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**Lowering your IT Costs
with Oracle Database 11g Release 2**

Michał Jerzy Kostrzewa

Central and Southern Eastern Europe Director Database Technologies



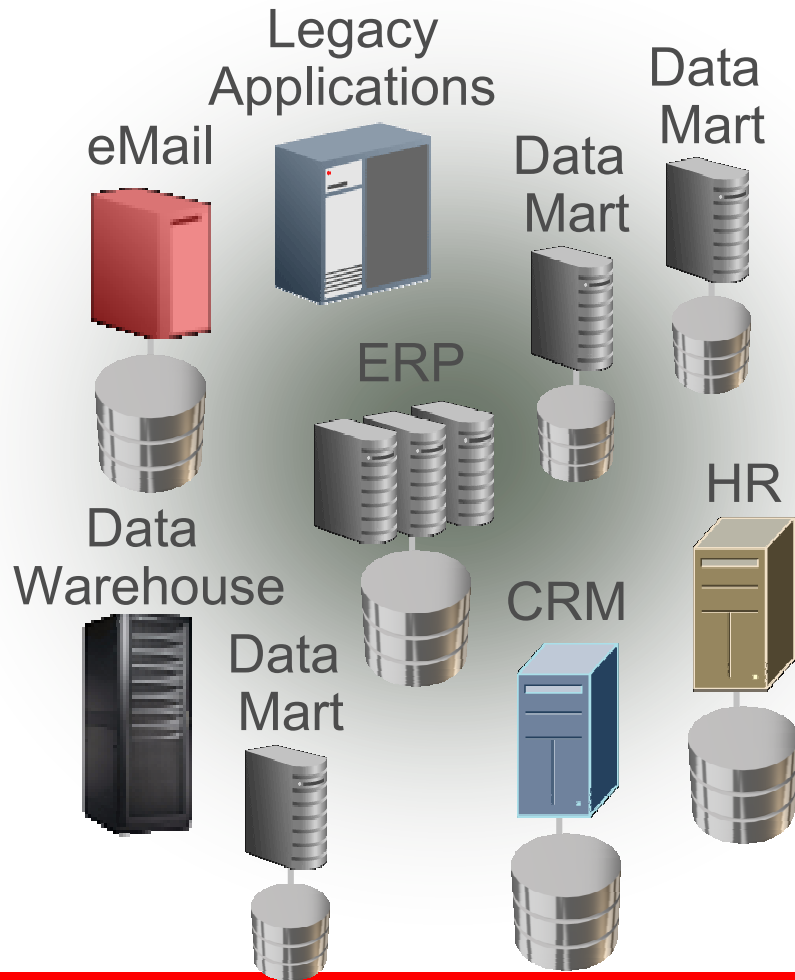
Oracle Database 11g Release 2

Specific Areas of Cost Reduction

- Reduce hardware capital costs by factor of 5x
- Improve performance by at least 10x
- Reduce storage costs by factor of 10x
- Eliminate downtime AND unused redundancy
- Raise DBA productivity by at least 2x

Reduce hardware costs by 5x

Is This Your Data Center?

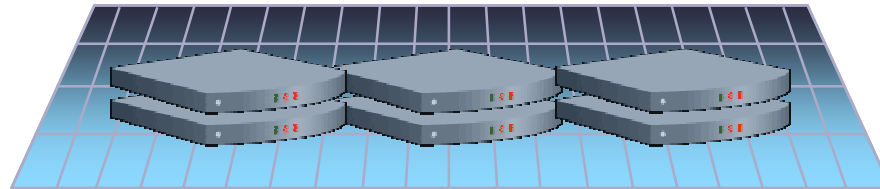


- Lots of servers
- Separate storage silos
- Multiple vendors products
- Different operating systems

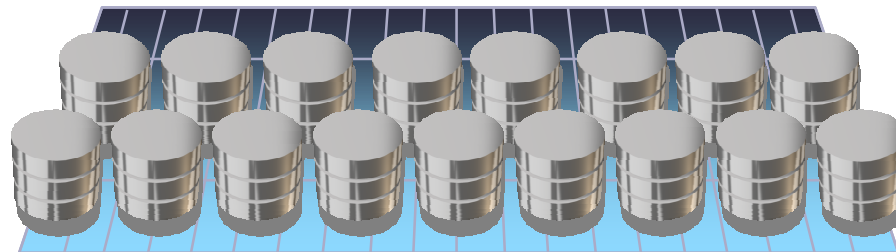
Consolidate onto the Grid

Using low-cost server and storage grids

In-Memory Database Cache



Real Application Clusters



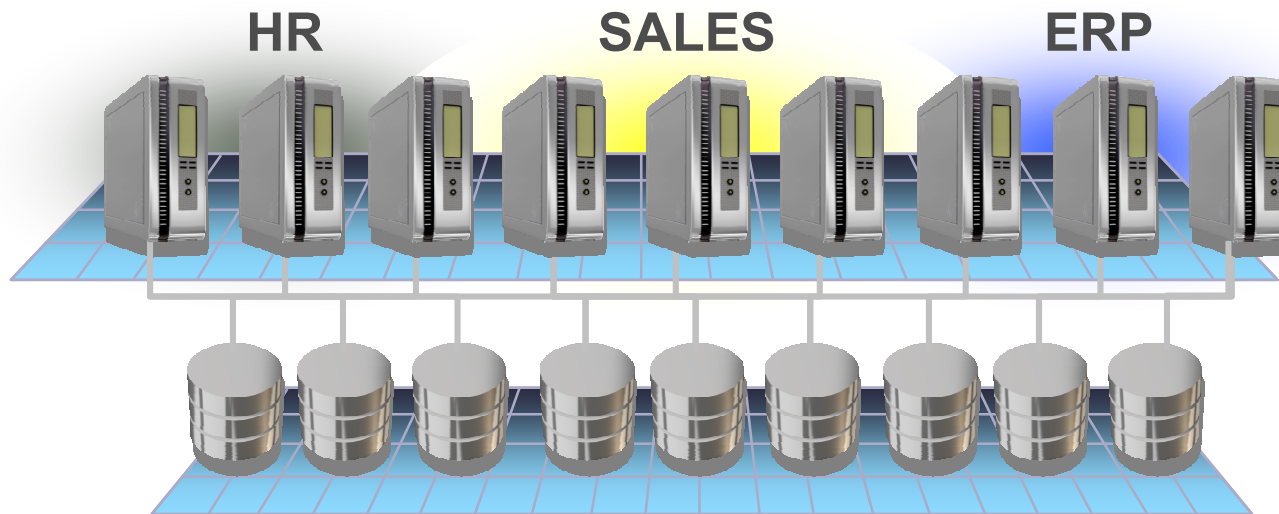
Automatic Storage Management



Enterprise Manager

Real Application Clusters

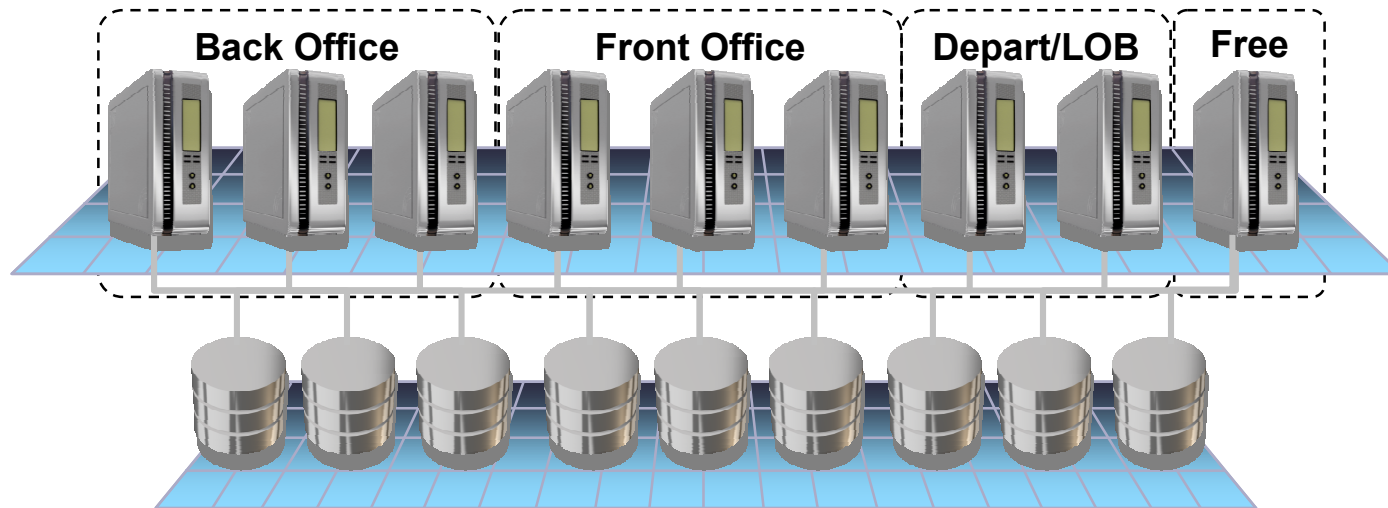
Virtualize low cost servers into a shared resource



- Run all databases for all applications on shared platform
- Highly available and scalable
- Adapts to changes in workloads

Oracle Database 11g Release 2

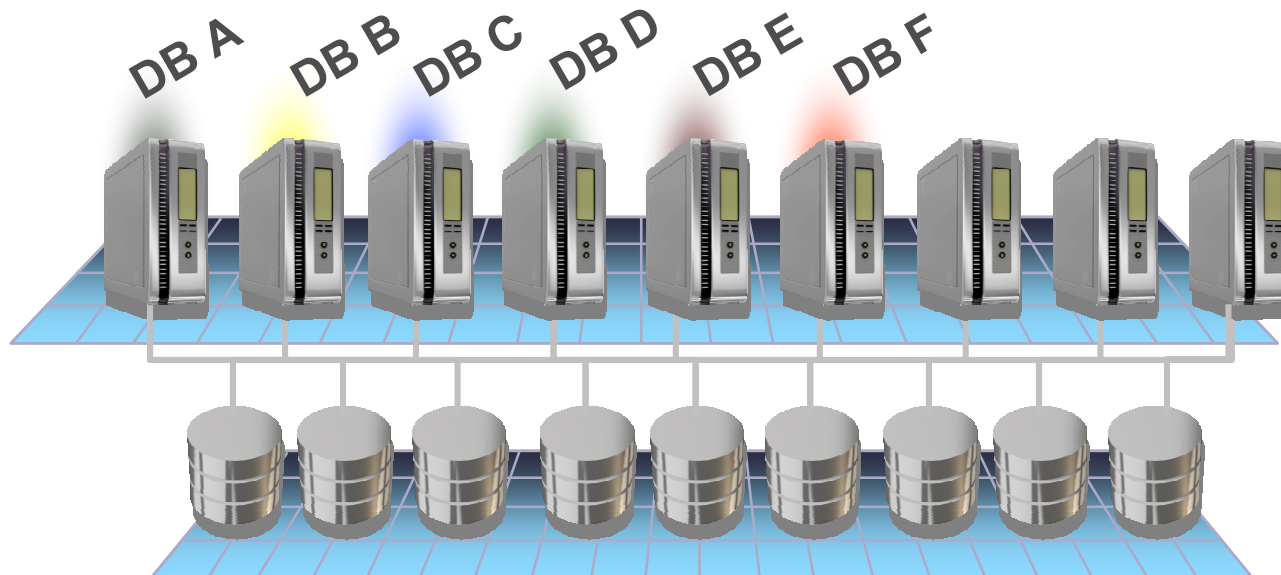
Dynamic Cluster Partitioning via Server Pools




- Dynamically assigns servers to run groups of related workload
- Allocation is Policy Managed – Min/Max, Relative Importance
- Unassigned Servers go to Free Pool
- Cluster reconfigures if a pool falls below its minimums

RAC One Node

New option for mass consolidation



- Low entry cost to grid consolidation
- Automated failover within Grid
- Rolling patches
- Online upgrade to multi-node RAC instances



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Sun Oracle Database Machine

Get on the Grid Faster - OLTP & Data Warehousing



Oracle Database Server Grid

- 8 Database Servers
 - 64 Cores, 400 GB DRAM

Exadata Storage Server Grid

- 14 Storage Servers
 - 5TB Smart Flash Cache
 - 336 TB raw Disk Storage

Unified Server/Storage Network

- 40 Gb/sec Infiniband Links
 - 880 Gb/sec Aggregate Throughput

Completely Fault Tolerant

3x database compression for OLTP

- Compressed 1.2 TB db in DRAM
- Compressed 15 TB db in Flash Cache



Start Small and Grow



Basic System

Quarter Rack

Half Rack

Full Rack



Data Warehousing Optimizations

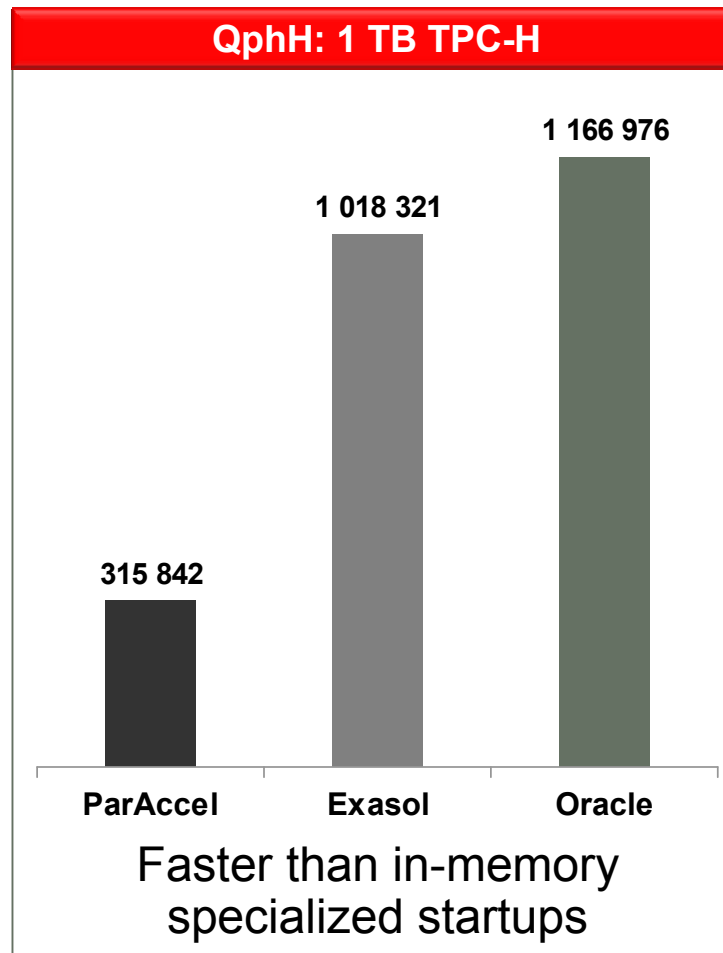
Work smarter not harder ...

Key Features	Oracle Database 11g
Partitioning	✓
Parallel Operations	✓
Optimized Indexing	✓
Materialized Views	✓
OLAP Cubes	✓
Data Mining	✓
Query Results Cache	✓
ETL & Data Quality	✓

Oracle Database 11g Release 2

In-Memory Parallel Execution

- Clustered commodity servers
 - large amounts of memory
- Compress more data in memory
- Intelligent algorithm
 - Places table fragments in memory on different nodes
- Reduces need for disk I/O
 - Speeds query execution



World's Fastest Data Warehouse Machine



“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



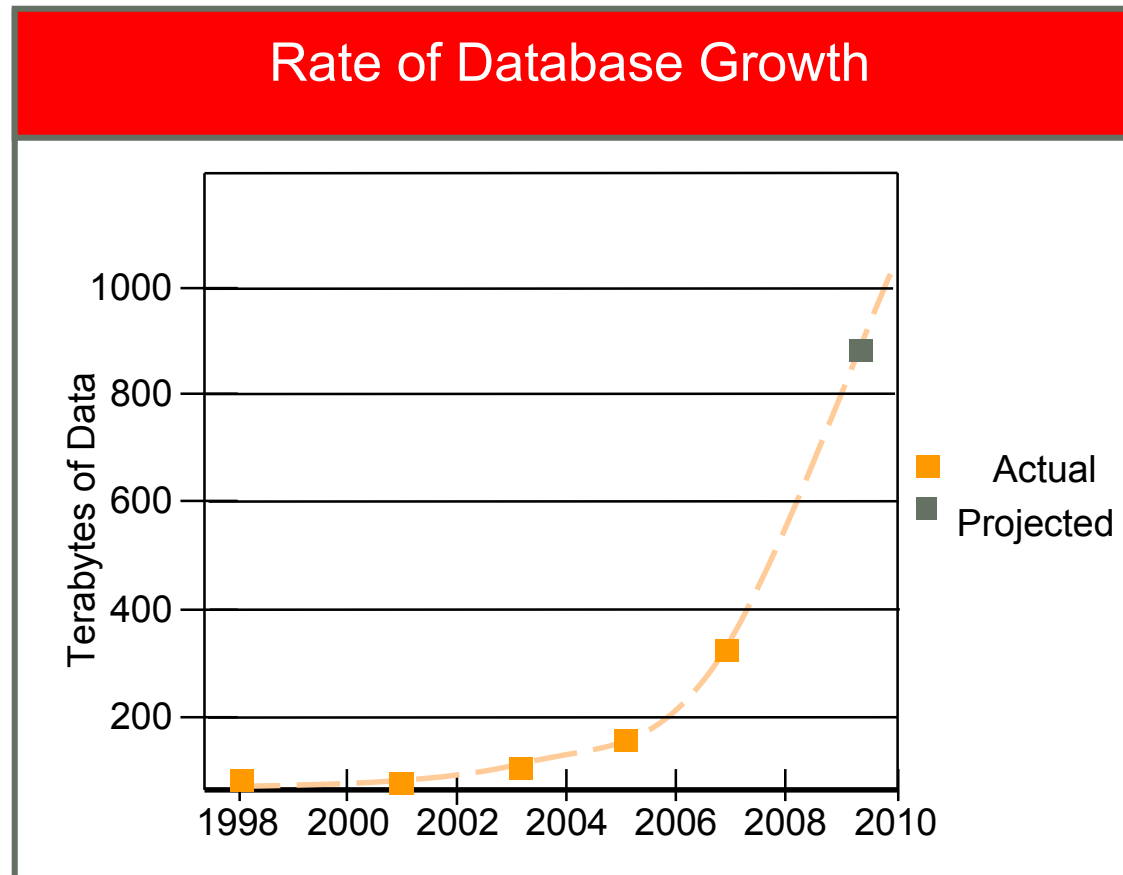
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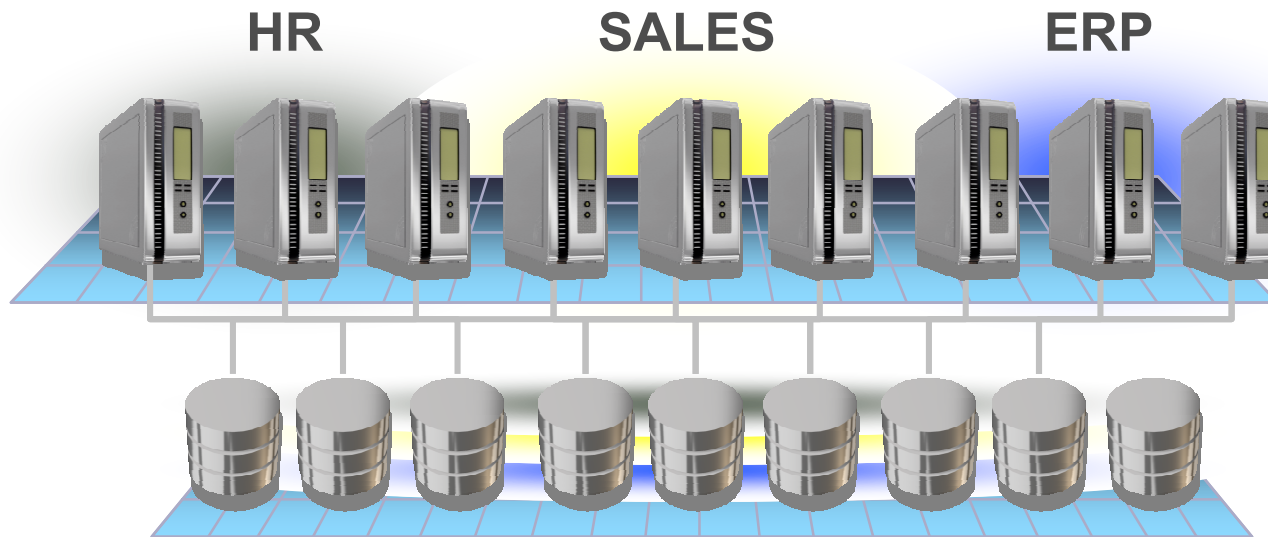
Reduce storage costs by factor of 10x

Data growth continues to outpace budget growth



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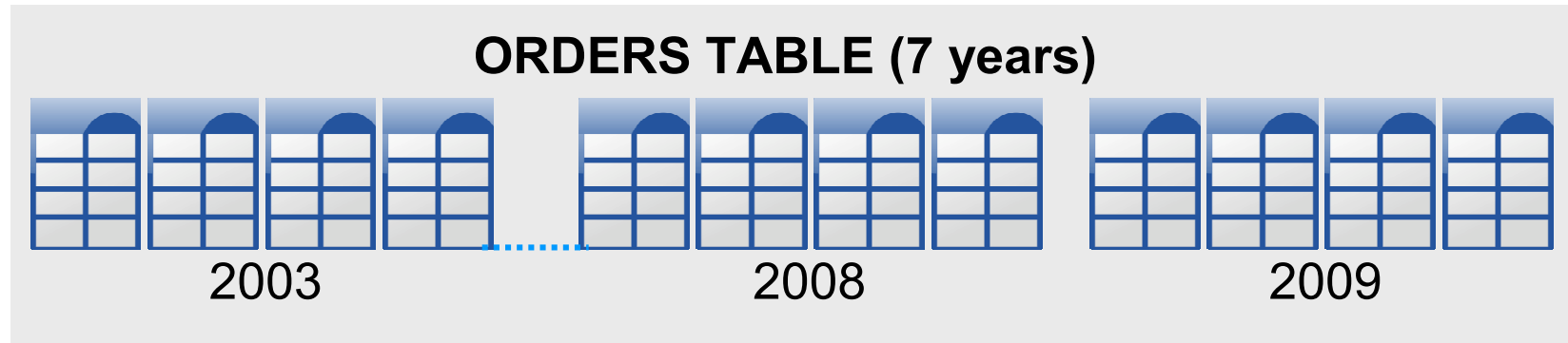
Reduce storage costs by factor of 10x



- Automatic Storage Management - Virtualize and share storage resources
 - Advanced data striping for maximum I/O performance
 - Online addition and migration of storage
- 11g R2
 - General purpose clustered or local file system
 - Optimized disk layout, online rebalance, mirroring
 - Dynamic volume management, read-only snapshots

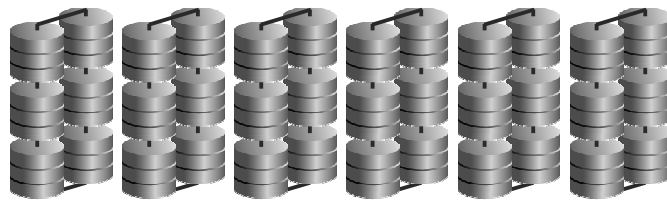
Manage Data Growth

Partition for performance, management and cost



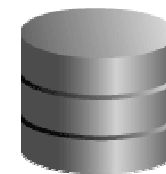
95% Less Active

5% Active



Low End Storage Tier

2-3x less per terabyte



High End Storage Tier

Significantly Reduce Storage Usage

Advanced OLTP Compression



- Compress large application tables
 - Transaction processing, data warehousing
- Compress all data types
 - Structured and unstructured data types
- Improve query performance
 - Cascade storage savings throughout data center

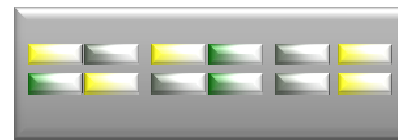
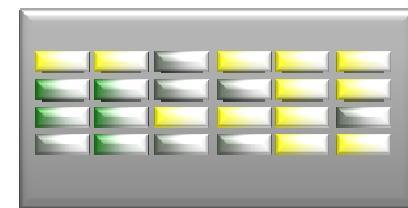
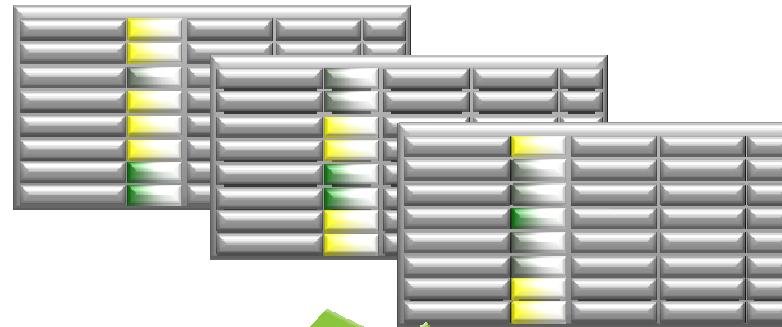


Up To
4X
Compression

Sun Oracle Exadata Storage Server

Hybrid Columnar Compression

- Data stored by column and then compressed
 - Useful for data that is bulk loaded or moved
- **Query mode** for data warehousing
 - Typical 10X compression ratios
 - Scans improve accordingly
- **Archival mode** for old data
 - Typical 15- 50X compression ratios




Up To
50X



Mike Prince
Chief Technology Officer
Burlington Coat Factory

“Our Chief Financial Officer likes the Advanced Compression option of Oracle Database 11g because with it we won't need two thirds of the disks we have right now.”



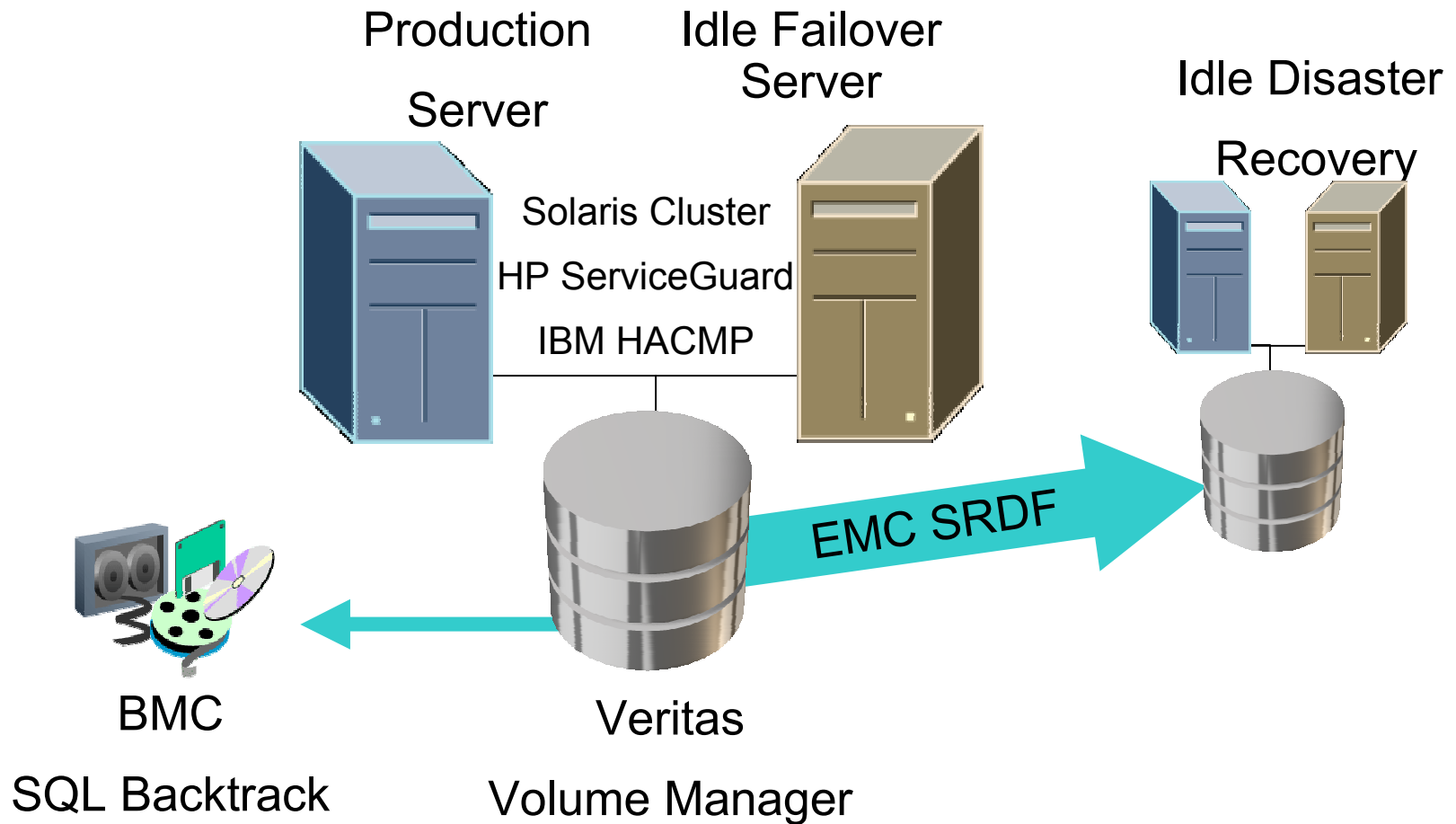
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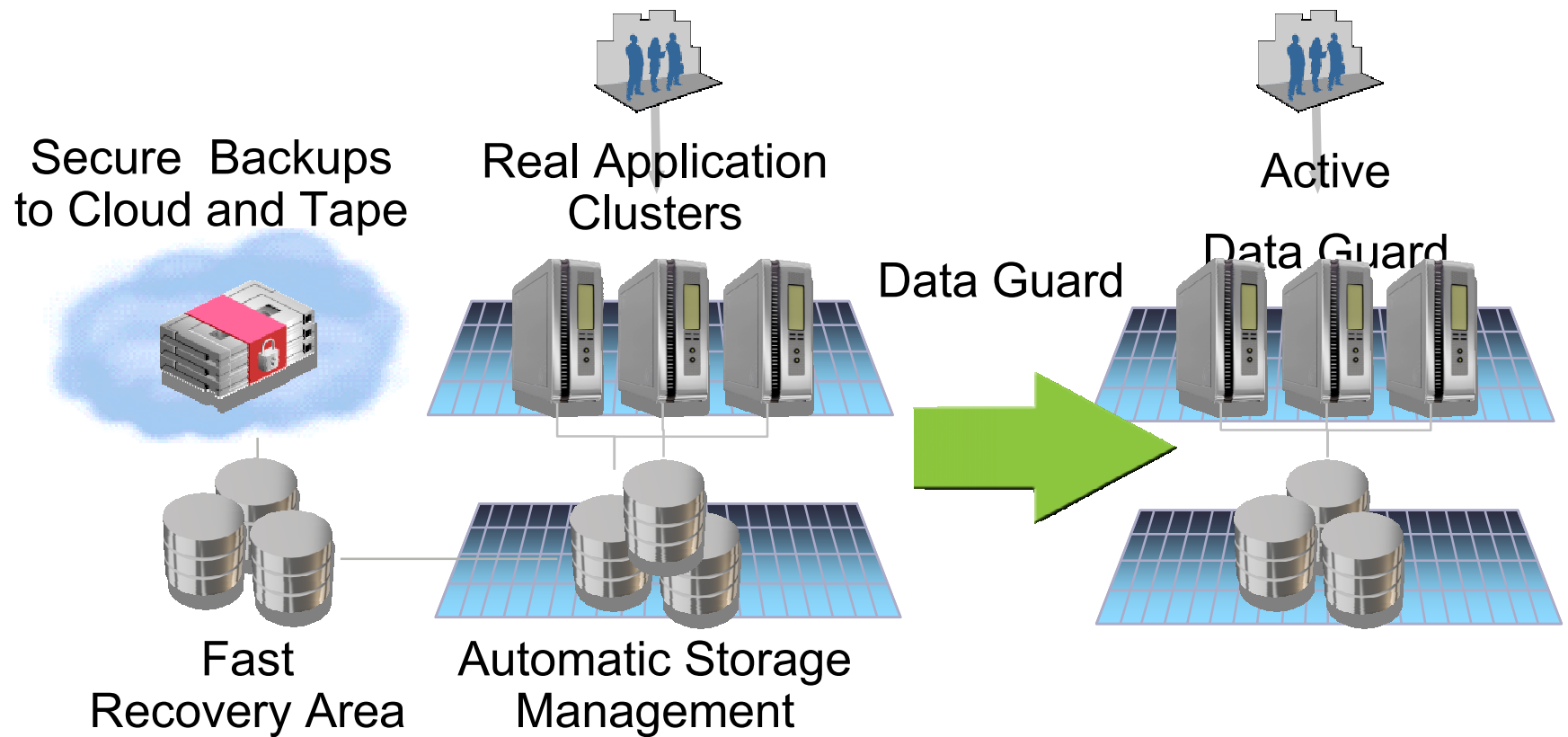
Traditional High Availability

Expensive, idle redundancy



Oracle Maximum Availability Architecture

Fully Utilizing Redundancy





Aris Prassinos

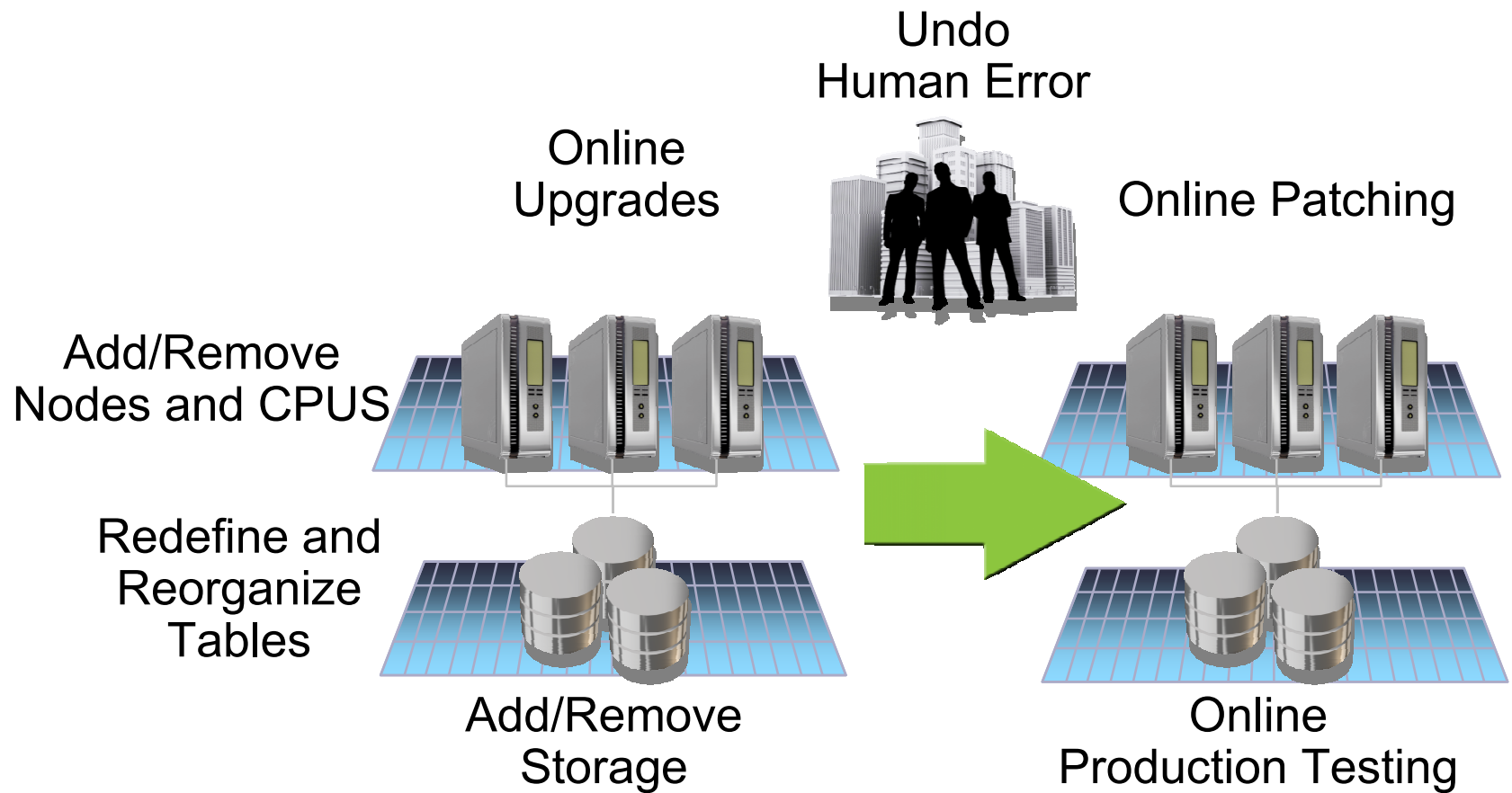
**Distinguished Member of
Technical Staff, MorphoTrak**

“Active Data Guard will enable us to reduce system costs by up to \$100,000 on our larger mission-critical systems”

“It’s simpler to use than disk mirroring or replication and it guarantees that service level agreements for reporting accuracy are met.”

Oracle Maximum Availability Architecture

Eliminate the cost of planned downtime



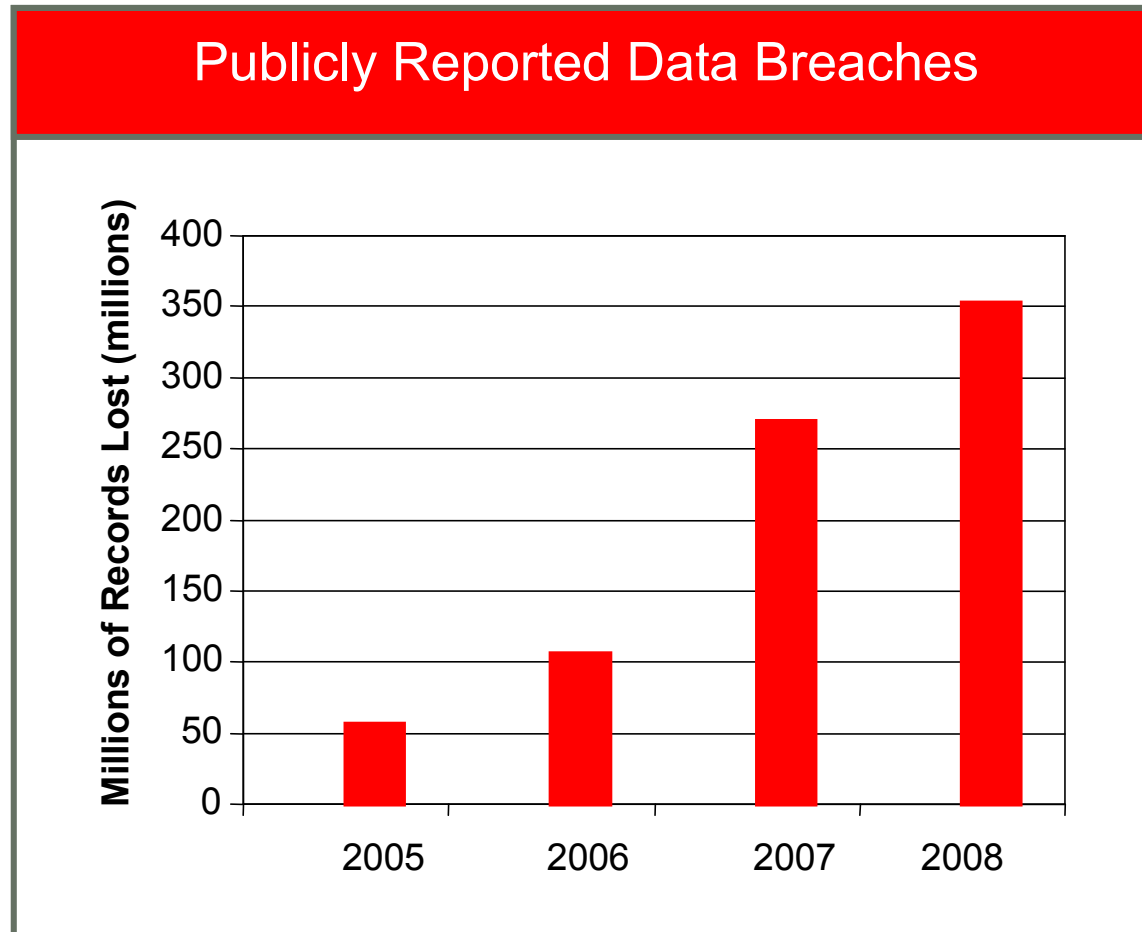


Online Application Upgrade

Edition-based redefinition

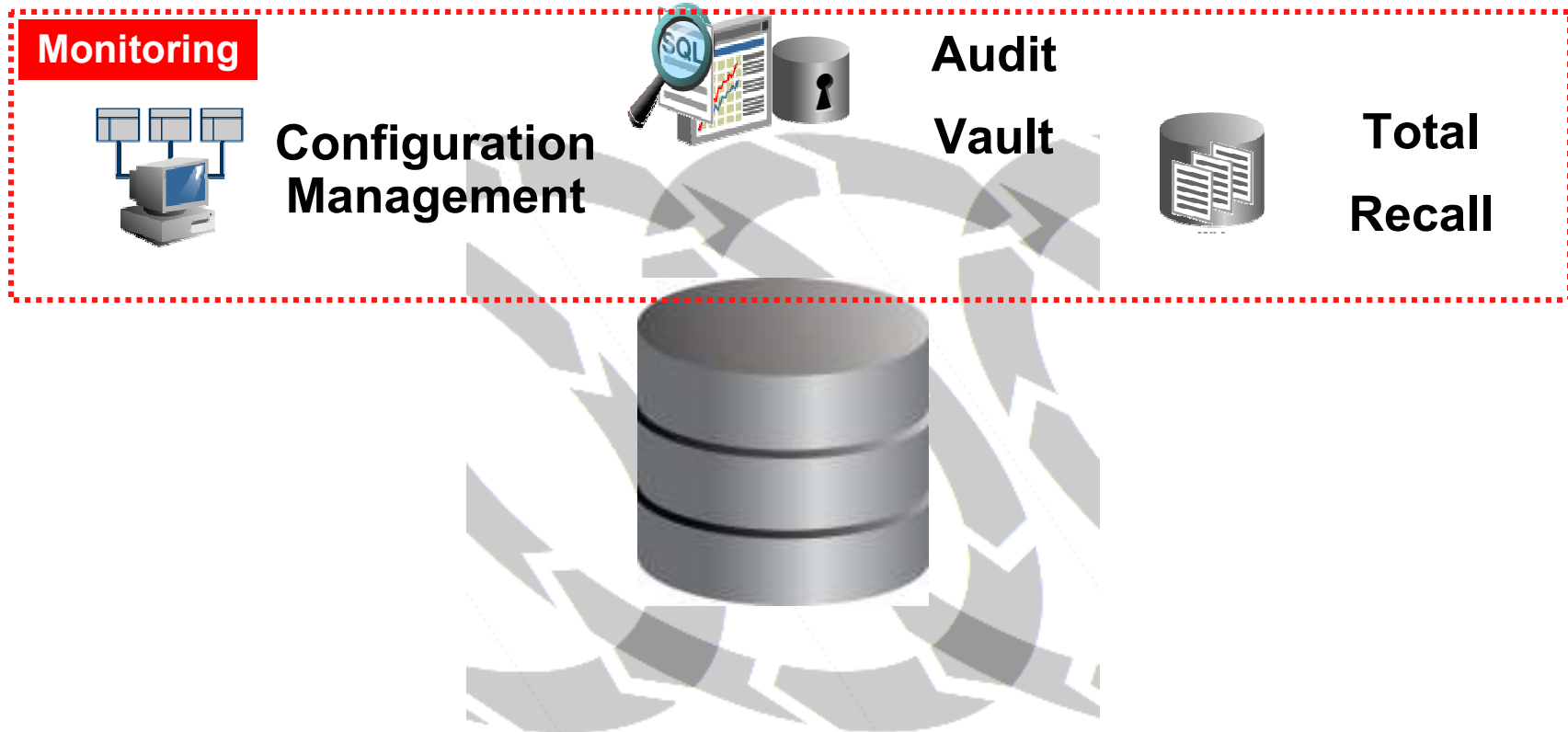
- Code changes are installed in the privacy of a new **edition**
- Data changes are made safely by writing only to new columns or new tables not seen by the old edition
- An **editioning view** exposes a different projection of a table into each edition to allow each to see just its own columns
- A **crossedition** trigger propagates data changes made by the old edition into the new edition's columns, or (in hot-rollover) vice-versa

How Secure is Your Data?



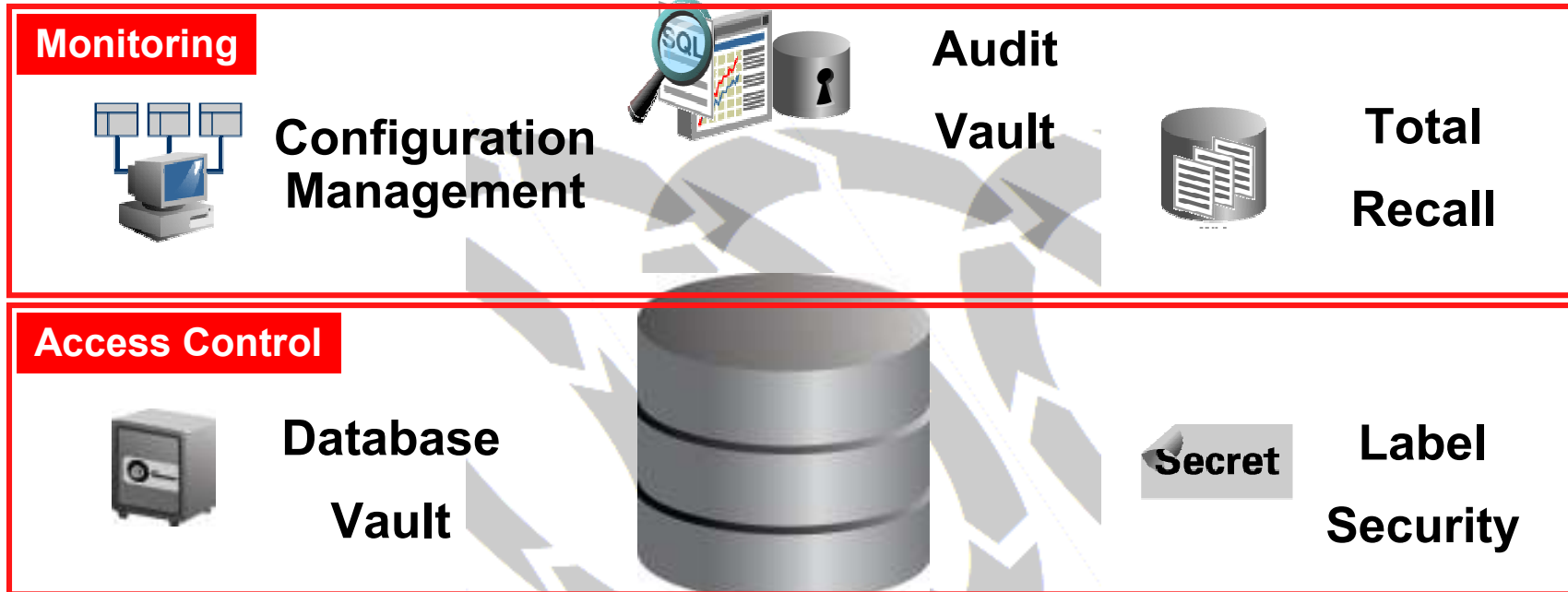
Oracle Database Security

Auditing and Configuration Scanning



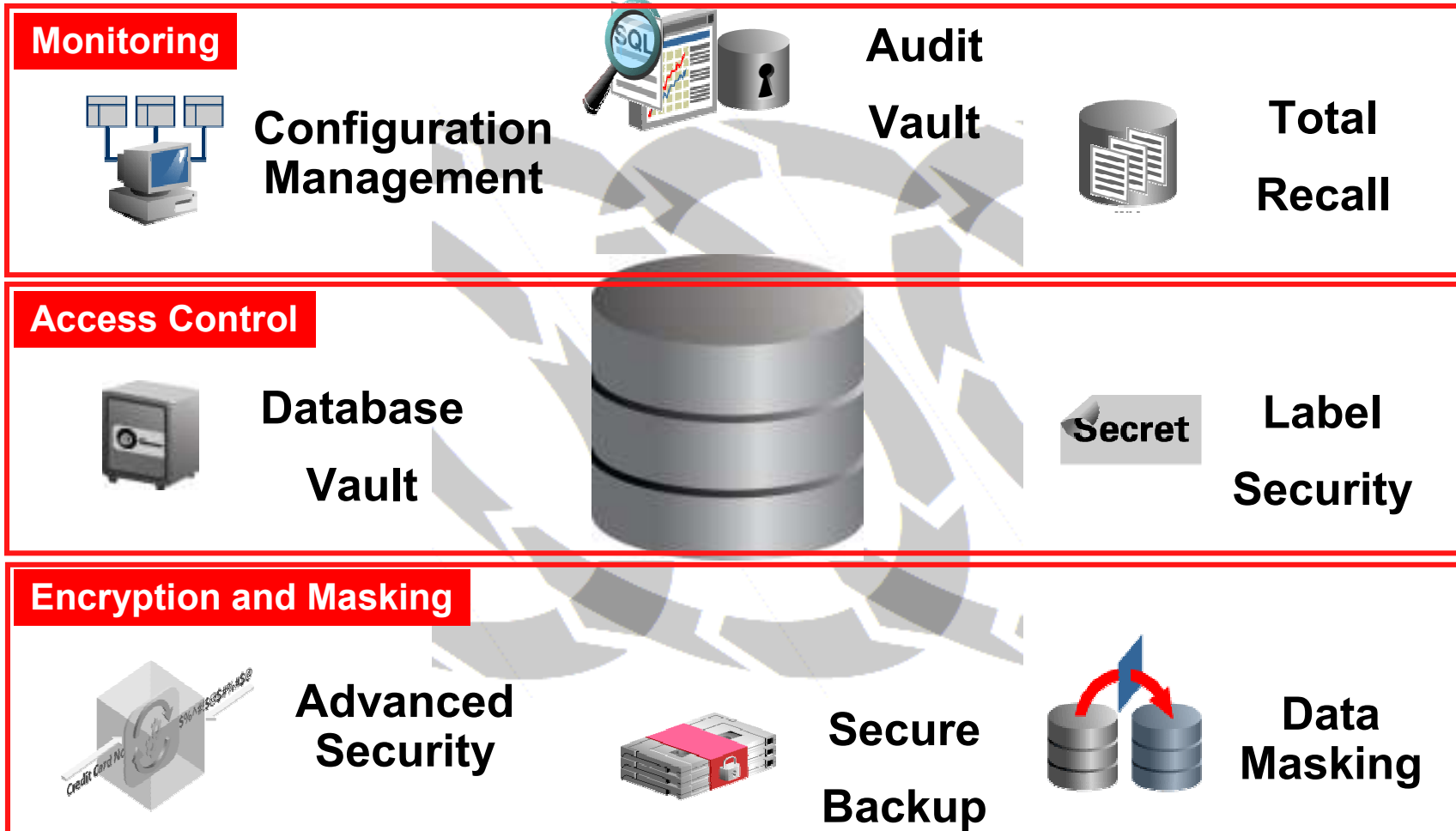
Oracle Database Security

Fine Grain Access Control



Oracle Database Security


Data encryption and masking



The logo for Dressbarn, featuring the word "dressbarn" in a dark green, lowercase, sans-serif font. The text is centered within a horizontal olive-green bar. This bar is positioned between two vertical red bars: a thin one on the left and a wider one on the right.

Sam Lebron
Senior Architect
Dress Barn

“It is truly transparent data encryption. Within a matter of a few hours, the basic components were running and available, and we didn’t notice any performance impact.”



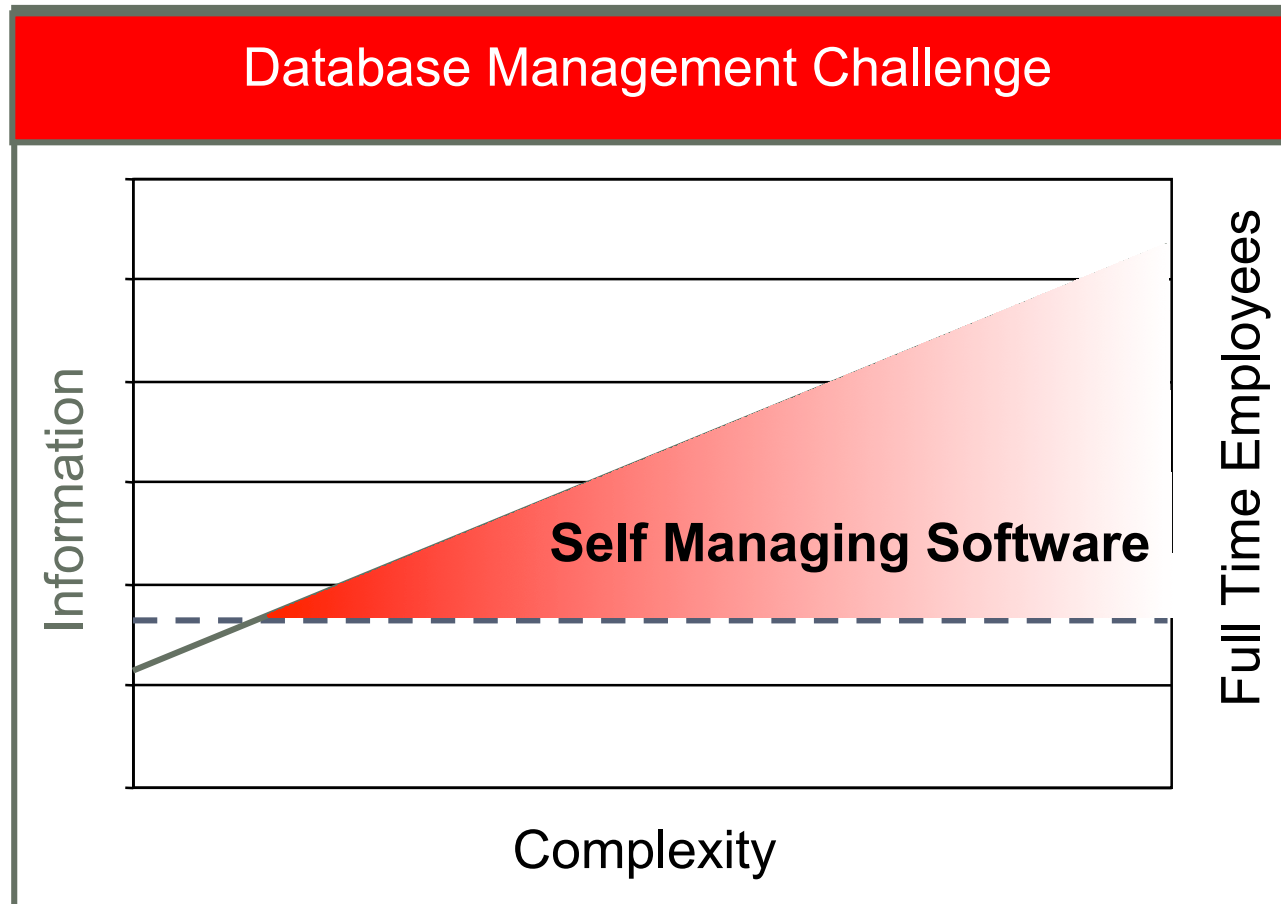
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Database Management

Proactive, Self-Managing Software



Managing Complexity

Automated Self-management

Automated:

- Storage
- Memory
- Statistics
- SQL tuning
- Backup and Recovery

Advisory:

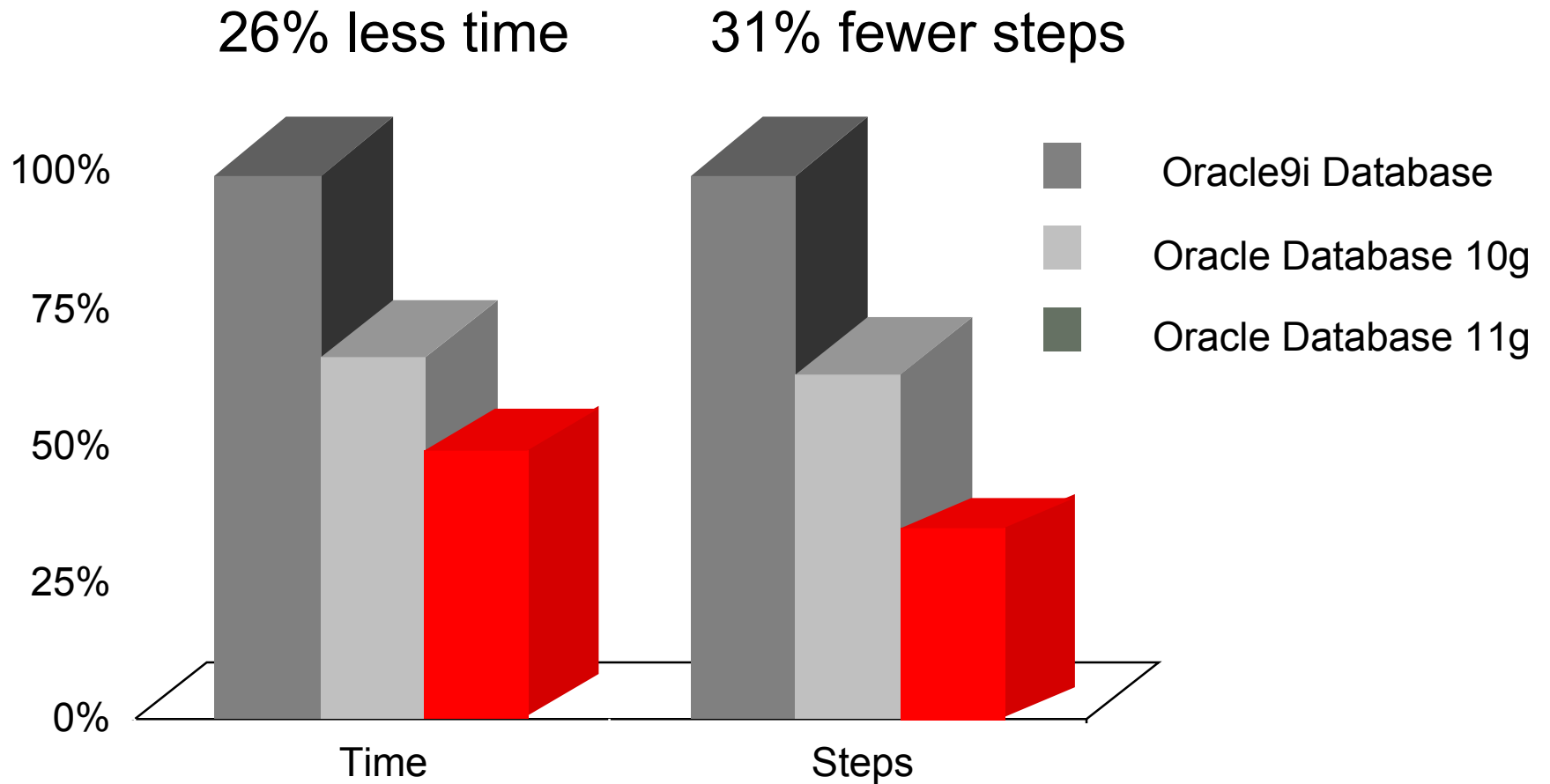
- Indexing
- Partitioning
- Compression
- Availability
- Data Recovery





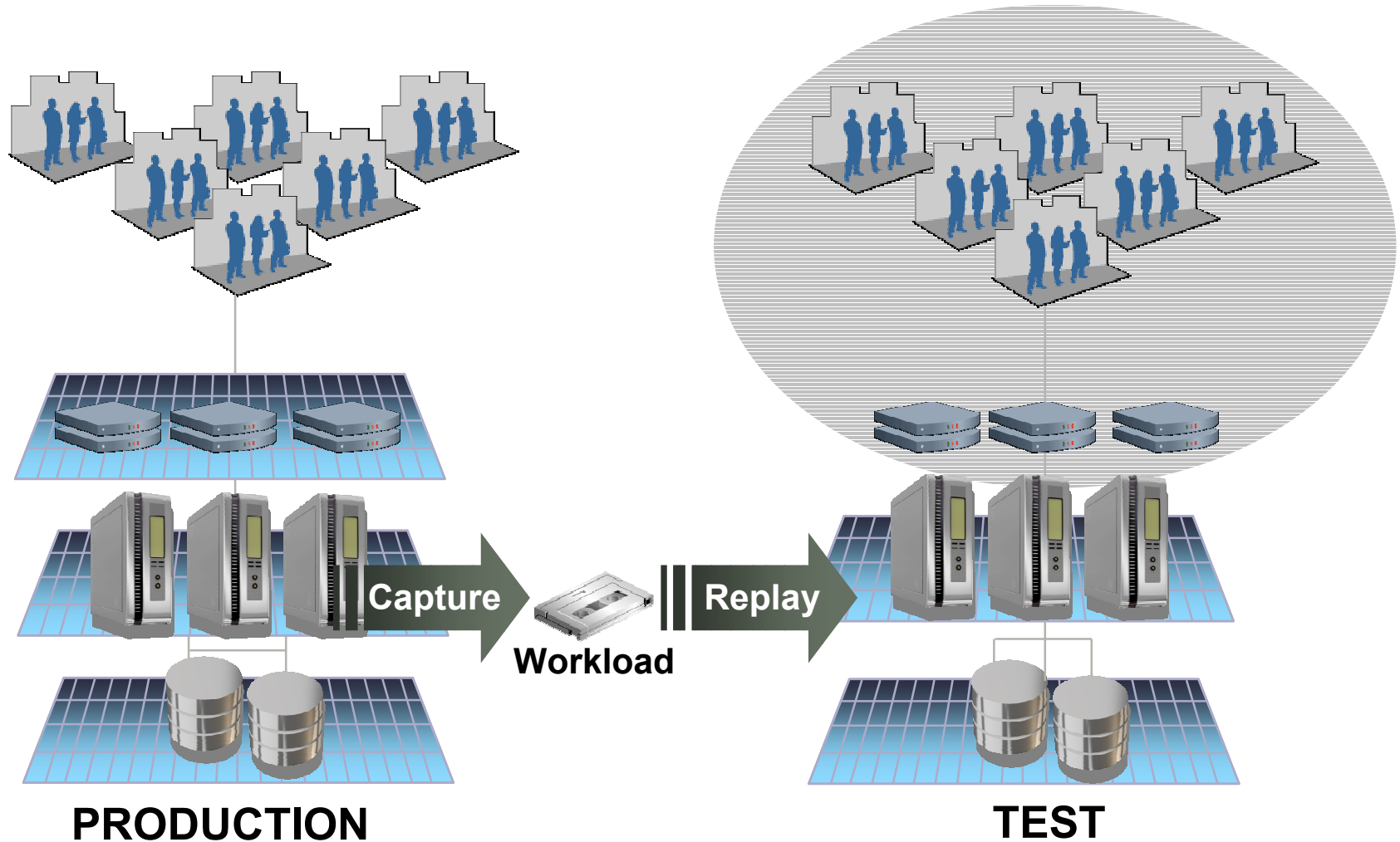
Oracle Database 11g vs Oracle Database 10g

Reducing time and complexity even more...



Real Application Testing


Workload of online users captured and replayed





Arup Nanda
Senior Director
Starwood Hotels & Resorts

“Oracle Enterprise Manager has helped us address system management issues proactively, automate previously manual administrative tasks, and reduce the need for extensive DBA training.”



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