How to find the integer values for the -l parameter in MQ amqsmon

https://www.ibm.com/support/pages/node/6152391

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+++ Objective

You want to use the MQ monitoring utility **amqsmon** to parse the accounting and statistics records, but you want to show only certain attributes in the output.

You understand that you can use the -l parameter to specify the desired attributes, but the utility expects integer numbers and it is not obvious from the documentation, how to find the mapping of the attribute names and their integer numbers.

The online manual shows an example for displaying the Queue accounting fields **ConnectionId** and **ApplicationName**:

```
amqsmon -m saturn.queue.manager -t accounting -b -a -l 7006,3024
```

It is necessary to specify integer numbers 7006 and 3024, instead of the names of the attributes. A sample output is shown below:

```
ConnectionId: x'414d514354524556312020202020208d0b374203090020'
ApplicationName: 'runmqsc'
```

However, the mapping of the attribute ConnectionId to the integer 7006 is not obvious.

You want to display the Queue statistics fields **QMaxDepth** and **AvgTimeOnQ.** How do you find out which integers to use?

The objective of this tutorial is to show you all the steps to find out the mapping.

For illustration purposes, real output data is shown from a queue manager that has been configured to record the statistics and accounting data.

The function of statistics and accounting was introduced many versions ago and thus, it is included in all supported versions of MQ. For illustration purposes, MQ 9.0.5 CD on Windows 10 is being used, but the principles and commands apply to all versions.

The chapters are:
Chapter 1: Configuring a queue manager to record statistics and accounting data
Chapter 2: Information on the utility “amqsmon” from the online manual
Chapter 3: Finding the mapping for ConnectionId (7006) and ApplicationName (3024)
Chapter 4: Finding the mapping for QMAXDETH (?) and AVGTIMEONQ (?)

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+++ Chapter 1: Configuring a queue manager to record statistics and accounting data
++

++ Background

The following tutorial was the base for the changes in the configuration of the queue manager.

http://www.ibm.com/support/docview.wss?uid=swg27022497
Gathering and Displaying Statistics in WebSphere MQ V7

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'.
Level of Difficulty: Intermediate

This presentation includes a section on how you can use the MQ Explorer and install the following plugin to view the events and statistics:

http://www-1.ibm.com/support/docview.wss?rs=171&uid=swg24011617
MS0P: WebSphere MQ Events and Statistics Plug-in
WebSphere MQ Explorer plug-in for Events and Statistics reports.
This SupportPac provides a mechanism to format Event messages and to aggregate the Statistics and Accounting reports generated by WebSphere MQ.

++ Configuration

Host: Windows 10
Version of MQ: 9.0.5.0 CD

The scenario for this tutorial was done on a Windows machine that has multiple installations of MQ.
Therefore, it is necessary to use setmqenv to specify the desired MQ installation.
If you have only 1 installation, then the default one is **Installation1**.

C:\> **setmqenv -n Installation8**

C:\> **dspmqver**
Name: IBM MQ
Version: 9.0.5.0
Level: p905-L180305.1
Platform: IBM MQ for Windows (x64 platform)
O/S: Windows 10 Enterprise x64 Edition, Build 18363
InstName: Installation8
InstDesc: 9.0.5

++ Parameters in the queue manager that were enabled for statistics and accounting:

C:\> **runmqsc QM905**

Showing original values for the queue manager:
display qmgr acctq acctint statq statint
AMQ8408I: Display Queue Manager details.
QMNAME(QMORI) ACCTINT(1800)
ACCTQ(OFF) STATINT(1800)
STATQ(OFF)

Altering the values to enable accounting and statistics and to set the refresh interval to 2 minutes (120 seconds):
alter qmgr ACCTQ(ON) ACCTINT(120) STATQ(ON) STATINT(120)

Redisplaying the changed values
display qmgr acctq acctint statq statint
AMQ8408I: Display Queue Manager details.
QMNAME(QM905) ACCTINT(120)
ACCTQ(ON) STATINT(120)
STATQ(ON)

Showing original values for local queue Q1:
display qlocal(Q1) acctq statq
AMQ8409I: Display Queue details.
QUEUE(Q1) TYPE(QLOCAL)
ACCTQ(QMGR) STATQ(QMGR)

Altering the values to enable accounting and statistics for the queue:
ALTER QLOCAL(Q1) ACCTQ(ON) STATQ(ON)

Redisplaying the changed values:
display qlocal(Q1) acctq statq
AMQ8409I: Display Queue details.
QUEUE(Q1) TYPE(QLOCAL)
ACCTQ(ON) STATQ(ON)

++ MQ Client “amqsput” is used to put messages into a queue

This sample will trigger the generation of records for statistics and accounting.

C:\> **amqsput Q1 QM905**
Sample AMQSPUT0 start
target queue is Q1
1
2

++
+++ Chapter 2: Information on the utility “amqsmon” from the online manual
++

Let’s explore the online manual for the information on the “amqsmon” utility, which is a sample command that you can use to display the records that are generated with statistics and accounting data.

The main page is the following one:

https://www.ibm.com/support/knowledgecenter/SSFKSJ_9.0.0/com.ibm.mq.mon.doc/q037400_.htm
IBM MQ 9.0.x / IBM MQ / Monitoring and performance / Monitoring your IBM MQ network / Accounting and statistics messages / Displaying accounting and statistics information / amqsmon (Display formatted monitoring information)

.
Use the amqsmon sample program to display in a readable format the information contained within accounting and statistics messages.
...
-l Parameter
Only display the selected fields from the records processed.
*** **Parameter is a comma-separated list of integer values, with each integer value mapping to the numeric constant of a field**, see amqsmon example 5. ***
If you do not specify this parameter, then all available fields are displayed.

OK, the above web page indicates that “amqsmon example 5” has more information.
If you click on the link you will land at:

https://www.ibm.com/support/knowledgecenter/SSFKSJ_9.0.0/com.ibm.mq.mon.doc/q037410_.htm#q037410__q037410_1
IBM MQ 9.0.x / IBM MQ / Monitoring and performance / Monitoring your IBM MQ network / Accounting and statistics messages / Displaying accounting and statistics information / amqsmon (Display formatted monitoring information) examples

The following command browses the accounting queue and displays the application name and connection identifier of every application for which MQI accounting information is available:

```
  amqsmon -m saturn.queue.manager -t accounting -b -a -l 7006,3024
```

The output from this command follows:

```
   ConnectionId: x'414d514354524556312020202020208d0b374203090020'
   ApplicationName: 'runmqsc'

   ConnectionId: x'414d514354524556312020202020208d0b3742010a0020'
   ApplicationName: 'amqsput'
```

++ Real Example using the integers 7006 and 3024

Now let's see what is the output that we obtain from the real data from our test machine:

```
C:\> amqsmon -m QM905 -t accounting -b -l 7006,3024
MonitoringType: QueueAccounting
ConnectionId: x'414d5143514d393035202020202020fcf1855e01e80322'
ApplicationName: 'WebSphere MQ\bin\amqsput.exe'
QueueAccounting: 0

MonitoringType: QueueAccounting
ConnectionId: x'414d5143514d393035202020202020fcf1855e01ea0322'
ApplicationName: 'BM\MQ_4\bin64\MQExplorer.exe'
QueueAccounting: 0
QueueAccounting: 1
QueueAccounting: 2
QueueAccounting: 3
QueueAccounting: 4
QueueAccounting: 5
QueueAccounting: 6
QueueAccounting: 7
QueueAccounting: 8
QueueAccounting: 9

MonitoringType: QueueAccounting
ConnectionId: x'414d5143514d393035202020202020fcf1855e01e90322'
ApplicationName: 's\IBM\MQ_4\bin64\amqsput.exe'
QueueAccounting: 0

MonitoringType: QueueAccounting
ConnectionId: x'414d5143514d393035202020202020fcf1855e01ef0322'
ApplicationName: 'BM\MQ_4\bin64\MQExplorer.exe'
QueueAccounting: 0
QueueAccounting: 1
QueueAccounting: 2
QueueAccounting: 3
QueueAccounting: 4
QueueAccounting: 5
QueueAccounting: 6
QueueAccounting: 7
QueueAccounting: 8
QueueAccounting: 9

MonitoringType: QueueAccounting
ConnectionId: x'414d5143514d393035202020202020fcf1855e01e60322'
ApplicationName: 's\IBM\MQ_4\bin64\runmqsc.exe'
QueueAccounting: 0

5 Records Processed.
```

++
+++ Chapter 3: Finding the mapping for ConnectionId (7006) and ApplicationName (3024)
++

In the previous chapter we saw that certain integers were used, but it was not clear what process was taken to find them.

** QUESTION: What is the mapping for 7006 and 3024 used in the example in the manual?

Summary:
7006 means MQBACF_CONNECTION_ID which is the "ConnectionId"
3024 means MQCACF_APPL_NAME which is the "ApplicationName"

** QUESTION: Where is the mapping explained?

To find out the mapping, it is necessary to take 2 steps.

++ Step 1: Visit the appropriate web page for the message data for accounting (Step 1-a) or statistics (Step 1-b)

+ Step 1-a: Queue accounting message data

https://www.ibm.com/support/knowledgecenter/SSFKSJ_9.1.0/com.ibm.mq.mon.doc/q037470_.htm
IBM MQ 9.1.x / IBM MQ / Monitoring and performance / Monitoring your IBM MQ network / Accounting and statistics messages / Accounting and statistics message reference / Queue accounting message data

The following is an excerpt for the stanzas for the fields ApplicationName and ConnectionId.
The information that we are looking for is the attribute: Identifier

+ begin excerpt

ApplicationName
    Description: The name of the application. The contents of this field are
                    equivalent to the contents of the PutApplName field in
                    the message descriptor.
    Identifier: **MQCACF_APPL_NAME**
    Data type: MQCFST
    Maximum length: MQ_APPL_NAME_LENGTH
    Returned: Always

ConnectionId
    Description: The connection identifier for the IBM MQ connection
    Identifier: **MQBACF_CONNECTION_ID**
    Data type: MQCFBS
    Maximum length: MQ_CONNECTION_ID_LENGTH
    Returned: Always

+ end excerpt

So far, we have this partial mapping:
ApplicationName => MQCACF_APPL_NAME
ConnectionId => MQBACF_CONNECTION_ID

+ Step 1-b: Queue statistics message data

https://www.ibm.com/support/knowledgecenter/SSFKSJ_9.1.0/com.ibm.mq.mon.doc/q037490_.htm
IBM MQ 9.1.x / IBM MQ / Monitoring and performance / Monitoring your IBM MQ network / Accounting and statistics messages / Accounting and statistics message reference / Queue statistics message data

++ Step 2: In the online Knowledge Center search for the Identifiers obtained from Step 1.

You could start by visiting the following web page and then based on the first few characters of the Identifier name, visit the corresponding section.
For example:
Identifer: MQCACF_APPL_NAME
Section: MQCACF_* (Command format Character Parameter Types)

https://www.ibm.com/support/knowledgecenter/SSFKSJ_9.1.0/com.ibm.mq.ref.dev.doc/q090210_.htm
IBM MQ 9.1.x / IBM MQ / Reference / Developing applications reference / MQI applications reference / Constants /
Constants

+ Step 2-a: Visit the appropriate sub-section and find the integer for the identifier

https://www.ibm.com/support/knowledgecenter/SSFKSJ_9.1.0/com.ibm.mq.ref.dev.doc/q090440_.htm
IBM MQ 9.1.x / IBM MQ / Reference / Developing applications reference / MQI applications reference / Constants / Constants /
MQCACF_* (Command format Character Parameter Types)

From the table:
MQCACF_APPL_NAME **3024** X'00000BD0'

+ Step 2-b: Visit the appropriate sub-section and find the integer for the identifier

https://www.ibm.com/support/knowledgecenter/SSFKSJ_9.1.0/com.ibm.mq.ref.dev.doc/q090370_.htm
IBM MQ 9.1.x / IBM MQ / Reference / Developing applications reference / MQI applications reference / Constants / Constants /
MQBACF_* (Command format Byte Parameter Types)

MQBACF_CONNECTION_ID **7006** X'00001B5E'

++ Conclusion:

Based on the findings from the sub-sections above, we can achieve the full mapping:

```
ApplicationName     =>     MQCACF_APPL_NAME          =>     3024
ConnectionId        =>     MQBACF_CONNECTION_ID      =>     7006
```

++
+++ Chapter 4: Finding the mapping for QMAXDETH (?) and AVGTIMEONQ (?)
++

++ Question: How about with another example, such as QMAXDETH and AVGTIMEONQ

OK, the previous pages show the process for the identifiers/integers used in the example in the online manual.

Now, let's repeat the process for these queue statistics fields:

QMAXDETH and AVGTIMEONQ

Step 1-b: Visit "Queue statistics message data" and get the "Identifier" values.

https://www.ibm.com/support/knowledgecenter/SSFKSJ_9.1.0/com.ibm.mq.mon.doc/q037490_.htm
IBM MQ 9.1.x / IBM MQ / Monitoring and performance / Monitoring your IBM MQ network / Accounting and statistics messages / Accounting and statistics message reference / Queue statistics message data
.
The following is an excerpt for the stanzas for the fields **QMaxDepth** and **AvgTimeOnQ**.
The information that we are looking for is the attribute: Identifier

+ begin excerpt

QMaxDepth
Description: The maximum queue depth during the monitoring period
Identifier: **MQIAMO_Q_MAX_DEPTH**
Data type: MQCFIN
Included in PCF group: QStatisticsData
Returned: When available

AvgTimeOnQ
Description: The average latency, in microseconds, of messages destructively retrieved from the queue during the monitoring period. This parameter is an integer list indexed by persistence value.
Identifier: **MQIAMO64_AVG_Q_TIME**
Data type: MQCFIL64
Included in PCF group: QStatisticsData
Returned: When available

+ end excerpt

So far, we have this partial mapping:
QMaxDepth => MQIAMO_Q_MAX_DEPTH
AvgTimeOnQ => MQIAMO64_AVG_Q_TIME

Step 2: In the online Knowledge Center search for the Identifiers obtained from Step 1.

Step 2-c:
https://www.ibm.com/support/knowledgecenter/SSFKSJ_9.1.0/com.ibm.mq.ref.dev.doc/q091620_.htm
IBM MQ 9.1.x / IBM MQ / Reference / Developing applications reference / MQI applications reference / Constants / Constants /
MQIAMO_* (Command format Integer Monitoring Parameter Types)

```
MQIAMO_Q_MAX_DEPTH 739    X'000002E3'
```

Step 2-d:
https://www.ibm.com/support/knowledgecenter/SSFKSJ_9.1.0/com.ibm.mq.ref.dev.doc/q091630_.htm
IBM MQ 9.1.x / IBM MQ / Reference / Developing applications reference / MQI applications reference / Constants / Constants /
MQIAMO64_* (Command format 64-bit Integer Monitoring Parameter Types)

```
MQIAMO64_AVG_Q_TIME       703    X'000002BF'
```

++ Conclusion:

Based on the findings from the sub-sections above, we can achieve the full mapping:

```
QMaxDepth    =>    MQIAMO_Q_MAX_DEPTH => 739
AvgTimeOnQ   =>    MQIAMO64_AVG_Q_TIME => 703
```

+++ Real example using the integers 739 and 703

C:\> **amqsmon -m QM905 -t statistics -b -l 739,703**

```
MonitoringType: QueueStatistics
QueueStatistics: 0
  QMaxDepth: 8
  AverageQueueTime: [0, 0]
QueueStatistics: 1
  QMaxDepth: 48
  AverageQueueTime: [0, 0]

MonitoringType: QueueStatistics
QueueStatistics: 0
  QMaxDepth: 84
  AverageQueueTime: [0, 0]
QueueStatistics: 1
  QMaxDepth: 2
  AverageQueueTime: [128, 0]
```

+++ end