

Practical Pathways to Oracle Cloud Infrastructure

Guide to Secure, Scalable, And Cost-Effective Cloud Adoption

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Agenda

- 1 Oracle OCI Global Footprint
- 2 What is OCI compute?
- **3** Compute Storage Options
- 4 High Availability and Disaster Recovery
- 5 Backup and Restore
- 6 OCI Defense-In-Depth
- **7** OCI Contracting & Success Story



100% renewable energy by 2025

51 Public Live Regions in 26 Countries

Defense, intelligence, and dedicated cloud regions are not listed



Frankfurt

Germany



Distributed Cloud Portfolio

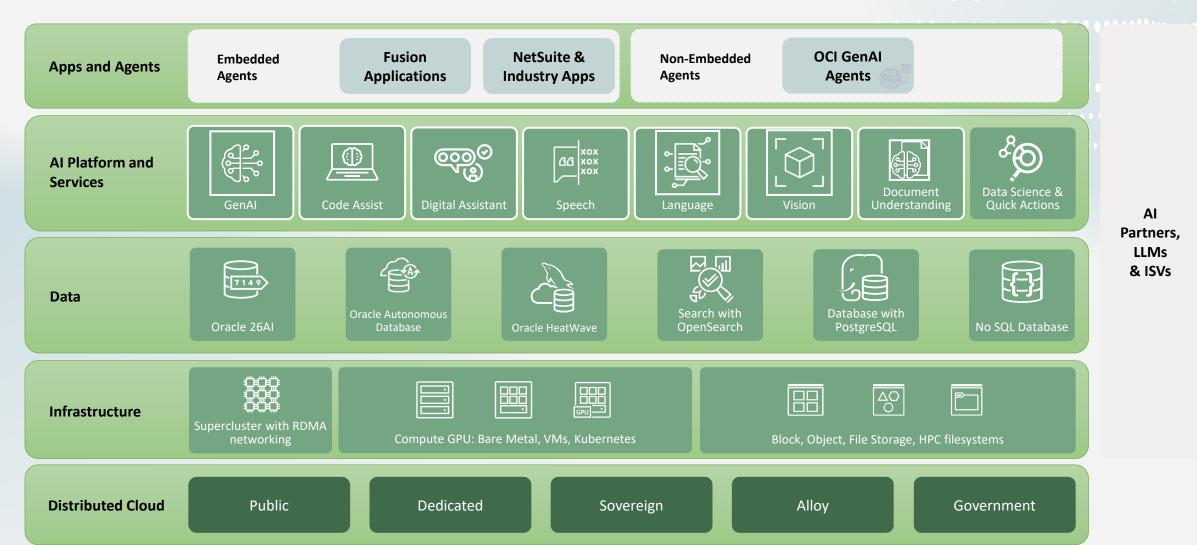
OCI enables you to address your location, operations, and regulatory needs

All 200+ OCI Services and up to 80+ compliance certifications Government Regulated Use Any Organization Workloads requiring Any workload Workloads restricted to a Workloads restricted to geopolitical area government usage air-gapped high security Global operations Disconnected ops Geographical ops Restricted ops Authorized personnel Oracle -Commercial **Oracle National** Government **Operated** regions regions regions Security regions **Data Center** Cloud services for **Dedicated Region Isolated Region** Cloud@Customer your organization Your **Data** Center Cloud services for resale to your customers Provide cloud services with your logo to your end customers

Dedicated Region and Oracle Alloy are not restricted to any region. They can be deployed for multiple use cases.



Oracle Cloud is Infrastructure, Platform, & SaaS in One Cloud

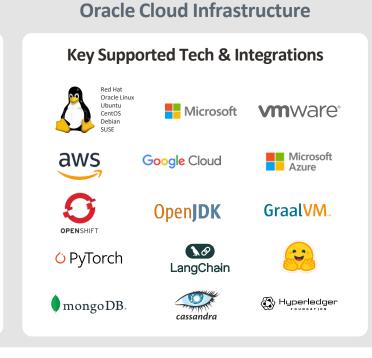


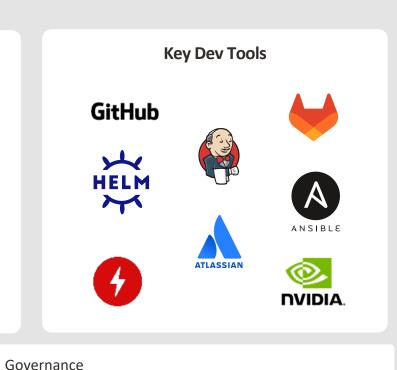
OCI Helps You Leverage Your Existing Technology Investments

Use our managed open-source or run your 3rd party and open source on better infrastructure

OCI-Managed Open-Source Services kubernetes kubernet

Security





Compliance

Messaging

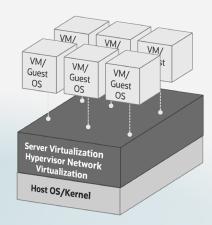
Observability |

Distributed Cloud

Commercial and Government Public Cloud Regions | Cloud@Customer | Dedicated Cloud | Roving Edge | Multicloud

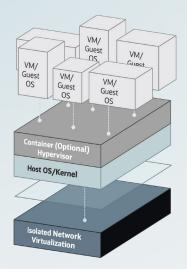


OCI Core Infrastructure Stands Alone



Gen. 1 Cloud Architecture

Shared network design creates security and performance vulnerabilities



OCI Gen. 2 Cloud Architecture

Isolated network
virtualization
improves throughput
and isolates security
threats

Lower Cloud Costs

Lowest networking prices, ~10x to ~13x lower cost than competitors.

Lower pricing than competitors on compute Financially backed network performance SLAs. Enterprise services like support, security tools, Linux, Cloud Guard, & GraalVM included.

Scale to Growth

51 public OCI regions worldwide including key markets.

Flexible CPU infrastructure optimizes resources to meet workload needs

Establish dedicated cloud regions as small as 3 racks anywhere in the world.

Improve Networking

Non-oversubscribed isolated network virtualization improves performance and throughput; eliminates noisy neighbor effect.

Low latency with RDMA cluster networking, L2 network virtualization, and nonblocking networks.

Open is the Standard

OCI builds services using open-source technology when available .

Proprietary tools like Oracle database are made available on other clouds

Partnerships with Azure, AWS, and GCP lets you use the best of each cloud without high network fees.



Compute Instance Types

OCI offers two primary compute instance types: Bare Metal (BM) and Virtual Machines (VMs). Provides flexibility to customers to choose the right model for their performance, control, and isolation needs.



Virtual Machine (VM)

Shared infrastructure with secure hypervisor-based isolation.

Hypervisor managed by Oracle

Runs Linux or Windows Server VMs

Flexible CPU, and memory



Bare Metal (BM)

Isolated

Direct hardware access, no virtualization, maximum performance/security.

Runs Linux or Windows Server VMs

KVM, or Hyper-V can be deployed on BM

Access to all cores and memory in the BM



Dedicated Virtual Host (DVH)

Isolated

Direct hardware access

Hypervisor incl and managed by Oracle

Maximum performance/security.

Runs Linux or Windows Server VMs

Access to all cores and memory in the BM

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Shape Types

A shape is a template that determines the number of OCPUs, amount of memory, and other resources that are allocated to an instance.



Standard (Default)

Balance of cores, memory, and network resources.
For Intel, AMD, ARM



DenselO

Includes locally-attached NVMe-based SSDs for large databases and big data workloads



GPU

Designed for hardwareaccelerated workloads using NVIDIA.



HPC & Optimized

High frequency processor cores for HPC workloads, and solving complex problems

Shapes Applicable for both Virtual and Bare Metal Machines



OCI Compute: Much More Flexible











Burstable Instances Preemptible Instances

Capacity Reservations Shielded Instances Range of CPUs

Subcore VMs that run at a fraction of the CPU with the ability to burst for short periods of time, at a lower cost than regular VMs VMs that run at 50% of the price of on-demand instances for interruptible or low-priority workloads To ensure capacity for critical events or unexpected spikes, reservations ensure capacity at 85% of regular resource costs reducing buffer capacity expenses Hardened firmware and boot + platform security to defend against malicious boot level SW attacks. Intel, NVIDIA, ARM and AMD-based compute offers the right better price performance for your workload



Virtual Machine Flexible Instance Sizing

Expanded support of Flex on more shapes for optimal efficiency for any workload; helps avoid wasted fixed shape spend

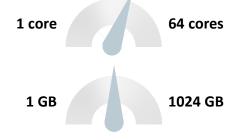


1. Pick processor

2. Select performance

3. Select memory

4. Select storage performance (optional)







OCI Storage Options

High performance, flexible, scalable, and low-cost storage



Architectural Differentiation: Storage

Oracle Cloud Storage

- <u>Block storage service</u> best scale and performance in the industry, and 5x 20x cheaper than competition.
- <u>Dynamic Performance Scaling</u> scales as you need, only pay for what is necessary backed by a differentiated IOPS SLA.
- <u>File Storage Service</u> scales elastically up to 8 Exabytes, and includes a differentiated performance SLA.
- Object Storage Service <u>S3 compatible</u>, works with Hadoop File Systems (<u>HDFS connector</u>), and provides <u>multiple tiers of</u> <u>storage</u> with industry's lowest access requests prices.



57%

Lower block storage costs than other CSPs

99.9%

(four 9s) file storage availability guarantee 1/10th

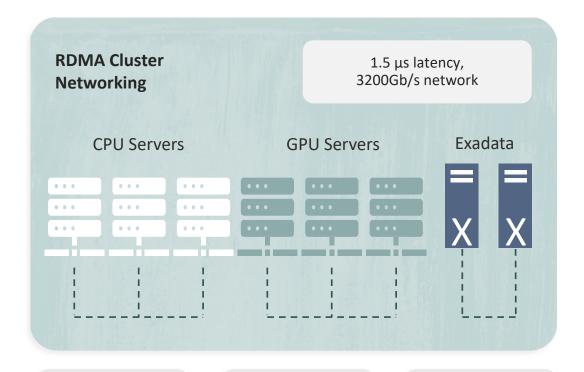
OCI object storage request prices are 1/10th of AWS'



Architectural Differentiation: Networking

Oracle Cloud Networking

- Secure, low-latency, low jitter, and high-bandwidth network that brings the consistent throughput enterprise workloads require.
- High performance <u>network services portfolio</u> without burdensome utilization charges that inhibit technical design.
- Up to <u>400Gbps dedicated connectivity</u> using <u>Oracle</u>
 <u>FastConnect</u> 4x higher bandwidth with lower operational overhead relative to competitive clouds.
- Enterprise-grade <u>network firewall</u> powered by industryleading Palo Alto Networks tech stack.



400

Gbps FastConnect connectivity vs. 100 with other CSPs 90%

Lower data egress costs vs. other CSPs

10TB

First 10TB of data egress per month is free



Backup and Restore



Block Storage Cloning



Object Storage



File Storage

- Console built-in tools to backup and restore data:
 - Backup boot volume (operating system) using OCI Block Volume service
 - Backup Block volume (data) and restore on OCI, manual, scheduled and policy based
 - Cross region block volume backup/copy, ex building1 to building2
 - Object Storage cross region replication of buckets using replication policy.
 - File Storage Service (nfs) snapshots on OCI, and/or use rclone to copy data to DR region
 - Export VM back to on-premise
- File level Backup / Restore of compute instances using existing backup solution installing agents on Compute instance
 - Use existing backup solutions such as Oracle Secure Backup, Commvault, Veritas NetBackup and install agents on VM compute instances
 - Backup to Object Storage using Oracle Cloud S3 Compatible API (Standard tier).
 - Use OS tools such as rsync & robocopy
- Best practices framework provided by Oracle to protect data
 - Example: Mirror locally attached NVME
 - Replicate files using rsync & robocopy

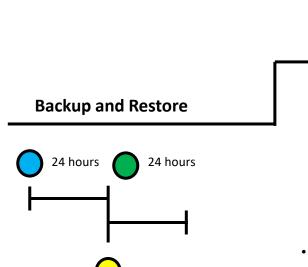




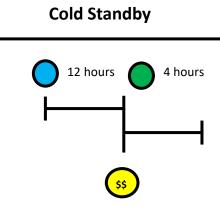




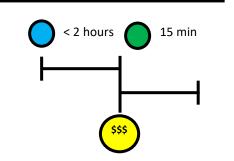
Disaster Recovery Options for Applications and Technology



- Backup / Restore of on-premises data to OCI to use in a DR event: Ex Oracle Secure Backup, Commvault, Veritas NetBackup
- Block volume (data) backup and restore on OCI, manual, scheduled and policy based
- Cross region block volume backup/copy on OCI
- Object Storage cross region copy on OCI.
- File Storage Service (FSS) snapshots on OCI



- Replicate data with minimum running services in OCI. (Pilot light)
- Database replication using Data Guard
- Sync data using Operating system tools, ex rsync,
- Custom VM export from on-premise and import to OCI.
- 3rd party tools such as RackWare DR from on-premise to OCI



Active/Active

- RPO amount of data that can be lost
- RTO amount of time the app can be down
- \$ Cost
- Replicate data and services into OCI ready to take over.
- Active/Active clustering across Availability Domains
- Active/Passive clustering across regions
- For Database, use Active Data Guard (DB is open and read only), GoldenGate (any DB to Oracle OCI)
- OCI <-> OCI: Cross-Region and Cross AD Async volume group (boot and block vol) replication RPO < 1hr, RTO < 1min
- Full Stack Disaster Recovery = Orchestrate failover or switchover to another OCI region
- RackWare can synchronize on-premise with OCI workloads

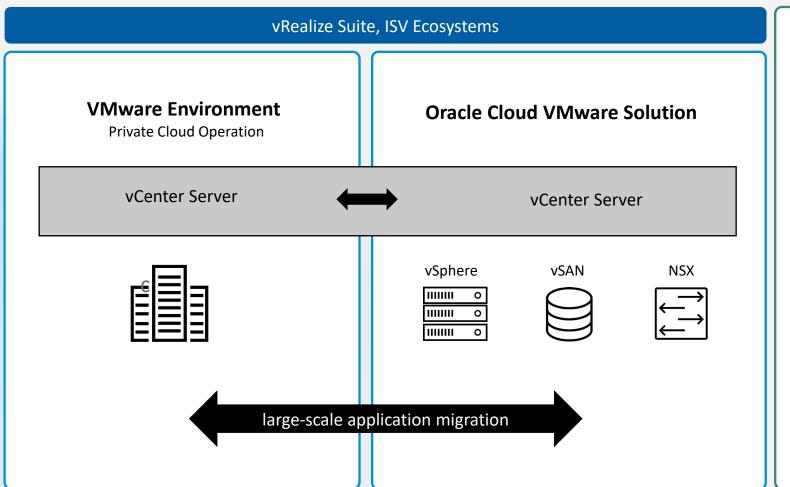
Oracle Cloud VMware Solution (OCVS)

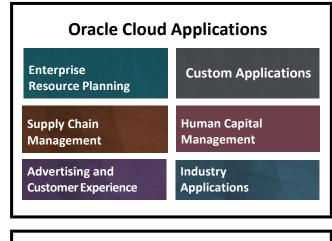
A complete platform for your VMware workloads



Oracle Cloud VMware Solution

A complete platform for your VMware workloads





OCI Services

- Analytics and BI
- Cloud Regions
- Compute
- · Containers and Functions
- Cost Management and Governance
- Data Lake
- Database Services
- Database Tools
- Developer Services
- Distributed Cloud

- Integration
- Machine Learning and Al
- Multicloud
- Networking
- Observability and Management
- SaaS Applications
- Security
- Storage
- VMware

Customer Data Center

Oracle Cloud Infrastructure

Core OCI technologies were designed to run VMware



Off-box virtualization

Complete instance isolation for higher security and performance



Custom security chips

Zero-trust approach to keep you safe from other tenants



Non-blocking networks

Cloud networks designed to match dedicated onpremises networks



L2 network virtualization

Cloud networking to natively support VMware, Oracle Database, and other clustering architectures



Flex infrastructure

Online infrastructure scales up and down resources without application rewrites

Improved customer control and governance

Retain full control of your dedicated VMware environments



Full root access and administrative control



Full capabilities of VMware features



Control of end-toend network settings



Control of patching & upgrade



Key Use Cases

Oracle Cloud VMware Solution is the ideal platform for enterprise VMware use cases



Data Center Exit



Disaster Recovery



Hybrid Cloud and Capacity Expansion



Virtual Desktop Infrastructure (VDI)



Oracle Compute Cloud@Customer

Run OCI Compute anywhere



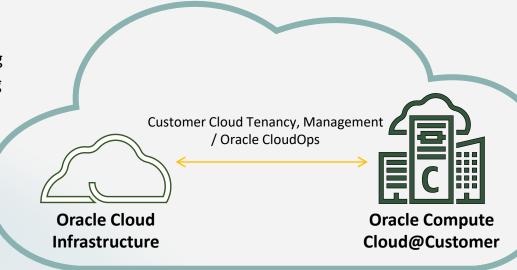


Oracle Compute Cloud@Customer

OCI Compute in One Rack

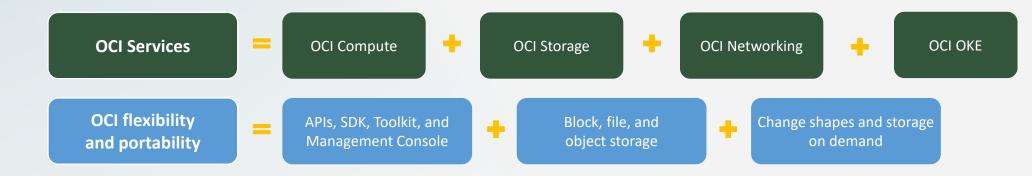
OCI

- Security monitoring and patching
- Resource metering and reporting
- Dynamic flexibility
- Universal Credits



In your data center

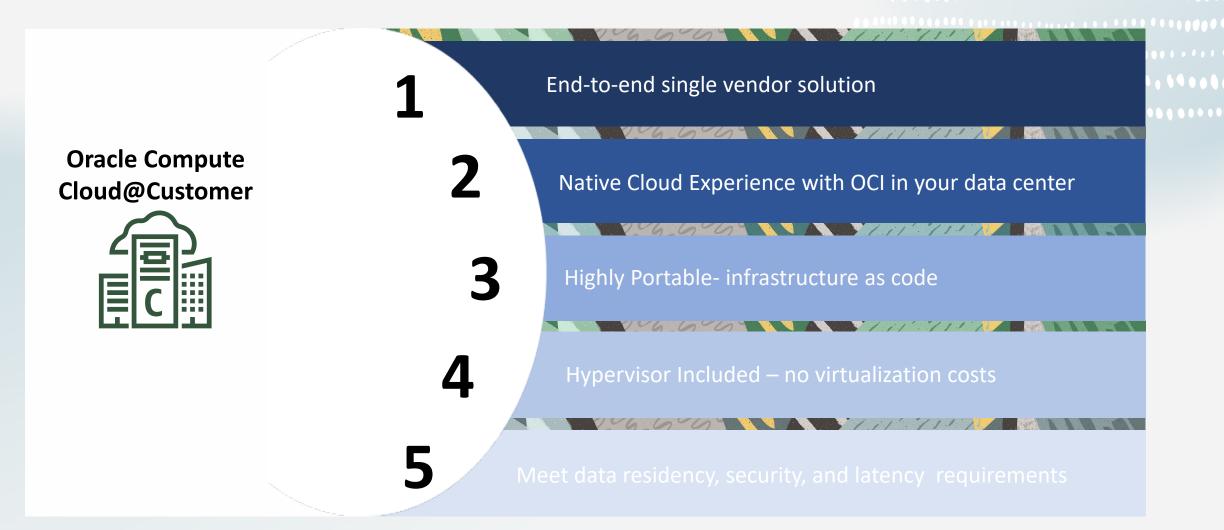
- Data control: Meets all data residency regulations
- Resiliency: Remains operational if disconnected from the Internet





5 reasons to enhance your cloud journey with Oracle

Oracle meets you where you are with public cloud services, economics and service levels



OCI Security Posture: Defense-in-depth

A full stack of cybersecurity capabilities built-in

Prevent

Block attacks and malicious traffic

Monitor

Log, analyze, and audit activity

Mitigate

Isolate communications with secure and reliable networks

Protect

Hardware-enabled security built into the architecture

Encrypt

Encrypt and protect all data

Access

Ensure authentication, authorization, and accounting



Security Zones
Security policy compliance



Distributed Denial of Service protection Automatic DDoS protection



Web Application
Firewall
Internet-facing endpoint protection



Cloud Guard Security posture management



Threat Intelligence
Multi-source, actionable guidance



Threat Detector

Monitor for known threats



Logging
Single pane for service log



Vulnerability Scanning
Patch and port monitoring



Auditing OCI API logging



Workload Protection runtime security monitoring and realtime threat hunting



Virtual Cloud Network



Security Lists
Virtual network firewall rules



Network Firewall



Bastion Time-limited SSH access



Dynamic Routing Gateway Virtual router



Fast Connect
Dedicated, high-speed connection



Virtual Private Network Secure connectivity over any network



NAT Gateway
Protected access to the internet



Bare Metal Servers
Servers with full customer control



Hardware
Root of Trust
Protect from firmware attacks



Signed Firmware
Prevent rootkit installation



Hardened Disk Images
OS with expert security settings



SmartNIC
Isolated admin of compute hardware



Off-box Network
Virtualization
Encapsulated, separated traffic



Oracle Linux &

Oracle Enterprise Linux

Performant, secure, enterprise Linux



Data Safe
Monitor data usage in database



Vault
Hardware security module protection



Key Management
Encryption key administration



Secrets Management
Credential and similar administration



Certificates Validation certificate administration



Access Governance
Proactive guidance for user actions



OCI Identity and Access Management Control access to cloud resources



Policies User access rules



Federation
Identity provider inter-operation

INTERNET & EDGE

MONITORING & PREVENTION

NETWORK

COMPUTE

STORAGE & DATABASE

IDENTITY & OPERATOR ACCESS



OCI's Approach To Contracting In The Cloud

Universal Cloud Credits

OCI credits can be used as currency and debited to any service, at any time, out of any region (excluding GPUs).

Global Pricing Standardization

Consistent low pricing across all regions and deployment methods such as GovCloud and Dedicated Region

Flexible Infrastructure

Unlike standard S, M, L t-shirt sizing, OCI offers flexible CPU infra ("tailormade") – pay for exactly what you use.

Enterprise Services

OCI doesn't charge for enterprise support, security tools, Enterprise Linux, Cloud Guard, or GraalVM

Price Protection

Price and discounts are set for the contract term, overages at same discount level, no cost to upgrade to next gen CPU shape



Uber uses OCI for 14 million predictions/second Uber makes approximately 33 million trips per day

Uber modernized its application tier and **AI infrastructure** with thousands of microservices

Dozens of Al models run on OCI for inference

Al Infrastructure **speeds responses** to trip requests, reducing latency and optimizing routes

Can easily scale AI infrastructure with future growth

Uber



"Collaborating with Oracle has allowed us to innovate faster while managing our infrastructure costs. With OCI, our products can run on best-of-breed infrastructure that is designed to support multicloud environments and can scale to support profitable growth."

Kamran Zargahi, Senior Director, Tech Strategy and Cloud Engineering, Uber

Zoom Uses OCI to Power its AI-first Platform in Saudi Arabia

Zoom report approximately 300 million daily participants

Zoom Al Companion uses OCI unique **GPU offering for inferencing**, data, and Al sovereignty capabilities

Zoom optimized its AI models to run on **efficient OCI GPU shapes** with top-tier performance while staying compliant with Saudi Arabian regulations

"By optimizing AI Companion to operate efficiently with **GPU** shapes in a local OCI region, we're enabling Saudi companies to take full advantage of AI without facing constraints."

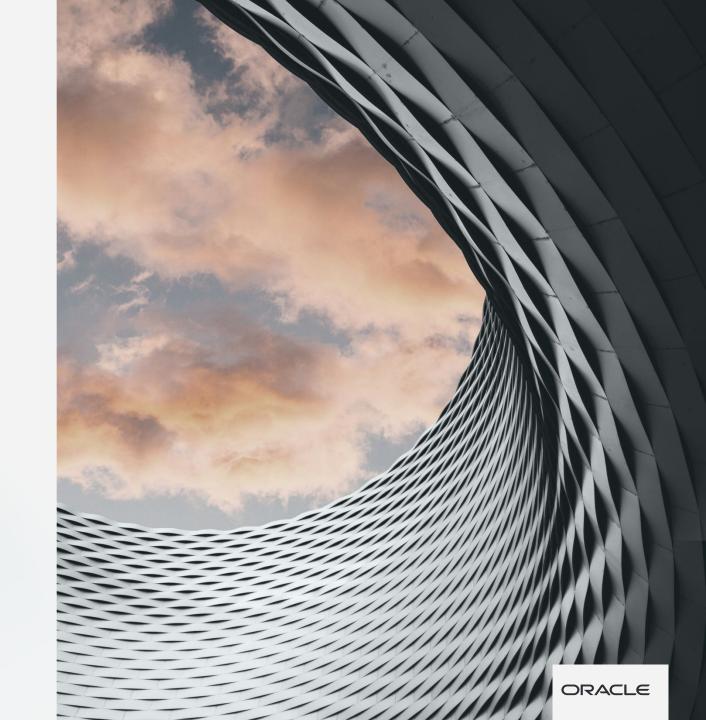
Velchamy Sankarlingam, President of Product and Engineering, Zoom





Miranda Nash, GVP, Oracle and XD Wang, CTO, Zoom

Q&A



Thank you

