


**“Wildfire” Workshops**




WildFire Workshop IMQ08  
Administration of Your z/OS Queue Manager (and  
some problem determination too)

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**Wildfire**  
Technical Hands-On Workshops  
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## Agenda

- Overview of administrator tasks
- MQ Administration
  - Customizing Queue managers
    - When do I need to add a new queue manager?
  - Migration
  - Day to day tasks
    - Adding resources & Promoting changes
    - Code reviews
    - Prior Day/Shift Review
    - Problem resolution
  - Keeping the house in order – periodic tasks
  - Capacity Planning



2

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## Administrative Tasks - Outline

- Adding a new Queue manager to an existing environment
- The Daily Grind:
  - Modification
    - Adding or changing objects
  - Monitoring
  - Maintenance
    - Backing-up is NOT hard to do
  - Troubleshooting

3

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## MQ - Adding a new queue manager

- When a new queue manager is requested:
  - Will an existing queue manager be sufficient?
    - Running out of resources?
      - Logging capacity is the biggest driver
    - Isolation needed?
  - If you must have a new one:
    - Subset of the initial implementation tasks are needed
    - Particular care may be needed:
      - If the new QMGR is added to an existing QSG
      - If the new QMGR is added to an existing cluster
      - Make sure the port number is unique for your z/OS environment

**LPAR**

**QMGR1**  
 Running on empty?

**QMGR2**  
 Isolate the evil?


4

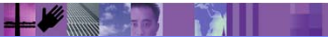
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## MQ - Modifying the Queue manager infrastructure

– Adding a new cluster or QSG?

- New Cluster Considerations:
  - Repository planning
  - 'Cluster Management' QMGRs
  - Cluster channel naming standards
- New QSG Considerations:
  - Resource sizing – admin structure
  - Resource sizing – application structures
  - Offload placement and rules
  - To duplex the structures or not
  - 'Admin' queue manager
  - CFSTRUCT BACKUP
    - > How often
    - > Where issued





6


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## MQ - Modifying Queue managers

– Adding a QMGR to an existing cluster or QSG?

- For a cluster:
  - Which cluster?
  - Cluster Receiver channel
  - Which repository?
- For a QSG:
  - Changing zParms – a queue manager cycle is required
  - Which structures will be used?
  - Will the existing structures need resizing?
  - Any issues with adding connections to the CF?





9

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## MQ - Modifying Queue managers

- **QMGR changes needed in response to environment or volume changes**
  - zPARM changes require an outage
    - Still a few non-dynamic options
    - Adding logs, adding pagesets no longer requires an outage
    - CTHREAD, IDFORE and IDBACK default to 32767
  - Do not turn off SMF Statistics (SMFSTAT=YES)
  - SMF Accounting records can be turned off (SMFACCT=NO)
    - SMF116 data can be prolific, especially when gathering the Class 3 and Class 4 traces


11


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## MQ – Day to Day maintenance tasks

- **Adding/changing Resources**
  - New & Changed queues
    - Global information for local queues:
      - Message Length
      - Maximum Depth
      - Queue High & low depth values
      - Monitoring on?
      - Security Requirements
    - Cluster queue
      - Cluster name
      - Additional hosts for queue
    - Shared queue
      - Structure name
    - Private queue
      - Storage class

12

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## MQ – Day to Day tasks

**Add or Change Queue Sample Form**

Request Type:    Add ☐    Change: ☐

Name: SAMPLE.QUEUE.NAME

Queue Type:    Local Private ☐    Local Shared ☐    Remote ☐    Alias ☐

If Local    Cluster    Y/N ☐

Cluster Name

If Local Private    Storage class

If Local Shared    Persistent Messages required? ☐    Long Messages (>63K) required? ☐

Structure name

If Remote:    Remote QMGR

Remote QNAME

XMITQ Name


If Alias    Base Queue Name

Maximum Message length     Maximum Queue Depth

Queue High Depth %    Queue Low Depth %

Queue Monitoring ☐    Put Enabled ☐    Get Enabled ☐

13

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## MQ – Day to Day tasks

- **Adding/changing Resources New & Changed channels**
  - Global Channel information:
    - Name – limited to 20 characters
    - Transport Type
    - Channel Exits?
    - Monitoring?
    - SSL Information
  - Sender channels:
    - Target queue manager
    - Connection Name
    - Transmission queue
  - Receiver channels
    - Channel Exits in use
    - Message Retry?
    - Put Authority
  - Server Connection channels
  - Cluster Receiver
    - Cluster name
    - Connection information for this queue manager
    - Put Authority
  - Cluster Sender
    - Cluster name
    - Target information

14

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## MQ – Day to Day tasks

**Add or Change Channel Sample Form**

Request Type:    Add \_\_\_\_\_ Change: \_\_\_\_\_

Name:    SAMPLE.CHANNEL.NAME

Channel Type: Sender \_\_\_\_\_ Receiver \_\_\_\_\_ Server Connection \_\_\_\_\_

Cluster Sender \_\_\_\_\_ Cluster Receiver \_\_\_\_\_

Transport Type    TCP \_\_\_\_\_ LU62 \_\_\_\_\_

If Sender    Remote Queue Manager \_\_\_\_\_

Connection Name \_\_\_\_\_

Connection Port \_\_\_\_\_

XMITQ \_\_\_\_\_

If Receiver    Put Authority \_\_\_\_\_

Message Retry \_\_\_\_\_ Retry Count \_\_\_\_\_ Retry Interval \_\_\_\_\_

15

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## MQ – Day to Day Tasks - Promotions

  - No, I am not talking about one for you
  - **Promotions between environments – development to QA to Production**
  - **How closely does the QA environment mimic production?**
    - Differences in maximum queue depths and message sizes
    - Differences in uncommitted messages
    - Differences in capacity
  - **Plan for backing up definitions**
    - Run 'MAKEDEF' tasks before a major application promotion
    - Save the definitions
    - Run 'MAKEDEF' tasks after the application promotion


16

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## MQ – Day to Day tasks

- **Code Reviews – for new and changed applications**
  - MQ Application coding standards
    - Always use 'Fail if Quiescing' options
    - Batch processes must commit periodically
    - Limit use of temporary dynamic queues
      - This is to reduce substantial overhead of queue creation
    - Queue manager name
      - Using Default queue manager
      - Parameter driven
      - Hard coded
      - QSG Name
    - Appropriate use of MQPUT1
    - Appropriate use of QALIAS
    - Message Header fields
      - Message Style – non-persistent or persistent
      - Reply to queue where needed
    - Triggering


17


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## A reminder from Level 2 & 3

- In MQ V8 - new message CSQI004I is issued when a local queue is accessed getting messages by message id or correlation id and the queue does not have an index configured.
  - This is for those of you who have not been looking at your task related accounting SMF data.
- Might want to alert (low level) on this.




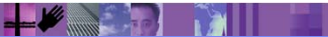



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## MQ – Day to Day tasks

- **Prior Day or Shift Review**
  - **Outage Reports**
    - Any significant queue manager outages reported?
    - Any significant slowdowns where no outage was reported?
    - Channel status
  - **MQ Statistics**
    - Review previous day's MQ SMF115 data for anomalies
      - SupportPac MP1B or monitoring tool
    - Review previous day's statistics messages for anomalies
      - For distributed queue managers including Linux for System z





 20

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## MQ – Day to Day tasks

- **Prior Day or Shift Review**
  - MQ logs
    - Review JES or queue manager error logs for problems
    - Review JES logs for additional information
      - Storage usage - Example
        - > CSQY220I QML1 CSQSCTL Queue manager storage usage:  
local storage: used 32MB, free 1700MB: above bar: used 83MB,  
>10GB
      - RESET QSTATS messages - Example
        - > 14.41.21 STC05215 CSQM201I BWF0 CSQMDRTC RESET QSTATS DETAILS  
QSTATS(ELKINSC.TEST.QSTATS)  
QSGDISP(QMGR)  
RESETINT(1197163)  
HIQDEPTH(5)  
MSGIN(5)  
MSGOUT(0)  
END QSTATS DETAILS
      - CFSTRUCT BACKUP commands



 22




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## MQ – Day to Day tasks


- **MQ IS BROKEN!**
  - Problem Resolution
    - Is it really or is there a link broken somewhere?
    - Are SLAs getting missed?
    - Are serving applications available?
    - Is it all a message depth issue?
- **MQ is losing messages**
  - Are messages not going where intended?
  - Is an application discarding the messages?
  - Have new instances of a cluster queue been defined?
  - Are messages really persistent?


23


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## Problem Determination







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## Problem Determination - Philosophy


- I prefer problem avoidance to problem determination, but sometimes you do what you have to do.
- It is not a skill that can be directly taught or automated – if it were it would have been automated by now.
  - Though there are ‘first places to look.’
- It can require subtle knowledge of the workings of many systems and applications to find the real problem.
  - Although throwing resources (CPU, memory) at a problem is often a temporary measure to get around a problem.



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## How is the problem reported?

- There are times when a certain set of problem determination steps can be set into motion based simply on how it is reported. Some examples are:
  - Automated system alert
    - Queue depth high or full – likely an application or channel serving that queue is down or running slowly.
    - Unusual/unexpected message in the JES log – usually something to be investigated, may not be an immediate issue
    - Presence of messages on dead letter queues, application backout queues, etc.
  - Problem ticket received
    - Always iffier
      - Sometimes an outage, sometimes a performance problem, sometimes ..
      - Requires attention
  - Phone is ringing, lights are flashing, there is the smell of sulfur
    - An Executive has become involved



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## Message Depth issues

- Unfortunately, the single thing many use to determine how healthy the environment is happens to be queue depth
  - And the knee jerk reaction is that there is something wrong with MQ when the depth is high or when applications start getting Queue Full reason codes
    - And maybe we, as administrators, have brought this on ourselves from time to time.
  - So look first to the MQ JES logs for the queue manager and channel initiator address space
    - Has a channel or feeding queue manager that was down for a while just restarted?
  - Second place to look is at the queue

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## Message Depth issues

- Second place to look is at the queue
 


Queue name	Queue type	QSG dispos...	Open input c...	Ope...	Current queue depth	Put messages	Get messages
QCPY.INPUT	Local	Queue man...	0	0	970	Allowed	Allowed
QCPY.OUTPUT	Local	Queue man...	0	0	30	Allowed	Allowed
- In this case the 'Open input count' is zero, meaning the listening application is not connected. This could be any number of things:
  - An application outage – planned or unplanned
  - A triggering failure
  - A CICS/IMS region is down

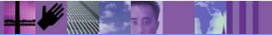
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## Message Depth issues

- Finally there is the dreaded politician message
- Just chews up resources and never does anything
- Queue depth grows but little or nothing is being processed, because the message just gets rolled back






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## Message Depth issues – if all else fails

- Has the message volume been trending up?
  - Eventually if the volume increases there may be performance issues, that can cause unavoidable build up.
    - Looking at your SMF data?
- Has the business added workload?
  - Did a universal pricing change take place, causing an unexpected spike?
- Has the message size changed?
- For private queues, use the DISPLAY USAGE command to see if bufferpools and pagesets may be constrained




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## MQ is losing my messages!

- Why, after all these years, is this still a thing?
  - As an overwhelming rule, MQ does NOT lose persistent messages.
    - There are very few exceptions to this rule.
  - Where might the messages have gone?
    - Messages have been routed somewhere 'unexpected'
    - Messages have been discarded by an application
    - Messages are not really persistent
    - Message PUT did not complete correctly
    - Messages have been put, but not committed





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## MQ is losing my messages – continued!


- Where might the messages have gone? Continued
  - Queue may have been cleared
    - Should have events turned on for this and have a paper trail on clearing of queues.
  - Queue may have been unloaded and not yet restored
    - In dealing with a problem, the contents might have been moved to a temporary location or downloaded to a dataset
  - Messages may have expired
  - A new one that we, unfortunately, expect to see
    - CAPEXPY is set too low




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## MQ is losing my publications/subscriptions


- Introduced universally in V7 pub/sub is now growing in production environments
  - We are starting to hear rumblings of publications going 'astray' or subscriptions not receiving publications as expected
  - So far, most of the issues have been with topic strings not quite matching
    - Corporate/HR is not the same as Corporate/hr
  - With the implementation of security we have also heard that some subscribing applications suddenly become unable to both put to and get from the target queue



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## MQ – Periodic Tasks

- **Keeping the house in order**
- Queue placement
  - Quarterly 'audit'
  - Can improve performance
- Run 'MAKEDEF' tasks
  - Even if done before and after each application promotion
- Pageset use and location
  - If not often used, location can get overlooked until it's an emergency
- Clusters
  - Run traceroute tests periodically
  - Make sure routing looks as expected based on MQ topology
- Logs
  - Keep 24 hours available on DASD
  - Review placement




40

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## MQ – Periodic Tasks

- Coupling Facility
  - Review RMF data for MQ structures
  - Structures altered in size may need redefining
  - New structures needed?
- Maintenance
  - Weekly search of APARS and PTFs
  - Regularly scheduled maintenance
    - Normally 2-4 times a year
- New release planning
  - Know when versions are going out of service and plan for upgrades
  - New features and functions may impact administration
- Failover planning and testing
  - Restart in place
  - Restart on another LPAR
- Disaster Recovery Tests
  - DASD mirroring
  - Restarting the QSG




41

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## Reference Material

- Manuals & Info Centers:
  - <http://www-01.ibm.com/support/knowledgecenter>
- SupportPacs:
  - <http://www-01.ibm.com/support/docview.wss?rs=977&uid=swg27007205>
- Developer Works:
  - <http://www.ibm.com/developerworks/>




42

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# Q&A

- Thank you for your attention!



43