

Sárecz Lajos

Cloud Platform Sales Consultant



Oracle Cloud Platform: Modern Cloud Infrastructure

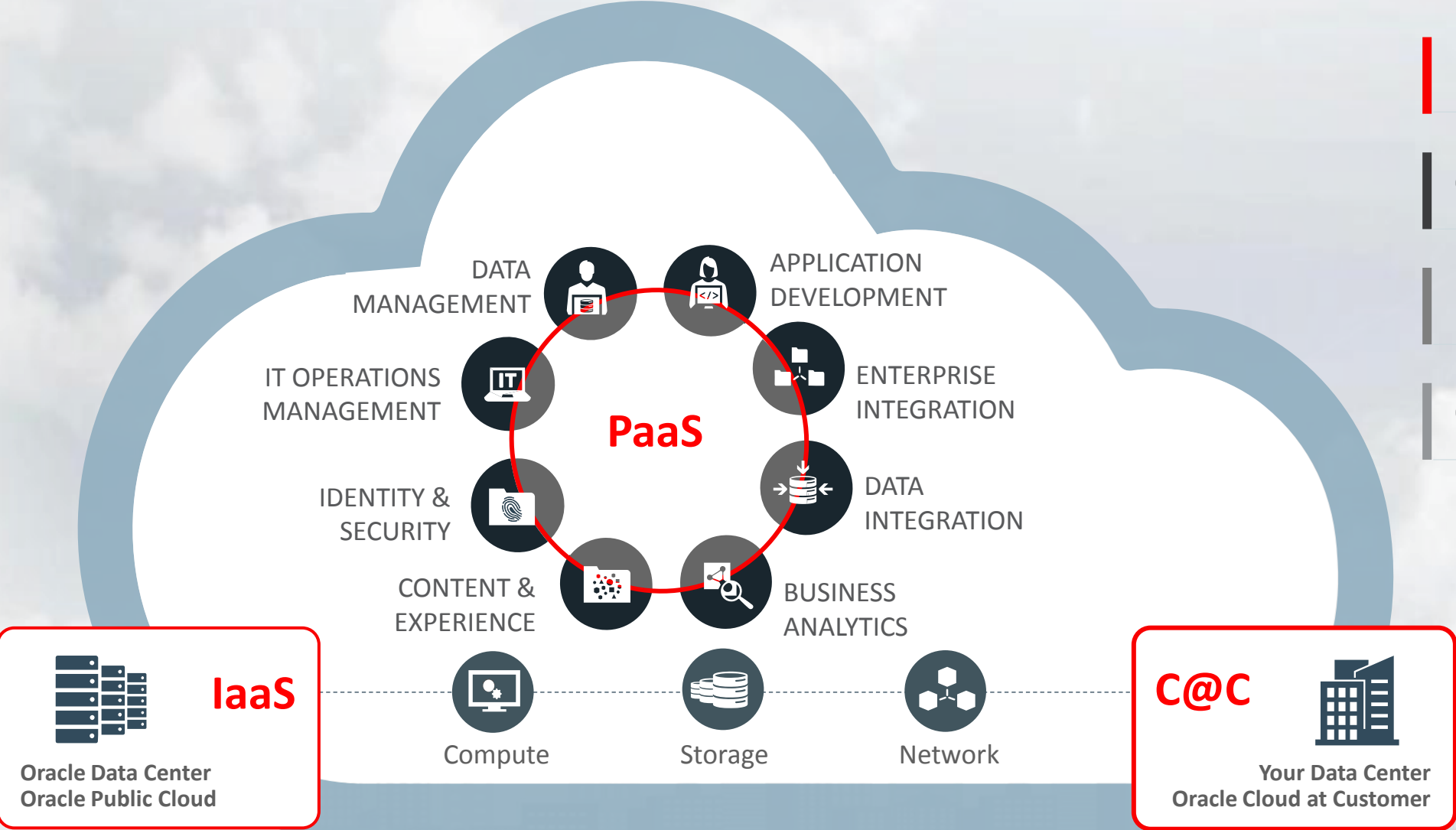
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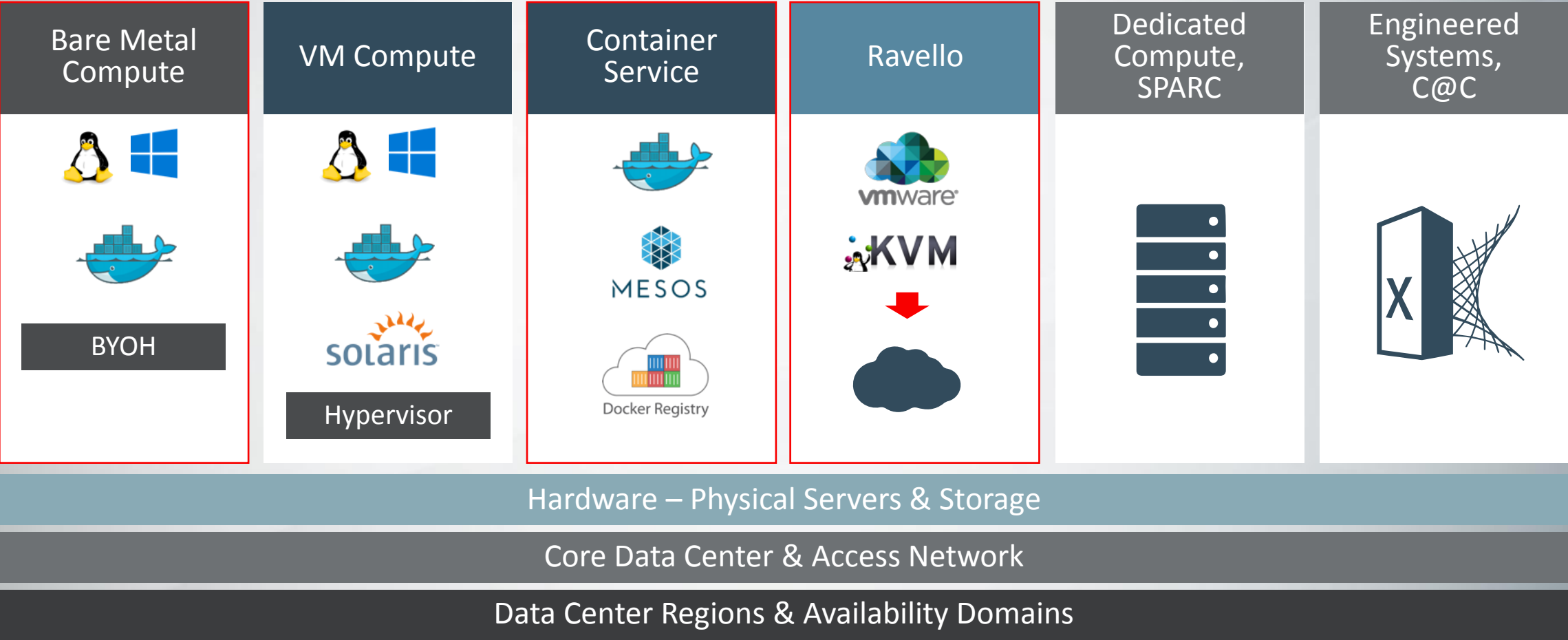
Oracle Cloud Platform



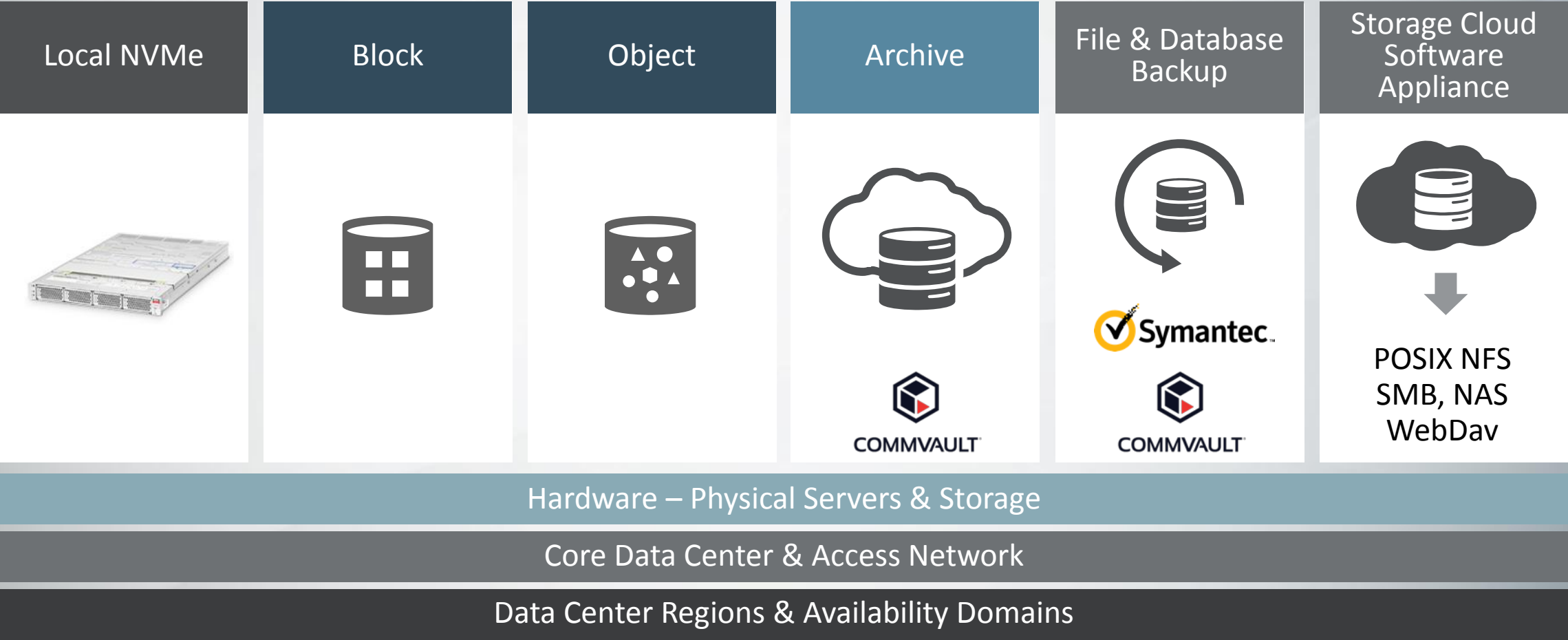
- Hybrid Cloud
- Comprehensive
- Integrated
- Open



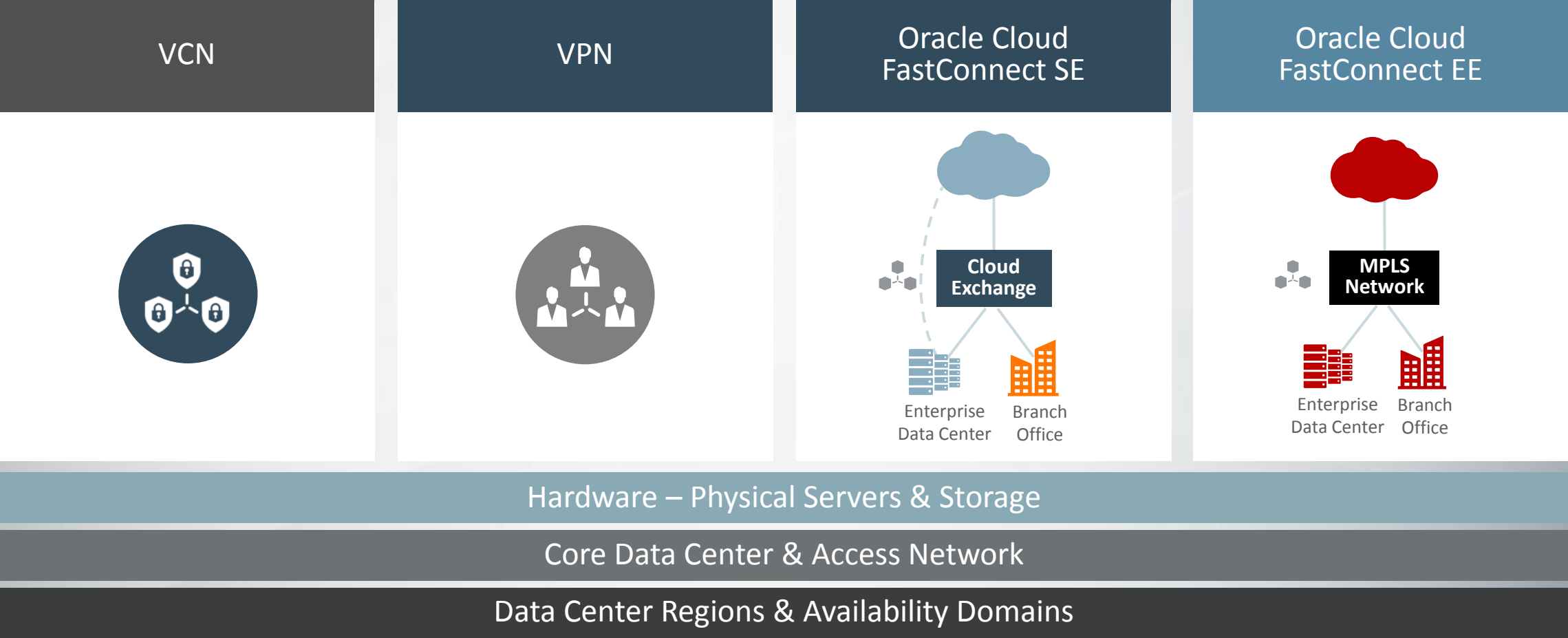
Oracle IaaS Compute: Supports Broadest Set of Workloads



Oracle IaaS Storage: Highest Performance and Durability



Oracle IaaS Networking: Ultimate Control and Connectivity



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

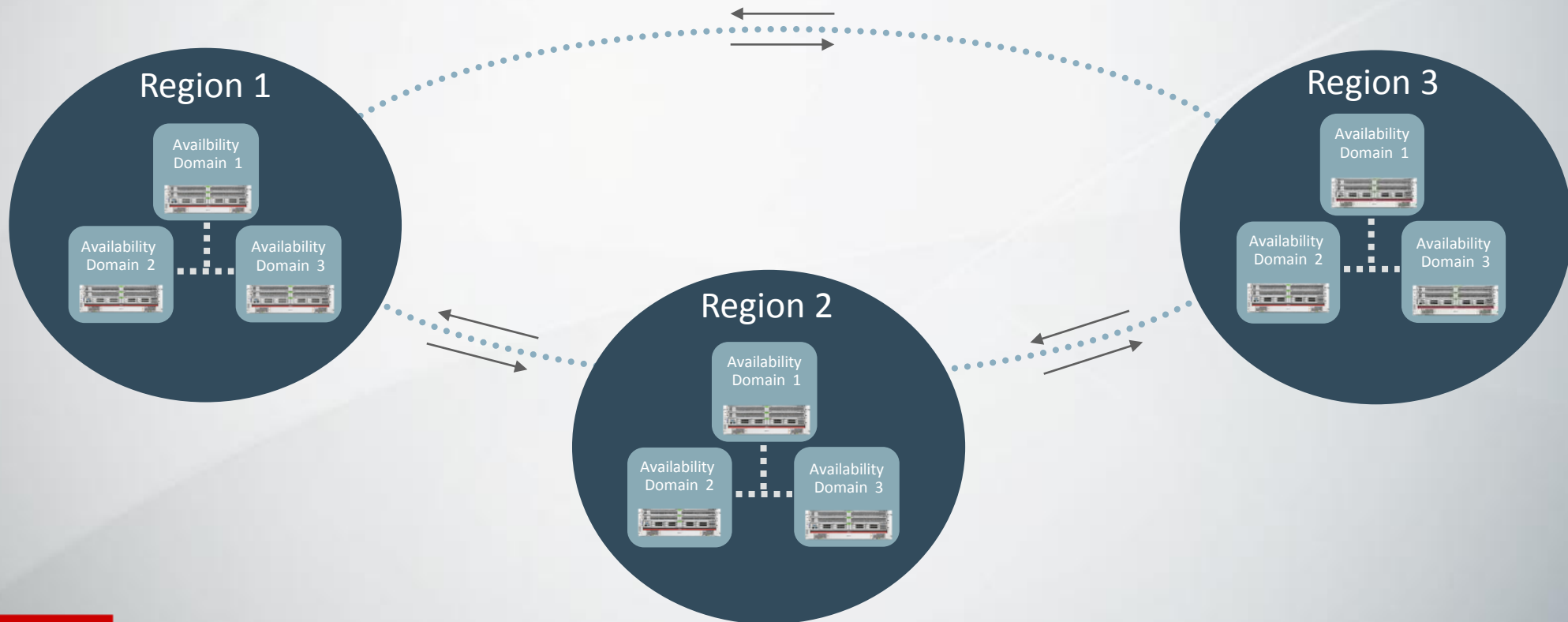
It starts with a Modern Cloud Infrastructure...

Latest Technologies Enable a Modern Cloud Infrastructure

Technology	Benefit
Availability domains	Enables enterprise-level high availability
Flat, non-blocking network	Enables predictable low latency; eliminates “noisy neighbors”
Off-box IO virtualization & automated hardware wiping	Enables secure deployments of bare metal servers without Oracle management software overhead
Direct-attached NVMe storage	Enables highest IO workloads

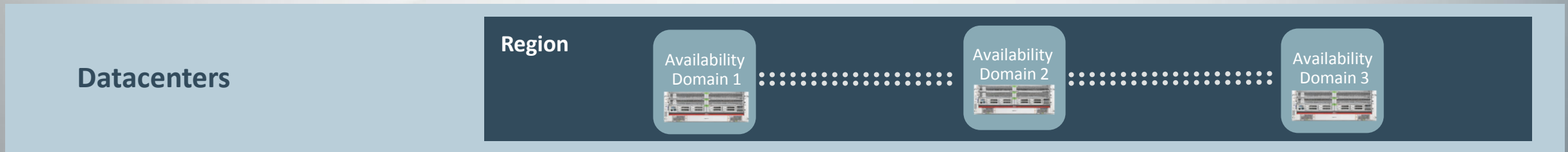
Region / Availability Domain Topology

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



Inside a Region – High Availability Building Blocks

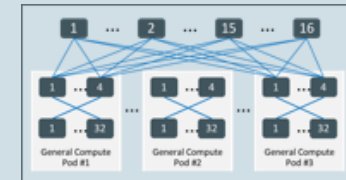
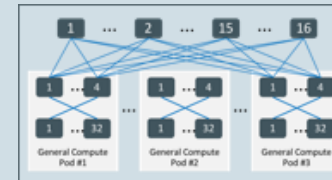
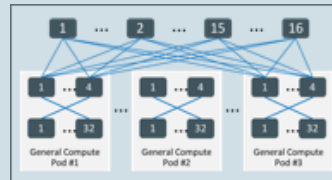
- Multiple fault-decorrelated, completely independent datacenters – Availability Domains (ADs)
- Predictable low latency & high speed, encrypted interconnect between ADs
 - < 500μs RTT latency, 1Tb/s bandwidth
- Enables zero-data-loss architectures (e.g. Oracle MAA) and high availability scale-out architectures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

Physical Network



Datacenters

Region

Availability Domain 1



Availability Domain 2

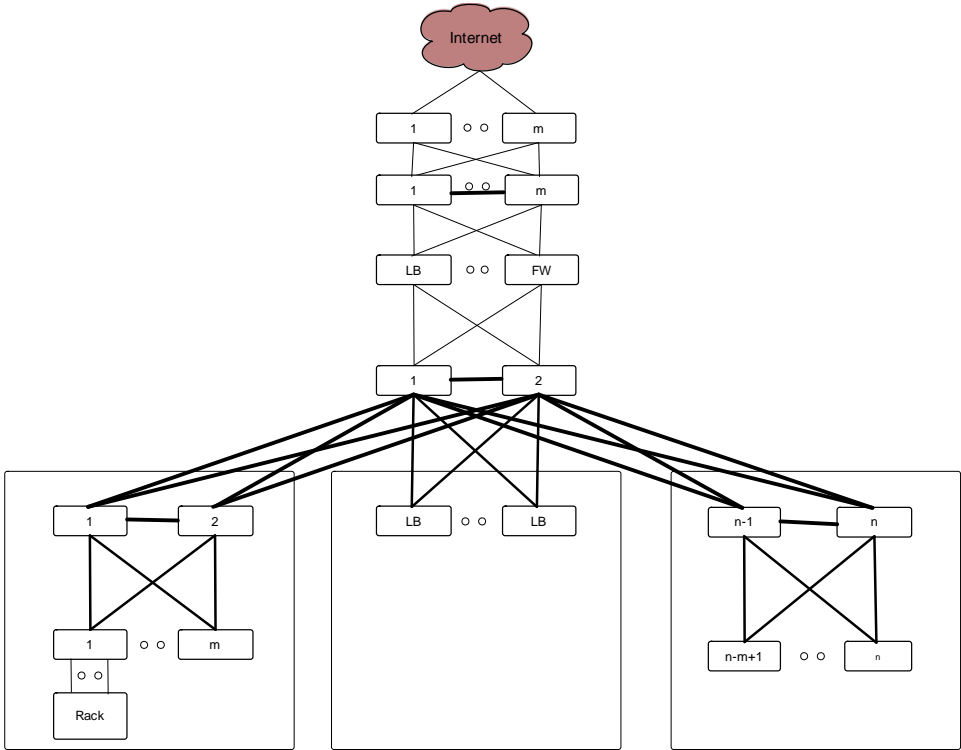


Availability Domain 3

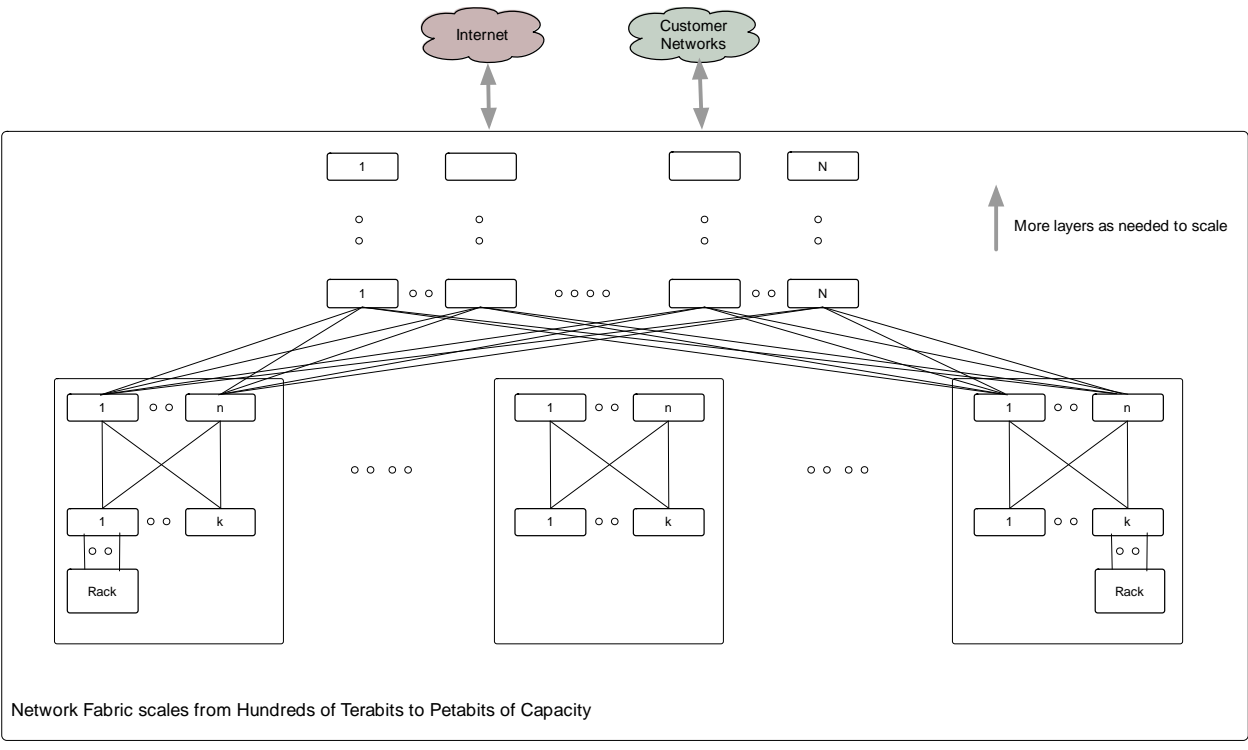


Network Design: Comparison with the Traditional Design

Traditional Datacenter Design



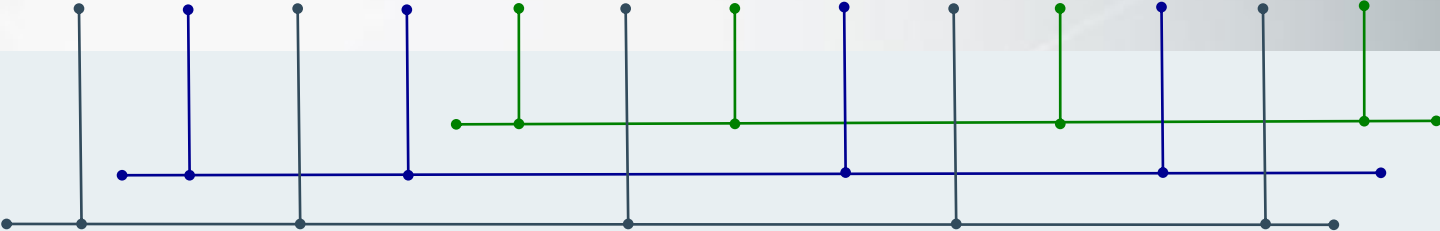
Oracle Cloud Datacenter Design



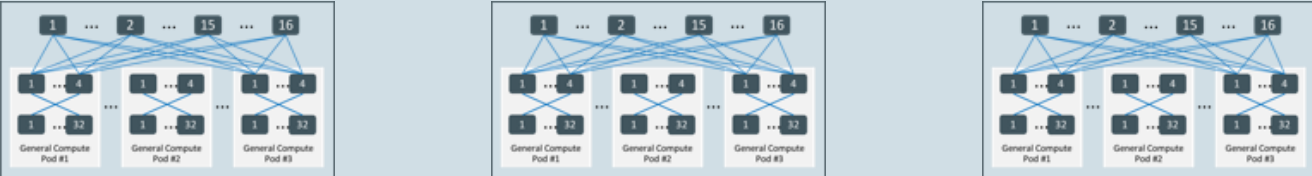
Comprehensive Virtual Network with Off-box Virtualization

- Highly configurable private overlay networks – moves management and IO out of the hypervisor and enables lower overhead and bare metal instances

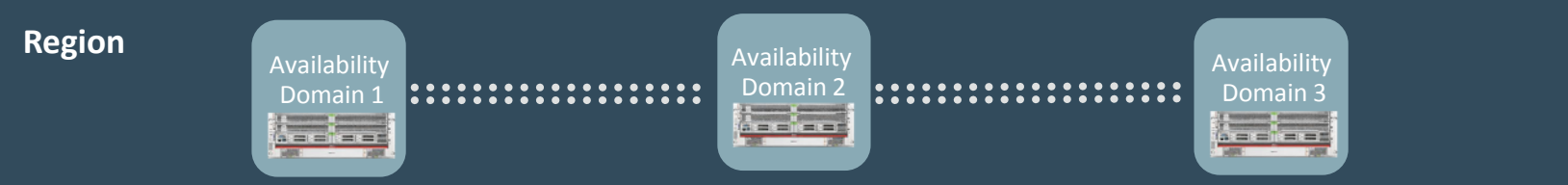
Virtual Network



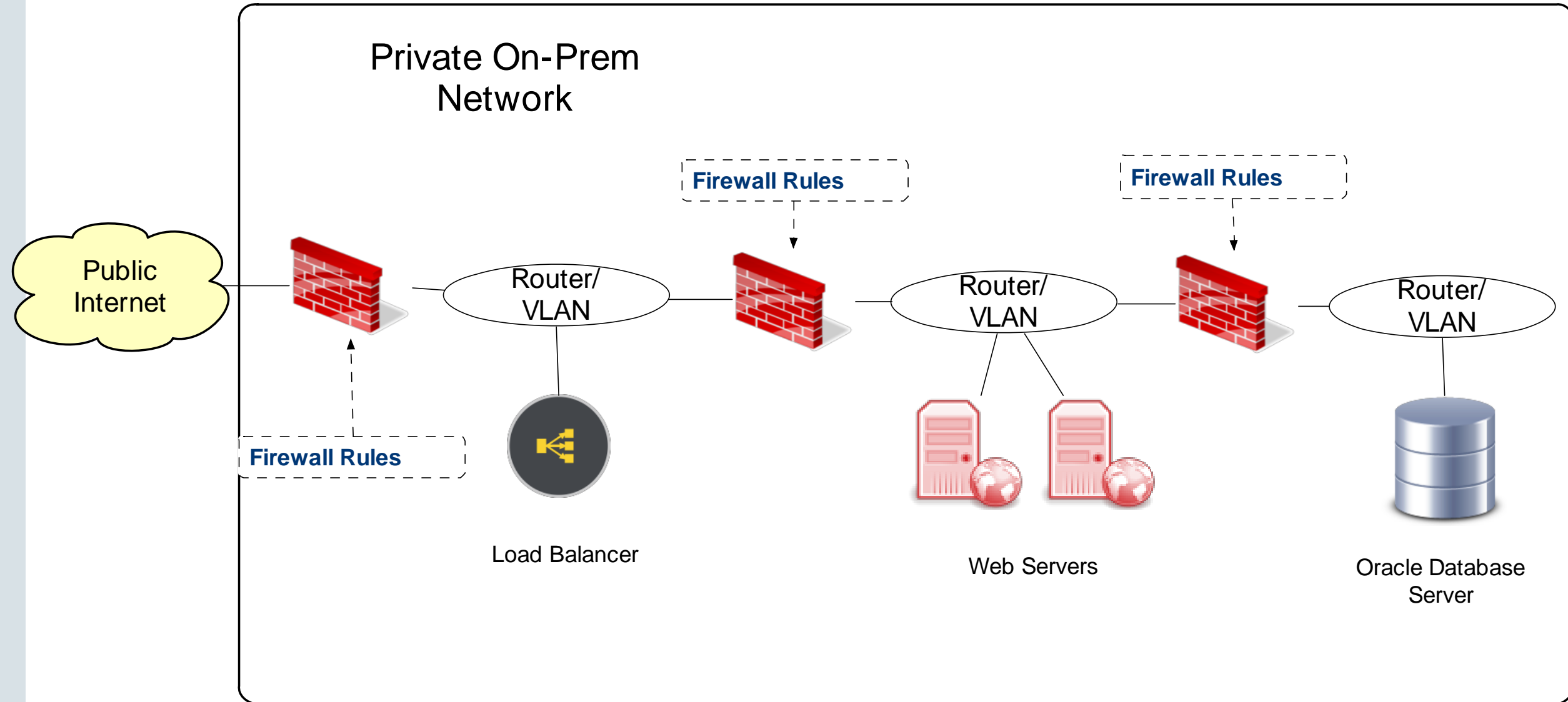
Physical Network



Datacenters

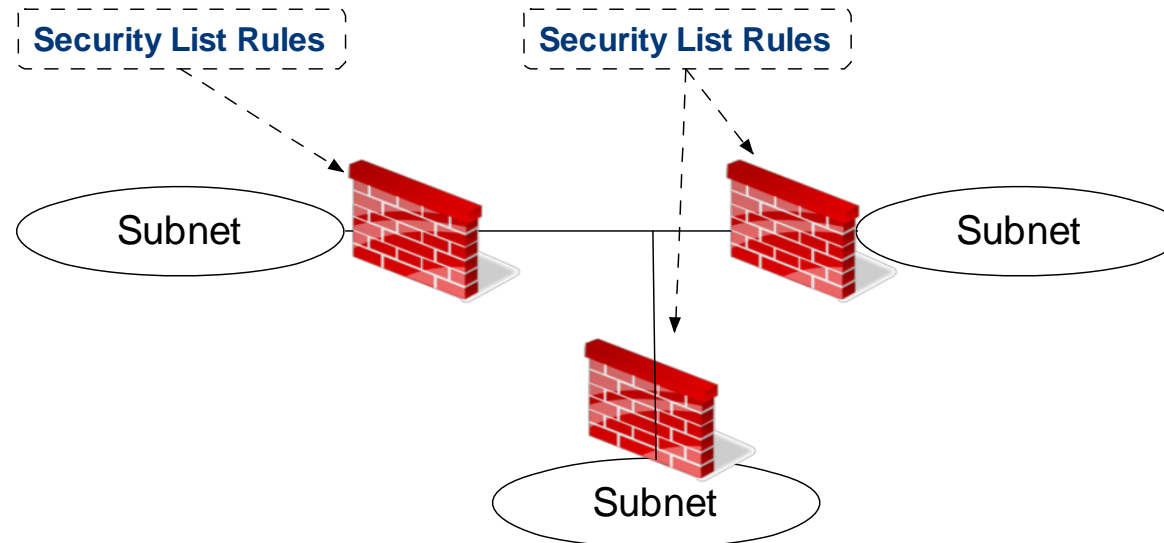


Traditional Three Tier App

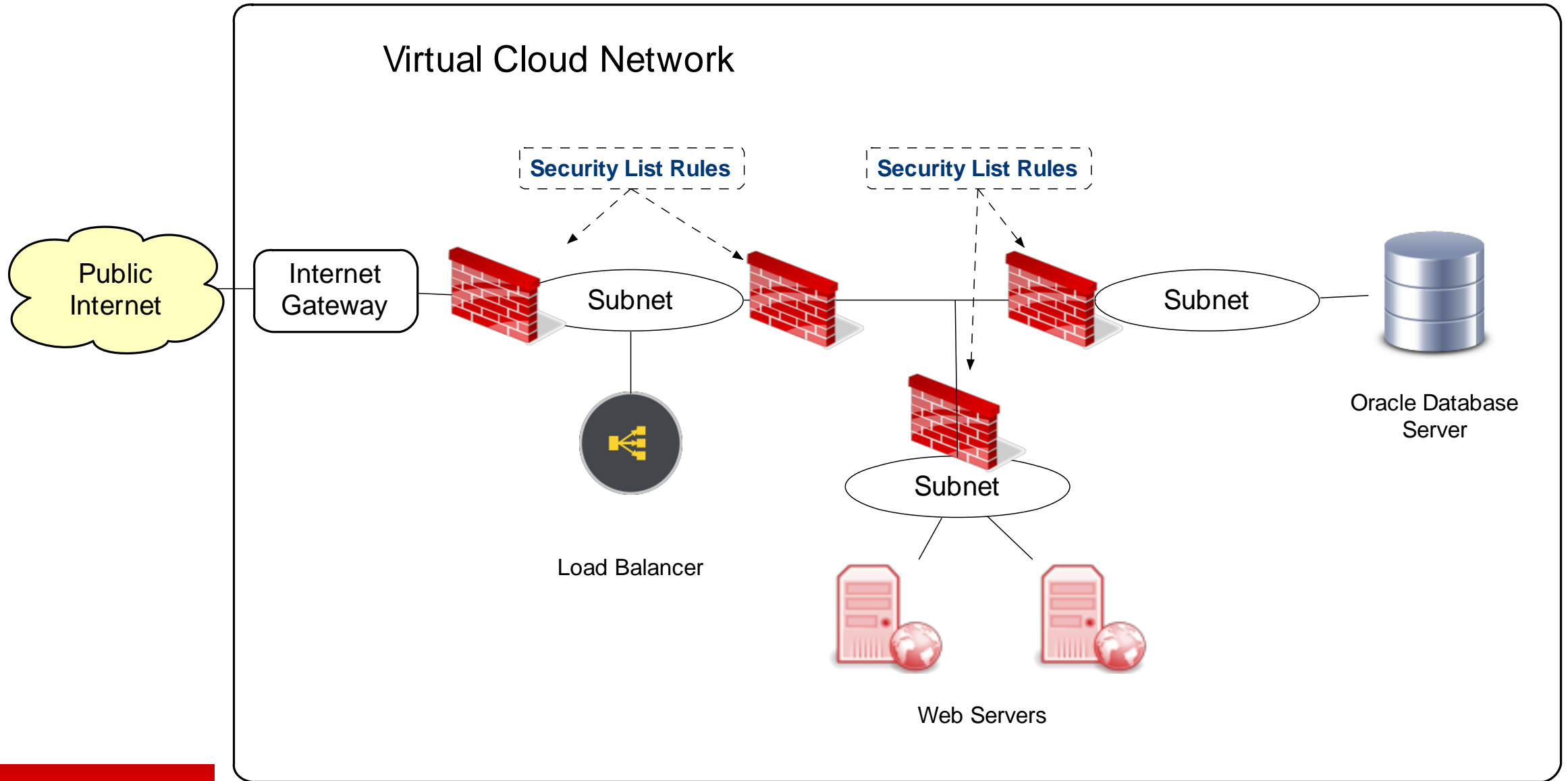


Virtual Cloud Network (VCN)

Private IP Address Space

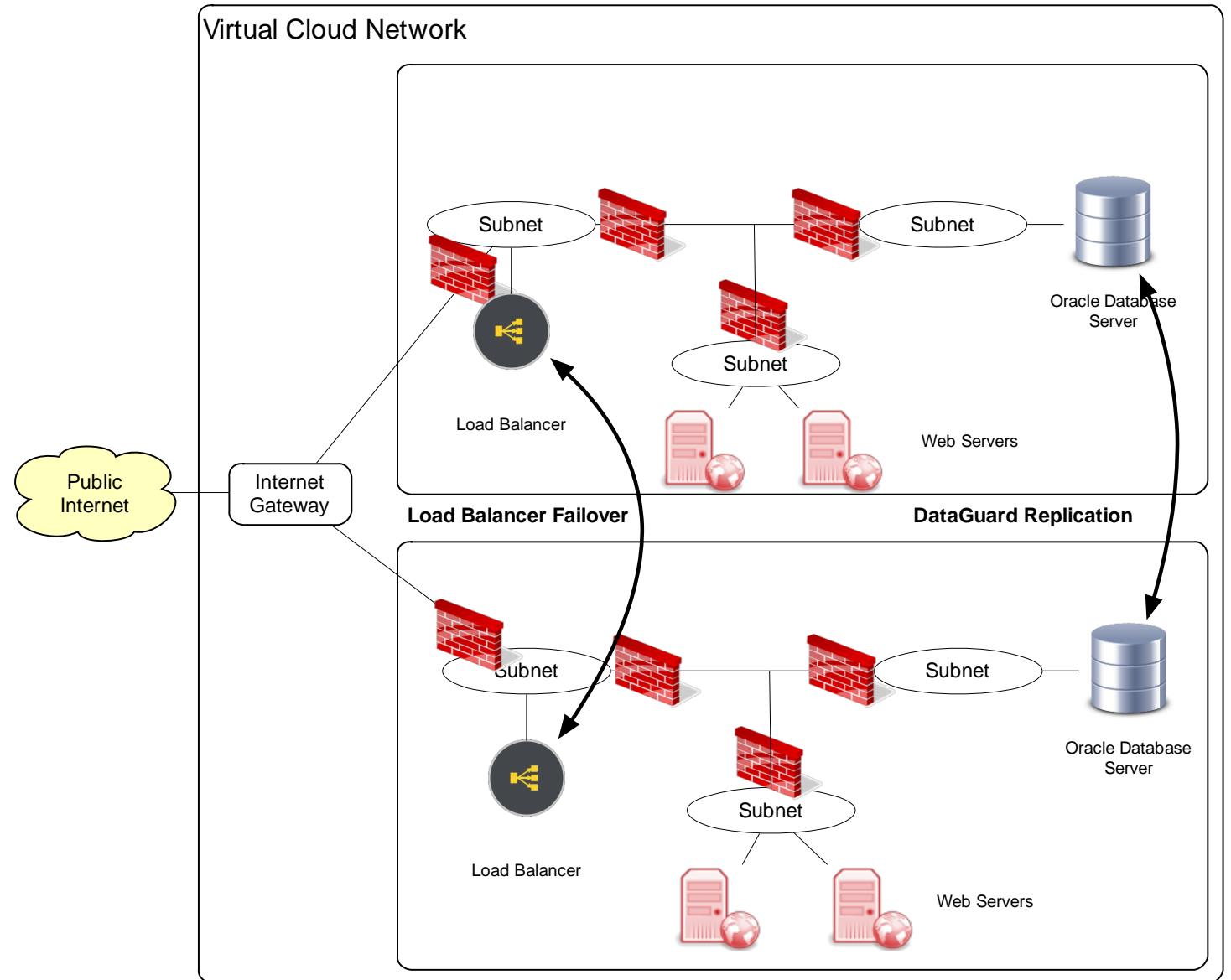


Traditional Three Tier App in VCN

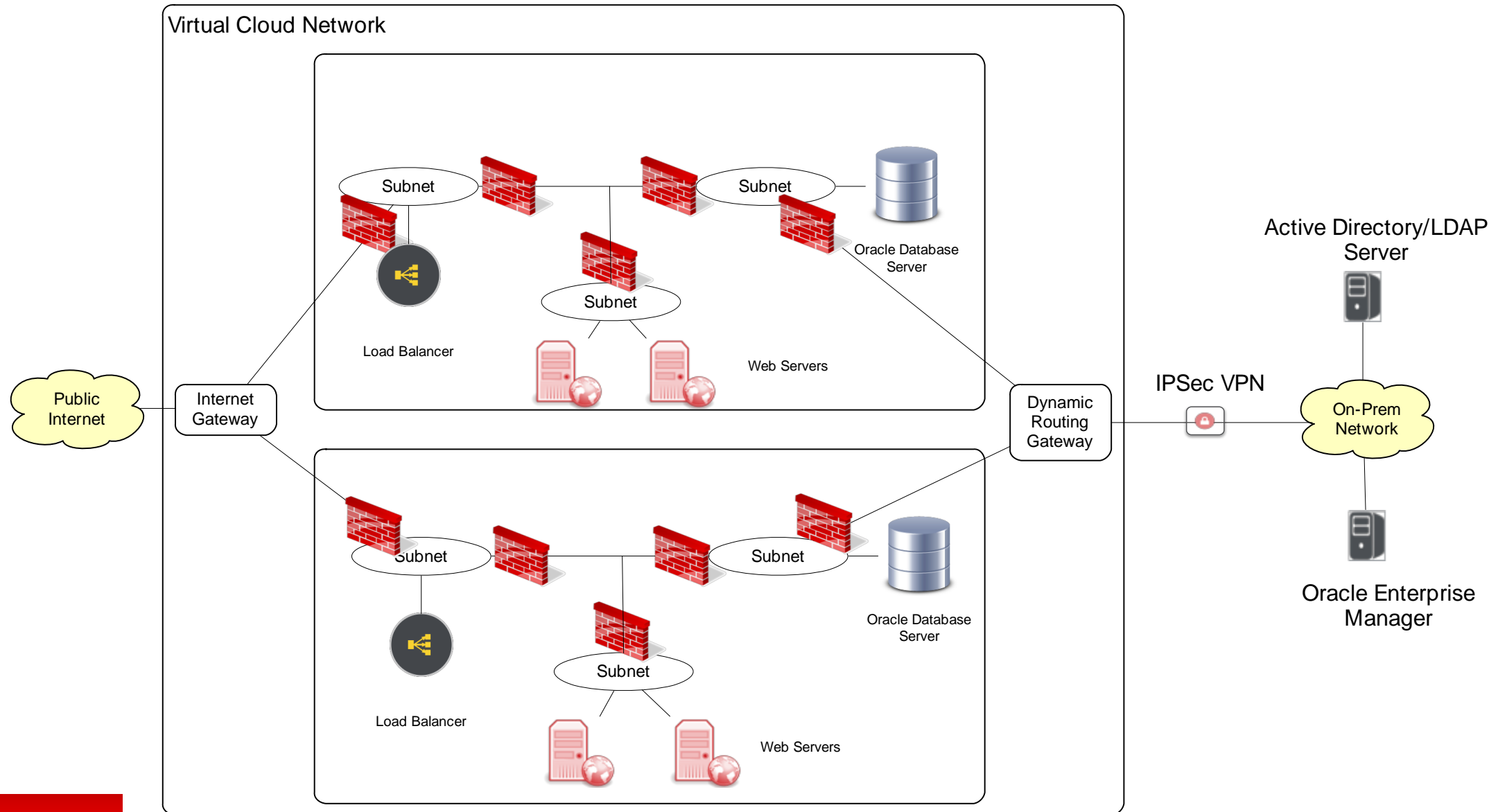


Three Tier App With Two ADs

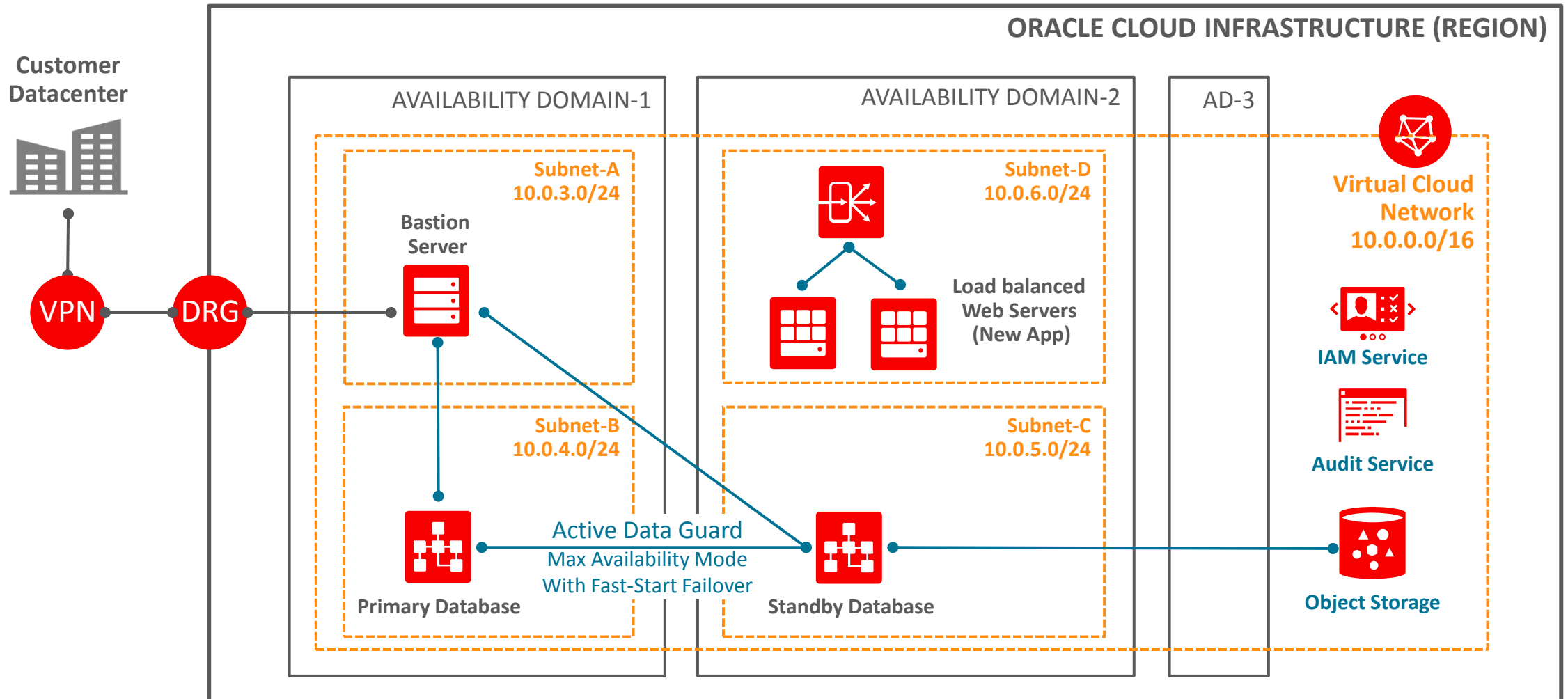
- Bare Metal, Virtual Machines, DB and Load-Balancer : ALL in the same private network
- Private connectivity within VCN across ADs



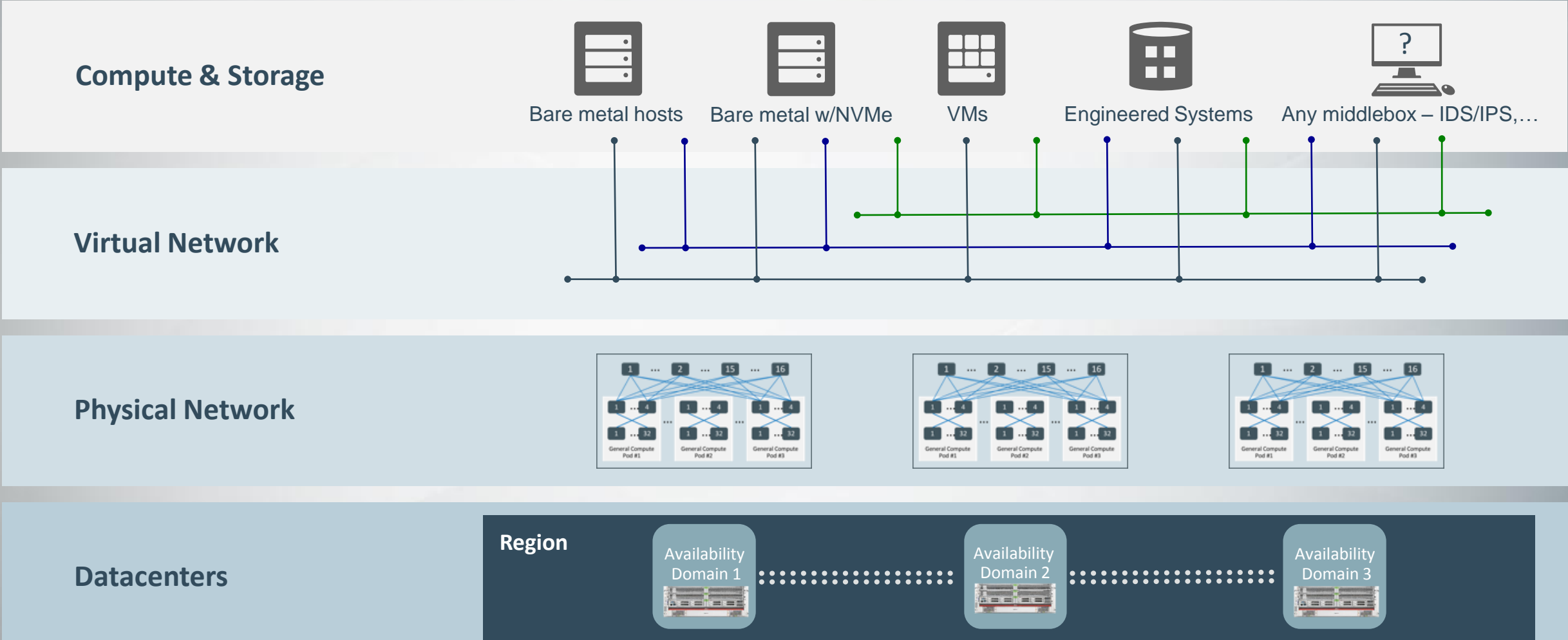
Secure Connectivity to On-Prem Network



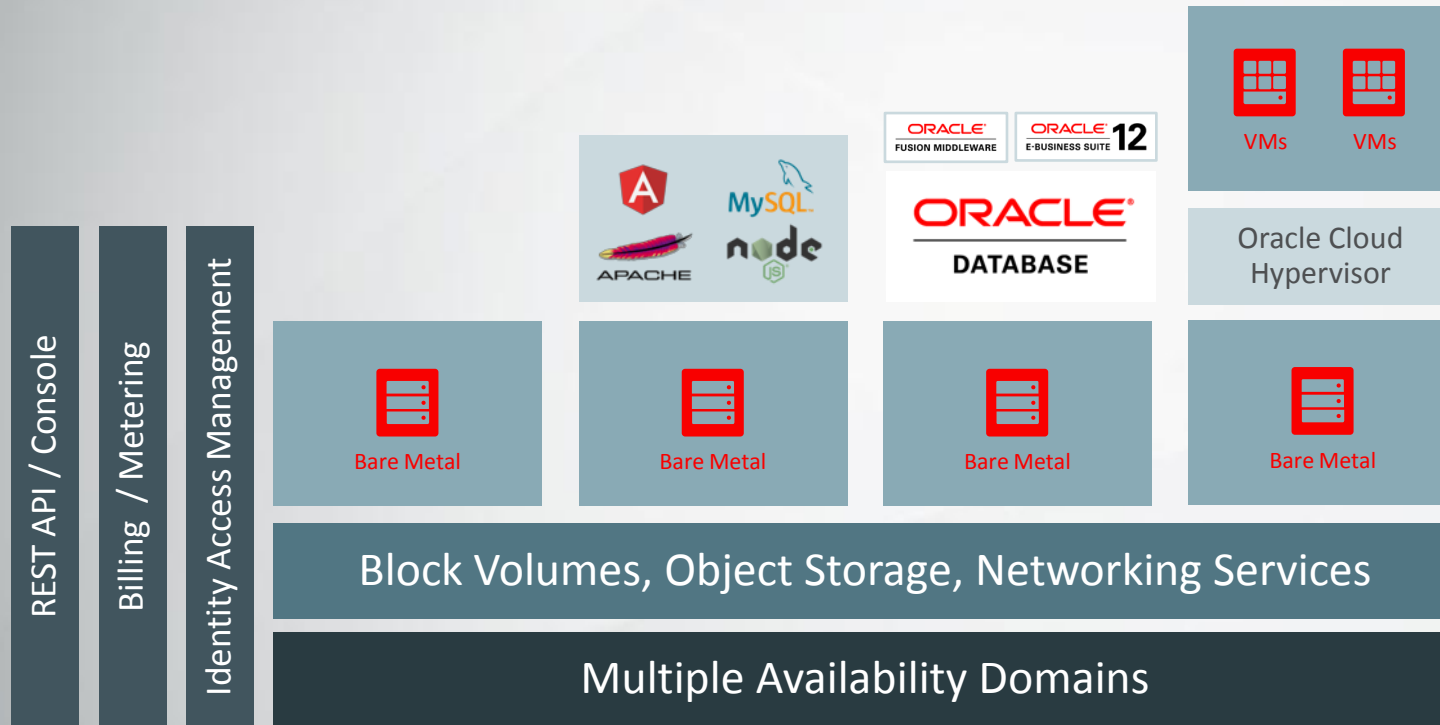
All Your Resources on the Same Virtual Cloud Network



Putting it All Together – Reliable, Predictable, Flexible, Fast



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

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)

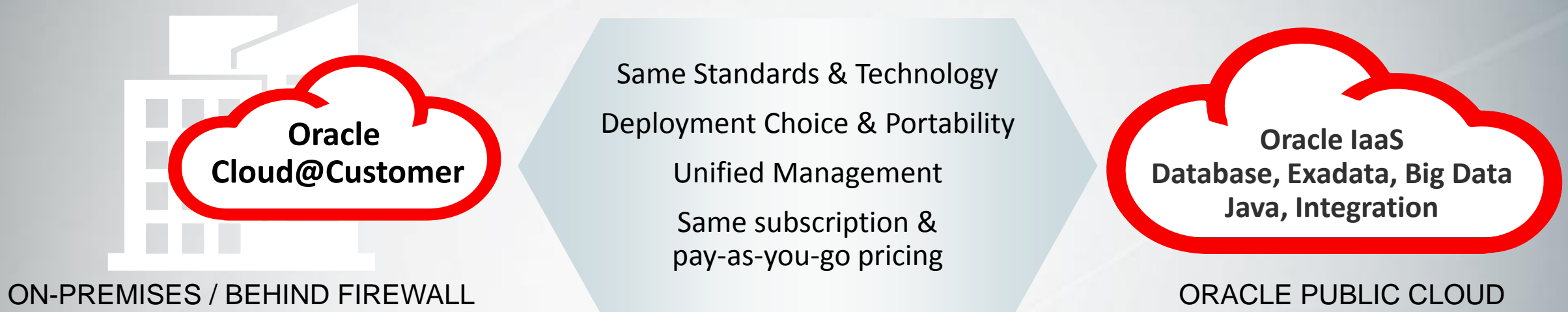
- Raw iron performance
- Dedicated hardware



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

Oracle Cloud@Customer: Complete Cloud Deployment Choice



Dev/Test in Oracle Cloud, deploy in production on-premises



Burst from on-premises to Oracle Cloud for flex capacity on demand



Oracle Ravello Cloud Service

- Run VMware & KVM workloads natively on cloud
 - No VM conversion required
 - Enables enterprise DC-like networking
- Layer 2 networking in public cloud
 - No networking changes required
 - Support for virtual network & security appliances
- Bring your own VPN, firewall, security solution to cloud
 - No application reconfiguration required

Ravello is well-suited for key VMware & KVM workloads

Pre-Prod Workloads



Dev Test



IT Ops



Security Testing

Production Workloads



Production Apps



Training



Demos/PoC

ORACLE

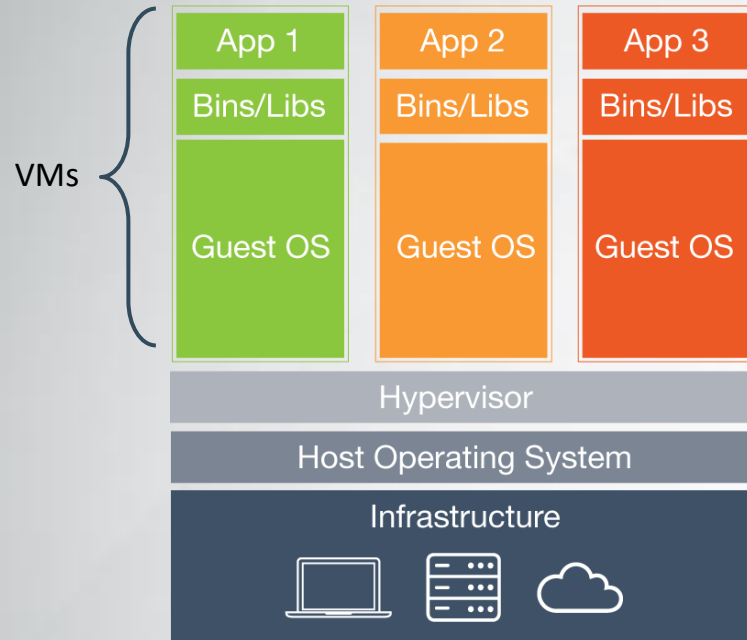
888 HOLDINGS

redhat

SimSpace

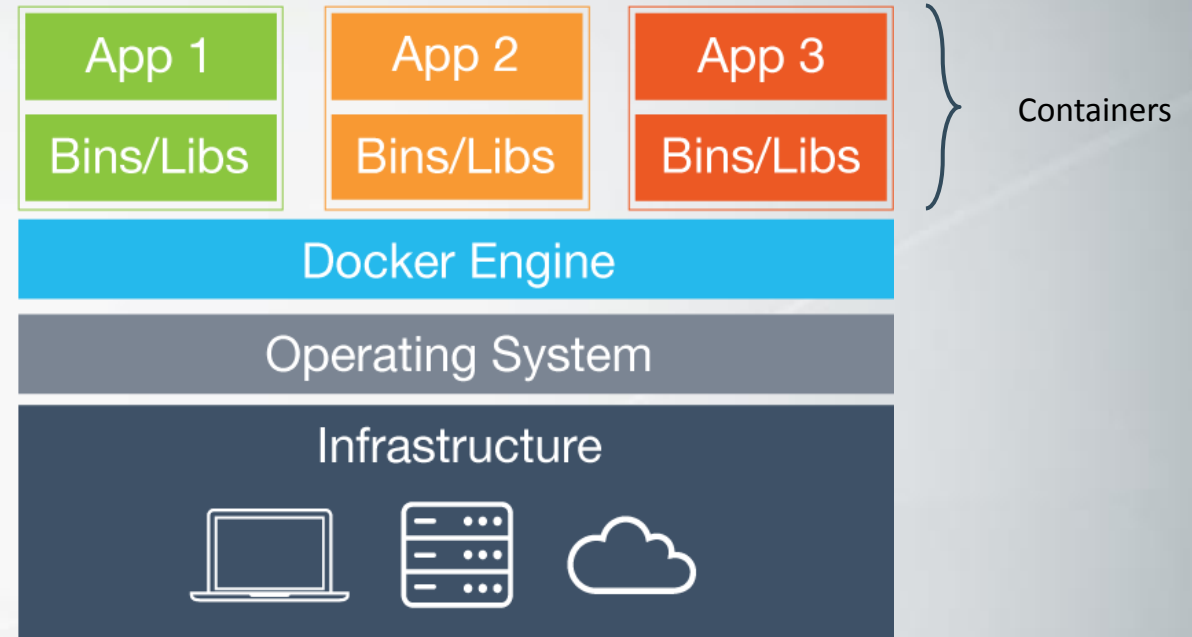
intel Security

Virtual Machines vs. Containers



Virtual Machines

- Each virtual machine (VM) includes the app, the necessary binaries and libraries and an **entire guest operating system**



Containers

- Containers include the app & all of its dependencies, but **share the kernel** with other containers.
- Run as an isolated process in userspace on the host OS
- **Not** tied to any specific infrastructure – containers run on any computer, infrastructure and cloud.

Introducing Oracle Container Cloud Service!



What is It?

- Hosted container service allows customers to deploy and run their own Docker containers
- Management and controls to orchestrate container placement and policies

What Problems Does it Solve?

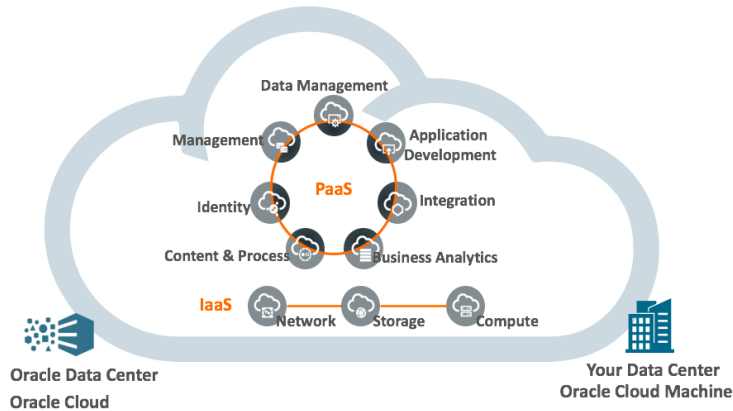
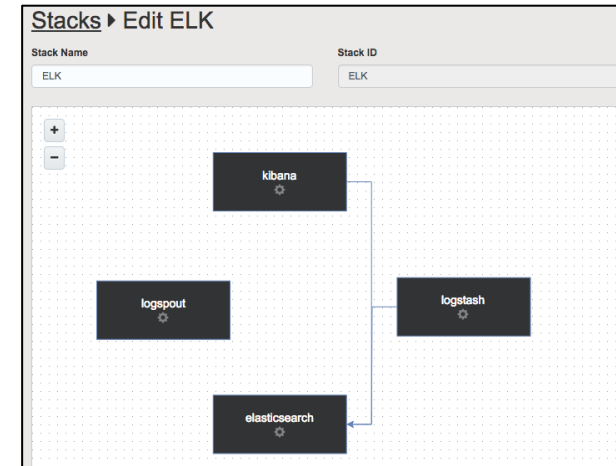
- Building & maintaining Docker environments & management is complex, costly and time consuming
- Lack of example container applications and best practices to get started
- Enterprises need Docker management from dev/test through to production

Key Benefits

- Enables developers to get started and deploy containers quickly, DevOps teams with Docker management, visibility and control.
- Integrates with Continuous Integration & Deployment Pipelines to automate new releases.
- Supports polyglot development, open source software and microservice architectures

Container Cloud Service Differentiation

1. Easy Onboarding and Use
2. Example Application Stacks
3. Part of Rich App Dev Portfolio
4. Planned Container Hybrid Cloud with Cloud @ Customer



Developer Cloud: Continuous integration/Continuous Delivery/Collaboration									
Application Container Cloud		Java Cloud/ WebLogic Server		Mobile Cloud		Application Builder Cloud		Container Cloud Service	
	Develop Cloud Native, Polyglot Apps		Modernize Java Apps to Cloud		Develop Mobile Apps		Declarative HTML5 Apps		Managed Docker Containers
Management Cloud: Performance Management, Log Analytics, IT Analytics									

1. Easy Onboarding and Use

- Intuitive complete UI for Developers and DevOps teams
- Quickstart Wizards for rapid setup
- Dashboards give at a glance operational views
- Docker Compatible (Docker Engine and tooling like Docker Compose)

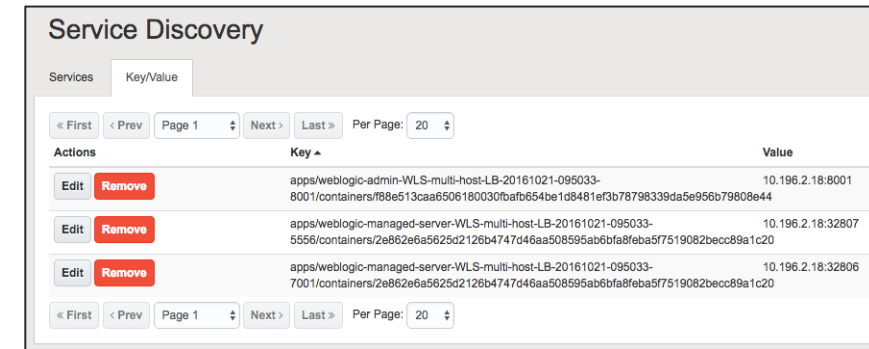
The screenshot displays the Oracle Cloud Infrastructure Dashboard. At the top right, there is a 'Quick Start Wizard' button. The dashboard is divided into several sections:

- Deployments:** A card showing 16 total deployments, with 7 healthy and 9 stopped. A green 'OK' status indicates all deployments have passed their health checks.
- Hosts:** A card showing 2 total hosts, with 2 active. A green 'OK' status indicates all hosts are active and reachable.
- Resource Pools:** A card showing 5 total resource pools, with 5 healthy.
- Resource Pool Details:** A table listing resource pools with their host counts, memory usage, and CPU usage.
- Summary:** A bottom section with two columns of metrics: Services (43), Stacks (15), Deployments (16), and Resource Pools (5) on the left; and Containers (11), Images (46), and Hosts (2) on the right.

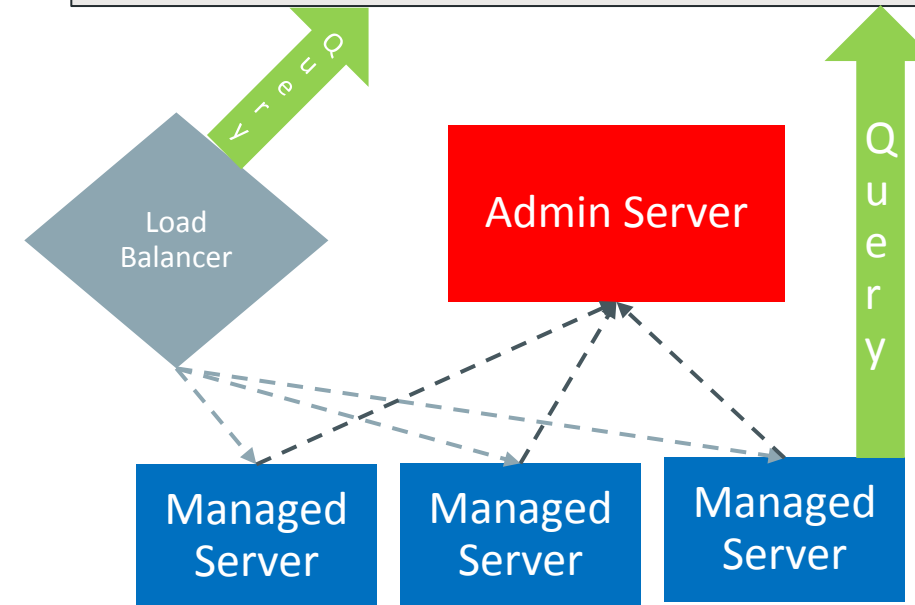
Name	Hosts	Memory	CPU
default	2	39%	0%
Development	0	0%	0%
myTeam	0	0%	0%
myTeam2	0	0%	0%
Production	0	0%	0%

2. Example Application Stacks

- Example “Stacks” enable quick customer ramp without complex orchestration
- Service Discovery Built-In to enable multi-host app deployments
- Complete functioning examples:
 - Load Balancing
 - Logging
 - Monitoring
 - Open Source (WordPress, Redis, others)
 - WebLogic Multi-Host



Actions	Key	Value
Edit Remove	apps/weblogic-admin-WLS-multi-host-LB-20161021-095033-8001/containers/f88e513caa6506180030fbaf654be1d8481ef3b78798339da5e956b79808e44	10.196.2.18:8001
Edit Remove	apps/weblogic-managed-server-WLS-multi-host-LB-20161021-095033-5556/containers/2e9862e6a5625d2126b4747d46aa508595ab6bfa8f8eba5f7519082becc89a1c20	10.196.2.18:32807
Edit Remove	apps/weblogic-managed-server-WLS-multi-host-LB-20161021-095033-7001/containers/2e9862e6a5625d2126b4747d46aa508595ab6bfa8f8eba5f7519082becc89a1c20	10.196.2.18:32806



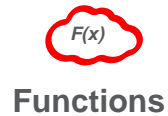
Multi-Host WebLogic Stack with Load balancer

3. Part of Rich App Dev Portfolio

Unique in Blending Traditional, Cloud Native and Low Code with End to End PaaS

Oracle Platform for Cloud Application Development

BACK-END SERVICES



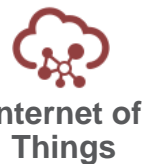
COMMON SERVICES



DATA SERVICES



INTEGRATION SERVICES



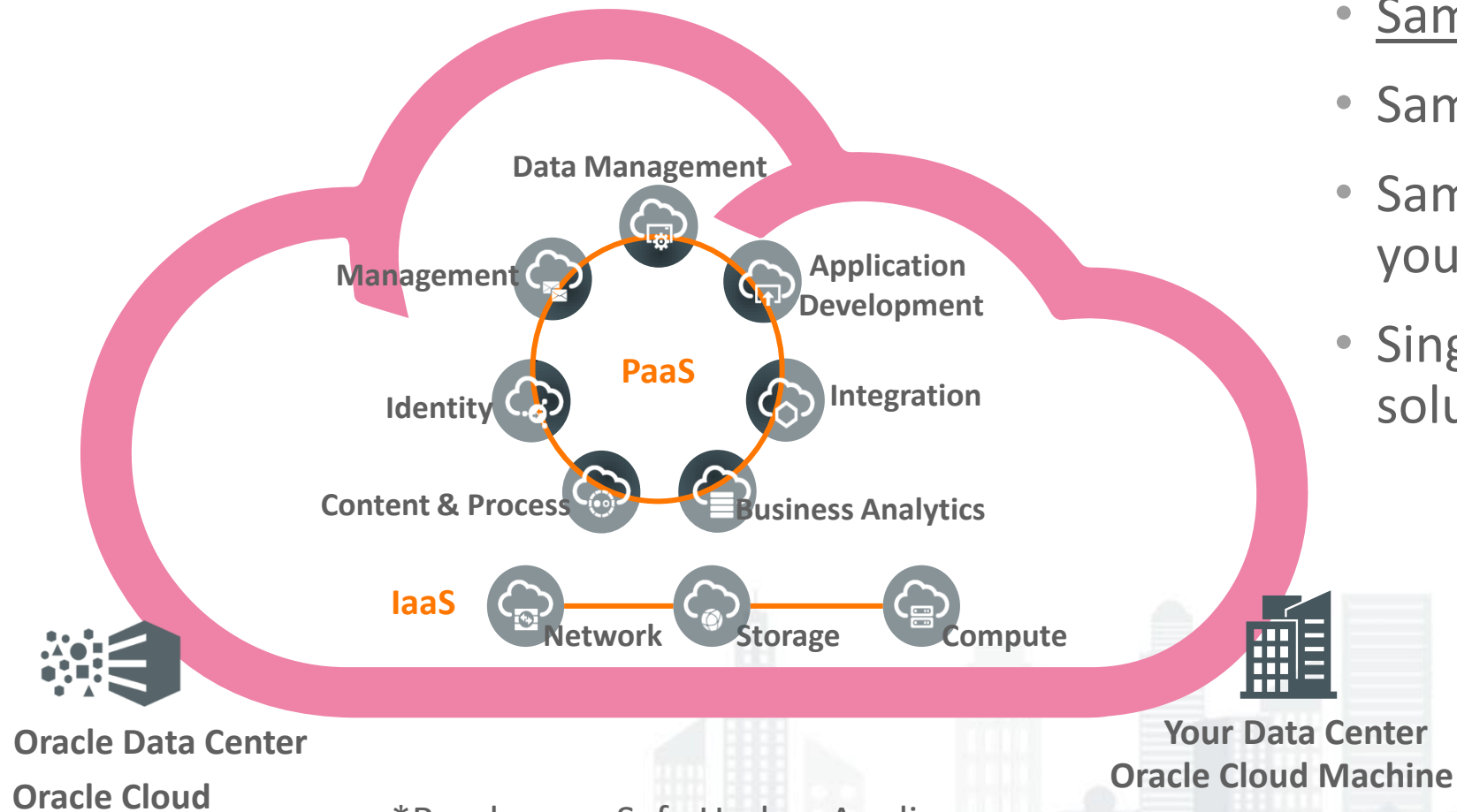
Compute (VM, Bare Metal)

Network

Storage

Infrastructure as a Service

4. Planned* Container Hybrid Cloud with Cloud @ Customer



- Same IaaS and PaaS software
- Same updates as Oracle Cloud
- Same subscription and pay-as-you-go pricing
- Single vendor for the entire solution

*Roadmap – Safe Harbor Applies

Oracle Cloud and Docker Containers

Compute CS



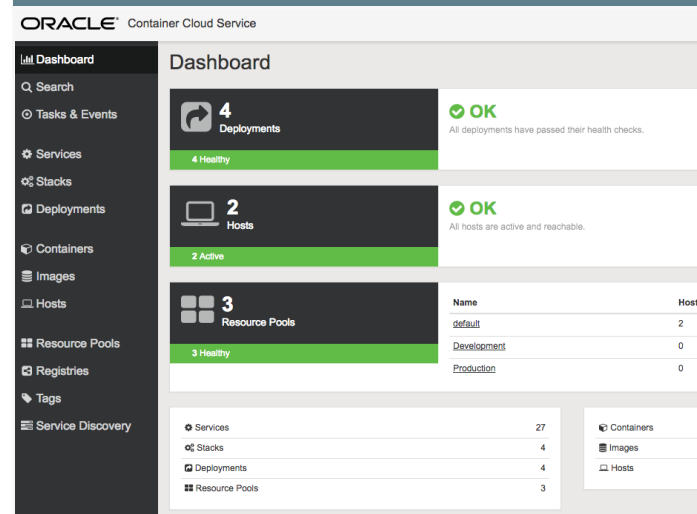
DIY Container Management

IaaS

Container CS



ORACLE Container Cloud Service



Oracle Managed Container Service

CaaS

Application Container CS



Docker-based Cloud Polyglot Platform

PaaS

Container Cloud PoC @Magyar Telekom

- The input for the exercise
 - The compute node is available at 141.145.40.244
 - Port forward is created to access the repos:
 - Configuration Repo (git):
 - The username/password is occspoc/*****
 - It is on the node's port 8443
 - Artifact Repo
 - The username/password is occspoc/*****
 - It is on the node's port 8444
 - Image name is energy.deconv.deconv-docker:2016.11.21-15.55.42

First steps in command line

```
[opc@test-occs-wkr-1 ~]$ sudo docker login '--username=occspec' '--password=*****' "--email=lajos.sarecz@gmail.com" localhost:8444 WARNING: login credentials saved in /root/.docker/config.json
Login Succeeded
```

```
[opc@test-occs-wkr-1 ~]$ sudo docker pull localhost:8444/energy.deconv.deconv-docker:2016.11.21-15.55.42
2016.11.21-15.55.42: Pulling from energy.deconv.deconv-docker
10ec637c060c: Pull complete
7905d7b158eb: Pull complete
933a007dab52: Pull complete
Digest: sha256:19507220ba6b051c02c47f3032e530eb151b496551d7f9abae914b20f3721206
Status: Downloaded newer image for localhost:8444/energy.deconv.deconv-docker:2016.11.21-15.55.42
```

```
[opc@test-occs-wkr-1 ~]$ sudo docker images
```

REPOSITORY	TAG	IMAGE ID	CREATED	SIZE
alpine	3.4	245f7a86c576	6 days ago	4.803 MB
ubuntu	14.04	7c09e61e9035	10 days ago	187.9 MB
localhost:8444/energy.deconv.deconv-docker	2016.11.21-15.55.42	65f36ef7a663	3 months ago	721.8 MB

List of Images on OCCS Console UI

The screenshot shows the Oracle Container Cloud Service console interface. The browser address bar displays the URL `https://141.145.40.18/#/images`. The page title is "Images". A navigation sidebar on the left includes options for Dashboard, Search, Tasks & Events, Services, Stacks, Deployments, Containers, Images (selected), and Hosts. The main content area displays a table of images with columns for Actions, Host, Name, Image ID, Diff Size, and Virtual. The table contains six rows of image data, each with "Run" and "Remove" buttons. The table also includes pagination controls at the top and bottom, showing "Page 1" and "Per Page: 20".

Actions	Host	Name	Image ID	Diff Size	Virtual
Run Remove	test-occs-wkr-1	alpine:3.4	sha256:245f7	5 MB	5 MB
Run Remove	test-occs-wkr-1	localhost8444/energy.d...	sha256:65f36	722 MB	722 MB
Run Remove	test-occs-wkr-1	openweb/git-sync:latest	sha256:ed87e	751 MB	751 MB
Run Remove	test-occs-wkr-1	oracle/oraclelinux:7.0	sha256:10ffe	197 MB	197 MB
Run Remove	test-occs-wkr-1	ubuntu:14.04	sha256:7c09e	188 MB	188 MB
Run Remove	test-occs-wkr-1	zaporylie/git:latest	sha256:24437	209 MB	209 MB

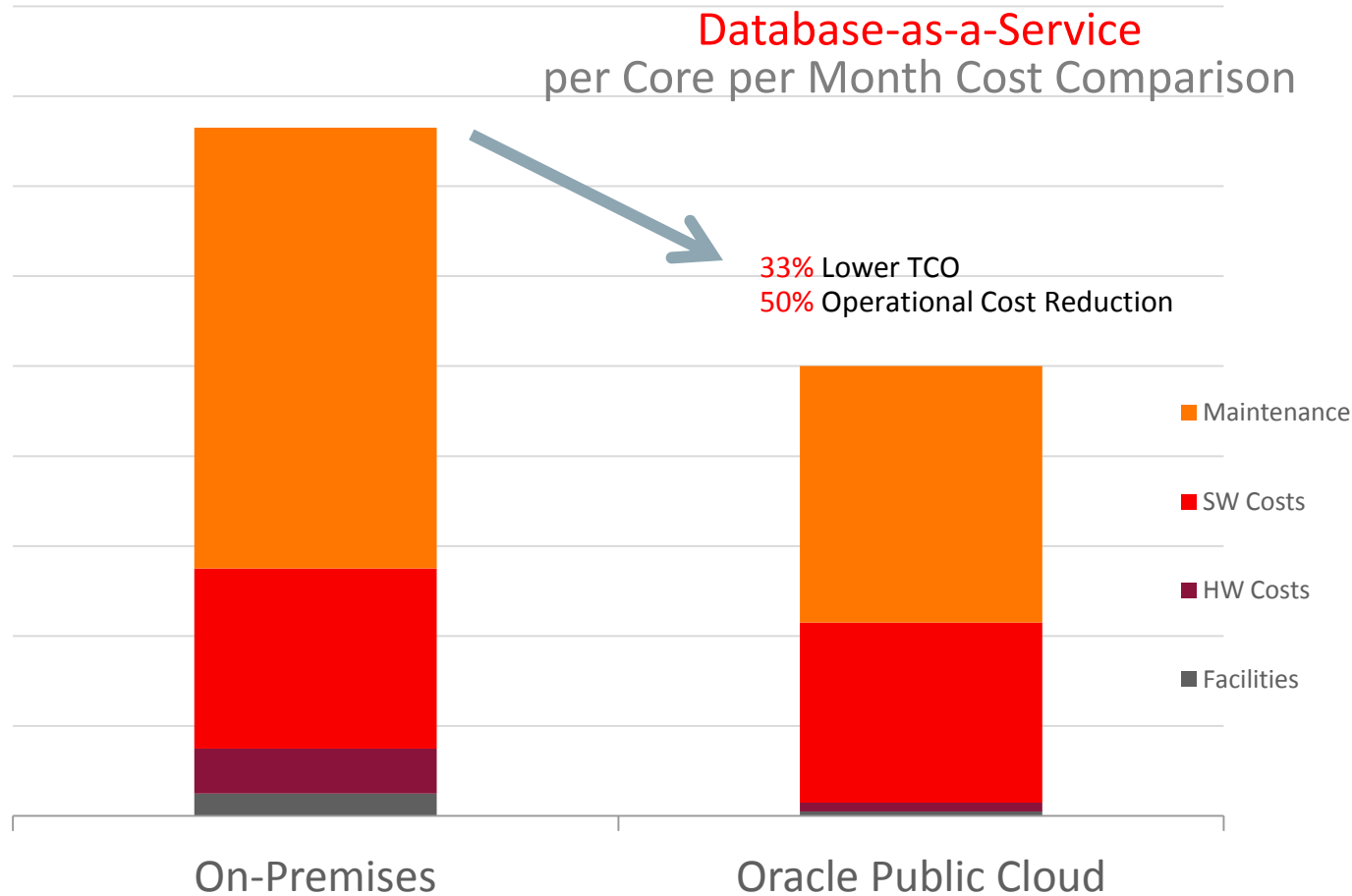


Access the GIT configuration repository

- Need to sync the git repo to OCCS
- Developer Cloud Service has GIT support, but we couldn't use it
- Created a service using an image from dockerhub:
<https://hub.docker.com/r/openweb/git-sync/>
- Set the URL for the GitLab repo:
`https://occs poc:*****@localhost:8443/energy/deconv-app.git`
- Set the volume path for the repo in energy.deconv.deconv-docker container
- Set `--network-mode=host` in the docker run command so the clone request is sent over ssh tunnel
- Set the environment variable `GIT_SSL_NO_VERIFY=true`

The Oracle Cloud Differentiator

Lower Total Cost of Ownership



On-going Maintenance Costs

- On-going maintenance represents the labor costs for installation, upgrades, patching, backups, provisioning etc.
- Oracle Public Cloud eliminates much of this work, thus reducing costs dramatically
- Note:** Compare to competitors who only offer IaaS (and thus only impact Facility & HW costs) with only 10% reduction in cost

Software Costs

- Access the latest innovations from Oracle in a self service manner
- Sample wide portfolio of products within a simple pricing model (e.g. database pricing includes 16+ database options)

Hardware Costs

- Simple IaaS costs that allow customers to leverage advanced engineered systems like Exadata
- Consumed only when utilized

Facility Costs

Integrated Cloud

Applications & Platform Services