

FCUBS GridLink Datasource Configuration  
Oracle FLEXCUBE Universal Banking  
Release 14.7.5.0.0  
Part No. G14514-01  
[September] [2024]



---

# Table of Contents

<b>1.</b>	<b>WEBLOGIC JDBC GRIDLINK DATASOURCE.....</b>	<b>1-1</b>
1.1	PREFACE.....	1-1
1.2	PURPOSE.....	1-1
1.3	WEBLOGIC DATA-GRID DATASOURCE OVERVIEW.....	1-1
1.4	INTRODUCTION.....	1-1
1.5	DATABASE RELATED CONFIGURATION .....	1-2
1.5.1	<i>ONS Setup.....</i>	<i>1-2</i>
1.5.2	<i>Database Service Modification and Monitoring.....</i>	<i>1-2</i>
1.6	CONFIGURING GRIDLINK DATASOURCE.....	1-3
1.6.1	<i>Non-XA Gridlink Datasource .....</i>	<i>1-3</i>
1.6.2	<i>XA Gridlink Datasource .....</i>	<i>1-7</i>

---

# 1. Weblogic JDBC GridLink Datasource

## 1.1 Preface

You need to carry out certain tasks manually before Oracle FLEXCUBE deployment. This document details out the pre-deployment tasks based on GridLink Datasource configuration in Weblogic Application Server.

## 1.2 Purpose

Purpose of this document is to give understanding and configuration of Weblogic GridLink Datasource for Oracle FLEXCUBE.

## 1.3 Weblogic Data-Grid Datasource Overview

In WebLogic Server 12c (12.1.2), JDBC GridLink includes Oracle Database 12c integration, having the latest functionalities of Application Continuity, Database Resident Connection Pool, Pluggable Database and Global Data Services.

The RAC integration capabilities of Universal Connection Pool (UCP) have been utilized by the WebLogic Server GridLink Data Source implementation to provide the Fast Connection Failover (FCF), Runtime Connection Load-Balancing (RCLB),

The active management of the connections in the pool is based on static settings configured on the connection pool itself (min/max capacity, timeouts, etc.) and real time information the connection pool receives from the RAC Oracle Notification Service (ONS) subsystem that advises the “client” of any state changes within the RAC cluster.

WebLogic GridLink Data Sources and JDBC connection pools leverage the load balancing functionality provided by an Oracle RAC database to provide better throughput and more efficient use of resources.

## 1.4 Introduction

FLEXCUBE is a financial application which needs fast connection failover on runtime to ensure zero downtime and proper disaster recovery.

FLEXCUBE will use GridLink data source for Fast Connection Failover and responds to Oracle RAC events using Oracle Notification Service (ONS). This ensures that the connection pool in the GridLink data source contains valid connections (including reserved connections) without the need to poll and test connections. It also ensures that connections are created on new nodes as they become available.

A GridLink data source uses Fast Connection Failover to:

- Provide rapid failure detection.
- Abort and remove invalid connections from the connection pool.
- Perform graceful shutdown for planned and unplanned Oracle RAC node outages. See Graceful Handling for Oracle RAC Outages.

- Adapt to changes in topology, such as adding or removing a node.
- Distribute runtime work requests to all active Oracle RAC instances, including those rejoining a cluster.

WebLogic GridLink Data Sources and JDBC connection pools leverage the runtime load balancing functionality provided by an Oracle RAC database to provide better throughput and more efficient use by FLEXCUBE application.

Runtime connection load balancing provides the following benefits:

- Manages pooled connections for high performance and scalability.
- Receives continuous recommendations on the percentage of work to route to database instances.
- Adjusts distribution of work based on different back-end node capacities such as CPU capacity or response time.
- Reacts quickly to changes in cluster reconfiguration, application workload, overworked nodes, or hangs.
- Receives metrics from the Oracle RAC Load Balance by ONS. Connections to well performing instances are used most often. New and unused connections to under-performing instances will gravitate away over time.

## 1.5 **Database Related Configuration**

### 1.5.1 **ONS Setup**

Make Sure ONS service is running in each of the database servers by issuing the below command.(To be run from GRID home)

ONS Status Check:

```
$ORACLE_HOME/opmn/bin/onsctl ping
ons is not running ...
```

Starting ONS:

```
$ORACLE_HOME/opmn/bin/onsctl start
onsctl start: ons started
$ORACLE_HOME/opmn/bin/onsctl ping
ons is running ...
```

By default ONS runs on port 6200.

### 1.5.2 **Database Service Modification and Monitoring**

For the database service that we use in the Datasource which makes use of Active Grid Link, goal needs to be defined which defaults to none.

The below sql block needs to be run in the database where the service is created.

```

BEGIN
  DBMS_SERVICE.MODIFY_SERVICE ( service_name    => 'psrcbt'
                                , aq_ha_notifications => true
                                , goal            => DBMS_SERVICE.GOAL_THROUGHPUT
                                , clb_goal        => DBMS_SERVICE.CLB_GOAL_SHORT
                                );
END;

```

Also we can monitor the metric generation for our service via v\$servicemetric

## 1.6 Configuring GridLink Datasource

### 1.6.1 Non-XA Gridlink Datasource

1) Navigate to Domain → Services → Data Sources → select New > **GridLink data source**

The screenshot shows the Oracle WebLogic Server Administration Console. The left sidebar displays the 'Domain Structure' tree with 'Data Sources' selected under 'Services'. The main content area is titled 'Summary of JDBC Data Sources' and includes a 'Configuration' tab. Below this, a table lists existing data sources. The 'GridLink Data Source' is highlighted with a red box, and a context menu is visible over it, showing options like 'New', 'Delete', and 'Edit'.

	Type	JNDI Name	Targets	Scope	Domain Partitions
Generic Data Source	Generic	jdbc/BIPPlatformDataSource	bi_cluster	Global	
GridLink Data Source	Generic	jdbc/LocalSvcTblDataSource	AdminServer	Global	
Multi Data Source	Generic	jdbc/mds/ovsm	AdminServer, bi_cluster	Global	
Proxy Data Source	Generic	jdbc/AuditAppendDataSource	AdminServer, bi_cluster	Global	
UCP Data Source	Generic	jdbc/AuditViewDataSource	AdminServer, bi_cluster	Global	
opss-audit-DBDS	Generic	jdbc/OpssDataSource	AdminServer, bi_cluster	Global	
opss-audit-viewDS	Generic	jdbc/WLSServicesDataSource	bi_cluster	Global	

- 2) Enter the **Name, JNDI Name**. Choose Database Driver as Oracle's Driver (Thin) for GridLink Connection. Click on **Next**

**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:** jdbc/fcjddevDS

What scope do you want to create your data source in?  
**Scope:** Global

What JNDI name would you like to assign to your new JDBC GridLink data source?  
**JNDI Name:** jdbc/fcjddevDS

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

Back Next Finish Cancel

- 3) Uncheck the **“Supports Global Transactions”** and click on **Next**

**ORACLE WebLogic Server Administration Console 12c**

Home Log Out Preferences Record Help Welcome, weblogic Connected to: bifoundation\_domain

Home > Summary of JDBC Data Sources

**Create a New JDBC GridLink Data Source**

Back Next Finish Cancel

**Transaction Options**  
You have selected non-XA JDBC driver to create database connection in your new data source.  
Does this data source support global transactions? If yes, please choose the transaction protocol for this data source.

☐ **Supports Global Transactions**  
Select this option if you want to enable non-XA JDBC connections from the data source to participate in global transactions using the *Logging Last Resource* (LLR) transaction optimization. Recommended in place of Emulate Two-Phase Commit.

☐ **Logging Last Resource**  
Select this option if you want to enable non-XA JDBC connections from the data source to emulate participation in global transactions using JTA. Select this option only if your application can tolerate heuristic conditions.

☐ **Emulate Two-Phase Commit**  
Select this option if you want to enable non-XA JDBC connections from the data source to participate in global transactions using the one-phase commit transaction processing. With this option, no other resources can participate in the global transaction.

☐ **One-Phase Commit**

Back Next Finish Cancel

- 4) Select first option **“Enter individual listener information”** and click **Next**

**ORACLE WebLogic Server Administration Console 12c**

Home Log Out Preferences Record Help Welcome, weblogic Connected to: bifoundation\_domain

Home > Summary of JDBC Data Sources

**Create a New JDBC GridLink Data Source**

Back Next Finish Cancel

**GridLink data source connection Properties Options**  
You can either enter the complete JDBC URL or enter individual host and port pair and let the assistant generate the JDBC URL.

☒ **Enter individual listener information**

☐ **Enter complete JDBC URL**

Back Next Finish Cancel

- 5) Enter the Database Name, Host Name, Port, User Name, Password, Confirm Password and Click on **Next**

Define Connection Properties.

What is the service name of the database you would like to connect to?

**Service Name:**

Enter host and port of each listener separated by colon and click the add button. In the case of a RAC DB listener, specify the SCAN address.

**Host and Port:**

What database account user name do you want to use to create database connections?

**Database User Name:**

What is the database account password to use to create database connections?

**Password:**

**Confirm Password:**

Additional Connection Properties:

**Protocol:**

**oracle.jdbc.DRCPConnectionClass:**

- 6) Click “Test All Listeners” and check the connection is established properly with the database and Click **Next**

Change Center

View changes and restarts

No pending changes exist. Click the Release Configuration button to allow others to edit the domain.

Domain Structure

zfoundation\_domain

- Domain Partitions
- Environment
- Deployments
- Services
  - Messaging
  - Data Sources
  - Persistent Stores
  - Foreign JNDI Providers
  - Work Contexts
  - XQL Registries
  - XQL Entity Caches
  - JCOM
  - Mail Sessions

How do I...  
• Create JDBC GridLink data sources

System Status

Health of Running Servers

- Failed (0)
- Critical (0)
- Overloaded (0)
- Warning (0)
- OK (2)

Home > Summary of JDBC Data Sources

Messages

✓ Connection test for jdbc:oracle:thin:@(DESCRIPTION=(ADDRESS\_LIST=(ADDRESS=(PROTOCOL=TCP)(HOST=blrgw6117.in.oracle.com)(PORT=1521)))(CONNECT\_DATA=(SERVICE\_NAME=FCUBS11G))) succeeded.

Create a New JDBC GridLink Data Source

**Test GridLink Database Connection**

Test the database availability and the connection properties you provided.

What is the full package name of JDBC driver class used to create database connections in the connection pool?

(Note that this driver class must be in the classpath of any server to which it is deployed.)

**Driver Class Name:**

What is the URL of the database to connect to? The format of the URL varies by JDBC driver.

**URL:**

Click the test button to test each listener.

jdbc:oracle:thin:@(DESCRIPTION=(ADDRESS\_LIST=(ADDRESS=(PROTOCOL=TCP)(HOST=blrgw6117.in.oracle.com)(PORT=1521)))(CONNECT\_DATA=(SERVICE\_NAME=FCUBS11G)))

What database account user name do you want to use to create database connections?

**Database User Name:**

What is the database account password to use to create database connections?

## 7) Enter the ONS host:port details which has already been configured in database

The screenshot shows the Oracle WebLogic Server Administration Console. On the left, the 'Domain Structure' tree is expanded to 'Services' > 'Data Sources'. The 'System Status' section shows 'Health of Running Servers' with 2 OK, 0 Warning, 0 Overloaded, 0 Critical, and 0 Failed. The main panel is titled 'ONS Client Configuration' and contains the following fields:

- ONS Client Configuration**: Define ONS Client Configuration.
- Check to enable the data source to subscribe to and process Oracle FAN events**: ☒ **FAN Enabled**.
- Enter host and port of each ONS node separated by colon and click the add button.**
- ONS host and port:** A list box containing 'mc13dbzg1-zone-1-mc13-n1:6200' and 'mc13dbzg1-zone-1-mc13-n2:6200'. An 'Add' button is next to the list, and a 'Remove' button is at the bottom right.
- The location of the Oracle wallet file in which the SSL certificates are stored.**
- ONS Wallet File Directory:** A text input field.
- The wallet password attribute that is included as part of the ONS client configuration string. This attribute is only required when ONS is configured to use the SSL protocol.**
- ONS Wallet Password:** A text input field.
- Confirm ONS Wallet Password:** A text input field.

Navigation buttons at the bottom: Back, Next, Finish, Cancel.

## 8) Click "Test ONS Nodes" to check the connection with ONS.

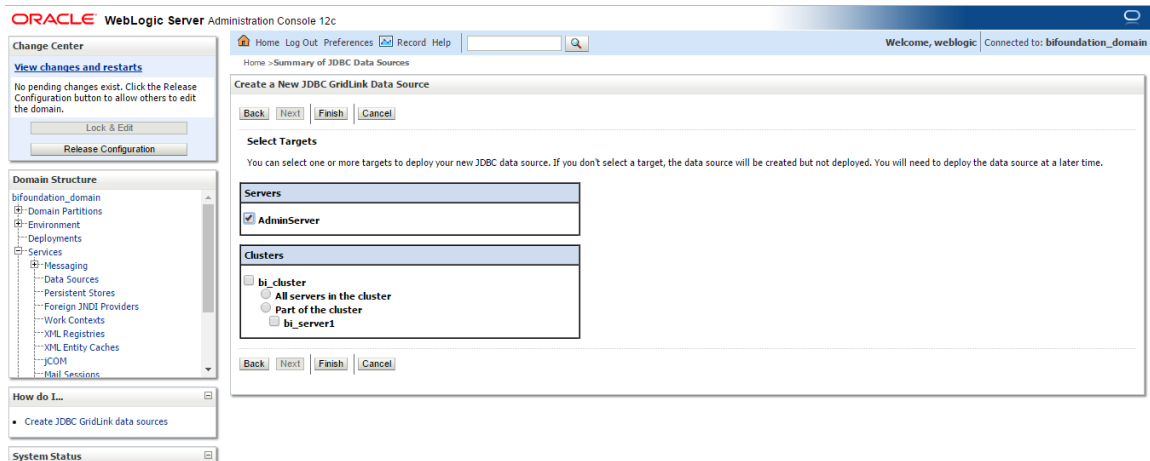
The screenshot shows the Oracle WebLogic Server Administration Console. On the left, the 'Domain Structure' tree is expanded to 'Services' > 'Data Sources'. The 'System Status' section shows 'Health of Running Servers' with 2 OK, 0 Warning, 0 Overloaded, 0 Critical, and 0 Failed. The main panel is titled 'Test ONS client configuration' and contains the following fields:

- Test ONS client configuration**: Test the ONS client configuration properties you provided.
- Check to enable the data source to subscribe to and process Oracle FAN events**: ☒ **FAN Enabled**.
- Enter host and port of each ONS node separated by colon and click the add button.**
- ONS host and port:** A list box containing 'mc13dbzg1-zone-1-mc13-n1:6200' and 'mc13dbzg1-zone-1-mc13-n2:6200'. An 'Add' button is next to the list, and a 'Remove' button is at the bottom right.
- Click the test button to test ONS node.**
- Test ONS Node:** A list box containing 'mc13dbzg1-zone-1-mc13-n1:6200' and 'mc13dbzg1-zone-1-mc13-n2:6200'.
- The location of the Oracle wallet file in which the SSL certificates are stored.**
- ONS Wallet File Directory:** A text input field.
- The wallet password attribute that is included as part of the ONS client configuration string. This attribute is only required when ONS is configured to use the SSL protocol.**

Navigation buttons at the bottom: Back, Next, Finish, Cancel.

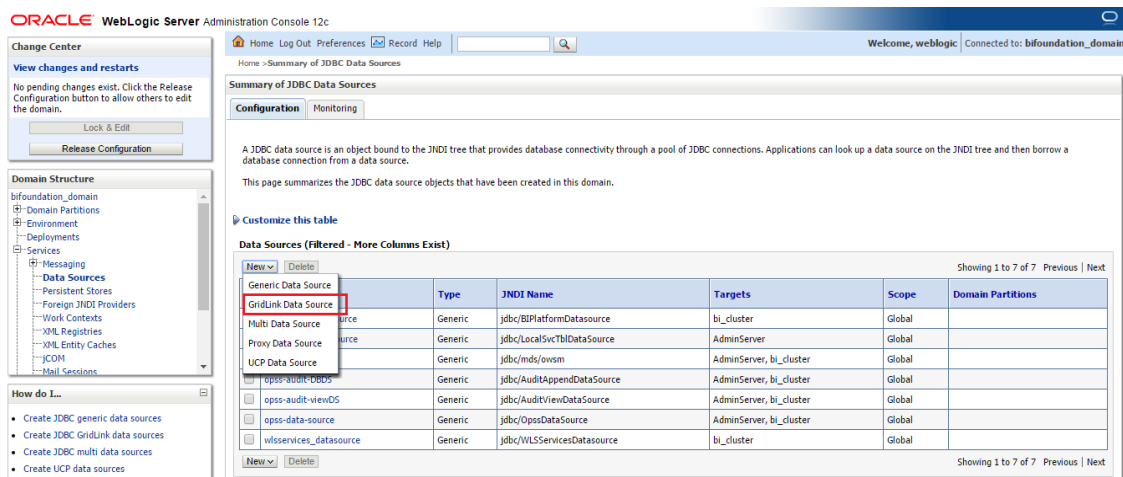


## 9) Select Target and click on **Finish**



## 1.6.2 XA Gridlink Datasource

### 1) Navigate to Domain → Services → Data Sources → select New > **GridLink data source**



- 2) Enter the **Name, JNDI Name**. Choose Database Driver as Oracle's Driver (XA Thin) for GridLink Connection. Click on **Next**

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:** jdbc/fcjschedulerDS

What scope do you want to create your data source in?  
**Scope:** Global

What JNDI name would you like to assign to your new JDBC GridLink data source?  
**JNDI Name:** jdbc/fcjschedulerDS

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 XA) for GridLink Connections Versions:Any

Back Next Finish Cancel

- 3) Click **Next**

ORACLE WebLogic Server Administration Console 12c

Home Log Out Preferences Record Help

Welcome, weblogic Connected to: bifoundation\_domain

Home > 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

- 4) Choose first option "Enter individual listener information" and Click **Next**

ORACLE WebLogic Server Administration Console 12c

Home Log Out Preferences Record Help

Welcome, weblogic Connected to: bifoundation\_domain

Home > Summary of JDBC Data Sources

Create a New JDBC GridLink Data Source

Back Next Finish Cancel

**GridLink data source connection Properties Options**

You can either enter the complete JDBC URL or enter individual host and port pair and let the assistant generate the JDBC URL.

☒ Enter individual listener information

☐ Enter complete JDBC URL

Back Next Finish Cancel

- 5) Enter the Database Name, Host Name, Port, User Name, Password, Confirm Password and Click on **Next**

Domain Structure

bifoundation\_domain

- Domain Partitions
- Environment
- Deployments
- Services
- Data Sources
- Persistent Stores
- Foreign JNDI Providers
- Work Contexts
- XML Registries
- XML Entity Caches
- JCOIM
- Mail Sessions

How do I...

- Create JDBC GridLink data sources

System Status

Health of Running Servers

Failed (0)

Critical (0)

Overloaded (0)

Warning (0)

OK (2)

Define Connection Properties.

What is the service name of the database you would like to connect to?

Service Name:

Enter host and port of each listener separated by colon and click the add button. In the case of a RAC DB listener, specify the SCAN address.

Host and Port:

Add

Remove

What database account user name do you want to use to create database connections?

Database User Name:

What is the database account password to use to create database connections?

Password:

Confirm Password:

Additional Connection Properties:

Protocol: TCP

oracle.jdbc.DRCPConnectionClass:

Back Next Finish Cancel

- 6) Click “Test All Listeners” and check the connection is established properly with the database and Click **Next**

Change Center

View changes and restarts

No pending changes exist. Click the Release Configuration button to allow others to edit the domain.

Lock & Edit

Release Configuration

Domain Structure

bifoundation\_domain

- Domain Partitions
- Environment
- Deployments
- Services
- Data Sources
- Persistent Stores
- Foreign JNDI Providers
- Work Contexts
- XML Registries
- XML Entity Caches
- JCOIM
- Mail Sessions

How do I...

- Create JDBC GridLink data sources

System Status

Health of Running Servers

Failed (0)

Critical (0)

Overloaded (0)

Warning (0)

OK (2)

Home > Summary of JDBC Data Sources

Messages

Connection test for jdbc:oracle:thin:@(DESCRIPTION=(ADDRESS\_LIST=(ADDRESS=(PROTOCOL=TCP)(HOST=blgr6117.in.oracle.com)(PORT=1521)))(CONNECT\_DATA=(SERVICE\_NAME=FCUBS11G))) succeeded.

Create a New JDBC GridLink Data Source

Test All Listeners Back Next Finish Cancel

Test GridLink Database Connection

Test the database availability and the connection properties you provided.

What is the full package name of JDBC driver class used to create database connections in the connection pool?

(Note that this driver class must be in the classpath of any server to which it is deployed.)

Driver Class Name: oracle.jdbc.OracleDriver

What is the URL of the database to connect to? The format of the URL varies by JDBC driver.

URL:

jdbc:oracle:thin:@(DESCRIPTION=(ADDRESS\_LIST=(ADDRESS=(PROTOCOL=TCP)(HOST=blgr6117.in.oracle.com)(PORT=1521)))(CONNECT\_DATA=(SERVICE\_NAME=FCUBS11G)))

Click the test button to test each listener.

Test Listener jdbc:oracle:thin:@(DESCRIPTION=(ADDRESS\_LIST=(ADDRESS=(PROTOCOL=TCP)(HOST=blgr6117.in.oracle.com)(PORT=1521)))(CONNECT\_DATA=(SERVICE\_NAME=FCUBS11G)))

What database account user name do you want to use to create database connections?

Database User Name: FCUBSNBESUP

What is the database account password to use to create database connections?

## 7) Enter the ONS host:port details which has already been configured in database

The screenshot shows the Oracle WebLogic Server Administration Console. On the left, the 'Domain Structure' tree is expanded to 'Services' > 'Data Sources'. The 'System Status' section shows 'Health of Running Servers' with 'OK (2)' servers. The main panel is titled 'ONS Client Configuration' and contains the following sections:

- ONS Client Configuration**: Define ONS Client Configuration.
- Check to enable the data source to subscribe to and process Oracle FAN events**: ☒ **FAN Enabled**.
- Enter host and port of each ONS node separated by colon and click the add button.**: A list box contains 'mc13dbzg1-zone-1-mc13-n1:6200' and 'mc13dbzg1-zone-1-mc13-n2:6200'. There is an 'Add' button and a 'Remove' button.
- ONS host and port:** A text input field.
- The location of the Oracle wallet file in which the SSL certificates are stored.**: A text input field.
- ONS Wallet File Directory:** A text input field.
- The wallet password attribute that is included as part of the ONS client configuration string. This attribute is only required when ONS is configured to use the SSL protocol.**: A text input field.
- ONS Wallet Password:** A text input field.
- Confirm ONS Wallet Password:** A text input field.

Navigation buttons at the bottom: Back, Next, Finish, Cancel.

## 8) Click “Test ONS Nodes” to check the connection with ONS.

The screenshot shows the Oracle WebLogic Server Administration Console. On the left, the 'Domain Structure' tree is expanded to 'Services' > 'Data Sources'. The 'System Status' section shows 'Health of Running Servers' with 'OK (2)' servers. The main panel is titled 'Test ONS client configuration' and contains the following sections:

- Test ONS client configuration**: Test the ONS client configuration properties you provided.
- Check to enable the data source to subscribe to and process Oracle FAN events**: ☒ **FAN Enabled**.
- Enter host and port of each ONS node separated by colon and click the add button.**: A list box contains 'mc13dbzg1-zone-1-mc13-n1:6200' and 'mc13dbzg1-zone-1-mc13-n2:6200'. There is an 'Add' button and a 'Remove' button.
- ONS host and port:** A text input field.
- The location of the Oracle wallet file in which the SSL certificates are stored.**: A text input field.
- ONS Wallet File Directory:** A text input field.
- The wallet password attribute that is included as part of the ONS client configuration string. This attribute is only required when ONS is configured to use the SSL protocol.**: A text input field.

Navigation buttons at the bottom: Back, Next, Finish, Cancel.

Below the main panel, there is a section titled 'Test ONS Nodes' with the following content:

- Test ONS Node**: mc13dbzg1-zone-1-mc13-n1:6200
- Test ONS Node**: mc13dbzg1-zone-1-mc13-n2:6200

Below this, there is a section titled 'Create a New JDBC GridLink Data Source' with the following content:

- Test All ONS Nodes**: Back, Next, Finish, Cancel

Below this, there is a section titled 'Messages' with the following content:

- Connection test for mc13dbzg1-zone-1-mc13-n1:6200 succeeded.**

## 9) Select Target and click on **Finish**

**ORACLE WebLogic Server Administration Console 12c**

Home Log Out Preferences Record Help

Welcome, weblogic Connected to: bifoundation\_domain

**Create a New JDBC GridLink Data Source**

Back Next Finish Cancel

**Select Targets**

You can select one or more targets to deploy your new JDBC data source. If you don't select a target, the data source will be created but not deployed. You will need to deploy the data source at a later time.

**Servers**

☒ AdminServer

**Clusters**

☒ bi\_cluster

☐ All servers in the cluster

☐ Part of the cluster

☐ bi\_server1

Back Next Finish Cancel

**Change Center**

**View changes and restarts**

No pending changes exist. Click the Release Configuration button to allow others to edit the domain.

Lock & Edit

Release Configuration

**Domain Structure**

bifoundation\_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 GridLink data sources

**System Status**



FCUBS Gridlink Datasource Configuration  
[September] [2024]  
Version 14.7.5.0.0

Oracle Financial Services Software Limited  
Oracle Park  
Off Western Express Highway  
Goregaon (East)  
Mumbai, Maharashtra 400 063  
India

Worldwide Inquiries:  
Phone: +91 22 6718 3000  
Fax: +91 22 6718 3001  
<https://www.oracle.com/industries/financial-services/index.html>

Copyright © [2007], [2024], Oracle and/or its affiliates. All rights reserved.

Oracle and Java are registered trademarks of Oracle and/or its affiliates. Other names may be trademarks of their respective owners.

**U.S. GOVERNMENT END USERS:** Oracle programs, including any operating system, integrated software, any programs installed on the hardware, and/or documentation, delivered to U.S. Government end users are "commercial computer software" pursuant to the applicable Federal Acquisition Regulation and agency-specific supplemental regulations. As such, use, duplication, disclosure, modification, and adaptation of the programs, including any operating system, integrated software, any programs installed on the hardware, and/or documentation, shall be subject to license terms and license restrictions applicable to the programs. No other rights are granted to the U.S. Government.

This software or hardware is developed for general use in a variety of information management applications. It is not developed or intended for use in any inherently dangerous applications, including applications that may create a risk of personal injury. If you use this software or hardware in dangerous applications, then you shall be responsible to take all appropriate failsafe, backup, redundancy, and other measures to ensure its safe use. Oracle Corporation and its affiliates disclaim any liability for any damages caused by use of this software or hardware in dangerous applications.

This software and related documentation are provided under a license agreement containing restrictions on use and disclosure and are protected by intellectual property laws. Except as expressly permitted in your license agreement or allowed by law, you may not use, copy, reproduce, translate, broadcast, modify, license, transmit, distribute, exhibit, perform, publish or display any part, in any form, or by any means. Reverse engineering, disassembly, or decompilation of this software, unless required by law for interoperability, is prohibited.

The information contained herein is subject to change without notice and is not warranted to be error-free. If you find any errors, please report them to us in writing.

This software or hardware and documentation may provide access to or information on content, products and services from third parties. Oracle Corporation and its affiliates are not responsible for and expressly disclaim all warranties of any kind with respect to third-party content, products, and services. Oracle Corporation and its affiliates will not be responsible for any loss, costs, or damages incurred due to your access to or use of third-party content, products, or services.