

Oracle Exadata Database Machine: Implementation and Administration

Duration: 5 Days

Course Outlines:

1 Introduction

- Course Objectives
- Audience and Prerequisites
- Oracle Exadata: 10 Years of Innovation
- Oracle Provides Full Choice of Deployment Model
- Oracle Database Deployment Models
- Additional Resources

2 Exadata Database Machine: Overview

- Exadata Database Machine: Introduction
- Why Exadata Database Machine?
- Exadata X8M Hardware
- Exadata Database Machine X8M-2 Database Server Hardware: Overview
- Exadata X8M-2 High Capacity Storage Server Hardware: Overview
- Exadata X8M-2 Extreme Flash Storage Server Hardware: Overview
- Exadata X8M-2 Extended Storage Server Hardware: Overview
- Exadata Capacity and Performance Metrics: Individual Servers
- Exadata X8M-2 Rack Configurations
- Elastic Configuration: Examples
- Exadata Database Machine X8M-8
- Exadata Database Machine X8M-8 Database Server Hardware: Overview
- Exadata Database Machine X8M-8 Use Cases
- Oracle Exadata Virtual Machines
- RDMA Over Converged Ethernet (RoCE): Overview
- Exadata Storage Expansion Racks
- Exadata Database Machine Support: Overview
- Oracle Platinum Services: Enhanced Support at No Additional Cost

3 Exadata Database Machine Architecture

- Exadata Architecture: Overview
- Remote Direct Memory Access (RDMA)
- RDMA over Converged Ethernet (RoCE)
- Exadata Network Architecture
- Leaf Switch Topology
- Scale Performance and Capacity Beyond a Single Rack
- Two Rack Case: Leaf/Spine Topology
- Multiple Rack Case: Up to Eight Racks
- Multiple Rack Case: 9 to 18 Racks
- Exadata Software Architecture: Overview
- Support for Mixed Database Versions
- High Capacity Storage Server: Disk Storage Entities and Relationships
- High Capacity Storage Server: Flash Storage Entities and Relationships
- Extreme Flash Storage Server: Flash Storage Entities and Relationships
- HC and EF Storage Server: Persistent Memory Entities and Relationships
- Disk Group Configuration

4 Key Capabilities of Exadata Database Machine

- Classic Database I/O and SQL Processing Model
- Exadata Smart Scan Model
- Exadata Storage Index: Overview
- Performance Optimization for SQL Queries with MIN or MAX Functions
- Hybrid Columnar Compression: Overview
- Result After Installation and Configuration
- Oracle Exadata Deployment Assistant (OEDA) CLI

- Hybrid Columnar Compression: Data Organization
- Exadata Smart Flash Cache: Overview
- Exadata Smart Flash Cache Intelligent Caching: Overview
- Exadata Smart Flash Cache Intelligent Caching Details
- Conventional Read: Write-Through Cache
- Conventional Write: Write-Back Cache
- Conventional Log Write: Overview
- Persistent Memory (PMEM)
- PMEM Advantages
- Exadata Smart PMEM Cache: Read Operation
- Exadata Smart PMEM Log: Log Write Operation
- In-Memory Columnar Caching on Storage Servers
- Smart Aggregation
- Smart In-Memory Columnar Cache with Row IDs
- Exafusion Direct-to-Wire Protocol
- Exadata X8M RoCE: High Priority Networking
- Exadata X8M RoCE: Avoiding Packet Loss
- Exadata X8M RoCE: Instant Failure Detection
- Cell-to-Cell Rebalance
- I/O Resource Management: Overview
- Exadata Benefits for Data Warehousing and Analytics
- Exadata Benefits for OLTP

5 Exadata Database Machine Initial Configuration

- Exadata Implementation: Overview
- Key Documentation
- Exadata Site Preparation
- Exadata Configuration Tool: Overview
- Web-Based Version of OEDA
- Hardware Page: Select Hardware
- Hardware Page: Rack and Customer Details
- Operating System Page
- Rack Networks Page: Admin Network
- Rack Networks Page: Enable VLAN
- Rack Networks Page: Admin Network Review and Edit
- Rack Networks Page: Private Network
- Rack Networks Page: Private Network Review and Edit
- Users and Groups Page
- Define Clusters Page
- Diskgroup Page
- Quorum Disks on Database Servers
- Database Home Page
- Database Page
- Cluster Network Page: Client Network
- View Network Connections
- Example: IP Address Allocation
- Cluster Network Page: Backup Network
- Alerting Page
- Comments Page
- Exadata Hardware Installation: Overview
- Configuring Exadata: Overview
- Loading the Configuration Information and Installing the Software
- Running the Exadata Deployment Tool
- Monitoring IORM Using AWR
- Monitoring IORM Using Database Statistics
- Monitoring IORM Using Exadata Metrics

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training@trends.com.ph
 (+632) 8863-2123
 www.trendssacademy.com.ph

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COURSE OUTLINE

- OEDACLI Operating Modes
- Using OEDACLI: Manage Exadata Storage Cells
- Using OEDACLI: Manage Clusters
- Example: Use the OEDACLI CREATE CLUSTER Command
- Using OEDACLI: Add Database Homes

6 Exadata Storage Server Configuration

- Exadata Storage Server Administration: Overview
- Default User Accounts for Oracle Exadata Storage Server
- Exadata Software Users, Roles, and Privileges
- Exadata Software Users, Roles, and Privileges: Examples
- Running CellCLI Commands from Database Servers
- ExaCLI: Examples
- Executing Commands Across Multiple Servers Using dcli
- dcli: Examples
- Executing Commands Across Multiple Servers Using exadcli
- exadcli: Examples
- Testing Storage Server Performance by Using CALIBRATE
- CALIBRATE: Example
- Configuring the Exadata Cell Server Software
- Starting and Stopping Exadata Cell Server Software
- Configuring Cell Disks
- Configuring Grid Disks
- Sparse Grid Disks
- Configuring Hosts to Access Exadata Cells
- Configuring ASM and Database Instances to Access Exadata Cells
- Configuring ASM Disk Groups by Using Exadata Storage
- Specifying Content Type for a Disk Group
- Reconfiguring Exadata Storage
- Optional Configuration Tasks
- Exadata Storage Security: Overview
- Exadata Storage Security Implementation

7 I/O Resource Management

- I/O Resource Management: Overview
- I/O Resource Management Concepts
- I/O Resource Management Plans
- I/O Resource Management Plans: Example
- IORM Architecture
- Getting Started with IORM
- Setting the IORM Objective
- Enabling Intradatabase Resource Management
- Intradatabase Plan: Example
- Using Exadata IORM with CDB
- Enabling IORM for Multiple Databases
- Interdatabase Plan: Example
- Category Plan: Example
- Complete Example: Database A
- Complete Example: Database B
- Complete Example: Exadata Cells
- Using Share-Based Allocation in the Interdatabase Plan
- Setting Database I/O Utilization Limits
- Interdatabase Plans and Database Roles
- Flash Cache and Flash Log Resource Control
- Flash Cache Space Resource Management
- PMEM Cache and PMEM Log Resource Control
- PMEM Cache Space Resource Management
- I/O Resource Management Profiles

- What to Look for When Monitoring IORM
- Using Database I/O Metrics

8 Recommendations for Optimizing Database Performance

- Optimizing Performance
- Persistent Memory Usage
- Setting the PMEM Cache Mode
- Flash Memory Usage
- Influencing Caching Priorities
- Using cachingPolicy attribute
- Choosing the Flash Cache Mode for Non-Extreme Flash Cells
- Setting the Flash Cache Mode
- PMEM/Flash Cache Configurations
- Administering In-Memory Columnar Caching
- Table Compression Usage
- Index Usage
- ASM Allocation Unit Size
- Extent Size
- Exadata Specific System Statistics
- Exadata I/O Latency Capping
- Setting the Exadata Cell I/O Timeout Threshold

9 Using Smart Scan

- Exadata Smart Scan: Overview
- Smart Scan Requirements
- Situations Preventing Smart Scan
- Monitoring Smart Scan in SQL Execution Plans
- Smart Scan Execution Plan: Example
- Example of a Situation Preventing Smart Scan
- Smart Scan Join Processing with Bloom Filters
- Smart Scan Join Filtering: Example
- Other Situations Affecting Smart Scan
- Exadata Storage Server Statistics: Overview
- Exadata Storage Server Wait Events: Overview
- Smart Scan Statistics: Example
- Smart Scan Wait Events: Example
- Concurrent Transaction: Example
- Extreme Concurrent Transaction: Example
- Migrated Rows: Example
- I/O Sent Directly to Database Server to Balance CPU Usage: Example
- Column Filtering: Example

10 Consolidation Options and Recommendations

- Consolidation: Overview
- Methods for Database Consolidation
- Core Principles for Database Consolidation
- Recommended Consolidation Approach
- Recommended Storage Configuration for Consolidation
- Alternative Storage Configurations
- Benefits and Limitations of Partitioned Storage Configurations
- Cluster Configuration Options
- Operating System Parameter Recommendations
- Memory Management Recommendations
- CPU Management Recommendations
- Process Management Recommendations
- Other Recommendations
- Isolating Management Roles
- Consolidation Using

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