



# Private Cloud Appliance

## PCA X9 Technical Features and Architecture Storyboard



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# Agenda

## Hardware Overview

- Physical infrastructure including data center integration

## System architecture

- Software architecture
- Logical partitioning (enclaves)

## Infrastructure services

- IAM
- Compute
- Containers (Cloud-Native)
- Storage
- Network

# Oracle Cloud Compatible Infrastructure on Premises

## Engineered for Mission Critical Private Cloud



**Image portability to OCI**  
**OCI compatible APIs**



**Tools and Services**

CI/CD  
SDK



**Business Continuity**

Fault Domains  
Disaster Recovery



**Monitoring and Management**

Grafana, Prometheus



**Security and Governance**

Identity and Access  
Policy  
Tagging  
Encryption



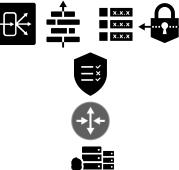
**Storage**

Block  
File  
Object



**Network**

Virtual Cloud Network  
Network Services  
Security Lists  
Gateway Services  
Datacenter Connectivity



**Compute**

Virtual Machines



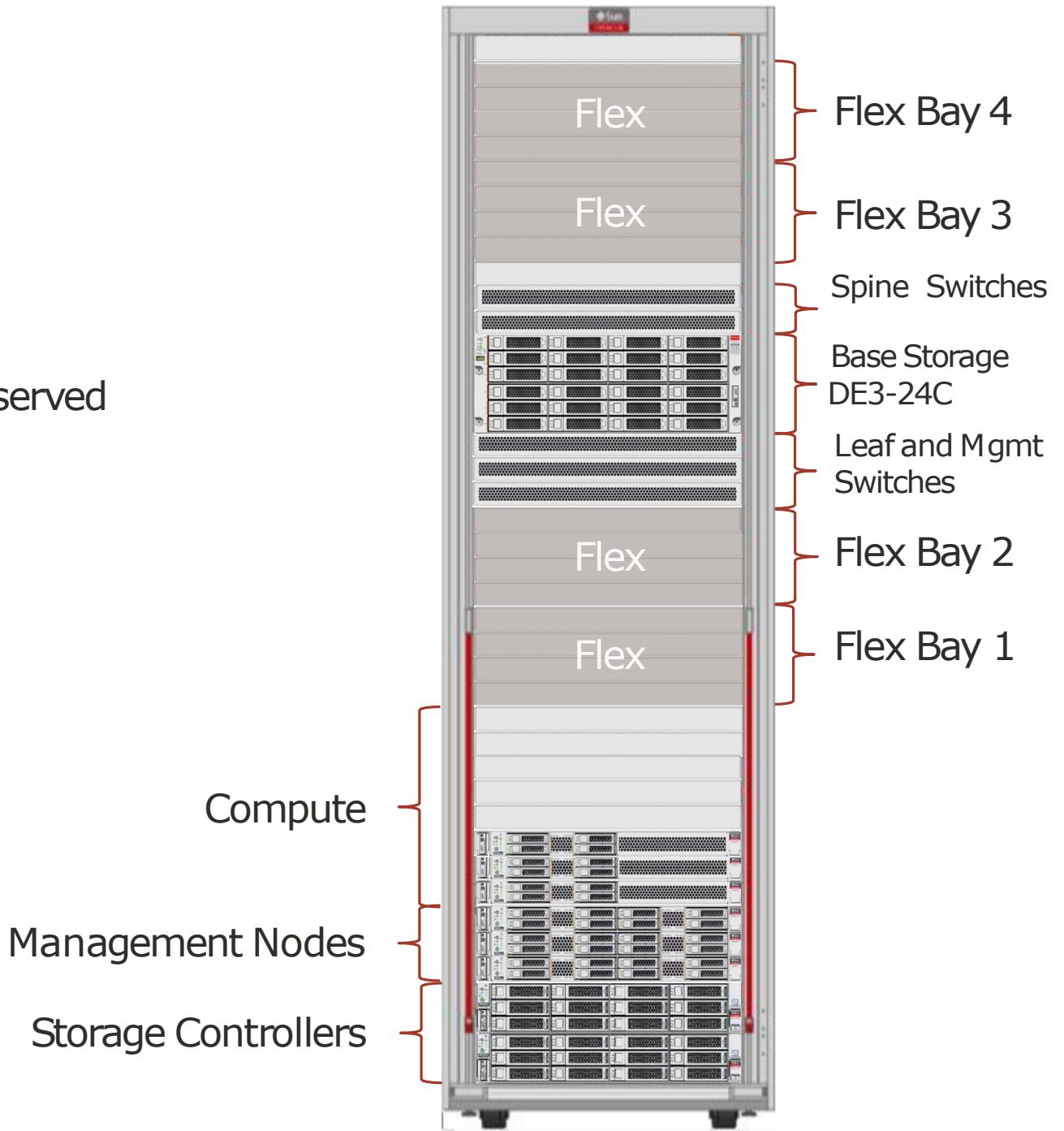
# PCA Base Rack

Base Rack configuration includes:

- 3x Management Nodes
- 3x Compute Nodes populated in three reserved rack units
  - 8x RU pre-cabled for compute
- 2x ZFSSA Controllers
- 1x DE3-24C
- 4x Cisco 9336C 100GbE switches
  - 2x Access, 2x Aggregation
- 1x Cisco 9348GC management switch

Remaining rack space can accommodate 4 additional flex bays

- Up to 18 compute nodes total
- Up to 2.1 PB raw storage capacity
  - Using 18TB HDDs; 1.7 PB with 14TB HDDs



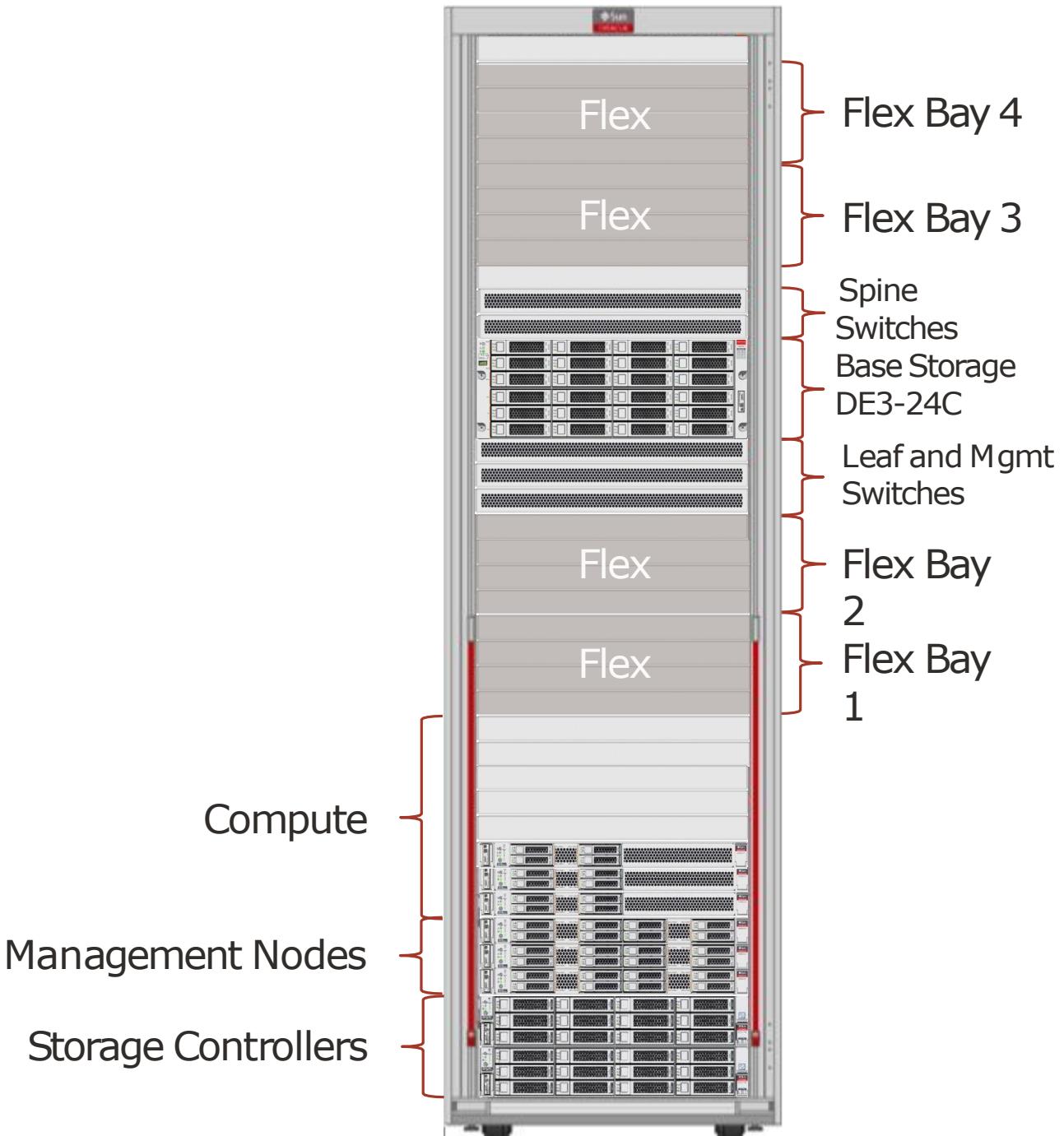
## PCA Base Rack – Flex Bays

Flex Bays reserved as 4RU areas in the rack that can accommodate various combinations of rack components

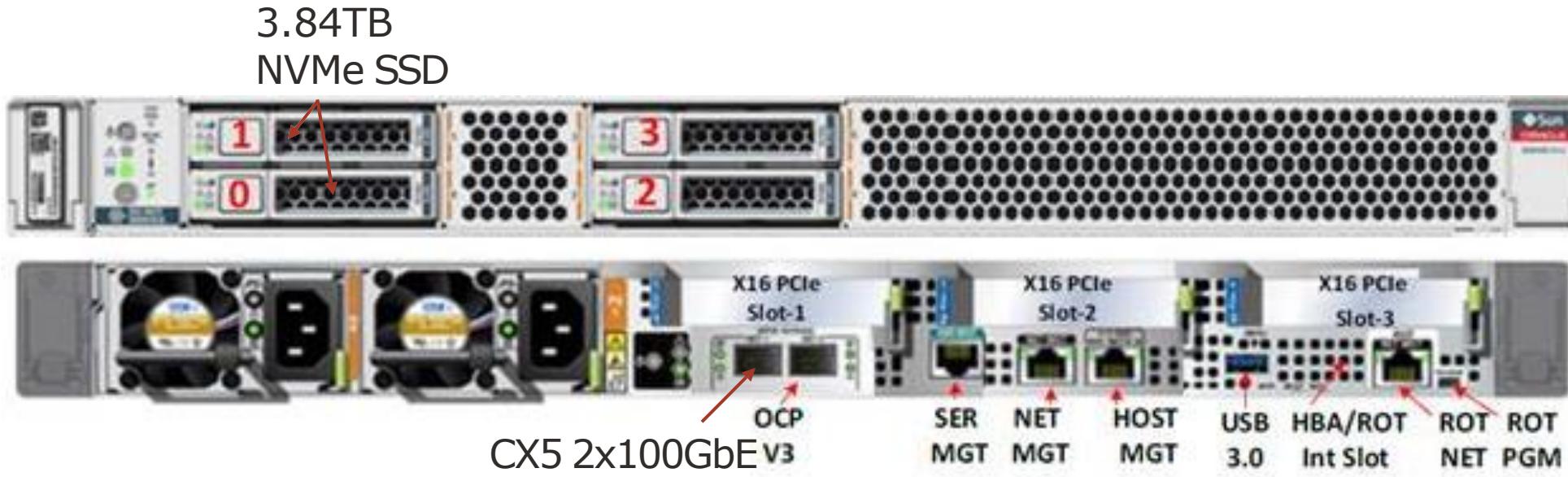
- 1 to 4x Compute Nodes
- 1 to 2x DE3-24P drive enclosures
- 1x DE3-24C drive enclosure

Once a bay type is selected, the 4RU area is set for that purpose

- Compute Node bay will accommodate only compute nodes
  - Additional compute nodes added until 4RU bay is completely populated
- DE3-24P bay accommodates only DE3-24P
  - 2<sup>nd</sup> enclosure added to fully populate bay before adding additional DE3-24P bays. Otherwise, 2RU populated with solid filler panels



# PCA X9 Management Node Configuration



CPU: 2x Ice Lake 24C/2.0GHz/165W

DRAM: 1TB, 16x 64GB DDR4-3200

Boot: 2x M.2 SATA 240GB

Storage: 2x NVMe 3.84TB

IO: CX5 2x100Gb Ethernet OCP v3 module

Mgmt: NET0 + Sideband

# System Network Interfaces

## Customer Interface

- Application
- Client/User
- Data load
- Local Archive

## Intra-region Interface

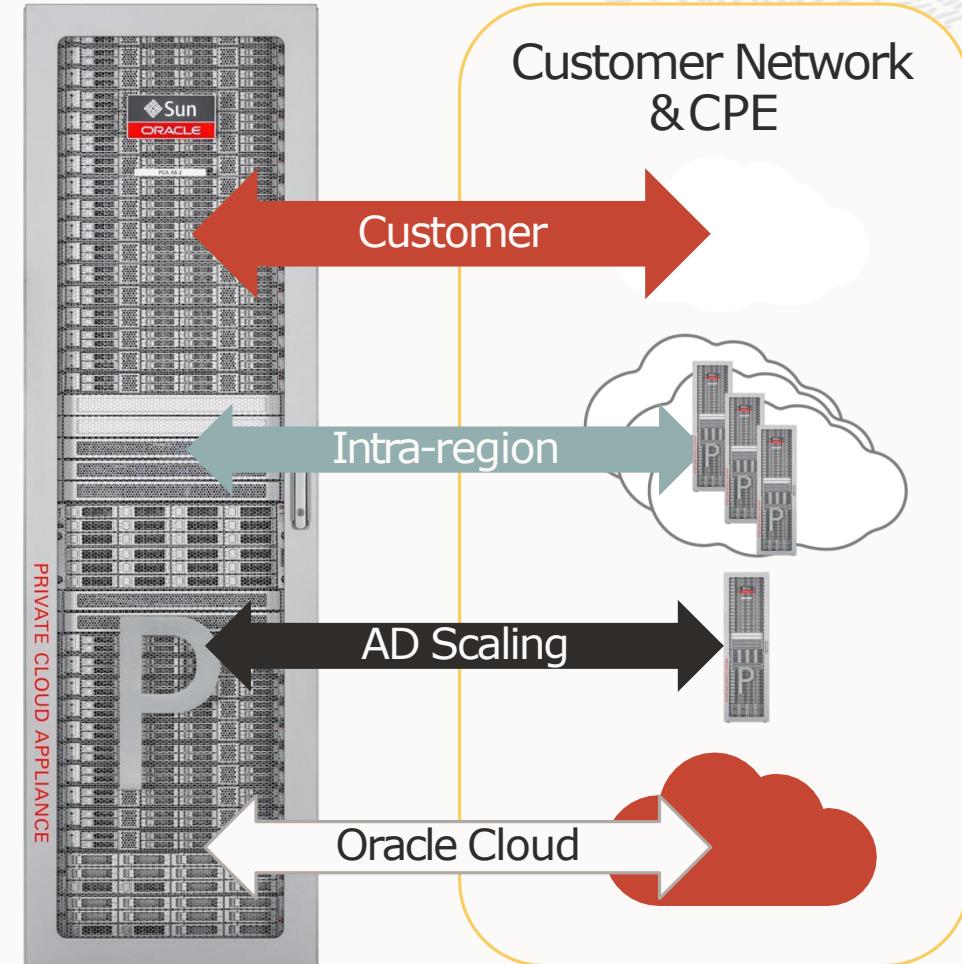
- Backup, Disaster Recovery
- AD – AD service communication

## Availability Domain scaling

- Scaling AD compute/storage/services with additional infrastructure racks
- Exadata/Exa-CC connectivity

## Oracle Cloud Interface

- Service delivery
- Management, monitoring, maintenance



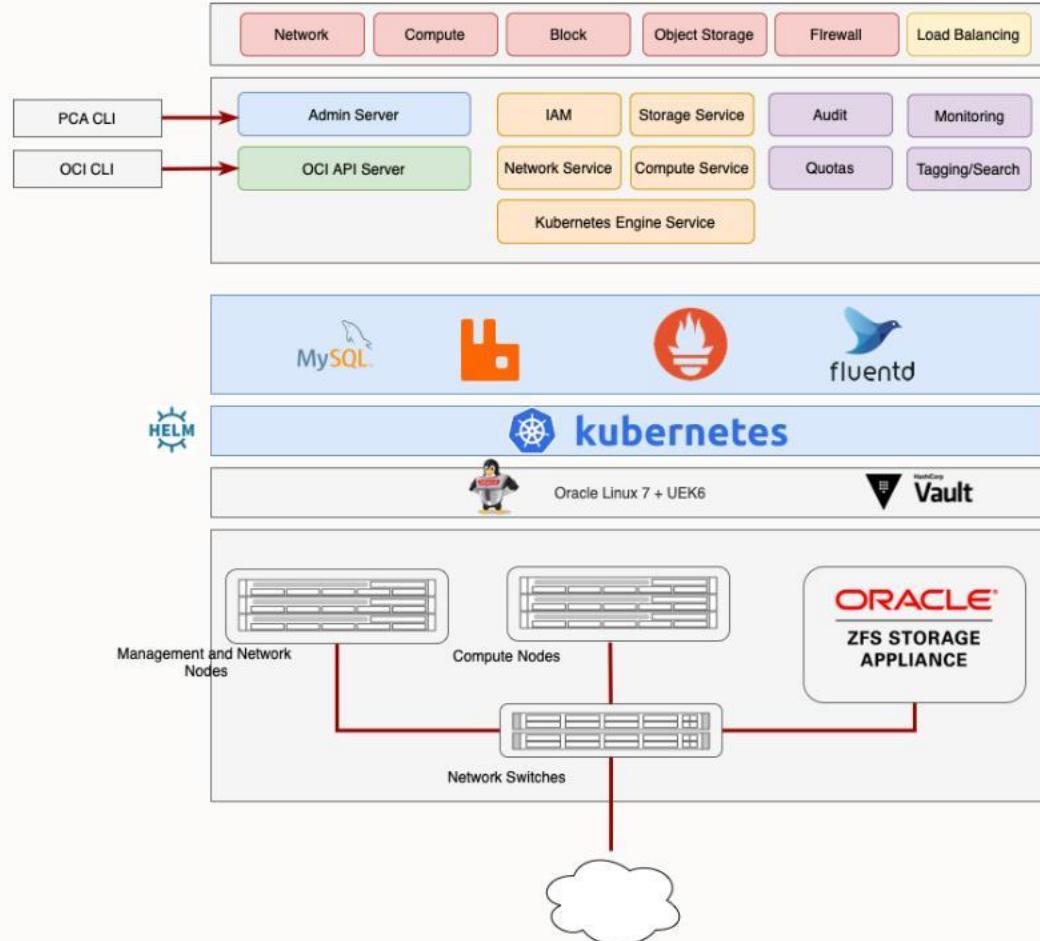
# System Architecture



PCA X9



# Software Architecture



## Microservices-based architecture

- Maximizes Availability
- Enables non-disruptive upgrade
- Hardware independent

# Software Architecture

Customer  
Instance

In-guest  
Agent

API



Controllers



Common  
Services



Layer 0/1



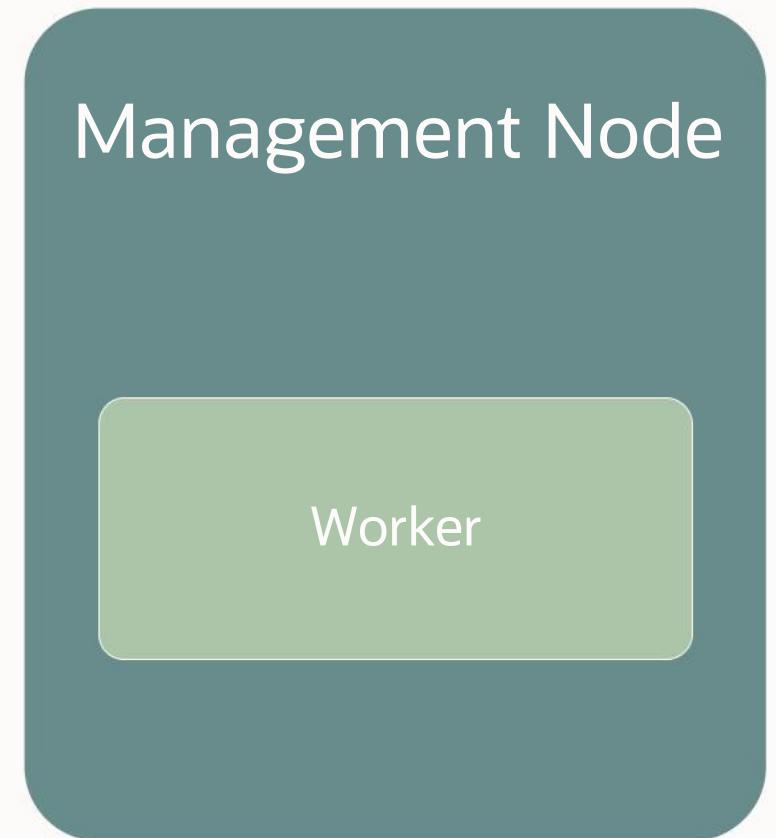
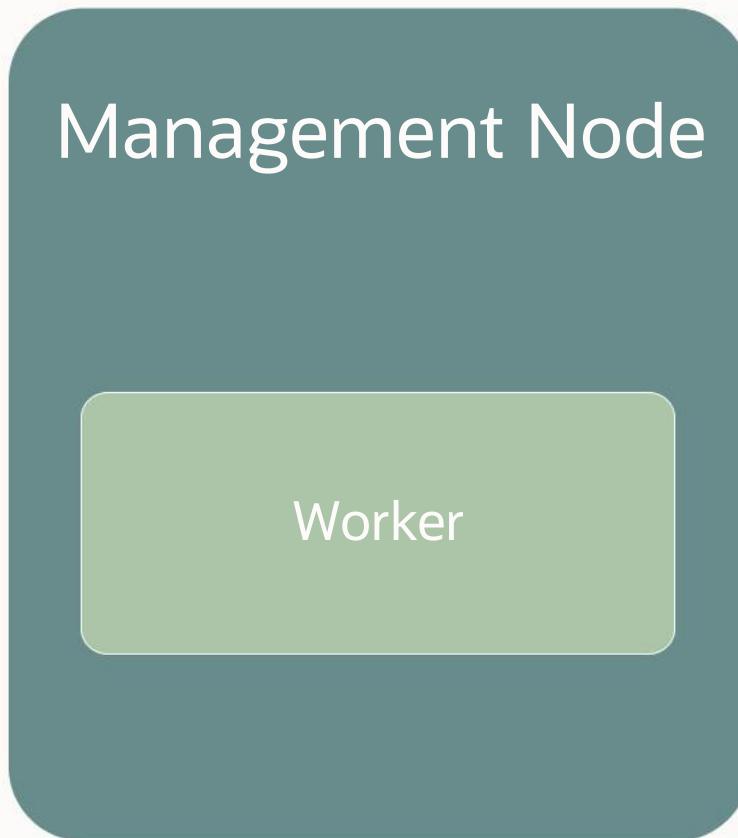
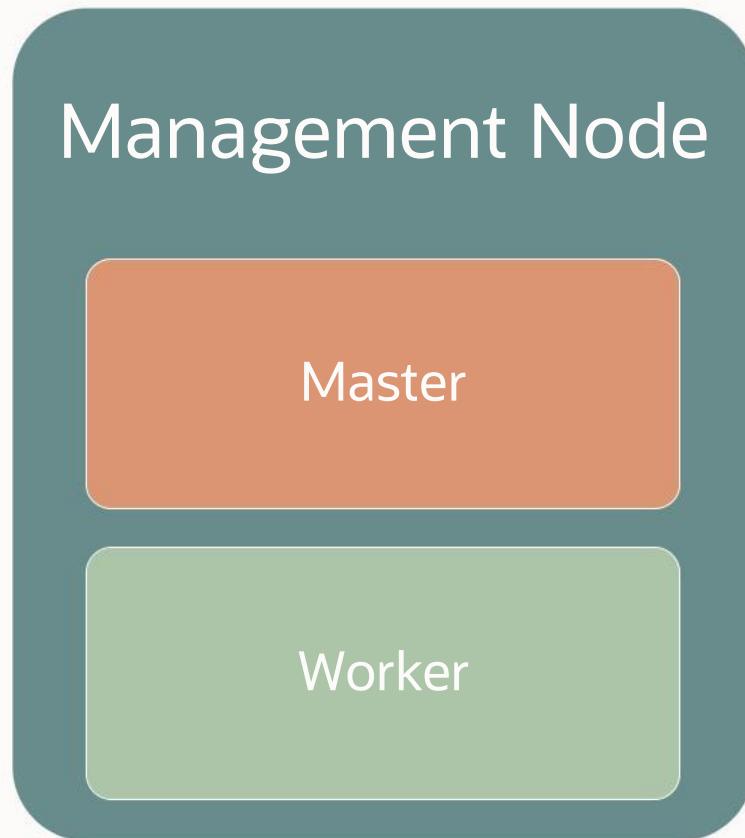
Physical



Deployer

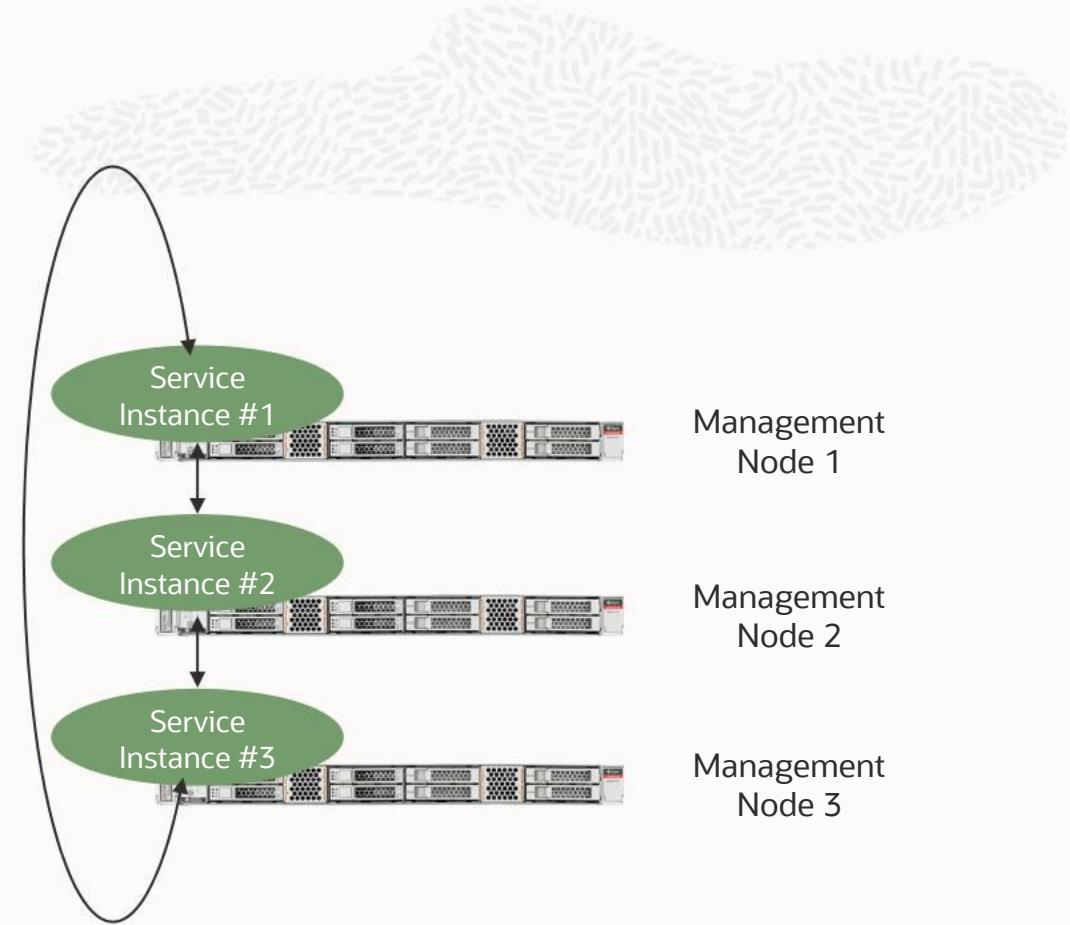


# Platform Strategy – Kubernetes Cluster

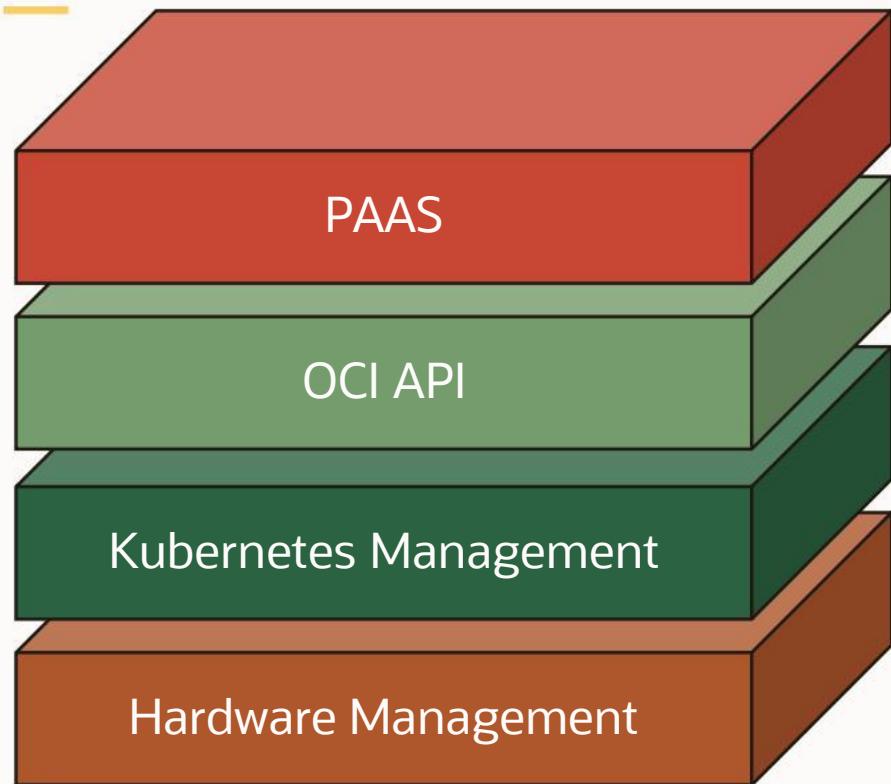


# PCA Microservices

- Packaged within a Docker container that is managed & deployed via Kubernetes
- HA is attained by running one container on each of three Management Nodes
- RabbitMQ is used to communicate with other microservices within the PCA system
- Loki used for log aggregation
- Prometheus used for statistics collection



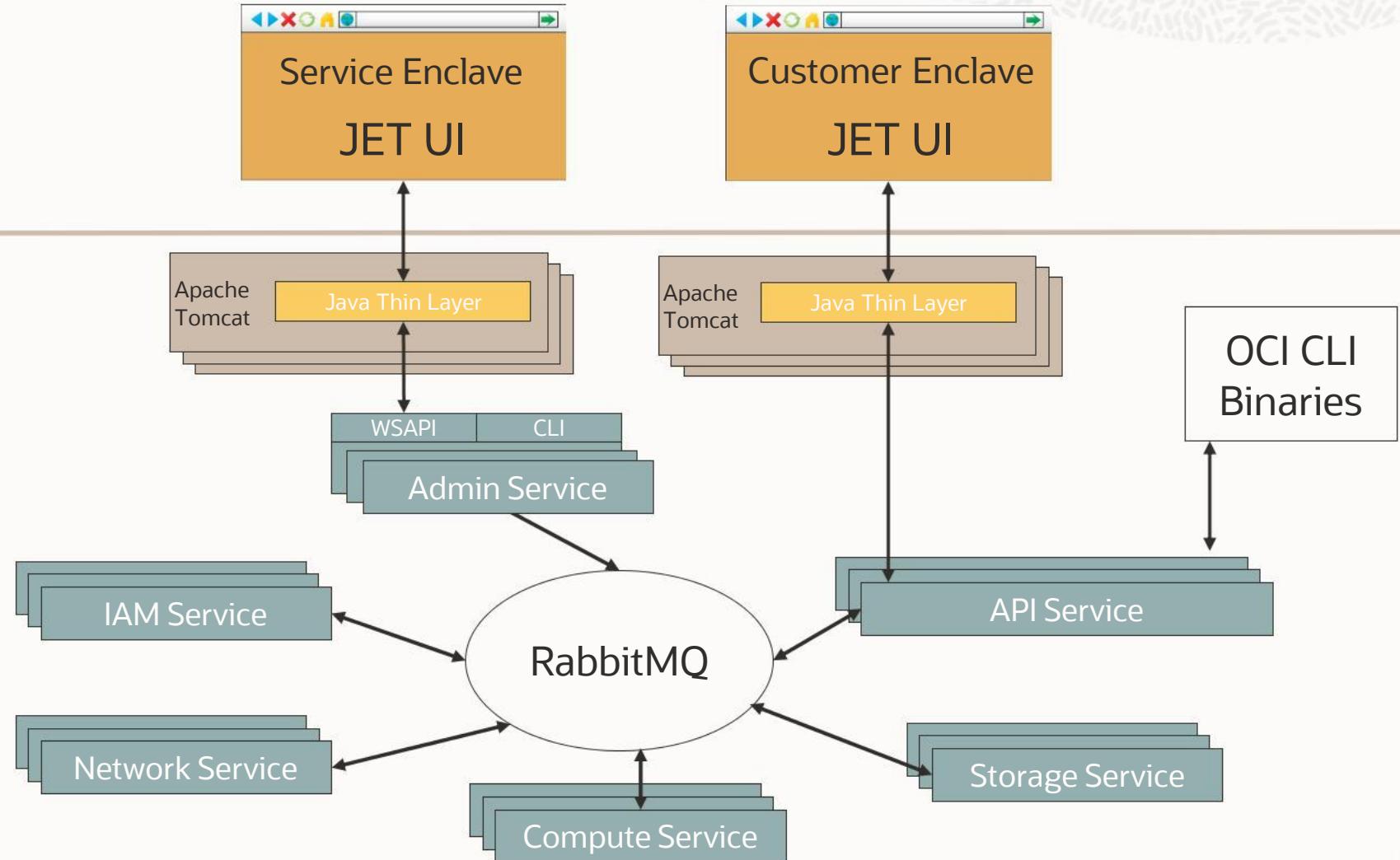
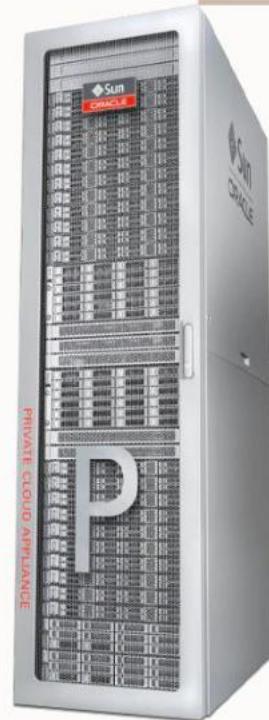
# Upgrades - System Platform Services



- Upgrades to micro-services done by deploying newer version to the registry
  - Kubernetes determines when and how to replace older apps
  - Rollback built into Kubernetes
- 
- OS, kernel, and PCA L1 stack updated with yum
  - Yum repo managed by pca-upgrader
  - Firmware upgrades can be synchronized with OS upgrades to minimize reboots
  - Firmware HMP and OS modules can always be on the same version
  - Unified utility simplifies patching for Platinum and PCC

# User Interfaces and Service Communication

**ORACLE**  
PRIVATE CLOUD  
APPLIANCE



# Infrastructure Services

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Services supported at release



# OCI IaaS – Initial Release

OCI Service	Features
Identity and Access Management	SAML 2.0 Federation
Compute	Fixed Virtual Machine Shapes (X9)
VCN	Subnets, vnics, gateways, routing tables, security lists, ...
Block Storage	Balanced and Performance
Object Storage	OCI
File Storage	NFS, SMB



# Infrastructure Services



IAM



# IAM

Identity and access management features such as authentication, single sign-on (SSO), and identity lifecycle management

## IAM Components

### RESOURCE

- The cloud objects that your company's employees create and use when interacting with Oracle Cloud Infrastructure (for example, compute instances, block instances, block storage volumes, virtual cloud networks, subnets, etc.), third-party applications, Software-as-a-Service (SaaS) applications, on-premises software, and retail web applications.

### USER

- An individual employee or system that needs to manage or use your company's Oracle Cloud Infrastructure resources. Users might need to launch instances, manage remote disks, work with your virtual cloud network, etc. End users of your application are not typically IAM users. Users have one or more IAM credentials (see User Credentials).



IAM

### GROUP

- A collection of users who all need the same type of access to a particular set of resources or compartment.



User



Groups

### NETWORK SOURCE

- A group of IP addresses that are allowed to access resources in your tenancy.

### COMPARTMENT

- A collection of related resources. Compartments are a fundamental component of Oracle Cloud Infrastructure for organizing and isolating your cloud resources. You use them to clearly separate resources for the purposes of measuring usage and billing, access (through the use of policies), and isolation (separating the resources for one project or business unit from another). A common approach is to create a compartment for each major part of your organization.



Compartments



Policies

### TENANCY

- The root compartment that contains all of your organization's Oracle Cloud Infrastructure resources.

### POLICY

- A document that specifies who can access which resources, and how. You can write policies to control access to all of the services within Oracle Cloud Infrastructure. Access is granted at the group and compartment level, which means you can write a policy that gives a group a specific type of access within a specific compartment, or to the tenancy itself. If you give a group access to the tenancy, the group automatically gets the same type of access to all the compartments inside the tenancy.



Tagging



Oracle Cloud Identifier

### FEDERATION

- A relationship that an administrator configures between an identity provider and a service provider.



# IAM Service: Overview

- Supports two main OCI features
  - Policies
  - Tagging
- Authenticates and uses policies to authorize all incoming requests
- Supports other OCI objects and operations
  - Users
  - UserGroups, UserGroupMemberships
  - Compartments
  - ApiKeys
- Supports federation with IdPs supporting SAML 2.0
  - Active Directory federation



# Infrastructure Services

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Compute



# Compute

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## Virtual Machine

- A virtual machine (VM) is an independent computing environment that runs on top of physical bare metal hardware. The virtualization makes it possible to run multiple VMs that are isolated from each other. VMs are ideal for running applications that do not require the performance and resources (CPU, memory, network bandwidth, storage) of an entire physical machine.



Virtual Machine

# Compute - Supported VM Shapes

## VM Shapes

- Fixed 1:16 ratio (OCPUs:GB Memory)

## Resources reserved for the hypervisor

- 4 cores
- 40 GB memory

## OCI Portability

- OCI supports shapes up to 18 OCPUs on X9 (VM.Optimized3.Flex)

Shape	OCPUs	Memory (GB)	OCI Portable
VM.PCAStandard1.1	1	16	✓
VM.PCAStandard1.2	2	32	✓
VM.PCAStandard1.4	4	64	✓
VM.PCAStandard1.8	8	128	✓
VM.PCAStandard1.16	16	256	✓
VM.PCAStandard1.24	24	384	✗
VM.PCAStandard1.32	32	512	✗
VM.PCAStandard1.48	48	768	✗
VM.PCAStandard1.Max	60	960	✗

# PCA X9 – Guest OS Matrix

Guest Operating System	Platform Image	Custom Image
Oracle Linux Release 8.x	✓	✓
Oracle Linux Release 7.x	✓	✓
Red Hat Enterprise Linux 8.x		✓
Red Hat Enterprise Linux 7.x		✓
CentOS 8.x		✓
CentOS 7.x		✓
SUSE Linux Enterprise Server 12 SP5		✓
SUSE Linux Enterprise Server 15 SP1		✓
Ubuntu 20.04 and later		✓
Ubuntu 18.04 and later		✓
Oracle Solaris 11		✓
Microsoft Windows Server 2019		✓
Microsoft Windows Server 2016		✓
Microsoft Windows Server 2012 R2		✓
Microsoft Windows Server 2012		✓



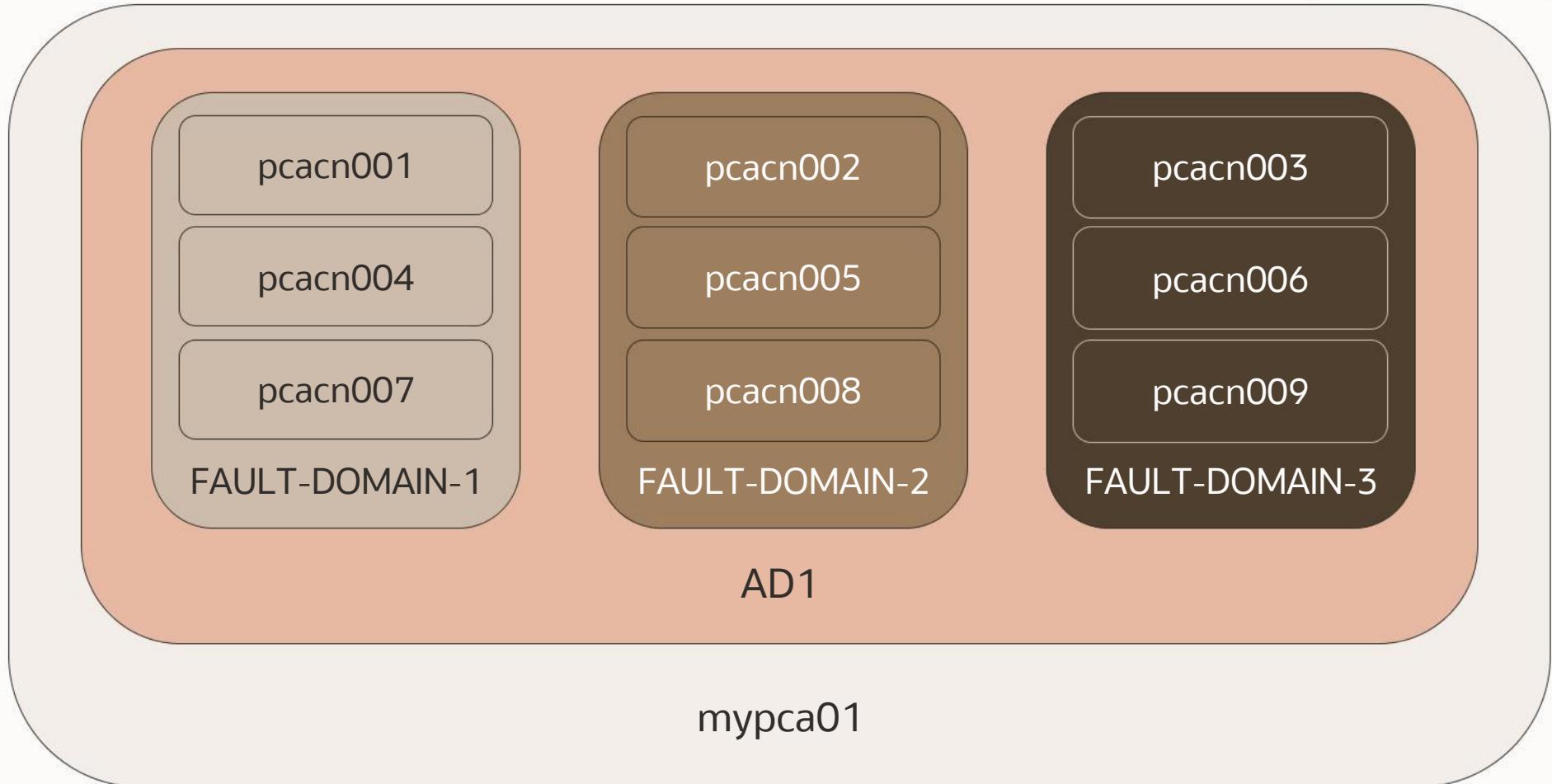
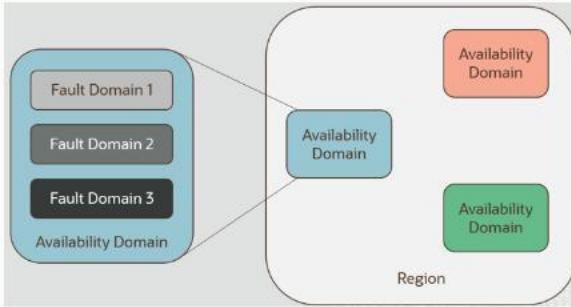
# Compute - Recommended System Sizing to Support Zero Down Time Upgrade

1. Calculate required system OCPU capacity leveraging supported VM shapes
2. Select system size which provides “Available Capacity” greater than required OCPU capacity
3. When using large VM shapes (OCPU 16 or greater), increase “reserve capacity” to ensure that large VMs can be moved during upgrade.
4. When configuring the system set alerts to ensure that desired “reserve capacity” is available

System Size		Reserve Capacity		Available Capacity	
Compute Nodes	OCpus	%	OCpus	%	OCpus
3	180	33%	60	67%	120
6	360	17%	60	83%	300
9	540	11%	60	89%	480
12	720	8%	60	92%	660
15	900	7%	60	93%	840
18	1,080	6%	60	94%	1,020

**Note:** Reserve Capacity is simply 20 cores per fault domain.

# PCA X9 Architecture In Practice



# Infrastructure Services

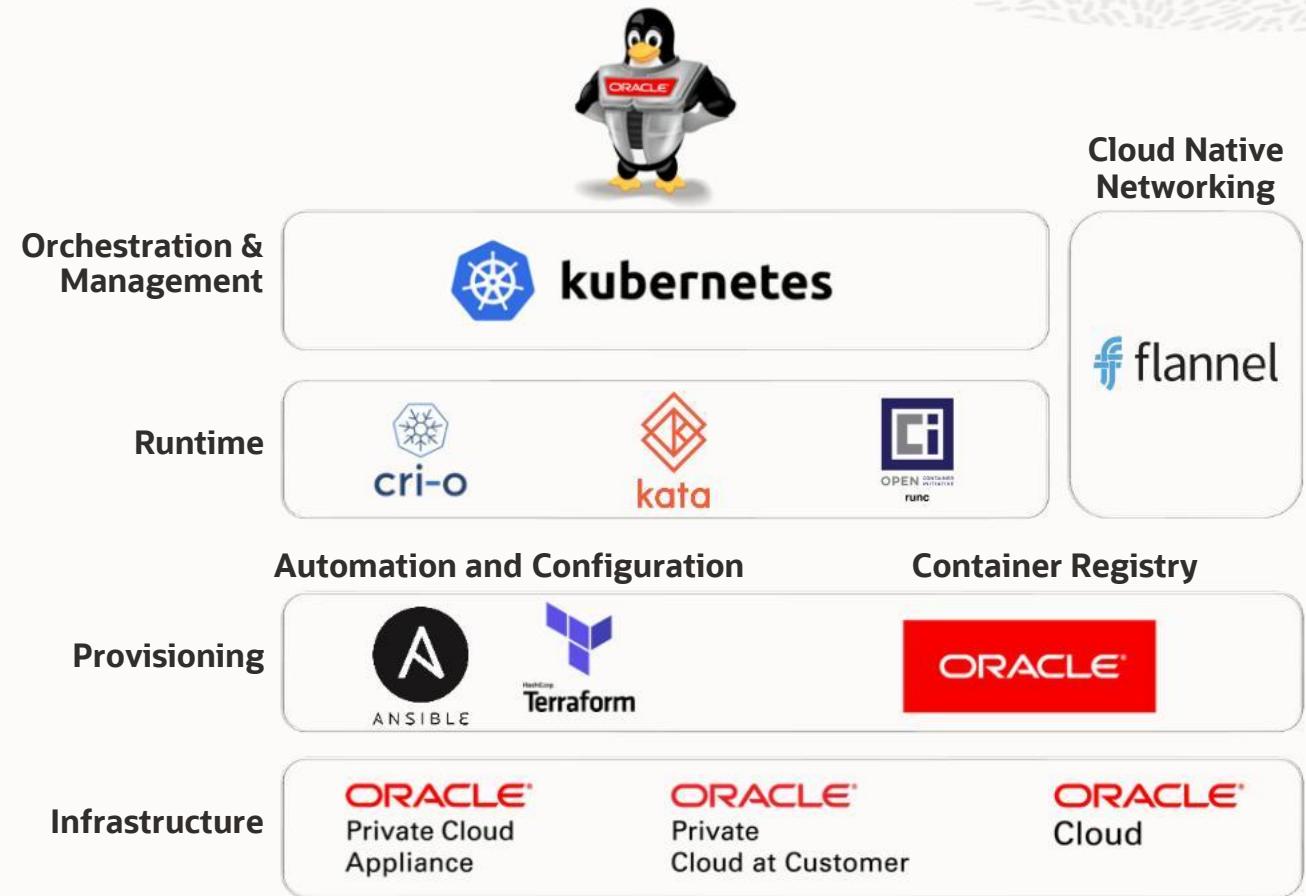
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Containers – Cloud Native



# Cloud Native Environment for Private Cloud

- Oracle Linux Cloud Native Environment included
- An open, integrated operating environment that is popular with developers and easy for IT operations to deliver:
  - Containers and orchestration
  - Management tools
  - Development tools
- Supports the open standards, specifications, and APIs defined by the Cloud Native Computing Foundation (CNCF)



# Oracle Products currently supported inside Docker containers

*Available on Oracle Container Registry*



- Oracle Linux  
6 and 7 with slim variants
- MySQL Community Server
- MySQL Server Enterprise Edition
- Oracle Java SE
- Oracle NoSQL Database
- Oracle Database
- Oracle GoldenGate
- Oracle Business Intelligence
- Oracle Coherence
- Oracle Fusion Middleware Infrastructure
- Oracle Data Integrator
- Oracle SOA Suite
- Oracle Tuxedo
- Oracle WebLogic Server
- Oracle HTTP Server
- ....more

# Infrastructure Services



Storage



# Storage Overview

## Support for fundamental storage services

- **Block**
  - Performance tiers dependent upon disk enclosure hardware
  - “Balanced” and “Performance”
- **File**
  - NFS (v3/v4)
  - SMB
  - **Note** - file is “very expensive” in public clouds
- **Object**
  - OCI object store



Block Storage



File Storage



Object Storage



Buckets

# Storage

## Base storage

- Base includes a single high-capacity tray
  - 140 TB user storage
  - 40 TB reserved capacity (system use)

	Min	Max
High Capacity Tray	1	48
High Performance Tray (optional)	0	47

## High Capacity Storage

- Storage services supported: balanced block, file, object

## High Performance Storage (optional)

- Storage services supported: performance block

## Sizing Considerations

- Include the following in sizing calculations: data storage, user storage, VM images, backups, snapshots, clones, ...



# Infrastructure Services



Networking



# PCA-X9 Networking – Core Components

**PCA-X9 Networking functionality consists of the following Kubernetes (K8s) controllers and Management services:**

- A Network Controller (NC/nwctrl)
- A Load Balancing Controller (LBC/lbctrl)
- Ethernet Switches - underlay network
- OVN/OVS - Overlay network
- DNS, and Switch Manager micro-service modules
- PCA management nodes
- A ZFSSA.
- MySql Data Base (DB)

**Functionality provided by PCA-X9 networking include:**

- Supporting the OCI networking CLI/APIs
- Conforming with OCI networking model:
  - OCI VCN, subnet, VNIC constructs,
  - Private and public IP address,
  - Private and public subnets, and
  - Various L3 services
- Providing DHCP, firewall, DNS, and Load Balancing networking services,
- Supporting management and storage network traffic.
- Creating MySQL DB objects for OCI objects (VCN, Subnet etc) and any related PCA specific objects.

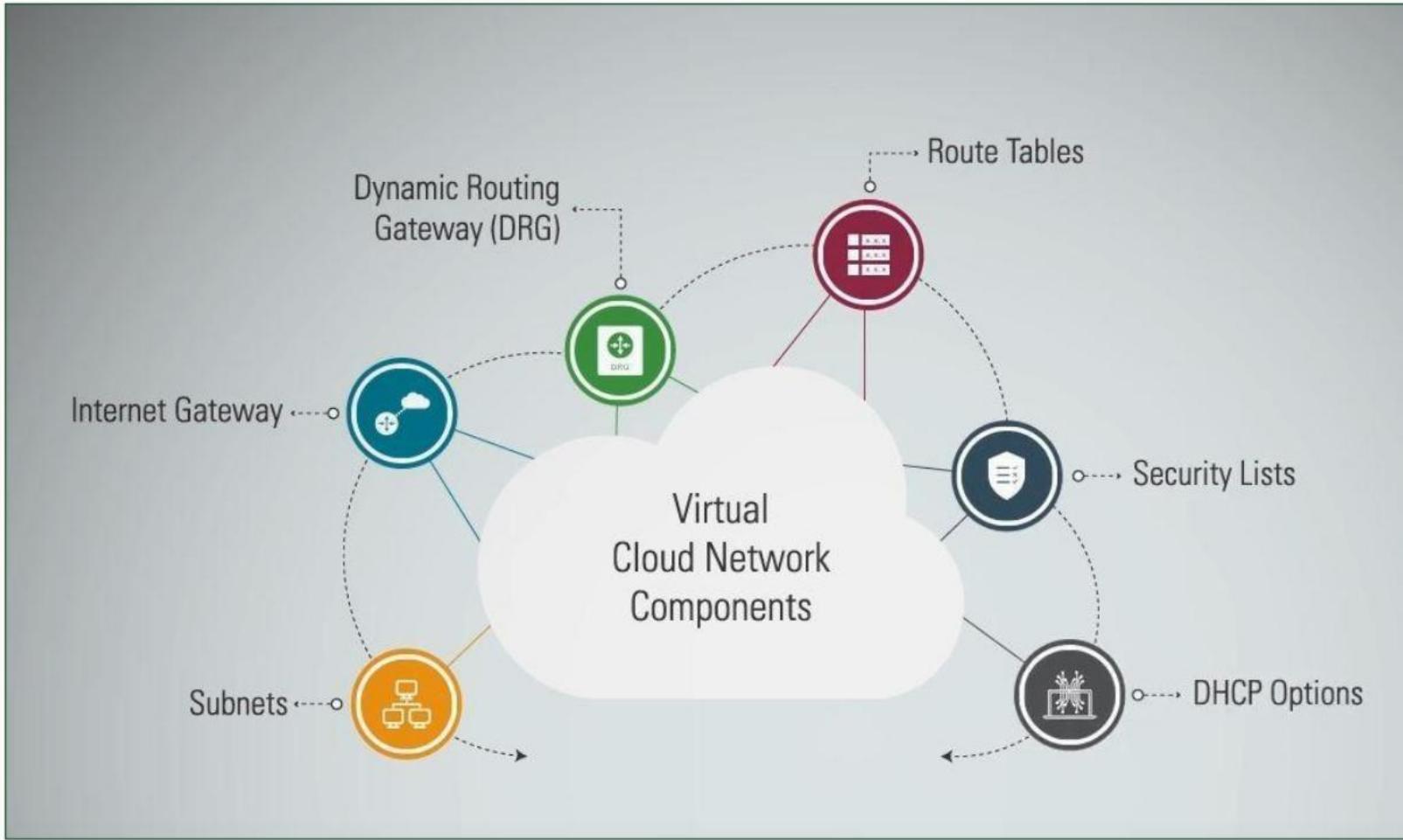


# Networking language of the Cloud (OCI)

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Overview

# Virtual Cloud Network (VCN)



- Virtual Cloud Network is a software-defined version of a traditional physical network including subnets, route tables, gateways, and firewall rules. Essentially a “Virtual Data Centre”.
- VCN covers a single, contiguous IPv4 CIDR block of your choice
  - Oracle recommends using one of the private IP address ranges in [RFC 1918](#) (10.0.0.0/8, 172.16/12, and 192.168/16) for VCN address space. However, you can also use a publicly routable range
- Allowable VCN size range is from /16 to /30 (VCN reserves the first two IP addresses and the last one in each subnet's CIDR)



# Securing your VCN

- **Public vs Private Subnets** - designate a subnet to be private, which means instances in the subnet cannot have public IP addresses
- **Security Lists** - To control packet-level traffic in/out of an instance by defining security rules in your VCN
- **Firewall Rules** - configure firewall rules directly on the instance itself to control packet-level traffic in/out of an instance
- **Gateways and Route Tables** - Control general traffic flow from your cloud network to outside destinations (the internet, your on-premises network, or another VCN)
- **IAM Policies** - control who has access to the PCA-X9 customer tenancies or console

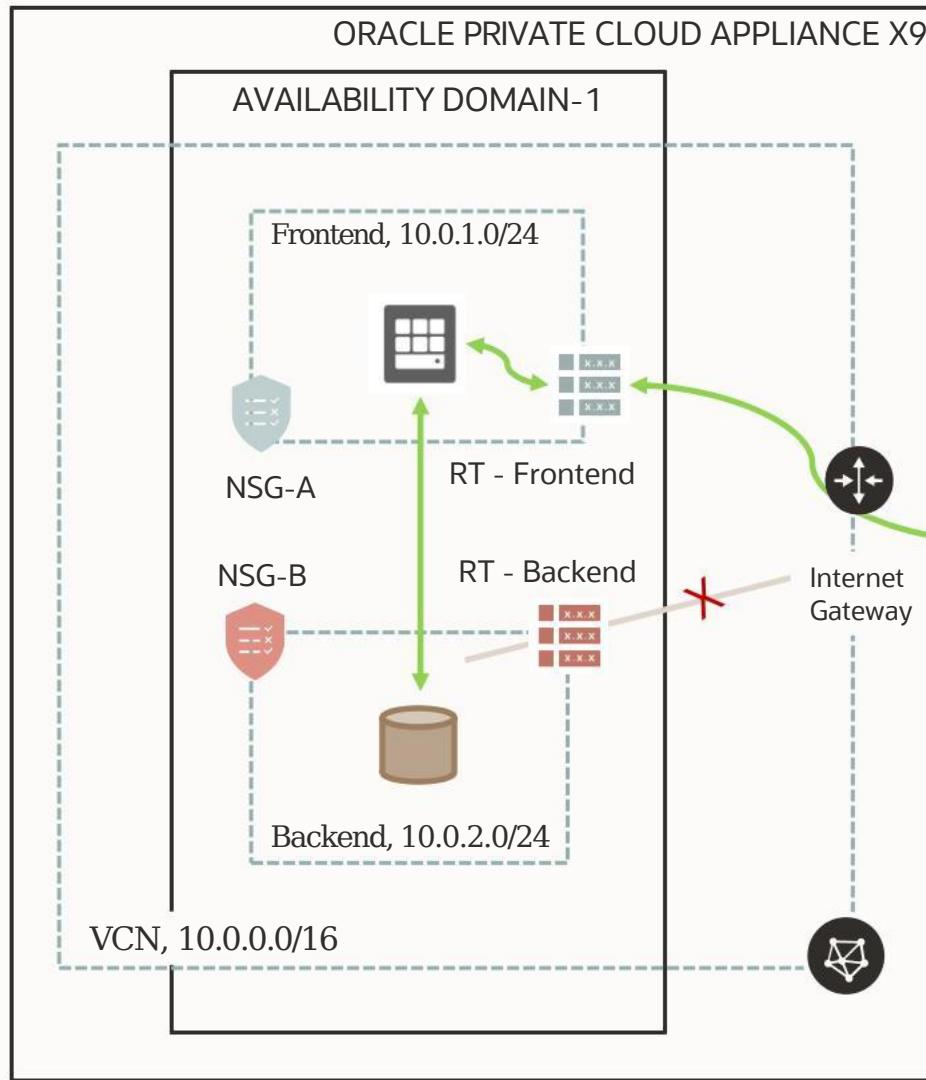


# VCN Definitions

- Subnets can have one Route Table and multiple Security Lists associated to it
- Route table defines what can be routed out of VCN
- Private subnets are recommended to have individual route tables to control the flow of traffic outside of VCN
- All hosts within a VCN can route to all other hosts in a VCN (no local route rule required)
- Security Lists manage connectivity north-south (incoming/outgoing VCN traffic) and east-west (internal VCN traffic between multiple subnets)
- PCA-X9 follows a white-list model (i.e. you must manually specify whitelisted traffic flows). By default, things are locked down
- Instances cannot communicate with other instances in the same subnet, until you permit them to!
- Oracle recommends using NSGs instead of SLs because NSGs let you separate the VCN's subnet architecture from your application security requirements



# VCN Deployment Architecture



Destination CIDR	Route Target
0.0.0.0/0	Internet Gateway

Type	CIDR	Protocol	Source Port	Dest Port
Stateful	Ingress	0.0.0.0/0	TCP	All 80
Stateful	Egress	NSG-B	TCP	All 1521

Destination CIDR	Route Target
0.0.0.0/0	NAT/ Service gateway /DRG

Type	CIDR	Protocol	Source Port	Dest Port
Stateful	Ingress	NSG-A	TCP	All 1521
Stateful	Egress		All	All

# ZFS Storage Management

Super-User@ovcasn01r1: Sun St... X +

Not secure | <https://localhost:215/#configuration/network>

For quick access, place your favorites here on the favorites bar. [Manage favorites now](#)

Super-User@ovcasn01r1 LOGOUT HELP

ORACLE ZFS STORAGE ZS7-2

Configuration Maintenance Shares Status Analytics

SERVICES STORAGE NETWORK SAN CLUSTER USERS PREFERENCES SETTINGS ALERTS

Network Configuration Addresses Routing

REVERT APPLY

**Devices** Total: 9

- Motherboard igb0 1Gb (full)
- PCIe 4 i40e2 40Gb (full)
- i40e3 40Gb (full)
- PCIe 5 i40e4 1Gb (full)
- i40e5 1Gb (full)
- i40e6 link down
- i40e7 link down
- PCIe 8 i40e0 40Gb (full)
- i40e1 40Gb (full)

**Datalinks** Total: 22

- Management\_vNIC1 vnic1, via i40e4
- Management\_vNIC2 vnic2, via i40e5
- Storage\_vNIC VLAN 3093, via vnic3, Custom MTU(9000), via aggr1
- Storage\_vNIC\_3073 VLAN 3073, via vnic4, via aggr1
- Storage\_vNIC\_3074 VLAN 3074, via vnic5, via aggr1
- Storage\_vNIC\_3075 VLAN 3075, via vnic6, via aggr1
- Storage\_vNIC\_3076 VLAN 3076, via vnic7, via aggr1
- Storage\_vNIC\_3077 VLAN 3077, via vnic8, via aggr1
- Storage\_vNIC\_3078 VLAN 3078, via vnic9, via aggr1
- Storage\_vNIC\_3079 VLAN 3079, via vnic10, via aggr1
- Storage\_vNIC\_3080 VLAN 3080, via vnic11, via aggr1
- Storage\_vNIC\_3081 VLAN 3081, via vnic12, via aggr1
- Storage\_vNIC\_3082 VLAN 3082, via vnic13, via aggr1
- Storage\_vNIC\_3083 VLAN 3083, via vnic14, via aggr1
- Storage\_vNIC\_3084 VLAN 3084, via vnic15, via aggr1
- Storage\_vNIC\_3085 VLAN 3085, via vnic16, via aggr1
- Storage\_vNIC\_3086 VLAN 3086, via vnic17, via aggr1
- Storage\_vNIC\_3087 VLAN 3087, via vnic18, via aggr1

**Interfaces** Total: 5

- Management\_Interface IPv4 static, 192.168.4.100/24, via vnic1, vnic2
- Storage\_Interface IPv4 static, 192.168.40.1/24, via vnic3
- i40e4 IPv4 static, 192.168.4.1/24, via i40e4
- vnic1 IPv4 static, 0.0.0.0/0, via vnic1
- vnic2 IPv4 static, 0.0.0.0/0, via vnic2

# Storage Pools

Sun  
ORACLE ORACLE ZFS STORAGE ZS7-2 Super-User@ovcasn01r1 LOGOUT HELP

Configuration Maintenance Shares Status Analytics

SERVICES STORAGE NETWORK SAN CLUSTER USERS PREFERENCES SETTINGS ALERTS

About Storage Configuration

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

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

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

**Available Pools**

HOST : POOL	DATA PROFILE	LOG PROFILE	STATUS	ERRORS ENCRYPTED
ovcasn01r1:OVCA_POOL	Mirrored	Mirrored log	Degraded	0
ovcasn02r1:VM_Data_Pool	Mirrored	Mirrored log	Online	0

**Allocation**

Pool Name: OVCA\_POOL  
Data Profile: Mirrored  
Log Profile: Mirrored log  
Pool Status: Degraded  
Data Errors: No known persistent errors  
Scrub Schedule: 30 days  
Scrub Status: Scrub completed: 0 errors  
2023-1-31 06:27:44 (10h48m)  
**SCRUB**

**Device Status**

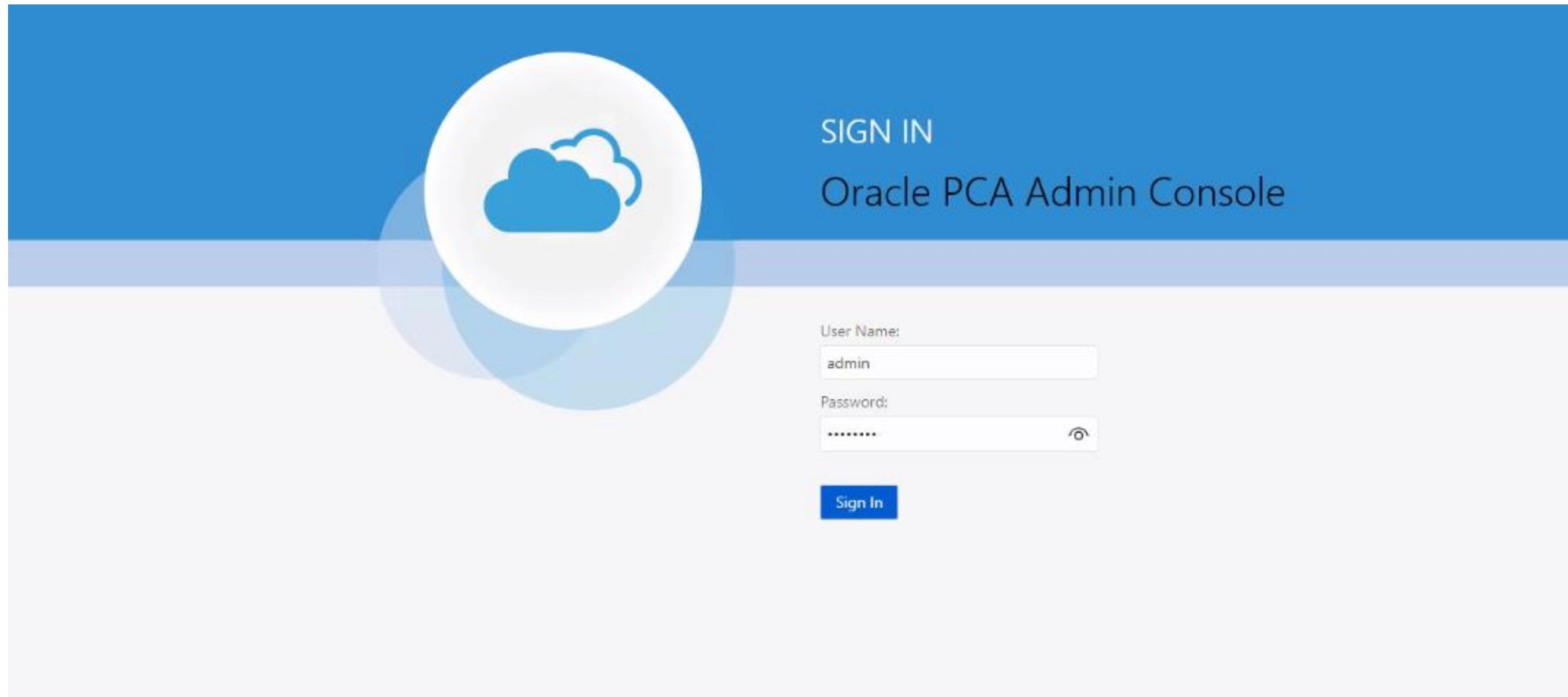
A device in a replicated configuration could not be opened. The pool is no longer providing the configured level of replication. Attach or replace the missing device.

DEVICE	TYPE	STATE (DETAILS)
2214NMQ80P-HDD 6	Data	Faulted (Active problem)
2214NMQ80P-HDD 11	Data	Hot Spare (for HDD 6)

**Allocation Data**

Data	142T
Reserve	147T
Spare	32.1T
Data + Reserve	18 disks
Spare	2 disks
Log	2 disks
Cache	2 disks
Meta	0 disks

# PCA Admin Console



# Networking Configurations

For quick access, place your favorites here on the favorites bar. [Manage favorites now](#)



ORACLE®  
PCA Admin Console

0

## Quick Launch



Hardware View



Network Environment



Password Management

# Network Setup

ORACLE  
PCA Admin Console Open OVM Manager... 

## Network Environment

Changes to the Network Environment configuration data requires entering the PCA Admin Password before selecting the 'Apply Changes' button.

Management Nodes Data Center Network DNS

**Management Node 1**

\* IP Address  \* Host Name

**Management Node 2**

\* IP Address  \* Host Name

**Management Virtual IP Address**

\* IP Address

↓

\* PCA Admin Password(Required for changes)  Reset Apply Changes

# Network Setup – DNS, Netmask, Default Gateway

ORACLE  
PCA Admin Console

Open OVM Manager...

## Network Environment

Changes to the Network Environment configuration data requires entering the PCA Admin Password before selecting the 'Apply Changes' button.

Management Nodes Data Center Network **DNS**

Management Network VLAN  5

\* Domain Name: brunswick.com

\* Netmask: 255.255.255.192

\* Default Gateway: 10.194.72.1

\* NTP: 10.4.0.54

\* PCA Admin Password(Required for changes)

Reset **Apply Changes**

This screenshot shows the 'Network Environment' configuration page in the Oracle PCA Admin Console. The 'Data Center Network' tab is selected. The 'Management Network VLAN' is set to VLAN 5. The 'Domain Name' is set to 'brunswick.com'. The 'Netmask' is set to '255.255.255.192'. The 'Default Gateway' is set to '10.194.72.1'. The 'NTP' server is set to '10.4.0.54'. A note at the top states that changes require entering the PCA Admin Password before applying. At the bottom, there is a password field for the PCA Admin Password and two buttons: 'Reset' and 'Apply Changes'.

# Networking DNS

ORACLE®  
PCA Admin Console

Open OVM Manager...

## Network Environment

Changes to the Network Environment configuration data requires entering the PCA Admin Password before selecting the 'Apply Changes' button.

Management Nodes Data Center Network **DNS**

\* DNS Server 1   
DNS Server 2   
DNS Server 3   


\* PCA Admin Password(Required for changes)  **Reset** **Apply Changes**

# OVM Manager

For quick access, place your favorites here on the favorites bar. [Manage favorites now](#)

ORACLE VM Manager

Logged in as: itcadmin [Logout](#) [Settings](#) [Help](#)

Health Servers and VMs Repositories Networking Storage Reports and Resources Jobs

Name	Tag(s)	Keymap	Virtual IP	Master Server	Pool File System	Secure VM Migrate	Description
Rack1_ServerPool		en-us			Pool filesystem for Rack1_ServerP...	Yes	

 Job Summary:  0 Total Jobs  0 Pending  0 In Progress  0 Failed  0 Aborted  0 Complete

# Compute Nodes Options

ORACLE VM Manager

Health Servers and VMs **Repositories** Networking Storage Reports and Resources Jobs

View ▾ Perspective: Virtual Machines ▾

Name	Status	Tag(s)	Event Severity	Server	Max. Memory (MB)	Memory (MB)	Max. Processors	Processors	Keymap	Operating System
vlasgapp281502p	Running		Informational	ovcacn07r1	16384	16384	2	2	en-us	Oracle Linux 5
vlasgapp284802n	Running		Informational	ovcacn07r1	16384	16384	2	2	en-us	Oracle Linux 5
<b>vlasgapp288301n</b>	Running		Informational	ovcacn07r1	24576	24576	2	2	en-us	Oracle Linux 7
vlasgar	Edit...		Informational	ovcacn07r1	24576	24576	4	4	en-us	Red Hat Enterprise Linux 7
vlasgar	Delete		Informational	ovcacn07r1	16384	16384	2	2	en-us	Oracle Linux 5
vlasgar	Start		Informational	ovcacn07r1	16384	16384	2	2	en-us	Oracle Linux 5
vlasgdt	Stop		Informational	ovcacn07r1	8192	8192	1	1	en-us	Oracle Linux 5
vlmerdl	Launch Console		Informational	ovcacn07r1	49152	49152	2	2	en-us	Red Hat Enterprise Linux 7

Rows Selected: 1

Right-click context menu for **vlasgapp288301n**:

- Launch Console
- Launch Serial Console
- Restart
- Kill
- Suspend
- Resume
- Export to OCI...
- Migrate or Move...
- Clone...
- Export to Virtual Appliance...
- Manage Clone Customizers...
- Send VM Messages...
- Display VM Config File Content...
- Display VM Hierarchy Viewer...
- Display Events...
- Generate Report

# Compute Nodes Setup Details

ORACLE VM Manager

Logged in as: itcadmin Logout Settings Help

Health Servers and VMs Repositories Networking Storage Reports and Resources Jobs

View Perspective: Virtual Machines Name Status Tag(s) Event Severity Server Max. Memory (MB) Export to OCI... Max. Processors Processors Keypad Operating System

vlasgapp281502p	Running	Informational	ovcacn07r1	16384	16384	2	2	en-us	Oracle Linux 5
vlasgapp284802n	Running	Informational	ovcacn07r1	16384	16384	2	2	en-us	Oracle Linux 5
vlasgapp288301n	Running	Informational	ovcacn07r1	24576	24576	2	2	en-us	Oracle Linux 7

Configuration Networks Disks

Name: vlasgapp288301n Max. Memory (MB): 24576 Huge Pages: No  
Status: Running Memory (MB): 24576 Repository for Configuration File: Prod\_Repo\_02  
Operating System: Oracle Linux 7 Priority: 50 Boot Order: Disk  
Keypad: en-us Mouse Type: OS Default Network Boot Path:  
Max. Processors: 2 Domain Type: Xen HVM PV Drivers Restart Action On Crash: Restart  
Processors: 2 Start Policy: Use Pool Policy  
Processor Cap: 100 High Availability: No  
ID: 0004fb0000060000b464cb11f0016b46  
Origin: http://amehlmgmt01.ehl.pri:8001/ehlappst07\_PCAMOVE.ova  
Description: A virtual machine  
Config File Absolute Path: /dev/mapper/3600144f0e2b554040000627a9af90002/VirtualMachines/0004fb0000060000b464cb11f0016b46/vm.cfg  
Config File Mounted Path: /OVS/Repositories/0004fb00000300083aa8a45d558165c/VirtualMachines/0004fb0000060000b464cb11f0016b46/vm.cfg

vlasgapp288302p	Running	Informational	ovcacn07r1	24576	24576	4	4	en-us	Red Hat Enterprise Linux 7
vlasgapp590001n	Running	Informational	ovcacn07r1	16384	16384	2	2	en-us	Oracle Linux 5
vlasgapp590002n	Stopped	Informational	ovcacn07r1	16384	16384	2	2	en-us	Oracle Linux 5
vlasgdb547401p	Running	Informational	ovcacn07r1	8192	8192	1	1	en-us	Oracle Linux 5

Rows Selected 1

Job Summary: 0 Total Jobs 0 Pending 0 In Progress 0 Failed 0 Aborted 0 Complete

Description	Status	Progress	Message	Timestamp	Duration	Abort	Details
No data to display							

# PCA Admin

```
[root@ovcamn06rl ~]# pca-admin
Welcome to PCA! Release: 2.4.4.2
PCA> help

Documented commands (type help <topic>):
-----
add      create  deprovision  get    list    reprovision  set    start  update
backup   delete  diagnose     help   remove  rerun     show  stop

Undocumented commands:
-----
EOF  exit  q  quit  shell

PCA> list help

Status: Failure
Error Message: Error (MISSING_TARGET_000): Missing command target for command: list. Command targets can be: ['management-node', 'iscsi-storage', 'lock', 'compute-node', 'er', 'backup-task', 'storage-profile', 'network-port', 'oci-backup', 'uplink-port', 'network-switch', 'mgmt-switch-port', 'update-task', 'uplink-port-group', 'task', 'oci-'

PCA> list compute-node

Note: Provisioning_Status is unrelated to node status in Oracle VM Manager Web UI.

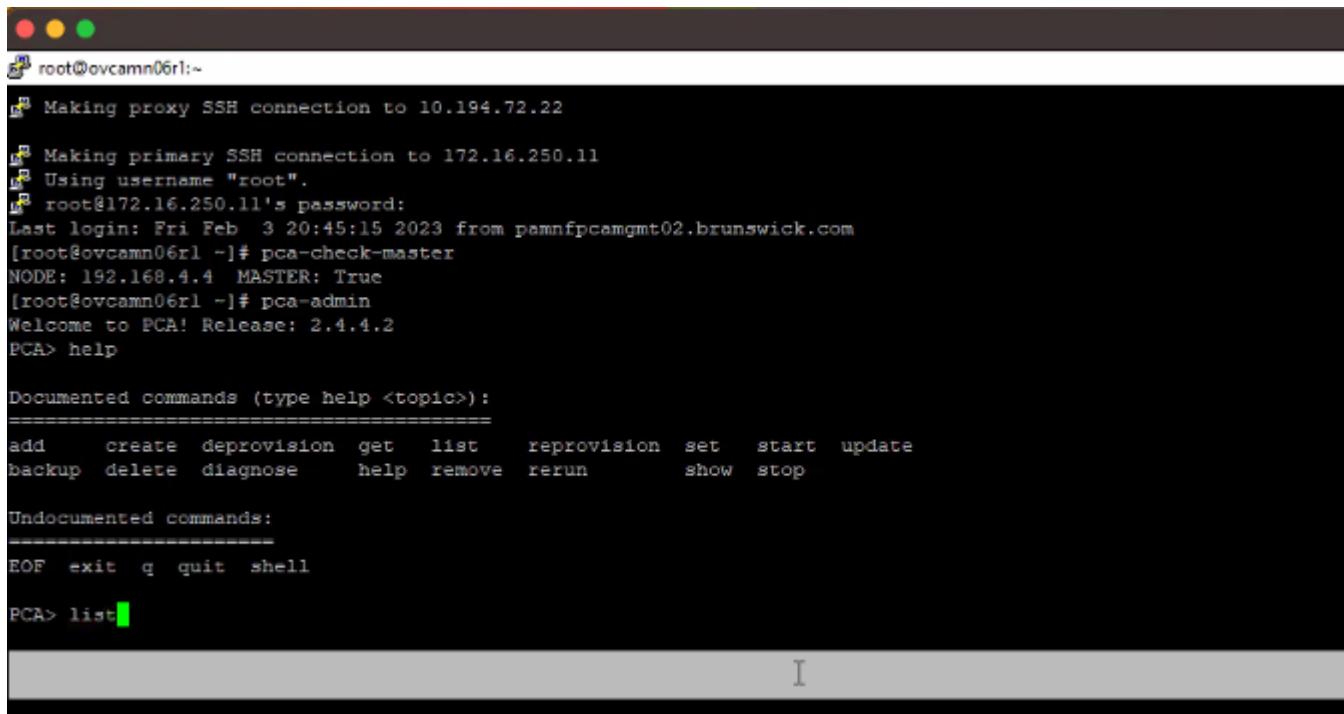
Compute_Node  IP_Address  Provisioning_Status  ILOM_MAC          Provisioning_State
-----
ovcacin09rl  192.168.4.7  RUNNING           a8:69:8c:06:59:9f  running
ovcacin08rl  192.168.4.6  RUNNING           a8:69:8c:06:50:fb  running
ovcacin07rl  192.168.4.5  RUNNING           a8:69:8c:06:52:e3  running

3 rows displayed
→
Status: Success

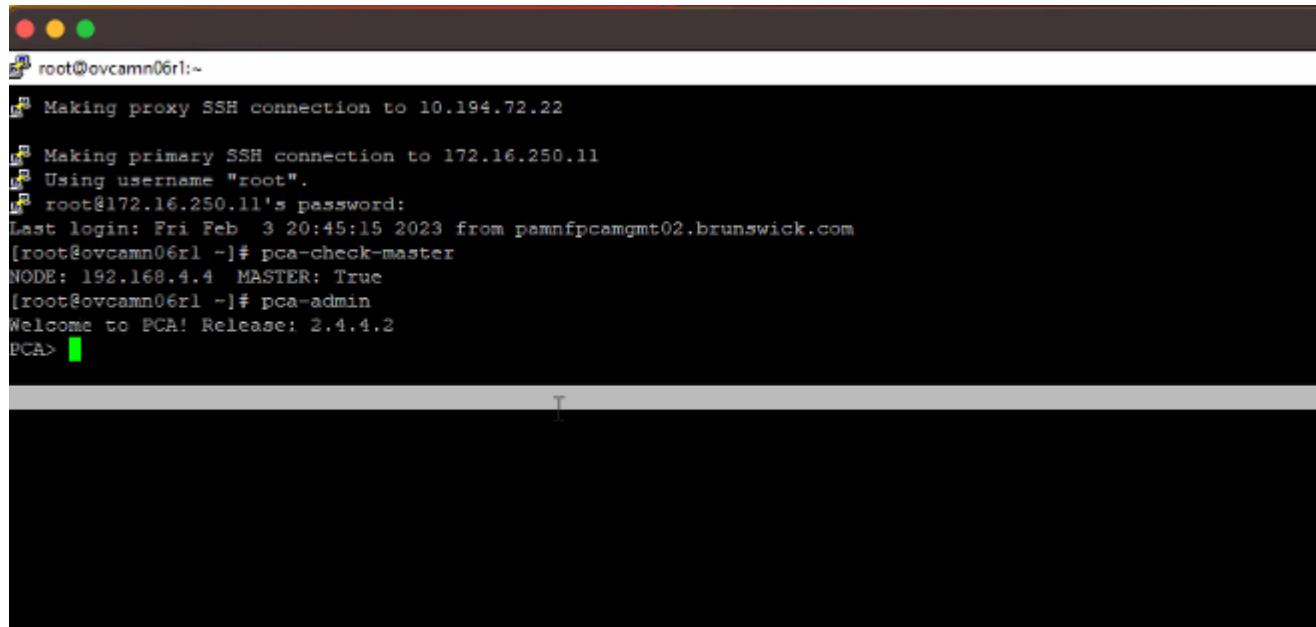
PCA> █
```

# Command Line Interface

## pca-check-master



```
root@ovcamn06rl:~  
Making proxy SSH connection to 10.194.72.22  
Making primary SSH connection to 172.16.250.11  
Using username "root".  
root@172.16.250.11's password:  
Last login: Fri Feb  3 20:45:15 2023 from pamnfpcamgmt02.brunswick.com  
[root@ovcamn06rl ~]# pca-check-master  
NODE: 192.168.4.4 MASTER: True  
[root@ovcamn06rl ~]# pca-admin  
Welcome to PCA! Release: 2.4.4.2  
PCA> help  
  
Documented commands (type help <topic>):  
=====  
add      create    deprovision   get      list      reprovision   set      start    update  
backup   delete    diagnose     help     remove   rerun      show    stop  
  
Undocumented commands:  
=====  
EOF  exit  q  quit  shell  
  
PCA> list
```



```
root@ovcamn06rl:~  
Making proxy SSH connection to 10.194.72.22  
Making primary SSH connection to 172.16.250.11  
Using username "root".  
root@172.16.250.11's password:  
Last login: Fri Feb  3 20:45:15 2023 from pamnfpcamgmt02.brunswick.com  
[root@ovcamn06rl ~]# pca-check-master  
NODE: 192.168.4.4 MASTER: True  
[root@ovcamn06rl ~]# pca-admin  
Welcome to PCA! Release: 2.4.4.2  
PCA>
```

# Diagnose ILOM

```
PCA> diagnose-ilom
*** Unknown syntax: diagnose-ilom
PCA> diagnose ilom
Checking ILOM health; please wait.

IP_Address      Status      Health_Details
-----  
192.168.4.129  Not Connected  None
192.168.4.128  Not Connected  None
192.168.4.127  Not Connected  None
192.168.4.126  Not Connected  None
192.168.4.125  Not Connected  None
192.168.4.124  Not Connected  None
192.168.4.123  Not Connected  None
192.168.4.122  Not Connected  None
192.168.4.121  Not Connected  None
192.168.4.120  Not Connected  None
192.168.4.101  OK          None
192.168.4.103  OK          None
192.168.4.102  OK          None
192.168.4.105  OK          None
192.168.4.104  OK          None
192.168.4.107  Faulty       Fri Jan 27 17:55:54 2023 System MB (Motherboard)
                           The Field Programmable Gate Array (FPGA) has detected a malfunctioning
                           component and has powered-off the system. (Probability:100,
                           UUID:432b473a-8409-c087-b374-ff4laa1b0ea9, Resource:/SYS/MB, Part
                           Number:8207753, Serial Number:465136J+2152GA00BP, Reference
                           Document:http://support.oracle.com/msg/SPENV-8000-D1)  
-----  
192.168.4.106  OK          None
192.168.4.109  Not Connected  None
192.168.4.108  Not Connected  None
192.168.4.112  Not Connected  None
192.168.4.113  Not Connected  None
192.168.4.110  Not Connected  None
192.168.4.111  Not Connected  None
192.168.4.116  Not Connected  None
192.168.4.117  Not Connected  None
192.168.4.114  Not Connected  None
192.168.4.115  Not Connected  None
192.168.4.118  Not Connected  None
192.168.4.119  Not Connected  None  
-----  
29 rows displayed
```

Status: Success

```
PCA>
```

# Diagnose Hardware RACK

```
PCA> diagnose hardware rack

Hostname          IP_Address    Last_Seen      Pingable   Status    Type
-----          -----        -----      -----      -----    -----
ovcasn01rl       192.168.4.1    02-03-2023 21:09:05 True      OK      zfs
ilom-ovcasn01rl  192.168.4.101  02-03-2023 21:09:05 True      OK      zfs-ilom
ilom-ovcasn02rl  192.168.4.102  02-03-2023 21:09:05 True      OK      zfs-ilom
ilom-ovcamn05rl  192.168.4.103  02-03-2023 21:09:05 True      OK      mn-ilom
ilom-ovcamn06rl  192.168.4.104  02-03-2023 21:09:05 True      OK      mn-ilom
ilom-ovcacr07rl  192.168.4.105  02-03-2023 21:09:05 True      OK      ilom
ilom-ovcacr08rl  192.168.4.106  02-03-2023 21:09:05 True      OK      ilom
ilom-ovcacr09rl  192.168.4.107  02-03-2023 21:09:05 True      OK      ilom
ovcasn02rl       192.168.4.2    02-03-2023 21:09:05 True      OK      zfs
ovcasw15rl       192.168.4.202  02-03-2023 21:09:05 True      OK      cisco_leaf
ovcasw16rl       192.168.4.203  02-03-2023 21:09:05 True      OK      cisco_leaf
ovcasw22rl       192.168.4.204  02-03-2023 21:09:05 True      OK      cisco_spine
ovcasw23rl       192.168.4.205  02-03-2023 21:09:05 True      OK      cisco_spine
ovcapoPDU-Arl   192.168.4.210  02-03-2023 21:09:05 True      OK      pdu
ovcapoPDU-Brl   192.168.4.211  02-03-2023 21:09:05 True      OK      pdu
ovcasw21rl       192.168.4.230  02-03-2023 21:09:05 True      OK      cisco
ovcamn05rl       192.168.4.3    02-03-2023 21:09:05 True      OK      mn
ovcamn06rl       192.168.4.4    02-03-2023 21:09:05 True      OK      mn
ovcacr07rl       192.168.4.5    02-03-2023 21:09:05 True      OK      cn
ovcacr08rl       192.168.4.6    02-03-2023 21:09:05 True      OK      cn
ovcacr09rl       192.168.4.7    02-03-2023 21:09:05 True      OK      cn
-----
21 rows displayed

Status: Success

PCA> █
```

# Setup Details

```
[root@ovcamn06rl ~]# fwupdate list all
=====
SP
=====
ID      Product Name          System Firmware Version    ILOM Version           BIOS/OBP Version        Fallback Boot Version   XML Support
sp      ORACLE SERVER X8-2     -                   v5.1.0.20 r145377       51070400               -                   N/A

=====
CONTROLLER
=====
ID      Type      Manufacturer Model      Product Name          FW Version      BIOS Version      EFI Version      FCODE Version    Package Version  NVDATA Version   XML Support
c0      SAS       LSI Logic      0x00ce      Avago MegaRAID SAS 9361-1 4.740.00-8466 6.36.00.3    06.24.02.05    4.19.08.00      -              -              -              N/A

=====
DISKS
=====
ID      Manufacturer Model      ATA Model          Chassis Slot  Type      Media      Size(GiB) FW Version  ATA FW Ver XML Support
c0d0    SEAGATE      ST1200IN9SUN1.2T  -            -          0         sas       1118      ORAB      -          N/A
c0d1    SEAGATE      ST1200IN9SUN1.2T  -            -          1         sas       1118      ORAB      -          N/A

=====
CONTROLLER
=====
ID      Type      Manufacturer Model      Product Name          FW Version      BIOS Version      EFI Version      FCODE Version    Package Version  NVDATA Version   XML Support
c1      NET       Mellanox      0x1019      Oracle Dual Port 100Gb Ro -          -              -              -              -              -              -              N/A

=====
CONTROLLER
=====
ID      Type      Manufacturer Model      Product Name          FW Version      BIOS Version      EFI Version      FCODE Version    Package Version  NVDATA Version   XML Support
c2      NET       Broadcom     0x16d9      Oracle Dual Port 10Gb/25G -          -              -              -              20.08.01.17    -              N/A

=====
CONTROLLER
=====
ID      Type      Manufacturer Model      Product Name          FW Version      BIOS Version      EFI Version      FCODE Version    Package Version  NVDATA Version   XML Support
c3      NET       Intel        0x1533      Intel(R) I210 Gigabit Net -          -              -              -              80000690      -              N/A
[root@ovcamn06rl ~]#
```

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