ORACLE
Cloud Infrastructure

ExaCS Overview

Level 300

Bal Sharma | May 2019

ORACLE

Safe Harbor Statement

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Exadata Cloud Service - Objectives

After completing this lesson, you should be able to:

- What is Exadata Cloud Service(ExaCS)
- Understand the core components of Exadata systems
- Describe the Exadata Storage and architecture
- Understand Exadata Cloud Service deployment options
- Describe the architecture of Exadata Cloud Service
- Have an understanding of deployment best practices.
- Sizing and Consolidation Best practices on ExaCS

Exadata Cloud Service(ExaCS)

- Exadata Cloud Service is offered on Oracle Cloud Infrastructure, within OCI regions.
- Exadata Cloud Service available in quarter Rack, Half Rack or full Rack configurations.
- Exadata rack in OCI includes DB nodes, storage nodes and InfiniBand switches.
- The storage and compute nodes are connected via high bandwidth Infiniband network that provides RDMA based storage access to the compute nodes.
- Exadata storage software runs on storage servers and offloads database SQL processing overheads.

Exadata Cloud Service(ExaCS)

- Currently, a single VM per compute node is supported. It allows root access for customers while protecting hardware and network, DB nodes are virtualized using Xen based OVM.
- Oracle Manages storage cells, switches, management or IB network while customer manages database compute nodes.
- Exadata Cloud Service provides a control Plane, a Web-based self-service management interface for Exadata provisioning and interactive access to service administration function.

ExaCS-Operational Overview

- REST APIs are also provided for service administration functions.
- Applications can connect to ExaCS databases using standard JDBC, SQL *Net based connections from OCI or on-premises or other cloud based deployments
- You can establish Secure Shell (SSH) connections for accessing ExaCS compute nodes
- ExaCS uses network interfaces and subnet exclusively for database backups to an Oracle Storage Cloud Service buckets, separate from the client subnet used for database connection
- The customer facing API for Exadata management are integrated with OCI Identity management console. Essentially, Customers can control API access via standard identity authorization policies.

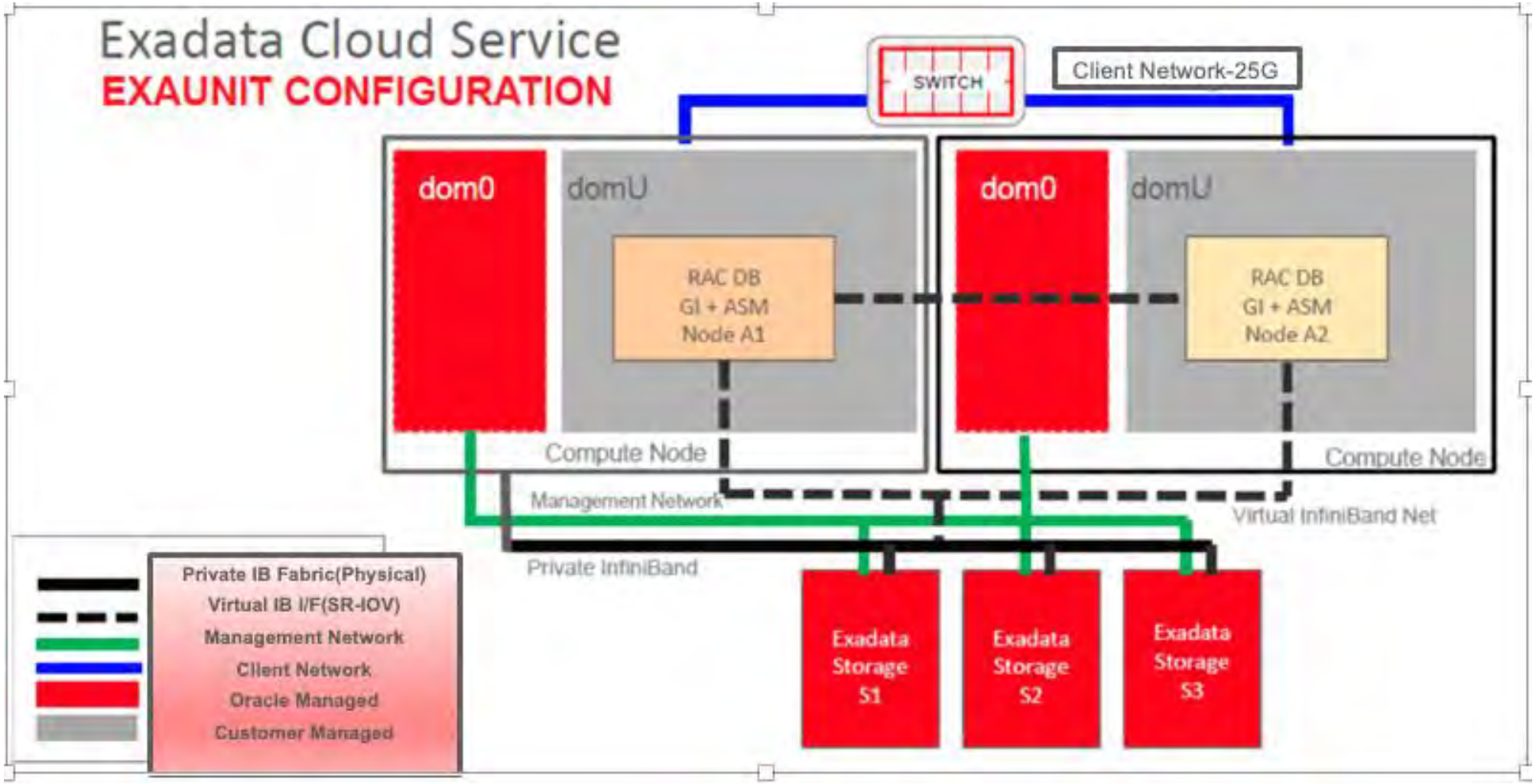
ExaCS Management

- Customers can manage DB compute nodes using root privileges(sudo)
- Components manage by Oracle include Network switch, storage cells , Power distribution and ILOM interfaces
- Customers have full administrative privileges on databases and can perform operations like database backups, recovery, run performance diagnostics etc.
- ExaCS runs on Enterprise Edition- Extreme Performance version which includes all the DB options and EM Packs.
- All database instances are configured with huge pages memory management,
- Customers can customize syslogformat for log analytics and better integration with SIEM products.
- Allow user to have a read only access to Storage Cell via exacli API.
- Block storage volumes can’t be attached to Exadata compute nodes currently
- With ExaCS you can either store your backups locally or in OCI Object storage.

ExaCS Networking

- Each compute/DB node has four 25G data/backup ports, one 1G admin port and one 1G iLOM port. Storage nodes have the 1G admin and ILOM ports for management purposes.
- Exadata in OCI platform are integrated with VCN wherein the customer visible DB nodes are presented via regular virtual NICs (VNICs) in customer's VCN
- Customer creates a subnet in a VCN via regular VCN APIs. Customer calls the Exadata Service API to allocate an "Exadata Quarter Rack" and passes in the subnet. Four VNICs will be allocated on each subnet, two for DB client traffic and two for DB backup traffic. Multiple private IP addresses will be allocated for each VNIC as required by DB RAC software, e.g: SCAN host and Floating IP's.
- DB clients in the VCN can access the Exadata DB nodes via private addresses. Customers can use all the standard VCN features, including security lists and routing rules, to control network access to their DB nodes. Additionally, VPN and Fast Connect can be used to connect to this service.
- Service Gateway provides connectivity to OCI Object Storage and other OCI services which eliminates need for NAT gateway or Internet Gateway.

ExaCS Architecture on OCI



Exadata Cloud Service X7 Hardware Infrastructure

	X7 Quarter Rack	X7 Half Rack	X7 Full Rack
Number of DB Compute Nodes	2	4	8
Maximum Number of OCPUs	92	184	368
Total Memory	1440 GB	2880 GB	5760 GB
Total Flash Capacity	76.8 TB	153.6 TB	307.2 TB
Max DB Size (No Local Backup)	85.5 TB	171.1 TB	342.1 TB
Network Connectivity	2x25 Gb Ethernet (bonded)	2x25 Gb Ethernet (bonded)	2x25 Gb Ethernet (bonded)

Note: ExaCS X7 also includes 8x 600GB drives for local drive capacity. Approx. 1.1TB of local capacity now available for Oracle Homes, per database server. Minimum No of OCPU=0

Note: Please plan the shape of ExaCS Service based on sizing, you can scale up/down within shape , currently we are not supporting scaling across shape. e.g-upgrade from 1/4th rack to ½ rack will require re deployment.

ExaCS- Customer v/s Oracle managed

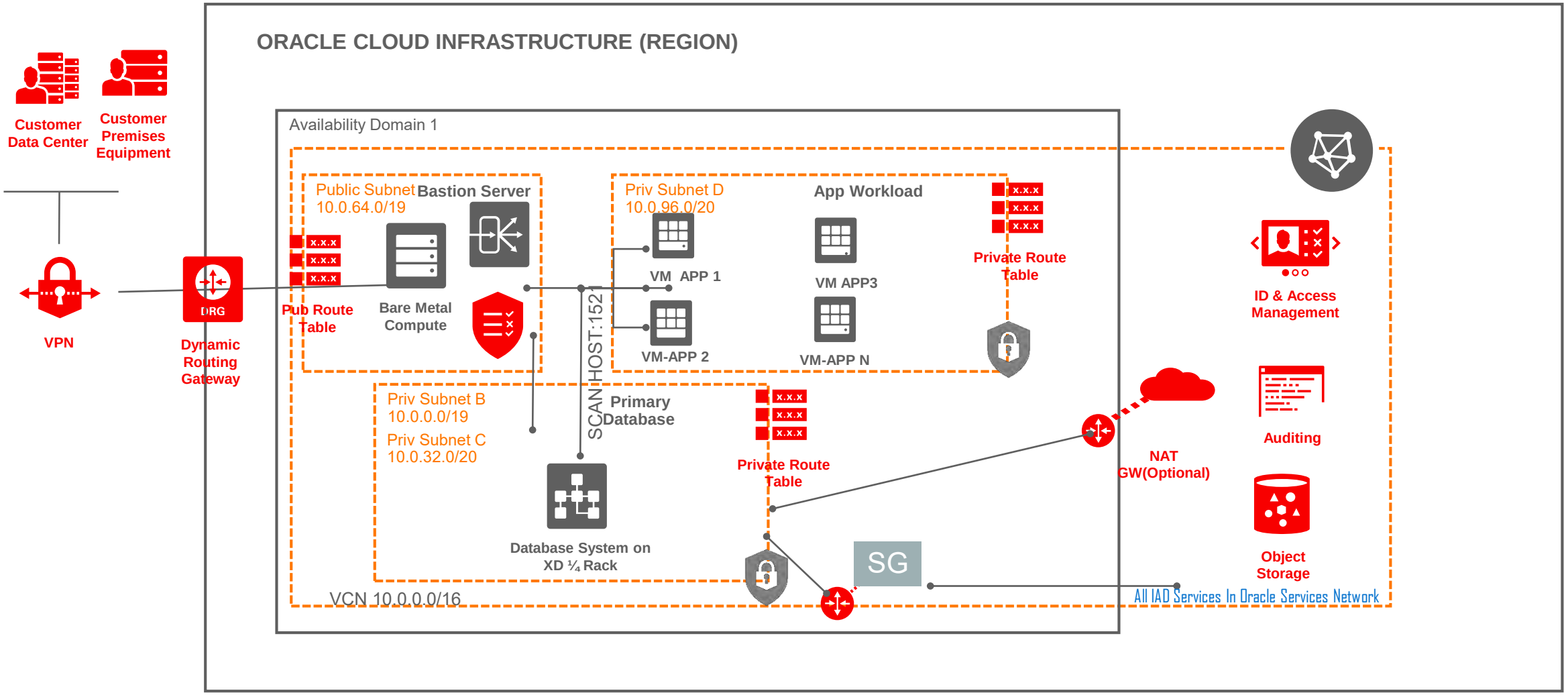
Customers control and manage software that directly affects their databases

- All Patches pre-staged (OS, GI, DB)
- Patch what you want when you want on your schedule
- Patching automated through cloud tooling
- REST services make scheduling easy

Oracle manages underlying infrastructure

- Proactive Hardware Fault Notification
- Oracle Patches the following rolling
  - Servers(dom0)
  - Storage hardware and software
  - Networking
  - Firmware
  - Hypervisor

Exadata typical deployment Architecture

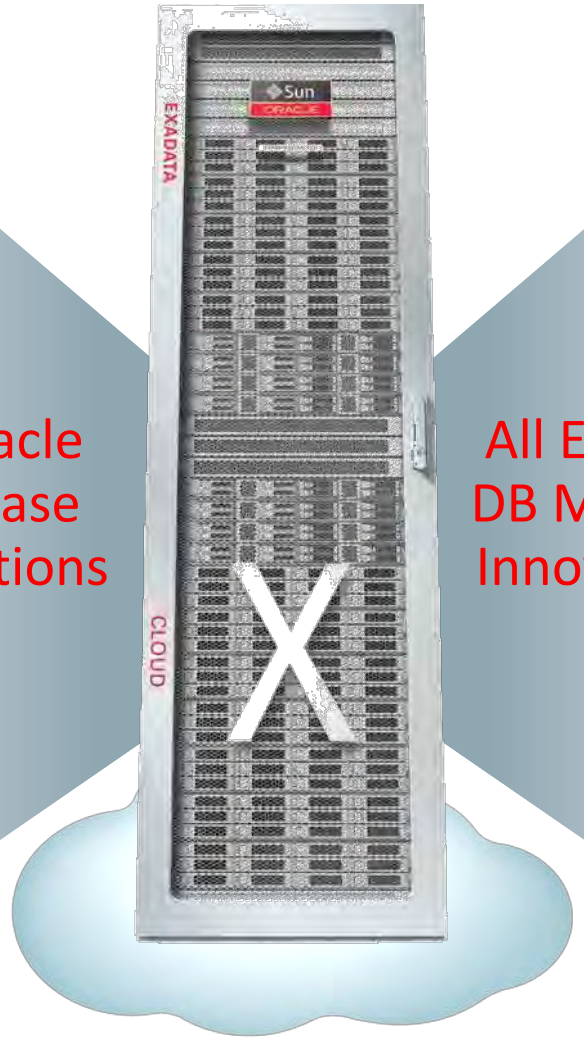


Exadata Basics

Exadata Cloud Service-Technical foundations

	Multitenant
	In-Memory DB
	Real Application Clusters
	Active Data Guard
	Partitioning
	Advanced Compression
	Advanced Security, Label Security, DB Vault
	Real Application Testing
	Advanced Analytics, Spatial and Graph
	Management Packs for Oracle Database

All Oracle Database Innovations



All Exadata DB Machine Innovations

Offload SQL to Storage	
InfiniBand Fabric	
Smart Flash Cache, Log	
Storage Indexes	
Columnar Flash Cache	
Hybrid Columnar Compression	
I/O Resource Management	
Network Resource Management	
In-Memory Fault Tolerance	
Exafusion Direct-to-Wire Protocol	

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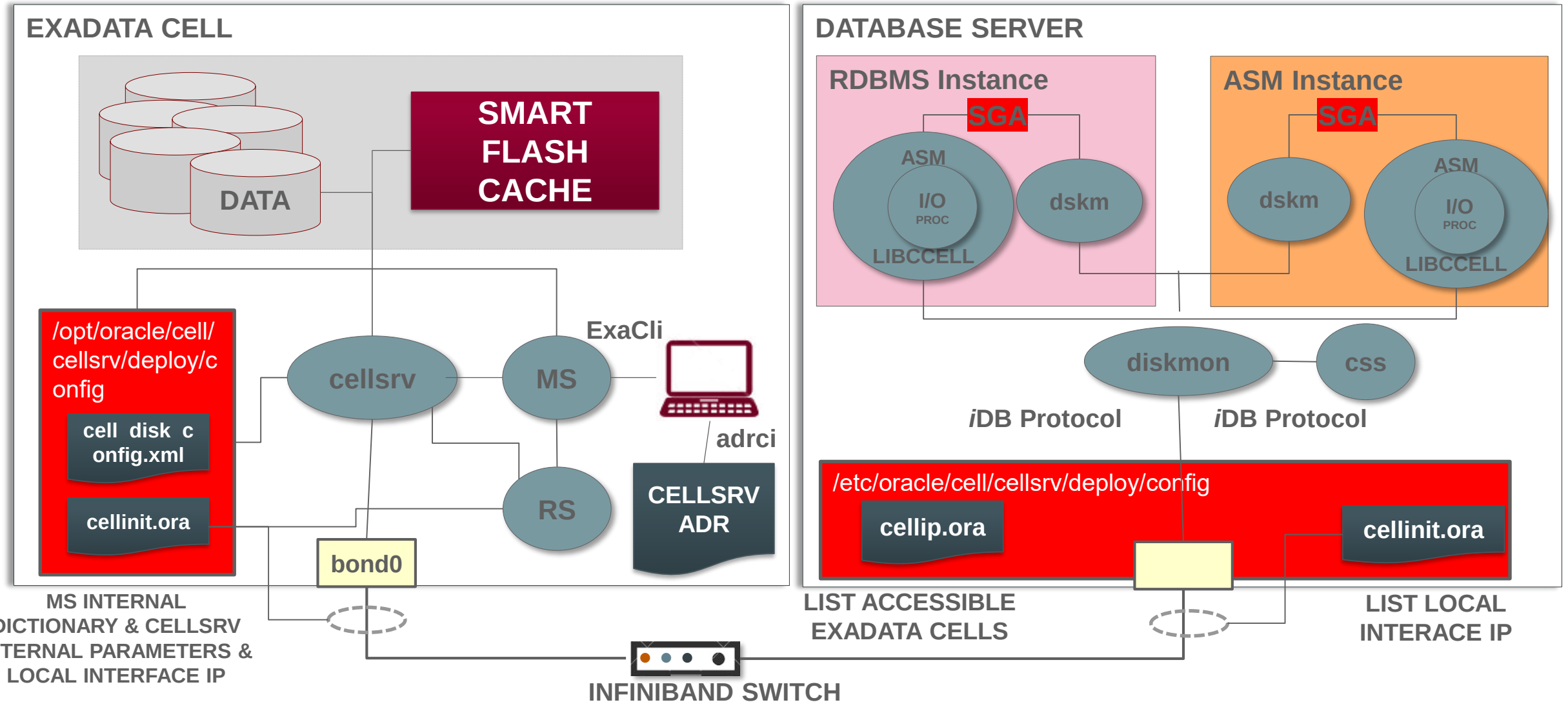
ExaCS: Operating System

Exadata image contains:

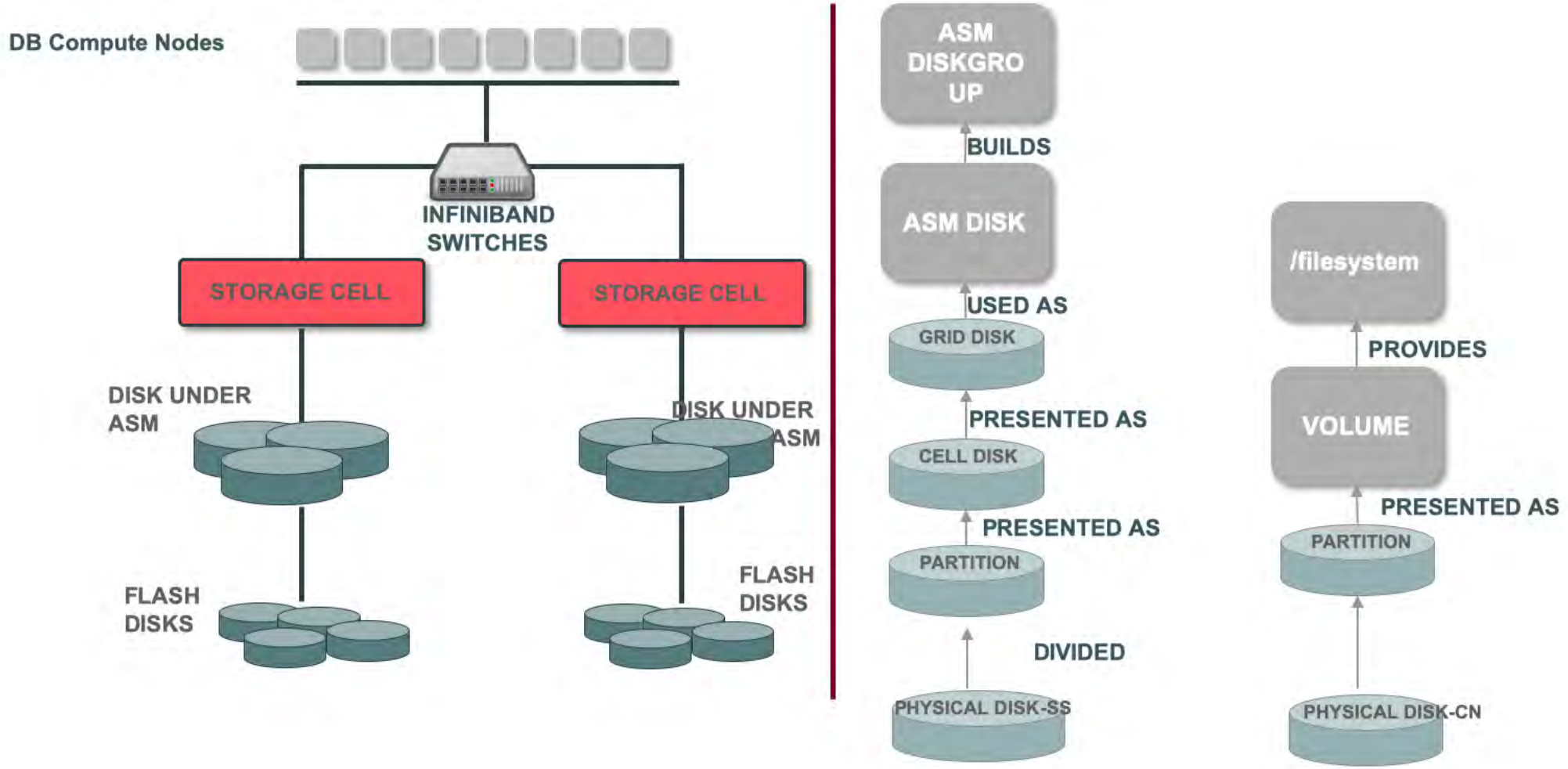
- Optimized (shrunk) set of Operating System packages, Exadata Specific packages, Configuration and Firmware and more, directly usable for the customer to run the Oracle Database best.
- AIDE (Advanced Intrusion Detection Environment)
  - Used to verify the integrity of the files
- STIG Notable changes
  - Password Qualify and ssh client alive interval.
- Chrony replaces NTP
  - Chrony is a different implementation of the network time protocol (NTP) than the network time protocol daemon (ntpd) that is able to synchronize the system clock faster and with better accuracy than ntpd
- Systemd replaces 'System V Init' /Upstart
  - Designed to overcome the shortcomings of init. It itself is a background processes which is designed to start processes in parallel, thus reducing the boot time and computational overhead. It has a lot other features as compared to init. It is backwards compatible with SysV init scripts.

ExaCS uses Oracle Linux 7.5 based on UEK4 QU7 (4.1.12-124.20.3) for domU, baremetal and cell.

Exadata Software Architecture

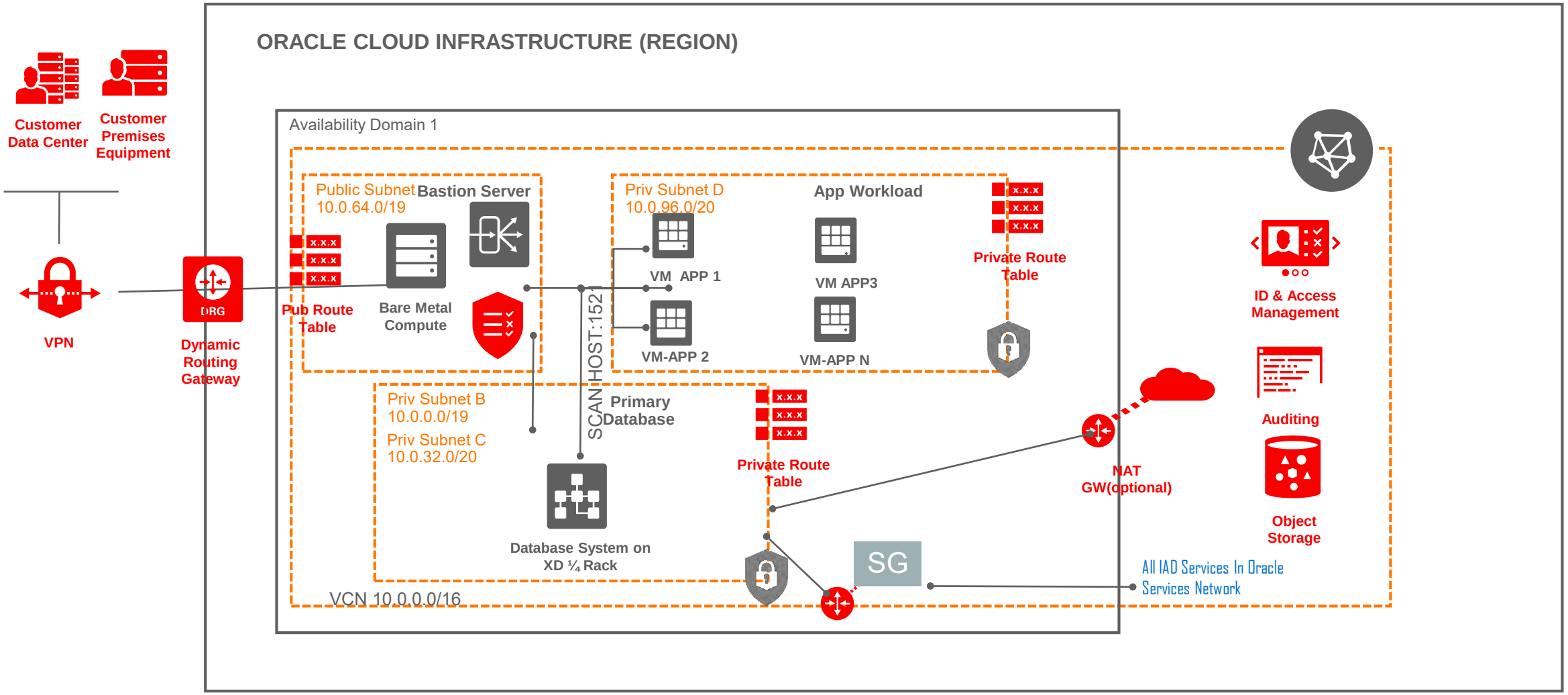


Disk Layout & Physical layout- Exadata



Exadata Cloud Service Provisioning

Exadata typical deployment Architecture



Exadata Cloud Service typical Deployment Flow

- Creating a VCN
- Creating Gateways- NAT/IGW and SG-Note: Service Gateway can handle all internal communication including backups, patching within OCI region.
- Creating Routing Tables
- Creating Security Lists
- Creating DHCP Options
- Creating Subnets
- Modifying Security Rules
- Launching Exadata DB System

Note: For deploying Exadata Cloud Service in OCI you must have IAM policy allowing the operation.
E.g: *Allow group DBAdmins to manage database-family in tenancy*

Prepare Network: Important Points to Consider

We recommend using one of the private IP address ranges specified in RFC 1918 (10.0.0.0/8, 172.16/12, and 192.168/16).

- Allowable OCI VCN size range is from /16 to /30
- VCN reserves the first two IP addresses and the last one in each subnet's CIDR
- The VCN's CIDR must not overlap with your on-premises network or another VCN you peer with.
- 1 VCN with (at least) 2 subnets (1 Client & 1 Backup)
  - Backup Subnet needs Object Storage Access
  - VCN can be fully private
  - VCN needs VCN resolver
- Create a custom VCN setup-
  - Choose different VCN IP ranges per region
  - Keep VCN name short (Tip: Include Region)
  - Keep Subnet name short (Tip: Include AD)
- Your hostname:
  - <node>-######.<subnet>.<vcn>.oraclevcn.com
  - xdprod-n53zg1.subprivdatabal.vcnbal.oraclevcn.com
  - <max13>-#######.<max24>.<max24>.oraclevcn.com (Max 63)

Step 1: Create a VCN

- Sign in to the Oracle Cloud Infrastructure Console.
- Navigate to Networking-Virtual Cloud Networks-Create a VCN,

For this example, enter the following values in the **Create Virtual Cloud Network** dialog box:

For **Name**, enter **vcn_bal**.

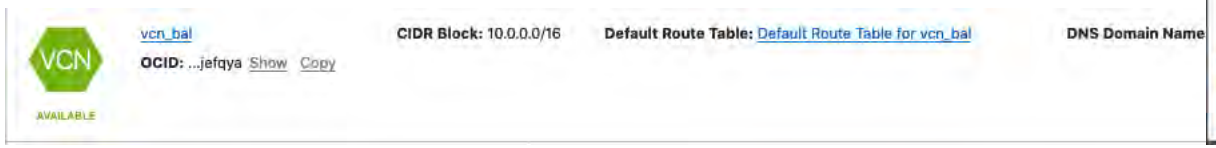
Select **Create Virtual Cloud Network Only**.

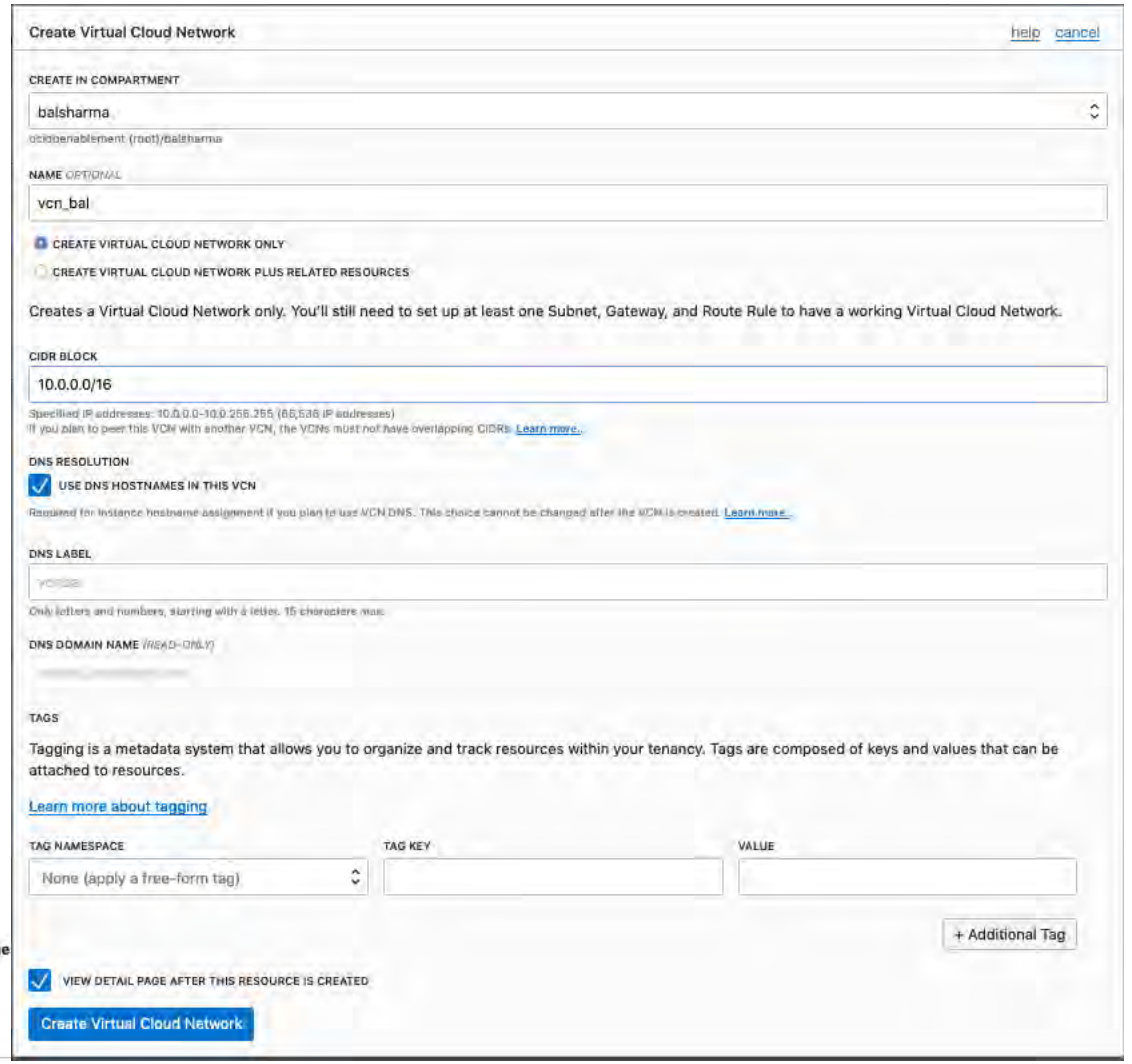
For **CIDR Block**, enter **10.0.0.0/16**.

Select the **Use DNS Hostnames in This VCN** check box.

For **DNS Label**, enter **vcnbal**.

Upon creation, VCN appears in the Console.





Step 2: Create a NAT Gateway(Optional- Not needed for provisioning)

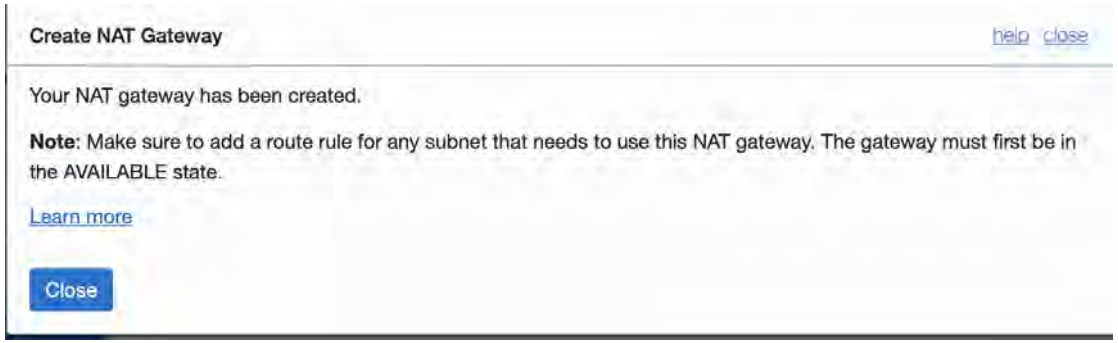
- Using NAT Gateway- Instances on private subnets can initiate connections to the public internet. Connections initiated from the internet are blocked. Since we want our deployment to be on private subnet and don't want to expose database compute on public Internet, we will create NAT GW to provide access outside.
- Navigate to Networking-Virtual Cloud Networks-Create a NAT Gateway,

For this example, enter the following values in the **Create NAT Gateway** dialog box:

For **Name**, enter **ng_bal**.

Click Create.

Upon creation, a confirmation appears and you will see the same in the Console.



Note: You might want to have a NAT GW configured, One of use case would be to upload diagnostic logs to Oracle Support portal directly from ExaCS node.

Step 3: Create a Service Gateway

A service gateway allows access to Object Storage. Later you configure your backup route table so that Exadata backup can travel to Object Storage within Oracle Cloud Infrastructure network fabric without traversing through public internet.

- Navigate to Networking-Virtual Cloud Networks-Select VCN-Create a Service Gateway,

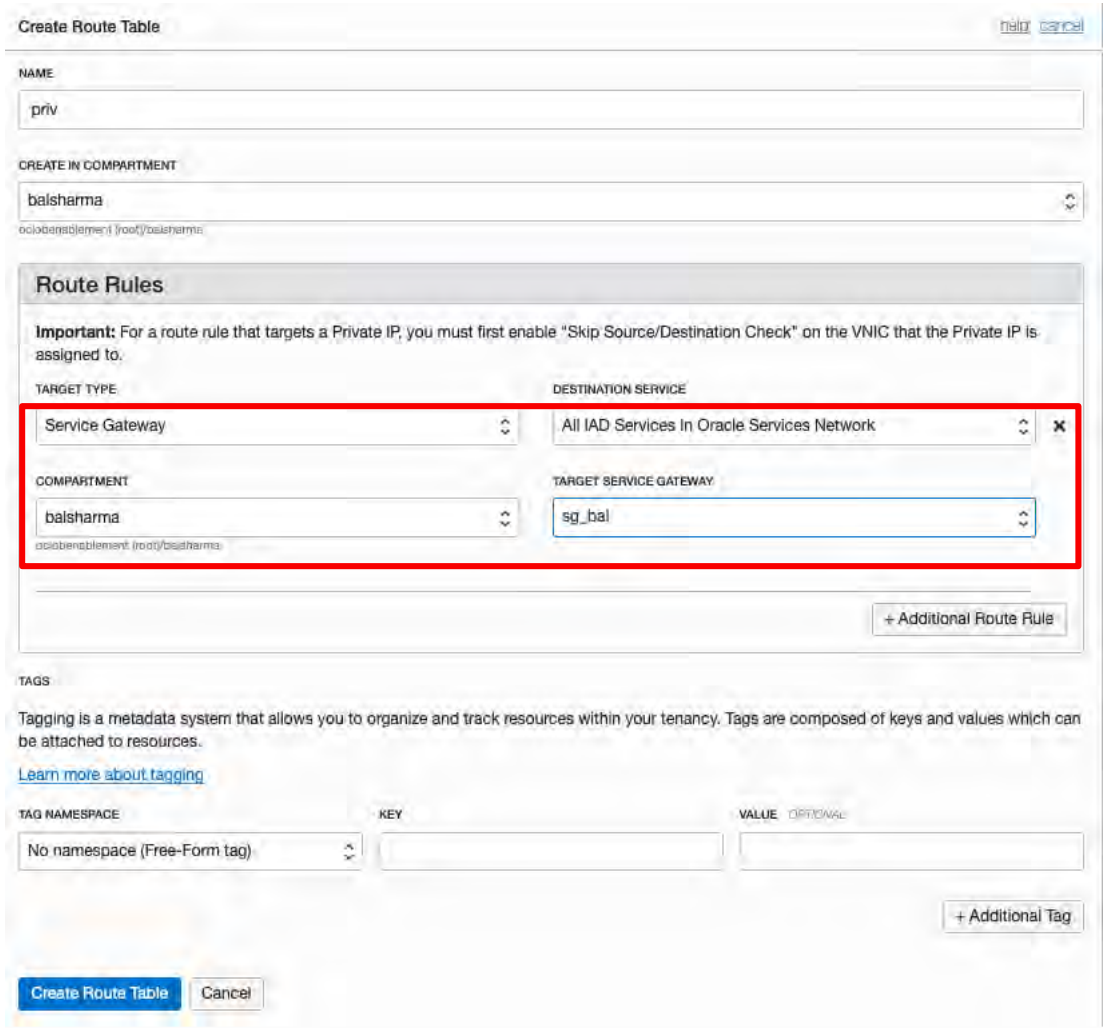
For this example, enter the following values in the **Create Service Gateway** dialog box:

For **Name**, enter **ng_bal**.
For Services , Select All IAD Services in Oracle Cloud Service Network
Click Create.

Upon creation, a confirmation appears and you will see the same in the Console.

Step 4: Create Route Tables

Virtual cloud network uses virtual route tables to send traffic out of the VCN
Each rule specifies a destination CIDR block and the target (the next hop) for any traffic that matches that CIDR. For Exadata, you create two route tables, for client traffic and backup traffic.
Select VCN you created earlier
For this example, enter the following values in the **Create Route Table** dialog box: For **Name**, enter **priv,** you can provide any name.
For Route Rules section
Define Target type as Service Gateway, you can additionally add NAT GW in case needed.
You need to select compartment.
Select the NAT Gateway(if Chosen) and Service Gateway you created earlier in corresponding rules
You can create these individually, In this example I have combined them. Please note Service GW can securely talk with all services in OCI region.



Route Tables in VCN

priv

Add Tag(s) Terminate

Route Table Information | Tags

OCID: ...3jganq Show Copy

Created: Mon, Jan 14, 2019, 11:14:51 PM UTC

Compartment: balsharma

Route Rules

Add Route Rules

Destination	Target Type	Target
0.0.0.0/0	NAT Gateway	ng_bal
All IAD Services In Oracle Services Network	Service Gateway	sg_bal

Default Route Table for vcn_bal

Apply Tag(s)

Route Table Information | Tags

OCID: ...tpd4va Show Copy

Created: Tue, 08 Jan 2019 21:28:56 GMT

Compartment: ociobenablement (root)/balsharma

Route Rules

Edit Route Rules

Destination CIDR Block: 0.0.0.0/0

Target Type: Internet Gateway

Target: ig_bal , ...ohd27q Show Copy

Route Tables *in* balsharma *Compartment*

Create Route Table

RT AVAILABLE

Default Route Table for vcn_bal

OCID: ...tpd4va Show Copy

1 RULE

Compartment: balsharma

RT AVAILABLE

priv

OCID: ...3jganq Show Copy

2 RULES

Compartment: balsharma

Route Table

ROUTE TABLE COMPARTMENT

balsharma

ociobenablement (root)/balsharma

ROUTE TABLE

Default Route Table for vcn_bal

Security Lists

SECURITY LIST COMPARTMENT

balsharma

ociobenablement (root)/balsharma

SECURITY LIST

bas ×

SECURITY LIST COMPARTMENT

balsharma

ociobenablement (root)/balsharma

SECURITY LIST

Default Security List for vcn_bal ×

SECURITY LIST COMPARTMENT

balsharma

ociobenablement (root)/balsharma

SECURITY LIST

fsaccess ×

+ Add Security List

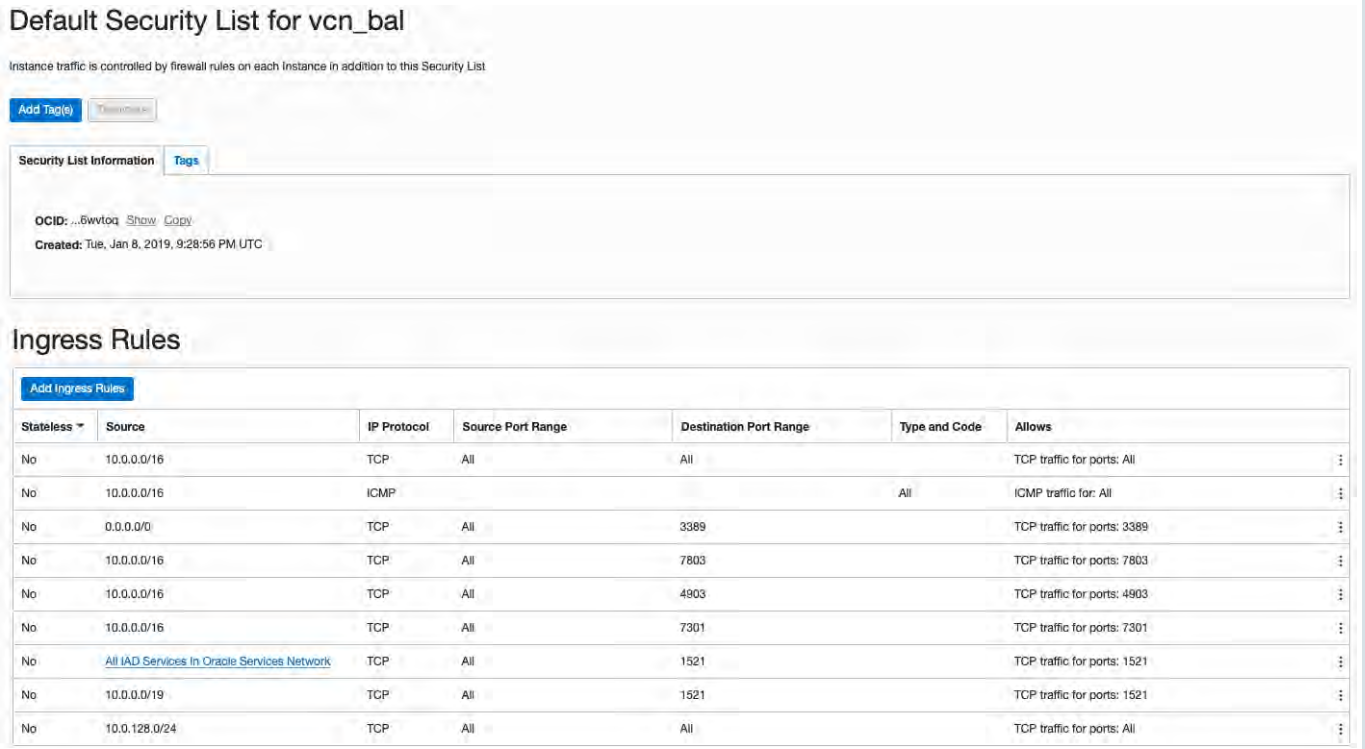
Update

Step 4: Create Security Lists

- A security list controls ingress and egress rules that specify the types of traffic allowed in and out. You configure your security lists at the subnet level, which means that all instances in a given subnet are subject to the same set of rules.

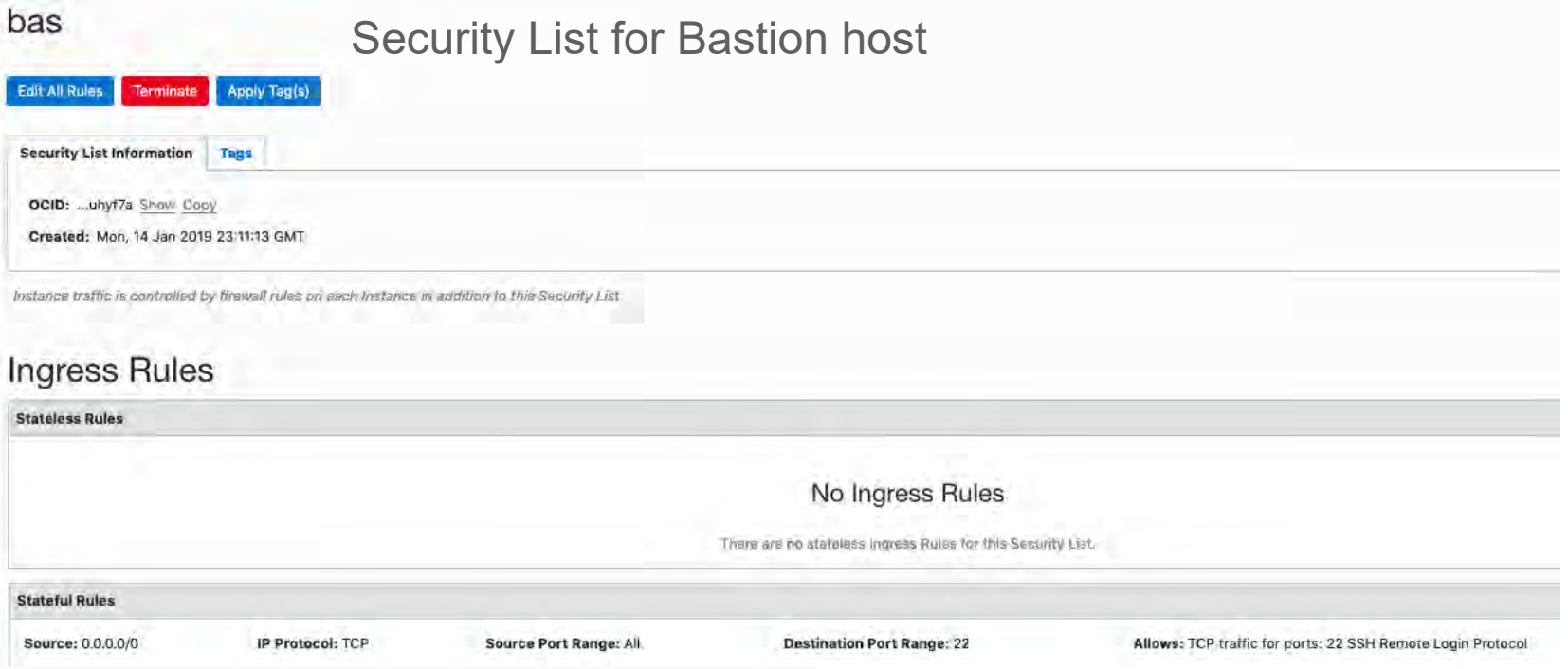
- Select VCN you created earlier to create SL.

- In this deployment I have 3 Security Lists: Default Security List which is defining data Ingress and egress rules,
- Another security list for Bastion Server.
- A separate security list for OCI File Service.

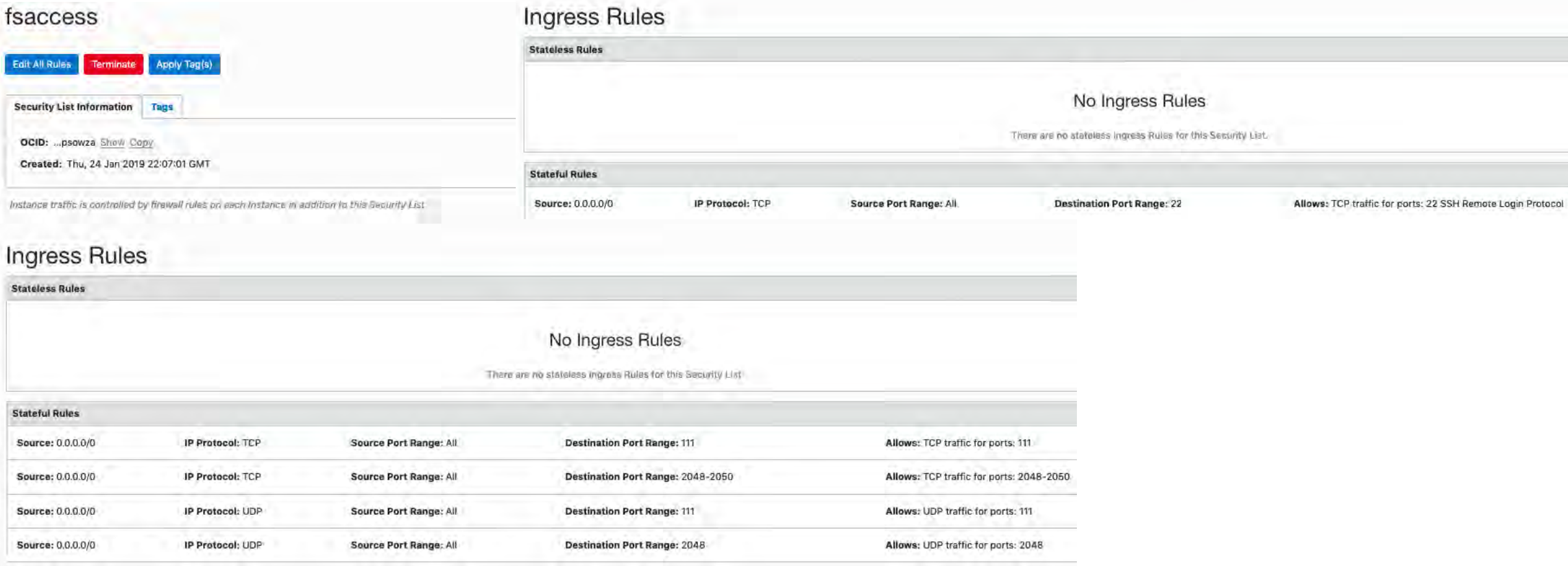


Security Lists

Security List for Bastion host



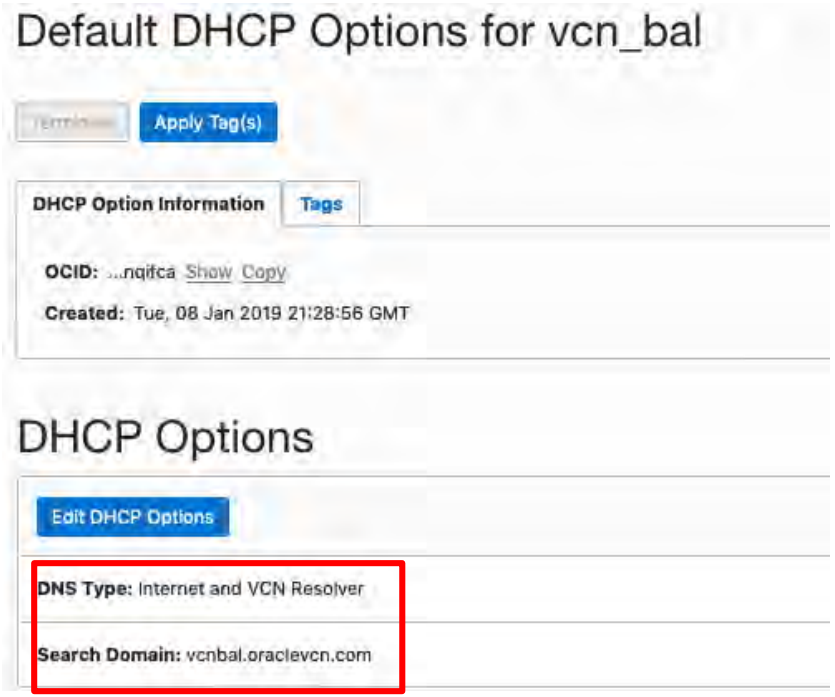
Security List to use File Service



Step 5: Create DHCP Options

VCN uses DHCP options to automatically provide configuration information to the instances when they boot up. Each VCN comes with a default set of DHCP options with initial values that you can change or keep.

In this example, I will be using default DHCP option for Exadata and recommend for ExaCS provisioning.



Step 6: Create Subnets

A subnet is a subdivision of a VCN. Each subnet in a VCN exists in a single availability domain and consists of a contiguous range of IP addresses that do not overlap with other subnets in the cloud network.

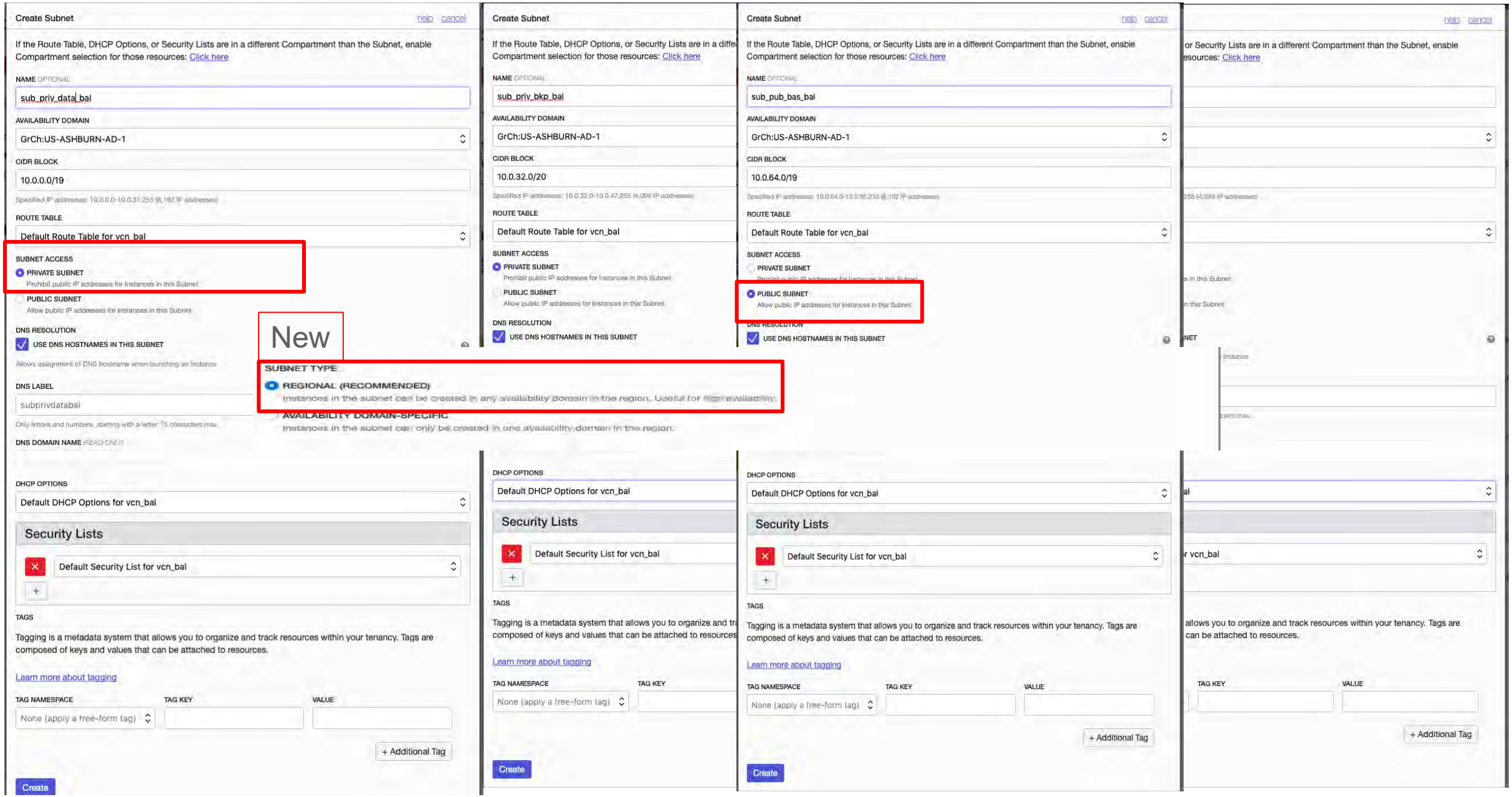
In this example, I will be creating 4 different subnets- Two of these will be required by ExaCS-data & Backup, One for Bastion Host, Last one for Applications

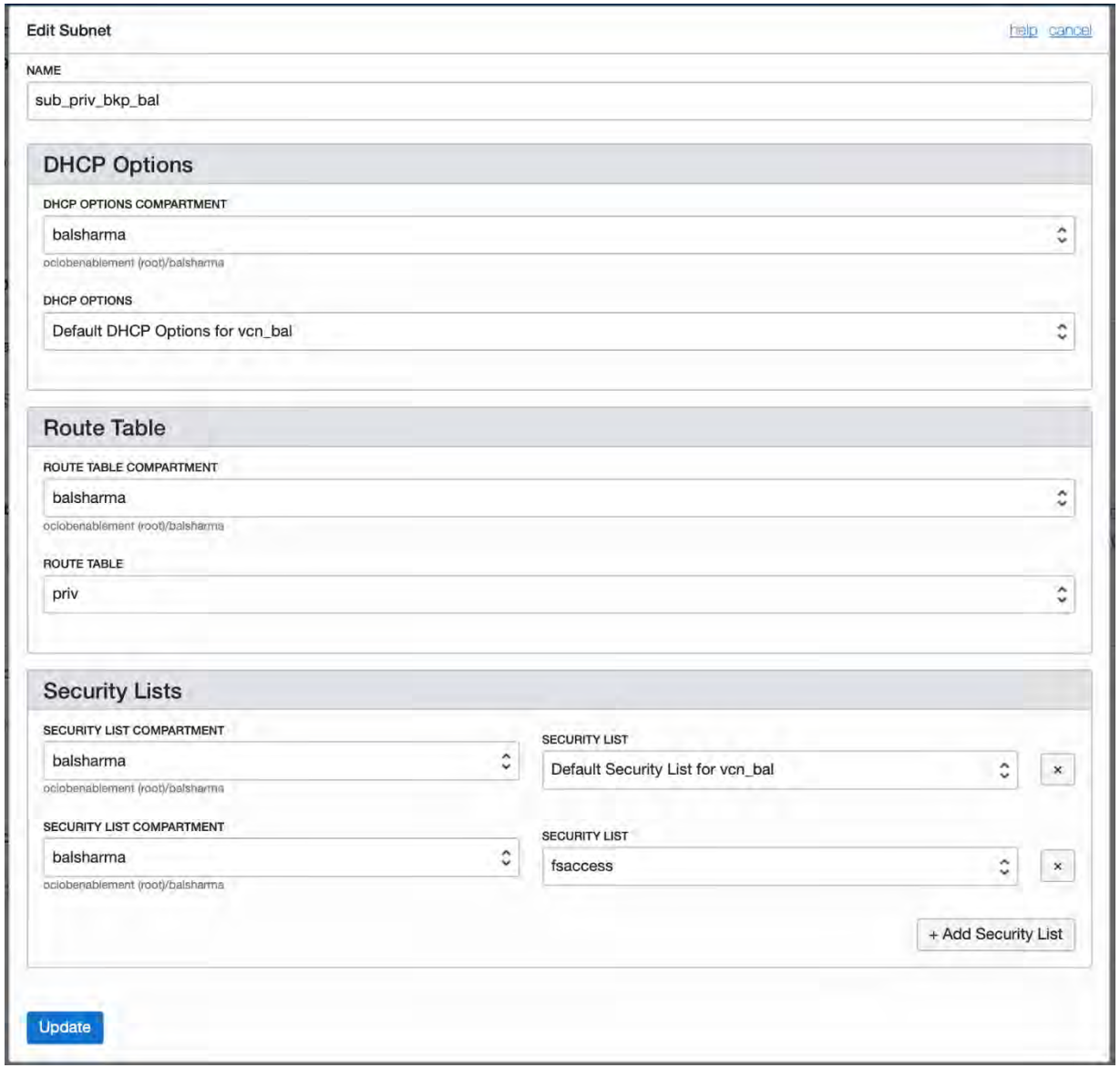
You can select **Regional Subnets** which is recommended over AD specific subnets. Regional subnets allows you to create instances in availability domain within region, so better high availability.

Follow these steps to create the client and backup subnet.

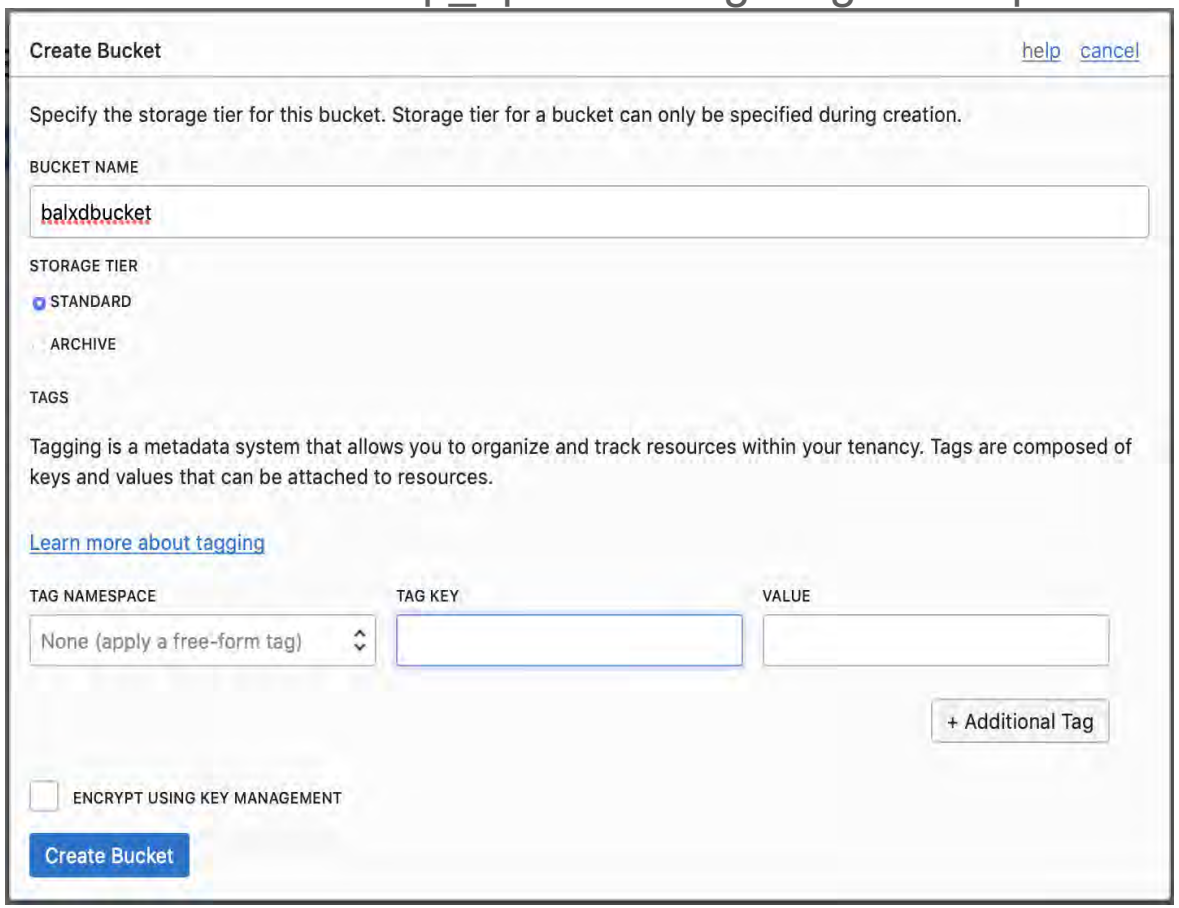
- In the Console, click the name of the VCN that you created-in this example bal_vcn.
- In the **Resources** section, click **Subnets**.
- Click **Create Subnet**.
- In the **Create Subnet** dialog box, enter the following values to create the client subnet:
  - Enter a name for the subnet (in this example, **sub_priv_data_bal**).
  - Choose the availability domain where you plan to launch the Exadata DB system.
  - Enter the CIDR block for the subnet (in this example, **10.0.0.0/19**).
  - Choose the route table that you created for the client traffic (in this example, **priv**).
  - For **Subnet Access** , select **Private Subnet**.
- Ensure that the **DNS Resolution** check box is selected.
- Leave the default value for **DNS Label**.

Follow same steps to create all other subnets except for bastion host you will be creating a public subnet.



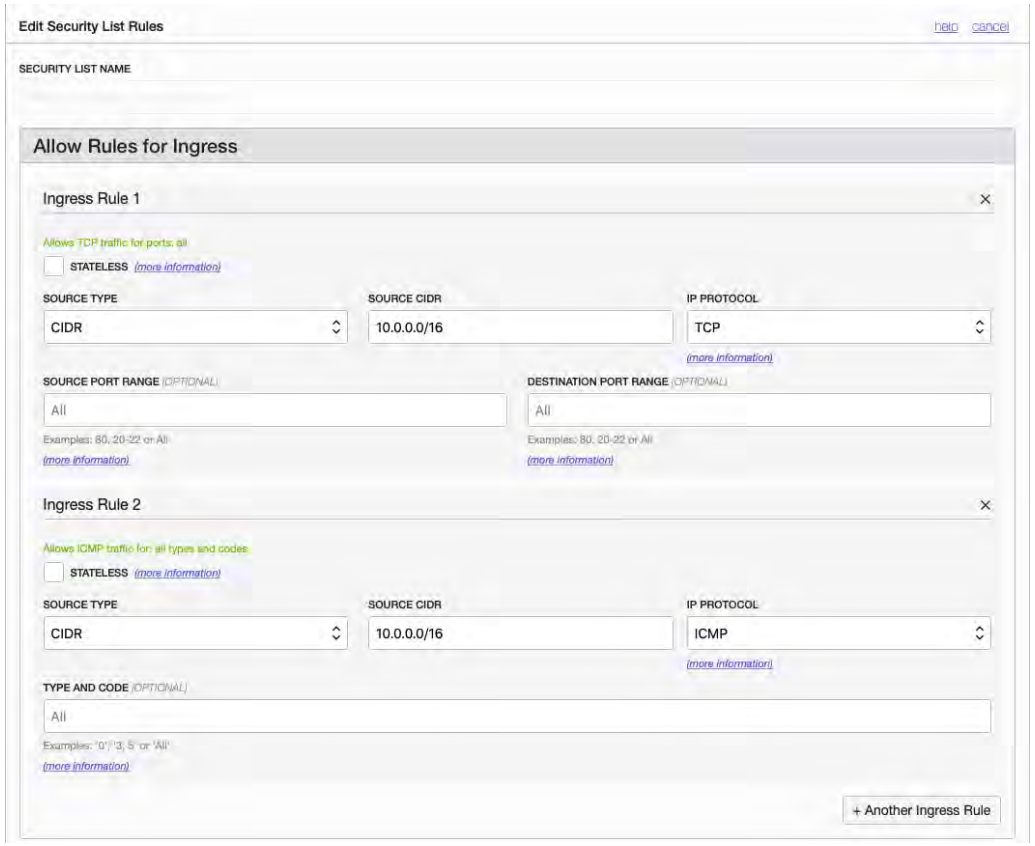


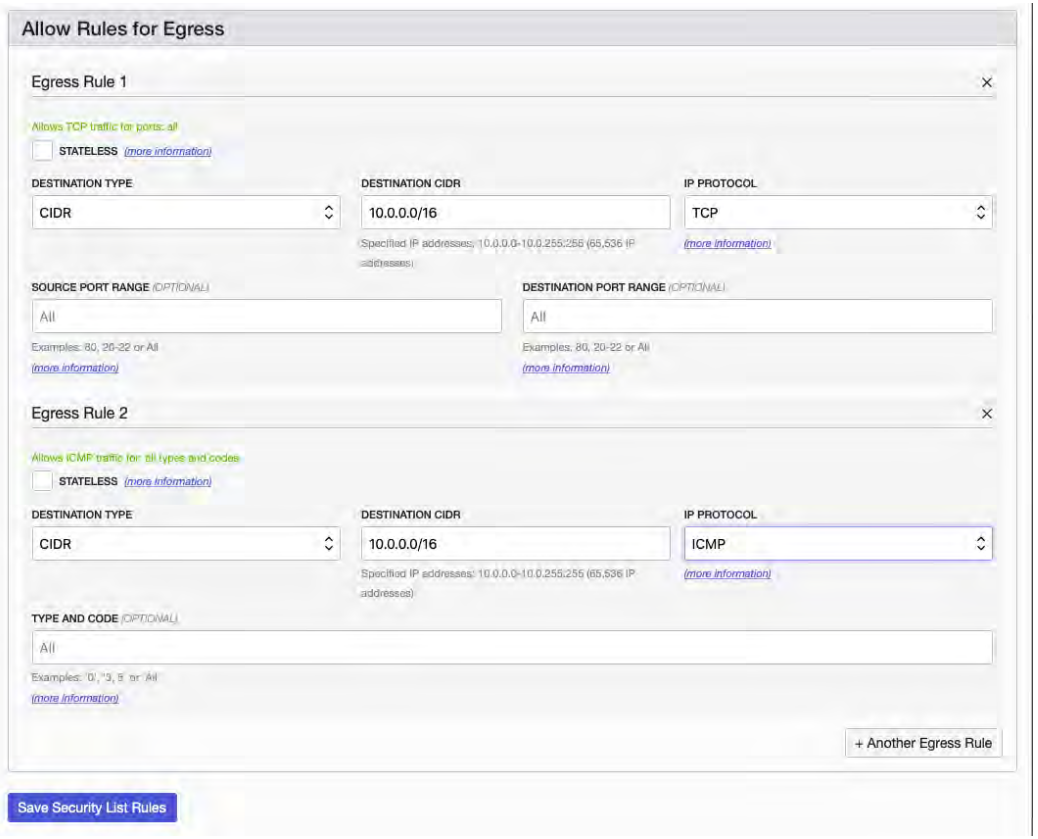
ExaCS new UI might provide Automated Backup through console, Create a bucket in object storage –For Backup Configuration-Can be used later for configuration in case You want to use bkup_api for configuring backup.



Step 7: Add Rules to Security Lists

Update your security lists and add appropriate ingress and egress rules to allow traffic.
In the Console, click the name of the VCN that you created. In the **Resources** section, click **Security Lists**. Click the **Default security list for vcn_bal**. and add following to allow TCP and ICMP traffic between both subnets-data and backup.





Default Security List for vcn_bal

Instance traffic is controlled by firewall rules on each instance in addition to this Security List

Add Tag(s) Terminate

Security List Information | Tags

OCID: ...6wvtoq Show Copy

Created: Tue, Jan 8, 2019, 9:28:56 PM UTC

Ingress Rules

Add Ingress Rules

Stateless	Source	IP Protocol	Source Port Range	Destination Port Range	Type and Code	Allows
No	10.0.0.0/16	TCP	All	All		TCP traffic for ports: All
No	10.0.0.0/16	ICMP			All	ICMP traffic for: All
No	0.0.0.0/0	TCP	All	3389		TCP traffic for ports: 3389
No	10.0.0.0/16	TCP	All	7803		TCP traffic for ports: 7803
No	10.0.0.0/16	TCP	All	4903		TCP traffic for ports: 4903
No	10.0.0.0/16	TCP	All	7301		TCP traffic for ports: 7301
No	All IAD Services in Oracle Services Network	TCP	All	1521		TCP traffic for ports: 1521
No	10.0.0.0/19	TCP	All	1521		TCP traffic for ports: 1521
No	10.0.128.0/24	TCP	All	All		TCP traffic for ports: All

Note: These examples use 0.0.0.0/0 for demo purposes only. You can add ingress and egress security rules as allowed by your company's security policies. Also note that All IAD Service in Oracle Service Network can be access with service Gateway.

Step 9: Launch an Exadata DB System from OCI Console

Now that you have created all the networking components that are required to launch an Exadata DB system, launch the system.

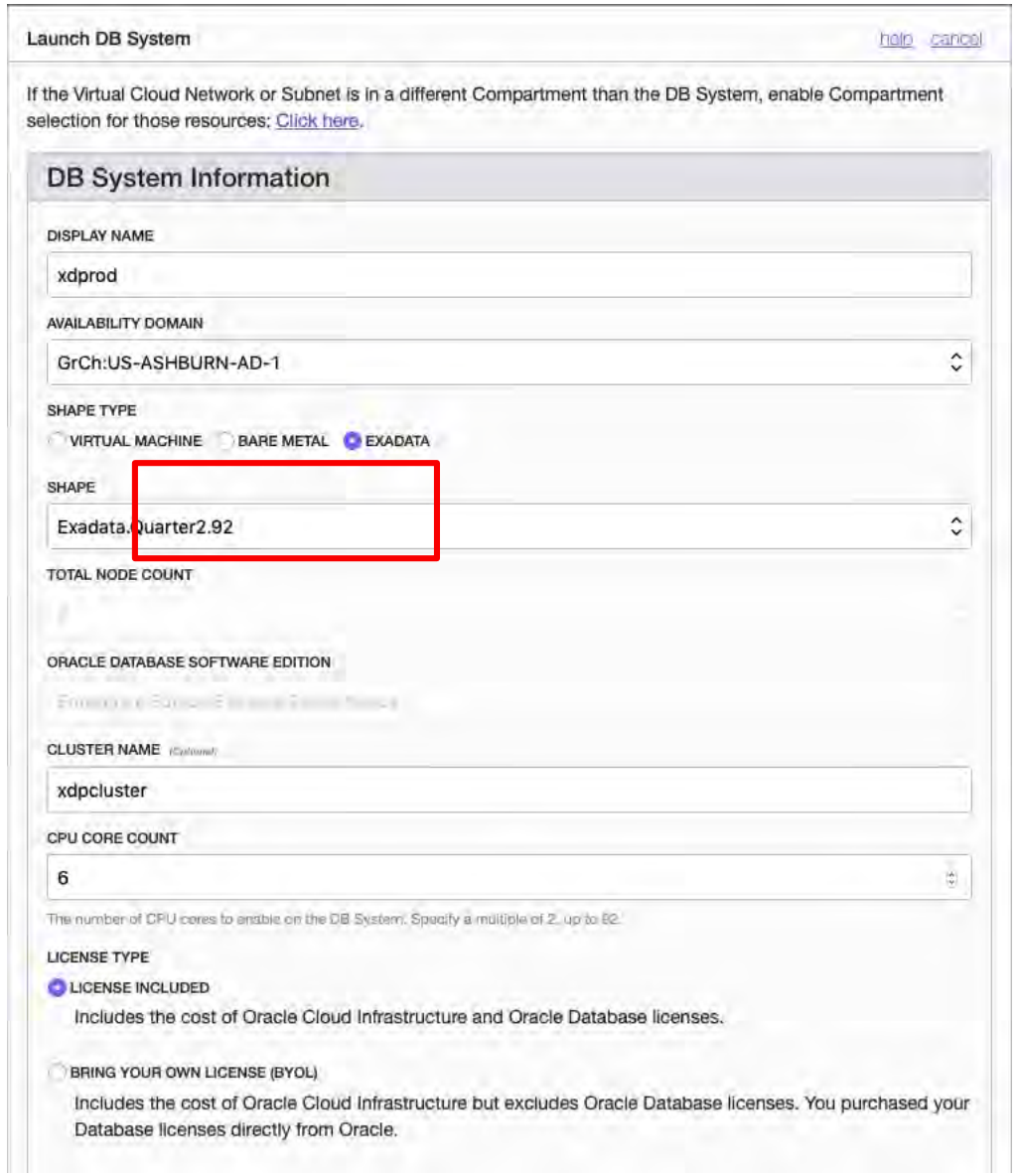
- In the Console, open the navigation menu. Under **Database**, click **Bare Metal, VM, and Exadata**.
- Choose your compartment.
- Click **Launch DB System**.
- In the Launch DB System dialog box, enter the following values.
- Enter a display name for the Exadata DB system (for example, **xdprod**).
- Choose the availability domain where the Exadata DB system will reside.
- For **Shape Type**, select **Bare Metal Machine**.
- Select the shape (for example, **Exadata.Quarter2.92**).
- Enter a cluster name (for example, **xdpcluster**).
- Enter a CPU core count (for example, **6**).
- Select a license type.
- Select to upload or paste SSH keys (public keys).
- Select a data storage percentage (for example, **35%**).

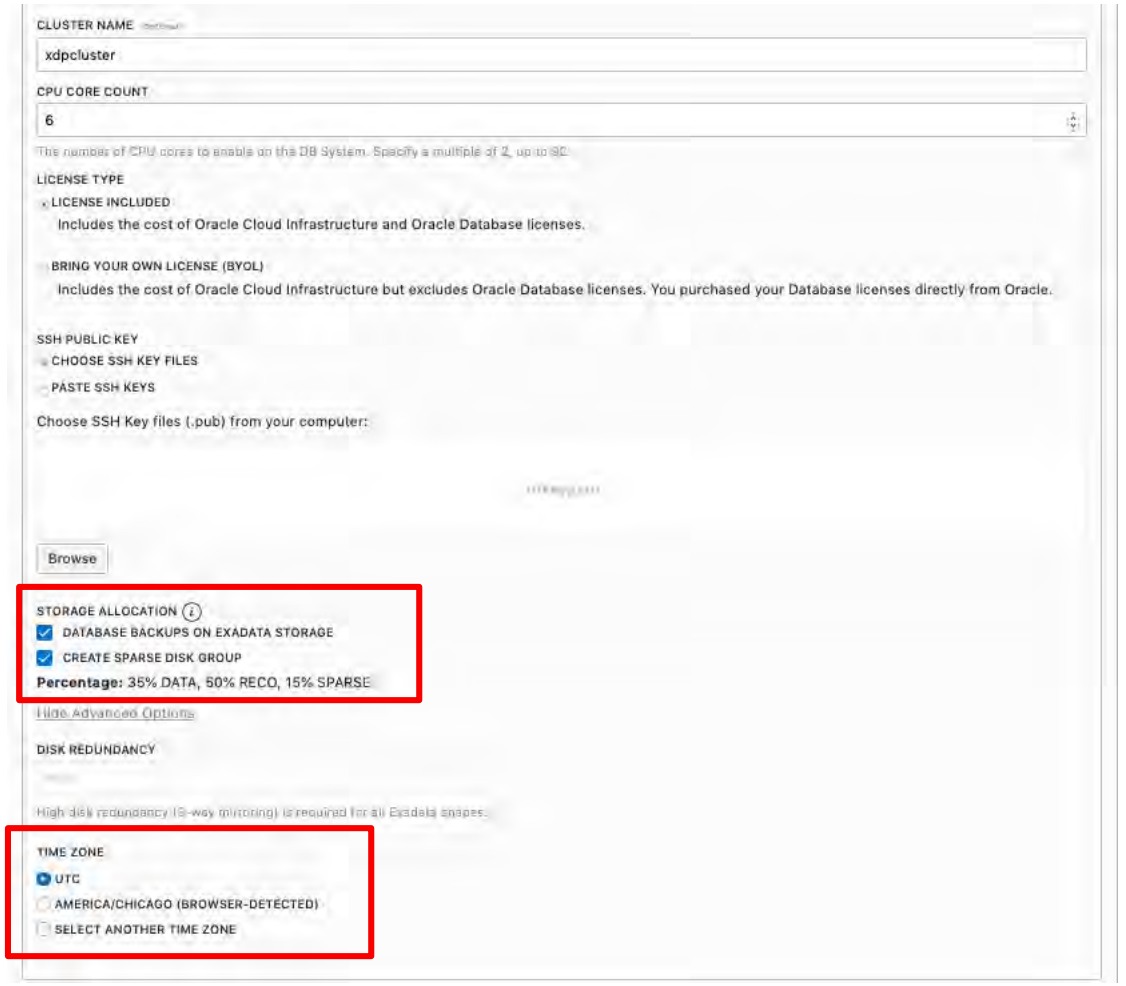
•For **Virtual Cloud Network**, select the VCN that you created (for example, **ExaVCN**).
•For **Client Subnet**, select the client subnet that you created (for example, **sub_priv_data_bal**).
•For **Backup Subnet**, select the backup subnet that you created (for example, **sub_priv_bkp_bal**).
•Enter a hostname prefix (for example, **xdprod**).

•Enter a database name (for example, **bmsprod**).
•Select a database version (for example, **12.1.0.2**).
•If you selected Oracle Database version 12 or later, enter a PDB name (for example, **bmspdb**).
•Enter and then confirm a database admin password.
•Select a database workload (OLTP or DSS).
•Click **Launch DB System**.

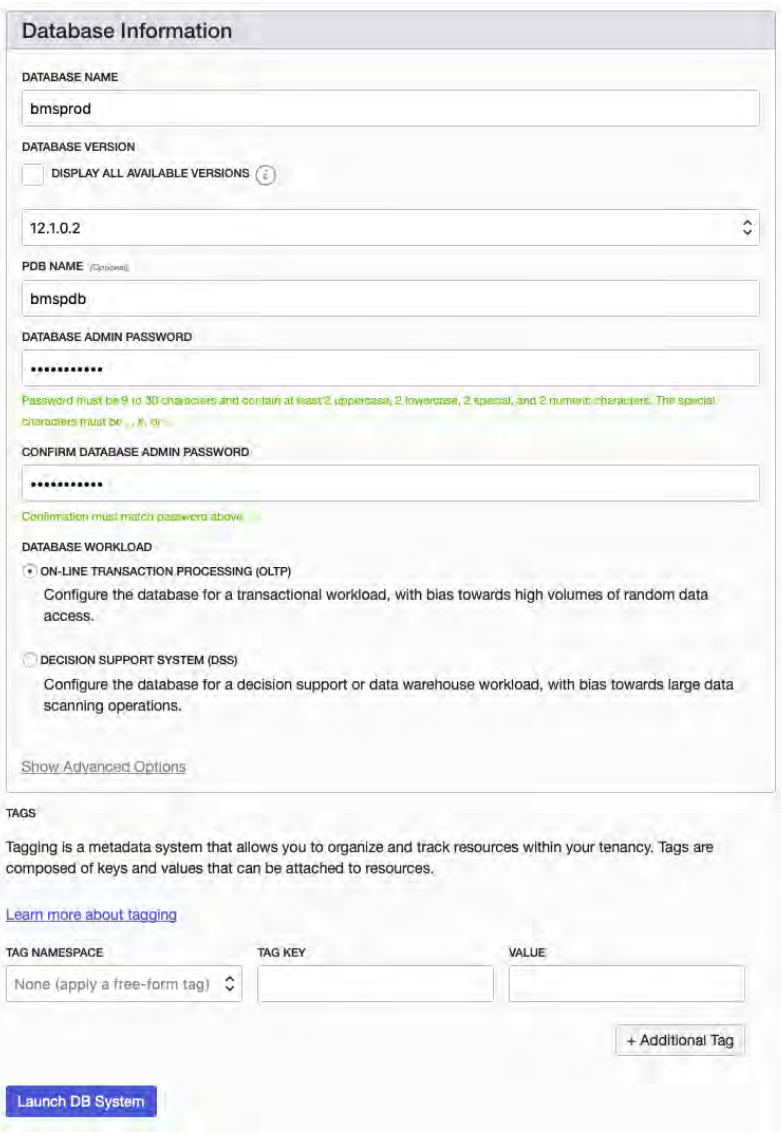
Note: Please select Database version as 18.X for getting GRID version 18 to be installed so that you Can create database version 11.X till 18 later.

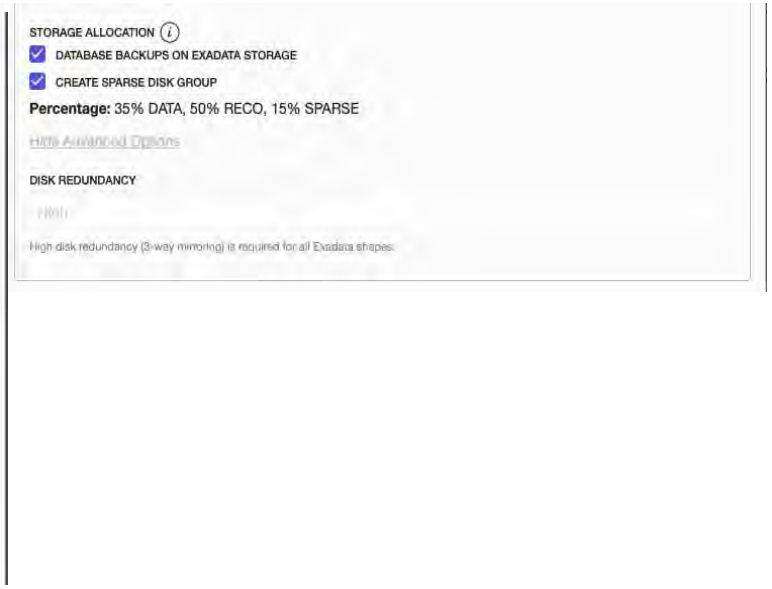
Screenshot: Launching an Exadata DB System from OCI Console



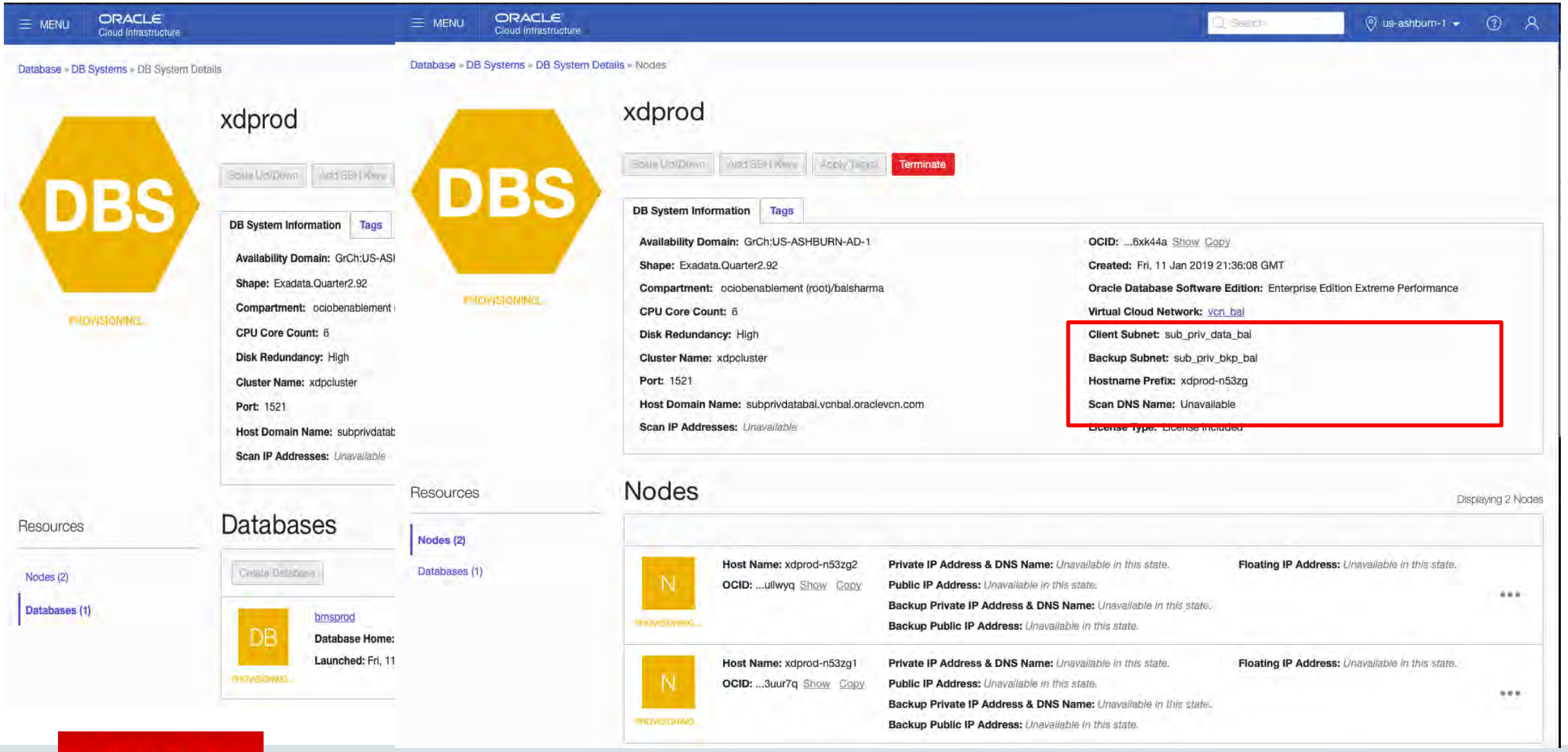


Screenshot: Launching an Exadata DB System from OCI Console





Screenshot: Launching an Exadata DB System from OCI Console

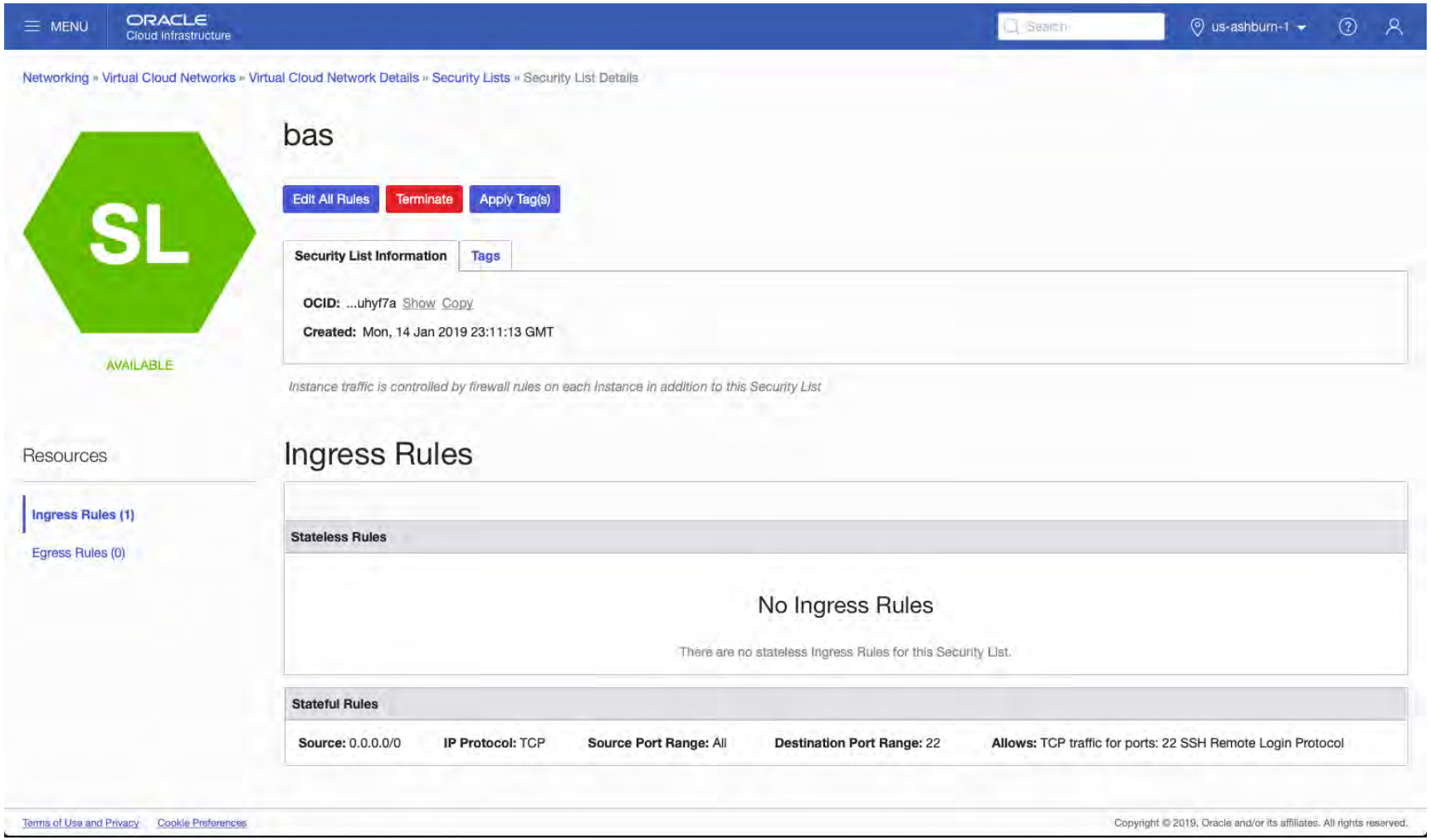


Secure Access via Bastion Server

Since the ExaCS system is on private subnet, you need to connect it using bastion host. Create a config file for ssh on Your client host to access The deployment of ExaCS on private Subnet using Proxy host. E.g

```
dhcp-10-135-189-14:.ssh balsharma$ cat config
HOST bastion
    IdentityFile /Users/balsharma/keys/new/balskey
    User opc
    Hostname 129.213.124.178

HOST 10.0.96.2
    User opc
    IdentityFile /Users/balsharma/keys/new/balskey
    ProxyCommand ssh bastion -W %h:%p
HOST 10.0.0.3
    User opc
    IdentityFile /Users/balsharma/keys/new/xdkey
    ProxyCommand ssh bastion -W %h:%p
HOST 10.0.0.2
    User opc
    IdentityFile /Users/balsharma/keys/new/xdkey
    ProxyCommand ssh bastion -W %h:%p
dhcp-10-135-189-14:.ssh balsharma$ pwd
/Users/balsharma/.ssh
dhcp-10-135-189-14:.ssh balsharma$
```



ExaCS: Verifying Database and system information

```
[opc@xdprod-n53zg1 ~]$ sudo -s
[root@xdprod-n53zg1 opc]# dbaascli dbhome info
DBAAS CLI version 18.2.3.1.0
Executing command dbhome info
Location of inventory.xml is set to /u01/app/oraInventory/ContentsXML/inventory.xml
Enter a homename or just press enter if you want details of all homes
1.HOME_NAME=OraHome100_12102_dbbp180417_0
  HOME_LOC=/u02/app/oracle/product/12.1.0/dbhome_2
  PATCH_LEVEL=12102_dbbp180417
  DBs installed= bmsprod
```

```
[root@xdprod-n53zg1 opc]# dbaascli database status --dbname bmsprod
DBAAS CLI version 18.2.3.1.0
Executing command database status
Database Status:
Instance bmsprod1 is running on node xdprod-n53zg1. Instance status: Open,HOME=/u02/app/oracle/product/12.1.0/dbhome_2.
Instance bmsprod2 is running on node xdprod-n53zg2. Instance status: Open,HOME=/u02/app/oracle/product/12.1.0/dbhome_2.
```

```
Bals-MacBook-Pro:.ssh balsharma$ ssh 10.0.0.2
Last login: Sun Jan 27 06:29:48 2019 from bast13.subpubbasbal.vcnbal.oraclevcn.com
[opc@xdprod-n53zg1 ~]$ grep -i MACHINETYPES /opt/oracle.SupportTools/onecommand/databasemachine.xml
                <MACHINETYPES>X7-2 Elastic Rack HC 10TB</MACHINETYPES>
[opc@xdprod-n53zg1 ~]$
```

ExaCS: Verifying ASM information

```
[opc@xdprod-n53zg1 ~]$ sudo su - grid
[grid@xdprod-n53zg1 ~]$
[grid@xdprod-n53zg1 ~]$
[grid@xdprod-n53zg1 ~]$ sqlplus

SQL*Plus: Release 12.2.0.1.0 Production on Sun Jan 27 19:34:52 2019

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Enter user-name: sys as sysasm
Enter password:

Connected to:
Oracle Database 12c Enterprise Edition Release 12.2.0.1.0 - 64bit Production

SQL> select failgroup , count(*) from v$asm_disk group by failgroup ;

FAILGROUP                      COUNT(*)
------------------------------ ----------
IAD300633EXDCL01                       36
IAD300633EXDCL02                       36
IAD300633EXDCL03                       36
XDPROD_N53ZG1                           1
XDPROD_N53ZG2                           1

SQL>
```

```
[grid@xdprod-n53zg1 ~]$ asmcmd
ASMCMD> lsdg
State    Type  Rebal  Sector  Logical_Sector  Block       AU   Total_MB    Free_MB  Req_mir_free_MB  Usable_file_MB  Offline_
es  Name
MOUNTED  HIGH  N         512             512   4096  4194304  117707008  115017408          6539264        36159325
 Y  DATAC1/
MOUNTED  HIGH  N         512             512   4096  4194304  168136704  167965296          9340928        52874789
 N  RECOC1/
MOUNTED  HIGH  N         512             512   4096  4194304   63037440   63036180          3502080        19544700
 N  SPRC1/
ASMCMD>
```

```
[root@xdprod-n53zg1 ~]# df -h
Filesystem            Size  Used Avail Use% Mounted on
/dev/mapper/VGExaDb-LVDbSys1
                       24G  5.6G   17G  26% /
tmpfs                 709G  616M  708G   1% /dev/shm
/dev/xvda1            488M   32M  431M   7% /boot
/dev/mapper/VGExaDb-LVDbOra1
                       20G  266M   19G   2% /u01
/dev/xvdb              50G   14G   33G  30% /u01/app/12.2.0.1/grid
/dev/xvdc              50G  9.0G   38G  20% /u01/app/oracle/product/12.2.0.1/dbhome_1
/dev/xvdd              50G  8.6G   39G  19% /u01/app/oracle/product/12.1.0.2/dbhome_1
/dev/xvde              50G  5.4G   42G  12% /u01/app/oracle/product/11.2.0.4/dbhome_1
/dev/xvdg             1.1T   12G 1017G   2% /u02
/dev/asm/acfsvol01-258
                      800G   31G  770G   4% /acfs01
[root@xdprod-n53zg1 ~]#
```

ExaCS –Deployment: Things to consider:

Deployment Time:

	Quarter	Half	Full
Launch	4h	6h	8h
Secure Erase	6h	6h	6h
Termination	Minutes	Minutes	Minutes

- Passwords: Don’t use SYS/SYSTEM/Oracle
- SSH Key: Only use 1 with no spaces in the “comment” field
- Adjust Huge Pages depending on DB and Memory requirements as per MOS Note

Connecting to the Database: Use an application service !

```
srvctl modify service -db ORCL -service APPCON -failovertype TRANSACTION -replay_init_time 300
-failoverretry 30 -failoverdelay 3 -notification TRUE -commit_outcome TRUE -session_state DYAMIC –
drain_timeout 30 –failover_restore LEVEL1
```

Setting Up Exadata (OCI Controlplane)

- Methods
  - Console
  - OCI CLI
  - Terraform
  - SDK
- Functions
  - Created/Terminated
  - Scale Up/Down
  - Create/Delete DB/DBHome

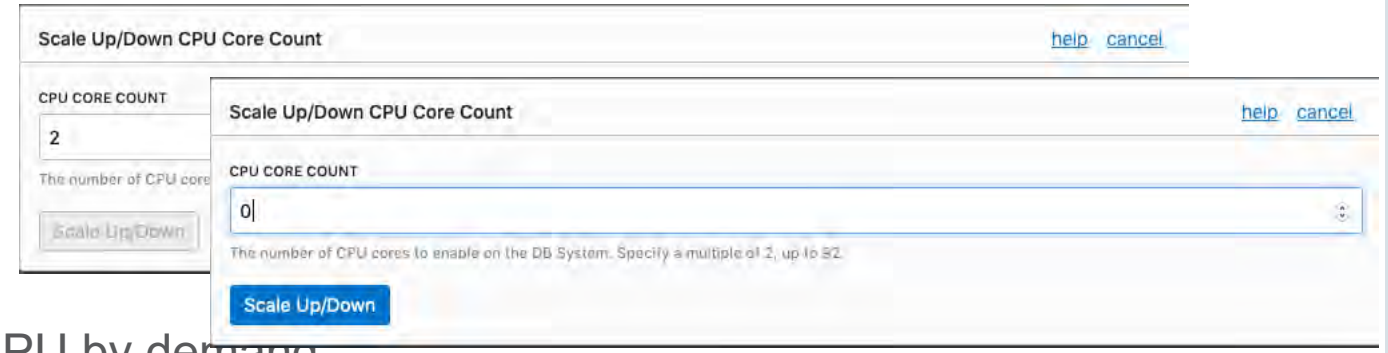
```
oci db system launch

--availability-domain, --compartment-id, --cpu-core-count, --
hostname, --shape, --subnet-id, --backup-subnet-id, --cluster-
name, --display-name, --domain, --sparse-diskgroup, --database-
edition, --admin-password, --db-name, --db-version, --ssh-
authorized-keys-file ...
```

oci db system launch [OPTIONS]

Ref: https://docs.cloud.oracle.com/iaas/tools/oci-cli/latest/oci_cli_docs/cmdref/db/system/launch.html

ExaCS - Sizing and Consolidation Best practices on

- X7 introduced a new pricing model
  - OCPUs and Infrastructure have been separated
    - Upon creation, infrastructure is charged 744 hours
    - Not designed to do a “quick” test
  - No OCPU minimums
    - 0 OCPUs will shutdown the VMs
    - Only infrastructure is charged
    - Don’t use less than 4 OCPU per node
    - No imparity allowed (today)
- Size for Storage capacity and IOP/s and Grow CPU by demand
  - ExaCS Shape change not possible => Data Guard for Migration



Consolidation on ExaCS

- Use CPU_COUNT to distribute workload
  - Production Workload
    - Partitioning Approach
    - Enabled Cores > SUM(CPU_COUNT)

Test/Development

- Overprovisioning Approach
- Enabled Cores > 3x SUM(CPU_COUNT)
- Use Resource Manager for IntraDB Workload
- Enable IORM for IO Distribution

Demo

ExaCS Network Preparation & Provisioning

Demo Flow

Prepare Network

- Create VCN
- Create Service GW
- Create Route Table
- Create Security List
- Create Subnets

Compartment: ExaCS_PROD_COMP

VCN Name: ExaCS_VCN_PROD
Compartment: ExaCS_PROD_COMP
CIDR Block: 10.0.0.0/19
Create with Option **Virtual Cloud Network Only**

SGW Name: ExaCS_NW_SGW
Compartment: EXACS_PROD_COMP
Services: All IAD Services in Oracle Service Network

RT Name: ExaCS_RT_DATA, ExaCS_RT_BKP
Route Rule: Target Type Service GW: ExaCS_NW_SGW

Security List: Two new- for Data and for Backup Subnet
ExaCS_SEC_DATA, ExaCS_SEC_BKP , Default Rule

Subnet Name: ExaCS_SUB_DATA, ExaCS_SUB_BKP:
Regional/Private, CIDR:
CIDR: 10.0.2.0/24, 10.0.3.0/24
Security Rules: ExaCS_SEC_DATA, ExaCS_SEC_BKP , Default Rule

Provision ExaCS

- Db System Information
- Network Information
- Database Information
- Launch Db System
- UI operations

Exadata Cloud Service – Summary

You should now be able to

- Describe the features of Exadata Cloud Service
- Understand Exadata and its core architecture.
- Understand Exadata Cloud Service Deployment best practices.
- Describe the aspects of service management in Exadata Cloud service
- Provision Exadata Cloud service using console
- Architecture best practices for database workload
- Consolidation best practices and sizing

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Cloud Infrastructure

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