Accessing a local database from a service network
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For Use with AMQ Interconnect 2.0 TECHNOLOGY PREVIEW
Abstract

This tutorial describes how to create AMQ Interconnect sites on OpenShift to build a service network.
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Making open source more inclusive

Red Hat is committed to replacing problematic language in our code, documentation, and web properties. We are beginning with these four terms: master, slave, blacklist, and whitelist. Because of the enormity of this endeavor, these changes will be implemented gradually over several upcoming releases. For more details, see our CTO Chris Wright’s message.

IMPORTANT

AMQ Interconnect 2.0 Technology Preview features are not supported with Red Hat production service level agreements (SLAs) and might not be functionally complete. Red Hat does not recommend using them in production.

These features provide early access to upcoming product features, enabling customers to test functionality and provide feedback during the development process. For more information about the support scope of Red Hat Technology Preview features, see https://access.redhat.com/support/offerings/techpreview.
CHAPTER 1. CREATING A SERVICE NETWORK WITH OPENSHIFT AND ACCESSING A DATABASE USING A SKUPPER GATEWAY

This tutorial demonstrates how to connect a frontend service on an OpenShift cluster with a backend service on an OpenShift cluster using the skupper command-line interface (CLI). The backend service connects to a database running on your local machine.

Prerequisites

- Access to projects in two OpenShift clusters, cluster-admin access is not required.
- One of the OpenShift clusters must be addressable from the other cluster.
- A MySQL database running on your local machine.

This tutorial shows how to connect the following:

- **west** - a namespace in an accessible OpenShift cluster running the frontend service.
- **mysql** - a database service running on a local machine.

1.1. INTRODUCTION TO AMQ INTERCONNECT 2.0

Interconnect 2.0 introduces a service network, linking services across the hybrid cloud. A service network enables communication between services running in different network locations. It allows geographically distributed services to connect as if they were all running in the same site.

For example, you can deploy your frontend in a public OpenShift cluster and deploy your backend on a local network, then connect them into a service network.

You deploy and manage a service network, including a gateway, using the skupper CLI.

Additional resources

- [OverviewLink]

1.2. INSTALLING THE SKUPPER CLI

Installing the skupper command-line interface (CLI) provides a simple method to get started with AMQ Interconnect.
Procedure

1. Ensure your subscription has been activated and your system is registered.

2. Subscribe to the required repositories:

   **Red Hat Enterprise Linux 7**
   
   ```
   $ sudo subscription-manager repos --enable=interconnect-2-for-rhel-7-server-rpms
   ```

   **Red Hat Enterprise Linux 8**
   
   ```
   $ sudo subscription-manager repos --enable=interconnect-2-for-rhel-8-x86_64-rpms
   ```

3. Use the `yum` or `dnf` command to install the `skupper` package:

   ```
   $ sudo yum install skupper
   ```

4. Verify the installation.

   ```
   $ skupper version
   client version 0.8.1-redhat-interconnect-2.0.0
   ```

### 1.3. CREATING A DATABASE

This procedure describes how to create a database on your local machine that is accessed from the service network.

**Prerequisites**

- A demo MySQL database running on RHEL

**PROCEDURE**

This procedure creates a user with a published password. Do not perform this procedure on a database with sensitive data.

1. Log into MySQL and create the database using the following commands:

   ```
   create database skupper;
   use skupper database;
   CREATE TABLE greetings (ID int, text varchar(255) );
   INSERT INTO greetings VALUES (1,'Hello');
   CREATE USER skupper@localhost IDENTIFIED BY 'reppuks';
   GRANT SELECT  ON skupper.* TO 'skupper'@'localhost';
   ```

2. Test the database by logging in as the `skupper` user and using the following SQL commands:

   ```
   use skupper database;
   select * from greetings;
   +--------+-------+
   | ID     | text  |
   +--------+-------+
Prerequisites

- The OpenShift CLI is installed. See the OpenShift CLI documentation for more instructions on how to install oc.

NOTE

In OpenShift 4.6 and later, you can use the web terminal to perform the following procedure, as described in the web terminal documentation.

Procedure

1. Start a terminal session to work on the west namespace and set the KUBECONFIG environment variable:

   ```bash
   $ export KUBECONFIG=$HOME/.kube/config-west
   
   This session is referred to later as the west terminal session.
   
   2. Log into the OpenShift cluster, for example:

      ```bash
      $ oc login
      ```

1.4. CREATING A SKUPPER SITE

1. Create the west project (namespace):

   ```bash
   $ oc new-project west
   ```

2. Create the service network site:

   ```bash
   $ skupper init
   ```

3. Check the site status:

   ```bash
   $ skupper status
   ``

   The output should be similar to the following:

   Skupper enabled for namespace ‘west’. It is not connected to any other sites.

1.5. CREATING THE FRONTEND SERVICE

The frontend service is a simple Python application that displays a record from the database.

Procedure
1. Deploy the frontend service:

   $ oc create deployment hello-mysql-frontend --image quay.io/pwright/hello-mysql-frontend

2. Expose the frontend deployment as a cluster service:

   $ oc expose deployment hello-mysql-frontend --port 8080 --type LoadBalancer

3. Create a route for the frontend:

   $ oc expose svc/hello-mysql-frontend

4. Check the frontend route:
   a. Get the route details:

      $ oc get routes

      The output should be similar to the following:

      | NAME                   | HOST/PORT          |
      |------------------------|--------------------|
      | hello-mysql-frontend   | <frontend-url>     |

   b. Navigate to the `<frontend-url>` value in your browser, you see a message similar to the following because the frontend cannot communicate with the backend yet:

      I am the frontend. The database says '(2003, "Can't connect to MySQL server on 'mydb' ([Errno -3] Temporary failure in name resolution")').

      To resolve this situation, you must create the skupper gateway and make the database available on the service network.

1.6. CREATING AND USING A SKUPPER GATEWAY

This procedure describes how to create a gateway and make a database available on the service network.

**Procedure**

1. Create a gateway and make the database available on the service network:

   $ skupper gateway expose mydb localhost 3306

2. Check the gateway status:

   $ skupper gateway status

   The output should be similar to following:

   **Gateway Definitions Summary**

<table>
<thead>
<tr>
<th>NAME</th>
<th>BINDS</th>
<th>FORWARDS</th>
<th>URL</th>
</tr>
</thead>
<tbody>
<tr>
<td>mydb</td>
<td></td>
<td></td>
<td>mydb</td>
</tr>
</tbody>
</table>
1.7. CHECKING DATABASE ACCESS FROM THE FRONTEND

Procedure

1. Get the route details:

   ```
   $ oc get routes
   ```

   The output should be similar to the following:

<table>
<thead>
<tr>
<th>NAME</th>
<th>HOST/PORT</th>
</tr>
</thead>
<tbody>
<tr>
<td>hello-mysql-frontend</td>
<td>&lt;frontend-url&gt;</td>
</tr>
</tbody>
</table>

2. Navigate to the `<frontend-url>` value in your browser, you see a message similar to the following:

   I am the frontend. The database says '(Hello,)'.

This shows how the frontend calls the database over the service network from an OpenShift cluster.

Additional resources

- Using the Skupper console
- Configuring AMQ Interconnect sites using the CLI

1.8. TEARING DOWN THE SERVICE NETWORK

This procedure describes how to remove the service network you created.

1. Delete the gateway:

   ```
   $ skupper gateway delete <machine-name>
   ```

2. Delete the `west` namespace from the west terminal session:

   ```
   $ oc delete project west
   ```

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