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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.

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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

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Distributed Transactions, XA Driver & Two-Phase Commit

Note – Important to understand for Active Grid Link Data Source

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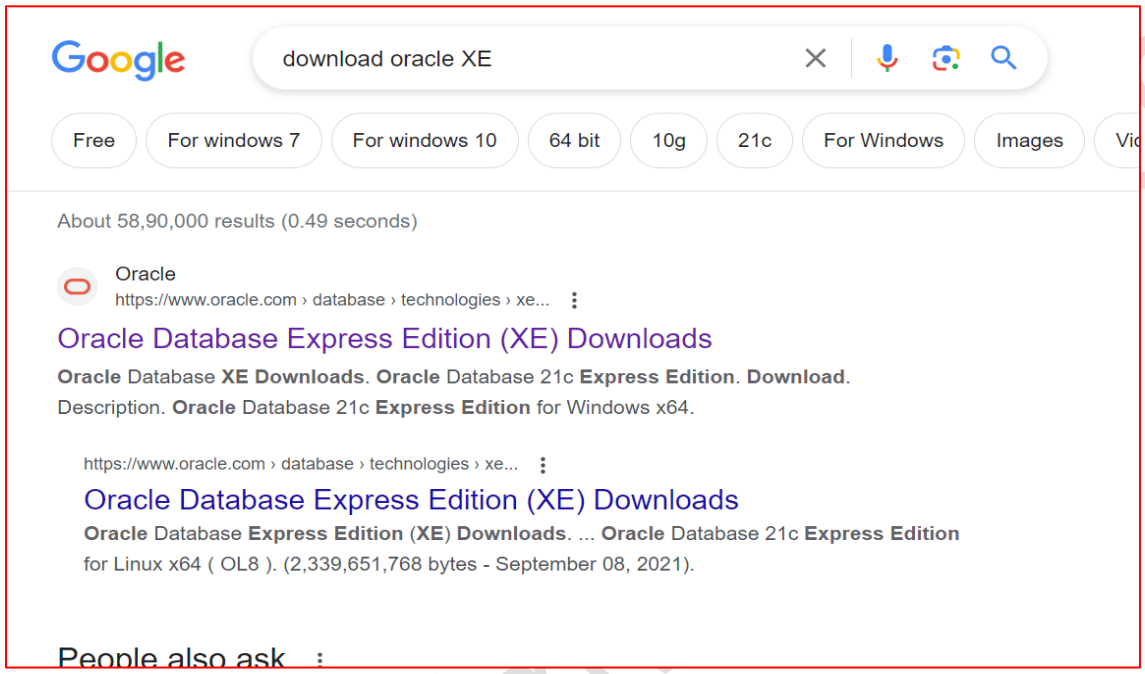
Information to Download Oracle XE edition for Testing Purpose

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/kxlPbRNUP_Y

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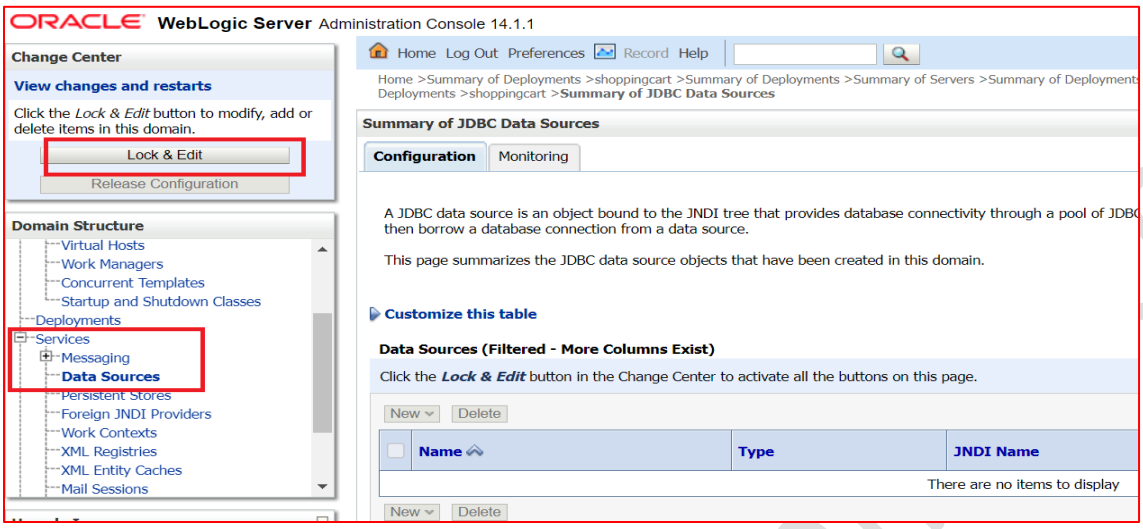
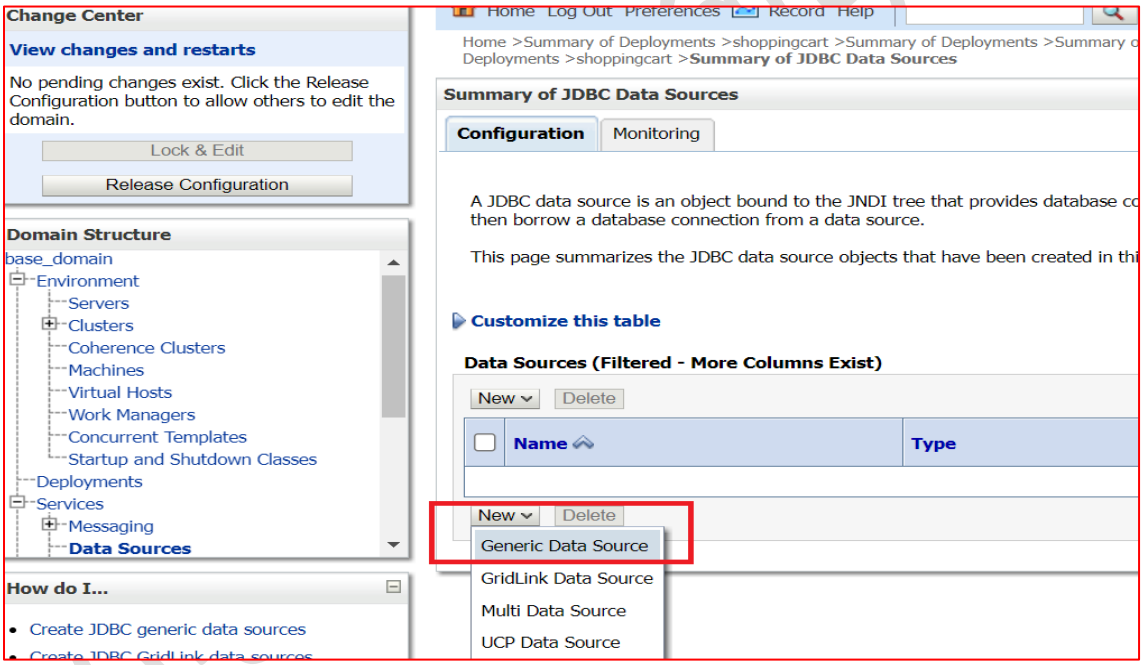
Configuring Generic Data Source

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



Click on new, and then Generic data source



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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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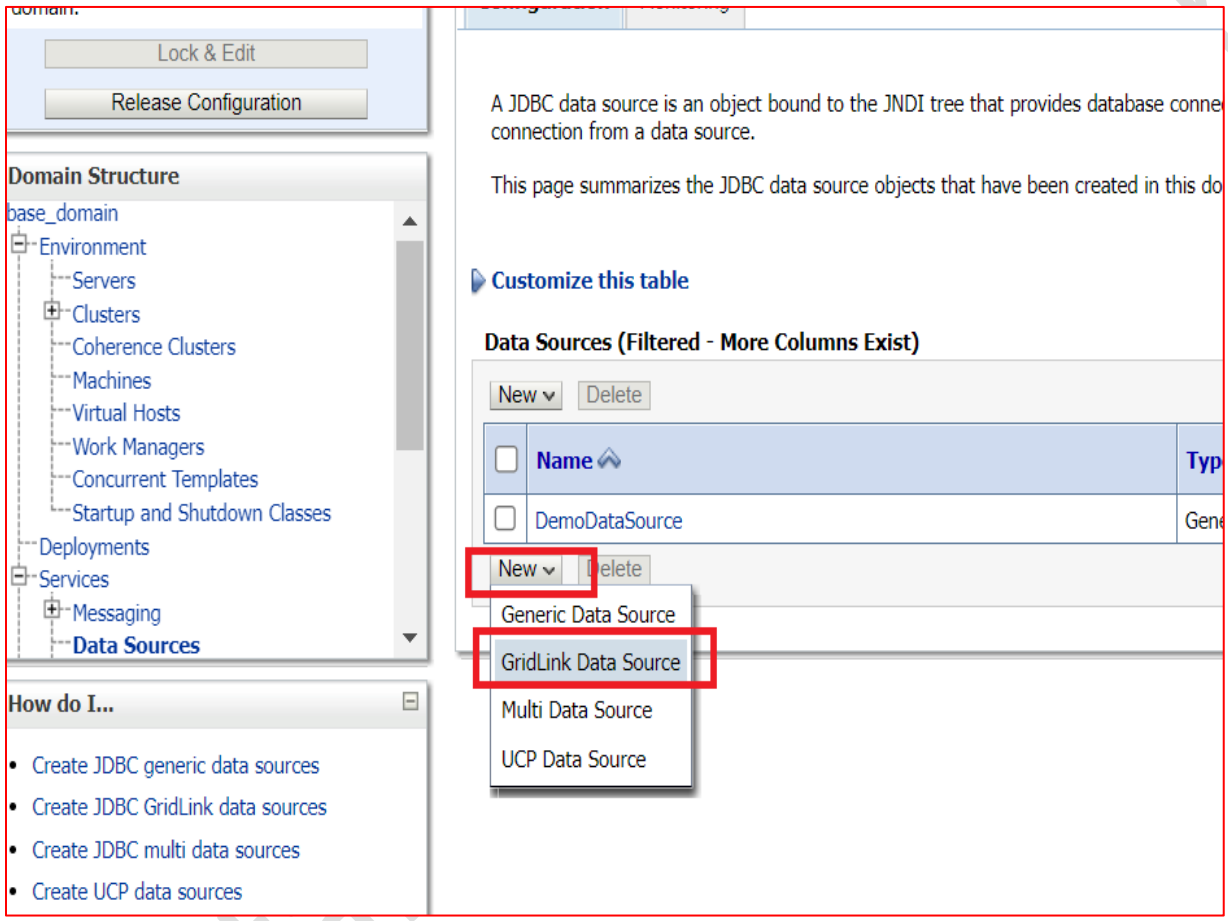
Configuring Active Grid Link Data Source

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



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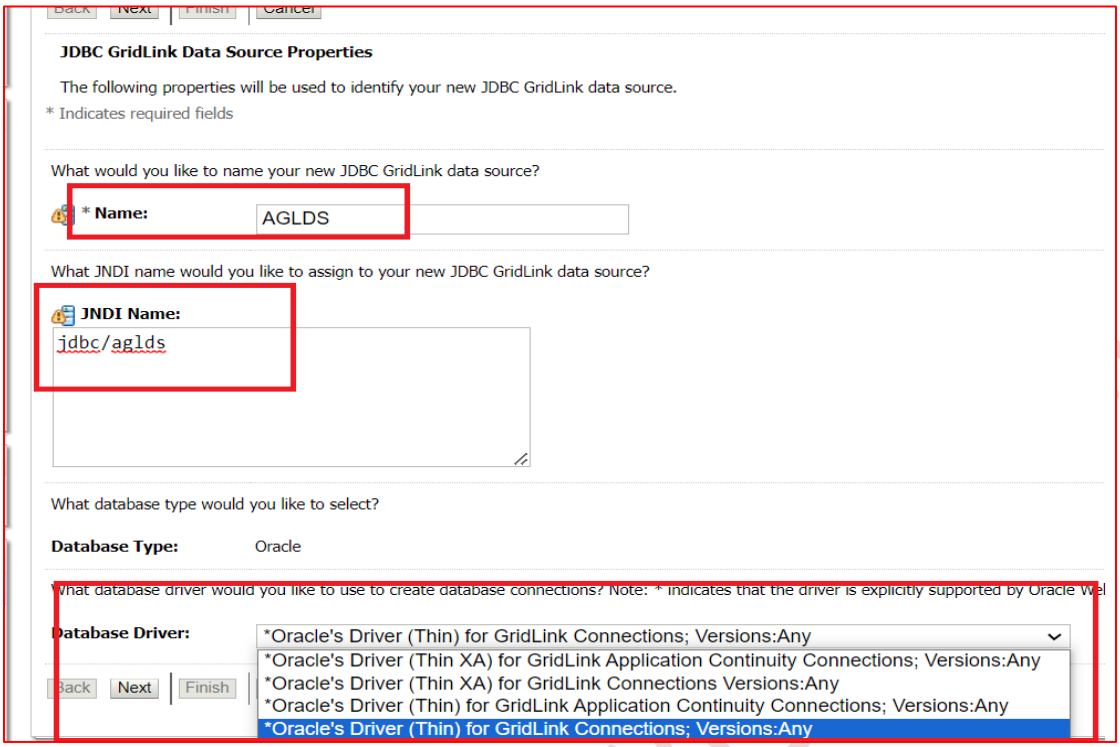
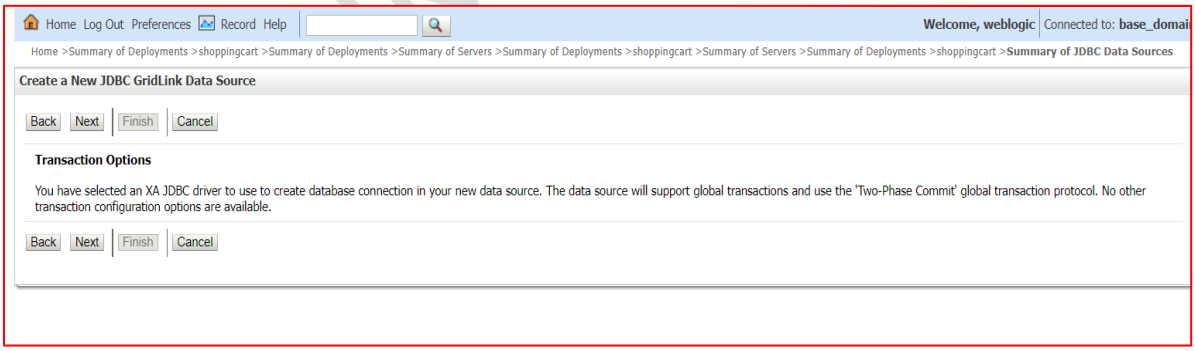
On next screen, enter suitable name for your database.

Enter JNDI name, and select appropriate driver.



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



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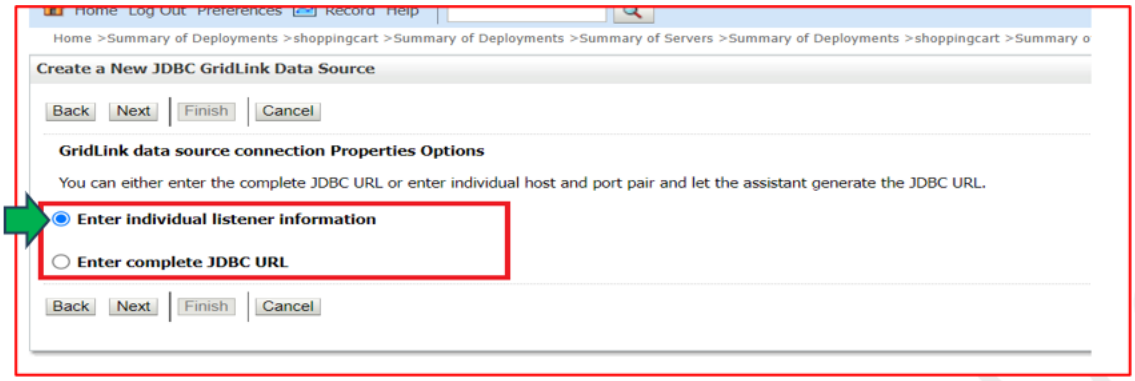
Now to configure database, you will get two options in next screen.



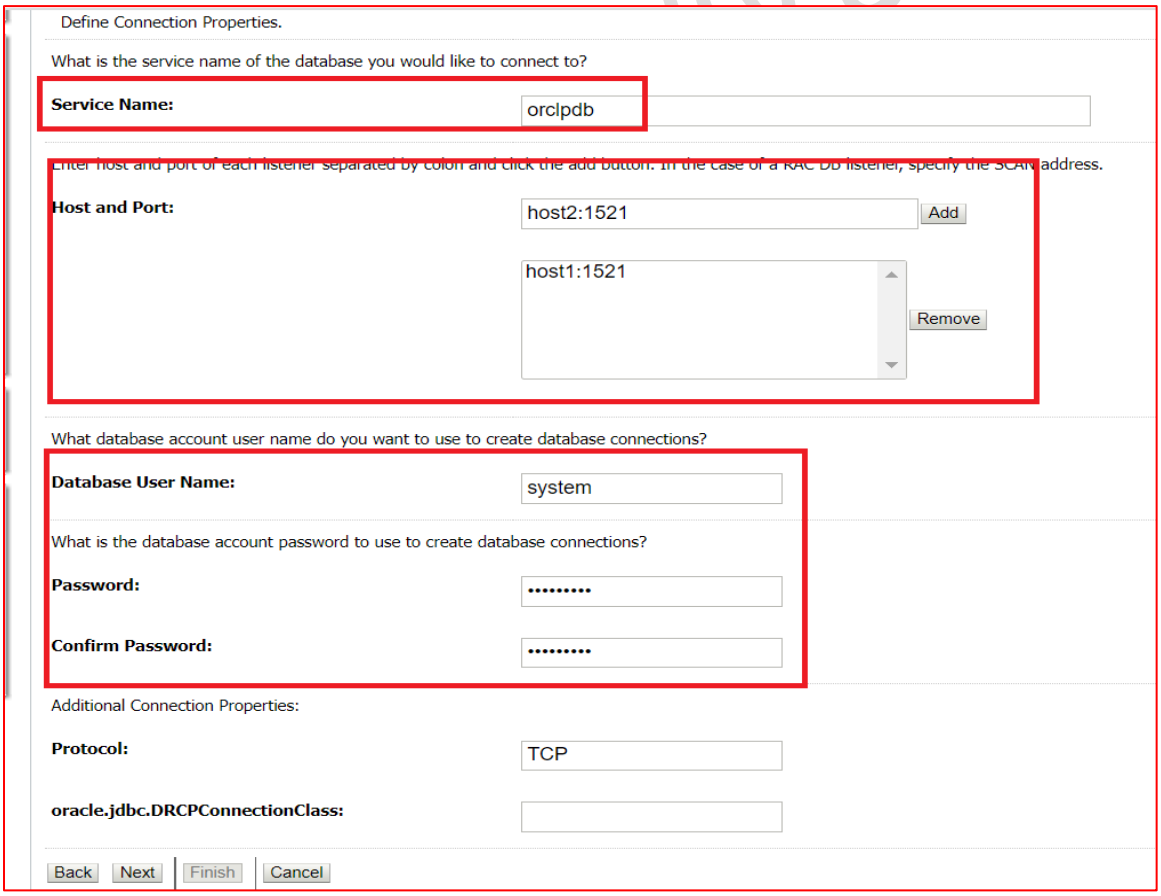
[Configure Active Grid Link Data Source - With Option 1]

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



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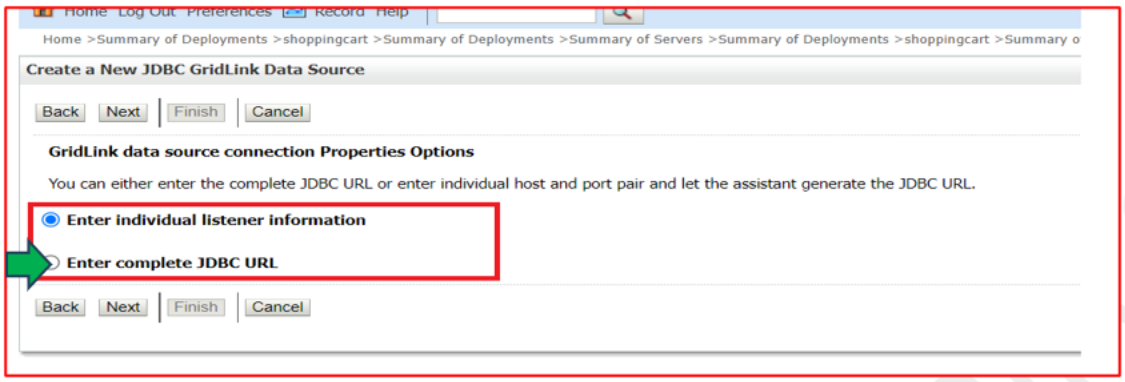
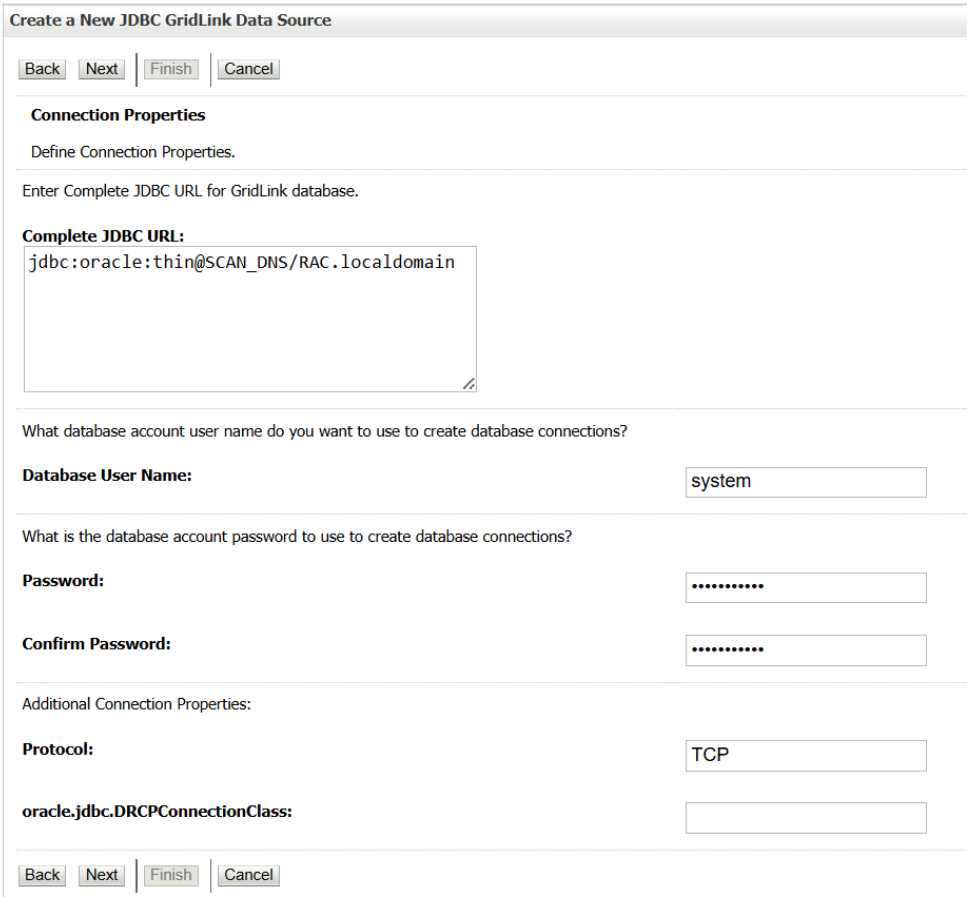
[Configure Active Grid Link Data Source - With Option 2] – Recommended Option

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



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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?

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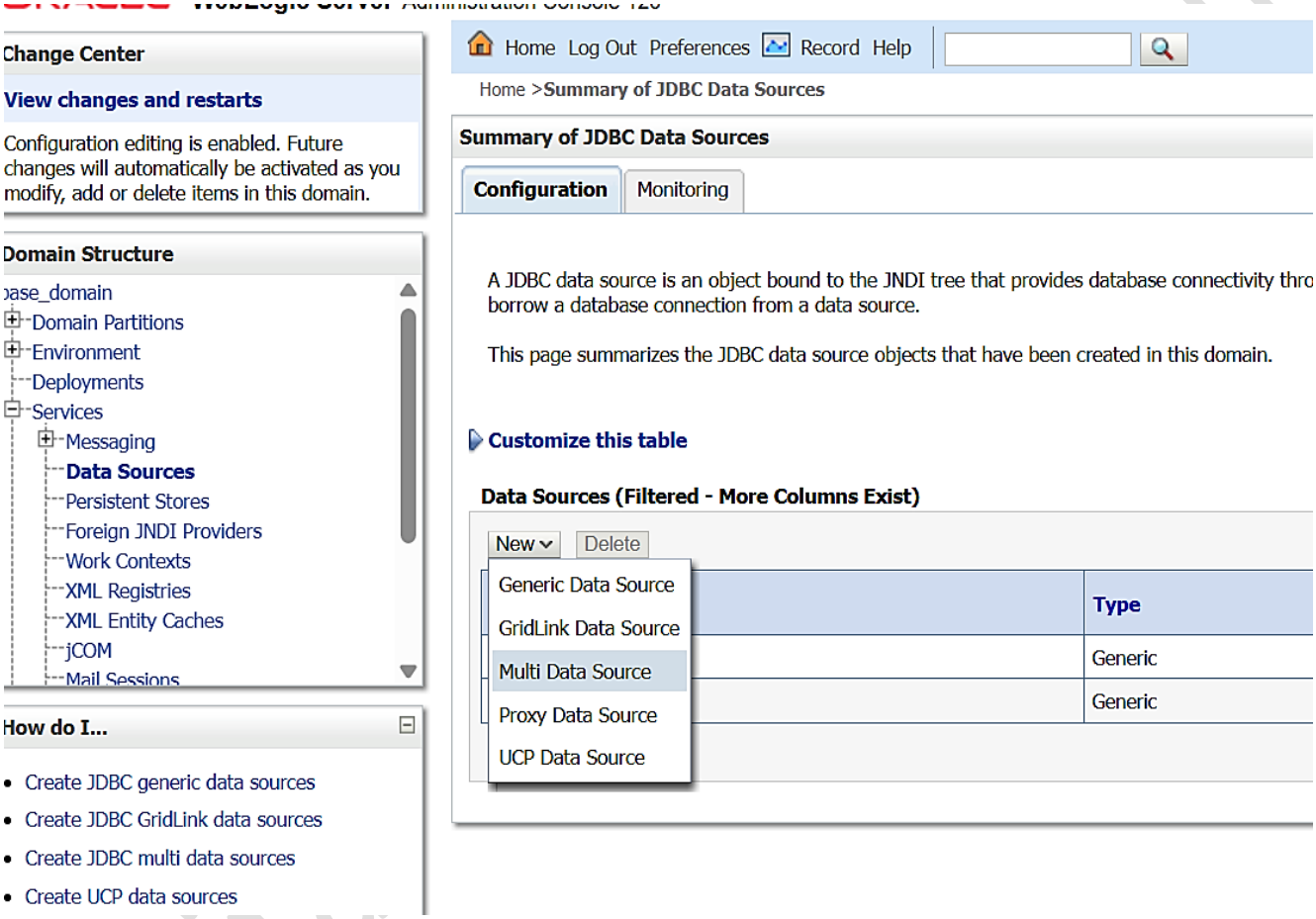
Multi Data Source Configuration

Login to Admin Console > Services

Data Sources > New

Select Multi Data Source



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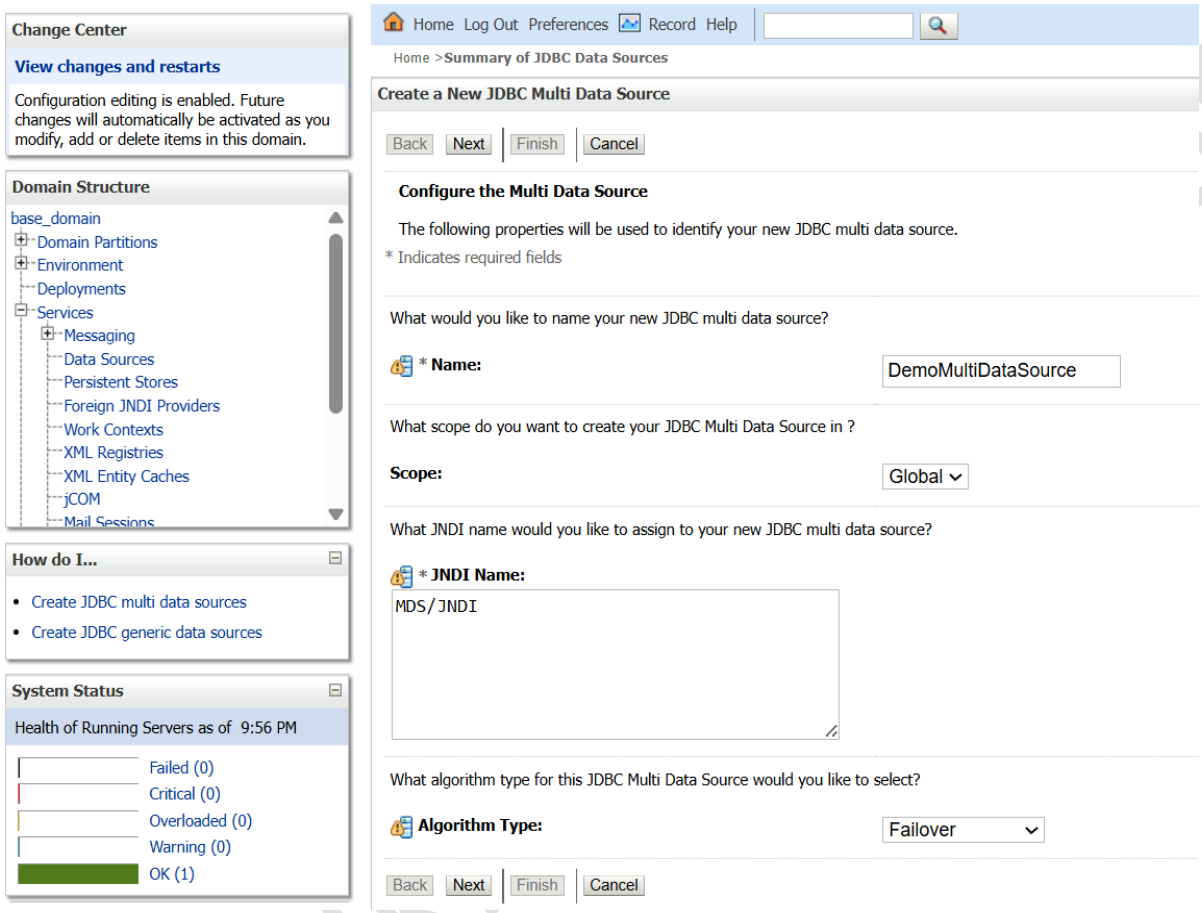
Enter a suitable Name and JNDI

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

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- Automatic failover if a data source is unavailable

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