

ORACLE

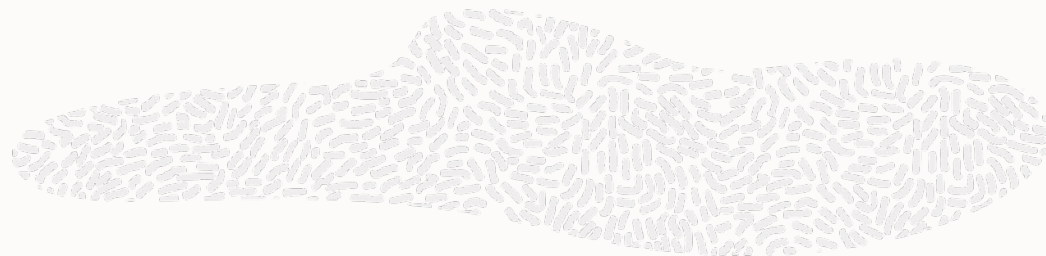
私有云一体机PCA X9 —OCI 在私有云的完美实现

邵莹华

April, 2022



并非每个组织或工作负载都可以使用公有云



数据主权和安全

- 法规或政策要求数据必须位于本地
- 以特定方式保护数据的要求



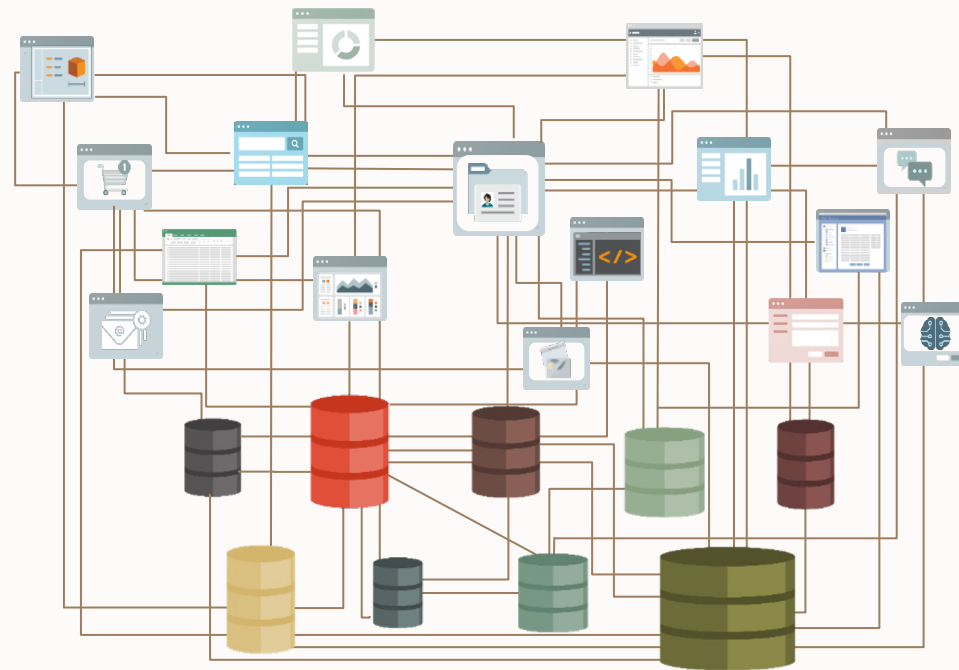
响应时间

- 真实世界的系统需要低延迟
- 很难将一个系统与其他系统分开



风险感知

- 对多租户云的担忧
- 对云提供商访问数据的担忧



Oracle基础设施和云战略-多样的云部署模式

Private Cloud

PCA



- 客户数据中心
- 购买
- 客户管理

Cloud @ Customer

PCC



- 在客户数据中心
- 订阅
- Oracle 管理

Public Cloud

OCI

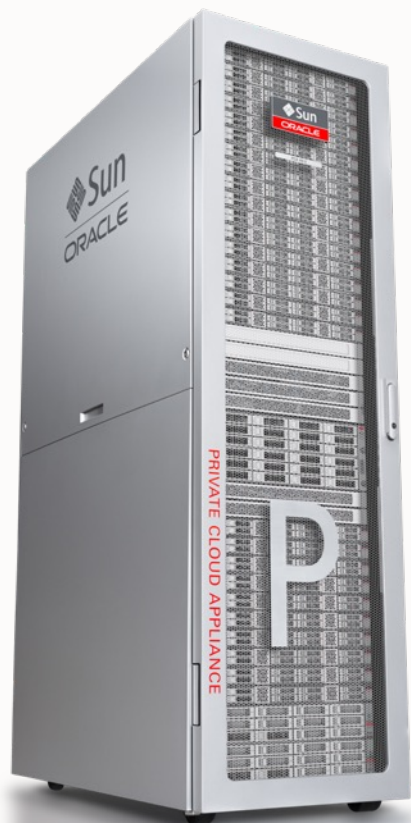


- Oracle 云
- 订阅
- Oracle 管理

面向各种负载

本地云和集成系统

Oracle's On-premise Platform of Choice



Applications and middleware

- Private Cloud Appliance
- Private Cloud at Customer

Database

- Exadata
- Exadata Cloud at Customer

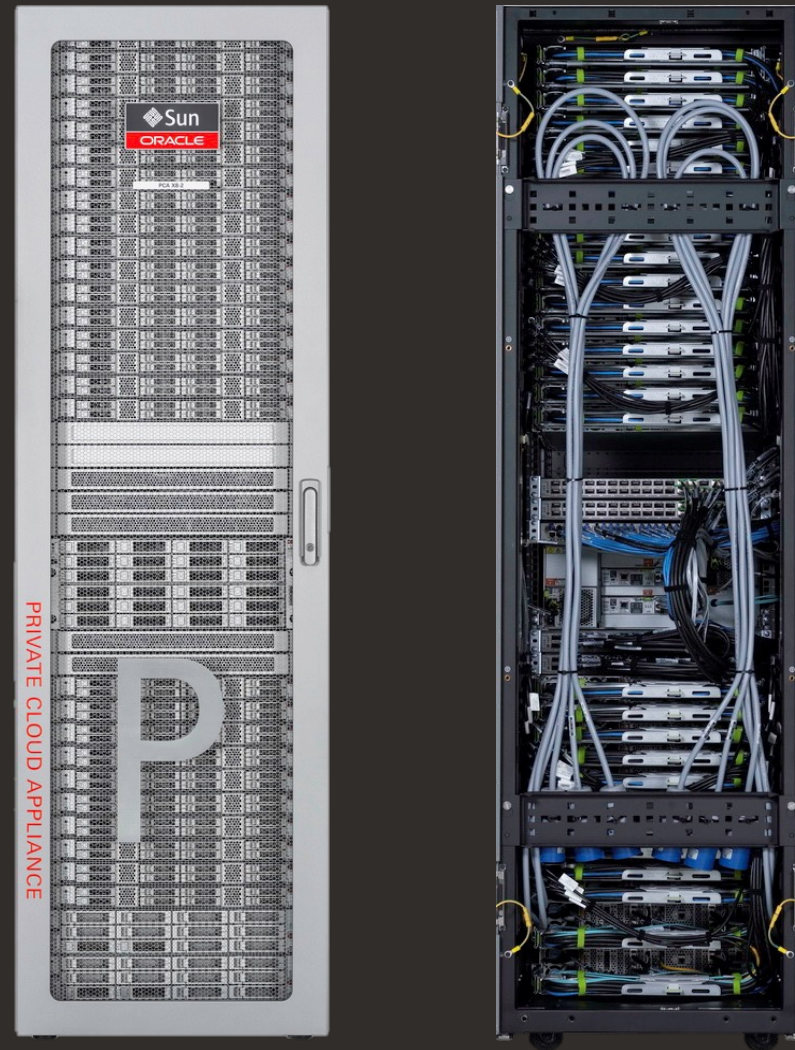
将最高性能的数据库和应用程序/中间件平台连接和管理在一起!



回顾前一代的PCA

Oracle Private Cloud Appliance X8

- 在几分钟内快速配置应用和数据库
- 随附虚拟化技术，高效的软件许可助力总拥有成本降低 30-50%
- 整合任意 Linux、Windows 和 Solaris 工作负载（包括非 Oracle 工作负载）
- 与 Oracle Cloud 以及其它 ES 使用相同的 Oracle Enterprise Manager 作为管理工具
- 开箱即用的基础架构云平台（IaaS）和数据库云平台（DBaaS）
- 第 6 代 Private Cloud Appliance X8-2
 - 速度比 X7 高出 45%
 - 网络主干网达 100 GbE
 - 集成式 ZS7-2 – 存储容量高出 17 倍



数小时即完成启动到生产！

PCA X8 内置完整的私有云堆栈

- Oracle VM Server for x86
 - High performance and scalability
 - Broad guest operating system support
 - All Oracle applications are fully certified on Oracle VM Server for x86
 - Cost-effective, enterprise-quality support available
- Oracle VM Templates
 - Rapid enterprise application deployment
 - Assembled and tested by Oracle
- Oracle VM Manager
 - VM and hypervisor (Xen) resource management
 - VM network / storage configuration
- Oracle Linux
 - Zero-downtime kernel, hypervisor and user space updates with Ksplice
 - Optimized for Oracle
- PCA Controller
 - Orchestrated Hardware Bringup
 - Inserts all servers in an Oracle VM Manager server pool
 - Configures external networking (set IP address, etc.)
 - Performs periodic back-up of Private Cloud Appliance
- Enterprise Manager
 - Cloud management (self service, metering and chargeback, etc.) for one or multiple PCAs
 - Hardware resource management
 - Database, middleware, apps management
 - Software management, configuration and compliance management
 - Plugin with Oracle VM Manager for full stack management

PCA X9-全新的设计理念

Oracle Private Cloud Appliance X9

与上一代产品相比的进步

兼容 OCI

- APIs, UIs, Console
- 基础架构和身份管理
- 安全模型和服务
- 嵌入式备份和数据保护



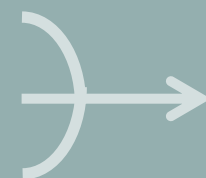
提高可扩展性

- CPU 核增加 33%
- 2.6 倍存储容量
- 2.5 倍存储带宽



开源软件

- KVM 虚拟化
- Grafana 与 Prometheus 用于监控和可视化
- Terraform 脚本自动化基础架构配置



PCA X9-2

重要规格参数

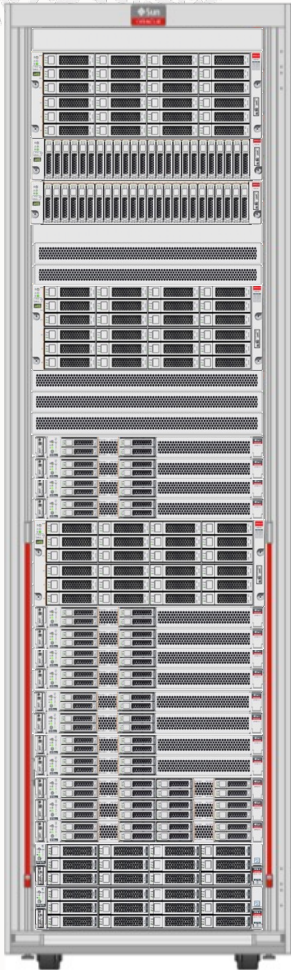
新的云基础架构堆栈

- 兼容 OCI
- 类似 OCI 的管理界面
- Hypervisor – KVM

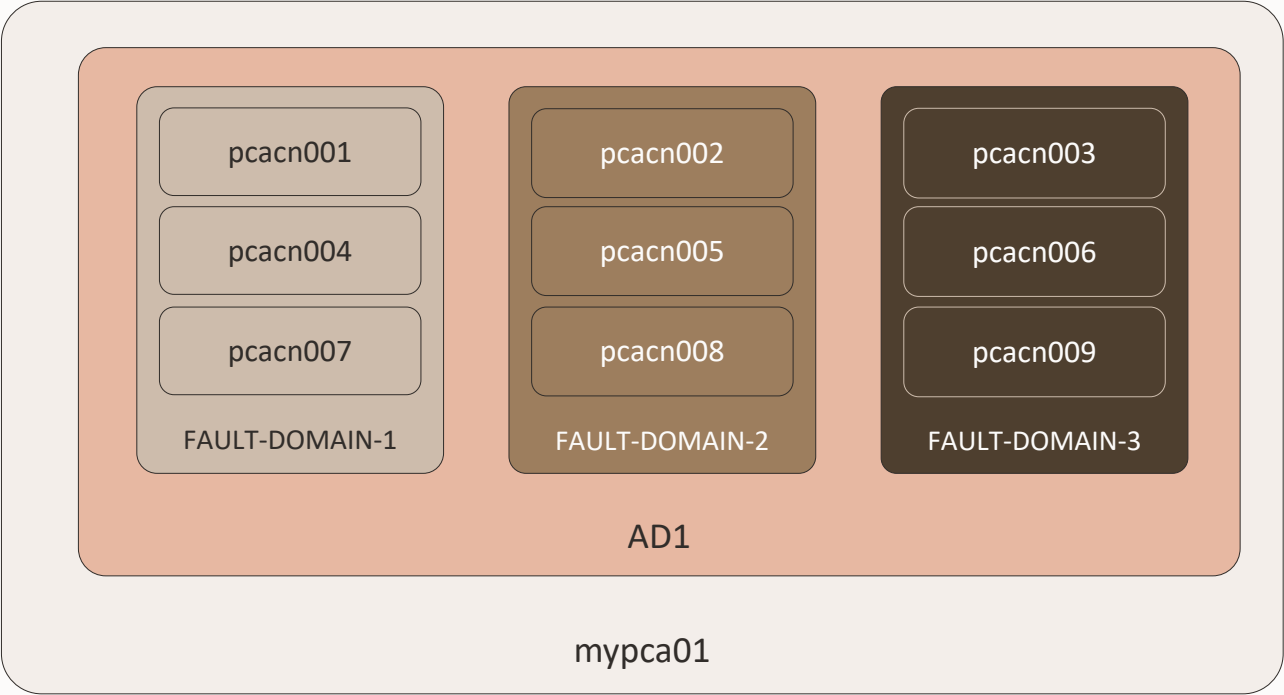
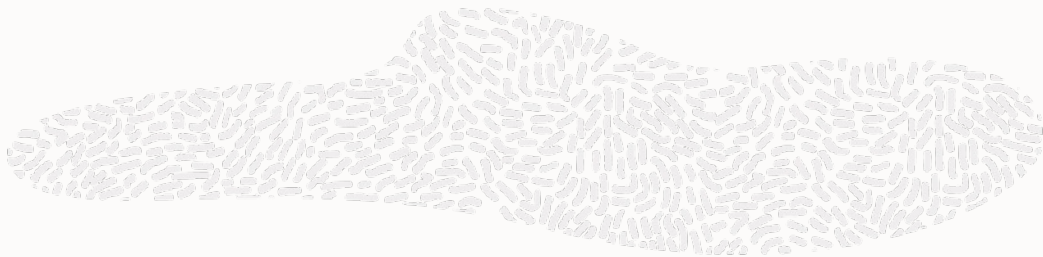
最新的硬件

- X9-2 servers (计算节点)
 - (2) Intel® Xeon® Platinum 8358 32-core 2.6 GHz processors
 - 1 TB - (16) 64 GB DDR4-3200 DIMMs
- ZS9-2 mid-range storage system
 - 180TB Usable in Base (RAID1)
 - 140TB for customer use, 40TB for SYS use
- 100 Gb networking

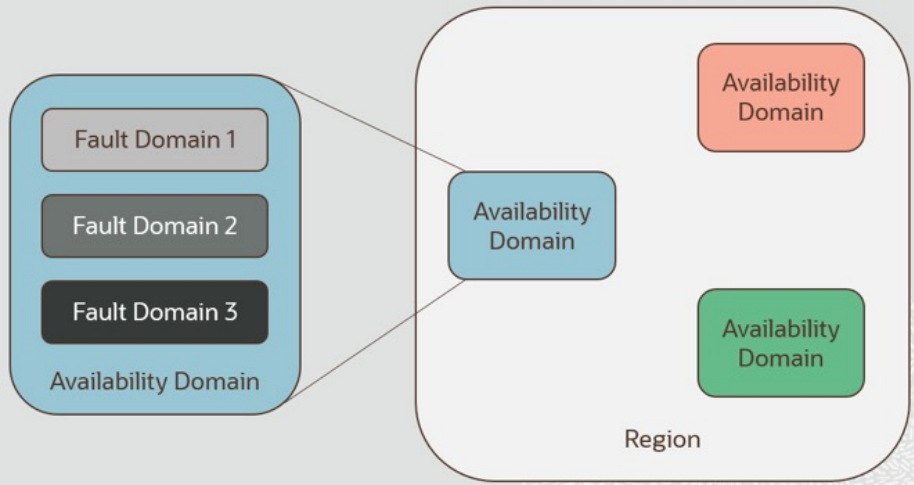
OCI Features	
Tenancies	Up to 8
IaaS Services	
Compute Shapes	Fixed VM Shapes
Storage	Block, File, Object
Network	VCN, Gateways
Fault Domains	3
OCPUs	Up to 1080
Service Enclave - servers	3
Customer Enclave – servers	3 – 20
Storage Capacity (Raw)	360 TB – 17.3 PB



PCA X9 Architecture In Practice



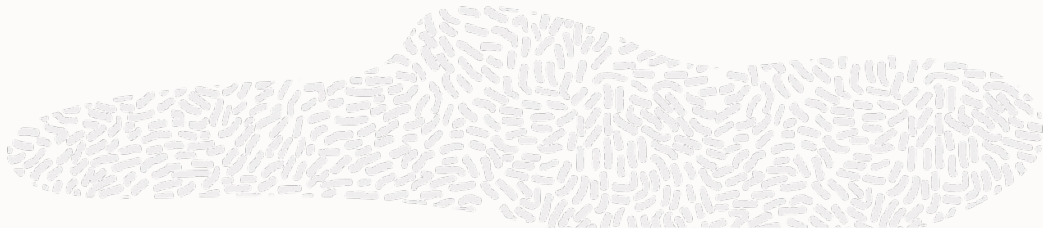
PCA



OCI



PCA上的IaaS 服务



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



支持的VM Shapes

VM Shapes

- Fixed 1:16 ratio (OCPU: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	✗

Private Cloud Appliance X9 – Guest OS 支持矩阵

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		✓

System Network Interfaces

Customer Data Center Interface (Layer 3)

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

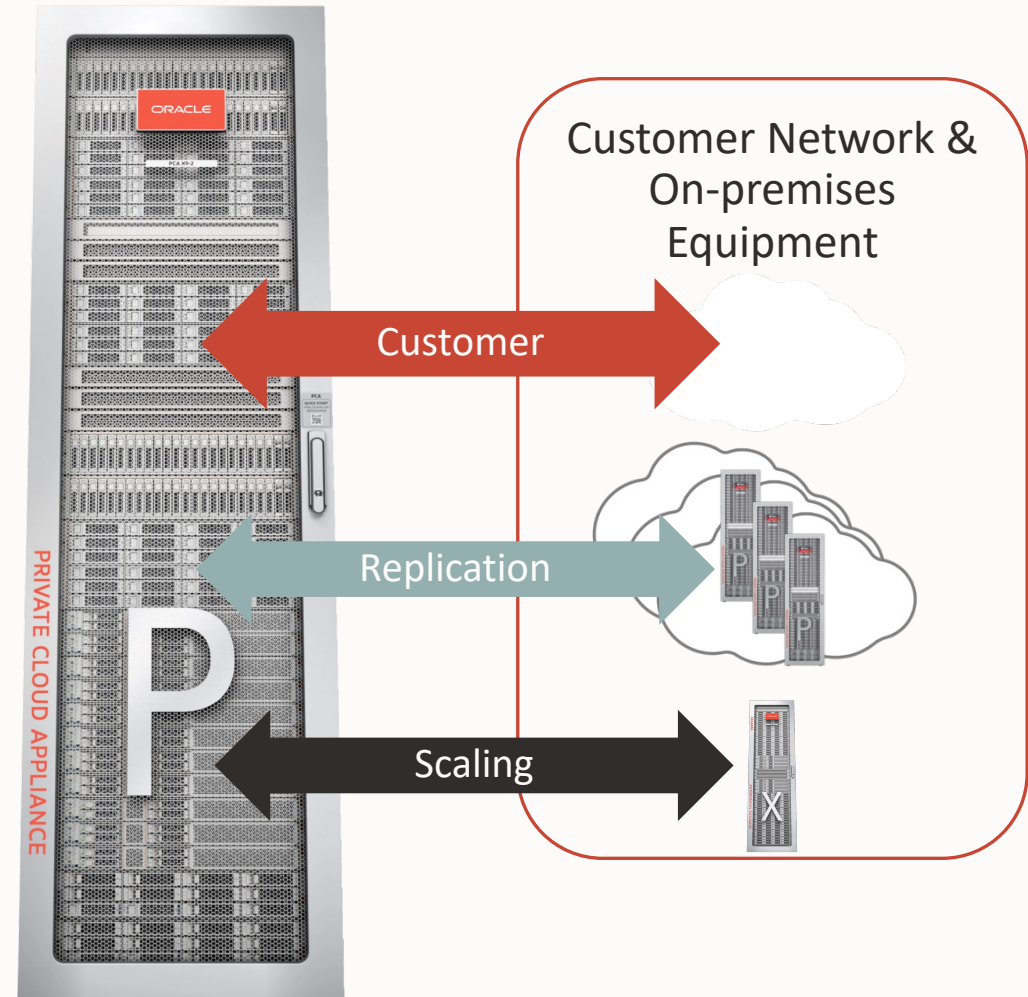
Replication

- Backup, Disaster Recovery

Availability Domain scaling

- Connectivity to Exadata and Cloud@Customer

Exadata



PCA X9-2 : 管理和用户界面

PCA 管理和监控

系统管理员

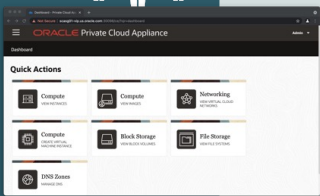
- 机柜
- 计算
- 网络
- 存储



兼容 OCI

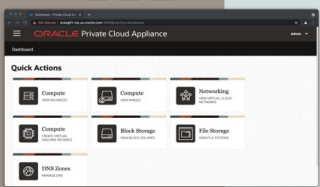
云用户

- 部署
 - VM, container
- 生命周期管理
 - VM, container



Tenancy Admin

- 用户
- 策略
- 服务



OKIT

- Open Source
- Docker or Vagrant container based
- Browser-based, drag-n-drop, design tool for OCI
- Visually design IaaS and then build
- Supports Terraform and Ansible
- Integrated with OCI Resource Manager

The screenshot displays the OKIT - OCI By Design web application interface. The browser tabs show 'Introduction to OKIT the OCI De...', 'OKIT - OCI By Design', and 'Oracle Architecture Center | Ora...'. The address bar is 'localhost/okit/designer'. The interface features a 'Palette' on the left with categories like Compute, Containers, Database, Gateways, and Networking. The main canvas shows a network diagram with components like 'nginx-vcn', 'nginx-public-subnet', 'nginx-lb001', 'nginx-in001', 'nginx-in002', and 'nginx-'. The diagram is enclosed in a dashed orange box labeled 'Virtual Cloud Network'. Below the diagram, there's a 'Subnet' configuration panel with a table of properties and values.

Property	Value
Virtual Cloud Network	nginx-vcn
Name	nginx-public-subnet
CIDR	10.0.0.0/24

Hide Advanced Options

Property	Value
Availability Domain	Regional
DNS Label	sn001
☐ Private	
Route Table	okit-rt001
Security List	okit-sl001
☐ IPv6 Enabled	
IPv6 CIDR	

Freeform Tags

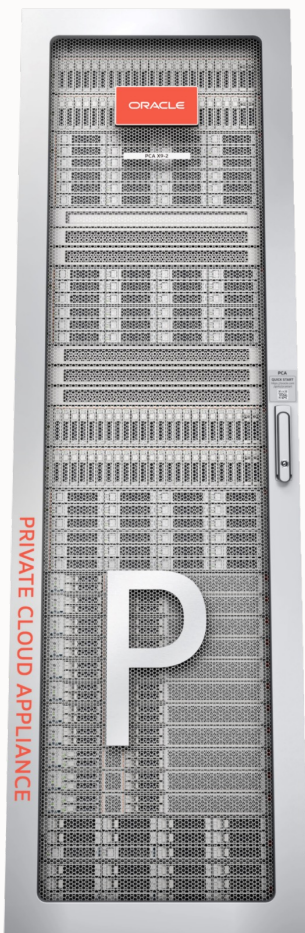
Key	Value	+
-----	-------	---

Defined Tags

Namespace	Key	Value	+
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Private Cloud Appliance X9: 像 Oracle 云基础设施一样使用



像 OCI 一样构建

- 基于容器的平台软件
- 安全地区隔云管与用户

可移植至 OCI

- 与基础架构即代码环境一致的架构模式和工具
- 开发容器化的云原生应用程序
- 应用程序和数据迁移时只需很少或无需修改

像 OCI 一样的用户体验

- 与 OCI 兼容的 API、CLI、SDK
- 与 OCI 类似的控制台

像 OCI 一样管理

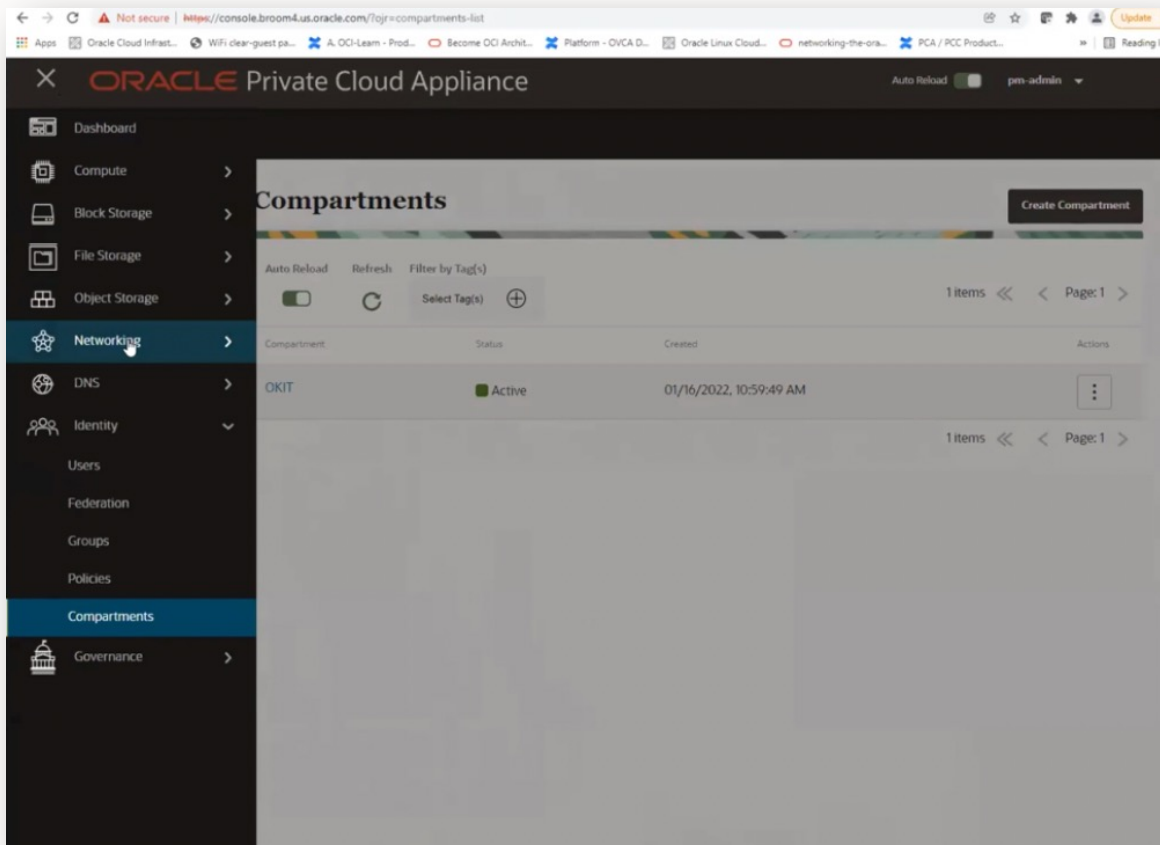
- 云原生工具:
 - Kubernetes
 - Prometheus and Grafana,
 - Terraform

像 OCI 一样升级

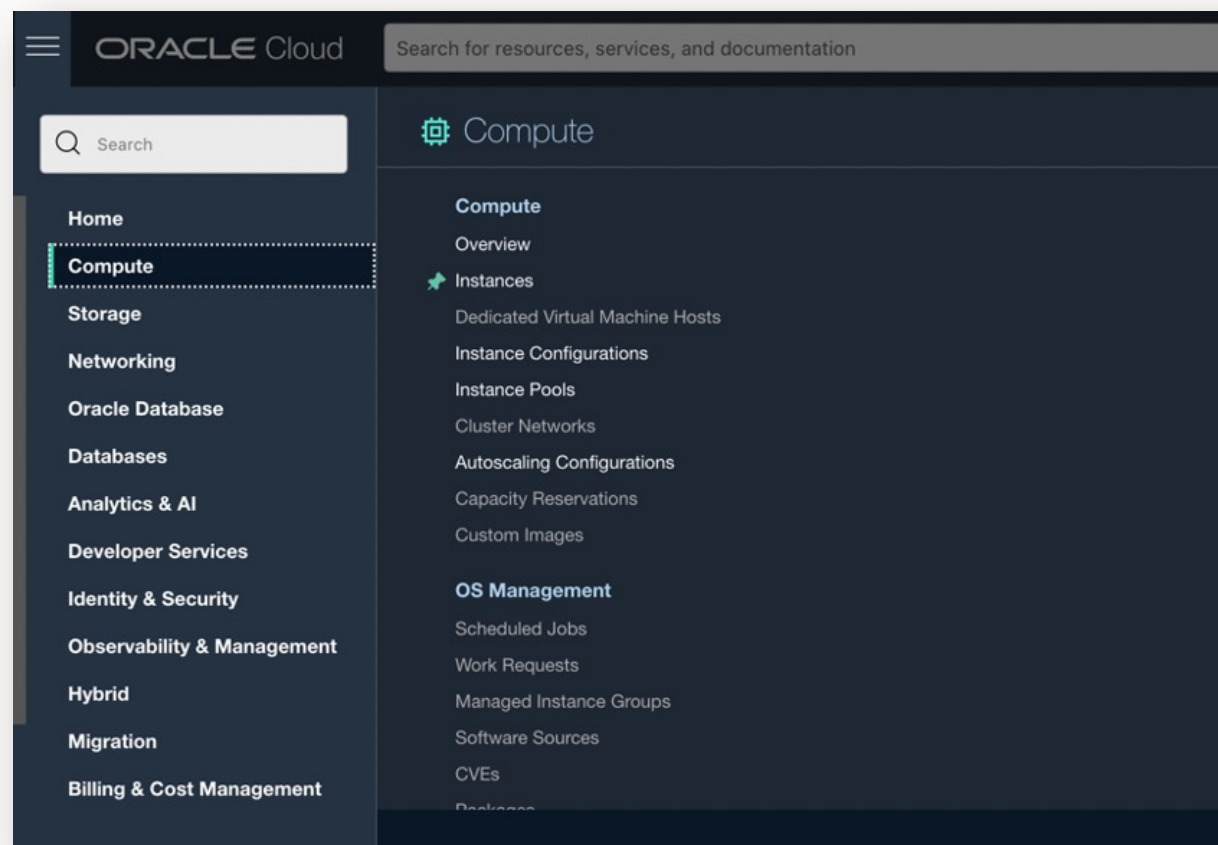
- CI/CD 方法 - 基于渠道的错误修复分发、CVE
- 所有组件的零停机升级 - 基于容器的服务提供连续可用性

所谓的“像OCI”...

PCA X9-2 用户界面

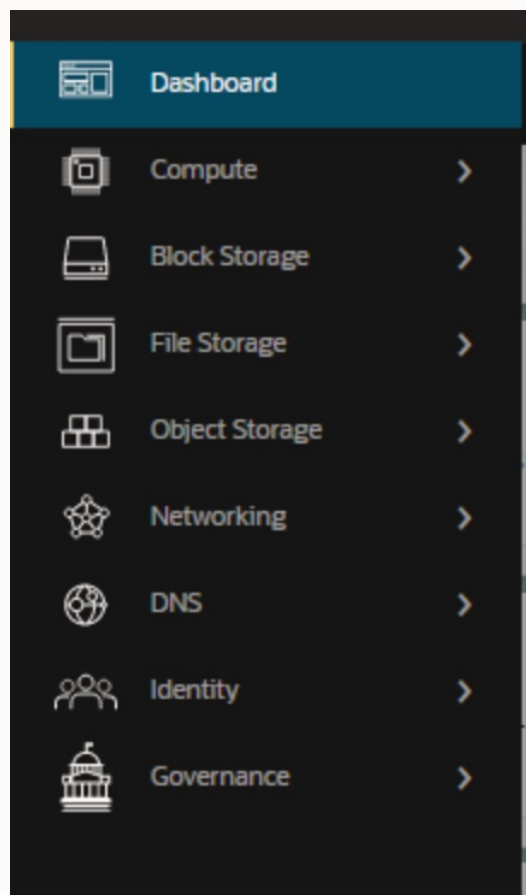


OCI 用户界面

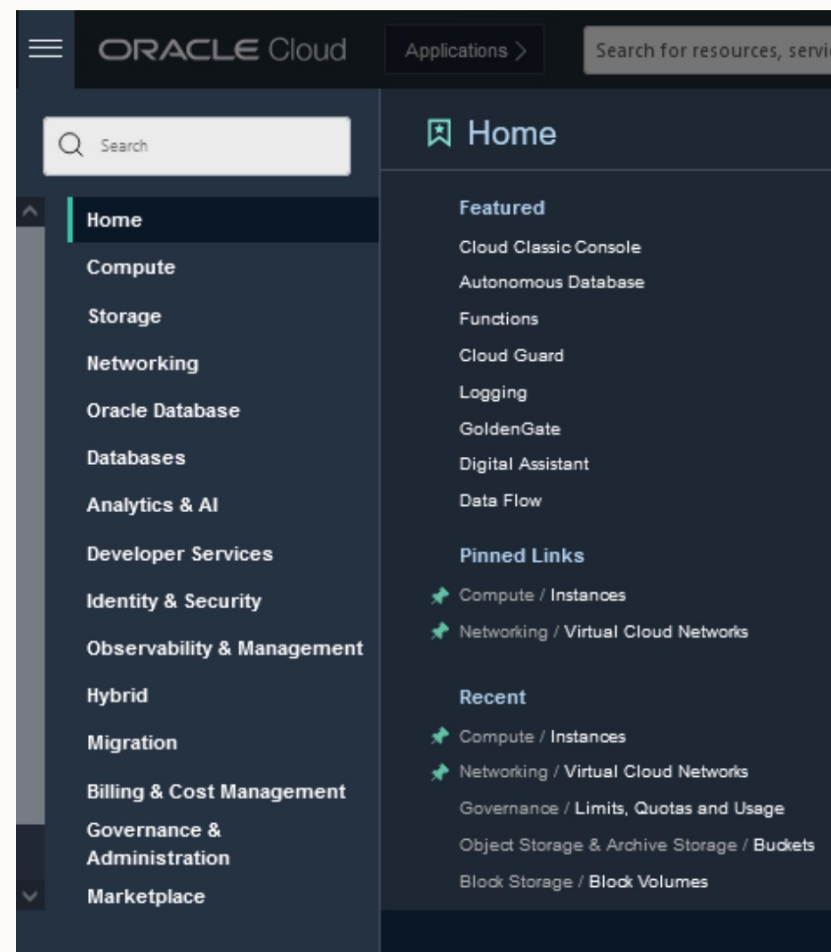


所谓的“像OCI”...

PCA X9-2 导航菜单



OCI 导航菜单



所谓的“像OCI”...

PCA X9-2 Compute Instance界面

ORACLE Private Cloud Appliance

Auto Reload admin

Dashboard / Instances

Compute

Instances

Instance Configurations

Instance Pools

Custom Images

Instances in the pca3doctenant compartment

Create Instance

Auto Reload Refresh Filter by Tag(s) Filter by Status

Select Tag(s) Any State

6 Items Page: 1

Instances	Status	Shape	Fault Domain	Created	Actions
LR-linux7	Stopped	VM.PCAStandard1.2	FAULT-DOMAIN-3	01/20/2022, 06:22:49 AM	
LR-OL7-default-import-param	Stopped	VM.PCAStandard1.2	FAULT-DOMAIN-3	01/20/2022, 07:58:32 AM	
LR-OL7-Jan25	Running	VM.PCAStandard1.2	FAULT-DOMAIN-1	01/25/2022, 07:11:46 AM	
LR-vdbench-2-jan25	Stopped	VM.PCAStandard1.2	FAULT-DOMAIN-3	01/25/2022, 06:53:11 AM	
LR-vdbench-pv	Running	VM.PCAStandard1.2	FAULT-DOMAIN-2	01/20/2022, 06:42:08 AM	
OL7-test-used-boot	Running	VM.PCAStandard1.1	FAULT-DOMAIN-1	02/15/2022, 07:39:57 AM	

6 Items Page: 1



OCI Compute Instance界面

Compute

- Overview
- Instances
- Dedicated Virtual Machine Hosts
- Instance Configurations
- Instance Pools
- Cluster Networks
- Autoscaling Configurations
- Capacity Reservations
- Custom Images

List Scope

Compartment
virdoc

Filtering

State
Any state

Capacity type

All capacity types

Availability domain

Instances in virdoc Compartment

The [Compute service](#) helps you provision VMs and bare metal instances to meet your compute and application requirements. An [instance](#) is a compute host. Choose between virtual machines (VMs) and bare metal instances. The image that you use to launch an instance determines its operating system and other software.

Create instance									
Name	State	Public IP	Private IP	Shape	OCPU count	Memory (GB)	Availability domain	Fault domain	Created
podman-2022-02-28-123318-0	Running	-	100.102.127.163	VM.Standard2.2	2	30	AD-3	FD-1	Mon, Feb 28, 2022
lr-feb2022-OL8-2	Running	-	100.102.113.140	VM.Optimized3.Flex	1	14	AD-3	FD-2	Fri, Feb 25, 2022
bm-ppp7-test	Running	-	100.102.121.110	VM.Standard2.1	1	15	AD-2	FD-2	Tue, Feb 15, 2022
bm-ppp8-test	Running	-	100.102.124.228	VM.Standard2.1	1	15	AD-2	FD-2	Tue, Feb 15, 2022
ah-olone-registry	Stopped	-	100.102.121.131	VM.Standard.E4.Flex	1	16	AD-2	FD-2	Thu, Feb 3, 2022
ah-olone-vault	Running	-	100.102.122.20	VM.Standard.E4.Flex	1	16	AD-3	FD-1	Wed, Jan 19, 2022
rowan-jekyl	Stopped	-	100.102.112.205	VM.Standard2.1	1	15	AD-2	FD-2	Tue, Jan 18, 2022
ol-automation-manager-2022-01-28-234559	Stopped	-	192.168.22.252	VM.Standard2.1	1	15	AD-3	FD-1	Mon, Jan 3, 2022
linux-labs	Stopped	-	100.102.121.0	VM.Standard2.2	2	30	AD-3	FD-2	Thu, Dec 16, 2021
ap-stig-test-2	Running	-	100.102.122.90	VM.Standard2.1	1	15	AD-3	FD-1	Mon, Nov 22, 2021
ap-stig-test	Running	-	100.102.117.110	VM.Standard2.1	1	15	AD-3	FD-2	Thu, Nov 18, 2021
cmobridge-desktop	Running	-	100.102.126.132	VM.Standard2.1	1	15	AD-3	FD-2	Tue, Nov 2, 2021
ml-podman-req	Stopped	-	10.0.32.108	VM.Standard2.1	1	15	AD-3	FD-1	Fri, Sep 17, 2021
inst-ffrog-ah-olone-instance-pool-ol8	Stopped	-	100.102.117.30	VM.Standard2.1	1	15	AD-2	FD-1	Tue, Sep 14, 2021
inst-vkata1-ah-olone-instance-pool-ol8	Stopped	-	100.102.116.82	VM.Standard2.1	1	15	AD-2	FD-3	Tue, Sep 14, 2021



所谓的“像OCI”...

PCA X9-2 创建文件系统界面

Create a Mount Target

Name

Create In Compartment

pca3doctenant

Subnet

VCN

pca3DocTenant (change)

VCN

Subnet

Select VCN first

Advanced Options

IP Address (Optional)

Host Name (Optional)

Enable Network Security Groups

Tagging

Tagging is a metadata system that allows you to organize and track resources within your tenancy. Tags are composed of keys and values that can be attached to resources.

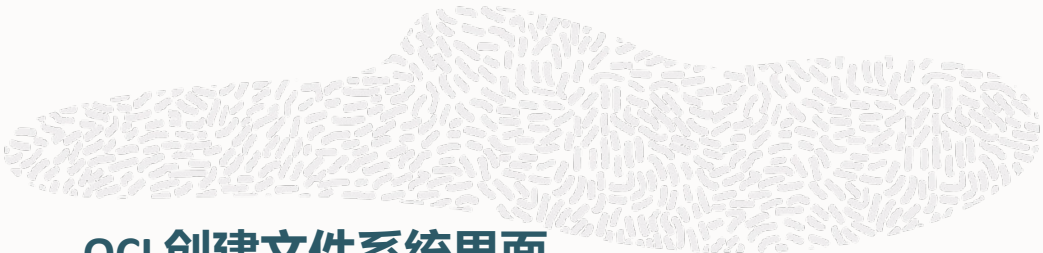
Tag Namespace

Key

None (add a free-form tag)

Create Mount Target

Cancel



OCI 创建文件系统界面

Create Mount Target

A mount target is an NFS endpoint that lives in your subnet of choice for accessing your file systems. You can access multiple file systems through a single mount target.

Mount Target Information

You can select compartments for mount target, virtual cloud network or subnet. [Click here to enable compartment selections.](#)

New Mount Target Name *Optional*

MountTarget-20220301-2045-41

Availability Domain

DSdu:US-ASHBURN-AD-1

Virtual Cloud Network

ah-olcne-tf-vcn

Subnet

None available in this compartment

Use network security groups to control traffic

Hide Advanced Options

IP Address *Optional*

Hostname *Optional*

Fully Qualified Domain Name *Read-Only*

Specify a subnet and hostname above

Show Tagging Options

Create

Cancel

22

PCA X9 是最佳的中间件和应用部署平台

OCI Native Cloud on Premises (OCI原生本地云)

在公共云和私有云中使用相同的云服务

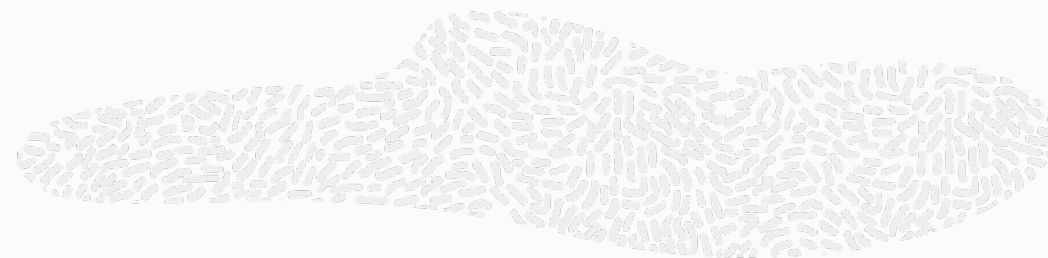
- OCI IaaS and APIs
- OCI 可移植性
- OKE - Cloud Native

部署任务关键型的Oracle应用和中间件

- 高可用性：3 个隔离的容错域，无单点故障
- 最低延迟的 Exadata 直连
- 集成灾难恢复

总拥有成本降低 40% 以上

- 可信分区优化软件许可成本
- 通过包括云管理、Oracle Linux、Oracle Solaris、Cloud Native Stack 等，消除基础架构"税"。
- 多达 8 个租户可安全地整合多个组织的基础架构



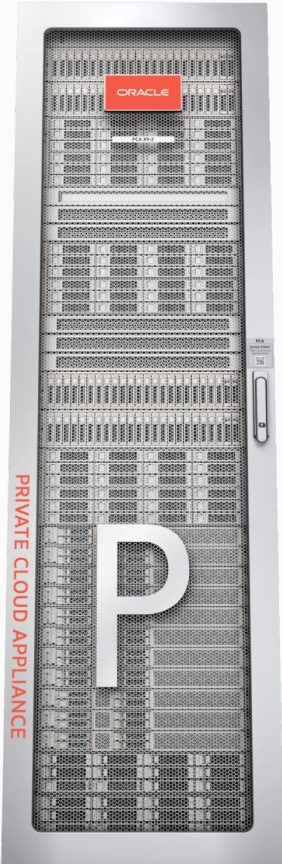
Private Cloud Appliance to Exadata Direct Connect

与 Exadata 的最低延迟连接可缩短响应时间并提高工作效率

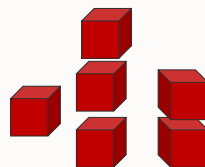


Oracle Cloud Native Environment on Private Cloud Appliance X9

Oracle Private Cloud Appliance Cloud Native Capabilities



Preconfigured
VM/Container
Infrastructure



Provisioning



Kubernetes
Orchestration &
Management



Runtime



OPEN CONTAINER
INITIATIVE
runc

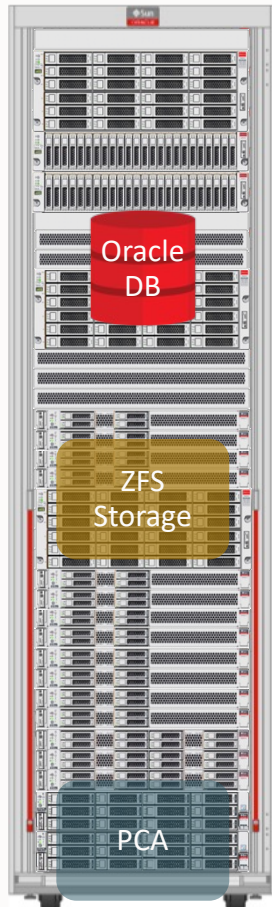


Observability &
Analysis



Disaster Recovery with Site Guard

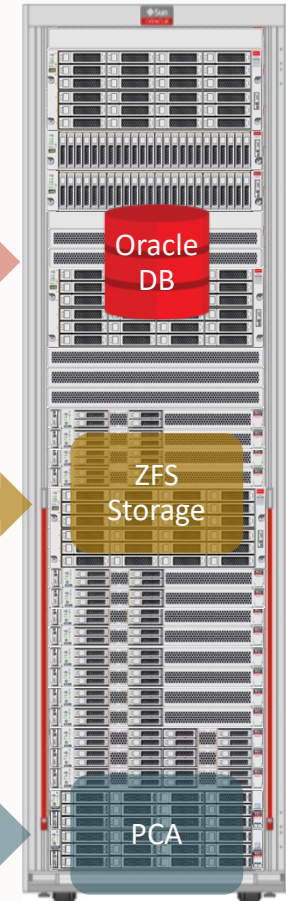
Site A



PCA SW
Oracle Data Guard
Internal ZFS Storage Appliance



Site B



1. Stop guests site A
2. Release repositories site A
3. Sync data centers
4. Change direction of replication data flow
5. Make site B database active, A standby
6. Discover repositories at site B
7. Discover and replicate guests to B
8. Starts guests at Site B

总结



PCA X9 – Oracle私有云基础设施

OCI兼容的IaaS - 为关键任务云部署而设计

Oracle Cloud Support

OCI Image portability

Tools and Services

CI/CD
IaC

Business Continuity

Fault Domains
Disaster Recovery

Monitoring and Management

Grafana

Security and Governance

Identity and Access
Policy
Tagging
Encryption

Storage

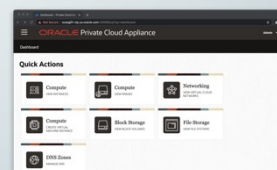
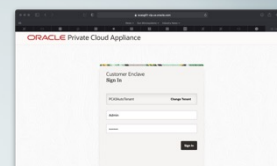
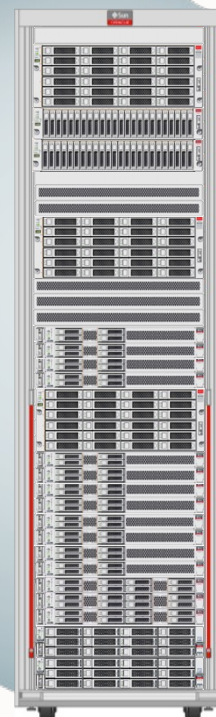
Block
File
Object

Network

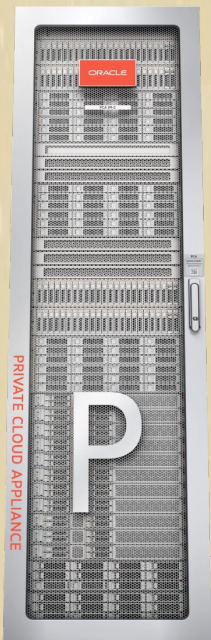
Virtual Cloud Network
Network Services
Security Lists
Gateway Services
Datacenter Connectivity

Compute

Virtual Machine
Container



集成以实现快速部署和降低成本



Private Cloud Appliance

1

应用程序和中间件的最佳平台

- 关键应用的高可扩展性和可用性
- 降低许可费用并保护数据

2

私有云和公共云之间的可移植性

- OCI 兼容的 API 和管理工具，可简化工作负载迁移
- 一致的开发人员和用户体验

3

与 Oracle Exadata 的直接连接

- 最低延迟连接
- 优化的多层应用程序部署

ORACLE