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## Oracle Optimized Solution for Enterprise Cloud Infrastructure — Implementation Guide for SPARC

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## Overview/Introduction

The Oracle Optimized Solution for Enterprise Cloud Infrastructure provides an integrated, complete infrastructure with recommendations and best practices for deploying and optimizing an enterprise cloud infrastructure for a highly virtualized environment. It addresses every layer of the infrastructure stack with Oracle hardware and software components including Oracle VM Server for SPARC virtualization, Oracle Enterprise Manager Ops Center 12c for management, Oracle's SPARC T4 servers, and Oracle's Sun ZFS Storage Appliances. This provides a robust, flexible foundation for running enterprise applications, middleware, and database software.

This document describes the installation and configuration of the Oracle Enterprise Manager Ops Center 12c management server, including the installation of the Oracle Solaris OS and Oracle Enterprise Manager Ops Center 12c software. The document also covers the required network cabling configuration of the Oracle SPARC T4-2 virtualization and management server nodes, the Sun ZFS Storage 7320 and Sun ZFS Storage 7420 appliances and Oracle's Sun Network 10 GbE Switch 72p switches in appropriate high availability (HA) configurations.

In addition, typical operational workflows are described and demonstrated for the most common procedures required to bring up a virtual infrastructure.

Oracle Enterprise Manager 12c Cloud Control can be deployed in combination with Oracle Enterprise Manager Ops. Center 12c to provide Cloud management features, including capacity planning, metering and chargeback, and self-service provisioning. For additional information on the further installation and usage of Oracle Enterprise Manager 12c, please consult that product's documentation.

## Deployment Models

Two standard configurations are available for the Oracle Optimized Solution for Enterprise Cloud Infrastructure on SPARC: a half-rack configuration of SPARC T4-2 servers and a larger full-rack configuration of 10 SPARC T4-2 servers. The two deployment sizes were chosen to provide a means to achieve a minimum set of hardware to provide full functionality in the half-rack configuration and in the full-rack configuration with the intention to demonstrate a high-density, scalable building block for larger implementations. Full Bills of Materials (BOMs) are available through Oracle. In addition to the SPARC T4-2's, SPARC T4-4s can be substituted in place of the T4-2s for additional memory capacity and greater virtualization scalability.

## Software Levels

The table below shows the minimum software levels for the Oracle software components that are used in the Oracle Optimized Solution for Enterprise Cloud Infrastructure.

ORACLE PRODUCT NAME	SOFTWARE RELEASE
Oracle Solaris	Oracle Solaris 10 Update 10 / Solaris 11 or later in native zones or domains Oracle Solaris branded zones are supported to provide environments to run Oracle Solaris 8 or 9 applications
Oracle Database	Oracle Database 11g Release 2 (11.2.0.1) or later in native zones or domains Older versions capable of running in Oracle Solaris 8 or 9 branded zones.
Oracle VM Server for SPARC	Oracle VM Server for SPARC 2.1 or later
Sun ZFS Storage 7320 or Sun ZFS Storage 7420	Firmware Version 2010.08.17.3.0.1-1.25 or later
Oracle's Sun Network 10 GbE Switch 72p	SP Firmware 3.0.5.2 or later

## Licensing Options

No licenses are required to use Oracle Enterprise Manager Ops Center 12c. The software is available for download at no charge and can be operated on any system where current premium support contracts have been purchased.

Any software hosted in virtual environments created through the use of Oracle Enterprise Manager Ops Center 12c must be in compliance with Oracle or third-party standard licensing policies.

## Cabling Configuration

In this Oracle Optimized Solution environment, it is recommended to lay out the rack configuration for either a half- or full-rack configuration, as shown in the figures below. Equipment placement decisions are intended to reduce unnecessary cable runs and provide ease of upgrade when growing the deployment.

### Cabling a SPARC T4-2 Node

Cabling for each SPARC T4-2 virtualization node is equivalent to every other node.

- Both power supplies are utilized and each is connected to a different rack PDU to provide power redundancy in the rack.
- A dual port, 10 GbE PCIe card is installed in PCIe slot #3. Both SFP+ ports are used; one port is connected to each top-of-rack (ToR) 10 GbE switch to again provide redundant communications to each server.

- An optional dual ported 8 Gb Fibre Channel PCIe HBA can be installed in PCIe Slot # 7 to provide a means to connect to SAN LUNs. External SAN switches must be provided, and each port should be cabled to separate redundant SAN switches.

Server management is carried out by connecting the Oracle Integrated Lights Out Manager (Oracle ILOM) management port to ToR switches using SFP+ to 1000Base-T adapter cables, and this requires the server to be configured to use side-band Oracle ILOM management ports shared with the main servers NET0 port. The ToR switch must also be correctly configured to operate the connected port at the required 1000GbE speeds and duplexing settings. Cable locations are shown in Figure 1.

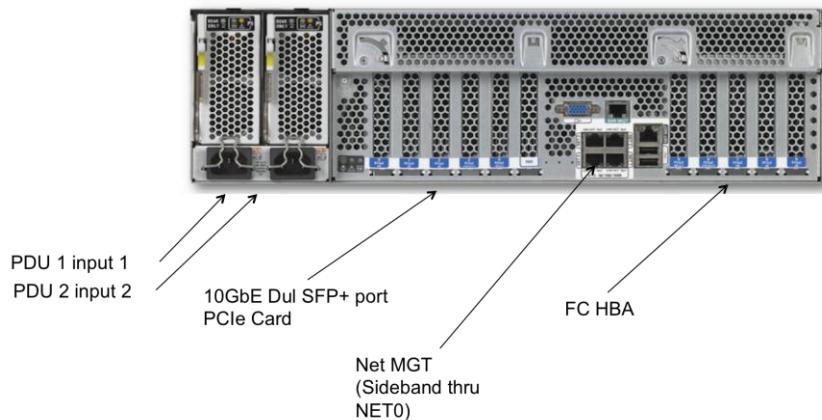


Figure 1.

### Full Rack Layout

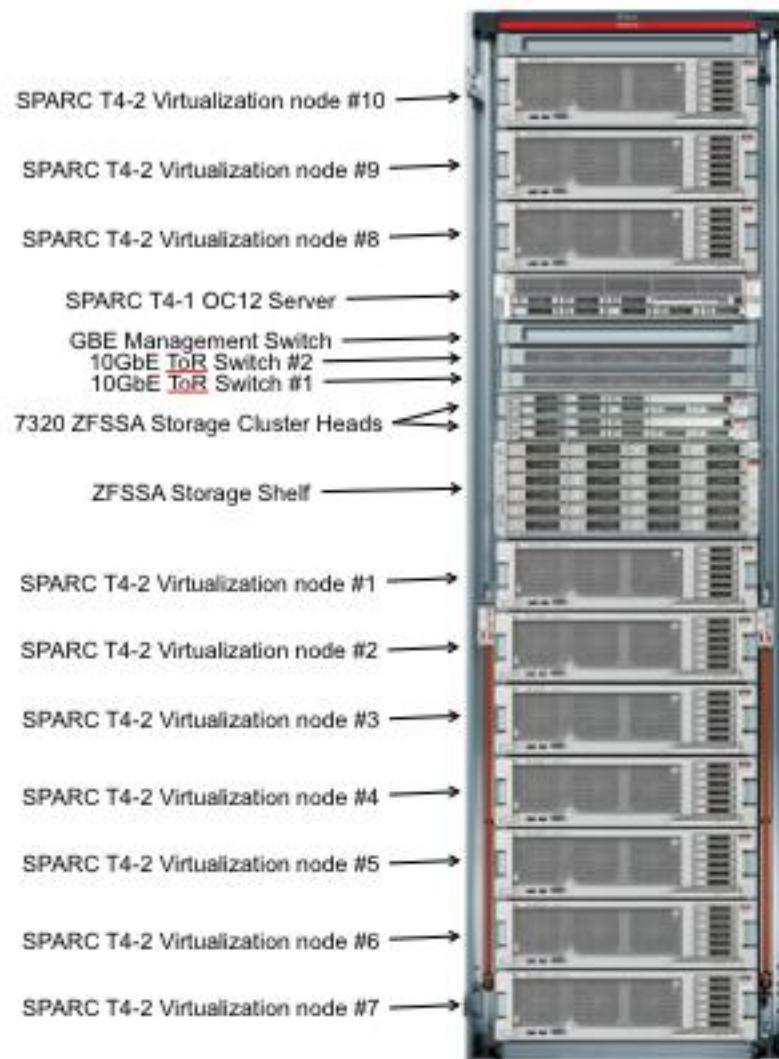


Figure 2, Full Rack Physical layout

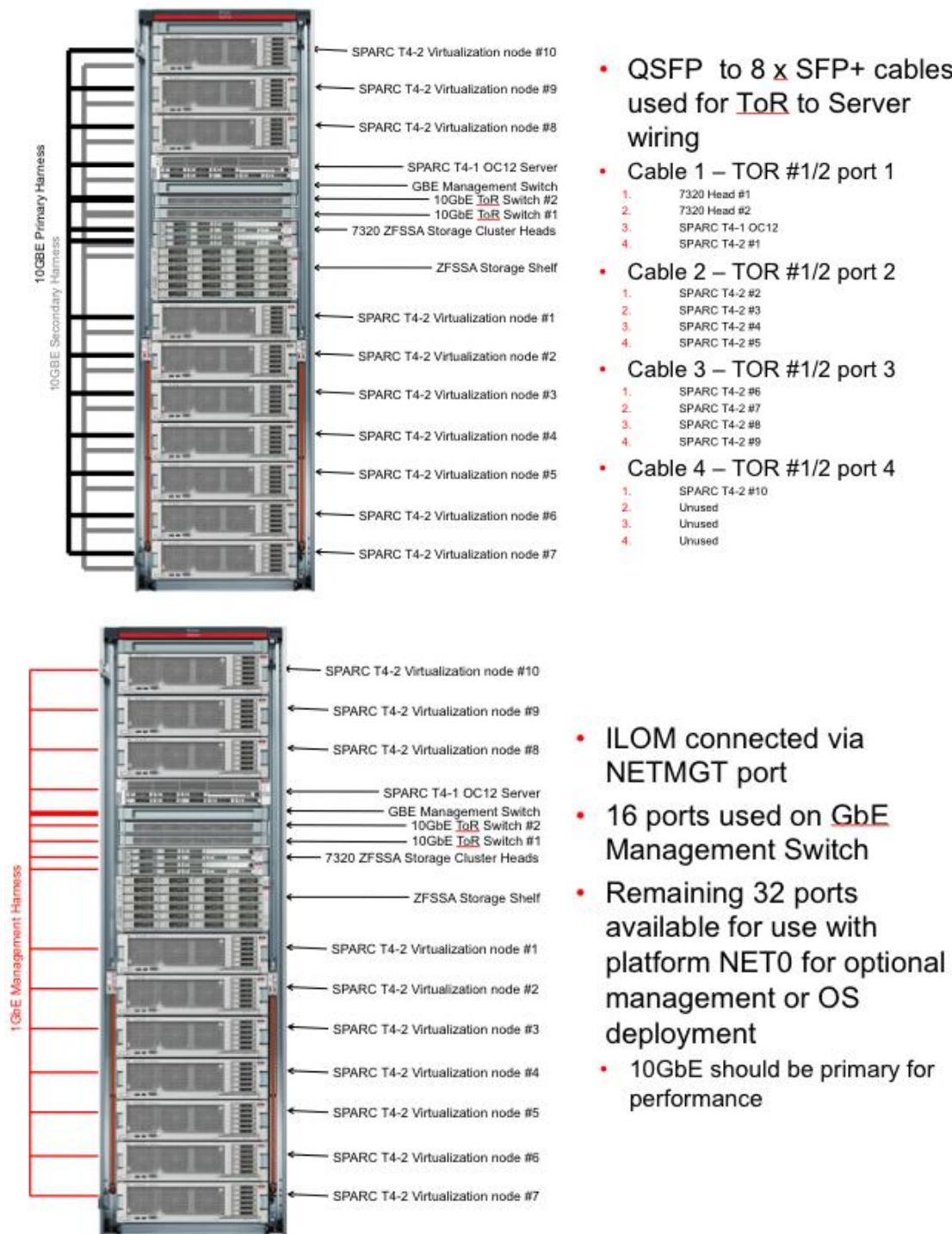


Figure 3, Full Rack Cabling configuration

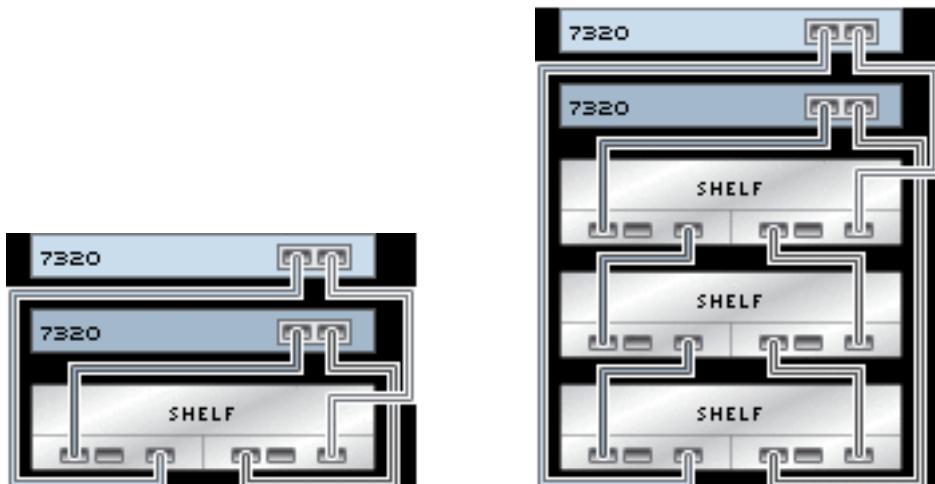
## Sun ZFS Storage 7320 and Sun ZFS Storage 7420 Cluster Cabling

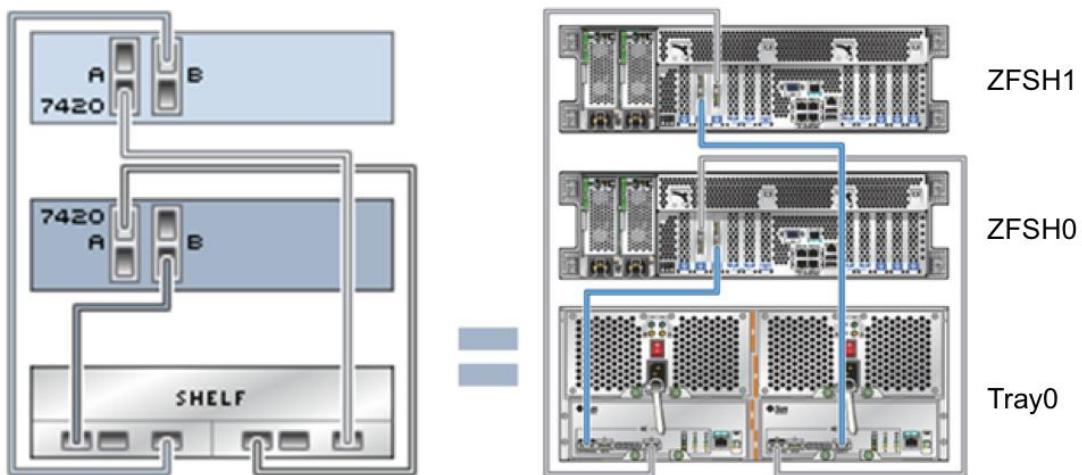
The illustrated minimal and full-rack configurations in this document show an HA clustered Sun ZFS Storage 7320 with a single storage tray; if additional storage expansion is required, it will be necessary to replace some of the SPARC T4-2 virtualization servers to make room within the rack, starting with servers #1 and #2 for one additional tray. If the Sun ZFS Storage 7420 is used, it will be necessary to further reduce the number of servers deployed in the rack due to the larger rack unit size of the clustered Sun ZFS Storage 7420 head nodes.

The Sun ZFS Storage 7320 cluster can support up to four storage trays. The Sun ZFS Storage 7420 cluster is capable of supporting more than six storage trays should large amounts of storage be required. The figures that follow show samples of stable, balanced, and redundant cluster configurations with two HBAs, as well as steps to migrate from one state to another. Please refer to the Sun ZFS Storage 7320/7420 deployment guides for further information on best practices for configuration.

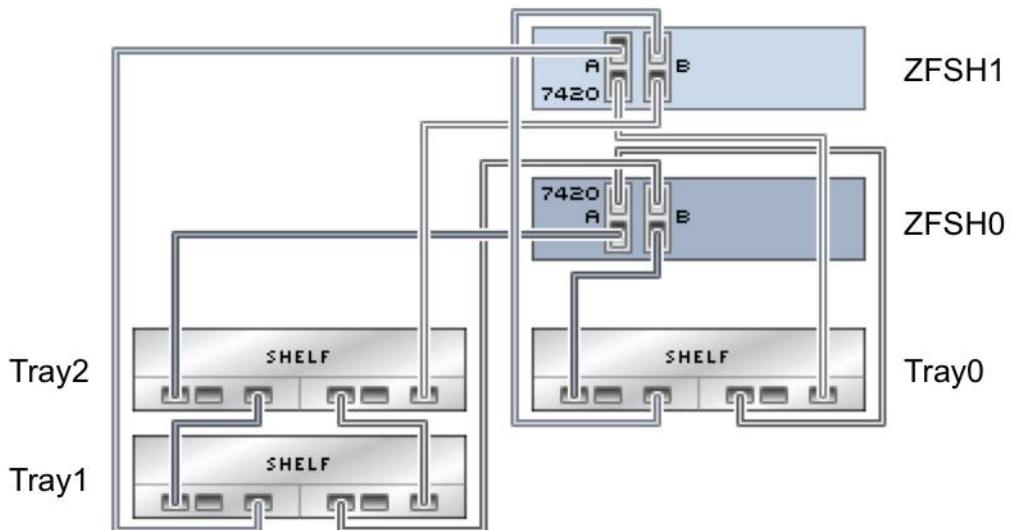
**NOTE:** The figures below are not necessarily representative of proper slot locations for the HBAs.

The images below show recommended cabling for Sun ZFS Storage 7320 or 7420 clusters with one disk shelf and a second cluster configuration with three disk shelves. Product photo images are shown adjacent to a first diagram so that readers can see the correspondence from the logical diagram to the physical equipment.





When using a Sun ZFS Storage 7420 cluster with three disk shelves, please cable the storage as shown below.



### Network Cabling and Initial Configuration

During initial configuration and cabling of the rack of servers, it is necessary to connect to the SER MGT ports of all devices in the rack and carry out an initial configuration of the Oracle ILOM service processors in each piece of equipment. This will consist of programming at least a static IP address into each piece of equipment to allow for subsequent configuration and management. No Console/Terminal server is required for the subsequent management of the systems in this deployment. For further information on connecting to the SER MGT port and configuring the Oracle ILOM service processor, please refer to the Oracle ILOM Administration Guide.

For reference, it is recommended that the following table be filled in during this initial configuration phase to track the allocated IP addresses, passwords, configurations, etc., of the components within the rack.

For management and initial server deployment, the 1 GbE switch is used; this provides connections to the Oracle ILOM NET MGT ports on all devices and the NET0 ports on all managed servers and storage as shown in the diagram below.

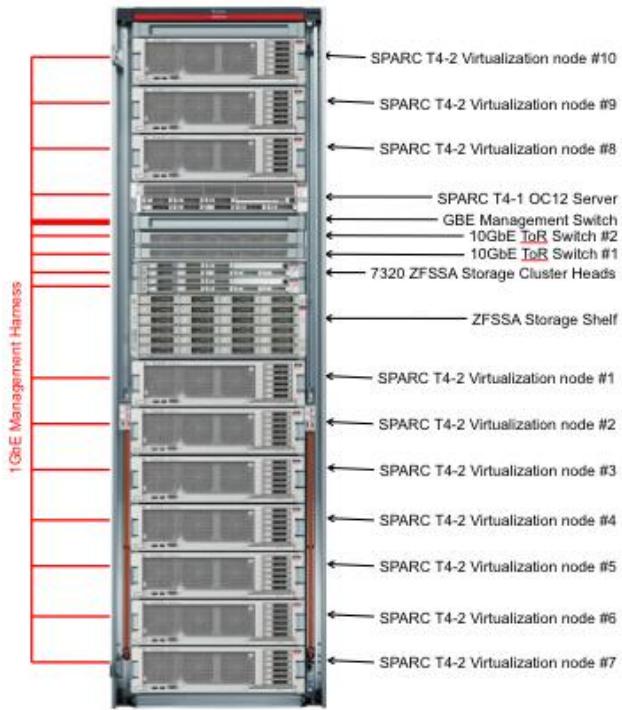


Figure 4, Management Network Cabling

- ILOM connected via NETMGT port
- 16 ports used on GbE Management Switch
- Remaining 32 ports available for use with platform NET0 for optional management or OS deployment
  - 10GbE should be primary for performance

### Network Cabling for Oracle's 10 GbE Top-of-Rack Switches

This section details the 10 GbE connectivity between the Sun Network 10 GbE Switch 72p and the 10 GbE dual-ported HBAs on the Oracle SPARC T4-2 virtualization servers and the Sun ZFS Storage 7320/7420 appliances. Please make the connections as shown in the figure below.

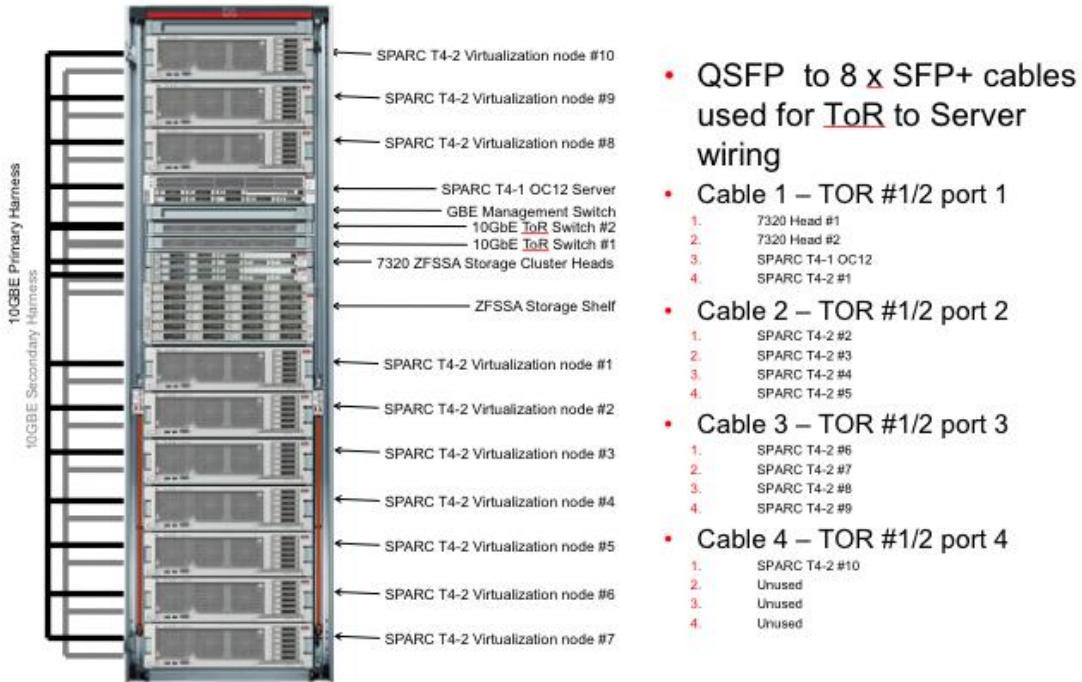


Figure 5, Storage and Data Network Cabling

### Network Cabling for Cluster Network Card on Sun ZFS Storage Appliances

Please connect the cluster cards for the two Sun ZFS Storage Appliance controllers as shown below.

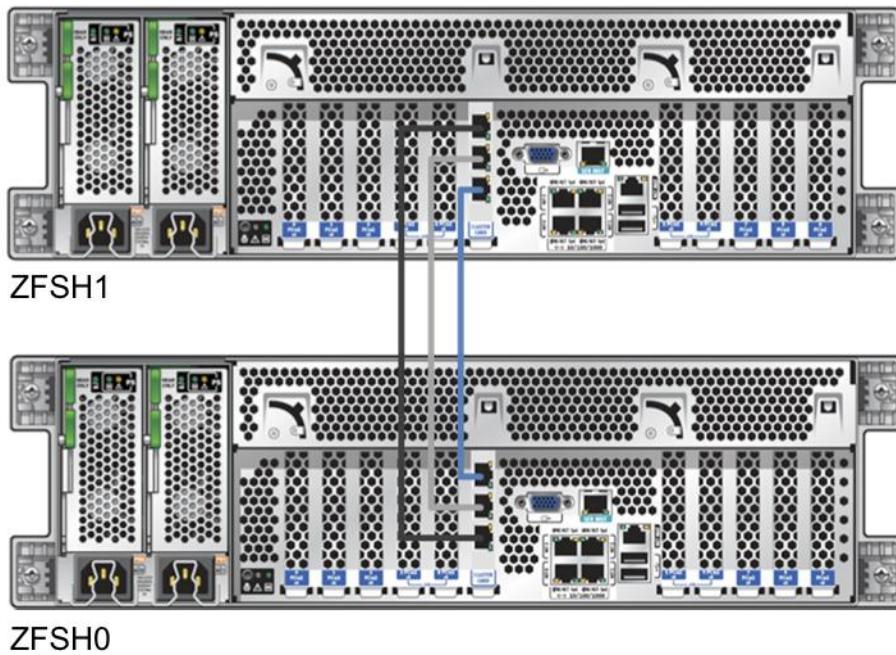


Figure 6, Cluster cabling for ZFS Storage Appliances

#### Network Cabling for Sun ZFS Storage 7320/7420 and SPARC T4-2s

This section details the 10 GbE connectivity between the Oracle SPARC T4-2 servers and the 10 GbE dual-ported HBAs on the Sun ZFS Storage 7420 appliances. Please make the connections as shown below.

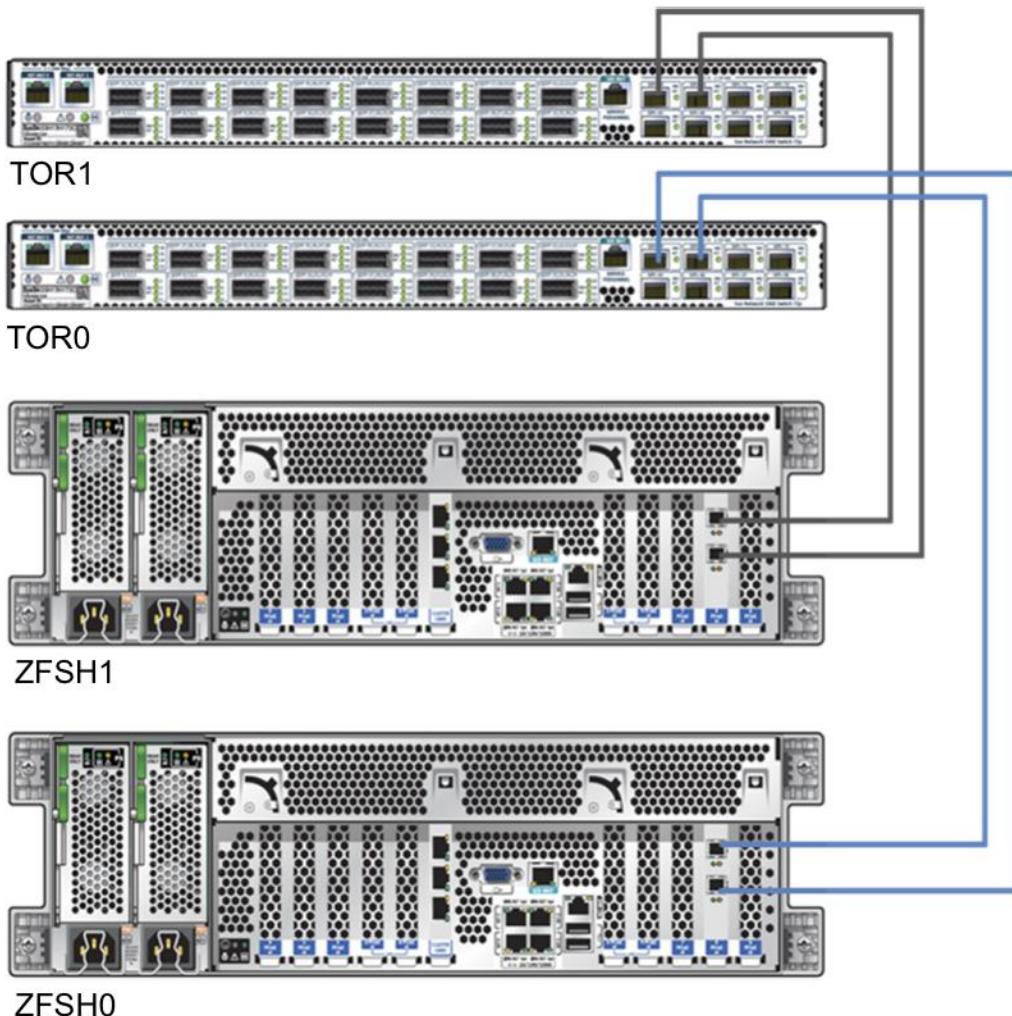


Figure 7, ZFS Storage Appliance connections to ToR Switches

#### Network Cabling Interconnect for Top-of-Rack Switches

For the purpose of high availability, the two top-of-rack switches have a QSFP interconnect to ensure network communication is maintained for the enterprise cloud infrastructure environment.



Figure 8, Interconnect ToR Switches

## Initial Hardware Configuration

This section describes the steps to set up the Oracle Optimized Solution for Enterprise Cloud Infrastructure. The steps are based upon the assumption that the rack components have all been physically installed, cabled, and powered on.

### The Oracle SPARC T4-1 and Oracle Enterprise Manager Ops Center 12c Management Server Configuration

This server may be installed with either Oracle Solaris 10 update 10 or Oracle Solaris 11. It is recommended that full installation be carried out with standard defaults and then required Oracle Optimized Solution for Enterprise Cloud Infrastructure- and customer-specific OS minimization or configuration be carried out prior to further installation of the Oracle Enterprise Manager Ops Center 12c management software.

#### Required Connections

NET0 connected to the 1 GbE Cisco management switch (port *x*)

#### Operating Systems Installation and Configuration

It is recommended that the operating system be installed on a RAID-protected filesystem, to ensure that the management node is resilient to disk failures. This can be achieved by various methods depending on the OS chosen; please follow OS installation best practices to achieve a mirrored root disk. After installation, an additional set of RAID-protected disks will be configured to house the Oracle Database that Oracle Enterprise Manager Ops Center 12 will install.

Carry out a standard OS installation of the chosen OS. Oracle Solaris 11 is recommended.

Once installed, some additional configuration is necessary.

By default Solaris 11 does not allow ‘root’ users to log into the system directly; first log in as a less privileged user and then ‘su’ to the root account. This is a security feature of the operating system; however, this can be reverted to conventional Oracle Solaris 10 type behavior by issuing the command

```
user@T4-1-OC12:~$ su - root
```

```
Password:xxxxx
root@T4-1-OC12:~# rolemod -K type=normal root
```

Ensure that the swap configuration of the server is sufficiently large. Oracle Enterprise Manager Ops Center 12c requires at least 32 GB of swap space. Swap space can be checked and added if necessary using the following commands

```
root@T4-1-OC12:~# swap -l
swapfile          dev      swaplo   blocks    free
/dev/zvol/dsk/rpool/swap 228,2        16  8388592  8388592
```

This command will return output indicating the swap devices, block size, and amount free, if the blocks number is the same as the free number, swap is not currently being used and can simply be removed, resized, and reinserted.

```
root@T4-1-OC12:~# swap -d /dev/zvol/dsk/rpool/swap
root@T4-1-OC12:~# swap -lh
No swap devices configured
root@T4-1-OC12:~# zfs set volsize=32G rpool/swap
root@T4-1-OC12:~# swap -a /dev/zvol/dsk/rpool/swap
root@T4-1-OC12:~# swap -lh
swapfile          dev      swaplo   blocks    free
/dev/zvol/dsk/rpool/swap 228,2        8K     32G     32G
```

If the swap is in use, an additional swap device can be created and added to the existing swap to achieve the required amount of swap.

```
root@T4-1-OC12:~# zfs create -V 32G rpool/swap2
root@T4-1-OC12:~# swap -a /dev/zvol/dsk/rpool/swap2
root@T4-1-OC12:~# swap -lh
swapfile          dev      swaplo   blocks    free
/dev/zvol/dsk/rpool/swap 228,2        8K  4G  4G
/dev/zvol/dsk/rpool/swap2 228,3       8K  32G 32G
```

When using Oracle Solaris 11 without specific network naming services enabled, it may be necessary to modify the /etc/hosts file to remove the any instances of the hostname assigned to the server from the lines also containing 'localhost' references to the IPv6 or IPv4 loopback addresses (::1 or 127.0.0.1), and be sure to add an appropriate entry for the assigned hostname of the server.

```
root@T4-1-OC12:~# more /etc/hosts
#
# Copyright 2009 Sun Microsystems, Inc. All rights reserved.
# Use is subject to license terms.
#
# Internet host table
#
::1 T4-1-OC12
127.0.0.1 T4-1-OC12 loghost
```

10.196.52.143 T4-1-OC12

In order to ensure proper communications with an external Oracle Solaris 11 package repository and the My Oracle Support center, it may be necessary to set up appropriate network proxies at the shell and application levels. At the shell the following can be set up:

```
root@T4-1-OC12:~# export http_proxy=http://<proxy_ipaddress>:<proxypot>
root@T4-1-OC12:~# export https_proxy=https://<proxy_ipaddress>:<proxypot>
```

These entries should also be added to the top of the /etc/profile system file to ensure they are set persistently and are available in the shell environments following a reboot of the server.

### **Setting Up a Local IPS Repository**

If the Oracle Enterprise Manager Ops Center 12c installation is taking place in a datacenter that is isolated from the external Internet, it is necessary to set up a local IPS repository in order to complete the installation of the application. It is possible to set up an IPS repository on the same server used for the Oracle Enterprise Manager Ops Center 12 install, but some modifications to the standard configuration of the IPS repository will be needed to prevent the IPS server and the Oracle Enterprise Manager Ops Center 12 installation both trying to use the same network ports. The following is the recommended configuration of IPS repository, making the repository effectively available using the ‘files’ interface rather than a conventional HTTP-based local server.

IPS repository binary images can be downloaded from:

<http://www.oracle.com/technetwork/server-storage/solaris11/downloads/index.html>

Download the two parts of the “Oracle Solaris 11 11/11 Repository Image” (later versions are also acceptable). Combine these together in a single image as shown on that screen.

```
user@T4-1-OC12:/# cat sol-11-1111-repo-full.iso-a sol-11-1111-repo-full.iso-b
>sol-11-1111-repo-full.iso
```

Once downloaded and combined, a ZFS filesystem can be created and shared as the IPS repository using the following commands.

User must be logged in as ‘root’ to carry out these commands.

Create a new **ZFS filesystem** to hold the package repository.

```
root@T4-1-OC12:/# zfs create rpool/RepoSolaris11
```

Set the ‘atime’ property to prevent updating the access time for files in the repository.

```
root@T4-1-OC12:/# zfs set atime=off rpool/RepoSolaris11
```

Mount the staged repository ISO image temporarily on the /mnt directory.

```
root@T4-1-OC12:/# mount -F hsfs <full_path_to_iso>/sol-11-1111-repo-full.iso
/mnt
```

Copy the IPS repository files from the mounted ISO image to the /export/repoSolaris11 directory.

```
root@T4-1-OC12:/# cd /mnt/repo; tar cf - . | (cd /rpool/RepoSolaris11; tar xfp -)
```

Change directory to root (/) and unmount the ISO image. This image can now be deleted if necessary.

```
root@T4-1-OC12:/# cd /
root@T4-1-OC12:/# umount /mnt
```

Use the pkgrepo command to build a search index for the local repository.

```
root@T4-1-OC12:/# pkgrepo -s /rpool/RepoSolaris11 refresh
```

Set the origin for the Solaris publisher to the locally shared repository.

```
root@T4-1-OC12:/# pkg set-publisher -G '*' -g file:///rpool/RepoSolaris11/
solaris
```

Verify the identity of the current IPS repository.

```
root@T4-1-OC12:/# pkg publisher
PUBLISHER      TYPE      STATUS      URI
solaris        origin    online    file:///rpool/RepoSolaris11/
```

Once configured, the IPS repository can be used by the Oracle Enterprise Manager Ops Center 12 installation.

### **Download and Install Oracle Enterprise Manager Ops Center 12c**

Please go to the following link to download the packages required for Oracle Enterprise Manager Ops Center 12c.

<http://www.oracle.com/technetwork/oem/ops-center/oem-ops-center-188778.html>

Please download the binary bundle listed under the title:

```
Oracle Solaris Operating System 10 & 11 (SPARC)
Enterprise Controller and all supported Agent and Proxy Controllers
```

Also download the required patches from <http://support.oracle.com>.

Locate patchset 10404530 or subsequent releases, and download zip files 1 of 7, 2 of 7 and 7 of 7.

Make sure that all downloaded files are located in the /var/tmp/downloads directory, create the directory if it does not already exist.

Unzip and untar the Enterprise controller bundle using the command

```
root@T4-1-OC12:/var/tmp/downloads# gzcat enterprise-
controller.Solaris.sparc.12.1.0.2001.tar.zip | tar xf -
```

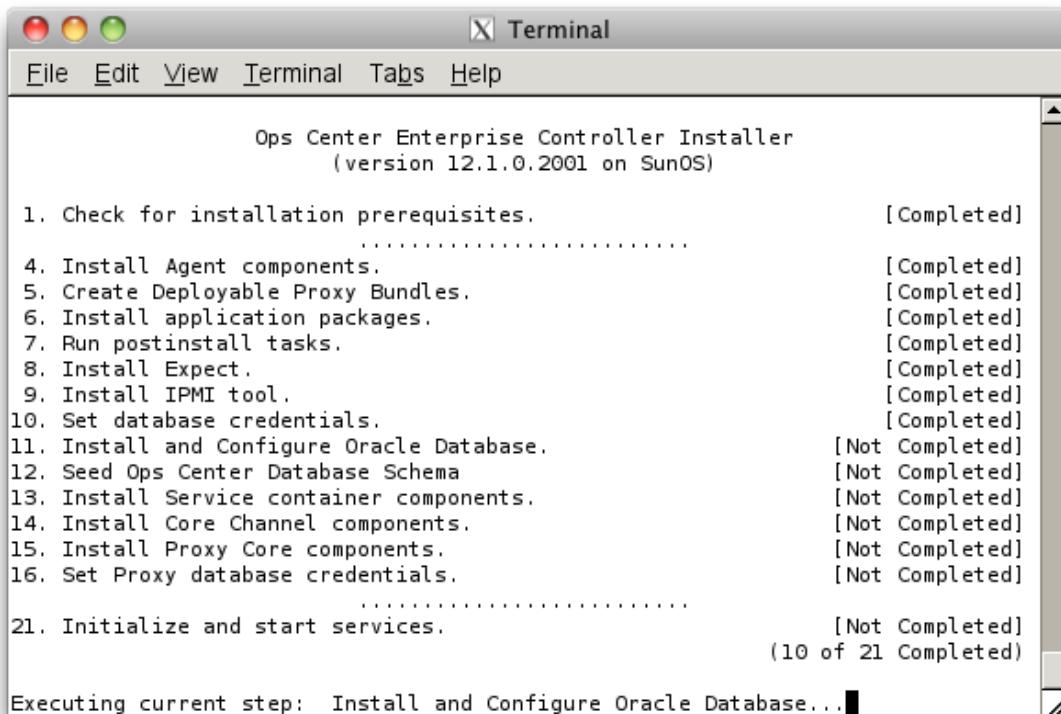
Change directory to the newly created xvmoc\_full\_bundle directory and run the Oracle Enterprise Manager Ops Center 12 installer program.

```
root@T4-1-OC12:/var/tmp/downloads# cd xvmoc_full_bundle/
root@T4-1-OC12:/var/tmp/downloads/xvmoc_full_bundle# ls
```

```
documentation license          ocasmpl      SunOS_sparc
install        Linux_i686       SunOS_i386
root@T4-1-OC12:/var/tmp/downloads/xvmoc_full_bundle# ./install
```

This program now prompts for various pieces of information as shown in the following screen captures; an example series of simple responses are shown. Customer-specific answers may vary.

Once successfully answered and verified, the installer proceeds through the many installation stages automatically. This may take up to an hour to complete.



#### **Configure Oracle Enterprise Manager Ops Center 12 with Suitable Storage to Hold the Local Data Repositories**

Working on the SPARC T4-1 Oracle Enterprise Manager Ops Center 12 server, choose a pair (or more) of the remaining disks on the SPARC T4-1 and create a mirrored Sun ZFS Storage Appliance

pool to store the local Oracle Enterprise Manager Ops Center 12 repository. Once the pool is created, three filesystems should be placed into the pool.

Determine the disks that the SPARC T4-1 contains by using the format command. Take note that the first two disks should be the rpool mirrors and the remaining disks are available for use as the repository pool.

```
root@T4-1-OC12:/root# format
Searching for disks...done

AVAILABLE DISK SELECTIONS:
 0. c0t5000C50043293CE3d0 <SUN600G cyl 64986 alt 2 hd 27 sec 668>
solaris
    /scsi_vhci/disk@g5000c50043293ce3
    /dev/chassis//SYS/HDD0/disk
 1. c0t5000C50043277677d0 <SEAGATE-ST960005SSUN600G-0606-558.91GB>
    /scsi_vhci/disk@g5000c50043277677
    /dev/chassis//SYS/HDD1/disk
 2. c0t5000C50043279EA7d0 <SUN600G cyl 64986 alt 2 hd 27 sec 668>
solaris
    /scsi_vhci/disk@g5000c50043279ea7
    /dev/chassis//SYS/HDD2/disk
 3. c0t5000C5004327703Fd0 <SEAGATE-ST960005SSUN600G-0606-558.91GB>
    /scsi_vhci/disk@g5000c5004327703f
    /dev/chassis//SYS/HDD3/disk
 4. c0t5000C50043542E0Bd0 <SUN600G cyl 64986 alt 2 hd 27 sec 668>
solaris
    /scsi_vhci/disk@g5000c50043542e0b
    /dev/chassis//SYS/HDD4/disk
 5. c0t5000C500432795C3d0 <SUN600G cyl 64986 alt 2 hd 27 sec 668>
solaris
    /scsi_vhci/disk@g5000c500432795c3
    /dev/chassis//SYS/HDD5/disk
 6. c0t5000C5004329299Fd0 <SUN600G cyl 64986 alt 2 hd 27 sec 668>
solaris
    /scsi_vhci/disk@g5000c5004329299f
    /dev/chassis//SYS/HDD6/disk
 7. c0t5000C50043277EB7d0 <SUN600G cyl 64986 alt 2 hd 27 sec 668>
solaris
    /scsi_vhci/disk@g5000c50043277eb7
    /dev/chassis//SYS/HDD7/disk
Specify disk (enter its number): q
`q' is not an integer.
Specify disk (enter its number): ^C
```

In this case choose disks 2 and 3 (c0t5000C50043279EA7d0 and c0t5000C5004327703Fd0 ), and create a mirrored zpool called ‘OC12repo’ with them.

```
root@T4-1-OC12:/root# zpool create -f OC12Repo mirror c0t5000C50043279EA7d0
c0t5000C50043542E0Bd0
```

Once created, check the configuration using the zpool list and status commands.

```
root@T4-1-OC12:/root# zpool list
NAME      SIZE  ALLOC   FREE   CAP  DEDUP  HEALTH  ALTROOT
OC12Repo  556G  137K   556G   0%   1.00x  ONLINE   -
rpool     556G  147G   409G  26%   1.00x  ONLINE   -
root@T4-1-OC12:/root# zpool status
  pool: OC12Repo
  state: ONLINE
    scan: none requested
  config:
    NAME          STATE       READ WRITE CKSUM
    OC12Repo      ONLINE      0     0     0
      mirror-0    ONLINE      0     0     0
        c0t5000C50043279EA7d0  ONLINE      0     0     0
        c0t5000C50043542E0Bd0  ONLINE      0     0     0
    errors: No known data errors

  pool: rpool
  state: ONLINE
    scan: none requested
  config:
    NAME          STATE       READ WRITE CKSUM
    rpool         ONLINE      0     0     0
      c0t5000C50043293CE3d0s0  ONLINE      0     0     0
    errors: No known data errors
```

Now create three filesystems for Oracle Enterprise Manager Ops Center 12 to use inside the OC12Repo zpool.

```
root@T4-1-OC12:/root# zfs create OC12Repo/library1
root@T4-1-OC12:/root# zfs create OC12Repo/library2
root@T4-1-OC12:/root# zfs create OC12Repo/library3
```

Check the status of the filesystems using the command zfs list.

```
root@T4-1-OC12:/root# zfs list
```

NAME	USED	AVAIL	REFER	MOUNTPOINT
OC12Repo	202K	547G	35K	/OC12Repo
OC12Repo/library1	31K	547G	31K	/OC12Repo/library1
OC12Repo/library2	31K	547G	31K	/OC12Repo/library2
OC12Repo/library3	31K	547G	31K	/OC12Repo/library3
rpool	150G	397G	75.5K	/rpool
rpool/ROOT	44.9G	397G	31K	legacy
rpool/ROOT/solaris	44.9G	397G	15.7G	/
rpool/ROOT/solaris/var	28.9G	397G	24.8G	/var
rpool/RepoSolaris11	6.64G	397G	6.64G	/rpool/RepoSolaris11
rpool/dump	65.8G	399G	63.8G	-
rpool/export	97.5K	397G	32K	/export
rpool/export/home	65.5K	397G	32K	/export/home
rpool/export/home/peter	33.5K	397G	33.5K	/export/home/peter
rpool/swap	33.0G	398G	32.0G	-

## Basic Preparation of SPARC T4-2 Virtualization Servers

The SPARC T4-2 setup process is very simple and consists only of:

- Ensuring the appropriate network connections (and optionally Fibre Channel) are correctly connected
- Ensuring that the ‘root’ user and password, and the IP address of the Oracle ILOM service processor are correctly set up

## Initial Storage Configuration for Sun ZFS Storage 7320/7420 Cluster

For high availability and optimal performance, a clustered Sun ZFS Storage 7320 or Sun ZFS Storage 7420 is recommended, but a single-headed configuration can also be used. Please note that the Sun ZFS Storage 7320 appliance is only capable of either 10 GbE connectivity or Fibre Channel connectivity due to the limited number of PCI card slots available on this platform. The Sun ZFS Storage 7420 appliance can accommodate both forms of connectivity. At the same time, it provides higher performance and scalability, at the expense of being physically larger and consuming more rack space, reducing the space available for SPARC T4-2 platforms hosting virtual environments.

The remainder of this document discusses primarily the configuration and setup of the clustered Sun ZFS Storage 7320 or Sun ZFS Storage 7420 appliance and notes the differences between clustered and unclustered configurations where appropriate. In order to configure a clustering in the Sun ZFS Storage 7320/7420, refer to the Setup and Administration Guides for the appliance.

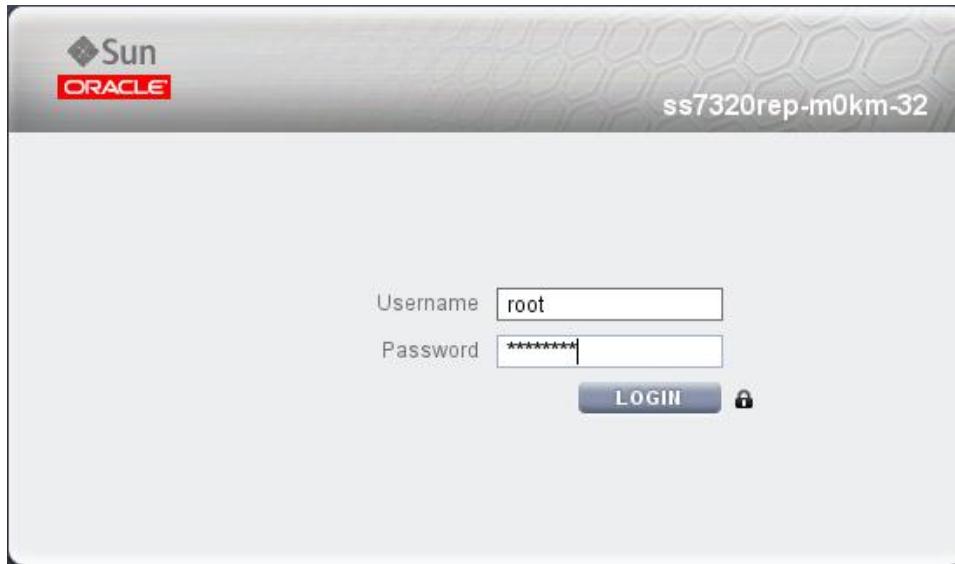
The assumption is that the initial configuration of the cluster has been performed, and the cluster is available on a suitable IP address for management but the Oracle Enterprise Manager Ops Center 12 server.

After properly configuring the storage controllers, the subsequent configuration steps are performed via the browser-based user interface (BUI).

Open a Web browser and enter the URL for the storage controller

([https://<ZFSSA\\_IP\\_Address>:215](https://<ZFSSA_IP_Address>:215) ).

Log in with root credentials, as configured earlier.



If the cluster has already been configured on the appliance, it is possible to skip ahead to the Storage Configuration step; otherwise, please follow these steps to complete initial configuration of the storage appliance.

Click the 'Start' button to begin the configuration process for the clustered storage controllers.

**Welcome**

Begin the appliance configuration task. These steps are required before you can begin using your new appliance.



**Sun ZFS Storage 7420**  
Oracle

**START**

**Welcome to the Sun Unified Storage System.**

Before using the appliance, you will need to provide some basic information about your system environment. During this process you will configure network, time, directory and support services, and then initialize your storage pool to provide space for data shares.

Once the initial setup process is complete, you will be able to create shares and configure more advanced settings specific to your environment and workload. If you need to revisit this process, select Maintenance: System from the main navigation. To begin, click the start button above.

At the Configure Clustering screen, click on the CLUSTER button to configure the cluster.

**Configure Clustering**

This appliance has cluster capable devices. You can choose to configure clustering as part of initial step or wait until a later time.



**Sun ZFS Storage 7420**  
Oracle

**SKIP** **CLUSTER**

This appliance supports configuring two head nodes into a cluster.

You can choose to configure clustering as part of the initial setup, or defer this until a later point. If you choose to not configure clustering now, you can do it later from the clustering configuration screen.

At the Cable Cluster screen, confirm that the connection links on the Sun ZFS Storage 7420 controller cluster cards are active. Click the COMMIT button when confirmed.

Configure a second appliance into a multi-node cluster connected to the active appliance. The two appliances will synchronize their settings and provide service for the other if one fails.

**ABORT**

**COMMIT**

**◀ Step 1 of 2 ▶**

**Cable Cluster**

Cable together the cluster card, power on the second appliance, and confirm that the communication links are active and connected.

**oem306**

Clustering is not configured

**unknown**

Unknown (disconnected or restarting)



clustron\_uart:1  
dipi:0  
clustron\_uart:0

clustron\_uart:1  
dipi:0  
clustron\_uart:0



At the Set Name and Password screen, enter the name and root password for the new appliance. Click the COMMIT button to continue with the appliance cluster configuration.

Configure a second appliance into a multi-node cluster connected to the active appliance. The two appliances will synchronize their settings and provide service for the other if one fails.

**Set Name and Password**

Enter a name and root password for the new appliance, and continue to begin appliance cluster configuration.

Appliance Name

Root Password

Confirm Password

ABORT REVERT COMMIT Step 2 of 2

At the Configure Networking screen, no additional settings need to be made at this time. Click COMMIT.

Initial configuration of appliance settings.

**Configure Networking**

Configure the appliance network interfaces. The first network interface has been configured for you using the settings you provided at the serial console.

	Configuration	Addresses	Routing
<b>Network</b>	<b>Configuration</b>	<b>Addresses</b>	<b>Routing</b>
To configure networking, build Datalinks on Devices, and Interfaces on Datalinks. Click on a pencil icon to edit object properties. Select an object to view its relationship to other objects. Drag objects to extend Aggregations or IP Multipathing Groups.	<b>REVERT</b> <b>APPLY</b>		
<b>Devices</b> 6 total	<b>Datalinks</b> 1 total	<b>Interfaces</b> 1 total	
<b>BUILT-IN</b>	<b>Untitled Datalink</b> via igb0	<b>Untitled Interface</b> IPv4 static, 10.133.102.39/23, via igb0	
igb0 100Mb (full)			
igb1 link down			
igb2 link down			
igb3 link down			
<b>PCIe 7</b>			
ixgbe0 link down			
ixgbe1 link down			

**Step 1 of 6**

At the Configure DNS screen, enter the DNS Domain and DNS sever information. When completed, click COMMIT.

Initial configuration of appliance settings.

**Configure DNS**

Configure the Domain Name Service.

Online

**Domain Name Service**

DNS is used to map host names such as sun.com to their corresponding IP addresses. DNS is always enabled on your appliance, and can be configured manually or based on your current DHCP settings. In addition, you may elect to attempt hostname resolution using other directory services (if configured).

**See Also**

- Help: DNS
- Wikipedia: DNS

**RESTART**

**DISABLE**

**REVERT** **COMMIT** **< Step 2 of 6 >**

At the Configure Time screen, enter the NTP server information if an NTP server exists on the network. Otherwise click the SYNC button to manually set the time and date to match the time and date with the Web browser. Click COMMIT when completed.

Initial configuration of appliance settings.

**Configure Time**

Configure the Network Time Protocol.

Disabled

**Network Time Protocol**

Configure the network time protocol. If you choose to leave the NTP service disabled, you may manually set the time and date to match your time according to your web browser.

**NTP Settings**

Discover NTP server via multicast address:  
224.0.1.1

Manually specify NTP server(s):

**Clock**

Server Time 2011-9-15 16:00:02  
Client Time 2011-9-15 16:00:02

**SYNC**

**See Also**

- Help: NTP
- NTP Project
- Wikipedia: NTP

**RESTART**

**ENABLE**

**REVERT** **COMMIT** **< Step 3 of 6 >**

At the Configure Name Services screen, configure the directory services for users and groups as desired. Each directory service can be enabled and configured independently, and more than one directory service can be enabled. When completed configuring the directory services, click COMMIT.

Initial configuration of appliance settings. COMMIT

### Configure Name Services ◀◀ Step 4 of 6 ▶▶

Configure directory services for users and groups. You can configure and enable each directory service independently, and you can configure more than one directory service.

**NIS** CONFIGURE

Recognize users and groups defined in a NIS directory. Once the NIS service is configured, go to Configuration/Users to give users permission to log into the administrative interface.

This service is not yet configured. Click the configure button to configure and enable the service.

**LDAP** CONFIGURE

Recognize users and groups defined in an LDAP directory. Once the LDAP service is configured, go to Configuration/Users to give users permission to log into the administrative interface.

This service is not yet configured. Click the configure button to configure and enable the service.

**Active Directory** CONFIGURE

Configure communication with a Microsoft Active Directory Server. Active Directory servers authenticate Windows users and share files over the SMB protocol.

This service is not yet configured. Click the configure button to configure and enable the service.

At the Configure Storage screen, accept the default empty configuration. Storage pools will be created later in this document. At this time, click the COMMIT button.

Initial configuration of appliance settings. COMMIT

### Configure Storage ◀◀ Step 5 of 6 ▶▶

Configure Storage Pools.

**About Storage Configuration**  
Storage is configured in pools that are characterized by their underlying data redundancy, and provide space that is shared across all filesystems and LUNs.

During the configuration process, you will select which devices to allocate to a storage pool and the redundancy profile most appropriate to your workload, balancing performance, availability, and capacity.

Importing storage will search all devices attached to the system for existing pool configurations, from which you can select one as the system pool. This option is used to migrate pools between systems, and in some cases can recover pools that were destroyed inadvertently.

**Available Pools** IMPORT

No pools are configured. Click the button to configure a new pool. Click the import button to search for previously configured pools.

At the Registration & Support screen, enter the My Oracle Support (MOS) account information and any Web proxy information if the Sun ZFS Storage Appliance communicates to the Web through a proxy server. When completed, click the REGISTER button to complete the registration. When successfully completed, click COMMIT.

## Registration & Support

Register your appliance and configure remote support.

### About Support Services

Oracle provides automated service response to system faults and connectivity issues as part of customer support. To enable this Phone Home service, you must register your appliance under a My Oracle Support account and your web connection should be properly configured if it requires a proxy. If you don't wish to register at this time, click the Later button.



Register your appliance with [My Oracle Support](#) to receive immediate notification of system updates, on-demand access to software downloads, and automated service call generation and fault response for your appliance. All registered customers are supported.

### See Also

[Help: Phone Home](#)  
[My Oracle Support](#)  
[Privacy Statement](#)

My Oracle Support Username  [New account?](#)

Password

Use web proxy If your system communicates to the web through a proxy, check this box and enter the configuration information below.

Host : port  :

Username

Password

[LATER](#) [REGISTER](#)

At this point, the Sun ZFS Storage 7420 controllers have been successfully configured in a clustered configuration. If desired, fail over the configured resources to the cluster peer by clicking the FAILBACK button.

When completed, click the COMMIT button.

Now that clustering has been configured, you can failover the configured resources to the cluster peer, if desired. This step can be deferred until a later point

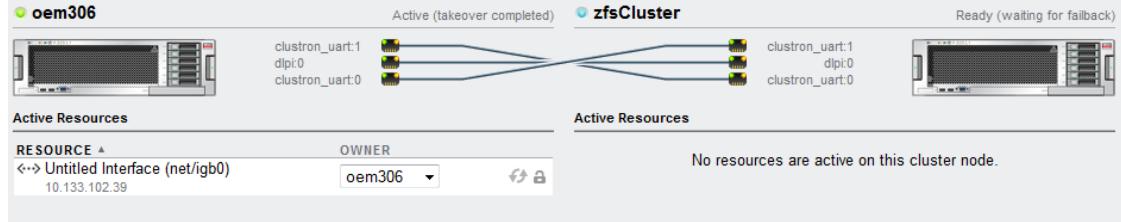
[ABORT](#) [COMMIT](#)

## Resource Failover

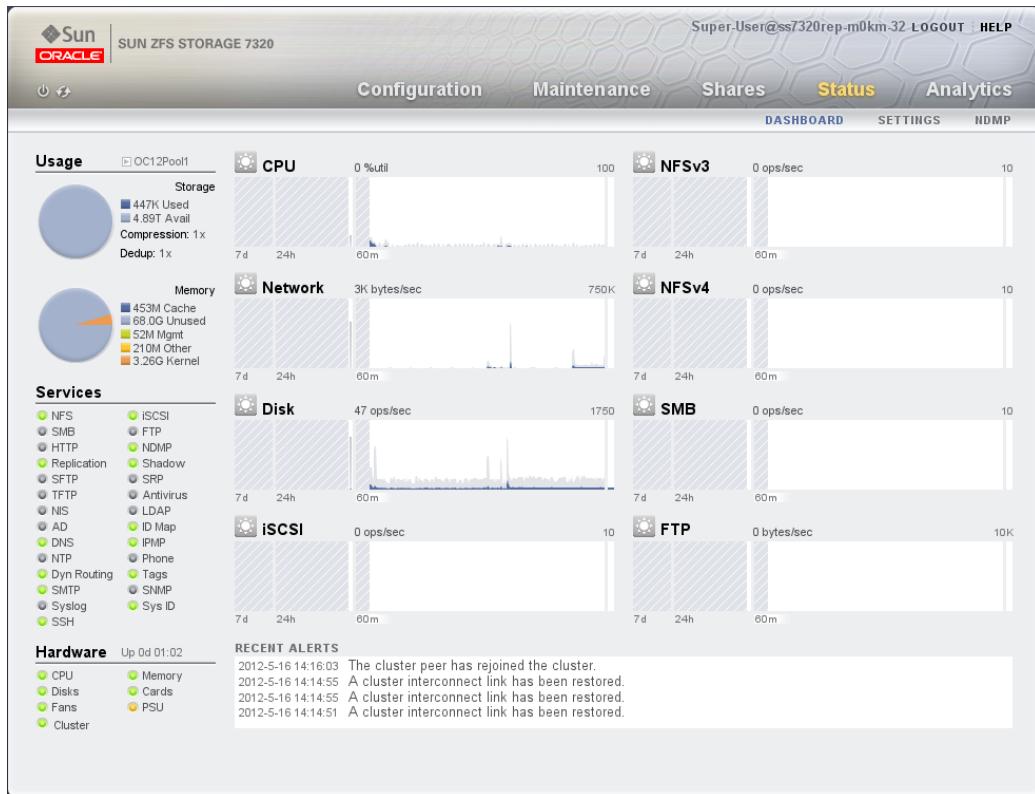
Choose which resources to failover now, or skip the step to do this at a later point.

[SETUP](#) [UNCONFIG](#) **FAILBACK** [TAKEOVER](#) [REVERT](#) [APPLY](#)

◀ Step 1 of 1 ▶



The initial configuration of the Sun ZFS Storage 7420 cluster controllers is completed and the Status information screen should be displayed.



## Switch Network Configuration

This section covers the configuration of the two Sun Network 10 GbE Switch 72p switches and the Cisco 4948 1 GbE management switch. This configuration utilizes Link Aggregation Control Protocol (LACP) for performance and availability where appropriate. The procedures outlined in this section are based on the ports used in the cabling diagrams. Please ensure that either the ports in the configuration match what is in this document, or please modify the procedures outlined in this section to match the configured environment.

### Cisco 4948 Management Switch Configuration

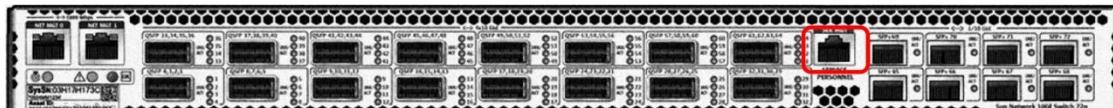
The Cisco 4948 1 GbE management switch requires no specific configuration. A default layer 2 switch configuration is adequate. Customers may choose to add an administrative IP address on the default VLAN. Consult Cisco deployment documentation for further details on configuration.

### Sun Network 10 GbE Switch 72p Administration Connections and Configuration

The recommended default configuration of the Sun Network 10 GbE Switch 72p top-of-rack switches (TORs) does not use VLANs. If there is a need to configure VLANs, please refer to the Sun Network

10 GbE Switch 72p VLAN Administration Guide at <http://download.oracle.com/docs/cd/E19934-01/index.html>.

To perform the initial power-on configuration of the switch, it is necessary to connect a serial cable to the SER MGT port on the TOR, as shown below. Use a DB9 to RJ45 adapter if necessary. Perform the required Oracle ILOM configuration steps on both Sun Network 10 GbE Switch 72p devices.



Connect an Ethernet cable from network port NET MGT 0 to the management network on both Sun Network 10 GbE Switch 72p network switches.

Connect power cables to the power supplies on both switches and verify that the status LEDs for each power supply on both Sun Network 10 GbE Switch 72p network switches indicate normal operation. The AC LED lights and the OK LED should become lit. The Attention LED should remain unlit. At this time the controller is effectively on and booting up, which may take up to two minutes.

Open a terminal window or terminal emulator with the below serial settings:

- 8N1: Eight data bits, no parity, one stop bit
- 9600 baud
- Disable hardware flow control (CTS/RTS)
- Disable software flow control (XON/XOFF)

The initial screen should present the following login prompt:

```
SUNSPnnnnnnnnnnnnn login:
```

Enter the username and password when prompted. The default user is root and the default password is changeme.

The Oracle ILOM prompt should appear as follows:

```
->
```

Change to the network directory:

```
-> cd SP/network
```

By default, the switch uses DHCP as the IP discovery method; this is not recommended as a permanent configuration and should be changed to static IP address settings to enable management in the future. To set the IP discovery mode to static, enter the following command:

```
-> set ipdiscovery=static
```

Configure a suitable management IP address on the switch with the following commands:

```
-> set pendingipaddress=<IP_Address>
-> set pendingipnetmask=<netmask_address>
-> set pendingipgateway=<netmask_address>
-> set commitpending=true
```

For future convenience, it may be useful to set a specific host name locally on the switch. This can be done with the following command:

```
-> set /SP/ hostname=TOR_XX_name
Set hostname to 'TOR_XX_name'
```

Set the switch state to enabled:

```
-> set state=enabled
```

Verify the information that has been entered:

```
-> show
```

Please confirm that the configuration is correct per the information that has been entered. When completed exit the switch ILOM command shell with the following command:

```
-> exit
```

Please perform these configuration steps on the second Sun Network 10 GbE Switch 72p so that it, too, may also be managed in the future.

The TOR switches utilize Oracle's Sun Ethernet Fabric Operating System command line to administer the configuration of the switch, please refer to the Sun Ethernet Fabric Operating System administration documentation available at:

<http://download.oracle.com/docs/cd/E19934-01/index.html>

Before configuring the network, please confirm that the TORs SP firmware version is at or above level 3.0.5.2. If the SP firmware is not at or above this level, please refer to the Sun Network 10 GbE Switch 72p product notes on how to upgrade the SP firmware. To check the current level of firmware, please ssh into the TOR and issue the following command:

```
-> version
```

Refer to the SP firmware version line for the current SP firmware level.

The two TOR switches are referred to as TOR0 and TOR1; these are the master and slave switches in this configuration. The top switch in the rack will be TOR0.

To configure the switch ports, ssh into TOR0, the bottom Sun Network 10 GbE Switch 72p, and run the commands listed below. Please check with the network administrators that the channel-groups numbers suggested are not already in use and that the spanning-tree priority level is set to an acceptable level such that TOR0 is the root switch for this enterprise cloud infrastructure environment.

```
-> cd /SYS/fs_cli/
TOR0 SEFOS# config term
TOR0 SEFOS(config)# set gvrp disable
TOR0 SEFOS(config)# set gmrp disable
TOR0 SEFOS(config)# set port-channel enable
TOR0 SEFOS(config)# set lldp enable
TOR0 SEFOS(config)# spanning-tree priority 28672
TOR0 SEFOS(config)# interface port 100
TOR0 SEFOS(config-if)# no shutdown
TOR0 SEFOS(config-if)# exit
TOR0 SEFOS(config)# interface port 200
TOR0 SEFOS(config-if)# no shutdown
TOR0 SEFOS(config-if)# exit
TOR0 SEFOS(config)# int range ex 0/29-32
TOR0 SEFOS(config-if)# channel-group 100 mode active
TOR0 SEFOS(config-if)# no shut
TOR0 SEFOS(config-if)# exit
TOR0 SEFOS(config)# int range ex 0/3-12
TOR0 SEFOS(config-if)# description "Connection to T4"
TOR0 SEFOS(config-if)# no shut
TOR0 SEFOS(config-if)# exit
TOR0 SEFOS(config)# int range ex 0/1-2
TOR0 SEFOS(config-if)# description "Connection to ZFS"
TOR0 SEFOS(config-if)# channel-group 200 mode active
TOR0 SEFOS(config-if)# no shut
TOR0 SEFOS(config-if)# exit
TOR0 SEFOS(config)# interface vlan 1
TOR0 SEFOS(config-if)# ip address 192.168.10.58 255.255.255.0
TOR0 SEFOS(config-if)# no shutdown
TOR0 SEFOS(config)# end
TOR0 SEFOS# copy running-config startup-config
```

Next, ssh into the TOR1, the top Sun Network 10 GbE Switch 72p, and run the commands listed below. Again, please check with the network administrators that the channel-group and port-channel numbers suggested are not already in use and that the spanning-tree priority level is set to an acceptable level such that TOR0 is the root switch for this enterprise cloud infrastructure environment.

```
-> cd /SYS/fs_cli/
```

```
TOR1 SEFOS# config term
TOR1 SEFOS(config)# set gvrp disable
TOR1 SEFOS(config)# set gmrp disable
TOR1 SEFOS(config)# set port-channel enable
TOR1 SEFOS(config)# set lldp enable
TOR1 SEFOS(config)# spanning-tree priority 28672
TOR1 SEFOS(config)# interface port 100
TOR1 SEFOS(config-if)# no shutdown
TOR1 SEFOS(config-if)# exit
TOR1 SEFOS(config)# interface port 200
TOR1 SEFOS(config-if)# no shutdown
TOR1 SEFOS(config-if)# exit
TOR1 SEFOS(config)# int range ex 0/29-32
TOR1 SEFOS(config-if)# channel-group 100 mode active
TOR1 SEFOS(config-if)# no shut
TOR1 SEFOS(config-if)# exit
TOR1 SEFOS(config)# int range ex 0/3-12
TOR1 SEFOS(config-if)# description "Connection to T4"
TOR1 SEFOS(config-if)# no shut
TOR1 SEFOS(config-if)# exit
TOR1 SEFOS(config)# int range ex 0/1-2
TOR1 SEFOS(config-if)# description "Connection to ZFS"
TOR1 SEFOS(config-if)# channel-group 200 mode active
TOR1 SEFOS(config-if)# no shut
TOR1 SEFOS(config-if)# exit
TOR1 SEFOS(config)# interface vlan 1
TOR1 SEFOS(config-if)# ip address 192.168.10.59 255.255.255.0
TOR1 SEFOS(config-if)# no shutdown
TOR1 SEFOS(config)# end
TOR1 SEFOS# copy running-config startup-config
```

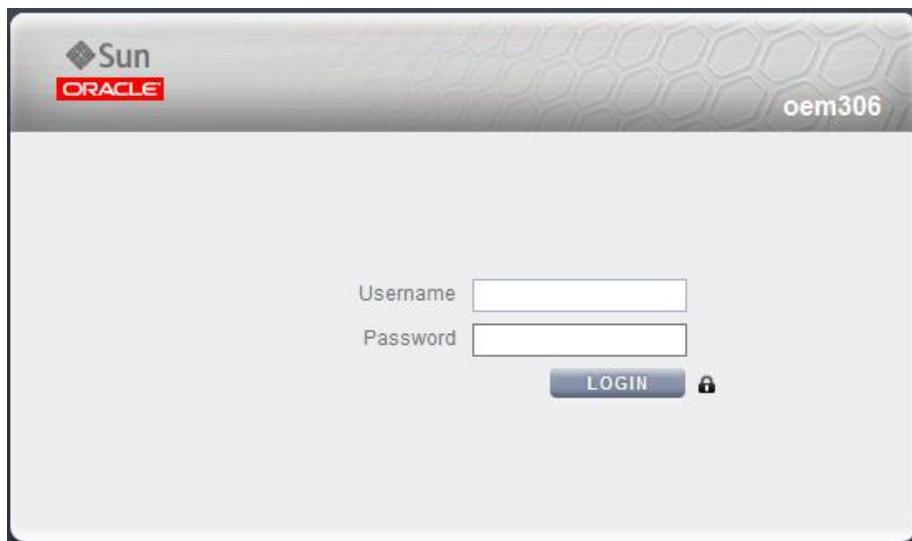
## Further Configuring the Sun ZFS Storage 7320 or Sun ZFS Storage 7420

The procedures discussed in this section of the document cover the specific configuration of the Sun ZFS Storage 7320/7420 recommended for the Oracle Optimized Solution for Enterprise Cloud Infrastructure on SPARC solution once the initial setup has been completed. This includes configuring the Link Aggregation Control Protocol (LACP) of the shared storage network datalinks for high availability and performance, as well as creating suitable storage pools and NFS and/or SAN shared storage LUNs.

### Sun ZFS Storage 7420 Network Datalink Configuration

Log into the Sun ZFS Storage Appliance BUI by opening a Web browser and enter the URL for the Sun ZFS Storage 7420 controller (<https://<ZFS IP Address>:215>).

Log in with root credentials.



Select Configuration from the top navigation menu.

Select NETWORK from the Configuration sub-navigation menu.



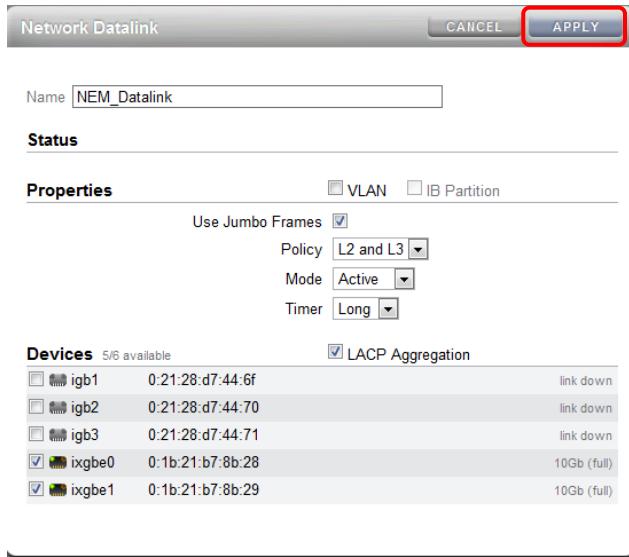
By default, an untitled Datalink is created with its interface already configured. This is the Sun ZFS Storage Appliance management interface. There is no need to modify the management interface at this time.

Devices		Datalinks	Interfaces
BUILT-IN	6 total	<b>Untitled Datalink</b> via igb0	1 total <b>Untitled Interface</b> IPv4 static, 10.133.102.39/23, via igb0
igb0	100Mb (full)		
igb1	link down		
igb2	link down		
igb3	link down		

Add additional datalinks that will be used for the shared storage network. To do this, in the Datalinks click on the plus sign next to Datalinks.

Devices		Datalinks	Interfaces
BUILT-IN	6 total	<b>Untitled Datalink</b> via igb0	1 total <b>Untitled Interface</b> IPv4 static, 10.133.102.39/23, via igb0
igb0	100Mb (full)		
igb1	link down		
igb2	link down		
igb3	link down		
PCIe 7			
ixgbe0	10Gb (full)		
ixgbe1	10Gb (full)		

In the Network Datalink screen, enter the datalink name, check the LACP Aggregation checkbox, and select the two 10 GbE network connections (ixgbe0 and ixgbe1). Also, select Policy as “L2 and L3” since the TORs support both these network layers. Select Mode as “Active” and Timer as “Long”. When completed, click on the Apply button.



The created LACP datalink will appear under the Datalinks section.

The next step is to create an interface for the newly created datalink. To do this, in the Interfaces section click on the plus sign next to Interfaces.

In the Network Interface screen, enter the interface name and IP address/Netmask for the selected datalinks. When completed, click on the Apply button.

Name

**Status**

**Properties**

Enable Interface  Allow Administration

Use IPv4 Protocol

Configure with: Static Address List

+

Use IPv6 Protocol

**Datalinks** 1/2 available  IP MultiPathing Group

NEM Datalink Jumbo frames, via ixgbe0, ixgbe1	0:1b:21:b7:8b:28
--	------------------

To complete the LACP network configuration for the network shared storage, click Apply button.

SUN ZFS STORAGE 7420 | Super-User@oem307 | LOGOUT | HELP

Configuration Maintenance Shares Status Analytics

Configuration Addresses Routing

REVERT APPLY

**Devices** 6 total

igb0	100Mb (full)
igb1	link down
igb2	link down
igb3	link down

**Datalinks** 2 total

NEM Datalink Jumbo frames, via ixgbe0, ixgbe1	<input type="button"/> <input type="button"/>
Untitled Datalink via igb0	<input type="button"/> <input type="button"/>

**Interfaces** 3 total

NEM Interface IPv4 static, 192.168.0.3/24, via aggr1	<input type="button"/> <input type="button"/>
Untitled Interface IPv4 static, 10.133.102.39/23, via igb0	<input type="button"/> <input type="button"/>

## Shared Storage Configuration for Sun ZFS Storage 7320/7420 Cluster

This section introduces Projects and Shares that are linked to the created storage pools.

### Introduction to Projects

All filesystems and LUNs are grouped into projects. A project defines a common administrative control point for managing shares. All shares within a project can share common settings, and quotas can be enforced at the project level in addition to the share level. Projects can also be used solely for grouping logically related shares together, so their common attributes (such as accumulated space) can

be accessed from a single point. All shares can be created within this default project. However, Oracle recommends that additional projects are created for each use case.

In the case of the Optimized Solution for Enterprise Cloud Infrastructure, Oracle recommends creation of a single project for all shares related to the storage of virtualization objects.

#### **Introduction to Shares**

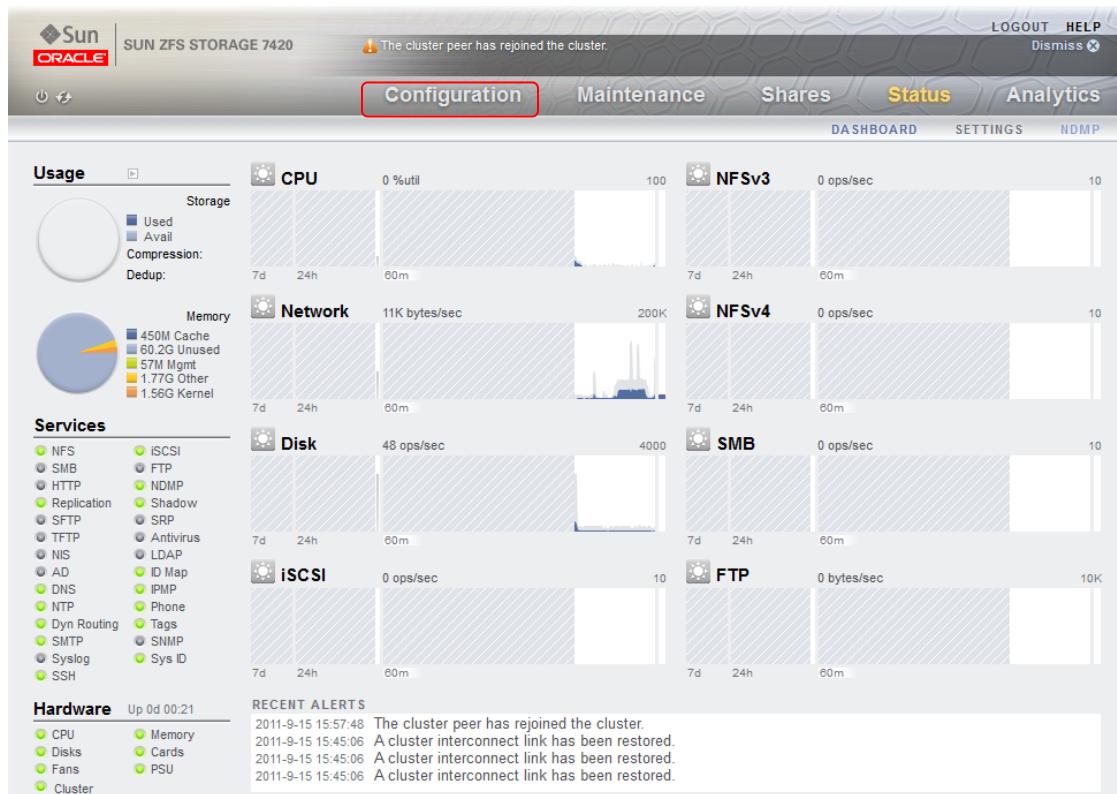
Shares are filesystems and LUNs that are exported over supported data protocols to clients of the appliance. Filesystems export a file-based hierarchy and can be accessed over NFS in the case of Oracle Exalogic machines. The project/share tuple is a unique identifier for a share within a pool. Multiple projects can contain shares with the same name, but a single project cannot contain shares with the same name. A single project can contain both filesystems and LUNs, and they share the same namespace.

In the case of the Oracle Optimized Solution for Enterprise Cloud Infrastructure, Oracle recommends that if the Sun ZFS Storage Appliance has only NFS sharing capability, at least three shares will be created for the purpose of storage of the virtualization objects and libraries. If the Sun ZFS Storage Appliance is capable of providing SAN LUN shares, then it is recommended that each virtual machine requiring high-performance storage be granted one or more dedicated LUNs. Further, it is recommended that appropriate LUN masking be configured in the SAN switch associated with the virtual machine such that all members of the host pool it may migrate amongst have visibility of the appropriate LUNs to enable VM migrations while limiting visibility of the LUN to only appropriate parties.

#### **Creating Storage Pools**

Storage pools are aggregations of raw storage devices (disks) available from the Sun ZFS Storage 7320/7420 configured as single collections of RAID-enabled media. These pools of storage then act as the repository from which space can be shared as filesystems or block LUN devices.

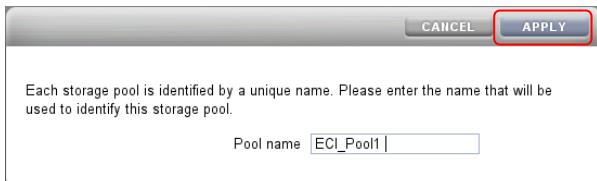
To configure storage pools, select Configuration from the top navigation menu.



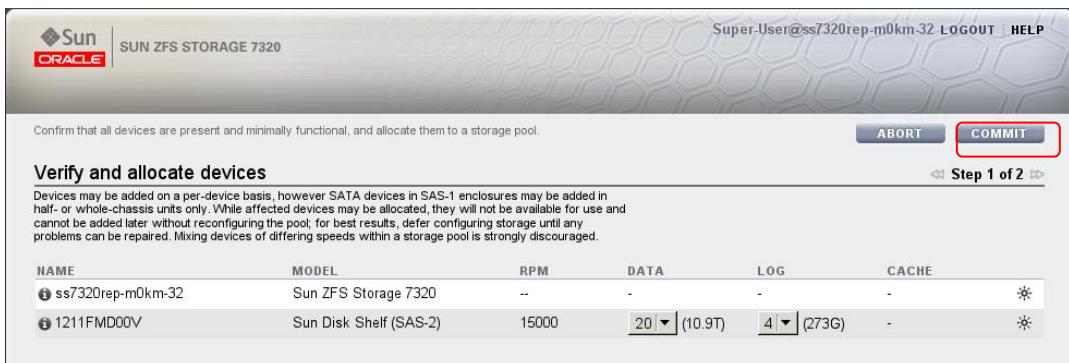
Select STORAGE from the Configuration sub-navigation menu, and in the Available Pools section, click on the plus sign to create a storage pool.



Enter the name of the storage pool that will be created. This document uses “ECI\_Pool1”. Click Apply when completed.



Select the number of disks to use from the attached disk trays (if there is more than one disk tray in the configuration, multiple Sun Disk Shelf entries will be shown) by clicking on the drop-down menu in the DATA section. Click COMMIT when completed. In the example shown here, all of the disks available in the storage shelf (including the four SSD log devices) are added to this pool.



In the Choose Storage Profile section, select the disk RAID type based on the desired availability, performance, and capacity. The available RAID profile options vary depending on the amount of disks available in the pool being configured. Detailed information on the data profile is found by clicking on a profile type (e.g., Double parity, Mirrored, Single parity, etc.) and the detailed information is displayed at the bottom of the page. Click COMMIT when completed. In the example shown, the “Triple Mirrored” profile is chosen.

Sun ORACLE SUN ZFS STORAGE 7320 Super-User@ss7320rep-m0km-32 LOGOUT HELP

Confirm that all devices are present and minimally functional, and allocate them to a storage pool.

**Choose Storage Profile**

Configure available storage into a pool by defining its underlying redundancy profile. Carefully read the profile descriptions to understand how each balances the inherent trade-offs between availability, performance, and capacity, and select the profile that best fits your workload. If available, NSPF indicates no single point of failure, which affords certain profiles the ability for a pool to survive through loss of a single disk shelf.

**Storage Breakdown**

TYPE	SIZE
Data	3.22T
Parity	6.65T
Reserved	52.4G
Spare	1.09T

**Data Profile: Triple mirrored**

Three redundant copies of data yield a very fast and highly reliable storage system. Triple mirroring is recommended for workloads requiring both maximum performance and availability, such as critical databases. Compared to standard mirroring, triple mirrored storage offers increased throughput and an added level of protection against disk failure at the expense of capacity.

**Disk Breakdown**

Category	Count
Data + Parity	18 disks
Spare	2 disks
Log	4 disks
Cache	0 disks

**Step 2 of 2**

**ABORT** **COMMIT**

The created pool is displayed on the following page. It is recommended to click the SCRUB button at this time in the created server pool section. This ensures that all storage devices are properly prepared and checked for errors.

Sun ORACLE SUN ZFS STORAGE 7320 Super-User@ss7320rep-m0km-32 LOGOUT HELP

**Configuration** **Maintenance** **Shares** **Status** **Analytics**

**Available Pools**

HOST : POOL	DATA PROFILE	LOG PROFILE	STATUS
ss7320rep-m0km-32:ECI_Pool1	Triple mirrored	Mirrored log	Online

**Allocation**

Data Profile: Triple mirrored  
Log Profile: Mirrored log  
Pool Status: Online  
Data Errors: No known persistent errors  
Scrub Status: Never scrubbed

**SCRUB**

**Device Status**

0 errors  
No device faults have been detected in the storage pool.

**Allocation Details**

TYPE	SIZE
Data	3.16T
Parity	6.62T
Reserved	51.3G
Spare	1.09T

Category	Count
Data + Parity	18 disks
Spare	2 disks
Log	4 disks
Cache	0 disks

## Creating Storage Projects

Shares are grouped together as Projects. For example, a project created for Dept\_1. Dept\_1 will contain department-level shares.

In the Browser User Interface (BUI), one can access the Projects user interface by clicking Shares > Projects. The project panel is displayed.

NAME	SIZE	CREATION
default	31K	2012-5-16 17:19:58

To create the project, click on the + button above the list of projects in the project panel.

Enter a name for the project; this example uses “ECIProfile1”.

The new project “ECIProfile1” is listed on the project panel, which is on the left navigation pane.

NAME	SIZE	CREATION
default	31K	2012-5-16 17:19:58
ECIProfile1	31K	2012-5-16 17:28:07

## Creating Shares

Shares are filesystems and LUNs that are exported over supported data protocols to compute nodes. Filesystems export a file-based hierarchy and can be accessed over the network via NFS. LUNs export a block-based storage device over the Fibre Channel interconnect.

### Filesystem Shares

To create a custom share, such as ECIShare1 under the ECIProject1 project, in the Browser User Interface (BUI), access the Projects user interface by clicking Shares > Shares.

The screenshot shows the SUN ZFS STORAGE 7320 BUI interface. At the top, there's a banner message: "The system has finished scrubbing the ZFS pool 'ECI\_Pool1'." Below the banner, the navigation bar includes links for Configuration, Maintenance, Shares (which is highlighted in yellow), Status, and Analytics. Underneath the navigation bar, there are three tabs: SHARES, PROJECTS, and SCHEMA. The SHARES tab is currently active. The main content area is titled "Projects > All Projects". It displays usage statistics: "Usage 0.0% of 3.21T", "Referenced data 62K", and "Total space 62K". Below these stats, there's a section for "Filesystems" with a "Filesystems" button (marked with a plus sign) and a "LUNs" section. A message below says, "No filesystems defined. Click the + button above to add a filesystem." The entire screenshot is framed by a thick black border.

Click the + button next to Filesystems to add a filesystem.

This screenshot shows the same BUI interface as the previous one, but with a red box highlighting the "+ Filesystems" button in the "Filesystems" section. The rest of the interface, including the header, tabs, and other sections, remains the same.

The Create Filesystem screen is displayed.

Create Filesystem

CANCEL    APPLY

Project	ECIProfile1
Name	ECIShare1
Data migration source	None
User	nobody
Group	other
Permissions	<input checked="" type="radio"/> R W X <input type="radio"/> R W X <input type="radio"/> R W X User   Group   Other
<input type="radio"/> Use Windows default permissions	
Inherit mountpoint	<input type="checkbox"/>
Mountpoint	/export/ECI
Reject non UTF-8	<input checked="" type="checkbox"/>
Case sensitivity	Mixed
Normalization	None

The shared NFS storage directory and mountpoint are now shown in filesystem screen.

SUN ZFS STORAGE 7420

Super-User@oem307 LOGOUT HELP

Configuration Maintenance Shares Status Analytics

SHARES PROJECTS SCHEMA

Projects > All Projects

Usage 0.0% of 12.5T

Referenced data 93K

Total space 93K

Filesystems LUNS 1 Total

SHOW ALL LOCAL REPLICAS

NAME	SIZE	MOUNTPOINT
proj_ovm /ovm_share	31K	/export/ovm

### LUN Shares

To create a new LUN shared block device, click Shares > Shares, and then click on the LUNs title to make a '+' appear next to it, which can then be clicked to create a LUN.

SUN ZFS STORAGE 7320

The system has finished scrubbing the ZFS pool 'ECI\_Pool1'. LOGOUT HELP Dismiss

Configuration Maintenance Shares Status Analytics

SHARES PROJECTS SCHEMA

Projects > All Projects

Usage 0.0% of 3.21T

Filesystems LUNS 0 Total

SHOW ALL LOCAL REPLICAS

No LUNs defined. Click the + button above to add a LUN.

The Create LUN screen is displayed.

Create LUN

CANCEL    APPLY

Project	ECIProject1
Name	ECILUN1
Volume size	20 G
Thin provisioned	<input type="checkbox"/>
Volume block size	8k
Target Group	default
Initiator Group	default
LU Number	<input type="radio"/> 0 <input checked="" type="radio"/> Auto-assign
Operational Status	Online

Click ‘Apply’ when the LUN name and volume size have been entered; in this case, the LUN is named ‘ECILUN1’ and the volume is sized at 20 GB. Other options are left at default values. The Target Group and Initiator Group settings may be changed later to ensure LUN masking is properly configured to prevent unauthorized access to the LUNs.

The screenshot shows the SUN ZFS STORAGE 7320 management interface. The top navigation bar includes links for LOGOUT, HELP, and Dismiss. Below the bar, there are tabs for Configuration, Maintenance, Shares (which is selected), Status, and Analytics. Under the Shares tab, there are sub-tabs for SHARES, PROJECTS, and SCHEMA. The main content area displays usage statistics: Referenced data (60.0G) and Total space (60.0G). It also shows file systems and LUNs. The LUN section lists three entries under the heading 'LUNS 3 Total':

NAME	SIZE	GUID
ECIProject1 / ECILUN1	20G	600144F0C1E0BA0700004FB52CD90001
ECIProject1 / ECILUN2	20G	600144F0C1E0BA0700004FB52D560002
ECIProject1 / ECILUN3	20G	600144F0C1E0BA0700004FB52D610003

In the example above, three LUNs have been created, named ECILUN1, ECILUN2, and ECILUN3.

At this point the GUID has been assigned to these LUNs. It is possible to set up appropriate LUN masking with the GUID information to ensure proper access control to the LUNs when configuring the SAN switch.

## Oracle Enterprise Manager Ops Center Build

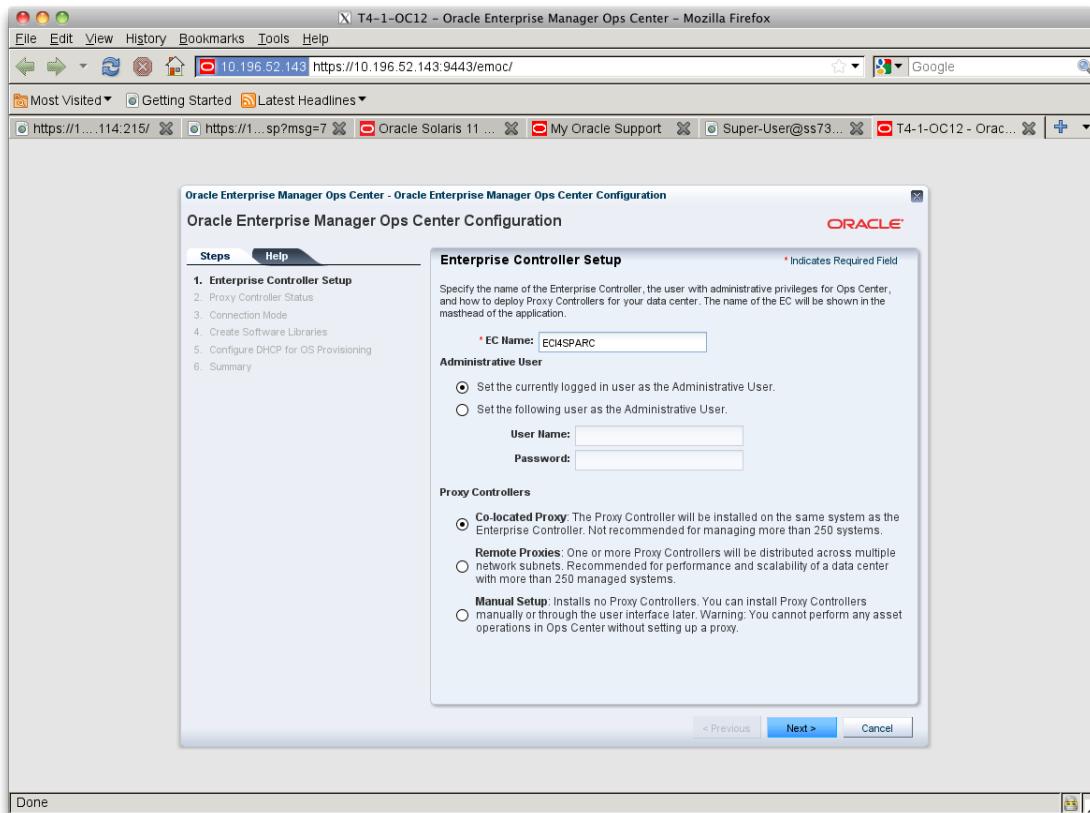
Once the prerequisites for the Oracle Enterprise Manager Ops Center 12 installation have been met and the Oracle Enterprise Manager Ops Center 12 binaries installed, there are some initial setup steps required on first use of the Oracle Enterprise Manager Ops Center 12 application.

These initial setup steps will be carried out using the Web UI provided by Oracle Enterprise Manager Ops Center 12.

Point a browser at [http://<IP\\_Address\\_of\\_T4-1\\_OC12\\_Server>](http://<IP_Address_of_T4-1_OC12_Server>) and log in with the credentials used to set up the ‘root’ users on the SPARC T4-1.

Login Screen of Oracle Enterprise Manager Ops Center 12:

Log in as ‘root’ user on the SPARC T4-1 platform. On first login, Oracle Enterprise Manager Ops Center 12 proceeds to ask various configuration information questions.



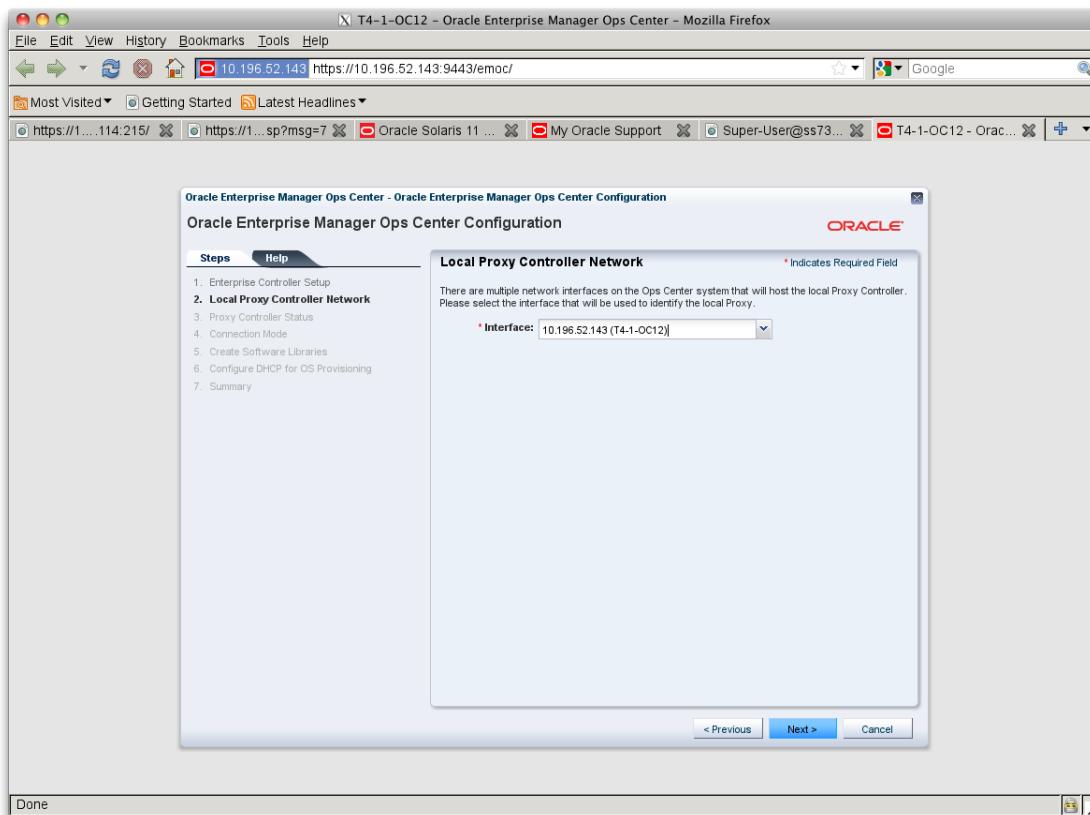
Enter the name to be used by the enterprise controller; in the example, “ECI4SPARC” was chosen.

The Administrative user for the Oracle Enterprise Manager Ops Center 12 system will default to the currently logged in user (‘root’ in the example), but if additional users have been defined on the Enterprise Controller SPARC T4-1 platform, they could be specified as having the Oracle Enterprise Manager Ops Center 12 Administrative User role.

Oracle Enterprise Manager Ops Center 12c consists of an Enterprise Controller(EC) and one or more Proxy Controllers.(PC) This allows for very large-scale managed asset collections by installing a primary EC that can manage multiple PCs that each handle a subset of the total managed asset collection.

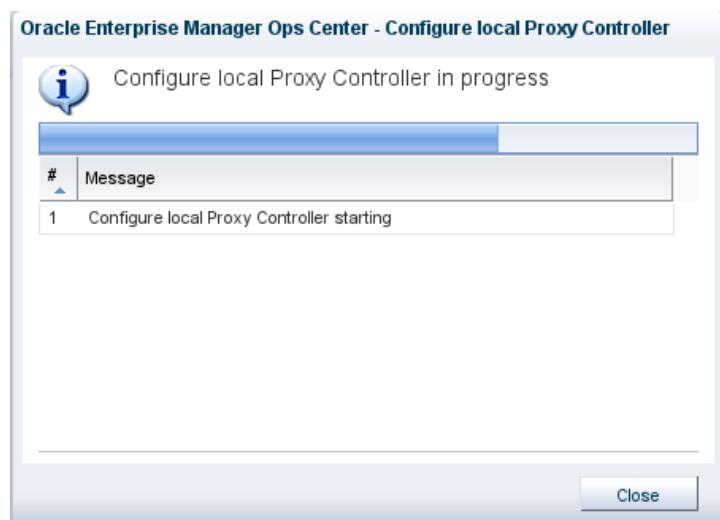
For the purposes of most Oracle Enterprise Manager Ops Center 12 installations, it should be sufficient to have both the EC and a single PC co-located on the same server (the SPARC T4-1 in this case).

Click ‘Next’ to progress to the ‘Local Proxy Controller Network’ configuration screen.

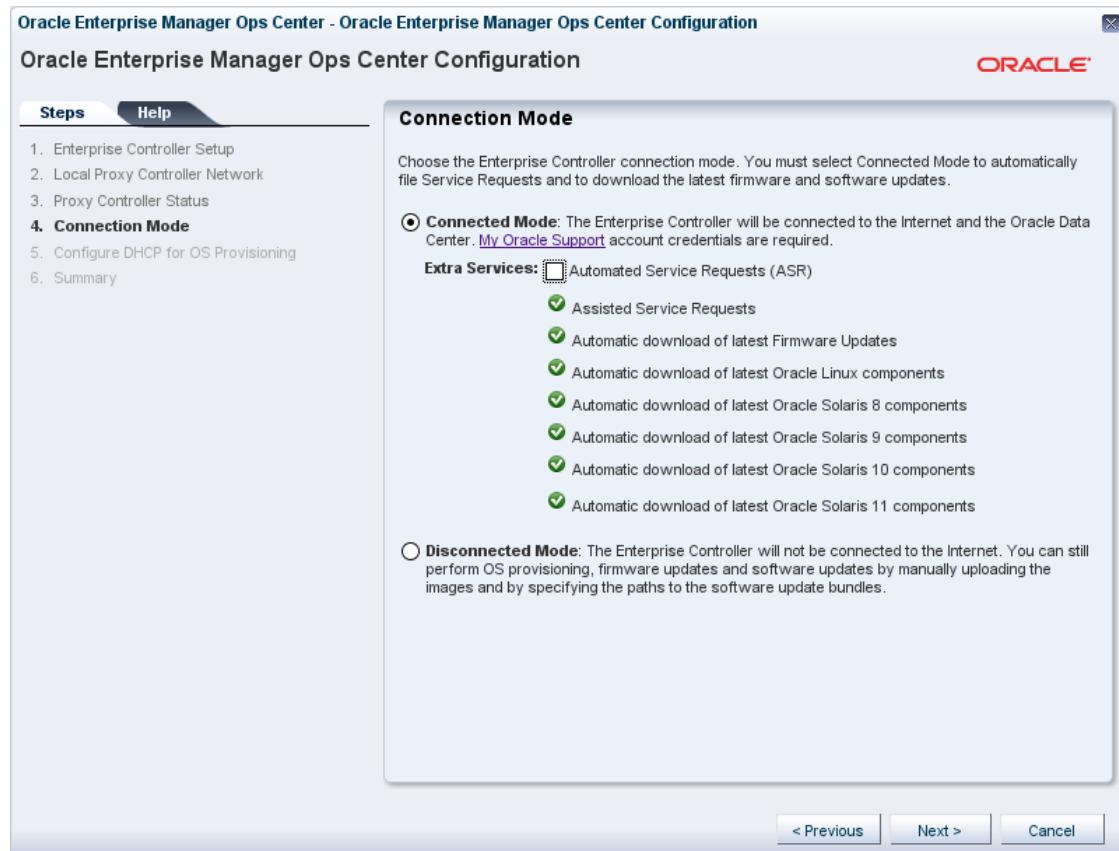


In the drop-down menu of this screen are one or more network interfaces on which the controller platform is currently configured. Choose the network that will be used to identify the primary proxy controller. This is generally the same network that is used to connect to the WebUI.

Click 'Next', to initiate configuration of the local proxy controller.



Once complete, click ‘Close’ and then ‘Next’ to proceed to configuring the ‘Connection Mode’ screen.

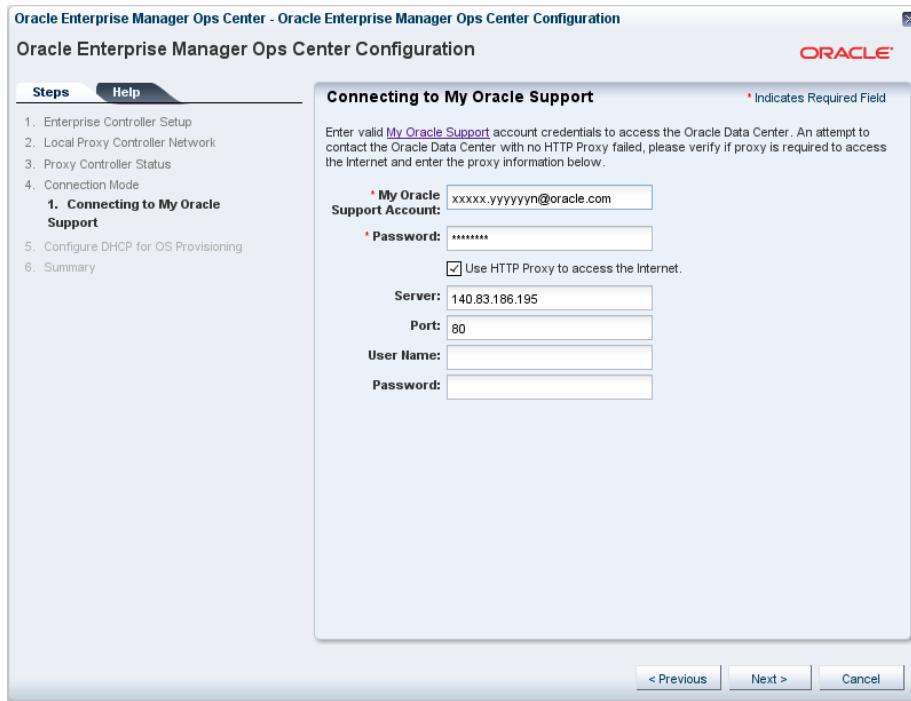


Connected Mode allows the Oracle Enterprise Manager to connect with Oracle.com directly and download patches, OS images, and firmware updates as they become available such that they are always available from the Oracle Enterprise Manager and are always current.

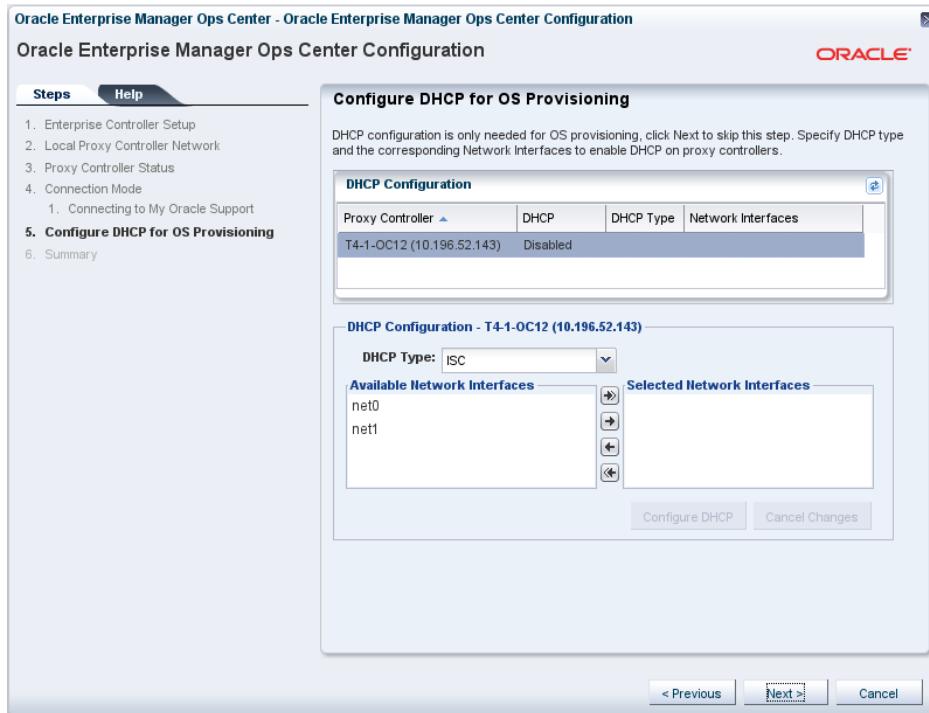
To configure Connected Mode, ensure the button next to “Connected Mode” is selected, and initially unselect the button next to the ‘Automated Service Request (ASR).’ These settings can be modified later, if necessary.

Click ‘Next’ when complete to proceed with specifying the account credentials of the user associated with the My Oracle Support account to be used by Oracle Enterprise Manager.

Also at this stage, any Web access proxy information should be specified that is required to access the Internet from this server.

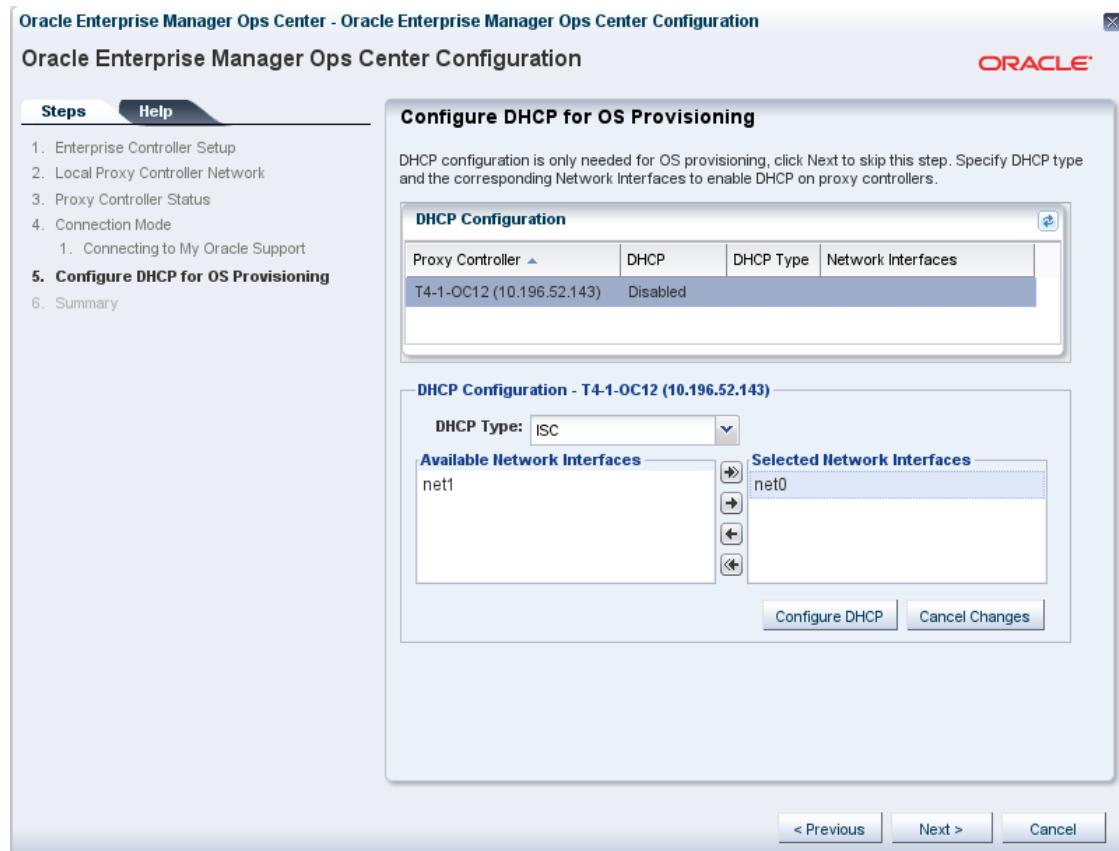


Once access has been verified, the “Configure DHCP for OS Provisioning” screen is presented.

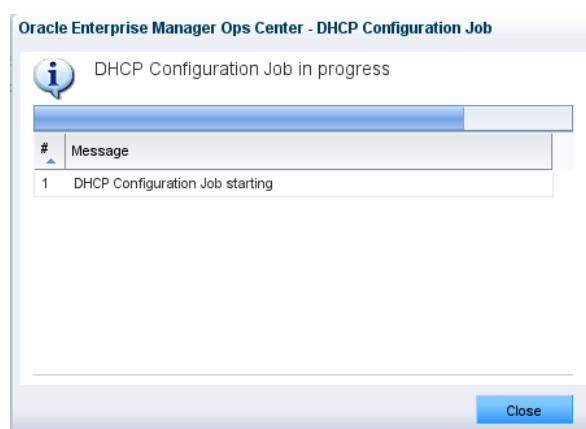


The DHCP server is required for OS provisioning; from the ‘Available Network Interfaces’ selection, please choose the network device(s) that will be used to serve OS installations on the managed

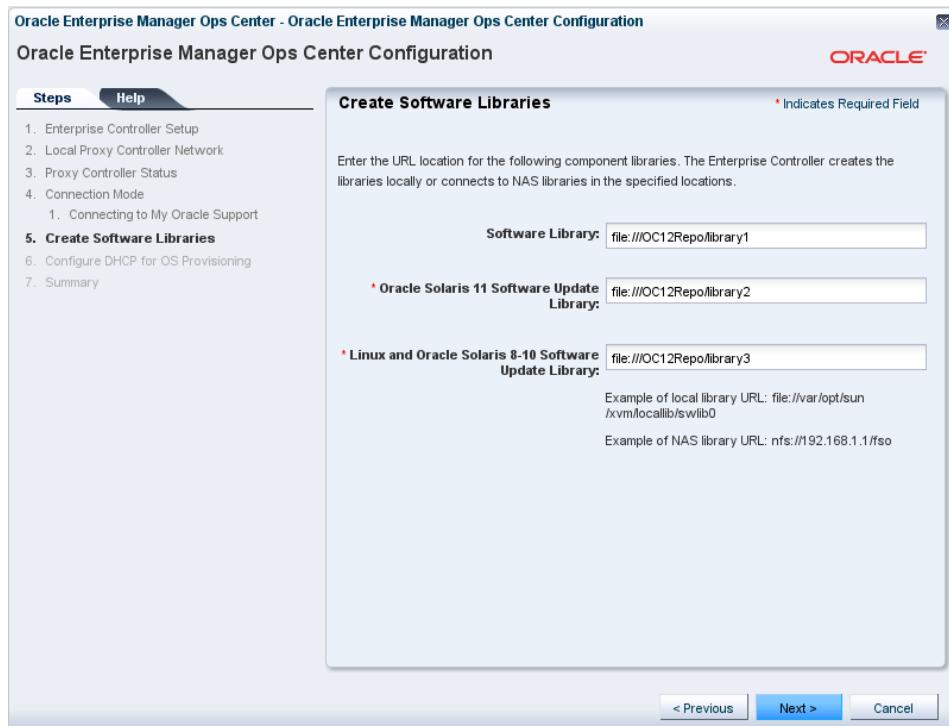
network(s). In the example, this is ‘net0’; select ‘net0’ and then click the right arrow to move the interface to the ‘Selected network interfaces’ box.



Once the required networks have been transferred to the ‘Selected network interfaces’ box, click ‘Configure DHCP’ to start the DHCP servers on these networks.



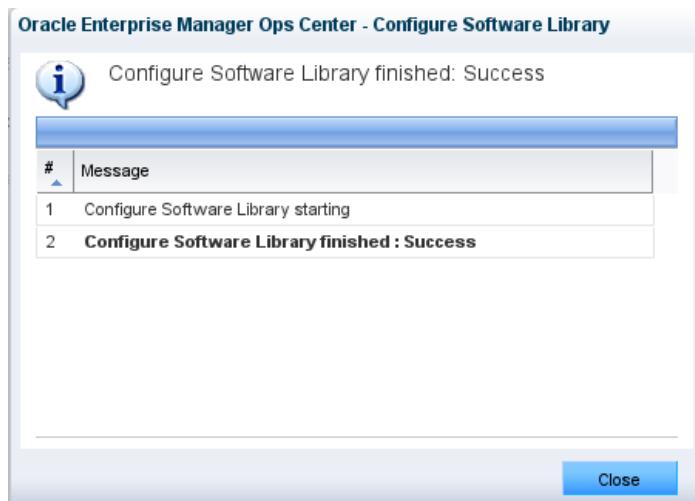
Click ‘Close’ once complete, and proceed to the ‘Create Software Libraries’ screen.



Oracle Enterprise Manager will create three libraries to store its Software Library, the Oracle Solaris 11 Update Library, and the Linux and Oracle Solaris 8-10 Update Libraries. These can be allocated on local disks or on the NFS shares which were set up from the Sun ZFS Storage 7320/7420 appliances. In this case, local libraries are configured on the SPARC T4-1 server.

Enter the location of the three libraries as shown, with the ‘file:///’ qualifier used to specify local filesystems, for example ‘file:///OC12Repo/library1’.

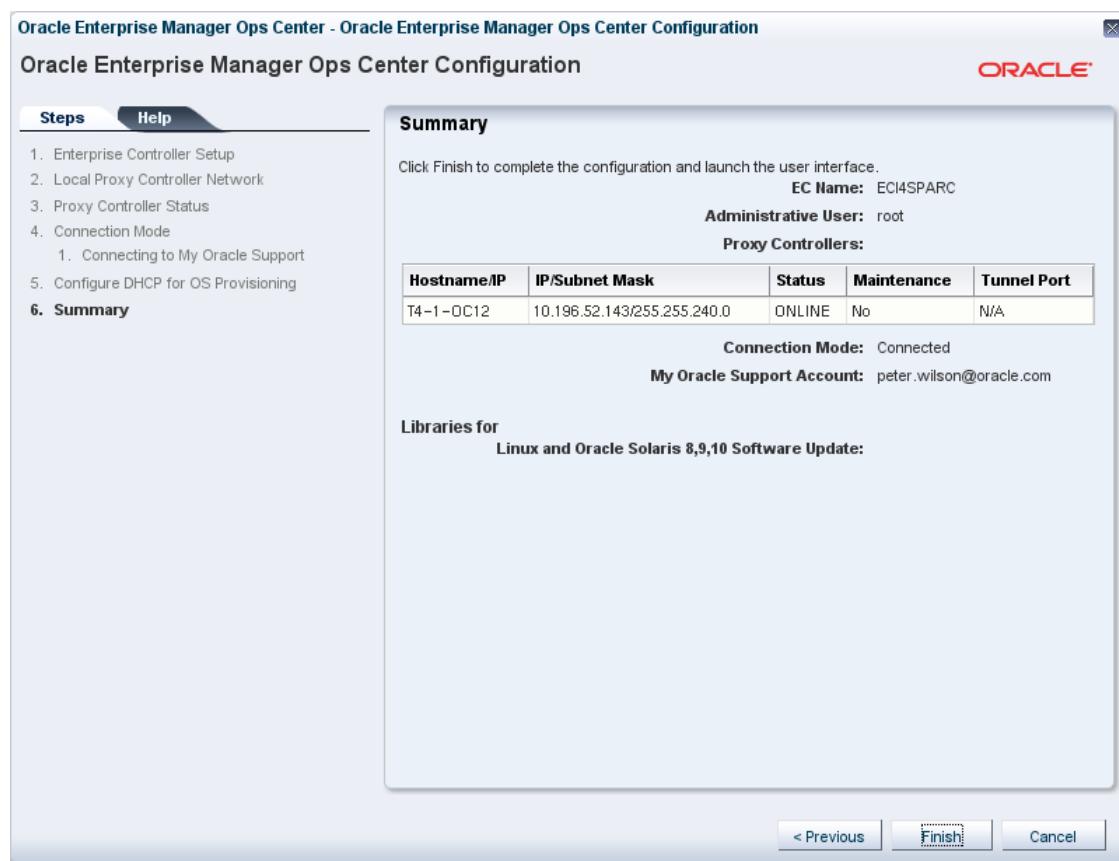
Click ‘Next’ once this has been done, and the libraries will be created.



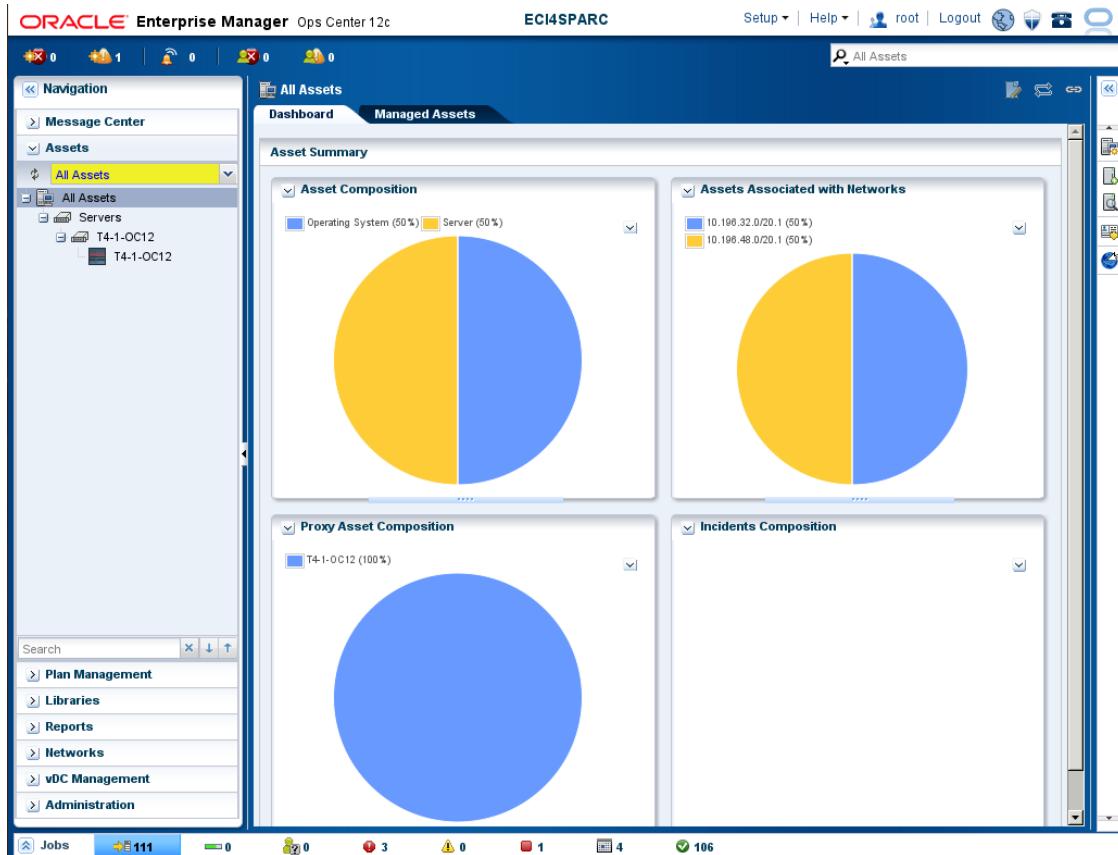
Click ‘Close’ to proceed to the ‘Oracle Solaris 11 Source Repository’ setup screen. This screen allows for configuration of access to the release or support Oracle Solaris 11 package repositories for automatic download and update.

Users can obtain a key and certificate to allow for automatic connection and download without interactively requiring logins. Visit <http://pkg-register.oracle.com> and use My Oracle Support credentials to create and download a Key file and a Certificate file. These can be uploaded to the Oracle Enterprise Manager Ops Center 12 server to allow it to automatically connect with and download updates from the My Oracle Support servers.

Click ‘Close’ once this has completed, and then click ‘Next’ to proceed to the ‘Summary’ page.

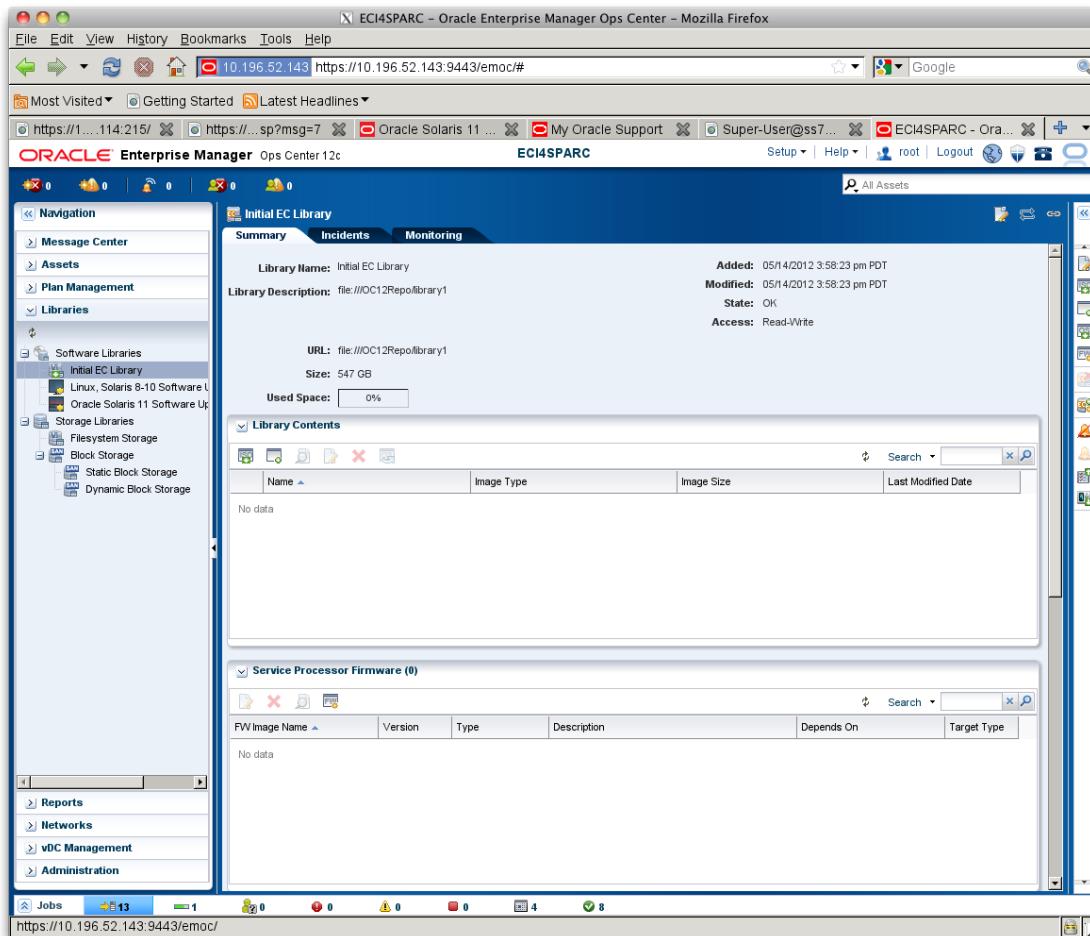


Click ‘Finish’ to complete the setup of Oracle Enterprise Manager and be taken to the Home Status screen.



Note that at this point the initial configuration of Oracle Enterprise Manager Ops Center 12c is complete, and a repository sync job has been started (note one running job). This may take many hours to complete, depending primarily on the speed of the connection to the Internet. Certain subsequent tasks will not complete successfully until this sync has completed due to dependencies on the content that is being downloaded.

While the Oracle Solaris 11 repository is building, this is a good time to download or import additional Oracle Solaris 10 images if required.



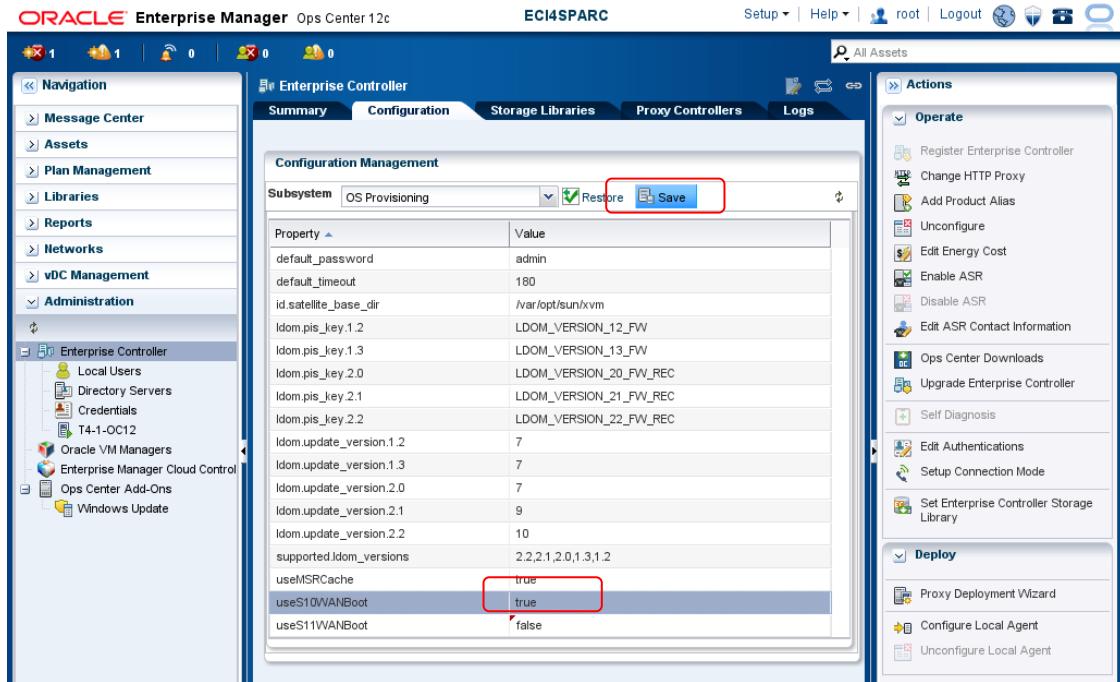
Either download Oracle Solaris 10 DVD .ISO images from Oracle.com or directly import the image from Oracle.com if suitably connected.

Visit the main Oracle download URL and download the full Oracle Solaris 10 DVD image locally to the SPARC T4-1 in a temporary directory; we suggest the /tmp directory.

Note that the import job will be started in the background and will run to completion.

### Oracle Solaris 11 Installation Options for Target Systems

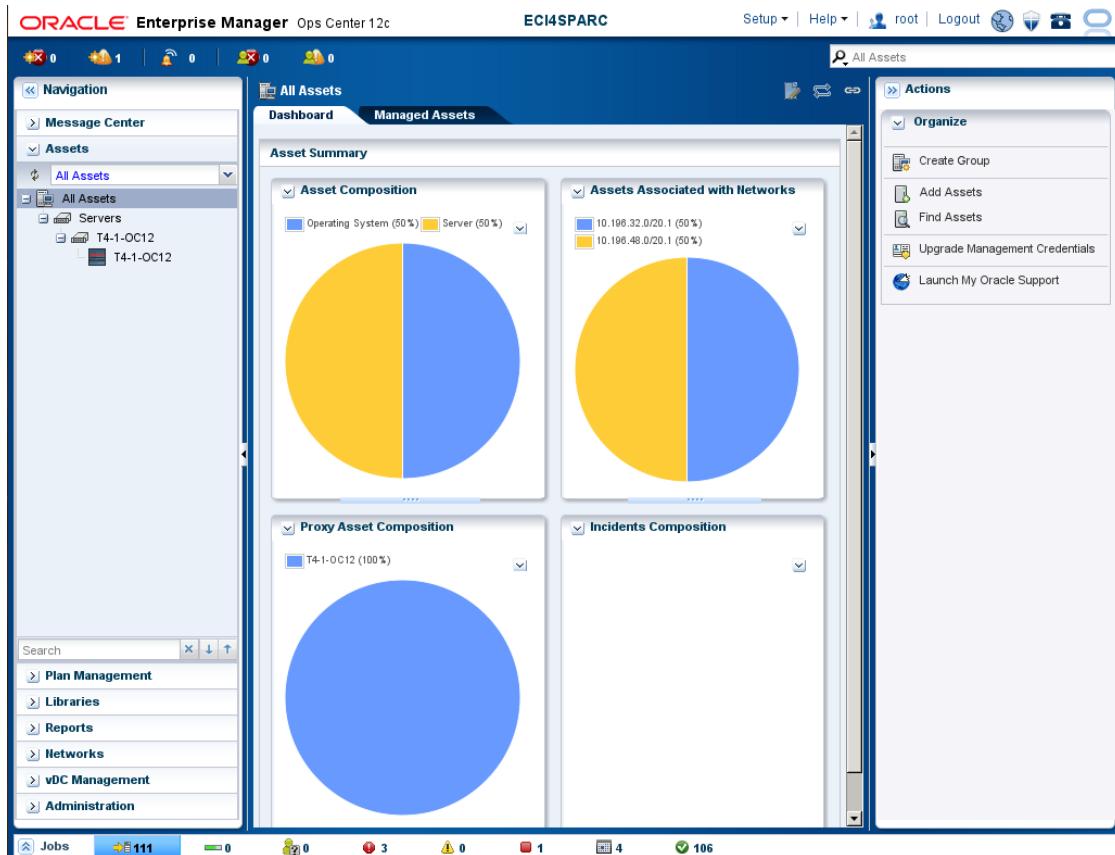
In order to install Oracle Solaris 11 on some systems it may be necessary to prevent the default use of WAN boot, and specify conventional DHCP boot for network installations. This can be specified in the ‘Navigation’ pane under the ‘Administration’ -> ‘Enterprise Controller’ tabs. On the center pane of the window, select the top ‘Configuration’ tab and then select the ‘OS Provisioning’ options from the ‘Subsystem’ drop-down menu. Change the ‘useS11WANBoot’ option to read ‘false’.



Once changed, click the ‘Save’ button to make this change permanent.

### Discover Sun ZFS Storage 7320 Appliance

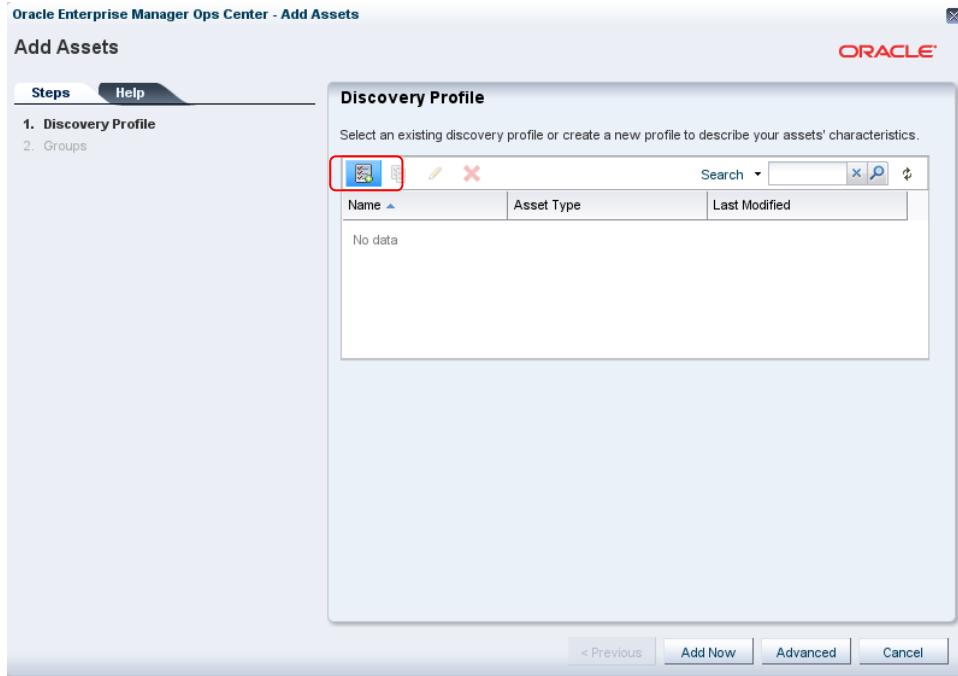
From the home screen of the Oracle Enterprise Manager server, ensure that on the left ‘Navigation’ pane, the ‘Assets’ tab is expanded and showing ‘All Assets’; this changes the right hand ‘Action’ pane and allows the user to start ‘Organizing’ the assets.



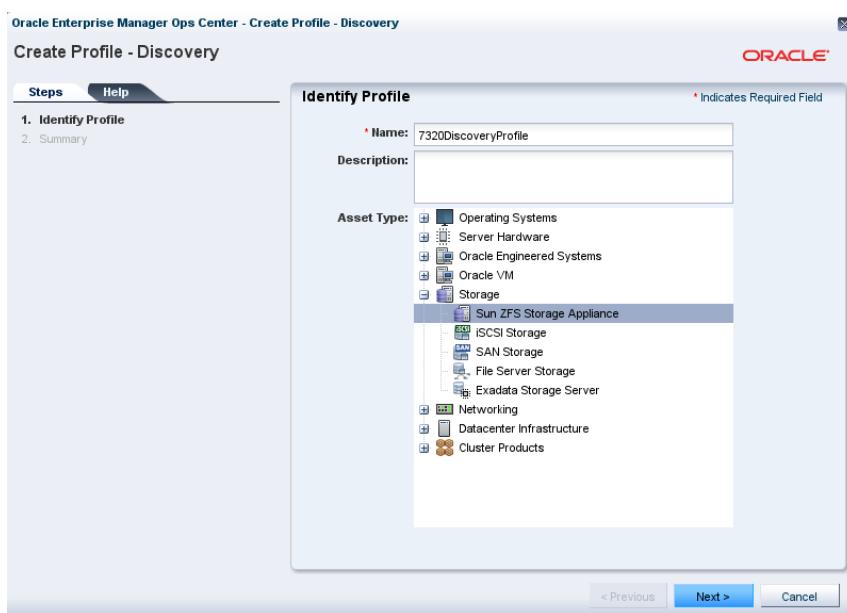
Click on ‘Add Asset’. This allows the user to specify the type of asset probes to use.



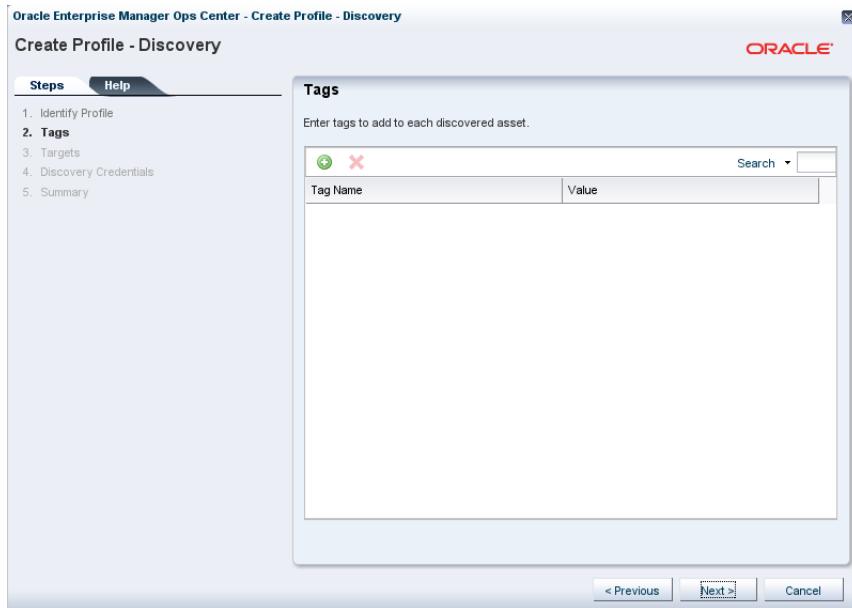
Select ‘Add and manage...’ and click ‘Next’.



 Click on the  icon to create a new discovery profile, and then under the 'Storage' Asset type, select 'Sun ZFS Storage Appliance' and click 'Next'.



It is possible to allocate user-defined 'Tags' for use in identifying and classifying Assets, but these are not used in this example. Click 'Next' on the 'Tags' screen.



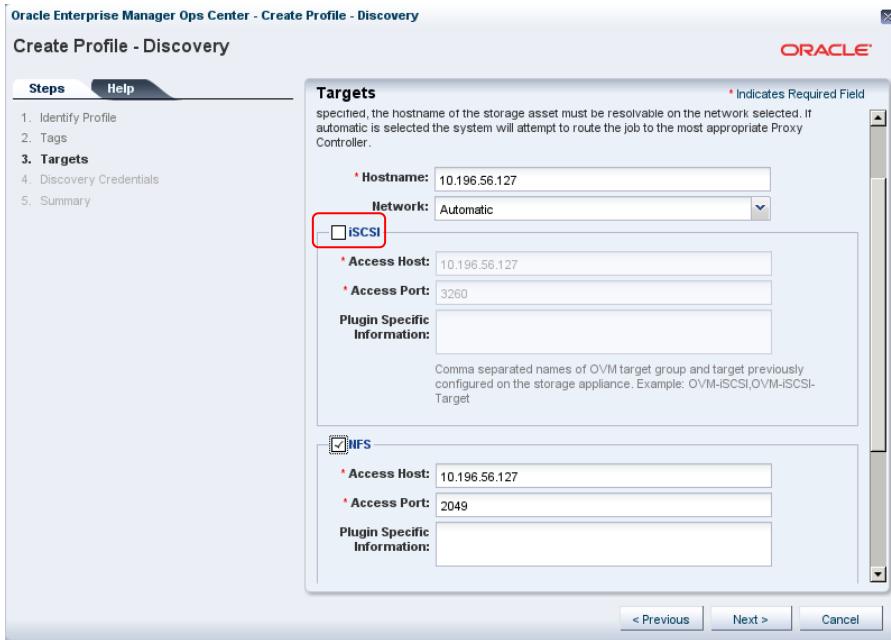
Choose the Targets types to be identified at the IP address of the asset to discover.

Enter the Hostname (if a suitable naming service has been configured), or the IP address of the Sun ZFS Storage Appliance to discover; in this example, the IP address is used.

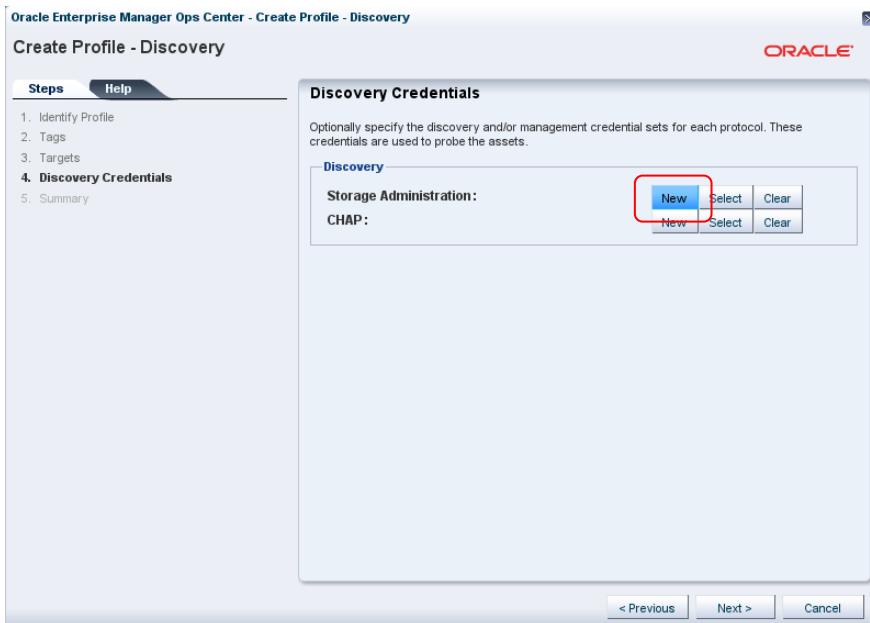
From the 'Network' drop-down list, select either 'Automatic' or manually select the appropriate network specification to search for the target.

Remove the check mark in the boxes for 'iSCSI' as the Sun ZFS Storage Appliance is not configured to provide iSCSI targets and none would be discoverable.

Click 'Next'.



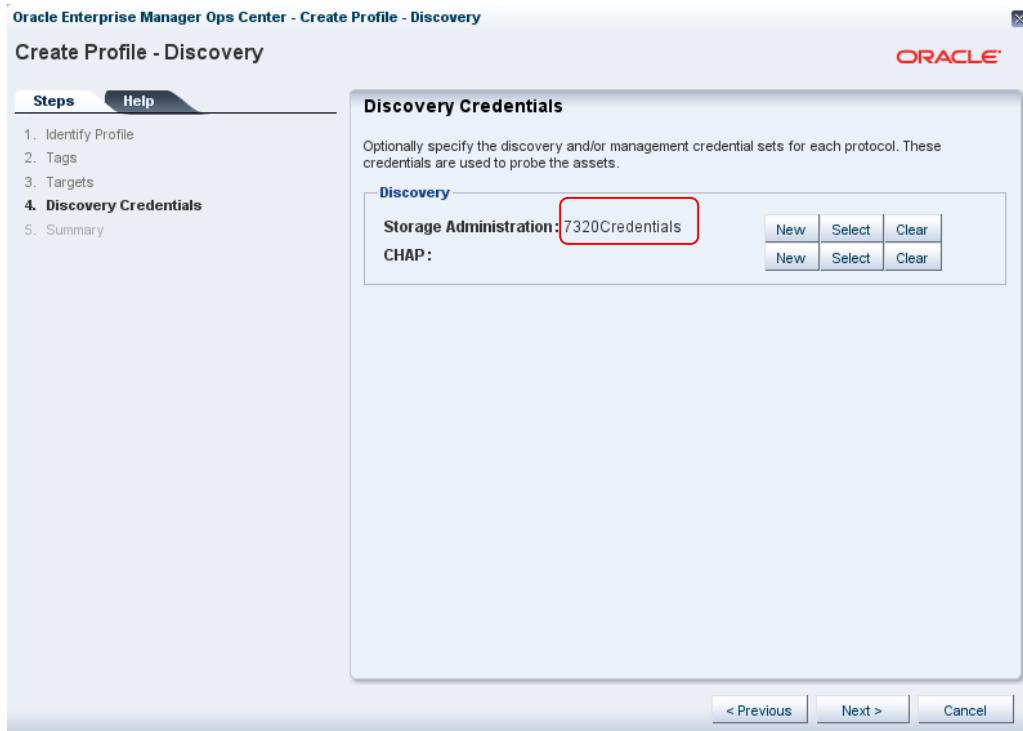
It is necessary to now specify the credentials that Oracle Enterprise Manager should use to try to log into the Sun ZFS Storage 7320 it will discover.



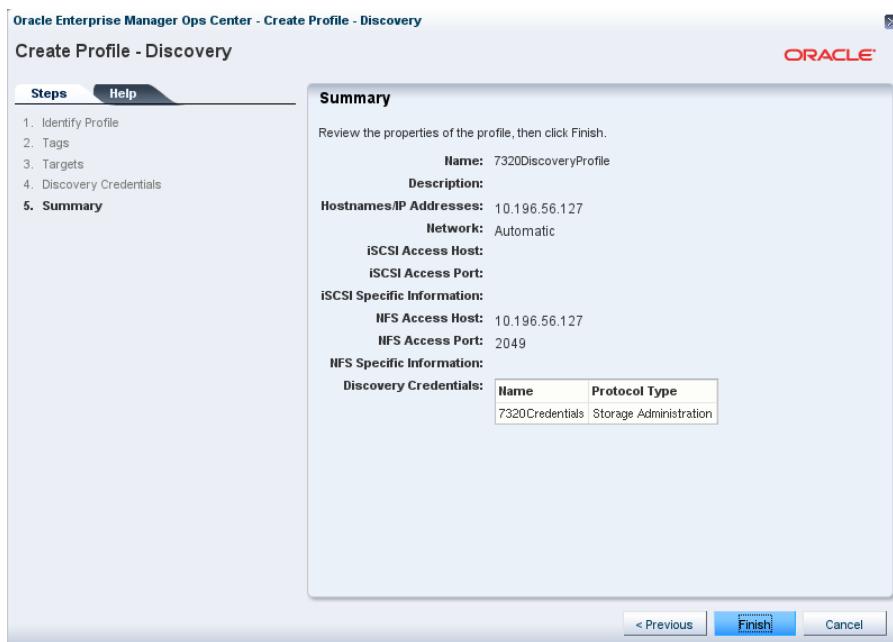
In the ‘Storage Administration’ row, click ‘New’ to enter login credentials to use. This opens a new popup window into which the required credentials may be entered. Click ‘Create’ once the administrative credentials have been entered.



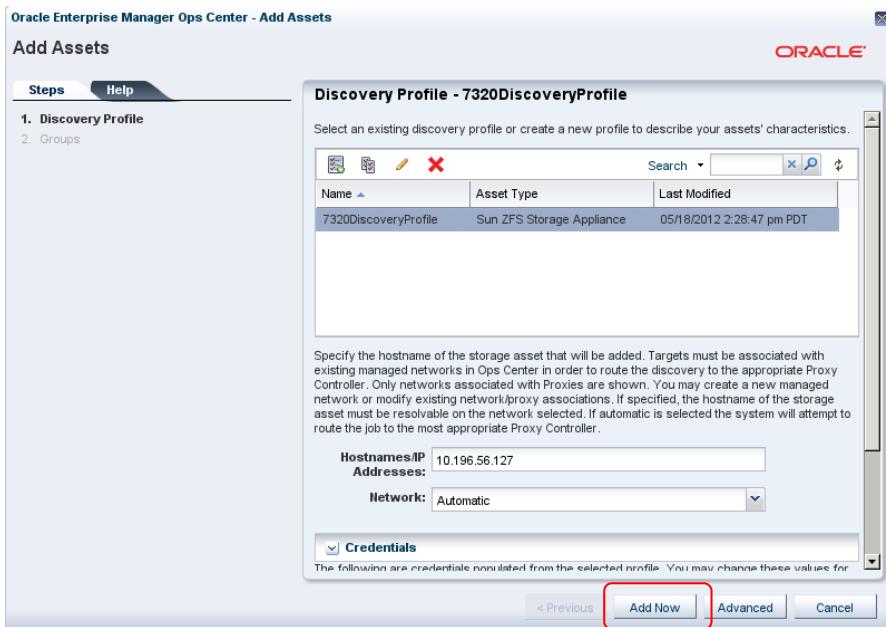
The newly specified discovery credentials are now visible in the Discovery Credentials window; click 'Next' to proceed.



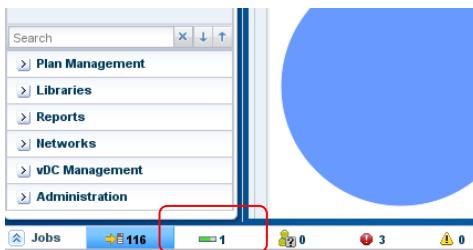
The discovery profile is now created and can be used. Click 'Finish' to proceed with the discovery.



Now that the Discovery profile is created, it can be selected and the 'Add Now' button clicked to start the discovery job task.



Once clicked, a new task should be running in the Jobs status bar in the home screen.

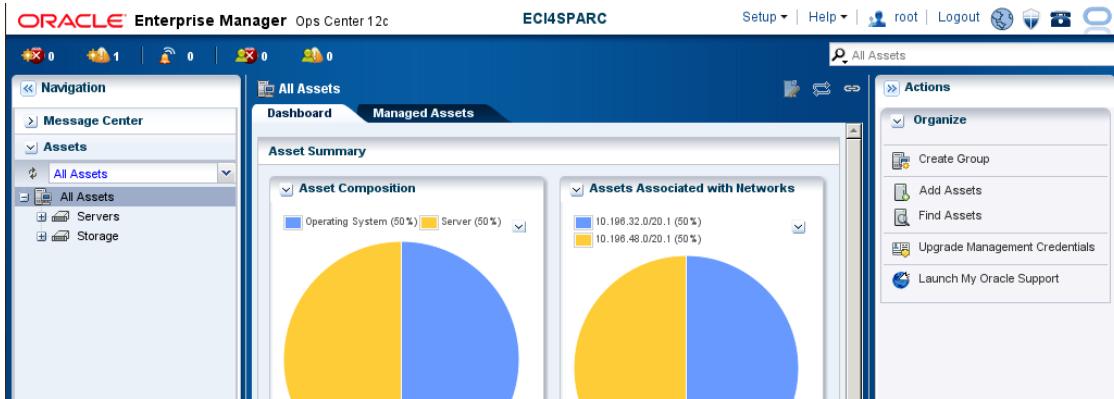


Discovery should take no more than a few minutes.

### Discover SPARC T4-2 Server Oracle ILOMs

From the Home screen the SPARC T4-2 servers can now be discovered. These will be discovered through their Oracle ILOM service processors as this gives full management capability over the platform.

With the 'Navigation' pane, 'Assets' tab expanded to show 'All Assets', click on the Action pane 'Add Assets' button.

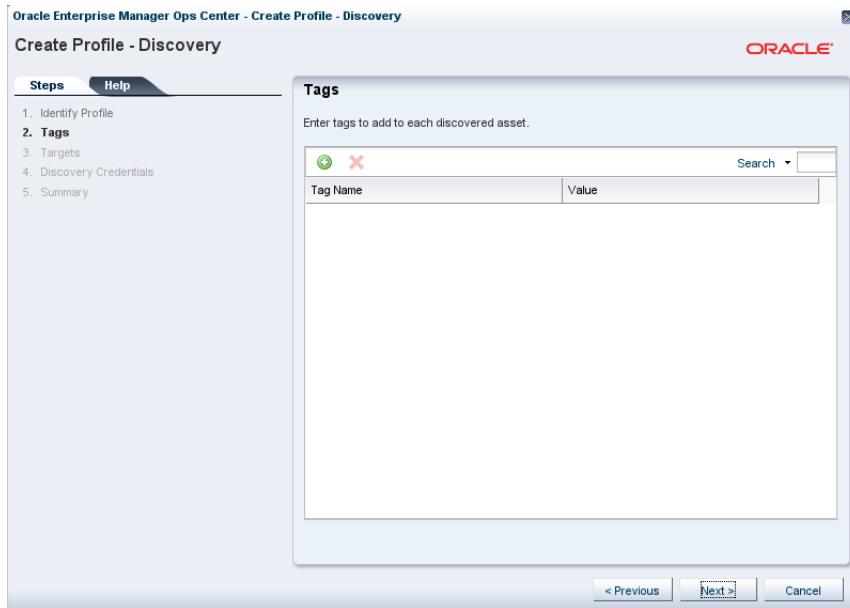


From the Add Assets popup window, select ‘Add and manager...’ and click ‘Next’.

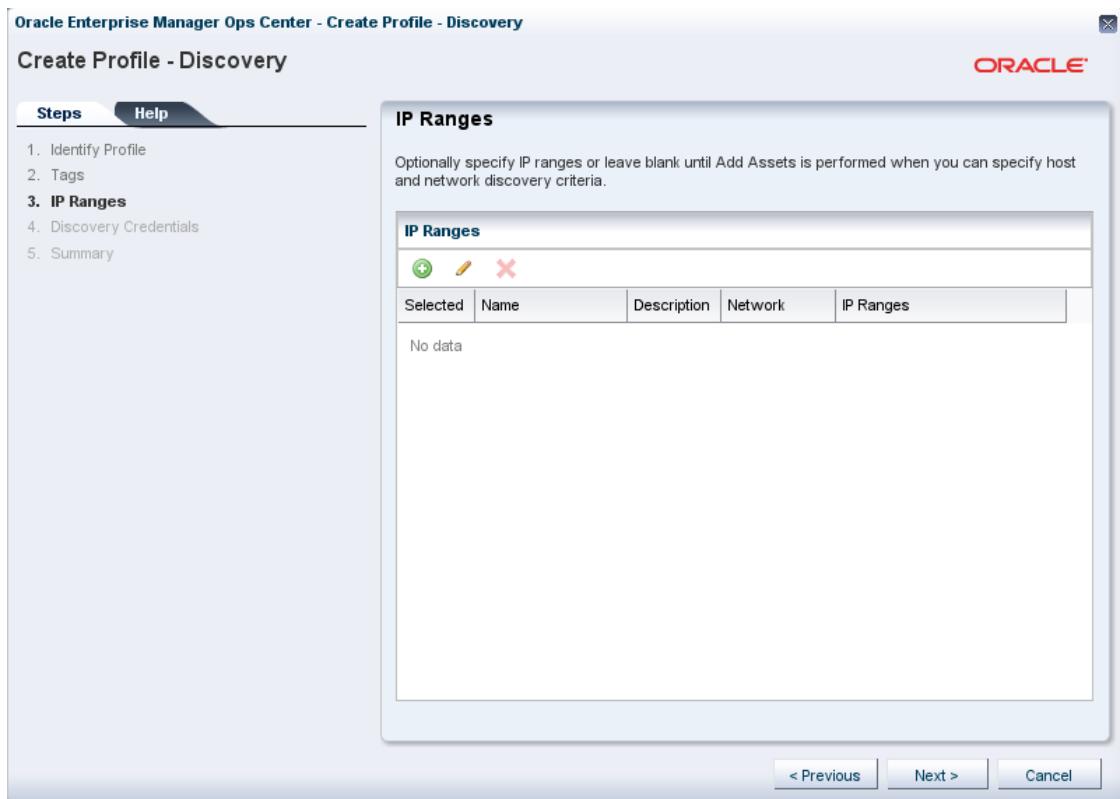


A new Discovery Profile must now be created to recognize SPARC T4-2 servers. Click the button to create a new discovery profile.

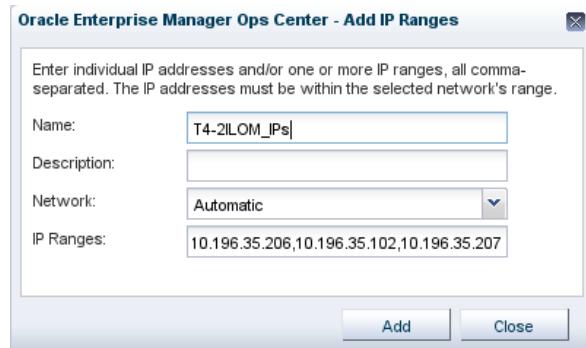
On the ‘Tag’ screen, click the ‘Next’ button.



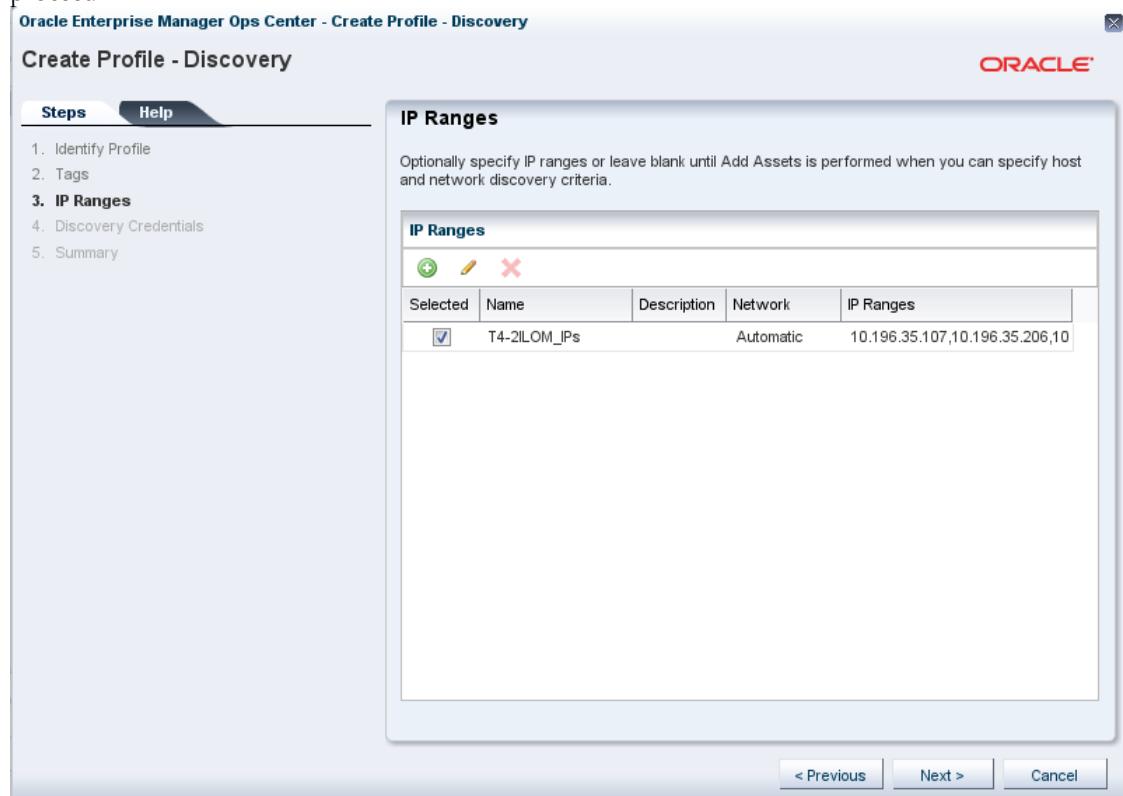
It is necessary to specify the IP ranges to use for the discovery process. Click the button to start creating an IP range.



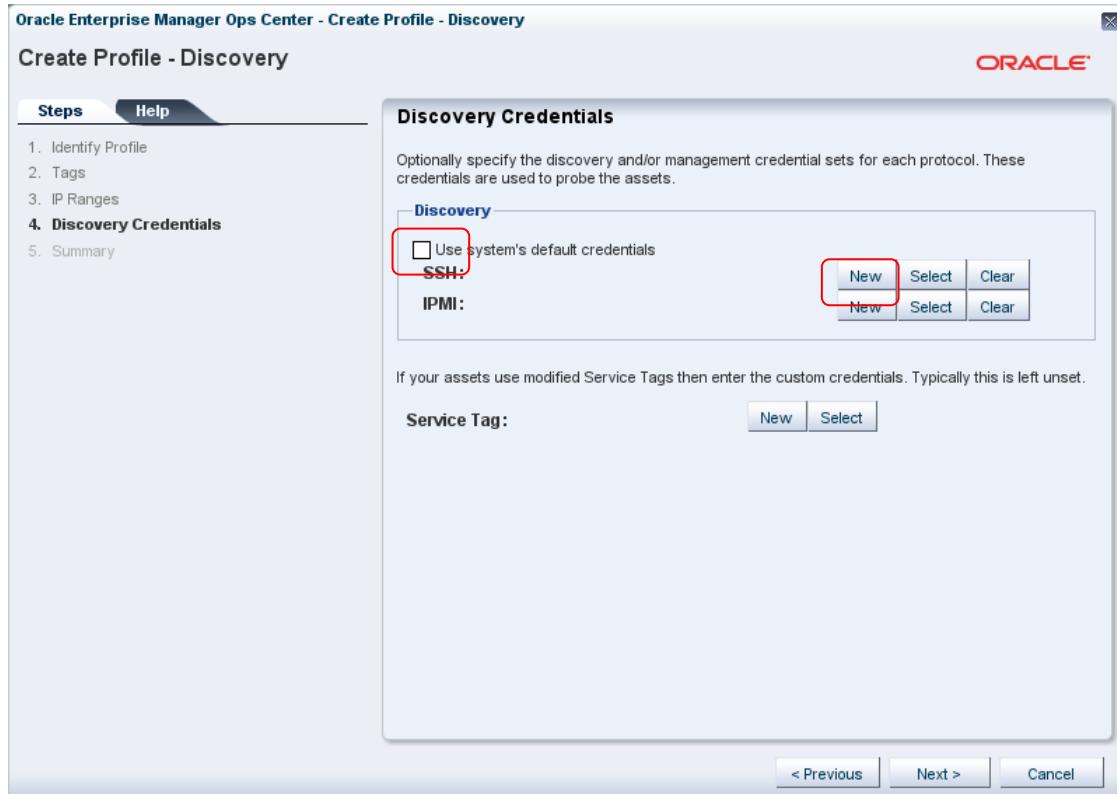
In the popup window, specify a name for the IP range being described and then specify the Network range from the drop-down menu. The default of ‘Automatic’ is usually adequate. In the IP Ranges box, enter the IP addresses of the Oracle ILOMs for the servers to be discovered; it is possible to specify ranges by using the ‘10-20’ format.



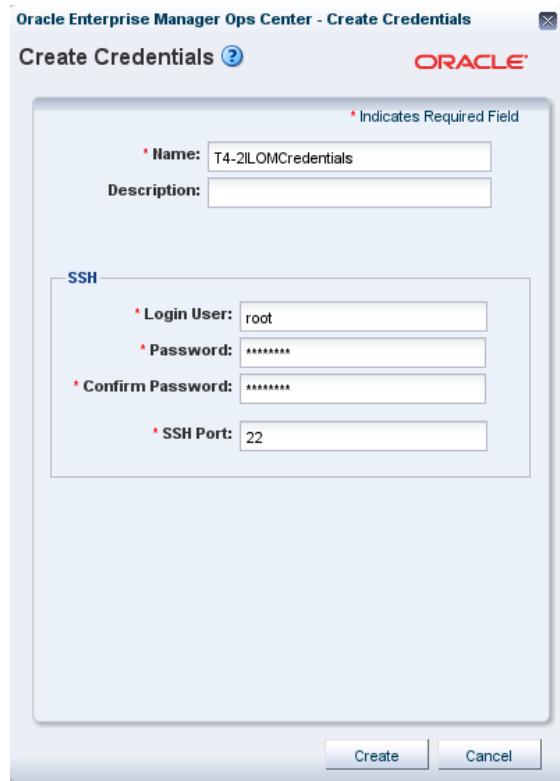
Once specified, the T4-2ILOM IP range should be selected and the ‘Next’ button can be clicked to proceed.



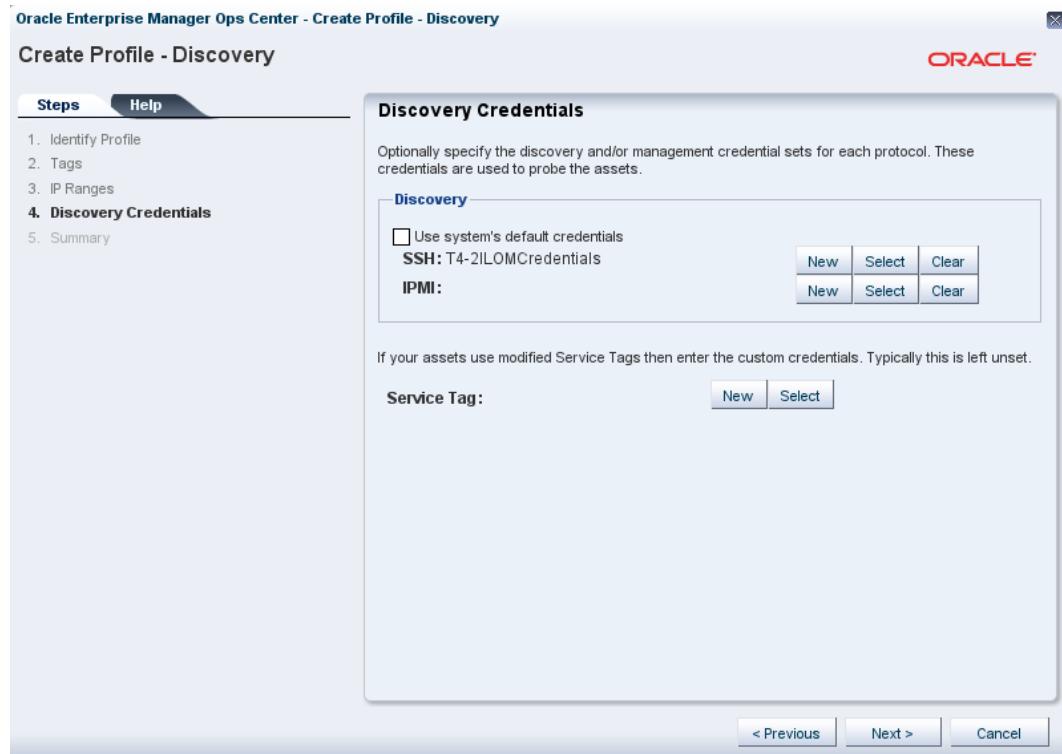
Discovery of the T4-2 ILOM login credentials will be required as part of the discovery profile. If the servers are fresh from the factory, select ‘use system’s default credentials’; otherwise, click on the ‘New’ button next to the ‘SSH’ row and enter the Oracle ILOM root user credentials that were set up on these SPARC T4-2 systems.



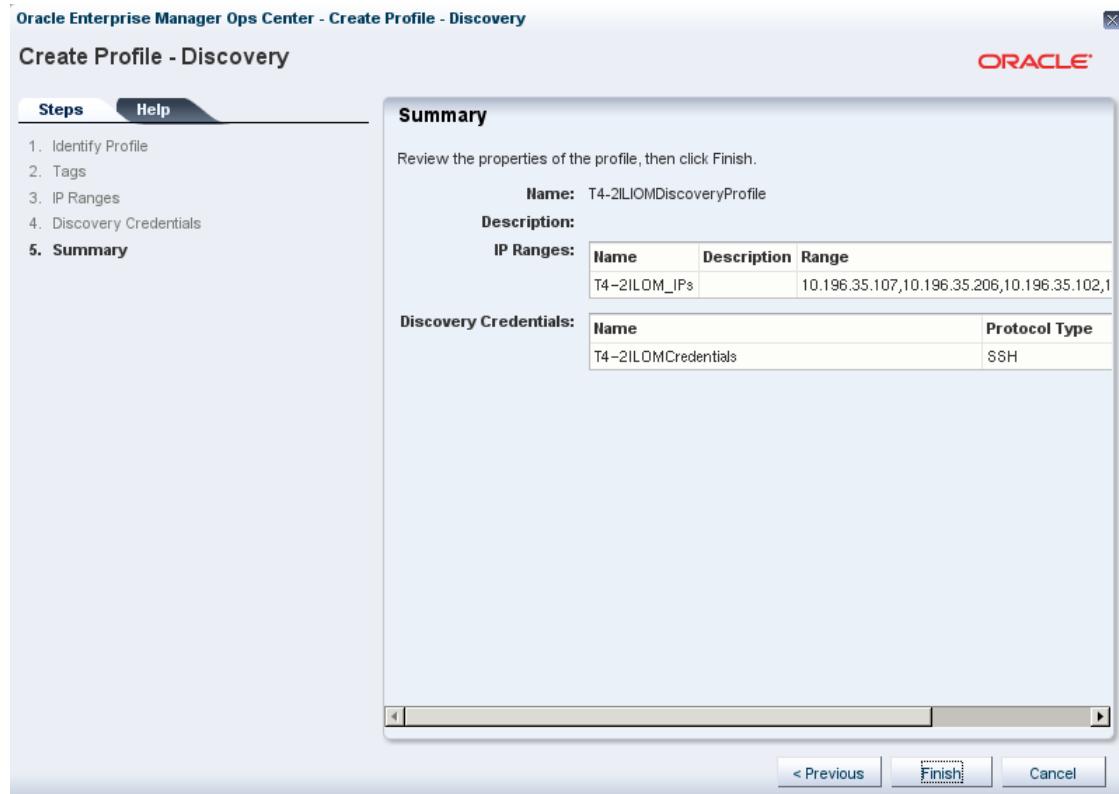
If non-default passwords are specified, the 'Create Credentials' popup is presented.



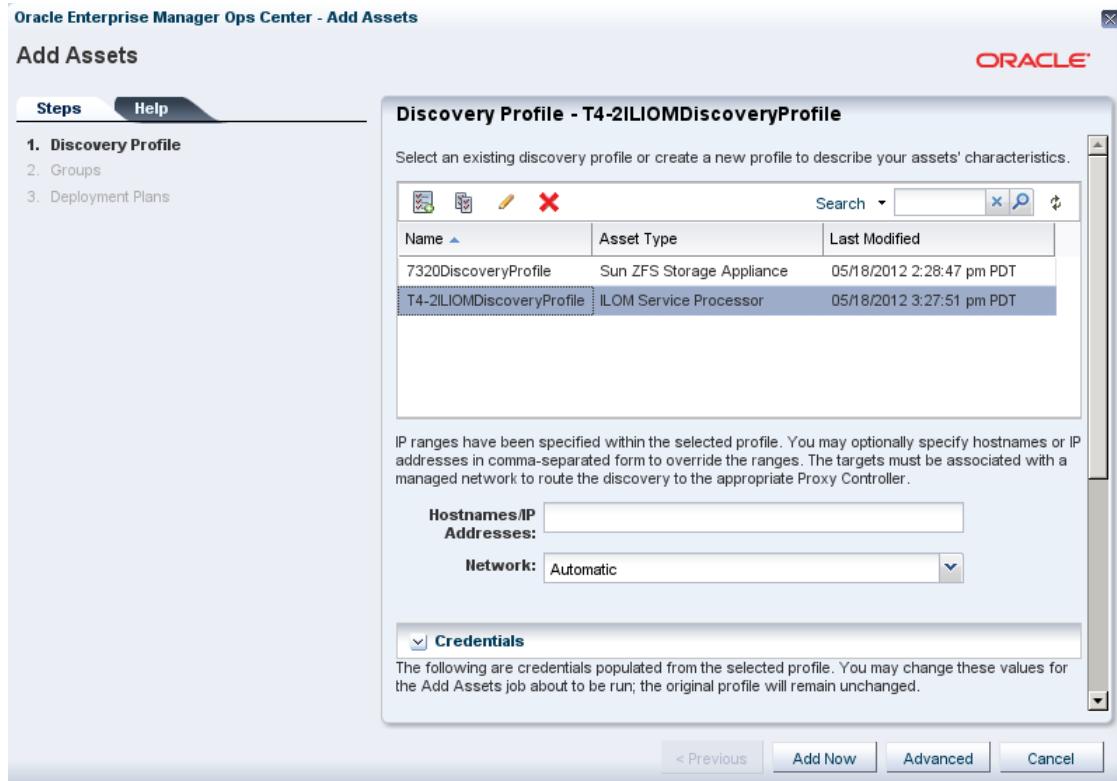
Once discovery credentials are entered, click 'Next' to proceed.



The Discovery profile is ready to use. Click 'Finish'.



Select the ‘T4-2 ILOM Discovery Profile’ and then click the ‘Add Now’ button to start the discovery task running in the background.



A new task is visible in the 'Job' status bar at the bottom of the home screen.

### Preparing Shares or Block Devices for Virtual Machine Deployments

In order to deploy virtual machines on either zones or domains that can be properly migrated between hosts within a server pool, it is necessary to place their disk images on shared storage that all members of the server pool can access.

VM disk images can be placed on either NFS filesystems or shared block devices such as Fibre Channel LUNs.

This section of the document describes how to use either type of share as was previously configured in the Sun ZFS Storage 7320 appliance.

#### Shared NFS Filesystems

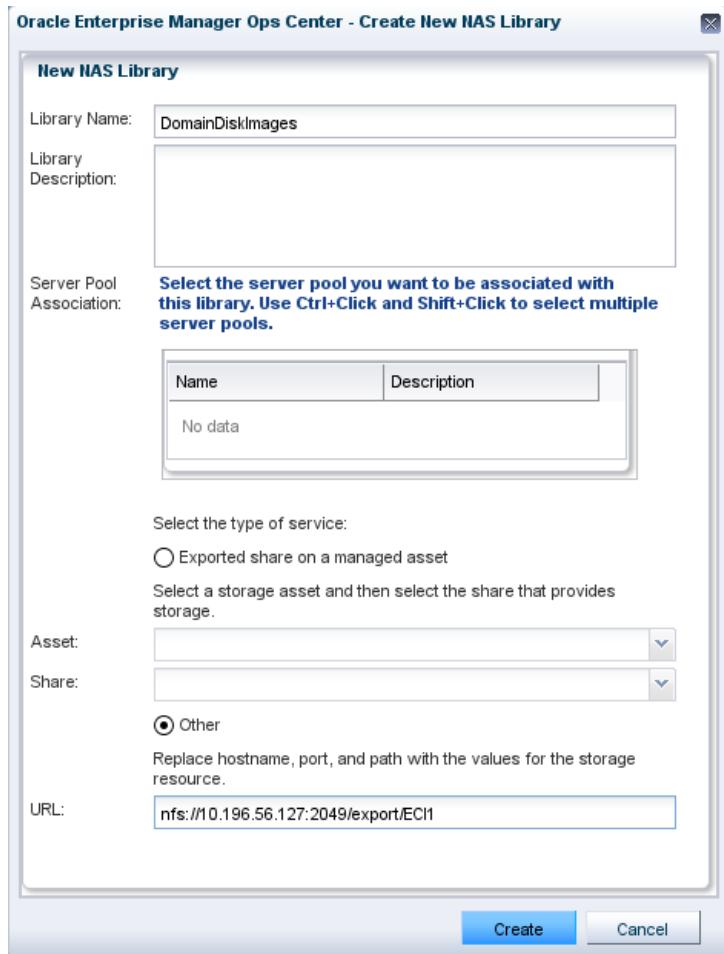
On the 'Navigation' pane, click on the 'Libraries' tab and expand it. Click on 'Storage Libraries' then 'Filesystem Storage'.

In the Action pane, click 'New NAS Storage'.

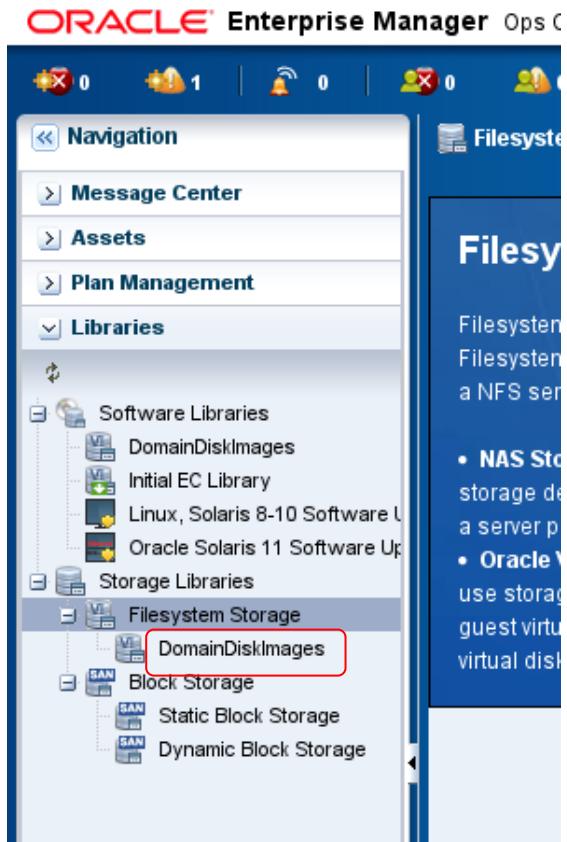


Give a name to the NAS library that will be created; in the example a NAS storage device is being created to contain the shared disk images for the Oracle VM Server for SPARC domains that will be created in the future.

Specify the location of the sharing server and the exported mount point in the ‘Other’ area.



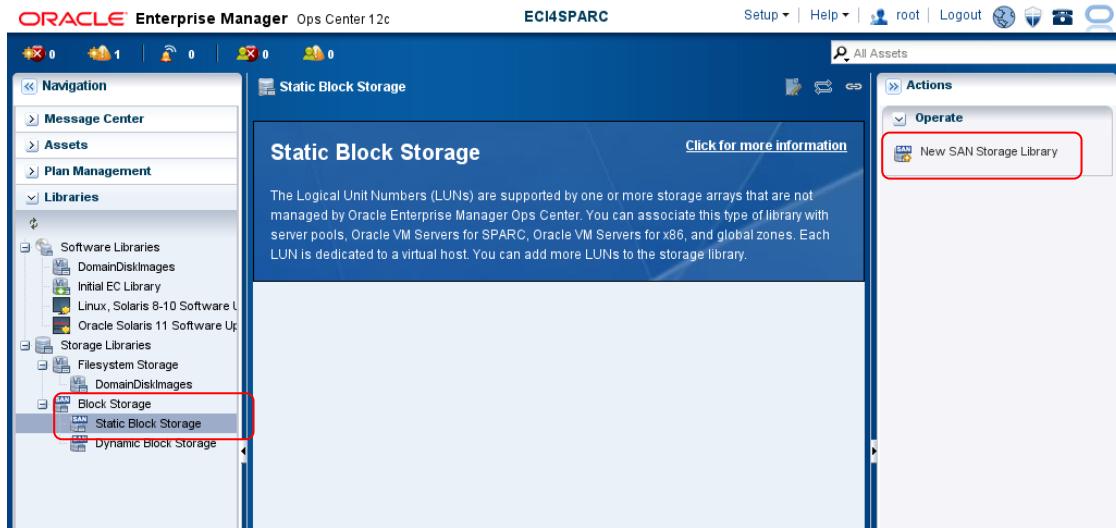
Click 'Create' to make the filesystem available for use. This creates a short task to set this up and the newly created NAS image library will be visible in the 'Libraries'->'Storage Libraries'-> 'filesystems Storage' pane.



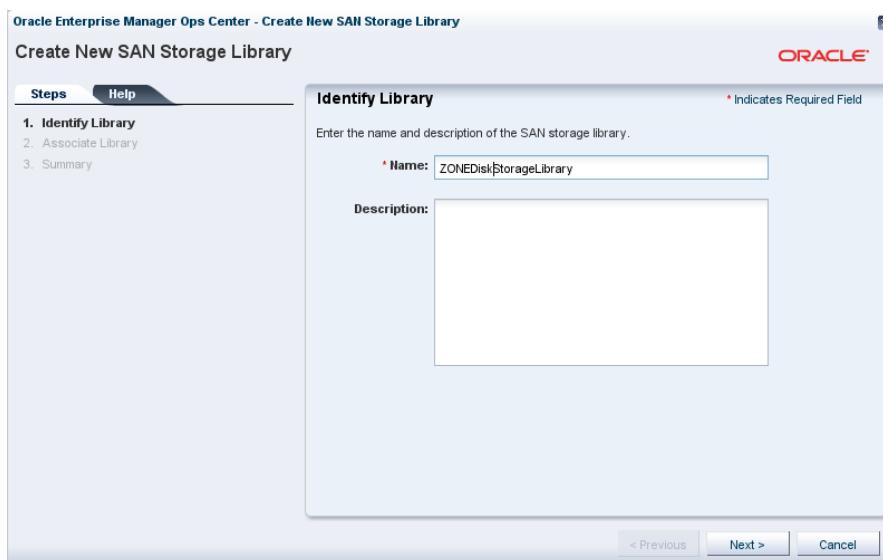
### Shared LUN Block Storage

SAN-based LUNs are recommended for use when storing shared filesystems used to contain Oracle Solaris Zone images.

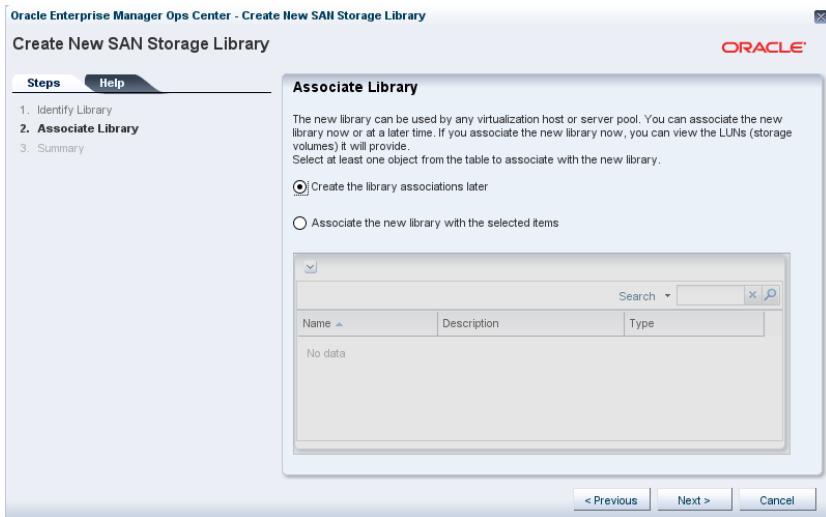
In the 'Navigation' pane, click 'Libraries'->'Storage Libraries'->'Block Storage' ->'Static Block Storage'. In the 'Action' pane, click 'New SAN Storage Library'.



Change the name to a suitable one for the intended purpose, then click 'Next'.



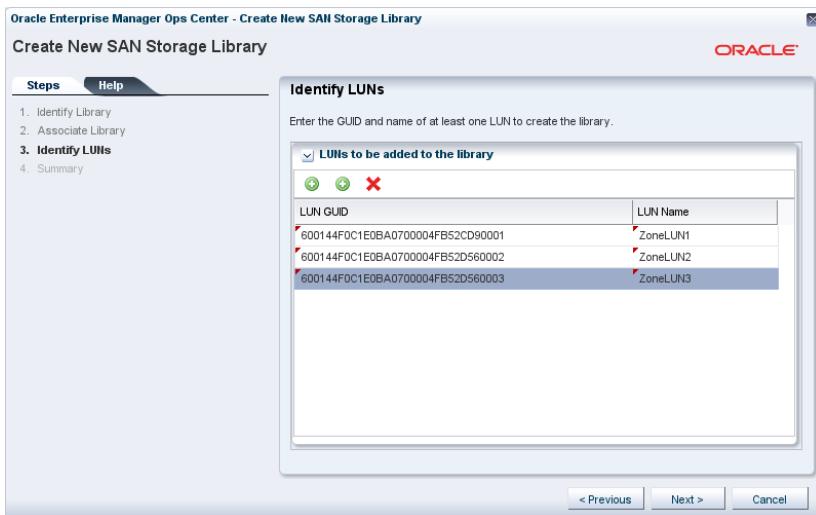
Library Associations will be allocated later; for the moment, click 'Next'.



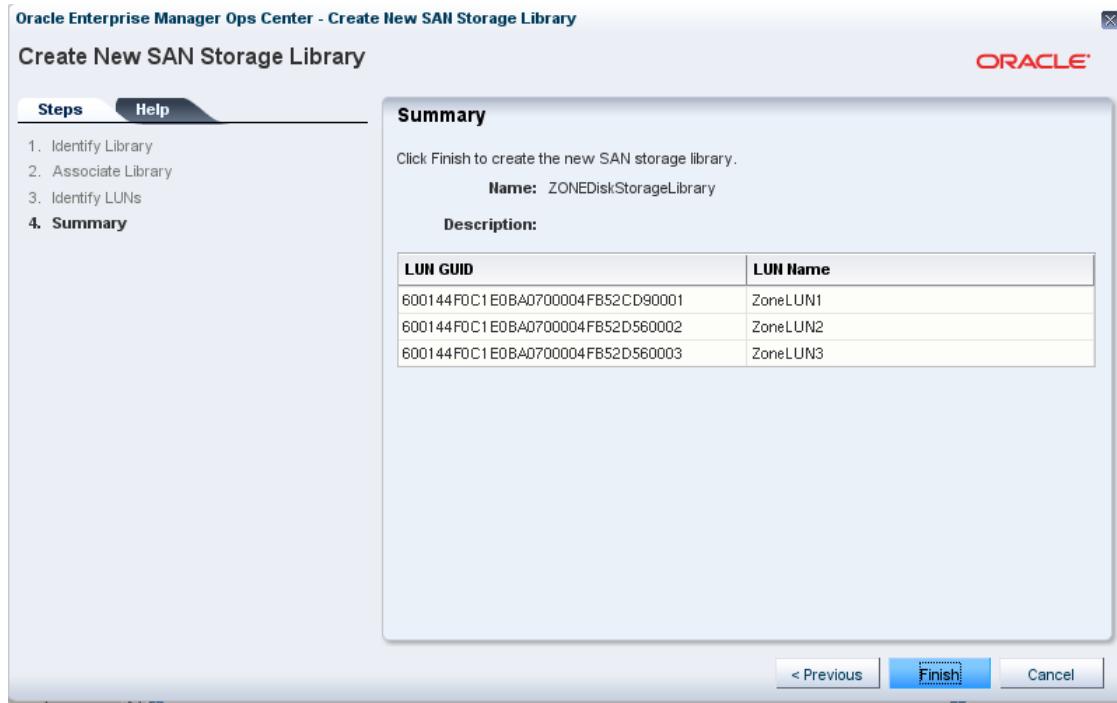
If LUNS are already present on the SAN, they can be allocated now. Enter the GUID associated with each LUN to be used and give the LUNs suitable names. To add additional LUNs, click the leftmost



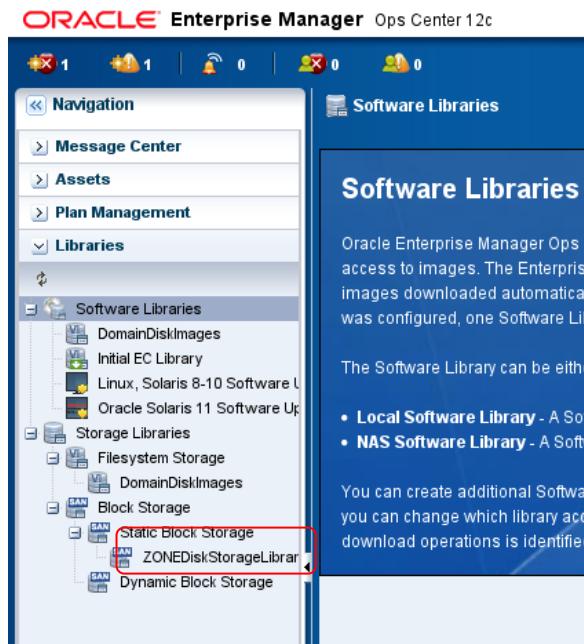
icon to add new entries.



A Summary page is shown. Click 'Finish' to complete identifying LUNs.



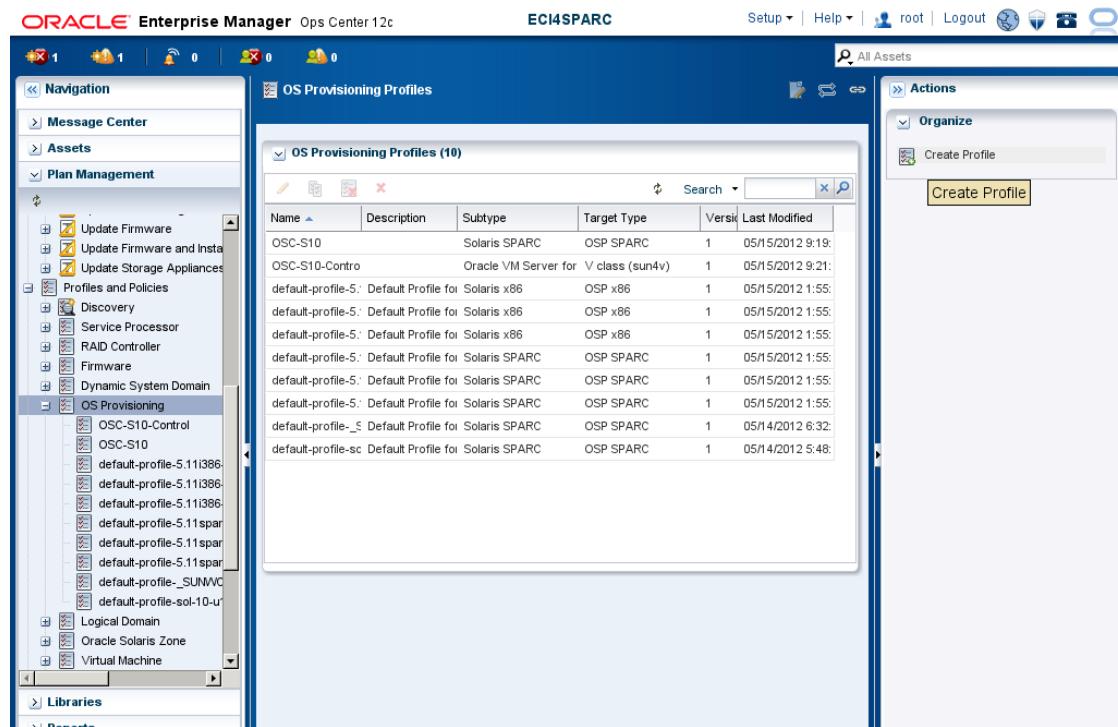
The newly created LUN library is now visible in the ‘navigation’ -> ‘Libraries’->‘Storage Libraries’->‘Block Storage’->‘Static Block Storage’ pane.



## Create Profiles for OS Provisioning of SPARC T4-2 Servers

OS provisioning is carried out by the development of Profiles and Plans that are used to specify the options used during network installations. These can be applied to one or more servers and can be modified as needed.

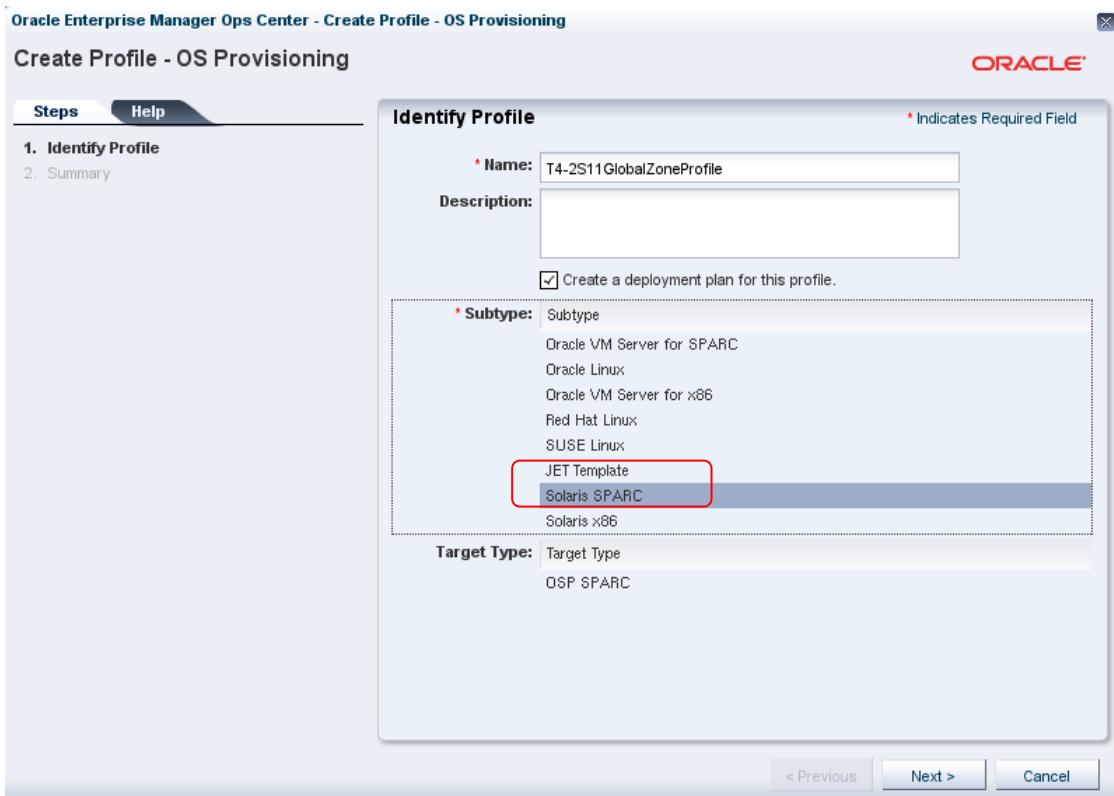
In the ‘Navigation’ pane, select ‘Plan Management’ and scroll the expanded list to the ‘Plans and Policies’ section, and click on ‘OS Provisioning’. Default profile could be used, but most users prefer to create a specific profile for their use case.



The screenshot shows the Oracle Enterprise Manager interface for Ops Center 12c. The title bar reads "ORACLE Enterprise Manager Ops Center 12c" and the window title is "OS Provisioning Profiles". The left sidebar has a "Navigation" tree with "Assets" and "Plan Management" expanded, showing "OS Provisioning" under "Plan Management". The main content area displays a table titled "OS Provisioning Profiles (10)" with columns: Name, Description, Subtype, Target Type, Version, and Last Modified. The table lists various profiles, mostly named "default-profile" followed by a string like "5.11sparc" or "5.11x86". The right sidebar has an "Actions" panel with "Organize" and "Create Profile" buttons, where "Create Profile" is highlighted.

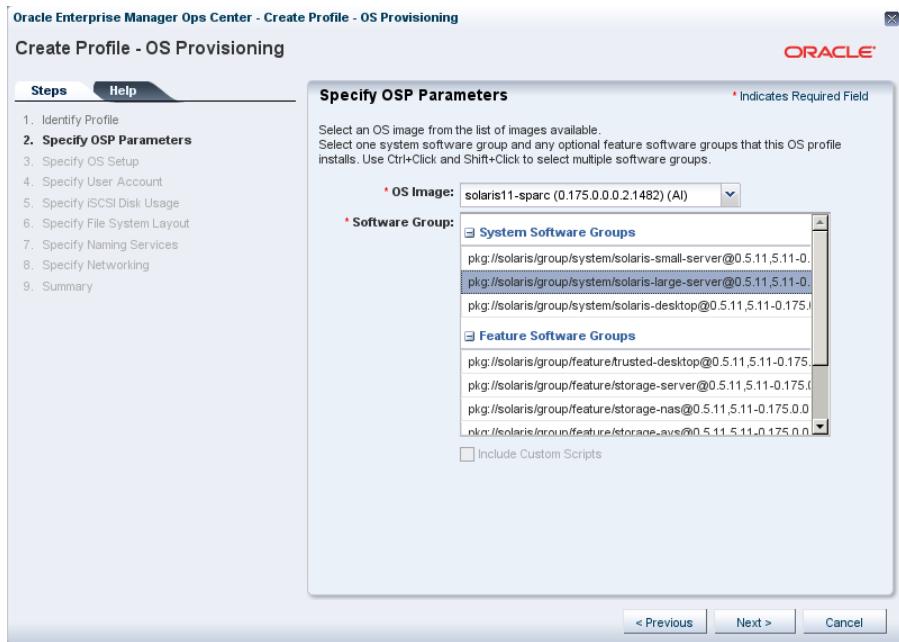
Name	Description	Subtype	Target Type	Version	Last Modified
OSC-S10		Solaris SPARC	OSP SPARC	1	05/15/2012 9:19:
OSC-S10-Contro		Oracle VM Server for V class (sun4v)	OSP x86	1	05/15/2012 9:21:
default-profile-5_11sparc	Default Profile for Solaris x86	OSP x86	OSP x86	1	05/15/2012 1:55:
default-profile-5_11sparc	Default Profile for Solaris x86	OSP x86	OSP x86	1	05/15/2012 1:55:
default-profile-5_11sparc	Default Profile for Solaris x86	OSP x86	OSP x86	1	05/15/2012 1:55:
default-profile-5_11sparc	Default Profile for Solaris SPARC	OSP SPARC	OSP SPARC	1	05/15/2012 1:55:
default-profile-5_11sparc	Default Profile for Solaris SPARC	OSP SPARC	OSP SPARC	1	05/15/2012 1:55:
default-profile-_S	Default Profile for Solaris SPARC	OSP SPARC	OSP SPARC	1	05/14/2012 6:32:
default-profile-sc	Default Profile for Solaris SPARC	OSP SPARC	OSP SPARC	1	05/14/2012 5:48:

Click ‘Create Profile’ in the ‘Actions’ pane.

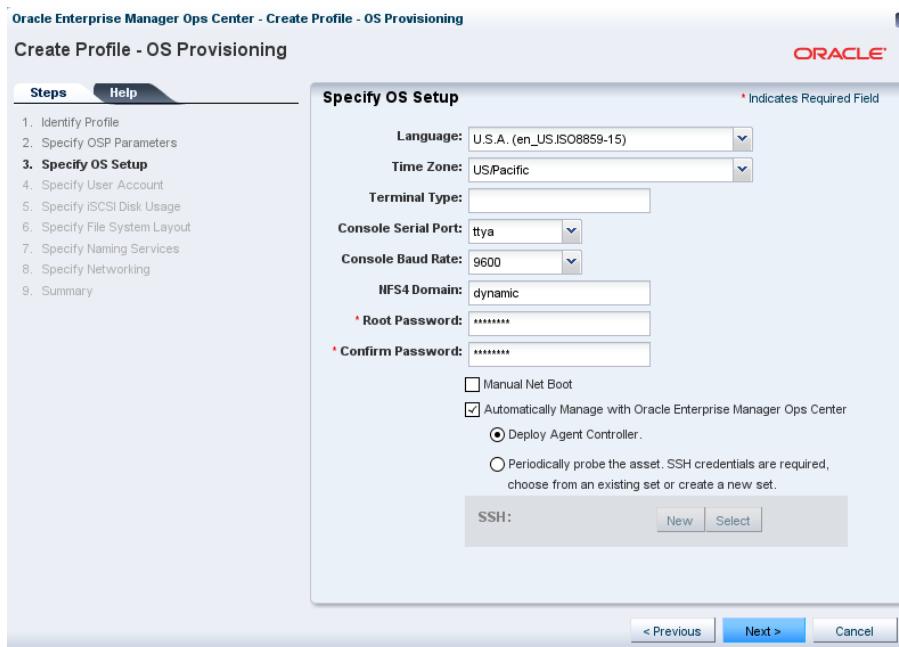


Choose a name for the OS provisioning profile and choose the appropriate ‘Subtype’. The subtype choice is important. Deploying Oracle Solaris Zones is not recommended on NFS shared filesystems, so LUNs will be used for deploying Zones.

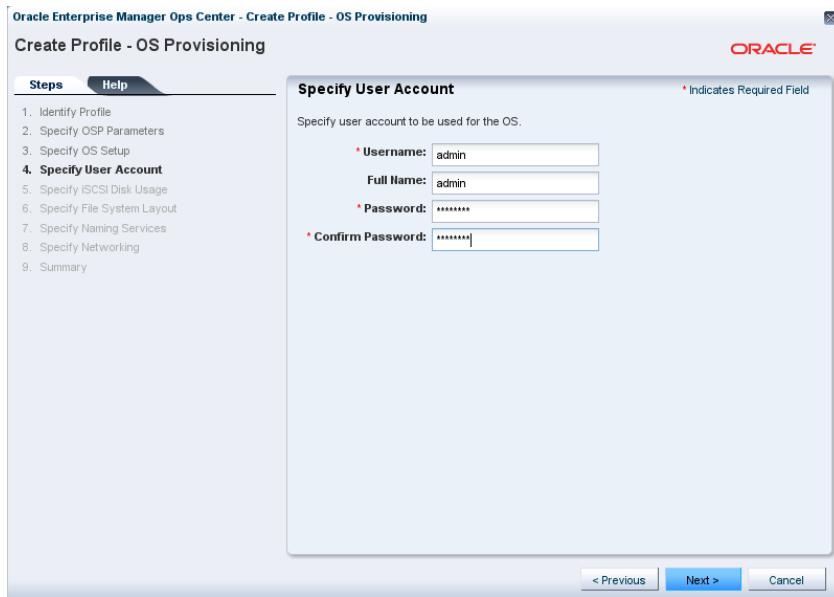
Specify the OS Provisioning parameters, from the ‘OS Image’ drop-down menu, and select the appropriate image to install. In this example, select ‘Solaris 11’. In the Software Group area, select the appropriate package cluster or package group. In this example, ‘Solaris-large-server’ is chosen.



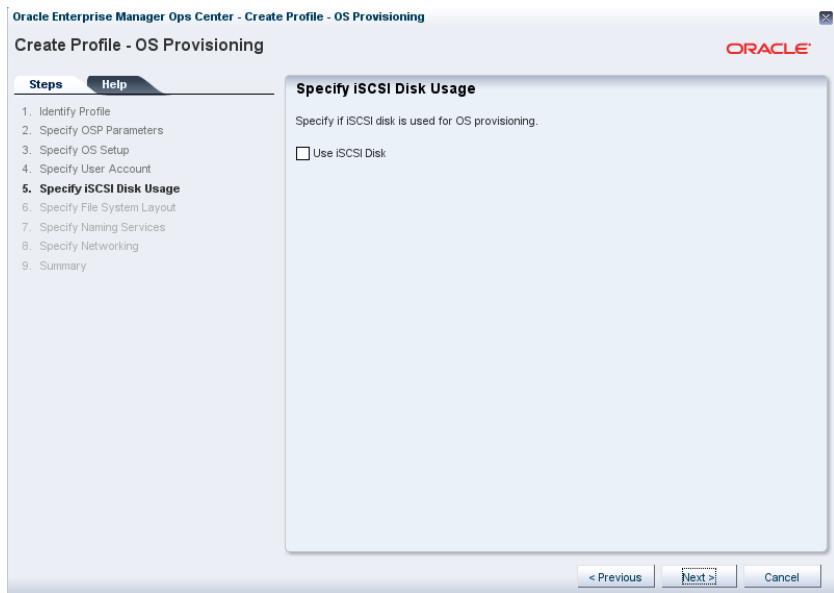
Specify the OS parameters such as time zone, root password, etc., that are required for OS deployment with this profile.



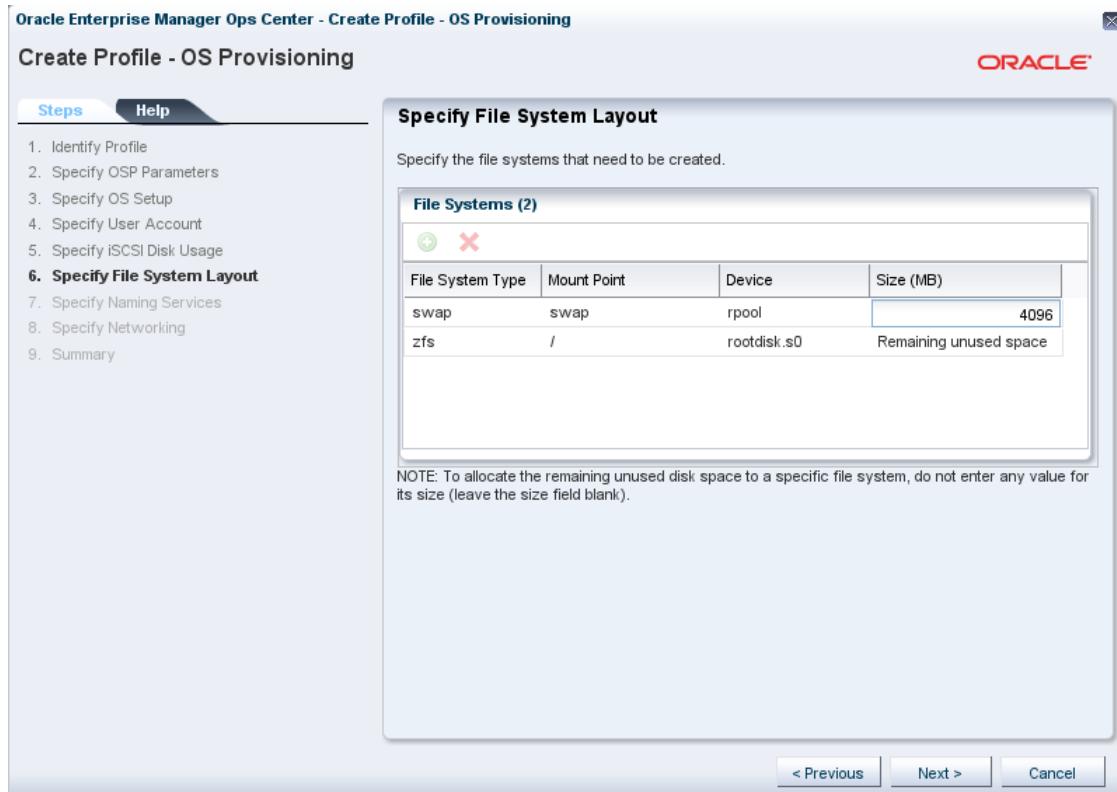
For Oracle Solaris 11 it is necessary to specify a secondary user since ‘root’ is not able to log into the system by default.



Oracle Solaris 11 allows the use of iSCSI devices to install the OS. This is not required for using SAN devices. Click 'Next'.



Specify the filesystem layout for the OS being installed. In the example, the default layout is used. Click 'Next'.



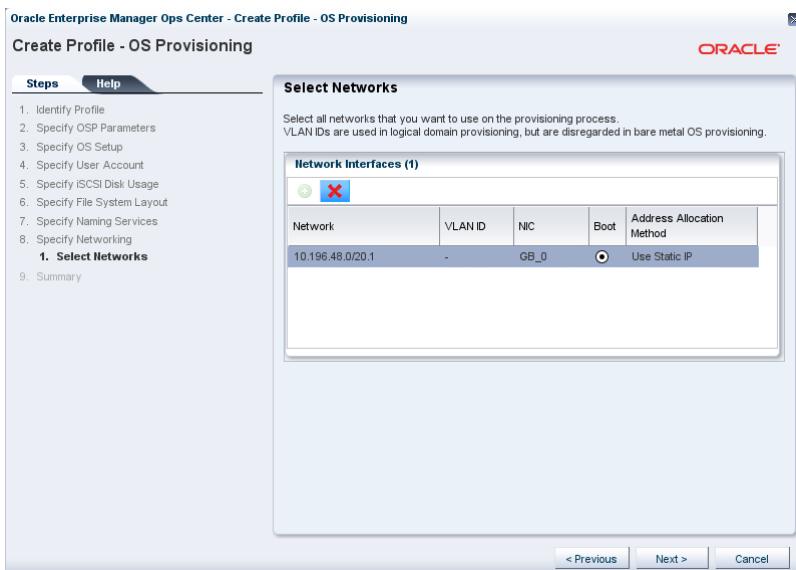
Specify the Naming Service that will be used. In this example, no naming service is used. Click 'Next'.



In this example, no Link Aggregation or IPMP configuration is used. Click 'Next'.



Select the Networks to be used in the provisioning process, then click 'Next'.



Once the Summary page has been checked, click 'Finish' to create the profile.



The newly created profile is now visible in the list of profiles.

Name	Description	Subtype	Target Type	Version	Last Modified
OSC-S10		Solaris SPARC	OSP SPARC	1	05/15/2012 9:19:
OSC-S10-Contro		Oracle VM Server for V class (sun4v)	OSP SPARC	1	05/15/2012 9:21:
<b>T4-2S11GlobalZc</b>		Solaris SPARC	OSP SPARC	1	05/18/2012 5:55:
default-profile-5	Default Profile for Solaris x86	OSP x86	OSP x86	1	05/15/2012 1:55:
default-profile-5	Default Profile for Solaris x86	OSP x86	OSP x86	1	05/15/2012 1:55:
default-profile-5	Default Profile for Solaris x86	OSP x86	OSP x86	1	05/15/2012 1:55:
default-profile-5	Default Profile for Solaris SPARC	OSP SPARC	OSP SPARC	1	05/15/2012 1:55:
default-profile-5	Default Profile for Solaris SPARC	OSP SPARC	OSP SPARC	1	05/15/2012 1:55:
default-profile-5	Default Profile for Solaris SPARC	OSP SPARC	OSP SPARC	1	05/15/2012 1:55:
default-profile-5	Default Profile for Solaris SPARC	OSP SPARC	OSP SPARC	1	05/14/2012 6:32:
default-profile-sc	Default Profile for Solaris SPARC	OSP SPARC	OSP SPARC	1	05/14/2012 5:48:

## Deploying Oracle Solaris 11 to a SPARC T4-2 Zone Host

Now that SPARC T4-2s have been identified and a suitable profile has been created (and an automatically derived deployment plan has also been created), the plan can be applied to the SPARC T4-2s to install the appropriate OS image.

From the ‘Navigation’ pane, click on ‘Plan management’->‘Deployment Plans’->‘Provision OS’. In the list beneath this option, the newly created profile and its derived plan can be clicked.

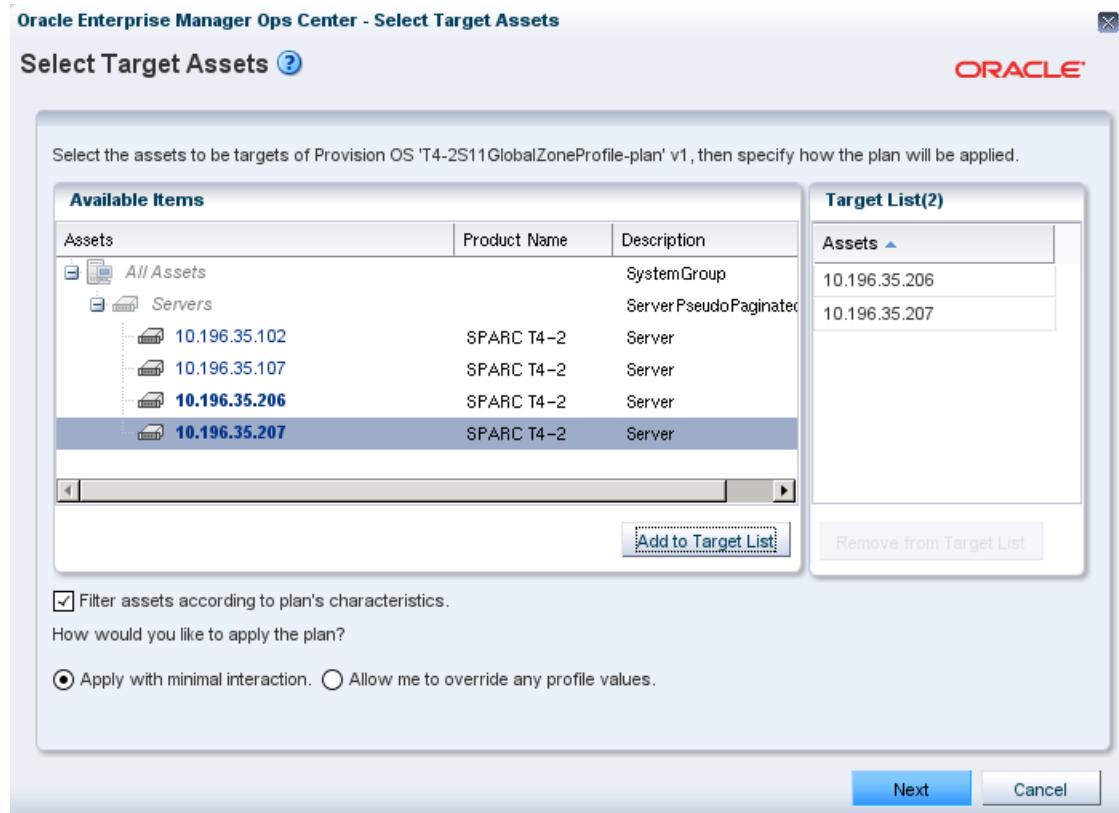
In the ‘Actions’ pane, click on ‘Apply Deployment Plan’.

The screenshot shows the Oracle Enterprise Manager Ops Center 12c interface. The main title bar reads "ORACLE Enterprise Manager Ops Center 12c" and "ECI4SPARC". The top navigation bar includes "Setup", "Help", "root", "Logout", and system status icons. The left sidebar contains a "Navigation" tree with options like "Message Center", "Assets", "Plan Management" (which is expanded to show "Create Dynamic System Domains", "Create Logical Domains", "Create Oracle Solaris Zone", "Create Virtual Machines", "Install Server", and "Provision OS"), and "OSC-S10-control-plan" and "OSC-S10-plan". The central content area displays the "T4-2S11GlobalZoneProfile-plan" details. It shows the "Plan Name" as "T4-2S11GlobalZoneProfile-plan", "Version" as "1", "Description" as "Created from profile", "Target Type" as "OSP SPARC", and "Failure Policy" as "Stop at failure". The "Created" and "Last Modified" times are both "05/18/2012 5:55:09 pm PDT". The "Template" is "Provision OS v2" and there are "0 Referrers". Below this is a "Deployment Plan Steps" table:

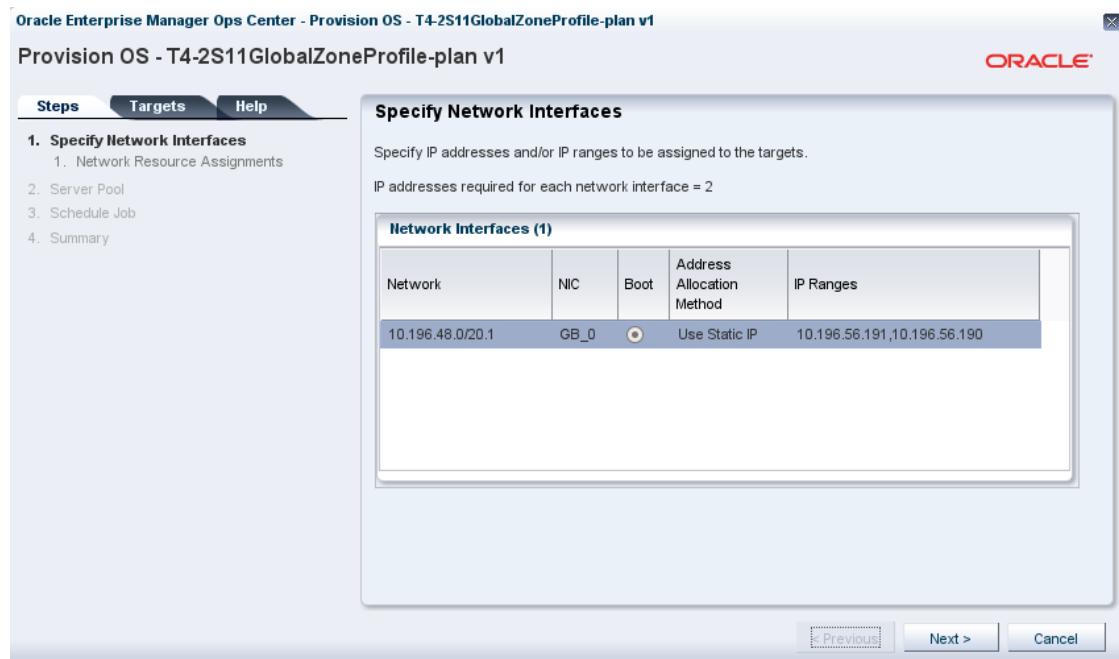
Step	Associated Profile/Deployment Plan	Number of Results
Provision OS	T4-2S11GlobalZoneProfile v1	1

The right side of the screen features an "Actions" pane with sections for "Operate", "Organize", "Deploy" (which contains a red box around the "Apply Deployment Plan" option), and "Update". At the bottom of the interface, there are "Jobs" and "Status" indicators, and a message at the bottom right: "T4-1-OC12.139.Create Profile finished: Success".

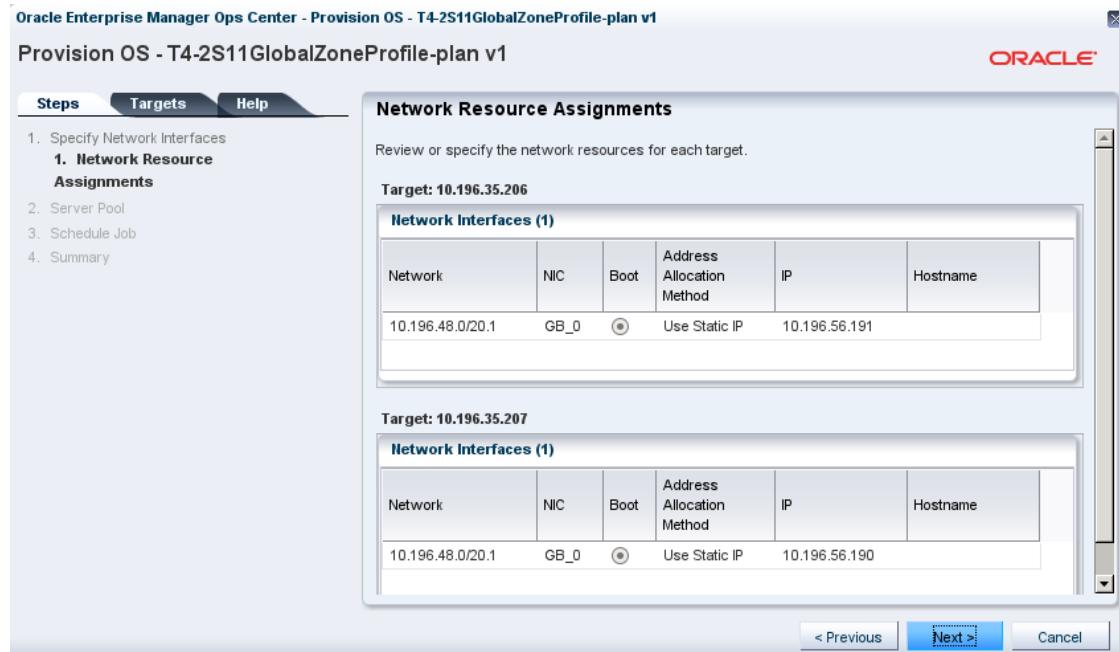
From the Expanded ‘Servers’ list, select the servers to install using this plan, and click ‘Add to Target list’. These servers will move to the Target List box. Click ‘Next’ to proceed.



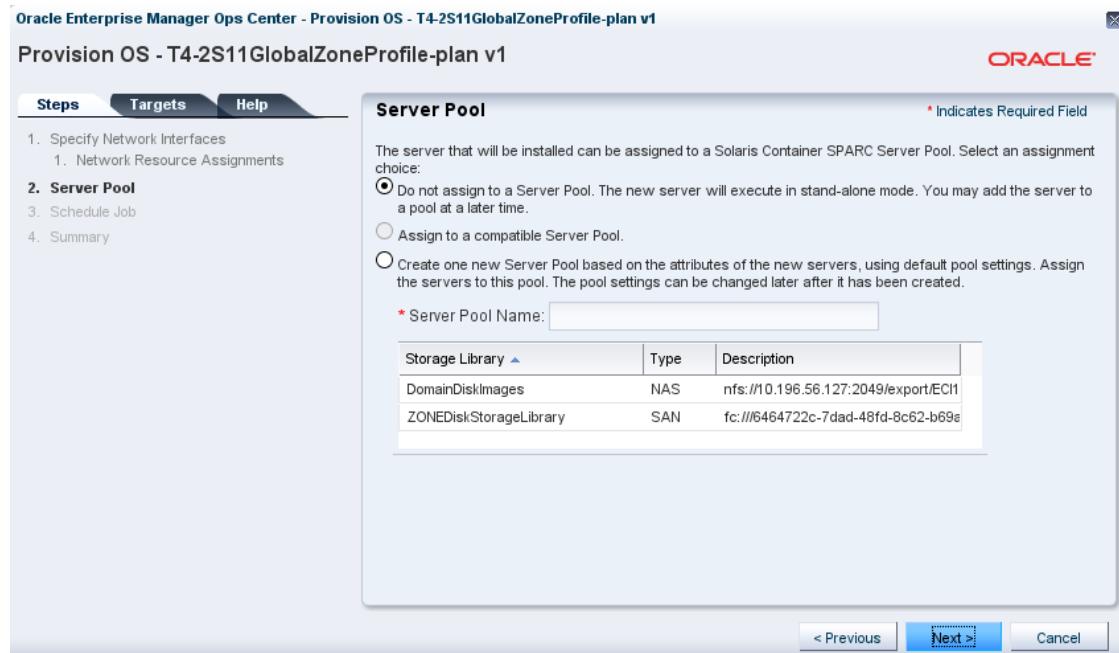
Choose the network to install into and then specify the comma separate list of IP addresses or range that the install clients can use during provisioning.



Verify the allocation of discovered assets to the IP address that is specified; edit if necessary. Then click 'Next'.



No server pool will be created or assigned at this stage. Click 'Next'.



Schedule the job for immediate action. Click 'Next'.

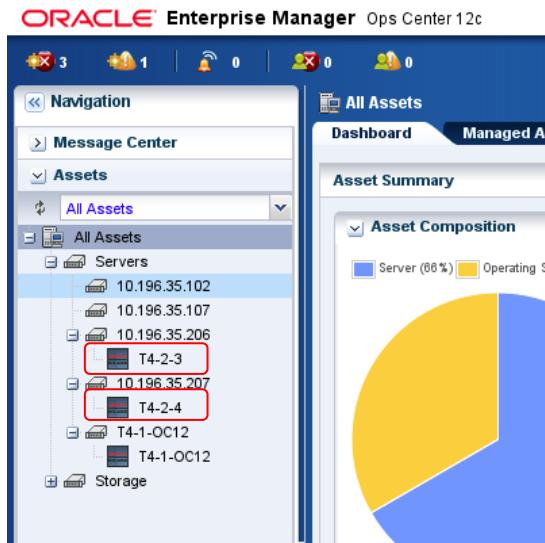


Accept the Summary screen, then click 'Apply' to start the provisioning job.



The OS deployment job will be launched and operate in the background to completion.

On completion, the newly installed assets will be visible in the home screen when the 'Assets'->'All Assets'->'Servers' tree is expanded, and the service processors are expanded to reveal the systems that they control.



Note that the SPARC T4-1 server acting as the Oracle Enterprise Manager Ops Center 12 host is also managed and visible when its service processor is expanded.

### Creating Pools of Servers to Host Virtual Machines

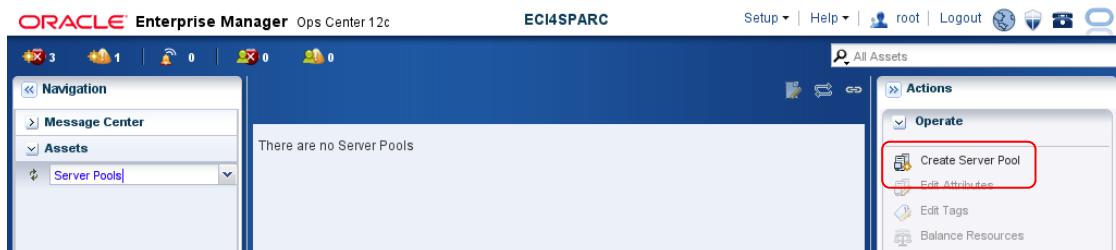
In order to allow for migration of virtual machines (whether they are Oracle VM Server for SPARC Domains or Oracle Solaris Zones) between hosts, it is required that the physical hosts be part of server 'Pools'. These are collections of servers that have similar features and access to the same shared resources (LUNs, NFS shares, etc.)

Once a pool is created it can be populated with as many servers as are required to give the required resources to that pool. Since pools can be managed through policies, it is possible to deploy virtual machines into the pool and have the system make policy-based decisions on which machine to locate the newly requested VM. It can even proactively move VMs to implement load balancing or other migration policies.

To create a pool, from the Oracle Enterprise Manager Ops Center 12 home screen, expand the navigation pane, select the drop-down 'filter' box in the 'Assets' menu item, and select (under Resource Management Views) the 'Server Pools' filter option.

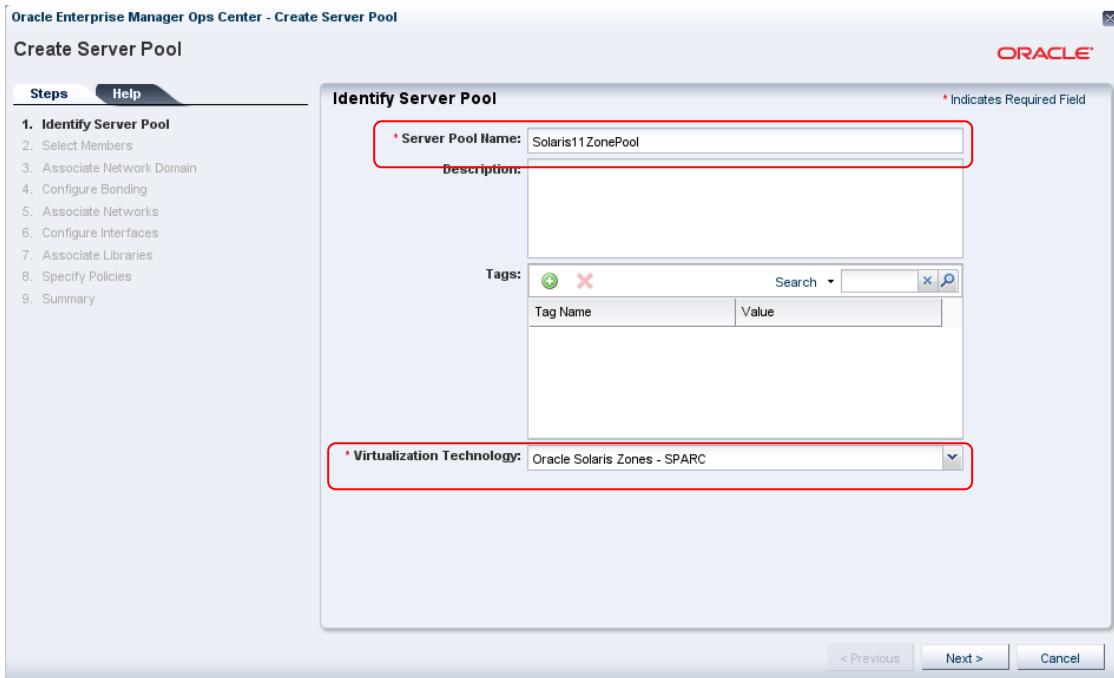


Then in the ‘Action’ pane, select ‘Create Server Pool’.



A popup window will appear; enter a name by which to refer to this pool in the future. In the example ‘Solaris11ZonePool’ is chosen. Ensure that the ‘Virtualization Technology’ drop-down menu shows the correct type of pool technology that will be used in this pool; in the example, a pool of Oracle Solaris 11 SPARC servers will be created that will act as Oracle Solaris Zone hosts, so ‘Oracle Solaris Zones-SPARC’ is selected.

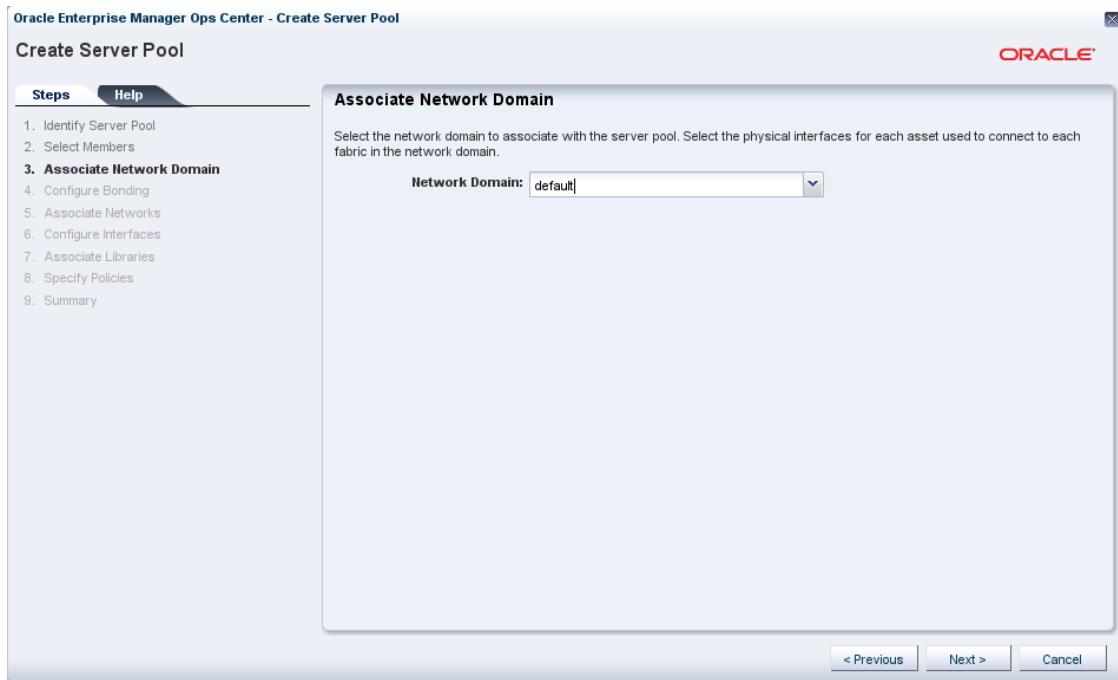
Click ‘Next’ to proceed to the next screen.



Now members of the pool can be chosen. A list of the available assets will be listed. Select these assets by clicking or ‘Shift-Clicking’ them to select more than one asset. In the example, servers T4-2-3 and T4-2-4 are chosen. Click ‘Next’ to proceed.

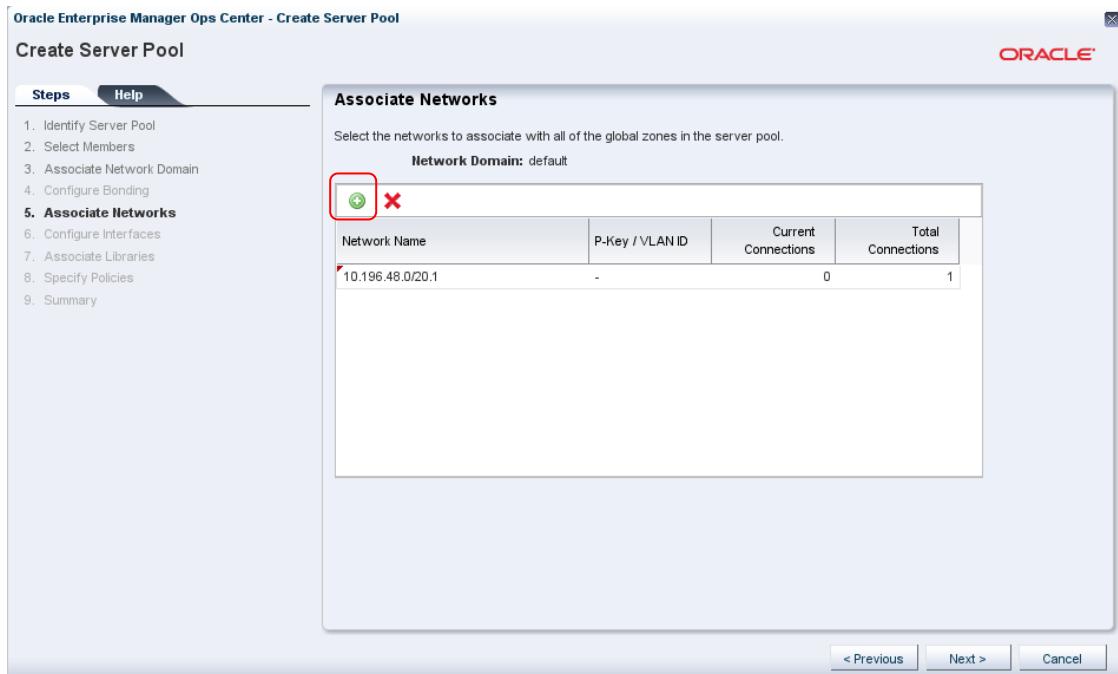


Now choose the Associated Network Domain for these assets to communicate on. Typically choosing ‘default’ is sufficient. Click ‘Next’ to proceed.



Now choose the networks that each global zone will be associated with in the server pool. In the example, the 10.196.48.0/20 subnet was chosen, since all members of the pool can communicate on this subnet, and it is of sufficient bandwidth to handle the anticipated traffic levels. It is necessary to

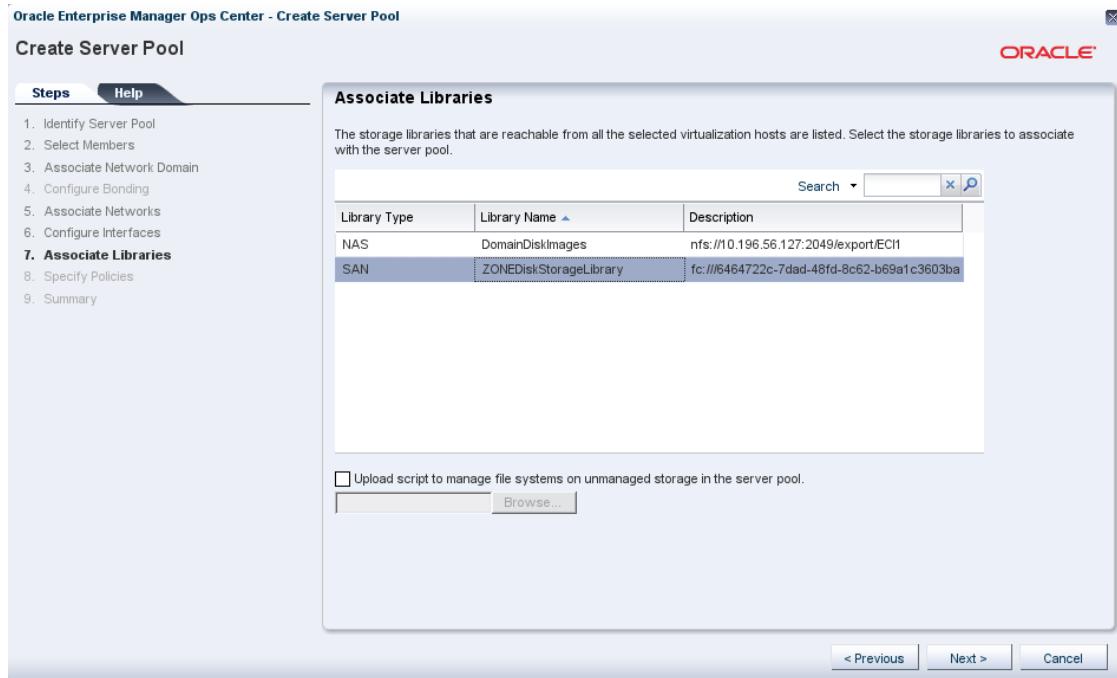
click the icon in order to add a network and choose from the available subnets.



If further specific network connection configurations are required, it is possible to set those on the ‘Configure Interfaces’ screen. In most cases, no further configurations are required. Click ‘Next’ to proceed to the next screen.



Now select which storage libraries are to be used from the server pool. Only libraries that are reachable from all hosts in the pool are listed. In the case of Oracle Solaris Zones, it is a recommended best practice to select SAN storage rather than NFS shares for performance reasons. Select the appropriate library and click ‘Next’ to proceed.



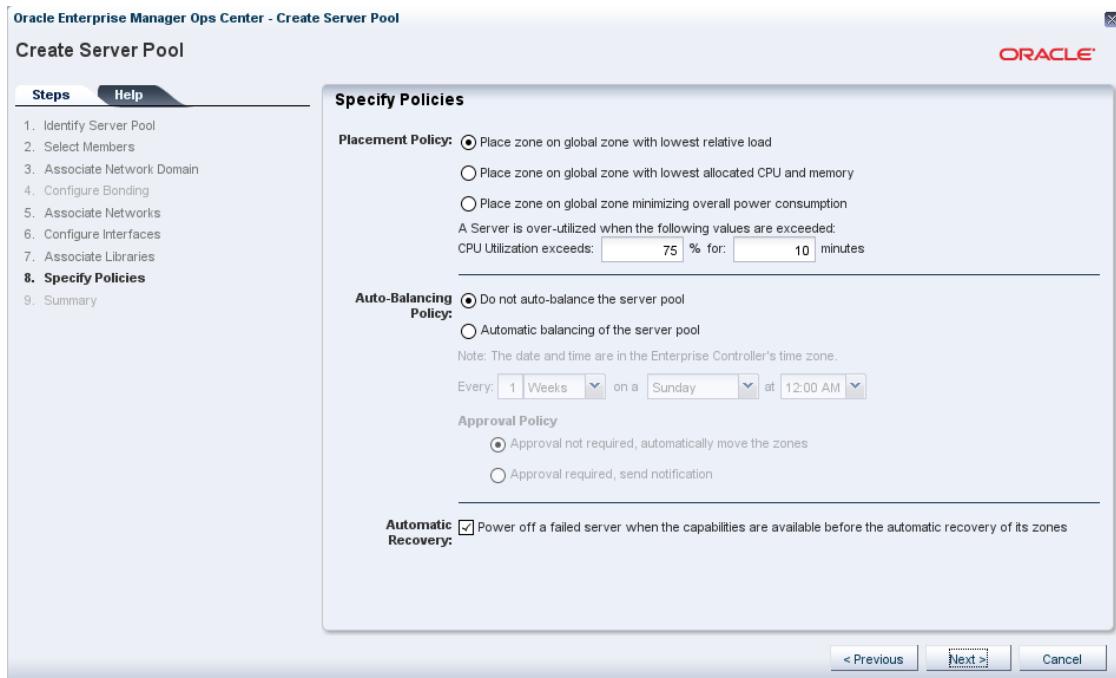
Now zone placement policies can be selected. In the case of Zones, it is possible to have Oracle Enterprise Manager Ops Center 12 choose where to place newly created zones based on one of several criteria:

- Use the global zone with the lowest relative load
- Use the global zone with the lowest allocated CPU and memory
- Use the global zone to minimize overall power consumption.

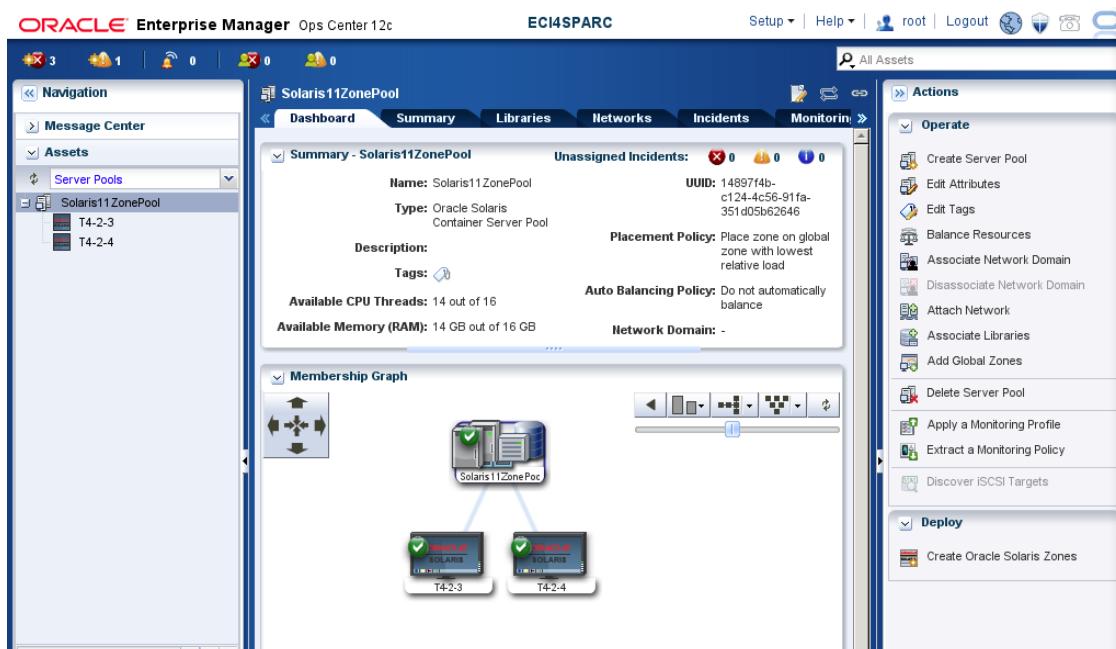
It is further possible to choose to have Oracle Enterprise Manager Ops Center 12 automatically rebalance the server pool based on the chosen criteria on a regular schedule, by moving zones to a better configuration as required.

Automatic recovery of failed zones can also be enabled or disabled here. A failed zone will be restarted on another host in the pool should it cease functioning for any reason.

Click 'Next' once a policy set has been chosen.



A Summary page of the choices and configurations for the pool is shown. Click 'Finish' to complete the creation of the pool. A short task is initiated, and the pool will be created and shown in a few seconds.



The pool is created and visible in the 'Navigation'->'Assets'->'Server Pools' menu together with the associated member server assets.

One further step is required on each server in the pool; unfortunately, this is a manual step that must be repeated on each server in the zone pool.

In order for Oracle Enterprise Manager Ops Center 12 to correctly be able to recognize and use the LUNs that are visible to each client, and present them as zone install location options, MPxIO must be enabled for at least the Fibre Channel HBAs that are present in those machines. This is a straightforward procedure and can be achieved by logging into each server in the pool and issuing the following commands.

A check can be carried out to determine whether MPxIO is already enabled on a pool server. The ‘stmsboot –L’ command lists any devices for which dual-pathing has already been enabled. If no devices are listed in response to this command, MPxIO is not currently enabled. These commands must be issued as ‘root’.

```
admin@T4-2-3:~$ su -
Password:
May 23 15:08:52 T4-2-3 su: 'su root' succeeded for admin on /dev/console
Oracle Corporation      SunOS 5.11      11.0      April 2012
root@T4-2-3:~# stmsboot -L
non-STMS device name          STMS device name
-----
root@T4-2-3:~#
```

In this case, no devices are listed from the command, indicating that MPxIO is not enabled. To enable MPxIO, issue the command ‘stmeboot –D fp –e’. This will enable MPxIO for the Fibre Channel devices only. The output of the ‘stmsboot –L’ command can then be checked to verify that dual pathed devices are now present. Setting up MPxIO requires the server to reboot to adjust its device paths properly.

```
root@T4-2-3:~# stmsboot -D fp -e
WARNING: This operation will require a reboot.
Do you want to continue ? [y/n] (default: y) y
The changes will come into effect after rebooting the system.
Reboot the system now ? [y/n] (default: y) y
May 23 10:47:10 T4-2-3 reboot: initiated by admin on /dev/console
```

Once the server reboots the MPxIO, status can be checked by logging in again and checking the output of the ‘stmsboot –L’ command.

```
T4-2-3 console login: admin
Password:
Last login: Wed May 23 14:53:37 on console
Oracle Corporation      SunOS 5.11      11.0      April 2012
admin@T4-2-3:~$ su -
Password:
May 23 15:16:14 T4-2-3 su: 'su root' succeeded for admin on /dev/console
Oracle Corporation      SunOS 5.11      11.0      April 2012
You have new mail.
```

```
root@T4-2-3:~# stmsboot -L
non-STMS device name           STMS device name
-----
/dev/rdsk/c3t21000024FF2D5C04d4 /dev/rdsk/c0t600144F0C1E0BA0700004FB52D610003d0
/dev/rdsk/c3t21000024FF2D5C04d2 /dev/rdsk/c0t600144F0C1E0BA0700004FB52D560002d0
/dev/rdsk/c3t21000024FF2D5C04d0 /dev/rdsk/c0t600144F0C1E0BA0700004FB52CD90001d0
/dev/rdsk/c3t21000024FF2D53E6d4 /dev/rdsk/c0t600144F0C1E0BA0700004FB52D610003d0
/dev/rdsk/c3t21000024FF2D53E6d2 /dev/rdsk/c0t600144F0C1E0BA0700004FB52D560002d0
/dev/rdsk/c3t21000024FF2D53E6d0 /dev/rdsk/c0t600144F0C1E0BA0700004FB52CD90001d0
root@T4-2-3:~#
```

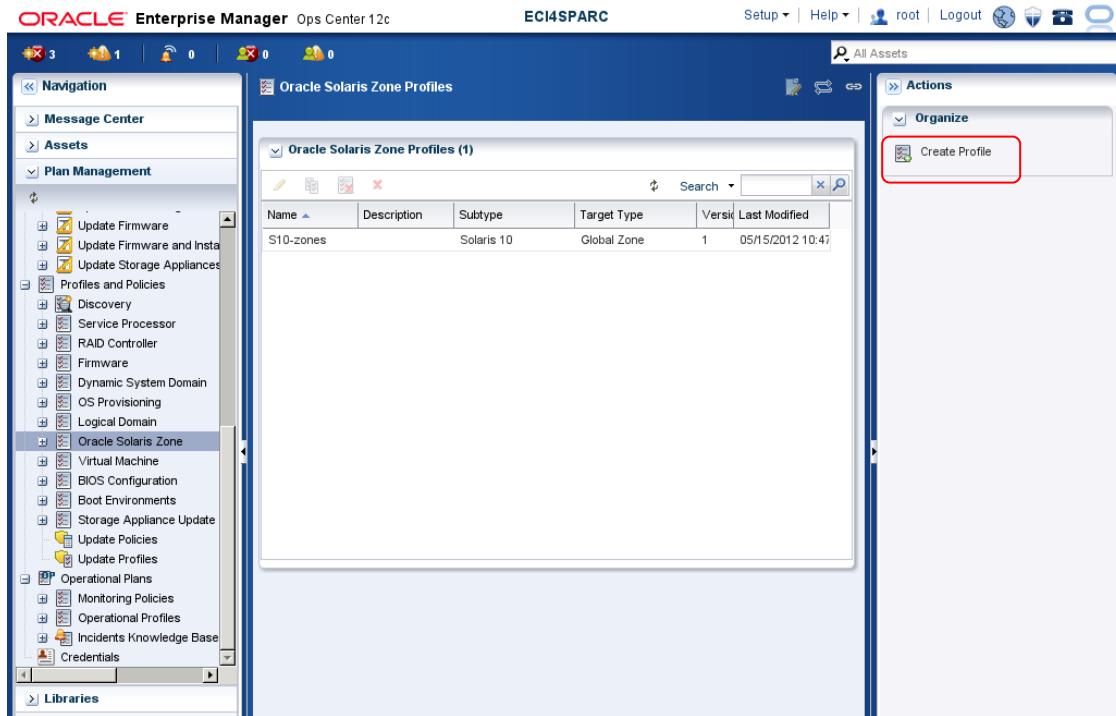
In this case the output shows that there are three LUNs visible to the server, and each is visible via two paths (note the very subtle differences in the /dev/rdsk/device specifications).

Repeat the above procedure for each server in the Zone pool to properly enable LUNs for zone migration.

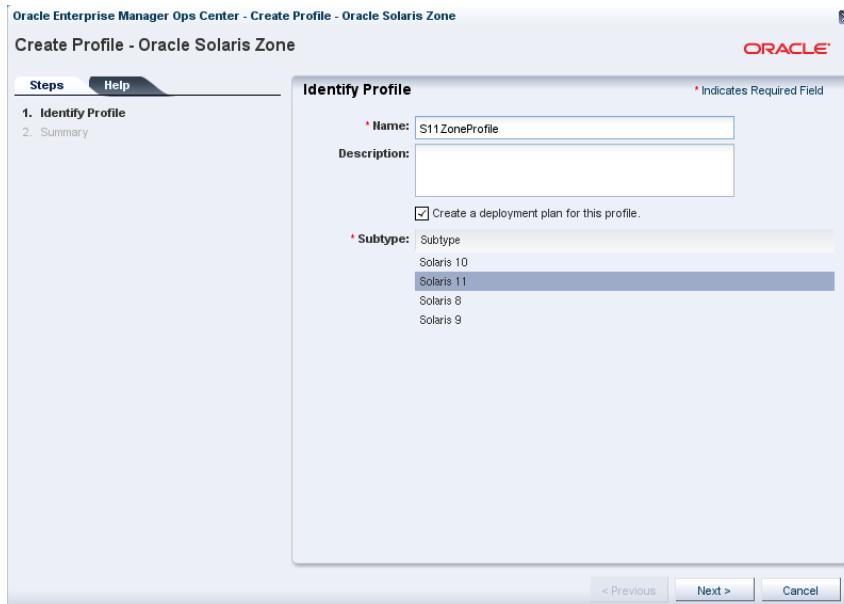
### **Creating Deployment Profiles for a Zone-based Virtual Machine**

Before a zone can be deployed into a server pool, it is necessary to create one or more suitable deployment plans that allow for the choice of a suitable OS image, filesystem mountpoints, user passwords, etc.

From the ‘Navigation’ pane, select ‘Plan Management’ -> ‘Profiles and Policies’->‘Oracle Solaris Zone’. In the ‘Action’ pane, click ‘Create Profile’.



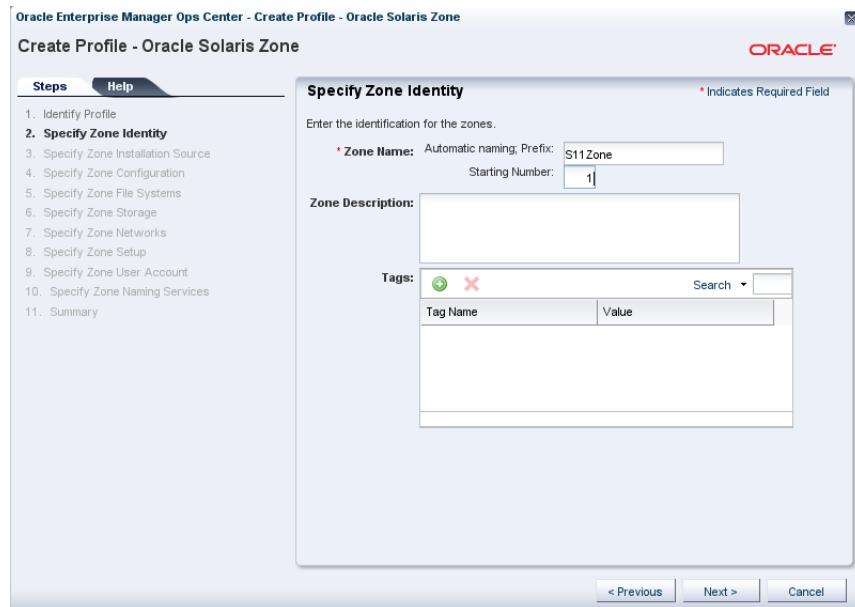
In the popup window, choose a name for the profile and leave the ‘tick’ in the box marked ‘Create a deployment plan for this profile’ in order to have a plan automatically created corresponding to this profile. From the ‘Subtype’ menu, select the appropriate OS type to base the plan on; in this case, ‘Solaris 11’ is chosen.



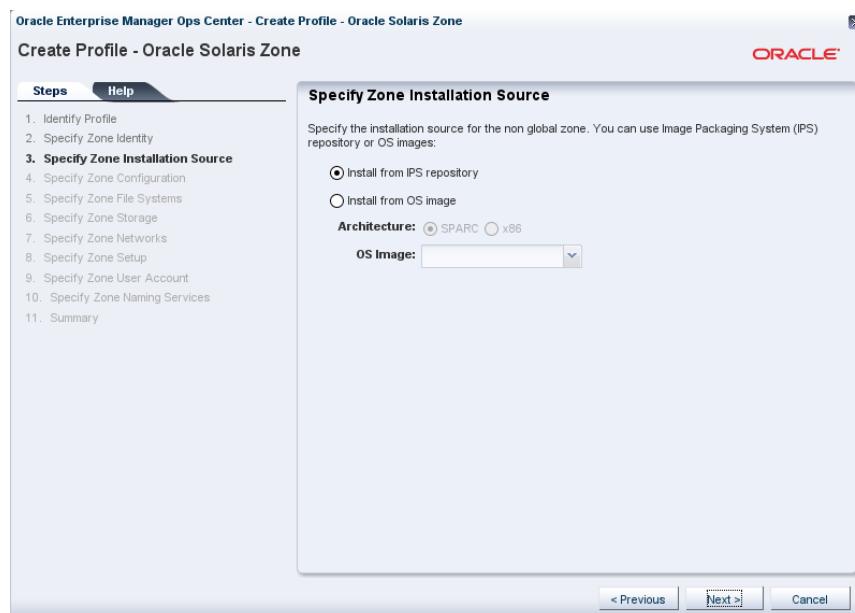
Zone identities can now be specified, and when multiple zones are created, a post-fixed number can be specified and auto-incremented for each new zone of this type as it is created. In this example the

zones are named 'S11Zone', and the starting number is '1'. This leads to zones created using this profile being incrementally named 'S11Zone-1', 'S11Zone-2', 'S11Zone-3', etc.

Click 'Next' to proceed.



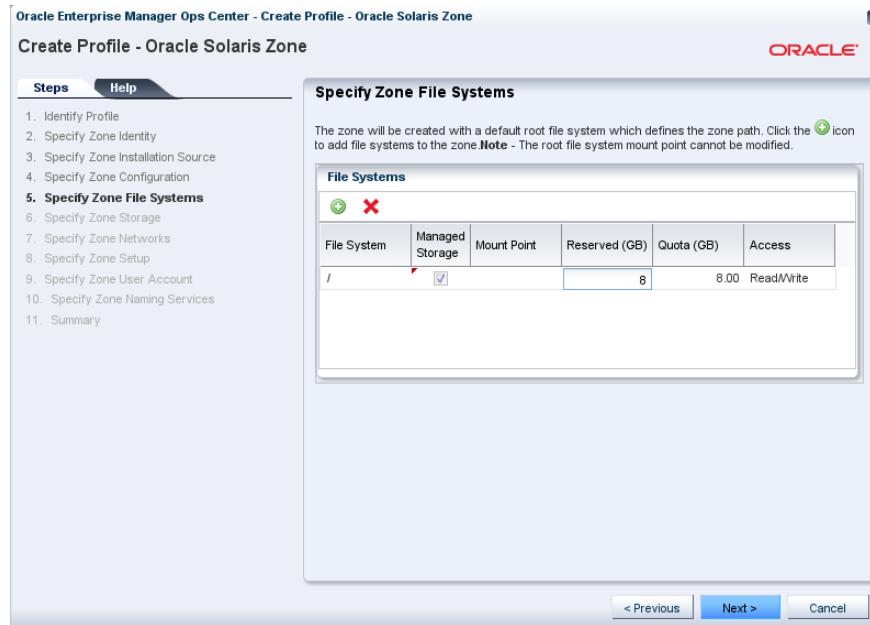
Specify the Zone installation source. In the example the IPS repository is chosen, but if suitable OS installation images had been uploaded, they could also be chosen. Click 'Next' to proceed.



Now the configuration of the zones can be chosen. These options allow the choice of a wide range of features of the CPU and memory models available as well as capping of resources. For this example all defaults will be chosen. Click 'Next' to proceed.



Specify the filesystems that will be associated with the Zone. By default the '/' filesystem will be associated, but additional filesystems can be specified if desired. For the example, only the '/' filesystem is required. Click 'Next' to proceed.



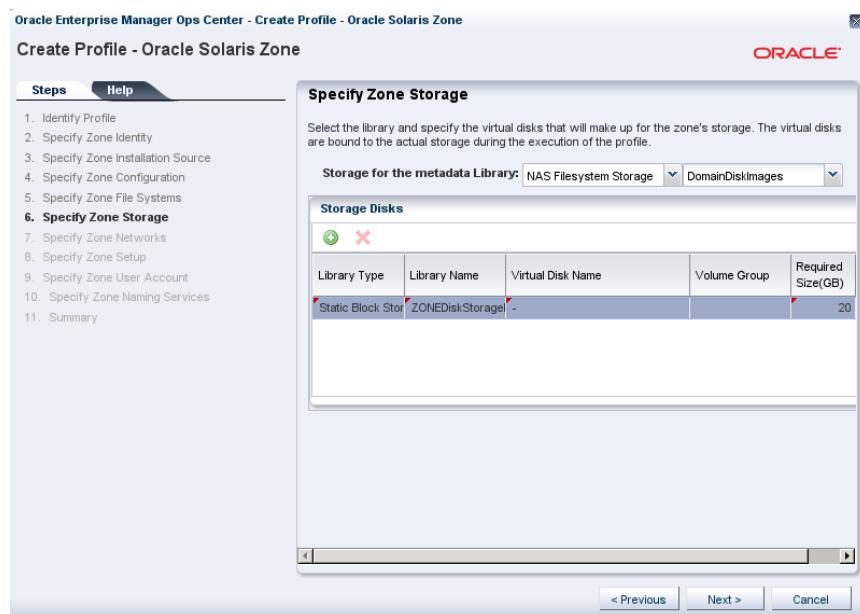
Specify the location of the Zone disk image. This should be selected as shown in the example.

Storage for the metadata library should be placed on a shared storage location available to all hosts in the pool to allow for zone migration. A NAS Filesystem Storage device is chosen, and one of the available shared filesystems is chosen as the metadata library location.

Storage disks for the zones should be placed on SAN disks, which can be found under the library type of ‘Static Block Storage’, and then the ‘Library Name’ can be chosen from the available LUNs.

Each disk created for a Zone will be of the ‘Required Size(GB)’ setting; 20 GB is the default size.

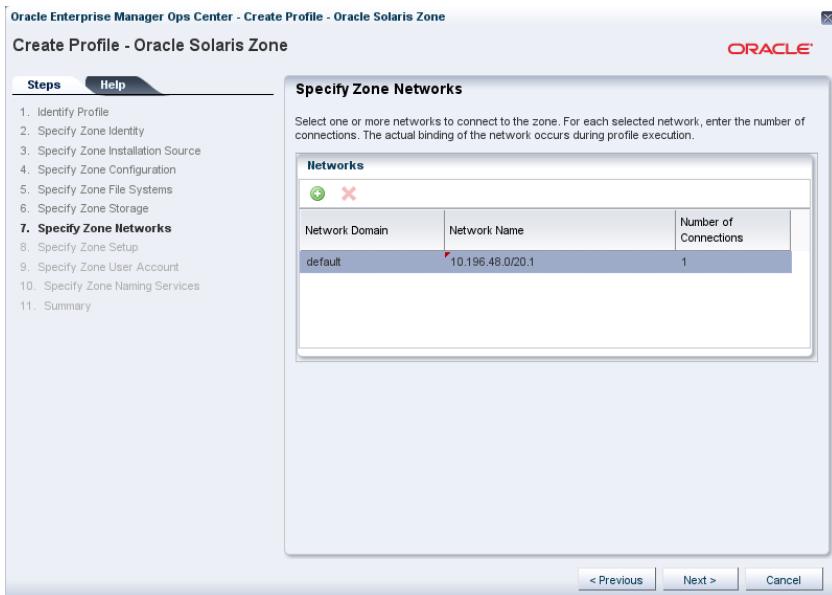
Click ‘Next’ to proceed.



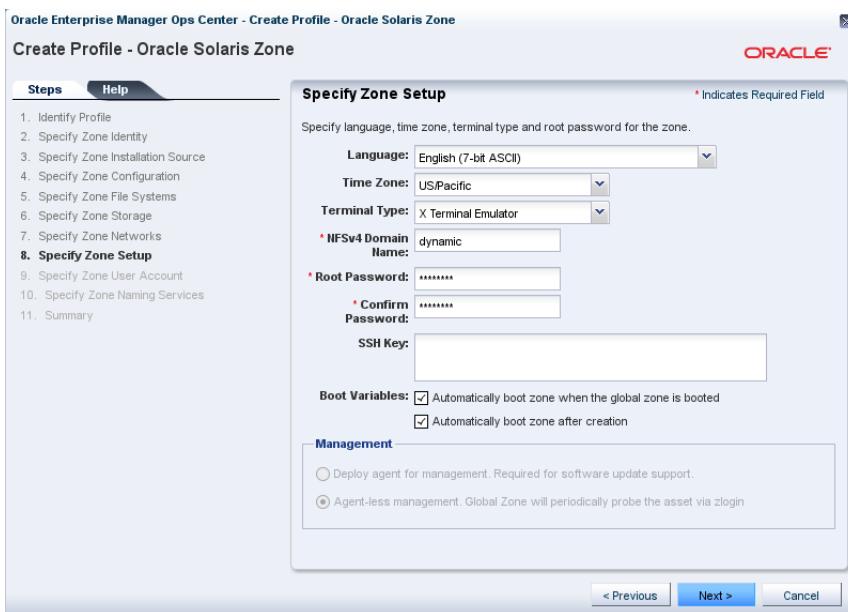
Choose the networks to be connected to the Zones; more than one can be connected by selecting the



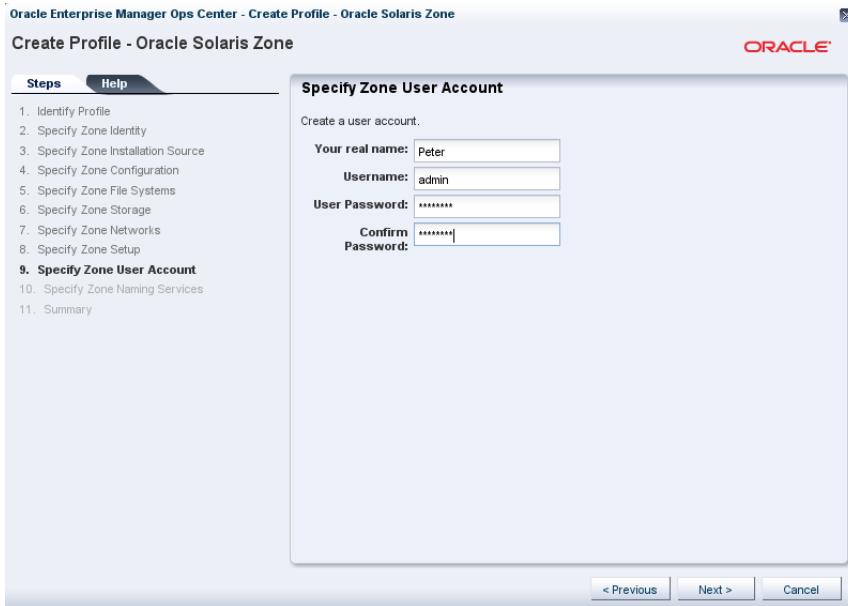
icon to add networks. The default network should be configured from the ‘Network Name’ drop-down menu such that all zones can communicate as required.



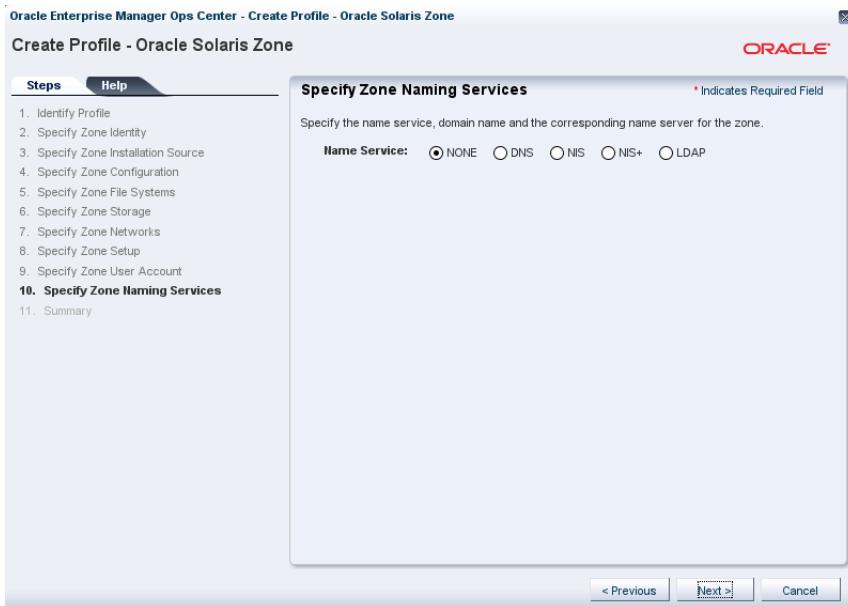
Select the OS localization and root user configuration defaults for the zones including time zones, root passwords, terminal types, and settings such as the auto-boot options. Click ‘Next’ to proceed.



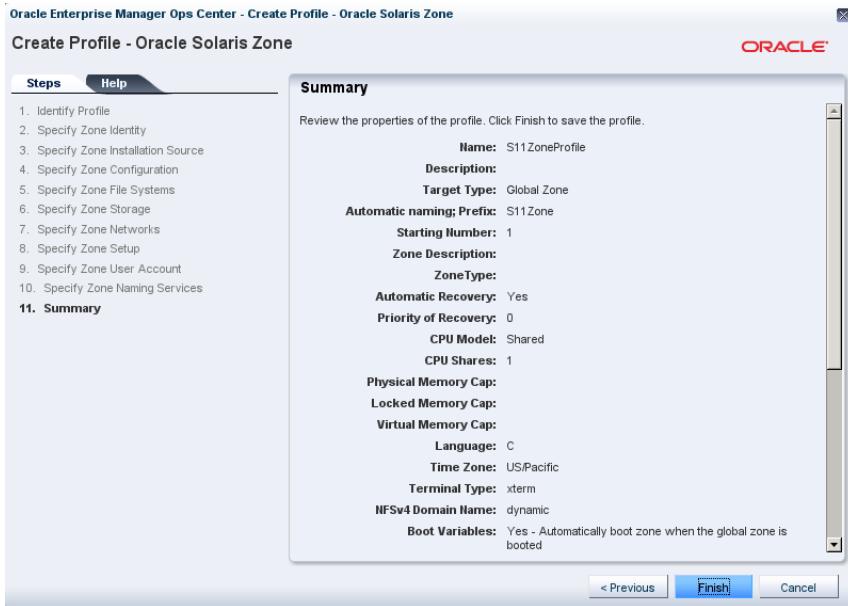
A zone user account is required in the case of Oracle Solaris 11. Enter the details of the account on the next screen. Click ‘Next’ to proceed.



Naming services to be used on the zones can be selected on this screen. In the example 'NONE' is selected; if DNS, NIS, etc., are selected, further configuration questions are asked. Click 'Next' to proceed.



A Summary screen is now shown. Click 'Finish' to proceed with creating the profile and the derived plan.



The created profile can now be seen in the expanded tree under ‘Navigation’->‘Plan Management’->‘Profiles and Policies’->‘Oracle Solaris Zone’, and note that a companion plan will have been created under ‘Navigation’->‘Deployment Plans’->‘Create Oracle Solaris Zone’.

Name	Description	Subtype	Target Type	Version	Last Modified
S10-zones	Solaris 10		Global Zone	1	05/15/2012 10:47
S11ZoneProfile	Solaris 11		Global Zone	1	05/22/2012 4:50

### Creating Oracle Solaris Zone based Virtual Machines in a Server Pool

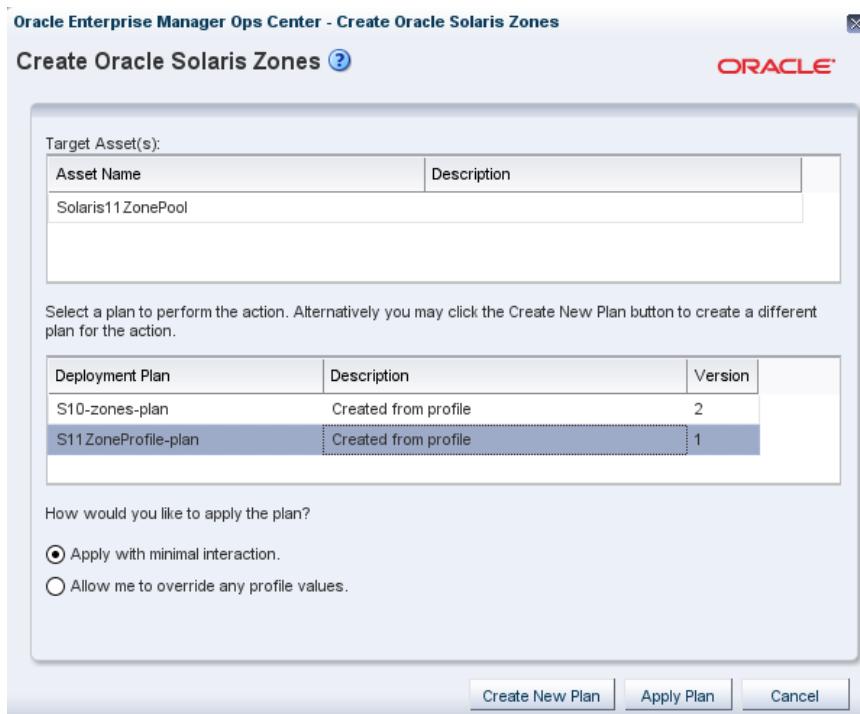
Now that a suitable pool has been created into which to deploy zone-based virtual machines, the creating of virtual machines in the zone can be easily accomplished.

From the ‘Navigation’ pane, select ‘Assets’-> sort by ‘Server Pools’, Select the Zone server pool into which a VM will be created. In the case of the example, ‘Solaris11ZonePool’ is chosen.

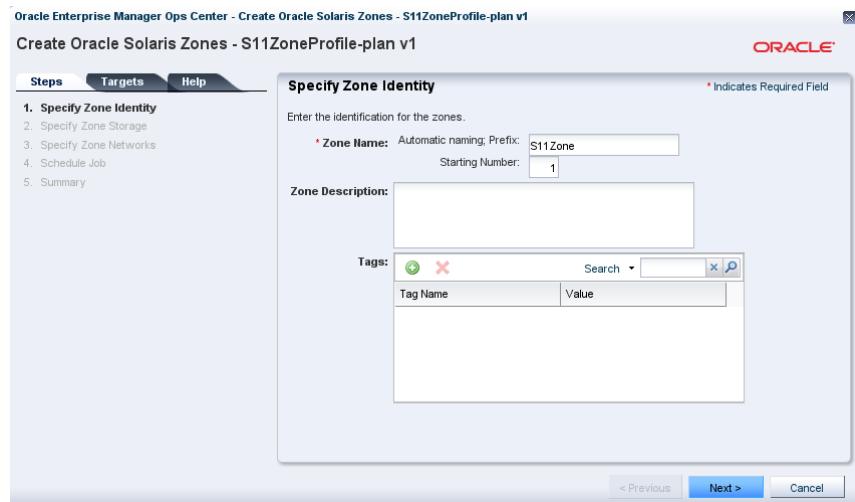
Now click ‘Create Oracle Solaris Zones’ in the ‘Actions’ pane.



A popup window appears to allow the choice of deployment plans to use when deploying the Zone image. If no additional plans have been created, only a short list of applicable plans are shown. Users can either click 'Apply Plan' after selecting one of the existing plans or click 'Create New Plan' to create a new plan. In the example, the previously created 'Solaris 11 ZoneProfile-plan' will be selected. Click 'Apply Plan' to proceed.



The Zone Identity can be changed from the defaults proposed by the selected plan. In the case of this example, the default zone naming scheme is accepted. Click 'Next' to proceed.



Zone Storage options can now be chosen. The presented settings are based on the defaults set in the deployment plan and should not need changing. Click 'Next' to proceed.



Network configurations for the Zone can be modified, if necessary, from the plan defaults. Variants of the plan can also be created as needed that specify if more than one zone should be created when deploying zones using this plan.

If only a single zone is to be created, only a single IP address is required in the 'IP Range' box.

It is required to specify multiple IP addresses if multiple Zones are being created. These can be supplied in the form of:

- A range of IP addresses that can be used for each of the zones that will be created using this plan, but if multiple Zones are to be created in this pool, a suitable range

of IP addresses must be specified, using the format ‘10.196.52.220-10.196.52.230’ to specify an 11 address range.

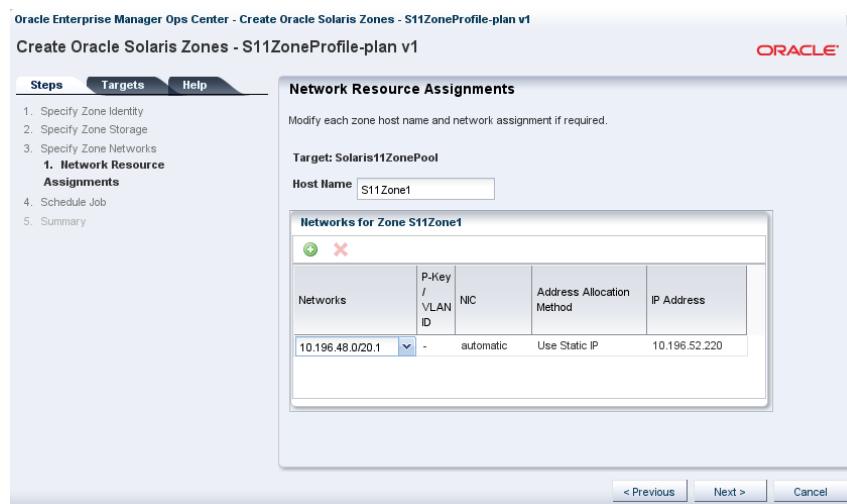
- A simple comma separated list of IP addresses can also be specified.

The example shows a single IP address has been specified as only a single Zone will be created by the default plan.

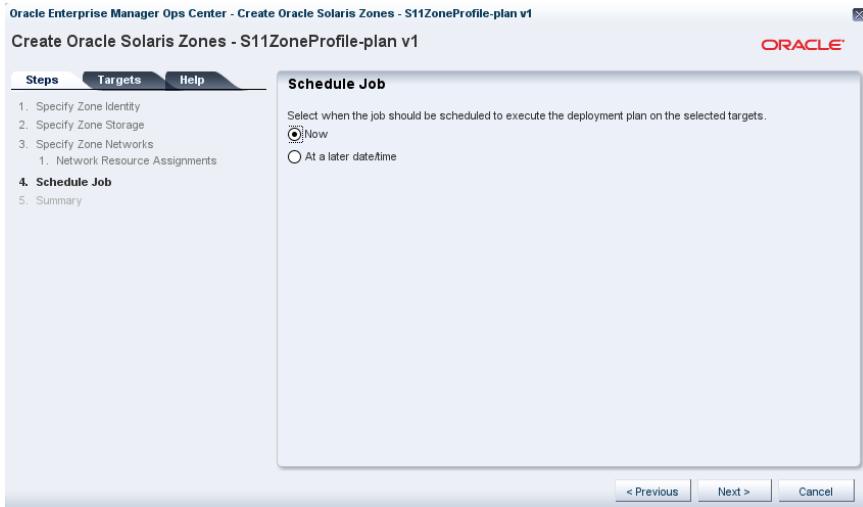
Click ‘Next’ to proceed.



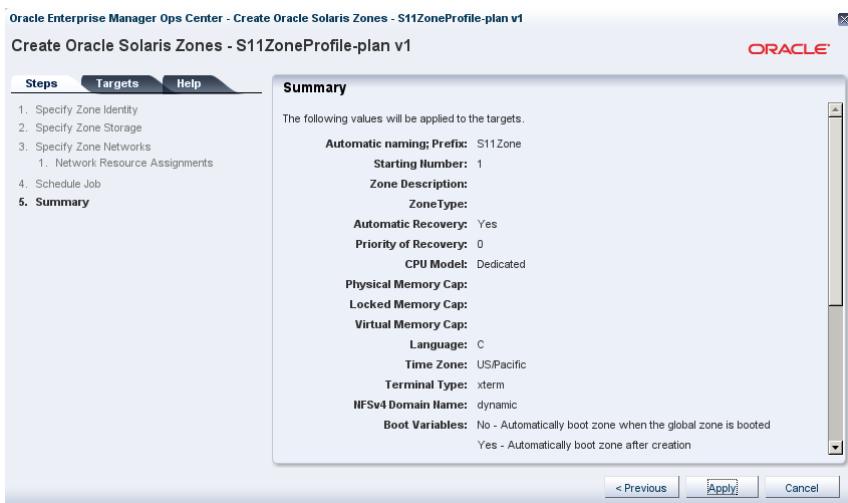
Next, any specific network resource assignments can be identified, such as VLAN configurations, specific NIC ports, etc. The defaults are accepted in the example. Click ‘Next’ to proceed.



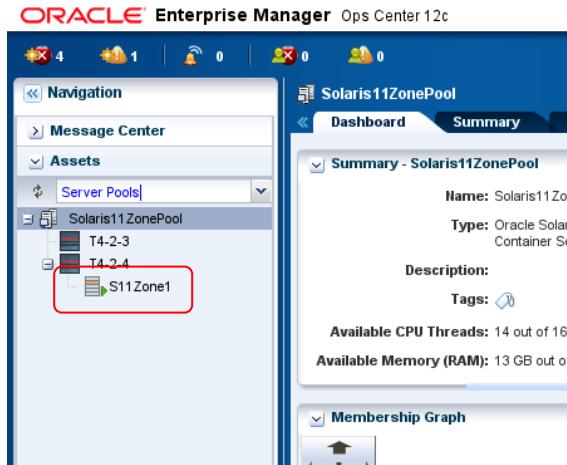
The Zone Creation job can now be scheduled. ‘Now’ is accepted. Another choice is to schedule the zone to be created at some time in the future based on a calendar and time. Click ‘Next’ to proceed.



A Summary page is now shown and the Zone creation task can be submitted by clicking the 'Apply' button.



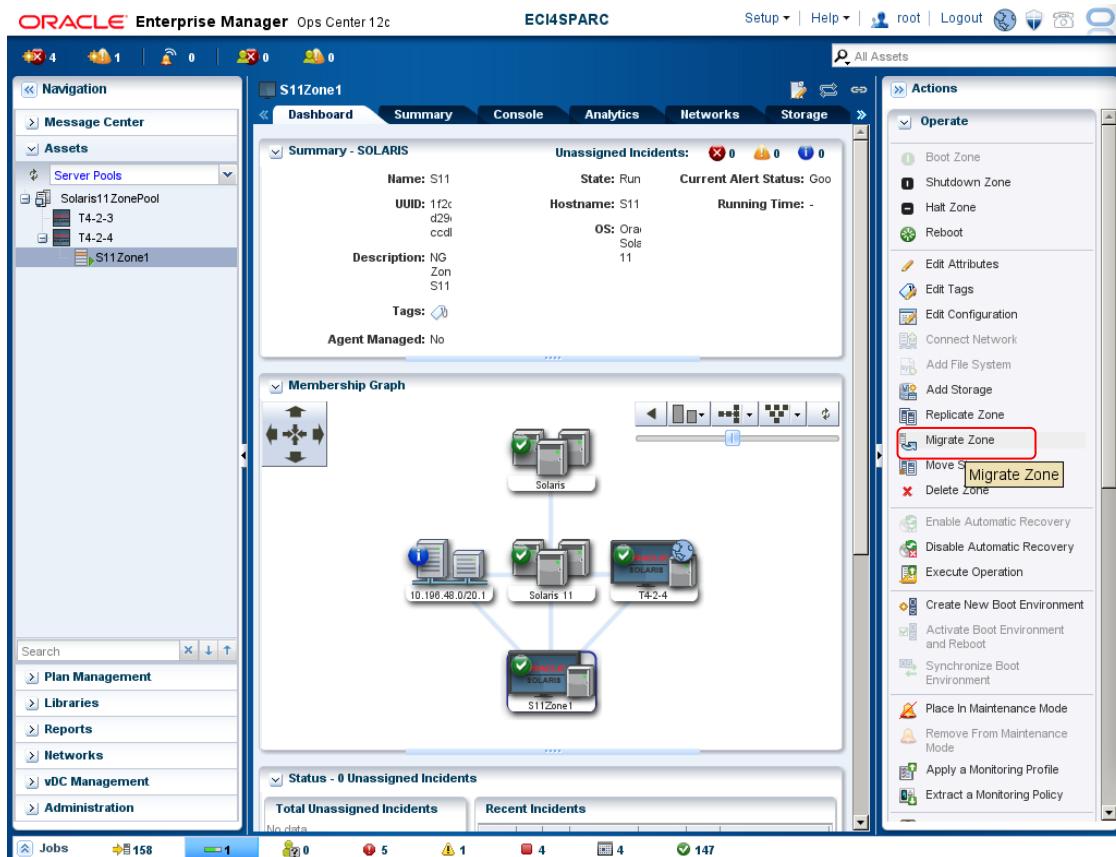
Once the Zone deployment task completes, the Zone is visible in the 'Navigation' pane->'Assets'->'Server Pools'->'Solaris11ZonePool' tree beneath one of the members of the Zone Pool.



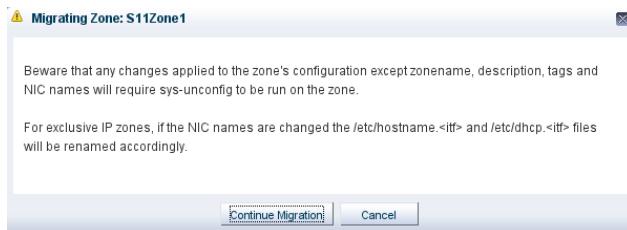
### Zone Migration Between Zone Pool Member Servers

Once Zones have been created, it is possible to automatically or manually migrate zones between members of the pool. If automatic migration has been specified in the zone creation policy, this will happen as required.

If manual zone migration is required, it can be carried out by selecting the zone to be migrated from the list of zones in the pool. From the Oracle Enterprise Manager Ops Center 12 home screen, by selecting in the 'Navigation' Pane ->'Assets'->'Server Pools'->'Solaris11ZonePool', select the zone to migrate. In this example, 'S11Zone1' is chosen. Click 'Migrate Zone' in the 'Actions' pane.



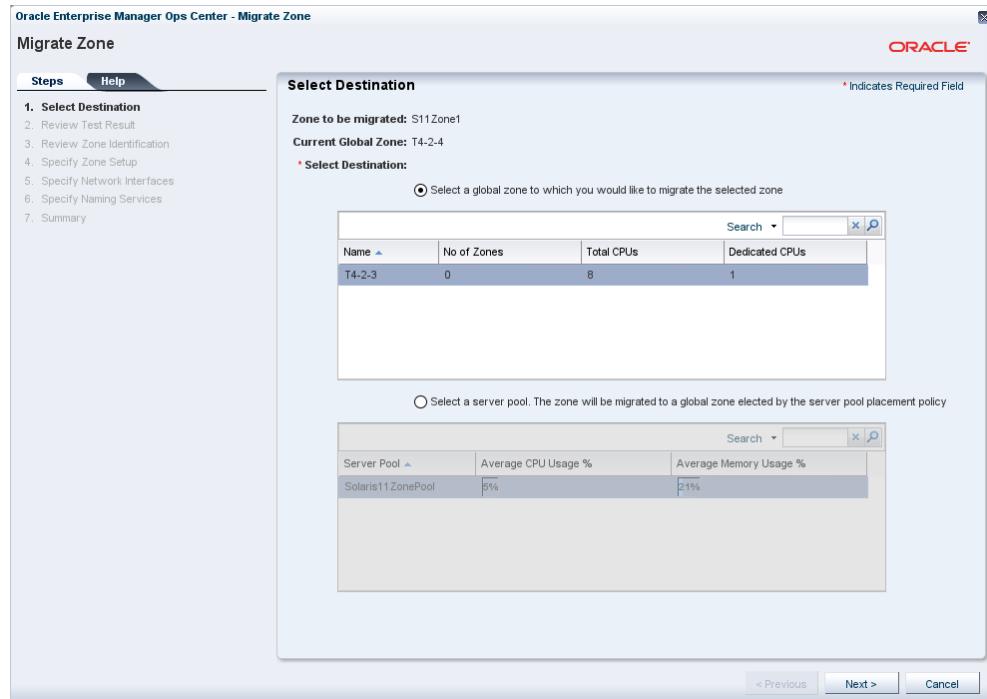
A ‘Caution’ popup menu is presented asking for confirmation of the migration process and pointing out that some changes that can be carried out on the zone during the migration may cause it to need reconfiguring. In the example, the warning is accepted. Click ‘Continue Migration’.



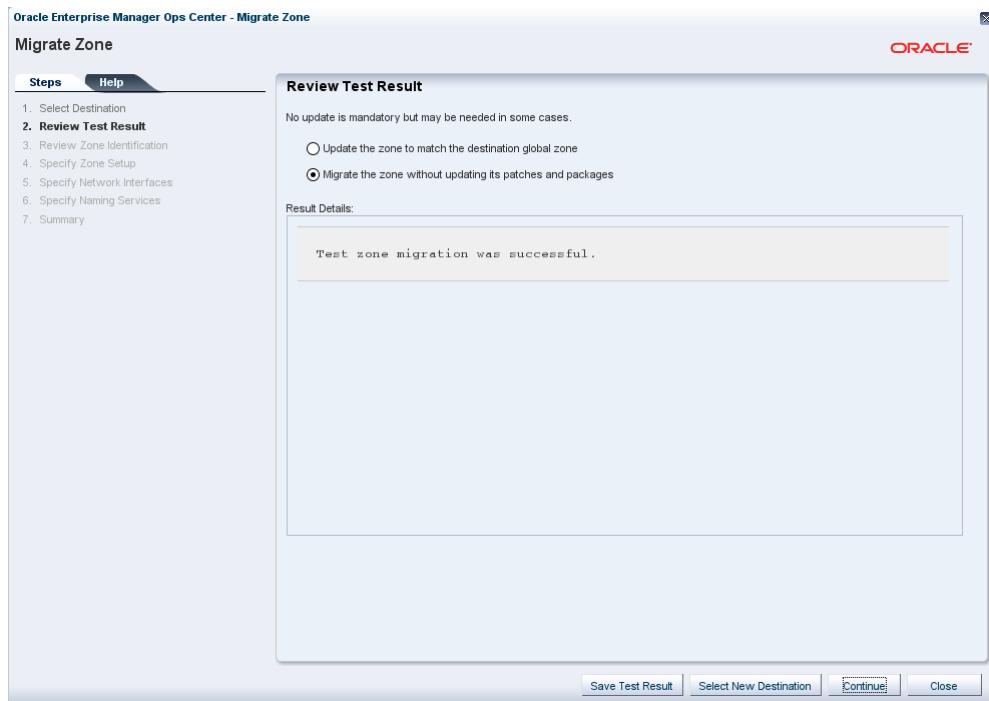
Once accepted, the destination server in the pool can be chosen. A list of other pool members is presented, and one of two policies is made available. Users can elect to simply select a destination server from the pool member list, or can allow Oracle Enterprise Manager Ops Center 12 to choose another server from the pool based on the server pool placement policy that was set up as part of the configuration of the pool.

In the example, a user-selected server is chosen and since the example pool only contains two servers, only the ‘other’ server in the pool is listed as an option for the destination server. In this case ‘T4-2-3’, since the zone is currently located on server ‘T4-2-4’.

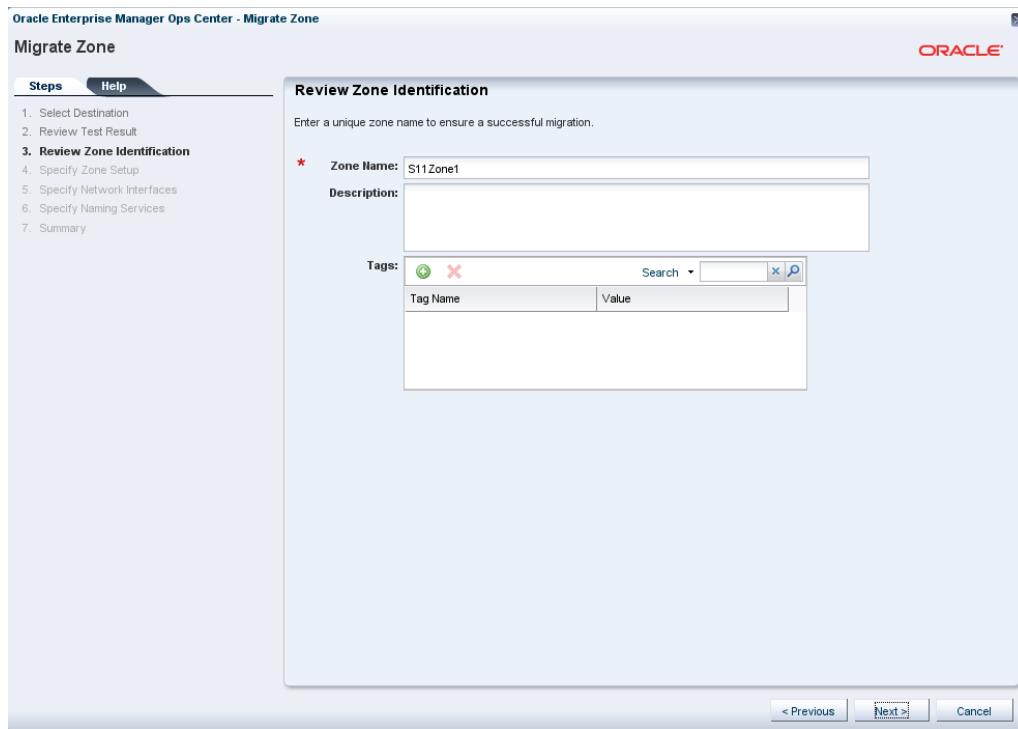
Click 'Next' to continue.



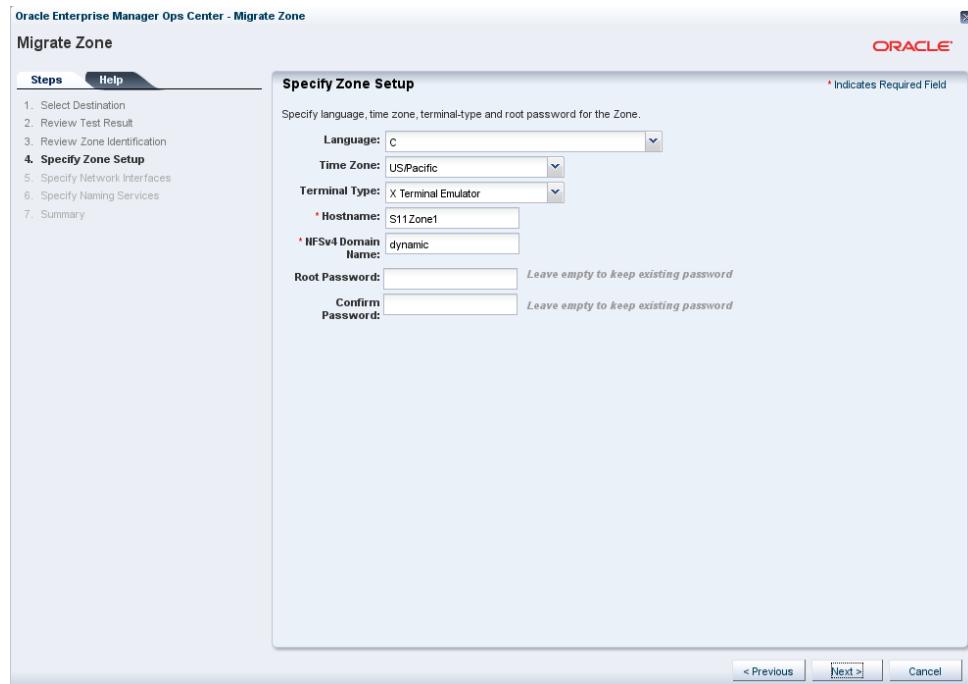
A preliminary test is carried out to see if the migration is successful and the result displayed. The user is asked to select whether to update and patch the zone to match the destination server patch levels. In the example case, no patching or updating is required since the pool servers are all installed to the same patch level. Click 'Continue' to proceed.



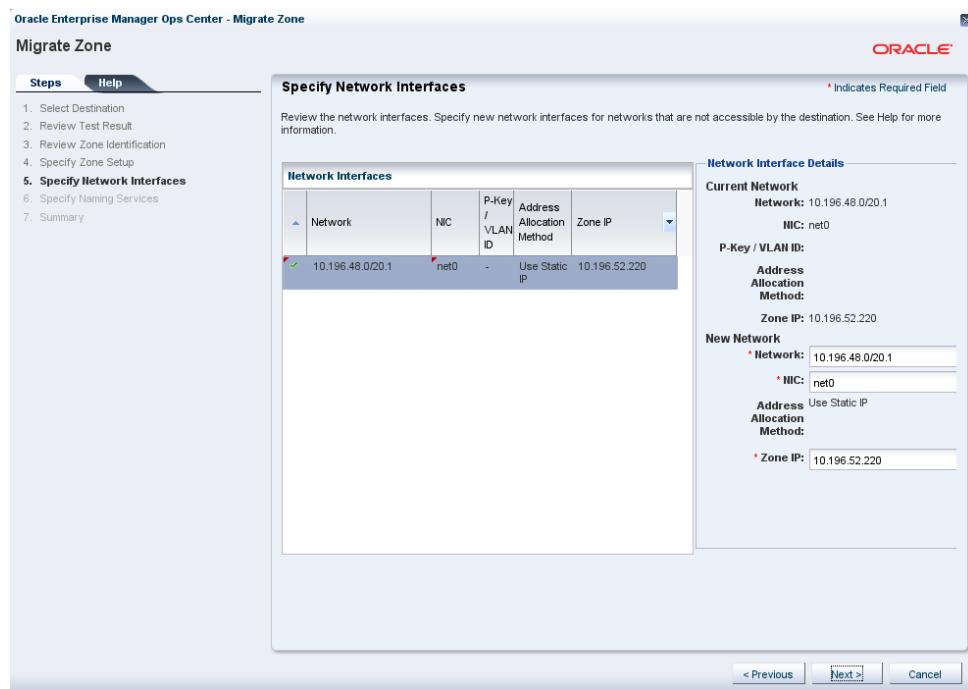
Zone identification options are presented for review, but bear in mind the caution issued at the start of the process. No or minimal changes should be made. In the example, no changes are made, then the 'Next' button is clicked to proceed.



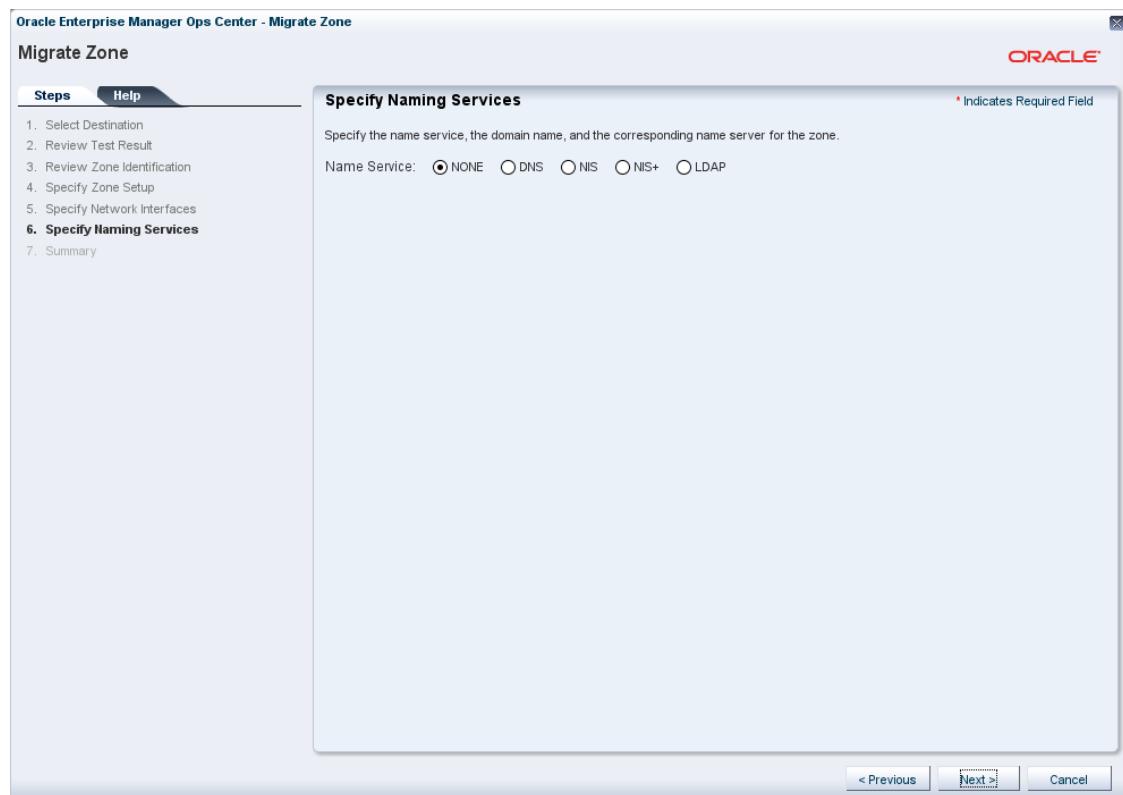
Next, changes to the Zone Setup can be made. No changes should be made to avoid the need to reconfigure the zone on the destination machine. Click ‘Next’ to proceed.



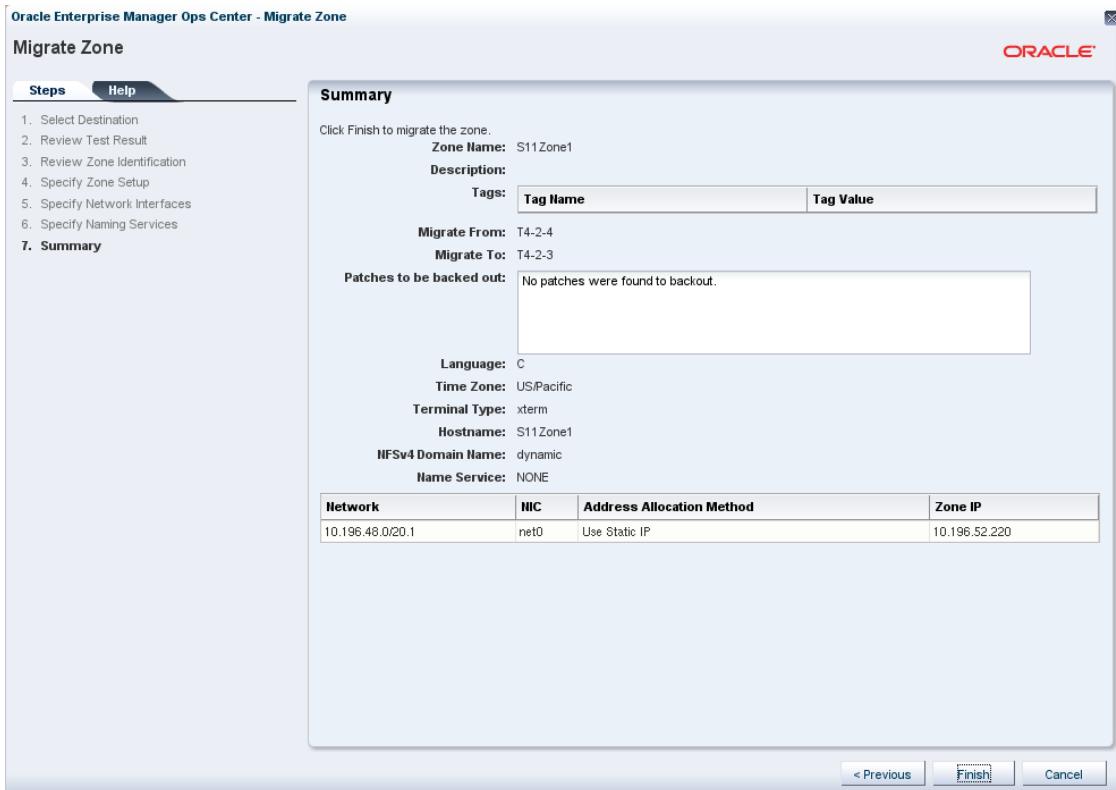
Network specification can be modified on the next screen. Again, no changes should be made to avoid the need for a zone reconfiguration. Click ‘Next’ to proceed.



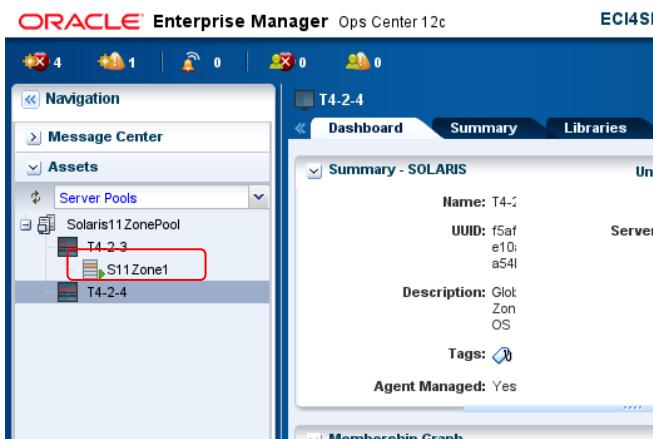
Naming service options could be changed, but again, no changes should be made. Click ‘Next’ to proceed.



A Summary screen is displayed. Click ‘Finish’ to proceed.



Once 'Finish' is selected, the zone migration task is started. The zone is locked and cannot be modified until the migration is complete. Once complete, the zone will be visible under the selected destination member of the pool.



## Virtual Data Center (vDC) Feature Implementation

In order to implement vDCs, it is necessary to satisfy some configuration prerequisites.

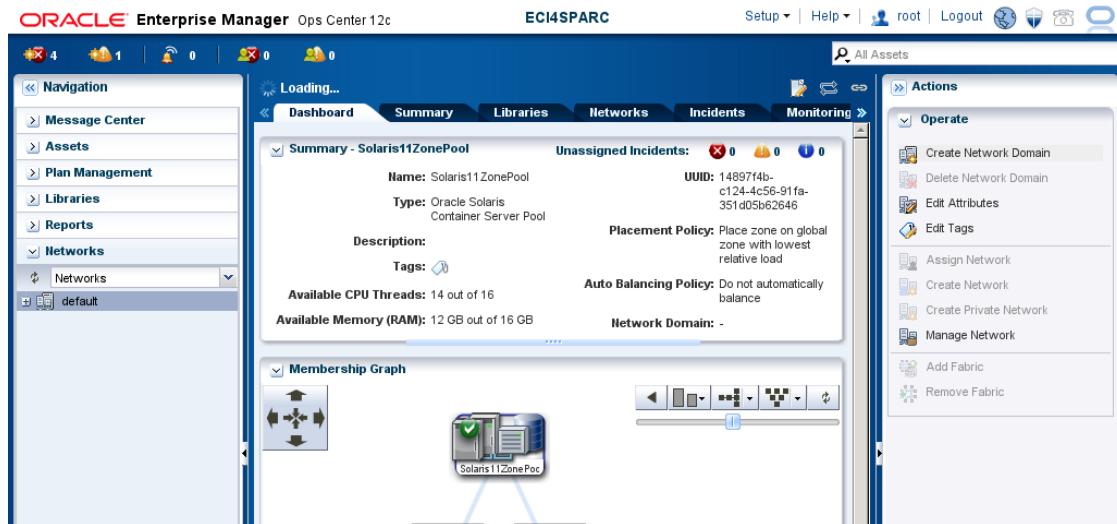
- A network must be designated for the vDC environment

- Storage for vDC server images must be placed on NAS environments
- A suitable authentication method must be determined to allow authentication of vDC users

### Setting Up a Suitable vDC Network Domain

One or more vDC Network Domains are needed to allow the vDC servers to securely communicate on either public or private networks, or both, once configured.

To set up a network domain, use the ‘Navigation’ pane, select ‘Networks’, and from the ‘Action’ pane select ‘Create Network Domain’.



Choose a name for the domain to be created. The example uses ‘vDCDomain’. Click ‘Next’ to continue.

**Oracle Enterprise Manager Ops Center - Create Network Domain**

**Create Network Domain**

**Identify Network Domain**

Specify the name, description, tags, physical fabric, and maximum number of networks for the network domain. Ops Center will automatically assign P-keys/VLAN IDs for the selected physical fabric.

\* Indicates Required Field

**Domain Name:** vDCDomain

**Description:**

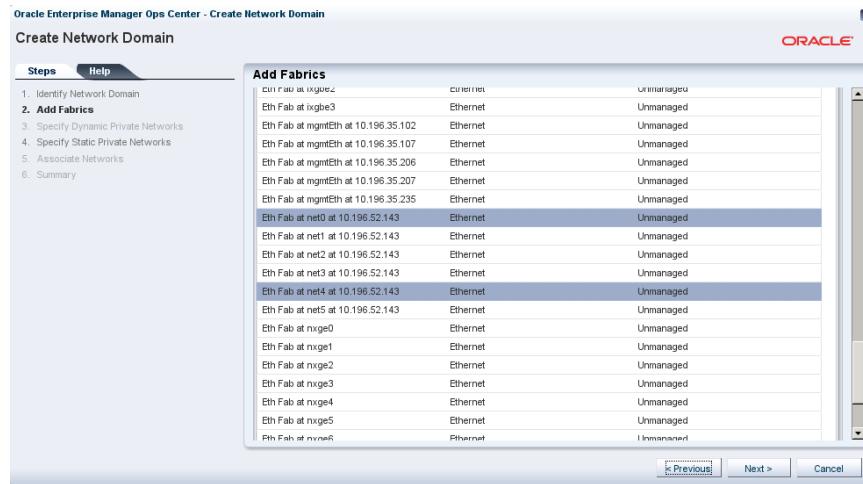
**Tags:**

< Previous    Next >    Cancel

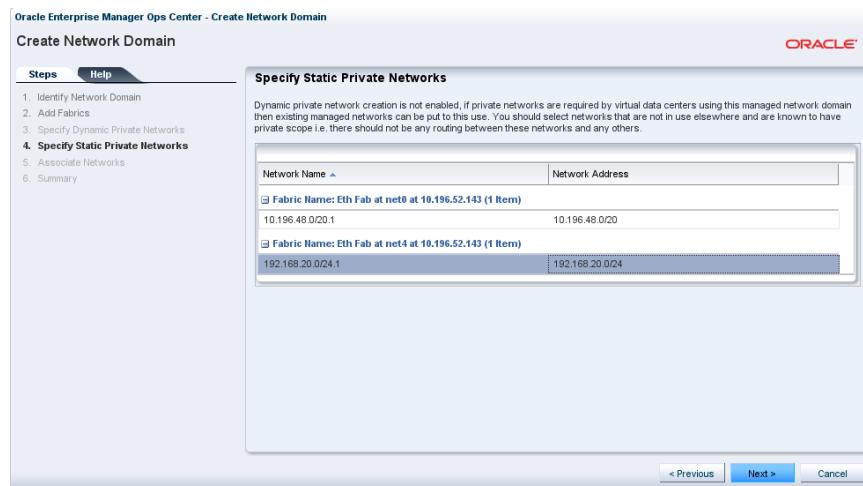
On the ‘Add Fabrics’ screen, choose which networks in the physical datacenter the virtual datacenter will be able to communicate with. This defines both the public network domain of the vDC

configuration, and if required, any private network domain used in the vDC. Multiple networks can be configured if required. In a later screen, private networks visible only to the vDC clients can be chosen from the available fabrics. These will rely on having a fully managed network environment and will use VLANs to separate traffic appropriately. To maintain proper security, the private network should not be routable to the public networks, or to other private networks.

In the example, two fabrics are selected. The associated physical datacenter domain is visible when the mouse is floated over the displayed fabric names.



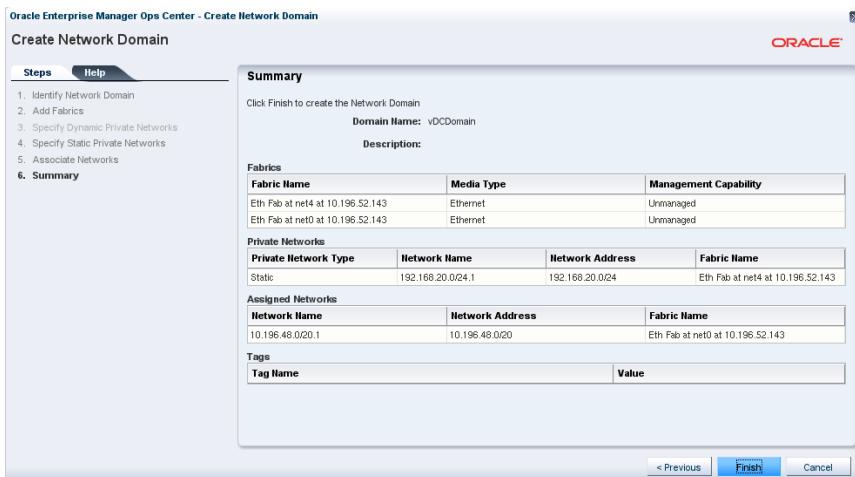
Specify which of the chosen fabrics is to be used only as a private network in the vDC, if required. Select a fabric to configure it as a private network. Click 'Next' to continue.



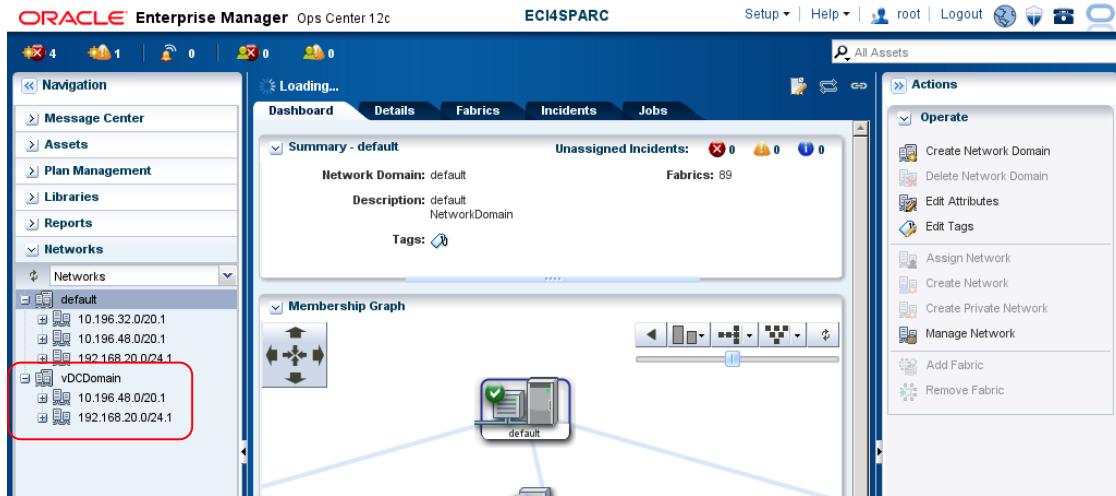
Any remaining network fabrics can now be selected for use as public networks and used to connect to the physical datacenter. Select the public networks and click 'Next' to continue.



Select 'Finish' to complete creating network domains.



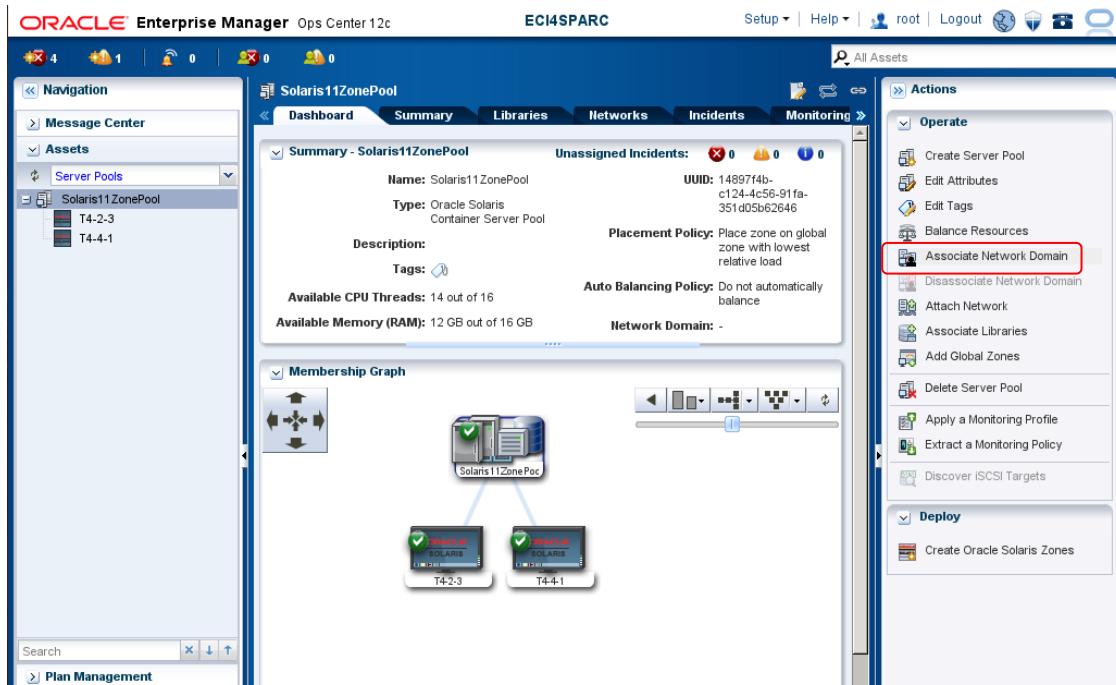
The newly created network domains are now visible in the 'Navigation' pane under the 'Networks' tab.



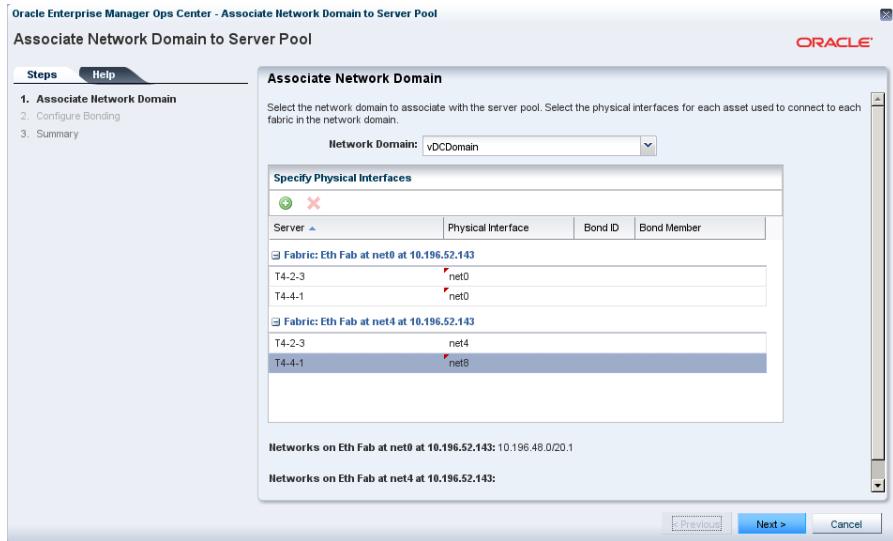
### Associate the vDC Network Domain with the vDC Server Pool

The newly created network domain must now be associated with the Zone server pool that will be used to supply resources to the vDC that will be created.

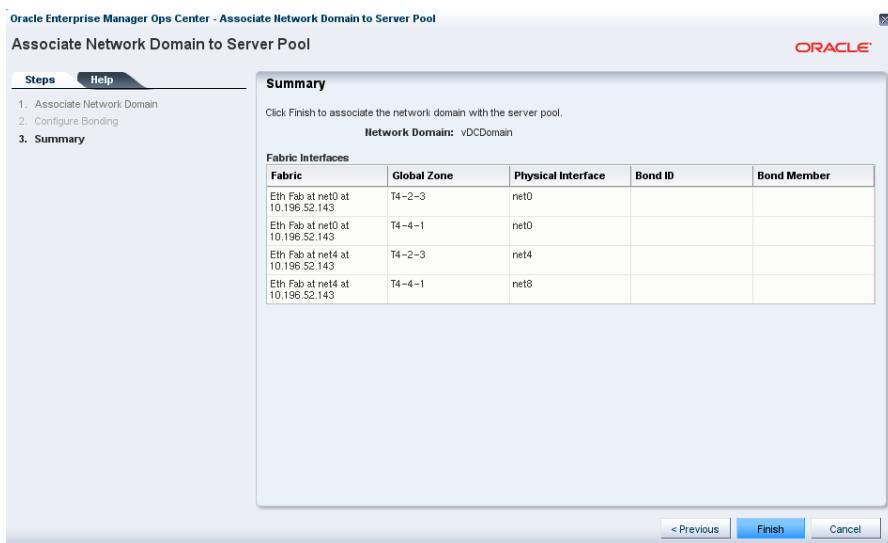
From the ‘Navigation’ pane, select ‘Assets’ -> ‘Server pools’ and select the Zone pool that will be used for vDC resources. In the ‘Actions’ pane, select ‘Associate Network Domain’.



Associate the network domains with the appropriate physical network ports on the servers in the pool, then click ‘Next’.



Click 'Finish' on the Summary page to complete the association.

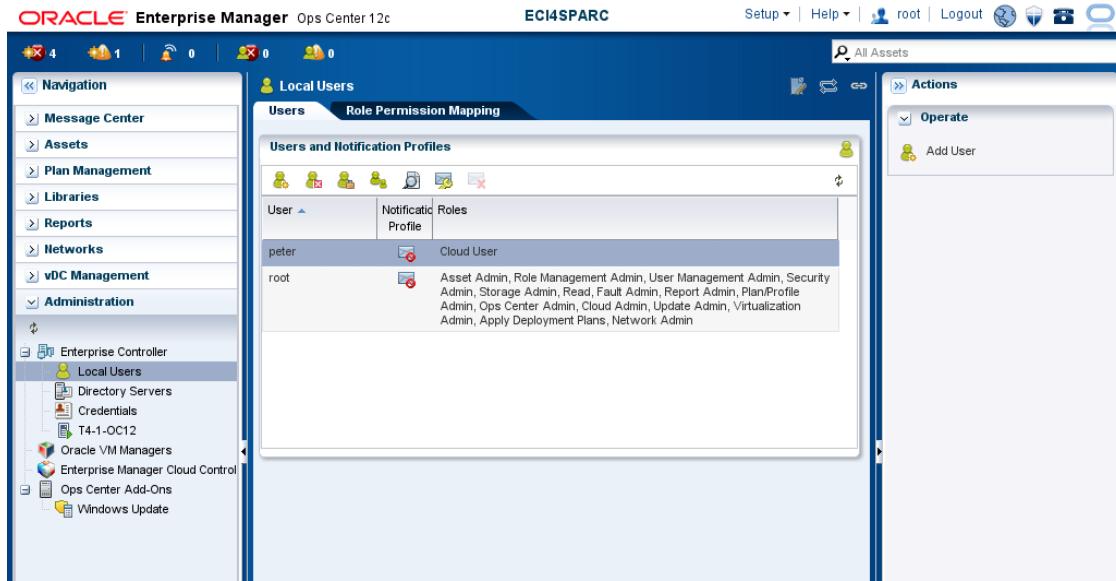


### Create a Suitable vDC User

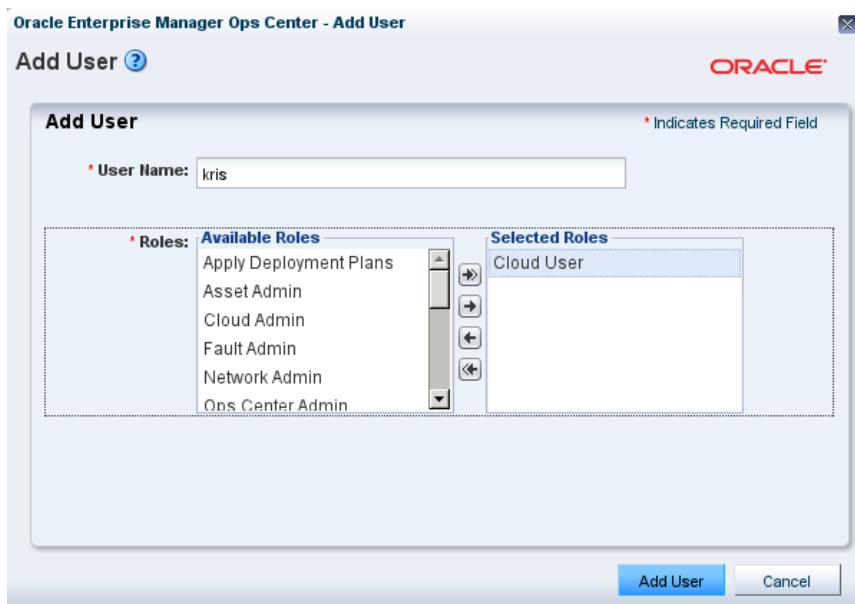
An authenticated user must be created or an existing user be augmented with 'Cloud User' roles and permissions in order to be able to create and modify resources within a vDC environment.

As the Oracle Enterprise Manager Ops Center 12 administrator, select the 'Administration' tab in the 'Navigation' pane. Depending on the user authentication process adopted for the Oracle Enterprise Manager Ops Center 12 server, select an appropriate user from the authentication methods listed under 'Enterprise Controller'.

In the case of this example, only 'Local Users' are configured; select 'Local Users'.



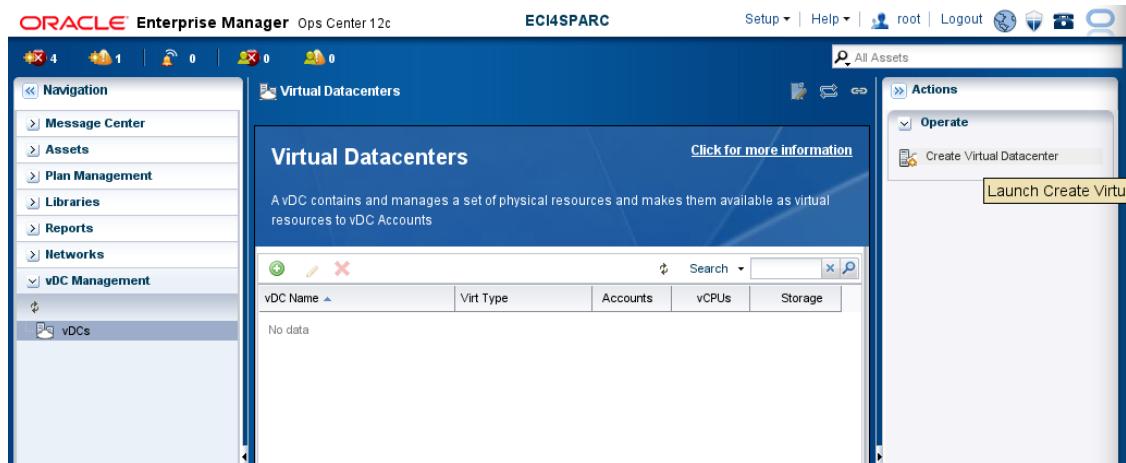
In the ‘Actions’ pane, click the ‘Add User’ icon to add a user.



Enter the user name (of an existing Oracle Enterprise Manager Ops Center 12 system account) that will have the added role of ‘Cloud User’ given to it. Select the ‘Cloud User’ role in the ‘Available Role’ column and transfer it to the user’s ‘Selected Roles’ column by clicking the right arrow key. Click ‘Add User’ to complete the addition of the user and role.

## Creating the vDC

From the ‘Navigation’ pane, click the ‘vDC Management’ tab. Then in the ‘Action’ tab, click ‘Create Virtual Datacenter’.

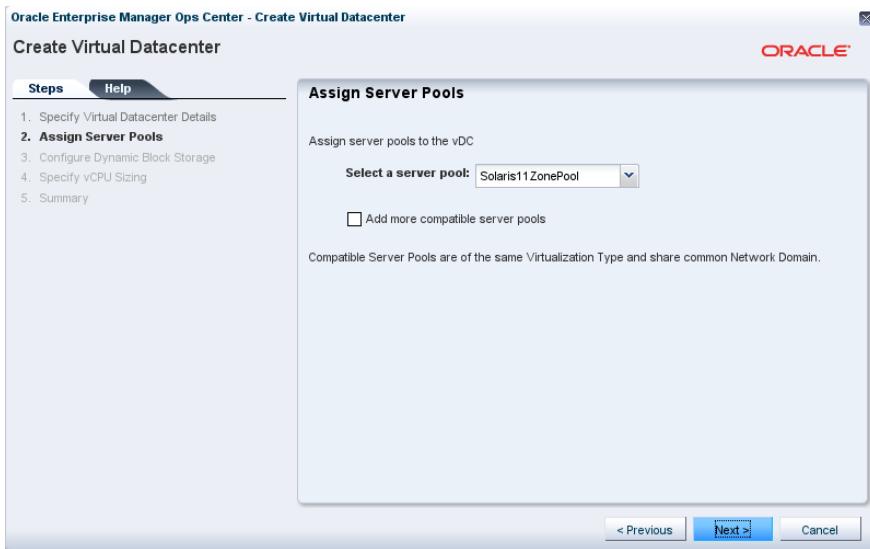


Choose a name for the vDC, then click ‘Next’.

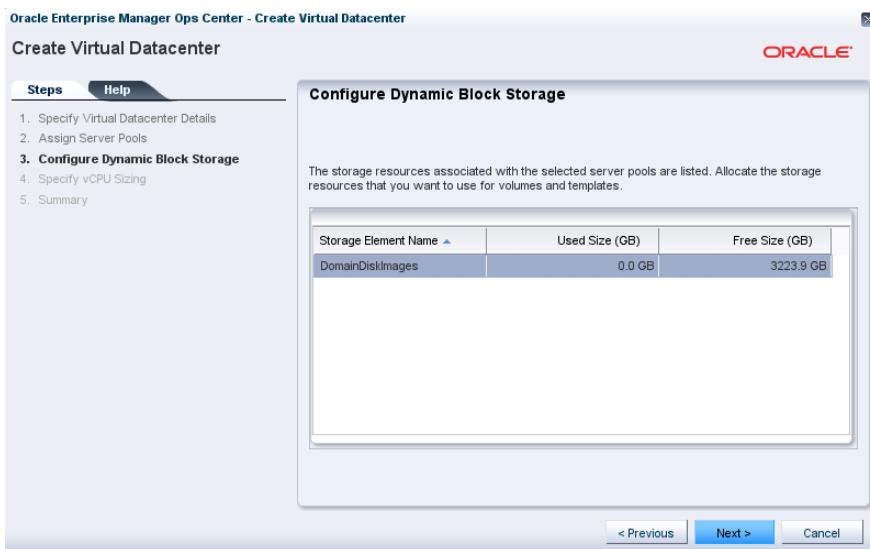
<b>vDC Name:</b>	vDCDemo
<b>Description:</b>	(empty)
<b>Tags:</b>	(empty)

< Previous      Next >      Cancel

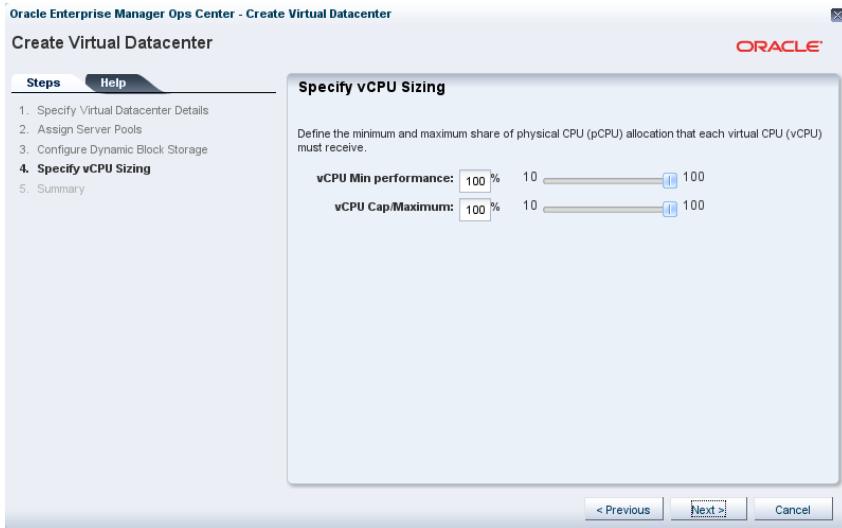
Choose the server pool that will be used for the resources required for the vDC. Click ‘Next’ to continue.



Select the NFS storage to use for the vDC server images. Click ‘Next’ to continue.



Select the vCPU share limitations that will be applied to the virtual CPUs. Click ‘Next’ to continue.



Click 'Finish' to complete creating the vDC.

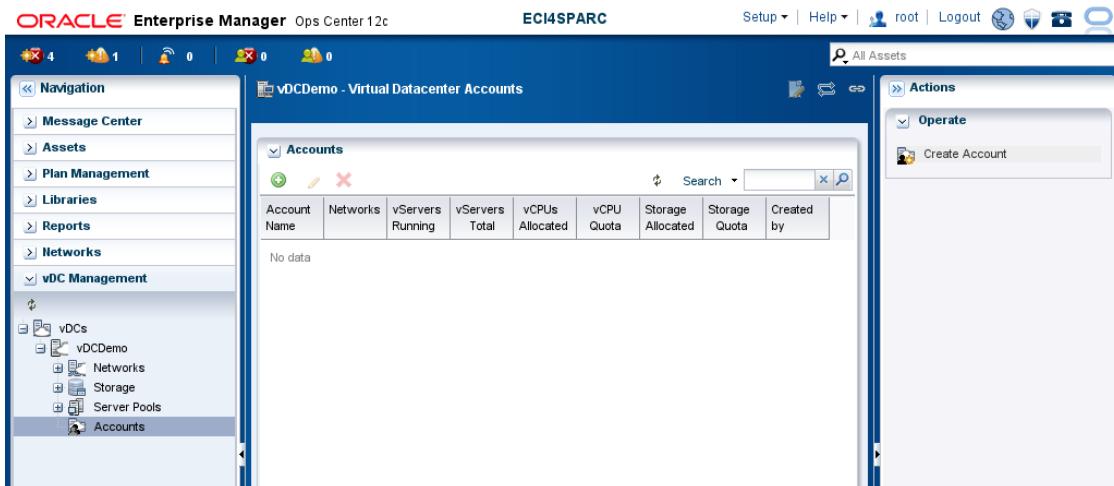


The vDC is now created and vDC users can now be created and empowered with self-provisioning capabilities.



### Creating vDC User Accounts

From the ‘Navigation’ pane, click ‘vDC Management’, select the vDC name that was created, and expand the item in the tree. Select the ‘Accounts’ item. In the ‘Actions’ pane, click ‘Create Account’.



Select a name for the user and click ‘Next’ to continue.

Oracle Enterprise Manager Ops Center - Create Account

Create Account

Steps Help

1. Specify Account Details  
2. Specify Account Resource Limits  
3. Assign Users  
4. Summary

**Specify Account Details**

Name: vDCDemo-Admin \* Indicates Required Field

Description:

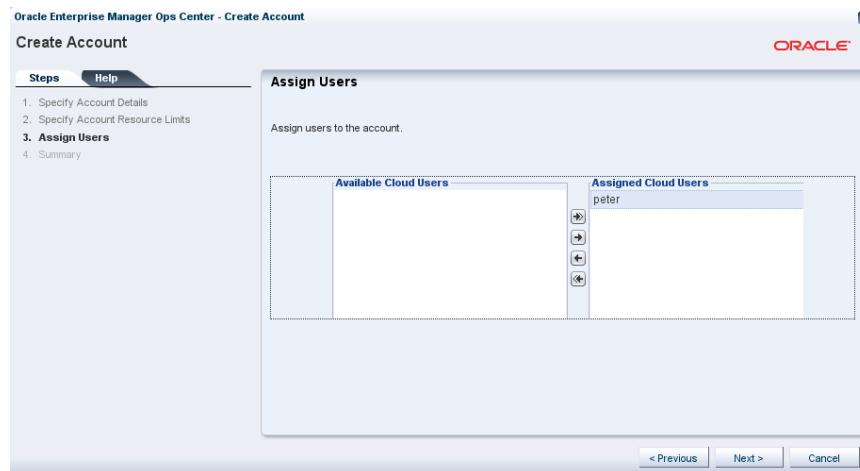
Tags:

< Previous Next > Cancel

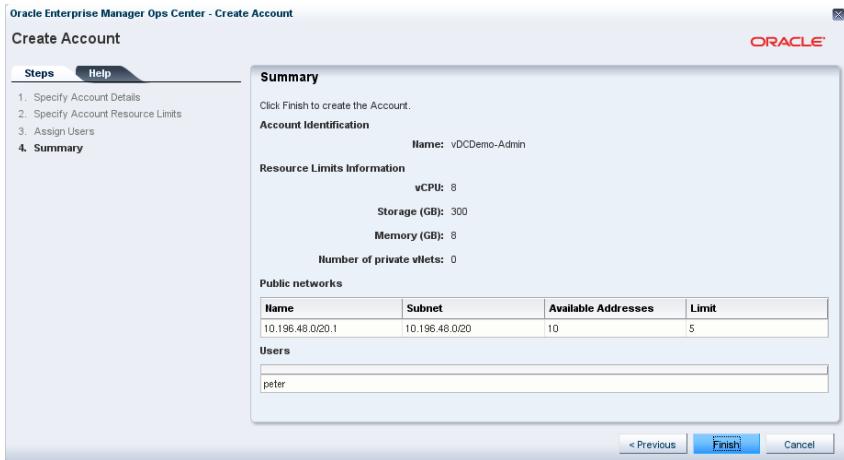
Specify the resource limits that are to be applied to the account user, limiting the amount of resources that can be used from those available in the pool. In the case of the example, 8 threads are available to this user, from a total of 16 in the pool. Similarly, 8 GB of RAM are available from a possible 16 GB, 300 GB of disk space can be used, and up to 5 IP addresses can be allocated in the public network from a pool of 10 available.



From the available list of users who have the ‘Cloud User’ role enabled in their profiles, select one or more to be able to allocate vDC server instances and use resources in this vDC. Select the user in the ‘Available Cloud User’ column, and click the right arrow icon to add it to the ‘Assigned Cloud User’ column. Click ‘Next’ to continue.



Click ‘Finish’ to complete the user setup for the vDC.



The vDC and the assigned user can now be seen in the vDC management tab.

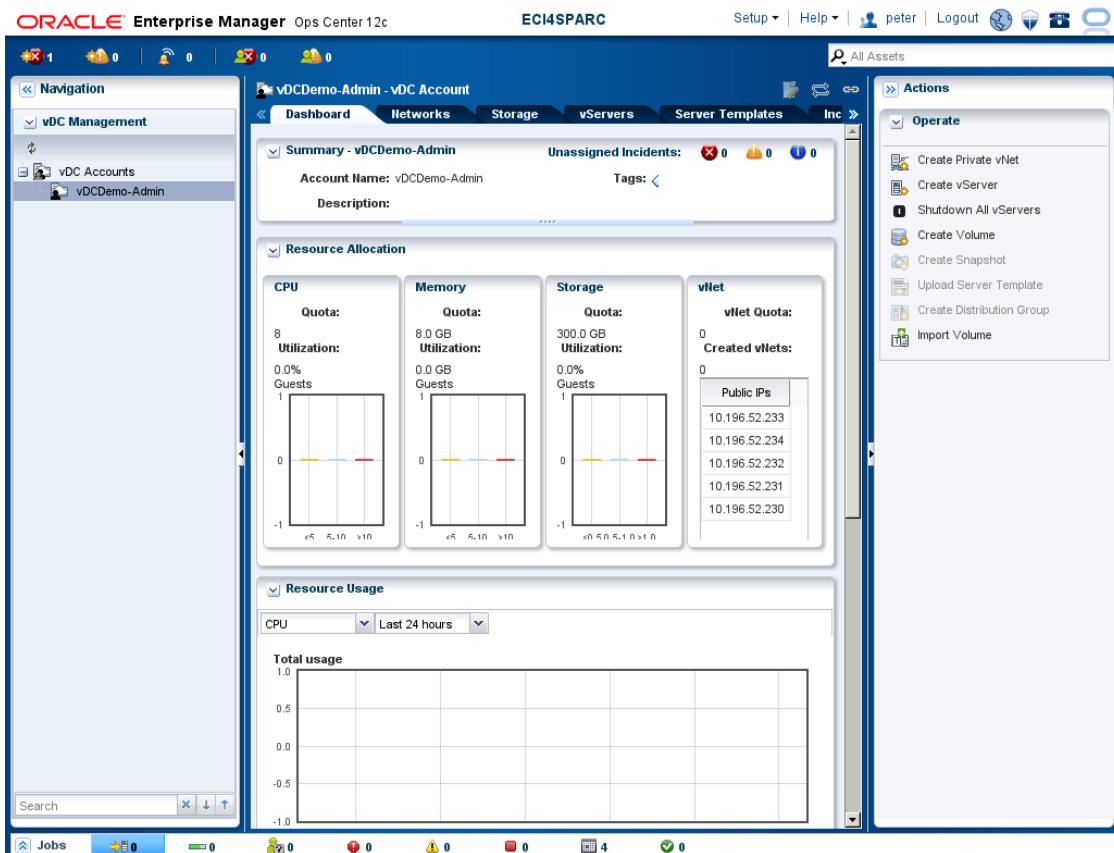
Account Name	Networks	vServers Running	vServers Total	vCPUs Allocated	vCPU Quota	Storage Allocated	Storage Quota	Created by
vDCDemo-	1	0	0	0	8	0.0 GB	300.0 GB	root

### Using the vDC

Log into the home page of the Oracle Enterprise Manager Ops Center 12 server using the vDC username and password rather than the Oracle Enterprise Manager Ops Center 12 administrator account.

The screenshot shows the Oracle Enterprise Manager Ops Center 12c interface. At the top left, the Oracle logo and the text "Enterprise Manager" and "Ops Center 12c" are displayed. On the right side, there is a "Login to Oracle Enterprise Manager Ops Center ECI4SPARC" window. It contains fields for "User Name" (peter), "Password" (redacted), and "Source" (Ops Center local). A "Log In" button is at the bottom of the window. Below the login window, there are three main sections: "Enterprise Manager Ops Center Key Features" (listing increased levels of observability, converged infrastructure as a service, and support for Oracle Linux Unbreakable Linux), "New In This Release" (listing enhanced management of existing virtualization environments, more complete management of Oracle Solaris Zones, and support for Oracle VM Server for SPARC), and "Did You Know?" (listing connecting Enterprise Manager Cloud Control and Ops Center will improve datacenter efficiencies and leveraging new OS thread level smart mapping to Oracle applications). A small note at the bottom left of the page states: "Copyright (c) 2007, 2012 Oracle and/or its affiliates. All rights reserved. Oracle is a registered trademark of Oracle Corporation and/or its affiliates. Other names may be trademarks of their respective owners." The page has a blue gradient background.

This presents only the vDC account capabilities to the vDC admin user.



Select the vDC user account in the ‘Navigation’ pane, and then from the ‘Action’ pane, click ‘Create vServer’.

**Oracle Enterprise Manager Ops Center - Create vServer**

**Create vServer**

**Steps Help**

**1. vServer Details**

1. vServer Template Selection
2. vServer Type Selection
3. vNet Selection
4. Assign IP Address
5. vServer Access Control
6. vServer Access Control
7. Summary

**vServer Details** \* Indicates Required Field

\* vServer Name:  Description:

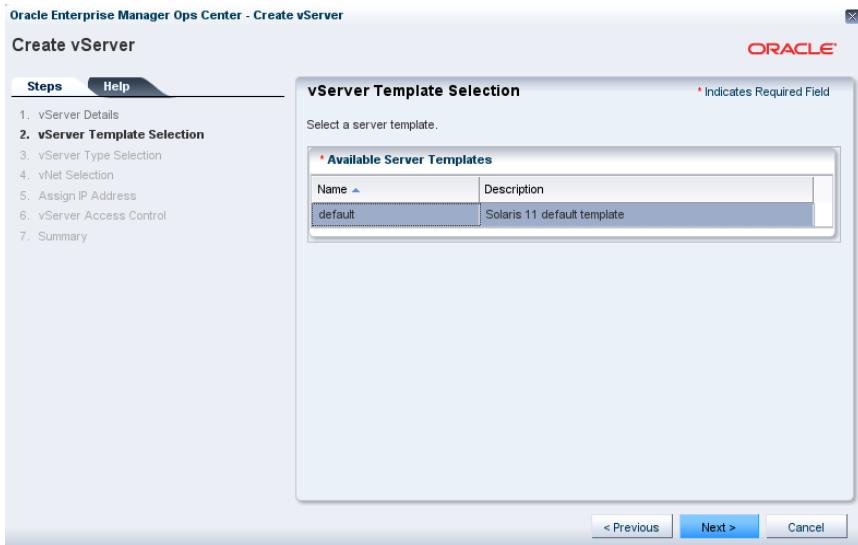
Tags:   Search

Tag Name	Value
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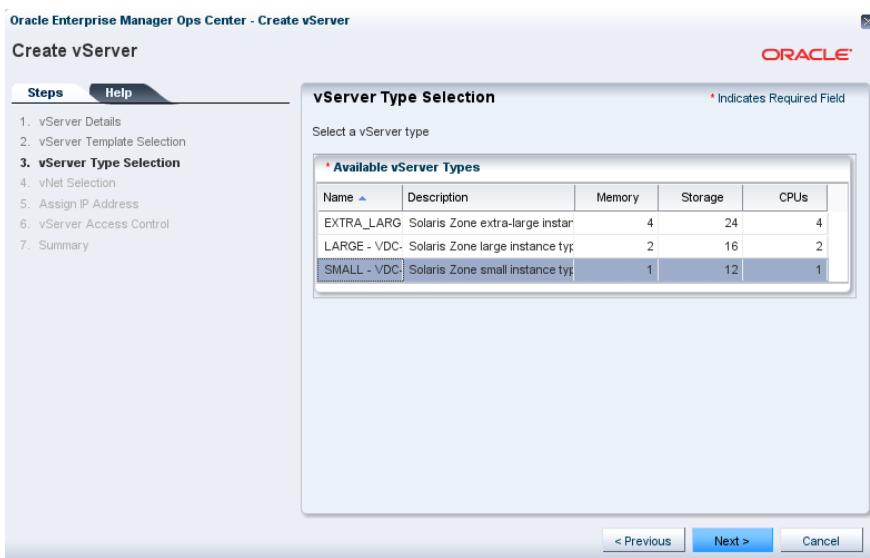
\* Number of vServers:  Support:  High Availability Support

< Previous Next > Cancel

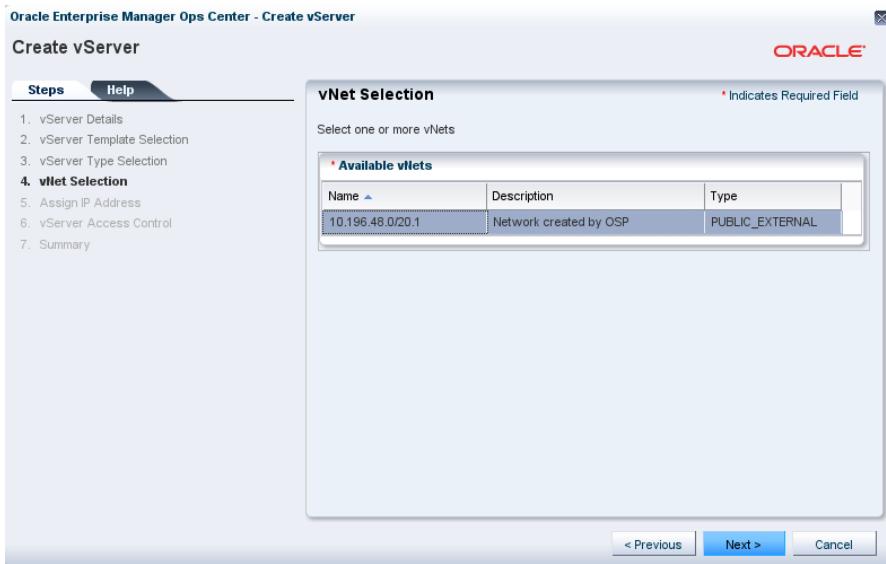
Choose the OS template to use for the vServer being created.



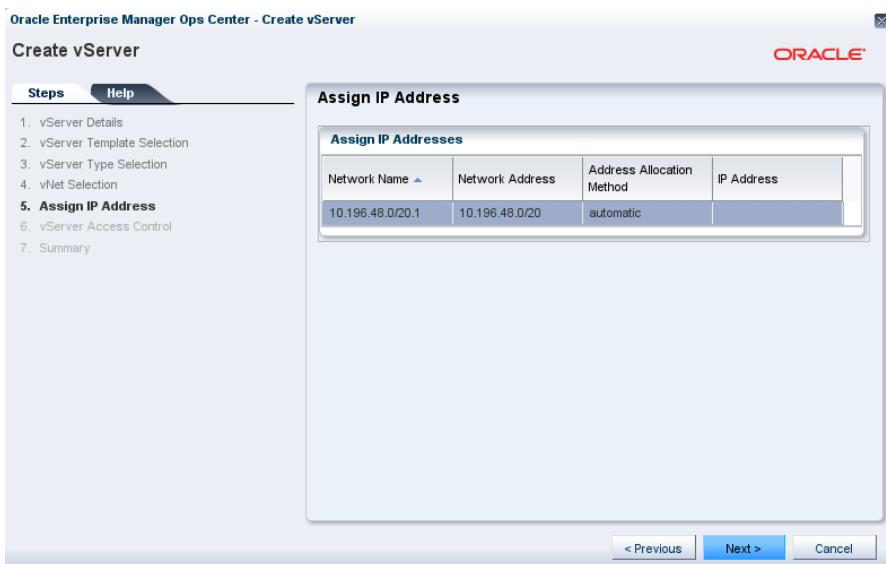
Select the vServer type to apply.



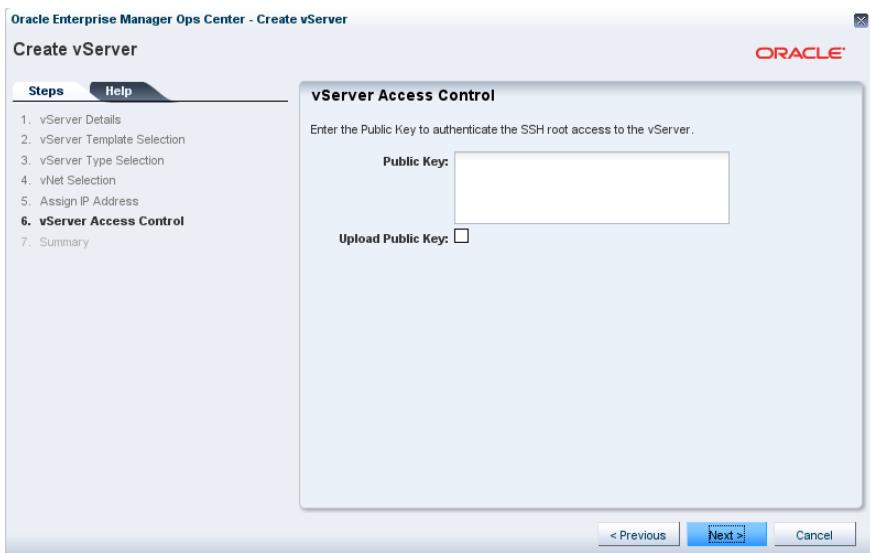
Select the vNet to use. Click 'Next' to continue.



Select IP addresses from the pool or allow default automatic allocation from the pool.



Select any access control keys that can be applied, or select ‘Next’ to continue.



Accept the ‘Summary’ page and click ‘Finish’ to complete the vServer configuration.



The vServer creation task is now started and will complete the vServer installation.

## Oracle VM Server for SPARC Domain Pools

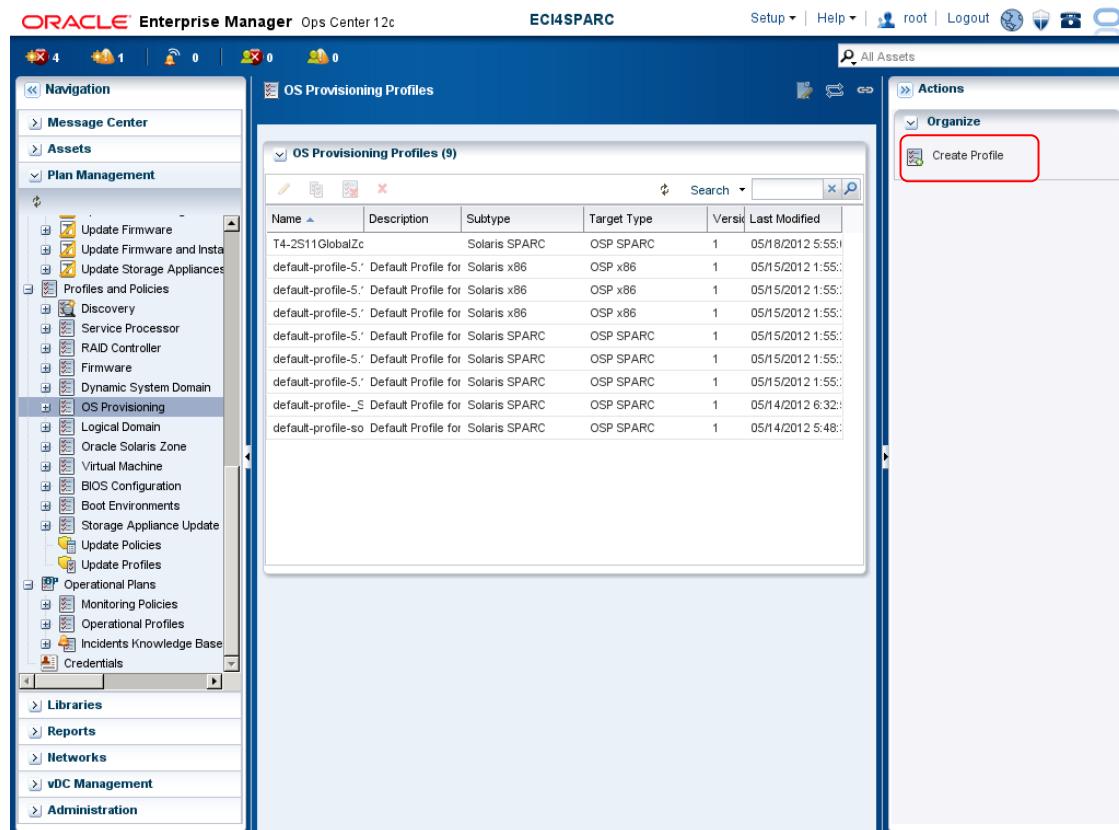
Oracle VM Server for SPARC (previously called Sun Logical Domains) provides virtual machine instances that are more isolated from each other and have very few dependencies on a ‘primary’ domain other than being provided with virtual IO devices, such as network and disk from it. In this respect, domains can be considered more isolated from each other than Zones and also do not share resources such as CPUs or memory with other domains. The CPU or memory allocated to a domain is entirely owned by the domain.

As a result, the granularity of a system virtualized using domains tends to be larger and domains tend to be used for ‘larger’, more heavyweight virtualized environments where full control over the software stack is required, including complete control of the release and patching of the operating system used.

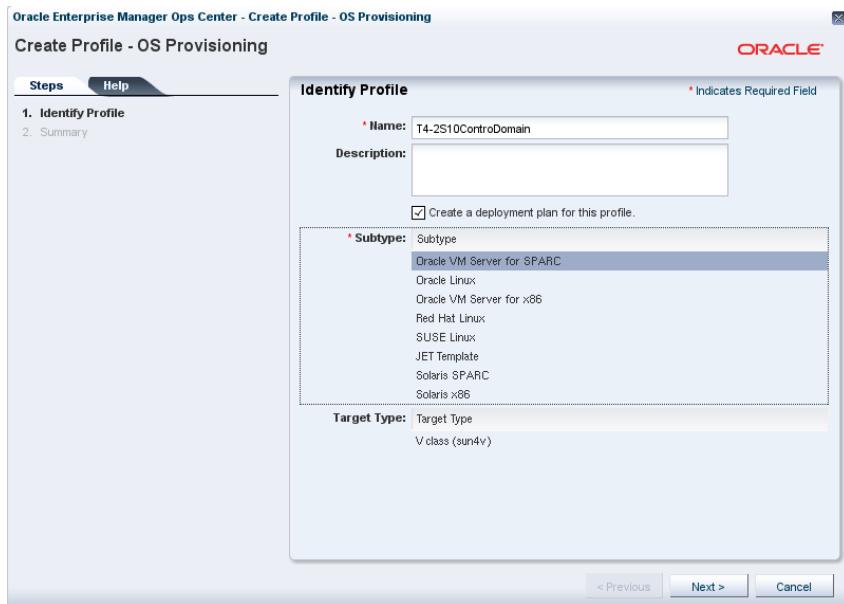
### Creating an Oracle Solaris Control Domain Deployment Profile and Plan

In order to provide an OS image suitable for use in creating a pool of servers capable of hosting Oracle VM Server for SPARC virtualized environments (henceforth referred to as *domains*), specific choices must be made when choosing the base OS deployment profile used to install the physical host machines.

From the ‘Navigation’ pane, select ‘Plan Management’->‘Profiles and Policies’ ->‘OS Provisioning’ and then from the ‘Actions’ pane, select ‘Create Profile’.



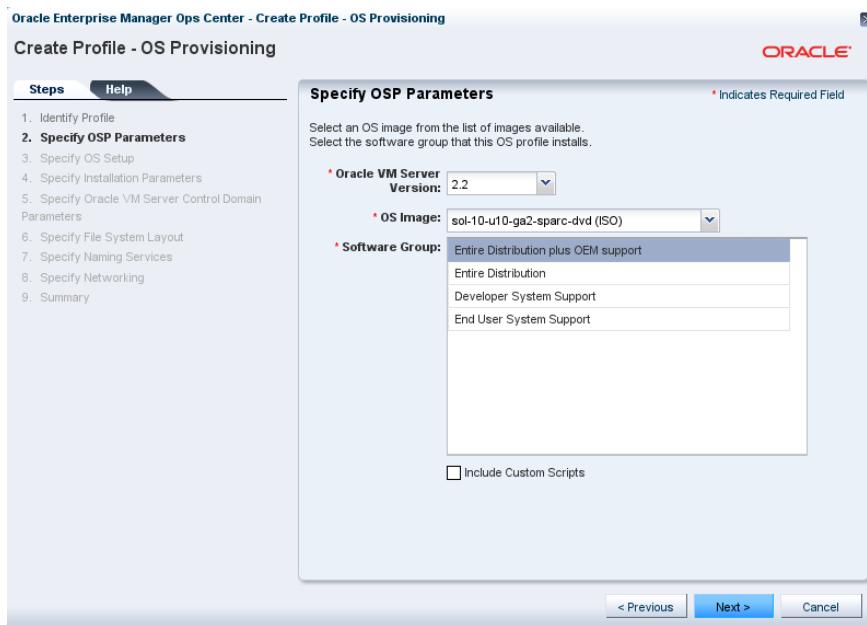
Choose a name for the profile that is to be created. The example uses ‘T4-2S10ControlDomain’. Select the correct ‘Subtype’ category since this profile will be used to create hosts suitable for use in a domain pool. The subtype should be ‘Oracle VM Server for SPARC’. Click ‘Next’ to continue.



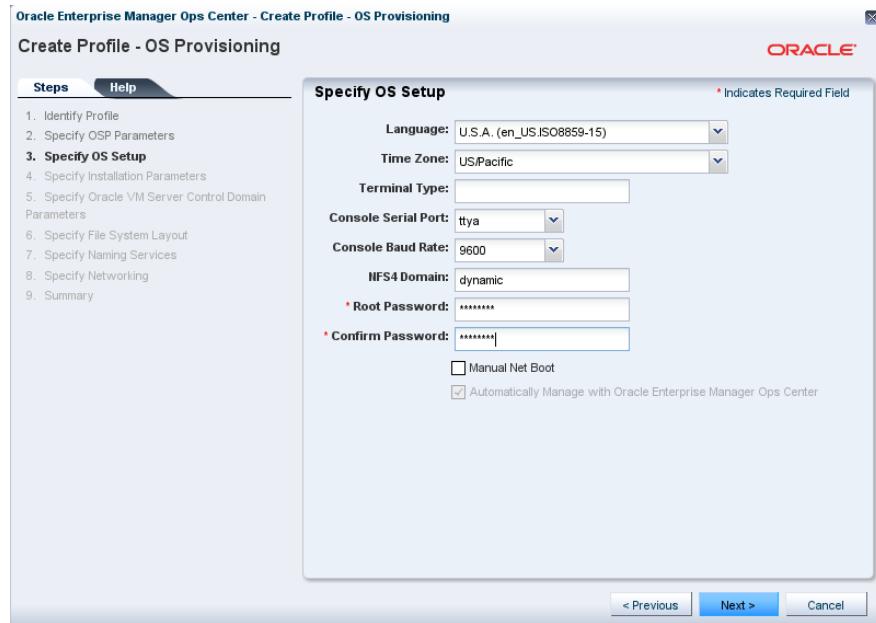
Various versions of Oracle VM Server for SPARC are supported and available. For the latest features and bug fixes, it is recommended that the latest version available for the selected operating system release be chosen.

This example selects Oracle Solaris 10 update 10 as the base OS, from the 'OS Image' drop-down selection box. This choice will populate the available options in the 'Oracle VM Server Version' drop-down box; select version '2.2'.

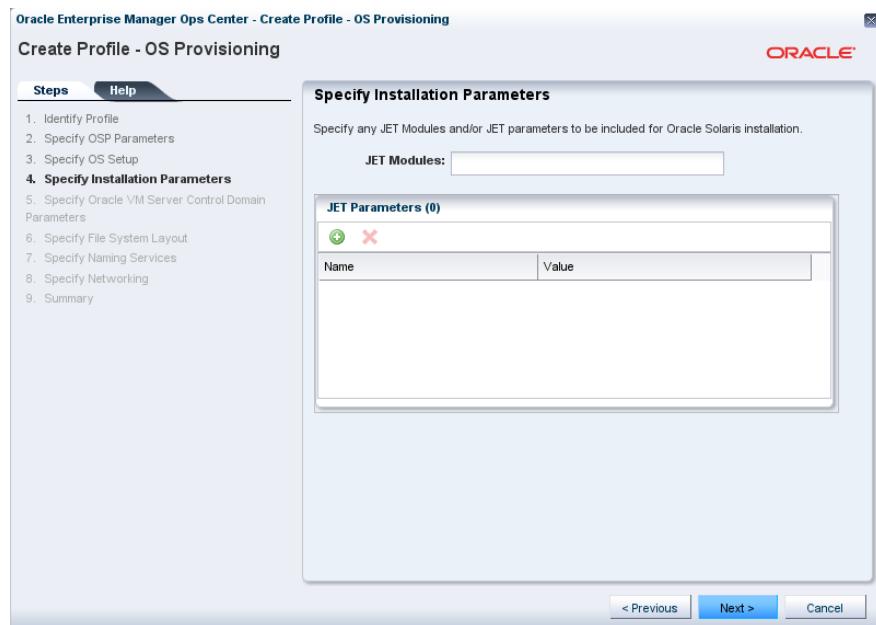
In addition, with Oracle Solaris 10 it is necessary to choose the Software Group that will be installed. In the example, the 'Entire Distribution plus OEM support' bundle is chosen.



Specify OS default parameters. Click ‘Next’ to continue.



Additional OS install parameters for JET can be optionally included; these are not used in the example. Click ‘Next’ to continue.

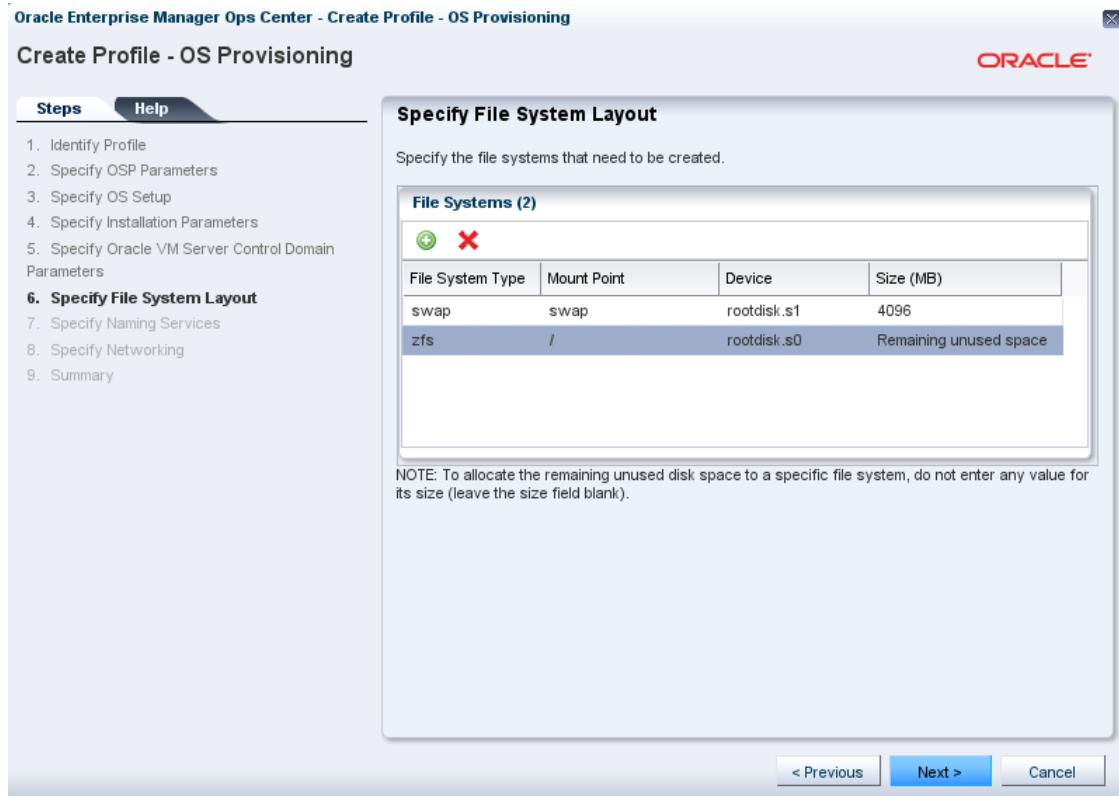


Now specific sizing parameters can be set up for the size of the control domain that will administer the additional guest domains that will be deployed onto each physical node. Parameters such as the number of CPU threads given to the control domain, the amount of memory allocated, and some configuration parameters, such as the port ranges used to communicate with the virtual serial ports of

the virtual domains are also selectable. It is recommended that the users consider sizing recommendations discussed elsewhere in this document when choosing these parameters. The example uses 8 threads for the control domain, and 8 GB of memory, and defaults the ports and other settings. Note: More memory may be required in the control domain if many guest domains will be created later.



Configure the control domain primary filesystem layout. The example uses a ZFS root filesystem to provide flexibility in the future.



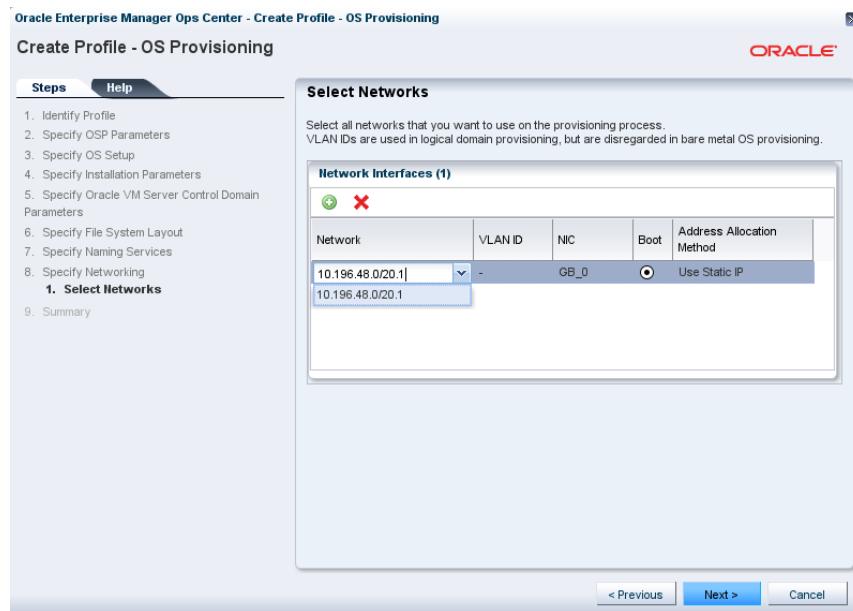
Specify the naming service details to be used. The example does not use a naming service.



Specify whether the provisioned OS image should implement IP network multipathing (IPMP) or Link Aggregation for its default network connections. The example does not require either of these.



Select any networks to associate with this installed OS image from the available drop-down menu or add new networks that the domain will need to talk to; the default network is used in the example.



Complete creating the configuration by clicking 'Finish'.



A short task is started to create the profile and the derived plan, and these will become visible in the 'Navigation'->'Plan Management'->'Deployment Plans' expanded trees under 'Provision OS' and under 'Profiles and Policies' under 'OS Provisioning'.

Step	Associated Profile/Deployment Plan	Number of Results
Provision OS	T4-2S10ControlDomain v1	1

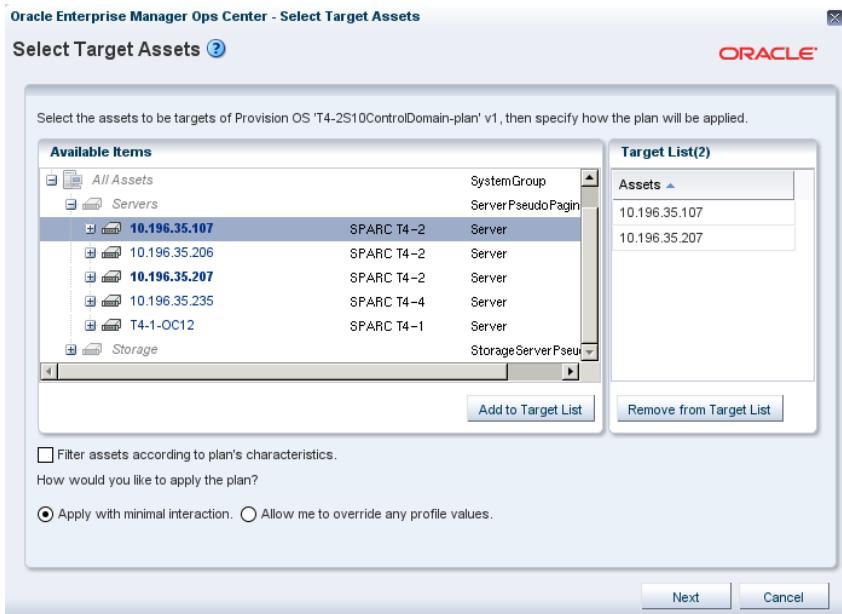
## Deploying Oracle VM Server for SPARC Host Platforms

Once a suitable deployment profile and associated plan have been developed (see previous chapter), the Oracle VM Server for SPARC-enabled platform can be chosen and installed according to the plan.

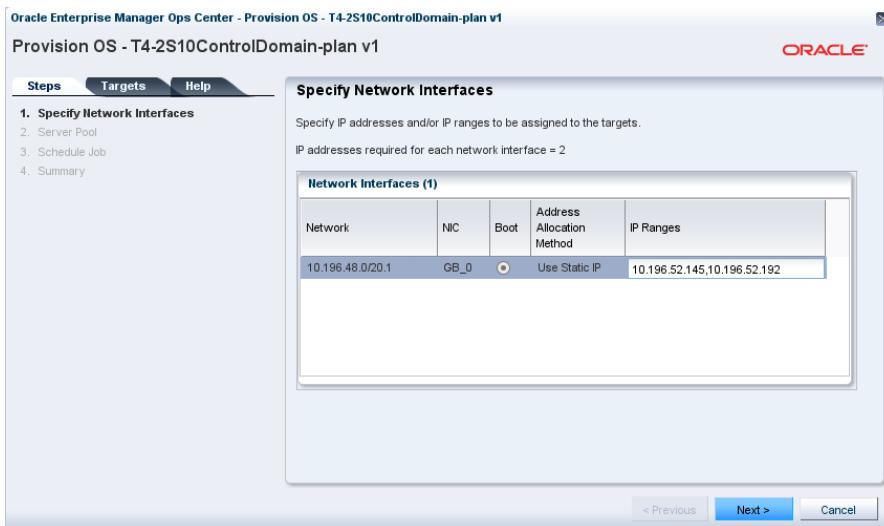
From the ‘Navigation’ pane under the ‘Plan Management’->‘Deployment Plans’ expanded trees, locate the appropriate plan from the ‘Provision OS’ subsection. In the example the ‘T4-2S10ControlDomain-plan’ is selected.

The screenshot shows the Oracle Enterprise Manager Ops Center 12c interface. The title bar reads "ORACLE Enterprise Manager Ops Center 12c" and "ECI4SPARC". The top navigation bar includes "Setup", "Help", "root", "Logout", and various system status icons. The left sidebar, titled "Navigation", has sections for "Message Center", "Assets", and "Plan Management". Under "Plan Management", the "Deployment Plans" section is expanded, showing a tree view of various provisioning steps. One node, "T4-2S10ControlDomain-plan", is selected and highlighted in blue. The main content area displays the details for this plan, including its name, version, creation date, last modified date, template, and referrers. Below this is a table titled "Deployment Plan Steps" with one row: Step "Provision OS" and Associated Profile/Deployment Plan "T4-2S10ControlDomain v1". On the right side, there is an "Actions" panel with sections for "Operate" (Delete Deployment Plan, Delete Version), "Organize" (Copy Deployment Plan), "Deploy" (Apply Deployment Plan), and "Update" (Edit Deployment Plan).

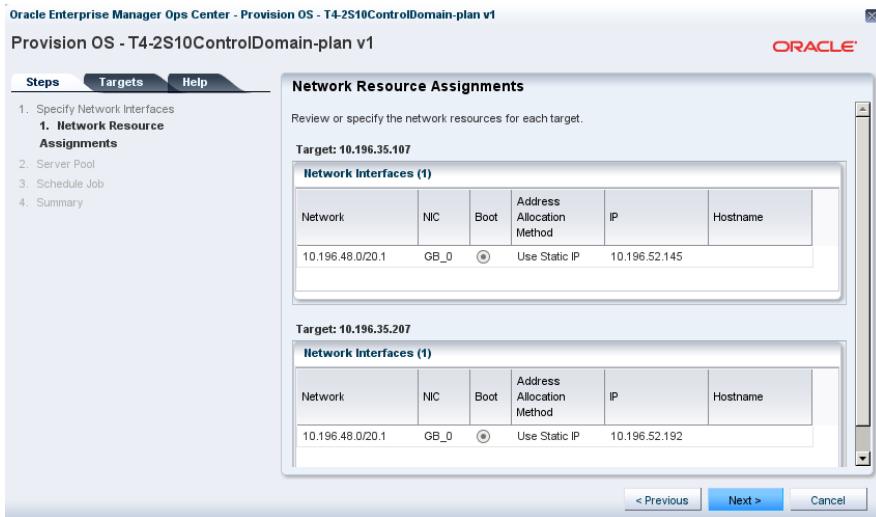
From the ‘Action’ pane, select ‘Apply Deployment Plan’, and in the popup window select the server assets that will be configured as control domain hosts. Select ‘Add to Target List’ to move the selected assets to the ‘Target List’ selection.



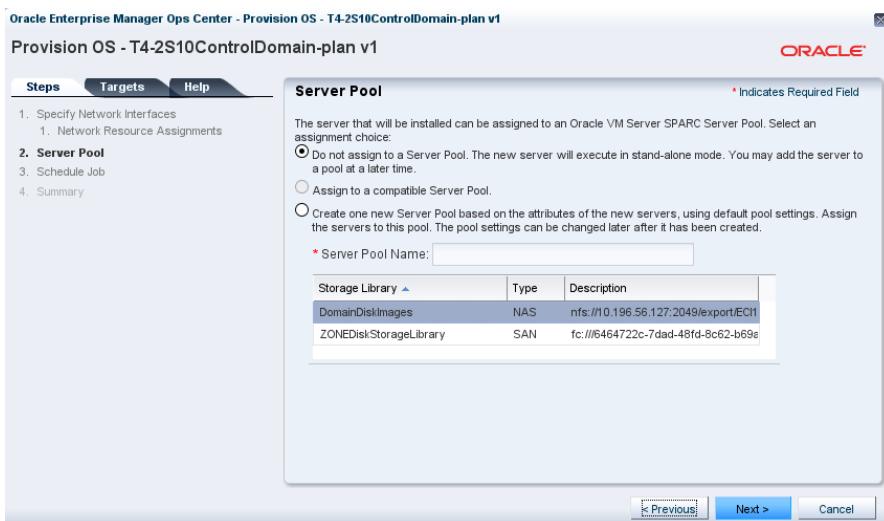
Specify the network IPs to choose for the control domains. Multiple IP addresses are required if more than one target asset is being deployed.



Verify that the correct IP assignments were made for each asset.



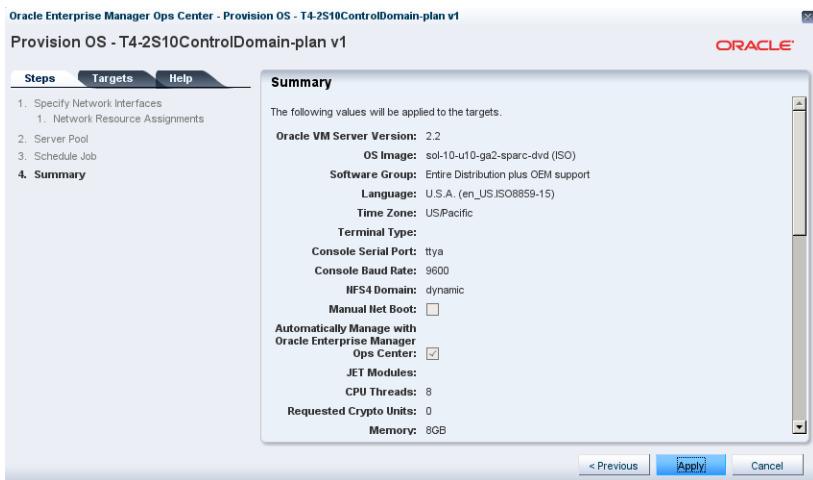
Don't assign the assets to a server pool at this stage; this can be done later.



Schedule the job and approve the summary of the task.



Confirm the summary.



Click 'Apply' to start the deployment task.

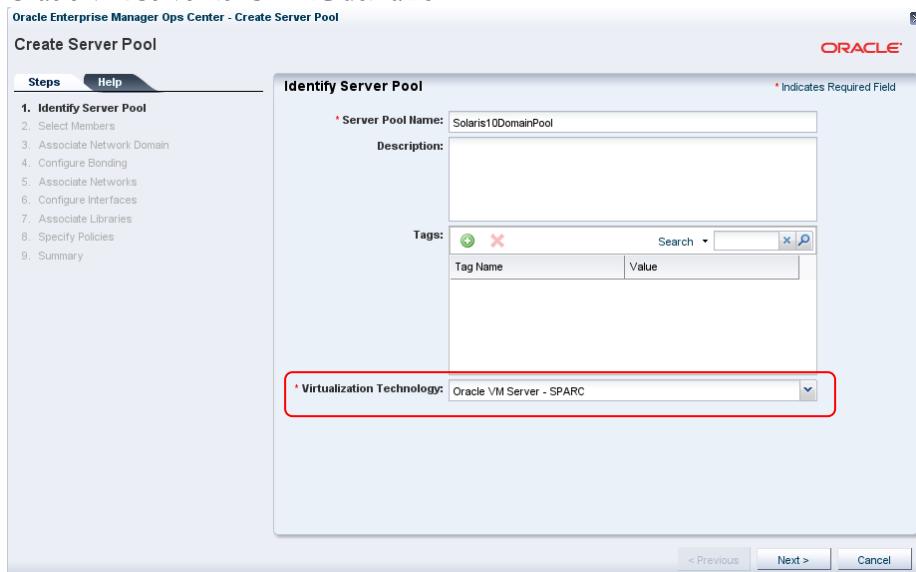
### Creating Oracle VM for SPARC Server Pools

Oracle VM for SPARC server pools can be created in a similar manner to that described when creating Zone host pools as described on page 87. Notable differences are shown here.

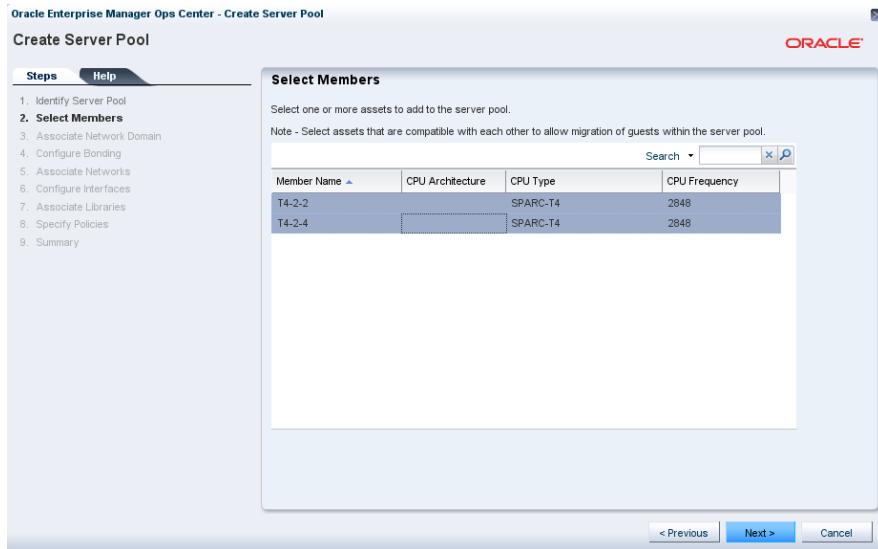
From the 'Navigation' pane, select 'Assets' and from the drop-down menu select 'Server Pools'. From the 'Actions' pane, select 'Create Server Pool'.



In the 'Identify Server Pool' window, choose a name for the pool and from the 'Virtualization Technology' drop-down menu select 'Oracle VM Server – SPARC' to signify that this pool is for Oracle VM Server for SPARC domains.



Continue to specify the servers that are suitable for this pool. A list of suitable servers will be provided if any are available. Select all of the servers and click 'Next'.



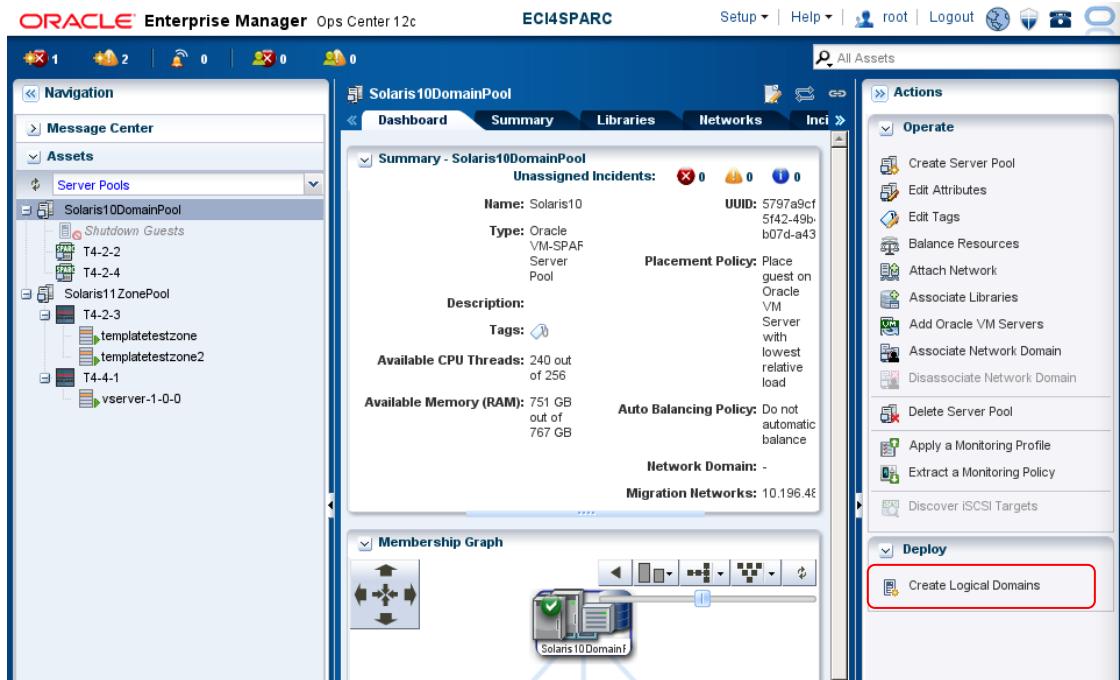
Continue to proceed as previously shown, selecting “Associate Networks’ options, being sure to note which network from the available ones should be used for domain migrations. Typically this will be the 10 GbE network that is shared by all of the SPARC T4-2 nodes in the pool.

When the pool specification is complete, click ‘Finish’ to actually create the pool.

#### Deploying Oracle VM Server for SPARC Guest Domains into a Pool

From the ‘Navigation’ pane, select ‘Assets’ and ‘Server Pools’, then choose the appropriate server pool. In the example above, this pool was named ‘Solaris10Domainpool’.

In the ‘Actions’ pane, select ‘Create Logical Domains’.



In the ‘Create Logical Domains’ window, choose from the list of pre-existing deployment plans, and whether the defaults in the plan should be used or if modifications should be incorporated as required. A new plan may also be created at this point if no suitable plan already exists. For the examples, the pre-existing ‘S10-Guest-plan’ is used with minimal interaction.

**Oracle Enterprise Manager Ops Center - Create Logical Domains**

**Create Logical Domains**

**Target Asset(s):**

Asset Name	Description
Solaris10DomainPool	

Select a plan to perform the action. Alternatively you may click the Create New Plan button to create a different plan for the action.

Deployment Plan	Description	Version
S10-Guest-plan	Created from profile	1
S10-LDOM-OS		1

How would you like to apply the plan?

Apply with minimal interaction.  
 Allow me to override any profile values.

**Create New Plan** **Apply Plan** **Cancel**

According to the plan selected, identification information will be requested for the domains that will be created. A default name of ‘Guest’ and a postfix numerator starting at ‘1’ will be accepted.

In the ‘Storage Resource Assignments’ page, ensure that the ‘Storage for the domain metadata’ dropdowns indicate shared NFS or SAN libraries that can be seen by all members of the host pool. This metadata must be visible to the pool hosts in order to enable domain migrations. Also select the appropriate ‘Virtual Disk/Storage Specification for Logical Domain Guest’ configuration to ensure that the virtual disks provided to the domains are also stored on shared access media whether NAS filesystems or SAN LUNs. Ensure that the ‘Required Size’ is set at a sufficiently large size to accommodate the OS installation that will be needed for the domains being created. Typically, 10 GB should be a minimum for default Oracle Solaris installations.

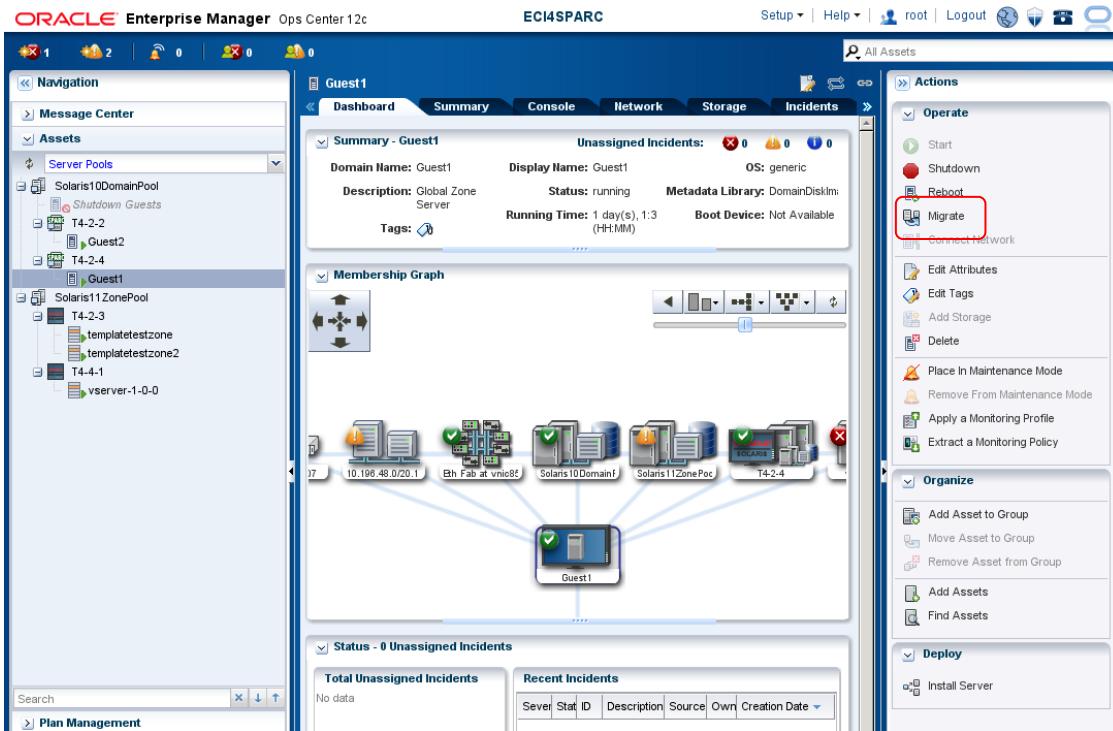


Specify any network requirements for the guest domains and then continue to schedule the domain creation job. In most cases domain creations are carried out ‘Now’. Click ‘Apply’ on the Summary screen to start the domain creation process.

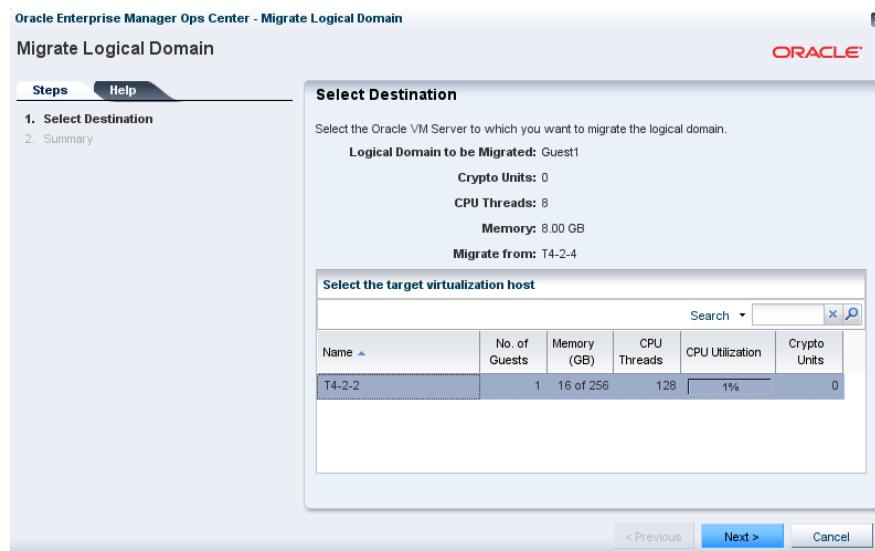
### Migrating an Oracle VM Server for SPARC Domain

Once one or more domains have been created in a pool of two or more host machines, it is possible to migrate domains between hosts either manually or automatically according to a load balancing plan.

To migrate a domain, from the ‘Navigation’ pane, select the ‘Assets’, ‘Server Pools’ list and expand the appropriate domain pool in which the domain will be migrated. Select the domain that is to be migrated.



In the 'Action' pane, click 'Migrate'.



Select the destination target for the domain to be migrated from the list of pool members shown and then click 'Next'. Check that the Summary page is correct, and then click 'Finish' to begin the migration job.

Once started, the migration will proceed without interrupting the operation of the migrating domain. The time required to successfully migrate depends on the speed of the network between the source and

destination host machines and how ‘busy’ the migrating domain is—in particular, how heavily it is using its memory. For best results, migrations should be carried out across 10 GbE networks, and if possible, migrating domains should be fairly quiet during the migration.

## Supporting Physical-to-Virtual Migrations of Oracle Solaris 8, 9, and 10 Servers

The ability to import the working environment from an older generation SPARC server running older releases of Oracle Solaris operating environments is supported through the abilities of Oracle Solaris Zones. This technology was previously referred to as ‘branded zones’. These are Zones running on a global zone installed with Oracle Solaris 10 or 11 which, through added packages, can simulate an Oracle Solaris 8, 9 or 10 environment for the zone image to operate inside. Oracle Solaris 8 and 9 environments can be hosted on an Oracle Solaris 10 global zone and Oracle Solaris 10 environments can be hosted on an Oracle Solaris 11 global zone.

For a successful physical-to-virtual (P2V) transition, several factors should be considered to determine if the target system is a suitable candidate for a P2V migration.

1. **The application workload on the target server** – If the workload requires specific volume manager configurations, these may not be easy to translate to the virtual environment of Zones, since the migrating zone is significantly based on the properties of the hosting global zone and these characteristics may not be flexible enough to accommodate the target machine requirements.
2. **The network configuration of the target server** – The network configuration of the target system must be duplicable on the host global domain, including connectivity to all of the required networks used by the target server.
3. **Local storage requirements and filesystems** – The storage configuration of the target system must be duplicable in the host zone, including required local filesystems and mounts of any remote filesystems. Remote SAN connections may need to be mounted on the global zone and exposed to the host zone as a local filesystem.
4. **Kernel release requirements** – If the target system has specific kernel release/version requirements, the host global zone must use the same or newer versions for the migration to succeed.
5. **Does the target system already run Oracle Solaris Zones?** – Nesting of zones is not possible inside other zones. Such a system, if migrated, will need to have each of the target machine zones individually migrated ahead of the migration of the global zone.
6. **Hardware requirements** – If the target machine has any requirements for specific hardware or PCI cards, ensure that suitable alternatives are available on the host platform of the global domain. In the case of some older PCI (or SBUS) cards it is likely that no current alternative exists on the new SPARC T4 platforms and migration may not be possible if the card is central to the function of the target machine.

7. **Sufficient resource on the virtual host platform** – Determine if the compute, memory, network, and disk requirements of the target system can be accommodated on the available resources of the intended virtual machine host.

If all of the prerequisites outlined above can be satisfied and P2V migration can be carried out, the process of migration can be started.

### Capturing the Details of the Target System

There are some essential items that must be captured to successfully virtualize an existing physical server.

- The hostname of the server
- The network settings
- The storage layout and filesystems contents
- The system HOSTID

#### Obtaining the Hostname

On the target system, log in and run the command ‘hostname’; this will reveal the configured hostname the system expects to use.

#### Obtaining the Network Settings of the Target System

Log into the target system as ‘root’ and run the command ‘ifconfig –a’ to list all of the configured network interfaces on the target system.

Run the command ‘netstat –nr’ to list the required network gateway and routing information for the configured networks.

If a network naming service is in use, capture the required configurations for that service.

#### Obtaining the Storage Requirements and Filesystem Contents

For an older server, it will be necessary to capture the required filesystems in FLAR format from the server to be migrated. This captured FLAR image should be imported into a shared NFS mounted library location such as the ‘DomainDiskImages’ library used in earlier examples. The library must be visible to the global zone on the host servers in order for them to be able to extract the required information to create the branded zone image from the FLAR archive.

Ensure that the target system has sufficient filesystem capacity, either locally available or temporarily mounted via NFS, to hold a complete copy of the filesystems to be copied during the physical-to-virtual transition.

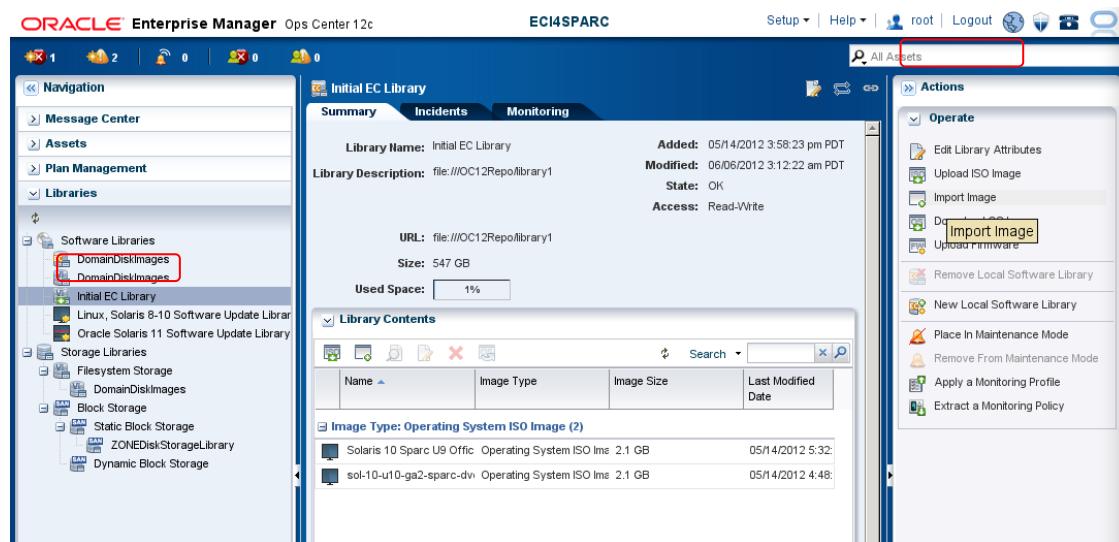
Identify the filesystems that are mounted on the target system and which will need to be copied over to the virtual copy. The mounted filesystems can be determined using the ‘mount’ command.

Once a filesystem FLAR has been captured, a branded zone deployment profile and plan must be constructed specifying the relevant base OS release and specifying the captured FLAR images as the deployment source image.

#### Importing an Oracle Solaris 8 or 9 FLAR Image into Oracle Enterprise Manager Ops Center 12

From the ‘Navigation’ pane, select ‘Libraries’, ‘Software Libraries’ and then select a library that will be mounted on shared media that can subsequently be accessed by the host servers that will be hosting the new Zones. Do not import the FLAR into a local library on the EC host, as this will cause the creation of the zones to fail when the global zone cannot access the zone image source. User-created non-local software libraries are a great choice; libraries dedicated to this use can be created.

In the ‘Actions’ pane, click ‘Import Image’.



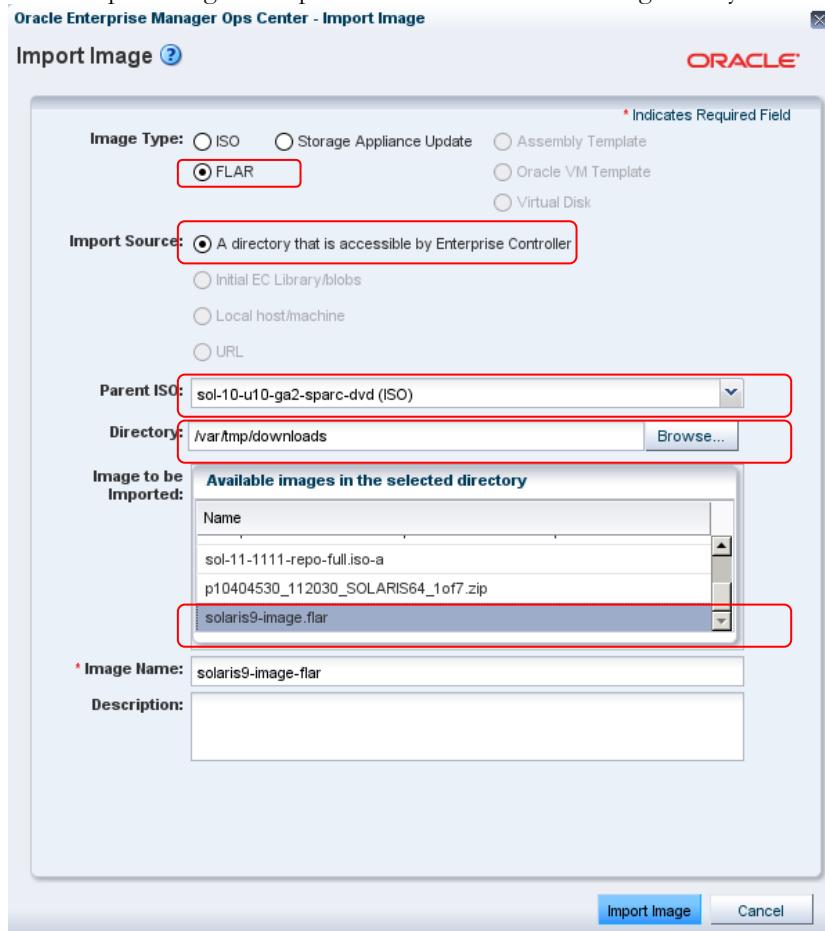
Select the ‘FLAR’ image type.

From the available list of ‘Parent ISO’ choices, select the most recent Oracle Solaris 10 ISO when importing Oracle Solaris 8 or 9 FLARs, or the most recent Oracle Solaris 11 ISO when importing Oracle Solaris 10 FLARs.

Presuming the FLAR archive has been copied to a directory on or accessible from the Oracle Enterprise Manager Ops Center 12 server, select the ‘Import Source’ to be ‘a directory that is accessible by Enterprise Controller’.

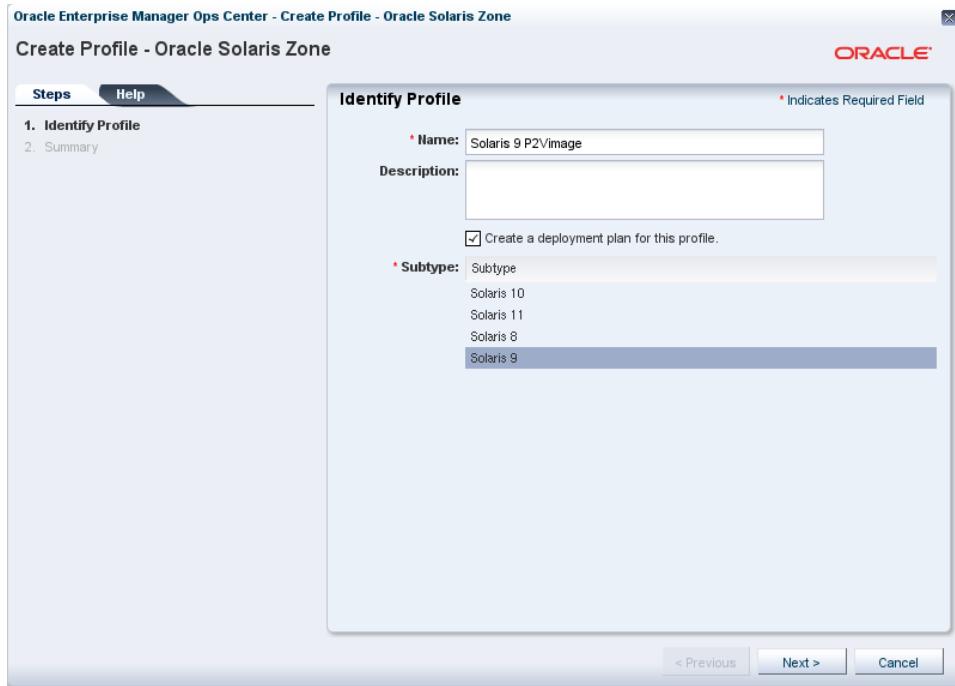
Specify the directory containing the FLAR archive in the ‘Directory’ area or use the Browse button to locate the directory and then select the FLAR image from the displayed list of files in that directory.

Click 'Import Image' to import the FLAR file into the image library.

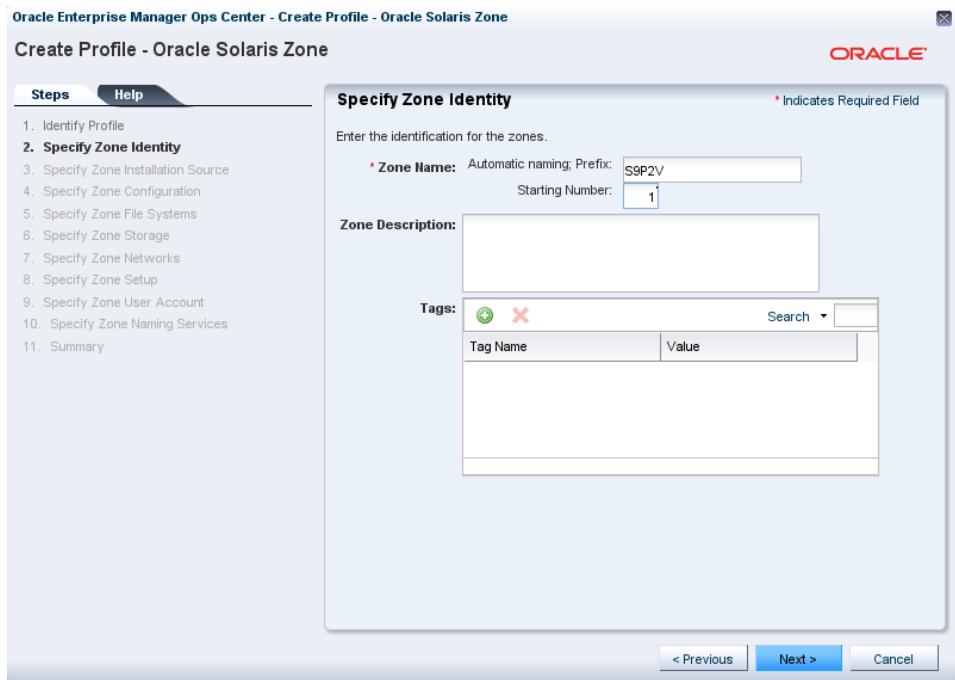


#### Creating an Oracle Solaris 8, 9, or 10 Branded Zone Image Deployment Profile and Plan

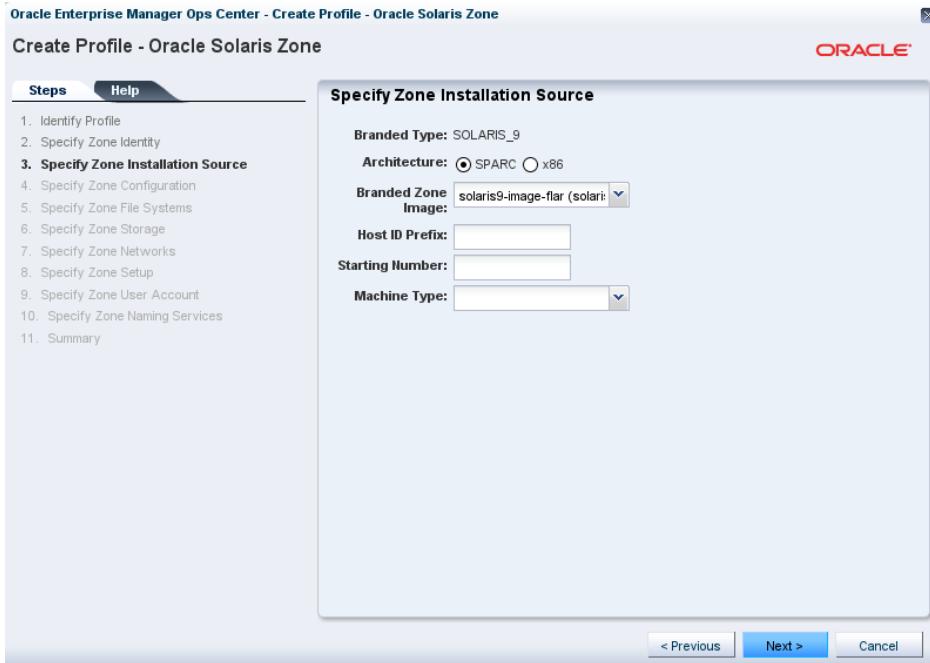
From the 'Navigation' pane, select 'Plan Management', select 'Profiles and Policies', and then from the 'Actions' pane, click 'Create Profile'.



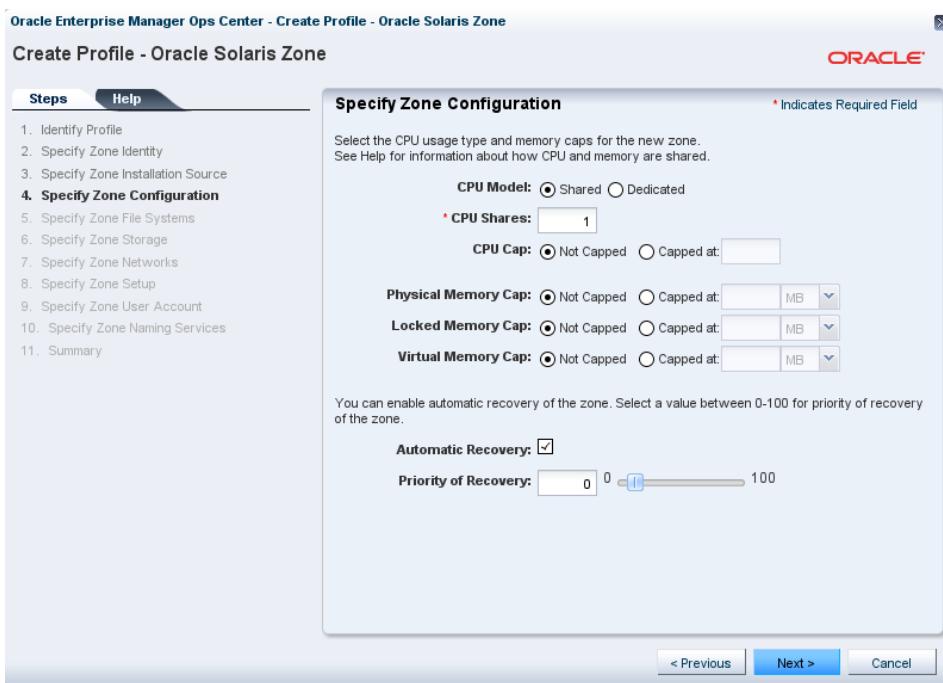
Choose a name to give to the P2V profile being created in the ‘Name’ box, and be sure to select the correct ‘Subtype’ from the selection box. In this example an Oracle Solaris 9-based FLAR image deployment profile is being created. Click ‘Next’.



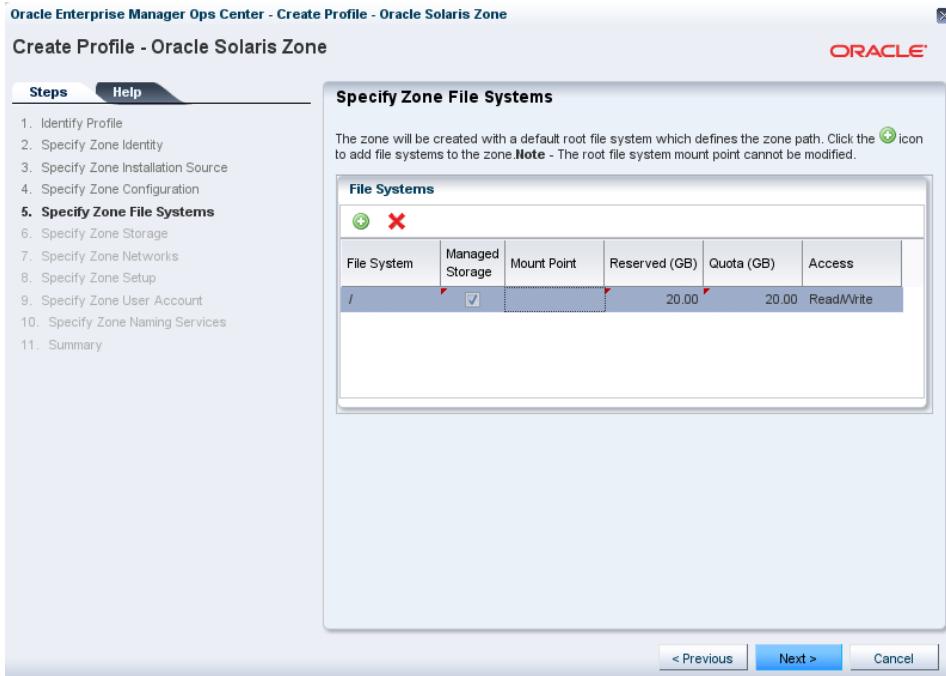
Select a name and starting number for the zones that will be deployed using this profile, and click ‘Next’.



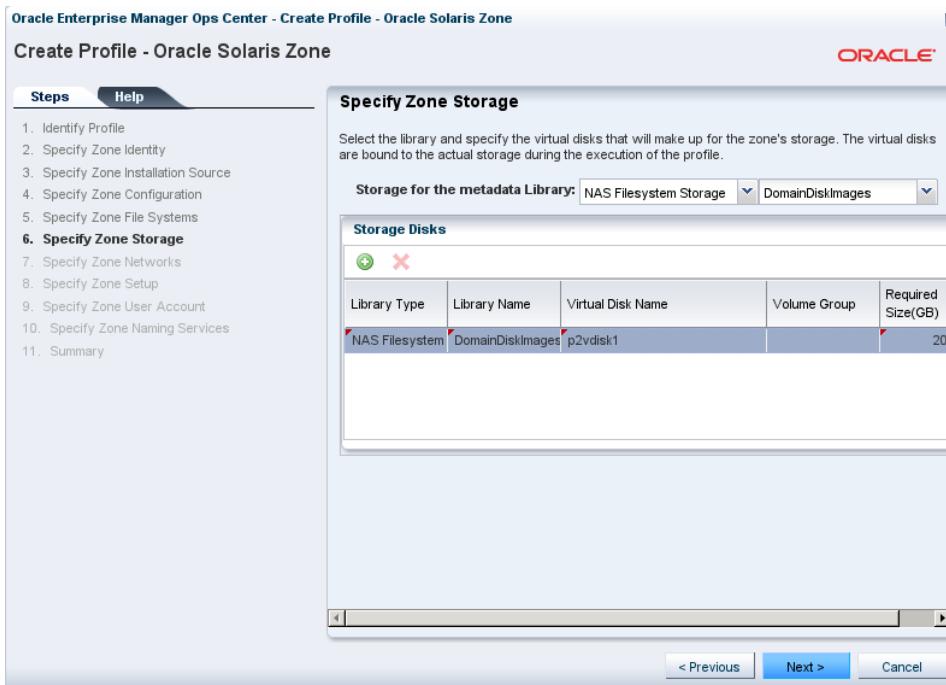
Select the 'SPARC' architecture options, and then select the branded Zone image that was uploaded from the 'Branded Zone Image' selection drop-down box. Click 'Next'.



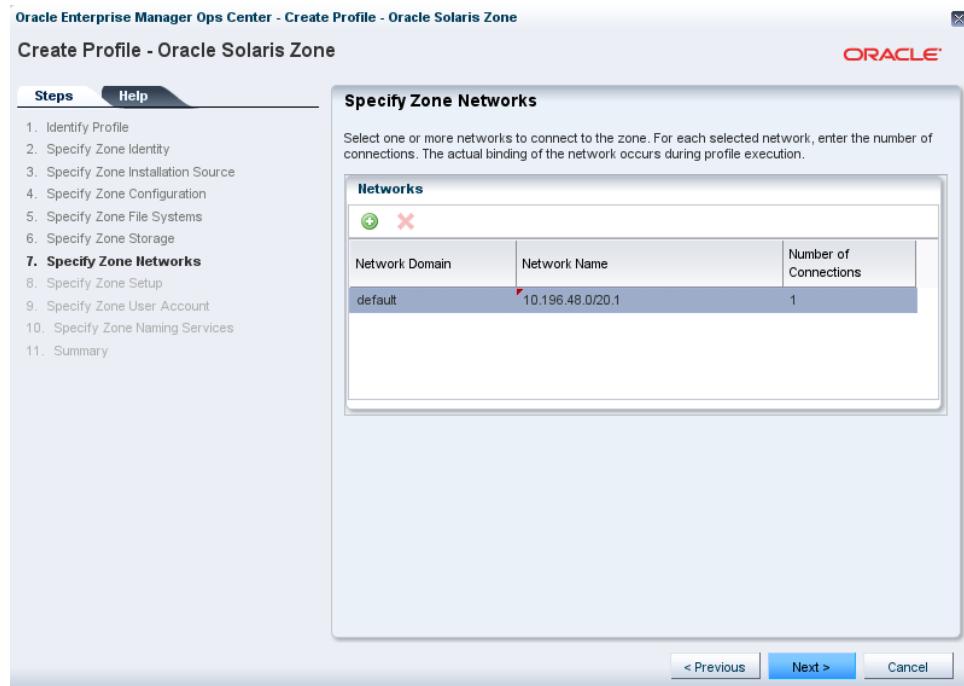
Select default Zone CPU and memory caps to be used when deploying this zone, defaults are shown in the example. Click 'Next'.



Specify the size of the disk to be created for the zone boot image to reside on; this should be sufficiently large to accommodate the filesystems captured from the original physical host and included in the FLAR archive. If additional filesystems are required for the image, these can be configured here. Click ‘Next’.



Now select where the storage and virtual disks allocated to the Zone will be stored. In the example, NAS filesystems are used; these should be shared filesystems if future migrations are to be possible. Click 'Next'.



Specify the network connectivity to configure in the Zone, check with the configuration of the original source of the Zone image to ensure that suitable networks are provided to enable the successful configuration of the virtual copy of the physical system. Additional network can be added as needed. Click 'Next' when complete.

**Oracle Enterprise Manager Ops Center - Create Profile - Oracle Solaris Zone**

### Create Profile - Oracle Solaris Zone

**Specify Zone Setup** \* Indicates Required Field

Specify language, time zone, terminal type and root password for the zone.

**Language:** English (7-bit ASCII)

**Time Zone:** US/Pacific

**Terminal Type:** X Terminal Emulator

**\* NFSv4 Domain Name:** dynamic

**\* Root Password:** \*password\*

**SSH Key:**

**Boot Variables:**  Automatically boot zone when the global zone is booted  
 Automatically boot zone after creation

**Management**

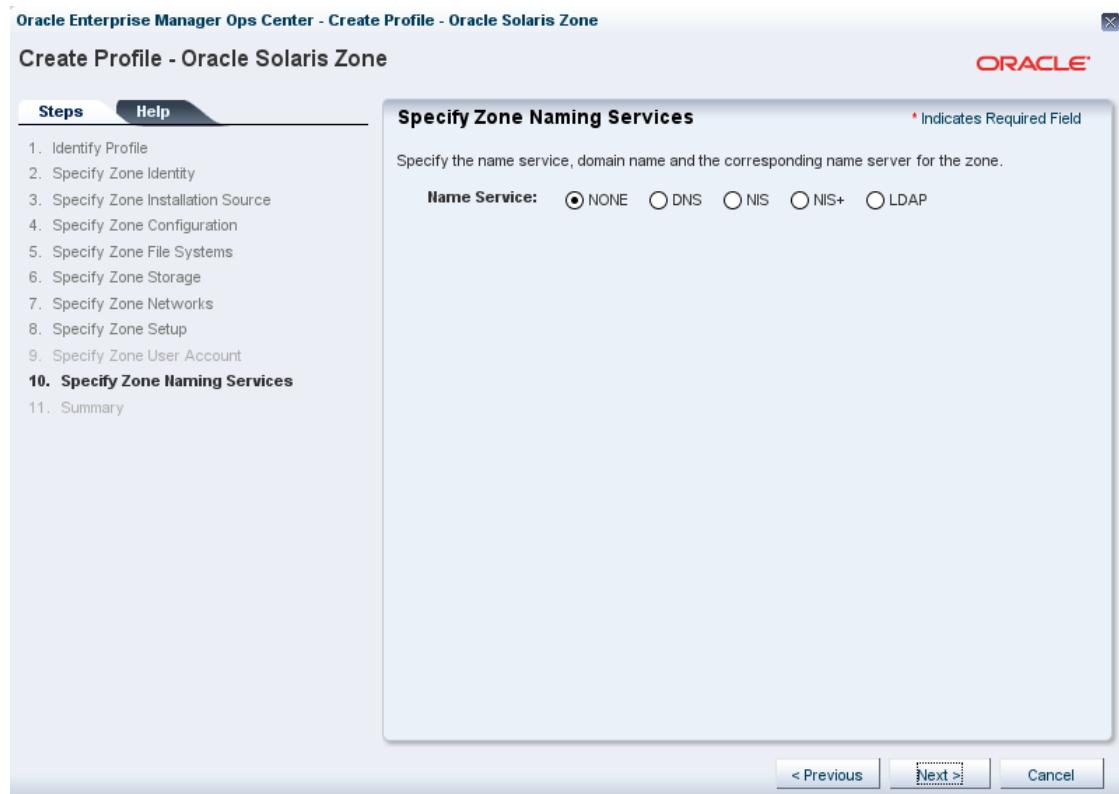
Deploy agent for management. Required for software update support.  
 Agent-less management. Global Zone will periodically probe the asset via zlogin

**Steps** **Help**

- Identify Profile
- Specify Zone Identity
- Specify Zone Installation Source
- Specify Zone Configuration
- Specify Zone File Systems
- Specify Zone Storage
- Specify Zone Networks
- Specify Zone Setup**
- Specify Zone User Account
- Specify Zone Naming Services
- Summary

< Previous  Cancel

Define the default setup of the zone, including locales, languages, root passwords, and so on. Ensure these are the same as those on the original source system to ensure compatibility. Click 'Next' to continue.



Configure appropriate naming services for this zone, based on the configuration of the original physical host. Click 'Next'.



Check the configuration in the Summary page and click 'Finish' to complete creating the profile and associated deployment plan. The automatically created deployment plan derived from this profile can be found in the 'Plan Management'->'Deployment Plans' tab under the 'Create Oracle Zones' leaf.

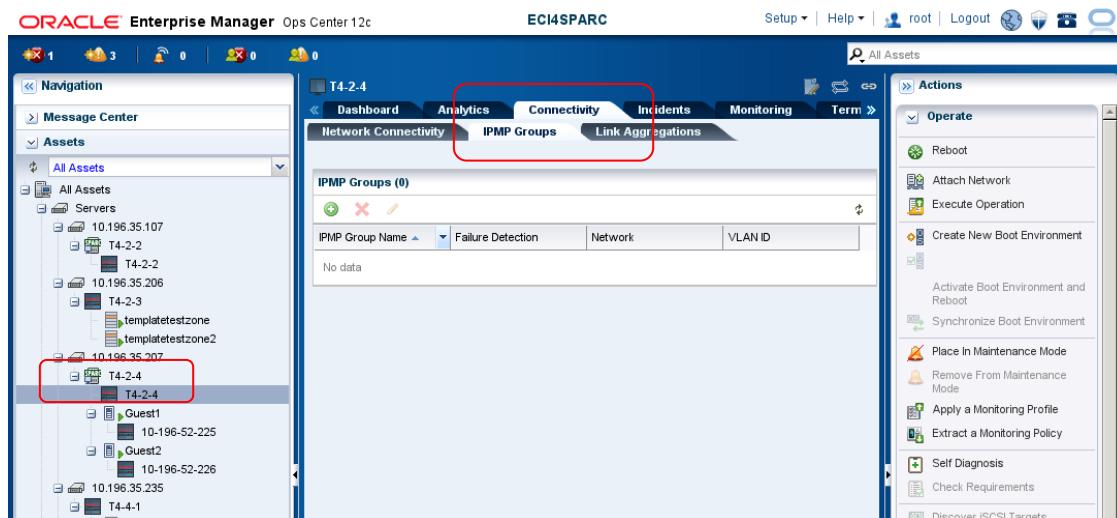
## Deploying an Oracle Solaris 8, 9, or 10 Branded Zone

Oracle Solaris 8 or 9 branded zones can be deployed into suitably connected (network and storage) Oracle Solaris 10 hosts or pools. Oracle Solaris 10 branded zones can be deployed on suitably connected Solaris 11 hosts or pools.

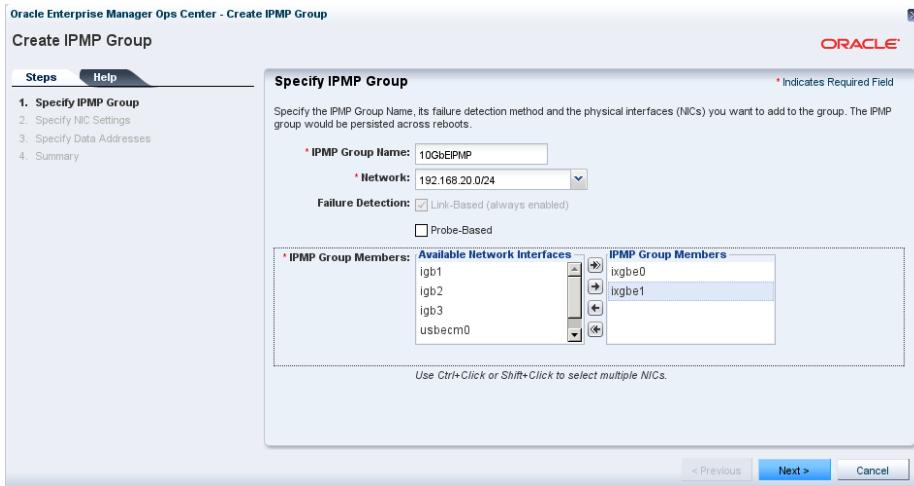
Deployment follows the same procedure as a normal Zone deployment, once the appropriate profile is chosen.

## Configure IPMP Inside Control Domain

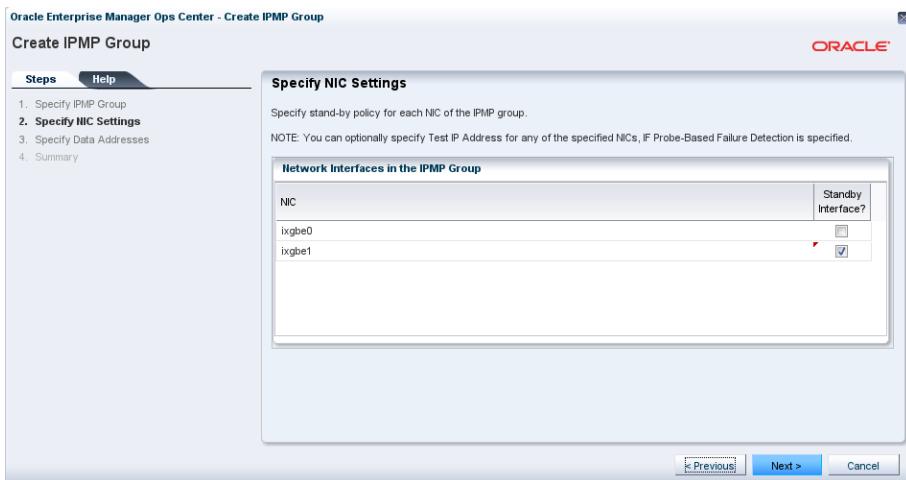
Select the OS portion of the control domain to be granted IPMP network HA, and then with the OS portion of the control domain selected in the asset Navigation pane, select the ‘Connectivity’ tab and then the ‘IPMP Groups’ sub-tab in the central context window.



Create a new IPMP interface group by clicking on the icon to create a new group, and choose a name for the IPMP group. In the example, a group of two 10 GbE interfaces are being added to a group named ‘10GbEIPMP’. The subnet that the 10 GbE interfaces are connected to is the 192.168.20.0/24 subnet, and the two interfaces are the ‘ixgbe0’ and ‘ixgbe1’ interfaces. Click ‘Next’.

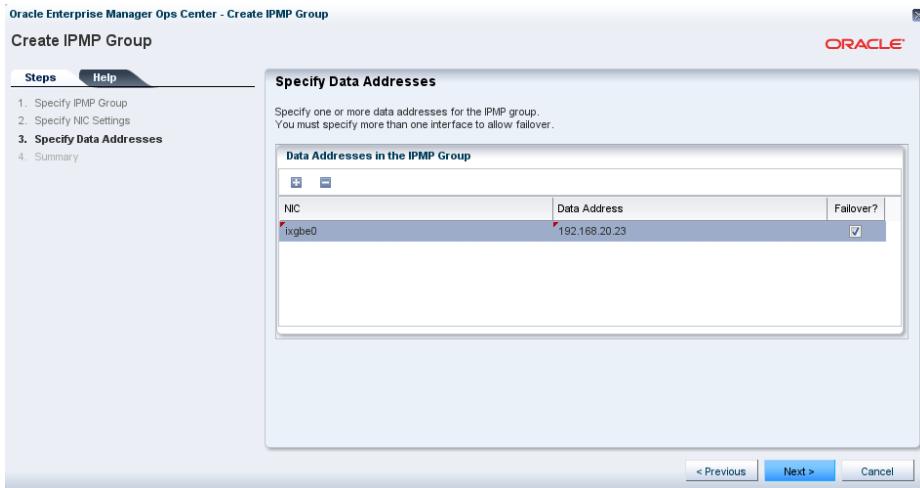


Specify which of the interfaces is to be the ‘Standby’ interface. In the case of link-based IPMP, or if probe-based IPMP is being used, IP addresses can be specified later. Link-based is shown in the example and interface ‘ixgbe1’ is configured as the standby interface.

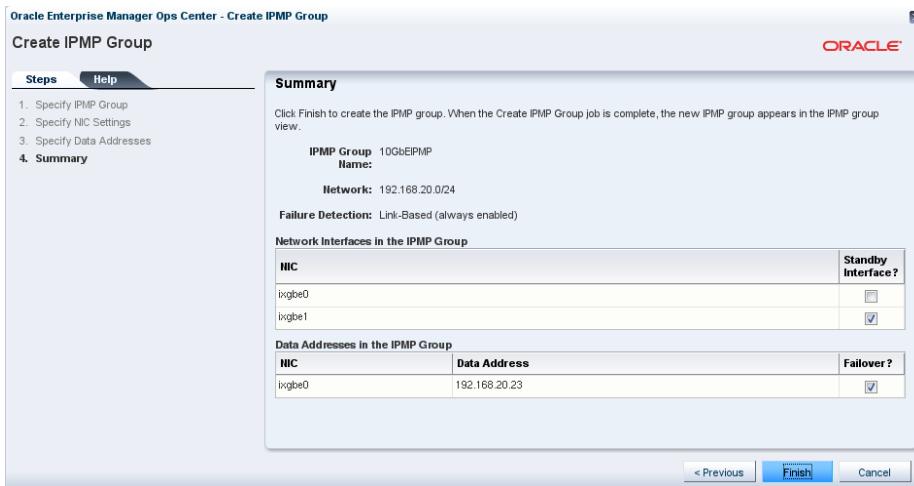


Specify one or more addresses as needed for the IPMP group using the required interfaces. In the example, link-based IP’s are used and a single IP address needs to be allocated to the primary NIC in

the IPMP group. Click to add a NIC and IP address to the configuration, select the available NIC from the drop-down box in the ‘NIC’ section (‘ixgbe0’ in the example), and then allocate an IP address in the ‘Data Address’ fields. In this example, ‘192.168.20.23’ is chosen. Click ‘Next’.



Check the ‘Summary’ window and click ‘Finish’ to create the IPMP group.



Once complete, the created IPMP group can be seen in the control domain OS window under the ‘Connectivity’ tab and the ‘IPMP Groups’ sub-tab.

The screenshot shows the Oracle Enterprise Manager interface for Ops Center 12c. The top navigation bar includes tabs for Dashboard, Analytics, Connectivity, Incidents, Monitoring, Terms, and Help. The main content area has tabs for Network Connectivity, IPMP Groups (which is selected), and Link Aggregations. On the left, a navigation pane shows a tree structure of assets, including servers like T4-2-4, T4-2-2, T4-2-3, and T4-4-1. The central panel displays the 'IPMP Groups (1)' section, which lists a single group named '10GbEIPMP' with failure detection set to 'Link-Based and Probe-Bal' and network '192.168.20.0/24'. Below this is a table titled 'Network Interfaces in 10GbEIPMP (2)', showing two interfaces: ixgbe0 and ixgbe1. The 'Actions' sidebar on the right contains various management options like Reboot, Attach Network, and Create New Boot Environment.

NIC	Failover?	Standby?	IP Address Type	IP Address
ixgbe0	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Data Address	192.168.20.23/24
ixgbe1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-	-

## Firmware Management

All managed assets can be monitored and upgraded in terms of their firmware levels.

The current levels of server firmware can be viewed from the highest platform level by selecting the server asset in the ‘Navigation’ pane, and then selecting the ‘Summary’ tab in the central context window. The ‘Firmware’ section describes the component versions of the firmware, and the overall firmware version encompassing these components is the ‘Sun System Firmware’ version. In the server in the example, the firmware revision is ‘8.1.1.c’.

**Navigation**

- Message Center
- Assets
  - All Assets
  - Servers
    - 10.196.35.107 (highlighted with a red box)
    - T4-2-2
    - T4-2-2
    - 10.196.35.206
    - T4-2-3
    - templatetestzone
    - templatetestzone2
  - 10.196.35.207
  - T4-2-4
  - T4-2-4
  - Guest1
  - 10-196-52-225
  - Guest2
  - 10-196-52-226
  - 10.196.35.235
  - T4-4-1
  - vserver-1-0-0
  - T4-1-OC12
  - T4-1-OC12
- Storage

**ECI4SPARC**

10.196.35.107

**Summary**

Server Name: 10.196.35.107  
Description: 10.196.35.107  
Current Alert Status: OK  
Model: SPARC T4-2  
Serial Number: 1143BDYAS3  
Management Interface IP: -  
MAC Address: -  
Processor: SPARC-SUN4V, Sun, 8 Core(s)  
Memory: 256 GB  
Power: On  
Locator Lights: off

**Tags**

Tag Name	Value
legacy.tags	LDomServer
oc.internal.virt.server.type	LDomServer

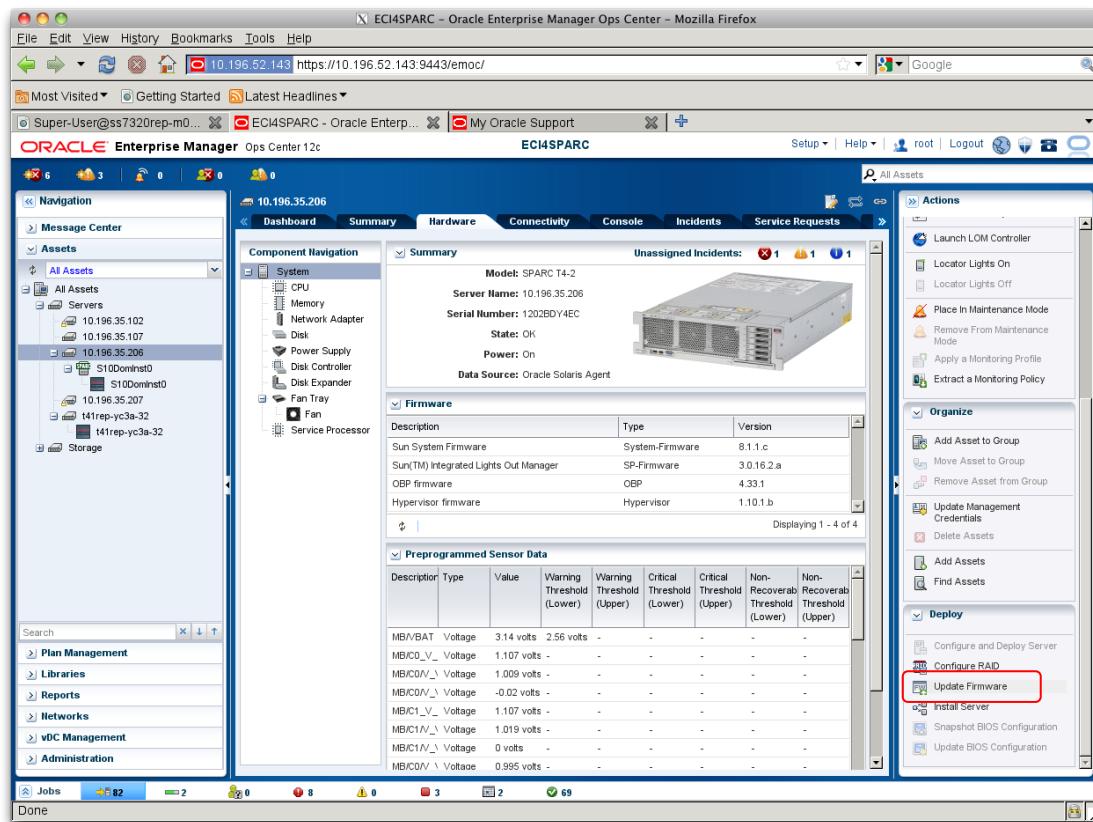
**Firmware**

Description	Type	Version
Hypervisor firmware	Hypervisor	1.10.1.b
OBP firmware	OBP	4.33.1
Sun System Firmware	System-Firmware	8.1.1.c
Sun(TM) Integrated Lights Out Manager	SP-Firmware	3.0.16.2.a

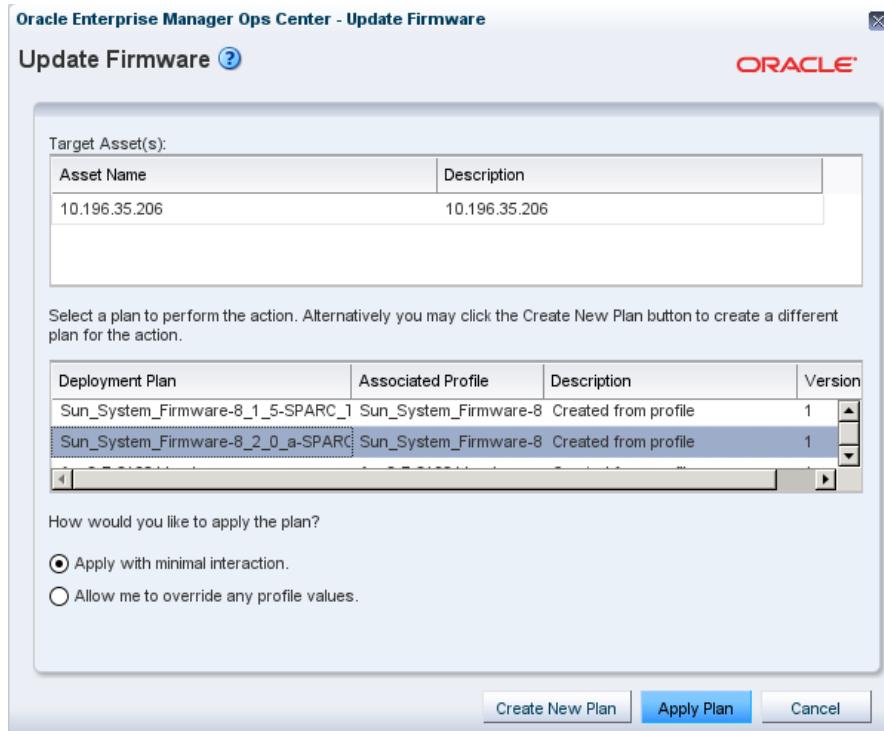
**Actions**

- Operate
  - Open Service Request
  - Execute Operation
  - Edit Tags
  - Edit ASR Contact Information
  - Power On
  - Power Off
  - Power On with Network Boot
  - Reset Server(s)
  - Reset Service Processor(s)
  - Refresh
  - Set Power Policy
  - Launch LOI Controller
  - Locator Lights On
  - Locator Lights Off
  - Place In Maintenance Mode
  - Remove From Maintenance Mode
  - Apply a Monitoring Profile
  - Extract a Monitoring Policy
- Organize
  - Add Asset to Group
  - Move Asset to Group
  - Remove Asset from Group
  - Update Management Credentials

To upgrade firmware, if necessary, select the ‘Service Processor’ of the platform as shown above and then from the ‘Action’ pane, select ‘Update Firmware’ (scroll the ‘Action’ window down if necessary to locate this option. Click ‘Update Firmware’.



In the popup window, select from the available firmware versions applicable to that model of server. Note that many versions of firmware may be displayed. Search for a deployment plan named after the 'Sun\_System\_Firmware-8\_x\_x\_y-SPARC...'. Firmware deployment profiles and plans are automatically generated by Oracle Enterprise Manager Ops Center 12 as it processes the downloaded patches and firmware files from the MOS site.



Select the firmware required, and click 'Apply Plan'. Choose to deploy the firmware 'Now' or schedule it for later installation and click 'Finish'



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Infrastructure—Implementation Guide for  
SPARC  
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