

Building a queue-sharing group from scratch

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Wildfire Workshop

Washington Systems Center Technical Hands-On Workshops



Planning your QSG

- What queue managers are going to be in the QSG?
 - Are they already in place, or will new ones be required?
 - If the initial application has been identified, where will it be running when using Shared Queues?
 - Will there be new instances, or will the application continue to run in one place (but now could be any LPAR)?
 - How much is known about the application behavior with MQ and overall today?
 - Is there a Db2 Data Sharing Group in place?
 - If there is more than one DSG, is the one MQ will use in the same LPARs?
 - Coupling facilities
 - At this point no capacity planning has been know, but knowing which CFs are available and have storage is important
 - It's not just a matter of how much storage each CF has, but 'how much can MQ use?'



Planning storage use

- For a 'basic' queue sharing group there are a minimum of 3 Coupling Facility List Structures:
 - CSQ_Admin
 - Holds information about the Queues and messages within a UoR
 - Sizing is based on the number of queue managers in the QSG and the version of the CF you are using
 - Use the CF Sizer tool to establish the size
 - CSQSYSAPPL
 - Hold Group UoR information used by WAS and CICS
 - Sizing has never really been an issue
 - One (preferably more) application list structure
 - CF sizing...well let's talk about that a bit more in a bit
 - This holds the queues and messages (or pointers to the messages)



Planning Storage

- Application structures how to size them?
 - How many queues?
 - Characteristics of those queues:
 - How big are the messages?
 - How deep do they normally get?
 - How deep do they abnormally get?
 - Are there requirements to hold X messages for Y time?
 - Are there any messages greater than 63K?
 - External storage plans for Shared Message Data Sets
 - Characteristics of the CF List structure
 - How much storage will the z/OS admin let me have?
 - Do I need a failover structure (yes, yes you do)?
 - Where will that be?



Background and parameters

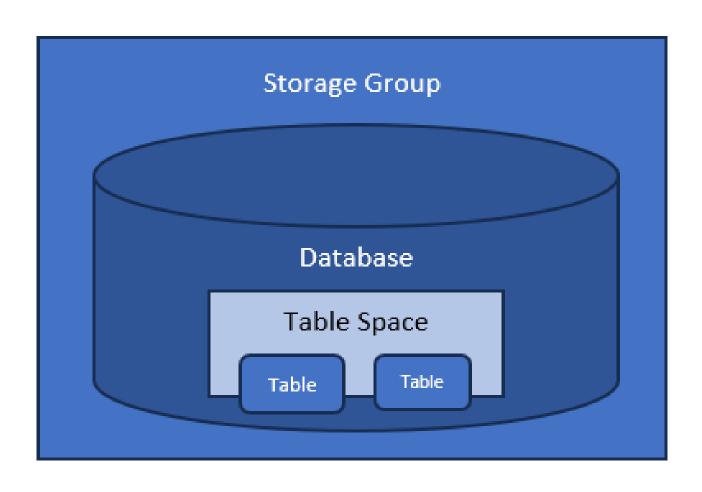
SDSF OU COMMAND				STR STC078	35 DSII) 2 L	INE CHAI	RS 'GROUP' FOU SCROLL === >	
*** BEGI	N DIS	SPLAY		(DB3AG)			13R1M5 0 1)	
				FUNCTION L ACTIVATED			/13R1M5Ø2`)	
				POSSIBLE F					
			PROTOCOL GROUP ATT	LEVEL(2) ΓΑCH NAME(D3AG)				
DB2		SUB			DB2	SYSTEM	IRLM		
MEMBER	ID	SYS	CMDPREF	STATUS	LVL	NAME		IRLMPROC	
D3A1	1	 D3A1	 -D3A1	ACTIVE	131503	MQS1	 I3 A1	D3A1IRLM	
D3A2			-D3A2	ACTIVE	131503		I3A2	D3A2IRLM	
DB2	PARA	 ALLEL	PARALI	 FI					
MEMBER			OR ASSIST						^
									Speaking:
D3A1 F1 = HEL	Þ	F2=	NO =SPLIT	NO F3=END	E/1=	=RETURN	F5=RFII	ND F6=RCHA	NC
F7=UP			-SPLII =DOWN	F9=SWAP		-KETUKN =LEFT	F11=RIG		



CSQ4CFRM	
CSQ4XCSG	Create the storage group
CSQ45CDB	Create the DB2 database used by IBM MQ
CSQ45CTS	Create the table spaces used by IBM MQ
CSQ4CTB	Create the tables and indices used by IBM MQ
CSQz45BPL	Bind the DB2 plans used by IBM MQ using DB2 TSO batch interface
CSQ45AQS	Add a QSG record into the DB2 admin table CSQ.ADMIN_B_QSG
CSQ45AQM	Add a queue manager record into the DB2 admin table CSQ.ADMIN_B_QSG

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Some basic DB2 architecture



CSQ4CFRM

- An administrative structure called qsgname CSQ_ADMIN. This structure is used by MQ itself and does not contain any user data.
- A system application structure called qsg-name CSQSYSAPPL. This structure is used by MQ system queues to store state information.
- One or more structures used to hold messages for shared queues

STRUCTURE NAME(QSGACSQ_ADMIN)
SIZE(60000)
INITSIZE(30000)
PREFLIST(CF01,CF02)
FULLTHRESHOLD(85)

STRUCTURE NAME(QSGATEST2)

SIZE(524288)

INITSIZE(272144)

PREFLIST(CF01,CF02)

FULLTHRESHOLD(25)

ALLOWAUTOALT(YES)

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Activating the new CFRM policy with our changes

SETXCF START,POLICY,TYPE=CFRM,POLNAME= policy-name

```
BROWSE
          SYS1.MQPLEX1.CFRM.POLICY.JCL(CFRM004)
      FULLTHRESHOLD (85)
 STRUCTURE NAME(QSGACSQSYSAPPL)
      SIZE(100000)
      INITSIZE (50000)
      PREFLIST (CF02, CF01)
      FULLTHRESHOLD (85)
 STRUCTURE NAME (QSGATEST1)
     SIZE (524288)
      INITSIZE (272144)
      PREFLIST(CF01,CF02)
      FULLTHRESHOLD (25)
      ALLOWAUTOALT (YES)
 STRUCTURE NAME(QSGATEST2)
      SIZE (524288)
      INITSIZE (272144)
      PREFLIST(CF01,CF02)
```

PREFEISI(CF01,CF02)

CSQ4XCSG

 Sample job to create the DB2 storage group used by IBM MQ using the DB2 TSO batch interface.

CREATE STOGROUP MQSTGG VOLUMES('*') VCAT DB3AD;

```
YOU MUST DO GLOBAL CHANGES ON THESE PARAMETERS USING YOUR EDITOR
  Replace
            DB2V13
                     with the high level qualifier of the
                                                                              Replace
                                                                                         MQSTGG
                     DB2 target library data sets.
                                                                       //*
                                                                                                 with the name of the DB2 storage group
                                                                       //*
                                                                                                 associated with the IBM MQ database.
            D3AG
   Replace
                                                                       //*
                     with the DB2 subsystem ID or
                                                                       //*
                                                                              Replace
                                                                                         ++DB2VCAT++
                     batch group attach name through which access
                                                                       //*
                                                                                                 with the short identifier of the ICF
                     is gained to the DB2 data-sharing group.
                                                                       //*
                                                                                                 catalog for the storage group.
                                                                       //*
  Replace
            DB2V13
                     with the version number of DB2 you
                     are currently using, for example
                       71 = DB2 \text{ for } 0S/390 \text{ V7.1}
  Replace
            USER1
                     with the name of the user id with sufficient
```

CSQ4XCDB

Replace	DB2V13	with the DB2 targ	Replace	SYSPR0G	with the name of the user id with sufficient authority to define the MQ DB2 resources.
Replace	D3AG	with the batch gra is gaine	Replace	MQSTGG	with the name of the DB2 storage group associated with the database.
Replace	DB2V13	with the are currents 51 = D	Replace	BP32K	with the name of a DB2 32K buffer pool associated with the database.
Replace	MQDB	with the	Replace	BP4	with the name of a DB2 4K buffer pool to be used for all indexes on IBM MQ tables

CSQ4XCTS

• Sample job to create the DB2 tablespaces used by IBM MQ using the DB2 TSO batch interface.

Re <u>p</u> lace	DB2V13	with the high level qualifier of the DB2 target library data sets.
Replace	D3AG	with the DB2 subsystem ID or batch group attach name through which access is gained to the DB2 data change group Replace MQDB
Replace	DB2V13	with the version number are currently using, for 10 = DB2 for z/390 V10 with the name of the DB2 database used for the IBM MQ tables.
Replace	SYSPROG	Replace MQSTGG with the name of the use authority to define the associated with the database.



CSQ4XCTB

Create the 15 Db2 tables and associated indexes.

```
Replace
         DB2V13
PRIMARY KEY (NLNAME, QSGNAME),
FOREIGN KEY (QSGNAME) REFERENCES CSQ.ADMIN B QSG
ON DELETE CASCADE
  MQDB.OBJNL;
    R€
             CLOSE NO;
                MQDB.ADMQSG;
```

CSQ4GEX

Replace	DB2V13							
		with the high level qualifier of the						
		DB2 tar	get librar	y data se	ets.			
			Replace	SYSPR0G				
Replace	D3AG				with the user ID that will be used for			
		with t			the CSQ5PQSG utility.			
		batch						
		is ga	Replace	SYSPR0G				
		0			with the user ID that will be used for			
Replace	DB2V13				the CSQUTIL utility.			
		with 1						
		are cu	Replace	SYSPROG				
		71 =			with the user ID that will be used for			
		-			the CSQUZAP utility.			
Replace	SYSPROG				che esquera dererey.			
Reptace	3131100	with th	e user Th	that will	l be used for			
		the que	ue manager	Star ted	Lask.			

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CSQ4BPL

• CSQ4BPL binds the Db2 plans for the queue manager, utilities, and channel initiator.

Replace	DB2V13	with the high level qualifier of the DB2 target library data sets.
Replace	D3AG	with the DB2 subsystem ID or batch group attach name through which access is gained to the DB2 data-sharing group.
Replace	MQ933CD	with the high level qualifier of the IBM MQ target library data sets.



CSQ45AQM

Replace ++DB2QUAL++ bles for IBM MQ. This with the high level qualifier of the DB2 target library data sets. Replace MQ933CD Replace ++DSGNAME++ with th with the name of the DB2 data-sharing group IBM MQ used by the IBM MQ queue-sharing group. Replace Replace ++DB2SSID++ with th with the DB2 subsystem ID or you wan batch group attach name through which access is gained to the DB2 data-sharing group. Replace ZQS1 with the name of the queue manager that is to be added to the queue-sharing group. Replace QSGA with the name of the queue-sharing group.

CSQ45AQS

Replace ++DB2QUAL++ with the high level qualifier of the DB2 target library data sets. Sal Replace MQ933CD with the high level qualifier of the IBM MQ target library data sets. Replace ++LANGLETTER++ with the letter for the language that you want messages shown in. Replace ++QSGNAME++ with the name of the queue-sharing group to be defined. Replace ++DSGNAME++ with the name of the DB2 data-sharing group

tion table



CSQZPRM

- Must be customized for each queue manager
- Update the QSGDATA parm
 QSGDATA=(QSGA,DB3AG,D3AG,4,4)
- QSGA is QSG name
- DB3AG is the Db2 data sharing group
- D3AG is the DB2 connection name
- 4 is the number of server tasks used for accessing DB2
- 4 is the number of tasks used for accessing the BLOBS

Replace MQ933CD with the high level qualifier of the SCSQMACS and SCSQAUTH target libraries. ZQS1.USERAUTH Replace with the data set name of the authorized load library in which to store your system parameter module. CSQ4ZPRM Replace with the name of your system parameter module. Note - do NOT use the default version name of CSQZPARM if you are using the IBM library SCSQAUTH to store your system parameter module.

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Allocating USERAUTH

Allocat	te New Data Set	Request failed More: +
Data Set Name : ZQS1.USERAU	тн	nore.
Management class DEFAULT Storage class STORAGE Volume serial Multiple Volumes Device type	(Blank for default of the control of	storage class) efault volume) ** t option) vice address) **
Data class <u>DEFAULT</u> Space units <u>TRACK</u>	(Blank for default of (BLKS, TRKS, CYLS, or RECORDS)	Speaking:
Average record unit Primary quantity 100 Secondary quantity 10 Directory blocks 20 Record format U	<pre>(M, K, or U) (In above units) (In above units) (Zero for sequentia)</pre>	l data set) *
Record length <u>0</u> Command ===> F1=Help F2=Split F3=Exit	F7=Backward F8=F	orward F9=Swap

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APF authorizing USERAUTH

- DISPLAY PROG,APF
- SETPROG APF,ADD,DSNAME=ZQS1.USERAUTH, VOLUME=SMS

Lessons learned

- Display commands are your best friends
 - display usage
 - display qlocal
 - -D3A1 DISPLAY BUFFERPOOL(BP4)
 - DISPLAY PROG,APF
 - display XCF,POLICY,TYPE=CFRM
 - -D3A1 DISPLAY group(*)
 - -DIS GROUP
 - -D3A1 DISPLAY BPOOL(*)



Lessons learned

```
OR INDEXSPACE MQDB.EXTQMG
    BEEN ACTIVATED
DSNT418I SQLSTATE = 57003 SQL
DSNT415I SQLERRP
                  = DSNXIC01
DSNT416I SQLERRD = 40 \ 0 \ 0 \ -1
DSNT416I SQLERRD = X'0000002
showing up for activation of MQD
MQDB.OBJPROC,
                      MQDB.
```

```
JOB (999, POK), 'DB3A INSTALL', CLASS=A,
                                      //$$BP4
                                      // MSGCLASS=T,NOTIFY=SYSADM,TIME=NOLIMIT,REGION=0M
                                      /*JOBPARM SYSAFF=*,L=9999
                                      // JCLLIB ORDER=(DB3AM.PROCLIB)
                                      //JOBLIB DD DISP=SHR,
                                                    DSN=DB2V13.SDSNLOAD
                                       //DSNTIAB EXEC PGM=IKJEFT01,DYNAMNBR=20
SQL ERROR DURING EXECUTE IMN
                                                    SYSOUT=*
                                      //SYSTSPRT_DD
DSNT408I SQLCODE = -647, ERRO //SYSPRINT DD SYSOUT=*
                                      //SYSUDUMP DD SYSOUT=*
                                      //SYSTSIN DD
                                        DSN SYSTEM(D3A1)
                                        -ALTER BUFFERPOOL (BP4) VPSIZE(20000)
                                      //DSNTICR EXEC PGM=IKJEFT01,DYNAMNBR=20,COND=(4,LT)
                                      //SYSTSPRT DD SYSOUT=*
                                      //SYSPRINT DD SYSOUT=*
                                                    SYSOUT=*
                                      //SYSTSIN DD
                                        DSN SYSTEM(D3A1)
                                        RUN PROGRAM(DSNTIAD) PLAN(DSNTIA13) -
                                             LIB('DB3AM.RUNLIB.LOAD')
                                        END
                                      //SYSIN
                                                 DD
                                         SET CURRENT SQLID = 'SYSADM';
                                         GRANT USE OF BUFFERPOOL BP4
                                               TO PUBLIC;
```

Lessons learned

```
000072 //SYSIN
                   SET CURRENT SQLID = 'USER1';
     000073
                   CREATE STOGROUP MQSTGG VOLUMES(*);
            STOCKOUT MOSTCO VOLUMES( ) VERT DUSKU,
     /*
          CREATE STOGROUP MQSTGG VOLUMES(*)
 SOL ERROR DURING EXECUTE IMMEDIATE
DSNT408I SQLCODE = -104, ERROR: ILLEGAL SYMBOL "*". SOME SYMBOLS THAT MIGHT BE
DSNT418I SQLSTATE = 42601 SQLSTATE RETURN CODE
DSNT415I SQLERRP = DSNHPARS SQL PROCEDURE DETECTING ERROR
DSNT416I SQLERRD = 3
                               32 502 SQL DIAGNOSTIC INFORMATION
DSNT416I SQLERRD
               = X'00000003'
                               X'00000000'
                                           X'00000000'
                                                       X'FFFFFFF'
                                                                   X'000
        INFORMATION
LREADY
   DSN SYSTEM(D3AG)
```

What's next? Shared message data sets

```
File
        Edit
              Edit Settings
                             Menu
                                    Utilities
                                               Compilers
                                                          Test
                                                                 Help
           ZQS1.SCSQPROC(CSQ4SMDS) - 01.00
                                                             Columns 00001 00072
EDIT
                                      Top of Data
 =MSG> -Warning- The UNDO command is not available until you change
                 your edit profile using the command RECOVERY ON.
 =MSG>
 =MSG> -CAUTION- Profile is set to STATS ON. Statistics did not exist for
                 this member, but will be generated if data is saved.
000001 //CSO4SMDS JOB
000003 //*
000004 //* <copyright
000005 //* notice="lm-source"
000006 //* pids="5655-MQ9"
000007 //* years="2011,2016"
000008 //* crc="1163847555" >
000009 //* Licensed Materials - Property of IBM
000010 //*
000011 //* 5655-M09
000012 //*
Command ===>
                                                                Scroll ===> PAGE
                                         F4=Expand
              F2=Split
                           F3=Exit
F1=Help
                                                      F5=Rfind
                                                                    F6=Rchange
F7=Up
              F8=Down
                           F9=Swap
                                        F10=Left
                                                     F11=Right
                                                                   F12=Cancel
  *DSLIST
```

Success!

- ✓ ZQS1 on '129.40.114.132(1424)'
 - Queues
 - Topics
 - Subscriptions
 - > 🗁 Channels
 - Listeners
 - Process Definitions
 - Namelists
 - Authentication Information
 - Storage Classes
 - □ ZQS2 on '129.40.114.134(1424)'
 - □ ZSHR on '9.82.31.241(1423)'
- → Dueue-sharing Groups
 - > ₩ QSGA

Queue-sharing Group QSGA

Queue-sharing group information source:

Queue manager name	ZQS1
Description	IBM MQ for z/OS - V9.3.3
Command level	933
QMID	ZQS1.DE7D142F0856B581
Coded character set ID	500

Last updated: 20:07:06

Members of queue-sharing group:

/ Queue manager name	Queue manager number	DB2 name	Queue manager status	DB2 connection status	Command level	Queue manager CPF
■ ZQS1	1	D3A1	Active	Active	933	ZQS1
■ ZQS2	2	D3A2	Active	Active	933	ZQS2



Resources:

- Managing queue sharing groups IBM Documentation
- <u>Set up the Db2 environment IBM Documentation</u>