

Oracle Database 23ai: Multitenant Architecture

Duration: 4 Days

Course Outlines:

CDB Basics

- Objectives
- Challenges
- Multitenant Architecture: Benefits
- Other Benefits of Multitenant Architecture
- Oracle Multitenant Container Database
- Configurations
- SYSTEM Objects in the USER Container
- Provisioning a Pluggable Database
- Multitenant Container Database Architecture
- Containers
- Tools
- Data Dictionary and Dynamic Views
- Terminology
- Impacts
- Multitenant Architecture Poster

CDB and Regular PDBs

- Objectives
- Goals
- Creating a CDB (SQL*Plus, SEED FILE_NAME_CONVERT, ENABLE PLUGGABLE DATABASE)
- After CDB Creation (Data Dictionary Views: DBA_xxx, CDB_xxx, V\$xxx)
- Automatic Diagnostic Repository and alert.log
- Provisioning New Pluggable Databases
- Tools
- Creating New PDB from PDB\$SEED (with/without FILE_NAME_CONVERT)

Application PDBs and Application Installation

- Objectives
- Regular PDBs vs Application PDBs
- Application Containers and Features
- Types of Containers
- Creating Application PDBs
- Application Name and Version
- Installing, Patching, and Upgrading Applications
- Application Common Objects
- Use Cases (Pure PDB-Based vs Hybrid Model)
- Container Map (Examples, Query Routing, Dynamic Map)
- Query Across CDBs Using Application Root Replica
- Durable Location Transparency
- Data Dictionary Views
- Terminology in Application Container Context
- Commonality in Application Containers
- Impacts

PDB Creation

- Objectives
- Cloning Regular PDBs and Application Containers
- Plugging Non-CDB into CDB (DBMS_PDB, Replication, Remote PDBs)
- Plugging/Unplugging Regular and Application PDBs
- Converting Regular PDBs to Application PDBs
- Handling Encrypted Data
- Local UNDO vs Shared UNDO Mode
- Cloning Remote PDBs in Hot Mode
- Near-Zero Downtime PDB Relocation
- Proxy PDBs (Query Across CDBs, Creating Proxy PDB)
- Using DBCA (Clone, Relocate, Duplicate CDB)
- Dropping PDBs

CDB and PDB Management

- Objectives
- Connection and Switching
- Creating and Renaming Services
- Starting, Mounting, Opening CDBs and PDBs
- Hybrid Read-Only Mode
- Automatic PDB Opening
- Closing PDBs and Shutting Down CDBs
- Changing PDB Mode and Settings
- Instance Parameter Change Impact
- ALTER SYSTEM at PDB Level
- Configuring Host Name and Port per PDB

Storage

- Objectives
- Objects in Tablespaces
- Tablespaces Created During PDB Creation
- Defining Default Permanent Tablespaces
- Temporary and UNDO Tablespaces

Security

- Objectives
- Creating Common Users, Roles, Privileges, Profiles
- Common Objects in Application Containers
- Operations on Data-Linked Objects
- Enabling Common Users to Access Data in PDBs
- CONTAINER_DATA Attributes
- PDB Lockdown Profiles (Static/Dynamic, Inheritance)
- Auditing Actions in CDB and PDBs
- Managing Security Policies in Application Containers
- Oracle Database Vault and Strict Mode
- Managing Keystore in CDB and PDBs (Creating, Opening, Encryption Keys, Isolated vs United Mode)
- Migrating Between Keystore Types
- Handling Encrypted Data and Certificates

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COURSE OUTLINE

Backup and Duplicate

- Objectives
- Goals
- RMAN Syntax and Clauses
- Whole and Partial CDB/PDB Backups
- Using RMAN Backup to Plug PDBs
- Duplicating Pluggable Databases
- Cloning Active PDBs
- Duplicating On-Premises and Cloud Encrypted CDBs
- Migrating Cloud Encrypted CDBs
- Block Corruption Checks

Recovery and Flashback

- Objectives
- Goals
- Instance Failure and Recovery
- NOARCHIVELOG Mode
- Tempfile, SYSTEM, UNDO Tablespace Recovery (CDB/PDB)
- Non-SYSTEM Tablespace Recovery
- PITR
- Migrating Non-CDB to CDB
- Relocating/Plugging PDBs into Other CDBs
- Transporting Backups
- Flashback (CDB/PDB, Snapshots, Snapshot Carousel)
- Creating, Dropping, Flashbacking PDB Snapshots
- Switchover and Refreshable Cloned PDBs

Performance

- Objectives
- Tuning and Sizing CDBs
- Managing SGA/PGA for PDBs
- Monitoring Memory Usage
- AWR and ADDM Behavior
- PDB-Level Snapshot Views
- Configuring ADDM Analysis at PDB Level
- Statistics for Common Objects
- Parallelism Control
- Heat Map and ADO Policies
- CDB Fleet (Lead and Members)
- DB Replay (Capturing, Replaying, Reporting, Consolidated Use Cases)

Resource Allocation

- Objectives
- Allocating Resources in CDB
- Resource Manager and PDBs
- Managing Resources Between PDBs
- CDB Resource Plan Basics and Examples
- IO Rate Limits
- Maintaining Resource Plans
- Managing Resources Within PDBs
- Parallel Statement Queuing
- Session PGA Limit
- Performance Profiles

Data Movement

- Objectives
- Oracle Data Pump with PDBs
- Export/Import Between Non-CDBs and PDBs
- Full Transportable Export/Import (Overview, Usage, Example)
- Transporting Databases Over Network
- SQL*Loader with PDBs

Upgrade Methods

- Objectives
- Upgrading CDB/PDBs to 23ai (Methods, OUI, AutoUpgrade Utility)
- AutoUpgrade System Checks, Fixups, Config Files
- AutoUpgrade Job Stages, Parameters, Syntax
- Replay Upgrade for PDB Plug-In
- Converting/Upgrading Regular PDBs to Application PDBs
- Cross-Platform Transportable PDB (Phases 1 & 2)

Consolidated Database Replay Procedures

- Consolidated Replay Steps
- Procedures for Steps 4–7
- Remapping Connections with PDBs
- Preparing Replay
- Synchronization Modes
- Starting Replay
- Views

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