Implementing an Enterprise Class Database Backup and Recovery Plan

Tammy Bednar

Oracle Corporation

400 Oracle Parkway, Redwood Shores, CA 94065

Work: (650) 506-4780

Fax: (650) 506-7203

tammy.bednar@oracle.com

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7 Seconds

The amount of time it takes to lose a customer on the internet

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$7800

The estimated cost of down time per minute
for an e-business

Why perform backups?

Data is Most Valuable

Hardware and software can be replaced

Oracle Media Recovery

- Oracle was designed to recover from a media failure and return the database to a transaction-consistent state without data loss
- Database can be in production during most media recovery scenarios
- The most important thing required to recover from a media failure
  - Backups of the database must be available!

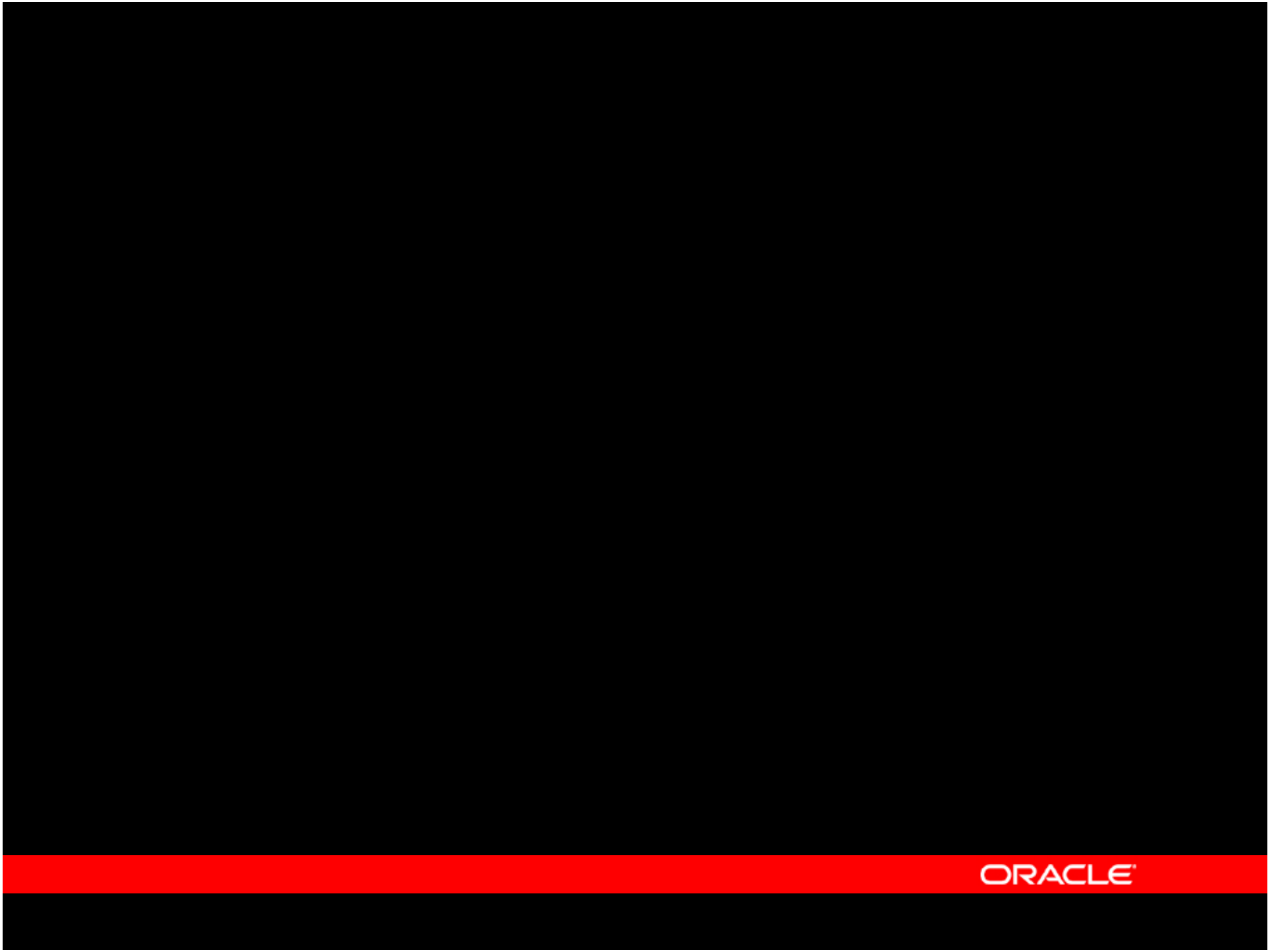
Agenda

- How do you protect your data?
  - 4 Steps to successful backup and recovery
    - Design a backup strategy
    - Determine a backup type
    - Identify what to backup
    - Select a backup tool
- Backup scenarios
- Summary

Step 1.
Design a backup strategy

Backup Strategy
Planning

- What do you plan for?
  - Media failures
  - Software failures
  - Human errors
  - Acts of nature
- Document backup and recovery procedures
- Ensures more choices available during recovery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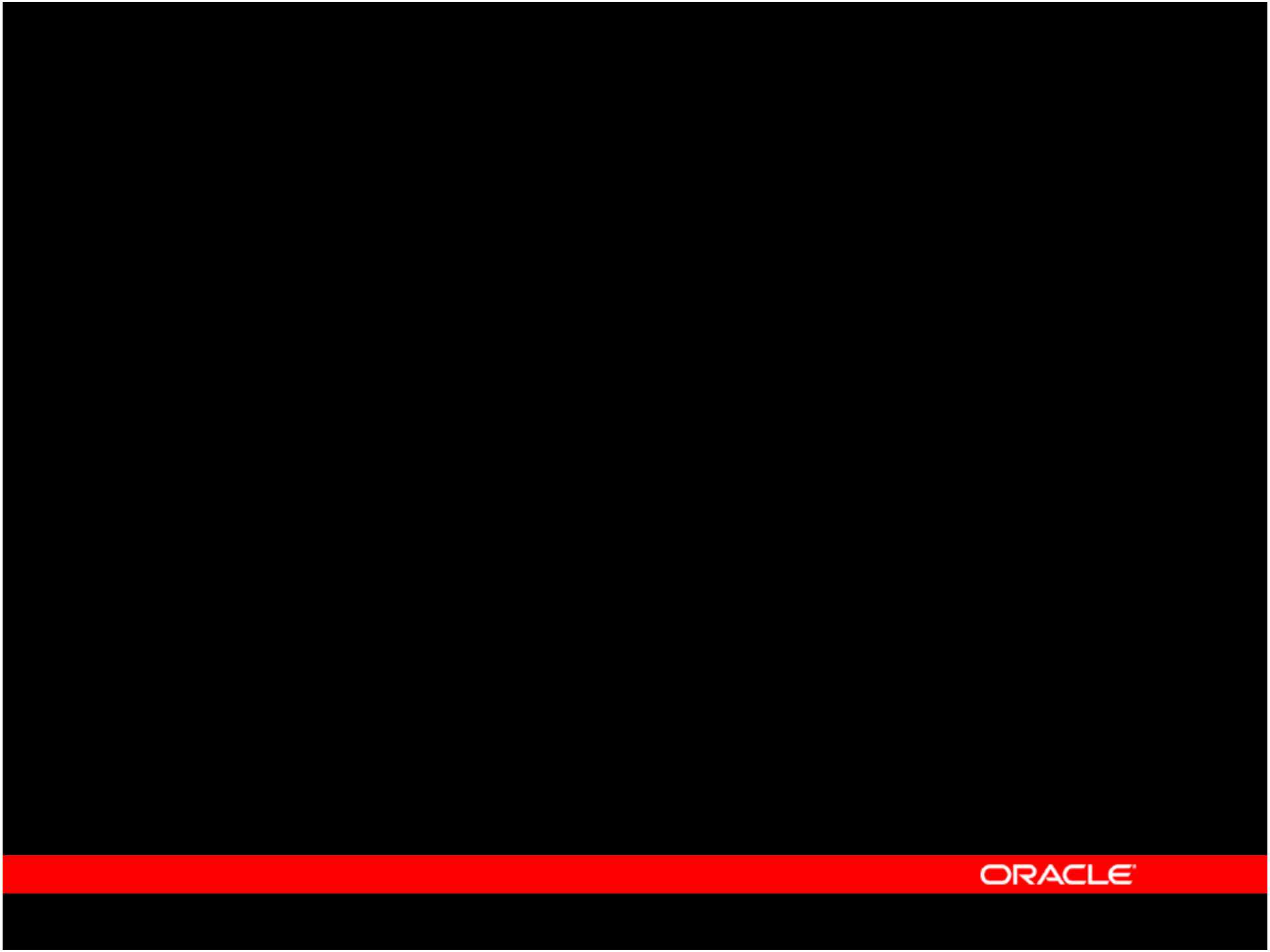
Backup Strategy Phases
Identify Resources

Hardware Configuration
Vendor/Model
Operation System
Version/Patch release
Disk Capacity
No. of Disk/Controller
Availability Requirement
Media Mgmt Vendor
Type and no of tapes

Database Configuration
Instance Name
Host Name
RDBMS Version
Size of Database
Backup Method/Frequency
Backup Method/Time to Restore
Datafile mount point(s)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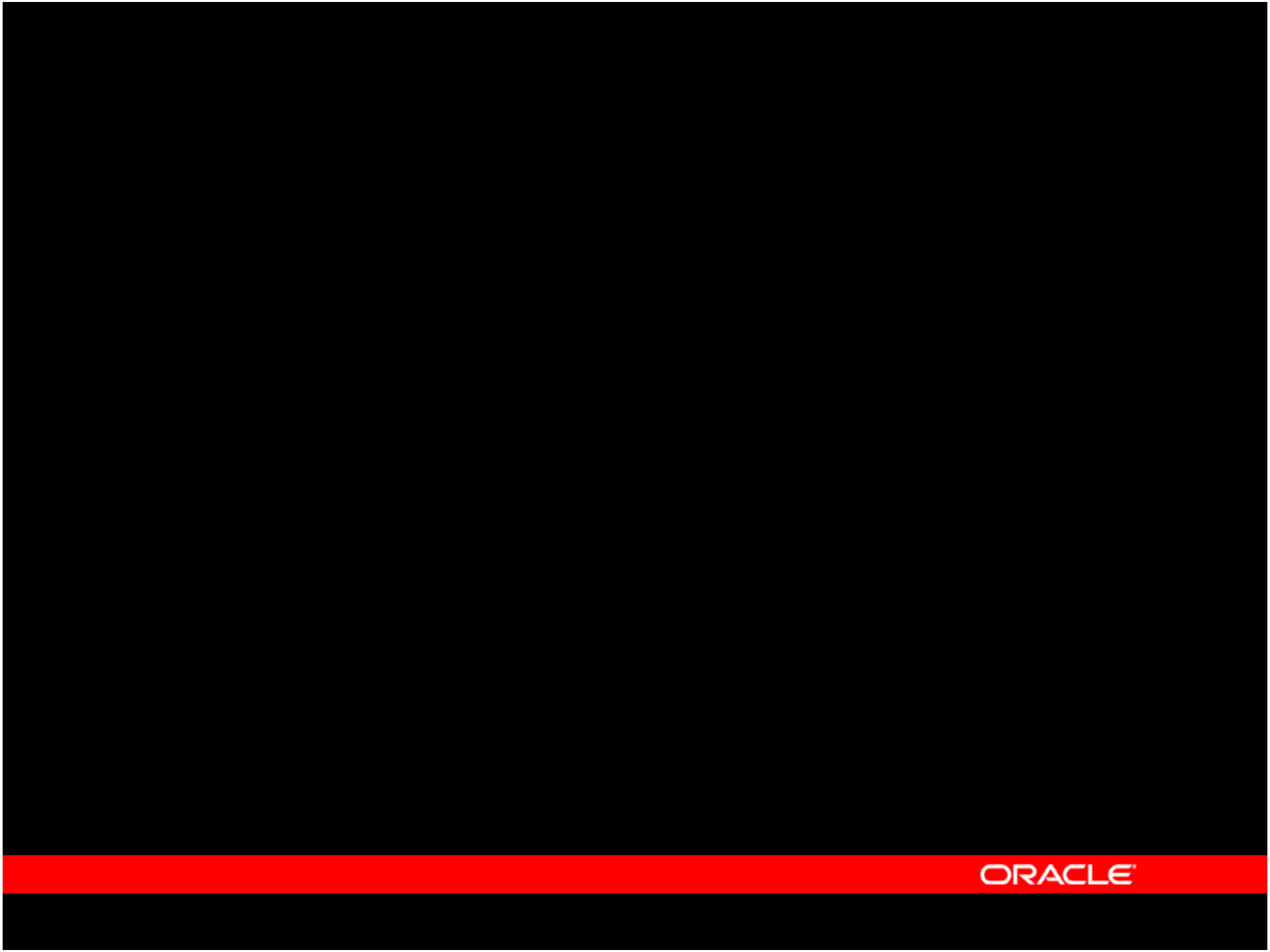
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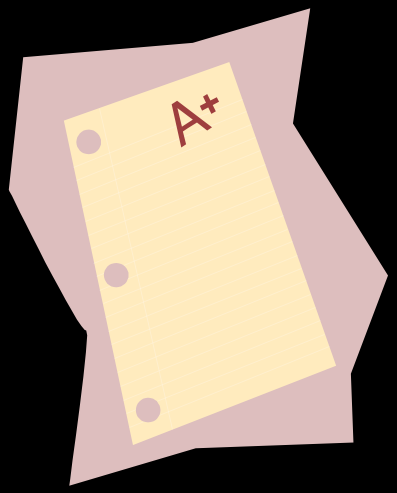
Backup Strategy Phases
Testing

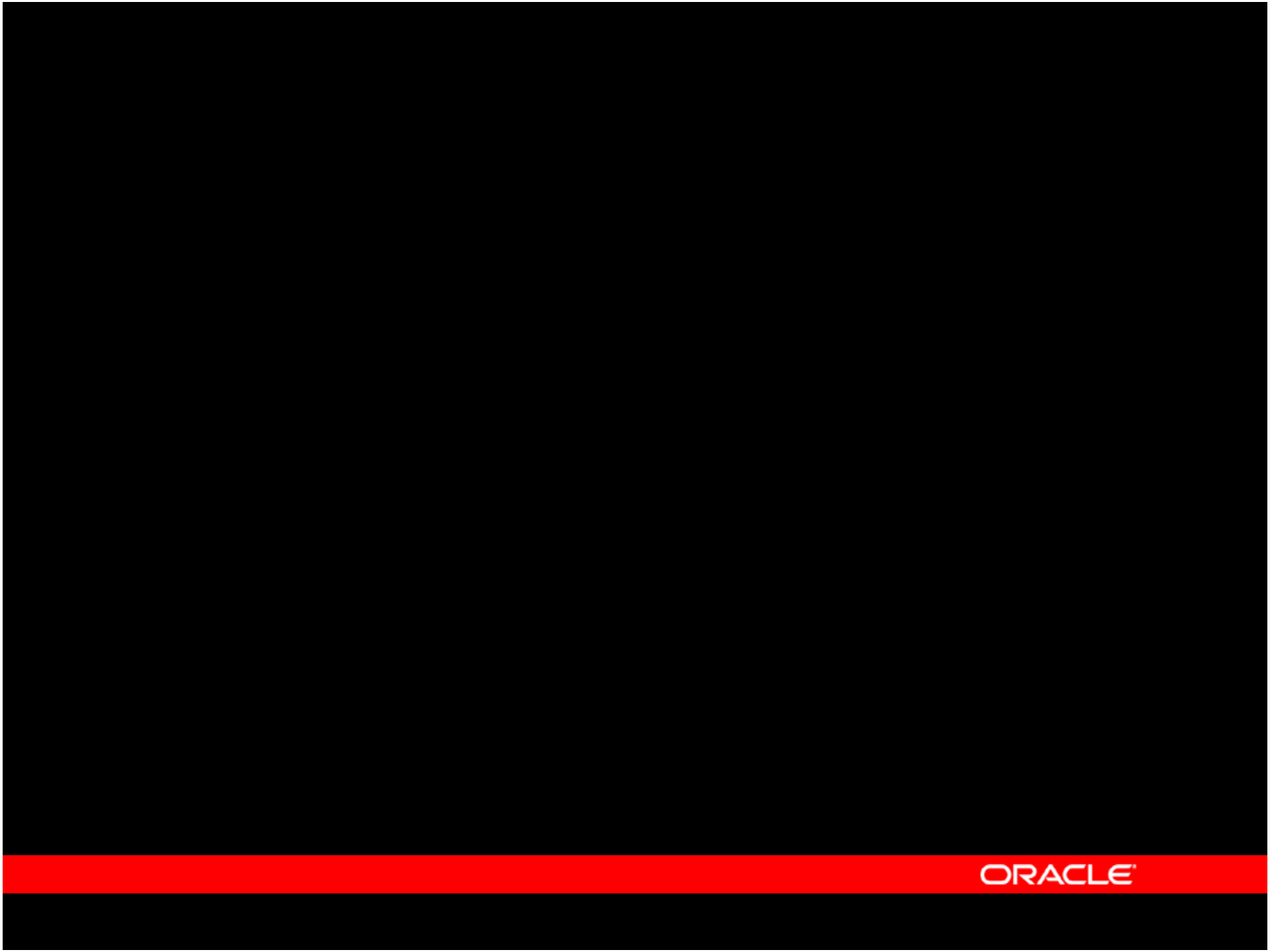


- Why test?
  - Ensure that your backup *and recovery* is working
  - Ensure recovery skills and procedures remain current
- What to test?
  - If a disk failed, would your DBA be able to perform a full recovery on the files from that disk?
  - What do you do if a table was dropped from the production instance?
  - How would you recover from a corrupted table block?
  - Can you recover the database server in the event of a fire?

Step 2.
Determine a backup type

Backup Types

Type	Definition
Full	A backup that backs up all used data blocks
Incremental	A backup of datafiles that includes only the blocks that have changed since a previous incremental backup
Online	A backup of any part of the database when it is open
Offline	A backup of any part of the database when it is mounted but not open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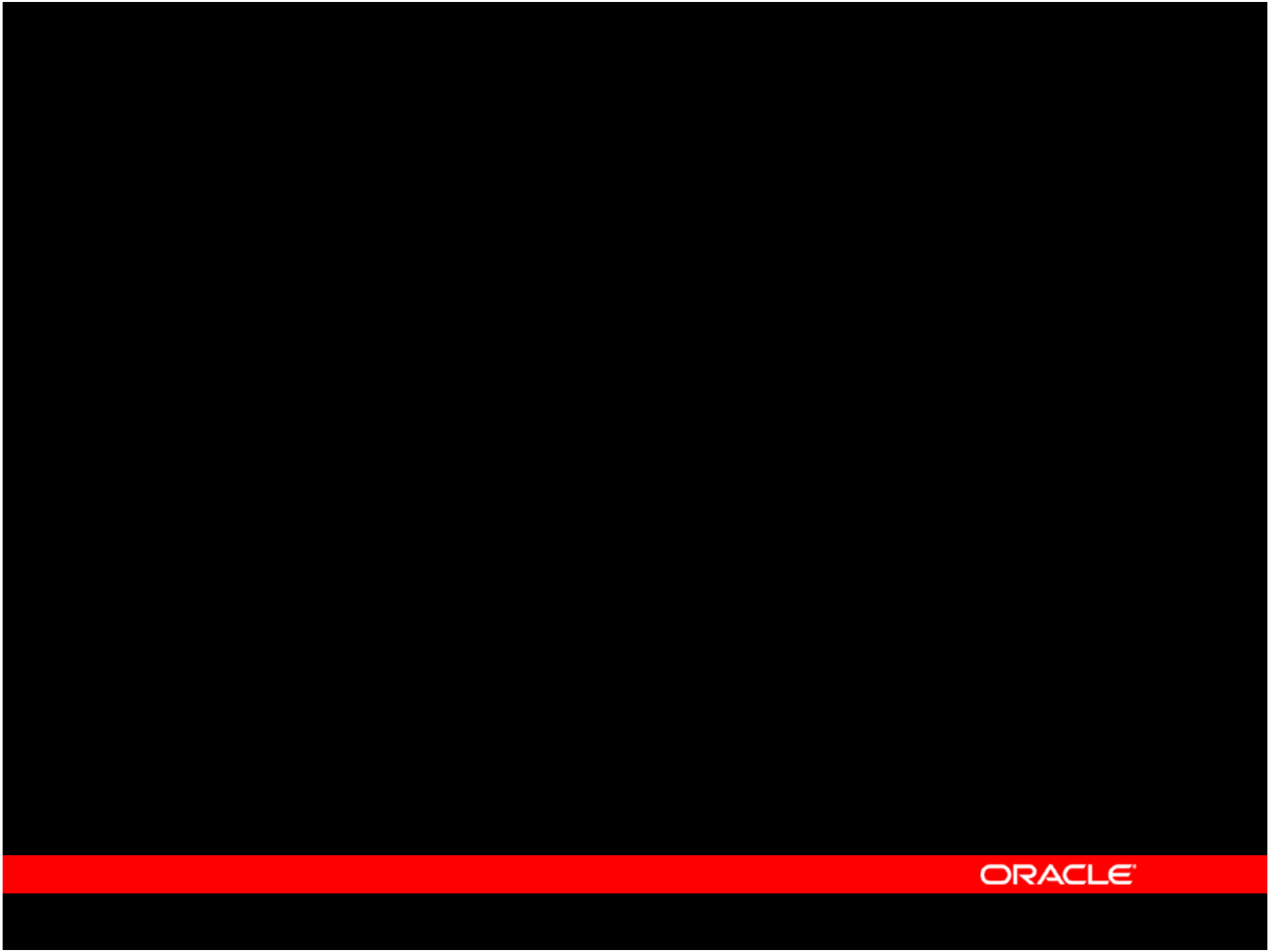
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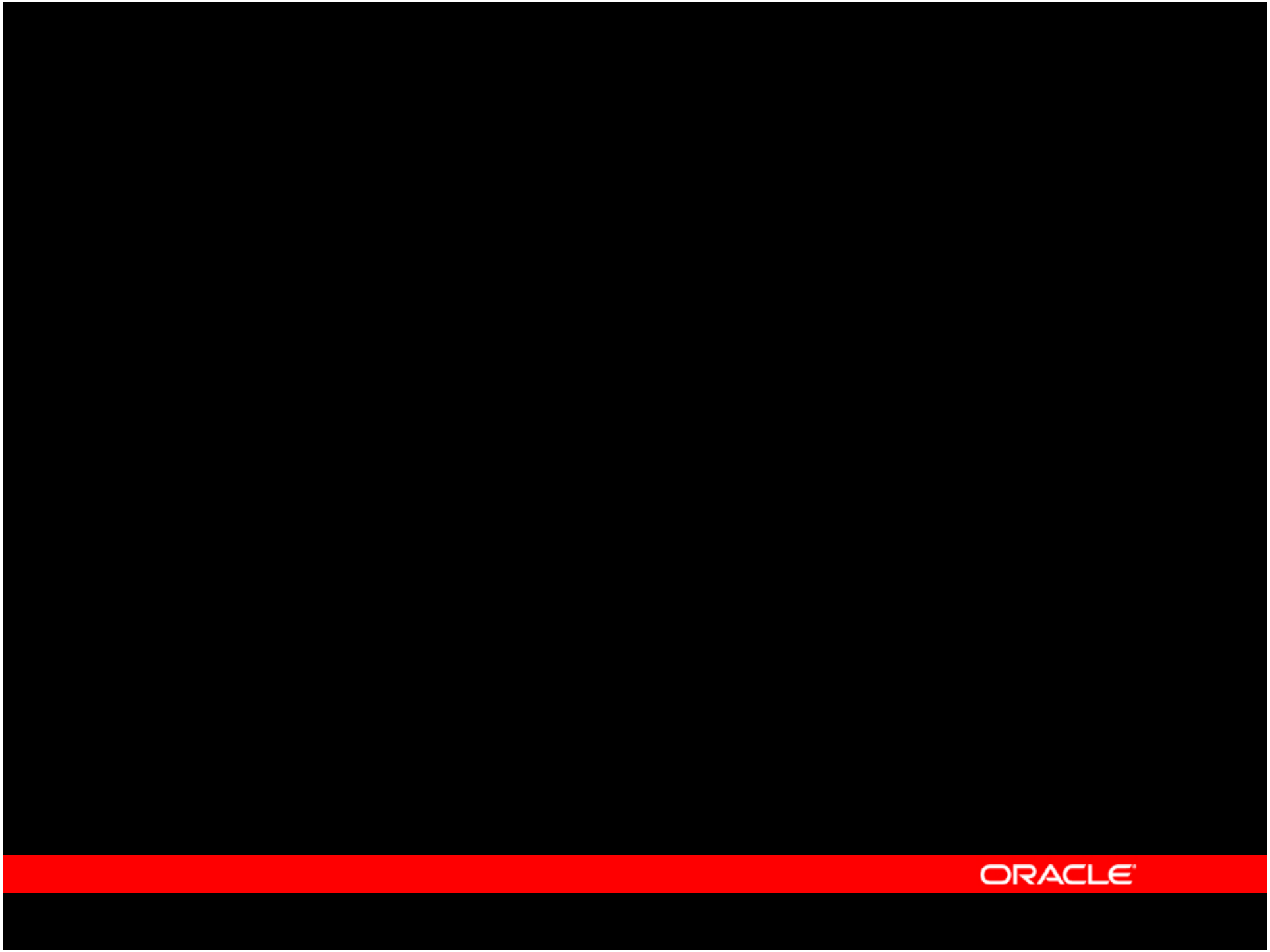
Step 3.
Identify what to backup

What should you backup and how often?

- Oracle Database Architecture
  - Datafiles
  - Archive logs
  - Control file
  - Configuration Files
- Determine your goal MTTR
  - Cost-effective detection of outage
  - Well defined action plans
  - Fast restore and recovery of the database
  - Opening the database quickly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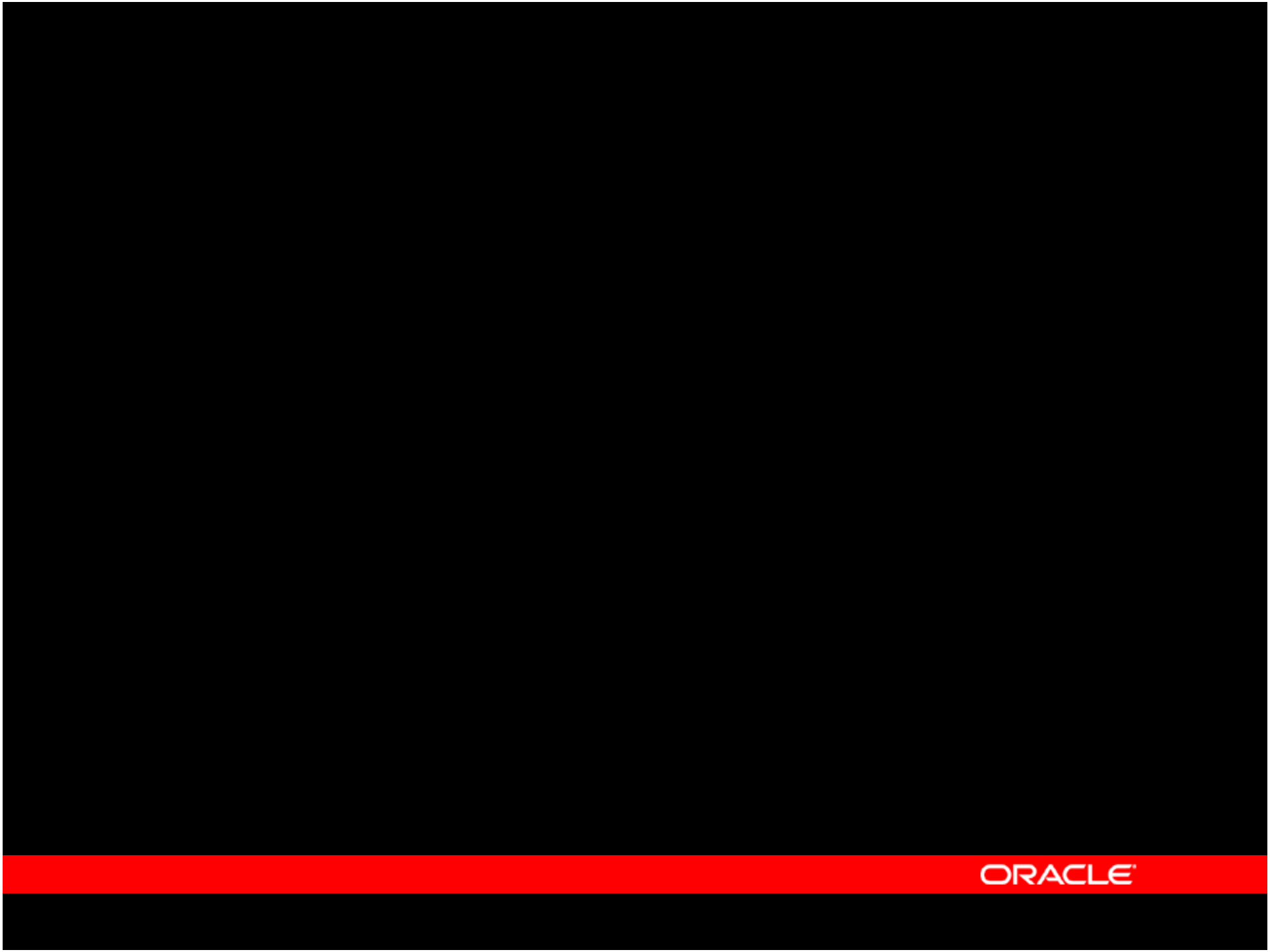
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Step 4.
Select a backup tool

Backup and Recovery Tools

- User Managed
  - Database is backed up and restored manually using OS commands
- Oracle Export/Import
  - Logical database backups
- Recovery Manager
  - Oracle's tightly integrated method for creating, managing, restoring and recovering databases
- Oracle Enterprise Manager
  - GUI interface to Recovery Manager
- Third Party Media Management Vendor
  - Database is backed up and restored using software interface

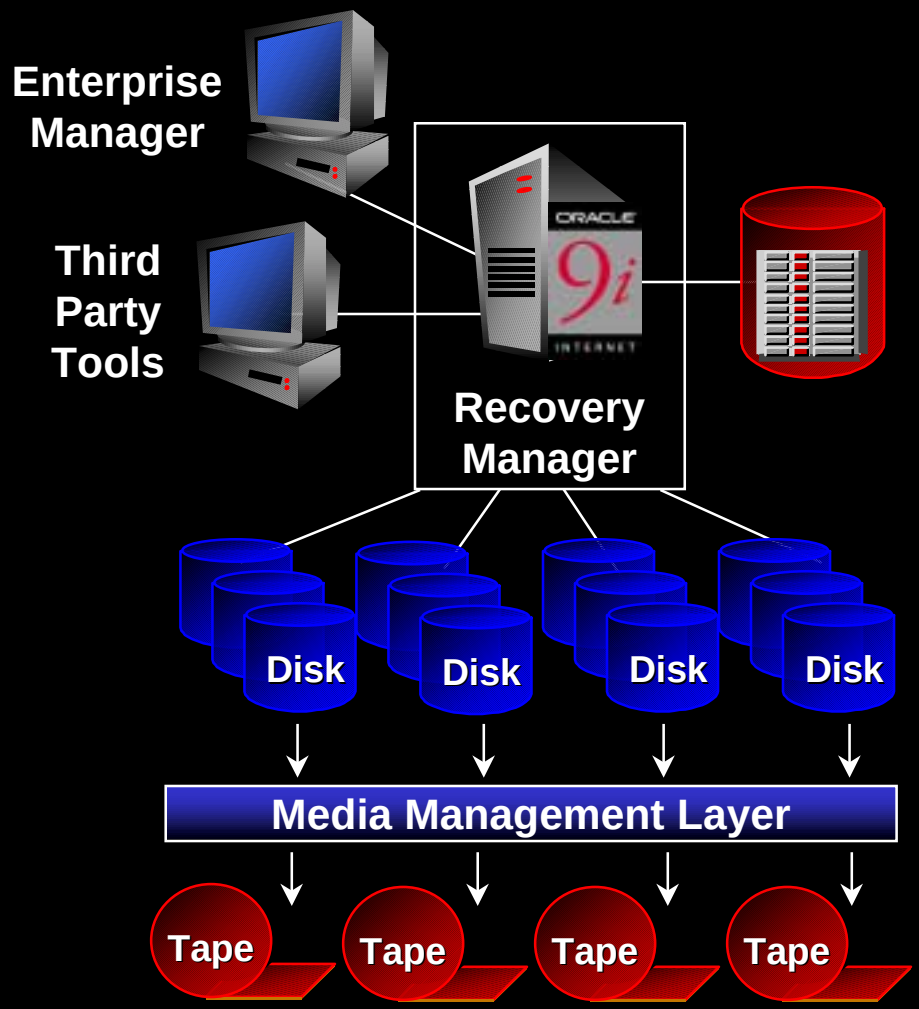
User Managed

- DBA must Manually
  - Create image backups using OS specific commands
  - Track when datafile backups are made
  - Track where the backups are located
  - Restore required datafiles and archivelog
  - Recover the database using SQL*Plus
- Online backups require tablespaces to be placed in Hot Backup mode

Oracle Export/Import

- Logical backups of the database, schema, or table
- Must use Oracle Import to insert data back into the database
- Should be used to supplement physical datafile backups
- Data may not be consistent across objects

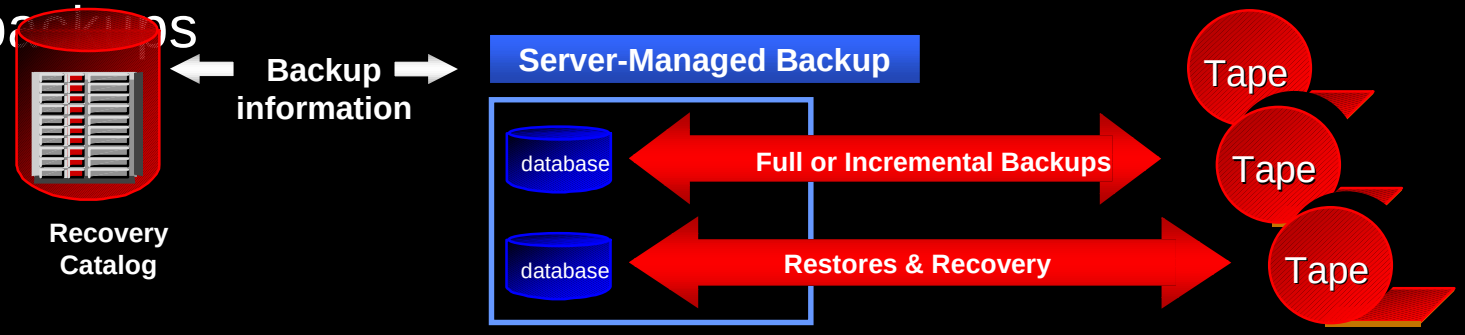
Oracle9*i* Recovery Manager



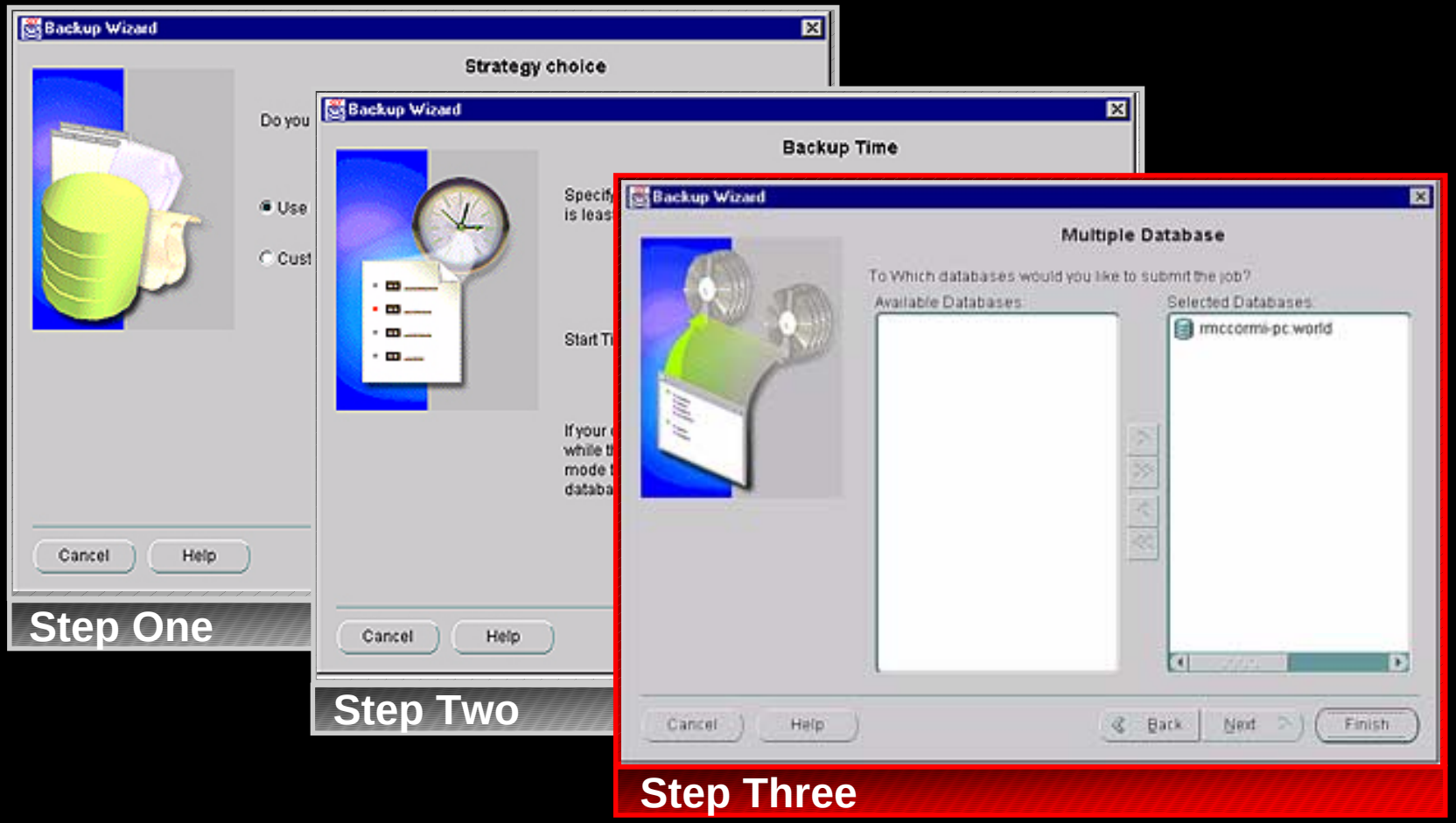
- Catalog backup and recovery information
- Manages backup, restore, and recovery operations
- Operates on-line and in parallel for fast processing
- Integrated with Enterprise Manager & 3rd Party Tools
- Proxy Copy Backup Accelerator for fast copy technology at the storage subsystem level
- Corrupt block detection during backup and restore and the ability to validate backups

Oracle9*i* Recovery Manager

- Request backup at database, tablespace, or datafile level
- Incremental backups (up to 4 levels)
- Comprehensive reporting
- Stored scripts that automate backup and recovery procedures
- Backups can be restricted to limit reads per file, per second to avoid interfering with OLTP work
- No generation of extra redo during online database backups



Recovery Manager
Enterprise Manager Interface



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Backup Solutions Program

http://www.oracle.com/ip/deploy/database/features/recovery/

Company	Product
CommVault Systems	DBVault Magnum
Compaq	OEM for Legato NetWorker, Veritas NetBackup, Veritas Backup Exec
Computer Associates	ARCServ
EMC	EMC Data Manager (EDM)
HP	Omniback
Innovation Data Processing	FDR/Upstream
Knox Software	Arkeia
Legato	Celestra, Networker, BudTool
Quadratec	Time Navigator
SCH Technologies	dbBRZ
Sun (Legato OEM)	Solstice Backup
Syncsort	Backup Express
Tantia Technologies	Harbor Backup
Tivoli	Tivoli Data Protection
VERITAS	Netbackup, Backup Exec
Verio	ASP provider

Oracle Partner Programs

- Backup Solutions Program (BSP)
- Oracle Storage Compatibility Program (OSCP)

Oracle Partner Programs - Backup Solutions Program (BSP)

- Facilitate tighter Integration with MMV
- Best of Database
- Best of Media Management Vendors
  - SBT interface - interface to tertiary storage
  - Proxy Copy - server-less backup
  - Provide SDK to certify backup product
  - Enterprise backup solution

Oracle Storage Programs - Oracle Storage Compatibility Program (OSCP)

- Validate Compatibility of “Specialized” storage solutions with Oracle
  - Oracle over NFS - NAS
  - Remote Mirroring - primarily for log files
  - Snapshot technologies
- Not a certification program
- Process - architecture review, test kit, usage guide, web page of supported configurations

A Simple backup scenario

BnR.com operates a $2 billion dollar a year e-business selling fishing tackle over the Internet. The Oracle database is hosted on a UNIX platform and requires the database to be available 24/7. BnR.com wants to keep 7 days of backups on disk and then move them to tape . At the end of the month, the tapes are moved to an offsite vaulting facility where they are kept for 3 months.

A backup scenario

- 4 Steps to Oracle database backup *and recovery*
  - Step 1. Create backup disk area on host; document HOST hardware and database; once per month TEST recovery procedures
  - Step 2. Online backups
  - Step 3. PROD datafiles, control files, archive logs, init.ora, tnsnames.ora, sqlnet.ora

    Sunday : Full backup, move SYSDATE-7 to tape

    Monday - Saturday : incremental backup
  - Step 4. Use RMAN, OEM and OS backup to tape

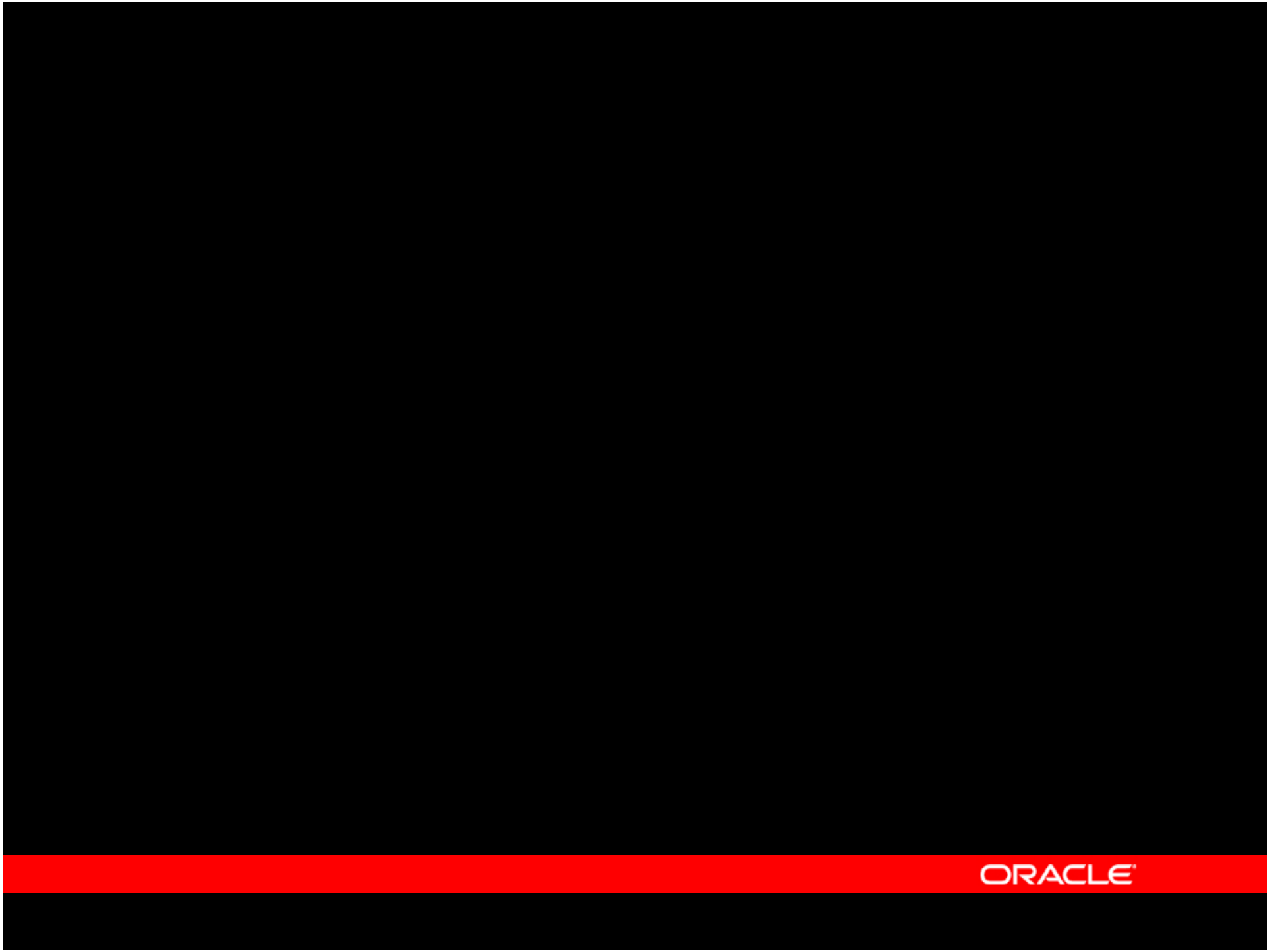
Split Mirror Backups

*The **backup database host** is an additional computer in the Recovery environment. On the primary site, the backup host is idle most of the time and used only during the backup window.*

Off-Loading Tasks

In many mission-critical e-business operations, it is important to have a point-in-time copy of the production database in order to off-load certain tasks. For example, the copy can be used to:

- *Extract data for a data warehouse*
- *Run reports*
- *Test upgrades*
- *Run database consistency checks*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Hybrid Solutions Are a Good Thing

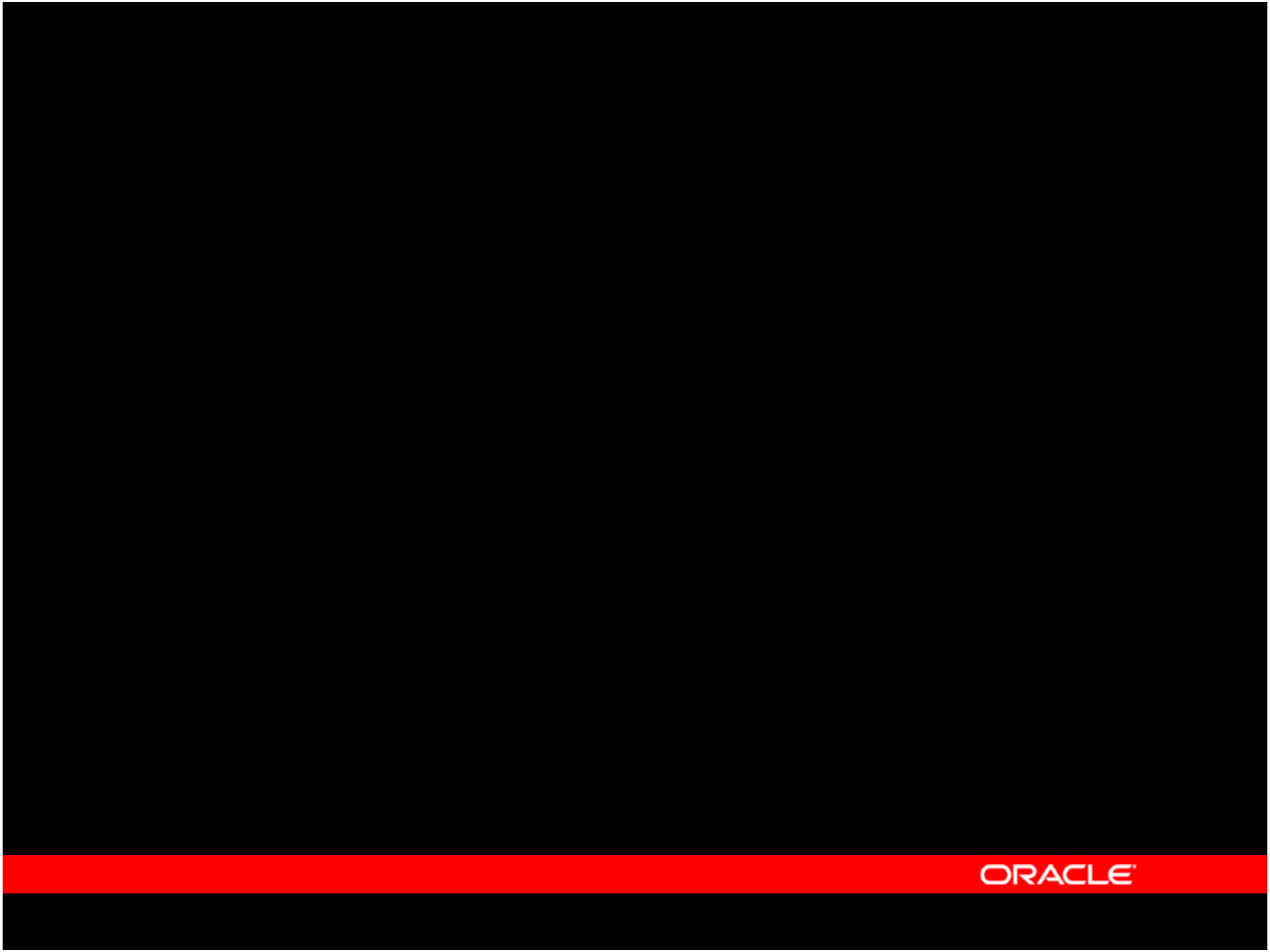
- Backups with everything, everywhere, all the time
- Fail Safe + TAF + Standby Database
- Oracle Real Application Clusters + Replication + RAID
- Standby Database + Geo-Mirroring
- Advanced Queuing + RAID + Oracle Real Application Clusters
- Oracle Real Application Clusters + TP Monitor
- Etc., etc., etc. …

The challenge is to understand your business needs and evaluate the pros and cons of the technology options

TOP 10

Reasons to Integrate RMAN into Your Backup and Recovery Solution

10. *Extensive Reporting*
9. *Incremental Backups*
8. *Downtime Free Backups*
7. *Backup and Restore Validation*
6. *Backup and Restore Optimization*
5. *Easily Integrated with Top Media Managers*
4. *Block Media Recovery (BMR)*
3. *RMAN Knows Archive Logs*
2. *Corrupt Block Detection*
1. *Trouble Free Backup and Recovery*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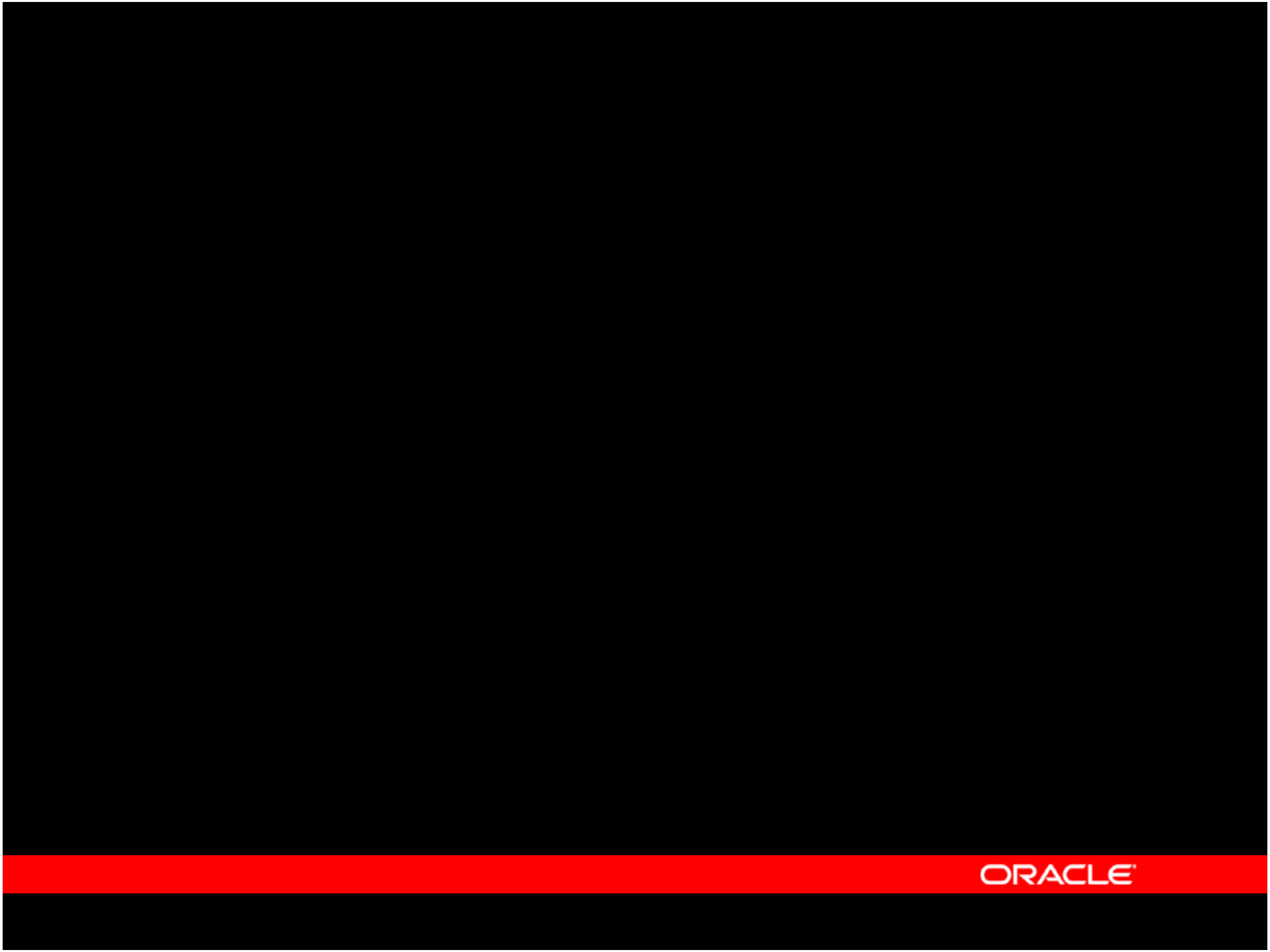
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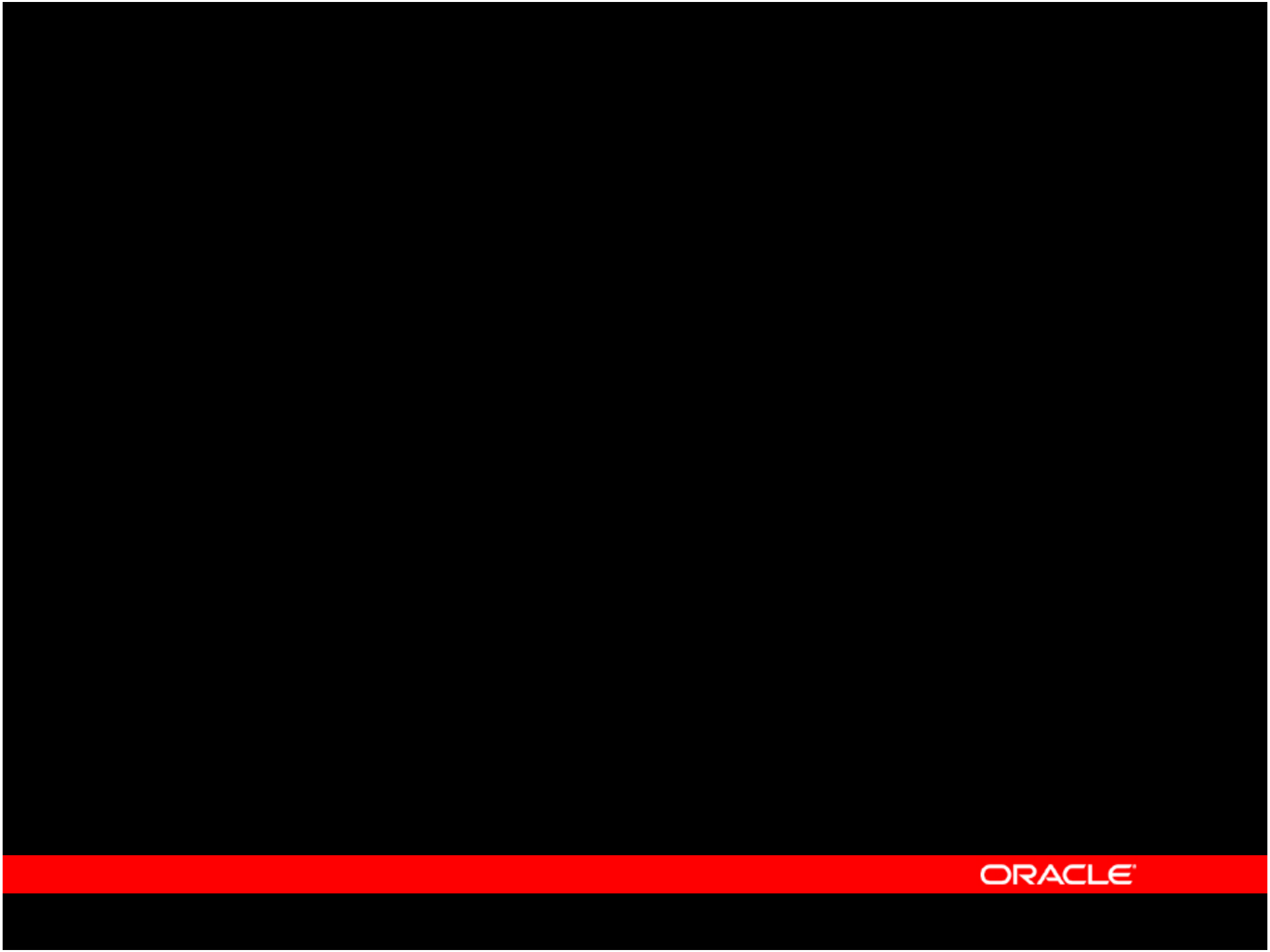
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Summary

- Define Backup Strategy by implementing
  - Backup Types
    - Full
    - Online
    - Offline
  - Recovery Methods
    - User Managed
    - Export/Import
    - Recovery Manager
    - Enterprise Manager
- Enhanced Availability
  - Bound crash recovery
  - Block Media Recovery
- Backup and Recovery Manageability
  - Retention Policy
  - Persistent Configuration
  - Self Describing Backup
- Integrate Recovery Manager

Useful URLs

- Oracle high availability and storage management white papers
  - http://otn.oracle.com/deploy/availability/
- Oracle Backup Solution Program (BSP)
  - http://www.oracle.com/ip/deploy/database/features/recovery/
- Oracle Storage Compatibility Program (OSCP)
  - http://www.oracle.com/ip/deploy/database/storage/

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