

甲骨文基礎架構平台介紹

Built for Enterprises

❑ 以**企業需求出發設計的架構**

Lift and Improve: **與地端運行相同的軟體**

- VMware, EBS, ExaCS, Modern Risk and Finance, Oracle Linux, etc
- 透過RDMA技術獲得高運算效能

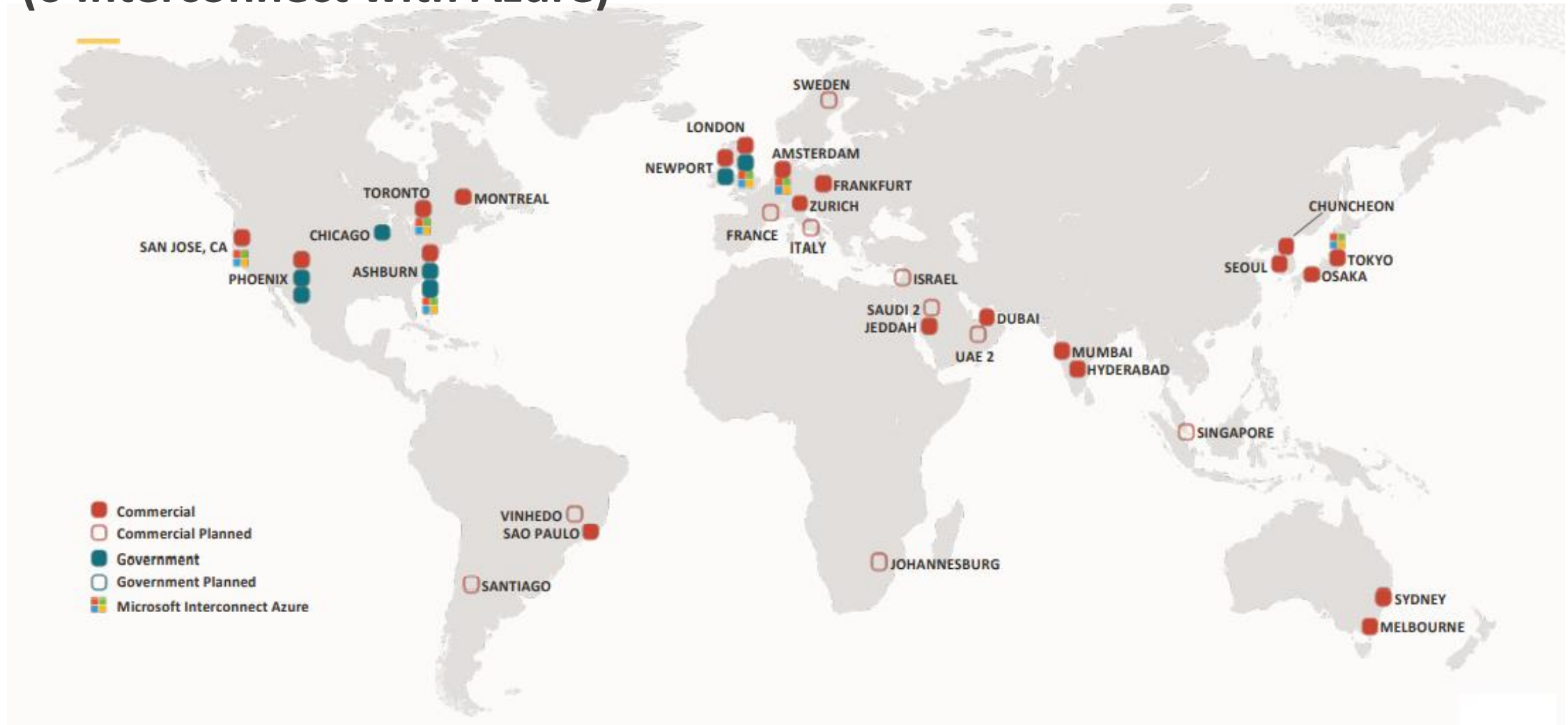
❑ 提供全面性的Oracle 資料庫功能選項

❑ 提供效能,管理,可用性的全面SLA 保證

❑ Oracle 為IaaS/PaaS/SaaS 供應廠商



29+ Live Regions and Growing (6 Interconnect with Azure)



Complete Services

COMPUTE

Bare metal, GPUs, VMs



Up to 52 CPU cores, 8 GPUs,
768 GB RAM, 51 TB local NVMe
SSD, 5M IOPS

STORAGE

NVMe, Block, File, Object, Archive



Predictable IOPS Block Storage
for up to 98% less than AWS,
High scale file & object storage

DATABASE

Bare metal, VMs, RAC, Exadata



Up to millions of transactions
per second; Full RAC and Active
Data Guard support

CONTAINERS

Containers and Kubernetes



Fully managed, certified
Kubernetes service with
Docker containers

NETWORKING

VCN, Load Balancing



Isolated private networks with
reserved IPs, subnets, security
lists, firewalls, load balancing

EDGE

DNS, VPN, FastConnect, Email



Global DNS, global private
connectivity at up to 97% less,
email delivery

RAVELLO

Migrate VMware or KVM



Move VM environments,
retaining existing networking

CLOUD AT CUSTOMER

IaaS, PaaS, Exadata On-premises



Subscription-priced cloud
infrastructure, PaaS, and
database managed by Oracle

DATA MOVEMENT

Storage appliance, Data Transfer



Software NAS gateway, data
ingest service with full chain of
custody (HDD or appliance)

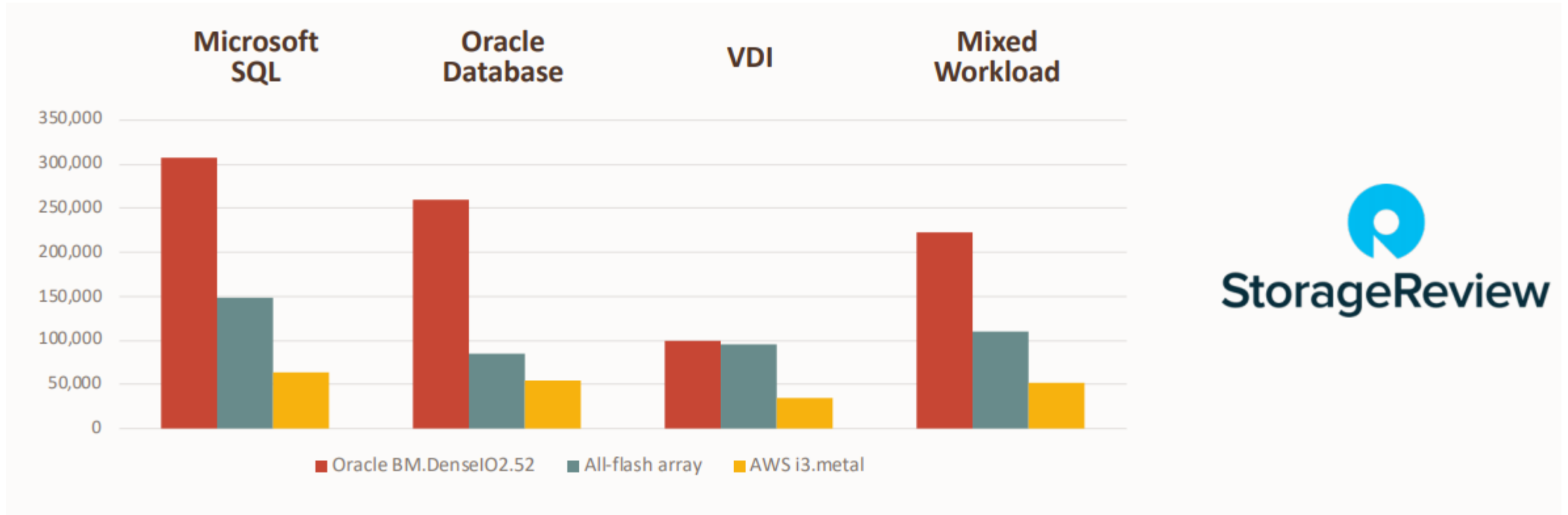
Global, regional, and industry compliance

Global	 SOC 1 : SOC 2 : SOC 3	 27001 : 27017 : 27018	 Level 1	 US Privacy Shield			
Government	 DoD DISA SRG IL2	 DoD DISA SRG IL5	 High – Agency ATO	 CJIS	 VPAT – Section 508	 G-Cloud 11 - UK	 Model Clauses - EU
Industry	 HIPAA	 PCI DSS	 TISAX - Germany	 FISC - Japan	 IG Toolkit - UK	 FINMA - Switzerland	
Regional	 GDPR - EU	 BSI C5 - Germany	 ENS - Spain	 PIPEDA - Canada	 Cyber Essentials Plus - UK	 My Number - Japan	 Cloud Security Principles - UK

Better performance per instance than AWS

	ORACLE Cloud Infrastructure	AWS	Oracle
General Purpose Compute	15.9 SPECInt	11.9 SPECInt	33% better
Memory Optimized Compute	41,941 MB/s	30,827 MB/s	36% better
Block Storage	700,000 IOPS	80,000 IOPS	7.8x better

2-5x faster workloads than on-prem or AWS



Lower product pricing than others

	Oracle	AWS	Azure	GCP
Virtual Machine Standard (\$/OCPU/Hour)	\$0.0638	+49%	+49%	+46%
Virtual Machine Dense IO (\$/OCPU/Hour)	\$0.1275	+18%	+48%	+20%
Bare Metal Standard (\$/OCPU/Hour)	\$0.0638	+45%	N/A	N/A
Bare Metal Dense IO (\$/OCPU/Hour)	\$0.1275	+4%	N/A	N/A
Kubernetes Cluster (monthly, 50 cores, 750GB RAM)	\$2,297	+56%	+50%	+32%
Block Storage High IO (monthly, 400GB 30K IOPS)	\$23.80	+7,900%	+2,900%	+400%
Data Archive (\$/GB/Month)	\$0.0026	+35%	-30%	+63%
Internet Data Egress (50TB/Month)	\$340	+1,300%	+1,300%	+1,300%
Private Line Network (1 Gbps, 100TB Data, Monthly)	\$155	+2,100%	+3,700%	+1,500%

Built for Enterprises



提供最全面最彈性且具備最高性能的資料庫雲端服務

用戶自行管理Database



**Oracle DB
on Compute**

VM/Bare Metal
Data Guard
Auto TDE

共同管理Database



**Oracle
Database
Cloud Service**

VM/Bare Metal
RAC
Data Guard
Auto TDE
Automated backup,
patching



Oracle Exadata

Extreme performance
Base – Full rack
RAC
ADG
IORM
Cloud Service/
Cloud@Customer

Oracle完全管理Database



ADW

Auto-scaling
Auto-tuning
Auto-patching
Serverless
Spatial, ML Document
SQL Developer

ATP

Auto-scaling
Auto-tuning
Auto-patching
Serverless or dedicated
APEX

Redefine IT with Cloud

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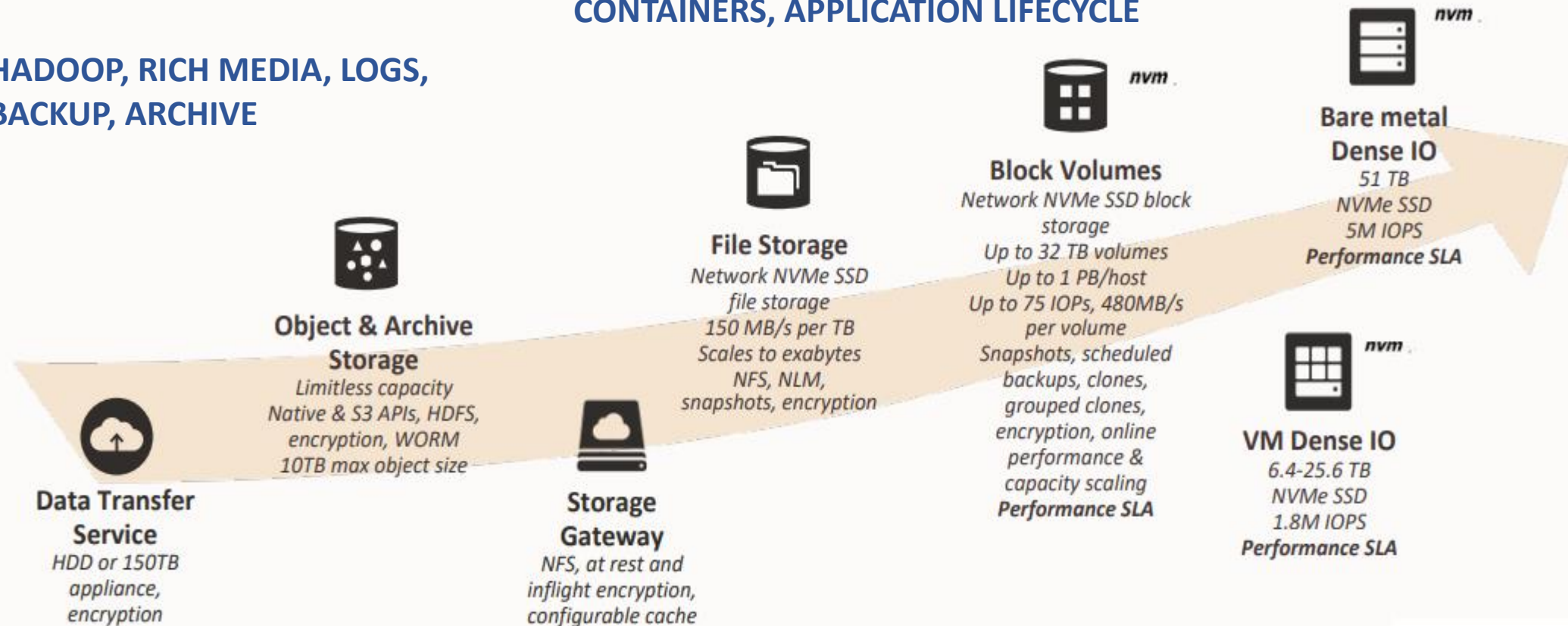


Complete storage portfolio, with consistently fast performance

資料分析, OLTP, HPC,
CONTAINERS, KUBERNETES

企業應用系統, 資料庫, GPU,
CONTAINERS, APPLICATION LIFECYCLE

HADOOP, RICH MEDIA, LOGS,
BACKUP, ARCHIVE



Redefine IT with Cloud

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為什麼隱藏的網路費用可能很重要

Why Hidden Network Egress Data Charges can be Significant

1

	Egress	OCI	AWS
1	使用者查詢雲端資料/或資料送返地端	使用 Fastconnect 不算流量	每TB 92USD 起步 (要算流量)
2	雲端 Web Servers 回應資料需求/ Streaming 媒體	每個月前10TB免費	每TB 92USD 起步
3	資料庫送資料到不同AD/AZ 的 Web Services	不同AD之間流量免費	每TB 92USD 起步
4	DR 資料庫到不同的 AD/AZ	不同AD之間流量免費	每TB 92USD 起步
5	DR 資料庫到不同的區域(如：東京到大阪)	每個月前10TB免費	每TB 92USD 起步

aws pricing calculator

1

Unit conversions

Intra region:

10 TB per month x 1024 GB in a TB = 10240 GB per month

Outbound:

All other regions: 10 TB per month x 1024 GB in a TB = 10240 GB per month

Pricing calculations

Intra region:

(10240 GB x 0.01 USD per GB outbound) + (10240 GB x 0.01 USD per GB inbound) = 204.80 USD

Outbound:

All other regions: 10240 GB x 0.02 USD per GB = 204.80 USD

Data Transfer cost (monthly): 409.60 USD

2 connections x 0.05 USD x 730 hours per month = 73.00 USD (Site to Site VPN usage cost)

Site to Site VPN usage cost (monthly): 73.00 USD

2

730 hours in a month x 0.01 USD = 7.30 USD (Hourly cost for endpoint ENI)

10,000 GB per month x 0.01 USD = 100.00 USD (PrivateLink data processing cost)

7.30 USD + 100.00 USD = 107.30 USD (Hourly cost and data processing per endpoint ENI)

1 VPC endpoints x 1 ENIs per VPC endpoint x 107.30 USD = 107.30 USD (Total PrivateLink endpoints and data processing cost)

Total PrivateLink endpoints and data processing cost (monthly): 107.30 USD

730 hours in a month x 0.045 USD = 32.85 USD (Gateway usage hourly cost)

1,024 GB per month x 0.045 USD = 46.08 USD (NAT Gateway data processing cost)

32.85 USD + 46.08 USD = 78.93 USD (NAT Gateway processing and month hours)

1 NAT Gateways x 78.93 USD = 78.93 USD (Total NAT Gateway usage and data processing cost)

Total NAT Gateway usage and data processing cost (monthly): 78.93 USD

4

5

End-to-end infrastructure SLAs

- 只有Oracle 針對: 效能, 可用性, 管理性提出SLA 承諾
- 可用性(Data Plane): 針對服務的正常運作時間及連接性進行SLA 承諾
- 管理性(Control Plane): 針對OCI Resource 可以進行管理, 監控, 修改的SLA 承諾
- 效能: 針對服務的一致性提供可預期的效能提出SLA 承諾

	Oracle	AWS	Azure	GCP
高可用性 /	✓	✓	✓	✓
效能 Disk IOPS & Network	✓	✗	✗	✗
可管理性 API Error Rate	✓	✗	✗	✗

An economical and powerful foundation

Key Resource	效能	價格	可靠度
Compute	提供業界最強大的Instance	比同業提供減少49%的成本	業界唯一提供管理性SLA承諾
Block Storage	表現出色的IOPS/GB 表現出色的IOPS/Instance	同時享有最低價及最高性能的儲存空間	業界唯一提供網路效能SLA承諾
Networking	無須超額訂閱就可以取得高達2X25Gbps的網路速度	可以用業界最低成本進行資料的取得及存放	業界唯一Block Storage效能SLA承諾
Database	表現出色的TPS	出色的價格及系統效能	RAC/Exadata CS 提供99.995% 資料庫系統可靠度

Flexible Pricing & Consumption Models

投資保護

Universal Credits

- 1份簡單合約
- 全球化標準計費模式 (IaaS/PaaS)
- 簡易的購買模式
- BYOL 折扣方案

雲端用量選擇

Pay As You Go

- 無須承諾使用時間
- 無須承諾用量
- 依據使用量支付費用
- 以牌價評估可能費用
- 用量依據小時計價

Annual Flex

- 最少採購一年
- 需要承諾每年最少使用用量
- 依據用量來做折扣申請

Factor that impact Pricing

Resource 大小

越大的Resource成本越高

資料傳輸

資料上傳無須費用
要注意下載費用

Resource 的種類

VMs VS BM
VMs VS Functions
BYOL VS Managed DBS..

OCI 在全球的Region都是相同
價格

Always Free – What's Included



Autonomous Database

*2 x Databases
20 GB each*



Compute

*2 x VMs
1 GB Memory each*



Storage

*100 GB Block
10 GB Object
10 GB Archive*



Networking/ Load Balancing

*10 Mbps LB
10 TB Outbound
Data Transfer*

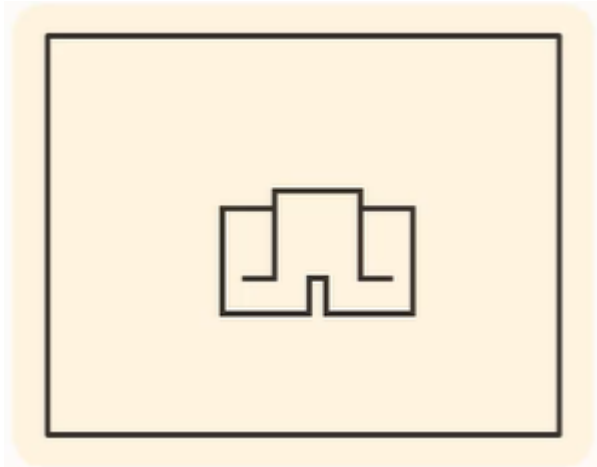


Monitoring / Notifications

*500M Metrics Ingestion
1B Metrics Retrieval
Notifications:
1M HTTP, 1K Email*

Oracle 新舊用戶都可以享受此優惠

OCI Architecture

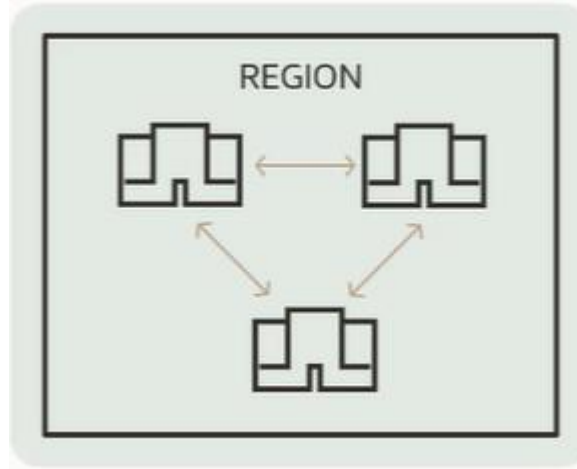


Region

地理區域

具備一個或多個

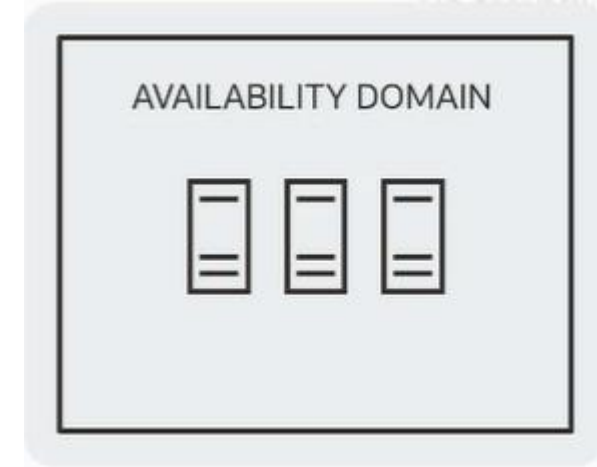
Availability Domain(AD)



Availability

Domain

一個或多個容錯性且獨立
區隔的 Data Center, 互相
之間以低延遲高頻寬網路
界接



Fault Domain

在一個AD 內的硬體或是
底層基礎設施, 可以提供
不中斷的容錯服務

How To Choose Region

地點

資料存放策略

可取得的服務

選擇與你最近的地點, 可以獲得最佳的效能及最低的延遲性

基於資料存放合規性. 有些國家對於資料存放的地點有嚴格的限制

Oracle會基於地點對於服務的需求, 當地對於法規上嚴格性的差異部屬相關服務



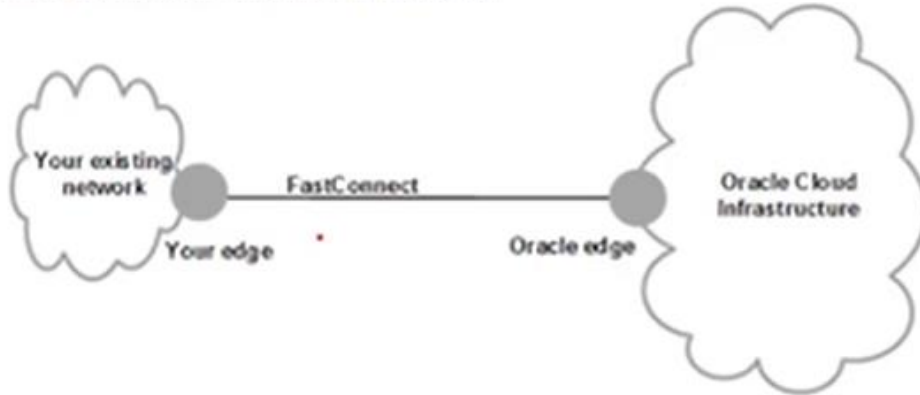
提供高真度的
網路界接服務

VCN	FastConnect	Load Balancing
可完全被配置的 Subnets.Routing,Firewall 提供IPSec VPN 25Gb 網路架構	專屬網路 提供網路界接SLA承諾 無須Data Transfer 費用 全球42家供應商提供服務	可選擇 TCP,HTTP,HTTP/2協定 提供全面SSL加密 支援TLS 加密

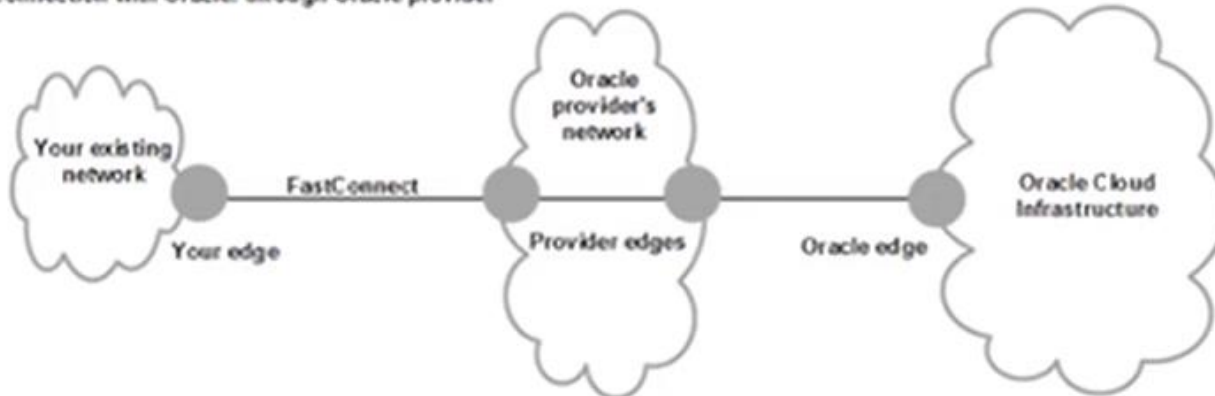
Service Gateway	DNS
無須透過Internet 即可存取 Private Zoom 支援涵蓋IaaS/PaaS	小於30ms 的回應時間 提供全球的Load Balancing服務 網路封包管理 網路健康檢測

FastConnect

Connection with Oracle: colocation in data center



Connection with Oracle: through Oracle provider



- **FastConnect 提供專屬私有的連線, 可以提供更高可信任性更高的頻寬的網路服務**
 - ✓ 透過預先整合的網路Partner 提供連線至OCI
 - ✓ 可以提供1Gbps – 10Gbps 甚至更高的網路速率
 - ✓ Inbound / Outbound 都無須額外資料傳輸費用
 - ✓ 使用BGP 通訊協定

FastConnet Use Case



需要低延遲的
企業Application

企業的應用系統不能容忍延遲性的發生,,包含Application運行或系統備份需要固定的執行效率



Big Data 應用-需要高資料傳輸性能

具備大量資料傳輸,例如資料的查詢, Batch Job等, 需要低延遲性及高效能資料傳輸



無法透過Public Internet
傳輸的機敏資料

具備個人資料等敏感性資料, 需要有專屬私有的資料傳輸環境



Lift and Shift To Oracle
Cloud

將企業內部Web,APPs,DBs 等系統轉移到Oracle Cloud 上, 需要專屬的連線環境



Compute

Compute Service
適合企業各種應用

Bare Metal	VMs	Containers	Functions
保證Instance 獨立 最高的IOPS 最高的Throughput 最低系統延遲	安全防護 Hypervisor 大小彈性 Dense IO and Dedicated host options	Bare metal Performance 自主化Cluster	用量計費 Serverless Container-native Open source
AMD EPYC		Intel Xeon	NVIDIA GPUs
Local Attached Storage		Remote Attached Storage	
NVMe SSDs Up to 51.2 TB 數以百萬的IOPS		NVMe Block Volumes up to 1PB 32 TB / volume 75 IOPS / GB	

Fast and scalable bare metal, VM, and GPU compute

企業Web &
Application 主機

企業Application主機
HADOOP應用

高效能運算,
AI/ML,3D圖形運算

DNA定序,CFD,
碰撞模擬

分散式運算
應用系統



**VM E3
Standard Flex**
1-64 OCPUs,
16 GB per OCPU RAM
Up to 1 PB Block
\$0.025 core hr.
\$0.0015 GB RAM hr.



**VM
Standard**
1-24 OCPUs,
15-320 GB RAM
Up to 1 PB Block
\$0.0638 core hr.



**Bare Metal E3
Standard**
128 OCPUs,
2048 GB RAM
Up to 1 PB Block
\$0.025 core hr.
\$0.0015 GB RAM
hr.

These 2 also available as
Dedicated VM Hosts



**Bare Metal
Standard**
52 OCPUs,
768 GB RAM
Up to 1 PB Block
\$0.0638 core hr.



**VM
Dense IO**
8-24 OCPUs,
120-320 GB RAM,
6.4-25.6TB NVMe
Up to 1 PB Block
\$0.0638 core hr.



**VM GPU
Standard v1 & 2**
From 1 P100 to
4 V100 GPUs
12-24 OCPUs,
104-360 GB RAM
Up to 1 PB Block
\$1.275 - \$2.95
/GPU hr.



**Bare Metal
GPU Standard**
2 P100 GPUs,
28 OCPUs, 192 GB RAM
Up to 1 PB Block
\$1.275 GPU hr.

v2

8 V100 GPUs, NVLINK
52 OCPUs, 768 GB
Up to 1 PB Block
\$2.95 GPU hr.



**Bare Metal HPC
Dense IO**
36 OCPUs (3.7 GHz),
384 GB RAM
Up to 1 PB Block
100 Gbps RDMA
\$ 0.075 core hr.



**Bare Metal
Dense IO**
52 OCPUs,
768 GB RAM,
51.2 TB NVMe
Up to 1 PB Block
\$ 0.1275 core hr.

V3 Bare Metal and VM GPU Standard*

From 1 to 8 NVIDIA A100 GPUs w/ NVLINK
Up to 64 OCPUs,
1.6 Tbps RDMA
Up to 25 TB local NVMe, Up to 1 PB Block
\$3.05 /GPU hr.

Redefine IT with Cloud

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Storage Requirement

持久型 or 非持久型資料

存放什麼資料?

DB,File,影音, 照片,文字..

你需要怎麼樣的存取速度

資料耐用性?

你需要多少份資料複製?

連接方式?

Local 或是透過網路存取?

存取協定

透過Block, File 或是 HttpS?



Storage

針對企業應用所設計
具備高性能及全面性的
Storage Service

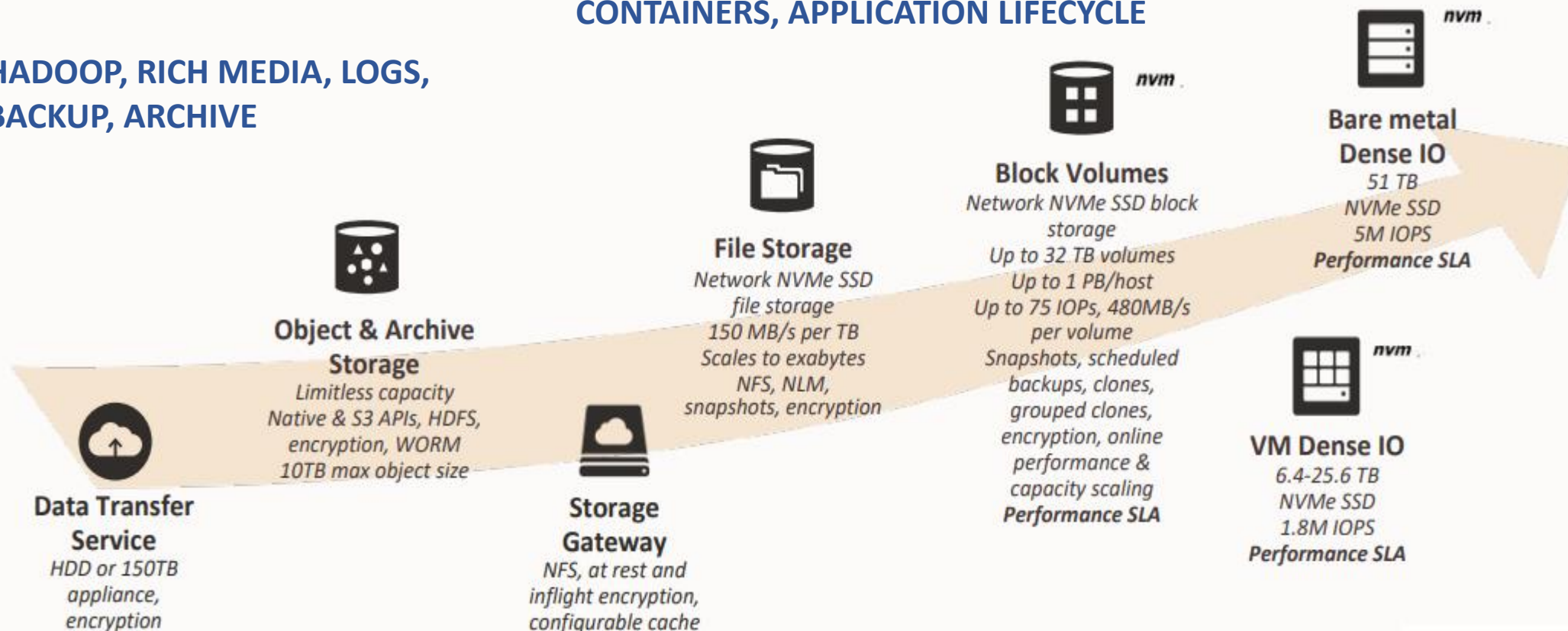
Local	Block	File	Object
NVMe SSDs Up to 51TB Millions of IOPS 10-100 μ s latency	NVMe SSDs 32 TB / volume 75 IOPS / GB <1ms 延遲 線上效能調校 線上空間擴充	HA file system Start with KBs, scale to Exabytes	分散式HA 機制. 可以自我修復 無限擴充性
HPC File Systems	Archive	Storage Gateway	Data Transfer
IBM Spectrum Scale, Lustre, BeeGFS, GlusterFS 保證獲得60 GB/s 效能	耐用的Object Storage 減少90%的儲存空間費用	資料傳輸使用 如同使用本地端的效能 可配置Cache	大量資料傳輸服務 可以應用在資料初始搬移 提供Disk 或 Appliance

Complete storage portfolio, with consistently fast performance

資料分析, OLTP, HPC,
CONTAINERS, KUBERNETES

企業應用系統, 資料庫, GPU,
CONTAINERS, APPLICATION LIFECYCLE

HADOOP, RICH MEDIA, LOGS,
BACKUP, ARCHIVE



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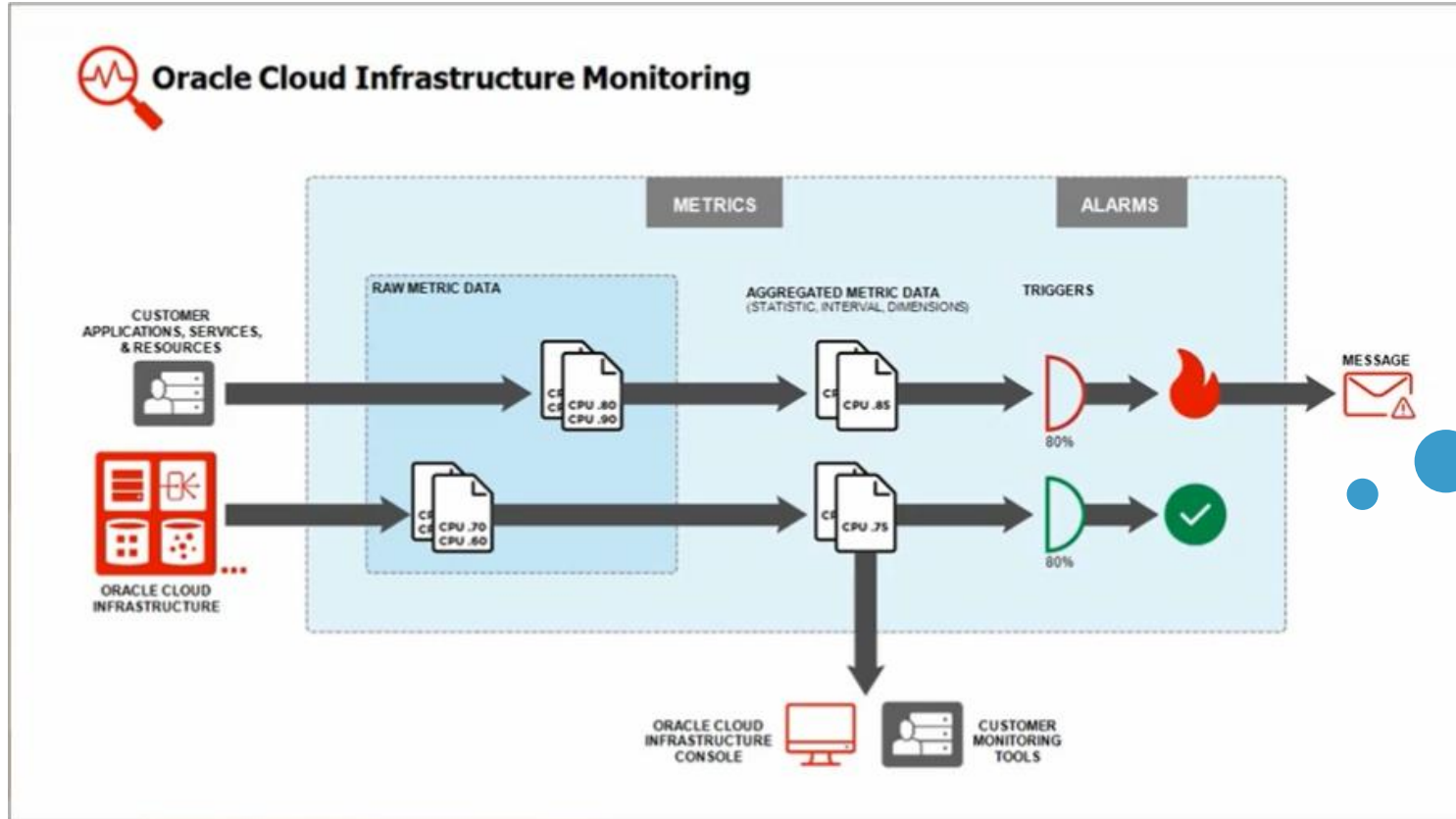
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OCI Storage Service

	Local NVMe	Block Volume	File Storage	Object Storage	Archive Storage
Type	NVMe SSD based temporary storage	NVMe SSD based block storage	NFSv3 compatible file system	Highly durable Object storage	Long-term archival & backup
Access	Block	Block	File	Object	Object
Structure	Block level structured	Block level structured	Hierarchical	Unstructured	Unstructured
Durability	Non-persistent; survives reboots	Durable (multiple copies in an AD)	Durable (multiple copies in an AD)	Multiple copies across ADs*	Multiple copies across ADs*
Capacity	Terabytes+	Petabytes+	Exabytes+	Petabytes+	Petabytes+
Unit Size	51.2 TB for BM, 6.4-25.6 TB for VM	50 GB to 32 TB/vol 32 vols/instance	Up to 8 Exabyte	10 TB/object	10 TB/object
Use cases	OLTP, NoSQL, Data warehousing	Database, VMFS, NTFS, boot and data disks for instances	Oracle apps (EBS), HPC, general purpose file systems	Unstructured data incl. logs, images, videos	Backups and long term archival (DB backups)

OCI Monitoring Service



- 監控Resource
- 支援指標告警
- 可以透過OCI Console或是API 進行設定

OCI Notifications Sample Case

告警及自動Resize VM



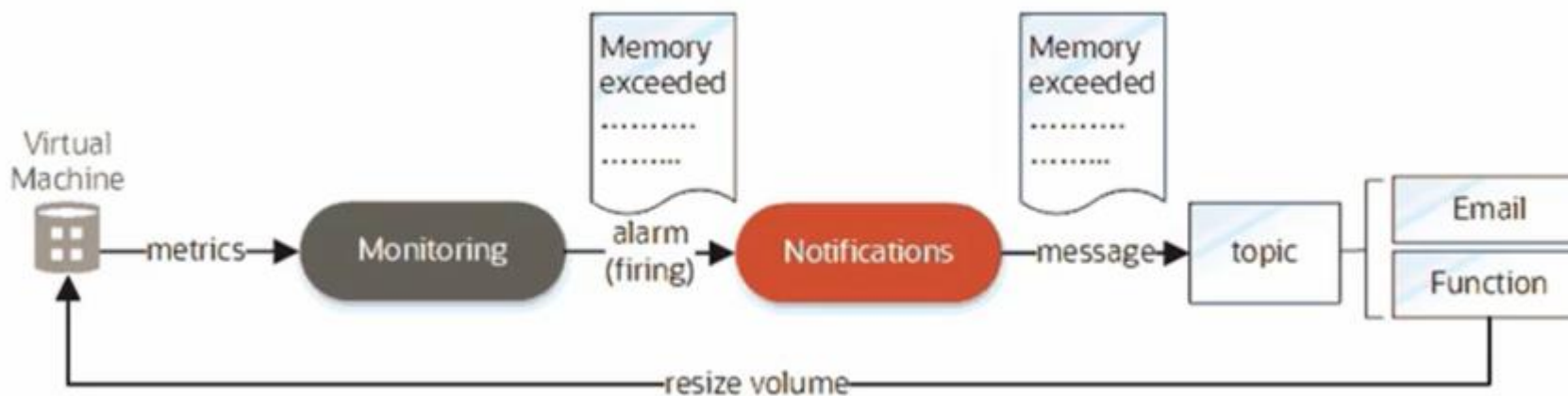
撰寫Resize VM
的Function

建立傳遞
Message 到
Function 的
Alarm

Notification 傳
遞Message到
Topic

Message 傳遞
到Topic所屬的
Subscription

Topic的
Subscription包
含Email 及
Function



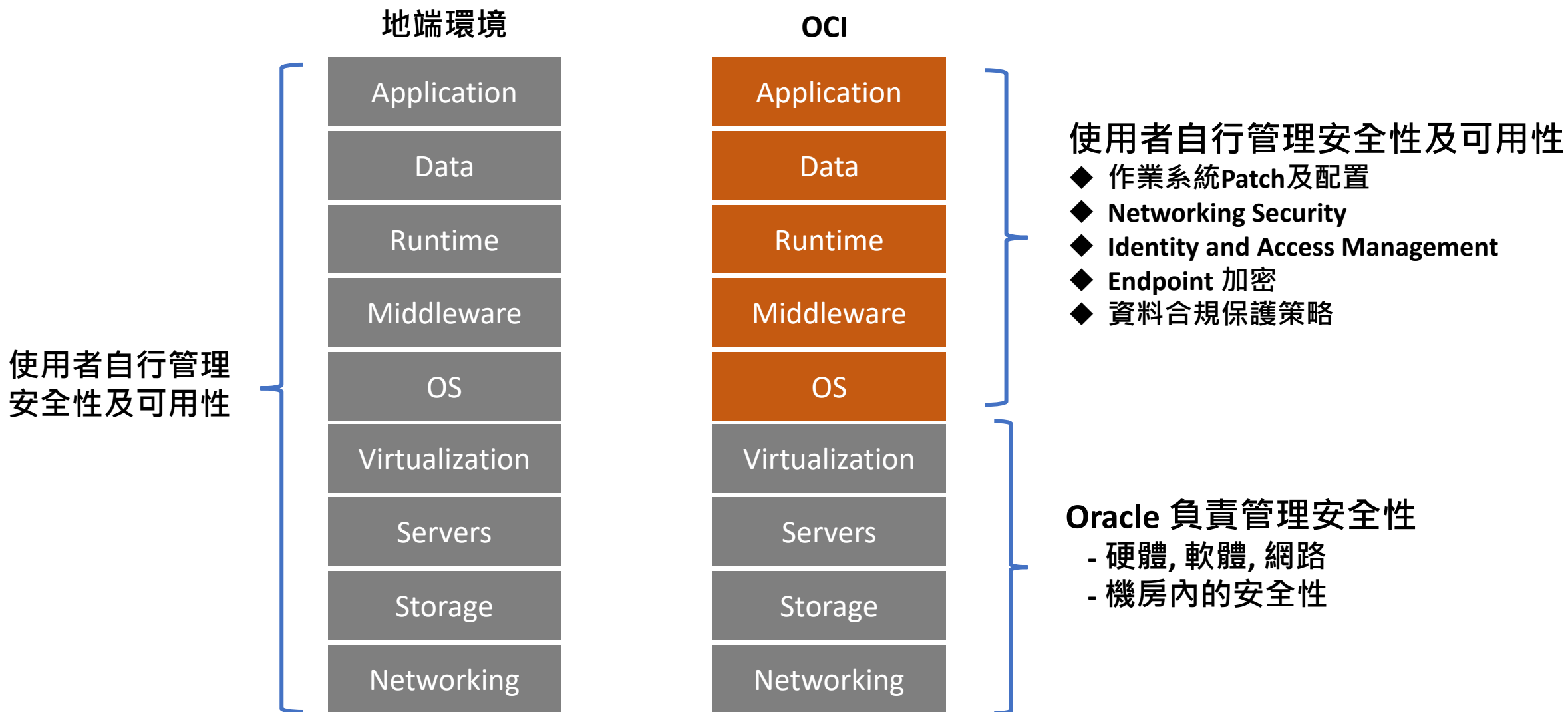
OCI Notifications Service

- ✓ 將相關訊息Broadcast 到發布的元件中
- ✓ 提供安全性/高可信賴度/低延遲性的信息通知
- ✓ 當事件規則被觸發或是違反告警Rule 發生時進行訊息傳遞

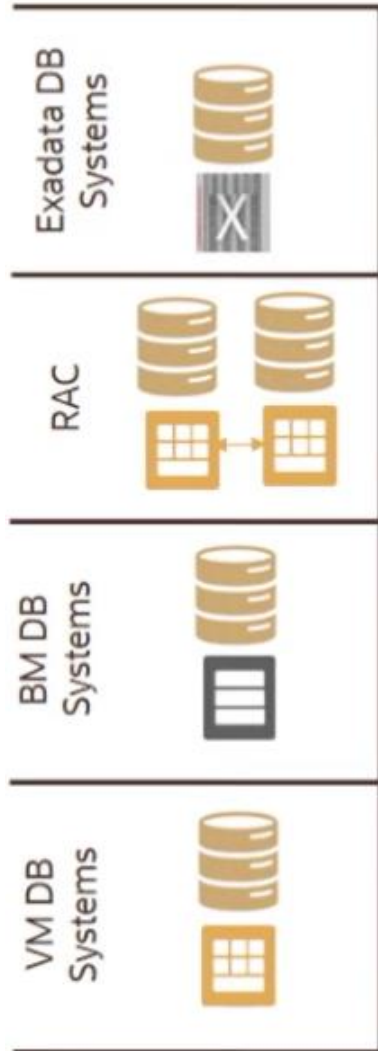
如何運作??

- ✓ 設置Communication Channel 來發布通知訊息
- ✓ 當告警訊息發布時, Notification Service 會將訊息傳遞到相關傳遞窗口

Shared Security Model



DB System



- 客戶可以完全控制的資料庫系統
- 提供Database Lifecycle 自動化: Provisioning, Patching, Back up & Restore
- 高可用性&DR: RAC and Data Guard
- 可擴充性:動態的OCPU and Memory 擴充
- 安全性: Infra(IAM,VCN,Audit), Database(TDE,備份加密, Block Volume 加密)

DB Service

	VM DB Systems	BM DB Systems	Exadata DB Systems	Autonomous – Shared	Autonomous - Dedicated
Management	Customer	Customer	Customer	Oracle	Oracle
Updates	Customer initiated	Customer initiated	Customer initiated	Automatic	Customer policy control
Scaling	Storage (CPU cores cannot be changed)	CPU (storage cannot be changed)	Within Exa CPU, across Exa racks	Both CPU and Storage	Both CPU and Storage
Backups	Customer initiated	Customer initiated	Customer initiated	Automated	Automated
Storage	Block Storage	Local NVMe disks	Local disks and NVMe flash cards	Local disks and NVMe flash cards	Local disks and NVMe flash cards
RAC	Available (2-node)	Not Available	Available	Not Available	Not Available
Data Guard	Available	Available	Available*	Not Available	Not Available

Redefine IT with Cloud