

Course Exercises Guide

IBM MQ Appliance Overview for IBM MQ Administrators

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Table 1. Configuration for each student

System label	Machine type and processor	RAM	Hard disk	Display resolution	Used in	Description	Operating system
MQAppl1	2.5 GHz or faster Duo Core with eight processors	8 GB	120 GB	1280 x 800	Exercise 1	New Apple Powered off	Appliance
MQAppl1-Lab1-Solution	2.5 GHz or faster Duo Core with eight processors	8 GB	120 GB	1280 x 800	Exercises 3 – 6	Fully configured solution to Exercise 1	Appliance
MQAppl1-HA	2.5 GHz or faster Duo Core with four processors	4 GB	120 GB	1280 x 800	Exercise 2	Smaller appl, used only in HA Exercise 2	Appliance
MQAppl2-HA	2.5 GHz or faster Duo Core with four processors	4 GB	120 GB	1280 x 800	Exercise 2	Smaller appl, used only in HA Exercise 2	Appliance
MQAppl3	2.5 GHz or faster Duo Core with eight processors	8 GB	120 GB	1280 x 800	Exercise 7	Firmware upgrade	Appliance
ZM051_1.0-WS 2008	2.5 GHz or faster Duo Core	3 GB	120 GB	1280 x 800	All exercises	Admin Desktop	Windows 2008

The course has six VM images. You are going to run only two VMs at a time, except for Exercise 2, which requires three VMs running. While running the required images, you are able to shut down all the other VMs.



Important

Exercise 7 is not available for hands-on. The exercise instructions are for your reference only.



Important

Online course material updates might exist for this course. To check for updates, see the Instructor wiki at: <http://ibm.biz/CloudEduCourses>

IDs and passwords

Table 2 lists the various IDs that IBM suggests for this class and any requirements that they have. Some might be automatically created during the installation process.

Table 2. ID names and login information

ID	User name	Password	New password	Comment
IBM MQ Appliance	admin	admin	passw0rd	MQAppl1
IBM MQ Appliance	admin	passw0rd		MQAppl1-Lab1-Solution
IBM MQ Appliance	admin	passw0rd		MQAppl1-HA
IBM MQ Appliance	admin	passw0rd		MQAppl2-HA
IBM MQ Appliance	admin	passw0rd		MQAppl3
Windows VM	Administrator	websphere		ZM051_1.0-WS2008

Exercises description

The IBM MQ Appliance provides a simplified messaging solution, by combining many of the benefits of IBM MQ with the benefits of a physical appliance. Like IBM MQ, the IBM MQ Appliance provides a rapid, reliable, secure infrastructure, but unlike IBM MQ, combines software with hardware. Deployable in less than 30 minutes, the IBM MQ Appliance saves customers from having to build their own servers, or needing as much local IBM MQ expertise when they deploy to partners or remote locations.

The IBM MQ Appliance has the following benefits:

- Seamless integration: Integrates with existing IBM MQ networks and clusters
- Simple high availability: With paired connectivity to another appliance, delivering personalized role-based monitoring and configuration
- New IBM MQ Console: A browser-based user interface, offering personalized role-based monitoring and configuration.
- Simpler maintenance: Fix packs delivered as certified firmware updates onto a locked down appliance
- Maximum performance: Pre-optimized with no tuning or extra configuration needed

You can choose between two appliances, according to the needs of the business:

- IBM MQ Appliance M2000A: A high-end solution for Enterprise use
- IBM MQ Appliance M2000B: Lower-end solution for branch office or factory deployment

This course includes the following exercises:

- Appliance configuration
- High availability setup
- The IBM MQ Console Web GUI
- Monitoring and troubleshooting
- Security setup
- Migrating queue managers to the IBM MQ Appliance
- Service and maintenance

In the exercise instructions, you can check off the line before each step as you complete it to track your progress.

Most exercises include required sections, which should always be completed. It might be necessary to complete these sections before you can start later exercises.

Exercise 1. Appliance configuration

Estimated time

00:45

Overview

In this exercise, you configure an IBM MQ virtual appliance and test that the basic configuration is working as expected.

Objectives

After completing this exercise, you should be able to:

- Configure an IBM MQ Appliance
- Test an IBM MQ Appliance to see that it is performing as expected

Introduction

The lab environment consists of two virtual appliances (**MQAppl1** and **MQAppl2**) and a Windows environment (**ZM051_1.0-WS2008**) to do console operations and testing. A third virtual appliance (**MQAppl3**) exists, but is not used in this exercise. Make sure that MQAppl3 is suspended or shut down.

For this exercise, when using VMware, you should be using the **MQAppl1** and the **ZM051_1.0-WS2008** VMs. You must suspend or shut down all other VMs.

Exercise instructions

In this exercise, you configure the virtual appliance and test that the basic configuration is working as expected.

The network adapters are described here. Pay particular attention to eth1, eth2, and eth3. They are the adapters that are used for HA. You can use the following table to record the IP addresses that your appliance is using.

Table 3.

Virtual network adapter name	Ethernet interface	Usage	Virtual network name	Virtual network type	IP address
Network adapter	eth0	Management and client traffic		NAT	
Network adapter 2	eth1	HA primary connection		NAT	
Network adapter 3	eth2	HA alternative connection		NAT	
Network adapter 4	eth3	HA replication connection		NAT	

1.1. Open the virtual appliance (MQAppl1)

- __ 1. Start the environment. As soon as it is started, you must suspend or power off MQAppl3 as it is not going to be used.
- __ 2. Wait for the virtual machine to power on.



```
DATAPOWER: Starting udevd
DATAPOWER: Triggering udevd
DATAPOWER: Settling udevd
DATAPOWER: Getting partnum
DATAPOWER: Finding flash device
DATAPOWER: Waiting to find encrypted flash
DATAPOWER: Found encrypted flash
DATAPOWER: Creating raidisk 1
DATAPOWER: Enabling loopback interface
DATAPOWER: Enabling LUKS-encrypted flash device
DATAPOWER: Unlocking LUKS from upgrade/bootstrap key
DATAPOWER: Unlocked LUKS from upgrade/bootstrap key
DATAPOWER: Checking flash filesystems
DATAPOWER: Stopping udev before executing supervisor
DATAPOWER: Executing supervisor process
(unknown)
Unauthorized access prohibited.
log in: _
```

1.2. Basic appliance configuration

- ___ 3. Enter admin as the login user name.
- ___ 4. Enter admin as the (initial) password.

```
DATAPOWER: Executing supervisor process
(unknown)
Unauthorized access prohibited.
login: admin
Password: *****
```

Take note of the new admin password. If you lose or forget the admin password, security best practice dictates that you return the appliance to IBM to reset this password.

After the appliance is returned to you, you must perform an initial firmware setup as described in the Installation Guide. Therefore, none of your configuration data is on the appliance.

However, when another user account can log in and has the appropriate access permission, that user can reset the password for the admin account.

Please enter new password: _

- ___ 5. Enter passw0rd next to “Please enter new password”.
- ___ 6. Enter passw0rd next to “Please re-enter new password to confirm”.
- ___ 7. Enter y next to “Do you want to run the Install Wizard?”

```
Please enter new password: *****
Please re-enter new password to confirm: *****
Do you want to run the Install Wizard? Yes/No [y/n]:y
```

Welcome to IBM MQ Appliance M2000U console configuration.
Copyright IBM Corporation 1999-2015

Version: MQ00.8.0.0.3 build 262660mq on Jun 2, 2015 3:28:04 PM
Serial number: 0000000

```
Please enter new password: *****
Please re-enter new password to confirm: *****
Do you want to run the Install Wizard? Yes/No [y/n]:y

Welcome to IBM MQ Appliance M2000U console configuration.
Copyright IBM Corporation 1999-2015

Version: MQ00.8.0.0.3 build 262660mq on Jun 2, 2015 3:28:04 PM
Serial number: 0000000
```

The IBM MQ Appliance virtual image is available for demonstration purposes only.

This VM image is owned by IBM Corporation and is to be used solely for the purpose of demonstration of certain capabilities and functionality of the IBM MQ Appliance. You are only allowed to view it as part of the demonstration to you by IBM (or IBM business partner) personnel who will use IBM (or IBM business partner) equipment to show you it. You are not allowed to load it on to your systems or retain a copy of it. It is not available for purchase.

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Important

You can use any password that you like. However, be sure to remember what password you use. If you forget your password on a real appliance, you might be required to return the appliance to IBM to be reset. With VMware, you would need to delete the virtual machine and start over.

- ___ 8. Enter **y** next to “**Step 1 - Do you want to configure network interfaces?**”

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Global configuration mode

The Installation Wizard helps to perform the following tasks:

- (1) Configure network interfaces
- (2) Configure network services (such as DNS)
- (3) Configure a unique system identifier
- (4) Configure remote management access
- (5) Configure a user account that can reset passwords
- (6) Review and save the configuration

Step 1 – Do you want to configure network interfaces? [y]:y_

- ___ 9. Enter **y** next to “**Do you have this information?**”

Global configuration mode

The Installation Wizard helps to perform the following tasks:

- (1) Configure network interfaces
- (2) Configure network services (such as DNS)
- (3) Configure a unique system identifier
- (4) Configure remote management access
- (5) Configure a user account that can reset passwords
- (6) Review and save the configuration

Step 1 – Do you want to configure network interfaces? [y]:y

To perform these tasks, you will need the following information:

- (1) The interfaces that are connected
- (2) Whether to use DHCP or a static IP address and subnet mask
- (3) The IP address of the default gateway

Do you have this information? [y]:y_

- ___ 10. Enter **y** next to “**Do you want to configure the eth0 interface?**”
- ___ 11. Enter **y** next to “**Do you want to enable DHCP?**”
- ___ 12. Enter **y** next to “**Do you want to configure the eth1 interface?**”
- ___ 13. Enter **y** next to “**Do you want to enable DHCP?**”
- ___ 14. Enter **y** next to “**Do you want to configure the eth2 interface?**”
- ___ 15. Enter **y** next to “**Do you want to enable DHCP?**”
- ___ 16. Enter **y** next to “**Do you want to configure the eth3 interface?**”

- ___ 17. Enter **y** next to “Do you want to enable DHCP?”

```
To perform these tasks, you will need the following information:
  (1) The interfaces that are connected
  (2) Whether to use DHCP or a static IP address and subnet mask
  (3) The IP address of the default gateway
+
Do you have this information? [y]:
Do you want to configure the eth0 interface? [y]:
Modify Ethernet Interface configuration

Do you want to enable DHCP? [y]:
Do you want to configure the eth1 interface? [y]:
Modify Ethernet Interface configuration

Do you want to enable DHCP? [y]:
Do you want to configure the eth2 interface? [y]:
Modify Ethernet Interface configuration

Do you want to enable DHCP? [y]:
Do you want to configure the eth3 interface? [y]:
Modify Ethernet Interface configuration

Do you want to enable DHCP? [y]:

```

- ___ 18. Enter **y** next to “Do you want to configure network services?”
- ___ 19. Enter **n** next to “Do you want to configure DNS?”
- ___ 20. Enter **y** next to “Step 3 – Do you want to assign a unique identifier for the appliance?”
- ___ 21. Enter a unique identifier for the appliance (MQAppl1).

```
Do you want to enable DHCP? [y]:y

Step 2 - Do you want to configure network services? [y]:y
Do you want to configure DNS? [y]:n

A system identifier is recommended, as it is required to configure an HA Group.
Step 3 - Do you want to define a unique system identifier for the appliance? [y]:y
Enter a unique system identifier: MQAppl1
Modify System Settings configuration
```

- ___ 22. Enter **y** next to “Do you want to configure remote management access?”
- ___ 23. Enter **y** next to “Do you have this information?”
- ___ 24. Enter **y** next to “Do you want to enable SSH?”
- ___ 25. Enter **0** next to “Enter the local IP address”.

- ___ 26. Press the **Enter** key to “accept the default port (22)”.

```
Step 4 - Do you want to configure remote management access? [y]:y
These configurations require the IP address of the local interface that manages
the appliance.

Do you have this information? [u]y
Do you want to enable SSH? [y]y
Enter the local IP address [0 for all]: 0
Enter the port number [22]: 0

%      Pending
SSH service listener enabled
```



Important

In a real appliance, you might want to restrict management access to a particular adapter rather than enabling management access for all adapters. In that case, you must enter the local IP address of the port you want to enable for management access. This rule also applies to the WebGUI port that is assigned in the next part of the exercise.

- ___ 27. Enter **y** next to “**Do you want to enable WebGUI access**”.
- ___ 28. Enter **0** next to “**Enter the local IP address**”.
- ___ 29. Press the **Enter** key to “**accept the default port (9090) for WebGUI access**”.

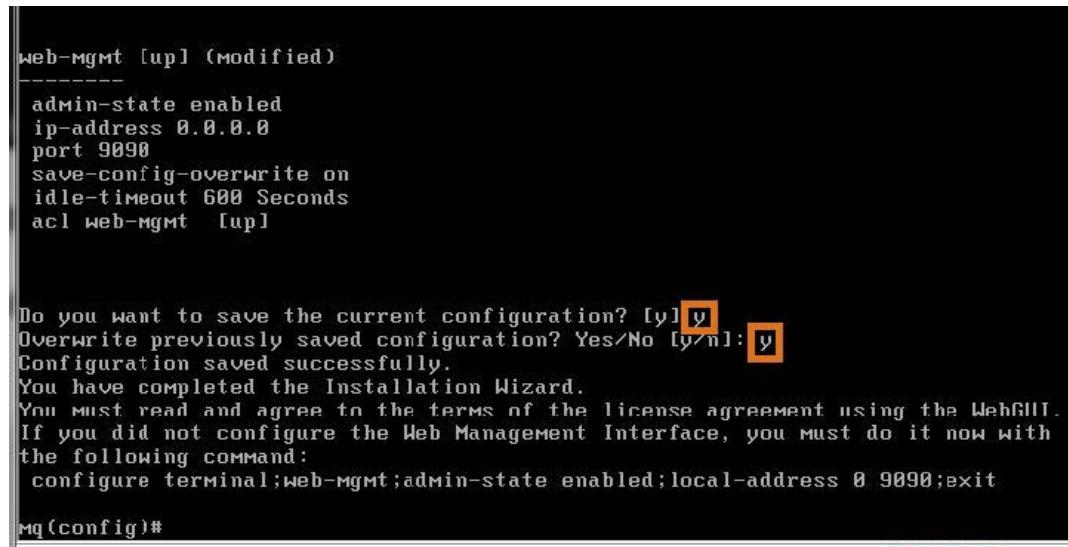
```
Do you want to enable WebGUI access [y]:y
Enter the local IP address [0 for all]: 0
Enter the port number [9090]: 0
Modify Web Management Service configuration
```

- ___ 30. Enter **y** next to “**Step 5 – Do you want to configure a user account that can reset passwords?**”
- ___ 31. Enter a unique user name for the user account (make sure that you make a note of whatever you choose).
- ___ 32. Enter a password next to “**Enter new password**”.
- ___ 33. Enter the same password next to “**Re-enter new password**”.

```
Step 5 - Do you want to configure a user account that can reset passwords? [y]:
Enter the name of the user account that can reset passwords [password-reset-user]
l: leegavin
New User configuration
Enter new password: *****
Re-enter new password: *****
Cleared RDM Cache
```

- ___ 34. Enter **y** next to “**Do you want to review the current configuration?**”

- ___ 35. Enter **y** next to “**Do you want to save the current configuration?**”
- ___ 36. Enter **y** next to “**Overwrite previously saved configuration?**”



```

web-mgmt [up] (modified)
-----
admin-state enabled
ip-address 0.0.0.0
port 9090
save-config-overwrite on
idle-timeout 600 Seconds
acl web-mgmt [up]

Do you want to save the current configuration? [y] y
Overwrite previously saved configuration? Yes/No [y/n]: y
Configuration saved successfully.
You have completed the Installation Wizard.
You must read and agree to the terms of the license agreement using the WebGUI.
If you did not configure the Web Management Interface, you must do it now with
the following command:
configure terminal;web-mgmt;admin-state enabled;local-address 0 9090;exit

Mq(config)#

```

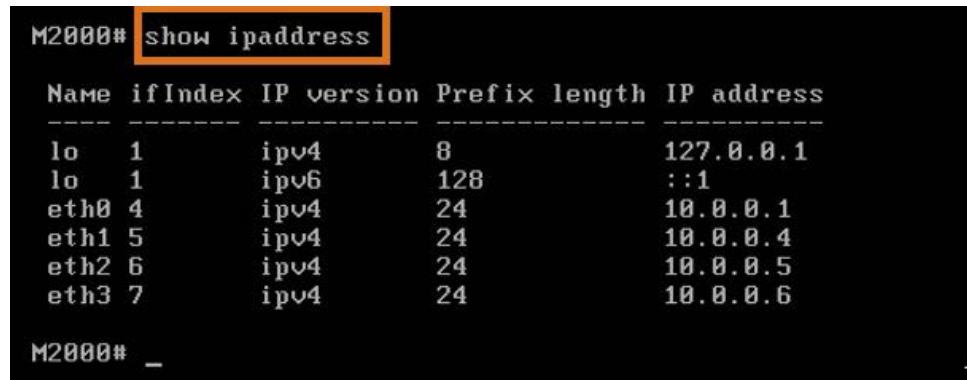


Important

If you are doing the configuration on the HTML5 client console, you notice that it has no scroll bars. However, you can use the **shift+PgUp** keyboard combination to scroll up and **shift+PgDn** to scroll down. In this way, you can see the entire configuration.

The last step is to display the IP addresses of the adapters. These addresses are required later when you try to access queue managers that you create in the appliance.

- ___ 37. Execute “**show ipaddress**”. Take note of your IP addresses. Later, you are going to use them to access the appliance.



Name	ifIndex	IP version	Prefix length	IP address
lo	1	ipv4	8	127.0.0.1
lo	1	ipv6	128	::1
eth0	4	ipv4	24	10.0.0.1
eth1	5	ipv4	24	10.0.0.4
eth2	6	ipv4	24	10.0.0.5
eth3	7	ipv4	24	10.0.0.6

The next step is to accept the license agreement. This step must be done with the WebGUI. Go to the Windows VM in your environment.

- ___ 38. Log in with **Administrator** as the user ID and **websphere** as the password.
- ___ 39. Start a web browser session.

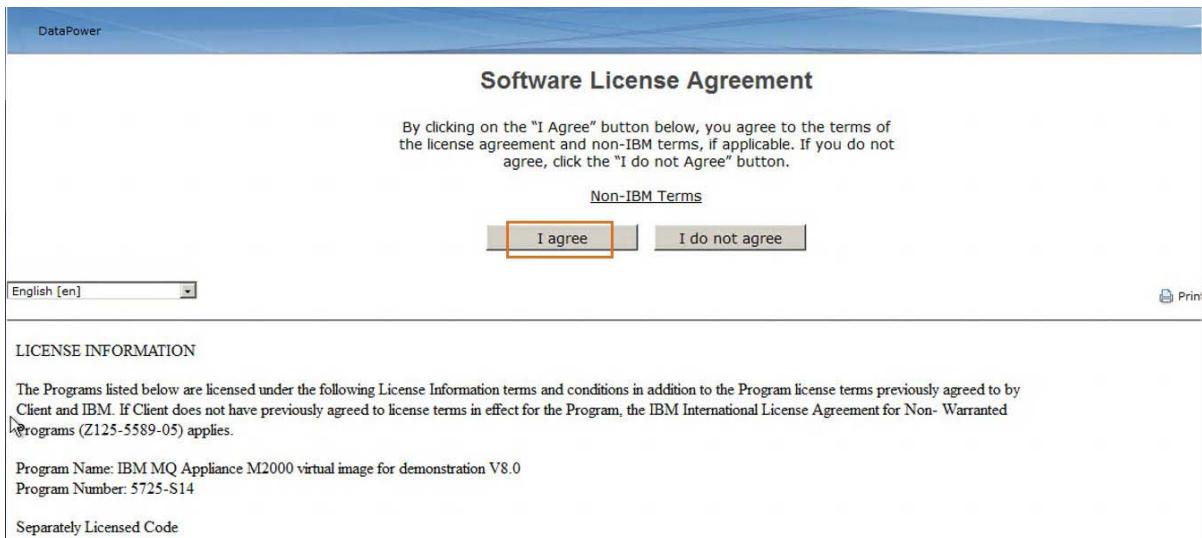
- ___ 40. Navigate to `https://<IP address of eth0>:9090`. If you receive any warnings, allow the exception and continue.



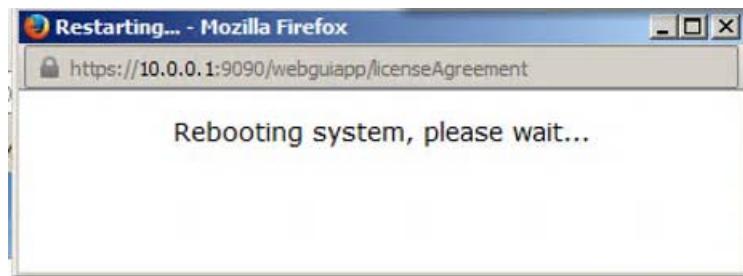
- ___ 41. You now see the console login screen.

- ___ 42. Enter `admin` as the user name.
___ 43. Enter `passw0rd` (or whatever you chose earlier) as the Password.
___ 44. Click **Login**.

- ___ 45. Click **I agree** to accept the license agreement.



The appliance now processes the license acceptance. All logged in users are now disconnected.



- ___ 46. After waiting a couple of minutes, you see the login screen again.

__ 47. Log in by using `admin` again.



__ 48. You are now logged in to the console.

A screenshot of the IBM MQ Appliance MQ00.8.0.0.3 main dashboard. The top navigation bar shows "IBM MQ Appliance | MQ00 console at 10.0.0.1" and a user dropdown "admin". The menu bar includes "Get started", "Manage Appliance", "MQ Console", "Save configuration", and "Export configuration". The main content area has a "Get started" section with a welcome message and a "Manage Appliance" section with a gear icon and a "MQ Console" section with a grid and arrow icon. Both sections have descriptive text and "Learn more" links.

1.3. Create and configure a queue manager

The next part of the exercise creates and configures a queue manager. This part is done by using the command-line interface provided by the appliance console. On a real appliance, this creation and configuration would be done by using a Secure Shell connection, with the port that was configured earlier (port 22 is the default).

The IBM MQ Appliance has the concept of modes. When the administrator logs in as `admin`, the shell starts out as an administrative shell. IBM MQ commands are not part of the administration mode. The `mqcli` command can be used to change to IBM MQ administration mode. As soon as you are in IBM MQ administration mode, the normal administration commands are not available. To exit from IBM MQ administration mode, use the `exit` command.

- ___ 49. Return to the MQAppl1 image.
- ___ 50. You must log in again as `admin`.
- ___ 51. Enter `passw0rd` (or whatever was selected earlier) as the **Password**. The `help` command displays all valid commands for the current mode.
- ___ 52. Execute the `help` command. Details on a particular command can be displayed by adding the command to the `help` command.

```
M2000# help
clock Sets the date or time
configure terminal Enters Global Configuration Mode
diagnostics Provides diagnostic information
disable Enters User Mode
disconnect Terminates a user session
echo Echoes text to the console
exec Executes a configuration script
exit Terminates the CLI connection
help Displays general or command-specific help
login Logs in as a specific user
mqcli Enters MQ Configuration Mode
ntp Identifies a network time server
ping Sends an ICMP ECHO_REQUEST
show Displays statistical or configuration data
shutdown Restarts or shuts down the appliance.
test tcp-connection Test TCP reachability
top Returns to initial login mode
traceroute Discovers the route to a host
M2000# _
```

- ___ 53. Execute the `help clock` command.

```
M2000# help clock
clock <yyyy-MM-dd>
clock <hh:MM:ss>
Sets the date or time.
For example:

clock 2003-12-23
sets the date to December 23, 2003
clock 23:32:00
sets the time to 11:32:00 PM.
M2000# _
```

- ___ 54. Use the `clock` command to set the date and time (note that the date format is US).

```
M2000# clock 2015-04-24
Clock update successful
M2000# clock 10:23:00
Clock update successful
M2000# clock
Usage: clock <yyyy-MM-dd>
clock <hh:MM:ss>
M2000# _
```

To create a queue manager, the command-line interface must be in IBM MQ mode.

- ___ 55. Execute the `mqcli` command.

```
M2000# mqcli
M2000(Mqcli)# _
```

- ___ 56. You now see the IBM MQ command-line interface prompt (`mqcli`). A list of available commands can be displayed by using the `help` command.
- ___ 57. Execute the `help` command. To see the actual IBM MQ commands that are available, use the `help mq` command.

```
M2000(Mqcli)# help
The following help topics are available. Type help <topic name> for more
information.

mq      General MQ administration commands
cert   Channel security certificate administration commands
diag   MQ problem diagnosis commands
ha     High availability administration commands
user   Messaging user and group administration
M2000(Mqcli)# _
```

- ___ 58. Execute the help mq command.

```
M2000(Mqcli)#
M2000(Mqcli)# help mq
The following MQ commands are available. Type help <command> for more
information.

crtmqm      Creates a queue Manager
dltmqm      Deletes a queue Manager
dspmq       Displays information about queue Managers
dspmqini    Displays queue manager initialization parameters
dspmqtrn    Displays in-doubt and heuristically completed transactions
dspmqvar    Displays global and queue manager environment variables
endmqm     Stops a queue manager
rsvmqtrn   Resolves in-doubt and heuristically completed transactions
runmqsc    Runs MQSC commands
runswchl   Switches transmission queue for cluster channel
setmqini   Configures queue manager initialization parameters
setmqvar   Configures global and queue manager environment variables
status      Displays status information
strmqm     Starts a queue manager
M2000(Mqcli)# -
```

If you are unfamiliar with IBM MQ command formats, the syntax for a particular IBM MQ command can also be displayed by using the help command.

- ___ 59. You are going to create a queue manager. Next, you look at the syntax that is required.
 ___ 60. Execute the help crtmqm command.

```
M2000(Mqcli)# help crtmqm
usage: crtmqm [-c text] [-d DefaultQ] [-h MaxHandles]
               [-p Port] [-t TrigInt] [-u DeadQ] [-x MaxUMsgs]
               [-lp LogPri] [-ls LogSec] [-lf LogFileSize]
               [-fs FileSystemSize] [-sx] QMgrName

-c Descriptive text.
-d Default transmission queue name.
-fs File system size in gigabytes (GB).
-h Maximum number of handles per connection handle.
-lf Log file size, specified in units of 4 KB pages.
-lp Primary log files allocated when the queue manager is created.
-ls Secondary log files allocated when the primary files are exhausted.
-p Port number for the managed TCP listener.
-sx Make this queue manager a high availability (HA) queue manager.
-t Trigger interval in milliseconds.
-u Dead-letter queue name.
-x Maximum number of uncommitted messages under any one syncpoint.
M2000(Mqcli)# -
```

You now create a queue manager that is named **QM1** by using the `crtmqm` command. The listener port is 1414. The file system size is set to 64 GB on a real appliance, but you need to set it to only 3 GB on the virtual appliance.

- ___ 61. Execute the following command:

```
crtmqm -p 1414 -u SYSTEM.DEAD.LETTER.QUEUE -fs 3 QM1
```

- ___ 62. Execute the strmqm QM1 command to start the queue manager. You can see that the queue manager is started and is IBM MQ V8.0.0.2. The status of the queue managers can be displayed with the dspmq command.

```
Setup completed.  
M2000(Mqcli)# strmqm QM1  
IBM MQ Appliance queue Manager 'QM1' starting.  
The queue Manager is associated with installation 'MQAppliance'.  
5 log records accessed on queue Manager 'QM1' during the log replay phase.  
Log replay for queue Manager 'QM1' complete.  
Transaction Manager state recovered for queue Manager 'QM1'.  
IBM MQ Appliance queue Manager 'QM1' started using V8.0.0.2.  
M2000(Mqcli)#

```

- ___ 63. Execute the dspmq command.

```
M2000(Mqcli)#
M2000(Mqcli)#
M2000(Mqcli)#
QMNAME(QM1)
M2000(Mqcli)#

```

STATUS(Running)

The queue manager must now be configured to allow connections, **including from MQExplorer**. This configuration will be done in the next section of this exercise.

1.4. Configuring the queue manager for connections

When a queue manager is first created, no external connections are allowed. The queue manager must now be configured to allow connections, including connections from IBM MQ Explorer. You do this configuration in this section of this exercise.

- ___ 64. Execute the following command:

```
usercreate -u testuser -g mqm -p passw0rd
```

```
M2000(mqcli)#
M2000(mqcli)# usercreate -u testuser -g mqm -p passw0rd
M2000(mqcli)# _
```

It is worth mentioning here that this user is different from the users that you worked with previously. The other users are administrative users for the appliance, but this one is a messaging (IBM MQ) user.

- ___ 65. Execute the `runmqsc QM1` command.

You need to create the SVRCONN channel that is used for remote administration and also define the channel authentication records to allow access.

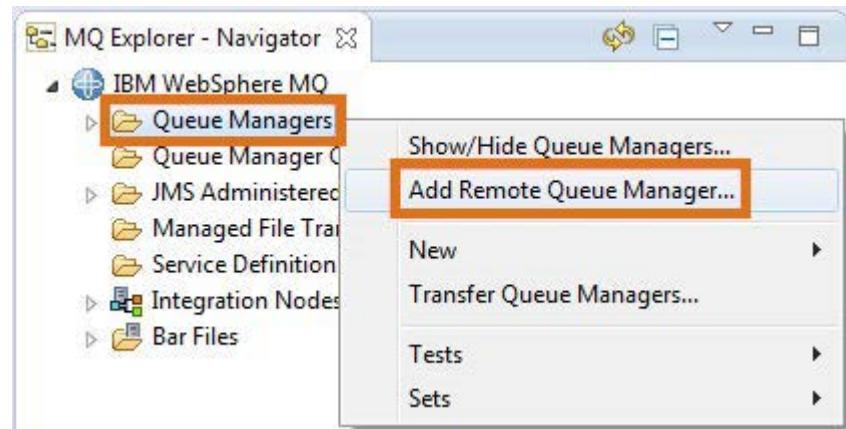
- ___ 66. Enter the following mqsc commands:

```
DEFINE CHANNEL('SYSTEM.ADMIN.SVRCONN') CHLTYPE(SVRCONN)
SET CHLAUTH('SYSTEM.ADMIN.SVRCONN') TYPE(BLOCKUSER) USERLIST('*whatever')
ALTER AUTHINFO('SYSTEM.DEFAULT.AUTHINFO.IDPWOS') AUTHTYPE(IDPWOS)
ADOPTCTX(YES)
REFRESH SECURITY TYPE(CONNAUTH)
END
```

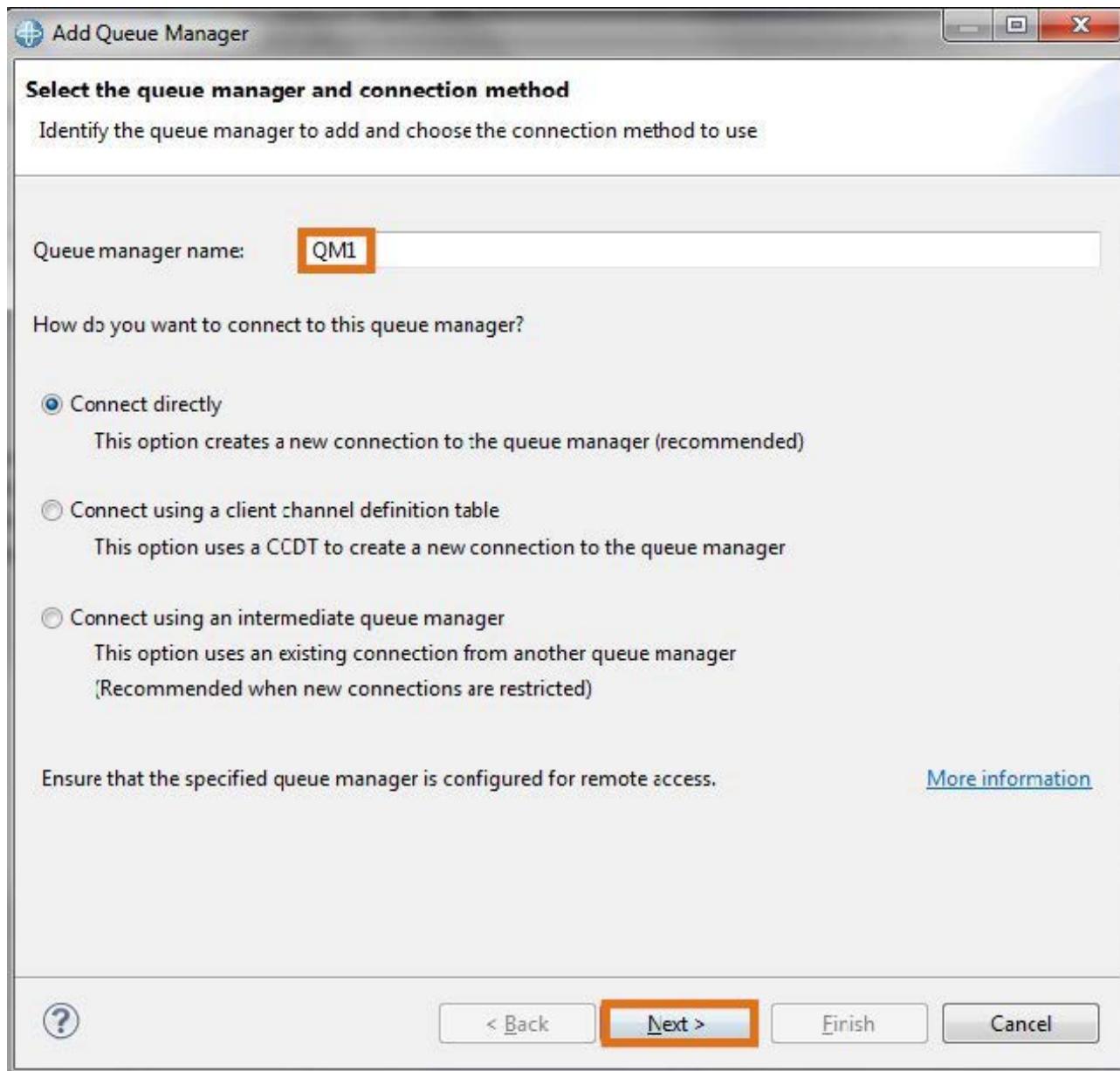
```
define channel(SYSTEM.ADMIN.SURCONN) chltype(SURCONN)
  1 : define channel(SYSTEM.ADMIN.SURCONN) chltype(SURCONN)
AMQ8014: IBM MQ Appliance channel created.
set chlauth(SYSTEM.ADMIN.SURCONN) type(BLOCKUSER) userlist('@whatever')
  2 : set chlauth(SYSTEM.ADMIN.SURCONN) type(BLOCKUSER) userlist('@whatever')
AMQ8877: IBM MQ Appliance channel authentication record set.
alter authinfo ('SYSTEM.DEFAULT.AUTHINFO.IDPWOS') authtype(IDPWOS) adoptctx(YES)
  3 : alter authinfo ('SYSTEM.DEFAULT.AUTHINFO.IDPWOS') authtype(IDPWOS) adoptctx(YES)
AMQ8567: IBM MQ Appliance authentication information changed.
refresh security type(CONNAUTH)
  4 : refresh security type(CONNAUTH)
AMQ8560: IBM MQ Appliance security cache refreshed.
```

- ___ 67. Start MQExplorer on the Windows image. Select **Start - All programs - IBM WebSphere MQ - WebSphere MQ Explorer (Installation1)**.

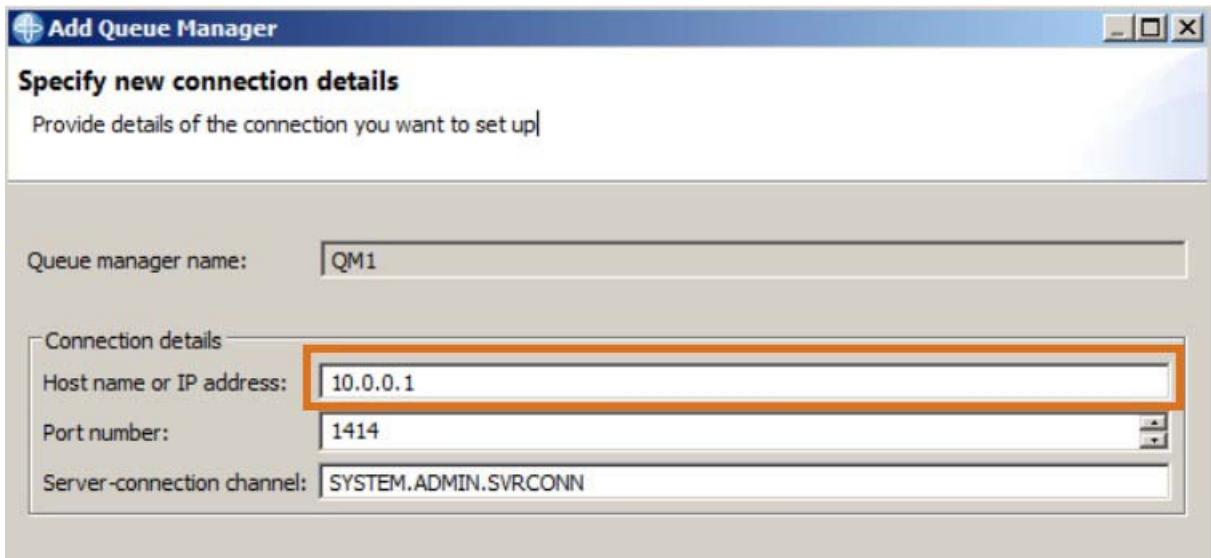
- ___ 68. Right-click Queue Managers. Select Add Remote Queue Manager.



- ___ 69. Enter QM1 as the Queue manager name. Click **Next**.

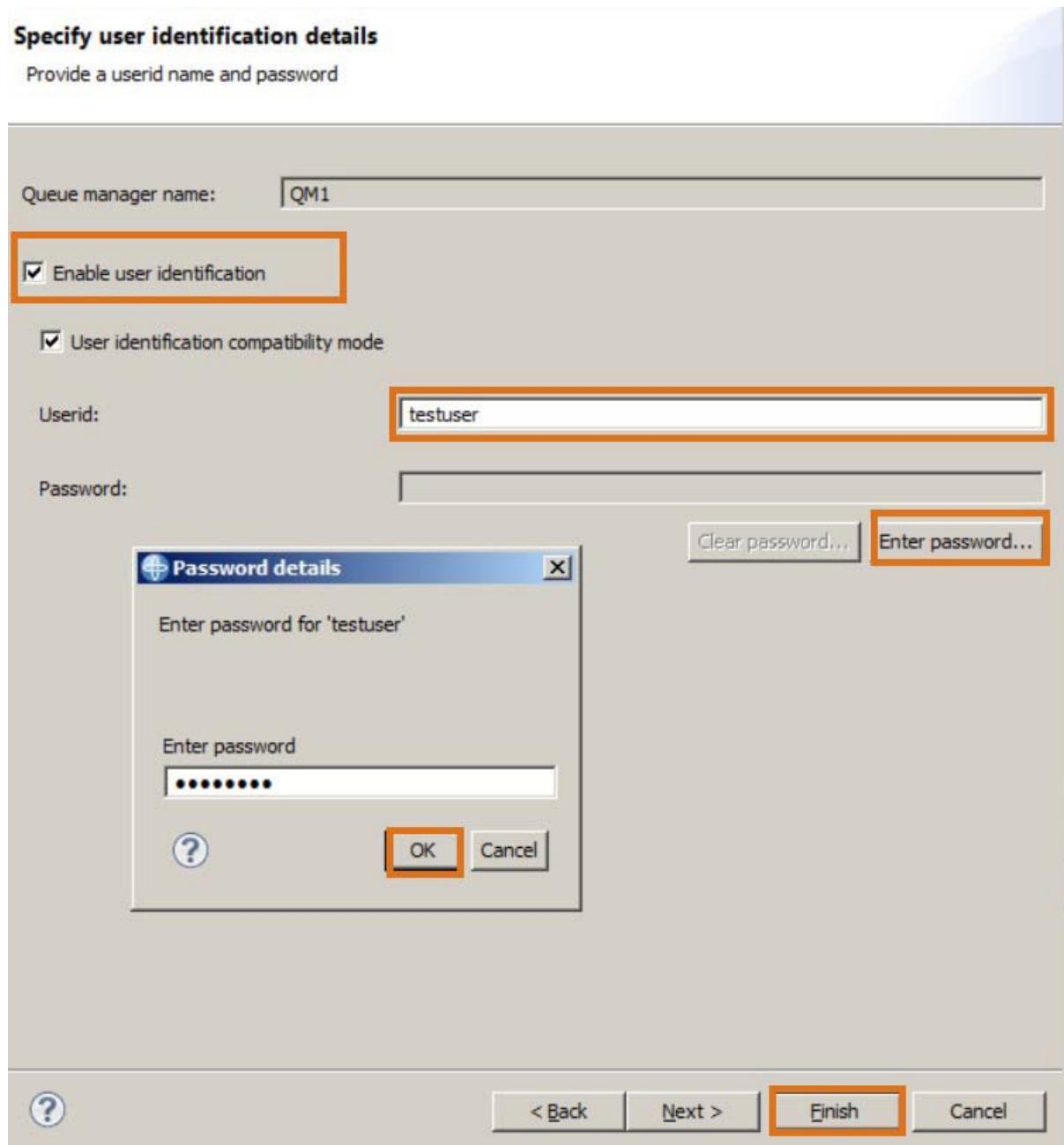


- ___ 70. Enter the IP address of the MQAppl1. Click **Next**.

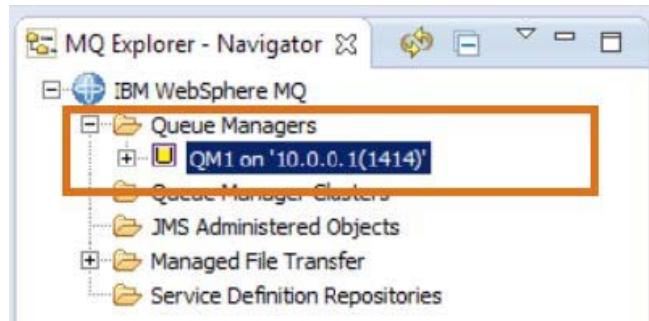


- ___ 71. Click **Next**.
___ 72. It is not possible to use security exits on the appliance, so click **Next** again.
___ 73. Select the check box next to **Enable user identification**.
___ 74. Enter `testuser` as the **Userid**.

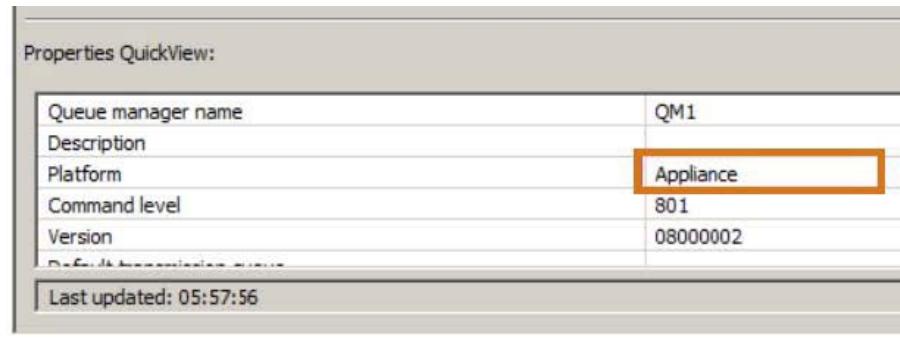
- 75. Enter `passw0rd` under **Enter password**. Click **OK**. Click **Finish**. The queue manager should now be visible in MQExplorer.



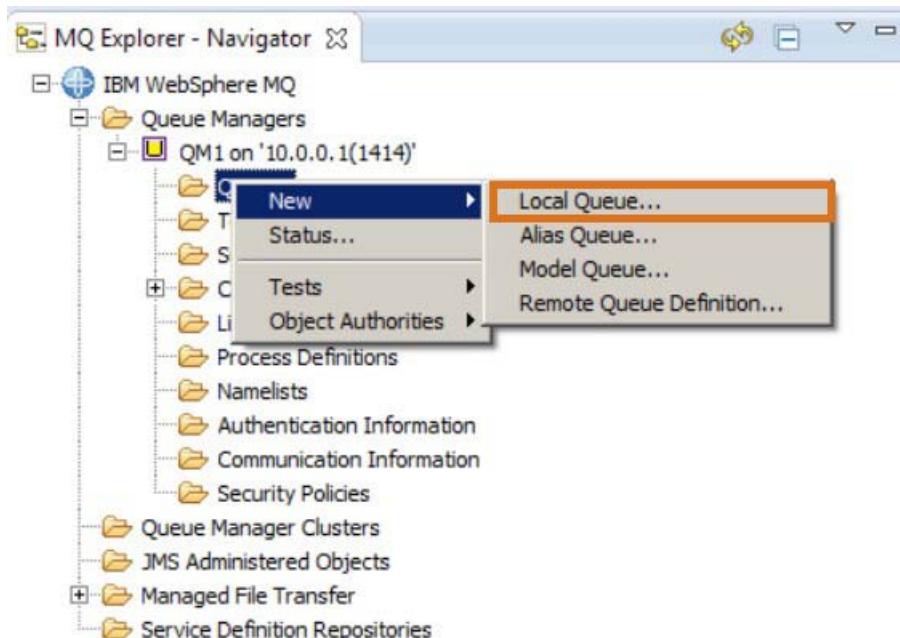
- ___ 76. Click **Finish**. The queue manager should now be visible in MQExplorer.



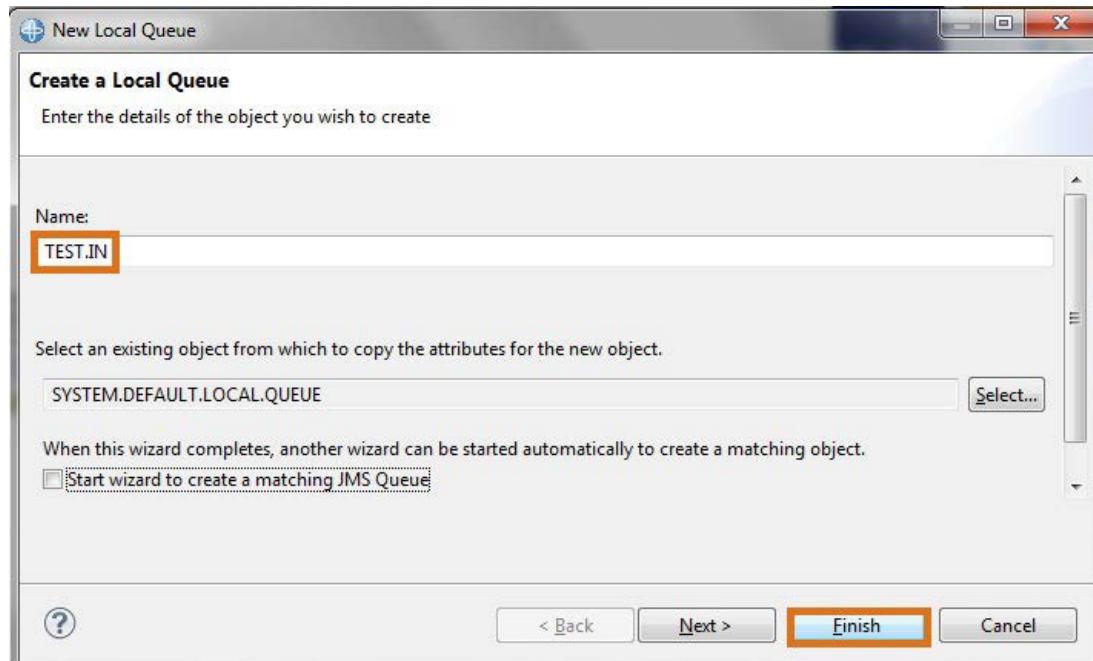
If you look at the Properties QuickView pane, you see that the MQExplorer identifies this queue manager as one that is running on an appliance.



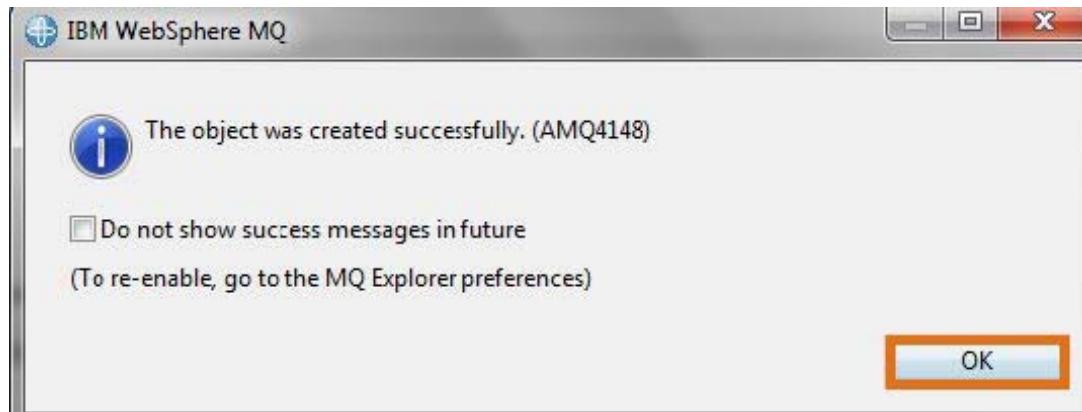
- ___ 77. Expand the **QM1** queue manager.
 ___ 78. Select **Queues**, right-click, and select **New > Local Queue** from the menu.



- ___ 79. Enter TEST.IN as the **Name**. Click **Finish**.



- ___ 80. The next window notifies you that the object was created successfully. Click **OK** to accept the notification and close the window.



- ___ 81. Repeat the previous steps to create another local queue with TEST.OUT as the **Name**. Both of these queues should be visible in MQExplorer.

Queues				
Filter: Standard for Queues				
Queue name	Queue type	Open input count	Open output count	Current queue depth
TEST.IN	Local	0	0	0
TEST.OUT	Local	0	0	0

1.5. Running applications against the appliance

The appliance is now configured for administrative access with MQExplorer, and two queues are created. The next part of the exercise runs IBM MQ applications against the appliance. The appliance must be configured to allow connections. The user (testuser) that was created in the previous exercise is going to be used to create and configure a SVRCONN channel (USER.SVRCONN) to allow client access.

- 82. Return to the MQAppl1 appliance.
- 83. Execute the `runmqsc QM1` command.
- 84. Enter the following mqsc commands:

```
DEFINE CHANNEL( 'USER.SVRCONN' ) CHLTYPE(SVRCONN)
SET CHLAUTH( 'USER.SVRCONN' ) TYPE(BLOCKUSER) USERLIST('*whatever')
END
```

```
Mq(mqcli)# runmqsc QM1
5724-H72 (C) Copyright IBM Corp. 1994, 2014.
Starting MQSC for queue manager QM1.

DEFINE CHANNEL(USER.SVRCONN) CHLTYPE(SVRCONN)
  1 : DEFINE CHANNEL(USER.SVRCONN) CHLTYPE(SVRCONN)
AM00014: IBM MQ Appliance channel created.
SET CHLAUTH('USER.SVRCONN') TYPE(BLOCKUSER) USERLIST('*whatever')
  2 : SET CHLAUTH('USER.SVRCONN') TYPE(BLOCKUSER) USERLIST('*whatever')
AM00877: IBM MQ Appliance channel authentication record set.
END
  3 : END
2 MQSC commands read.
No commands have a syntax error.
All valid MQSC commands were processed.
Mq(mqcli)#

```

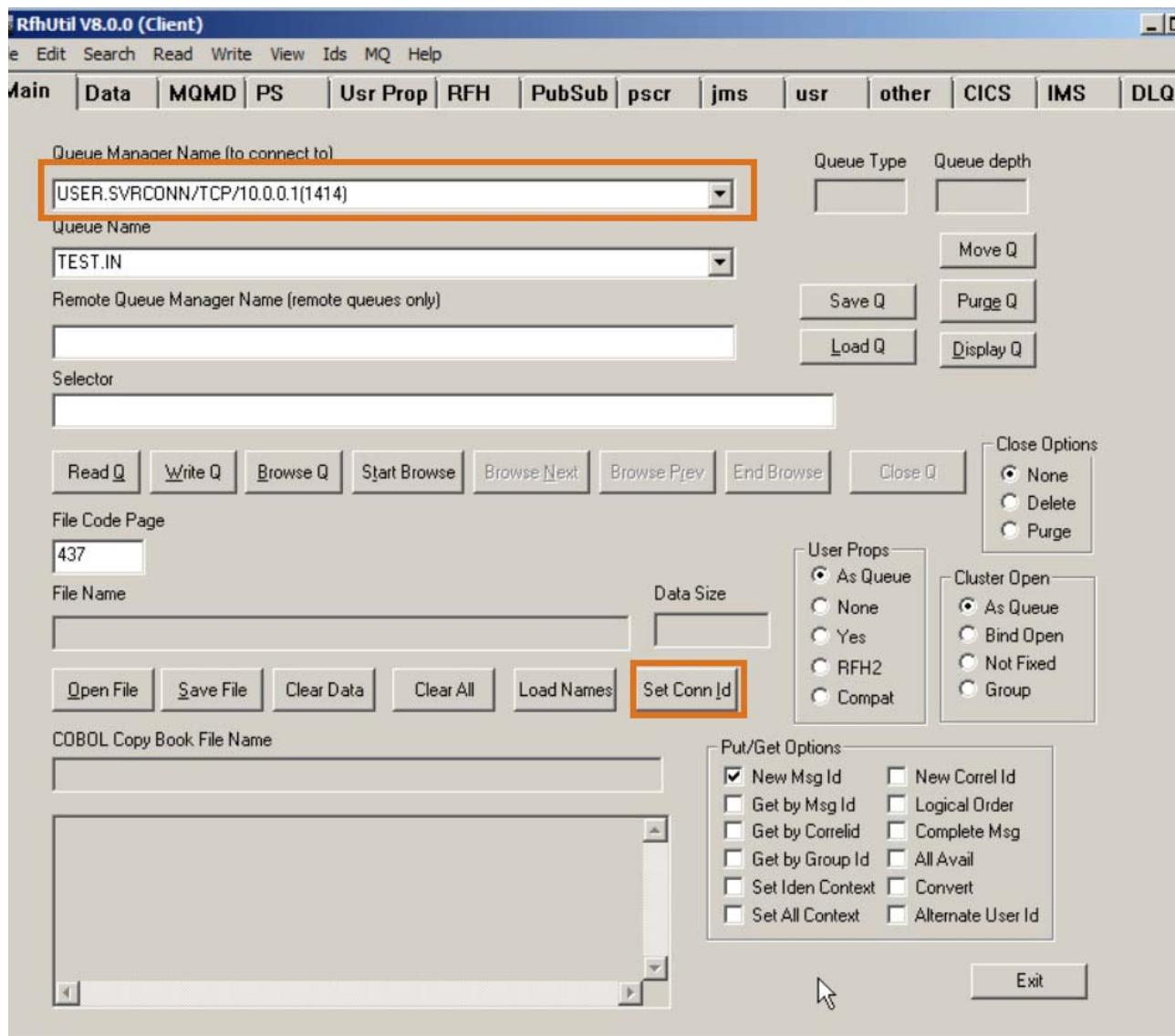
You are now going to use RFHUtilc to test the configuration

- 85. Go back to the Windows image.
- 86. Open a command window.
- 87. Navigate to:
`C:\MQ-POT\Tools\rfhutil\MQappliance\lab1`
- 88. Execute the **RFHUtilc** (client version) application.

```
Administrator: Command Prompt
Microsoft Windows [Version 6.1.7600]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.

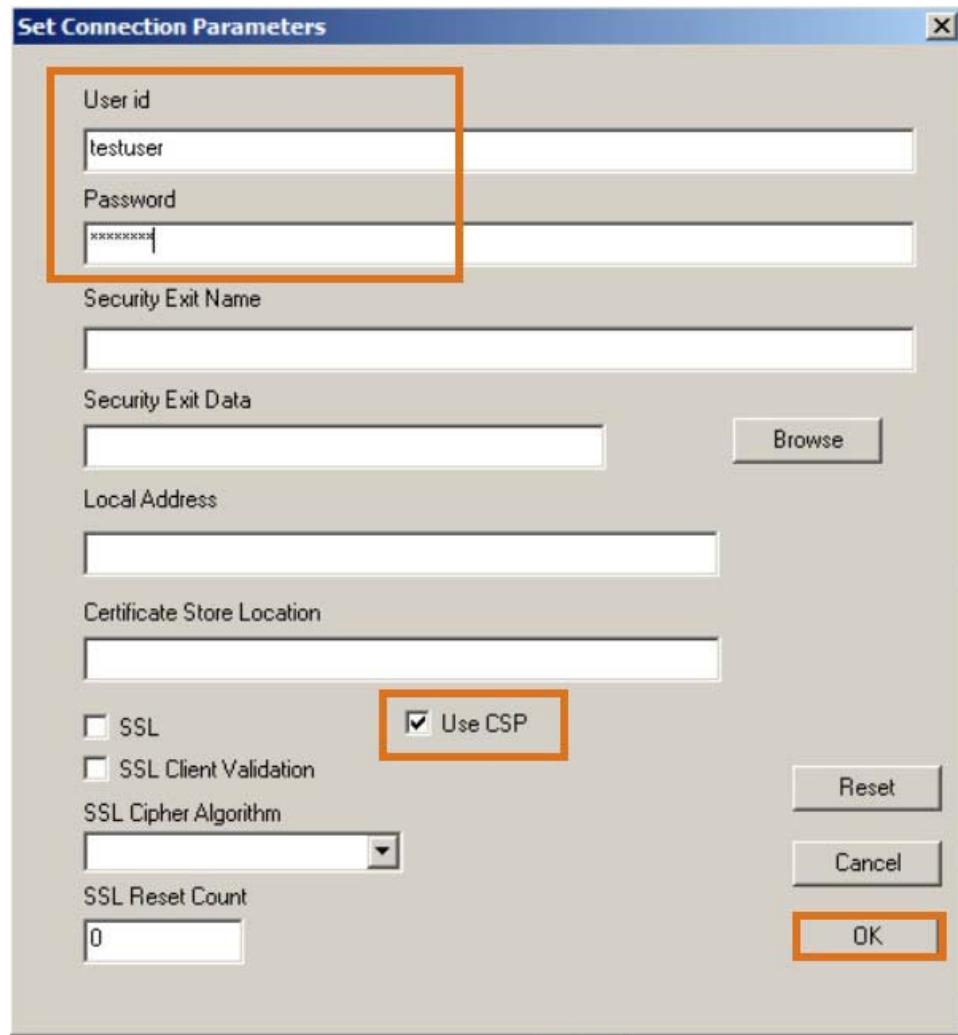
C:\Users\Administrator>cd C:\MQ-POT\Tools\rfhutil\MQappliance\lab1
C:\MQ-POT\Tools\rfhutil\MQappliance\lab1 rfhutilc
C:\MQ-POT\Tools\rfhutil\MQappliance\lab1>
```

89. Set the Queue manager to **USER.SVRCONN/TCP/10.0.0.1(1414)** and click **Set Conn Id**.

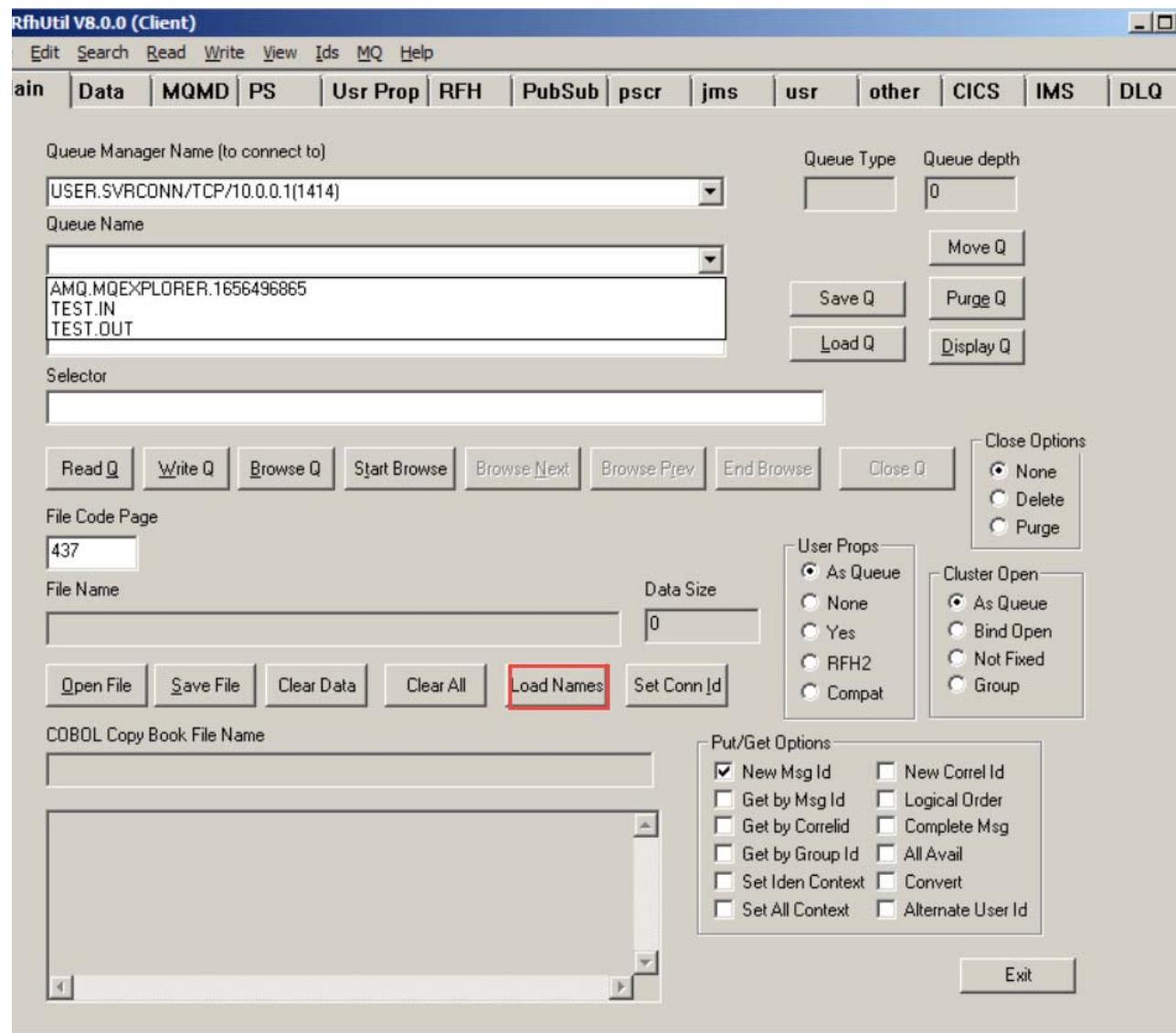


___ 90. In the Set Connection Parameters window, set the following information:

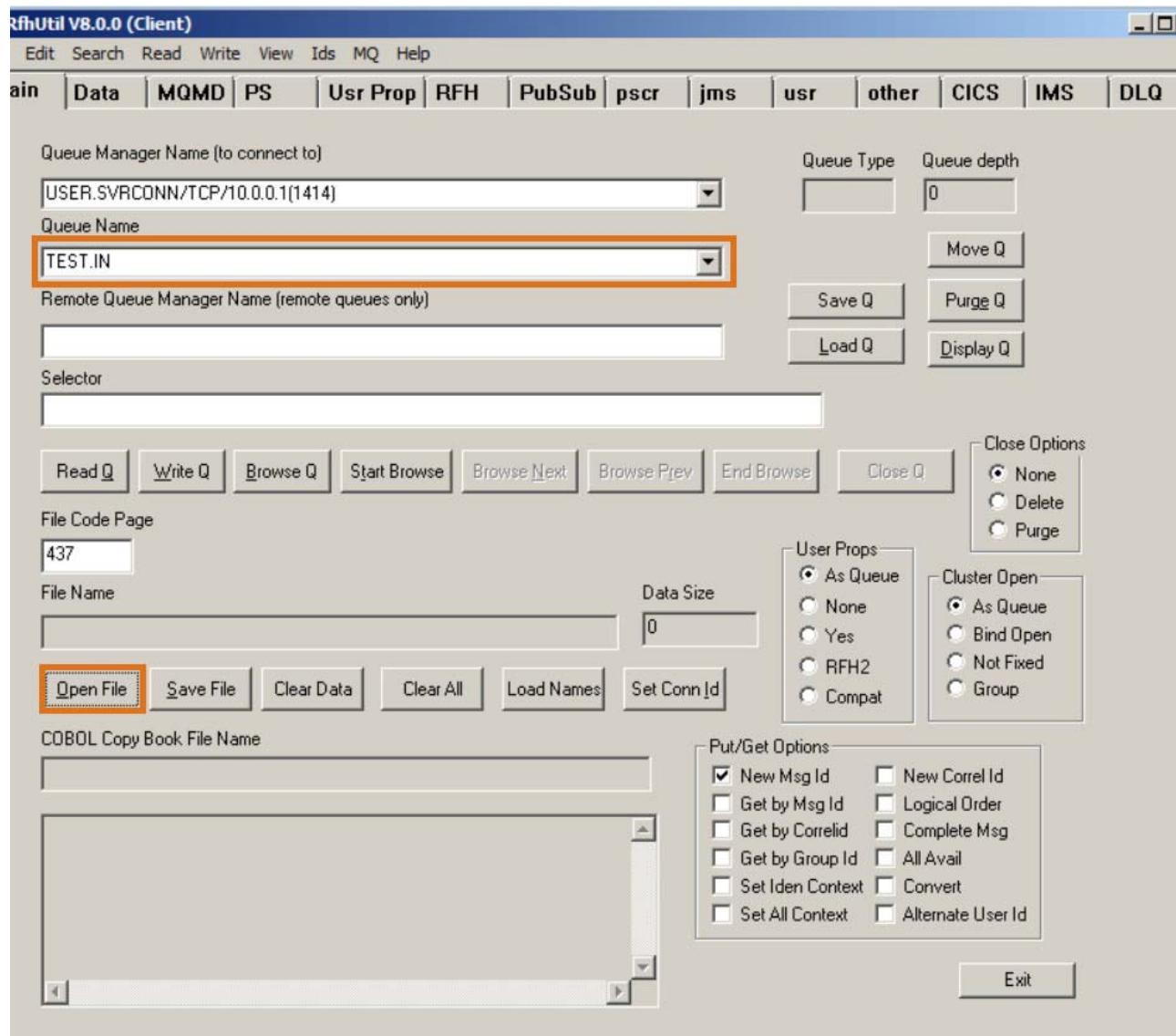
- Set the User id to: testuser
- Set the Password to: passw0rd
- Select the **Use CSP** check box.
- Click **OK**.



91. The next step loads the list box with the queues that are defined on the queue manager. It connects to the queue manager to get the queue names. Click **Load Names**.



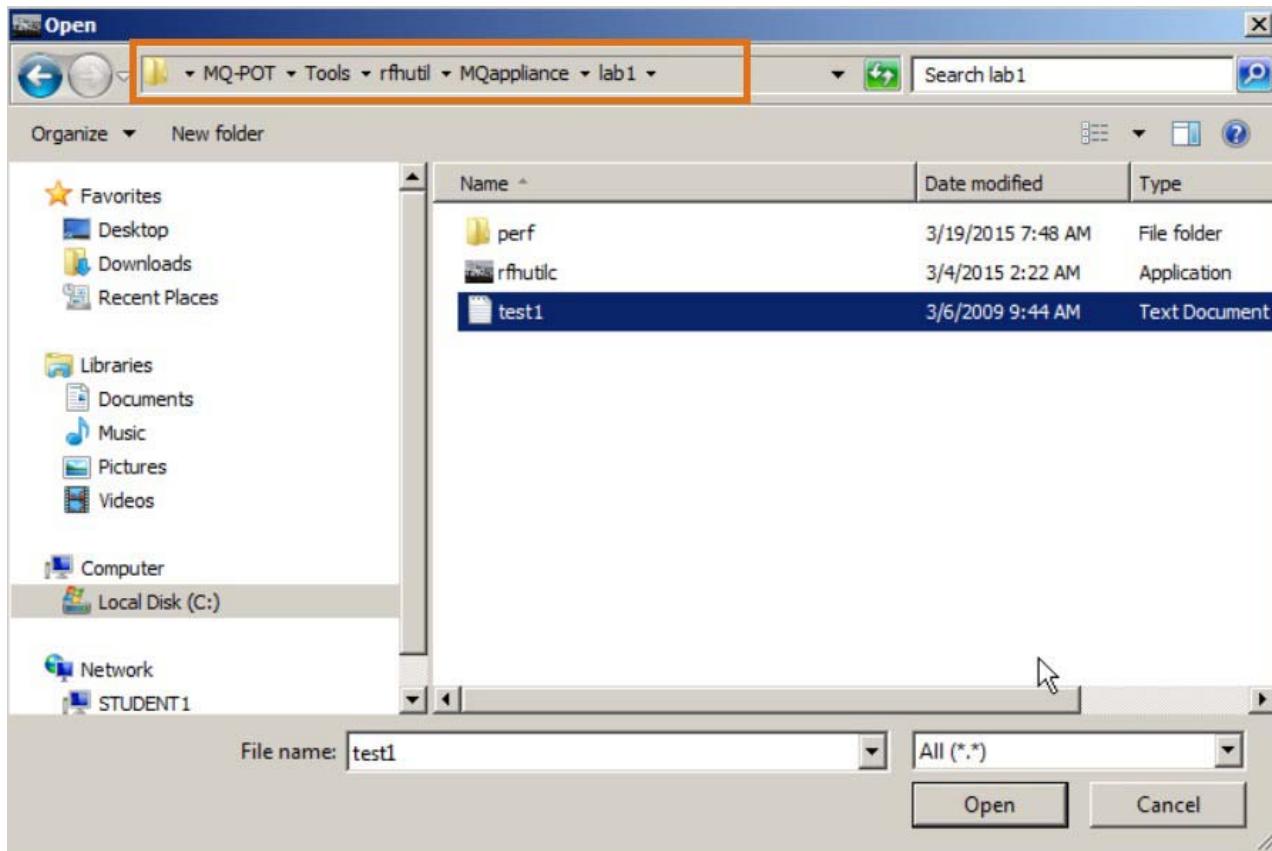
92. Use the menu to select **TEST.IN** as the Queue Name. Click **Open File**.



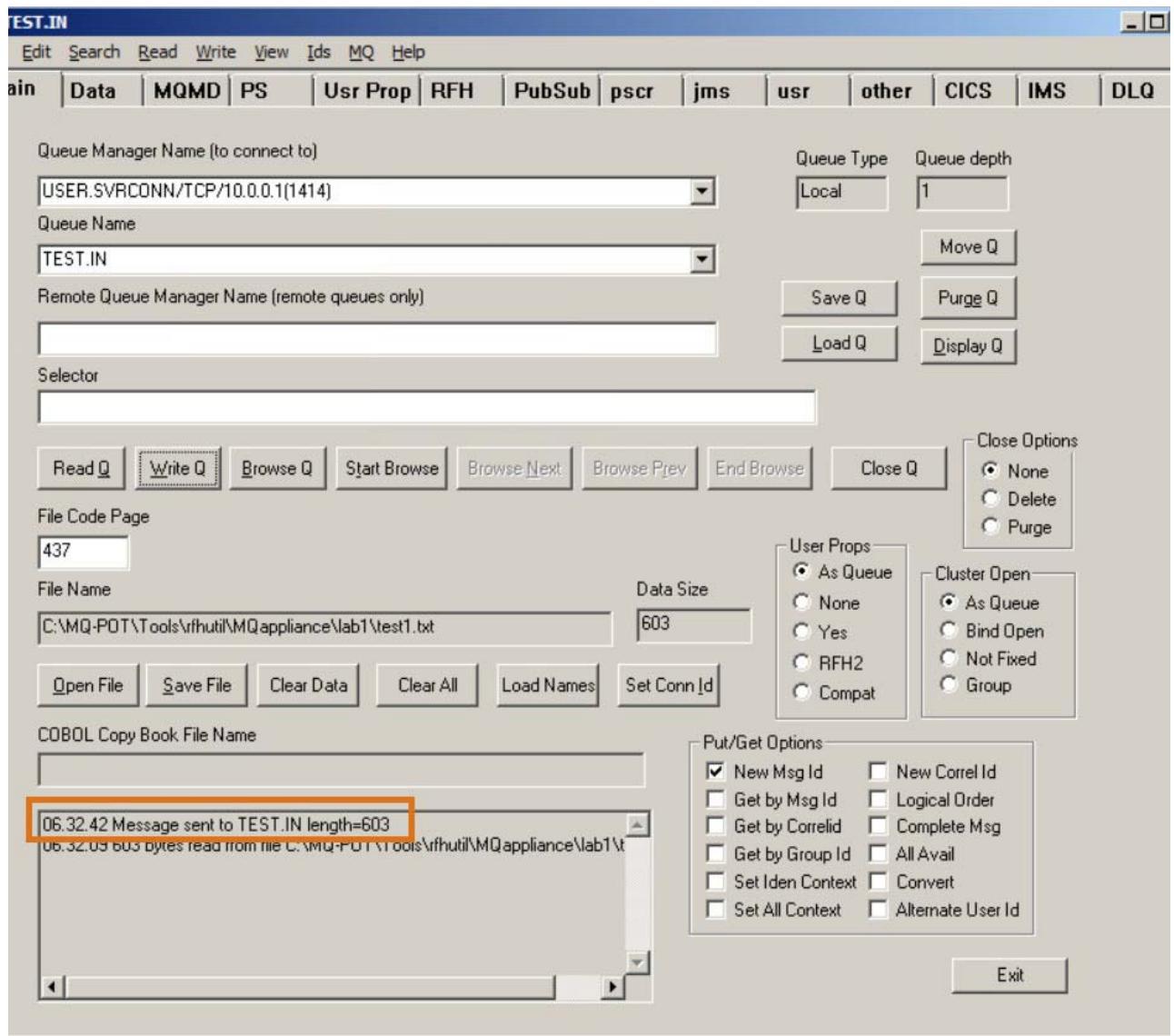
- ___ 93. Navigate to the provided data file (it is in the same directory as the RFHutilc application that you started).

Select the file (test1.txt), which is located in the

C:\MQ-POT\Tools\rfhutil\MQappliance\lab1 folder. Click **Open**.

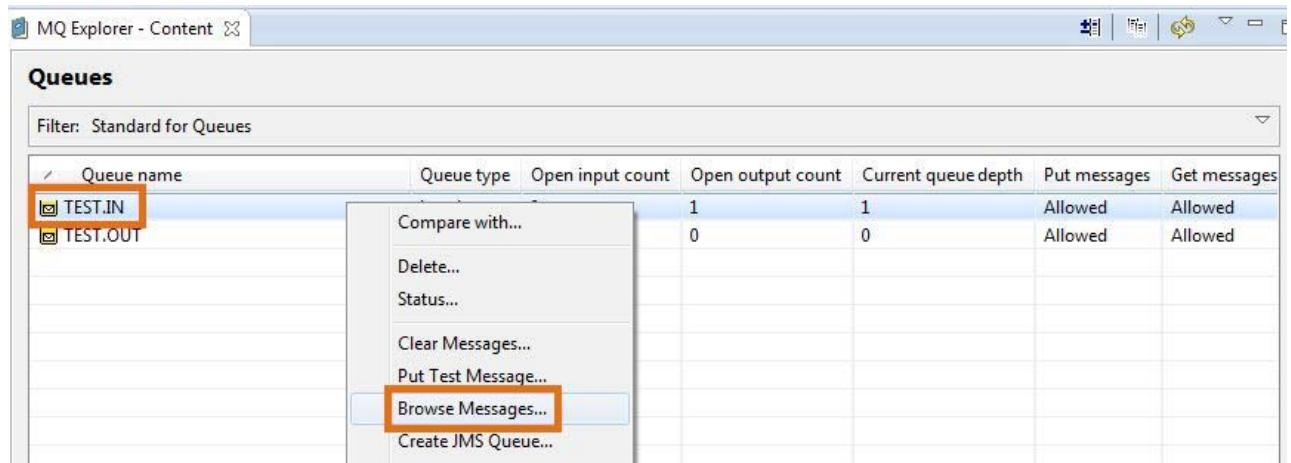


- ___ 94. Click **Write Q**. A message should be written to the **TEST.IN** queue.



- ___ 95. Return to MQExplorer.

96. Select the **TEST.IN** queue, right-click, and select **Browse Messages**. The message should be visible.



97. Click **Close**.

Message browser

Queue Manager Name: QM1
Queue Name: TEST.IN

Position	Put date/time	User identifier	Put application name	Format	Total length	Message data
1	Apr 24, 2015 11:32:16 AM	testuser	Qappliance\ab1\fnutilc.exe		603	{ "glossary": { "title": "

Scheme: Standard for Messages

Last updated: 06:34:02 (1 item)

(i) All available messages on the queue have been browsed. Press the refresh button for new messages.

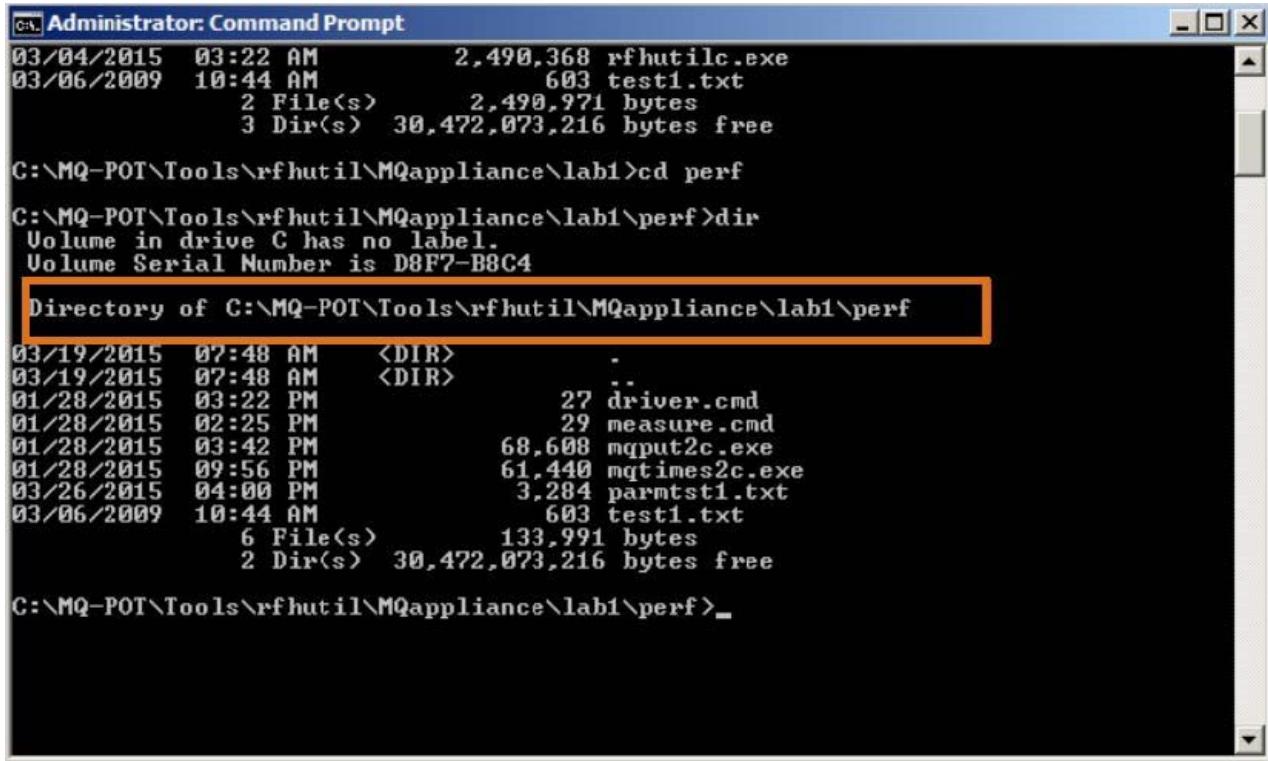
Refresh Close

1.6. Testing performance

This section uses some performance utilities from SupportPac IH03 to show how to do simple performance measurements against the IBM MQ Appliance. When using a virtual appliance, the performance should be similar to a local queue manager.

Some files and programs are provided in the `perf` folder. These resources are used for this part of the exercise. The applications are part of SupportPac IH03.

- ___ 98. Go back to the command window from earlier.
- ___ 99. Change to the `perf` directory.



```

Administrator: Command Prompt
03/04/2015  03:22 AM      2,490,368 rfhutilc.exe
03/06/2009  10:44 AM      603 test1.txt
              2 File(s)    2,490,971 bytes
              3 Dir(s)   30,472,073,216 bytes free

C:\MQ-POT\Tools\rfhutil\MQappliance\lab1>cd perf

C:\MQ-POT\Tools\rfhutil\MQappliance\lab1\perf>dir
Volume in drive C has no label.
Volume Serial Number is D8F7-B8C4

Directory of C:\MQ-POT\Tools\rfhutil\MQappliance\lab1\perf

03/19/2015  07:48 AM  <DIR>  .
03/19/2015  07:48 AM  <DIR>  ..
01/28/2015  03:22 PM      27 driver.cmd
01/28/2015  02:25 PM      29 measure.cmd
01/28/2015  03:42 PM      68,608 mqput2c.exe
01/28/2015  09:56 PM      61,440 mqtimes2c.exe
03/26/2015  04:00 PM      3,284 parmtst1.txt
03/06/2009  10:44 AM      603 test1.txt
              6 File(s)    133,991 bytes
              2 Dir(s)   30,472,073,216 bytes free

C:\MQ-POT\Tools\rfhutil\MQappliance\lab1\perf>_

```

- ___ 100. Open the `parmtst1.txt` parameters file in your favorite text editor, such as Notepad. The `parmtst.txt` file is located in the `C:\MQ-POT\Tools\rfhutil\MQappliance\lab1\perf` folder.

101.Edit the file as follows:

- Change the **Qmgr** parameters to match the ones that you used in RFHUtilc:
USER.SVRCONN/TCP/10.0.0.1(1414).
- Confirm that the user ID and password are correct.
- Save the file (**Ctrl+S**).
- Close the editor (Notepad) session.

```
[header]
* Input parameters for MQPut2 program *
*
*
* name of the queue and queue manager
* to write messages to
*
qname=TEST.OUT
qmgr=USER.SVRCONN/TCP/10.0.0.1(1414)

* user id and password to connect with
*
userID=testuser
password=passw0rd

* total number of messages to be written
* the program will stop after this number of
* messages has been written
*
```

102.Execute the measure.cmd file.

```
C:\MQ-POT\Tools\rfhutil\MQappliance\lab1\perf>
C:\MQ-POT\Tools\rfhutil\MQappliance\lab1\perf>measure.cmd

C:\MQ-POT\Tools\rfhutil\MQappliance\lab1\perf>mqtimes2c.exe -f parmtst1.txt
mqtimes2c.c V3.0 Client version (Jan 28 2015 20:56:48) program start
Copyright IBM Corp. 2001/2002/2004/2005/2014
Connecting using TCP on channel USER.SVRCONN at 10.0.0.1<1414>
Selected to QM1
Binding queue TEST.OUT for input
Issuing 50000 messages from TEST.OUT on USER.SVRCONN/TCP/10.0.0.1<1414> with max wait time of 120 secs
```

103.Start a second command window.104.Change to the directory that you are using for the test.

```
Microsoft Windows [Version 6.1.7601]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.

C:\Users\Administrator>cd C:\MQ-POT\Tools\rfhutil\MQappliance\lab1\perf

C:\MQ-POT\Tools\rfhutil\MQappliance\lab1\perf>
```

105.Execute the driver.cmd file.

___ 106.Switch to the other command window to see the results.

```

opening queue TEST.OUT for input
Reading 50000 messages from TEST.OUT on USER.SURCONN/TCP/10.0.0.1<1414>
with max wait time of 120 secs
15452809 2091 msgs total msgs      2091
15452900 2265 msgs - recent average 2265.00 total msgs      4356
15453000 2117 msgs - recent average 2191.00 total msgs      6473
15453100 2158 msgs - recent average 2180.00 total msgs      8631
15453200 2156 msgs - recent average 2174.00 total msgs     10787
15453300 2146 msgs - recent average 2168.40 total msgs     12933
15453400 2091 msgs - recent average 2155.50 total msgs     15024
15453500 1856 msgs - recent average 2112.71 total msgs     16800
15453600 2072 msgs - recent average 2107.63 total msgs     18952
15453700 1988 msgs - recent average 2094.33 total msgs     20940
15453800 1981 msgs - recent average 2083.00 total msgs     22921
15453900 2652 msgs - recent average 2121.70 total msgs     25573
15454001 2136 msgs - recent average 2123.60 total msgs     27709
15454100 2226 msgs - recent average 2130.40 total msgs     29935
15454200 2087 msgs - recent average 2123.50 total msgs     32022
15454300 2129 msgs - recent average 2121.80 total msgs     34151
15454400 2543 msgs - recent average 2167.00 total msgs     36694
15454500 2345 msgs - recent average 2215.90 total msgs     39039
15454600 2520 msgs - recent average 2260.70 total msgs     41559
15454700 2121 msgs - recent average 2274.00 total msgs     43680
15454800 2161 msgs - recent average 2292.00 total msgs     45841
15454900 2154 msgs - recent average 2242.20 total msgs     47995
154550 2005 msgs

closing the input queue <TEST.OUT>
disconnecting from the queue manager

Total messages 50000
total bytes in all messages 30150000
average message size 603
Total number of seconds with at least one message 23
First time 13:55:28 Last time 13:55:50 seconds 23
Average message rate except first and last intervals 2185.90
Peak message rate 2652

MQTIMES2 program ended

C:\MQ-POT\Tools\rfhutil\MQappliance\lab1\perf>_

```

1.7. Shutting down the appliance

This part of the exercise is optional. When all the other parts of the exercise are finished and any other exploration is complete, the appliance can be shut down.

— 107.Return to the VMware console, and do the following steps to shut down the appliance.

- Use the `exit` command to return to the system console.
- Use the `shutdown halt` command to shut down the appliance.
- Respond `y` to the “**Do you want to continue?**” prompt.

```
mq(mqcli)#
mq# exit
mq# shutdown halt
Error report creation successfully started to 'temporary:///error-report.0000000
.20150128113427204EST.txt.gz', check the logs for the final result

You have requested a system shutdown. Do you want to continue? Yes/No [y/n]: y
System about to shutdown in 0 seconds
mq# _
```

You have completed the exercise successfully.

You can use this environment for the other exercises. If you use this environment for the HA Exercise 2, you need to configure MQAppl2 as you did for MQAppl1.

End of exercise

Exercise review and wrap-up

In the first part of the exercise, you performed basic configuration to the IBM MQ Appliance. You created and configured a queue manager. The appliance was configured for administrative access so that you were able to run applications against the appliance.

Exercise 2. High availability setup

Estimated time

00:30

Overview

In this exercise, you configure an IBM MQ virtual appliance for high availability and test high availability failover.

Objectives

After completing this exercise, you should be able to:

- Configure an IBM MQ Appliance for high availability
- Test HA failover on an IBM MQ Appliance

Introduction

The lab environment consists of two virtual appliances (MQAppl1 and MQAppl2) and a Windows environment to do console operations and testing. A third virtual appliance (MQAppl3) is not used in this exercise.

Requirements

This exercise assumes that Exercise 1 is completed.

The virtual appliances that you use for this exercise are **MQAppl1**, **MQAppl2**, and **ZM051_1.0-WS2008**. If using VMware, you should be using the **MQAppl1- HA** and **MQAppl2 HA** and the **ZM051_1.0-WS2008** VMs. You must suspend or shut down all other VMs.

Exercise instructions

If you successfully completed Exercise 1, you can continue to use your environment. Otherwise, you can use the IBM MQ Appliance PoT HA – 8.0.0.3, which is the solution for Exercise 1. Create an environment to work with and start all the virtual images. However, if you successfully completed Exercise 1 on VMware, you must shut down the MQAppl1 VM and start MQAppl1 – HA and MQAppl2 – HA. The HA images are smaller so that you can run three VMs concurrently.

The network adapters are described here. Pay particular attention to eth1, eth2, and eth3. They are the adapters that are used for HA.

Table 4.

Virtual network adapter name	Ethernet interface	Usage	Virtual network name	Virtual network type
Network adapter	eth0	Management and client traffic	VMnet8	NAT
Network adapter 2	eth1	HA primary connection	Custom (VMnet1)	Host-only
Network adapter 3	eth2	HA alternative connection	Custom (VMnet2)	Host-only
Network adapter 4	eth3	HA replication connection	Custom (VMnet3)	Host-only

2.1. Start the environment

- 1. Wait for the virtual machines to power on, as MQAppl1 is shown in the following image. MQAppl2 should look the same.

The IBM MQ Appliance virtual image is available for demonstration purposes only.

This VM image is owned by IBM Corporation and is to be used solely for the purpose of demonstration of certain capabilities and functionality of the IBM MQ Appliance. You are only allowed to view it as part of the demonstration to you by IBM (or IBM business partner) personnel who will use IBM (or IBM business partner) equipment to show you it. You are not allowed to load it on to your systems or retain a copy of it. It is not available for purchase.

If you or any of your company's affiliates provides IBM Corporation or any of its affiliates (either directly or via an IBM business partner) with any feedback (including suggestions, data and/or written materials) in relation to (i) the IBM MQ Appliance, or (ii) IBM Corporation or its affiliates products or services, then IBM Corporation and its affiliates shall be free to use such feedback for any purpose, including (without limitation) the development, manufacture and marketing of products and services. For clarification purposes, the foregoing provisions shall not provide the right for IBM Corporation or any of its affiliates to identify you as the source of any such feedback.

```
M2000# mqcli
M2000(mqcli)#
```

2.2. The virtual environment

Virtual appliance MQAppl1

- ___ 2. The first virtual appliance you look at is MQAppl1. Check that this appliance is in a running state.
- ___ 3. Make sure that you are at the appliance command line. If you are in the mqcli, type: exit Enter the show ipaddress command. The IP addresses in use for this appliance are as follows:

```
M2000# show ipaddress

  Name ifIndex IP version Prefix length IP address
  ---- ----- -----
    lo  1       ipv4      8          127.0.0.1
    lo  1       ipv6     128         ::1
    eth0 4      ipv4     24          10.0.0.1
    eth1 5      ipv4     24          10.0.0.4
    eth2 6      ipv4     24          10.0.0.5
    eth3 7      ipv4     24          10.0.0.6

M2000# _
```

Virtual appliance MQAppl2

- ___ 4. The second virtual appliance that you look at is MQAppl2. Check that this appliance is in a running state.
- ___ 5. The IP addresses in use for this appliance are as follows:

```
M2000# show ipaddress

  Name ifIndex IP version Prefix length IP address
  ---- ----- -----
    lo  1       ipv4      8          127.0.0.1
    lo  1       ipv6     128         ::1
    eth0 4      ipv4     24          10.0.0.2
    eth1 5      ipv4     24          10.0.0.7
    eth2 6      ipv4     24          10.0.0.8
    eth3 7      ipv4     24          10.0.0.9

M2000# _
```

2.3. Create HA group

You create the HA group on the two appliances. You should be at the mqcli command line, as shown.

```
M2000# mqcli
M2000(mqcli)# _
```

- ___ 6. On MQAppl2, run the following command.

```
prepareha -s SomeSecret -a 10.0.0.4
```

The `prepareha` command prepares an appliance to be part of an HA group. You run it on the appliance that you do not run `crthagrp` on. For example, `-a 10.0.0.4` specifies the IP address of the HA group primary interface on other appliance in the group. Another example is that `-s SomeSecret` specifies a string that is used to generate a short-lived password. The password is used to set up the unique key for the two appliances.

- ___ 7. Now go to the MQAppl1 (do not wait for the `prepareha` command to complete) and enter the following command:

```
crthagrp -s SomeSecret -a 10.0.0.7
```

The `crthagrp` command creates a HA group of two appliances. The `prepareha` command must be run on the other appliance before you run `crthagrp`.

- ___ 8. This process might take a few minutes. At the completion of the command execution you should see the following messages:

```
M2000(mqcli)# crthagrp -s SomeSecret -a 10.0.0.7
Checking network configuration
Configuring HA Group on this appliance
Configuring HA Group on the other appliance
This Appliance: Online
Appliance MQAppl2: Online
```

You are now ready to move on to creating some queue managers and testing the HA.

2.4. Create queue managers

- 9. On the MQAppl1 appliance, enter the following command:

```
crtmqm -p 1511 -fs 3 -sx HAQM1
```

The `-fs` stands for the file system size that is set to 64 GB on a real appliance, but you set it to only 3 GB on the virtual appliance.

- 10. After the queue manager is created, you will see the HA configuration as it takes place. You should see the message that indicates the final HA configuration is successful.

```
Performing initial high availability configuration
Configuring appliance MQApp12

Configuring this appliance
Initial high availability configuration succeeded
IBM MQ Appliance queue Manager created.
The queue Manager is associated with installation 'MQAppliance'.
Creating or replacing default objects for queue Manager 'HAQM1'.
Default objects statistics : 84 created. 0 replaced. 0 failed.
Completing setup.
Setup completed.

Performing final high availability configuration
Final high availability configuration succeeded
```



Note

You can view the status of a queue manager in a high availability (HA) group by using the `status` command on the command line.

The `status` command returns information about the operational status of a specified queue manager in the HA group. The status can include the following information:

- The operational state of the HA group
- The file system size, CPU percentage used, and memory used by the queue manager
- The replication status of the queue manager (if synchronization is in progress)
- The preferred appliance for the queue manager
- Whether a partitioned situation is detected, and if so, the amount of “out-of-sync” data held

- 11. You should now check the status of the queue manager by running the following command:

```
status HAQM1
```

- ___ 12. You should see now that the queue manager is running, HA is enabled and running normally, with "This appliance" as the preferred location.

```
M2000(Mqcli)# status HAQM1
QM(HAQM1)
CPU:
Memory:
Queue Manager file system:
HA role: ▾
HA status: Status(Running)
HA control: 0.00%
HA preferred location: 202MB
Primary
Normal
Enabled
This appliance
118MB used, 3.0GB allocated [4%]
M2000(Mqcli)#

```

- ___ 13. If you do not see output as depicted in the previous step, try running the command again as synchronization might still be in progress.
 - ___ 14. Now, go to the MQAppl2 appliance.
 - ___ 15. You create another HA queue manager. Enter the following command:
- ```
crtmqm -p 1512 -fs 3 -sx HAQM2
```
- \_\_\_ 16. Again, you expect to see the successful creation of the queue manager and successful completion of the HA configuration.

```
M2000(Mqcli)# crtMQM -p 1512 -fs 3 -sx HAQM2
Please wait while 3 GB file system is initialized for queue manager HAQM2.
Performing initial high availability configuration
Configuring appliance MQAppl1

Configuring this appliance
Initial high availability configuration succeeded
IBM MQ Appliance queue manager created.
The queue manager is associated with installation 'MQAppliance'.
Creating or replacing default objects for queue manager 'HAQM2'.
Default objects statistics : 84 created. 0 replaced. 0 failed.
Completing setup.
Setup completed.
Performing final high availability configuration
Final high availability configuration succeeded
M2000(Mqcli)#

```

- \_\_\_ 17. Run the status command for this queue manager to check that the initial synchronization was completed successfully.

```
status HAQM2
```

- \_\_\_ 18. Staying on MQAppliance2, run the status command for the HAQM1 queue manager. If you contrast it with the HAQM2 status, you see the following result:

```
Final high availability configuration successful
M2000(mqcli)# status HAQM2
QM(HAQM2)
CPU: Status(Running)
Memory: 0.00%
Queue Manager file system: 202MB
HA role: Primary
HA status: Normal
HA control: Enabled
HA preferred location: This appliance
M2000(mqcli)# status HAQM1
QM(HAQM1)
HA role: Secondary
HA status: Normal
HA control: Enabled
HA preferred location: Other appliance
M2000(mqcli)# _
```

- \_\_\_ 19. The status shows you that the HAQM1 queue manager is running on another appliance, and that that other appliance is the preferred location for HAQM1.

You are now ready to start testing your HA, but first you need to set up the IBM MQ Explorer side of things.

## 2.5. Set up IBM MQ Explorer

First you need to set up a messaging user on each appliance. Note: This messaging is different from the user that administers the appliance itself.

- \_\_\_ 20. Go to the MQAppl1 appliance and enter the following command:

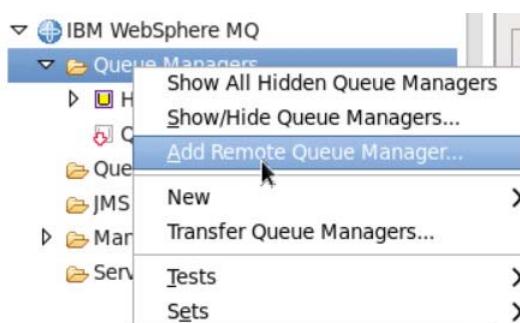
```
usercreate -u mquser -p mquser -g mqm
```

- \_\_\_ 21. You need to set up the SYSTEM.ADMIN.SVRCONN that the IBM MQ Explorer uses for communication.

- \_\_\_ 22. Go to the MQAppl1 appliance and enter the following commands:

```
runmqsc HAQM1
DEFINE CHANNEL(SYSTEM.ADMIN.SVRCONN) CHLTYPE(SVRCONN)
SET CHLAUTH(SYSTEM.ADMIN.SVRCONN) TYPE(BLOCKUSER) USERLIST('*whatever')
ALTER AUTHINFO('SYSTEM.DEFAULT.AUTHINFO.IDPWOS') AUTHTYPE(IDPWOS)
ADOPTCTX(YES)
REFRESH SECURITY TYPE(CONNAUTH)
END
```

- \_\_\_ 23. Go to the MQAppl2 appliance and repeat all of steps in this Setup IBM MQ Explorer section (replacing HAQM2 for HAQM1). You are now ready to add the appliance HA queue managers to IBM MQ Explorer.
- \_\_\_ 24. Open the environment where the MQExplorer and browser are.
- \_\_\_ 25. Log in as Administrator with passw0rd as the password.
- \_\_\_ 26. Open IBM MQ Explorer (from the desktop).
- \_\_\_ 27. Right-click the Queue Managers folder and select **Add Remote Queue Manager**.



- \_\_\_ 28. Enter the name of the MQAppl1 queue manager (`HQM1`) and select **Connect directly**.

**Select the queue manager and connection method**

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

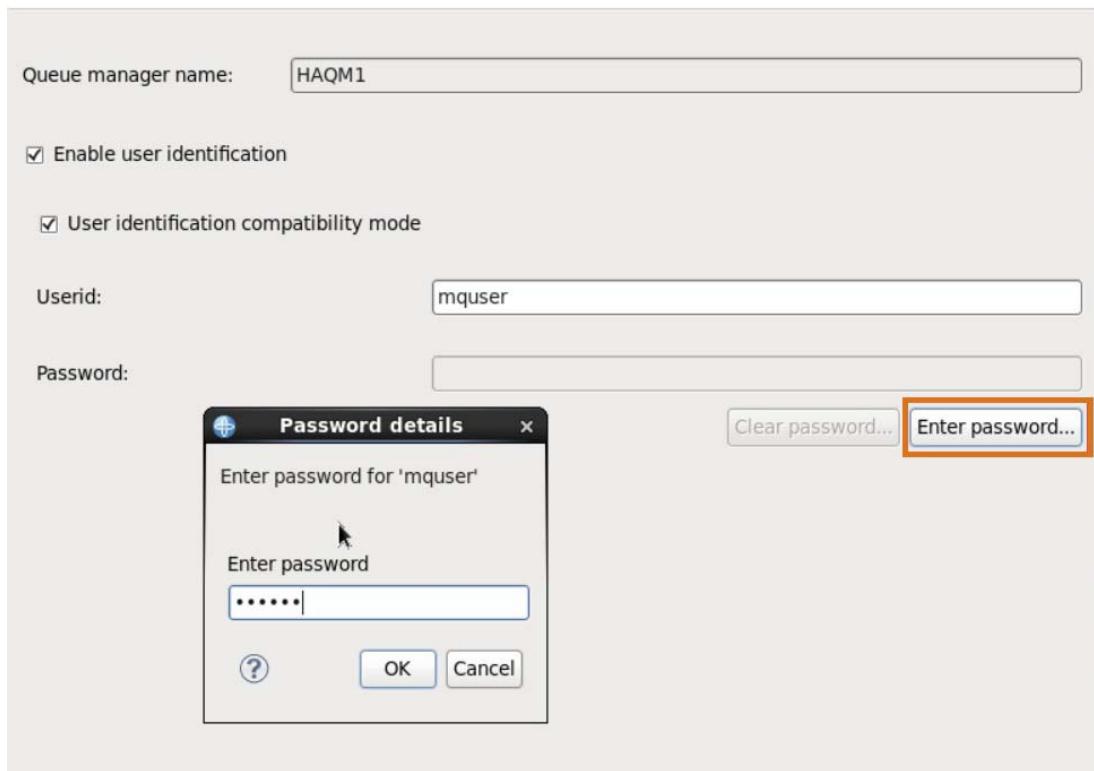
Queue manager name:

How do you want to connect to this queue manager?

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

- \_\_\_ 29. Click **Next**.
- \_\_\_ 30. Enter the IP address of the MQAppl1 appliance (10.0.0.1) and the port number of the listener (1511).
- Connection details**
- |                            |                                                   |
|----------------------------|---------------------------------------------------|
| Host name or IP address:   | <input type="text" value="10.0.0.1"/>             |
| Port number:               | <input type="text" value="1511"/>                 |
| Server-connection channel: | <input type="text" value="SYSTEM.ADMIN.SVRCONN"/> |
- \_\_\_ 31. Click **Next** and **Next** again.
- \_\_\_ 32. Click **Enable user identification**.
- \_\_\_ 33. Enter the messaging user (`mquser`) and click **Enter password** (if the Enter password box is disabled, click the link to take you to the “enable password saving” screen and enable password saving).

- \_\_\_ 34. Enter the password for the messaging user (mquser).



- \_\_\_ 35. Click **OK**.

- \_\_\_ 36. Repeat the previous steps to add the HAQM2 by using the following information:

- Queue manager (HAQM2)
- IP address (10.0.0.2)
- Listener port (1512)
- Messaging user and password (as before)

- \_\_\_ 37. You now see the two IBM MQ Appliance queue managers in the `Queue Managers` folder.



- 38. In the content pane, you see that the queue managers are identified as Appliance queue managers. You are now ready to test the HA failover.

The screenshot shows the 'Queue Managers' window with the following details:

| Queue manager name | Command level | Version  | Queue manager status | Queue-sharing group name | Platform  | Dead-letter queue | Def... |
|--------------------|---------------|----------|----------------------|--------------------------|-----------|-------------------|--------|
| HAQM1              | 801           | 08000002 | Running              |                          | Appliance |                   |        |
| HAQM2              | 801           | 08000002 | Running              |                          | Appliance |                   |        |

Below the table, a section titled "Connection details for queue manager 'HAQM1 on '10.0.0.1(1511)'":

|                          |                      |
|--------------------------|----------------------|
| Connection status        | Connected            |
| Connection type          | Client               |
| Connection name          | 10.0.0.1(1511)       |
| Channel name             | SYSTEM.ADMIN.SVRCONN |
| Channel definition table |                      |

## 2.6. Test HA failover

- \_\_\_ 39. Go back to MQAppl1.
- \_\_\_ 40. Ensure that you are at the mqcli interface and enter the following command:

```
sethagrp -s
```

The `sethagrp -s` command pauses and resumes an appliance in a high availability group. The `sethagrp` command can be used to pause (or suspend) an appliance that is part of a high availability group. When you use the `sethagrp` command in this way, any queue managers that are running on that appliance are going to fail over to the other appliance in the group.

- \_\_\_ 41. Run a `status HAQM1` command. What does it show?

```
M2000(mqcli)# status HAQM1
QM(HAQM1)
HA role: UNKNOWN
HA status: UNKNOWN
HA control: UNKNOWN
HA preferred location: UNKNOWN
M2000(mqcli)#
Status(Running elsewhere)
```

- \_\_\_ 42. Go back to the IBM MQ Explorer and add the HAQM1, but this time, add it as if it is running on MQAppl2 rather than MQAppl1.
  - Queue manager (HAQM1)
  - IP address (10.0.0.2)
  - Listener port (1511)
  - Messaging user and password (as before).
- \_\_\_ 43. You now see that two queue managers are listed, but both queue managers are now running on the MQAppl2 appliance.



- \_\_\_ 44. The queue manager on MQAppl1 appliance shows as disconnected (and does not show a status). All looks good so far, so you now resume the appliance from standby mode.

The screenshot shows the 'Queue Managers' interface. At the top, there is a filter bar with the text 'Filter: Standard for Queue Managers'. Below it is a table with columns: Queue manager name, Command level, Version, Queue manager status, Queue-sharing group name, Platform, and Dead-letter queue. There are three entries: HAQM1 (status: Disconnected), HAQM1 (status: Running), and HAQM2 (status: Running). A detailed view for HAQM1 is expanded at the bottom, showing connection details: Connection status (Disconnected), Connection type (Client), Connection name (10.0.0.1(1511)), Channel name (SYSTEM.ADMIN.SVRCONN), and Channel definition table.

- \_\_\_ 45. Go back to MQAppl1 and enter the following command:

```
sethagrp -r
```

- \_\_\_ 46. Check the status of the HAQM1 queue manager. What does it show?

```
M2000(mqcli)# status HAQM1
QM(HAQMQ1)
HA role: Secondary
HA status: Normal
HA control: Enabled
HA preferred location: This appliance
M2000(mqcli)#

```

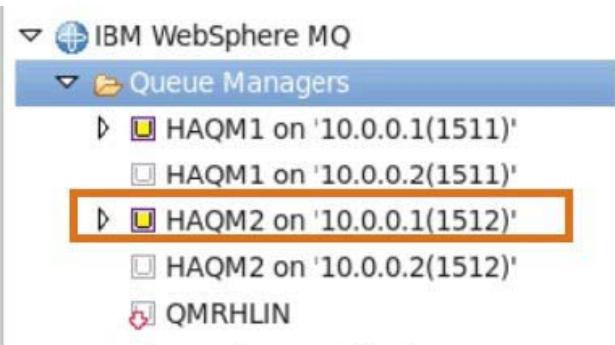
- \_\_\_ 47. If the queue manager is not yet showing as Running, it is still failing back. Run the status command again.

- \_\_\_ 48. Is it running on MQAppl1 again?

```
HA preferred location: THIS APPLIANCE
M2000(mqcli)# status HAQM1
QM(HAQMQ1)
CPU: 0.01%
Memory: 199MB
Queue Manager file system: 118MB used, 3.0GB allocated [4%]
HA role: Primary
HA status: Normal
HA control: Enabled
HA preferred location: This appliance
M2000(mqcli)#

```

- \_\_\_ 49. Go to the IBM MQ Explorer and verify that it is also showing the HAQM1 as running on the MQAppl1 appliance. Note: If not, you might need to reconnect to the queue manager. Next, do the same failover test, but for the HAQM2 queue manager on the MQAppl2 appliance.
- \_\_\_ 50. Go back to the MQAppl2 appliance and run the `sethagrp` command to suspend, as before:  
`sethagrp -s`
- \_\_\_ 51. Check the status of the HAQM2 queue manager to verify that the status indicates that it is running elsewhere.
- \_\_\_ 52. Check in the IBM MQ Explorer to verify that you can add (and then see) the HAQM2 running on the MQAppl1 appliance.



- \_\_\_ 53. Finally, go back to the MQAppl2 and resume the appliance (use `sethagrp -r`).
- \_\_\_ 54. Verify that both queue managers are running on the appropriate appliance. Finally, for this exercise you must process some messages in the HA environment.

## 2.7. Process some messages

In this section you create some queues and processing messages to and from these queues.

You can use any combination of your favorite tools to do any of this section (IBM MQ Explorer, rfhutil, any of the sample programs for IBM MQ). However, start with the web console because it is new and a useful interface to the appliance queue managers.

- \_\_\_ 55. Open a Firefox browser on Windows.
- \_\_\_ 56. If you receive any exception messages when opening the console URLs, add an exception and continue.
- \_\_\_ 57. You have two tabs in the browser, one for the web console of each appliance.
- \_\_\_ 58. Select the first tab and log in to the console for MQAppl1 (user = admin and password = passw0rd).
- \_\_\_ 59. Click **IBM MQ Console**.
- \_\_\_ 60. The first interesting thing that you see is the queue manager status.

| Name  | Running TCP listener ports | Status            | High Availability |
|-------|----------------------------|-------------------|-------------------|
| HAQM1 | 1511                       | Running           | REPLICATED        |
| HAQM2 |                            | Running elsewhere | REPLICATED        |
| QM1   |                            | Stopped           |                   |

- \_\_\_ 61. You see both queue managers in a running and highly available state. You add a widget for the queues.

- 62. Click **Add MQ Object Widget**, and click **Choose the configuration options for the object widget**.

The screenshot shows the IBM MQ Console interface. At the top, there are tabs for 'IBM MQ Console', 'Dashboard', and 'Appliance'. Below the tabs, a 'Welcome' dropdown and a '+' button are visible. A red box highlights the '+ Add MQ Object Widget' button. To its right are '+ Add Queue Manager Widget' and '+ Add Chart Widget' buttons. The main area displays a table titled 'Queue Managers' with three rows:

| Name  | Running TCP listener ports | Status                         | High Availability |
|-------|----------------------------|--------------------------------|-------------------|
| HAQM1 | 1511                       | <span>Running</span>           | REPLICATED        |
| HAQM2 |                            | <span>Running elsewhere</span> | REPLICATED        |
| QM1   |                            | <span>Stopped</span>           |                   |

Below the table, an 'MQ Object Widget' configuration dialog is open. It has a title bar with icons for refresh, settings, information, and close. A red box highlights the 'Choose the configuration options for the object widget' link. The configuration fields include:

- Queue manager: HAQM1
- Object: Queues
- Object type: All
- Objects per page: 5
- Widget title: HAQM1 Queues (highlighted with a red box)
- Show system objects:

At the bottom are 'Save' and 'Cancel' buttons, with 'Save' highlighted by a red box.

- 63. Give the widget a title: HAQM1 Queues  
Click **Save**.

This screenshot shows the 'MQ Object Widget' configuration dialog again. The 'Widget title' field contains 'HAQM1 Queues' and is highlighted with a red box. The 'Save' button at the bottom is also highlighted with a red box. The other configuration fields are the same as in the previous screenshot.

- 64. The widget now appears in the dashboard. You now need to create the queue that you are going to use for your testing. In the Queues widget, click the plus sign.

| Name                     | Queue type | Queue depth |
|--------------------------|------------|-------------|
| AMQ.MQEXPLORER.958174710 | Local      | 0           |

- 65. Name the queue Q1 and leave the default object type set to Local. Click Create.

### Create a Queue

Enter required information for the new object

\* Name:  (Red box highlights the input field)

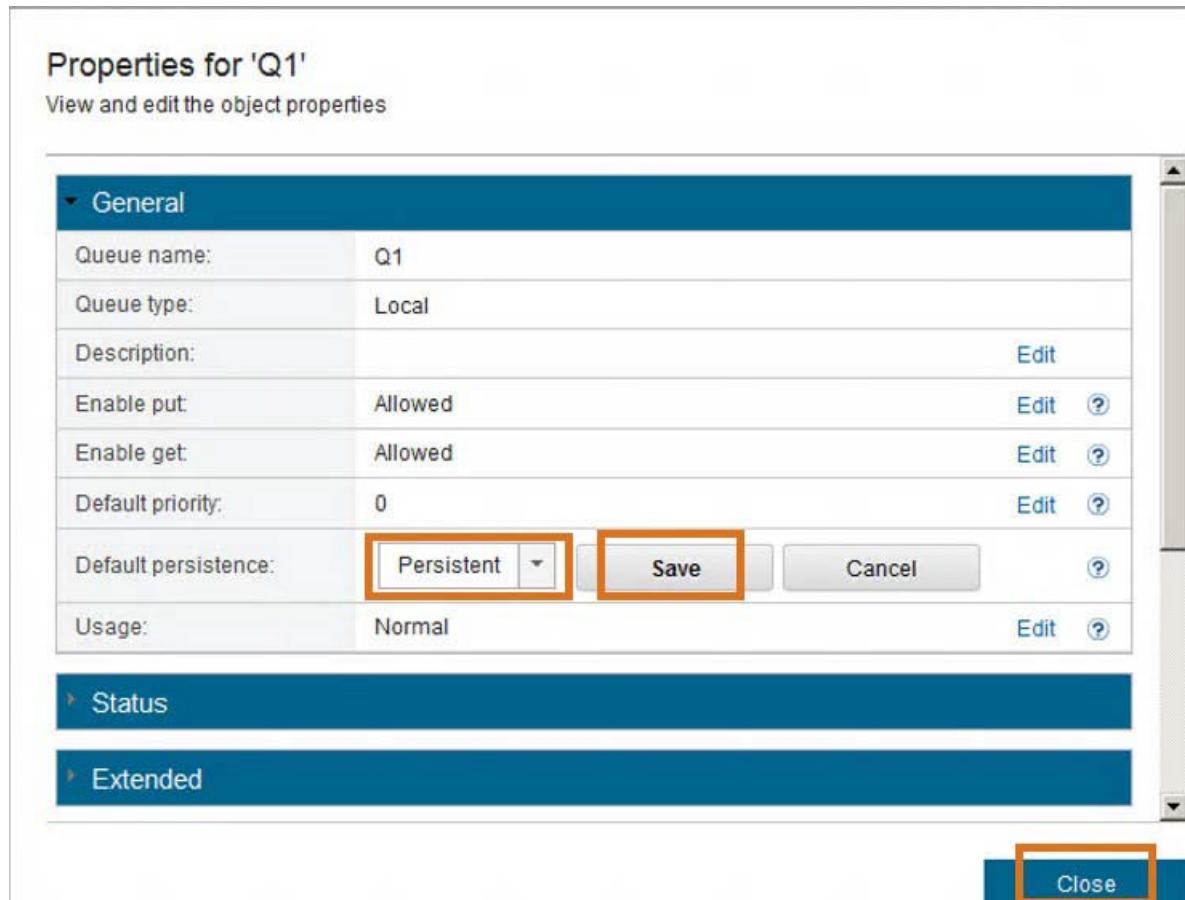
\* Object type:

**Create** (Red box highlights the button) | **Cancel**

- 66. Click Q1, and then click the properties icon.

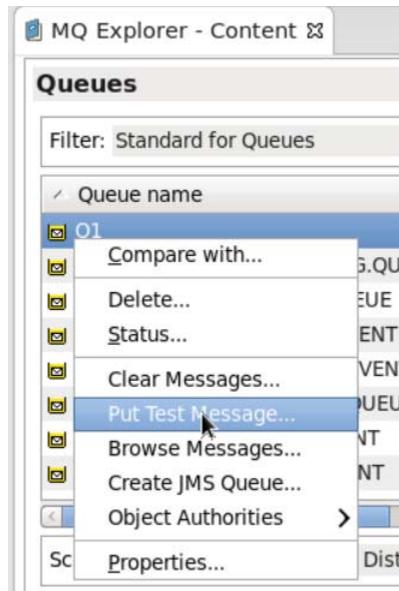
| Name | Queue type | Queue depth |
|------|------------|-------------|
| Q1   | Local      | 0           |

- \_\_\_ 67. In the dialog box, set the properties for the new queue. Click **Edit** next to Default persistence, then click the list box, and set it to **Persistent**. Then, click **Save**.

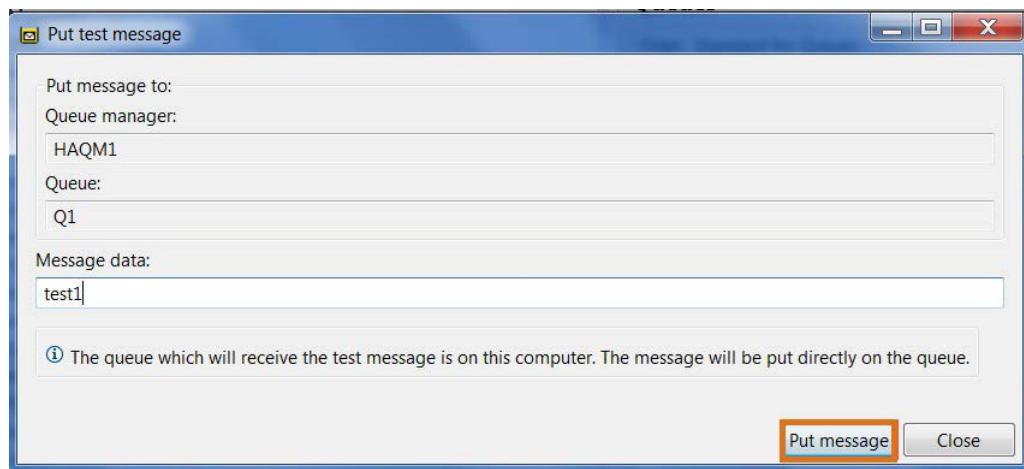


- \_\_\_ 68. Click **Close**. You now need to put some messages onto the Q1 queue. Use the IBM MQ Explorer for this step, as you can easily put messages onto the queue without having to do any additional configuration.
- \_\_\_ 69. Open the IBM MQ Explorer content pane for the HAQM1 queues.

- \_\_\_ 70. Right-click Q1 and select **Put Test Message**.



- \_\_\_ 71. Try some test messages by entering some text and clicking **Put message**.



- \_\_\_ 72. Repeat this process for as many messages as you want to put on the queue (you put 12 messages for the test).
- \_\_\_ 73. When you are finished, click **Close**.
- \_\_\_ 74. Go back to the web console dashboard and refresh the display to update the queue depth.



- 75. You should now see that the queue has 12 messages (or as many messages as you put). You now need to test the HA to ensure that the messages fail over to the queue and queue manager on the other appliance.

| Name                      | Queue type | Queue depth |
|---------------------------|------------|-------------|
| AMQ.MQEXPLORER.1544262185 | Local      | 0           |
| Q1                        | Local      | 12          |

Total: 2 Selected: 1      1      Last updated: 3:49:01 AM

- 76. Go to the MQAppl1 appliance.  
 — 77. Suspend the appliance by using the `sethagrp -s` command as before.  
 — 78. Use the `dspmq` command to verify that the HAQM1 is running elsewhere (as before, if this step takes some time, continue to run the command until the results are as shown in the following image).

```
M2000(mqcli)#
QMNAME(HAQM1)
re)
QMNAME(HAQM2)
re)
```

STATUS(Running elsewhere)  
STATUS(Running elsewhere)

- 79. Go back to the browser, but this time log in to the web console for the MQAppl2 appliance (it is the other tab in the browser).  
 — 80. As before, add an IBM MQ Object Widget to the dashboard. Select HAQM1 but this time, name it Failed Over HAQM1 to indicate that you are looking at the failed over queue manager. As you can see, the 12 messages are all present and accounted for on Q1.

| Name | Queue type | Queue depth |
|------|------------|-------------|
| Q1   | Local      | 12          |

Total: 1 Selected: 0      1      Last updated: 2:51:28 PM

- \_\_\_ 81. From here, you can browse the messages on the queue. Click the eyeglass icon.

The screenshot shows a dashboard titled "Queues on HAQM1 (Failed Over HAQM1)". It includes a header with "Welcome" and a "+" button, and three buttons for "Add MQ Object Widget", "Add Queue Manager Widget", and "Add Chart Widget". Below the header is a search bar with a magnifying glass icon, which is highlighted with an orange box. The main area displays a table with columns "Name", "Queue type", and "Queue depth". One row, "Q1", is selected and highlighted with a dashed blue border. The table shows "Local" as the queue type and "12" as the queue depth. At the bottom, it says "Total: 1 Selected: 1" and "Last updated: 2:51:28 PM".

- \_\_\_ 82. Check that the messages all look as you expect. Click **Close**. You now want to put the queue managers back the way that they were.

The screenshot shows a "Browse Messages" interface for queue "Q1" on HAQM1. It has a header "Messages for queue 'Q1' on HAQM1" and a "Filter" button. Below is a table with columns "Position", "Message body", and "Date/time". The table contains five rows with message bodies "test1" through "test5" and their corresponding dates/times. At the bottom, it says "Total: 12 Selected: 0" and "Last updated: 2:53:47 PM". At the bottom right are buttons for "Add Browse Widget" and "Close".

- \_\_\_ 83. Go to the MQAppl1 appliance.  
 \_\_\_ 84. Enter the `setahagr -r` command to resume the appliance.  
 \_\_\_ 85. Go back to the web console dashboard for MQAppl1.

- \_\_\_ 86. Refresh the Queue Managers widget to see that HAQM1 is now running on this appliance again and HAQM2 is still running on the other appliance.
- \_\_\_ 87. Also, refresh the Queues widget to see that the 12 messages for Q1 are back where they belong on the queue that belongs to this queue manager.

The screenshot shows the IBM MQ Explorer interface with two main widgets:

**Queues on HAQM1 (HAQM1 Queues)**

| Name | Queue type | Queue depth |
|------|------------|-------------|
| Q1   | Local      | 12          |

Total: 1 Selected: 0      Last updated: 2:55:42 PM

**Queue Managers**

| Name  | Running TCP listener ports | Status            | High Availability |
|-------|----------------------------|-------------------|-------------------|
| HAQM1 | 1511                       | Running           | REPLICATED        |
| HAQM2 |                            | Running elsewhere | REPLICATED        |
| QM1   |                            | Stopped           |                   |

Total: 3 Selected: 0      Last updated: 2:56:56 PM

In both widgets, specific entries are highlighted with orange boxes: 'Q1' in the Queues table and the 'Running' status for HAQM1 in the Queue Managers table.

You now successfully completed the setup and testing of the HA environment between two IBM MQ Appliances.



### Note

If you have time to spare and would like to try some more testing, you might want to test failing over the other queue manager. Alternatively, you might want to test other sample IBM MQ utilities such as amqsputc and amqsgetc.

Bear in mind that if you want to run these utilities from the browser or IBM MQ Explorer image, you also need to do some additional setup.

- \_\_\_ 1. Set up SYSTEM.DEF.SVRCNN.
- \_\_\_ a. You can use the default svrconn channel for your client communication with the queue managers, but you need to configure the channel authentication as you did previously for the SYSTEM.ADMIN.SVRCNN.

- \_\_\_ b. Using runmqsc on each of the appliances, run the following code:

```
SET CHLAUTH(SYSTEM.DEF.SVRCONN) TYPE(BLOCKUSER) USERLIST('*whatever')
ALTER AUTHINFO('SYSTEM.DEFAULT.AUTHINFO.IDPWOS') AUTHTYPE(IDPWOS)
ADOPTCTX(YES)
REFRESH SECURITY TYPE(CONNAUTH)
END
```

- \_\_\_ 2. Set up variables.

You also need to set the connection information for the `MQSERVER` and `MQSAMP_USER_ID` variables.

- \_\_\_ a. Depending on whether you are running your test in a Windows or a Linux environment, they have a slightly different format.
- \_\_\_ b. For Windows:
- Set `MQSERVER=SYSTEM.DEF.SVRCONN/TCP/ipaddress(port)`
  - Set `MQSAMP_USER_ID=mquser`

You can change these variables to suit whichever particular appliance and queue manager you are running a test for.

---

### End of exercise

## Exercise review and wrap-up

In this exercise, you configured an IBM MQ virtual appliance and tested the basic configuration.

---

# Exercise 3. The IBM MQ Console Web GUI

## Estimated time

00:45

## Overview

In this exercise, you explore some of the appliance administration capabilities of the new Web UI and the configuration capabilities of the IBM MQ Console.

## Objectives

After completing this exercise, you should be able to:

- Use the new Web UI of the IBM MQ Appliance
- Administer the appliance by using the IBM MQ Console

## Introduction

The IBM MQ Appliance M2000 introduces a new administrative interface for managing the appliance. This browser-based Web UI, which you saw briefly in Exercise 1, supplies an easy-to-use alternative to the IBM MQ Appliance command shell for appliance administration. It also includes a new component that is called the IBM MQ Console, which provides an alternative to the IBM MQ Appliance mqcli command shell.

As a browser-based tool, the Web UI and IBM MQ Console offer certain advantages over command shell or Eclipse-based tools like the IBM MQ Explorer. Examples of these advantages are avoiding the cost of installing and maintaining software remotely, and being available across a much wider variety of platforms and devices.

## Requirements

This exercise assumes that Exercise 1 is completed.

## Exercise instructions

## 3.1. What is the IBM MQ Appliance Web UI and IBM MQ Console?

This exercise explores some of the appliance administration capabilities of the Web UI, but most of this exercise focuses on the capabilities of the IBM MQ Console. The IBM MQ Console provides both configuration and monitoring capabilities. In this exercise, you explore its configuration capabilities; in a subsequent exercise, you explore some of the monitoring capabilities it provides.

The IBM MQ Console was designed to allow users to create a more customized experience for monitoring and administering IBM MQ. Two main concepts to keep in mind are:

- **Dashboards** represent the presentation space that users create. These dashboards are highly customizable, and can be configured to suit a user's individual tastes.
- **Widgets** represent the object types that are displayed on the dashboard. Each dashboard tab can hold a number of widgets, arranged in a grid.

The design of the IBM MQ Console supports the creation of multiple dashboards, enabling different views of the IBM MQ resources that the IBM MQ Appliance hosts. For example, dashboards can be created that offer views for different business applications that use IBM MQ, with widgets that show the objects relevant to each application. Or you might have a tab that is focused purely on monitoring, with charts that show the consumption of various resources over time (as mentioned, monitoring capabilities are explored in a subsequent exercise). Widgets that represent IBM MQ objects can be added, viewed, and deleted from the Dashboard as needed. In addition, some of the properties of the IBM MQ objects that are represented in these widgets can be modified.

In this exercise, you explore various capabilities of both the Appliance Admin interface and the IBM MQ Console.

## 3.2. Starting the IBM MQ Appliance Web UI

For this exercise you should use the same environment that you created for Exercise 1. The virtual appliance that you use for this exercise is **MQAppl1** or **MQAppl1 – Lab1 – Solution** and also the **ZM051\_1.0-WS2008** VM. You must suspend or shut down all other VMs.

## Connect to the IBM MQ Appliance

- 1. In Exercise 1 you displayed the IP addresses available on virtual appliance MQAppl1. If you still have those addresses at hand, you can skip this step.

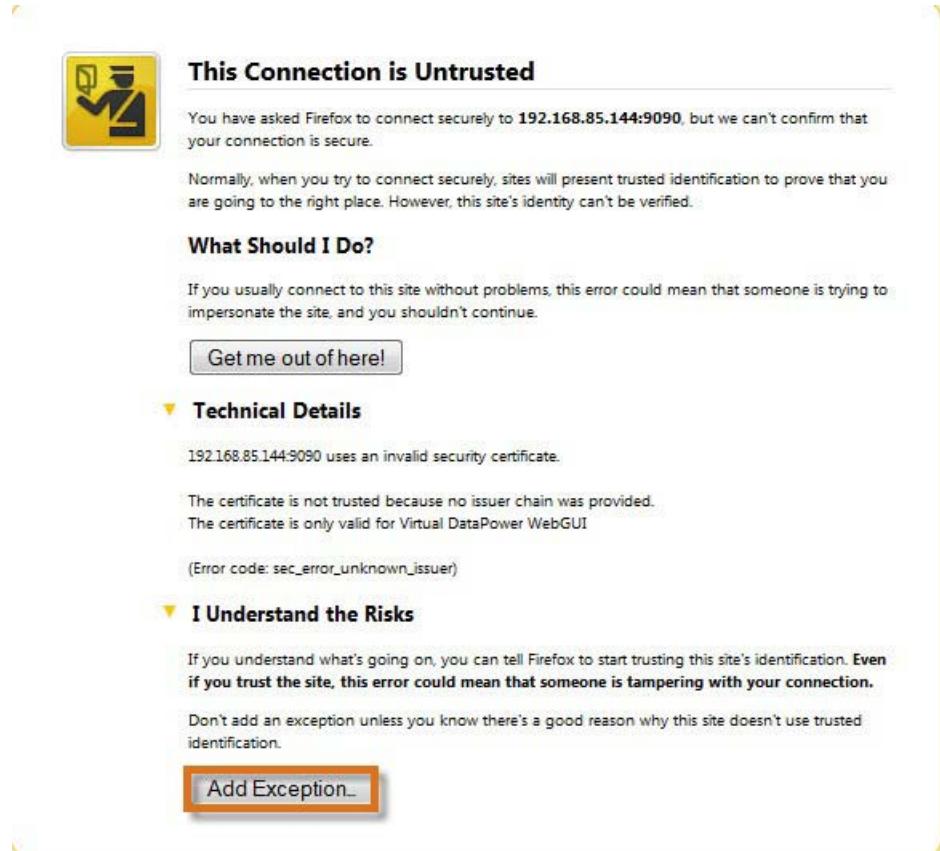
To obtain the IP addresses available on virtual appliance MQAppl1, enter the `show ipaddress` command. Take note of the IP addresses shown (note: you might see different addresses from the addresses in this screen capture). Use the IP address for **eth0** to access the appliance by using the Web UI.

| M2000# show ipaddress |         |            |               |            |           |  |
|-----------------------|---------|------------|---------------|------------|-----------|--|
| Name                  | ifIndex | IP version | Prefix length | IP address |           |  |
| lo                    | 1       | ipv4       | 8             |            | 127.0.0.1 |  |
| lo                    | 1       | ipv6       | 128           |            | ::1       |  |
| eth0                  | 4       | ipv4       | 24            |            | 10.0.0.1  |  |
| eth1                  | 5       | ipv4       | 24            |            | 10.0.0.4  |  |
| eth2                  | 6       | ipv4       | 24            |            | 10.0.0.5  |  |
| eth3                  | 7       | ipv4       | 24            |            | 10.0.0.6  |  |

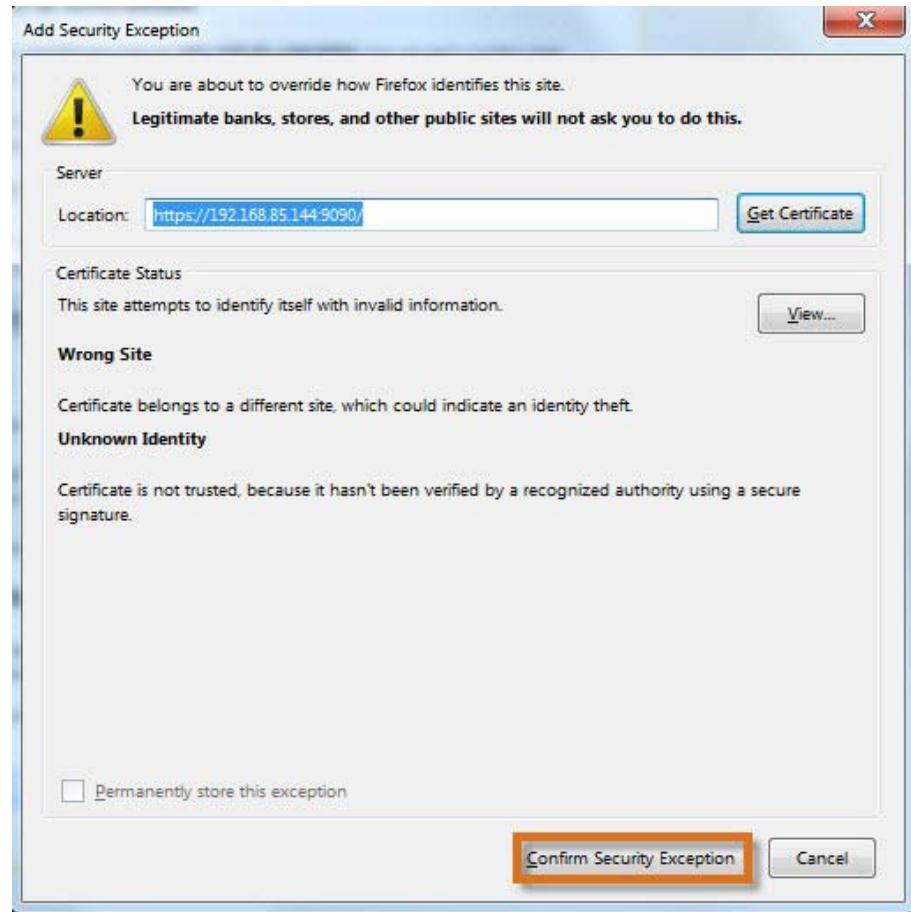
- 2. Use the Firefox icon on the Windows image to start a web browser session.



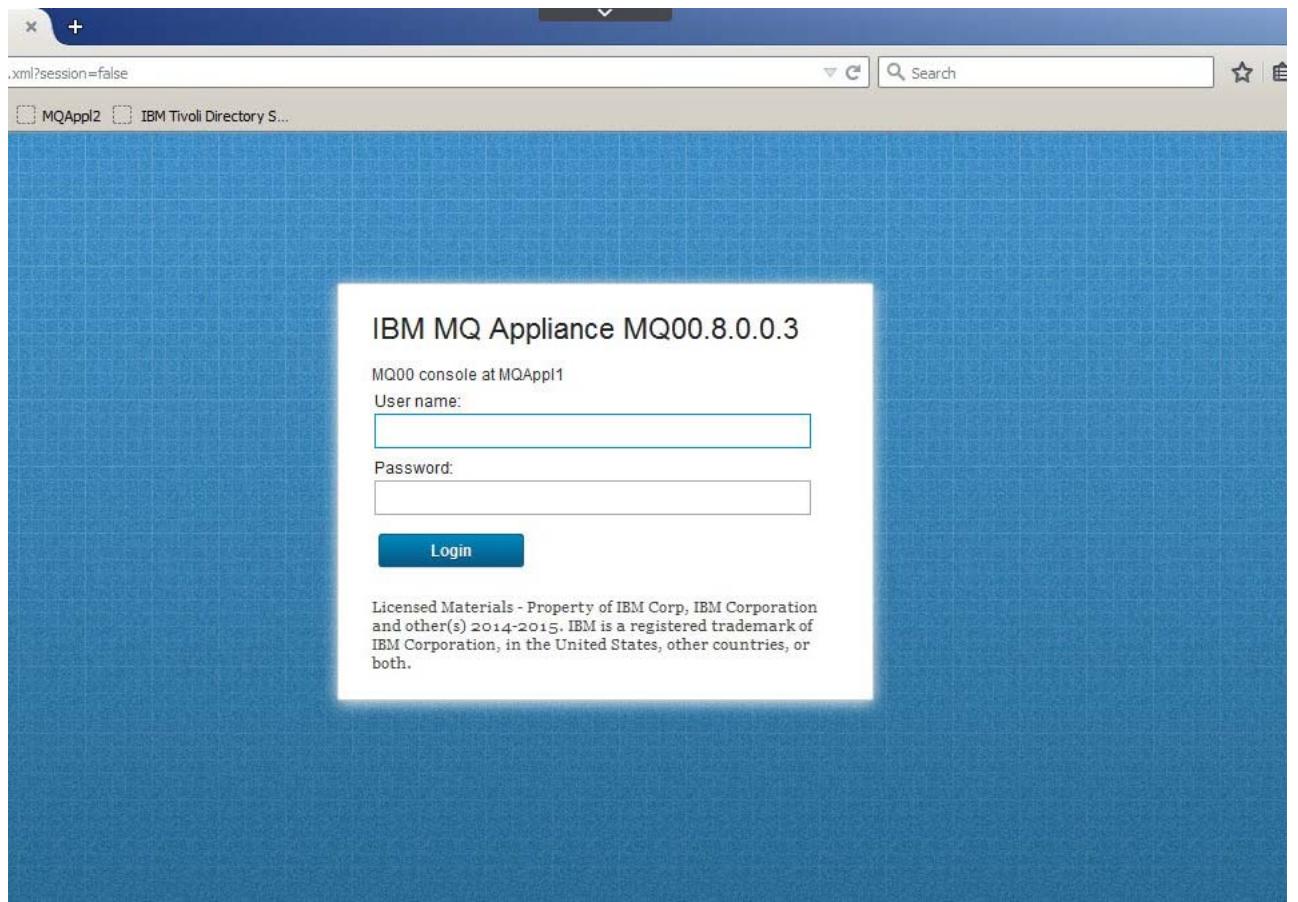
3. Navigate to `https://<IP address of eth0>:9090`. If you use the Firefox browser, you might see the following window, which tells you that the connection is untrusted. Click **Add Exception**:



\_\_ 4. Click **Confirm Security Exception**.



- \_\_\_ 5. The login screen for the IBM Appliance Web UI is displayed.



- \_\_\_ 6. Enter `admin` and `passw0rd` for the user name and password, and click **Login**.

A screenshot of the same login page as above, but with the 'User name:' field containing 'admin' and the 'Password:' field containing 'passw0rd' highlighted by orange rectangles. The 'Login' button is also highlighted with an orange rectangle. The rest of the page, including the header and footer, remains the same.

### 3.3. Exploring the Appliance Administration Web UI

#### Getting started with the Web UI

- 7. Take a few minutes to explore the main features of the IBM MQ Appliance Web UI **Get Started** page.

The screenshot shows the 'Get started' page of the IBM MQ Appliance. At the top, there's a navigation bar with tabs for 'Get started', 'Manage Appliance', and 'MQ Console'. Below the tabs, there's a search bar and a 'Save configuration' button. The main content area has two main sections: 'Manage Appliance' (with a gear icon) and 'MQ Console' (with a play button icon). Each section contains a brief description and a 'Learn more' link.

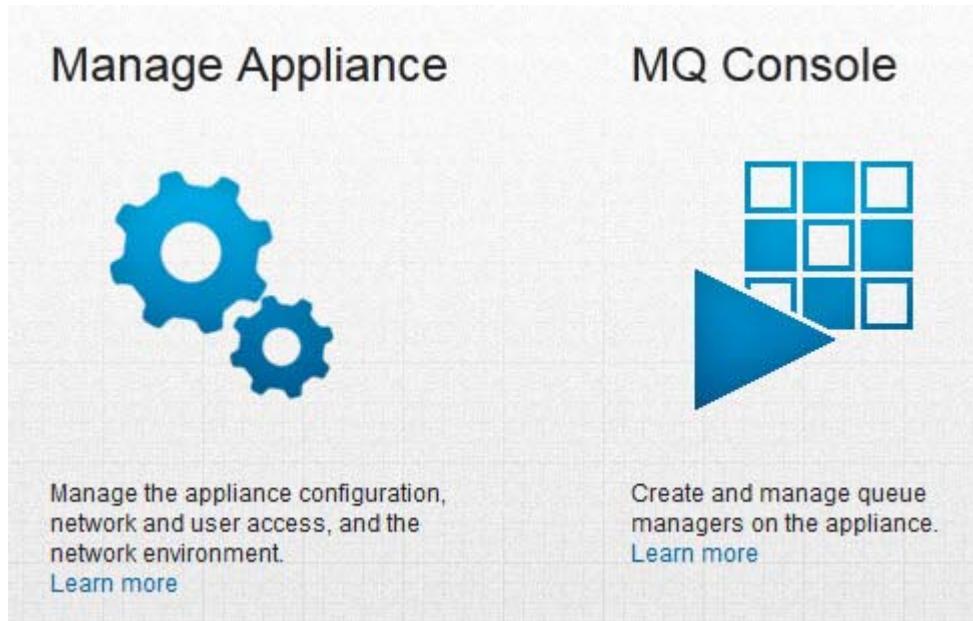
| Section          | Icon        | Description                                                                               | Link                       |
|------------------|-------------|-------------------------------------------------------------------------------------------|----------------------------|
| Manage Appliance | Gears       | Manage the appliance configuration, network and user access, and the network environment. | <a href="#">Learn more</a> |
| MQ Console       | Play button | Create and manage queue managers on the appliance.                                        | <a href="#">Learn more</a> |

- 8. First, note the buttons across the top of the page:

The screenshot shows the header bar of the IBM MQ Appliance. It includes the URL 'IBM MQ Appliance | MQ00 console at 192.168.116.206', a user dropdown 'admin', and the IBM logo. The 'Manage Appliance' tab is highlighted with a red box. To its right are three buttons: 'Save configuration', 'Export configuration', and 'Import configuration'.

- 9. An appliance administrator uses the buttons on the *right* to save, export, and import appliance configuration data. Click each of these buttons in turn and explore the options available for each. In this exercise, you do not explore those capabilities in depth, but these options are available for appliance administrators.

- 10. The tabs on the *left*, and the objects in the center of the page, provide access to the two administrative perspectives available to users of the IBM MQ Appliance Web UI:



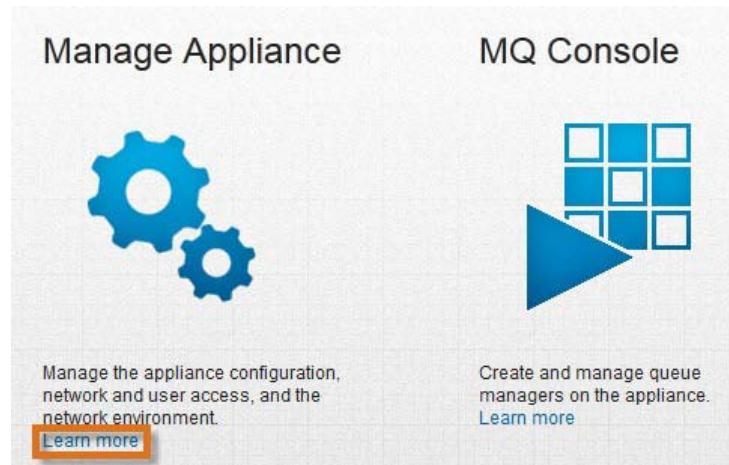
The IBM MQ Appliance, Appliance administration, and IBM MQ Administration are separate roles. None is a superset or subset of the other.

---

## 3.4. The appliance manager role

### Explore the Manage Appliance settings

- \_\_\_ 11. The **appliance administrator** manages the appliance as a whole. A person in that role is managing the *platform* – not IBM MQ resources. Click the **Learn more** link under *Manage Appliance* to learn more about the tasks that an appliance administrator handles.



- \_\_\_ 12. Take a moment to review the types of tasks that the **appliance administrator** is responsible for managing.

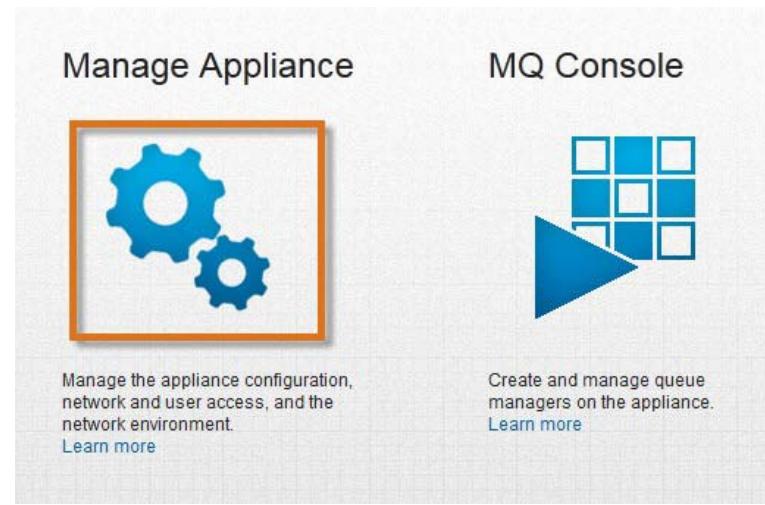
The screenshot shows the 'Manage Appliance' section of the IBM MQ Console. It includes a blue gear icon, a 'Learn more' button, and a detailed description of the configurations provided by the menu. A callout box highlights the 'Managing the appliance' section, which lists categories such as Appliance, Network, Network access, and User access.

**Managing the appliance**

The **Manage Appliance** menu provides access to the configurations that manage the appliance itself, and connectivity to the appliance. The following configurations are separated into the following categories.

- Appliance: System Settings, Time Settings, and Language.
- Network: Ethernet Interface, VLAN Interface, Link Aggregation Interface, Host Alias, DNS Settings, and NTP Service.
- Network access: SSH Service, and Web Management Service.
- User access: User Accounts, User Groups, and RBM Settings.

- 13. Now click the **Manage Appliance** icon itself:



- 14. Briefly review the **System Settings** that the appliance administrator manages. Notice that none of these settings are related to IBM MQ.

|                                               |                                     |
|-----------------------------------------------|-------------------------------------|
| Description: <a href="#">?</a>                | IBM MQ Appliance                    |
| Serial number: <a href="#">?</a>              | 0000000                             |
| Entitlement serial number: <a href="#">?</a>  | 0000000                             |
| Product ID: <a href="#">?</a>                 | 5725 [Rev None]                     |
| Contact: <a href="#">?</a>                    |                                     |
| Appliance name: <a href="#">?</a>             | MQAppl1                             |
| Location: <a href="#">?</a>                   |                                     |
| Services: <a href="#">?</a>                   | 72                                  |
| Backup mode: <a href="#">?</a>                | Normal                              |
| Product Mode: <a href="#">?</a>               | Normal                              |
| Custom user interface file: <a href="#">?</a> | store:///dp-user-interface-demo.xml |

- \_\_\_ 15. Look at the properties that are displayed under **System Settings**.

## System Settings

Status: up (?)

**Main**

|                                               |                                                                           |
|-----------------------------------------------|---------------------------------------------------------------------------|
| Enable administrative state: <span>(?)</span> | <input checked="" type="checkbox"/>                                       |
| Comments: <span>(?)</span>                    | <input type="text"/>                                                      |
| Product OID: <span>(?)</span>                 | 1.3.6.1.4.1.14685.1.8                                                     |
| Description: <span>(?)</span>                 | IBM MQ Appliance                                                          |
| Serial number: <span>(?)</span>               | The read-only string that identifies the serial number for the appliance. |
| Entitlement serial number: <span>(?)</span>   | 0000000                                                                   |
| Product ID: <span>(?)</span>                  | 5725 [Rev None]                                                           |
| Contact: <span>(?)</span>                     | <input type="text"/>                                                      |
| Appliance name: <span>(?)</span>              | 01                                                                        |
| Location: <span>(?)</span>                    | <input type="text"/>                                                      |
| Services: <span>(?)</span>                    | 72                                                                        |
| Backup mode: <span>(?)</span>                 | Normal                                                                    |
| Product Mode: <span>(?)</span>                | Normal                                                                    |
| Custom user interface file: <span>(?)</span>  | local:/// <span style="float: right;">▼</span>                            |

- \_\_\_ 16. You can click the hotspot in the upper right to see help for this property sheet as a whole. You can also hover over the hotspot next to each property to see a description of that property.



### Note

Some properties are disabled, and are read-only. These properties are fixed, or they can be modified only by using the appliance's command-line interface.

- \_\_\_ 17. Make a small change to the configuration. In the **Comments** field, enter a comment of your choice.

**System Settings**

|                              |                                                       |
|------------------------------|-------------------------------------------------------|
| Status:                      | up                                                    |
| <b>Main</b>                  |                                                       |
| Enable administrative state: | <input checked="" type="checkbox"/>                   |
| Comments:                    | <input type="text" value="This is my new appliance"/> |
| Product OID:                 | <input type="text" value="1.3.6.1.4.1.14685.1.8"/>    |
| Description:                 | <input type="text" value="IBM MQ Appliance"/>         |

- \_\_\_ 18. Click **Apply** at the bottom of the page to apply the change.

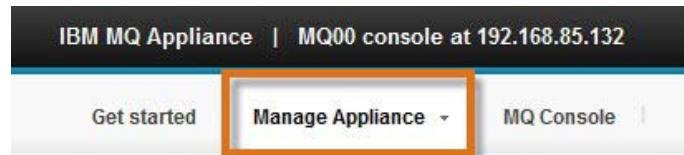


- \_\_\_ 19. Notice that when you apply a configuration change, the **Save configuration** button at the upper left is highlighted. Click **Save configuration**.

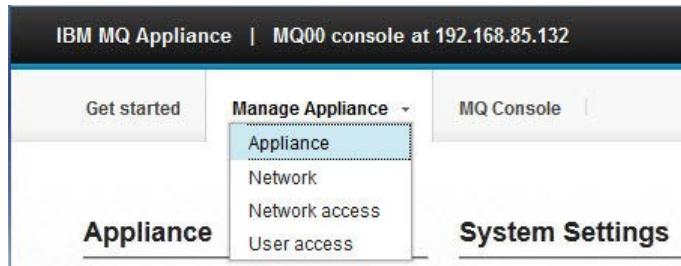


## Explore the Manage Network settings

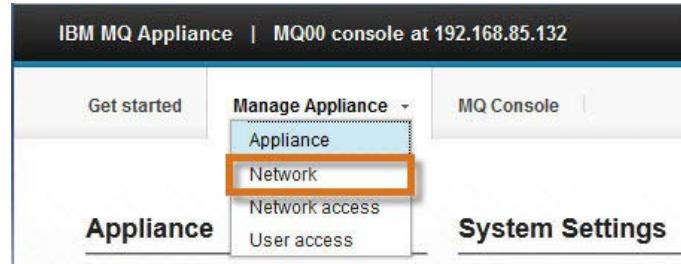
- \_\_\_ 20. Click **Manage Appliance** at the upper left.



- \_\_\_ 21. Note the available categories. **IBM MQ Appliance** is selected.



- \_\_\_ 22. Click **Network**.

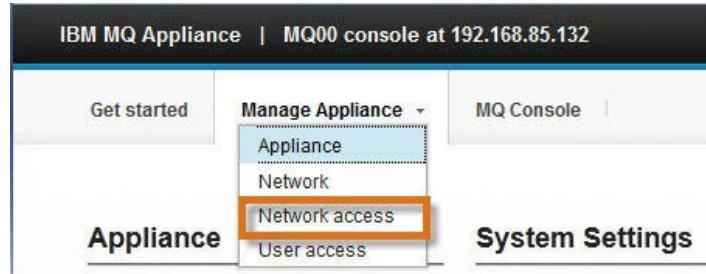


- \_\_\_ 23. The network configuration for the appliance as a whole is displayed. You should recognize the Ethernet interfaces that you configured in Exercise 1. Explore the Network configuration options available.

| Network                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |        |         |                    |  |  |  |                |  |  |  |                            |  |  |  |                  |  |  |  |            |  |  |  |              |  |  |  |             |  |  |  |                          |      |        |         |                          |      |    |  |                          |      |    |  |                          |      |    |  |                          |      |    |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|--------|---------|--------------------|--|--|--|----------------|--|--|--|----------------------------|--|--|--|------------------|--|--|--|------------|--|--|--|--------------|--|--|--|-------------|--|--|--|--------------------------|------|--------|---------|--------------------------|------|----|--|--------------------------|------|----|--|--------------------------|------|----|--|--------------------------|------|----|--|
| Ethernet Interface                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |      |        |         |                    |  |  |  |                |  |  |  |                            |  |  |  |                  |  |  |  |            |  |  |  |              |  |  |  |             |  |  |  |                          |      |        |         |                          |      |    |  |                          |      |    |  |                          |      |    |  |                          |      |    |  |
| <table border="1"> <thead> <tr> <th colspan="4">Ethernet Interface</th> </tr> <tr> <th colspan="4">VLAN Interface</th> </tr> <tr> <th colspan="4">Link Aggregation Interface</th> </tr> <tr> <th colspan="4">Network Settings</th> </tr> <tr> <th colspan="4">Host Alias</th> </tr> <tr> <th colspan="4">DNS Settings</th> </tr> <tr> <th colspan="4">NTP Service</th> </tr> </thead> <tbody> <tr> <td><input type="checkbox"/></td> <td>Name</td> <td>Status</td> <td>Comment</td> </tr> <tr> <td><input type="checkbox"/></td> <td>eth0</td> <td>up</td> <td></td> </tr> <tr> <td><input type="checkbox"/></td> <td>eth1</td> <td>up</td> <td></td> </tr> <tr> <td><input type="checkbox"/></td> <td>eth2</td> <td>up</td> <td></td> </tr> <tr> <td><input type="checkbox"/></td> <td>eth3</td> <td>up</td> <td></td> </tr> </tbody> </table> |      |        |         | Ethernet Interface |  |  |  | VLAN Interface |  |  |  | Link Aggregation Interface |  |  |  | Network Settings |  |  |  | Host Alias |  |  |  | DNS Settings |  |  |  | NTP Service |  |  |  | <input type="checkbox"/> | Name | Status | Comment | <input type="checkbox"/> | eth0 | up |  | <input type="checkbox"/> | eth1 | up |  | <input type="checkbox"/> | eth2 | up |  | <input type="checkbox"/> | eth3 | up |  |
| Ethernet Interface                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |      |        |         |                    |  |  |  |                |  |  |  |                            |  |  |  |                  |  |  |  |            |  |  |  |              |  |  |  |             |  |  |  |                          |      |        |         |                          |      |    |  |                          |      |    |  |                          |      |    |  |                          |      |    |  |
| VLAN Interface                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      |        |         |                    |  |  |  |                |  |  |  |                            |  |  |  |                  |  |  |  |            |  |  |  |              |  |  |  |             |  |  |  |                          |      |        |         |                          |      |    |  |                          |      |    |  |                          |      |    |  |                          |      |    |  |
| Link Aggregation Interface                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |        |         |                    |  |  |  |                |  |  |  |                            |  |  |  |                  |  |  |  |            |  |  |  |              |  |  |  |             |  |  |  |                          |      |        |         |                          |      |    |  |                          |      |    |  |                          |      |    |  |                          |      |    |  |
| Network Settings                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |      |        |         |                    |  |  |  |                |  |  |  |                            |  |  |  |                  |  |  |  |            |  |  |  |              |  |  |  |             |  |  |  |                          |      |        |         |                          |      |    |  |                          |      |    |  |                          |      |    |  |                          |      |    |  |
| Host Alias                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |        |         |                    |  |  |  |                |  |  |  |                            |  |  |  |                  |  |  |  |            |  |  |  |              |  |  |  |             |  |  |  |                          |      |        |         |                          |      |    |  |                          |      |    |  |                          |      |    |  |                          |      |    |  |
| DNS Settings                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |        |         |                    |  |  |  |                |  |  |  |                            |  |  |  |                  |  |  |  |            |  |  |  |              |  |  |  |             |  |  |  |                          |      |        |         |                          |      |    |  |                          |      |    |  |                          |      |    |  |                          |      |    |  |
| NTP Service                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |        |         |                    |  |  |  |                |  |  |  |                            |  |  |  |                  |  |  |  |            |  |  |  |              |  |  |  |             |  |  |  |                          |      |        |         |                          |      |    |  |                          |      |    |  |                          |      |    |  |                          |      |    |  |
| <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Name | Status | Comment |                    |  |  |  |                |  |  |  |                            |  |  |  |                  |  |  |  |            |  |  |  |              |  |  |  |             |  |  |  |                          |      |        |         |                          |      |    |  |                          |      |    |  |                          |      |    |  |                          |      |    |  |
| <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | eth0 | up     |         |                    |  |  |  |                |  |  |  |                            |  |  |  |                  |  |  |  |            |  |  |  |              |  |  |  |             |  |  |  |                          |      |        |         |                          |      |    |  |                          |      |    |  |                          |      |    |  |                          |      |    |  |
| <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | eth1 | up     |         |                    |  |  |  |                |  |  |  |                            |  |  |  |                  |  |  |  |            |  |  |  |              |  |  |  |             |  |  |  |                          |      |        |         |                          |      |    |  |                          |      |    |  |                          |      |    |  |                          |      |    |  |
| <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | eth2 | up     |         |                    |  |  |  |                |  |  |  |                            |  |  |  |                  |  |  |  |            |  |  |  |              |  |  |  |             |  |  |  |                          |      |        |         |                          |      |    |  |                          |      |    |  |                          |      |    |  |                          |      |    |  |
| <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | eth3 | up     |         |                    |  |  |  |                |  |  |  |                            |  |  |  |                  |  |  |  |            |  |  |  |              |  |  |  |             |  |  |  |                          |      |        |         |                          |      |    |  |                          |      |    |  |                          |      |    |  |                          |      |    |  |

## Explore the Manage Network access settings

- \_\_\_ 24. Return to the **Manage Appliance** list. Click **Network access**.



- \_\_\_ 25. Here you can see the SSH and web access configuration, which were configured in Exercise 1.

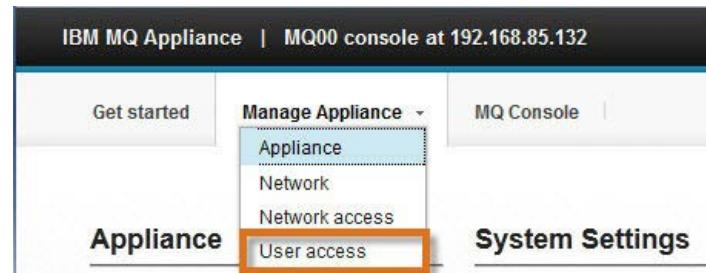
The screenshot shows the "Network access" configuration page. On the left, there is a sidebar with "SSH Service" selected. The main content area is titled "SSH Service" and displays the following configuration:

- Status: up
- Main section:
  - Enable administrative state:
  - Local address: 0.0.0.0
  - Port number: 22
  - Access control list: ssh

At the bottom right, there are "New", "Edit", and "Apply" buttons.

## Explore the Manage User access settings

- \_\_\_ 26. Return to the **Manage Appliance** menu. Click **User access**.



27. Here you can see the user accounts for the appliance that were created in Exercise 1. All the configuration settings that are reviewed in this section apply to the M2000 appliance as a whole. In later exercises, you return to some of these appliance administrator views and explore them in more detail. The rest of this exercise focuses on the IBM MQ administrative role of the IBM MQ Console.

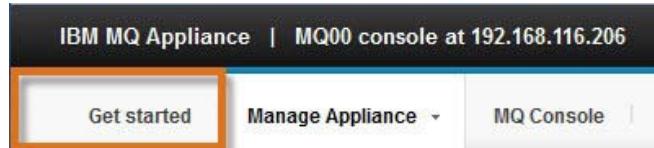
The screenshot shows the 'User access' interface with the 'User Account' tab selected. On the left, a sidebar lists 'User Account' (selected), 'User Group', and 'RBM Settings'. The main area is titled 'User Account' and displays a table with two rows. A blue 'New...' button is located in the top right corner of the table header. The table columns are 'Name', 'Status', and 'Comment'. The first row contains 'admin' with status 'up' and comment 'Administrator'. The second row contains 'mqadmin' with status 'up' and comment 'Created by startup script'.

|                          | Name    | Status | Comment                   |
|--------------------------|---------|--------|---------------------------|
| <input type="checkbox"/> | admin   | up     | Administrator             |
| <input type="checkbox"/> | mqadmin | up     | Created by startup script |

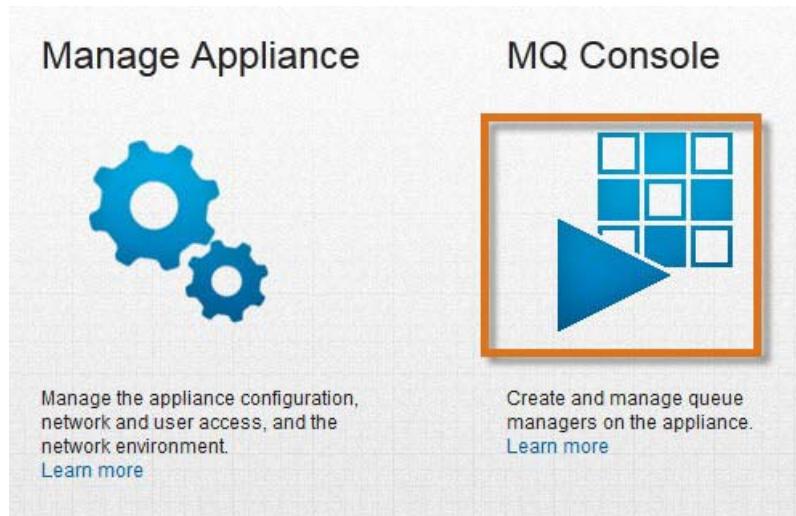
## 3.5. The IBM MQ Console dashboard role

### Explore the IBM MQ Console role

- \_\_\_ 28. Click the **Get started** tab to return to the home page.



- \_\_\_ 29. Click the **IBM MQ Console** icon to open that perspective:



- 30. Using this perspective, take a few minutes to explore the options available to an IBM MQ Administrator, starting at the top (#1).

- **Dashboard** is the current Web UI view.
- **High Availability** reports on the HA status of the appliance.
- **Admin** is the identity of the current logged in user.

You can use these controls to import, export, and reset the current dashboard configuration:

- The **Add New Tab** button. Use this button to create more tabbed dashboard views.
- The **Add Widget** toolbar. These tools are used to construct the dashboard views.
- **Queue Managers** widget. This widget is displayed automatically as part of the default Dashboard view.

Open and close the **Help** view. If the Help view is visible, you might want to close it to provide more space for widgets on the dashboard.

The screenshot shows the IBM MQ Console Web GUI in the Dashboard perspective. The top navigation bar has tabs for 'IBM MQ Console', 'Dashboard' (which is selected), and 'Appliance'. Below the tabs is a sub-navigation bar with buttons for 'Welcome' (highlighted with a yellow circle #5), 'Add MQ Object Widget' (highlighted with a yellow circle #1), 'Add Queue Manager Widget' (highlighted with a yellow circle #2), and 'Add Chart Widget' (highlighted with a yellow circle #3). The main content area features a 'Queue Managers' widget (highlighted with a yellow circle #4) displaying a table with one row:

| Name | Running TCP listener ports | Status  | High Availability |
|------|----------------------------|---------|-------------------|
| QM1  |                            | Stopped |                   |

At the bottom of the screen, there is a 'Help View' section with a sidebar containing 'Help section: Dashboard' and 'Open in Knowledge Center'.

- 31. You can create widgets to represent **queue managers**, **queue manager objects** (queues and channels, for example), and **charts**, by using these hot spots at the top of the dashboard. In this exercise, you explore the first two chart widgets, and you learn how to use them in detail in a later exercise.

The screenshot shows the IBM MQ Console Web GUI in the Dashboard perspective. The top navigation bar has tabs for 'IBM MQ Console', 'Dashboard' (selected), and 'Appliance'. Below the tabs is a sub-navigation bar with buttons for 'Welcome' (highlighted with a yellow circle #8), 'Add MQ Object Widget' (highlighted with a yellow circle #1), 'Add Queue Manager Widget' (highlighted with a yellow circle #2), and 'Add Chart Widget' (highlighted with a yellow circle #3). The main content area is currently empty.

## Queue manager widgets

- 32. You should see a queue manager widget already on the dashboard. If you do not see one on the dashboard, click the *Add Queue Manager Widget* hotspot. A queue manager widget appears on the dashboard.



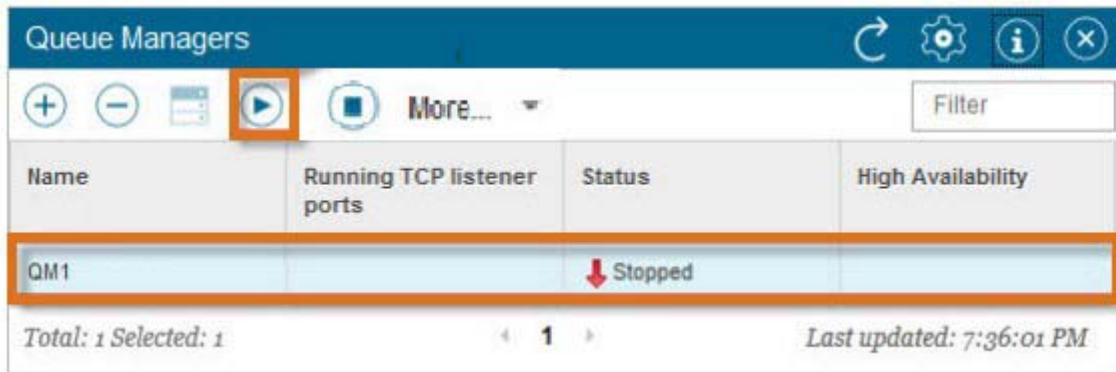
- 33. By default, all queue managers on the appliance are displayed. You should see the queue manager that was created in Exercise 1 (QM1).

If QM1 does not have a status of **Running**, that is not a problem. You are going to start it shortly.

- 34. Look at the controls at the top of the widget. Take note of these *queue manager* controls, from left to right:
- Click the plus sign control to *add* (create) a new queue manager.
  - Click the minus sign control to *delete* a queue manager.
  - Click the bullet control to *view* and *edit* queue manager properties.
  - Click the triangle control to *start* a stopped queue manager.
  - Click the square control to *stop* a running queue manager.
  - Use the down arrow control to create and manage authority records, and to retrieve and view queue manager error logs.
  - Use the filter control to enter a filter value.
  - In addition, take note of these *widget* controls on the right:
    - o Click the control to *refresh* the widget view immediately.
    - o Click the control to *view* and *edit* widget properties.
    - o Click the control to access *help* information on this widget.
    - o Click the control to *delete* the widget.

You use these controls throughout the remainder of the exercises.

- 35. If the QM1 queue manager shows a Status of **Stopped**, click the start icon on the toolbar. Be sure that the **QM1** entry in the widget is selected when you start it.



The screenshot shows the 'Queue Managers' table. The first column is 'Name', the second is 'Running TCP listener ports', the third is 'Status', and the fourth is 'High Availability'. A row for 'QM1' is selected, highlighted with a blue border. The 'Status' cell for QM1 contains a red downward arrow icon and the text 'Stopped'. The toolbar at the top has several icons: a plus sign, minus sign, list, play (highlighted with an orange box), square, more, filter, and close. At the bottom, it says 'Total: 1 Selected: 1' and 'Last updated: 7:36:01 PM'.

| Name | Running TCP listener ports | Status  | High Availability |
|------|----------------------------|---------|-------------------|
| QM1  |                            | Stopped |                   |

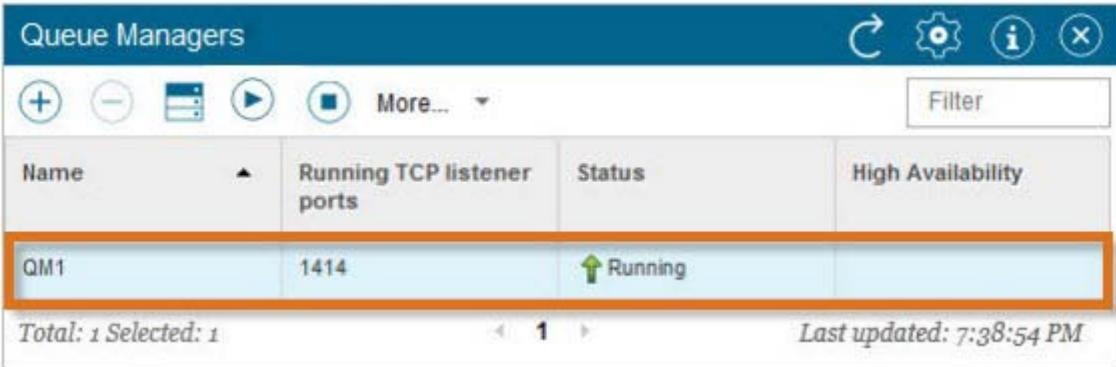
Total: 1 Selected: 1      Last updated: 7:36:01 PM

The queue manager shows a status of *Starting* while it is being initialized.



This is a close-up view of the 'Status' column from the previous screenshot. The 'QM1' entry is highlighted with a blue box and shows the text 'Starting' with a small circular arrow icon next to it.

- 36. The QM1 queue manager should be Running, listening on port 1414. Display the properties of the QM1 queue manager. Notice that you can display these properties by clicking the properties control on the toolbar, or by double-clicking the QM1 entry in the table.



The screenshot shows the 'Queue Managers' table again. The 'Status' column for QM1 now displays a green upward arrow icon and the text 'Running'. The rest of the table and toolbar are identical to the previous screenshot.

| Name | Running TCP listener ports | Status  | High Availability |
|------|----------------------------|---------|-------------------|
| QM1  | 1414                       | Running |                   |

Total: 1 Selected: 1      Last updated: 7:38:54 PM

- \_\_\_ 37. Examine the Properties dialog box for QM1. If you are an IBM MQ administrator, the categories and properties are familiar to you.

The screenshot shows the 'Properties for 'QM1'' dialog box. The 'General' tab is selected, displaying the following properties:

|                         |                |             |
|-------------------------|----------------|-------------|
| Queue manager name:     | QM1            | (?)         |
| Platform:               | MQPL_APPLIANCE | (?)         |
| Coded character set ID: | 1208           | (?)         |
| Description:            |                | Edit (?)    |
| Command level:          | 801            | (?)         |
| Version:                | 08000003       | (?)         |
| Command server control: | Queue Manager  | (edit icon) |
| Channel init control:   | Queue Manager  | Edit (?)    |

Below the General tab, there are other tabs: Status, Extended, Cluster, and Repository. A 'Close' button is located at the bottom right of the dialog box.

Take note of the following actions:

- Hover over the question mark hotspot to see help information for the property in question.
- Click the Edit hotspot to edit the property.
- Note the screen icon. This icon indicates a property that cannot be changed by using the IBM MQ Console, but can be changed from the command line (or, in many cases, from the IBM MQ Explorer).

- \_\_\_ 38. Try changing one of the properties. Click the hotspot for the **Description** property.

| General                 |                                                                |
|-------------------------|----------------------------------------------------------------|
| Queue manager name:     | QM1                                                            |
| Platform:               | MQPL_APPLIANCE                                                 |
| Coded character set ID: | 1208                                                           |
| Description:            | <span style="border: 1px solid orange; padding: 2px;"> </span> |
| Command level:          | 801                                                            |
| Version:                | 08000003                                                       |
| Command server control: | Queue Manager                                                  |
| Channel init control:   | Queue Manager                                                  |

- \_\_\_ 39. Enter a description of your choice (for example, "Queue manager for Lab 1"). Click **Save**.

| General                 |                                                                |
|-------------------------|----------------------------------------------------------------|
| Queue manager name:     | QM1                                                            |
| Platform:               | MQPL_APPLIANCE                                                 |
| Coded character set ID: | Please enter a string no longer than 64 characters             |
| Description:            | <span style="border: 1px solid orange; padding: 2px;"> </span> |

- \_\_\_ 40. The property change should be displayed.

| General                 |                          |
|-------------------------|--------------------------|
| Queue manager name:     | QM1                      |
| Platform:               | MQPL_APPLIANCE           |
| Coded character set ID: | 1208                     |
| Description:            | Queue manager for Lab 1. |

- \_\_\_ 41. Expand the various categories, and review the queue manager properties in each. Click **Close** to close the dialog box.



## IBM MQ Object widgets – queues

- \_\_\_ 42. The IBM MQ Object widget is used to display the various IBM MQ objects that are supported by using the IBM MQ Console. The following types of IBM MQ Objects are available:
- Queues
  - Topics
  - Channels
  - Client-connection channels
  - Listeners
  - Channel Authentication Records

- \_\_\_ 43. Click the *Add IBM MQ Object Widget* hotspot.



- \_\_\_ 44. An IBM MQ Object widget appears on the dashboard. To configure the IBM MQ Object widget for a particular type of IBM MQ object, click **Choose the configuration options for the object widget**.



- \_\_\_ 45. Accept the default object type of Queues. Other widget properties (object type, objects per page, and others) can also be selected here. Accept the defaults for these properties, and click **Save**.



- \_\_\_ 46. The configured IBM MQ Object widget is displayed, and in this case shows the local queues that are defined to QM1. You should see the queues TEST.IN and TEST.OUT that were created in Exercise 1.

| Queues on QM1                          |                                  |                                       |
|----------------------------------------|----------------------------------|---------------------------------------|
|                                        |                                  |                                       |
| <input type="button" value="+"/>       | <input type="button" value="-"/> | <input type="button" value="Filter"/> |
| <input type="button" value="More..."/> |                                  |                                       |
| Name                                   | Queue type                       | Queue depth                           |
| AMQ.MQEXPLORER.2079924675              | Local                            | 0                                     |
| TEST.IN                                | Local                            | 0                                     |
| TEST.OUT                               | Local                            | 0                                     |
| Total: 3 Selected: 0                   | 1                                | Last updated: 7:58:06 AM              |

- \_\_\_ 47. The toolbar for the IBM MQ Queues widget is similar to the toolbar on the Queue Manager widget. A few different controls are available:
- A control to put messages to a queue
  - A control to browse messages on a queue
  - A control to manage authority records, and to clear messages from a queue

You explore the Queues widget in more detail shortly.



## IBM MQ Object widgets – channels

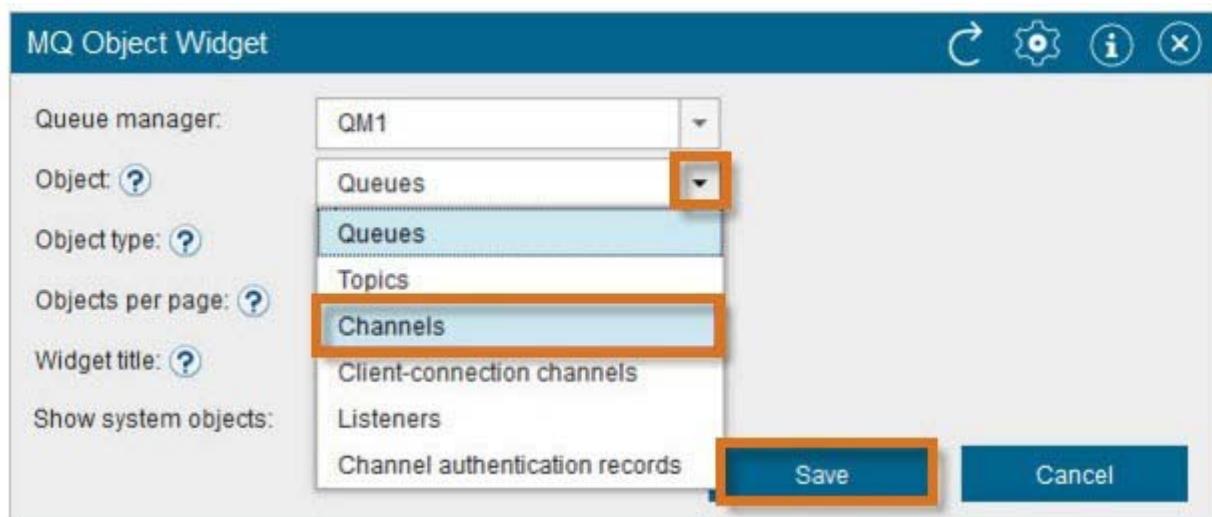
- \_\_\_ 48. Now create an IBM MQ Object widget to display queue manager channels. Click the *Add MQ Object Widget* hotspot.



- \_\_\_ 49. Click **Choose the configuration options for the object widget**.



- \_\_\_ 50. Use the Object list to select **Channels**, and click **Save**.



- \_\_\_ 51. The configured IBM MQ Object widget is displayed, and in this case shows the channels that are defined to QM1. You should see the USER.SVRCNN channel that was created in Exercise 1.

The screenshot shows a table titled "Channels on QM1". The columns are "Name", "Type", and "Overall channel status". A single row is selected, highlighted with a red border. The row contains the values "USER.SVRCNN", "Server-connection", and "Inactive". The table has a header row with column names. At the bottom left, it says "Total: 1 Selected: 0". At the bottom right, it says "Last updated: 11:51:46 AM". The top bar has a "Filter" button and several icons.

| Name        | Type              | Overall channel status |
|-------------|-------------------|------------------------|
| USER.SVRCNN | Server-connection | Inactive               |

- \_\_\_ 52. The toolbar for the IBM MQ Channels widget is similar to the IBM MQ Queues toolbar. The controls (add, delete, properties, start, stop) should be self-explanatory.

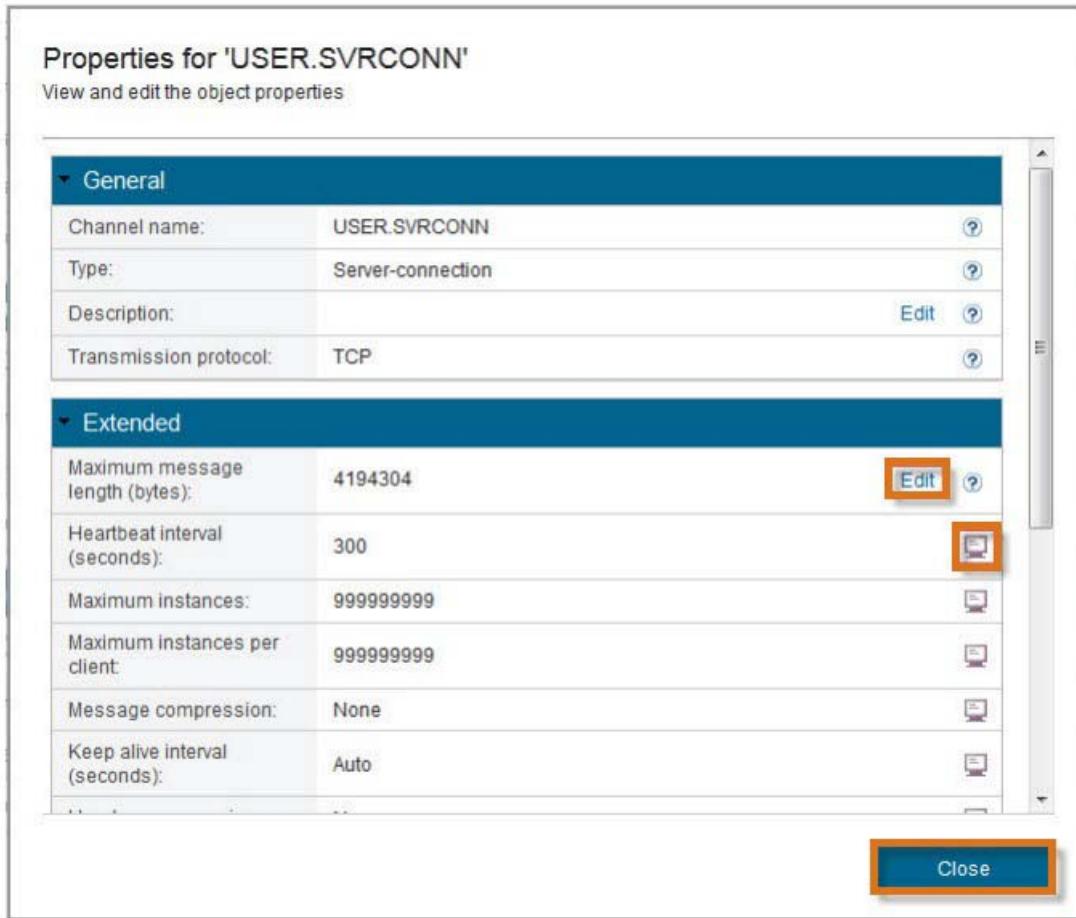
The screenshot shows the toolbar for the IBM MQ Channels widget. It includes standard toolbar icons for operations like Add (+), Delete (-), Properties (gear), Start (play), Stop (stop), and More... (dropdown). There is also a "Filter" button and a "Last updated" timestamp at the bottom right.

- \_\_\_ 53. Display the properties for the USER.SVRCNN channel. Notice that you can display these properties by clicking the control, or by double-clicking the **USER.SVRCNN** entry in the table.

The screenshot shows the same "Channels on QM1" table as before, but now the row for "USER.SVRCNN" is selected, highlighted with a blue background. The table structure is identical to the previous screenshot.

| Name        | Type              | Overall channel status |
|-------------|-------------------|------------------------|
| USER.SVRCNN | Server-connection | Inactive               |

- 54. Review the channel properties. If you are an IBM MQ administrator, the categories and properties are familiar to you. Recall that a hotspot next to a property means that property can be changed by using the IBM MQ Console. However, other properties must be changed from the command line (or in many cases, from the IBM MQ Explorer).



- 55. Click **Close** to close the dialog box.

## IBM MQ Object widgets: Channel authentication records

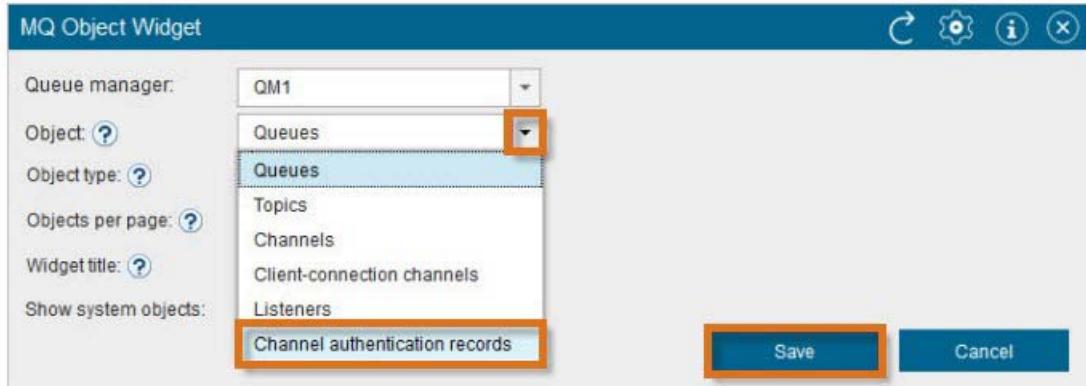
- 56. Create another IBM MQ Object widget – this one to display queue manager channel authentication records. Click the **Add MQ Object Widget** hotspot.



- \_\_\_ 57. Click **Choose the configuration options for the object widget.**



- \_\_\_ 58. Use the Object list to select **Channel authentication records**, and click **Save**.



- \_\_\_ 59. The configured IBM MQ Object widget is displayed, and in this case shows the channel authentication records that are defined to QM1. You should see the CHLAUTH record for channel USER.SVRCNN that was created in Exercise 1.

| Channel Authentication Records on QM1 |                 |                      |                          |  |
|---------------------------------------|-----------------|----------------------|--------------------------|--|
| Profile name                          | Type            | Attribute            | User source              |  |
| *                                     | Block User List | User list: *MQADMIN  |                          |  |
| USER.SVRCNN                           | Block User List | User list: *whatever |                          |  |
| Total: 2 Selected: 0                  | 1               |                      | Last updated: 1:23:39 PM |  |

- \_\_\_ 60. The toolbar for the IBM MQ Channel Authentication Records is similar to the other IBM MQ Object toolbars. The controls (add, delete, properties) should be self-explanatory.



- \_\_\_ 61. Display the properties for the CHLAUTH record for USER.SVRCONN. Notice that you can display these properties by clicking the control, or by double-clicking the CHLAUTH record in the table.

| Profile name | Type            | Attribute            | User source |
|--------------|-----------------|----------------------|-------------|
| *            | Block User List | User list: *MQADMIN  |             |
| USER.SVRCONN | Block User List | User list: *whatever |             |

Total: 2 Selected: 1      1      Last updated: 1:23:39 PM

- \_\_\_ 62. Review the channel properties. Click **Close** to close the dialog box.

Channel authentication record properties  
View and edit the object properties

General

Channel name: USER.SVRCONN

Type: Block User List

Description:

Block User

Extended

Statistics

Close

# Organizing the dashboard

You can organize IBM MQ Console dashboards to have a layout that is appropriate for the information you are displaying. Multiple widgets of the same or different types can be created, and they can be positioned on the dashboard in any manner that you choose. The widgets can be arranged in a grid pattern.

Try this activity with the dashboard that you are working with in this exercise.

- 63. On the dashboard, click and hold the mouse on the title bar of the **Queues on QM1** widget, and drag the widget to the upper-right quadrant of the dashboard.

The screenshot shows the IBM MQ Console Web GUI interface with a dashboard layout. There are four main widgets displayed:

- Channel Authentication Records on QM1:** Shows two entries: one for 'USER.SVRCONN' with 'User list: \*MQADMIN' and another for 'USER.SVRCONN' with 'User list: \*whatever'. Total: 2 Selected: 2 Last updated: 3:35:20 PM.
- Channels on QM1:** Shows one entry for 'USER.SVRCONN' with 'Server-connection' type and 'Inactive' status. Total: 1 Selected: 0 Last updated: 3:35:00 PM.
- Queues on QM1:** (highlighted with an orange border) Shows three entries: 'AMQ.HQexplorer.2179924675', 'TEST.IN', and 'TEST.OUT'. All are 'Local' queue types with a depth of 0. Total: 3 Selected: 0 Last updated: 7:58:06 AM.
- Queue Managers:** Shows one entry for 'QM1' with 'Running TCP listener ports' and 'High Availability' status.

- 64. You should see that the widget moved from its former location to the location where you dropped it on the dashboard. The locations of the other widgets on the dashboard are adjusted correspondingly.

The screenshot shows the IBM MQ Console Web GUI interface with three cards on the dashboard:

- Channel Authentication Records on QM1**: Displays a table with one row. The first column is "Profile name" (USER.SVRCDIN), the second is "Type" (Block User List), the third is "Attribute" (User Id: \*MQADMN), and the fourth is "User source". Total selected: 1. Last updated: 5:35:20 PM.
- Channels on QM1**: Displays a table with one row. The first column is "Name" (USER.SVRCDIN), the second is "Type" (Server-connection), and the third is "Overall channel status" (Inactive). Total selected: 0. Last updated: 5:35:00 PM.
- Queue Managers**: Displays a table with one row. The first column is "Name" (QM1), the second is "Running TCP listener ports" (1414), the third is "Status" (Running), and the fourth is "High Availability". Total selected: 1. Last updated: 5:41:22 PM.

\_\_\_ 65. Continue arranging the widgets until you see a view similar to the following image.

The screenshot shows the IBM MQ Console Web GUI with four widgets arranged vertically:

- Queue Managers:** Displays a table with columns: Name, Running TCP listener ports, Status, and High Availability. One row is selected, showing 'QM1' with '1414' ports and 'Running' status.
- Queues on QM1:** Displays a table with columns: Name, Queue type, and Queue depth. It lists three local queues: 'AMQ.MQEXPLORER.2079924675', 'TEST.IIN', and 'TEST.OUT', all with depth 0.
- Channels on QM1:** Displays a table with columns: Name, Type, and Overall channel status. It lists one channel, 'USER.SVRCONN', which is a 'Server-connection' type and 'inactive'.
- Channel Authentication Records on QM1:** Displays a table with columns: Profile name, Type, Attribute, and User source. It lists two entries, both 'Block User List' type, under 'User list: \*MQADMN' and 'User list: \*whatever' respectively.

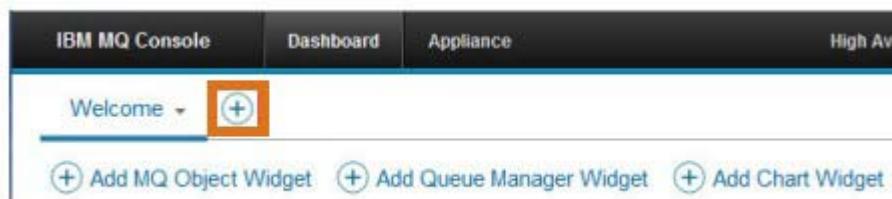
## Creating a dashboard

The design of the IBM MQ Console supports the creation of multiple dashboards, enabling different users to create dashboard layouts that offer views for different business applications that use IBM MQ. You can also create dashboards that serve different roles (for example, a dashboard that is focused purely on monitoring). Or, you can create dashboards that reflect your personal preference.

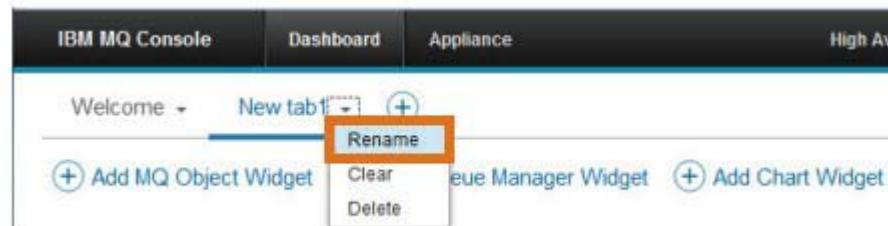
When an administrator creates dashboards, they are “remembered”, allowing the user to access them later, from the same or a different browser, without needing to re-create them. Dashboard layouts can also be exported and imported, allowing different users to share these views.

In this section you create a new dashboard, create new IBM MQ queue managers and IBM MQ objects, and explore other features of the IBM MQ Console widgets. You also customize the dashboard to view only a subset of the IBM MQ resources that are defined on the appliance. Finally, you learn how to export and import dashboard layouts.

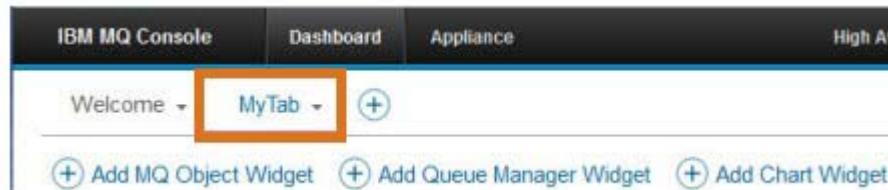
\_\_\_ 66. Create a tab on the IBM MQ Console.



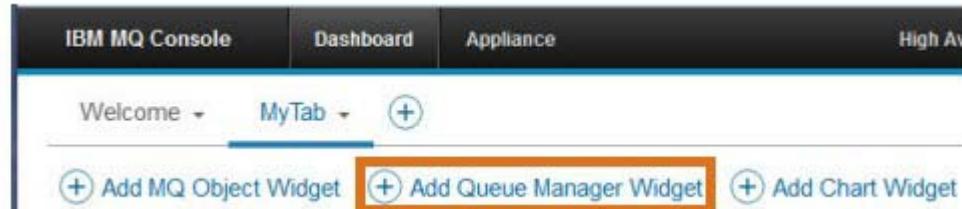
\_\_\_ 67. A new tab should appear, with a default name of *New tab1*. Click the new tab heading. Select **Rename** from the list.



\_\_\_ 68. Enter a name for the new tab ("MyTab" in this example) and press **Enter**.



\_\_\_ 69. You should now see a blank dashboard. Click **Add Queue Manager Widget**.



- 70. The Queue Managers widget appears. As before, it displays all the queue managers on the appliance (of which only one currently exists, **QM1**). Click the widget toolbar.

| Name | Running TCP listener ports | Status  | High Availability |
|------|----------------------------|---------|-------------------|
| QM1  | 1414                       | Running |                   |

Total: 1 Selected: 0      Last updated: 5:29:19 PM

- 71. Enter **QM1** for the name. Notice that the IBM MQ Console knows that this name is a duplicate name, and you cannot click the **Create** button.

Create a queue manager  
Enter a name and port for the new queue manager

\* Name:  A queue manager with the same name exists already

\* Port:

Specify file system size:   
File system size:   MB  GB

Create Cancel

- 72. Enter **MY\_QM** for the name. Click **Create**. Notice that the IBM MQ Console knows that the port that is specified is already in use, and you cannot click the **Create** button.

The screenshot shows the 'Create a queue manager' dialog box. It has fields for 'Name' (MY\_QM) and 'Port' (1414). A tooltip message 'There already is a running listener on this TCP port.' is displayed next to the port field, indicating that the chosen port is in use.

|                                                    |                                                                                   |
|----------------------------------------------------|-----------------------------------------------------------------------------------|
| Name: ?                                            | MY_QM                                                                             |
| Port: ?                                            | 1414                                                                              |
| Specify file system size: <input type="checkbox"/> |                                                                                   |
| File system size: ?                                | <input type="text"/> <input type="radio"/> MB <input checked="" type="radio"/> GB |

**Create** **Cancel**

- 73. Change the Port number to **2414**, and click **Create**. It takes a few seconds for the queue manager to be created.

The screenshot shows the 'Create a queue manager' dialog box with the port number changed to 2414. A progress bar at the bottom left indicates the process is 'Creating queue manager...'. The 'Create' button is disabled and highlighted in orange.

|                                                    |                                                                                   |
|----------------------------------------------------|-----------------------------------------------------------------------------------|
| Name: ?                                            | MY_QM                                                                             |
| Port: ?                                            | 2414                                                                              |
| Specify file system size: <input type="checkbox"/> |                                                                                   |
| File system size: ?                                | <input type="text"/> <input type="radio"/> MB <input checked="" type="radio"/> GB |

**Creating queue manager...** **Create** **Cancel**

- 74. You might see the following error when trying to create the queue manager: Failed to create new object

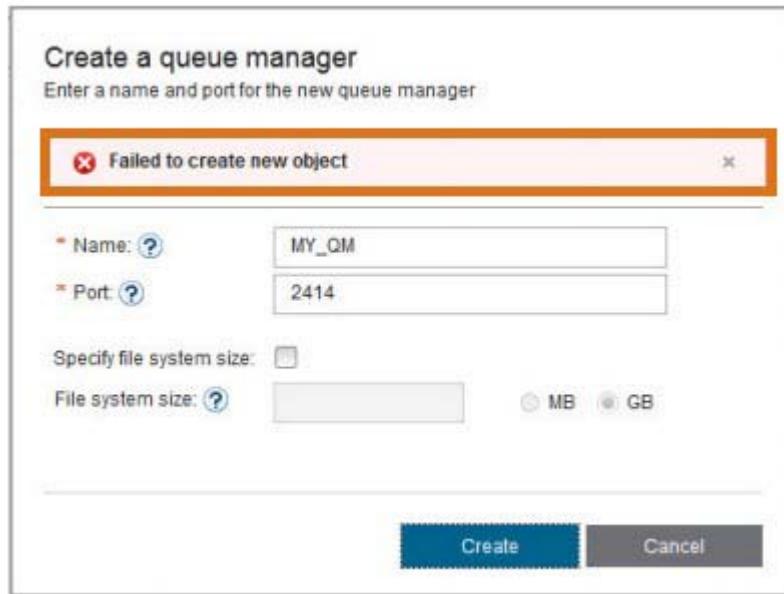
Create a queue manager  
Enter a name and port for the new queue manager

**Failed to create new object**

Name: MY\_QM  
Port: 2414

Specify file system size:   
File system size:  MB  GB

**Create** **Cancel**



- 75. Click the error text (which is a hyperlink) to see details about the error. If you see the error, do steps 10 – 13, then continue on with step 14. If you do **not** see the error, steps 10 – 13 are not necessary, but you should review them, and resume at step 14.

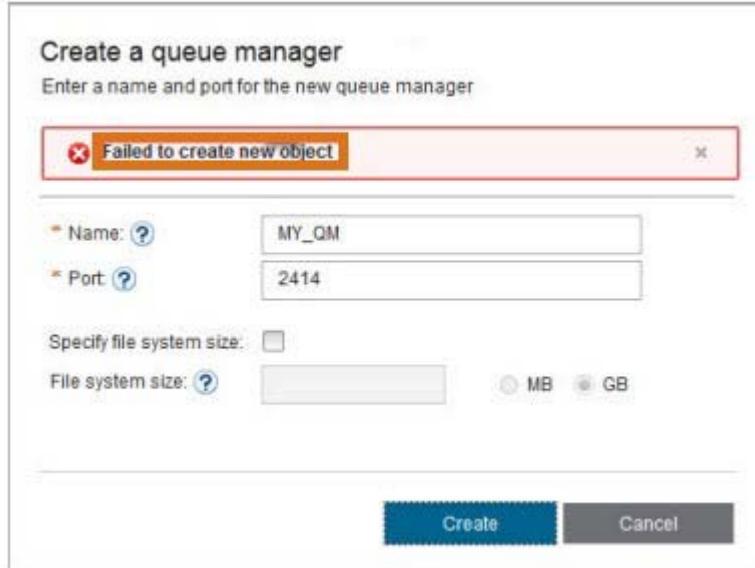
Create a queue manager  
Enter a name and port for the new queue manager

**Failed to create new object**

Name: MY\_QM  
Port: 2414

Specify file system size:   
File system size:  MB  GB

**Create** **Cancel**



- 76. When an error occurs while creating or working with IBM MQ objects by using the IBM MQ Console, the failing commands and reason codes are displayed. In the example that is shown, the file system storage on the virtual appliance is not sufficient to create another queue manager.

The screenshot shows the 'Create a queue manager' dialog box. At the top, it says 'Enter a name and port for the new queue manager'. Below that is a red-bordered error message box with the title 'Failed to create new object' and the message 'crtmqm -p 2414 MY\_QM Please wait while 64 GB file system is initialized for queue manager 'MY\_QM'. AMQ7065: Insufficient space on disk.' The main form has fields for 'Name:' (MY\_QM) and 'Port:' (2414). There is a 'Specify file system size:' checkbox which is unchecked. Below it, 'File system size:' is set to '2' with the radio button for 'GB' selected. At the bottom are 'Create' and 'Cancel' buttons.

- 77. By default, the IBM MQ Appliance allocates a 64-GB file system for each queue manager that is created. The file system size that is allocated to a queue manager is configurable. Check the **Specify file system size** check box, enter a **File system size** of 2, and make sure that the **GB** option is selected. Then, click **Create**.

This screenshot is identical to the previous one, showing the 'Create a queue manager' dialog box. The 'Specify file system size:' checkbox is checked, and the 'File system size:' field contains the value '2'. The 'GB' radio button is selected. The 'Create' button at the bottom is highlighted with a blue border.

- \_\_\_ 78. You should see the new queue manager as it is being created.
- \_\_\_ 79. In the queue manager widget, notice that two queue managers are now on the appliance (**QM1** and **MY\_QM**).

The screenshot shows the 'Queue Managers' section of the IBM MQ Console. It displays a table with four columns: Name, Running TCP listener ports, Status, and High Availability. There are two rows: one for 'MY\_QM' (port 2414, status Running) and one for 'QM1' (port 1414, status Running). A 'Filter' input field at the top right is empty. The bottom of the screen shows 'Total: 2 Selected: 1' and 'Last updated: 8:41:26 AM'.

| Name  | Running TCP listener ports | Status  | High Availability |
|-------|----------------------------|---------|-------------------|
| MY_QM | 2414                       | Running |                   |
| QM1   | 1414                       | Running |                   |

Total: 2 Selected: 1 Last updated: 8:41:26 AM

- \_\_\_ 80. You can use filters to hide queue managers that you are not interested in seeing. In the Filter box, type: **MY**  
The QM1 queue manager is no longer visible in the widget.

The screenshot shows the 'Queue Managers' section with a filter applied. The 'Filter' input field contains 'MY'. Only the row for 'MY\_QM' (port 2414, status Running) is visible. The bottom of the screen shows 'Total: 1 Selected: 1' and 'Last updated: 8:42:17 AM'.

| Name  | Running TCP listener ports | Status  | High Availability |
|-------|----------------------------|---------|-------------------|
| MY_QM | 2414                       | Running |                   |

Total: 1 Selected: 1 Last updated: 8:42:17 AM

- \_\_\_ 81. Return to the VMware console for the virtual appliance. Enter: `dspmq`  
You should now see that **MY\_QM** exists on the appliance.

```
M2000(Maccli)# dspmq
QMNAME(QM1)
QMNAME(MY_QM)
M2000(Mqcli)#
STATUS(Running)
STATUS(Running)
```

- \_\_ 82. Enter the following to create another queue manager on the appliance:

```
crtmqm -p 3414 -fs 2 MY_QM2
```

```
M2000(mqcli)# crtMQM -p 3414 -fs 2 MY_QM2
Please wait while 2048 MB file system is initialized for queue manager MY_QM2.
IBM MQ Appliance queue manager created.
The queue manager is associated with installation 'MQAppliance'.
Creating or replacing default objects for queue Manager 'MY_QM2'.
Default objects statistics : 84 created. 0 replaced. 0 failed.
Completing setup.
Setup completed.
M2000(mqcli)#

```

You should see the new queue manager as it is being created.

- \_\_ 83. Return to the IBM MQ Console. In the queue manager widget, notice that the new **MY\_QM2** queue manager is visible.

| Queue Managers       |                            |         |                          |
|----------------------|----------------------------|---------|--------------------------|
|                      |                            |         | More... ▾                |
| Name                 | Running TCP listener ports | Status  | High Availability        |
| MY_QM                | 2414                       | Running |                          |
| MY_QM2               |                            | Stopped |                          |
| Total: 2 Selected: 1 |                            | 1       | Last updated: 8:46:00 AM |



### Note

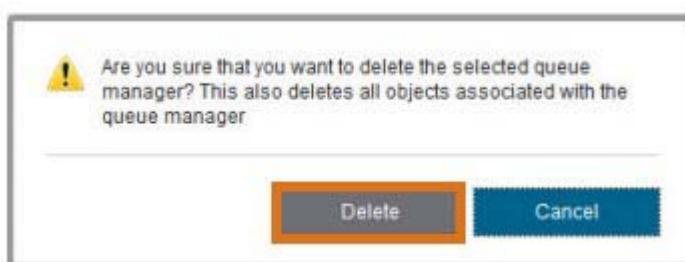
You might need to reenter the filter value ("MY"). Notice that queue managers that were created by using the IBM MQ Console (such as **MY\_QM** mentioned previously) are both created and immediately started. This situation is different from when you create a queue manager from the appliance console (such as **MY\_QM2**), where you must first create the queue manager (by using *crtmqm*) and then start it (by using *strmqm*).

- \_\_\_ 84. You are not going to use this queue manager, so delete it. Click **MY\_QM2** in the table, and then click the delete toolbar control.

| Name   | Running TCP listener ports | Status                                     | High Availability |
|--------|----------------------------|--------------------------------------------|-------------------|
| MY_QM  | 2414                       | <span style="color: green;">Running</span> |                   |
| MY_QM2 |                            | <span style="color: red;">Stopped</span>   |                   |

Total: 2 Selected: 1 Last updated: 8:50:45 AM

- \_\_\_ 85. Click **Delete** when you are asked whether you want to do so.



- \_\_\_ 86. You might need to reenter the filter value (**MY**).

| Name  | Running TCP listener ports | Status                                     | High Availability |
|-------|----------------------------|--------------------------------------------|-------------------|
| MY_QM | 2414                       | <span style="color: green;">Running</span> |                   |

Total: 1 Selected: 1 Last updated: 8:53:18 AM

- \_\_\_ 87. Return to the VMware console for the virtual appliance. Enter: `dspmq`  
You should now see that **MY\_QM2** is deleted, and only **QM1** and **MY\_QM** remain.

```
M2000(Mqcl1)#
QMNAME(QM1)
QMNAME(MY_QM)
M2000(Mqcl1)# _
```

STATUS(Running)  
STATUS(Running)

- \_\_\_ 88. Now create an IBM MQ Object widget. Click the *Add MQ Object Widget* hotspot.



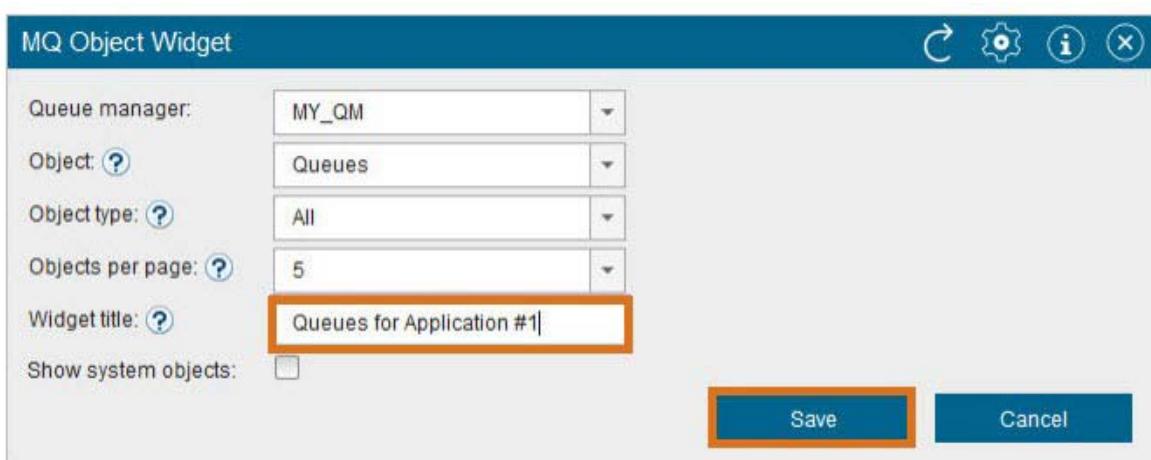
- \_\_\_ 89. Click **Choose the configuration options for the object widget**.



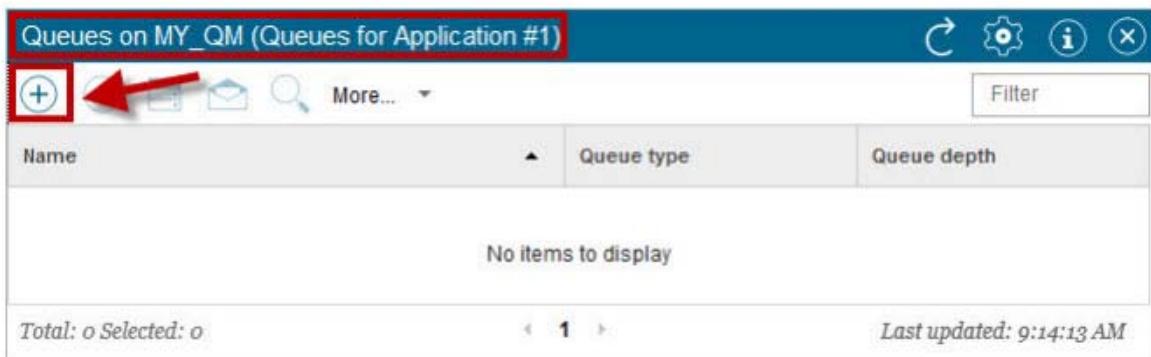
- \_\_\_ 90. For *Object*, accept the default value of *Queues*. For the *Widget title*, enter:

Queues for Application #1

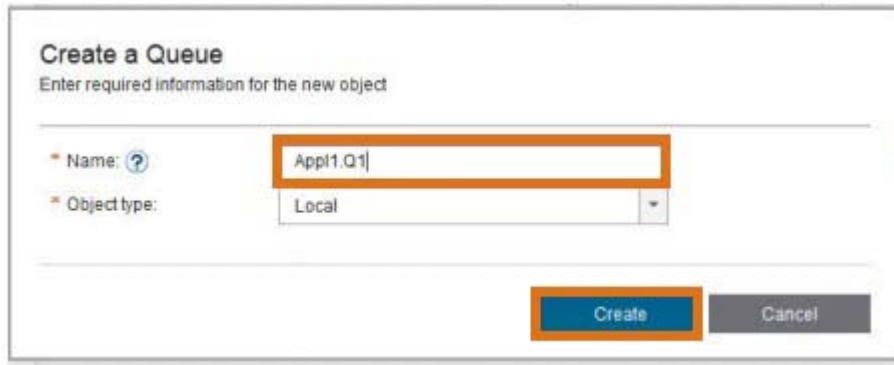
Click **Save**.



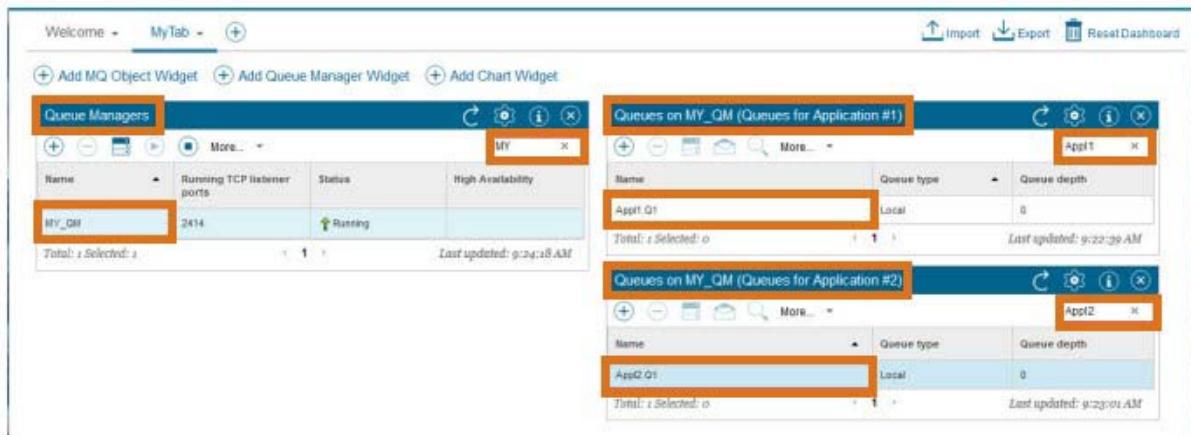
- \_\_\_ 91. The new widget should have the title that you specified. Click the widget toolbar to create a new queue.



- \_\_\_ 92. Enter a Name of: App1.Q1  
Click **Create**.



- \_\_\_ 93. Now complete the following steps:
- Create another IBM MQ Object widget. Name the widget: Queues for Application #2
  - In this new widget, create a new queue. Name the queue: App2.Q1
  - In the **Queues for Application #1** widget, enter a Filter value of: App1
  - In the **Queues for Application #2** widget, enter a Filter value of: App2
  - Arrange the dashboard widgets so that the Queue Manager widget is on the left, and the Queue widgets are on the right.
- \_\_\_ 94. When the previous arrangement is complete, your dashboard should look something like the following image:

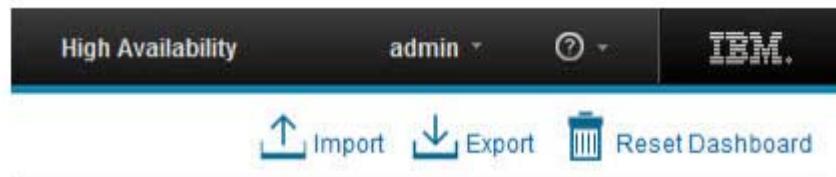


This exercise provides a simple example of how a custom dashboard can be created.

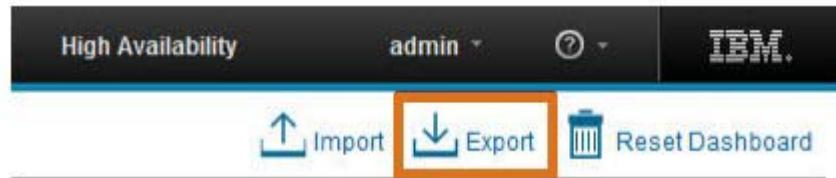
## Exporting and importing dashboards

Dashboard layouts can be exported and shared with others. This section demonstrates how to do so.

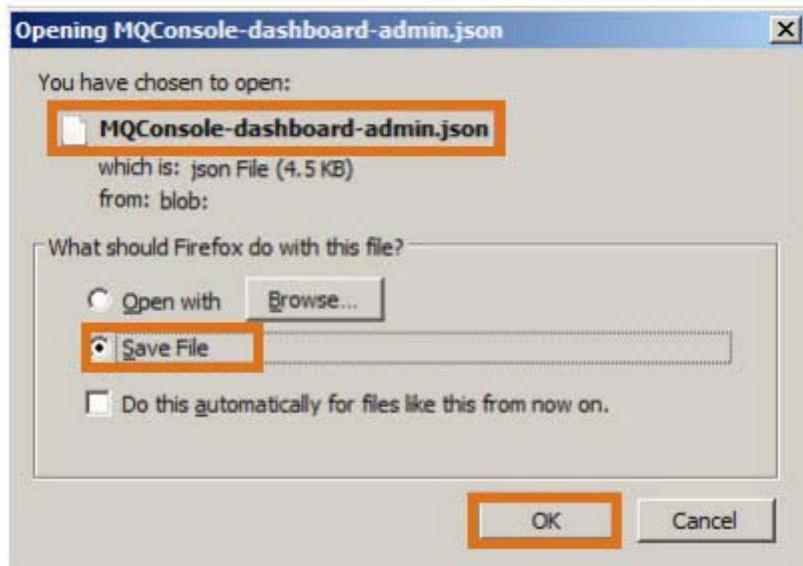
- \_\_\_ 95. In the upper right corner are controls that you can use to import, export, and reset the layout of the current dashboard.



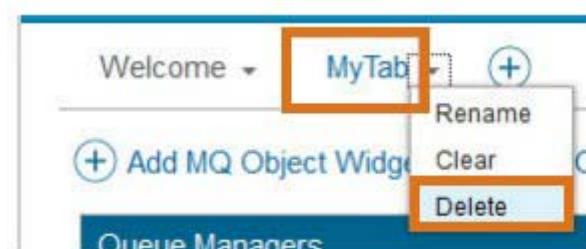
- \_\_\_ 96. To export the current dashboard layout, click **Export**.



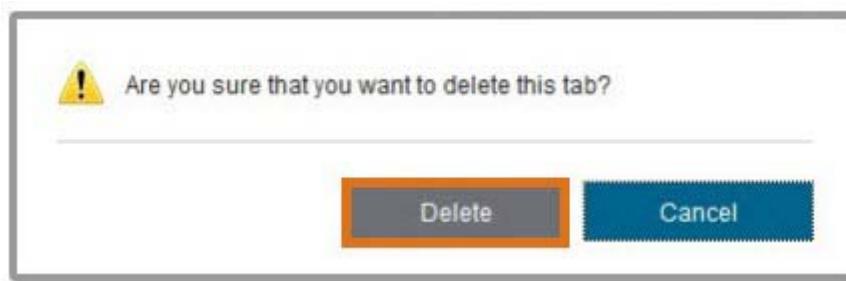
- \_\_\_ 97. The file name is "MQConsole-dashboard-admin.json". Make sure that **Save File** is selected, and click **OK**.



- \_\_\_ 98. Delete the current dashboard.



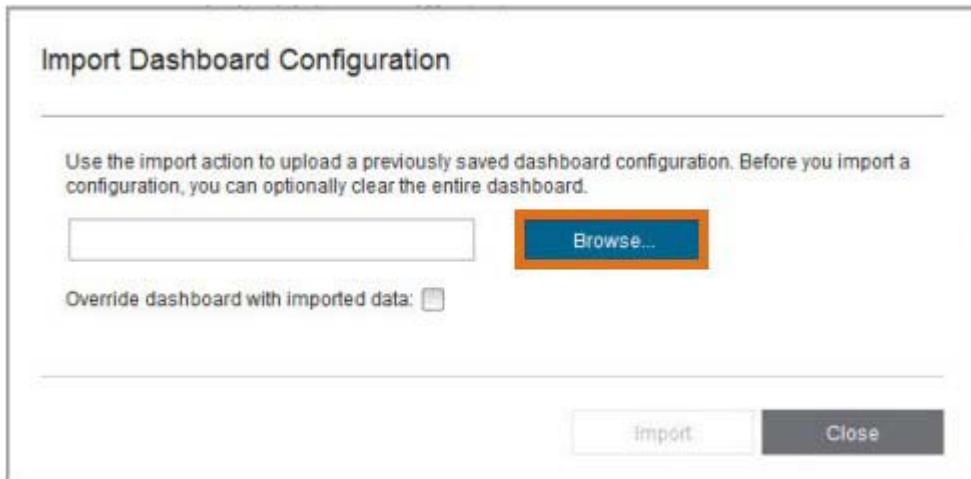
\_\_\_ 99. Click **Delete** to confirm.



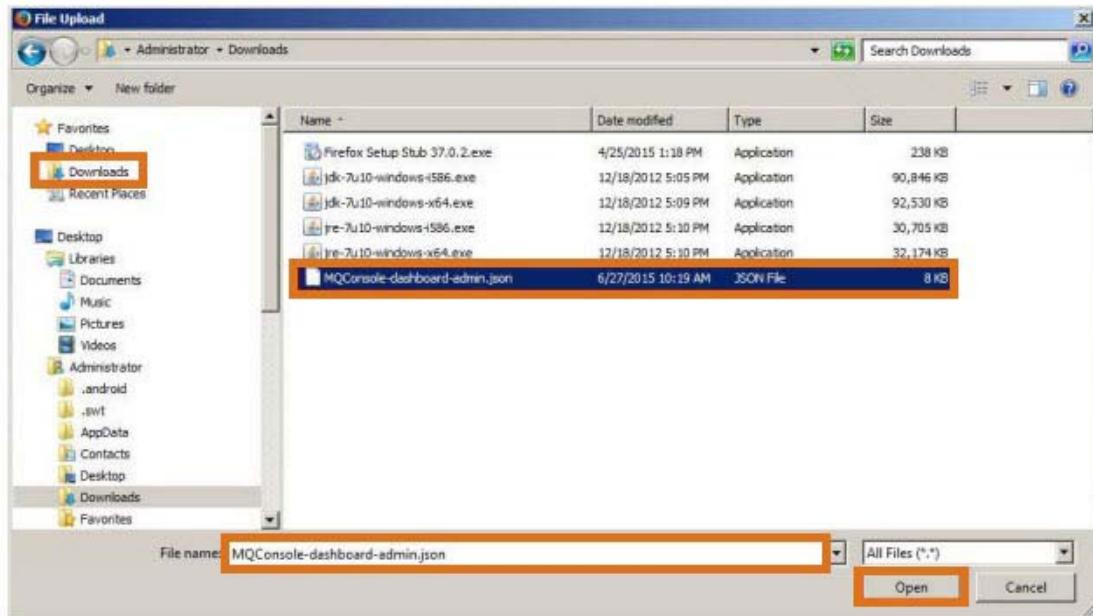
\_\_\_ 100. Now select **Import**.



\_\_\_ 101. Click **Browse** to locate the configuration file that was previously saved.



- \_\_\_ 102. Select **Downloads** on the left, then locate and select the previously saved file, and click **Open**.



- \_\_\_ 103. Click **Import**.

A screenshot of a 'Import Dashboard Configuration' dialog box. The title is 'Import Dashboard Configuration'. The instructions say: 'Use the import action to upload a previously saved dashboard configuration. Before you import a configuration, you can optionally clear the entire dashboard.' There is a file input field containing 'MQConsole-dashboard-admin.json' (highlighted with a red box), a 'Browse...' button, and a checkbox labeled 'Override dashboard with imported data:'. At the bottom are 'Import' and 'Close' buttons, with 'Import' highlighted with a red box.

- \_\_\_ 104. You should see your saved dashboard **MyTab** restored, with the widgets and the layout that were in place when the dashboard was saved.

- \_\_\_ 105. One thing to note is that filters are not considered part of these dashboard layouts, and so are not saved when the dashboard is exported. Reenter the filter values as shown:

## Working with queues

This section explores some of the capabilities available when working with queues by using the IBM MQ Console.

- \_\_\_ 106.On the **Queues for Application #1** widget, click the **App1\_Q1** queue, and then click the icon on the toolbar.

| Name    | Queue type | Queue depth |
|---------|------------|-------------|
| App1.Q1 | Local      | 0           |

- \_\_\_ 107.Review the queue properties. Click **Close** when complete.

| Property             | Value          | Action                 |
|----------------------|----------------|------------------------|
| Queue name:          | App1.Q1        |                        |
| Queue type:          | Local          |                        |
| Description:         |                | Edit                   |
| Enable put:          | Allowed        | Edit <a href="#">?</a> |
| Enable get:          | Allowed        | Edit <a href="#">?</a> |
| Default priority:    | 0              | Edit <a href="#">?</a> |
| Default persistence: | Not persistent | Edit <a href="#">?</a> |
| Usage:               | Normal         | Edit <a href="#">?</a> |

- \_\_\_ 108.Put a message on the App1\_Q1 queue. To do so, on the **Queues for Application #1** widget, click the **App1\_Q1** queue, and then click the icon on the toolbar.

| Name    | Queue type | Queue depth |
|---------|------------|-------------|
| App1.Q1 | Local      | 0           |

Total: 1 Selected: 1 Last updated: 11:02:55 AM

- \_\_\_ 109.Enter some test data, and click **Put**.

**Put Message**  
Enter message text to put on queue 'App1.Q1'

\* Message:

Count:

**Put** **Cancel**

- \_\_\_ 110.Put two more messages on the same queue, with different message content. When you are done, the queue should have three messages total, as shown.

| Name    | Queue type | Queue depth |
|---------|------------|-------------|
| App1.Q1 | Local      | 3           |

Total: 1 Selected: 1 Last updated: 12:30:42 PM

- \_\_\_ 111. Click the **App1\_Q1** queue in the widget, and then the browse tool in the toolbar.

The screenshot shows a table titled "Queues on MY\_QM (Queues for Application #1)". The table has three columns: "Name", "Queue type", and "Queue depth". A single row is highlighted in orange, corresponding to the "App1.Q1" queue. The "Queue type" is listed as "Local" and the "Queue depth" is "3". The toolbar at the top includes icons for adding (+), removing (-), creating a dashboard, sending email, and a search icon (magnifying glass). A dropdown menu labeled "More..." is also present. A search bar on the right contains the text "App1". At the bottom, it says "Total: 1 Selected: 1" and "Last updated: 12:30:42 PM".

- \_\_\_ 112. A Browse Messages dialog box is displayed. From this dialog box, you can view messages on the queue and sort them by position, message content, and put date/time. If many messages are present, you can use filters to reduce the number of messages displayed. For more message browse capabilities, you can create a **Browse** widget on the dashboard. To create this widget, click **Add Browse Widget**.

The screenshot shows a "Browse Messages" dialog box. The title is "Messages for queue 'App1.Q1' on MY\_QM". It contains a table with three columns: "Position", "Message body", and "Date/time". Three messages are listed:

| Position | Message body         | Date/time                |
|----------|----------------------|--------------------------|
| 1        | Test message data    | Jun 27, 2015, 7:29:31 AM |
| 2        | Some more test data  | Jun 27, 2015, 7:30:35 AM |
| 3        | Still more test data | Jun 27, 2015, 7:30:41 AM |

At the bottom, it says "Total: 3 Selected: 0" and "Last updated: 12:33:52 PM". The toolbar includes a "Filter" button, a refresh icon, and an information icon. At the bottom right are two buttons: "Add Browse Widget" (highlighted in orange) and "Close".

- 113. The **Browse** widget provides the same basic view as the Browse Message dialog box, but also allows viewing of specific messages and their properties. To view a message, select one of the messages on the queue and click the toolbar control.

| Position | Message body         | Date/time                |
|----------|----------------------|--------------------------|
| 1        | Test message data    | Jun 27, 2015, 7:29:31 AM |
| 2        | Some more test data  | Jun 27, 2015, 7:30:35 AM |
| 3        | Still more test data | Jun 27, 2015, 7:30:41 AM |

Total: 3 Selected: 1      Last updated: 12:34:45 PM

- 114. Review the displayed message properties. When finished, click **Close**.

| General                 |                |
|-------------------------|----------------|
| Application name:       | java           |
| Character set:          | UTF-8          |
| Correlation identifier: |                |
| Persistence:            | Not persistent |
| Encoding:               | 273            |
| Expiry:                 | 0              |
| Format:                 | MQSTR          |
| Priority:               | 0              |
| Reply to:               |                |
| User identifier:        | mqsystem       |

**Close**

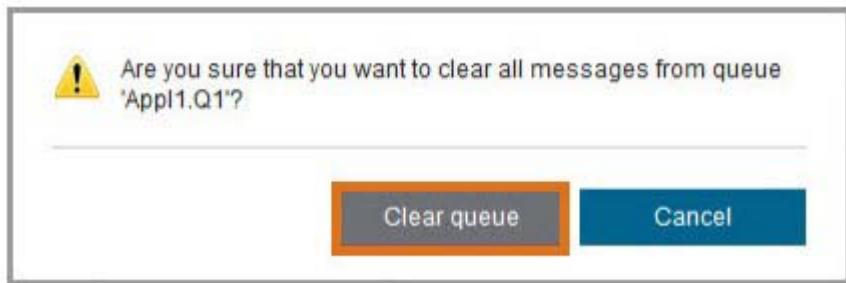
- \_\_\_ 115. Remain in the **Browse** widget, and select **More > Clear queue** on the widget toolbar.

Messages for queue 'Appl1.Q1' on MY\_QM

| Position | Message body         | Date/time                |
|----------|----------------------|--------------------------|
| 1        | Test message data    | Jun 27, 2015, 7:29:31 AM |
| 2        | Some more test data  | Jun 27, 2015, 7:30:35 AM |
| 3        | Still more test data | Jun 27, 2015, 7:30:41 AM |

Total: 3 Selected: 1      Last updated: 12:34:45 PM

- \_\_\_ 116. Click **Clear queue**.



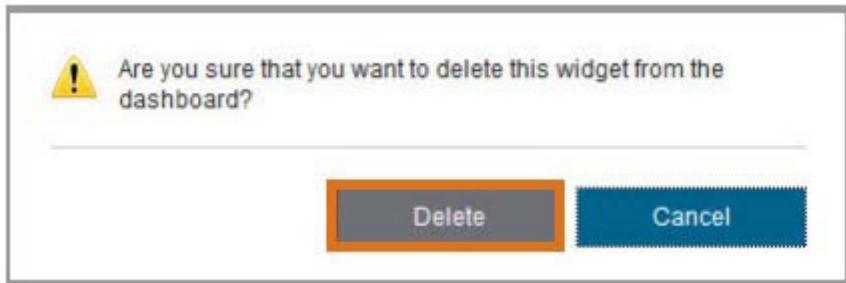
- \_\_\_ 117. Click the icon on the upper right of the **Browse** widget to delete the widget.

Messages for queue 'Appl1.Q1' on MY\_QM

| Position | Message body         | Date/time                |
|----------|----------------------|--------------------------|
| 1        | Test message data    | Jun 27, 2015, 7:29:31 AM |
| 2        | Some more test data  | Jun 27, 2015, 7:30:35 AM |
| 3        | Still more test data | Jun 27, 2015, 7:30:41 AM |

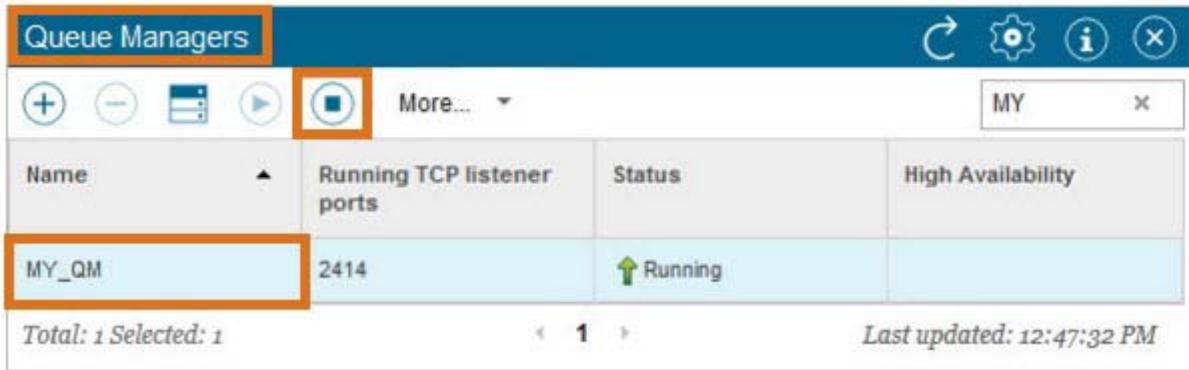
Total: 3 Selected: 1      Last updated: 12:34:45 PM

- \_\_\_ 118. Click **Delete**. The **Browse** widget should be deleted.



## Cleanup

- 119.To clean up, return to the Queue Managers widget. Click the **MY\_QM** queue manager, and click the stop toolbar icon.



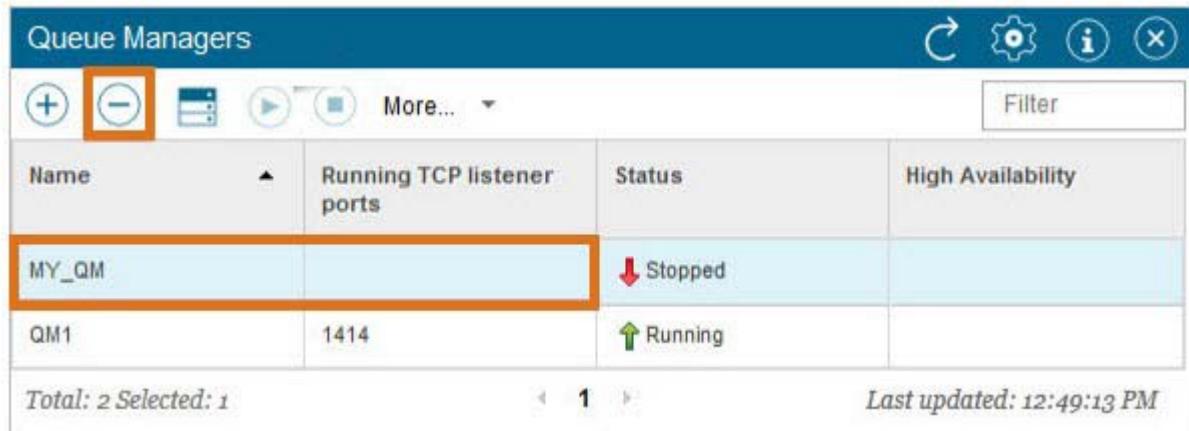
The screenshot shows the Queue Managers widget with the following details:

- Toolbar:** Includes icons for Add (+), Delete (-), Refresh, and Stop (highlighted with an orange box).
- Filter:** Set to "MY".
- Table Headers:** Name, Running TCP listener ports, Status, High Availability.
- Rows:**
  - Row 1: Name - Running TCP listener ports, Status - High Availability.
  - Row 2: MY\_QM (highlighted with an orange box), 2414, Running.
- Footer:** Total: 1 Selected: 1, Last updated: 12:47:32 PM.

- 120.Click **Stop** to stop the queue manager.



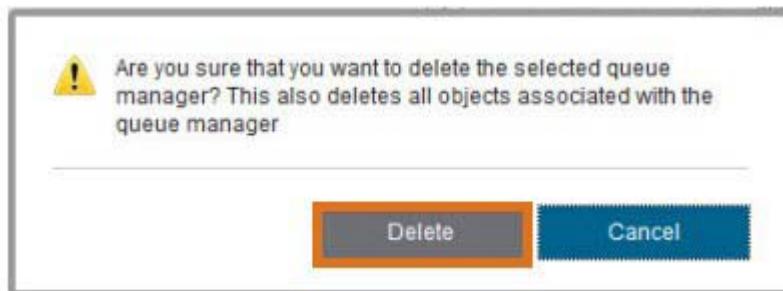
- 121.Click the delete icon in the Queue Managers toolbar to delete the queue manager.



The screenshot shows the Queue Managers widget with the following details:

- Toolbar:** Includes icons for Add (+), Delete (-) (highlighted with an orange box), Refresh, and Stop.
- Filter:** Set to "Filter".
- Table Headers:** Name, Running TCP listener ports, Status, High Availability.
- Rows:**
  - Row 1: Name - Running TCP listener ports, Status - High Availability.
  - Row 2: MY\_QM (highlighted with an orange box), 1414, Stopped.
  - Row 3: QM1, 1414, Running.
- Footer:** Total: 2 Selected: 1, Last updated: 12:49:13 PM.

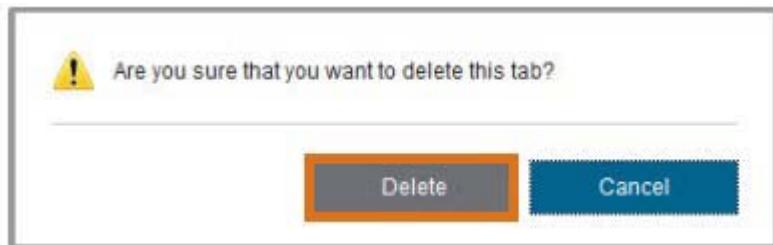
- \_\_\_ 122. Click **Delete** on the confirmation menu.



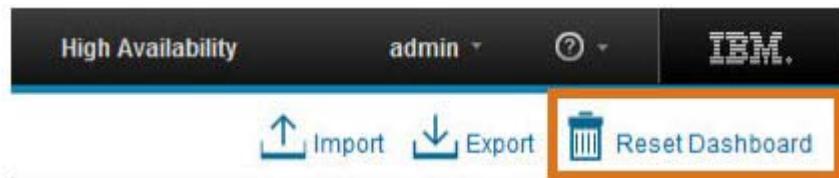
- \_\_\_ 123. The MY\_QM should be gone, leaving only the QM1 queue manager. Click the **MyTab** tab, and in the menu, click **Delete**.



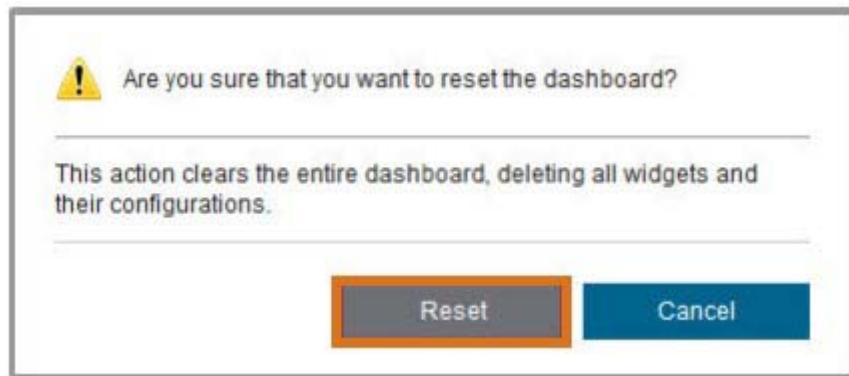
- \_\_\_ 124. Click **Delete** on the confirmation menu.



- \_\_\_ 125. On the **Welcome** dashboard, use the **Reset Dashboard** tool at the upper right to reset the dashboard to its default view.



- \_\_\_ 126. Click **Reset** on the confirmation menu.



- \_\_\_ 127. The IBM MQ Console should now display a single **Welcome** tab with only a **Queue Managers** object.

A screenshot of the IBM MQ Console interface. The top navigation bar includes "IBM MQ Console", "Dashboard", "Appliance", "High Availability", "admin", and the IBM logo. Below the navigation is a toolbar with "Import", "Export", and "Reset Dashboard" buttons. The main content area is titled "Welcome" and contains a "Queue Managers" widget. The widget has a header with icons for refresh, settings, information, and close. Below the header is a table with columns: Name, Running TCP listener ports, Status, and High Availability. One row is visible for "QM1" with "1414" in the TCP ports column and "Running" in the status column. At the bottom of the widget, it says "Total: 1 Selected: 0" and "Last updated: 1:03:29 PM".

This step concludes the IBM MQ Appliance Web UI and IBM MQ Console exercise.

## End of exercise

## Exercise review and wrap-up

In this exercise, you configured the virtual appliance and tested the basic configuration.

---

# Exercise 4. Monitoring and troubleshooting

## Estimated time

00:45

## Overview

In this exercise, you explore some of the available options for monitoring the IBM MQ Appliance by using a combination of command-line and reporting widgets in the IBM MQ Console. You also learn how to implement the application activity trace for the IBM MQ Appliance, and explore some of the commands that are available for diagnosing and resolving issues.

## Objectives

After completing this exercise, you should be able to:

- Monitor activity by using the IBM MQ Appliance
- Run application activity traces on the IBM MQ Appliance
- Describe commands that are available for diagnosing and resolving issues

## Requirements

This exercise assumes that Exercise 1 is completed.

In this exercise, you use the same environment that you created for the getting started exercise. You can use the **MQAppl1** or **MQAppl1 – Lab1 – Solution** VM and the **ZM051\_1.0-WS2008** VM. You must suspend or shut down all other VMs.

## Exercise instructions

## 4.1. Monitoring and reporting

You are going to explore some of the options available for monitoring the IBM MQ Appliance by using a combination of command-line and reporting widgets in the IBM MQ Console. You also look at how you can implement the use of the application activity trace for the IBM MQ Appliance. Finally, you see some of the commands available for diagnosing and resolving problems.

### Monitoring system resource usage

- 1. Open the MQAppl1 image (it should still be running from previous exercises).

Before you investigate the IBM MQ-specific resource monitoring, you start by monitoring the operation of the appliance itself. You can use the `show` command to monitor different aspects of the appliance.

You can use the `show` command to view information about how an aspect of the appliance is configured or to monitor aspects of the appliance operation. The `status_provider` argument specifies which information you view. The `show` command is available at login, and in most configuration modes. A large list of `status_provider` values is available. The complete list can be found in the IBM Knowledge Center for the IBM MQ Appliance at:

[http://www.ibm.com/support/knowledgecenter/SS5K6E\\_1.0.0/com.ibm.mqa.doc/monitoring/mo00041\\_.htm?lang=en](http://www.ibm.com/support/knowledgecenter/SS5K6E_1.0.0/com.ibm.mqa.doc/monitoring/mo00041_.htm?lang=en)

- 2. If you are at the `mqcli` command prompt, exit from where you are.
- 3. First, enter the `show` command. This command gives a list of all of the available `status_provider` values available.
- 4. Now enter: `show version`

This command shows the firmware and library version, similar to the following image:

```
M2000# show version

 Serial: 0000000
 Version: MQ00.8.0.0
 Build: 258372Mq
 Build Date: 2015/03/12 20:27:38
 Watchdog Build: MQ00.8.0.0
 Installed DPOS: MQ00.8.0.0
 Running DPOS: MQ00.8.0.0
 XML accelerator: embedded
 Machine Type: 5725
 Model Type: S14

M2000# _
```

One of the other things that you can find out from the `show` command is what users are defined for the appliance.

- 5. Enter: `show usernames`

- \_\_\_ 6. You should see two users: the admin user that was preconfigured and also the user that you set up in the first exercise as the user that is authorized to reset the password.

```
M2000# show usernames
user: admin [up]
 admin-state enabled
 summary Administrator
 access-level privileged

user: leegavin [up]
 admin-state enabled
 summary "Created by startup script"
 access-level privileged

M2000# -
```

- \_\_\_ 7. You can also use the `show` command to give a list of logged in users. Enter: `show users`
- \_\_\_ 8. You can see that the admin user is logged in via the serial port (which means that you are entering commands into the console) and also logged in to the IBM MQ Console (if you are not logged in, log in to the IBM MQ Console and rerun the command).

| Session | ID | Name  | Connection  | IP address   | Login                    | Domain  |
|---------|----|-------|-------------|--------------|--------------------------|---------|
| 3       |    | admin | serial-port |              | Tue May 12 09:27:00 2015 | default |
| 5       |    | admin | web-gui     | 192.168.86.1 | Tue May 12 14:42:34 2015 | default |

- \_\_\_ 9. Move on to get some monitoring information about the IBM MQ environment on the appliance.
- \_\_\_ 10. Go to the command-line interface, and enter:
- mqcli
- \_\_\_ 11. Using `dspmq`, verify that the QM1 from the first exercise is running. If the queue manager is not running, start it.
- \_\_\_ 12. You now use the `status` command to view information about resource allocation.

You can use the `status` command to view the following information about the system resources on the appliance:

- The size and usage of the system memory
- The CPU usage of the system
- The size and usage of the internal disk
- The size and usage of the system volume
- The number of FFDCs and the disk space used
- The disk space that is used by trace

— 13. Enter the command: status

You see a response similar to the following image:

```

QMNAME(QM1)
M2000(Mqcli)#
Memory: 2814MB used, 7.6GB total [36%]
CPU: 0%
CPU load: 0.00, 0.00, 0.00
Internal disk: 9216MB allocated, 1024.0GB total [1%]
System volume: 1978MB used, 14.6GB allocated [13%]
MQ errors file system: 33MB used, 0 FDCs, 1.0GB allocated [3%]
MQ trace file system: 72MB used, 2.0GB allocated [4%]
M2000(Mqcli)#

```



### Note

You can also use the status command to view the following information about the system resources that are used by a queue manager:

- The queue manager name
- The queue manager status
- An estimate of the CPU usage of the queue manager
- An estimate of the memory usage of the queue manager
- The amount of the queue manager file system the queue manager uses

For a high availability queue manager, additional information can be viewed:

- The file system size for the queue manager
- The replication status of the queue manager
- The preferred appliance for the queue manager
- Whether a partitioned situation was detected, and if it has, the amount of “out-of-sync” data held

— 14. Enter the command for QM1:

status QM1

— 15. You should see a response similar to the following:

```

M2000(Mqcli)#
QM1(QM1)
CPU: 0.02%
Memory: 201MB
Queue Manager file system: 119MB used, 3.0GB allocated [4%]
M2000(Mqcli)#

```

You can use the `amqsrua` command to query metadata that is related to the system resource usage of a queue manager.

**Note**

The `amqsrua` command reports metadata that queue managers publish. This data can include information about the CPU, memory, and disk usage. You can also see data equivalent to the STATMQI PCF statistics data. The data is published every 10 seconds and is reported while the command runs.

- `-n MaxPubs`

Specifies how many reports are returned before the command ends. The command publishes data every ten seconds, so if you enter a value of 50, the command returns 50 reports over 500 seconds.

If you do not specify this parameter, the command runs until either an error occurs, or the queue manager shuts down.

- `-m QMgrName`

Specifies the name of the queue manager that you want to query. The queue manager must be running.

If you do not specify the queue manager name, the default queue manager is used.

- 16. You are going to report the metadata for a minute, while putting some messages on the TEST.IN queue from the first exercise, and see the results.
- 17. Enter the command as follows:

`amqsrua -n 30 -m QM1`

with the following responses:

STATMQI for the Class selection and PUT for the Type selection.

```

^CM2000(Mqcli)#
M2000(Mqcli)# amqsrua -n 30 -m QM1
CPU : Platform central processing units
DISK : Platform persistent data stores
STATMQI : API usage statistics
Enter Class selection
==> STATMQI
CONNDISC : MQCONN and MQDISC
OPENCLOSE : MQOPEN and MQCLOSE
INQSET : MQINQ and MQSET
PUT : MQPUT
GET : MQGET
SYNCPOINT : Commit and rollback
SUBSCRIBE : Subscribe
PUBLISH : Publish
Enter Type selection
==> PUT_

```

- 18. Either go to the IBM MQ Console, or go to the IBM MQ Explorer (in the Windows image) and put some messages on the queue.

- \_\_\_ 19. Depending on which method you use, and how many messages you put on the queue, you see results similar to the following image:

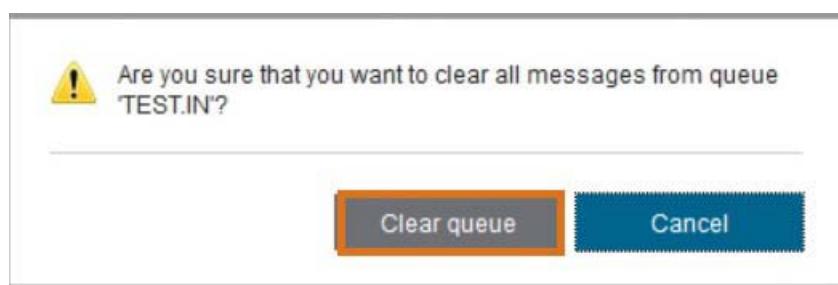
```
Publication received PutDate:20150512 PutTime:14221291
Interval total MQPUT/MQPUT1 count 12 1/sec
Interval total MQPUT/MQPUT1 byte count 10884 1088/sec
Non-persistent message MQPUT count 12 1/sec
Persistent message MQPUT count 0
Failed MQPUT count 0
Non-persistent message MQPUT1 count 0
Persistent message MQPUT1 count 0
Failed MQPUT1 count 0
Put non-persistent messages - byte count 10884 1088/sec
Put persistent messages - byte count 0
MQSTAT count 0
Failed MQSTAT count 0
```

- \_\_\_ 20. Now you move on to the IBM MQ Console and see some of the reports that you can generate.
- \_\_\_ 21. If you are not already logged in to the IBM MQ Console on the Windows VM, do so now.
- \_\_\_ 22. If you do not already have a widget for queues on the dashboard, add one now and clear the messages from TEST.IN from previous tests.
- \_\_\_ 23. Highlight the queue name and click the **More** list box.
- \_\_\_ 24. Select **Clear queue**.

The screenshot shows the IBM MQ Console dashboard. On the left, there's a 'Queues on QM1' section with a table for TEST.IN and TEST.OUT. A context menu is open over the TEST.IN row, with 'Clear queue...' highlighted. On the right, there's a 'Queue Managers' section showing QM1 as running. At the top, there are buttons for Import, Export, and Reset Dashboard.

| Name | Running TCP listener ports | Status  | High Availability |
|------|----------------------------|---------|-------------------|
| QM1  | 1414                       | Running |                   |

- \_\_\_ 25. Click **Clear queue**.



- \_\_\_ 26. You now investigate some of the chart widgets. First, add a new tab for the charts. Click the + sign in the tabs to add a tab.

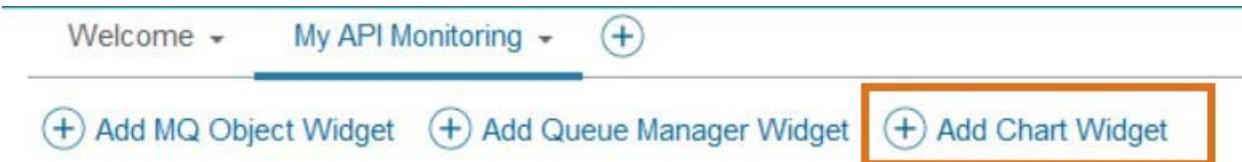


- \_\_\_ 27. Click the triangle next to the tab name and select **Rename**.

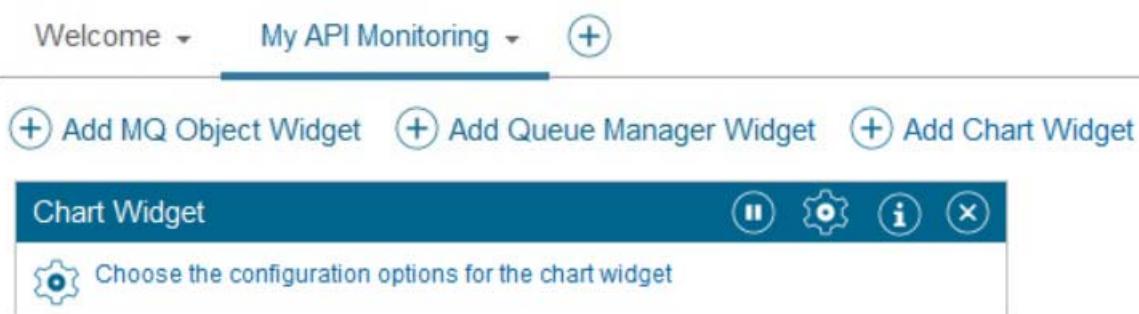


- \_\_\_ 28. Enter a name for the new tab (as seen in the following image, you chose My API Monitoring).

- \_\_\_ 29. Click **Add Chart Widget**.

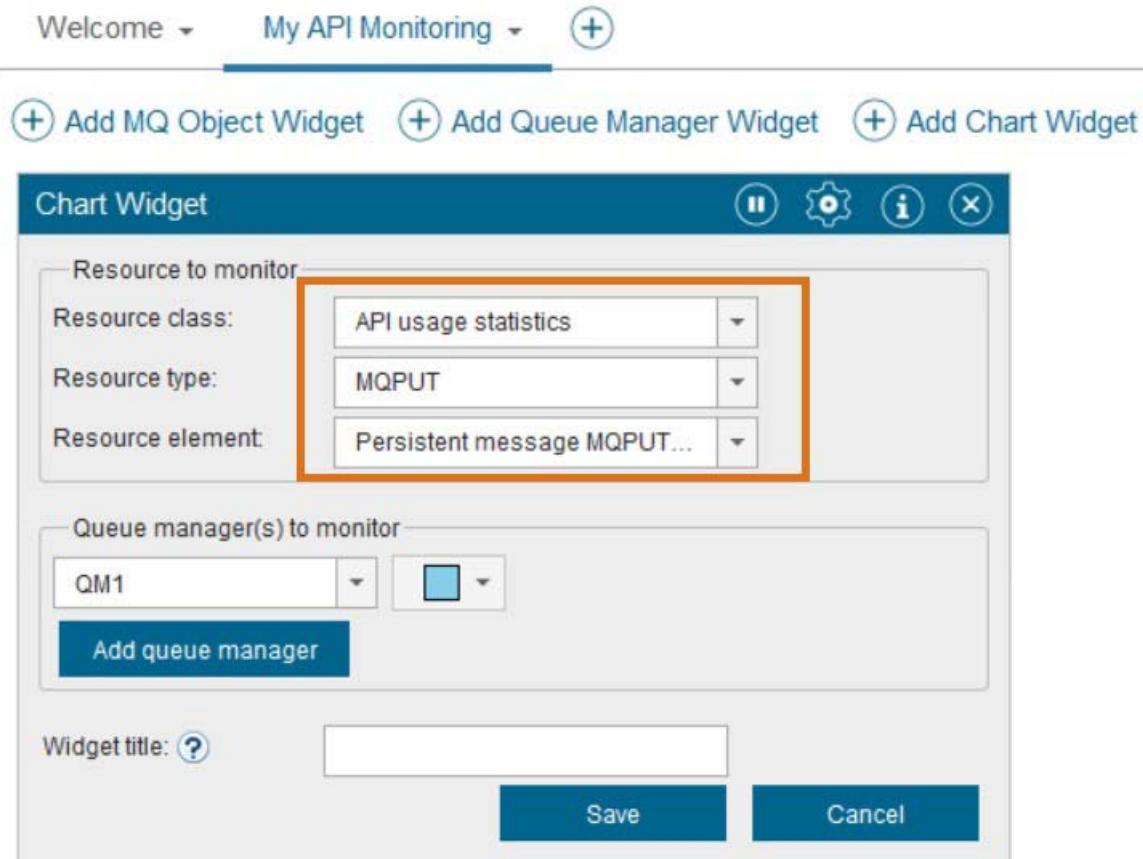


- \_\_\_ 30. After the widget is added, click **Choose the configuration options for the chart widget**.



31. Using the drop-down lists, select the following options for the widget.

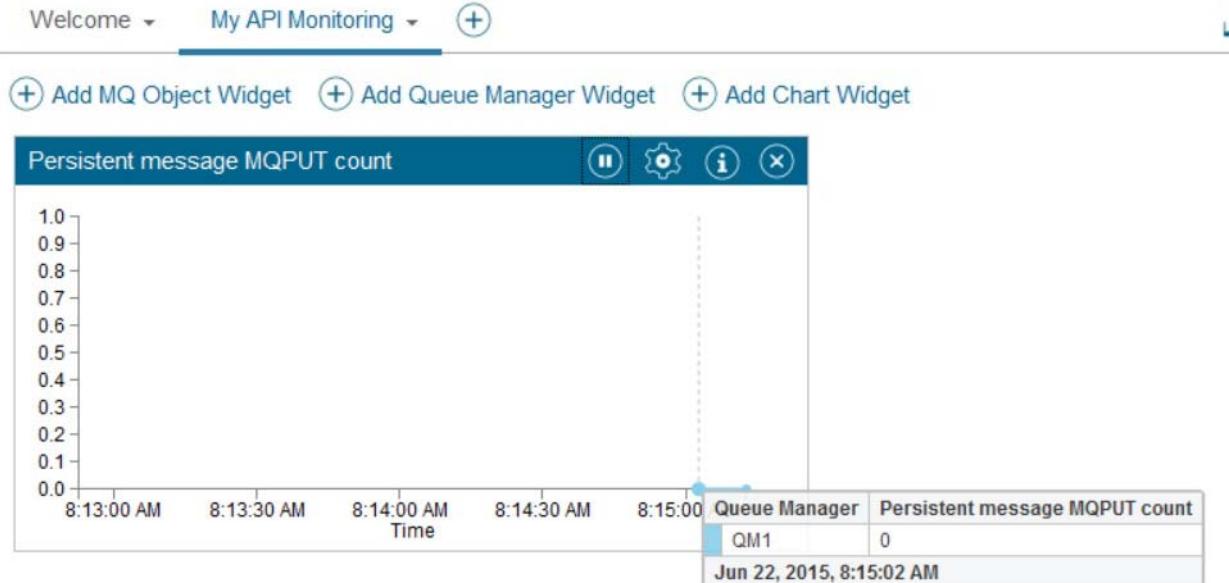
- Resource class = API usage statistics
- Resource type = MQPUT
- Resource element = Persistent message MQPUT count
- Queue manager to monitor = QM1



- \_\_\_ 32. You now see the widget.

In the chart widget, the data is collected at 10-second intervals. The X-axis of the chart displays a timeline. The Y-axis displays units appropriate to the resource that you are viewing. The Y-axis is dynamically resized to accommodate the data that is returned.

Hover over one of the data points to see the more detailed information.



You now need to start putting some messages to see the chart change.

- \_\_\_ 33. You can use the IBM MQ Console to put some messages onto a queue to test the widgets.  
\_\_\_ 34. Go to the Welcome page of the IBM MQ Console.

- 35. As you are monitoring persistent messages, you need to ensure that the default persistence on the queue is set to persistent (as the IBM MQ Console puts the message by using persistent according to the queue definition).

Open the properties of the TEST.IN queue and change the **Default persistence** to **Persistent** (if it is not already set to Persistent).

### Properties for 'TEST.IN'

View and edit the object properties

| General              |                                                                                                                                                                                           |                                                                                                                                                                                                    |
|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Queue name:          | TEST.IN                                                                                                                                                                                   |                                                                                                                                                                                                    |
| Queue type:          | Local                                                                                                                                                                                     |                                                                                                                                                                                                    |
| Description:         | <a href="#">Edit</a>                                                                                                                                                                      |                                                                                                                                                                                                    |
| Enable put:          | Allowed                                                                                                                                                                                   | <a href="#">Edit</a> <a href="#">?</a>                                                                                                                                                             |
| Enable get:          | Allowed                                                                                                                                                                                   | <a href="#">Edit</a> <a href="#">?</a>                                                                                                                                                             |
| Default priority:    | 0                                                                                                                                                                                         | <a href="#">Edit</a> <a href="#">?</a>                                                                                                                                                             |
| Default persistence: | <input style="border: 1px solid #ccc; padding: 2px 10px; margin-right: 5px;" type="button" value="Persistent"/> <span style="border: 1px solid #ccc; padding: 2px 5px;">Persistent</span> | <input style="border: 1px solid #ccc; padding: 2px 10px; margin-right: 5px;" type="button" value="Save"/> <input style="border: 1px solid #ccc; padding: 2px 10px;" type="button" value="Cancel"/> |
| Usage:               | Normal                                                                                                                                                                                    |                                                                                                                                                                                                    |

- 36. Select **TEST.IN** and click the “Put message” icon.

| Queues on QM1                                                                                          |                                                                                                        |
|--------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| <input style="border: 1px solid #ccc; padding: 2px 10px; margin-right: 5px;" type="button" value="+"/> | <input style="border: 1px solid #ccc; padding: 2px 10px; margin-right: 5px;" type="button" value="-"/> |
| Name                                                                                                   | Queue type                                                                                             |
| TEST.IN                                                                                                | Local                                                                                                  |
| TEST.OUT                                                                                               | Local                                                                                                  |
| Total: 2 Selected: 1                                                                                   |                                                                                                        |

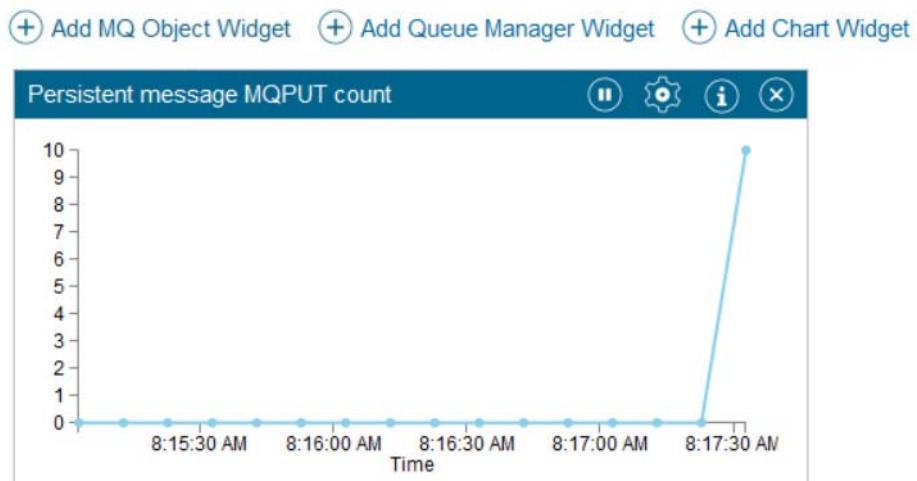
- \_\_\_ 37. Put some messages on the queue (as many or as few as you like – the example below shows that 10 messages were put).

**Put Message**  
Enter message text to put on queue 'TEST.IN'

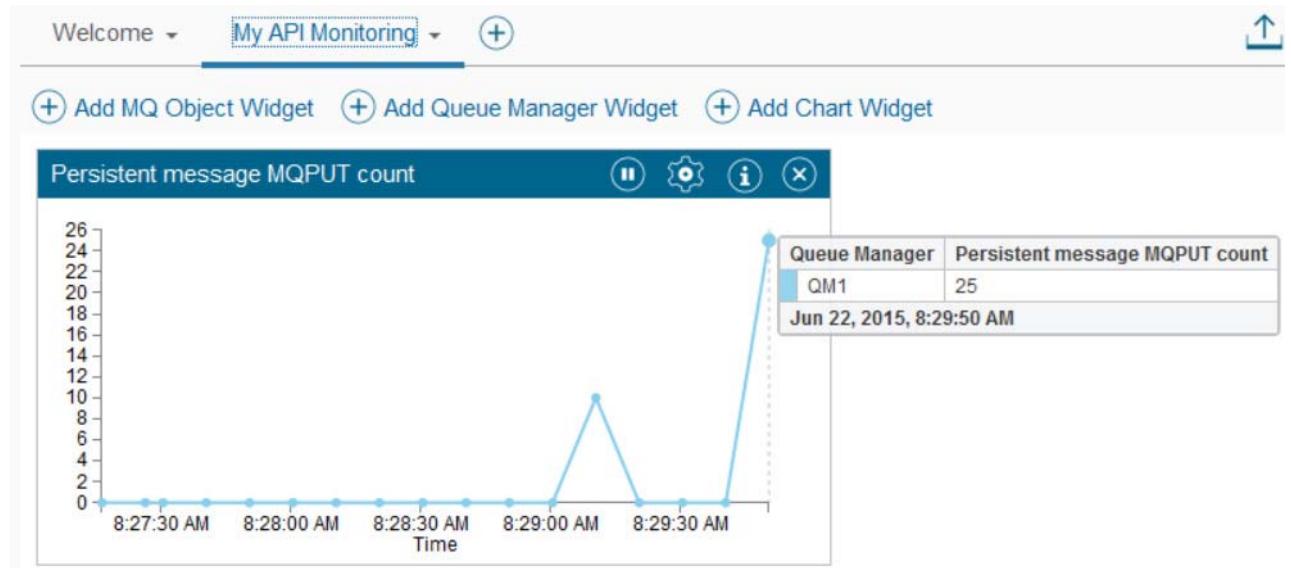
\* Message:  Count:

**Put** **Cancel**

- \_\_\_ 38. Go back to the **My API Monitoring** tab and widget that you created. You see a spike when you are putting messages.



- \_\_\_ 39. If you put some more messages on the queue, you can see the “traffic” as it starts and stops over a few minutes duration.



It is possible to monitor more than a one queue manager on a single widget, which might be useful when you are in a high-traffic environment. You can see which queue managers are taking the bulk of the traffic or where the peaks and troughs of message processing are taking place.

You now create a new queue manager and after configuring it, send some messages to it to contrast the two queue managers in the widget. You can create the queue manager by using either the console or the command-line interface on the appliance (whatever your preference).

- \_\_\_ 40. Go back to the first tab on the dashboard.  
 \_\_\_ 41. In the Queue Managers widget, select new queue manager (the plus sign).

42. Enter a name for the queue manager (choose MONITOR as this exercise is a monitoring exercise). Add a listener port for the queue manager (choose 1424). Click **Create**.

**Create a queue manager**  
Enter a name and port for the new queue manager

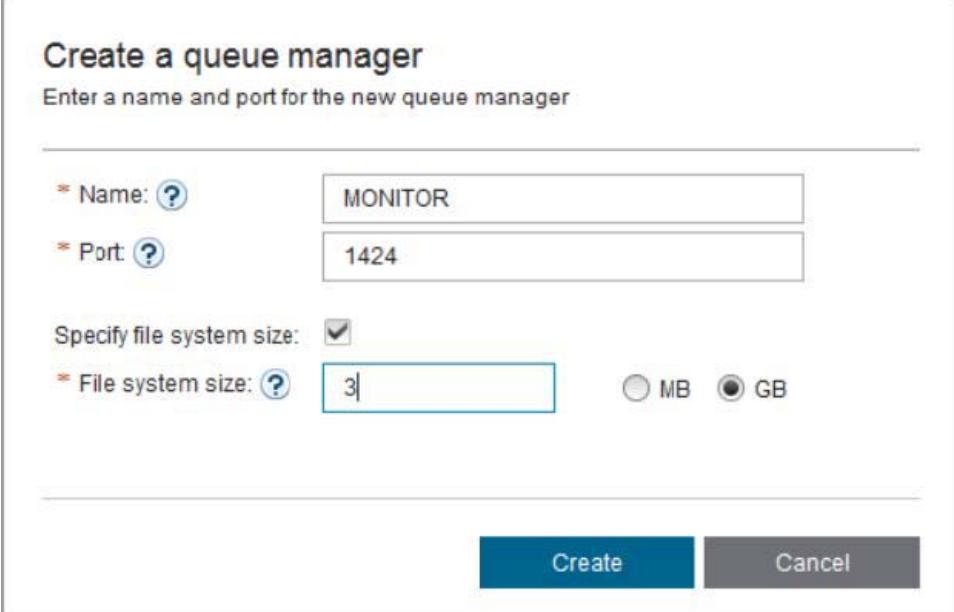
\* Name:

\* Port:

Specify file system size:

\* File system size:   MB  GB

**Create** **Cancel**



- \_\_\_ 43. This action creates and starts the queue manager.

You need to create the SVRCONN channel that is used for remote administration and also define the channel authentication records to allow access. Also, because you are using version 8, you need to configure the CONNAUTH settings. The CONNAUTH cannot currently be edited in the IBM MQ Console so you go to the command-line interface on the appliance for all of these commands.

| Interval:                  |                                        |
|----------------------------|----------------------------------------|
| Command input queue:       | SYSTEM.ADMIN.COMMAND.QUEUE             |
| Syncpoint:                 | Available                              |
| Distribution lists:        | Supported                              |
| Telemetry:                 | Not supported                          |
| Custom:                    | <a href="#">Edit</a> <a href="#">?</a> |
| Security policies:         | Supported                              |
| Connection authentication: | SYSTEM.DEFAULT.AUTH                    |

Use the command line to edit this property

- ▶ Cluster
- ▶ Repository
- ▶ Communication
- ▶ Events

[Close](#)

- \_\_\_ 44. Go back to the appliance. Ensure that you are in the IBM MQ client interface (mqcli).  
 \_\_\_ 45. Enter runmqsc MONITOR.

- \_\_\_ 46. Enter the following mqsc commands:

```
DEFINE CHANNEL('SYSTEM.ADMIN.SVRCONN') CHLTYPE(SVRCONN)
SET CHLAUTH('SYSTEM.ADMIN.SVRCONN') TYPE(BLOCKUSER)
USERLIST('*whatever')
ALTER AUTHINFO('SYSTEM.DEFAULT.AUTHINFO.IDPWOS') AUTHTYPE(IDPWOS)
ADOPTCTX(YES)
REFRESH SECURITY TYPE(CONNAUTH)
END
```

```
M2000(mqcli)# runmqsc MONITOR
5724-H72 (C) Copyright IBM Corp. 1994, 2014.
Starting MQSC for queue manager MONITOR.

DEFINE CHANNEL(SYSTEM.ADMIN.SURCONN) CHLTYPE(SURCONN)
 1 : DEFINE CHANNEL(SYSTEM.ADMIN.SURCONN) CHLTYPE(SURCONN)
AMQ8014: IBM MQ Appliance channel created.
SET CHLAUTH(SYSTEM.ADMIN.SURCONN) TYPE(BLOCKUSER) USERLIST('*WHATEVER')
 2 : SET CHLAUTH(SYSTEM.ADMIN.SURCONN) TYPE(BLOCKUSER) USERLIST('*WHATEVER')
AMQ8877: IBM MQ Appliance channel authentication record set.
ALTER AUTHINFO('SYSTEM.DEFAULT.AUTHINFO.IDPWOS') AUTHTYPE(IDPWOS) ADOPTCTX(YES)
 3 : ALTER AUTHINFO('SYSTEM.DEFAULT.AUTHINFO.IDPWOS') AUTHTYPE(IDPWOS) ADOPT
CTX(YES)
AMQ8567: IBM MQ Appliance authentication information changed.
REFRESH SECURITY TYPE(CONNAUTH)
 4 : REFRESH SECURITY TYPE(CONNAUTH)
AMQ8560: IBM MQ Appliance security cache refreshed.
EXIT
 5 : EXIT
4 MQSC commands read.
No commands have a syntax error.
All valid MQSC commands were processed.
M2000(mqcli)# _
```

- \_\_\_ 47. Now go back to the IBM MQ Console to complete the setup.  
 \_\_\_ 48. Using the method that you saw previously, add an IBM MQ Object widget for Channels.  
 \_\_\_ 49. Create a channel called MONITOR.SVRCONN of the type Server-connection.

### Create a Channel

Enter required information for the new object

---

|                                             |                   |
|---------------------------------------------|-------------------|
| * Name: <span style="color: blue;">?</span> | MONITOR.SVRCONN   |
| * Object type:                              | Server-connection |

---

Create
Cancel

- \_\_\_ 50. Add a widget for the channel authentication records for the MONITOR queue manager.

| Profile name | Type            | Attribute           | User source |
|--------------|-----------------|---------------------|-------------|
| *            | Block User List | User list: *MQADMIN |             |

Total: 1 Selected: 1 Last updated: 3:52:27 AM

- \_\_\_ 51. Edit the default channel authentication record to change the Block User list to “\*whatever”, as shown previously.

### Channel authentication record properties

View and edit the object properties

General

|               |                                           |
|---------------|-------------------------------------------|
| Channel name: | *                                         |
| Type:         | Block User List                           |
| Description:  | Default rule to disallow privileged users |

Block User

|            |           |
|------------|-----------|
| User list: | *whatever |
|------------|-----------|

Save Cancel

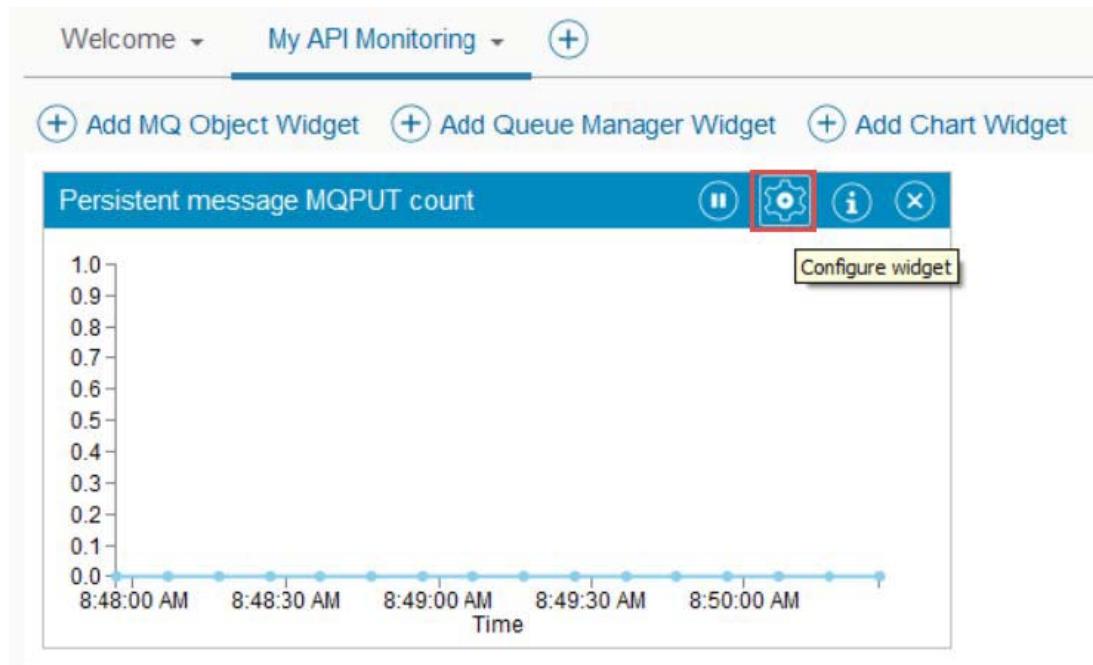
Extended

Statistics

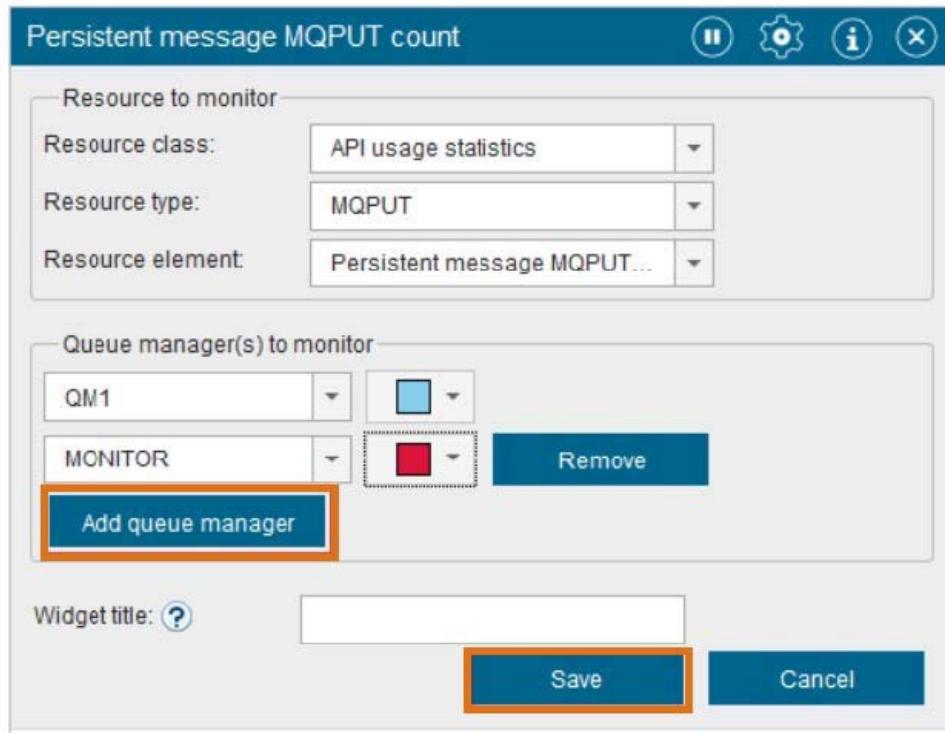
- \_\_\_ 52. Add an IBM MQ Object widget for queues. Create a local queue called: MONITOR

The screenshot shows a table titled "Queues on MONITOR". The table has three columns: "Name", "Queue type", and "Queue depth". There is one row for the queue "MONITOR", which is of type "Local" and has a depth of 0. At the bottom of the table, it says "Total: 1 Selected: 1" and "Last updated: 3:56:24 AM". The interface includes standard navigation and search controls at the top.

- \_\_\_ 53. Change the Default persistence property of the queue to **Persistent**.
- \_\_\_ 54. You are now ready to put some messages onto the queue, but need to update the API monitoring widget to add the new queue manager. Go back to the **MY API Monitoring** tab. Select the “Configure widget” icon, as shown.



- \_\_\_ 55. Click **Add queue manager** and select the **MONITOR** queue manager (set a color). Click **Save**.

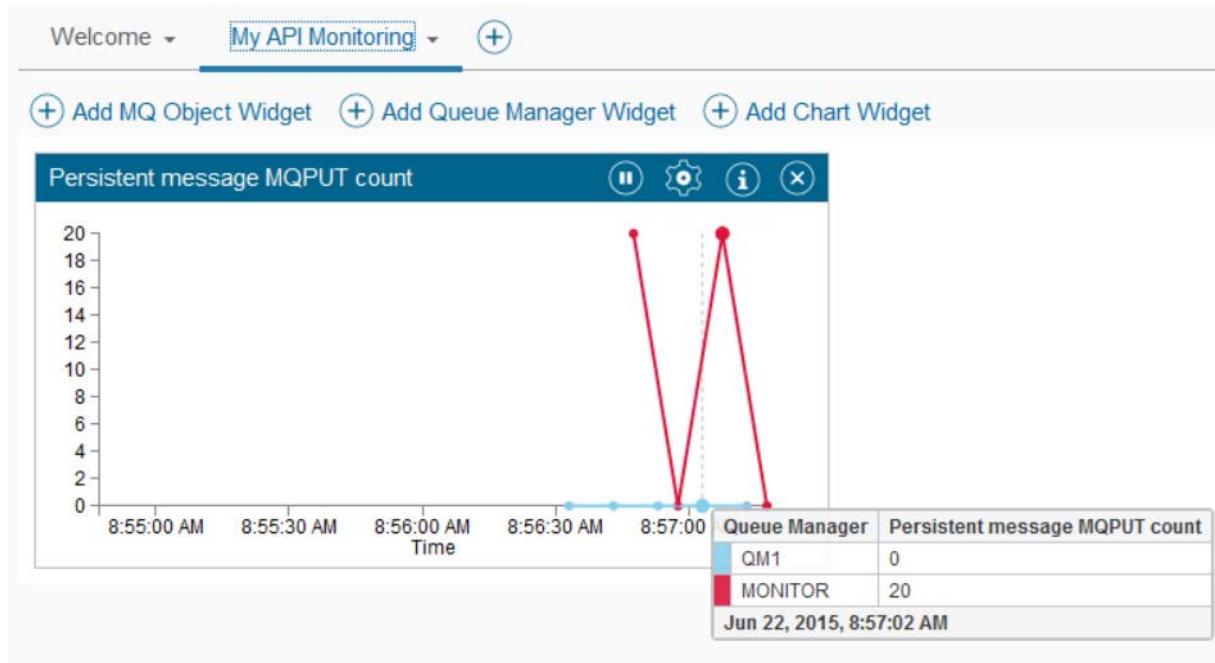


- \_\_\_ 56. Go back to the **Welcome** tab and use the method that you used previously to put some test messages onto the MONITOR queue.

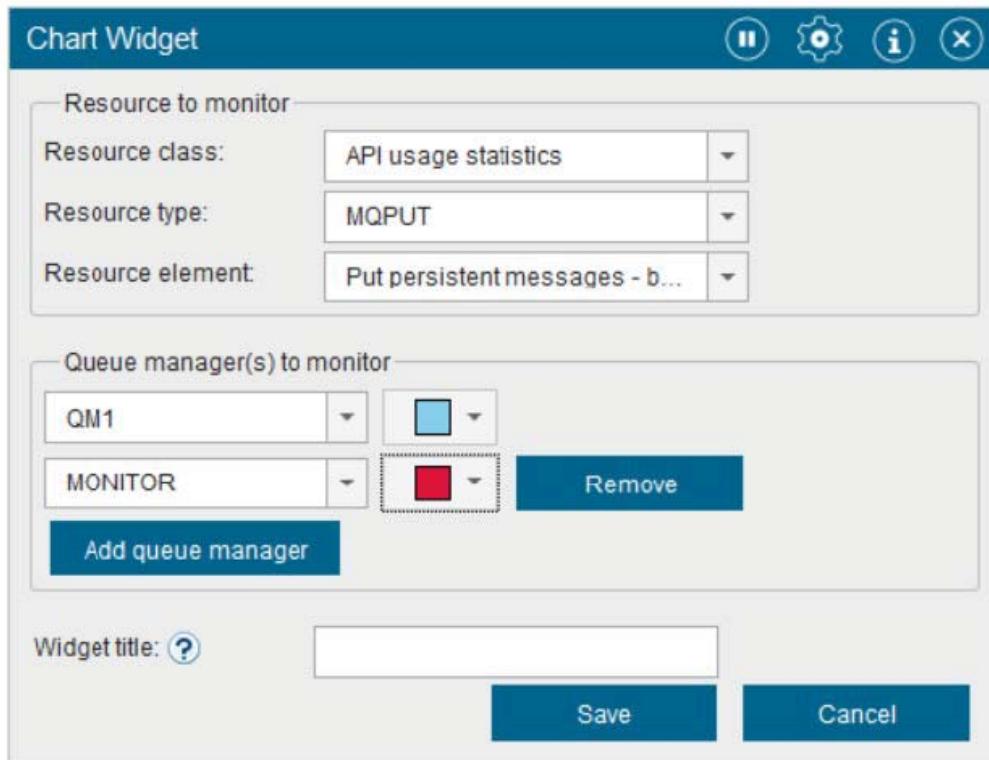
The screenshot shows a 'Put Message' dialog. It has a title 'Put Message' and a subtitle 'Enter message text to put on queue 'MONITOR''. There are two input fields: 'Message:' with the value 'More testing messages' and 'Count:' with the value '20'. At the bottom, there are 'Put' and 'Cancel' buttons, with 'Put' being highlighted with a red box.

- \_\_\_ 57. Put a few messages (as many or as few as you like, and the content of the messages is not important).
- \_\_\_ 58. Go back to the **My API Monitoring** tab.

- 59. As you can see in the following image, no activity took place for QM1 in the past collection interval, but you now see the activity for the MONITOR queue manager. Explore some more options available with the monitoring widgets. This time, you monitor the amount of data that is put onto the queues.



- \_\_\_ 60. Add another monitoring widget to the page. This time, select a resource element of **Put persistent messages – byte count**. Select both queue managers.



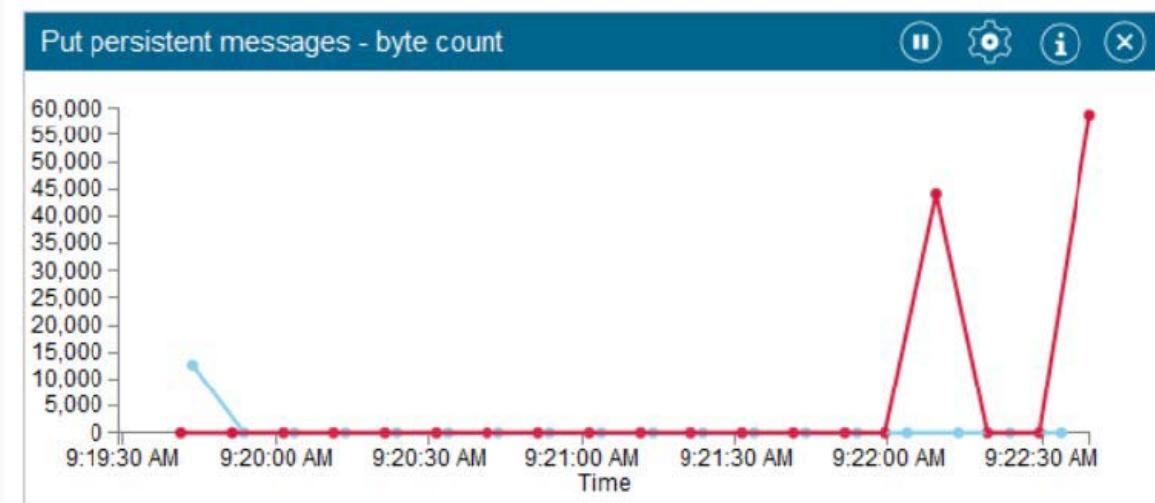
- \_\_\_ 61. Go back to the **Welcome** tab and put some more messages to the **MONITOR** queue.  
 \_\_\_ 62. Enter some more messages (enter a few, wait, enter a few, and continue – this shows the byte count over more than one collection interval).

- \_\_\_ 63. Using your preferred method, put some test messages to **TEST.IN** on **QM1**.

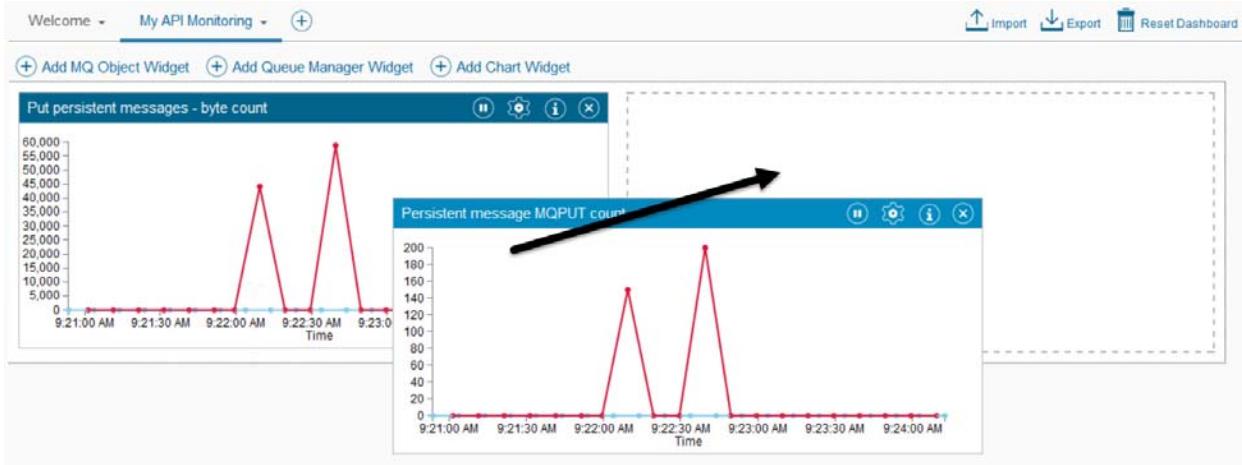
- \_\_\_ 64. Go back to the IBM MQ Console and have a look at the byte count widget.

As you can see in the figure below, the putting of messages for MONITOR starts, spans a couple of collection intervals, and then stops.

The byte count for QM1 climbs (and if you are fast enough, you might detect it before the next collection interval indicates that activity is stopped).



- \_\_\_ 65. You can easily rearrange the widgets to optimize the screen space.  
 \_\_\_ 66. Click the MQPUT count widget and drag it over to the right side of the screen. You see a dotted box where you can then drop the widget.



The next thing you do for this exercise is to add another tab to the dashboard, for resource monitoring. You are monitoring the disk and CPU usage in this tab.

- \_\_\_ 67. As you did previously, add another tab to the dashboard. Call this tab: My Resource Monitoring

\_\_\_ 68. Add a chart widget with the following settings:

- Resource class = Platform persistent data stores
- Resource type = Disk usage – running queue managers
- Resource element = Queue Manager file system – free space
- Add QM1 and MONITOR

Chart Widget

Resource to monitor

Resource class: Platform persistent data stores

Resource type: Disk usage - running queue ...

Resource element: Queue Manager file system - ...

Queue manager(s) to monitor

QM1

MONITOR

Add queue manager

Widget title: ?

Save Cancel

The screenshot shows the 'Chart Widget' configuration dialog. In the 'Resource to monitor' section, 'Platform persistent data stores' is selected for Resource class, 'Disk usage - running queue ...' for Resource type, and 'Queue Manager file system - ...' for Resource element. In the 'Queue manager(s) to monitor' section, 'QM1' and 'MONITOR' are listed. A green square icon is highlighted with a dashed selection box. Below the queue managers is a 'Remove' button and an 'Add queue manager' button. At the bottom, there is a 'Widget title:' field with a question mark icon, and 'Save' and 'Cancel' buttons.

\_\_\_ 69. Add another widget.

Chart Widget

Resource to monitor

Resource class: Platform central processing ...

Resource type: CPU performance - platform ...

Resource element: User CPU time percentage

Queue manager(s) to monitor

QM1

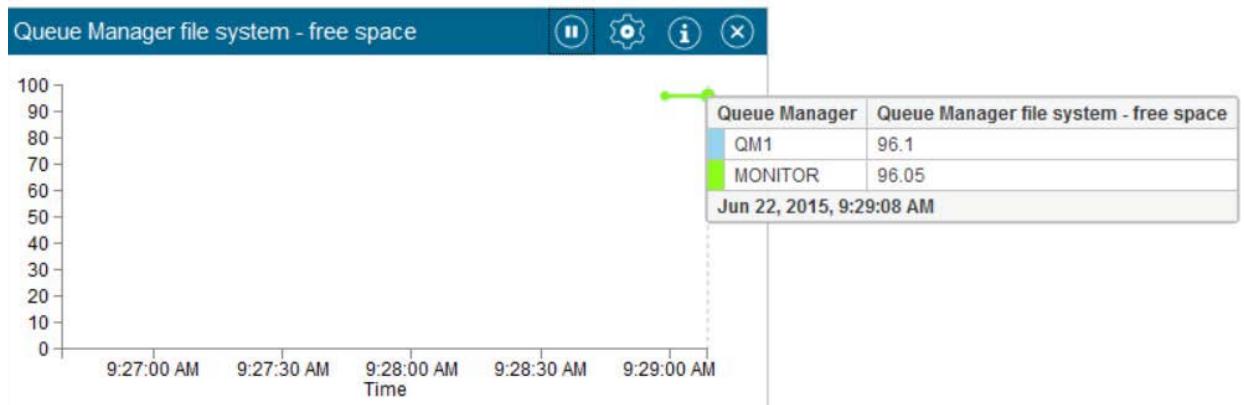
MONITOR

Add queue manager

Widget title: ?

Save Cancel

At the moment, you do not see much going on in either queue manager for change in disk usage or CPU.



As you saw in Exercise 1, some files and programs should be provided in the `perf` folder. These are again used for this part of the exercise. The applications are part of SupportPac IH03.

- \_\_\_ 70. Go back to the command window from earlier. Change to the `perf` directory.

```

Administrator: Command Prompt
03/04/2015 03:22 AM 2,490,368 rfhutilc.exe
03/06/2009 10:44 AM 603 test1.txt
 2 File(s) 2,490,971 bytes
 3 Dir(s) 30,472,073,216 bytes free

C:\MQ-POT\Tools\rfhutil\MQappliance\lab1>cd perf

C:\MQ-POT\Tools\rfhutil\MQappliance\lab1\perf>dir
Volume in drive C has no label.
Volume Serial Number is D8F7-B8C4

Directory of C:\MQ-POT\Tools\rfhutil\MQappliance\lab1\perf

03/19/2015 07:48 AM <DIR> .
03/19/2015 07:48 AM <DIR> ..
01/28/2015 03:22 PM 27 driver.cmd
01/28/2015 02:25 PM 29 measure.cmd
01/28/2015 03:42 PM 68,608 mqput2c.exe
01/28/2015 09:56 PM 61,440 mqtimes2c.exe
03/26/2015 04:00 PM 3,284 parmtst1.txt
03/06/2009 10:44 AM 603 test1.txt
 6 File(s) 133,991 bytes
 2 Dir(s) 30,472,073,216 bytes free

C:\MQ-POT\Tools\rfhutil\MQappliance\lab1\perf>_

```

- \_\_\_ 71. Open the `parmtst1.txt` parameters file in your favorite text editor, such as Notepad.  
 \_\_\_ 72. Change the **Qmgr** parameters to match the new MONITOR queue manager:  
`MONITOR.SVRCONN/TCP/10.0.0.1(1424)`.
- \_\_\_ 73. Change the `qname` parameter to: `MONITOR`

```

* Input parameters for MQPut2 program *
*
*
* name of the queue and queue manager
* to write messages to
*
qname=MONITOR
qmgr=MONITOR.SVRCONN/TCP/10.0.0.1(1424)
*qmgr=SYSTEM.DEF.SVRCONN/TCP/localhost(2415)
*qmgr=USER.SVRCONN/TCP/192.168.2.132(2414)
*
* user id and password to connect with
*
userID=testuser
password=passw0rd
*
```

- \_\_\_ 74. Change the msgcount to 1000 and change the qmax to 6000.

```

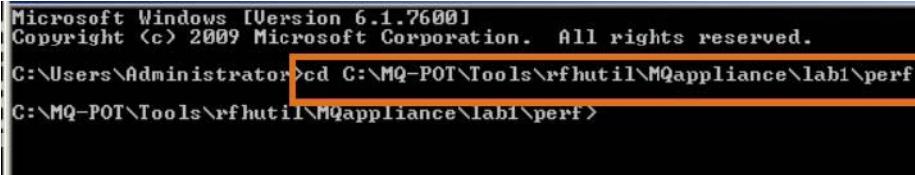
* total number of messages to be written
* the program will stop after this number of
* messages has been written
*
msqcount=1000
*
* desired qdepth for input queue
* the program will write messages until the queue depth
* is equal to the qmax parameter. When the queue depth
* reaches the desired depth, more messages will be written
* to bring the depth back to twice the desired value.
*
qdepth=300
qmax=6000

```

- \_\_\_ 75. Go to the bottom of the file and change the file in the [filelist] to: BigFile.xml

```
[filelist]
BigFile.xml
```

- \_\_\_ 76. Save the file (**Ctrl+S**).  
 \_\_\_ 77. Close the editor (Notepad) session.  
 \_\_\_ 78. Go back to the command window.



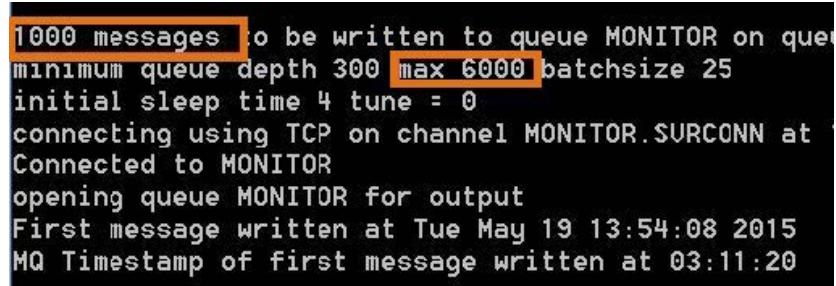
```

Microsoft Windows [Version 6.1.7601]
Copyright <c> 2009 Microsoft Corporation. All rights reserved.

C:\Users\Administrator>cd C:\MQ-POT\Tools\rfhutil\MQappliance\lab1\perf
C:\MQ-POT\Tools\rfhutil\MQappliance\lab1\perf>
```

- \_\_\_ 79. Execute the driver.cmd file.

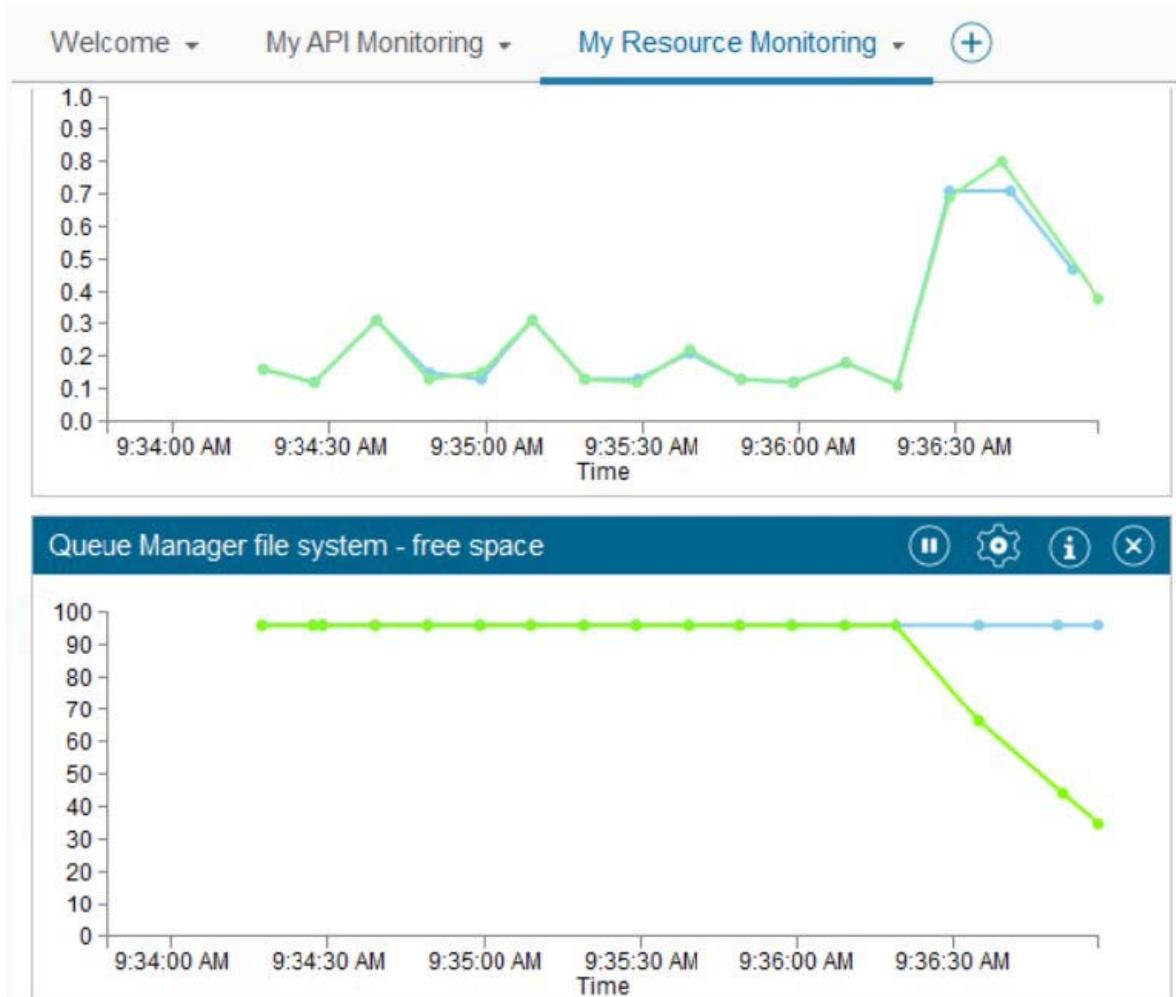
Notice that as soon as the program starts, the queue depth settings are as follows:



```

1000 messages to be written to queue MONITOR on queue
minimum queue depth 300 max 6000 batchsize 25
initial sleep time 4 tune = 0
connecting using TCP on channel MONITOR.SURCONN at ...
Connected to MONITOR
opening queue MONITOR for output
First message written at Tue May 19 13:54:08 2015
MQ Timestamp of first message written at 03:11:20
```

- \_\_\_ 80. Go to the IBM MQ Console and go to the **My Resource Monitoring** tab.



- \_\_\_ 81. Now you see a significant amount of change.  
 \_\_\_ 82. Go to the My API Monitoring tab, and you see significant change there too.  
 \_\_\_ 83. If you now go back to the command window, you see that the program ended successfully and that it put a large amount of data onto the queue and used a great deal of memory.

```
Total messages written 1000 out of 1000
Total elapsed time in seconds 63.994269
total bytes written 1983108000
total memory used 1983493
closing the queue
closing the inquiry queue
disconnecting from the queue manager
MQPUT2 program ended
```

- \_\_\_ 84. Go back to the console and refresh the queues widget for the MONITOR queue manager. Here you see the many messages that you just put on the queue (or more if you did not clear out messages from previous tests).

The screenshot shows a table titled "Queues on MONITOR". The table has three columns: "Name", "Queue type", and "Queue depth". There is one row for the queue "MONITOR", which is of type "Local". The "Queue depth" cell contains the value "1940", which is highlighted with an orange border. The top right corner of the table has icons for refresh, settings, information, and close. Below the table, it says "Total: 1 Selected: 1" and "Last updated: 4:31:33 AM".

| Name    | Queue type | Queue depth |
|---------|------------|-------------|
| MONITOR | Local      | 1940        |

Total: 1 Selected: 1      Last updated: 4:31:33 AM

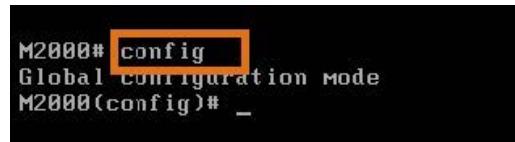
- \_\_\_ 85. You do not really want to take up all of this space on your disk, so use the widget to clear the messages from the queue.

## 4.2. Troubleshooting

In this exercise, you look at the logs that are available for troubleshooting. The IBM MQ Appliance has a set of logs similar to traditional MQ. In this section, you learn where they are stored on the IBM MQ Appliance and how to access them.

First look at where the IBM MQ error logs are stored.

- \_\_\_ 86. Exit from runmqsc and then exit from mqcli (these exits take you back to the M2000# prompt).
- \_\_\_ 87. Enter the config command to take you into configuration mode.



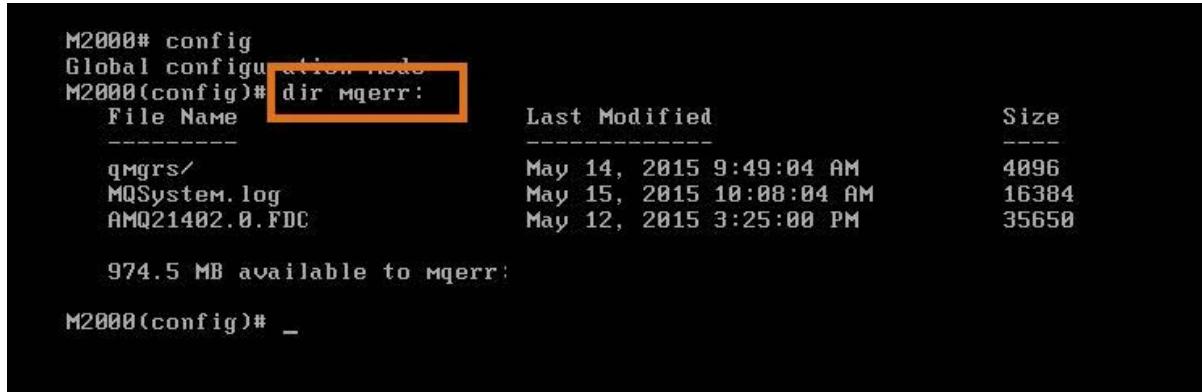
```
M2000# config
Global configuration mode
M2000(config)# _
```

Directory structures on the appliance are accessible in the form of URIs. A dedicated URI, mqerr, is used for accessing IBM MQ logs.

- \_\_\_ 88. Enter the following command (make sure that you put the colon at the end).

```
dir mqerr:
```

You see the structure of the log directories.



| File Name      | Last Modified            | Size  |
|----------------|--------------------------|-------|
| qmgrs/         | May 14, 2015 9:49:04 AM  | 4096  |
| MQSystem.log   | May 15, 2015 10:08:04 AM | 16384 |
| AMQ21402.0.FDC | May 12, 2015 3:25:00 PM  | 35650 |

```
974.5 MB available to mqerr:
M2000(config)# _
```

- \_\_\_ 89. Enter the following command to see the QM1 queue manager logs (these logs should be familiar to anyone who is familiar with IBM MQ).

```
dir mqerr:/qmgrs/QM1
```

| File Name    | Last Modified            | Size   |
|--------------|--------------------------|--------|
| AMQERR03.LOG | May 11, 2015 11:35:00 AM | 0      |
| AMQERR01.LOG | May 14, 2015 6:11:01 PM  | 215008 |
| AMQERR02.LOG | May 11, 2015 11:35:00 AM | 0      |

2905.0 MB available to mqerr:/qmgrs/QM1

- \_\_\_ 90. Exit configuration mode (`exit`).
- \_\_\_ 91. Go to the IBM MQ command-line interface (`mqcli`). You can list or view the system error logs, queue manager error logs, and first failure data captures (FFDCs) by using the `dspmqerr` command.

```
M2000(config)# exit
M2000# mqcli
M2000(mqcli)w_
```

- \_\_\_ 92. Enter:

```
help dspmqerr
```

This command lists the options available for viewing the logs.

```
M2000(mqcli)# help dspmqerr
Usage: dspmqerr [-f | -l | -m | -n | -s | -w] [-i : FileName]

-f File type: FDCs.
-l List files of specified type.
-m File type: Queue-manager error log.
-s File type: System error log.
-w File type: Web UI log.
M2000(mqcli)#

```

93. Look at the AMQERR01.LOG for QM1. Enter:

```
dspmqerr -m QM1 AMQERR01.LOG
```

The command is based on the UNIX less command. The less command provides controls for navigating the contents of a file, and you can use these controls when you view system error logs. Try the following tips:

- Use the arrow keys to scroll up and down the logs.
- Use the page, space, or return keys for simple scrolling.
- Enter **q** to exit at any time.
- Enter **h** to display full help while you view a log. The help lists further commands, for example, for searching for strings or jumping a set number of lines.

```
05/11/15 11:35:02 - Process(20465.4) User(mqsystem) Program(amqzmuc0)
Host((none)) Installation(MQAppliance)
URMF(8.0.0.2) QMgr(QM1)

AMQ6287: IBM MQ Appliance V8.0.0.2 (p800-A001-L150330.1).

EXPLANATION:
IBM MQ Appliance system information:
Host Info :- Linux 2.6.32-431.29.2.dp_800.15.x86_64 (MQ (64-bit))
Installation :- /opt/mqm (MQAppliance)
Version :- 8.0.0.2 (p800-A001-L150330.1)
ACTION:
None.

05/11/15 11:35:02 - Process(20465.4) User(mqsystem) Program(amqzmuc0)
Host((none)) Installation(MQAppliance)
URMF(8.0.0.2) QMgr(QM1)

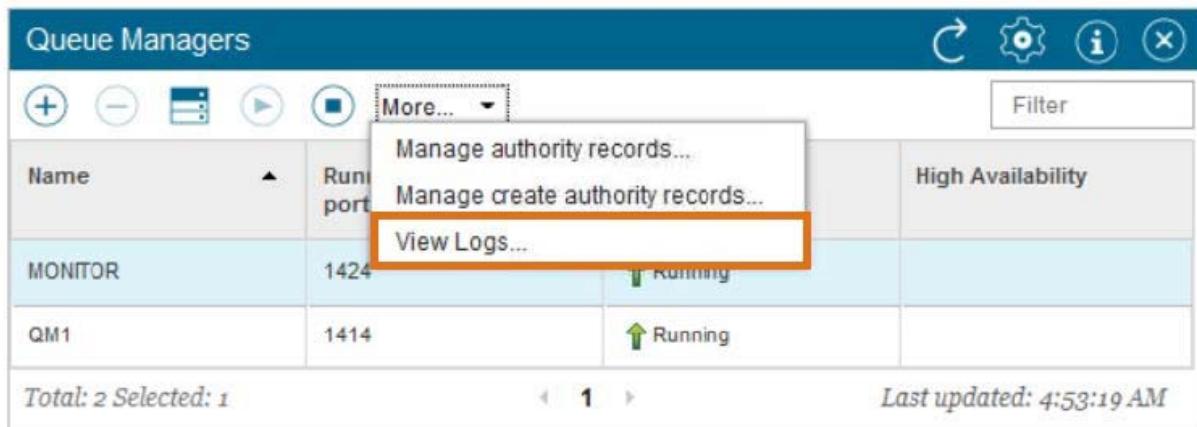
AMQ5051: The queue manager task 'LOGGER-IO' has started.

EXPLANATION:
The critical utility task manager has started the LOGGER-IO task. This task has
now started 1 times.
ACTION:
/var/mqm/vols/QM1/qmgr/QM1/errors/AMQERR01.LOG
```

- \_\_\_ 94. Enter `dspmqerr -s` to see the system log.

```
05/11/15 06:51:17 root mqdpinit 11407.1 AMQ6605-I: Verifying kernel settings.
05/11/15 06:51:18 root mqdpinit 11407.1 AMQ6688-I: Initializing Replicated HA.
05/11/15 06:51:44 root mqdpinit 11407.1 AMQ6644-I: Initializing queue managers.
05/11/15 06:52:23 root mqdpinit 11407.1 AMQ6645-I: The MQ Daemon has completed initialization.
05/11/15 06:52:23 root mqdpinit 11407.1 AMQ6602-I: The IBM MQ Appliance subsystem is active. Queue Managers running [0].
05/11/15 07:22:23 root mqdpinit 11407.1 AMQ6602-I: The IBM MQ Appliance subsystem is active. Queue Managers running [0].
05/11/15 07:23:35 mqsystem mqdpcli 20385.1 AMQ6607-I: The IBM MQ Appliance CLI has started for user admin from address .
05/11/15 07:29:55 mqsystem mqdpcli 20385.1 AMQ6608-I: The IBM MQ Appliance CLI has ended for user admin from address .
05/11/15 11:30:00 root mqdpinit 11407.1 AMQ6602-I: The IBM MQ Appliance subsystem is active. Queue Managers running [0].
05/11/15 11:34:18 mqsystem mqdpcli 20438.1 AMQ6607-I: The IBM MQ Appliance CLI has started for user admin from address .
05/11/15 15:18:27 mqsystem mqdpcli 20438.1 AMQ6608-I: The IBM MQ Appliance CLI has ended for user admin from address .
05/11/15 17:37:10 root mqdpinit 11416.1 AMQ6605-I: Verifying kernel settings.
05/11/15 17:37:10 root mqdpinit 11416.1 AMQ6688-I: Initializing Replicated HA.
05/11/15 17:37:52 root mqdpinit 11416.1 AMQ6644-I: Initializing queue managers.
05/11/15 17:37:53 root mqdpinit 11416.1 AMQ6643-I: Mounted filesystem QM-QM1 for queue Manager QM1.
/var/Mqm/errors/MQSystem.log
```

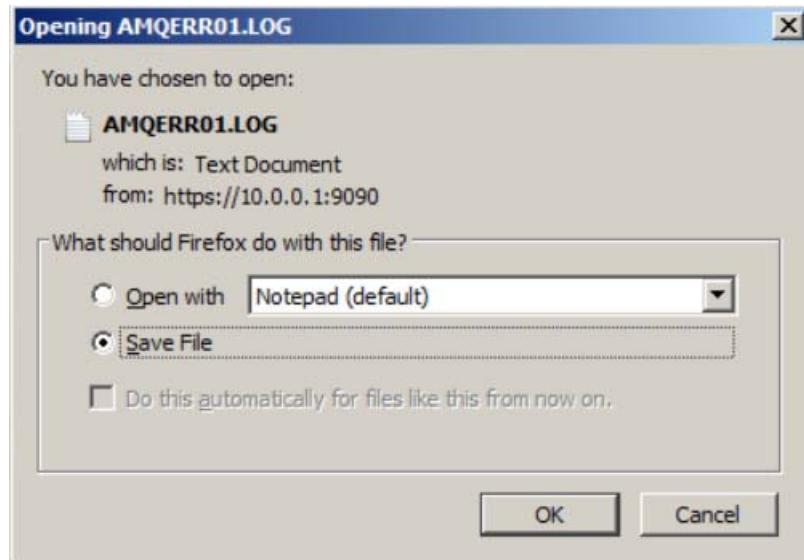
- \_\_\_ 95. It is possible to copy the error logs from the IBM MQ Appliance. This copying is done from the configuration mode (the config prompt) by using the `copy` command or from the IBM MQ Console.
- \_\_\_ 96. Look at the options available from the console.
- \_\_\_ 97. If you do not already have one, add a Queue Managers widget.
- \_\_\_ 98. Select a queue manager and click the **More** list box.
- \_\_\_ 99. Select **View Logs**.



- 100. You now see the `AMQERRxx.log` files for the queue manager. From here, you are able to download the logs. Highlight the **AMQERR01.LOG** file and click the download icon.

The screenshot shows a web-based interface titled "Queue Manager Logs for MONITOR". At the top right are refresh and information icons. A "Filter" button is on the right. Below is a table with two columns: "Name" and "Size". The first row, "AMQERR01.LOG", is highlighted with a dashed blue border and has a download icon (a downward arrow) in its "Name" column, which is also highlighted with an orange box. The second row is "AMQERR02.LOG" with "0.0 Bytes" size. The third row is "AMQERR03.LOG" with "0.0 Bytes" size. At the bottom left is a status bar with "Total: 3 Selected: 1". In the center is a page number "1" with arrows on either side. At the bottom right is a timestamp "Last updated: 4:55:42 AM". A large "Close" button is at the bottom right of the main content area.

- 101. You now get a dialog box that asks you to save or open the file (you choose to save the file so that you can look at it later).



- \_\_\_ 102.Take a few minutes to have a look at the log (open the downloaded file by using Notepad++).

```
06/22/2015 09:32:16 AM - Process(30544.4) User(mqsystem) Program(amqzmuc0)
| | |
| | Host(MQAppl1) Installation(MQAppliance)
| | VRMF(8.0.0.3) QMgr(MONITOR)
|
AMQ6287: IBM MQ Appliance V8.0.0.3 (p800-003-150612).

EXPLANATION:
IBM MQ Appliance system information:
Host Info :- Linux 2.6.32-431.29.2.dp_800.15.x86_64 (MQ (64-bit)
Installation :- /opt/mqm (MQAppliance)
Version :- 8.0.0.3 (p800-003-150612)
ACTION:
None.

06/22/2015 09:32:16 AM - Process(30544.4) User(mqsystem) Program(amqzmuc0)
| | |
| | Host(MQAppl1) Installation(MQAppliance)
| | VRMF(8.0.0.3) QMgr(MONITOR)
|
AMQ5051: The queue manager task 'LOGGER-IO' has started.

EXPLANATION:
The critical utility task manager has started the LOGGER-IO task. This task has
now started 1 times.
ACTION:
None.
```

- \_\_\_ 103.You can also run `strmqtrc` (from the command-line interface) and after the `endmqtrc`, the trace files (`AMQppppp.qq.TRC`) can also be copied from the IBM MQ Appliance.

## End of exercise

## Exercise review and wrap-up

In this exercise, you explored some of the options available for monitoring the IBM MQ Appliance by using a combination of command-line and reporting widgets in the IBM MQ Console.

# Exercise 5. Security setup

## Estimated time

00:45

## Overview

In this exercise, you explore the unique security aspects of the IBM MQ Appliance and compare them to a standard IBM MQ software installation. To successfully complete this exercise, you need to be familiar with basic IBM MQ security functions.

## Objectives

After completing this exercise, you should be able to:

- Set up security on the IBM MQ Appliance
- Implement SSL/TLS protection of channels between queue managers on separate platforms

## Introduction

The lab environment consists of a single IBM MQ Appliance virtual image (MQAppl1) and a Windows environment to do console operations and testing and to demonstrate SSL/TLS protection of channels between queue managers on a separate platform.

## Requirements

This exercise assumes that Exercise 1 is completed.

For this exercise, you should use the same environment that you created for Exercise 1. The virtual appliance that you use for this exercise is MQAppl1. If using VMware, you should be using the **MQAppl1** or **MAQAppl1 - Lab1 - Solution** VM and the **ZM051\_1.0-WS2008**. You must suspend or shut down all other VMs.

The VMware environment is created, and both VM images are started. **Note:** The starting point for this exercise reflects the completion of **Exercise 1 – Getting Started with the IBM MQ Appliance**. You should have the exercise guide for Exercise 1 on hand in case you need to refer to steps that are referenced within this exercise.

Ensure that the clocks on both VM images are set to the current date and local time (required for SSL/TLS certificate generation and use). For the IBM MQ Appliance, you can set the clock by entering config mode and use the `clock yyyy-mm-dd` and `clock hh:mm:ss` to set if necessary. For the Windows VM, use the date-time icon in the system tray to reset, if necessary.

Verify that the IP address for the Windows image is 10.0.0.10 and for the Appliance image is 10.0.0.3. Otherwise, all references to IP addresses and to the provided mqsc scripts must be edited to reflect the proper addresses.

## Exercise 5. Security setup

Steps 56 – 74 are for your reference. You do not do these steps in the hands-on exercise.

## Exercise instructions

### Overview of security

Managing security of the IBM MQ Appliance can be considered from two perspectives. The first is to identify the users that are authorized to access the Appliance and associated IBM MQ resources. The second is to configure security for IBM MQ channel connections to the Appliance.

### User security

The IBM MQ Appliance has two types of users: *appliance* users and *messaging* users. Appliance users are users that can configure and administer the Appliance and IBM MQ resources. Messaging users are users that can operate on messaging resources.

- **Appliance users** can log in locally to the Appliance and modify all appliance settings, including configuration of IBM MQ queue managers. Appliance users are created by using the Appliance command-line interface or the **Manage Appliance** section of the IBM MQ Console. Appliance users are stored in the appliance's internal user store.
- **Messaging users** can connect to queue managers for typical IBM MQ functions such as PUTs and GETs of messages. They can be authorized to manage some aspects of queue managers by using tools such as the IBM MQ Explorer or the `rwmqsc` command shell. Messaging users are created by using user administration commands.

Messaging users can be stored in the appliance's internal user store, or in an external LDAP repository. (The internal user store for messaging users is separate from the store that is used for Appliance users.) The scalability of the internal store is limited, so in situations where many messaging users are required an external LDAP repository would provide better performance.

### Connection security

- **Securing IBM MQ Appliance Connections**

The Appliance is delivered in a locked-down state. All of the network ports and also the IBM MQ Console are disabled. As part of the initial configuration of the device, the installer must enable each of the network ports that are going to be used. The installer must also configure the IBM MQ Console to enable access from one or more of the network connections.

Configuration of connection security for the Appliance and the IBM MQ Console was enabled as part of **Exercise 1 – Getting Started with the IBM MQ Appliance**.

- **Securing IBM MQ Channel Connections**

Connection security for each of the queue managers that were configured on the Appliance must also be considered. For this exercise, you review the required steps to enable SSL/TLS security on SENDER and RECEIVER channels. This security is to protect messaging traffic between queue managers that are hosted on the Appliance and queue managers that are hosted on remote platforms.

## 5.1. Securing access to the IBM MQ Appliance

Since Exercise 1 covered the initial tasks that were required to enable connections to the Appliance, you do not repeat those steps in this exercise. Instead, you review the steps that are required to create another IBM MQ Appliance user and group and also to grant specific privileges to do a subset of administrative tasks.

- \_\_\_ 1. Start a web browser session in the Windows VM image.
- \_\_\_ 2. Navigate to `https://10.0.0.1:9090`. If you receive any warnings, allow the exception and continue.
- \_\_\_ 3. You now see the IBM MQ Console login screen.

IBM MQ Appliance MQ00.8.0.0.3

MQ00 console at 192.168.1.7:9090

User name:

Password:

Login

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- \_\_\_ 4. Enter `admin` as the user name.
- \_\_\_ 5. Enter `passw0rd` (or whatever you chose earlier) as the password.

6. You are now logged in to the IBM MQ Console.

The screenshot shows the IBM MQ Appliance console at 10.0.0.1. At the top, there are tabs for 'MQAppl1' and 'MQAppl2'. The main title is 'IBM MQ Appliance | MQ00 console at 10.0.0.1'. On the right, it shows 'admin' and the IBM logo. Below the title, there are links for 'Get started', 'Manage Appliance', 'MQ Console', 'Save configuration', 'Export configuration', and 'Import configuration'. A 'Get started' section contains a welcome message and two main buttons: 'Manage Appliance' (with a gear icon) and 'MQ Console' (with a play button icon). Each button has a detailed description below it: 'Manage the appliance configuration, network and user access, and the network environment.' and 'Create and manage queue managers on the appliance.' respectively, each with a 'Learn more' link.

7. Click the **Manage Appliance** menu and select the **User access** menu item.

This screenshot shows the 'Manage Appliance' menu open, with a red arrow pointing to the 'User access' option, which is highlighted with a red border. The background shows the 'Get started' section of the console.

## Exercise 5. Security setup

8. A list of the currently defined users is displayed. Notice that the default **admin** account is listed and the user account that was created in Exercise 1 to enable resetting of passwords. The Status column indicates that both users are currently enabled.

The screenshot shows the 'User Account' section of the MQ00 console. On the left, a sidebar titled 'User access' has 'User Account' selected. The main area is titled 'User Account' and contains a table with three rows:

|                          | Name    | Status | Comment                   |
|--------------------------|---------|--------|---------------------------|
| <input type="checkbox"/> | admin   | up     | Administrator             |
| <input type="checkbox"/> | mqadmin | up     | Created by startup script |

At the top right of the table are buttons for 'New...', 'Edit', and 'Delete'.

Both of the accounts that are listed have **Privileged** access rights. That gives these users full access to all capabilities of the Appliance. To create an account with a restricted set of permissions, you should first create a **User Group** that has the intended permissions. As soon as that group is created, you can assign a **User Account** to be a member of that group.

To create a group that contains a subset of privileges, start by selecting the **User Group** menu item from the **User access** list, and then click **New**.

The screenshot shows the 'User Group' section of the MQ00 console. On the left, a sidebar titled 'User access' has 'User Group' selected. The main area is titled 'User Group' and contains a table with one row and a message below it:

| Name | Status | Comment |
|------|--------|---------|
|      |        |         |

Below the table, the message 'No items to display' is visible. At the top right of the table are buttons for 'New...', 'Edit', and 'Delete'.

- \_\_\_ 9. Enter LAB5GROUP in the **Name** text box and Lab 5 Group in the **Comments** text box.

The screenshot shows the 'User Group' configuration interface. On the left, there's a sidebar with a 'User Group' section containing a green checkmark icon and the text 'LAB5GROUP \*'. The main area has a title 'User Group' at the top. Below it, under the 'Main' tab, there are several fields: 'Name' (containing 'LAB5GROUP'), 'Enable administrative state' (with a checked checkbox), 'Comments' (containing 'Lab 5 Group'), and an 'Access profile' section. The 'Access profile' section contains a text input field with the value '\*/\*/\*?Access=r', a 'Build' button, and a delete button. There are also 'Add' and 'CLI command groups' buttons. At the bottom right are 'Apply' and 'Cancel' buttons.

- \_\_\_ 10. The default settings for a new **User Group** enable a member of the group to log in to the IBM MQ Appliance user interfaces, but not administer any of the Appliance's resources.

This screenshot is identical to the one above, showing the 'User Group' configuration interface. The 'Main' tab is selected, and the 'Access profile' section is highlighted with a red box. The 'Access profile' section contains the same fields as the first screenshot: an input field with '\*/\*/\*?Access=r', a 'Build' button, and a delete button. The 'Add' and 'CLI command groups' buttons are also present. The 'Apply' and 'Cancel' buttons are at the bottom right.

- \_\_ 11. Perform the following steps to enable a member of a new **User Group** to do some Appliance-related tasks.

- \_\_ a. Click the delete icon next to the default access profile.



- \_\_ b. Expand the CLI command groups section and click **Add**.



- \_\_ c. Click the list box to display the list of available command groups. Select **System** from the list and click **Apply**.

User Group

User Group  
LAB5GROUP \*

Comments: Lab 5 Group

Access profile: System

CLI command groups

Command group: System

Apply Cancel

## Exercise 5. Security setup

- \_\_\_ d. Save the new group by clicking the **Save configuration** link at the top of the window.

The screenshot shows the 'User Group' configuration page in the MQ00 console. The left sidebar has 'User access' with 'User Account' selected. The main area shows a table with one row: LAB5GROUP, status up, comment 'Lab 5 Group'. The top right has 'Save configuration' (highlighted with a red box), 'Export configuration', and 'Import configuration'.

| Name      | Status | Comment     |
|-----------|--------|-------------|
| LAB5GROUP | up     | Lab 5 Group |

- \_\_\_ 12. Perform the following steps to create a **User Account** that uses the new group to do authorized Appliance-related tasks.
- \_\_\_ a. Select the **User Account** menu item that is located under the **User access** list, and then click **New...**.

The screenshot shows the 'User Account' configuration page in the MQ00 console. The left sidebar has 'User access' with 'User Account' selected (highlighted with a red box). The main area shows a table with two rows: admin (status up, comment 'Administrator') and mqadmin (status up, comment 'Created by startup script'). The top right has 'Save configuration', 'Export configuration', and 'Import configuration'.

| Name    | Status | Comment                   |
|---------|--------|---------------------------|
| admin   | up     | Administrator             |
| mqadmin | up     | Created by startup script |

- b. Enter the following information as shown in these screen captures. Notice that the **User group** section does not appear until after you select the **Access level** entry of **Group defined**. Click **Apply** when all fields are entered.

- **Name:** LAB5USER
- **Enable administrative state:** Leave checked to enable this user.
- **Comments:** Lab 5 User
- **Password:** passw0rd
- **Access level:** Group defined
- **User group:** LAB5GROUP

### User Account

The screenshot shows the 'User Account' configuration dialog. On the left, there's a sidebar with a tree view where 'User Account LAB5USER \*' is expanded, and 'User Group LAB5GROUP' is also listed. The main area has a 'Main' section with the following fields:

- \* Name: LAB5USER (highlighted with a red border)
- Enable administrative state:
- Comments: Lab 5 User (highlighted with a red border)
- \* Password:  (highlighted with a red border)
- \* Access level:  (highlighted with a red border)
- \* User group:

At the bottom right are 'Apply' and 'Cancel' buttons.

### User Account

This screenshot shows the same 'User Account' dialog after the 'Access level' was set to 'Group defined'. Now, the 'User group' field is highlighted with a red border, indicating it is a required field. The sidebar still shows the expanded 'User Account' node and the collapsed 'User Group' node.

The main area contains the following fields:

- Comments: Lab 5 User
- \* Password:
- \* Access level:
- \* User group:  (highlighted with a red border)

Below the user group field, there's a section for 'Domain restriction (deprecated)' with an 'Add' button. At the bottom right are 'Apply' and 'Cancel' buttons.

- c. Save the new **User Account** by clicking the **Save configuration** link at the top of the window.

The screenshot shows the 'User Account' section of the IBM MQ Appliance console. On the left, there's a sidebar with 'User access' options: 'User Account' (which is selected and highlighted in blue) and 'User Group'. The main area is titled 'User Account' and contains a table with three rows of user information:

|                          | Name     | Status | Comment                   |
|--------------------------|----------|--------|---------------------------|
| <input type="checkbox"/> | admin    | up     | Administrator             |
| <input type="checkbox"/> | LAB5USER | up     | Lab 5 User                |
| <input type="checkbox"/> | mqadmin  | up     | Created by startup script |

At the top right of the main area, there are buttons for 'New...', 'Edit', and 'Delete'. At the very top of the page, there are navigation links for 'Get started', 'Manage Appliance', 'MQ Console', and 'Save configuration' (which is highlighted with a red box), along with 'Export configuration' and 'Import configuration'.

- 13. Verify that the `LAB5USER` user is created and has some limited access to the IBM MQ Appliance resources by completing the following steps.
- Log out of the IBM MQ Appliance Console from all browser windows.
  - Log in to the IBM MQ Appliance Console with the `LAB5USER` user ID. (Note: You might be prompted to change your password.) Notice that `LAB5USER` has access to only a subset of tasks as compared to the `admin` user.

The screenshot shows the welcome page of the IBM MQ Appliance. At the top, it says 'IBM MQ Appliance | MQ00 console at 192.168.1.7' and 'lab5user'. The 'Manage Appliance' button is highlighted with a red box. Below the header, there's a 'Get started' section with a welcome message and a 'Save configuration' button. The main content area has two main sections: 'Manage Appliance' (with a gear icon) and 'MQ Console' (with a grid icon). Each section has a brief description and a 'Learn more' link.

| Manage Appliance                                                                                                        | MQ Console                                                                       |
|-------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| Manage the appliance configuration, network and user access, and the network environment.<br><a href="#">Learn more</a> | Create and manage queue managers on the appliance.<br><a href="#">Learn more</a> |

- 14. Log out of the web interface.

## Securing access to IBM MQ resources

- **Messaging Users**

The IBM MQ Appliance is based on IBM MQ V8.0.0.4 with several modifications to enable support of

an Appliance form factor. One modification to IBM MQ is the management of messaging users that are allowed to access IBM MQ objects.

Previous exercises demonstrated how to manage the Appliance's objects by using user IDs that are defined in the *appliance* user store. To support a separation of responsibilities for management of IBM MQ resources from Appliance resources, the Appliance provides a separate user store for messaging users only. The users that are defined in this message store can manage and access only IBM MQ resources. They do not have access to any of the Appliance resources.

By default, user IDs for messaging users are stored in the internal user store. The Appliance also supports accessing user IDs that are stored in an external LDAP repository. The scalability of the internal store is limited, so for situations where many messaging users exist, an external LDAP repository might provide better performance.

- **SSL/TLS channel security**

The IBM MQ Appliance supports the configuration of SSL/TLS protection for message channels. The concepts for managing certificates and keystores for queue managers that are hosted on the Appliance are similar to traditional IBM MQ. However, since the Appliance does not enable traditional command-line or file system access, new procedures must be followed to configure this support.

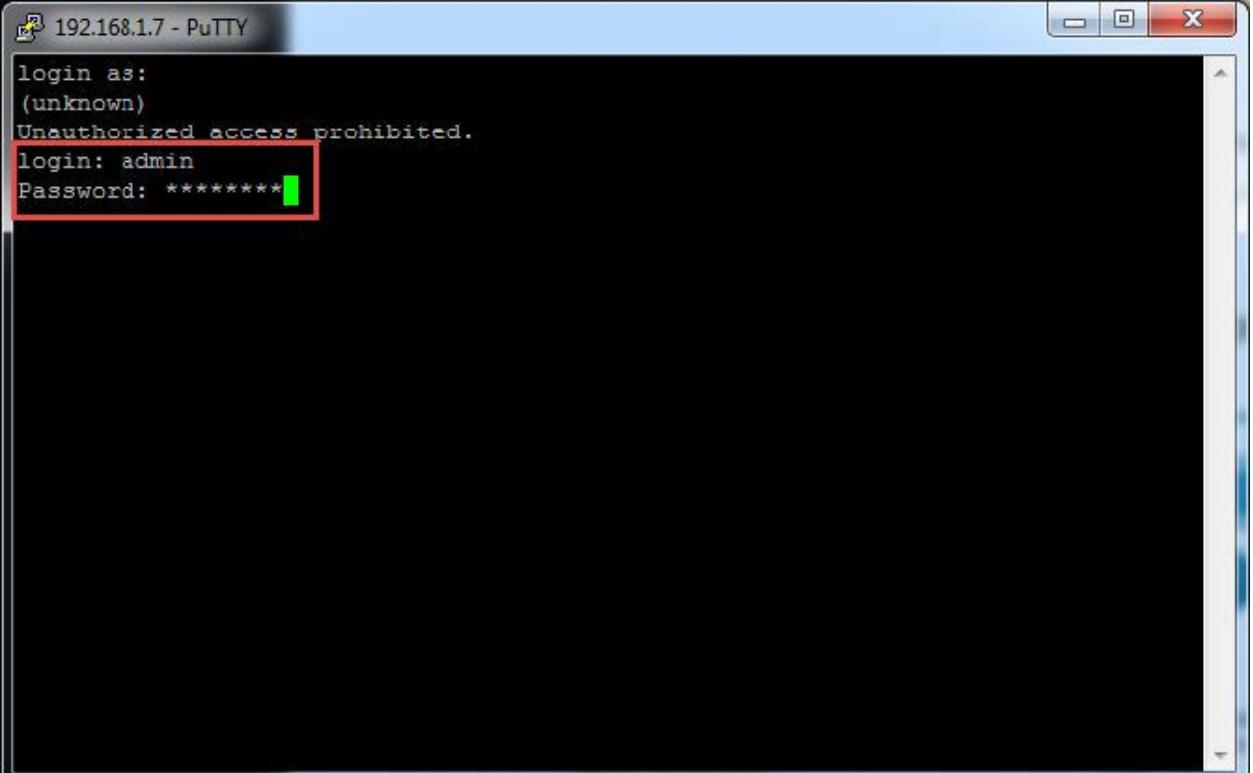
## 5.2. Exploring the IBM MQ Appliance internal store for messaging users

Access to the Appliance's internal user store is supported through a command-line interface only. You can use the Appliance's console window for entering commands, or if you prefer, a copy of PuTTY is provided in the `C:\Lab05\Commands` directory. (Hint: Use PuTTY. It is much easier to use.)

If you choose to use the IBM MQ Appliance console window, you notice that no scroll bars are displayed for data. To view information that might scroll off the screen, use the following keyboard combinations:

- **Shift+PgUp** to scroll up
- **Shift+PgDn** to scroll down

\_\_\_ 15. Log in to the command-line interface by using the `admin` user ID and associated password.



The screenshot shows a PuTTY session titled "192.168.1.7 - PuTTY". The terminal window displays the following text:  
login as:  
(unknown)  
Unauthorized access prohibited.  
login: admin  
Password: \*\*\*\*\*

A red rectangular box highlights the password entry field, which contains the masked password "\*\*\*\*\*".

\_\_\_ 16. Run the `mqcli` command to enter IBM MQ command-line mode.



The screenshot shows a command-line interface with the following prompt:  
M2000# mqcli  
M2000(mqcli)# \_

- 17. With the `mqcli` command prompt, an *appliance* user can configure IBM MQ resources. Use the `help` command to see a list of command categories that the Appliance supports.

```
M2000(mqcli)# help
The following help topics are available. Type help <topic name> for more
information.

mq General MQ administration commands
cert Channel security certificate administration commands
diag MQ problem diagnosis commands
ha High availability administration commands
user Messaging user and group administration
M2000(mqcli)#

```

- 18. Your goal in this section of the exercise is to create *messaging* users. To see the list of available commands to create messaging users and groups, use the `help user` command.

```
M2000(mqcli)# help user
The following user and group commands are available.

groupcreate Creates a Messaging group in the internal user store
groupdelete Deletes a Messaging group in the internal user store
grouplist Lists the Messaging groups in the internal user store

usercreate Creates a Messaging user in the internal user store
userdelete Deletes a Messaging user in the internal user store
userlist Lists the Messaging users in the internal user store
usermodify Modifies a Messaging user in the internal user store

userbackup Backs up the internal user store
userrestore Restores the internal user store
M2000(mqcli)#

```

- 19. In Exercise 1, you created a messaging user to test the ability to PUT messages to the **TEST.IN** queue on **QM1**. Enter the following command to display a list of messaging users that are defined to the Appliance: `userlist`

```
M2000(mqcli)# userlist
testuser
M2000(mqcli)#

```

- 20. Notice that a single user that is named `testuser` is listed. To display details of this user, enter the following command: `userlist -u testuser`

```
M2000(mqcli)# userlist -u testuser
Userid: testuser Grcups: users mqm
Description:

M2000(mqcli)#

```

- 21. As you can see, `testuser` is a member of the `mqm` group. Just like IBM MQ, being a member of the `mqm` group gives `testuser` full access to all resources in a queue manager. You want to create a new user and group that does not have full access.

- \_\_\_ 22. Create a group for messaging users by entering the following command:

```
groupcreate -g newgroup
```

```
M2000(mqcli)# groupcreate -g newgroup
M2000(mqcli)# _
```

- \_\_\_ 23. List all of the messaging groups that are now defined to the Appliance by entering the following command: grouplist

```
M2000(mqcli)# grouplist
mqm : testuser
users : testuser
newgroup :

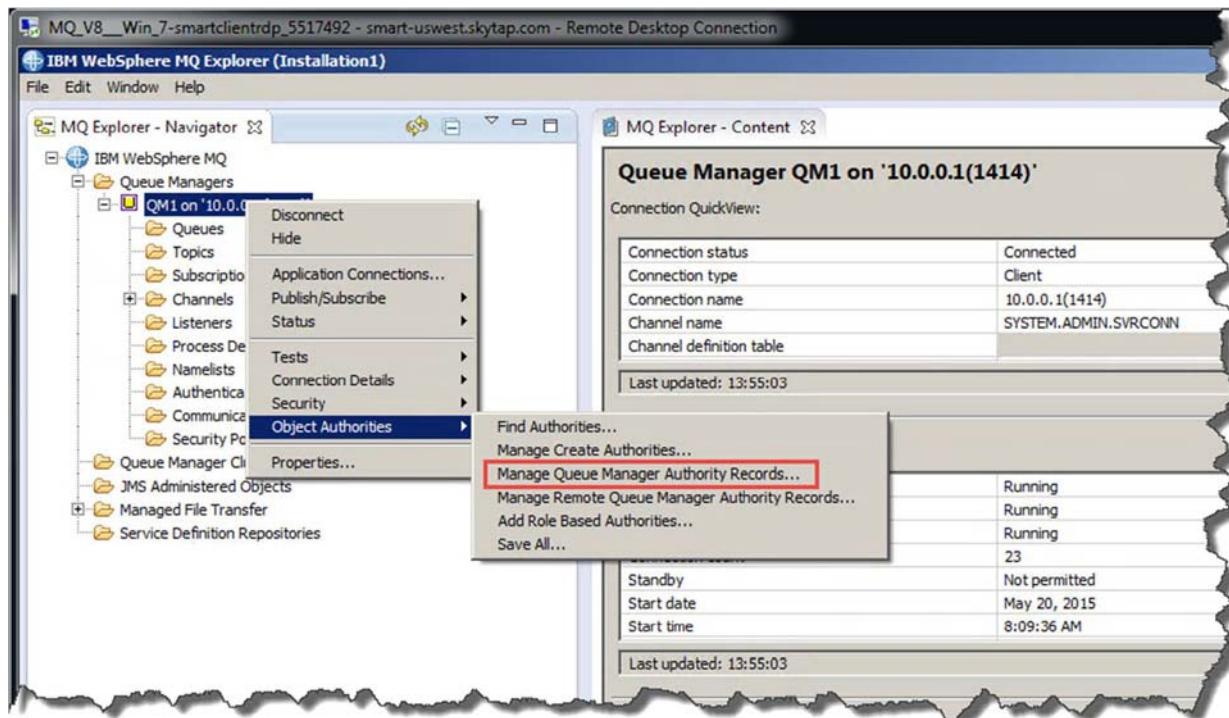
M2000(mqcli)# _
```

- \_\_\_ 24. Now create a new user by entering the following command:

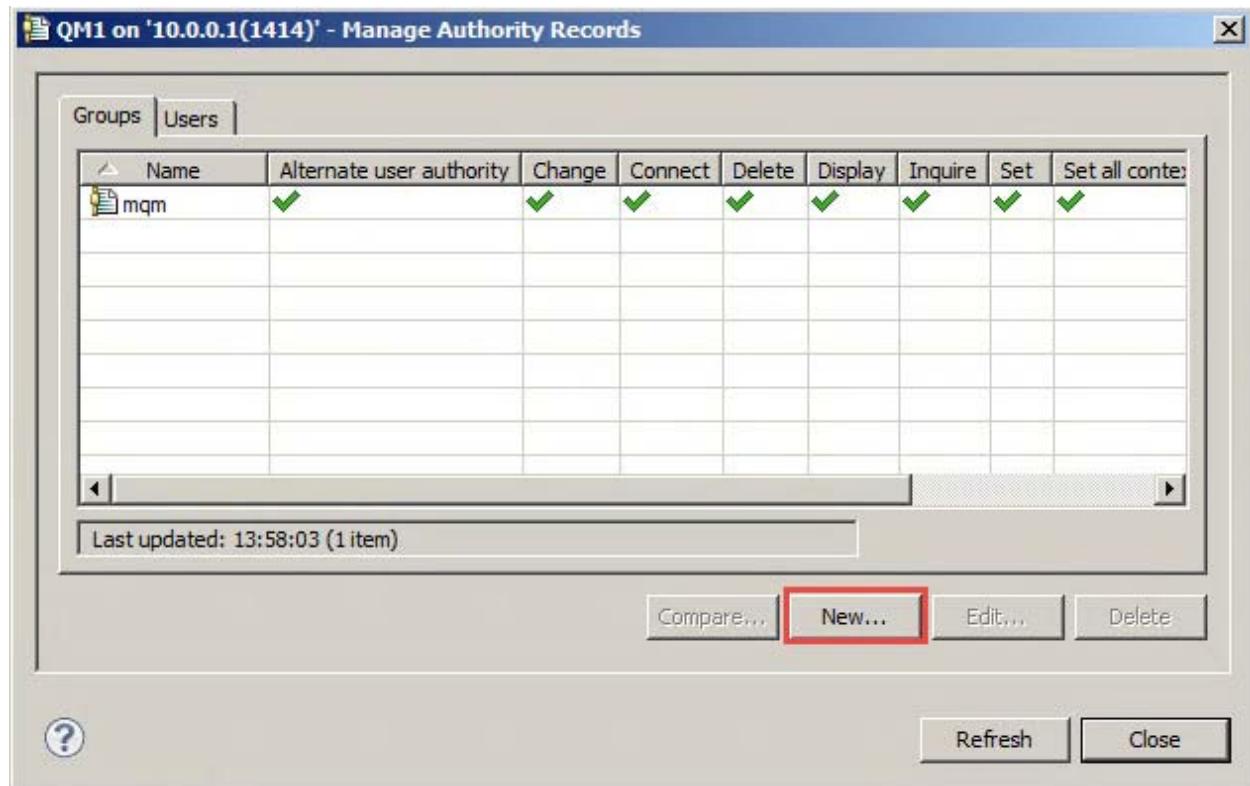
```
usercreate -u newuser -d "New user for Lab 5" -g newgroup -p passw0rd
```

```
M2000(mqcli)# usercreate -u newuser -d "New user for lab 5" -g newgroup -p passw
ord
M2000(mqcli)# ...
```

25. Now that you created a new user, you need to grant permissions for that user to connect to the queue manager and access various IBM MQ resources. Switch to the Windows image and open the IBM MQ Explorer. Connect to the **QM1** queue manager, if necessary. Right-click **QM1** and select the **Object authorities > Manage Queue Manager Authority Records** menu item.

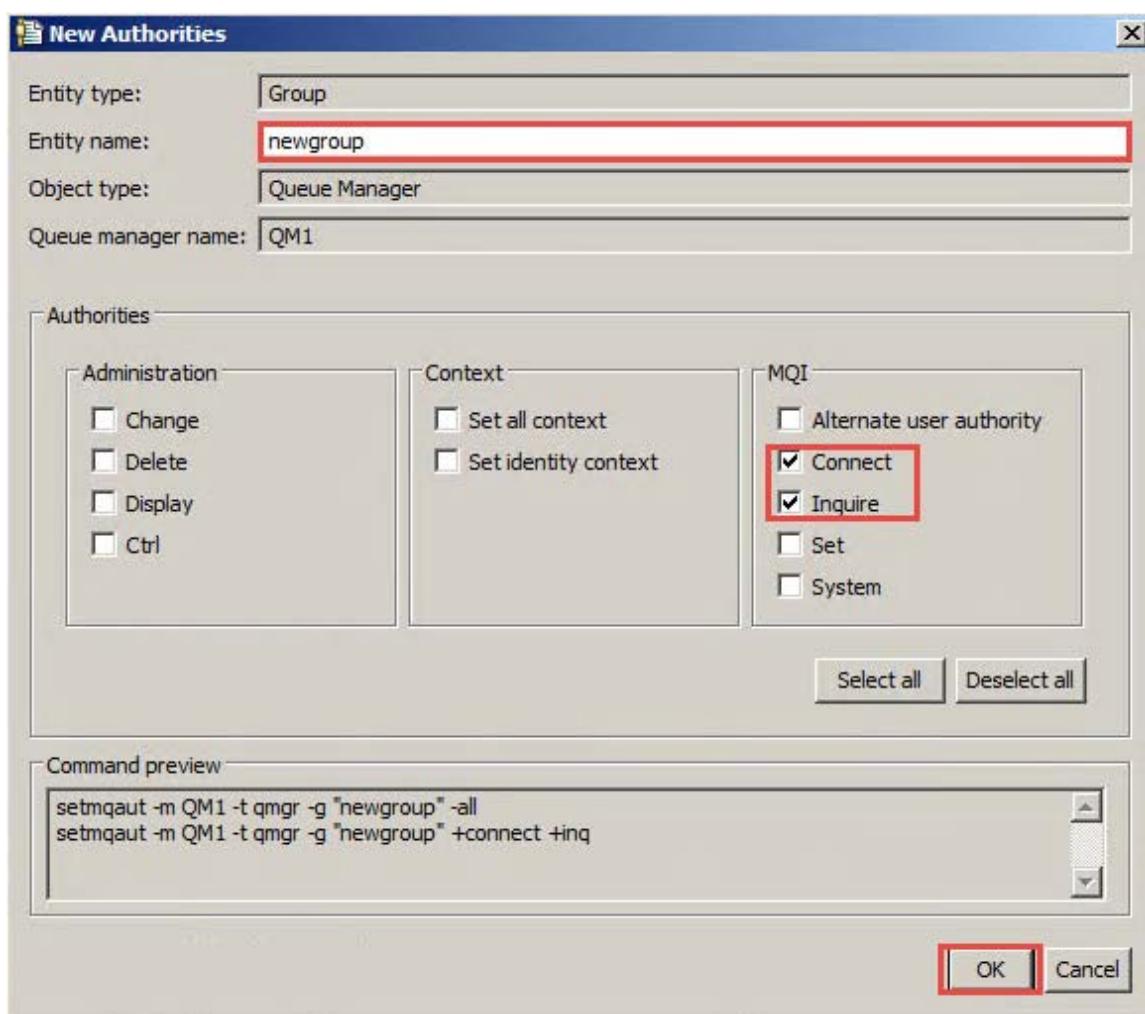


- \_\_\_ 26. Click **New** to add a group record.

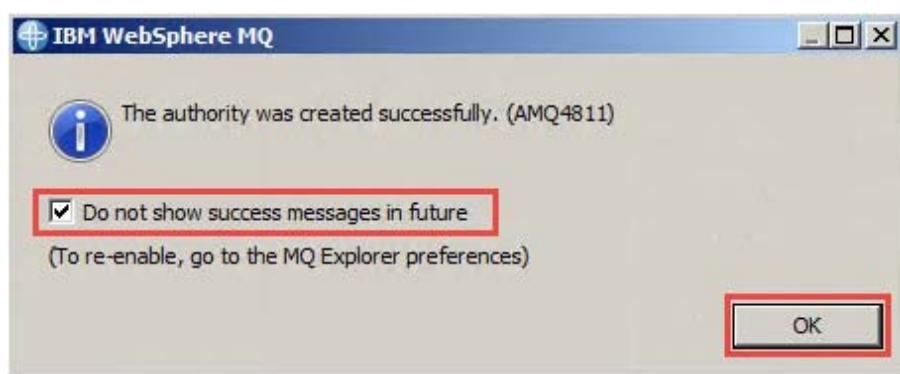


Exercise 5. Security setup

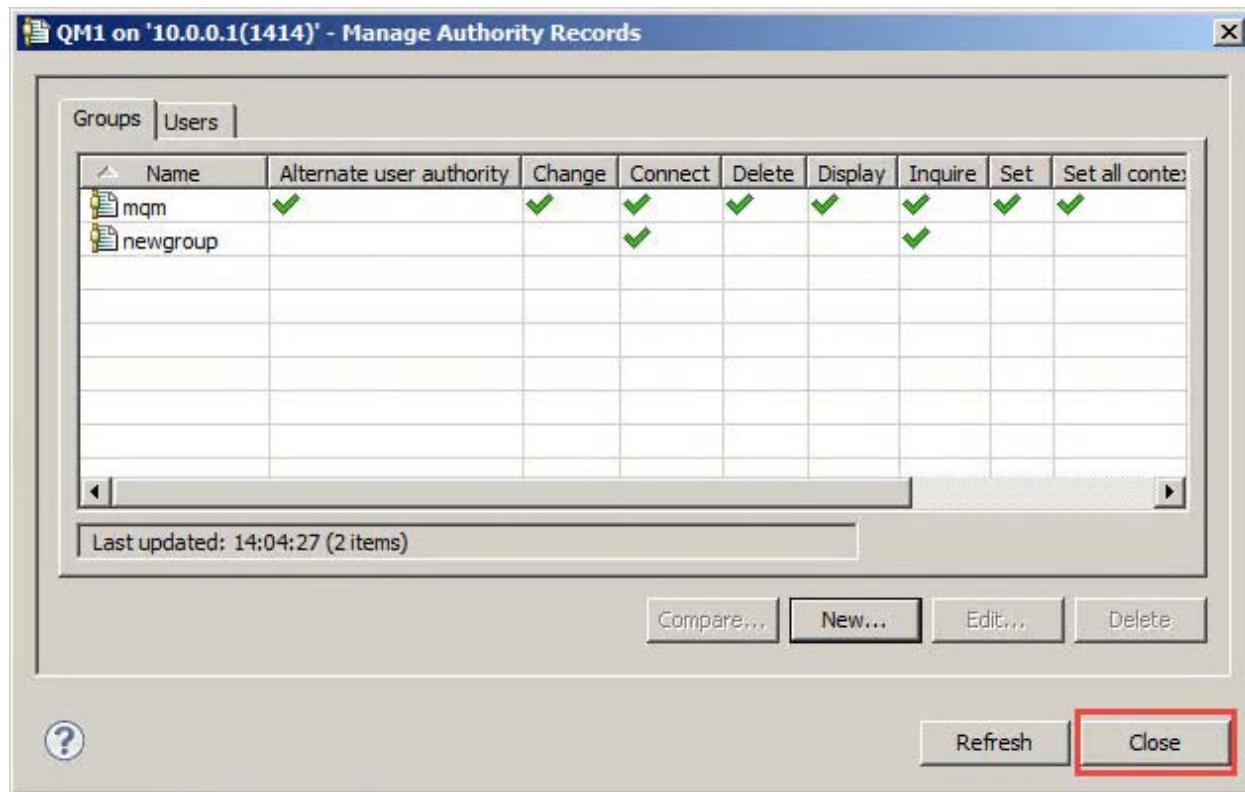
- \_\_\_ 27. Enter `newgroup` in the **Entity name** text box, and then select the **Connect** and **Inquire** check boxes. Click **OK** when finished.



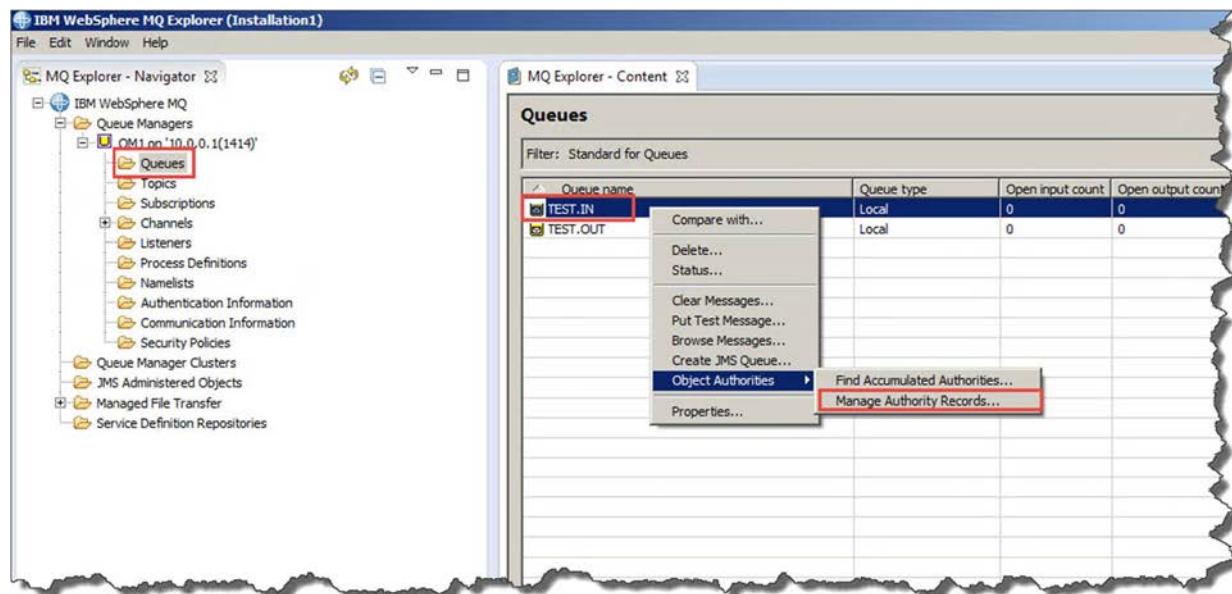
- \_\_\_ 28. If prompted, select the **Do not show success messages in the future** check box and click **OK** to continue.



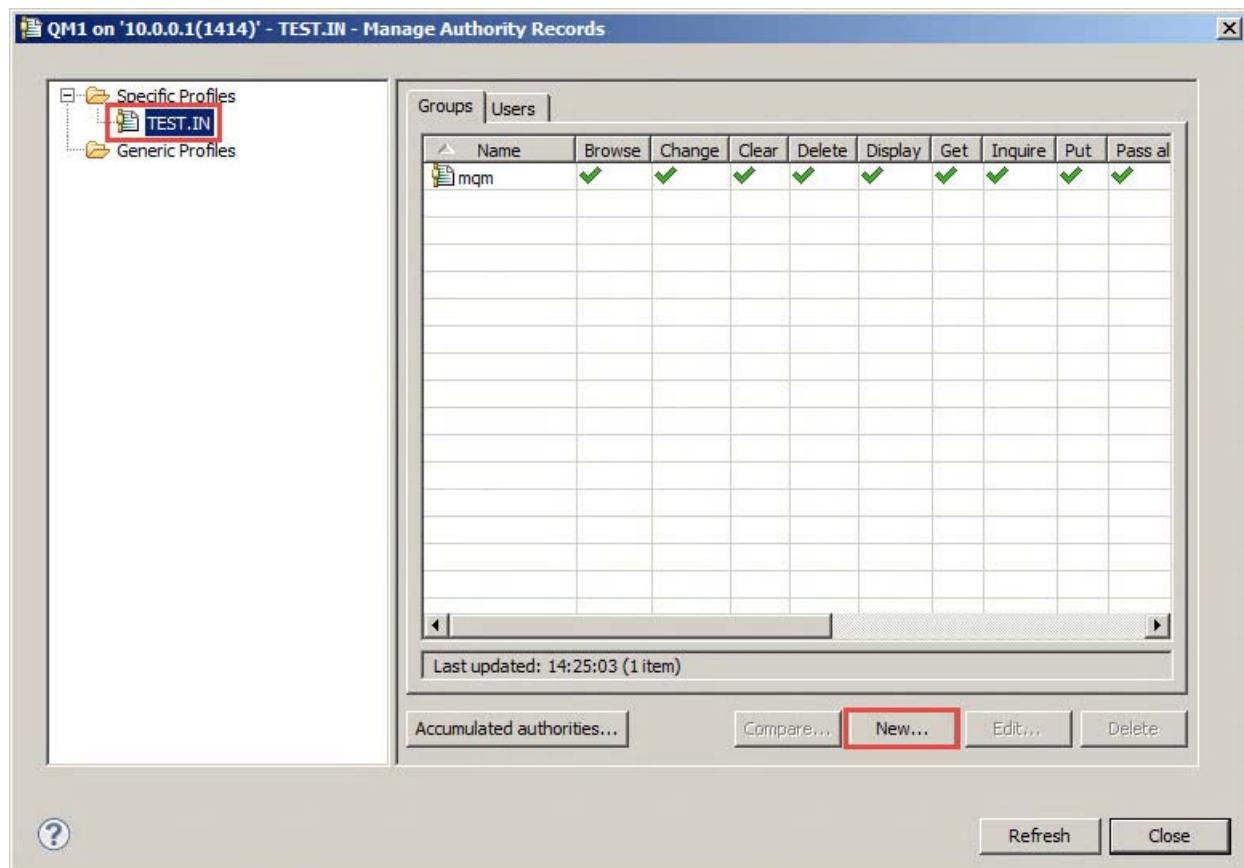
- \_\_\_ 29. Click **Close** to close the window.



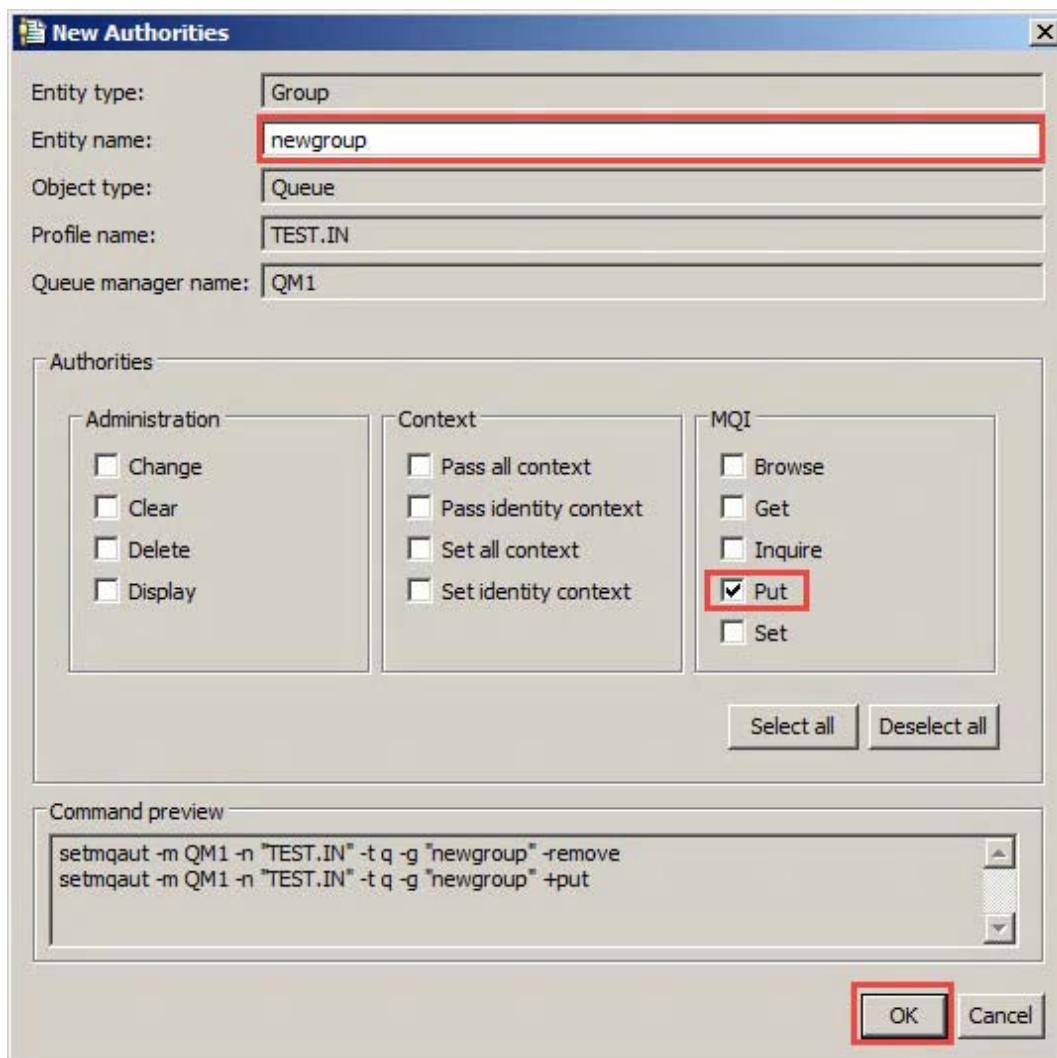
- \_\_\_ 30. Now select the **Queues** folder for the **QM1** queue manager and right-click the **TEST.IN** queue. Select the **Object Authorities > Manage Authority Records** menu item.



31. Expand the **Specific Profiles** section, select the **TEST.IN** entry, and then click **New...**.

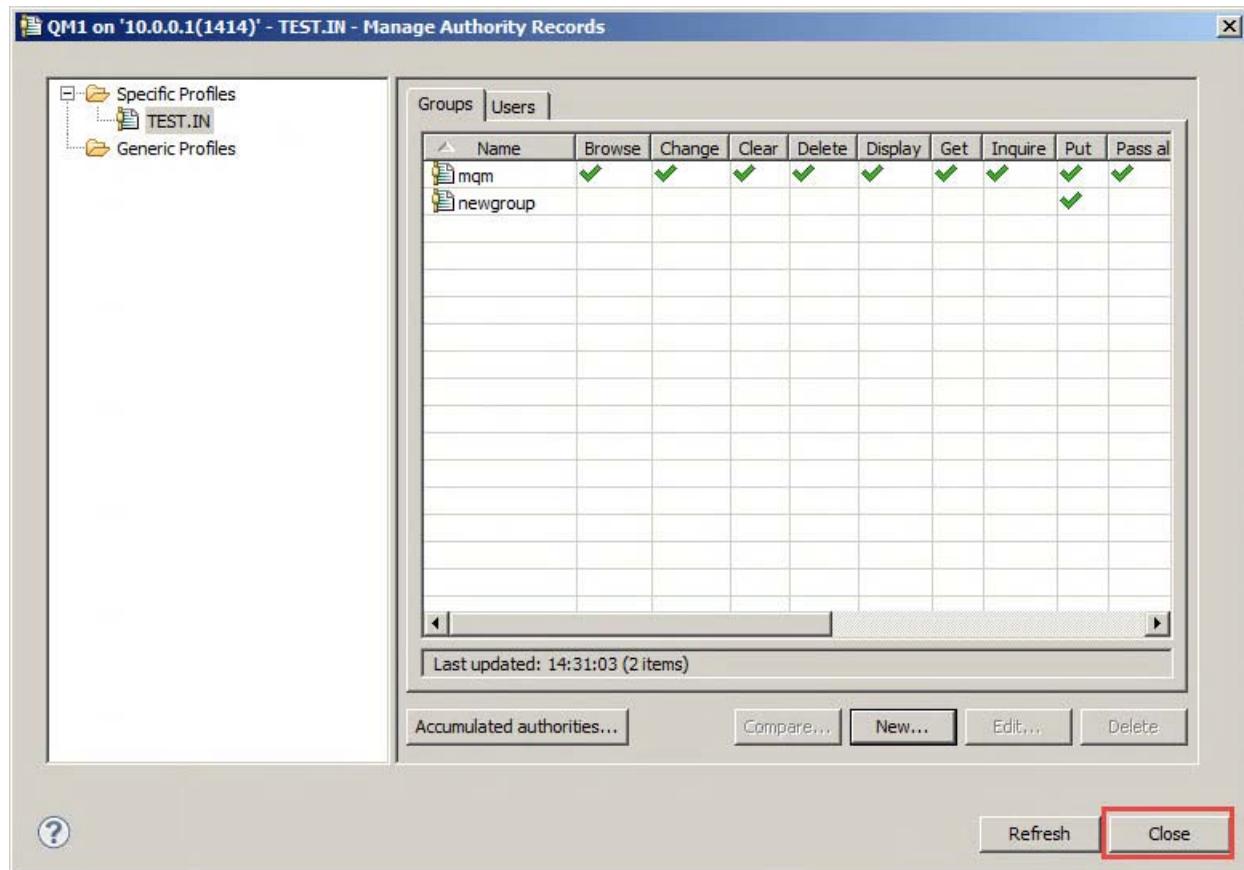


32. Enter `newgroup` in the **Entity name** text box, and then select the **Put** check box. Click **OK** when finished.



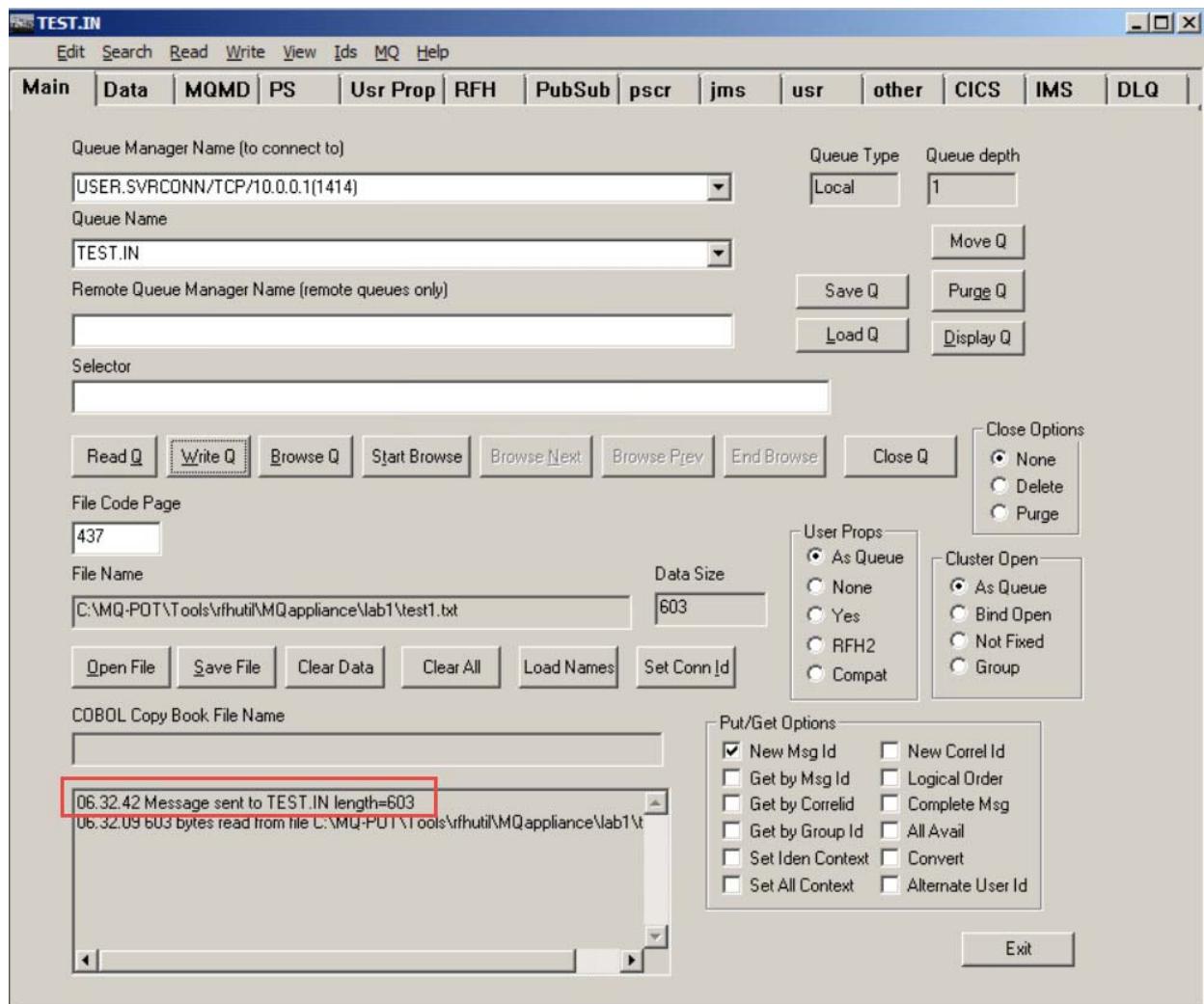
## Exercise 5. Security setup

33. Close the **Manage Authority Records** window and minimize the IBM MQ Explorer window.



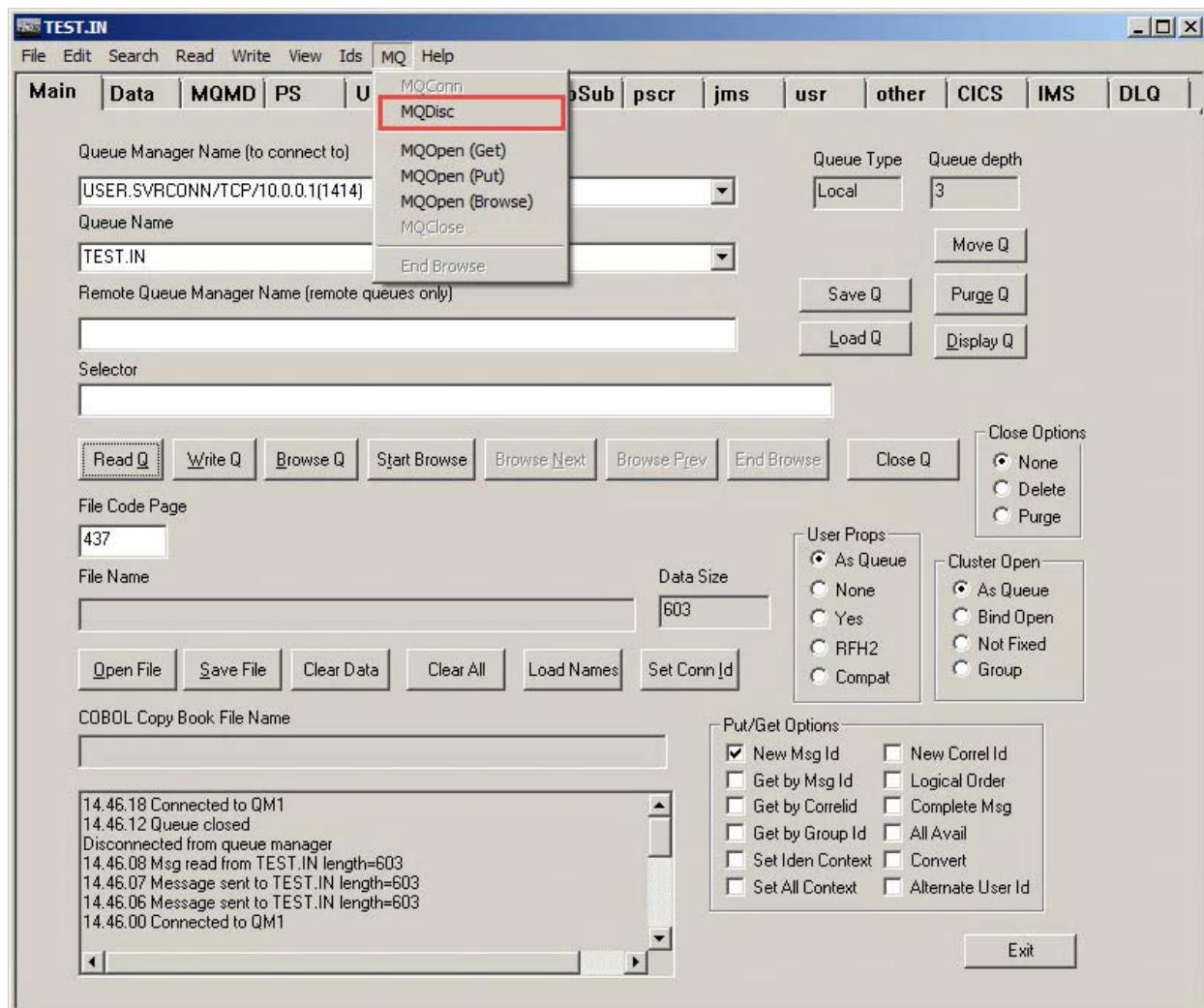
## Exercise 5. Security setup

34. Now you need to use the **RFHutilc** program to test the security settings that you defined. See the steps in Exercise 1 to start the program and connect to the queue manager as `testuser`. Continue through the steps in Exercise 1 until you successfully write a test message to the **TEST.IN** queue.



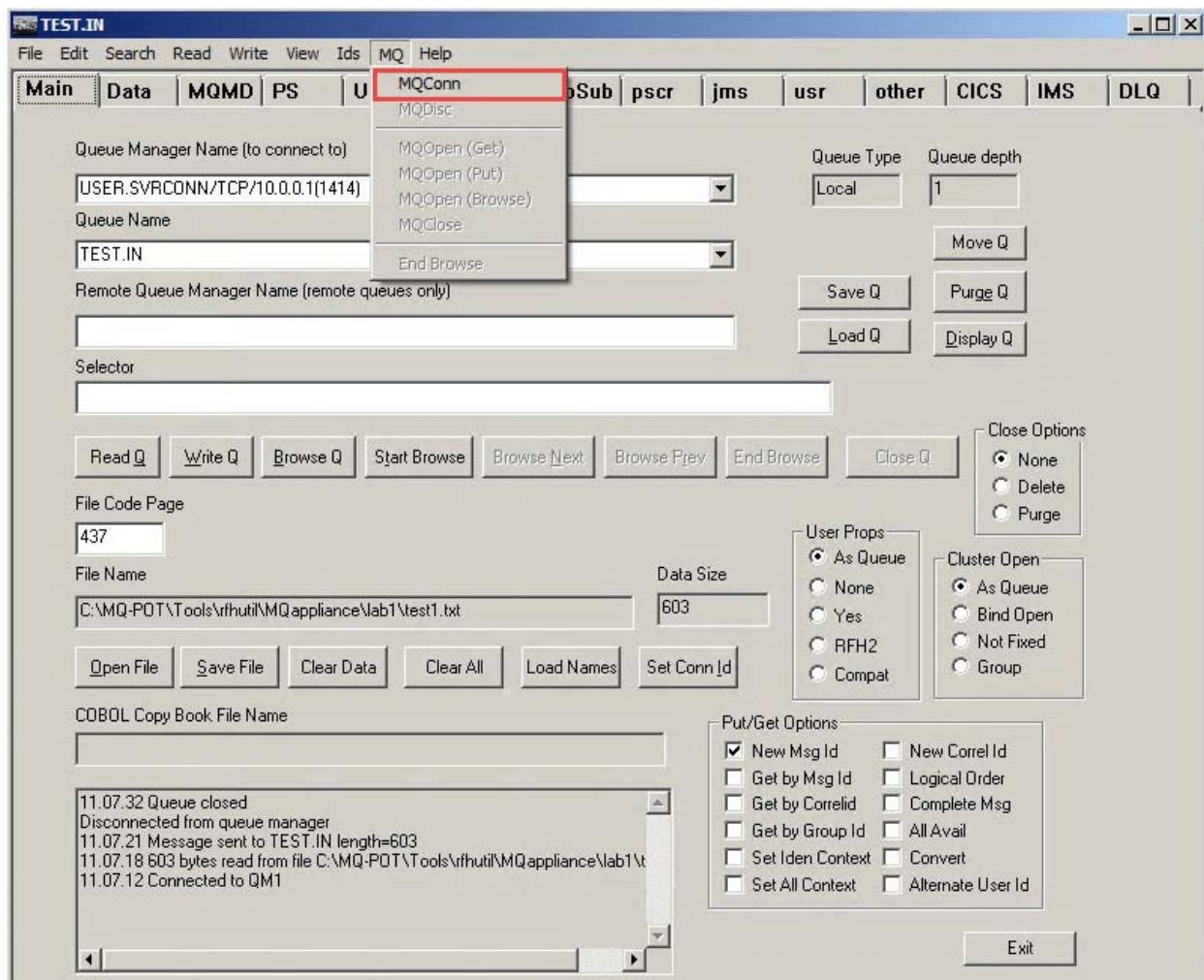
## Exercise 5. Security setup

35. Disconnect from the queue manager by clicking the **MQ > MQDisc** menu item.



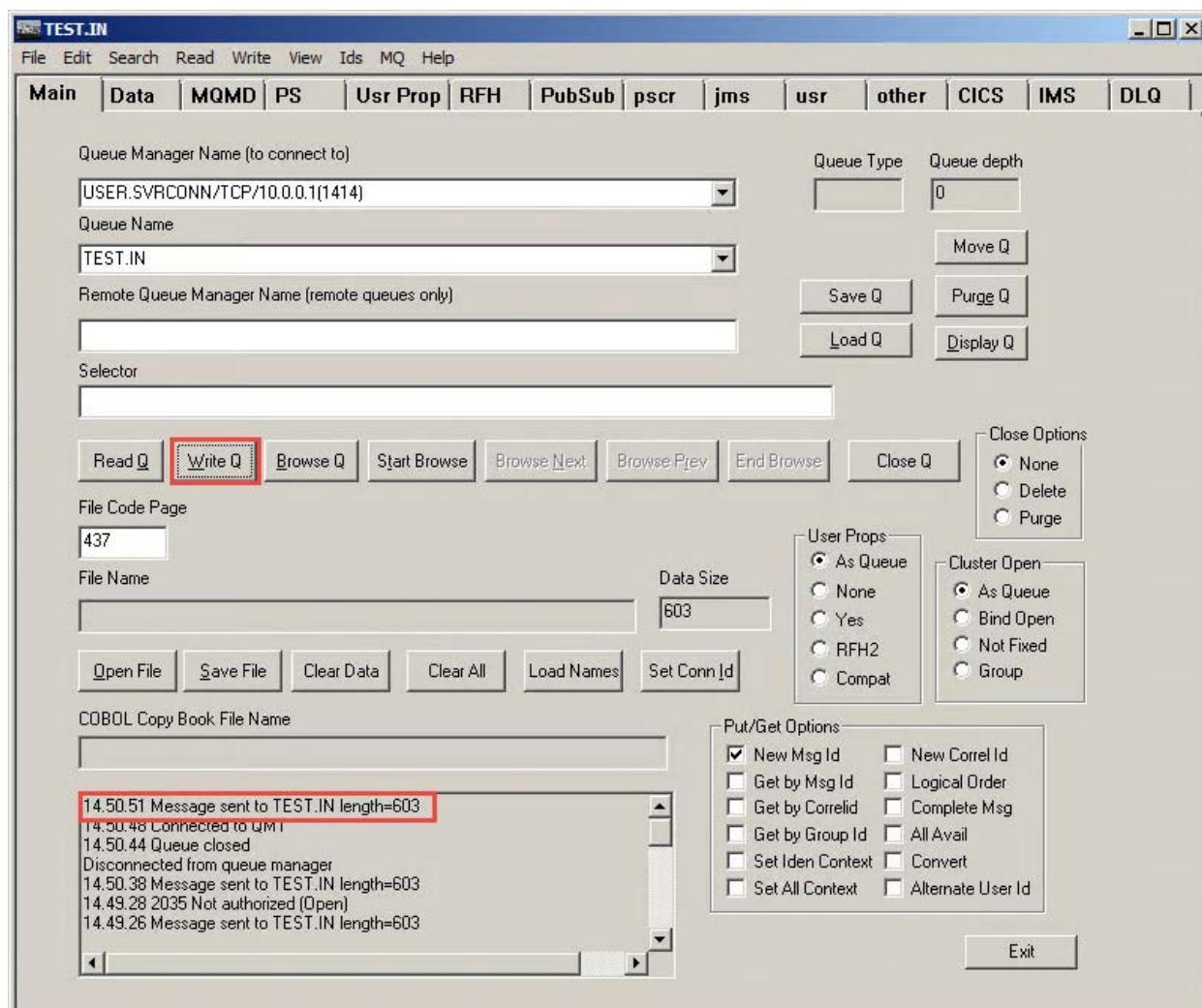
## Exercise 5. Security setup

36. Now change the user ID associated with the connection to **QM1** by clicking **Set Conn Id** and by using the `newuser` user ID and associated password. Reconnect to the queue manager by clicking the **MQ > MQConn** menu item.



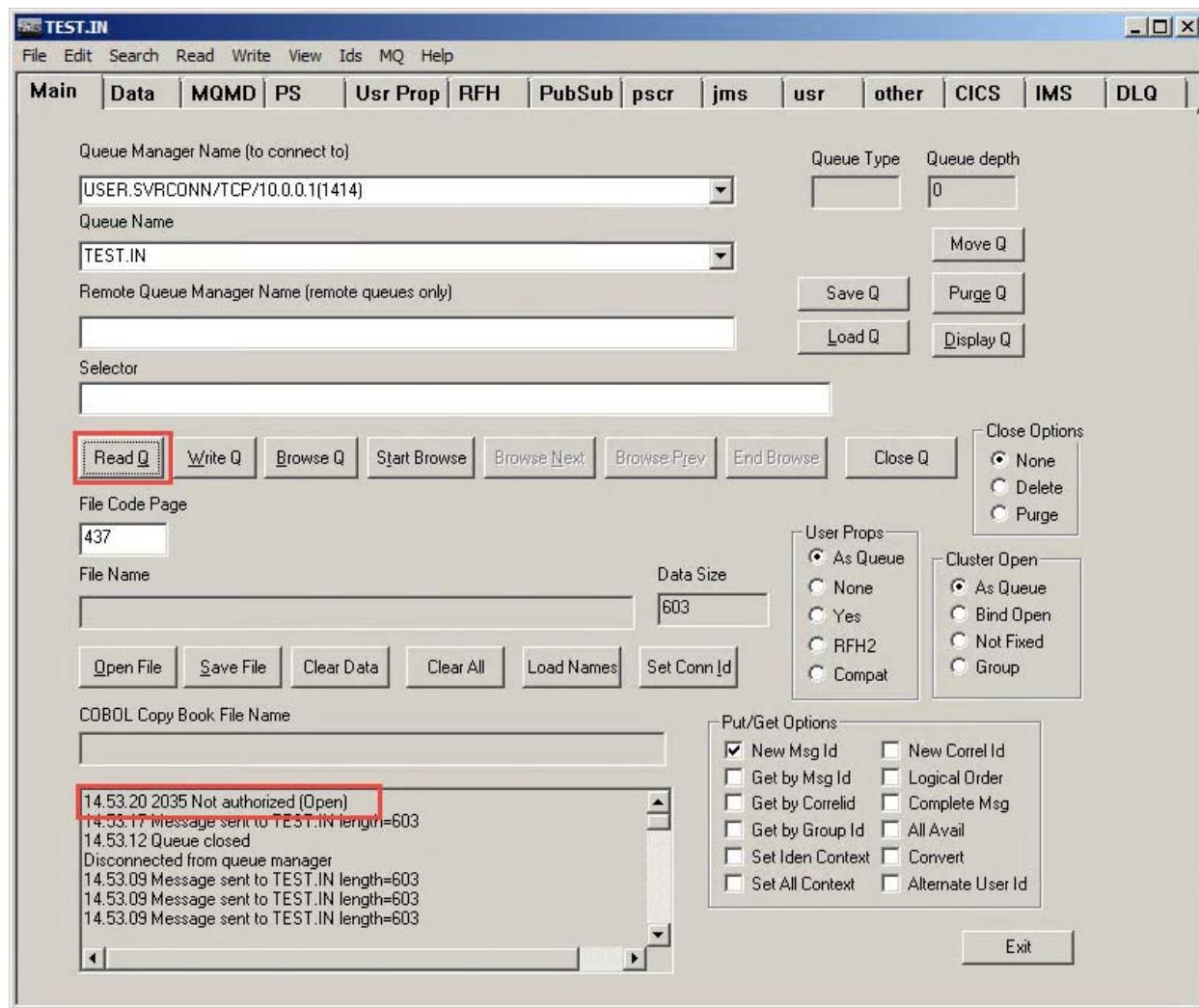
## Exercise 5. Security setup

- 37. Click **Write Q** to send another test message to the **TEST.IN** queue. This message should be successfully written.



## Exercise 5. Security setup

38. Now click **Read Q**. You see a **Not authorized** error message.



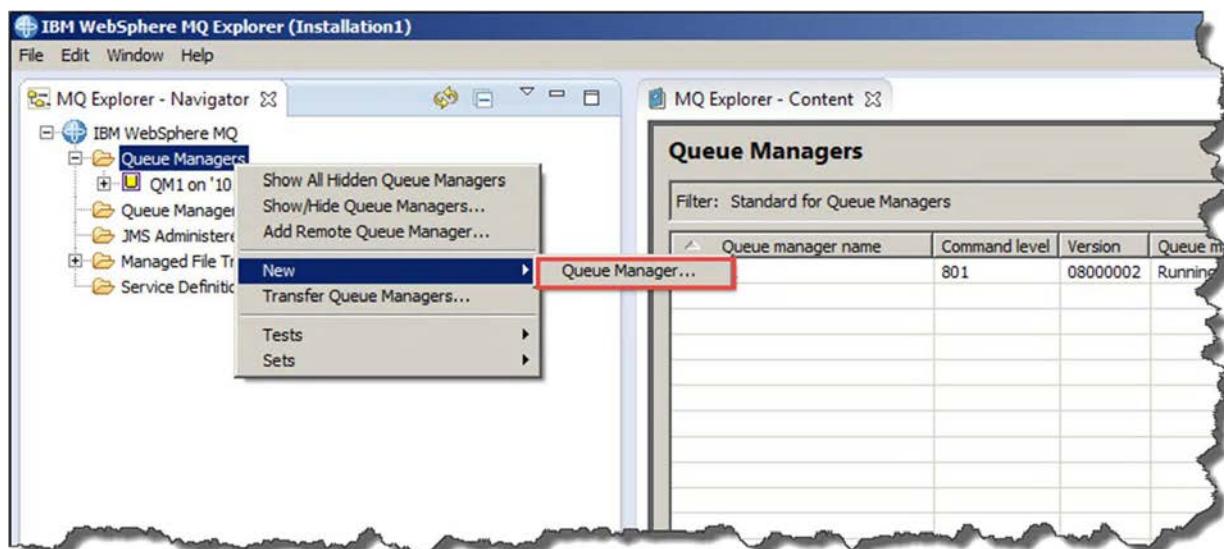
39. Close the **RFHutilc** application.

## 5.3. Prepare queue managers for configuration of SSL/TLS channels

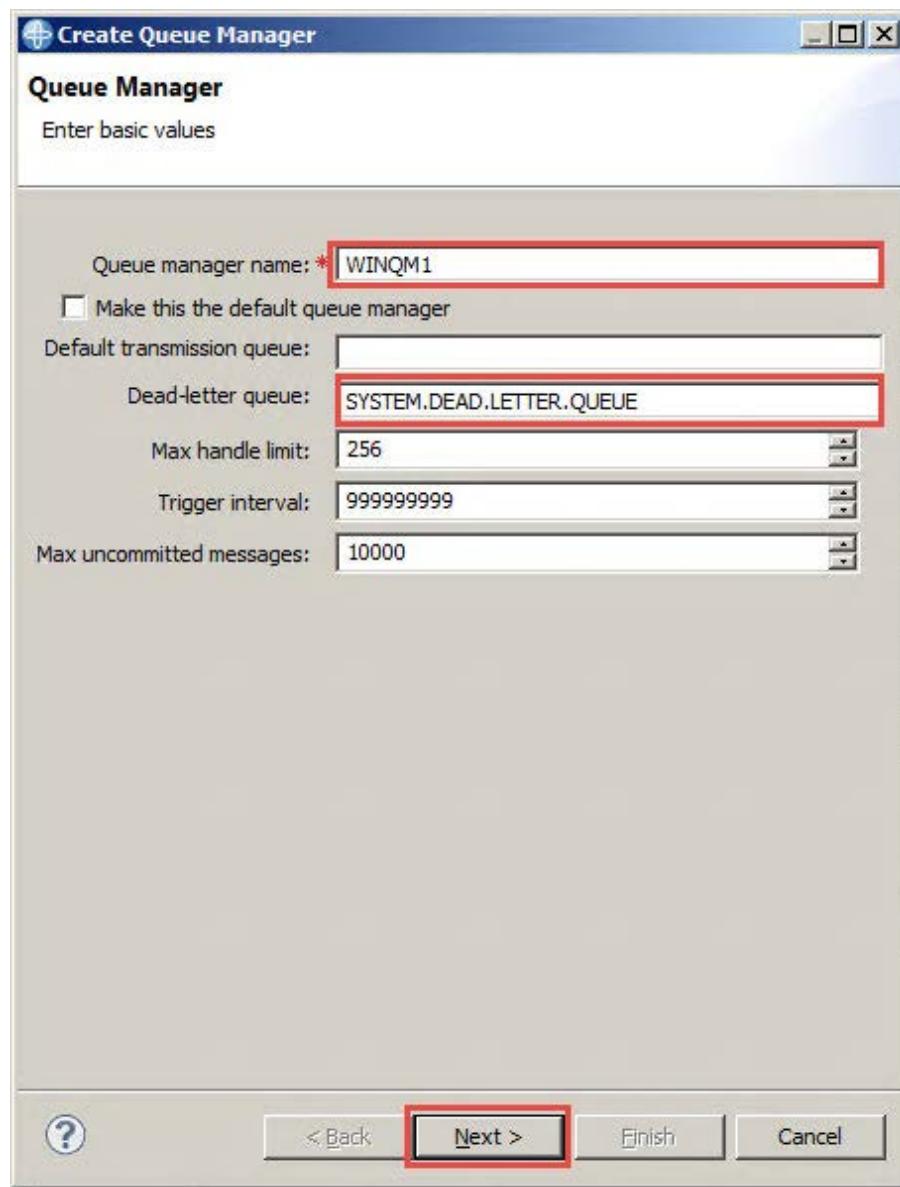
To enable SSL/TLS protection of messages that flow between queue managers, a basic distributed queuing environment must first be established. As soon as the initial configuration is defined and tested, you can configure more settings to enable SSL/TLS protection on the channels. In this portion of the exercise, you create and configure a Windows based queue manager to connect to **QM1** on the Appliance. You also create appropriate queue manager objects on **QM1** to connect to the Windows queue manager. Since configuration of basic distributed queuing is assumed to be an existing skill, you use MQSC scripts to create the initial configuration.

The following steps should be completed on the Windows VM image.

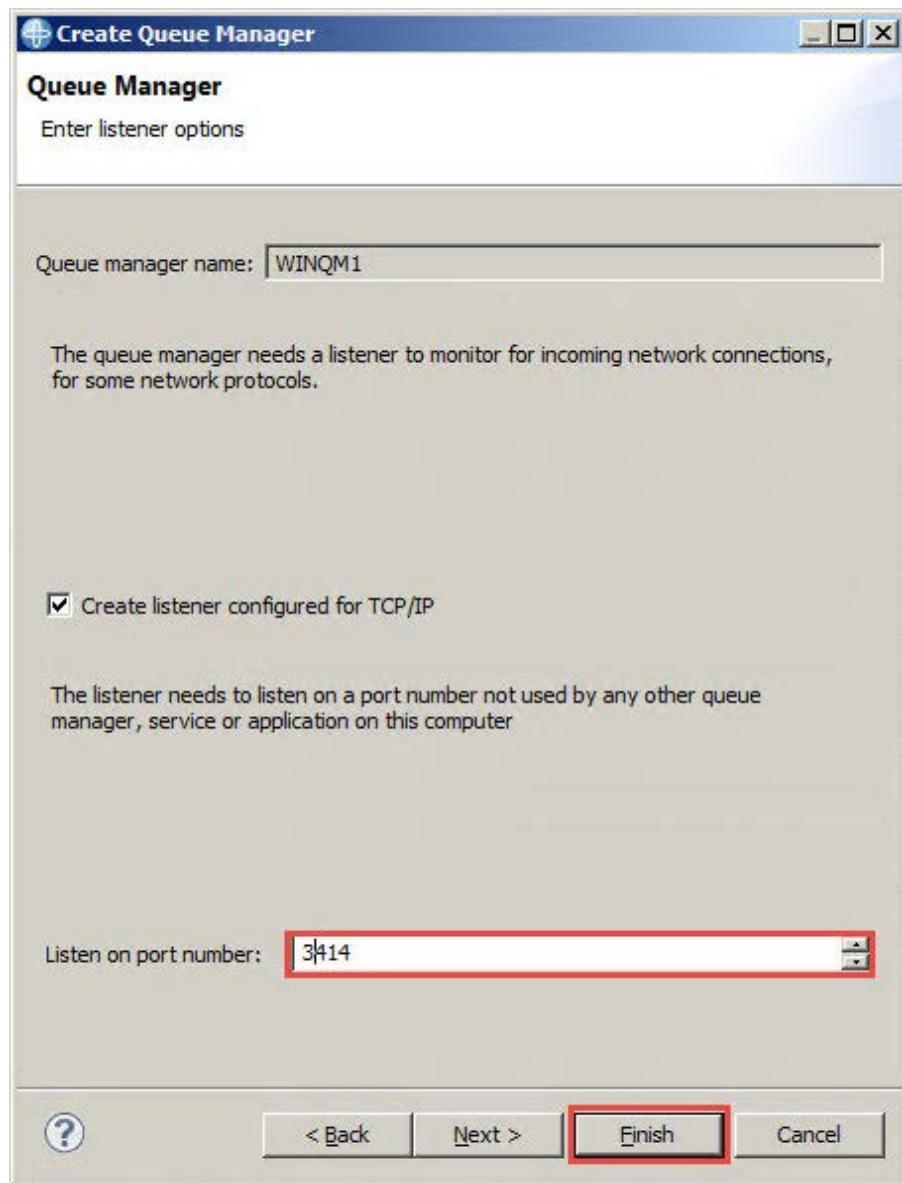
- 40. Use the IBM MQ Explorer to create a new queue manager by right-clicking the **Queue Managers** folder and clicking the **New > Queue Manager** menu item.



41. Enter WINQM1 in the **Queue manager name:** text box and SYSTEM.DEAD.LETTER.QUEUE in the **Dead-letter queue:** text box, and then click **Next**.



42. Click **Next** two more times to navigate past the **Enter data and log values** and the **Enter configuration options** windows, then enter 3414 in the **Listen on port number** text box, and click **Finish**.



43. The mqsc scripts to create a starter set of IBM MQ objects for the **WINQM1** and **QM1** queue managers are located in the `C:\Lab05\MQSC\` directory. If the IP addresses of the Windows and IBM MQ Appliance VMs are not 10.0.0.3 and 10.0.0.1, in that order, edit the files as necessary. Next, open a command line, navigate to that directory, and then run the following command:

```
runmqsc WINQM1 < WINQM1.mqsc
```

```
C:\Lab5\MQSC>runmqsc WINQM1 < WINQM1.mqsc
5724-H72 <C> Copyright IBM Corp. 1994, 2014.
Starting MQSC for queue manager WINQM1.

 1 : DEF QLOCAL<QM1> USAGE<XMITQ> TRIGGER INITQ<SYSTEM.CHANNEL.INITQ> TRIGDA
TA<WINQM1.TO.QM1> DESCRL'Transmission queue for QM1 on the MQ Appliance' REPLACE
AMQ8006: WebSphere MQ queue created.
 2 : DEF QLOCAL<WINTESTQ> DESCRL'Sample local queue for QM1 on the MQ Appliance to use' REPLACE
AMQ8006: WebSphere MQ queue created.
 3 : DEF QRREMOTE<MQAPPLQ> DESCRL'Sample remote queue for local queue manager to send to' RNNAME<MQAPPLQ> RQMNAME<QM1> XMITQ<QM1> REPLACE
AMQ8006: WebSphere MQ queue created.
 4 : DEF CHANNEL<WINQM1.TO.QM1> CHLTYPE<SDR> TRPTYPE<TCP> CONNAME('10.0.0.1<
1414>') XMITQ<QM1> DESCRL'Sender channel to QM1 on MQ appliance' REPLACE
AMQ8014: WebSphere MQ channel created.
 5 : DEF CHANNEL<QM1.TO.WINQM1> CHLTYPE<RCUR> DESCRL'Receiver channel from QM1 on MQ appliance' REPLACE
AMQ8014: WebSphere MQ channel created.
5 MQSC commands read.
No commands have a syntax error.
All valid MQSC commands were processed.

C:\Lab5\MQSC>
```

44. Next, you need to create a similar set of objects on the Appliance's **QM1** queue manager. The easiest means to do that is to use a client connection to **QM1** from the Windows image. To enable a client connect, you must first set an environment variable to specify the connection parameters to **QM1**. Enter the following command to set the **MQSERVER** environment variable:

```
SET MQSERVER=USER.SVRCONN/TCP/10.0.0.1(1414)
```

**Note:** Ensure that you substitute the actual IP address of the IBM MQ Appliance if necessary.

```
C:\Lab5\MQSC>set MQSERVER=USER.SVRCONN/TCP/10.0.0.1(1414)
C:\Lab5\MQSC>
```

- \_\_\_ 45. Next, use the following command to create the appropriate configuration objects on **QM1**:

```
runmqsc -c -u testuser QM1 < QM1.mqsc
```

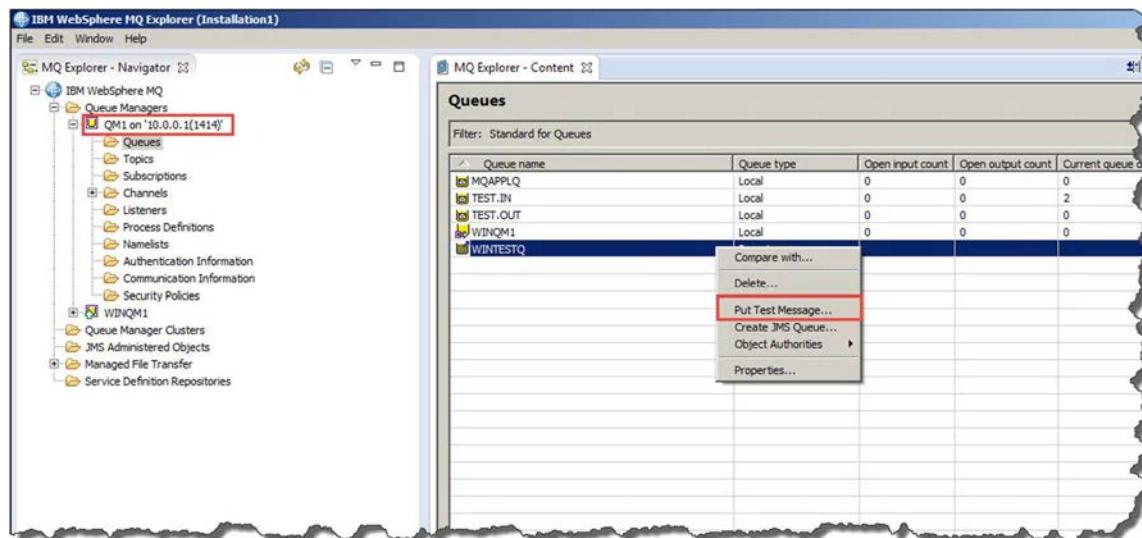
**Note:** This mqsc file contains the password for `testuser` as the first line of the file. This first line is necessary to enable the password to be passed blindly to the `runmqsc` command shell.

```
C:\Lab5\MQSC>runmqsc -c -u testuser QM1 < QM1.mqsc
5724-H72 (C) Copyright IBM Corp. 1994, 2014.
Enter password:
Starting MQSC for queue manager QM1.

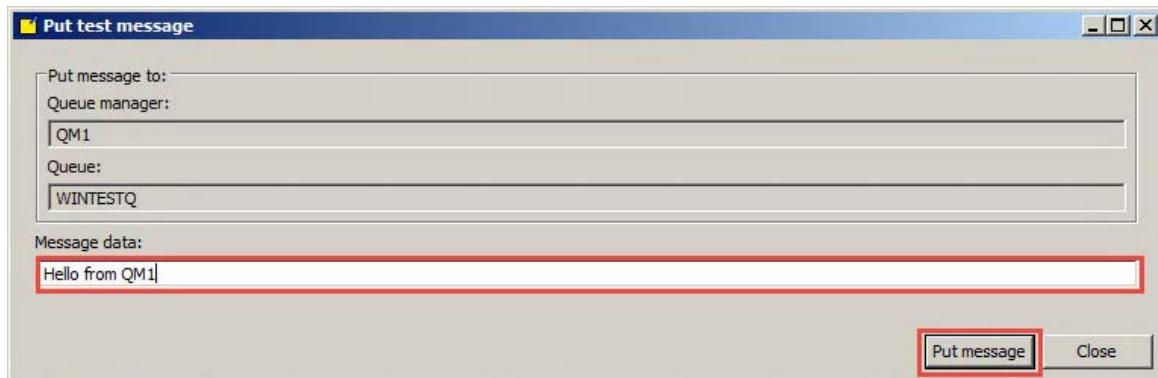
 1 : DEF QLOCAL<WINQM1> USAGE<XMITQ> TRIGGER INITQ<SYSTEM.CHANNEL.INITQ> TRI
GDATA<QM1.TO.WINQM1> DESCRL'Transmission queue for WINQM1 on Windows' REPLACE
AMQ8006: IBM MQ Appliance queue created.
 2 : DEF QLOCAL<MQAPPLQ> DESCRL'Sample queue for WINQM1 on Windows to use' REPLACE
AMQ8006: IBM MQ Appliance queue created.
 3 : DEF QRREMOTE<WINTESTQ> DESCRL'Sample remote queue for local queue manager to send to' RNAME<WINTESTQ> RQMNAME<WINQM1> XMITQ<WINQM1> REPLACE
AMQ8006: IBM MQ Appliance queue created.
 4 : DEF CHANNEL<QM1.TO.WINQM1> CHLTYPE<SDR> TRPTYPE<TCP> CONNAME('10.0.0.10
<3414>') XMITQ<WINQM1> DESCRL'Sender channel to WINQM1 on Windows' REPLACE
AMQ8014: IBM MQ Appliance channel created.
 5 : DEF CHANNEL<WINQM1.TO.QM1> CHLTYPE<RCUR> DESCRL'Receiver channel from WINQM1 on Windows' REPLACE
AMQ8014: IBM MQ Appliance channel created.
10 command responses received.

C:\Lab5\MQSC>
```

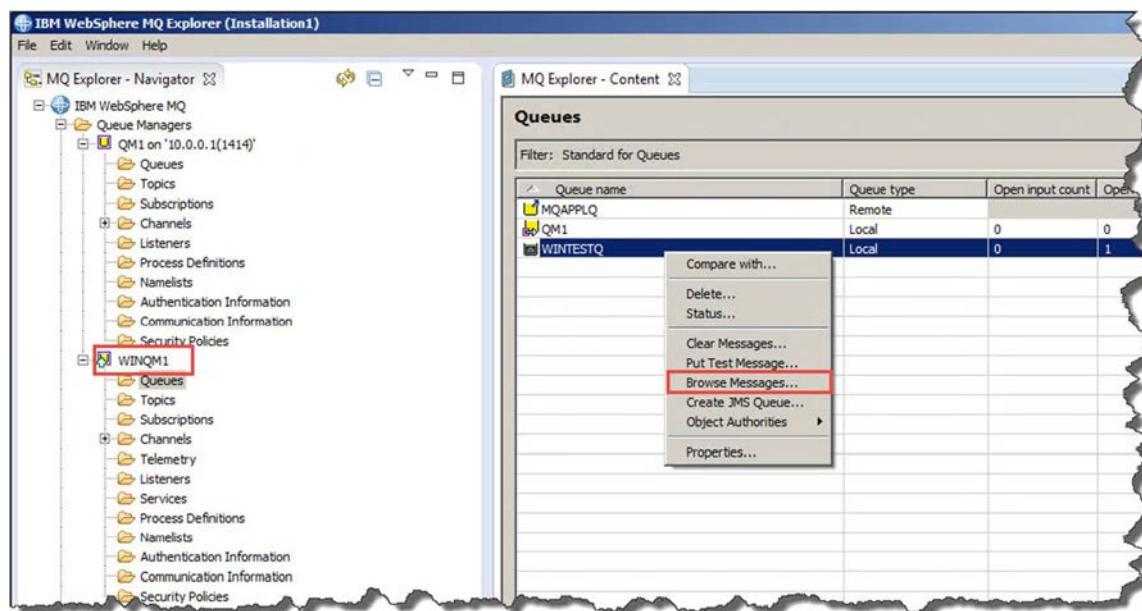
- \_\_\_ 46. You should now have a set of channels, local queues, and remote queues that you can use to send messages between the two platforms with the SENDER channels auto-triggered. Test your configuration by completing the following steps:
- Open the IBM MQ Explorer and expand the **QM1** queue manager entry. Right-click the **WINTESTQ** queue and click the **Put Test Message** menu item.



- b. Enter a simple message and click **Put message**.

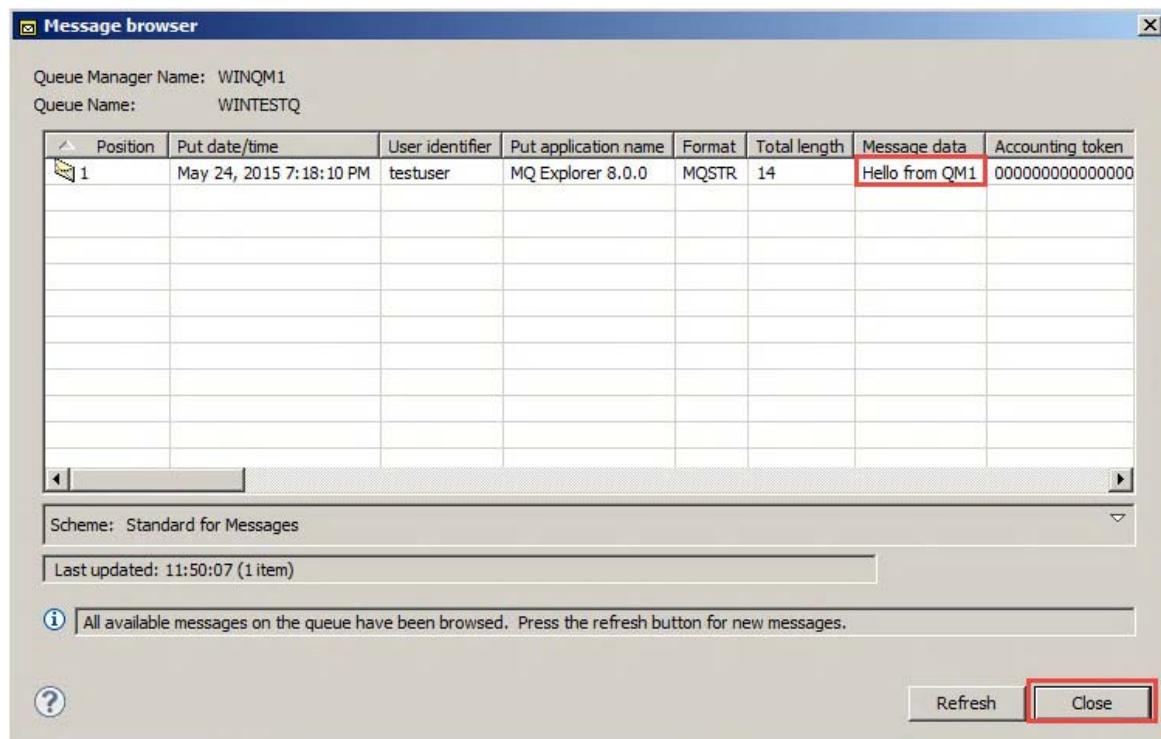


- c. Close the test window, then expand the **WINQM1** queue manager, and right-click the **WINTESTQ** queue. Select the **Browse Messages** menu item.



## Exercise 5. Security setup

- d. Your message should be listed in the browser window. Click **Close** to continue.



- \_\_ e. Repeat steps **a – d** to test triggering of channels from **WINQM1** to **QM1** by putting a simple message on **WINQM1**'s **MQAPPLQ** remote queue definition and ensuring it is PUT to the corresponding local queue on **QM1**. Correct any configuration issues before proceeding.
  - \_\_ f. Stop the **SENDER** channels on both queue managers.

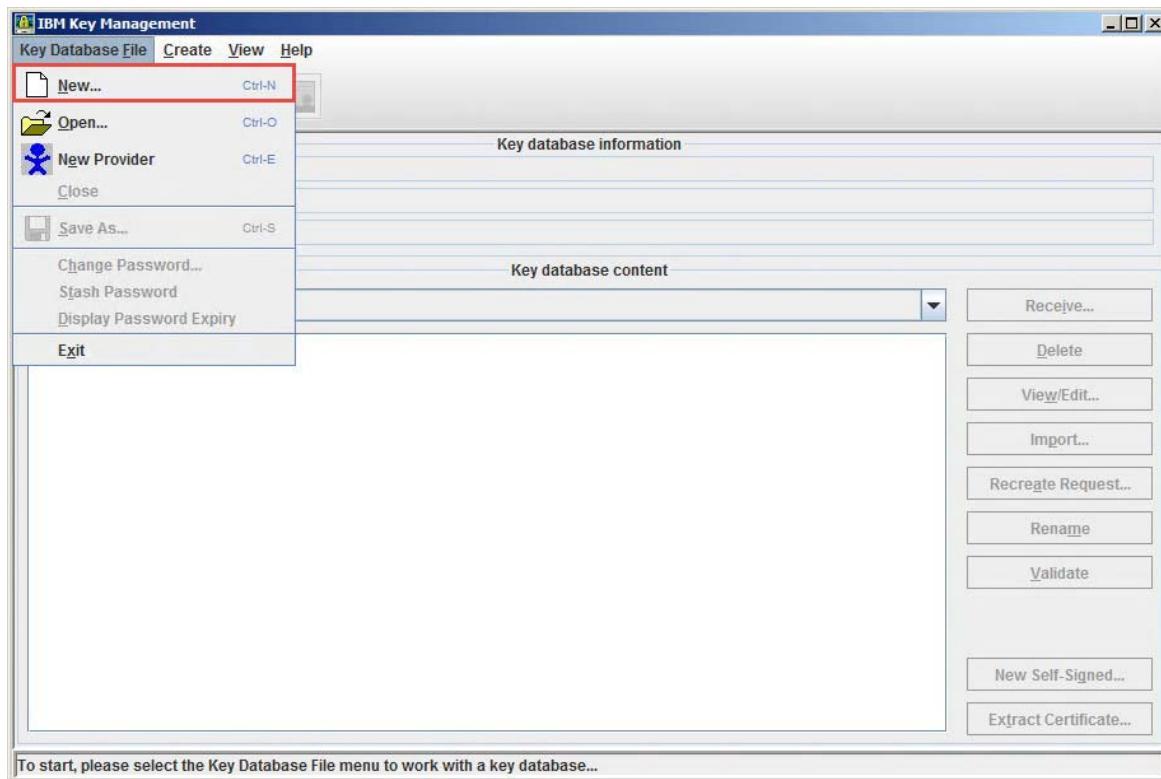
## 5.4. Configuring the Windows queue manager for SSL/TLS channels

Enablement of SSL/TLS protection for channels requires a keystore for the queue manager to use for storage of personal certificates and storage for the signer certificates of any remote queue managers that need to be accessed.

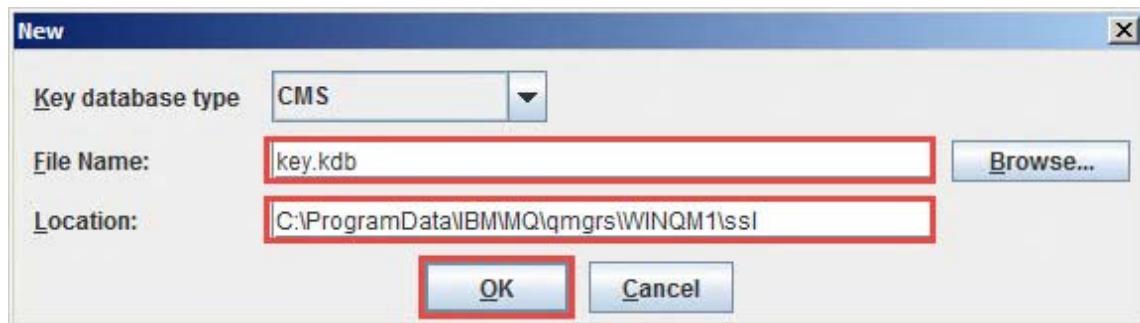
- 47. Create a keystore and personal certificate for the **WINQM1** queue manager by completing the following steps:
- a. Start the IBM Key Management tool by clicking the **IBM Key Management (Installation 1)** shortcut from **Start > All Programs**.



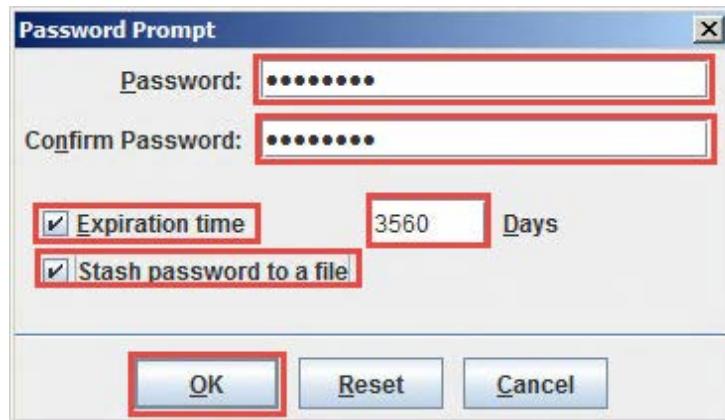
- \_\_\_ b. Create a keystore by clicking the **Key Database File > New** menu item.



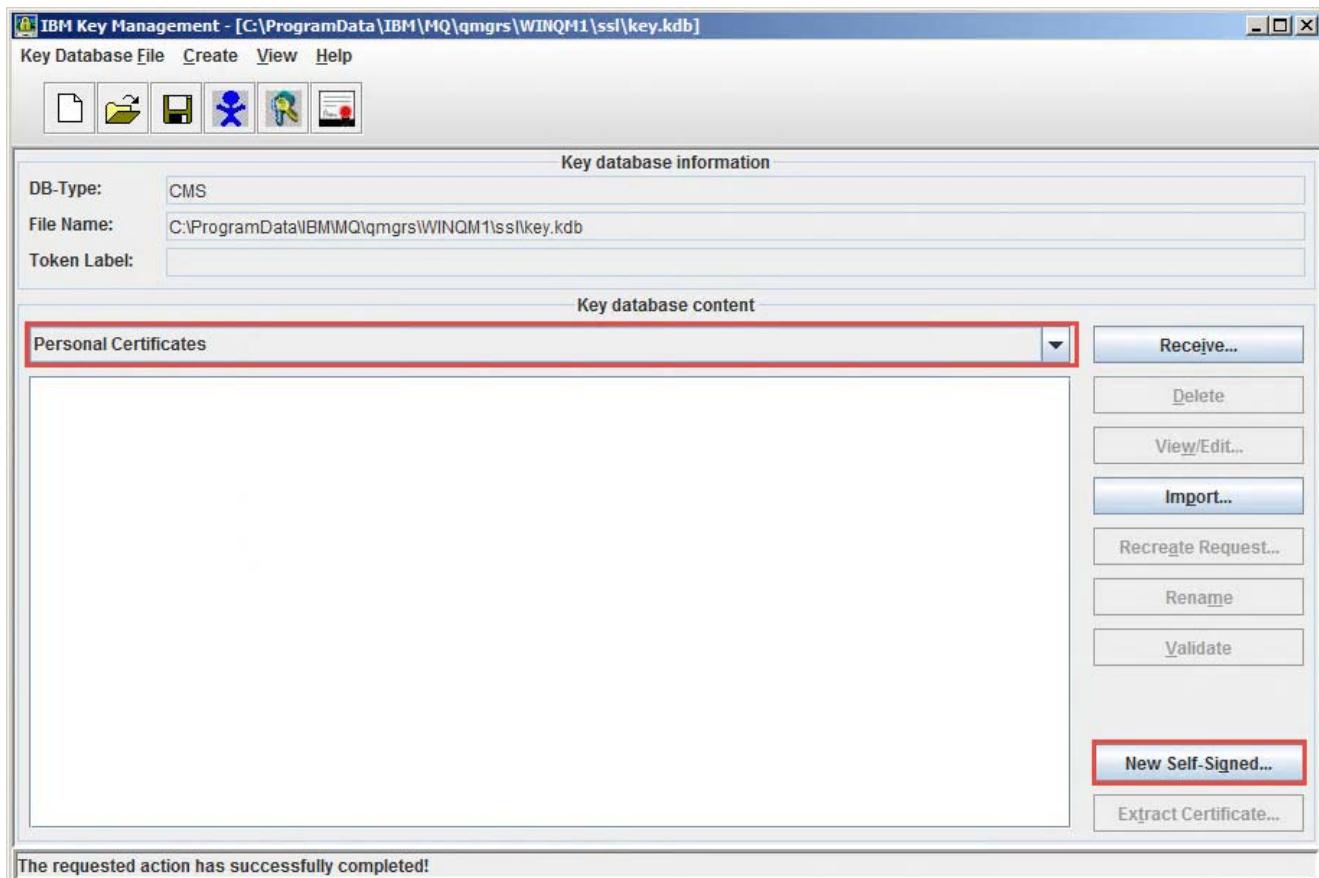
When a queue manager is created, it looks for a keystore in a default location. For this exercise, the **WINQM1** queue manager looks for a keystore in the following location:  
 C:\ProgramData\IBM\MQ\qmgrs\WINQM1\ssl\. The default name for the keystore is assumed to be **key.kdb**. Enter **key.kdb** in the **File Name** text box and  
 C:\ProgramData\IBM\MQ\qmgrs\WINQM1\ssl in the **Location** text box, and then click **OK**.



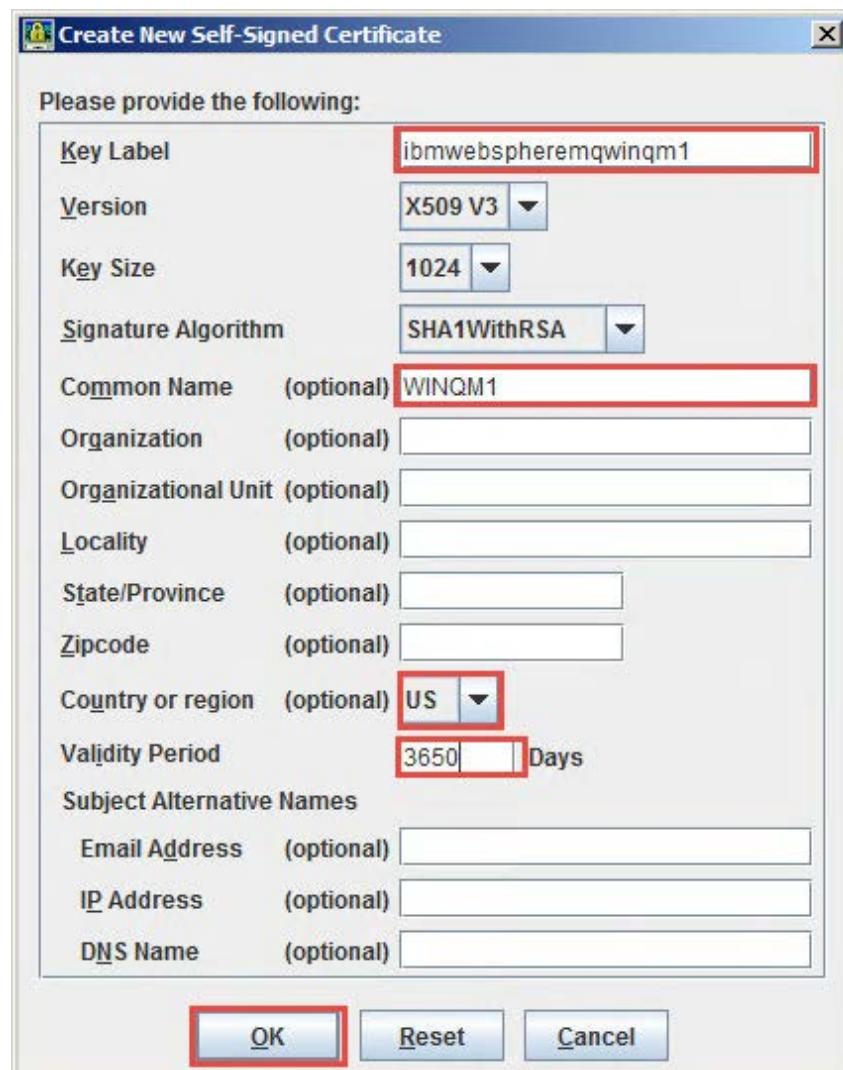
- c. Enter `passw0rd` as the password for the keystore. Select the **Expiration time** and **Stash password to a file** check boxes. Enter a value of 3560 days in the **Days** text box (you do not want to deal with certificate expiration anytime soon) and click **OK**.



- d. Now you create a self-signed certificate to use for protecting messages. Ensure that **Personal Certificates** is selected, and then click **New Self-Signed**.

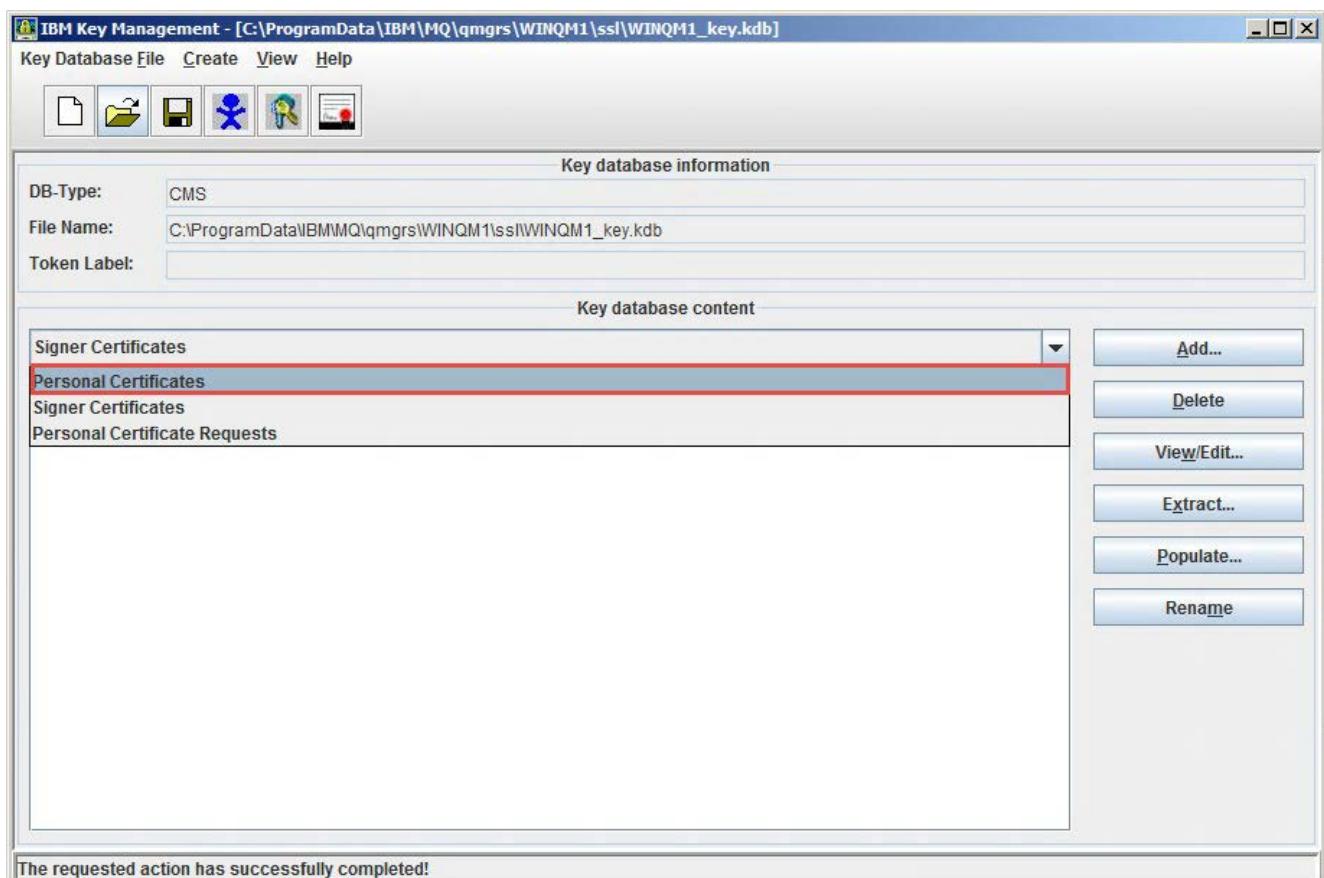


- e. WebSphere MQ Version 7 and earlier had specific requirements for the **Key Label** entry. Although you are working with a Version 8 queue manager, you assign a label by using the more stringent requirements. Enter a value of `ibmwebspheremqwinqm1` in the **Key Label** text box. Enter a value of `3560` in the **Validity Period** text box. IBM MQ does not use the content of the remaining fields. However, for this exercise enter `WINQM1` in the **Common Name** text box and select a value of **US** in the **Country or region** list. Click **OK** when ready.



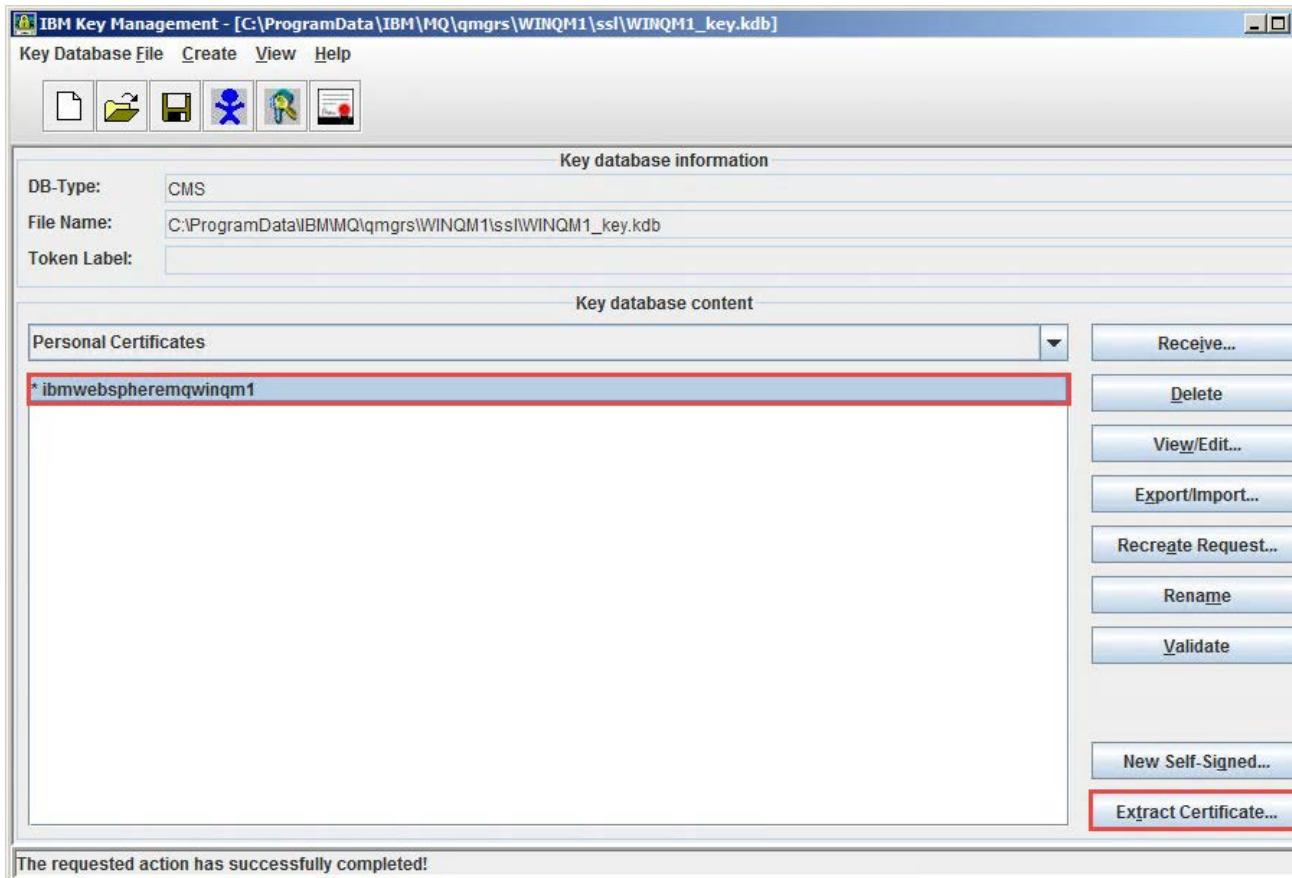
## Exercise 5. Security setup

- f. Next, you must extract the public part of **WINQM1**'s certificate for the **QM1** queue manager on the Appliance to use. Verify that **Personal Certificates** is selected from the list.

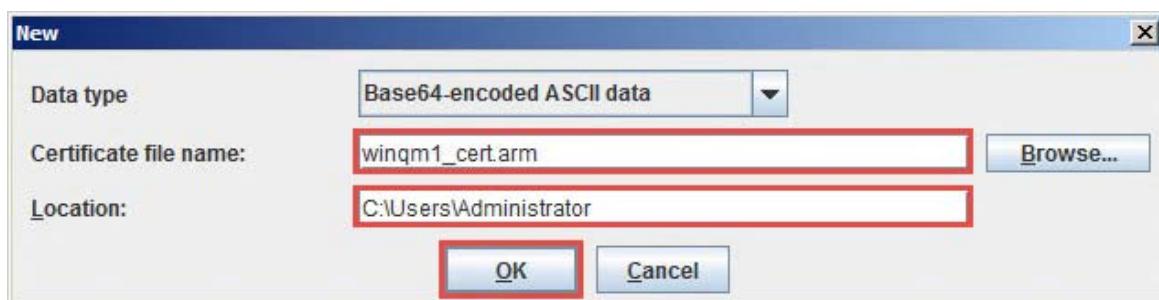


## Exercise 5. Security setup

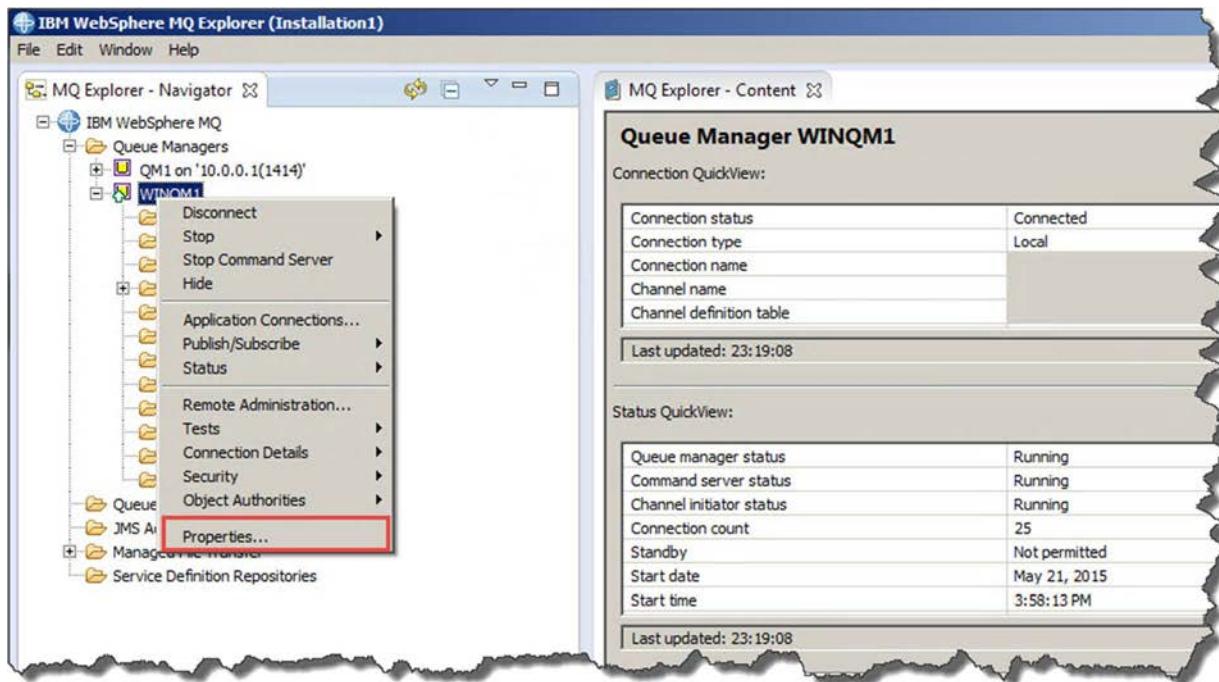
- g. Select the certificate for the WINQM1 queue manager and click **Extract Certificate**.



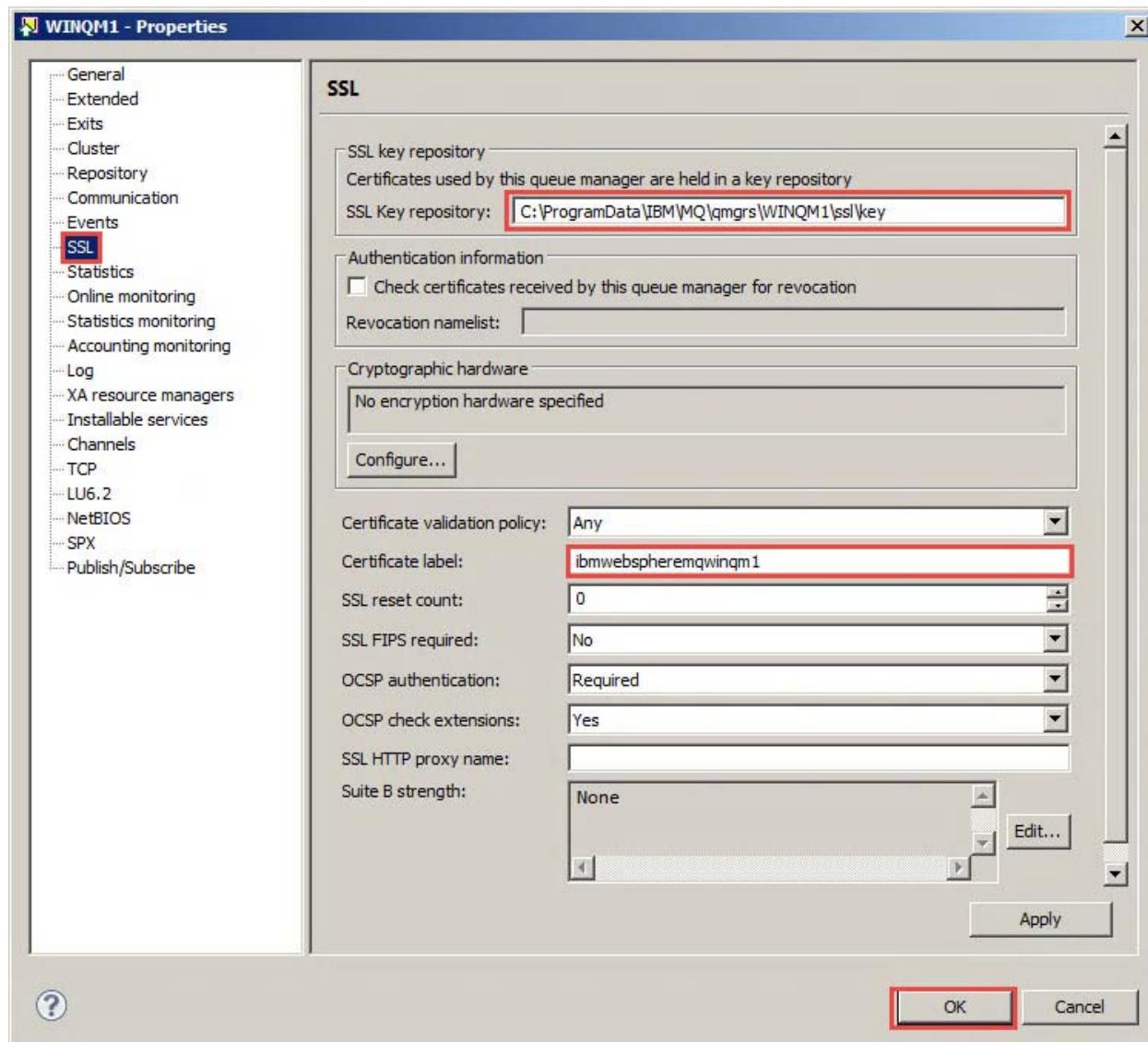
- h. Export the certificate to a location where the SFTP server is able to access it for transfer to the Appliance. For this exercise, use `winqm1_cert.arm` for the **Certificate file name** and `C:\Users\Administrator` for the **Location**. Click **OK**.



- 48. Now review the SSL properties of the **WINQM1** queue manager to see where various settings match the values in the keystore and personal certificate. Open the IBM MQ Explorer, right-click the **WINQM1** queue manager, and then click the **Properties** menu item.

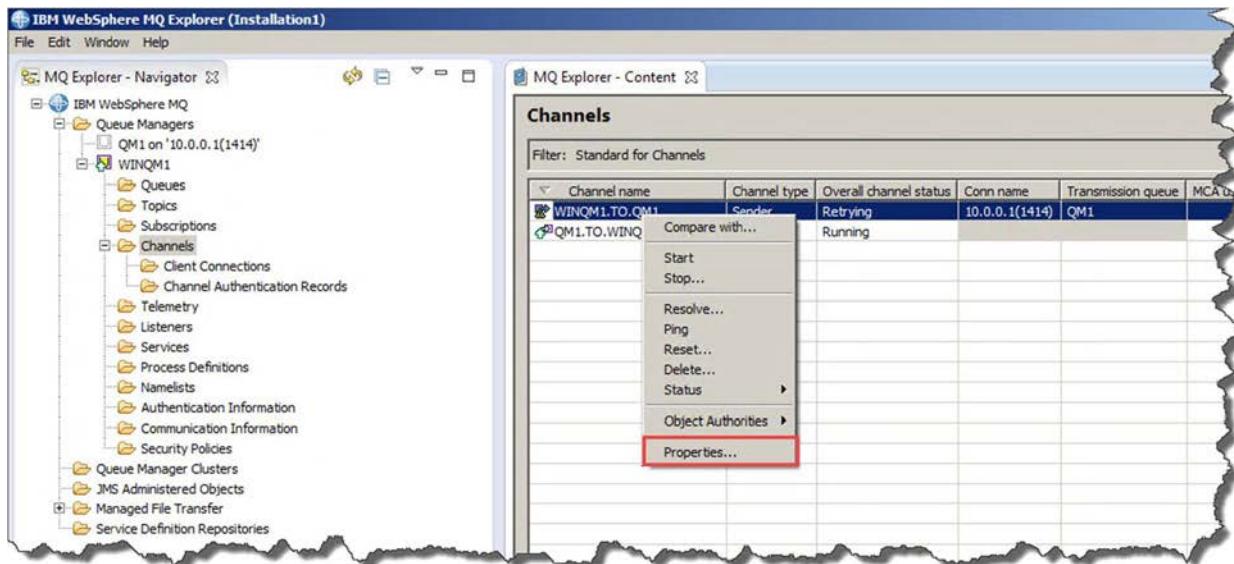


49. Select the **SSL** entry in the list. Note the entry for the **SSL Key repository** text box. This entry specifies the path to the keystore file and the file name of the keystore (without the **.kdb** extension).

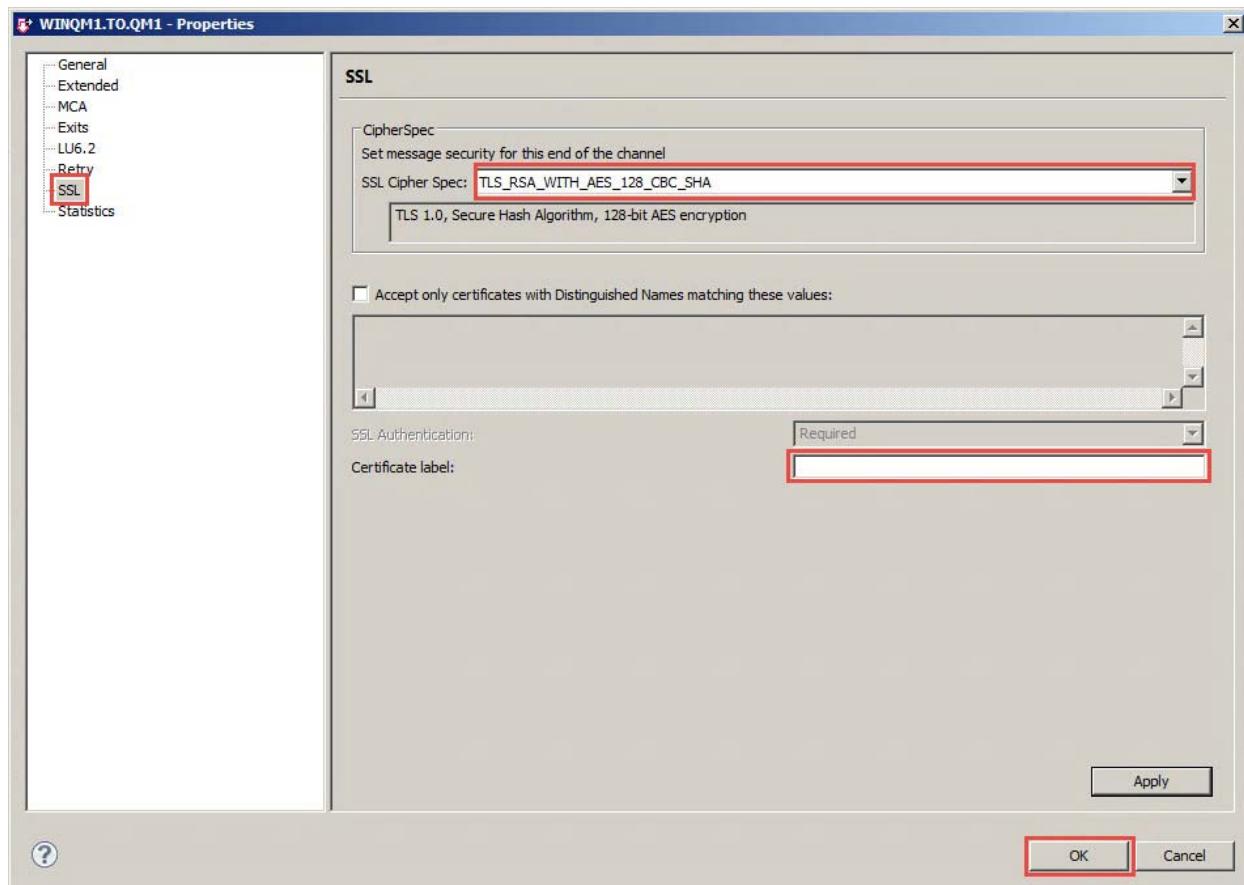


Also, take note of the **Certificate label** entry. This label is used to match the personal certificate that is found in the keystore. Click **OK** when done.

50. You must now specify which channels you would like to enable for SSL/TLS security. Expand the **Channels** folder for **WINQM1** in the IBM MQ Explorer and right-click the **WINQM1.TO.QM1** sender channel entry. Click the **Properties** menu item.



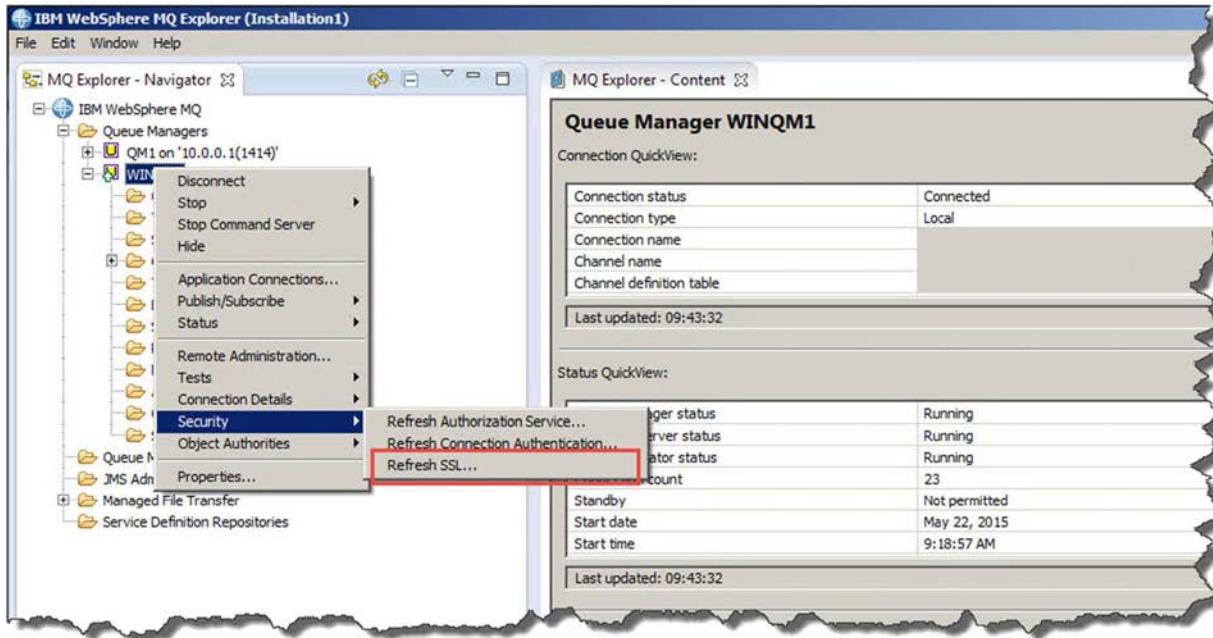
- \_\_\_ 51. Select the **SSL** entry from the list. Select an entry from the **SSL Cipher Spec** list box that matches your selection on the other queue manager. Notice that a number of algorithms are available in the list. For this exercise, select the **TLS\_RSA\_WITH\_AES\_128\_CBC\_SHA** cipher specification.



Notice a text box that is labeled **Certificate label**. This text box is a new feature of IBM MQ V8.0 that you can use to specify different certificates for each channel. In this exercise, you use the default certificate that is specified at the queue manager level, so leave it blank. Click **OK** to continue.

- \_\_\_ 52. Repeat steps 4 and 5 for the **QM1.TO.WINQM1** receiver channel.

53. Since changes were made to the SSL configuration for the queue manager, you need to either restart the queue manager or refresh the SSL configuration settings. Right-click the **WINQM1** queue manager entry in the IBM MQ Explorer and click the **Security > Refresh SSL** menu item.



54. Click **Yes** when prompted.



55. Proceed to the next section to configure the **QM1** queue manager that is hosted on the Appliance.



#### REFERENCE ONLY:

The following steps 56 – 74 for configuring the IBM MQ Appliance queue manager for SSL/TLS channels are for your reference. You need to stop here for the hands-on exercise. Use the following steps in your environment to configure the IBM MQ Appliance queue manager for SSL/TLS channels.

- \_\_\_ 56. Switch to the PuTTY session (or the Appliance's console window) and ensure that you are in IBM MQ administration mode by entering the `mqcli` command (if necessary).

```
M2000# mqcli
M2000(mqcli)# _
```

- \_\_\_ 57. Create a self-signed certificate for the QM1 queue manager by entering the following command:

```
createcert -m QM1 -dn "CN=MQAppl1, O=IBM, C=US" -label ibmwebspheremqqm1
```

```
M2000(mqcli)# createcert -m QM1 -dn "CN=MQAppl1, O=IBM, C=US" -label ibmwebspheremqqm1
Certificate has been extracted to 'mqpubcert://QM1_ibmwebspheremqqm1'.
M2000(mqcli)# _
```

Notice that you specified a value for `-label` that matches the **CERTLABEL** value of **QM1**. After the self-signed certificate is generated, the public part of the certificate is extracted to a file that is placed in the Appliance's `mqpubcert://` file system. The certificate's file name was generated for you by default. Notice that the file name was displayed when the command completed. In the example above, the name of the generated file is `QM1_ibmwebspheremqqm1`.

- \_\_\_ 58. The certificate for **QM1** must now be transferred to the Windows server so that it can be imported into **WINQM1**'s keystore file. Use the following steps to transfer the certificate:

- \_\_\_ a. Exit the IBM MQ administration mode by entering the `top` command.

```
M2000(mqcli)# top
M2000# _
```

- \_\_\_ b. Enter the configuration mode for the Appliance by entering the `config` command.

```
M2000# config
Global configuration mode
M2000(config)# _
```

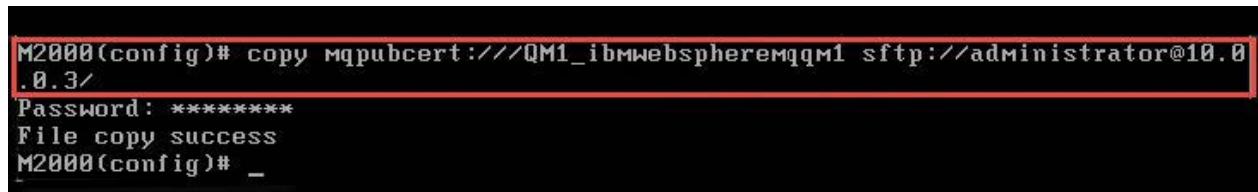
- \_\_\_ c. Transfer the certificate to the Windows server by entering the following command (substitute the proper IP address if different from what is shown):

```
copy mqpubcert:///QM1_ibmwebspheremq1 sftp://administrator@10.0.0.3/
```

**Note:** The path for the **mqpubcert** container has three forward slashes.

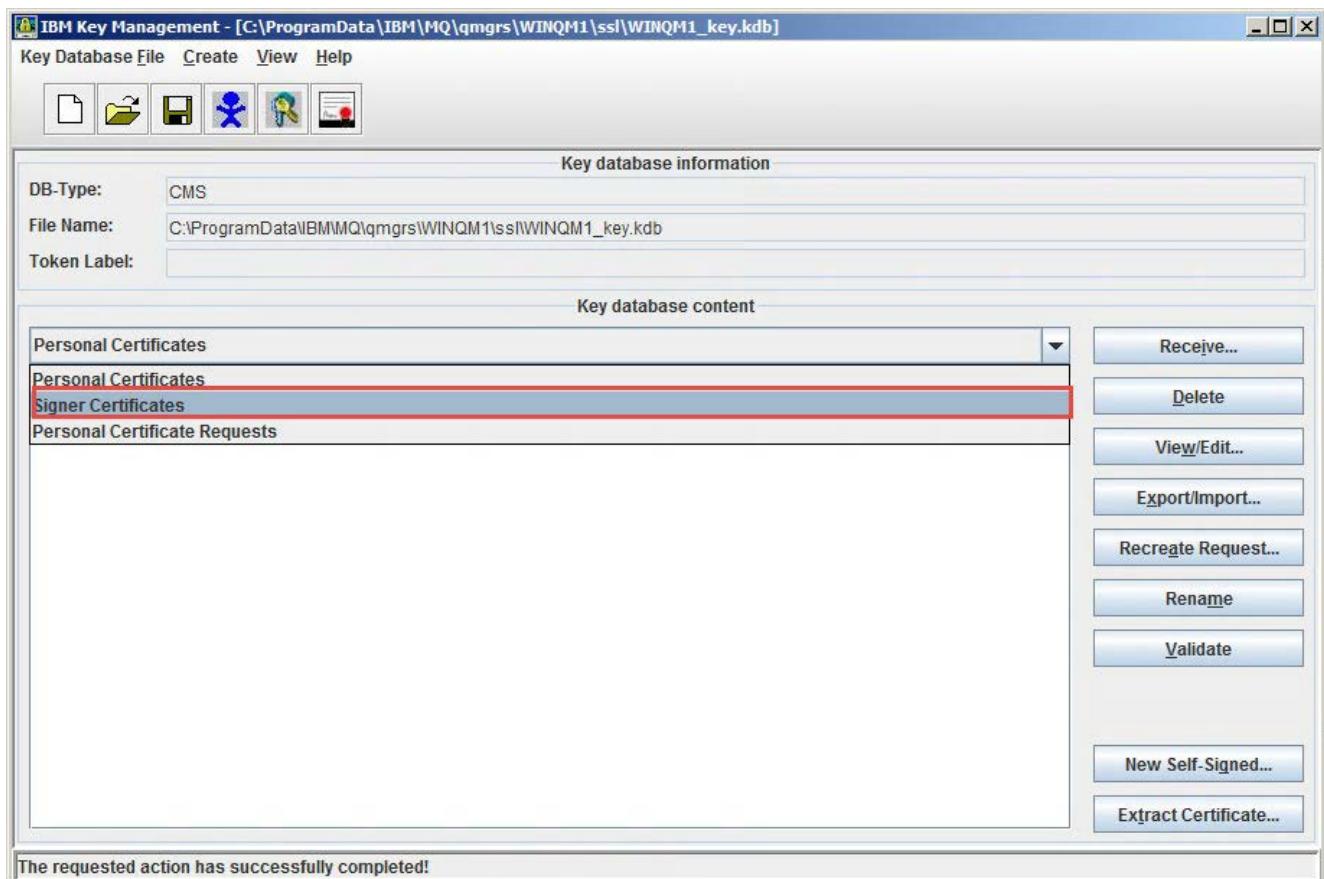
Enter `passw0rd` when prompted for a password.

**Note:** The user ID and password that are passed on this command are the ones that the SFTP server uses, not the IBM MQ Appliance.



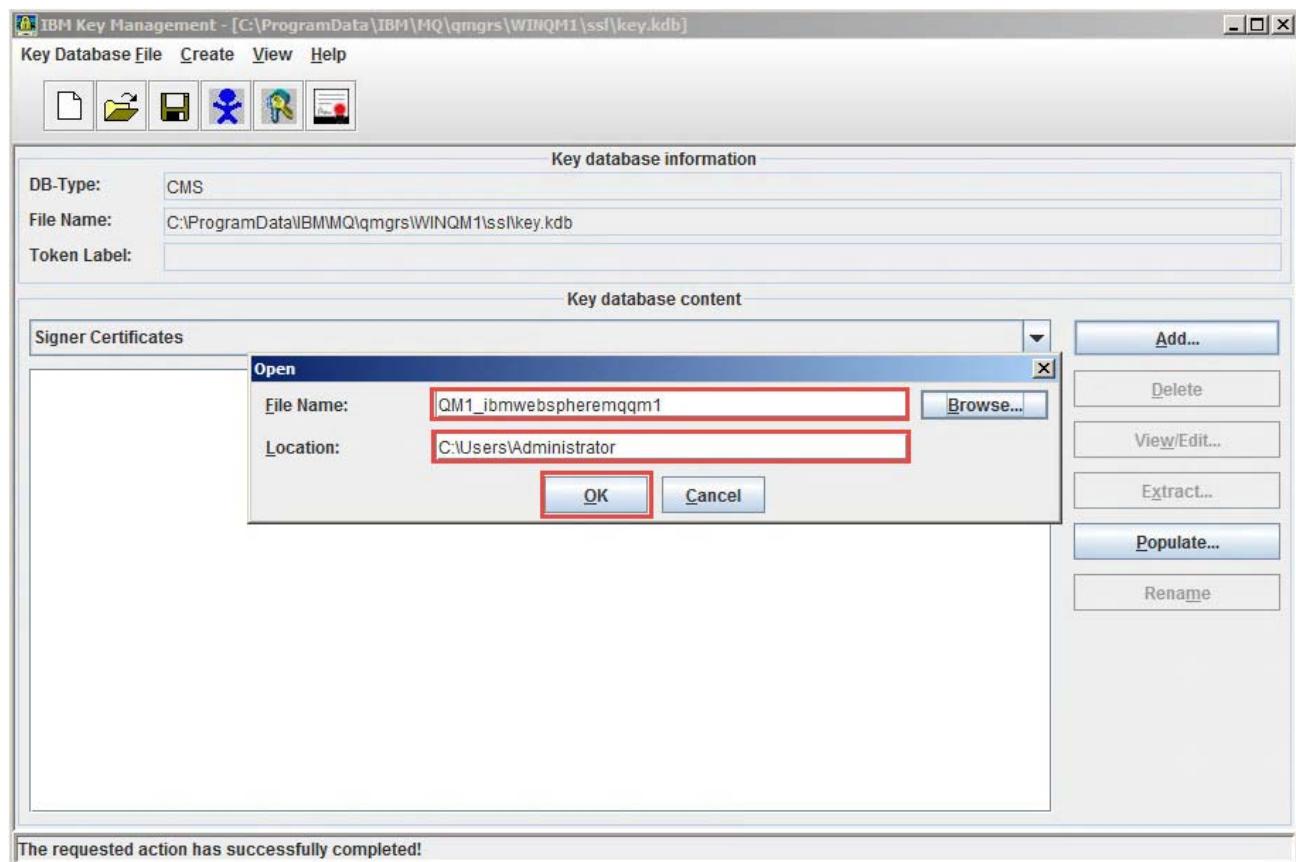
```
M2000(config)# copy mqpubcert:///QM1_ibmwebspheremq1 sftp://administrator@10.0.0.3/
Password: *****
File copy success
M2000(config)# _
```

- \_\_\_ 59. The certificate must now be imported into **WINQM1**'s keystore to enable the queue manager to be able to participate in SSL/TLS protected sessions. Using the following steps, import this certificate:
- \_\_\_ a. Return to the **IBM Key Management** window and select **Signer Certificates** in the list box.



### Exercise 5. Security setup

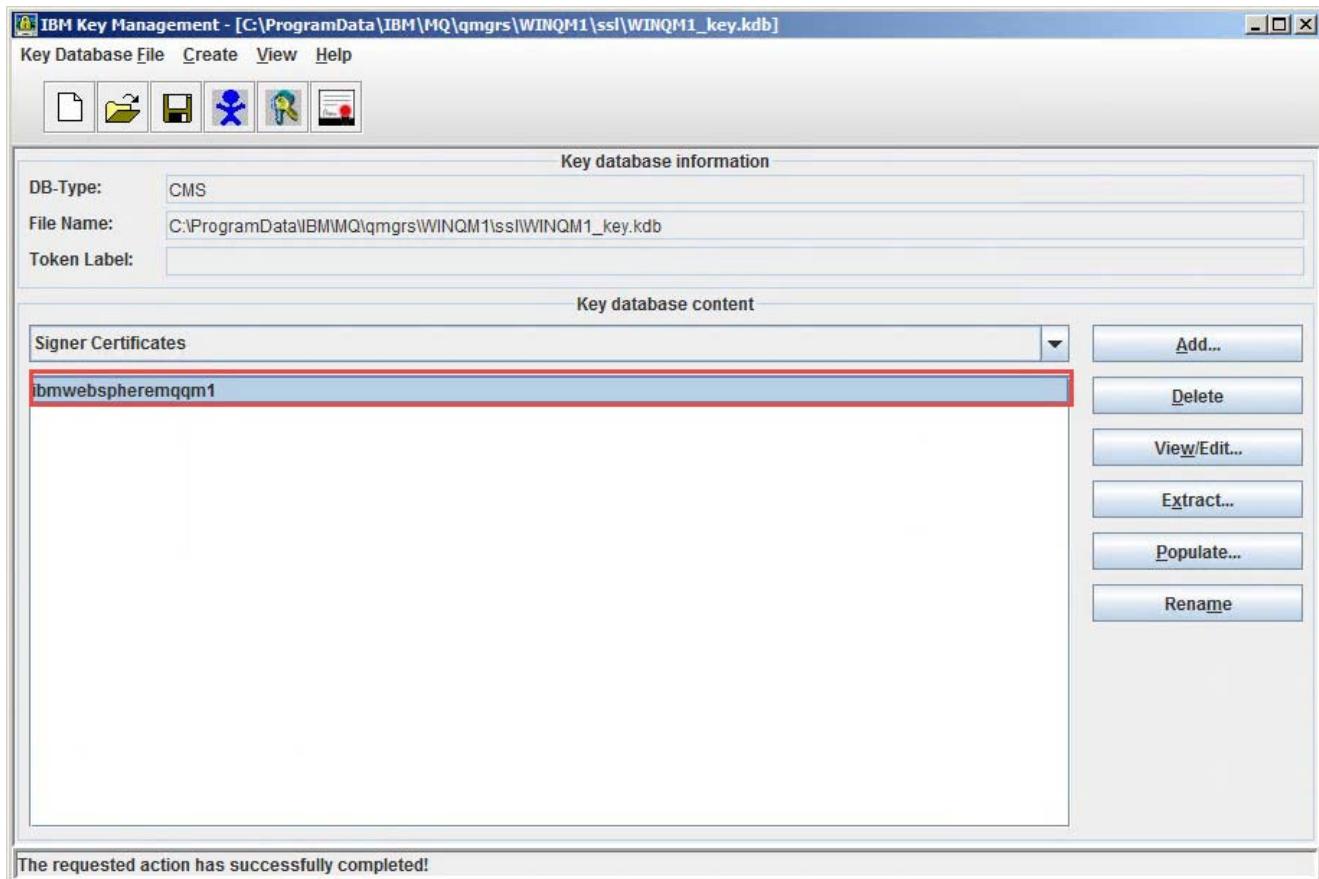
- \_\_\_ b. Click **Add** to select the certificate to import. Navigate to the C:\Users\Administrator directory and select the certificate for the **QM1** queue manager. Click **OK**.



- \_\_\_ c. Enter `ibmwebspheremqqm1` for the label name and click **OK**.

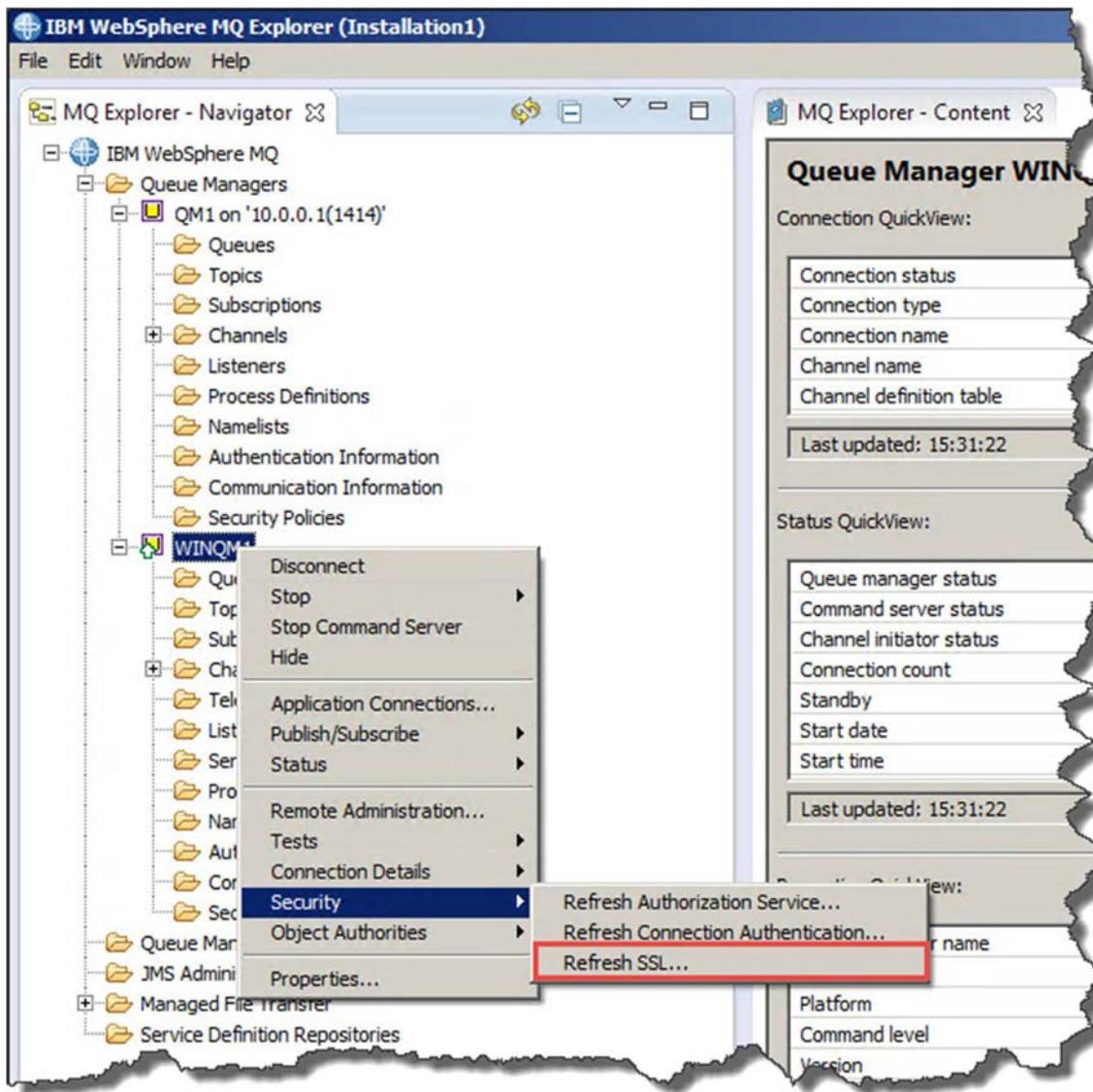


- \_\_\_ d. The public certificate for the **QM1** queue manager is now available for the WINQM1 queue manager to use.



- \_\_\_ e. Close the **IBM Key Management** window.

- f. You must now refresh the SSL configuration (again) for the **WINQM1** queue manager. Return to the IBM MQ Explorer window, right-click the **WINQM1** queue manager in the IBM MQ Explorer, and click the **Security > Refresh SSL** menu item.



- g. Click **Yes** when prompted.



- \_\_\_ h. The amount of time that is required to refresh the SSL configuration varies depending on the activity level of the queue manager and its active channels. You might get a warning message that states that the operation timed out. Continue with the following steps while the operation continues in the background.
- \_\_\_ 60. You must now transfer the signer certificate for the **WINQM1** queue manager (exported earlier) to the Appliance. Switch back to the PuTTY session (or the Appliance's console window) and enter the following command:

```
copy sftp://administrator@10.0.0.3/winqm1_cert.arm mqpubcert:
///ibmwebspheremqwinqm1
```

**Note:** The path for the **mqpubcert** container has three forward slashes.

```
M2000(config)# copy sftp://administrator@10.0.0.3/winqm1_cert.arm mqpubcert:///ibmwebspheremqwinqm1
password: *****
File copy success
M2000(config)# _
```

Enter `passw0rd` as the password when prompted.

- \_\_\_ 61. Now you add the public certificate for the **WINQM1** queue manager to the keystore of **QM1**. To complete this step, you must be in the IBM MQ administration mode. Exit the Appliance configuration mode by entering the `top` command, and then go to IBM MQ administration mode by entering the `mqcli` command.

```
M2000(config)# top
M2000# mqcli
M2000(mqcli)# _
```

- \_\_\_ 62. Enter the following command to import the certificate:

```
addcert -m QM1 -label ibmwebspheremqwinqm1 -file ibmwebspheremqwinqm1
```

```
M2000(mqcli)# addcert -m QM1 -label ibmwebspheremqwinqm1 -file ibmwebspheremqwinqm1
5724-H72 (C) Copyright IBM Corp. 1994, 2014.
M2000(mqcli)# _
```

- \_\_\_ 63. The sender and receiver channels must now be configured to support the same cipher specifications that the **WINQM1** channels are using. Start the QM command environment by using the following command: `runmqsc QM1`

```
M2000(mqcli)# runmqsc QM1
5724-H72 (C) Copyright IBM Corp. 1994, 2014.
Starting MQSC for queue Manager QM1.
_
```

- \_\_ 64. Enter the following commands to specify the appropriate value for the SSLCIPH property:

```
ALTER CHANNEL(QM1.TO.WINQM1) CHLTYPE(SDR) SSLCIPH(TLS_RSA_WITH_AES_128_CBC_SHA)
ALTER CHANNEL(WINQM1.TO.QM1) CHLTYPE(RCVR) SSLCIPH(TLS_RSA_WITH_AES_128_CBC_SHA)
```

```
ALTER CHANNEL(QM1.TO.WINQM1) CHLTYPE(SDR) SSLCIPH(TLS_RSA_WITH_AES_128_CBC_SHA)
 1 : ALTER CHANNEL(QM1.TO.WINQM1) CHLTYPE(SDR) SSLCIPH(TLS_RSA_WITH_AES_128_
CBC_SHA)
AMQ8016: IBM MQ Appliance channel changed.
ALTER CHANNEL(WINQM1.TO.QM1) CHLTYPE(RCVR) SSLCIPH(TLS_RSA_WITH_AES_128_CBC_SHA)
 2 : ALTER CHANNEL(WINQM1.TO.QM1) CHLTYPE(RCVR) SSLCIPH(TLS_RSA_WITH_AES_128_
CBC_SHA)
AMQ8016: IBM MQ Appliance channel changed.
-
```

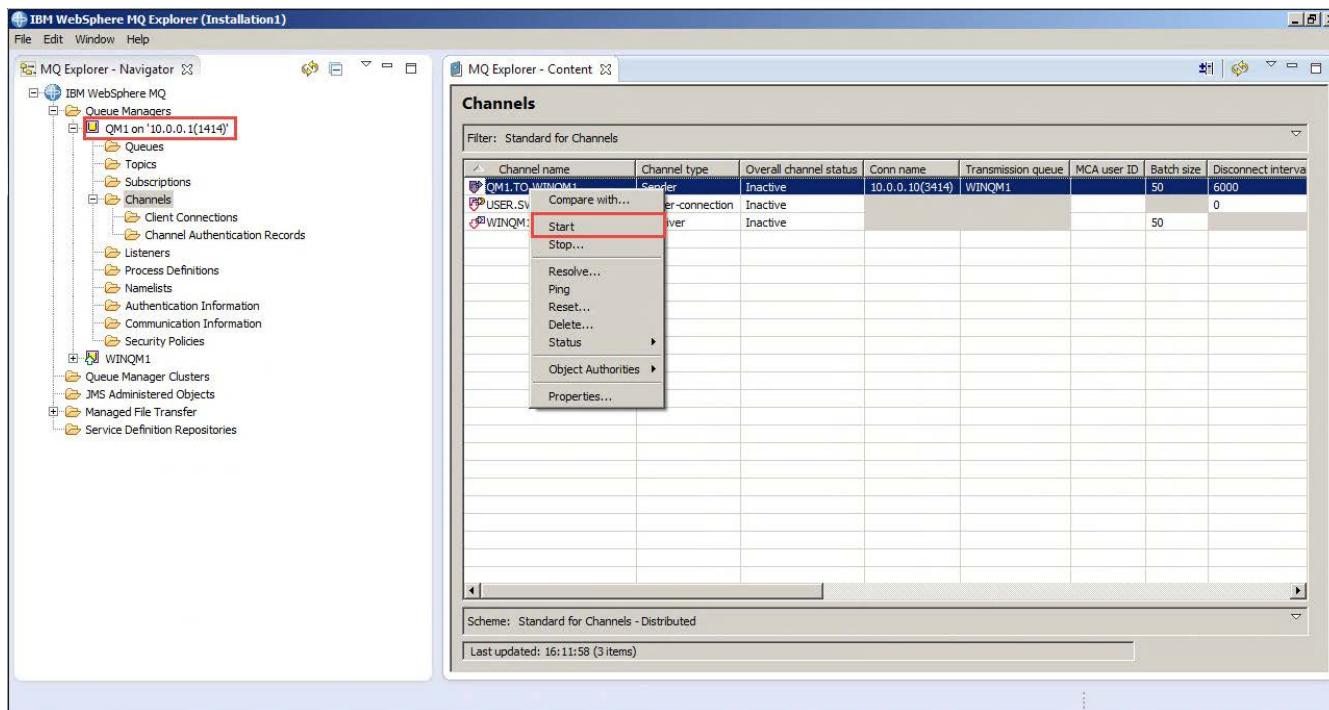
- \_\_ 65. Refresh the SSL security cache for the queue manager by entering the following command:

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

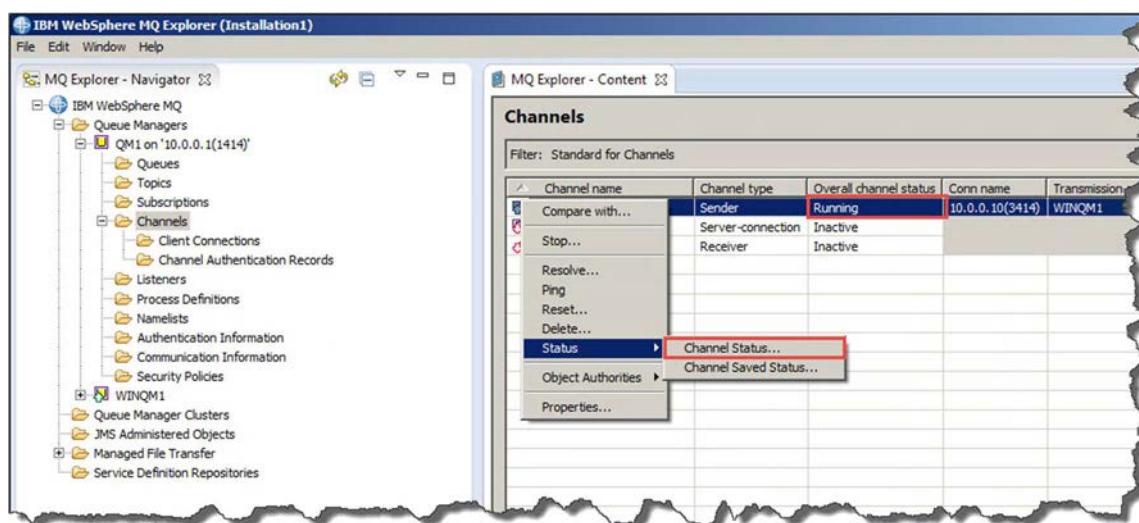
```
REFRESH SECURITY TYPE(SSL)
 3 : REFRESH SECURITY TYPE(SSL)
AMQ8560: IBM MQ Appliance security cache refreshed.
-
```

## 5.5. Verify SSL/TLS configuration

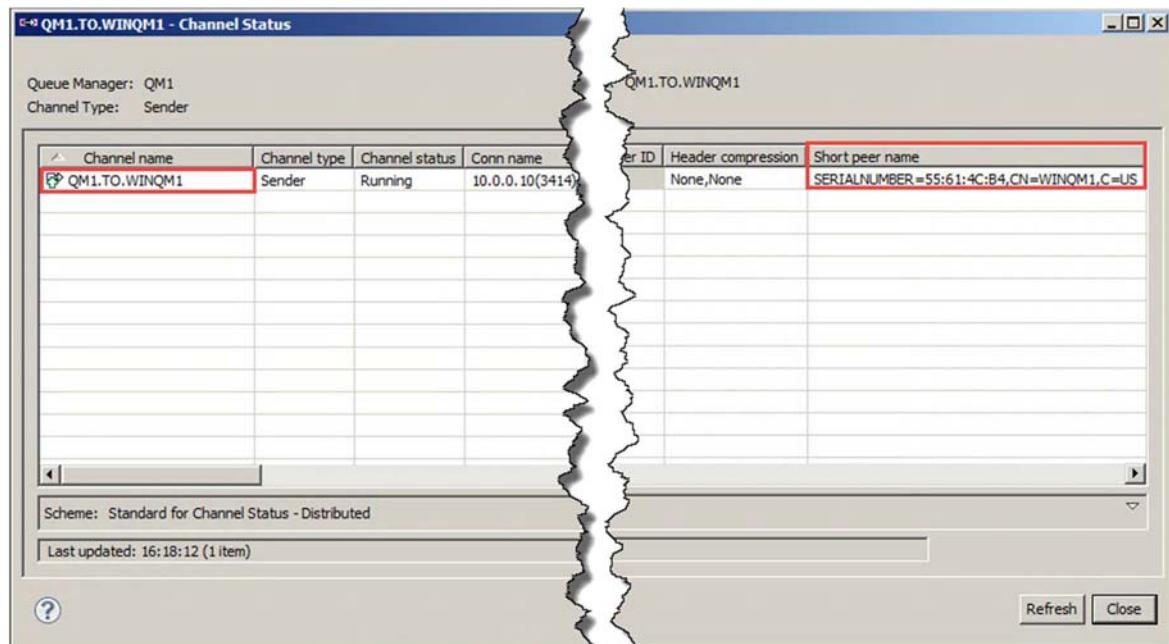
- 66. To verify that your SSL/TLS configuration is correct, you need to start the channels and verify that SSL attributes are in effect. Switch back to the Windows image, and then use the IBM MQ Explorer to start the sender channels for each queue manager and verify the SSL status.
- a. Expand the tree for **QM1** to display **Channels**. Stop the **QM1.TO.WINQM1** channel unless it is in **Stopped** or **Inactive** state, and then start (restart) the channel.



- b. After a few moments, the channel should reach a status of **Running**. As soon as it reaches running status, right-click the channel and click the **Channel Status** menu item.



- c. A status window appears. This window has a number of columns that report on the channel status. Scroll to the right until you see a column that is labeled **Short peer name**. Presence of an entry in this column indicates that SSL/TLS protection is in effect, and shows the serial number and other information of the certificate that is in use.



- d. Repeat steps a – c for the **WINQM1.TO.QM1** channel that is part of the **WINQM1** queue manager.

## 5.6. Configuring LDAP

### Overview of IBM MQ usage of an LDAP repository

IBM MQ Version 8.0.0.2 introduces new security capabilities where an LDAP repository can now be used for *authentication* and *authorization* purposes. It is important to understand that these two use cases are distinct.

- Authentication: A queue manager can be configured to require an application to present a user ID for authentication before granting access. The queue manager can be configured to accept either an O/S or an LDAP user ID when an application connects to the queue manager. For LDAP-based authentication, it is not necessary that an LDAP user ID is defined as a local O/S user.
  - Authorization: LDAP authorization is available on the following platforms:
    - UNIX platforms
    - IBM i
    - Messaging Appliance
- 

**N**

Queue managers that are hosted on a Windows platform do not support LDAP authorization.

As soon as the user ID is authenticated, the queue manager's object authority manager (OAM) handles the authorization functions to manage access to IBM MQ objects. You can configure a queue manager to present one of two user IDs to the OAM for authorization purposes:

- The user ID that is associated with the application that is connected to the queue manager; that is, the O/S user ID that the application is running under.
- The user ID was used during the authentication phase of connecting to the queue manager.

The **ADOPTCTX** attribute on the **AUTHINFO** object that is active for the queue manager determines which method of authorization is used.

Changing the authorization processing method on a queue manager requires careful planning to avoid accidentally blocking all user access to a queue manager. OAM security authorizations are associated with the authorization method in place when they are configured. If you change from O/S authorization to LDAP authorization, any existing O/S authorization rules that were set become inactive and invisible. Likewise, when switching back from LDAP to O/S based authorization, all LDAP authorizations that were defined become inactive and invisible, restoring the original O/S rules.

---

### LDAP fundamentals

A user ID is stored as a record in an LDAP repository and has a number of attributes that are associated with it. The specific attributes that are available, and which of those attributes are mandatory, are

determined according to the **objectClass** that the records are derived from. For this exercise, you have user IDs that are a part of the **inetOrgPerson** objectClass and group IDs that are a part of the **groupOfNames** objectClass. When configuring a queue manager to use an LDAP user repository, more must be done than to merely configure the queue manager to connect to the LDAP repository. User ID records that are defined in an LDAP repository have a hierarchical structure. To identify a specific record, you must be familiar with the directory structure. You then use this information to properly configure the queue manager.

An example of identifying a specific user that uses a fully qualified domain name (FQDN) would be:

```
cn=wmbuser1, ou=users, ou=wmbv8, o=ibm, c=us
```

Therefore, an IBM MQ application might connect to the queue manager and present an **FQDN** as its user ID. However, this information is a great deal to provide. It would be simpler to configure the queue manager to assume that all user IDs that are presented are found in one specific branch of the hierarchy. Then, the queue manager would add that portion of the hierarchy to any user ID that the application provides.

This provision is one of the purposes of a queue manager's **AUTHINFO** object. The **BASEDNU** attribute of an **AUTHINFO** object is used to identify the portion of the **FQDN** that is common for all user IDs. An **AUTHINFO** object also has a **USRFIELD** attribute that can be used to help compose an LDAP user ID. Examine the following table to see how the **AUTHINFO** attributes are used to compose LDAP user IDs.

*Table 5.*

| Application provides                            | USRFIELD | BASEDNU                                 |
|-------------------------------------------------|----------|-----------------------------------------|
| cn=wmbuser1, ou=users,<br>ou=wmbv8, o=ibm, c=us |          |                                         |
| cn=wmbuser1                                     |          | Adds ou=users, ou=wmbv8,<br>o=ibm, c=us |
| wmbuser1                                        | Adds cn= | Adds ou=users, ou=wmbv8,<br>o=ibm, c=us |



N

A similar set of attributes can manage group IDs.

## Gather LDAP server data

Like many other software components, an LDAP server has a wide range of options that can be used to store and retrieve entries. To enable a queue manager to use an LDAP repository, you must configure queue manager objects to properly match LDAP objects. An instance of IBM's Tivoli Directory Server V6.2 is installed in the Windows image to support this exercise. Before starting this exercise, note the

following information about the LDAP server:

*Table 6.*

| Entry                     | Description                                                                                                                                                                                                                                                                                                                                                                                       | Value                                |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
| LDAP server name          | Host name and IP address of server.<br>Include the port number in parentheses unless it is the default.                                                                                                                                                                                                                                                                                           | 10.0.0.3                             |
| User name                 | A valid user ID that the queue manager can use to query the LDAP                                                                                                                                                                                                                                                                                                                                  | cn=root                              |
| Password                  | The password for the previously mentioned user                                                                                                                                                                                                                                                                                                                                                    | db2admin                             |
| Equivalent short user     | The LDAP attribute that is used to map between an LDAP entry and the underlying OS. Examples for the <code>inetOrgperson</code> LDAP object class would be either <code>sn</code> or <code>uid</code> .                                                                                                                                                                                           | sn                                   |
| User object class         | The LDAP object class that the user ID record is derived from.                                                                                                                                                                                                                                                                                                                                    | inetOrgPerson                        |
| Qualifying user field     | The LDAP attribute that is used to identify the user. Refer to the previous section for an example of how to determine what value to use.                                                                                                                                                                                                                                                         | cn                                   |
| Use secure communications | Determines whether to configure SSL/TLS communications between the queue manager and the LDAP repository. For this exercise, leave this value at NO.                                                                                                                                                                                                                                              | NO                                   |
| Authorization method      | Is used to determine how the queue manager should query for user and group IDs. For this exercise, specify <code>SEARCHGRP</code> to indicate that you are going to search for users and groups in an LDAP directory. This command also specifies that the queue manager should use the Qualifying group field attribute to identify which group attribute to use to search for group membership. | SEARCHGRP                            |
| Allow nested groups       | Is used to determine whether access rights can be aggregated through a group's hierarchy.                                                                                                                                                                                                                                                                                                         | YES                                  |
| User base DN              | Is used to compose an FQDN for a user ID as described previously.                                                                                                                                                                                                                                                                                                                                 | ou=users,<br>ou=wmbv8<br>o=ibm, c=us |

Table 6.

| Entry                  | Description                                                                                                                                               | Value                               |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| Group base DN          | Is used to compose an FQDN for a group ID as described previously.                                                                                        | ou=users<br>ou=wmbv8<br>o=ibm, c=us |
| Group object class     | The LDAP object class that the group ID record is derived from.                                                                                           | groupOfNames                        |
| Qualifying group field | The LDAP attribute that is used to identify the group. Refer to the previous section for an example of how to determine what value to use.                | cn                                  |
| Group membership field | The LDAP attribute that is used to identify the members of the group. Refer to the previous section for an example of how to determine what value to use. | member                              |

The LDAP server that is used for this exercise contains five user IDs and one group. The user IDs are:

Table 7.

| User ID                                      | Password |
|----------------------------------------------|----------|
| cn=wmbuser1, ou=users, ou=wmbv8, o=ibm, c=us | user1pw  |
| cn=wmbuser2, ou=users, ou=wmbv8, o=ibm, c=us | user2pw  |
| cn=wmbuser3, ou=users, ou=wmbv8, o=ibm, c=us | user3pw  |
| cn=wmbuser4, ou=users, ou=wmbv8, o=ibm, c=us | user4pw  |
| cn=wmbuser5, ou=users, ou=wmbv8, o=ibm, c=us | user5pw  |

## Prepare the queue manager

- \_\_\_ 67. To support the use of an LDAP, a queue manager needs to be running at COMMAND LEVEL 801. By default, an Appliance-based queue manager runs at COMMAND LEVEL 801. However, an IBM MQ-based queue manager does not. To verify the COMMAND LEVEL of the queue manager, use the **runmqsc** command shell and enter the following command: **DIS QMGR**
- \_\_\_ 68. If the **COMMAND LEVEL** is not at 801, run the following commands to set it:
  - \_\_\_ a. **endmqm -i <queue\_manager\_name>**
  - \_\_\_ b. **strmqm -e CMDLEVEL=801 <queue\_manager\_name>**
  - \_\_\_ c. **strmqm <queue\_manager\_name>**

- \_\_\_ 69. Follow these steps to configure the queue manager to connect to the LDAP server.

**N**

For convenience, you can cut and paste these commands from `C:\Lab05\Commands\Command Snippets.txt` into the PuTTY session (not the Appliance's console window).

---

- \_\_\_ a. Use the **runmqsc QM1** program to so that mqsc authorization commands can be entered.
- \_\_\_ b. Use the following command to create a new AUTHINFO object to reference the LDAP directory. Note: You must substitute values in the command with those values that you collected from the LDAP server:

```
DEFINE AUTHINFO(USE.LDAP) AUTHTYPE(IDPWLDAP) ADOPTCTX(YES)
CONNNAME(10.0.0.3) CHCKCLNT(REQUIRED) CHCKLOCL(REQUIRED)
CLASSGRP('groupOfNames') CLASSUSR('inetOrgPerson') FINDGRP('member')
BASEDNG('ou=users, ou=wmbv8, o=ibm, c=us') BASEDNU('ou=users, ou=wmbv8,
o=ibm, c=us') LDAPUSER('cn=root') LDAPPWD('db2admin') SHORTUSR('sn')
GRPFIELD('cn') USRFIELD('cn') AUTHORMD(SEARCHGRP) NESTGRP(YES)
```

- \_\_\_ c. Use the following command to modify the queue manager to use the new AUTHINFO object:
- ALTER QMGR CONNAUTH(USE.LDAP)
- \_\_\_ d. Use the following command to refresh the security settings of the queue manager:

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

Do not exit the **runmqsc** command shell until you have completed the next two steps.

- \_\_\_ 70. Now that the queue manager is configured for LDAP and security for the queue manager is refreshed, you must use valid user IDs from the LDAP for both authentication and authorization. To this point in your configuration, none of the LDAP user IDs have any access to the queue manager or any of its objects until you start granting explicit authorities to all of the necessary objects.

Also, keep in mind that the IBM MQ “superuser” group of **mqm** is known only to the O/S that the queue manager is running on. You can no longer use membership within that group as you work with the queue manager’s objects. For this exercise, you use an LDAP group that is named **authorized** to function the same as the **mqm** group does in an O/S-based authorization configuration. Complete the following steps to configure the **authorized** LDAP group to act as an IBM MQ superuser.

- \_\_\_ a. Use the following command to enable a member of the **authorized** group to connect to the queue manager:

```
SET AUTHREC OBJTYPE(QMGR) GROUP('authorized') AUTHADD(ALL)
```

- \_\_\_ b. Use the following commands to enable access to the queue manager from the IBM MQ Explorer and **runmqsc** command shell:

```
SET AUTHREC PROFILE(SYSTEM.MQEXPLORER.REPLY.MODEL)
OBJTYPE(QUEUE) GROUP('authorized') AUTHADD(ALL)
SET AUTHREC PROFILE(SYSTEM.ADMIN.COMMAND.QUEUE) OBJTYPE(QUEUE)
GROUP('authorized') AUTHADD(ALL)
SET AUTHREC PROFILE(SYSTEM.MQSC.REPLY.QUEUE) OBJTYPE(QUEUE)
GROUP('authorized') AUTHADD(ALL)
SET AUTHREC PROFILE(USER.SVRCONN) OBJTYPE(CHANNEL)
GROUP('authorized') AUTHADD(ALL)
REFRESH SECURITY
```

- \_\_\_ c. Exit the **runmqsc** command shell.
- \_\_\_ d. A number of further authorizations must be set to provide the **authorized** group full queue manager administrative rights. To simplify this task, the remaining authorizations were added to an mqsc script. Open a Windows command prompt, navigate to the `C:\Lab05\MQSC` directory, and then enter the following commands:

```
SET MQSERVER=USER.SVRCONN/TCP/192.168.142.138(1415)
runmqsc -c -u wmbuser1 QM1 < SET_authorized_ACCESS.mqsc
```

Notice that the mqsc file contains the password for `wmbuser1` as the first line of the file. This first line is necessary to enable the password to be passed blindly to the `runmqsc` command shell.

## Verify LDAP authentication and authorization

Now that LDAP authorization is configured, the user IDs that are members of the **authorized** LDAP group should be able to access the queue manager and all of its objects. However, the user IDs that are not in the **authorized** group should not have any access to the queue manager. Complete the following steps to test your configuration:

- \_\_\_ 71. Open the IBM MQ Explorer, right-click the QM1 queue manager, and then click the **Connection Details > Properties** menu item.
- \_\_\_ 72. Select **Userid** from the list. Ensure that the check boxes are selected as shown, then enter the user ID you want to test in the **Userid** text box, and click **Enter password** to enter the password. Click **OK** when done.
- \_\_\_ 73. Right-click the **QM1** entry and click the **Connect** menu item. Your access to the queue manager should be granted or denied based on the user ID that you entered.
- \_\_\_ 74. Disconnect from **QM1** and retry with a different user ID. You should see that the LDAP server now controls your access rights.

You have now completed this exercise. Close all windows.

## End of exercise

## Exercise review and wrap-up

In this lab exercise, you explored the unique security aspects of the MQ Appliance.

# Exercise 6. Migrating queue managers to the IBM MQ Appliance

## Estimated time

00:45

## Overview

In this exercise, you explore the steps that are required to migrate an existing queue manager that is running on IBM MQ on Windows to the IBM MQ Appliance.

## Objectives

After completing this exercise, you should be able to:

- Migrate an IBM MQ queue manager from IBM MQ on Windows to an IBM MQ Appliance

## Requirements

This exercise assumes that Exercise 1 is completed and that the IBM MQ Appliance image MQAppl1 is started.

The lab environment consists of a single virtual appliance image (MQAppl1) and a Windows environment that has your existing queue manager. You should use the same CSIDE environment that you created for Exercise 1. The virtual appliance that you use for this exercise is **MQAppl1**. If using VMware, you should be using **the MQAppl1 or MQAppl1 – Lab1 – Solution VM** and the **ZM051\_1.0-WS2008** VM. You must suspend or shut down all other VMs.

## Exercise instructions

# Differences between queue managers that are running on the IBM MQ Appliance and an IBM MQ installation

IBM MQ Appliance queue managers are similar in their capabilities to IBM MQ queue managers that are hosted on supported UNIX and Linux platforms, although some differences do exist.

## Exits and services

You cannot run user code on the IBM MQ Appliance. Any attempts to create administrative objects that reference user code are rejected.

The following types of exits and services are not supported:

- Channel exits: Any attempt to define or alter a channel to use an exit is rejected.
- Channel auto-definition exits: Any attempt to alter a queue manager to use an exit is rejected.
- Cluster workload exits: Any attempt to alter a queue manager to use an exit is rejected.
- Data conversion exits: You cannot upload a data conversion exit to the appliance.
- Services: Any attempt to define a service is rejected.
- API exits, publish exits, and user authorization services: Stanzas about API exits, publish exits, and user authorization services cannot be added to the `qm.ini` file.
- MQTT services: MQTT services cannot be used on the appliance.
- MQLight services: MQLight services cannot be used on the appliance.

## Queue manager configuration on the IBM MQ Appliance

Queue managers on the IBM MQ Appliance are created with different default values from queue managers in IBM MQ.

- Maximum channels

On the IBM MQ Appliance, you do not need to alter the `MaxChannels` or `MaxActiveChannels` attributes to define the maximum number of channels that can concurrently connect to a queue manager. On the IBM MQ Appliance, the default value of the `MaxChannels` and `MaxActiveChannels` attributes is set to infinite.

If you want to limit the maximum number of channel instances or client connections per channel, use the per-channel `MAXINST` and `MAXINSTC` attributes on the `SVRCONN` channel definitions to define limits for each `SVRCONN` channel.

You can use the `DEFINE CHANNEL` or `ALTER CHANNEL` command to set these attributes.

- TCP network protocol

Any channels that are configured on an IBM MQ Appliance queue manager must be of TCP protocol type. The appliance does not support any other network protocols.

- User and group permissions

IBM MQ Appliance queue managers support the user-based permissions model. When an authority record is created for a user, only that user is granted access. To grant a group of users access, an authority record is required for the group.

- Circular logging

IBM MQ Appliance queue managers support only circular logging. They do not support creating a queue manager with linear logs.

When the IBM MQ Appliance supports external storage, it is expected that linear logging might be used for queue managers that you place on that external storage.

- Queue manager data

When you use the `crtmqm` command to create a queue manager on the appliance, a file system is created where all queue manager data, recovery logs, and errors logs are stored. The default size of this file system is 64 GB, but you can alter the size by using the `-fs` parameter with the `crtmqm` command.

- Applications connecting to a queue manager

An application that connects to a queue manager that is running on an IBM MQ Appliance is different from an application that runs in an IBM MQ installation. Queue managers that are running on the appliance support only applications that connect by using TCP, over IBM MQ channels.

## Differences between administering an IBM MQ Appliance and an IBM MQ installation

Many IBM MQ administrative concepts and commands are supported on the appliance, although some differences do exist. You can use the IBM MQ control commands on the IBM MQ Appliance command line. However, not all of the control commands are supported, and some of the control commands have different parameters from the IBM MQ equivalent. You must refer to the IBM MQ Appliances IBM Knowledge Center for a list of the commands that are not supported on the IBM MQ Appliance, and for the supported commands, what the differences are.

## Overview of migration

You can consolidate your IBM MQ infrastructure by migrating existing queue manager configurations onto the IBM MQ Appliance. The IBM MQ Appliance is expected to be a good candidate for consolidation scenarios, where an existing diverse estate of IBM MQ queue managers and applications is converged into a messaging hub architecture. Features of the environment that make the appliance ideal for this use case include the system performance tuning for client connectivity, high availability capabilities, and segmentation available by using fixed storage allocations for queue managers.

A number of factors need consideration when you plan such a migration or consolidation exercise, depending on your previous IBM MQ configuration. The steps that are described in the following topics must be tailored to the particular environment that is being consolidated or migrated.

Consolidation of your IBM MQ estate means moving your queue managers from their various platforms to your IBM MQ Appliance. IBM MQ Appliance V8.0 is compatible with IBM MQ V8.0.

You use the `dmpmqcfg` command on your source system to save the configuration of a queue manager.

Running `dmpmqcfg` records a series of MQSC commands that you later run with the `rwmqsc` command.

You create a new queue manager on your target appliance, and create a connection to it on your source system. You then use the `rwmqsc` command on the source system to configure the remote queue manager.

As part of moving a queue manager, you must carefully check the details that you are exporting. If some features in the export are not supported on the IBM MQ Appliance, you must remedy this situation. In particular, be aware that you cannot run applications or services on the appliance. You must move such functionality to a client application.

You might move queue managers that are part of a distributed configuration. If you do, you must update channel definitions on other queue managers in the configuration to point to the new location of the moved queue manager on the appliance.

You move a queue manager by re-creating it on the target system. The procedure re-creates the configuration of the queue manager, it does not attempt to re-create the current state of the queue manager by, for example, unloading and reloading queues.

## 6.1. Steps to move a queue manager

The set of steps to move a queue manager are listed as follows, and you complete these steps in the exercise.

- \_\_\_ 1. Log in to the source system as a user in the IBM MQ administrators (mqm) group.
- \_\_\_ 2. Save the configuration information of the queue manager that you want to move by typing the following command:

```
dmpmqcfg -a -m QM_name > QM_file
```

Where:

- *QM\_name* is the name of the queue manager that you want to move.
- *QM\_file* is the name and path of a local file on the source system to which the configuration information is written.

- \_\_\_ 3. If the queue manager is part of a distributed configuration, quiesce the queue manager. Ensure that no messages are in flight, and then stop the queue manager.
- \_\_\_ 4. Create and start a new target queue manager on the IBM MQ Appliance. You can use the IBM MQ Console to do this action, or you can use MQSC commands, with the required name and attribute values. If you want to use MQSC commands, you must complete the following steps:
  - \_\_\_ a. Connect to the IBM MQ Appliance.
  - \_\_\_ b. Log in as a user in the administrators group.
  - \_\_\_ c. Type the following command to open the IBM MQ command-line interface:  
`mqcli`
- \_\_\_ 5. Set up any user IDs that are necessary to the queue manager that you are moving.
- \_\_\_ 6. Enable a client connection to the target queue manager. You must define and start a TCP listener, define an SVRCONN channel, and allow administrator access to the queue manager by using this channel.
- \_\_\_ 7. Ensure that your exported queue manager configuration is compatible with the target IBM MQ Appliance. Edit the file that contains the queue manager configuration information if necessary. Examples are exit definitions, SERVICE definitions, and non-TCP/IP listeners. You are going to read about these incompatibilities in section “Handling incompatible features in the Queue Manager.”
- \_\_\_ 8. Import the source queue manager configuration into the target queue manager. You run these steps on the source system:
  - \_\_\_ a. Define an environment variable that is named MQSERVER to identify the channel that connects to the target queue manager. For example, the value of MQSERVER might be set to:  
`SYSTEM.ADMIN.SVRCONN/TCP/9.20.233.217(1414)`

- \_\_\_ b. Run the following command to replay on the target queue manager the commands that were exported from the source queue manager:  
`runmqsc -c QM_name < QM_file`
- \_\_\_ 9. Restore the attributes that were masked in the dmpmqcfg output and that you identified when you checked the output (see section “Substitute appropriate values for masked values” for examples). You restore attributes by using the client connection from the source system. You can either use IBM MQ Explorer, or start runmqsc interactively in client mode, and then input MQSC commands:  
`runmqsc -c QM_name`
- \_\_\_ 10. Stop and restart the queue manager on the target IBM MQ Appliance and ensure that it starts cleanly.

## 6.2. Planning for incompatible features in the queue manager

It is possible that the target IBM MQ Appliance does not support all features in your source queue manager. You should take time to plan how you intend to handle any incompatible features.

### User IDs and groups

As part of moving the queue manager, you must identify any user IDs and groups that the queue manager configuration includes and re-create them on the IBM MQ Appliance. If different user IDs and groups are created on the appliance, then you must make the appropriate changes to the dmpmqcfg output.

### Special considerations for moving a queue manager from z/OS

Queue managers on z/OS are likely to have several z/OS-specific attributes that are not supported on the IBM MQ Appliance. You must remove or comment out such attributes.

These changes do not ensure that the migrated queue manager is functionally equivalent to the original queue manager on z/OS. You must consider each of the attributes that the new queue manager does not support to decide whether its value is significant for your applications. It is also important to consider whether the behavior of the object in the new queue manager, without this attribute, is acceptable. In some cases, it might be necessary to define different objects or to set other values to achieve the same effect. This consideration also applies to differences in the default value of some attributes. For example, queues on z/OS default to non-shared so you might have several statements that replace queues, including default system queues, with non-shared versions. If your applications rely on this characteristic, this action might be the right thing to do. However, it might be the wrong thing to do because you want to preserve the default behavior of the appliance queue manager.

### Inspecting the qm.ini file for the source queue manager

Examine the `qm.ini` file and make a note of any settings that cannot be made by running the commands in the dmpmqcfg output. These settings might include, for example, log file settings. Particularly note any exit information in the configuration. IBM MQ Appliance does not support exits, so this functionality must be substituted. For example, channel authentication records can replace channel exits, and activity trace can replace API exits. See section “Editing qm.ini files on the IBM MQ Appliance” for information on how to set values in the Appliance’s `qm.ini` file.

### Applications

Applications cannot be run on the IBM MQ Appliance. You must plan to migrate any applications that are local to the queue manager to client systems. Such applications need to be rebuilt so that they can connect to the queue manager from another machine by using client connections. If any applications are run as triggered processes, they must also be converted to run on a client machine. In that case, it is necessary to run the trigger monitor in client mode and to alter the queue manager’s process definitions correspondingly.

## Exits and services

The IBM MQ Appliance does not support exits or services that are defined in the queue manager configuration. You must plan to migrate exits and services to equivalent functionality on a client system.

## Channels that use SSLv3 CipherSpecs

By default, IBM MQ v8.0.0.2 does not support SSLv3 and related CipherSpecs. If you move a queue manager to the IBM MQ Appliance that has one or more channels that use SSLv3, you can enable support for SSLv3.

## Handling incompatible features in the Queue Manager

You must check that the queue manager that you are moving to the IBM MQ Appliance is compatible with the appliance.

The `dmpmqcfg` command that you run on your source platform produces a series of MQSC commands that you run to re-create the queue manager on the target IBM MQ Appliance. Certain features are incompatible with the appliance, and you must check the `dmpmqcfg` output, and amend it if necessary, to deal with incompatible features.

The output from the `dmpmqcfg` command contains lines that are commented out with the asterisk (\*) character. Many of these values are read-only values that are set when the queue manager is created.

They cannot be affected by the commands in the `dmpmqcfg` output.

You must also check the configuration file (`qm.ini`) for the source queue manager and make a note of any non-default attributes that the `ALTER QMGR` command cannot set. These attributes are not recorded in the output from `dmpmqcfg`.

## Substitute appropriate values for masked values

The output from the `dmpmqcfg` command might include one or more masked values. If these values were replayed in commands, they would not correctly re-create the objects configuration. The values are masked to prevent sensitive data, such as passwords, from being included in clear text in the configuration dump.

Before you replay the configuration, first check the output for masked parameters such as `SSLCRYP`, `PASSWORD`, or `LDAPPWD` that are commented. You must use more commands to substitute valid values.

## Remove definitions of queue manager services

IBM MQ Appliance does not support queue manager services. You must search the `dmpmqcfg` output for any `DEFINE SERVICE` or `ALTER SERVICE` commands and remove service definitions. Services can be replaced with code in client applications.

## Remove changes to the CCSID

Remove any change to the queue manager CCSID in the `ALTER QMGR` command. The default CCSID for the IBM MQ Appliance is 819. If you must change the CCSID, use a separate command and then restart the queue manager to ensure that all processes switch to the new CCSID.

## Verify user IDs

Ensure that any user IDs specified in the commands are correctly defined on the IBM MQ Appliance. On Windows source systems, the user and group names might be in the form `name@domain`. This format is not supported on the appliance, so any such user IDs must be mapped to new user IDs on the appliance.

## Remove changes to the SSLKEYR queue manager attribute

The appliance manages the `SSLKEYR` queue manager attribute, and should not be overwritten when you replay the commands to create the queue manager configuration.

## Removing listeners from Windows queue managers

Where you are moving a queue manager from a source Windows system, you must remove any definitions for NETBIOS, SPX, and LU62 listeners from the `dmpmqcfg` output.

## Editing qm.ini files on the IBM MQ Appliance

You cannot directly edit a queue manager `qm.ini` file on the IBM MQ Appliance. However, you can use some CLI commands to work with `qm.ini` files.

- You can add a value or modify an existing value in the configuration file of a queue manager by using the `setmqini` command on the command line.
- You can delete a value from the `qm.ini` file of a queue manager by using the `setmqini` command on the command line.
- You can view the contents of a single stanza or key in a queue manager configuration file by using the `dspmqini` command on the command line.

## Preparing the Windows IBM MQ installation for the exercise

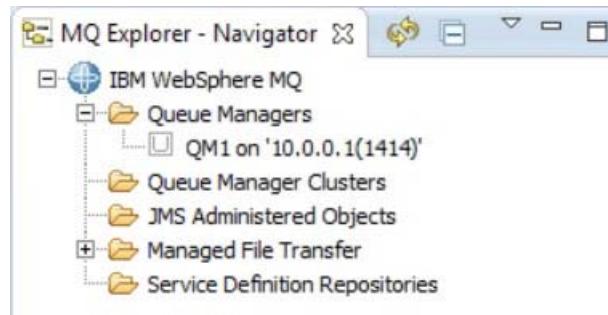
You add two queue managers to the IBM MQ installation on the Windows image that you use in the exercise. You create `APP1_QMGR` and `APP2_QMGR`. `APP1_QMGR` is the queue manager that you migrate to the IBM MQ Appliance. While you are going to add these queue managers now, the assumption is that they are here and being used, communicating between the two queue managers. You use `mqsc` scripts to update and create all of the IBM MQ objects in each queue manager.

The scenario is that you want to migrate `APP1_QMGR` and keep communication with `APP2_QMGR`, which for now stays where it is.

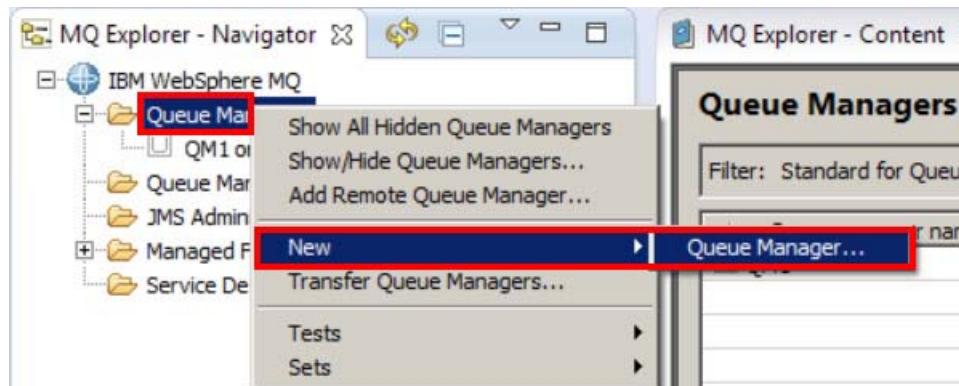
- \_\_\_ 11. Start **IBM MQ Explorer** in the Windows VM image.



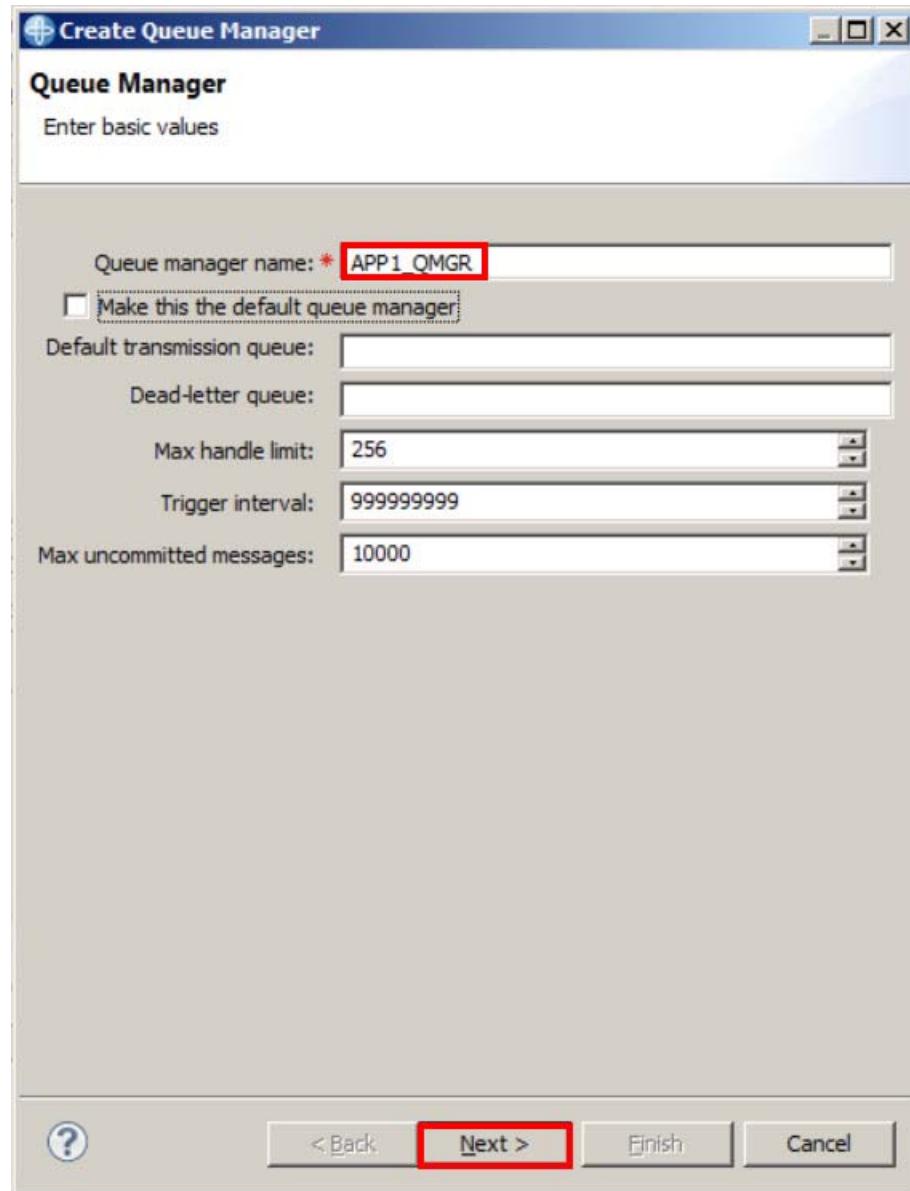
- \_\_\_ 12. Notice that you do not see any local queue managers. The first step is to create the two queue managers.



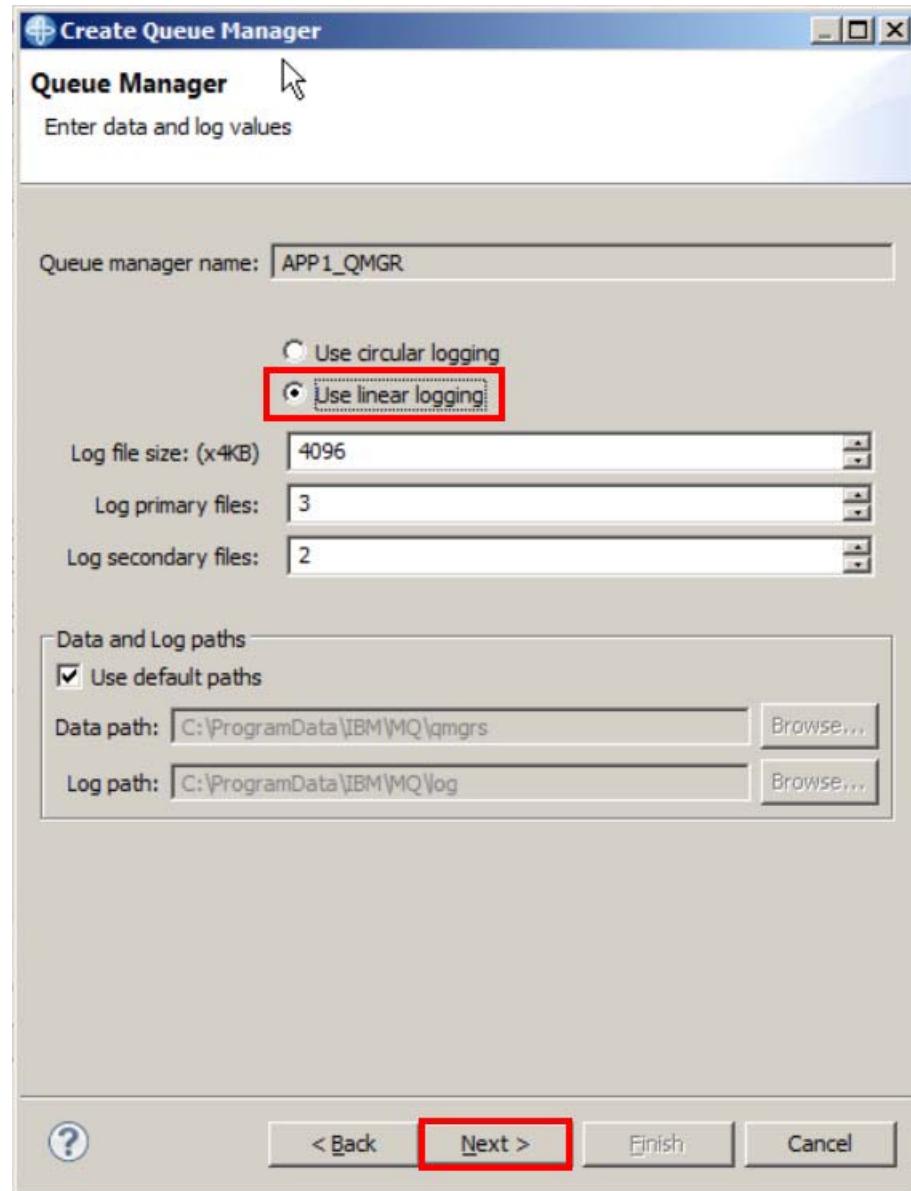
- \_\_\_ 13. Right-click the **Queue Managers** folder in the IBM MQ Explorer Navigator and click **New > Queue Manager**.



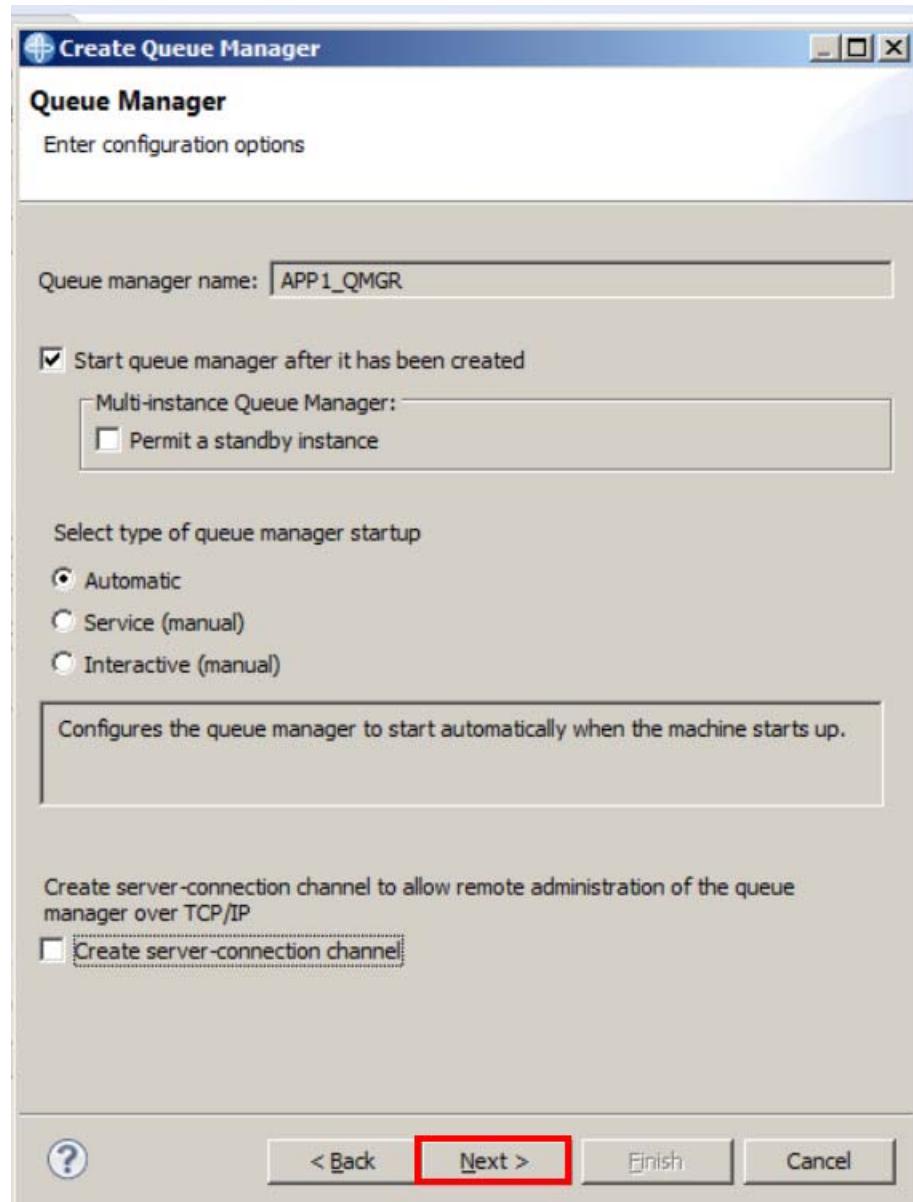
- 14. In the Create Queue Manager dialog box, enter APP1\_QMGR for the queue manager name, and click **Next**. Since you are using an mqsc script, all attributes are set from the values in the script with an ALTER QMGR command. Therefore, you do not need to worry about other parameters that are changeable after queue manager creation.



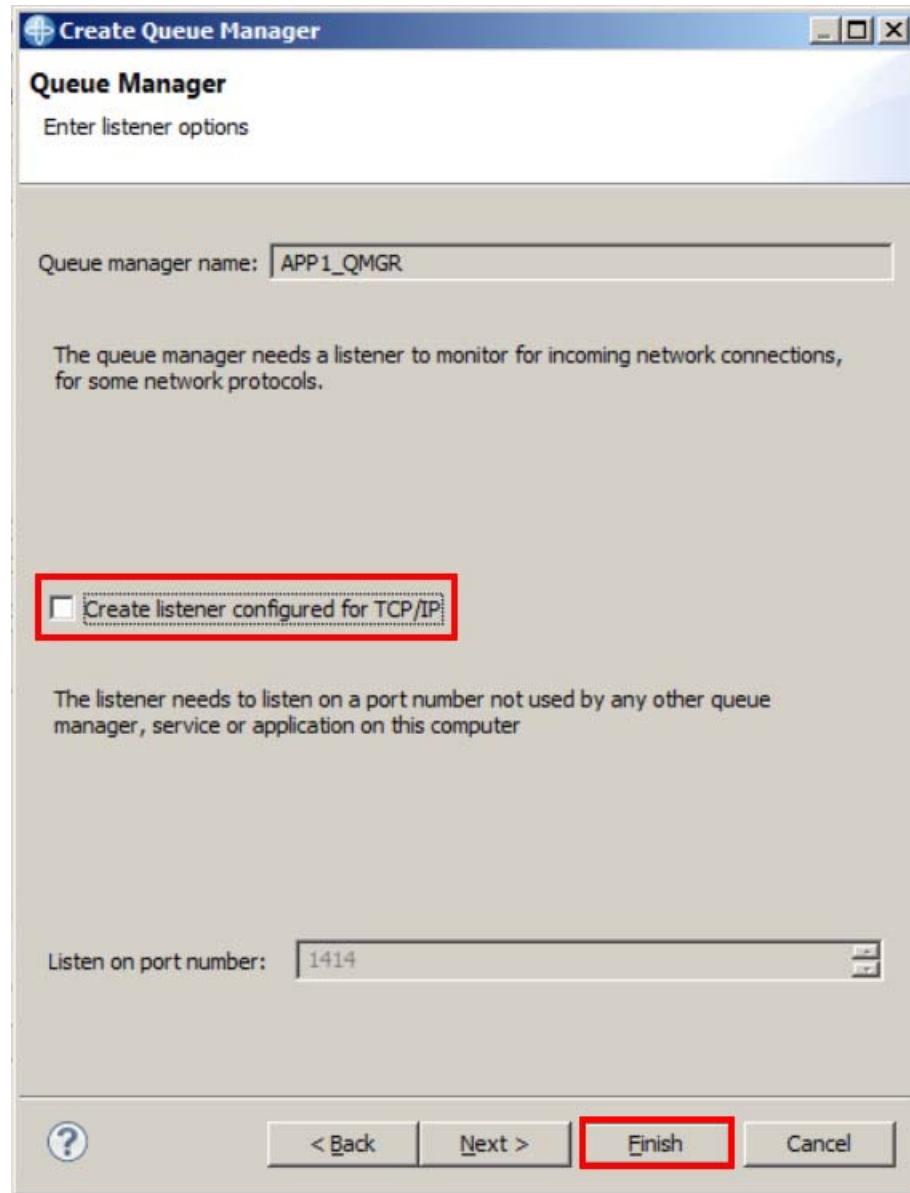
\_\_\_ 15. Select **Use linear logging** and click **Next**.



- \_\_\_ 16. Keep the defaults on this page and click **Next**.



- 17. You allow the mqsc script to create the listener, so **clear** the box **Create listener configured for TCP/IP** and click **Finish**. Note: When you first get to this panel, you are probably going to see an error: “The port is already used by another WebSphere MQ listener”. When you clear the box, the error goes away.



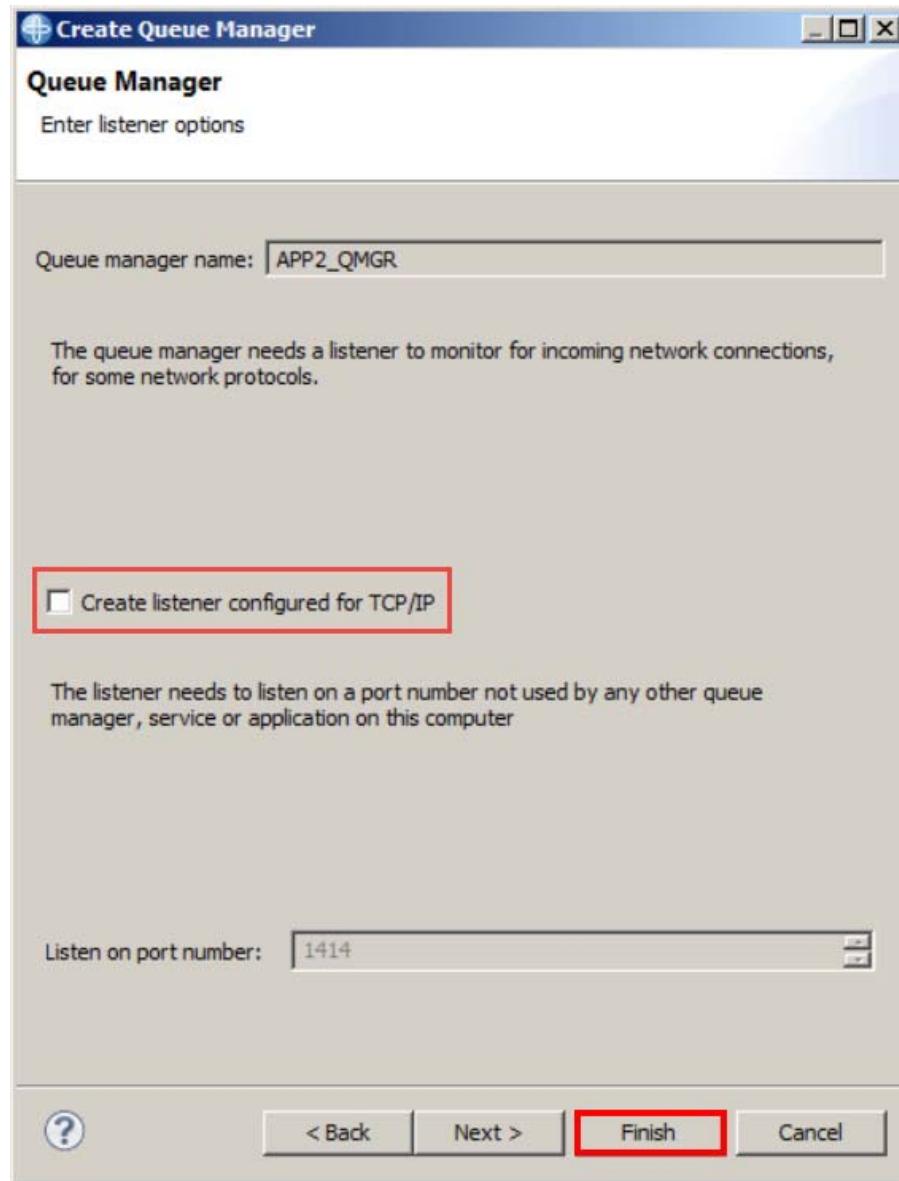
Note: When you first get to this panel, you are likely to see an error that states, “The port is already used by another WebSphere MQ listener”. When you clear the box, the error goes away.

- \_\_\_ 18. Wait for the queue manager to be created and started. It will show up in the MQ Explorer after it is created.



- \_\_\_ 19. Now create the second queue manager. Again, right-click **Queue Managers** and click **New > Queue Manager**.
- \_\_\_ 20. Enter APP2\_QMGR for the Queue manager name and click **Next**.
- \_\_\_ 21. Click **Next** two more times until you get to the final dialog box.

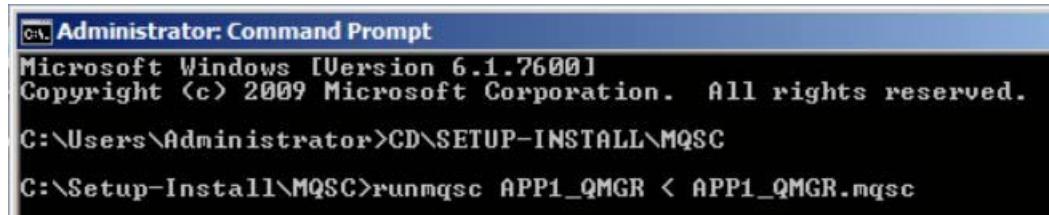
- \_\_\_ 22. Clear the box **Create listener configured for TCP/IP** and click **Finish**.



- \_\_\_ 23. Now both queue managers should be running. You now run the two mqsc scripts to restore the configurations of the two queue managers.
- \_\_\_ 24. Open a command-prompt window.

- \_\_\_ 25. Enter the following commands:

```
CD\SETUP-INSTALL\MQSC
runmqsc APP1_QMGR < APP1_QMGR.mqsc
```



```
Administrator: Command Prompt
Microsoft Windows [Version 6.1.7600]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.

C:\Users\Administrator>CD\SETUP-INSTALL\MQSC
C:\Setup-Install\MQSC>runmqsc APP1_QMGR < APP1_QMGR.mqsc
```

You should receive the following message after the script completes.

```
AMQ8862: WebSphere MQ authority record set.
324 MQSC commands read.
No commands have a syntax error.
All valid MQSC commands were processed.
```

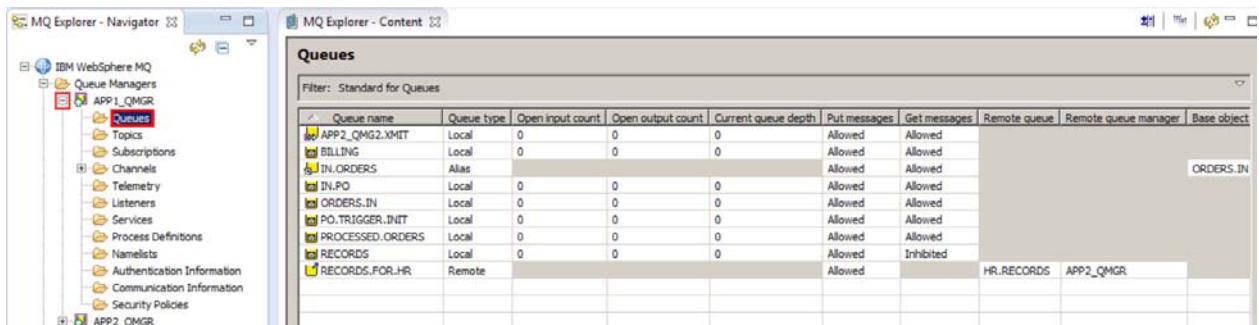
- \_\_\_ 26. Now enter the following command:

```
runmqsc APP2_QMGR < APP2_QMGR.mqsc
```

Look for the statement “No commands have a syntax error.”

```
AMQ8862: WebSphere MQ authority record set.
294 MQSC commands read.
No commands have a syntax error.
All valid MQSC commands were processed.
```

- \_\_\_ 27. You should now have your two “pre-existing” queue managers ready for the rest of the exercise. For verification, return to the IBM MQ Explorer. You can leave the command prompt open.
- \_\_\_ 28. Click next to APP1\_QMGR and then click the **Queues** folder. You should see all of the queues that the script re-created.



The screenshot shows the IBM MQ Explorer interface. On the left, the Navigator pane displays the structure of the queue manager APP1\_QMGR, including Queue Managers, Topics, Subscriptions, Channels, Telemetry, Listeners, Services, Process Definitions, Namelists, Authentication Information, Communication Information, and Security Policies. The 'Queues' folder under Queue Managers is selected. On the right, the Content pane shows a table titled 'Queues' with the following data:

| Queue name       | Queue type | Open input count | Open output count | Current queue depth | Put messages | Get messages | Remote queue | Remote queue manager | Base object |
|------------------|------------|------------------|-------------------|---------------------|--------------|--------------|--------------|----------------------|-------------|
| APP2_QMG2.XMIT   | Local      | 0                | 0                 | 0                   | Allowed      | Allowed      |              |                      |             |
| BILLING          | Local      | 0                | 0                 | 0                   | Allowed      | Allowed      |              |                      |             |
| IN.ORDERS        | Alias      |                  |                   |                     | Allowed      | Allowed      |              |                      |             |
| IN.PO            | Local      | 0                | 0                 | 0                   | Allowed      | Allowed      |              |                      |             |
| ORDERS.IN        | Local      | 0                | 0                 | 0                   | Allowed      | Allowed      |              |                      |             |
| PO.TRIGGER.INIT  | Local      | 0                | 0                 | 0                   | Allowed      | Allowed      |              |                      |             |
| PROCESSED.ORDERS | Local      | 0                | 0                 | 0                   | Allowed      | Allowed      |              |                      |             |
| RECORDS          | Local      | 0                | 0                 | 0                   | Allowed      | Inhibited    |              |                      |             |
| RECORDS.FOR.HR   | Remote     |                  |                   |                     | Allowed      |              | HR.RECORDS   | APP2_QMGR            |             |

29. You can explore the other folders for the other IBM MQ objects that the script re-created, including Topic, Subscription, Channel, Listener, and Process Definition objects, along with OAM accumulated authority records on the BILLING queue. You want to be familiar with this queue manager since you are going to migrate it to the IBM MQ Appliance.

| Topics                      |            |                    |             |           |           |                       |                  |                     |
|-----------------------------|------------|--------------------|-------------|-----------|-----------|-----------------------|------------------|---------------------|
| Filter: Standard for Topics |            |                    |             |           |           |                       |                  |                     |
| Topic name                  | Topic type | Topic string       | Description | Publish   | Subscribe | Durable subscriptions | Default priority | Default persistence |
| ORDERS                      | Local      | ORDERS_TOPICSTRING |             | As parent | As parent | As parent             | As parent        | As parent           |

| Subscriptions                      |            |                    |                      |       |                   |                           |                  |           |
|------------------------------------|------------|--------------------|----------------------|-------|-------------------|---------------------------|------------------|-----------|
| Filter: Standard for Subscriptions |            |                    |                      |       |                   |                           |                  |           |
| Subscription name                  | Topic name | Topic string       | Wildcard usage       | Scope | Destination class | Destination queue manager | Destination name | Durable   |
| Records_Orders                     | ORDERS     | ORDERS_TOPICSTRING | Topic level wildcard | All   | Provided          |                           | RECORDS          | Yes Admin |

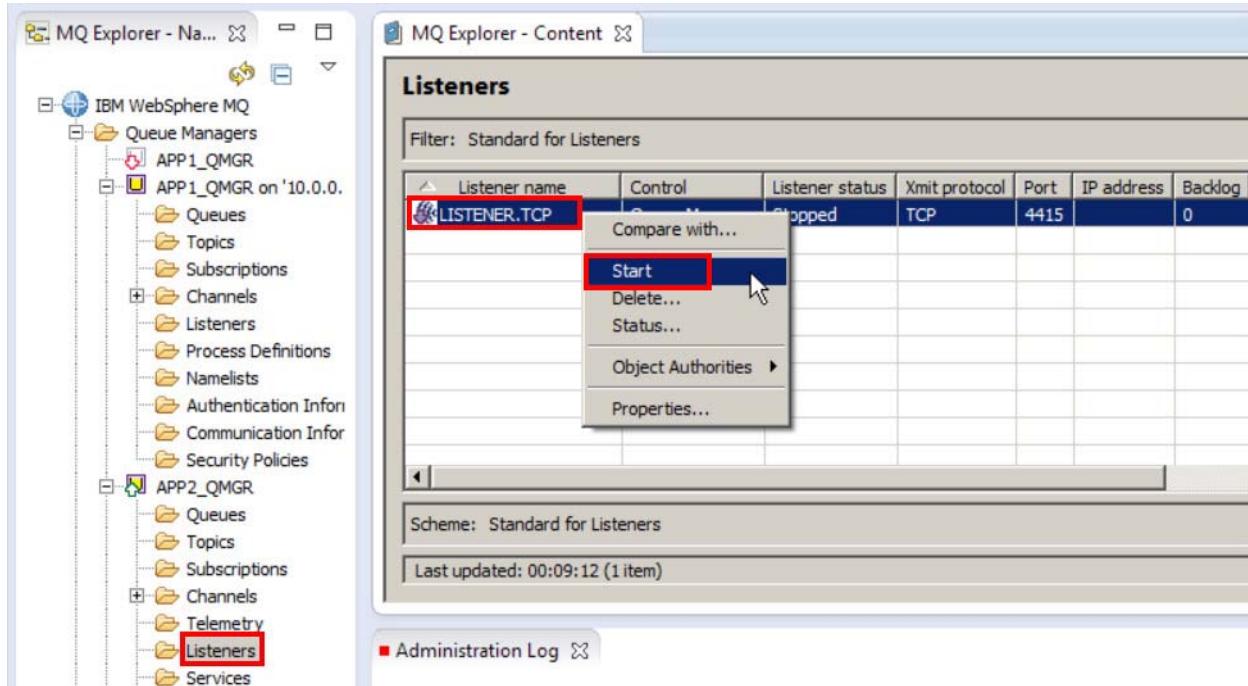
| Channels                      |              |                        |                 |                    |             |            |                     |                    |
|-------------------------------|--------------|------------------------|-----------------|--------------------|-------------|------------|---------------------|--------------------|
| Filter: Standard for Channels |              |                        |                 |                    |             |            |                     |                    |
| Channel name                  | Channel type | Overall channel status | Conn name       | Transmission queue | MCA user ID | Batch size | Disconnect interval | Heartbeat interval |
| TO.APP2_QMGR                  | Sender       | Inactive               | localhost(4415) | APP2_QMG2.XMIT     |             | 50         | 6000                | 300                |

| Listeners                      |               |                 |               |      |            |         |         |        |
|--------------------------------|---------------|-----------------|---------------|------|------------|---------|---------|--------|
| Filter: Standard for Listeners |               |                 |               |      |            |         |         |        |
| Listener name                  | Control       | Listener status | Xmit protocol | Port | IP address | Backlog | TP name | Action |
| LISTENER.TCP                   | Queue Manager | Stopped         | TCP           | 4414 |            | 0       |         |        |

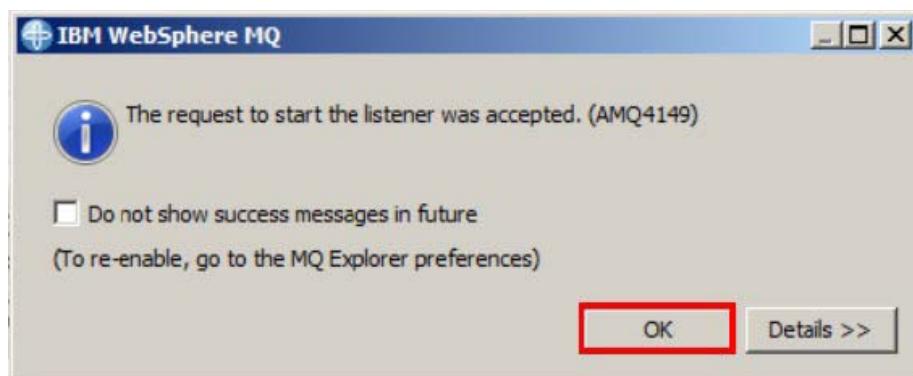
| Process Definitions                      |            |                |             |            |          |          |               |                 |
|------------------------------------------|------------|----------------|-------------|------------|----------|----------|---------------|-----------------|
| Filter: Standard for Process Definitions |            |                |             |            |          |          |               |                 |
| Process name                             | App type   | Application ID | Environment | Start time | End time | Run time | Last run time | Last run status |
| PROCESS.TRIGGER.PO                       | Windows NT | Readit.exe     |             |            |          |          |               |                 |

| Find Accumulated Authorities      |           |       |              |               |                      |                 |     |                       |                  |     |         |     |
|-----------------------------------|-----------|-------|--------------|---------------|----------------------|-----------------|-----|-----------------------|------------------|-----|---------|-----|
| Entity type:                      | Group     | User  | Object type: | Profile name: | Queue manager name:  | Find            |     |                       |                  |     |         |     |
| Entity name:                      | potuser   |       |              |               |                      |                 |     |                       |                  |     |         |     |
| Object type:                      | Queue     |       |              |               |                      |                 |     |                       |                  |     |         |     |
| Profile name:                     | BILLING   |       |              |               |                      |                 |     |                       |                  |     |         |     |
| Queue manager name:               | APP1_QMGR |       |              |               |                      |                 |     |                       |                  |     |         |     |
| Name                              | Type      | Clear | Change       | Browse        | Set identity context | Set all context | Set | Pass identity context | Pass all context | Put | Inquire | Get |
| potuser (Accumulated Authorities) | User      | ✓     | ✓            | ✓             | ✓                    | ✓               | ✓   | ✓                     | ✓                | ✓   | ✓       | ✓   |
| mqm@STUDENT1 (BILLING)            | Group     | ✓     | ✓            | ✓             | ✓                    | ✓               | ✓   | ✓                     | ✓                | ✓   | ✓       | ✓   |
| potuser@STUDENT1 (BILLING)        | User      |       | ✓            |               |                      |                 |     |                       |                  | ✓   | ✓       | ✓   |

- \_\_\_ 30. Click the next to **APP2\_QMGR** and then click the **Queues** folder. You should see the queues that the script re-created.
- \_\_\_ 31. The one thing you need to do to prepare for your later testing is to start the listener on **APP2\_QMGR**. Click the **Listeners** folder under the **APP2\_QMGR** queue manager. Right-click the **LISTENER.TCP** listener, and then click **Start** from the menu.



- \_\_\_ 32. Click **OK** to close the dialog box.



- \_\_\_ 33. The listener should start, and show a Listener status of **Running**.

| Listeners                      |               |                 |               |      |            |         |
|--------------------------------|---------------|-----------------|---------------|------|------------|---------|
| Filter: Standard for Listeners |               |                 |               |      |            |         |
| Listener name                  | Control       | Listener status | Xmit protocol | Port | IP address | Backlog |
| LISTENER.TCP                   | Queue Manager | Running         | TCP           | 4415 |            | 0       |

## 6.3. Using dmpmqcfg on the source queue manager

For a real migration, now would be your starting point. You would go to the running queue manager that you want to migrate, and enter the `dmpmqcfg` command to dump out the queue manager's configuration and generate the `mqsc` script to re-create it.

You generate output from the `dmpmqcfg` command a couple times to get all IBM MQ objects, your durable subscription, channel authentication records, and authority records that you want. You are using multiple steps to eliminate the extra hundreds of authority records that you do not need since they are default authorities (which the creation of the queue manager on the Appliance takes care of).

- \_\_\_ 34. Return to the command prompt.
- \_\_\_ 35. First, capture your IBM MQ objects. Enter the following command:

```
dmpmqcfg -a -x object -m APP1_QMGR > APP1_QMGR_Migration.mqsc
```

This command dumps the configuration of all IBM MQ objects, with the `-a` flag to include all attributes, and redirects the output to the file named `APP1_QMGR_Migration.mqsc`. You should get just the prompt back.

```
C:\Setup-Install>dmpmqcfg -a -x object -m APP1_QMGR > APP1_QMGR_Migration.mqsc
C:\Setup-Install>
```

- \_\_\_ 36. Now capture your durable subscription definition. Enter the following command:

```
dmpmqcfg -a -x sub -m APP1_QMGR >> APP1_QMGR_Migration.mqsc.
```

This command dumps the configuration of all durable subscriptions (you have one), with the `-a` flag to include all attributes, and appends the output to the file named `APP1_QMGR_Migration.mqsc`. Be sure to use two greater than symbols (`>>`) so that you *append* and do not overwrite the contents of your first output. You should get just the prompt back.

```
C:\Setup-Install>dmpmqcfg -a -x sub -m APP1_QMGR >> APP1_QMGR_Migration.mqsc
C:\Setup-Install>
```

- \_\_\_ 37. Now you dump the channel authentication records. Enter the following command:

```
dmpmqcfg -a -x chlauth -m APP1_QMGR >> APP1_QMGR_Migration.mqsc
```

This command dumps the configuration of all channel authentication records, with the **-a** flag to include all attributes, and appends the output to the file named **APP1\_QMGR\_Migration.mqsc**. You should get just the prompt back.

```
C:\Setup-Install>dmpmqcfg -a -x chlauth -m APP1_QMGR >> APP1_QMGR_Migration.mqsc
C:\Setup-Install>
```

Finally, dump the authority records that you need. You limit the output as much as you can.

- \_\_\_ 38. Enter the following command:

```
dmpmqcfg -a -x authrec -n BILLING -m APP1_QMGR >> APP1_QMGR_Migration.mqsc
```

This command dumps the configuration of authority records, looking for a Profile name of **BILLING**, with the **-a** flag to include all attributes, and appends the output to the file named **APP1\_QMGR\_Migration.mqsc**. You should get just the prompt back.

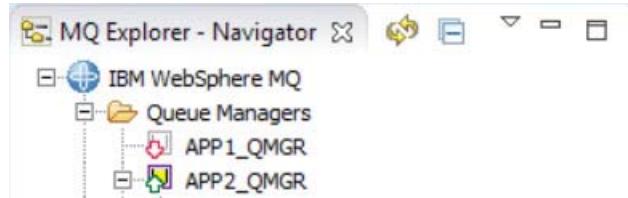
```
C:\Setup-Install>dmpmqcfg -a -x authrec -n BILLING -m APP1_QMGR >> APP1_QMGR_Migration.mqsc
C:\Setup-Install>
```

- \_\_\_ 39. Now you need to quiesce the queue manager that you are going to move. At the command prompt, enter the following command:

```
endmqm -c APP1_QMGR
```

```
C:\Setup-Install>endmqm -c APP1_QMGR
Quiesce request accepted. The queue manager will stop when all outstanding work
is complete.
C:\Setup-Install>
```

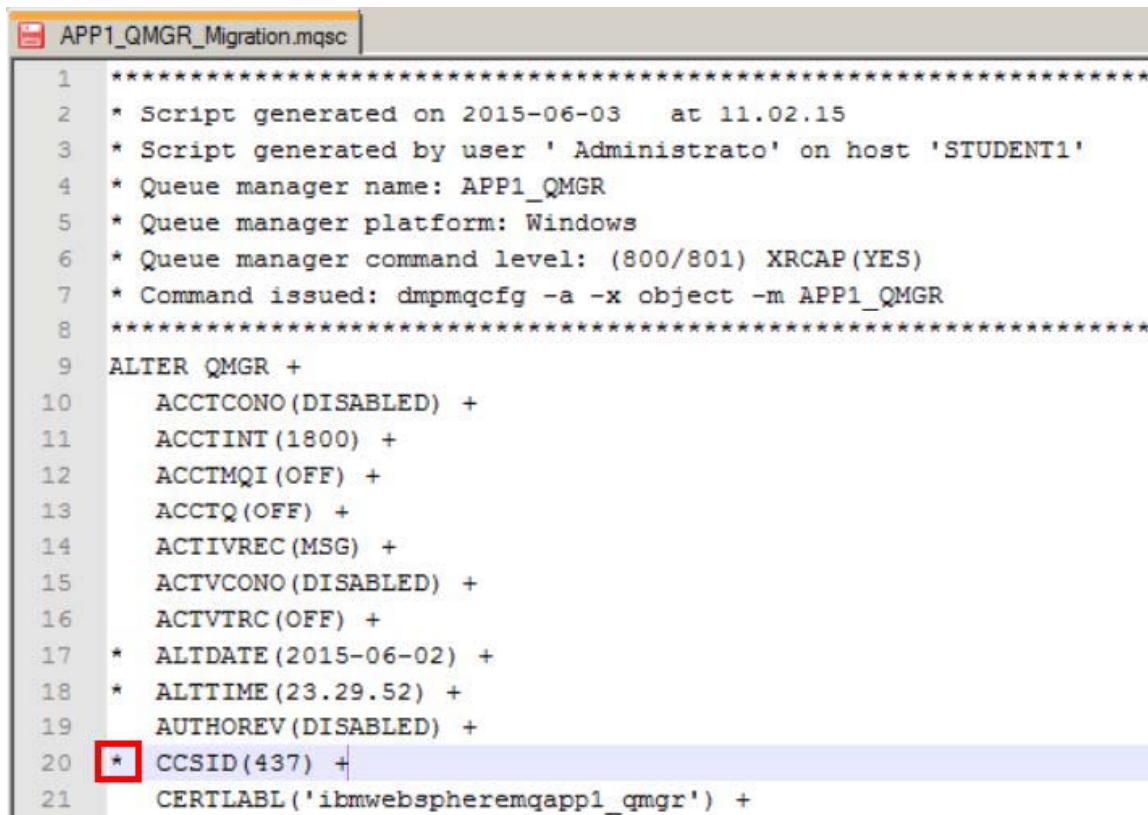
- \_\_\_ 40. You can return to the IBM MQ Explorer to verify that the queue manager is stopped.



## 6.4. Reviewing the exported queue manager configuration for compatibility with the target IBM MQ Appliance

You must now review this mqsc script for any incompatibilities with a queue manager that is running on the IBM MQ Appliance. You must make any necessary changes to the mqsc script.

- 41. Start **Notepad**.
  - 42. Click **File > Open**.
  - 43. Navigate to `C:\Setup-Install\MQSC` and select the **APP1\_QMGR\_Migration.mqsc** file. Click **Open**.
- You see lines that are commented out with the asterisk (\*) character. These values are read-only and are set when the queue manager is created, so you do not need to be concerned about them. A later section outlines the types of things that you need to look for. The first one you encounter is the CCSID. You are advised to remove any change to the queue manager CCSID in the ALTER QMGR command, as the default CCSID for IBM MQ Appliance is 819.
- 44. Go to the line that has **CCSID(437)** (line 20) and place an **asterisk (\*)** character at the beginning of the line to make it a comment.



```

APP1_QMGR_Migration.mqsc

1 ****
2 * Script generated on 2015-06-03 at 11.02.15
3 * Script generated by user 'Administrato' on host 'STUDENT1'
4 * Queue manager name: APP1_QMGR
5 * Queue manager platform: Windows
6 * Queue manager command level: (800/801) XRCAP(YES)
7 * Command issued: dmpmqcfg -a -x object -m APP1_QMGR
8 ****
9 ALTER QMGR +
10 ACCTCONO(DISABLED) +
11 ACCTINT(1800) +
12 ACCTMQI(OFF) +
13 ACCTQ(OFF) +
14 ACTIVREC(MSG) +
15 ACTVCONO(DISABLED) +
16 ACTVTRC(OFF) +
17 * ALTDATE(2015-06-02) +
18 * ALTTIME(23.29.52) +
19 AUTHOREV(DISABLED) +
20 * CCSID(437) +
21 CERTLABL('ibmwebspheremqapp1_qmgr') +

```

- \_\_\_ 45. Do not overwrite the queue manager DESCRIPTOR attribute that you are going to set when you create the queue manager on the Appliance. Find the **DESCR** attribute for the **APP1\_QMGR** (on line 44), and place an **asterisk (\*)** character at the beginning of the line to make it a comment.

---

```

31 CLWLMRUC(999999999) +
32 CLWLUSEQ(LOCAL) +
33 CMDEV(DISABLED) +
34 * CMDLEVEL(800) +
35 * COMMANDQ(SYSTEM.ADMIN.COMMAND.QUEUE) +
36 CONFIGEV(DISABLED) +
37 CONNAUTH('SYSTEM.DEFAULT.AUTHINFO.IDPWOS') +
38 * CRDATE(2015-06-02) +
39 * CRTIME(23.19.32) +
40 CUSTOM(' ') +
41 DEADQ('APP1_QMGR.DLQ') +
42 DEFCLXQ(SCTQ) +
43 DEFXMITQ(' ') +
44 * DESCRIPTOR(' ') + ██████████
45 * DISTL(YES) +
46 INHIBTEV(DISABLED) +

```

- \_\_\_ 46. You are also advised that the Appliance manages the SSLKEYR queue manager attribute, and it should not be overwritten when you replay the commands to create the queue manager configuration. So again, go to the line that has **SSLKEYR** at the beginning (line 81) and place an **asterisk (\*)** character at the beginning of the line to make it a comment.

---

```

77 SSLCRLN(' ') +
78 SSLCRYP(' ') +
79 SSLEV(DISABLED) +
80 SSLFIPS(NO) +
81 * SSLKEYR('C:\ProgramData\IBM\MQ\qmgrs\APP1_QMGR\ssl\key') + ██████████
82 SSLRKEYC(0) +

```

- 47. Review the PROCESS definition. Find the `DEFINE PROCESS` command, which starts at line 3432. You do not need to alter it, and you are not going to test it. You want to understand how to migrate an application that uses triggering. You would need to change it to client triggering, and start running the client version of the trigger monitor (`runmqtmc`). Looking at the PROCESS definition, you would need to ensure that the **Readit.exe** application is built with client libraries (so if it was originally built with local binding libraries, it would need to be rebuilt). Unless the name or location of the `.exe` file changes, it should not be necessary to edit the process definition.

```
3432 DEFINE PROCESS('PROCESS.TRIGGER.PO') +
3433 APPLTYPE(WINDOWSNT) +
3434 APPLICID('Readit.exe') +
3435 ENVRDATA(' ') +
3436 USERDATA(' ') +
3437 DESCRIPTOR(' ') +
3438 * ALTDATE(2015-06-02) +
3439 * ALTTIME(23.30.03) +
3440 REPLACE
```

- \_\_\_ 48. You need to alter the **CONNNAME** attribute for your channel, **TO.APP2\_QMGR**. You need to set it to the IP address of the Windows system (your virtual image) that is running the APP2\_QMGR. You need the IP address of the (destination) Windows system.
  - \_\_\_ 49. Return to the command prompt. Enter the following command: `ipconfig`
  - 50. Make note of the **IPv4 Address**.

```
C:\Administrator: Command Prompt
C:\Setup-Install\MQSC>ipconfig
Windows IP Configuration

Ethernet adapter Local Area Connection:

Connection-specific DNS Suffix . : example.com
Link-local IPv6 Address : fe80::a947:f450:1849:dd1f%11
IPv4 Address : 10.0.0.3
Subnet Mask : 255.255.255.0
Default Gateway : 10.0.0.254

Tunnel adapter isatap.example.com:

Media State : Media disconnected
Connection-specific DNS Suffix . : example.com

Tunnel adapter Local Area Connection* 11:

Media State : Media disconnected
Connection-specific DNS Suffix . . . :

C:\Setup-Install\MQSC>
```

Note: Your IP address is likely to be different from what is shown.

- 51. Back in Notepad++, find the `DEFINE CHANNEL('TO.APP2_QMGR')` command, and then the line with the **CONNNAME** attribute (line 3867). Change **localhost** to the IP address you obtained. In this example, you would change it to read:

```
CONNNAME('10.0.0.3(4415)') +
```

```

3856 DEFINE CHANNEL('TO.APP2_QMGR') +
3857 CHLTYPE(SDR) +
3858 * ALTDATE(2015-06-19) +
3859 * ALTTIME(13.51.14) +
3860 BATCHHB(0) +
3861 BATCHINT(0) +
3862 BATCHLIM(5000) +
3863 BATCHSZ(50) +
3864 CERTLBL(' ') +
3865 COMPHDR(NONE) +
3866 COMPMMSG(NONE) +
3867 CONNAME('10.0.0.3(4415)') +
3868 CONVERT(NO) +
3869 DESCR(' ') +
3870 DISCINT(6000) +

```

Normally this change is not something you would need to do in this situation. Since you are using a virtual image that can change IP addresses, you need to handle it.

You need to delete the listeners for the Netbios, LU62, and SPX protocols. These three definitions are grouped together. Move to line 3986, and then mark lines 3986 – 4008 to include these three `DEFINE` commands. Press the **Delete** key to remove these lines. Be sure to delete any blank lines that are left from this deletion so that the line numbers match in the following steps.

- 52. You also need to delete the Service definition since the IBM MQ Appliance does not support Services. Find the **DEFINE SERVICE** command after the listener definitions (now at line 3994).

```

APP1_QMGR_Migration.mqsc
3986 DEFINE LISTENER('SYSTEM.DEFAULT.LISTENER.LU62') TRPTYPE(LU62) CONTROL(MANUAL) +
3987 TPNAME(' ') +
3988 DESCRIPTOR(' ') +
3989 * ALTDATE(2015-05-21) +
3990 * ALTTIME(18.33.00) +
3991 REPLACE
3992 DEFINE LISTENER('SYSTEM.DEFAULT.LISTENER.NETBIOS') TRPTYPE(NETBIOS) CONTROL(MANUAL) +
3993 ADAPTER(0) +
3994 LOCALNAME(' ') +
3995 NTBNAMES(0) +
3996 SESSIONS(0) +
3997 COMMANDS(0) +
3998 DESCRIPTOR(' ') +
3999 * ALTDATE(2015-05-21) +
4000 * ALTTIME(18.33.00) +
4001 REPLACE
4002 DEFINE LISTENER('SYSTEM.DEFAULT.LISTENER.SPX') TRPTYPE(SPX) CONTROL(MANUAL) +
4003 BACKLOG(0) +
4004 SOCKET(0) +
4005 DESCRIPTOR(' ') +
4006 * ALTDATE(2015-05-21) +
4007 * ALTTIME(18.33.00) +
4008 REPLACE
4009 DEFINE LISTENER('SYSTEM.DEFAULT.LISTENER.TCP') TRPTYPE(TCP) CONTROL(MANUAL) +

```

- 53. Highlight the entire **DEFINE SERVICE** definition, lines 3994 – 4006, and delete it by pressing the **Delete** key.

```

3986 DEFINE LISTENER('SYSTEM.DEFAULT.LISTENER.TCP') TRPTYPE(TCP) CONTROL(MANUAL) +
3987 PORT(0) +
3988 IPADDR(' ') +
3989 BACKLOG(0) +
3990 DESCRIPTOR(' ') +
3991 * ALTDATE(2015-05-21) +
3992 * ALTTIME(18.33.00) +
3993 REPLACE
3994 DEFINE SERVICE('SYSTEM.DEFAULT.SERVICE') +
3995 CONTROL(MANUAL) +
3996 SERVTYPE(COMMAND) +
3997 STARTCMD(' ') +
3998 STARTARG(' ') +
3999 STOPCMD(' ') +
4000 STOPARG(' ') +
4001 STDOUT(' ') +
4002 STDERR(' ') +
4003 DESCRIPTOR(' ') +
4004 * ALTDATE(2015-05-21) +
4005 * ALTTIME(18.33.00) +
4006 REPLACE
4007 DEFINE COMMINFO('SYSTEM.DEFAULT.COMMINFO.MULTICAST') +

```

- 54. Now you can remove most of the `SET AUTHREC` commands since almost all of them are for default authorities. (You did limit how many `SET AUTHREC` records you exported, but you still have more than what you want.) You have two `SET AUTHREC` statements that relate to a Principal of “potuser” that you must handle. You add a user ID on the Appliance (in a later step) to accommodate these records, and change the `SET AUTHREC` commands correspondingly.

Everything else then defaults to the right values for the new queue manager on the Appliance.

When thinking about migrating from Windows queue managers, the Principal names and group names include the Windows domain (in the form of `name@domain`). This format is not supported on the Appliance, so any such user IDs must be mapped to new user IDs on the Appliance, and the domain name must be removed. Also, IBM MQ supports a maximum user name length of 12 characters on UNIX and Linux platforms, so any names like Administrator need to be shortened or changed on the Appliance.

- 55. Find the beginning of the `SET AUTHREC` definitions that start at line 4292.

```

4292 SET AUTHREC +
4293 PROFILE('@CLASS') +
4294 PRINCIPAL('Administrator@STUDENT1') +
4295 OBJTYPE(CHANNEL) +
4296 AUTHADD(CRT)
4297 SET AUTHREC +
4298 PROFILE('@CLASS') +
4299 GROUP('mqm@STUDENT1') +
4300 OBJTYPE(CHANNEL) +
4301 AUTHADD(CRT)
4302 SET AUTHREC +
4303 PROFILE('@CLASS') +
4304 PRINCIPAL('Administrator@STUDENT1') +
4305 OBJTYPE(AUTHINFO) +
4306 AUTHADD(CRT)

```

Notice that depending on the exact configuration of the queue manager, you might end up with a different number of `SET AUTHREC` definitions that the `dmpmqcfg` command generates. You want to keep only two. The following code shows the two `AUTHREC` definitions that you want to leave after editing:

```

SET AUTHREC +
PROFILE('BILLING') +
PRINCIPAL('potuser') +
OBJTYPE(QUEUE) +
AUTHADD(BROWSE,GET,INQ,PUT)
SET AUTHREC +
PROFILE('@class') +
PRINCIPAL('potuser') +
OBJTYPE(QUEUE) +
AUTHADD(NONE)

```

- 56. Now select all lines, starting at 4292 – 4361. (You can hold down the left mouse button, starting at the “S” on the first line, and then move the cursor down and to the right to keep selecting lines while you scroll down.) Then, press the **Delete** key to remove these lines.

```

4337 SET AUTHREC +
4338 PROFILE ('@CLASS') +
4339 GROUP ('mqm@STUDENT1') +
4340 OBJTYPE (LISTENER) +
4341 AUTHADD (CRT)
4342 SET AUTHREC +
4343 PROFILE ('@CLASS') +
4344 PRINCIPAL ('Administrator@STUDENT1') +
4345 OBJTYPE (SERVICE) +
4346 AUTHADD (CRT)
4347 SET AUTHREC +
4348 PROFILE ('@CLASS') +
4349 GROUP ('mqm@STUDENT1') +
4350 OBJTYPE (SERVICE) +
4351 AUTHADD (CRT)
4352 SET AUTHREC +
4353 PROFILE ('BILLING') +
4354 PRINCIPAL ('Administrator@STUDENT1') +
4355 OBJTYPE (QUEUE) +
4356 AUTHADD (BROWSE, CHG, CLR, DLT, DSP, GET, INQ, PUT, PASSALL, PASSID, SET, SETALL, SETID)
4357 SET AUTHREC +
4358 PROFILE ('BILLING') +
4359 GROUP ('mqm@STUDENT1') +
4360 OBJTYPE (QUEUE) +
4361 AUTHADD (BROWSE, CHG, CLR, DLT, DSP, GET, INQ, PUT, PASSALL, PASSID, SET, SETALL, SETID)
4362 SET AUTHREC +
4363 PROFILE ('BILLING') +
4364 PRINCIPAL ('potuser@STUDENT1') +
4365 OBJTYPE (QUEUE) +
4366 AUTHADD (BROWSE, GET, INQ, PUT)

```

- 57. You should now be at line 4292 and the first SET AUTHREC definition that references potuser.

```

4292 SET AUTHREC +
4293 PROFILE ('BILLING') +
4294 PRINCIPAL ('potuser@STUDENT1') +
4295 OBJTYPE (QUEUE) +
4296 AUTHADD (BROWSE, GET, INQ, PUT)

```

- 58. You need to remove the @STUDENT1 domain from the PRINCIPAL attribute. Edit line 4294, removing @STUDENT1 so the line now reads:

```
PRINCIPAL('potuser') +
```

```
4292 SET AUTHREC +
4293 PROFILE('BILLING') +
4294 PRINCIPAL('potuser') + ██████████
4295 OBJTYPE(QUEUE) +
4296 AUTHADD(BROWSE,GET,INQ,PUT)
```

- 59. Now you have more SET AUTHREC definitions to delete. Highlight lines 4297 – 4326 and press **Delete**.

```
4297 SET AUTHREC +
4298 PROFILE('@CLASS') +
4299 PRINCIPAL('Administrator@STUDENT1') +
4300 OBJTYPE(CLNTCONN) +
4301 AUTHADD(CRT)
4302 SET AUTHREC +
4303 PROFILE('@CLASS') +
4304 GROUP('mqm@STUDENT1') +
4305 OBJTYPE(CLNTCONN) +
4306 AUTHADD(CRT)
4307 SET AUTHREC +
4308 PROFILE('@CLASS') +
4309 PRINCIPAL('Administrator@STUDENT1') +
4310 OBJTYPE(RQMNAME) +
4311 AUTHADD(NONE)
4312 SET AUTHREC +
4313 PROFILE('@CLASS') +
4314 PRINCIPAL('Administrator@STUDENT1') +
4315 OBJTYPE(QUEUE) +
4316 AUTHADD(CRT)
4317 SET AUTHREC +
4318 PROFILE('@CLASS') +
4319 GROUP('mqm@STUDENT1') +
4320 OBJTYPE(QUEUE) +
4321 AUTHADD(CRT)
4322 SET AUTHREC +
4323 PROFILE('@CLASS') +
4324 PRINCIPAL('MUSR_MQADMIN@STUDENT1') +
4325 OBJTYPE(QUEUE) +
4326 AUTHADD(NONE) ██████████
4327 SET AUTHREC +
```

- 60. Starting now at line 4292, your two Authority records should now be referencing potuser.

- 61. You again need to remove the domain name from the Principal in the second record. Edit line 4299, removing @STUDENT1 so the line now reads: PRINCIPAL( 'potuser' ) +

```
4292 SET AUTHREC +
4293 PROFILE('BILLING') +
4294 PRINCIPAL('potuser') +
4295 OBJTYPE(QUEUE) +
4296 AUTHADD(BROWSE,GET,INQ,PUT)
4297 SET AUTHREC +
4298 PROFILE('@CLASS') +
4299 PRINCIPAL('potuser') + REDACTED
4300 OBJTYPE(QUEUE) +
4301 AUTHADD(NONE)
```

- 62. You also need to change the Profile name of @CLASS to be @class on the IBM MQ Appliance (it is lowercase on Linux and UNIX systems). Edit line 4298, changing @CLASS to @class, so the line reads: PROFILE( '@class' ) +

```
4297 SET AUTHREC +
4298 PROFILE('@class') + REDACTED
4299 PRINCIPAL('potuser') +
4300 OBJTYPE(QUEUE) +
4301 AUTHADD(NONE)
```

- 63. Finally, you need to remove the remaining unneeded Authority records. Highlight lines 4302 – 4331 and press **Delete**.

```

4302 SET AUTHREC +
4303 PROFILE('@CLASS') +
4304 PRINCIPAL('Administrator@STUDENT1') +
4305 OBJTYPE(NAMELIST) +
4306 AUTHADD(CRT)
4307 SET AUTHREC +
4308 PROFILE('@CLASS') +
4309 GROUP('mqm@STUDENT1') +
4310 OBJTYPE(NAMELIST) +
4311 AUTHADD(CRT)
4312 SET AUTHREC +
4313 PROFILE('@CLASS') +
4314 PRINCIPAL('Administrator@STUDENT1') +
4315 OBJTYPE(PROCESS) +
4316 AUTHADD(CRT)
4317 SET AUTHREC +
4318 PROFILE('@CLASS') +
4319 GROUP('mqm@STUDENT1') +
4320 OBJTYPE(PROCESS) +
4321 AUTHADD(CRT)
4322 SET AUTHREC +
4323 PROFILE('@CLASS') +
4324 PRINCIPAL('Administrator@STUDENT1') +
4325 OBJTYPE(QMGR) +
4326 AUTHADD(CRT)
4327 SET AUTHREC +
4328 PROFILE('@CLASS') +
4329 GROUP('mqm@STUDENT1') +
4330 OBJTYPE(QMGR) +
4331 AUTHADD(CRT)
4332

```

- 64. Now that all changes are made, save the file with **Ctrl+S**.

- 65. You must do one more thing to the file to prepare to be able to execute these commands from your Windows runmqsc command line. You need to place the password for the user ID that gets passed from the Windows client to the queue manager as the first line of this file. Scroll back to the top of the file. Add a blank line at the top of the file, and then enter `passw0rd` on that line. The top of the file should now look as follows:

```

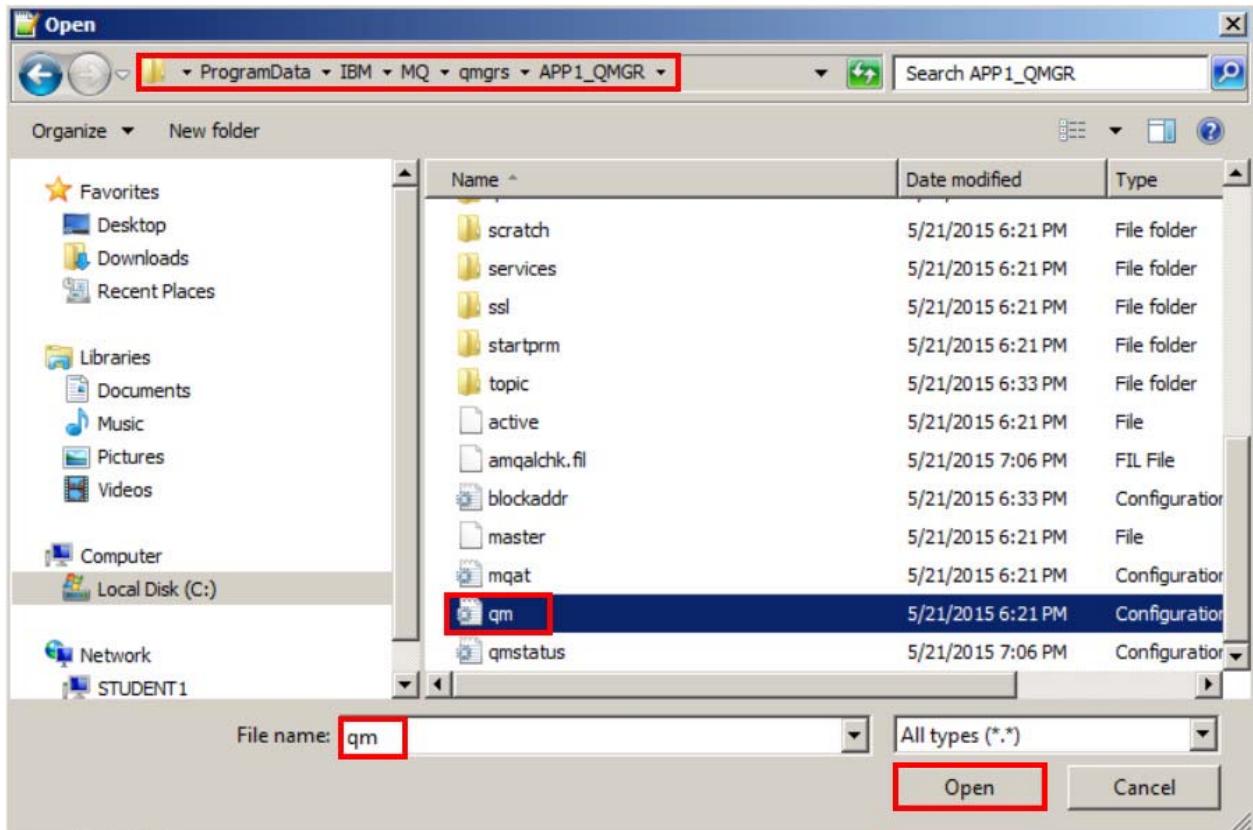
1 passw0rd
2 ****
3 * Script generated on 2015-06-03 at 11.02.15
4 * Script generated by user ' Administrato' on host 'STUDENT1'
5 * Queue manager name: APP1_QMGR
6 * Queue manager platform: Windows
7 * Queue manager command level: (800/801) XRCAP(YES)
8 * Command issued: dmpmqcfg -a -x object -m APP1_QMGR
9 ****
10 ALTER QMGR +
11 ACCTCONO(DISABLED) +
12 ACCTINT(1800) +
13 ACCTMQI(OFF) +
14 ACCTQ(OFF) +
15 ACTIVREC(MSG) +

```

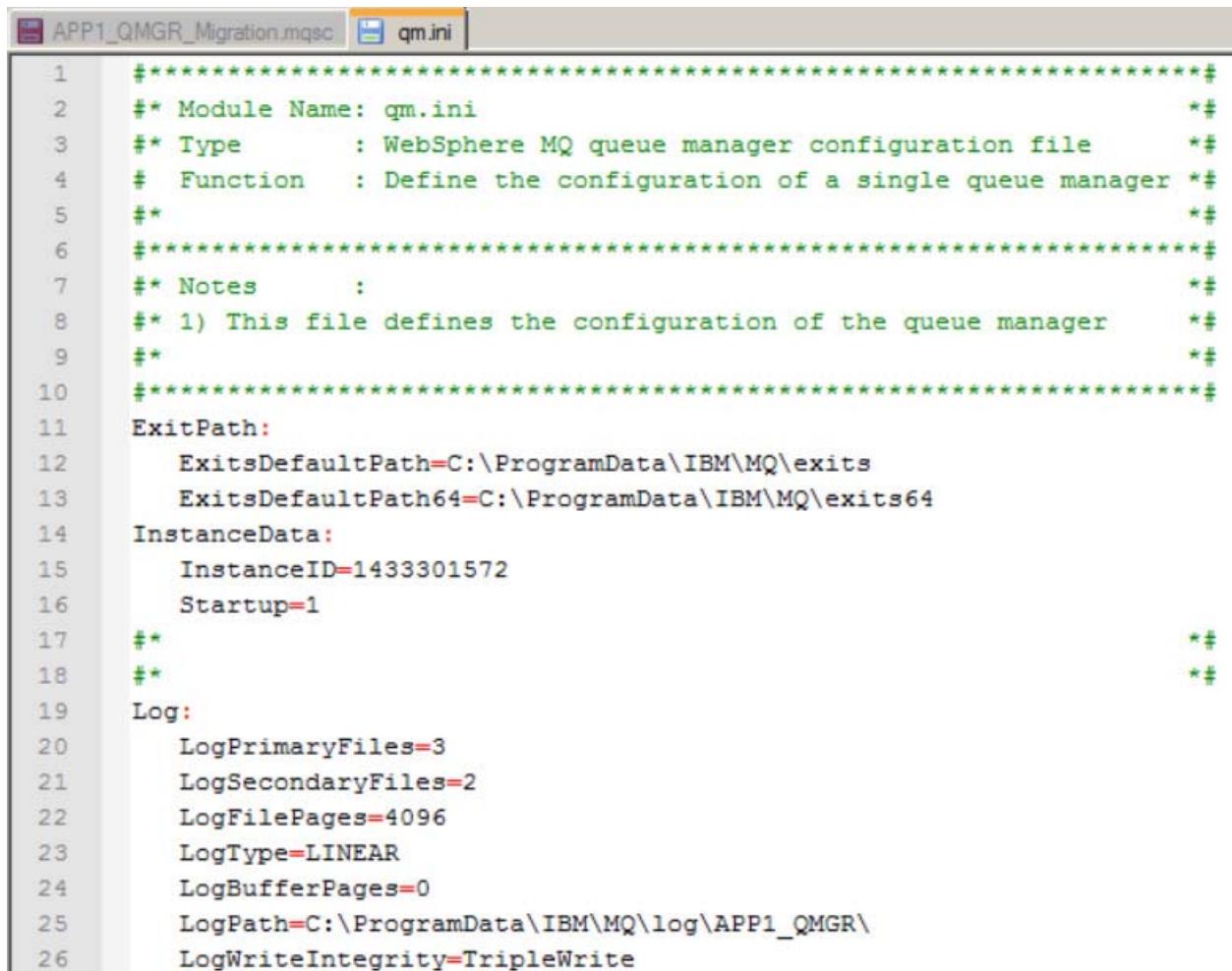
You are going to run the `runmqsc` command with the `-c` flag on the Windows system to connect to the APP1\_QMGR queue manager on the Appliance. In this way, you can run this mqsc script to migrate the queue manager from Windows. Since you are running with IBM MQ V8 security, the client must authenticate to the queue manager. The user ID and password get checked because the queue manager connection authority (CONNAUTH) configuration refers to an authentication information (AUTHINFO) object named 'SYSTEM.DEFAULT.AUTHINFO.IDPWOS' with CHCKCLNT REQDADM. Currently, IBM MQ has a deficiency that prevents you from providing the password interactively, when you also want to use an mqsc script file to redirect into the `runmqsc` command line. If you want to run the `runmqsc` command line remotely and interactively, you can enter the password. This password is known in the exercise, and it is hoped that a fix is going to be provided in a future fix pack. So for this exercise, while not a preferred practice, you get around the problem by placing the password as the first line of the file that gets redirected into the `runmqsc` command. That first line is used to satisfy the password prompt.

- 66. Again, save the file with **Ctrl+S**.

- 67. You must also typically check the configuration file (`qm.ini`) for the source queue manager. Make a note of any non-default attributes that cannot be set with the `ALTER QMGR` command, and thus are not recorded in the output from `dmpmqcfg`. Click **File > Open**, navigate to `C:\ProgramData\IBM\MQ\qmgrs\APP1_QMGR`, and select the `qm` configuration file. Click **Open**.



- \_\_\_ 68. Review the file. In this case, the only change is that this queue manager used linear logging on Windows, and must use circular logging on the IBM MQ Appliance. When the queue manager gets created on the IBM MQ Appliance, this change is handled for you. Therefore, you have nothing to be concerned about this time.



```

APP1_QMGR_Migration.mqsc qm.ini
1 ****
2 /* Module Name: qm.ini */
3 /* Type : WebSphere MQ queue manager configuration file */
4 # Function : Define the configuration of a single queue manager */
5 /*
6 ****
7 /* Notes :
8 /* 1) This file defines the configuration of the queue manager */
9 /*
10 /*
11 ExitPath:
12 ExitsDefaultPath=C:\ProgramData\IBM\MQ\exits
13 ExitsDefaultPath64=C:\ProgramData\IBM\MQ\exits64
14 InstanceData:
15 InstanceID=1433301572
16 Startup=1
17 /*
18 /*
19 Log:
20 LogPrimaryFiles=3
21 LogSecondaryFiles=2
22 LogFilePages=4096
23 LogType=LINEAR
24 LogBufferPages=0
25 LogPath=C:\ProgramData\IBM\MQ\log\APP1_QMGR\
26 LogWriteIntegrity=TripleWrite

```

- \_\_\_ 69. Leave Notepad++ open.

## 6.5. Creating the queue manager on the IBM MQ Appliance

You now create the target queue manager, still named `APP1_QMGR`, on the IBM MQ Appliance. You also need to create the principals that the queue manager authority records name. Any group or principal that is named in any `DEFINE` command must be in existence.

You are just creating the queue manager shell right now, which means that it is defined with all of your required IBM MQ objects after you “migrate” it by running the `mqsc` script against the queue manager. You might normally include some attributes at creation time, such as naming the queue manager’s dead-letter queue (the `DEADQ` attribute), but you do not include them, and you allow the script to update.

- \_\_\_ 70. Log in to the **MQ\_Appl1** IBM MQ Appliance. Use `admin` for the user ID and `passw0rd` for the password.
- \_\_\_ 71. At the `M2000#` command line, enter `mqcli` to enter `mq` command mode.
- \_\_\_ 72. Enter the following command to create the queue manager on the Appliance:

```
crtmqm -c "Migrated from Windows" -p 4444 -fs 3 APP1_QMGR
```

You should see that the queue manager gets created successfully. You need a listener so you can connect to the queue manager remotely to execute the `mqsc` script, so you have a listener that is defined on port 4444.

```
M2000(mqcli)# crtqm -c "Migrated from Windows" -p 4444 -fs 3 APP1_QMGR
Please wait while 3 GB file system is initialized for queue Manager 'APP1_QMGR'.
IBM MQ Appliance queue Manager created.
The queue Manager is associated with installation 'MQAppliance'.
Creating or replacing default objects for queue Manager 'APP1_QMGR'.
Default objects statistics : 84 created. 0 replaced. 0 failed.
Completing setup.
Setup completed.
5724-H72 (C) Copyright IBM Corp. 1994, 2014.
M2000(mqcli)#

```

Due to the limited size of the virtual image, you use the “`-fs`” parameter to create the queue manager with a 3-GB file system size.

- \_\_\_ 73. A normal, non-HA queue manager does not get started automatically after it is created on the Appliance, so you must start it now. Enter the following command to start the queue manager:

```
strmqm APP1_QMGR
```

```
M2000(mqcli)# strmqm APP1_QMGR
IBM MQ Appliance queue manager 'APP1_QMGR' starting.
The queue manager is associated with installation 'MQAppliance'.
5 log records accessed on queue manager 'APP1_QMGR' during the log replay phase.
Log replay for queue manager 'APP1_QMGR' complete.
Transaction manager state recovered for queue manager 'APP1_QMGR'.
IBM MQ Appliance queue manager 'APP1_QMGR' started using V8.0.0.3.
M2000(mqcli)# _
```

You should see that the queue manager gets started successfully.

- \_\_\_ 74. Now you must add any user IDs that are used in IBM MQ object definitions or authorities to the IBM MQ Appliance.

```
M2000(mqcli)# usercreate -u potuser -p passw0rd
M2000(mqcli)# _
```

You need to add one messaging user, potuser. Enter the following command:

```
usercreate -u potuser -p passw0rd
```

Ensure that the user is created successfully.

```
M2000(mqcli)# runmqsc APP1_QMGR
5724-H72 (C) Copyright IBM Corp. 1994, 2014.
Starting MQSC for queue manager APP1_QMGR.

_
```

- 75. You need to create the SVRCONN channel that is used for remote administration and also define the channel authentication records to allow access from a client. Enter the following command to enter the `mqsc` command line on the Appliance:

```
runmqsc APP1_QMGR
```

```
DEFINE CHANNEL('SYSTEM.ADMIN.SURCONN') CHLTYPE(SURCONN)
 1 : DEFINE CHANNEL('SYSTEM.ADMIN.SURCONN') CHLTYPE(SURCONN)
AMQ8014: IBM MQ Appliance channel created.
SET CHLAUTH('SYSTEM.ADMIN.SURCONN') TYPE(BLOCKUSER) USERLIST('*whatever')
 2 : SET CHLAUTH('SYSTEM.ADMIN.SURCONN') TYPE(BLOCKUSER) USERLIST('*whatever')
'')
AMQ8877: IBM MQ Appliance channel authentication record set.

:
ALTER AUTHINFO('SYSTEM.DEFAULT.AUTHINFO.IDPWOS') AUTHTYPE(IDPWOS) ADOPTCTX(YES)
 3 : ALTER AUTHINFO('SYSTEM.DEFAULT.AUTHINFO.IDPWOS') AUTHTYPE(IDPWOS) ADOPT
CTX(YES)
AMQ8567: IBM MQ Appliance authentication information changed.
REFRESH SECURITY TYPE(CONNAUTH)
 4 : REFRESH SECURITY TYPE(CONNAUTH)
AMQ8560: IBM MQ Appliance security cache refreshed.
END
 5 : END
4 MQSC commands read.
No commands have a syntax error.
All valid MQSC commands were processed.
M2000(mqcli)# _
```

- 76. Now enter the following commands at the `runmqsc` command line:

```
DEFINE CHANNEL('SYSTEM.ADMIN.SVRCONN') CHLTYPE(SVRCONN)
SET CHLAUTH('SYSTEM.ADMIN.SVRCONN') TYPE(BLOCKUSER)
USERLIST('*whatever')
ALTER AUTHINFO('SYSTEM.DEFAULT.AUTHINFO.IDPWOS') AUTHTYPE(IDPWOS)
ADOPTCTX(YES)
REFRESH SECURITY TYPE(CONNAUTH)
END
```

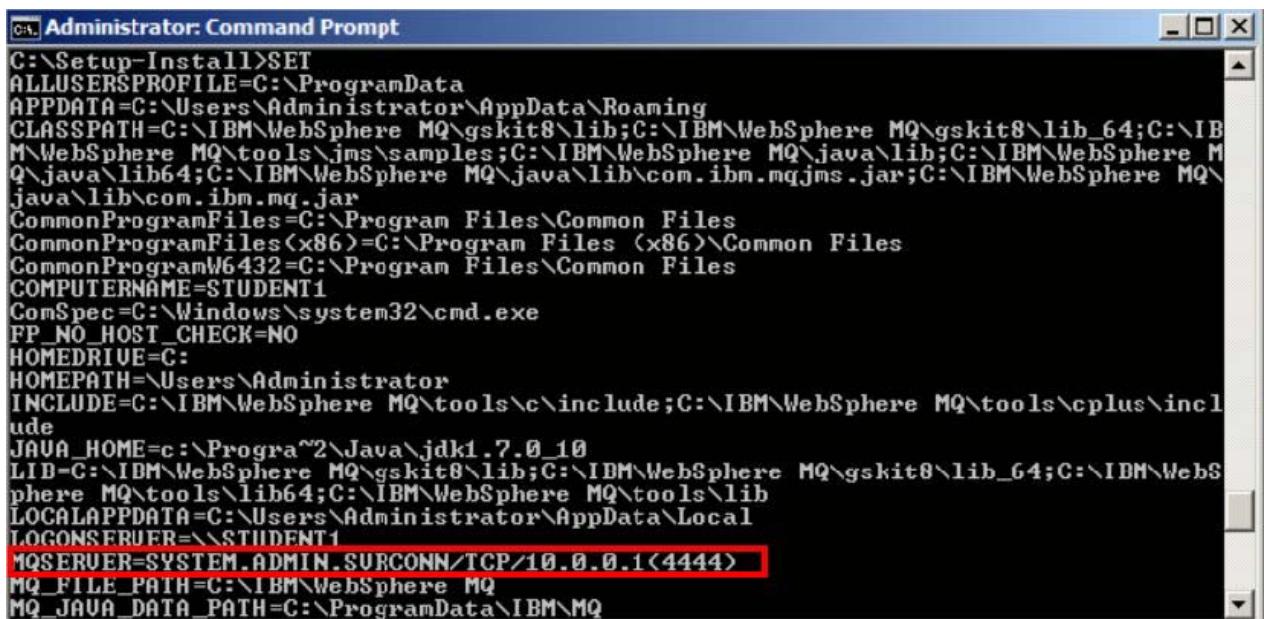
## 6.6. Running the mqsc script on the IBM MQ Appliance queue manager

Now that the queue manager is created, it is time to actually migrate the queue manager by running mqsc remotely with the edited output from the `dmpmqcfg` command.

- 77. Back in the Windows VM, return to the command prompt.
- 78. You must set the **MQSERVER** environment variable to define the IBM MQ channel that you are going to use to connect to the queue manager on the IBM MQ Appliance. Enter the following command:

```
SET MQSERVER=SYSTEM.ADMIN.SVRCONN/TCP/10.0.0.1(4444)
```

You can validate that this variable is set by entering a `SET` command and reviewing the list of variables to find the `MQSERVER` variable.



```
C:\Setup-Install>SET
ALLUSERSPROFILE=C:\ProgramData
APPDATA=C:\Users\Administrator\AppData\Roaming
CLASSPATH=C:\IBM\WebSphere MQ\gskit8\lib;C:\IBM\WebSphere MQ\gskit8\lib_64;C:\IBM\WebSphere MQ\tools\jms\samples;C:\IBM\WebSphere MQ\java\lib;C:\IBM\WebSphere MQ\java\lib64;C:\IBM\WebSphere MQ\java\lib\com.ibm.mqjms.jar;C:\IBM\WebSphere MQ\java\lib\com.ibm.mq.jar
CommonProgramFiles=C:\Program Files\Common Files
CommonProgramFiles(x86)=C:\Program Files (x86)\Common Files
CommonProgramW6432=C:\Program Files\Common Files
COMPUTERNAME=STUDENT1
ComSpec=C:\Windows\system32\cmd.exe
FP_NO_HOST_CHECK=NO
HOMEDRIVE=C:
HOMEPATH=\Users\Administrator
INCLUDE=C:\IBM\WebSphere MQ\tools\c\include;C:\IBM\WebSphere MQ\tools\cplus\include
JAVA_HOME=c:\Program~2\Java\jdk1.7.0_10
LIB=C:\IBM\WebSphere MQ\gskit8\lib;C:\IBM\WebSphere MQ\gskit8\lib_64;C:\IBM\WebSphere MQ\tools\lib64;C:\IBM\WebSphere MQ\tools\lib
LOCALAPPDATA=C:\Users\Administrator\AppData\Local
LOGONSERUER=\STUDENT1
MQSERVER=SYSTEM.ADMIN.SVRCONN/TCP/10.0.0.1(4444)
MQ_FILE_PATH=C:\IBM\WebSphere MQ
MQ_JAVA_DATA_PATH=C:\ProgramData\IBM\MQ
```

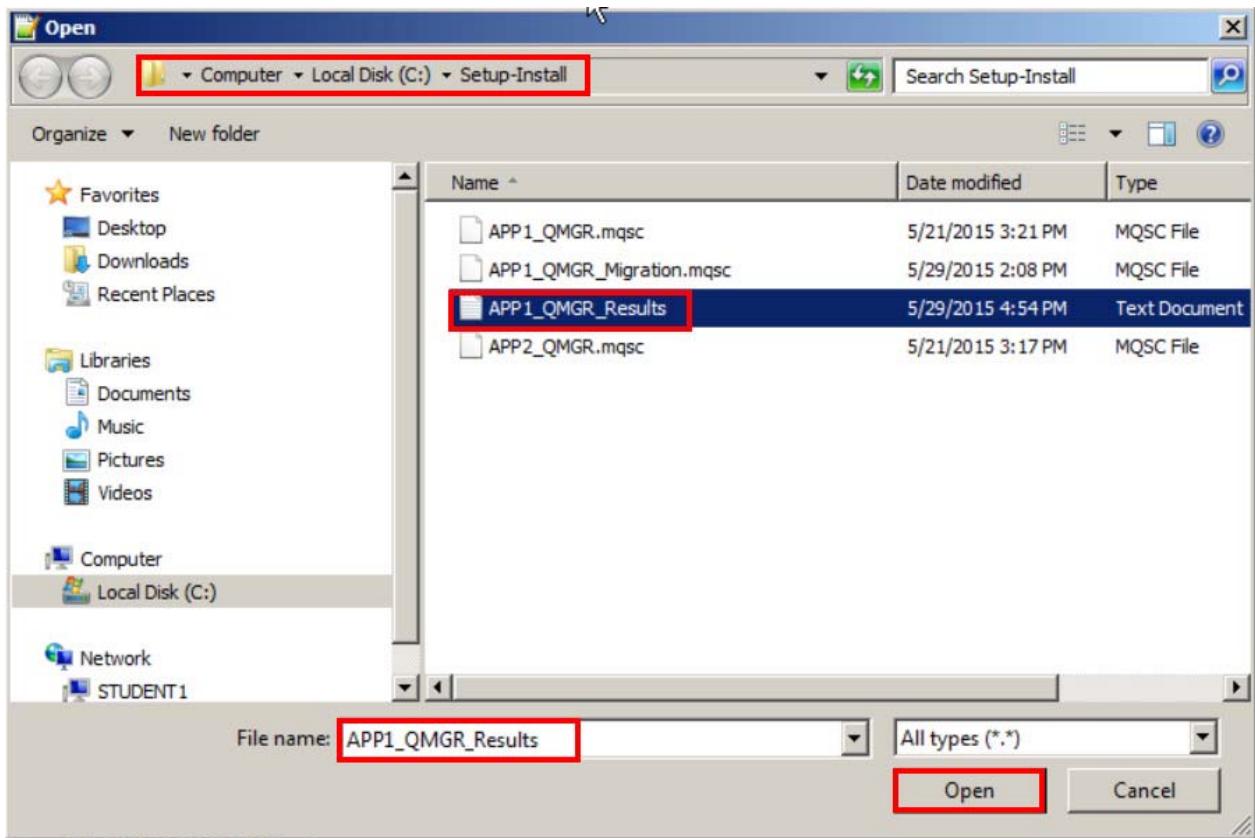
- 79. Now you are ready to execute the updated, migration-ready, mqsc script. Enter the following command:

```
runmqsc -c -u testuser APP1_QMGR < APP1_QMGR_Migration.mqsc >
APP1_QMGR_Results.txt
```

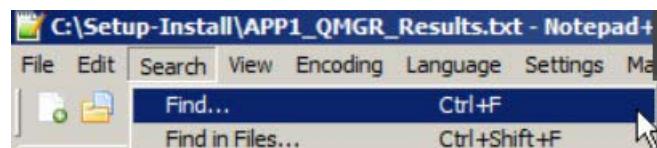
It displays the request for a password, which is being fed in as the first line of the file.

You are redirecting the output to another file, `APP1_QMGR_Results.txt`. You do this redirection so that you can review the execution of the commands to validate each command's success.

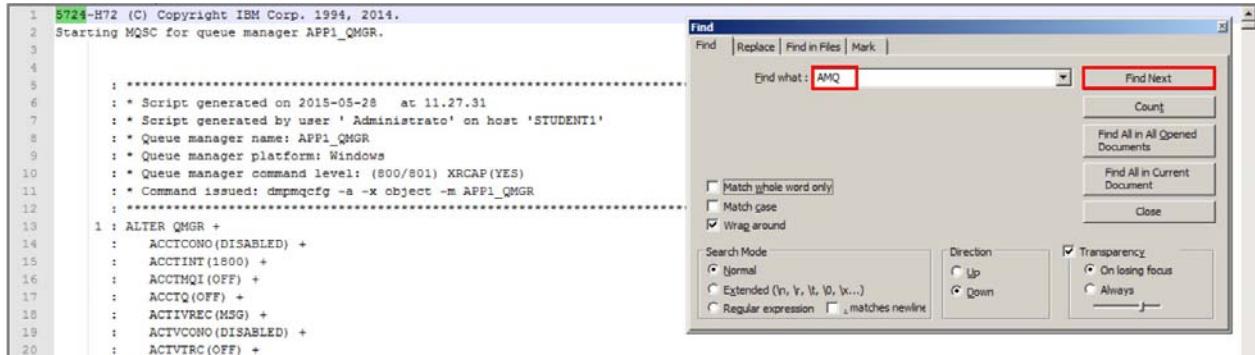
- 80. Back in Notepad++, click **File > Open** and navigate to `C:\Setup-Install` if necessary. Select the `APP1_QMGR_Results.txt` file and click **Open**.



- 81. You want to check that each command was successful. You can use the Find dialog in Notepad++ since a message that starts with “AMQ” informs you of the command result. Press **Ctrl+F**, or click **Search > Find** on the Notepad++ menu to open the Find dialog.



82. Move the Find dialog box to the far right side of your screen, so you can leave it where it is and keep checking each AMQ line. Enter **AMQ** in the **Find what** text box, then click **Find Next**.

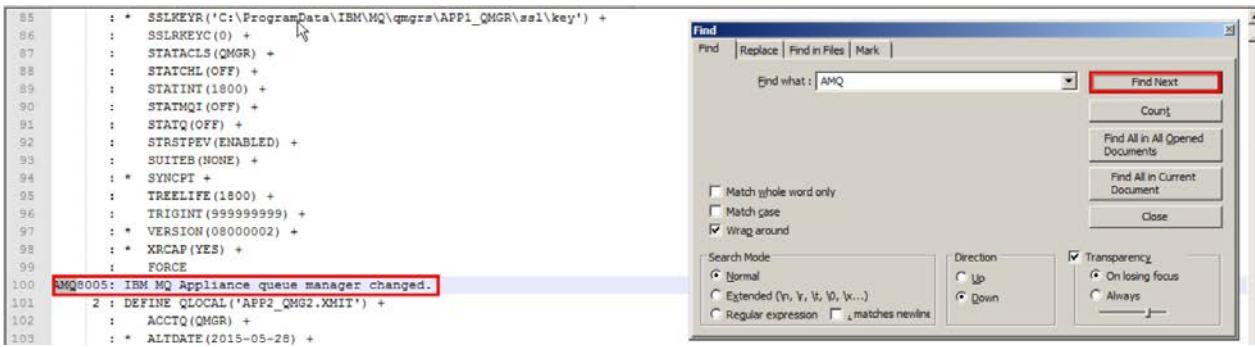


```

1 5724-H72 (C) Copyright IBM Corp. 1994, 2014.
2 Starting MQSC for queue manager APP1_QMGR.
3
4
5 : ****
6 : * Script generated on 2015-05-28 at 11.27.31
7 : * Script generated by user 'Administrator' on host 'STUDENT1'
8 : * Queue manager name: APP1_QMGR
9 : * Queue manager platform: Windows
10 : * Queue manager command level: (800/801) XRCAP(YES)
11 : * Command issued: dmpmqcfg -a -x object -m APP1_QMGR
12 : ****
13 1 : ALTER QMGR +
14 : ACCICONO(DISABLED) +
15 : ACCINT(1800) +
16 : ACCMQI(OFF) +
17 : ACCTQ(OFF) +
18 : ACTIVREC(MSG) +
19 : ACTVCONO(DISABLED) +
20 : ACTVTRC(OFF) +

```

83. The Find should stop at line 100, showing you that you successfully executed the **ALTER QMGR** command, with a line that reads **AMQ8005: IBM MQ Appliance queue manager changed.**. Click **Find Next** to move to the next response message.



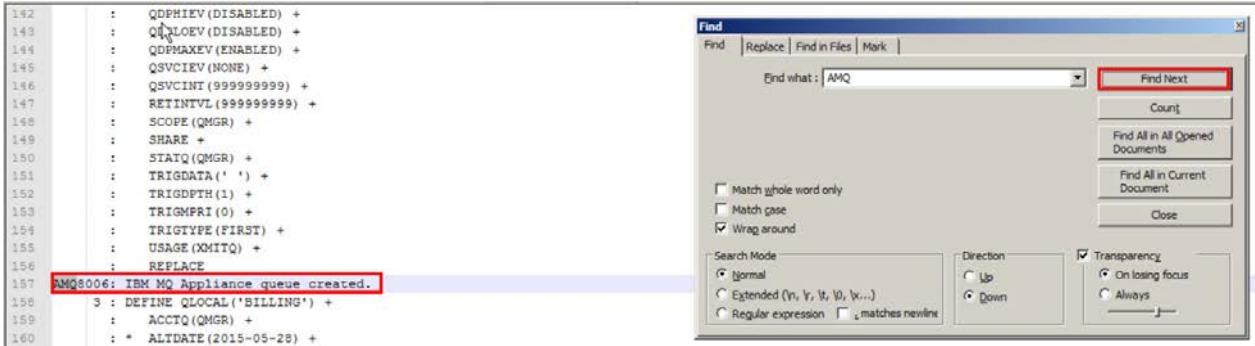
```

85 : * SSLKEYR('C:\ProgramData\IBM\MQ\qmgrs\APP1_QMGR\ssl\key') +
86 : SSLKEYC(0) +
87 : STATACLS(QMGR) +
88 : STATCHL(OFF) +
89 : STATINT(1800) +
90 : STATMQI(OFF) +
91 : STATQ(OFF) +
92 : STARTPEV(ENABLED) +
93 : SUITES(NONE) +
94 : * SYNCPT +
95 : * TREELIFE(1800) +
96 : TRIGINT(99999999) +
97 : * VERSION(08000002) +
98 : * XRCAP(YES) +
99 : FORCE
100 AMQ8005: IBM MQ Appliance queue manager changed.
101 2 : DEFINE QLOCAL('APP2_QMG2.XMIT') +
102 : ACCTQ(QMGR) +
103 : * ALTDATE(2015-05-28) +

```

If you get an error message, for this command or any of the 202 commands that get executed by the script, you must go back and correct the command in the **APP1\_QMGR\_Migration.mqsc** file in Notepad++. Save the file, and then start again at step 3 in this section.

84. This time, you should be at line 157, and you should see **AMQ8006: IBM MQ Appliance queue created.** as the response to the first **DEFINE QLOCAL** command.



```

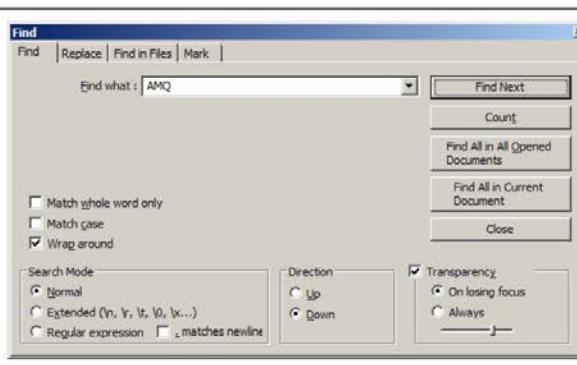
142 : QDPHIEV(DISABLED) +
143 : QJLOEV(DISABLED) +
144 : QDFMAXEV(ENABLED) +
145 : QSVCIEV(NONE) +
146 : QSVCINT(99999999) +
147 : RETINTVL(99999999) +
148 : SCOPE(QMGR) +
149 : SHARE +
150 : STATQ(QMGR) +
151 : TRIGDATA(' ') +
152 : TRIGDPTH(1) +
153 : TRIGMPRI(0) +
154 : TRIGTYPE(FIRST) +
155 : USAGE(XMITQ) +
156 : REPLACE
157 AMQ8006: IBM MQ Appliance queue created.
158 3 : DEFINE QLOCAL('BILLING') +
159 : ACCTQ(QMGR) +
160 : * ALTDATE(2015-05-28) +

```

- 85. The script defines 63 queues. Keep clicking **Find Next** in the Find dialog and checking for the **AMQ8006** response.

Hint: Most of the commands in this script file are for objects that you did not change when editing the script file. You touched and changed only a few of these commands. So you should be sure to check the response to the execution of those commands that you altered. The rest of them you can probably skip, assuming that you were careful in Notepad++ and did not accidentally change something else.

- 86. After all of the queue definitions, the next Find stop is at line 3485 after a **DEFINE NAMELIST** command. You should see: **AMQ8552: IBM MQ Appliance namelist created**. There are three namelists. Click **Find Next** to review each of the other two namelists.

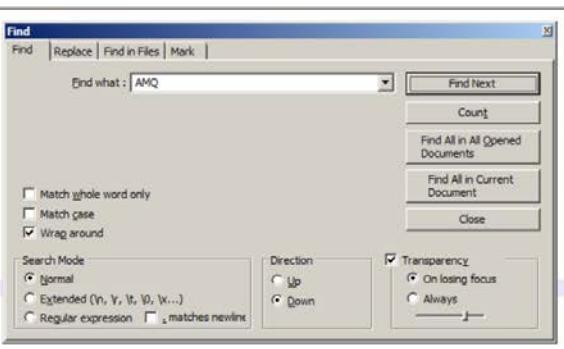


```

162 : QDPMIEV(DISABLED) +
163 : QDPFLOEV(DISABLED) +
164 : QDPMAXEV(ENABLED) +
165 : QSVCIEV(NONE) +
166 : QSVCINT(99999999) +
167 : RETINTVL(99999999) +
168 : SCOPE(QMGR) +
169 : SHARE +
170 : STATQ(QMGR) +
171 : TRIGDATA(' ') +
172 : TRIGDFTH(1) +
173 : TRIGMPRI(0) +
174 : TRIGTYPE(FIRST) +
175 : USAGE(NORMAL) +
176 : REPLACE
177 AMQ8006: IBM MQ Appliance queue created.
178 65 : DEFINE NAMELIST('SYSTEM.DEFAULT.NAMELIST') +
179 : * NAMCOUNT(0) +
180 : NAMES(' ') +
181 : DESCR(' ') +
182 : * ALTDATE(2015-05-28) +
183 : * ALTTIME(09.28.43) +
184 : REPLACE
185 AMQ8552: IBM MQ Appliance namelist created.
186 66 : DEFINE NAMELIST('SYSTEM.QPUBSUB.QUEUE.NAMELIST') +

```

- 87. Click **Find Next** again, and you should be at line 3512 and your process definition. You should see: **AMQ8010: IBM MQ Appliance process created**. Click **Find Next** again to review the other process definition.

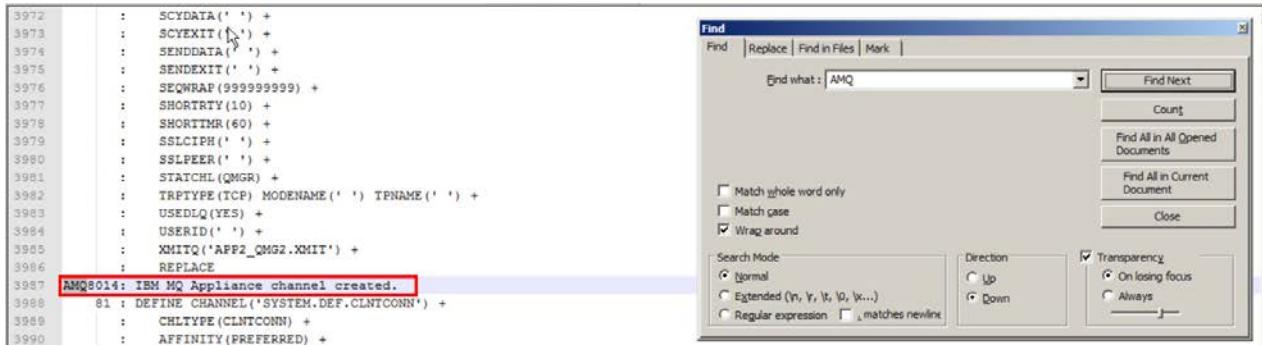


```

3497 : NAMES('SYSTEM.BROKER.DEFAULT.SUBPOINT') +
3498 : DESCR('Topic objects list used to match to RFH2 subscription points')
3499 : * ALTDATE(2015-05-28) +
3500 : * ALTTIME(09.28.43) +
3501 : REPLACE
3502 AMQ8552: IBM MQ Appliance namelist created.
3503 68 : DEFINE PROCESS('PROCESS.TRIGGER.PO') +
3504 : APPLTYPE(WINDOWSNT) +
3505 : APPLICID('Readit.exe') +
3506 : ENVRDATA(' ') +
3507 : USERDATA(' ') +
3508 : DESCR(' ') +
3509 : * ALTDATE(2015-05-28) +
3510 : * ALTTIME(09.28.43) +
3511 : REPLACE
3512 AMQ8010: IBM MQ Appliance process created.
3513 69 : DEFINE PROCESS('SYSTEM.DEFAULT.PROCESS') +
3514 : APPLTYPE(WINDOWSNT) +
3515 : APPLICID(' ') +

```

- 88. Click **Find Next** again, and you are at the first channel definition. You should see an AMQ8014: IBM MQ Appliance channel created response. The 11<sup>th</sup> channel definition is the one that you altered, the **TO.APP2\_QMGR** channel. Click **Find Next** 10 more times, checking the responses, until you get to line 3987. This line is the response for your channel. Validate that it was created successfully. One more channel definition remains after this definition, so click **Find Next** to review.

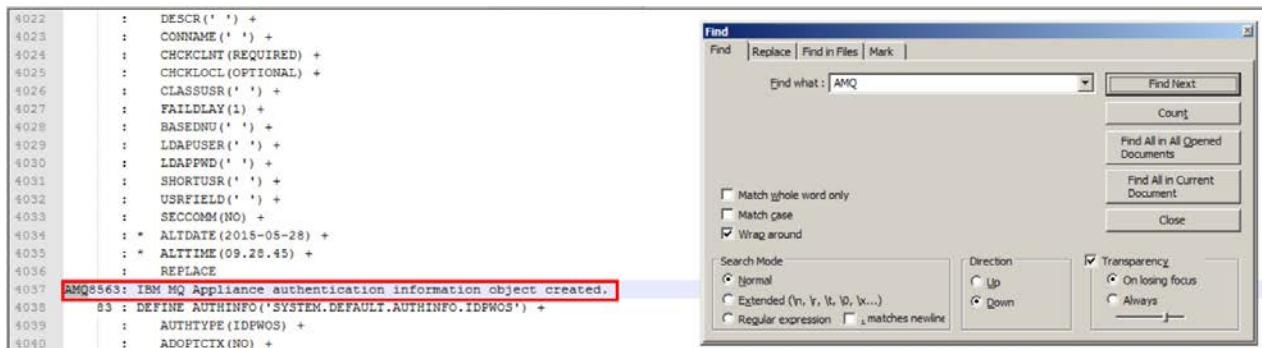


```

3972 : SCYDATA(' ') +
3973 : SCYEXIT(' ') +
3974 : SENDDATA(' ') +
3975 : SENDEXIT(' ') +
3976 : SEQNRAF(999999999) +
3977 : SHORTRTY(10) +
3978 : SHORTMR(60) +
3979 : SSLCIPH(' ') +
3980 : SSLEFFER(' ') +
3981 : STATCHL(QMGR) +
3982 : TRPTYPE(TCP) MODENAME(' ') TPNAME(' ') +
3983 : USEDLQ(YES) +
3984 : USERID(' ') +
3985 : XMITQ('APP2_QMGR.XMIT') +
3986 : REPLACE
3987 AMQ8014: IBM MQ Appliance channel created.
3988 81 : DEFINE CHANNEL('SYSTEM.DEF.CLNICONN') +
3989 : CHLTYP(CLNTCONN) +
3990 : AFFINITY(PREFERRED) +
3991

```

- 89. Click **Find Next** again, and you should be at line 4037 and the first AUTHINFO record definition.



```

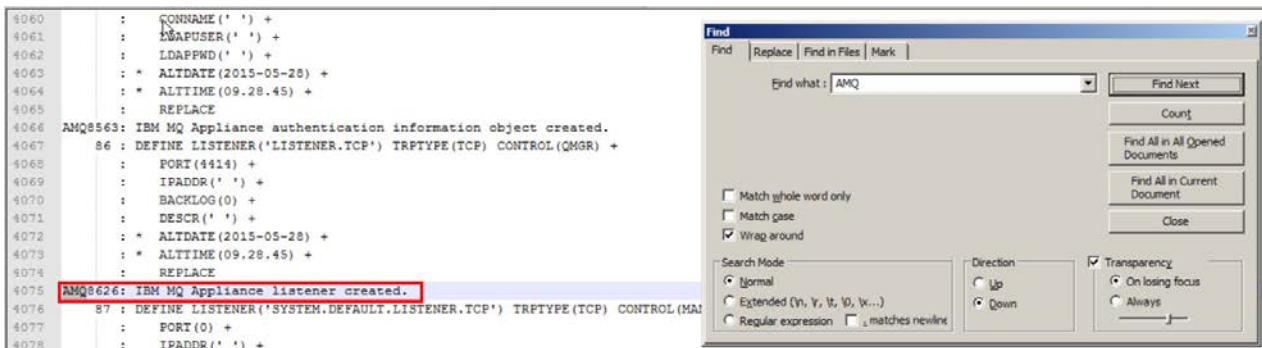
4022 : DESCRL(' ') +
4023 : CONNAME(' ') +
4024 : CHCKCLNT(REQUIRED) +
4025 : CHCKLCL(OPTIONAL) +
4026 : CLASSUSR(' ') +
4027 : FAILDLAY(1) +
4028 : BASEDNU(' ') +
4029 : LDAPUSER(' ') +
4030 : LDAPPWD(' ') +
4031 : SHORTUSR(' ') +
4032 : USRFIELD(' ') +
4033 : SECOMM(NO) +
4034 : * ALTDATE(2015-05-28) +
4035 : * ALTTIME(09.28.45) +
4036 : REPLACE
4037 AMQ8563: IBM MQ Appliance authentication information object created.
4038 83 : DEFINE AUTHINFO('SYSTEM.DEFAULT.AUTHINFO.IDPWOS') +
4039 : AUTHTYPE(IDPWOS) +
4040 : ADOPTCTX(NO) +
4041

```

You should see AMQ8563: IBM MQ Appliance authentication information object created.

Three more AUTHINFO definitions are available to **Find Next** and review.

- 90. The next **Find Next** takes you to line 4075 and your listener definition. You should see: AMQ8626: IBM MQ Appliance listener created. One more listener definition must be checked after the next **Find Next**.

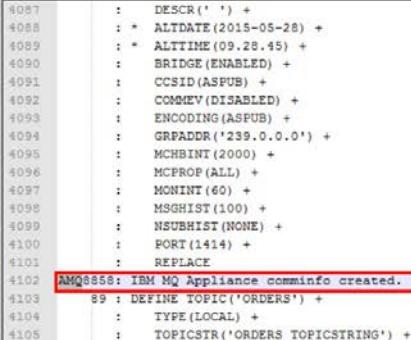
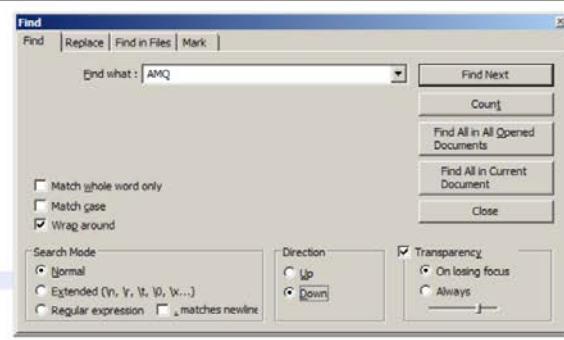


```

4060 : CONNAME(' ') +
4061 : LDAPUSER(' ') +
4062 : LDAPPWD(' ') +
4063 : * ALTDATE(2015-05-28) +
4064 : * ALTTIME(09.28.45) +
4065 : REPLACE
4066 AMQ8563: IBM MQ Appliance authentication information object created.
4067 86 : DEFINE LISTENER('LISTENER.TCP') TRPTYPE(TCP) CONTROL(QMGR) +
4068 : PORT(4414) +
4069 : IPADDR(' ') +
4070 : BACKLOG(0) +
4071 : DESCRL(' ') +
4072 : * ALTDATE(2015-05-28) +
4073 : * ALTTIME(09.28.45) +
4074 : REPLACE
4075 AMQ8626: IBM MQ Appliance listener created.
4076 87 : DEFINE LISTENER('SYSTEM.DEFAULT.LISTENER.TCP') TRPTYPE(TCP) CONTROL(MA
4077 : PORT(0) +
4078 : IPADDR(' ') +
4079

```

- \_\_\_ 91. Another **Find Next** should bring you to line 4102 and a **COMMINFO** definition. You should see: AMQ8858: IBM MQ Appliance comminfo created.

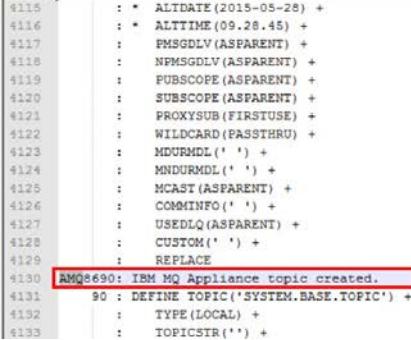
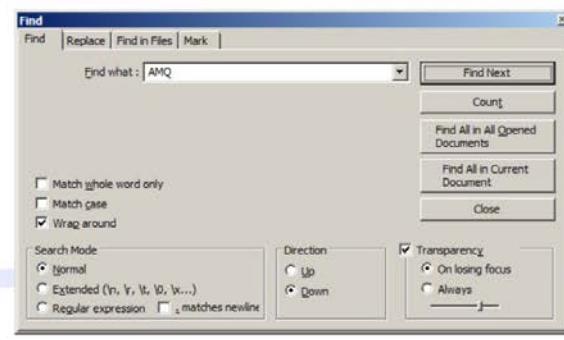



```

4087 : DESC(' ') +
4088 : * ALTDAT(2015-05-28) +
4089 : * ALTTIME(09.28.45) +
4090 : BRIDGE(ENABLED) +
4091 : CCSID(ASFB) +
4092 : COMMEV(DISABLED) +
4093 : ENCODING(ASFB) +
4094 : GRPADDR('239.0.0.1') +
4095 : MCHBINT(2000) +
4096 : MCPROP(ALL) +
4097 : MONINT(60) +
4098 : MSGHIST(100) +
4099 : NSUBHIST(NONE) +
4100 : PORT(1414) +
4101 : REPLACE
4102 AMQ8858: IBM MQ Appliance comminfo created.
4103 90: DEFINE TOPIC('ORDERS') +
4104 : TYPE(LOCAL) +
4105 : TOPICSTR('ORDERS_TOPICSTRING') +

```

- \_\_\_ 92. Click **Find Next** again, and you reach the topic definition (line 4130). You should see: AMQ8690: IBM MQ Appliance topic created. Five more topic definitions exist. Click **Find Next** and validate through these definitions.

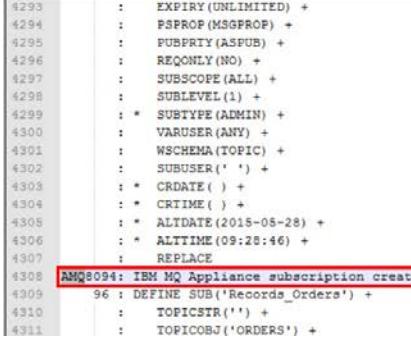
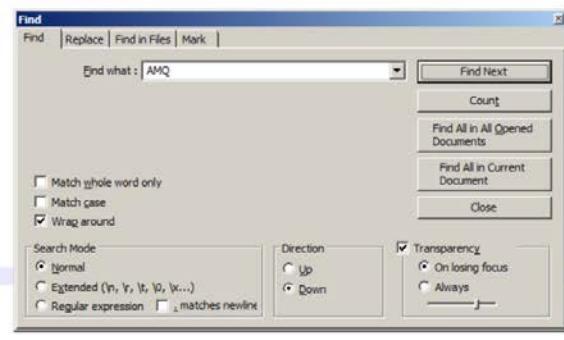



```

4115 : * ALTDAT(2015-05-28) +
4116 : * ALTTIME(09.28.45) +
4117 : FMSSDLV(ASPARENT) +
4118 : NFMSSDLV(ASPARENT) +
4119 : PUBSCOPE(ASPARENT) +
4120 : SUBSCOPE(ASPARENT) +
4121 : PROXYSUB(FIRSTUSE) +
4122 : WILDCARD(PASSTHRU) +
4123 : MDURMDL(' ') +
4124 : MNDRMDL(' ') +
4125 : MCAST(ASPARENT) +
4126 : COMMINFO(' ') +
4127 : USEDLQ(ASPARENT) +
4128 : CUSTOM(' ') +
4129 : REPLACE
4130 AMQ8690: IBM MQ Appliance topic created.
4131 90: DEFINE TOPIC('SYSTEM.BASE.TOPIC') +
4132 : TYPE(LOCAL) +
4133 : TOPICSTR('') +

```

- \_\_\_ 93. Click **Find Next** again, and it takes you to a subscription definition at line 4308. You should see: AMQ8094: IBM MQ Appliance subscription created. Click **Find Next** again, and you can review your subscription definition.

```

4293 : EXPIRY(UNLIMITED) +
4294 : PSFPROP(MSGPROP) +
4295 : PUBPRIV(ASFB) +
4296 : REQONLY(NO) +
4297 : SUBSCOPE(ALL) +
4298 : SUBLVEL(1) +
4299 : * SUBTYPE(ADMIN) +
4300 : VARUSER(ANY) +
4301 : WSCHEMA(TOPIC) +
4302 : SUBUSER(' ') +
4303 : * CRDATE() +
4304 : * CRTIME() +
4305 : * ALTDAT(2015-05-28) +
4306 : * ALTTIME(09.28.46) +
4307 : REPLACE
4308 AMQ8094: IBM MQ Appliance subscription created.
4309 96: DEFINE SUB('Records_Orders') +
4310 : TOPICSTR('') +
4311 : TOPICOBJ('ORDERS') +

```

- \_\_\_ 94. Click **Find Next** again, and you are at the first channel authentication definition, at line 4357.

```

4342 : * Queue manager name: APP1_QMGR
4343 : * Queue manager platform: Windows
4344 : * Queue manager command level: (800/801) XRCAP(YES)
4345 : * Command issued: dmpmqcfg -a -x chlauth -m APP1_QMGR
4346 : ****
4347 97 : SET CHLAUTH('SYSTEM.ADMIN.SVRCONN') +
4348 : TYPE(ADDRESSMAP) +
4349 : DESCRIPTOR('Default rule to allow MQ Explorer access') +
4350 : CUSTOM('') +
4351 : ADDRESS('*') +
4352 : USERSRC(CHANNEL) +
4353 : CHCKCLNT(ASQMGR) +
4354 : * ALTDATE(2015-05-28) +
4355 : * ALTTIME(09.28.46) +
4356 : ACTION(REPLACE)
4357 AMQ8877: IBM MQ Appliance channel authentication record set.
4358 98 : SET CHLAUTH('SYSTEM.') +
4359 : TYPE(ADDRESSMAP) +
4360 : DESCRIPTOR('Default rule to disable all SYSTEM channels') +

```

You should see: AMQ8877: IBM MQ Appliance channel authentication record created. Click **Find Next**, and validate the two remaining channel authentication definitions.

- \_\_\_ 95. Finally, click **Find Next** again, and you are at the first AUTHINFO definition, at line 4400.  
You should see: AMQ8862: IBM MQ Appliance authority record set. Only one definition remains. Review it, and then close the Find dialog by clicking **Close**.

```

4380 : ****
4381 : * Script generated on 2015-05-28 at 12.19.35
4382 : * Script generated by user 'Administrato' on host 'STUDENTI'
4383 : * Queue manager name: APP1_QMGR
4384 : * Queue manager platform: Windows
4385 : * Queue manager command level: (800/801) XRCAP(YES)
4386 : * Command issued: dmpmqcfg -a -x authrec -n BILLING -m APP1_QMGR
4387 : * No matching namelist objects
4388 : * No matching process objects
4389 : * No matching channel objects
4390 : * No matching authinfo objects
4391 : * No matching listener objects
4392 : * No matching service objects
4393 : * No matching comminfo objects
4394 : * No matching topic objects
4395 100 : SET AUTHREC +
4396 : PROFILE('BILLING') +
4397 : PRINCIPAL('potuser') +
4398 : OBJTYPE(QUEUE) +
4399 : AUTHADD(BROWSE,GET,INQ,PUT)
4400 AMQ8862: IBM MQ Appliance authority record set.
4401 101 : SET AUTHREC +
4402 : PROFILE('$class') +
4403 : PRINCIPAL('potuser') +
4404 : OBJTYPE(QUEUE) +
4405 : AUTHADD(NONE)
4406 AMQ8862: IBM MQ Appliance authority record set.
4407 202 command responses received.

```

- \_\_\_ 96. At the bottom of the file, you see the final response from runmqsc, 202 command responses received. Close Notepad++.

Notice that as previously mentioned, the number of commands that get generated by the `dmpmqcfg` command might be different depending on the exact configuration of the queue manager. If all of the commands work, especially those commands that you had to edit and then verify, the number does not matter.

## 6.7. Validating the IBM MQ Appliance queue manager

- 97. By now, you should have your APP1\_QMGR running and completed the migration from the Windows platform to the IBM MQ Appliance. You validated that your migration script was completed successfully. Now you can do some checking to validate that it works as the Windows queue manager did.
- 98. It would be possible to use the IBM MQ Console to review all of the objects that you just created (migrated), but instead you are going to use IBM MQ Explorer. In the Windows image, return to IBM MQ Explorer (start it unless it is already running).

The screenshot shows the IBM MQ Console dashboard with four main panels:

- Listeners on APP1\_QMGR:**

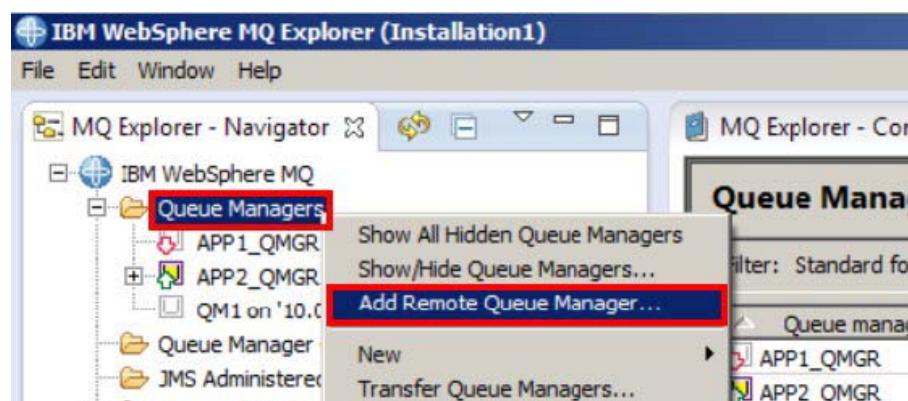
| Name                        | Port | Listener status |
|-----------------------------|------|-----------------|
| LISTENER.TCP                | 4414 | Running         |
| SYSTEM.DEFAULT.LISTENER.TCP | 0    | Stopped         |
| SYSTEM LISTENER.TCP.1       | 4444 | Running         |
- Queue Managers:**

| Name      | Running TCP listener ports | Status  | High Availability |
|-----------|----------------------------|---------|-------------------|
| APP1_QMGR | 4414,4444                  | Running |                   |
| QM1       |                            | Stopped |                   |
- Channels on APP1\_QMGR:**

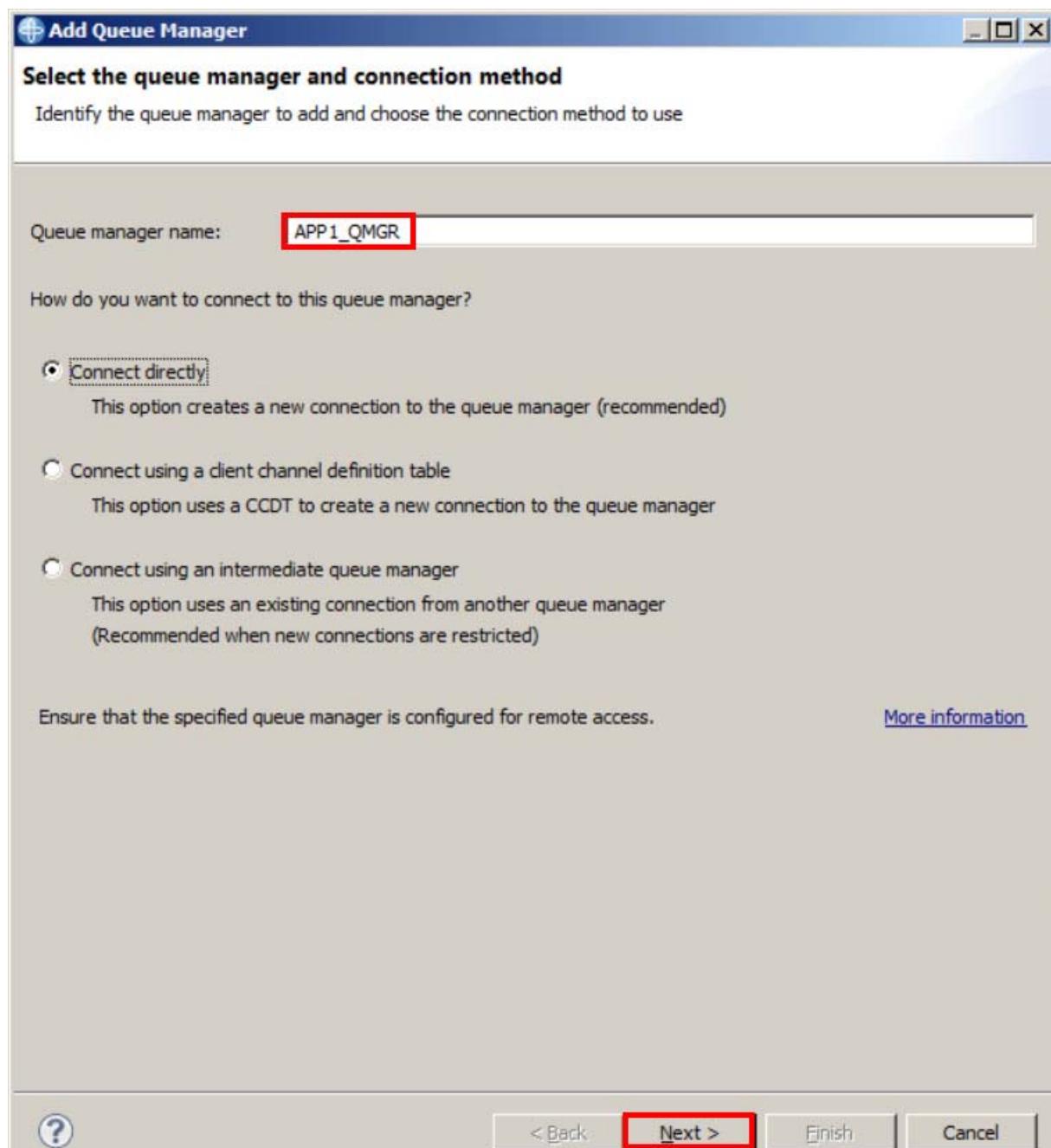
| Name         | Type   | Overall channel status |
|--------------|--------|------------------------|
| TO_APP2_QMGR | Sender | Running                |
- Queues on APP1\_QMGR:**

| Name           | Queue type | Queue depth |
|----------------|------------|-------------|
| APP2_QMG2.XMIT | Local      | 0           |
| BILLING        | Local      | 0           |
| IN.ORDERS      | Alias      |             |
| IN.PO          | Local      | 0           |
| ORDERS.IN      | Local      | 0           |

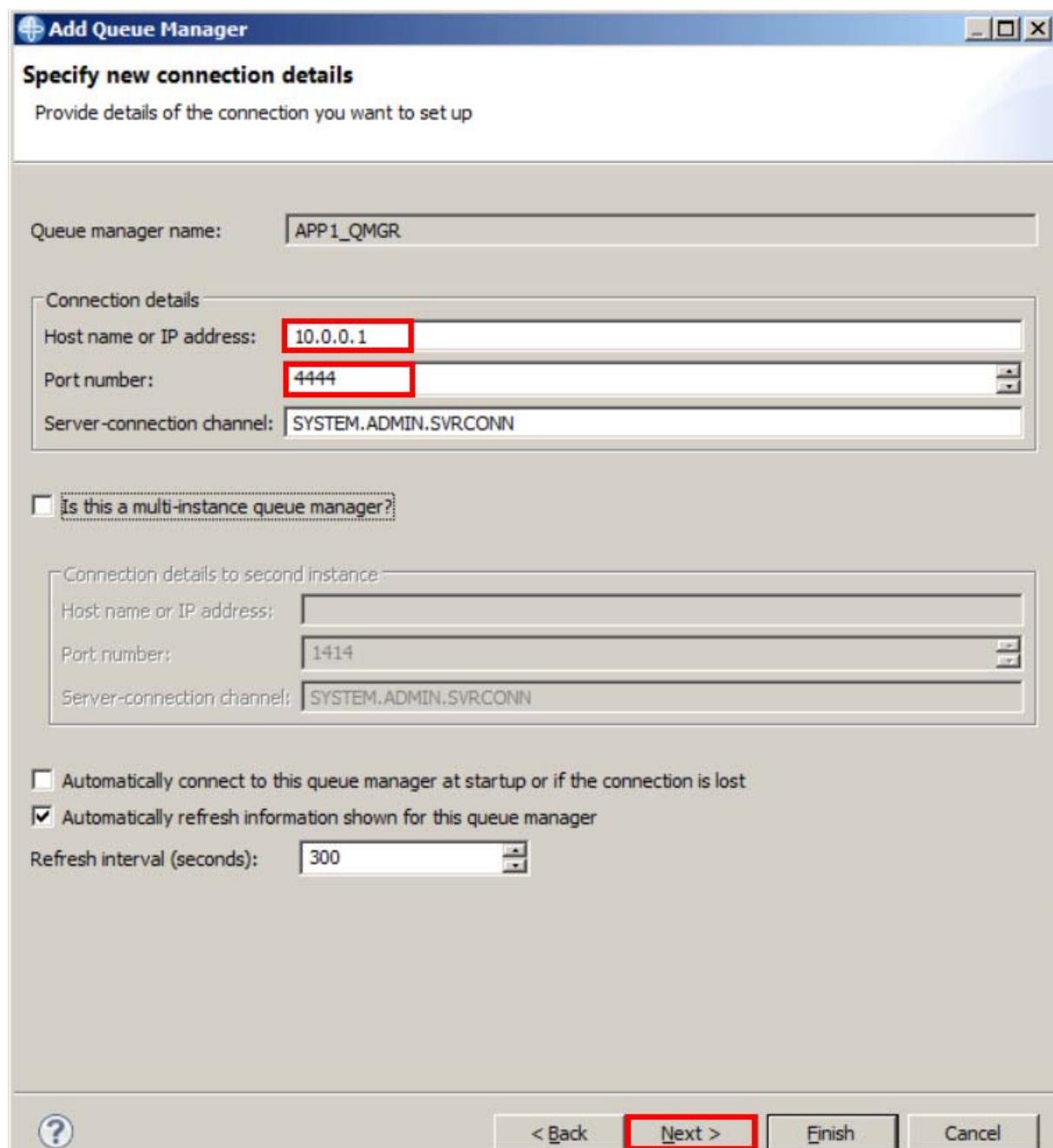
- 99. If you used the IBM MQ Console, you might see something like the following image. Right-click **Queue Managers**, and then click **Add Remote Queue Manager**.



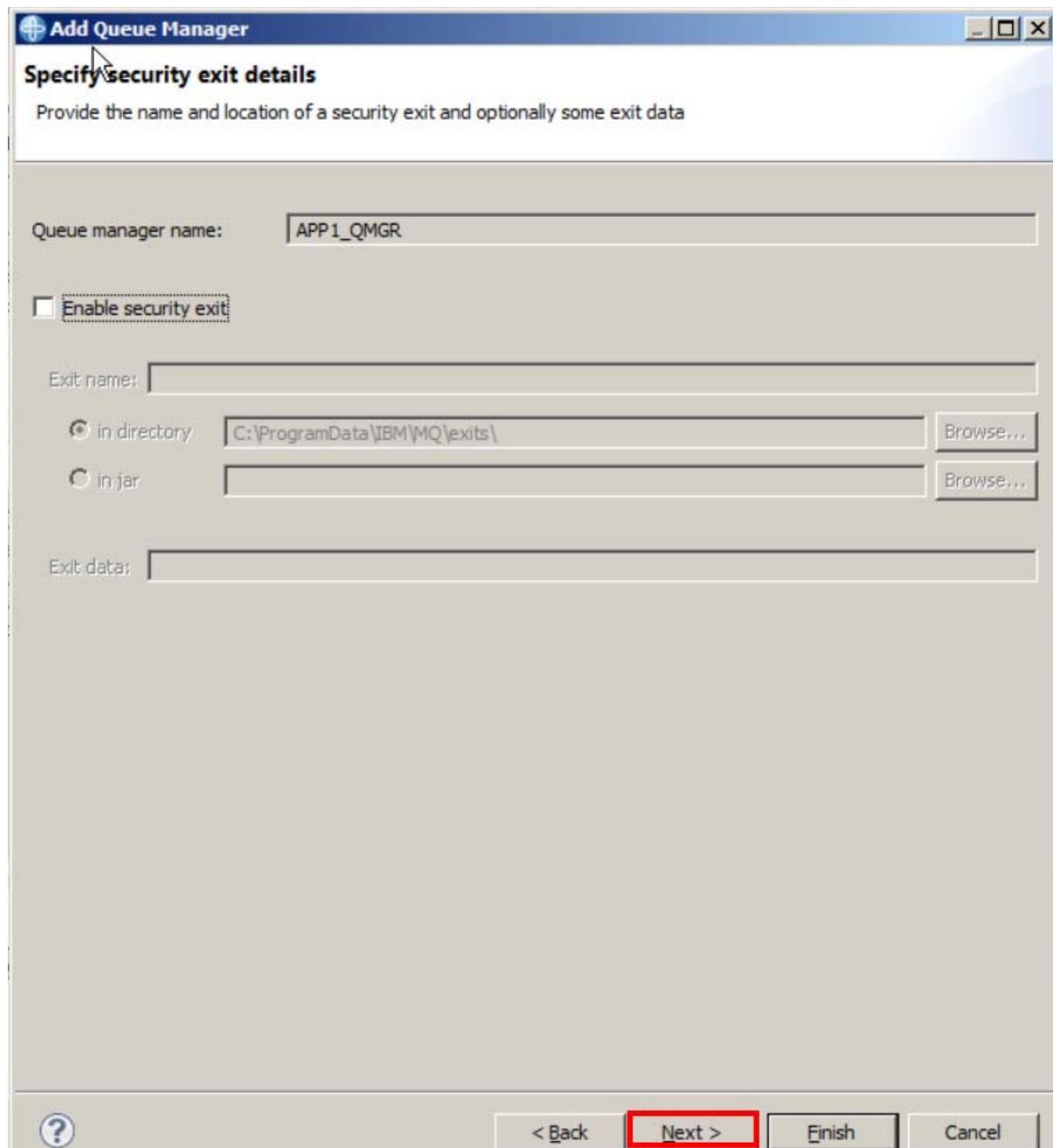
- \_\_\_ 100. On the Add Queue Manager panel, enter APP1\_QMGR for the **Queue manager name**, and then click **Next**.



- 101. Enter 10.0.0.1 in the **Host name or IP address** text box, and 4444 in the **Port number** text box. Click **Next**.

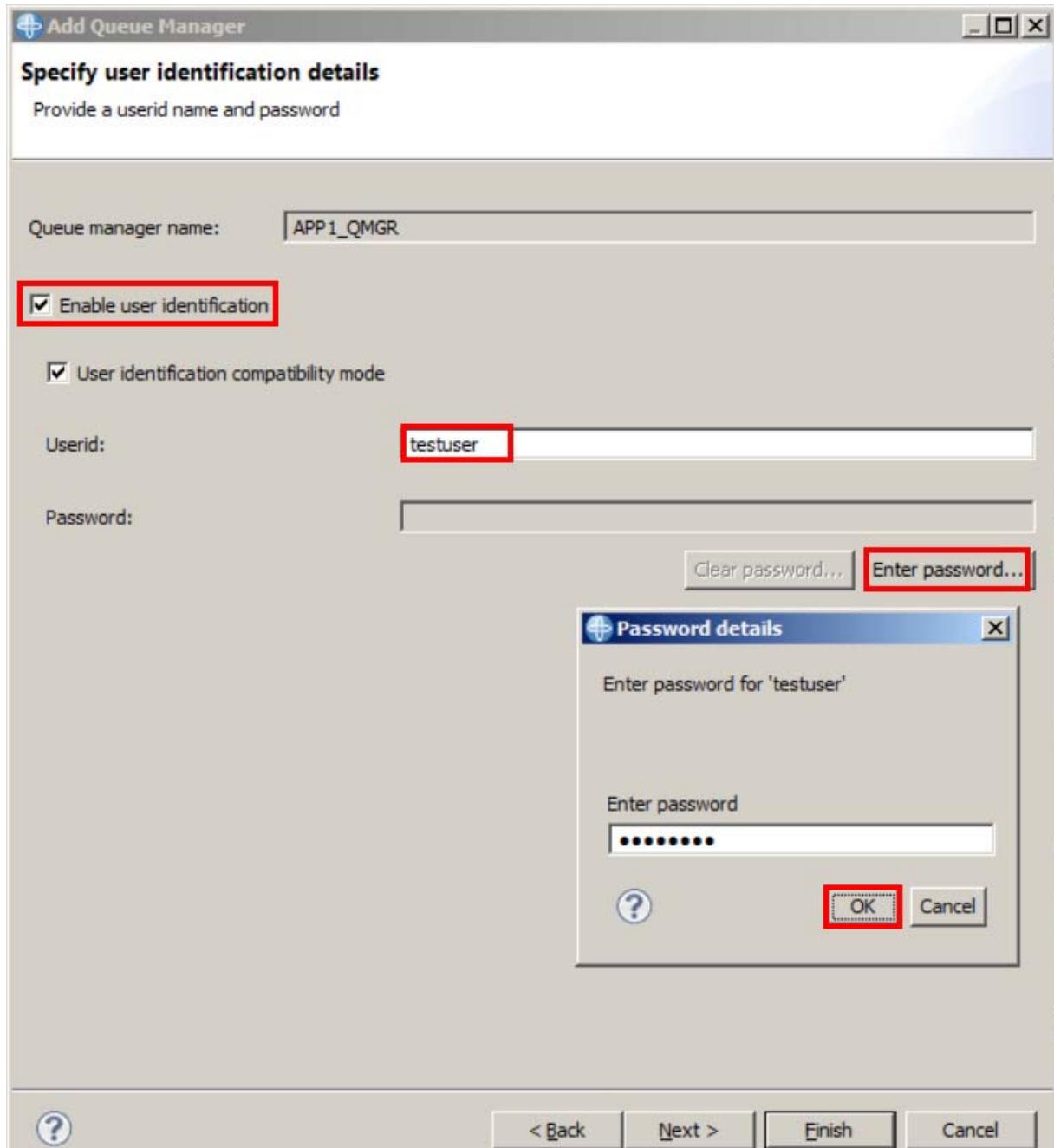


- \_\_\_ 102. On the next panel, you do not change anything, so click **Next**.

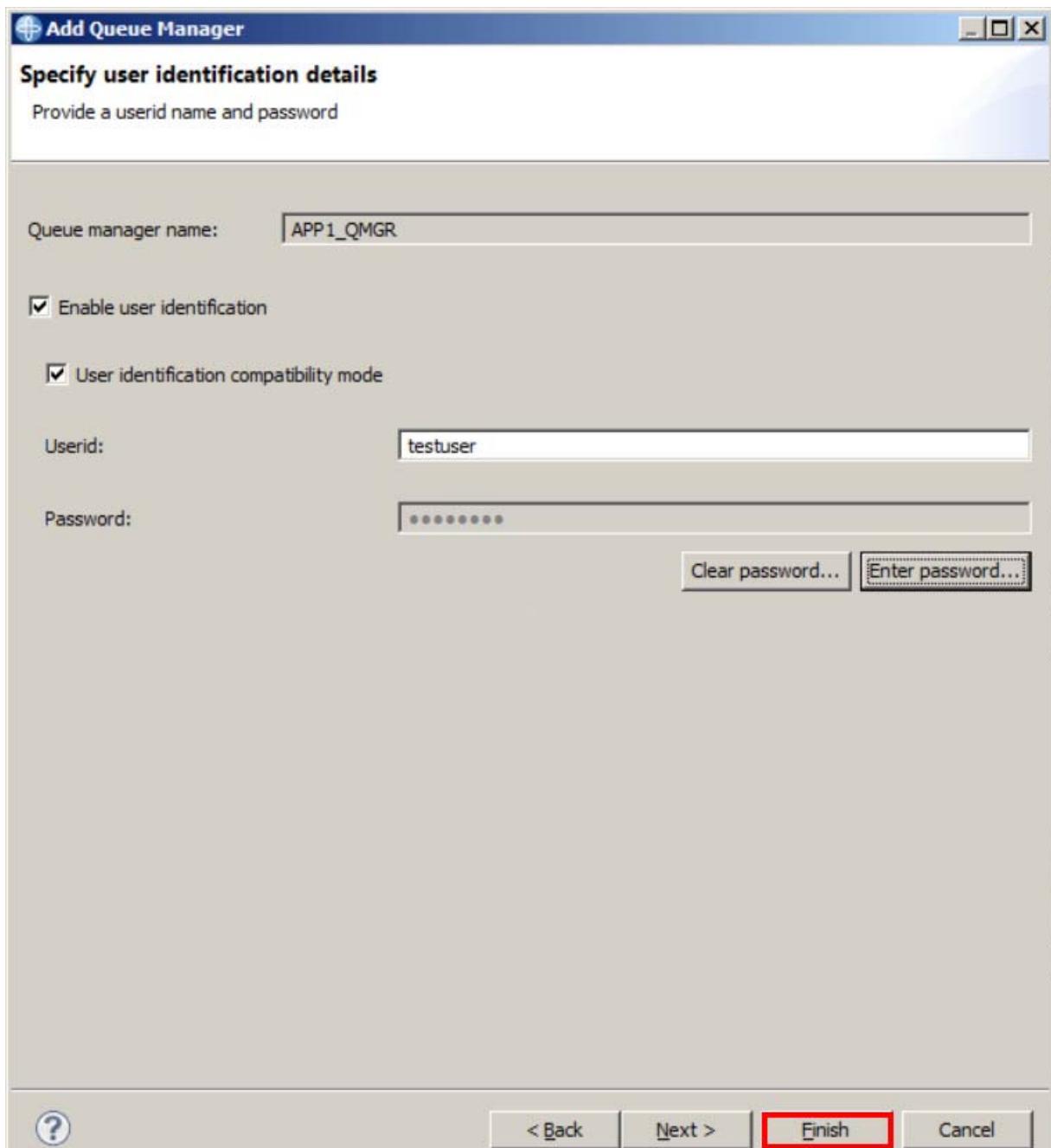


- 103. Click the **Enable user identification** check box. By checking that selection, you can enter text in the Userid text box.

Enter `testuser` in the **Userid** text box, and then click **Enter password**. In the **Password details** window, enter `passw0rd` and click **OK**.



- 104. Recall that you created the **testuser** messaging user in Exercise 1, and this user is a member of the **mqm** group. Click **Finish**.



- \_\_\_ 105.The APP1\_QMGR on the IBM MQ Appliance should now be visible in the IBM MQ Explorer.

The screenshot shows the IBM MQ Explorer interface. On the left, the Navigator pane displays the 'Queue Managers' section, which includes 'APP1\_QMGR' and 'APP1\_QMGR on '10.0.0.1(4444)''. The 'APP1\_QMGR on '10.0.0.1(4444)'' node is highlighted with a red box. On the right, the Content pane shows a table titled 'Queue Managers' with columns: Queue manager name, Command level, Version, Queue manager status, Queue-sharing group name, and Platform. The table lists four entries: APP1\_QMGR (Stopped, Windows), APP1\_QMGR (Running, Appliance), APP2\_QMGR (Running, Windows), and QM1 (Running, Appliance). The 'APP1\_QMGR' and 'APP2\_QMGR' rows are also highlighted with red boxes.

| Queue manager name | Command level | Version  | Queue manager status | Queue-sharing group name | Platform  |
|--------------------|---------------|----------|----------------------|--------------------------|-----------|
| APP1_QMGR          | 800           |          | Stopped              |                          | Windows   |
| APP1_QMGR          | 801           | 08000003 | Running              |                          | Appliance |
| APP2_QMGR          | 800           | 08000002 | Running              |                          | Windows   |
| QM1                | 801           |          | Running              |                          | Appliance |

- \_\_\_ 106.Click the (plus sign) next to **APP1\_QMGR on '10.0.0.1(4444)'** to open the queue manager. Then, click **Queues** to view the list of queues. You should see all of the queues that the mqsc script defined.

The screenshot shows the Navigator pane with 'APP1\_QMGR on '10.0.0.1(4444)'' expanded, revealing 'Queues', 'Topics', 'Subscriptions', 'Channels', 'Listeners', 'Process Definitions', 'Namelists', 'Authentication Information', 'Communication Information', and 'Security Policies'. The 'Queues' node is highlighted with a red box. On the right, the Content pane shows a table titled 'Queues' with columns: Queue name, Queue type, Open input count, Open output count, Current queue depth, Put messages, Get messages, and Remove. The table lists several queues: APP2\_QMG2.XMIT (Local, 0, 0, 0, Allowed, Allowed), BILLING (Local, 0, 0, 0, Allowed, Allowed), IN.ORDERS (Alias, 0, 0, 0, Allowed, Allowed), IN.PO (Local, 0, 0, 0, Allowed, Allowed), ORDERS.IN (Local, 0, 0, 0, Allowed, Allowed), PO.TRIGGER.INIT (Local, 0, 0, 0, Allowed, Allowed), PROCESSED.ORDERS (Local, 0, 0, 0, Allowed, Allowed), RECORDS (Local, 0, 0, 0, Allowed, Inhibited), and RECORDS.FOR.HR (Remote, 0, 0, 0, Allowed, HR).

| Queue name       | Queue type | Open input count | Open output count | Current queue depth | Put messages | Get messages | Remove |
|------------------|------------|------------------|-------------------|---------------------|--------------|--------------|--------|
| APP2_QMG2.XMIT   | Local      | 0                | 0                 | 0                   | Allowed      | Allowed      |        |
| BILLING          | Local      | 0                | 0                 | 0                   | Allowed      | Allowed      |        |
| IN.ORDERS        | Alias      | 0                | 0                 | 0                   | Allowed      | Allowed      |        |
| IN.PO            | Local      | 0                | 0                 | 0                   | Allowed      | Allowed      |        |
| ORDERS.IN        | Local      | 0                | 0                 | 0                   | Allowed      | Allowed      |        |
| PO.TRIGGER.INIT  | Local      | 0                | 0                 | 0                   | Allowed      | Allowed      |        |
| PROCESSED.ORDERS | Local      | 0                | 0                 | 0                   | Allowed      | Allowed      |        |
| RECORDS          | Local      | 0                | 0                 | 0                   | Allowed      | Inhibited    |        |
| RECORDS.FOR.HR   | Remote     | 0                | 0                 | 0                   | Allowed      | HR           |        |

- \_\_\_ 107.Click **Topics** to view the topic that the mqsc script created.

The screenshot shows the Navigator pane with 'APP1\_QMGR on '10.0.0.1(4444)'' expanded, revealing 'Topics', 'Subscriptions', and 'Channels'. The 'Topics' node is highlighted with a red box. On the right, the Content pane shows a table titled 'Topics' with columns: Topic name, Topic type, Topic string, Description, Publish, Subscribe, and Durable subscriptions. The table lists one topic: ORDERS (Local, ORDERS\_TOPICSTRING, As parent, As parent, As parent).

| Topic name | Topic type | Topic string       | Description | Publish   | Subscribe | Durable subscriptions |
|------------|------------|--------------------|-------------|-----------|-----------|-----------------------|
| ORDERS     | Local      | ORDERS_TOPICSTRING |             | As parent | As parent | As parent             |

- \_\_\_ 108.Click **Subscriptions** to view the subscription that the mqsc script created.

The screenshot shows the Navigator pane with 'APP1\_QMGR on '10.0.0.1(4444)'' expanded, revealing 'Subscriptions', 'Channels', and 'Topics'. The 'Subscriptions' node is highlighted with a red box. On the right, the Content pane shows a table titled 'Subscriptions' with columns: Subscription name, Topic name, Topic string, Wildcard usage, Scope, Destination class, and Destination queue manager. The table lists one subscription: Records\_Orders (ORDERS, ORDERS\_TOPICSTRING, Topic level wildcard, All, Provided).

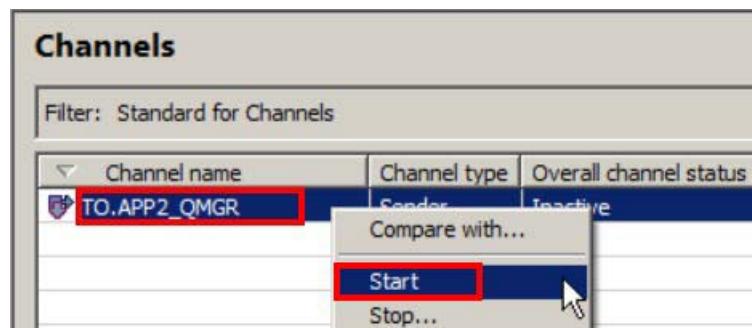
| Subscription name | Topic name | Topic string       | Wildcard usage       | Scope | Destination class | Destination queue manager |
|-------------------|------------|--------------------|----------------------|-------|-------------------|---------------------------|
| Records_Orders    | ORDERS     | ORDERS_TOPICSTRING | Topic level wildcard | All   | Provided          |                           |

- \_\_\_ 109. Click **Channels** to view the channel that the mqsc script created.

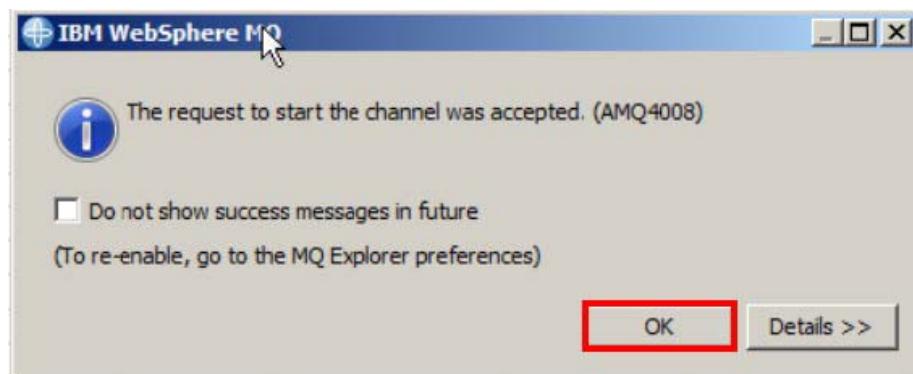
The screenshot shows two windows of the MQ Explorer interface. The left window, titled 'MQ Explorer - Navigator', displays a tree structure under 'IBM WebSphere MQ' > 'Queue Managers' > 'APP1\_QMGR'. The 'Channels' node is highlighted with a red box. The right window, titled 'MQ Explorer - Content', has a tab bar with 'Channels' selected. It shows a table titled 'Channels' with one row: TO.APP2\_QMGR, Sender, Inactive, 10.0.0.10(4415), APP2\_QMG2.XMIT.

| Channel name | Channel type | Overall channel status | Conn name       | Transmission queue | MCA user ID |
|--------------|--------------|------------------------|-----------------|--------------------|-------------|
| TO.APP2_QMGR | Sender       | Inactive               | 10.0.0.10(4415) | APP2_QMG2.XMIT     |             |

- \_\_\_ 110. Now you start this channel to ensure that the channel communicates with the APP2\_QMGR, which is still running on Windows. Right-click the **TO.APP2\_QMGR** channel, and then click **Start**.



- \_\_\_ 111. Click **OK** to close the message box.

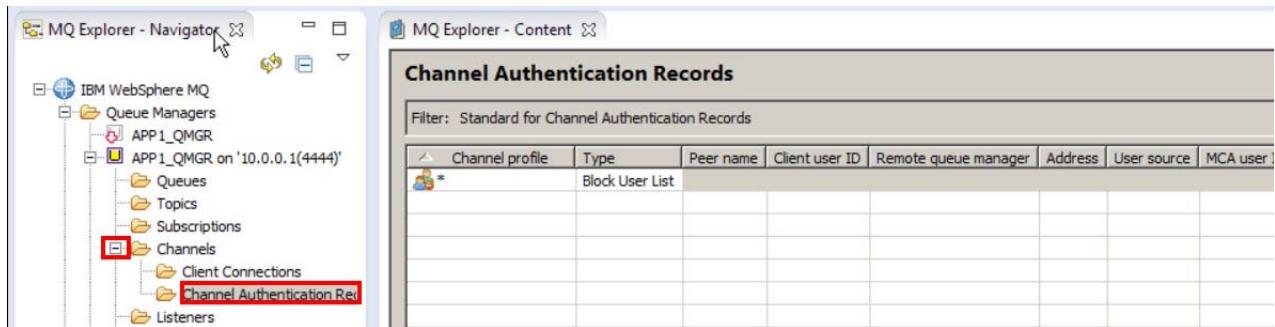


- \_\_\_ 112. The channel should change to a **Running** status. This status means that your channel definition and transmission queue definition are good.

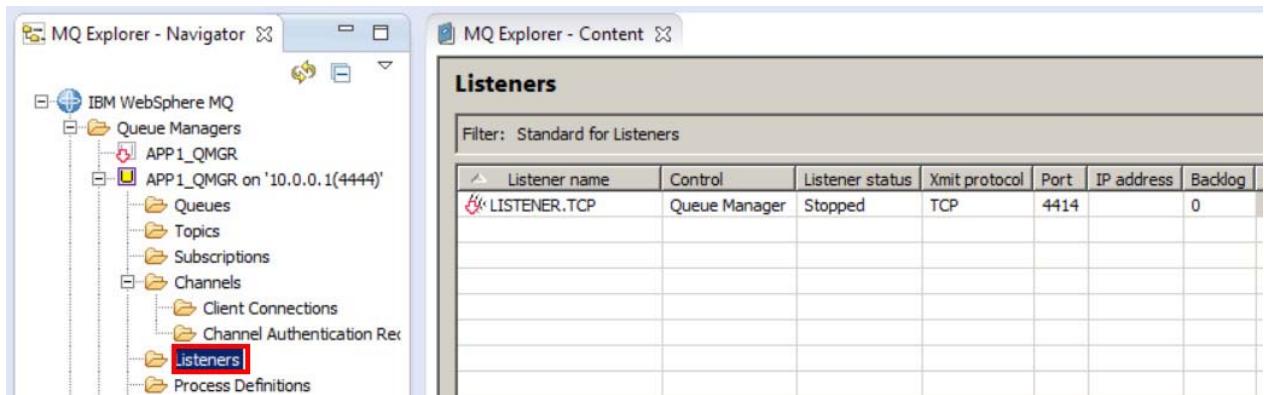
A screenshot of the 'Channels' list window. The table shows the following data:

| Channel name | Channel type | Overall channel status | Conn name       | Transmission queue | MCA user ID | Batch size | Disconnect interval | Heartbeat interval |
|--------------|--------------|------------------------|-----------------|--------------------|-------------|------------|---------------------|--------------------|
| TO.APP2_QMGR | Sender       | Running                | 10.0.0.10(4415) | APP2_QMG2.XMIT     |             | 50         | 6000                | 300                |

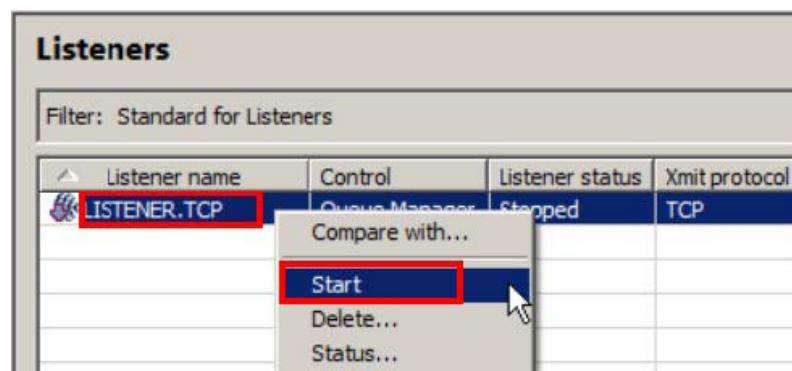
- 113. Click the (plus sign) next to **Channels**, and then click **Channel Authentication Records** to view the channel authentication records that the mqsc script created.



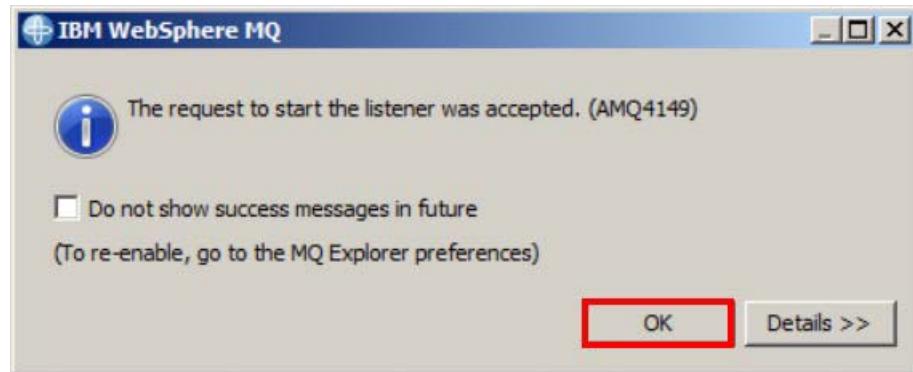
- 114. Click **Listeners** to view the listeners that the mqsc script created. You added a listener by using the same port that the queue manager used on Windows (in addition to the system listener that got created when the queue manager was created on the Appliance).



- 115. Right-click the **LISTENER.TCP** listener and click **Start** so that you ensure that your listener works correctly.



- \_\_\_ 116. Click **OK** to close the message box.



- \_\_\_ 117. The listener should show a status of **Running**.

| Listeners                      |               |                 |               |      |            |         |
|--------------------------------|---------------|-----------------|---------------|------|------------|---------|
| Filter: Standard for Listeners |               |                 |               |      |            |         |
| Listener name                  | Control       | Listener status | Xmit protocol | Port | IP address | Backlog |
| LISTENER.TCP                   | Queue Manager | Running         | TCP           | 4414 |            | 0       |

- \_\_\_ 118. Click **Process Definitions** to view the process that the mqsc script created.

| Process name       | App type   | Application ID | Environment data | User data | Description | Alteration date | Alteration time |
|--------------------|------------|----------------|------------------|-----------|-------------|-----------------|-----------------|
| PROCESS.TRIGGER.PO | Windows NT | Readit.exe     |                  |           |             | May 29, 2015    | 8:36:34 PM      |

- \_\_\_ 119. Now you test running a client application. You use the amqsputc sample IBM MQ program (which is the PUT with client bindings sample). Before you can run the sample, you must set another environment variable that the samples use for security. You need to set the user ID that you want to pass to the queue manager for authentication.

Return to the command prompt and enter:

```
SET MQSAMP_USER_ID=testuser
```

```
C:\Setup-Install>SET MQSAMP_USER_ID=testuser
C:\Setup-Install>
```

- 120. Now you can run amqsputc. The directory where it is located is in your PATH, so enter the following command at the command prompt:

```
amqsputc IN.ORDERS APP1_QMGR
```

```
C:\Setup-Install>amqsputc IN.ORDERS APP1_QMGR
Sample AMQSPUT0 start
Enter password:
```

- 121. You are prompted for the password for testuser. Enter `passw0rd` and press Enter. The amqsputc program connects to the APP1\_QMGR and opens the IN.ORDERS queue. Notice that the IN.ORDERS queue is an alias queue for the ORDERS.IN queue.

```
C:\Setup-Install>amqsputc IN.ORDERS APP1_QMGR
Sample AMQSPUT0 start
Enter password: passw0rd
target queue is IN.ORDERS
```

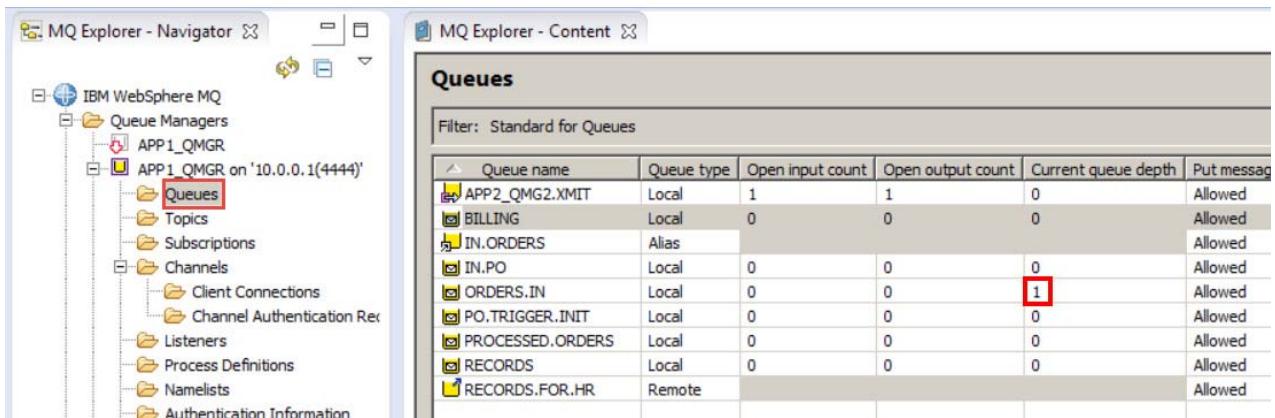
- 122. Now you can enter anything that you want as a message to be sent to the queue. Enter your message, and press **Enter** to PUT it to the queue. Press **Enter** a second time, on the blank line, and the program terminates.

For example:

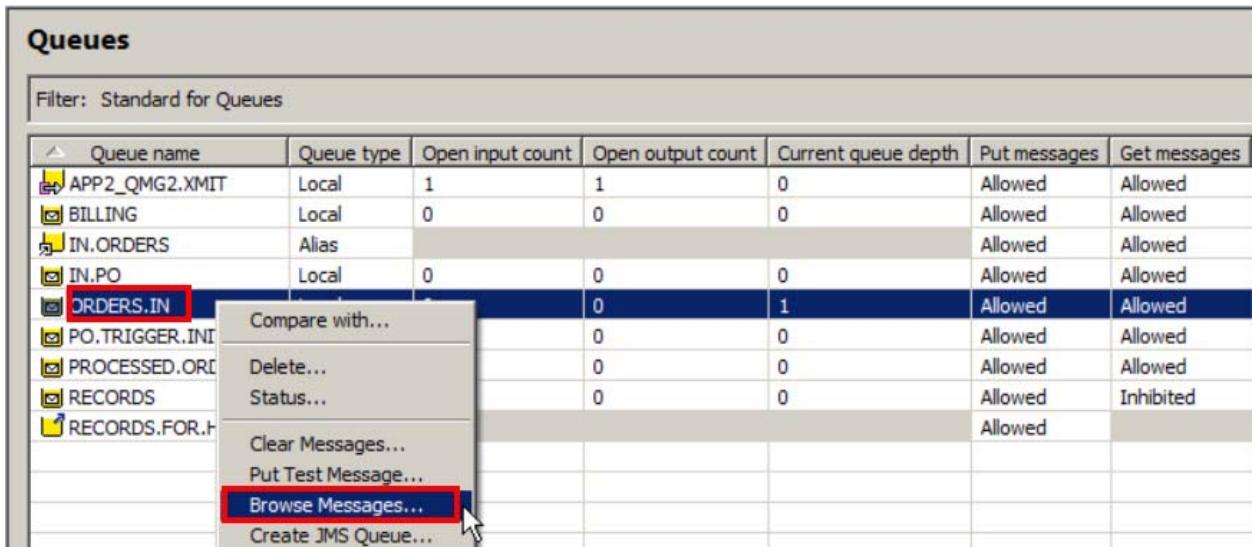
```
C:\Setup-Install>amqsputc IN.ORDERS APP1_QMGR
Sample AMQSPUT0 start
Enter password: passw0rd
target queue is IN.ORDERS
This is a test message coming from the Windows client using amqsputc.

Sample AMQSPUT0 end
C:\Setup-Install>
```

- 123. Now you check the queue for your message. Return to IBM MQ Explorer and click **Queues** under the **APP1\_QMGR** on '10.0.0.1(4414)' queue manager. You should see the depth of the **ORDERS.IN** queue (this queue is the base object for the IN.ORDERS queue alias that you used) is now 1.



- \_\_\_ 124.Right-click the ORDERS.IN queue and click **Browse Messages** from the menu.



- \_\_\_ 125.Look at the message in the **Message data** column. Make note of the **Put date/time** field to validate that this message is the one that you just sent from the client application on Windows, sitting on the ORDERS.IN queue on the IBM MQ Appliance. (You might have to resize the window to see the entire message.) Click **Close**.

| Message browser |                          |                 |                              |        |              |                                                             |
|-----------------|--------------------------|-----------------|------------------------------|--------|--------------|-------------------------------------------------------------|
| Position        | Put date/time            | User identifier | Put application name         | Format | Total length | Message data                                                |
| 1               | May 29, 2015 11:31:49 PM | testuser        | Sphere MQ\bin64\amqsputc.exe | MQSTR  | 69           | This is a test message coming from the Windows client using |
|                 |                          |                 |                              |        |              |                                                             |

- 126. Now you test sending a message from the APP1\_QMGR on the IBM MQ Appliance to the APP2\_QMGR on Windows. Right-click the **RECORDS.FOR.HR** queue, and click **Put Test Message**. This PUTs a message on the RECORDS.FOR.HR remote queue definition, and so the message is sent to the HR.RECORDS queue on APP2\_QMGR, as you can see from the IBM MQ Explorer.

| Queues                      |                                                                                                           |                  |                   |                     |              |              |              |                      |
|-----------------------------|-----------------------------------------------------------------------------------------------------------|------------------|-------------------|---------------------|--------------|--------------|--------------|----------------------|
| Filter: Standard for Queues |                                                                                                           |                  |                   |                     |              |              |              |                      |
| Queue name                  | Queue type                                                                                                | Open input count | Open output count | Current queue depth | Put messages | Get messages | Remote queue | Remote queue manager |
| APP2_QMG2.XMIT              | Local                                                                                                     | 1                | 1                 | 0                   | Allowed      | Allowed      |              |                      |
| BILLING                     | Local                                                                                                     | 0                | 0                 | 0                   | Allowed      | Allowed      |              |                      |
| IN.ORDERS                   | Alias                                                                                                     |                  |                   |                     | Allowed      | Allowed      |              |                      |
| IN.PO                       | Local                                                                                                     | 0                | 0                 | 0                   | Allowed      | Allowed      |              |                      |
| ORDERS.IN                   | Local                                                                                                     | 0                | 0                 | 1                   | Allowed      | Allowed      |              |                      |
| PO.TRIGGER.INIT             | Local                                                                                                     | 0                | 0                 | 0                   | Allowed      | Allowed      |              |                      |
| PROCESSED.ORDERS            | Local                                                                                                     | 0                | 0                 | 0                   | Allowed      | Allowed      |              |                      |
| RECORDS                     | Local                                                                                                     | 0                | 0                 | 0                   | Allowed      | Inhibited    |              |                      |
| RECORDS.FOR.HR              | Compare with...<br>Delete...<br><b>Put Test Message...</b><br>Create JMS Queue...<br>Object Authorities > |                  |                   |                     | Allowed      |              | HR.RECORDS   | APP2_QMGR            |

- 127. Type a message in the **Message data** box, and click **Put message**. For example:

**Put test message**

Put message to:

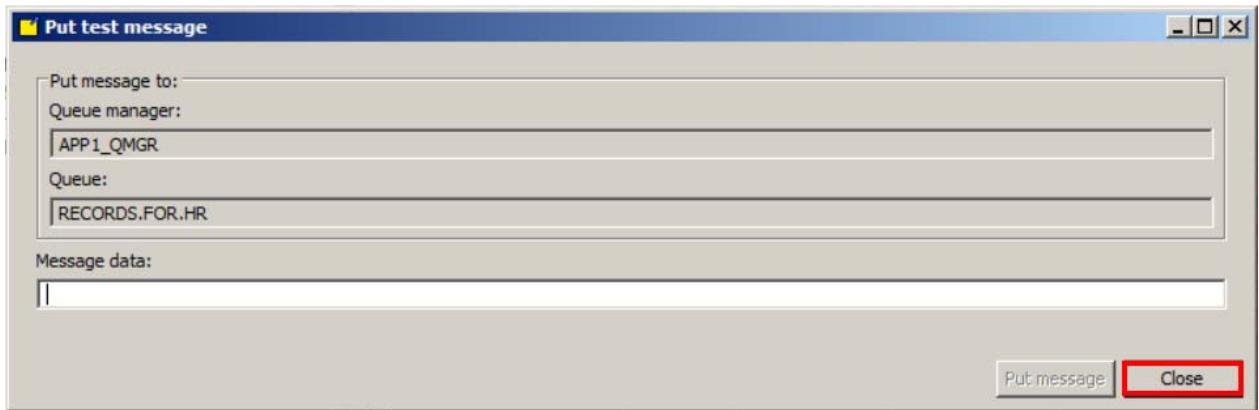
Queue manager:  
APP1\_QMGR

Queue:  
RECORDS.FOR.HR

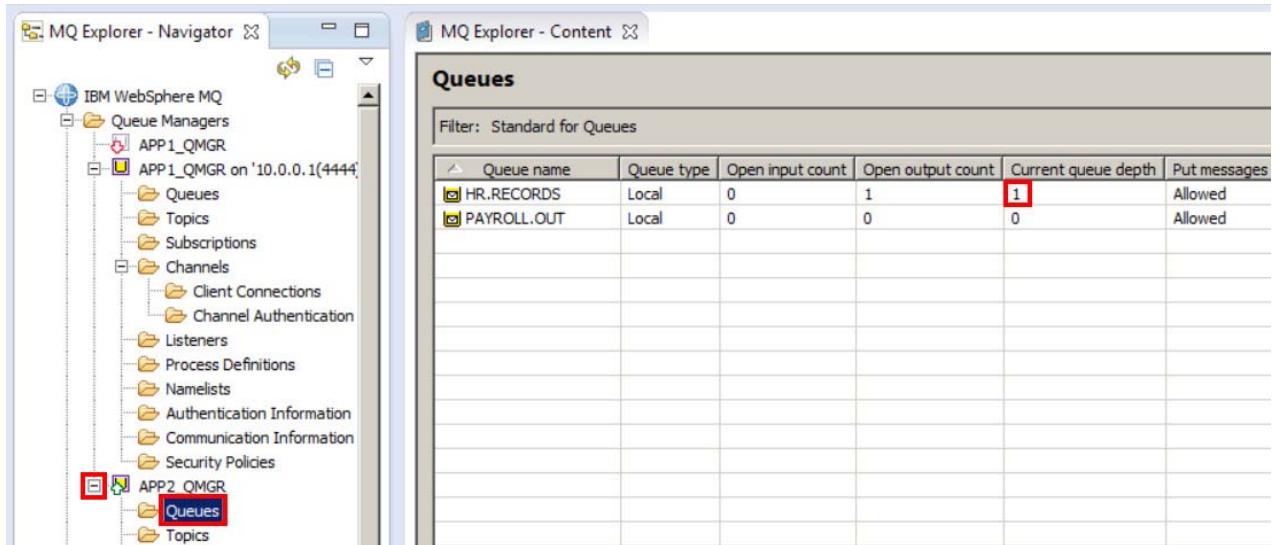
Message data:  
This message came from the MQ Appliance!

**Put message**

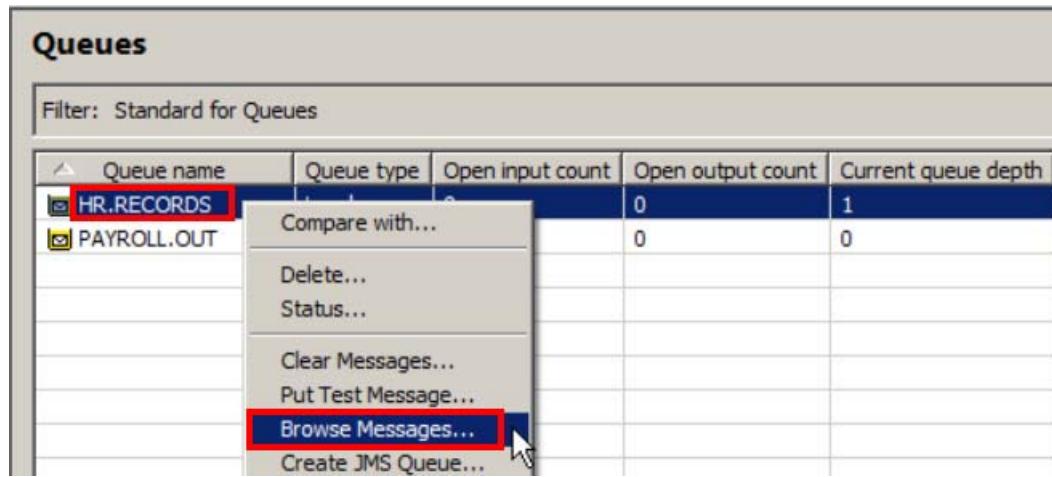
- \_\_\_ 128.Click **Close**.



- \_\_\_ 129.In IBM MQ Explorer, click the (**plus sign**) next to the **APP2\_QMGR** queue manager, and then click **Queues** under it. Notice that you now have one message in the **HR.RECORDS** queue.



- \_\_\_ 130.Right-click the **HR.RECORDS** queue and click **Browse Messages** from the menu.



- \_\_\_ 131.Look at the message in the **Message data** column, and make note of the **Put date/time** field to validate that this message is the one that you just sent from the IBM MQ Appliance.

Message browser

Queue Manager Name: APP2\_QMGR  
Queue Name: HR.RECORDS

| Position | Put date/time            | User identifier | Put application name | Format | Total length | Message data                             |
|----------|--------------------------|-----------------|----------------------|--------|--------------|------------------------------------------|
| 1        | May 29, 2015 11:49:58 PM | testuser        | MQ Explorer 8.0.0    | MQSTR  | 40           | This message came from the MQ Appliance! |

Scheme: Standard for Messages

Last updated: 23:58:16 (1 item)

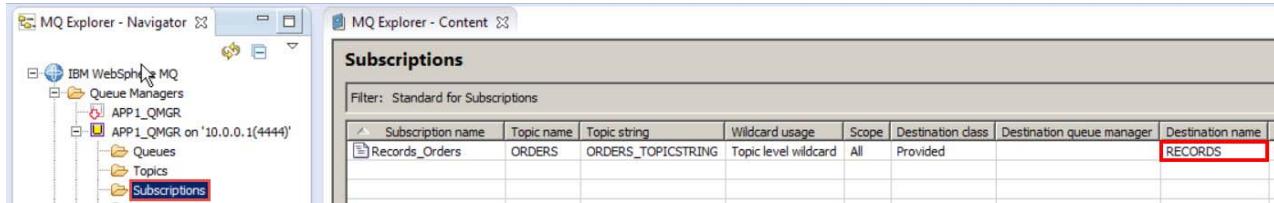
(i) All available messages on the queue have been browsed. Press the refresh button for new messages.

?

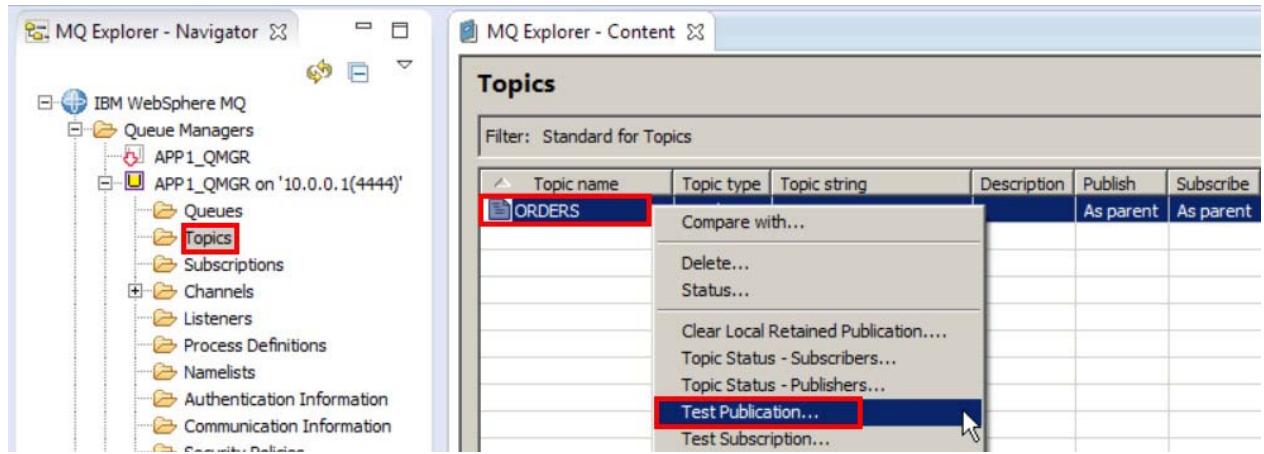
Refresh Close

- \_\_\_ 132.Click **Close**.

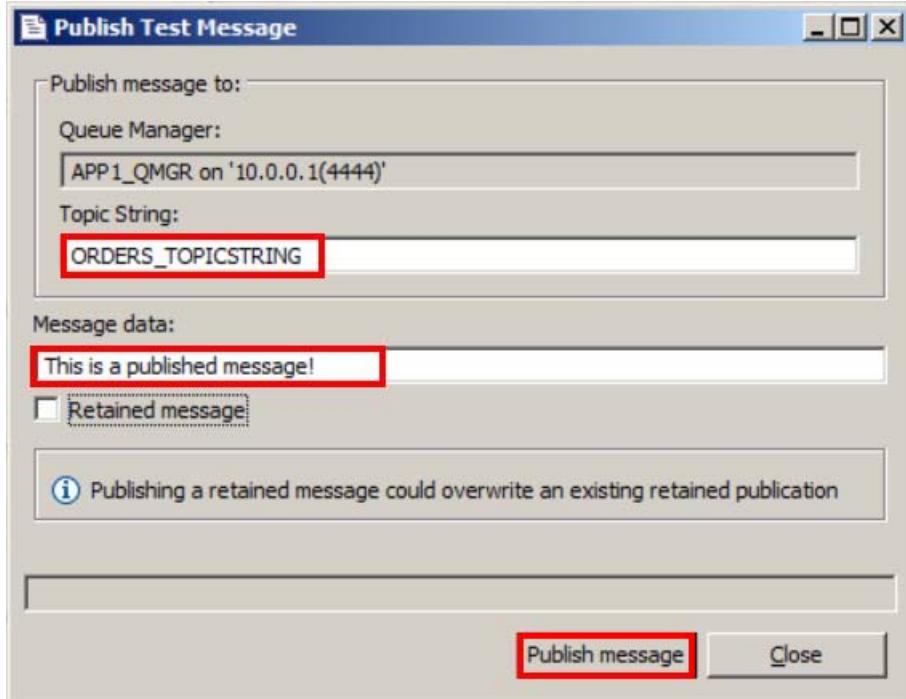
- \_\_\_ 133. You now test publish/subscribe. You next do a test publication. First, review the subscription. Click **Subscriptions** under the **APP1\_QMGR** on '10.0.0.1(4444)' queue manager. Notice the **Destination name** for your subscription, a queue named **RECORDS**.



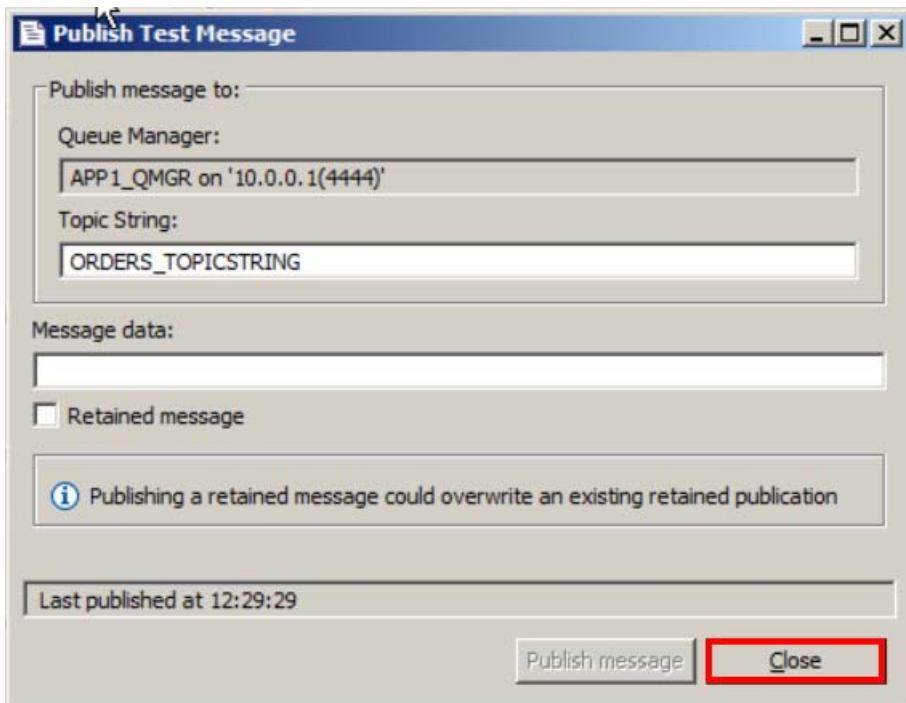
- \_\_\_ 134. Now click **Topics**, and then click the **ORDERS** topic name. Right-click **ORDERS**, and then click **Test Publication**.



- \_\_\_ 135. On the Publish Test Message dialog box, the **Topic String** of **ORDERS\_TOPICSTRING** should be completed. Enter a message in the **Message data** text box, and click **Publish message**. For example:



- \_\_\_ 136. Click **Close**.



- 137. Now click the **Queues** folder. Notice the queue depth for the RECORDS queue (you can refresh if needed).

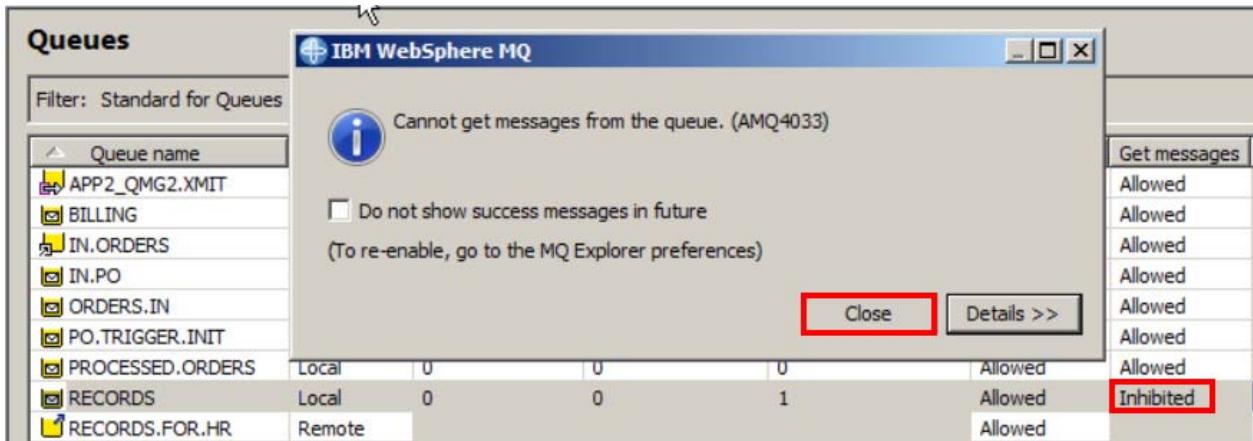
The screenshot shows the MQ Explorer interface. On the left, the Navigator pane displays the tree structure: IBM WebSphere MQ > Queue Managers > APP1\_QMGR > Queues. The 'Queues' folder is selected and highlighted with a red box. On the right, the Content pane titled 'Queues' shows a table with the following data:

| Queue name       | Queue type | Open input count | Open output count | Current queue depth | Put messages |
|------------------|------------|------------------|-------------------|---------------------|--------------|
| APP2_QMG2.XMIT   | Local      | 0                | 0                 | 0                   | Allowed      |
| BILLING          | Local      | 0                | 0                 | 0                   | Allowed      |
| IN.ORDERS        | Alias      |                  |                   |                     | Allowed      |
| IN.PO            | Local      | 0                | 0                 | 0                   | Allowed      |
| ORDERS.IN        | Local      | 0                | 0                 | 1                   | Allowed      |
| PO.TRIGGER.INIT  | Local      | 0                | 0                 | 0                   | Allowed      |
| PROCESSED.ORDERS | Local      | 0                | 0                 | 0                   | Allowed      |
| <b>RECORDS</b>   | Local      | 0                | 0                 | <b>1</b>            | Allowed      |
| RECORDS.FOR.HR   | Remote     |                  |                   |                     | Allowed      |

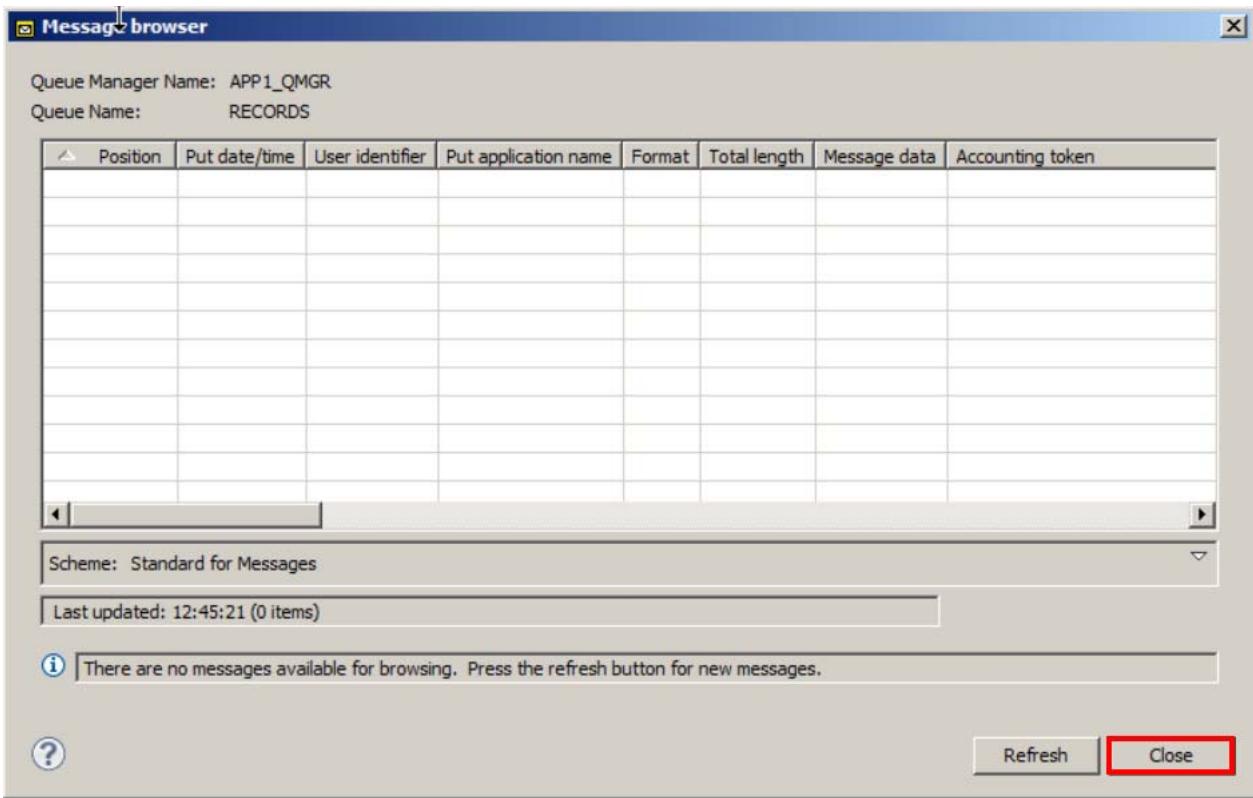
- 138. Right-click the **RECORDS** queue and click **Browse Messages**.

The screenshot shows the MQ Explorer interface with the 'Queues' table. The 'RECORDS' row is selected and highlighted with a red box. A context menu is open over the 'RECORDS' entry, with the 'Browse Messages...' option highlighted with a blue box and a cursor arrow pointing at it.

- 139. Notice the error: Cannot get messages from the queue. Notice that the **RECORDS** queue has **Get messages** set to **Inhibited**. If you are interested, click **Details** to review the error. Click **Close** to close the error.



- 140. Click **Close** on the Message Browser window.



- 141. Finally, recall that you migrated a user with the name `potuser` whose access to the **BILLING** queue was limited. You now test that this user's authorities successfully migrated. You need to switch to be the `potuser`. Return to the running command prompt, and close it to avoid confusion.

In the command prompt, enter: `exit`

- \_\_\_ 142. Now on the Windows desktop, double-click the **potuser** shortcut to open a command-prompt window that is running with the user ID of **potuser**.
- \_\_\_ 143. First, you need to set the right MQSERVER environment variable for this command prompt.

Enter the following command:

```
SET MQSERVER=SYSTEM.ADMIN.SVRCONN/TCP/10.0.0.1(4444)
```

```
cmd /K CD /D C:\MQ-POT\Users\Scripts\potuser
C:\MQ-POT\Users\Scripts\potuser>SET MQSERVER=SYSTEM.ADMIN.SVRCONN/TCP/10.0.0.1(4444)
C:\MQ-POT\Users\Scripts\potuser>
```

- \_\_\_ 144. Now try the `amqsputc` command again with potuser. Notice that since you are running as potuser, you do not set the `MQSAMP_USER_ID` variable.

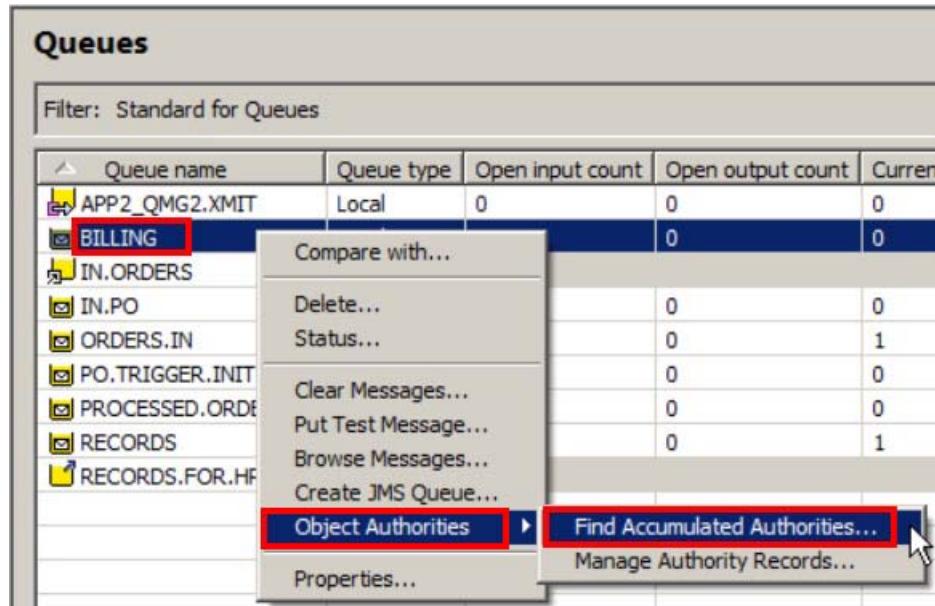
Enter the following command:

```
amqsputc BILLING APP1_QMGR
```

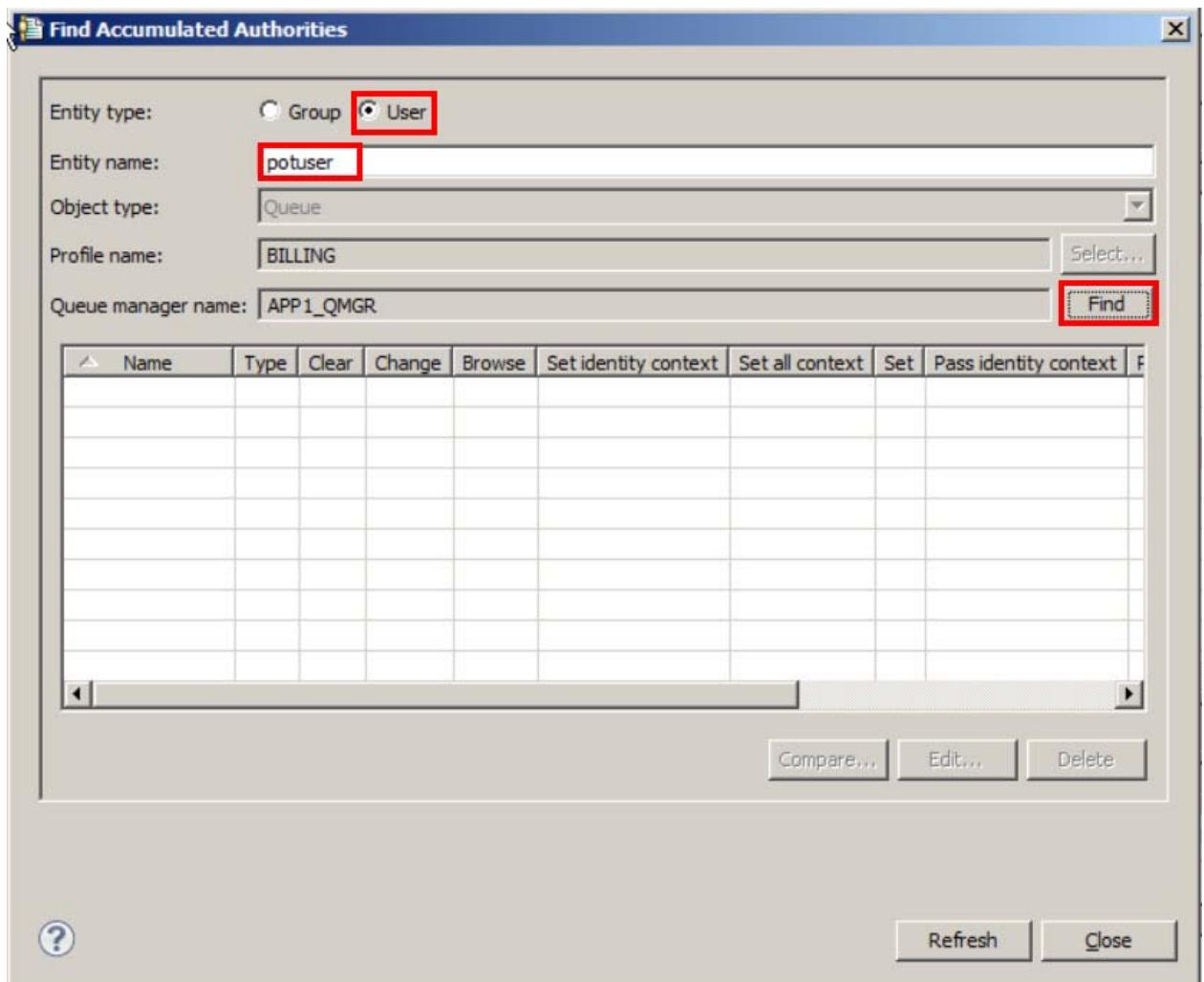
```
C:\MQ-POT\Users\Scripts\potuser>amqsputc BILLING APP1_QMGR
Sample AMQSPUT0 start
MQCONNX ended with reason code 2035
C:\MQ-POT\Users\Scripts\potuser>
```

- \_\_\_ 145. Notice that you get a 2035 on the MQCONNX call, a reason code that is probably familiar: `MQRC_NOT_AUTHORIZED`. Look at the authority records. Return to IBM MQ Explorer.

Right-click the **BILLING** queue, and then select **Object Authorities > Find Accumulated Authorities**.

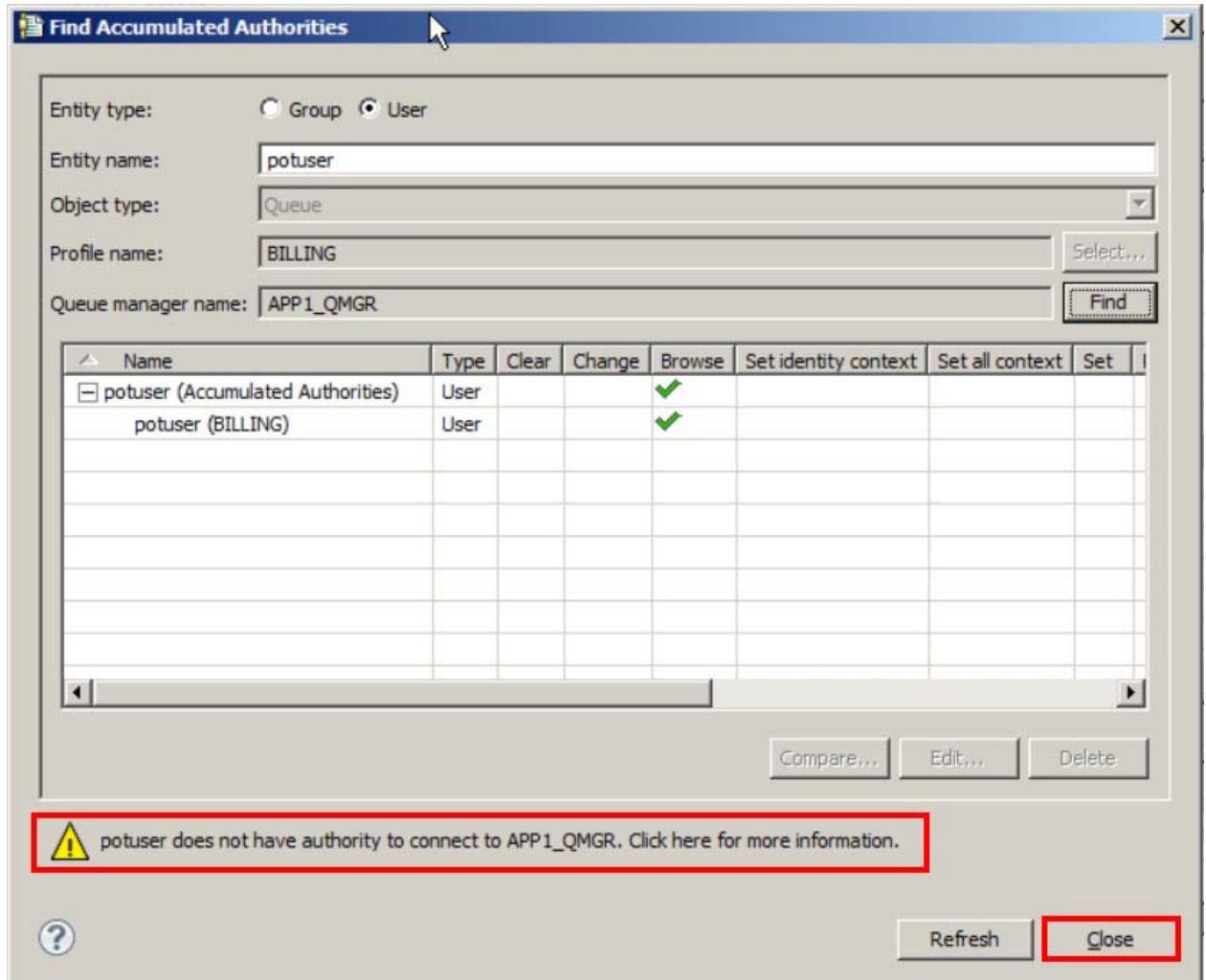


146. Select **User** for **Entity type**, and enter `potuser` in the **Entity name** field. Click **Find**.

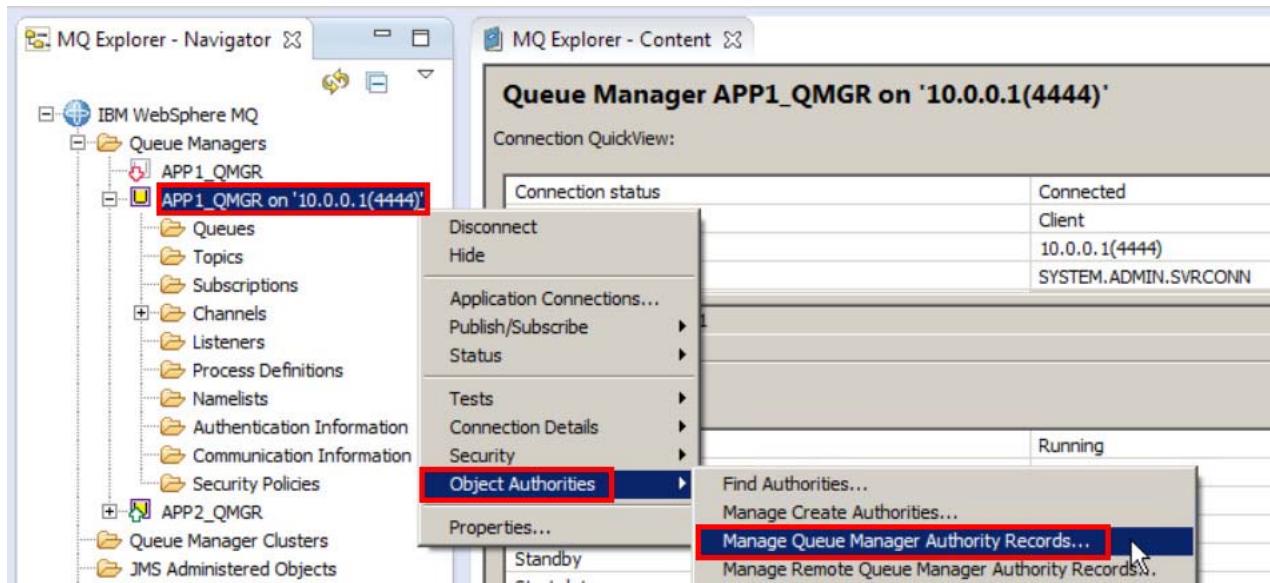


- 147. You can scroll to the right to review the authorities on the BILLING queue. However, notice the message at the bottom: “**potuser does not have authority to connect to APP1\_QMGR.**”

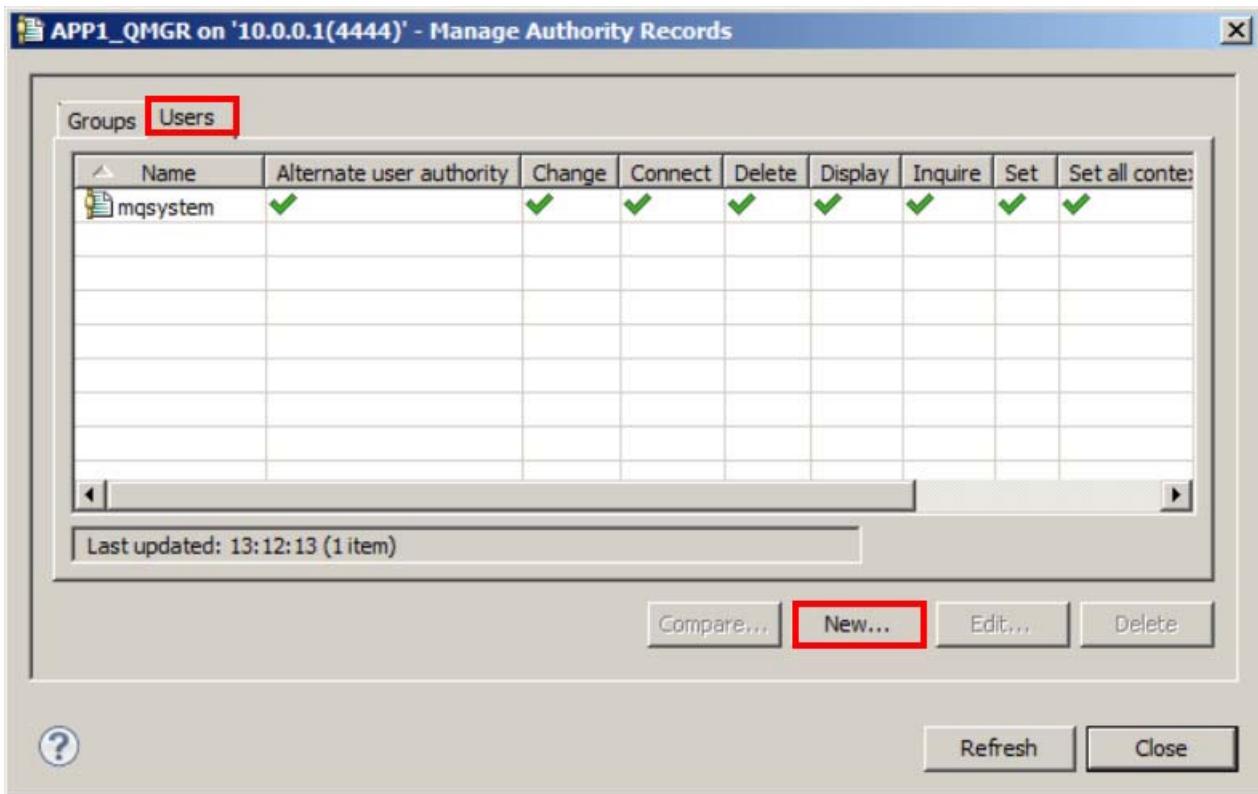
That explains the 2035 return code. Click **Close**.



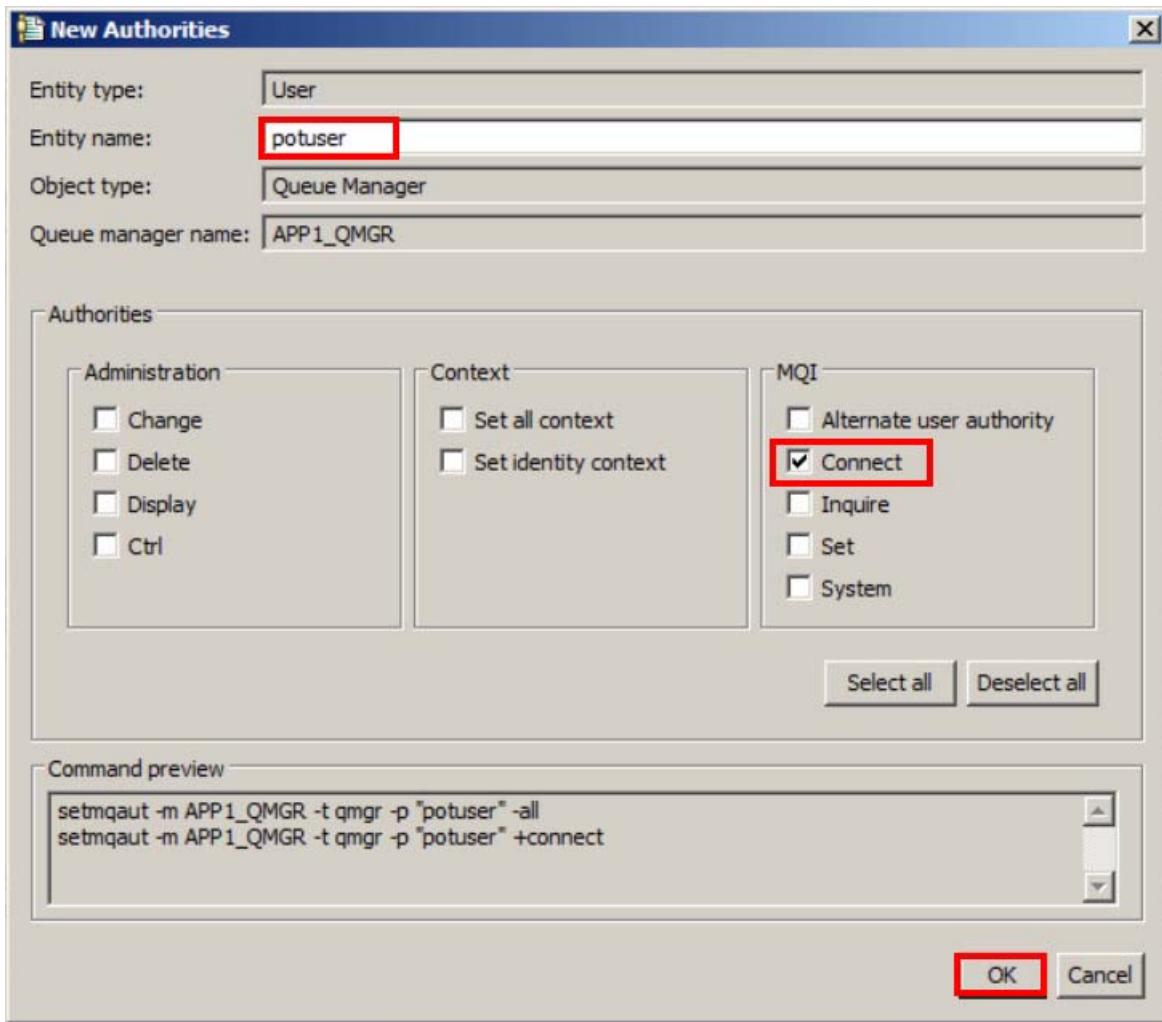
148. You now fix that error. Right-click the APP1\_QMGR on '10.0.0.1(4444)' queue manager, and then click Object Authorities > Manage Queue Manager Authority Records.



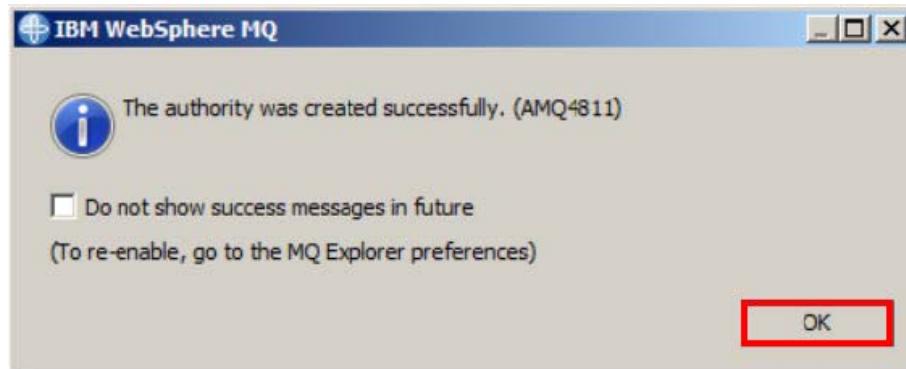
149. Ensure that the **Users** tab is selected, and then click **New**.



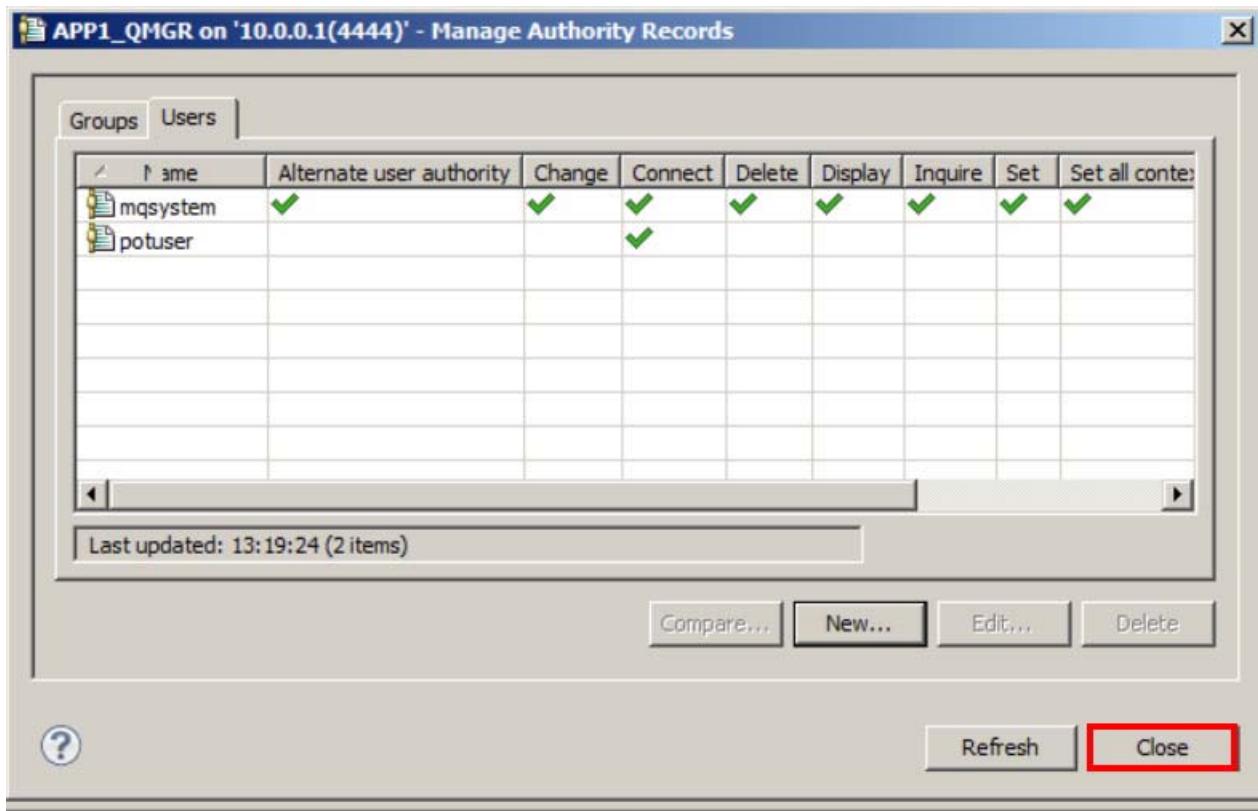
- \_\_\_ 150.In the New Authorities dialog box, enter `potuser` in the **Entity name** text box. Click the **Connect** check box under the **MQI** column. Click **OK**.



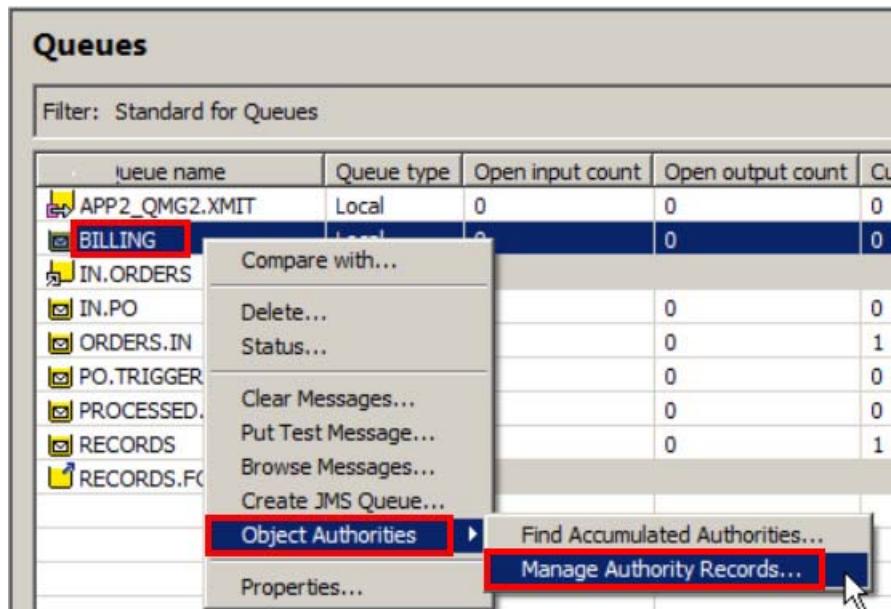
- \_\_\_ 151.Click **OK** to close the information box.



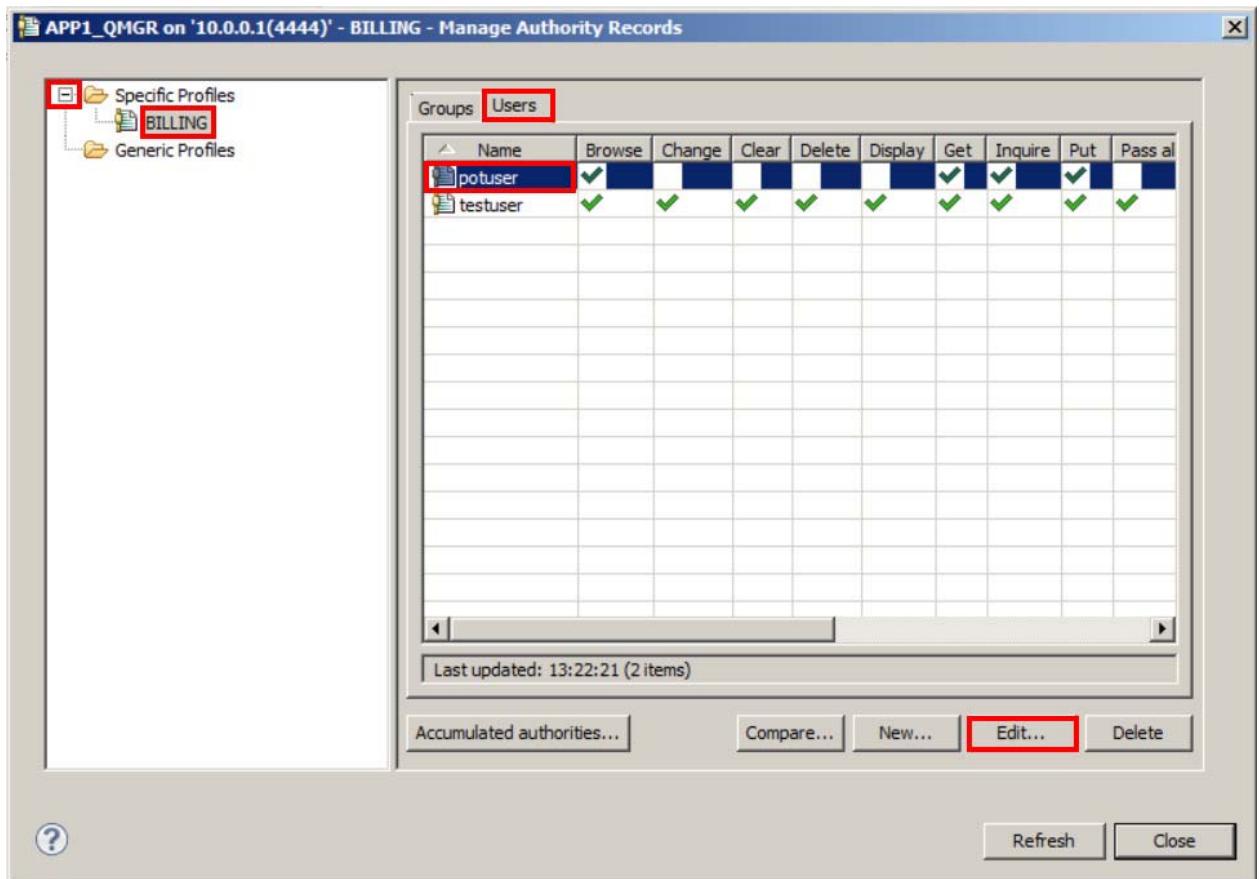
\_\_\_ 152.Click **Close**.



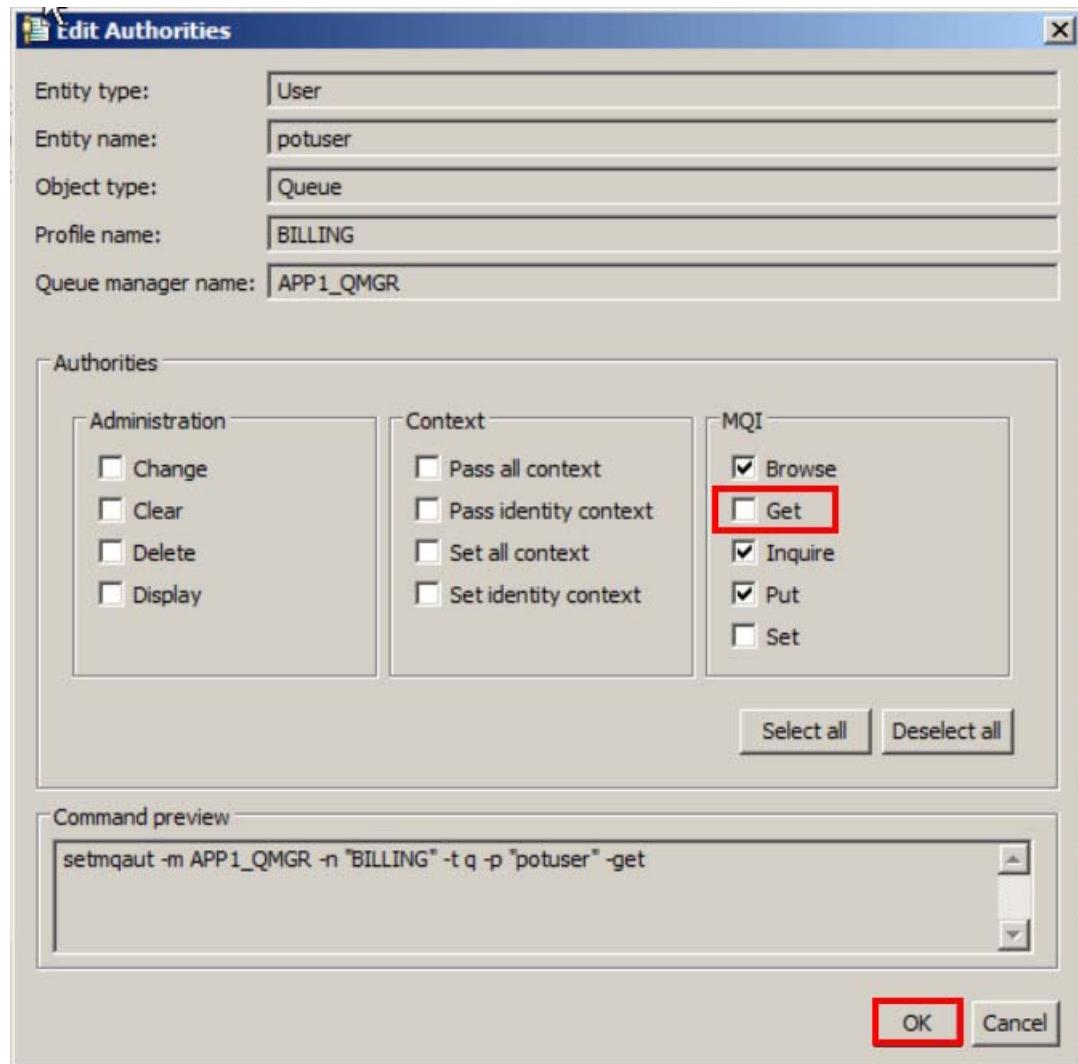
\_\_\_ 153.You now effect one more change for an easy test. Click **Queues**, right-click the **BILLING** queue, and then select **Object Authorities > Manage Authority Records**.



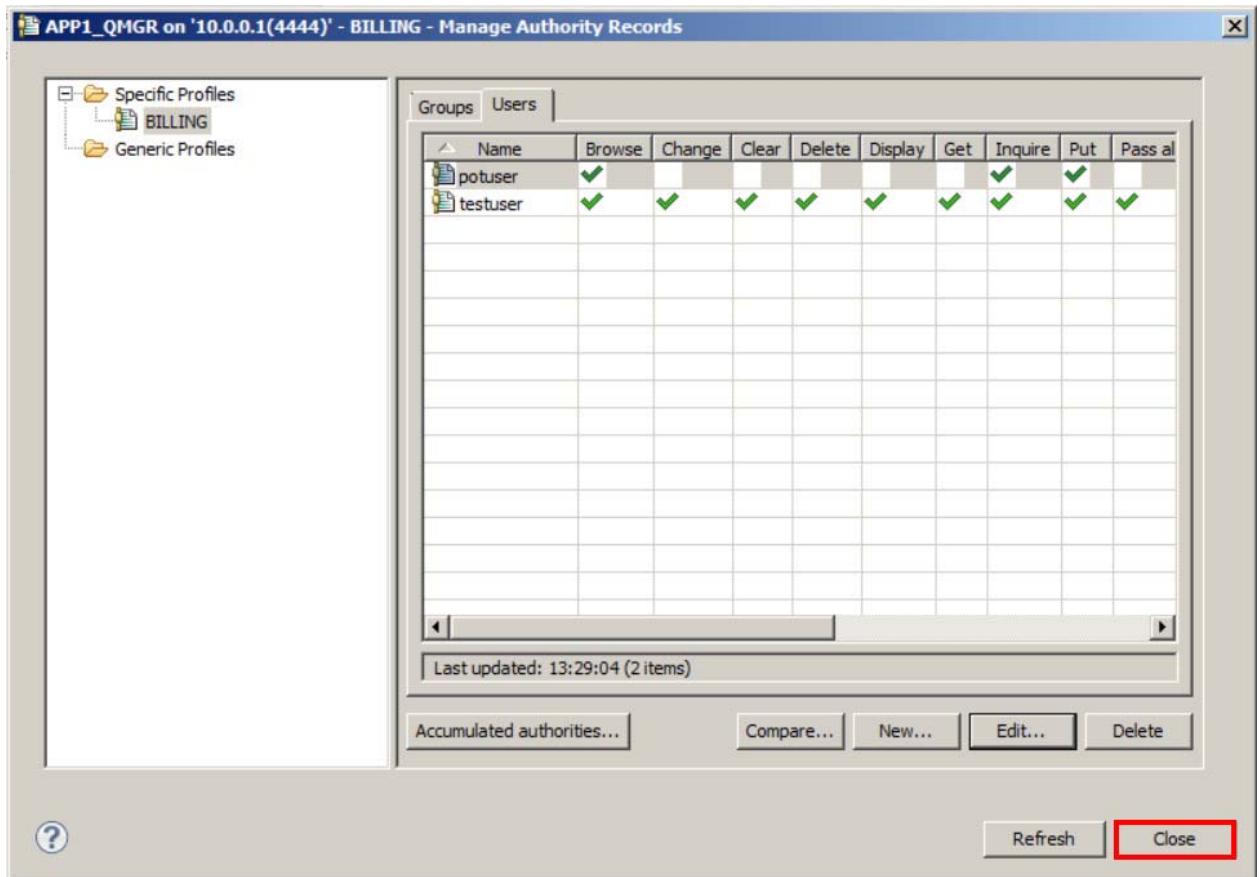
154. Click the box next to **Specific Profiles**, and then click the **BILLING** profile. Ensure that the **Users** tab is selected, and then click **potuser**. Now click **Edit**.



\_\_\_ 155. Click **Get** under the **MQI** column, leaving it cleared. Click **OK**.



\_\_\_ 156.Click **Close**.



\_\_\_ 157.Now return to the command prompt again.

Enter the following command again:

```
amqsputc BILLING APP1_QMGR
```

```
C:\MQ-POT\Users\Scripts\potuser>amqsputc BILLING APP1_QMGR
Sample AMQSPUT0 start
target queue is BILLING
```

\_\_\_ 158.This time, it connects to APP1\_QMGR successfully, and opens the BILLING queue. Now enter a message and press Enter. For example:

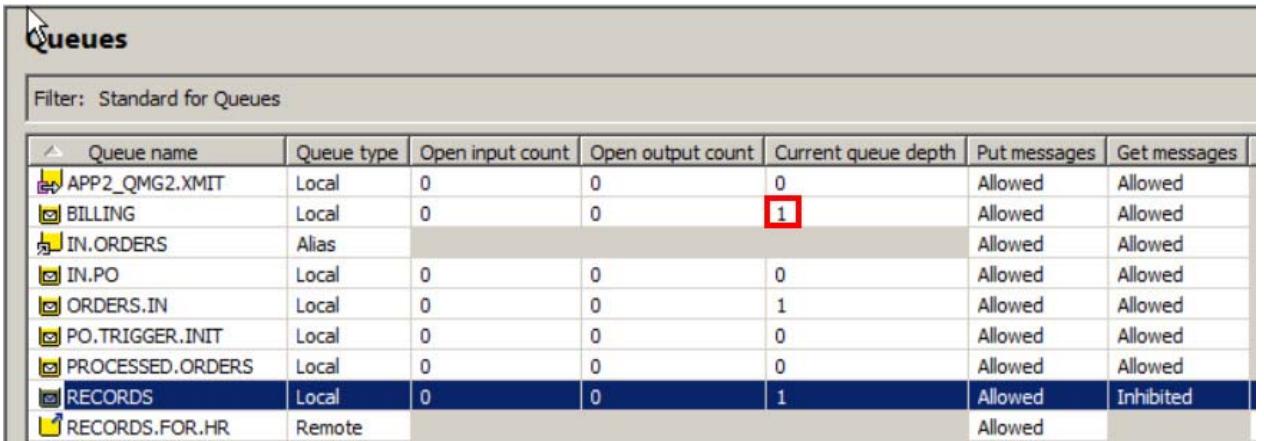
```
C:\MQ-POT\Users\Scripts\potuser>amqsputc BILLING APP1_QMGR
Sample AMQSPUT0 start
target queue is BILLING
This is a message from potuser on Windows

Sample AMQSPUT0 end

C:\MQ-POT\Users\Scripts\potuser>
```

Press Enter a second time on the blank line to terminate the amqsputc program.

- \_\_\_ 159.Return to IBM MQ Explorer. Click **Queues** if necessary under the `APP1_QMGR` on '`10.0.0.1(4444)`'. Notice that the **BILLING** queue has one message.



| Queue name       | Queue type | Open input count | Open output count | Current queue depth | Put messages | Get messages |
|------------------|------------|------------------|-------------------|---------------------|--------------|--------------|
| APP2_QMG2.XMIT   | Local      | 0                | 0                 | 0                   | Allowed      | Allowed      |
| <b>BILLING</b>   | Local      | 0                | 0                 | 1                   | Allowed      | Allowed      |
| IN.ORDERS        | Alias      |                  |                   |                     | Allowed      | Allowed      |
| IN.PO            | Local      | 0                | 0                 | 0                   | Allowed      | Allowed      |
| ORDERS.IN        | Local      | 0                | 0                 | 1                   | Allowed      | Allowed      |
| PO.TRIGGER.INIT  | Local      | 0                | 0                 | 0                   | Allowed      | Allowed      |
| PROCESSED.ORDERS | Local      | 0                | 0                 | 0                   | Allowed      | Allowed      |
| RECORDS          | Local      | 0                | 0                 | 1                   | Allowed      | Inhibited    |
| RECORDS.FOR.HR   | Remote     |                  |                   |                     | Allowed      |              |

- \_\_\_ 160.Now from your Windows client, try to GET the message.

Return to the command prompt and enter:

```
amqsgetc BILLING APP1_QMGR
```

```
C:\MQ-POT\Users\Scripts\potuser>amqsgetc BILLING APP1_QMGR
Sample AMQSGET0 start
MQOPEN ended with reason code 2035
unable to open queue for input
Sample AMQSGET0 end

C:\MQ-POT\Users\Scripts\potuser>
```

You get a 2035 error again, this time because **potuser** does not have **GET** authority. Therefore, when trying to OPEN the queue, you get the failure.

— 161. Now try to browse the message.

Return to the command prompt and enter:

amqsbcbc BILLING APP1 OMGR

This command works, and you see the message that you sent to the queue, because **potuser** does have **Browse** authority.

- \_\_\_ 162.That command is all that you are going to test. You successfully migrated a queue manager from Windows to the IBM MQ Appliance, and you completed the exercise.
- \_\_\_ 163.To clean up, you can enter `exit` at the command prompt (you must enter `exit` twice: the first to exit the potuser level, and then to close the command prompt) and close IBM MQ Explorer.

## End of exercise

## Exercise review and wrap-up

In this exercise, you learn the steps that are required to migrate an existing queue manager that is running on IBM MQ on Windows to the IBM MQ Appliance.

# Exercise 7. Service and maintenance

## Estimated time

00:30

## Overview

In this exercise, you learn how to back up and restore the configuration and how to apply service, such as upgrading the firmware on the IBM MQ Appliance.

## Objectives

After completing this exercise, you should be able to:

- Back up and restore the configuration
- Upgrade the firmware on an IBM MQ Appliance

## Requirements

The lab environment consists of one virtual appliance and a Windows environment to do console operations and testing. These steps are available as a reference. You are not going to be executing these steps for the hands-on exercises.

## Exercise instructions

In this exercise, you explore how to maintain the appliance. You learn how to back up and restore the configuration and how to apply services such as upgrading the firmware that is running the appliance.

## 7.1. Back up the IBM MQ Appliance configuration

You can back up various features of your IBM MQ Appliance and restore these features to the same or to a different appliance, as required.

After you back up an appliance, you must restore it to the same or another appliance that is running the same firmware level.

To back up your IBM MQ Appliance, you back up the following features:

- Configuration of the IBM MQ Appliance
- Messaging users and groups
- Key repository
- Queue manager configurations
- IBM MQ Console configurations
- Optionally, IBM MQ messages

You use URIs to copy the backed-up information from the appliance to safe storage. You also use URIs to restore backed-up information to a target appliance. You restore an appliance in the following order:

- Restore configuration of the IBM MQ Appliance.
- Restore messaging users and groups.
- Re-create the queue managers.
- Restore the key repository.
- Restore queue manager configurations.
- Restore IBM MQ Console configurations.
- Optionally, restore IBM MQ messages.

For this exercise, you back up only the IBM MQ Appliance configuration. You then restore the configuration after you upgrade the firmware to Fix Pack 1.

### Backing up the appliance configuration

You use the write memory command to write the current appliance configuration to the `autoconfig.cfg` file. You can then copy the `autoconfig.cfg` file from a URI on the appliance to secure storage on another system. In the exercise, you use the accompanying Windows system as the external storage.

**Note**

The backup that you take is not secure so sensitive data, such as appliance user IDs and passwords, are not included. If you use the backup to restore an appliance, you must re-create these items manually.

**Important**

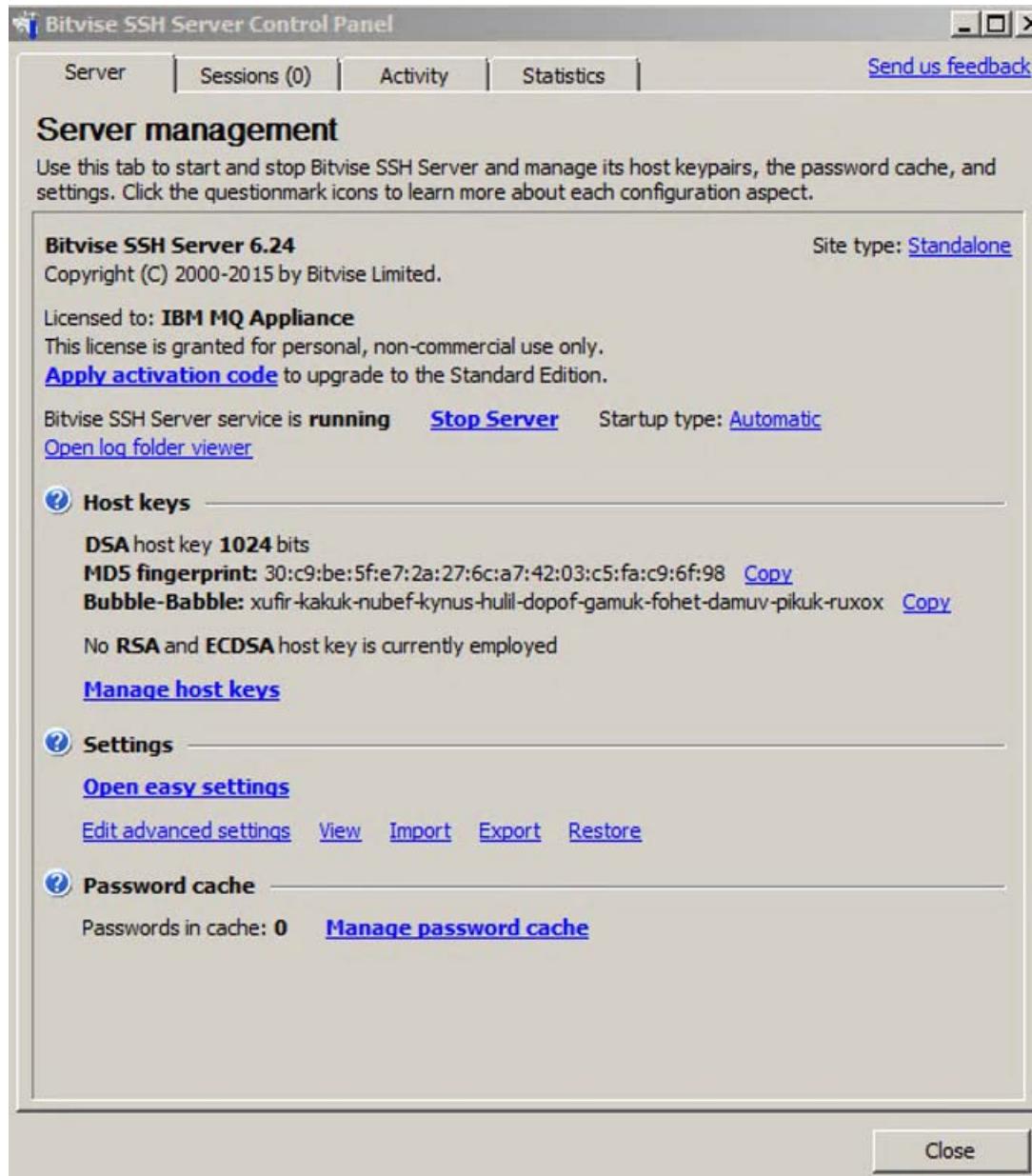
This exercise is for reference only. You are not going to be executing these steps in the hands-on exercises. Use the reference for your work environment.

- \_\_\_ 1. Go to the command-line interface of your IBM MQ Appliance.
- \_\_\_ 2. If not logged in, log in as `admin` for the user ID and `passw0rd` for the password in the administrators group. You should already be logged in when the environment starts.
- \_\_\_ 3. Type the following command to enter configuration mode:  
`config`
- \_\_\_ 4. Type the following command to write the current configuration to the backup file `autoconfig.cfg`:  
`write memory`
- \_\_\_ 5. When prompted, reply “`y`” that you want to overwrite the current `autoconfig.cfg` file.  
`Overwrite existing autoconfig.cfg? y`

```
M2000#
M2000# config
Global configuration mode
M2000(config)# write memory
Overwrite previously saved configuration? Yes/No [y/n]: y
Configuration saved successfully.
M2000(config)# _
```

- 6. When copying to or from the appliance, you must use the `scp` (secure copy) command. An SSH or SFTP server must be installed on the workstation. For this exercise, the Bit Vise SSH server is installed on the Windows 7 workstation.

Start the Bitvise SSH Server on Windows by double-clicking the icon on the desktop. The Bitvise SSH server is started. It was preconfigured, so it is ready for secure connections.



**Note**

When copying between your workstation and the IBM MQ Appliance, you use secure copy. Three slashes (///) are used in the path for the appliance and two slashes (//) are used for your workstation path.

- 
- 7. Copy the `autoconfig.cfg` file to a location on another system from where you can write it to back up storage. In this case, you copy the `autoconfig.cfg` file to a directory on the Windows system. The format of the command is given here:

```
copy config:///autoconfig.cfg scp://username@ipaddress/[/]directorypath
```

- 8. Enter the following command on the appliance command line:

```
copy config:///autoconfig.cfg scp://administrator@10.0.0.4//C:/Setup-Install/
```

- 9. Enter the Administrator's password for the Windows system when prompted: `passw0rd`

As stated, the command uses URIs to identify the paths of the files. Reviewing the command, you are copying the `autoconfig.cfg` file from the `config:` directory of the appliance to a directory (`Setup-Install`) on the Windows `C:\` drive. The `scp` command indicates that this copy is a secure copy to the IP address where the user "administrator" is logged in.

## 7.2. Firmware upgrade

To upgrade your IBM MQ Appliance, you must install the newest level of firmware on the appliance. New function, security updates, and maintenance fixes for the IBM MQ Appliance are made available through firmware releases. Extra maintenance through interim fixes is made available, as necessary, on the most recent firmware level release.

You can also revert to a previous level of firmware to back out of an upgrade, as required. Fixes are cumulative, so you should always download the most recent firmware that is available on the IBM Fix Central website. All queue manager information persists through upgrades and rollbacks. The standard rules of applying upgrades to IBM MQ apply when firmware is upgraded and queue managers restarted. The new firmware might move the IBM MQ installation to a new command level. If so, any queue managers that are started at the new command level are no longer able to start under a lower command level, even following a firmware rollback.

### Upgrading firmware

You upgrade the IBM MQ Appliance by downloading a new version of the firmware and installing it. Normally you would use a computer with web access to download the required image from IBM Fix Central. This website is a repository for all available and supported firmware images for IBM MQ Appliances. The fixes are cumulative, so always choose the most recent image.

You then download the new firmware image from the IBM Fix Central website, and copy the image to the appliance. You then restart the appliance, and use the new image.

In your environment, the download of Fix Pack 1 was already done for you and is stored in the directory `C:\Setup-Install\`.

Fix packs are delivered by using a `.scrypt*` file. The file with a `.scrypt3` extension is the fix pack for the physical appliance. The file with a `.scrypt4` extension is the fix pack for the virtual appliance. Use the file with `scrypt4` in this exercise.



#### Note

If the appliance that you are upgrading is part of a high availability configuration, then you pause the first appliance, upgrade, and resume the first appliance. You then pause, upgrade, and resume the second appliance. The first step in a firmware upgrade is to back up your IBM MQ Appliance. You already completed that step.

- \_\_\_ 10. Make sure that you are at the IBM MQ Appliance command line. If you are still in Global configuration mode, type: `Exit`
- \_\_\_ 11. Ensure that all the queue managers are stopped (no queue managers should be running).

- \_\_\_ 12. Get the current firmware version of the appliance by entering one of the following commands:

```
show firmware or
show firmware -version or
show version
```

- \_\_\_ 13. Type config to enter configuration mode.
- \_\_\_ 14. Type flash to enter the correct mode for firmware upgrade.
- \_\_\_ 15. Copy the firmware image from the computer where it was downloaded to the image location on the appliance. The format of the command is given here:

```
copy scp://username@ipaddress/[]directorypath/firmware_file image:
```

Enter the following command on the appliance command line:

```
copy
scp://administrator@10.0.0.4//C:/Setup-Install/8.0.0.1-IBM-MQ-Appliance-M200
0-U0001.scrypt4 image:
```

- \_\_\_ 16. Enter the password passw0rd when prompted.



### Note

When copying between your workstation and the IBM MQ Appliance, you use secure copy. Three slashes (///) are used in the path for the appliance and two slashes (//) are used for your workstation path.

- \_\_\_ 17. Restart the appliance with the new image by typing the following command:

```
boot image accept-license firmware_file
```

where *firmware\_file* is the name of the file that contains the new firmware image. In your case, the command is:

```
boot image accept-license 8.0.0.1-IBM-MQ-Appliance-M2000-U0001.scrypt4
```

The appliance then restarts, and the new firmware is loaded. This restart takes a few minutes, and the appliance restarts. Wait for the Login: prompt to come back, and then log in as before with admin as the user ID and passw0rd as the password.

- \_\_\_ 18. After you are logged in, verify that the firmware image is upgraded by entering the following command:

```
show firmware
```

which shows the following results. You should see a build date of 2015/03/12.

Alternatively, use one of the following commands, which shows more information:

```
show version
show firmware -version
```

**Note**

The device must be attached to the network to do a firmware upgrade. The upgrade image is downloaded from IBM Fix Central on a separate computer and then copied to the appliance by using the appliance command-line interface.

## Reverting to the previous level of firmware

When you upgrade the IBM MQ Appliance firmware by using the `boot image` command, the appliance retains current configuration data. This feature is used to restore the appliance to a known, stable state if required.

- The previous firmware image and the associated configuration data are the secondary installation.
- The newly installed firmware image and the associated configuration data are the primary installation.

When you switch between firmware images, the switch can take some time. During this switch operation, do not power off or restart the appliance.

- \_\_\_ 19. You should still be on the command line of the IBM MQ Appliance. If not, log in to the appliance as an administrator.
- \_\_\_ 20. Ensure that all queue managers are stopped.
- \_\_\_ 21. Type `config` to enter configuration mode.
- \_\_\_ 22. Type `flash` to enter the correct mode for firmware rollback.
- \_\_\_ 23. Restart the appliance with the original image by typing the following command:

```
boot switch
```

## Restore the IBM MQ Appliance configuration

You can restore the configuration of an IBM MQ Appliance to the same or to a different appliance. If you are restoring to the same appliance, it has the same IP address and the same name. The first steps are the same as initially configuring the appliance when you first installed it.

If you are restoring to a different appliance, it must be running the same firmware level. You copy a previously saved `autoconfig.cfg` file to the target IBM MQ Appliance and then restart the appliance.

- \_\_\_ 24. Type the following command to enter configuration mode:

```
config
```

- \_\_\_ 25. Copy your saved `autoconfig.cfg` file to the target appliance:

```
copy scp://administrator@10.0.0.4//C:/Setup-Install/autoconfig.cfg
```

```
config:///autoconfig.cfg
```

- \_\_\_ 26. Answer “y” to the overwrite prompt.
- \_\_\_ 27. Enter password `passw0rd` when prompted.
- \_\_\_ 28. Type `exit` to exit the global configuration mode.
- \_\_\_ 29. Shut down and restart the appliance by entering the following command:

```
shutdown reboot
```

This is the normal process, but since you are going to do a factory reset next, you do not need to restart this time.

- \_\_\_ 30. Answer “y” to the prompt for restart.

## 7.3. Factory reset

A factory reset restores the IBM MQ Appliance to its default state. A factory reset deletes all queue managers and messages that are hosted on the appliance. The reset forcibly ends all queue managers and detaches any applications that are connected to them. After the update, you require direct console access to reinitialize the system.

### Factory reset

To do a factory reset on a physical appliance, you need to complete the following steps:

- Connect the appliance to the network.
- Connect a terminal to the appliance as shown here.
- Cabling on the physical appliance is as follows:
  - Black is the terminal USB cable to a PC.
  - Red is the Ethernet port ETH10 that is connected to the network.



#### Note

You can use the Rj45 to USB cable and PuTTY for the terminal window, so you need a USB serial driver. You can use the one at this website:

<http://www.prolific.com.tw/US>ShowProduct.aspx?pcid=41>

You are using a virtual appliance, so you simulate the previous steps. You still use PuTTY from the Windows machine and connect to eth0 – 10.0.0.1.

- \_\_\_ 31. From Windows Explorer, navigate to C:\Utilities\Putty.
- \_\_\_ 32. Double-click **PuTTY** to open the configuration window.
- \_\_\_ 33. If prompted to allow program to run, click “Run”.
- \_\_\_ 34. Click session and enter 10.0.0.1 for the Host Name (or IP address). Port should already be 22. Click **Open** to start the session.
- \_\_\_ 35. Allow any security alerts by replying “Yes”.
- \_\_\_ 36. Log in as the default administrator: `admin` for the user ID and `passw0rd` for the password. You might need to enter the user ID twice.
- \_\_\_ 37. Enter the configuration mode by typing: `Config`
- \_\_\_ 38. Enter flash mode by typing: `flash`
- \_\_\_ 39. Check the firmware version:  
  
`show firmware-version`

- \_\_\_ 40. Verify the firmware image is in the image directory:

```
dir image:
```

- \_\_\_ 41. If the image directory is empty or the correct image is not present, go to IBM Fix Central and obtain the newest firmware release. The download is done for you and is located in the directory C:\Setup-Install. The normal extension for the firmware is \*.scrypt3. However, for the virtual appliance, the firmware has an extension \*.scrypt4.
- \_\_\_ 42. Instead of downloading, you can copy the firmware image to the appliance by using this command:

```
copy scp://username@ipaddress/[/]directorypath/firmware_file image:
```

For example, for Windows:

```
copy
scp://administrator@10.0.0.4//C:/Setup-Install/8.0.0.1-IBM-MQAppliance-M2000
-U0001.scrypt4 image:
```

- \_\_\_ 43. To reinitialize the appliance, the file must be in the `image:` directory. As soon as the firmware file is copied into the `image:` directory, you can reinitialize the firmware.
- \_\_\_ 44. Type the following command:
- ```
reinitialize firmware_image_file
```
- for example:
- ```
reinitialize 8.0.0.1-IBM-MQ-Appliance-M2000-U0001.scrypt4
```
- \_\_\_ 45. You are prompted to verify that you want to reinitialize the device as reinitializing wipes out everything. Enter “y” to confirm.
- All queue managers and all services such as the Web GUI, HA clustering, and syslog are stopped and deleted.



### Note

This step takes a few minutes, and the appliance restarts. Wait for the Login: prompt to come back. The factory reset is then complete.

## End of exercise

## Exercise review and wrap-up

You saw how to do a backup of the IBM MQ Appliance. You also upgraded the IBM MQ Appliance firmware from the GA version to the first fix pack. You tested the factory reset option, loaded the newest firmware, and restored the configuration from a backup.



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