

Oracle® Fusion Middleware

WebLogic Server Administration

Lab 11: Data Source Configuration



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Oracle Fusion Middleware: WebLogic Server Administering (12C & 14.1.1)

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About Data Source and Connection Pool

Data Source

A Data Source in WebLogic is a configuration object that defines how an application connects to a database.

It contains:

- Database URL
- Username and password
- Driver class
- Connection pool settings

Applications use the Data Source (via JNDI) instead of directly connecting to the database.

Connection Pool

A Connection Pool is a group of pre-created database connections maintained by WebLogic.

Instead of creating a new database connection for every request:

- WebLogic reuses existing connections from the pool.
- After use, the connection is returned to the pool.

Benefits of Using Data Source & Connection Pool

- Better Performance - Reusing connections reduces connection creation time.
- Efficient Resource Management - Controls number of database connections.
- Security - Credentials are stored in WebLogic, not in application code.
- Centralized Configuration - Easy to modify database settings without changing application code.
- Scalability - Supports multiple users efficiently.

In Simple Terms:

A Data Source is the database connection configuration, and the Connection Pool is the set of reusable database connections that improves performance and scalability.

Types of Data Sources in WebLogic

Generic Data Source

A Generic Data Source is the basic and most commonly used type of data source in WebLogic.

- Connects to a single database instance
- Uses a standard JDBC driver
- Suitable for standalone databases

Simple configuration

Used in most applications

Multi Data Source (MDS)

A Multi Data Source is a logical grouping of multiple Generic Data Sources.

- Provides failover or load balancing
- Can switch between multiple databases if one fails
- Supports:
 - Failover mode
 - Load-balancing mode

High availability

Database redundancy support

Active GridLink (AGL) Data Source

An Active GridLink Data Source is specifically designed for Oracle RAC (Real Application Clusters).

- Automatically integrates with Oracle RAC
- Supports Fast Connection Failover (FCF)
- Automatically detects node addition/removal in RAC

Best for Oracle RAC environments

Intelligent load balancing

Automatic failover

Distributed Transactions, XA Driver & Two-Phase Commit

Note – Important to understand for Active Grid Link Data Source

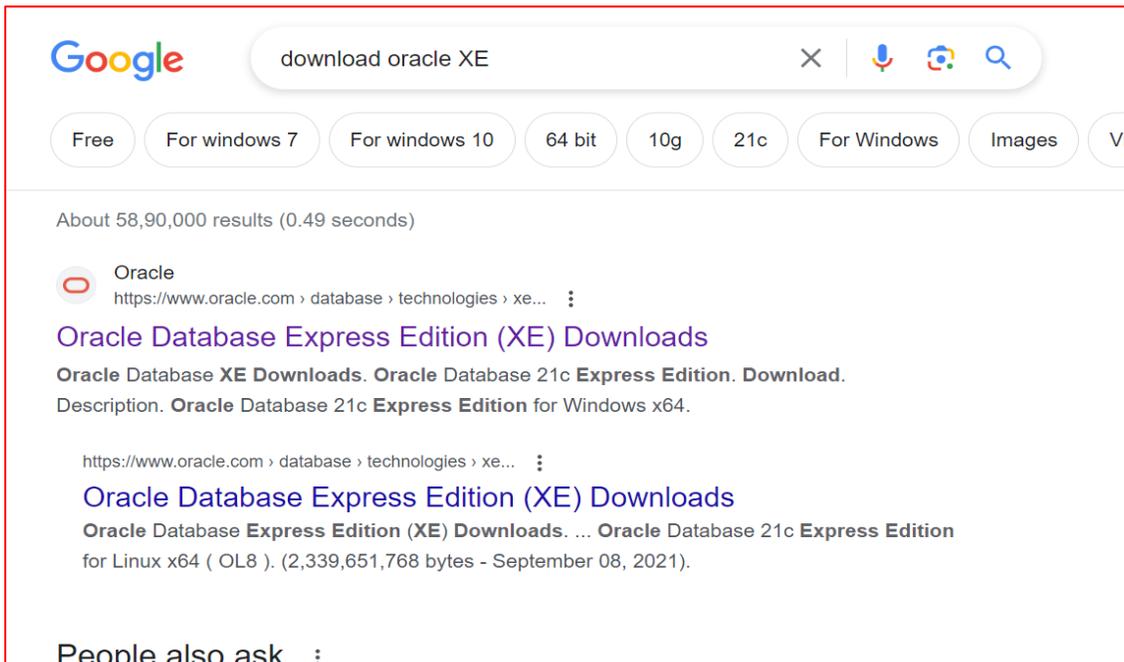
***** **Sample Doc** *****

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Information to Download Oracle XE edition for Testing Purpose

For Data Source configuration you need a running database with a valid username and password. You can download and install any certified database in your machine but would recommend to install oracle. For demo, testing and training purpose you can download and install Oracle Database Express Edition (XE).

Search for download oracle XE in browser, download and install.

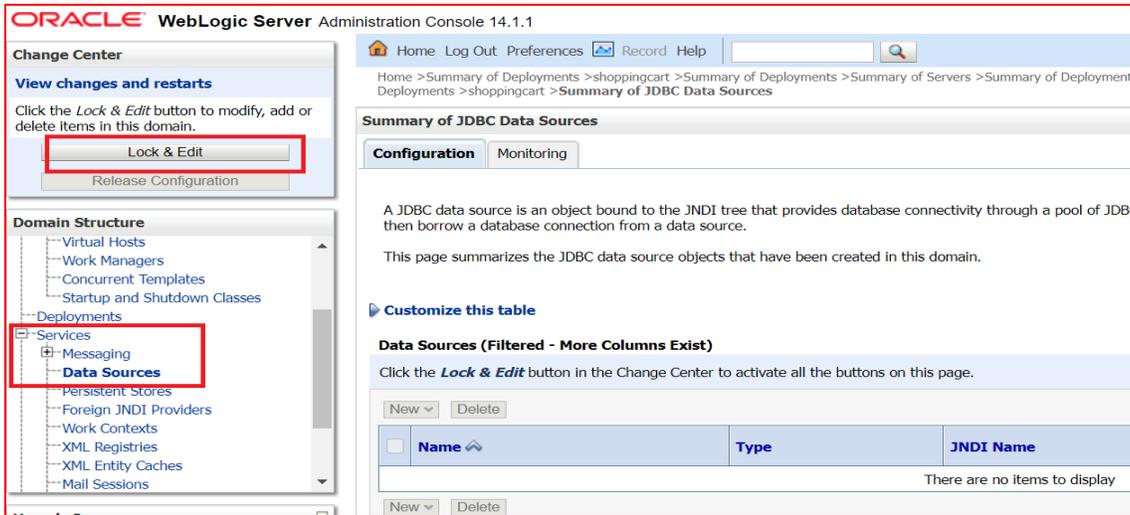


You can check below DigiTalk Session for installation.

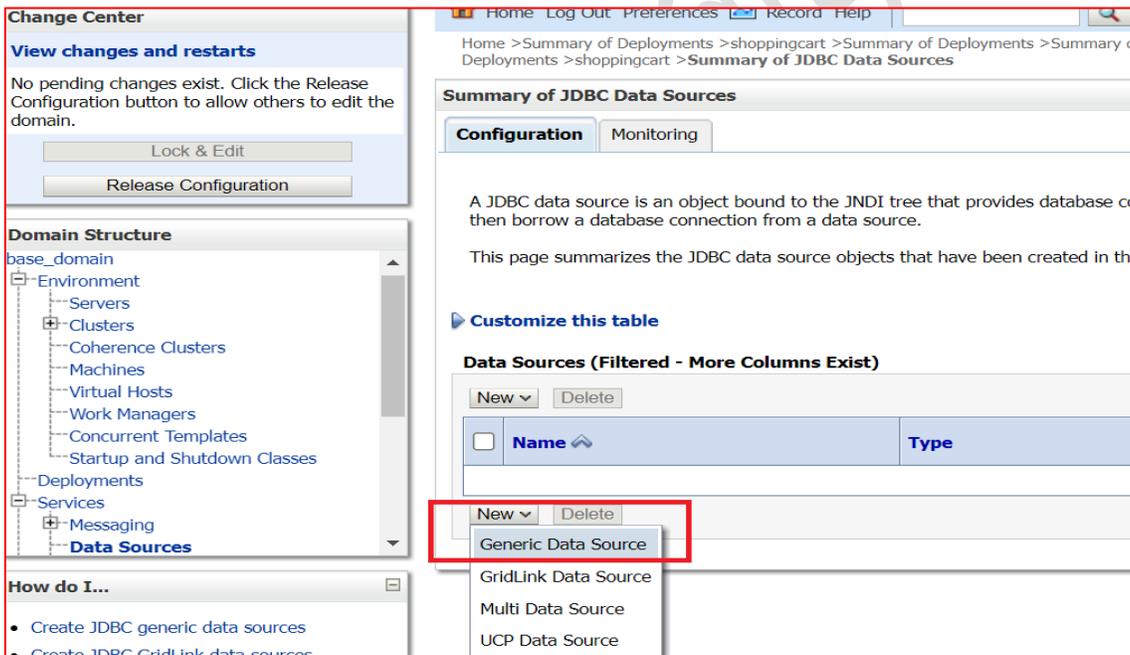
https://youtu.be/kxIPbRNUP_Y

Configuring Generic Data Source

Login to admin console, click on data Sources inside Services tab and then take lock.



Click on new, and then Generic data source



Enter a suitable name for your data source.

Enter the JNDI name. This JNDI name is defined inside the code, and application use this to take connection from the data source. For Demo purpose we can define any name because we are not going to test this data source using any application, but in real environments we always get this name from developers.

Select the appropriate database. For our demo we are using oracle database. Click Next

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Configuring Active Grid Link Data Source

Active Grid Link Data Source is used with clustered database, where multiple clustered database instances are running in parallel for High Availability, just like we configure multiple managed servers in weblogic cluster. For that you need some addition database details in comparison with the generic data source.

Select grid link data source inside services > data sources > New option

The screenshot shows the WebLogic Server Administration console. On the left, the 'Domain Structure' tree is expanded to 'Data Sources'. Below it, a 'How do I...' section lists links for creating different types of data sources. The main area shows a table of existing data sources, with a 'New' button highlighted and a dropdown menu open, showing 'GridLink Data Source' as the selected option.

Lock & Edit
Release Configuration

Domain Structure

- base_domain
 - Environment
 - Servers
 - Clusters
 - Coherence Clusters
 - Machines
 - Virtual Hosts
 - Work Managers
 - Concurrent Templates
 - Startup and Shutdown Classes
 - Deployments
 - Services
 - Messaging
 - Data Sources**

How do I...

- Create JDBC generic data sources
- Create JDBC GridLink data sources
- Create JDBC multi data sources
- Create UCP data sources

A JDBC data source is an object bound to the JNDI tree that provides database connection from a data source.

This page summarizes the JDBC data source objects that have been created in this do

[Customize this table](#)

Data Sources (Filtered - More Columns Exist)

New Delete

| <input type="checkbox"/> | Name | Type |
|--------------------------|----------------|------|
| <input type="checkbox"/> | DemoDataSource | Gene |

New Delete

- Generic Data Source
- GridLink Data Source**
- Multi Data Source
- UCP Data Source

On next screen, enter suitable name for your database.

Enter JNDI name, and select appropriate driver.

JDBC GridLink Data Source Properties

The following properties will be used to identify your new JDBC GridLink data source.

* Indicates required fields

What would you like to name your new JDBC GridLink data source?

* Name:

What JNDI name would you like to assign to your new JDBC GridLink data source?

JNDI Name:

What database type would you like to select?

Database Type: Oracle

What database driver would you like to use to create database connections? Note: * indicates that the driver is explicitly supported by Oracle WebLogic Server.

Database Driver:

- *Oracle's Driver (Thin) for GridLink Connections; Versions:Any
- *Oracle's Driver (Thin XA) for GridLink Application Continuity Connections; Versions:Any
- *Oracle's Driver (Thin XA) for GridLink Connections Versions:Any
- *Oracle's Driver (Thin) for GridLink Application Continuity Connections; Versions:Any
- *Oracle's Driver (Thin) for GridLink Connections; Versions:Any

Make sure to use XA driver with grid link data source. In Demo we are going to use * Oracle Driver (Thin XA) for GridLink Connections Versions: Any”

You will below prompt in next screen with XA driver. Click Next

Home Log Out Preferences Record Help Welcome, weblogic Connected to: base_domain

Home > Summary of Deployments > shoppingcart > Summary of Deployments > Summary of Servers > Summary of Deployments > shoppingcart > Summary of Servers > Summary of Deployments > shoppingcart > Summary of JDBC Data Sources

Create a New JDBC GridLink Data Source

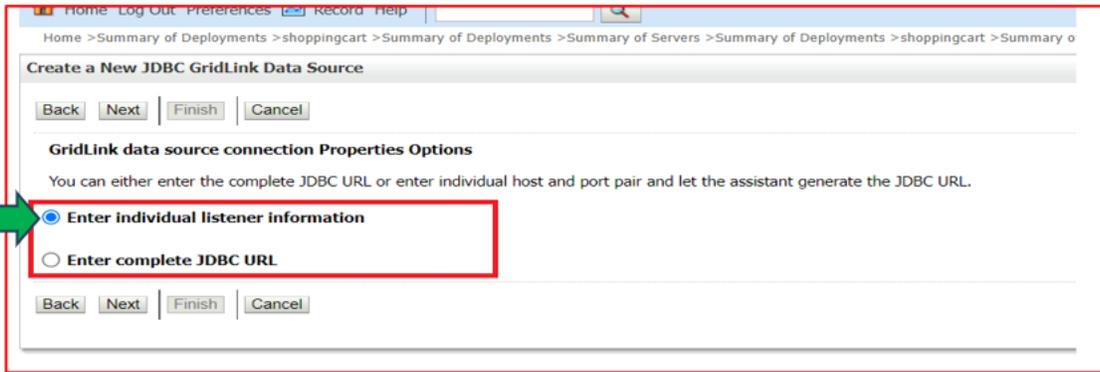
Back Next Finish Cancel

Transaction Options

You have selected an XA JDBC driver to use to create database connection in your new data source. The data source will support global transactions and use the "Two-Phase Commit" global transaction protocol. No other transaction configuration options are available.

Back Next Finish Cancel

Now to configure database, you will get two options in next screen.

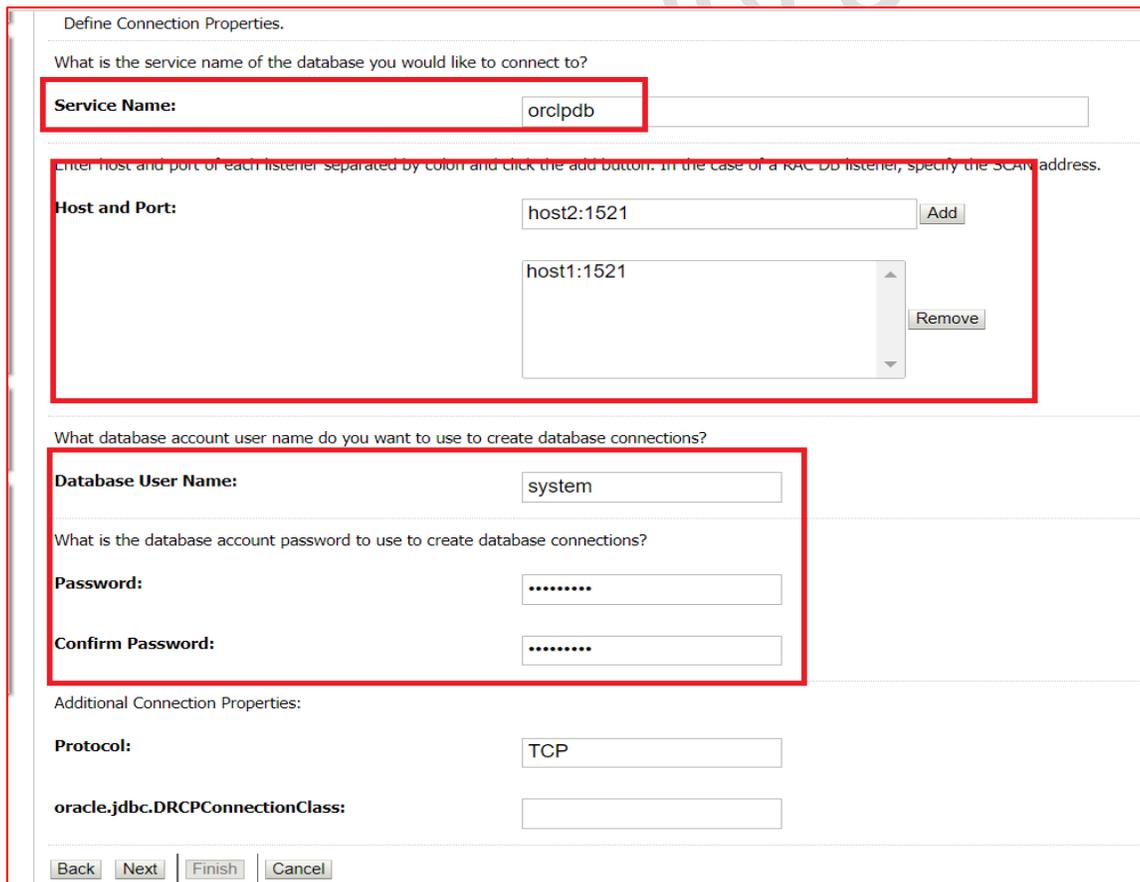


[Configure Active Grid Link Data Source - With Option 1]

With first option (Enter Individual listener information), you will get below screen, where you have to mention Database service name

We have multiple database instance running on different machine in the cluster, so add each host details one by one and click add inside “Host and Port” option.

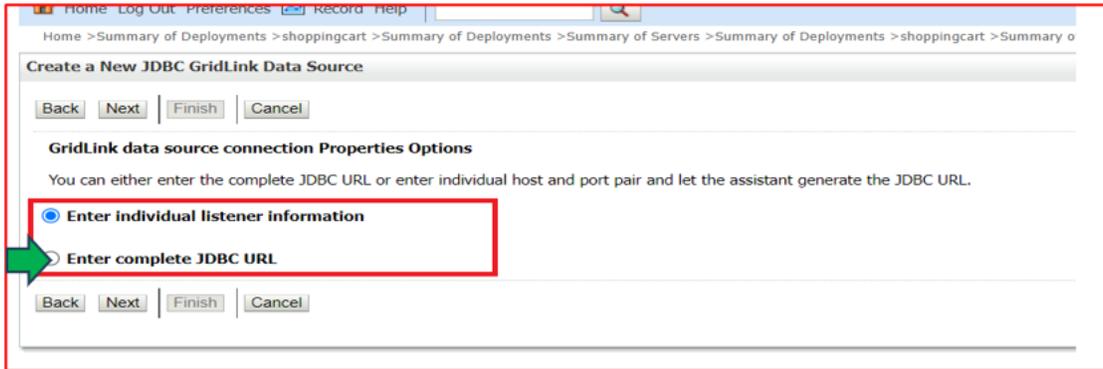
Enter username and password



***** Sample Doc *****

[Configure Active Grid Link Data Source - With Option 2] – Recommended Option

With second option, “Enter Complete JDBC url”, you will get below screen, where you have to manually specify the complete URL



Enter the Completed JDBC URL, username and password

The screenshot shows the 'Create a New JDBC GridLink Data Source' wizard at the 'Connection Properties' step. The heading is 'Create a New JDBC GridLink Data Source' with buttons for 'Back', 'Next', 'Finish', and 'Cancel'. The section is titled 'Connection Properties' and contains the text: 'Define Connection Properties.' and 'Enter Complete JDBC URL for GridLink database.' The 'Complete JDBC URL:' field contains the text 'jdbc:oracle:thin@SCAN_DNS/RAC.localdomain'. Below this is the question 'What database account user name do you want to use to create database connections?' with the 'Database User Name:' label and a text box containing 'system'. The next question is 'What is the database account password to use to create database connections?' with 'Password:' and 'Confirm Password:' labels and two masked text boxes. Below this is the section 'Additional Connection Properties:' with 'Protocol:' and 'oracle.jdbc.DRCPConnectionClass:' labels and two text boxes, one containing 'TCP'. At the bottom are buttons for 'Back', 'Next', 'Finish', and 'Cancel'.

Understand Complete JDBC URL:

`jdbc:oracle:thin@SCAN_DNS/RAC.localdomain`

Here **SCAN_DNS** is the scan DNS of RAC database, and **RAC.localdomain** is the service name of RAC database.

SCAN DNS (Single Client Access Name)

- SCAN is a cluster-level hostname used to connect to Oracle RAC.
- It resolves to multiple IP addresses (one per RAC node).
- Clients use SCAN instead of connecting to individual nodes.
- It provides automatic load balancing and failover.

Example: SCAN DNS in 2-Node RAC

Suppose you have a 2-node RAC:

- Node1 - rac1.example.com → 192.168.1.101
- Node2 - rac2.example.com → 192.168.1.102

What is SCAN?

***** **Sample Doc** *****

Multi Data Source Configuration

Login to Admin Console > Services

Data Sources > New

Select Multi Data Source

The screenshot shows the WebLogic Server Administration Console interface. On the left, the 'Domain Structure' tree is expanded to 'Services' > 'Data Sources'. Below it, a 'How do I...' section lists tasks like 'Create JDBC generic data sources' and 'Create JDBC multi data sources'. The main content area is titled 'Summary of JDBC Data Sources' and has tabs for 'Configuration' and 'Monitoring'. A text block explains that a JDBC data source is an object bound to the JNDI tree. Below this, a 'Customize this table' link is present. A table titled 'Data Sources (Filtered - More Columns Exist)' shows two entries, both of type 'Generic'. A 'New' dropdown menu is open, showing options: 'Generic Data Source', 'GridLink Data Source', 'Multi Data Source' (highlighted), 'Proxy Data Source', and 'UCP Data Source'.

Change Center
View changes and restarts
Configuration editing is enabled. Future changes will automatically be activated as you modify, add or delete items in this domain.

Domain Structure
base_domain
+ Domain Partitions
+ Environment
-- Deployments
+ Services
+ Messaging
-- **Data Sources**
-- Persistent Stores
-- Foreign JNDI Providers
-- Work Contexts
-- XML Registries
-- XML Entity Caches
-- jCOM
-- Mail Sessions

How do I...

- Create JDBC generic data sources
- Create JDBC GridLink data sources
- Create JDBC multi data sources
- Create UCP data sources

Home > Summary of JDBC Data Sources

Summary of JDBC Data Sources

Configuration | Monitoring

A JDBC data source is an object bound to the JNDI tree that provides database connectivity through a database connection from a data source.

This page summarizes the JDBC data source objects that have been created in this domain.

[Customize this table](#)

Data Sources (Filtered - More Columns Exist)

| New ▾ | | Delete |
|--------------------------|--|---------|
| Generic Data Source | | Type |
| GridLink Data Source | | Generic |
| Multi Data Source | | Generic |
| Proxy Data Source | | |
| UCP Data Source | | |

Enter a suitable Name and JNDI

Note - The application uses the JNDI name of the Multi Data Source, not the individual data sources. WebLogic internally manages which actual data source provides the connection.

In **Algorithm Type**: You can select Failover or Load Balancing based on requirements.

Failover:

In failover mode, connection requests are first sent to the primary data source. If it fails, the request automatically moves to the next data source in the list.

This continues until a connection is successful. If no data source works, an error (exception) is returned.

Load Balancing:

In load balancing mode, connection requests are distributed evenly among all configured data sources.

If one data source fails, the system automatically tries the next one.

So, it provides both:

- Even distribution of connections

- Automatic failover if a data source is unavailable

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