# Oracle Data Integrator 12c: Integration and Administration Ed 3

Oracle Database

| DURATION | MODULES | COURSE CODE |
| --- | --- | --- |
| **5 Days** | **22 Lectures** | **—** |

## Course Overview

This Oracle Data Integrator (ODI) training provides experience in configuring and administering the ODI 12c environment. Learn methods and techniques of data integration among various platforms based on the architecture of Extract Load Transform (EL-T).

## What You Will Learn

### Introduction to Integration and Administration

- Course Objectives
- Lesson Objectives
- Course Agenda
- Lesson Agenda
- Why Oracle Data Integrator?
- Conventional Integration Process: ETL
- Extract Load Transform (E-LT)
- ODI Architecture and Components
- ODI Architecture
- ODI Components: Overview
- Using ODI Studio
- Designer Navigator (Work Repository)
- Operator Navigator (Work Repository)
- Topology Navigator (Master Repository)
- Security Navigator (Master Repository)
- What Is an Agent?
- ODI Agents
- Three Types of Agents: Java EE, Standalone, Collocated Standalone
- Using the Three Types of Agents
- Standalone Agent: Example
- ODI Console
- Enterprise Manager FMW Console

- Management Pack for ODI for Enterprise Manager Cloud Control
- Management Pack for ODI for EM CC ODI: Home Page
- Agenda
- ODI Repositories
- Master and Work Repositories
- Repository Setup: Example
- Repository Setup: Multiple Master Repositories
- Components: Global View
- Possible ODI Methodology
- Checklist of Practice Activities
- Starting Oracle Data Integrator
- Using Online Help
- Quiz
- Summary
- Practice 1-1 Overview: Logging In and Using Help

## Administering ODI Repositories

- Objectives
- Agenda
- Initial Repository Administration Tasks
- Steps to Set Up the ODI Repositories
- 1. Run Repository Creation Utility
- 1a. Create Schemas
- 1b. Create Passwords and Tablespaces
- 2. Connect to the Master/Work Repository 3. Create a Wallet
- Connecting to the Master/Work Repository
- Exporting the Master Repository
- Importing the Master Repository
- Creating a Work Repository – 1
- Creating a Work Repository – 2
- Changing the Work Repository Password
- Quiz
- Summary
- Checklist of Practice Activities
- Practice 2-1 Overview: Creating and Connecting to ODI Master and Work
- Repositories

## ODI Topology Concepts

- Objectives
- Agenda
- What Is Topology?
- What Is in the Topology?
- Agenda
- What Is a Data Server?
- Data Servers: Examples

- Important Guideline 1
- What Is a Physical Schema?
- Physical Schemas: Properties
- Technology Terminology Among Vendors
- Important Guideline 2
- Agenda
- Infrastructure for Two Production Sites: Example
- ODI Design: Physical Architecture of the Two Production Sites
- Logical Schemas and Contexts
- What Is a Logical Schema?
- Important Guideline 3
- Logical Versus Physical Architecture
- Design Time Versus Run Time
- What Is a Context?
- A Context Maps a Logical to a Physical Schema
- Important Guideline 4: Defining Contexts
- Mapping Logical and Physical Resources
- Agenda
- ODI Physical Agents
- Creating a Physical Agent
- ODI Agent Parameters
- Launching a Standalone Agent: Examples
- Stopping the ODI Agent
- Deploying and Configuring a Java EE Agent
- Load Balancing: Example
- Important Guideline 5
- Infrastructure with Agents: Example
- Defining Agents: Example
- Special Case: Fragmentation Problem
- Special Case: Important Guideline 6
- Special Case: Defining the Physical Architecture
- Special Case: Infrastructure
- Special Case: Physical Architecture in ODI
- Agenda
- Planning the Topology
- Matrix of Logical and Physical Mappings
- Quiz
- Summary
- Checklist of Practice Activities
- Practice 3-1 Overview: Configuring a Standalone Agent by Using the Common
- Administration Model

## Physical and Logical Architecture

- Objectives
- Agenda

- What Topology Navigator Contains
- Topology Navigator: Overview
- Review: Context Connects Logical to Physical
- Objects You Create in the Practice
- Defining a Context
- Agenda
- Physical Architecture View
- Prerequisites for Connecting to a Server
- Important Note
- Creating a Data Server
- Creating a Data Server: JDBC
- JDBC Driver
- JDBC URL
- Creating a Data Server: JNDI
- Testing a Data Server Connection
- Creating a Physical Schema
- Agenda
- Logical Architecture and Context Views
- Creating a Logical Schema
- Creating a Logical Agent
- Editing a Context to Link Logical and Physical Agents
- Quiz
- Summary
- Checklist of Practice Activities
- Practice 4-1 Overview: Working with Topology

## Setting Up a New ODI Project

- Objectives
- Agenda
- What Is a Project?
- Oracle Data Integrator Projects: Overview
- How to Use ODI Projects in Your Work
- Creating a New Project
- Agenda
- What Is a Folder?
- Creating a New Folder
- Organizing Projects and Folders
- Agenda
- What Is a Knowledge Module?
- Types of Knowledge Modules
- Which Knowledge Modules Are Needed?
- Knowledge Modules: Examples
- Importing Knowledge Modules
- Replacing Existing KMs
- Knowledge Module Editor

- Editing a Knowledge Module
- Agenda
- Exporting and Importing
- Exporting an Object
- Importing an Object
- ID Numbers: Overview
- Import Types
- Choosing an Import Mode
- Import Report
- Agenda
- What Is a Marker?
- Tagging Objects with Markers
- Removing Markers
- Marker Groups
- Project and Global Markers
- Creating a Marker Group
- Quiz
- Summary
- Checklist of Practice Activities
- Practice 5-1 Overview: Setting Up a New ODI Project

## Oracle Data Integrator Model Concepts

- Objectives
- What Is a Model?
- Agenda
- Relational Model
- Relational Model: Tables and Columns
- Relational Model: Keys
- Relational Model: Foreign Keys
- Relational Model: Constraints
- Relational Model: Indexes
- Relational Model Support in ODI
- Additional Metadata in ODI
- FlexFields
- Agenda
- What Is Reverse-Engineering?
- Methods for DBMS Reverse-Engineering
- Other Methods for Reverse-Engineering
- Standard Versus Customized Reverse-Engineering
- Reverse-Engineering Life Cycle
- Agenda
- Creating a Model by Reverse-Engineering
- Step 1: Creating and Naming a New Model
- Step 2: Defining a Reverse-Engineering Strategy
- Step 3: Starting the Reverse-Engineering Process

- Using RKM for Customized Reverse-Engineering
- Selective Reverse-Engineering
- Step 4: Fleshing Out Models
- Shortcuts
- Smart Export and Import
- Quiz
- Summary
- Checklist of Practice Activities
- Practice 6-1 Overview: Creating Models by Reverse-Engineering

## Organizing ODI Models and Creating ODI Datastores

- Objectives
- Agenda
- What Is a Model Folder?
- Creating a Model Folder
- What Is a Submodel?
- Creating a Submodel
- Organizing Datastores into Submodels
- Setting Up Automatic Distribution
- Agenda
- Creating Datastores
- Creating a Datastore in a Model
- Adding Columns to a Datastore
- Agenda
- What Is a Constraint in ODI?
- Constraints in ODI
- Creating a Mandatory Column
- Agenda
- Creating a Key
- Checking a Key
- Creating a Reference
- Creating a Simple Reference
- Creating a Complex Reference
- Checking a Reference
- Agenda
- Creating a Condition
- Checking a Condition
- Agenda
- Audit/Explore: When and Why
- Audit/Explore Process: Overview
- Agenda
- Displaying the of a Datastore
- Viewing the Distribution of Values
- Analyzing the of a Datastore
- Agenda

- Defining Business Rules in ODI
- From Business Rules to Constraints
- Deducing Constraints from Data Analysis
- Testing a Constraint
- Auditing a Model or Datastore
- Reviewing Erroneous Records
- Quiz
- Summary
- Checklist of Practice Activities
- Practice 7-1 Overview: Checking Data Quality in the Model

## ODI Mapping Concepts

- Objectives
- Agenda
- What Is a Mapping?
- Business Rules for Mappings
- Where Are the Rules Defined?
- Agenda
- What Is an Expression?
- What Is a Join?
- What Is a Filter?
- What Is a Lookup?
- What Is a Set?
- What Are Some of the Others?
- New with Patch: Pivot and Unpivot
- Agenda
- How Does ODI Implement Business Rules?
- Business Problem
- Implementing the Rules
- Integration Process
- Process Details
- Process Implementation: Example 1
- Process Implementation: Example 2
- Process Implementation: Example 3
- Agenda
- What Is a Staging Area?
- Execution Location
- Agenda
- From Business Rules to Processes
- Knowledge Modules
- What Is a Knowledge Module?
- Code Generation
- KM Types Used in Mappings
- Agenda
- Purpose of a Mapping

- What Is an Expression?
- Creating a One-to-One Mapping
- Creating and Naming a Mapping
- Defining the Target Datastore
- Multiple Targets
- Defining the Source Datastore
- Connecting the Ports to Make the Map
- Defining the Expressions
- Valid Expression Types
- Saving the Mapping
- Running the Mapping
- Quiz
- Summary
- Checklist of Practice Activities
- Practice 8-1Overview: Mapping: Simple Transformations

## Designing Mappings

- Objectives
- Agenda
- Multiple-Source Datastores
- Creating a Join Manually
- Advanced Joins
- Types of Joins
- Setting Up a Join
- Creating Lookups
- Using Lookups
- Agenda
- Filters in ODI
- Defining a Filter Manually
- Setting Up a Filter
- Agenda
- Physical Mapping Diagram
- Flow in the Physical Diagram
- What Defines the Flow?
- Scenario
- Basic Process
- Agenda
- Purpose of a Staging Area
- Placing the Staging Area
- Important Note
- Specifying the Staging Area
- Agenda
- Options for Expressions
- Setting Options for Expressions
- Disabling an Expression

- Enabling a Mapping for Inserts or Updates
- Agenda
- Execution Location and Syntax
- Why Change the Execution Location?
- Changing the Execution Location
- ODI Mapping Execution Simulation
- Agenda
- Which KMs for Which Flow?
- Knowledge Modules: Additional Information
- Identifying IKMs and LKMs
- IKMs and LKMs: Strategies and Methods
- Specifying an LKM
- Specifying an IKM
- Common KM Options
- Flow: Example 1
- Flow: Example 2
- Flow: Example 3
- Quiz
- Summary
- Checklist of Practice Activities
- Practice 9-1 Overview: Mapping: Complex Transformations
- Practice 9-2 Overview: Mapping: Implementing Lookup

## Mappings: Monitoring and Troubleshooting

- Objectives
- Agenda
- Operator Navigator: Viewing the Log
- Using the Operator Navigator
- Hierarchy: Sessions, Steps, Tasks
- Viewing Details of Sessions, Steps, and Tasks
- Monitoring Execution of a Mapping
- Troubleshooting a Session
- 1. Identifying the Error
- 2. Reviewing the Code
- 3. Fixing the Code and Restarting the Session
- 4. Fixing the Mapping
- Keys to Reviewing the Generated Code
- Agenda
- Common Errors and Symptoms
- Important Note
- Tips for Preventing Errors
- Using the Attributes Panel for Quick Edits
- Quiz
- Summary
- Checklist of Practice Activities

Practice 10-1 Overview: Creating ODI Mapping: Exporting a Flat File to a Relational

- Table

## Designing Mappings: Advanced Topics 1

- Objectives
- Agenda
- Business Rules in Mappings
- Business Rule Elements
- More Elements
- Expression Editor
- Agenda
- Using a Variable in Code
- Binding Versus Substitution
- Case Sensitivity
- Agenda
- Defining a Dataset
- Using Set-Based Operators
- Example of SET: UNION
- Agenda
- Types of Sequences
- Support for Native Sequences
- Creating a Native Sequence
- Referring to Sequences
- Sequences Updated by Agent
- Using Standard Sequences in Mappings Correctly
- Using ODI Standard Sequences in Mappings
- Populating Native Identity Attributes
- Sequences: Best Practices
- Automatic Temporary Index Management
- Tracking Variables and Sequences
- How Variable and Sequence Tracking Works
- Variable Actions
- Definition Tab of Session Step or Session Task
- Quiz
- Summary
- Checklist of Practice Activities
- Practice 11-1: Using Native Sequences with ODI Mapping
- Practice 11-2: Using Temporary Indexes
- Practice 11-3: Using Sets with ODI Mapping

## Designing Mappings: Advanced Topics 2

- Objectives
- Agenda
- Partitioning
- Definition in Datastore After Reverse-Engineering
- Using Partitioning in a Mapping

- Agenda
- Reusable Mappings
- Using Reusable Mappings: Example
- Derived Select (Subselect) for Reusable Mappings
- Agenda
- What Is a User Function?
- Why Use User Functions?
- Properties of User Functions
- Using User Functions
- Creating a User Function
- Defining an Implementation
- Syntax and Implementations
- User Functions at Design Time
- User Functions at Run Time
- Note: Functions in Execution Log
- Agenda
- Using Substitution Methods
- Substitution Methods: Examples
- Agenda
- Description of KM Steps
- Details of the Steps
- Setting KM Options
- Developing Your Own KM: Guidelines
- Complex File Technology
- Quiz
- Summary
- Checklist of Practice Activities
- Practice 12-1: Creating and Using Reusable Mappings
- Practice 12-2: Developing a New Knowledge Module

## Using ODI Procedures

- Objectives
- Agenda
- What Is a Procedure?
- Procedure: Examples
- Creating Procedures: Overview
- Agenda
- Creating a New Procedure
- Agenda
- Creating a Command
- Arranging Tasks in Order
- Which Parameters Should Be Set?
- Valid Types of Commands
- More Elements
- Why Use a Source Command?

- Agenda
- Types of Options
- Creating a New Option
- Making a Command Optional
- Using an Option Value in a Command
- Agenda
- Procedure Execution
- Using the Operator Navigator to View Results
- Quiz
- Summary
- Checklist of Practice Activities
- Practice 13-1: Creating an ODI Procedure

## Using ODI Packages

- Objectives
- Agenda
- What Is a Package?
- Creating a Package
- Agenda
- Creating and Naming a Package
- Package Diagram
- Package Diagram Toolbar
- Agenda
- Package Steps
- Creating a Package Step
- What Is an ODI Tool?
- Creating an ODI Tool Step
- Tool Steps: Best Practices
- Agenda
- Sequencing Steps
- A Simple Package
- Sequencing Package Steps
- Agenda
- Executing a Package
- Agenda
- Basic Step Types
- Advanced Step Types
- Agenda
- Creating Model, Submodel, and Datastore Steps
- Models, Submodels, and Datastore Steps
- Agenda
- Creating a Variable Step
- Variable Steps
- Agenda
- Controlling Execution

- Error Handling
- Creating a Loop
- The Advanced Tab
- Quiz
- Summary
- Checklist of Practice Activities
- Practice 14-1: Creating an ODI Package
- Practice 14-2: Using ODI Packages with Variables and User Functions

## Step-by-Step Debugger

- Objectives
- Agenda
- Overview
- Agenda
- Process Overview
- Starting a Session in Debug Mode
- Specifying Debug Properties
- Control Execution Flow
- Screen Step Numbering
- Agenda
- New Functionalities
- Benefits for End Users
- Agenda
- Debug Toolbar
- Toolbar: Current Cursor
- Toolbar: Get Data
- Toolbar: Step Into
- Toolbar: Run to Task End
- Toolbar: Run to Next Task
- Toolbar: Run to Step End
- Toolbar: Run to Next Step
- Toolbar: Pause
- Toolbar: Resume
- Summary
- Checklist of Practice Activities
- Practice 15-1: Debugging Mappings

## Managing ODI Scenarios

- Objectives
- Agenda
- What Is a Scenario?
- Properties of Scenarios
- Agenda
- Scenario-Related Tasks
- Generating a Scenario

- Regenerating a Scenario
- Generation Versus Regeneration
- Executing a Scenario from the GUI
- Executing a Scenario from a Command Line
- Executing a Scenario from a Package
- Exporting a Scenario
- Agenda
- Preparing Scenarios for Deployment
- Automating Scenario Management
- Scheduling the ODI Scenario
- Scheduling ODI Scenario with External Scheduler
- Managing Schedules
- Quiz
- Summary
- Checklist of Practice Activities
- Practice 16-1: Creating and Scheduling an ODI Scenario

## Using Load Plans

- Objectives
- Should You Organize Executions with Load Plans?
- What Are Load Plans?
- Load Plan Editor
- Load Plan Steps
- Defining the Restart Behavior
- Are Load Plans Substitutes or Packages or Scenarios?
- Benefits of Using Load Plans
- Handling Failed Load Plans
- Quiz
- Summary
- Checklist of Practice Activities
- Practice 17-1 Overview: Using Load Plans

## Enforcing Data Quality with ODI

- Objectives
- Agenda
- Why Data Quality?
- When to Enforce Data Quality
- Data Quality in Source Applications
- Data Quality Control in the Integration Process
- Data Quality in the Target Applications
- Agenda
- Data Quality Business Rules
- From Business Rules to Constraints
- Agenda
- Data Quality System: Overview

- Static and Flow Controls: Differences
- Data Quality Control: Properties
- Synchronous Control
- What Is a Constraint?
- What Can Be Checked?
- Enforcing Data Quality in a Mapping
- Agenda
- Setting Up Static or Flow Control
- Enabling Static or Flow Control
- Agenda
- Setting the Physical Options
- Setting the Logical Options
- Agenda
- Selecting Which Constraints to Enforce
- Selecting Which Constraints to Check
- Differences Between Control Types
- Agenda
- Reviewing Erroneous Records
- EnterpriseDataQuality Tool
- Using the EDQ Tool
- Quiz
- Summary
- Checklist of Practice Activities
- Practice 18-1: Enforcing Data Quality with ODI Mappings

## Working with Changed Data Capture (CDC)

- Objectives
- Why Changed Data Capture?
- CDC Techniques
- Changed Data Capture in ODI
- Journalizing Components
- CDC Infrastructure in ODI
- Simple Versus Consistent Set Journalizing
- Limitations of Simple CDC Journalizing: Example
- Consistent CDC Journalizing
- Consistent CDC: Infrastructure
- Setting Up Journalizing
- Setting CDC Parameters: Example
- Adding a Subscriber: Example
- Starting Journal: Example
- Journalizing Status
- Viewing Data/Changed Data: Example
- Using Changed Data
- Oracle GoldenGate Integration
- Oracle GoldenGate Integration in ODI 12c

- Quiz
- Summary
- Checklist of Practice Activities
- Practice 19-1: Implementing Changed Data Capture

## Advanced ODI Administration

- Objectives
- Agenda
- Introduction to ODI Security Navigator
- Security Concepts: Overview
- Defining Security Policies
- Creating Profiles
- Using Generic and Nongeneric Profiles
- Built-in Profiles
- Creating Users
- Assigning a Profile to a User
- Assigning an Authorization by Profile or User
- Defining Password Policies
- Setting User Preferences
- ODI Security Integration: Overview
- Implementing External Authentication (OPSS)
- Implementing External Authentication (OPSS): Switching the Authentication
- Mode
- Implementing External Password Storage
- Agenda
- Types of ODI Reports
- Generating Topology Reports
- Generated Topology Report: Example
- Version Comparison Report: Example
- Generating Object Reports
- Agenda
- Integration of ODI with Enterprise Manager
- Java EE Agent and Enterprise Manager Configuration with WebLogic
- Domain: Overview
- Using ODI Console: Example
- Quiz
- Summary
- Checklist of Practice Activities
- Practice 20-1: Setting Up ODI Security
- Practice 20-2: Integration with Enterprise Manager and Using ODI Console

## Integrating ODI with Subversion

- Objectives
- Agenda
- ODI-VCS Integration

- ODI-VCS Integration Features
- ODI: Selecting the Required VCS
- ODI Repository Change
- Agenda
- SVN Connections
- Creating an SVN Connection
- Configuring ODI Subversion Settings
- Configuring the Subversion Repository with ODI
- Creating a Default Subversion Project Structure
- Configuring the Subversion Repository with ODI: Options
- SVN Configuration Options
- Creating the Default Project Structure
- Disconnection from ODI (Required)
- Agenda
- Adding ODI Objects to SVN: Options
- Adding a Single Non-Versioned Object to SVN: 1
- Adding a Single Non-Versioned Object to SVN: 2
- Adding Multiple Non-Versioned Objects to SVN: 1
- Adding Multiple Non-Versioned Objects to SVN: 2
- Creating a New Version for an Object
- Adding a Version Comment
- Agenda
- Creating Full or Partial Tags in the Subversion Repository
- Creating a Full Tag
- Full Tag Parameters
- Creating a Partial Tag
- Partial Tag: Adding a Subset of ODI Objects
- Agenda
- Version History
- Comparing Versions
- Version Search Criteria
- Version Compare Results
- Display Color Options
- Display Version Tree
- Agenda
- Performing a Branch Merge
- Merge Summary Report
- Merge Results Window
- Resolving Merge Conflicts
- Merge Conflict Resolution
- Quiz
- Summary
- Practice 21-1: Subversion ODI Setup

## Integrating Big Data with ODI

- Objectives

- Agenda
- Big Data
- Google BigTable, a Big Data Pioneer
- Emergence of Apache Hadoop
- Agenda
- Apache Hadoop
- Hadoop Ecosystem
- Apache HBASE
- Apache Hive
- Apache Pig
- Apache Spark
- Apache Sqoop
- Apache Oozie
- Agenda
- Big Data Transformation with Data Integrator
- Agenda
- Hadoop Data Integration: Overview
- Big Data Knowledge Modules Matrix:1
- Big Data Knowledge Modules Matrix: 2
- Big Data Knowledge Modules Matrix: 3
- Big Data Knowledge Modules Matrix: 4
- Big Data Knowledge Modules Matrix: 5
- ODI: Hadoop Integration Process
- ODI: Further Processing After Hadoop Analysis
- ODI: Code Generation
- Agenda
- Apache Oozie and ODI Integration
- ODI to Oozie Workflow Tasks
- Agenda
- ODI Support for Unstructured Data
- ODI Support for Complex Data
- Summary
- Practice 22-1: Configuring the Hadoop ecosystem