#### **Oracle® Database Appliance**

Solution-in-a-Box: Deploying Database Systems and Application VMs on Oracle Database Appliance

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### Deploying Database Systems and Application VMs on Oracle Database Appliance

This document in the Solution-in-a-Box series provides a step-by-step guide to utilize the KVM technology on Oracle Database Appliance bare metal system release 19.18 and later. It provides guidelines how to create the Application tier together with the database tier on the same Oracle Database Appliance hardware.

About Oracle Database Appliance

Oracle Database Appliance is a pre-built, ready to deploy platform for Oracle Database.

• Why Use Virtualization and How does Oracle Database Appliance provide a Virtualization Solution

Understand how Oracle Database Appliance can address your virtualization requirements.

- Oracle Database Appliance Virtualization Terminology
   Understand the terminology used in this document.
- Solution-in-a-Box Designs

There are three basic scenarios on how to install the application along with the database on an Oracle Database Appliance. For an Oracle Database Appliance High-Availability hardware model, there are additional designs since your database can be a Oracle RAC or a single instance database on one node only and depending on your application, you may be able to run it on one or both nodes.

- High-Availability and Networking Considerations
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- Solution: Create an Application VM with Linux Operating System Using a Kickstart File

Following is an example of how to use a kickstart file to automate some of the steps in the operating system configuration.



Solution: Create an Application VM with Windows OS

Following is an example of how to set up an application VM or Compute Instance with Microsoft Windows operating system.

- Creating a DB System Understand how you can create a KVM DB system on Oracle Database Appliance.
- Deploying JD Edwards EnterpriseOne on Oracle Database Appliance KVM Understand how you can deploy JD Edwards EnterpriseOne on Oracle Database Appliance KVM.
- Deploying Oracle E-Business Suite on Oracle Database Appliance KVM Understand how you can deploy Oracle E-Business Suite on Oracle Database Appliance KVM.
- Deploying Oracle FLEXCUBE on Oracle Database Appliance KVM Understand how you can deploy Oracle FLEXCUBE on Oracle Database Appliance KVM.
- Deploying Oracle Enterprise Manager Cloud Control on Oracle Database Appliance KVM
  - Understand how you can deploy Oracle Enterprise Manager Cloud Control on Oracle Database Appliance KVM.
- Deploying PeopleSoft on Oracle Database Appliance KVM Understand how you can deploy PeopleSoft PeopleTools on Oracle Database Appliance KVM.
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Understand how you can deploy Oracle TimesTen In-Memory Database on Oracle Database Appliance KVM.

- Migrating Oracle VM Guest Machines to KVM on Oracle Database Appliance Understand how you can migrate Oracle VM guest machines from Virtualized Platform to Oracle KVM guest machines on Oracle Database Appliance KVM.
- Backing up Oracle Database Appliance KVM Guest Machines
   Understand how you can back up KVM guest machines on Oracle
   Database Appliance.
- Oracle Database Appliance References

Links and references to the concepts, commands, and examples used in this document.

#### About Oracle Database Appliance

Oracle Database Appliance is a pre-built, ready to deploy platform for Oracle Database.

Oracle Database Appliance is an engineered system, an integrated, full-stack solution developed for Oracle Database. Oracle hardware and software are designed to work perfectly together and are able to run crucial customer workloads faster, at lower costs, and with greater security than multivendor, on-premises 'build your own' solutions. Each Oracle Database Appliance system consists of server nodes,



networking, and redundant storage. Oracle Database Appliance can be a single node model (S for small, M for Medium and in the case of X6-2L, for Large), or a two node HA model (HA models support high-availability). With the High-Availability models, you get two clustered nodes and you are able to create highly-available Oracle RAC databases easily and quickly using either the browser user interface (BUI) or the command-line interface (CLI).

### Why Use Virtualization and How does Oracle Database Appliance provide a Virtualization Solution

Understand how Oracle Database Appliance can address your virtualization requirements.

#### Why use Virtualization?

There are several reasons why virtualization might be considered. Virtual Machines (VMs) can be used to consolidate and to utilize resources more effectively. Rather than disable cores that are not licensed, you can utilize them for other workloads. This can reduce the number of physical servers, resulting in space, power maintenance reductions, and cost savings. Virtualization is a great technology that provides application and database isolation and enables bundling of applications, middleware, and databases on the same hardware.

# How does Oracle Database Appliance provide a Virtualization Solution?

Oracle Database Appliance has provided virtualization since Oracle Database Appliance release 2.5. To use virtualization on Oracle Database Appliance earlier, it had to be deployed with a special image. Users had to decide before deploying Oracle Database Appliance to go with either the bare metal (BM) image or the virtualized platform image (VP). To change from one layout to the other, the appliance had to be reimaged from scratch. Oracle Database Appliance VP was only available for Oracle Database Appliance High Availability (2 node appliance) and not for single node appliance. Virtualization on Oracle Database Appliance was introduced to allow the utilization of cores not licensed for Oracle Database. To avoid leaving these cores unused, virtualization allowed to utilize them for virtual machines hosting applications, webservers, and others. To host not only the database tier, but also the application and web tier on the same Oracle Database Appliance is also known as Solution-in-a-Box. This concept is widely adopted and not only used for Oracle Applications like EBS, WLS, Peoplesoft, Oracle Hospitality to name a few, but as well for many customer and third party software vendor developed applications.

In the past virtualization on Oracle Database Appliance was implemented with Oracle Virtual Machine (OVM) which is a type 1 bare metal hypervisor based on xen technology. Virtualization on Oracle Database Appliance is now available with KVM. KVM stands for Kernel-based Virtual Machine and is a type 2 host OS-based hypervisor. KVM provides modules that enable the Linux kernel to be used as a hypervisor. It is available on all Oracle Database Appliance hardware models (single



node and HA). KVM is a mature technology that has been around since 2007 and offers several advantages. To name one, Oracle Database Appliance does not need separate bare metal system and virtualized platform images anymore. Starting with Oracle Database Appliance 19.9, Oracle Database Appliance integrated KVM support for applications. A user can use the built-in BUI or the command line to manage the Application VM life cycle on Oracle Database Appliance. The user is responsible for managing the application inside the KVM, for the Oracle Database Appliance 19.10, Oracle Database Appliance integrates KVM support for Oracle Database Appliance 19.10, Oracle Database Appliance integrates KVM support for Oracle databases. A user can use Oracle Database Appliance's built-in BUI or the command line to manage both DB System (database KVM system on Oracle Database Appliance) life cycle and databases inside DB Systems. DB Systems allow Oracle hard partitioning licensing, thus a user only needs to have Oracle Database licenses for the CPU cores assigned to the DB System.

#### Oracle Database Appliance Virtualization Terminology

Understand the terminology used in this document.

- Virtual Machine (VM): Image and virtual resources that behave like an actual server within the host server.
- **KVM guest machine:** The software on an application VM with an independent operating system instance.
- DB System (KVM Database System): A database VM which runs an Oracle Database on Oracle Database Appliance. The DB System is created and managed by Oracle Database Appliance tooling.
- VM Storage: Central location for storing resources needed to create virtual machines.
- Virtual Network: Separate virtual network for the VM.
- Virtual Disk: Additional storage option for VMs to add additional block storage.
- **KVM Database System Networks:** Default networks created on Oracle Database Appliance, which are the public network (vnetwork pubnet) and the internal managed cluster interconnect and Oracle ASM network.

#### Solution-in-a-Box Designs

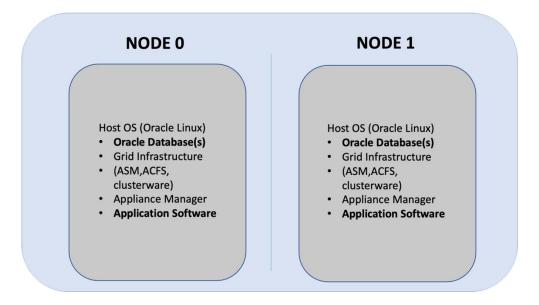
There are three basic scenarios on how to install the application along with the database on an Oracle Database Appliance. For an Oracle Database Appliance High-Availability hardware model, there are additional designs since your database can be a Oracle RAC or a single instance database on one node only and depending on your application, you may be able to run it on one or both nodes.

The basic scenarios are:

Application and Database installed in bare metal system

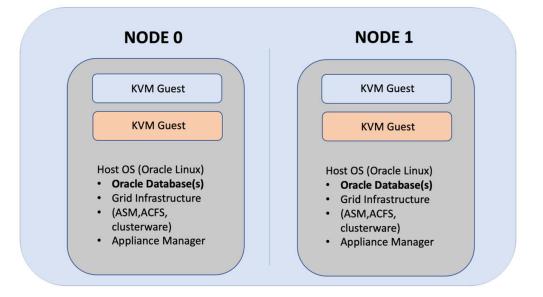


This option is only applicable for a few applications which do not interfere with the database software and operating system installation. One supported example is the Oracle Enterprise Manager software.



# Database installed in bare metal system, Application installed in KVM guest machine

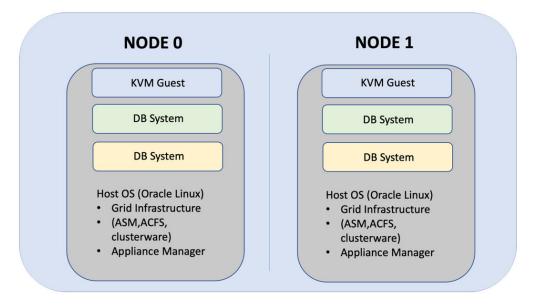
This option does not allow hard partitioning, that is, separation of cores for database and application is not possible.





## Database and Application in separate KVM guest machines

This third option is ideal to separate resources for databases and applications and license them independently. This step-by-step guide covers an example of the third case since this is the best solution for most use cases.



### High-Availability and Networking Considerations

Understand the high-availability and networking options when deploying your Solutionin-a-Box.

### High-Availability Considerations

With Oracle Database Appliance, the best High Availability option is to use an Oracle RAC database. An Oracle RAC One Node design may be sufficient for your availability requirements as well. These options are only available with an Oracle Database Enterprise Edition (EE) licence. Oracle Database Standard Edition (SE) Oracle databases have Standard Edition High Availability (SEHA) feature enabled. The KVM guest machines you create for your applications are set up by default to auto-restart and auto-failover. You can confirm the setting by running the command odacli describe-vm. The output displays: Auto start: YES - Fail over: YES

### **Networking Considerations**

Oracle Database Appliance KVM virtual network supports two type of networks, bridged and bridged-vlan. For bridged network, a bridge is created and a NIC or a bond is attached to it. On the public network, selected during appliance deployment, a bridge with the name pubnet is attached. If a VM needs access to pubnet, it can be



attached to this network. This pubnet vnetwork cannot be modified or deleted. If additional bridged virtual networks are required, then they can be created on other interfaces that are not used for the pubnet. For DB Systems on Oracle Database Appliance release 19.10, you cannot use a virtual network other than the pubnet. With later releases of Oracle Database Appliance, VLANs can be created on all available public interfaces, including the interface on which the public network is already configured. When planning to run one or more DB Systems, be aware that every DB System requires its own set of VIPs and SCAN IPs.

## Solution: Create an Application VM with Linux Operating System

Following is an example of how to set up an application VM or a Compute Instance with Linux operating system.

#### 🔷 Tip:

Do not use Oracle KVM guest machines to run an Oracle database. Use DB systems, instead, to run an Oracle database. Some of the following steps are mandatory as indicated, and other steps are optional. Decide to run the optional steps based on how you designed your Solution-in-a-Box. For example, if your application VM must only use a defined number of CPUs, then, you must create a VM CPU Pool as part of the process. Creation of VM storage is mandatory as several application VMs can share a single VM storage. If you have specific network requirements, you can create additional virtual networks for these purposes. Another optional step is the creation of virtual disks. One VM disk is created for each application guest KVM as part of the VM instance creation. You can create additional virtual disks for your application VM and these virtual disks can be shared between different application VMs, if required.

#### Note:

Run the osinfo-query os --fields short-id, name, version, family, id command to view the list of operating systems.

### Step 1: Create a VM CPU Pool (Optional)

Create a CPU pool to specify how many CPU cores your KVM should use. This CPU pool is later assigned to the KVM guest machine.

In the Browser User Interface (BUI), in the **Appliance** tab, navigate to the **Create CPU Pool** page and specify the **CPU Pool Name**, **Number of CPU Cores**, and select the **CPU Pool Type** as **VM Instance**. You can specify the sockets to use for the CPU pool. To use all sockets, do not specify any value.



	ppliance	System: scaoda819 Current User: oda-admin	Resources - Account	• Q Search Documentation
		Appliance Database	Object Store Monitoring	g Security Activity Diagnostics
Overview	Create CPU Pool			⑦ Help
Compute Instances				
DB Systems	CPU Pool Name * testcpupool	Number of CPU Cores *	~ ~	
Network				
CPU Pool	CPU Pool Type VM Instance	Configure on    All Nodes		
Oracle ASR	VM Instance	All Nodes		
Patch Manager	Socket to Use All Sockets	Use Reserved CPU Cores		
Parameter Repository				
			Cancel Create	>

ODACLI command for creating a CPU pool:

# odacli create-cpupool -n testcpupool -c 2 -vm

#### Step 2: Create VM Storage

In the **Appliance** tab, select Compute Instances, and then navigate to the **Create VM Storage** page and specify **Storage Name**, **Storage Size**, and **ASM Disk group** and the redundancy you want to use. Click **Create**.

	pliance	System: scaoda819 Current Use	ar: oda-admin Resources 🔻 Accou	nt • Q Search Documentation
		Appliance	Database Object Store Monitori	ng Security Activity Diagnostics
Overview	VM Instances VM Storage Virtual Disks	Virtual Networks		(?) Help
Compute Instances				
DB Systems	Create VM Storage			
Network	Storage Name * Storage	Size *	ASM Disk group	
CPU Pool	testvmstor 100	~ ^ GB ~	DATA	•
Oracle ASR				
Patch Manager			Cancel Create	• >
Parameter Repository				

ODACLI command for creating VM storage:

# odacli create-vmstorage -n testvmstor -s 100G -dg DATA -r MIRROR

Note that the default value of -dg is DATA for -r MIRROR.

#### Step 3: Create a Virtual Network (if required)

Any VM that needs to access the public network must be attached to the pubnet virtualnetwork. No bridged network other than the default pubnet bridge is allowed to be created on the public network interface. Additional bridged vnetwork (public network without tagged VLAN configuration) can be created on other interfaces that are not used for the public network. It is not mandatory to assign IP addresses to the bridge. IP addresses are only required if communication between the bare metal system host and the KVM guest is desired. When two IP addresses are assigned to a high-availability machine, the first will be assigned to the bridge on node0 and the second IP address to node1.



c		pliance			System: scaoda819	Current Use	er: oda-admin	Resources 🔻	Account	Q s	earch Docume	ntation
						Appliance	Database	Object Store	Monitoring	Security	Activity	Diagnostics
	Overview	VM Instances	VM Storage	Virtual Disk	s Virtual Networks					() H	elp	
	Compute Instances											
	DB Systems	Create Virtual I	Network									
	Network	Name *		N	de0 IP Address		VLAN ID					
	CPU Pool	kvmnet		[	192.168.10.2		1		~ ^			
	Oracle ASR	Network Type		N	ode1 IP Address		Configure on					
	Patch Manager	Bridged		•	192.168.10.3		All Nodes		•			
	Parameter Repository	Bridge Name		SL	ibnet Mask							
		bridge4kvm		[:	255.255.255.0	•						
		Interface *		Ga	ateway							
		em1		• [·	192.168.10.1							
								Cancel	Create >			

ODACLI command for creating a virtual network:

```
# odacli create-vnetwork -name kvmnet -bridge bridge4kvm -type bridged
-interface bond1 -ip xx.xx.xx -gateway xx.xx.xx -netmask
xx.xx.xx
```

#### Step 4: Create Virtual Disk (if required)

During the VM creation, a VM disk is created to host the operating system. If additional disks are required ,you must create them in advance. Using virtual disks provides better control over the storage layout of your VM.

	ppliance System: scaoda	819 Current User: oda-admin Resources 👻 Account 👻 🔍	Search Documentation
		Appliance Database Object Store Monitoring Security	Activity Diagnostics
Overview	VM Instances VM Storage Virtual Disks Virtual Networks	Ø	Help
Compute Instances			
DB Systems	Create Virtual Disk		
Network	Virtual Disk Name * Disk	Size *	
CPU Pool	testvmdisk 49	~ ^ GB ~	
Oracle ASR	VM Storage Name *	parse 🗹 Shared	
Patch Manager	testvmstor		
Parameter Repository			
		< Back Cancel Create >	

ODACLI command for creating a virtual disk:

# odacli create-vdisk -n testvmdisk -vms testvmstor -s 49G -sh

#### Step 5: Create the VM Instance

To create the VM go to 'VM Instances' and 'Create VM'. Type in the mandatory information for your VM plus the additional configuration you would like to use for your VM guest. Mandatory information is the 'VM name', 'VM Storage Name', the path to the application to install, under ,Source installation'. You have as well to define how many CPUs and how much memory to use for the VM. If you have created a CPU Pool a Virtual Disk or a Virtual Network, select them into the respective fields. Specify



the size of the OS disk to be created for your VM guest in "VM Disk Size". If you need your VM to access the DB System via the pubnet, make sure 'pubnet' is selected in the 'Virtual Networks'.

In the **Appliance** tab, select Compute Instances, and then navigate to the **Create VM Instance** page and specify **VM Name** and **VM Storage Name**. Specify the path for the installation of application in the **Source Installation** field. Define the **Number of vCPUS** to use and the **Maximum Memory Size** for the VM. If you have created a CPU pool, virtual disk, or virtual network, then specify their names. Specify the operating system disk size to be created for your guest VM in the **VM Disk Size** field. To ensure that your VM can access the DB system through the pubnet, select pubnet in the **Virtual Networks** field. Click **Create**.

ORACLE <sup>®</sup> Database Appliance						System: scaoda403			Resources
Overview	Create VM Instance								
Compute Instances	VM Name *	CPU Pool Name				Virtual Disk Names			
DB Systems	testvm	testcpupool			•	testvmdisk ×			
Network	VM Description	Maximum number of vCPUs to us	ie			Virtual Networks			
CPU Pool		2			~ ^	pubnet × kvmnet ×			
Oracle ASR	Disk Group	Number of vCPUs to use *				Specify VM disk size			
Patch Manager	DATA	2			× ^	49 Disk Size	× ^	GB	•
Parameter Repository	VM Storage Name	Maximum Memory Size				DIDK 3128			
	testvmstor	8	· ^	GB	•				
	Source Installation	Memory Size *							
	/u01/software/OL77_x86_64.iso	8	~ ^	GB	•				
	Preterred Node Select Preferred Node OS Type OS Variant Oraphics Settings Extra Arguments Extra Arguments Extra Sources								
	Reset						< Back	Cancel	Create >

ODACLI command for creating a VM instance:

```
# odacli create-vm -n testvm -vc 2 -m 8G -vms testvmstor -vd
testvmdisk -s 49G -cp testcpupool -vn pubnet -src /u01/software/
OL77_x86_64.iso
```

#### Step 6: Complete the operating system installation

If the creation of the VM was successful, use the odacli describe-vm command to check the VNC port (Display port).

```
# odacli describe-vm -n testvm
VM details
------
ID: 4d0d9a5a-bcc7-47e5-b210-de1c661d6764
Name: testvm
Created: 2024-01-12 15:53:18 UTC
```



```
Updated: 2024-01-12 15:53:19 UTC
VM Storage: testvmstor
Description: NONE
VM image path: /u05/app/sharedrepo/testvmstor/.ACFS/snaps/vm testvm/
testvm
VM size: 49.00 GB
Source: OL77 x86 64.iso
Cloned from: N/A
OS Variant: NONE
Graphics settings: vnc, listen=127.0.0.1
Display Port: 127.0.0.1:0
Status
_____
Current node: node1
Current state: ONLINE
Target state: ONLINE
Parameters
_____
Preferred node: NONE
Boot option: NONE
Auto start: YES
Fail over: YES
NUMA enabled: NO
Config Live
 -----
Memory: 8.00 GB 8.00 GB
Max Memory: 8.00 GB 8.00 GB
vCPU count: 2 2
Max vCPU count: 2 2
CPU Pool: testcpupool testcpupool
Effective CPU set: 1,33,65,97 1,33,65,97
vCPUs: 0:1,33,65,97 0:1,33,65,97
1:1,33,65,97 1:1,33,65,97
vDisks: testvmdisk:vdb testvmdisk:vdb
vNetworks: pubnet:52:54:00:6f:21:59 pubnet:52:54:00:6f:21:59
```

### Step 7: Connect to the Oracle Database Appliance bare metal system node using VNC

To find out the VNC port that the bare metal system (not the KVM guest machine) uses, run the vncserver command.

```
# vncserver
```

```
WARNING: vncserver has been replaced by a systemd unit and is now considered deprecated and removed in upstream. Please read /usr/share/doc/tigervnc/HOWTO.md for more information.
```



```
You will require a password to access your desktops.
Password:
Verify:
Would you like to enter a view-only password (y/n)? n
A view-only password is not used
xauth: file /root/.Xauthority does not exist
New 'scaoda10ha241:1 (root)' desktop is scaoda10ha241:1
Creating default startup script /root/.vnc/xstartup
Creating default config /root/.vnc/config
Starting applications specified in /root/.vnc/xstartup
Log file is /root/.vnc/scaoda10ha241:1.log
[root@scaoda10ha241 ~] # vncserver
WARNING: vncserver has been replaced by a systemd unit and is now
considered deprecated and removed in upstream.
Please read /usr/share/doc/tigervnc/HOWTO.md for more information.
New 'scaoda10ha241:2 (root)' desktop is scaoda10ha241:2
```

```
Starting applications specified in /root/.vnc/xstartup
Log file is /root/.vnc/scaoda10ha241:2.log
```

Use a VNC client of your choice and connect to host:vncport (the host is your Oracle Database Appliance bare metal system, the VNC port is from the vncserver command).

VNC server: node	1:1		
Options	Load	Save As.	
About		Cancel	Connect /

The command prompt in the VNC viewer is displayed. Specify vncviewer 127.0.0.1:2 in the command prompt. Note that this Display Port: 127.0.0.1:2 is the same as displayed in the odacli describe-vm output.

[root@	"]# vncview	ver 127.0.0.1:2[]		



### Step 8: Complete the installation process

Select the language:

		🕮 us
WELCOME TO OF	RACLE LINUX 7.7.	
What language would yo	ou like to use during the insta	allation process?
English	English 🔉	English (United States)
Afrikaans	Afrikaans	English (United Kingdom)
አማርኛ	Amharic	English (India)
العربية	Arabic	English (Australia)
অসমীয়া	Assamese	English (Canada)
Asturianu	Asturian	English (Denmark) English (Ireland)
Беларуская	Belarusian	English (New Zealand)
Български	Bulgarian	English (Nigeria)
বাংলা	Bengali	English (Hong Kong SAR China)
Bosanski	Bosnian	English (Philippines)
Català	Catalan	English (Singapore)
Čeština	Czech	English (South Africa)
Cymraeg	Welsh	English (Zambia)
Dansk	Danish	English (Zimbabwe) English (Botswana)
Deutsch	German	English (Antigua & Barbuda)
[]	G	

In the Device Selection screen, the disks that were created when you ran the odacli create-vm and odacli create-vdisk commands are displayed. Ensure that you select the appropriate disk for the operating system install.

Select the device(s) yo Local Standard Disks	ou'd like to install to. T	hey will be left untouc
49 GiB	50 GiB	
0x108e	0x108e	k
vda / 49 GiB free	vdb / 50 GiB free	

When prompted, accept the message to restart, and then run the VNC to complete the setup, such as accepting the license agreement.

Step 9: Configure the Application VM network



After the Linux operating system installation for the application VM is completed, the VM may have several interfaces. The following example describes how to assign the IP address to the pubnet and locate the MAC address for this interface.

# odacli describe-vm -n testvm|grep vNetworks

vNetworks: kvmnet:52:54:00:ed:02:57 kvmnet:52:54:00:ed:02:57 pubnet:52:54:00:00:b4:93 pubnet:52:54:00:00:b4:93

Login to the application VM through the VNC client and run the command ip link show to identify the interface with the MAC address described in the command above.

```
# ip link show
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN
mode DEFAULT group default qlen 1000
    link/loopback 00:00:00:00:00 brd 00:00:00:00:00:00
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast
state UP mode DEFAULT group default qlen 1000
    link/ether 52:54:00:7d:7b:6b brd ff:ff:ff:ff:ff
3: virbr0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue
state DOWN mode DEFAULT group default qlen 1000
    link/ether 52:54:00:42:63:d7 brd ff:ff:ff:ff:ff
4: virbr0-nic: <BROADCAST,MULTICAST> mtu 1500 qdisc pfifo_fast master
virbr0 state DOWN mode DEFAULT group default qlen 1000
    link/ether 52:54:00:42:63:d7 brd ff:ff:ff:ff:ff
```

Edit the /etc/sysconfig/network-scripts/ifcfg-eth0 and /etc/resolv.conf file to find the DNS inside the VM. Refer to your operating system specific document to configure the network interface. The following is an example:

```
# cat /etc/sysconfig/network-scripts/ifcfg-eth0
TYPE=Ethernet
BOOTPROTO=none
DEFROUTE=yes
NAME=eth0
DEVICE=eth0
NM_CONTROLED=no
ONBOOT=yes
IPADDR=your IP address
PREFIX=your subnet prefix
GATEWAY=your gateway
```

# cat /etc/resolv.conf
search domain
nameserver your first DNS server
nameserver your second DNS server



## Step 10: Test for the required connectivity to the VM guest machine

Test that you are able to connect to all guest machines and clients (database, external machines, and others). To connect as root through SSH, you may need to change SELINUX to permissive mode in the /etc/selinux/config file. If required, test this connectivity as well after you migrate the VM guest machine to the other node. To migrate the node, run the following commands:

```
# odacli describe-vm -n testvm2 | grep 'Current node'
Current node: node1
# odacli migrate-vm -n testvm2 -to node2
# odacli describe-vm -n testvm2 | grep 'Current node'
Current node: node2
```

# Solution: Create an Application VM with Linux Operating System Using a Kickstart File

Following is an example of how to use a kickstart file to automate some of the steps in the operating system configuration.

For example, you can set the root password, IP address, host name and other settings using the kickstart file. Specify the kickstart file location in the ODACLI command to create a KVM. Follow these steps:

### Step 1: Set up the HTTP Server that Hosts the Kickstart File

Currently, ODACLI only supports kickstart configuration file over the network.

On the server you want to use as an HTTP server, run the following command:

```
# yum install httpd
```

Start the service:

```
# systemctl enable httpd --now
```

### Step 2: Create a Kickstart File

The easiest way to create a kickstart file is to use one from an existing Oracle Linux machine. Each Oracle Linux installation creates a kickstart file, for example, /root/



anaconda-ks.cfg. You can use the file to repeat an installation, or you can customise the settings in this file for different system configurations. The following example displays a kickstart file from the earlier manual installation with updated network information and a different root password:

```
# Network information
network --bootproto=static --device=eth0 --gateway=ww.xx.yy.1 --
ip=ww.xx.yy.zz --nameserver=aa.bb.cc.dd --netmask=iii.iii.iii.iii --
noipv6 --activate network --hostname=mykvmhost
# Root password
```

rootpw welcome1

Store the file on the HTTP server as /var/www/html/ks.txt.

# Step 3: Access Kicsktart File from Oracle Database Appliance

To verify that you can access the kickstart file, from the Oracle Database Appliance bare metal system server, run the command:

```
curl -I "st.uv.wx.yz:80/ks.txt" ←replace st.uv.wx.yz with the IP
address of your http server
```

The contents of the ks.txt file are displayed.

#### Step 4: Install the KVM on Oracle Database Appliance

Run the odacli create-vm command and provide the additional kickstart information with the --extra-args option. Provide under ip= the IP, gateway, subnet and hostname of the VM you want to deploy, for example,

ip=ip::gateway:netmask:hostname:interface:none. In ks=, specify the location of the ks.txt file as explained in Step 3. Following is an example:

```
odacli create-vm -n testkick -vc 2 -m 8G -vms testvmstor -s 49G -vn
pubnet -src /u01/software/OL77_x86_64.iso --extra-args
"dns=aa.bb.cc.dd
ip=ww.xx.yy.zz::ww.xx.yy.1:iii.iii.iii.iii.iii:mykvmhost.us.oracle.com:eth0
:none ks=st.uv.wx.yz:80/ks.txt"
```

After the odacli create-vm command completes, check the VNC connection details of the VM as follows:

# odacli describe-vm -n testkick|grep Display  $\leftarrow$  where testkick is the name of your VM Display Port: 127.0.0.1:2



To monitor the progress of the operation, use a VNC client of your choice and connect to host:vncport (the host is your Oracle Database Appliance bare metal system, the VNC port is from the vncserver command).

VNC server: node	1:1		
Options	Load	Save As.	
About		Cancel	Connect

The command prompt in the VNC viewer is displayed. Specify vncviewer 127.0.0.1:2 in the command prompt. Note that this Display Port: 127.0.0.1:2 is the same as displayed in the odacli describe-vm output.

[root@:]# vncviewer 127.0.0.1:2[

#### Solution: Create an Application VM with Windows OS

Following is an example of how to set up an application VM or Compute Instance with Microsoft Windows operating system.

The following procedure is applicable for Oracle Database Appliance release 19.12 or later. If your Oracle Database Appliance is on an earlier release, then follow the instructions in My Oracle Support Note 2748946.1 at the location https://support.oracle.com/rs?type=doc&id=2748946.1.

Before you start, download the **Oracle VirtIO Drivers Version** for Microsoft Windows software either from Oracle Software Delivery Cloud or from My Oracle Support. For details, refer to the *Oracle Linux KVM User's Guide*. With BUI of Oracle Database Appliance release 19.12 or 19.11, the option to define an external source is not available. Use ODACLI commands to create the VM with the option -esrc.

Step 1: Create a VM CPU Pool (Optional step, required only for cases when you need dedicated CPU resources for the Windows VM)

# odacli create-cpupool -n winvmcpupool -c 2 -vm



#### Step 2: Create VM Storage

# odacli create-vmstorage -n winvmstor -s 100G -dg DATA

## Step 3: Create Virtual Disk (Optional, required only if you need additional disks for the Windows VM )

```
# odacli create-vdisk -n winvmdisk -vms winvmstor -s 49G -sh
```

#### Step 4: Create the VM Instance

```
# odacli create-vm -n winvm -vc 2 -m 8G -vms winvmstor -s 49G -vd
winvmdisk -cp winvmpool -vn pubnet -src /u01/software/win19.iso -
esrc /u01/software/winvirtio.iso
```

#### Step 5: Identify the VNC port

```
# odacli describe-vm -n winvm
VM
details
 _____
_____
_____
_____
ID: f1259c48-fba2-45e8-894d-6b878806db55
Name: winvm
Created: 2024-01-29 11:45:47 UTC
Updated: 2024-01-29 11:45:48 UTC
VM Storage: winvmstor
Description: NONE
VM image path: /u05/app/sharedrepo/winvmstor/.ACFS/snaps/vm winvm/winvm
VM size: 49.00 GB
Source: win19.iso
Cloned from: N/A
OS Variant: win2k19
Graphics settings: vnc, listen=127.0.0.1
Display Port: 127.0.0.1:4
Status
_____
Current node: scaoda10ha241
Current state: ONLINE
Target state: ONLINE
```



```
Parameters
_____
Preferred node: NONE
Boot option: NONE
Auto start: YES
Fail over: YES
NUMA enabled: NO
Config Live
_____
Memory: 8.00 GB 8.00 GB
Max Memory: 8.00 GB 8.00 GB
vCPU count: 2 2
Max vCPU count: 2 2
CPU Pool: winvmcpupool winvmcpupool
Effective CPU set: 3,35,67,99 3,35,67,99
vCPUs: 0:3,35,67,99 0:3,35,67,99
1:3,35,67,99 1:3,35,67,99
vDisks: winvmdisk:vdb winvmdisk:vdb
vNetworks: pubnet:52:54:00:26:29:f3 pubnet:52:54:00:26:29:f3
```

## Step 6: Connect to the Oracle Database Appliance bare metal system node using VNC

To find out the VNC port that the bare metal system (not the KVM guest machine) uses, run the vncserver command.

```
# vncserver
perl: warning: Setting locale failed.
perl: warning: Please check that your locale settings:
   LANGUAGE = (unset),
   LC ALL = (unset),
   LC CTYPE = "UTF-8",
   LANG = "en US.UTF-8"
    are supported and installed on your system.
perl: warning: Falling back to the standard locale ("C").
You will require a password to access your desktops.
Password:
Verify:
Would you like to enter a view-only password (y/n)? n
A view-only password is not used
xauth: file /root/.Xauthority does not exist
New 'node1:1 (root)' desktop is node1:1 
VNC port
Creating default startup script /root/.vnc/xstartup
Creating default config /root/.vnc/config
```



```
Starting applications specified in /root/.vnc/xstartup
Log file is /root/.vnc/node1:1.log
```

### Step 7: Connect to the VM guest machine using VNC

Use a VNC client of your choice and connect to host:vncport (the host is your Oracle Database Appliance bare metal system, the VNC port is from the vncserver command).

VNC server: node	1:1		
Options	Load	Save As.	
About		Cancel	Connect /-

The command prompt in the VNC viewer of type vncviewer 127.0.0.1:2 is displayed. Note that this Display Port: 127.0.0.1:2 is the same as displayed in the odacli describe-vm output.

[root@	~]# vncviewer	127 0 0 1+20
	1. AUCAICOCI	121+0+0+1+20

## Step 8: Complete the Windows operating system installation

Select the configuration details.





Provide the required values and navigate through the installation setup.

🖆 Windows Setup	
Windows Server* 2019	
Install now	
Tistai Iom	
Repair your computer	
© 2018 Microsoft Corporation. All rights reserved.	

Select the configuration details.



Operating system	Architecture	Date modified
Windows Server 2019 Standard Evaluation	x64	9/7/2019
Windows Server 2019 Standard Evaluation (Desktop Experien		9/7/2019
Windows Server 2019 Datacenter Evaluation Windows Server 2019 Datacenter Evaluation (Desktop Experi	x64 x64	9/7/2019 9/7/2019
scription: is option installs the full Windows graphical environment, co	nsumino extra di	ive space. It can b
seful if you want to use the Windows desktop or have an app t		ive space. It can b

When prompted Where do you want to install Windows?, select Load driver.

A Befresh	Delete	Eormat	<mark>₩</mark> Ngw	
🕑 Load driver	Delete			

Navigate to the VirtIO driver on E: CDROM drive.



Browse for Folder	×
Browse to the driver, and then click OK.	
<ul> <li>CD Drive (D:) SSS_X64FREE_EN-US_DV9</li> <li>CD Drive (E:) CDROM</li> <li>NetKVM</li> </ul>	^
Vio Vin 10 amd64	
> Win7	
Win8.1	
	×
OK Cano	el

In the vio/Win10/amd64 directory, select viostororcl.inf from the list.

	alloon Driver (E:\vi CSI controller (E:\v			
Oracle Virtuo S	CSI controller (E.)V	10 (WINTO / 910004 /	viostororci.intj	

After loading the driver, the pre-created virtual disk and the extra virtual disk (winvmdisk) is displayed. Select the pre-created virtual disk and continue with the installation.



Name		Total size	Free space	Туре
Drive 0 Una	allocated Space	49.0 GB	49.0 GB	
for Defearb		Eormat	+ New	
Refresh				

Review the progress of the installation.

🄏 Windows Setup	<u> </u>
Installing Windows	
Status	
Copying Windows files Getting files ready for installation (14%) Installing features Installing updates Finishing up	

To run **Ctrl+Alt+Delete** in the Windows operating system, click inside the Windows screen and press the **F8** key. On a Mac, press **Fn+F8**.





Step 9: Install the VirtIO drivers by running Setup from the CDROM drive E:

File Home Share	View Drive Tools			~
← → ~ ↑ 🖾 → Thi	is PC    CD Drive (E:) CDROM	) v	Search CD Driv	e (E:) CDROM
	Name NetKVM Vio Vioinput Vioscial Viostore AUTORUN Setup	Date modified           2/8/2018 10:17 AM           2/26/2019 11:47 AM           2/26/2019 11:47 AM           2/26/2019 11:46 AM           Sce: 22.5 M8           Date modified: 2/26/2019 11:46 AM	Type File folder File folder File folder File folder File folder File folder Setup Information Application	Size 1 KB 23,105 KB

Navigate through the installation setup.





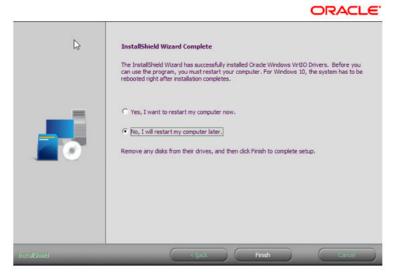
Select the default option.



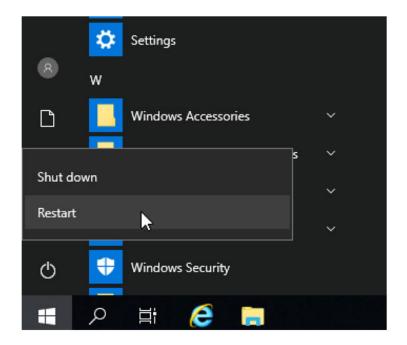
When prompted, do not select to restart the computer.



Drivers Installer



Restart the computer from the Windows Start menu.



### Step 10: Complete the configuration

Connect to your guest VM using VNC and configure it according to your needs. For example, you can assign a fixed IP address.



Ethernet 3	Diagnose this connection		
Network Oracle VirtiO Ethernet Adapter	Ethernet 3 Properti	es	×
Cracle VirtiO Ethernet Adapter	Networking Connect using: Concel VitiO E This connection uses Concert for Me Concert for Me Conc	Internet Protocol Version 4 (TCP/IPv General You can get IP settings assigned au this capability. Otherwise, you need for the appropriate IP settings. O gbtain an IP address automatic Digit the following IP address IP address:	iomatically if your network supports to ask your network administrator
	<	Sybnet mask: Default gateway:	
	Description Transmission Contr wide area network across diverse inte	Other DNS server address aut Other DNS server and Preferred DNS server: Alternate DNS server:	
item 1 item selected		Valjdate settings upon exit	Adganced

After disabling the Windows firewall, you can ping the bare metal system host IP from the KVM guest machine and vice versa.

Win	dows Security		- 0
$\leftarrow$		Who and what can access your networks.	Learn more about Firewall & network protection
=			3
ŝ	Home	8 Windows Defender Firewall is using settings that may make your device unsafe.	
D	Virus & threat protection	Restore settings	Who's protecting me?
			Manage providers
(ib)	Firewall & network protection		
	App & browser control	Domain network	Change your privacy settings
旦	Device security	Firewall is off.	View and change privacy settings for your Windows 10 device.
		Turn on	Privacy settings
			Privacy dashboard
			Privacy Statement
		Se Private network (active)	
		Firewall is off.	
		Turn on	
		Public network	
		Firewall is off.	
8	Settings	Turn on	I

Step 11: Remove the ISO image files from the configuration (for high-availability systems, do this on both nodes)



To delete the ISO files from the directory (/u01/software in this example), you must remove the files from the KVM configuration as follows:

**1.** Stop the VM:

# odacli stop-vm -n winvm

2. View the list of configured disks:

3. Edit the VM configuration:

# virsh edit winvm

 Remove the two lines that contain the Windows and the virtio ISOs as follows, using the vi editor:

```
<source file='/u05/app/sharedrepo/winvmstor/.ACFS/snaps/
vdisk winvmdisk/winvmdisk'/>
```

and:

```
<source file='/u01/software/win19.iso'/>
```

5. Start the VM:

odacli start-vm -n winvm

6. Test the KVM migration to the other node:

#odacli migrate-vm -n winvm -to second node name

#### Creating a DB System

Understand how you can create a KVM DB system on Oracle Database Appliance.

Always review the latest Oracle Database Appliance documentation library for the features and configuration details for each release since these procedures may change with each release.

Oracle Database Appliance documentation library is available at:



#### https://docs.oracle.com/en/engineered-systems/oracle-database-appliance/index.html

The space reserved on Oracle ACFS storage for a DB system node is fixed at 200 GB. This is the space assigned for the operation system, Oracle Grid Infrastructure home and the database home of the DB system. The database files are stored on Oracle ASM disk groups of the Oracle Database Appliance bare metal system to which the Oracle Grid Infrastructure of the DB System connects as a client.

Follow these steps to create a DB system on your appliance:

#### Check the Oracle Database Appliance release

```
# odacli describe-component -v
System Version
_____
19.21.0.0.0
System node Name
_____
scaoda10ha241
Local System Version
_____
19.21.0.0.0
System node Name
_____
scaoda10ha242
Local System Version
_____
19.21.0.0.0
```

#### Download the DB System image

Download Patch 32451228 for the DB System image to a temporary directory on your appliance and unzip the file.

```
# cd /tmp
#unzip p32451228_1921000_Linux-x86-64.zip
odacli-dcs-19.21.0.0.0-231220-ODAVM-19.21.0.0.zip
```



#### Update the Oracle Database Appliance repository

```
# odacli update-repository -f /tmp/odacli-dcs-19.21.0.0.0-231220-
ODAVM-19.21.0.0.zip
{
    "jobId" : "2e392dad-587b-4ed1-87b6-995f3131cab6",
    "status" : "Created",
    "message" : "/tmp/odacli-dcs-19.21.0.0.0-231220-ODAVM-19.21.0.0.zip",
    "reports" : [],
    "createTimestamp" : "Jan 15, 2024 00:26:39 AM HDT",
    "resourceList" : [],
    "description" : "Repository Update",
    "updatedTime" : "Jan 15, 2024 00:26:39 AM HDT"
```

#### Confirm the DB System image is correctly registered

```
# odacli describe-dbsystem-image
DB System Image
details
------
Component Name Supported Versions Available Versions
------
DBVM 19.21.0.0.0 19.21.0.0.0
```

#### Create the DB System Using BUI

Decide on the database shape according to your Database Class (OLTP, DSS or IMDB) resource requirements and available licenses. The database shape determines the number of cores you assign to the DB system. For a complete list of DB shapes, review the Oracle Database Appliance documentation. You can use the BUI to create a DB system or you can use a JSON file to create the DB system using ODACLI commands.

Log into the BUI. In the **Appliance** tab, click **DB Systems** and then click **Create DB System**. If you need to assign more cores later, then ou can change the configuration after creation.



				Acc	ount +	🕜 Help 🤟
	Appliance	Database	Object Store	Monitoring	Security	Activity
Appliance						
Overview						
Compute Instances						
DB Systems						
Network						
CPU Pool						
Oracle ASR						
Patch Manager There are no	DB Systems.					
Click Create DB System	to create a new DB	System.				
Create I	0B System					
Lean	n More					

### Create the DB System: System Information

Provide the system information.

DRACLE	Database Appliance					Acc	ount 🔻	Help
			Appliance	Database	Object Store	Monitoring	Security	Activit
ppliance	Create DB System							
Overview								
Compute Instances	Load Configuration Browse.	No file selected.						
DB Systems	System Information							
Network	DB System Name *	Region			System Pass	word *		
CPU Pool		Other		Ŧ				
	Domain Name *	Time Zone			Confirm Pass	word *		
Oracle ASR		GMT		v				
Patch Manager	Disk Group for VM Storage *							
	DATA	-						
	DNS Servers							
	NTP Servers							

Create the DB System: Network Information

Provide the network information.



DRACLE	Database Appliance					Acc	ount *	Help *
			Appliance	Database	Object Store	Monitoring	Security	Activity
	Network Information							
	Client Access Network	SCAN and VIP Network						
	Node0 Host Name *	Node0 VIP Name *						
	IP Address *	VIP Address *						
	Node1 Host Name *	Node1 VIP Name *						
	IP Address *	VIP Address *						
	Subnet Mask *	SCAN Name *						
	Gateway *	SCAN IP Address *						

## Create the DB System: Users and Groups and Database Information

Customize users and groups and decide if you want to use operating system role separation. You must specify the same configuration details for the DB system users and groups as the configuration details for the Oracle Grid Infrastructure installation on the bare metal system. If your bare metal system has a user grid and a user oracle, then you are using role separation. You can also provide information about the database you want to create.

		Appliance	Database Object Store	Monitoring Security A			
User and Group Selection							
Customize Users & Groups 🕓 Yes 🖲 No	Allow OS Role Separation  . Yes  . No						
Database Information							
DB Name *	Database Edition		SYS and PDB Admin Use	er Password			
	Enterprise Edition	w.					
DB Unique Name	Deployment		Confirm Password *				
	RAC	×					
DB Version	Shape		Character Set				
19.10.0.210119 *	odb1(1 Core, 8GB Memory)	v	AL32UTF8	v			
CDB • Yes No	Database Class		National Character Set				
PDB Name *	OLTP	*	AL16UTF16	w.			
PDB Name			Language				
PDB Admin User			AMERICAN	*			
PDB Admin User			Territory				
			AMERICA	v			
			Configure EM Express	Yes 💿 No			
			Enable TDE 🕕 Yes 🔍	No			
			TDE Wallet Password	110			
			TEL HUNDET USSANDE				
			Confirm TDE Wallet Pass	word			
			Committee Hander and	in the second se			



You can monitor the progress of the DB system creation either in the **Activity** tab of the BUI or through ODACLI commands. Use the odacli list-jobs helps you to find the running job. The odacli describe-job command displays the completed steps and the running ones. Following are the steps to check the DB system creation process:

- 1. Obtain the job ID in the bare metal system.
- 2. SSH into the DB system VM.
- 3. Obtain the job ID inside the DB system.
- 4. Query the status of the job.

```
# odacli list-jobs
ID
                                        Status
Description
                       Created
_____
----- -----
                                          ----- . .
46f3a1fc-9380-41c5-8540-ad8026300251 DB System scaoda10ha24c3
creation 2024-01-30 14:02:54 UTC Running
# ssh root@IP of DB System
# odacli list-jobs
ID
Description
                      Created
                                        Status
_____ ____
_____ _
8351cf95-a3c3-438d-8056-830b7c7e6024 Provisioning service
creation 2024-01-30 14:08:34 CET Running
# odacli describe-job -i 8351cf95-a3c3-438d-8056-830b7c7e6024
Job details
_____
      ID: 8351cf95-a3c3-438d-8056-830b7c7e6024
Description: Provisioning service creation
   Status: Success
  Created: January 30, 2024 2:08:34 PM CET
  Message:
                            Node Name
Task Name
                                        Start
              End Time
Time
                                           Status
_____ ____
_____
                      _____
_____
                            scaoda10ha24c3n1 January 30,
Network setup
2024 2:08:49 PM CET January 30, 2024 2:09:03 PM CET Success
OS usergroup 'asmdba' creation scaoda10ha24c3n1 January 30,
2024 2:09:03 PM CET January 30, 2024 2:09:03 PM CET Success
```



#### Create DB System Using CLI

You can also create a DB System using a JSON file. Check the latest Oracle Database Appliance documentation for sample JSON file to deploy a high-availability DB system. You can also specify the DB system details in the BUI and create a JSON file when you click **Save Configuration** on the Create DB System page.

Create DB System with the odacli create-dbsystem command

### Confirm the DB System creation

Confirm that the DB System was created successfully.

```
ID: 397d80c3-d52a-4ae2-90e9-d7fa94663418

Name: scaoda10ha24c3

Image version: 19.21.0.0.0

Current version: 19.21.0.0.0

Shape: odb2

Cluster name: dbsa1c1fc249

Grid version: 19.21.0.0.231017

Number of cores: 2

Memory: 16.00 GB

NUMA enabled: YES

AFD enabled: NO

Status: CONFIGURED

Created: 2024-01-30 14:02:59 UTC

Updated: 2024-01-30 14:49:02 UTC
```

CPU Pool

\_\_\_\_\_

Name: calclfc249 Number of cores: 2



```
Host: scaoda10ha241
       Effective CPU set: 4,36,68,100
            Online CPUs: 4, 36, 68, 100
           Offline CPUs: NONE
                  Host: scaoda10ha242
       Effective CPU set: 4,36,68,100
            Online CPUs: 4, 36, 68, 100
           Offline CPUs: NONE
VM Storage
_____
            Disk group: DATA
            Volume name: SA1C1FC249
          Volume device: /dev/asm/salc1fc249-472
                   Size: 400.00 GB
            Mount Point: /u05/app/sharedrepo/scaoda10ha24c3
             Redundancy: Mirror
VMs
_____
                  Host: scaoda10ha241
               VM Name: xalclfc249
           VM Host Name: scaoda10ha24c3n1.us.oracle.com
          VM image path: /u05/app/sharedrepo/scaoda10ha24c3/.ACFS/
snaps/vm xalclfc249/xalclfc249
           Target State: ONLINE
          Current State: ONLINE
                   Host: scaoda10ha242
```

```
VM Name: yalclfc249
VM Host Name: scaodal0ha24c3n2.us.oracle.com
VM image path: /u05/app/sharedrepo/scaodal0ha24c3/.ACFS/
snaps/vm_yalclfc249/yalclfc249
Target State: ONLINE
Current State: ONLINE
```



Host:	scaoda10ha242			
VM Name:	yalclfc249			
Public:	10.95.115.210	/	255.255.240.0	/
enp0s3 / BRIDGE(pubnet)				
ASM:	192.168.17.7	/	255.255.255.128	/
enp0s4 / BRIDGE(privasm) VL	AN(icbond0.100)			
Interconnect:	192.168.17.134	/	255.255.255.252	/
enp0s5 / BRIDGE(privnet2) V	LAN(icbond0.102)			

Databases

Name:	hagen
Resource ID:	a702829e-95b5-4a37-a317-eea9f6984575
Unique name:	hagen
Database ID:	3694037607
Domain name:	us.oracle.com
DB Home ID:	4a06bb4b-cebb-4bd4-a884-67911c7af8a3
Shape:	odb2
Version:	19.21.0.0.231017
Edition:	EE
Туре:	RAC
Role:	PRIMARY
Class:	OLTP
Storage:	ASM
Redundancy:	MIRROR
Target node name:	
Character set:	AL32UTF8
NLS character set:	
Language:	AMERICAN
Territory:	AMERICA
Console enabled:	
High Availability:	false
Associated networks:	Public-network
Backup config ID:	
Level 0 Backup Day:	sunday
Autobackup enabled:	false
TDE enabled:	false
CDB type:	true
PDB name:	pdb1
PDB admin user:	pdbadmin

## Test the database connection

Test connectivity to your DB System. During creation of the DB system you specified the SCAN name and database name. With this information you should be able to build your TNS connect string using the default service name which is the same as the database name. It is a best practice to create your own database services based on



your high-availability requirements. For an initial connection test, the default service is sufficient.

Username Password Save Passwor Oracle Connection Typ		Connection Color		
Sa <u>v</u> e Passwor				
Oracle				
	Basic			
Connection Typ	Basic			
		▼ Ro <u>l</u> e de	fault 🔻	
Hostn <u>a</u> me	mysbsystem	-scan. con	n	
Po <u>r</u> t	1521			
⊖ S <u>I</u> D				
Service name	my19db	com		
OS Authenti	cation 🗌 Ker	beros Authenticatio	n Advanced	

Connect to the KVM guest machine nodes with SSH also, and verify that you can connect to the database instances locally.

```
# ssh root@nodeln1
# su - oracle
$ export ORACLE_HOME=/u01/app/oracle/product/19.0.0.0/dbhome_1
$ export ORACLE_SID=my19db1 (the '1' after the DB name is for
instance 1 on the first RAC node)
$ /u01/app/oracle/product/19.0.0.0/dbhome_1/bin/sqlplus / as sysdba
SQL*Plus: Release 19.0.0.0.0 - Production on Mon Mar 15 08:32:37 2021
Version 19.10.0.0.0
Copyright (c) 1982, 2020, Oracle. All rights reserved.
Connected to:
Oracle Database 19c Enterprise Edition Release 19.0.0.0.0 - Production
Version 19.10.0.0
SQL>
```

Modify a DB System



You can change several settings of a DB system at any time after creation, for example, the shape or the memory allocation. The --help option of the odacli modify-dbsystem command provides you the possible setting you can change. # odacli modify-dbsystem -h modify-dbsystem Modifies a DB System Syntax modify-dbsystem -n [-avn ] [-cp ] [-dvn ] [-en] [-f] [-gw ] [-ip ] [-m ] [-nm ] [-no-cp] [-r {MIRROR | HIGH}] [-sip ] [-sn ] [-s ] [-vips ] [-vt ] [-j] [-h] Parameters Options Description \_\_\_\_\_ --name,-n (\*) Specifies the DB System name --attach-vnetwork,-avn Defines the name of the VNetwork to attach --cpupool,-cp Defines the shared DB System CPU Pool name --detach-vnetwork,-dvn Defines the VNetworks to detach --enable-numa,-en Enables NUMA configuration for the DB System --force,-f Specifies to force the operation Defines the gateway of the network Defines the IP of the network --gateway,-gw --ip,-ip --memory,-m Defines the memory size (Format: units --netmask,-nm Defines the netmask of the network --no-cpupool,-no-cp Specifies to dissociate the current DB --memory,-m Defines the memory size (Format: units: M|G) System CPU Pool Specifies DB System's VM storage --redundancy,-r redundancy (can be HIGH or MIRROR) . Not allowed for DB Systems on non-FLEX disk group. Options: MIRROR HIGH Default option: MIRROR --scan-ips,-sip --scan-name,-sn Defines the scan IP of the network Defines the scan of the network --shape,-s Defines the new DB System shape --vips,-vips Defines the VIPs of the network in format :0:,:1: --vnetwork-type,-vt Defines the VNetwork type to attach(dataguard|database|management|backup|other) --json,-j Specifies to show output in JSON format --help,-h Specifies to display help message

Deploying JD Edwards EnterpriseOne on Oracle Database Appliance KVM



Understand how you can deploy JD Edwards EnterpriseOne on Oracle Database Appliance KVM.

#### Note:

JD Edwards EnterpriseOne provides an Xen Virtualization VM Template. You cannot use this template for KVM virtualization deployment.

To install JD Edwards EnterpriseOne in KVM on Oracle Database Appliance, follow these steps:

- **1.** On Oracle Database Appliance, create the application KVM for Windows guest machines as described in this document.
- 2. Create a DB system on Oracle Database Appliance and deploy Oracle Database.
- Follow the JD Edwards EnterpriseOne documentation steps to install JD Edwards EnterpriseOne: https://docs.oracle.com/cd/E84502\_01/learnjde/installation.html#one-clickprovisioning

## Deploying Oracle E-Business Suite on Oracle Database Appliance KVM

Understand how you can deploy Oracle E-Business Suite on Oracle Database Appliance KVM.

# Considerations for E-Business Suite 12.2 on Oracle Database Appliance:

- The Rapid Install tool is not supported on Oracle Database Appliance DB System. You cannot directly install new Oracle E-Business Suite environment on Oracle Database Appliance DB System.
- Existing Oracle E-Business Suite databases can be migrated to Oracle Database Appliance DB System. Use the following procedure to migrate Oracle E-Business Suite databases to Oracle Database Appliance DB System:
  - **1.** Create a DB System.
  - Refer to either of the following My Oracle Support Notes to migrate the database from source system to Oracle Database Appliance: Export/Import Process for Oracle E-Business Suite Release 12.2 Database Instances Using Oracle Database 19c (Doc ID 2554156.1)

Using Transportable Tablespaces to Migrate Oracle E-Business Suite Release 12.2 Using Oracle Database 19c Enterprise Edition On a Multitenant Environment (Doc ID 2674405.1)

3. If Oracle Database Appliance DB System Oracle RAC Database, then run Autoconfig on the remaining nodes following the instructions in Step 8.2 of My



Oracle Support Note: Using Oracle 19c RAC Multitenant (Single PDB) with Oracle E-Business Suite Release 12.2 (Doc ID 2530665.1)

- E-Business Suite requires one-off patches to be installed. This would conflict that future upgrades using Oracle Database Appliance tooling. Typically, these one-off patches must be rolled back, the database home patched and the equivalent E-Business Suite patches applied again.
- This process was tested with E-Business Suite 12.2 with Oracle Database Appliance releases 12.2 and 19.11.

#### **E-Business Suite References**

Interoperability Notes: Oracle E-Business Suite Release 12.2 with Oracle Database 19c (Doc ID 2552181.1)

Oracle E-Business Suite Release 12.2: Consolidated List of Patches and Technology Bug Fixes (Doc ID 1594274.1)

Export/Import Process for Oracle E-Business Suite Release 12.2 Database Instances Using Oracle Database 19c(Doc ID 2554156.1)

Using Transportable Tablespaces to Migrate Oracle E-Business Suite Release 12.2 Using Oracle Database 19c Enterprise Edition On a Multitenant Environment (Doc ID 2674405.1)

Using Oracle 19c RAC Multitenant (Single PDB) with Oracle E-Business Suite Release 12.2 (Doc ID 2530665.1)

## Deploying Oracle FLEXCUBE on Oracle Database Appliance KVM

Understand how you can deploy Oracle FLEXCUBE on Oracle Database Appliance KVM.

#### Note:

Oracle FLEXCUBE does not provide a Virtualization Template.

To install Oracle FLEXCUBE in KVM on Oracle Database Appliance, follow these steps:

- 1. On Oracle Database Appliance, create the application KVM for your specific deployment, as described in this document.
- Follow the Oracle FLEXCUBE documentation steps to install Oracle FLEXCUBE: https://docs.oracle.com/cd/F18207\_01/install.htm



## Deploying Oracle Enterprise Manager Cloud Control on Oracle Database Appliance KVM

Understand how you can deploy Oracle Enterprise Manager Cloud Control on Oracle Database Appliance KVM.

You can install Oracle Enterprise Manager Cloud Control directly on the Oracle Database Appliance bare metal system. It is recommended that you install Oracle Enterprise Manager Cloud Control on the KVM guest VM.

#### Prerequisites

- Create one application KVM guest machine with Oracle Linux.
- Create a DB System to host Oracle Enterprise Manager Cloud Control repository database.

### Procedure

Follow the Oracle Enterprise Manager Cloud Control 13.5 documentation to install and configure the software:

https://docs.oracle.com/en/enterprise-manager/cloud-control/enterprise-manager-cloud-control/13.5/index.html

There are no additional configuration requirements specific to Oracle Database Appliance. The deployment of Oracle Linux 8.2 on the application KVM guest machine with Oracle Database Appliance release 19.12 DB System and Oracle RAC database release 19.12 are supported.

Install the Oracle Database Appliance plug-in on the bare metal system nodes so that Oracle Enterprise Manager agent can monitor the hardware and other specific metrics for Oracle Database Appliance.

The latest Oracle Enterprise Manager Cloud Control plug-in is available for download at:

https://www.oracle.com/enterprise-manager/downloads/oem-v135-update-plugins-downloads.html

Oracle Database Appliance Plug-in documentation is available at:

https://docs.oracle.com/en/engineered-systems/oracle-database-appliance/plugin.html

### Deploying PeopleSoft on Oracle Database Appliance KVM

Understand how you can deploy PeopleSoft PeopleTools on Oracle Database Appliance KVM.

You can install PeopleSoft PeopleTools directly on the Oracle Database Appliance bare metal system. It is recommended that you install PeopleTools on the KVM guest VM. For each release of Oracle Database Appliance and PeopleSoft, you must ensure



that additional RPMs installed do not replace or conflict with the Oracle Database Appliance binaries.

#### Prerequisites

- Create one application KVM guest machine with Oracle Linux.
- Create a DB System to host PeopleSoft repository database.

#### Procedure

Follow the PeopleSoft PeopleTools 8.59 or later documentation to install and configure the software. The documentation and software can be obtained from Oracle Software Delivery Cloud by searching for **PeopleSoft PeopleTools** and downloading the software.

There are no additional configuration requirements specific to Oracle Database Appliance. The deployment of Oracle Linux 8.2 on the application KVM guest machine with Oracle Database Appliance release 19.12 DB System and Oracle RAC database release 19.12 are supported.

Oracle Software Delivery Cloud is available at:

https://edelivery.oracle.com

## Deploying Oracle TimesTen In-Memory Database on Oracle Database Appliance KVM

Understand how you can deploy Oracle TimesTen In-Memory Database on Oracle Database Appliance KVM.

### Installing Oracle TimesTen Database KVM

To install Oracle TimesTen In-Memory Database in KVM on Oracle Database Appliance, follow these steps:

- 1. On Oracle Database Appliance, create the application KVM with Oracle Linux. This application KVM is referred to as TimesTen In-Memory database KVM in this procedure.
- Follow the TimesTen documentation steps to install TimesTen and create a TimesTen instance: https://docs.oracle.com/en/database/other-databases/timesten/22.1/installation/ index.html
  - Perform operating system pre-requisites and create system user and user group to use as TimesTen administrator. https://docs.oracle.com/en/database/other-databases/timesten/22.1/ installation/operating-system-prerequisites.html#GUID-2E8BFC2E-DFDC-4304-97BA-85A6EB7DC42D



Note the operating system user and user group ID you created as the TimesTen administrator so that you can use them when you configure HugePages.

- b. Download and install TimesTen software. https://docs.oracle.com/en/database/other-databases/timesten/22.1/ installation/creating-installation-linux-unix.html
- c. Create a TimesTen instance. https://docs.oracle.com/en/database/other-databases/timesten/22.1/ installation/creating-timesten-client-instance.html

# Configuring HugePages on Oracle TimesTen Database KVM

You can configure HugePages for more efficient memory management and improvement in database performance in the TimesTen database. See the Oracle *TimesTen In-Memory Database Installation, Migration, and Upgrade Guide* for more details. Once configured, the memory allocated for HugePages is taken from the total RAM on the Linux host and is not available for any other use. In addition, the HugePages memory segment is automatically locked and cannot be swapped to disk.

Follow these steps to configure HugePages on Oracle TimesTen Database KVM:

 On the Oracle Database Appliance bare metal system, configure the HugePages size by modifying the Oracle TimesTen Database KVM guest VM configuration file available at /u05/app/sharedrepo/<reponame>/.ACFS/snaps/vm\_<vmname>/ <vmname>.xml.

For example, in the /u05/app/sharedrepo/kvmbrtest/.ACFS/snaps/vm\_testvm/testvm.xml file, replace the following:

#### with the following:

```
<domain type='kvm' xmlns:qemu='http://libvirt.org/schemas/domain/
qemu/1.0'>
    <name>testvm</name>
    <uuid>148006d3-aalf-4ade-8b90-8c00a283ccab</uuid>
    <metadata>
```



2. Stop the VM as root or as odaadmin based on your deployment type with the command:

odacli stop-vm -n vmname

3. Undefine the VM as the root user:

virsh undefine vmname

4. Start the VM as root or as odaadmin based on your deployment type with the command:

odacli start-vm -n vmname

 Log into the TimesTen Database KVM and view the HugePages setting, similar to the following:

root@TTKVM# grep	-i hugepages	/proc/meminfo
AnonHugePages:	73728 kB	
ShmemHugePages:	0 kB	
FileHugePages:	0 kB	
HugePages_Total:	0	
HugePages_Free:	0	
HugePages_Rsvd:	0	
HugePages_Surp:	0	
Hugepagesize:	2048 kB	

6. Configure the number of pages that the TimesTen database may require of the HugePages memory in the TimesTen Database KVM in the /etc/sysctl.conf file. Log into the TimesTen Database KVM as root user and update the vm.nr\_hugepages kernel parameter with the appropriate value. The following command configures 3000 pages.

root@TTKVM# echo "vm.nr hugepages=3000" >>/etc/sysctl.conf

7. Grant HugePages access to the TimesTen operating system user group. By default, on the TimesTen Database KVM, HugePages access group is set to gid 0.



If your TimesTen operating system user group is not 0, run the following command as root user in the TimesTen Database KVM, to include the TimesTen operating system user group ID to be part of the HugePages access group:

```
root@TTKVM# echo "vm.hugetlb shm group=<gid>" >>/etc/sysctl.conf
```

- 8. Repeat steps 2 to 4 to restart the TimesTen KVM.
- 9. Log into the TimesTen Database KVM again and look for HugePages settings. Note the changes in Hugepages total is now set to 3000.

[tt_admin@TTKVM /]\$ grep	-i hugepages /proc/meminfo
AnonHugePages: 100352	kB
ShmemHugePages: 0	kB
FileHugePages: 0	kB
HugePages_Total: 3000	
HugePages_Free: 3000	
HugePages_Rsvd: 0	
HugePages_Surp: 0	
Hugepagesize: 2048	kB

If you want to configure TimesTen as a cache for Oracle Database to improve application performance, then follow the TimesTen Cache documentation to configure a cache:

https://docs.oracle.com/en/database/other-databases/timesten/22.1/get-started-cache/ index.html

# Migrating Oracle VM Guest Machines to KVM on Oracle Database Appliance

Understand how you can migrate Oracle VM guest machines from Virtualized Platform to Oracle KVM guest machines on Oracle Database Appliance KVM.

Creating a Solution-in-a-Box does not necessitate creation of a new virtual machine. You may have an existing Oracle Database Appliance running Oracle Virtual Machine (OVM) and you would may want to migrate the OVM from this machine to a KVM guest.

For the procedure, refer to *My Oracle Support Note 2773840.1: Migrating OVM guests from ODA VP to KVM on ODA BM* at:

https://support.oracle.com/rs?type=doc&id=2773840.1

## Backing up Oracle Database Appliance KVM Guest Machines

Understand how you can back up KVM guest machines on Oracle Database Appliance.



Backup and Recovery procedures for the DB Systems are similar to Oracle Database database backup procedures.

For backup of application VMs, refer to My Oracle Support Note 2779329.1: Backup of KVM guests on ODA 19.9 BM and later.

https://support.oracle.com/rs?type=doc&id=2779329.1

For backup of DB Systems, refer to My Oracle Support Note 2784991.1: Database System backup on Oracle Database Appliance Release 19.10 and later.https://support.oracle.com/rs?type=doc&id=2784991.1

#### Oracle Database Appliance References

Links and references to the concepts, commands, and examples used in this document.

Oracle Database Appliance documentation library is available at:

https://docs.oracle.com/en/engineered-systems/oracle-database-appliance/index.html

Oracle Database Appliance KVM and DB Systems Command Line Reference:

Oracle Database Appliance Command-Line Interface for KVM

Sample JSON file for creating a DB System on Oracle Database Appliance KVM:

Example JSON File to Create a High-Availability DB System

Supported Database Shapes on Oracle Database Appliance KVM:

Database Shapes for Oracle Database Appliance

## **Documentation Accessibility**

For information about Oracle's commitment to accessibility, visit the Oracle Accessibility Program website at http://www.oracle.com/pls/topic/lookup? ctx=acc&id=docacc.

## Access to Oracle Support

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Oracle Database Appliance Solution-in-a-Box: Deploying Database Systems and Application VMs on Oracle Database Appliance G14677-02

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