Best Practices for handling SYSTEM queues in an IBM MQ Queue Manager

https://www.ibm.com/support/pages/node/7031962

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+++ Objective +++

You are a new Administrator for an IBM MQ Queue Manager and you see many objects who name begin with 'SYSTEM', specially queues that have messages in it.
You would like to get some advice on how to handle these queues, such as:
Should you be concerned about those queues?
Do you need to delete the messages?
Should you not touch those queues?

+++ Answer

The SYSTEM.* objects are for internal use by the MQ queue managers.
In general, we ask customers to not touch them, even when some of the SYSTEM queues have messages in them, otherwise the queue manager may fail or have unexpected side-effects.

HOWEVER, there are few queues that need attention by the MQ Administrators and is ok to delete messages from them.

There are 2 sections:

- Section 1) Queues that MQ Administrator needs to consume manually or via tooling.
       SYSTEM.ADMIN.*
       SYSTEM.DEAD.LETTER.QUEUE
       SYSTEM.DEFAULT.LOCAL.QUEUE

- Section 2) Queues that MQ Administrator should not touch: do not delete messages

+ Update on 29-Sep-2023
Thanks to Morag Hughson for mentioning that the following queues need to be in Section 1:
     SYSTEM.ADMIN.ACTIVITY.QUEUE
     SYSTEM.ADMIN.TRACE.ACTIVITY.QUEUE
     SYSTEM.ADMIN.TRACE.ROUTE.QUEUE

++ Section 1) Queues that MQ Administrator needs to consume manually or via tooling.

a) Dead Letter Queue: SYSTEM.DEAD.LETTER.QUEUE

When queue manager QMGR1 from host1 sends a message via Sender/Receiver channels to queue manager QMGR2 in host2, and if there is a failure in placing the message into the destination in QMGR2, such as destination queue is full, then the message is considered to be "undeliverable" and it is sent to the Dead Letter Queue (DLQ).
There is no default DLQ when the queue manager is created, but it is common that MQ Administrators designate the following queue as the DLQ:

Here are some articles to help you deal with messages in the DLQ:

https://www.ibm.com/support/pages/node/6589941
How to find reason code for message that was sent to the IBM MQ Dead Letter Queue DLQ

https://www.ibm.com/support/pages/node/6589929
Using runmqdlq, MQ DLQ handler, defined as a service in a queue manager in Linux and Windows

+ Best Practice:

You can use the -u flag in crtmqm to specify the name of the DLQ.

$ crtmqm -u DLQ QMGRNAME

Caveat: You must define the DLQ. The above parameter does NOT actually create the queue, it just tells the queue manager which is the name of the DLQ.
.
The following runmqsc command define the DLQ queue:
define qlocal(DLQ) like(SYSTEM.DEAD.LETTER.QUEUE)

+ b) Event queues (SYSTEM.ADMIN.*.EVENT)

By default, the queue manager does NOT generate messages to indicate that certain events have occurred.
The MQ Administrator can setup the generation of events for several categories, and those messages are stored in queues that have the following general format:
SYSTEM.ADMIN.*.EVENT

This is the list:
SYSTEM.ADMIN.CHANNEL.EVENT
SYSTEM.ADMIN.COMMAND.EVENT
SYSTEM.ADMIN.COMMAND.QUEUE
SYSTEM.ADMIN.CONFIG.EVENT
SYSTEM.ADMIN.LOGGER.EVENT
SYSTEM.ADMIN.PERFM.EVENT
SYSTEM.ADMIN.PUBSUB.EVENT
SYSTEM.ADMIN.QMGR.EVENT

The following articles could be helpful:

https://www.ibm.com/support/pages/node/6416507
MQ queue SYSTEM.ADMIN.COMMAND.EVENT gets daily many messages

https://www.ibm.com/support/pages/node/590415
Webcast replay: Gathering and Displaying Statistics in WebSphere MQ V7 (MP3 Audio and PDF)
This WebSphere Support Technical Exchange is designed to present how to gather and display statistics in WebSphere MQ V7, by using the sample amqsmon and the SupportPac MS0P 'WebSphere MQ Explorer - Configuration and Display Extension Plug-ins'.
Index for the PDF:
  Pages 10-14: Events
  Pages 17-20: Real-time monitoring
  Pages 21-25: Accounting
  Pages 26-41: Statistics
  Pages 45-52: Displaying records

You can use the MQ Explorer and install the following plugin to view the events and statistics:
https://www.ibm.com/support/pages/node/712469
WebSphere MQ Explorer plug-in for Events and Statistics reports.
MS0P: WebSphere MQ Events and Statistics Plug-in
This SupportPac provides a mechanism to format Event messages and to aggregate the Statistics and Accounting reports generated by MQ.

The installation instructions for this plugin have a changed for MQ 9.2 and 9.3.
https://www.ibm.com/support/pages/node/6965360
Installing MS0P plugin in IBM MQ Explorer 9.2 and 9.3 in Windows
For usage details of the MS0P Plugin, please see section:
  Queue statistics records: viewed by MS0P plugin in MQ Explorer or by amqsmon

For more details on using the Plugin, see the webcast presentation. There is a section for
Events.

+ If you want to manually clear the messages, see the following article:

https://www.ibm.com/support/pages/node/6566477
Some ways to delete all messages from an IBM MQ queue
- MQ administrative runmqsc command: CLEAR QLOCAL
- MQ sample "amqsget" (local) or "amqsgetc" (remote)
- MQ Explorer
- RFHUTIL utility (from github)
- q.exe utility (old SupportPac MA01 – now available from github)
- MQ command: dmpmqmsg
- MQ samples amqsblst and blast.

+ c) Statistics and Accounting records

Similarly with the SYSTEM*EVENT queues (see item "b" above), by default the MQ queue manager does not generate statistics and/or accounting records.
The MQ Administrator can setup the generation of events for several categories, and those messages are stored in queues that have the following general format:
SYSTEM.ADMIN.ACCOUNTING.QUEUE
SYSTEM.ADMIN.STATISTICS.QUEUE

See the recommendation for the webcast recording and the MQ Explorer and MS0P plugin.

In addition, please see these articles:

https://www.ibm.com/support/pages/node/622383
AMQ7315E or AMQ7316E with rc 2053 indicating full queue in IBM MQ
SYSTEM.ADMIN.ACCOUNTING.QUEUE and SYSTEM.ADMIN.STATISTICS.QUEUE

The following technote provides a comprehensive information on how to deal with a full SYSTEM.ADMIN.ACCOUNTING.QUEUE or SYSTEM.ADMIN.STATISTICS.QUEUE (how to delete messages, how to stop new messages from being placed in that queue).

https://www.ibm.com/support/pages/node/6985619
Use value of NONE at the level of the IBM MQ queue manager to stop the generation of statistics and accounting records
To stop the generation of these records, in order to avoid filling the SYSTEM.ADMIN queues for Accounting and Statictics, please use:
  ALTER QMGR ACCTMQI(OFF) ACCTQ(NONE) STATMQI(OFF) STATQ(NONE)

+ d) SYSTEM.DEFAULT.LOCAL.QUEUE

This queue is only used by the MQ queue manager when the MQ Administrator defines new queues.

But some customers use this queue as a way for testing the MQ Client applications, such as amqsput, and thus, there might be messages created by users in this queue.
The messages can be cleared.

+ e) Activity Recording (SYSTEM.ADMIN.ACTIVITY.QUEUE)

For more details, see:
https://www.ibm.com/docs/en/ibm-mq/9.3?topic=monitoring-activity-recording
IBM MQ / 9.3
Activity Recording
"Activity recording is a technique for determining the routes that messages take through a queue manager network. To determine the route that a message has taken, the activities performed on behalf of the message are recorded.
When using activity recording, each activity performed on behalf of a message can be recorded in an activity report. An activity report is a type of report message. Each activity report contains information about the application that performed the activity on behalf of the message, when the activity took place, and information about the operations that were performed as part of the activity.
"

+ f) Application Activity Trace (SYSTEM.ADMIN.TRACE.ACTIVITY.QUEUE)

https://www.ibm.com/docs/en/ibm-mq/9.3?topic=network-application-activity-trace
IBM MQ / 9.3
Application activity trace
"
Application activity trace produces detailed information about the behavior of applications connected to a queue manager.
It traces the behavior of an application and provides a detailed view of the parameters used by an application as it interacts with IBM MQ resources.
It also shows the sequence of MQI calls issued by an application.
.
Use Application activity trace when you require more information than is provided by Event monitoring, Message monitoring, Accounting and statistics messages, and Real-time monitoring.
"

https://www.ibm.com/docs/en/ibm-mq/9.3?topic=information-using-amqsact-view-trace-messages
IBM MQ / 9.3
Using amqsact to view trace messages
"
You can use the amqsact program with IBM® MQ 9.0 to generate and view trace messages.
Display mode
By default, amqsact in display mode processes messages on SYSTEM.ADMIN.TRACE.ACTIVITY.QUEUE.
"

+ g) Trace Route (SYSTEM.ADMIN.TRACE.ROUTE.QUEUE)

For more details see:

https://www.ibm.com/docs/en/ibm-mq/9.3?topic=monitoring-trace-route-messaging
IBM MQ / 9.3
Trace-route messaging
"

Trace-route messaging is a technique that uses trace-route messages to record activity information for a message.
Trace-route messaging involves sending a trace-route message into a queue manager network.
As the trace-route message is routed through the queue manager network, activity information is recorded.
This activity information includes information about the applications that performed the activities, when they were performed, and the operations that were performed as part of the activities.
"

https://www.ibm.com/docs/en/ibm-mq/9.3?topic=information-acquiring-from-trace-route-reply-messages
Acquiring information from trace-route reply messages
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To acquire activity information you locate the trace-route reply message.
Then you retrieve the message and analyze the activity information.
.
Procedure
+ Check the reply-to queue that was specified in the message descriptor of the trace-route message. If the trace-route reply message is not on the reply-to queue, check the following locations:
- The local system queue, SYSTEM.ADMIN.TRACE.ROUTE.QUEUE, on the target queue manager of the trace-route message
- The common queue, if you have set up a common queue for trace-route reply messages
- The local system queue, SYSTEM.ADMIN.TRACE.ROUTE.QUEUE, on any other queue manager in the queue manager network, which can occur if the trace-route message has been put to a dead-letter queue, or the maximum number of activities was exceeded
.
+ Retrieve the trace-route reply message
+ Use the IBM MQ display route application to display the recorded activity information
https://www.ibm.com/docs/en/ibm-mq/9.3?topic=monitoring-mq-display-route-application
IBM MQ display route application (dspmqrte)
"

++ Section 2) Queues that MQ Administrator should not touch: do not delete messages

Please leave these queues alone! Do not change them, do not delete messages!

SYSTEM.AMQP.COMMAND.QUEUE
SYSTEM.AUTH.DATA.QUEUE
SYSTEM.BROKER.ADMIN.STREAM
SYSTEM.BROKER.CONTROL.QUEUE
SYSTEM.BROKER.DEFAULT.STREAM
SYSTEM.BROKER.INTER.BROKER.COMMUNICATIONS
SYSTEM.CHANNEL.INITQ
SYSTEM.CHANNEL.SYNCQ
SYSTEM.CHLAUTH.DATA.QUEUE
SYSTEM.CICS.INITIATION.QUEUE
SYSTEM.CLUSTER.COMMAND.QUEUE
SYSTEM.CLUSTER.HISTORY.QUEUE
SYSTEM.CLUSTER.REPOSITORY.QUEUE
SYSTEM.CLUSTER.TRANSMIT.MODEL.QUEUE
SYSTEM.CLUSTER.TRANSMIT.QUEUE
SYSTEM.DDELAY.LOCAL.QUEUE
SYSTEM.DEFAULT.ALIAS.QUEUE
SYSTEM.DEFAULT.MODEL.QUEUE
SYSTEM.DEFAULT.REMOTE.QUEUE
SYSTEM.DOTNET.XARECOVERY.QUEUE
SYSTEM.DURABLE.MODEL.QUEUE
SYSTEM.DURABLE.SUBSCRIBER.QUEUE
SYSTEM.HIERARCHY.STATE
SYSTEM.INTER.QMGR.CONTROL
SYSTEM.INTER.QMGR.FANREQ
SYSTEM.INTER.QMGR.PUBS
SYSTEM.INTERNAL.REPLY.QUEUE
SYSTEM.INTERNAL.REQUEST.QUEUE
SYSTEM.JMS.TEMPQ.MODEL
SYSTEM.MANAGED.DURABLE.xxxxxx   => derived from SYSTEM.DURABLE.MODEL.QUEUE
SYSTEM.MANAGED.NDURABLE.xxx   => derived fromSYSTEM.NDURABLE.MODEL.QUEUE
SYSTEM.MQEXPLORER.REPLY.MODEL
SYSTEM.MQSC.REPLY.QUEUE
SYSTEM.NDURABLE.MODEL.QUEUE
SYSTEM.PENDING.DATA.QUEUE
SYSTEM.PROTECTION.ERROR.QUEUE
SYSTEM.PROTECTION.POLICY.QUEUE
SYSTEM.REST.REPLY.QUEUE
SYSTEM.RETAINED.PUB.QUEUE
SYSTEM.SELECTION.EVALUATION.QUEUE
SYSTEM.SELECTION.VALIDATION.QUEUE

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