ORACLE

Multicloud is the new normal

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Multicloud strategies will be the new normal ?!

81% of organizations have adopted a **multicloud** IT strategy to leverage advanced capabilities across clouds. –Gartner

76% Of companies are adopting multicloud and hybrid cloud approaches. – S&P Global/451

70% of organizations have adopted multicloud or hybrid cloud strategies. –IDC

ORACLE
Cloud Infrastructure

Azure

aws

Google Cloud Platform

Alibaba Cloud

Private Cloud (On-premises)

6

Multicloud Strategies are becoming the new normal!!

- Best-of-Breed Innovation

- Multicloud Economics

- Reduces Vendor Lock-in

- Increased Redundancy

- Reduced Latency

- DevOps and Microservices

- Compliance and Governance

- Cross Cloud Platform Migration and Disaster Recovery Strategy

Multicloud *is the coordinated use of cloud computing services from two or more public cloud vendors.*

Top multicloud motivators and challenges

Motivators

- Data residency

- Cost optimization

- Business agility and innovation

- Best-of-breed cloud services and applications

- Cloud vendor lock-in concerns

Challenges

- Cloud management - operational visibility and management across clouds

- Network interconnectivity

- Data management and governance

- Workload and data mobility

- Ensuring security across clouds

OCI's portfolio of multicloud and hybrid cloud services

NEW

Public / Government Cloud Regions

Hyperscale cloud regions in 39 worldwide locations

MySQL Heatwave

OLAP & OLTP at the same instance

Exadata Cloud@Customer

Cloud Autonomous Databases, running in your data center

Microsoft Azure Interconnect

Regional low-latency integration for multicloud architectures
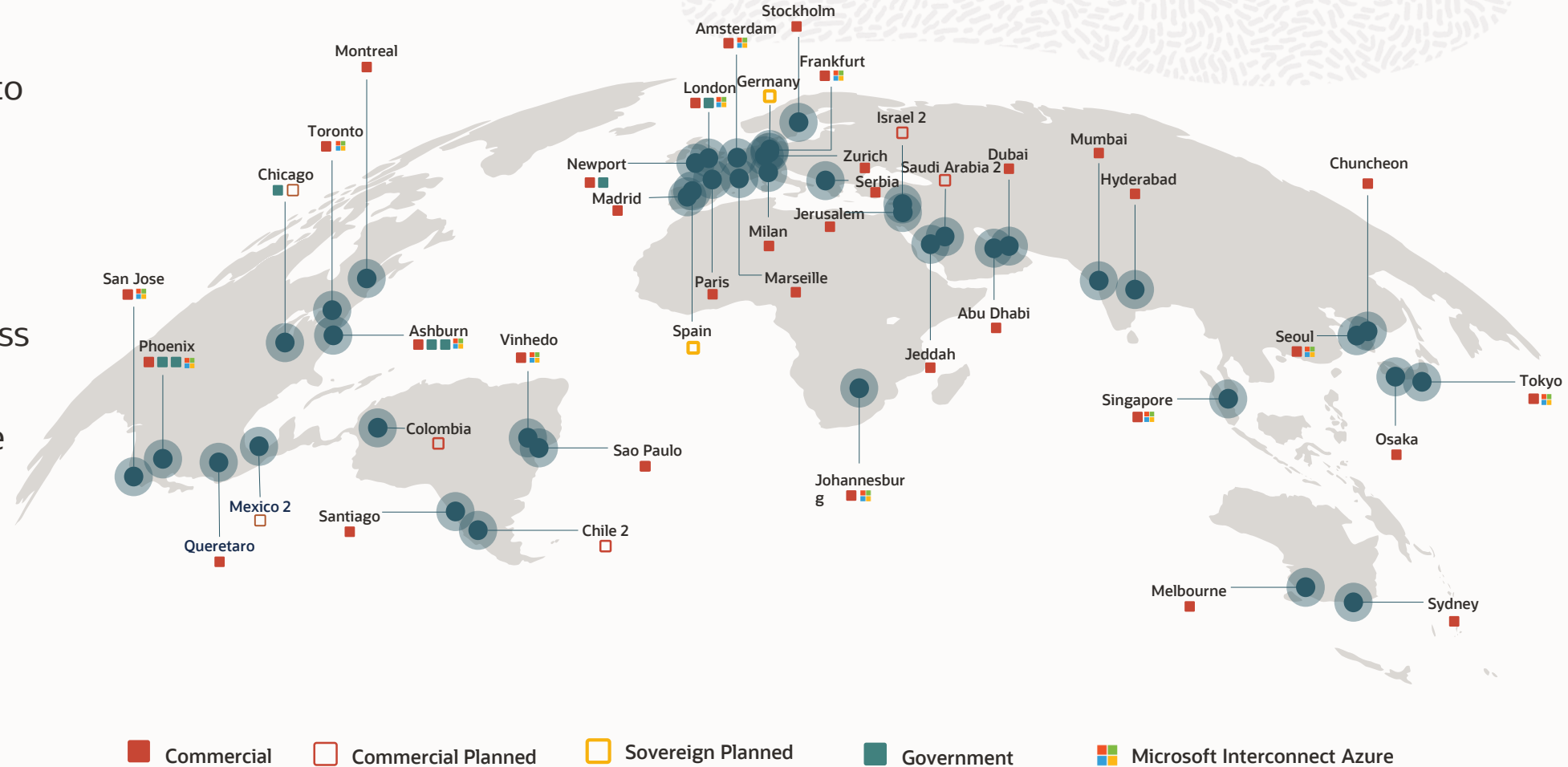
Oracle Database Service for Azure

Fully managed service for Azure customers to use Oracle databases on OCI
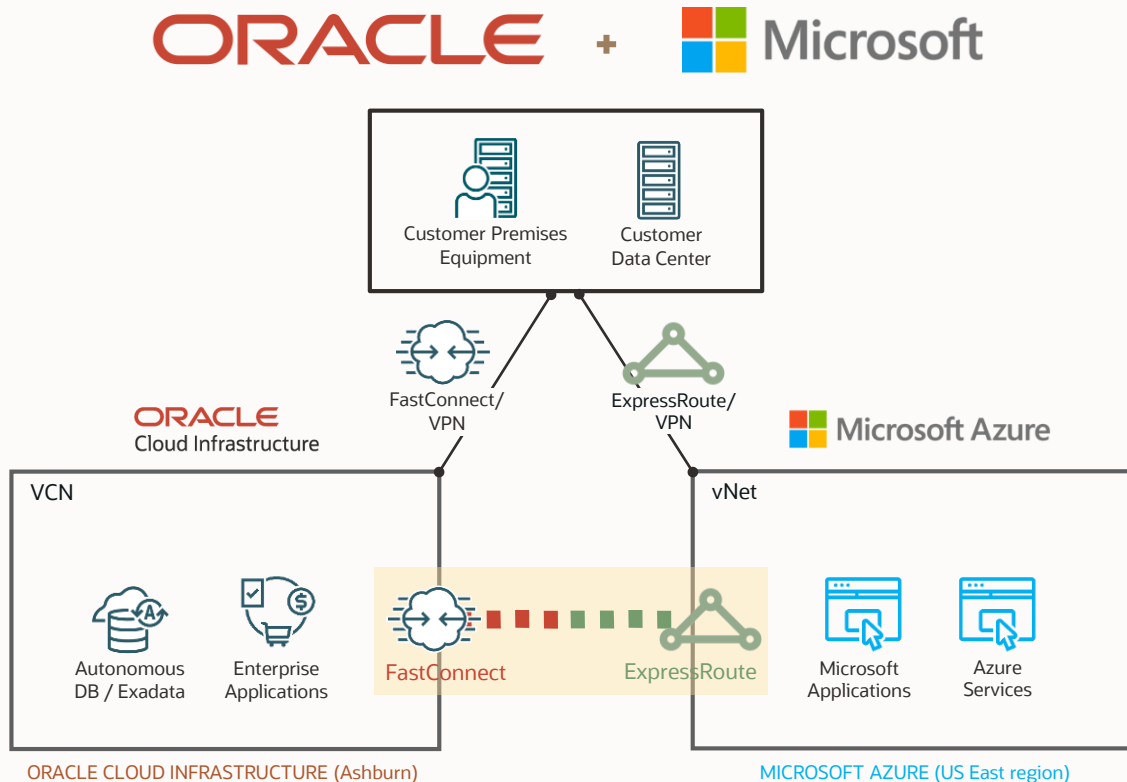
Foundation

The OCI-Azure Interconnect created the network foundation

- 12 global regions to date

- < 2 millisecond latency private interconnection

- No egress or ingress charges for data

- End-to-end secure encrypted tunnel

■ Commercial	□ Commercial Planned	□ Sovereign Planned	■ Government	■ Microsoft Interconnect Azure

Oracle Cloud and Microsoft Azure Interconnect

ORACLE + Microsoft

Customer Premises Equipment · **Customer Data Center**

FastConnect/VPN · ExpressRoute/VPN

ORACLE Cloud Infrastructure

VCN

Autonomous DB / Exadata · Enterprise Applications

FastConnect — ExpressRoute

ORACLE CLOUD INFRASTRUCTURE (Ashburn)

Microsoft Azure

vNet

Microsoft Applications · Azure Services

MICROSOFT AZURE (US East region)

- ✓ Microsoft Azure and Oracle Cloud are **interconnected today**, so you can migrate and run mission-critical enterprise workloads across clouds

- ✓ **FastConnect and ExpressRoute** direct connection with 2 millisecond latency and no intermediate service provider required

- ✓ **Unified identity and access** management via single sign-on with automated user provisioning to easily manage resources across clouds

- ✓ **Collaborative support** of workloads across clouds, for example, custom and Oracle Applications on Azure with Oracle Database cloud services – connect best-in-class services across clouds

- ✓ No inbound or outbound egress charges _over Interconnect_

- ✓ **Available Now:** Ashburn, San Jose, Vinhedo, Toronto, London, Frankfurt, Amsterdam, Tokyo

- ✓ **Coming Soon:** Government, Asia, Europe regions

More Details: https://azure.microsoft.com/en-us/pricing/details/expressroute/

Introducing the Oracle Database Service for Azure
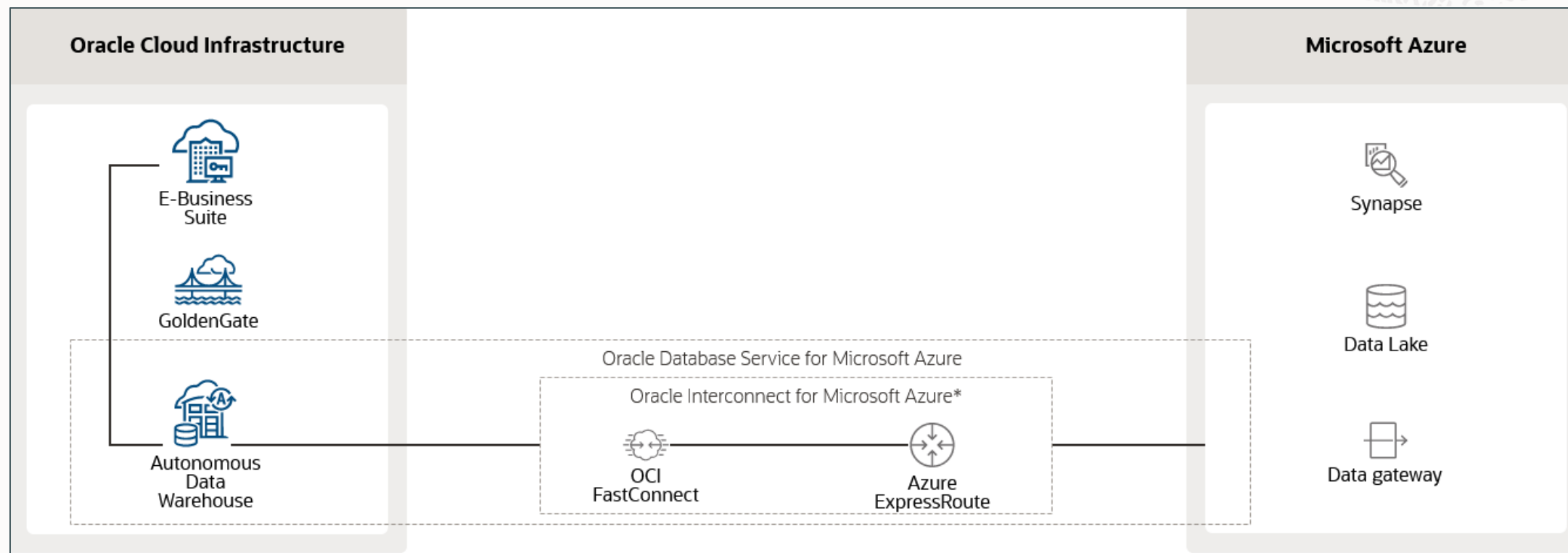
An Oracle managed service that enables customers to easily provision and manage Oracle databases running on OCI using an Azure-native API and console experience.

Familiar experience to Azure users
Access OCI database services

Now includes MySQL Heatwave

1. Connect Azure and OCI

2. Provision OCI databases

3. Use your OCI database like an Azure resource

4. OCI manages Azure to OCI networking

Oracle Database Service for Azure benefits

Seamless and secure interoperability

- Familiar Azure-native user experience
- Automated identity, networking, and monitoring integration
- Private interconnect and networking
- Use Microsoft Azure services with OCI databases together
- Collaborative support

Enterprise-grade cloud services

- < 2 ms latency private interconnect – suitable for nearly any app
- Zero downtime high availability with native Oracle RAC
- Scales up to 31 PB data warehouses and 10 million+ SQL IOPS
- Completely hands-off, multi-modal Autonomous Database
- Combine OLTP, OLAP, and ML into one MySQL Database service with MySQL HeatWave

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Cloud Infrastructure
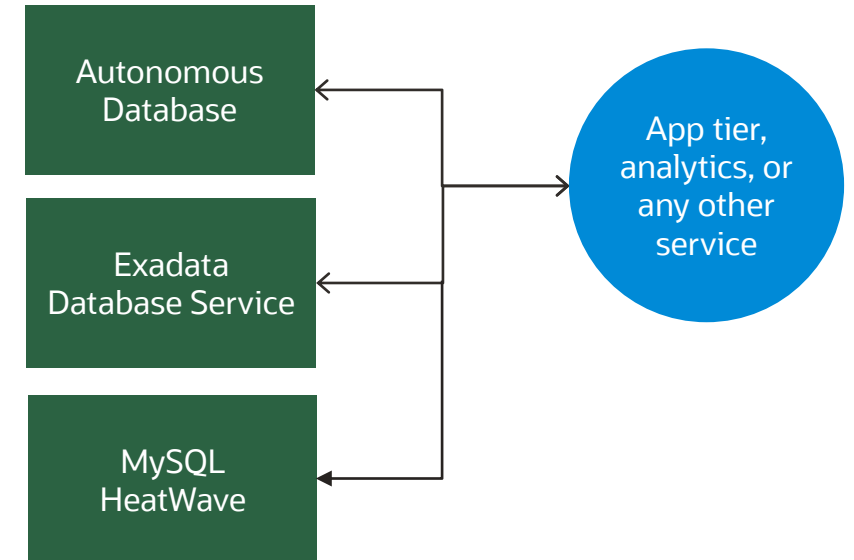
Microsoft Azure

Autonomous Database

Exadata Database Service

MySQL HeatWave

App tier, analytics, or any other service

ODSA creates more options for customers to harness cloud innovation

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Cloud Infrastructure

Build with the best of OCI and Azure services

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Cloud Infrastructure

Microsoft Azure

Autonomous Database

Any Azure Analytics

- Power BI
- Synapse
- HDInsights
- Event Clusters

Any Azure App

- App Services
- Kubernetes
- Virtual Machines
- Functions
- Containers

Use fully managed Oracle Databases with Azure

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Cloud Infrastructure

Microsoft Azure

Autonomous Database

eCommerce App

Customer-managed Oracle DB

Run exclusive OCI database services with Azure

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Cloud Infrastructure

Microsoft Azure

Exadata Database Service

App Tier

On-Prem

Exadata Database Machine

App

ODSA creates more options for customers to harness cloud innovation

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Cloud Infrastructure

Build with the best of OCI and Azure services

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Cloud Infrastructure

MySQL HeatWave

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Any Azure Analytics

- Power BI
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Any Azure App

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Use fully managed Oracle Databases with Azure

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Cloud Infrastructure

MySQL HeatWave

Microsoft Azure

Marketing analytics app
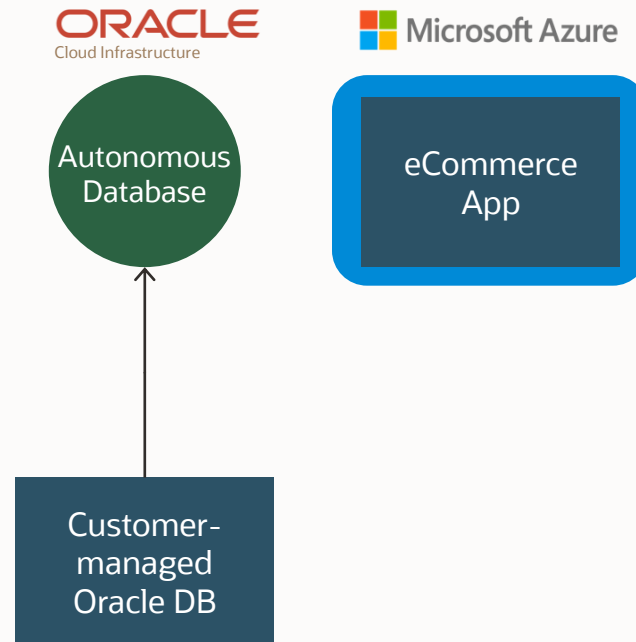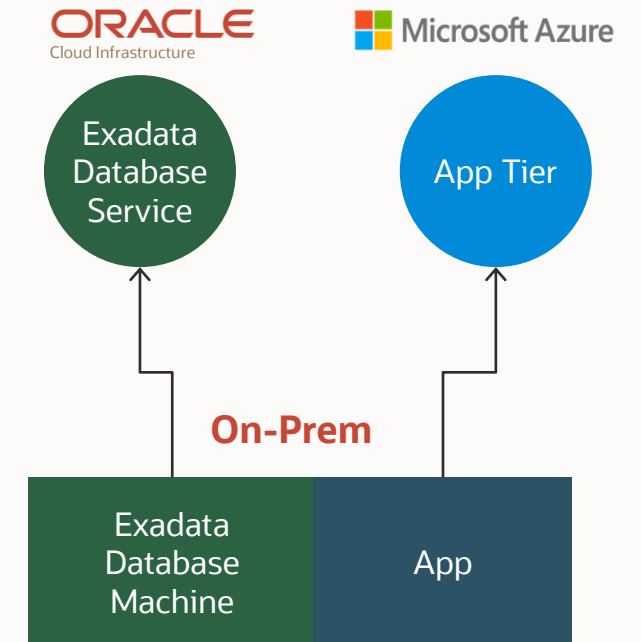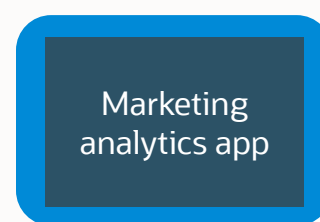
Customer-managed MySQL database for transactions + analytics database + ML tools + ETL processes between data stores

WIKIBON

"The MySQL HeatWave technology is by far the **best in the market now**...Wikibon strongly recommends that enterprise IT departments set a three-year plan to **eliminate separate OLAP databases and ETL** from MySQL transactional databases."

IDC

"HeatWave ML promises to be **a game-changer for application developers and a broad range of data analysts and scientists.**"

2. Use fully managed Oracle Databases with Azure

Customer Profile

Applications using Oracle database software, regardless of deployment location or feature set

Triggers:

- Higher availability or resilience needs
- Higher performance needs
- Greater database capacity needed
- Desire reduction in database maintenance

Oracle Database Service for Azure

Benefits to IT staff:

- No OCI or new Oracle Database skills needed
- On-demand provisioning in minutes
- 80% reduction in admin tasks
- Operate like other Azure resources

Technical benefits of Autonomous Database:

- Zero downtime configurations (for failures and planned maintenance)
- Non-disruptive scaling

3. Run exclusive OCI database services with Azure

ORACLE
Cloud Infrastructure

Customer Profile

Applications using Oracle databases

- Exadata Database Machine
- Databases with Real Application Clusters (RAC)

Triggers:

- Azure migration
- Hardware refresh
- IT strategy change

With Oracle Database Service for Azure

Benefits to IT staff:

- No OCI or new Oracle Database skills needed
- On-demand provisioning in minutes
- No application re-architecture required

Technical benefits:

Exadata Database Service:

- **Scalability:** Up to 31 PB databases with Exadata Database Service
- **Performance:** 10's of millions of IOPs

Real Application Clusters (RAC) on OCI:

- High availability
- Fast scaling

4. Run exclusive OCI database services with Azure

Customer Profile

Applications using MySQL databases

- MySQL HeatWave

Triggers:

- Need for real-time analytics/higher query performance
- Eliminate separate analytics databases
- Eliminate separate ML tools
- Eliminate the complexity, latency, and security risks of ETL between data stores
- Increase automation
- Reduce costs

With Oracle Database Service for Azure

Benefits to IT staff:

- No OCI or new Oracle Database skills needed
- On-demand provisioning in minutes
- No application re-architecture required
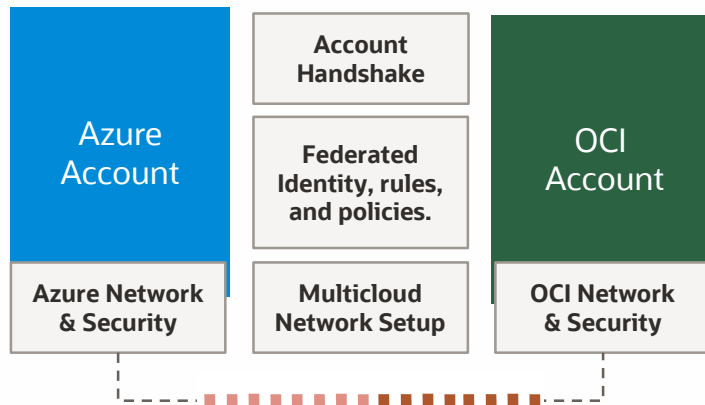
Technical benefits:

MySQL HeatWave:

- Single database for transaction processing and real-time analytics
- No ETL/ELT processes and tools
- In-database Machine Learning
- ML-powered automation with MySQL Autopilot
- Increased security (no data movement and built-in advanced security features)

How does the Oracle Database Service for Azure work?

1 Guided cloud to cloud setup and configuration

Azure Account	Account Handshake	OCI Account
	Federated Identity, rules, and policies.	
Azure Network & Security	Multicloud Network Setup	OCI Network & Security

2 Provision and operate OCI Database services

Oracle Database Service for Azure

Oracle services

Create a resource | Autonomous Database | Exadata Database | Base Database | MySQL HeatWave

Navigate

Deployments | Billing

Useful links

Getting started with Autonomous Database   Getting started with Exadata Database   Getting
All ODSA Database documentation

Configure | Deploy | Automated Backup

Restore from backup | Manual Backup | License Management

User roles and permissions | | Real Application Clusters (RAC)

3 Database access and managed connectivity

Azure Account	Database queries and query results	OCI Account
	Database Metrics & events	
Azure App Insights Azure Log Analytics	Private network auto-scaling	
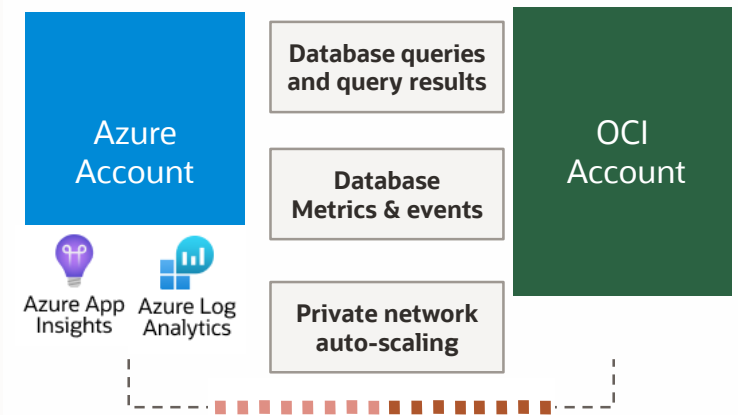
Ten unique Oracle Database capabilities NOT in 3rd-party clouds

ORACLE Database

1. Automatic indexing provides continuous performance tuning

2. More efficient use of vCPU by offloading CPU intensive processes to Exadata storage servers

3. Fault tolerant In-Memory tables

4. Fast node failure detection/recovery

5. Automatic block repair from standby

6. Automatically prioritizes latency sensitive database operations

7. Automatically expands In-Memory capacity to lower-cost, shared flash storage tier

8. Real-time reporting on standby databases

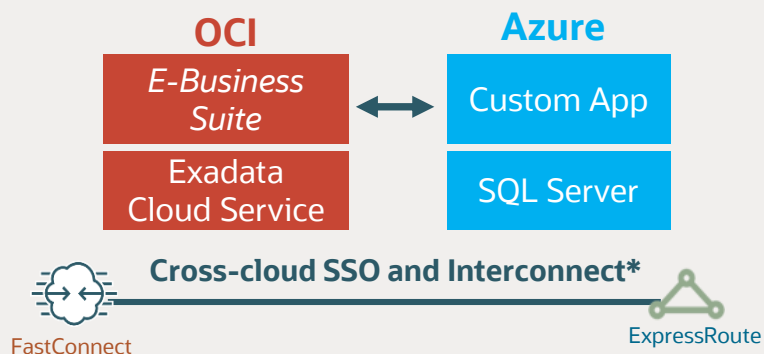9. Allows SQL read/write on standby

10. Real-time statistics gathering

Not your Average Database Cloud Service

Using Oracle Database in multicloud architectures

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Database

Run full stack applications

OCI   **Azure**

OCI		Azure
E-Business Suite	⟷	Custom App
Exadata Cloud Service		SQL Server

Cross-cloud SSO and Interconnect*

FastConnect   ExpressRoute

Run split stack applications

OCI   **Azure**

OCI		Azure
Oracle Autonomous Database	⟷	*Power BI*

Cross-cloud SSO and Interconnect*

FastConnect   ExpressRoute

- Application stacks on OCI and Azure interoperate and share data

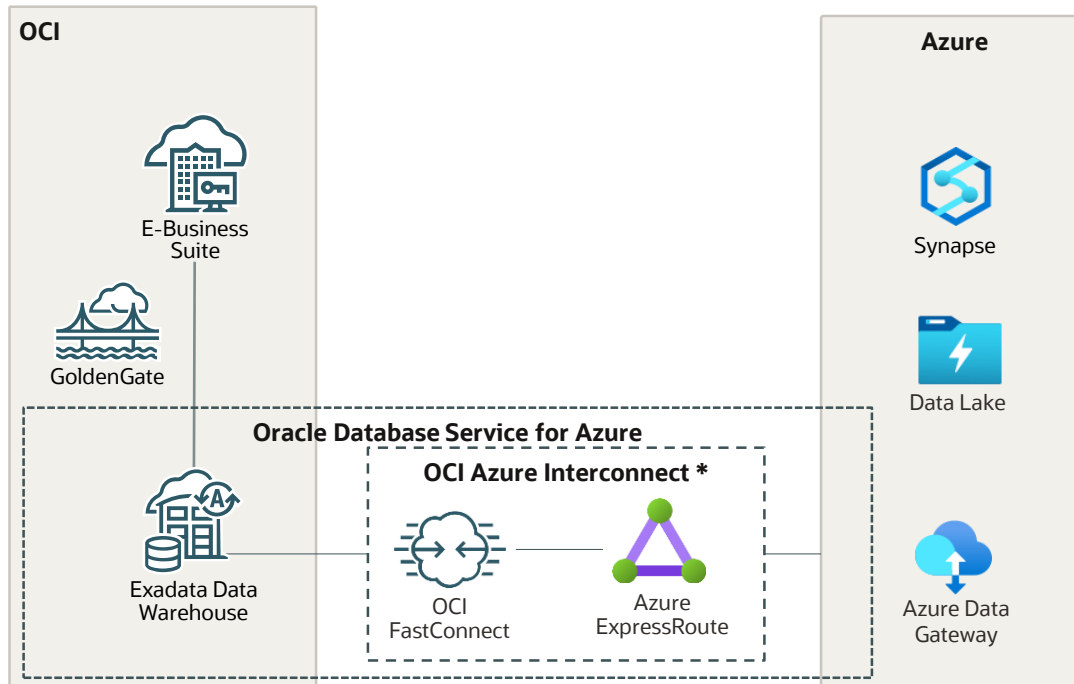- Maintain high performance connectivity between dependent applications in the cloud with no re-architecture
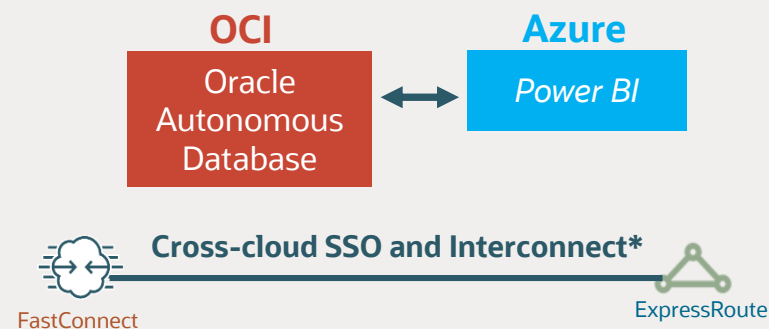
- Application running on Azure with an Oracle Database running on OCI using a low latency, high speed connection

- Achieve high performance, innovation and economics by running application components in the most optimal environment

*Direct connection with <2ms RTT latency between clouds – No intermediate connectivity provider is required

Use case: Data analytic pipeline

OCI

E-Business
Suite

GoldenGate

Oracle Database Service for Azure

Exadata Data
Warehouse

OCI Azure Interconnect *

OCI
FastConnect

Azure
ExpressRoute

Azure

Synapse

Data Lake

Azure Data
Gateway

*Direct connection with <2ms RTT latency between clouds – No
intermediate connectivity provider is required

- Modernize data transformation pipeline with real-time data analysis and faster delivery of data reports to help customers make more informed and timely business decisions

- **Example architecture**

  - Data analytics frontend on Azure with Oracle Autonomous Data Warehouse (ADW) on the backend in Oracle Database service for Azure (ODSA) on OCI for real-time data insight

  - Data feed from EBS to Oracle ADW using OCI GoldenGate

  - Data transfer to Azure Data lake via OCI Azure Interconnect and Azure Data Gateway for batch data upload
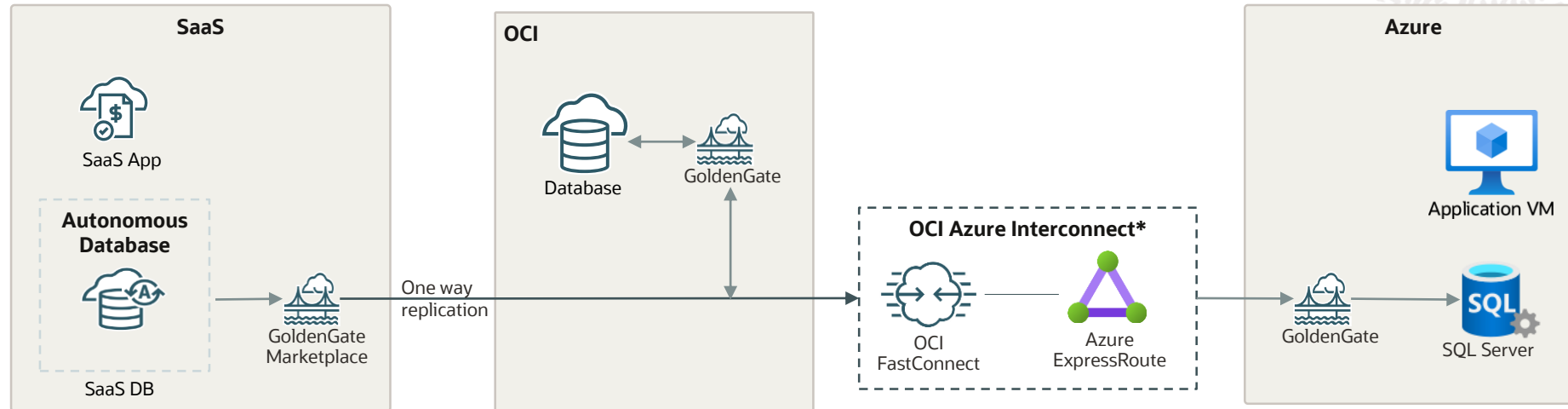
Use case: App to app integration
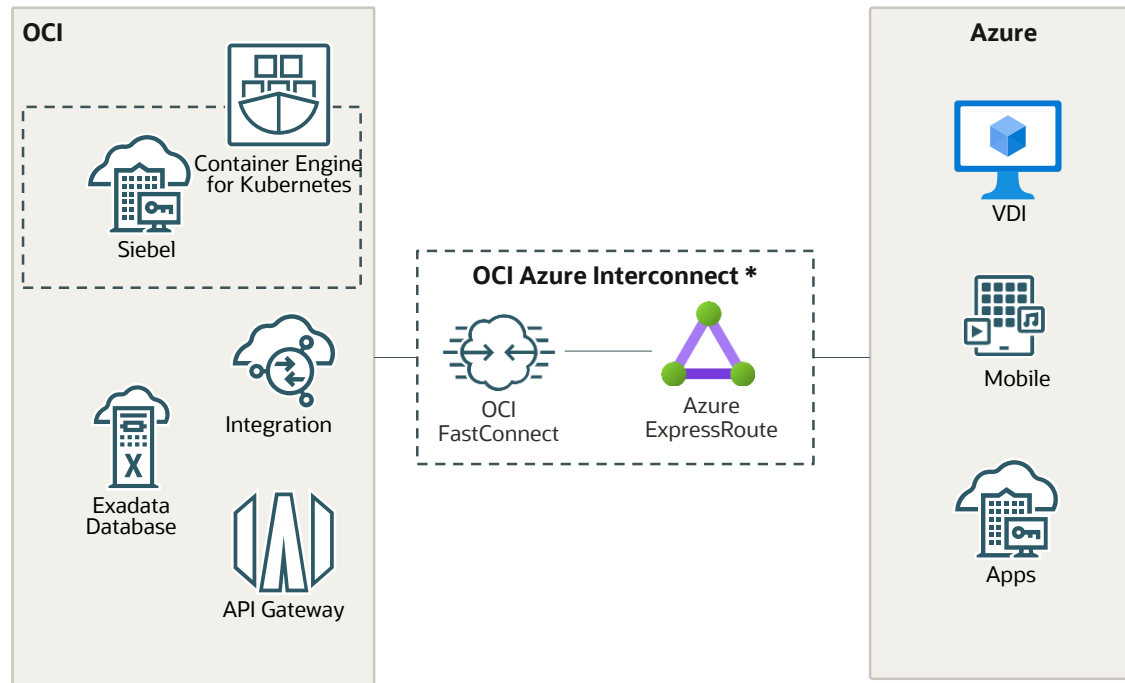
*Direct connection with <2ms RTT latency between clouds – No intermediate connectivity provider is required

- Application stacks on OCI and Azure interoperate and share data.

- Maintain high performance connectivity between dependent applications in the cloud with no re-architecture

- **Example architecture**

  - Siebel CRM 22.8 in Oracle OKE with Exadata database on OCI

  - Low latency, high speed integration with Azure-hosted apps using Interconnect

Use case: SaaS to platform integration

SaaS

SaaS App

Autonomous Database

SaaS DB

GoldenGate Marketplace

One way replication

OCI

Database ↔ GoldenGate

OCI Azure Interconnect*

OCI FastConnect — Azure ExpressRoute

Azure

Application VM

GoldenGate

SQL Server

- Integrate SaaS applications with applications on different clouds to achieve business agility and innovation

- **Example architecture**

  - Replicate Oracle Retail Cloud database to database on OCI to run the custom application.

*Direct connection with <2ms RTT latency between clouds – No intermediate connectivity provider is required

- Near real-time Integration of customer apps with SaaS application

- The data is also replicated from OCI GoldenGate to GG for SQL Server running in Azure and subsequently loaded into an Azure SQL database

MySQL HeatWave customer momentum

Marketing analytics
Real-time analysis of advertising/
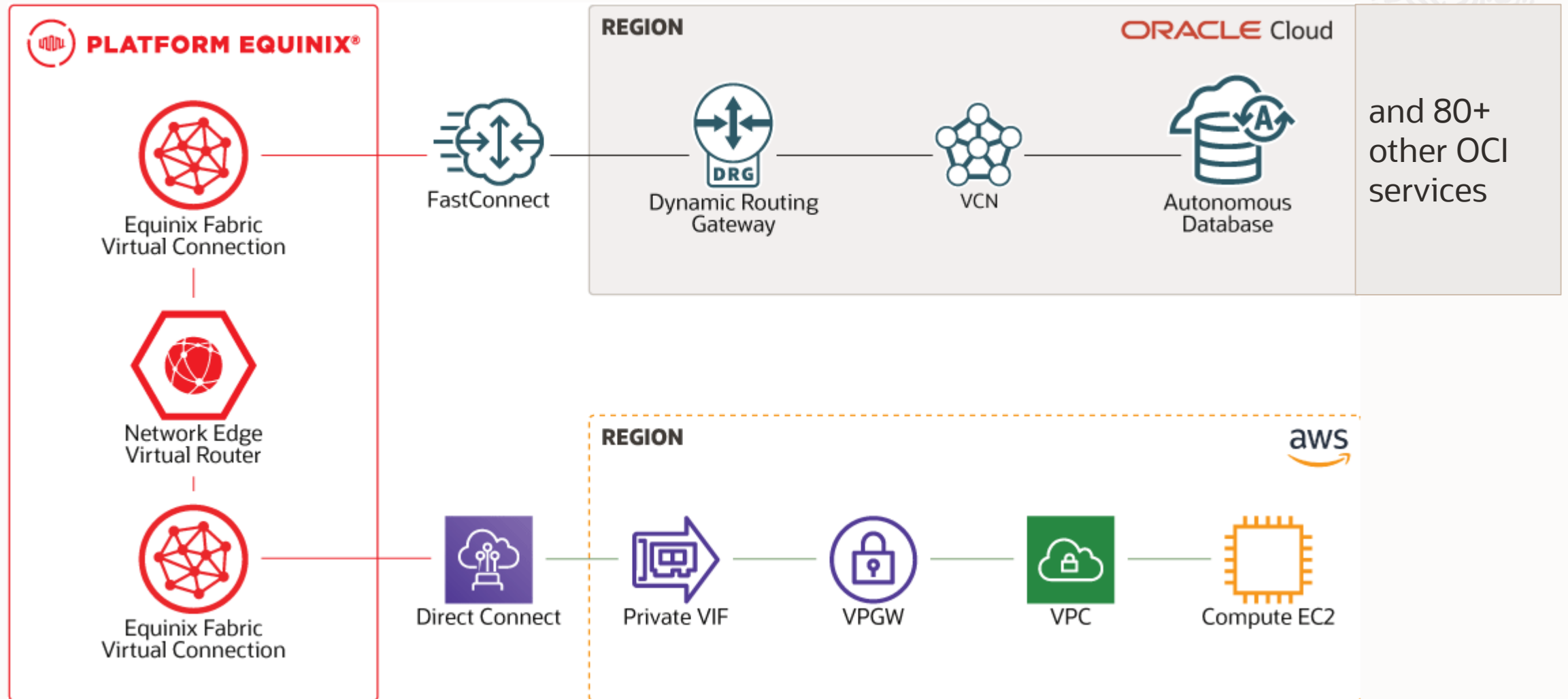marketing campaigns performance

Gaming analytics
To improve the players' experience and
adjust the difficulty level

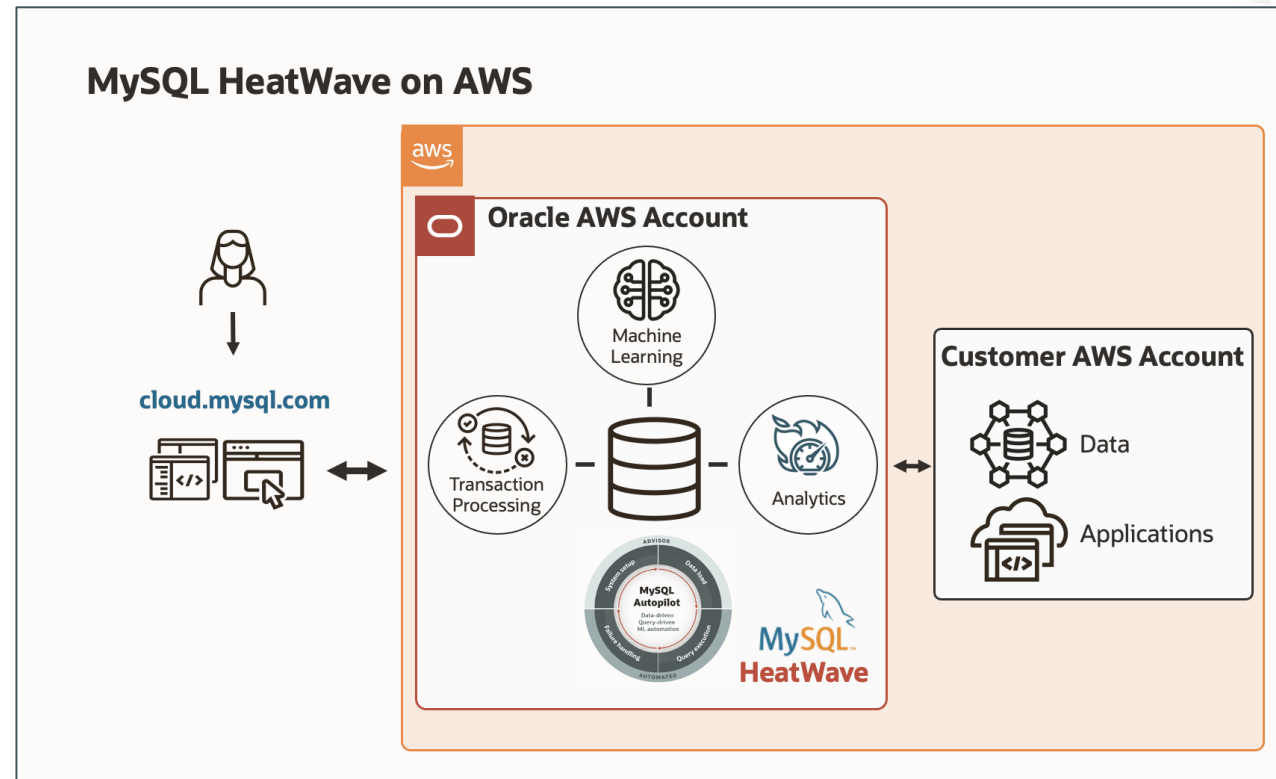**Real-time monitoring of diabetes**
To improve patients' lives

Multicloud Networking with AWS using Equinix

and 80+ other OCI services

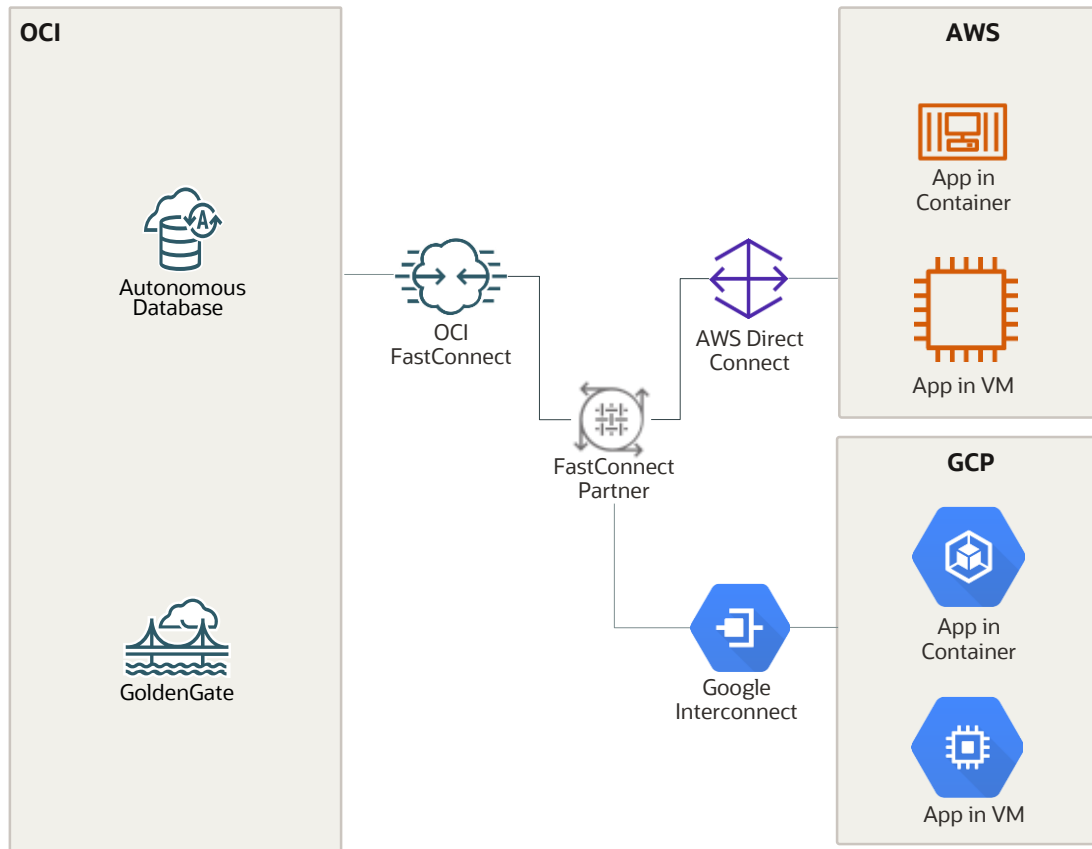* OCI supports 50+ other connectivity providers

MySQL Heatwave on AWS

Familiar experience to AWS users
Simplicity of transaction and real-time analytics in one service
7x better price performance than Amazon Redshift

Use case: **Split stack application**

OCI FastConnect partner connects OCI FastConnect to AWS Direct Connect
and GCP Interconnect with 2-4 ms RTT latency between clouds

- Support specific development environments and toolsets while using best-of-breed data management

- **Example architecture**

  - PowerBuilder, .NET and Go applications front-end on AWS and GCP with back-end Autonomous Database on OCI

  - OCI FastConnect partner connects OCI FastConnect to AWS Direct Connect

Use case: **Workload mobility**
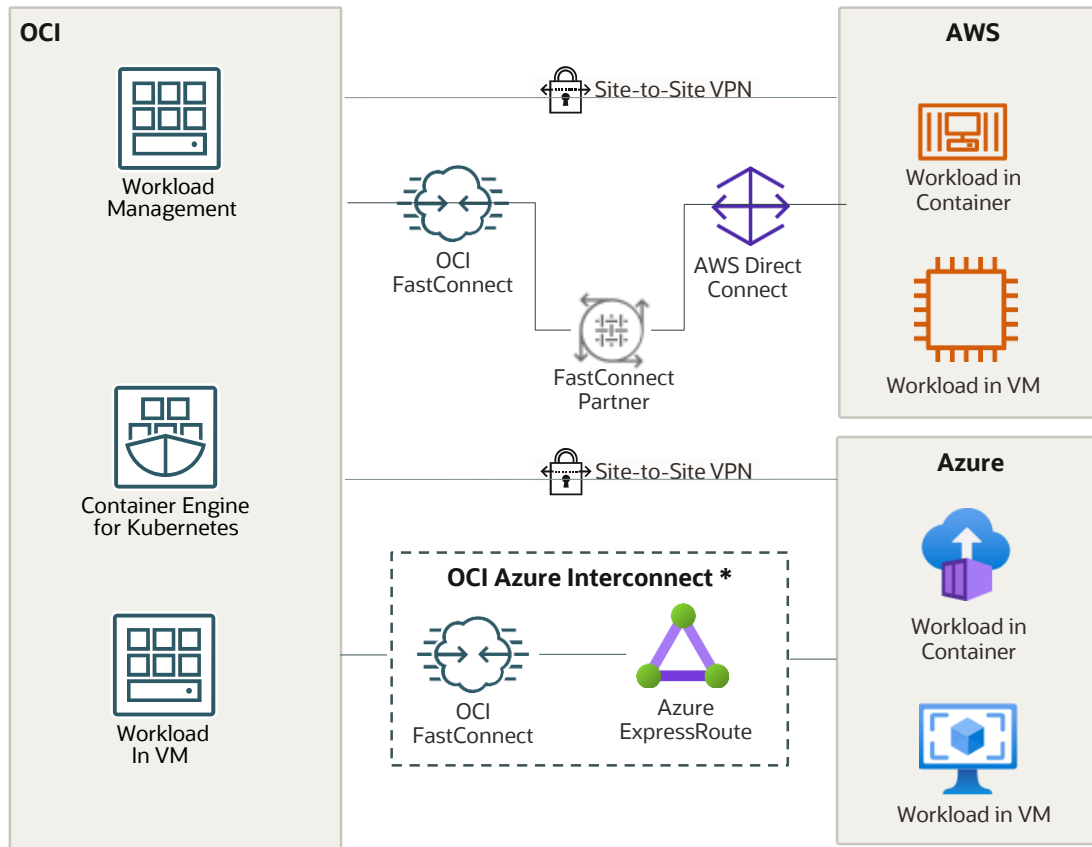
- Distribute workloads to run on different clouds to achieve the best price performance.

- **Example architecture**

  - Run workload orchestration on OCI and run distributed Kubernetes or VM workload on OCI and Azure

  - Achieve a high level of parallel computing and good price performance

FAQ
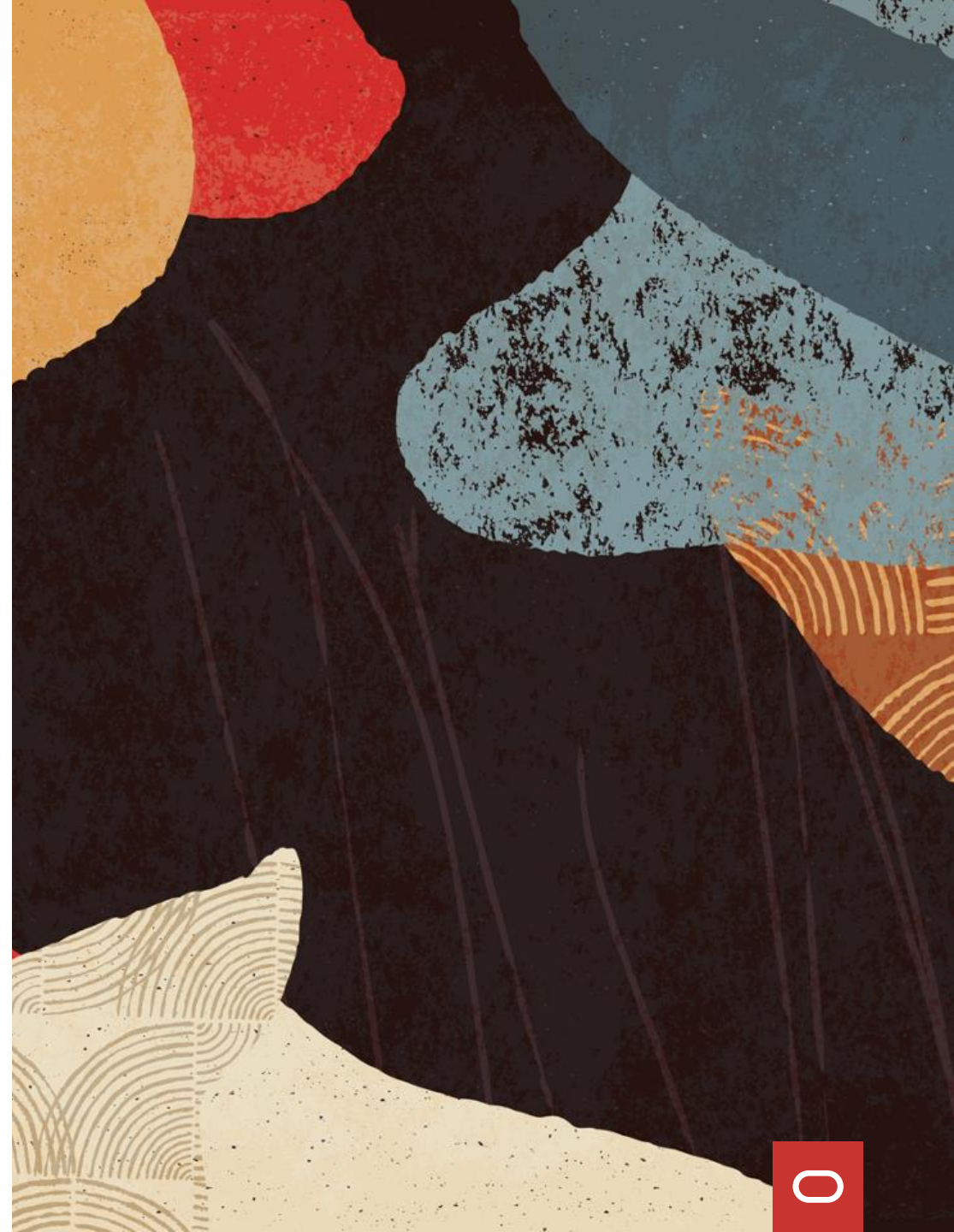
What's the difference between the Oracle Database Service for Azure and the OCI-Azure Interconnect?

	Oracle Database Service for Azure	OCI and Microsoft Azure Interconnect
Primary Use	Azure customers who want to connect Azure resources to Oracle Databases on OCI.	Customized bi-directional scenarios. Usable with all OCI and Azure resources.
What is it?	A guided experience to automate and simplify account linkage, user entitlements, and provides a portal on Azure to manage OCI database services with a UX experience familiar to Azure users.	Direct connectivity between OCI and Azure built on Oracle FastConnect and Azure ExpressRoute to create low-latency, high throughput, and redundant connections in multiple regions with unified identity and access management between Azure and OCI.
Support	Collaborative support model (same as interconnect)	Collaborative support model
Network Cost	No interconnection port or ingress/egress charges.	Interconnection ports (FastConnect and ExpressRoute) Zero data ingress/egress charges
Network scaling	Fully managed by OCI	Customer managed in the customer's tenancy
Monitoring	Consolidated metrics and events consumed in Azure App Insights and Azure Log Analytics	Customer managed
Pricing	No cost for Oracle Database Service for Azure. Pay only for Azure and OCI service consumption.	Interconnection ports (FastConnect and ExpressRoute), plus Azure and OCI service consumption

What database features are available in Oracle Database Service for Azure today?

Key capabilities	Oracle Database Service for Azure Portal	OCI Console
Manual Backup	✓	✓
Automated Backup	✓	✓
Restore to existing database	✓	✓
License Management	✓	✓
RAC	✓	✓
Service Requests	✓	✓
Data Guard	Coming soon	✓
Scaling Infrastructure	Coming soon	✓
Autoscaling	Coming soon	✓

Coming soon features can be managed via the OCI portal
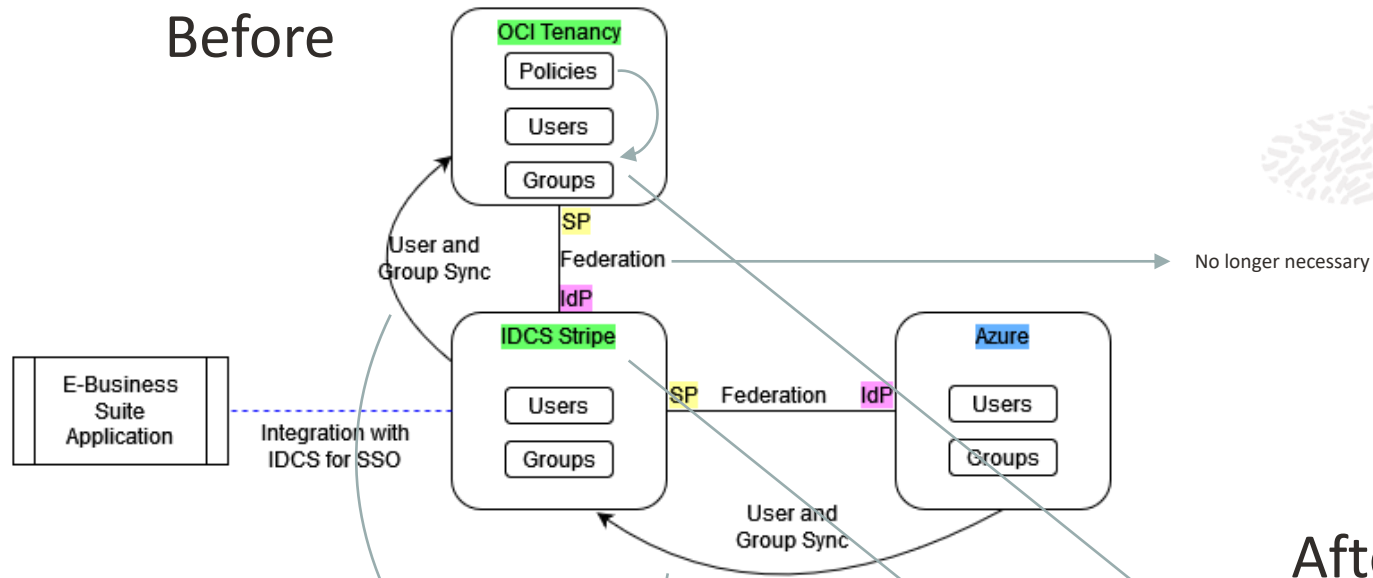
Collaborative support

1. Raise issues with Oracle or Microsoft

2. Joint resolution by both cloud vendors

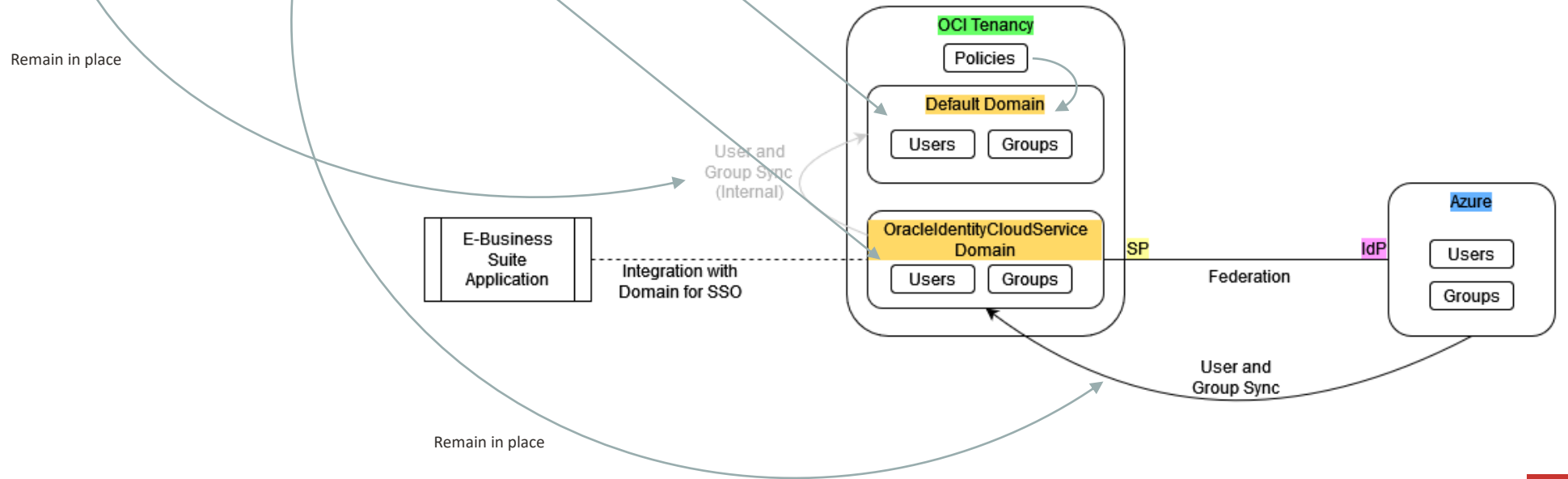3. Customer approves support organization engagement between Microsoft and Oracle

https://www.oracle.com/cloud/azure-interconnect/
Click on collaborative support

Customer
Raises Issue with Oracle using CSI#

Oracle
Validates customer entitlement and creates service request to manage issue

Issue with Oracle product?

Yes

Oracle
Works with customer to troubleshoot and resolve issue

No

Personal customer data
- Customer name
- Microsoft Support Identifier
- Preferred contact method

Oracle
Requests approval to engage Microsoft on customer's behalf

Yes

Yes

Oracle
Contacts Microsoft; shares customer data so Microsoft can validate customer entitlement and collaborates on issue identification

Issue with Oracle product?

No

Microsoft
creates Microsoft Service Request and contacts customer to resolve issue

Oracle support
Microsoft support
Requires Customer approval

Federation from Azure AD

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OCI can enhance your multicloud strategy

Products

- Oracle Database Service for Azure
- Oracle MySQL Heatwave on AWS
- Oracle Interconnect for Azure

Related services

- OCI IAM
- OCI Application Integration
- OCI Golden Gate
- OCI Data Integration
- Oracle Cloud Manageability & Observability Platform
- OCI Database Management
- Oracle Data Safe

Architectures

30+ multicloud patterns and automation to get you started and into production

Related applications

- ERP (EBS, PeopleSoft, JD Edwards, Siebel, SAP, etc.)
- Industry apps (Banking, Retail, Telco, Healthcare, xx)
- SaaS (ERP cloud, HCM cloud, CX cloud, Retail cloud, Transportation cloud, xx)
- Cloud native, k8s
- In-house developed apps

Oracle Cloud Lift

Hundreds of experts at multicloud architectures – go from design to go-live as part of your OCI contract

Related services

- On-premises to OCI
- Cloud to OCI
- Private hosting to OCI
- Partner with Global System Integrators and Managed Services Partners
- Database, VM, JEE on WLS,
- Oracle app (EBS, PeopleSoft, JD Edwards, Siebel)

> **Get a free multicloud evaluation**

> **Get multicloud architect certification**