Exercise 6: AMQ 7.12 Clients

AMQ 7.12 comes with several new clients covering a variety of protocols and programming languages. In the past, any supported clients were only released when new versions of the AMQ product is released. With AMQ7.12 that has changed; each client has its own lifecycle and is released independently from the AMQ broker/server components.

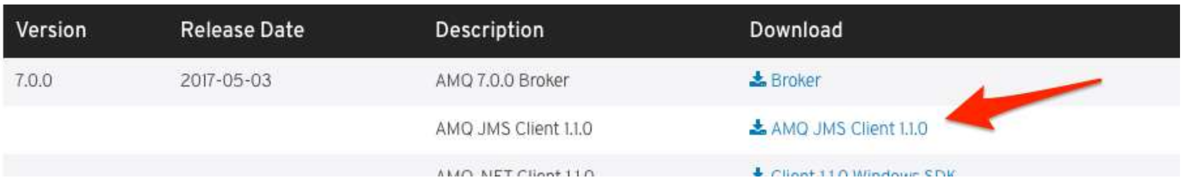
AMQ7.12 includes the following supported clients:

- AMQ JMS Client
- AMQ C++ Client
- AMQ JavaScript/NodeJS Client
- AMQ Python Client
- AMQ .NET Client

Let's explore the clients.

AMQ JMS Client

To use the AMQ JMS client, navigate to https://developers.redhat.com/products/amq/download/ and locate the AMQ JMS Client.



Version	Release Date	Description	Download
7.0.0	2017-05-03	AMQ 7.0.0 Broker	Broker
		AMQ JMS Client 1.1.0	AMQ JMS Client 1.1.0
		AMQ .NET Client 1.1.0	Client 1.1.0 Windows SDK

When you've downloaded the file, copy it to a location where you'd like to unzip this client.

```
$ mv ~/Downloads/apache-qpid-jms-0.21.0.redhat-1-bin.zip ./clients/
$ cd clients
$ unzip apache-qpid-jms-0.21.0.redhat-1-bin.zip
$ cd apache-qpid-jms-0.21.0.redhat-1
```

Now we'll explore the client. In the distribution we just unzipped, there's an `examples` folder. Navigate into it and you'll find a Java Maven project. Let's build the project:

```
$ cd examples
$ mvn install
```

If successful, you should see output like this:

```
[INFO]
[INFO] --- maven-install-plugin:2.5.2:install (default-install) @ qpid-jms-
examples ---
[INFO] Skipping artifact installation
[INFO] ------------------------------------------------------------------------
```

```
[INFO] BUILD SUCCESS
[INFO] ------------------------------------------------------------------------
[INFO] Total time: 4.063 s
[INFO] Finished at: 2017-05-11T15:52:15-07:00
[INFO] Final Memory: 28M/456M
[INFO] ------------------------------------------------------------------------
```

Feel free to open this project in your favorite IDE (like JBoss Developer Studio).

A couple of things to notice about this example:

- Our JMS ConnectionFactory and destination names are configured in the `src/main/resources/jndi.properties` file
- Our `org.apache.qpid.jms.example.HelloWorld` main() class bootstraps the `MessageConsumer` and `MessageProducer` used in this example
- We lookup the JMS connection information from JNDI as specified in our `jndi.properties` file
- We send one message and receive one message.

Review the code closer to get an idea of what it's doing:

```
    public static void main(String[] args) throws Exception {
        try {
            // The configuration for the Qpid InitialContextFactory has been
supplied in
            // a jndi.properties file in the classpath, which results in it
being picked
            // up automatically by the InitialContext constructor.
            Context context = new InitialContext();

            ConnectionFactory factory = (ConnectionFactory)
context.lookup("myFactoryLookup");
            Destination queue = (Destination) context.lookup("myQueueLookup");

            Connection connection =
factory.createConnection(System.getProperty("USER"),
System.getProperty("PASSWORD"));
            connection.setExceptionListener(new MyExceptionListener());
            connection.start();

            Session session = connection.createSession(false,
Session.AUTO_ACKNOWLEDGE);

            MessageProducer messageProducer = session.createProducer(queue);
            MessageConsumer messageConsumer = session.createConsumer(queue);

            TextMessage message = session.createTextMessage("Hello world!");
            messageProducer.send(message, DeliveryMode.NON_PERSISTENT,
Message.DEFAULT_PRIORITY, Message.DEFAULT_TIME_TO_LIVE);
            TextMessage receivedMessage = (TextMessage)
messageConsumer.receive(2000L);

            if (receivedMessage != null) {
                System.out.println(receivedMessage.getText());
            } else {
                System.out.println("No message received within the given
timeout!");
```

```
            }

            connection.close();
        } catch (Exception exp) {
            System.out.println("Caught exception, exiting.");
            exp.printStackTrace(System.out);
            System.exit(1);
        }
    }
```

To run this example, we'll first download all of the project's dependencies:

```
$ mvn clean package dependency:copy-dependencies -DincludeScope=runtime -
DskipTests
```

Next, we need to make sure our broker is running. If you've followed from the previous labs, you have a broker running with a single `Acceptor` running on port `61616`. Let's change our `jndi.properties` file to reflect this change. (if you're coming to this lab from your own installation/running instance of the AMQ7.12 broker, adjust the properties as needed; e.g., if you still have the dedicated AMQP `Acceptor` running, then no need to make this change).

Our `jndi.properties` file should look like this, with the `connectionfactory.myFactoryLookup` property set to `61616`

NOTE: We need to change the connection factory URL to `61616` since our `acceptor` does not have the other ports open.

```
# Set the InitialContextFactory class to use
java.naming.factory.initial = org.apache.qpid.jms.jndi.JmsInitialContextFactory

# Define the required ConnectionFactory instances
# connectionfactory.<JNDI-lookup-name> = <URI>
connectionfactory.myFactoryLookup = amqp://localhost:61616

# Configure the necessary Queue and Topic objects
# queue.<JNDI-lookup-name> = <queue-name>
# topic.<JNDI-lookup-name> = <topic-name>
queue.myQueueLookup = queue
topic.myTopicLookup = topic
```

Now let's build our project and run:

```
$ mvn clean install
$ java -cp "target/classes/:target/dependency/*"
org.apache.qpid.jms.example.HelloWorld
```

If everything completed properly, you should see the following output:

```
Hello world!
```

Some things to note:

The URL we passed to the connection factory should be in the following form:

amqp[s]://hostname:port[?option=value[&option2=value...]]

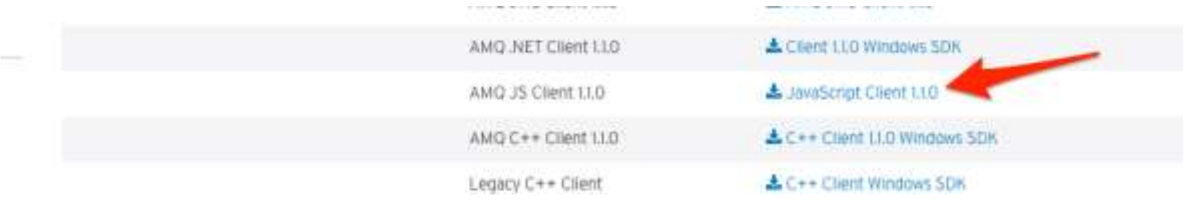
We can also use the failover URI (discussed in future lab) like this:

failover:(amqp://host1:port[,amqp://host2:port...])[?option=value[&option2=value...]]

AMQ NodeJS Client

The AMQ NodeJS client can be used to connect to the AMQ7 broker (or any compatible AMQP 1.0 broker) and can send and receive messages regardless of what clients produced them (ie, they could be MQTT IoT producers for example).

To use the AMQ NodeJS client, navigate to https://developers.redhat.com/products/amq/download/ and locate the AMQ NodeJS (called "JavaScript" in the download portal) Client.



AMQ .NET Client 1.1.0	Client 1.1.0 Windows SDK
AMQ JS Client 1.1.0	JavaScript Client 1.1.0
AMQ C++ Client 1.1.0	C++ Client 1.1.0 Windows SDK
Legacy C++ Client	C++ Client Windows SDK

When you've downloaded the file, copy it to a location where you'd like to unzip this client.

```
$ mv ~/Downloads/nodejs-rhea-0.2.0-1.zip . ./clients/
$ cd clients
$ unzip nodejs-rhea-0.2.0-1.zip
$ cd nodejs-rhea-0.2.0-1
```

To run the examples, we'll need to install two dependencies:

```
$ npm install debug
$ npm install yargs
```

Now let's navigate to the `examples` folder and take a look at the application that will receive messages from the broker:

```
$ cd node_modules/rhea/examples
```

Open up the `simple_recv.js` file in your favorite editor:

```
var args = require('yargs').options({
      'm': { alias: 'messages', default: 100, describe: 'number of messages to
expect'},
      'n': { alias: 'node', default: 'examples', describe: 'name of node (e.g. 
queue) from which messages are received'},
      'p': { alias: 'port', default: 5672, describe: 'port to connect to'}
    }).help('help').argv;

var received = 0;
var expected = args.messages;

container.on('message', function (context) {
    if (context.message.id && context.message.id < received) {
        // ignore duplicate message
        return;
    }
    if (expected === 0 || received < expected) {
        console.log(JSON.stringify(context.message.body))
        if (++received === expected) {
            context.receiver.detach();
            context.connection.close();
        }
    }
});

container.connect({'port':args.port}).open_receiver(args.node);
```

We see that this simple receiver application tries to connect to a broker on port `5672` by default (which is also the AMQP default port) and tries to read messages from the `examples` queue. Since we have our broker running on port `61616`, let's run our receiver and direct it to connect to our broker on the correct port:

```
$ node simple_recv.js -p 61616
```

Open another window to run our sender. Navigate back to the same directory where the examples where and run:

```
$ node simple_send.js -p 61616
```

Note that for the sender, we're also changing its port. Hit enter to run the sender. You should see similar output:

From the receiver:

```
{"sequence":1}
.
.
.
{"sequence":90}
{"sequence":91}
{"sequence":92}
{"sequence":93}
{"sequence":94}
{"sequence":95}
{"sequence":96}
{"sequence":97}
{"sequence":98}
{"sequence":99}
```

```
{"sequence":100}
```

From the sender:

```
sent 1
.
.
.
sent 90
sent 91
sent 92
sent 93
sent 94
sent 95
sent 96
sent 97
sent 98
sent 99
sent 100
all messages confirmed
```

Other clients

You can download the other clients from the Red Hat support portal or the developers.redhat.com site. At the moment all the clients are available for download there EXCEPT the *Python* and *Linux C++* libraries (for RHEL). Those are available as RPMs through your RHEL subscription.