Oracle Database 19c: Backup and Recovery Live Class

Oracle Database

DURATION	MODULES	COURSE CODE
5 Days	**24 Lectures**	**—**

Course Overview

In this course, students learn how to perform backup and recovery based on the related Oracle Database architecture components. Various backup, failure, restore, and recovery scenarios are provided so that students learn to evaluate their own recovery requirements and develop an appropriate strategy for backup and recovery procedures. This course includes an interactive workshop, with scenarios that provide participants with opportunities to diagnose and recover from several failure situations.

What You Will Learn

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
- 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 Control Files
- 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
- Practice Overview

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
- Practice Overview

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 to 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 Control File to a Trace File
- Cataloging Additional Backup Files
- Reporting on Backups
- Using Dynamic Views
- Summary
- Practice Overview

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 by 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
- Practice Overview

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
- Practice Overview

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

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
- Practice Overview

Using Stored Scripts

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

Creating and Using Virtual Private Catalogs

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

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 Recovery Advisor
- Data Failure: Examples
- Data Recovery Advisor RMAN Command-Line Interface
- Listing Data Failures
- Advising on Repair
- Executing Repairs
- Classifying (and Closing) Failures
- Data Recovery Advisor Views
- Summary
- Practice Overview

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 Tempfile Recovery
- PDB SYSTEM or UNDO Tablespace Recovery
- PDB Non-SYSTEM Tablespace Recovery
- Summary
- Practice Overview

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 by 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
- Practice Overview

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
- Practice Overview

Performing Additional Recovery Operations

- Objectives
- Recovery from Loss of Server Parameter File
- Restoring the Server Parameter File from the Control File Autobackup
- Loss of a Control File
- Recovering from the Loss of All Control File Copies: Overview
- Restoring the Control File from Autobackup
- Restoring the SPFILE and the Control File
- 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
- Practice Overview

Oracle Flashback Technology: Overview

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

Using Logical Flashback Features

- Objectives
- Using Flashback Technology 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
- 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 Data Archives
- Creating a Temporal History and Enabling Archiving
- How the Flashback Data Archive Works
- Collecting User Context in Temporal History
- Transparent Schema Evolution
- Full Schema Evolution
- Temporal Validity and History
- Using the PERIOD FOR Clause
- Filtering on Valid-Time Columns: Example 1
- Filtering on Valid-Time Columns: Example 2
- Using DBMS_FLASHBACK_ARCHIVE
- Summary
- Practice Overview

Using Flashback Database

- Objectives
- Preparing Your Database for Flashback
- Guaranteeing Undo Retention

- Flashback Database: Continuous Data Protection
- Flashback Database
- Flashback Database Architecture
- Configuring Flashback Database
- Flashback Database: Examples
- CDB and PDB Flashback
- Flashback Database Considerations
- Monitoring Flashback Database Information
- Guaranteed Restore Points
- Flashback Database and Guaranteed Restore Points
- PDB Flashback and Clean Restore Point
- Best Practices: Flashback Database
- Summary
- Practice Overview

Using PDB Snapshots

- Objectives
- PDB Snapshot Carousel
- Creating PDB Snapshots
- Creating PDBs by Using PDB Snapshots
- Dropping PDB Snapshots
- Flashing Back PDBs by 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 That 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
- Practice Overview