ORACLE UNIVERSITY

Oracle Database 23ai Administration Workshop

Duration: 5 days

Oracle Database 23c is now Oracle Database 23ai.

This course is targeted at Database Administrators and begins with explaining the architecture of an Oracle Database instance and the tools used to access it. The course includes creating and managing a database, configuring and managing Oracle Net Services along with creating and administering pluggable databases (PDBs). You learn how to create and manage database storage, users, backup, and implement database security. Additionally, the course covers protection of database against failures, loading, and transporting data.

Benefits To You

Upon completion of this course, the student should be able to:

- Describe Oracle Database architecture
- Configure the database to support your applications
- Manage database security and implement auditing
- Implement basic backup and recovery procedures
- Move data between databases and files
- Employ basic monitoring procedures and manage performance

Role

- Database Administrators

Course Topics

1. **Introduction to Oracle Database**
   - Objectives
   - Oracle Database Server Architecture: Overview
   - Oracle Database Instance Configurations
   - Oracle Multitenant Container Database: Introduction
   - Oracle Multitenant Container Database: Architecture
   - Oracle Database Memory Structures
   - Shared Pool
   - Database Buffer Cache
   - Redo Log Buffer
   - Large Pool
   - Java Pool and Streams Pool
   - Program Global Area (PGA)
   - Process Architecture
   - Process Structures
   - Database Writer Process (DBWn)
   - Log Writer Process (LGWR)
   - Checkpoint Process (CKPT)
   - System Monitor Process (SMON)
   - Process Monitor Process (PMON)

Recoverer Process
Archiver Processes (ARCn)
Database Sharding: Introduction
Oracle Database Server: Interactive Architecture Diagram
Summary

2. **Accessing an Oracle Database**
Objectives
Connecting to an Oracle Database Instance
Oracle Database Tools
Database Tool Choices
SQL*Plus
Oracle SQL Developer
Oracle SQL Developer: Connections
Oracle SQL Developer: DBA Actions
Database Configuration Assistant (DBCA)
Oracle Enterprise Manager Database Express
Enterprise Manager Cloud Control 13c Features
Oracle Enterprise Manager Component Overview
Single Pane of Glass for Enterprise Management
Oracle Enterprise Manager Database Management
Summary

3. **Creating an Oracle Database by Using DBCA**
Objectives
Planning the Database
Choosing a Database Template
Choosing the Appropriate Character Set
How are character sets used?
Setting NLS_LANG Correctly on the Client
Using the Database Configuration Assistant
Using DBCA in Silent Mode
Summary

4. **Creating an Oracle Database by Using a SQL Command**
Objectives
Creating a Container Database (CDB)
Creating a CDB by Using a SQL Command: Example
Using the SEED FILE_NAME_CONVERT Clause
Using the ENABLE PLUGGABLE DATABASE Clause
Summary

5. **Starting Up and Shutting Down a Database Instance**
Objectives
Starting the Oracle Database Instance
Shutting Down an Oracle Database Instance
Comparing SHUTDOWN Modes
Opening and Closing PDBs
Configuring PDBs to Automatically Open
Summary

6. **Managing Database Instances**
   Objectives
   Working with Initialization Parameters
   Initialization Parameters
   Modifying Initialization Parameters
   Viewing Initialization Parameters
   Working with the Automatic Diagnostic Repository
   Automatic Diagnostic Repository
   Viewing the Alert Log
   Using Trace Files
   Administering the DDL Log File
   Querying Dynamic Performance Views
   Considerations for Dynamic Performance Views
   Data Dictionary: Overview
   Querying the Oracle Data Dictionary
   Summary

7. **Oracle Net Services: Overview**
   Objectives
   Connecting to the Database Instance
   Oracle Net Services: Overview
   Defining Oracle Net Services Components
   Tools for Configuring and Managing Oracle Net Services
   Oracle Net Listener: Overview
   The Default Listener
   Comparing Dedicated and Shared Server Architecture
   Summary

8. **Configuring Naming Methods**
   Objectives
   Establishing Oracle Network Connections
   Connecting to an Oracle Database Instance
   Name Resolution
   Establishing a Connection
   User Sessions
   Naming Methods
   Easy Connect
   Local Naming
   Directory Naming
   Using Database Services to Manage Workloads Creating Database Services
   Summary

9. **Configuring and Administering the Listener**
   Objectives
   Review: Oracle Net Services Overview
   Oracle Net Listener: Overview
   The Default Listener

Configuring Dynamic Service Registration
Configuring Static Service Registration
Summary

10. Configuring a Shared Server Architecture
Objectives
Shared Server Architecture: Overview
Comparing Dedicated and Shared Server Architecture: Review
Enabling Shared Server
Controlling Shared Server Operations
SGA and PGA Usage
Shared Server Configuration Considerations
Summary
Practice Overview

11. Creating PDBs from Seed
Objectives
Provisioning New Pluggable Databases
Tools
Creating a New PDB from PDB$SEED
Using the FILE_NAME_CONVERT Clause
Using OMF or the PDB_FILE_NAME_CONVERT Parameter
Summary

12. Using Other Techniques to Create PDBs
Objectives
Cloning Regular PDBs
Migrating Data from a Non-CDB into a CDB
Plugging a Non-CDB into CDB Using DBMS_PDB
Replicating a Non-CDB into a CDB by Using GoldenGate
Cloning a Non-CDB or Remote PDB
Using DBCA to Clone a Remote PDB
Plugging an Unplugged Regular PDB into CDB
Plugging in a PDB Using an Archive File
Cloning Remote PDBs in Hot Mode
Near-Zero Downtime PDB Relocation
Using DBCA to Relocate a Remote PDB
Proxy PDB: Query Across CDBs Proxying Root Replica
Creating a Proxy PDB
Summary

13. Managing PDBs
Objectives
Changing the PDB Mode
Modifying PDB Settings
Impact of Changing Initialization Parameters
Changing Initialization Parameters: Example
Using the ALTER SYSTEM Command in a PDB

Configuring Host Name and Port Number per PDB
Dropping PDBs
Summary

14. Database Storage Overview
Objectives
Database Storage Architecture
Logical and Physical Database Structures
Segments, Extents, and Blocks
Tablespaces and Data Files
Default Tablespaces in a Multitenant Container Database
SYSTEM and SYSAUX Tablespaces
Types of Segments
How Table Data Is Stored 14-12 Database Block Content
Understanding Deferred Segment Creatio
Controlling Deferred Segment Creation
Monitoring Tablespace Space Usage
Summary

15. Creating and Managing Tablespaces
Objectives
Creating Tablespaces
Creating a Tablespace: Clauses
Creating Permanent Tablespaces in a CDB
Defining Default Permanent Tablespaces
Temporary Tablespaces
Altering and Dropping Tablespaces
Viewing Tablespace Information
Implementing Oracle Managed Files (OMF)
Enlarging the Database
Moving or Renaming Online Data Files
Examples: Moving and Renaming Online Data Files
Summary

16. Improving Space Usage
Objectives
Space Management Features
Block Space Management
Row Chaining and Migration
Free Space Management Within Segments
Allocating Extents
Using Unusable Indexes
Using Temporary Tables
Creating Global Temporary Tables
Creating Private Temporary Tables
Table Compression: Overview
Table Compression: Concepts
Compression for Direct-Path Insert Operations
Advanced Row Compression for DML Operations

Specifying Table Compression
Using the Compression Advisor
Resolving Space Usage Issues
Reclaiming Space by Shrinking Segments
Shrinking Segments
Results of a Shrink Operation
Managing Resumable Space Allocation
Using Resumable Space Allocation
Resuming Suspended Statements
What operations are resumable?
Summary

17. Managing Undo Data

Objectives
Undo Data: Overview
Transactions and Undo Data
Storing Undo Information
Comparing Undo Data and Redo Data
Managing Undo
Comparing SHARED Undo Mode and LOCAL Undo Mode
Configuring Undo Retention
Categories of Undo
Guaranteeing Undo Retention
Changing an Undo Tablespace to a Fixed Size
Temporary Undo: Overview
Temporary Undo Benefits
Enabling Temporary Undo
Monitoring Temporary Undo
Summary

18. Creating and Managing User Accounts

Objectives
Database User Accounts
Oracle-Supplied Administrator Accounts
Creating Oracle Database Users in a Multitenant Environment
Creating Common Users in the CDB and PDBs
Creating Schema-Only Accounts
Authenticating Users
Using Password Authentication
Using Password File Authentication
Using OS Authentication
OS Authentication for Privileged Users
Assigning Quotas
Summary

19. Configuring Privilege and Role Authorization

Objectives
Privileges
System Privileges

System Privileges for Administrators
Schema-Level Privileges
New Developer Role and Simplified Schema Privileges
Object Privileges
Granting Privileges in a Multitenant Environment
Granting Privileges: Example
Using Roles to Manage Privileges
Assigning Privileges to Roles and Assigning Roles to Users
Oracle-Supplied Roles
Granting Roles in a Multitenant Environment
Granting Roles: Example
Making Roles More Secure
Revoking Roles and Privileges
Granting and Revoking System Privileges
Granting and Revoking Object Privileges
Summary

20. Configuring User Resource Limits

Objectives
Profiles and Users
Creating Profiles in a Multitenant Architecture
Creating Profiles: Example
Profile Parameters: Resources
Profile Parameters: Locking and Passwords
Oracle-Supplied Password Verification Functions
Assigning Profiles in a Multitenant Architecture
Summary

21. Implementing Oracle Database Auditing

Objectives
Database Security
Monitoring for Compliance
Types of Activities to be Audited
Mandatorily Audited Activities
Understanding Auditing Implementation
Administering the Roles Required for Auditing
Database Auditing: Overview
Configuring Auditing
Creating a Unified Audit Policy
Creating an Audit Policy: Systemwide Audit Options
Creating an Audit Policy: Object-Specific Actions
Creating an Audit Policy: Specifying Conditions
Enabling and Disabling Audit Policies
Auditing Actions in the CDB and PDBs
Modifying a Unified Audit Policy
Auditing Top-Level Statements Only
Viewing Audit Policy Information
Value-Based Auditing
Fine-Grained Auditing

FGA Policy
Audited DML Statements: Considerations
FGA Guidelines
Archiving and Purging the Audit Trail
Purging Audit Trail Records
Summary

22. Introduction to Loading and Transporting Data
Objectives
Moving Data: General Architecture
Oracle Data Pump: Overview
Oracle Data Pump: Benefits
SQL Loader: Overview
Summary

23. Loading Data
Objectives
SQL Loader: Review
Creating the SQL*Loader Control File
SQL*Loader Loading Methods
Protecting Against Data Loss
SQL*Loader Express Mode
Using SQL*Loader to Load a Table in a PDB
Summary

24. Transporting Data
Objectives
Data Pump Export and Import Clients
Data Pump Interfaces and Modes
Data Pump Import Transformations
Using Oracle Data Pump with PDBs
Exporting from a Non-CDB and Importing into a PDB
Exporting and Importing Between PDBs
Full Transportable Export/Import
Full Transportable Export/Import: Example
Transporting a Database Over the Network: Example
Using RMAN to Transport Data Across Platforms
RMAN CONVERT Command
Transporting Data with Minimum Down Time
Transporting a Tablespace by Using Image Copies
Determining the Endian Format of a Platform
Transporting Data with Backup Sets
Transporting a Tablespace
Transporting Inconsistent Tablespaces
Summary

25. Using External Tables to Load and Transport Data
Objectives

External Tables
External Tables: Benefits
ORACLE_LOADER Access Driver
ORACLE_DATAPUMP Access Driver
External Tables
Viewing Information About External Tables
Summary
Practice Overview

26. Automated Maintenance Tasks: Overview

Objectives
Proactive Database Maintenance Infrastructure
Automated Maintenance Tasks: Components
Predefined Automated Maintenance Tasks
Maintenance Windows
Predefined Maintenance Windows
Automated Maintenance Tasks
Summary

27. Automated Maintenance Tasks: Managing Tasks and Windows

Objectives
Configuring Automated Maintenance Tasks
Enabling and Disabling Maintenance Tasks
Creating and Managing Maintenance Windows
Resource Allocations for Automated Maintenance Tasks
Changing Resource Allocations for Maintenance Tasks
Summary
Practice Overview

28. Database Monitoring and Tuning Performance Overview

Objectives
Performance Management Activities
Performance Planning Considerations
Database Maintenance
Automatic Workload Repository (AWR)
Automatic Database Diagnostic Monitor (ADDM)
Configuring Automatic ADDM Analysis at the PDB Level
Advisory Framework
Performance Tuning Methodology
Summary

29. Monitoring Database Performance

Objectives
Server-Generated Alerts
Setting Metric Thresholds
Reacting to Alerts
Alert Types and Clearing Alerts
Database Server Statistics and Metrics

Performance Monitoring
Viewing Statistics Information
Monitoring Wait Events
Monitoring Sessions
Monitoring Services
Summary

30. Analyzing SQL and Optimizing Access Paths

Objectives
SQL Tuning Process
Oracle Optimizer
Optimizer Statistics
Optimizer Statistics Collection
Setting Optimizer Statistics Preferences
Optimizer Statistics Advisor
Optimizer Statistics Advisor Report
Executing Optimizer Statistics Advisor Tasks
SQL Plan Directives
Adaptive Execution Plans
SQL Tuning Advisor: Overview
SQL Access Advisor: Overview
SQL Performance Analyzer: Overview
Managing Automated Tuning Tasks
Summary