

Custom MQ Images on RHOS

First section covers RHOS 3.11 with no TLS connectivity required

Second section covers RHOS 3.11 and RHOS 4.2

Where 4.2 requires TLS to connect clients from outside
of the RHOS Cluster

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Purpose of this document

ICP4i on RHOS 4.2 requires that “off cluster” clients connect via TLS to queue managers deployed in the cluster.

In scenarios there administrators wish to connect to MQ using existing tools or processes its is likely that they will do so against an MQ Image where a custom layer has been added over the top of the IBM MQ base image. Such a layer would simply enable client connectivity for “off cluster” tools.

When using RHOS 3.11 this is fairly straight forward. When using RHOS 4.2 we need TLS connection and therefore we need to consider that the administrators system (laptop etc) needs to be set up with keys and certs that will be interchanged with the queue managers on cluster.

This document assumes that “you” are that administrator and your system (laptop) has never used TLS for MQ connectivity before.

PART 1 of the document – this is simply showing how to create a custom layer on the MQ Image and make it available in an RHOS 3.11 cluster with ICP4i and connect administration tools over a specific SVRCONN channel

PART 2 of the document – this builds to connecting to queue managers on RHOS 4.2 over TLS from your laptop.

- a) Setting up TLS between a client connected tools on the lap top to a queue manager running natively on your laptop
- b) Reusing the collateral in a) above to build a custom docker image/container and have client connect tools on the lap top connect over TLS to a queue manager in the container running on the laptop.
- c) Push the custom image to dockerhub, use an image stream on RHOS 3.11 to pull the image onto RHOS 3.11 cluster. ICP4i (Helm) deploy of the custom image. Connect tools on the lap top to the queue manager on ICP4i on RHOS 3.11 via TLS
- d) **To be Done** Push the custom image to dockerhub, use an image stream on RHOS 4.2 to pull the image onto RHOS 4.2 cluster. ICP4i (Helm) deploy of the custom image. Connect tools on the lap top to the queue manager on ICP4i on RHOS 4.2 via TLS

Part 1 - Custom MQ Image on RHOS 3.1.1 with ICP4i (no TLS)

Load Official ICP4i MQAdvanced Server image to local docker repos

Windows (C:) > SHARE > ProductsTechnology > MQv9-9.1 > ICP4iMQAdv-image > images

<input type="checkbox"/> Name	Date modified	Type
ibm-mqadvanced-server-integration_9.1.3.0-r4-amd64.tar	9/11/2019 1:14 AM	GZ File
ibm-mq-oidc-registration_2.2.0-amd64.tar	9/11/2019 1:14 AM	GZ File
icp4i-od-agent_1.0.0-amd64.tar	9/11/2019 1:14 AM	GZ File
icp4i-od-collector_1.0.0-amd64.tar	9/11/2019 1:14 AM	GZ File

docker load < ibm-mqadvanced-server-integration_9.1.3.0-r4-amd64.tar.gz

```
Directory of C:\SHARE\ProductsTechnology\MQv9-9.1\ICP4iMQAdv-image\images

13/12/2019 07:02 PM <DIR> .
13/12/2019 07:02 PM <DIR> ..
09/11/2019 01:14 AM 161,053,184 ibm-mq-oidc-registration_2.2.0-amd64.tar.gz
09/11/2019 01:14 AM 942,485,504 ibm-mqadvanced-server-integration_9.1.3.0-r4-amd64.tar.gz
09/11/2019 01:14 AM 310,161,408 icp4i-od-agent_1.0.0-amd64.tar.gz
09/11/2019 01:14 AM 321,895,424 icp4i-od-collector_1.0.0-amd64.tar.gz
        4 File(s) 1,735,595,520 bytes
        2 Dir(s) 217,878,286,336 bytes free

C:\SHARE\ProductsTechnology\MQv9-9.1\ICP4iMQAdv-image>docker load < ibm-mqadvanced-server-integration_9.1.3.0-r4-amd64.tar.gz
cd28e8b3d42a: Loading layer [=====] 7.68kB/7.68kB
84eaf14cef7b: Loading layer [=====] 6.144kB/6.144kB
dc025946c48b: Loading layer [=====] 806MB/806MB
084a5de0f8d3: Loading layer [=====] 2.56kB/2.56kB
a0cf9052d6e2: Loading layer [=====] 12.39MB/12.39MB
8c20517487b4: Loading layer [=====] 5.876MB/5.876MB
0199fa08053a: Loading layer [=====] 10.24kB/10.24kB
7f6264a97cf1: Loading layer [=====] 11.78kB/11.78kB
1355ce09db14: Loading layer [=====] 3.584kB/3.584kB
f9d44c67deb4: Loading layer [=====] 18.28MB/18.28MB
c4b465bf4f6a: Loading layer [=====] 7.68kB/7.68kB
79163b2a33c5: Loading layer [=====] 2.146MB/2.146MB
2c903f0b7155: Loading layer [=====] 3.072kB/3.072kB
87ba76dd2431: Loading layer [=====] 3.584kB/3.584kB
1c321fdcb962: Loading layer [=====] 7.168kB/7.168kB
f561b484f28b: Loading layer [=====] 2.152MB/2.152MB
2b68e45b087e: Loading layer [=====] 7.168kB/7.168kB
a10f6d83153f: Loading layer [=====] 21.5kB/21.5kB
1cf819e9f0e: Loading layer [=====] 3.237MB/3.237MB
364112d1df0e: Loading layer [=====] 261.6kB/261.6kB
9f4789d1e0ed: Loading layer [=====] 3.072kB/3.072kB
07cdf8094239: Loading layer [=====] 3.497MB/3.497MB
6eb6a773bf24: Loading layer [=====] 3.738MB/3.738MB
ac7598f58291: Loading layer [=====] 3.738MB/3.738MB
Loaded image: ibm-mqadvanced-server-integration:9.1.3.0-r4-amd64

C:\SHARE\ProductsTechnology\MQv9-9.1\ICP4iMQAdv-image>
```

Docker File and MQSC script for custom image

(C:) > Users > DAVIDARNOLD > myDocker > ibm-mqadvanced-server-ivt

<input type="checkbox"/> Name	Date modified	Type
dockerfile	12/12/2019 3:10 PM	File
ivt.mqsc	12/12/2019 4:55 PM	MQSC File

Docker file – run an mqsc script

```
FROM ibm-mqadvanced-server-integration:9.1.3.0-r4-amd64
```

```
USER mqm
```

```
COPY ivt.mqsc /etc/mqm/
```

IVT.mqsc – enable clients to connect

```
DEFINE CHANNEL(IVT.SVRCONN) CHLTYPE(SVRCONN)
```

```
SET CHLAUTH(IVT.SVRCONN) TYPE(BLOCKUSER) USERLIST(nobody)
```

```
ALTER AUTHINFO(SYSTEM.DEFAULT.AUTHINFO.IDPWOS) AUTHTYPE(IDPWOS) CHCKCLNT(NONE)  
ADOPTCTX(YES)
```

```
SET CHLAUTH(IVT.SVRCONN) TYPE (ADDRESSMAP) ADDRESS(*) MCAUSER('mqm')
```

```
REFRESH SECURITY TYPE(CONNAUTH)
```

OR – if this is based off a non ICP4i mq image that used admin/passw0rd

* Connection authentication

```
DEFINE AUTHINFO('ORG.AUTHINFO') AUTHTYPE(IDPWOS) CHCKCLNT(REQDADM)  
CHCKLOCL(OPTIONAL) ADOPTCTX(YES) REPLACE
```

```
ALTER QMGR CONNAUTH('ORG.AUTHINFO')
```

```
REFRESH SECURITY(*) TYPE(CONNAUTH)
```

* Channels (Application + Admin)

```
DEFINE CHANNEL('IVT.SVRCONN') CHLTYPE(SVRCONN) REPLACE
```

```
DEFINE CHANNEL('ORG.APP.SVRCONN') CHLTYPE(SVRCONN) MCAUSER('app') REPLACE
```

* Channel authentication rules

```
SET CHLAUTH('*') TYPE(ADDRESSMAP) ADDRESS('*') USERSRC(NOACCESS) DESCRIPTOR('Back-stop rule -  
Blocks everyone') ACTION(REPLACE)
```

```
SET CHLAUTH('ORG.APP.SVRCONN') TYPE(ADDRESSMAP) ADDRESS('*') USERSRC(CHANNEL)  
CHCKCLNT(REQUIRED) DESCRIPTOR('Allows connection via APP channel') ACTION(REPLACE)
```

```
SET CHLAUTH('IVT.SVRCONN') TYPE(BLOCKUSER) USERLIST('nobody') DESCRIPTOR('Allows admins on  
ADMIN channel') ACTION(REPLACE)
```

```
SET CHLAUTH('IVT.SVRCONN') TYPE(USERMAP) CLNTUSER('admin') USERSRC(CHANNEL)  
DESCRIPTOR('Allows admin user to connect via ADMIN channel') ACTION(REPLACE)
```

* Authority records

```
SET AUTHREC GROUP('mqclient') OBJTYPE(QMGR) AUTHADD(CONNECT,INQ)
```

```

SET AUTHREC PROFILE('ORG.**') GROUP('mqclient') OBJTYPE(QUEUE)
AUTHADD(BROWSE,GET,INQ,PUT)

SET AUTHREC PROFILE('ORG.**') GROUP('mqclient') OBJTYPE(TOPIC) AUTHADD(PUB,SUB)

```

Docker build – Create image FROM ibm-mqadvanced-server

C:\Users\DAVIDARNOLD\myDocker\ibm-mqadvanced-server-ivt>docker images

REPOSITORY	TAG	IMAGE ID	CREATED	SIZE
ace11002mqc91intms1	1.0	ec39bb5df84f	2 days ago	1.59GB
ibmcom/mq	latest	268baf40303f	7 days ago	927MB
ibmcom/ace-mq	latest	0f5a883d8a95	4 weeks ago	2.51GB
ibmcom/ace-mqclient	latest	d71cee6dfd5f	4 weeks ago	1.94GB
ibmcom/ace	latest	d33c5a966d7b	4 weeks ago	1.63GB
ibm-mqadvanced-server-integration	9.1.3.0-r4-amd64	ee41039b9552	5 weeks ago	932MB

C:\Users\DAVIDARNOLD\myDocker\ibm-mqadvanced-server-ivt> docker build -t davexacom/ibm-mqadvanced-server-ivt:9.1.3.0-r4-amd64 .

```

C:\Users\DAVIDARNOLD\myDocker\mqsrvmqsc>docker build -t davexacom/ibm-mqadvanced-server-ivt:9.1.3.0-r4-amd64 .
Sending build context to Docker daemon 4.096kB
Step 1/3 : FROM ibmcom/mq
--> 268baf40303f
Step 2/3 : USER mqm
--> Using cache
--> f976d4712a79
Step 3/3 : COPY ivt.mqsc /etc/mqm/
--> Using cache
--> 0c686c880b92
Successfully built 0c686c880b92
Successfully tagged davexacom/ibm-mqadvanced-server-ivt:9.1.3.0-r4-amd64

```

Perform Local testing on docker workstation

C:\Users\DAVIDARNOLD\myDocker\ibm-mqadvanced-server-ivt>docker images

REPOSITORY	TAG	IMAGE ID	CREATED	SIZE
davexacom/ibm-mqadvanced-server-ivt	9.1.3.0-r4-amd64	0c686c880b92	3 days ago	927MB

docker run -e LICENSE=accept -e MQ_QMGR_NAME=QM1 -P davexacom/ibm-mqadvanced-server-ivt:9.1.3.0-r4-amd64

Start the container – docker run

C:\Users\DAVIDARNOLD\myDocker\ibm-mqadvanced-server-ivt>docker run -e LICENSE=accept -e MQ_QMGR_NAME=QM1 -P davexacom/ibm-mqadvanced-server-ivt:9.1.3.0-r4-amd64

2019-12-13T08:29:20.120Z CPU architecture: amd64

2019-12-13T08:29:20.121Z Linux kernel version: 4.9.184-linuxkit

2019-12-13T08:29:20.121Z Container runtime: docker

2019-12-13T08:29:20.121Z Base image: Red Hat Enterprise Linux Server 7.7 (Maipo)

Break

Starting MQSC for queue manager QM1.

1 : DEFINE CHANNEL(IVT.SVRCONN) CHLTYPE(SVRCONN)

AMQ8014I: IBM MQ channel created.

2 : SET CHLAUTH(IVT.SVRCONN) TYPE(BLOCKUSER) USERLIST(nobody)

AMQ8877I: IBM MQ channel authentication record set.

3 : ALTER AUTHINFO(SYSTEM.DEFAULT.AUTHINFO.IDPWOS) AUTHTYPE(IDPWOS)
CHCKCLNT(NONE) ADOPTCTX(YES)

AMQ8567I: IBM MQ authentication information changed.

4 : SET CHLAUTH(IVT.SVRCONN) TYPE (ADDRESSMAP) ADDRESS(*) MCAUSER('mqm')

AMQ8877I: IBM MQ channel authentication record set.

5 : REFRESH SECURITY TYPE(CONNAUTH)

AMQ8560I: IBM MQ security cache refreshed.

5 MQSC commands read.

No commands have a syntax error.

All valid MQSC commands were processed.2019-12-13T08:29:22.125Z

Metrics are disabled

2019-12-13T09:09:17.684Z AMQ8024I: IBM MQ channel initiator started.

2019-12-13T09:09:17.706Z AMQ5806I: Queued Publish/Subscribe Daemon started for queue manager QM1.

C:\Users\DAVIDARNOLD\myDocker\ibm-mqadvanced-server-ivt>

C:\Users\DAVIDARNOLD\myDocker\ibm-mqadvanced-server-ivt>docker ps

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS
PORTS		NAMES		

```
b5e2c8034d8c    davexacom/ibm-mqadvanced-server-ivt:9.1.3.0-r4-amd64  
"runmqinteg...r..." 26 seconds ago   Up 25 seconds   0.0.0.0:32770->1414/tcp,  
0.0.0.0:32769->9157/tcp, 0.0.0.0:32768->9443/tcp  relaxed_lamport
```

Connect MQ Explorer

IBM MQ

Queue Managers

Add Queue Manager

Select the queue manager and connection method

Identify the queue manager to add and choose the connection method to use

Queue manager name: QM1

Queue manager name: QM1

Connection details

Host name or IP address: localhost

Port number: 32770

Server-connection channel: IVT.SVRCONN

Queue manager name: QM1

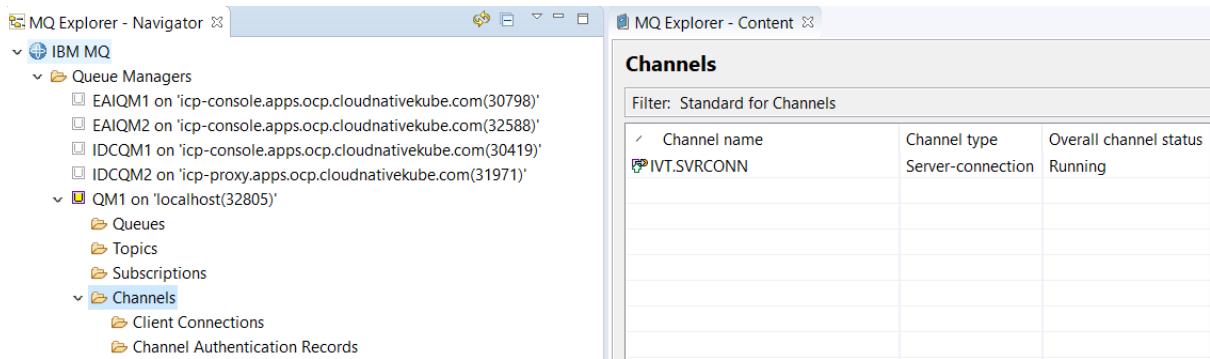
Enable user identification

User identification compatibility mode

Userid: mqm

Password

No password



Navigator

- IBM MQ
 - Queue Managers
 - EAIQM1 on 'tcp-console.apps.ocp.cloudnativekube.com(30798)'
 - EAIQM2 on 'tcp-console.apps.ocp.cloudnativekube.com(32588)'
 - IDCQM1 on 'tcp-console.apps.ocp.cloudnativekube.com(30419)'
 - IDCQM2 on 'tcp-proxy.apps.ocp.cloudnativekube.com(31971)'
 - QM1 on 'localhost(32805)'
 - Queues
 - Topics
 - Subscriptions
 - Channels
 - Client Connections
 - Channel Authentication Records

Content

Channels

Channel name	Channel type	Overall channel status
IVT.SVRCONN	Server-connection	Running

Access via RUNMQSC client

```
SET MQSERVER=IVT.SVRCONN/TCP/localhost(32770)
```

manual

```
C:\Users\DAVIDARNOLD\myDocker\ibm-mqadvanced-server-ivt>runmqsc -c QM1
5724-H72 (C) Copyright IBM Corp. 1994, 2019.
Starting MQSC for queue manager QM1.

def ql(DA.Q)
  1 : def ql(DA.Q)
AMQ8006I: IBM MQ queue created.
end
  2 : end
2 command responses received.
```

scripted

1q-npwd.mqsc - Notepad

File Edit Format View Help

define ql(DA) replace

```
C:\temp>SET MQSERVER=IVT.SVRCONN/TCP/localhost(32805)

C:\temp>runmqsc -c QM1 < 1q-npwd.mqsc
5724-H72 (C) Copyright IBM Corp. 1994, 2019.
Starting MQSC for queue manager QM1.

      1 : define ql(DA) replace
AMQ8006I: IBM MQ queue created.
2 command responses received.
```

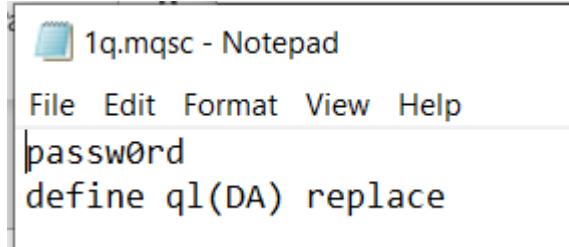
Note if you are using a queue manager where the username is password protected

Manual running of mqsc

```
C:\temp>runmqsc -c -u admin QM1
5724-H72 (C) Copyright IBM Corp. 1994, 2019.
Enter password:
*****
Starting MQSC for queue manager QM1.

end
      1 : end
0 command responses received.
```

If -u is on the command and we are piping in, runmqsc assumes the first line is the password.



```
1q.mqsc - Notepad
File Edit Format View Help
passw0rd
define ql(DA) replace
```

```
C:\temp>runmqsc -c -u admin QM1 < 1q.mqsc
5724-H72 (C) Copyright IBM Corp. 1994, 2019.
Enter password:
Starting MQSC for queue manager QM1.

      1 : define ql(DA) replace
AMQ8006I: IBM MQ queue created.
2 command responses received.
```

Push the new image to Dockerhub

```
C:\Users\DAVIDARNOLD\myDocker\ibm-mqadvanced-server-ivt>docker images
```

REPOSITORY	TAG	IMAGE ID	CREATED	SIZE
davexacom/ibm-mqadvanced-server-ivt	9.1.3.0-r4-amd64	2237fea38967	17 minutes ago	932MB

```
C:\Users\DAVIDARNOLD\myDocker\ibm-mqadvanced-server-ivt>docker images
```

REPOSITORY	TAG	IMAGE ID	CREATED	SIZE
davexacom/ibm-mqadvanced-server-ivt	9.1.3.0-r4-amd64	e269ad126613	5 minutes ago	932MB

<https://hub.docker.com/repositories>

The screenshot shows the Docker Hub interface. At the top, there's a search bar and navigation links for Explore, Repositories, Organizations, Get Help, and a user account dropdown. Below that, a dropdown menu shows 'davearno' selected. A search bar for repositories is also present. The main area displays three repository cards:

- davexacom / ace11002mqc91ntms1**
Updated a year ago
0 stars, 13 downloads, PUBLIC
- davexacom / ace11002mqc91soe**
Updated a year ago
0 stars, 43 downloads, PUBLIC
- davexacom / ace11002mqc91ntms2**
Updated a year ago
0 stars, 12 downloads, PUBLIC

docker push davexacom/ibm-mqadvanced-server-ivt:9.1.3.0-r4-amd64

```
C:\Users\DAVIDARNOLD\myDocker\ibm-mqadvanced-server-ivt>docker push davexacom/ibm-mqadvanced-server-ivt:9.1.3.0-r4-amd64
```

The push refers to repository [docker.io/davexacom/ibm-mqadvanced-server-ivt]

```
0d8459f27ecc: Pushing [=====] 3.072kB
ac7598f58291: Pushing [=====>] 1.378MB/3.735MB
6eb6a773bf24: Pushing [=====>] 1.378MB/3.735MB
07cdf8094239: Pushing [=====>] 561.2kB/3.49MB
9f4789d1e0ed: Pushing [=====>] 3.072kB
364112d1df0e: Waiting
```

```
cd28e8b3d42a: Pushed
```

```
2705f79af6db: Layer already exists
```

```
ce459cc53899: Layer already exists 9.1.3.0-r4-
amd64: digest: sha256:040e8e0aca3307369b10cce8411f97e147a9a92bb7514619a16c2a78093c085f
size: 5963
```

<https://hub.docker.com/repository/docker/davexacom/ibm-mqadvanced-server-ivt>

The screenshot shows the Docker Hub interface for the repository `davexacom / ibm-mqadvanced-server-ivt`. At the top, there's a header bar with links for ICP4i on CPSystem, Login - RHOS-OKD-IB..., ICPonRHOS-KD-IBM C..., and ICP4ionRHOS-OKD-IB... A dark banner at the top right encourages users to "Try the two-factor authentication beta. Learn more". Below the header is a search bar with placeholder text "Search for great content (e.g., mysql)". The main navigation menu includes "Repositories", "davexacom / ibm-mqadvanced-server-ivt", and tabs for "General", "Tags", "Builds", "Timeline", "Collaborators", "Webhooks", and "Settings". The "General" tab is currently selected. The repository details section shows the name `davexacom / ibm-mqadvanced-server-ivt`, a note that "This repository does not have a description", and a timestamp indicating the last push was "a few seconds ago".

Tags

This repository contains 2 tag(s).

9.1.3.0-r4-amd64



a few seconds ago

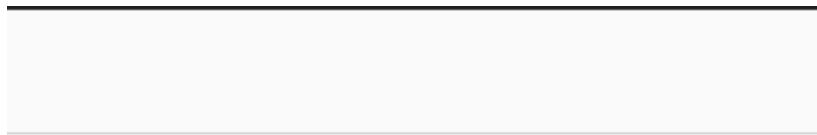
Create a new Image Stream on RHOS

<https://registry-console-default.apps.ocp.cloudnativekube.com/registry#/images/mq>

Images

[New image stream](#)

Name	Tags	Repository
<code>mq/ibm-mq-oidc-registration</code>	<code>2.1.0-amd64</code>	<code>docker-registry.default.svc:5000/mq/ibm-mq-oidc-registration</code>
<code>mq/ibm-mqadvanced-server-integration</code>	<code>9.1.3.0-r1-amd64</code>	<code>docker-registry.default.svc:5000/mq/ibm-mqadvanced-server-integration</code>



⊕ New image stream

Repository

Docker.io/davexacom/ibm-mqadvanced-server-ivt

Create new image stream / or change image stream

Change image stream

Name ibm-mqadvanced-server-ivt

Project mq

Populate

Pull from docker.io/davexacom/ibm-mqadvanced-server-ivt

Tags 9.1.3.0-r4-amd64

Remote registry is insecure

mq/ibm-mqadvanced-server-ivt 1.0-amd64 9.1.3.0-r4-amd64 docker-registry.default.svc:5000/mq/ibm-mqadvanced-server-ivt

Image stream Tags

Access Policy [Images may only be pulled by specific users or groups](#)

Pulling repository docker-registry.default.svc:5000/mq/ibm-mqadvanced-server-ivt

Image count 2

To push an image to this image stream:

```
$ sudo docker tag myimage docker-registry-default.apps.ocp.cloudnativekube.com/mq/ibm-mqadvanced-server-ivt:tag
$ sudo docker push docker-registry-default.apps.ocp.cloudnativekube.com/mq/ibm-mqadvanced-server-ivt:tag
```

Pulling repository to use in helm charts

docker-registry.default.svc:5000/mq/ibm-mqadvanced-server-ivt

ICP4i MQ new instance using custom image

Add new ICP4i instance of MQ

<https://icp-proxy.apps.ocp.cloudnativekube.com/integration>

mq	idcab1 ...
mqtest	mqtest ...

+ Add new instance

Add a queue manager based messaging capability

You'll be deploying [IBM MQ](#) to provide this capability. Please work with your IBM Cloud Private cluster administrator to ensure the following dependencies are satisfied:

- a unique [namespace](#) must exist for the sole use of IBM MQ. Multiple instances can be deployed in the same namespace. This namespace must allow deployments that require a [security context constraint](#) of type : **ibm-anyuid-scc**.
- a [storage class](#) or [persistent volume](#) needs to be provided for persistent storage

Close

Continue

Configure Helm chart

ibm-mqadvanced-server-integration-prod V 4.1.0

[Overview](#) [Configuration](#)

 IBM Certified Container

IBM MQ queue manager for Cloud Pak for Integration

[ibm-entitled-charts](#)

[Licenses](#) | [Release Notes](#) | [Qualification](#)

IBM Certified Container

4.1.0 ▾

 IBM MQ Advanced

Introduction

This chart deploys a single IBM® MQ version 9.1.3 middleware that simplifies and accelerates the integration of multiple platforms. It uses message queues to facilitate a messaging solution for cloud, mobile, Internet of T

Hit configure

Configure

Values for the charts

Cluster Hostname (for deployment)

icp-proxy.apps.ocp.cloudnativekube.com

MQ server image:

docker-registry.default.svc:5000/mq/ibm-mqadvanced-server-ivt

MQ Server image Tag:

9.1.3.0-r4

MQ Server OIDC registration image

docker-registry.default.svc:5000/mq/ibm-mq-oidc-registration

MQ Server OIDC registration image tag:

2.1.0

Managed NFS name (from oc command):

managed-nfs-storage

TLS Secret

ibm-mq-tls-secret

IBM MQ queue manager for Cloud Pak for Integration. Edit these parameters for configuration.

Helm release name *

idcqm1p

Target namespace *

mq

Target Cluster *

local-cluster

License * 

I have read and agreed to the [License agreement](#)

icp-proxy.apps.ocp.cloudnativekube.com

Quick start

Required and recommended parameters to view and edit.

TLS

Configuration settings for TLS

Cluster hostname *

icp-proxy.apps.ocp.cloudnativekube.com

MQ server image:

[docker-registry.default.svc:5000/mq/ibm-mqadvanced-server-ivt](#)

MQ Server image Tag:

[9.1.3.0-r4](#)

Results in the following image and tag being used

[docker-registry.default.svc:5000/mq/ibm-mqadvanced-server-ict:9.1.3.0-r4-amd64](#)

Image
Configuration settings for the container image

Image repository *	Image tag *
docker-registry.default.svc:5000/mq/ibm-mqadvanced-server-ivt	9.1.3.0-r4
Image pull secret	Image pull policy (for all images) *
Enter value	IfNotPresent

MQ Server OIDC registration image

docker-registry.default.svc:5000/mq/ibm-mq-oidc-registration

MQ Server OIDC registration image tag:

2.1.0

Single sign-on
Configuration settings for single sign-on

Registration image repository *	Registration image tag *
docker-registry.default.svc:5000/mq/ibm-mq-oidc-registration	2.1.0

TLS Secret

Ibm-mq-tls-secret

TLS
Configuration settings for TLS

Generate Certificate

Cluster hostname *	Secret name <small>i</small>
icp-proxy.apps.ocp.cloudnativekube.com	Ibm-mq-tls-secret

Managed NFS name (from oc command):

managed-nfs-storage

Persistence

Configuration settings for Persistent Volumes

Enable persistence *

Use dynamic provisioning *

Data PVC

Configuration settings for the main Persistent Volume Claim

Name *

data

Storage Class name 

managed-nfs-storage

Size *

2Gi

Queue manager

Configuration settings for the Queue Manager

Queue manager name 

IDCQM1

Metrics

Configuration settings for Prometheus metrics

Enable metrics * 

Readiness probe

Configuration settings for the MQ readiness probe, which checks when the MQ listener is running

Initial delay (seconds)

30



Install

Use the little X to retain your populated chart for re-use if things go wrong.

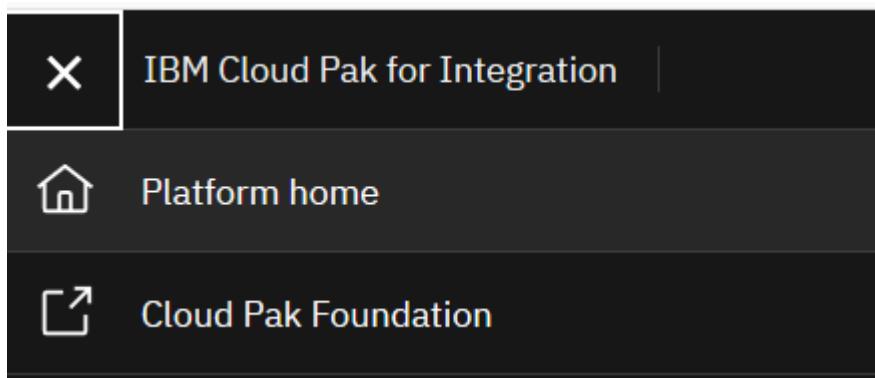


Installation started. For progress view your Helm releases.

[View Helm Releases](#)

Return to [Catalog](#)

Verifying the Helm release via ICP foundation



X IBM Cloud Private CL my

Overview

▼ Workloads

- Brokered Services
- DaemonSets
- Deployments
- Helm Releases

Helm Releases

i You are currently viewing only the helm releases of this cluster.

Name	Namespace	Status	Chart name
idcqmq1p	mq	● Deployed	ibm-mqadvanced-server-integration-prod

Job

Name	COMPLETIONS	DURATION	Age
idcqm1p-ibm-mq-registration	1/1	7s	119s

Pod

Name	READY	Status	RESTARTS	Age
idcqm1p-ibm-mq-0	1/1	Running	0	118s
idcqm1p-ibm-mq-registration-fknmq	0/1	Completed	0	119s

Role

Name	Age
idcqm1p-ibm-mq	2m

Service

Name	TYPE	Cluster IP	External IP	Port(s)
idcqm1p-ibm-mq	NodePort	172.30.223.140	<none>	9443:31495/TCP,1414:32182/TCP

ServiceAccount

Name	SECRETS	Age
idcqm1p-ibm-mq	2	2m

StatefulSet

Name	Desired	Current	Age
idcqm1p-ibm-mq	1	1	119s

Events

Search Events

Type	Source	Count	Reason	Message
Normal	statefulset-controller	1	SuccessfulCreate	create Pod idcqm1p-ibm-mq-0 in StatefulSet idcqm1p-ibm-mq successful

items per page **20** | 1-1 of 1 items

Pods					
<input type="text"/> Search Pods					
Name	Namespace	Status	Host IP	Pod IP	Ready
idcqm1p-ibm-mq-0	mq	Running	135.90.82.92	10.129.1.228	1/1
items per page <select>20</select> 1-1 of 1 items					

StatefulSets / idcqm1p-ibm-mq / idcqm1p-ibm-mq-0

idcqm1p-ibm-mq-0

Overview Containers [Events](#)

Search Events

Type	Source	Count	Reason	Message
Normal	kubelet icp4inodeme3.ocp.cloudnativekube.com	1	Started	Started container
Normal	kubelet icp4inodeme3.ocp.cloudnativekube.com	1	Pulled	Container image "docker-registry.default.svc:5000/mq/ibm-mqadvanced-server-ivt:9.1.3.0-r4-amd64" already present on machine
Normal	kubelet icp4inodeme3.ocp.cloudnativekube.com	1	Created	Created container

Starting the MQ Web Console

IBM Cloud Private CLUSTER mycluster Create resource Catalog

Helm Releases

You are currently viewing only the helm releases of this cluster.

idc

Name	Namespace	Status	Chart name	Current version	Available version	Updated	Actions
idcab1	mq	Deployed	ibm-mqadvanced-server-integration-prod	4.0.0	5.0.0	December 13, 2019 11:17am	Launch ▾
idcqm1p	mq	Deployed	ibm-mqadvanced-server-integration-prod	4.1.0	5.0.0	December 16, 2019 02:51pm	Launch ▲
oidcclient-watcher	kube-system	Deployed	oidcclient-watcher	3.2.1906-rhel	Up To Date	December 4, 2019	console-https



Warning: Potential Security Risk Ahead

Firefox detected a potential security threat and did not continue to `icp-proxy.apps.ocp.cloudnativekube.com`. If you visit this site, attackers could try to steal information like your passwords, emails, or credit card details.

[Learn more...](#)

[Go Back \(Recommended\)](#)

[Advanced...](#)

`icp-proxy.apps.ocp.cloudnativekube.com:31495` uses an invalid security certificate.

The certificate is not trusted because it is self-signed.

Error code: `MOZILLA_PKIX_ERROR_SELF_SIGNED_CERT`

[View Certificate](#)

[Go Back \(Recommended\)](#)

[Accept the Risk and Continue](#)

Add Widget - Channels

Started [ICP4i on CPSystem](#) [Login - RHOS-OKD-IB...](#) [ICPonRHOS-KD-IBM C...](#) [ICP4ionRHOS-OKD-IB...](#)

Tab 1 +

Local Queue Managers	
Name	Status
IDCQM1	Running

Channels on IDCQM1	
Name	Type
IVT.SVRCONN	Server-connection

Connecting MQ Explorer

Add remote queue manager

 IBM MQ Explorer (Installation1)

File Edit Window Help

 MQ Explorer - Navigator X

▼  IBM MQ

▼  Queue Managers

 Add Queue Manager

Select the queue manager and connection method

Identify the queue manager to add and choose the connection method to use

Queue manager name:

IDCQM1

How do you want to connect to this queue manager?

Connect directly

This option creates a new connection to the queue manager (recommended)

 Add Queue Manager

Specify new connection details

Provide details of the connection you want to set up

Queue manager name:

IDCQM1

Connection details

Host name or IP address:

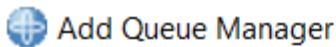
icp-proxy.apps.ocp.cloudnativekube.com

Port number:

32182

Server-connection channel:

IVT.SVRCONN



Specify user identification details

Provide a userid name and password

Queue manager name: IDCQM1

Enable user identification

User identification compatibility mode

Userid: mqm

Password

No password

Channel name	Channel type	Overall channel status
IVT.SVRCONN	Server-connection	Running

Using Runmqsc in client mode

```
SET MQSERVER=IVT.SVRCONN/TCP/icp-proxy.apps.ocp.cloudnativekube.com(32182)
```

```
Runmqsc -c IDCQM1
```

```
C:\Users\DAVIDARNOLD\myDocker\ibm-mqadvanced-server-ivt>SET MQSERVER=IVT.SVRCONN/TCP/icp-proxy.apps.ocp.cloudnativekube.com(32182)

C:\Users\DAVIDARNOLD\myDocker\ibm-mqadvanced-server-ivt>runmqsc -c IDCQM1
5724-H72 (C) Copyright IBM Corp. 1994, 2019.
Starting MQSC for queue manager IDCQM1.

def ql(manual.q)
  1 : def ql(manual.q)
AMQ8006I: IBM MQ queue created.
end
  2 : end
2 command responses received.
```

```
C:\temp>type 1q-npwd.mqsc
define ql(DA) replace

C:\temp>runmqsc -c IDCQM1 < 1q-npwd.mqsc
5724-H72 (C) Copyright IBM Corp. 1994, 2019.
Starting MQSC for queue manager IDCQM1.

      1 : define ql(DA) replace
AMQ8006I: IBM MQ queue created.
2 command responses received.
```

Part 2 - Custom MQ Image on RHOS 3.11 and 4.2 with ICP4i - TLS

With iCP4i on RHOS 4.2 for clients that are running outside the RHOS cluster to connect to queue managers TLS protocol must be used.

clients must use TLS to connect now.

https://www.ibm.com/support/knowledgecenter/en/SSFKSJ_9.1.0/com.ibm.mq.mcpak.doc/cc_conn_qm_openshift.htm

"You need an [OpenShift Route](#) to connect an application to an IBM® MQ queue manager from outside a Red Hat OpenShift cluster. You must enable TLS on your IBM MQ queue manager and client application, because [Server Name Indication \(SNI\)](#) is only available in the TLS protocol. The OpenShift Container Platform (OCP) Router uses SNI for routing requests to the IBM MQ queue manager. The required configuration of the OpenShift Route depends on the SNI behavior of your client application."

Documentation from the Helm chart with annotations

Configuring MQ objects

You have the following major options for configuring the MQ queue manager itself:

1. ~~Use the MQ web console interactively~~
2. Create a new image layer with your configuration ~~for remote administration baked-in via the supply of an mqsc file with TLS enabled SVRCONN definitions for admin and app.baked-in.~~
3. ~~Configure remote administration over messaging, and use existing tools, such as runmqsc, MQ Explorer or the MQ Command Server.~~

The REST administrative API is not currently supported.

Configuring MQ using a new image layer

You can create a new container image layer, on top of the IBM MQ Advanced base image. You can add MQSC files to define MQ objects such as queues and topics, and place these files into `/etc/mqm` in your image. When the MQ pod starts, it will run any MQSC files found in this directory (in sorted order).

Example Dockerfile and MQSC script for creating a new image

In this example you will create a Dockerfile that creates two users:

- `admin` - Administrator user which is a member of the `mqm` group
- `app` - Client application user which is a member of the `mqclient` group. (You will also create this group)

You will also create a MQSC Script file called `config.mqsc` that will be run automatically when your container starts. This script will do the following:

- Create default local queues for my applications
- Create channels for use by the `admin` and `app` users
- Configure security to allow use of the channels by remote applications
- Create authority records to allow members of the `mqclient` group to access the Queue Manager and the default local queues.

First create a file called config.mqsc. This the MQSC file that will be run when an MQ container starts. It should contain the following:

```
* Create Local Queues that my application(s) can use.  
DEFINE QLOCAL('EXAMPLE.QUEUE.1') REPLACE  
DEFINE QLOCAL('EXAMPLE.QUEUE.2') REPLACE  
  
* Create a Dead Letter Queue for undeliverable messages and set the Queue Manager to use it.  
DEFINE QLOCAL('EXAMPLE.DEAD.LETTER.QUEUE') REPLACE  
ALTER QMGR DEADQ('EXAMPLE.DEAD.LETTER.QUEUE')  
  
* Set ADOPTCTX to YES so we use the same userid passed for authentication as the one for authorization and refresh the security configuration  
ALTER AUTHINFO(SYSTEM.DEFAULT.AUTHINFO.IDPWOS) AUTHTYPE(IDPWOS)  
ADOPTCTX(YES)  
REFRESH SECURITY(*) TYPE(CONNAUTH)  
  
* Create a entry channel for the Admin user and Application user  
* add the TLS configuration values on channels here  
DEFINE CHANNEL('EXAMP.ADMIN.SVRCONN') CHLTYPE(SVRCONN) REPLACE  
DEFINE CHANNEL('EXAMP.APP.SVRCONN') CHLTYPE(SVRCONN) MCAUSER('app') REPLACE  
  
REFRESH SECURITY TYPE(SSL)  
  
* Set Channel authentication rules to only allow access through the two channels we created and only allow admin users to connect through EXAMPLE.ADMIN.SVRCONN  
SET CHLAUTH('*') TYPE(ADDRESSMAP) ADDRESS('*') USERSRC(NOACCESS)  
DESCR('Back-stop rule - Blocks everyone') ACTION(REPLACE)  
SET CHLAUTH('EXAMP.APP.SVRCONN') TYPE(ADDRESSMAP) ADDRESS('*')  
USERSRC(CHANNEL) DESCRIPTOR('Allows connection via APP channel') ACTION(REPLACE)  
SET CHLAUTH('EXAMP.ADMIN.SVRCONN') TYPE(ADDRESSMAP) ADDRESS('*')  
USERSRC(CHANNEL) DESCRIPTOR('Allows connection via ADMIN channel')  
ACTION(REPLACE)  
SET CHLAUTH('EXAMP.ADMIN.SVRCONN') TYPE(BLOCKUSER) USERLIST('nobody')  
DESCR('Allows admins on ADMIN channel') ACTION(REPLACE)  
  
* Set Authority records to allow the members of the mqclient group to connect to the Queue Manager and access the Local Queues which start with "EXAMPLE."  
SET AUTHREC OBJTYPE(QMGR) GROUP('mqclient') AUTHADD(CONNECT,INQ)  
SET AUTHREC PROFILE('EXAMPLE.*') OBJTYPE(QUEUE) GROUP('mqclient')  
AUTHADD(INQ,PUT,GET,BROWSE)
```

Next create a Dockerfile that expands on the MQ Advanced Server image to create the users and groups. It should contain the following, replacing <IMAGE NAME> with the MQ image you want to use as a base:

```
FROM <IMAGE NAME>  
# Add the admin user as a member of the mqm group and set their password  
USER root  
RUN useradd admin -G mqm \  
    && echo admin:passw0rd | chpasswd \  
# Create the mqclient group  
    && groupadd mqclient \  
    && gpasswd -a admin mqclient
```

```

# Create the app user as a member of the mqclient group and set their
password
  && useradd app -G mqclient \
  && echo app:passw0rd | chpasswd
# Copy the configuration script to /etc/mqm where it will be picked up
automatically
USER mqm
COPY config.mqsc /etc/mqm/

```

Finally, build and push the image to your registry.

You can then use the new image when you deploy MQ into your cluster. You will find that once you have run the image you will be able to see your new default objects and users.

JSON log output

By default, the MQ container output is in JSON format, to better integrate with log aggregation services. On the command line, you can use utilities like 'jq' to format this output, for example:

```
kubectl logs foo-ibm-mq-0 | jq -r '.ibm_datetime + " " + .message'
```

Supplying certificates to be used for TLS

Create a matched set of keys and certs "locally" and test that your MQ Explorer (client) can connect to a local queue manager over TLS.

Use the server side keys and certs as input to the following.

The `pki.trust` and `pki.keys` allow you to supply details of Kubernetes secrets that contain TLS certificates. By doing so the TLS certificates will be imported into the container at runtime and MQ will be configured to use them. You can supply both certificates which contain only a public key and certificates that contain both public and private keys.

If you supply invalid files or invalid YAML objects then the container will terminate with an appropriate termination message. The next 2 sections will detail the requirements for supplying each type of certificate.

Supplying certificates which contain the public and private keys

When supplying a Kubernetes secret that contains a certificate files for both the public and private key you must ensure that the secret contains a file that ends in `.crt` and a file that ends in `.key` named the same. For example: `tls.crt` and `tls.key`. The extension of the file denotes whether the file is the public key (`.crt`) or the private key (`.key`) and must be correct. If your certificate has been issued by a Certificate Authority, then the certificate from the CA must be included as a seperate file with the `.crt` extension. For example: `ca.crt`.

The format of the YAML objects for `pki.keys` value is as follows:

```

- name: mykey
  secret:
    secretName: mykeysecret
    items:
      - tls.key
      - tls.crt

```

```
- ca.crt
```

or alternatively in a single line you can supply the following:

```
- name: mykey, secret: {secretName: mykeysecret, items: [tls.key, tls.crt, ca.crt]}
```

`name` must be set to a lowercase alphanumeric value and will be used as the label for the certificate in the keystore and queue manager.

`secret.secretName` must match the name of a Kubernetes secret that contains the TLS certificates you wish to import

`secret.items` must list the TLS certificate files contained in `secret.secretName` you want to import.

To supply the YAML objects when deploying via Helm you should use the following:

```
--set pki.keys[0].name=mykey,pki.keys[0].secret.secretName=mykeysecret,pki.keys[0].secret.items[0]=tls.key,pki.keys[0].secret.items[1]=tls.crt,pki.keys[0].secret.items[2]=ca.crt
```

If you supply multiple YAML objects then the queue manager will use the first object chosen by the label name alphabetically. For example if you supply the following labels: `alabel`, `blabel` and `clabel`. The queue manager will use the certificate with the label `alabel` for its identity. This can be changed at runtime by executing the MQSC command: `ALTER QMGR CERTLBL('<new label>')`.

Supplying certificates which contain only the public key

When supplying a Kubernetes secret that contains a certificate file with only the public key you must ensure that the secret contains files that have the extension `.crt`. For example: `tls.crt` and `ca.crt`.

The format of the YAML objects for `pki.trust` value is as follows:

```
- secret:
  secretName: mycertificate
  items:
    - tls.crt
```

or alternatively in a single line you can supply the following:

```
- secret: {secretName: mycertificate, items: [tls.crt]}
```

`secret.secretName` must match the name of a Kubernetes secret that contains the TLS certificates you wish to add.

`secret.items` must list the TLS certificate files contained in `secret.secretName` you want to add.

To supply the YAML objects when deploying via Helm you should use the following:

```
--set pki.trust[0].secret.secretName=mycertificate,pki.trust[0].secret.items[0]=tls.crt
```

If you supply multiple YAML objects then all of the certificates specified will be added into the queue manager and MQ Console Truststores.

Creating TLS key and certs set – In the local “Admin” environment

Points of note

Clarification of “extract”/“add” versus “export”/“import”

SSL uses public/private keys to provide a flexible encryption scheme that can be setup at the time of the secure transaction. When a certificate is created, it contains both the public and private keys.

The "extract" and "add" functions deal with ONLY the public keys. That is, the "extract" gets the public key of a certificate from a database and the "add" puts the public key into a database. No passwords are required because the private key is not obtained.

The "export" and "import" functions deal with BOTH the public and private keys for a certificate. Passwords are required due to the private key.

Summary of steps

Step 1: Client: Create TLS client key database

Step 2: Client: Create certificate

Step 3: Client: Extract the public TLS client certificate and copy it to the TLS server side

Step 4: Server: Create TLS server key database

Step 5: Server: Create certificate

Step 6: Server: Add the TLS client certificate to the Queue Manager's key database.

Step 7: Server: Extract the public TLS server certificate and copy it to the TLS client side

Step 8: Client: Add the TLS client certificate to the Client's key database.

Step 9: Server: Run MQSC commands for TLS server side queue manager SVRCONN

Step 10: Client: Verifying the TLS set up with MQCERTCK

Step 11:Client: Use runmqsc in client mode to connect to the QMGR and administer it

Local Environment

Queue Manager Name – TLSPRQM1 (TLS enabled Production Queue Manager 1)

Listening on port - 2414

The screenshot shows the IBM MQ Explorer interface. On the left, there is a tree view under 'IBM MQ' with nodes for 'Queue Managers', 'TLSPRQM1' (selected), 'Queues', 'Topics', 'Subscriptions', 'Channels' (selected), 'Client Connections', 'Channel Authentication Records', 'Listeners', 'Services', 'Process Definitions', 'Namelists', 'Authentication Information', 'Communication Information', 'Queue Manager Clusters', and 'JMS Administered Objects'. On the right, a table titled 'Channels' is displayed with the following data:

Channel name	Channel type	Overall channel status
SYSTEM.ADMIN.SVRCONN	Server-connection	Inactive
SYSTEM.AUTO.RECEIVER	Receiver	Inactive
SYSTEM.AUTO.SVRCONN	Server-connection	Inactive
SYSTEM.DEF.AMQP	AMQP	Inactive
SYSTEM.DEF.CLUSRCVR	Cluster-receiver	Inactive
SYSTEM.DEF.CLUSSDR	Cluster-sender	Inactive
SYSTEM.DEF.RECEIVER	Receiver	Inactive
SYSTEM.DEF.REQUESTER	Requester	Inactive
SYSTEM.DEF.SENDER	Sender	Inactive
SYSTEM.DEF.SERVER	Server	Inactive
SYSTEM.DEF.SVRCONN	Server-connection	Inactive
TLSPRQM1.SVRCONN	Server-connection	Inactive

Runmqsc TLSPRQM1 to create SVRCONN to use

Note: on windows This should have been MCAUSER('MUSR_MQADMIN') rather than mqm

DEFINE CHANNEL(TLSPRQM1.SVRCONN) CHLTYPE(SVRCONN)

SET CHLAUTH(TLSPRQM1.SVRCONN) TYPE(BLOCKUSER) USERLIST(nobody)

ALTER AUTHINFO(SYSTEM.DEFAULT.AUTHINFO.IDPWOS) AUTHTYPE(IDPWOS) CHCKCLNT(NONE)
ADOPTCTX(YES)

SET CHLAUTH(TLSPRQM1.SVRCONN) TYPE (ADDRESSMAP) ADDRESS() MCAUSER('mqm')

SET CHLAUTH(TLSPRQM1.SVRCONN) TYPE (ADDRESSMAP) ADDRESS(*)
MCAUSER('MUSR_MQADMIN')

REFRESH SECURITY TYPE(CONNAUTH)

Step 1: Client: Create SSL client key database

Windows command prompt running as administrator

```
Administrator: Command Prompt
Microsoft Windows [Version 10.0.18362.535]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\windows\system32>
```

The default directory for MQ 9.1 in this machine is:

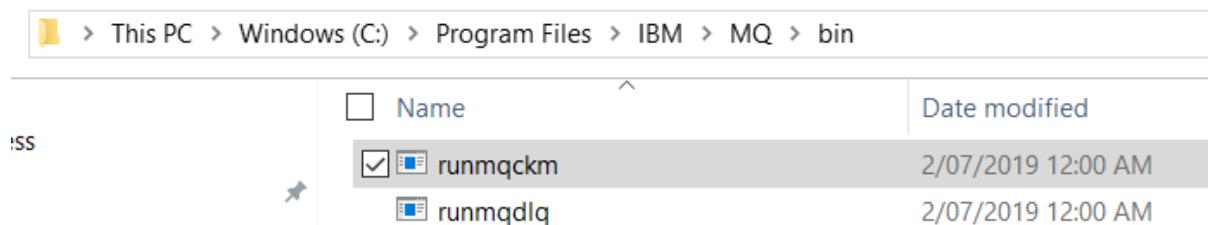
```
cd C:\Program Files\IBM\MQ\bin
```

If you have multiple installations of MQ versions set the correct installation

```
setmqenv -n Installation1
```

```
C:\Program Files\IBM\MQ\bin>setmqenv -n Installation1

C:\Program Files\IBM\MQ\bin>
```



Create TLS client key database

```
runmqckm -keydb -create -db "C:\Program Files\IBM\MQ\arnold.kdb" -pw clientpass -type cms -
expire 365 -stash
```

```
C:\Program Files\IBM\MQ\bin>runmqckm -keydb -create -db "C:\Program Files\IBM\MQ\arnold.kdb" -pw clientpass -type cms -
expire 365 -stash
5724-H72 (C) Copyright IBM Corp. 1994, 2019.

C:\Program Files\IBM\MQ\bin>
```

Files are created by default in c:\program files\ibm\mq

Windows (C:) > Program Files > IBM > MQ

Name	Date modified	Type
arnold.kdb	18/12/2019 4:34 PM	KDB File
arnold.rdb	18/12/2019 4:34 PM	RDB File
arnold.sth	18/12/2019 4:34 PM	STH File

Step 2: Client: Create certificate

```
Administrator: Command Prompt

C:\Program Files\IBM\MQ\bin>cd ..

C:\Program Files\IBM\MQ>dir arnold.*
Volume in drive C is Windows
Volume Serial Number is 3CBA-3B12

Directory of C:\Program Files\IBM\MQ

18/12/2019  04:34 PM           88 arnold.kdb
18/12/2019  04:34 PM           80 arnold.rdb
18/12/2019  04:34 PM          193 arnold.sth
```

Create certificate

```
runmqckm -cert -create -db "C:\program files\ibm\mq\arnold.kdb" -pw clientpass -label
ibmmqarnold -dn "CN=arnold,OU=Support,O=IBM,ST=NC,C=" -expire 365
```

```
C:\Program Files\IBM\MQ>runmqckm -cert -create -db "C:\program files\ibm\mq\arnold.kdb" -pw clientpass -label ibmmqarnold
-dn "CN=arnold,OU=Support,O=IBM,ST=NC,C=" -expire 365
5724-H72 (C) Copyright IBM Corp. 1994, 2019.

C:\Program Files\IBM\MQ>
```

List the certificate

List the certificate:

```
runmqckm -cert -list -db "c:\program files\ibm\mq\arnold.kdb" -pw clientpass
```

```
C:\Program Files\IBM\MQ>runmqckm -cert -list -db "c:\program files\ibm\mq\arnold.kdb" -pw clientpass
5724-H72 (C) Copyright IBM Corp. 1994, 2019.
Certificates in database c:\program files\ibm\mq\arnold.kdb:
    ibmmqarnold
```

Dir the files – note change in size of arnold.kdb

```
C:\Program Files\IBM\MQ>dir arnold.*
Volume in drive C is Windows
Volume Serial Number is 3CBA-3B12

Directory of C:\Program Files\IBM\MQ

18/12/2019  04:56 PM           5,088 arnold.kdb
18/12/2019  04:56 PM             80 arnold.rdb
18/12/2019  04:34 PM            193 arnold.sth
```

Step 3: Client: Extract the public SSL client certificate and copy it to the SSL server side

Extract the public TLS client certificate for copy to the TLS server side

Extract the certificate:

```
runmqckm -cert -extract -db "c:\Program Files\IBM\MQ\arnold.kdb" -pw clientpass -label  
ibmmqarnold -target arnold.crt -format ascii
```

```
C:\Program Files\IBM\MQ>runmqckm -cert -extract -db "c:\Program Files\IBM\MQ\arnold.kdb" -pw clientpass -label ibmmqarno  
ld -target arnold.crt -format ascii  
5724-H72 (C) Copyright IBM Corp. 1994, 2019.  
C:\Program Files\IBM\MQ>
```

Note: The file "arnold.crt" is created in the current directory

Directory of C:\Program Files\IBM\MQ			
18/12/2019	05:03 PM	836	arnold.crt
18/12/2019	04:56 PM	5,088	arnold.kdb
18/12/2019	04:56 PM	80	arnold.rdb
18/12/2019	04:34 PM	193	arnold.sth

Windows (C) > Program Files > IBM > MQ

	Name	Date modified	Type
<input checked="" type="checkbox"/>	arnold	18/12/2019 5:03 PM	Security Certificate
<input type="checkbox"/>	arnold.kdb	18/12/2019 4:56 PM	KDB File
<input type="checkbox"/>	arnold.rdb	18/12/2019 4:56 PM	RDB File
<input type="checkbox"/>	arnold.sth	18/12/2019 4:34 PM	STH File

Arnold.crt is our client side public TLS certificate extracted from the client database that can be used by the server side queue manager.

Step 4: Server: Create SSL server key database Step 5: Server: Create certificate

Windows command prompt running as administrator

```
Administrator: Command Prompt
Microsoft Windows [Version 10.0.18362.535]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\windows\system32>
```

The default directory for MQ 9.1 in this machine is:

```
cd C:\Program Files\IBM\MQ\bin
```

If you have multiple installations of MQ versions set the correct installation

```
setmqenv -n Installation1
```

```
C:\Program Files\IBM\MQ\bin>setmqenv -n Installation1
C:\Program Files\IBM\MQ\bin>
```

Change to the directory where the Queue Manager key database will be located:

```
Cd C:\ProgramData\IBM\MQ\qmgrs\TLSPRQM1\ssl
```

```
(linux cd /var/mqm/qmgrs/ TLSPRQM1/ssl/)
```

```
C:\Program Files\IBM\MQ>cd C:\ProgramData\IBM\MQ\qmgrs\TLSPRQM1\ssl  
  
C:\ProgramData\IBM\MQ\qmgrs\TLSPRQM1\ssl>dir  
Volume in drive C is Windows  
Volume Serial Number is 3CBA-3B12  
  
Directory of C:\ProgramData\IBM\MQ\qmgrs\TLSPRQM1\ssl  
  
18/12/2019  04:12 PM    <DIR>          .  
18/12/2019  04:12 PM    <DIR>          ..  
                           0 File(s)           0 bytes
```

Create SSL server key database

```
runmqckm -keydb -create -db "C:\ProgramData\IBM\MQ\qmgrs\TLSPRQM1\ssl\TLSPRQM1.kdb" -  
pw serverpass -type cms -expire 365 -stash
```

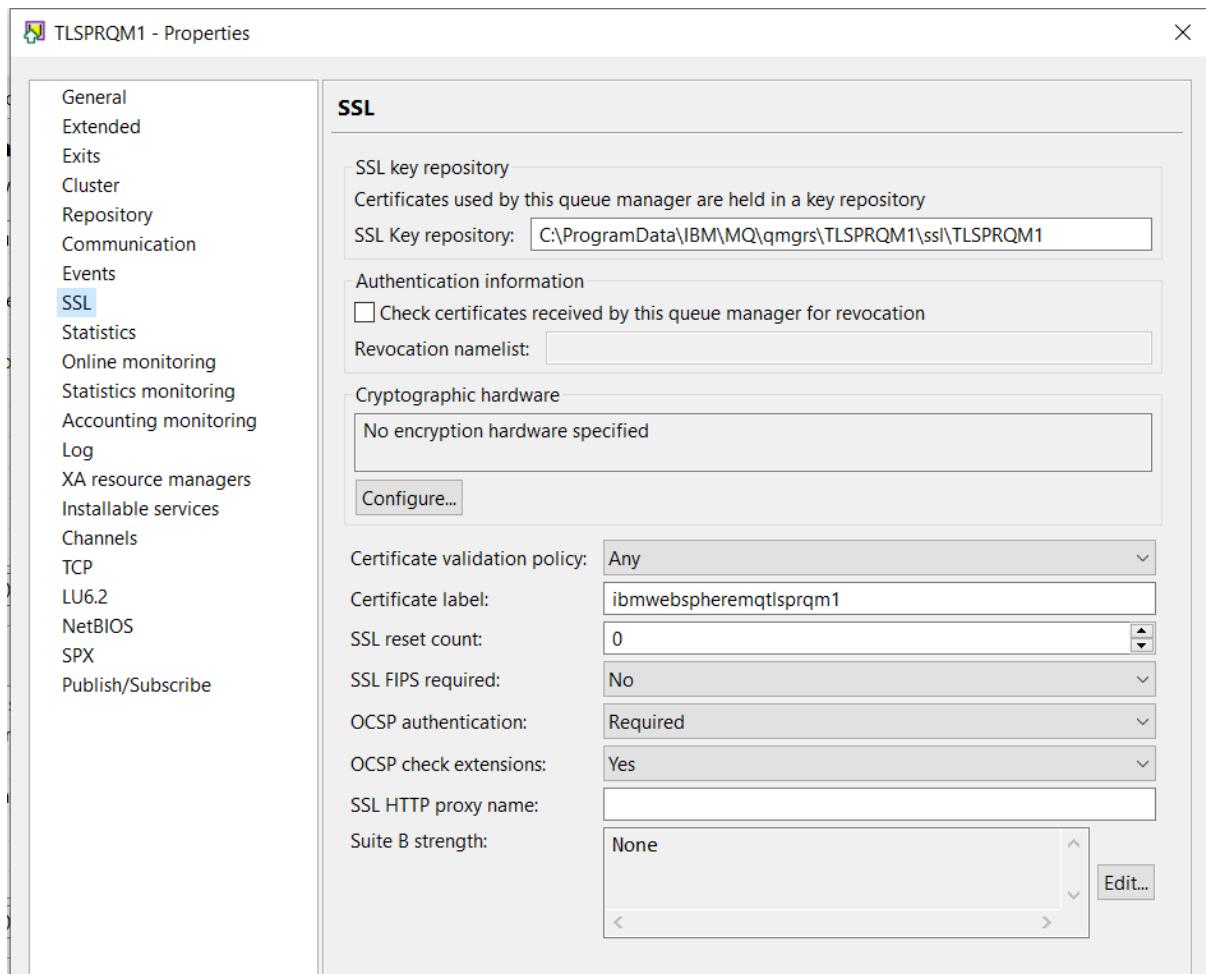
```
C:\ProgramData\IBM\MQ\qmgrs\TLSPRQM1\ssl>runmqckm -keydb -create -db "C:\ProgramData\IBM\MQ\qmgrs\TLSPRQM1\ssl\TLSPRQM1.kdb" -  
pw serverpass -type cms -expire 365 -stash  
5724-H72 (C) Copyright IBM Corp. 1994, 2019.  
C:\ProgramData\IBM\MQ\qmgrs\TLSPRQM1\ssl>
```

These are the files that are created: dir C:\ProgramData\IBM\MQ\qmgrs\TLSPRQM1\ssl

```
C:\ProgramData\IBM\MQ\qmgrs\TLSPRQM1\ssl>dir C:\ProgramData\IBM\MQ\qmgrs\TLSPRQM1\ssl  
Volume in drive C is Windows  
Volume Serial Number is 3CBA-3B12  
  
Directory of C:\ProgramData\IBM\MQ\qmgrs\TLSPRQM1\ssl  
  
18/12/2019  06:41 PM    <DIR>          .  
18/12/2019  06:41 PM    <DIR>          ..  
18/12/2019  06:41 PM            88 TLSPRQM1.kdb  
18/12/2019  06:41 PM            80 TLSPRQM1.rdb  
18/12/2019  06:41 PM           193 TLSPRQM1.sth
```

Step 5: Server: Create certificate

Important: There is a default certificate label on the Queue Manager side.

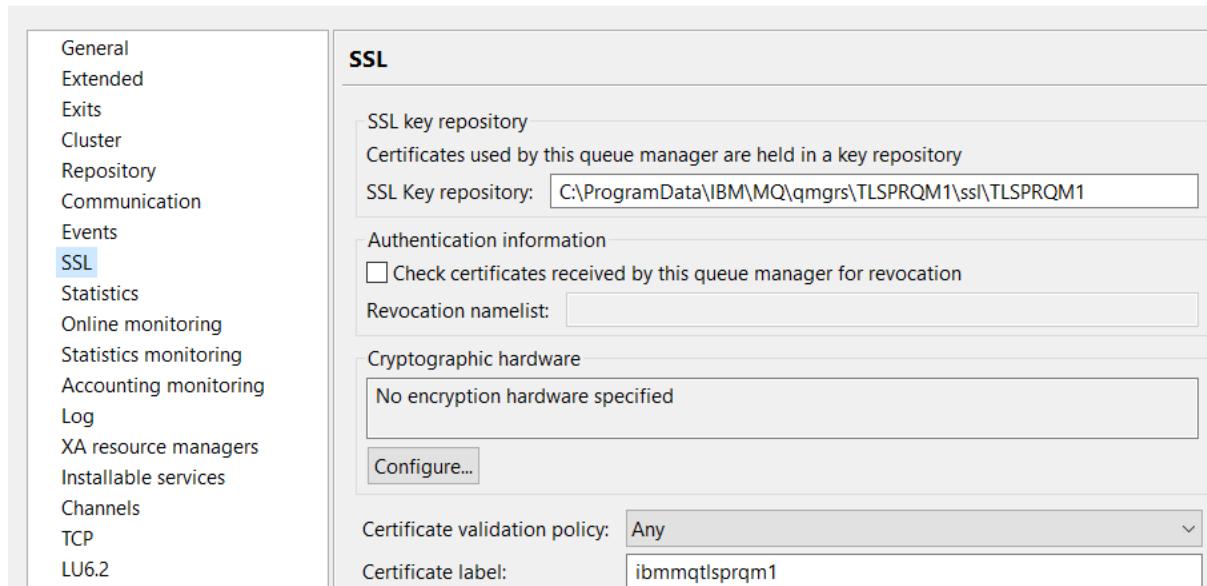


If you choose not to use the default `ibmwebspheremq<lower case queue manager name>` you will need to change this value in the queue manager.

In this example we will use a non default. “`ibmmq<lower case queue manager name>` i.e. `ibmmqtlsprqm1`

Therefore I will change the queue manager's cert label

TLSPRQM1 - Properties



TLS server certificate setup

Create the certificate:

```
runmqckm -cert -create -db "C:\ProgramData\IBM\MQ\qmgrs\TLSPRQM1\ssl\TLSPRQM1.kdb" -pw  
serverpass -label ibmmqtlsprqm1 -dn "CN=TLSPRQM1,OU=Support,O=IBM,ST=NC,C=" -expire 365
```

```
C:\ProgramData\IBM\MQ\qmgrs\TLSPRQM1\ssl>runmqckm -cert -create -db "C:\ProgramData\IBM\MQ\qmgrs\TLSPRQM1\ssl\TLSPRQM1.kdb"  
-pw serverpass -label ibmmqtlsprqm1 -dn "CN=TLSPRQM1,OU=Support,O=IBM,ST=NC,C=" -expire 365  
5724-H72 (C) Copyright IBM Corp. 1994, 2019.  
C:\ProgramData\IBM\MQ\qmgrs\TLSPRQM1\ssl>
```

List the certificate:

```
runmqckm -cert -list -db "C:\ProgramData\IBM\MQ\qmgrs\TLSPRQM1\ssl\TLSPRQM1.kdb" -pw  
serverpass
```

```
C:\ProgramData\IBM\MQ\qmgrs\TLSPRQM1\ssl>runmqckm -cert -list -db "C:\ProgramData\IBM\MQ\qmgrs\TLSPRQM1\ssl\TLSPRQM1.kdb"  
-pw serverpass  
5724-H72 (C) Copyright IBM Corp. 1994, 2019.  
Certificates in database C:\ProgramData\IBM\MQ\qmgrs\TLSPRQM1\ssl\TLSPRQM1.kdb:  
ibmmqtlsprqm1
```

Notice that the file size for the kdb file was increased

```
dir C:\ProgramData\IBM\MQ\qmgrs\TLSPRQM1\ssl
```

```
C:\ProgramData\IBM\MQ\qmgrs\TLSPRQM1\ssl>dir C:\ProgramData\IBM\MQ\qmgrs\TLSPRQM1\ssl  
Volume in drive C is Windows  
Volume Serial Number is 3CBA-3B12  
  
Directory of C:\ProgramData\IBM\MQ\qmgrs\TLSPRQM1\ssl  
  
18/12/2019  06:41 PM    <DIR>          .  
18/12/2019  06:41 PM    <DIR>          ..  
18/12/2019  06:48 PM           5,088  TLSPRQM1.kdb  
18/12/2019  06:48 PM            80  TLSPRQM1.rdb  
18/12/2019  06:41 PM           193  TLSPRQM1.sth
```

Step 6: Server: Add the SSL client certificate to the Queue Manager's key database.

Add the SSL client certificate **arnold.crt** to the Queue Manager's key database.

Change to the directory where the queue manager key database is located:

(linux cd /var/mqm/qmgrs/TLSPRQM1/ssl/)

Cd C:\ProgramData\IBM\MQ\qmgrs\TLSPRQM1\ssl

Notice that the file rivera.crt is in the directory: ls -l -rw----- 1 rivera mqm 5080 2014-03-04 11:43 QM_71SSL.kdb -rw----- 1 rivera mqm 80 2014-03-04 11:43 QM_71SSL.rdb -rw----- 1 rivera mqm 129 2014-03-04 11:37 QM_71SSL.sth -rw----- 1 rivera mqm 776 2014-03-04 11:50 rivera.crt (new file)

Add the client certificate arnold.crt:

Windows (C) > Program Files > IBM > MQ

	Name	Date modified	Type
<input checked="" type="checkbox"/>	arnold	18/12/2019 5:03 PM	Security Certificate
<input type="checkbox"/>	arnold.kdb	18/12/2019 4:56 PM	KDB File
<input type="checkbox"/>	arnold.rdb	18/12/2019 4:56 PM	RDB File
<input type="checkbox"/>	arnold.sth	18/12/2019 4:34 PM	STH File

runmqckm -cert -add -db "C:\ProgramData\IBM\MQ\qmgrs\TLSPRQM1\ssl\TLSPRQM1.kdb" -pw serverpass -label ibmmqarnold -file "c:\program files\ibm\mq\arnold.crt" -format ascii

```
C:\ProgramData\IBM\MQ\qmgrs\TLSPRQM1\ssl>runmqckm -cert -add -db "C:\ProgramData\IBM\MQ\qmgrs\TLSPRQM1\ssl\TLSPRQM1.kdb"
-pw serverpass -label ibmmqarnold -file "c:\program files\ibm\mq\arnold.crt" -format ascii
5724-H72 (C) Copyright IBM Corp. 1994, 2019.

C:\ProgramData\IBM\MQ\qmgrs\TLSPRQM1\ssl>
```

List the certificates:

runmqckm -cert -list -db "C:\ProgramData\IBM\MQ\qmgrs\TLSPRQM1\ssl\TLSPRQM1.kdb" -pw serverpass

```
C:\ProgramData\IBM\MQ\qmgrs\TLSPRQM1\ssl>runmqckm -cert -list -db "C:\ProgramData\IBM\MQ\qmgrs\TLSPRQM1\ssl\TLSPRQM1.kdb"
-pw serverpass
5724-H72 (C) Copyright IBM Corp. 1994, 2019.
Certificates in database C:\ProgramData\IBM\MQ\qmgrs\TLSPRQM1\ssl\TLSPRQM1.kdb:
    ibmmqtlsprqm1
    ibmmqarnold
```

Notice the increase in size for the kdb file:

```
C:\ProgramData\IBM\MQ\qmgrs\TLSPRQM1\ssl>dir
Volume in drive C is Windows
Volume Serial Number is 3CBA-3B12

Directory of C:\ProgramData\IBM\MQ\qmgrs\TLSPRQM1\ssl

18/12/2019  06:41 PM    <DIR>      .
18/12/2019  06:41 PM    <DIR>      ..
18/12/2019  07:02 PM           10,088 TLSPRQM1.kdb
18/12/2019  07:02 PM            80 TLSPRQM1.rdb
18/12/2019  06:41 PM            193 TLSPRQM1.sth
```

Step 7: Server: Extract the public TLS server certificate and copy it to the TLS client side

Extract the public TLS server certificate to make it available to the TLS client side

Change to the directory where the queue manager key database is located:

(linux cd /var/mqm/qmgrs/TLSPRQM1/ssl/)

Cd C:\ProgramData\IBM\MQ\qmgrs\TLSPRQM1\ssl

```
runmqckm -cert -extract -db "C:\ProgramData\IBM\MQ\qmgrs\TLSPRQM1\ssl\TLSPRQM1.kdb" -pw
serverpass -label ibmmqtlsprqm1 -target TLSPRQM1.crt -format ascii
```

The file "TLSPRQM1.crt" is created in the current directory

```
C:\ProgramData\IBM\MQ\qmgrs\TLSPRQM1\ssl>runmqckm -cert -extract -db "C:\ProgramData\IBM\MQ\qmgrs\TLSPRQM1\ssl\TLSPRQM1.
kdb" -pw serverpass -label ibmmqtlsprqm1 -target TLSPRQM1.crt -format ascii
5724-H72 (C) Copyright IBM Corp. 1994, 2019.
```

Dir C:\ProgramData\IBM\MQ\qmgrs\TLSPRQM1\ssl

```
C:\ProgramData\IBM\MQ\qmgrs\TLSPRQM1\ssl>dir
Volume in drive C is Windows
Volume Serial Number is 3CBA-3B12

Directory of C:\ProgramData\IBM\MQ\qmgrs\TLSPRQM1\ssl

18/12/2019  07:12 PM    <DIR>   .
18/12/2019  07:12 PM    <DIR>   ..
18/12/2019  07:12 PM           842 TLSPRQM1.crt
18/12/2019  07:02 PM        10,088 TLSPRQM1.kdb
18/12/2019  07:02 PM          80 TLSPRQM1.rdb
18/12/2019  06:41 PM        193 TLSPRQM1.sth
```

Step 8: Client: Add the SSL client certificate to the Client's key database.

The MQ Queue Manager Signer Certificate, " TLSPRQM1.crt" needs to be made available to the host where the MQ Client is located.

Change directory to the local client side key database arnold.kdb

```
cd C:\Program Files\IBM\MQ
```

```
C:\Program Files\IBM\MQ>dir arnold.*
Volume in drive C is Windows
Volume Serial Number is 3CBA-3B12

Directory of C:\Program Files\IBM\MQ

18/12/2019  05:03 PM           836 arnold.crt
18/12/2019  04:56 PM        5,088 arnold.kdb
18/12/2019  04:56 PM          80 arnold.rdb
18/12/2019  04:34 PM        193 arnold.sth
```

Client side key database

	Name	Date modified	Type	Size
<input type="checkbox"/>	arnold	18/12/2019 5:03 PM	Security Certificate	1 KB
<input checked="" type="checkbox"/>	arnold.kdb	18/12/2019 4:56 PM	KDB File	5 KB
<input type="checkbox"/>	arnold.rdb	18/12/2019 4:56 PM	RDB File	1 KB
<input type="checkbox"/>	arnold.sth	18/12/2019 4:34 PM	STH File	1 KB

Add the queue manager certificate to client side key database

Queue manager certificate

Windows (C) > ProgramData > IBM > MQ > qmgrs > TLSPRQM1 > ssl

Name	Date modified	Type
TLSPRQM1	18/12/2019 7:12 PM	Security Certificate
TLSPRQM1.kdb	18/12/2019 7:02 PM	KDB File
TLSPRQM1.rdb	18/12/2019 7:02 PM	RDB File
TLSPRQM1.sth	18/12/2019 6:41 PM	STH File

```
runmqckm -cert -add -db "C:\Program Files\IBM\MQ\arnold.kdb" -pw clientpass -label  
ibmmqtlsprqm1 -file "c:\programData\ibm\mq\qmgrs\TLSPRQM1\ssl\TLSPRQM1.crt" -format ascii
```

```
C:\Program Files\IBM\MQ>runmqckm -cert -add -db "C:\Program Files\IBM\MQ\arnold.kdb" -pw clientpass -label ibmmqtlsprqm1  
-file "c:\programData\ibm\mq\qmgrs\TLSPRQM1\ssl\TLSPRQM1.crt" -format ascii  
5724-H72 (C) Copyright IBM Corp. 1994, 2019.
```

```
C:\Program Files\IBM\MQ>
```

List the certificate

```
runmqckm -cert -list -db "C:\Program Files\IBM\MQ\arnold.kdb" -pw clientpass
```

```
C:\Program Files\IBM\MQ>runmqckm -cert -list -db "C:\Program Files\IBM\MQ\arnold.kdb" -pw clientpass  
5724-H72 (C) Copyright IBM Corp. 1994, 2019.  
Certificates in database C:\Program Files\IBM\MQ\arnold.kdb:  
ibmmqarnold  
ibmmqtlsprqm1
```

Note the change in size of the arnold.kbd file

```
C:\Program Files\IBM\MQ>dir arnold.*  
Volume in drive C is Windows  
Volume Serial Number is 3CBA-3B12  
  
Directory of C:\Program Files\IBM\MQ  
  
18/12/2019 05:03 PM 836 arnold.crt  
18/12/2019 07:28 PM 10,088 arnold.kdb  
18/12/2019 07:28 PM 80 arnold.rdb  
18/12/2019 04:34 PM 193 arnold.sth
```

Step 9: Server: Run MQSC commands for TLS server side queue manager

GSKit will add the ".kdb" suffix for the key database. So don't add the kdb extension

You MUST provide the value for SSLKEYR as follows:

full path name of the key store MINUS the .kdb suffix (the .kdb is added at runtime):

Windows Full path name with suffix:

```
C:\ProgramData\IBM\MQ\qmgrs\TLSPRQM1\ssl\TLSPRQM1.kdb
```

Windows Full path name minus suffix: C:\ProgramData\IBM\MQ\qmgrs\TLSPRQM1\ssl\TLSPRQM1

(Linux full path name minus suffix /var/mqm/qmgrs/ TLSPRQM1/ssl/ TLSPRQM1)

Watch out for single quotes when cut and pasting – you might have to type over them in the command after the paste.

Runmqsc TLSPRQM1

```
ALTER QMGR SSLKEYR('C:\ProgramData\IBM\MQ\qmgrs\TLSPRQM1\ssl\TLSPRQM1')
```

```
ALTER QMGR SSLFIPS(NO)
```

```
ALTER QMGR SSLKEYR('C:\ProgramData\IBM\MQ\qmgrs\TLSPRQM1\ssl\TLSPRQM1')
  2 : ALTER QMGR SSLKEYR('C:\ProgramData\IBM\MQ\qmgrs\TLSPRQM1\ssl\TLSPRQM1')
AMQ8005I: IBM MQ queue manager changed.
ALTER QMGR SSLFIPS(NO)
  3 : ALTER QMGR SSLFIPS(NO)
AMQ8005I: IBM MQ queue manager changed.
```

```
DEFINE CHANNEL('TLSPRQM1.SVRCONN') CHLTYPE(SVRCONN) TRPTYPE(TCP) SSLCIPH(ANY_TLS12)
SSLCAUTH(REQUIRED) REPLACE
```

```
SET CHLAUTH(TLSPRQM1.SVRCONN) TYPE(BLOCKUSER) USERLIST('nobody')
```

```
REFRESH SECURITY TYPE(SSL)
```

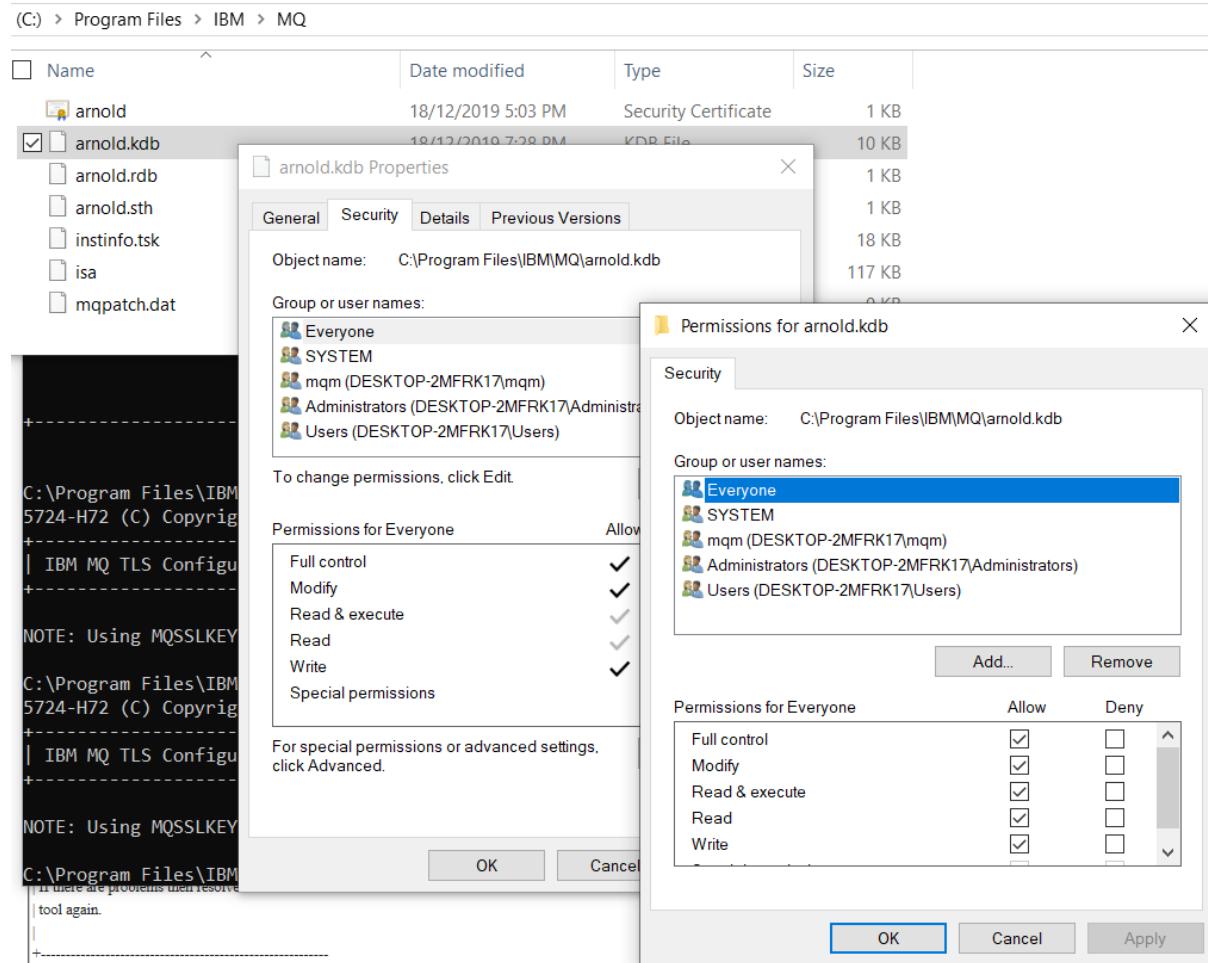
```
end
```

```
DEFINE CHANNEL('TLSPRQM1.SVRCONN') CHLTYPE(SVRCONN) TRPTYPE(TCP) SSLCIPH(ANY_TLS12) SSLCAUTH(REQUIRED) REPLACE
  7 : DEFINE CHANNEL('TLSPRQM1.SVRCONN') CHLTYPE(SVRCONN) TRPTYPE(TCP) SSLCIPH(ANY_TLS12) SSLCAUTH(REQUIRED) REPLACE
AMQ8014I: IBM MQ channel created.
REFRESH SECURITY TYPE(SSL)
  8 : REFRESH SECURITY TYPE(SSL)
AMQ8560I: IBM MQ security cache refreshed.
end
  9 : end
```

Step 10: Verifying the TLS set up with MQCERTCK

File read/write attributes on the .KDB

There might be a problem with read/write access to the files



Notes from an IBM tech note

Check the AMQERR01.LOG

AMQ9660: SSL key repository: password stash file absent or unusable. EXPLANATION: The SSL key repository cannot be used because MQ cannot obtain a password to access it. Reasons giving rise to this error include: (a) the key database file and password stash file are not present in the location configured for the key repository, (b) the key database file exists in the correct place but that no password stash file has been created for it, (c) the files are present in the correct place but the userid under which MQ is running does not have permission to read them, (d) one or both of the files are corrupt.

ACTION: Ensure that the key repository variable is set to where the key database file is. Ensure that a password stash file has been associated with the key database file in the same directory, and that the userid under which MQ is running has read access to both files. If both are already present and readable in the correct place, delete and recreate them. Restart the channel.

file permissions for the ssl files:

```
cd /var/mqm/qmgrs/TLSPRQM1/ssl ls -l -rw----- 1 davidarnold mqm 782 2014-03-04 12:12  
TLSPRQM1.crt -rw----- 1 davidarnold mqm 10080 2014-03-04 11:51 TLSPRQM1.kdb -rw----- 1  
arnold mqm 80 2014-03-04 11:51 TLSPRQM1.rdb -rw----- 1 davidarnold mqm 129 2014-03-04  
11:37 TLSPRQM1.sth -rw----- 1 davidarnold mqm 776 2014-03-04 11:50 arnold.crt
```

Notice that the userid “davidarnold” is being used in this scenario. This user is a member of the “mqm” group, but the SSL files were created in such a way that other members of the group cannot read/write the files.

Change the permissions to allow the group “mqm” to read and write:

```
/var/mqm/qmgrs/TLSPRQM1/ssl chmod 660 *
```

```
rivera@veracruz: /var/mqm/qmgrs/TLSPRQM1/ssl ls -l -rw-rw--- 1 davidarnold mqm 782 2014-03-  
04 12:12 TLSPRQM1.crt -rw-rw--- 1 davidarnold mqm 10080 2014-03-04 11:51 TLSPRQM1.kdb -rw-  
rw--- 1 davidarnold mqm 80 2014-03-04 11:51 TLSPRQM1.rdb -rw-rw--- 1 davidarnold mqm 129  
2014-03-04 11:37 TLSPRQM1.sth -rw-rw--- 1 davidarnold mqm 776 2014-03-04 11:50 arnold.crt
```

Using MQCERTCK

```
mqcrtck <QMName> -clientkeyr <Client Key Repository> -clientchannel <Channel Name> -  
clientusername <Client Username> -clientlabel <Client Certificate label> -clientport <Free  
Port Number>
```

Set the environment variable for the client side key database arnold.kdb

```
set MQSSLKEYR=C:\Program Files\IBM\MQ\arnold
```

set the environment variable for MQSERVER to specific the client channel

```
Set MQSERVER=TLSPRQM1.SVRCONN/TCP/localhost(2414)
```

Try mqcrtck with -clientuser mqm

```
C:\Program Files\IBM\MQ>mqcrtck TLSPRQM1 -clientchannel TLSPRQM1.SVRCONN -clientuser  
mqm -clientport 5857
```

5724-H72 (C) Copyright IBM Corp. 1994, 2019.

```
+-----
```

```
| IBM MQ TLS Configuration Test tool
```

```
+-----
```

NOTE: Using MQSSLKEYR environment variable

```
C:\Program Files\IBM\MQ>mqcrtck TLSPRQM1 -clientchannel TLSPRQM1.SVRCONN -clientuser mqm -clientport 5857  
5724-H72 (C) Copyright IBM Corp. 1994, 2019.  
+-----  
| IBM MQ TLS Configuration Test tool  
+-----  
NOTE: Using MQSSLKEYR environment variable  
C:\Program Files\IBM\MQ>
```

Try mqcrtck with -clientlabel ibmmqtlspqrqm1

```
C:\Program Files\IBM\MQ>mqcertck TLSPRQM1 -clientchannel TLSPRQM1.SVRCONN -clientlabel  
ibmmqtlsprqm1 -clientport 5857
```

```
C:\Program Files\IBM\MQ>mqcertck TLSPRQM1 -clientchannel TLSPRQM1.SVRCONN -clientlabel ibmmqtlsprqm1 -clientport 5857  
5724-H72 (C) Copyright IBM Corp. 1994, 2019.  
+-----  
| IBM MQ TLS Configuration Test tool  
+-----  
NOTE: Using MQSSLKEYR environment variable  
C:\Program Files\IBM\MQ>
```

Step 11: Client: use runmqsc in client mode to connect to the TLSPRQM1 and administer it

Set the environment variable to point to the client's key database

Windows (C:) > Program Files > IBM > MQ

	Name	Date modified	Type
...	arnold	18/12/2019 5:03 PM	Security Certificate
...	<input checked="" type="checkbox"/> arnold.kdb	18/12/2019 7:28 PM	KDB File
...	arnold.rdb	18/12/2019 7:28 PM	RDB File
...	arnold.sth	18/12/2019 4:34 PM	STH File

Windows Full path name with suffix: C:\Program Files\IBM\MQ\arnold.kdb

Windows Full path name minus suffix: C:\Program Files\IBM\MQ\arnold

```
set MQSSLKEYR=C:\Program Files\IBM\MQ\arnold
```

```
C:\Program Files\IBM\MQ>set MQSSLKEYR=C:\Program Files\IBM\MQ\arnold  
C:\Program Files\IBM\MQ>echo %MQSSLKEYR%  
C:\Program Files\IBM\MQ\arnold
```

Using MQSERVER for the client channel won't work

Set the environment variable for the MQSERVER

Set MQSERVER=TLSPRQM1.SVRCONN/TCP/localhost(2414)

```
C:\Program Files\IBM\MQ>Set MQSERVER= TLSPRQM1.SVRCONN/TCP/localhost(2414)  
C:\Program Files\IBM\MQ>echo %MQSERVER%  
TLSPRQM1.SVRCONN/TCP/localhost(2414)
```

Note that you cannot set the cipherspec for the client side channel to use.

If you runmqsc -c TLSPRQM1 it fails

```
C:\Program Files\IBM\MQ>runmqsc -c TLSPRQM1  
5724-H72 (C) Copyright IBM Corp. 1994, 2019.  
Starting MQSC for queue manager TLSPRQM1.  
  
AMQ9709E: SSL/TLS initialization error.  
0 command responses received.  
  
C:\Program Files\IBM\MQ>
```

In the logs

Windows (C:) > ProgramData > IBM > MQ > qmgrs > TLSPRQM1 > errors

Name	Date modified
AMQERR01	18/12/2019 11:08 PM

MQ9639E: Remote channel 'TLSPRQM1.SVRCONN' did not specify a CipherSpec.

EXPLANATION:

Remote channel 'TLSPRQM1.SVRCONN' did not specify a CipherSpec when the local channel expected one to be specified.

Using MQCCDT for the client channel

Notes:

Do we have to use MQCCDT file in order for runmqsc to client connect because the MQSERVER limits the details we can specify for the connection to the SVRCONN

A CCDT enables the specification of cipher specs etc to be specified on the client end

See <https://www-01.ibm.com/support/docview.wss?uid=swg27045974&aid=1>

A CCDT file always have at least one channel: SYSTEM.DEF.CLNTCONN # It is the default, but causes confusion. Do not use it.

We need a CLNTCONN channel something like the following

display CHANNEL(TLSPRQM1.SVRCONN) all AMQ8414: Display Channel details.

CHANNEL(TLSPRQM1.SVRCONN)

CHLTYP(CLNTCONN) AFFINITY(PREFERRED) CERTLBL() CLNTWGHT(0)
COMPHDR(NONE) COMPMMSG(NONE)

CONNNAME(localhost(2414)) DEFRECON(NO) DESCRIPTOR() HBINT(300)
KAINT(AUTO) LOCLADDR() MAXMSGL(4194304) MODENAME()
PASSWORD() QMNAME(TLSPRQM1) RCVDATA() RCVEXIT()
SCYDATA() SCYEXIT() SENDDATA() SENDEXIT() SHARECNV(10)

SSLIPH(ANY_TLS12) SSLPEER() TPNAME() TRPTYPE(TCP) USERID()

Set up the CCDT

Create an client connection channel MQSC file

Make sure you add the **CERTLAB** to the CLNTCONN definition and retry

```
DEFINE CHANNEL(TLSPRQM1.SVRCONN) +
    CHLTYPE(CLNTCONN) +
    TRPTYPE(TCP) +
    CONNAME('localhost(2414)') +
    CERTLBL('ibmmqarnold') +
    QMNAME(TLSPRQM1) +
    SSLCIPH(ANY_TLS12) +
    REPLACE
```

```
C:\temp>dir TLSPRQM1CLTCONN.mqsc
Volume in drive C is Windows
Volume Serial Number is 3CBA-3B12

Directory of C:\temp

19/12/2019  10:38 AM           197 TLSPRQM1CLTCONN.mqsc
                  1 File(s)           197 bytes
                   0 Dir(s)  211,153,235,968 bytes free

C:\temp>type TLSPRQM1CLTCONN.mqsc
DEFINE CHANNEL(TLSPRQM1.SVRCONN) +
    CHLTYPE(CLNTCONN) +
    TRPTYPE(TCP) +
    CONNAME('localhost(2414)') +
    CERTLBL('ibmmqarnold') +
    QMNAME(TLSPRQM1) +
    SSLCIPH(ANY_TLS12) +
    REPLACE
```

Runmqsc with the -n (no queue manager switch) to create a CCDT from the MQSC script

```
runmqsc -n < c:\temp\TLSPRQM1CLTCONN.MQSC
```

```
C:\temp>runmqsc -n < c:\temp\TLSPRQM1CLTCONN.MQSC
5724-H72 (C) Copyright IBM Corp. 1994, 2019.
Starting local MQSC for 'AMQCLCHL.TAB'.
 1 : DEFINE CHANNEL(TLSPRQM1.SVRCONN) +
      : CHLTYPE(CLNTCONN) +
      : TRPTYPE(TCP) +
      : CONNAME('localhost(2414)') +
      : QMNAME(TLSPRQM1) +
      : SSLCIPH(ANY_TLS12) +
      : REPLACE
AMQ8014I: IBM MQ channel created.
  :
  :
No commands have a syntax error.
```

If the default CCDT TAB name and default CCDT TAB directory are not used, we will need to set up the environment variable for path to AMQCLCHL.TAB

Because I have used all defaults the MQClient code will find and use the default AMQCLCHL.TAB

On Linux

```
export MQCHLTAB=/var/mqm/AMQCLCHL.TAB
echo $MQCHLTAB
```

On windows

```
set MQCHLTAB= C:\ProgramData\IBM\MQ\AMQCLCHL.TAB
echo %MQCHLTAB%
C:\ProgramData\IBM\MQ
```

Windows (C:) > ProgramData > IBM > MQ

	Name	Date modified	Type
	AMQCLCHL.TAB	19/12/2019 10:04 AM	TAB File

```
C:\temp>cd \programData\ibm\mq

C:\ProgramData\IBM\MQ>type AMQCLCHL.TAB
AMQR          TLSPRQM1.SVRCONN      2  2  2
RQM1                                     localhost(2414)          TLSP
<  FÜ; 2
FÜ; @ 2                                     localhost(2414)

          0, 2      2  ö  ç
ANY_TLS12                                     2  2  2
          FÜ; FÜ; 2  è  2      ibmmqarnold
                                         c1 .]                                     2
C:\ProgramData\IBM\MQ>
```

Check the MQSSLKEYR environment variable

```
C:\ProgramData\IBM\MQ>echo %MQSSLKEYR%
c:\program files\ibm\mq\arnold

C:\ProgramData\IBM\MQ>
```

Clear MQSERVER environment variable

```
C:\ProgramData\IBM\MQ>set MQSERVER=
C:\ProgramData\IBM\MQ>echo %MQSERVER%
%MQSERVER%

C:\ProgramData\IBM\MQ>
```

runmqsc -c TLSPRQM1

If you get any of the errors below check the logs C:\ProgramData\IBM\MQ\qmgrs\TLSPRQM1\errors

Goto the debug section in the document for help.

```
C:\ProgramData\IBM\MQ>runmqsc -c TLSPRQM1
5724-H72 (C) Copyright IBM Corp. 1994, 2019.
Starting MQSC for queue manager TLSPRQM1.

AMQ9709E: SSL/TLS initialization error.
```

```
C:\temp>runmqsc -c TLSPRQM1
5724-H72 (C) Copyright IBM Corp. 1994, 2019.
Starting MQSC for queue manager TLSPRQM1.

AMQ8135E: Not authorized.
```

You should get

```
C:\temp>runmqsc -c TLSPRQM1
5724-H72 (C) Copyright IBM Corp. 1994, 2019.
Starting MQSC for queue manager TLSPRQM1.

dis QL(*)
  1 : dis QL(*)
AMQ8409I: Display Queue details.
  QUEUE(AMQ.5DF9F6E423C0A402)          TYPE(QLOCAL)
AMQ8409I: Display Queue details.
```

SUCCESS!!!!

SERVERside TLS files – end of exercise

Windows (C:) > ProgramData > IBM > MQ > qmgrs > TLSPRQM1 > ssl

Name	Date modified	Type
TLSPRQM1	18/12/2019 7:12 PM	Security Certificate
TLSPRQM1.kdb	18/12/2019 7:02 PM	KDB File
TLSPRQM1.rdb	18/12/2019 7:02 PM	RDB File
TLSPRQM1.sth	18/12/2019 6:41 PM	STH File

CLIENTside TLS files – end of exercise

Windows (C:) > Program Files > IBM > MQ

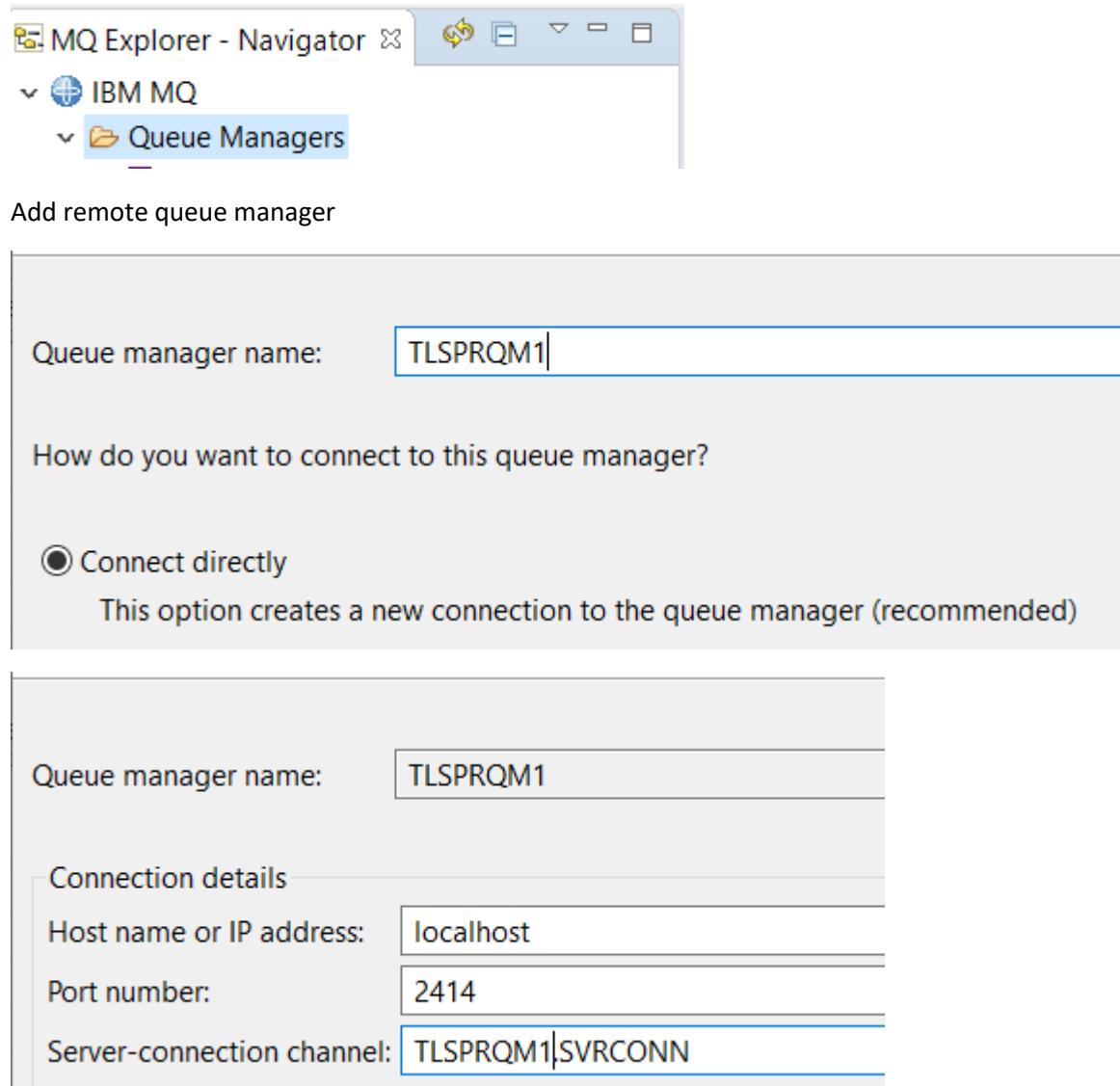
Name	Date modified	Type
arnold	18/12/2019 5:03 PM	Security Certificate
arnold.kdb	18/12/2019 7:28 PM	KDB File
arnold.rdb	18/12/2019 7:28 PM	RDB File
arnold.sth	18/12/2019 4:34 PM	STH File

Step 12: Client: connect MQ Explore to queue manager via “Add remote Queue Manager”

What the blazes! .JKS

https://www.ibm.com/support/knowledgecenter/en/SSFKSJ_9.1.0/com.ibm.mq.adm.doc/q020430.htm

When you get to the SSL certificate repository details MQExplorer wants .JKS note .KDB



Specify SSL certificate key repository details

Provide the location and password of a trusted store and optionally a personal certificate store

Queue manager name:

Enable SSL key repositories

Trusted Certificate Store

Store name:
Password:

Personal Certificate Store

Store name:
Password:

Creating the custom MQ Image Layer for ICP4i on RHOS 4.2

Run docker images

REPOSITORY	TAG	IMAGE ID	CREATED	SIZE
davexacom/ibm-mqadvanced-server-ivt	9.1.3.0-r4-amd64	e269ad126613	3 days ago	932MB
ace11002mqc91intms1	1.0	ec39bb5df84f	8 days ago	1.59GB
ibmcom/mq	latest	268baf40303f	13 days ago	927MB
ibmcom/ace-mq	latest	0f5a883d8a95	5 weeks ago	2.51GB
ibmcom/ace-mqclient	latest	d71cee6dfd5f	5 weeks ago	1.94GB
ibmcom/ace	latest	d33c5a966d7b	5 weeks ago	1.63GB
ibm-mqadvanced-server-integration	9.1.3.0-r4-amd64	ee41039b9552	6 weeks ago	932MB

If you do not have an image for the IBM published ibm-mqadvanced-server-integration 9.1.3.0-r4-amd64 see the instructions in the RHOS 3.11 section for loading the image into the local repository

TLS enabled custom image layer – Build Files

md ibm-mqadvanced-server-tls

cd ibm-mqadvanced-server-tls

```
C:\Users\DAVIDARNOLD\myDocker>md ibm-mqadvanced-server-tls  
C:\Users\DAVIDARNOLD\myDocker>cd ibm-mqadvanced-server-tls  
C:\Users\DAVIDARNOLD\myDocker\ibm-mqadvanced-server-tls>
```

Windows (C) > Users > DAVIDARNOLD > myDocker > ibm-mqadvanced-server-tls

Name	Date modified	Type
dockerfile	20/12/2019 12:24 PM	File
NOTLS.mqsc	20/12/2019 9:51 AM	MQSC File
TLSPRQM1	18/12/2019 7:12 PM	Security Certificate
TLSPRQM1.kdb	18/12/2019 7:02 PM	KDB File
TLSPRQM1.mqsc	20/12/2019 10:48 AM	MQSC File
TLSPRQM1.rdb	18/12/2019 7:02 PM	RDB File
TLSPRQM1.sth	18/12/2019 6:41 PM	STH File

Docker file – run mqsc scripts and copy .KDB file to image

Notepad++ dockerfile

```
FROM ibm-mqadvanced-server-integration:9.1.3.0-r4-amd64
```

```
USER mqm
```

```
COPY TLSPRQM1.mqsc /etc/mqm/
```

```
COPY NOTLS.mqsc /etc/mqm/
```

```
COPY TLSPRQM1.kdb /run/runmqserver/tls/
```

```
COPY TLSPRQM1.crt /etc/mqm/
COPY TLSPRQM1.rdb /etc/mqm/
COPY TLSPRQM1.sth /etc/mqm/
```

```

1 FROM ibm-mqadvanced-server-integration:9.1.3.0-r4-amd64
2
3 USER mqm
4
5 COPY TLSPRQM1.mqsc /etc/mqm/
6 COPY NOTLS.mqsc /etc/mqm/
7
8 COPY TLSPRQM1.kdb /etc/mqm/
9 COPY TLSPRQM1.crt /etc/mqm/
10 COPY TLSPRQM1.rdb /etc/mqm/
11 COPY TLSPRQM1.sth /etc/mqm/

```

TLSPRQM1.mqsc – enable TLS clients to connect
notes

MUSR_MQADMIN is windows version of mqm user in linux so should be changed for linux container deployment

The supplied base container sets this ('/run/runmqserver/tls/key') to target key.kdb

We will ALTER QMGR SSLKEYR to target TLSPRQM1.kdb

if you copy in the TLSPRQM1.kbd (and other key files) to the /run/runmqserver/tls directory this happens at start up so put it elsewhere /etc/mqm for example

*2019-12-19T23:42:50.123Z Failed to create PKCS#12 TrustStore: error running
"/opt/mqm/bin/runmqakm -keydb -create": /opt/mqm/bin/runmqakm: exit status 1 CTGSK3026W
The key file "/run/runmqserver/tls/trust.p12" does not exist or cannot be read.*

The supplied image does ALTER QMGR CERTLBL("")

We need to set CERTLBL('ibmmqtlsprqm1')

The MSQC file:

```

DEFINE CHANNEL(TLSPRQM1.SVRCONN) CHLTYPE(SVRCONN) SSLCIPH(ANY_TLS12) REPLACE
SET CHLAUTH(TLSPRQM1.SVRCONN) TYPE(BLOCKUSER) USERLIST(nobody)
ALTER AUTHINFO(SYSTEM.DEFAULT.AUTHINFO.IDPWOS) AUTHTYPE(IDPWOS) CHCKCLNT(NONE)
ADOPTCTX(YES)
SET CHLAUTH(TLSPRQM1.SVRCONN) TYPE (ADDRESSMAP) ADDRESS(*) MCAUSER('mqm')
ALTER QMGR SSLKEYR('/etc/mqm/TLSPRQM1') CERTLBL('ibmmqtlsprqm1')
REFRESH SECURITY TYPE(CONNAUTH)
REFRESH SECURITY
```

Notepad++ TLSPRQM1.mqsc

```
dockerfile TLSPRQM1.mqsc NOTLS.mqsc NOTLSPRQM1CLTCONN.mqsc TLSPRQM1CLTCONN.mqsc
1 DEFINE CHANNEL(TLSPRQM1.SVRCONN) CHLTYPE(SVRCONN) SSLCIPH(ANY_TLS12) |REPLACE
2 SET CHLAUTH(TLSPRQM1.SVRCONN) TYPE(BLOCKUSER) USERLIST(nobody)
3 ALTER AUTHINFO(SYSTEM.DEFAULT.AUTHINFO.IDPWOS) AUTHTYPE(IDPWOS) CHCKCLNT(NONE) ADOPTCTX(YES)
4 SET CHLAUTH(TLSPRQM1.SVRCONN) TYPE (ADDRESSMAP) ADDRESS(*) MCAUSER('mqm')
5 ALTER QMGR SSLKEYR('/etc/mqm/TLSPRQM1') CERTLBL('ibmmqtlsprqm1')
6 REFRESH SECURITY TYPE(CONNAUTH)
7 REFRESH SECURITY
```

NOTLS.mqsc – add channel for in cluster clients to connect

```
DEFINE CHANNEL(IVT.SVRCONN) CHLTYPE(SVRCONN)
```

```
SET CHLAUTH(IVT.SVRCONN) TYPE(BLOCKUSER) USERLIST(nobody)
```

```
ALTER AUTHINFO(SYSTEM.DEFAULT.AUTHINFO.IDPWOS) AUTHTYPE(IDPWOS) CHCKCLNT(NONE)
ADOPTCTX(YES)
```

```
SET CHLAUTH(IVT.SVRCONN) TYPE (ADDRESSMAP) ADDRESS(*) MCAUSER('mqm')
```

```
REFRESH SECURITY TYPE(CONNAUTH)
```

Key database files and password stash files

The .KDB etc with server side and client side certs from the matched set of files created earlier

Docker build – Create image FROM ibm-mqadvanced-server

```
C:\Users\DAVIDARNOLD\myDocker\ibm-mqadvanced-server-tls>dir
Volume in drive C is Windows
Volume Serial Number is 3CBA-3B12

Directory of C:\Users\DAVIDARNOLD\myDocker\ibm-mqadvanced-server-tls

20/12/2019 12:22 PM <DIR> .
20/12/2019 12:22 PM <DIR> ..
20/12/2019 10:47 AM 157 dockerfile
20/12/2019 09:51 AM 304 NOTLS.mqsc
18/12/2019 07:12 PM 842 TLSPRQM1.crt
18/12/2019 07:02 PM 10,088 TLSPRQM1.kdb
20/12/2019 10:48 AM 387 TLSPRQM1.mqsc
18/12/2019 07:02 PM 80 TLSPRQM1.rdb
18/12/2019 06:41 PM 193 TLSPRQM1.sth
```

```
C:\Users\DAVIDARNOLD\myDocker\ibm-mqadvanced-server-tls> docker build -t davexacom/ibm-mqadvanced-server-tls:9.1.3.0-r4-amd64 .
```

```
C:\Users\DAVIDARNOLD\myDocker\ibm-mqadvanced-server-tls>docker build -t davexacom/ibm-mqadvanced-server-tls:9.1.3.0-r4-amd64 .
Sending build context to Docker daemon 18.43kB
Step 1/8 : FROM ibm-mqadvanced-server-integration:9.1.3.0-r4-amd64
--> ee41039b952
Step 2/8 : USER mqm
--> Using cache
--> 89c0bb4a3f90
Step 3/8 : COPY TLSPRQM1.mqsc /etc/mqm/
--> f4175b5e2b23
Step 4/8 : COPY NOTLS.mqsc /etc/mqm/
--> ada3d193149d
Step 5/8 : COPY TLSPRQM1.kdb /etc/mqm/
--> cfbf7115749c
Step 6/8 : COPY TLSPRQM1.crt /etc/mqm/
--> 8da14eae49e3
Step 7/8 : COPY TLSPRQM1.rdb /etc/mqm/
--> 75e9c882e224
Step 8/8 : COPY TLSPRQM1.sth /etc/mqm/
--> 0d0d475be96d
Successfully built 0d0d475be96d
Successfully tagged davexacom/ibm-mqadvanced-server-tls:9.1.3.0-r4-amd64
SECURITY WARNING: You are building a Docker image from Windows against a non-Windows Docker host. All files and directories added to build context will have '-rwxr-xr-x' permissions. It is recommended to double check and reset permissions for sensitive files and directories.
```

Perform Local testing on docker workstation

C:\Users\DAVIDARNOLD\myDocker\ibm-mqadvanced-server-tls>docker images

REPOSITORY	TAG	IMAGE ID	CREATED	SIZE
davexacom/ibm-mqadvanced-server-tls	9.1.3.0-r4-amd64	f34a2f062408	2 minutes ago	932MB

Start the container – docker run

C:\Users\DAVIDARNOLD\myDocker\ibm-mqadvanced-server-tls>docker run -e LICENSE=accept -e MQ_QMGR_NAME=TLSPRQM1 -P davexacom/ibm-mqadvanced-server-tls:9.1.3.0-r4-amd64

```
C:\Users\DAVIDARNOLD\myDocker\ibm-mqadvanced-server-tls>docker run -e LICENSE=accept -e MQ_QMGR_NAME=TLSPRQM1 -P davexacom/ibm-mqadvanced-server-tls:9.1.3.0-r4-amd64
2019-12-19T06:30:19.945Z CPU architecture: amd64
2019-12-19T06:30:19.945Z Linux kernel version: 4.9.184-linuxkit
2019-12-19T06:30:19.945Z Container runtime: docker
2019-12-19T06:30:19.945Z Base image: Red Hat Enterprise Linux Server 7.7 (Maipo)
2019-12-19T06:30:19.947Z Running as user ID 888 () with primary group 888, and supplementary groups 0
2019-12-19T06:30:19.947Z Capabilities (bounding set): chown,dac_override,fowner,fsetid,kill,setgid,setuid,setpcap,net_bind_service,net_raw,sys_chroot,mknod,audit_write,sefcap
2019-12-19T06:30:19.947Z seccomp enforcing mode: filtering
2019-12-19T06:30:19.947Z Process security attributes: none
2019-12-19T06:30:19.948Z No volume detected. Persistent messages may be lost
2019-12-19T06:30:19.971Z Open Tracing is disabled
2019-12-19T06:30:19.979Z Using queue manager name: TLSPRQM1
2019-12-19T06:30:19.984Z Created directory structure under /var/mqm
2019-12-19T06:30:19.984Z Image created: 2019-11-06T12:02:58+0000
2019-12-19T06:30:19.984Z Image tag: ibm-mqadvanced-server-integration:9.1.3.0-r4-amd64
2019-12-19T06:30:19.994Z MQ version: 9.1.3.0
2019-12-19T06:30:19.995Z MQ level: p913-L190628_IT30047_P
2019-12-19T06:30:19.995Z MQ license: Production
2019-12-19T06:30:20.398Z Creating queue manager TLSPRQM1
```

Break

note that the default container image sets an SSLKEYR ssl key repository of /run/runmqserver/tls/key which means it expects a key.kdb file in that location to house the key database.

```
: * Set the keystore location for the queue manager
 1 : ALTER QMGR SSLKEYR('/run/runmqserver/tls/key')
AMQ8005I: IBM MQ queue manager changed.
 2 : ALTER QMGR CERTLBL('')
AMQ8005I: IBM MQ queue manager changed.
 3 : REFRESH SECURITY(*) TYPE(SSL)
AMQ8560I: IBM MQ security cache refreshed.
 3 MQSC commands read.
```

Here are our TLS channel definitions being run

```
Starting MQSC for queue manager TLSPRQM1.
```

```
1 : DEFINE CHANNEL(TLSPRQM1.SVRCONN) CHLTYPE(SVRCONN) SSLCIPH(ANY_TLS12) REPLACE
AMQ8014I: IBM MQ channel created.
2 : SET CHLAUTH(TLSPRQM1.SVRCONN) TYPE(BLOCKUSER) USERLIST(nobody)
AMQ8877I: IBM MQ channel authentication record set.
3 : ALTER AUTHINFO(SYSTEM.DEFAULT.AUTHINFO.IDPWOS) AUTHTYPE(IDPWOS) CHCKCLNT(NONE) ADOPTCTX(YES)
AMQ8567I: IBM MQ authentication information changed.
4 : SET CHLAUTH(TLSPRQM1.SVRCONN) TYPE (ADDRESSMAP) ADDRESS(*) MCAUSER('mqm')
AMQ8877I: IBM MQ channel authentication record set.
5 : ALTER QMGR SSLKEYR('/etc/mqm/TLSPRQM1') CERTLBL('ibmmqtlspqrqm1')
AMQ8005I: IBM MQ queue manager changed.
6 : REFRESH SECURITY TYPE(CONNAUTH)
AMQ8560I: IBM MQ security cache refreshed.
7 : REFRESH SECURITY
AMQ8560I: IBM MQ security cache refreshed.
7 MQSC commands read.
```

```
2019-12-19T06:30:21.648Z Metrics are disabled
2019-12-19T06:30:21.471Z AMQ5051I: The queue manager task 'LOGGER-IO' has started.
2019-12-19T06:30:21.477Z AMQ7229I: 5 log records accessed on queue manager 'TLSPRQM1' during the log replay phase.
2019-12-19T06:30:21.477Z AMQ7230I: Log replay for queue manager 'TLSPRQM1' complete.
2019-12-19T06:30:21.478Z AMQ5051I: The queue manager task 'CHECKPOINT' has started.
2019-12-19T06:30:21.480Z AMQ7231I: 0 log records accessed on queue manager 'TLSPRQM1' during the recovery phase.
2019-12-19T06:30:21.480Z AMQ7232I: Transaction manager state recovered for queue manager 'TLSPRQM1'.
2019-12-19T06:30:21.488Z AMQ7233I: 0 out of 0 in-flight transactions resolved for queue manager 'TLSPRQM1'.
```

C:\Users\DAVIDARNOLD\myDocker\ibm-mqadvanced-server-tls>docker ps

CONTAINER ID	IMAGE	COMMAND	CREATED
STATUS	PORTS		NAMES
3a10fb9133ac	davexacom/ibm-mqadvanced-server-tls:9.1.3.0-r4-amd64	"runmqintegraser..."	41 seconds ago
Up 40 seconds	0.0.0.0:32782->1414/tcp, 0.0.0.0:32781->9157/tcp, 0.0.0.0:32780->9443/tcp		lucid_haibt

Ports exposed 0.0.0.0:32782->1414/tcp, 0.0.0.0:32781->9157/tcp, 0.0.0.0:32780->9443/tcp

Connect MQ Explorer

Add remote queue manager



Add Queue Manager

Select the queue manager and connection method

Identify the queue manager to add and choose the connection method to use

Queue manager name:

TLSPRQM1

How do you want to connect to this queue manager?

Connect directly

This option creates a new connection to the queue manager (recommended)



Add Queue Manager

Specify new connection details

Provide details of the connection you want to set up

Queue manager name:

TLSPRQM1

Connection details

Host name or IP address:

localhost

Port number:

32782

Server-connection channel:

IVT.SVRCONN



Add Queue Manager

Specify user identification details

Provide a userid name and password

Queue manager name:

TLSPRQM1

Enable user identification

User identification compatibility mode

Userid: mqm

Password

No password

The screenshot shows the MQ Explorer interface with two panes. The left pane, titled 'MQ Explorer - Name', lists various queue managers and their channels. The right pane, titled 'MQ Explorer - Content', is titled 'Channels' and contains a table with 13 rows of channel information.

Channel name	Channel type
IVT.SVRCONN	Server-connection
SYSTEM.AUTO.RECEIVER	Receiver
SYSTEM.AUTO.SVRCONN	Server-connection
SYSTEM.DEF.AMQP	AMQP
SYSTEM.DEF.CLUSRCVR	Cluster-receiver
SYSTEM.DEFCLUSSDR	Cluster-sender
SYSTEM.DEF.RECEIVER	Receiver
SYSTEM.DEF.REQUESTER	Requester
SYSTEM.DEF.SENDER	Sender
SYSTEM.DEF.SERVER	Server
SYSTEM.DEF.SVRCONN	Server-connection
TLSPRQM1.SVRCONN	Server-connection

Connect RUNMQSC via Non TLS client

Set MQSERVER=IVT.SVRCONN/TCP/localhost(32782)

```
C:\temp>Set MQSERVER=IVT.SVRCONN/TCP/localhost(32782)
```

```
C:\temp>runmqsc -c TLSPRQM1
5724-H72 (C) Copyright IBM Corp. 1994, 2019.
Starting MQSC for queue manager TLSPRQM1.
```

```
dis ql(*)
  1 : dis ql(*)
AMQ8409I: Display Queue details.
  QUEUE(AMQ.5DFC2484257A2902)                      TYPE(QLOCAL)
AMQ8409I: Display Queue details
```

Connect RUNMQSC via TLS client

Set up the Client Channel Definition Table

Create an client connection channel MQSC file

Make sure you correctly set the port number

```
DEFINE CHANNEL(TLSPRQM1.SVRCONN) +
```

```
CHLTYPE(CLNTCONN) +
```

```

TRPTYPE(TCP) +
CONNNAME('localhost(32782)') +
CERTLBL('ibmmqarnold') +
QMNAME(TLSPRQM1) +
SSLCIPH(ANY_TLS12) +
REPLACE

```

```

1 DEFINE CHANNEL(TLSPRQM1.SVRCONN) +
2   CHLTYPE(CLNTCONN) +
3   TRPTYPE(TCP) +
4   CONNAME('localhost(32782)') +
5   CERTLBL('ibmmqarnold') +
6   QMNAME(TLSPRQM1) +
7   SSLCIPH(ANY_TLS12) +
8   REPLACE

```

Runmqsc with the -n (no queue manager switch) to create a CCDT from the MQSC script

```
runmqsc -n < c:\temp\TLSPRQM1CLTCONN.MQSC
```

```
C:\temp>runmqsc -n < c:\temp\TLSPRQM1CLTCONN.MQSC
5724-H72 (C) Copyright IBM Corp. 1994, 2019.
Starting local MQSC for 'AMQCLCHL.TAB'.
1 : DEFINE CHANNEL(TLSPRQM1.SVRCONN) +
:   CHLTYPE(CLNTCONN) +
:   TRPTYPE(TCP) +
:   CONNAME('localhost(32782)') +
:   CERTLBL('ibmmqarnold') +
:   QMNAME(TLSPRQM1) +
:   SSLCIPH(ANY_TLS12) +
:   REPLACE
AMQ8014I: IBM MQ channel created.
:
:
No commands have a syntax error.
```

Optionally set the CCDT environment variables

If the default CCDT TAB name and default CCDT TAB directory are not used, we will need to set up the environment variable for path to AMQCLCHL.TAB

Because I have used all defaults the MQClient code will find and use the default AMQCLCHL.TAB

```
dir c:\programdata\ibm\mq\*.TAB
```

This is the default but for reference purposes here's how to set the environment variable.

On Linux

```
export MQCHLLIB=/var/mqm/AMQCLCHL.TAB
```

```
echo $MQCHLLIB
```

On windows

```
set MQCHLLIB=C:\ProgramData\IBM\MQ\AMQCLCHL.TAB
```

```
echo %MQCHLLIB%
```

set MOCHLTAB= AMOCLCHL.TAB

```
echo %MQCHLTAB%
```

Eyeball the .TAB file – check for host and port number

```
type c:\programdata\ibm\mq\AMQCLCHL.TAB
```

```
C:\temp>type c:\programdata\ibm\mq\AMQCLCHL.TAB
AMQR          TLSPRQM1.SVRCONN  2 2 2
RQM1                                     localhost(32782)
                                         2 p2

<   ;Ü;@@@                                     localhost(32782)

;Ü; @ @                                     localhost(32782)

ANY_TLS12                                     2 2 2
                                         ibmmqarnold
                                         J%n]
                                         B
C:\temp>
```

Clear the `MOSERVER` environment variable so the CCDT is used

SET MOSERVER=

ECHO %MOSERVER%

Set the MQSSLKEYR environment variable for the client side
set MQSSLKEYR=C:\Program Files\IBM\MQ\arnold

```
C:\temp>set MQSSLKEYR=C:\Program Files\IBM\MQ\arnold  
  
C:\temp>echo %MQSSLKEYR%  
C:\Program Files\IBM\MQ\arnold  
  
C:\temp>dir C:\\"Program Files"\IBM\MQ\arnold.kdb  
Volume in drive C is Windows  
Volume Serial Number is 3CBA-3B12  
  
Directory of C:\Program Files\IBM\MQ  
  
18/12/2019  07:28 PM           10,088 arnold.kdb  
                  1 File(s)      10,088 bytes  
                  0 Dir(s)  215,355,838,464 bytes free
```

Double check MQSERVER is clear

Echo %MQSERVER%

```
C:\ProgramData\IBM\MQ>set MQSERVER=  
  
C:\ProgramData\IBM\MQ>echo %MQSERVER%  
%MQSERVER%  
  
C:\ProgramData\IBM\MQ>
```

runmqsc -c TLSPRQM1

```
C:\temp>runmqsc -c TLSPRQM1
5724-H72 (C) Copyright IBM Corp. 1994, 2019.
Starting MQSC for queue manager TLSPRQM1.
```

```
dis chl(TLSPRQM1.SVRCONN)
  1 : dis chl(TLSPRQM1.SVRCONN)
AMQ8414I: Display Channel details.

          CHANNEL(TLSPRQM1.SVRCONN)           CHLTYPE(SVRCONN)
          ALTDATE(2019-12-20)                 ALTTIME(01.59.34)
          CERTLBL( )                         COMPHDR(NONE)
          COMPMMSG(NONE)                   DESCRL( )
          DISCINT(0)                       HBINT(300)
          KAINT(AUTO)                     MAXINST(999999999)
          MAXINSTC(999999999)             MAXMSGL(4194304)
          MCAUSER( )                      MONCHL(QMGR)
          RCVDATA( )                      RCVEXIT( )
          SCYDATA( )                      SCYEXIT( )
          SENDDATA( )                     SENDEXIT( )
          SHARECNV(10)                   SSLCAUTH(REQUIRED)
          SSLCIPH(ANY_TLS12)              SSLPEER( )
          TRPTYPE(TCP)
```

You are now connected to TLSPRQM1 in your container via TLS

Testing TLS custom MQ Image Layer on RHOS 3.11

Pushing the custom image to docker hub

```
C:\Users\DAVIDARNOLD\myDocker\ibm-mqadvanced-server-tls>docker images
```

REPOSITORY	TAG	IMAGE ID	CREATED	SIZE
davexacom/ibm-mqadvanced-server-tls	9.1.3.0-r4-amd64	2237fea38967	17 minutes ago	932MB

```
C:\Users\DAVIDARNOLD\myDocker\ibm-mqadvanced-server-ivt>docker images
```

REPOSITORY	TAG	IMAGE ID	CREATED	SIZE
davexacom/ibm-mqadvanced-server-ivt	9.1.3.0-r4-amd64	e269ad126613	5 minutes ago	932MB

<https://hub.docker.com/repositories>

The screenshot shows the Docker Hub interface. At the top, there's a search bar and navigation links for Explore, Repositories, Organizations, Get Help, and a user dropdown. Below that, a dropdown menu shows 'davexacom' selected. A search bar for repository names is also present. On the right, a blue button says 'Create Repository+'. The main area displays three repository cards for 'davexacom':

- ace11002mqc91intms1**: Updated a year ago, 13 downloads, PUBLIC.
- ace11002mqc91soe**: Updated a year ago, 43 downloads, PUBLIC.
- ace11002mqc91intms2**: Updated a year ago, 12 downloads, PUBLIC.

docker push davexacom/ibm-mqadvanced-server-tls:9.1.3.0-r4-amd64

```
C:\Users\DAVIDARNOLD\myDocker\ibm-mqadvanced-server-ivt>docker push davexacom/ibm-mqadvanced-server-tls:9.1.3.0-r4-amd64
```

The push refers to repository [docker.io/davexacom/ibm-mqadvanced-server-tls]

```
0d8459f27ecc: Pushing [=====] 3.072kB
ac7598f58291: Pushing [=====] 1.378MB/3.735MB
6eb6a773bf24: Pushing [=====] 1.378MB/3.735MB
07cdf8094239: Pushing [=====] 561.2kB/3.49MB
9f4789d1e0ed: Pushing [=====] 3.072kB
364112d1df0e: Waiting
cd28e8b3d42a: Pushed
2705f79af6db: Layer already exists
ce459cc53899: Layer already exists 9.1.3.0-r4-
amd64: digest: sha256:040e8e0aca3307369b10cce8411f97e147a9a92bb7514619a16c2a78093c085f
size: 5963
```

<https://hub.docker.com/repository/docker/davexacom/ibm-mqadvanced-server-tls>

Docker Hub

https://hub.docker.com

davexacom / ibm-mqadvanced-server-tls

9.1.3.0-r4-amd64

a few seconds ago

Create a new Image Stream on RHOS 3.11

<https://registry-console-default.apps.ocp.cloudnativekube.com/registry#/images/mq>

Name	Tags	Repository
mq/libm-mq-oidc-registration	2.1.0-amd64	docker-registry.default.svc:5000/mq/libm-mq-oidc-registration
mq/libm-mqadvanced-server-integration	9.1.3.0-r1-amd64	docker-registry.default.svc:5000/mq/libm-mqadvanced-server-integration

New image stream

Repository

Docker.io/davexacom/ibm-mqadvanced-server-tls

Create new image stream

Create image stream

Name	ibm-mqadvanced-server-tls
Project	mq
Populate	Pull specific tags from another image repository
Pull from	docker.io/davexacom/ibm-mqadvanced-server-tls
Tags	9.1.3.0-r4-amd64
<input type="checkbox"/> Remote registry is insecure	
Cancel Create	

 mq/ibm-mqadvanced-server-tls [Show all image streams](#)

Image Stream

Access Policy [Images may only be pulled by specific users or groups](#) 

Pulling repository: docker-registry.default.svc:5000/mq/ibm-mqadvanced-server-tls

Image count: 1

 To push an image to this image stream:

```
$ sudo docker tag myimage docker-registry-default.apps.ocp.cloudnativekube.com/mq/ibm-mqadvanced-server-tls:tag
$ sudo docker push docker-registry-default.apps.ocp.cloudnativekube.com/mq/ibm-mqadvanced-server-tls:tag
```

Images

Tag	From
9.1.3.0-r4...	docker.io/davexacom/ibm-mqadvanced-server-tls:9.1.3.0-r4-amd64

Pulling repository to use in helm charts on 3.11

docker-registry.default.svc:5000/mq/ibm-mqadvanced-server-tls

Add new ICP4i instance of MQ custom TLS layer on RHOS 3.11

<https://icp-proxy.apps.ocp.cloudnativekube.com/integration>



MQ

mq

idcab1

⋮

mqtest

⋮

Add new instance

Add a queue manager based messaging capability

You'll be deploying [IBM MQ](#) to provide this capability. Please work with your IBM Cloud Private cluster administrator to ensure the following dependencies are satisfied:

- a unique [namespace](#) must exist for the sole use of IBM MQ. Multiple instances can be deployed in the same namespace. This namespace must allow deployments that require a [security context constraint](#) of type : **ibm-anyuid-scc**.
- a [storage class](#) or [persistent volume](#) needs to be provided for persistent storage

Close

Continue

Configure Helm chart

ibm-mqadvanced-server-integration-prod V 4.1.0

[Overview](#) [Configuration](#)

 IBM Certified Container

IBM MQ queue manager for Cloud Pak for Integration

[ibm-entitled-charts](#)

[Licenses](#) | [Release Notes](#) | [Qualification](#)

IBM Certified Container

4.1.0 ▾

 IBM MQ Advanced

Introduction

This chart deploys a single IBM® MQ version 9.1.3 middleware that simplifies and accelerates the integration of multiple platforms. It uses message queues to facilitate a messaging solution for cloud, mobile, Internet of T

Hit configure

Configure

Values for the charts

Cluster Hostname (for deployment)

icp-proxy.apps.ocp.cloudnativekube.com

MQ server image:

docker-registry.default.svc:5000/mq/ibm-mqadvanced-server-tls

MQ Server image Tag:

9.1.3.0-r4

MQ Server OIDC registration image

docker-registry.default.svc:5000/mq/ibm-mq-oidc-registration

MQ Server OIDC registration image tag:

2.1.0

Managed NFS name (from oc command):

managed-nfs-storage

TLS Secret

ibm-mq-tls-secret

ibm-mqadvanced-server-integration-prod V 4.1.0

Overview Configuration

⚠ Pod Security Warning Your ICP cluster is running all namespaces Unrestricted (ibm-anyuid-hostpath-psp) by default. This could pose a security risk.

Configuration

IBM MQ queue manager for Cloud Pak for Integration. Edit these parameters for configuration.

Helm release name *
tlspqrmlp

Target namespace *
mq

Target Cluster *
local-cluster

License **i*
 I have read and agreed to the License agreement

icp-proxy.apps.ocp.cloudnativekube.com

Quick start
Required and recommended parameters to view and edit.

TLS
Configuration settings for TLS

Cluster hostname **i*

icp-proxy.apps.ocp.cloudnativekube.com|

MQ server image:

docker-registry.default.svc:5000/mq/ibm-mqadvanced-server-tls

MQ Server image Tag:

9.1.3.0-r4

Results in the following image and tag being used

docker-registry.default.svc:5000/mq/ibm-mqadvanced-server-tls:9.1.3.0-r4-amd64

Image Configuration settings for the container image	
Image repository * docker-registry.default.svc:5000/mq/ibm-mqadvanced-server-tls	Image tag *<small>i</small> 9.1.3.0-r4
Image pull secret Enter value	Image pull policy (for all images) * IfNotPresent

MQ Server OIDC registration image

docker-registry.default.svc:5000/mq/ibm-mq-oidc-registration

MQ Server OIDC registration image tag:

2.1.0

Single sign-on Configuration settings for single sign-on	
Registration image repository * docker-registry.default.svc:5000/mq/ibm-mq-oidc-registration	Registration image tag * 2.1.0

TLS Secret

Ibm-mq-tls-secret

TLS Configuration settings for TLS	
<input checked="" type="checkbox"/> Generate Certificate	
Cluster hostname * icp-proxy.apps.ocp.cloudnativekube.com	Secret name<small>i</small> Ibm-mq-tls-secret

Managed NFS name (from oc command):

managed-nfs-storage

Persistence

Configuration settings for Persistent Volumes

Enable persistence *

Use dynamic provisioning *

Data PVC

Configuration settings for the main Persistent Volume Claim

Name *

data

Storage Class name 

managed-nfs-storage

Size *

2Gi

Queue manager

Configuration settings for the Queue Manager

Queue manager name 

TLSPRQM1

Metrics

Configuration settings for Prometheus metrics

Enable metrics * 

Readiness probe

Configuration settings for the MQ readiness probe, which checks when the MQ listener is running

Initial delay (seconds)

30



Install

Use the little X to retain your populated chart for re-use if things go wrong.



Installation started. For progress view your Helm releases.

[View Helm Releases](#)

Return to [Catalog](#)

Verifying the Helm release via ICP foundation

The screenshot shows a dark-themed user interface with a navigation bar at the top. On the left is a white button with a black 'X'. To its right is the text "IBM Cloud Pak for Integration". Below this, there are two more items: "Platform home" with a house icon and "Cloud Pak Foundation" with a cloud icon.



Overview

▼ Workloads

Brokered Services

DaemonSets

Deployments

Helm Releases

Helm Releases



You are currently viewing only the helm releases of this cluster.



tls



Name	Namespace	Status	Chart name	Current version
tlsprqm1p	mq	● Deployed	ibm-mqadvanced-server-integration-prod	4.1.0

tlsprqm1p ● Deployed

UPDATED: December 20, 2019 at 1:40 PM

Details and Upgrades		
CHART NAME	CURRENT VERSION	AVAILABLE VERSION
ibm-mqadvanced-server-integration-prod	4.1.0	5.0.0 ▲
NAMESPACE	Installed: December 20, 2019 → Release Notes	Released: November 29, 2019 → Release Notes
mq		
Job		
Name	COMPLETIONS	
tlsprqm1p-ibm-mq-registration	1/1	

Service				
Name	TYPE	Cluster IP	External IP	Port(s)
tlsprqm1p-ibm-mq	NodePort	172.30.190.198	<none>	9443:30218/TCP,1414:30182/TCP

[StatefulSets](#) / [tlsprqm1p-ibm-mq](#)

tlsprqm1p-ibm-mq

Overview [Events](#)

Events				
Type	Source	Count	Reason	Message
Normal	statefulset-controller	1	SuccessfulCreate	create Claim data-tlsprqm1p-ibm-mq-0 Pod tlsprqm1p-ibm-mq-0 in StatefulSet tlsprqm1p-ibm-mq success
Normal	statefulset-controller	1	SuccessfulCreate	create Pod tlsprqm1p-ibm-mq-0 in StatefulSet tlsprqm1p-ibm-mq successful

[StatefulSets](#) / [tlsprqm1p-ibm-mq](#) / [tlsprqm1p-ibm-mq-0](#)

tlsprqm1p-ibm-mq-0

Overview [Containers](#) [Events](#)

Name	Image	Port	State
qmgr	docker-registry.default.svc:5000/mq/ibm-mqadvanced-server-tls:9.1.3.0-r4-amd64	1414/TCP,9443/TCP,9157/TCP	Running

Configure client side CCDT for TLSRQM1 on RHOS 3.11
Goto the Helm release's service definition

Service				
Name	Type	Cluster IP	External IP	Port(s)
tsprqm1p-ibm-mq	NodePort	172.30.237.192	<none>	9443:32527/TCP,1414:32602/TCP

Click on qmgr 32602/TCP

Node port	console-https 32527/TCP qmgr 32602/TCP
------------------	---

Copy the URL from the web browser link

icp-console.apps.ocp.cloudnativekube.com:32602

Update the MQSC file that builds the CCDT

```
1 DEFINE CHANNEL(TLSPRQM1.SVRCONN) +
2   CHLTYPE(CLNTCONN) +
3   TRPTYPE(TCP) +
4   CONNAME('icp-console.apps.ocp.cloudnativekube.com(32602)') +
5   CERTLBL('ibmmqarnold') +
6   QMNAME(TLSPRQM1) +
7   SSLCIPH(ANY_TLS12) +
8   REPLACE
```

```
runmqsc -n < c:\temp\TLSPRQM1CLTCONN.MQSC
```

```
C:\temp>runmqsc -n < c:\temp\TLSPRQM1CLTCONN.MQSC
5724-H72 (C) Copyright IBM Corp. 1994, 2019.
Starting local MQSC for 'AMQCLCHL.TAB'.
 1 : DEFINE CHANNEL(TLSPRQM1.SVRCONN) +
      :       CHLTYPE(CLNTCONN) +
      :       TRPTYPE(TCP) +
      :       CONNAME('icp-console.apps.ocp.cloudnativekube.com(32602)') +
      :       CERTLBL('ibmmqarnold') +
      :       QMNAME(TLSPRQM1) +
      :       SSLCIPH(ANY_TLS12) +
      :       REPLACE
AMQ8014I: IBM MQ channel created.
  :
  :
No commands have a syntax error.
```

Check the MOSERVER, MOSSLKEYR and MQCHLIB MQCHLTAB environment variables are correct

MQSERVER, MQCHLLIB and MQCHLTAB can all be unset if defaults are being used.

MQSSLKEYR should have been set from the local docker testing

C:\temp\SET

```
LOGONSERVER=\DESKTOP-2MFRK17
MQSSLKEYR=C:\Program Files\IBM\MQ\arnold
MQ_FILE_PATH=C:\Program Files\IBM\MQ
```

Starting the MQ Web Console – from the service link
<https://icp-console.apps.ocp.cloudnativekube.com:32527/>

Add widgets->Queues

Create a new queue called MYQ

Create a Queue

Queue name: * 

Queue type:

Local Remote Alias Model

C:\temp\runmqsc -c TLSPRQM1

```
C:\temp>runmqsc -c TLSPRQM1
5724-H72 (C) Copyright IBM Corp. 1994, 2019.
Starting MQSC for queue manager TLSPRQM1.

dis chl(TLSPRQM1.SVRCONN)
  1 : dis chl(TLSPRQM1.SVRCONN)
AMQ8414I: Display Channel details.
  CHANNEL(TLSPRQM1.SVRCONN)          CHLTYPE(SVRCONN)
    ALTDATE(2019-12-20)              ALTTIME(02.50.41)
    CERTLBL( )                      COMPHDR(NONE)
    COMPMMSG(NONE)                  DESCRL( )
    DISCINT(0)                      HBINT(300)
    KAINT(AUTO)                     MAXINST(999999999)
    MAXINSTC(999999999)             MAXMSGL(4194304)
    MCAUSER( )                      MONCHL(QMGR)
    RCVDATA( )                      RCVEXIT( )
    SCYDATA( )                      SCYEXIT( )
    SENDDATA( )                     SENDEXIT( )
    SHARECNV(10)                    SSLCAUTH(REQUIRED)
    SSLCIPH(ANY_TLS12)              SSLPEER( )
    TRPTYPE(TCP)
dis ql(MYQ)
  2 : dis ql(MYQ)
AMQ8409I: Display Queue details.
  QUEUE(MYQ)                       TYPE(QLOCAL)
```

Success ! you are no TLS connected to a QMgr on RHOS 3.11

Using pre-configured collateral to connect

Custom Layer MQ Image for TLS

The custom layer MQ image with TLS enabled and the server side TLS files deployed

<https://hub.docker.com/repository/docker/davexacom/ibm-mqadvanced-server-tls>

The docker file and mq files used to create the image

<https://github.com/DAVEXACOM/Exploring-ICP4i-RHOS/tree/master/TLS%20-%20custom%20layer%20MQ%20Image/customImageLayerFiles>

Plus the server side TLS files it has deployed can be found here

<https://github.com/DAVEXACOM/Exploring-ICP4i-RHOS/tree/master/TLS%20-%20custom%20layer%20MQ%20Image/serverside%20TLS%20files>

Deploy an ICP4i MQ instance

Follow instructions from earlier in this section = “[Configure Helm Chart](#)”

CCDT

Client channel definition table and the MQSC file to create it.

AMQCLCHL.TAB from here and stick it in c:\programdata\ibm\mq (default location (windows example))

<https://github.com/DAVEXACOM/Exploring-ICP4i-RHOS/tree/master/TLS%20-%20custom%20layer%20MQ%20Image/CCDTfiles>

client side TLS files

The arnold.* client side files

in C:\Program Files\IBM\MQ (default location (windows example))

<https://github.com/DAVEXACOM/Exploring-ICP4i-RHOS/tree/master/TLS%20-%20custom%20layer%20MQ%20Image/clientside%20TLS%20files>

Set/Clear Environment Variables

Check the MQSERVER, MQSSLKEYR and MQCHLLIB MQCHLTAB environment variables are correct

MQSERVER, MQCHLLIB and MQCHLTAB can all be unset if defaults are being used.

MQSSLKEYR should have been set from the local docker testing

C:\temp\SET MQSSLKEYR=c:\Program Files\IBM\MQ\arnold

Connecting runmqsc in client mode

runmqsc -c TLSPRQM1

Testing TLS custom MQ Image Layer on RHOS 4.2

Create a new Image Stream on RHOS 4.2

Login into the RHOCP 4.2 dashboard

<https://console-openshift-console.apps.mq.dev.###mbr.com>

Goto Builds->Image Streams

The screenshot shows the Red Hat OpenShift Container Platform dashboard. The top navigation bar includes the Red Hat logo and the text "OpenShift Container Platform". A sidebar on the left lists various categories: Home, Operators, Workloads, Networking, Storage, and Builds. Under the Builds category, there are sub-options for Build Configs and Builds. The "Image Streams" option is highlighted with a blue selection bar at the bottom of the list.

<https://console-openshift-console.apps.mq.dev.###mbr.com/k8s/ns/default/imagestreams>

switch to the MQ project

The screenshot shows the Red Hat OpenShift Container Platform interface. At the top, the Red Hat logo and "Red Hat OpenShift Container Platform" are displayed. On the left, a sidebar menu includes "Administrator", "Home", and "Operators". The main content area is titled "Image Streams" and shows a "Create Image Stream" button. The project dropdown at the top right is set to "Project: mq".

Create Image Stream

Project: mq ▾

Create Image Stream

Create by manually entering YAML or JSON definitions, or by dragging and dropping a file into the editor.

```
1 apiVersion: image.openshift.io/v1
2 kind: ImageStream
3 metadata:
4   name: example
5   namespace: mq
6
```

Add the YAML to define the stream for [Docker.io/davexacom/ibm-mqadvanced-server-tls](#) using these details:

Name	ibm-mqadvanced-server-tls
Project	mq
Populate	Pull specific tags from another image repository
Pull from	docker.io/davexacom/ibm-mqadvanced-server-tls
Tags	9.1.3.0-r4-amd64

You can use the original MQ Image details as an example

Project: mq ▾

[Image Streams](#) > [Image Stream Details](#)

IS ibm-mqadvanced-server-integration

Overview

YAML

History

```
1 kind: ImageStream
2 apiVersion: image.openshift.io/v1
3 metadata:
4   name: ibm-mqadvanced-server-integration
5   namespace: mq
```

Result for custom layer MQ image should be as below

```
kind: ImageStream
apiVersion: image.openshift.io/v1
metadata:
  name: ibm-mqadvanced-server-tls
  namespace: mq
  selfLink: >-
    /apis/image.openshift.io/v1/namespaces/mq/imagestreams(ibm-mqadvanced-
server-tls
  uid: 166c6191-22e1-11ea-953d-0a580a81008b
  resourceVersion: '5278304'
  generation: 2
  creationTimestamp: '2019-12-20T04:27:52Z'
  annotations:
    openshift.io/dockerRepositoryCheck: '2019-12-20T04:27:55Z'
spec:
  lookupPolicy:
    local: false
  tags:
    - name: 9.1.3.0-r4-amd64
      annotations: null
      from:
        kind: DockerImage
        name: 'docker.io/davexacom/ibm-mqadvanced-server-tls:9.1.3.0-r4-amd64'
      generation: 2
```

```
importPolicy: {}
referencePolicy:
  type: Source
status:
  dockerImageRepository: >-
    image-registry.openshift-image-registry.svc:5000/mq/ibm-mqadvanced-server-tls
  publicDockerImageRepository: >-
    default-route-openshift-image-registry.apps.mq.dev.atombr.com/mq/ibm-mqadvanced-server-tls
  tags:
    - tag: 9.1.3.0-r4-amd64
      items:
        - created: '2019-12-20T04:27:55Z'
          dockerImageReference: >-
            docker.io/davexacom/ibm-mqadvanced-server-tls@sha256:b9cfafe7e3811fc80d5bd6ae130dab977cef5bc38ebe129ac408fc70a69b2450
            image: >-
              sha256:b9cfafe7e3811fc80d5bd6ae130dab977cef5bc38ebe129ac408fc70a69b2450
              generation: 2
```

Project: mq ▾

[Image Streams](#) > [Image Stream Details](#)

 **ibm-mqadvanced-server-tls**

[Overview](#)

[YAML](#)

[History](#)

Image Stream Overview

Name

ibm-mqadvanced-server-tls

Namespace

 **mq**

Labels

No labels

Annotations

[1 Annotation](#) 

Image Repository

image-registry.openshift-image-registry.svc:5000/mq/ibm-mqadvanced-server-tls

Public Image Repository

default-route-openshift-image-registry.apps.mq.dev.atombr.com/mq/ibm-mqadvanced-server-tls

Image Count

1

Created At

 Dec 20, 3:27 pm

 [Do you need to work with this Image Stream outside of the web console?](#)

Tags

Name	From	Identifier
 ibm-mqadvanced-server-tls:9.1.3.0-r4-amd64	docker.io/davexacom/ibm-mqadvanced-server-tls:9.1.3.0-r4-amd64	sha256:b9cfafe7e3811fc80d5bd6ae130dab977cef5bc38eb e129ac408fc70a69b2450

Pulling repository to use in helm charts on 4.2

image-registry.openshift-image-registry.svc:5000/mq/ibm-mqadvanced-server-tls

with a tag 9.1.3.0-r4-amd64

Add new ICP4i instance of MQ custom TLS layer on RHOS 4.2

Values for the charts

Cluster Hostname (for deployment)

icp-proxy.apps.mq.dev.###mbr.com

MQ server image:

image-registry.openshift-image-registry.svc:5000/mq/ibm-mqadvanced-server-tls

MQ Server image Tag:

9.1.3.0-r4

MQ Server OIDC registration image

image-registry.openshift-image-registry.svc:5000/mq/ibm-mq-oidc-registration

MQ Server OIDC registration image tag:

2.1.0-2.2.0

Managed NFS name (from oc command):

managed-nfs-storage-gp2

TLS Secret

ibm-mq-tls-secret

<https://ibm-icp4i-prod-integration.apps.mq.dev.###mbr.com/>

[Create instance](#)[View instances](#)

API Connect

Create, manage and secure your APIs
[Create instance](#)



App Connect

Unlock the power of your data to drive new opportunities
[Create instance](#)



Event Streams

Apache Kafka for the Enterprise
[Create instance](#)



MQ

Proven, enterprise-grade messaging that moves data to where it is needed
[Create instance](#)

Configure the Helm release parameters

ibm-mqadvanced-server-integration-prod V 5.0.0

[Overview](#)[Configuration](#)

Configuration

IBM MQ queue manager for Cloud Pak for Integration. Edit these parameters for configuration.

Helm release name ***Target namespace *****Target cluster *****License ***

I have read and agreed to the [License agreement](#)

Cluster Hostname (for deployment)

icp-proxy.apps.mq.dev.###mbr.com

Parameters

To install this chart, additional configuration is needed in Quick start.

Quick start

Required and recommended parameters to view and edit.

TLS

Configuration settings for TLS

Cluster hostname *

icp-proxy.apps.mq.dev.###mbr.com

MQ server image:

image-registry.openshift-image-registry.svc:5000/mq/ibm-mqadvanced-server-tls

MQ Server image Tag:

9.1.3.0-r4

Image

Configuration settings for the container image

Image repository *

image-registry.openshift-image-registry.svc:5000/mq/ibm-mqadvanced-server-tls

Image tag *

9.1.3.0-r4

Image pull secret

Enter value

Image pull policy (for all images) *

IfNotPresent

MQ Server OIDC registration image

image-registry.openshift-image-registry.svc:5000/mq/ibm-mq-oidc-registration

MQ Server OIDC registration image tag:

2.1.0-2.2.0

Single sign-on

Configuration settings for single sign-on

Registration image repository *	Registration image tag *
image-registry.openshift-image-registry.svc:5000/mq/ibm-mq-oidc-registration	2.2.0

TLS Secret

ibm-mq-tls-secret

TLS

Configuration settings for TLS

Generate Certificate (1)

Cluster hostname *	Secret name
icp-proxy.apps.mq.dev.atombr.com	ibm-mq-tls-secret

Storage class name for Data PVC, Log PVC and QM PVC – **gp2**

Data PVC

Configuration settings for the main Persistent Volume Claim

Name *	Storage Class name
data	gp2

Size *

2Gi

Log PVC

Configuration settings for the transaction logs Persistent Volume Claim

Enable separate storage for transaction logs *

Name *	Storage Class name
log	gp2

Size *

2Gi

QM PVC

Configuration settings for the queue manager data Persistent Volume Claim

Enable separate storage for queue manager data *

Name *

qm

Storage Class name

gp2

Size *

2Gi

Queue Manager Name: **TLSPRQM1**

Queue manager

Configuration settings for the Queue Manager

Queue manager name 

TLSPRQM1

Disable metrics

Metrics

Configuration settings for Prometheus metrics

Enable metrics * 

Increase initial delay on readiness probe

Readiness probe

Configuration settings for the MQ readiness probe

Initial delay (seconds)

30

Hit INSTALL



Installation started.

[Return to Home](#)

Click on the 'X' to retain your chart and values in case you need to try again.

Check the MQ Helm Release in ICP4i foundation

The screenshot shows a dark-themed interface with a white header bar. On the left is a close button ('X'). The main title is 'IBM Cloud Pak for Integration'. Below the title, there's a navigation bar with two items: 'Administer' and a right-pointing arrow. The 'Administer' item is highlighted with a blue outline.

From Administer select “Helm Releases”

Helm releases

The screenshot shows a table titled 'Helm releases'. A message at the top says 'You are currently viewing only the helm releases of this cluster.' The table has columns: Name, Namespace, Status, Chart name, Current version, Available version, and Updated. One row is visible: 'tlsprqm1p' in namespace 'mq' is 'Deployed' with chart 'ibm-mqadvanced-server-integration-prod' at version 5.0.0, 'Up To Date', and updated on December 23, 2019, 11:37am.

Name	Namespace	Status	Chart name	Current version	Available version	Updated
tlsprqm1p	mq	● Deployed	ibm-mqadvanced-server-integration-prod	5.0.0	Up To Date	December 23, 2019 11:37am

Job

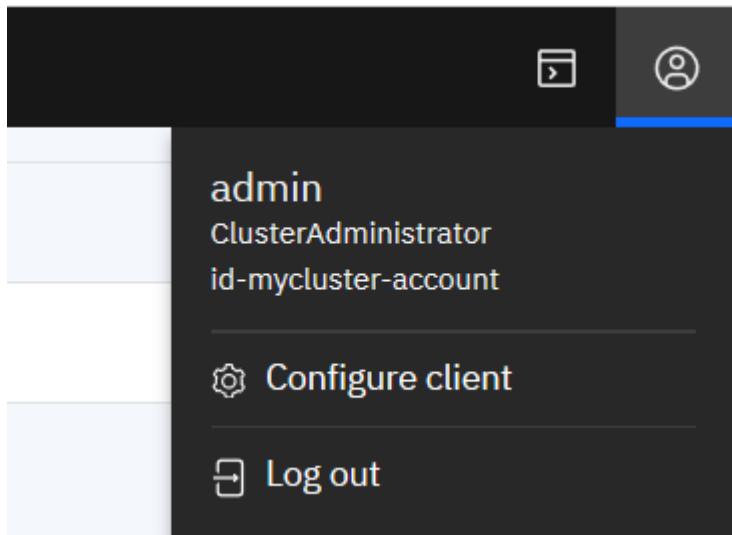
Name	Completions	Duration	Age
tlsprqm1p-ibm-mq-registration	1/1	11s	5m32s

Pod

Name	Ready	Status	Restarts	Age
tlsprqm1p-ibm-mq-0	1/1	Running	0	5m32s
tlsprqm1p-ibm-mq-registration-fs6wt	0/1	Completed	0	5m32s

tlsprqm1p-ibm-mq	ClusterIP	172.30.234.78	<none>	9443/TCP,1414/TCP								
ServiceAccount												
<table border="1"> <thead> <tr> <th>Name</th><th>Secrets</th><th>Age</th></tr> </thead> <tbody> <tr> <td>tlsprqm1p-ibm-mq</td><td>2</td><td>6m32s</td></tr> </tbody> </table>					Name	Secrets	Age	tlsprqm1p-ibm-mq	2	6m32s		
Name	Secrets	Age										
tlsprqm1p-ibm-mq	2	6m32s										
StatefulSet												
<table border="1"> <thead> <tr> <th>Name</th><th>Desired</th><th>Current</th><th>Age</th></tr> </thead> <tbody> <tr> <td>tlsprqm1p-ibm-mq</td><td>1</td><td>1</td><td>6m32s</td></tr> </tbody> </table>					Name	Desired	Current	Age	tlsprqm1p-ibm-mq	1	1	6m32s
Name	Desired	Current	Age									
tlsprqm1p-ibm-mq	1	1	6m32s									
Notes												
<p>Get the MQ Console URL by running these commands:</p> <pre>export CONSOLE_ROUTE=\$(kubectl get route tlsprqm1p-ibm-mq-web -n mq -o jsonpath=".spec.host") echo https://\$CONSOLE_ROUTE/ibmmq/console</pre> <p>The MQ connection information for clients inside the cluster is as follows:</p> <pre>tlsprqm1p-ibm-mq.mq.svc:1414</pre>												

Launch the MQ Console webUI for MQ on RHOS 4.2



Configure client

X

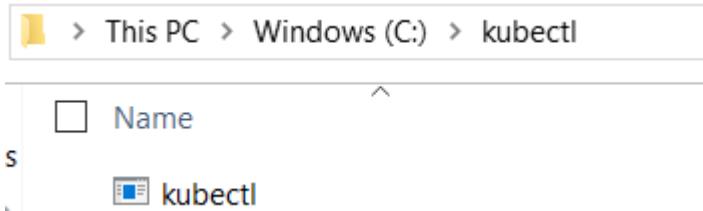
Before you run commands in the kubectl command line interface for this cluster, you must configure the client.

Prerequisites:

Install CLI tools

To configure the CLI, paste the displayed configuration commands into your terminal window and run them:

```
kubectl config set-cluster mycluster --server=https://api.mq.dev.mbr.com:6443 --insecure-skip-tls-verify=true
kubectl config set-context mycluster-context --cluster=mycluster
kubectl config set-credentials admin --token=05cX0JNuVgAt0PV2lSWJ
kubectl config set-context mycluster-context --user=admin --name=admin
kubectl config use-context mycluster-context
```



```
C:\kubectl>kubectl config set-cluster mycluster --server=https://api.mq.dev.mbr.com:6443 --insecure-skip-tls-verify=true
Cluster "mycluster" set.

C:\kubectl>kubectl config set-context mycluster-context --cluster=mycluster
Context "mycluster-context" modified.

C:\kubectl>kubectl config set-credentials admin --token=05cX0JNuVgAt0PV2lSWJ:fGrG6E6K-5YPvHqj_0fgW
User "admin" set.

C:\kubectl>kubectl config set-context mycluster-context --user=admin --namespace=tracing
Context "mycluster-context" modified.

C:\kubectl>kubectl config use-context mycluster-context
Switched to context "mycluster-context".
```

Get the MQ Console URL by running these commands:

Linux

```
export CONSOLE_ROUTE=$(kubectl get route tlsprqm1p-ibm-mq-web -n mq -o jsonpath=".spec.host")
```

```
echo https://$CONSOLE_ROUTE/ibmmq/console
```

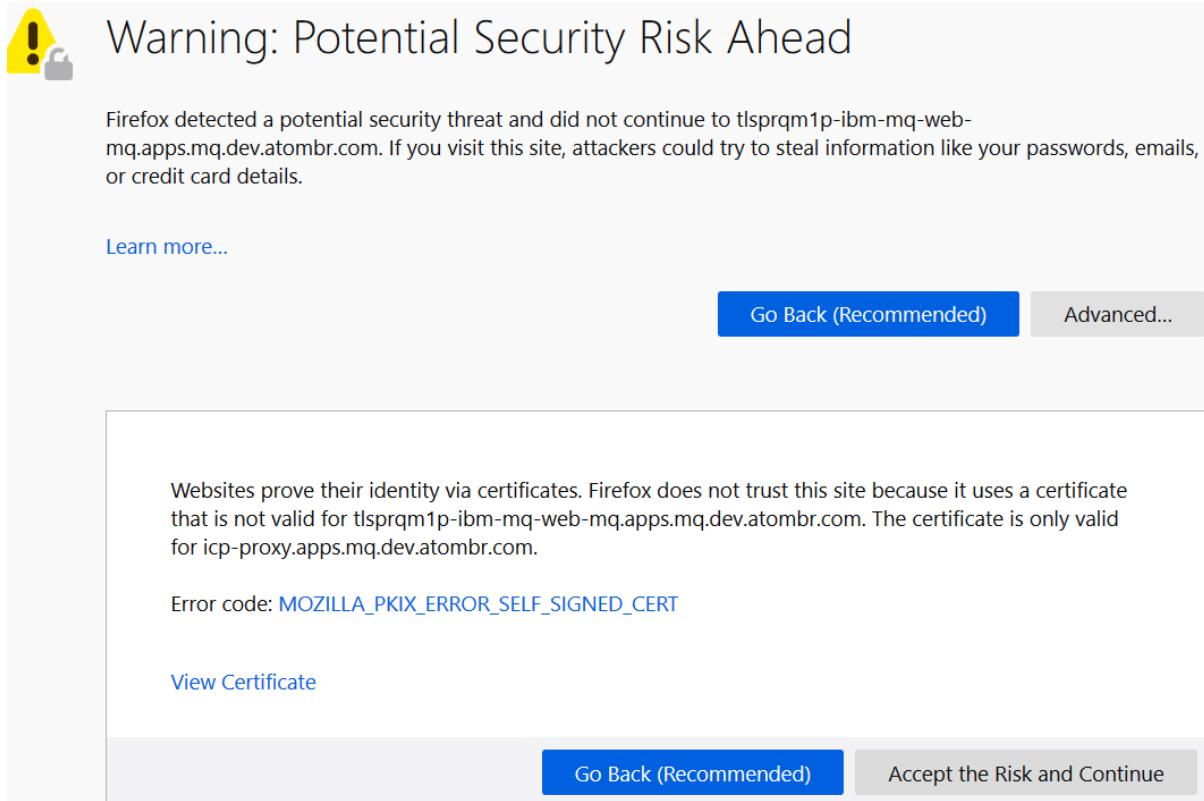
OR windows

```
C:\kubectl>kubectl get route tlsprqm1p-ibm-mq-web -n mq -o jsonpath=".spec.host"
```

```
C:\kubectl>kubectl get route tlsprqm1p-ibm-mq-web -n mq -o jsonpath=".spec.host" "tlsprqm1p-ibm-mq-web-mq.apps.mq.dev.###mbr.com"
```

Enter in a browser

<https://tlsprqm1p-ibm-mq-web-mq.apps.mq.dev.###mbr.com/>



Add Widgets – Queues, Channels etc

The screenshot shows the IBM Cloud Pak for Integration MQ interface. On the left, there's a sidebar for "Local Queue Managers" with one entry: "TLSPRQM1". The main area has tabs for "Local Queue Managers" and "Chart". A central modal dialog titled "Add a new widget" is open, showing options for "Local Queue Managers" and "Chart". Under "Local Queue Managers", "TLSPRQM1" is selected. A dropdown menu for "Queue manager" also shows "TLSPRQM1". Below the dropdown, there are four categories: "Queues", "Topics", "Listeners", and "Channels", each with a brief description. At the bottom of the dialog are "Close" and "Last updated: 12:00:36 PM" buttons.

Create a test queue

Create a Queue

Queue name: *

Queue type:

Local Remote Alias Model

review the Queue Managers properties for SSL

IBM Cloud Pak for Integration | MQ mq | tlspqm1p

Properties for 'TLSPRQM1'

Local Queues

Properties

Name: TLSPRQM1

General

Extended

Cluster

Repository

Communication

Events

SSL

Statistics

SSL Key repository: /etc/mqm/TLSPRQM1

Cert label: ibmmqtlspqm1

Certificate validation policy: Any

SSL FIPS required: No

review the TLSPRQM1.SVRCONN properties for SSL

IBM Cloud Pak for Integration | MQ mq | tlspqm1p

Properties for 'TLSPRQM1.SVRCONN'

TLSPRQM1

Total: 1

Channels

Delete

General

Extended

MCA

Exits

SSL

Statistics

SSL cipher spec: ANY_TLS12

Peer name:

SSL authentication: Required

Cert label: |

Close Save

Name	Type	Status
IVT.SVRCONN	Server-connection	Inactive
TLSPRQM1.SVRCONN	Server-connection	Inactive

Connecting to RHOS 4.2 with runmqsc in client mode via TLS

Create the openshift route for the tls channel

Reusing the command prompt used to find the MQ Console Route

C:\openshift>oc get routes

NAME	HOST/PORT	PATH	SERVICES	PORT	TERMINATION
abmqr2-ibm-mq-qm	abmqr2-ibm-mq-qm-mq.apps.mq.dev.atombr.com		abmqr2-ibm-mq	1414	passthrough
abmqr2-ibm-mq-web	abmqr2-ibm-mq-web-mq.apps.mq.dev.atombr.com		abmqr2-ibm-mq	9443	passthrough
cgs1-ibm-mq	cgs1-ibm-mq-mq.apps.mq.dev.atombr.com		cgs1-ibm-mq	1414	passthrough
cgs1-ibm-mq-qm	cgs1-ibm-mq-qm-mq.apps.mq.dev.atombr.com		cgs1-ibm-mq	1414	passthrough
cgs1-ibm-mq-qm-mq.apps.mq.dev.atombr.com-sc4rs	cgs1-ibm-mq-qm-mq-mq.apps.mq.dev.atombr.com	/cgs1-ibm-mq(/ \$)(.*)	cgs1-ibm-mq	1414	passthrough
cgs1-ibm-mq-web	cgs1-ibm-mq-web-mq.apps.mq.dev.atombr.com		cgs1-ibm-mq	9443	passthrough
ivt-rqm1r01	ivt2-svcmon.chl.mq.ibm.com		ivt2-svcmon.chl.mq	1414	passthrough
rqm1r01-ibm-mq	rqm1r01-ibm-mq-mq.apps.mq.dev.atombr.com		rqm1r01-ibm-mq	1414	passthrough
rqm1r01-ibm-mq-qm	rqm1r01-ibm-mq-qm-mq.apps.mq.dev.atombr.com		rqm1r01-ibm-mq	1414	passthrough
rqm1r01-ibm-mq-qm-mq.apps.mq.dev.atombr.com-c789j	rqm1r01-ibm-mq-qm-mq-mq.apps.mq.dev.atombr.com	/rqm1r01-ibm-mq(/ \$)(.*)	rqm1r01-ibm-mq	1414	passthrough
rqm1r01-ibm-mq-web	rqm1r01-ibm-mq-web-mq.apps.mq.dev.atombr.com		rqm1r01-ibm-mq	9443	passthrough
rqm1r01-ibm-mq	rqm1r01.apps.dev.atombr.com		rqm1r01-ibm-mq	1414	passthrough
tlsprqlmp-ibm-mq-qm	tlsprqlmp-ibm-mq-qm-mq.apps.mq.dev.atombr.com		tlsprqlmp-ibm-mq	1414	passthrough
tlsprqlmp-ibm-mq-web	tlsprqlmp-ibm-mq-web-mq.apps.mq.dev.atombr.com		tlsprqlmp-ibm-mq	9443	passthrough

tlsprqm1p-ibm-mq-qm tlsprqm1p-ibm-mq-qm-mq.apps.mq.dev.atombr.com

tlsprqm1p-ibm-mq 1414 passthrough None

tlsprqm1p-ibm-mq-web **tlsprqm1p-ibm-mq-web-mq.apps.mq.dev.atombr.com**

tsprqm1p-ibm-mq 9443 passthrough None

(start note: For some other clients you'll need to create a specific route as per the documentation)

https://www.ibm.com/support/knowledgecenter/en/SSFKSJ_9.1.0/com.ibm.mq.mcpak.doc/cc_conn_qm_openshift.htm

<https://www.ibm.com/support/pages/ibm-websphere-mq-how-does-mq-provide-multiple-certificates-certlbl-capability>

(end note: For some other clients you'll need to create a specific route as per the documentation.)

My recommendation is that you follow these instructions and create a new route

An Example YAML file for a `tlsprqm1` `tls` route:-

kind: Route

apiVersion: route.openshift.io/v1

metadata:

name: tls-tlsprqm1p

namespace: mq

selfLink: /apis/route.openshift.io/v1/namespaces/mq/routes/tls-tlsprqm1p

uid: b269c229-2537-11ea-befc-0a580a82008f

resourceVersion: '6926208'

creationTimestamp: '2019-12-23T03:52:53Z'

labels:

app: ibm-mq

chart: ibm-mqadvanced-server-integration-prod

```
heritage: Tiller
release: tlspqrqm1p

spec:
  host: tlspqrqm12e-svrconn.chl.mq.ibm.com
  subdomain: ""
  to:
    kind: Service
    name: tlspqrqm1p-ibm-mq
    weight: 100
  port:
    targetPort: 1414
  tls:
    termination: passthrough
  wildcardPolicy: None
status:
  ingress:
    - host: tlspqrqm12e-svrconn.chl.mq.ibm.com
      routerName: default
    conditions:
      - type: Admitted
        status: 'True'
      lastTransitionTime: '2019-12-23T03:52:53Z'
  wildcardPolicy: None
  routerCanonicalHostname: apps.mq.dev.###mbr.com
```

```
kind: Route
apiVersion: route.openshift.io/v1
metadata:
  name: tls-tlsprqm1p
  namespace: mq
  selfLink: /apis/route.openshift.io/v1/namespaces/mq/routes/tls-tlsprqm1p
  uid: b269c229-2537-11ea-befc-0a580a82008f
  resourceVersion: '6926208'
  creationTimestamp: '2019-12-23T03:52:53Z'
  labels:
    app: ibm-mq
    chart: ibm-mqadvanced-server-integration-prod
    heritage: Tiller
    release: tlsprqm1p
spec:
  host: tlsprqm12e-svrconn.ch1.mq.ibm.com
  subdomain: ''
  to:
    kind: Service
    name: tlsprqm1p-ibm-mq
    weight: 100
  port:
    targetPort: 1414
  tls:
    termination: passthrough
    wildcardPolicy: None
status:
  ingress:
    - host: tlsprqm12e-svrconn.ch1.mq.ibm.com
      routerName: default
      conditions:
        - type: Admitted
          status: 'True'
          lastTransitionTime: '2019-12-23T03:52:53Z'
      wildcardPolicy: None
      routerCanonicalHostname: apps.mq.dev.REDACTED.com
```

You can create routes via the Openshift dashboard

Networking->routes->create route-> then there is a form

Project: mq ▾

Create Route

[Edit YAML](#)

Routing is a way to make your application publicly visible.

Name *

tls-tlsprqm1p

A unique name for the route within the project.

Hostname

tlsprqm12e-svrconn.chl.mq.ibm.com

Public hostname for the route. If not specified, a hostname is generated.

Path

/

Path that the router watches to route traffic to the service.

Service *

 tlsprqm1p-ibm-mq



Service to route to.

Target Port *

1414 → 1414 (TCP)



Tick the TLS and set passthrough

Oc get routes

```
tls-tlsprqm1p          tlsprqm12e-svrconn.chl.mq.ibm.com
tlsprqm1p-ibm-mq-qm    tlsprqm1p-ibm-mq-qm-mq.apps.mq.dev.atombr.com
tlsprqm1p-ibm-mq-web   tlsprqm1p-ibm-mq-web-mq.apps.mq.dev.atombr.com
C:\openshift>
```

```
tls-tlsprqm1p          tlsprqm12e-svrconn.chl.mq.ibm.com
tlsprqm1p-ibm-mq 1414  passthrough None
```

```
tlsprqm1p-ibm-mq-qm      tlsprqm1p-ibm-mq-qm-mq.apps.mq.dev.atombr.com
tlsprqm1p-ibm-mq 1414  passthrough None
```

```
tlsprqm1p-ibm-mq-web      tlsprqm1p-ibm-mq-web-mq.apps.mq.dev.atombr.com
tlsprqm1p-ibm-mq 9443  passthrough None
```

note: routes can also be created through the command line: **oc create route passthrough [NAME] --service=SERVICE [flags]**

Configure the CCDT via runmqsc -n and .mqsc file

Edit (or create a .mqsc file) tlspqm1cltconn.mqsc. The key values to consider are the default openshift route created by the helm release as per the documentation. You should be able to use this default with runmqsc as it is a C Client.

```
DEFINE CHANNEL(TLSPQM1.SVRCONN) +
    CHLTYPE(CLNTCONN) +
    TRPTYPE(TCP) +
    CONNAME('tlspqm1p-ibm-mq-qm-mq.apps.mq.dev.###mbr.com(443)') +
    CERTLBL('ibmmqarnold') +
    QMNAME(TLSPQM1) +
    SSLCIPH(ANY_TLS12) +
    REPLACE
```



```
TLSPQM1.mqsc X NOTLS.mqsc X NOTLSPQM1CLTCONN.mqsc X TLSPQM1CLTCONN.mqsc X
DEFINE CHANNEL (TLSPQM1.SVRCONN) +
    CHLTYPE (CLNTCONN) +
    TRPTYPE (TCP) +
    CONNAME ('tlspqm1p-ibm-mq-qm-mq.apps.mq.dev.###mbr.com(443)') +
    CERTLBL ('ibmmqarnold') +
    QMNAME (TLSPQM1) +
    SSLCIPH (ANY_TLS12) +
    REPLACE
```

Pipe the MQSC file into runmqsc with -n option for no queue manager to create the CCDT table of default name in the default directory

```
runmqsc -n < c:\temp\TLSPQM1CLTCONN.MQSC
```

```
C:\temp>runmqsc -n < c:\temp\TLSPQM1CLTCONN.MQSC
5724-H72 (C) Copyright IBM Corp. 1994, 2019.
Starting local MQSC for 'AMQCLCHL.TAB'.
1 : DEFINE CHANNEL(TLSPQM1.SVRCONN) +
:     CHLTYPE(CLNTCONN) +
:     TRPTYPE(TCP) +
:     CONNAME('tlspqm1p-ibm-mq-qm-mq.apps.mq.dev.###mbr.com(443)') +
:     CERTLBL('ibmmqarnold') +
:     QMNAME(TLSPQM1) +
:     SSLCIPH(ANY_TLS12) +
:     REPLACE
AMQ8014I: IBM MQ channel created.
:
```

Check the default CCDT table

> This PC > Windows (C) > ProgramData > IBM > MQ

Name	Date modified
AMQCLCHLTAB	23/12/2019 12:22 PM

```
C:\temp>cd C:\ProgramData\IBM\MQ
C:\ProgramData\IBM\MQ>type AMQCLCHLTAB
AMQR          TLSPRQM1.SVRCONN      2   2   2
1                                     TLSPRQM
<    pÜ; 2
pÜ; @ 2                               tlsprqm1p-ibm-mq-qm-
                                         2   p2
                                         2   2   2
ANY_TLS12                                ibmmqarnold
                                         2   2   2
                                         2   2   2
```

Check the environment variables.

MQSSLKEYR should be set to the client side key repository. But MQSERVER, MQCHLLIB and MQCHLTAB can be cleared (assuming you are using defaults)

Type SET and check variables beginning with 'M'

```
Administrator: Command Prompt
LOGONSERVER=\DESKTOP-2MFRK17
MQSSLKEYR=C:\Program Files\IBM\MQ\arnold
MQ_FILE_PATH=C:\Program Files\IBM\MQ
MQ_JAVA_DATA_PATH=C:\ProgramData\IBM\MQ
MQ_JAVA_INSTALL_PATH=C:\Program Files\IBM\MQ\java
MQ_JAVA_LIB_PATH=C:\Program Files\IBM\MQ\java\lib64;C:\Program Files\IBM\MQ\java\lib
MQ_JRE_PATH=C:\Program Files\IBM\MQ\java\jre
NUMBER_OF_PROCESSORS=8
```

Clear MQSERVER, MQCHLLIB and MQCHLTAB if necessary with "SET MQSERVER= " (for example)

```
C:\temp>runmqsc -c TLSPRQM1
5724-H72 (C) Copyright IBM Corp. 1994, 2019.
Starting MQSC for queue manager TLSPRQM1.

dis ql(A*)
  1 : dis ql(A*)
AMQ8409I: Display Queue details.
  QUEUE(AMQ.5E00315525525703)                      TYPE(QLOCAL)
AMQ8409I: Display Queue details.
  QUEUE(ATESTQ)                                     TYPE(QLOCAL)
```

If you get a problem go to the debugging section below

```
C:\temp>runmqsc -c TLSPRQM1
5724-H72 (C) Copyright IBM Corp. 1994, 2019.
Starting MQSC for queue manager TLSPRQM1.

AMQ9709E: SSL/TLS initialization error.

0 command responses received.
```

Appendix of useful-ish info and links

+++ Step 10: Client: Run sample client to test connection

WINDOWS: Run the C sample client "SSLsample.exe" (provided with the SupportPac MO04) on the Windows box

Download the following SupportPac. Notice that we are going to use the testing samples only, which work for 7.1 and 7.5. The GUI that is provided for the SSL Wizard function has not been updated to use the GSKit commands used by MQ 7.1 and 7.5.

<http://www-1.ibm.com/support/docview.wss?uid=swg24010367> MO04: WebSphere MQ SSL Wizard

Change the directory to the location where the SupportPac was downloaded: cd "C:\MQ-SupportPac\MO04 SSL Wizard" cd client_samples\bin

```
SSLsample.exe veracruz.x.com(1430) SSL.SVRCONN QM_71SSL NULL_SHA  
"C:\Users\IBM_ADMIN\AppData\Local\VirtualStore\Program Files (x86 )\IBM\WebSphere  
MQ_2\rivera" Connecting to: Connname = veracruz.x.com(1430). SrvconnChannelName =  
SSL.SVRCONN. QMgrName = QM_71SSL. SSLCiph = NULL_SHA. SSLKeyr =  
C:\Users\IBM_ADMIN\AppData\Local\VirtualStore\Program Files (x86)\IB M\WebSphere  
MQ_2\rivera. MQCONNXX ended with reason code 2393 Use "mqrc" to find out the short name for  
the return code 2393.
```

C:\MQ-SupportPac\MO04 SSL Wizard\client_samples\bin> mqrc 2393

2393 0x00000959 MQRC_SSL_INITIALIZATION_ERROR

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+++ Step 11: Troubleshooting

UNIX: Let's take a look at the error log for the queue manager

cd /var/mqm/qmgrs/QM_71SSL/errors

tail AMQERR01.LOG

AMQ9660: SSL key repository: password stash file absent or unusable. EXPLANATION: The SSL key repository cannot be used because MQ cannot obtain a password to access it. Reasons giving rise to this error include: (a) the key database file and password stash file are not present in the location configured for the key repository, (b) the key database file exists in the correct place but that no password stash file has been created for it, (c) the files are present in the correct place but the userid under which MQ is running does not have permission to read them, (d) one or both of the files are corrupt.

ACTION: Ensure that the key repository variable is set to where the key database file is. Ensure that a password stash file has been associated with the key database file in the same directory, and that the userid under which MQ is running has read access to both files. If both are already present and readable in the correct place, delete and recreate them. Restart the channel.

Let's take a look at the file permissions for the ssl files:

```
cd /var/mqm/qmgrs/QM_71SSL/ssl ls -l -rw----- 1 rivera mqm 782 2014-03-04 12:12 QM_71SSL.crt  
-rw----- 1 rivera mqm 10080 2014-03-04 11:51 QM_71SSL.kdb -rw----- 1 rivera mqm 80 2014-03-
```

```
04 11:51 QM_71SSL.rdb -rw----- 1 rivera mqm 129 2014-03-04 11:37 QM_71SSL.sth -rw----- 1
rivera mqm 776 2014-03-04 11:50 rivera.crt
```

Notice that the userid "rivera" is being used in this scenario. This user is a member of the "mqm" group, but the SSL files were created in such a way that other members of the group cannot read/write the files.

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Let's change the permissions to allow the group "mqm" to read and write:

```
rivera@veracruz: /var/mqm/qmgrs/QM_71SSL/ssl chmod 660 *
```

```
rivera@veracruz: /var/mqm/qmgrs/QM_71SSL/ssl ls -l -rw-rw---- 1 rivera mqm 782 2014-03-04
12:12 QM_71SSL.crt -rw-rw---- 1 rivera mqm 10080 2014-03-04 11:51 QM_71SSL.kdb -rw-rw---- 1
rivera mqm 80 2014-03-04 11:51 QM_71SSL.rdb -rw-rw---- 1 rivera mqm 129 2014-03-04 11:37
QM_71SSL.sth -rw-rw---- 1 rivera mqm 776 2014-03-04 11:50 rivera.crt
```

Windows: Let's try again:

```
C:\MQ-SupportPac\MO04 SSL Wizard\client_samples\bin> SSLSample.exe veracruz.x.com(1430)
SSL.SVRCONN QM_71SSL NULL_SHA "C:\Users\IBM_ADMIN\AppData\Local\VirtualStore\Program
Files (x86)\IBM\WebSphere MQ_2\rivera" Connecting to: Connname = veracruz.x.com(1430).
SrvconnChannelName = SSL.SVRCONN. QMgrName = QM_71SSL. SSLCiph = NULL_SHA. SSLKeyr =
C:\Users\IBM_ADMIN\AppData\Local\VirtualStore\Program Files (x86)\IB M\WebSphere
MQ_2\rivera. MQCONNX ended with reason code 2035 The rc 2035 means: 2035 0x000007f3
MQRC_NOT_AUTHORIZED
```

Unix: Let's take a look at the error log of the queue manager.

AMQ9776: Channel was blocked by userid EXPLANATION: The inbound channel 'SSL.SVRCONN' was blocked from address '9.80.3.88' because the active values of the channel were mapped to a userid which should be blocked. The active values of the channel were 'MCAUSER(rivera) CLNTUSER(rivera) SSLPEER(SERIALNUMBER=53:16:00:C7,CN=rivera,OU=Support,O=IBM,ST=NC,C=)'.

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ACTION: Contact the systems administrator, who should examine the channel authentication records to ensure that the correct settings have been configured. The ALTER QMGR CHLAUTH switch is used to control whether channel authentication records are used. The command DISPLAY CHLAUTH can be used to query the channel authentication records.

Let's display the channel authentication records:

```
runmqsc QM_71SSL DISPLAY CHLAUTH (*) 2 : DISPLAY CHLAUTH (*) AMQ8878: Display channel
authentication record details. CHLAUTH(SYSTEM.ADMIN.SVRCONN) TYPE(ADDRESSMAP)
ADDRESS(*) USERSRC(CHANNEL) AMQ8878: Display channel authentication record
details. CHLAUTH(SYSTEM.ADMIN.*) TYPE(BLOCKUSER) USERLIST(nobody) AMQ8878:
Display channel authentication record details. CHLAUTH(SYSTEM.*)
TYPE(ADDRESSMAP) ADDRESS(*) USERSRC(NOACCESS) AMQ8878: Display channel
authentication record details. CHLAUTH(*) TYPE(BLOCKUSER) USERLIST(nobody
,*MQADMIN)
```

The last record is a rule that indicates that the “*MQADMIN” is going to be blocked for all channels, and this notation indicates an MQ Administrator. Because the userid used in this example is “rivera” and belongs to the group “mqm” is an MQ Administrator, and thus it is blocked.

We have now the choice to create a rule to add rivera as a valid user, or to reduce the blacklist for SSL.SVRCONN, allowing administrators to use this channel. Let's try this 2nd option:

```
SET CHLAUTH(SSL.SVRCONN) TYPE(BLOCKUSER) USERLIST('nobody') end
```

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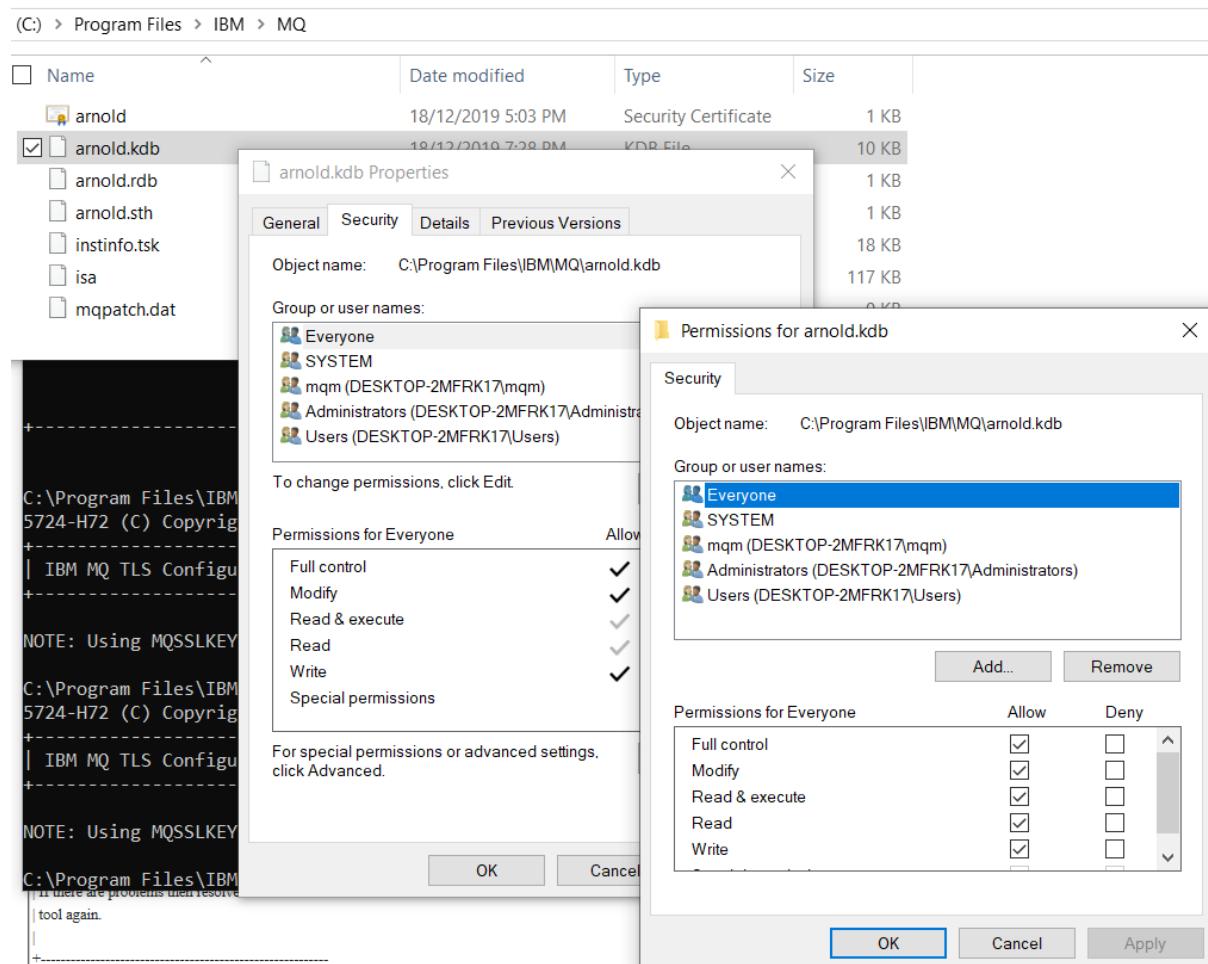
WINDOWS:

Let's try the sample again:

```
C:\MQ-SupportPac\MO04 SSL Wizard\client_samples\bin> SSLSample.exe veracruz.x.com(1430)
SSL.SVRCONN QM_71SSL NULL_SHA "C:\Users\IBM_ADMIN\AppData\Local\VirtualStore\Program
Files (x86)\IBM\WebSphere MQ_2\rivera" Connecting to: Conname = veracruz.x.com(1430).
SrvconnChannelName = SSL.SVRCONN. QMgrName = QM_71SSL. SSLCiph = NULL_SHA. SSLKeyr =
C:\Users\IBM_ADMIN\AppData\Local\VirtualStore\Program Files (x86)\IB M\WebSphere
MQ_2\rivera. Connection Successful!. SSLSample end
```

This time, the connection was successful. Yeah!!!

+++ end ++



https://www.mqtechconference.com/sessions_v2018/Using_runmqsc_and_dmpmqcfg_over_TLS_client.pdf

<http://runmqsc.blogspot.com/>

<https://www-01.ibm.com/support/docview.wss?uid=swg27045974&aid=1>

CCDT setting up

```
DEFINE CHANNEL(TLSPRQM1.SVRCONN) +
    CHLTYPE(CLNTCONN) +
    TRPTYPE(TCP) +
    CONNAME('localhost(2414)') +
    QMNAME(TLSPRQM1) +
    SSLCIPH(ANY_TLS12)
REPLACE
```

```
echo "run the runmqsc command to create the CCDT called AMQCLCHL.TAB in /var/mqm directory"
runmqsc -n < /tmp/mq/mqsc/TLSPRQM1CLT.MQSC"
```

```
# will need to set up the environment variable for path to
# AMQCLCHL.TAB if the default CCDT TAB name and default CCDT TAB directory are not used.
# because I have used all defaults the MQClient code will find and use the AMQCLCHL.TAB
# separate script package NPP-SET-MQENV can be used to export the MQCHLTAB env variable
#echo "setting MQCHLTAB to var/mqm for the CCDT .TAB file"
#
#export MQCHLTAB=/var/mqm/AMQCLCHL.TAB
#
#echo $MQCHLTAB
#
#you can test simple client connection with amqspputc
#putting msgs to APP qmgr RQ1s and they will be picked up by IIB
#and put back to EQ1s which exist in GW qmgrs across the cluster
#export MQSERVER=SYSTEM.DEF.SVRCONN/TCP/IPaddress
#echo $MQSERVER
#cd var/mqm/samp/bin
#./amqspputc RQ1 GWQM1
#export MQCHLTAB=/var/mqm/AMQCLCHL.TAB
```

```
#echo $MQCHLTAB  
#cd var/mqm/samp/bin  
#/amqsputc RQ1 GWQM1
```

Debugging

Lacking a certificate – didn't add the certlab to CLNTCONN in CCDT from the logs

19/12/2019 10:15:11 - Process(29412.12) User(MUSR_MQADMIN) Program(amqrmpa.exe)

Host(DESKTOP-2MFRK17) Installation(Installation1)
VRMF(9.1.3.0) QMgr(TLSPRQM1)
Time(2019-12-18T23:15:11.742Z)
RemoteHost(127.0.0.1)
CommentInsert1(TLSPRQM1.SVRCNN)
CommentInsert2(gsk_attribute_get_cert_info)
CommentInsert3(kubernetes (127.0.0.1))

AMQ9637E: Channel is lacking a certificate.

EXPLANATION:

The channel is lacking a certificate to use for the SSL handshake. The channel name is 'TLSPRQM1.SVRCNN' (if '????' it is unknown at this stage in the SSL processing).

The remote host is 'kubernetes (127.0.0.1)'.

The channel did not start.

ACTION:

Make sure the appropriate certificates are correctly configured in the key repositories for both ends of the channel.

----- amqccisa.c : 8245 -----

19/12/2019 10:15:11 - Process(29412.12) User(MUSR_MQADMIN) Program(amqrmpa.exe)

Host(DESKTOP-2MFRK17) Installation(Installation1)

VRMF(9.1.3.0) QMgr(TLSPRQM1)
Time(2019-12-18T23:15:11.743Z)
CommentInsert1(TLSPRQM1.SVRCONN)
CommentInsert2(29412(39076))
CommentInsert3(kubernetes (127.0.0.1))

AMQ9999E: Channel 'TLSPRQM1.SVRCONN' to host 'kubernetes (127.0.0.1)' ended abnormally.

EXPLANATION:

The channel program running under process ID 29412(39076) for channel 'TLSPRQM1.SVRCONN' ended abnormally. The host name is 'kubernetes (127.0.0.1)'; in some cases the host name cannot be determined and so is shown as '????'.

ACTION:

Look at previous error messages for the channel program in the error logs to determine the cause of the failure. Note that this message can be excluded completely or suppressed by tuning the "ExcludeMessage" or "SuppressMessage" attributes under the "QMErrorLog" stanza in qm.ini. Further information can be found in the System Administration Guide.

CERTLBL

Certificate label for this channel to use.

The label identifies which personal certificate in the key repository is sent to the remote peer. If this attribute is blank, the certificate is determined by the queue manager **CERTLBL** parameter.

Add the CERTLAB to the CLNTCONN definition and retry

```
DEFINE CHANNEL(TLSPRQM1.SVRCONN) +
    CHLTYPE(CLNTCONN) +
    TRPTYPE(TCP) +
    CONNAME('localhost(2414)') +
    CERTLBL('ibmmqarnold') +
    QMNAME(TLSPRQM1) +
```

SSLCIPH(ANY_TLS12) +

REPLACE

```
runmqsc -n < c:\temp\TLSPRQM1CLTCONN.MQSC
```

Not authorized – used mqm instead of MUSR_MQADMIN in the chl auth rec
From the logs

```
----- amqrmsa.c : 945 -----
19/12/2019 10:38:58 - Process(29412.13) User(MUSR_MQADMIN) Program(amqrmppa.exe)
    Host(DESKTOP-2MFRK17) Installation(Installation1)
        VRMF(9.1.3.0) QMgr(TLSPRQM1)
        Time(2019-12-18T23:38:58.367Z)
        CommentInsert1(mqm)
        CommentInsert2(TLSPRQM1.SVRCONN)
        CommentInsert3(TLSPRQM1)
```

AMQ9245W: Unable to obtain account details for channel MCA user ID.

EXPLANATION:

IBM MQ was unable to obtain the account details for MCA user ID 'mqm'. This user ID was the MCA user ID for channel 'TLSPRQM1.SVRCONN' on queue manager 'TLSPRQM1' and may have been defined in the channel definition, or supplied either by a channel exit or by a client.

ACTION:

Ensure that the user ID is correct and that it is defined on the Windows local system, the local domain or on a trusted domain. For a domain user ID, ensure that all necessary domain controllers are available.

```
----- cmqxrsv.c : 2220 -----
```

```
19/12/2019 10:38:58 - Process(29412.13) User(MUSR_MQADMIN) Program(amqrmppa.exe)
```

```
    Host(DESKTOP-2MFRK17) Installation(Installation1)
        VRMF(9.1.3.0) QMgr(TLSPRQM1)
        Time(2019-12-18T23:38:58.369Z)
```

ArithInsert1(2) ArithInsert2(2035)

CommentInsert1(mqm)

AMQ9557E: Queue Manager User ID initialization failed for 'mqm'.

EXPLANATION:

The call to initialize the User ID 'mqm' failed with CompCode 2 and Reason 2035. If an MQCSP block was used, the User ID in the MQCSP block was ". If a userID flow was used, the User ID in the UID header was " and any CHLAUTH rules applied prior to user adoption were evaluated case-sensitively against this value.

ACTION:

Correct the error and try again.

----- cmqxrsv.c : 2524 -----

When I created the SVRCONN in the first place I had a CHLAUTH for MCAUSER('mqm')

This should have been MCAUSER('MUSR_MQADMIN')

Change it in MQExplorer

Channel	Address Map	*	No Access
SYSTEM.*	Address Map	*	Channel
SYSTEM.ADMIN.SVRCONN	Address Map	*	Map
TLSPRQM1.SVRCONN	Address Map	*	MUSR_MQADMIN

No CipherSpec – used MQSERVER instead of CCDT.

MQ9639E: Remote channel 'TLSPRQM1.SVRCONN' did not specify a CipherSpec.

EXPLANATION:

Remote channel 'TLSPRQM1.SVRCONN' did not specify a CipherSpec when the local channel expected one to be specified.

Do we have to use MQCCDT file in order for runmqsc to client connect because the MQSERVER limits the details we can specify for the connection to the SVRCONN

A CCDT enables the specification of cipher specs etc

Debugging in local container

```
C:\temp>runmqsc -c TLSPRQM1
5724-H72 (C) Copyright IBM Corp. 1994, 2019.
Starting MQSC for queue manager TLSPRQM1.

AMQ9709E: SSL/TLS initialization error.

0 command responses received.
```

Docker ps

Docker exec -it <container id> /bin/bash

```
C:\temp>docker ps
CONTAINER ID        IMAGE               COMMAND             CREATED            NAMES
STATUS              PORTS
5edaadeb1fe0        daveexamcom/mqadvanced-server-tls:9.1.3.0-r4-amd64   "runmqintegrationser..."   About an hour ago
Up About an hour   0.0.0.0:32779->1414/tcp, 0.0.0.0:32778->9157/tcp, 0.0.0.0:32777->9443/tcp   silly_noether

C:\temp>docker exec -it 5edaadeb1fe0 /bin/bash
bash-4.2$ ls
bin  boot  dev  etc  home  lib  lib64  licenses  media  mnt  opt  proc  root  run  sbin  srv  sys  tmp  usr  var
bash-4.2$
```

Find the error logs for MQ

/var/mqm/qmgr/TLSPRQM1/errors

```
bash-4.2$ ls /var/mqm/qmgrs/TLSPRQM1/errors
AMQERR01.json  AMQERR01.LOG  AMQERR02.json  AMQERR02.LOG  AMQERR03.json  AMQERR03.LOG
```

tail /var/mqm/qmgrs/TLSPRQM1/errors/AMQERR01.json

"AMQ9660E: SSL key repository: password stash file absent or unusable."}

```
{"ibm_messageId":"AMQ9999E","ibm_arithInsert1":0,"ibm_arithInsert2":0,"ibm_commentInsert1":"?????","ibm_commentInsert2":"258","ibm_commentInsert3":"gateway (172.17.0.1)","ibm_datetime":"2019-12-20T01:05:05.311Z","ibm_serverName":"TLSPRQM1","type":"mq_log","host":"5edaadeb1fe0","loglevel":"ERROR","module":"amqrmsa.c:945","ibm_sequence":"1576803905_312716800","ibm_qmgrId":"TLSPRQM1_2019-12-19_23.50.28","ibm_processId":"258","ibm_threadId":"9","ibm_version":"9.1.3.0","ibm_processName":"amqrmpa","ibm_userName":"mqm","ibm_installationName":"Installation1","ibm_installationDir":"/opt/mqm","message":"AMQ9999E: Channel '????' to host 'gateway (172.17.0.1)' ended abnormally."}
```

Debugging in RHOS 4.2

Check the client end first as this is straight forward – check the event log

There may be a problem at this end.

If there is no problem in the client side logs then you'll need to bash into pod hosting the queue manager and take a look at the queue managers logs – see below on how to do that.

The screenshots show the Windows Event Viewer interface. Both screenshots have the following layout:

- Left pane:** Shows the navigation tree with "Event Viewer (Local)" selected, followed by "Windows Logs" and "Application".
- Middle pane:** A table titled "Application" with the following columns: Level, Date and Time, Source, Event ID, and Task Ca... (partially visible).
- Right pane:** A "Actions" bar with "Application" selected, and buttons for "Open Saved Log..." and "Create Custom View...".
- Bottom pane:** A details window for the selected event, showing "General" and "Details" tabs.

Screenshot 1 (Top): The event table shows several events. The details window for event 9788, titled "Event Properties - Event 9788, IBM MQ (Installation1)", contains the following text in the "General" tab:

```
An attempt to resolve address '13.237.20.120' using the 'getnameinfo' function call took 4 seconds to complete. This might indicate a problem with the DNS configuration.
```

Screenshot 2 (Bottom): The event table shows several events. The details window for event 9633, titled "Event Properties - Event 9633, IBM MQ (Installation1)", contains the following text in the "General" tab:

```
CommentInsert2([Class=]GSKVALMethod:X509[Issuer=]CN=ingress-operator@1575938339[#=]1e7d4d52f98ca466[Subject=]CN=*.apps.mq.dev.atombr.com[Class=]GSKVALMethod::PKIX[Issuer=]CN=ingress-operator@1575938339[#=]1e7d4d52f98ca466[Subject=]CN=*.apps.mq.dev.atombr.com) CommentInsert3(ec2-13-237-20-120 (13.237.20.120)(443)) Bad SSL certificate for channel 'TLSRQM1.SVRCONN'.
```

'????'. The remote host is 'ec2-13-237-20-120 (13.237.20.120)(443)'. The channel did not start. &P The details of the certificate which could not be validated are '[Class=]GSKVALMethod::X509[Issuer=]**CN=ingress-operator@1575938339[#=]1e7d4d52f98ca466[Subject=]CN=*.apps.mq.dev.atombr.com[Class=]GSKVALMethod::PKIX[Issuer=]CN=ingress-operator@1575938339[#=]1e7d4d52f98ca466[Subject=]CN=*.apps.mq.dev.atombr.com**'. &P The certificate validation error was 575010.

If you get something like the above it would appear that the RHOS 4.2 ingress controller is getting in the way. You are probably hitting a “route” that is not set for “passthrough” and hence it is getting involved in the TLS handshake. The ingress controller is therefore trying to terminate the TLS rather than passing it to the queue manager and the ingress controller does not have our certs!

Use oc get routes to investigate.

Get the command line login information

The screenshot shows the Red Hat OpenShift Container Platform web interface. On the left, there's a sidebar with a user dropdown set to "Administrator", a "Home" link, and other navigation options like "Dashboards", "Projects", "Search", and "Explore". The main content area has a blue header bar with the message "You are logged in as a temporary administrative user. Update the cluster OAuth configuration to allow others to log in.". Below this, under the heading "Command Line Tools", it says "oc - OpenShift Command Line Interface (CLI)". It provides a brief description: "With the OpenShift command line interface, you can create applications and manage OpenShift projects from a terminal. The oc binary offers the same capabilities as the kubectl binary, but it is further extended to natively support OpenShift Container Platform features." There are two buttons at the bottom: "Download oc" and "Copy Login Command".

Download the OC tools if you don't have them

Click on Copy Login Command

Click on display token

In a browser you get

The screenshot shows a web browser window with the URL "bauth-openshift.apps.mq.dev". The page title is "Display Token". The browser toolbar includes back, forward, refresh, and home buttons. Below the address bar, there are several links: "Getting Started", "ICP4i on CPSystem", "Login - RHOS-OKD-IB...", and "ICPonRHC". The main content area displays the text "Your API token is" followed by a long token string: "rTbx_17lfRNplx_████████gYxNnJokDJdYKKsBZuYlNwY06Q".

Click on display token

The screenshot shows a terminal window with the following text:
Your API token is
rTbx_17lfRNplx_████████gYxNnJokDJdYKKsBZuYlNwY06Q
Log in with this token
oc login --token=rTbx_17lfRNplx_████████gYxNnJokDJdYKKsBZuYlNwY06Q --server=https://api.mq.dev.atombr.com:6443
C:\openshift>oc login --token=rTbx_17lfRNplx_████████gYxNnJokDJdYKKsBZuYlNwY06Q --server=https://api.mq.dev.atombr.com:6443
Logged into "https://api.mq.dev.atombr.com:6443" as "kube:admin" using the token provided.
You have access to 59 projects, the list has been suppressed. You can list all projects with 'oc projects'
Using project "tracing".
C:\openshift>

Change to the mq project

Oc project mq

The screenshot shows a terminal window with the following text:
C:\openshift>oc project mq
Now using project "mq" on server "https://api.mq.dev.atombr.com:6443".
C:\openshift>

Oc get pods

NAME	READY	STATUS	RESTARTS	AGE
abmqr2-ibm-mq-0	1/1	Running	0	9d
abmqr2-ibm-mq-registration-qpppb	0/1	Completed	0	11d
abqmgr1-ibm-mq-post-delete-l5458	0/1	Completed	0	9d
cgs1-ibm-mq-0	1/1	Running	0	9d
cgs1-ibm-mq-registration-ffbwh	0/1	Completed	0	9d
efs-provisioner	1/1	Running	0	5d4h
mqivt1-ibm-mq-post-delete-89pdc	0/1	Error	0	3d2h
mqivt1-ibm-mq-post-delete-9ckv7	0/1	Error	0	3d1h
mqivt1-ibm-mq-post-delete-9kvkn	0/1	Error	0	3d2h
mqivt1-ibm-mq-post-delete-rbfwg	0/1	Error	0	3d4h
rqm1r01-ibm-mq-0	1/1	Running	0	7d2h
rqm1r01-ibm-mq-registration-fwzrj	0/1	Completed	0	97m
tlsprqm1p-ibm-mq-0	1/1	Running	0	79m
tlsprqm1p-ibm-mq-registration-fs6wt	0/1	Completed	0	79m

You'll need the kubectl tool to bash in – download if you need it from the ICP4i foundation by clicking on install CLI tools

Configure client

Before you run commands in the kubectl command line interface for this cluster, you must configure the client.

Prerequisites:
Install CLI tools

```
kubectl exec -it tlsprqm1p-ibm-mq-0 -- /bin/bash
```

```
C:\openshift>kubectl exec -it tlsprqm1p-ibm-mq-0 -- /bin/bash
bash-4.2$
```

```
bash-4.2$ cd /var/mqm/qmgrs/TLSPRQM1/errors
```

```
bash-4.2$ ls
```

```
bash-4.2$ ls
AMQERR01.json  AMQERR01.LOG  AMQERR02.json  AMQERR02.LOG  AMQERR03.json  AMQERR03.LOG
```

```
bash-4.2$ tail -n 4000 AMQERR01.LOG
```

```
lational","ibm_installationDir":"/opt/mqm","message":"AMQ5037I: The queue manager task 'MARKINTSCAN' has started."}
{"ibm_messageId":"AMQ5051I","ibm_arithInsert1":0,"ibm_arithInsert2":1,"ibm_commentInsert1":"IQM-COMMS-MANAGER","ibm_datetime":"2019-12-23T00:37:46.367Z","ibm_serverName":"TLSPRQM1","type":"mq_log","host":"tlsprqm1p-ibm-mq-0","loglevel":"INFO","module":"amqzmut0.c:1722","ibm_sequence":1577061466_367923916,"ibm_qmgrId":TLSPRQM1_2019-12-23_00.37.43,"ibm_processId":355,"ibm_threadId":16,"ibm_version":9.1.3.0,"ibm_processName":amqzmuc0,"ibm_userName":mqm,"ibm_installationName":Installation1,"ibm_installationDir":"/opt/mqm","message":AMQ5051I: The queue manager task 'IQM-COMMS-MANAGER' has started."}
{"ibm_messageId":"AMQ8024I","ibm_arithInsert1":0,"ibm_arithInsert2":0,"ibm_commentInsert1":SYSTEM.CHANNEL.INITQ,"ibm_datetime":2019-12-23T00:37:46.477Z,"ibm_serverName":TLSPRQM1,"type":mq_log,"host":tlsprqm1p-ibm-mq-0,"loglevel":INFO,"module":amqrimna.c:865,"ibm_sequence":1577061466_477433047,"ibm_qmgrId":TLSPRQM1_2019-12-23_00.37.43,"ibm_processId":403,"ibm_threadId":1,"ibm_version":9.1.3.0,"ibm_processName":rummqchi,"ibm_userName":mqm,"ibm_installationName":Installation1,"ibm_installationDir":"/opt/mqm","message":AMQ8024I: IBM MQ channel initiator started."}
{"ibm_messageId":"AMQ5806I","ibm_arithInsert1":0,"ibm_arithInsert2":0,"ibm_commentInsert1":TLSPRQM1,"ibm_datetime":2019-12-23T00:37:46.479Z,"ibm_serverName":TLSPRQM1,"type":mq_log,"host":tlsprqm1p-ibm-mq-0,"loglevel":INFO,"module":cmqxfxc.c:1397,"ibm_sequence":1577061466_479961716,"ibm_qmgrId":TLSPRQM1_2019-12-23_00.37.43,"ibm_processId":401,"ibm_threadId":1,"ibm_version":9.1.3.0,"ibm_processName":amqfqpub,"ibm_userName":mqm,"ibm_installationName":Installation1,"ibm_installationDir":"/opt/mqm","message":AMQ5806I: Queued Publish/Subscribe Daemon started for queue manager TLSPRQM1."}
bash-4.2$ tail -n 4000 AMQERR01.json
```

Type 'exit' to leave the bash session

```
bash-4.2$ exit
exit
command terminated with exit code 127

C:\openshift>
```

Check the openshift routes

oc get routes

NAME	HOST/PORT	PATH	SERVICES	PORT	TERMINATION	WILDCARD
abmqr2-ibm-mq-qm	abmqr2-ibm-mq-qm-mq.apps.mq.dev.atombr.com		abmqr2-ibm-mq	1414	passthrough	None
abmqr2-ibm-mq-web	abmqr2-ibm-mq-web-mq.apps.mq.dev.atombr.com		abmqr2-ibm-mq	9443	passthrough	None
cgs1-ibm-mq	cgs1-ibm-mq-mq.apps.mq.dev.atombr.com		cgs1-ibm-mq	1414	passthrough	None
cgs1-ibm-mq-qm	cgs1-ibm-mq-qm-mq.apps.mq.dev.atombr.com		cgs1-ibm-mq	1414	passthrough	None
cgs1-ibm-mq-qm-mq.apps.mq.dev.atombr.com-sc4rs	cg51-ibm-mq-qm-mq.apps.mq.dev.atombr.com	/cg51-ibm-mq(/ \$)(.*)	cg51-ibm-mq	1414	passthrough	None
cgs1-ibm-mq-web	cgs1-ibm-mq-web-mq.apps.mq.dev.atombr.com		cgs1-ibm-mq	9443	passthrough	None
ivt-rqm1r01	ivt2e-svrconn.ch1.mq.ibm.com		ivt2e-svrconn.ch1.mq.ibm.com	1414	passthrough	None
rqm1r01-ibm-mq	rqm1r01-ibm-mq-mq.apps.mq.dev.atombr.com		rqm1r01-ibm-mq	1414	passthrough	None
rqm1r01-ibm-mq-qm	rqm1r01-ibm-mq-qm-mq.apps.mq.dev.atombr.com		rqm1r01-ibm-mq	1414	passthrough	None
rqm1r01-ibm-mq-qm-mq.apps.mq.dev.atombr.com-c789j	rqm1r01-ibm-mq-qm-mq-mq.apps.mq.dev.atombr.com	/rqm1r01-ibm-mq(/ \$)(.*)	rqm1r01-ibm-mq	1414	passthrough	None
rqm1r01-ibm-mq-web	rqm1r01-ibm-mq-web-mq.apps.mq.dev.atombr.com		rqm1r01-ibm-mq	9443	passthrough	None
rqm1r01-qm	rqm1r01-apps.mq.dev.atombr.com		rqm1r01-ibm-mq	1414	passthrough	None
tlsprqm1p-ibm-mq-qm	tlsprqm1p-ibm-mq-qm-mq.apps.mq.dev.atombr.com		tlsprqm1p-ibm-mq	1414	passthrough	None
tlsprqm1p-ibm-mq-web	tlsprqm1p-ibm-mq-web-mq.apps.mq.dev.atombr.com		tlsprqm1p-ibm-mq	9443	passthrough	None

tlsprqm1p-ibm-mq-qm tlsprqm1p-ibm-mq-qm-mq.apps.mq.dev.atombr.com

tlsprqm1p-ibm-mq 1414 passthrough None

tlsprqm1p-ibm-mq-web tlsprqm1p-ibm-mq-web-mq.apps.mq.dev.atombr.com

tlsprqm1p-ibm-mq 9443 passthrough None