Oracle® Enterprise Manager Ops Center

Configure a Secondary Service Domain

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

Introduction

This document focuses on using the latest features introduced in Oracle Enterprise Manager Ops Center 12.2 to create a highly available environment using a dual I/O configuration as well as the application of several best practices.

In earlier versions of Oracle Enterprise Manager Ops Center, it was only possible to create and manage the control domain which owned all the physical I/O devices and also provided virtual devices to the guest domains. It was impossible to configure, deploy, manage, or discover a secondary domain. An advantage of having a secondary service domain and creating a resilient environment is that maintenance on the control domain (such as OS upgrades, patching, and increasing memory) happens without affecting any running guest domains.

This example describes how to use Oracle Enterprise Manager Ops Center 12.2.1 to deploy:

- A control domain, also referred to as primary domain and denoted as primary wherever applicable in the Oracle Enterprise Manager Ops Center UI.
- A secondary service domain, also referred to as alternate I/O domain or redundant I/O domain. The secondary service domain is a root domain, that is a domain configured with a PCIe root complex with a configuration similar to the control domain.
- A high available (HA) guest domain, the guest domain will use services from both, the control domain and secondary service domain for improving resilient.

The scenario in this document uses an Oracle SPARC server and Oracle VM Server for SPARC to create the control domain, the secondary service domain, and the guest domain.

What You Will Need

The following resources are used for this example:

- A server hosting Oracle Enterprise Manager Ops Center, the Enterprise controller and the co-located Proxy controller.
- Oracle Enterprise Manager Ops Center 12.2.1 installed. Enterprise Controller (EC) with co-located Proxy Controller (PC), and an embedded database running on Solaris 11.1 SRU 19.6.



- Oracle Solaris 11 Software Update Library. This example uses Oracle Solaris 11.1 SRU 19.6 content
- Oracle SPARC T5-2 ILOM discovered and managed in Oracle Enterprise Manager Ops Center.
- Sun ZFS Storage 7120 appliance discovered in Oracle Enterprise Manager Ops Center.
- Fiber Channel (FC) LUNs available from the Sun ZFS Storage 7120 appliance.
- NFS share from the Sun ZFS Storage 7120 appliance.
- Free IP addresses allocated.
- VLAN tagged network created in Enterprise Manager Ops Center.
- Oracle SPARC T5-2 for provisioning Oracle VM for SPARC Server, version 3.1.1. The server requires a free PCIe bus for configuring the secondary service domain.
- Virtualization Admin, and Profile and Plan Admin role to perform the actions.

Preview of the Configuration for the Resilient Environment

An Oracle SPARC T5-2 Server is used to create the service domains and the HA guest domain. A summary of how the domains and guest will be configured is explained in the following section, followed by a table which includes the PCIe buses used, and then an image depicting the layout.

Due to lab constraints, I/O configuration options were limited; therefore, setting up a best practice environment in all areas was not possible. However, the document mentions areas in which best practices could be applied.

Configuration Summary

The primary and secondary domains will be configured similarly, with:

- Connections to a Public and an Admin network
- Link aggregation for the public Network
- Connections to an Sun 7120 Storage Appliance
- Oracle Solaris 11.1 SRU 19.6 operating system (OS)
- Oracle VM Server for SPARC 3.1.1
- 4 whole-core CPUs for the control domain, and 2 whole-cores CPUs for the secondary domain
- 16 GB of memory for the control domain and 4GB of memory for the secondary domain.

Each domain will have access to different PCIe buses for resilience.

For best practice, consider having multipathed LUNs from the storage to the primary and secondary domains.

The guest domain will have:

- Two network connections for the public network, one from each domain
- Two network connections for the admin network, one from each domain
- Redundant storage I/O paths provided by primary and secondary domains

- Oracle Solaris s11.1 SRU 19.6 operating system
- 4 core CPUs
- 4 GB of memory

Configuration Table

The following table shows how PCIe buses are used for each domain:

Domain	Configuration	Network	Storage
Control domain	Oracle Solaris 11	4 Ethernet connections:	FC LUN (pci0)
	SRU 19.6	ixgbe0 (pci0) connected to	provided by a Sun ZFS Storage 7120 appliance
	4 CPUs	admin network.	Storage / 120 apphance
	16 GB of memory	ixgbe1(pci0), ixgbe2(pci1), and ixgbe3(pci1) connected to the public network, all aggregated.	
Secondary	Oracle Solaris 11	4 Ethernet connections:	FC LUN (pci3)
service domain	SRU 19.6	ixgbe0 (pci3) connected to	provided by a Sun ZFS Storage 7120 storage
	2 CPUs	admin network.	appliance
	4 GB of memory	ixgbe1(pci3), ixgbe2(pci2), and ixgbe3(pci2) connected to the public network, all aggregated.	
Guest domain	Oracle Solaris 11	4 virtual network connections:	Redundant I/O paths
	SRU 19.6	The admin network has two	to virtual disk server in
	4 CPUs	virtual networks (vnets) one	secondary domain.
	4 GB of memory	one from the secondary domain and which is IP Multipathed (IPMP0).	,
		The public network has two network connections, one from the control domain and one from the secondary domain which will be IP Multipathed (IPMP1).	

Configuration Illustration

Figure 1 illustrates how the Oracle SPARC server will be configured to allow for resilient logical domains.



Figure 1 Resilient Environment for Logical Domains

Steps for Creating the Environment

To following steps define the procedure to create a resilient logical domain environment, each step is discussed in detail:

- 1. Configuring and Provisioning the Control Domain
- 2. Adding a PCI bus to the Control Domain
- 3. Aggregating Networks and Creating a Virtual Switch to the Control Domain
- 4. Configuring and Provisioning the Secondary Service Domain
- 5. Creating the HA Guest Domain

Configuring and Provisioning the Control Domain

The first domain in Oracle VM Server for SPARC is always the control domain. The main purpose of this domain is to provide an environment where the Oracle VM Server for SPARC Manager runs. It also provides virtual console services as well as virtual services to guest domains.

The following steps define the procedure to successfully configure and provision Oracle VM Server for SPARC 3.1.1 version:

- 1. Creating an OS Provisioning Profile
- **2.** Creating an OS Configuration Profile
- 3. Creating the Deployment Plan and Provisioning the Control Domain

Creating an OS Provisioning Profile

The OS provisioning profile (OSP) allows you to set the operating system parameters, including file system layout, time zones, passwords, and other parameters.

To create the OSP in Oracle Enterprise Manager Ops Center:

- **1.** Select **Plan Management** section and expand **Profiles and Policies** in the Navigation pane.
- 2. Select OS Provisioning profile and click Create Profile in the Actions pane.
- **3.** Enter the following details in the **Create OS Profile OS Provisioning** wizard and then click **Next** to specify the OSP parameters.:
 - Name and description of the profile.
 - Select Oracle VM Server for SPARC as the Subtype.
- **4.** Select the following parameters in the Specify OSP Parameters step and then click **Next** to specify the OS setup:
 - Select the Oracle VM Server for SPARC version along with the required Oracle Solaris 11 OS and SRU. In this example, select the version Solaris 11.1 SRU 19.6.0 (LDom 3.1.1.0).
 - Select solaris-small-server from the Systems Software Group.
- **5.** Retain the default values for the OS setup parameters or edit the language, time zone, and NFS4 Domain values for your environment. Enter the root password and confirm the password. Click **Next** to specify the user account for Oracle Solaris 11 OS.

You can also choose to select the **Manual Net Boot** and **Save NVRAMRC** options. For more information about this, refer to the Related Articles and Resources section.

6. Root login is not enabled in Oracle Solaris 11 OS. 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 provisioning Oracle VM Server for SPARC.

7. Do not select the option to use iSCSI disk as this scenario does not involve the use of iSCSI disk for provisioning Oracle VM Server for SPARC.

Click **Next** to specify the file system layout.

8. Retain the default values for the root (/) and swap file systems. You have the options to change the swap size and add more ZFS file systems.

) X	•			
File System Type	Mount Point	Device	Size (MB)	
swap	swap	rpool	4096	
7fs	1	rootdisk s0	Remaining unused space	

Click Next to specify the name service.

9. If you have a naming service in place, select the appropriate one and provide the setup details. In this example, 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.

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

Creating an OS Configuration Profile

The OS configuration profile (OSC) is used to configure the resources for the control domain, like CPU cores, as well as detach unused buses, set network options, and other options.

To create the OSC in Oracle Enterprise Manager Ops Center:

- **1.** Select the **Plan Management** section in the Navigation pane and expand **Profiles and Policies**.
- 2. Select OS Configuration and click **Create Profile** in the Actions pane.
- 3. Enter the following details in the **Create Profile OS Configuration** wizard:
 - Name and description of the profile.
 - Select Oracle VM Server for SPARC as the Subtype.

Click Next to specify the control domain parameters.

- **4.** Specify the resources that you want to assign to the control domain. The remaining resources are available for the logical domains. The following are new additions to the 12.2 version:
 - Allocate CPU resources as Whole Cores. All threads are allocated from the CPU to the control domain.
 - Virtual Disk Server name can be altered from the default.
 - Detach unused buses, PCIe buses that are not required for use by the control domain are unassigned and can be used for other domains.

• Enable SR-IOV, permits virtual functions to be shared from the PCIe card if the card permits.

In this scenario, select the following configuration parameters for the control domain:

- Oracle VM Server Version: Select the Solaris 11.1 SRU 19.6.0 (LDom 3.1.1.0) version to be installed.
- **CPU Model**: Use Whole-core to allocate the CPU resource in cores.
- **CPU Cores**: Enter four CPU core to be allocated to the control domain.
- Memory: Enter 16 GB as the memory required for control domain.
- Virtual Console Port Range: Enter the range between 5000 to 6000.

Do not provide any values for **Requested Crypto Units** and **Max CPU Cores**. Retain or edit the default name of the virtual disk server. Select the option **Detach Unused Buses**.

Click Next to specify the OS management details.

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

Click Next to specify the networking details.

6. Select None as the networking option for Oracle VM Server for SPARC.

Click Next to specify the networking details for Oracle VM Server for SPARC.

7. Select the network interface to use for OS provisioning. Select the **Controller** that hosts the network interfaces and the corresponding network interface. The **Address Allocation** is Use Static IP by default and cannot be modified.

Select **Auto** to create a virtual switch automatically for the network connection to the control domain. The virtual switch is created in the default format. For example, the network *192.0.2.0/24*, the virtual switch is created as *192.0.2.0_24*.

Note: As Figure 1shows, the networks of the control domain are aggregated. However, as the option Detach Unused Buses is selected, this would mean pci1 would not be owned by the control domain, so aggregation as required (for using pci0 and pci1) is not possible. Aggregation will happen later when pci1 is re-added and owned by the control domain.

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

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

Creating the Deployment Plan and Provisioning the Control Domain

The Deployment Plan combines the OSP and OSC to provision and configure the control domain.

To create the deployment plan in Oracle Enterprise Manager Ops Center:

- 1. Select **Plan Management** section in the Navigation pane.
- 2. Expand Deployment Plans and select Provision OS.

- 3. Click Create Deployment Plan in the Actions pane.
- 4. Enter the following information for the deployment plan:
 - Name and description for the plan.
 - Select **Stop at Failure** as the Failure Policy.
 - Select the corresponding OS provisioning and configuration profile created for the control domain.
- 5. Click **Save** to create the deployment plan.

Once the Deployment plan has been created, the next task is to provision the control domain. To do this selects the ILOM server from the assets menu and select **Install Server** from the Actions panel. A job will be created, similar to the one below after completing the steps:

Task	Target of the task	Result	Elapsed Time
a 🚥 t5-2-tvp540	t5-2-tvp540	Flow execution is in progress	00 hr, 00 min, 08 sec
4 🚥 t5-2-tvp540			-
4 🚥 Provision OS			-
📀 Setup Install Client	10.163.212.79	Setup Clients task is successfully completed. (32519)	Less than a second
		Configured the Oracle VM Server for	
🤡 Configure Virtualizat	10.163.212.79	SPARC as per the values set in	Less than a second
		Oracle VM Server for SPARC profile.	
		Created Auto Install client t5-2-	
📼 Configure Install Ser	10.163.212.79	tvp540-c'having macaddress	00 hr, 00 min, 06 sec
		00:10:E0:2A:3C:E4.	
🛶 ClearZoneController	t5-2-tvp540		
🛶 Reset to Factory De	t5-2-tvp540-		-
🛶 Network Install	t5-2-tvp540-		-
🛶 Monitor OS Installatio	10.163.212.79		-
🛶 Cleanup Client	10.163.212.79		-
4 🛶 Configure OS			
n Setup Configure Clie	10.163.212.79		-
4 🛶 Download Agent Ima	1		-
🛶 Download Image	PC		-
🛶 Configure Target Se	10.163.212.79		-
🛶 Monitor OS Configur	10.163.212.79		
🛶 Verify Agent Install	10.163.212.79		-
🛶 Cleanup OSC Client	10.163.212.79		-

Once the Provisioning job has completed successfully, check if the parameters have been set. This can be seen from the UI by selecting the Summary tab.

Virtual Services I/O Resources	Libraries Netv			
Oracle VM Server Statu	s: Healthy			
Reachabl	e: Yes			
Server Poo	ok -			
Oracle VM Server Version: 3.1.1.0.5				
Tags				
Tag Name 🔺	Value			
legacy.tags	Idom virtualization controller			
Memory Size (ME	i): 4096			
	Virtual Services 1/0 Resources Oracle VM Server Statu Reachabl Server Por Oracle VM Server Versio Tags Tag Name A legacy.tags Memory Size (MB			

Since the option **Detach unused buses** was selected in the OSC, the control domain only owns the *pci0* bus. You can verify it in the UI by selecting the I/O Resources tab, or in the CLI by logging in to the control domain and using the *ldm ls-io* command. From the CLI the output will look similar to the following:

root@t5-2-tvp540-c:/var/tmp# ldm ls-io				
NAME	TYPE	BUS	DOMAIN	STATUS
pci_1	BUS	pci_1		
pci_0	BUS	pci_O	primary	
pci_3	BUS	pci_3		
pci_2	BUS	pci_2		
/SYS/MB/PCIE5	PCIE	pci_1		UNK
/SYS/MB/PCIE6	PCIE	pci_1		UNK
/SYS/MB/PCIE7	PCIE	pci_1		UNK
/SYS/MB/PCIE1	PCIE	pci_O	primary	occ
/SYS/MB/SASHBAO	PCIE	pci_O	primary	occ
/SYS/MB/NETO	PCIE	pci_O	primary	occ
/SYS/MB/PCIE8	PCIE	pci_3		UNK
/SYS/MB/SASHBA1	PCIE	pci_3		UNK
/SYS/MB/NET2	PCIE	pci_3		UNK
/SYS/MB/PCIE2	PCIE	pci_2		UNK
/SYS/MB/PCIE3	PCIE	pci_2		UNK
/SYS/MB/PCIE4	PCIE	pci_2		UNK
/SYS/MB/NETO/IOVNET.PFO	PF	pci_0	primary	
/SYS/MB/NETO/IOVNET.PF1	PF	pci_0	primary	
root@t5-2-tvp540-c:/var/tmp#				

As shown above, the control domain now only owns pci_0.

Adding a PCI bus to the Control Domain

As seen in the output generated by the command ldm ls-io, pcil needs to be added to the control domain, which will provide another network interface and allow network aggregation across the pci0 and pcil buses.

Currently, the network devices on the control domain are ixgbe2 (net0) and ixgbe3 (net1). You can verify it from the CLI by using the dladm show-phys command.

root@t5-2-tv	p540-c:/var/tmp# dladn	n show-phys			
LINK	MEDIA	STATE	SPEED	DUPLEX	DEVICE
netO	Ethernet	up	100	full	ixgbe2
net1	Ethernet	unknown	0	unknown	ixgbe3
net10	Ethernet	up	100	full	vsw0
root@t5-2-tv	vp540-c:/var/tmp# 📒				

The device numbers might seem strange at first, as seeing ixbge0 and ixbge1 would be more logical. The reason for the numbering is because of the way Oracle Solaris maps instance names to physical devices in /etc/path_to_inst. Oracle Solaris keeps a history about all devices and how they are mapped.

PCIe buses cannot be dynamically added to the control domain. Therefore, the control domain is set in delayed reconfiguration mode. In this mode, operation changes take effect after the next reboot.

Certain actions, usually one-time actions, cannot be performed from the UI, such as adding a PCIe bus. These actions need to be performed from the CLI by using ldm commands on the control domain. A new feature in Ops Center 12.1 and above allows using CLI or BUI in parallel to perform administration tasks.

To add a new PCIe bus to the control domain:

1. Initiate the delayed reconfiguration state in the control domain by using the ldm start-reconf command.



2. Add the PCIe bus to the control domain by using the ldm add-io pci_1 primary command, in this scenario the PCIe bus name pci1 is added.



3. Reboot the primary domain for changes to take effect.

After the reboot, the control domain is now the owner of pci1 and pci0, as shown below.

root@t5-2-tvp540-c:/var/tmp# ldm ls-io				
NAME	TYPE	BUS	DOMAIN	STATUS
¥-				
pci_1	BUS	pci_1	primary	
pci_0	BUS	pci_0	primary	
pci_3	BUS	pci_3		
pci_2	BUS	pci_2		
/SYS/MB/PCIE5	PCIE	pci_1	primary	UNK
/SYS/MB/PCIE6	PCIE	pci_1	primary	UNK
/SYS/MB/PCIE7	PCIE	pci_1	primary	UNK
/SYS/MB/PCIE1	PCIE	pci_0	primary	occ
/SYS/MB/SASHBAO	PCIE	pci_0	primary	occ
/SYS/MB/NETO	PCIE	pci_0	primary	occ
/SYS/MB/PCIE8	PCIE	pci_3		UNK
/SYS/MB/SASHBA1	PCIE	pci_3		UNK
/SYS/MB/NET2	PCIE	pci_3		UNK
/SYS/MB/PCIE2	PCIE	pci_2		UNK
/SYS/MB/PCIE3	PCIE	pci_2		UNK
/SYS/MB/PCIE4	PCIE	pci_2		UNK
/SYS/MB/NETO/IOVNET.PFO	PF	pci_0	primary	
/SYS/MB/NETO/IOVNET.PF1	PF	pci O	primary	
root@t5-2-tvp540-c:/var/tmp#				

The network devices available on the control domain are now xgbe2 (net0), ixgbe3 (net1), xgbe0 (net4), and xgbe1 (net5):

root@t5-2-tvp540-	c:/etc/default# dladm) show-phys			
LINK	MEDIA	STATE	SPEED	DUPLEX	DEVICE
net8	Ethernet	up	10	full	usbecm2
ntet0	Ethernet	up	100	full	ixgbe2
net4	Ethernet	unknown		unknown	ixgbe0
net1	Ethernet	unknown		unknown	ixgbe3
net5	Ethernet	unknown		unknown	ixgbe1
net10	Ethernet	up	100	full	vswO
root@t5-2-tvp540-	c:/etc/default# 📒				

This yields the four network interfaces that are required. In the next step, three of the interfaces for the public network will be aggregated.

Aggregating Networks and Creating a Virtual Switch to the Control Domain

Link aggregation increases bandwidth, provides degradation as failure occurs, and increases availability. In addition, it provides network redundancy by load-balancing traffic across all available links. If a link fails, the system automatically load-balances traffic across all remaining links as specified when creating the policy.

For redundancy, network links are used from the pci0 and pci1 buses. These are aggregated for better throughput and added redundancy.

The following steps define the procedure to create the aggregated links and the virtual switch:

- 1. Creating Aggregated Links
- **2.** Creating a Virtual Switch

Creating Aggregated Links

To create aggregated link from the UI:

- 1. Expand Assets in the Navigation pane and select the OS of the control domain.
- **2.** Select the Networks tab in the center pane, then the Link Aggregations sub tab, and click the **Create Link Aggregation** icon.

t5-2-tvp540-c						-
Contraction Dashboard	Summary	Libraries	Storage	Analytics	Networks	Incidents
Network Connectiv	vity IPMP	Groups Li	nk Aggregations	Bandwi	idth Managemer	ıt
~						
IEEE 802.3ad Link A	ggregations (1)					
💿 🗙 🥖						
Link Approaction Nom	Dataliak Mu	tinothing	ACD Mada	1400	Timor	Load Balanci

3. Specify a name for the link aggregation and move the network interfaces to the link aggregation members list, as shown below.



4. Configure the aggregation links, as shown in the image below.

Oracle Enterprise Manager Ops Center - Creater Cligate Link Aggregation	: Link Aggregation	ORACLE
Steps Help 1. Specify Link Aggregation 2. Configure Link Aggregation 3. Summary	Configure Link Aggregation Specify the configuration of the IEEE 802.3ad Link Aggregation. * Load Balancing 12 - Determines the outgoing link by hashing the MAC (12) Policy: 13 - Determines the outgoing link by hashing the IP (13) h I L4 - Determines the outgoing link by hashing the TCP, LDP LACP Mode: Passive Active Off LACP Timer: Short Long MAC Address: 00000000000	Indicates Required Field Insader of each packet eader of each packet P, or other ULP (14) header of each packet
		< Previous Next > Cancel

5. Review the summary and click Finish.

You can use the UI or the command line to confirm that the correct changes have taken place.

From the command line, login to the control domain and run the following command:

root@t5-2-tvp540-c:/	etc/defaul	t# dlac	um snow-l:	INK
LINK	CLASS	MTU	STATE	OVER
net8	phys	1500	up	
netO	phys	1500	up	
net4	phys	1500	up	
net1	phys	1500	up	
net5	phys	1500	up	
net10	phys	1500	up	
aggrO	aggr	1500	up	net5 net1 net4
root@t5-2-typ540-c*	/etc/defeul	+ #		

As shown in the output above, an aggregated link called aggr0 has been created, consisting of net 1, net 4, and net 5. This information can also be seen from the UI, as depicted in the image below:

Network Connectivity	/ IPMP Groups	Link Aggregations	Bandwidth Managen	nent		
IEEE 802.3ad Link Agg	regations (1)					
O X /						
Link Aggregation Name	Datalink Multipathing (DLMP)	LACP Mode	LACP Timer	Load Balancing Policy	MAC Address Policy	MAC Address
aggr0	No	Active	Short	L4	Auto	A0:36:9F:24:ED:F2
Network Interfaces in	aggr0 (3)					
NIC						
net5						
net1						
net4						

Creating a Virtual Switch

At this stage, a virtual switch (vsw) for the aggregation link aggr0 needs to be created for the control domain. This virtual switch connects the guest domain to the public and admin networks.

To create a virtual switch:

- 1. Expand Assets in the Navigation pane and select the control domain.
- 2. Select the Networks tab in the center pane and click Attach Network.
- 3. Select the public network, in this example is vlan-1234.

Dashboard Si Drace Enterprise Manager Ops Center - Attach Attach Notwork	ummary Analytics Virtual Services I/O Res Network	ources 🛛 Libraries	Networks Incidents Monito	ring Charts > Uperate
Steps Holo Steps Holo Steps Holo Steps Holo Steps Holo Configure Interfaces	Select Networks Select one or more networks to connect to the server pool. The curr Network Domain: -	nt connection column show	s the existing number of connections between the n	twork and server pool.
4. Summary	Network Name	P-Key / VLAN ID	Network IP	Current Connections
	OS Network - Global Labs UK		10.163.208.0	1
_	SP. Network - Global Labs LH		10 163 224 0	0
	vian-1234	1234	192.168.13.0	0

4. Configure the aggregation links, as shown in the image below.

Network									1
									ORACLE
Configure Inte	rfaces	network	connection						
Asset/Serv	er Pool t5-2-tvp540 Name:	+c							
Specify Configura	ation Settings for	each Net	work Connection						
Hostname	Service Domain	SR-IOV	Network 🔺	P-Key/VLAN ID	Mode	NIC	Switch Name	Address Allocation Method	IP Address
B Network: vlan-	1234								
t5-2-tvp540-c	primary		vlan-1234	1234	Tagged	aggr0	primary-prod	Do not Allocate IP	Not Allocated
	Network Configure Inte Specify the configure Asset/Serv Specify Configure Hostname R Network: vlan- 15-2-typ540-c	Network Configure Interfaces Specify the configuration settings for ead Asset/Server Pool 52-2xbp30 Specify Configuration Settings for additional settings for the same: Specify Configuration Settings for the same: Specify Configuration Settings for the same: Specify Configuration Settings for the same: Hostname Service Domain Network: vian-1234 15-2-typ540-c primery	Network Configure Interfaces Specify the configuration settings for each network. Asset/Server Pool (5-24x)640 - Name: Specify Configuration Settings for each Network. Hostname Service Domain SR40V Hostname Service Domain SR40V Network: vlan-1234 15-24xp540-c primary	Network Configure Interfaces Specify the configuration settings for each network connection. Asset/Server Pool 52-2-by540-c Name: Specify Configuration Settings for each Network Connection Hostname Service Domain SR-IOV Hetwork # Network: vlan-1234 15-2-by540-c primary vlan-1234	Network Configure Interfaces Specify the configuration settings for each network connection. Asset/Server Pool 15-2-hp50-c Name: Specify Configuration Settings for each Network Connection Hostname Service Domain SR-80V Network - P-Key/YLANID Network: vlan-1234 IS-2-hp540-c primary vlan-1234 IS-2-hp540-c primary vlan-1234	Network Specify the configure Interfaces Specify the configuration settings for each network connection. Asset/Server Pool 52-2vp540-c Name: Specify Configuration Settings for each Network Connection Hostmane Service Domain SR-00' Network - P-Key/VLAN D Mode Network: vlan-1224 S-2-typ540-c primary vlan-1234 15-2-typ540-c primary vlan-1234	Network Specify the configure Interfaces Specify the configuration settings for each network connection. Asset/Server Pool IS-2x-5x960-c Name: Specify Configuration Settings for each Network Connection Hostname Service Domain SR-0V Network P4:esyVLAN D Mode NC Network: vlan-1234 15-24-ty560-c primery vlan-1234 15-24-ty560-c primery vlan-1234	Network Configure Interfaces Specify the configuration settings for each network connection. Asset/Server Pool IS-2-tp:540-C Name: Specify Configuration Settings for each Network Connection Hostname Service Domain SR-80'V Network = P-Key/VLAN D Mode NC Switch Name Network: vlan-1234 IS-2-tp:540-C primary Van-1234 1234 Tagged aggr0 primary-prod	Network Configure Interfaces Specify the configuration settings for each network connection. Asset/Server Pool 52-2xp540-c Name: Specify Configuration Settings for each Network Connection Hostmane Service Domain R-AdV Network + P-Key/YLAN D Mode NC Switch Name Address Adocation Mithod Nc Network vian-1234 IS-2-typ540-c primary Vian-1234 IS-2-typ540-c primary D not Adocate P

5. Review the summary and click **Finish**.

You can use the command line to view the newly created virtual switch for the aggregated links (aggr0) by using the ldm ls-services command.

reo vec	t@t5-2-tvp540-c:~	# 1dm 1s-services							
	NAME primary-vcc0	LDOM primary	PORT-RANGE 5000-6000						
vsw									
	NAME	LDOM	MAC	NET-DEV	DEVICE	LINKPROP	DEFAULT-VLAN-ID	PVID	
	10.163.208.0_20	primary	00:14:4f:fb:2e	:cS net0	switch80	phys-state			
	primary-prod	primary	00:14:4f:fe:32	:6e aggr0	switch81	phys-state			1234
VDS									
	NAME	LDOM	VOLUME	OPTIONS	MPGROUP	DEVICE			
	primary-vds0	primary							
200	t@t5-2-tvp540-c:~	#							

Configuring and Provisioning the Secondary Service Domain

As mentioned before the secondary service domain has various names, such as alternate I/O domain or redundant I/O Domain.

By design, the secondary domain will have some physical I/O devices assigned, which may be a PCIe bus root complex, a PCI device, or a SR-IOV (Single Root I/O Virtualization) virtual function.

Within Oracle Enterprise Manager Ops Center, when creating a secondary domain, the terms physical I/O domain and root domain are used. The physical I/O domain maps PCI device end points, and the root domain maps PCIe buses, which also has an option to create SR-IOV functions.

In this example, a Root Domain is created by assigning PCIe buses. As seen, the Oracle SPARC T5-2 server has two free PCIe buses that have not been assigned to the primary Domain (pci2 and pci3). These PCIe buses are used to create the secondary domain (root domain).

The following steps define the procedure to successfully configure a secondary service domain:

- 1. Creating the Logical Domain Profile
- 2. Applying the Logical Domain Profile

- **3.** Provisioning the Secondary Domain OS
- 4. Creating Aggregation Link and Creating Virtual Switches

Creating the Logical Domain Profile

To create the secondary service domain in Oracle Enterprise Manager Ops Center, start by creating a Logical Domain Profile.

To create the Logical Domain profile:

- **1.** Select **Plan Management** section and expand **Profiles and Policies** in the Navigation pane.
- 2. Select Logical Domain profile and click Create Profile in the Actions pane.
- **3.** Enter the following details in the **Create Profile Logical Domain** wizard and then click **Next**.
 - Name and description of the profile.
 - Retain the option to create a deployment plan for this profile.
 - Select Root Domain as the Subtype.
- 4. Provide a name for the secondary service domain and click Next.
- **5.** Enter the configuration details for the secondary service domain and click **Next**. In this example, you use Whole-Core CPU model with 2 CPU cores and 4 GB of memory.
- **6.** Specify the number of PCIe buses to be assigned to the secondary I/O and click **Next**. In this example, you assign two buses.
- **7.** Select a library to store the metadata and the secondary service domain's storage, then click **Next**. In this example, select the local filesystem library and enter the disk size as 20 GB.

The metadata is on the local disk, file://guest. This is fine for the secondary domain as it will not be migrated. Only the logical domains and their guests will get migrated; this makes it mandatory to have the metadata on a shared storage.

- **8.** Skip the step to specify networks and click **Next**. This step is optional for this example.
- **9.** Review the parameters selected for the profile and click **Finish** to create the profile.

Applying the Logical Domain Profile

To apply the logical domain profile in Oracle Enterprise Manager Ops Center:

- 1. Select **Plan Management** section in the Navigation pane and expand **Deployment Plans**.
- 2. Expand Create Logical Domains and select the newly create plan from the list.
- **3.** Click **Apply Deployment Plan** in the Actions pane.
- 4. In the **Select Targets** window, select the control domain.

Click **Add to Target List** to move the selected target Oracle VM Server to the Target List, then click **Next**.

5. Specify the name for the secondary service domain, then click Next.

6. Select the PCIe buses that will be assigned to the secondary domain and then click Next. In this example, you assign pci1_3 and pci_2.

Targets Help	PCIe Buses Assig	nment			
fy Domain Identity Buses Assignment	Specify the PCIe buses	for the root domains.			
ige Resource Assignments Fy Network Connections Settings	Target: t5-2-tvp540	ŀc			
orks Resource Assignments dule Job	PCIe Buses Assign	ment for secondary-1			
nary	Bus Type	Alias		Bus name	
	PCle	pci_3		pci@3c0	
	PCle	pci_2	*	pci@380	

- 7. Retain or edit the default name of the virtual disk server (vds), then 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 Assignments steps are empty. For this example, skip both steps by clicking **Next**.
- 9. Schedule the job to run now and click Next.
- **10.** Review the properties and click **Apply** to apply the deployment plan to create secondary domain.

Once the job completes successfully, you can use the UI or the command line to confirm that the changes.

From the command line, login to the control domain and run the following commands:

root@t5-2-tvp540	-c:~# 1dm 1	5						
NAME	STATE	FLAGS	CONS	VCPU	MEMORY	UTIL	NORM	UPTIME
primary	active	-n-cv-	UART	16	4G	0.4%	0.4%	4d 18h 40m
secondary	active	-tv-	5000	16	4G	6.2%	6.2%	2m
root@t5-2-tvp540	-c:~#							
weet at 5 2 tom 54	0	1.0.1.0						
rootets-z-tvp54	0-c:~≞ Idm	13-10		TYDE	BITE		NAT THE	CTATIC
NAME				LIFE	605	DC	MAIN	SIAIUS
					1			
				DUD	pci_i	pi	imary	
pci_0				805	pci_0	pr	rimary	
pc1_3				BUS	pc1_3	36	conda	rylov
				805	pc1_2	se	conda:	rylov
/SYS/MB/PCIES				PCIE	pci_1	pı	rimary	OCC
/SIS/MB/PCIE6				PCIE	pci_1	pr	rimary	EMP
/SYS/MB/PCIE7				PCIE	pci_1	pı	rimary	EMP
/SYS/MB/PCIE1				PCIE	pci_0	pr	rimary	OCC
/SYS/MB/SASHBA0				PCIE	pci_0	pr	rimary	OCC
/SYS/MB/NETO				PCIE	pci_0	pr	rimary	occ
/SYS/MB/PCIE8				PCIE	pci_3	36	econda:	ryUNK
/SYS/MB/SASHBA1				PCIE	pci_3	se	conda	ryUNK
/SYS/MB/NET2				PCIE	pci_3	36	conda	ryUNK
/SYS/MB/PCIE2				PCIE	pci_2	36	conda	ryUNK
/SYS/MB/PCIE3				PCIE	pci_2	se	conda	ryUNK
/SYS/MB/PCIE4				PCIE	pci_2	36	conda	ryUNK
/SYS/MB/PCIE5/I	OVNET.PF0			PF	pci_1	pr	rimary	
/SYS/MB/PCIE5/I	OVNET.PF1			PF	pci_1	pı	rimary	
/SYS/MB/NET0/IC	VNET.PF0			PF	pci_0	pr	rimary	
/SYS/MB/NET0/IC	VNET.PF1			PF	pci_0	pı	rimary	
root@t5-2-tvp54	0-c:~#							



CTe/NIU Buses (2)					
Jas		Bus name		Type 🔺	
ci_2		pci@380		BUS	
ci_3		pci@3c0		BUS	
Alas 🔺	Device Name	Root Domain	PCie Bus	PCIe Slot Status	Domain
Alas . Ethernet Device (2)	Device Name	Root Domain	PCie Bus	PCIe Slot Status	Domain
Alas Ethernet Device (2) /SYSMBNET2	Device Name	Root Domain secondary	PCIe Bus	PCIe Siot Status	Domain
Alas = Ethernet Device (2) /SYS/IB/NET2 /SYS/IB/PCE2	Device Name pci@3c0/pci@1/pci pci@350/pci@1/pci	Root Domain secondary secondary	PCie Bus pci_3 pci_2	PCie Siet Status .	Domain secondary secondary
Alas A Ethernet Device (2) /SYSMBNET2 /SYSMBNEC2 [Unrecognized Devic	Device Name pci@3c0/pci@1/pci pci@380/pci@1/pci e Type] (4)	Root Domain secondary secondary	PCIe Bus pci_3 pci_2	PCie Siot Status	Domain secondary secondary
Alas A Ethernet Device (2) /SYSMBNET2 /SYSMBNPCE2 [Unrecognized Devic /SYSMBNPCE3	Device Name pci@3c0/pci@1/pci pci@300/pci@1/pci e Type] (4) pci@300/pci@1/pci	Root Domain secondary secondary secondary	PCIe Bus pci_3 pci_2 pci_2	PCIe Siot Status	Domain secondary secondary secondary
Alas A Ethernet Device (2) /SYSMBNCE2 /SYSMBNCE2 [Unrecognized Devic /SYSMBNCE3 /SYSMBNCE3	Device Name pci@3c0/pci@1/pci pci@300/pci@1/pci e Type] (4) pci@300/pci@1/pci pci@300/pci@1/pci	Root Domain secondary secondary secondary secondary	PCie Bus pci_3 pci_2 pci_2 pci_2	PCIe Sixt Status	Domain secondary secondary secondary secondary
Alas ~ Ethemet Device (2) /SYSMBMET2 /SYSMBMCE2 (Unrecognized Devic /SYSMBMCE3 /SYSMBMCE4 /SYSMBMCE4	Device Name pci@326/pci@1/pci pci@380/pci@1/pci e Type] (4) pci@380/pci@1/pci pci@380/pci@1/pci pci@3260/pci@1/pci pci@3260/pci@1/pci	Root Domain secondary secondary secondary secondary secondary	PCie Bus pci_3 pci_2 pci_2 pci_2 pci_2 pci_2 pci_3	PCie Sist Status	Domain secondary secondary secondary secondary secondary

Provisioning the Secondary Domain OS

To provision the operating system to the secondary service domain, you need to create an OS provisioning (OSP) profile, create an OS configuration (OSC) profile, create a deployment plan for the OSP and OSC profiles, and apply the deployment plan to the secondary service domain.

Creating an OS Provisioning Profile

- **1.** Select **Plan Management** section and expand **Profiles and Policies** in the Navigation pane.
- 2. Select OS Provisioning profile and click Create Profile in the Actions pane.
- **3.** Enter the following details in the **Create OS Profile OS Provisioning** wizard and then click **Next** to specify the OSP parameters.:
 - Name and description of the profile.
 - Select Logical Domain as the Subtype.
- **4.** Complete the remaining steps according to your requirements. In the Summary screen click **Finish** to create the OSP profile.

Channel and Channel an						-
Steps Help	Summary					
Identify Profile	OS Ir	mage: Oracle S	Solaris 11.1 sparc (SRU 19.6.0) (AI)		
Specify OSP Parameters	Software G	Froup: pkg://sol	laris/group/system	solaris-small-server		
Specify US Setup	Lang	uage: English (7-bit ASCID			
Specify iSCSI Disk Lisage	Time	Zone: GMT				
Specify File System Layout	Terminal	Type: vt100				
Specify Naming Services	Console Seria	Port: ttya				
Summary	Console Baud	Rate: 9600				
	NES4 Do	main: oracle o	orn			
	Mapual Net	Boot:				
	Solaris 11 Undate P	rofile:				
	User	name: jack				
	Full)	Name:				
	lise iSCS	Diek:				
	0001000					ļ
	File Systems (2)				_	
	File System Type	Mount Point	Device	Size (MB)		
	swap	swap	rpool	4096		
	zfs	1	rootdisk.s0	Remaining unused space		
	Name Se	rvice: DNS				

Creating an OS Configuration Profile

To create the OSC in Oracle Enterprise Manager Ops Center:

- 1. Select the **Plan Management** section in the Navigation pane and expand **Profiles and Policies**.
- 2. Select OS Configuration and click **Create Profile** in the Actions pane.
- 3. Enter the following details in the Create Profile OS Configuration wizard:
 - Name and description of the profile.
 - Select logical domain as the Subtype.

Click **Next** to specify the logical domain parameters.

4. Complete the remaining steps according to your requirements. In the Summary screen click **Finish** to create the OSC profile.

Create Profile - OS Configuratio	n	ORACLE'
Steps Help 1. Identify Profile 2. OS Management 3. Specify Networking 1. Specify Network Interfaces 4. Summary 1. Specify Network Interfaces	Summary Review the properties of the pro- Name: Description: Target Type: Automatically Manage with Oracle Enterprise Manager Ops Center: Deploy Agent Controller: Enable Multiplexed IO (MPxtO): Number of Interfaces:	File. Click Finish to save the profile. secondary-OSC VirtualMachine ? ? 1

Creating the Deployment Plan and Provisioning the Secondary Domain OS

To create the deployment plan in Oracle Enterprise Manager Ops Center:

- 1. Select **Plan Management** section in the Navigation pane.
- 2. Expand **Deployment Plans** and select **Provision OS**.
- 3. Click Create Deployment Plan in the Actions pane.
- 4. Enter the following information for the deployment plan:
 - Name and description for the plan.
 - Select **Stop at Failure** as the Failure Policy.
 - Select the corresponding OS provisioning and configuration profile created for the secondary service domain.
- 5. Click **Save** to create the deployment plan.

Once the Deployment plan has been created, the next task is to apply the deployment plan to the secondary service domain.

- 6. Expand Assets in the Navigation pane and select the control domain.
- 7. Click **Create Logical Domains** in the Actions pane.
- 8. Select the recently created Deployment Plan and complete the Provision OS step.
- **9.** In the Boot Interface Resource Assignment step, make sure that the correct boot interface is selected, as shown below.

roduction vision OS ot Interface Resource Assignments	Boot Interf	ace Resource Assignm y the network resources for the vork Interface by MAC Address	ents	each target.		
igure 05	Boot Interfa	ices				
Resource Assignments ool	Target	Network	Controller	Interface	P	Prin
Summary	secondary	OS Network - Global Lab	NET2(pci_3)	✓ net_0	10.163.208.	
			NET2(pci_3)			
			PCIE2(pci_2)			
						,

10. Complete all other steps as required and then, click **Finish**. A job, similar to the one depicted below, will run.

Image: Secondary Target of the task Result Elapsed Time Task Flow execution is in progress 00 kr, 03 min, 32 sec - Image: Secondary Secondary - - Image: Secondary Secondary - - Image: Secondary Setup Instal Clent 10.163.223.199 Setup Clents task is successfully completed. (32519) Less than a second completed. (32519) Image: Clear Configure Instal Ser 10.163.223.199 Setup Clearts task is successfully. (15021) Less than a second completed succesfully. (15021) Less than a second complete	Job Composition for secondary	Elapsed Time: 00 h	ır, 03 min, 32 sec		
Task Target of the task Result Elapsed Time Image: Secondary Secondary Flow execution is in progress 00 hr, 03 min, 32 sec Image: Secondary Setup Notation OS - Image: Setup Instail Client 10.163.223.199 Setup Client task is successfully completed. (32519) Less than a second completed. (32519) Image: Client ZoneController secondary Task completed successfully. (15029) Less than a second Image: Client ZoneController secondary Task completed successfully. (15029) Less than a second Image: Cleary Client 10.163.223.199 Starting VAN boot of Solisis 11 00 hr, 03 min, 10 sec Image: Configure OS - - Image: Configure Time - Image: Configur	D 🖉				\$
Secondary secondary Image: Secondary Flow execution is in progress 00 hr, 03 min, 32 sec Image: Secondary	Task	Target of the task	Result	Elapsed Time	
Image: Secondary - Image: Secondary - Image: Secondary Setup Clerits task is successfully completed. (32519) Less than a second Image: Configure Install Clerit. 10.163.223.199 Enable clerit task is successfully completed. 00 hr, 00 min, 09 sec Image: Clear ZoneController secondary Task completed successfully. (15029) Less than a second Image: Clear ZoneController secondary Task completed successfully. (15029) Less than a second Image: Network Install secondary Task completed successfully. (15029) Less than a second Image: Only Image: Clerit. 10.163.223.199 Image: Clerit. 10.163.223.199 - Image: Configure Cler. 10.163.223.199 - - Image: Configure Target Ser. 10.163.223.199 - - Image: Configure Target Ser. 10.163.22	4 🞫 secondary	secondary	Flow execution is in progress	00 hr, 03 min, 32 sec	
Image: Provision OS	4 📼 secondary				
Setup Instal Client 10.163.223.199 Setup Client task is successfully completed. (32519) Less than a second Configure Instal Ser 10.163.223.199 Enable Centratusk is successfully completed. (32519) 00 hr, 00 min, 09 sec Clear ZoneController secondary Task completed successfully. (15029) Less than a second 00 hr, 00 min, 09 sec Hetwork Instal secondary Task completed successfully. (15029) Less than a second Montor OS Installatik. 10.163.223.199 - Montor OS Installatik. 10.163.223.199 - Setup Configure OS - Setup Configure Inter - Setup Configure Inter - Setup Configure Inter - Configure Inter Inter -	4 🚥 Provision OS			-	
Configure Install Ser 10.163.223.199 Configure Install Ser 10.163.223.199 Clear ZoneController secondary Task completed successfully (15029) Less than a second Task completed successfully (15029) Less than a second Starting WAN boot of Solaris 11 OD hr, 03 min, 10 sec Starting WAN boot of Solaris 11 Starting WAN boot of Solaris 1	Setup Install Client	10.163.223.199	Setup Clients task is successfully completed. (32519)	Less than a second	
Clear Zone/Controller secondary Task completed successfully, (15029) Less than a second Image: Network Install secondary SpRRC client secondary 00 hr, 03 min, 10 sec Image: SpRRC client secondary - Image: SprRC client secondary - <	Configure Install Ser	10.163.223.199	Enable client task is successfully completed	00 hr, 00 min, 09 sec	
Network Install secondary Starting VAAN boot of Soleris 11 SPARC client secondary. 00 hr, 03 min, 10 sec Image Montor OS Installatir. 10.163.223.199 - - Image Configure OS - - Image Download Agent Inc - - Image Download Agent Inc - - Image Download Agent Inc - - Image Download Inage PC -	ClearZoneController	secondary	Task completed successfully. (15029)	Less than a second	
■ Moniter OS Installatí: 10.163.223.199	Network Install	secondary	Starting WAN boot of Solaris 11 SPARC client secondary.	00 hr, 03 min, 10 sec	
	🔫 Monitor OS Installatic	10.163.223.199		-	
Image Configure OS - Image Setup Configure Clie 10.163.223.199 - Image Download Agent Inc - Image Download Image PC - Image Configure Target Set 10.163.223.199 - Image Download Image PC - Image Download I	- Cleanup Client	10.163.223.199		-	
wgj Setup Configure Cle 10.163.223.199 - Jamp Download Agent Imt - wgj Download Image PC - wgj Configure Target Sei 10.163.223.199 - wgj Monkor OS Configure 10.163.223.199 - wgj Verify Agent Install 10.163.223.199	4 🛶 Configure OS			-	
	n Setup Configure Clie	10.163.223.199			
wg Download Image PC - wg Configure Target Sei 10.163.223.199 - wg Monkor OS Configure 10.163.223.199 - wg Verify Agent Install 10.163.223.199	4 🔫 Download Agent Ime				
Image Configure Target Sei 10.163.223.199 Image Monitor OS Configur 10.163.223.199 Image Verify Agent Install 10.163.223.199 Image Verify Agent Install 10.163.223.199 Image Verify Agent Install 10.163.223.199	🔫 Download Image	PC			
■g Monitor OS Configur 10.163.223.199 - ■g Verify Agent Install 10.163.223.199 -	🔫 Configure Target Sei	10.163.223.199			
- Verify Agent Install 10.163.223.199	🔫 Monitor OS Configur	10.163.223.199			
	🔫 Verify Agent Install	10.163.223.199			
	n Cleanup OSC Client	10.163.223.199			
₩ Enable SRIOV on Do t5-2-tvp540-c -	=> Enable SRIOV on Do	t5-2-tvp540-c			

It is possible and recommended to view how the install is progressing. To do this, log on the control domain and view the /var/log/vntsd/secondary/console-log file as shown below.



Once the job has completed successfully, confirm the set-up is correct in the UI or the command line.

Dashboard	Summary	Libraries	Storage	Analytics	Networks	Incidents	Monitoring	
	Name: bookabl	e-10-163-223-199	SOLARIS			State: Running		
0	escription: Global 2	one OS			Runn	ing Time: 5 day(s)	, 21:40 (HH:MM	
				Zone Pa	rallel Patching	Enabled: No		
Se	rver Name: seconda	ny		Zones that can	be patched in	parallet -		
	05: Oracle 5	iolaris 11		Tags				
Total CP	U Threads: 16			Tag Name 🔺	Value			
Name Service: NONE				legacy.tags virtualizationcontroller.zone				
Active Boot Environment: solaris			oc.internal.tier virtualizationcontroller					
				oc.internal.tier.virt	type zone			
🗵 Total CPU (Itilization			🗵 Total Hemor	y Utilization			
Name 🔺	% Used	Sh T	CPU hreads	Type		% Used	Total (G8)	
3 Type: pset_o	lefault (1 Item)			Physical		49.58%	4	
pset_default	0%	0	16	Virtual		25.75%	8	
_				Locked		26.84%	4	
				Disk Swap		0%	٦ <u>\$</u>	

Creating Aggregation Link and Creating Virtual Switches

As with the control domain, the public network for the secondary service domain are aggregated links in order to provide resilience and better throughput.

Creating aggregated links in the secondary domain is a similar process to the one used to create those links in the control domain virtual switch (vsw). However, another virtual switch for the admin network needs to be created.

Creating Aggregated Links

To create aggregated link from the UI:

- 1. Expand Assets in the Navigation pane and select the OS of the secondary domain.
- 2. Select the Networks tab in the center pane, then the Link Aggregations sub tab, and click the **Create Link Aggregation** icon.

📕 t5-2-tvp540-c		
Cashboard Summary Libraries	Storage Analyt	ics Networks Incidents
Network Connectivity IPMP Groups	Link Aggregations	andwidth Management
TEEF 802 2nd Link Aggregations (1)		
Contraction Aggregations (1)		
(O) × /		
Link Approaction Name . Datalisk Multipathing	LACE Hada	LACD Timer Load Relaccing

3. Specify a name for the link aggregation and move the network interfaces to the link aggregation members list, as shown below.

				ORACLE
Specify Link Aggrega	tion			Indicates Required Field
Specify the IEEE 802.3ad Link Aggregation created would be * Link Aggregation Name:	Aggregation Name and select the ph persisted across reboots. aggr0	iysic	al interfaces (NICs) you want to aggr	egate. The Link
* Link Aggregation Members:	Available Network Interfaces	*) + (*	Link Aggregation Members net1 net2 net3	
	Use Ctrl+Click or Shift+Click to selec	t mu	lople NICs.	

4. Configure the aggregation links, as shown in the image below.

Steps Ltop Configure Link Aggregation Indicates Ref 1. Specify Link Aggregation Specify Link Aggregation Specify Link Aggregation Indicates Ref 2. Configure Link Aggregation Specify the configuration of the IEEE 002.3d Link Aggregation. Indicates Ref 3. Summary * Load Bialancing L2 - Determines the outgoing link by hashing the IMAC (L2) header of each padet Policy: I.3 - Determines the outgoing link by hashing the IP (L3) header of each padet VEL4 - Determines the outgoing link by hashing the TCP, LDP, or other LLP (L4) header of each LACP Mode: Possive Active Off LACP Timer: Short Long MAC Address Short Long	ACLE.
	juired Field

5. Review the summary and click Finish.

You can use the UI or the command line to confirm that the correct changes have taken place.

From the command line, login to the secondary domain and run the following command:

root@bookable-10-1	63-223-199:	∙# dladz	n show-ago	ir		
LINK	MODE POLICY	7 ADDE	RPOLICY		LACPACTIVITY	LACPTIMER
aggr0	trunk L4	auto			active	short
root@bookable-10-1	63-223-199:	∙# dladr	a show-lir	ık		
LINK	CLASS	MTU	STATE	OVER		
netO	phys	1500	up			
net2	phys	1500	up			
net1	phys	1500	up			
net3	phys	1500	up			
aggr0	aggr	1500	up	net2 net	t1 net3	
root@bookable-10-1	63-223-199:	~#				

As shown in the output above, an aggregated link called aggr0 has been created, consisting of net 1, net 2, and net 3. This information can also be seen from the UI, as shown below:

bookable-10-163-	223-199					
Dashboard	Summary Librari	es Storage	Analytics Ne	tworks Incidents	Monitoring Ter	rminal Boot Env
Network Connectivity	/ IPMP Groups	Link Aggregatio	ns Bandwidth M	lanagement		
EEE 802.3ad Link Agg	regations (1)					
o 🗙 🗷						
ink Aggregation Name	Datalink Multipathing (DLMP)	LACP Mode	LACP Timer	Load Balancing Policy	MAC Address Policy	MAC Address
99r0	No	Active	Short	L4	Auto	A0:36:9F:27:61:50
etwork Interfaces in	aggr0 (3)					
ec.						
vet2						
net1						
net3						

Creating a Virtual Switch

The command line output shown below shows that the primary domain has two virtual switches; one from the admin network and another from the public network. The secondary domain, on the other hand, has no virtual switches.

coot@t5-2-tvp540-c:/ NAME primary NAC	var/log/vntsd/seco	ndary# ldm	15 -	o network p	rimary			
00:10:e0:2a:3c:e	4							
VSW NAME 10.163.208.0_20 primary-prod	MAC 00:14:4f:fb:2e:c5 00:14:4f:fe:32:6e	NET-DEV net0 aggr0	ID 0 1	DEVICE switch00 switch01	LINKPROP phys-state phys-state	DEFAULT-VLAN-ID 1	PVID 1 1	VID 1234
root@t5-2-tvp540-c:/ NAME secondary	var/log/vntsd/secon	ndary# ldm		o network s	econdary			
NAC 00:14:4f:ff:a0:0 coot@t5-2-tvp540-c:/	2 var/log/vntsd/secon	ndary#						

To create a virtual switch for the admin network:

- 1. Expand Assets in the Navigation pane and select the control domain that was just created.
- 2. Select the Networks tab in the center pane and click Attach Network.
- 3. Select the admin network, in this example is OS Network.

C D4	ashboard Summary		Analytics Virtual Se	rvices I/O Resource	s Libraries No	tworks Incidents	Monitoring Char	ts
				🖳 indicates ti	e network is the manager	nent network for the Oracle	/M Server and cannot be m	nodifi
Grad	le VM Server Network Phys	ical Co	onnectivity (7)					
	No 192 193							٥
	Network Name 🔺	VL ID	Service Domain	Switch name	Link	Over	IP Address	
	OS Network - Global Labs		primary	10.163.208.0_20	net0		10.163.212.79	
	OS Network - Global Labs		secondary		net0			
	vian-1234	1234	primary	primary-prod	vnic1728412588	aggr0	0.0.0.0	
			primary	primary-prod	aggr0			

- 4. Configure the aggregation links, as shown in the image below.
 - Ensure the secondary service domain is selected.
 - Select the correct NIC, in this example is net0.
 - Enter a name for the Switch Name, in this example secondary-mgmt.
 - No Network IP address is allocated.

Steps Help	Configure In	terfaces								
Select Networks Configure Networks Gonfigure Interfaces Summary	Specify the config. Asset/Se	ration settings for each rver Pool t5-2-tvp540- Name:	network c	connection.						
	Specify Config	ration Settings for e	ach Net	work Connection				_	,	
	Hostname	Service Domain	SR-10V	Network 🔺	P-Key/VLAN ID	Mode	NIC	Switch Name	Address Allocation Method	IP Address
	⊖ Network: 05	Network - Global Lab	UK							
	t5-2-tvp540-c	secondary		OS Network - Glo		Untagged	net0	secondary-mgmt	Do not Allocate IF	Not Allocated
								L	J 1	

5. Review the summary and click **Finish**.

You can use the command line to view the newly created virtual switch.



6. Repeat the steps to create another virtual switch for the aggregated link on the secondary service domain. Ensure that:

- The secondary service domain is selected.
- Select the correct NIC, in this example is aggr0.
- Enter a name for the Switch Name, in this example secondary-prod.
- No Network IP address is allocated.

You can verify both virtual switches were created from the command line or UI. In the control domain, it is possible to see the networks crated for the control domain and secondary domain.

coot@t5-2-tvp540-c:/var/log/vntsd/secondar NAME secondary	ary# 1dm 1s -o net⊍	ork secondary					
MAC 00:14:4f:ff:a0:02 I							
VSW NAME NAC NET secondary-mgmt 00:14:4f:f8:68:d8 net secondary-prod 00:14:4f:fb:c3:67 agg	TT-DEV ID DEVIC to 0 switc ggr0 1 switc	E LINKPROP h80 h81	DEFAULT-VLAN-ID 1 1	PVID VID 1 1 1234	NTU 1500 1500	MODE	INTER-VNET-LINK on on
root@t5-2-tvp540-c:/var/log/vntsd/secondar NAME primary	ary# 1dm 1s -o net⊍	ork primary					
MAC 00:10:e0:2a:3c:e4							
VSU NAME MAC NET 10.163.208.0_20 00:14:4f:fb:2e:c5 net primary-prod 00:14:4f:fe:32:6e agg	ET-DEV ID DEVIC etO O switc ggrO 1 switc	E LINKPROP h90 phys-state h91 phys-state	DEFAULT-VLAN-ID 1 1	PVID VID 1 1 1234	MTU 1500 1500	MODE	INTER-VNET-LINK on on
coot&t5-2-tvp540-c:/var/log/vntsd/secondar	ar y#						

Creating the HA Guest Domain

In Oracle Enterprise Manager Ops Center, it is possible to create two types of Guest Domains: Guest Domain and HA Guest Domain. The required criteria for creating a HA Guest Domain is:

- Two network connections for each network
- Redundant storage access to the virtual disks

Since the goal of this paper is to help create a resilient environment, a HA Guest domain is created. The following steps define the procedure:

- **1.** Creating the HA Guest Domain Profile
- 2. Applying the HA Guest Domain Profile
- **3.** Provisioning the HA Guest Domain OS

It is also possible to combine multiple profiles mentioned above in a complex plan, thus enabling just one job to create the Guest HA container and install the OS.

Creating the HA Guest Domain Profile

To create the HA guest domain:

- **1.** Select **Plan Management** section and expand **Profiles and Policies** in the Navigation pane.
- 2. Select Logical Domain profile and click Create Profile in the Actions pane.
- **3.** Enter the following details in the **Create Profile Logical Domain** wizard and then click **Next**.
 - Name and description of the profile.
 - Retain the option to create a deployment plan for this profile.

- Select HA Guest Domain as the Subtype.
- 4. Provide a name for the HA guest domain and click **Next**.
- **5.** Enter the configuration details for the HA guest domain and then click **Next**. In this example, you use Virtual CPU model with 4 CPU threads and 4 GB of memory.
- **6.** Select a library to store the metadata and the HA guest domain's storage, then click **Next**.

In this example, select the NAS Filesystem Storage as storage type to store the metadata and select the predefined NFS share. Select the Dynamic Block Storage from the menu, which is a Sun ZFS Storage 7120 appliance, to be the storage for the guest domain and specify the size of 20 GB.

s Help	Specify Sto	orage and Disks			
ntify Profile	Select a library	to store the logical do	main metadata and the librarie	is to be used for logical	domain's storage
ecify Domain Identity	beleet a library	to stare are logical as		s to be used for logica	contain a atoroget
nfigure Logical Domain	Storage	for the domain me	tadata: NAS Filesystem Store	sge 🛛 dom-me	tadata
ecity Storage and Disks	2				
nmary	<u> </u>				
	Type	Library	LUN/Virtual Disk Name	Volume Group	Required
					Size(08)
	lock Storage	 ZFS Storage 7 	Create LUN	tank/loca//OC	20
	NAS Filesyste	m Storage			\sim
	Static Block S	torage			
	Dynamic Bloc	k Storage			
	Local Filesyst	an Storage			
	Local Devices				

7. Specify the networks to add to the HA Guest by adding two network connections for each of the networks (admin and public).

Create Profile - Logical Domain			ORACLE
Steps Help 1. Identify Profile 2. Specify Domain Identity 3. Configure Logical Domain 4. Specify Storage and Disks 5. Specify Networks	Specify Networks Select the networks to be order of the networks entu- Network Specification	connected to the logical domain and the nur ered would be used when binding the netwo ms	mber of connections for each network. The rks to the NICs during the profile execution.
6. Summary	Network Domain	Network	Number of Connections
	default default	OS Network - Global Labs UK vlan-1234	2
		OS Network - Global Labs UK SP Network - Global Labs UK vlan-1234	

8. Review the parameters selected for the profile and click **Finish** to create the profile.

eate Profile - Logical Dom	ain				C	RACL
Steps Help	Summary					
Identify Profile	CPU Threads:	4				
Specify Domain Identity	CPU Architecture:	native				
Configure Logical Domain	Requested Crypto Units:	-				
Specify Storage and Disks	Memory:	4 GB				
Specify Networks	Automatic Recovery:	No				
Summary	Priority of Recovery:					
	Authorize recovery without redundant I/O:	No				
	Metadata Library Type:	NAS				
	Metadata Library:	Ldom-met	tadata			
	Virtual Disks:					
		Туре	Library	Disk Name	Group	Require Size(GB
		Dynamic Storage	ZFS Storage		tank/local/OC	21
			/120			
	Network:	Networ	k N	etwork	Number	of ions
		default	0	S Network - Glo ibs UK	bal 2	
		default	vł	an-1234	2	
						_

Applying the HA Guest Domain Profile

To apply the logical domain profile in Oracle Enterprise Manager Ops Center:

- **1.** Expand Assets and select the control domain.
- 2. Click Create Logical Domains in the Actions pane.
- **3.** Select the HA Guest profile that was just created and click **Apply Plan**.
- 4. Retain the default name and click Next.
- **5.** Retain the values for metadata and virtual disks, select which devices to multi-path, and chose one for the active path.

Since the objective is to create a redundant guest domain, provide a LUN from both the primary and secondary domains. One path must be chosen as the active path.

Targets Help	Storage Re	source Ass	ignments			
Ify Domain Identity age Resource Assignments	Storage for	r the domain	metadata: NAS Filesyst	em Storage	Ldom-metadat	ð
orks Resource Assignments	Virtual Disk	/Storage Spe	cification for Logical D	omain GuestHA	1	
	O X					
		Library	LUNA Columbia	Volume Group	Multipathing	Requ
	Type	Library	LUN/VITUAI Disk Name	volume Group	Group	Size(
	Dynamic	ZFS Storag	Create LUN	tank/local/0	Group	Size(21
	Dynamic	ZFS Storag	Create LUN	tank/local/0	Group	Size(21
	Dynamic Edit Multipat Select	ZFS Storag thing For Devi Service Na	Create LUN Cce Create LUN me	Counie Group	Group	Size(21 Active Path
	Dynamic	ZFS Storag thing For Devi Service Na secondary	Create LUN Cce Create LUN me -vds0	Domain Name secondary	Group	Active Path

Click Next.

6. Choose Untagged as the mode for the public network (vlan network) so that the guest OS will see the network as untagged.

eate Logical Domains - HA-Guest-plan v1								
Steps Targets Help 1. Specify Domain Identity Storage Resource Assignments 3. Specify Network Connections Settings 4. Network Resource Assignments	Specify Network Connection Specify whether the network connection mode for networks configured with VU Network connections	ons Settin on must be cre NN ID.	gs eated using virtual fun	ction or vnet, and also the tagging				
5. Schedule Job 6. Summary	Network OS Network - Global Labs UK OS Network - Global Labs UK vlan-1234 vlan-1234	SR-IOV	VLAN ID / P-KEY - 1234 1234	Mode No VLAN No VLAN Untagged Untagged				
				Tagged Untagged				

7. Specify the network from each domain. One connection will be for the control domain and the other for the secondary domain, to ensure that there is redundancy.

Targets Help Networks Re	source Assi	inments					
nain Identity Specify the netwo	rk resource for ea	sch logical dom	iain.				
vork Connections Settings Target: t5-2-tv	р540-с						
esource Assignments	(Dention for t	and and down a	in Countril at				
Network Spec	Network Specifications for Logical domain GuestHA1						
Network	SR-IOV	Service Domain	Map connection	VLAN ID / P-KEY	Mode		
OS Network - G	ło 📺	secondary	secondary-mgmt	-	No VLAN		
OS Network - G	lo	primary	10.163.208.0_20	-	No VLAN		
vian-1234		secondary	secondary-prod	1234	Tagged		
vlan-1234		primary 💙	primary-prod	1234	Tagged		
		secondary					
		primary					

8. Review the Summary and click **Finish** to complete the HA guest domain installation.

After the job completes successfully, HA guest domain is created. The guest domain appears in the Navigation pane listed under the corresponding control domain.

Provisioning the HA Guest Domain OS

Installing the OS requires creating the OS Provisioning Profile (OSP) and OS Configuration Profile (OSC), then combining the Profiles in a Deployment Plan to apply it to the HA guest domain.

Creating an OS Provisioning Profile

- **1.** Select **Plan Management** section and expand **Profiles and Policies** in the Navigation pane.
- 2. Select OS Provisioning profile and click Create Profile in the Actions pane.
- **3.** Enter the following details in the **Create OS Profile OS Provisioning** wizard and then click **Next** to specify the OSP parameters.:
 - Name and description of the profile.
 - Select Logical Domain as the Subtype.
- **4.** Complete the remaining steps according to your requirements. In the Summary screen click **Finish** to create the OSP profile.

Creating an OS Configuration Profile

Within this profile you use IPMP for the networks to achieve the goal of having resilient networks.

To create the OSC in Oracle Enterprise Manager Ops Center:

- 1. Select the **Plan Management** section in the Navigation pane and expand **Profiles and Policies**.
- 2. Select OS Configuration and click Create Profile in the Actions pane.
- 3. Enter the following details in the Create Profile OS Configuration wizard:
 - Name and description of the profile.
 - Select logical domain as the Subtype.

Click Next.

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.

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

- **5.** Select Use IPMP as the networking option, then click **Next** to specify the networking details.
- 6. Create two IPMP groups and specify two interfaces for each, then click Next.

Because resilience is required, two IPMP groups are created. One will be used for the admin network and the other from the public network. Each network should have two connections, one from the control domain and another from the secondary service domain.

Create Profile - OS Configur	ation			ORACLE				
Steps Holp 1. Identify Profile 2. OS Management 3. Specify Networking 1. Specify IPMP Groups 2. Specify IPMP Interfaces 4. Summary	Specify IPMP Groups and Specify the IPMP groups and Specif	I PS nd the associated failure de	tection methods.	5				
	IPMP Groups (2)	IPMP Groups (2)						
	(pmp1) (pmp2)	Link-Based Link-Based	2					

7. Specify the physical network interfaces for each IPMP groups as show in the image below, then click **Next**.

cho unote	Specify IPMP I	nterfaces			
Identify Profile OS Management Specify Networking 1. Specify IPMP Groups	Specify the physical n interface. Select the interface. Select Assi	etwork interfaces for e appropriate check boxe gn IP Address to assign	ach IPMP group. Always de s for Failover or Standby in the IP address during con	efine the first interface iterface to define the t figuration.	as the boot ype of network
2. Specify IPMP Interfaces	Network Interfa	ces in ipmp1 (2)			
Summary	Interface	Failover	Standby Interface	Assign IP Address	
	Interface 0	V	(m)	V	
	Interface 1	v	1		
	Network Interfa	ces in ipmp2 (2)	Claudhy Islasfaas	Assis D Address	
	Network Interfa	ces in ipmp2 (2) Failover	Standby Interface	Assign IP Address	
	Network Interfa Interface	ces in ipmp2 (2) Failover	Standby Interface	Assign IP Address	

This configuration states how to set up the IPMP groups and how the failover should be initiated, such as Link Based or Probe-Based.

ORACLE

8. Review the summary information, and then click Finish.

Create Profile - OS Configuration

s Help W ntify Profile Management sdfy Networking Specify IPMP Groups	Summary Deploy Agent C Enable Multip	ontroner: V plexed I/O (MPxIO): V Jse IPMP: V			•		
mmary	IPMP Groups (2)						
	IPMP Group Name	•	Link-Based	Probe-Based			
	ipmp1		V				
	ipmp2		V				
	Interface 0 Interface 1	Failover	Standby Interface	Assign IP Address	E		
	Network Inter	aces in ipmp2	(2)				
	Interface	Failover	Standby Interface	Assign IP Address			
	Interface 0	V		V			
	Interface 1						

Creating the Deployment Plan and Provisioning the Control Domain

To create the deployment plan in Oracle Enterprise Manager Ops Center:

- 1. Select **Plan Management** section in the Navigation pane.
- 2. Expand Deployment Plans and select Provision OS.
- **3.** Click **Create Deployment Plan** in the Actions pane.

The Create a Deployment Plan window is displayed.

- 4. Enter the following information for the deployment plan:
 - Name and description for the plan.
 - Select **Stop at Failure** as the Failure Policy.

- Select the corresponding OSP and OSC profiles created for the HA guest domain.
- 5. Click **Save** to create the deployment plan.

Once the Deployment plan has been created, the next task is to apply the deployment plan to the HA guest domain.

- 6. Expand Assets in the Navigation pane and select the HA guest domain.
- 7. Click Install Server in the Actions pane.
- **8.** Select the recently created Deployment Plan for the HA guest domain, click **Apply Plan** and complete the first steps of Install Server wizard.
- **9.** In the Boot Interface Resource Assignment step, select the primary interface to install the OS and assign an IP address, then click **Next** and complete the next steps.

	Boot Interf	ace Resource As	signments			
Introduction Provision OS Boot Interface Resource Assignmen Devision OS Summary	Review or specified to the specified to	y the network resource vork Interface by MAC /	s for the boot in Address	nterface of each t	arget.	
Configure OS	Boot Interfa	ices				
Network Resource Assignments Server Pool	Target	Network	Controller	Interface	P	Primary Hostname
Configure OS Summary Schedule Job	GuestHA1	OS Network - GL	virtual	primary/10 🕶	10.163.223.40	
				primary/10 secondary/5		

10. In the Network Resource Assignments step, select the correct network for each of the IPMP groups, then select the correct Network Interfaces for the IPMP groups, and assign an IP address. Then click **Next**.

all Server - Guest-HA VI						OR	
ps Targets Help	Network Re	esource A	ssignments				
itroduction ravision OS pot Interface Resource Assignments	Review or specif	y the network	resources for each	target.			
rovision OS Summary	Target: Gues	tHA1					
onfigure OS etwork Resource Assignments	IPMP Groups (2)						
erver Pool	IPMP Group N	ame	Link-Based	Probe-Based	Network		
onfigure OS Summary	ipmp1		7		OS Network - Global L	abs UK	1
chedule Job	ipmp2		V	-	vlan-1234 vlan-1234	ð	1
	Network Int	erfaces (4)					_
	IPMP Group Name	Control	Interface	Data IP Add	ress Test IP Address	Primary	
	ipmp1	virtual	primary/10.163.208.	. 10.163.223	40 -	۲	
	ipmp1	virtual	secondary/second			0	=
	ipmp2	virtual		192.168.13	-	\odot	-

ps Targets Help	Network R	esource A	ssignments				
ntroduction rovision OS oot Innterface Resource Assignments	Review or speci	fy the networ	rk resources for ead	h target.			
rovision OS Summary	Target: Gues	tHA1					
onngure OS	IPMP Group	rs (2)					
erver Pool	IPMP Group N	ame	Link-Based	Probe-Based	Network		Π
onfigure OS Summary	ipmp1				OS Network - Global Li	abs UK	1
chedule Job	ipmp2		2		vian-1234		
	Network In	terfaces (4))				
	IPMP Group Name	Control	Interface	Data IP Add	ress Test IP Address	Primary	Γ
	ipmp1	virtual	secondary/second		-	0	1
							ari 11
	ipmp2	virtual	y-prod/1234/net_0	192.168.13.	25 -		

11. Complete the remaining steps, schedule the job to run now, and click **Apply** to start a job to install the OS on the HA guest domain immediately.

It is possible and recommended to view how the install is progressing. To do this, log on the control domain and view the /var/log/vntsd/ha-guest/console-log file as shown below.

13:41:28	Download:	33022/50926	items	379.9/528.1MB	71%	complete	(4.1M/s)
13:41:33	Download:	35542/50926	items	399.2/528.1MB	75%	complete	(3.6M/s)
13:41:38	Download:	37065/50926	items	412.3/528.1MB	78%	complete	(3.2M/s)
13:41:43	Download:	39193/50926	items	435.7/528.1MB	82%	complete	(3.7M/s)
13:41:48	Download:	40727/50926	items	476.4/528.1MB	90%	complete	(6.4M/s)
13:41:53	Download:	42495/50926	items	499.0/528.1MB	94%	complete	(6.3M/s)
13:41:58	Download:	46558/50926	items	503.6/528.1MB	95%	complete	(2.7M/s)
13:42:03	Download:	48568/50926	items	519.3/528.1MB	98%	complete	(2.0M/s)
13:42:07	Download:	Completed 52	28.14 MB	3 in 114.85 se	conds	(4.6M/s)	
13:42:15	Actions:	1/70640	actions	s (Installing)	new ad	ctions)	
13:42:20	Actions:	15044/70640	actions	s (Installing)	new ad	ctions)	
13:42:25	Actions:	17221/70640	actions	s (Installing)	new ad	ctions)	
13:42:30	Actions:	19202/70640	actions	s (Installing)	new ad	ctions)	
13:42:35	Actions:	21737/70640	actions	s (Installing)	new ad	ctions)	
13:42:40	Actions:	23492/70640	actions	s (Installing)	new ad	ctions)	
13:42:45	Actions:	25701/70640	actions	s (Installing)	new ad	ctions)	

Once the job has completed successfully, confirm the setup is correct in the UI or the command line.

What's Next?

This document demonstrated how to improve the resilience of a guest domain by creating a secondary service domain. This was demonstrated by configuring an Oracle SPARC T5-2 server with a control domain and a secondary domain with redundant I/O access to and from a guest domain as configured within Oracle Enterprise Manager Ops Center. This configuration was tested by first halting the control domain and monitoring all guest operations. This test showed no loss of service in the guest domain. The test was repeated by halting the secondary domain, and again, there were no interruptions on the guest.

To take resilience to the next step, Server Pools should be introduced. These can perform automatic recovery of guests in the event of server failure. See the following documents for information about server pools:

- Oracle Enterprise Manager Ops Center Virtualization Guide
- Oracle Enterprise Manager Ops Center Creating a Server Pool for Oracle VM Server for SPARC

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.

See the following documentation for more detailed information:

- Oracle Enterprise Manager Ops Center Creating a Server Pool for Oracle VM Server for SPARC
- Oracle Enterprise Manager Ops Center Virtualize Reference for information about LDom creation
- Oracle Enterprise Manager Ops Center Operations Reference for information about OS provisioning
- Oracle VM Server for SPARC documentation at http://www.oracle.com/technetwork/documentation/vm-sparc-194287.html

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 a Secondary Service Domain, 12*c* Release 3 (12.3.0.0.0) E60039-01

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