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## **Oracle Database Directions**

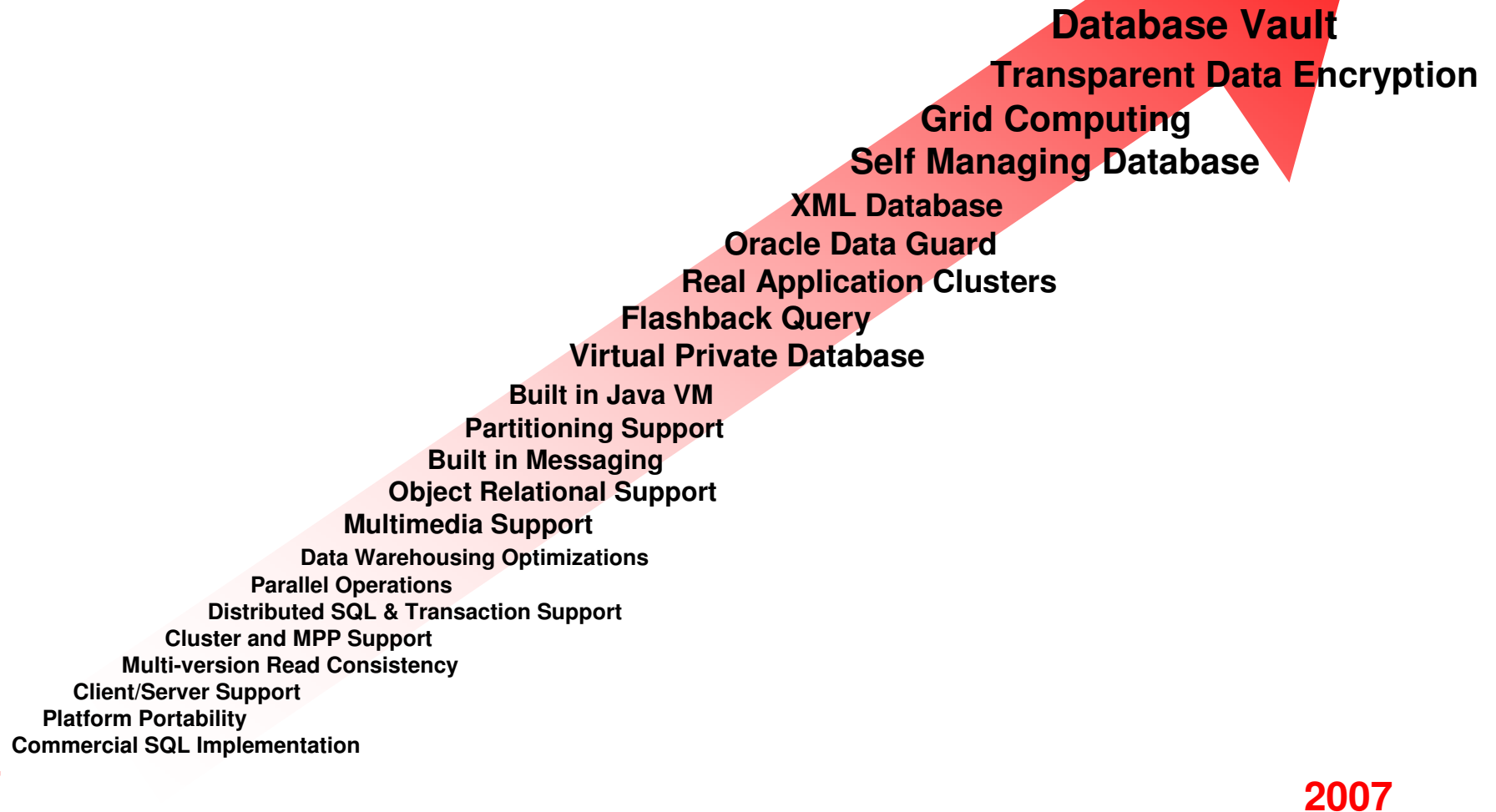
**Fred Louis**

Principal Sales Consultant  
Ohio Valley Region



# Oracle Database

## 30 Years of Sustained Innovation





# Oracle Database 11g

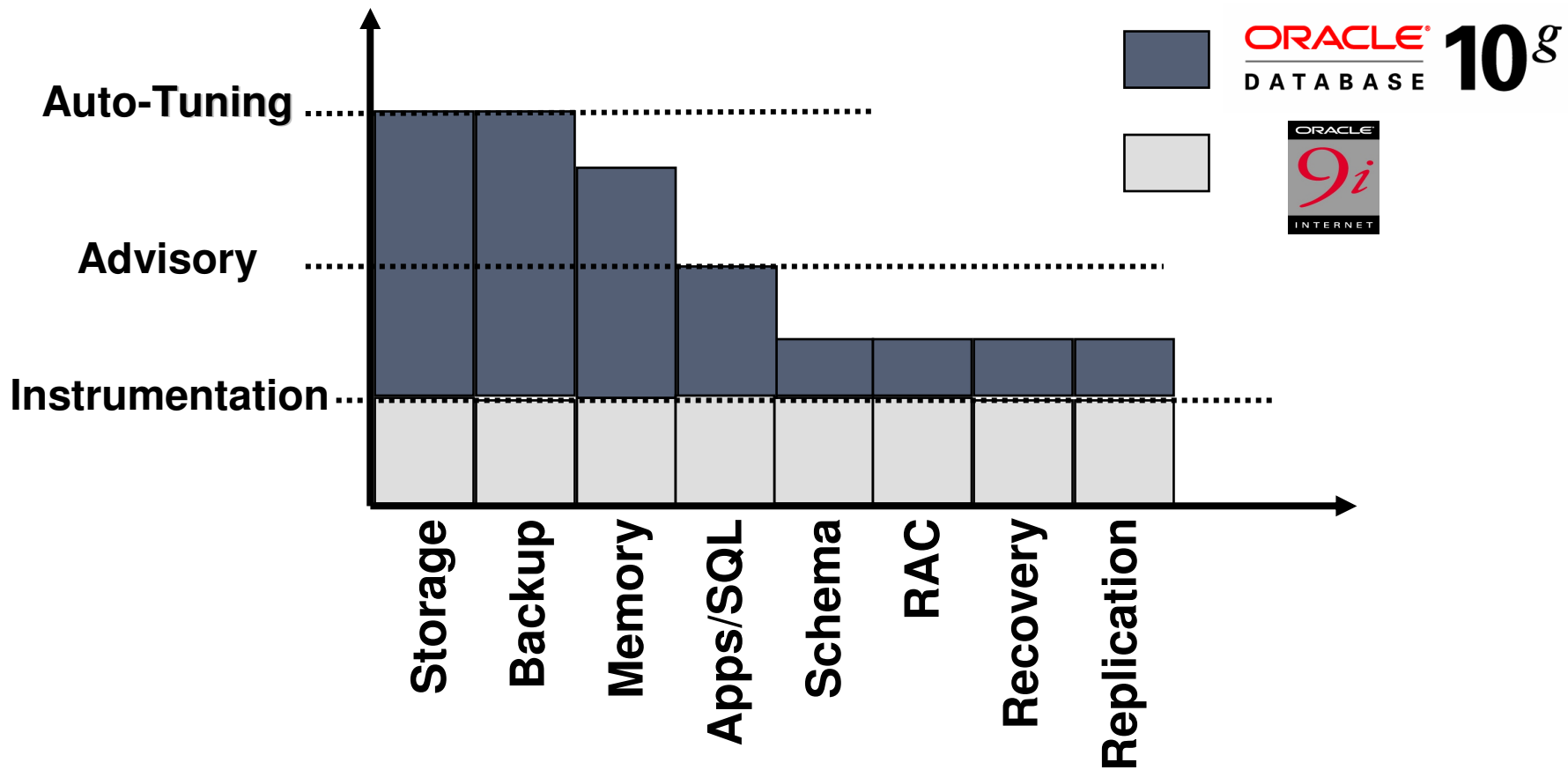
- Major new release of Oracle functionality
  - In Beta since September 2006
  - Production on Linux 32bit August 2007
- Furthers the adoption of Grid Computing
  - Grid Computing benefits
    - Unique scale-out technology with single database image
    - Lowers server and storage costs
    - Increases availability and scalability
  - Grid is disruptive technology that fundamentally
    - Changes the game for the database industry
    - Changes the way data centers look and operate
    - Currently in rapid adoption phase

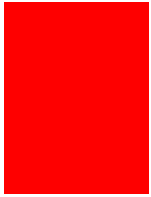


# 11g Value Proposition

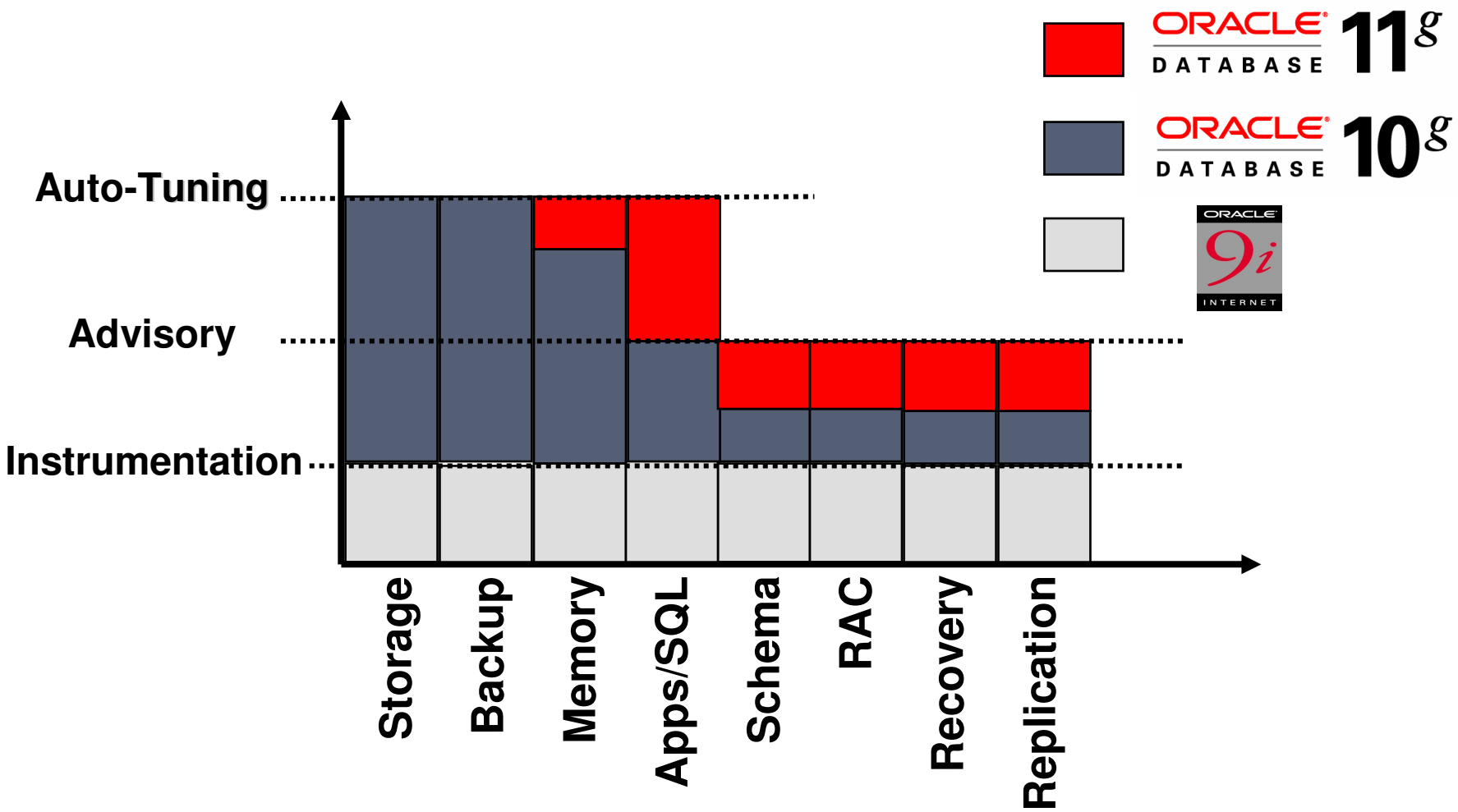
- Easiest to Manage
- Highest Quality of Service
  - Highest Performance and Scalability, Fault Tolerant, Most Secure, Best Information
- Lowest Cost
- Lowest Risk of Change


# Self Managing Database







# Self Managing Database



 **ORACLE** DATABASE **11<sup>g</sup>**

 **ORACLE** DATABASE **10<sup>g</sup>**

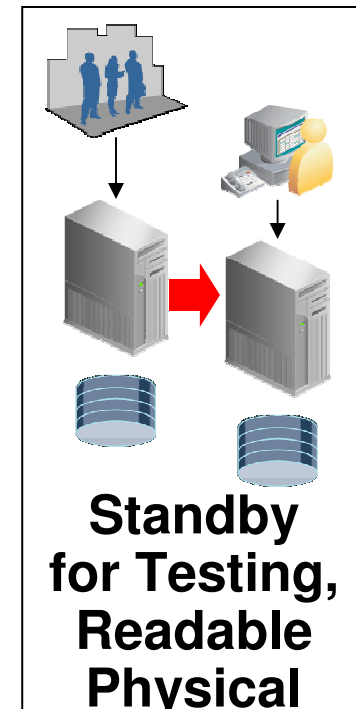
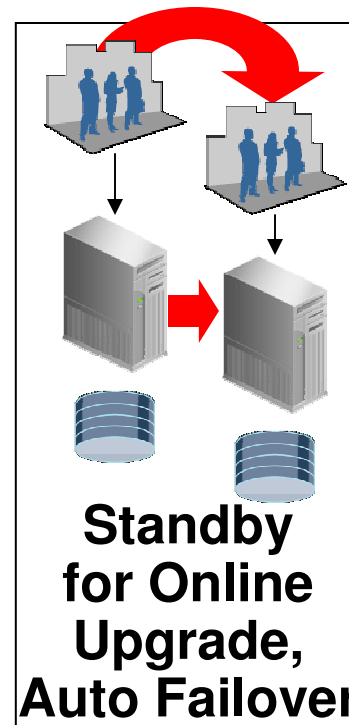
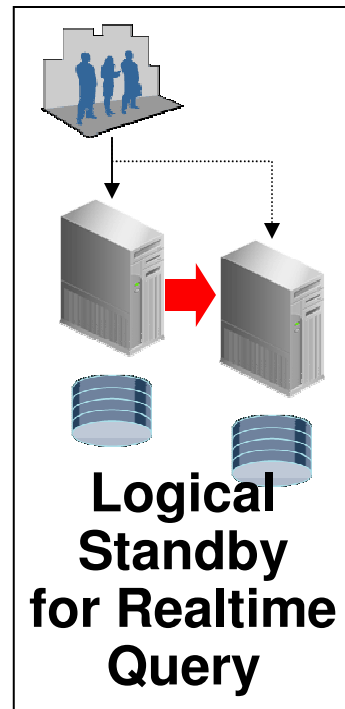
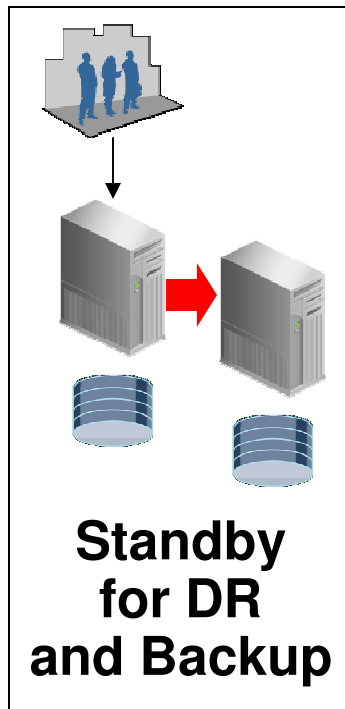
 **ORACLE** *9i* INTERNET



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**Database Availability**

# Unlocking the Value of Standby DBs



# Active Data Guard Option

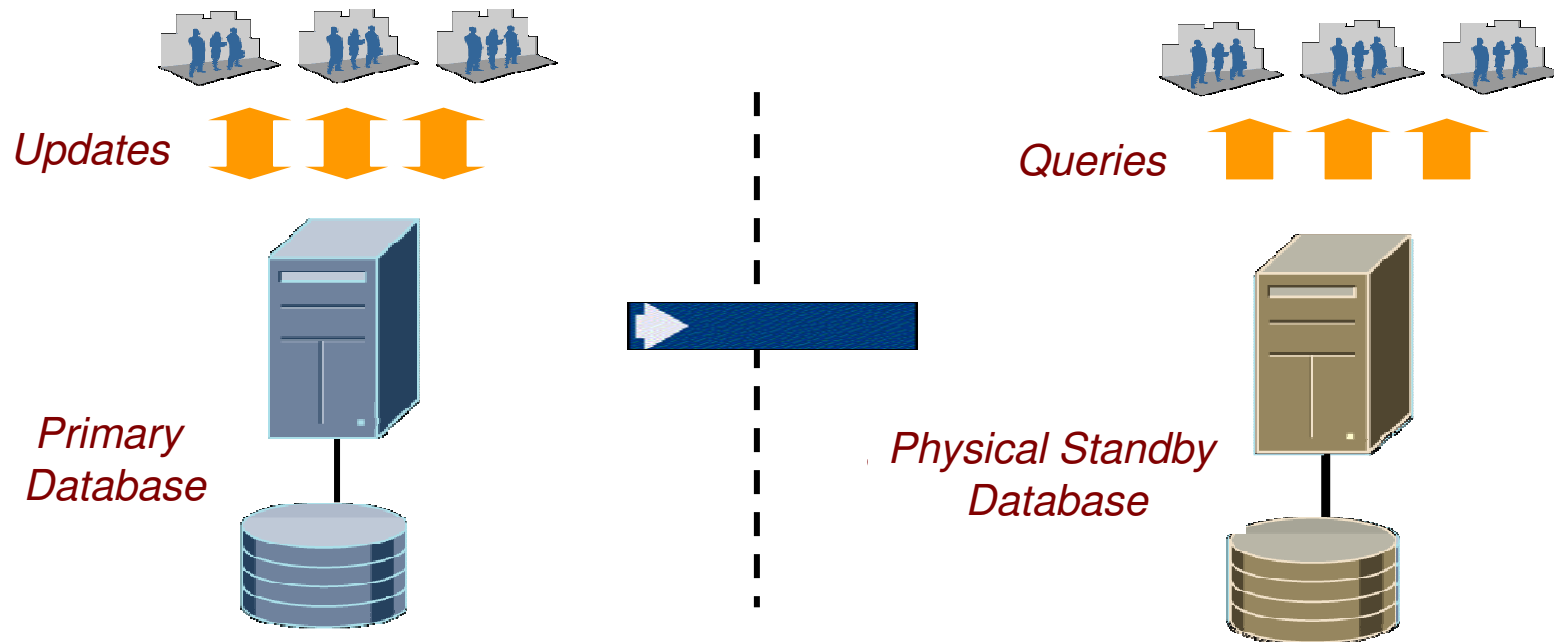
## Physical Standby with Real-Time Query



- Read-only queries on physical standby concurrent with redo apply
  - Supports RAC on primary / standby
  - Queries see transactionally consistent results
- Immediate appeal to the many users of physical standby
- DR with real time query is unique in the industry – **no idle resources**
- Handles all data types, but not as flexible as logical standby

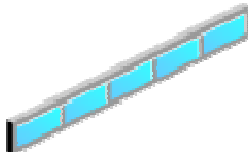
# Snapshot Standby

## *Leverage Standby Database for Testing*

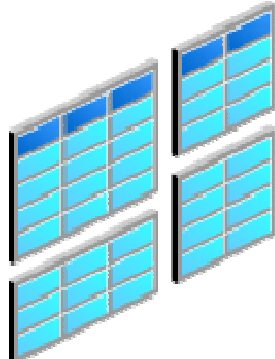


- Preserves zero data loss, although no real time query or fast failover
- Truly leverages DR hardware for multiple purposes
- Similar to storage snapshots, but provides DR at the same time and uses single copy of storage

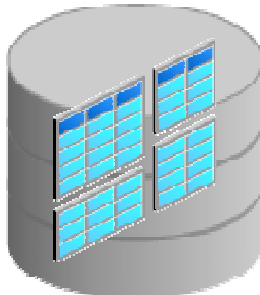
# Flashback for Rapid Recovery from Human Error



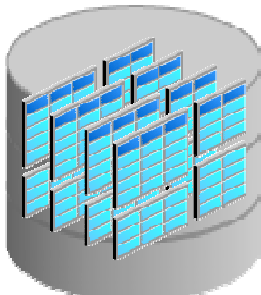
**Flashback Query**



**Flashback Tables**



**Flashback Database**



**Flashback Data Archive and Transaction**



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DATABASE

ORACLE<sup>®</sup> **10<sup>g</sup>**  
DATABASE

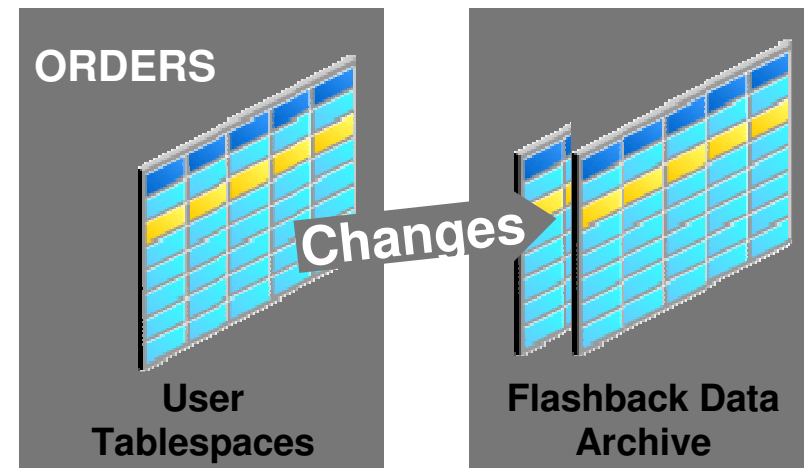
ORACLE<sup>®</sup> **11<sup>g</sup>**  
DATABASE

# Total Recall Option

## Flashback Data Archive

- Flashback Data Archive
  - Easy, practical way to add “time dimension” to your data
    - For change tracking, ILM, auditing, compliance, ...
  - Query data “AS OF” any time in the past
  - Efficient storage / retrieval of undo data

```
Select * from orders  
AS OF  
'Midnight 31-Dec-  
2003'
```







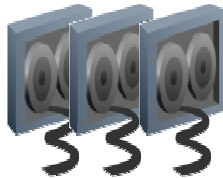

**Total Recall**



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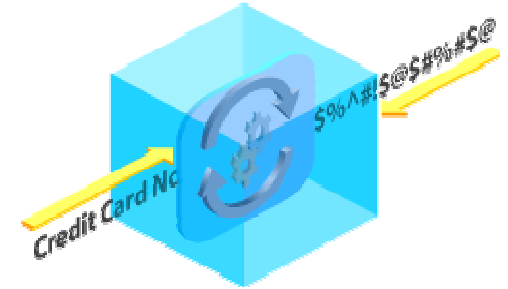
**Database Security**

# Database Security and Compliance

<b>Audit Vault</b>	<b>Database Vault</b>	<b>Label Security</b>	<b>Advanced Security</b>	<b>Secure Backup</b>	<b>Configuration Mgmt Pack</b>
					
<b>Monitor, Alert, Consolidate</b>	<b>Multi-factor DBA Controls</b>	<b>Data Classification</b>	<b>Encrypted Data</b>	<b>Encrypted Data on Tape</b>	<b>Secure Deployments</b>

# Advanced Security Option

## Transparent Data Encryption



- Building on transparent column level encryption in Oracle Database 10g Release 2
- Tablespace level encryption
  - For encrypting entire application data
  - Supports foreign keys and range scan
- LOB encryption
- Master Key protection in hardware using PKCS #11
- Integrates with LogMiner, Logical Standby, Streams, Datapump

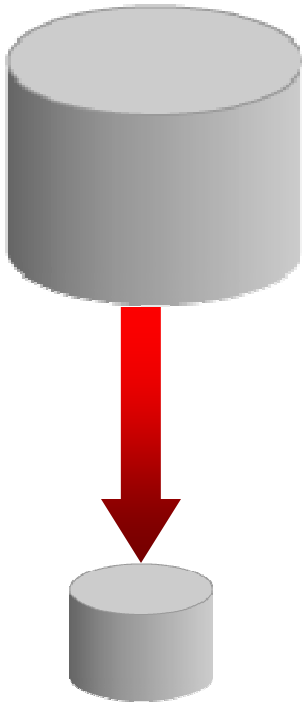


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# **Oracle Database Scalability and Performance**

# Advanced Compression Option

## Compression for Mainstream

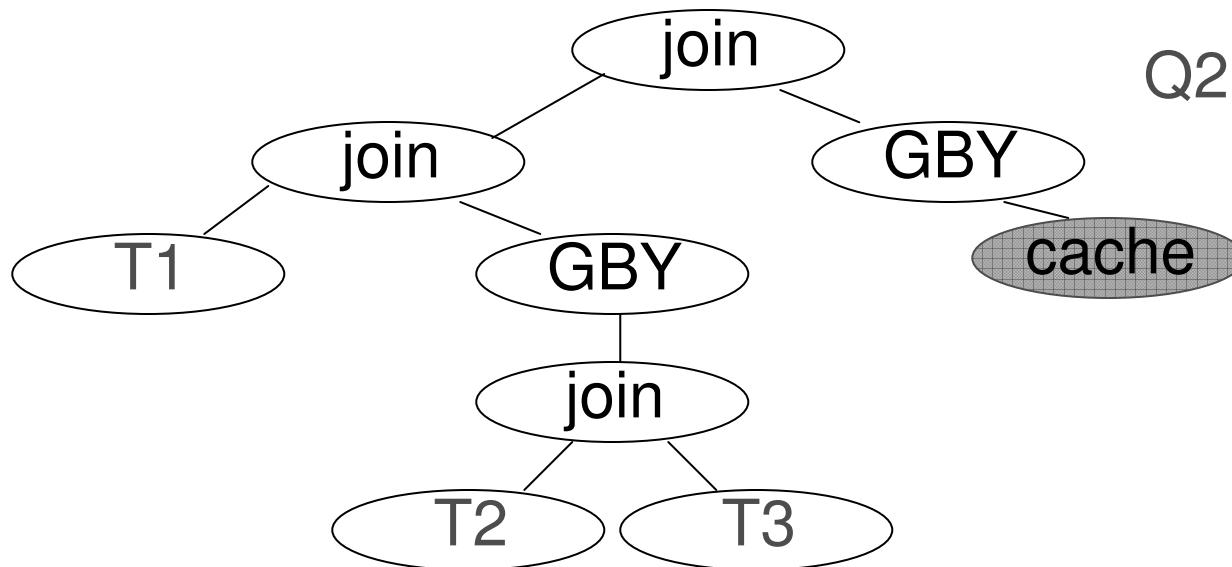


- Oracle 9i compresses table data only during bulk load
  - Data warehousing, ILM
- Table compression is now viable for all applications
  - Compress during random updates
- Typical compression ratio of **2x to 3x**
- Database directly reads compressed data bypassing decompression overhead
- Strategy - Compress 10 largest tables in a database
  - Reduce table data by half, increase CPU usage 5%
- Savings cascades into test, dev, standby, mirrors, archiving, backup, etc.

# Server Results Cache

## *taking the buffer cache to the next level*

- Caches results of queries, query blocks, or pl/sql function calls
  - Cache is shared across statements and sessions on server
  - Significant speed up for read-only / read-mostly data



Q2: Use it transparently



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**Best Information**



# Complete Information Management

**Secure Enterprise Search**

*Enterprise Wide Search*

**Content DB and Records DB**

*Content Management in the Database*

**XML**

*Integrated Native XML Database*

**Text**

*Text Indexing and Classification*

**Location & Spatial**

*Location Enabled Databases*

**Multimedia**

*Audio, Image and Video*

**Relational**

*Characters, Numbers, Dates, LOBs*

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# Complete Information Management

**Secure Enterprise Search**

*Complete Set of Connectors*

**Content DB and Records DB**

*Content Management in the Database*

**XML**

*Binary XML Support*

**Text**

*RDF and OWL Support*

**Location & Spatial**

*3D Support*

**Multimedia**

*Medical Image Support*

**Relational**

*New SecureFiles LOB Storage*

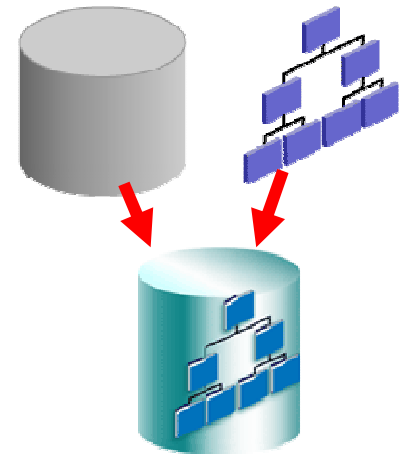
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# Oracle SecureFiles

## *Consolidated Secure Management of Data*

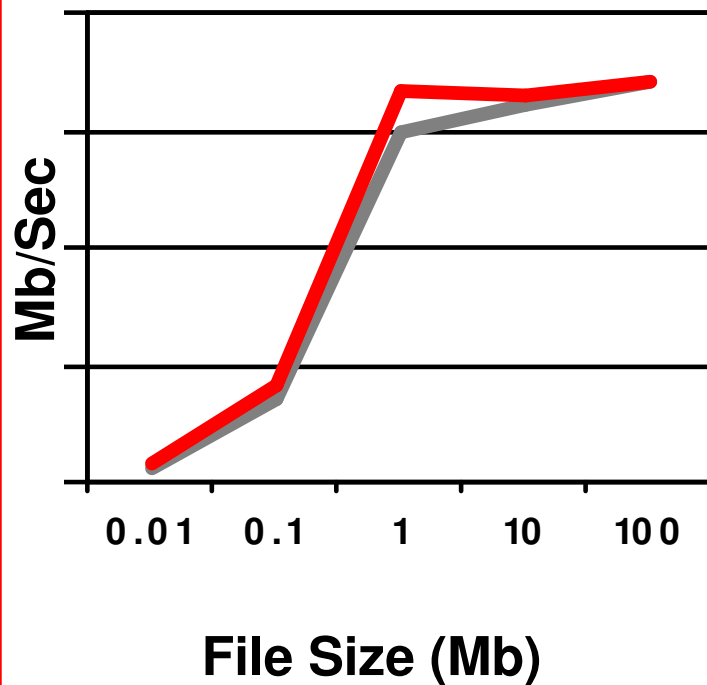
- Many applications have both files and relational data
  - e.g. Document Management, Medical, CAD, Imaging
- SecureFiles breaks the performance barrier that has kept file data out of databases
- Similar to LOBs but much faster, and with more capabilities
  - Transparent encryption (with Advanced Security Option)
  - Compression, Deduplication (with Advanced Compression Option)
  - Superset of LOB interfaces for easy migration from LOBs
- Benefits
  - Single security model
  - Single view of data
  - Single management of data
  - High performance



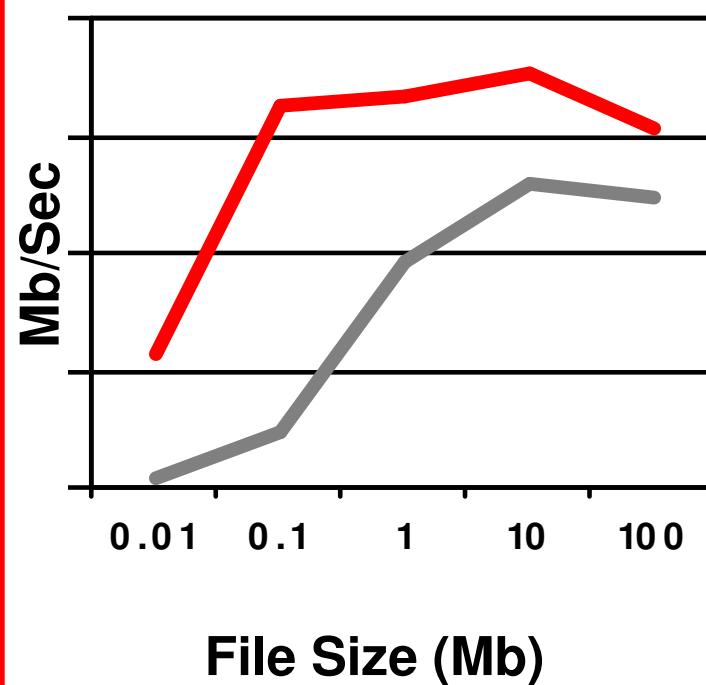
# Oracle Secure Files

Breaking the performance barrier...

## Read Performance



## Write Performance




SecureFiles

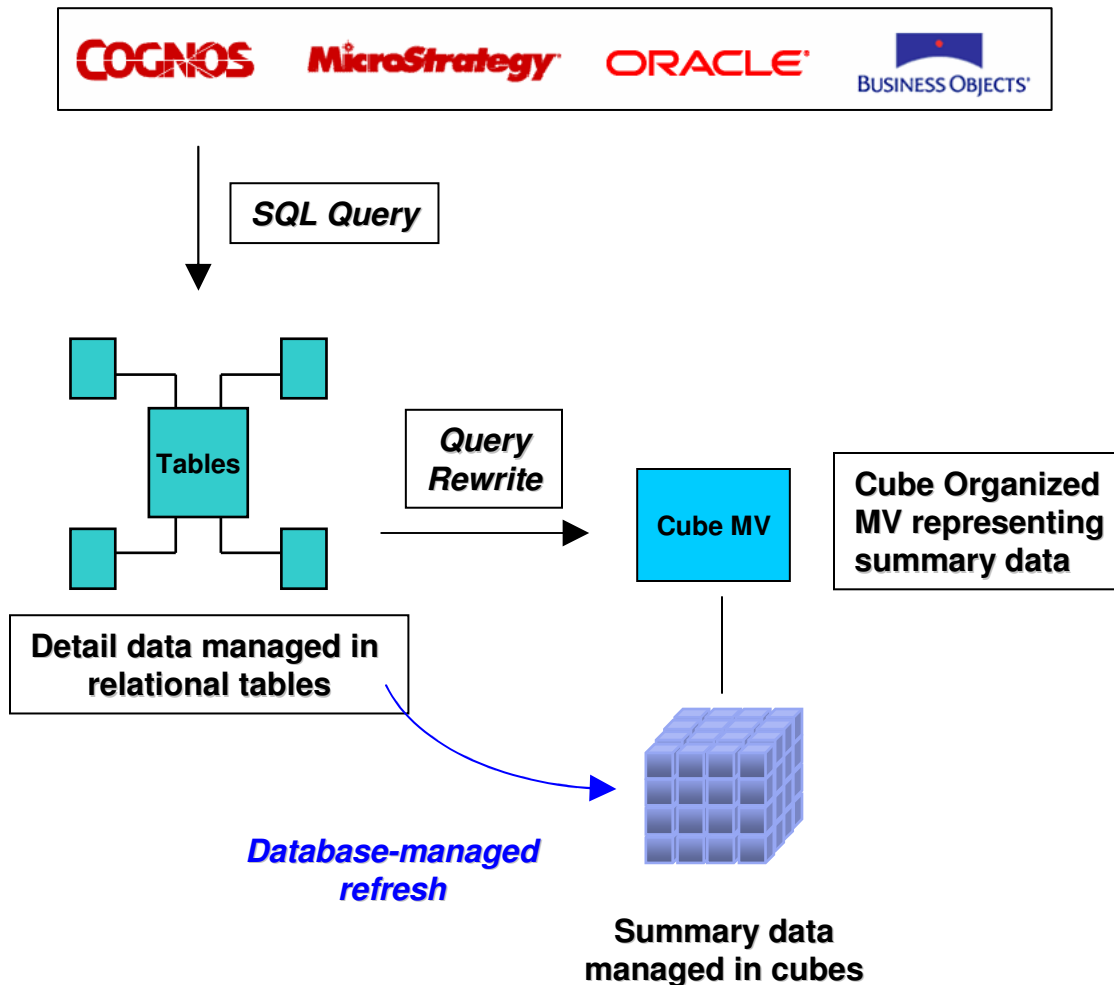
Linux Files

# Oracle Partitioning Option

10 years of innovation

	Core functionality
Oracle8	Range partitions, global range index
Oracle8i	Hash and composite range-hash partitioning
Oracle9i	List partitioning
Oracle9i R2	Composite range-list partitioning
Oracle 10g	Global hash indexes
Oracle 10g R2	1M partitions per table
	<b>Partitioning by reference</b> <b>Virtual column partitioning</b> <b>Automatic interval partitioning</b> <b>New composite partitioning:</b> range-range, list-range, list-list, list-hash <b>Partition Advisor</b>

# OLAP Option in Oracle Database 11g



- Detail data is stored in relational tables
- Application queries relational tables with SQL
- Summary data is managed by OLAP cube
- Access to summary data occurs via automatic query rewrite to the cube
- Application is unchanged, but updates and queries are faster



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**Application Development**

# Application Development

## SQL Developer



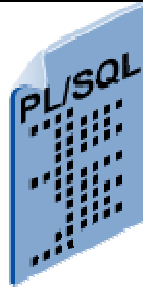
- Migration Workbench
- Third party database support

## Application Express



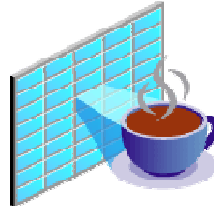
- Access migration
- Flash Charting, PDF output

## PL/SQL



- FAST Native Compiler
- Fine Grained Dependency Tracking

## Java



- FAST Native Transparent JIT Compiler
- Easy JDK-like environment

## PHP



- Scalability with Database Resident Connection Pool

## .NET



- Integration with Visual Studio 2005
- Microsoft ADO.NET 2.0 support

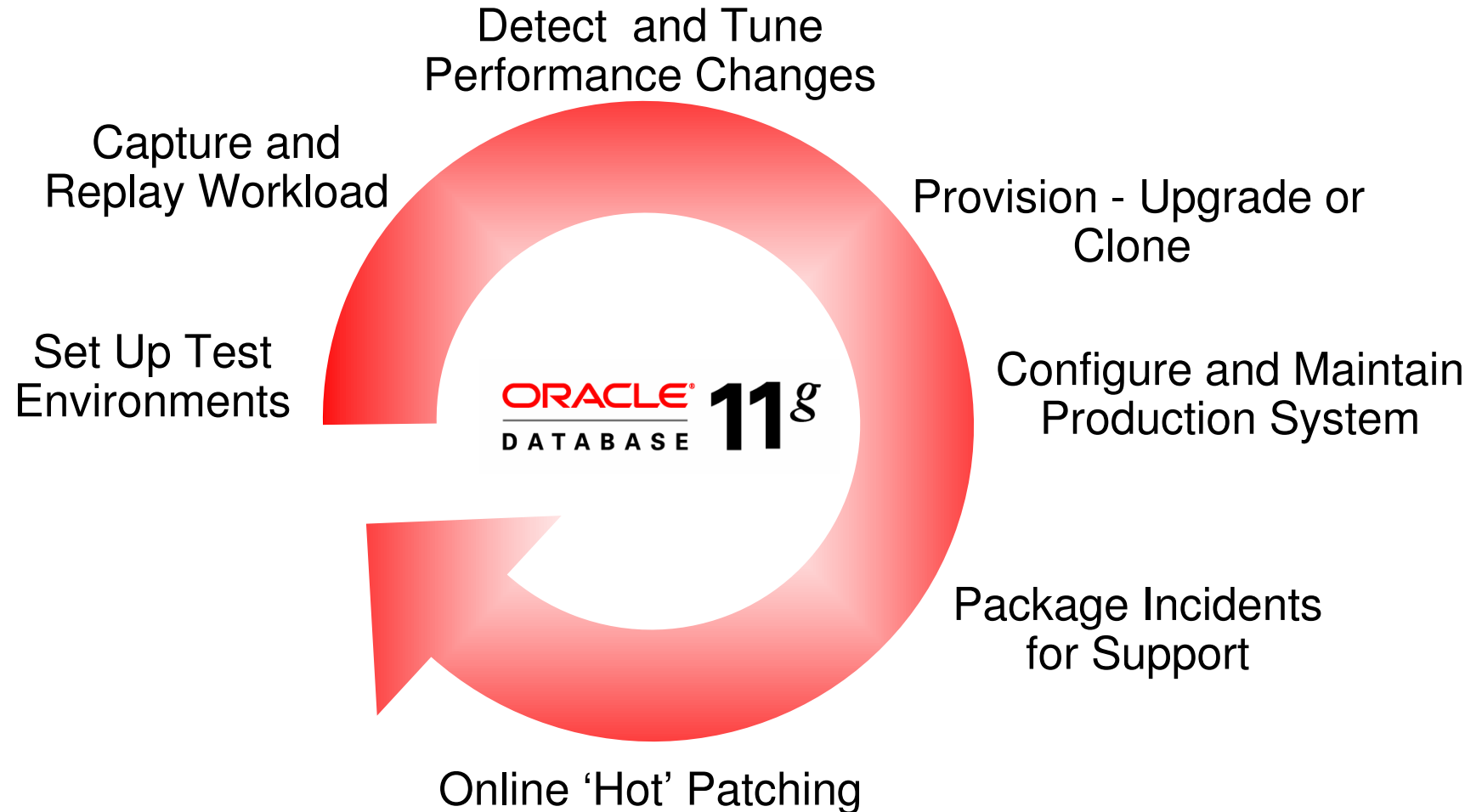


**So ... What is the perennial customer challenge ?**

**Change**

# Lifecycle of Change Management

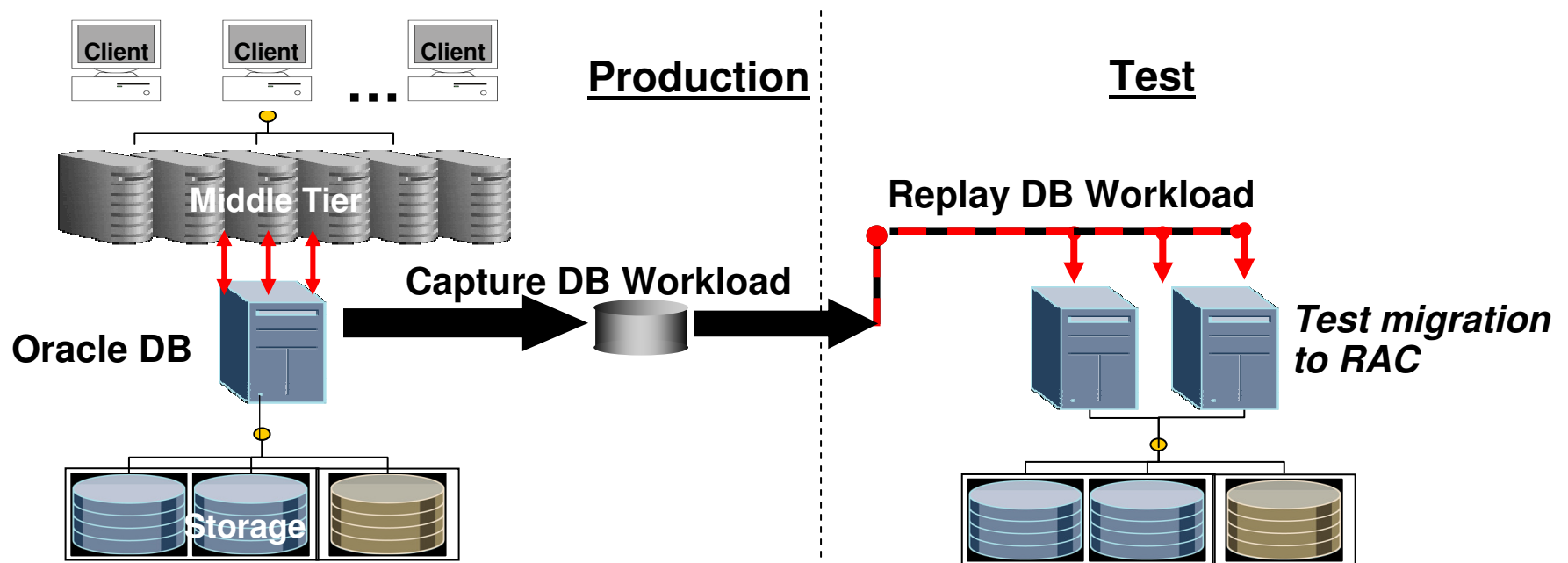
## New Change Assurance Capabilities



# Make Change Safe - Real Application Testing Option

## *Realistic Testing with Database Replay*

- Recreate actual production database workload in test environment
- No test development required
- Replay workload in test with production timing
- Analyze & fix issues before production



# Make Change Safe - Real Application Testing Option

## Find Regressed SQL with SQL Performance Analyzer

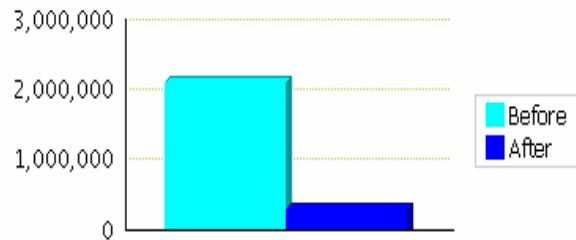
### SQL Replay Analysis Result: STE\_PAT

Task Name **STE\_PAT**  
 Task Owner **SYSTEM**  
 Task Description

SQL Tuning Set Name [STE\\_123](#)  
 STS Owner **SYSTEM**

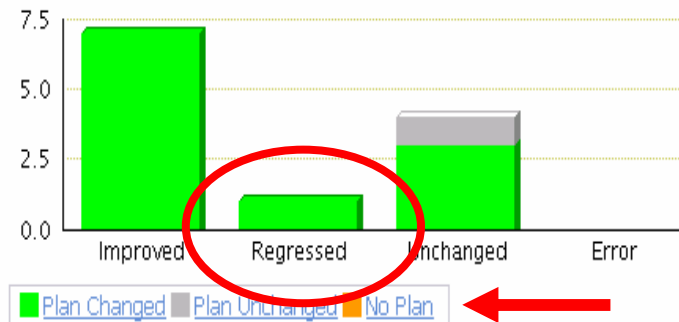
#### Global Statistics

Projected Workload Buffer Gets



Improvement Impact [+86.692%](#)  
 Regression Impact [-0.080%](#)  
 Overall Impact [+86.612%](#)

SQL Statement Count

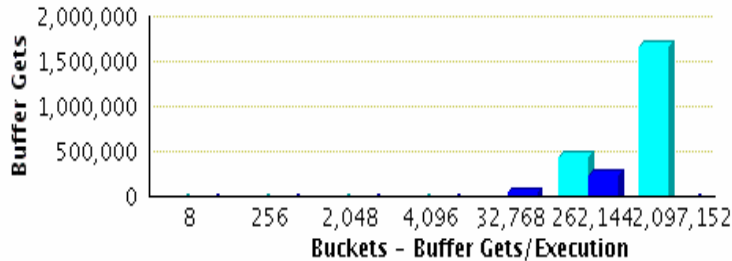


#### Recommendations

Run SQL Tuning Advisor to tune regressed SQL statements.

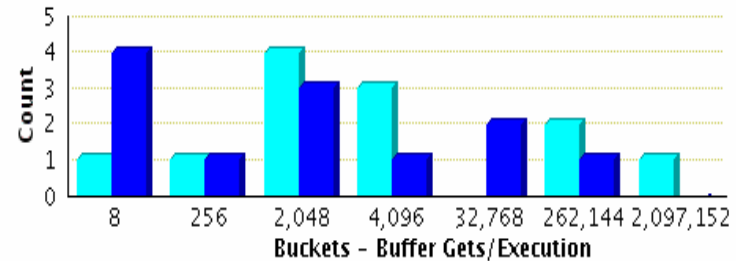
[Run SQL Tuning Advisor](#)

Projected Workload Buffer Gets Distribution



Before After

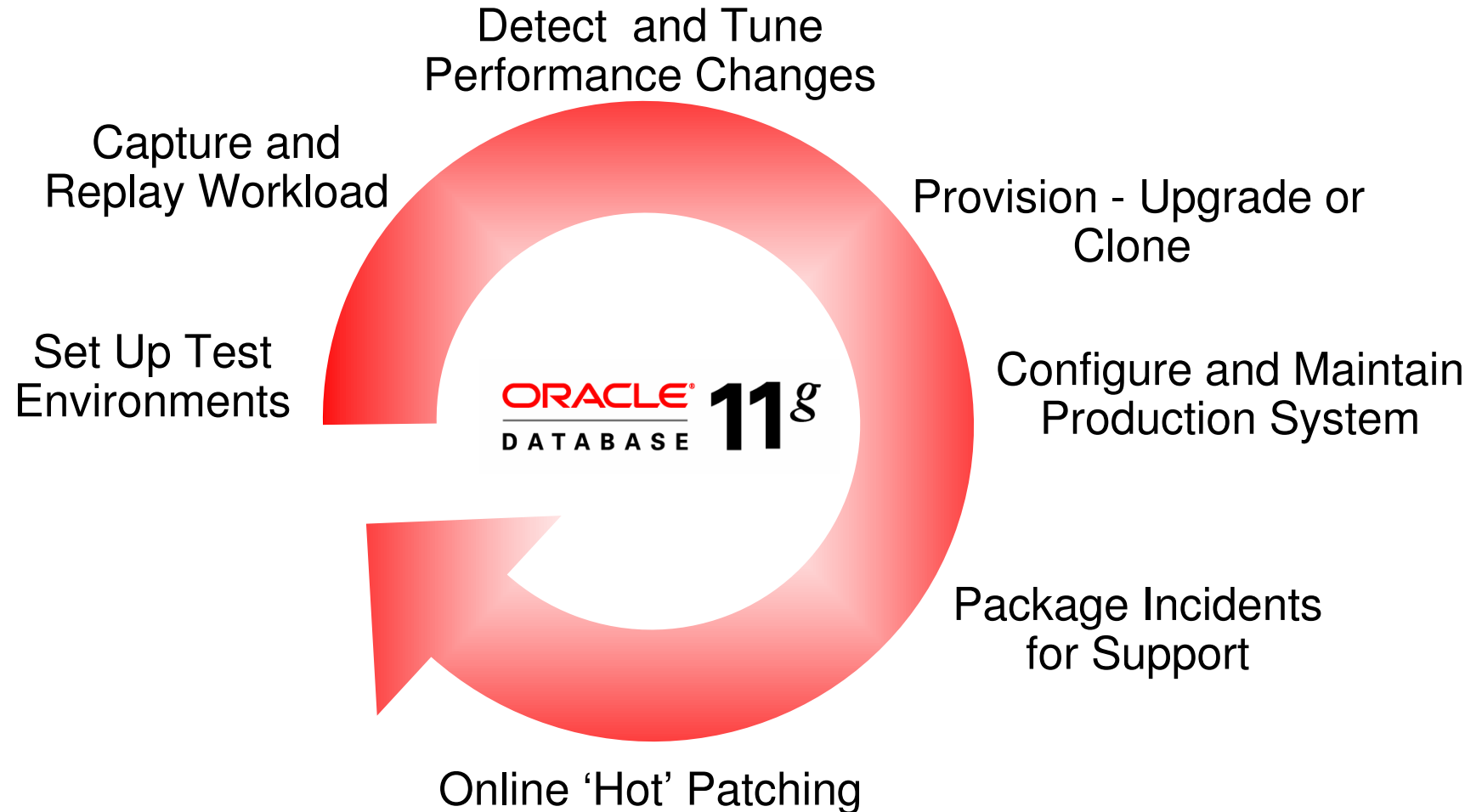
Single Execution SQL Statement Count Distribution



Before After

# Lifecycle of Change Management

## New Change Assurance Capabilities





# Other Oracle Database 11g Highlights

- **Performance and Scalability**
  - Query Result Cache
  - TimesTen Cache Enhancements
  - RAC Scalability Enhancements
- **High Availability**
  - Data Recovery Advisor
  - Readable Physical Standby
- **VLDB/ILM**
  - Interval and Referential Partitioning
  - Enhanced Compression
- **Manageability and Diagnosability**
  - Support Workbench
  - SQL Performance Analyzer
  - SQL Test Case Builder
- **Security**
  - Tablespace and LOB Encryption
  - Secure Configuration
- **Business Intelligence**
  - BI Publisher Reporting
  - Supermodels for Data Mining
- **Unstructured Data Management**
  - Enhanced XML indexing
  - Storage & Query of Semantic Content
- **Developer Productivity**
  - APEX 3.0 including support for Flash Charting and PDF output
  - Improved PHP Scalability
  - .NET Improvements
  - Simple compilation of PLSQL and Java Stored Procedures



**Q U E S T I O N S**  
**A N S W E R S**