


MQPERF1

**MQ Statistics and MP1B –
More Statistics Reports and
New SMF data (V8 & 9)**



An
IBM Washington
Systems Center **Wildfire**
Workshop



MP1B – Other statistics reports

- In this presentation the following reports will be discussed:
 - Data Manager
 - Pageset statistics
 - Channel Initiator
 - Adapter Tasks
 - Dispatcher Tasks
 - SSL Tasks
 - Queue Sharing Group Reports
 - CF and CFCSV
 - SMDS
 - DB2

Data Manager Report

- The data manager name is a bit misleading to me – it includes a lot about the queue manager access the queues, and some on the API
- Internally the data manager will call the buffer manager to access to the messages
- A sample report looks like this:

Data Manager statistics							
MPX1,QML3,2018/11/14,01:13:58,VRM:900,							
Obj Cre	657,	Obj Puts	2,	Obj Dels	1314,	Obj Gets	4190
Locates	38171,	Stgclass	0,	Enum	240		
Msg Gets	16049,	Msg Puts	18122				
Lock MM	1,	Rel MM	1,	Delete MM	0		
Read Ahead:IO	0,	:Buffer	0,	Gets:disk	0,	BP	3611
MPX1,QML3,2018/11/14,01:28:56,VRM:900,							
Obj Cre	443,	Obj Puts	0,	Obj Dels	886,	Obj Gets	3833
Locates	23031,	Stgclass	0,	Enum	233		
Msg Gets	13038,	Msg Puts	14556				
Lock MM	0,	Rel MM	0,	Delete MM	0		
Read Ahead:IO	0,	:Buffer	0,	Gets:disk	0,	BP	3172



Data Manager Report – fields of interest

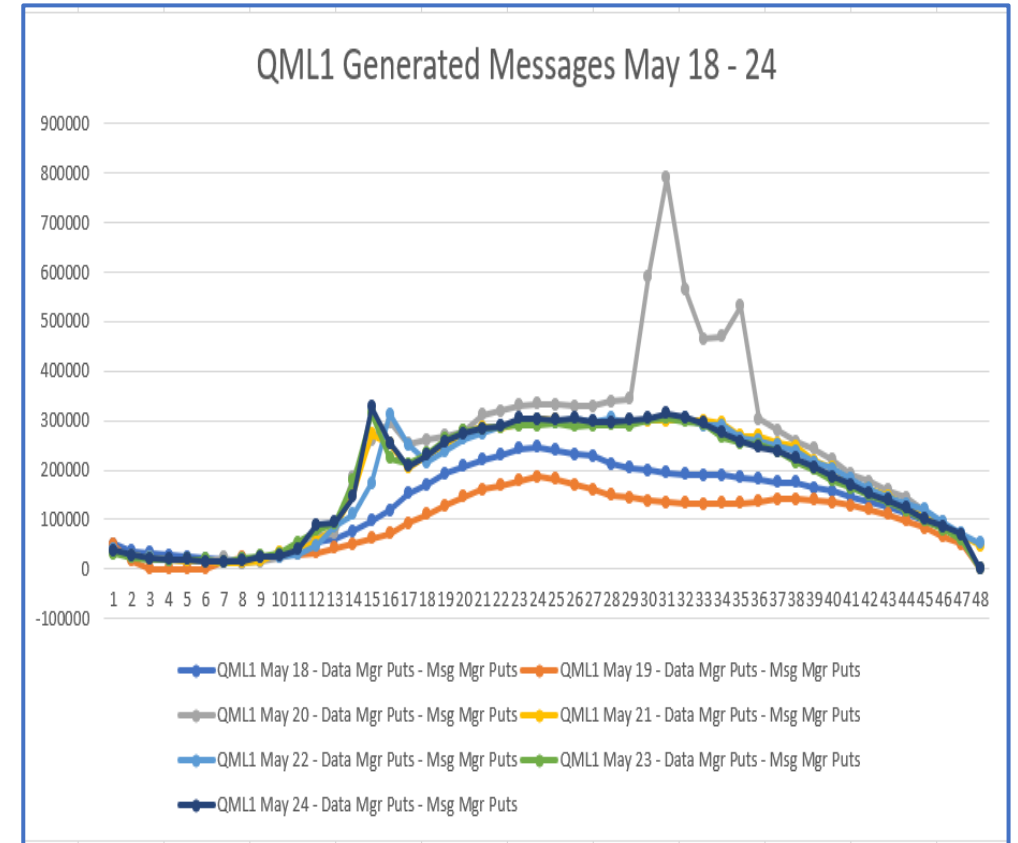
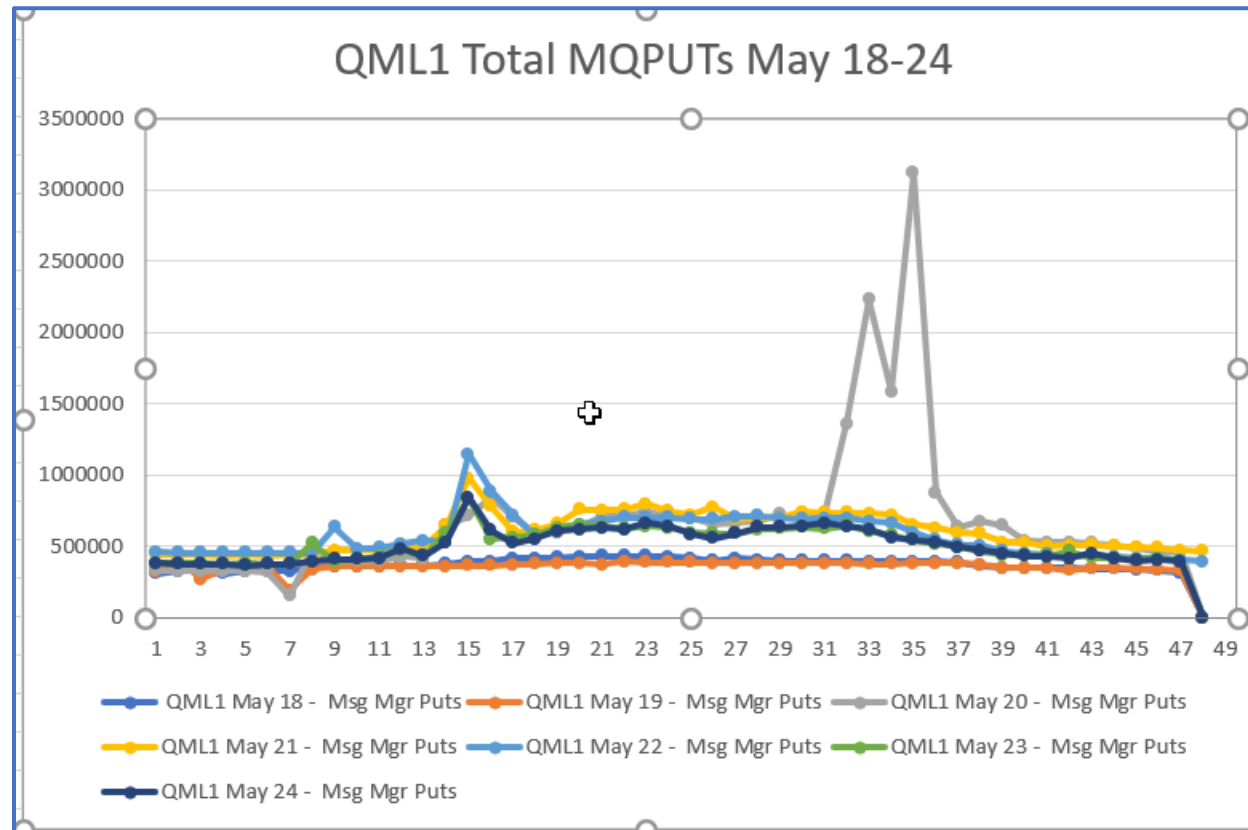
- These reports are from the CSQDQIST macro
 - At this time of composition, the MP1B documentation has an incorrect macro name, CSQDIST
- Obj Cre –objects created during this interval - QISTDCRE field
 - In the sample the numbers seem quite high for a production queue manager
 - This is likely the result of temporary dynamic queues being created, often by monitoring tools.
 - Verify the tasks creating the queue with task accounting records.
 - Reducing this creation activity can result in lowered CPU costs – use permanent queues where possible.
- Obj Puts – objects altered – QISTDPUT field
- Obj Del – objects deleted – QISTDDEL field
 - Again this surprisingly high number is likely due to the use of temporary dynamic queues
 - Note – looking into a possible problem.
- Obj Gets –object definition retrieval for a display or alter – QISTDGET
- Locates – object locates for an MQOPEN, display, or alter – QISTDLOC
- Stgclass – requests to alter a storage class definition – QISTALST
- Enum – requests to find an object - QISTENUM



Data Manager Report – fields of interest - continued

- Msg Gets – The number of MQGET requests – QISTMGET
- Msg Puts – The number of MQPUT+MQPUT1s – QISTMPUT
- Lock MM, Release MM, Delete MM – are counting actions performed against Marked Message when browsing with marking
- Read Ahead I/O – counted when messages are being read from a pageset on sequential processing

MQPUTs and Generated Messages



Pageset Statistics

- Pageset activity is I/O activity, or occasionally the expansion of the pageset.
- Pages written in checkpoint describes I/O activity that is due to log switching or LOGLOAD checkpoints

```
MPX1,QML3,2018/11/14,01:13:58,VRM:900,  
From 2018/11/14,00:59:00.958046 to 2018/11/14,01:13:58.539156, duration 898 seconds.  
PS00 BP 0, Pages 89993, Size 351 MB, free 99.8%, used 0.2%, P 0%, NP 0%, #full 0,  
PS00 No I/O activity  
PS01 BP 1, Pages 332978, Size 1300 MB, free 99.8%, used 0.2%, P 0%, NP 0%, #full 0,  
PS01 No I/O activity  
PS02 BP 2, Pages 805809, Size 3147 MB, free 100.0%, used 0.0%, P 0%, NP 0%, #full 0,  
PS02 No I/O activity  
PS03 BP 3, Pages 1042314, Size 4071 MB, free 100.0%, used 0.0%, P 0%, NP 0%, #full 0,  
PS03 No I/O activity  
PS04 BP 4, Pages 89993, Size 351 MB, free 100.0%, used 0.0%, P 0%, NP 0%, #full 0,  
PS04 No I/O activity  
PS05 BP 5, Pages 89993, Size 351 MB, free 100.0%, used 0.0%, P 0%, NP 0%, #full 0,  
PS05 No I/O activity  
PS06 BP 6, Pages 341977, Size 1335 MB, free 92.3%, used 7.7%, P 7%, NP 0%, #full 0,  
Pages written in checkpoint 0  
Pages written not in checkpoint 4672  
Number of stripes 1  
Put Cursor high 003F6609  
Expansion type:User  
PS06 Type :I/O requests, Pages, Avg I/O time, pages per I/O, MB/Sec, busy%  
PS06 Write: 292, 4672, 1736, 16.0, 36, 0%  
PS06 GET : 1, 1, 468, 1.0, 8.3, 0%  
PS99 BP 99, Pages 53995, Size 210 MB, free 100.0%, used 0.0%, P 0%, NP 0%, #full 0,  
PS99 No I/O activity
```

Channel Initiator Statistics – Adapter Tasks

- The Channel Initiator Adapter tasks make the requests to the queue manager
- The default is 8 tasks and the channel initiator uses the first available task to make requests
- More tasks are needed when the last task in the string is busy
- The shortened example shown, has 5 of the 32 allocated tasks
 - In this case the tasks are probably over allocated as the last task used was task 4 and it was never busy

```
MPX1, QML3, 2018/11/09, 11:11:54, VRM: 900,  
From 2018/11/09, 11:00:47.027983 to 2018/11/09, 11:11:54.017670 duration  
Task, Type, Requests, Busy %, CPU used, CPU %, "avg CPU", "avg ET"  
          ,          ,          ,          , Seconds,          , uSeconds, uSeconds  
0, ADAP, 196468, 3.7, 9.402554, 1.4, 48, 125  
1, ADAP, 5302, 0.1, 0.257137, 0.0, 48, 118  
2, ADAP, 114, 0.0, 0.005127, 0.0, 45, 116  
3, ADAP, 15, 0.0, 0.000624, 0.0, 42, 376  
4, ADAP, 5, 0.0, 0.000245, 0.0, 49, 44  
Summ, ADAP, 201906, 0.1, 9.665891, 0.0, 48, 124
```


Channel Initiator Statistics – Dispatcher Tasks

- The dispatcher tasks communicate with the network to send and receive data
- As channels start they are bound to a particular task, and will remain with that task until the channel is stopped and restarted.
- In the sample show, task three is busier than the others and has more channels assigned.

```
MPX1, QML3, 2018/11/07, 00:13:30, VRM: 900,
From 2018/11/06, 23:58:32.432441 to 2018/11/07, 00:13:30.013562 duration
Task, Type, Requests, Busy %, CPU used, CPU %, "avg CPU", "avg ET"
      ,      ,      ,      , Seconds,      , uSeconds, uSeconds
0, DISP, 8399, 0.0, 0.136885, 0.0, 16, 14
1, DISP, 2272, 0.0, 0.034978, 0.0, 15, 13
2, DISP, 73714, 0.1, 0.930957, 0.1, 13, 11
3, DISP, 106318, 0.2, 1.584851, 0.2, 15, 13
4, DISP, 34828, 0.0, 0.408012, 0.0, 12, 10
5, DISP, 162, 0.0, 0.017988, 0.0, 111, 98
Summ, DISP, 225693, 0.0, 3.113672, 0.0, 14, 12
0, DISP, number of channels on this TCB, 6
1, DISP, number of channels on this TCB, 5
2, DISP, number of channels on this TCB, 6
3, DISP, number of channels on this TCB, 9
4, DISP, number of channels on this TCB, 6
Summ, DISP, number of channels on all TCBs, 33
```

Channel Initiator Statistics – SSL Tasks

- The SSL tasks behave much like the dispatcher tasks
- If crypto coprocessors are used and the elapsed time rises, it can mean that the coprocessors are overloaded.
- Monitor the elapsed time – as that is one area that can be influenced by the addition of resources

```
MPX1,QML3,2018/11/07,00:13:30,VRM:900,  
From 2018/11/06,23:58:32.432441 to 2018/11/07,00:13:30.013562 duration 897.581120 seconds  
Task,Type,Requests,Busy %,      CPU used, CPU %,"avg CPU","avg ET",longest ,date      ,time  
      Seconds,      , uSeconds,uSeconds,uSeconds,  
0,SSL ,      5324,      0.0,      0.099386,      0.0,      19,      19,      214,2018/11/07,00:02:55.037480  
1,SSL ,      447,      0.0,      0.006556,      0.0,      15,      14,      62,2018/11/07,00:07:04.459401  
2,SSL ,     40827,      0.1,      1.050829,      0.1,      26,      26,     2413,2018/11/07,00:02:02.937263  
3,SSL ,     52076,      0.1,      0.636646,      0.1,      12,      12,     1011,2018/11/07,00:05:35.853284  
4,SSL ,      71,      0.0,      0.001193,      0.0,      17,      17,      103,2018/11/07,00:04:53.894447  
Summ,SSL ,     98745,      0.0,      1.794610,      0.0,      18,      18,     2413,2018/11/07,00:02:02.937263
```



CF Statistics

- Typically we (the WSC) use the CF Activity report, rather than this
 - Potential slowdowns
 - Service time averages from different LPARs
 - Requests from all LPARs
- The fields
 - Structure Full – if the structure is full this count is incremented
 - Max Entries and Max Elements – the highest number of entries and elements during the interval
 - As both are 256 bytes, this might be used to calculate how much of the storage area is used by MQ for messages
 - Single Requests – typically an MQ GET or PUT
 - Multiple Requests – typically a commit
 - Average elapsed time for both
 - Retries for both

QMGR Health – CF Activity

STRUCTURE NAME = QSGUSER TYPE = LIST STATUS = ACTIVE									
SYSTEM NAME	# REQ	REQUESTS			TIME (MIC)		REASON	#	DE
	TOTAL AVG/SEC	# REQ	% OF ALL	-SERV AVG	STD_DEV			REQ	% R
MPX1	295K	SYNC	295K	26.9	4.3	1.2	NO SCH	0	0
	492.1	ASync	0	0.0	0.0	0.0	PR WT	0	0
		CHNGD	0	0.0	INCLUDED IN ASync		PR CMP	0	0
		SUPPR	0	0.0			DUMP	0	0
MPX2	802K	SYNC	802K	73.1	17.8	2.5	NO SCH	0	0
	1339	ASync	0	0.0	0.0	0.0	PR WT	0	0
		CHNGD	0	0.0	INCLUDED IN ASync		PR CMP	0	0
		SUPPR	0	0.0			DUMP	0	0

- We (the WSC) tend to use the CF Activity report rather than the MQ Statistics
- In the example shown above it is easy to see that the MPX2 LPAR is getting a much higher service time (almost times!) than the MPX1 LPAR and that MPX2 is making many more requests.
 - While this may not be a problem, this could indicate some workload skewing that is impacting response times, etc.

CF Statistics – Sample Report

```
MPX1,QML3,2018/11/07,00:28:27,VRM:900,  
  CSQ_ADMIN      , Structure-fulls      0  
    Single      2936, avg et in uS      11, Retries      0  
    Multiple      5, avg et in uS      429, Retries      0  
    Max entries      1131, Max elements      1356  
  APPPER      , Structure-fulls      0  
    Multiple      3, avg et in uS      9, Retries      0  
  APPNOP      , Structure-fulls      0  
    Single      4719, avg et in uS      18, Retries      0  
    Multiple      1595, avg et in uS      19, Retries      25  
    Max entries      13638, Max elements      71272  
  CSQSYSAPPL    , Structure-fulls      0  
    Multiple      179, avg et in uS      10, Retries      0
```




SMDS – Shared Message Data Set Statistics

- In the report format there is a huge amount of detail
 - Much of the pertinent data is in the CSV file
- At this point I have not seen many queue managers require tuning for SMDS, but I do expect this to change
 - A recent wave of customers moving client applications on z/OS specifically for availability is 'my' leading indicator
- Heavy use or I/O slowdowns may cause delays, leading to tuning opportunities for the buffers

SMDS – Usage CSV report

- In this report, the messages were put on queue manager QML1 and read from QML3
- Note there was no usage reported from QML3
- The Reads reported are from the deletion of message by QML1 after they had been read and committed from QML3

z/OS	QM	Date	Time	Duration	StrNum	StrName	What	requests	Pages	Pages/Req	IOTime	WaitTime	IORate	IOBusy
MPX1	QML1	2018/12/14	13:28:34	73	2	SMDSMSG	Format	0,0	0.0	0.000000	0.000000	0,0	0,0	
MPX1	QML1	2018/12/14	13:28:34	73	2	SMDSMSG	Write	448	8150	18.2	0.000920	0.000731	77,0	0
MPX1	QML1	2018/12/14	13:28:34	73	2	SMDSMSG	Read	0,0	0.0	0.000000	0.000000	0,0	0,0	
MPX1	QML1	2018/12/14	13:28:34	73	2	SMDSMSG	Other	0,0	0.0	0.000000	0.000000	0,0	0,0	
MPX1	QML1	2018/12/14	13:28:34	73	2	SMDSMSG	Total	448	8150	18.2	0.000920	0.000731	77,0	0
MPX1	QML1	2018/12/14	13:30:36	76	2	SMDSMSG	Format	0,0	0.0	0.000000	0.000000	0,0	0,0	
MPX1	QML1	2018/12/14	13:30:36	76	2	SMDSMSG	Write	0,0	0.0	0.000000	0.000000	0,0	0,0	
MPX1	QML1	2018/12/14	13:30:36	76	2	SMDSMSG	Read	315	5725	18.2	0.000935	0.000695	76,0	0
MPX1	QML1	2018/12/14	13:30:36	76	2	SMDSMSG	Other	0,0	0.0	0.000000	0.000000	0,0	0,0	
MPX1	QML1	2018/12/14	13:30:36	76	2	SMDSMSG	Total	315	5725	18.2	0.000935	0.000695	76,0	0
MPX1	QML1	2018/12/14	13:31:36	61	2	SMDSMSG	Format	0,0	0.0	0.000000	0.000000	0,0	0,0	
MPX1	QML1	2018/12/14	13:31:36	61	2	SMDSMSG	Write	0,0	0.0	0.000000	0.000000	0,0	0,0	
MPX1	QML1	2018/12/14	13:31:36	61	2	SMDSMSG	Read	97	1775	18.3	0.000993	0.000768	72,0	0
MPX1	QML1	2018/12/14	13:31:36	61	2	SMDSMSG	Other	0,0	0.0	0.000000	0.000000	0,0	0,0	
MPX1	QML1	2018/12/14	13:31:36	61	2	SMDSMSG	Total	97	1775	18.3	0.000993	0.000768	72,0	0

Db2 Statistics

- Db2 statistics should be reviewed periodically, but primarily to make sure that Db2 Blobs are not being overused (hopefully not at all!)

```
MPX1,QML3,2018/12/14,17:29:37,VRM:900,
Tasks   : Servers      8, Active      9, Conns      0, Discs      0
          HighMax      1, Abend      0, Requeue      0
          Count Task avg Task max DB2 avg DB2 max(ms) (Task-DB2)Avg Max
List      :      12      0      0      0      0      0      0
SCS Select :      1      0      0      0      0      0      0
Blob Insert:     326      8     251      8     251      0      0
MPX1,QML1,2018/12/14,17:29:49,VRM:900,
Tasks   : Servers      8, Active      9, Conns      0, Discs      0
          HighMax      1, Abend      0, Requeue      0
          Count Task avg Task max DB2 avg DB2 max(ms) (Task-DB2)Avg Max
List      :      12      0      0      0      0      0      0
SCS Select :      1      0      0      0      0      0      0
Blob Select:     326      0     11      0     11      0      0
Blob Delete:     326      1      5      1      5      0      0
```



And there are many more....

- But some are IBM use only
- Others you may have few opportunities to influence queue manager behavior