

# MQ SMF: Statistics, Accounting, and Lies

## Session 27066

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"There are three kinds of lies:  
lies, damned lies, and  
statistics."

# Agenda

MQ SMF – the answer or not

My favorite RFEs

Examples of lies, or misleading results

Summary

## MQ SMF Data- the Answer

- ❖ I have spent longer on MQ SMF than anything I have worked on at IBM
  - ❖ Well perhaps travel arrangements since they enforce these new tools
- ❖ MQ SMF has taught me more about the way it works than any session
- ❖ MQ SMF exposes patterns of use and operation
  - ❖ A break in those patterns can be the answer to a problem or an indicator of trouble brewing

## Why do I have to know about MQ SMF data?

- ❖ We have tools to look at this for us
  - ❖ Tools can be wrong
    - ❖ How many years has MP1B been published, by MQ developers?
      - ❖ And within the last 6 months a calculation error was found
  - ❖ Tools can exclude data
    - ❖ Sometimes it is a matter of catching up
    - ❖ Sometimes it is a decision
      - ❖ It doesn't evaluate the accounting data
    - ❖ Looking across a multiple queue managers can be a problem
- ❖ Machine Learning is still more at the hype stage than reality
  - ❖ Someday <pick your AI name of choice> will be able to do it all

## My current favorite RFEs on SMF

- ❖ Publish the MQ Statistics and MQ Accounting SMF data in addition to creating the SMF Records
  - ❖ Like the Statistics and Accounting information is published on distributed
  - ❖ [https://www.ibm.com/developerworks/rfe/execute?use\\_case=viewRfe&CR\\_ID=134864](https://www.ibm.com/developerworks/rfe/execute?use_case=viewRfe&CR_ID=134864)
- ❖ IBM MQ for z/OS - Queue Statistics
  - ❖ New subtype of statistics records dealing with the API requests against individual queues
  - ❖ Much of the time the task detail is less critical than the queue information
  - ❖ [https://www.ibm.com/developerworks/rfe/execute?use\\_case=viewRfe&CR\\_ID=135074](https://www.ibm.com/developerworks/rfe/execute?use_case=viewRfe&CR_ID=135074)

## Examples of Lies – or at least misleading results

- Generated messages
- The last LPAR added
- There are no problems with my bufferpools
- Other Lies, omissions, misleading things, etc.

## Generated Messages – those pesky things

- ❖ Generated messages are messages that the queue manager itself writes when:
  - 1) A trigger event occurs
  - 2) A Performance event occurs
  - 3) Any other kind of detected event
- ❖ They appear to be counted by the Data Manager component
  - ❖ Note: I have not studied this in detail, generated trigger messages do show up in this data and while I have been told that performance events and report messages are as well I've not verified.
- ❖ There is a generated messages count in the WQ records – NGEN field
  - ❖ But what does it really count?



## Generated Messages – So where is the LIE?

❖ Gen

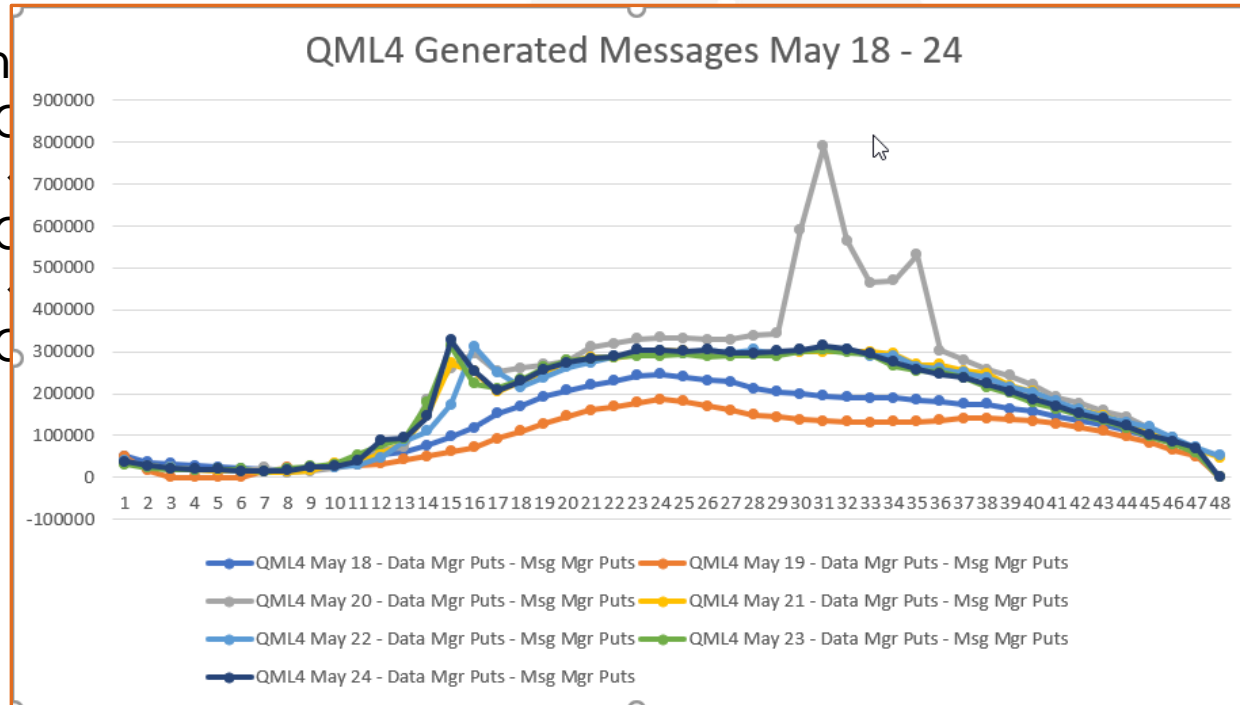
❖ C

❖ C

❖ C

Messages

Counted



## Last LPAR added problem

- ❖ Customer extended their Queue Sharing group, added a new LPAR
  - ❖ New Queue manager was added to the LPAR and QSG on May 1
  - ❖ New BMP to process messages was added on May 18
  - ❖ On May 22, customer experienced what was perceived as an 'outage'
    - ❖ Response time went from sub-second to multi-second to minutes for some transactions
- ❖ Opened a PMR against MQ, IMS, and z/OS
  - ❖ No real problems found in any subsystem
  - ❖ Statistics, accounting and dumps failed to show any real issue in the new LPAR
- ❖ Resolution process included stopping the BMP that was added on May 18
  - ❖ Queue depths began dropping
- ❖ So adding #8 must be the problem!

## Last LPAR added problem – Not so fast

- ❖ Months later they are still ‘smarting’ from the situation
  - ❖ The reason for the added LPAR is the anticipation of new workload at peak periods
  - ❖ Never got to root cause of the issue
  - ❖ It had to be that last LPAR, didn’t it?
    - ❖ ‘Something funny about going from 7 to 8’
    - ❖ ‘An unknown issue or counter problem somewhere’
- ❖ One underlying issue was the depth of the INITQ
  - ❖ How did it suddenly get so high?
- ❖ A few months later I was asked to do an MQ for z/OS Health check, and the subject was brought up again (and again, and again)

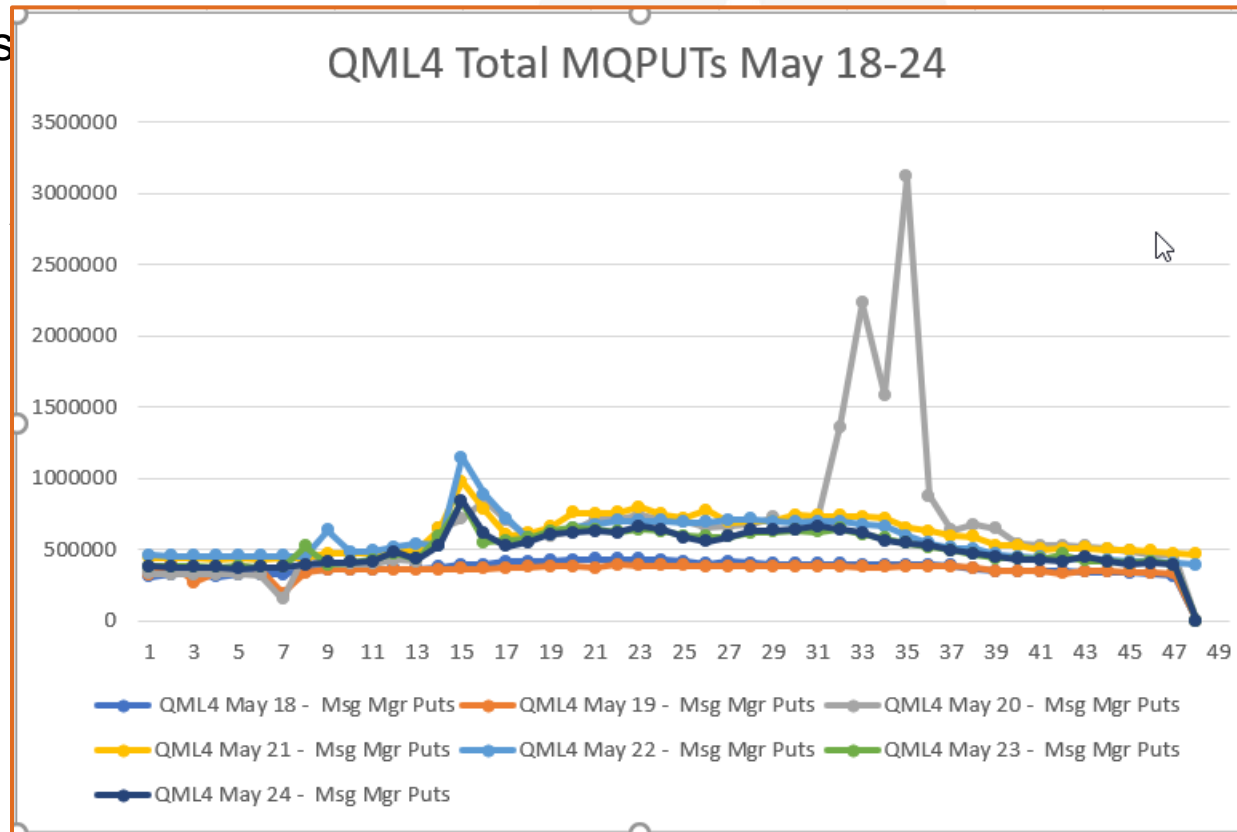
# Last LPAR added problem – What really happened

❖ I as

❖

❖

s still around  
e managers in the



# My Buffer pools, there are no problems with my buffer pools!

- ❖ When above the bar and more buffer pools were introduced, way back in V8, bufferpools problems went away.
  - ❖ I've moved the BPs above the bar and made them huge
  - ❖ Never seeing any SoS or Sync Write Threshold being hit any more
  - ❖ So why am I having slowdowns?

## Buffer pool lies

- ❖ Big bufferpools can cause some issues:
  - ❖ Internal contention, especially when there is a mixture of batch and online work, does not show up in the statistics
  - ❖ Increasing queue depth causes latches when internal pointers have to be extended or moved
  - ❖ Smaller buffer pools may have hidden this because the deferred write threshold was hit more often, causing message offloads
  - ❖ If there is I/O going on, unless the buffer pool is page fixed the internal latching can be longer due to the software page fixing going on

# BP Lies – the Latching problem

BASE_NAME	PAGESET_ID	BUFFERPOOL_ID	PUT_PAGESET_ACCESS_COUNT	LONGEST_LATCH	MAX_LATCH_WAIT_TIME_S	MAX_LATCH_WAIT_TIME_US	MAX_LATCH_WAIT_ID
ELKINSC.QUEUE1	2	1	62	00000048071	5	731717	19
ELKINSC.QUEUE2	2	1	62	00000048069	3	394963	19
ELKINSC.QUEUE3	2	1	62	00000048071	2	769386	19
ELKINSC.QUEUE1	2	1	63	00000048069	2	701325	19
ELKINSC.QUEUE2	2	1	0	00000048069	2	701325	19
ELKINSC.QUEUE3	2	1	0	00000048069	2	701325	19
ELKINSC.QUEUE4	2	3	0	00000048069	1	701842	19
ELKINSC.QUEUE5	2	3	0	00000048069	1	701842	19
ELKINSC.QUEUE4	2	3	0	00000048069	1	701842	19
ELKINSC.QUEUE5	2	3	0	00000048069	1	701842	19

```
SELECT Q.QMgr, Correlation, Base_Name, Pageset_ID, BufferPool_ID, Get_Pageset_Count,
       Get_Messages_Skipped_Count, Get_Messages_Expired_Count,
       Put_Pageset_Access_Count, Put1_Pageset_Access_Count, Correl,
       Longest_Latch, Max_Latch_Wait_Time_s, Max_Latch_Wait_Time_us, Max_Latch_Wait_ID,
       Start_Time_Date, Start_Time_Time
```

```
FROM MQSMF.WQ Q , MQSMF.WTAS WTAS
```

```
WHERE
```

```
(Q.QMgr = 'QML1' AND
 Correlation = Correl AND
 Longest_Latch > '000000000000000000' AND
 (Max_Latch_Wait_Time_us > 25000 OR
  Max_Latch_Wait_Time_s > 0))
```

## Other Lies

- ❖ CSQ4SMFD always presents the truth
  - ❖ Not quite, about six months ago we found a major bug with the presentation of the Log Manager data :
    - ❖ When running a v910 SMF formatter against a v910 queue manager, the fields 'QJSTSLPTU' AND 'QJSTIOSQU' are not included in the SMF dump.
    - ❖ When running a v910 SMF formatter against a v710 queue manager, there are various additional fields that are not being outputted from 'QJSTIOCOUNT' down to 'QJSTIOMAXSUSL'.
  - ❖ New APAR has been added, although the PTF is not yet closed is should be soon.
    - ❖ **PH15885** - <https://www-01.ibm.com/support/docview.wss?uid=swg1PH15885>
- ❖ Also, and older fix on dates from CSQ4SMFD
  - ❖ PI68790: WMQ OUTPUT FROM THE CSQ4SMFD RETURNS VALUES THAT ARE NOT IN THE VALID DATE RANGE



## Other Statistics, accounting, omissions, and lies

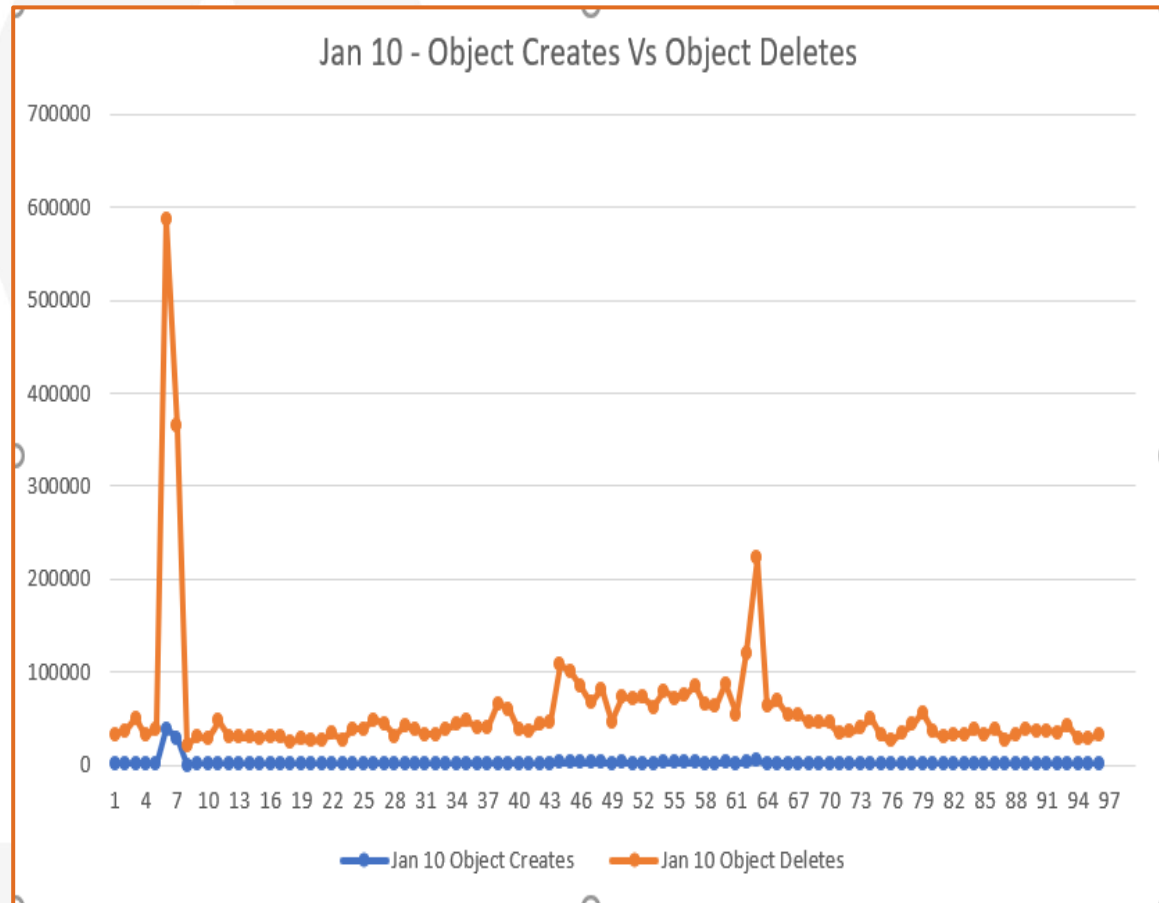
- ❖ Channel Accounting:
  - ❖ Does not include any CPU use
    - ❖ Some of us are particularly interested in the cost of the MQCONN/CONNX and MQDISC
  - ❖ Is not produced like task accounting
    - ❖ There is a request to change the behavior to act like the task accounting records

## Other Statistics, accounting, omissions, and misleading things

- ❖ Data Manager Reporting – Object creates and Deletes:
  - ❖ Object creates are typically low, unless Temporary or Permanent Dynamic queues in heavy use
  - ❖ Recent discovery – 2 to 1 ratio of Object Deletes to Object Creates
    - ❖ This has been observed before, but we now know the cause
    - ❖ When a TD queue is closed it becomes eligible for deletion
      - ❖ If there is an explicit syncpoint done, the queue is deleted as part of that work
      - ❖ If there is no explicit syncpoint, the delete is attempted but does not complete as the transaction still holds and interest in the TD queue
      - ❖ After the transaction fully ends, a scavenger task can delete and clean up the TD queue

# Other Statistics, accounting, omissions, and misleading things

- ❖ Data Manager Reporting – Object creates and Deletes:
  - ❖ Another recent discovery – a MUCH higher ratio of Object Deletes to Object Creates
  - ❖ Queue manager is counting every delete attempt
  - ❖ We suspect that the channels using the TD queues are abending, causing this effect.
  - ❖ Asking customer to open Case on this



## Other Statistics, accounting, omissions, and misleading things

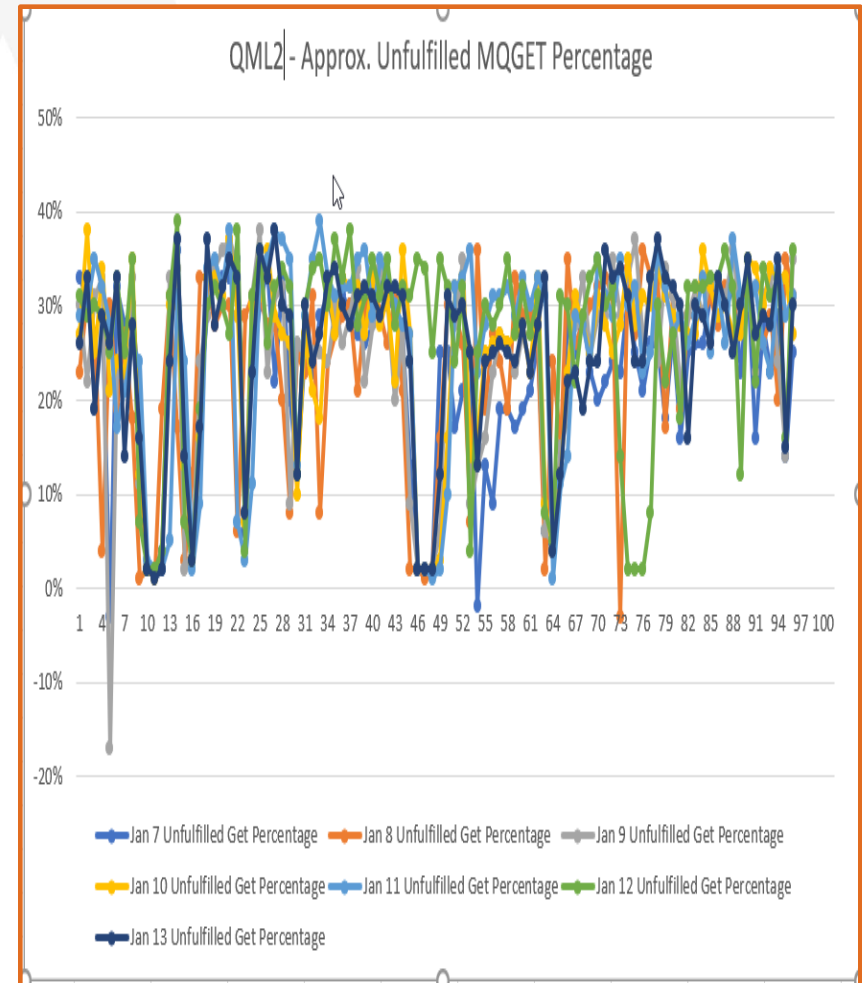
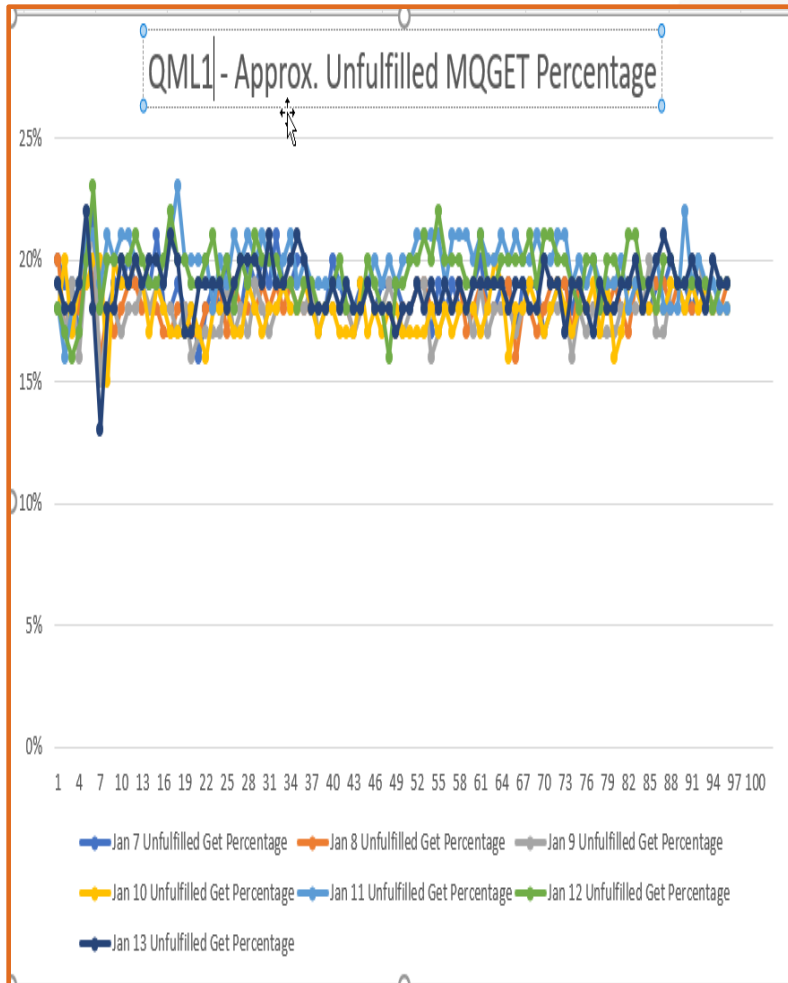
- ❖ Db2 BLOB Use – Not called out in MP1B reporting
  - ❖ Db2 BLOBs may be used for message bodies over 63K that cannot be stored in the CF
  - ❖ BLOB use has been discouraged since MQ V7.1 when Shared Message Data Sets (SMDS) became available
    - ❖ CPU consumption and throughput
  - ❖ While BLOBs continue to be allowed, there is talk that this may be deprecated at some point
  - ❖ When does 'some' become 'too many' ?

Date	Blob Inserts	Blob Deletes
1/7/2020	41178	41683
1/8/2020	38584	39817
1/9/2020	39989	40377
1/10/2020	42446	42999
1/11/2020	36439	36994
1/12/2020	43528	44056
1/13/2020	38072	38284

# Unfulfilled MQGETs

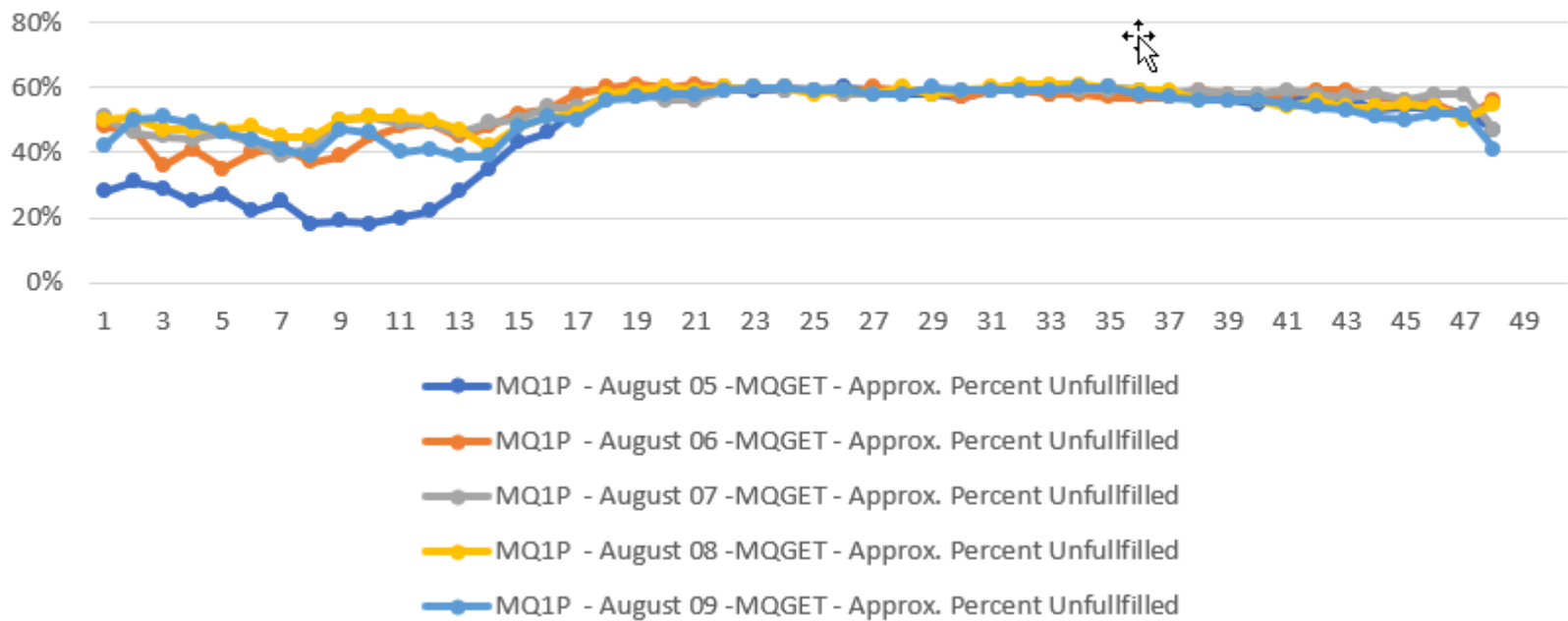
- ❖ Message Manager and Data Manager Data
  - ❖ MQGETs reported in the MM data is the number of MQGET requests that are issued
  - ❖ Message Gets reported in the DM component are the gets passed from the MM to the DM
    - ❖ Example: An MQGET against an EMPTY queue is not passed, an MQGET for a non-empty queue is passed but may not be fulfilled because a selector is not matched
  - ❖ The difference in the gets is an approximate number of 'unfulfilled gets'
    - ❖ It's approximate because there are other factors at play (selectors, etc.)
  - ❖ Can be a good leading indicator that there are too many getting applications (or too few!)

# Unfulfilled MQGETs



# Unfulfilled GETs

## QML3 - MQGETs Approximate Unfulfilled Requests August 05 - 09



## Still my 'favorite' lie – which buffer pool is used

- ❖ The WQ Accounting records are not always accurate in the buffer pool and page set values
  - ❖ Often they will be the default value of 0, if the storage has not yet been accessed or has not needed to be
    - ❖ For example - Put to waiting getter
  - ❖ Recently learned that when heavy use of TD queues is involved the BP and PSID can be 'leftover' values that do not reflect reality in any way, shape or form
- ❖ I have an open case on this problem, as it is impacting figuring out how storage is used in heavy TD environments.



## Summary

- ❖ I learn something new with every set of data I look at!
- ❖ The MQ SMF data is coming under more scrutiny as tools (both IBM and vendor provided) are making more use of the data
  - ❖ This has several benefits, the more we find that is missing or inaccurate the better all the tools become
    - ❖ Even CSQIBALL
  - ❖ This has a downside that people are becoming less familiar with the data
    - ❖ As an MQ or performance admin, you need to know what the data is telling you
- ❖ Finally, everyone is spending a lot of time proving that MQ on z/OS is not a problem

# MQ & ACE Sessions (Room 201B unless stated)

Day	Monday	Tuesday	Wednesday	Thursday	Friday
8:30			27054: Hybrid Integration - App Connect, Connecting Cloud and on-Prem  <b>David Coles</b>	27060: Using MQ in Multiple Cloud Environments - Docker, Kubernetes, OpenShift, AWS, Azure, and more  <b>Mark Taylor</b>	27083: CICS and MQ - New and Vintage  <b>Room 201A Lyn Elkins &amp; Mitch Johnson</b>
9:45	27055: Introduction to IBM MQ - Enterprise Messaging That Makes Your Life Easier [z/OS & Distributed]  <b>Simon Page</b>		27061: Welcome to IBM Event Streams (Apache Kafka)  <b>Subhajit Maitra</b>	27065: z/OS Container Extensions - Running MQ on a Container on z/OS and Integrating with MQ on zOS  <b>Subhajit Maitra</b>	27068: Where's My Message in MQ and in IBM Event Streams (Kafka)?  <b>Neil Johnston</b>
11:00	27064: A technical introduction to IBM App Connect Enterprise [z/OS & Distributed]  <b>David Coles</b>	27056: Making MQ Application Development Easier [z/OS & Distributed]  <b>Mark Taylor</b>	27053: Better MQ z/OS Performance Through Understanding the Internals [z/OS]  <b>Lyn Elkins</b>	26226: Lab: MQ - Hands-on Labs for MQ 9.1 ~or~ z/OS Connect - Hands on Lab Experience  <b>Hands On-Lab: Room 102 Lyn Elkins, Mitch Johnson &amp; Mark Taylor</b>  .... The Lab Continues ....	27069: Scalable, Fault Tolerant Messaging with MQ Shared Queues on z/OS and Uniform Clusters on Distributed [z/OS & Distributed]  <b>Simon Page</b>
12:25 PM					
1:45 PM					
2:15 PM					
	27063: What's New in MQ 9.1 and More [z/OS & Distributed]  <b>Mark Taylor</b>		27057: Making sense of queues and event streams : IBM MQ vs IBM Event Streams (Apache Kafka)  <b>Subhajit Maitra</b>		
3:00 PM	27062: What's New in App Connect Enterprise [z/OS & Distributed]  <b>David Coles</b>	27059: Security: Everything You Wanted to Know about SSL/TLS Principles but Were Unsure Who to Ask [z/OS & Distributed]  <b>Neil Johnston</b>		27067: Monitoring z/OS and Distributed Queue Managers with Open Source Tools  <b>Mark Taylor</b>	
3:30 PM					
4:15 PM	27066: MQ SMF Data: What We Continue to Learn about Statistics and Lies [z/OS]  <b>Lyn Elkins</b>	27070: Implementing RESTful Services Using IBM MQ and z/OS Connect  <b>Mitch Johnson</b>		27058: Securing your Enterprise: Understanding MQ Security through Scenarios and Roles [z/OS & Distributed]  <b>Neil Johnston</b>	

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