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)

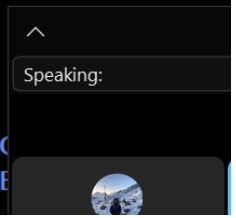
Planning Storage

- 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

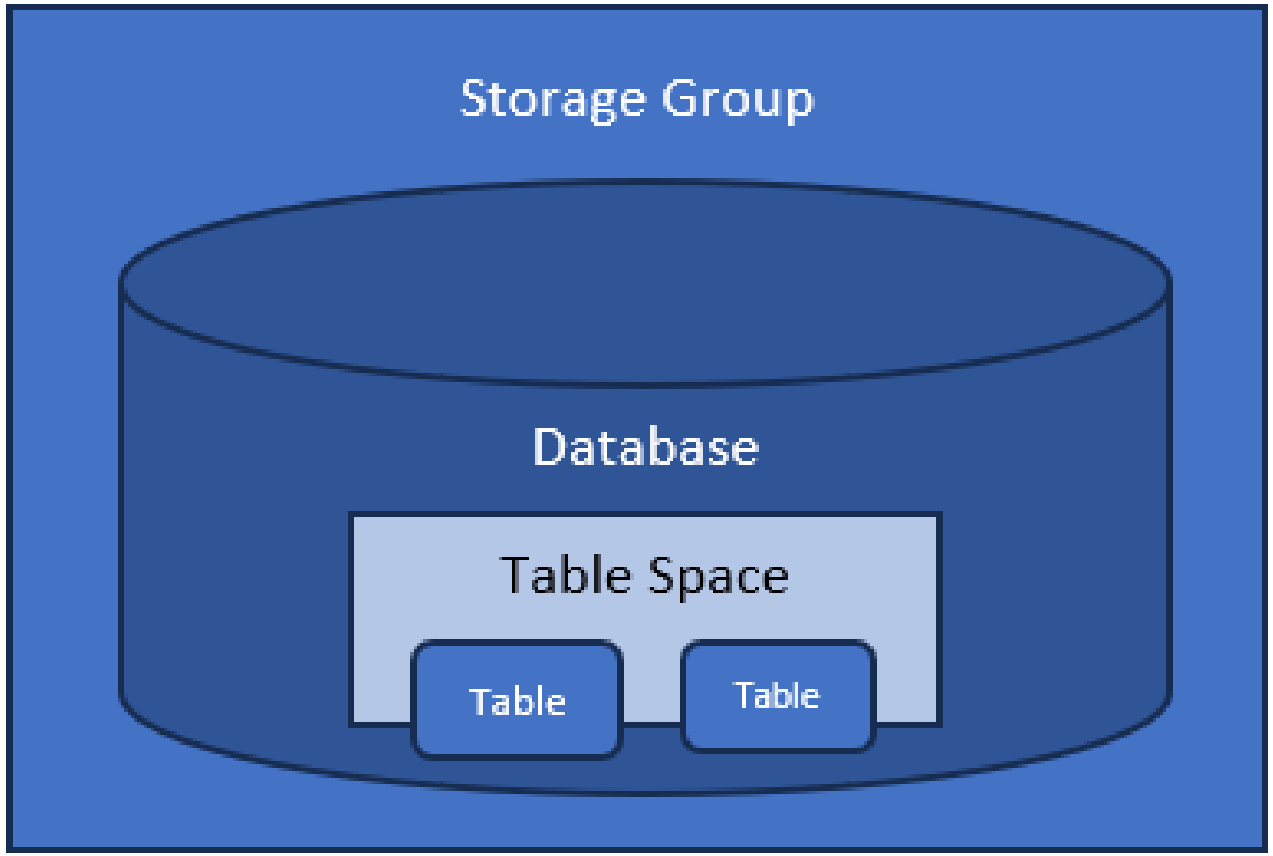
- Sub
- Stru
- QSC
- CF
- Stru
- CFR

```
  Display  Filter  View  Print  Options  Search  Help
 ------------------------------------------------------------------------------
 SDSF OUTPUT DISPLAY D3A1MSTR STC07835  DSID     2 LINE  CHARS 'GROUP' FOUND
 COMMAND INPUT ===>                                    SCROLL ===> CSR
*** BEGIN DISPLAY OF GROUP(DB3AG    ) CATALOG LEVEL(V13R1M501)
                   CURRENT FUNCTION LEVEL(V13R1M502)
                   HIGHEST ACTIVATED FUNCTION LEVEL(V13R1M502)
                   HIGHEST POSSIBLE FUNCTION LEVEL(V13R1M503)
                   PROTOCOL LEVEL(2)
                   GROUP ATTACH NAME(D3AG)
 ------------------------------------------------------------------------------
 DB2          SUB                          DB2    SYSTEM    IRLM
 MEMBER    ID SYS  CMDPREF   STATUS         LVL    NAME      SUBSYS IRLMPROC
 -------- --- ---- -------- -------- ------ -------- ---- --------
 D3A1       1 D3A1 -D3A1     ACTIVE   131503 MQS1     I3A1 D3A1IRLM
 D3A2       2 D3A2 -D3A2     ACTIVE   131503 MQS2     I3A2 D3A2IRLM
 ------------------------------------------------------------------------------
 DB2      PARALLEL    PARALLEL
 MEMBER   COORDINATOR ASSISTANT
 -------- ----------- ---------
 D3A1                 NO        NO
   F1=HELP      F2=SPLIT     F3=END       F4=RETURN    F5=RFIND     F6=RCHANG
   F7=UP        F8=DOWN      F9=SWAP     F10=LEFT     F11=RIGHT    F12=RETRIE
```



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

Some basic DB2 architecture



CSQ4CFRM

- An administrative structure called qsg-name 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)
```

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)
```

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
//*                      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   DB2V13
//*                      with the version number of DB2 you
//*                      are currently using, for example
//*                        71 = DB2 for OS/390 V7.1
//*
//*    Replace   USER1
//*                      with the name of the user id with sufficient
```

```
//*
//*
//*
//*
//*
//*
//*
//*
```

```
Replace   MQSTGG
                  with the name of the DB2 storage group
                  associated with the IBM MQ database.

Replace   ++DB2VCAT++
                  with the short identifier of the ICF
                  catalog for the storage group.
```

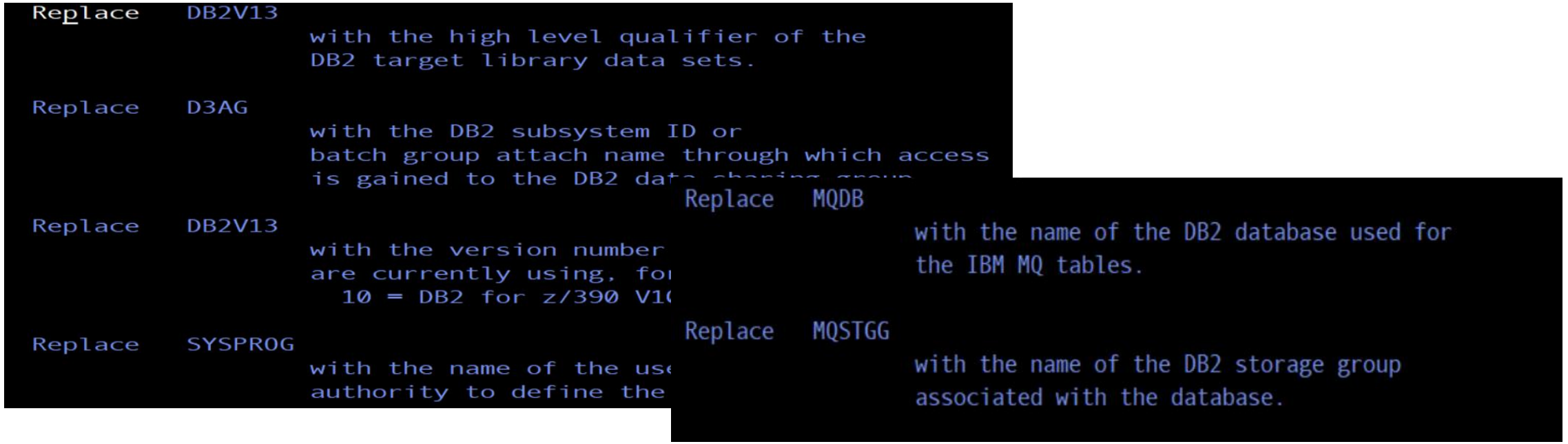
CSQ4XCDB

```
Replace    DB2V13
                  with the
                  DB2 targ

Replace    D3AG
                  with the
                  batch gr
                  is gaine

Replace    DB2V13
                  with the
                  are curr
                    51 = D

Replace    MQDB
                  with the
                  the WebS
```

```
Replace    SYSPROG
                  with the name of the user id with sufficient
                  authority to define the MQ DB2 resources.

Replace    MQSTGG
                  with the name of the DB2 storage group
                  associated with the database.

Replace    BP32K
                  with the name of a DB2 32K buffer pool
                  associated with the database.

Replace    BP4
                  with the name of a DB2 4K buffer pool
                  to be used for all indexes on IBM MQ tables
```

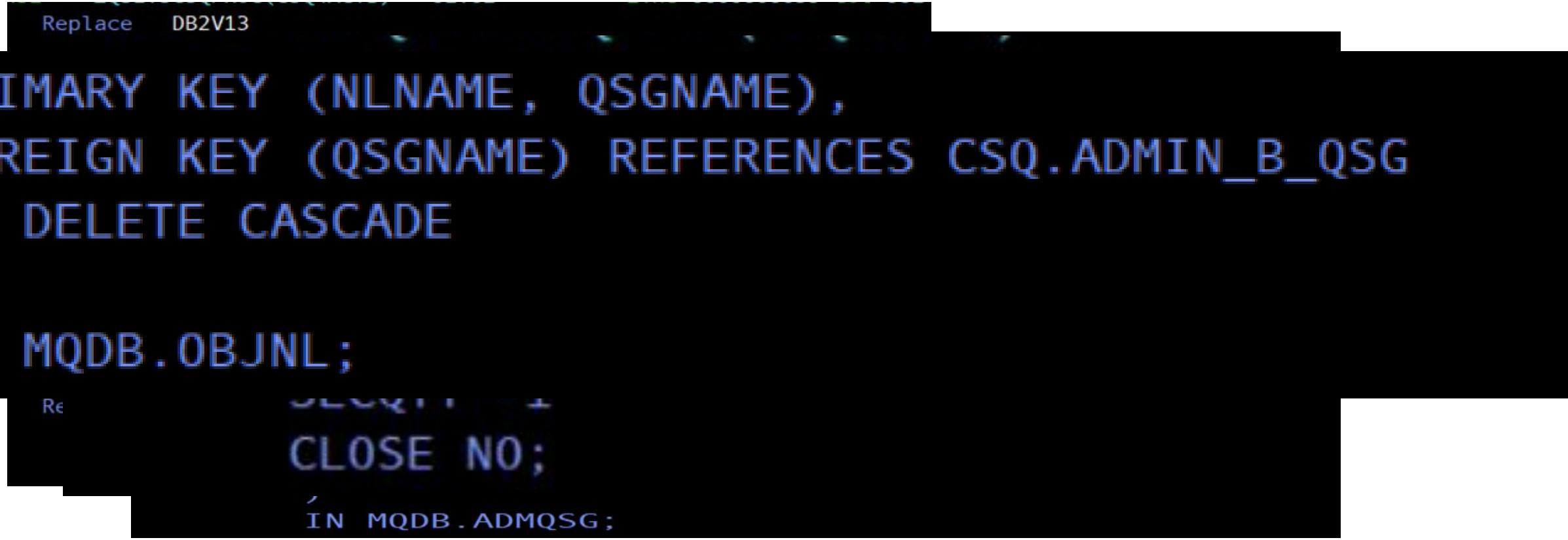
CSQ4XCTS

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



CSQ4XCTB

- Create the 15 Db2 tables and associated indexes.

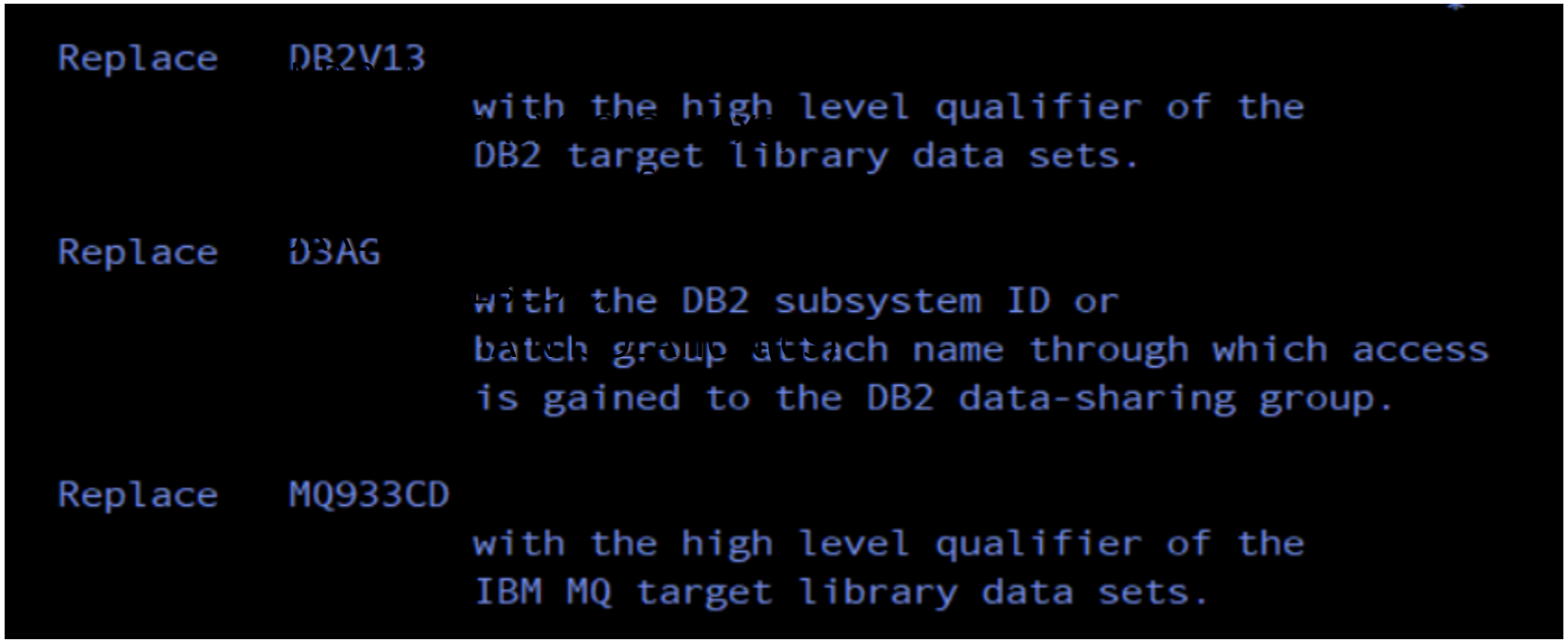


CSQ4GEX

```
Replace   _DB2V13
                with the high level qualifier of the
                DB2 target library data sets.
                      _ Replace   SYSPROG
Replace   D3AG                                with the user ID that will be used for
                with t                        the CSQ5PQSG utility.
                batch
                is ga   Replace   SYSPROG
                                              with the user ID that will be used for
Replace   DB2V13                              the CSQUTIL utility.
                with t
                are cu  Replace   SYSPROG
                  71 =                        with the user ID that will be used for
                                              the CSQUZAP utility.
Replace   SYSPROG
                with the user ID that will be used for
                the queue manager started task.
```

CSQ4BPL

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



CSQ45AQM

```
Replace    ++DB2QUAL++
                  with the high level qualifier of the
                  DB2 target library data sets.

Replace    MQ933CD
                  with th
                  IBM MQ

Replace    E
                  with th
                  you wan

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.
```

bles for IBM MQ. This

```
Replace    ++DSGNAME++
                  with the name of the DB2 data-sharing group
                  used by the IBM MQ queue-sharing group.

Replace    ++DB2SSID++
                  with the DB2 subsystem ID or
                  batch group attach name through which access
                  is gained to the DB2 data-sharing group.
```

CSQ45AQS

- Sa ation table CS

```
Replace    ++DB2QUAL++
                  with the high level qualifier of the
                  DB2 target library data sets.

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
```

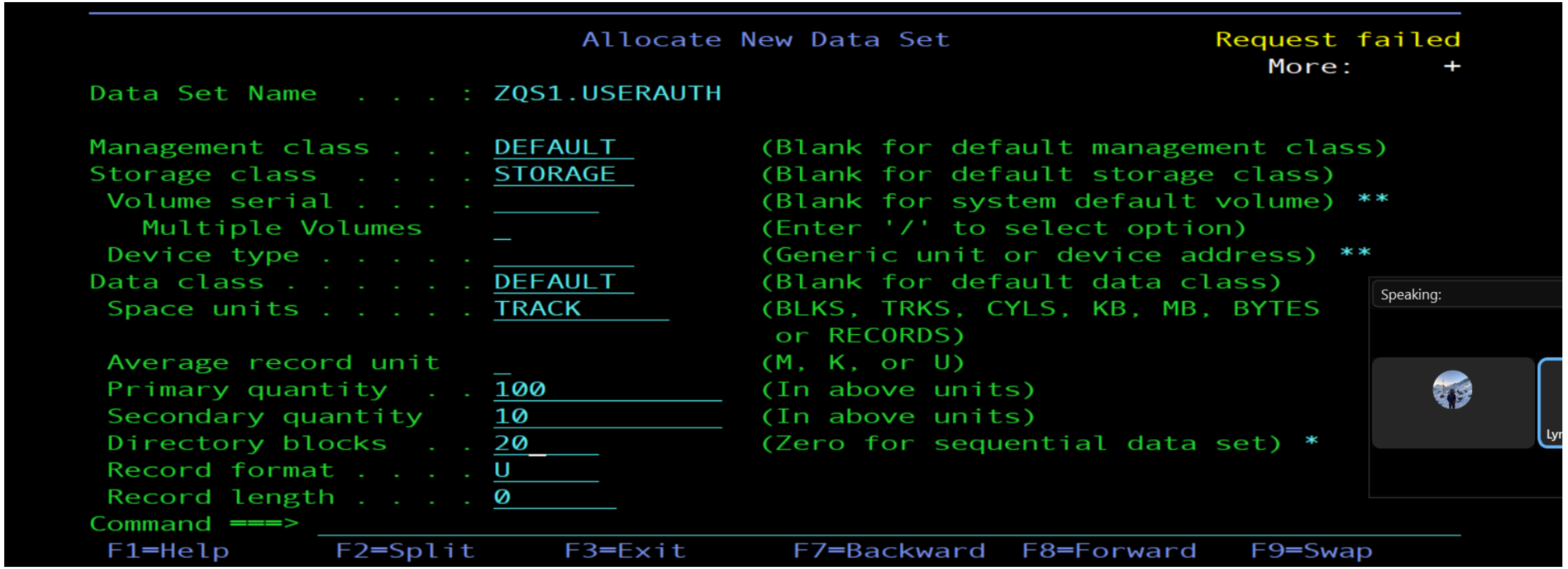
CSQZPRM

- 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.

Replace    ZQS1.USERAUTH
                  with the data set name of the authorized
                  load library in which to store your
                  system parameter module.

Replace    CSQ4ZPRM
                  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.
```

Allocating USERAUTH



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

SQL ERROR DURING EXECUTE IMN
DSNT408I SQLCODE = -647, ERROR
OR INDEXSPACE MQDB.EXTQMGI
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.A

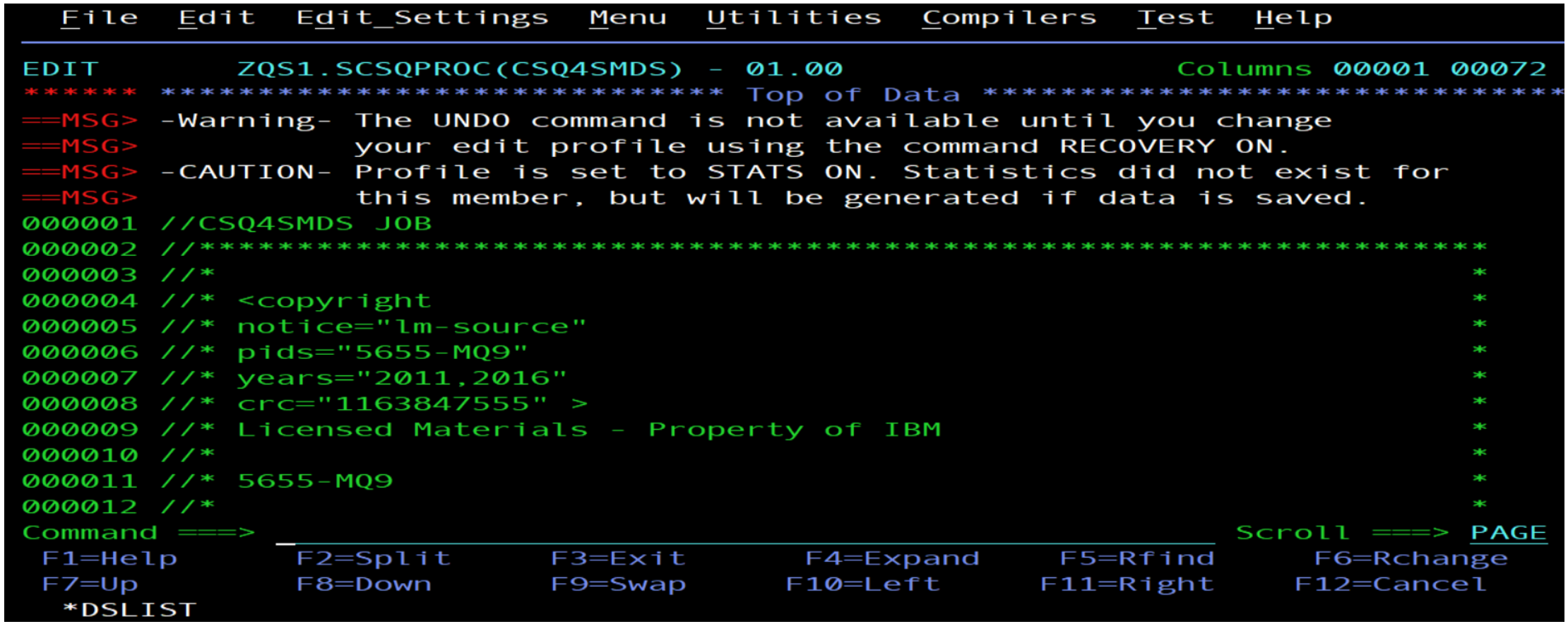
```
//$$BP4      JOB (999,POK),'DB3A INSTALL',CLASS=A,
// MSGCLASS=T,NOTIFY=SYSADM,TIME=NOLIMIT,REGION=0M
/*JOBPARM SYSAFF=*,L=9999
// JCLLIB ORDER=(DB3AM.PROCLIB)
//JOBLIB  DD  DISP=SHR,
//            DSN=DB2V13.SDSNLOAD
//*
//DSNTIAB EXEC PGM=IKJEFT01,DYNAMNBR=20
//SYSTSPRT DD  SYSOUT=*
//SYSPRINT 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=*
//SYSUDUMP DD  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

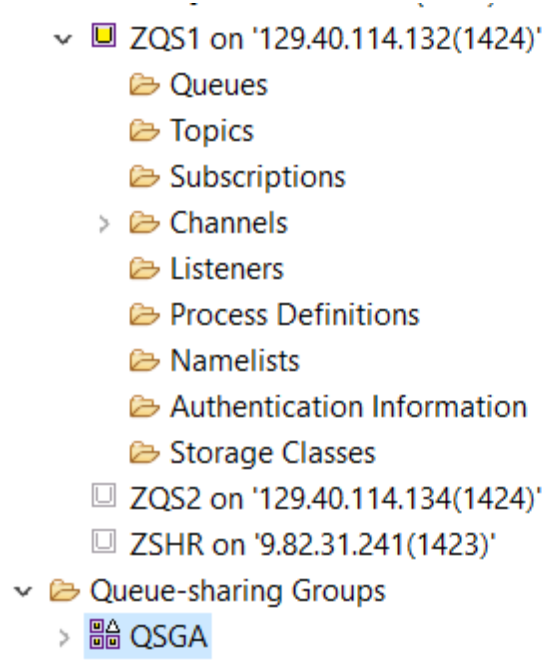
```
000072 //SYSIN    DD *
000073    SET CURRENT SQLID = 'USER1';
000074    CREATE STOGROUP MQSTGG VOLUMES(*);
000075 /*
000076 //
```

```
        CREATE STOGROUP MQSTGG VOLUMES(*)
 SQL 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  0  0  -1  32  502 SQL DIAGNOSTIC INFORMATION
DSNT416I SQLERRD    = X'00000003'  X'00000000'  X'00000000'  X'FFFFFFFF'  X'000
        INFORMATION
1READY
    DSN SYSTEM(D3AG)
```

What’s next? Shared message data sets



Success!



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
- Set up the Db2 environment - IBM Documentation