

Sebastian Solbach
Consulting Member of Technical Staff

Bare Metal Cloud DBaaS Service
Oracle Deutschland b.v. & C.o KG

@s2solbach
Sebastian.solbach@oracle.com

Next Generation Database Clouds

Challenges & Solutions of running high available Oracle Databases in the cloud

Challenges of High available Oracle Databases (in the Cloud)

Placement

Where should my database be?

Networking

Virtual IP Addresses (Floating IPs) / Subnet /
Networking services

Storage

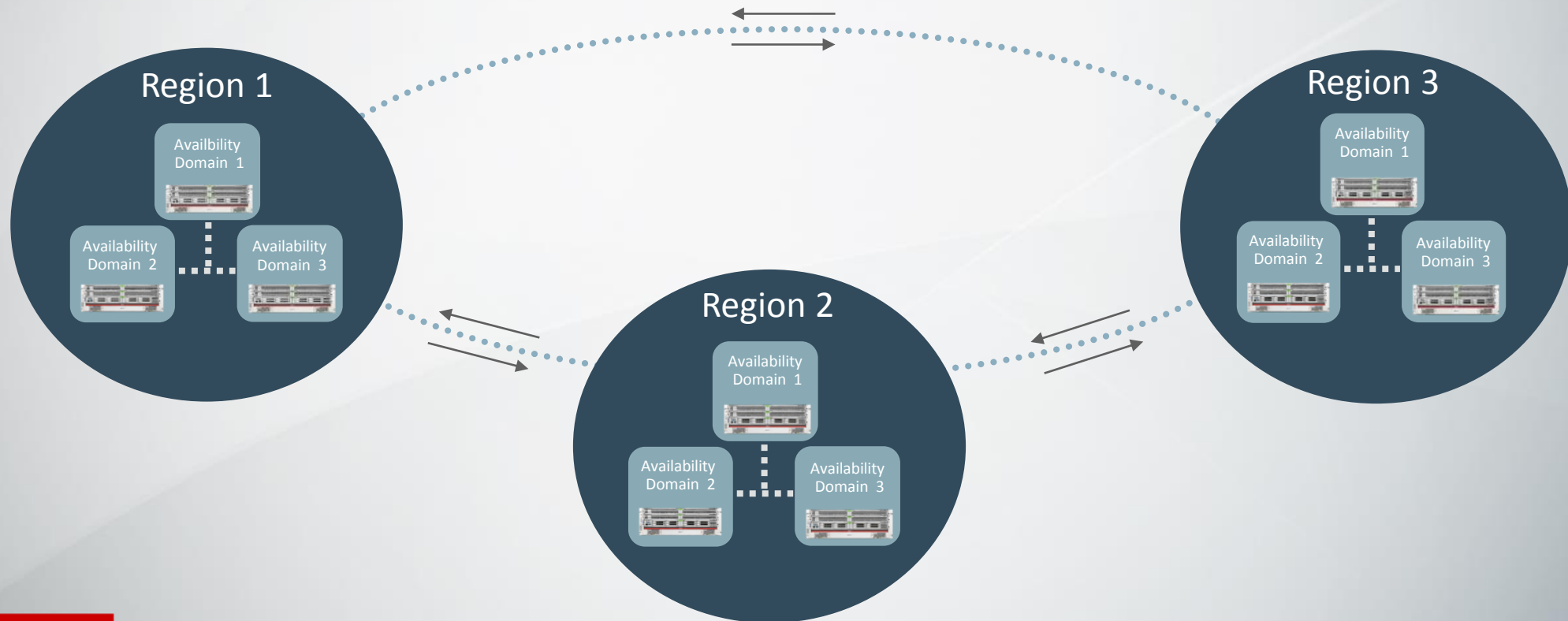
Shared Storage

Performance

Predictable network / storage / CPU performance

Defining Placement: Region / Availability Domain Topology

- Regions serve different geographies, provide Disaster Recovery
- Availability Domains provide a High Availability foundation in a Region



Inside a Region – High Availability Building Blocks

- Multiple fault-decorrelated, completely independent datacenters – Availability Domains (ADs)
- Predictable low latency & high speed, encrypted interconnect between ADs
 - < 500μs RTT latency, 1Tb/s bandwidth
- Enables zero-data-loss architectures (e.g. Oracle MAA) and high availability scale-out architectures (e.g. Sharding)

Datacenters

Region

Availability Domain 1



Availability Domain 2



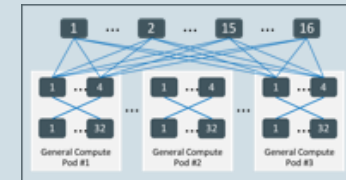
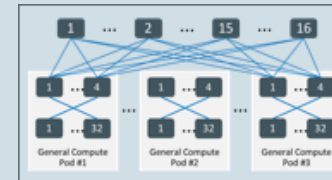
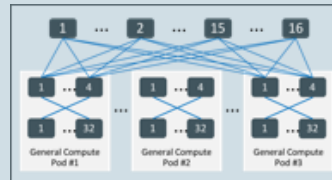
Availability Domain 3



Inside an AD – High Scale, High Performance Network

- Non-oversubscribed Clos network – flat, fast, predictable
- Very high scale – ~1 million network ports in an AD
- Predictable low latency & high speed interconnect between hosts in an AD
 - < 100μs RTT latency, 10Gb/s bandwidth

Physical Network



Datacenters

Region

Availability Domain 1



Availability Domain 2



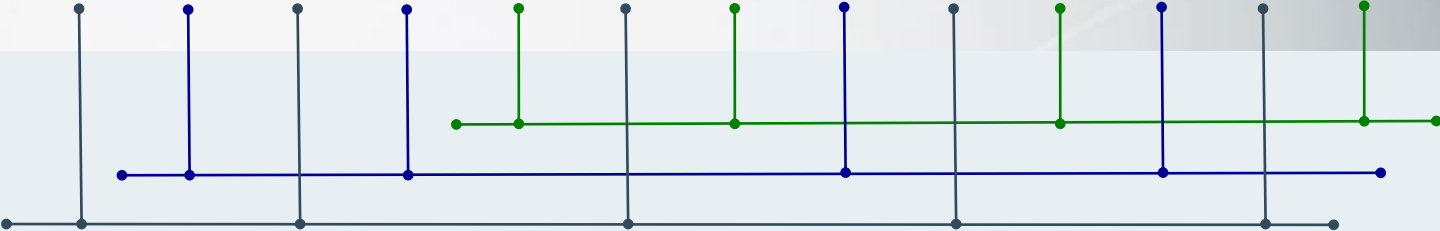
Availability Domain 3



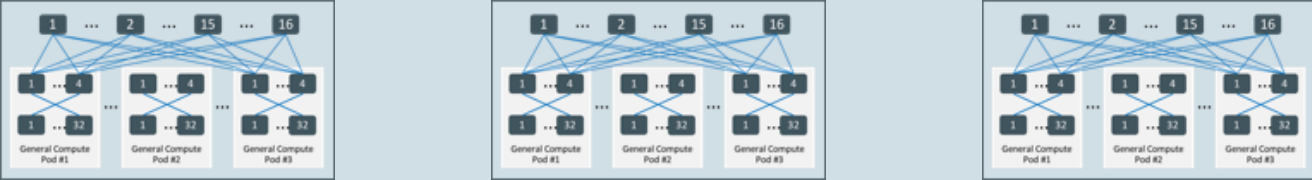
Comprehensive Virtual Network with Off-box Virtualization

- Highly configurable private overlay networks – moves management and IO out of the hypervisor and enables lower overhead and bare metal instances
- Allows VIPs (Floating IPs) for RAC

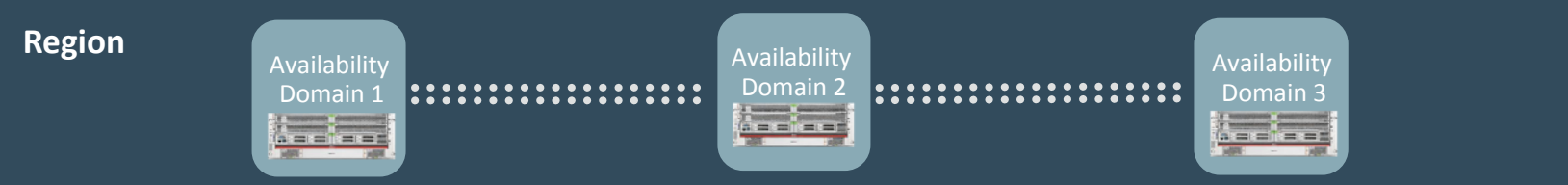
Virtual Network



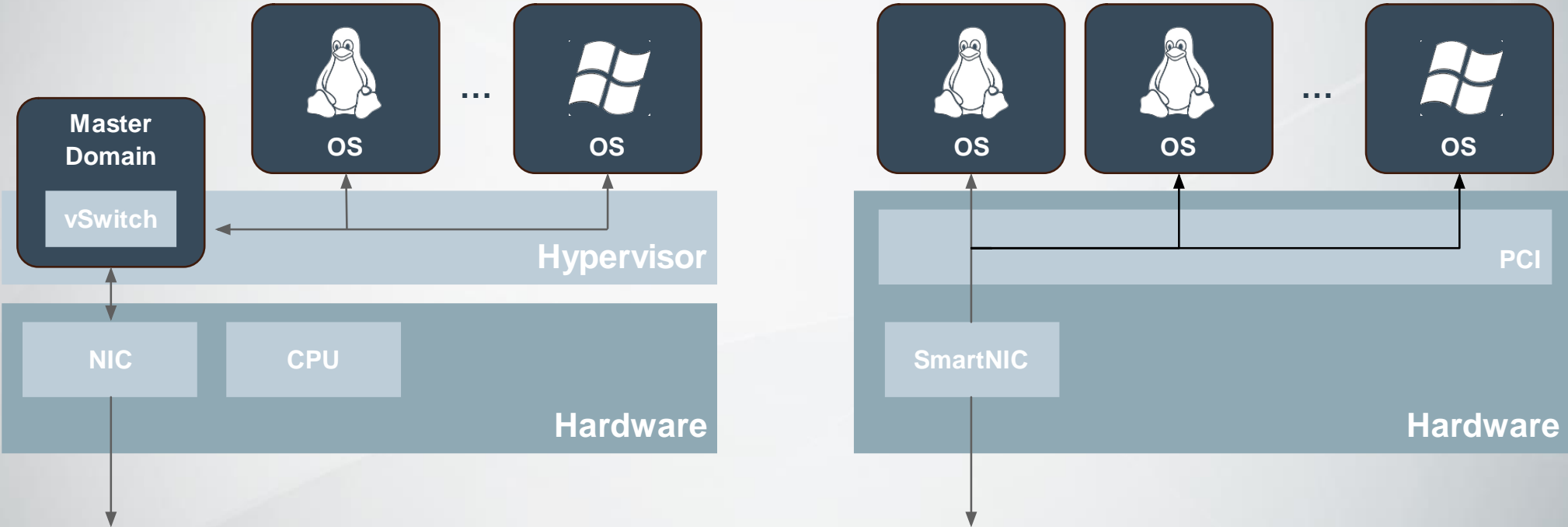
Physical Network



Datacenters



Managing the Traffic Flow on a SmartNIC Reduces the Processing Delay and Merges Multiple Workload Types onto a Single VCN



High IO Hardware Technology



High Performance Compute Systems

36 Cores per Server

Standard: Non-NVMe SSD, 256 GB RAM

High I/O: 12.8 TB NVMe SSD, 512 GB RAM

Dense I/O: 28.8 TB NVMe SSD, 512 GB RAM



High Performance Storage Systems

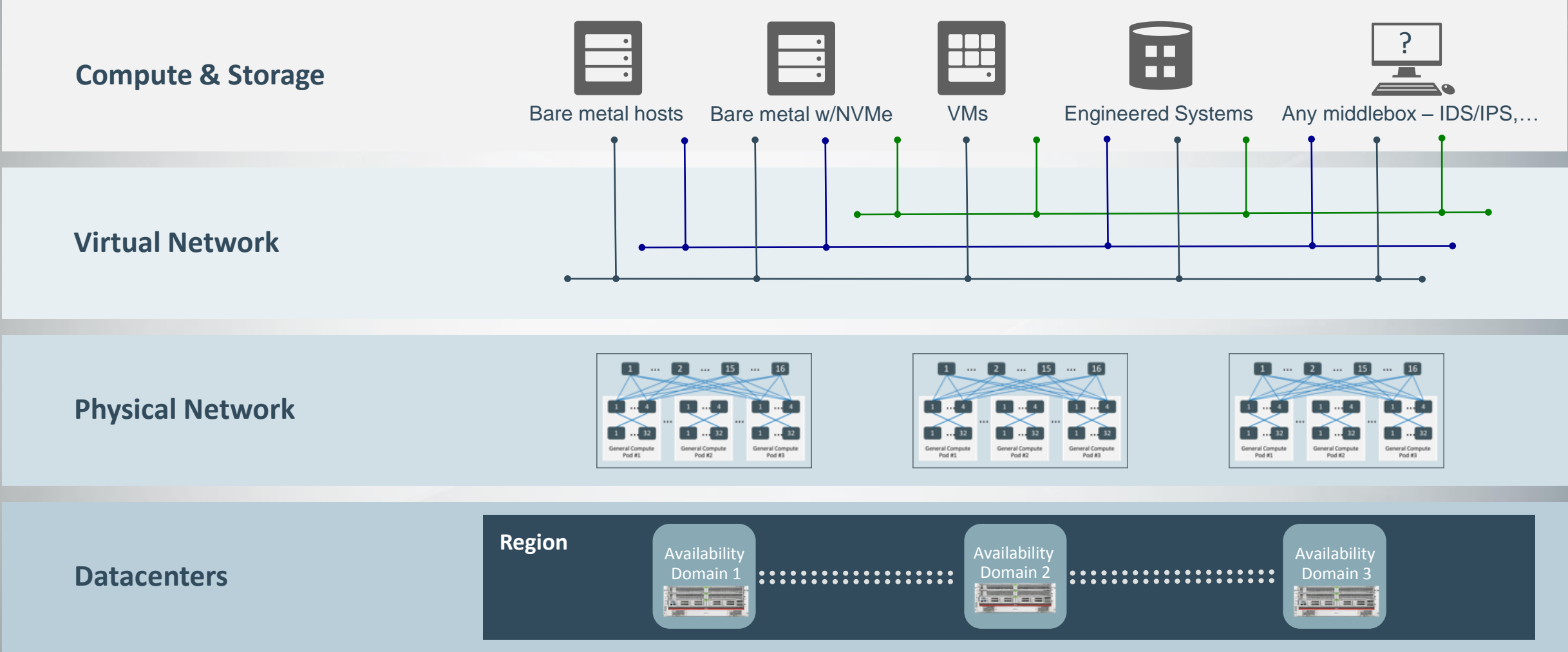
Local NVMe: up to 28.8 TB/Server, ~4 Million 4K Read IOPs

Block Storage: 256GB-2TB, 1.5K-6K IOPs per Volume

Object Storage – High Throughput, Strong Consistency

Fast Local Storage solves the I/O problem for High End Systems, whereas iSCSI block storage solves it for generic systems

Putting it All Together – Predictable, Flexible, Fast



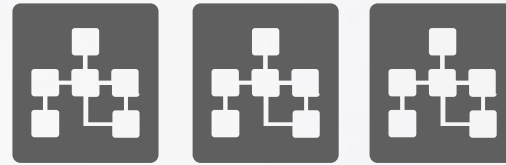
Oracle Database Cloud Service Offers Infrastructure Choice

Virtual Machines



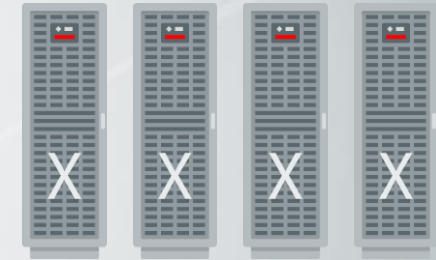
- Test, Development, Departmental Applications
- Oracle AppsUnlimited, PaaS
- Compute Shapes – by OCPU, Standard or High RAM
- Block Storage – by the GB
- Up to 40TB database

Bare Metal



- Intensive Test, Development, Departmental Applications
- Custom Applications
- Bare Metal Compute Shapes – by core, HighIO or DenseIO
- Fixed NVMe Storage by Shape
- Up to 9TB database

Engineered Systems



- Mission Critical, Intensive OLTP and Decision Support
- Oracle and Custom Apps
- ¼, ½ and Full Rack Shapes
- Fixed Storage and Memory by Shape
- Up to 168TB database

Database Cloud Service (Oracle Cloud Infrastructure/Bare Metal)

- **3 Bare Metal Compute shapes**
 - DB.BM.HighIO1.36 – 12.8TB NVMe
 - DB.BM.DenseIO1.36 – 28.8TB NVMe
 - DB.BM.RACLocalStorage1.72 - 64TB SSD
 - VM Shapes
 - Full-featured **11gR2 or 12c** database
 - Database 12c (version 12.2.0.1 / 12.1.0.2)
 - Database 11g (version 11.2.0.4)
 - **Scale-up/down** easily
 - Start with 2 cores, and grow up to 36 cores
 - Deploys into your **Virtual Cloud Network**
- **Fully Portable** from On-Premises to Cloud
 - Full root access
 - RMAN, Database CLI, Oracle EM support
 - **Fully certified Oracle**
 - Backed by Oracle Support
 - Simple **licensing bundles** and pricing
 - SE, EE, EE-High Perf, and EE-Extreme Perf
 - BYOL or License-included options
 - Platform Native APIs and integrated console experience for deployment
 - Complete customization and hybrid configurations or fully automated deployment

Challenges of High available Oracle Databases (in the Cloud)

Placement

Regions / Availability Domains

Networking

Flat non blocking Clos network with Overlay

Storage

Local NVMe / iSCSI Block Volumes

Performance

No noisy neighbors

ORACLE®