



IBM Software Group

# WebSphere® Message Broker V6

## *External Functions in Java™*



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This presentation discusses External Functions in Java.

## External functions in Java

- Allows the ESQL environment to be extended with libraries of Java functions
- Java methods can be called wherever an ESQL function or procedure can be called



In WebSphere Message Broker Version 6, the ESQL environment now has access to Java functions. Java methods can be called wherever an ESQL function or procedure can be called.

## Example

### ■ ESQL Procedure Definition

```
CREATE PROCEDURE myProc1( IN P1 INT, OUT P2 INT, INOUT P3 INT)
RETURNS INTEGER
LANGUAGE JAVA
EXTERNAL NAME "com.ibm.broker.MyClass.myMethod1";
```

```
Package com.ibm.broker;

class MyClass {
    public static void myMethod1(Long P1, Long[] P2, Long[] P3) {
        ...
    }
}
```

### ■ ESQL Invocation

```
CALL myProc1( intVar1, intVar2, intVar3) INTO intReturnVar3;
-- or
SET intReturnVar3 = myProc1( intVar1, intVar2, intVar3);
```

This example shows the relationship between the procedure definition, the Java class, and the invocation of the procedure. The CREATE PROCEDURE statement is used to define a callable ESQL procedure. Within this procedure definition, you identify the language as Java and provide the external class and method name. The external class (in this case, myClass) must be available in the Java classpath when the procedure is called. The invocation of the procedure can be made by an actual CALL statement or it can be called implicitly.

Parameter directions IN, OUT, INOUT are defined within the CREATE PROCEDURE statement and identify the data types of the invocation parameters. The data type mappings of ESQL parameters in relation to Java data type parameters are shown on the next slide.

## ESQL to Java data type mapping table

ESQL data types	Java IN data types	Java INOUT and OUT data types
INTEGER, INT	java.lang.Long	java.lang.Long []
FLOAT	java.lang.Double	java.lang.Double[]
DECIMAL	java.math.BigDecimal	java.math.BigDecimal[]
CHARACTER, CHAR	java.lang.String	java.lang.String[]
BLOB	byte[]	byte[][]
BIT	java.util.BitSet	java.util.BitSet[]
DATE	com.ibm.broker.plugin.MbDate	com.ibm.broker.plugin.MbDate[]
TIME	com.ibm.broker.plugin.MbTime	com.ibm.broker.plugin.MbTime[]
GMTTIME	com.ibm.broker.plugin.MbTime	com.ibm.broker.plugin.MbTime[]
TIMESTAMP	com.ibm.broker.plugin.MbTimestamp	com.ibm.broker.plugin.MbTimestamp[]
GMTTIMESTAMP	com.ibm.broker.plugin.MbTimestamp com.ibm.broker.plugin.MbTimestamp[]	
INTERVAL	Not supported	Not supported
BOOLEAN	java.lang.Boolean	java.lang.Boolean[]
REFERENCE (msg tree)	com.ibm.broker.plugin.MbElement	com.ibm.broker.plugin.MbElement[]
ROW	Notsupported	Not supported
LIST	Notsupported	Not supported



Here is an overview of the ESQL to Java data type mapping table. You can find this table in the WebSphere Message Broker Information Center by searching on “java mapping table”. Review this table in the Information Center for usage information and restrictions.

## Other enhancements related to Java

- Automatic deployment of JAR file
  - ▶ When flow containing LANGUAGE Java procedure is added to BAR file, the workspace is searched for appropriate class file and it is archived as a JAR file and added to BAR file automatically
- JAR files can be manually added to BAR file
  - ▶ Useful for external JAR files
- Implementation JAR file can still be manually installed on broker machine
  - ▶ Useful for very large, unchanging JAR files



Other enhancements have been made in Version 6 to complement this support. When the broker archive process detects an ESQL procedure that identifies the language as Java, the archive process searches the workspace for the appropriate class file and, if found, the file is archived in a .jar file and added to the broker archive file automatically. In addition, you can manually add the .jar file to the broker archive file, which is useful for external .jar files. And if the broker archive does not contain the .jar file associated with an ESQL Java procedure, you can manually install the .jar file into the Java classpath on the machine where the flow is deployed.

## Section

# *Summary and references*

And, in summary . . .

## Summary

- Version 6 now supports an ESQL procedure that invokes Java
- The required Java class files can be packaged into the broker archive
  - ▶ Automatically – if the archive process find the class file needed in the workspace
  - ▶ Manually
- You can manually add the jar file into the Java classpath of the machine where the flow is deployed



The ESQL environment has been enhanced in Version 6 to allow you to call Java methods using an ESQL procedure. The Java class associated with the procedure can be included within the broker archive file, either manually or automatically. If the deployed broker archive does not contain the jar file needed by the ESQL Java procedure, you can install the required jar files manually on the machine where the message flow is deployed.

## References

- WebSphere Message Broker library:
  - <http://www-306.ibm.com/software/integration/wbimessagebroker/library/>
- WebSphere Message Broker Information Center:
  - <http://publib.boulder.ibm.com/infocenter/wmbhelp/v6r0m0/index.jsp>

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