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Oracle Cloud Infrastructure – Exadata Cloud Service: Implementing Exadata Apps

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Enterprise Grade Cloud Platform built for Oracle Databases

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Safe Harbor Statement

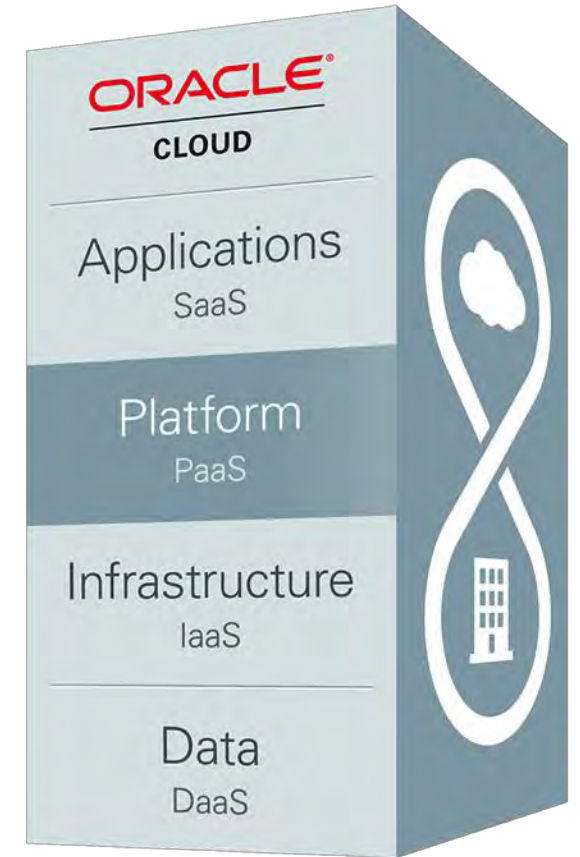
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Tip! Remember to remove this text box.

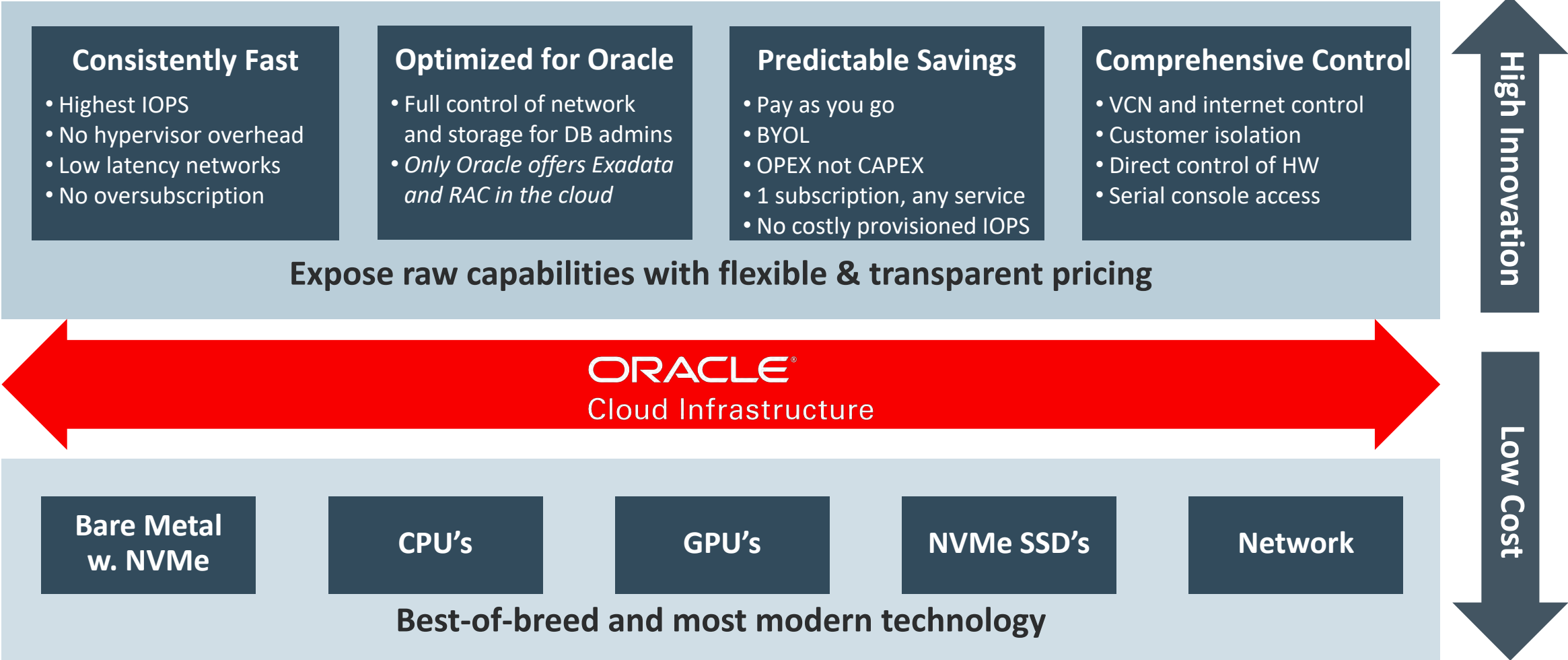
Agenda

- 1 Oracle Cloud Infrastructure (OCI) - Introduction
- 2 OCI Database Service – Introduction
- 3 OCI Database Service – Exadata
- 4 Learn how Ingersoll Rand leverages OCI Exadata Cloud Service
- 5 Learn how Brinks leverages OCI as their Secondary Data Center
- 6 Key Takeaways



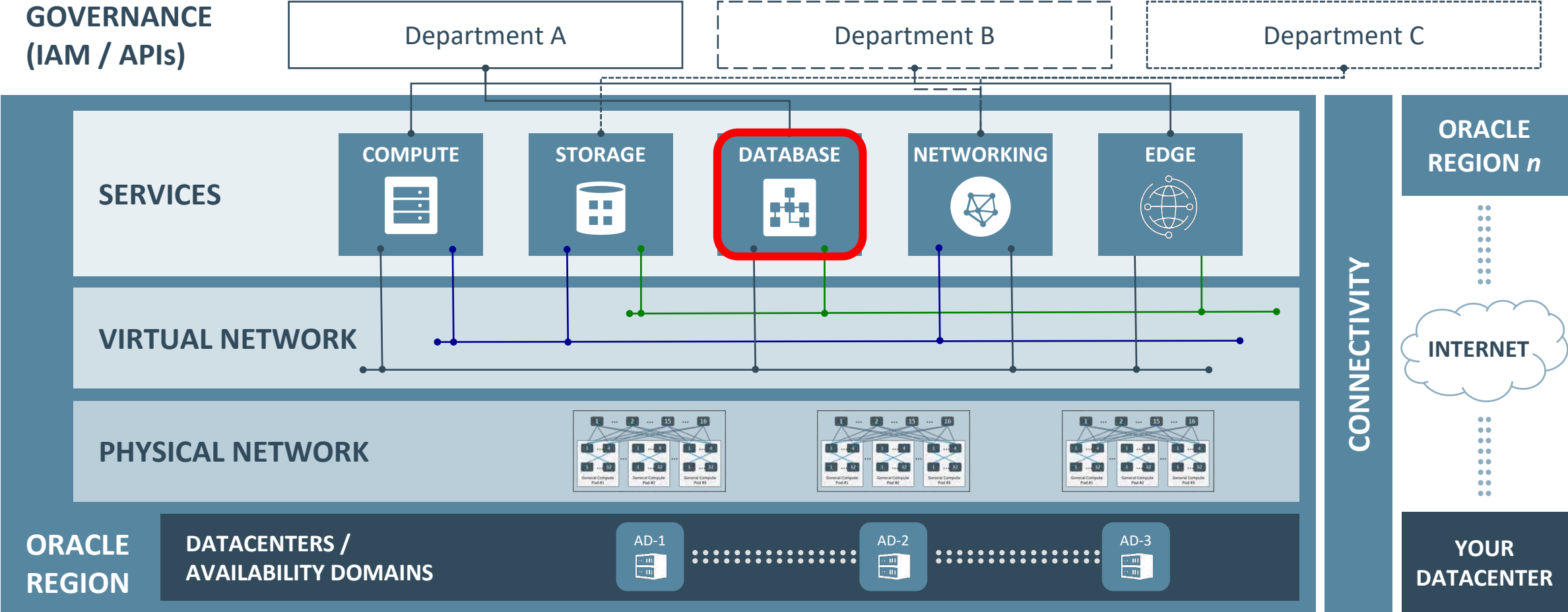
Oracle Cloud Infrastructure

Oracle's Differentiation for Database Applications



Oracle Cloud Infrastructure Overview

High performance compute, storage, database, edge on the same flexible virtual network



Oracle Cloud Infrastructure Database: Introduction

Challenges You Face Migrating Oracle Database Applications



- **High capital costs:** Long budget cycles required for large data center deployments with extra capacity
- **Ensuring predictable performance:** Typical clouds can't solve for noisy neighbors, inconsistent IOPS, and higher latency
- **Implementing high availability:** Achieving HA for cloud databases requires enterprise-level features designed from the ground up
- **Finding the best underlying infrastructure:** How do you know that your cloud is optimized for database, rather than merely “good enough?”

Today, you manage...

Server maintenance
RACK/ Server Setup
Network maintenance
Power
Availability
Scaling
Backups
Database S/W installation
Database S/W patches
OS Installation

And more...

With OCI Database service,
now you can focus on....

Application development
DB tuning/optimizations

Oracle Cloud Infrastructure Database

- **Full-featured 11gR2 or 12c database**
 - Database 12c (version 12.1.0.2, 12.2.0.4)
 - Database 11g (version 11.2.0.4)
- **Advanced Manageability**
 - Automated Patching
 - Automated Backup/Restore
 - Automated Data Guard
 - Storage Scale Up (No downtime)
 - CPU Scale up/down (No downtime)
 - Multi-Database Management
- **Fully Portable from On-Premises to Cloud**
 - Full root access
 - RMAN, Database CLI, Oracle EM support
- **Oracle Certified**
 - Backed by Oracle Support
- **Simple licensing and cost effective pricing**
 - Bring-Your-Own-License (BYOL)
 - Universal Cloud Credits Model
- **Unified customer experience**
 - Platform Native APIs,
 - CLI
 - Console
 - SDKs (Coming soon...)

Oracle Database Cloud Service lets you easily build, scale, and secure Oracle databases in the cloud.

Oracle Cloud Infrastructure Database: Platform

Mission Critical Enterprise Grade Cloud Database Service

- **Comprehensive offering to cover all enterprise database needs**
 - CPU : 1 – 336 Cores
 - Memory: 7 GB – 5.6 TB
 - Usable Storage: 256 GB – 275 TB
 - Network: 0.6 – 10 Gbps (per node)

Platform	CPU Core	Memory	Usable Storage	Network	RAC Interconnect	Nodes
VM	1 -16	7-112 GB	256 GB-40 TB	0.6 - 4.8 Gbps	0.6-4.8 Gbps (Shared)	1-2
Bare Metal	2-72	512 GB	3.2-20 TB	10 Gbps	1 x 40 GbE IB (Dedicated)	1-2
Exadata	22-336	1.11 -5.6 TB	68-275 TB	2 x 10 Gbps	2 x 40 GbE IB (Dedicated)	2-8

Platform

Platform	CPU Core	Memory	Storage	Network	RAC Interconnect	Nodes
Bare Metal	2-72	512 GB	3.2-9.6 TB	10 Gbps	1 x 40 GbE IB (Dedicated)	1-2

- **High IO**

- 1 x x86 Server
- 36 Cores
- 512 GB Memory
- 12.8 TB SSD (4 x 3.2 NVMe)
- Single Instance
- Capacity on demand
 - 2- 36 Cores

- **Dense IO**

- 1 x x86 Server
- 36 Cores
- 512 GB Memory
- 28.8 TB SSD (9 x 3.2 NVMe)
- Single Instance
- Capacity on Demand
 - 2- 36 Cores

- **2 Node RAC**

- 2 x x86 Server
- 72 Cores
- 512 GB Memory
- 24.8 TB SSD
- RAC
- Infiniband Interconnect
- Capacity on demand
 - 4- 72 Cores

Platform

Database in VM – 5 Shapes

Platform	CPU Core	Memory	Storage	Network	RAC Interconnect	Nodes
VM	1 -16	7-112 GB	256GB - 40 TB	0.6- 4.8 Gbps	0.6-4.8 Gbps (Shared)	1-2

- Single Instance or 2 Node RAC
- Highly Available Remote block storage
- Very high performance SR-IOV based network interface
 - Separate interfaces for database client and RAC interconnect
- Scale storage from 256GB to 40 TB

Platform

Exadata– 3 Shapes

Platform	CPU Core	Memory	Storage	Network	RAC Interconnect	Nodes
Exadata	22-336	1.11 -5.6 TB	68-275 TB	2 x 10 Gbps	2 x 40 GbE IB (Dedicated)	2-8

- Quarter Rack

- 2 x DB Servers
- 3 x Storage Servers
- 84 DB Cores (2 x 44)
- 1,440 GB Memory
- DB Storage – 68.3 TB
- RAC with all Db options
- Capacity on demand
 - 22- 84 Cores

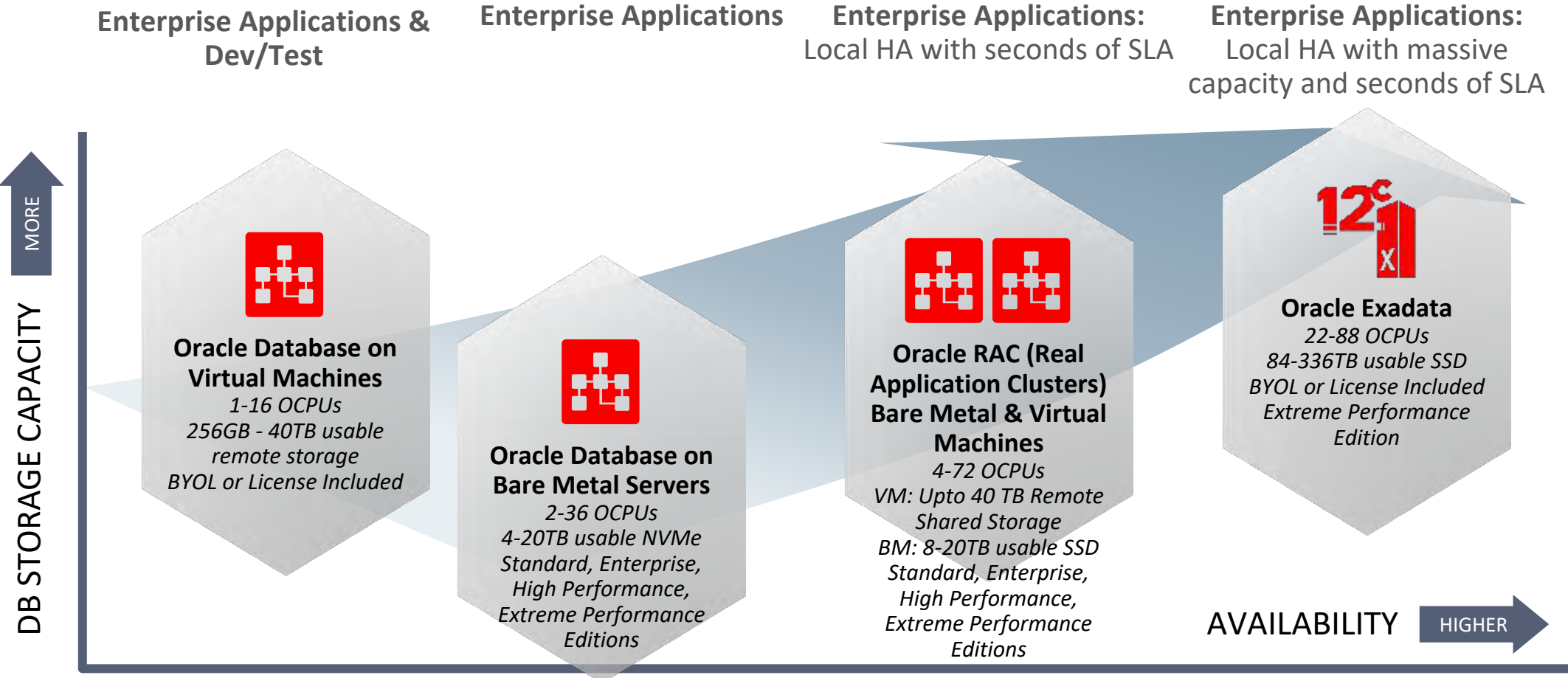
- Half Rack

- 4 x DB Servers
- 6 x Storage Servers
- 168 DB Cores (4 x 44)
- 2,880 GB Memory
- DB Storage – 136.7 TB
- RAC with all Db options
- Capacity on demand
 - 44- 168 Cores

- Full Rack

- 8 x DB Servers
- 12 x Storage Servers
- 336 DB Cores (8 x 44)
- 5,760 GB Memory
- DB Storage – 273.4 TB
- RAC with all Db options
- Capacity on demand
 - 88- 336 Cores

Database: The Highest Database Performance and Reliability



Oracle Cloud Infrastructure Database: Exadata Cloud Service - Introduction

Oracle Cloud Infrastructure Exadata Cloud Service

- **Full Oracle Database with all advanced options**
 - #1 database for mission critical OLTP and DW
- **On fastest and most available database cloud platform**
 - Scale-Out Compute, Scale-Out Intelligent Storage, InfiniBand, PCIe flash
 - **Complete Isolation** of tenants with no overprovisioning
- **All Benefits of Public Cloud**
 - Fast, Elastic, Web Driven & On-Demand Provisioning
 - Oracle Experts Deploy and Manage Infrastructure
 - 1 subscription; Pay-As-You-Go; BYOL



Best of On-Premises with Best of Cloud

Exadata Cloud Service Overview

- Customer requests Exadata Service on Oracle Cloud Portal
 - Provides system size; Database names, sizes, versions, etc.
- Start with a minimal number of cores within a Quarter Rack Shape
 - Minimum: 22 cores, enable additional cores on demand
 - Access to all storage
 - Can expand to 100s of Cores, 100s of TB storage, Millions of IOPs
- Exadata DB System automatically provisioned for customer
 - Assured hardware resources: no server or storage over-provisioning
- Databases requested by customer prebuilt and ready to run
 - Oracle Database 11.2.0.4, 12.1.0.2 and 12.2.0.1 available

Quarter Rack Shape X6-2	
OCPUs (min-max) ¹	22 - 84
Total Memory	1.5 TB
Compute Nodes	2
PCIe Flash	38.4 TB
Max DB size ²	34.2/68.3 TB

1. OCPU = Oracle CPU = 1 usable compute core

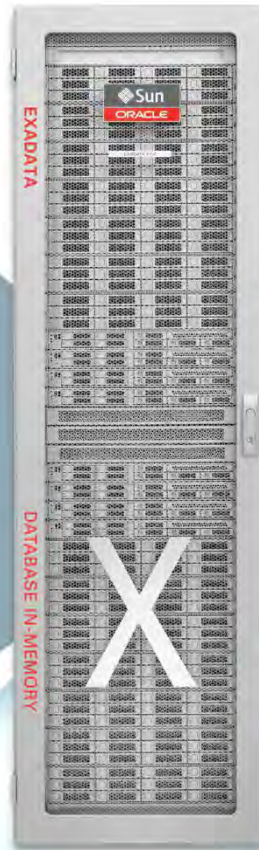
2. After provisioning DATA and RECO disk groups, actual space depends on space needed for local backups

Exadata Cloud: Compatible – Scalable – Available – Secure

Decades of Database Innovation Proven at Millions of Mission-Critical Deployments

	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

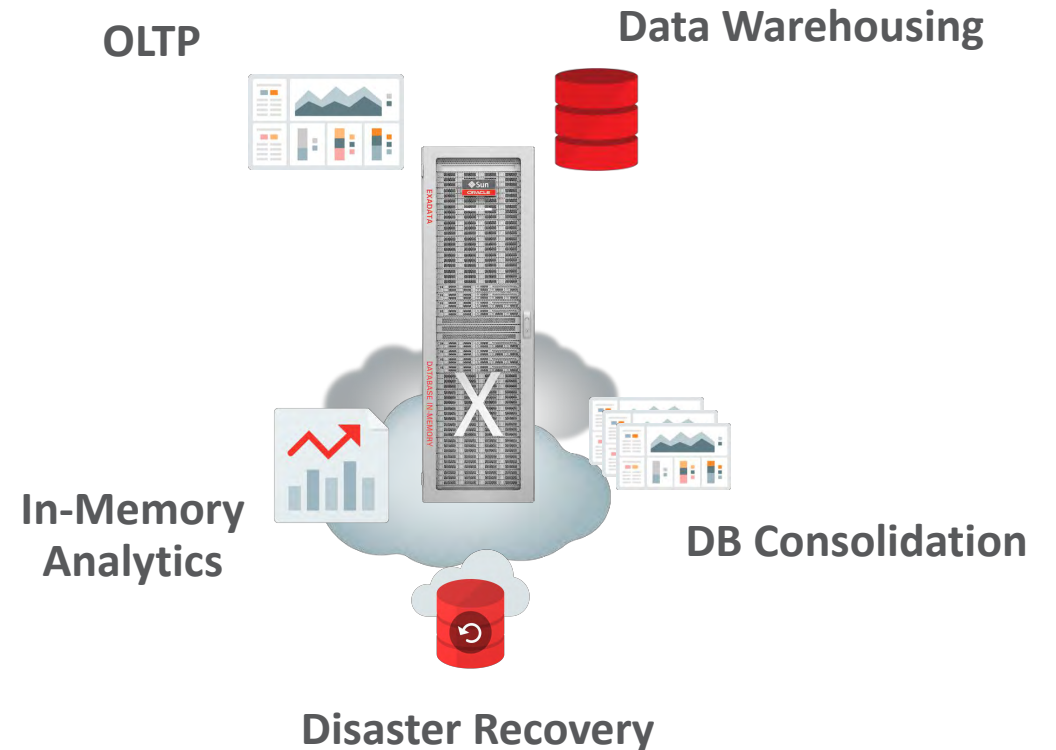
Offload SQL to Storage	
InfiniBand Fabric	
Smart Flash Cache, Log	
Storage Indexes	
Columnar Flash Cache	
Hybrid Columnar Compression	
I/O Resource Management	
Network Resource Management	
In-Memory Fault Tolerance	
Exafusion Direct-to-Wire Protocol	



Exadata Cloud Service Use Cases

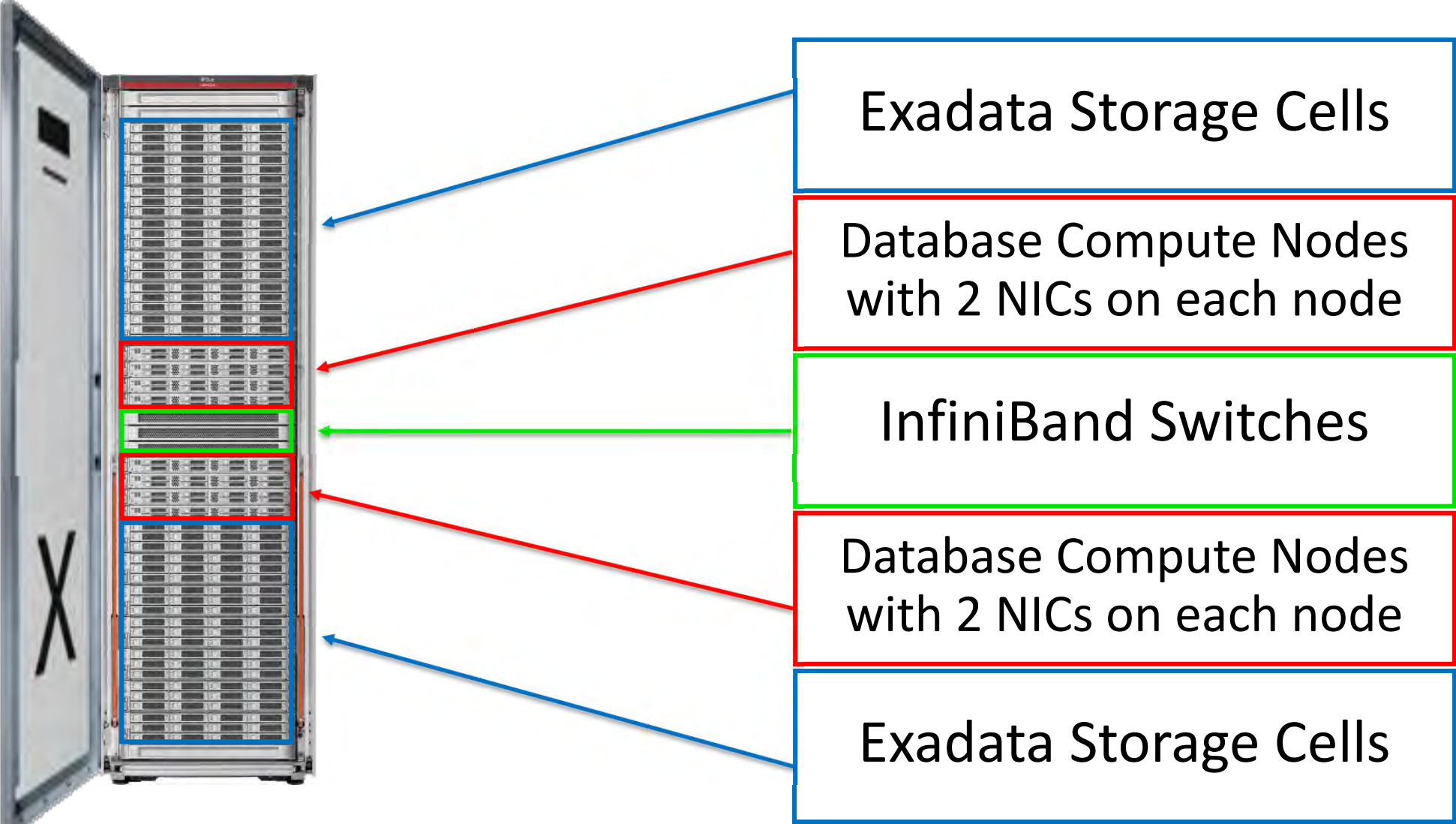
- Mission Critical Production Databases
 - Very large databases (VLDB)
 - Database consolidation
 - OLTP, Data Warehousing, Analytics, Reporting...
 - Oracle on Oracle – EBS, JDE, PeopleSoft
- Test, Development, Certification
- Disaster Recovery

*100% Compatible with on-premises databases:
Extend your Data Center*



Oracle Cloud Infrastructure: Database Service – Exadata layout

Provisioning an Exadata Cloud Service



Access and Security

- **Management Access**
 - Identity and Access Management Service with security rules
 - Users, Group, Policy and Resource Compartments
- **Platform/Infrastructure**
 - Secure Access through Virtual Cloud Network (VCN)
 - Dynamic Routing Gateway and Internet Gateway (with Security rules)
 - Private subnets with VPN, public and private subnets
 - Ingress & Egress Security rules precisely control who has access
 - 2 Physical Networks
 - Client Network – Application Connectivity
 - Backup Network – Separate network for DB backup traffic
- **Database/Instance level**
 - InfiniBand partition per tenant for complete isolation
 - Database Tablespaces and SQL*Net encrypted by default
 - All ports closed upon creation



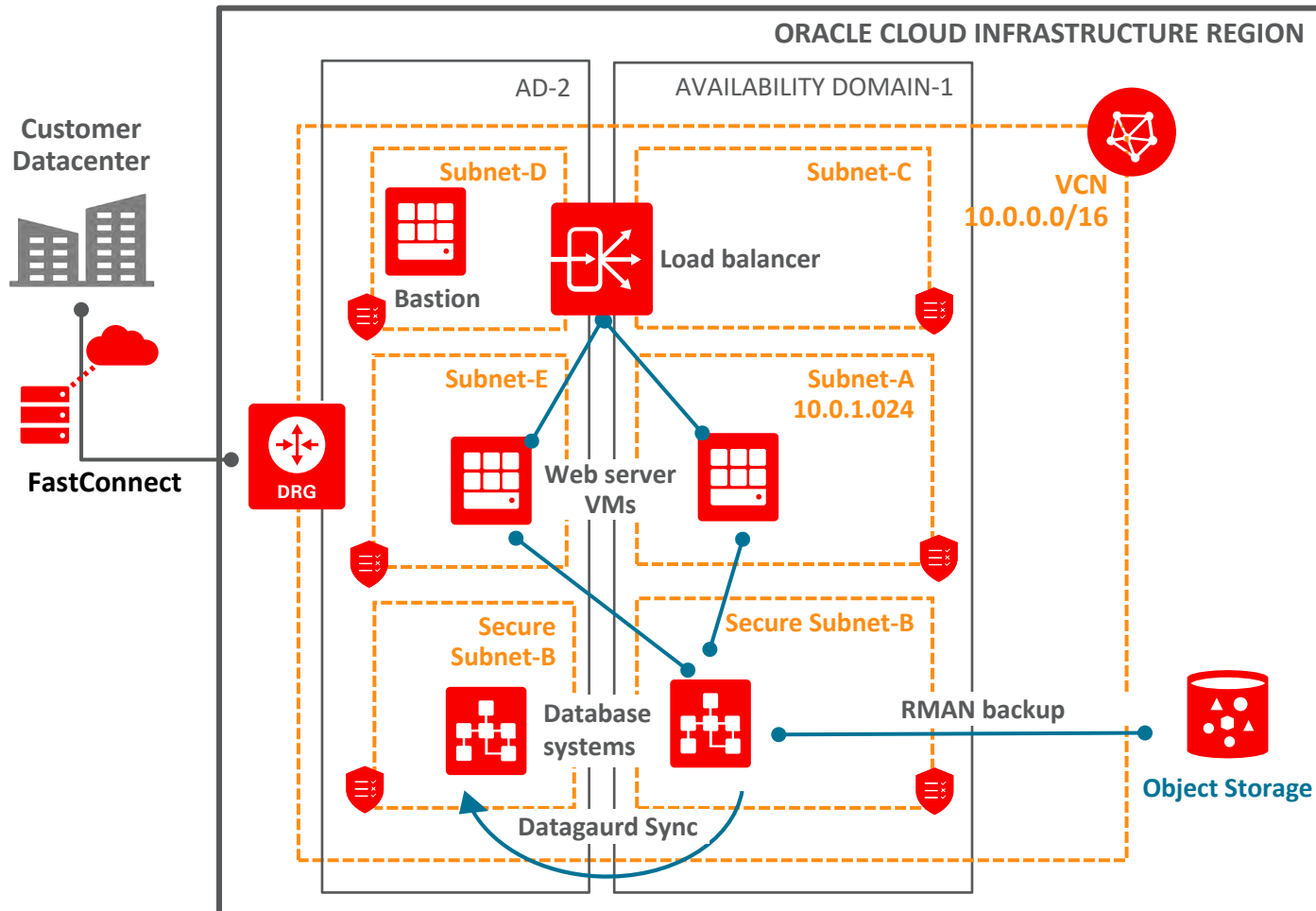
Exadata Cloud Service Networking

- Non-oversubscribed flat physical networks
 - Clos network implementation
- High bandwidth and Low latency network within & across ADs
- User Defined Virtual Cloud Networks
 - Software defined networking
 - Private or Public Subnets
 - Security Lists to allow or restrict all traffic
 - Customer's traffic completely isolated
 - IPSEC VPN and Fast Connect



Oracle Cloud Infrastructure: Database Service – Typical Cloud Architecture

OCI Database service: Typical Architecture



- Compute and Database servers next to each other
- High-availability with a loadbalancer instance and multiple VMs in separate ADs
- Database Systems with active dataguard sync and backups to object storage in a secure subnet
- Upgrade to FastConnect connectivity for dedicated network bandwidth

Demo

Oracle Cloud Infrastructure: Database Service – Exadata Provisioning

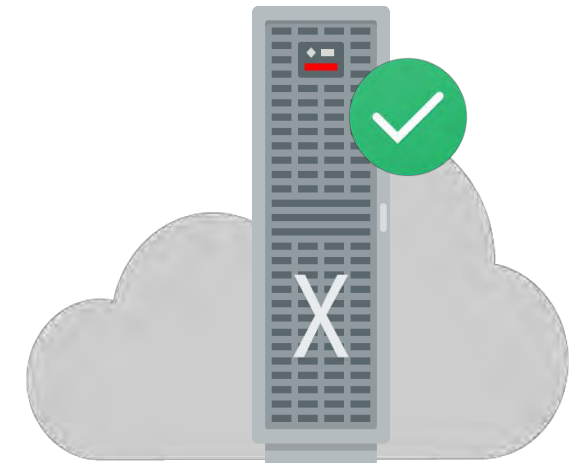
Management & Maintenance

- Oracle manages underlying infrastructure
 - Facilities
 - Servers
 - Storage hardware
 - storage software
 - Networking
 - Firmware
 - hypervisor, etc.
 - Rolling patching for Storage cells
- Customers control and manage software that directly affects their databases
 - Database
 - OS (Root SSH Access)

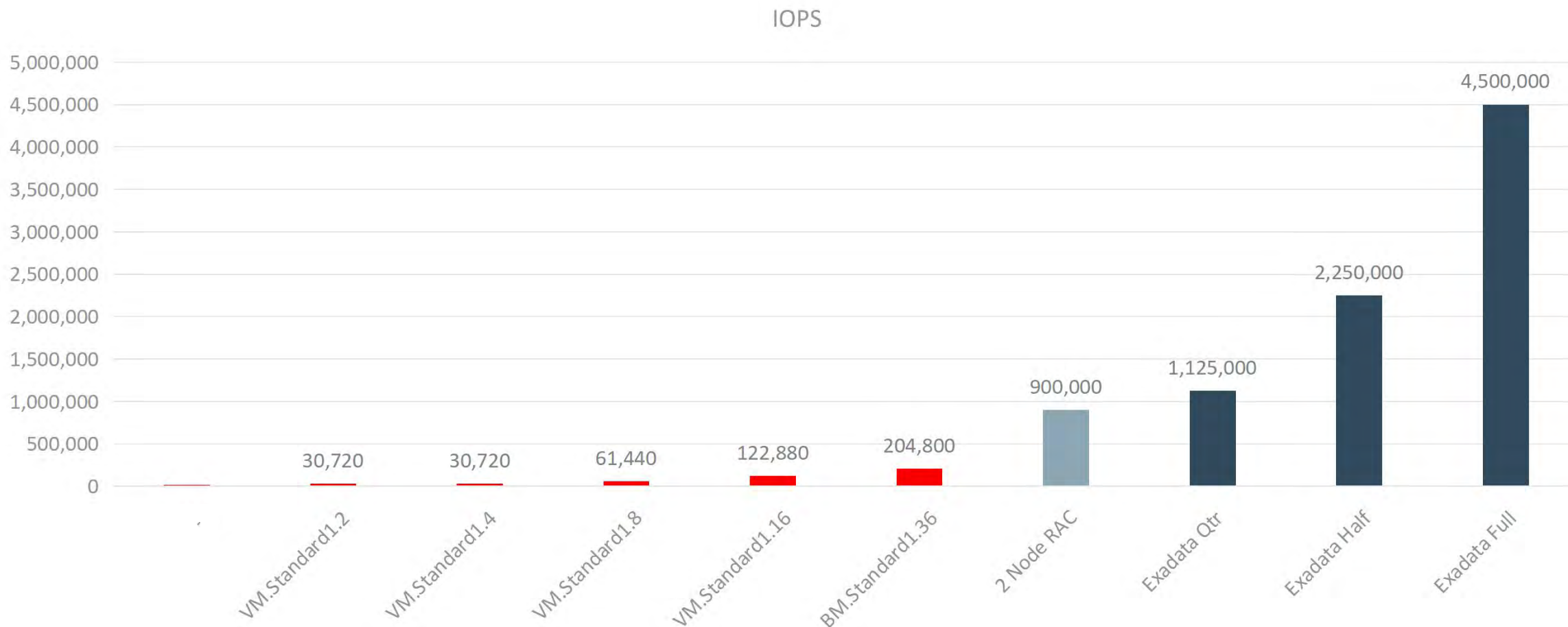


High Availability and Backup & Recovery in Cloud

- **Integrated Exadata Maximum Availability Architecture features and practices**
 - Exadata Hardware Enables High Availability
 - Storage is triple mirrored
 - Backup Power Distribution Units
 - Full data protection, consistency, transactional isolation
 - Fully active RAC cluster, ASM High Redundancy
 - VCN Local DNS Support for hostname resolution
 - SCAN IPs support
 - Round Robin DNS Name for SCAN Ips
 - Redundant InfiniBand and Ethernet networks
 - Data Guard to a standby database in the Cloud
- **Cloud backup to Bare Metal Object Store**
 - Default frequency: weekly full, daily incremental
- **Fast Recovery Area (FRA) on Exadata for local on-disk RMAN backups**



OCI RAC – All Platforms IOPS



Demo

Oracle Cloud Infrastructure: Exadata Switchover/Failover across ADs



Demo

Oracle Cloud Infrastructure: Backup/Restore Performance to Object Storage





Rob Fuchsteiner

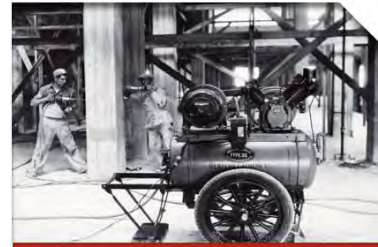
IT Director, Converged Infrastructure

Introduction



IR Ingersoll Rand
Inspiring Progress™

Ingersoll Rand advances the quality of life by **creating comfortable, sustainable and efficient environments.**



COMPANY HISTORY

- Ingersoll Rand is 145 years old. The company was founded when Simon Ingersoll patented the steam-powered rock drill in 1871.
- The Ingersoll-Rand Company was first incorporated on June 1, 1905.



COMPANY HEADQUARTERS

- Ingersoll Rand is incorporated in Swords, Ireland.
- Ingersoll Rand's North American Headquarters and Corporate Center is located in Davidson, North Carolina.



NEW YORK STOCK EXCHANGE

- Ingersoll Rand (NYSE: IR) has been listed continuously on the New York Stock Exchange since October 11, 1906.
- Ingersoll Rand is the 16th oldest company and the 12th oldest continuously listed company on the NYSE.
- Ingersoll Rand's stock ticker is IR



World-Class Talent in Every Market
More than **40,000 employees** globally

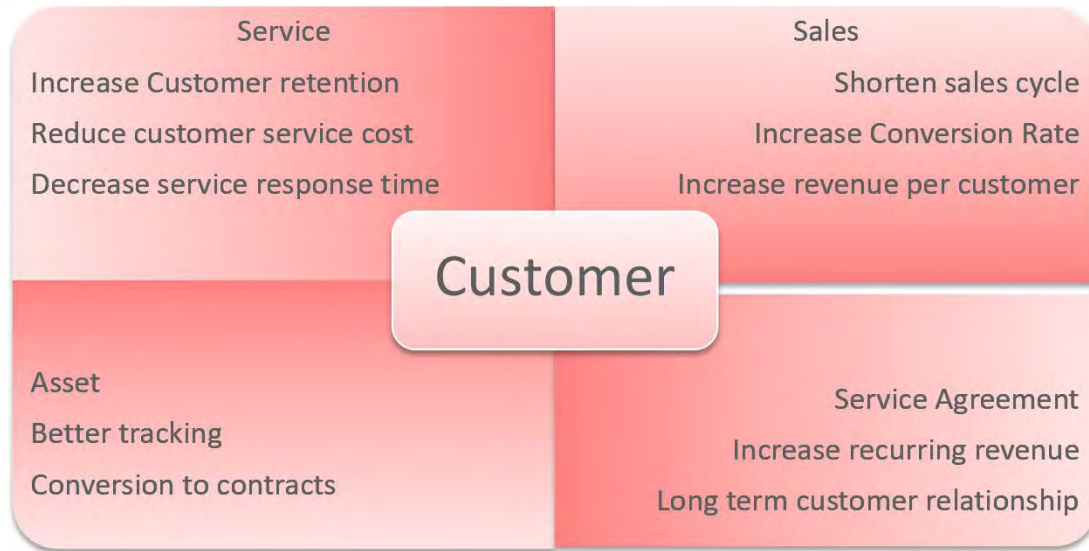


Global Footprint and Ingersoll Rand Locations
We have a total of **867 facilities** around the world, including **51 manufacturing facilities** worldwide.

**Rob Fuchsteiner, IT Director –
Converged Infrastructure**

Overview of the Application

Siebel: Field Service application to manage long term contracts and improve recurring revenue across the globe

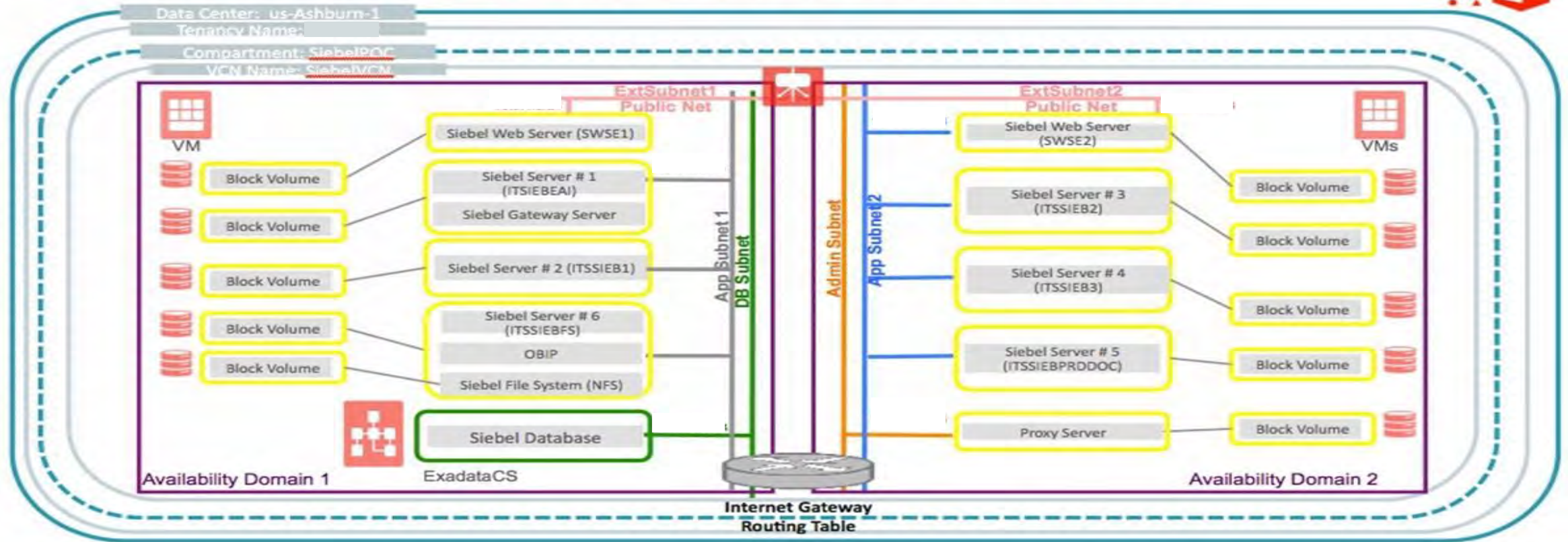


The industry's biggest growth today lies in selling additional services to existing customers

- Multi lingual and Multi currency
- Advance contract management for Preventive Maintenance, Repairs, Advance Billing, Package Care for Industrial compressor
- 4000+ active users
 - 1000 users using integrated mobile app for dispatching technicians
- 80+ Customer Service center across the globe
- Distributor portal
- 10000+ Maintenance contracts supporting 200K Assets
- 100+ million revenue transacted annually via the system
- 90+ Integrations to various ERP's and other external partners
- Opportunity & Quote management
- Generate proposals and Sales order

Architecture Diagram

Siebel IP 2014– Physical Deployment View on BMC Data Center / Location View / Example Topology Mixed Service Models



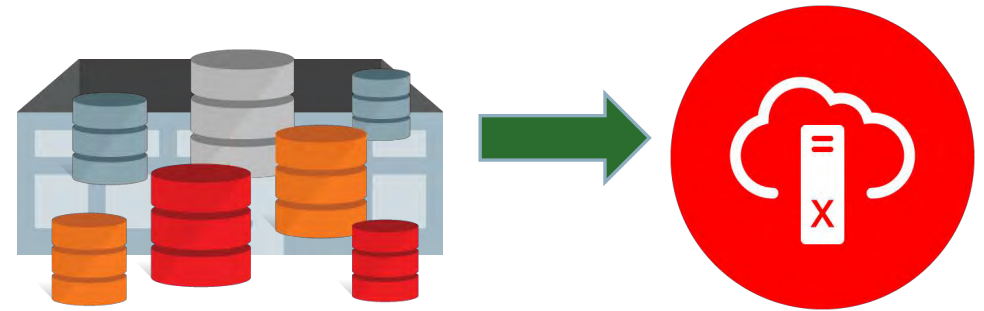
Key requirements expected out of the OCI

REQUIREMENT	EVALUATION
REDUCE COST	Better than On Premises
SECURITY	Lacking Outer Layer Security
PERFORMANCE	Excellent
FLEXIBILITY	Modifications Limited
INNOVATION / VISION	Oracle HW as a Service
GOVERNANCE	Work with ACS
GEOGRAPHICAL LOCATIONS	Limited
MATURITY	Growing

Oracle Cloud Infrastructure Database: Exadata Cloud Service – Migration

Options for Migrating Databases to Cloud

- 100% Oracle Database compatibility makes migration easy and low risk
- Logical Migration: allows reorganization and optimization
 - Data Pump, GoldenGate Replication
- Physical Migration: simplest, byte-to-byte copy
 - RMAN backup, Transportable technologies, Data Guard
 - Restore from backup on Oracle Public Cloud
- Data Movement Options:
 - Use public internet
 - Private high bandwidth virtual network (FastConnect)
 - Data Transfer Services
- MAA Migration Best Practices [“Best Practices for Migrating to Exadata Database Machine”](#)



Options for Migrating Databases to Cloud

- SQL*Loader
- Import/export (5+)
- Oracle Data Pump Export/Import Utility (10.2+)
- Transportable Tablespaces (8i+)
- Pluggable Databases (PDBs) (12c)
 - Remote Cloning
 - Lift and Shift
- APEX/SQL Developer Data Loaders
- External Tables





Dan Osburn

Lead Infrastructure Architect



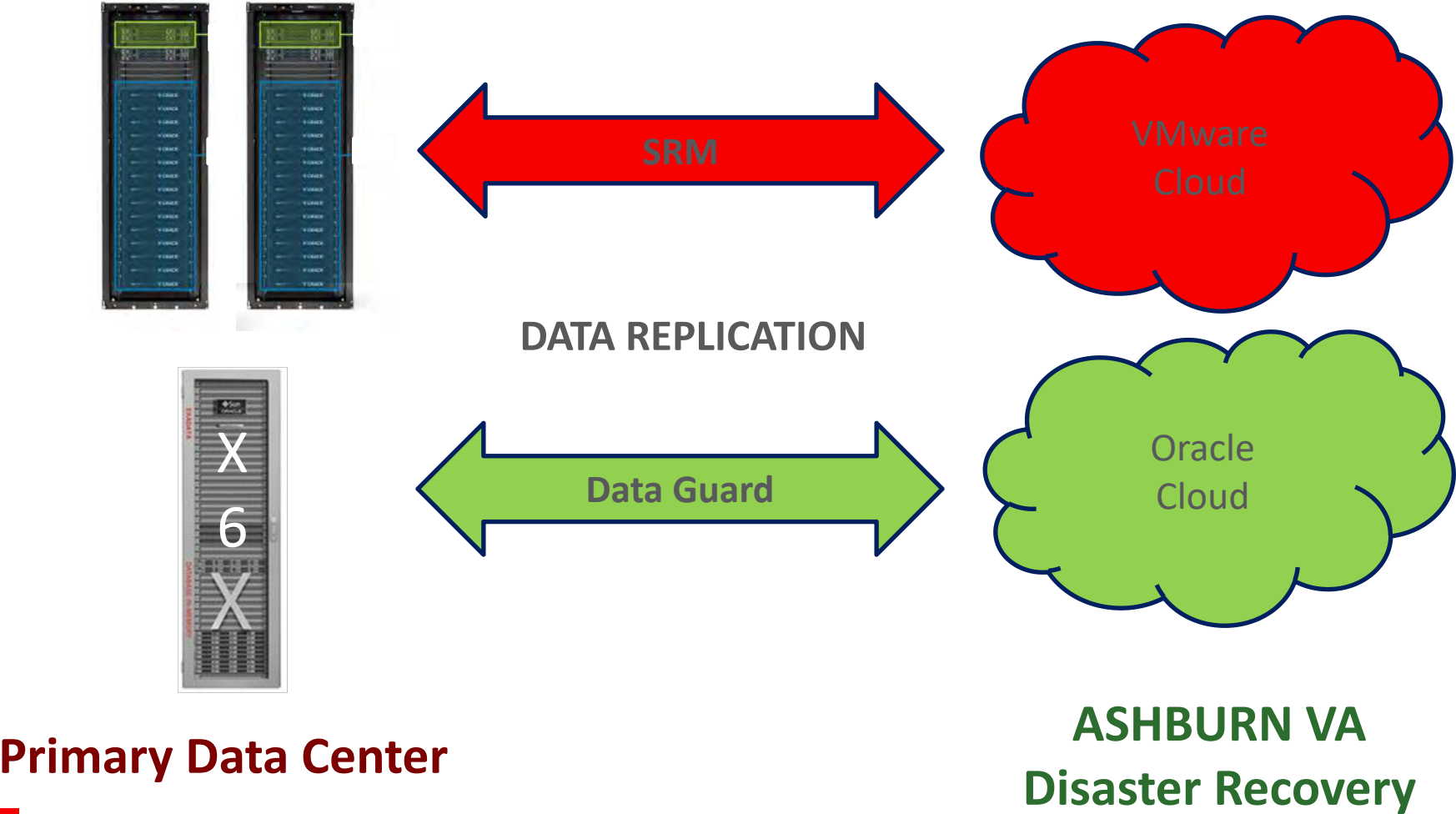
Primary Data Center

**Hyper-Converged
Compute Cluster**

and

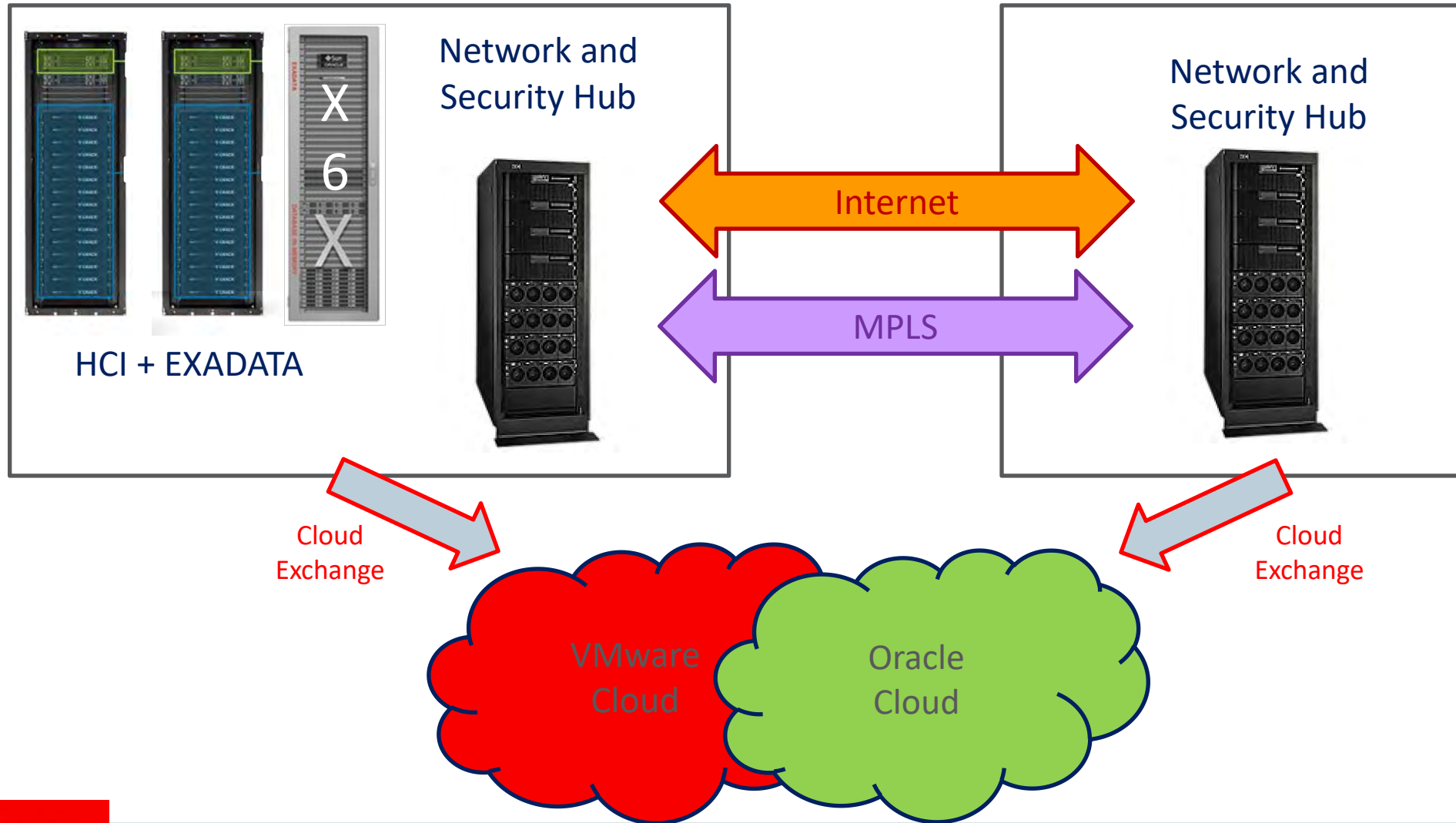
Oracle EXADATA

Cloud Disaster Recovery



Primary Data Center

Secondary Data Center



Primary Components

- Normal Private Data Center
- Cloud Disaster Recovery
- Complete Network & Security Stacks

IN BOTH LOCATIONS

- Ability to move workloads back and forth

Oracle Cloud Infrastructure Database: Summary

OCI Database Service: Simple and Intuitive pricing

- Introducing BYOL on to OCI Database service
 - Allows Oracle Database customers to bring their existing licenses to Oracle Cloud
 - Maintain Perpetual Licenses
 - Bring your all existing options
- Lowering license Included pricing
 - Great for Non ULA/PULA customers who don't have licenses lying around

Key Takeaways

- Best cloud for enterprise
 - Bring your past, build your future
 - A breadth of offerings to meet all your SQL needs: **Starting from 15000 IOPS all the way up to 4.5 million IOPS**
- Enterprise grade Database Service
 - Managed, performant, and highly secure
 - **Retain control** while getting the latest advancements
- High availability configurations
 - **Cloud-First RAC** at L2 Virtual Networking layer
 - **Data Guard** across Availability Domains
- Simple and intuitive pricing – **BYOL!**
 - Mix & Match BYOL + License included in a single account

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Oracle Cloud Infrastructure Product Sessions

Session	Title	Date	Time
GEN7215	General Session: Oracle Cloud Infrastructure – Strategies for Mastering Cloud Adoption	Tues, Oct 3	11:30 - 1:00
CON7216	Oracle Cloud Infrastructure: The Basics, the Shiny New Stuff, and the Future	Tues, Oct 3	3:45 - 4:30
CON7217	Oracle E-Business Suite in the Cloud: Oracle Apps on Oracle Cloud Infrastructure	Tues, Oct 3	4:45 - 5:30
CON7223	Enterprise to HPC: Build Best-in-Class Performance Apps in the Oracle Cloud	Tues, Oct 3	5:45 - 6:30
CON7225	Cloud Infrastructure at the Edge and Why It Matters to Your User Experience	Tues, Oct 3	4:45 - 5:30
CON7231	Cloud Networking: Best Practices from First Steps to Hybrid to All-in the Cloud	Tues, Oct 3	5:45 - 6:30
CON7478	Run Your VMware Apps Faster on a Public Cloud Than On-Premises	Wed, Oct 4	12:00 - 12:45
CON7451	Advanced Practices for Moving Your Databases to Oracle Cloud Infrastructure	Wed, Oct 4	4:30 - 5:15
CON7894	Give Us Your Most Challenging Workloads and Migrate Them to the Cloud	Wed, Oct 4	5:30 - 6:15
CON6427	Lift and Shift VMware and Physical Workloads to Oracle Cloud Infrastructure	Wed, Oct 4	11:00 - 11:45
CON7232	Fire It Up: Superfast Oracle Database Apps on Oracle Cloud Infrastructure	Wed, Oct 4	12:00 - 12:45
CON7220	PeopleSoft in the Cloud: Oracle Apps on Oracle Cloud Infrastructure	Wed, Oct 4	2:00 - 2:45

NEXT STEPS: BUILD YOUR PATH TO CLOUD TODAY

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through demos

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