Oracle® Enterprise Manager Ops Center

Configure and Install Root Domains

12*c* Release 3 (12.3.0.0.0)

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This guide provides an end-to-end example for how to use Oracle Enterprise Manager Ops Center.

Introduction

Using Oracle Enterprise Manager Ops Center, you can configure and install root domains on Oracle VM Server for SPARC systems.

A logical domain is a virtual machine with resources, such as CPU threads, memory, I/O devices, and its own operating system. A root domain is a logical domain that has PCIe root complexes assigned to it. The PCIe bus and all the devices on it are owned by the root domain. From the root domain, you can allocate PCIe Endpoint devices to other logical domains.

When you provision Oracle VM Server for SPARC using Oracle Enterprise Manager Ops Center, ensure to select the option to detach the unused buses. The unused buses are detached from the primary domain and are available for creating root domains. See the Related Articles and Resources section for more information.

The number of root domains that you can create depends on the number of PCIe buses that are available on the server hardware.

In this guide, a root domain is created on Oracle SPARC T4-2 server provisioned with Oracle VM Server for SPARC 3.1 version. The SPARC server has two PCIe buses. One PCIe bus, *pci_0*, is allocated to the primary domain and the other PCIe bus, *pci_1*, is detached and available for root domain creation.

What You Will Need

You need the following resources to configure and deploy a root domain:

- **Oracle VM Server for SPARC system**

  Oracle SPARC T4-2 server installed and configured with Oracle VM Server for SPARC 3.1 version using Oracle Enterprise Manager Ops Center. See the Related Articles and Resources section for more information.

- **Network Connection**

  Obtain the details of the Ethernet devices connected to the PCIe bus that will be assigned to the root domain. You must acquire the network interfaces in the PCIe Endpoint device that are physically connected to the required network.

  The network to which the network interface is physically connected must be discovered and managed in Oracle Enterprise Manager Ops Center.

An IP address to be assigned to the root domain OS.

- **Storage Libraries**

  The local filesystem library is used for virtual disks of the root domain. The root domain is not migratable and hence the root domain metadata is stored in the local filesystem library automatically. In this example, 20 GB of virtual disk is created for the root domain.

- **OS Image**

  You must install and configure Oracle Enterprise Manager Ops Center in Oracle Solaris 11 OS and populate the Oracle Solaris 11 Library with SRUs. You can select an Oracle Solaris 11 OS of particular SRU version.

  Refer to the Related Articles and Resources section for more information about uploading or importing OS images.

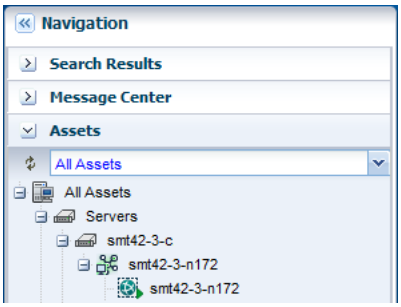
- **Roles and Permissions**

  A user with the following roles:

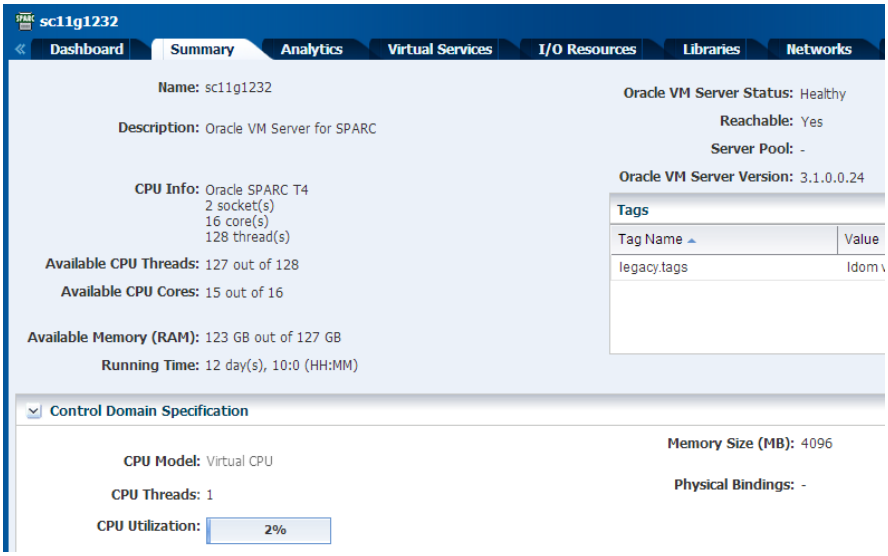
  - Virtualization admin role to create root domains and server provisioning.
  - Plan/Profile admin role to create profiles and plan for root domain creation and provisioning.

Hardware and Software Configuration

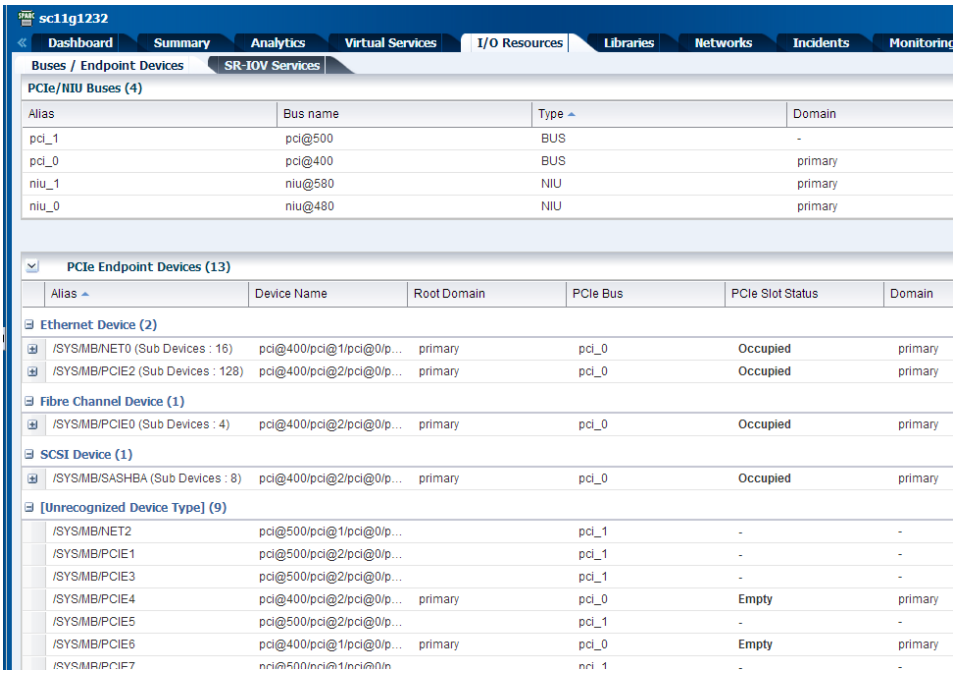
In this example, the root domain is installed on Oracle VM Server for SPARC 3.1 version. The control domain is configured and deployed in stand-alone mode and it is not placed in a server pool.



The Oracle VM Server for SPARC 3.1 version **Summary** tab is displayed in the UI as follows:

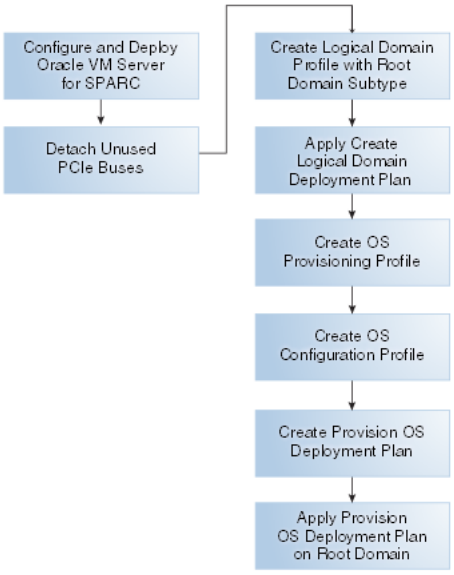


The **I/O Resources** tab of the control domain shows the PCIe buses and its allocation status. The **I/O Resources** tab of the control domain is displayed in the UI as follows:



Configuring and Installing Root Domains

The necessary profiles and plans that must be created and applied to create root domains are illustrated in the following illustration:



The steps to configure and install root domain is as follows:

- Creating a Root Domain Profile
- Deploying the Root Domain Plan
- Creating an OS Provisioning Profile
- Creating an OS Configuration Profile
- Creating a Provision OS Deployment Plan
- Applying Provision OS Deployment Plan On Root Domain

Creating a Root Domain Profile

Create a root domain with the following resource requirements:

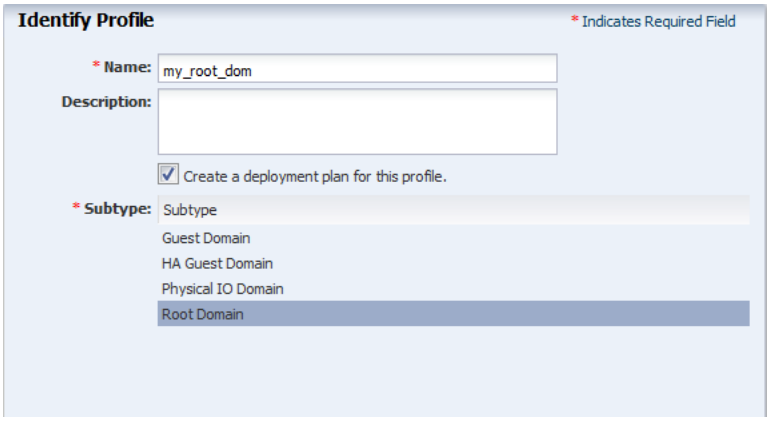
- Four CPU Threads.
- 4 GB of memory. You must provide at least 4 GB of memory for each I/O device.
- Native CPU architecture.
- Local file system for the virtual disks.

Do not provide any virtual network connection for the root domain. Instead, an Ethernet connection from one of the PCIe Endpoint device of the PCIe bus assigned to the root domain will be used for providing the physical network connection for OS provisioning.

1. Select **Plan Management** section in the Navigation pane.
2. Expand **Profiles and Policies** and select **Logical Domain**.
3. Click **Create Profile** in the Actions pane.

   The **Create Logical Domain Profile** wizard is displayed.
4. Enter a name and description to identify the profile.

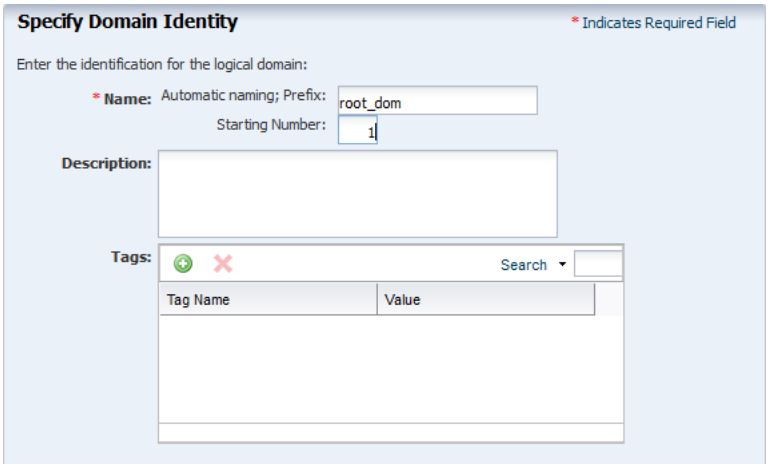
Retain the option to create a deployment plan for this profile. Select Root Domain in the Subtype.



Click **Next**.

5. Enter the name of the root domain as *root_dom* and the starting number as 1. The root domain will be created with the name as *root_dom1*.

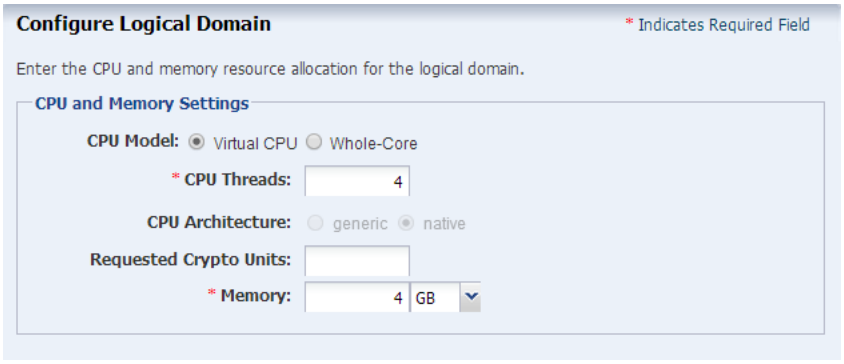
   Provide description and add new tags for the root domain. All the logical domains created using this profile uses the same description and tags.



Click **Next** to configure the CPU Threads and memory.

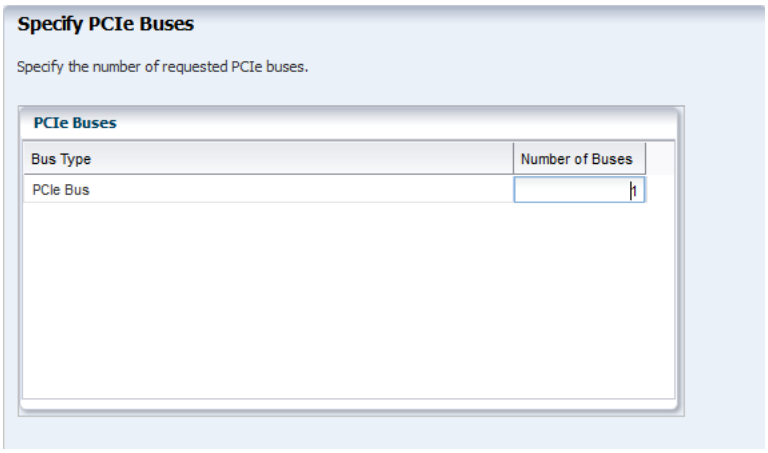
6. The threads in the physical CPU of the Oracle VM Server are dedicated to the logical domains. Select Virtual CPU as the CPU model and enter the values for CPU Threads and memory to be allocated for the root domain:

   - 4 CPU Threads.
   - 4 GB of memory.
   - Do not specify a value for Crypto Units. Depending on the number of CPU threads, the Crypto units are assigned automatically.



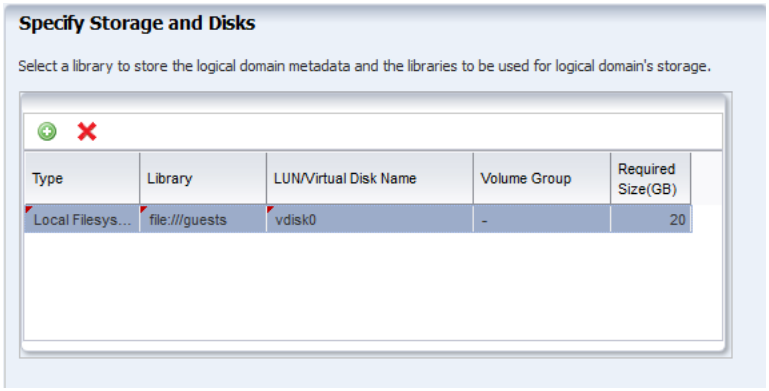
Click **Next** to specify the PCIe bus for the root domain.

7. Specify the number of PCIe buses that must be allocated to the root domain. The number of bus allocated in this example is one.



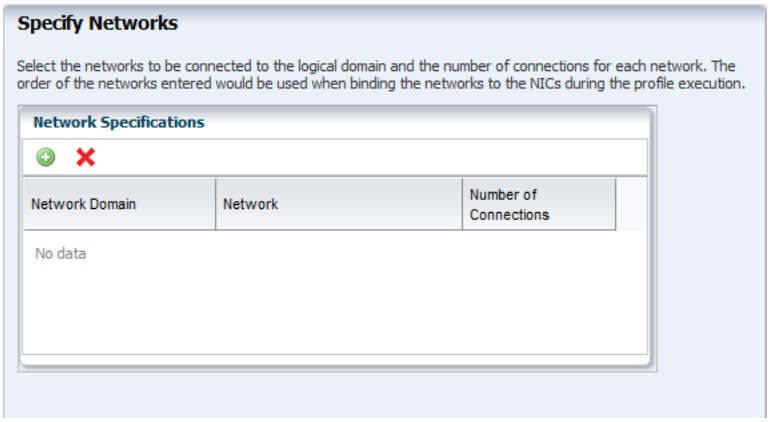
Click **Next** to specify the storage for the logical domains.

8. Click the **Add** icon to select the local filesystem library for the virtual disks. Enter the disk size as 20 GB. You can retain or edit the name of the virtual disk.



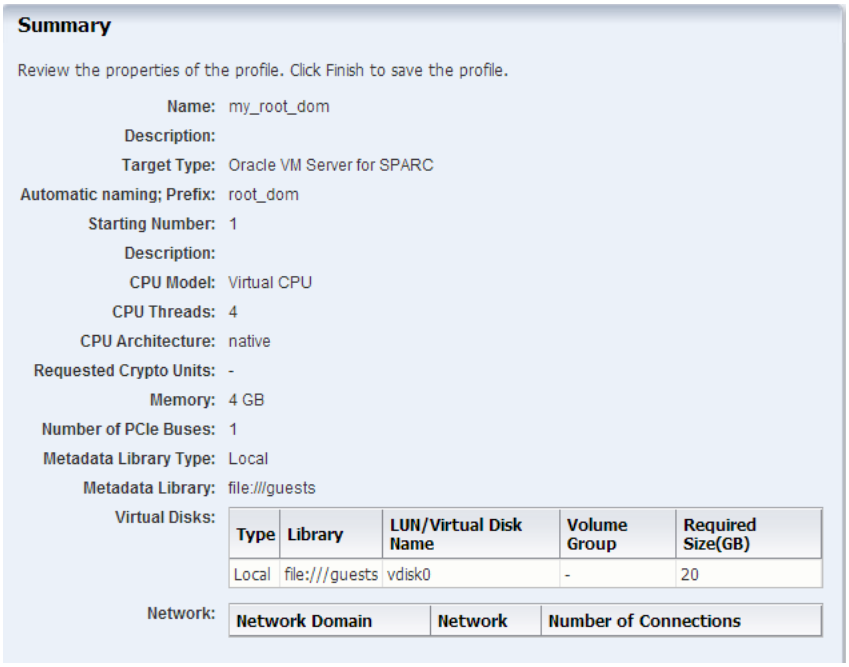
Click **Next**.

9. Skip the step to specify the networks that must be used for OS provisioning. In this example, virtual network connection is not used. Instead, a physical network connection from one of the PCIe Endpoint device is provided.



Click **Next** to view the summary of the logical domain details.

10. Review the information and click **Finish** to save the profile.

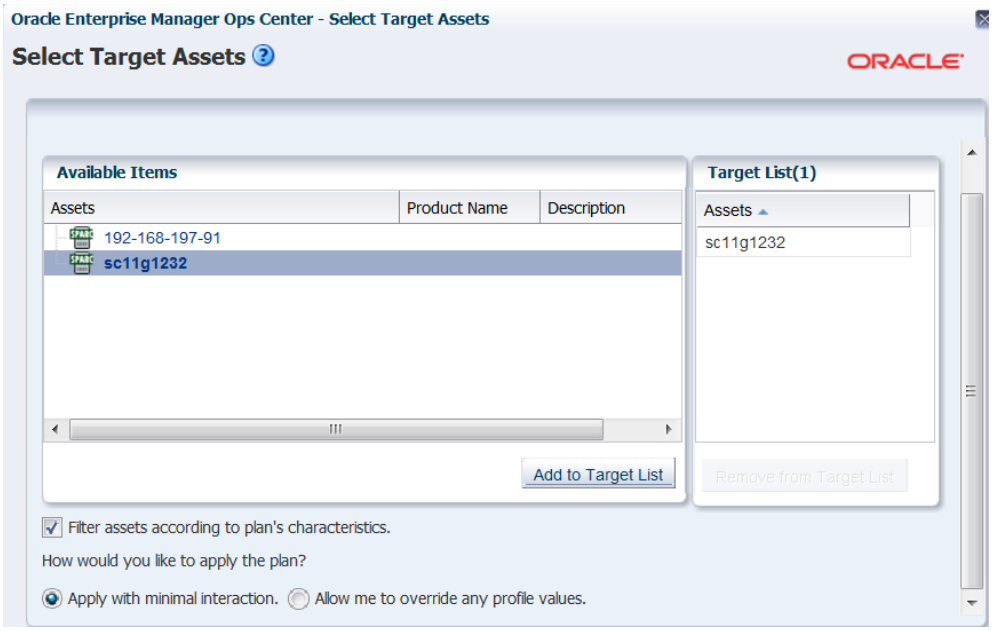


The profile to create to the root domain and the corresponding deployment plan are created. Apply the deployment plan to create the root domain.

Deploying the Root Domain Plan

Deploy the automatically created root domain plan to create a root domain. The root domain is created without any OS provisioned on it.

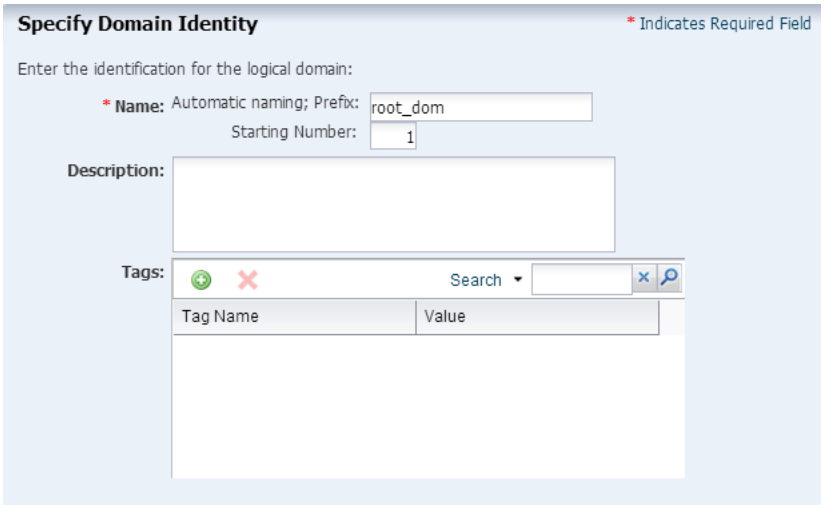
1. Select the **Plan Management** section in the Navigation pane.
2. Expand **Deployment Plans**, then expand **Create Logical Domains**.
3. Select the plan from the list of plans and click **Apply Deployment Plan** in the Actions pane.
4. In the **Select Targets** window, select the Oracle VM Server for SPARC system on which you want to create the root domain.



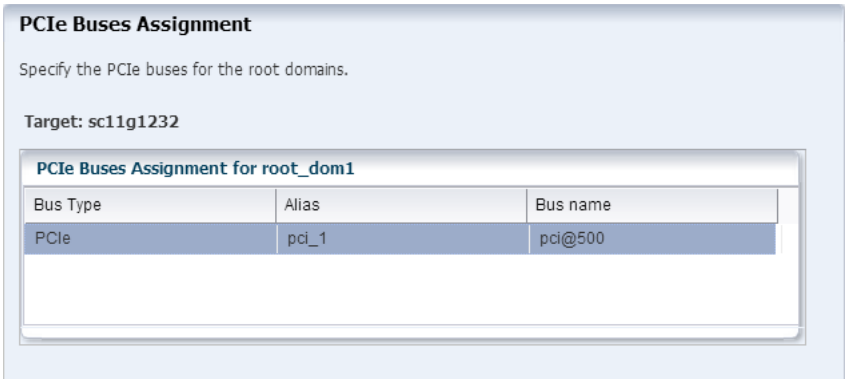
Click **Add to Target List** to move the selected target Oracle VM Server to the Target List. Select to apply the deployment plan in minimum interaction mode.

Click **Next**.

5. The Specify Domain Identity step is displayed. Confirm the given name in the profile and click **Next**.



6. Specify the PCIe bus alias for the root domain.

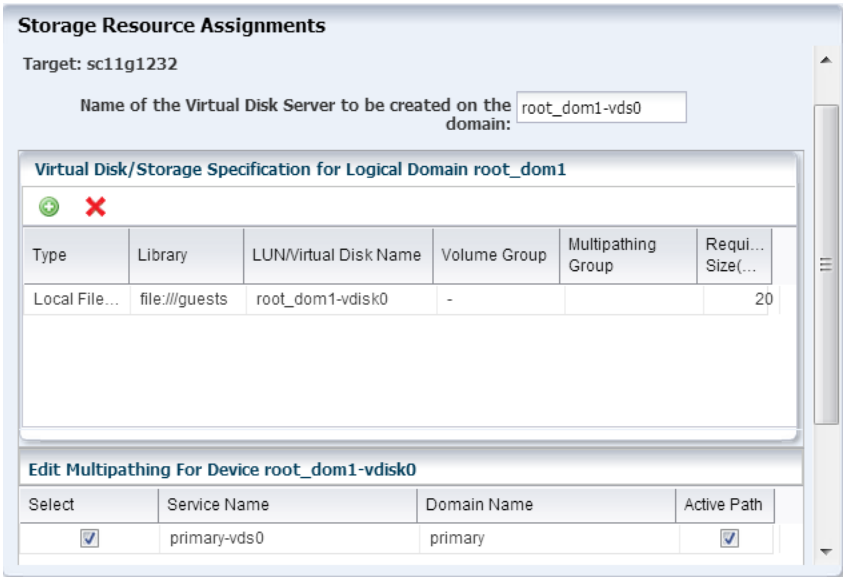


Click **Next**.

7. In the Storage Resource Assignments step, retain the storage library selected for the virtual disks from the profile.

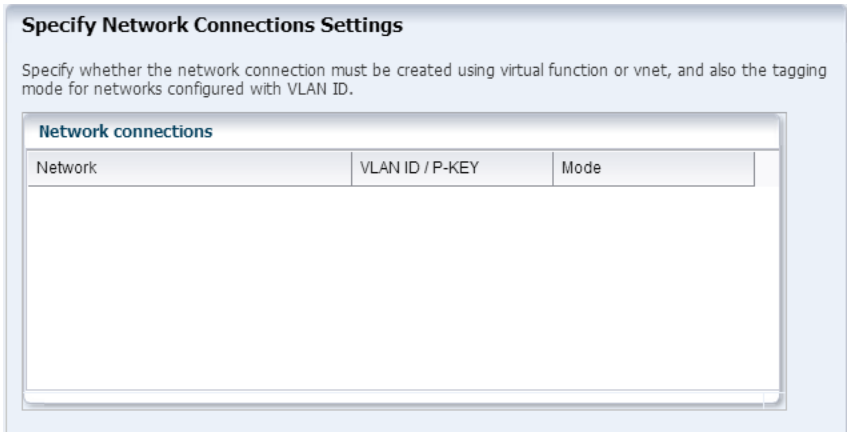
   There is only one path to access the back-end storage and the multipathing group name is not provided. Therefore, multipathing group is not created for this virtual disk.

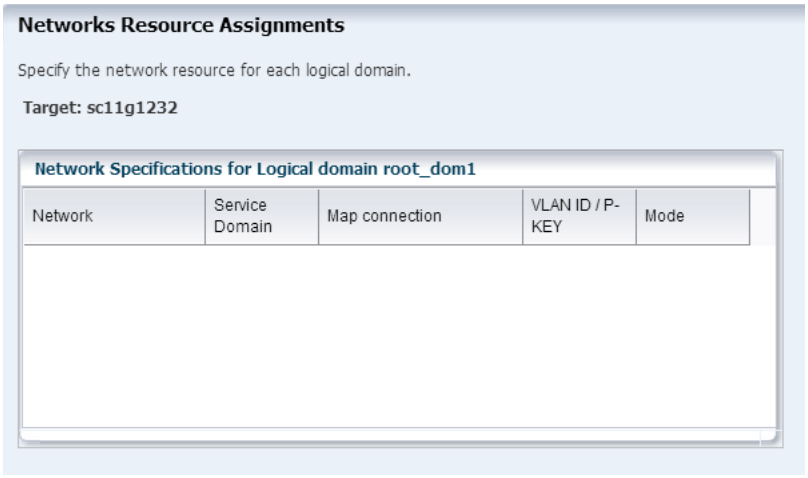
   The virtual disk server is named as *root_dom1-vds0* by default. If required, you can modify the name of the virtual disk server.



Click **Next**.

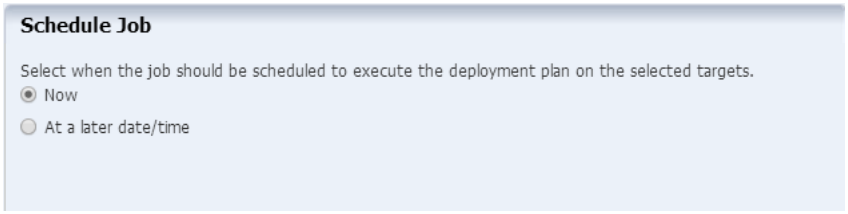
8. In the profile to create root domain, the network connections details were not provided. Therefore, the network connection settings step and network resource step are empty.





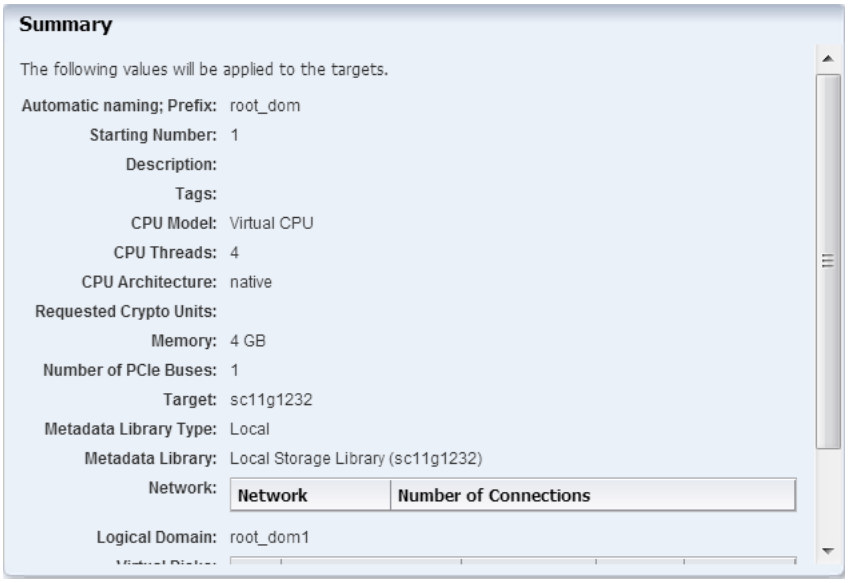
Click **Next**.

9. Schedule the job to run now.

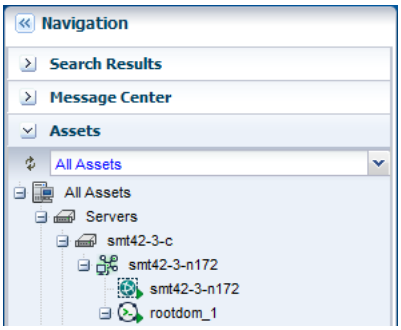


Click **Next**.

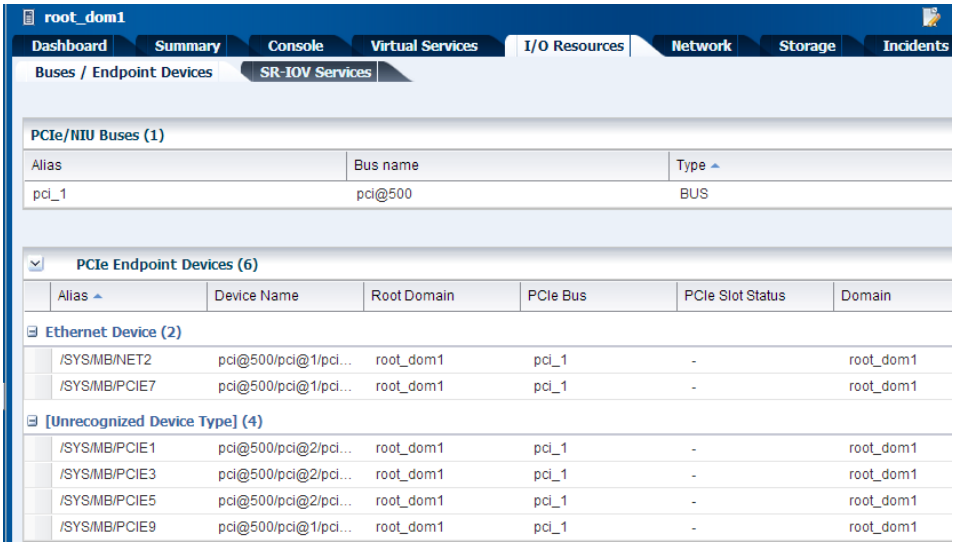
10. Review the properties and click **Apply** to apply the deployment plan to create logical domain.



The root domain is created and displayed under the corresponding Oracle VM Server for SPARC server:

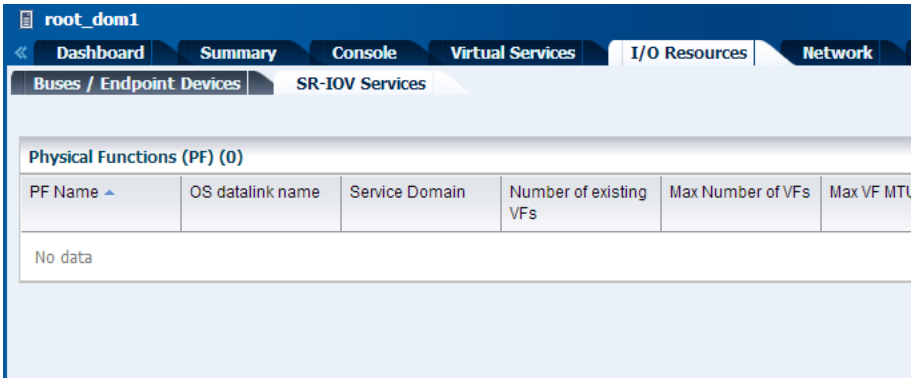


The root domain is in installing state as the OS is not yet provisioned on it. You can view the **I/O Resources** tab of the root domain in the center pane of Oracle Enterprise Manager Ops Center UI. The PCIe bus is assigned to the root domain. The PCIe slot status will be updated once the OS is provisioned on it.



You can also see in the I/O resources details that there are Ethernet devices available in the `/SYS/MB/NET2` and `/SYS/MB/PCIE7` slots. You must select these slots while provisioning the OS on the root domain.

If the PCIe Endpoint Ethernet device supports SR-IOV configuration, then the virtual functions are created for the physical function. The virtual functions are created only during OS provisioning. The **SR-IOV Services** are empty for the root domain created:

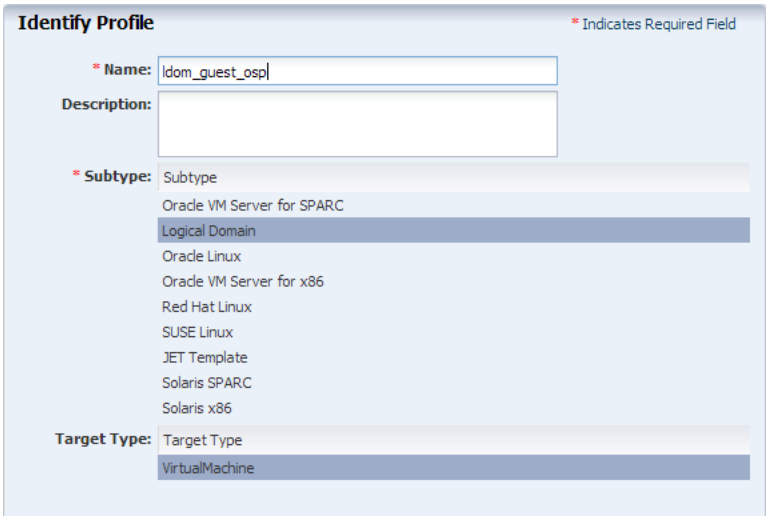


Creating an OS Provisioning Profile

Create a new OS provisioning profile for the Oracle Solaris 11 OS that must be provisioned on the root domain. You can also edit the default profiles that are created for the Oracle Solaris 11 OS. The procedure in this section describes about creating a new OS provisioning profile.

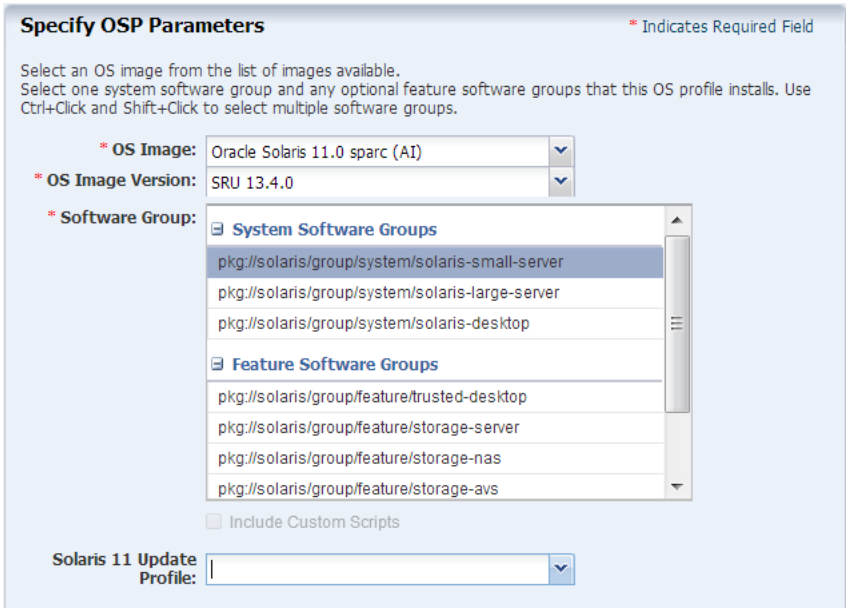
1. Select the **Plan Management** section in the Navigation pane.
2. Expand **Profiles and Policies** and select **OS Provisioning** profile.
3. Click **Create Profile** in the Actions pane.

   The **Create Profile - OS Provisioning** wizard is displayed.
4. Provide the following details for the profile identification:
   - Enter the name of the profile as *ldom_guest_osp*.
   - Enter a suitable description for the profile.
   - Select Logical Domain as the Subtype.



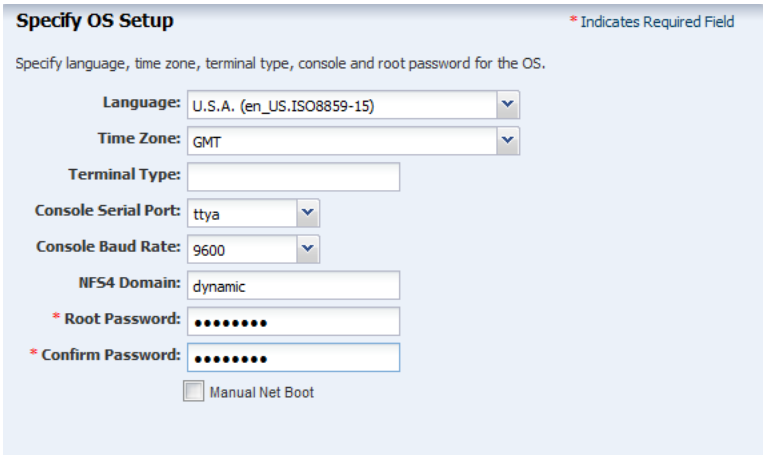
Click **Next** to specify the provisioning parameters.

5. Select the following OSP parameters:
   - Oracle Solaris 11 OS and SRU 13.4.0 from the list.
   - `solaris-small-server` as the Software Group.



Click **Next** to specify the OS Setup.

6. Specify the OS setup parameters:
   - Enter the time zone, language, terminal type, console serial port, and console baud rate.
   - Enter the root password.
   - The NFS4 domain is set to dynamic in this example. If a naming service is configured in your environment, enter the NFS4 domain value.

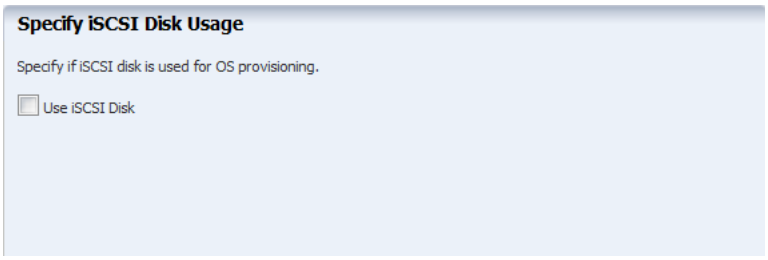


Click **Next**.

7. Create a user account to SSH to the OS after provisioning. Provide a user name and password for the account.

Click **Next** to specify whether you want to use iSCSI disks for OS provisioning.

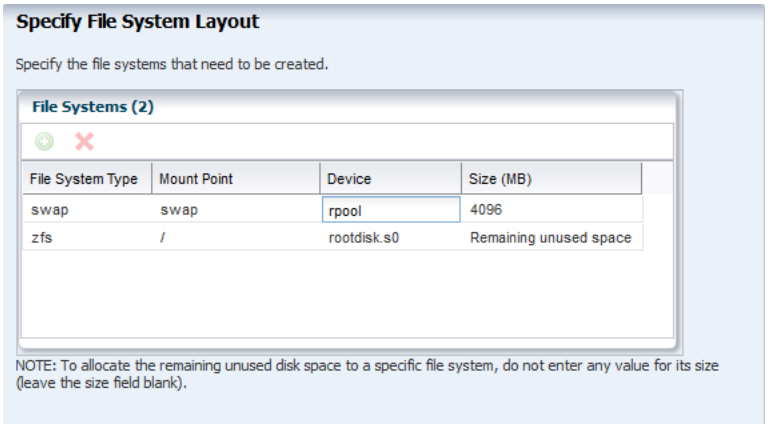
8. Do not select the option to use iSCSI disk as this scenario does not involve the use of iSCSI disk for OS provisioning.



Click **Next**.

9. The root (/) and a swap file system are defined by default. You can change the swap size. Click the **Add** icon to add more ZFS file systems.

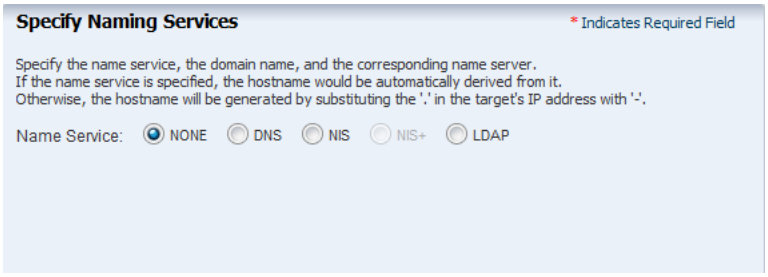
   UFS File System Type is available when you are provisioning Oracle Solaris 10 1/13 OS.



Click **Next** to specify the name service.

10. If you have a naming service in place, select the appropriate one and provide the setup details. In this procedure, select **None** for the naming service.

    If you have any naming service in your setup, refer to the help in the wizard or the Related Articles and Resources section for information about specifying the naming services.



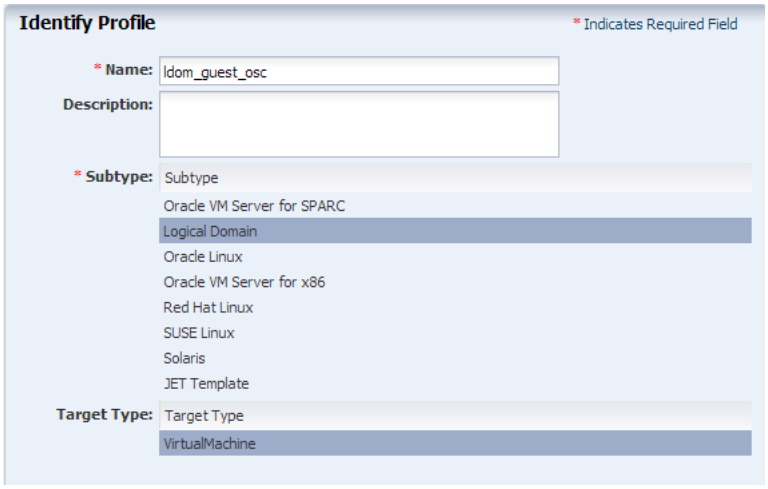
Click **Next** to view the summary of the parameters selected for the profile.

11. Review the parameters selected for the profile and click **Finish** to create the OS provisioning profile.

12. Click **Finish** to create the OS provisioning profile.

Creating an OS Configuration Profile

1. Select the **Plan Management** section and expand **Profiles and Policies**.
2. Select **OS Configuration** and click **Create Profile** in the Actions pane.
3. Enter the following details to identify the profile:
   - Name and description of the profile.
   - Select Logical Domain as the Subtype and Virtual Machine as the Target Type.

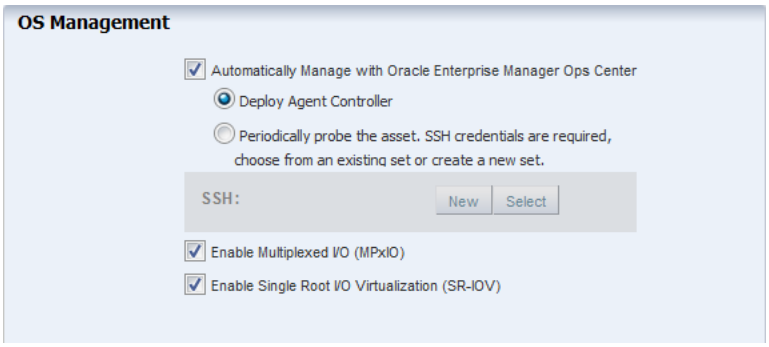


   Click **Next** to set the OS Management properties

4. Select to manage the OS automatically and deploy the Agent Controller to manage the asset.

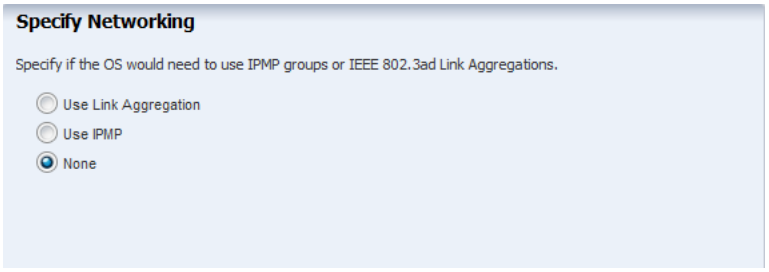
Select the option **Enable Multiplexed I/O** so that you can associate block storage libraries such as FC and iSCSI for storage with the OS.

Select the option **Enable Single Root I/O Virtualization (SR-IOV)** in the root domain. Starting with the 12.2.2.0.0 release, you can choose to disable SR-IOV to root domains by deselecting this option. Disabling SR-IOV prevents Oracle Enterprise Ops Center to automatically create virtual functions on the root domain.



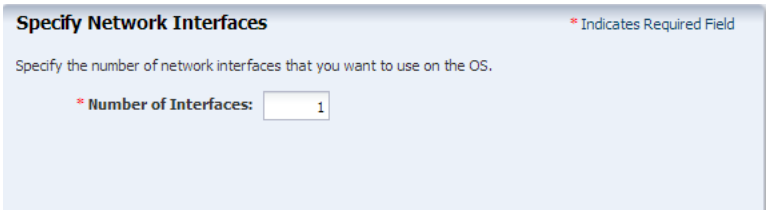
Click **Next** to specify the networking details.

5. Select **None** as the networking option for the OS.



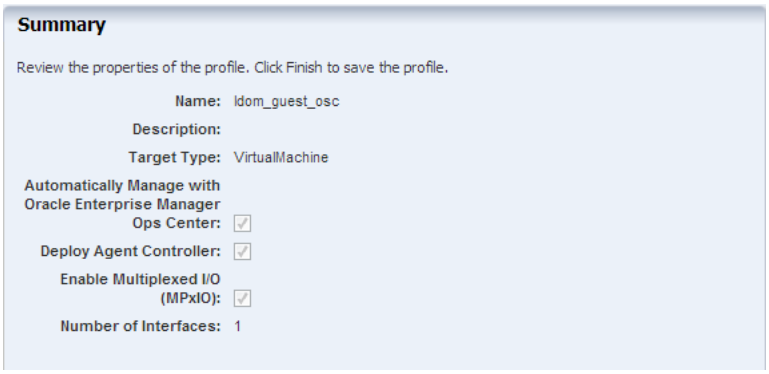
Click **Next** to specify the networking details for the OS such as network interface.

6. Enter the number of network interfaces that must be used on the OS. The details of the interfaces are collected while deploying the plan.



Click **Next** to view the summary of the parameters selected for OS configuration.

7. Review the parameters and click **Finish** to create the OS configuration profile.

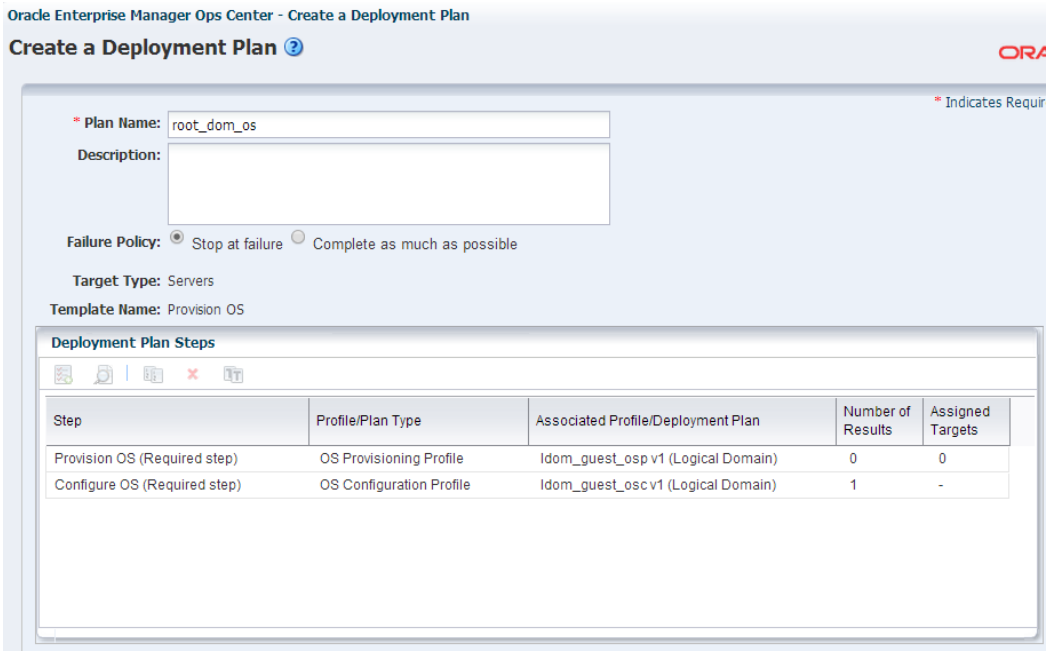


Creating a Provision OS Deployment Plan

Create a Provision OS plan that includes the OS Provisioning and OS Configuration profile created in the previous procedures. The provision plan will then be applied on the created root domain.

1. Select **Plan Management** section in the Navigation pane.
2. Expand **Deployment Plans** and select **Provision OS**.
3. Click **Create Plan from Template** in the Actions pane.
4. In the **Create a Deployment Plan** window, enter the following details:
   - Name of the plan as *my_guest_os*.
   - Description for the plan.
   - Select **Stop at failure** for Failure Policy.
   - Select the **OS Provisioning Profile** and the **OS Configuration Profile** created for provisioning OS on the root domain.

   Click **Save** to save the deployment plan.



Applying Provision OS Deployment Plan On Root Domain

For provisioning OS on the root domain, two important parameters are required:

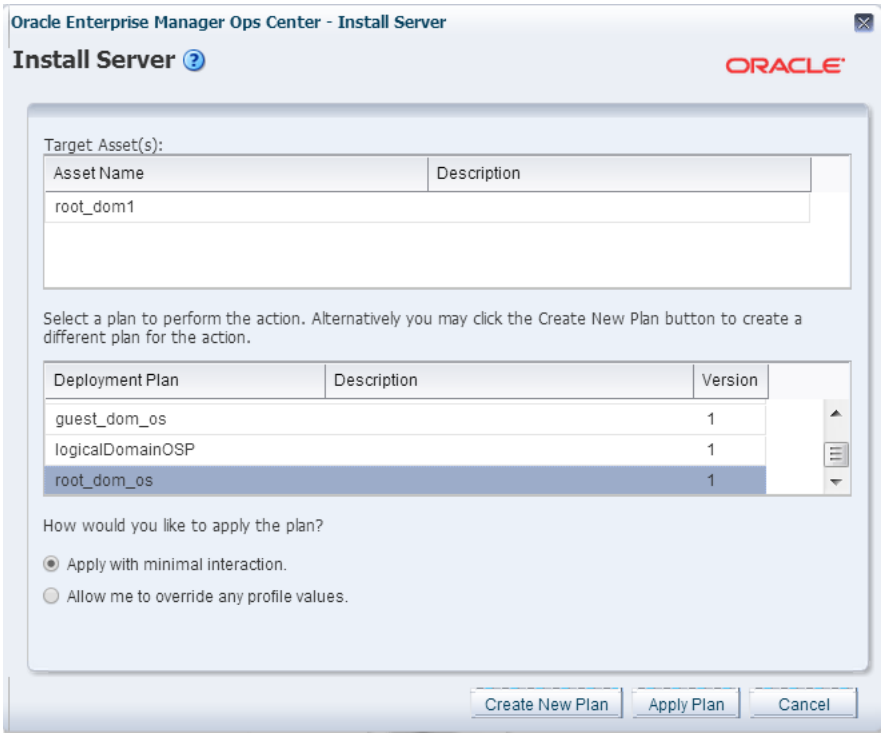
- **Boot interface details**: The details can be either the PCIe slot and the network port number, or the MAC address of the interface.
- **OS Provisioning IP Address**: The IP address that must be used on the OS. If you have more than one interfaces defined to be used on the OS, the network slot and the IP address for each network connection.

In this scenario, the root domain is created first and then the OS provisioning plan is deployed on the root domain. The available PCIe Endpoint devices are filtered and displayed in the boot interface list.

1. Select the root domain in the **Assets** tree of the Navigation pane.
2. Click **Install Server** in the Actions pane.

   The **Install Server** window is displayed.
3. Select the OS provisioning plan created for deploying the OS and apply the plan in minimal interaction mode.

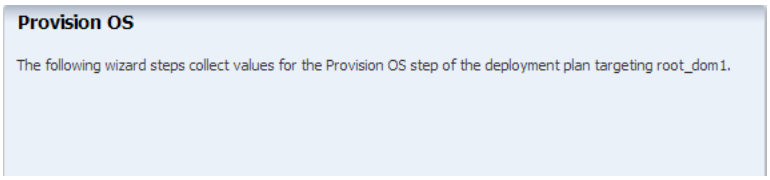
   Click **Apply Plan**.



4. The OS deployment wizard is displayed. Select not to review the steps that are not included in the deployment plan.

Click **Next** in the Introduction step.

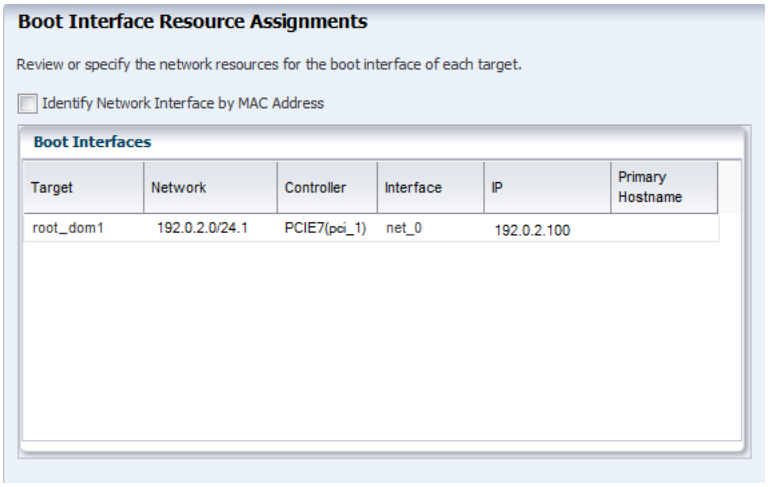
5. The plan consists of the OS provisioning profile and OS configuration profile. The application of the plan starts with the Provision OS step.



Click **Next** to define the boot interface resources.

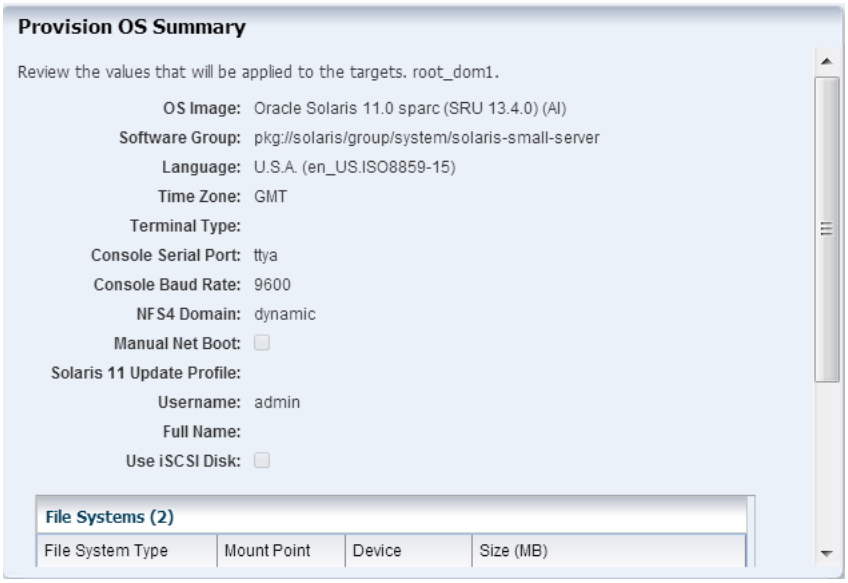
6. In the Boot Interface Resource Assignment step, enter the following details:
   - Select a network in the **Network** column. The networks that are discovered and managed in Oracle Enterprise Manager Ops Center are listed.
   - Select the PCIe Endpoint device that provides the network interface for the network connection.

     In this example, select `PCIE7(pci_1)` in the **Controller** column. The controller displays only those devices that are available for network connection. It does not display all the endpoint devices available in the bus.
   - Select the interface from the list of interfaces available for that PCIe slot.
   - Provide the IP address for the boot interface.
   - (Optional) Provide the host name for the target.



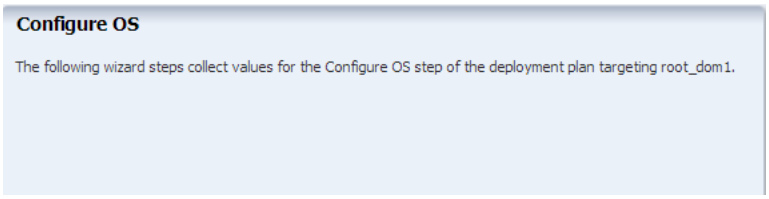
Click **Next**.

7. Review the summary of information for OS provisioning and click **Next**.



Click **Next**.

8. The application of the OS configuration profile starts in the wizard.

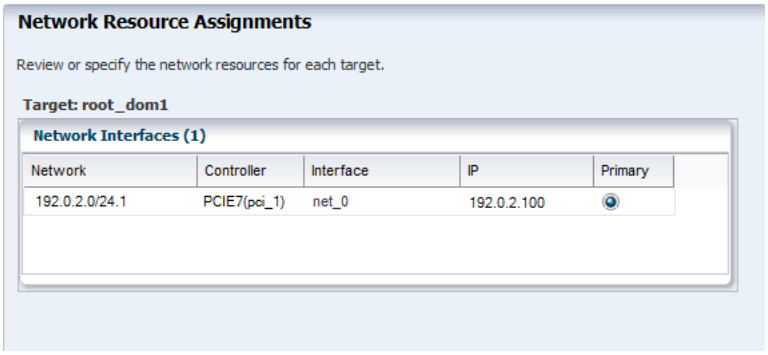


Click **Next**.

9. The boot interface network details are populated in this step. In this example, there was only one network interface selected to be configured on the OS. Therefore, the network resource is populated with the boot interface network details.

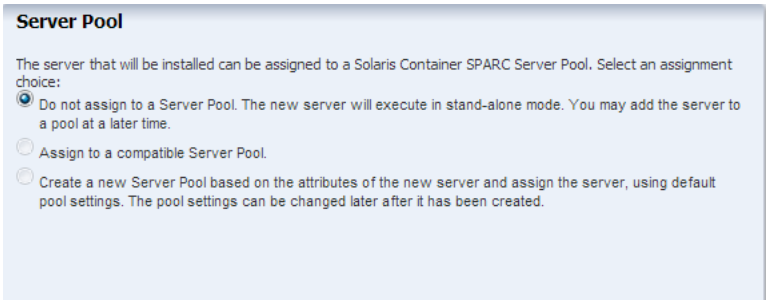
   If you have selected more than one interface to be configured on the OS, the first interface is always overwritten by the boot interface network details. Always define the first interface as the boot interface. You can select the interface that you want to be the primary interface. Specify the network resources for the selected interfaces:

   - Select the network in the **Network** column.
   - Select the PCIe Endpoint device in the **Controller** column. The PCIe Endpoint device provides the network interface for communication.
   - Select the network interface.
   - Enter the IP address for OS provisioning.
   - Select the primary interface.



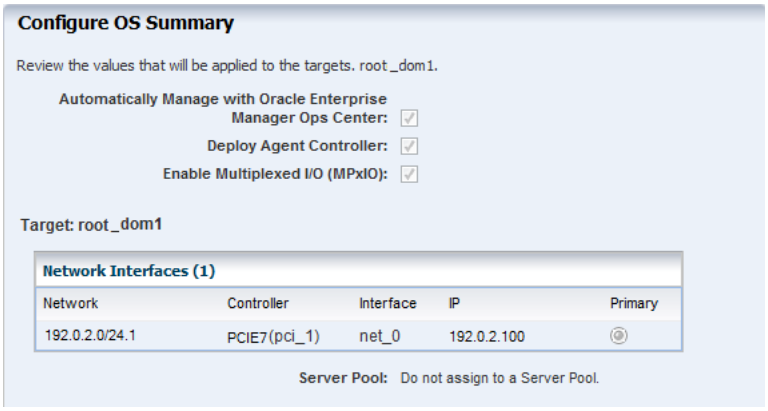
Click **Next**.

10. In this example, the OS is not placed in a server pool for zones.

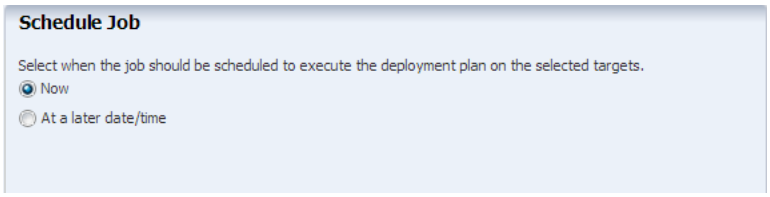


Click **Next**.

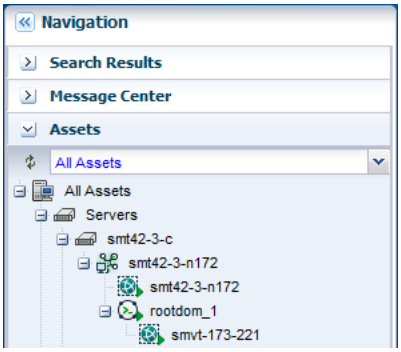
11. Review the summary of OS configuration parameters and click **Next**.



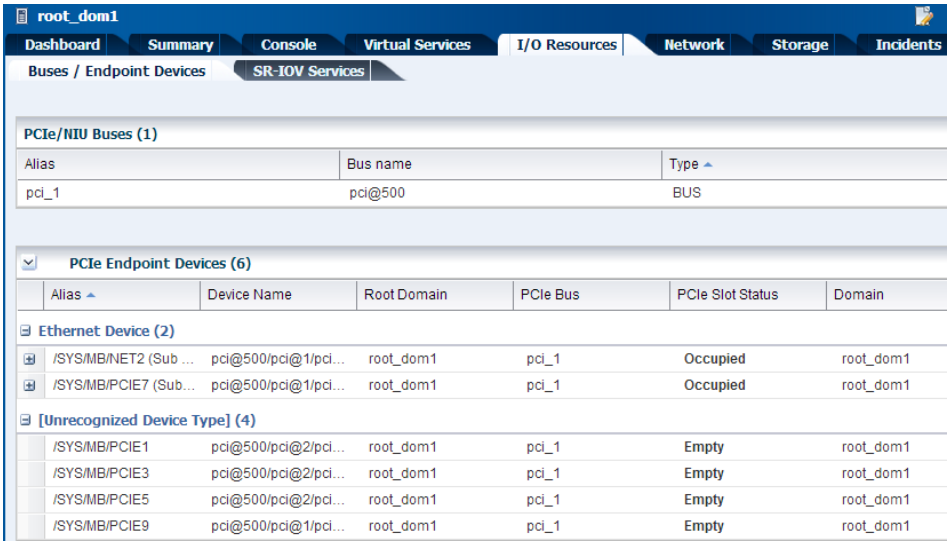
12. Schedule the job to run now and click **Apply**.



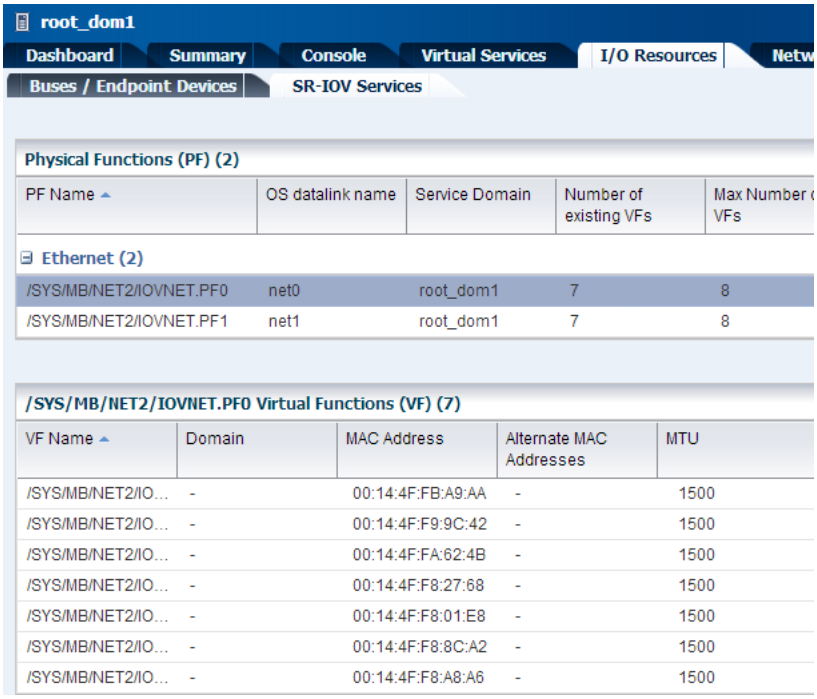
Execute the provisioning job on the root domain. The OS is provisioned and it is displayed in the UI:



You can now view the **I/O Resources** tab of the root domain that displays the complete details of the PCIe slot status.



For the SR-IOV enabled network interfaces, the virtual functions are created. In this scenario, the `/SYS/MB/NET2` is SR-IOV enabled network interface. Therefore, the virtual functions were created for the two physical functions:



For any reason, if you want to delete the root domain, starting with the 12.2.2.0.0 release you can use the **Delete** action to delete root domains if other domains are not using a virtual function from the root domain. For previous releases, if you want to delete the root domain that have virtual functions, then you must delete all the virtual functions created on the SR-IOV enabled PCIe devices before proceeding to delete the domain, all virtual functions must be deleted manually from the command line prompt of the control domain.

What's Next?

You can release the PCIe Endpoint Devices of the root domain, so that you can create I/O domains. Or, you can provide virtual I/O resources services to the other guest domains in the server.

Related Articles and Resources

The Oracle Enterprise Manager Ops Center 12*c* Release 3 documentation is available at `http://docs.oracle.com/cd/E59957_01/index.htm`.

Refer to the following resources for more information:

- *Oracle Enterprise Manager Ops Center Configuring and Deploying Oracle VM Server for SPARC* for more information about deploying Oracle VM Server for SPARC.
- *Oracle Enterprise Manager Virtualization Guide* for more information about creating and managing logical domains.
- *Oracle Enterprise Manager Ops Center Operations Guide* for more information about OS images and content.
- `http://www.oracle.com/technetwork/documentation/vm-sparc-194287.html` for Oracle VM Server for SPARC documentation

For current discussions, see the product blog at https://blogs.oracle.com/opscenter.

See the Deploy How To library at http://docs.oracle.com/cd/E59957_01/nav/deploy.htm and the Operate How To library at http://docs.oracle.com/cd/E59957_01/nav/operate.htm for deployment and operational examples.

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Oracle Enterprise Manager Ops Center Configure and Install Root Domains, 12*c* Release 3 (12.3.0.0.0)
E60040-01

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