



Creating Streaming queues w/ IBM MQ for z/OS

Audience level: Some knowledge of MQ or z/OS

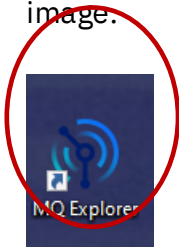
Skillset: MQ Administration

Lab Objective

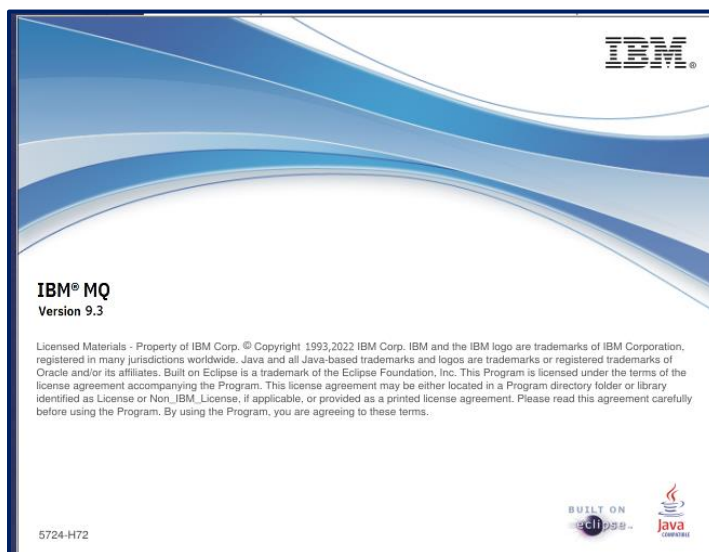
This lab introduces using streaming queues to MQ for z/OS.

Lab Steps

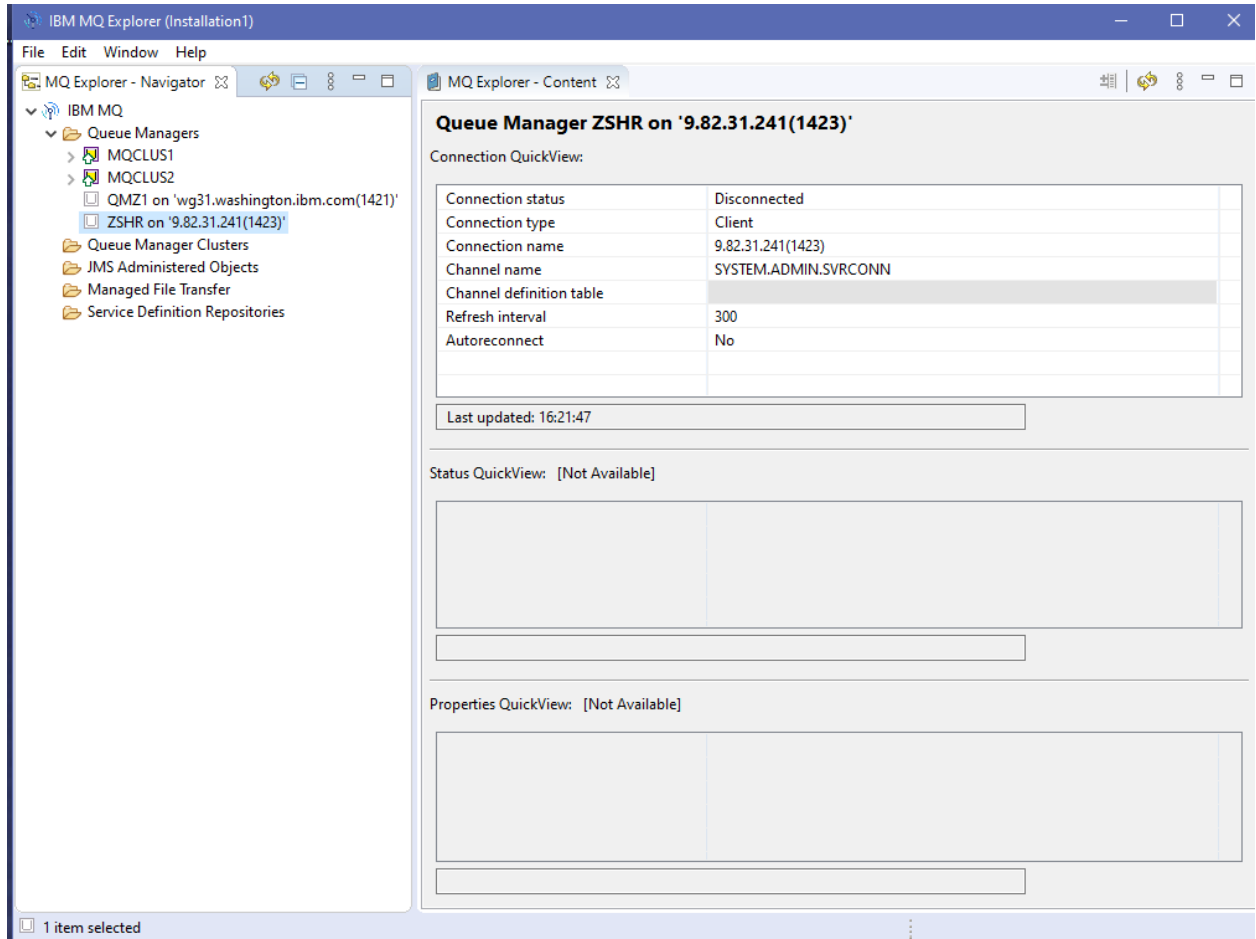
- 1) If not already started, start the MQ Explorer by double clicking on the icon on the image.



- 2) The explorer should start and show that it is at MQ Version 9.3 as shown:



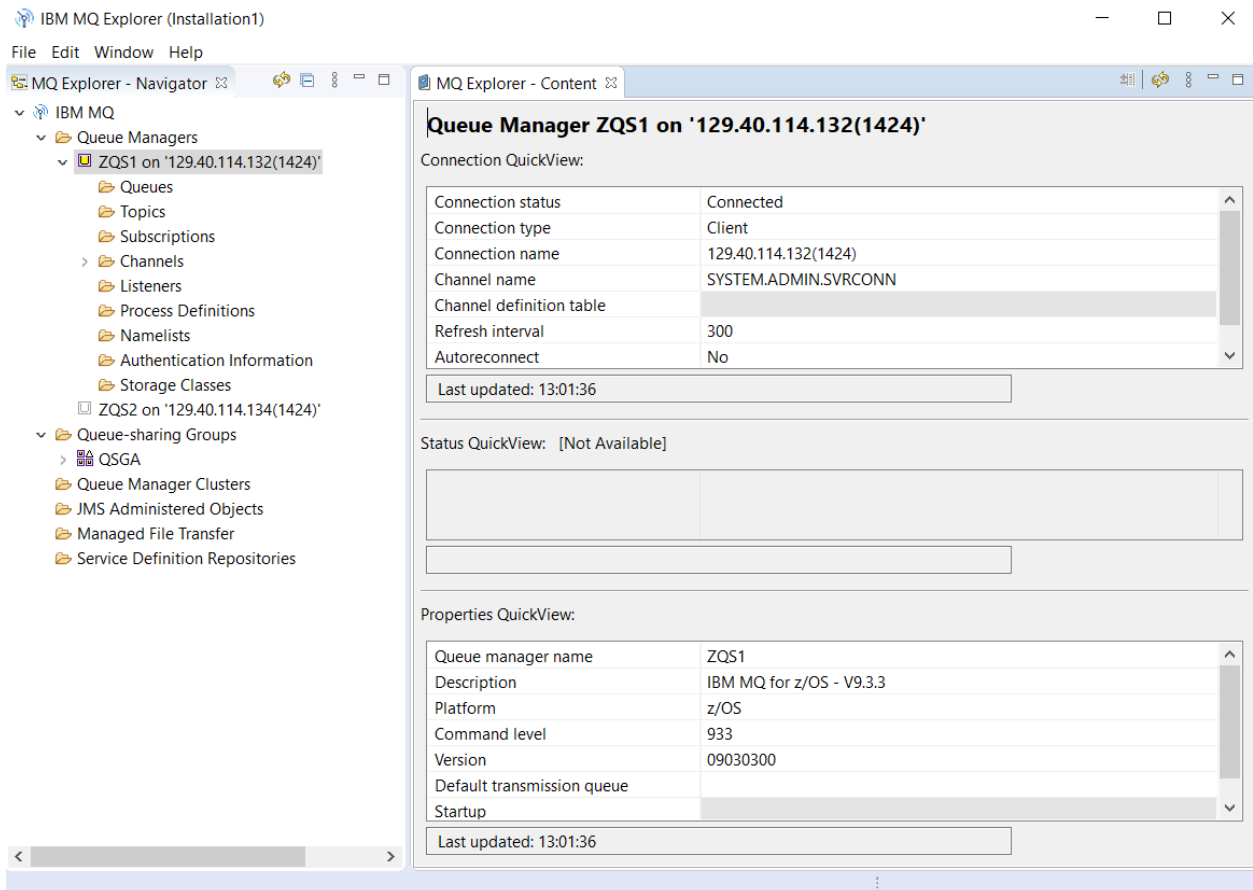
- 3) When the explorer has started, there may be a selection of queue managers available. We are interested in connections to queue managers on our z/OS environment. If you do not see connections to a queue manager you have been working with, you can create a connection by right clicking 'Queue Managers' and selecting to 'Add Remote Queue Manager...'. You will then fill out all the necessary details for IP address and port number.



- 4) Right click on ZQS3 and select connect. Please note that the IP address may be different from what is shown here.

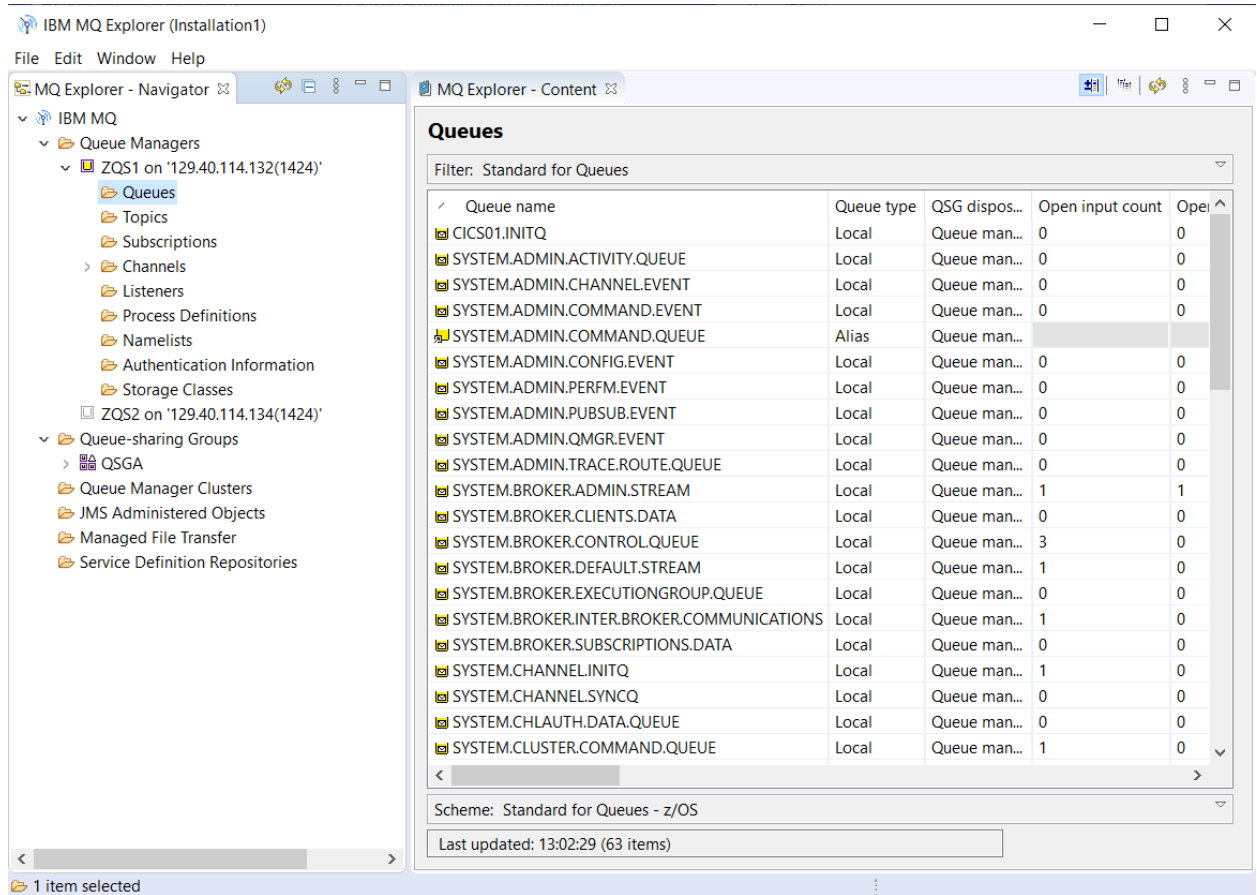
If you are unable to connect, please notify one of the IBMers that you need assistance. The gateway may need to be reconnected.

The description and command level show that this is a 9.3 queue manager on z/OS.






















- 5) Expand the ZQS3 queue manager – click on the '>' beside the name to see the resources defined to this queue manager.

- 6) Click on the 'Queues' to see the queues that are currently defined. Please note that the list may differ from what is shown here. For example, you may see the SYSTEM queues or temporary dynamic queues that are currently in use.

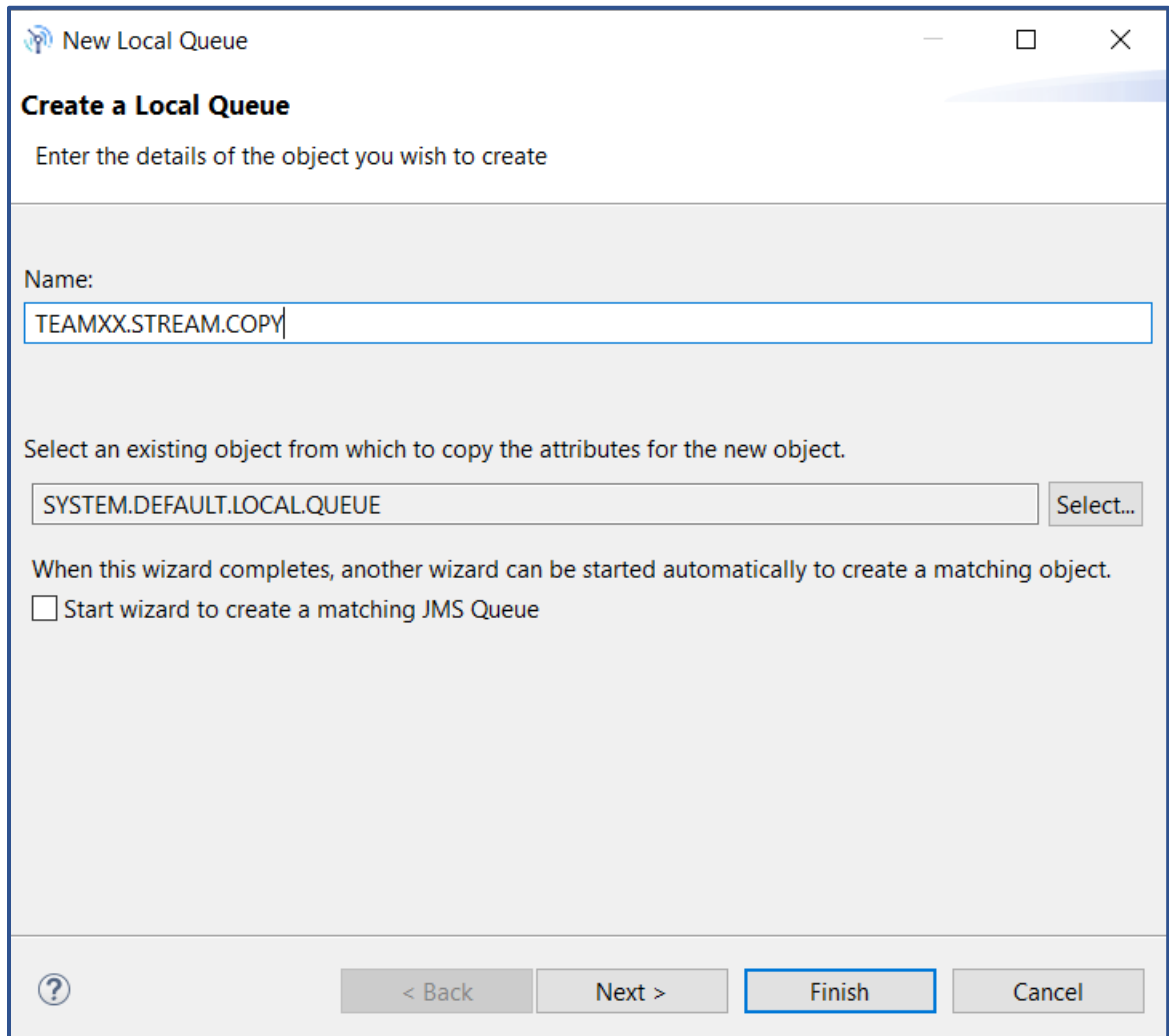


- 7) Right click on the Queues under the ZQS3 queue manager and select New-> Local Queue

MQ for z/OS – IBM MQ for z/OS – Streaming Queues Lab

- ▼  IBM MQ
 - ▼  Queue Managers
 - ▼  ZQS1 on '129.40.114.132(1424)'
 -  Queues
 -  Topics
 -  Subscriptions
 - >  Channels
 -  Listeners
 -  Process Definitions
 -  Namelists
 -  Authentication Information
 -  Storage Classes
 -  ZQS2 on '129.40.114.134(1424)'
 - ▼  Queue-sharing Groups
 - >  QSGA
 -  Queue Manager Clusters
 -  JMS Administered Objects
 -  Managed File Transfer
 -  Service Definition Repositories

- 8) The New Local Queue dialog box should appear, and you will type in the queue name for the streaming target queue. It should be TEAMXX.STREAM.COPY, replacing the TEAMXX with the TEAM number you have been assigned (it will be TEAM01-TEAM32). After entering the queue name, please click on the 'Next' button.



The image shows a 'New Local Queue' dialog box with the following elements:

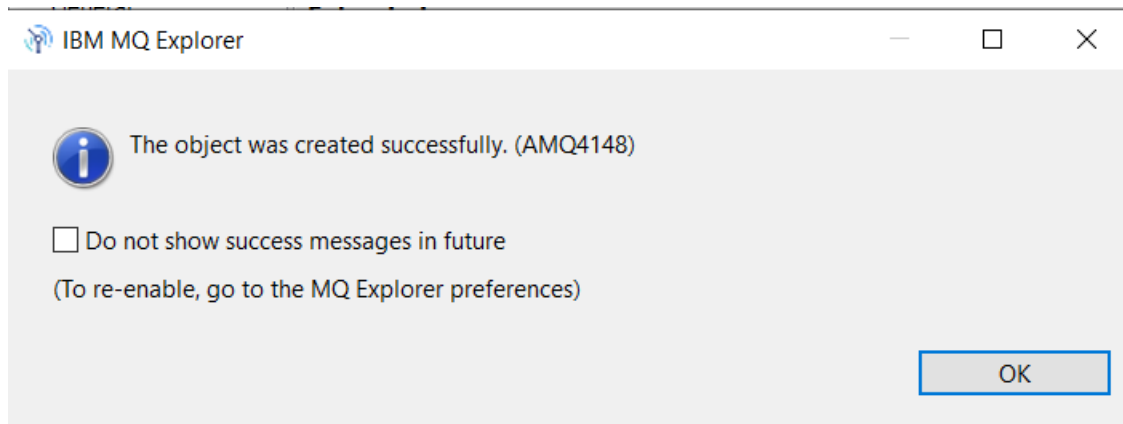
- Title Bar:** 'New Local Queue' with standard window controls (minimize, maximize, close).
- Section Header:** 'Create a Local Queue'.
- Instruction:** 'Enter the details of the object you wish to create'.
- Name Field:** A text box labeled 'Name:' containing 'TEAMXX.STREAM.COPY'.
- Selection Field:** A text box labeled 'Select an existing object from which to copy the attributes for the new object.' containing 'SYSTEM.DEFAULT.LOCAL.QUEUE', with a 'Select...' button to its right.
- Checkbox:** A checkbox labeled 'When this wizard completes, another wizard can be started automatically to create a matching object.' with the text 'Start wizard to create a matching JMS Queue' below it. The checkbox is currently unchecked.
- Footer:** A row of buttons: a help icon (?), '< Back', 'Next >', 'Finish' (highlighted with a blue border), and 'Cancel'.

- 9) On the Change Properties dialog box Please select the 'Extended' option and change the 'Sharability' to 'Sharable' and the 'Default input open option' to 'Input Shared as shown and click on the Finish Button.

The screenshot shows the 'New Local Queue' dialog box with the 'Change properties' tab selected. The 'Extended' section is active, displaying various configuration options. The 'Shareability' is set to 'Shareable' and the 'Default input open option' is set to 'Input shared'. The 'Finish' button is highlighted.

Property	Value
Max queue depth:	999999999
Maximum message length (bytes):	4194304
Shareability:	Shareable
Default input open option:	Input shared
Message delivery sequence:	Priority
Retention interval (hours):	999999999
Definition type:	Predefined
Index type:	None

- 10) The object should be successfully created, and the following dialog box should appear. If you would like to check the 'do not show success messages in future' please feel free. Please then click the OK button to clear the success display.



- 11) You will now define the base queue for streaming. Right click on the queues tab again and select 'New' -> 'Local Queue' to define the streaming base queue. It's name will be TEAMXX.STREAM.BASE, replacing the TEAMXX with your team number (TEAM01 thru TEAM32) .

New Local Queue

Create a Local Queue

Enter the details of the object you wish to create

Name:

TEAMXX.STREAM.BASE

Select an existing object from which to copy the attributes for the new object.

SYSTEM.DEFAULT.LOCAL.QUEUE Select...

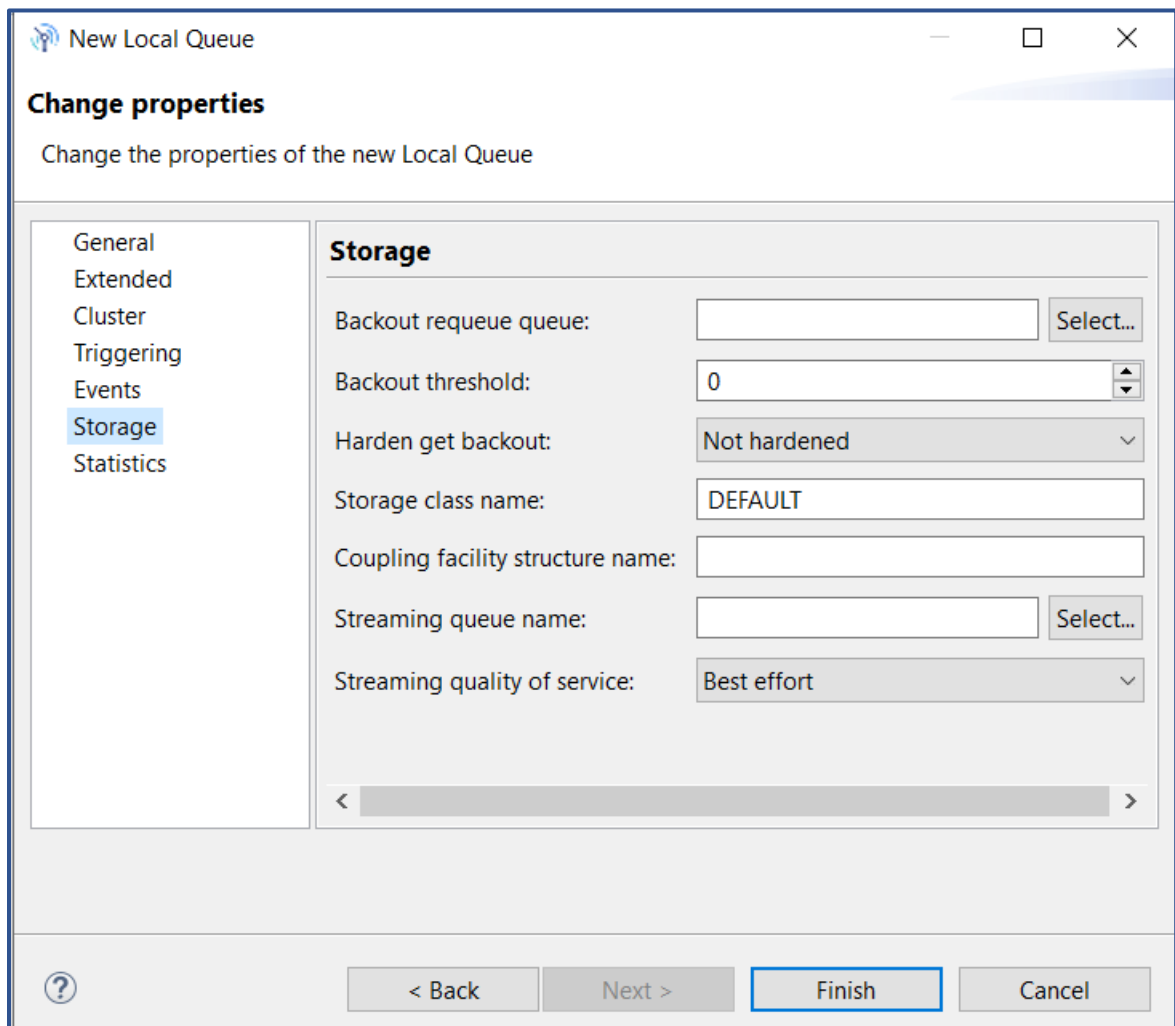
When this wizard completes, another wizard can be started automatically to create a matching object.

☐ Start wizard to create a matching JMS Queue

? < Back Next > Finish Cancel

- 12) Click on the Next Button. There are both Extended and Storage tab changes that will be made.
- 13) On the 'Extended' tab please change the Sharability and Default Open input option to 'Sharable' and 'Input Shared' as you did for the first queue.

- 14) For those of you familiar with the Storage tab on this dialog box, there have been some changes for 9.3. The streaming queue name and quality of service are set here.



The image shows a screenshot of the 'New Local Queue' dialog box in IBM MQ. The 'Storage' tab is selected in the left-hand navigation pane. The main area displays various configuration options for the queue's storage and streaming properties. The 'Streaming queue name' and 'Streaming quality of service' are highlighted in the original image.

New Local Queue

Change properties
Change the properties of the new Local Queue

Storage

Backout requeue queue: **Select...**

Backout threshold:

Harden get backout:

Storage class name:

Coupling facility structure name:

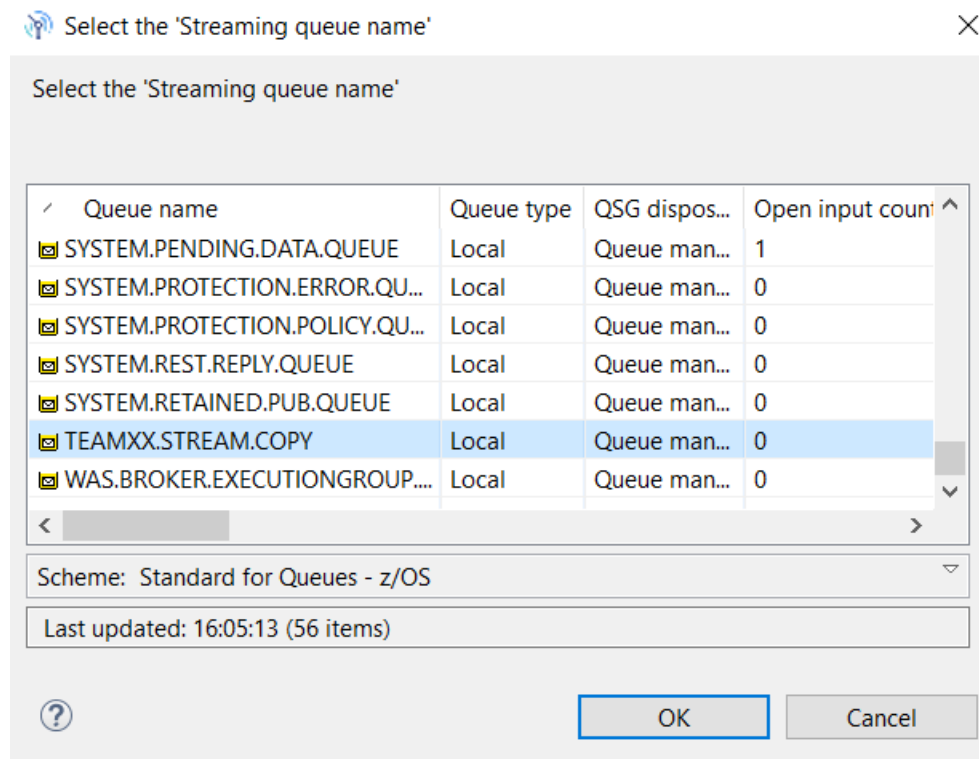
Streaming queue name: **Select...**

Streaming quality of service:

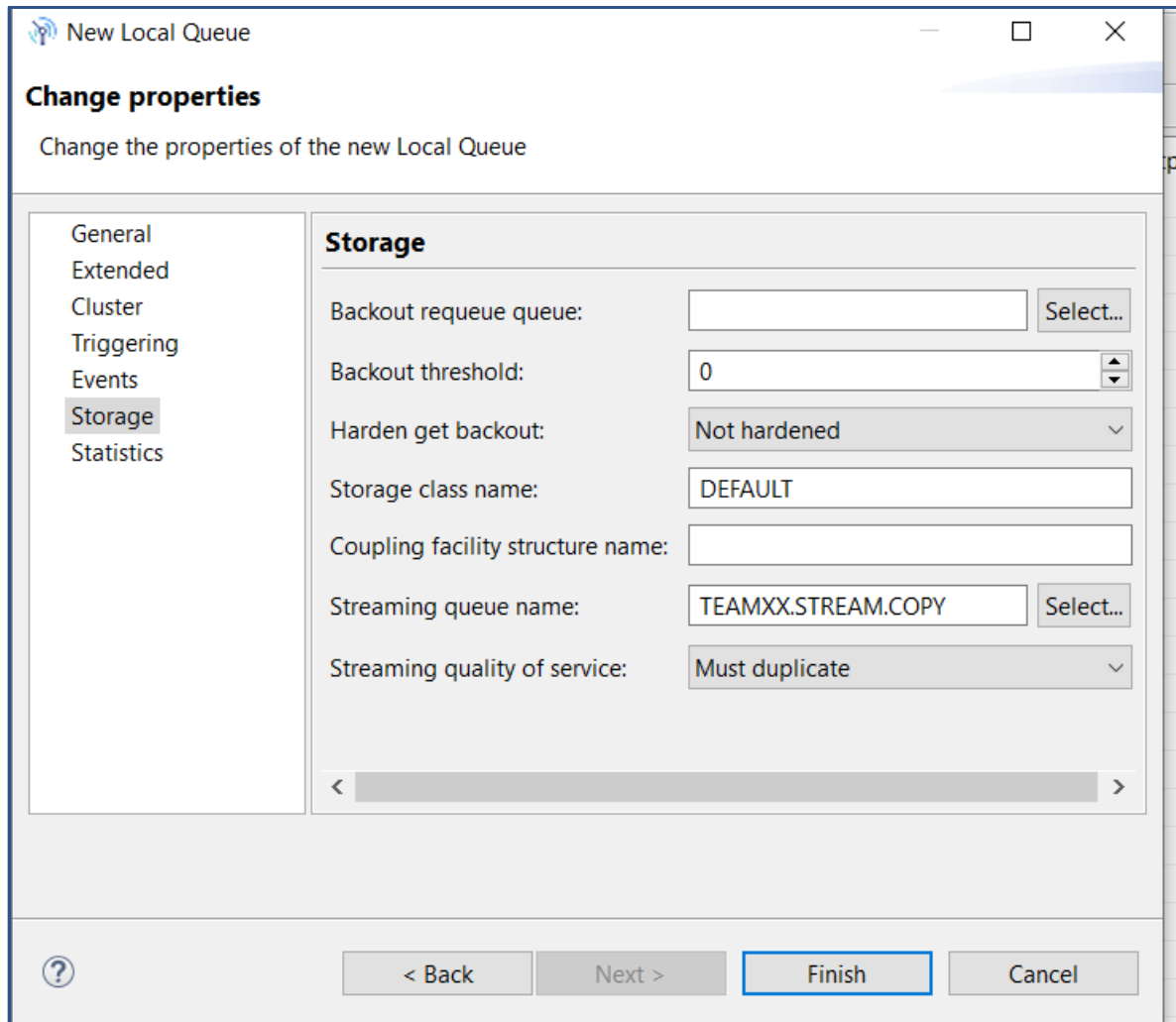
< >

Finish

- 15) The queue name may be selected from the previously defined queues by using the 'Select' Button and choosing the name from the dialog box. Please select the streaming target queue defined above, you may have to scroll down to find it, and click on 'OK'.



- 16) The queue name should now be populated in the dialog box. Please then select 'Must duplicate' for the first test and click on Finish.



The image shows a 'New Local Queue' dialog box with the 'Storage' tab selected. The dialog has a title bar with a question mark icon and standard window controls. The main area is divided into a left sidebar with tabs (General, Extended, Cluster, Triggering, Events, Storage, Statistics) and a right pane for the 'Storage' tab. The right pane contains several configuration fields: 'Backout requeue queue' with a text box and a 'Select...' button; 'Backout threshold' with a numeric spinner set to 0; 'Harden get backout' with a dropdown menu set to 'Not hardened'; 'Storage class name' with a text box containing 'DEFAULT'; 'Coupling facility structure name' with an empty text box; 'Streaming queue name' with a text box containing 'TEAMXX.STREAM.COPY' and a 'Select...' button; and 'Streaming quality of service' with a dropdown menu set to 'Must duplicate'. At the bottom of the dialog are four buttons: '< Back', 'Next >', 'Finish' (highlighted with a blue border), and 'Cancel'.

New Local Queue

Change properties
Change the properties of the new Local Queue

Storage

Backout requeue queue: Select...

Backout threshold:

Harden get backout:

Storage class name:

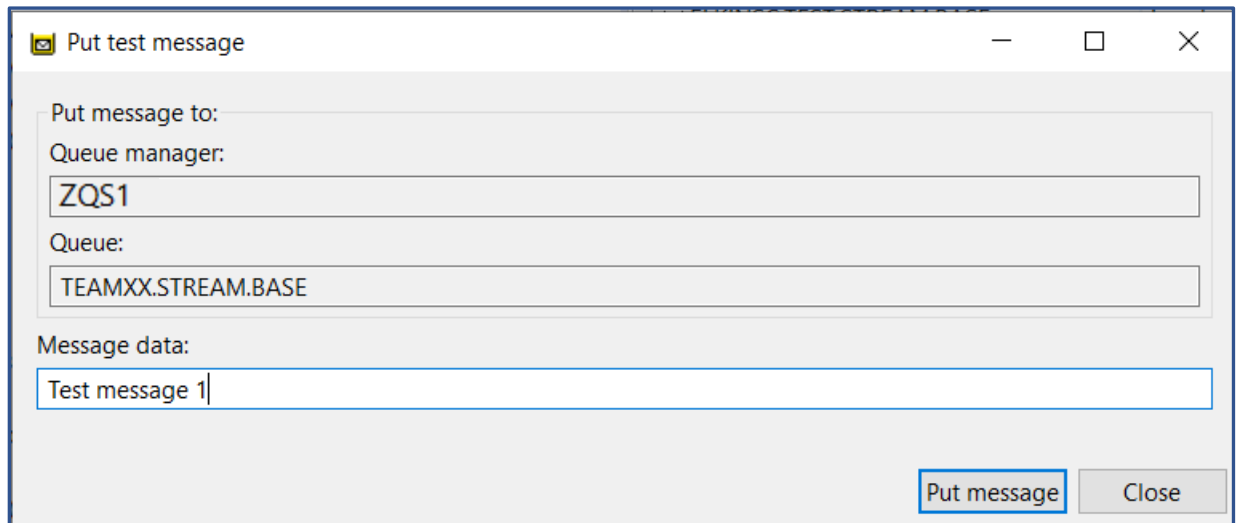
Coupling facility structure name:

Streaming queue name: Select...

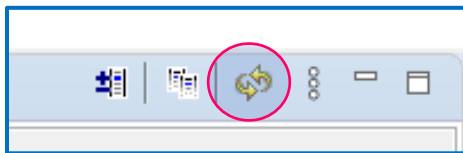
Streaming quality of service:

< >

- 17) To test, we are just going to put messages to the base queue. From the queue list right click on the TEAMXX.STREAM.BASE queue (replacing TEAMXX with your team number) and select 'Put Test message'. In the dialog box, please enter a test message and click on the 'OK' button



- 18) Please put two more messages onto the queue, varying the contents a bit. 'Test 1, Test2, Test 3' is just fine. Click on the 'Close' button to return to the queue list.
- 19) Click on the refresh key, in the upper right side of the queue list box to refresh the list of queues.



- 20) You should now see that both the base and copy queues have an equal number of messages.

MQ Explorer - Content

Queues

Filter: Standard for Queues

Queue name	Queue type	QSG dispos...	Open input count	Open output count	Current queue depth
TEAMXX.STREAM.BASE	Local	Queue man...	0	0	3
TEAMXX.STREAM.COPY	Local	Queue man...	0	0	3

21) At this point you can browse the queues. Note that the message contents are the same as are the Message IDs on both queues.

BASE:

Message browser

Queue Manager Name: ZQS1

Queue Name: TEAMXX.STREAM.BASE

Position	Put date/time	User identifier	Put application name	Format	Total length
1	Aug 10, 2022 4:14:08 PM	984675897	MQ Explorer 9.3.0	MQSTR	14
2	Aug 10, 2022 4:14:14 PM	984675897	MQ Explorer 9.3.0	MQSTR	14
3	Aug 10, 2022 4:14:21 PM	984675897	MQ Explorer 9.3.0	MQSTR	14

Scheme: Standard for Messages

Last updated: 16:19:23 (3 items)

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

Refresh Close

COPY:

Message browser

Queue Manager Name: ZQS1

Queue Name: TEAMXX.STREAM.COPY

Position	Put date/time	User identifier	Put application name	Format	Total length
1	Aug 10, 2022 4:14:08 PM	984675897	MQ Explorer 9.3.0	MQSTR	14
2	Aug 10, 2022 4:14:14 PM	984675897	MQ Explorer 9.3.0	MQSTR	14
3	Aug 10, 2022 4:14:21 PM	984675897	MQ Explorer 9.3.0	MQSTR	14

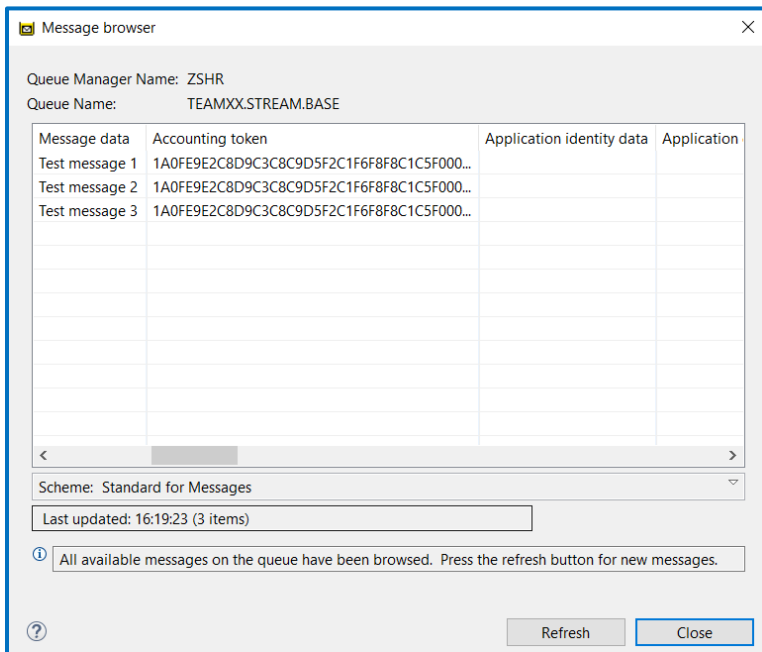
Scheme: Standard for Messages

Last updated: 16:20:23 (3 items)

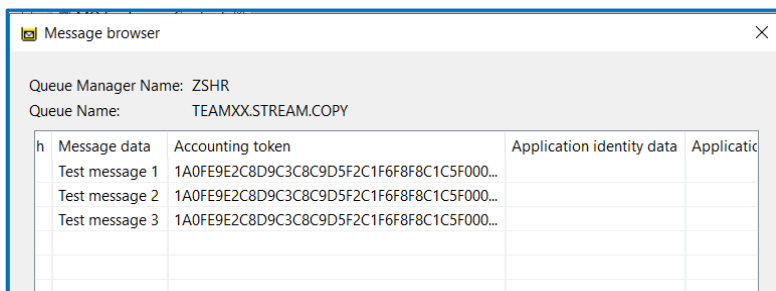
All available messages on the queue have been browsed. Press the refresh button for new messages.

Refresh Close

BASE:



COPY:



BASE:

Queue Manager Name: ZSHR
Queue Name: TEAMXX.STREAM.BASE

Message identifier bytes	Message type	Offset
C3E2D840E9E2C8D940404040404040DBEF9D05175D0D05	Datagram	0
C3E2D840E9E2C8D940404040404040DBEF9D0AA0DCE505	Datagram	0
C3E2D840E9E2C8D940404040404040DBEF9D1176AE3500	Datagram	0

Scheme: Standard for Messages
Last updated: 16:19:23 (3 items)

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

Refresh Close

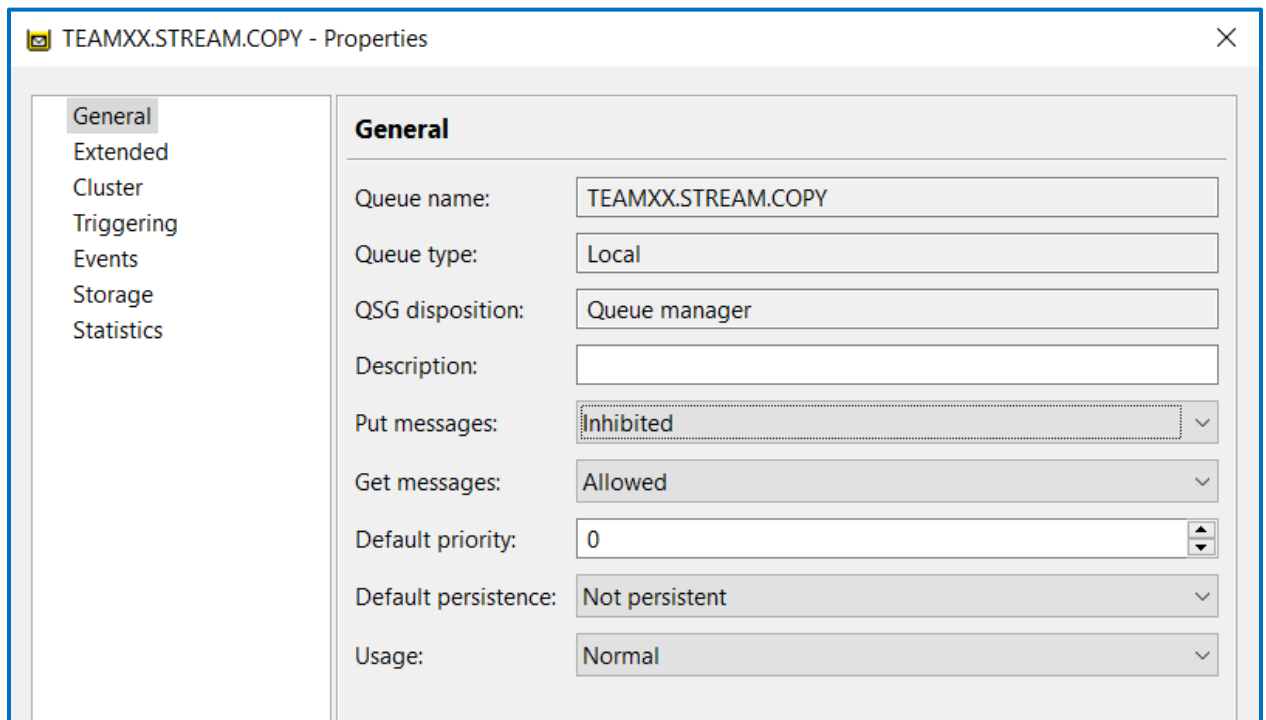
COPY:

Queue Manager Name: ZSHR
Queue Name: TEAMXX.STREAM.COPY

Message identifier bytes	Message type	Offset	Ori
C3E2D840E9E2C8D940404040404040DBEF9D05175D0D05	Datagram	0	-1
C3E2D840E9E2C8D940404040404040DBEF9D0AA0DCE505	Datagram	0	-1
C3E2D840E9E2C8D940404040404040DBEF9D1176AE3500	Datagram	0	-1

Tech Tip: Unlike pub/sub the streamed messages will have the same message ID.

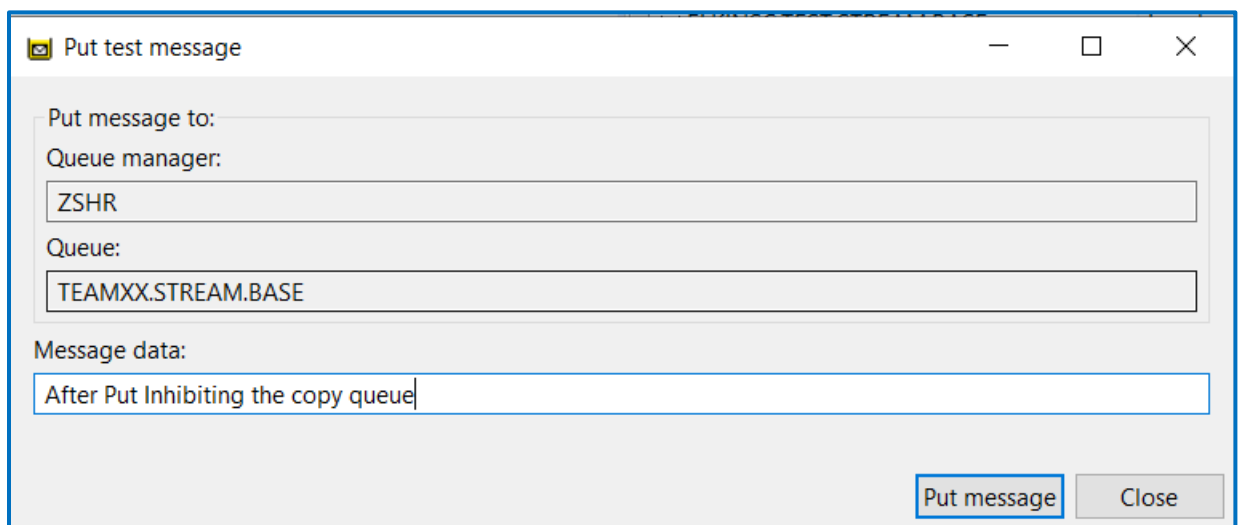
- 22) Testing an Exception – put inhibit the COPY queue. From the list of queues, Right click on the TEAMXX.STREAM.COPY (USE YOUR TEAM NUMBER IN PLACE OF TEAMXX) queue and select Properties. Select 'Inhibited' for put messages, and click on OK.



The screenshot shows the 'TEAMXX.STREAM.COPY - Properties' dialog box with the 'General' tab selected. The left sidebar lists various tabs: General, Extended, Cluster, Triggering, Events, Storage, and Statistics. The main area displays the following settings:

Property	Value
Queue name:	TEAMXX.STREAM.COPY
Queue type:	Local
QSG disposition:	Queue manager
Description:	
Put messages:	Inhibited
Get messages:	Allowed
Default priority:	0
Default persistence:	Not persistent
Usage:	Normal

- 23) Attempt to put a message on the TEAMXX.BASE.QUEUE, replacing the TEAMXX with your team ID.

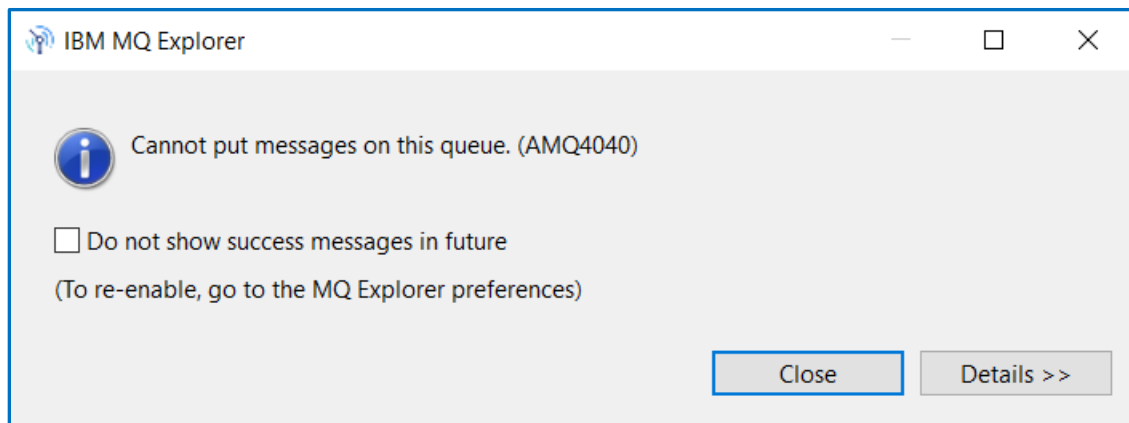


The screenshot shows the 'Put test message' dialog box. The fields are filled as follows:

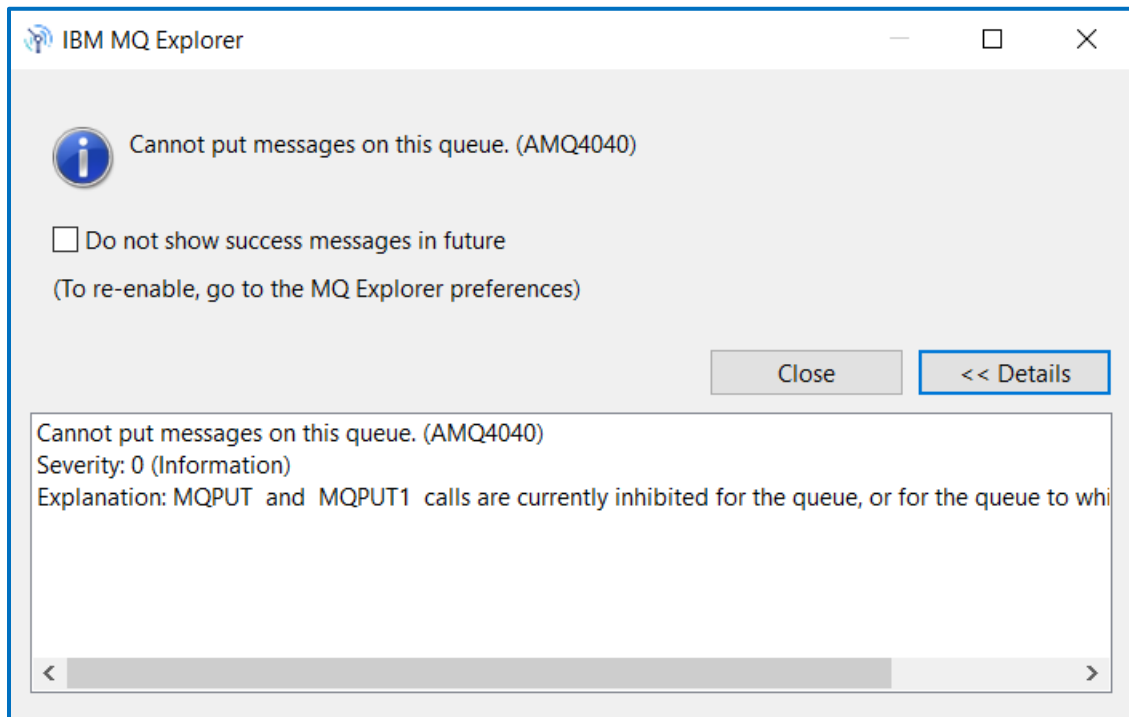
Field	Value
Put message to:	
Queue manager:	ZSHR
Queue:	TEAMXX.STREAM.BASE
Message data:	After Put Inhibiting the copy queue

At the bottom right, there are two buttons: 'Put message' and 'Close'.

24) You should receive a message that you cannot put a message to this queue.



25) Clicking on the 'Details' shows the reason:



- 26) Going back to the BASE queue, change the Streaming Quality of service from 'Must Duplicate' to 'Best effort' and click the OK button.

The screenshot shows the 'TEAMXX.STREAM.BASE - Properties' dialog box. On the left is a tree view with the following items: General, Extended, Cluster, Triggering, Events, **Storage** (highlighted), and Statistics. The main area is titled 'Storage' and contains the following fields:

- Backout requeue queue: [Empty text box] [Select...]
- Backout threshold: [0] [Up/Down arrows]
- Harden get backout: [Not hardened] [Dropdown arrow]
- NPM class: [Normal]
- Storage class name: [DEFAULT]
- Coupling facility structure name: [Empty text box]
- Streaming queue name: [TEAMXX.STREAM.COPY] [Select...]
- Streaming quality of service: [Best effort] [Dropdown arrow]

At the bottom right of the main area is an 'Apply' button. At the bottom of the dialog box are three buttons: a help icon (?), 'OK', and 'Cancel'.

27) Try to put another message to the BASE queue, like what is shown.

Put test message

Put message to:

Queue manager:

ZSHR

Queue:

TEAMXX.STREAM.BASE

Message data:

Putting test message after changing to 'best effort'

Put message Close

28) That should work, and the depths of the base and copy queues should now be different:

Queue name	Queue type	QSG dispos...	Open input count	Open output count	Current queue depth	Put messages	Get messages
ELKINSC.INDEXED	Local	Queue man...	0	0	0	Allowed	Allowed
ELKINSC.TEST.STREAM.BASE	Local	Queue man...	0	0	6	Allowed	Allowed
ELKINSC.TEST.STREAM.COPY	Local	Queue man...	0	0	6	Allowed	Allowed
TEAMXX.STREAM.BASE	Local	Queue man...	0	0	4	Allowed	Allowed
TEAMXX.STREAM.COPY	Local	Queue man...	0	0	3	Inhibited	Allowed
WAS.BROKER.EXECUTIONGROUP.REPLY	Local	Queue man...	0	0	0	Allowed	Allowed

29) Congratulations! You have now been able to create and use a streaming, private queue.

30) Now, we will use the queue-sharing group defined on the environment called QSGA to create a streaming, shared queue.

31) On MQ explorer, under Queue-sharing groups, you should see QSGA defined. Click the drop-down to see a list of Shared Queues.

Shared Queues

Filter: Standard for Queues

Queue name	Queue type	QSG dispos...	Open input count	Open output count
SYSTEM.QSG.CHANNEL.SYNCCQ	Local	Shared	0	0
SYSTEM.QSG.UR.RESOLUTION.QUEUE	Local	Shared	0	0
TEST1_QUEUE	Local	Shared	0	0
TEST2_QUEUE	Local	Shared	0	0

32) Unlike private queues, we will need to check which shared storage we should specify for our shared queues. Look under 'Coupling Facility Structures'

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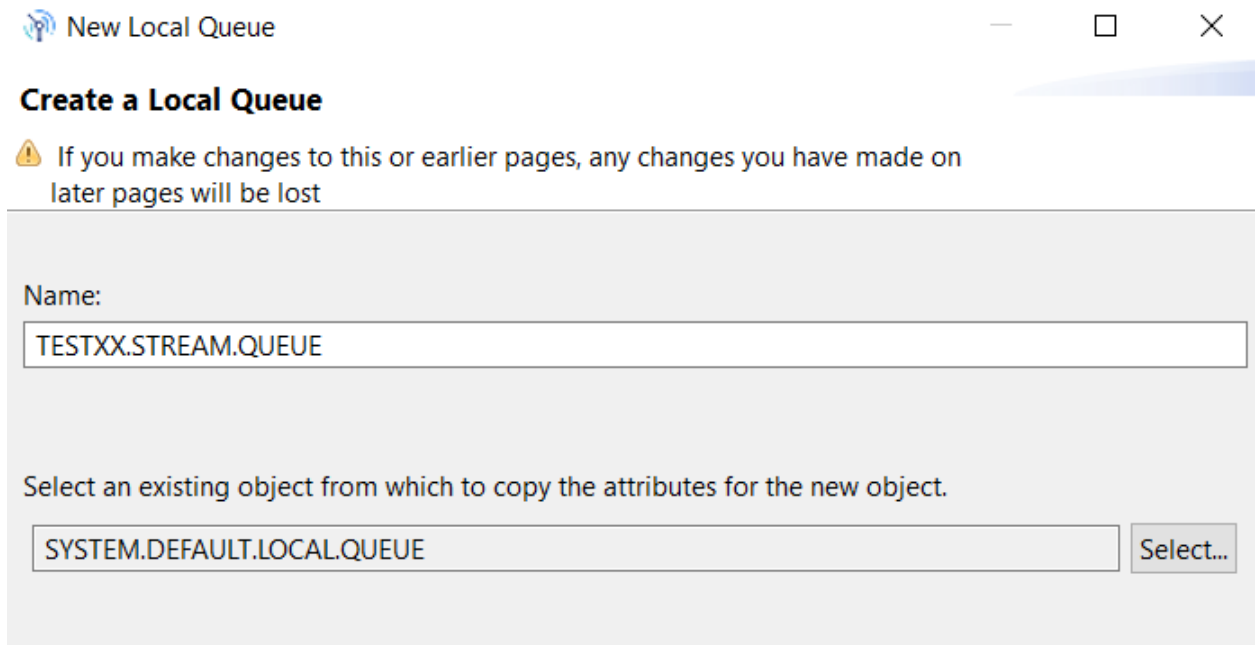
The screenshot shows the IBM MQ Explorer interface. The left pane, titled 'MQ Explorer - Navigator', displays a tree view of the MQ environment. Under 'Queue Managers', 'ZQS1 on '129.40.114.132(1424)'' is expanded, showing 'Queues', 'Topics', 'Subscriptions', 'Channels', 'Listeners', 'Process Definitions', 'Namelists', 'Authentication Information', and 'Storage Classes'. Under 'Queue-sharing Groups', 'QSGA' is expanded, showing 'Shared Queues', 'Coupling Facility Structures' (highlighted), and 'Group Definitions'. The right pane, titled 'MQ Explorer - Content', displays the 'Coupling Facility Structures' table. The table has columns: Coupling facility name, Status, Level, Description, Recovery, and Loss of CF connec. The table contains three rows: CSQSYSAPPL (Failed, Level 3, Recoverable System CF structure, Yes, Terminate), TEST1 (Active, Level 5, Recoverable System CF structure, Yes, Tolerate), and TEST2 (Active, Level 5, Recoverable System CF structure, Yes, Tolerate). The bottom of the right pane shows the 'Scheme: Standard for Coupling Facility Structures' and 'Last updated: 13:25:32 (3 items)'.

Coupling facility name	Status	Level	Description	Recovery	Loss of CF connec
△ CSQSYSAPPL	Failed	3	Recoverable System CF structure	Yes	Terminate
△ TEST1	Active	5	Recoverable System CF structure	Yes	Tolerate
△ TEST2	Active	5	Recoverable System CF structure	Yes	Tolerate

33) We will go ahead and remember TEST1 for our storage needs. Now, create a new shared queue.

The screenshot shows the IBM MQ Explorer interface with the 'Queue-sharing Groups' tree view expanded. The 'QSGA' group is selected, and the 'Share' button is highlighted. A 'New' dialog box is open, showing the 'Local Queue...' option.

34) We will start with defining our streaming queue like so.



New Local Queue

Create a Local Queue

⚠ If you make changes to this or earlier pages, any changes you have made on later pages will be lost

Name:

TESTXX.STREAM.QUEUE

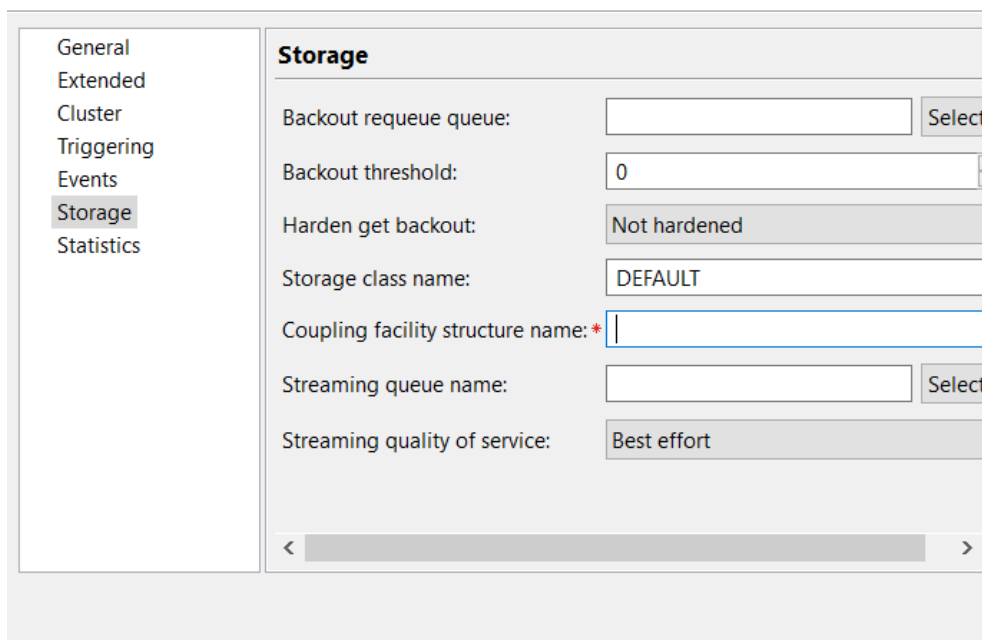
Select an existing object from which to copy the attributes for the new object.

SYSTEM.DEFAULT.LOCAL.QUEUE Select...

35) Under the Storage settings, we must specify our Coupling facility structure name of choice. This is where we will put in TEST1. That is the only additional setting you will need to make for the streaming queue. Press finish.

Change properties

Change the properties of the new Local Queue



Change properties

Change the properties of the new Local Queue

General
Extended
Cluster
Triggering
Events
Storage
Statistics

Storage

Backout requeue queue: Select

Backout threshold: 0

Harden get backout: Not hardened

Storage class name: DEFAULT

Coupling facility structure name: *


Streaming queue name: Select

Streaming quality of service: Best effort

< >

TECH TIP: If you navigate to 'Extended' when setting up the queue, you will see the option for 'Shareability'. You do not need to toggle shareable here to make a shared queue. That shareability refers to whether the queue can be opened for input multiple times

36) Now, we will define our base queue following the same process of creating a shared queue. Here, however, we will specify a streaming queue to point to like so.

 New Local Queue — □ ×

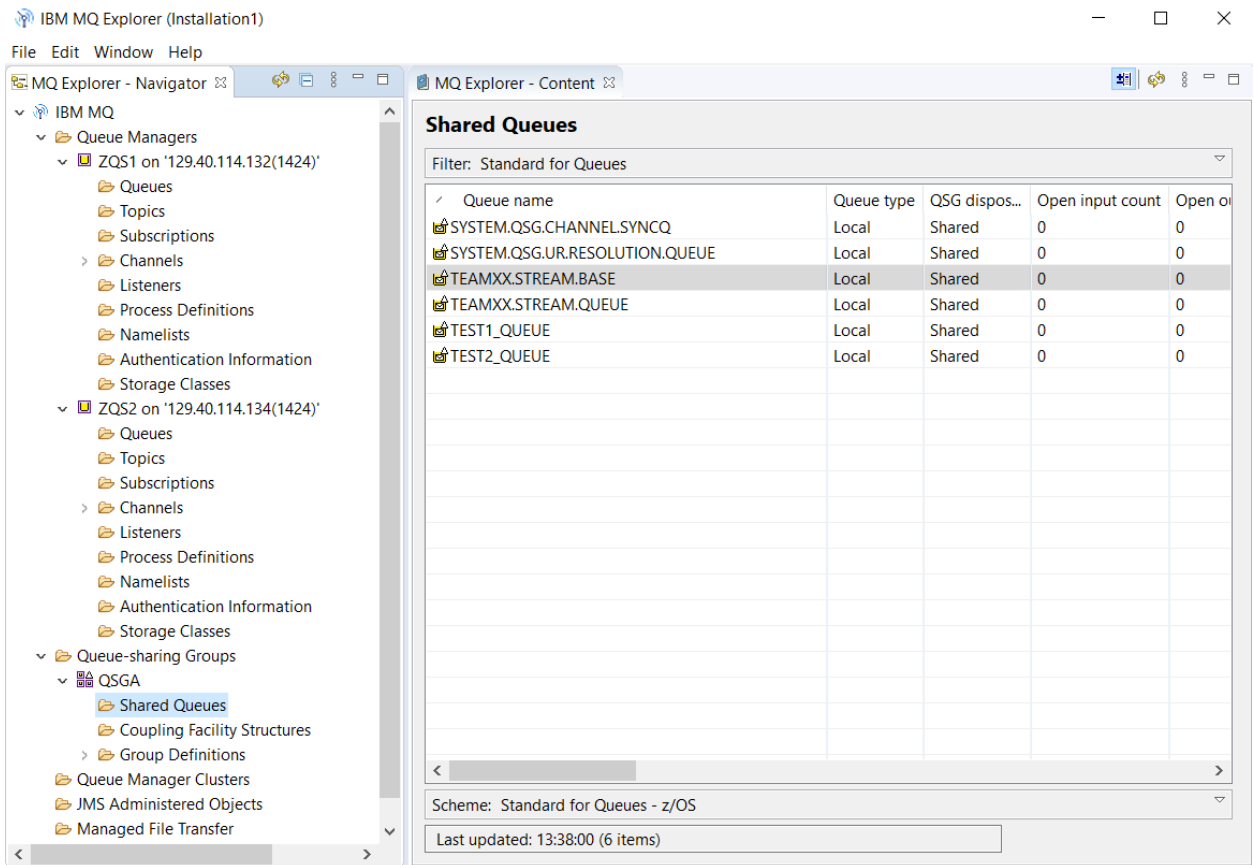
Change properties

Change the properties of the new Local Queue

<ul style="list-style-type: none"> General Extended Cluster Triggering Events Storage Statistics 	<h4>Storage</h4> <p>ackout requeue queue: <input type="text"/> Select...</p> <p>ackout threshold: <input type="text" value="0"/> ▲ ▼</p> <p>arden get backout: Not hardened ▼</p> <p>orage class name: <input type="text" value="DEFAULT"/></p> <p>oupling facility structure name: * <input type="text" value="TEST1"/></p> <p>reaming queue name: <input type="text" value="TEAMXX.STREAM.QUEUE"/> Select...</p> <p>reaming quality of service: Best effort ▼</p> <p>< <input type="text"/> ></p>
--	--

? < Back Next > **Finish** Cancel

37) Now, we have defined two shared queues. You should see both in the shared queues list under QSGA.



38) Let's test them out! Right click the base queue and put a test message on the base queue.

39) Once put, you should see the message duplicated on the streaming queue.

40) When you navigate to the individual queue managers' queues, you should see both the shared queues and their messages available to both ZQS3 and ZQS2

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Queues

Filter: Standard for Queues

Queue name	Queue type	QSG dispos...	Open input count	Open output count
SYSTEM.JMS.PS.STATUS.QUEUE	Local	Queue man...	0	0
SYSTEM.JMS.REPORT.QUEUE	Local	Queue man...	0	0
SYSTEM.JMS.TEMPQ.MODEL	Model	Queue man...		
SYSTEM.MQEXPLORER.REPLY.MODEL	Model	Queue man...		
SYSTEM.NDURABLE.MODEL.QUEUE	Model	Queue man...		
SYSTEM.PENDING.DATA.QUEUE	Local	Queue man...	1	0
SYSTEM.PROTECTION.ERROR.QUEUE	Local	Queue man...	0	0
SYSTEM.PROTECTION.POLICY.QUEUE	Local	Queue man...	0	0
SYSTEM.QSG.CHANNEL.SYNCCQ	Local	Shared	0	0
SYSTEM.QSG.UR.RESOLUTION.QUEUE	Local	Shared	0	0
SYSTEM.REST.REPLY.QUEUE	Local	Queue man...	0	0
SYSTEM.RETAINED.PUB.QUEUE	Local	Queue man...	0	0
TARGET.QUEUE	Local	Queue man...	0	0
TEAMXX.STREAM.BASE	Local	Shared	0	0
TEAMXX.STREAM.QUEUE	Local	Shared	0	0
TEST.STRM.PRIVATE.TARGET	Local	Queue man...	0	0
TEST1_QUEUE	Local	Shared	0	0
TEST2_QUEUE	Local	Shared	0	0
WAS.BROKER.EXECUTIONGROUP.REPLY	Local	Queue man...	0	0
ZQS2.DEAD.QUEUE	Local	Queue man...	0	0
ZQS2.DEFXMIT.QUEUE	Local	Queue man...	0	0

Scheme: Standard for Queues - z/OS

Last updated: 13:40:01 (64 items)

~~LAB FINISHED!~~