT_COMM) =	
Default client adapter number	(DFT_CLIENT_ADPT) = 0	
Maximum query degree of parallelism	(MAX_QUERYDEGREE) = 1	
Enable intra-partition parallelism	(INTRA_PARALLEL) = YES	
No. of int. communication buffers(4KB)	(FCM_NUM_BUFFERS) = 1024	
Number of FCM request blocks	(FCM_NUM_RQB) = 2048	
Number of FCM connection entrie s	(FCM_NUM_CONNECT) = (FCM_NUM_RQB * 0.75)	
Number of FCM message anchors	(FCM_NUM_ANCHORS) = (FCM_NUM_RQB * 0.75)	

Configuration Parameters for the DB2 Database

Database Configuration for Database perf1

Database configuration release level		= 0x0900
Database release level		= 0x0900
Database territory		= US
Database code page		= 1252
Database code set		= IBM-1252
Database country code		= 1
Dynamic SQL Query management	(DYN_QUERY_MGMT)	= DISABLE
Directory object name	(DIR_OBJ_NAME)	=
Discovery support for this database	(DISCOVER_DB)	= ENABLE
Default query optimization class	**(DFT_QUERYOPT)**	**= 3**
Degree of parallelism	(DFT_DEGREE)	= 1
Continue upon arithmetic exceptions	(DFT_SQLMATHWARN)	= NO
Default refresh age	(DFT_REFRESH_AGE)	= 0
Number of frequent values retained	(NUM_FREQVALUES)	= 10
Number of quantiles retained	(NUM_QUANTILES)	= 20
Backup pending		= NO
Database is consistent		= YES
Rollforward pending		= NO
Restore pending		= NO
Multi-page file allocation enabled		= NO
Log retain for recovery status		= NO
User exit for logging status		= NO
Data Links Token Expiry Interval (sec)	(DL_EXPINT)	= 60
Data Links Number of Copies	(DL_NUM_COPIES)	= 1
Data Links Time after Drop (days)	(DL_TIME_DROP)	= 1
Data Links Token in Uppercase	(DL_UPPER)	= NO
Data Links Token Algorithm	(DL_TOKEN)	= MAC0
Database heap (4KB)	(DBHEAP)	= 600
Catalog cache size (4KB)	(CATALOGCACHE_SZ)	= 64
Log buffer size (4KB)	(LOGBUFSZ)	= 8
Utilities heap size (4KB)	(UTIL_HEAP_SZ)	= 5000
Buffer pool size (pages)	(BUFFPAGE)	= 250

Extended storage segments size (4KB)   (ESTORE_SEG_SZ) = 16000

Number of extended storage segments   (NUM_ESTORE_SEGS) = 0

Max storage for lock list (4KB)   (LOCKLIST) = 500

Max appl. control heap size (4KB)   (APP_CTL_HEAP_SZ) = 128

Sort list heap (4KB)   (SORTHEAP) = 256

SQL statement heap (4KB)   (STMTHEAP) = 2048

Default application heap (4KB)   (APPLHEAPSZ) = 640

Package cache size (4KB)   (PCKCACHESZ) = (MAXAPPLS*8)

Statistics heap size (4KB)   (STAT_HEAP_SZ) = 4384

Interval for checking deadlock (ms)   (DLCHKTIME) = 10000

Percent. of lock lists per application   (MAXLOCKS) = 30

Lock timeout (sec)   (LOCKTIMEOUT) = 60

Changed pages threshold   (CHNGPGS_THRESH) = 60

Number of asynchronous page cleaners   (NUM_IOCLEANERS) = 4

Number of I/O servers   (NUM_IOSERVERS) = 12

Index sort flag   (INDEXSORT) = YES

Sequential detect flag   (SEQDETECT) = YES

Default prefetch size (pages)   (DFT_PREFETCH_SZ) = 32

Track modified pages   (TRACKMOD) = OFF

Default number of containers   = 1

Default tablespace extentsize (pages)   (DFT_EXTENT_SZ) = 16

Max number of active applications   (MAXAPPLS) = 100

Average number of active applications   (AVG_APPLS) = 20

Max DB files open per application   (MAXFILOP) = 64

Log file size (4KB)   (LOGFILSIZ) = 2500

Number of primary log files   (LOGPRIMARY) = 20

Number of secondary log files   (LOGSECOND) = 30

Changed path to log files   (NEWLOGPATH) =

Path to log files   = D:\DB2\NODE0000\SQL00002\SQLOGDIR\

First active log file   =

Group commit count   (MINCOMMIT) = 1

Percent log file reclaimed before soft chckpt (SOFTMAX) = 100

Log retain for recovery enabled   (LOGRETAIN) = OFF

User exit for logging enabled   (USEREXIT) = OFF

Auto restart enabled   (AUTORESTART) = ON

Index re-creation time   (INDEXREC) = SYSTEM (ACCESS)

Default number of loadrec sessions   (DFT_LOADREC_SES) = 1

Number of database backups to retain   (NUM_DB_BACKUPS) = 12

Recovery history retention (days)   (REC_HIS_RETENTN) = 366

TSM management class   (TSM_MGMTCLASS) =

TSM node name   (TSM_NODENAME) =

TSM owner   (TSM_OWNER) =

TSM password   (TSM_PASSWORD) =

DB2 Tablespaces

Name	Type of data	Managed by	State	Extent size	Prefetch size	Overhead	Transfer rate	Buffer Pool	Allocated size	Size used	Percentage used
INDEX16K	Regular	Database	Normal	16	32	24.100	0.9	BINDEX16K	7680	48	0
INDEX8K	Regular	Database	Normal	16	32	24.100	0.9	BINDEX8K	2560	48	1
SYSCATSPACE	Regular	System	Normal	16	32	24.100	0.9	IBMDEFAULTBP	3057	3057	100
TEMP16K	System temp...	System	Normal	16	32	24.100	0.9	BTEMP16K	1	1	100
TEMP8K	System temp...	System	Normal	16	32	24.100	0.9	BTEMP8K	1	1	100
TEMPSPACE1	System temp...	System	Normal	16	32	24.100	0.9	IBMDEFAULTBP	1	1	100
USER16K	Regular	Database	Normal	16	32	24.100	0.9	BPOOL16K	76800	112	0
USER8K	Regular	Database	Normal	16	32	24.100	0.9	BPOOL8K	128000	82096	64
USERSPACE1	Regular	Database	Normal	16	32	24.100	0.9	IBMDEFAULTBP	488280	213232	43

DB2 Bufferpools

ARIBA3 - DB2 - PERF1 - SYSCAT.BUFFERPOOLS

BPNAME	BUFFERPOOLID	NGNAME	NPAGES	PAGESIZE	ESTORE
IBMDEFAULTBP	1		6,000	4,096	N
BPOOL8K	2		12,400	8,192	N
BPOOL16K	3		12,400	16,384	N
BTEMP8K	4		2,400	8,192	N
BTEMP16K	5		2,400	16,384	N
BINDEX8K	6		12,400	8,192	N
BINDEX16K	7		12,400	16,384	N

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Chapter 4: Summary

Netfinity8500R server and to validate the performance testing done by GeSI in Fort Lauderdale, Florida. GeSI successfully ran 400 concurrent users on an Netfinity 7000-m10(500 MHZ) with 4G memory and 4 CPU's. This performance test was done on an Netfinity 8500 (549MHZ) with equivalent memory and CPU's. I was able to successfully run 600 concurrent users with a requisition throughput of 2,200 requisitions/hour. During this test the CPU usage averaged 55% and memory usage was around 2.3G. It was my observation during this test that the Ariba Buyer product is more CPU intensive than memory intensive. Even though the average CPU usage was 55% there was considerable spiking but the memory usage barely exceeded half of the 4G available.

I did not change the Ariba parameters.table to reflect tablespace usage for "LARGE", "MEDIUM", "SMALL", and "SUPPORT" tablespaces and indexes, I left those entries blank to allow DB2 to select which tablespaces to use. I chose not to use the data from the BDS70.ZIP file downloaded from the Ariba FTP site as the "initdb" would have taken at least 5 days to complete. Instead we used the import files and "importall" script provided by Kenneth Chen, IBM Toronto, to load the certification test data and this took less that eight hours to complete the database load. There were also other scripts used during the installation and setup of DB2. I used a script called "buyerdb_nt.ddl" to create the database, tablespaces, and bufferpools. Once the database was created and the data imported I ran a script called "addindex.sql
were designed by Kenneth Chen to improve performance. The next script I ran was "runstats.sql" which updates the statistics in the system catalog tables to help with the query optimization process.

It is likely that higher concurrent users can be achieved working more with some of the parameters in DB2 such as Query Optimization level, I/O cleaners, I/O servers, etc. As well as Worker Thread Pools, Java Heap Size, Java Stack Size, etc.