

Oracle Database/RAC

&

Oracle NoSQL Big Data

# Did You Know?

Cisco Systems run 1,000's of Oracle Databases (Single Instance & RAC)?

Cisco's largest Oracle DB is over 40TB in size?

Cisco runs Oracle Database 10g, 11g, and looking at 12C.

All of Cisco runs on Oracle except voice and telepresence!

Cisco trusts Cisco Unified Computing System to run Oracle Database – period 😊

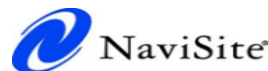
***The best practices for Oracle we ask YOU to adopt we use ourselves!***

# The Cisco and Oracle Relationship



- 20 years of relationship
  - Initially in networking, now extended to **Cisco UCS**
- Foundational customers to each other
- Joint engineering engagements
  - Certifications
  - Cisco Validated Designs (CVD)
  - Benchmarks
- Growing Number of Joint Customers

# Over 4,500 Customers Run Oracle on UCS!



## EMC

- Improved application response and batch run-times by **20 times**
- EMC running **8.8TB** database
- Saved over **\$7 million** in capital and operational expenses

## Cisco IT

- Running 100's of Oracle Databases and RAC
- **Largest database is over 40TB on Cisco UCS**
- **Our best practices we publish for YOU to use!**

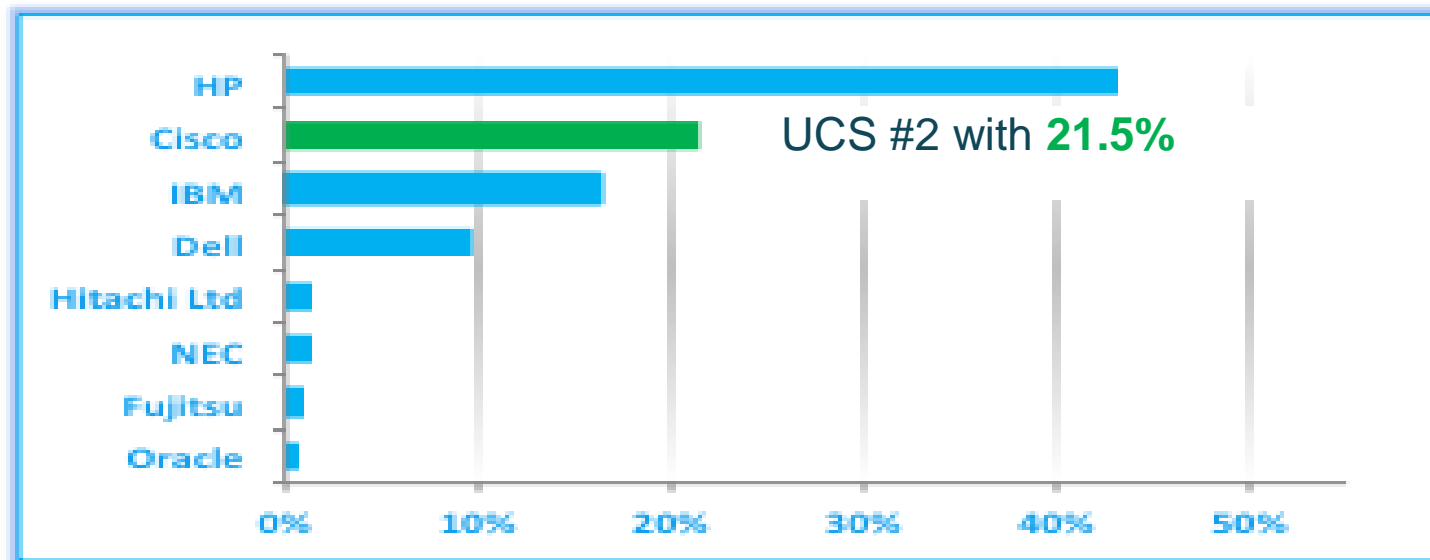
## Indoff

- Reduced power consumption by **20 percent**
- Cut cooling costs by more than **50 percent**
- Saved **US\$80,000** in deployment of Oracle ERP suite due to reduced hardware demands
- Cut software maintenance costs by as much as 35 percent, saving estimated **\$50,000**

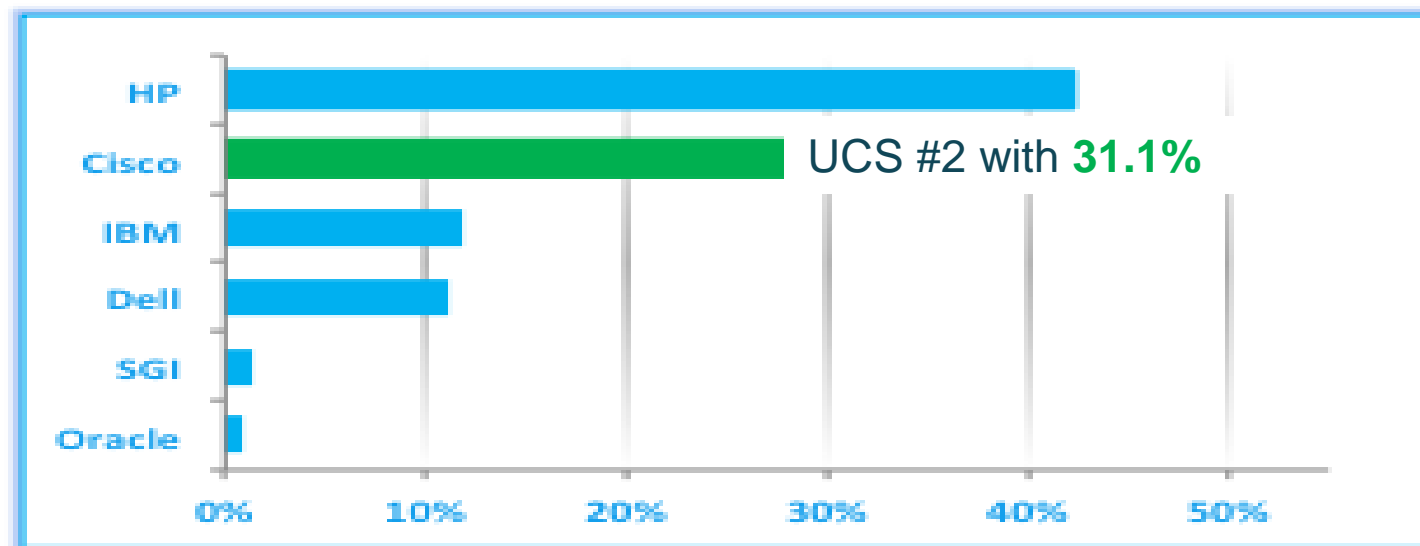
# Customers Have Spoken



## Worldwide



## Americas



UCS momentum is fueled by game-changing innovation; Cisco is quickly passing established players

UCS x86 Blade servers revenue grew 34% Y/Y in Q2CY13<sup>1</sup>

## UCS #2 in Only Four Years

Maintained #2 in Americas (31.1%), #2 in N. America (32.9%) and #2 in the US (33.9%)<sup>1</sup>

Maintained #2 worldwide in x86 Blades with 21.5%

Source: <sup>1</sup> IDC Worldwide Quarterly Server Tracker, Q2 2013, August 2013, Revenue Share

# Oracle Performance Records

Now 27 World Record Industry Standard Benchmarks & 6 Proof Points!



INDUSTRY STANDARD

PROOF POINT



Three new #1 World Records

Oracle E-Business Suite Xtra Large Model Payroll B200 M3

SPECjbb2013 2-socket B200 M3

SPECjbb2005 2-socket B200 M3

# Oracle Database 11g & 12c

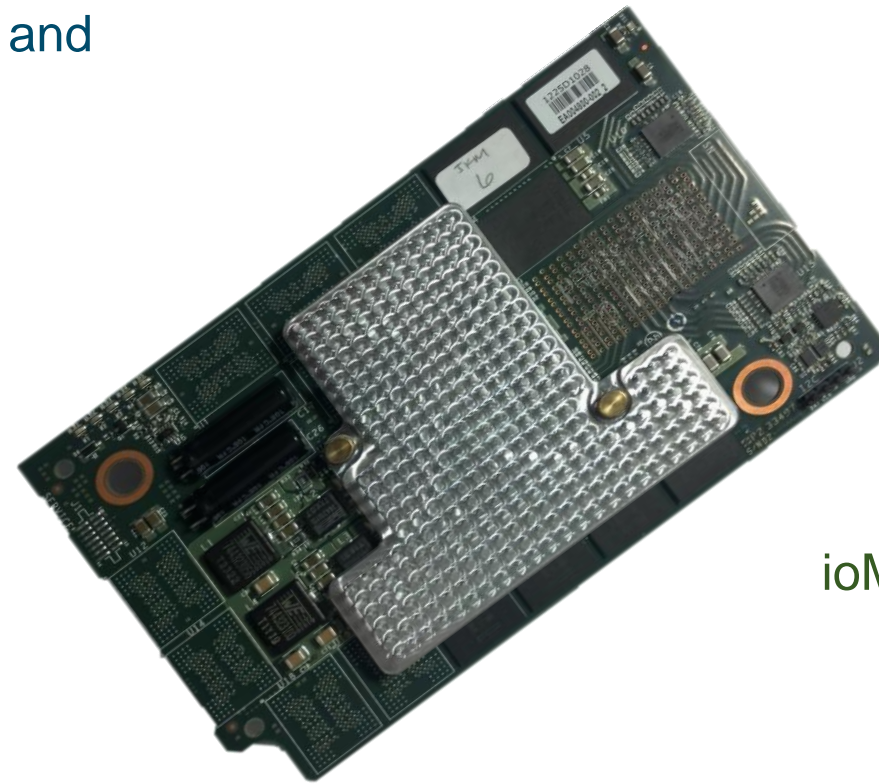


# Fusion I/O Mezzanine Card for UCS B-Series

Expanding the Unified Computing Blade Option Portfolio

Fusion I/O Drive2 architected into Cisco UCS blade servers allow storage performance to be decoupled from capacity through the integration of a **powerful new memory tier uniquely designed to accelerate applications**

- Boost in-server application performance with Database and Virtualization workloads
- Specs:
  - 785 GB MLC Flash capacities (365 GB MLC 2<sup>nd</sup> Phase)
  - 1.5GB/s Bandwidth (1MB Read)
  - 1.1GB/s Bandwidth (1MB Write)
  - 141,000 IOPS (512B Random Read)
  - 535,000 IOPS (512B Random Write)
  - 15µs Write Latency, 68µs Read Latency
- HW supported: All M3 Blades
- SW supported: UCS Manager 2.1+



ioMemory2 for UCS B-Series

EC completed  
Expected Q1CY13  
SKU: UCSB-F-FIO-785M



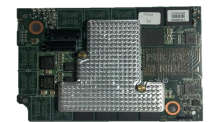


# FUSION-IO Database Usage Models

## A Hybrid Deployment

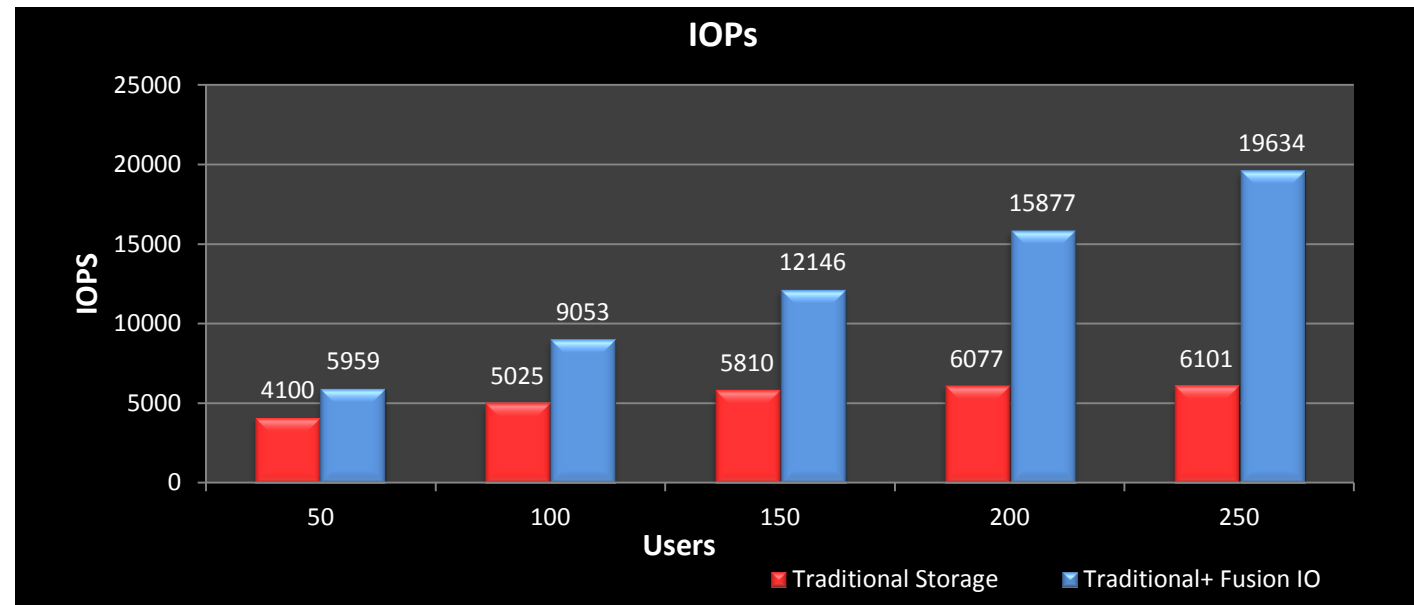
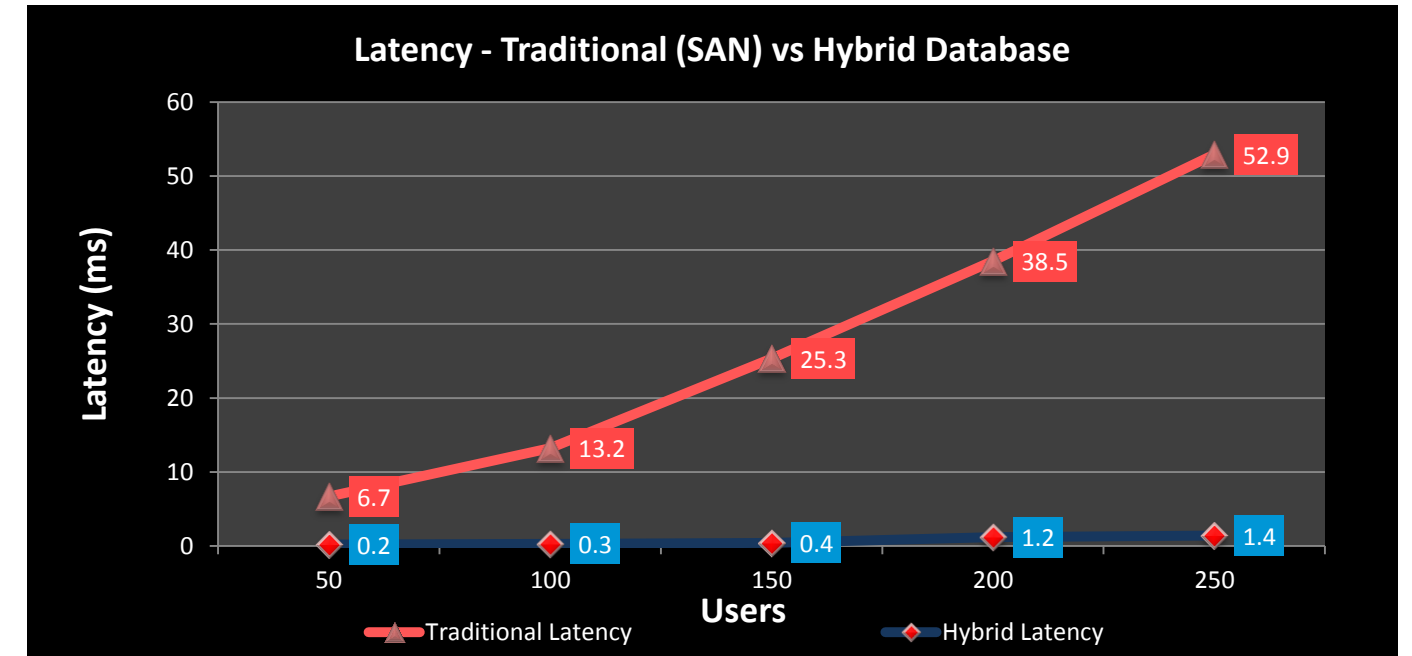
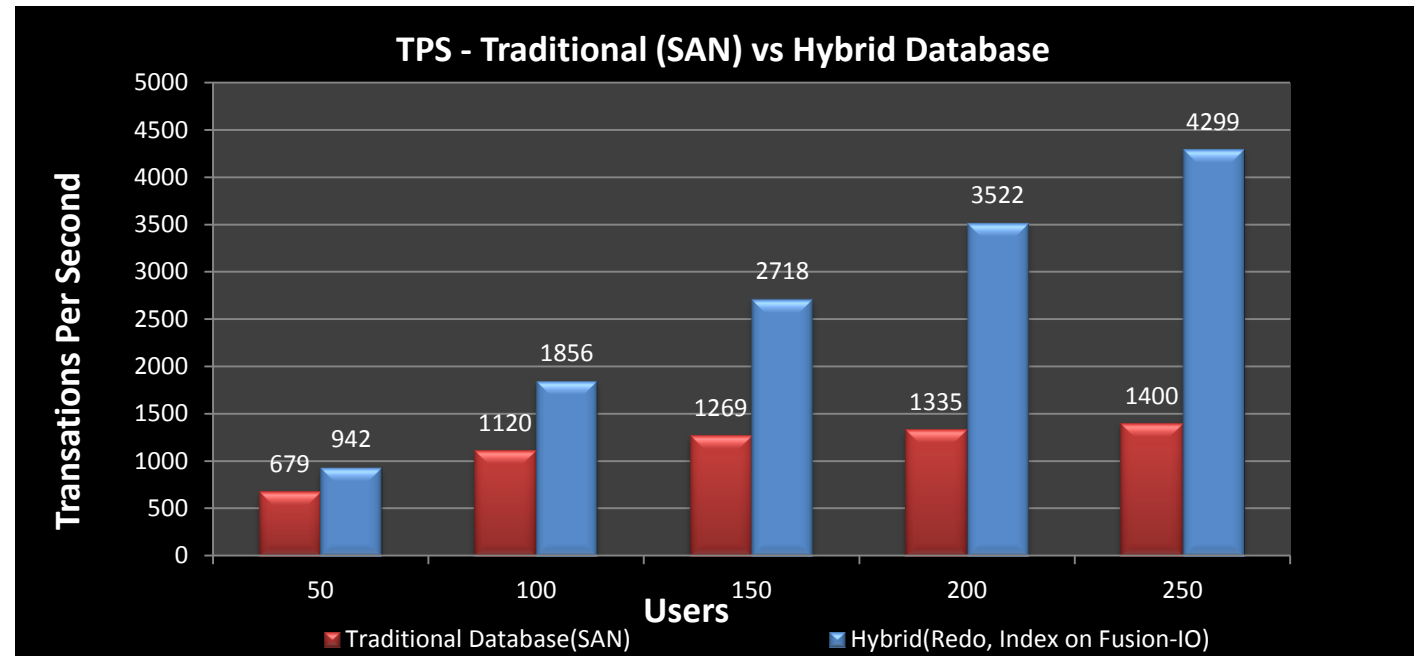
### Hybrid Deployment - Move Hot components to Fusion IO

- If Database size is significantly larger
  - Move hot database components to Fusion-IO adapter
    - Ideal candidates are:
      - Redo Logs
      - Indexes
      - Temporary table spaces
      - Undo Table space
- Significant performance gain
- Cost savings due to storage reduction



# Traditional vs Hybrid Deployment

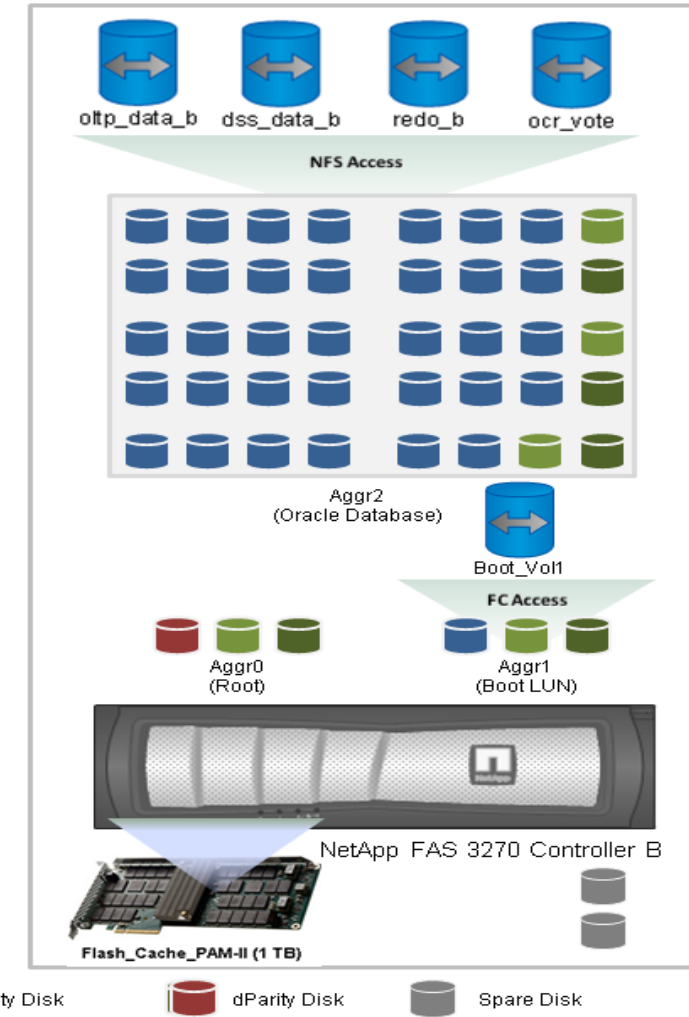
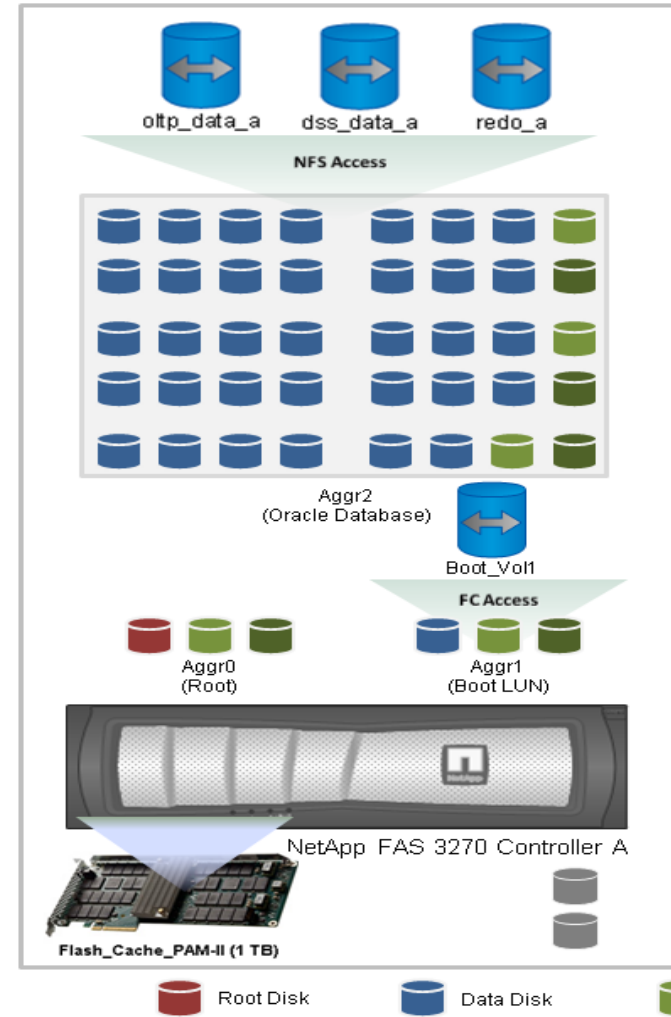
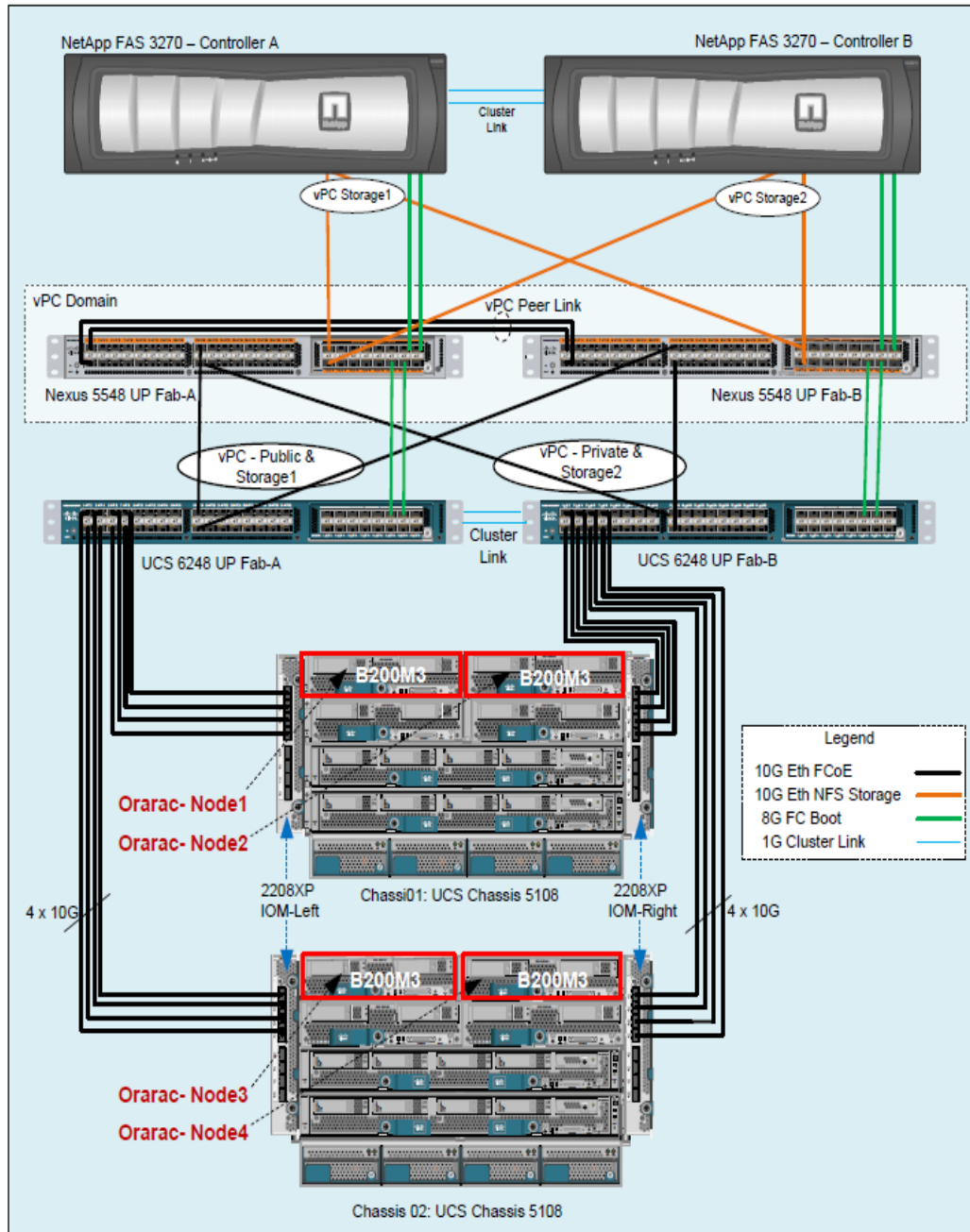
## Fusion I/O Increased Performance with Lower Latency for Oracle Database 11g



### Best Practices:

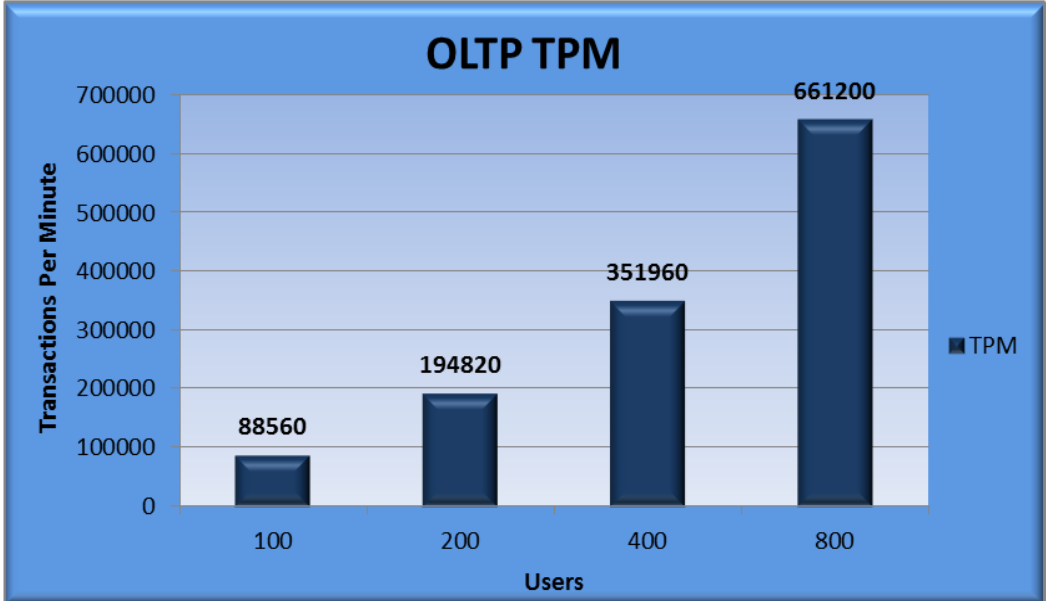
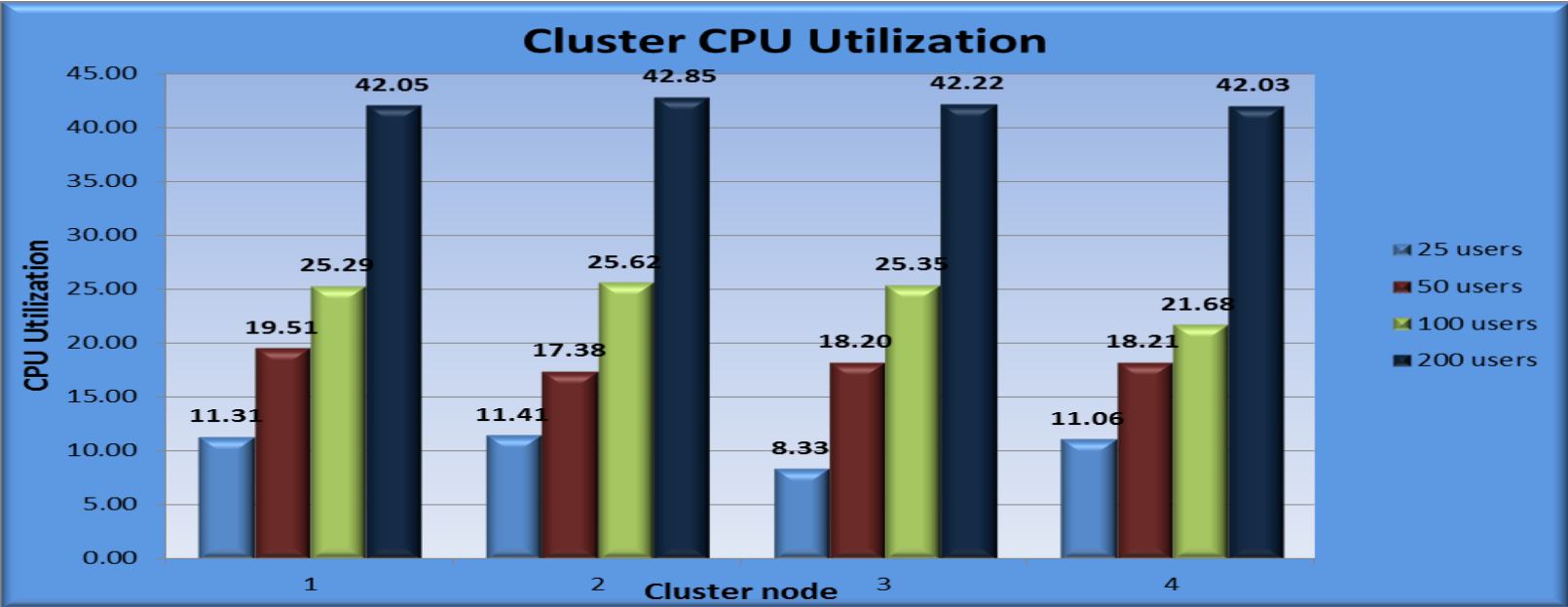
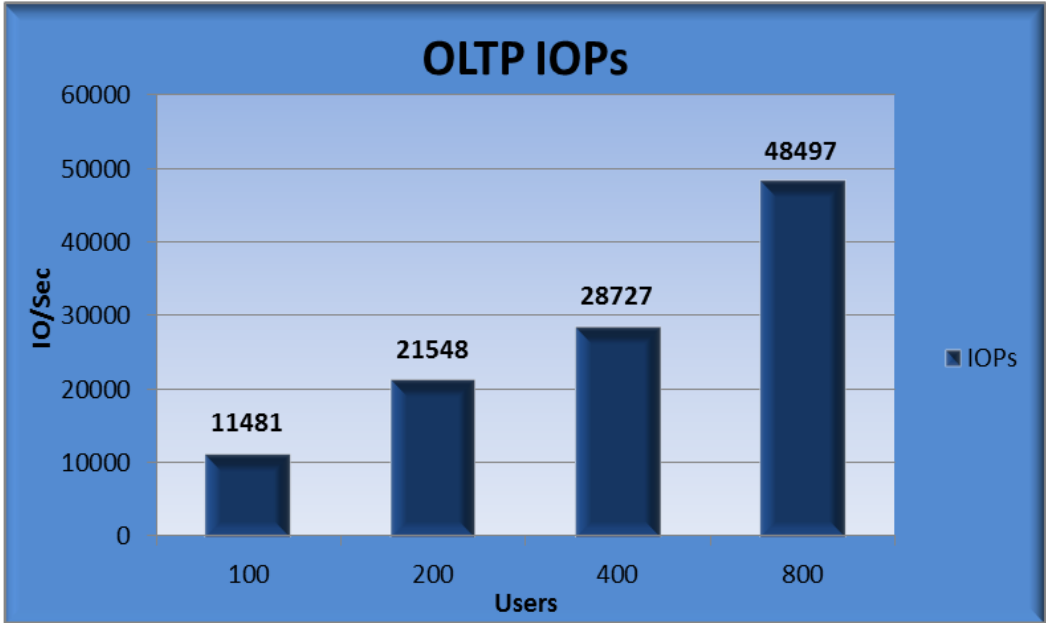
- Move full database on Fusion-I/O yields best performance if possible
- Performance scales linearly with more users and work completed
- Maintain Appropriate replication practices to suit business needs.
- For larger databases, move hot components to adapter
  - Reduces storage requirements
  - Dramatic overall performance improvements and reduced mechanical failures
  - Power and cooling improvements.

# Flexpod Oracle RAC Cluster Design (NFS)



- FlexPod combines Cisco UCS, NetApp in a proven architecture
- 4 Node Oracle RAC Cluster
- UCS B200 M3 Servers

# OLTP Workload - Flexpod for Oracle RAC



**OLTP workload**

- Swingbench Order Entry workload
- Oracle Database 11g RAC
- 60% Reads, 40% Writes
- Linear scale for 4 Node Oracle RAC Cluster

# Oracle Database 12C

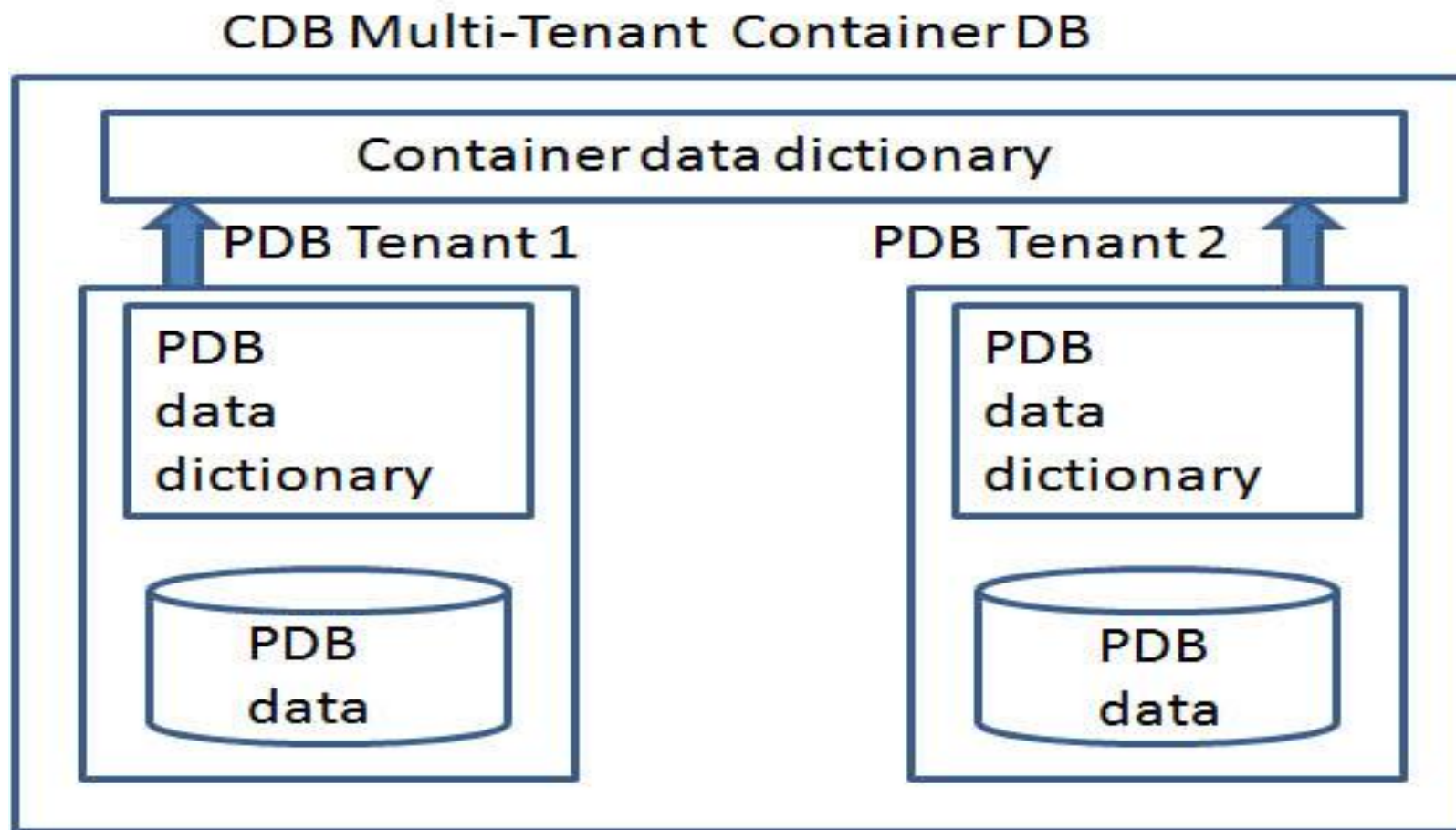
Released June 2013 – Introduces Pluggable Database Architecture

Oracle Database 12C introduced the Pluggable Database Concept which is meant to streamline the administration of multiple Oracle database images into a container data directory. Until Oracle Database 12C, each database or RAC had to be managed separately, defined separately, leading to increased management costs.

Up to 250 Oracle Database 12c may be plugged in.

Each database has the same character sets, thus enabling faster back ups, lowering administration costs, and decreasing time to migrate to new versions of Oracle Database.

Cisco decided to test the performance of pluggable databases.



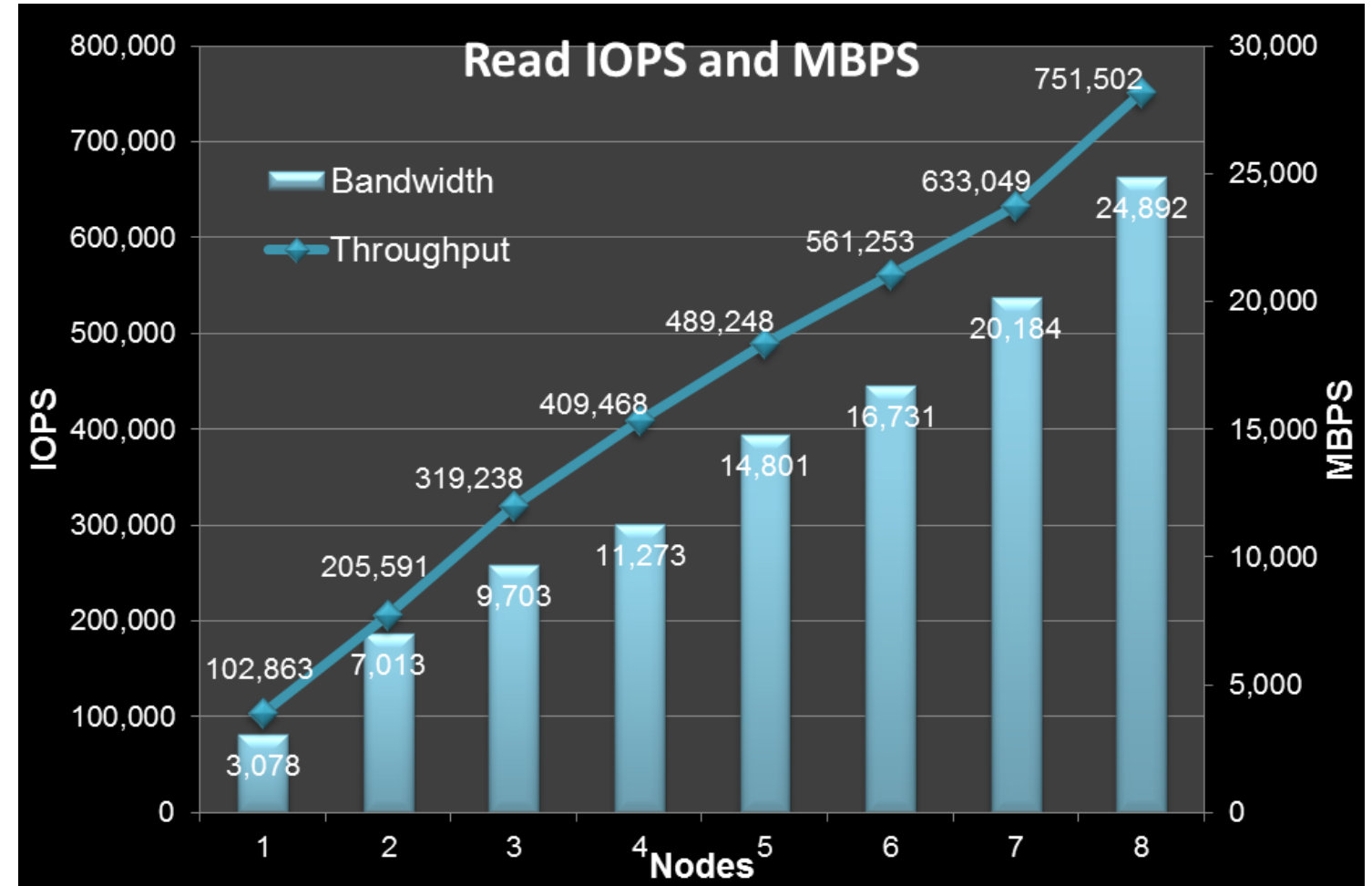
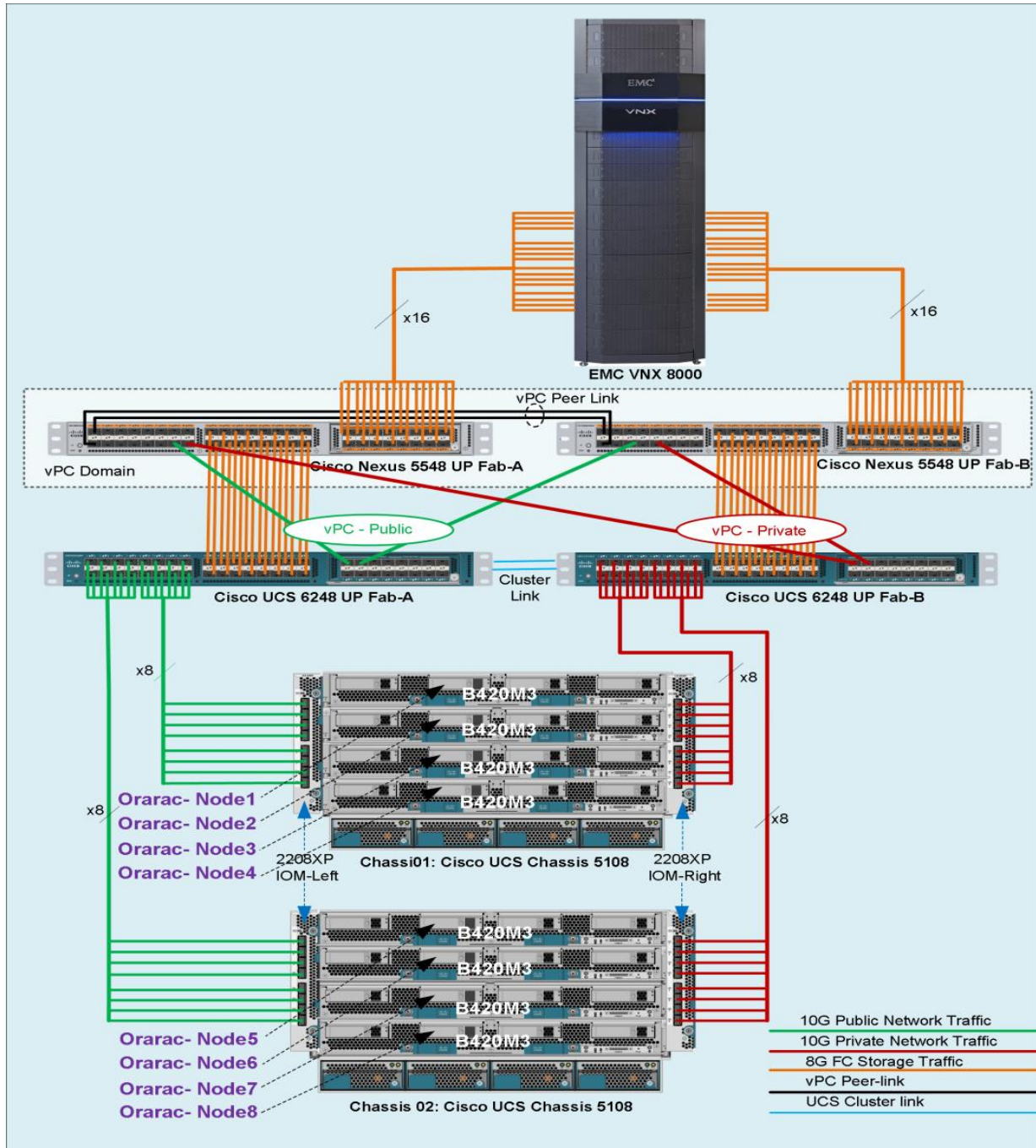
## Key Benefits for Pluggable Databases:

- **Up to 250 Databases:** May be “plugged” in.
- **Easy fast cloning:** Simply copy the PDB very quickly
- **Easy upgrades:** Just copy/move the PDB to a container running a higher release of Oracle

- “Pluggable Database” encapsulate a sub-set of Oracle data tables and indexes along with its associated metadata from the data dictionary.
- Start by creating a "root" instance database, called a container database (CDB).
- A CDB is used to hold many pluggable database "tenants" (PDB's) that have same character sets
- Key Interesting features:
  - **Flex Clusters** – Allows to configure/join multiple clusters under a single domain
  - **IPV6** support for public networks
  - **Flex ASM** - Allows to separate ASM from databases

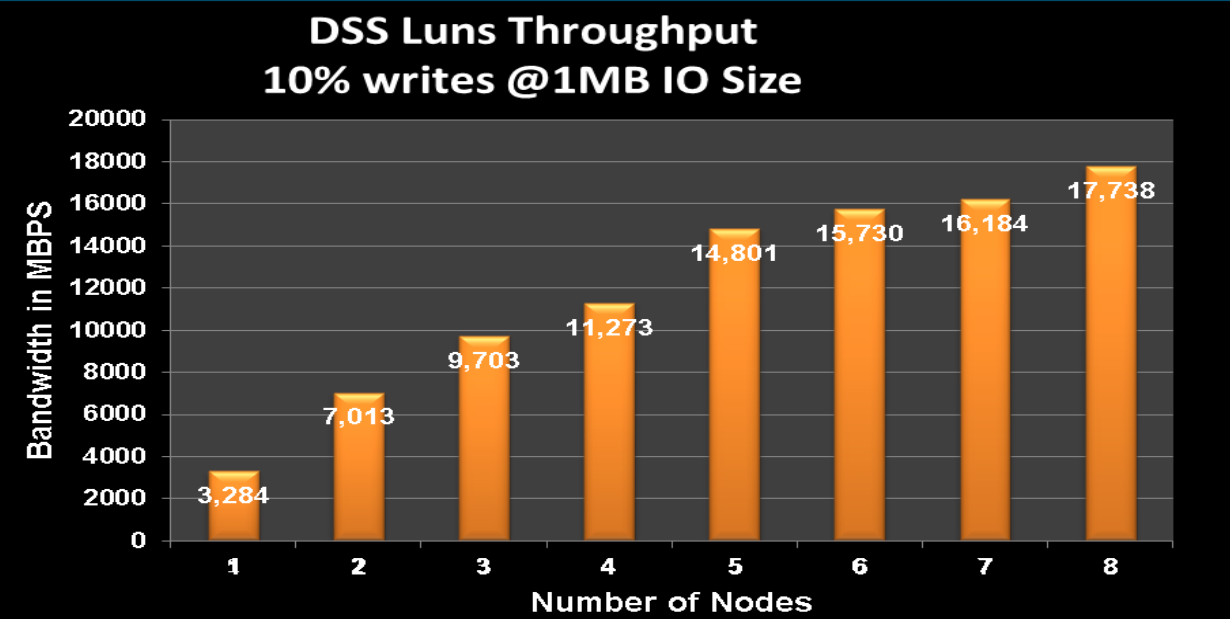
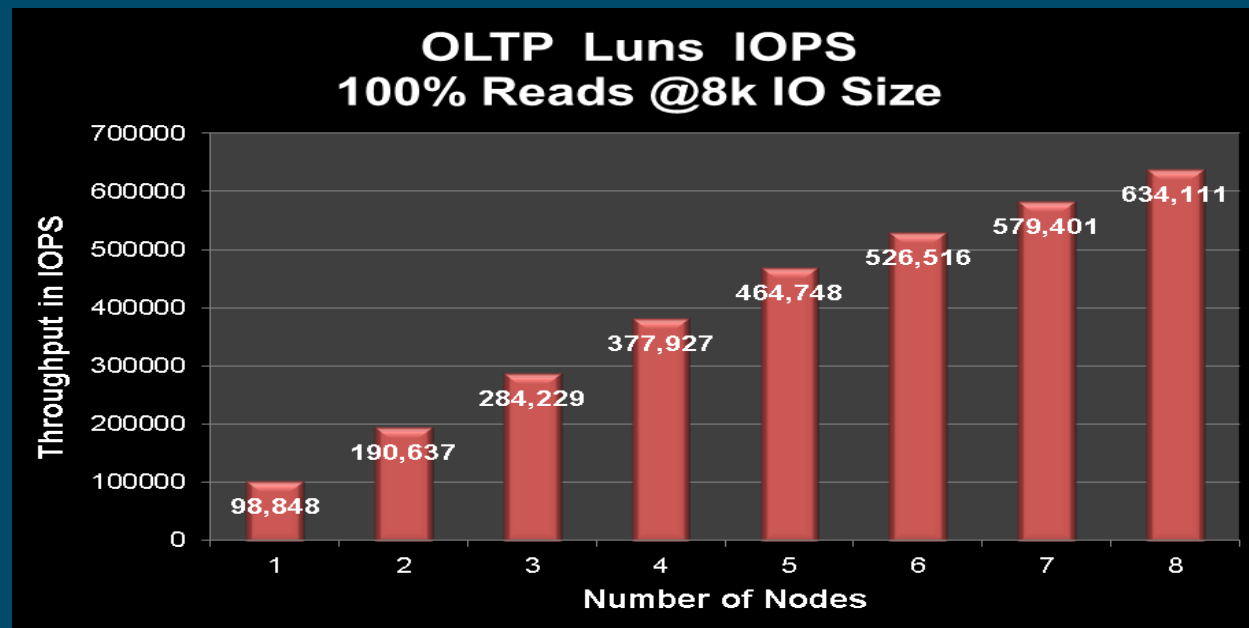
[http://www.dba-oracle.com/t\\_plugg](http://www.dba-oracle.com/t_plugg)

# High Performance Oracle RAC Design - 8 Node Cluster



- 8 node Oracle RAC cluster
- 2 chassis, 4 x B420 Blade servers
- 750K IOPs at very low latency (< 2 ms)
- 25 Gbytes/Sec. bandwidth (200 Gbps)

# Multitenant Database Configuration with Oracle 12c



## OLTP workload

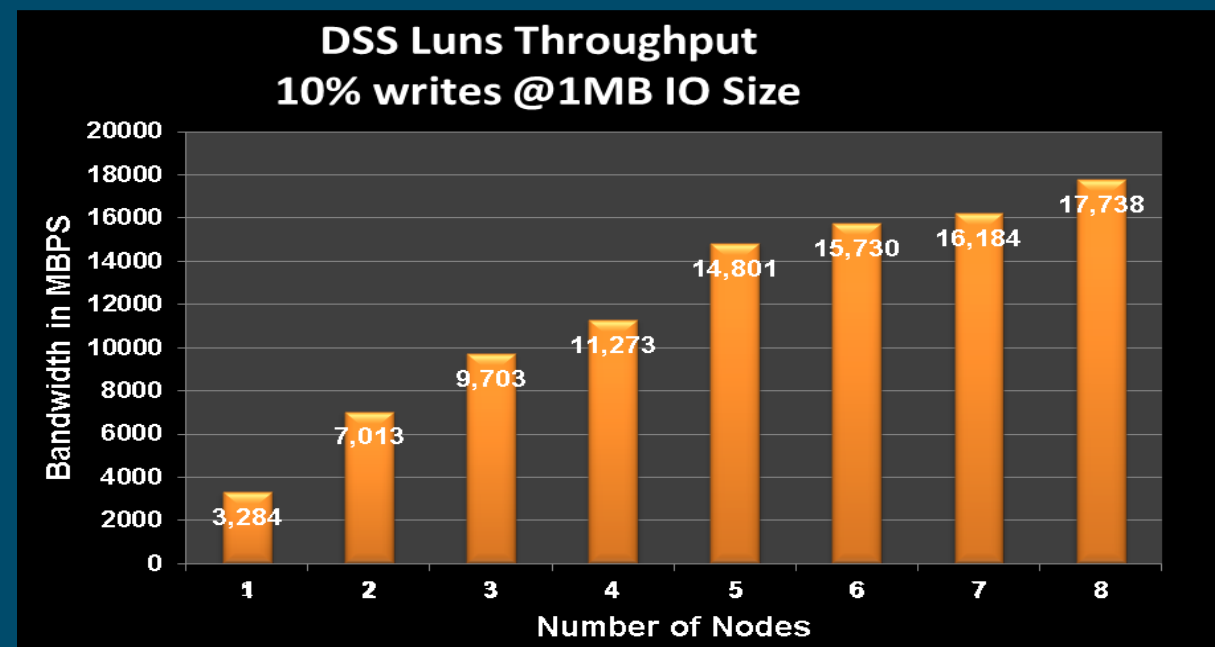
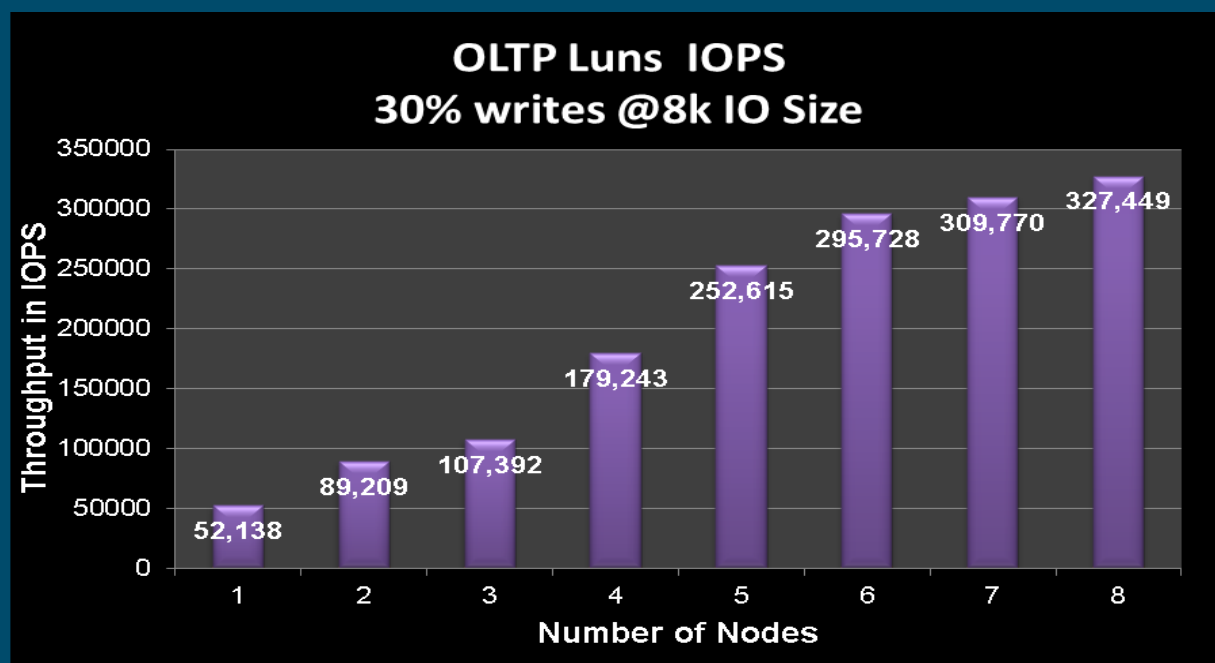
- Random 8K Reads
- 100 % Reads
- 630K IOPs at very low latency (< 2 ms)
  - Storage Pool with 50 SSDs

## DSS workload

- Large Reads 1 MB size
- 90% Reads, 10% writes
- 17GB/Sec Bandwidth
  - Storage Pool with 30 SSDs, 160 SAS drives



# Multitenant Database Configuration with Oracle 12c



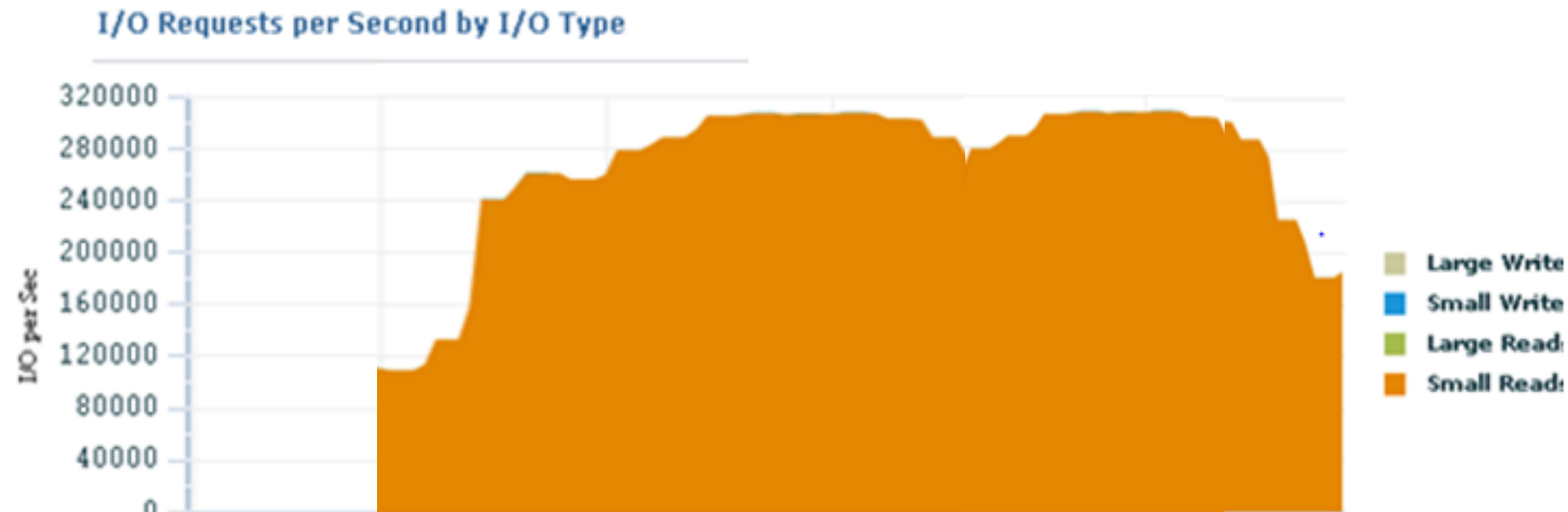
## OLTP workload

- Random 8K Reads
- 70% Reads, 30% Writes
- 630K IOPs at very low latency (< 2 ms)
  - Storage Pool with 50 SSDs

## DSS workload

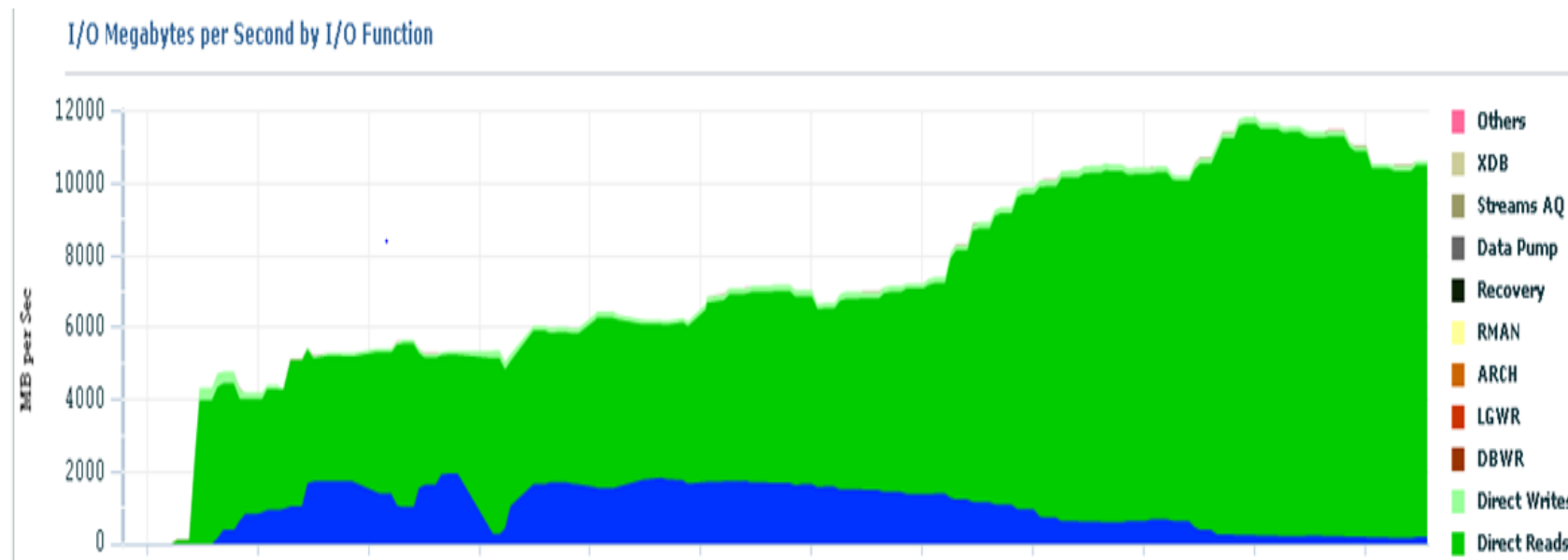
- Large Reads 1 MB size
- 90% Reads, 10% writes
- 17GB/Sec Bandwidth
  - Storage Pool with 30 SSDs, 160 SAS drives

# Multitenant Database Oracle RAC12c Swingbench Scaling Study



## OLTP workload- Order Entry

- 2 TB Database size
- Random 8K Reads
- 300K IOPs at very low latency
- Storage Pool with 50 SSDs, 50 SAS Disks



## DSS workload – Sales History

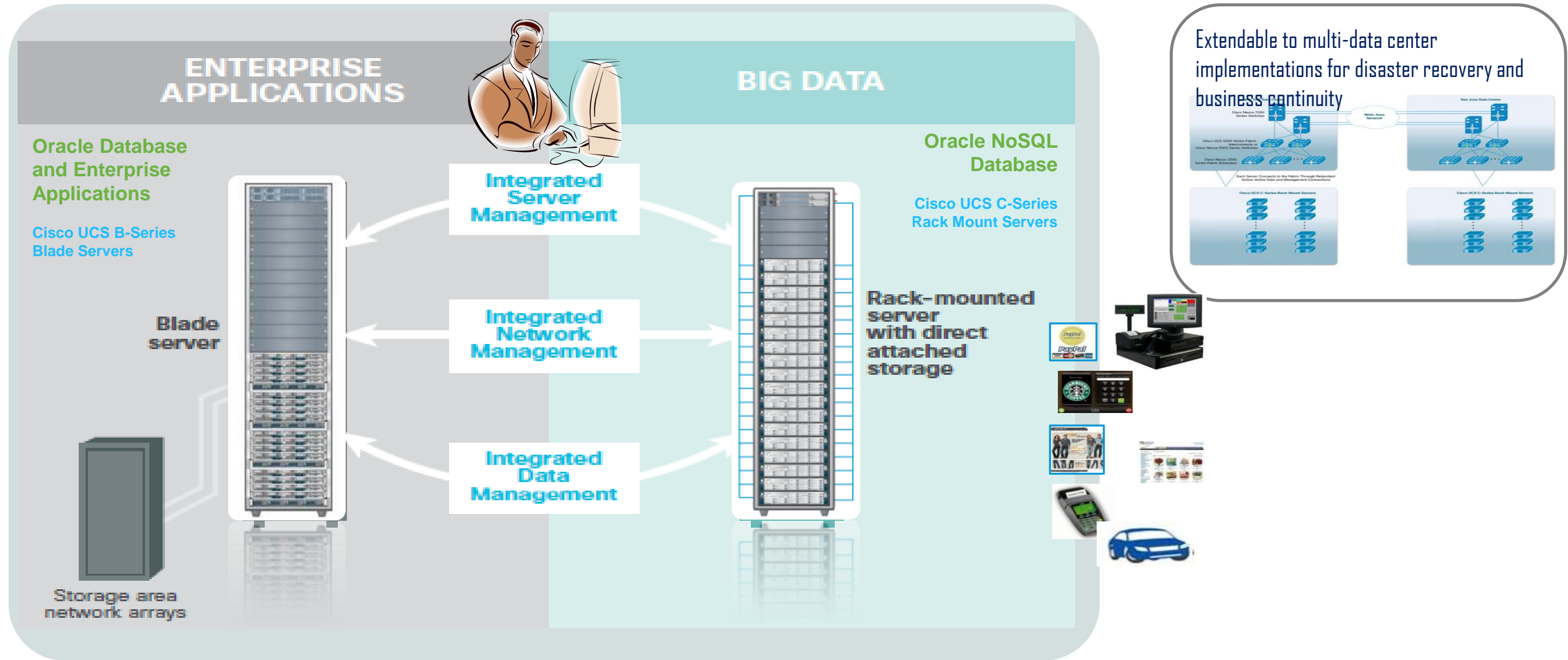
- 5 TB Database size
- Large Reads 1 MB size
- 11 GB/Sec sustained Bandwidth
- Storage Pool with 30 SSDs, 160 SAS Disks

# Oracle NoSQL Big Data



# Extending UCS Oracle Ecosystem to Big Data

## Manage Oracle Database/RAC and NoSQL Big Data = Same Console



# Big Data Market Opportunity

Big data can generate significant financial value across sectors



## US health care

- \$300 billion value per year
- ~0.7 percent annual productivity growth



## Europe public sector administration

- €250 billion value per year
- ~0.5 percent annual productivity growth



## Global personal location data

- \$100 billion+ revenue for service providers
- Up to \$700 billion value to end users



## US retail

- 60+% increase in net margin possible
- 0.5–1.0 percent annual productivity growth



## Manufacturing

- Up to 50 percent decrease in product development, assembly costs
- Up to 7 percent reduction in working capital

SOURCE: McKinsey Global Institute analysis

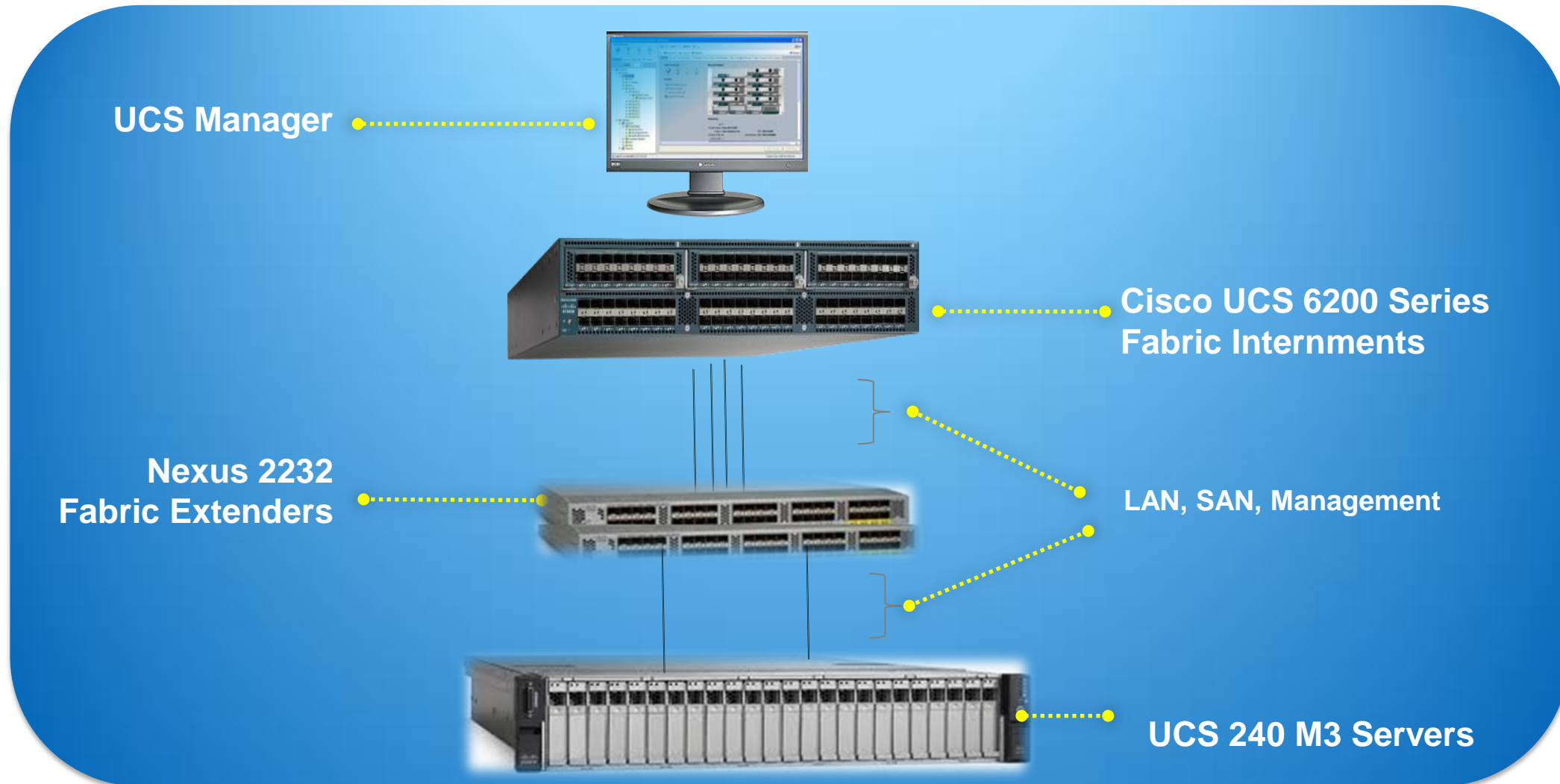
# Big Data and Cisco

- Major role in the Internet revolution. Global leader in networking
- Complete Big Data platform portfolio with UCS
- Areas of focus: Massive scale-out solutions including NoSQL and Hadoop
- Exclusive partnership: Cisco UCS + Oracle NoSQL Database. Joint lab. Massive scale-testing
- Differentiation: Seamless management integration and data integration capability with UCS Oracle infrastructure



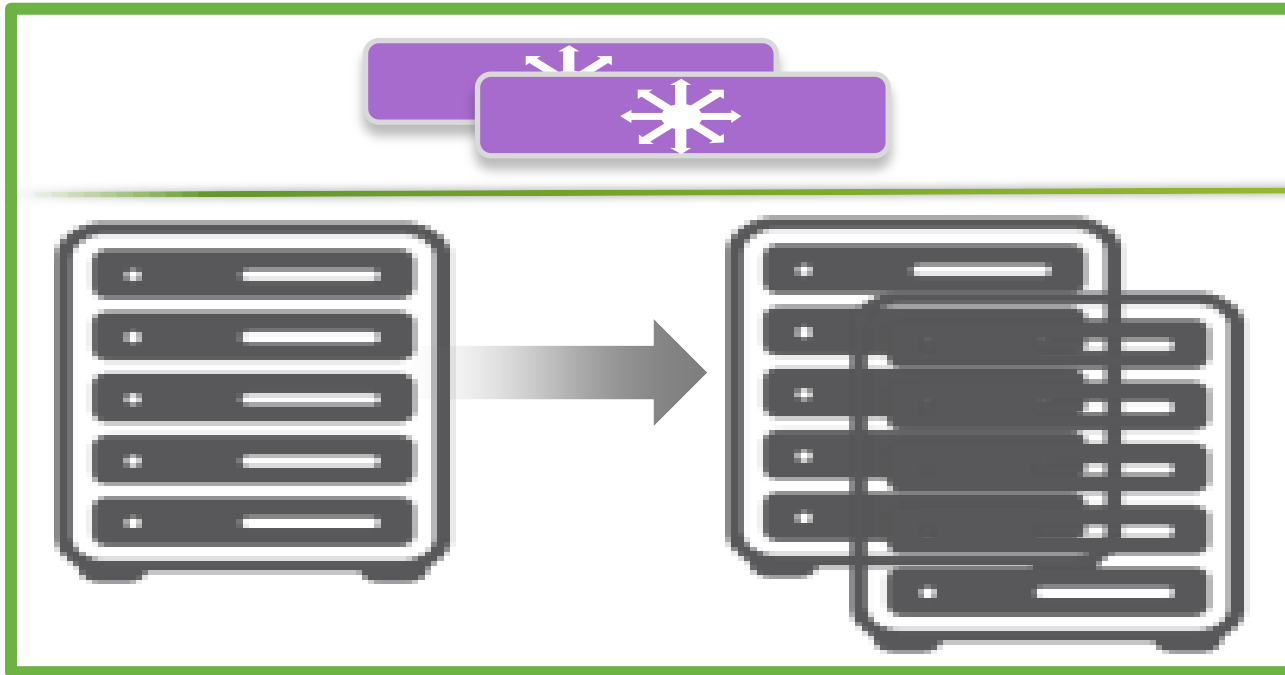
# Cisco UCS Big Data Common Platform (CPA)

## *Building Blocks*



# Cisco UCS Big Data Common Platform (CPA)

## *Ideal Platform for Oracle NoSQL Database*



UCS Fabric Interconnects provide Common Management Plane for Scale-out

UCS C-Series Rack servers with Internal Storage provide the Compute Nodes

**Cisco Big Data Common Platform (CPA)** is a highly scalable architecture designed to meet variety of scale-out application demands. Supports 160 servers in a single management domain and up to 10,000 server using UCS Central across data centers.

### Business Benefits

- **Operational Simplification:** Simplified & policy-based management to manage the cluster
- **Modular Solution:** With modular framework, infrastructure and expansion modules simplify deployment
- **Risk-reduction:** Pre-validation, sizing and performance optimization reduces integration and deployment risk
- **Lower TCO:** With reduced managed switch nodes in scale-out solutions

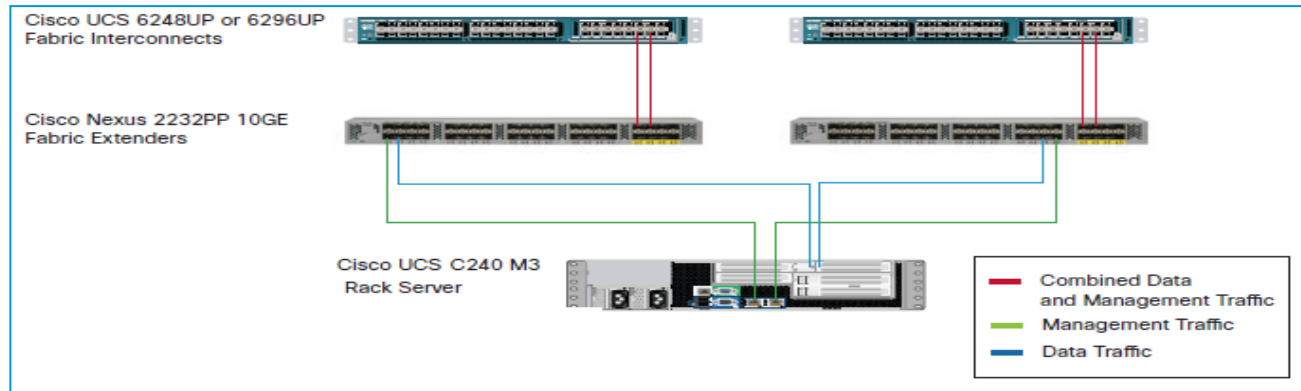
### Architectural Benefits

- **Scalability:** Modular building block, scalable up to 2560 processor cores and 7.2 PB in single management domain
- **Performance:** Best in class performance of compute and network for massively scale-out applications
- **Management & Monitoring:** Unified management across cluster (up to 10000 nodes)



# Cisco UCS Big Data Common Platform (CPA)

## Reference Configurations for Oracle NoSQL Database



- 2 Intel Xeon Processors E5 Family
- Cisco UCS VIC 1225 (2x 10 Gbps)
- Embedded Cisco IMC (2x 1 Gbps)
- LSI MegaRAID SAS 9226CV-8i Card
- 4 Integrated Gigabit Ethernet Ports
- Red Hat Enterprise Linux Server Standard
- Redundant Hot-Swappable Power Supplies

High-Performance Configuration

- 256 GB Memory
- 24 SFF Disk Drive

High-Capacity Configuration

- 128 GB Memory
- 12 3-TB SAS 7200 RPM LFF Disk Drives



6200 Series FIs  
and  
2232 Series FEX

16 x C240 M3 Servers

256 Processor Cores  
4 TB Memory (Up to 12 TB Supported)

15K SAS : 113 TB  
10K SAS: : 338 TB  
7.2K SATA : 384 TB

Flash : 20 TB

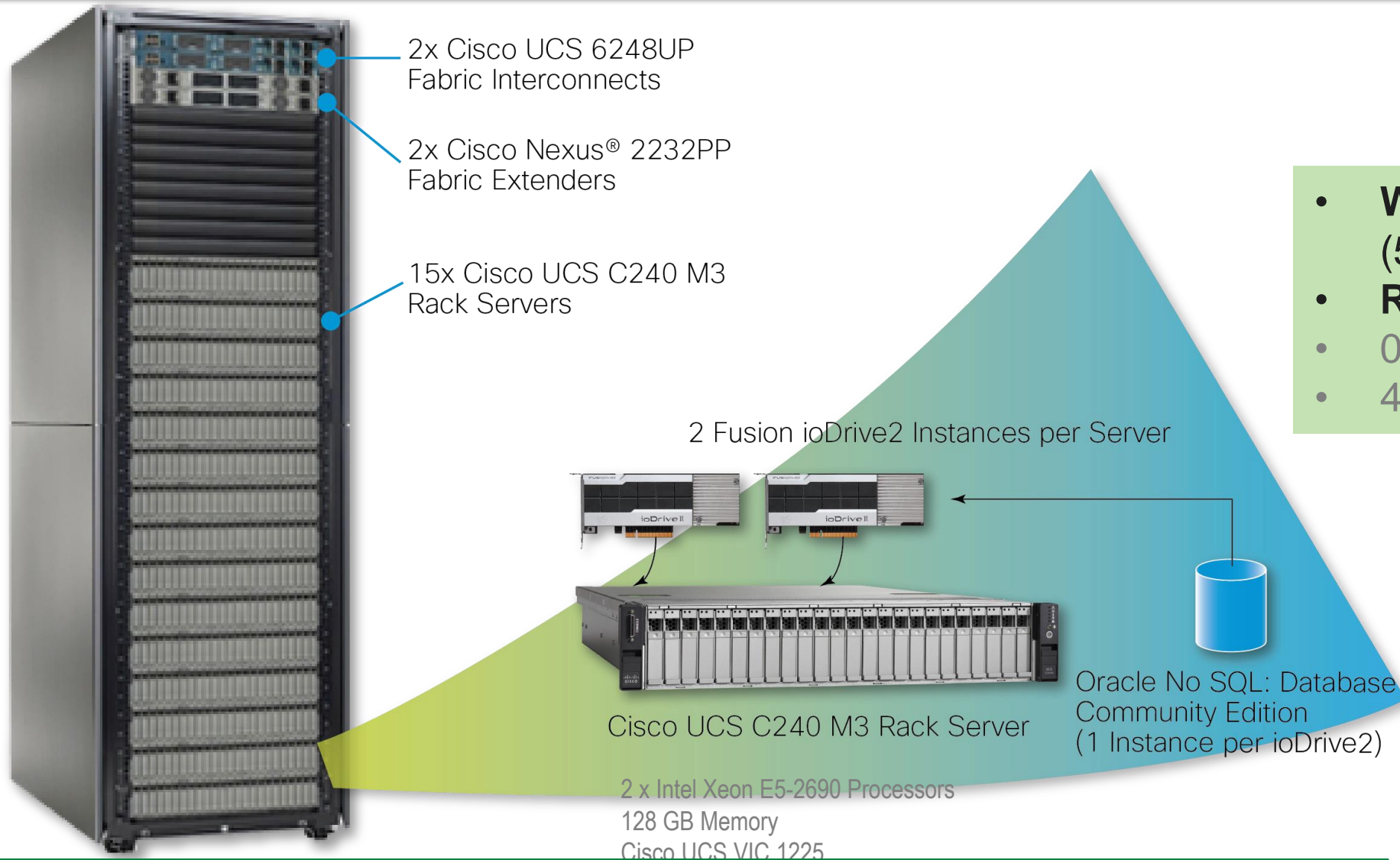
160 Servers in a single UCS Management domain  
10,000 Servers with UCS Central

# Breaking the Million OPS/Sec Barrier

Using Yahoo! Cloud Serving Benchmark (YCSB)



## Cisco Big Data Common Platform (CPA) Rack, Enhanced with Flash



- **Workload:** YCSB Mixed workload (5% updates/95% reads)
- **Result: 1,244,550 OPS/Sec**
- 0.88 ms Read Latency
- 4.47 ms Update Latency

**Cisco Big Data Common Platform (CPA)** is a highly scalable architecture designed to meet variety of scale-out application demands

# A Perfect Match: Important Solution Differentiators

## Oracle NoSQL Database

## Cisco UCS

Simple data model

Radically simplified architecture

Easy to scale

Modular scalability

Predictive performance

High performance

High availability

Fully redundant architecture

Integration with UCS Oracle Database Infrastructure

Enterprise-class service and support

# More Information – Thanks for Watching!

## Oracle on Cisco UCS

[www.cisco.com/go/oracle](http://www.cisco.com/go/oracle)

## Oracle NoSQL Database

[www.oracle.com/us/products/database/nosql](http://www.oracle.com/us/products/database/nosql)

Cisco UCS Ecosystem for Oracle:

Extend Support to Big Data and Oracle NoSQL Database

[www.cisco.com/en/US/solutions/collateral/ns340/ns517/ns224/ns944/le\\_34301\\_wp.PDF](http://www.cisco.com/en/US/solutions/collateral/ns340/ns517/ns224/ns944/le_34301_wp.PDF)



Thank you.

