ORACLE

SOUG swiss oracle user group

SOUG Day Spring – Multicloud – Now what?

OCI und Azure? Multicloud!!

Was heisst das in der Realität

Andreas Ueltschi
Tech Cloud Engineering
Oracle Switzerland

SOUG

Agenda

- Was ist OCI?
- Oracle DB@Azure – Das Beispiel für Multi-Cloud
  - Überblick
  - High Availability und Disaster Recovery
  - User Journey
  - Netzwerk
  - Migration
  - Betrieb von DB@Azure
- Zusammenfassung

What if you could

Modernize your entire app portfolio and infrastructure without an army of consultants?

Run all your applications – legacy or cloud native – 50% more efficiently and with more agility?

Get the same public cloud services in Oracle regions or on-premises, at the same low prices globally?

Focus on insights and innovation, while OCI did the rest?

We designed a cloud to help you get there.

OCI is a hyperscaler leader

2023 Gartner® Magic Quadrant,™ Strategic Cloud Platform Services

Distributed and sovereign cloud: *"Oracle is out-innovating the market in the areas of distributed cloud and sovereign cloud computing."*

Multicloud integration: *OCI's multicloud services "make it easier for many customers to establish OCI as a 'second cloud'…"*

Velocity of new features: *"Oracle continues an impressive year-over-year pace of feature introductions…"*

Get the Gartner report

Gartner, Magic Quadrant for Strategic Cloud Platform Services
Published: 04 Dec 2023
Analysts: David Wright, Dennis Smith, Kevin Ji, Miguel Angel Borrega, Alessandro Galimberti, Stephanie Bauman

We built our cloud from the ground up to break the rules

11 years after the first generation of cloud, we started with a clean sheet

Off-box virtualization

The way we manage OCI is entirely separate from your resources, maximizing isolation, performance, and security

Nonblocking network design

We designed and optimized our networks to help ensure consistent bandwidth between your resources.

Maximum computing density per MW

We pack over 230,000 cores into each megawatt and can deliver an entire cloud region in only 12 racks

Flex infrastructure

You can choose exactly the amount of cores, memory, and storage performance you need, and pay for exactly that, minimizing waste

Simple, predictable pricing

Our pricing is simple to understand. Services in each region are priced consistently worldwide, so you get predictable savings with no surprises. Networking between regions are up to 90% lower than other hyperscalers.

Oracle Cloud: all the services you need to build, run, and scale

Infrastructure, platform, and SaaS in one cloud

Oracle Applications
Industry | ERP | EPM | SCM | HCM | ACX

Custom Applications
Polyglot | Traditional | Cloud Native

ISV Applications
Hundreds to choose from

Oracle Cloud Infrastructure


Developer Services


Oracle Databases


Open Source Databases


Analytics and BI


AI and Machine Learning


Data Lake


Compute


Operating Systems, Native VMware


Containers and Functions


Storage


Networking


Integration

Security | Observability | Compliance | Messaging | Governance

Distributed Cloud

Public Cloud | Cloud@Customer | Dedicated Cloud | Multicloud

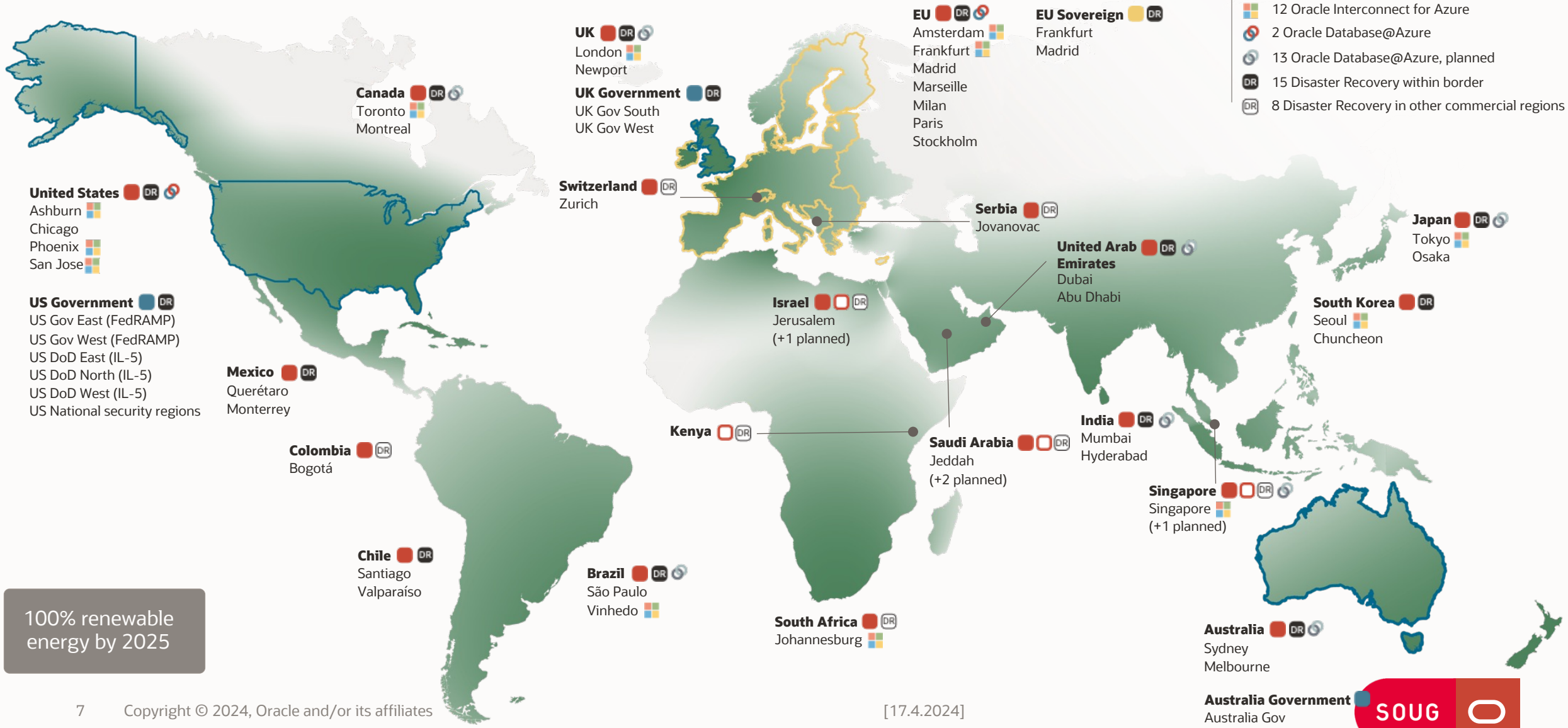
100+
platform services to support your workloads

10,000
OCI developers

3,000
field cloud engineers

Oracle Cloud Infrastructure global footprint – 68 regions

April 2024 - 48 public regions, 18 Dedicated, Alloy and Secret regions



100% renewable energy by 2025

Oracle’s distributed cloud offers exceptional flexibility and choice

Multicloud

We work with other providers:

Oracle Database@Azure
Oracle Interconnect for Azure
Oracle MySQL Heatwave on AWS

Public cloud

48 global locations:

Commercial
US Gov, UK Gov, Australian Gov
US National Security Regions
EU Sovereign

Hybrid cloud

We bring cloud services to you:

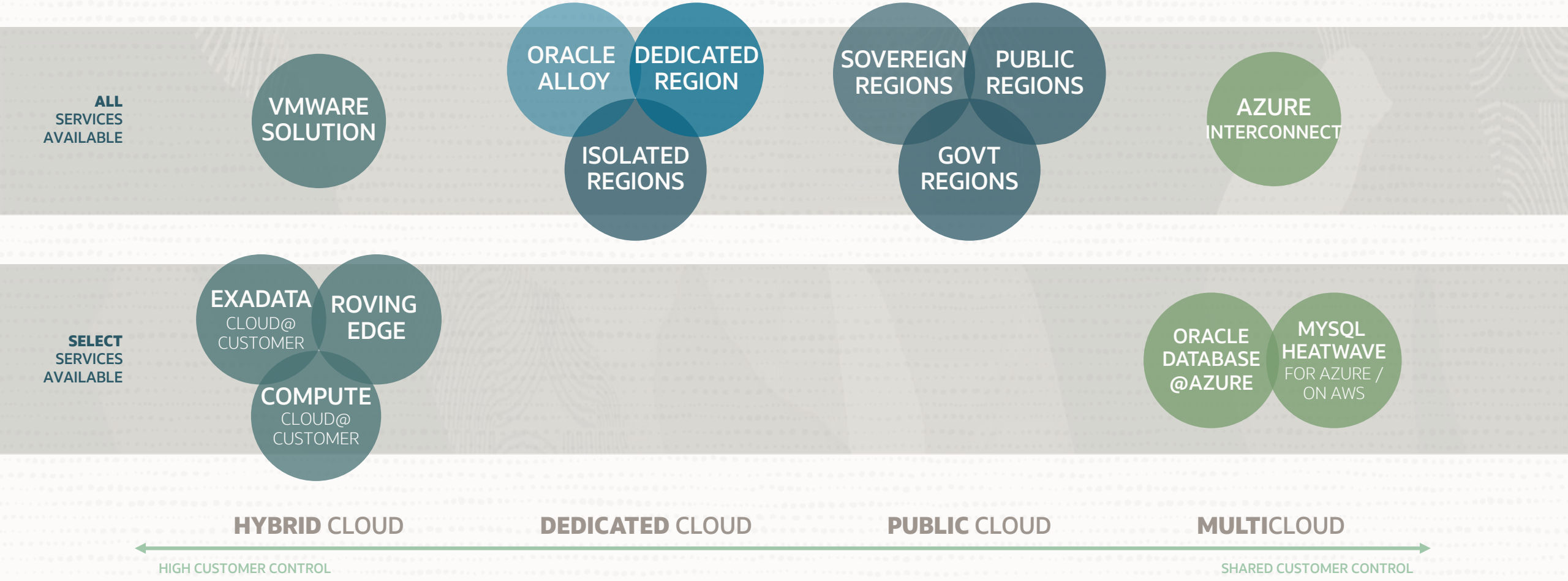
Oracle Exadata Cloud@Customer
Oracle Compute Cloud@Customer
Oracle Roving Edge Infrastructure

Dedicated cloud

All 100+ OCI services running in customer data centers:

OCI Dedicated Region
Oracle Alloy
Oracle Isolated Region

Or deploy OCI cloud services exactly where you need them



Oracle Data Platform: A complete suite of services

Oracle Data Platform

Data Sources

- Enterprise Data & Applications
- ERP
- CRM
- Enterprise SaaS Applications
- IoT
- Social Media
- Digital Assets

Integration

- OCI Data Integration
- OIC (Application Integration)
- GoldenGate (RT Data Replication)
- OCI Streaming

AI/ML

- Speech
- Vision
- Language
- Generative AI
- Classification *
- OCI Data Science
- OCI Digital Assistant

Data Management

Applications data

- Autonomous Transaction Processing
- Oracle Database Cloud Service
- Exadata Cloud Service
- MySQL HeatWave
- No SQL Database

Data Warehousing/Analytics

- Autonomous Data Warehouse
- MySQL
- HeatWave

Other Open-Source databases

- OpenSearch
- PostgreSQL
- Redis

Big Data and Data Lake

- Data Flow
- Big Data
- Data Lake
- OCI Query Service*

Data Access, Security, and Governance

- Data Catalog
- Identity and Access Management

Analytics

- Oracle Analytics Cloud
- GoldenGate Stream Analytics

Business

- Oracle or Any Business Applications
- Any SaaS
- Any Applications

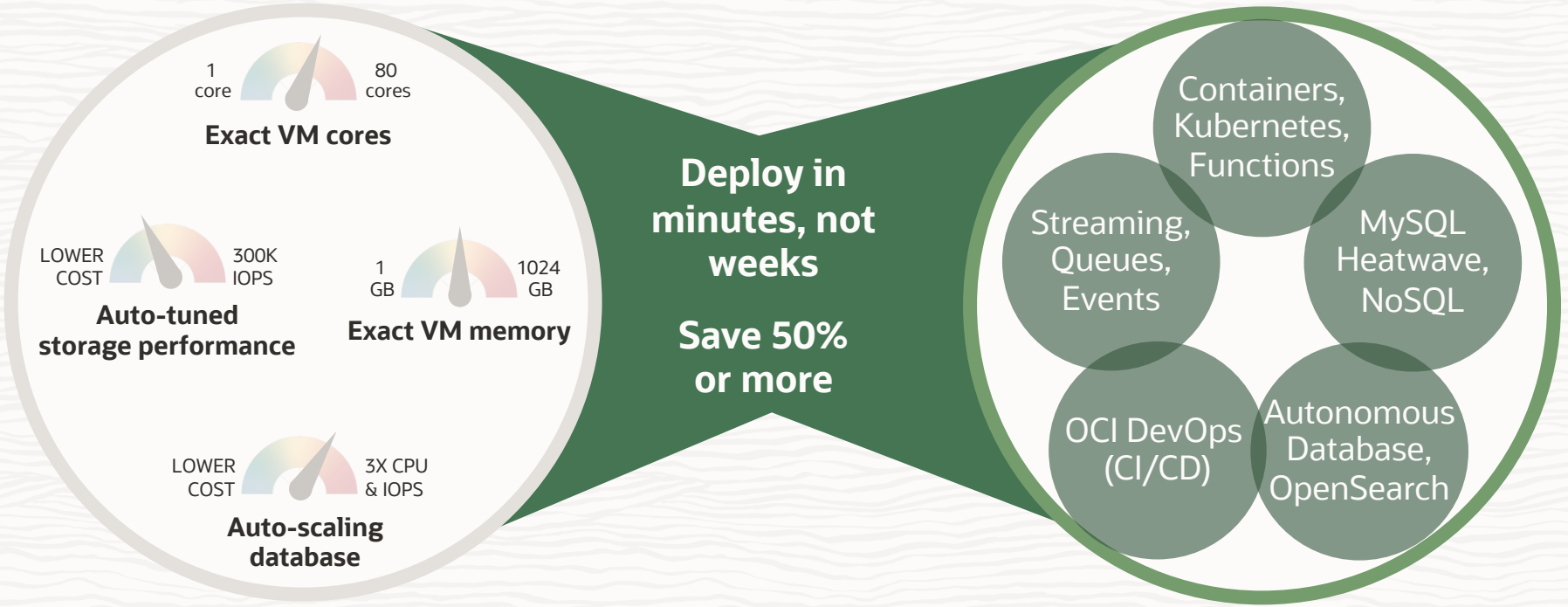
Outcomes

- Growth and Resilience
- Better Forecasts and Predictions
- Operational Efficiency
- Lower Costs

Automate everything, even your legacy apps, on one platform

Monolithic, database-centric workloads like ERP, SCM

Cloud native workloads like social, e-commerce, media

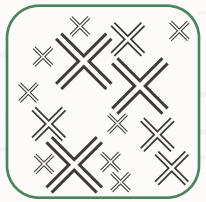


Build bigger, faster AI and HPC infrastructure

Equal to or better than on-premises

Workloads that previously needed to be on-premises

Move to **OCI computer clusters or OCI Superclusters**



Billions of parameters

Intense AI computation

High performance file system

Rapid, parallel read & write

Computational fluid dynamics

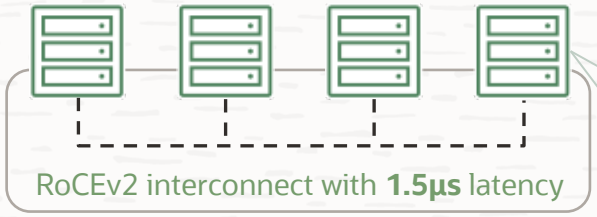
Intense matrix computation

Monte Carlo Simulations

Multivariate computation and analysis

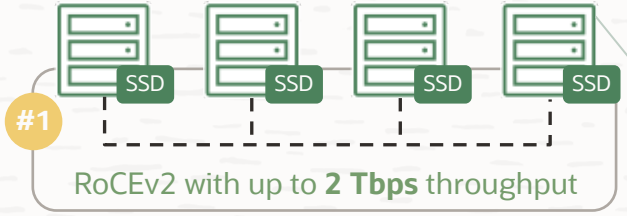
Build a high performance compute cluster

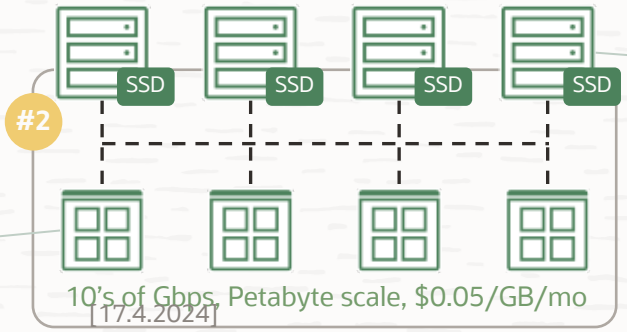
Choose between optimized CPU or accelerated GPU



Build a high performance clustered file system

WEKA, BeeGFS, Lustre, GlusterFS, or IBM Spectrum Scale





Block Storage

Low latency

Up to 32 TB *per volume*

Up to 300K IOPS *per volume*

Choose:

GPU
NVIDIA: 8x A100
AMD: 64 cores
2TB memory
1.6 Tbps RDMA

Up to 32K GPUs

NVIDIA AMD

High Frequency CPU
Intel: 36 cores
512GB memory
100 Gbps RDMA

Up to 20K cores

intel

High Frequency CPU
Intel: 36 cores
512GB memory
100 Gbps RDMA

Up to 20K cores
Petabytes capacity

intel

[17.4.2024]

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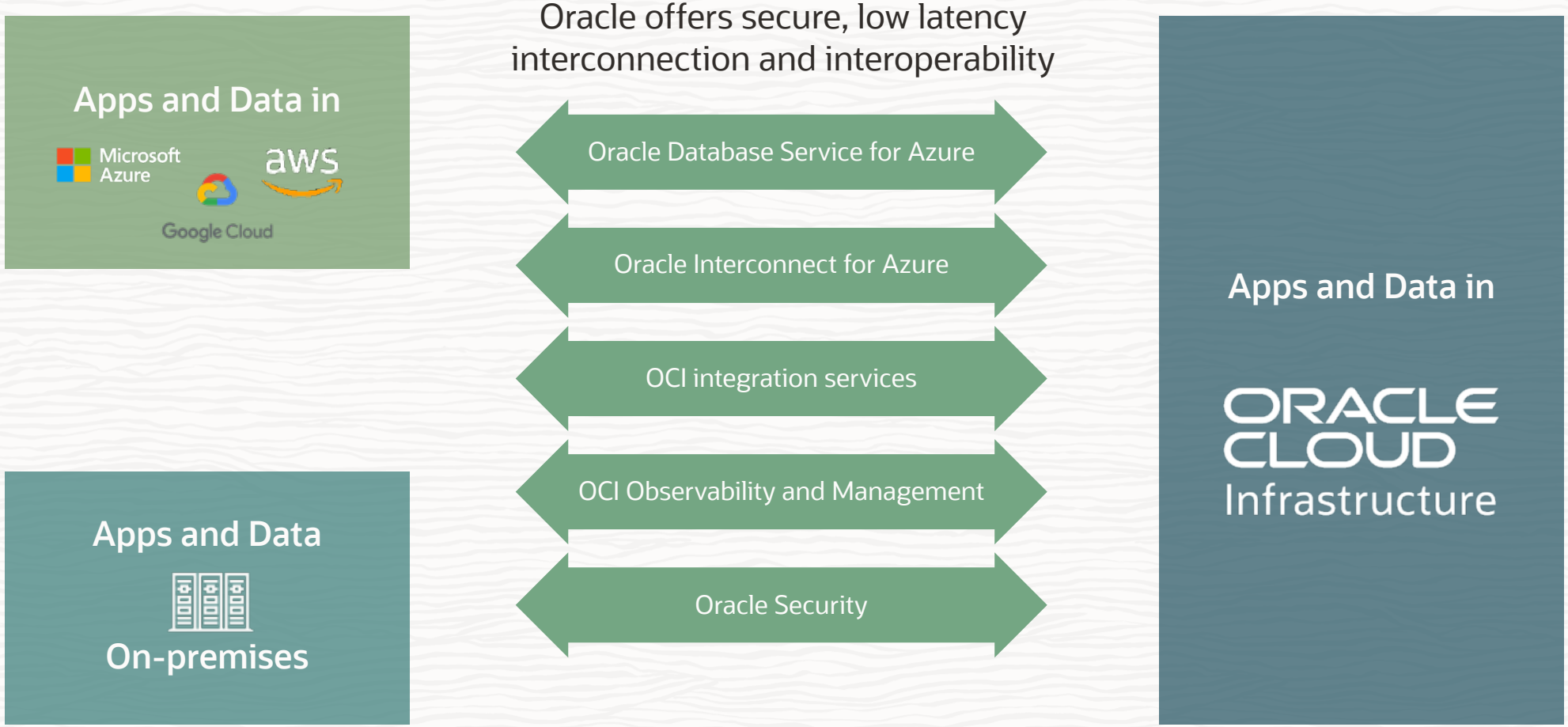
OCI helps you get the best from all your cloud providers



Oracle Database@Azure

Das Beispiel für Multi-Cloud

Customers want choices

98%

of companies use two or more clouds

Leaders rely on Oracle Exadata

10 of top **10**	**Banking**
10 of top **10**	**Communications**
10 of top **10**	**Food & Drug**
9 of top **10**	**Automotive**
9 of top **10**	**Healthcare**
8 of top **10**	**Retail**

But migration has been challenging

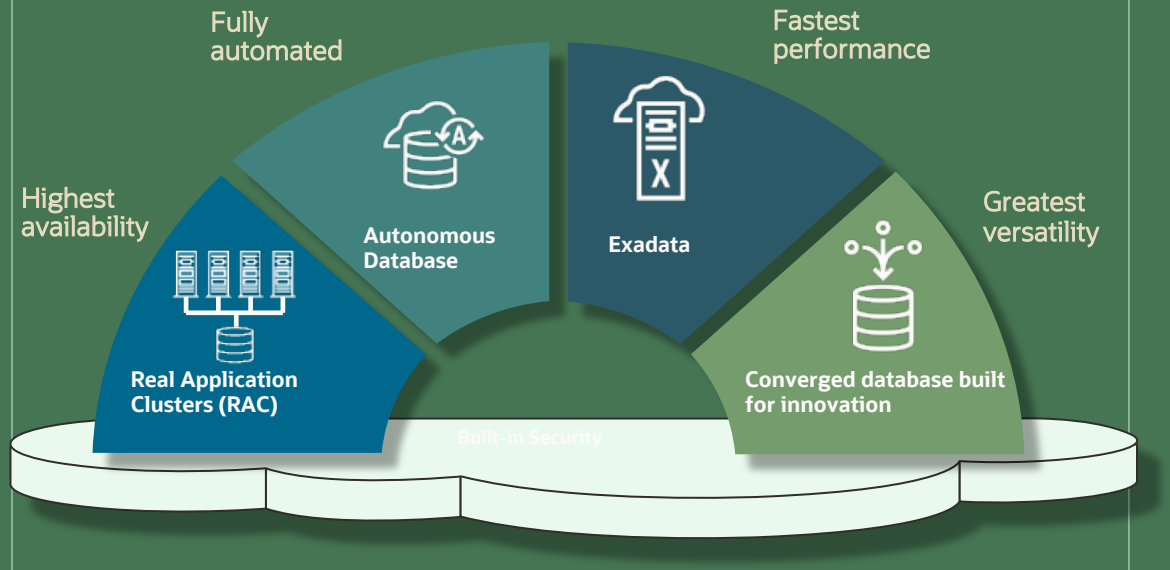
31%

of enterprise workloads are in the cloud today

Sources: S&P, Oracle, Goldman Sachs

Customers want the best of both worlds

Trusted data management



ORACLE CLOUD Infrastructure

Trusted application services

- Virtual Machines
- Azure Kubernetes Service
- App Services
- Azure DevOps
- Microsoft Entra ID
- Microsoft Fabric

Microsoft Azure

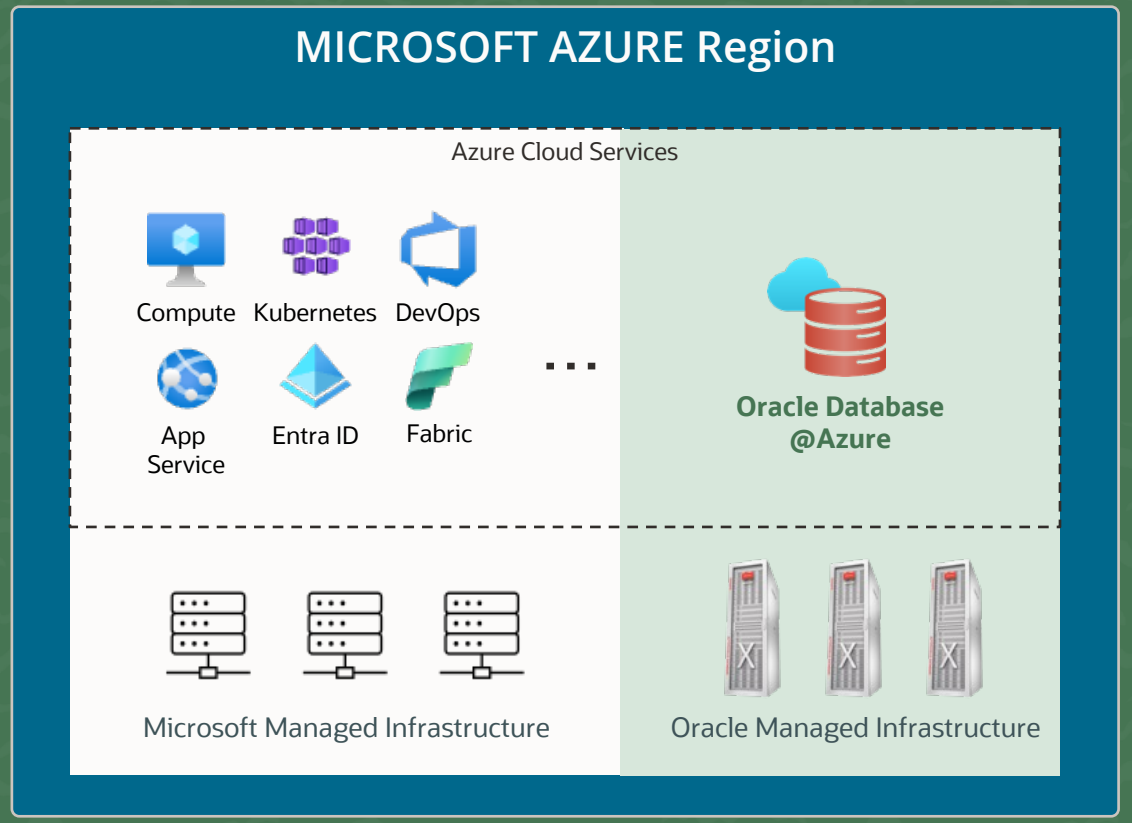
Sources: S&P, Oracle, Goldman Sachs

Introducing

Oracle Database@Azure

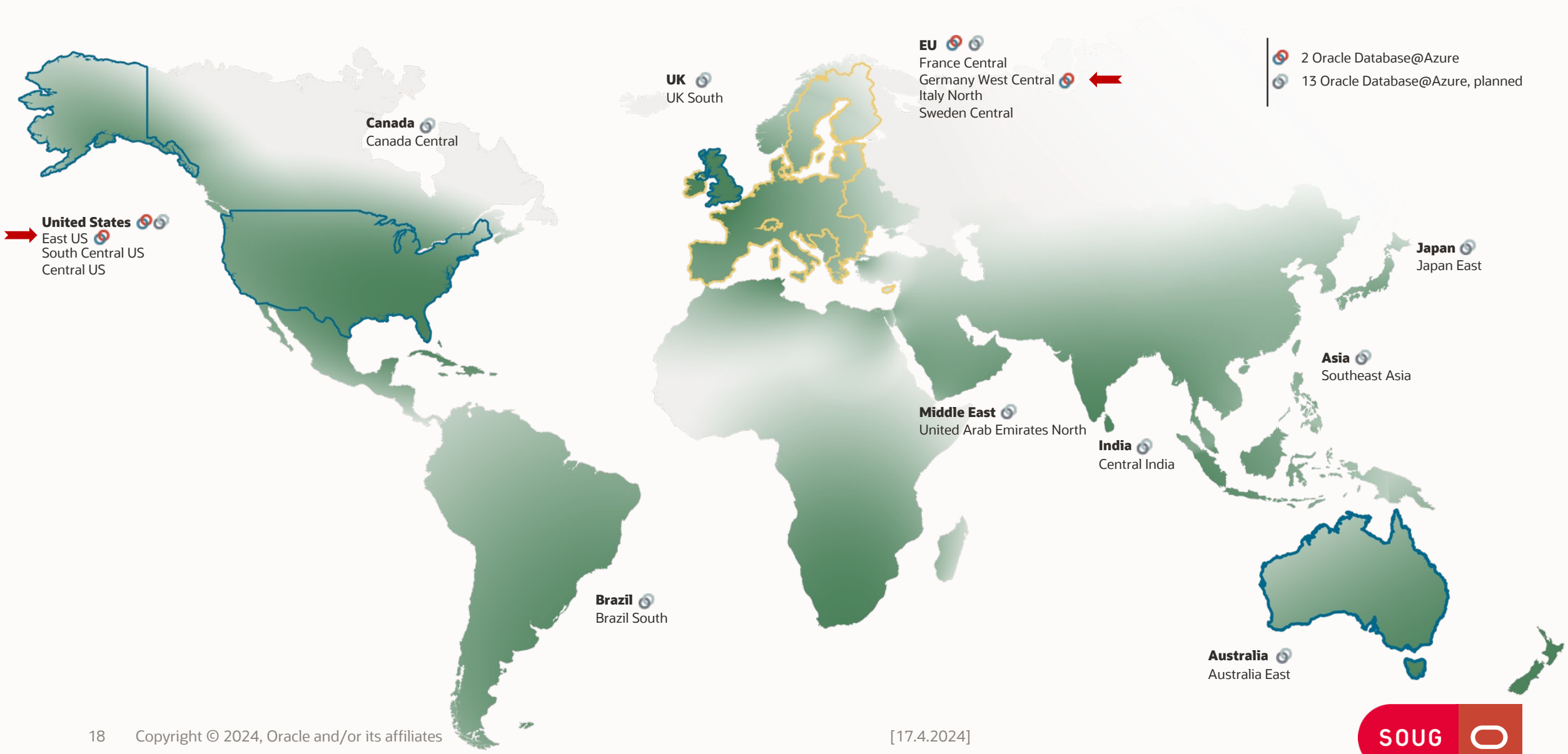
Oracle and Microsoft deliver Oracle database services on OCI in Microsoft Azure datacenters

ORACLE | Microsoft

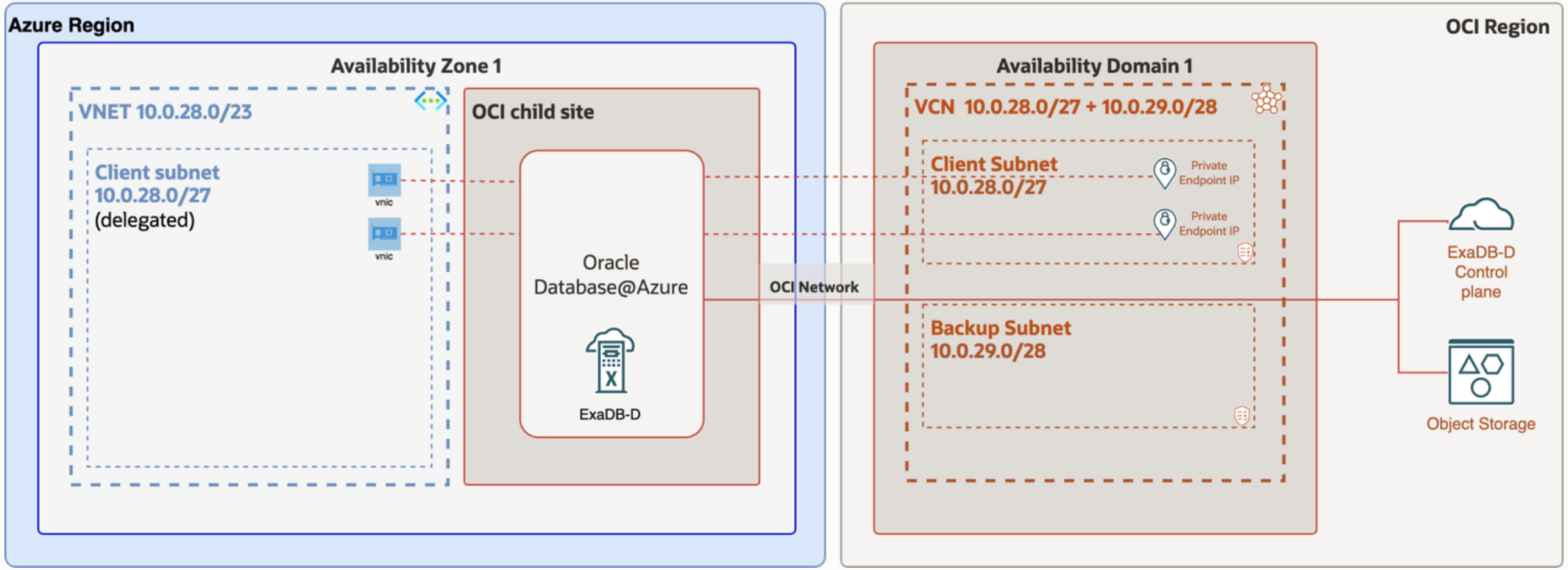


Oracle Database@Azure global footprint

March 2024



High Level Architecture – Single AZ Deployment



High Availability und Disaster Recovery

Proven Oracle Maximum Availability Architectures (MAA)

Production/ departmental (MAA Silver)

- Single AZ Database HA with RAC Active/Active clustering
- Automatic database backup
- Application continuity
- Sharding (optional)
    - Provides fault isolation, scalability and geographical distribution
- RTO/RPO = Hours to days/since last backup

Business critical (MAA Gold)

Prod/departmental +

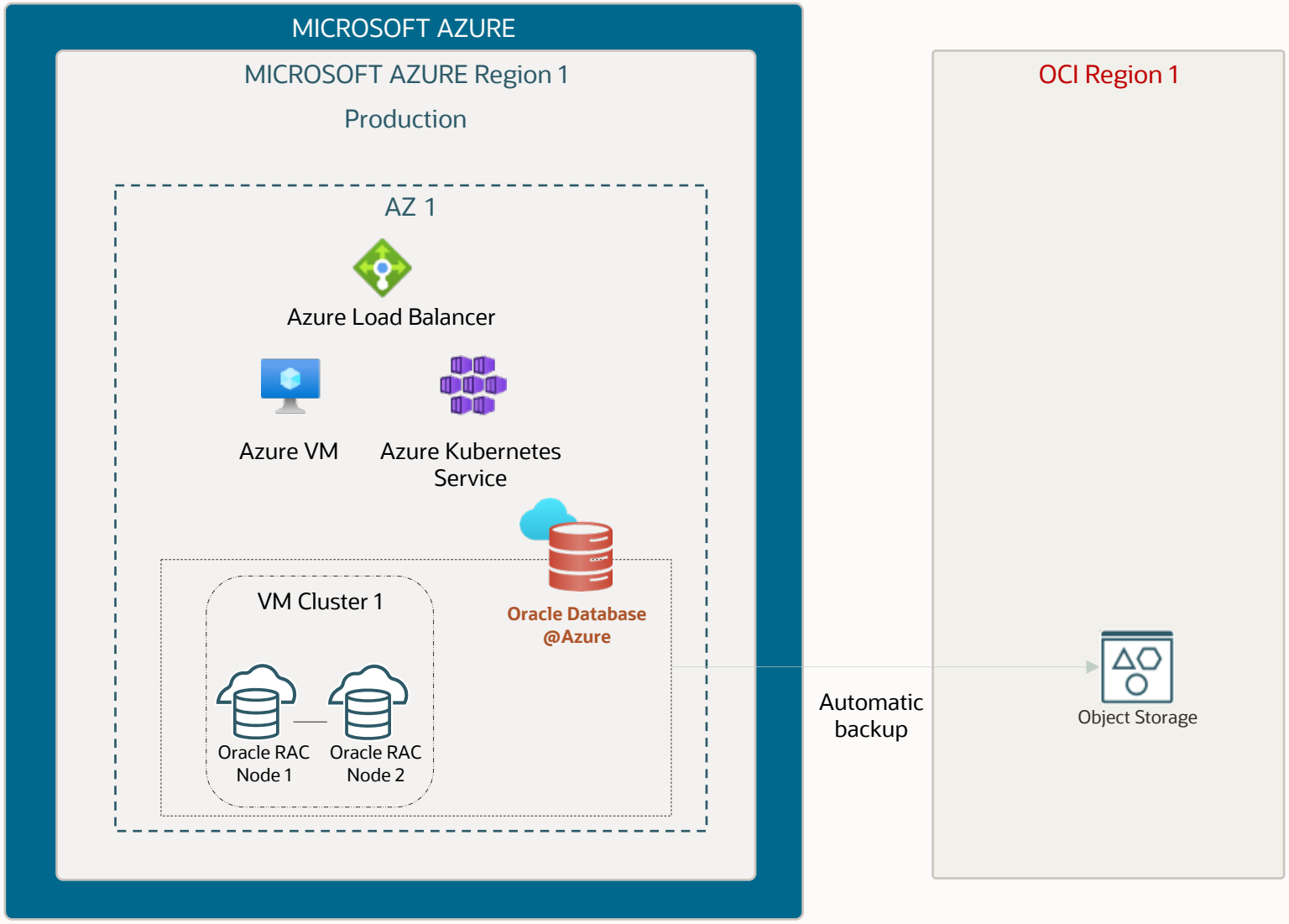
- Physical replication
- DB replication with Active Data Guard or Data Guard
    - Comprehensive data protection
- Local backup on both primary and standby
- RTO/RPO = Seconds to 2 minutes/zero or seconds

Mission critical (MAA Platinum)

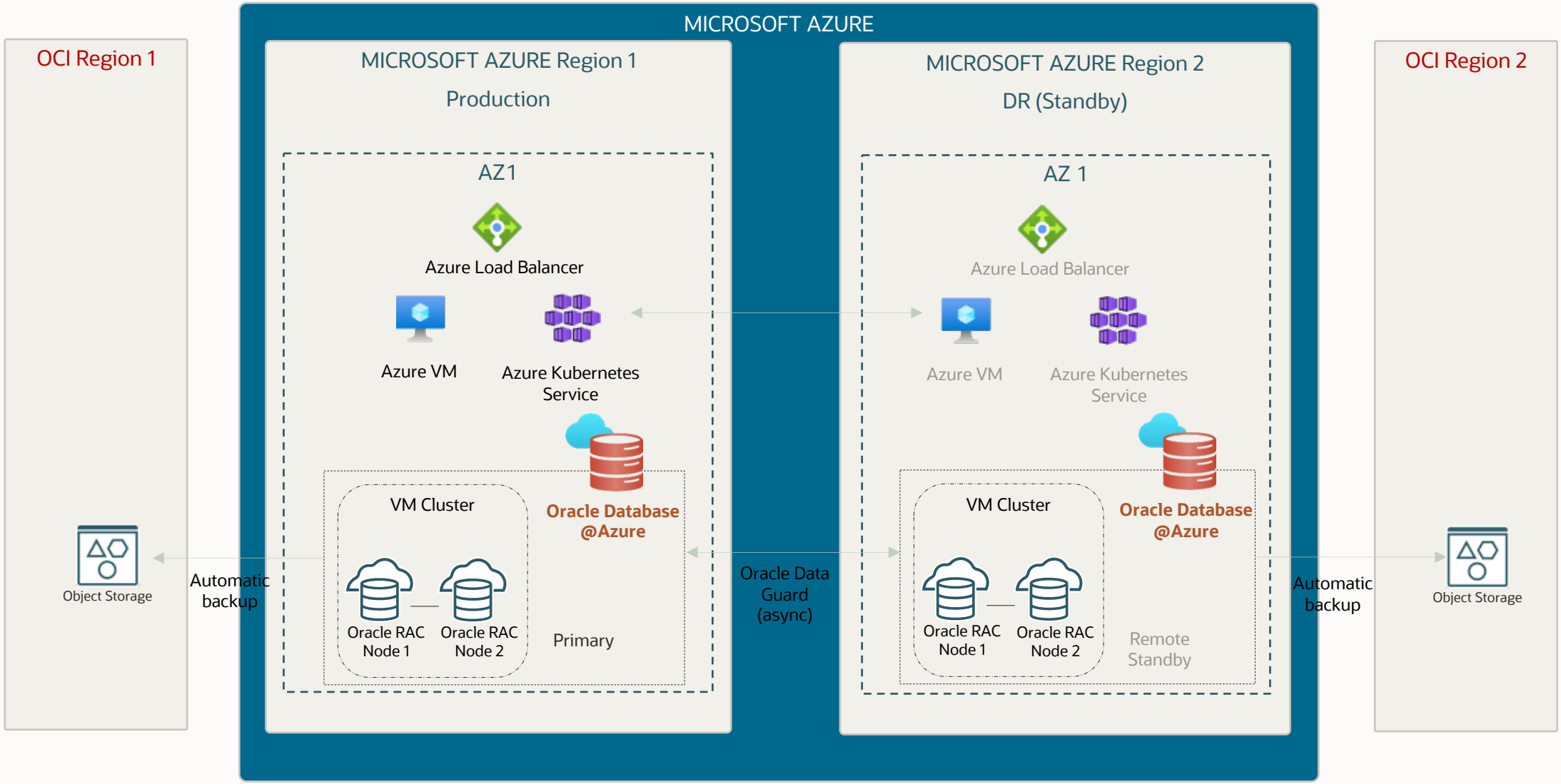
Business critical +

- Logical Active/Active replication
- DB replication with GoldenGate
- Advanced HA options
- Edition-based redefinition (Alternative)
- RTO/RPO = Zero/zero

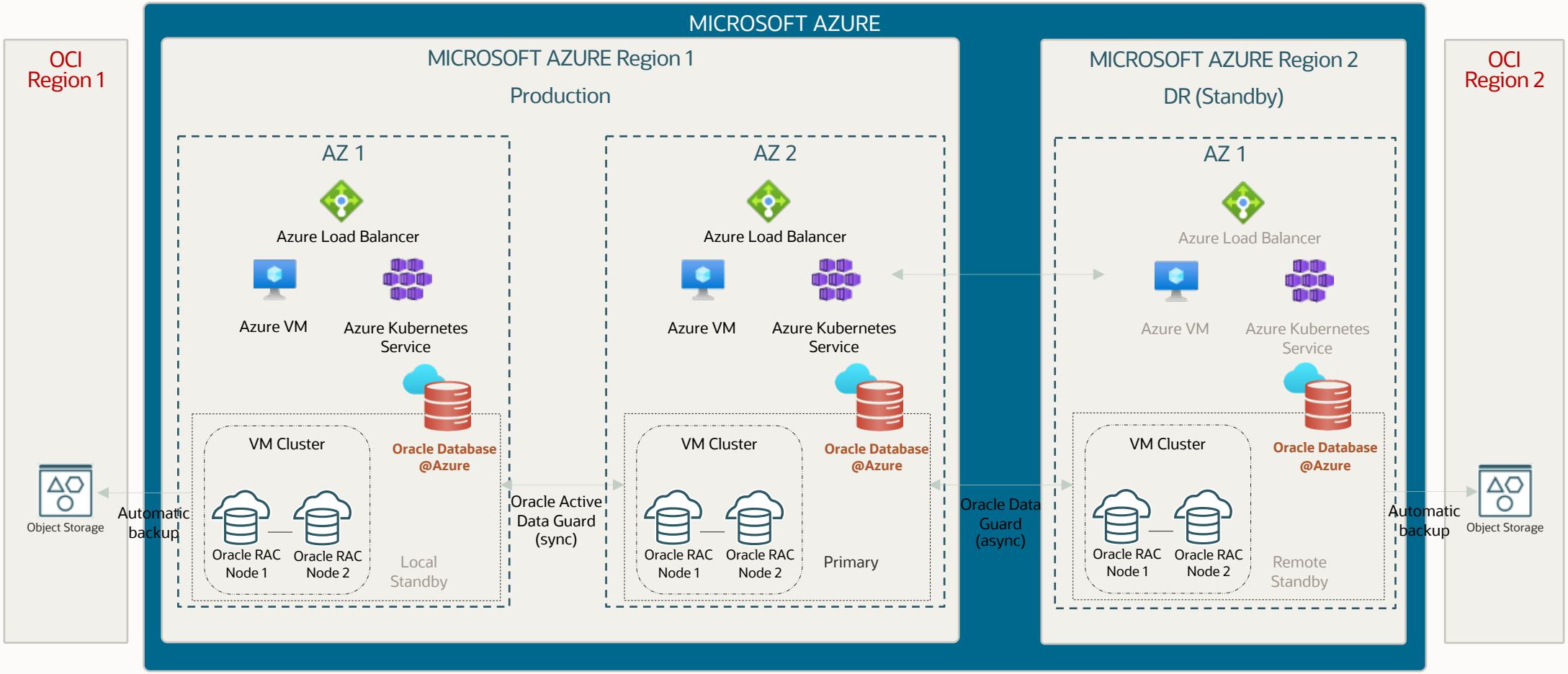
RAC High Availability architecture (Prod/departmental)



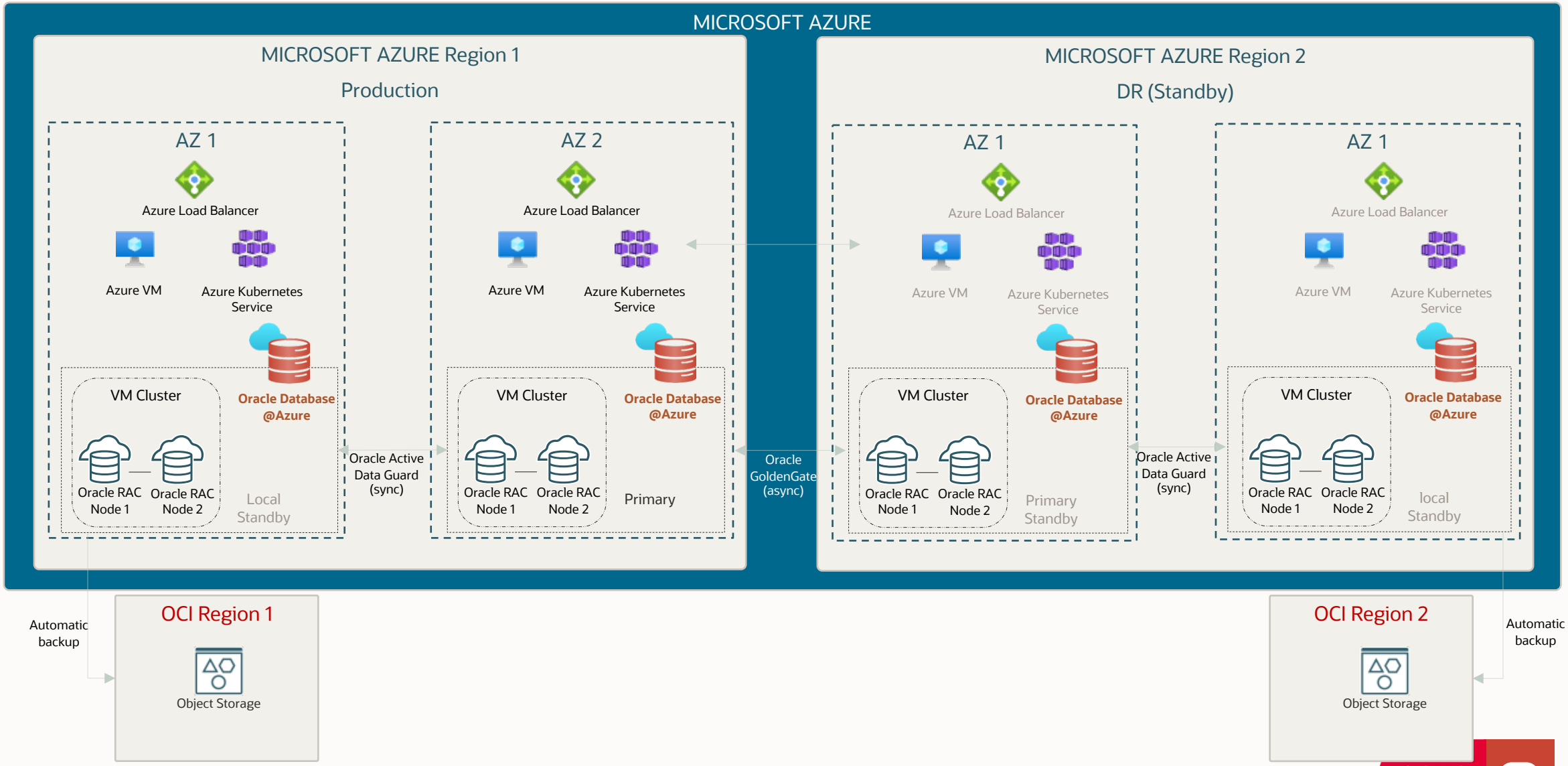
RAC High Availability + Disaster Recovery (Business critical)



RAC High Availability + Disaster Recovery (Business critical)

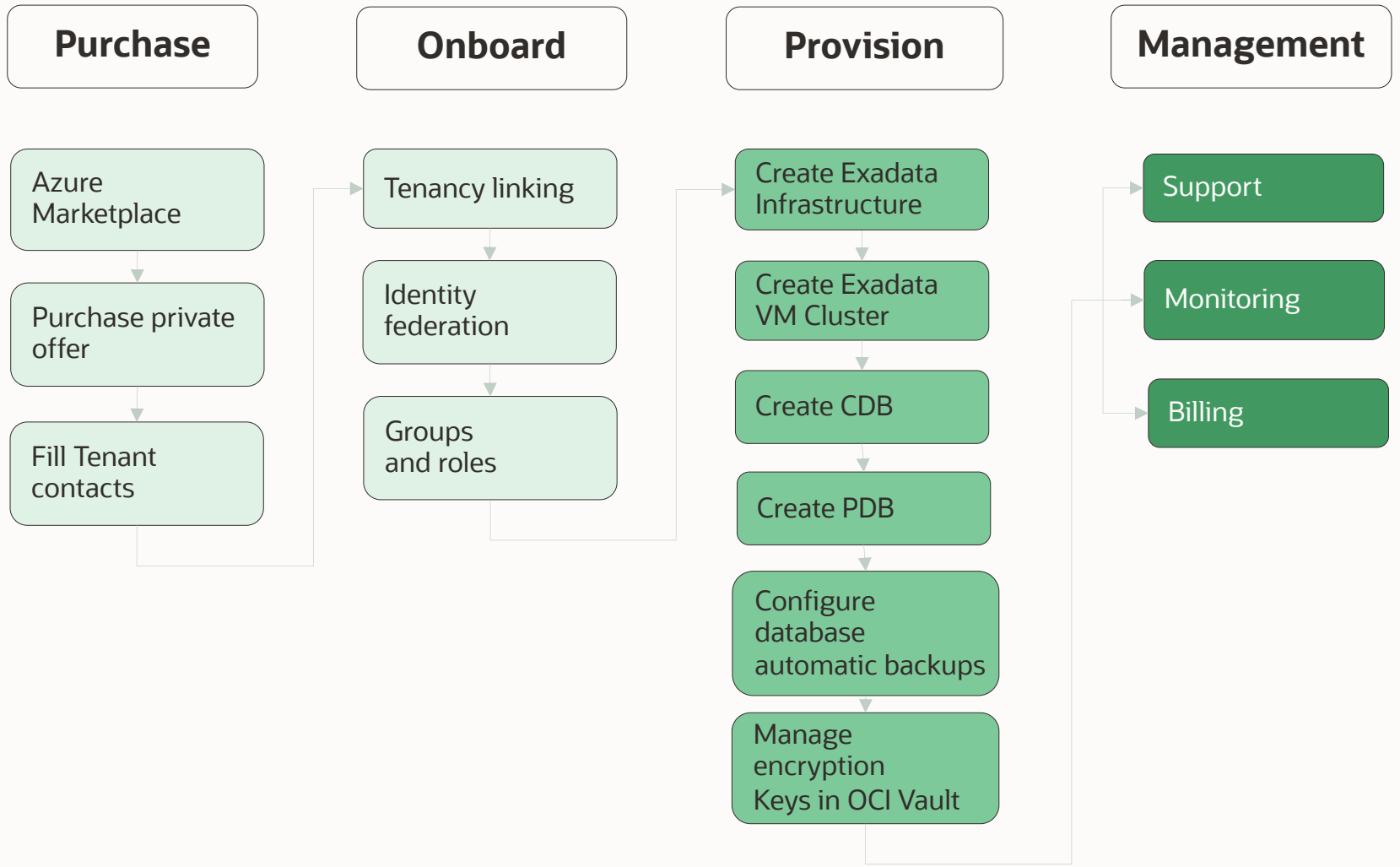


RAC High Availability + Full Disaster Recovery (Mission critical)



User Journey

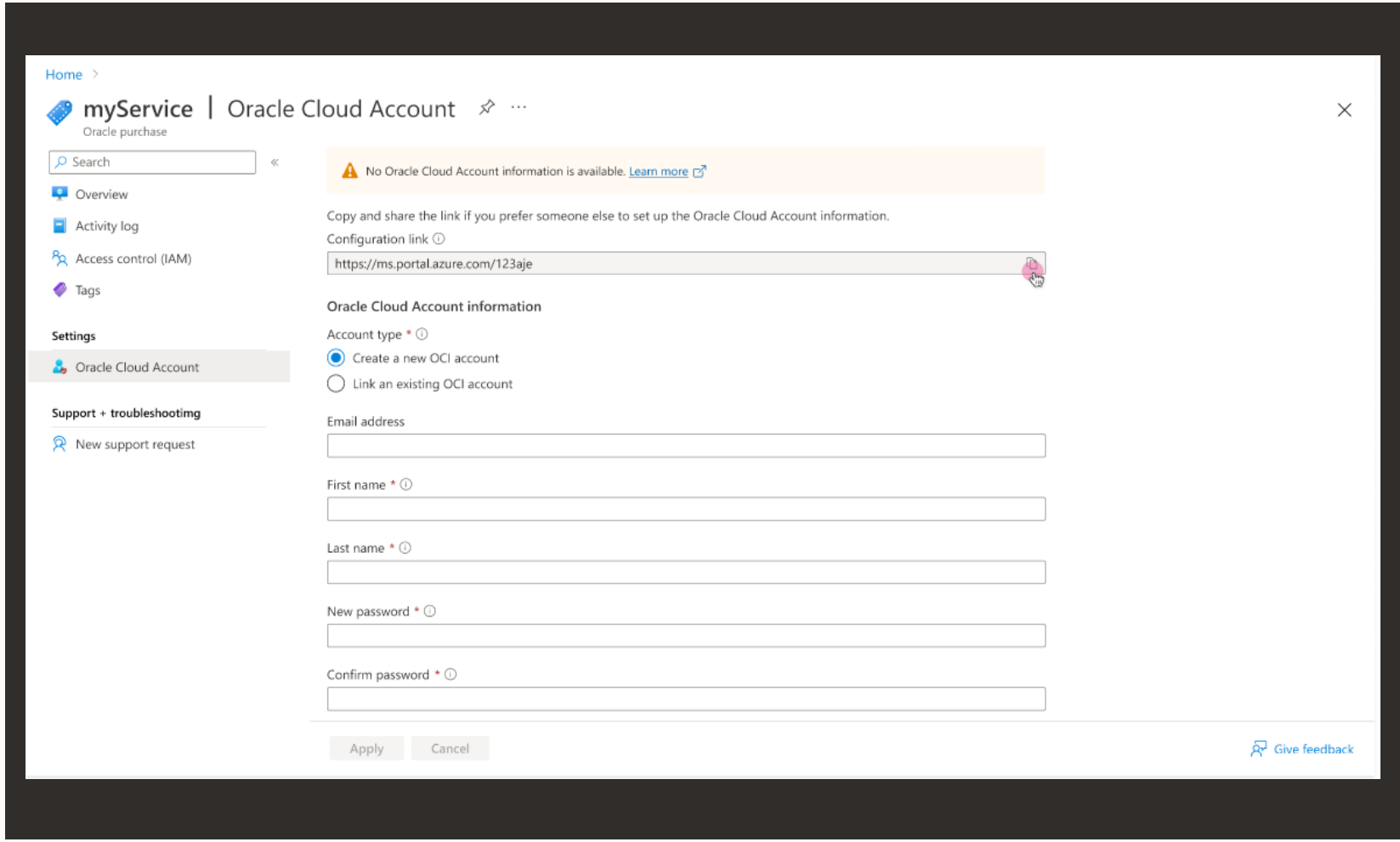
User journey overview



Azure / OCI Tenancy Linking

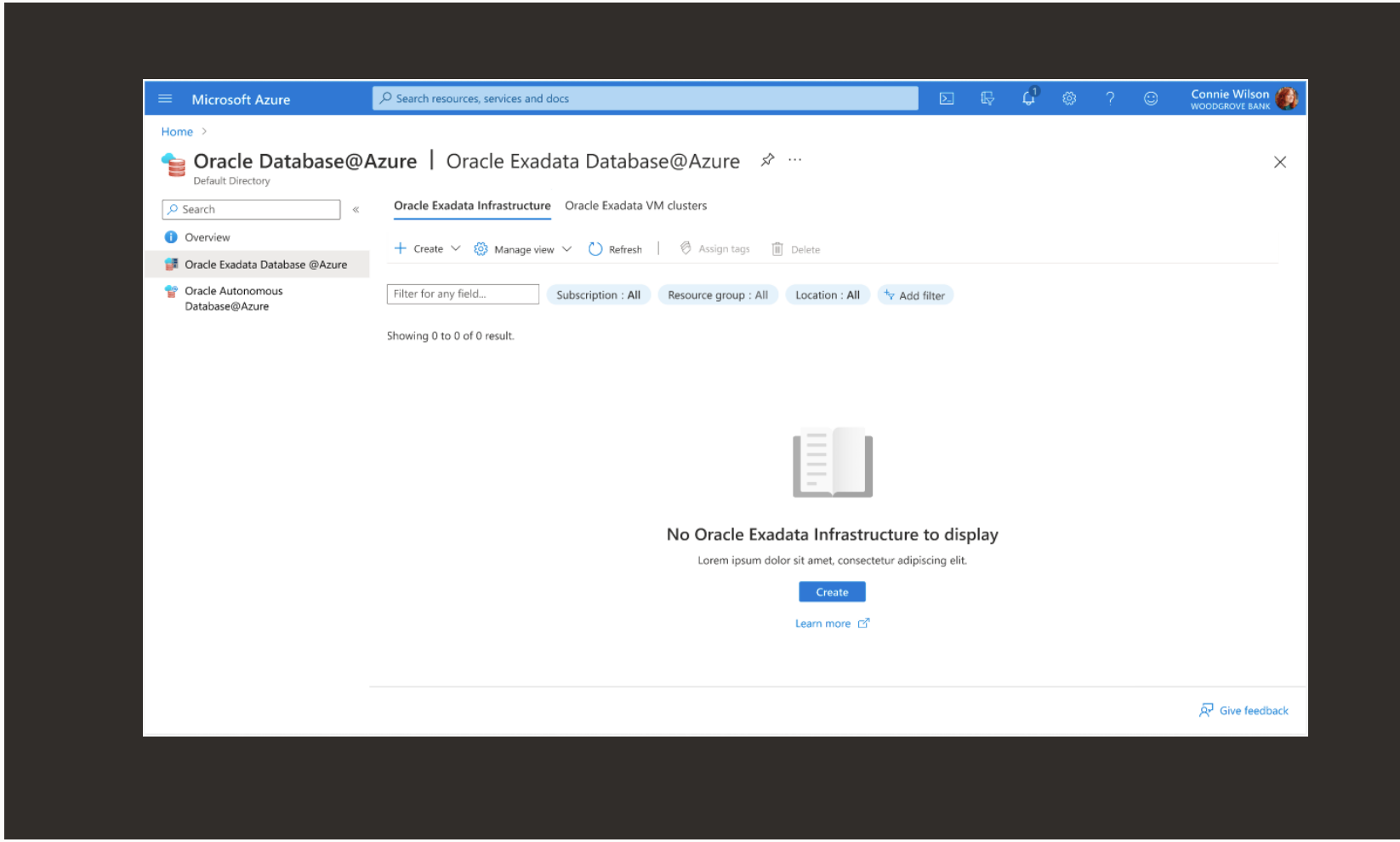
- Create new or link existing OCI tenancy
  - Information in the welcome email
  - Complete once
  - Customer has full control of the account

- Benefits:
  - Billing orchestration
  - Database management
  - Oracle managed updates to ExaDB-D
  - Oracle managed backups for ExaDB-D



Provision Exadata Infrastructure

- Support BYOL and license included
- Require Oracle Database@Azure infrastructure admin group privilege
- Create the resource to reserve the Exadata infrastructure



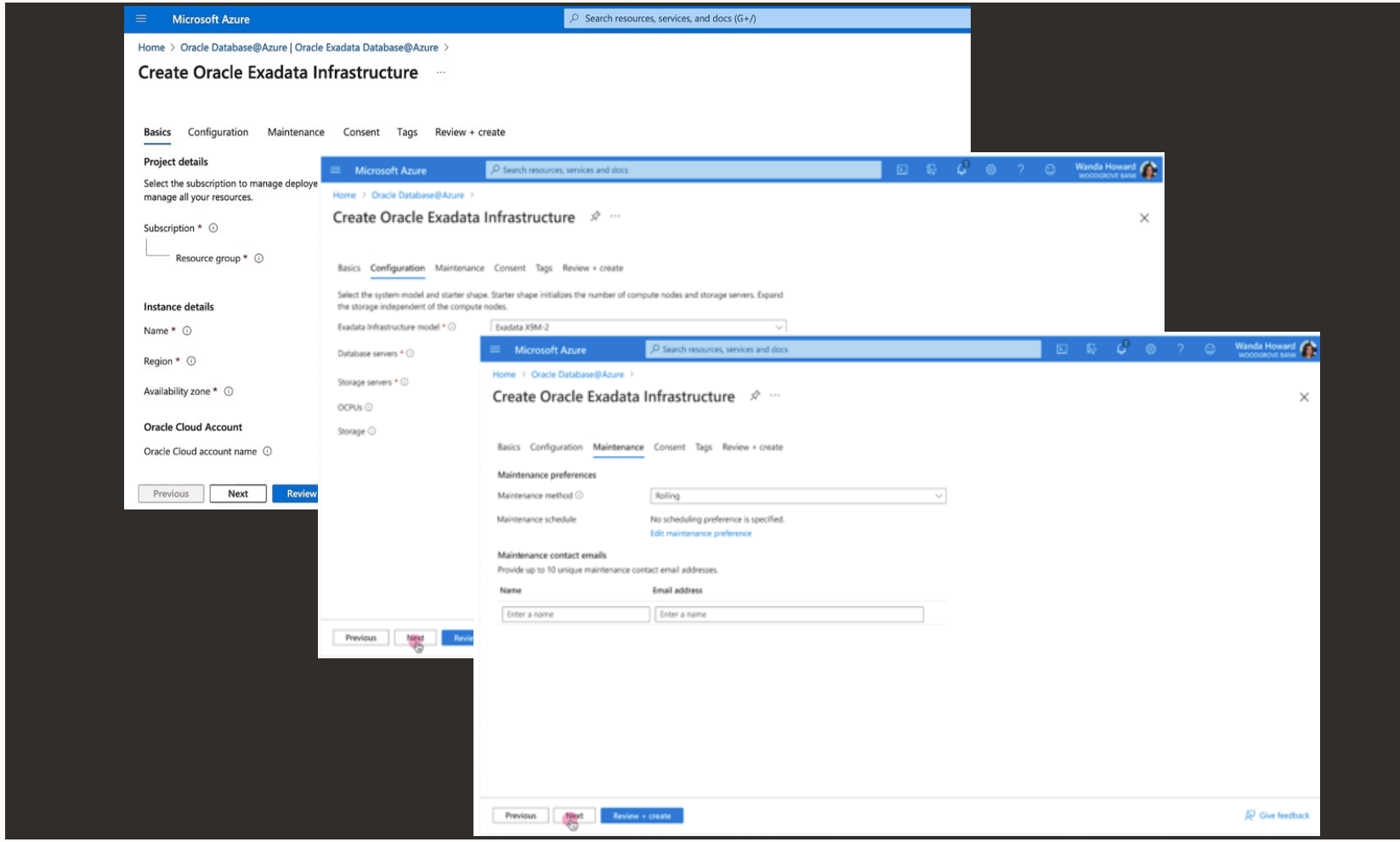
Steps to provision Exadata Infrastructure

1. Enter basic information like name, AZ, Subscription and resource group you want to deploy in

2. Choose the Exadata Infrastructure with the number of Database Servers and Storage

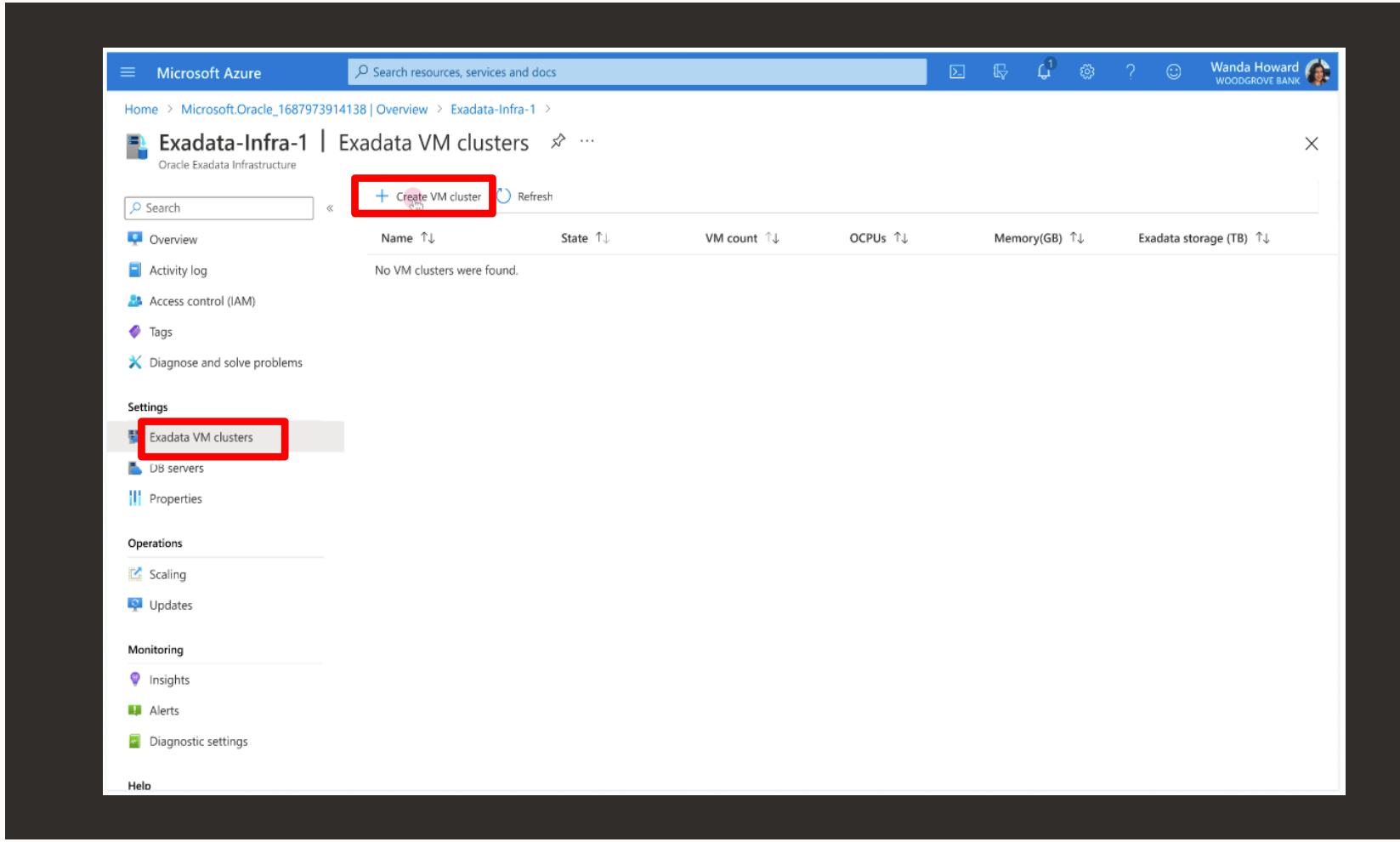
3. Select the managed patching for the infrastructure as well as the schedule

4. Once these details are entered, you can consent and provision



Provision Exadata VM Cluster

- Must be part of the Oracle Database@Azure VM cluster admin group
- Require Delegated Subnets in your Azure VNet for the Oracle Database@Azure service
- Subnets must be empty and cannot be reused



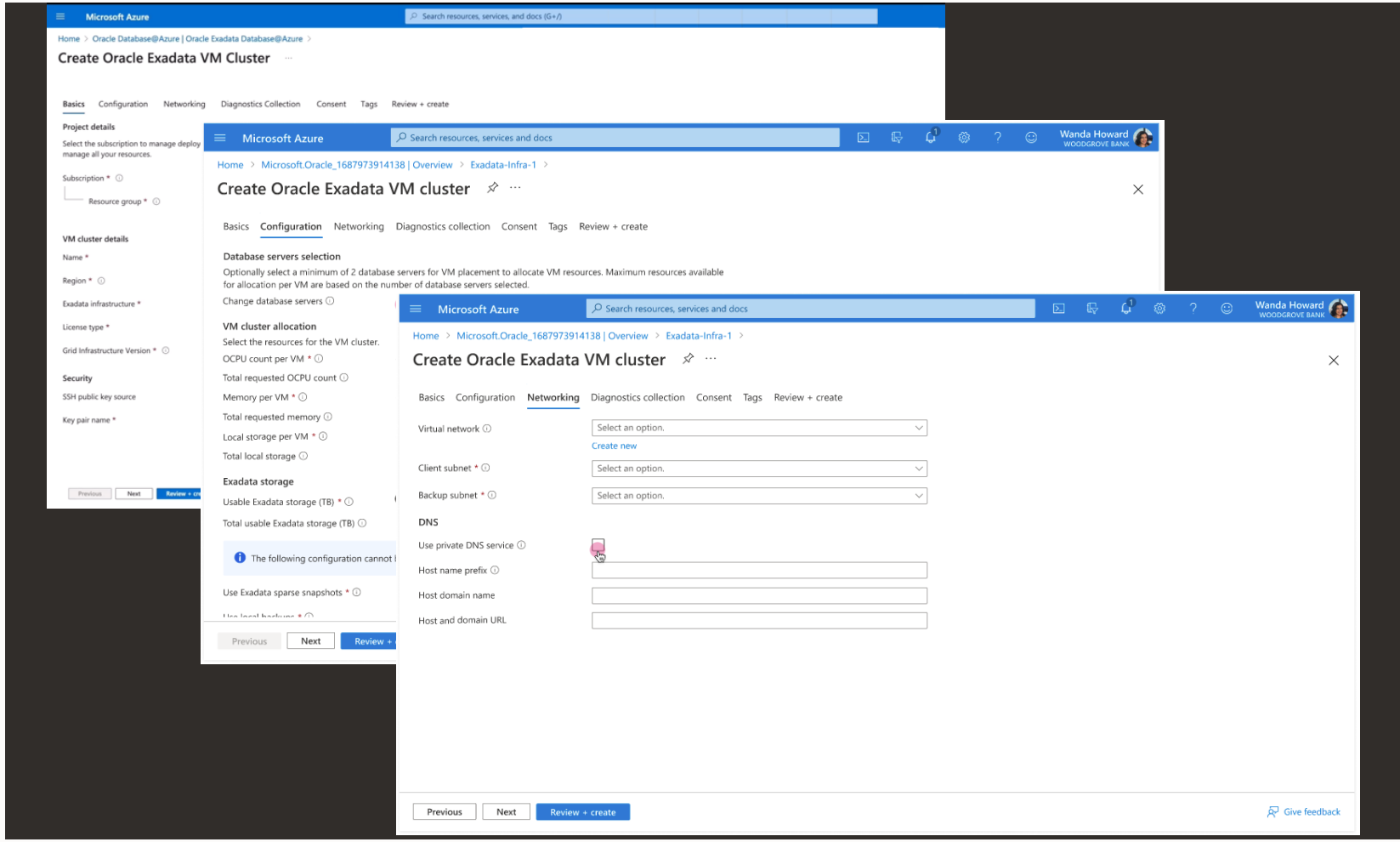
Steps to provision Exadata VM Cluster

1. Enter basic information like name, AZ, subscription and resource group you want to deploy in.

2. Select licensing type (BYOL or License Included)

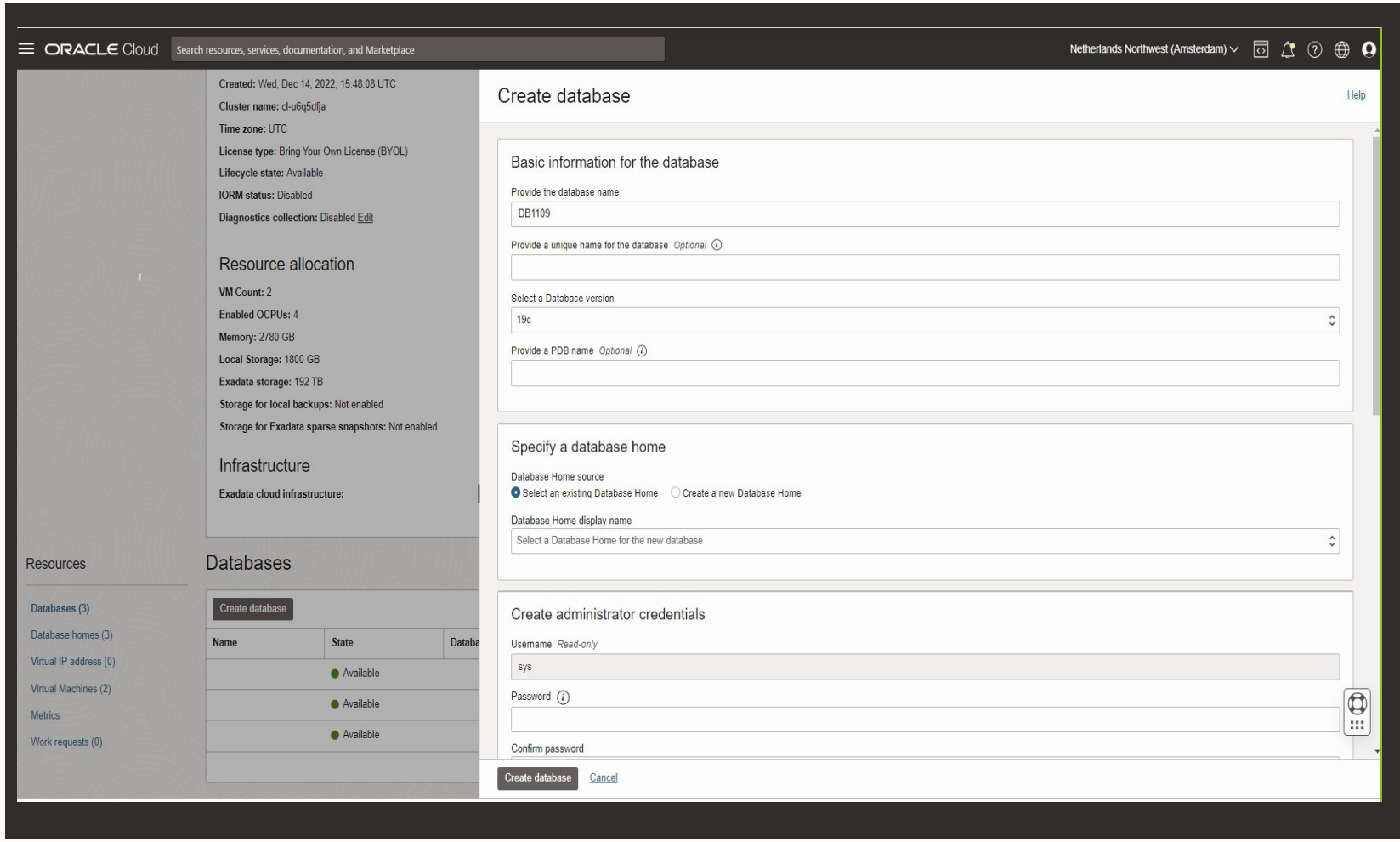
3. Allocate VM cluster resource (memory, nodes, storage, etc.).

4. Select the VNet it will be deployed and the two **Delegated Subnets**



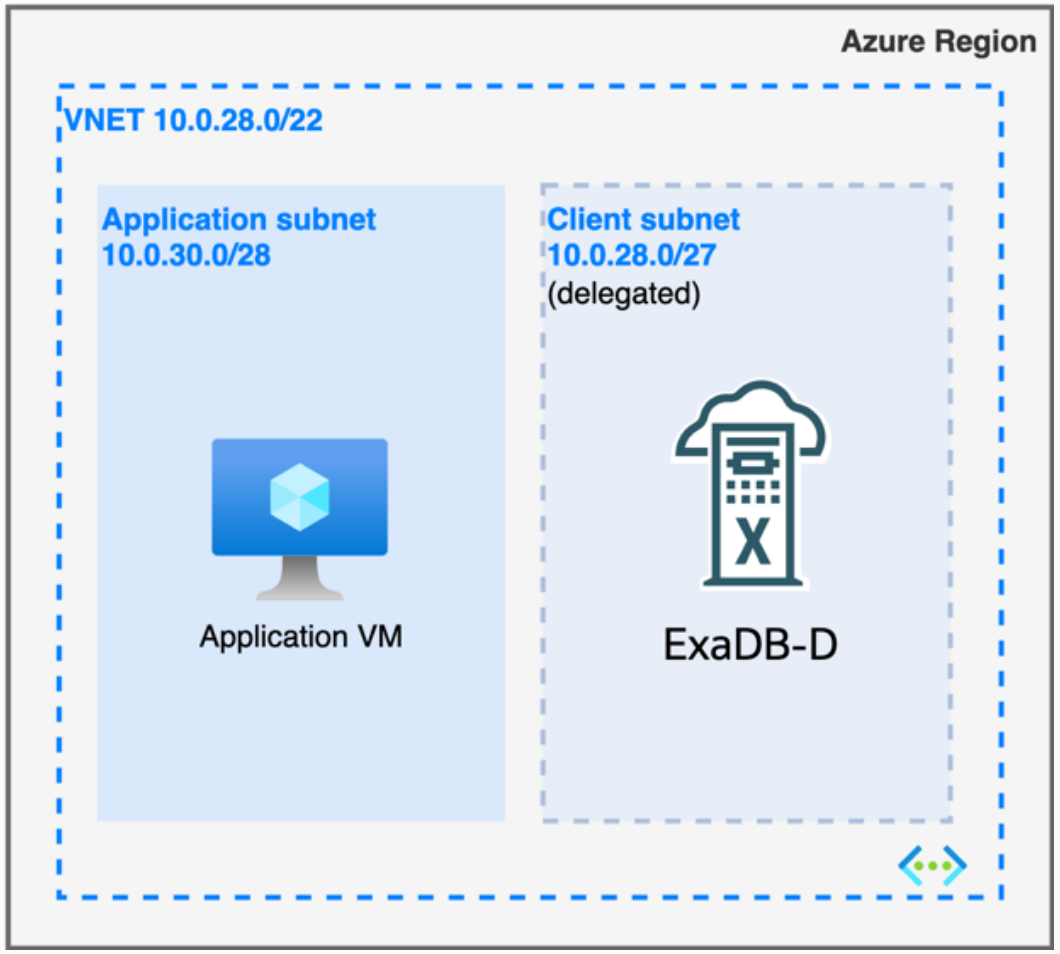
Create Database (CDB and PDB) in OCI

- Must be part of the Oracle Database@Azure CDB or PDB admin groups, depending on the operation
- In the Azure VM cluster resource page, click the OCI Database URL **Go To OCI** using the identity federation
- On the OCI console, create CDB and/or PDB



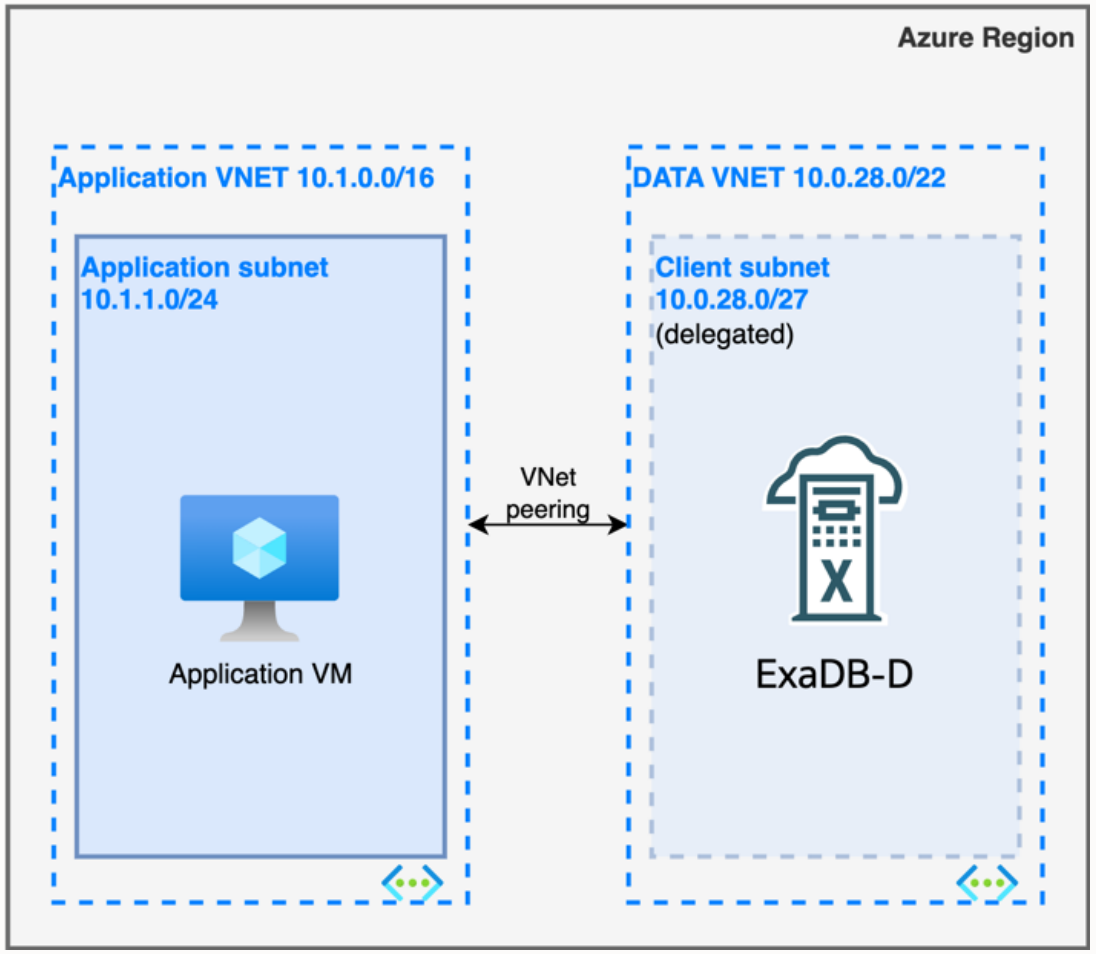
Netzwerk

Local VNet topology



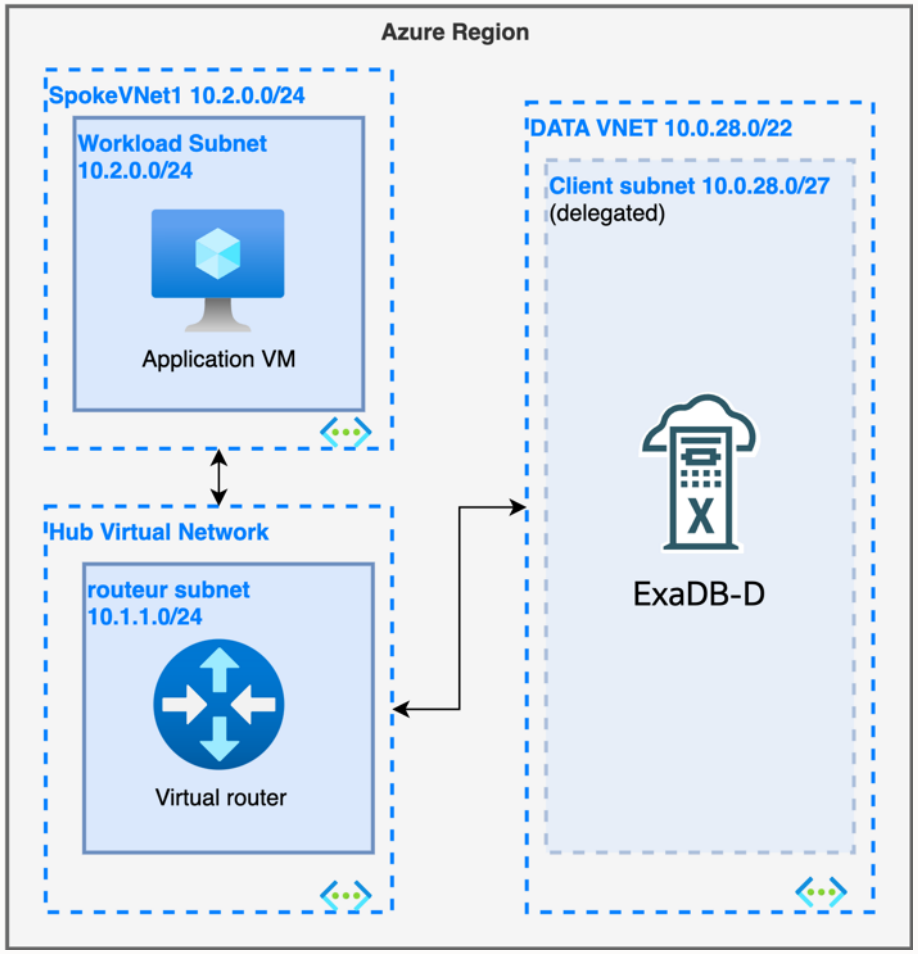
- Simple networking topology connects apps to the database in the same VNet
- App connects to database via Deleted Subnet to client subnet
- Lowest network latency
- No ingress/egress costs

VNet Peering topology



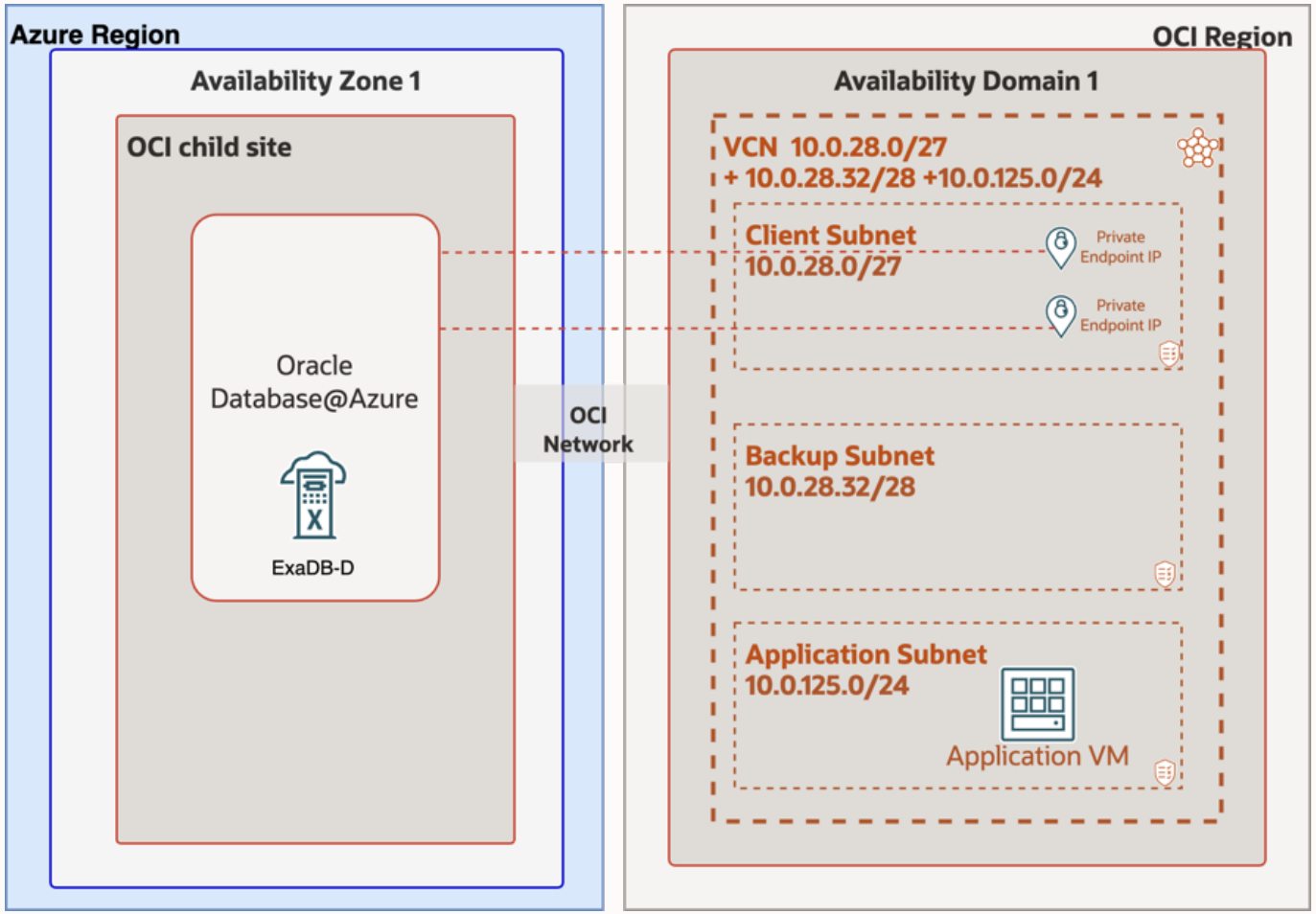
- Use local VNet Peering to connect apps in other VNet of the same region to database VNet.
- VNet Peering incurs ingress and egress costs. For more information, see Virtual Network pricing.

Hub-spoke VNet Peering topology



- The hub VNet is a central point of connectivity between apps and database;
- The spoke VNets peer with the hub.
- VNet Peering incurs ingress and egress costs. For more information, see Virtual Network pricing.
- It's not recommended for latency sensitive apps due to the additional hop.

Connect OCI application or service in same VCN



1. Create an additional subnet in the OCI shadow VCN
2. Deploy the application or service in the new subnet
3. Connect the application or service to the private endpoint of the database

Migration

Proven database migration strategies and services

Plan

- Identify sources and targets
- Prioritize business and technical planning factors
- Use free planning advisors

Prepare

- Provision resources in Azure, following the deployment process
- Simulate migrations and respond to exceptions

Execute

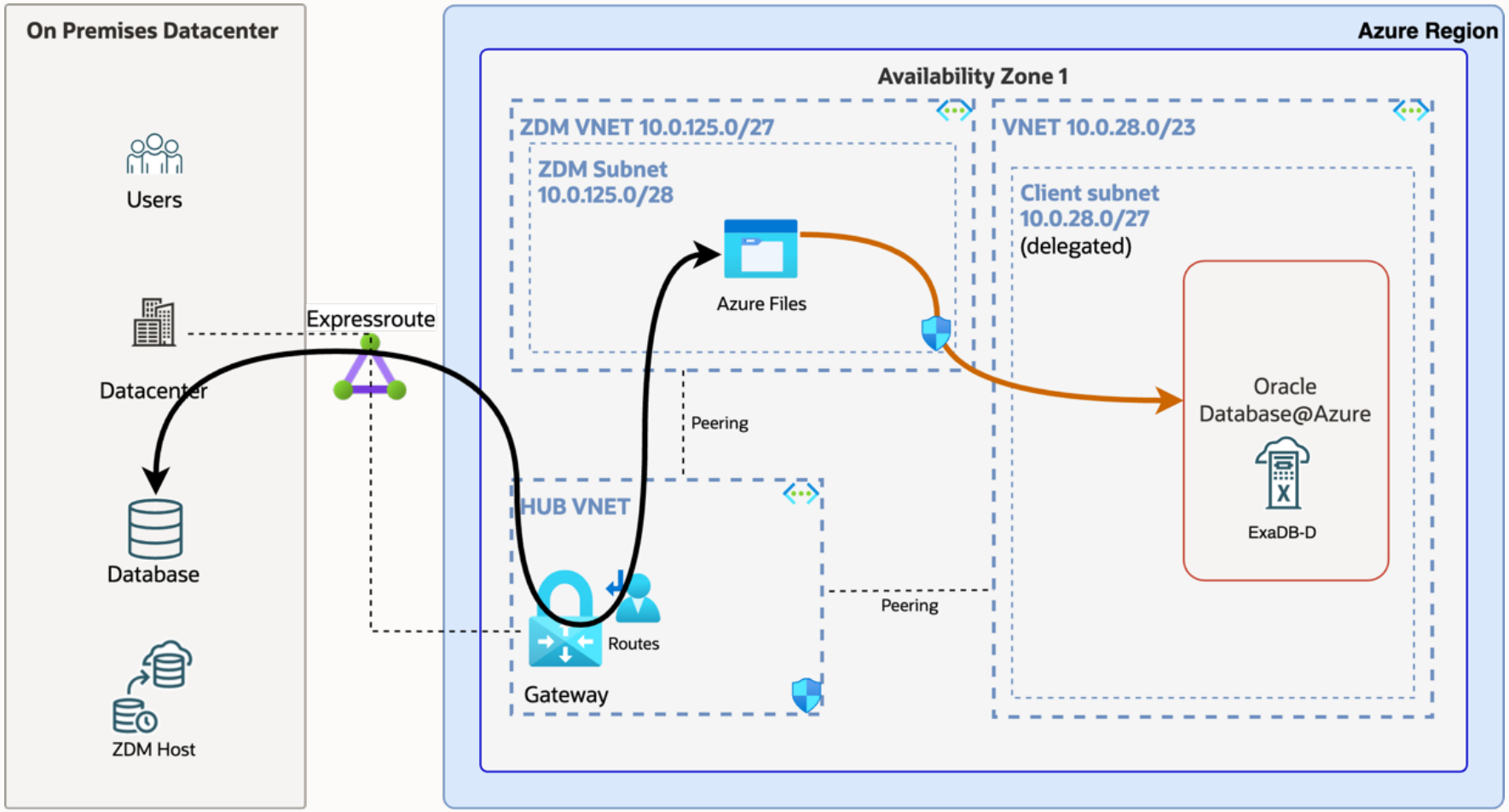
- Backup source database
- Copy source to target with Oracle Zero Downtime (ZDM)
- Capture ongoing changes and apply to target

Validate

- Confirm data movement
- Compare performance
- Switchover to new database

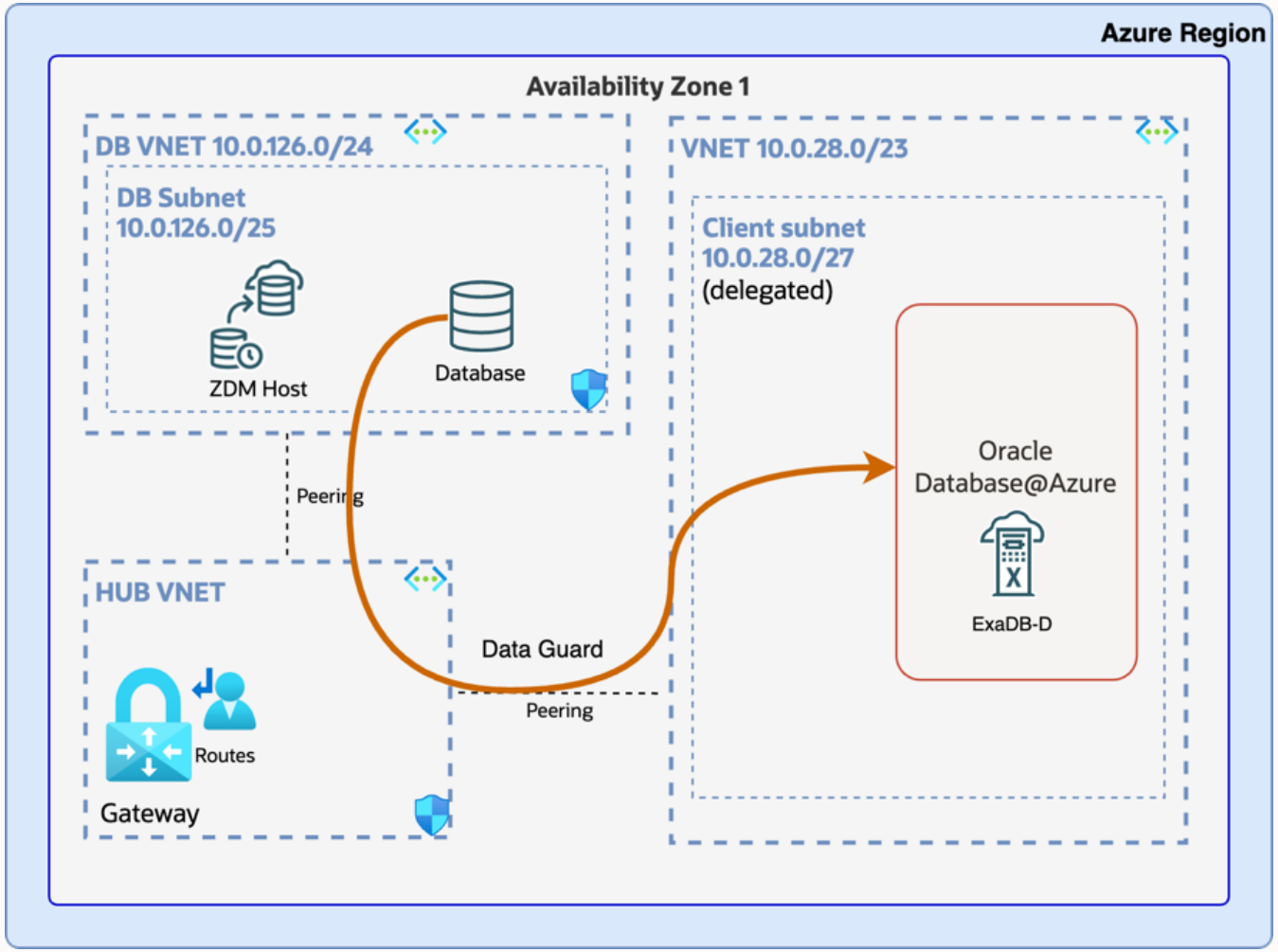
Migration with ZDM on Azure from On Premises

Physical Offline Migration



Migration with ZDM on Azure

Physical Online Migration – direct method (restore from service)

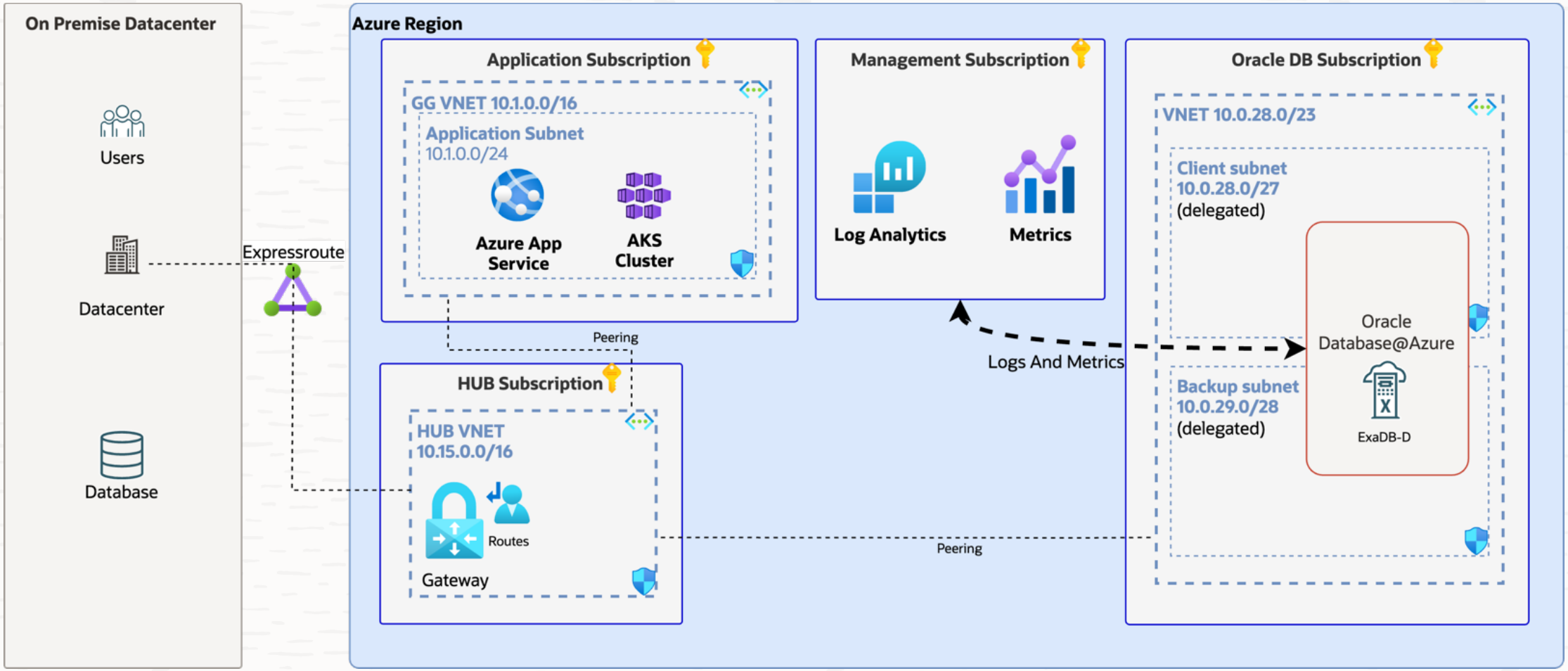


Betrieb von DB@Azure

Oracle Database@Azure Operational Resources

	Azure	OCI
Resource & Lifecycle Management	**Exadata instance management** (Infra. & VM cluster)	**Infra. & VM** scaling, maintenance **DB management** DB CRUD, backup, keys, Database connection string information
Observability	Infrastructure logs, metrics, & events database logs and metrics	Database logs and metrics
Billing, Costs & Usage	Invoice cost management	Detailed usage reporting
Support	Collaboration SR first line to OCI	

Azure Subscription Segmentation: Monitoring subscription



Monitoring & Logs

- Embedded in the resource page in Azure
- Single pane of glass
  - VM Cluster (live)
  - Database (early ‘24)
- Fully integrated with Azure Monitor
  - Create charts
  - Correlate metrics to logs
  - Set up alerts

Zusammenfassung

Services comparison

Services	OCI database services	Oracle Database@Azure	Oracle Interconnect for Microsoft Azure
Connectivity	Native in OCI	Native in Azure	Dedicated Tunnel, Customer managed
Network cost	Zero (local in OCI)	Zero (local to Azure)	ExpressRoute port and FastConnect port charges
OCI services available	ExaDB-D, ADB, Base DB, MySQL Heatwave	ExaDB-D	All OCI services
Common use cases	App DB full stack in OCI	App DB full stack in Azure	App integration, App DB split stack
SLA/SLO	ExaDB-D 99.95%; ADB 99.95%; BaseDB 99.9%; MySQL 99.95%	ExaDB-D 99.95%	Customer managed
Region availability	66 OCI regions	Azure East US	12 regions
Latency	< 100µs	< 500 µs	< 2ms
Support	OCI support	OCI and Azure collaborative	OCI and Azure collaborative
Automation	Yes	Yes	Yes
Decision points	High performance + low latency + no or low MACC	Large unmet MACC + ExaDB-D + low latency	Azure and OCI multicloud integrations / Need ADB and BaseDB immediately

Zusammenfassung

- Multi-Cloud ist eine Realität
- Die Zusammenarbeit von Oracle und Microsoft umfasst
  - Cloud Services
  - Billing
  - Support
- Daten können sowohl in Azure wie Oracle genutzt werden

Our mission is to help people see data in new ways, discover insights, unlock endless possibilities.