

## Oracle Database 11g: Data Warehousing Fundamentals

**Duration:** 3 Days

### What you will learn

In this course, students learn the basic concepts of a data warehouse and study the issues involved in planning, designing, building, populating, and maintaining a successful data warehouse. Students learn to improve performance or manageability in a data warehouse using various Oracle Database features.

Students also learn the basics about Oracle's Database partitioning architecture and identify the benefits of partitioning. Students review the benefits of parallel operations to reduce response time for data-intensive operations. Students learn about the extract, transform, and load of data phase (ETL) into an Oracle database warehouse. Students learn the basics about the benefits of using Oracle's materialized views to improve the data warehouse performance. Students also learn at a high level how query rewrite can improve a query's performance. Students review OLAP and Data Mining and identify some data warehouse implementations considerations.

Students briefly use some of the available data warehousing tools such as Oracle Warehouse Builder, Analytic Workspace Manager, and Oracle Application Express.

Learn To:

Define the terminology and explain basic concepts of data warehousing

Identify the technology and some of the tools from Oracle to implement a successful data warehouse

Describe methods and tools for extracting, transforming, and loading data

Identify some of the tools for accessing and analyzing warehouse data

Describe the benefits of partitioning, parallel operations, materialized views, and query rewrite in a data warehouse

Explain the implementation and organizational issues surrounding a data warehouse project

### Audience

Application Developers  
Data Warehouse Administrator  
Data Warehouse Analyst  
Data Warehouse Developer  
Developer  
Functional Implementer  
Project Manager  
Support Engineer

### Prerequisites

*Suggested Prerequisites*

Knowledge of general data warehousing concepts  
Knowledge of client-server technology  
Knowledge of relational server technology

### Course Objectives

Define the terminology and explain the basic concepts of data warehousing  
Describe methods and tools for extracting, transforming, and loading data  
Identify some of the tools for accessing and analyzing warehouse data  
Identify the technology and some of the tools from Oracle to implement a successful data warehouse  
Define the decision support purpose and end goal of a data warehouse  
Describe the benefits of partitioning, parallel operations, materialized views, and query rewrite in a data warehouse  
Explain the implementation and organizational issues surrounding a data warehouse project  
Use materialized views and query rewrite to improve the data warehouse performance  
Develop familiarity with some of the technologies required to implement a data warehouse

## **Course Topics**

### **Introduction**

Course Objectives  
Course Schedule  
Course Pre-requisites and Suggested Pre-requisites  
The sh and dm Sample Schemas and Appendices Used in the Course  
Class Account Information  
SQL Environments and Data Warehousing Tools Used in this Course  
Oracle 11g Data Warehousing and SQL Documentation and Oracle By Examples  
Continuing Your Education: Recommended Follow-Up Classes

### **Data Warehousing, Business Intelligence, OLAP, and Data Mining**

Data Warehouse Definition and Properties  
Data Warehouses, Business Intelligence, Data Marts, and OLTP  
Typical Data Warehouse Components  
Warehouse Development Approaches  
Extraction, Transformation, and Loading (ETL)  
The Dimensional Model and Oracle OLAP  
Oracle Data Mining

### **Defining Data Warehouse Concepts and Terminology**

Data Warehouse Definition and Properties  
Data Warehouse Versus OLTP  
Data Warehouses Versus Data Marts  
Typical Data Warehouse Components  
Warehouse Development Approaches  
Data Warehousing Process Components  
Strategy Phase Deliverables  
Introducing the Case Study: Roy Independent School District (RISD)

### **Business, Logical, Dimensional, and Physical Modeling**

Data Warehouse Modeling Issues  
Defining the Business Model  
Defining the Logical Model  
Defining the Dimensional Model  
Defining the Physical Model: Star, Snowflake, and Third Normal Form  
Fact and Dimension Tables Characteristics  
Translating Business Dimensions into Dimension Tables  
Translating Dimensional Model to Physical Model

## **Database Sizing, Storage, Performance, and Security Considerations**

Database Sizing and Estimating and Validating the Database Size

Oracle Database Architectural Advantages

Data Partitioning

Indexing

Optimizing Star Queries: Tuning Star Queries

Parallelism

Security in Data Warehouses

Oracle's Strategy for Data Warehouse Security

## **The ETL Process: Extracting Data**

Extraction, Transformation, and Loading (ETL) Process

ETL: Tasks, Importance, and Cost

Extracting Data and Examining Data Sources

Mapping Data

Logical and Physical Extraction Methods

Extraction Techniques and Maintaining Extraction Metadata

Possible ETL Failures and Maintaining ETL Quality

Oracle's ETL Tools: Oracle Warehouse Builder, SQL\*Loader, and Data Pump

## **The ETL Process: Transforming Data**

Transformation

Remote and Onsite Staging Models

Data Anomalies

Transformation Routines

Transforming Data: Problems and Solutions

Quality Data: Importance and Benefits

Transformation Techniques and Tools

Maintaining Transformation Metadata

## **The ETL Process: Loading Data**

Loading Data into the Warehouse

Transportation Using Flat Files, Distributed Systems, and Transportable Tablespaces

Data Refresh Models: Extract Processing Environment

Building the Loading Process

Data Granularity

Loading Techniques Provided by Oracle

Postprocessing of Loaded Data

Indexing and Sorting Data and Verifying Data Integrity

## **Refreshing the Warehouse Data**

Developing a Refresh Strategy for Capturing Changed Data

User Requirements and Assistance

Load Window Requirements

Planning and Scheduling the Load Window

Capturing Changed Data for Refresh

Time- and Date-Stamping, Database triggers, and Database Logs

Applying the Changes to Data

Final Tasks

## **Materialized Views**

Using Summaries to Improve Performance

Using Materialized Views for Summary Management

Types of Materialized Views

Build Modes and Refresh Modes

Query Rewrite: Overview

Cost-Based Query Rewrite Process

Working With Dimensions and Hierarchies

### **Leaving a Metadata Trail**

Defining Warehouse Metadata

Metadata Users and Types

Examining Metadata: ETL Metadata

Extraction, Transformation, and Loading Metadata

Defining Metadata Goals and Intended Usage

Identifying Target Metadata Users and Choosing Metadata Tools and Techniques

Integrating Multiple Sets of Metadata

Managing Changes to Metadata

### **Data Warehouse Implementation Considerations**

Project Management

Requirements Specification or Definition

Logical, Dimensional, and Physical Data Models

Data Warehouse Architecture

ETL, Reporting, and Security Considerations

Metadata Management

Testing the Implementation and Post Implementation Change Management

Some Useful Resources and White Papers