

Administering the EntireX WebSphere MQ RPC Server

EntireX WebSphere MQ RPC Server runs as an RPC server and processes RPC client calls. It is used to send messages to and receive messages from a WebSphere MQ Queue. This means that existing EntireX wrappers can be used for communication with WebSphere MQ.

This chapter covers the following topics:

- Customizing the WebSphere MQ RPC Server
- Configuring the RPC Server Side
- Configuring the WebSphere MQ Side
- Mapping IDL Data Types to the MQ Message Buffer
- Starting the WebSphere MQ RPC Server
- Stopping the WebSphere MQ RPC Server
- Tracing the WebSphere MQ RPC Server

See also *Introduction to the WebSphere MQ RPC Server and WebSphere MQ Listener | Advanced WebSphere MQ RPC Server Functionality | Administering the WebSphere MQ Listener | Advanced WebSphere MQ Listener Functionality*.

Customizing the WebSphere MQ RPC Server

To set up the WebSphere MQ RPC Server, there is a configuration file and there are scripts to start the WebSphere MQ RPC Server.

The WebSphere MQ RPC Server is contained in *entirex.jar*. There are two parts: the RPC server and the WebSphere MQ side.

The WebSphere MQ RPC Server uses the WebSphere MQ base Java classes from IBM. To run the WebSphere MQ RPC Server, you need either the base Java classes or a full installation of WebSphere. Prerequisites for all EntireX components are described centrally. See *Prerequisites for WebSphere MQ RPC Server and WebSphere MQ Listener* under UNIX | Windows for the required JAR file(s). The WebSphere MQ environment variables `MQ_JAVA_LIB_PATH` and `MQ_JAVA_INSTALL_PATH` must be set.

Make sure that either the local WebSphere MQ installation or the WebSphere MQ Java classes are accessible.

The default name for the configuration file is *entirex.wmqbridge.properties*. The WebSphere MQ RPC Server searches for this file in the current working directory. You can set the name of the configuration file with `-Dentirex.server.properties= your file name`. Use the slash "/" as file separator. The configuration file contains the configuration for both parts of the WebSphere MQ RPC Server.

Use the RPC server agent of the System Management Hub for setup. Add the WebSphere MQ RPC Server as an RPC server. See *Administering the EntireX RPC Servers using System Management Hub* under UNIX | Windows for details.

Alternatively, you can use a script to start the WebSphere MQ RPC Server. On Windows, use *wmqbridge.bat* in the folder *bin* to start the WebSphere MQ RPC Server. On UNIX, use *wmqbridge.bsh* in the folder *bin* to start the WebSphere MQ RPC Server. Both scripts use the configuration file *entirex.wmqBridge.properties* in the folder *etc*, and both can be customized.

Configuring the RPC Server Side

The RPC server side of the WebSphere MQ RPC Server is configured like the Java RPC Server. The WebSphere MQ RPC Server uses all properties starting with "entirex.server".

The RPC server side can adjust the number of worker threads to the number of parallel requests. Use the properties `entirex.server.fixedservers`, `entirex.server.maxservers` and `entirex.server.minservers` to configure this scalability.

With `entirex.server.fixedservers=yes`, the number of `entirex.server.minservers` is started and the server can process this number of parallel requests.

With `entirex.server.fixedservers=no`, the number of worker threads balances between `entirex.server.minservers` and `entirex.server.maxservers`. This is done by a so-called attach server thread. On startup, the number of worker threads is `entirex.server.minservers`. If more than `entirex.server.minservers` are waiting for requests, a worker thread stops if its receive call times out. The timeout period is configured with `entirex.server.waitserver`.

Alternatively you can use the command-line option. The command-line parameters have a higher priority than the properties set as Java system properties, and these have higher priority than the properties in the configuration file. For a list of all of the command-line parameters, use `-help`.

Name	Parameter	Default Value	Explanation
<code>entirex.bridge.xml.encoding</code>		utf-8	Encoding of the XML document which is sent to MQ (if <code>entirex.bridge.xmm</code> is used).
<code>entirex.bridge.marshalling</code>			Define the type of marshalling (Natural or COBOL). Must be set only if the IDL file contains arrays of groups. See <i>Mapping IDL Data Types to the MQ Message Buffer</i> .
<code>entirex.server.brokerid</code>	<code>-broker</code>	localhost	Broker ID
<code>entirex.server.compresslevel</code>	<code>-compresslevel</code>	0 (no compression)	Permitted values (you can enter the text or the numeric value): BEST_COMPRESSION 9 BEST_SPEED 1 DEFAULT_COMPRESSION -1, mapped to 6 DEFLATED 8 NO_COMPRESSION 0 N 0 Y 8
<code>entirex.server.encryptionlevel</code>	<code>-encryption</code>	0	Encryption level. Valid values: 0,1,2.
<code>entirex.server.fixedservers</code>		no	If no, use an attach server thread to manage worker threads, otherwise run the minimum number of server threads. See the properties <code>entirex.server.maxservers</code> and <code>entirex.server.minservers</code> .
<code>entirex.server.logfile</code>	<code>-logfile</code>		Name of the log file, the default is standard output.
<code>entirex.server.maxservers</code>		32	Maximum number of worker threads.
<code>entirex.server.minservers</code>		1	Minimum number of server threads.

Name	Parameter	Default Value	Explanation
entirex.server.monitorport	-smhport	0	The port where the server listens for commands from the System Management Hub (SMH). If this port is 0, no port is used and management by the SMH is disabled.
entirex.server.password	-password		The password for secured access to the Broker. The password is encrypted and written to the property <code>entirex.server.password.e</code> . To change the password, set the new password in the properties file (default is <code>entirex.wmqbridge.properties</code>). To disable password encryption, set <code>entirex.server.passwordencrypt=no</code> (default for this property is yes).
entirex.server.properties	-propertyfile	<code>entirex.wmqbridge.properties</code>	The file name of the property file.
entirex.server.restartcycles	-restartcycles	15	Number of restart attempts if the Broker is not immediately available. This can be used to keep the Java RPC Server running while the Broker is temporarily down.
entirex.server.security	-security	no	no/yes/auto/Name of BrokerSecurity object.
entirex.server.serveraddress	-server	RPC/SRV1/ CALLNAT	Server address.
entirex.server.serverlog	-serverlog		Name of the file where worker thread starts and stops are logged. Used by the Windows RPC Service.
entirex.server.userid	-user	WMQRPCServer	The user ID for the Broker for RPC. See <code>entirex.server.password</code> .
entirex.server.verbose	-verbose	no	Enable verbose output to the log file.
entirex.server.waitattach		600S	Wait timeout for the attach server thread.
entirex.server.waitserver		300S	Wait timeout for the worker threads.
entirex.timeout		20	TCP/IP transport timeout. See <i>Setting the Transport Timeout</i> under <i>Writing Advanced Applications - EntireX Java ACI</i> .
entirex.trace	-trace	0	Trace level (1,2,3).

Configuring the WebSphere MQ Side

These properties are used to configure the connection to the WebSphere MQ queue manager.

Name	Parameter	Default Value	Explanation
entirex.wmqbridge.host			If host is not specified, bindings mode is used to connect to the local MQ Server. Otherwise specify the hostname or IP address of the MQ Server.
entirex.wmqbridge.port		1414	Port of the MQ Server. Not used in bindings mode.
entirex.wmqbridge.channel		SYSTEM.DEF.SVRCONN	Channel name used to the MQ Server. Not used in bindings mode.
entirex.wmqbridge.queuemanager	-wmqmanager		Name of the (local or remote) queue manager. If not specified, a connection is made to the default queue manager.
entirex.wmqbridge.inputqueue	-wmqinqueue		Name of input queue (the queue which is used for MQ GET operations).
entirex.wmqbridge.outputqueue	-wmqoutqueue		Name of output queue (the queue which is used for MQ PUT operations).
entirex.wmqbridge.userid	-wmquser		UserID for MQ Server.
entirex.wmqbridge.password	-wmqpassword		Password for MQ Server.
entirex.wmqbridge.waittime			Wait interval for MQ Get operation in milliseconds.
entirex.wmqbridge.userexit			Class name for WMQBridge user exit.
entirex.wmqbridge.userexit.classpath			URL of the classpath for WMQBridge user exit (optional).
entirex.wmqbridge.ccsid		platform encoding	Coded Character Set Identification used by the EntireX WebSphere MQ RPC Server (which acts as an MQ client), unused in bindings mode.
entirex.wmqbridge.mqtrace		0	MQ tracing enabled if parameter > 0.

Name	Parameter	Default Value	Explanation
<code>entirex.bridge.xmm</code>			Name of XMM (XML Mapping) file; if MQ message payload is XML/SOAP. If this is specified, messages to/from MQ will be converted to XML.
<code>entirex.bridge.xml.encoding</code>		<code>utf-8</code>	Encoding of the XML document which is sent to MQ (if <code>entirex.bridge.xmm</code> is used).
<code>entirex.bridge.names.file</code>			Name of a properties file generated with the <code>bridge.tpl</code> template which contains names of the first level parameters in the IDL file (optional). Necessary if IDL file contains dynamic MQ parameters.
<code>entirex.bridge.verbose</code>		<code>no</code>	Verbose/trace mode of WebSphere MQ RPC Server
<code>entirex.wmqbridge.environment.sslCipherSuite</code>			Configuration for SSL connection to MQ Server. See the WebSphere MQ documentation for details.
<code>entirex.wmqbridge.environment.sslFipsRequired</code>			Configuration for SSL connection to MQ Server. See the WebSphere MQ documentation for details.
<code>entirex.wmqbridge.priority</code>			Message priority for messages sent to MQ (different from the default priority of the destination queue).

The WebSphere MQ RPC Server can be run to

- only send messages to MQ (only output queue specified),
- only receive messages from MQ (only input queue specified), or
- transport messages in both directions (bidirectional communication).

If your programs use arrays of groups, you have to set `entirex.bridge.marshalling` to "Natural" or "COBOL". If your programs do not use arrays of groups, you must not set `entirex.bridge.marshalling`.

Alternatively the RPC data can be transformed to/from XML or SOAP as defined by an XMM mapping file from the XML/SOAP Wrapper. To achieve this, specify the parameter `entirex.bridge.xmm`.

Mapping IDL Data Types to the MQ Message Buffer

The WebSphere MQ RPC Server uses a predefined mapping of IDL data types to the MQ message buffer.

Data Type	Description	Format	Note
<i>A</i> <i>number</i>	Alphanumeric	<i>number</i> bytes, encoding the characters.	
AV	Alphanumeric variable length	Bytes up to the end of the buffer.	1, 4
AV[<i>number</i>]	Alphanumeric variable length with maximum length	Bytes up to the end of the buffer, maximal length <i>number</i> .	1
<i>K</i> <i>number</i>	Kanji	Same as data type A.	
KV	Kanji variable length	Same as data type AV.	1, 4
KV[<i>number</i>]	Kanji variable length with maximum length	Same as data type AV[<i>number</i>].	1
I1	Integer (small)	<i>sign</i> (+, -) and 3 bytes (digits).	
I2	Integer (medium)	<i>sign</i> (+, -) and 5 bytes (digits).	
I4	Integer (large)	<i>sign</i> (+, -) and 10 bytes (digits).	
N <i>number1</i> [. <i>number2</i>]	Unpacked decimal	<i>sign</i> (+, -), <i>number1</i> bytes (digits) [<i>number2</i>] bytes (digits), no decimal point.	
P <i>number1</i> [. <i>number2</i>]	Packed decimal	<i>sign</i> (+, -), <i>number1</i> bytes (digits) [<i>number2</i>] bytes (digits), no decimal point.	
L	Logical	1 byte: X for true, all other false.	
D	Date	YYYYMMDD.	2
T	Time	YYYYMMDDhhmmssS.	3

Notes:

1. Only as last value.
2. YYYY year, MM month, DD day.
3. YYYY year, MM month, DD day, hh hour, mm minute, ss second, S tenth of a second.
4. Not possible when using COBOL.

Data types not supported:

- Binary (B[*n*],BV, BV[*n*])
- Floating point (F4, F8)

Starting the WebSphere MQ RPC Server

Use start script `wmqbridge.bsh` (UNIX) or `wmqbridge.bat` (Windows) in the folder `bin` to start the WebSphere MQ RPC Server. You may customize this file. See also *Prerequisites for WebSphere MQ RPC Server and WebSphere MQ Listener* under UNIX | Windows.

The start scripts contain references to JAR files in the WS-Stack directory. If you update these JAR files, you may need to customize the JAR file names in the script files.

You can use the RPC server agent in the System Management Hub to configure and start the WebSphere MQ RPC Server.

Under Windows you can start the WebSphere MQ RPC Server as a Windows Service. The installation of the service is similar to the installation of the Java RPC Server as Windows Service. See *Running the Java RPC Server as a Windows Service*.

Stopping the WebSphere MQ RPC Server

Use the RPC server agent in the System Management Hub to stop the WebSphere MQ RPC Server. You can also stop the WebSphere MQ RPC Server with CTRL-C.

On UNIX you can use `kill <pid of Java process>` to stop the WebSphere MQ RPC Server.

An alternative is the agent for the Broker. Use `Deregister` on the service, specified with the property `entirex.server.serveraddress`.

Tracing the WebSphere MQ RPC Server

The trace level for the EntireX RPC Server part is controlled by the usual `entirex.trace` property. It can be set in the configuration file. Additional diagnostic output can be enabled by setting the property `entirex.server.verbose`.

The WebSphere MQ RPC Server specific diagnostic output is enabled by setting the property `entirex.bridge.verbose`. In addition, tracing of the IBM WebSphere MQ classes can be influenced with the property `entirex.wmqbridge.mqtrace`.

Use the RPC server agent of the System Management Hub to dynamically change the level of the diagnostic output. You can specify a value of 0, 1, 2, or 3 which changes the value of `entirex.trace`. In addition, the value 0 will disable both `entirex.server.verbose` and `entirex.bridge.verbose`. A value greater than 0 will enable both `entirex.server.verbose` and `entirex.bridge.verbose`.

Redirect the trace to a file with the property `entirex.server.logfile`. Set this to the file name of the log file, default is standard output.