



IBM Software Group

WebSphere MQ Shared Queueing in a Coupling Facility Environment

WebSphere MQ Level 2 Team (Research Triangle Park Labs):

Beverly Brown (craigbev@us.ibm.com)

Beverly Kingsley (bkingsly@us.ibm.com)

Rick Armstrong (rickied@us.ibm.com)

Blanche Ishida (ishidabl@us.ibm.com)

Greg Woods (gwoods@us.ibm.com)

Mark Womack (womack@us.ibm.com)

Vincente Suarez (Vicente_Suarez@uk.ibm.com)

August 22, 2013



WebSphere® Support Technical Exchange



Agenda

- Introduction
- General Overview Shared Queueing
- Recently Reported Issues / FAQs
- Typical Diagnostics
- Summary

Introduction

- Topic (Shared Queues)
- Brief History of Shared Queues
- Evolution of Shared Queues
- Recent improvements
 - ▶ Performance
 - ▶ Availability

CSQ5PQSG – ADD and REMOVE

- Add a QSG to the DB2 tables.
Sample CSQ45AQS → CSQ5PQSG ADD QSG
- Add a queue manager to a QSG.
Sample CSQ45AQM → CSQ5PQSG ADD QMGR
- Remove a queue manager from a QSG.
Sample CSQ45RQM → CSQ5PQSG REMOVE QMGR (after taking other steps)
- Remove a QSG from the DB2 tables.
Sample CSQ45RQS → CSQ5PQSG REMOVE QSG

Disaster Recovery – need to ADD QMGR

- Errors:
 - ▶ CSQ5010E CSQ5CONN XCF IXCQUERY member error, RC=00000008 reason=00000004
 - ▶ CSQV086E QUEUE MANAGER ABNORMAL TERMINATION REASON=00F50017
- At the disaster recovery site, run the ADD QMGR command of the CSQ5PQSG utility for every queue manager in the queue-sharing group.
- See technote [1452734](#)

CSQ5PQSG – MIGRATE, FORCE, VERIFY

- CSQ5PQSG **syntax**
- MIGRATE DSG or QSG
 - ▶ Validates coexistence maintenance
 - ▶ Does not actually do migration
 - ▶ Need **PM58871** for WebSphere MQ V710
- FORCE QMGR
- VERIFY QSG
 - ▶ Validates consistency of DB2 information

APARs

- Techdoc [7006625](#) has links to fix lists for each release
- There is a column to draw attention to High Impact or Pervasive (HIPER) fixes
- A .csv file has information about which fixes are included on each RSU level

What are CSQ45BPL, CSQ45GEX, CSQ45BPK?

- CSQ45BPL – Bind DB2 plans for WebSphere MQ
- CSQ45GEX – Grant authority to the plans

These are run at installation after MQ maintenance prior to PM60589/PM65422

- CSQ45BPK – Bind DB2 packages
 - ▶ Added by PM60589 (V710) and PM65422 (V701)
 - ▶ See technote [1643097](#)

How do I migrate my QSG?

- Review technote [1299323](#).
- Apply **coexistence fixes**
 - ▶ Run the updated CSQ45xxx jobs (preferably at a lightly loaded time to avoid DB2 locks)
 - ▶ Restart each queue manager at the old release before migrating any of them.
- Do not need an outage of the entire QSG
- Can have a QSG consisting of queue managers at multiple releases

Shared queues in a cluster

- Users in the network see the shared queue as being hosted by each queue manager within the QSG
- The usual cluster workload algorithm is used
- If the MQPUT is done on a member of the QSG, the queue attribute CLWLUSEQ(LOCAL) will force the message directly to the shared queue

Why does DISPLAY SMDSCONN return with CSQMQ297I ?

- **DISPLAY SMDSCONN** only works for connected structures.
- CSQM297I CSQ1 CSQMDRTC NO SMDSCONN FOUND MATCHING REQUEST CRITERIA

What are some guidelines for SharedQ's ?

- Serializing your applications
- Applications that are not suitable for use with shared queues
- Deciding whether to share non-application queues
- Migrating your existing applications to use shared queues
- Influencing workload distribution with shared queues
- Shared queue recovery
- Shared queues and queue depth events (WebSphere® MQ for z/OS®)
- Planning your coupling facility and offload storage environment

Why does the queue manager Abend with 5C600C511CE ?

- The ADMIN structure is full
- Application putting thousands of messages before committing
- Syslog message IXC585E STRUCTURE qsgnameCSQ_ADMIN IN COUPLING FACILITY YYY IS AT OR ABOVE STRUCTURE FULL MONITORING THRESHOLD OF
- Increase the size of structure qsgnameCSQ_ADMIN

Why does the MSTR fail with Abend S5C6 00C511C8 ?

- The ABEND5C6-00C511C8 occurred because WebSphere MQ lost the connection to the Coupling Facility.
- DOC APAR [PK34486](#) – Clarify how WebSphere MQ for z/OS handles coupling facility structure failures and connection failures.

Why is MQRC 2192 MQRC STORAGE MEDIUM FULL returned when writing to a shared queue ?

- Technote 1144275
- PQ75276/UQ78066
- APAR OW37576
- PM77094
- Search the WebSphere MQ support page for other possible 2192 fixes

Why is CSQJ104E CSQ1 CSQJR206 RECEIVED ERROR STATUS 00000008 issued?

- CSQJ104E CSQ1 CSQJR206 RECEIVED ERROR STATUS 00000008 FROM LOCATE FOR DSNNAME=CSQ1.ARCLOG1...
- The archive log was deleted
- CSQE041E CSQECFBI Structure XXXX backup is more than a day old

Why do I receive an MQRC 2048 when putting a persistent message to a shared queue?

- Ensure that you have Coupling Facility structures defined with RECOVER(YES)
 - ▶ Reference [Information Center](#).

How often should I backup CF Structures?

- IBM recommends that you backup your CF structures every hour to minimize the time it takes to restore a CF structure.
 - ▶ Reference [Information Center](#).

How do I recover CSQSYSAPPL when it is in a failed state?

- Ex: CSQE035E CSQECONN Structure
CSQSYSAPPL in failed state, recovery needed.
- Issue **RECOVER CFSTRUCT(CSQSYSAPPL)
TYPE(NORMAL)**
- Issue **RECOVER CFSTRUCT(CSQSYSAPPL)
TYPE(PURGE)**
 - ▶ The TYPE(PURGE) parameter is restricted. It requires IBM L2 involvement.
 - ▶ It is used when no backups are available

Why won't my application structure reconnect?

- Ex: You see CSQE005I and CSQE006I for application structures and the CSQE006I indicates that the structure is disconnected.
- This can be expected as a result of a **BACKUP CFSTRUCT** command if there are no applications connecting to the queue manager that uses the queues on the structure in question.
- Reference: Technote [1431563](#)

Why do I receive CSQ5005E, REASON=00F50029?

- There is one or more queue managers in the queue sharing group that has not been started with the toleration PTF(s)
- Reference Technote [1608631](#)

Why are my getting applications not balanced equally across queue managers in the QSG?

- QSGs are not intended for load balancing.
- Putting queue managers have precedence over other queue managers in the QSG when a "list transition notification" is sent from the CF. If it can, it will process the MQGET from a waiting application before the other queue managers are notified of the "list transition notification"
- Reference [Information Center](#).

Why does my queue manager get an ABEND5C6-00C5101A when it starts?

- Multiple queue managers in the QSG are assigned queue-manager ID n.
- This can be caused by a residual queue manager still being in the queue sharing group (QSG) perhaps from a previous configuration.



Why does my queue manager get an ABEND5C6-00C5101A when it starts? Continued...

- Use CSQ5PQSG REMOVE/FORCE QMGR to remove the residual queue manager and then, CSQ5PQSG ADD QMGR to add it back in.
- Use **DISPLAY GROUP** to show the queue manager ID.

CSQ5102I +RTP2 Queue managers in group RLG1 327

Name	Num	Prefix	Status	Ver	DB2	Connection
RTP1	1	+RTP1	FAILED	701	DH3C	INACTIVE
RTP2	2	+RTP2	ACTIVE	701	DH3C	ACTIVE
RTP3	3	+RTP3	FAILED	701	DH3C	INACTIVE

Why can't my CFLEVEL be altered to 5 ?

- OPMODE must be NEWFUNC not COMPAT
 - ▶ All queue managers in the QSG should be V710 or greater

 - ▶ CSQY334E indicates problem

 - ▶ Associated with migration from V701 to V710
 - Example OPMODE(NEWFUNC,710)

Why did the CHINabend 5C6-00E2000B ?

- 00E2000B – local storage shortage
 - ▶ Build-up of DXWB (DB2 XCF Work Blocks, 4K long)
 - used to queue the requests from XCF to MQ
 - ▶ Problem in the sysplex
 - ▶ Application opening and closing queues
 - MQOO_INPUT_AS_Q_DEF or
 - Keep the queue open for longer



What's the minimum size for application structure ?

- Use **CFSizer** to determine the correct size
- The space has to accommodate both user and system data
 - ▶ WebSphere MQ and CF control data
- Each time the CF level is upgraded, the CFSizer should be used
- CF decides what the size of the structure is going to be
 - ▶ Structure element/ratio recalculation when ALLOWAUTOALT(YES) along with structure resizing is managed by the CF not by WebSphere MQ .

The documentation required for shared queues

- Collect troubleshooting data for shared queues
 - ▶ Technote # [1177414](#)

Can Shared Message Data Sets(SMDS) be used in place of DB2, but using the same QSG name?

- SMDS is not a total replacement for DB2 since WebSphere MQ still uses internal DB2 tables for managing shared objects in a QSG.
- An SMDS data set(VSAM) is an alternative to DB2 for offloading large or small messages from the application structure.
- Switching from DB2 to SMDS can occur while retrieving existing messages.

Can SMDS be used in place of DB2, but using the same QSG name ? Continued...

- The queue sharing group needs to be built at the V710 level. OPMODE(NEWFUNC)
- **DEFINE CFSTRUCT** with the OFFLOAD(SMDS|DB2) attribute and offload rules enable message offloading to SMDS or DB2.
- Performance improvements using SMDS for storing and accessing large messages(>63K).
- CF structures need to be at CFLEVEL(5).

How to resolve the message CSQE137E DB2 and CF is out of sync?

- Use CSQUZAP with ARRAYDB2 to ascertain bit setting for LH number. If bit is ON.
 - ▶ Use CSQUZAP with DELDB2 to remove the queue from MQ DB2 Table
 - ▶ Use CSQUZAP with ZAPSTR to remove the CF entry.
 - ▶ CSQUZAP is an undocumented program. Use only when IBM Support instructs.

Explain why the **DISPLAY GROUP** command may cause CPU utilization to increase?

- **DISPLAY GROUP** command initiates cleanup for large messages.
- 10 minutes elapse without a cleanup of large messages; signals cleanup initiation.



Attempts to offload small messages to SMDS fail, why?

Messages need to be at least 140 bytes in length before the 3rd offload rule can offload messages to SMDS.



Why does MQ restart with 00C51176 ?

- Due to unexpected return code from XES (Sysplex Services)
 - ▶ CF should be checked
 - ▶ PM92897 / IXLEERSP Unexpected Error
 - ▶ PM92899 / IXLFORCE Unexpected Error
 - ▶ PM92901 / IXLUSYNC Unexpected Error

Why can't I back up my structure ?

- CSQE106E Unable to back up structure
 - ▶ START SMDSCONN / DISPLAY SMDSCONN
 - OPENMODE – How queue manager opens
 - STATUS – Connection status
 - AVAIL – Data set availability
 - EXPANDST – Data set expansion status

 - ▶ DISPLAY CFSTATUS TYPE(SMDS)
 - [PM82597](#) DOCUMENTS REASONS

Why does ALTER fail with 00D44004 ?

- ▶ ALTER QL(SHARED.Q) CFSTRUCT(A)
QSGDISP(SHARED)
 - CFSTRUCT/QSGDISP disallowed
 - Delete and redefine queue

What does MQ do in a QSG failure ?

- ▶ Queue manager behavior if failure in QSG ?
 - What failed ? Code levels ?
 - DB2 abnormally terminates
 - Queue manager abends with 00C510AB
 - CFCONLOS
 - Number of Queue Manager, LPARS, paths
 - RESET CFSTRUCT ACTION(FAIL)
 - INJERROR

What about CF and structure failures ?

- ▶ What about CF and structure failures ?
 - Either structures fail or connectivity is lost
 - VARY PATH OFFLINE
 - CONFIG CHPID OFFLINE
 - System Managed Duplexing
 - Frequent and regular backups
 - ADMIN Structure
 - Failure Scenarios ?

Summary

- QSGs within a CF provide high availability
- Ensure CFLEVEL is properly set
- SMDS offload outperforms DB2 offload
- DR procedures for QSG require thorough planning
- Take care to properly bind DB2 plans
- Use CFSizer to properly size your structures
- Perform backups in the QSG regularly and often
- Keep maintenance for QMGRs in the QSG current
- Review how offload rules work as documented

Abbreviations (not previously defined)

- CF Coupling Facility
- DSG Data Sharing Group
- LH List Header
- PTF Program Temporary Fix
- QSG Queue Sharing Group
- RSU Recommended Service Upgrade

Additional WebSphere Product Resources

- Learn about upcoming WebSphere Support Technical Exchange webcasts, and access previously recorded presentations at:
http://www.ibm.com/software/websphere/support/supp_tech.html
- Discover the latest trends in WebSphere Technology and implementation, participate in technically-focused briefings, webcasts and podcasts at:
<http://www.ibm.com/developerworks/websphere/community/>
- Join the Global WebSphere Community:
<http://www.websphereusergroup.org>
- Access key product show-me demos and tutorials by visiting IBM® Education Assistant:
<http://www.ibm.com/software/info/education/assistant>
- View a webcast replay with step-by-step instructions for using the Service Request (SR) tool for submitting problems electronically:
<http://www.ibm.com/software/websphere/support/d2w.html>
- Sign up to receive weekly technical My Notifications emails:
<http://www.ibm.com/software/support/einfo.html>

Connect with us!

1. Get notified on upcoming webcasts

Send an e-mail to wsehelp@us.ibm.com with subject line “wste subscribe” to get a list of mailing lists and to subscribe

2. Tell us what you want to learn

Send us suggestions for future topics or improvements about our webcasts to wsehelp@us.ibm.com

3. Be connected!

Connect with us on [Facebook](#)

Connect with us on [Twitter](#)

Questions and Answers