

An Oracle White Paper
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JD Edwards Competency

EnterpriseOne 9.0 on Sun Enterprise T5240 Server



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Executive Overview.....	2
Benchmark Overview.....	4
Testing Details	4
Methodology.....	6
Results.....	7
Hardware and Software.....	9
Enterprise Server and Web Server.....	9
Database Server.....	10
HP LoadRunner Controllers and Deployment Server.....	10
Tuning.....	11
Operating System Tuning.....	11
Application Tuning.....	11
EnterpriseOne Server Tuning.....	12
Oracle Web Server Tuning.....	13
Database Tuning.....	14
Conclusions.....	15
Appendix A – Interactive and Batch Business Processes Tested.....	16
Appendix B – Containers Installation for the Enterprise and Web Servers.....	20
Appendix C – Summary of Operating System Level Changes	27
Appendix D – Additional Information.....	30

Executive Overview

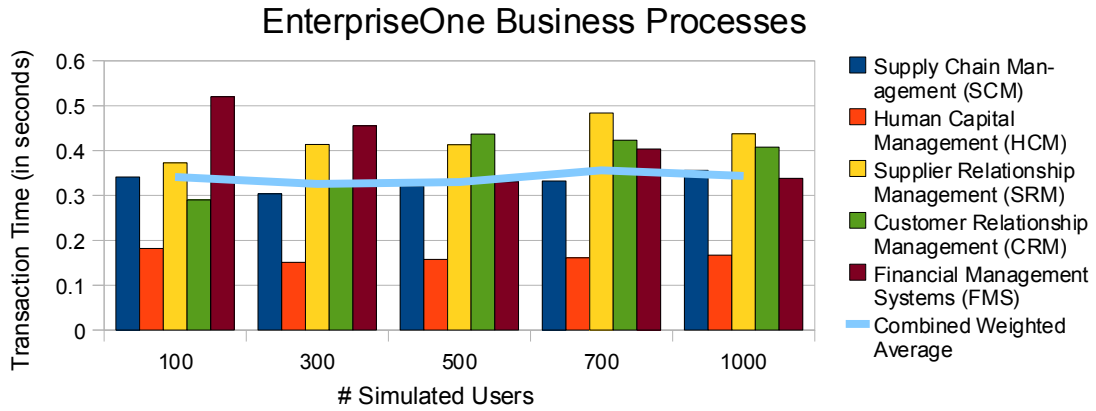
A series of JD Edwards EnterpriseOne software business processes and batch processes were executed concurrently on a Sun Enterprise T5240 with a Sun Enterprise M4000 for the supporting database. Along with conducting interactive and batch processing, these systems handled varying numbers of concurrent interactive users up to 1000 with sub-second response times.

The average response times for the transactions in the tested Business Process Family are listed below. The weighted transactional average for 1000 users, seen in Table 1, is 0.34 seconds.

TABLE 1. SUMMARY OF RESULTS

INTERACTIVE WORKLOAD	1000 USERS
Business Process Family	
• Supply Chain Management (SCM)	0.36 seconds
• Human Capital Management (HCM)	0.17 seconds
• Supplier Relationship Management (SRM)	0.44 seconds
• Customer Relationship Management (CRM)	0.41 seconds
• Financial Management Systems (FMS)	0.34 seconds
Weighted Average	0.34 seconds

The following bar chart shows average transaction times for the interactive Business Process tests while increasing the number of simulated users:



Benchmark Overview

In late 2009, Sun and Oracle conducted a validation test to measure the interactive and batch performance of the EnterpriseOne architecture on Oracle's Sun hardware. The metrics measured and tuned included transactional response times for the operating system, database and web server. These tests used a 3-tier configuration with the T5240 server as the combined web server and EnterpriseOne enterprise server, and the M4000 as the database server. The T5240 was logically divided using the Solaris 10 Container technology, a very low overhead, efficient method for isolation of resources that provides easy administration. See Appendix C to find more information on Containers and how they were configured. Oracle Application Server (OAS) 10.1.3.4, the Solaris 10 operating system, and Oracle Database 11.1.0.7 64-bit were the major components used for these tests.



Sun SPARC Enterprise® T5240 Server
EnterpriseOne Enterprise Server
Oracle Application Server



Sun SPARC® Enterprise M4000
EnterpriseOne Database Server

Testing Details

The validation test measured client response times against increasing numbers of users from 100 to 1000 along with 21 batch processes, see appendix A for details. The test's database composition model represents a medium-sized manufacturing company performing a wide variety of financial, distribution and manufacturing tasks. All testing was conducted in a controlled environment with no other applications running other than taking system statistics at a rate of every 15 seconds.

The goal of these tests was to utilize the “Day in the Life “ (DIL) kit for JD Edwards EnterpriseOne 9.0 / 8.98 on Oracle's Sun hardware technology and the Solaris 10 operating system. These results demonstrate stability, scalability, and performance of the JD Edwards EnterpriseOne on Sun hardware with the native Solaris 10 Containers technology (also known as zones).

Methodology

The workload is based on usage models representing a mid-size manufacturing company, and simulates users during a typical work day. The scenarios include “think time” to better approximate a typical user’s working style. “Think time” is the normal delay between user entry key strokes and screen refreshes that occur while the user reviews the information being presented to them on the screen.

JD Edwards EnterpriseOne applications are all initiated from a browser. HP LoadRunner was used as the load driver, simulating interactive users for this test. The work load generated by the Day In the Life benchmark simulated a predefined number of concurrent users performing various tasks as well as non-interactive bulk processing of transactions. Appendix A contains a breakdown of the EnterpriseOne applications exercised and the user load per module.

The time from the scripts click the <OK> button until the HTML response page is returned for the final step of a business transaction, is measured and recorded by LoadRunner. Measurements were recorded during an approximately 60 minute test window when all users had completely logged on and were positioned at their respective initial application screens. A combined weighted average was calculated for each module to easily measure the end user performance.

One of the key metrics used to evaluate performance is the business transaction time which is reported by LoadRunner. EnterpriseOne defines a business transaction as a series of HTML pages that guide a user through a business process, such as entering a multi-line sales order. For purposes of testing, LoadRunner scenario groups were defined to exercise a number of areas available in the EnterpriseOne application. The five areas (EnterpriseOne applications) include business processes such as SCM, HCM, SRM, CRM and FMS as was presented in the Summary of Results table in the Executive Overview. These are delineated in Appendix A table 4.

Results

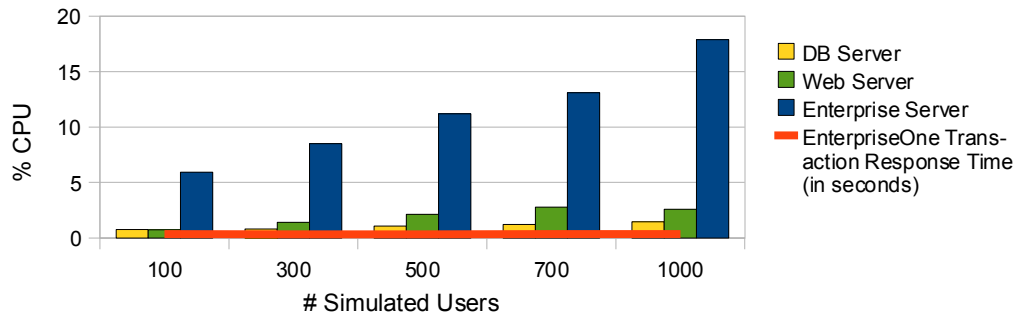
Listed below are the response times for up to 1000 users with batch processing. The batch processing tests varied between seven concurrent medium duration batch processes and 14 concurrent short duration processes to simulate different load conditions. Table 5 in Appendix A lists the batch processes used. The CPU utilization for the three distinct operations was small and demonstrates the capacity to scale beyond this range of simulated users.

TABLE 2. RESPONSE TIMES AND CPU UTILIZATION FOR TESTS WITH BATCH PROCESSING

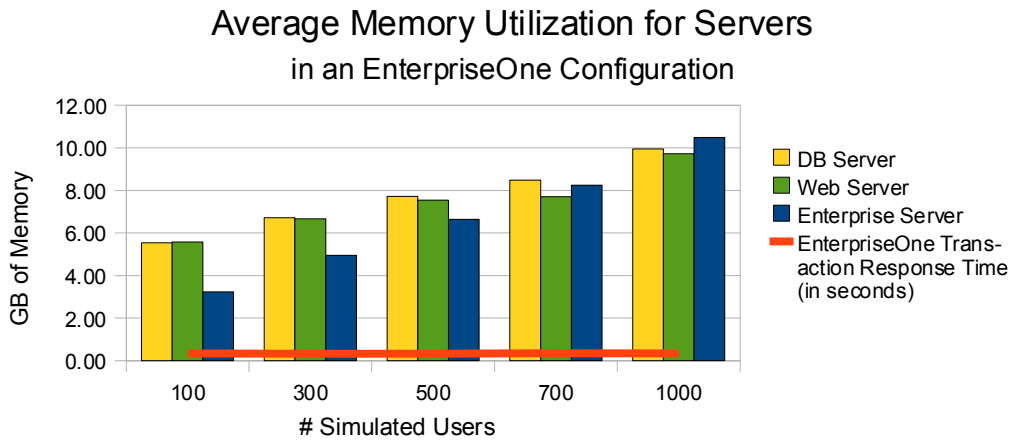
# OF SIMULATED USERS	100 USERS	300 USERS	500 USERS	700 USERS	1000 USERS
Response time	0.34 seconds	0.33 seconds	0.33 seconds	0.36 seconds	0.34 seconds
% CPU Database Server	0.75%	0.82%	1.08%	1.20%	1.46%
% CPU Enterprise Server	5.92%	8.50%	11.18%	13.09%	17.88%
% CPU Web Server	0.73%	1.42%	2.14%	2.78%	4.05%

The chart depicts the near linear scalability of this architecture. As expected, the response times for the transactions slowly increased as the number of users increased. This is normal for a system under load. The CPU utilization increased most dramatically on the enterprise server, with no notable operating system bottlenecks observed at the highest levels of testing.

**Average CPU Utilization for Servers
in an EnterpriseOne Configuration**



Memory utilization was also captured for each of the tests. As expected, the memory usage increased as the workload increased. This data suggests scaling will be achievable at higher levels.



Hardware and Software

Enterprise Server and Web Server

A single Sun Enterprise T5240 Server was used for the Enterprise Server and the OAS Web Server. It was configured with the following hardware and software:

- Hardware for Enterprise Server and Web Server – 1 Sun Enterprise T5240 Server
 - 2x 1.6GHz UltraSPARC T2 Plus processor (each processor with 8 cores, each core with 8 threads, for a total of 128 virtual processors - 2x8x8)
 - 128 Gigabytes of memory
 - 2x 146GB internal disk drives
 - 1x Sun StorageTek 2540 Array with dual fibre channel RAID controllers, 12x 136GB disks
- Software for Enterprise Server
 - Solaris 10 5/09 (the container software is a standard part of the Solaris 10 distribution)
 - JD Edwards EnterpriseOne 9.0
 - JD Edwards EnterpriseOne Tools 8.98.0
 - Electronic Software Updates (ESUs): JL11117, JL11051, JL11233, JL11234
 - Verity 6.12, an integrated third party search engine
- Software for Web Server
 - Solaris 10 5/09 (the container software is a standard part of the Solaris 10 distribution)
 - Oracle Application Server (OAS) 10.1.3 with Patch Set 4 (10.1.3.4)

Database Server

One Sun Enterprise M4000 Server was used for the Oracle Database Server. It was configured with:

- Hardware for Database Server – 1 Sun Enterprise M4000 Server
 - 4x 2.53GHz SPARC64-VII processors (each processor with 4 cores, each core with 2 threads, for a total of 32 virtual processors - 4x4x2)
 - 32 GB of memory
 - 2x 73GB internal disk drives
 - 1x Sun StorageTek 6140 array with dual fibre channel RAID controllers, 16x 136GB disks
- Database Server Software
 - Solaris 10 5/09
 - Oracle Database 11g Enterprise Edition Release 11.1.0.7 with Patch Set 1 (SPARC 64-bit)

HP LoadRunner Controllers and Deployment Server

Two Windows 2003 servers were used in this testing, one to initiate the tests and collect the response time data. The other Windows 2003 server is the Deployment Server. Each of these systems were Sun Fire X4200 M2 Servers containing:

- Hardware for HP LoadRunner Controllers – 2 Sun Fire X4200 M2 Servers
 - 1x 2.79GHz dual-core AMD Opteron Processor 2220 (each processor with 2 cores - 1x2x1)
 - 8 Gigabytes of memory
 - 1x 136GB internal disk drive
- Software for HP LoadRunner Controllers
 - Microsoft Windows Server 2003 R2 Enterprise Edition SP2
 - HP LoadRunner 9.1

Tuning

Operating System Tuning

All test systems were installed with Solaris 10 5/09 and initially set up with 16GB of swap. The global zone of the enterprise and web server was altered to have 64GB of swap which became necessary when scaling to more than 1000 simulated users. Although it is common practice to assign CPU resources to Solaris zones in the EnterpriseOne architecture, CPU capping was not necessary for the smaller number of users. Appendix B contains instructions for configuring the capping of CPUs in zones.

The operating system changes for a larger user count are :

- maximum number of semaphores allowed per semaphore set (max-sem-nsem)
- shared memory identifier maximum (max-shm-ids)
- maximum number of message queue identifiers (max-msg-ids)

See Appendix C for a detailed look at how database, enterprise and web server systems were prepared for this test.

Application Tuning

The following sections show the configuration files that were altered for these tests. These values are for a 1000 user test, but include notes for increasing beyond this number of users.

EnterpriseOne Server Tuning

JDE.INI (in \$EVRHOME/ini)

```
[JDEIPC]
maxNumberOfSemaphores=2000
startIPCKeyValue=503300001

[JDENET]
# user ratio of 100/1 (maxNetProcesses & maxNetConnections)
maxNetProcesses=10
maxNetConnections=1000

[JDENET_KERNEL_DEF4]
# user ratio of 100/1 (maxNumberOfProcesses & numberOfAutoStartProcesses)
maxNumberOfProcesses=10
numberOfAutoStartProcesses=10

[JDENET_KERNEL_DEF6]
# user ratio of 10/1 (maxNumberOfProcesses & numberOfAutoStartProcesses)
maxNumberOfProcesses=100
numberOfAutoStartProcesses=100
```

¹ The initial value for the first semaphore id was 50330000 on this set of systems. Some scripts did not expect the large value and were not able to cope with the IPC processes until the value of startIPCKeyValue was made to coincide with the actual id from the system. Since the IPC start id may be different on other systems, the output from the command “ipcs -a” should be used to determine the correct value.

Oracle Web Server Tuning

Four JVMs were used for the 1000 user test, all other tests used three JVMs. Each JVM used a minimum and maximum heap size of 1024 (MB). These values were modified through the Oracle Enterprise Manager console:

```
http://<hostname>:7777/em/console/login
```

Other settings that were changed to allow for an increased number of users:

jas.ini (in ~JDE_HOME/targets/HTML898/config)

```
PathCodes=('PD900')
# MAXUser default is 150
MAXUser=500

# Time out value for requests sent to the Enterprise Server
# default is 90000
enterpriseServerTimeout=150000

# maxPoolSize= default value is 100
maxPoolSize=200
```

jdbj.ini (in ~JDE_HOME/targets/HTML898/config)

```
# maxConnection default is 150
maxConnection=500
```

httpd.conf (in \$ORACLE_HOME/Apache/Apache/conf/)

```
# MaxClients default is 150
MaxClients 1000
```

Database Tuning

The following settings were used for the Database Server for all tests:

spfileorcl.ora (\$ORACLE_HOME/dbs/)

```
processes = 5000
open_cursors=1000
session_cached_cursors=1000
pga_aggregate_target=500M
sga_target=1G
sga_max_size=2G
memory_target=2G
memory_max_target=2G
recyclebin=OFF
```

The default sizes for the standard database files were increased using the following SQL commands:

```
# to increase the default Oracle system tablespace
ALTER DATABASE DATAFILE '$ORACLE_BASE/df/ol_mf_system_5bngd8sf_.dbf' \
RESIZE 1500M;
ALTER DATABASE DATAFILE '$ORACLE_BASE/df/ol_mf_system_5bngd8sf_.dbf' \
AUTOEXTEND ON NEXT 10M;

# increase the size of the default Oracle sysaux tablespace
ALTER DATABASE DATAFILE '$ORACLE_BASE/df/ol_mf_sysaux_5bngd8v9_.dbf' \
RESIZE 1500M;
ALTER DATABASE DATAFILE '$ORACLE_BASE/df/ol_mf_sysaux_5bngd8v9_.dbf' \
AUTOEXTEND ON NEXT 10M;

# increased size for default Oracle tempfile tablespace
ALTER DATABASE TEMPFILE '$ORACLE_BASE/df/ol_mf_temp_5bnghyq2_.tmp' \
RESIZE 7000M;

# increase the number of redo logs from the default of 3 to 6, and increase the size
ALTER DATABASE ADD LOGFILE GROUP 4 ('/u01/redo04.log') SIZE 250M REUSE;
ALTER DATABASE ADD LOGFILE GROUP 5 ('/u01/redo05.log') SIZE 250M REUSE;
ALTER DATABASE ADD LOGFILE GROUP 6 ('/u01/redo06.log') SIZE 250M REUSE;
ALTER DATABASE DROP LOGFILE GROUP 1;
ALTER DATABASE DROP LOGFILE GROUP 2;
ALTER DATABASE DROP LOGFILE GROUP 3;
ALTER DATABASE ADD LOGFILE GROUP 1 ('/u01/redo01.log') SIZE 250M REUSE;
ALTER DATABASE ADD LOGFILE GROUP 2 ('/u01/redo02.log') SIZE 250M REUSE;
ALTER DATABASE ADD LOGFILE GROUP 3 ('/u01/redo03.log') SIZE 250M REUSE;
```

Conclusions

This document provides a set of data points to illustrate the scalability of the EnterpriseOne architecture on Oracle Sun hardware. Using the Solaris Containers technology to house both Application and Web server on one system enables consolidation and reduces costs in terms of power consumption, hardware and labor.

With these results, the Oracle Sun SPARC Enterprise T5240 Server clearly demonstrates its compelling performance benefits and responsive scaling to over 1000 EnterpriseOne 9.0 users. All web and EnterpriseOne processing was performed on a two rack unit (2RU) system with extremely low power consumption, providing customers with an optimal system for deploying JD Edwards EnterpriseOne solutions. While power consumption data was not gathered during the test phase, tools at <http://www.sun.com/calc/servers/coolthreads/t5240/> demonstrate that power consumption for this configuration is minimal.

This testing utilized much of the flexibility that Solaris Containers provide. The web server container used a dedicated network interface, allowing for the maximum throughput from one port. The Enterprise container hosted a disk array which was not visible to the web server container. Though each Solaris Container in this configuration used half of the CPU resources, another option would have been to specify a range of minimum and maximum CPU resources for each Solaris Container, thus allowing maximum utilization for a variety of situations.

In general, Oracle's Sun SPARC Enterprise servers and blades with chip multithreading technology (CMT) provide new levels of performance, scalability, and reliability, while delivering reductions in space, power consumption, and cost. In addition, these servers have built-in virtual-machine capabilities with Solaris Containers and Logical Domains (LDoms).

While this document contains useful information for configuring and tuning the EnterpriseOne environment, it should not be used as a standalone sizing document. Please contact your local Oracle Sun hardware representative for proper sizing of hardware for specific numbers of users on a given architecture.

Appendix A – Interactive and Batch Business Processes Tested

The following seventeen JD Edwards EnterpriseOne business processes were tested.

TABLE 4. INTERACTIVE BUSINESS PROCESSES TESTED

JOB	APPLICATION	DESCRIPTION	# OF USERS					# OF TRANSACTIONS (# OF USERS)
			100	300	500	700	1000	
SCM – SUPPLY CHAIN MANAGEMENT								
1	P31114	W.O. Completion	3	9	15	21	30	30 (100) 90 (300) 150 (500) 210 (700) 300 (1000)
2	P3411	MRP Order Type WO	6	18	39	42	60	20 (100) 60 (300) 300 (500) 420 (700) 600 (1000)
3	P3411	MRP Order Type OP	6	18	30	42	60	20 (100) 60 (300) 300 (500) 420 (700) 600 (1000)
4	P3411	MRP Order Type OT	6	18	30	42	60	20 (100) 60 (300) 300 (500) 420 (700) 600 (1000)
5	P4113	Inventory transfer	5	15	25	35	50	25 (100) 75 (300) 125 (500) 175 (700) 250 (1000)
6	P42101	S.O. Entry 10 line items	25	75	125	175	250	25 (100) 75 (300) 125 (500) 175 (700) 250 (1000)

TABLE 4. INTERACTIVE BUSINESS PROCESSES TESTED

JOB	APPLICATION	DESCRIPTION	# OF USERS					# OF TRANSACTIONS (# OF USERS)
			100	300	500	700	1000	
7	P42101	S.O. Update	5	15	25	35	50	50 (100) 150 (300) 250 (500) 350 (700) 500 (1000)
8	P4915	Ship Confirm Approval only	3	9	15	21	30	30 (100) 90 (300) 150 (500) 210 (700) 300 (1000)
9	P4915	Ship Confirm & change entry	1	3	5	7	10	10 (100) 30 (300) 50 (500) 70 (700) 100 (1000)
10	P4915	Ship Confirm	1	3	5	7	10	10 (100) 30 (300) 50 (500) 70 (700) 100 (1000)
HCM – HUMAN CAPITAL MANAGEMENT								
11	P051191	Daily Time Entry	2	6	10	14	20	40 (100) 120 (300) 200 (500) 280 (700) 400 (1000)
SRM – SUPPLIER RELATIONSHIP MANAGEMENT								
12	P4310	P.O. Entry 25 line items	20	60	100	140	200	120 (100) 360 (300) 600 (500) 840 (700) 1200 (1000)
13	P4312	P.O. Receipts	2	6	10	14	20	12 (100) 36 (300) 60 (500) 84 (700) 120 (1000)
14	P4314	Voucher Match	2	6	10	14	20	12 (100) 36 (300) 60 (500) 84 (700) 120 (1000)

TABLE 4. INTERACTIVE BUSINESS PROCESSES TESTED

JOB	APPLICATION	DESCRIPTION	# OF USERS					# OF TRANSACTIONS (# OF USERS)
			100	300	500	700	1000	
CRM – CUSTOMER RELATIONSHIP MANAGEMENT								
15	P17500	Case Mgmt Add	5	15	25	35	50	25 (100) 75 (300) 125 (500) 175 (700) 250 (1000)
FMS – FINANCE MANAGEMENT SYSTEMS								
16	P03B102	Apply Receipts	10	30	50	70	100	100 (100) 300 (300) 500 (500) 700 (700) 1000 (1000)
17	P0411	Supplier Ledger Inquiry	10	30	50	70	100	100 (100) 300 (300) 500 (500) 700 (700) 1000 (1000)

TABLE 5. MEDIUM DURATION BATCH JOBS USED IN TESTING

JOB	BATCH PROCESS	DESCRIPTION
1	R014021	One Line per Address
2	R01403	Full Address Report
3	R03B461	Collection Report
4	R09205P	Account Master Report
5	R09410	Trial Balance Report
6	R41403	Print Variance Detail
7	R41411	Select Items for Count 1 item

TABLE 6. SHORT DURATION BATCH JOBS USED IN TESTING

JOB	BATCH PROCESS	DESCRIPTION
1	R0004P	UDC Records Types Print
2	R0006P	Business Unit Report
3	R0008P	Date Patterns Report
4	R0010P	Company Constants Report
5	R0012P1	AAI Report
6	R0014	Payment Terms Report
7	R01402W	Who's Who Report
8	R03B155	A/R Summary Analysis
9	R03B31	Activity Log Report
10	R0909P	Chart of Accounts Report
11	R41411	Select Items for Count 1 item
12	R42072	Price category Print
13	R48096	Cost Plus Markup Listing
14	R41411_all	Select Items for Count 1 item

Appendix B – Containers Installation for the Enterprise and Web Servers

[Oracle's BigAdmin System Administration Portal](#) about Solaris Containers, states “Zones provide a new isolation primitive for the Solaris OS, which is secure, flexible, scalable and lightweight: virtualized OS services which look like different Solaris instances. Together with the existing Solaris Resource management framework, Solaris Zones forms the basis of Solaris Containers.” For the JD Edwards EnterpriseOne testing, the use of containers helped create a combined server for the web tier and Enterprise server sharing the power of a Sun Enterprise T5240.

Set up of Global Zone

The global zone is the main OS running on the system which will house the two local zones containing the Enterprise server software and the web server software. Below, the Enterprise Server is listed as jds-zone1 and the web server is jds-zone2.

Add the following kernel configuration parameter to /etc/system

```
set noexec_user_stack=1
```

Create the directories to contain the local zone data

```
jds04> mkdir /E1Server  
jds04> chmod 700 /E1Server  
jds04> mkdir /WebServer  
jds04> chmod 700 /WebServer
```

Add the two new zones' IP information to the host file (/etc/hosts) in the global zone. The following is an example which includes each system's host name and an alias which is the name of the zone:

```
10.6.222.241 jds-zone1    E1Server  
10.6.222.84  jds-zone2    WebServer
```

Creating EnterpriseOne Server Zone

Setup of a default (sparse) zone from the global zone (named jds04)

```
jds04> zonecfg -z E1Server
zonecfg:E1Server> create
zonecfg:E1Server> set zonepath=/E1Server
zonecfg:E1Server> add net
zonecfg:E1Server:net> set physical=nxge1
zonecfg:E1Server:net> set address=10.6.222.241/24
zonecfg:E1Server:net> set defrouter=10.6.222.254
zonecfg:E1Server:net> end
zonecfg:E1Server> add device
zonecfg:E1Server:device> set match=/dev/dsk/..
zonecfg:E1Server:device> set match=/dev/rdisk/..
zonecfg:E1Server:device> end
zonecfg:E1Server> verify
zonecfg:E1Server> commit
zonecfg:E1Server> info
zonecfg:E1Server> exit
jds04> zoneadm -z E1Server install
jds04> zoneadm list -cv
jds04> zoneadm -z E1Server boot
```

Note: When scaling to 1000 users, performance was improved by assigning half the CPUs to each zone. This limited the number of cross calls and context switching. On the T5240, which holds 128 virtual CPUs, the instructions for doing this are:

```
jds04> zoneadm -z E1Server
zonecfg:E1Server> add dedicated-cpu
zonecfg:E1Server:dedicated-cpu> set ncpus=64
zonecfg:E1Server:dedicated-cpu> end
zonecfg:E1Server> verify
zonecfg:E1Server> commit
zonecfg:E1Server> exit
```

It is not necessary to set this limit in the web server zone, since it will acquire the remaining CPUs.

Configuring the EnterpriseOne Server Zone

After the operating system software is installed, the zone needs to be set up to run the Enterprise server software.

Log into the zone's console

```
jds04> zlogin -C E1Server
```

In the EnterpriseOne Server zone, adjust the environment to allow the root user to ssh in with a bash shell

```
jds-zone1> usermod -s /usr/bin/bash root
```

Allow root logins by editing `/etc/ssh/sshd_config` and changing the value of `PermitRootLogin` from no to yes

```
PermitRootLogin yes
```

Restart the ssh service:

```
jds-zone1> svcadm restart ssh
```

Make sure the groupids and userids match those on the Database Server

```
jds-zone1> groupadd -g 98194049 jde900
jds-zone1> groupadd -g 98194050 oinstall
jds-zone1> groupadd -g 98194051 dba
jds-zone1> useradd -u 237422 -g jde900 -d /JDE -m -s /bin/ksh jde900
jds-zone1> passwd jde900 jde900
jds-zone1> useradd -u 237445 -g oinstall -G dba -d /export/oracle \
-m -s /usr/bin/bash oracle
jds-zone1> passwd oracle oracle
```

Mount the external storage device, add the mounting entry to `/etc/vfstab`

```
/dev/dsk/... /dev/rdisk/... /db ufs 2 yes noatime,forcedirectio
```

Create the mount point and mount the device

```
jds-zone1> mkdir /db
jds-zone1> mount /db
```

The Oracle users's .profile needs to include settings for ORACLE_HOME and ORACLE_SID (also included are the variables needed for Verity)

```
ORACLE_BASE=/db/app/oracle; export ORACLE_BASE
ORACLE_HOME=$ORACLE_BASE/product/11.1.0/db_1; export
ORACLE_HOME
ORACLE_SID=orcl; export ORACLE_SID
JDE_HOME=/db/jdedwards/JDE_HOME/bin; export JDE_HOME
PATH=$PATH:/opt/SUNWspro/bin:
$ORACLE_HOME/bin:/db/usr/local/bin:/usr/ucb.; export PATH
# for Verity software
VDK612_HOME=/db/jdedwards/e900/verity612/solaris; export
VDK612_HOME
VDK612_PATH=$VDK612_HOME/_ssol26/bin; export VDK612_PATH
PATH=$VDK612_PATH:$PATH
LD_LIBRARY_PATH=$VDK612_PATH:$LD_LIBRARY_PATH; export
LD_LIBRARY_PATH
```

Increase the maximum number of shared memory identifiers. Default = 128

```
jds-zone1> projmod -s -K 'project.max-shm-ids=(privileged,1024,deny)' \
default
```

Increase the maximum size of a shared memory segment. Default = ¼ of physical memory

```
jds-zone1> projmod -s -K 'project.max-shm-memory=(privileged,12gb,deny)' \
default
```

Increase the maximum number of semaphores allowed per semaphore set. Default = 512

```
jds-zone1> projmod -s -K 'process.max-sem-nsems=(privileged,4096,deny)' \
default
```

Increase the maximum number of message queue identifiers. Default = 128

```
jds-zone1> projmod -s -K 'project.max-msg-ids=(privileged,1024,deny)' default
```

To verify that the above commands worked, /etc/project should look similar to:

```
default:3:::process.max-sem-nsems=(privileged,4096,deny); \
project.max-msg-ids=(privileged,1024,deny); \
project.max-shm-ids=(privileged,1024,deny); \
project.max-shm-memory=(privileged,12884901888,deny)
```


Add the following kernel configuration parameter to /etc/system

```
set noexec_user_stack=1
```

Reboot the enterprise server zone

```
jds-zone1> reboot
```

From a non-console terminal window, login to the enterprise server and install the EnterpriseOne software

```
othersystem> ssh -X -l oracle EnterpriseServer
```

Creating the Web Server Zone

Setup of a default (sparse) zone from the global zone (named jds04):

```
jds04> zonecfg -z WebServer
zonecfg:WebServer> create -b
zonecfg:WebServer> set zonepath=/WebServer
zonecfg:WebServer> set autoboot=false
zonecfg:WebServer> set ip-type=exclusive
zonecfg:WebServer> add inherit-pkg-dir
zonecfg:WebServer> set dir=/lib
zonecfg:WebServer> end
zonecfg:WebServer> add inherit-pkg-dir
zonecfg:WebServer> set dir=/platform
zonecfg:WebServer> end
zonecfg:WebServer> add inherit-pkg-dir
zonecfg:WebServer> set dir=/sbin
zonecfg:WebServer> end
zonecfg:WebServer> add inherit-pkg-dir
zonecfg:WebServer> set dir=/usr
zonecfg:WebServer> end
zonecfg:WebServer> add net
zonecfg:WebServer> set physical=nxge2
zonecfg:WebServer> end
zonecfg:WebServer> add net
zonecfg:WebServer> verify
zonecfg:WebServer> commit
zonecfg:WebServer> info
zonecfg:WebServer> exit
```

Install and boot the zone

```
jds04> zoneadm -z WebServer install
jds04> zoneadm -z WebServer boot
```

Log into the zone's console

```
jds04> zlogin -C WebServer
```

Configuring the Web Server Zone

After the operating system software is installed, the zone needs to be set up to run the EnterpriseOne Server software.

In E1Server zone, adjust the environment:

```
jds-zone2> usermod -s /usr/bin/bash root
jds-zone2> /etc/ssh/sshd_config (set PermitRootLogin to yes)
jds-zone2> svcadm restart ssh
```

Make sure the groupids and userids match those on the Database Server:

```
jds-zone2> groupadd -g 98194050 oinstall
jds-zone2> groupadd -g 98194051 dba
jds-zone2> useradd -u 237445 -g oinstall -G dba -d /export/oracle \
-m -s /usr/bin/bash oracle
jds-zone2> passwd oracle oracle
```

The Oracle user's .profile needs to include settings for ORACLE_HOME, for example:

```
export PATH=/usr/bin:/usr/sbin:/usr/ucb:/etc:
# Environment variables for OAS
export ORACLE_HOME=/export/oracle/product/10.1.3.1/OracleAS_1
export PATH=$PATH:$ORACLE_HOME/opmn/bin:/usr/local/bin
# the following need to be added to use vnc
export PATH=$PATH:/usr/openwin/bin:/usr/X11/bin
export JDE_HOME=/export/JDEdwards/JDE_HOME/bin
```

Change kernel parameters. Add the following line to /etc/system

```
set noexec_user_stack=1
```

Reboot the E1Server zone

```
jds-zone2> reboot
```

Log into the zone and install the Oracle Application Server software. From a non-console terminal window, login to the WebServer:

```
othersystem> ssh -X -l root WebServer
```

Appendix C – Summary of Operating System Level Changes

Enterprise Server (jds-zone1):

/etc/group

```
oinstall::98194050:  
dba::98194051:oracle  
jde900::98194049:
```

/etc/passwd

```
jde900:x:237422:98194049::/JDE:/usr/bin/bash  
oracle:x:237445:98194050::/export/oracle:/usr/bin/bash
```

/etc/vfstab

```
/dev/dsk/c4t600A...1EF4d0s6 /dev/rdisk/c4t600A...1EF4d0s6 /db  
ufs 1 yes noatime,forcedirectio
```

Web Server (jds-zone2):

/etc/group

```
oinstall::98194050:  
dba::98194051:oracle
```

/etc/passwd

```
oracle:x:237445:98194050::/export/oracle:/usr/bin/bash
```

Oracle DB Server (jds02):

/etc/system

```
set maxphys=1048576
```

/etc/group

```
oinstall::98194050:  
dba::98194051:oracle
```

/etc/passwd

```
oracle:x:237445:98194050::/export/oracle:/usr/bin/bash
```

/etc/projects (changed through the projmod command)

```
default:3:::process.max-sem-nsems=(privileged,4096,deny); \
project.max-msg-ids=(privileged,1024,deny); \
project.max-shm-ids=(privileged,1024,deny); \
project.max-shm-memory=(privileged,12884901888,deny)
```

These are the commands used to update /etc/project

```
# max-sem-nsems def=512
projmod -s \
-K 'process.max-sem-nsems=(privileged,4096,deny)' default
# max-msg-ids def= 128
projmod -s \
-K 'project.max-msg-ids=(privileged,1024,deny)' default
# max-shm-ids def=128
projmod -s \
-K 'project.max-shm-ids=(privileged,1024,deny)' default
# max-shm-memory def=% of memory
projmod -s \
-K 'project.max-shm-memory=(privileged,12gb,deny)' default
```

ulimit

When scaling to a larger number of users, the default stack size may not be large enough on the database. The default value of 8192 can be changed with the following command:

```
jds02> ulimit -s
8192
jds02> ulimit -s 16384
jds02> ulimit -s
16384
```

/etc/rctladm.conf was changed by executing the `rctladm` command. This will generate warning messages if a resource limit is reached. The warnings go to the console and `/var/adm/messages`

```
rctladm -e syslog process.max-port-events  
rctladm -e syslog process.max-msg-messages  
rctladm -e syslog process.max-msg-qbytes  
rctladm -e syslog process.max-sem-ops  
rctladm -e syslog process.max-sem-nsems  
rctladm -e syslog process.max-address-space  
rctladm -e syslog process.max-data-size  
rctladm -e syslog process.max-file-size  
rctladm -e syslog process.max-cpu-time  
rctladm -e syslog task.max-cpu-time  
rctladm -e syslog task.max-lwps  
rctladm -e syslog project.max-contracts  
rctladm -e syslog project.max-device-locked-memory  
rctladm -e syslog project.max-locked-memory  
rctladm -e syslog project.max-port-ids  
rctladm -e syslog project.max-shm-memory  
rctladm -e syslog project.max-shm-ids  
rctladm -e syslog project.max-msg-ids  
rctladm -e syslog project.max-sem-ids  
rctladm -e syslog project.max-crypto-memory  
rctladm -e syslog project.max-tasks  
rctladm -e syslog project.max-lwps  
rctladm -e syslog project.cpu-cap  
rctladm -e syslog zone.max-swap  
rctladm -e syslog zone.max-locked-memory  
rctladm -e syslog zone.max-shm-memory  
rctladm -e syslog zone.max-shm-ids  
rctladm -e syslog zone.max-sem-ids  
rctladm -e syslog zone.max-msg-ids  
rctladm -e syslog zone.max-lwps  
rctladm -e syslog zone.cpu-cap
```

Appendix D – Additional Information

Wikipedia entry for Solaris Containers - http://en.wikipedia.org/wiki/Solaris_Containers

Solaris Containers - Optimizing Resource Utilization for Predictable Service Levels -

<http://www.sun.com/software/solaris/ds/containers.jsp>

Check Metalink <http://metalink.oracle.com> for the most recent tips, techniques, tuning and scaling information.



White Paper: JD Edwards EnterpriseOne 9.0 on
Sun SPARC Enterprise T5240 Server Sizing Study
- Draft

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