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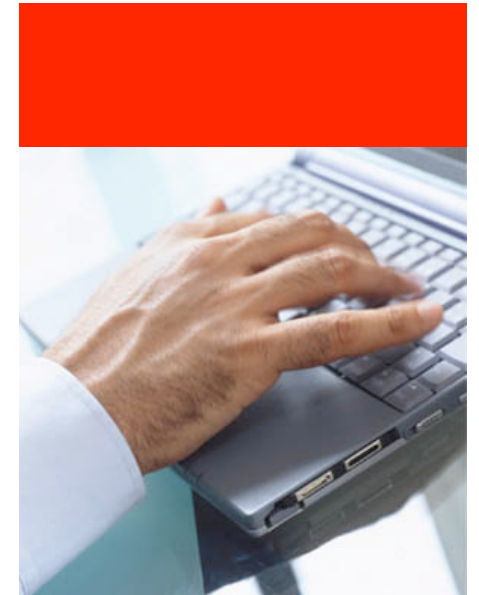
## **Oracle Database Backup-and-Recovery Best Practices and New Features**

Timothy Chien  
Principal Product Manager  
Database High Availability

Husnu Sensoy  
VLDB Expert  
Turkcell Communication Services

# Agenda

- What Keeps You Awake at Night?
- Oracle Data Protection Planning & Solutions
- Oracle Backup & Recovery Solutions
  - Physical Data Protection
    - Recovery Manager
    - Oracle Secure Backup
  - Logical Data Protection
    - Flashback Technologies
  - Recovery Analysis
    - Data Recovery Advisor
  - Putting It All Together: Customer Example
- Turkcell Backup & Recovery Case Study
- Q&A



# What Keeps You Awake at Night?

## Data Protection Concerns...



- Meeting recovery SLAs?
- Reducing exposure to data loss?
- Meeting backup windows?
- Dealing with long-term backup storage?
- Management complexity?
- Budget?

*...Where do I begin?*

# Assess Recovery Requirements

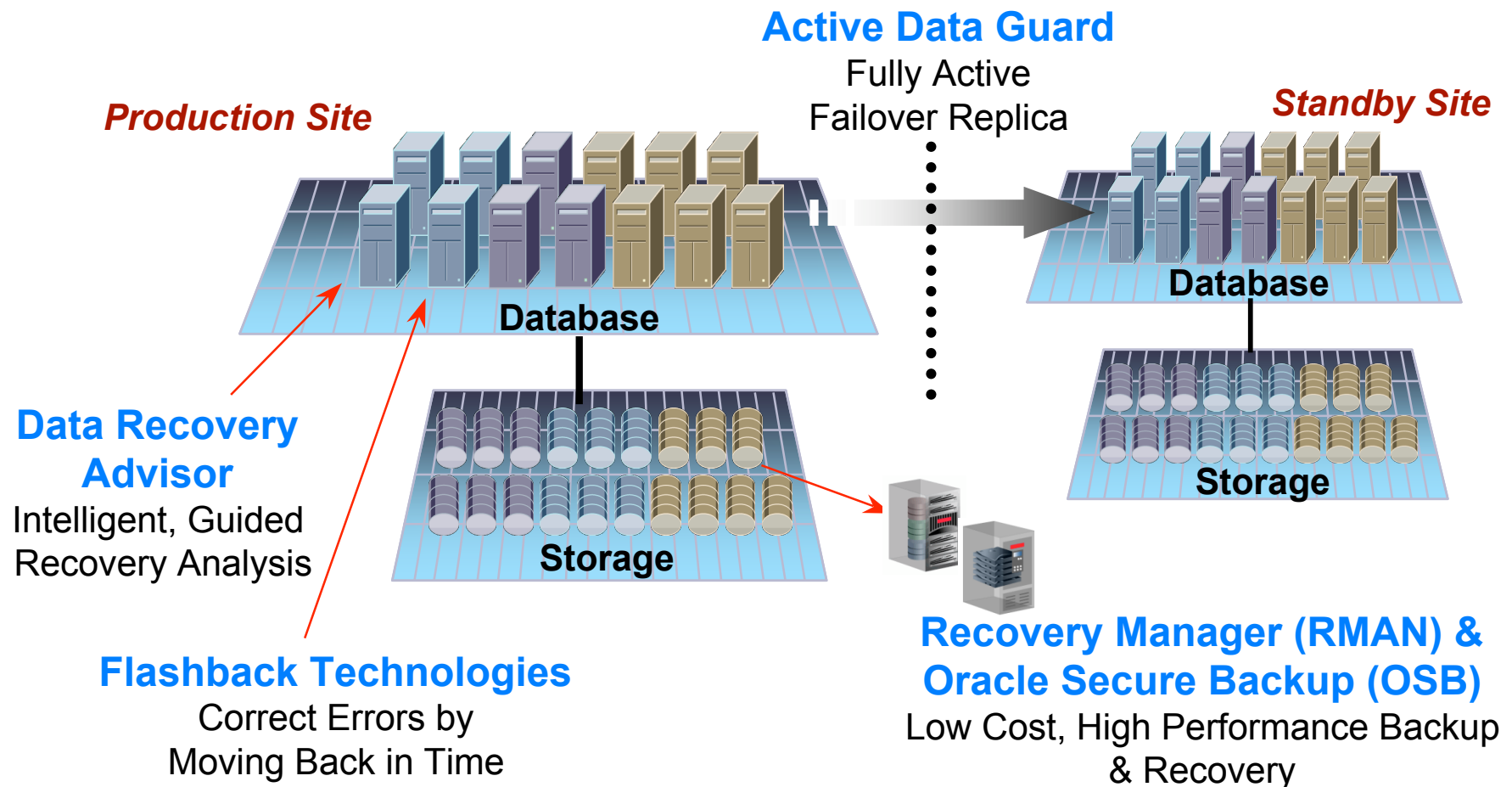
## First Step in Data Protection Planning



- **Identify** and prioritize critical data
- **Design** recovery requirements around data criticality
  - Assess tolerance for data loss - *Recovery Point Objective (RPO)*
    - How frequently should backups be taken?
    - Point-in-time recovery required?
  - Assess tolerance for downtime - *Recovery Time Objective (RTO)*
    - Downtime: Problem identification + recovery planning + systems recovery
    - Tiered RTO per level of granularity, e.g. database, tablespace, table, row
  - Determine backup retention policy
    - Onsite, offsite, long-term
- **Assess** data protection requirements
  - Physical: Disasters, outages, failures, corruptions
  - Logical: Human errors, application errors

# Oracle Maximum Availability Architecture

## Robust & Integrated Data Protection





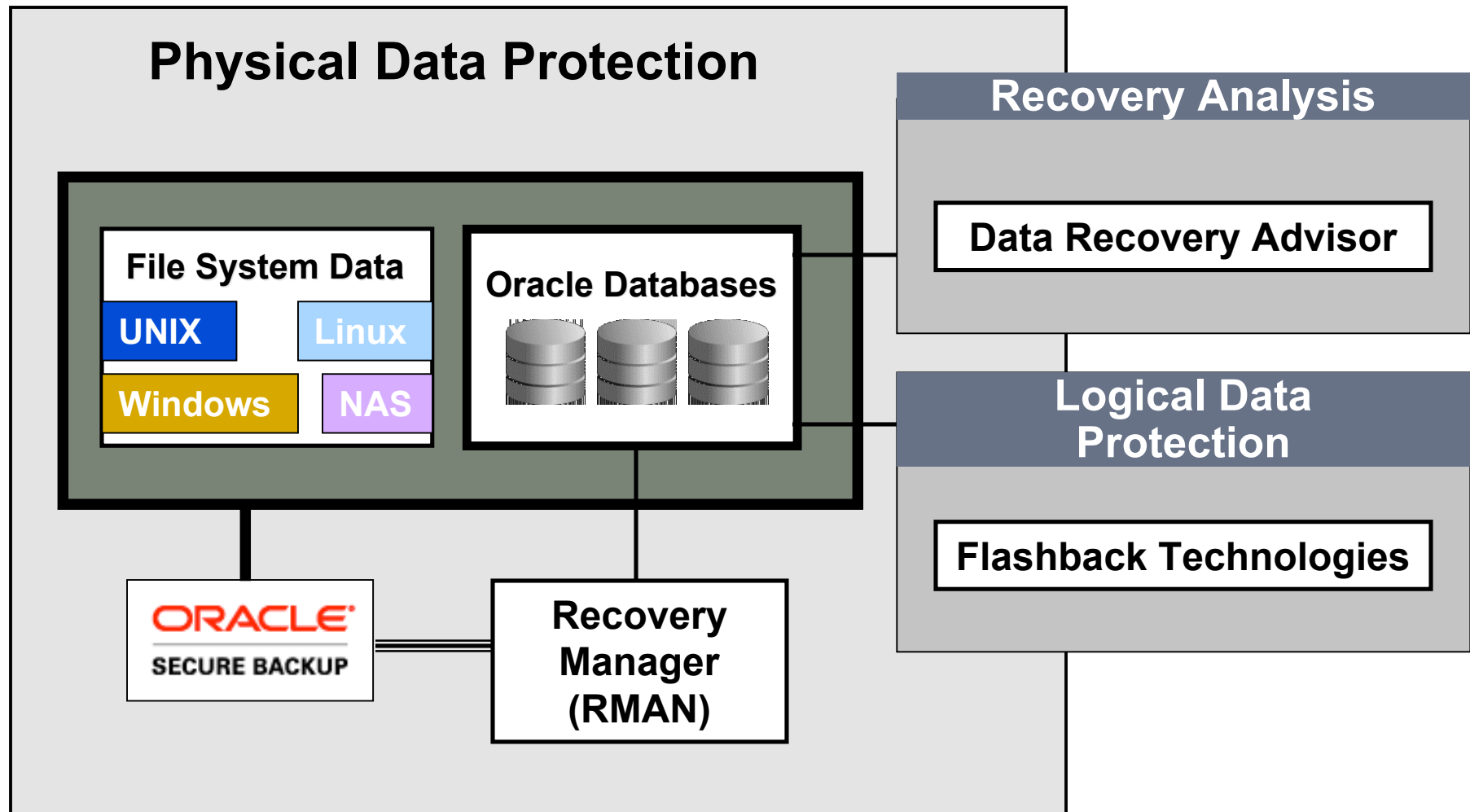
# Oracle Data Protection Solutions

Backup & Recovery	Recovery Time Objective (RTO)
Physical Data Protection <ul style="list-style-type: none"><li>• Recovery Manager (RMAN)</li><li>• Oracle Secure Backup (OSB)</li></ul>	Hours/Days
Logical Data Protection <ul style="list-style-type: none"><li>• Flashback Technologies</li></ul>	Minutes/Hours
Recovery Analysis <ul style="list-style-type: none"><li>• Data Recovery Advisor</li></ul>	Minimizes time for problem identification & recovery planning

Disaster Recovery	Recovery Time Objective (RTO)
Physical Data Protection <ul style="list-style-type: none"><li>• Active Data Guard</li></ul>	Seconds/Minutes

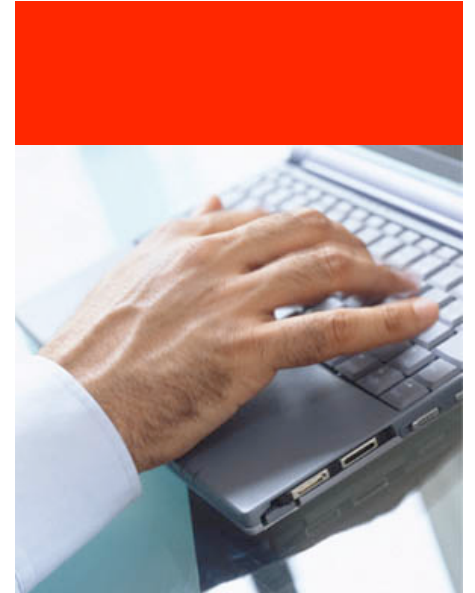
# Oracle Backup & Recovery Solutions

**“Backup and Recovery on Steroids”**



# Agenda

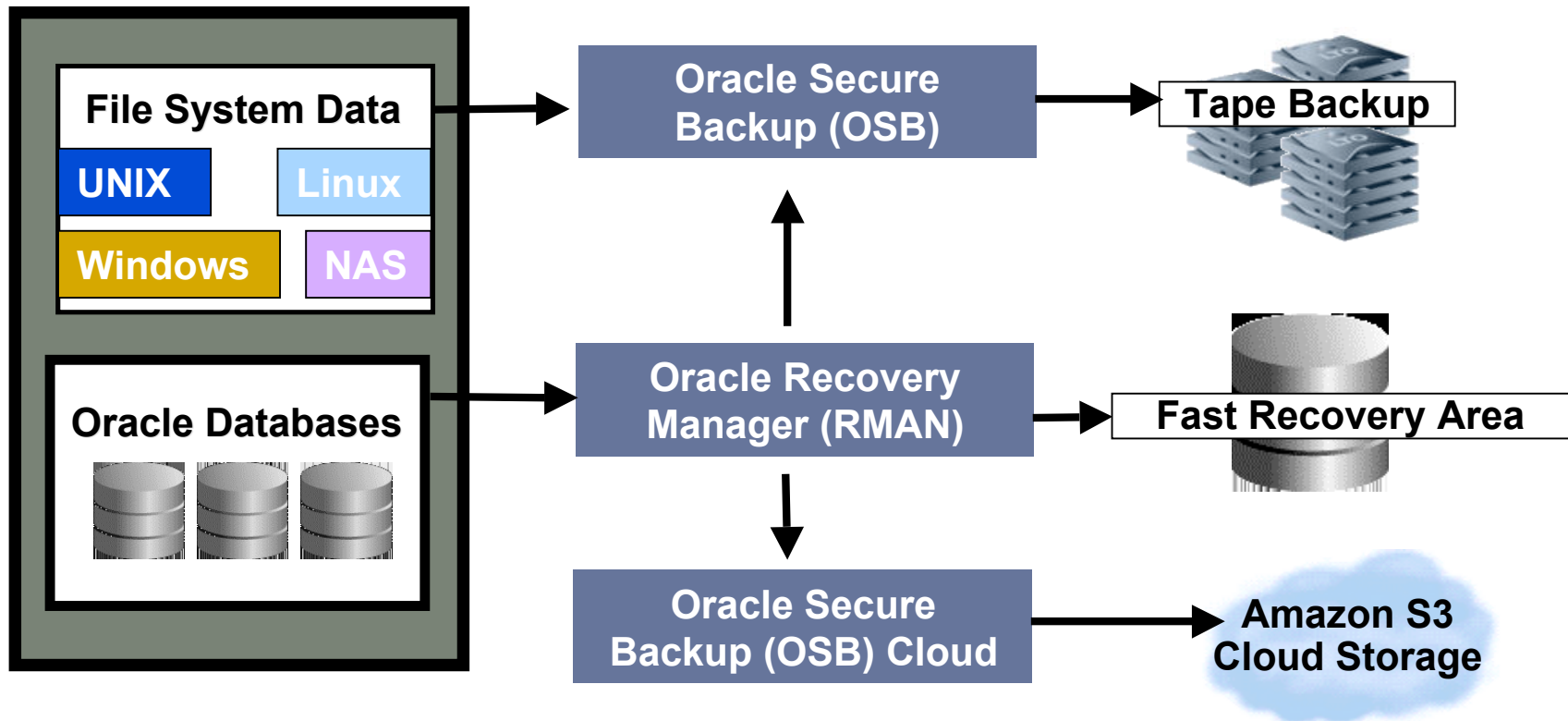
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# Backup & Recovery Foundation

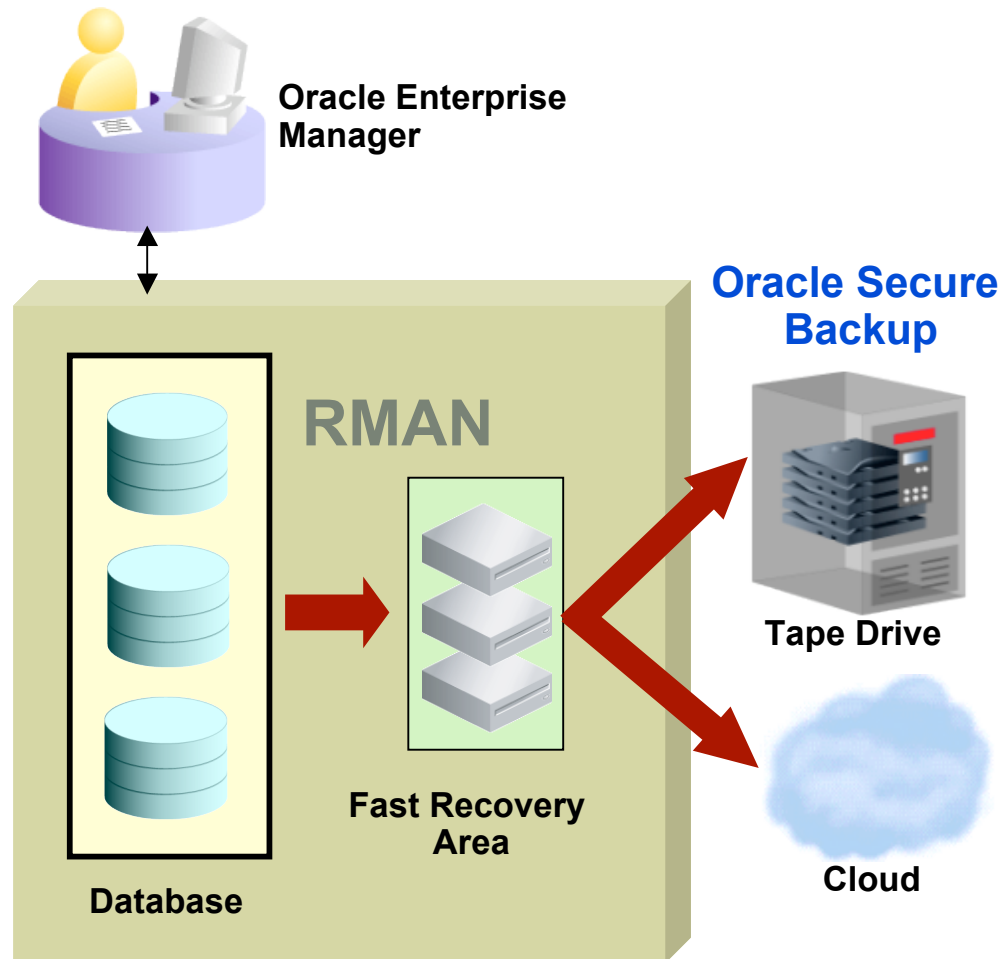
## Complete Oracle Solution from Disk to Tape



- Oracle backup and recovery for your entire IT environment
- Multiple media options available to meet the most stringent SLAs
  - Local disk, remote Cloud storage, physical and virtual tape

# Oracle Recovery Manager (RMAN)

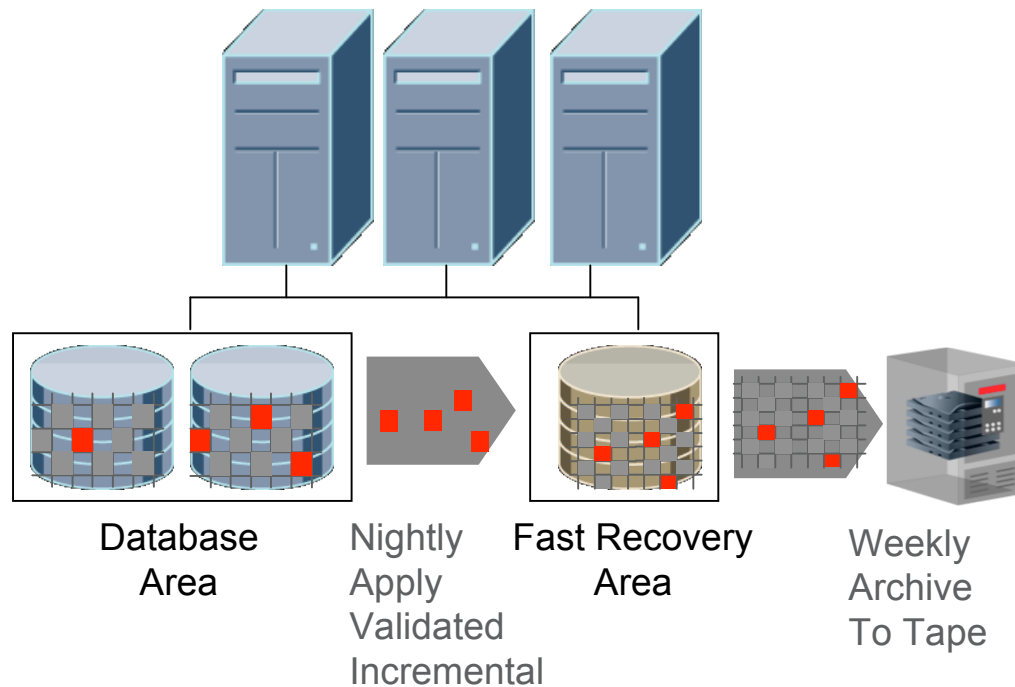
## Oracle-integrated Backup & Recovery Engine



- Intrinsic knowledge of database file formats and recovery procedures
  - Block validation
  - Online block-level recovery
  - Tablespace/data file recovery
  - Online, multi-streamed backup
  - Unused block compression
  - Native encryption
- Integrated disk, tape & cloud backup leveraging the Fast Recovery Area and Oracle Secure Backup

# Oracle Fast Recovery Area

## Automatic Disk-to-Disk (D2D) Backup & Recovery



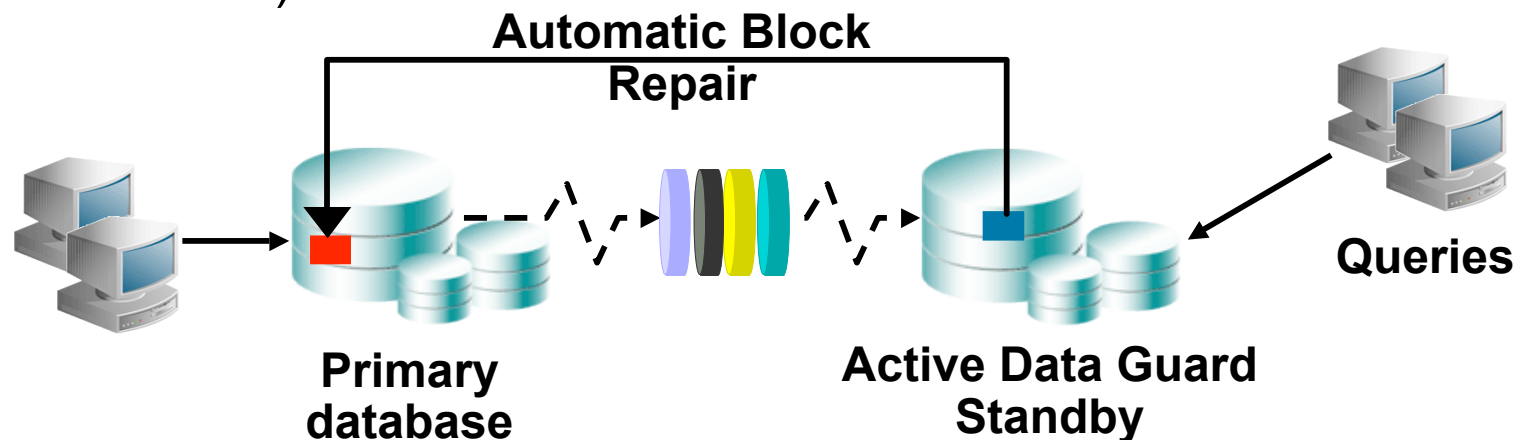
*Integrated backup-storage tiering*

- Fast Recovery Area – Integrated D2D backup and recovery
  - Favorable disk economics – low-cost disks used for recovery area
  - Oracle makes it even better with ‘restore-free recovery’:
    - `switch datafile 4 to copy;`
    - `recover datafile 4;`
- Fast incremental backups
  - Backs up only changed blocks
  - Changed blocks are tracked using a very efficient algorithm, e.g. 20X faster
- Nightly incremental backup rolls forward recovery area backup
  - No need to do full backups
    - `recover copy of database with tag 'ORCL';`

# RMAN New Features

## Oracle Database 11g Release 2

- Automatic Block Repair
  - Allows corrupt blocks on the primary database to be automatically repaired from physical standby database, as they are detected.
  - In-line and transparent. User sees brief wait from query on corrupt block while it is being repaired.
  - Can also be performed on-demand via `RECOVER` command
  - Requires Active Data Guard (real-time query on physical standby database).





# RMAN New Features

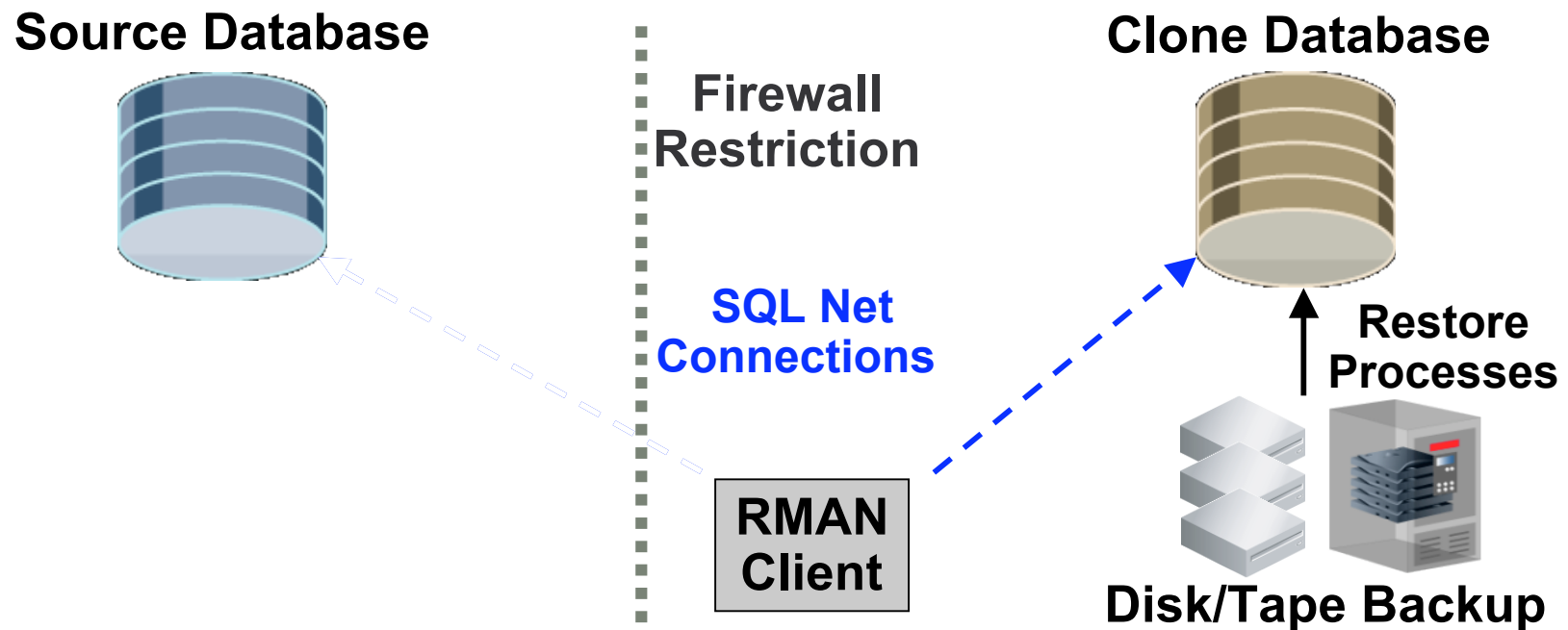
## Oracle Database 11g Release 2

- Backup compression: popular way to save on storage costs
- Multiple RMAN backup compression levels
  - Choose compression levels & backup throughput
    - **[BASIC] | HIGH | MEDIUM | LOW**
    - HIGH – reduces backup size by 40%+ depending on data type
    - LOW – least impact on backup throughput
    - MEDIUM – best balance between compression and throughput
    - HIGH | MEDIUM | LOW require Advanced Compression Option

# RMAN New Features

## Oracle Database 11g Release 2

- In previous releases, `DUPLICATE` required RMAN client connections to source and clone databases.
- With enhanced `DUPLICATE`, connection to source database not needed for environments where network connection is not available.



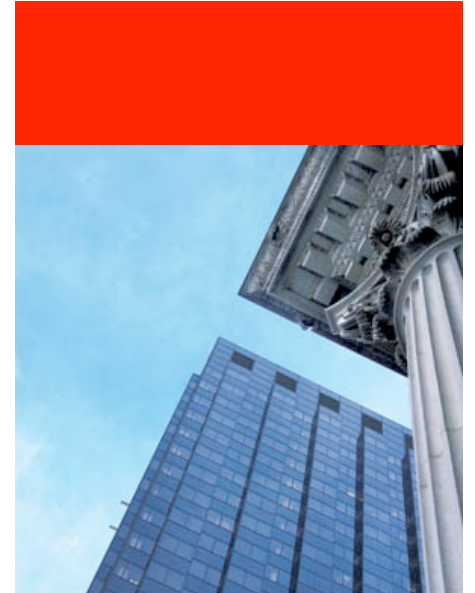


# Additional RMAN New Features

Feature	Benefit
<b>Backup Fast Recovery Area to disk location</b>	<ul style="list-style-type: none"><li>• Protect Fast Recovery Area with on-disk backup of its RMAN backups, archived logs, and controlfiles.</li></ul>
<b>Extended tablespace point-in-time recovery (TSPITR) capabilities</b>	<ul style="list-style-type: none"><li>• Recover a dropped tablespace.</li><li>• Perform multiple tablespace point-in-time recoveries, without requiring recovery catalog</li></ul>
<b>Resumable DUPLICATE</b>	<ul style="list-style-type: none"><li>• DUPLICATE can resume processing from most points of failure, reducing overall time.</li></ul>
<b>CONVERT DATABASE can skip unneeded datafiles</b>	<ul style="list-style-type: none"><li>• Reduces overall conversion time by only processing the required UNDO-containing data files.</li></ul>
<b>SET NEWNAME FOR TABLESPACE   DATABASE</b>	<ul style="list-style-type: none"><li>• Simplifies renaming of datafiles for RESTORE, DUPLICATE, and TSPITR operations.</li></ul>



# RMAN Best Practices







# RMAN Best Practices

- Fast Recovery Area (FRA) guidelines
  - Place FRA on separate storage & store backups, in addition to copy of control file, redo logs, and archived logs, to protect all needed recovery-related files from production outages.
  - When estimating FRA size, if you want to keep:
    - Control file backups and archived logs
      - Estimate archived logs generated between successive backups on the busiest days and multiply total size by 2 to account for activity spikes.
    - Archived logs and Flashback logs
      - Multiply the archived log size between backups by 4, assuming Flashback retention = time between archived log backups.
    - Incremental backups
      - Add in their estimated sizes
    - On-disk image copy backup
      - Add in size of the database minus the size of temp files

# RMAN Performance Factors

## Balancing Backup and Restore Requirements

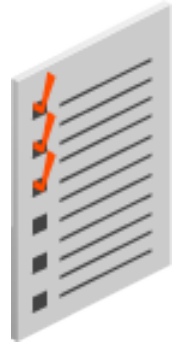
Consideration	Performance Effect
Incremental Backup Strategy	<ul style="list-style-type: none"><li>• Incremental backup strategy improves backup performance, with trade-off in recovery performance</li><li>• Enable block change tracking for fast incremental backups</li><li>• Cumulative vs. differential incremental backups</li><li>• 'Incremental forever' requires an initial full then incrementals thereafter<ul style="list-style-type: none"><li>– <b>Fast recovery</b>: Current image copy of database readily available</li></ul></li></ul>
Multiplexing	<ul style="list-style-type: none"><li>• Backup 'x' files in parallel per channel, improving backup performance</li><li>• RMAN multiplexing level = <code>min(FILESPERSET, MAXOPENFILES)</code></li><li>• Exception: Set <code>MAXOPENFILES = 1</code> for SAME or ASM datafiles</li><li>• Set # of RMAN channels = # of tape drives, so that <b>media management multiplexing</b> is not used for RMAN backups<ul style="list-style-type: none"><li>– Setting # of RMAN channels &gt; # of tape drives will impact restore, due to interleaved backup pieces on single tape</li></ul></li></ul>
Hardware/Network/Storage	<ul style="list-style-type: none"><li>• Assess host resources, production disk I/O, HBA/network, tape drive throughput</li><li>• Minimum performant component of these will be performance bottleneck</li></ul>



# Data Warehouse B&R Best Practices

- Exploit partitioning and read-only tablespaces
  - Older partitions can be moved to read-only tablespaces
  - Backup read-only tablespaces once, then periodically, depending on tape retention policy
- Divide full backup workload across multiple days
- Leverage database & backup compression
- Save time with tablespace level backups
  - Backup index tablespaces less frequently than data tablespaces
  - Backup scarcely used tablespaces less frequently
  - Reduce restore time for most critical tablespaces, by grouping them together in separate backups
- Take incremental backup when NOLOGGING operations finish to ensure recoverability

# Test, Test, Test Recovery...



Recovery Scenario	Oracle Technologies
Media Failure	RMAN – restore all files to new storage location
Block Corruption	RMAN Validate, Block Media Recovery, Trial Recovery, LogMiner
User/Logical Error	Flashback Technologies, RMAN TSPITR, LogMiner
Disaster	Data Guard; RMAN -- restore all files to new host/storage

- **Data Recovery Advisor – built-in database failure diagnosis, analysis, & repair tool**



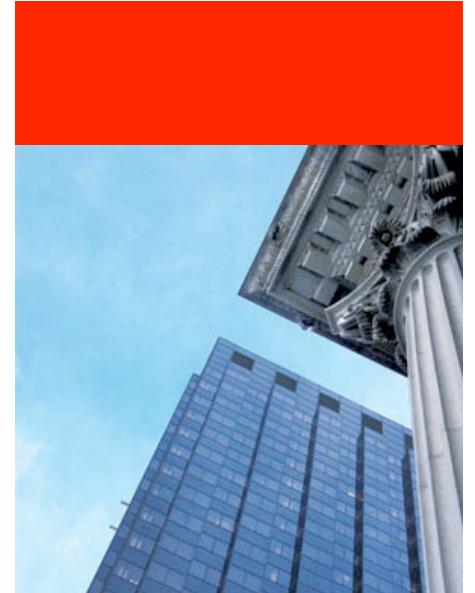


## Additional Resources

- RMAN Step-by-Step Performance Tuning (NEW)
  - [http://www.oracle.com/technology/deploy/availability/pdf/rman\\_tuning\\_mm\\_bp.pdf](http://www.oracle.com/technology/deploy/availability/pdf/rman_tuning_mm_bp.pdf)
- Very Large Database Backup & Recovery Best Practices
  - [http://www.oracle.com/technology/deploy/availability/pdf/vldb\\_br.pdf](http://www.oracle.com/technology/deploy/availability/pdf/vldb_br.pdf)
- Best Practices using Recovery Manager with Oracle Data Guard and Oracle Streams
  - <http://www.oracle.com/technology/deploy/availability/pdf/oracle-openworld-2008/298772.pdf>

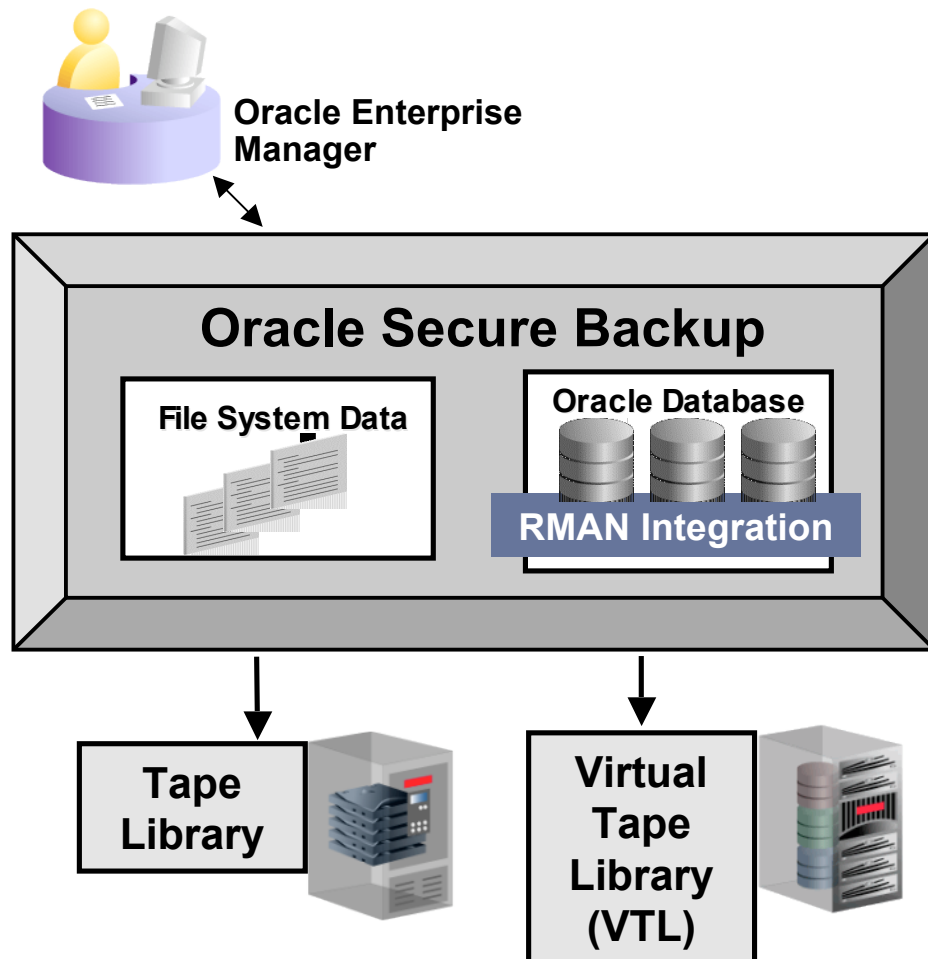


# Oracle Secure Backup



# Oracle Secure Backup (OSB)

## Enterprise Tape Backup Management

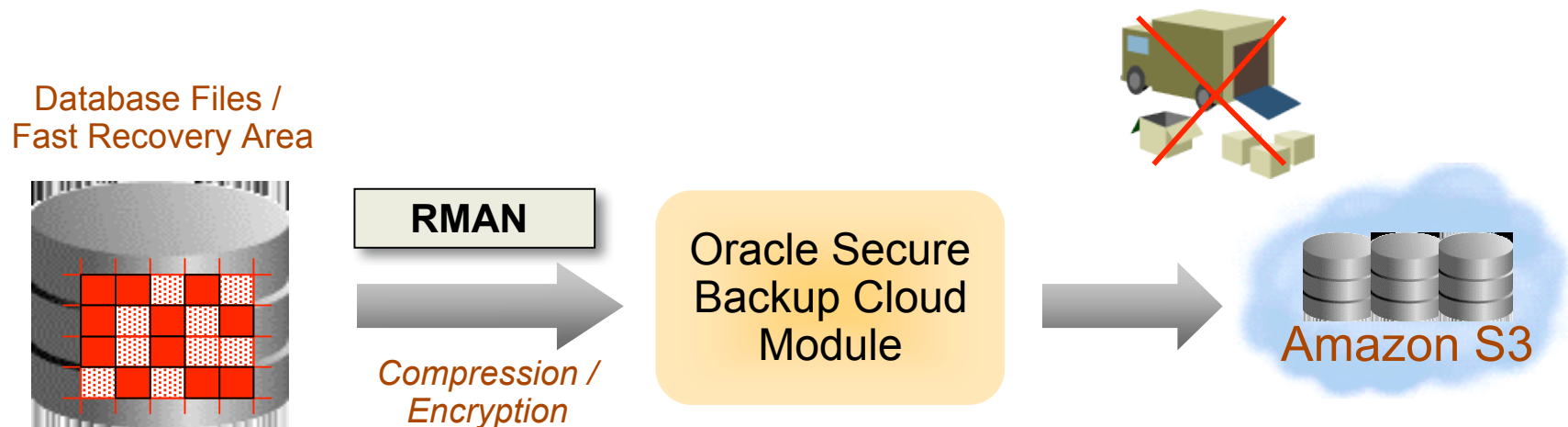


### Protects Entire IT Environment

- Oracle Database 11g Release 2 to Oracle9i
  - **25 – 40% faster tape backup**
- Heterogeneous file systems (UNIX/ Linux / Windows) and NAS devices
- **Built-in Oracle Integration**
- Centralized management in distributed environments
- **Over 75% less expensive than comparable products**

# Oracle Secure Backup Cloud Module

## Offsite Database Backups in the Cloud

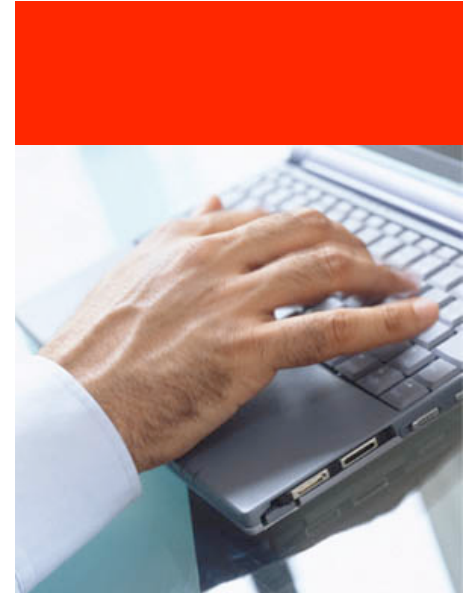


- Oracle Secure Backup Cloud module: Backup databases to Amazon Cloud
  - Complements local disk and/or tape backup
  - Eliminates IT management overhead of a disaster recovery site
  - Backed by Amazon S3 uptime SLAs
- \$3,500 per RMAN channel
- More information: <http://www.oracle.com/technology/tech/cloud/index.html>



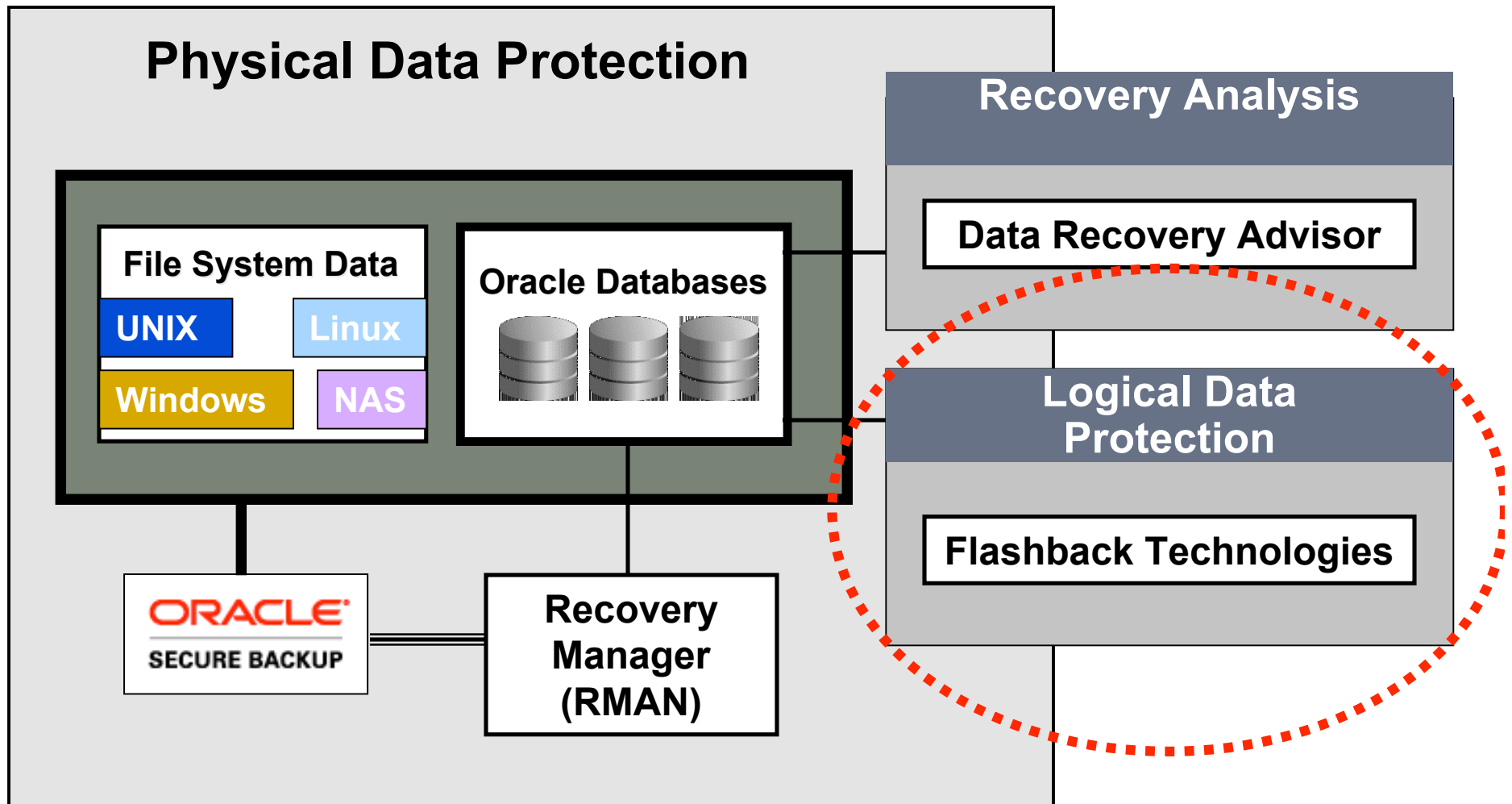
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# Logical Data Protection

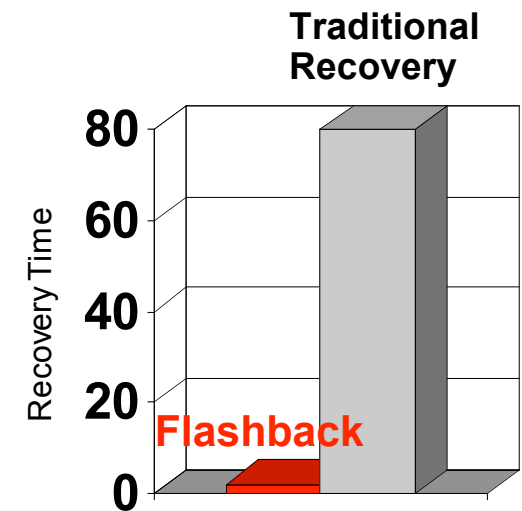
*Fast 'Rewind' of Logical Errors*



# Flashback Technologies

## Error Detection & Correction

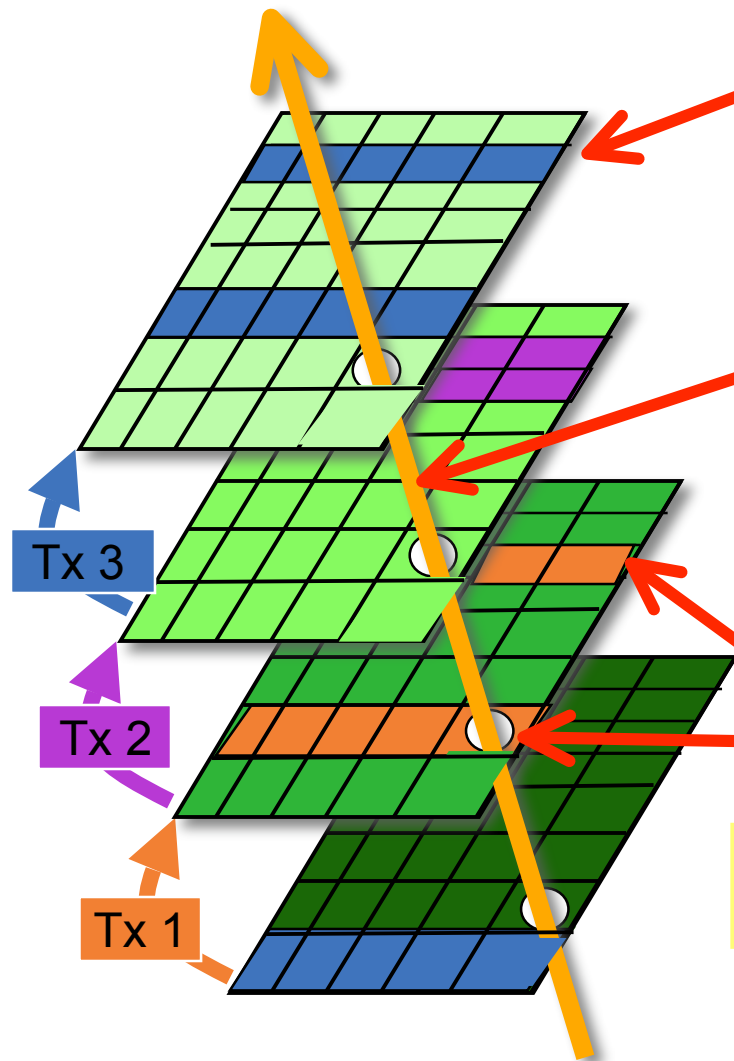
- Flashback revolutionizes error recovery
  - View 'good' data as of a past point-in-time
  - Simply rewind data changes
  - Time to correct error equals time to make error



$$\text{Correction Time} = \text{Error Time} + \cancel{f(\text{DB\_SIZE})}$$

- Low impact
- Excellent tool for configuring QA, Dev and Training databases
- Flashback is easy – simple commands, no complex procedure

# Error Investigation with Flashback



- **Flashback Query**

- Query all data at point in time

```
select * from Salary AS OF '12:00 P.M.' where ...
```

- **Flashback Version Query**

- See all versions of a row between times
- See transactions that changed the row

```
select * from Salary VERSIONS BETWEEN  
'12:00 PM' and '2:00 PM' where ...
```

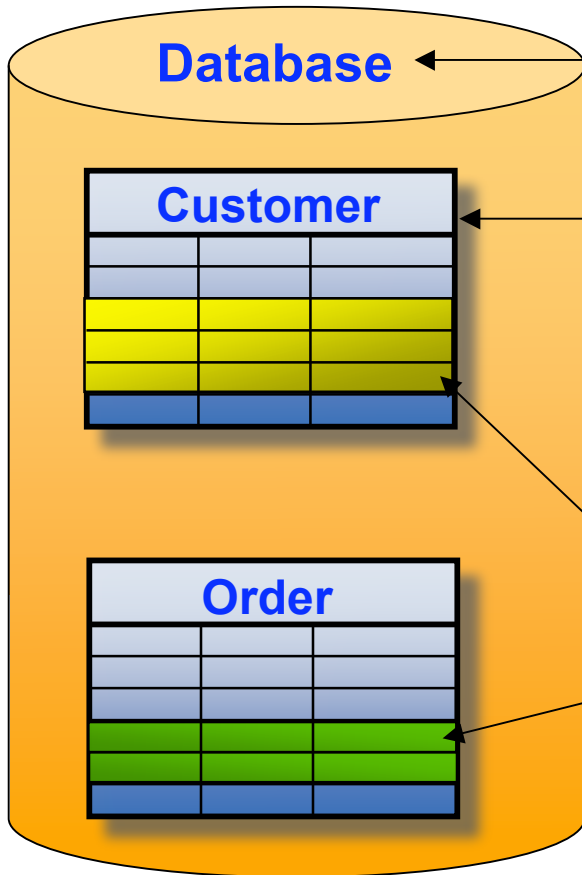
- **Flashback Transaction Query**

- See all changes made by a transaction

```
select * from FLASHBACK_TRANSACTION_QUERY  
where xid = HEXTORAW('000200030000002D');
```

- **All above are based on available UNDO**

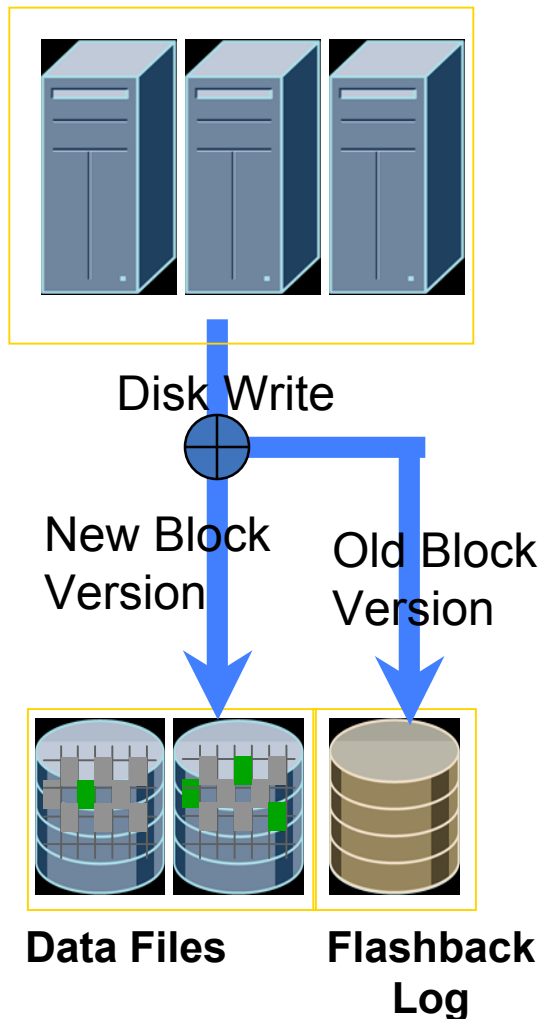
# Error Correction with Flashback



- **Flashback Database** – restore database to any point in time
- **Flashback Table** – restore contents of tables to any point in time (undo-based)
- **Flashback Drop** – restore accidentally dropped tables (based on free space in tablespace)
- **Flashback Transaction** – back out transaction and all subsequent conflicting transactions (redo-based)

# Flashback Database

## Continuous Data Protection (CDP)



- Fast point-in-time recovery strategy
- Eliminate the need to restore a whole database backup
- Continuous data protection for database
  - Optimized, before-change block logging
  - Restores just changed blocks
  - Replay log to restore DB to desired time
- It's fast - recover in minutes, not hours
- It's easy - single command restore

Flashback Database to '2:05 PM'

**"Rewind" button for the Database**



# Flashback Technologies New Features

## Oracle Database 11g Release 2

- **Increased Availability**
  - Enable Flashback Database while database is open
    - Test Flashback without having to take downtime
- **Better Manageability**
  - Monitor Flashback Database progress with `v$session_longops`
    - Progress percentage can be found with `(SO FAR / TOTAL WORK)`
- **Minimize System Impact**
  - Optimized Flashback logging for batch/insert intensive loads
    - Potentially reduce Flashback logging impact to ~2%
- **Extended Dependency Tracking**
  - Flashback Transaction supports foreign key dependency tracking



# Best Practices – Undo-based Flashback

## Flashback Query, Flashback Table

- Use Undo Advisor (available through Enterprise Manager) to get recommendations on available undo retention for various sizes.
- Use fixed size undo
  - Undo retention automatically tuned for best possible retention based on tablespace size and current system load.
- Be aware of DDL restrictions – not possible to query in the past if table structure is modified (e.g. drop/modify column, move table, etc.)
- Further details:  
[http://download.oracle.com/docs/cd/B19306\\_01/appdev.102/b14251/adfns\\_flashback.htm#sthref1496](http://download.oracle.com/docs/cd/B19306_01/appdev.102/b14251/adfns_flashback.htm#sthref1496)



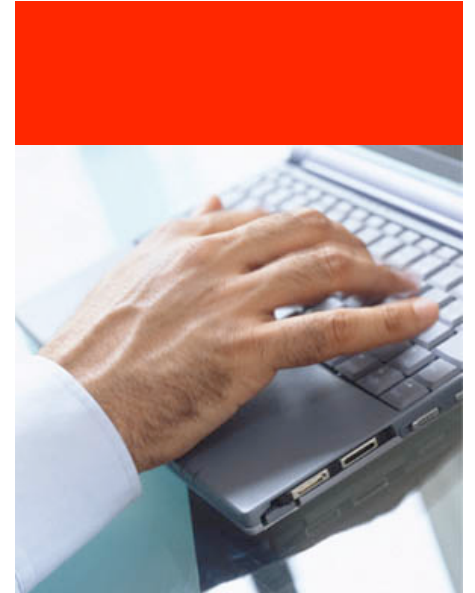


# Best Practices – Flashback Database

- Tune FRA storage
  - Use ASM, configure enough disk spindles, etc.
- Use physical standby database to test Flashback logging
- Use `V$FLASHBACK_DATABASE_LOG` to size log space, after running workload > duration of Flashback retention period.
- Create Guaranteed Restore Point (GRP) without enabling Flashback logging
  - Saves disk space for workloads where same blocks are repeatedly updated
  - Drop GRP to immediately reclaim space
- Further details:  
[Metalink Note 565535.1 Flashback Database Best Practices & Performance](#)

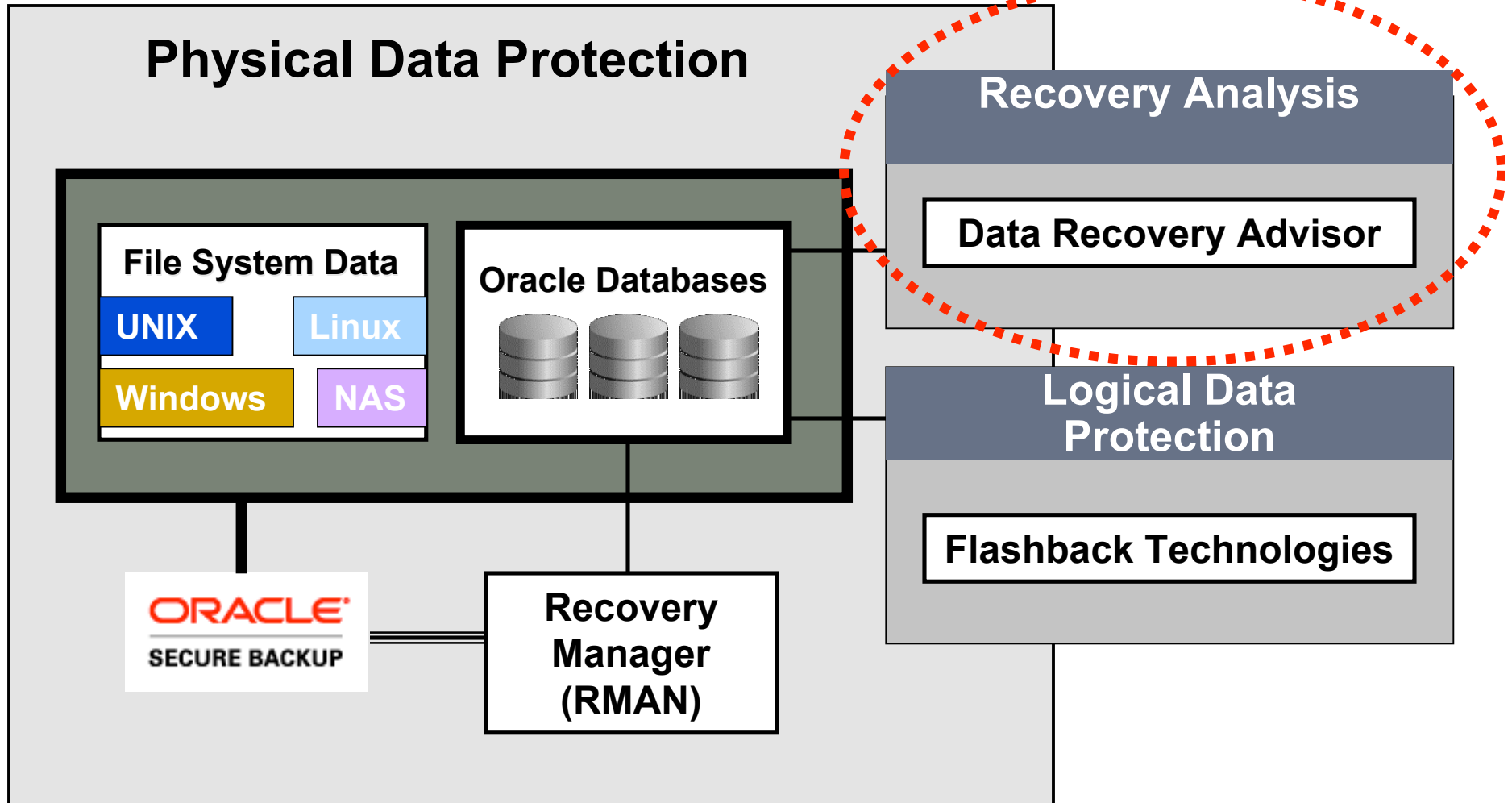
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# Recovery Analysis

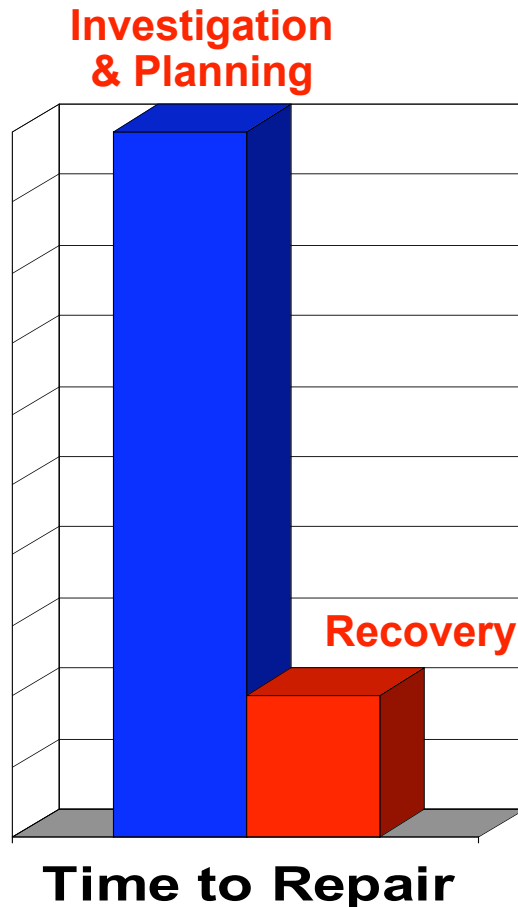
## Intelligent, Guided Recovery





# Data Recovery Advisor

## *The Motivation*



- Oracle provides robust tools for data repair:
  - ✓ RMAN – physical media loss or corruptions
  - ✓ Flashback – logical errors
  - ✓ Data Guard – physical problems
- However, problem diagnosis and choosing the right solution can be error prone and time consuming
  - Errors more likely during emergencies



# Data Recovery Advisor (DRA)

- Oracle Database tool that automatically diagnoses data failures, presents repair options, and executes repairs at the user's request
- Determines failures based on symptoms
  - E.g. an “open failed” because datafiles f045.dbf and f003.dbf are missing
  - Failure Information recorded in diagnostic Automatic Diagnostic Repository (ADR)
  - Flags problems before user discovers them, via automated health monitoring
- Intelligently determines recovery strategies
  - Aggregates failures for efficient recovery
  - Presents only feasible recovery options
  - Indicates any data loss for each option
- Can automatically perform selected recovery steps
- Accessed via RMAN or EM

***Reduces downtime by eliminating confusion***

# Data Recovery Advisor Wizard

**ORACLE** Enterprise Manager 10g  
Grid Control

Home Targets Deployments Alerts Compliance Jobs Reports  
Setup Preferences Help Logout

Hosts | Databases | Middleware | Web Applications | Services | Systems | Groups | **All Targets**

Database Instance: NewYork.us.oracle.com >

### Information

1. [Database Failures](#) - 1
2. [Current Status](#) - MOUNTED

### Perform Recovery

#### Oracle Advised Recovery

The Data Recovery Advisor has detected failures. Click on "Advise and Recover" to have Oracle analyze and produce recovery advice.

Failures Detected **Critical: 0 High: 1 Low: 0**  
Failure Description **One or more non-system datafiles are missing**

[Advise and Recover](#)

#### User Directed Recovery

Recovery Scope **Whole Database** [Recover](#)

Operation Type ☒ Recover to the current time or a previous point-in-time  
Datafiles will be restored from the latest usable backup as required.  
☐ Restore all datafiles  
Specify Time, SCN or log sequence. The backup taken at or prior to that time will be used. No recovery will be performed in this operation.  
☐ Recover from previously restored datafiles

#### Decrypt Backups

#### Host Credentials

To perform recovery, supply operating system login credentials to access the target database.

### Overview

- Recover database failures as advised by Oracle
- Restore and/or recover the entire database or selected objects
- Restore files to a new location
- Recover tablespaces to a point-in-time based on a timestamp, system change number (SCN), or log sequence number
- Recover datafile data blocks that are marked as corrupted, or based on datafile block IDs or tablespace block addresses
- Flashback database or tables to a specific system change number (SCN) or timestamp

# Data Recovery Advisor – View Failures

**ORACLE** Enterprise Manager 10g  
Grid Control

HomeTargetsDeploymentsAlertsComplianceJobsReportsSetupPreferencesHelpLogout

Hosts | Databases | Middleware | Web Applications | Services | Systems | Groups | All Targets

Database Instance: NewYork.us.oracle.com >

## View and Manage Failures

Last Refresh March 20, 2009 12:18:44 PM EDT

Select dropdown values and optionally enter failure description and impact strings to filter the data that is displayed in your results set.

Failure Description Impact Priority Status Time Detected

CRITICAL or HIGH OPEN All Go

Select failures and ... Advise Close Set Priority High Set Priority Low

Select All | Select None | Expand All | Collapse All

Select	Failure Description	Impact	Priority	Status	Time Detected
<input type="checkbox"/>	Data Failures				
<input checked="" type="checkbox"/>	One or more non-system datafiles are missing	See impact for individual child failures	HIGH	OPEN	2009-03-20 12:15:27.0
<input checked="" type="checkbox"/>	Datafile 5: '/private3/oracledg/oradata/NewYork/example01.dbf' is missing	Some objects in tablespace EXAMPLE might be unavailable	HIGH	OPEN	2009-03-20 12:15:27.0

**TIP** All CRITICAL failures must be selected before "Advise". All CRITICAL failures must be unselected before "Set Priority High" or "Set Priority Low".

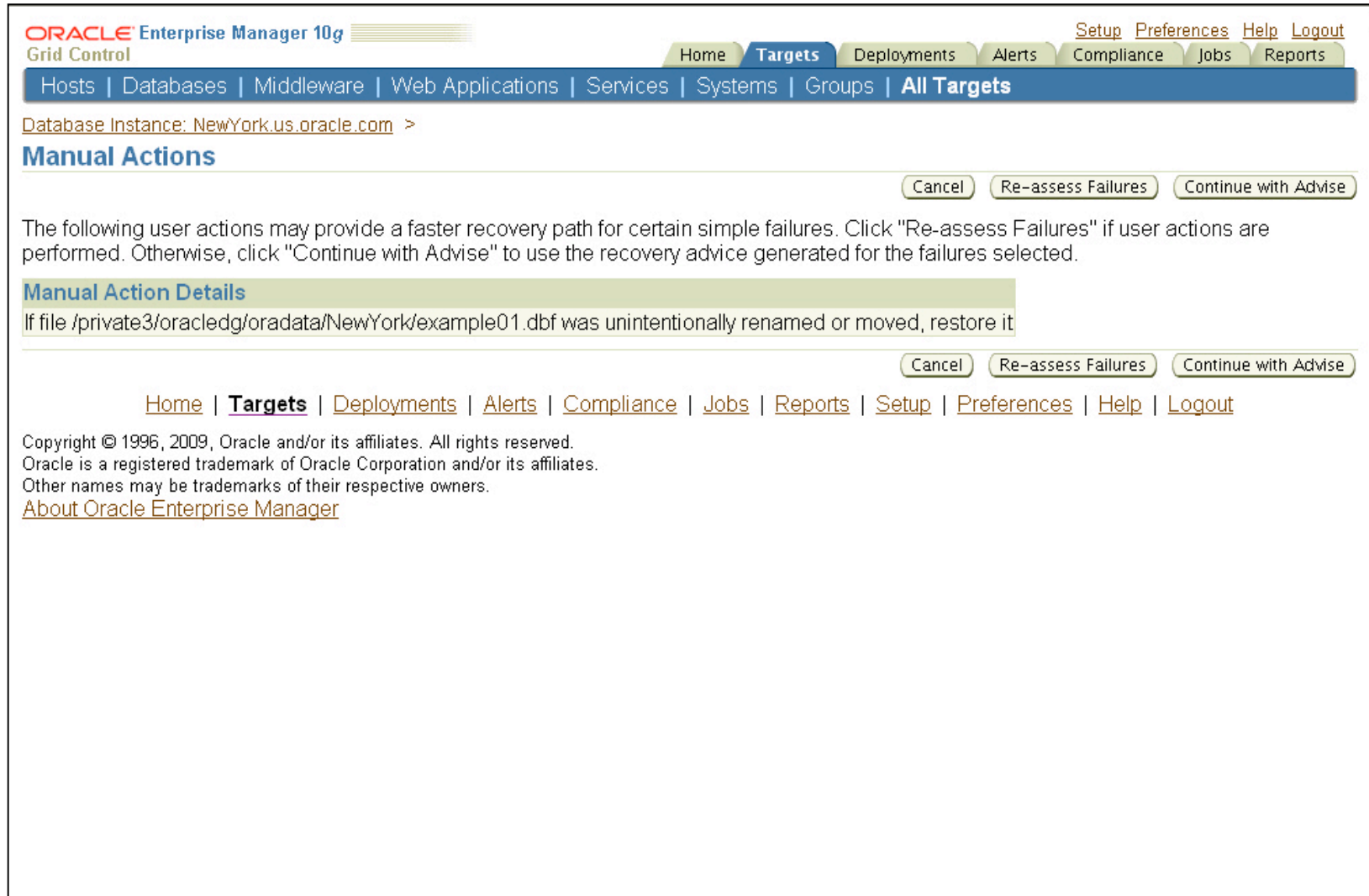
### Related Links

[Checkers](#)

Home | Targets | Deployments | Alerts | Compliance | Jobs | Reports | Setup | Preferences | Help | Logout

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[About Oracle Enterprise Manager](#)

# Data Recovery Advisor – Manual Repair



The screenshot shows the Oracle Enterprise Manager 10g interface for the Data Recovery Advisor. The top navigation bar includes links for Home, Targets, Deployments, Alerts, Compliance, Jobs, and Reports. The main content area is titled "Manual Actions" and contains a section for "Manual Action Details". The details section describes a file that was unintentionally renamed or moved and provides options to "Cancel", "Re-assess Failures", or "Continue with Advise". The footer contains copyright information and a link to "About Oracle Enterprise Manager".

ORACLE Enterprise Manager 10g  
Grid Control

Home Targets Deployments Alerts Compliance Jobs Reports

Hosts | Databases | Middleware | Web Applications | Services | Systems | Groups | All Targets

Database Instance: NewYork.us.oracle.com >

### Manual Actions

Cancel Re-assess Failures Continue with Advise

The following user actions may provide a faster recovery path for certain simple failures. Click "Re-assess Failures" if user actions are performed. Otherwise, click "Continue with Advise" to use the recovery advice generated for the failures selected.

#### Manual Action Details

If file /private3/oracledg/oradata/NewYork/example01.dbf was unintentionally renamed or moved, restore it

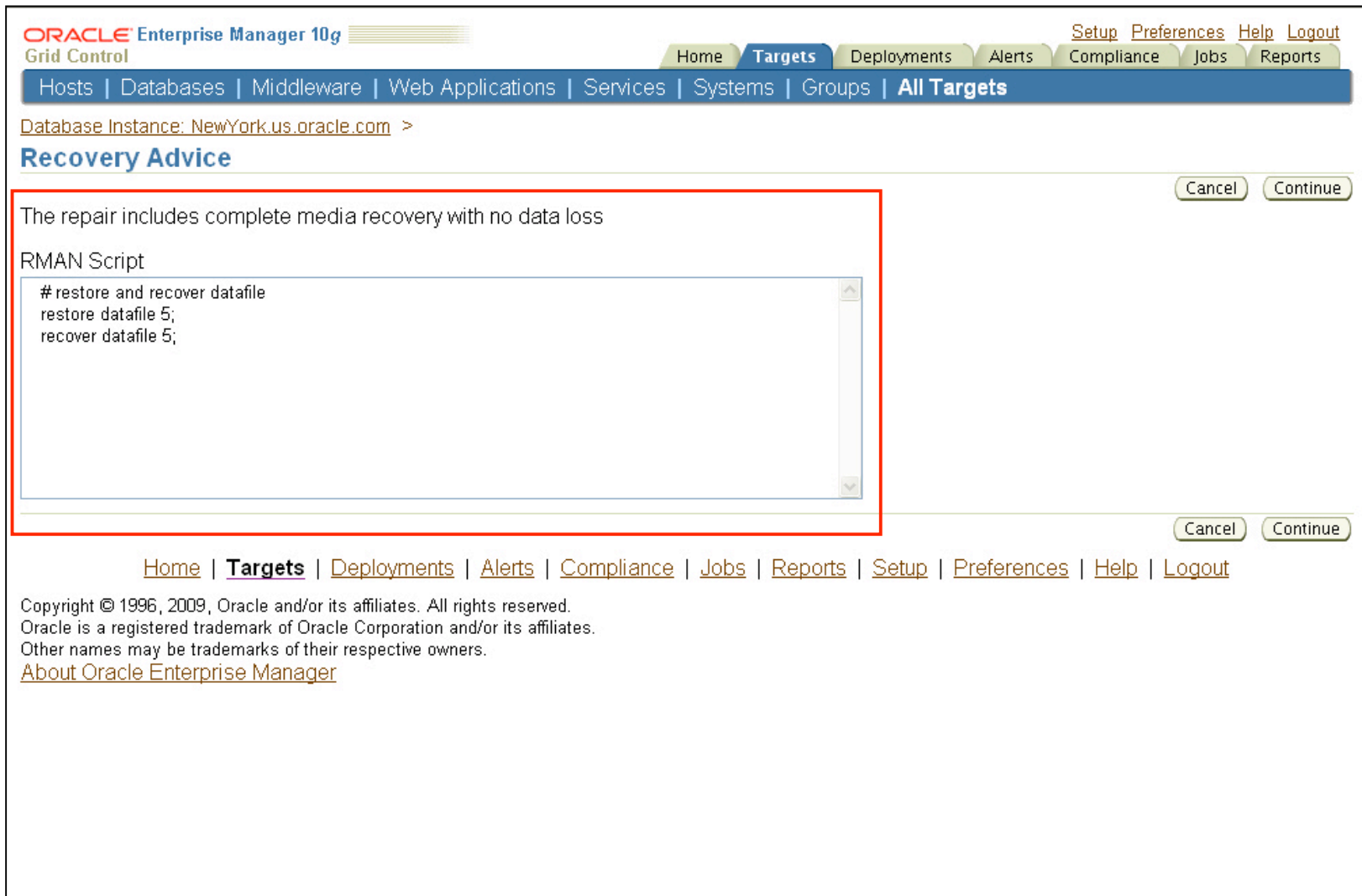
Cancel Re-assess Failures Continue with Advise

Home | Targets | Deployments | Alerts | Compliance | Jobs | Reports | Setup | Preferences | Help | Logout

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# Data Recovery Advisor – Recovery Advice



The screenshot shows the Oracle Enterprise Manager 10g interface. The top navigation bar includes links for Home, Targets, Deployments, Alerts, Compliance, Jobs, and Reports. Below this is a sub-navigation bar with links for Hosts, Databases, Middleware, Web Applications, Services, Systems, Groups, and All Targets. The main content area is titled "Recovery Advice" and displays the following information:

The repair includes complete media recovery with no data loss

Cancel Continue

RMAN Script

```
# restore and recover datafile
restore datafile 5;
recover datafile 5;
```

Cancel Continue

Home | **Targets** | Deployments | Alerts | Compliance | Jobs | Reports | Setup | Preferences | Help | Logout

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# Data Recovery Advisor – Summary

**ORACLE Enterprise Manager 10g**  
Grid Control

HomeTargetsDeploymentsAlertsComplianceJobsReportsSetupPreferencesHelpLogout

Hosts | Databases | Middleware | Web Applications | Services | Systems | Groups | All Targets

Database Instance: NewYork.us.oracle.com >

Review

CancelSubmit Recovery Job

The repair includes complete media recovery with no data loss

☒ Open Database after Recovery  
The database is currently not open. Open the database after a successful recovery operation.

Failures That Will Be Resolved

Expand All | Collapse All

Failure Description	Impact	Priority
▼ Failures That Will Be Resolved		
▼ One or more non-system datafiles are missing	See impact for individual child failures	HIGH
Datafile 5: '/private3/oracledg/oradata/NewYork/example01.dbf' is missing	Some objects in tablespace EXAMPLE might be unavailable	HIGH

RMAN Script

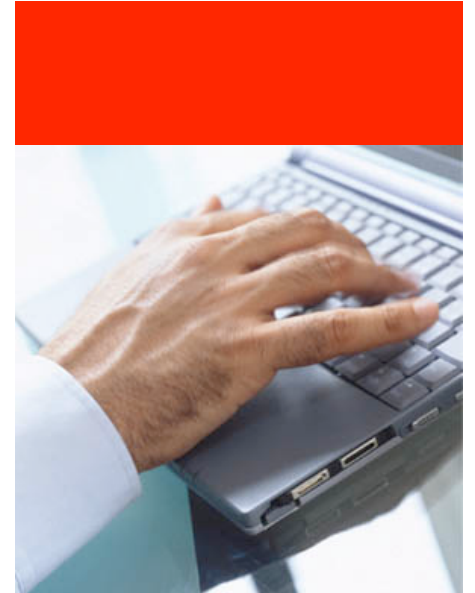
# restore and recover datafile  
restore datafile 5;  
recover datafile 5;

CancelSubmit Recovery Job

HomeTargetsDeploymentsAlertsComplianceJobsReportsSetupPreferencesHelpLogout

# Agenda

- What Keeps You Awake at Night?
- Oracle Data Protection Planning & Solutions
- Oracle Backup & Recovery Solutions
  - Physical Data Protection
    - Recovery Manager
    - Oracle Secure Backup
  - Logical Data Protection
    - Flashback Technologies
  - Recovery Analysis
    - Data Recovery Advisor
  - Putting It All Together – Customer Example
- Turkcell Backup & Recovery Case Study
- Q&A



# Putting It All Together..

## Customer Example

Requirement	Service Level Agreement	Oracle Solution
RPO	Any point in time within recovery window	➤ Archived Log Mode
RTO •Tier 3  •Tier 2  •Tier 1	<ul style="list-style-type: none"><li>• &lt;1 hour for tablespace/datafile recovery &lt;3 hours for full database recovery</li><li>• &lt;30 min for row/table recovery (within last 3 hrs)</li><li>&lt;1 hour for database recovery from logical errors (within last 2 hrs)</li><li>• &lt;15 min for any database outage</li></ul>	<ul style="list-style-type: none"><li>➤ RMAN, OSB, DRA</li><li>➤ Flashback Table</li><li>➤ Flashback Database</li><li>➤ Data Guard</li></ul>
Disaster Recovery	Failover to standby database at secondary site Backups sent offsite	<ul style="list-style-type: none"><li>➤ Data Guard</li><li>➤ OSB</li></ul>
Retention Policy	Onsite backups - 3 day recovery window Offsite backups - 1 year tape retention	➤ Fast Recovery Area, OSB
Backup Redundancy	Two backup copies on tape	➤ OSB



# Recovery SLAs

## Customer Example

- Oracle Solution - RMAN + OSB + Data Guard + DRA
  - One-time image copy backup to Fast Recovery Area (FRA)
  - Daily differential incremental backup to FRA
  - Image copy rolled forward daily until “sysdate – 4”
  - FRA sized for one image copy backup + 4 incrementals + 4 days of archived logs
  - Daily backup of FRA to tape via OSB (retained for 1 month)
  - Daily vaulting of tape backups to offsite location (retained for 1 year)
  - Real-time, synchronized physical standby database in Maximum Performance mode for disaster recovery
  - Leverage DRA for real-time detection and analysis of failures



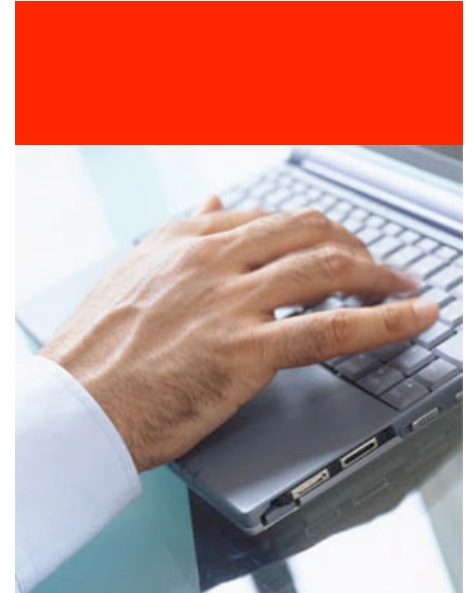
# Recovery SLAs

## Customer Example

- Oracle Solution – Flashback Technologies
  - Size UNDO tablespace for 3 hour retention period
  - Set Flashback Database target retention time to 2 hours
  - Provision Flashback log space in FRA, based on 2 hour workload

# Agenda

- What Keeps You Awake at Night?
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# Remember?

## Data Protection Concerns...



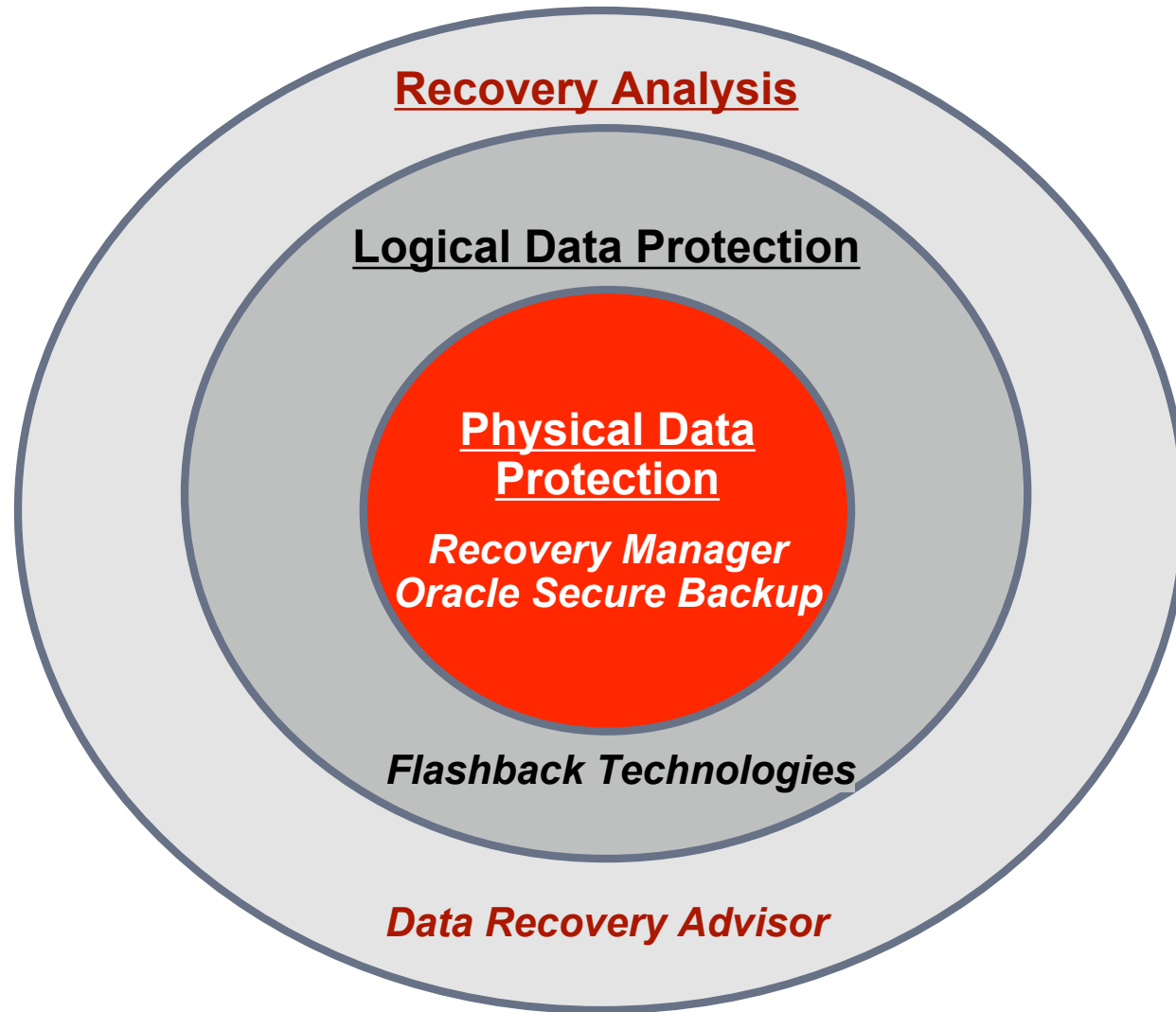
- Meeting recovery SLAs?
- Reducing exposure to data loss?
- Meeting backup windows?
- Dealing with long-term backup storage?
- Management complexity?
- Budget?

***Solution...***



# Oracle Backup & Recovery Solutions

## Complete & Targeted Recovery





# OTN Resources

- Recovery Manager:

[http://www.oracle.com/technology/deploy/availability/htdocs/RMAN\\_Overview.htm](http://www.oracle.com/technology/deploy/availability/htdocs/RMAN_Overview.htm)

- Oracle Secure Backup

<http://www.oracle.com/technology/products/secure-backup/index.html>

- Flashback Technologies

[http://www.oracle.com/technology/deploy/availability/htdocs/Flashback\\_Overview.htm](http://www.oracle.com/technology/deploy/availability/htdocs/Flashback_Overview.htm)

- Oracle Cloud Computing Center

<http://www.oracle.com/technology/tech/cloud/index.html>

- Oracle Maximum Availability Architecture

<http://www.oracle.com/technology/deploy/availability/htdocs/maa.htm>

ORACLE

# HA Sessions, Labs, & Demos by Oracle Development

**Sunday, 11 October – Hilton Hotel Imperial Ballroom B**

**3:45p** Online Application Upgrade

**Monday, 12 October – Marriott Hotel Golden Gate B1**

**11:30a** Introducing Oracle GoldenGate Products

**Monday, 12 October – Moscone South**

**1:00p** Oracle's HA Vision: What's New in 11.2, Room **103**

**4:00p** Database 11g: Performance Innovations, Room **103**

**2:30p** Oracle Streams: What's New in 11.2, Room **301**

**5:30p** Comparing Data Protection Solutions, Room **102**

**Tuesday, 13 October – Moscone South**

**11:30a** Oracle Streams: Replication Made Easy, Room **308**

**11:30a** Backup & Recovery on the Database Machine, Room **307**

**11:30a** Next-Generation Database Grid Overview, Room **103**

**1:00p** Oracle Data Guard: What's New in 11.2, Room **104**

**2:30p** GoldenGate and Streams - The Future, Room **270**

**2:30p** Backup & Recovery Best Practices, Room **104**

**2:30p** Single-Instance RAC, Room **300**

**4:00p** Enterprise Manager HA Best Practices, Room **303**

**Tuesday, 13 October – Marriott Hotel Golden Gate B1**

**11:30a** GoldenGate Zero-Downtime Application Upgrades

**1:00p** GoldenGate Deep Dive: Architecture for Real-Time

**Wednesday, 14 October – Moscone South**

**10:15a** Announcing OSB 10.3, Room **300**

**11:45a** Active Data Guard, Room **103**

**5:00p** Exadata Storage & Database Machine, Room **104**

**Thursday, 15 October – Moscone South**

**9:00a** Empowering Availability for Apps, Room **300**

**12:00p** Exadata Technical Deep Dive, Room **307**

**1:30p** Zero-Downtime DB Maintenance, Room **103**

## Demos Moscone West DEMOGrounds

**Mon & Tue 10:30a - 6:30p; Wed 9:15a - 5:15p**

Maximum Availability Architecture (MAA), **W-045**

Oracle Streams: Replication & Advanced Queuing, **W-043**

Oracle Active Data Guard, **W-048**

Oracle Secure Backup, **W-044**

Oracle Recovery Manager & Flashback, **W-046**

Oracle GoldenGate, **3709**

## Hands-on Labs Marriott Hotel Golden Gate B2

**Monday 11:30a-2:00p** Oracle Active Data Guard, Parts I & II

**Thursday 9:00a-11:30a** Oracle Active Data Guard, Parts I & II



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