Configure a Database Call Studio Element - Tomcat JNDI for SQL Database

Contents

Introduction

This document describes the Configure Customer Voice Portal (CVP) Call Studio Database Element, Tomcat Java Naming and Directory Interface (JNDI), for SQL Database.

Prerequisites

Requirements

Cisco recommends that you have knowledge of these topics:

- Cisco Unified Contact Center Enterprise (UCCE) Release 12.6.2
- Cisco Package Contact Center Enterprise (PCCE) Release 12.6.2
- CVP Release 12.6.2
- CVP Call Studio 12.6.2

Components Used

The information in this document is based on these software versions:

- Cisco PCCE Release 12.6.2
- CVP Release 12.6.2
- CVP Call Studio 12.6.2

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, ensure that you understand the potential impact of any command.

Background Information

The database element provides the ability to run an Structured Query Language (SQL) command on external databases within a voice application call flow. The element requires JNDI to be configured in the Java application server in order to handle database connections. Only a single SQL statement can be run per element. There are four types of commands that can be made, but in this document only the single command is used:

Single – This is used to run a SQL query that returns only a single row. Element data will be created with the variable names being the names of the columns returned and the value of that column as the element data value (as a string). If no row is returned, no element data will be set.

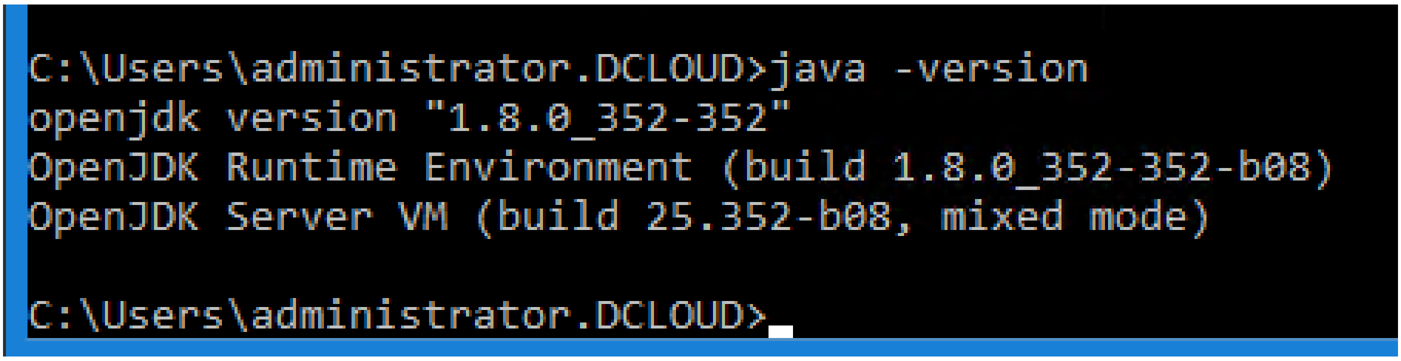
More Information can be found in the CVP VXML Element guide.

Configuration

This section explains how to create a new JNDI database connection in Tomcat.

Step 1. Determine the Java Runtime Environment (JRE) Version on your CVP Server.

- Click the **Start** button (left button corner on your desktop bar)
- Click the **Run...** option
- Type in **CMD** and click **OK** in order to bring up the DOS prompt
- Then type in **java-version**



```
C:\Users\administrator.DCLOUD>java -version
openjdk version "1.8.0_352-352"
OpenJDK Runtime Environment (build 1.8.0_352-352-b08)
OpenJDK Server VM (build 25.352-b08, mixed mode)

C:\Users\administrator.DCLOUD>_
```

Step 2. Install a compatible Java Database Connectivity (JDBC) driver with the SQL Version. In order to enable database access on your application server, a compatible JDBC driver must be installed. These drivers, typically packaged as **JAR** files, must be placed in a directory accessible to the application server classpath (on Tomcat, for example, place in %CVP_HOME%\VXMLServer\Tomcat\lib).

Different drivers can be found here.

An example from the MS supported list:

SQL version compatibility

Expand table

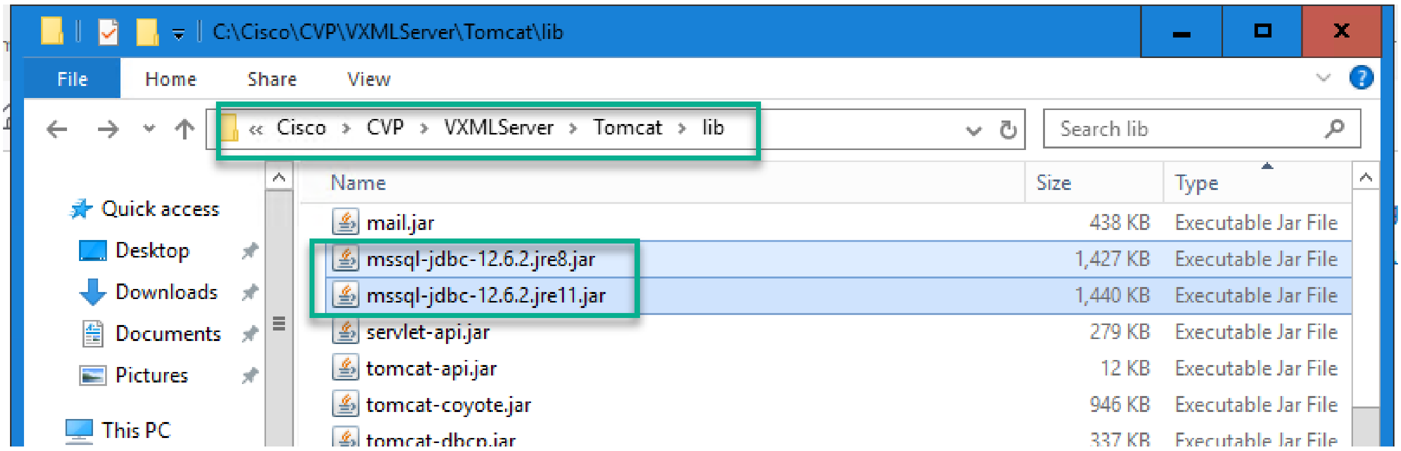
Database version → ↓ Driver Version	Azure SQL Database	Azure Synapse Analytics	Azure SQL Managed Instance	SQL Server 2022	SQL Server 2019	SQL Server 2017	SQL Server 2016	SQ Se 20
12.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
12.4	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
12.2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Java and JDBC specification support

Expand table

JDBC Driver Version	JRE Versions	JDBC API Version
12.6	1.8, 11, 17, 21	4.2, 4.3 (partially)
12.4	1.8, 11, 17, 20	4.2, 4.3 (partially)
12.2	1.8, 11, 17, 19	4.2, 4.3 (partially)
11.2	1.8, 11, 17, 18	4.2, 4.3 (partially)
10.2	1.8, 11, 17	4.2, 4.3 (partially)
9.4	1.8, 11, 16	4.2, 4.3 (partially)

Note: The database must exist for this connection to work. CVP Voice XML (VXML) Server will not create the database for you. In this document the UCCE AW database is used as an example and the JDBC driver version 12.6 is the one installed.



Name	Size	Type
mail.jar	438 KB	Executable Jar File
mssql-jdbc-12.6.2.jre8.jar	1,427 KB	Executable Jar File
mssql-jdbc-12.6.2.jre11.jar	1,440 KB	Executable Jar File
servlet-api.jar	279 KB	Executable Jar File
tomcat-api.jar	12 KB	Executable Jar File
tomcat-coyote.jar	946 KB	Executable Jar File
tomcat-dbcp.jar	337 KB	Executable Jar File

Step 2. Add a Tomcat Context for the database connection so that the CVP VXML Server knows how to communicate with your database. For more information, see https://tomcat.apache.org/tomcat-9.0-doc/jndi-

datasource-examples-howto.html.

Here is an example that uses SQL (edit **context.xml** from **AUDIUM_HOME\Tomcat\conf** folder where AUDIUM_HOME is usually Cisco\CVP\VXMLServer):

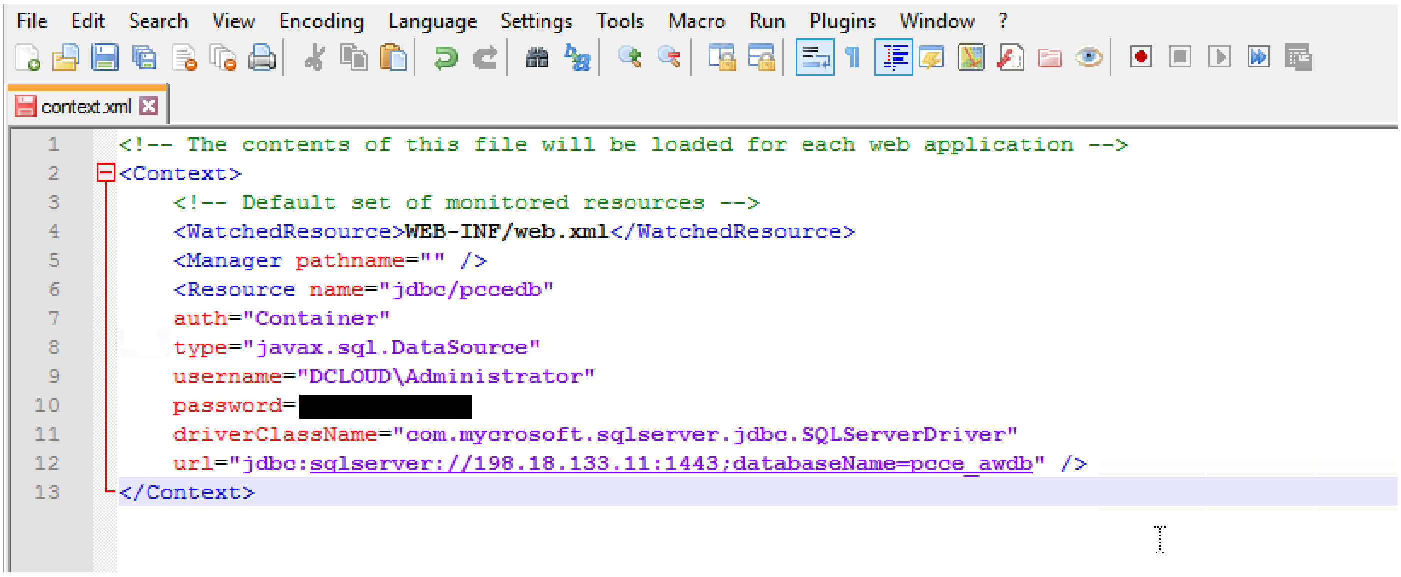
```
<Context>

<Resource name="jdbc/<LABEL_YOU_CHOOSE>"

auth="Container"

type="javax.sql.DataSource"

username="USER_NAME"

password="USER_PW"

driverClassName="com.microsoft.sqlserver.jdbc.SQLServerDriver"

url="jdbc:sqlserver://HOSTNAME_OR_IP:PORT;DatabaseName=< DB_NAME>" />

</Context>
```

The default port number for MS SQL is 1433. An example url for the earlier context will be 'jdbc: sql://localhost:1433;databaseName=pcce_awdb'.

Note: Alternately, the <Resource> can be configured in the **server.xml** file under <GlobalNamingResources>, and a <ResourceLink> created in **context.xml** under <Context>.

For enhanced security, it is recommended to set the username or password using the element and manually delete the username and password fields from the **context.xml** file.

If the username and password is provided in the element, the username and password in the **context.xml** file will be ignored.



```
<!-- The contents of this file will be loaded for each web application -->
<Context>
    <!-- Default set of monitored resources -->
    <WatchedResource>WEB-INF/web.xml</WatchedResource>
    <Manager pathname="" />
    <Resource name="jdbc/pccedb"
    auth="Container"
    type="javax.sql.DataSource"
    username="DCLOUD\Administrator"
    password=[redacted]
    driverClassName="com.mycrosoft.sqlserver.jdbc.SQLServerDriver"
    url="jdbc:sqlserver://198.18.133.11:1443;databaseName=pcce_awdb" />
</Context>
```

Step 3. Under heavy load conditions, enable **Database Connection Pooling**.

A database connection pool creates and manages a pool of connections to a database. Recycling and reusing already existing connections to a database is more efficient than opening a new connection. For further information on Tomcat Database Pooling, see https://tomcat.apache.org/tomcat-9.0-doc/jndi-datasource-examples-howto.html.

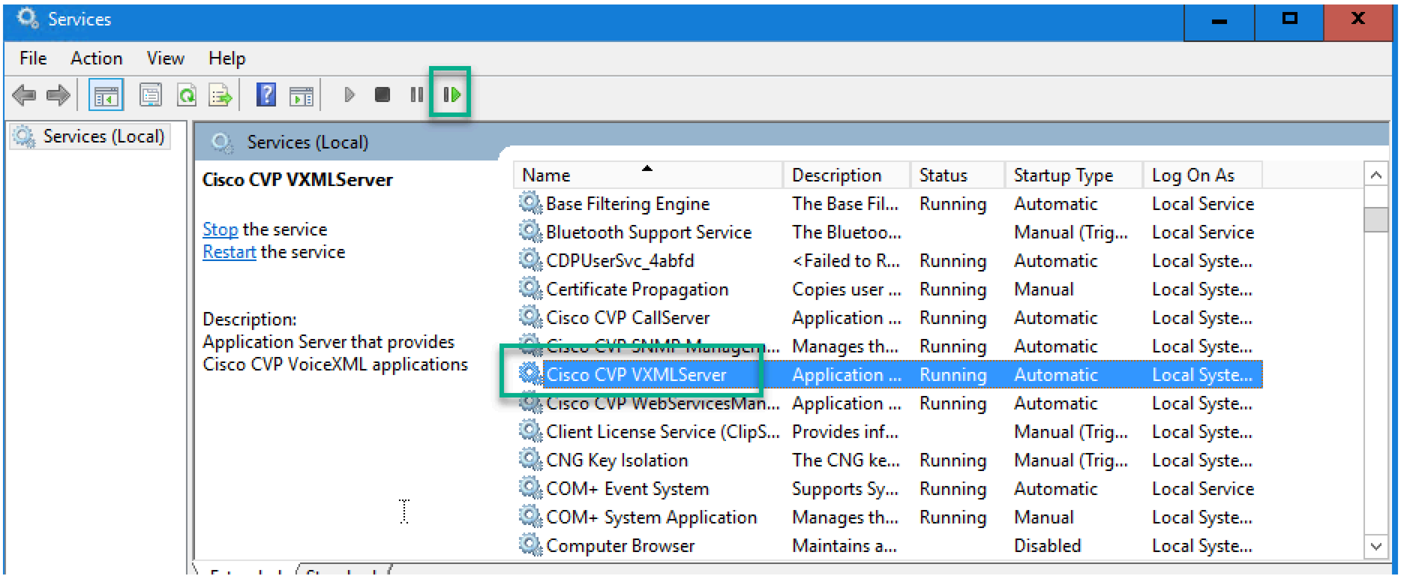
Note: Tomcat 8.0 has two connection pool libraries: commons-dbcp and tomcat-jdbc-pool. Due to a known issue with tomcat-jdbc-pool connection pool library, if the connection between the CVP VXML server and the remote SQL server goes down, the connections are not re-established automatically. The connections can be re-established only after the VXMLServer tomcat service is restarted.

The commons-dbcp connection pool library does not have this problem. The commons-dbcp library is used by default, and the tomcat-jdbc-pool is only used if the tomcat **context.xml** file contains this line:

factory="org.apache.tomcat.jdbc.pool.DataSourceFactory"

Due to this issue, Cisco does not recommend using the tomcat-jdbc-pool library.

Step 4. Restart the CVP VXML Service.



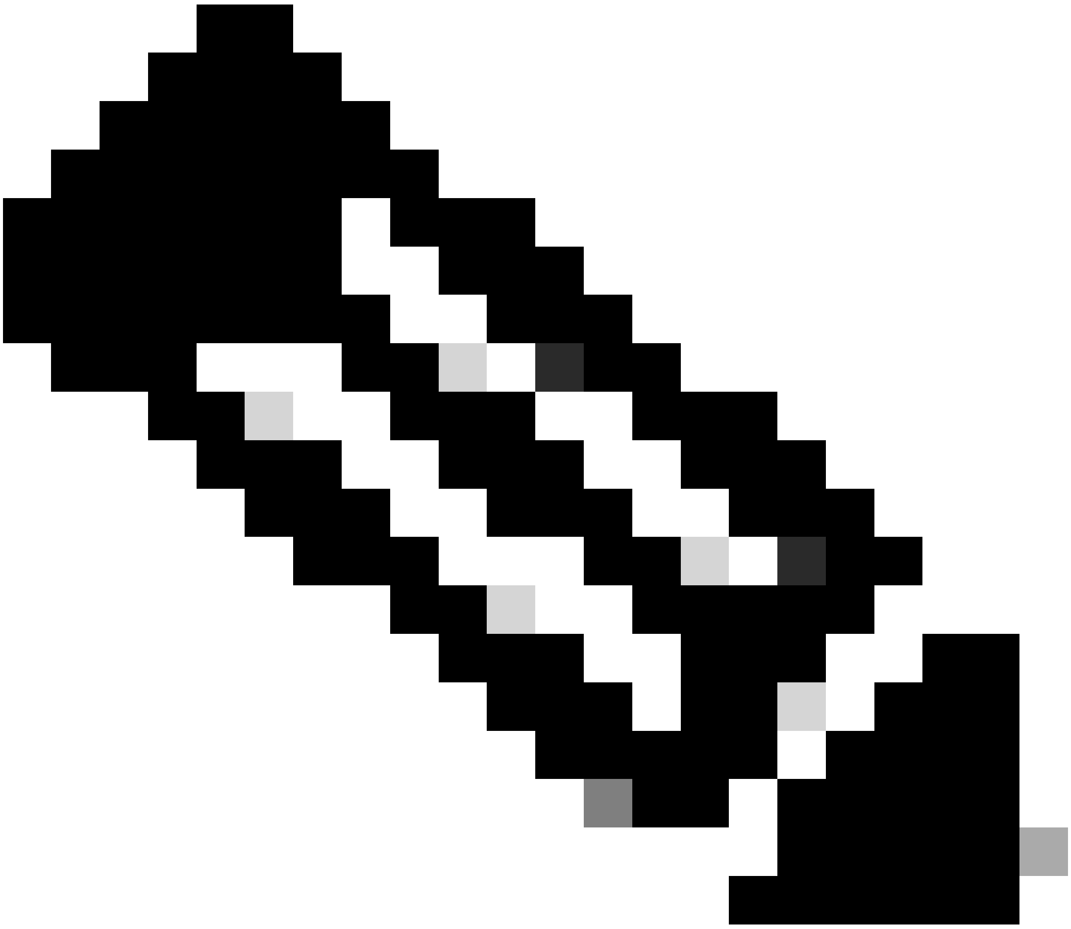
Cisco CVP VXMLServer

Stop the service
Restart the service

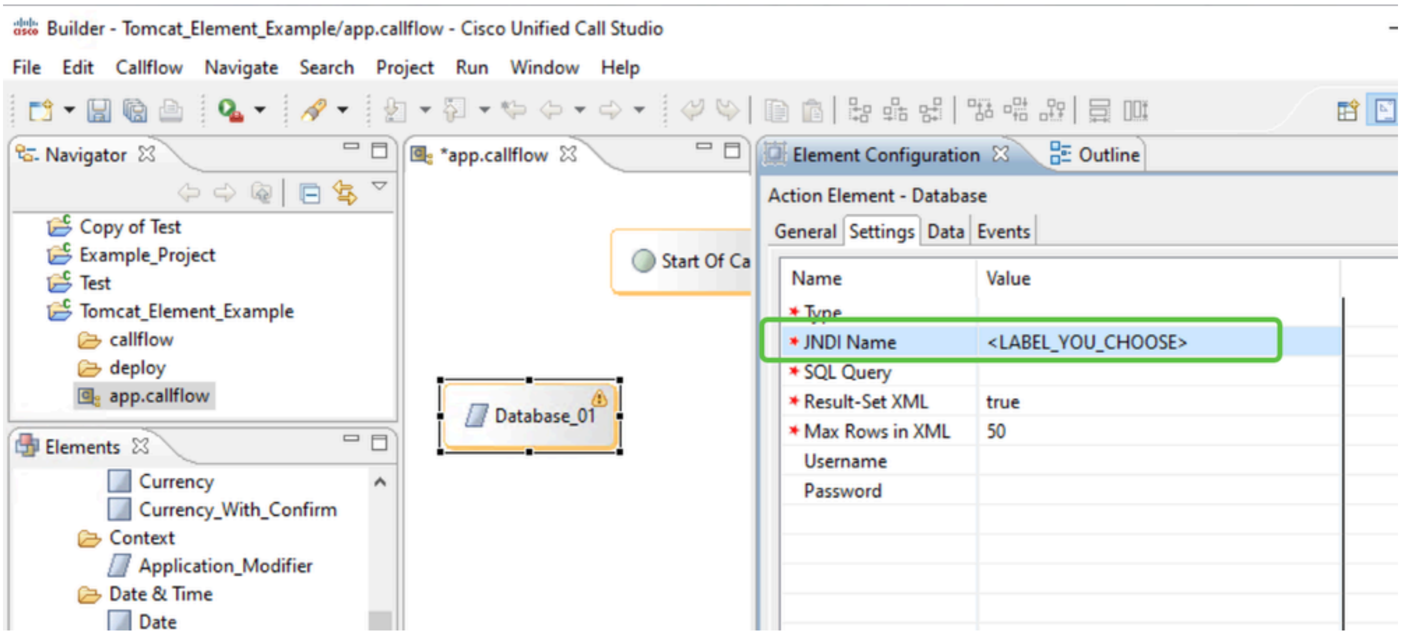
Description:
Application Server that provides Cisco CVP VoiceXML applications

Name	Description	Status	Startup Type	Log On As
Base Filtering Engine	The Base Fil...	Running	Automatic	Local Service
Bluetooth Support Service	The Bluetoo...		Manual (Trig...	Local Service
CDPUserSvc_4abfd	<Failed to R...	Running	Automatic	Local Syste...
Certificate Propagation	Copies user ...	Running	Manual	Local Syste...
Cisco CVP CallServer	Application ...	Running	Automatic	Local Syste...
Cisco CVP SNMP Managem...	Manages th...	Running	Automatic	Local Syste...
Cisco CVP VXMLServer	Application ...	Running	Automatic	Local Syste...
Cisco CVP WebServicesMan...	Application ...	Running	Automatic	Local Syste...
Client License Service (ClipS...	Provides inf...		Manual (Trig...	Local Syste...
CNG Key Isolation	The CNG ke...	Running	Manual (Trig...	Local Syste...
COM+ Event System	Supports Sy...	Running	Automatic	Local Service
COM+ System Application	Manages th...	Running	Manual	Local Syste...
Computer Browser	Maintains a...		Disabled	Local Syste...

Step 5. In CVP Call Studio, edit the configuration of the Database element in question. Enter the string you entered in <LABEL_YOU_CHOOSE> from the Tomcat Context into the JNDI Name property of the Settings tab of your Database element.



Note: Do not include the jdbc/portion here.



Builder - Tomcat_Element_Example/app.callflow - Cisco Unified Call Studio

Action Element - Database

Name	Value
* Type	
* JNDI Name	<LABEL_YOU_CHOOSE>
* SQL Query	
* Result-Set XML	true
* Max Rows in XML	50
Username	
Password	

Step 6. Save, Deploy, and Update the application on the VXML server.

Troubleshoot

There is currently no specific troubleshooting information available for this configuration.

Related Information

- Microsoft JDBC Driver for SQL Server support matrix: Microsoft JDBC Drivers
- VXMl Element Guide: CVP VXML Element Guide
- Technical Support & Documentation - Cisco Systems