

Chapter 3: Configuring WebLogic Services

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Connection Pools and Data Sources

- A JDBC connection pool maintains a set of ready-to-use connections to a database server.
 - ▶ The primary purpose of a connection pool is to improve performance.
 - ▶ A database server can run faster with dedicated connections than if it has to handle incoming connections on demand at run-time.
- A connection pool also allows you to control the number of concurrent connections to the database.
 - ▶ This can be important if you have a licensing limitation on the number of connections or other issues with the database resource.
- A JDBC data source enables an application to access a connection pool through a lookup in the JNDI tree.
 - ▶ In this manner, the application does not need to know where the database is located or which vendor's database is being used.
- Connection pools and data sources are configured using the Administration Console.
 - ▶ When you create a data source, you specify if it will participate in distributed (XA) transactions.
 - ▶ If the associated connection pool uses a non-XA driver, you can configure the data source to emulate the two-phase commit required for distributed transactions.

Configuring Data Sources

- We will use the Administration Console to configure two JDBC Data Sources for the PointBase™ database server.
 - ▶ An evaluation copy is included with the WebLogic installation in the directory shown below. See www.pointbase.com for more information about PointBase.

```
c:\bea\wlserver_10.x\common\eval\pointbase
```

- Sign into the Administration Console.

```
http://localhost:7001/console
```

- In the right-hand frame, click the link labeled "Data Sources" (under Domain Configurations, Services, JDBC). The "Summary of JDBC Data Sources" pane appears. A table of existing Data Sources is shown.

- Click the "Lock & Edit" button in the "Change Center" (top left-hand portion of screen).

- Click the "New" button above the table of Data Sources. The "Create a new JDBC Data Source" pane appears.

- In the "Name" box, use the default name or change to a name of your preference.

- ▶ Note: You may wish to consider using names without spaces, because they are generally easier to use with command-line utilities.

Configuring Data Sources

- In the "JNDI Name" box, type:
`jdbc/exampleDataSource`
- Use the default "Database Type" selection (Pointbase). In the "Database Driver" box, select:
Pointbase's Driver (Type 4) Versions: 4.X, 5.X

(Be sure to select Type 4, not Type 4XA, which is the default.)
- Click "Next." On the next screen, remove the check mark on the box labeled "Supports Global Transactions."

- Click "Next." On the next screen, make the following entries.

▶ Database Name: `weblogic_eval`

▶ Host Name: `localhost` (default)

▶ Port: `9093`

▶ Database User Name: `public`

▶ Password: `public`

▶ Confirm Password: `public`

- Click "Next." On the next screen, click the "Test Configuration" button.

Configuring Data Sources

- The "Connection test succeeded" message should appear (in green) at the top of the screen. (Ask your instructor for assistance if any other message appears.) Click "Next."
- On the next screen, check the box labeled "AdminServer," then click "Finish." You should be back on the "Summary of JDBC Data Sources," with one new entry in the table of Data Sources.
- We will now configure a second (transactional) data source. Click the "New" button. The "Create a new JDBC Data Source" pane appears.
- In the "Name" box, use the default name or change to a name of your preference.
- In the "JNDI Name" box, type:
`jdbc/exampleTXDataSource`
- Use the default "Database Type" selection (Pointbase).
- Use the default "Database Driver" selection (Pointbase's Driver (Type 4XA)).
- Click "Next." On the next screen, click "Next."

Configuring Data Sources

- On the next screen, make the following entries.
 - ▶ Database Name: `weblogic_eval`
 - ▶ Host Name: `localhost`
 - ▶ Port: `9093`
 - ▶ Database User Name: `public`
 - ▶ Password: `public`
 - ▶ Confirm Password: `public`
- Click "Next." On the next screen, click the "Test Configuration" button.
- The "Connection test succeeded" message should appear (in green) at the top of the screen. (Ask your instructor for assistance if any other message appears.) Click "Next."
- On the next screen, check the box labeled "AdminServer," then click "Finish." You should be back on the "Summary of JDBC Data Sources," with two new entries in the table of Data Sources.
- Click the green "Activate Changes" button in the "Change Center" (top left-hand portion of screen).
- To access the data source settings, select a data source from the "Summary of JDBC Data Sources" table, then select the Configuration tab.

Data Source Settings

Configuration / General Tab	
Name	Cannot be changed after the connection pool is created
JNDI Name	The JNDI lookup string to which this data source is bound

Configuration / Connection Pool Tab	
URL	The format of JDBC URL is dictated by the JDBC driver. It usually contains an indication of what type of database and the IP address and port number for the database server.
Driver Classname	Fully qualified classname of the JDBC driver. Driver is typically provided by the database vendor or the application server.
Properties	Optional properties to be passed to the JDBC driver. Properties are driver-specific.
Initial Capacity	Number of database connections opened when the connection pool is created
Maximum Capacity	Maximum number of connections in the pool
Capacity Increment	The number of new connections that will be opened when the pool expands
Statement Cache Type	Algorithm used for maintaining statements in the cache; can be LRU (replace least recently used) or FIXED (keep first n statements)
Statement Cache Size	Number of prepared or callable statements in the cache. Increasing this setting may improve performance

Data Source Settings

Configuration / Connection Pool Tab – Advanced	
Test Connections On Reserve	Specifies whether WebLogic tests a connection before giving it to a client
Test Frequency	The number of seconds between when WebLogic tests unused database connections. Connections that fail are closed and re-opened
Test Table Name	The name of a database table to use when testing database connections. This is a required entry if you specify a "Test Frequency" and enable "Test Connections On Reserve."
Shrink Frequency	The number of seconds before WebLogic shrinks the connection pool. When set to 0, shrinking is disabled.
Login Delay	The number of seconds to delay before creating each physical database connection. This delay supports database servers that cannot handle multiple connection requests in rapid succession.
Inactive Connection Timeout	The number of inactive seconds on a reserved connection before WebLogic returns the connection to the pool

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Multi Data Sources

- A JDBC Multi Data Source is a group of data sources that you can set up according to either a failover or load-balancing algorithm.
- You use a Multi Data Source in the same manner that you use a data source.
 - ▶ When an application requests a connection, the Multi Data Source determines which data source will provide a connection, based on the selected algorithm.
- Typically, you create two or more data sources, and then you create a Multi Data Source and assign data sources to the Multi Data Source.
- You can choose one of the following algorithm options for each Multi Data Source.
 - ▶ Failover, in which the data sources are set up as an ordered list and used sequentially
 - If a connection request fails (e.g., the connection pool is suspended), the request is sent to the next data source in the list.
 - Note that although the first data source in the list is busy (all connections are being used), it does not trigger an attempt to get a connection from the next data source in the list.
 - ▶ Load balancing, in which all listed data sources are accessed using a round-robin scheme
 - Multi Data Sources that use the Load Balancing algorithm also fail over to the next connection pool in the list if a connection request fails.

JMS Stores

- If you want to have persistent JMS messages (stored on disk in addition to memory), you must first configure a JMS store.
 - ▶ WebLogic can store persistent messages in either a JDBC-accessible database or a disk-based file.
- File stores have the following advantages over JDBC stores.
 - ▶ File stores are generally much faster.
 - ▶ File stores are easier to configure.
 - ▶ File stores generate no network traffic; JDBC stores will generate network traffic if the database is on a different machine from the JMS server.
- A JMS store can also be used as a JMS paging store, which is used for temporarily paging messages to disk when memory has been exhausted.
- File stores are recommended for paging stores.
 - ▶ However, a paging store cannot be the same JMS file store used for storing persistent messages.
 - ▶ Therefore, you need to configure an additional JMS file store to be used exclusively for message paging for each JMS server.

Configuring a JMS JDBC Store

- From the Administration Console main menu, click the link labeled "Persistent Stores" (under Domain Configurations / Services). The "Summary of Persistent Stores" table appears.
- Click the "Lock & Edit" button in the "Change Center" (top left-hand portion of screen).
- Click the "New" button above the table of Persistent Stores, and then click "Create JDBCStore" on the drop-down menu. The "Create a New JDBC Store" pane appears.
- In the "Name" box, use the default name or change to a name of your preference.
- Select "AdminServer" as the Target and your non-transactional data source as the Data Source.
- In the "Prefix Name" box, enter a prefix that is prepended to the name of the database table that will hold the JMS messages.
 - ▶ For example, if you enter the prefix "ABC," the table name is ABCWLSTORE.
- Click "OK." The "Summary of Persistent Stores" table is displayed.

Configuring a JMS File Store

- Click the "New" button above the table of Persistent Stores, and then click "Create FileStore" on the drop-down menu. The "Create a New File Store" pane appears.
- In the "Name" box, use the default name or change to a name of your preference.
- Select "AdminServer" as the Target.
- In the "Directory" box, enter a directory name in which the files will be created. **The directory must already exist.** The following file will be created.

```
JMSFileStoreName000000.DAT
```
- Click "OK." The "Summary of Persistent Stores" table is displayed.
- Click the green "Activate Changes" button in the "Change Center" (top left-hand portion of screen).

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Configuring JMS

- From the Administration Console main menu, click the link labeled "JMS Servers" (under Domain Configurations, Services, Messaging). The "Summary of JMS Servers" pane appears. A table of existing JMS Servers is shown.
- Click the "Lock & Edit" button in the "Change Center" (top left-hand portion of screen).
- Click the "New" button above the table of JMS Servers. The "Create a new JMS Server" pane appears.

- In the "Name" box, use the default name or change to a name of your preference.
- For "Persistent Store," select one of the persistent stores that you created from the drop-down list.

- Click "Next."

- Select "AdminServer" from the drop-down list of targets, and click on "Finish". The table of JMS Servers is displayed.

- Return to the Administration Console main menu.

Configuring JMS

- Click the link labeled "JMS Modules" (under Domain Configurations, Services, Messaging). The "JMS Modules" pane appears. A table of existing JMS Modules is shown.
- Click the "New" button above the table of JMS Modules. The "Create JMS System Module" pane appears.
 - ▶ In the "Name" box, use the default name or change to a name of your preference.
 - ▶ In the "Descriptor File Name" box, type **mymodule** or a different name of your choice. WebLogic automatically adds an ending of `-jms.xml`.
 - ▶ Leave the "Location in Domain" box blank (defaults to the domain's `config\jms` directory).
- Click "Next." On the next screen, select "AdminServer" as the target server, and click "Next."
- On the next screen, check the box labeled "Would you like to add resources," and then click "Finish."
- At the bottom of the next screen, the "Summary of Resources" table is displayed. Click the "New" button. The "Create a New JMS System Module Resource" pane appears.
- Select the radio button for "Queue." Click "Next."

Configuring JMS

- Accept the default name or change to a name that you prefer. Make the following entry, and then click on "Next."

▶ JNDI Name: `jms/somequeue`

- On the next screen, click the button labeled "Create a New Subdeployment." The "Create a New Subdeployment" screen appears. Type a name in the "Subdeployment Name" box (e.g., **mysubdep**). Click "OK." You should be back on the previous screen with the name of your subdeployment shown in the "Subdeployments" box.

- Select your JMS Server as the target and click "Finish."

- At the bottom of the next screen, the "Summary of Resources" table is displayed again. Click the "New" button. The "Create a New JMS System Module Entity" pane appears.

- Select the radio button for "Topic." Click "Next."

- Accept the default name or change to a name that you prefer. Make the following entry and then click on "Next."

▶ JNDI Name: `jms/sometopic`

Configuring JMS

- Use the drop-down arrow next to the "Subdeployments" box to select your subdeployment. Select your JMS Server as the target, and then click "Finish."
- Click the green "Activate Changes" button in the "Change Center" (top left-hand portion of screen).

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JMS Server Settings

Configuration / General Tab	
Name	Cannot be changed once the JMS server is created
Persistent Store	If you have configured JMS stores, select the one you wish to use for persistent messages.
Paging Directory	Specifies a directory for temporary paging of messages to disk. If the persistent store is a file store, this should not be the same directory used by the file store. Defaults to <code>tmp</code> (in the <i>server-name</i> subdirectory)
Message Buffer Size	<p>The amount of memory (in bytes) that the JMS server can use to store messages before paging them to disk.</p> <p>Default value of -1 means that the server will compute this setting based on the maximum heap size of the JVM. It will be set to either one-third the maximum heap size, or 512 Mb, whichever is larger.</p>
Temporary Template	If you have configured JMS templates, select the one to use when creating temporary destinations.
Expiration Scan Interval	A time interval (in seconds) that specifies how often to scan for expired messages. A value of 0 disables message expiration scans; messages still expire but are cleaned up less quickly.

JMS Server Settings

Configuration / Thresholds & Quotas Tab	
Bytes Threshold High	Upper threshold value that triggers events based on the number of bytes stored by the JMS server. (Default value of -1 means that flow control and log messages are disabled.)
Bytes Threshold Low	Lower threshold value that triggers events based on the number of bytes stored by the JMS server. (Default value of -1 means that flow control and log messages are disabled.)
Messages Threshold High	Upper threshold value that triggers events based on the number of messages stored by the JMS server. (Default value of -1 means that flow control and log messages are disabled.)
Messages Threshold Low	Lower threshold value that triggers events based on the number of bytes stored by the JMS server. (Default value of -1 specifies that flow control and log messages are disabled.)
Bytes Maximum	Maximum number of bytes for messages stored by the JMS Server. (Default value of -1 indicates no limit.)
Messages Maximum	Maximum number of messages stored by the JMS Server. (Default value of -1 indicates no limit.)
Maximum Message Size	Maximum number of bytes allowed for a single message. The default value is 2147483647.

Flow Control

- If Bytes or Messages Threshold High is reached, the JMS server instructs producers to begin decreasing their message flow.
- If Bytes or Messages Threshold Low is reached, the JMS server instructs producers to begin increasing their message flow.

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JMS Destinations Settings

Configuration / General Tab	
Name	Cannot be changed once the JMS Queue or Topic is created
Template	The JMS template from which this destination is derived. A template provides a way to define multiple destinations with similar settings.
Destination Keys	<p>If you have configured destination keys, select one or more destination keys to define the sort ordering for messages in the queue/topic. The default ordering is FIFO (first in – first out). Destination keys must be configured separately (as part of the JMS Module).</p> <p>When you create a JMS Destination Key, you specify a sort key and a direction (ascending or descending). Sort keys can be either a message header field or a message property. (For better performance, use message header fields as sorting keys, rather than message properties.)</p>

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JMS Destinations Settings

Configuration / Thresholds & Quotas Tab	
Bytes Threshold High	These settings have the same meanings (but sometimes-different default values) as the corresponding settings in the Configuration / Thresholds & Quotas Tab for JMS Server, except that these settings apply only to a particular destination.
Bytes Threshold Low	
Messages Threshold High	
Messages Threshold Low	If the destination is derived from a JMS template, then specifying the default value for any of these settings means that the value will come from the template.
Maximum Message Size	
Quota	If you have configured any quotas, select one from the drop-down list. Quotas control the allotment of system resources (such as memory) to JMS destinations. Quotas must be configured separately (as part of the JMS Module).

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Exercises

1. On the Administration Console main menu, click the link labeled "JMS Modules" (under Domain Configurations, Services, Messaging). The table of existing JMS Modules is displayed. Select the JMS module you configured in this chapter, and add two more resources to it.
 - ▶ Configure a new JMS Queue with a JNDI name of "demo.inqueue."
 - ▶ Configure a new JMS Topic with a JNDI name of "demo.replies."

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