For use with AMQ Online 1.6
Abstract

This guide describes how to install and manage AMQ Online to evaluate its potential use in a production environment.
1.1. AMQ ONLINE OVERVIEW

Red Hat AMQ Online is an OpenShift-based mechanism for delivering messaging as a managed service. With Red Hat AMQ Online, administrators can configure a cloud-native, multi-tenant messaging service either in the cloud or on premise. Developers can provision messaging using the Red Hat AMQ Console. Multiple development teams can provision the brokers and queues from the Console, without requiring each team to install, configure, deploy, maintain, or patch any software.

AMQ Online can provision different types of messaging depending on your use case. A user can request messaging resources by creating an address space. AMQ Online currently supports two address space types, standard and brokered, each with different semantics. The following diagrams illustrate the high-level architecture of each address space type:

Figure 1.1. Standard address space

Figure 1.2. Brokered address space

1.2. SUPPORTED FEATURES

The following table shows the supported features for AMQ Online 1.6:

Table 1.1. Supported features reference table

<table>
<thead>
<tr>
<th>Feature</th>
<th>Brokered address space</th>
<th>Standard address space</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address type</td>
<td>Queue</td>
<td>Yes</td>
</tr>
<tr>
<td>Feature</td>
<td>Brokered address space</td>
<td>Standard address space</td>
</tr>
<tr>
<td>------------------------------</td>
<td>------------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>Topic</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Multicast</td>
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<td>Yes</td>
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<td>Anycast</td>
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<td>Yes</td>
</tr>
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<td>Subscription</td>
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<td>Messaging protocol</td>
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<td>Yes</td>
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<tr>
<td>MQTT</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td>CORE</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>OpenWire</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>STOMP</td>
<td>Yes</td>
<td>No</td>
</tr>
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<td>Transports</td>
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</tr>
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<td>TCP</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>WebSocket</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Durable subscriptions</td>
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<td>JMS durable subscriptions</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>&quot;Named&quot; durable subscriptions</td>
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<td>Yes</td>
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<tr>
<td>JMS</td>
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<td></td>
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<tr>
<td>Transaction support</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Selectors on queues</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Message ordering guarantees</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>(including prioritization)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scalability</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scalable distributed queues</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

### 1.3. SUPPORTED CONFIGURATIONS

For more information about AMQ Online supported configurations see Red Hat AMQ 7 Supported Configurations.
1.4. DOCUMENT CONVENTIONS

1.4.1. Variable text

This document contains code blocks with variables that you must replace with values specific to your installation. In this document, such text is styled as italic monospace.

For example, in the following code block, replace `my-namespace` with the namespace used in your installation:

```
sed -i 's/amq-online-infra/my-namespace/' install/bundles/enmasse-with-standard-authservice/*.yaml
```
CHAPTER 2. GETTING STARTED

This guide describes the process of setting up AMQ Online on OpenShift with clients for sending and receiving messages to evaluate its potential use in a production environment.

Prerequisites

- To install AMQ Online, the OpenShift Container Platform command-line interface (CLI) is required.
  - For more information about how to install the CLI on OpenShift 3.11, see the OpenShift Container Platform 3.11 documentation.
  - For more information about how to install the CLI on OpenShift 4.x, see the OpenShift Container Platform 4.5 documentation.
- An OpenShift cluster is required.
- A user on the OpenShift cluster with cluster-admin permissions is required to set up the required cluster roles and API services.

2.1. INSTALLING AMQ ONLINE USING A YAML BUNDLE

After completing the download and installation procedures, you must then:

- create an address space
- create an address
- create a messaging user

2.1.1. Downloading AMQ Online

Procedure

- Download and extract the amq-online-install.zip file from the AMQ Online download site.

  NOTE
  Although container images for AMQ Online are available in the Red Hat Container Catalog, we recommend that you use the YAML files provided instead.

2.1.2. Installing AMQ Online using a YAML bundle

The simplest way to install AMQ Online is to use the predefined YAML bundles.

Procedure

1. Log in as a user with cluster-admin privileges:

   oc login -u system:admin
2. (Optional) If you want to deploy to a project other than `amq-online-infra` you must run the following command and substitute `amq-online-infra` in subsequent steps:

```
 sed -i 's/amq-online-infra/my-project/ install/bundles/amq-online/*.yaml
```

3. Create the project where you want to deploy AMQ Online:

```
 oc new-project amq-online-infra
```

4. Change the directory to the location of the downloaded release files.

5. Deploy using the `amq-online` bundle:

```
 oc apply -f install/bundles/amq-online
```

6. (Optional) Install the example plans and infrastructure configuration:

```
 oc apply -f install/components/example-plans
```

7. (Optional) Install the example roles:

```
 oc apply -f install/components/example-roles
```

8. (Optional) Install the `standard` authentication service:

```
 oc apply -f install/components/example-authservices/standard-authservice.yaml
```

9. (Optional) Install the Service Catalog integration:

```
 oc apply -f install/components/service-broker
 oc apply -f install/components/cluster-service-broker
```

### 2.2. INSTALLING AND CONFIGURING AMQ ONLINE USING THE OPERATOR LIFECYCLE MANAGER

You can use the Operator Lifecycle Manager to install and configure an evaluation instance of AMQ Online.

In OpenShift Container Platform 4.x, the Operator Lifecycle Manager (OLM) helps users install, update, and manage the life cycle of all Operators and their associated services running across their clusters. It is part of the Operator Framework, an open source toolkit designed to manage Kubernetes native applications (Operators) in an effective, automated, and scalable way.

The OLM runs by default in OpenShift Container Platform 4.x, which aids cluster administrators in installing, upgrading, and granting access to Operators running on their cluster. The OpenShift Container Platform console provides management screens for cluster administrators to install Operators, as well as grant specific projects access to use the catalog of Operators available on the cluster.

OperatorHub is the graphical interface that OpenShift cluster administrators use to discover, install, and upgrade Operators. With one click, these Operators can be pulled from OperatorHub, installed on the cluster, and managed by the OLM, ready for engineering teams to self-service manage the software in development, test, and production environments.
2.2.1. Installing AMQ Online from the OperatorHub using the OpenShift Container Platform console

You can install the AMQ Online Operator on an OpenShift Container Platform 4.x cluster by using OperatorHub in the OpenShift Container Platform console.

**NOTE**

You must install and deploy the AMQ Online Operator in the `openshift-operator` project.

**Prerequisites**

- Access to an OpenShift Container Platform 4.x cluster using an account with `cluster-admin` permissions.

**Procedure**

1. In the OpenShift Container Platform console, log in using an account with `cluster-admin` privileges.
2. Click **Operators** > **OperatorHub**.
3. In the **Filter by keyword** box, type **AMQ Online** to find the AMQ Online Operator.
4. Click the AMQ Online Operator. Information about the Operator is displayed.
5. Read the information about the Operator and click **Install**. The **Create Operator Subscription** page opens.
6. On the **Create Operator Subscription** page, accept all of the default selections and click **Subscribe**.

**NOTE**

All namespaces on the cluster (default) installs the Operator in the default `openshift-operators` project and makes the Operator available to all projects in the cluster.

The **amq-online** page is displayed, where you can monitor the installation progress of the AMQ Online Operator subscription.

7. After the subscription upgrade status is shown as **Up to date**, click **Operators** > **Installed Operators** to verify that the **AMQ Online** ClusterServiceVersion (CSV) is displayed and its **Status** ultimately resolves to **InstallSucceeded** in the `openshift-operators` project.

**NOTE**

For the All namespaces... installation mode, the status resolves to **InstallSucceeded** in the `openshift-operators` project, but the status is **Copied** if you view other projects.

For troubleshooting information, see the **OpenShift Container Platform documentation**.

**Next steps**
Configure AMQ Online using the OpenShift Container Platform console

2.2.2. Configuring AMQ Online using the OpenShift Container Platform console

After installing AMQ Online from the OperatorHub using the OpenShift Container Platform console, create a new instance of a custom resource for the following items within the openshift-operators project:

- service infrastructure configuration for an address space type (the example uses the standard address space type)
- an authentication service
- an address space plan
- an address plan

After creating the new instances of the custom resources, next:

- create an address space
- create an address
- create a messaging user

The following procedures use the example data that is provided when using the OpenShift Container Platform console.

2.2.2.1. Creating an infrastructure configuration custom resource using the OpenShift Container Platform console

You must create an infrastructure configuration custom resource to use AMQ Online. This example uses StandardInfraConfig for a standard address space.

Procedure

1. In the top right, click the Plus icon (+). The Import YAML window opens.

2. From the top left drop-down menu, select the amq-online-infra project.

3. Copy the following code:

```yaml
apiVersion: admin.enmasse.io/v1beta1
kind: StandardInfraConfig
metadata:
  name: default
```

4. In the Import YAML window, paste the copied code and click Create. The StandardInfraConfig overview page is displayed.

5. Click Operators > Installed Operators

6. Click the AMQ Online Operator and click the Standard Infra Config tab to verify that its Status displays as Active.
Next steps

- Create an authentication service custom resource using the OpenShift Container Platform console

2.2.2.2. Creating an authentication service custom resource using the OpenShift Container Platform console

You must create a custom resource for an authentication service to use AMQ Online. This example uses the standard authentication service.

Procedure

1. In the top right, click the Plus icon (+). The Import YAML window opens.

2. From the top left drop-down menu, select the amq-online-infra project.

3. Copy the following code:

   ```yaml
   apiVersion: admin.enmasse.io/v1beta1
   kind: AuthenticationService
   metadata:
     name: standard-authservice
   spec:
     type: standard
   ```

4. In the Import YAML window, paste the copied code and click Create. The AuthenticationService overview page is displayed.

5. Click Workloads > Pods. In the Readiness column, the Pod status is Ready when the custom resource has been deployed.

Next steps

- Create an address space plan custom resource using the OpenShift Container Platform console

2.2.2.3. Creating an address space plan custom resource using the OpenShift Container Platform console

You must create an address space plan custom resource to use AMQ Online. This procedure uses the example data that is provided when using the OpenShift Container Platform console.

Procedure

1. In the top right, click the Plus icon (+). The Import YAML window opens.

2. From the top left drop-down menu, select the amq-online-infra project.

3. Copy the following code:

   ```yaml
   apiVersion: admin.enmasse.io/v1beta2
   kind: AddressSpacePlan
   metadata:
     name: standard-small
   spec:
   ```
4. In the Import YAML window, paste the copied code and click **Create**. The AddressSpacePlan overview page is displayed.

5. Click **Operators > Installed Operators**

6. Click the AMQ Online Operator and click the **Address Space Plan** tab to verify that its **Status** displays as **Active**.

**Next steps**

- Create an address plan custom resource using the OpenShift Container Platform console

### 2.2.2.4. Creating an address plan custom resource using the OpenShift Container Platform console

You must create an address plan custom resource to use AMQ Online. This procedure uses the example data that is provided when using the OpenShift Container Platform console.

**Procedure**

1. In the top right, click the **Plus** icon (+). The Import YAML window opens.

2. From the top left drop-down menu, select the **amq-online-infra** project.

3. Copy the following code:

```yaml
apiVersion: admin.enmasse.io/v1beta2
class: AddressPlan
metadata:
  name: standard-small-queue
spec:
  addressType: queue
  resources:
    router: 0.01
    broker: 0.1
```

4. In the Import YAML window, paste the copied code and click **Create**. The AddressPlan overview page is displayed.

5. Click **Operators > Installed Operators**

6. Click the AMQ Online Operator and click the **Address Plan** tab to verify that its **Status** displays as **Active**.

**Next steps**
2.3. CREATING ADDRESS SPACES USING THE COMMAND LINE

In AMQ Online, you create address spaces using standard command-line tools.

Procedure

1. Log in as a messaging tenant:
   
   ```
   oc login -u developer
   ```

2. Create the project for the messaging application:
   
   ```
   oc new-project myapp
   ```

3. Create an address space definition:
   
   ```yaml
   apiVersion: enmasse.io/v1beta1
   kind: AddressSpace
   metadata:
     name: myspace
   spec:
     type: standard
     plan: standard-unlimited
   ```

4. Create the address space:
   
   ```
   oc create -f standard-address-space.yaml
   ```

5. Check the status of the address space:
   
   ```
   oc get addressspace myspace -o jsonpath={.status.isReady}
   ```
   
   The address space is ready for use when the previous command outputs `true`.

2.4. CREATING ADDRESSES USING THE COMMAND LINE

You can create addresses using the command line.

Procedure

1. Create an address definition:
   
   ```yaml
   apiVersion: enmasse.io/v1beta1
   kind: Address
   metadata:
     name: myspace.myqueue
   spec:
   ```
Prefixing the name with the address space name is required to ensure addresses from different address spaces do not collide.

2. Create the address:

   oc create -f standard-small-queue.yaml

3. List the addresses:

   oc get addresses -o yaml

### 2.5. CREATING USERS USING THE COMMAND LINE

In AMQ Online users can be created using standard command-line tools.

**Prerequisites**

- You must have already created an **address space**.

**Procedure**

1. To correctly base64 encode a password for the user definition file, run the following command:

   ```bash
   echo -n password | base64 #cGFzc3dvcmQ=
   ```

   **NOTE**

   Be sure to use the `-n` parameter when running this command. Not specifying that parameter will result in an improperly coded password and cause log-in issues.

2. Save the user definition to a file:

   ```yaml
   apiVersion: user.enmasse.io/v1beta1
   kind: MessagingUser
   metadata:
     name: myspace.user1
   spec:
     namespace: user1
     authentication:
       type: password
       password: cGFzc3dvcmQ= # Base64 encoded
     authorization:
     - addresses: ["myqueue", "queue1", "queue2", "topic"]
       operations: ["send", "recv"]
     - addresses: ["anycast1"]
       operations: ["send"]
   ```
3. Create the user and associated user permissions:

```
oc create -f user-example1.yaml
```

4. Confirm that the user was created:

```
oc get messagingusers
```

## 2.6. SENDING AND RECEIVING MESSAGES

### Prerequisites

- Installed Apache Qpid Proton Python bindings.
- An address space named `myspace` must be created.
- An address named `myqueue` must be created.
- A user named `user1` with password `password` must be created.

### Procedure

1. Save Python client example to a file:

```python
from __future__ import print_function, unicode_literals
import optparse
from proton import Message
from proton.handlers import MessagingHandler
from proton.reactor import Container

class HelloWorld(MessagingHandler):
    def __init__(self, url):
        super(HelloWorld, self).__init__()
        self.url = url

    def on_start(self, event):
        event.container.create_receiver(self.url)
        event.container.create_sender(self.url)

    def on_sendable(self, event):
        event.sender.send(Message(body="Hello World!"))
        event.sender.close()

    def on_message(self, event):
        print("Received: " + event.message.body)
        event.connection.close()

parser = optparse.OptionParser(usage="usage: %prog [options]"
parser.add_option("-u", "--url", default="amqps://localhost:5672/myqueue",
                    help="url to use for sending and receiving messages")
opts, args = parser.parse_args()
```
try:
    Container(HelloWorld(opts.url)).run()
except KeyboardInterrupt: pass

2. Retrieve the address space messaging endpoint host name:

    oc get addressspace myspace -o 'jsonpath={.status.endpointStatuses[?
        (@.name=="messaging")].externalHost}"

    Use the output as the host name in the following step.

3. Run the client:

    python client-example1.py -u
    amqps://user1:password@messaging.example1.com:443/myqueue
CHAPTER 3. UNINSTALLING AMQ ONLINE

You must uninstall AMQ Online using the same method that you used to install AMQ Online.

3.1. UNINSTALLING AMQ ONLINE USING THE YAML BUNDLE

This method uninstalls AMQ Online that was installed using the YAML bundle.

Procedure

1. Log in as a user with `cluster-admin` privileges:
   
   ```
   oc login -u system:admin
   ```

2. Delete the cluster-level resources:

   ```
   oc delete crd -l app=enmasse
   oc delete crd -l app=enmasse --timeout=600s
   oc delete clusterrolebindings -l app=enmasse
   oc delete clusterroles -l app=enmasse
   oc delete apiservices -l app=enmasse
   oc delete oauthclients -l app=enmasse
   ```

3. (OpenShift 4) Delete the console integration:

   ```
   oc delete consolelinks -l app=enmasse
   ```

4. (Optional) Delete the service catalog integration:

   ```
   oc delete clusterservicebrokers -l app=enmasse
   ```

5. Delete the project where AMQ Online is deployed:

   ```
   oc delete project amq-online-infra
   ```

3.2. UNINSTALLING THE AMQ ONLINE OPERATOR USING THE OPENSHIFT CONTAINER PLATFORM 4.X CONSOLE

You can uninstall the AMQ Online Operator on an OpenShift Container Platform 4.1 cluster in the OpenShift Container Platform console.

Prerequisites

- An installed AMQ Online Operator on a OpenShift Container Platform 4.1 cluster.

Procedure

1. From the Project list, select the `openshift-operators` project.

2. Click Catalog → Operator Management. The Operator Management page opens.

3. Click the Operator Subscriptions tab.
4. Find the AMQ Online Operator you want to uninstall. In the far right column, click the vertical ellipsis icon and select **Remove Subscription**.

5. When prompted by the Remove Subscription window, select the **Also completely remove the AMQ Online Operator from the selected namespace** check box to remove all components related to the installation.

6. Click **Remove**. The AMQ Online Operator will stop running and no longer receive updates.

**Next steps**

- To completely remove all remaining resources, see **Removing remaining resources after uninstalling AMQ Online using the Operator Lifecycle Manager**.

**3.2.1. Removing remaining resources after uninstalling AMQ Online using the Operator Lifecycle Manager**

Due to **ENTMQMAAS-1281**, some resources remain after uninstalling AMQ Online using the Operator Lifecycle Manager. This procedure removes the remaining resources, which completely uninstalls AMQ Online.

**Prerequisites**

- Uninstalled the AMQ Online Operator using the OpenShift Container Platform 4.x console

**Procedure**

1. On the command line, log in as a user with permissions to run commands in the **openshift-operators** project:
   
   ```bash
   oc login -u system:admin
   ```

2. Change to the **openshift-operators** project:
   
   ```bash
   oc project openshift-operators
   ```

3. Run the following commands to remove any remaining resources:
   
   ```bash
   oc delete all -l app=enmasse
   oc delete crd -l app=enmasse
   oc delete apiservices -l app=enmasse
   oc delete cm -l app=enmasse
   oc delete secret -l app=enmasse
   ```
APPENDIX A. USING YOUR SUBSCRIPTION

AMQ Online is provided through a software subscription. To manage your subscriptions, access your account at the Red Hat Customer Portal.

Accessing your account

1. Go to access.redhat.com.
2. If you do not already have an account, create one.
3. Log in to your account.

Activating a subscription

1. Go to access.redhat.com.
2. Navigate to My Subscriptions.
3. Navigate to Activate a subscription and enter your 16-digit activation number.

Downloading zip and tar files
To access zip or tar files, use the Red Hat Customer Portal to find the relevant files for download. If you are using RPM packages, this step is not required.

1. Open a browser and log in to the Red Hat Customer Portal Product Downloads page at access.redhat.com/downloads.
2. Locate the Red Hat AMQ Online entries in the JBOSS INTEGRATION AND AUTOMATION category.
3. Select the desired AMQ Online product. The Software Downloads page opens.
4. Click the Download link for your component.

Registering your system for packages
To install RPM packages on Red Hat Enterprise Linux, your system must be registered. If you are using zip or tar files, this step is not required.

1. Go to access.redhat.com.
2. Navigate to Registration Assistant.
3. Select your OS version and continue to the next page.
4. Use the listed command in your system terminal to complete the registration.

To learn more see How to Register and Subscribe a System to the Red Hat Customer Portal.

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