
IBM Software Group
Ask the Experts
MQ Clustering Gotchas! Avoiding Cluster Administration Errors
19 November 2013
WebSphere® Support Technical Exchange
ON DEMAND BUSINESS

Agenda

- Introduce the panel of experts
- Avoiding WebSphere MQ Clustering administration errors.
- Answer questions submitted by email (5 questions)
- Open telephone lines for questions
- Summarize highlights

Panel of Experts

Panelist	Role at IBM
Andy Emmett	WebSphere MQ Distributed L3 Support
Yana Johnson	WebSphere MQ Distributed L2 Support
Valerie Lampkin	WebSphere MQ Distributed L2 Support
William (Bill) Moss	WebSphere MQ Distributed L2 Support
Miguel Rodriguez	WebSphere MQ Distributed L2 Support

Introduction

- Present the most common MQ Clustering administration errors MQ Support has encountered assisting customers with clustering problems.
- Unintended consequences of the administration error.
- Resolving administration mistake.
- Provide a high level view of MQ Clustering functionality as it relates to each topic discussed.
- Provide additional MQ Clustering information for awareness.

Question 1

- Improperly removing a cluster queue manager from the cluster.

Answer to Question 1

Improperly removing a queue manager from a cluster.

- Activities
  - Deleting cluster channels without taking them out of a cluster first
  - Redefining the same queue manager in a cluster without taking the original queue manager out of a cluster first
  - Stopping and deleting a queue manager without taking it out of a cluster

- Possible problems and errors
  - More then one entry for the same queue manager in a cluster cache
  - 2189 0x0000088d MQRC_CLUSTER_RESOLUTION_ERROR
  - 2085 0x00000825 MQRC_UNKNOWN_OBJECT_NAME
  - AMQ9456, AMQ9469 - Messages received in the queue manager error logs that updates were not received for cluster objects.

Answer to Question 1 (cont.)

Improperly removing a queue manager from a cluster (cont.)

- Removing a queue manager from a cluster correctly!
  - ALTER CHANNEL(TO.TEST1) CHLTYPE(CLUSRCVR) CLUSTER(' ')
  - ALTER CHANNEL(TO.TEST2) CHLTYPE(CLUSSDR) CLUSTER(' ')
  - STOP CHANNEL(TO.TEST1)
  - STOP CHANNEL(TO.TEST2)
  - DELETE CHANNEL(TO.TEST1)
  - DELETE CHANNEL(TO.TEST2)

Note: Cluster retains knowledge about a removed queue manager in the cluster cache for 90 days in case there is a need for a removed queue manager to rejoin a cluster.

Answer to Question 1 (cont.)

Improperly removing a queue manager from a cluster (cont.)

- Removing a full repository queue manager from a cluster
  - Demote a full repository queue manager to a partial repository
    - ALTER QMGR (TEST) REPOS(‘ ‘)
  - Remove manually defined cluster sender and cluster receiver channels from a cluster
  - Stop and delete cluster sender and cluster receiver channels

Question 2

- Improper use of Refresh Cluster and Reset Cluster administration commands

Answer to Question 2

Improper use of REFRESH CLUSTER and RESET CLUSTER commands.

- REFRESH CLUSTER
  - NOT a fix all command to use
  - Should be used under guidance from WMQ L2/L3 support
  - Usually used when
    - Rejoining a queue manage back into a cluster
    - Cleanup of the current cluster cache on a partial repository and acquiring the latest cluster information from a full repository

Answer to Question 2 (cont.)

Improper use of REFRESH CLUSTER and RESET CLUSTER commands.

- REFRESH CLUSTER commands
  - REFRESH CLUSTER(CLUSTER1) REPOS(NO) – default
    - Knowledge of all locally defined cluster queue manager and cluster queues and all full repositories cluster queue managers is retained
    - Full repository for the cluster retains knowledge of the other cluster queue managers
  - REFRESH CLUSTER(CLUSTER1) REPOS(YES)
    - Objects representing full repository cluster queue managers are also refreshed
    - NOT valid on a full repository queue manager
  - REFRESH CLUSTER(*)
    - Refreshes the queue manager in all the clusters it is a member of

Answer to Question 2 (cont.)

Improper use of REFRESH CLUSTER and RESET CLUSTER commands (cont.)

- RESET CLUSTER
  - Can be issued only on a full repository queue manager
  - Usually used in exceptional circumstances when information about a cluster queue manager has to be removed
  - Only way to remove auto-defined cluster sender channels
  - RESET CLUSTER(CLUSTER1) QMNAME(TEST) ACTION(FORCEREMOVE) QUEUES(YES)
  - RESET CLUSTER(CLUSTER1) QMID('TEST_2013-07-30_13.49.41') ACTION(FORCEREMOVE) QUEUES(YES)

Question 3

- Ignoring cluster related messages in the queue manager error logs.

Answer to Question 3

Ignoring cluster related messages in the Queue Manager Error Logs.

The queue manager error logs reports error and warning messages that if unheeded can result in a negative impact to the MQ Cluster.

- AMQ9409 Repository manager ended abnormally.
  - Without the cluster repository manager process, amqrrmfa, running, the local queue manager will not get cluster updates from the full repository nor will be able to publish new or changes to cluster objects.
  - The applications connecting to the queue manager will be able to continue to operate normally for 90 days. After the 90 days, the local repository's cluster object entries will expire at which point processing of messages will be disrupted due to cluster resolution errors.

Answer to Question 3 (cont.)

Ignoring cluster related messages in the Queue Manager Error Logs (cont.)

- AMQ9420 No repositories for cluster “ABC”
- AMQ9418 Only one repository for cluster “ABC”

  - These error messages may be reported when modifications are being performed to the cluster full repositories by the MQ administrator. However, these messages must be investigated if the full repository was not being administered.
  - MQ clusters were designed to have 2 full repository managers and as such ensuring that one full repository will always be available.
  - If two full repositories are defined, verify the manually defined cluster sender of the queue manager in question is pointing to a full repository and that this channel can connect to the full repository successfully.

Answer to Question 3 (cont.)

Ignoring cluster related messages in the Queue Manager Error Logs (cont.)

- AMQ9407 Cluster queue “ABC” is defined inconsistently
  - Define cluster queue attributes consistently across the MQ Cluster, especially when one's application opens the queue with the option of MQOO_BIND_AS_Q_DEF. Mixing the BIND attribute across cluster queues can result in unexpected and unintended behaviors.
  - Sometimes AMQ9407 errors can be the result of cluster object changes that were delayed. If the queues are consistent verify the manually defined cluster channels to and from the full repository can run successfully.

Question 4

Improperly using the MQ clustering feature for High Availability or Disaster Recovery purposes

- Clustering offers increased availability and workload balancing
  - Not to be confused with High Availability/DR. You may instead wish to consider multi-instance queue managers for High Availability.
  - Clusters allow scalability because you can define several instances of the same queue on more than one queue manager, thereby distributing the workload. Please be aware workload distribution may not always be exactly even. There is an internal clustering algorithm that considers many factors when it decides where to route messages.
  - If a message batch is sent to a particular queue manager in the cluster and that queue manager becomes unavailable, the message is backed out and workload management routine attempts to selects an alternative. However, messages that are in doubt or have no suitable alternative will wait until the original queue manager becomes available (resulting in a stranded message which is not ideal for high availability or disaster recovery).

Answer to Question 4

Improperly using the MQ clustering feature for High Availability or Disaster Recovery purposes (cont).

- Clustering offers increased availability and workload balancing
  - Cluster repositories keep a cache of up-to-date information about the cluster. It is not advisable to introduce a “DR” queue manager into the cluster as the repositories may then consider this to be a viable candidate for sending messages.

Stranded messages rarely happen but we do provide a Technote with steps for removing messages left behind after removing a queue manager from a WebSphere MQ cluster

http://www-01.ibm.com/support/docview.wss?uid=swg21220277

Answer to Question 4 (cont.)

Improperly using the MQ clustering feature for High Availability or Disaster Recovery purposes.

- Message affinities: If applications require a response/reply to the same queue manager or that messages be handled in a particular order then your application may have message affinities that are not suitable for normal clustering configurations.

- Ways to handle message affinities:
  - Name a specific destination on the MQOPEN call
  - Return the queue-manager name in the reply-to queue manager field
  - Use the MQOO_BIND_ON_OPEN option on the MQOPEN call
  - Use the cluster workload exit

NOTE: The use of segmented messages can cause an affinity problem

Question 5

- Improperly configuring MQ Cluster channels and repositories.

Answer to Question 5

Improperly Configuring MQ Cluster Channels

- Administration Error:
  Configuring a manually defined cluster sender to a partial repository.

> Queue manager will be out of synchronization with the cluster information.

- Unintended Consequences:

> Queue manager will be out of synchronization with the cluster information.
> Queue manager could be removed from the cluster by the full repository.

- Resolution:

> Delete the manually defined cluster sender to the partial repository.
> Create a new channel to a full repository queue manager.
> Issue a REFRESH CLUSTER(ClusterName) REPOS(YES) to repopulate the MQ Cluster information.

Answer to Question 5 (cont.)

Improperly Configuring MQ Cluster Repositories

- Administration Error:
  - > Defining more than two full repositories for a given cluster.
- Unintended Consequences:
  - > Full repositories' cluster information will be out of synchronization with each other.
  - > Increased messaging traffic may negatively impact system resources and impede performance.
  - > Not necessary and does not provide any benefit.
- Resolution:
  - > Choose two queue managers to contain the full repository for the cluster.
  - > Demote all other queue managers to a partial repository.

HIPER APAR IV25030

- **IV25030: WEBSPHERE MQ CLUSTER FAILS, POSSIBLY GENERATING FDC FILES WITH PROBE IDS RM296000 OR OTHER rrcE_REPOSITORY_ERROR**

- All users of WebSphere MQ Clusters are potentially affected by this error. Platforms include: Windows, AIX, HP-UX (PA-RISC), HP-UX (Itanium), Solaris (SPARC), Solaris (x86-64), iSeries, Linux (x86), Linux (x86-64), Linux (zSeries), Linux (Power)

- http://www-01.ibm.com/support/docview.wss?uid=swg1IV25030

HIPER APAR IV25030 (cont.)

High Impact, pervasive issue. We strongly recommend you apply the fix to all QMGRS in your cluster. Fix is available in the following Fix Packs:

7.0.1.10

7.1.0.3

7.5.0.1

Symptoms: WMQ cluster stops working. FDCs may include but are not limited to rrcE_REPOSITORY_ERROR and Probe ID RM296000. The repository manager process amqrrmfa ends abruptly. Other symptom will include a corrupted cluster name of WMQ cluster objects, for example: CLUSTER(
ￗ￢￱@@@@@@@@@@@@@@@@@@
@@@@@@@@@@@@@@@@@@@@@@@).

HIPER APAR IV25030 (cont.)

Once the fix is applied, you should clean any corrupt cluster cache with the refresh command. This may require that full repositories be demoted to issue the refresh command on those QMGRS.
Cluster QMGRs on zOS may exhibit similar corrupted cluster output, but that is a different issue and is address by APAR **PM84108**

http://www-01.ibm.com/support/docview.wss?uid=swg1PM84108

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Summary

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