

ORACLE

數據中台加速實現敏捷製造願景

Enterprise Data Platform as a Service

—
Paul Chang

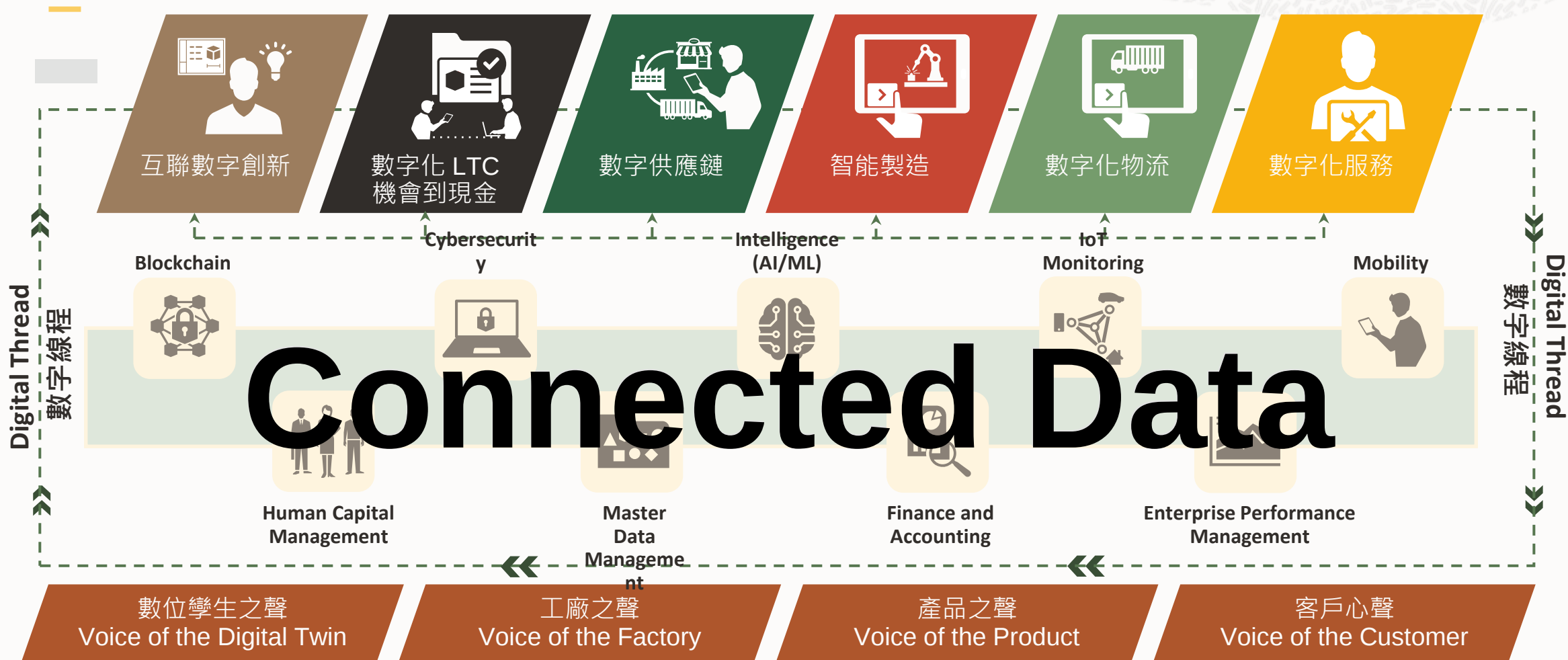


Safe harbor statement

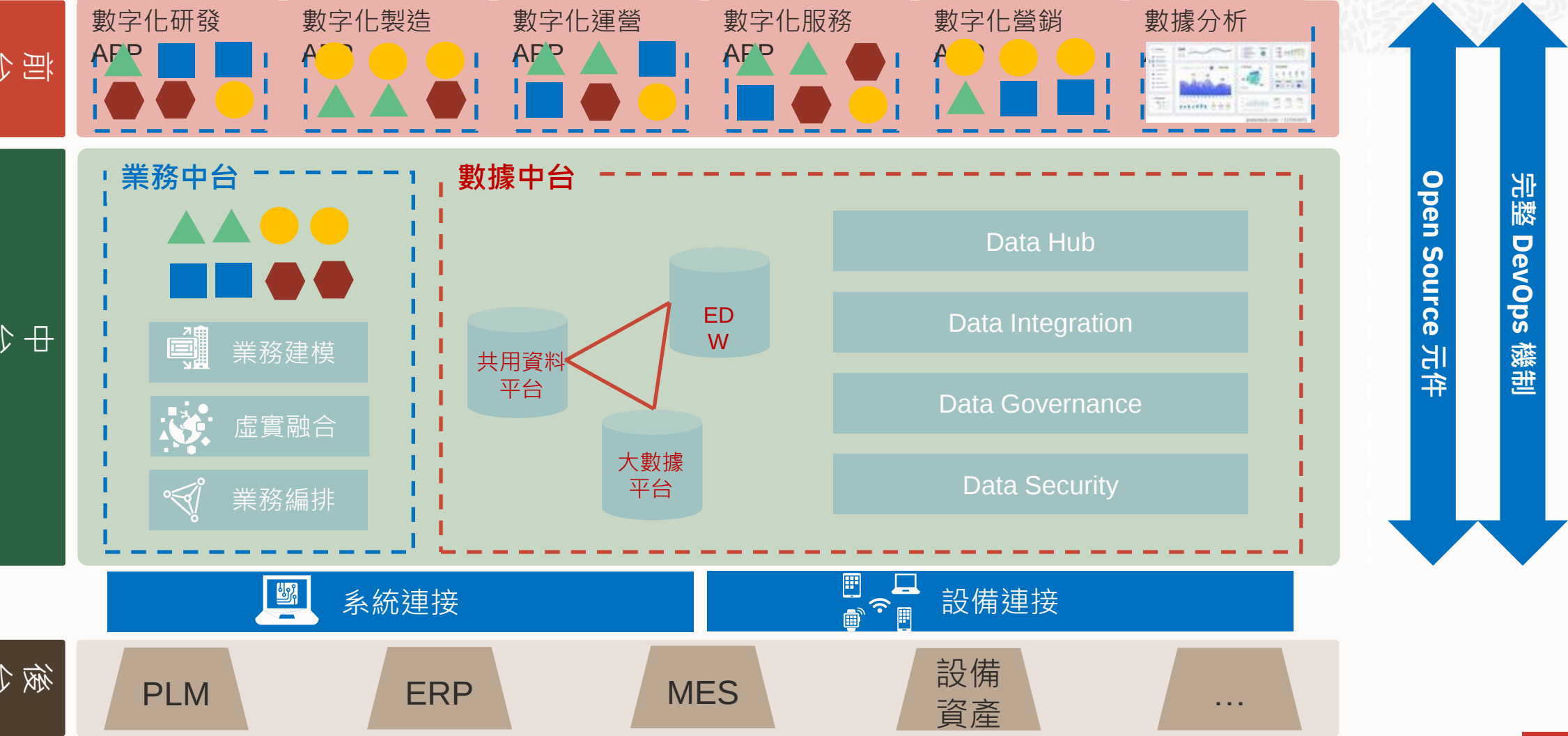
The following is intended to outline our general product direction. It is intended for information purposes only, and may not be incorporated into any contract. It is not a commitment to deliver any material, code, or functionality, and should not be relied upon in making purchasing decisions.

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數字化連接企業實現工業4.0的願景

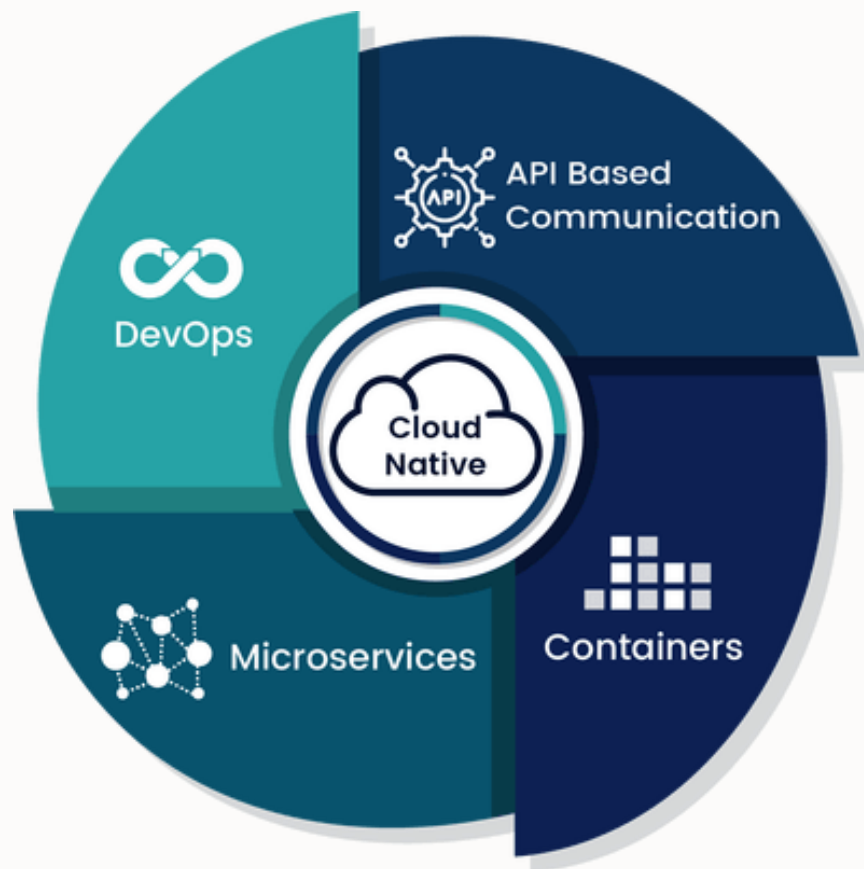


實現工業4.0新世代「敏捷化」資訊系統架構



企業需要擁抱「Cloud-Native」敏捷架構來實現工業4.0的轉型願景

應用系統開發需基於Cloud-Native架構



微服務

微服務架構各服務皆為獨立運作，比較容易開發、維護和部署，也不會因其中一個服務出錯而影響其他的服務，出現超載負荷、程式故障的問題，為各大企業開發軟體的重要趨勢。

容器化

將微服務放在各個容器中，即可打造獨立自主的執行環境。每個容器中，都包含應用程式及其相依性資源，可單獨作業，容器彼此互不干擾，方便快速部署和調整個別功能，且單一容器所佔資源小，可減少不必要的資源（CPU、Memory）浪費並加快啟動速度。

DevOp

有別於過去產品開發、測試、維運分別作業的型態，DevOps可以整合內部專業人才、技術和資源，為公司帶來更高的效能。

工業4.0進程中，數據整合管理痛點

大量ETL作業，造成系統間數據管理亂象

1 應用系統多元化

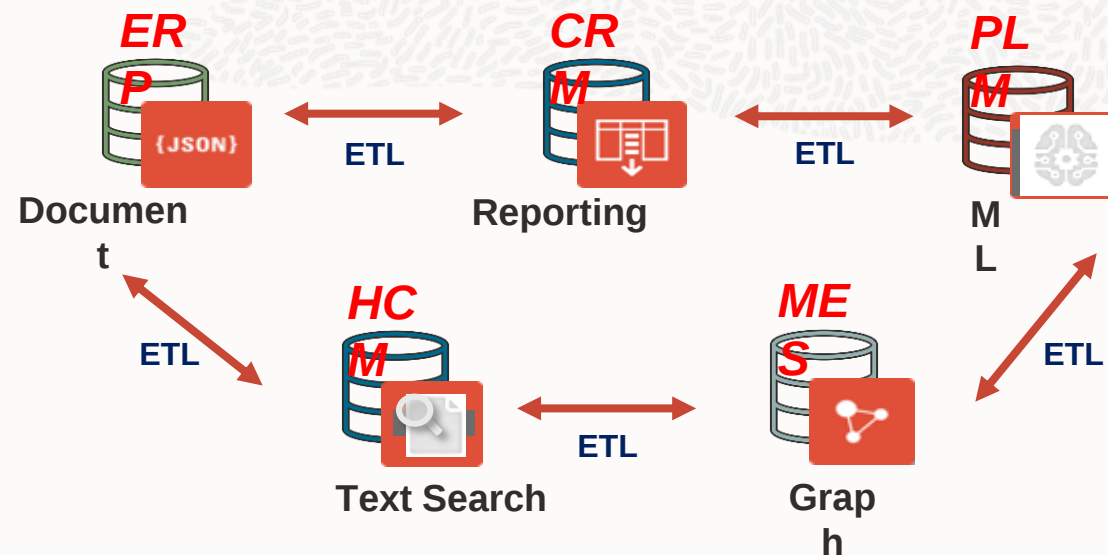
- 大量數據處理
- 非結構數據分析
- 複雜演算邏輯

2 業務應用需要跨系統數據

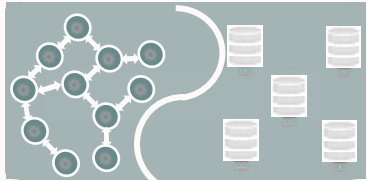
- 必須對其他系統要求數據提供
- 造成大量點對點連線難以管理
- 來自不同的資料源

3 數據的即時性

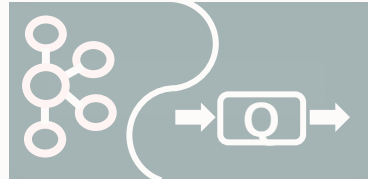
- 業務系統產生的數據以批次方式彙整至數據湖
- 不易支持客戶的即時互動體驗



Oracle提供全面解決方案以支持企業進行「Cloud-Native」轉型



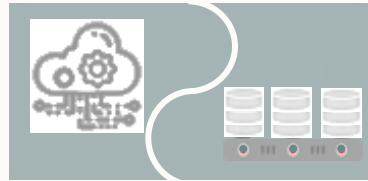
Microservices – **DB Containers**



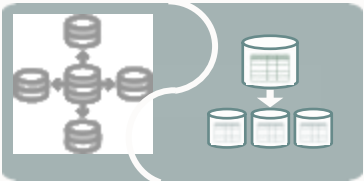
Events – **Database Queues**



CI/CD – **SQLcl Liquibase**



SaaS – **Multitenant DB**



Distributed Data – **Sharding**



API Driven – **REST Data Svcs**



Low Code – **APEX**



Defense in Depth – **Declarative Security**

微服務

有別於厚重的傳統資料庫系統，Oracle針對每一個微服務提供DB Containers以符合微服務環境的彈性需求。

DevOp

Oracle提供SQLcl幫助企業構建基於雲計算的CICD流水線，實現應用程式的自動構建、自動測試和自動部署，提高應用發布頻率。

基於API的系統連

結 Oracle提供REST Data Service將SQL或Package轉化成微服務通訊所使用的Restful API，更完善微服務資料存取的高彈性及可用性。

Oracle 新一代融合式資料庫

Oracle Converged Database 解決數據整合管理痛點

1

Multi-workload 解決應用系統使用情境多元化問題

統一管理不同類型資料使用情境，包括高效能交易系統、資料倉儲系統、資料分析系統、ML、IoT、Streaming...等，深度優化可在所有工作負載中提供卓越的性價比

2

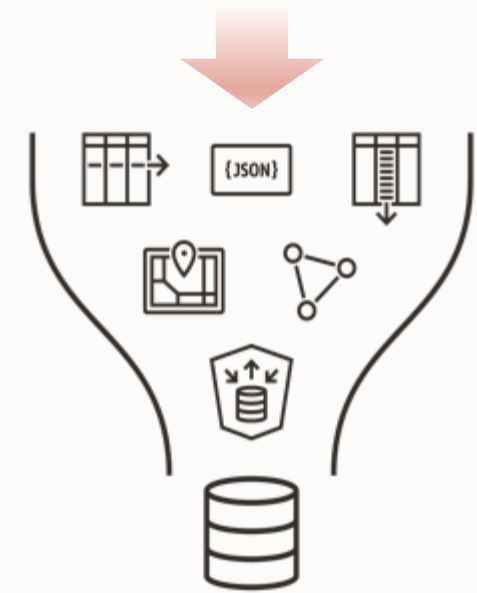
Multi-model 解決業務應用需要跨系統數據問題

融合 RDBMS, JSON, Spatial, Graph, Cube, Text, Blockchain ...等多元資料型態操作，讓使用者不必煩惱跨系統資料複製、移轉、整合等問題，使您能夠輕鬆地為所有數據創造價值

3

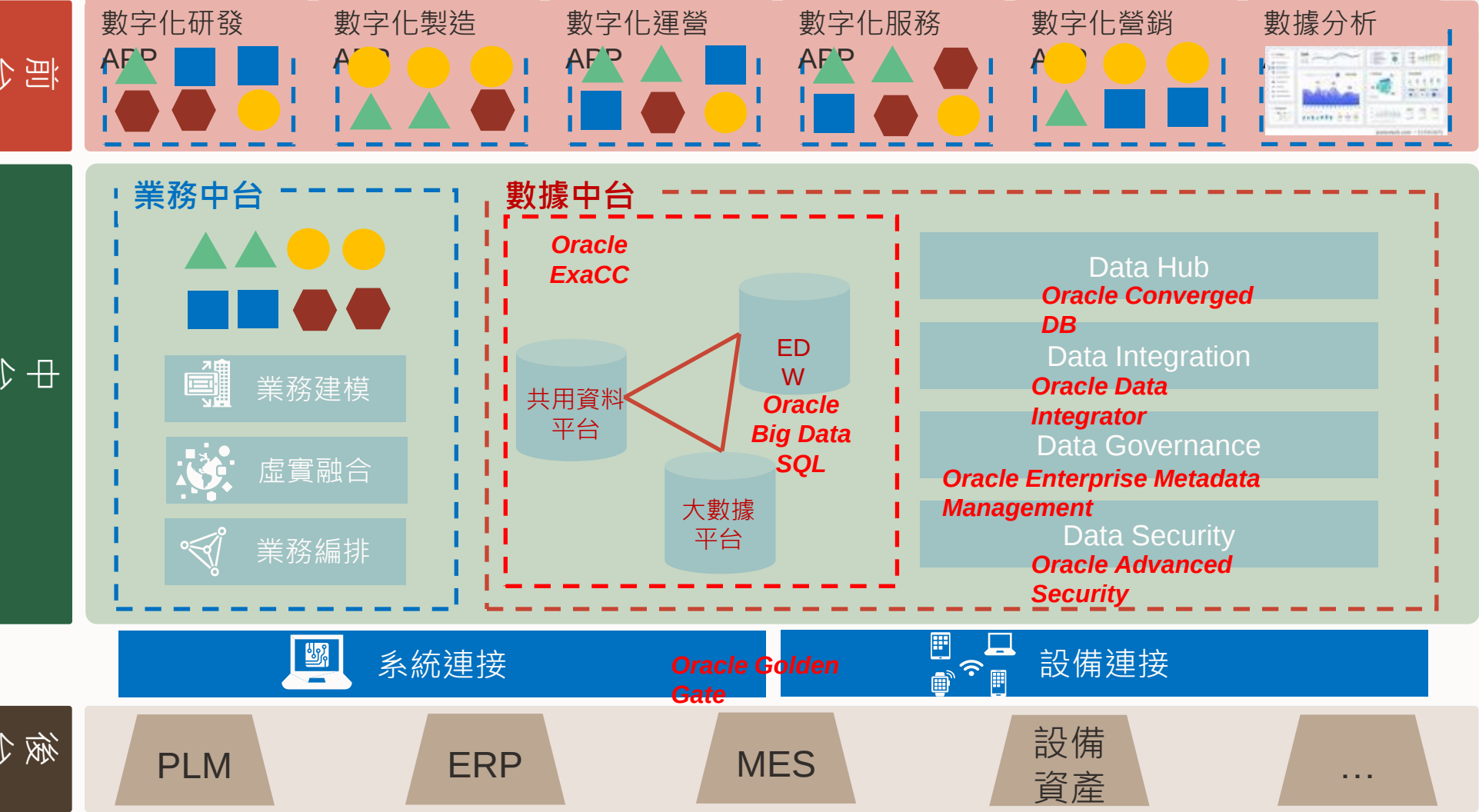
Most productive for developers 解決數據對開發者即時性問題

可使開發者在面對微服務、Events、REST、CI/CD、Low Code等不同使用情境，均可用相同的 SQL 對任何數據和工作負載進行作業快速上線



**Converged
Database**

實現工業4.0新世代「Cloud-Native」資訊系統架構



Oracle ExaCC 實現部署完整新一代數據中台

極致的效能和高可用性、低成本和隨處可用



最理想的資料庫硬體平台 –

橫向擴充 (Scale-out) 且資料庫最佳化的運算、網路和儲存全面性整合架構

資料庫感知的智能系統軟體 –

獨步演算法極致地提升 OLTP、Analytics 和資料庫集成 (Consolidation) 的資料庫運算效益

自主化管理 –

全面性自動化和端到端 (end-to-end) 的最佳化

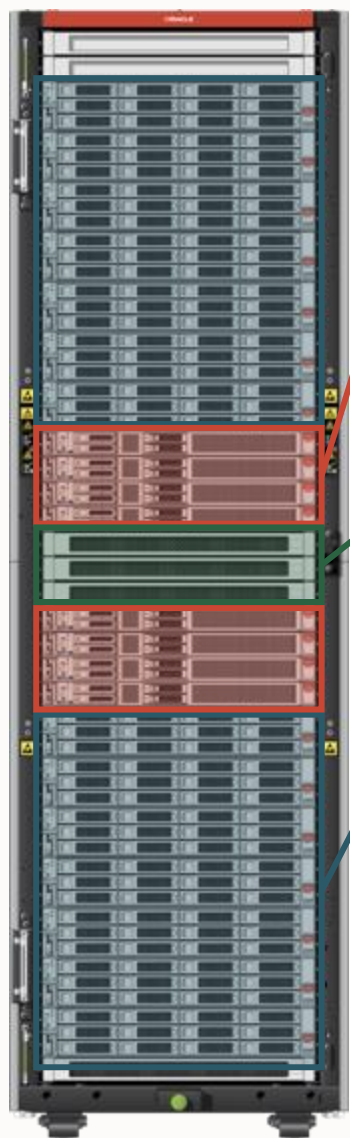
可用模式

On Premises

Cloud@Customer

Oracle Cloud

Exadata X9M-2 Database Machine



Scale-Out 1 or 2 Socket Database Servers

- 33% more cores - latest 32-core Intel Ice Lake CPUs
- Increased memory capacity
- Faster local disk – 3.84 TB NVMe
- Additional client network flexibility

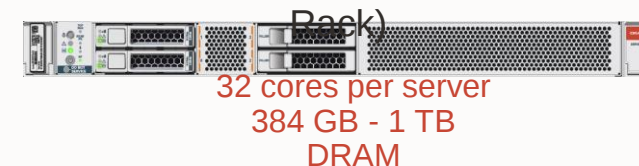
100Gb RDMA over Converged Ethernet (RoCE) Internal fabric

- PCIe4.0, active-active, 2 x 100 Gb RoCE network interface ports in Database and Storage Servers

Scale-Out Intelligent 2-Socket Storage Servers

- Latest 16-core Intel Ice Lake CPUs
- Increased memory – 256 GB
- 28% higher capacity – 18 TB Disk Drives
- 768 GB Persistent Memory per storage server (*1/8 Rack HC)
- 1.8x faster NVMe Flash – PCIe4.0
- Three tiers of storage: PMEM, NVMe, HDD

1 Socket Database Server (1/8 Rack)



32 cores per server
384 GB - 1 TB
DRAM

1/8 Rack High Capacity (HC) Storage



108 TB disk capacity
12.8 TB PCIe NVMe Flash
768 GB Persistent Memory
16 cores for SQL offload

Optional

Extended (XT) Storage

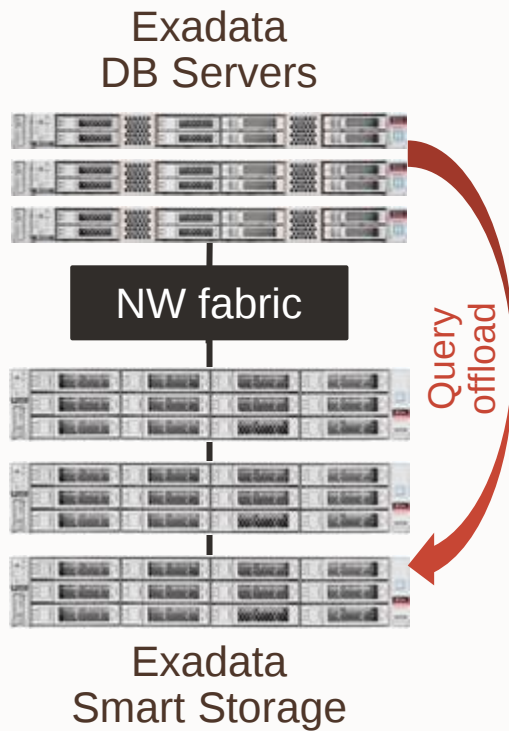


216 TB disk capacity



Oracle Exadata X9M smart software

Eliminate shared-storage IO bottleneck for more functionality and value



Smart Scan automatically offloads data-intensive SQL operations to storage servers

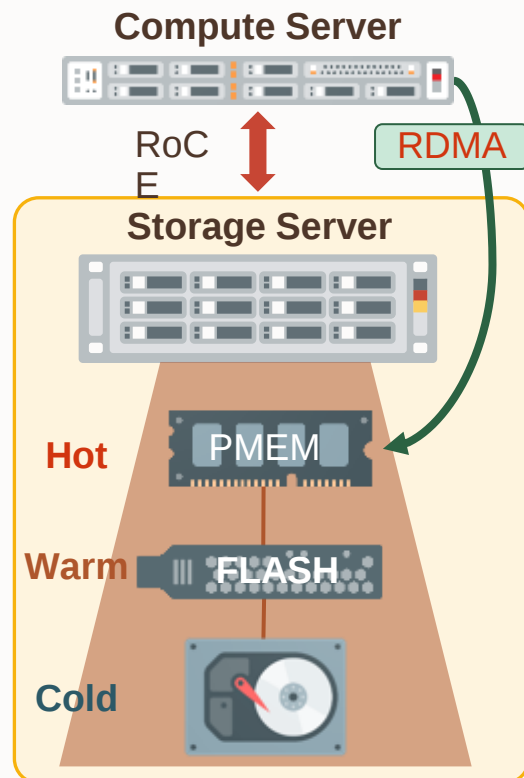
- In-database analytics
- Machine-learning algorithms
- Decryption
- Decompression
- Backup

Parallel execution of OLTP updates

Oracle Database only licensed on database server CPUs

Oracle Exadata X9M shared persistent memory

Persistent Memory Data Accelerator speeds access to shared data



Exadata Storage Servers transparently add persistent memory in front of flash memory

- World's first and only shared persistent memory optimized for database

Database uses RDMA instead of I/O to read remote PMEM

- Bypasses network and I/O software, interrupts, context switches
- Frees CPUs to work on Smart Scan queries
- 10x better latency and 2.5x higher I/Os per second

PMEM automatically tiered in front of flash and disk

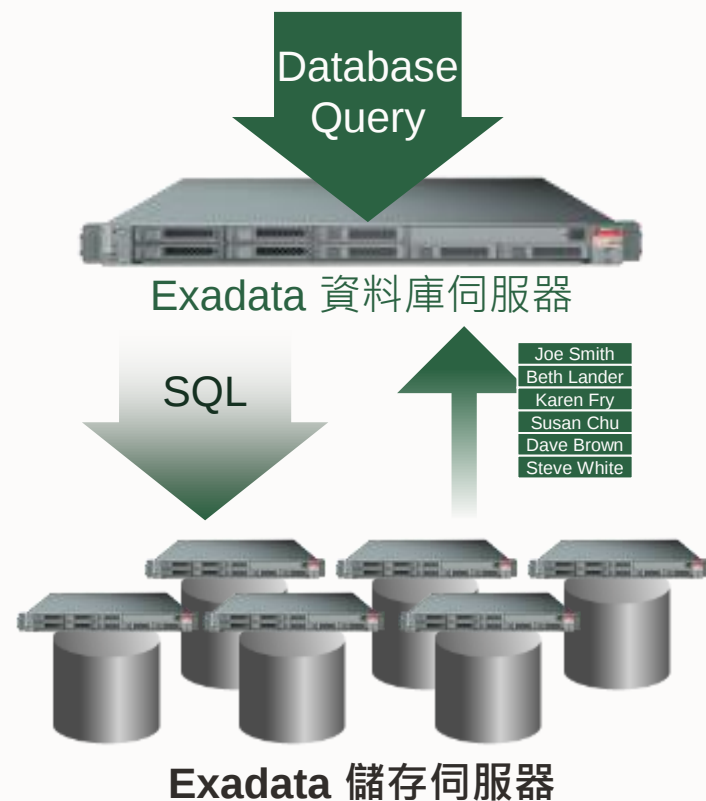
- Caching only hottest data increases effective capacity 10X

PMEM RDMA also used to accelerate log writes up to 8x

一般商業化硬體無法達成的效益

Exadata 效能最佳化：用最有效的方式強化資料庫與應用效能和服務速度

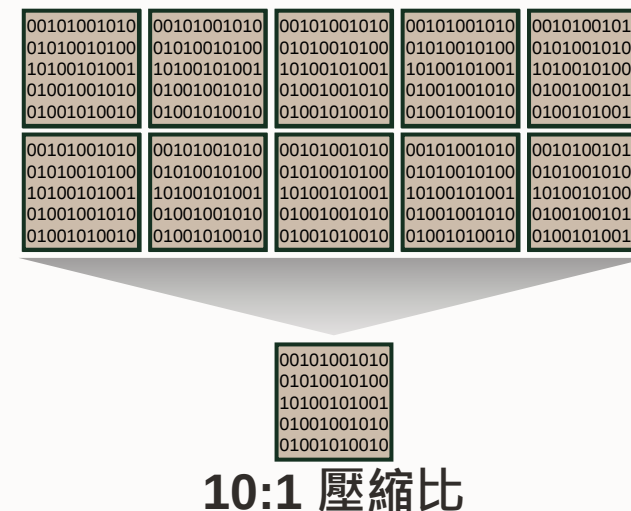
Exadata Smart Scan 高度平行化的資料庫伺服器處理卸載



Smart Flash Cache 更快速且有效的儲存存取效能



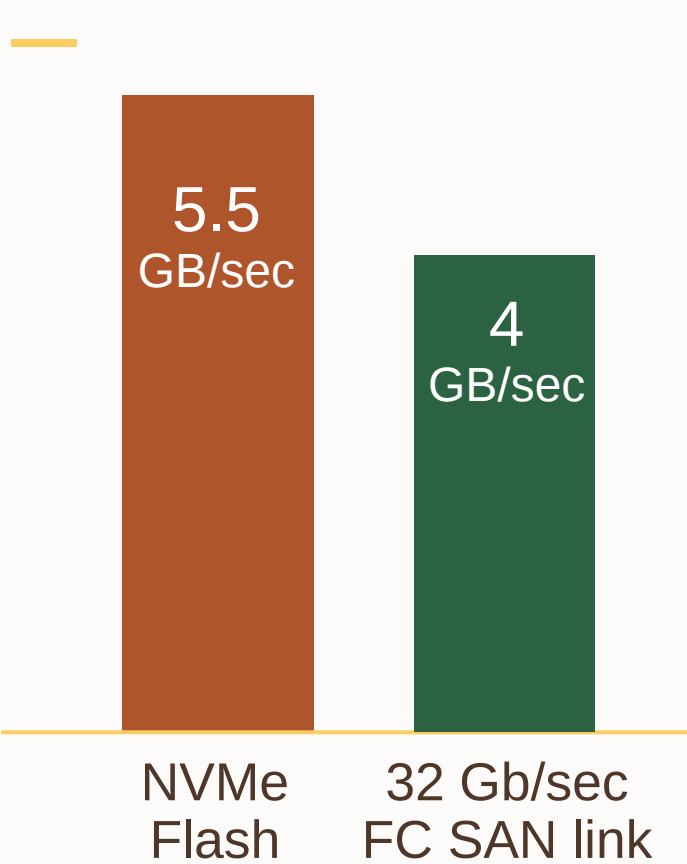
Hybrid Columnar Compression (HCC)



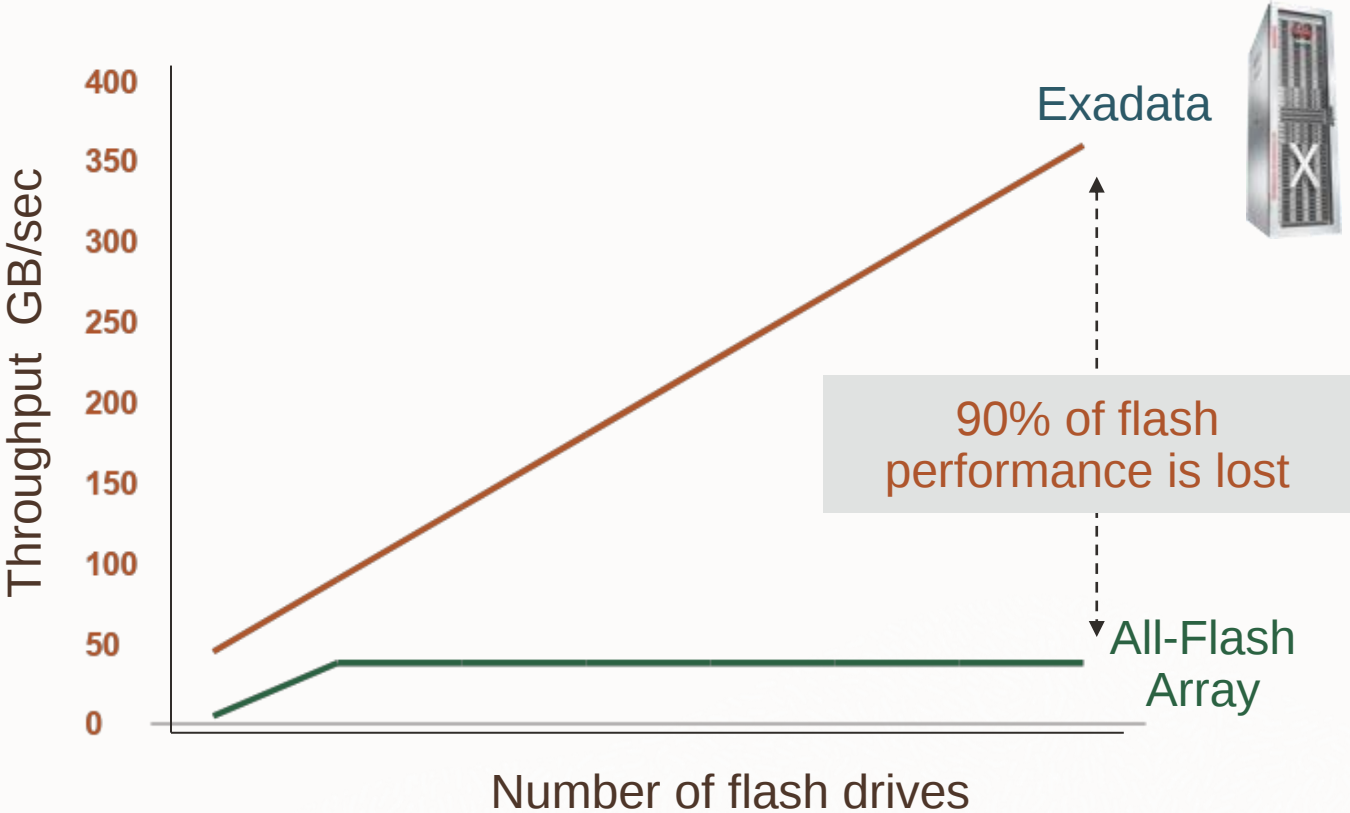
可有效地提升快閃 (儲存/快取)
可用容量效益達十倍以上



Latest flash creates a **giant bottleneck** for shared storage



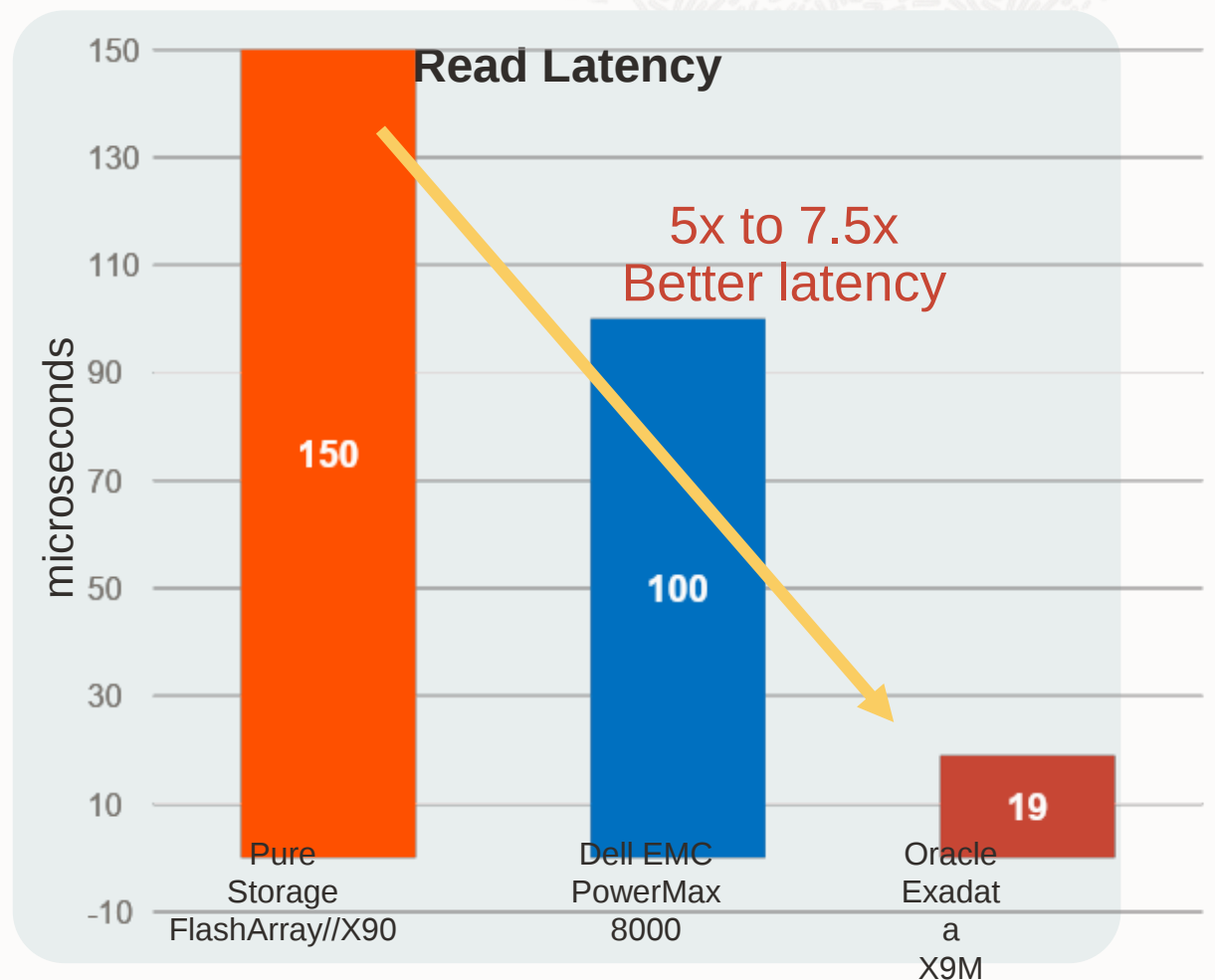
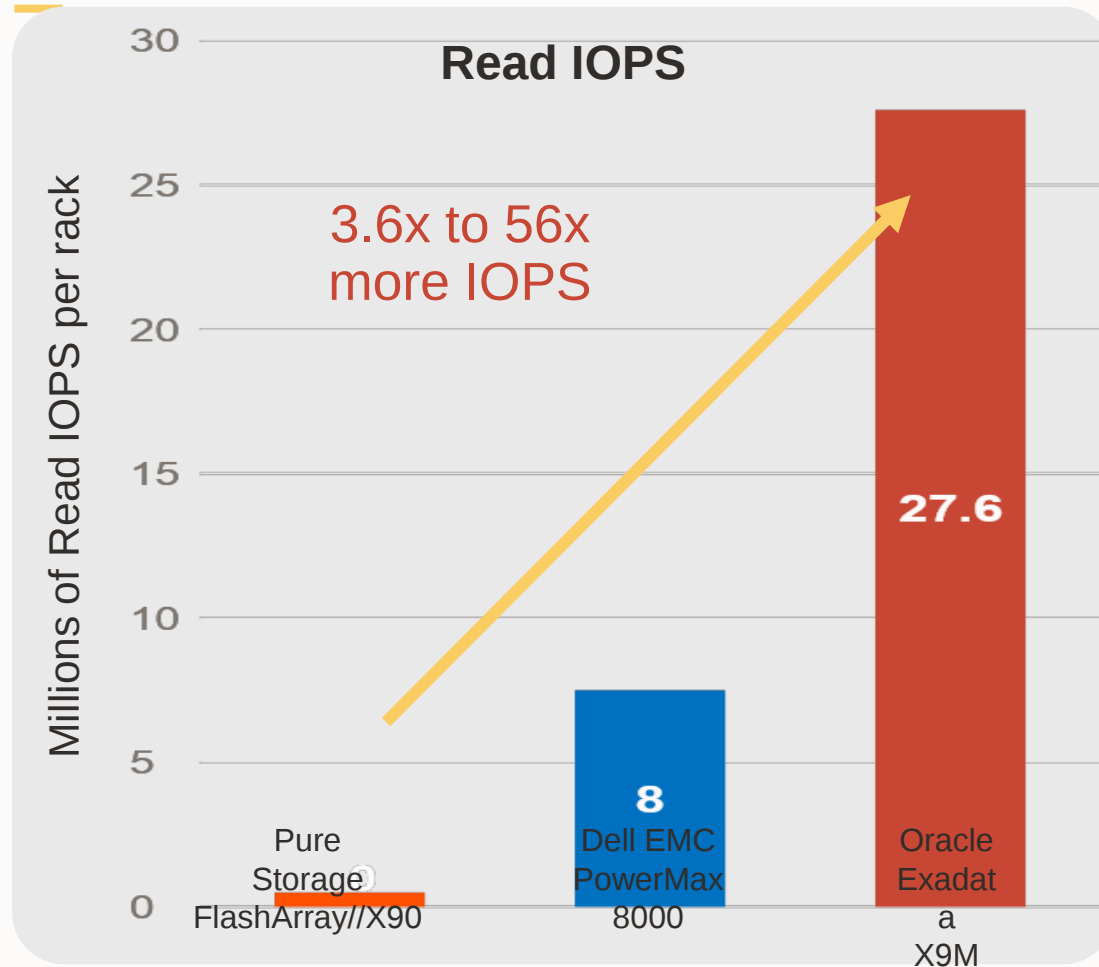
A single flash drive is faster than a fast SAN



Exadata Scales as Flash is Added,
Flash Arrays Bottlenecked by Network

Fastest **OLTP**

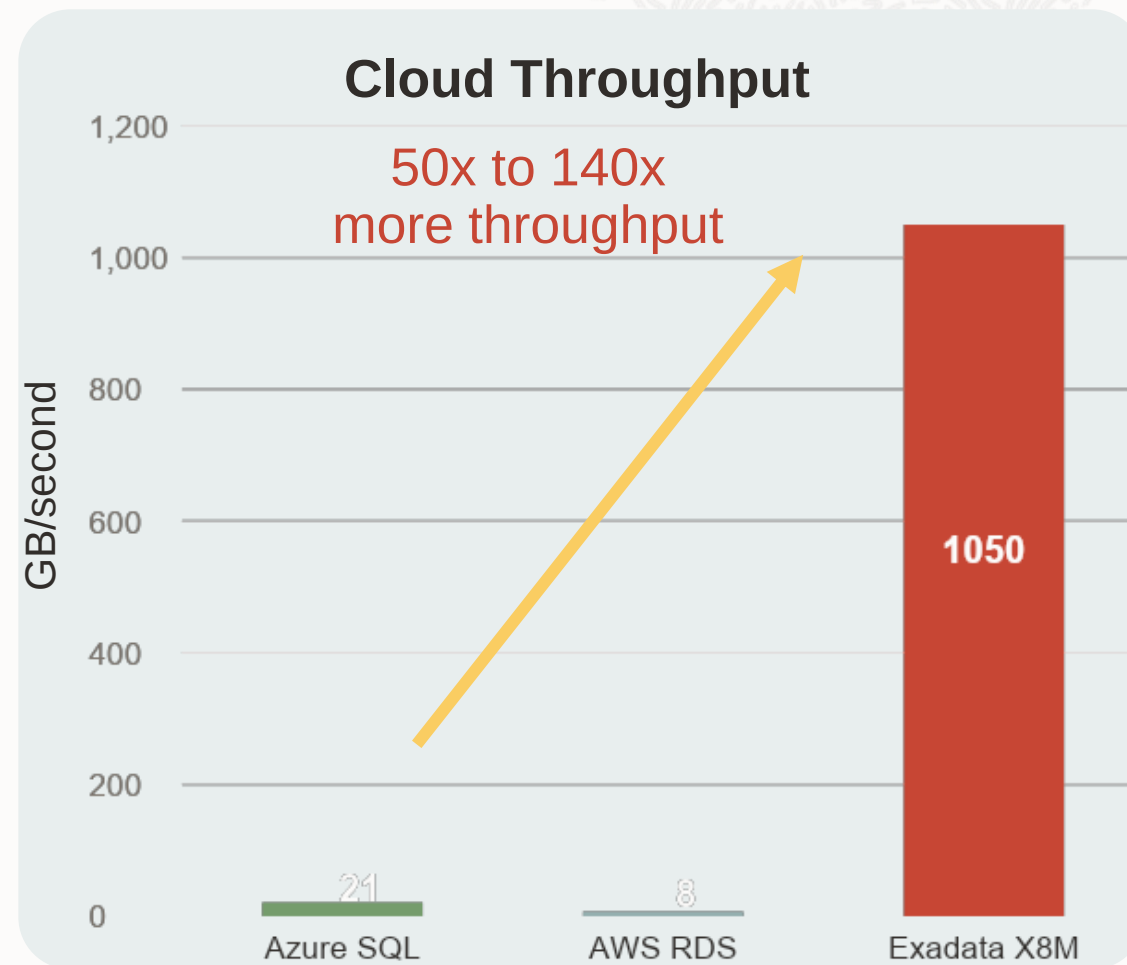
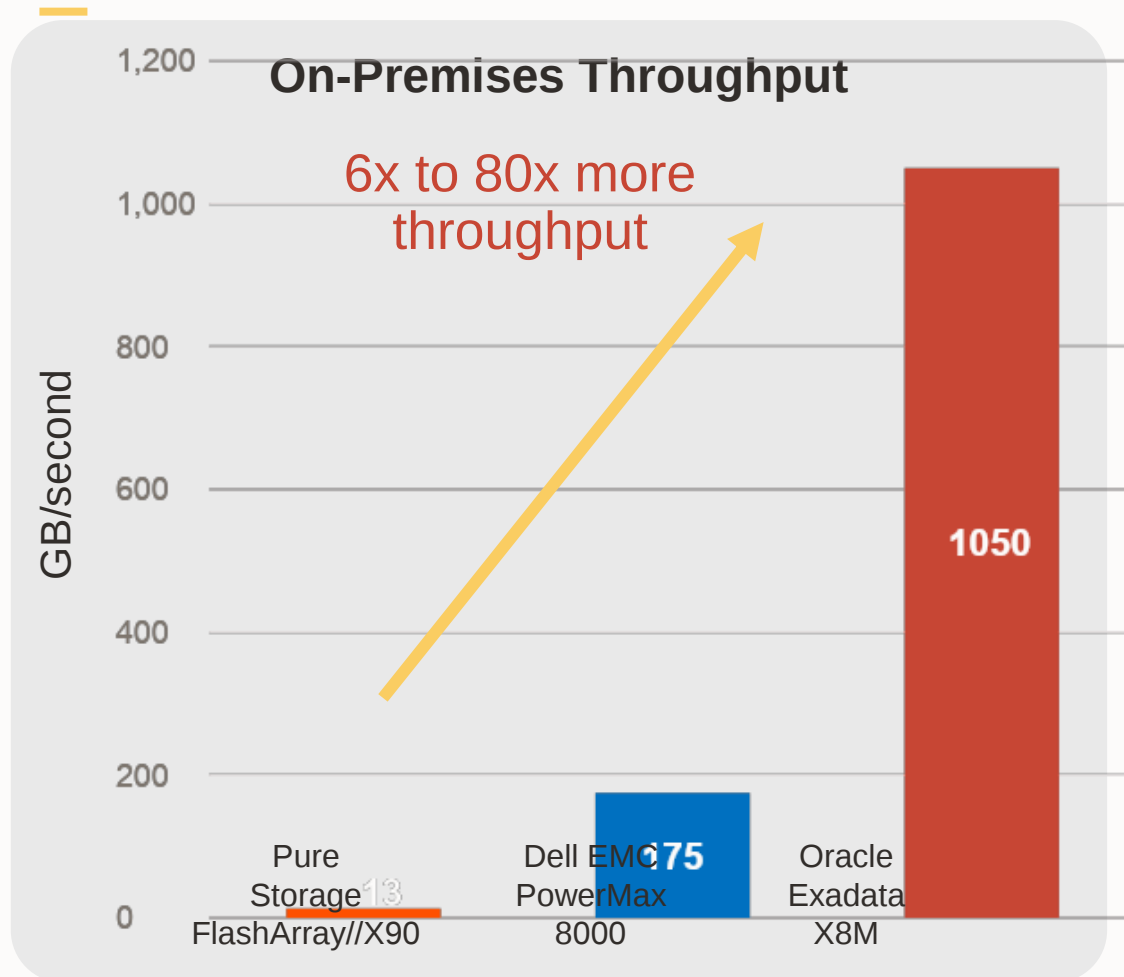
Dramatically Higher **OLTP** Performance and Lower Latency than Others



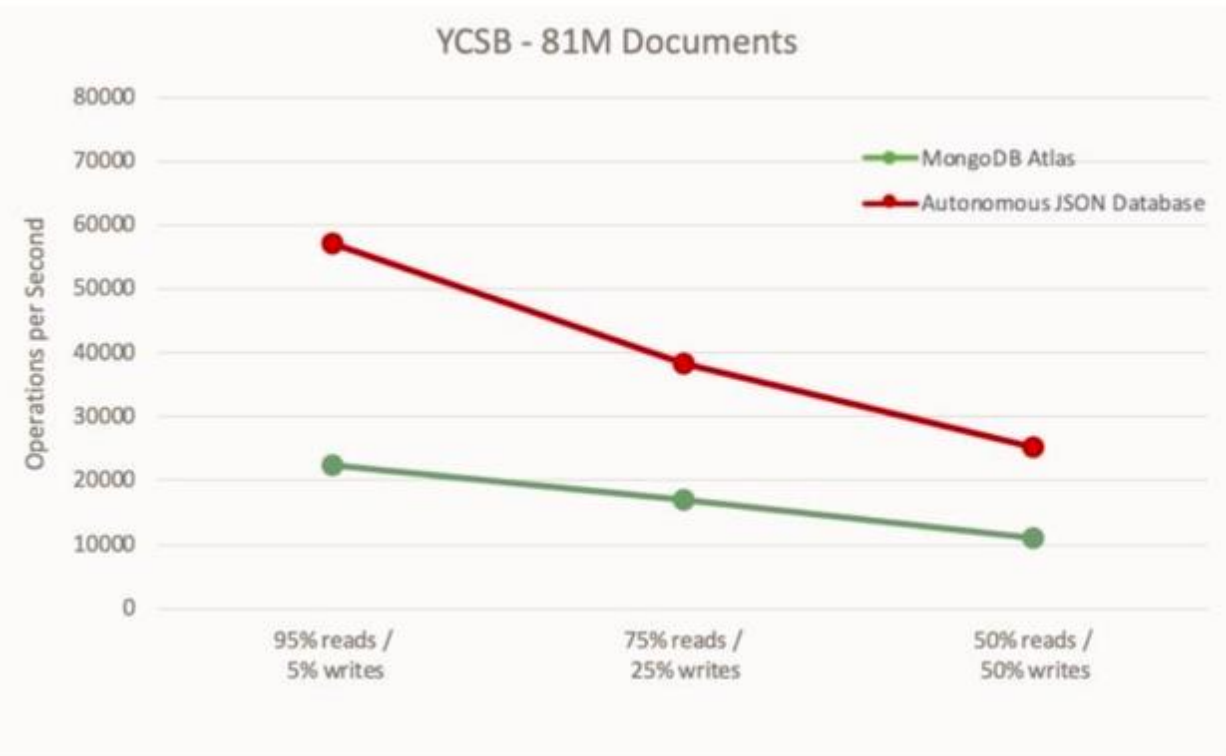
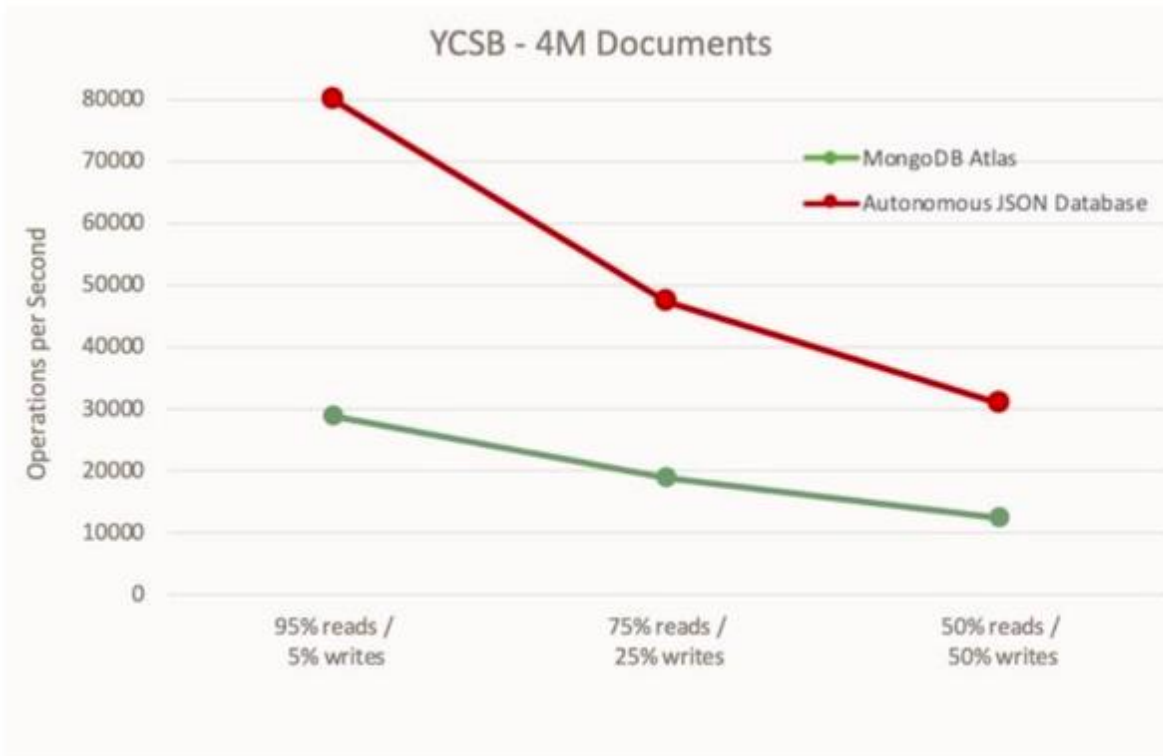
Single system, per-rack capabilities – PowerMax scales to 2 racks, **Exadata X9M scales to 12 racks**

Fastest **Analytics**

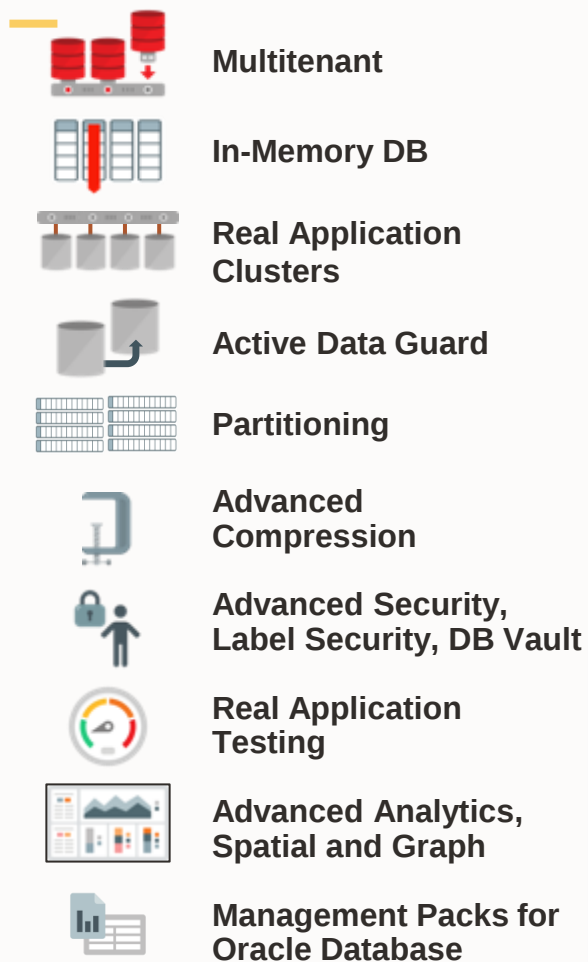
Dramatically Higher **Analytics** Performance than Others



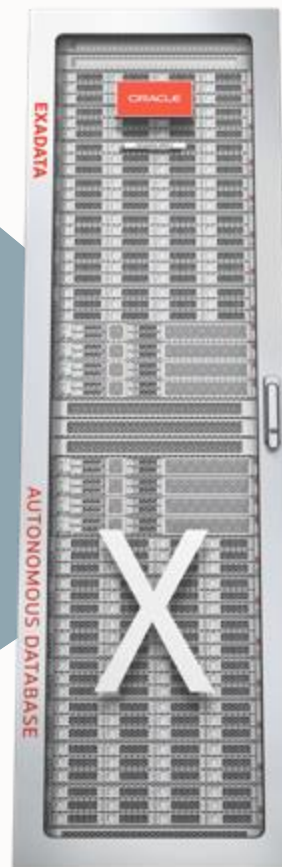
Better **JSON** performance



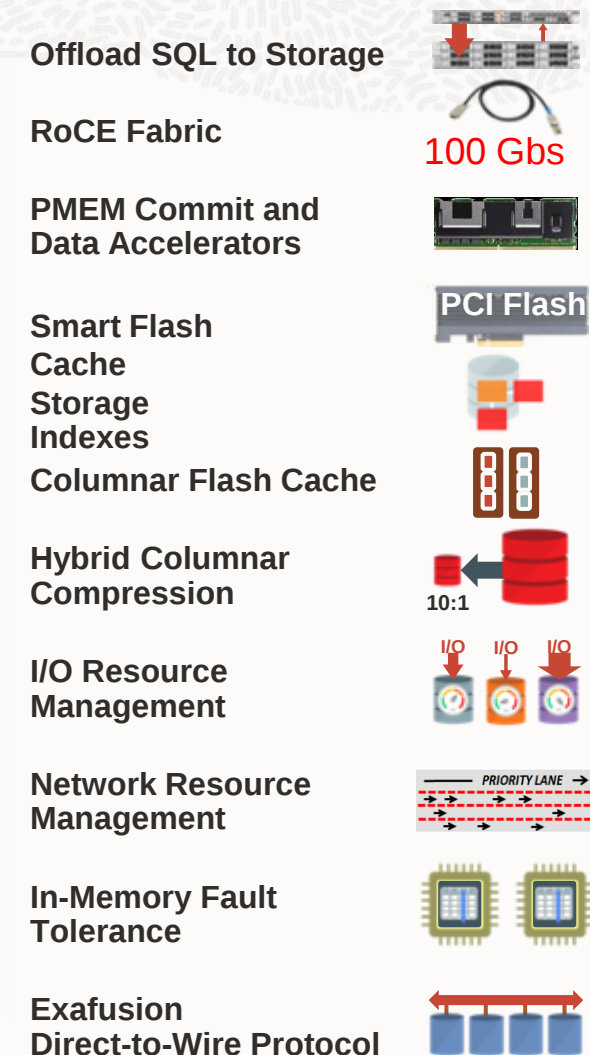
ExaCC包括Oracle可加選項目



**All Oracle
Database
Innovations**

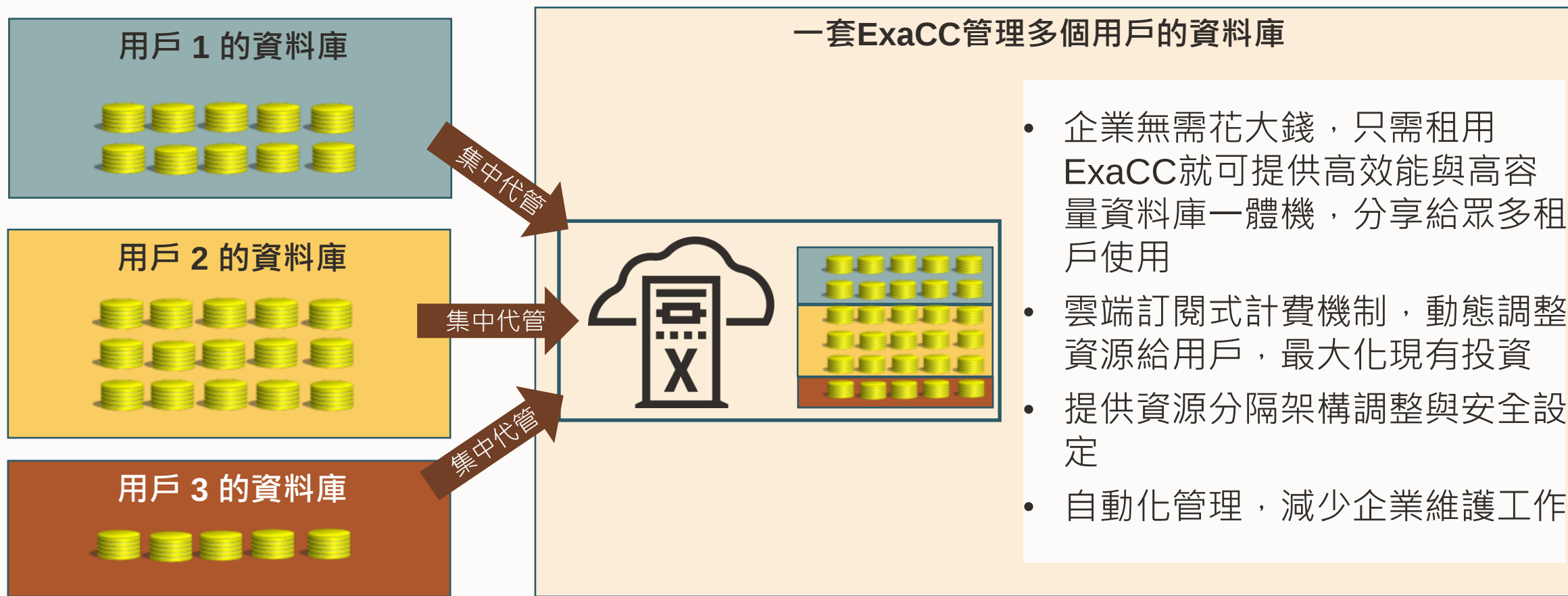


**All Exadata
DB Machine
Innovations**



ExaCC數據中台多用戶(系統、部門、廠區)彈性使用環境

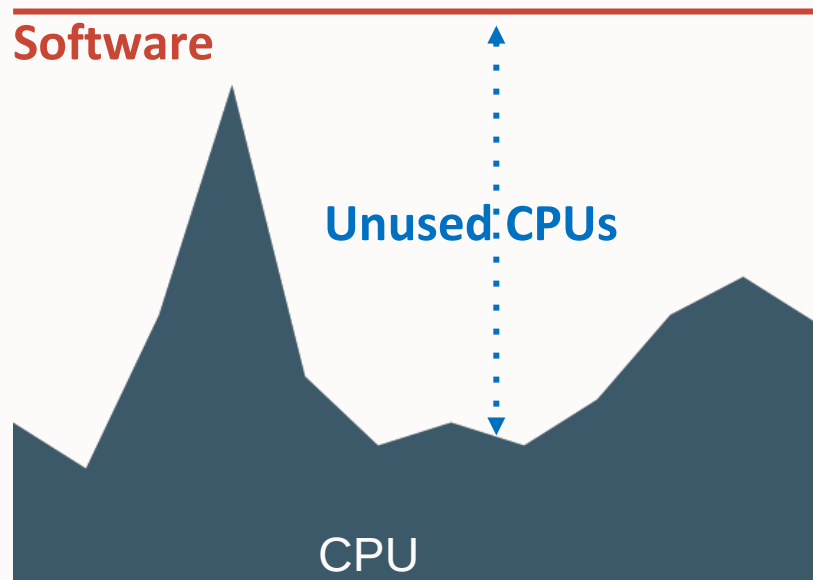
依需求彈性建置並集中代管資料庫環境



ExaCC 系統資源彈性使用，減少成本開銷

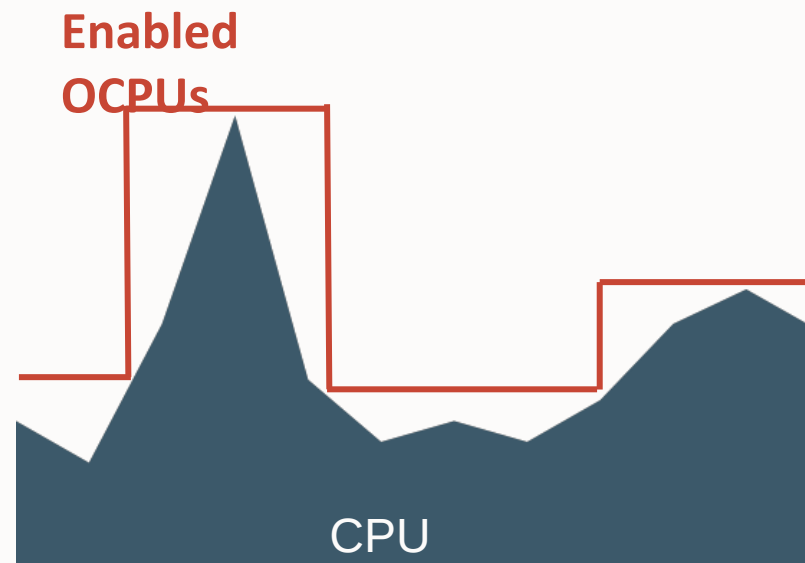
Capex to Opex

— Configured
CPUs and
Software



On-Premises - Static

Purchase CPUs and software licenses for **highest projected peak load**



Cloud - Elastic

Adjust enabled OCPUs to match **actual load**
OCPUs are charged hourly



Thank you

