Oracle AI Database: Backup and Recovery Live Class

Oracle Database

DURATION	MODULES	COURSE CODE
5 Days	**28 Lectures**	**—**

Course Overview

This course details the architecture and concepts that support backup and recovery. You also learn to implement various backup, failure, restore, and recovery scenarios, including data duplication using the Recovery Manager (RMAN) command-line interface. With hands-on practices, you'll be able to leverage your learning to accomplish backup and recovery tasks.

What You Will Learn

Course Overview

- Target Audience
- Prerequisites
- Learning Outcomes
- Course Outline
- What’s next?

Backup and Recovery: Overview

- Objectives
- DBA Responsibilities
- Separation of DBA Duties
- Assessing Your Recovery Requirements
- Categories of Failure
- Statement Failure
- User Process Failure
- Network Failure
- User Error
- Instance Failure
- Media Failure
- Data Failures
- Instance Recovery
- The Checkpoint (CKPT) Process

- The Redo Log Files and the Log Writer (LGWR) Process
- Database Log Mode
- Automatic Instance Recovery or Crash Recovery
- Phases of Instance Recovery
- Tuning Instance Recovery
- Using the MTTR Advisor
- Restoring and Recovering
- Comparing Complete and Incomplete Recovery
- The Complete Recovery Process
- The Point-in-Time Recovery Process
- Oracle Data Protection Solutions
- Flashback Technology
- Summary

Backup and Recovery Configuration

- Objectives
- Configuring for Recoverability
- Configuring the Fast Recovery Area
- Monitoring the Fast Recovery Area
- Multiplexing controlfiles
- Redo Log Files
- Multiplexing the Redo Log
- Creating Archived Redo Log Files
- Archiver (ARCn) Process
- Archived Redo Log Files: Naming and Destinations
- Configuring ARCHIVELOG Mode
- Summary

Using Recovery Manager (RMAN)

- Objectives
- Integrated Oracle Recovery Manager (RMAN)
- Connecting to RMAN and a Target Database
- Using SQL in RMAN
- Types of RMAN Commands
- Job Commands: Example
- Configuring Persistent Settings for RMAN
- Viewing Persistent Settings
- Managing Persistent Settings
- Specifying a Retention Policy
- Recovery Window Retention Policy: Example
- Summary

Backup Strategies

- Objectives

- Understanding Types of Backups
- Backup Terminology
- Understanding Types of Backups
- RMAN Backup Types
- Backup Solutions: Overview
- Balancing Backup and Restore Requirements
- Comparing Backup Strategies
- Option 1: Full and Incremental Backups
- Option 2: Incrementally Updated Disk Backups
- Option 3: Offloading Backups Physical Standby Database in Data
- Guard Environment
- Backing Up Read-Only Tablespaces: Considerations
- Data Warehouse Backup and Recovery: Best Practices
- Summary

Creating Database Backups

- Objectives
- Using RMAN Commands to Create Backups
- Syntax and Clauses in RMAN
- Creating Backup Sets
- Creating Image Copies
- Creating a Whole Database Backup
- CDB Backup: Whole CDB Backup
- CDB Backup: Partial CDB Backup
- PDB Backup: Partial PDB Backup
- Review: RMAN Backup Types
- Incrementally Updated Backups
- Incrementally Updated Backups: Example
- Fast Incremental Backup
- Maintaining the Block Change Tracking File
- Monitoring Block Change Tracking
- Automatic Disk-to-Disk Backup and Recovery
- Oracle-Suggested Backup
- Backing Up the controlfile to a Trace File
- Cataloging Additional Backup Files
- Reporting on Backups
- Using Dynamic Views
- Summary

Using Optional Backup Features

- Objectives
- Saving Backup Space with Unused Block Compression
- Compressing Backups
- Using RMAN Backup Compression
- Using a Media Manager

- Configuring Backup and Restore for Very Large Files
- Backing Up and Restoring Very Large Files
- Creating RMAN Multisection Backups
- Creating Proxy Copies
- Creating Duplexed Backup Sets Using BACKUP COPIES
- Creating Backups of Backup Sets
- Archival Backups: Concepts
- Creating Archival Backups with RMAN
- Managing Archival Database Backups
- Backing Up Recovery Files
- Summary

Tuning RMAN Backup Performance

- Objectives
- Is there a problem?
- Diagnosing Performance Bottlenecks
- Diagnosing Performance Bottlenecks: Read Phase
- Is there a “write” problem?
- Diagnosing Performance Bottlenecks: Write or Copy Phase
- Using Dynamic Views to Diagnose RMAN Performance
- Monitoring RMAN Job Progress
- Identifying Backup and Restore Bottlenecks
- Asynchronous I/O Bottlenecks
- Synchronous I/O Bottlenecks
- Tuning RMAN Backup Performance
- Parallelization of Backup Sets
- RMAN Multiplexing
- Summary

Recovery Catalog Overview

- Objectives
- RMAN Repository Data Storage: Comparison of Options
- Storing Information in the Recovery Catalog
- Reasons to Use a Recovery Catalog
- Summary

Creating a Recovery Catalog

- Objectives
- Creating a Recovery Catalog: Three Steps
- 1. Configuring the Recovery Catalog Database
- 2. Creating the Recovery Catalog Owner
- 3. Creating the Recovery Catalog
- Summary

Managing Target Database Records

- Objectives
- Managing Target Database Records in the Recovery Catalog
- Registering a Database in the Recovery Catalog
- Unregistering a Target Database from the Recovery Catalog
- Recovery Catalog Resynchronization: Concepts
- Manually Resynchronizing the Recovery Catalog
- Summary

Using Stored Scripts

- Objectives
- Using RMAN Stored Scripts
- Executing RMAN Stored Scripts
- Maintaining RMAN Stored Scripts
- Summary

Creating and Using Virtual Private Catalogs

- Objectives
- Creating and Using Virtual Private Catalogs
- Creating a Virtual Private Catalog
- Managing Virtual Private Catalogs
- Upgrading Catalog
- Upgrading Virtual Private Catalogs
- Upgrading Catalog Example
- Upgrading Catalog
- Summary

Restore and Recovery Concepts

- Objectives
- File Loss
- Data Repair Techniques
- Restoring and Recovering
- Using RMAN RESTORE and RECOVER Commands
- Instance Failure
- Instance Recovery
- Phases of Instance Recovery
- Media Failure
- Comparing Complete and Incomplete Recovery
- Complete Recovery Process
- Point-in-Time Recovery Process
- Recovery with the RESETLOGS Option
- Restore and Recovery Performance: Best Practices
- Summary

Diagnosing Failures

- Objectives
- Reducing Problem Diagnosis Time
- Automatic Diagnostic Workflow
- Automatic Diagnostic Repository
- ADR Command-Line Tool (ADRCI)
- V$DIAG_INFO View
- Data Failure: Examples
- Summary

Performing Complete Recovery

- Objectives
- Ensuring Backups Are Available
- Restoring in NOARCHIVELOG Mode
- Recovery with Incremental Backups in NOARCHIVELOG Mode
- Performing Complete Recovery
- Review: Recovering Image Copies
- Recovering Image Copies: Example
- Performing a Fast Switch to Image Copies
- Using SET NEWNAME for Switching Files
- Using Restore Points
- PDB Temp File Recovery
- PDB SYSTEM or UNDO Tablespace Recovery
- PDB Non-SYSTEM Tablespace Recovery
- Summary

Performing Point-in-Time Recovery

- Objectives
- Point-in-Time Recovery
- PITR Terminology
- Performing Point-in-Time Recovery
- When to Use TSPITR
- Tablespace Point-in-Time Recovery: Architecture
- Preparing for TSPITR
- Determining the Correct Target Time
- Determining the Tablespaces for the Recovery Set
- Identifying Objects That Will Be Lost
- Performing RMAN TSPITR
- Performing Fully Automated TSPITR
- Improving TSPITR Performance
- Performing RMAN TSPITR with an RMAN-Managed Auxiliary Instance
- Performing RMAN TSPITR Using Your Own Auxiliary Instance
- Troubleshooting RMAN TSPITR
- PITR of PDBs

- Recovering Tables from Backups
- Table Recovery: Graphical Overview
- Prerequisites and Limitations
- Specifying the Recovery Point in Time
- Process Steps of Table Recovery
- Summary

Performing Block Media Recovery

- Objectives
- What is block corruption?
- Block Corruption Symptoms: ORA-01578
- How to Handle Corruption
- Setting Parameters to Detect Corruption
- Block Media Recovery
- Prerequisites for Block Media Recovery
- Recovering Individual Blocks
- Best Practice: Proactive Checks
- Checking for Block Corruption
- Summary

Performing Additional Recovery Operations

- Objectives
- Recovery from the Loss of the Server Parameter File
- Restoring the Server Parameter File from the controlfile Autobackup
- Loss of a controlfile
- Recovering from the Loss of All controlfile Copies: Overview
- Restoring the controlfile from Autobackup
- Restoring the SPFILE and the controlfile
- Recovering NOLOGGING Database Objects
- Loss of a Redo Log File
- Log Group Status: Review
- Recovering from the Loss of a Redo Log Group
- Clearing a Log File
- Re-creating a Password Authentication File
- Summary

Oracle Flashback Technology: Overview

- Objectives
- Configuring Database Flashback Technologies
- Flashback Technologies: Error Detection and Correction
- Review: Transactions and Undo
- Flashback Technology
- Summary

Using Logical Flashback Features

- Objectives
- Using Flashback Technologies to Query Data
- Flashback Query
- Flashback Version Query
- Flashback Table: Overview
- Flashback Table
- Flashback Table: Considerations
- Flashback Transaction Query
- Flashback Transaction Query: Considerations
- Flashback Transaction Backout
- Flashback Transaction Backout Options
- Flashing Back a Transaction
- Best Practices: Undo-Based Flashback Query, Flashback Table
- Flashback Drop and the Recycle Bin
- Recycle Bin
- Bypassing the Recycle Bin
- Using Flashback Time Travel
- Creating and Enabling Flashback Time Travel
- How the Flashback Data Archive Works
- Transparent Schema Evolution
- Full Schema Evolution
- Summary

Using Flashback Database

- Objectives
- Preparing Your Database for Flashback
- Guaranteeing Undo Retention
- Undo Retention
- Flashback Database: Continuous Data Protection
- Flashback Database
- Flashback Database Architecture
- Configuring Flashback Database
- Configuring Flashback Database Overview
- Configuring Flashback Database Parameters
- Configuring Flashback Database Log Management
- Flashback Database: Examples
- CDB and PDB Flashback
- Flashback Database Considerations
- Monitoring Flashback Database Information
- Flashback Database and Guaranteed Restore Points
- Guaranteed Restore Points
- PDB Flashback and Clean Restore Point
- Summary

Transport Using Recovery Catalog

- Objectives
- Overview
- Methods of Transporting with Recovery Catalog
- Prerequisites: Generic
- Prerequisites: Specific
- Recovery Catalog Methods for PDBs
- Quickly Transport a PDB with Recovery Catalog
- Transport a PDB Using a Preexisting Backup with Recovery Catalog
- Transport a PDB Using Multiple Incremental Backups with Recovery Catalog
- Recovery Catalog Methods for Tablespaces
- Quickly Transport a Tablespace with Recovery Catalog
- Transport a Tablespace Using a Preexisting Backup with Recovery Catalog
- Transport a Tablespace Using Multiple Incremental Backups with
- Recovery Catalog
- Transport a PDB Using Multiple Incremental Backups with Recovery Catalog
- Summary

Transport Using NOCATALOG

- Objectives
- Methods of Transporting in NOCATALOG Mode
- Prerequisites: Generic
- Prerequisites: Specific
- NOCATALOG Mode for PDBs
- Quickly Transport a PDB in NOCATALOG Mode
- Transport a PDB Using a Preexisting Backup in NOCATALOG Mode
- Transport a PDB Using Multiple Incremental Backups in NOCATALOG Mode
- NOCATALOG Mode for Tablespaces
- Quickly Transport a Tablespace in NOCATALOG Mode
- Transport a Tablespace Using a Preexisting Backup in NOCATALOG Mode
- Transport a Tablespace Using Multiple Incremental Backups in
- NOCATALOG Mode
- Summary

Transport Using Network Link

- Objectives
- Methods of Transporting Over Network Link
- Prerequisites: Generic
- Methods of Transporting PDBs Over Network Link
- Transporting PDBs Over Network Link
- Quickly Transport a PDB Over Network Link
- Transport PDBs by Restoring Backups Incrementally Over the Network
- Methods of Transporting Tablespaces Over Network Link
- Transport Tablespaces Over Network Link

- Quickly Transport a Tablespace Over Network Link
- Transport Tablespaces by Restoring Backups Incrementally Over
- the Network
- Summary

Using PDB Snapshots

- Objectives
- PDB Snapshot Carousel
- Creating PDB Snapshots
- Creating PDBs Using PDB Snapshots
- PDB Snapshots Basics
- PDB Snapshots Views
- Dropping PDB Snapshots
- Flashing Back PDBs Using PDB Snapshots
- Summary

Database Duplication Overview

- Objectives
- Using a Duplicate Database
- Choosing Database Duplication Techniques
- Duplicating an Active Database with “Push”
- Comparing the “Push” and “Pull” Methods of Duplication
- Duplicating a Database with a Target Connection
- Duplicating a Database with a Recovery Catalog
- Duplicating a Database Without a Recovery Catalog or Target Connection
- Summary

Creating a Backup-Based Duplicate Database

- Objectives
- Creating a Backup-Based Duplicate Database
- Creating an Initialization Parameter File for the Auxiliary Instance
- Specifying New Names for Your Destination
- Using the SET NEWNAME Clauses
- Substitution Variables for SET NEWNAME
- Specifying Parameters for File Naming
- Starting the Instance in NOMOUNT Mode
- Ensuring Backups and Archived Redo Log Files Are Available
- Allocating Auxiliary Channels
- Understanding the RMAN Duplication Operation
- Specifying Options for the DUPLICATE Command
- Using Additional DUPLICATE Command Options
- Duplicating Selected PDBs in a CDB
- Cloning an Active PDB into an Existing CDB
- Example: Duplicating PDB1 from CDB1 to CDB2 as PDB1
- Example: Duplicating PDB1 from CDB1 to CDB2 as PDB2

- Summary