WebSphere Application Server

Tomcat Config Migration

IBM WebSphere Application Server Migration Toolkit

Version 3.5.1 Tech Preview

IBM Software Group, Application and Integration Middleware Software

Contents

Overview

IBM® WebSphere® Application Server Migration Toolkit - Tomcat Config Migration Tech Preview is a migration tool that helps you move Apache Tomcat server configuration and application configuration to the WebSphere® Application Server Liberty profile.

This document explains how to install, configure, and use the migration tool as part of your migration process.

The migration tool supports the following migrations:

- Migrating from Apache Tomcat 7
- Migrating to WebSphere® Application Server V8.5.5 Liberty Profile
- Migrating tomcat-users from conf/tomcat-users.xml
- Migrating HTTP/1.1 Connectors from conf/server.xml
- Migrating Standard Manager from conf/context.xml
- Migrating Resource configuration for Apache Derby and IBM® DB2® from conf/server.xml, conf/context.xml, and the application META-INF/context.xml
- Migrating Resource configuration for IBM® WebSphere® MQ and Apache ActiveMQ from conf/server.xml, conf/context.xml, and the application META-INF/context.xml
- Migrating security-constraints from the application WEB-INF/web.xml

The migration tool was tested with the following product versions:

- Apache Tomcat 7.0.37
- Apache ActiveMQ 5.8.0
- Apache Derby 10.8.2.2
- IBM DB2 10.1
- IBM WebSphere MQ 7.0
- WebSphere Application Server V8.5.5 Liberty Profile
- WebSphere® Application Server Developer Tools for Eclipse V8.5.5
- Eclipse 4.2.2 for Java™ EE Developers (Juno SR2)
- Microsoft™ Windows™ 7 and Windows™ XP

The *WebSphere Application Server V8.5 Migration Guide* provides comprehensive information about migrating to WebSphere® Application Server. It uses the WebSphere® Application Migration Toolkit in its examples to migrate Java™ Platform, Enterprise Edition (Java™ EE) applications. You can use the IBM WebSphere Application Server Migration Toolkit - Tomcat Config Migration Tech Preview to migrate the Tomcat server configuration and application configuration that previously had to be done manually.

Support

The IBM WebSphere Application Server Migration Toolkit - Tomcat Config Migration Tech Preview migrates a subset of the Apache Tomcat server configuration and application configuration to WebSphere Application Server V8.5.5 Liberty Profile. For information about which configuration elements are migrated , see *Configuration migration details* on page 12.

The migration tool does not migrate the entire configuration. If you identify additional parts of the configuration that you want to migrate, submit your feedback to the Application Migration Tool forum, available at developerWorks™ site *https://www.ibm.com/developerworks/community/forums/html/forum?id=11111111-0000-0000-0000-000000002106*. You can also use the forum to get answers to your questions about the migration tool.

The migration tool is provided as-is.

Installing the migration tool

The WebSphere Application Server Migration Toolkit provides tools as Eclipse features that you install into an existing Eclipse environment. The IBM WebSphere Application Server Migration Toolkit - Tomcat Config Migration Tech Preview is supported on Eclipse 4.2.2 for Java EE Developers (Juno SR2), available at *http://www.eclipse.org*.

Before you begin, you must also install the following items:

- Application Migration Tool - Apache Tomcat to WebSphere available from *http://www.ibm.com/developerworks/ websphere/downloads/migtoolkit/*
- WebSphere Application Server V8.5.5 Liberty Profile available from *http://wasdev.net*
- WebSphere Application Server Developer Tools for Eclipse V8.5.5 available from *http://wasdev.net*

To install the migration tool, perform the following steps:

1. Download the Tomcat Config Migration Tech Preview repository and save it locally. The repository is available from the WASdev - WebSphere Application Server Developer Community website , *http://wasdev.net*. From the WASdev website homepage, go to **Downloads** to download the repository.
2. Start Eclipse.
3. Uninstall version 3.5.0 Tech Preview of the migration tool before installing Version 3.5.1.
4. Install the Tomcat Config Migration Tech Preview in Eclipse.

    a) Go to **Help > Install New Software** to open the installation dialog.
    b) Click **Add**.
    c) In the **Add Repository** window, enter the following information, which is shown in *Figure 1: Tool installation*.

        - **Name:** Enter `Tomcat Config Migration Tool`.
        - **Location:** Enter the file path of the compressed file that you downloaded. Click **Archive** to browse through your system directories.
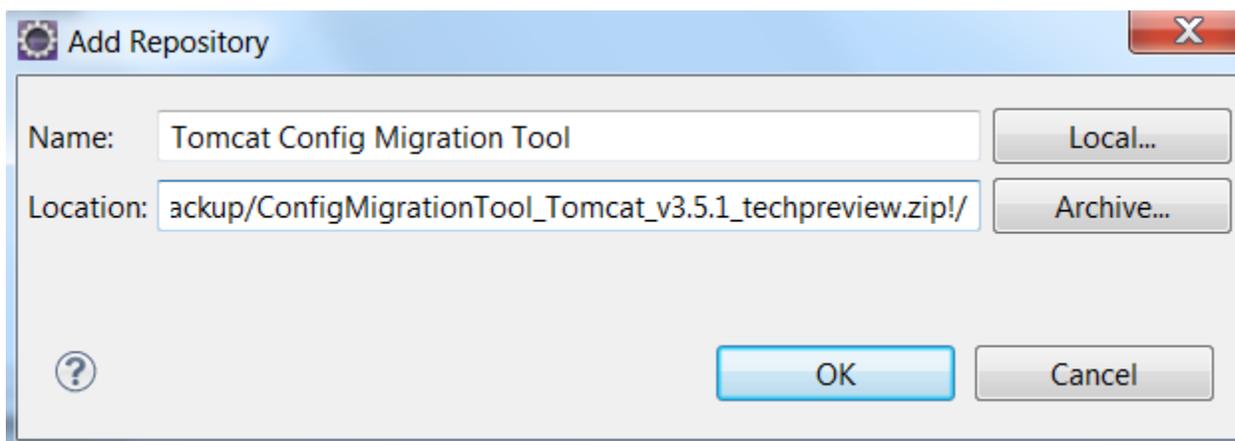

Figure 1: Tool installation

    d) Click **OK**.
    e) In the **Install** window, select **Configuration Migration Tool** and **Contact all update sites during install to find required software**, then click **Next**.

        An example of this window is shown in *Figure 2: Select Plug-In*.
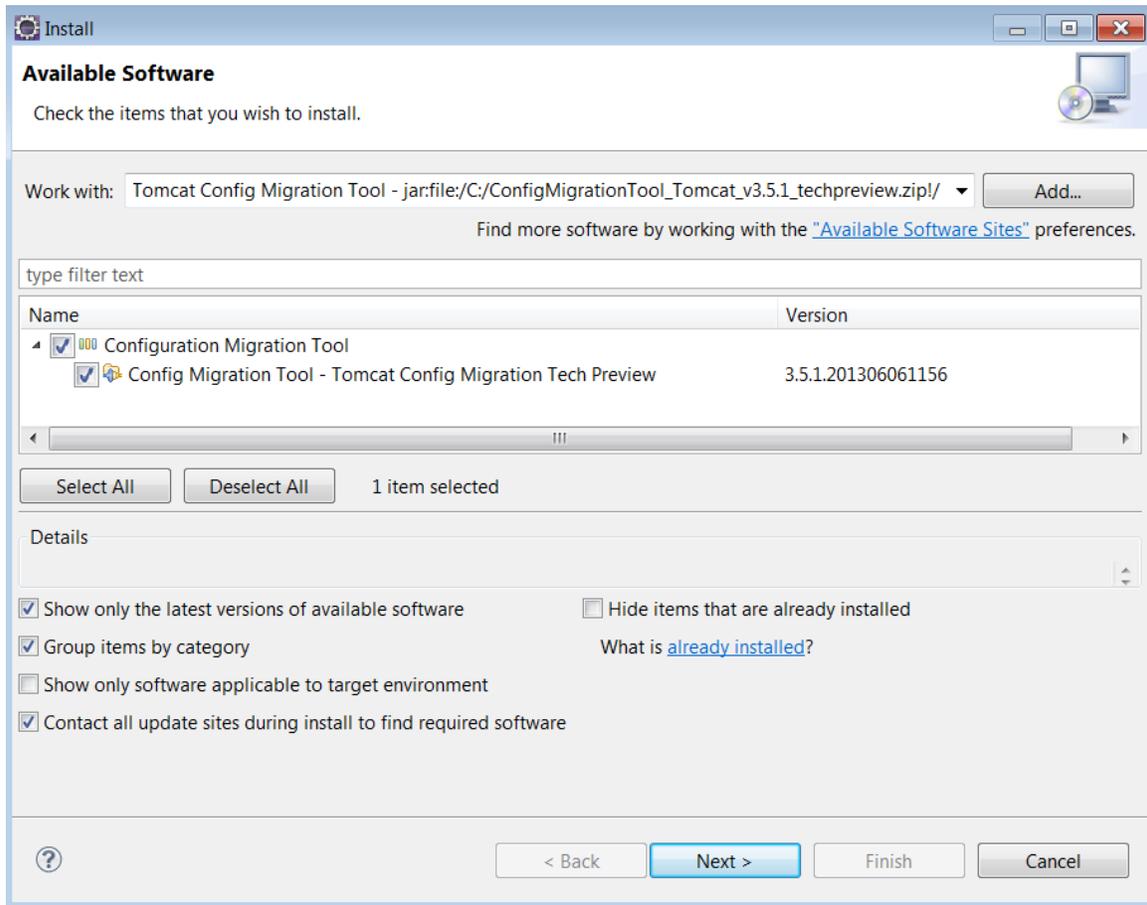
Figure 2: Select Plug-In

f) In the **Install Details** window, click **Next**.

g) In the **Review Licenses** window, read the terms and accept the license agreements. Click **Finish**.
    The install status window shows the installation progress.

h) In the **Software Updates** window, click **Yes** to restart Eclipse.
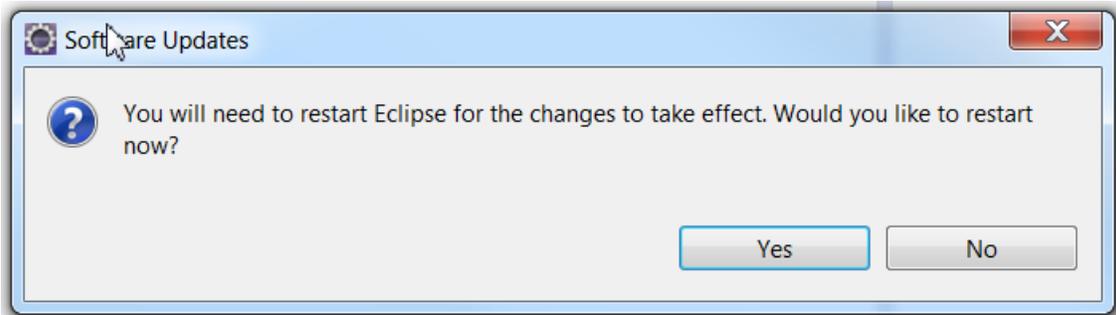

Figure 3: Restart dialog

Running the migration tool for an Apache Tomcat server

Begin your migration process by migrating the Apache Tomcat server configuration. Before you run the migration tool, the Liberty profile server must already exist in Eclipse. You can run the migration tool from the following locations within Eclipse:

- the Eclipse **Run** menu
- the Explorer pop-up menu
- the Servers pop-up menu

These locations are illustrated in the following figure.
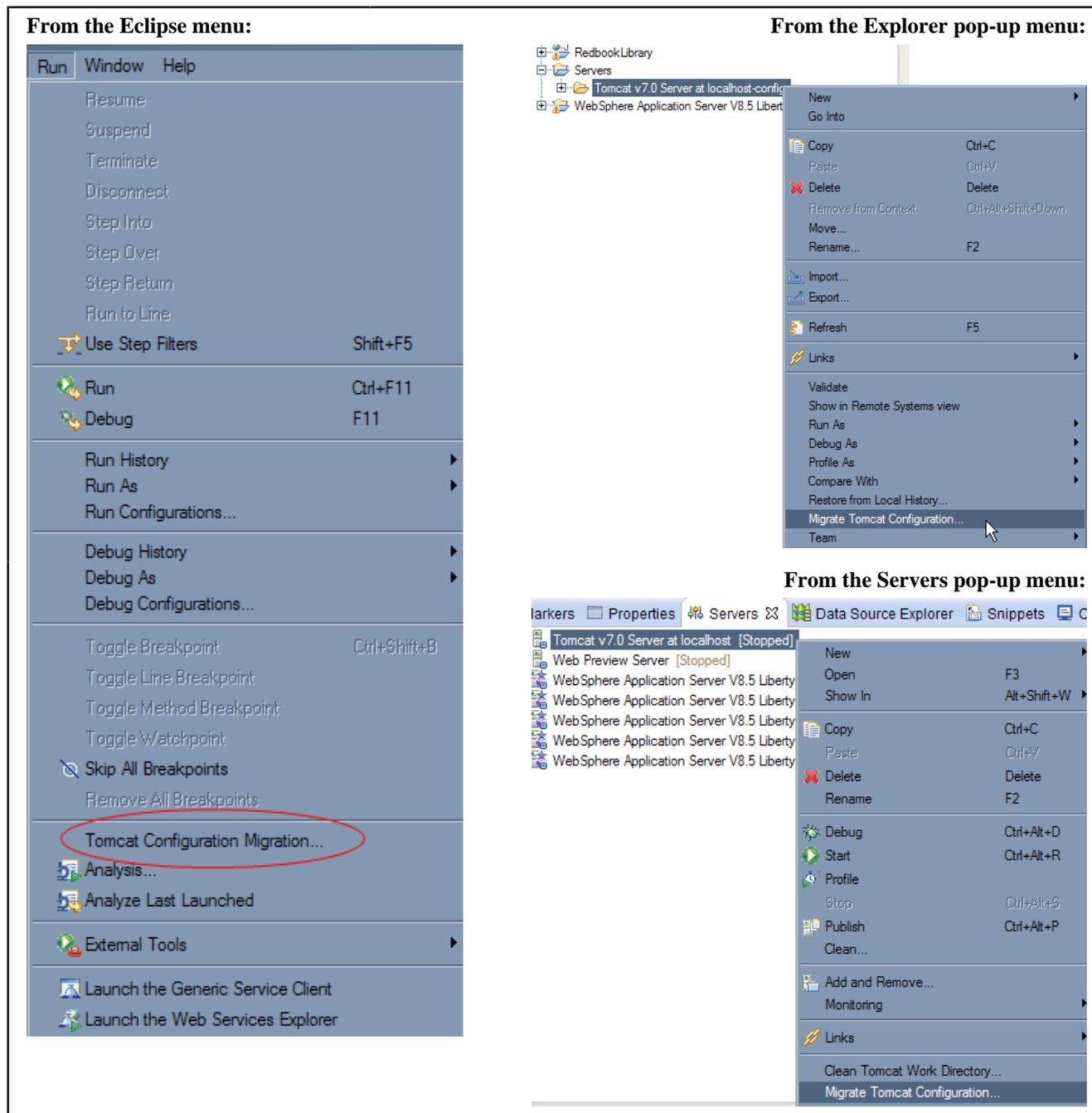
Figure 4: Options for running the tool to migrate server configuration

To migrate the server configuration using the Run menu, complete the following steps:

1. Select **Run** > **Tomcat Configuration Migration...** to display the Tomcat server selection dialog.

2. Browse to the location of the Tomcat server installation. Select the file folder, and click **OK**.
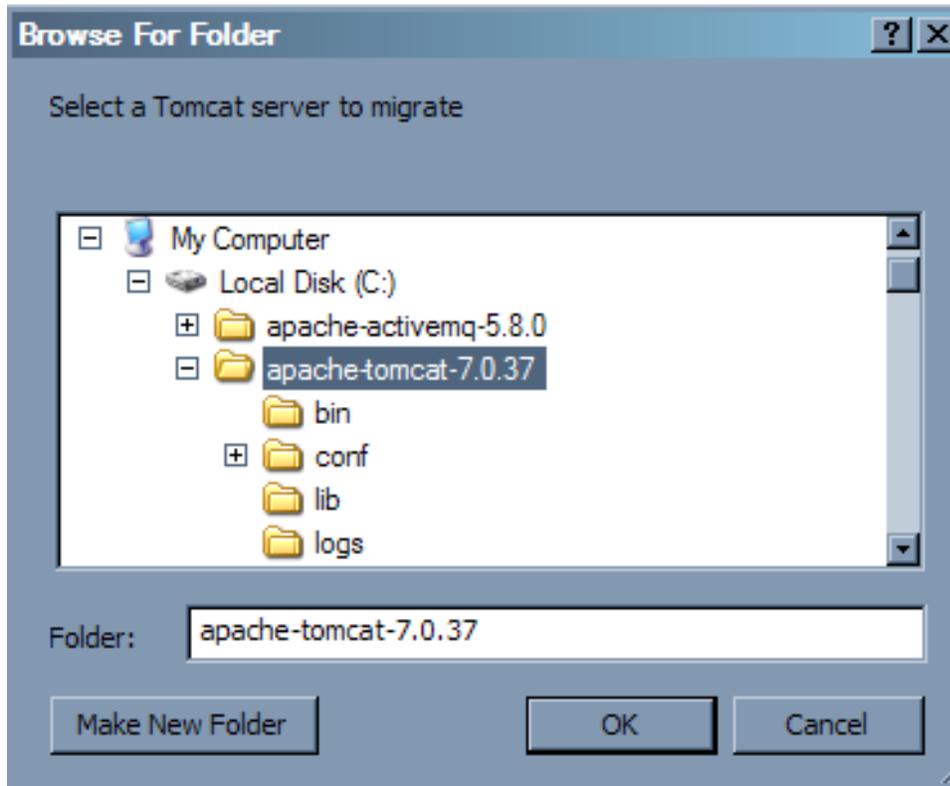
3. Select the Liberty profile server that you are migrating to, and click **OK**.
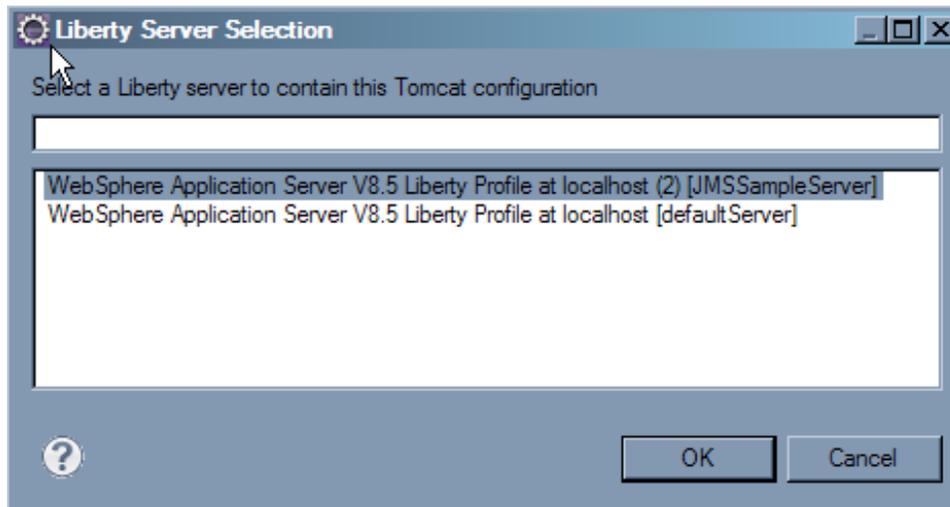
4. Click **OK** to close the completion dialog. The Liberty profile server workspace refreshes.
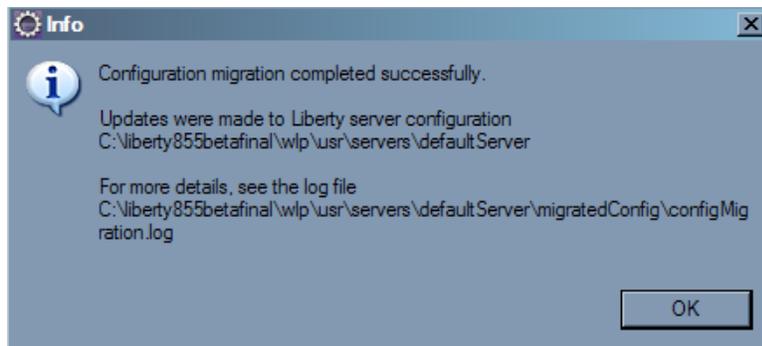
The selected Liberty profile server now contains the updated configuration. The server.xml file contains an include of migratedConfig/server-updates-for-config.xml, as shown in the following figure.
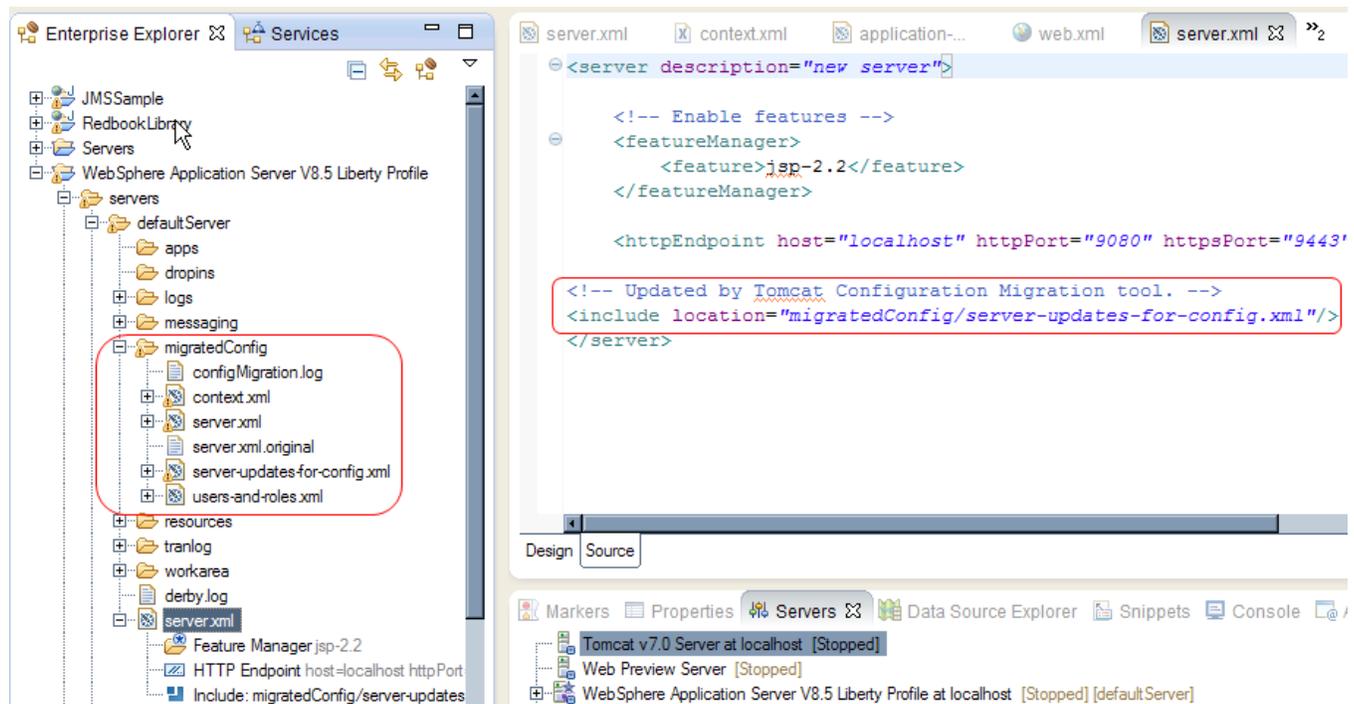
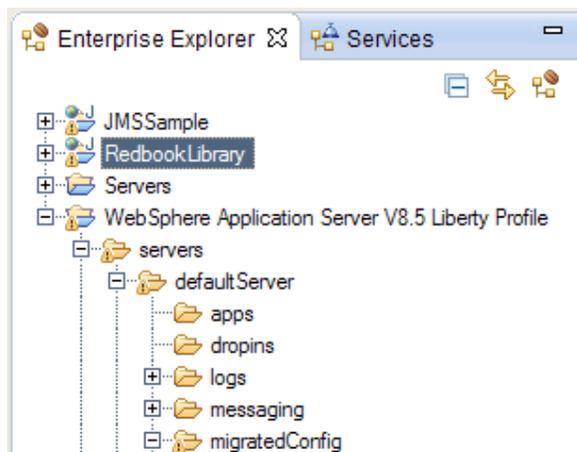

The updated configuration includes the following files:

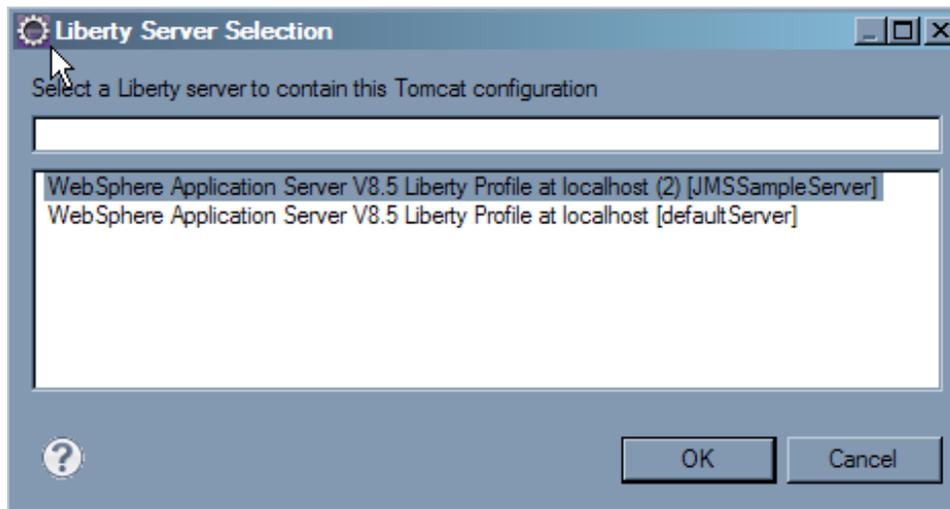| server.xml	Liberty profile server configuration file updated to include the generated configuration file migratedConfig/server-updates-for-config.xml
migratedConfig/configMigration.log	Information on the migration.
migratedConfig/context.xml	Configuration from the Tomcat context.xml file.
migratedConfig/server.xml	Configuration from the Tomcat server.xml file.
migratedConfig/server.xml.original	Copy of original Liberty server.xml before the migration.
migratedConfig/server-updates-for-config.xml	High-level include file.
migratedConfig/users-and-roles.xml	Configuration from the Tomcat tomcat-users.xml file.

Running the migration tool for an application

After migrating the Apache Tomcat server configuration, use the migration tool to migrate the application configuration. Before you run the migration tool, the application WAR file must be imported into Eclipse, and the application source, which can include Java source code, JavaServer Pages (JSP), and deployment descriptors, must be migrated using the Application Migration Tool – Apache Tomcat to WebSphere. For information about the Application Migration Tool – Apache Tomcat to WebSphere, see *http://www.ibm.com/developerworks/websphere/downloads/migtoolkit/*

To migrate the application configuration, complete the following steps:

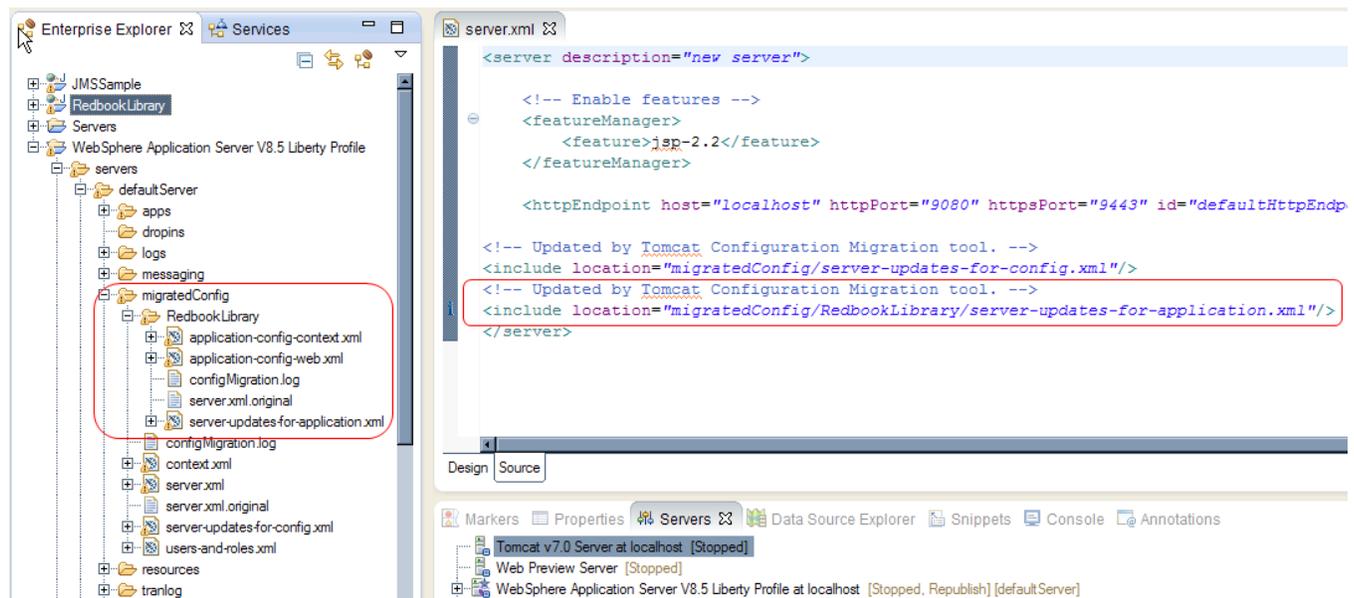1. Select the application project in the Explorer view.

2. Right-click the project name and select **Migrate Tomcat Configuration...** from the menu.
3. Select the Liberty profile server that you are migrating to, and click **OK**.

4. Click **OK** to close the completion dialog. The Liberty profile server workspace refreshes.
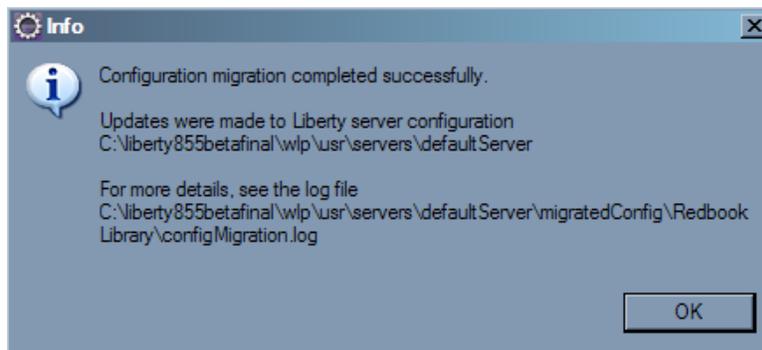
The selected Liberty profile server now contains the updated configuration. The server.xml file contains an include of server-updates-for-application.xml, as shown in the following figure.

The updated configuration includes the following files:

server.xml	Liberty profile server configuration file updated to include the generated configuration file migratedConfig/ [application-name]/server-updates-for-application.xml
migratedConfig/[application-name]/configMigration.log	Information on the migration.
migratedConfig/[application-name]/application-config-context.xml	Configuration from the application META-INF/context.xml file.
migratedConfig/[application-name]/application-config-web.xml	Configuration from the application WEB-INF/web.xml file.
migratedConfig/[application-name]/server.xml.original	Copy of original Liberty server.xml before the migration.
migratedConfig/[application-name]/server-updates-for-application-config.xml	High-level include file.

Configuration migration details

Mapping of files, elements and attributes

In Tomcat, certain configuration required by an application can be located in the server.xml or context.xml files, which are located in the Tomcat `conf` directory. Additional configuration can be in the META-INF/context.xml or WEB-INF/web.xml files of the application. Without the migration tool, that configuration must be migrated manually to the Liberty profile server configuration. Information about which configuration elements are migrated by the migration tool are contained in the following tables.

Table 1: Configuration elements migrated from the conf/tomcat-users.xml file

Tomcat Configuration Element (located in conf/tomcat-users.xml)	Liberty Configuration Element (generated in migratedConfig/users-and-roles.xml)	List of migrated attributes (Tomcat attribute = Liberty attribute)
tomcat-users/role	basicRegistry/group	rolename = name
tomcat-users/user	basicRegistry/user	username = name
		password = password (hash encoded using securityUtility.bat)
		roles = group/member[@name] (a group member is created for each role)

Table 2: Configuration elements migrated from the conf/server.xml file

Tomcat Configuration Element (located in conf/server.xml)	Liberty Configuration Element (generated in migratedConfig/server.xml)	List of migrated attributes (Tomcat attribute = Liberty attribute)
Service/Connector with type HTTP/1.1 and scheme attribute http	httpEndpoint	port = httpPort
		redirectPort = httpsPort
		Server/Service/Engine/@defaultHost = host
		connectionTimeout = httpOptions/@persistTimeout
		maxThreads = httpOptions/@maxKeepAliveRequests
		socket.soReuseAddress = tcpOptions/@soReuseAddr
Service/Connector with type HTTP/1.1 and scheme attribute https	httpEndpoint	port = httpsPort
		Server/Service/Engine/@defaultHost = host
		connectionTimeout = httpOptions/@persistTimeout
		maxThreads = httpOptions/@maxKeepAliveRequests

Tomcat Configuration Element (located in conf/server.xml)	Liberty Configuration Element (generated in migratedConfig/server.xml)	List of migrated attributes (Tomcat attribute = Liberty attribute)
		socket.soReuseAddress = tcpOptions/@soReuseAddr
Resource with driverClassName 'org.apache.derby.jdbc.EmbeddedDriver'	dataSource	name = jndiName
		username = properties.derby.embedded/@user
		password = properties.derby.embedded/@password (xor encoded using securityUtility.bat)
		url = properties.derby.embedded/@createDatabase, @databaseName
		defaultTransactionIsolation = isolationLevel
		maxActive = connectionManager/@maxPoolSize
		maxIdle = connectionManager/@minPoolSize
		maxWait = connectionManager/@connectionTimeout
Resource with driverClassName 'com.ibm.db2.jcc.DB2Driver'	dataSource	name = jndiName
		username = properties.db2.jcc/@user
		password = properties.db2.jcc/@password (xor encoded using securityUtility.bat)
		url = properties.db2.jcc/@databaseName, @serverName, @portNumber
		defaultTransactionIsolation = isolationLevel
		maxActive = connectionManager/@maxPoolSize
		maxIdle = connectionManager/@minPoolSize

Tomcat Configuration Element (located in conf/server.xml)	Liberty Configuration Element (generated in migratedConfig/server.xml)	List of migrated attributes (Tomcat attribute = Liberty attribute)
		maxWait = connectionManager/ @connectionTimeout
Resource with type 'org.apache.activemq.ActiveMQConnectionFactory'	jmsConnectionFactory	name = jndiName
Resource with type 'org.apache.activemq.command.ActiveMQTopic'	jmsTopic	name = jndiName
		id = jndiName
		physicalName = properties.wasJms/ @queueName
Resource with type 'org.apache.activemq.command.ActiveMQQueue'	jmsQueue	name = jndiName
		id = jndiName
		physicalName = properties.wasJms/ @topicName
Resource with type 'com.ibm.mq.jms.MQConnectionFactory'	jmsConnectionFactory	name = jndiName
Resource with type 'com.ibm.mq.jms.MQQueueConnectionFactory'	jmsQueueConnectionFactory	name = jndiName
Resource with type 'com.ibm.mq.jms.MQTopicConnectionFactory'	jmsTopicConnectionFactory	name = jndiName
Resource with type 'com.ibm.mq.jms.MQTopic'	jmsTopic	name = jndiName
		TOP or TOPIC = properties.wasJms/ @topicName
Resource with type 'com.ibm.mq.jms.MQQueue'	jmsQueue	name = jndiName
		QU or QUEUE = properties.wasJms/ @queueName

Table 3: Configuration elements migrated from the conf/context.xml file

Tomcat Configuration Element (located in conf/context.xml)	Liberty Configuration Element (generated in migratedConfig/context.xml)	List of migrated attributes (Tomcat attribute = Liberty attribute)
Manager with className 'org.apache.catalina.session.StandardManager'	httpSession	maxActiveSessions = maxInMemorySessionCount
		maxInactiveInterval = invalidationTimeout
		sessionIdLength = idLength
		processExpiresFrequency = forceInvalidationMultiple

Tomcat Configuration Element (located in conf/context.xml)	Liberty Configuration Element (generated in migratedConfig/ context.xml)	List of migrated attributes (Tomcat attribute = Liberty attribute)
Resource with driverClassName 'org.apache.derby.jdbc.EmbeddedDriver'	dataSource	See table above for conf/server.xml for details on migrated attributes.
Resource with driverClassName 'com.ibm.db2.jcc.DB2Driver'	dataSource	See table above for conf/server.xml for details on migrated attributes.
Resource with type 'org.apache.activemq.ActiveMQConnectionFactory'	jmsConnectionFactory	See table above for conf/server.xml for details on migrated attributes.
Resource with type 'org.apache.activemq.command.ActiveMQTopic'	jmsTopic	See table above for conf/server.xml for details on migrated attributes.
Resource with type 'org.apache.activemq.command.ActiveMQQueue'	jmsQueue	See table above for conf/server.xml for details on migrated attributes.
Resource with type 'com.ibm.mq.jms.MQConnectionFactory'	jmsConnectionFactory	See table above for conf/server.xml for details on migrated attributes.
Resource with type 'com.ibm.mq.jms.MQQueueConnectionFactory'	jmsQueueConnectionFactory	See table above for conf/server.xml for details on migrated attributes.
Resource with type 'com.ibm.mq.jms.MQTopicConnectionFactory'	jmsTopicConnectionFactory	See table above for conf/server.xml for details on migrated attributes.
Resource with type 'com.ibm.mq.jms.MQTopic'	jmsTopic	See table above for conf/server.xml for details on migrated attributes.
Resource with type 'com.ibm.mq.jms.MQQueue'	jmsQueue	See table above for conf/server.xml for details on migrated attributes.

Table 4: Configuration elements migrated from the application META-INF/context.xml file.

Tomcat Configuration Element (located in META-INF/context.xml of application)	Liberty Configuration Element (generated in migratedConfig/ [application-name]/ application-config-context.xml)	List of migrated attributes (Tomcat attribute = Liberty attribute)
Resource with driverClassName 'org.apache.derby.jdbc.EmbeddedDriver'	dataSource	See table above for conf/server.xml for details on migrated attributes.
Resource with driverClassName 'com.ibm.db2.jcc.DB2Driver'	dataSource	See table above for conf/server.xml for details on migrated attributes.

Tomcat Configuration Element (located in META-INF/context.xml of application)	Liberty Configuration Element (generated in migratedConfig/ [application-name]/ application-config-context.xml)	List of migrated attributes (Tomcat attribute = Liberty attribute)
Resource with type 'org.apache.activemq.ActiveMQConnectionFactory'	jmsConnectionFactory	See table above for conf/ server.xml for details on migrated attributes.
Resource with type 'org.apache.activemq.command.ActiveMQTopic'	jmsTopic	See table above for conf/ server.xml for details on migrated attributes.
Resource with type 'org.apache.activemq.command.ActiveMQQueue'	jmsQueue	See table above for conf/ server.xml for details on migrated attributes.
Resource with type 'com.ibm.mq.jms.MQConnectionFactory'	jmsConnectionFactory	See table above for conf/ server.xml for details on migrated attributes.
Resource with type 'com.ibm.mq.jms.MQQueueConnectionFactory'	jmsQueueConnectionFactory	See table above for conf/ server.xml for details on migrated attributes.
Resource with type 'com.ibm.mq.jms.MQTopicConnectionFactory'	jmsTopicConnectionFactory	See table above for conf/ server.xml for details on migrated attributes.
Resource with type 'com.ibm.mq.jms.MQTopic'	jmsTopic	See table above for conf/ server.xml for details on migrated attributes.
Resource with type 'com.ibm.mq.jms.MQQueue'	jmsQueue	See table above for conf/ server.xml for details on migrated attributes.

Table 5: Configuration elements migrated from the application META-INF/web.xml file

Tomcat Configuration Element (located in WEB-INF/web.xml of application)	Liberty Configuration Element (generated in migratedConfig/ [application-name]/ application-config-web.xml)	List of migrated attributes (Tomcat attribute = Liberty attribute)
web-app/security-constraint/auth-constraint	application/application-bnd/ security-role	role-name = name

Additional information on migration of JMS Resources

To support the migration of JMS applications, Tomcat Resources related to WebSphere MQ and Apache ActiveMQ are migrated to the Embedded Liberty Messaging features and related configuration elements in the Liberty profile server. The applications must use JMS interfaces to function properly when configured to use the Liberty embedded messaging engine.

Additional information on migration of database Resources

To support the migration of applications utilizing databases, Tomcat Resources related to IBM DB2 and Apache Derby are migrated to datasource configuration elements in the Liberty profile server. For Apache Derby, the generated configuration

expects to find the derby.jar file in the `${shared.resource.dir}` of the Liberty profile server. Copy the JAR file to that location, or modify the generated configuration to point to the location of the JAR file. For IBM DB2, the generated configuration expects to find the db2jcc4.jar and db2jcc_license_cu.jar files in the `${shared.resource.dir}` of the Liberty profile server. Copy the JAR file to that location, or modify the generated configuration to point to the location of the JAR file.

Troubleshooting

Known issues

User Input Required dialog appears during application configuration migration

During application configuration migration, a User Input Required dialog appears stating that application publishing requires the applicationMonitor updateTrigger attribute to be set to mbean in the server configuration file. The prompt asks if you want to set it in the server configuration. You can safely select **No**. The migration tool adds the necessary settings to the generated configuration.

Liberty Profile Configuration Problem in Markers pane related to id attributes on some messaging elements

After configuration migration, the Markers pane may contain one or more warnings related to id attributes under the heading "Liberty Profile Configuration Problem". The warning states "The attribute 'id' is not a recognized attribute for the element 'queue'". This warning appears for the messagingEngine element, as well as the queue and topicSpace sub-elements. You can safely ignore these warnings. The configuration is valid and the server runtime works as expected.

Liberty Server Selection dialog is empty

The Liberty Server Selection dialog is populated with Liberty profile servers found in the Servers view of Eclipse. If no Liberty profile servers are present, the selection dialog will be empty. You must cancel the migration and add a Liberty profile server to Eclipse before you can proceed.

Application receives a SQLException

The generated datasource configuration expects to find the necessary database JAR files in `{shared.resource.dir}`. Copy the relevant JAR files into that directory, or change the datasource configuration in the Liberty profile server to point to a different location.

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