Oracle IaaS, a modern felhő infrastruktúra
Azure Window collapsed
Oracle Infrastructure as a Service Strategy

• Give customers a “high fidelity data center” in the Oracle Cloud
• Cost-effective, highly-elastic Compute, Storage, and Network resources
• Migrate existing Software Stacks and Automation Tools without re-write
• Deep control with unmatched security, governance, and performance

*It starts with a Modern Cloud Infrastructure...*
# Latest Technologies Enable a Modern Cloud Infrastructure

<table>
<thead>
<tr>
<th>Technology</th>
<th>Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Availability domains</td>
<td>Enables enterprise-level high availability</td>
</tr>
<tr>
<td>Flat, non-blocking network</td>
<td>Enables predictable low latency; eliminates “noisy neighbors”</td>
</tr>
<tr>
<td>Off-box IO virtualization &amp; automated hardware wiping</td>
<td>Enables secure deployments of bare metal servers without Oracle management software overhead</td>
</tr>
<tr>
<td>Direct-attached NVMe storage</td>
<td>Enables highest IO workloads</td>
</tr>
</tbody>
</table>
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. Cassandra)
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
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
Putting it All Together – Reliable, Predictable, Flexible, Fast

**Compute & Storage**
- Bare metal hosts
- Bare metal w/NVMe
- VMs
- Engineered Systems
- Any middlebox – IDS/IPS,

**Virtual Network**

**Physical Network**

**Datacenters**

**Region**

Availability Domain 1

Availability Domain 2

Availability Domain 3
Cutting-edge, High IO Hardware Technology

**High Performance Compute Systems**

**36 Cores per Server**
- Standard: Non-NVMe SSD, 256 GB RAM
- High I/O: 13.2 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, 1,500 IOPs per Volume
- Object Storage – High Throughput, Strong Consistency

**2X Cores**
**2X Memory**
**4.5X Storage**
**11X IOPS**
**80% Price vs. AWS Highest IO Offering (i2.8xlarge)**
Oracle Combines the Best of First-gen IaaS and On-premises

First-generation IaaS (e.g. AWS, Azure)
- Adding capacity takes minutes
- Only pay for what you use

On-premises or Managed Hosting (e.g. Rackspace, Softlayer)
- Raw iron performance
- Dedicated hardware

Modern Cloud Infrastructure
- Bare metal servers in minutes
- Raw performance without hypervisor overhead
- Pay for what you use
- Integrated compute, storage, database services on their own, low-latency private network
- Enterprise-level governance
- High availability for traditional and modern apps
- All features usable via console or API
Bare metal or VM instances – Same Modern Infrastructure

- **Bare metal**: Industry-leading performance and security with pay-as-you-go pricing
  - Available in < 5 minutes
  - Standard: Non-NVMe SSD, 256GB RAM
  - High IO: 12.8TB NVMe SSD, 512GB RAM
  - Dense IO: 28.8TB NVMe SSD, 512GB RAM
- **VMs**: Smaller instances on the same fast network
  - Available in < 1 minute
  - 1, 2, or 4 core, 28GB RAM, block storage
- **OS images**
  - Oracle Linux – 7.2, 6.8
  - Ubuntu, RHEL – coming soon
## Storage Capabilities: Local NVMe, Block, and Object Storage

<table>
<thead>
<tr>
<th>NVMe Storage</th>
<th>Block Volumes</th>
<th>Object Storage</th>
</tr>
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<tbody>
<tr>
<td>- 12.8 TB or 28.8 TB local storage per bare metal instance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Up to 4 million host IOPS</td>
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<tr>
<td>- Add redundancy with Oracle Dataguard or replication with HDFS</td>
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<td></td>
</tr>
<tr>
<td>- Network storage (unidirectional iSCSI)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- 256 GB or 2TB options</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- 1,500 IOPS per volume</td>
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<td></td>
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<tr>
<td>- Default encryption at rest</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Dynamically attach / detach volumes</td>
<td></td>
<td></td>
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<tr>
<td>- Backups can be attached to any compute instance</td>
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<tr>
<td>- Highly durable &amp; automatically replicated across ADs</td>
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<td></td>
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<tr>
<td>- Strongly consistent model</td>
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<tr>
<td>- Create, list, edit buckets</td>
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<tr>
<td>- Server-side encryption</td>
<td></td>
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<tr>
<td>- Native HDFS support</td>
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<tr>
<td>- Native and Swift APIs</td>
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</table>
Virtual Cloud Networks

Connectivity Options
10 Gb/Seconds+

- Each Customer’s traffic completely isolated in Private Layer 3 Overlay Network
- Differentiator: Complete customer traffic isolation provides much better security
- Differentiator: No Network or CPU Over-subscription provides predictable bandwidth & performance
Load Balancing Service Capabilities

- Regional Load Balancer for your VCN
  - Redundant across 2 ADs (No single point of failure)
  - Distributes Internet traffic across 3 ADs within VCN
  - Honors your network security policies!

- Distribute traffic across multiple protocols
  - TCP, HTTP, HTTP/2, WebSocket

- Traffic management
  - Dynamically add/remove instances to traffic

- SSL Offloading
  - End-to-end, Tunnel, Terminate SSL
All Your Resources on the Same Virtual Cloud Network

ORACLE CLOUD INFRASTRUCTURE (REGION)

AVAILABILITY DOMAIN-1
- Subnet-A 10.0.3.0/24
- Bastion Server
- Active Data Guard
- Max Availability Mode
- With Fast-Start Failover
- Primary Database

AVAILABILITY DOMAIN-2
- Subnet-D 10.0.6.0/24
- Load balanced
- Web Servers (New App)
- Standby Database

AD-3
- Virtual Cloud Network 10.0.0.0/16
- IAM Service
- Audit Service
- Object Storage

Customer Datacenter

VPN

DRG
## Price / Performance – Get More, Pay Less

<table>
<thead>
<tr>
<th>Services</th>
<th>Oracle BMCS vs AWS</th>
</tr>
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<tbody>
<tr>
<td>High Performance Compute</td>
<td></td>
</tr>
<tr>
<td>(DenseIO compared to AWS I2.8xlarge)</td>
<td>2.25 x Cores</td>
</tr>
<tr>
<td></td>
<td>2 x RAM</td>
</tr>
<tr>
<td></td>
<td>11 x IOPS</td>
</tr>
<tr>
<td></td>
<td>4.5 x Storage</td>
</tr>
<tr>
<td></td>
<td>$21% Lower</td>
</tr>
<tr>
<td>General Purpose Compute – VM</td>
<td></td>
</tr>
<tr>
<td>(Compare to AWS M4.2xlarge)</td>
<td>Same Cores</td>
</tr>
<tr>
<td></td>
<td>Similar RAM</td>
</tr>
<tr>
<td></td>
<td>$38% Lower</td>
</tr>
<tr>
<td>Network – Outboard Data Transfer</td>
<td></td>
</tr>
<tr>
<td>(Compared to AWS VPC)</td>
<td>1 pricing dimension</td>
</tr>
<tr>
<td></td>
<td>Free inter-AD</td>
</tr>
<tr>
<td></td>
<td>10 x Free Egress</td>
</tr>
<tr>
<td></td>
<td>$86% Lower</td>
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</table>

**Oracle BMCS** vs **AWS**

- **21% Lower** for Cores
- **38% Lower** for RAM
- **86% Lower** for Network - Outboard Data Transfer (Compared to AWS VPC)
Oracle Cloud Platform: Cloud for Any Workload
Complete Deployment Choice

Oracle Cloud Delivered on Customers Premise
Oracle Cloud Platform

Hybrid Cloud
Comprehensive
Integrated
Open

PaaS

DATA MANAGEMENT
APPLICATION DEVELOPMENT
IDENTITY & SECURITY
ENTERPRISE INTEGRATION
CONTENT & EXPERIENCE
DATA INTEGRATION
BUSINESS ANALYTICS

IaaS

Oracle Data Center
Oracle Public Cloud

C@C

Your Data Center
Oracle Cloud at Customer

Compute
Storage
Network
Oracle IaaS Compute: Supports Broadest Set of Workloads

<table>
<thead>
<tr>
<th>Bare Metal Compute</th>
<th>VM Compute</th>
<th>Container Service</th>
<th>Ravello</th>
<th>Dedicated Compute, SPARC</th>
<th>Engineered Systems, C@C</th>
</tr>
</thead>
<tbody>
<tr>
<td>BYOH</td>
<td>Hypervisor</td>
<td>Hardware – Physical Servers &amp; Storage</td>
<td></td>
<td>Core Data Center &amp; Access Network</td>
<td></td>
</tr>
</tbody>
</table>

- **Hardware – Physical Servers & Storage**
  - Bare Metal Compute
  - VM Compute
  - Container Service
  - Ravello
  - Dedicated Compute, SPARC
  - Engineered Systems, C@C

- **Core Data Center & Access Network**
  - BYOH
  - Hypervisor
  - Container Service
  - Ravello
  - Dedicated Compute, SPARC
  - Engineered Systems, C@C

- **Data Center Regions & Availability Domains**
  - BYOH
  - Hypervisor
  - Container Service
  - Ravello
  - Dedicated Compute, SPARC
  - Engineered Systems, C@C
Oracle IaaS Networking: Ultimate Control and Connectivity

- VCN
- VPN
- Oracle Cloud FastConnect SE
- Oracle Cloud FastConnect EE

Hardware – Physical Servers & Storage
Core Data Center & Access Network
Data Center Regions & Availability Domains
Build Your Path To Cloud

- Build your cloud strategy, understand how Oracle can help
- Identify applications to move to cloud, build migration plan
- Understand your app development plans, identify how Oracle IaaS can help accelerate

Cloud.Oracle.com/IaaS
## New Oracle IaaS TCO Calculator

### On-premises vs Oracle Cloud IaaS

#### 3 Year Cost Comparison

<table>
<thead>
<tr>
<th>Category</th>
<th>On-premises</th>
<th>Oracle IaaS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Server</td>
<td>$46,400</td>
<td>$28,800</td>
</tr>
<tr>
<td>Storage</td>
<td>$4,710</td>
<td>$3,586</td>
</tr>
<tr>
<td>Network</td>
<td>$13,456</td>
<td>$1,961</td>
</tr>
<tr>
<td>Software</td>
<td>$14,400</td>
<td>$0</td>
</tr>
<tr>
<td>Power and Cooling</td>
<td>$7,276</td>
<td>$0</td>
</tr>
<tr>
<td>Data Center Space and Infrastructure</td>
<td>$13,128</td>
<td>$0</td>
</tr>
<tr>
<td>IT Labor</td>
<td>$29,730</td>
<td>$17,838</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$129,100</strong></td>
<td><strong>$52,285</strong></td>
</tr>
</tbody>
</table>

Click sections above to view details or click [here](http://www.oracle.com/calculate-iaas-tco) to view all.

- **3 Year Savings**: $76,815
- **Average Annual Savings**: $25,605

[Oracle Cloud IaaS TCO calculator](http://www.oracle.com/calculate-iaas-tco)
Questions?