



Extreme Performance with Sun Oracle DB Machine

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Sun Oracle Database Machine / Exadata

The Extreme ROI Platform

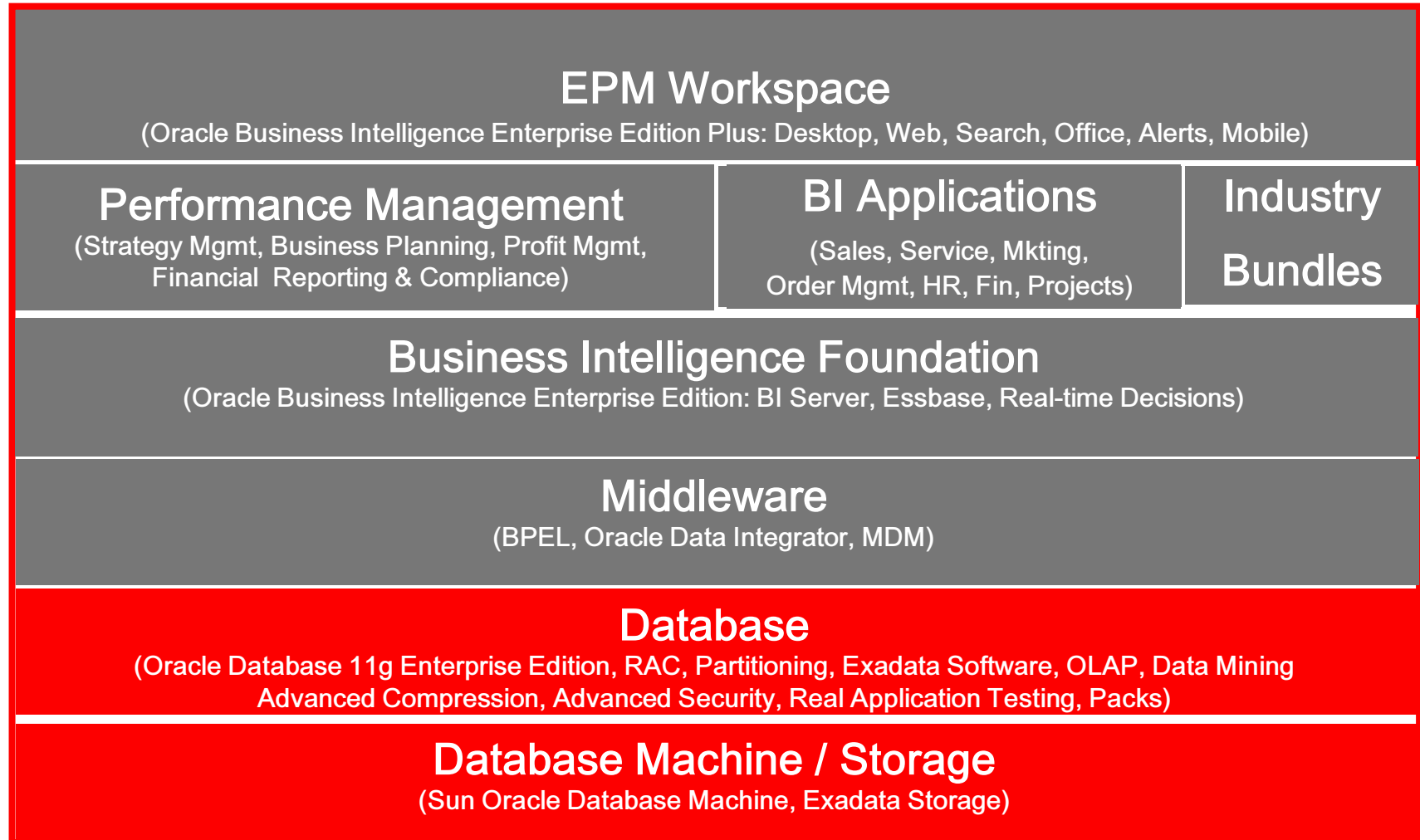
- Fast Predictable Performance
- Lower Ongoing Costs
- The Fastest Time to Value & Lowest Risk





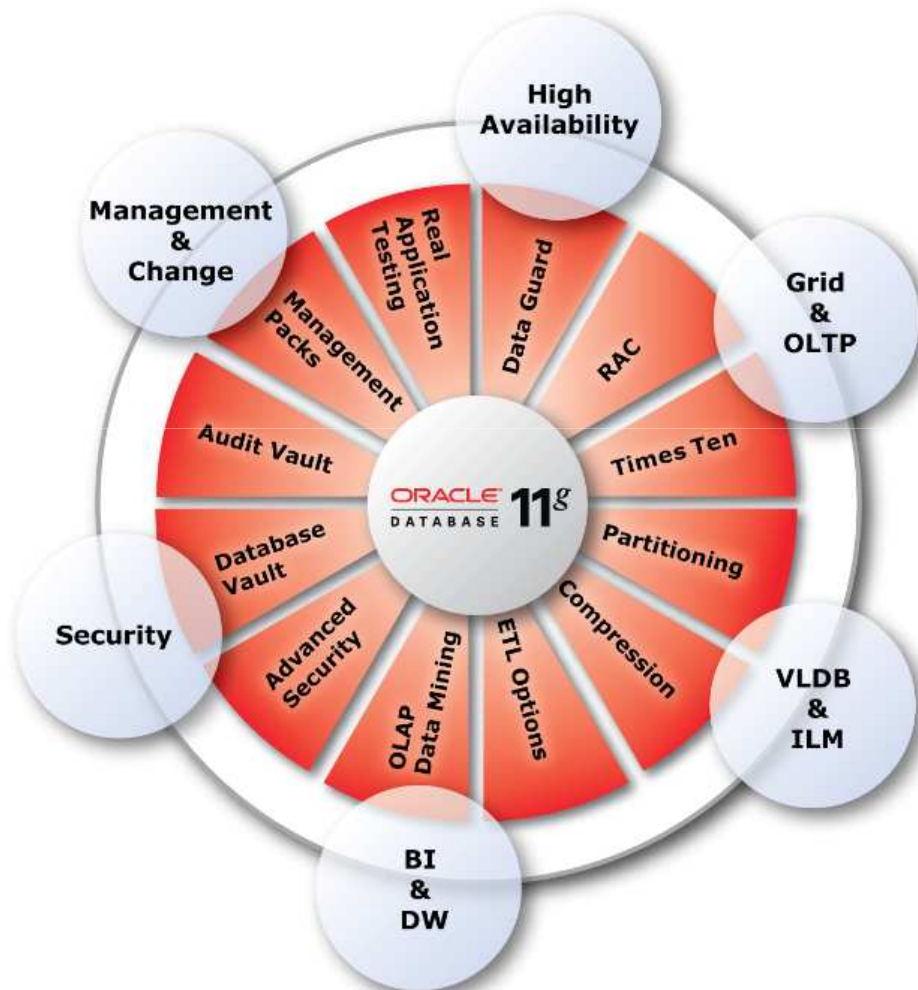
Oracle Data Warehouse components

Complete, Open, Integrated, Best-of-Breed



Oracle Database 11g

The Leading Database for Data Warehousing



• Key Data Warehousing Capabilities

- Embedded Analytics
- Single Point of Management
- Secure
- 24X7 Availability
- Optimal Storage Management
- Scale to hundreds of Terabytes & large analyst communities
- Flexible Model Deployment

Sun Oracle Database Machine

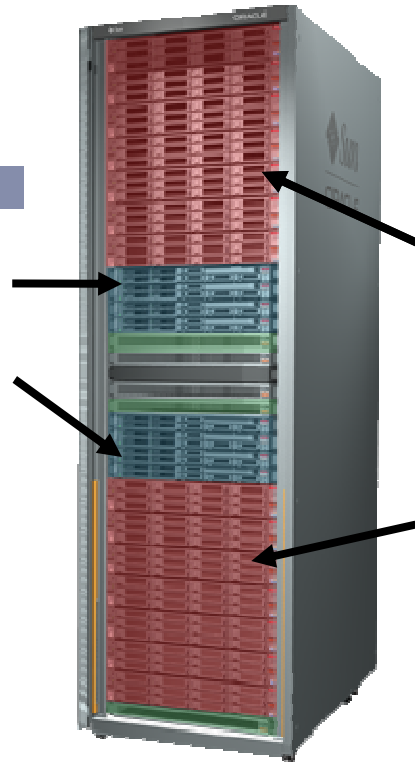
Highest performance, lowest cost, redundant, incrementally scalable

RAC Database Server Grid

- 8 High-performance low-cost computer servers
- 2 Intel quad-core Xeons each

InfiniBand Network

- 40 Gb/sec fault-tolerant unified server and storage network



Exadata Storage Server Grid

- 14 High-performance low-cost storage servers
- 100 TB raw SAS disk storage
or
336 TB raw SATA disk storage
- 5TB flash storage!

ORACLE

1st and only complete grid architecture for all data management needs

Sun Oracle Database Machine

Extreme Performance!

Oracle DB Server Grid

- Millions of transactions / second
- Tens of millions of queries / minute
- Billions of rows / minute

InfiniBand Network

- 880 Gb/sec aggregate throughput



Exadata Storage Server Grid

- 21 GBs disk bandwidth
- 50 GBs flash memory bandwidth
- 1 million I/Os per second

Deployments drastically simplified



Months to
days

- Database Machine eliminates the complexity of deployment
 - Months of Configuration, troubleshooting, tuning
- Database Machine ready from day one
 - Pre-built, Tested, Standard, Supported Configuration
 - **Executes applications without any changes**
- Extreme Performance *out of the box*

Start Small and Grow



$\frac{1}{4}$ Rack

$\frac{1}{2}$ Rack

1 Rack

The Architecture of the Future

Massively Parallel Grid

The Best for DW
The Best for OLTP
The Best for Consolidation





THE BEST FOR DW

The Best Machine for Data Warehouse



OLAP



ETL



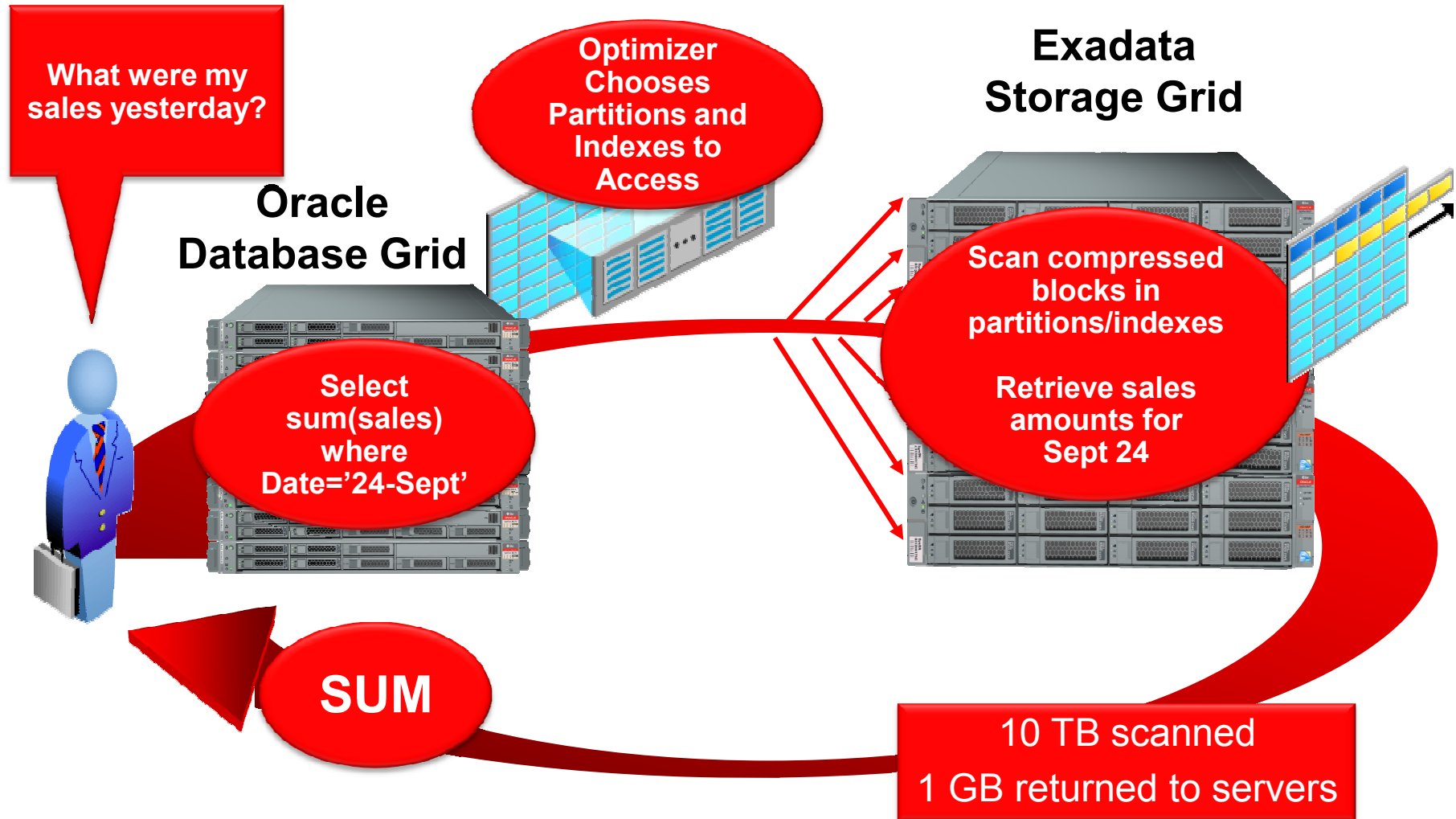
Data Mining



- Massively Parallel Hardware
 - Processes great quantities of data
 - Exadata processes data at the storage system
- More Complete Analytical Capacity
 - OLAP, Statistics, Spatial, Data Mining, Real-time transactional ETL, Efficient point queries
- Specific Optimizations for DW
 - Flexible Partitioning, Bitmap Indexing, Join indexing, Materialized Views, Result Cache
- **New Capacities for DW**

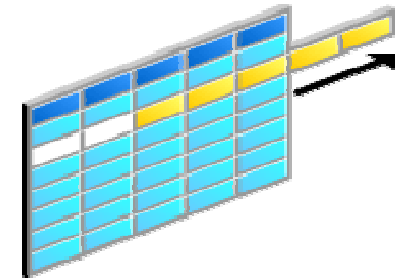
Exadata Storage

Smart Scan



Exadata Database Processing in Storage

- Exadata cells process data in an intelligent manner
 - *Row filtering with “where” clause*
 - *Column filtering*
 - *Join filtering*
 - *Incremental backup filtering*
 - *Storage Indexing*
 - *Scans on encrypted data*
 - *Data Mining model scoring*
- 10x less data sent to the DDBB servers
- Transparent



Exadata Storage Index

11gR2

Transparent I/O Elimination with No Overhead

Tabla

Idx

A	B	C	D
	1		
	3		
	5		
	5		
	8		
	3		

Min B=1
Max B=5

Min B=3
Max B=8

- Keeps in memory range of values
 - Stores the MIN and MAX of columns
 - Normally one entry in the index / MB of disk
- Automatic and transparent
- Reduces I/Os
 - Is it the same “where” clause?

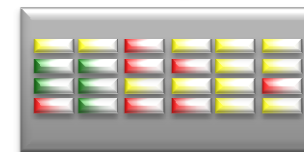
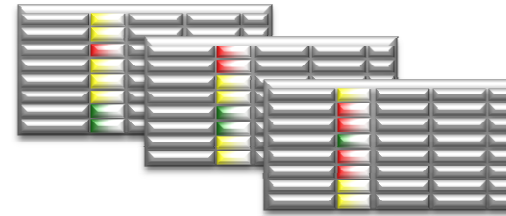
Select * from Table where B<2

Exadata software

Hybrid Columnar Compression

11gR2

- Data **stored by columns** and then compressed
- **Query Mode** for DW
 - Optimized for speed
 - **10X** Compression ratio
 - Improved Scans
- **Archival Mode** to access unfrequent data
 - Optimized to reduce space
 - **15X** Compression ratio (up to 50X)



Up to
50x!



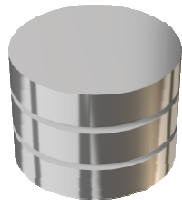
THE BEST FOR OLTP

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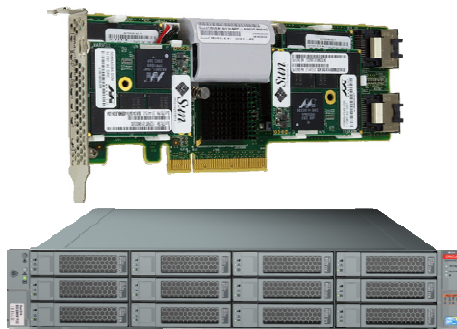
Exadata Storage Server

Eliminates bottlenecks for Random I/O

300 iops



10's of thousands iops



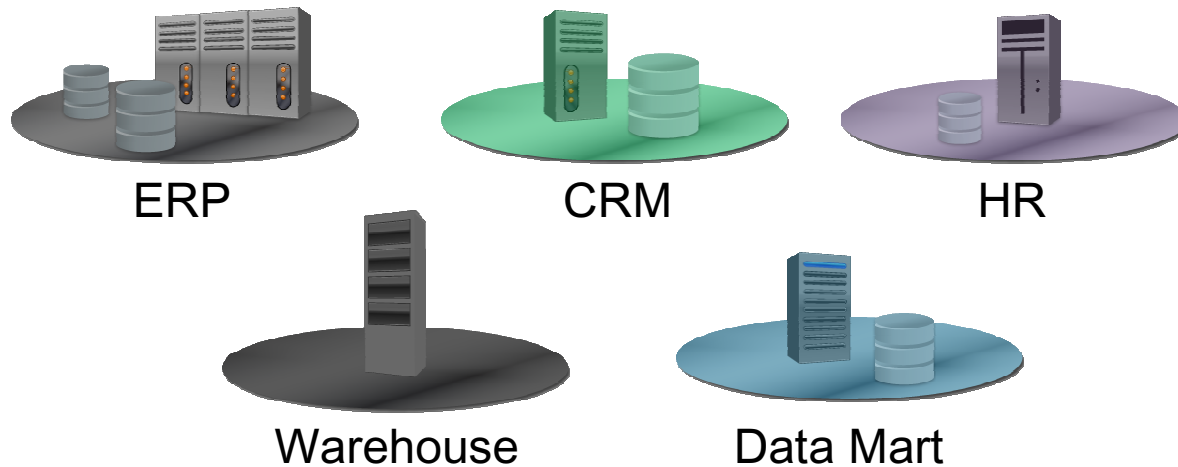
- Disks
 - Great quantity of data ↑
 - Physical limit on iops
 - Cheaper
- Memory Flash Technology
 - Hosts less data
 - 10 of thousands iops ↑
 - + expensive
- Ideal Solution
 - Only hot data on flash memory ↑
 - Transparent
 - Flash Cards
 - High bandwidth
 - Low latency
 - Avoids disk controller limitations



THE BEST FOR CONSOLIDATION

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DDBB Consolidation



- Consolidate on the Database Machine
 - High Performance for all Applications
 - Low Cost HW for all Applications
 - Predictable Response time on a shared environment
 - Centralized management
 - Complete, Integrated, Open



CONCLUSION



Sun Oracle Database Machine Focuses on Optimizing Mixed Workloads

- *“Consider this platform as a consolidation strategy for multiple TP applications and for improving performance by consolidating TP and DW on a single RAC system”.*
- *“Nevertheless, it’s prebuilt, tested and configured appliances can speed up deployment and will enable users to receive service from a single source.*

Gartner, 23-Sep-09

Lower Costs vs Conventional Hardware

Database Machine

\$1,150,000



- Better Performance
 - 6x Less Cost
 - 3x Less Power
 - 5x Less Space

High End SMP

High End Storage Array



\$7,700,000



Exadata Customers



“A query that used to take **24 hours** now runs in **less than 30 minutes**. The Oracle Database Machine beats competing solutions on **bandwidth, load rate, disk capacity, and transparency.**”

Christian Maar, CIO



“**Every query was faster** on Exadata compared to our current systems. The smallest performance improvement was **10x** and the biggest one was an incredible **72x.**”

Simeon Dimitrov, Enterprise Resources Manager



“Call Data Record queries that used to run for **over 30 minutes** now complete in **under 1 minute**. **That's extreme performance.**”

Grant Salmon, CEO, LGR Telecommunications



Thank you!

ORACLE **11^g** **Consolidate. Compress. Control.**
DATABASE **Announcing Oracle Database 11g Release 2**

The banner features a grid pattern with a red and white pixelated graphic on the right side.