IBM Software Group

WebSphere® MQ V7 Publish/Subscribe Troubleshooting Tools & Techniques

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ON DEMAND BUSINESS

Agenda

- Overview of some changes in V7 which affect troubleshooting
- Things to check
- The dump command
- Traces
- Miscellaneous
- Using the samples to troubleshoot

Overview – New things

- Match Space – also known as the “pub/sub engine”
- Topic objects
- Subscription objects
- The queued publish/subscribe interface

Things to check – is the Match Space Up?

Check using runmqsc command

DISPLAY QMGR PSMODE

Possible responses are:

ENABLED – Both V7 and earlier versions are up

DISABLED – Neither V7 nor earlier versions are up

COMPAT – Only V7 is up

Use “ALTER QMGR PSMODE()” to change

Things to check – Match Space objects

Topic Objects

- Can they be published to or subscribed to?
- Is the topic string correct?
- Has the object inherited an improper value?

Subscription Objects

- Can they be subscribed to?
- Is the topic string correct?
- Are DEST or DESTQMGR misspelled?
- Does DEST exist?

Things to check – More on subscriptions

```
dis SUB(PJO_SUB_FILM.THEATER.NEWS) all
   SUBID(414D5120504A4F5F4149583220202020204958ED2920004608)
   SUB(PJO_SUB_FILM.THEATER.NEWS)                TOPICSTR(FILM.THEATER.NEWS)
   TOPICOBJ( )                                   DEST(TEST.SUB)
   DESTQMGR( )                                   PUBAPPID( )
   SELECTOR( )                                   USERDATA( )
   PUBACCT(043731313600000000000000000000000000000000000000000000000000000006)
   DESTCORL(414D5120504A4F5F4149583220202020204958ED2920004608)
   DESTCLAS(PROVIDED)                            DURABLE(YES)
   EXPIRY(UNLIMITED)                             PSPROP(MSGPROP)
   PUBPRTY(ASPUB)                                REQONLY(NO)
   SUBSCOPE(ALL)                                 SUBLEVEL(1)
   SUBTYPE(ADMIN)                                VARUSER(ANY)
   WSCHEMA(TOPIC)                                SUBUSER(paulod)
   CRDATE(2008-12-29)                            CRTIME(15:28:39)
   ALTDATE( )                                    ALTTIME( )
```

Things to check – Subscription status

Output of the “dis sbstatus(*)” runmqsc command:

```
dis sbstatus(*)
     2 : dis sbstatus(*)
AMQ8099: WebSphere MQ subscription status inquired.
   SUB(PJO_AIX2 SYSTEM.BROKER.INTER.BROKER.COMMUNICATIONS
  414D51590000010100000000
00000000000000000000000 SYSTEM.BROKER.ADMIN.STREAM MQ/PJO_AIX2
                      /StreamSupport)
   SUBID(414D5120504A4F5F414958322020204958ED2920001603)
AMQ8099: WebSphere MQ subscription status inquired.
   SUB(PJO_SUB_FILM.THEATER.NEWS)
   SUBID(414D5120504A4F5F414958322020204958ED2920004608)
AMQ8099: WebSphere MQ subscription status inquired.
   SUB(SYSTEM.DEFAULT.SUB)
   SUBID(414D5120504A4F5F414958322020204958ECFA10000006)
```

There is only one non-system subscription: SUB(PJO_SUB_FILM.THEATER.NEWS)

Things to check – Subscription status

```
dis sbstatus(PJO_SUB_FILM.THEATER.NEWS)
SUB(PJO_SUB_FILM.THEATER.NEWS)
   SUBID(414D5120504A4F5F4149583220202020204958ED2920004608)
   SUBUSER(paulod)                                  RESMDATE(2008-12-29)
   RESMTIME(15:28:39)                               LMSGDATE( )
   LMSGTIME( )
   ACTCONN(000000000000000000000000000000000000000000000000)
   DURABLE(YES)                                     NUMMSGS(0)
   SUBTYPE(ADMIN)
```

Things to check - Topic

```
DISPLAY TOPIC(SPORT.FOOTBALL.NEWS)
   TOPIC(SPORT.FOOTBALL.NEWS)                TYPE(LOCAL)
   TOPICSTR(SPORT/FOOTBALL/NEWS)             DESCR( )
   CLUSTER( )                                DURSUB(ASPARENT)
   PUB(ASPARENT)                             SUB(ASPARENT)
   DEFPSIST(ASPARENT)                        DEFPRTY(ASPARENT)
   DEFPRESP(ASPARENT)                        ALTDATE(2008-12-29)
   ALTTIME(13.12.02)                         PMSGDLV(ASPARENT)
   NPMSGDLV(ASPARENT)                        PUBSCOPE(ASPARENT)
   SUBSCOPE(ASPARENT)                        PROXYSUB(FIRSTUSE)
   WILDCARD(PASSTHRU)                        MDURMDL( )
   MNDURMDL( )
```

- The value of "PUB" determines whether this topic can be published to.
- The value of "SUB" determines whether it can be subscribed to.

Things to check – Topic Status

```
dis tpstatus(FILM.THEATER.NEWS)
   TOPICSTR(FILM.THEATER.NEWS)                ADMIN( )
   MDURMDL(SYSTEM.DURABLE.MODEL.QUEUE)
   MNDURMDL(SYSTEM.NDURABLE.MODEL.QUEUE)
   DEFPSIST(NO)                               DEFPRTY(0)
   DEFPRESP(SYNC)                             DURSUB(YES)
   PUB(ENABLED)                               SUB(ENABLED)
   PMSGDLV(ALLDUR)                            NPMSGDLV(ALLAVAIL)
   RETAINED(NO)                               PUBCOUNT(0)
   SUBCOUNT(1)                                PUBSCOPE(ALL)
   SUBSCOPE(ALL)
```

amqldmpa – dumping the Match Space

- The command is: amqldmpa –m QMGR –c t
- amqldmpa creates a file in
  /var/mqm/qmgrs/QMGR_NAME
  whose name begins with “TopicDump”.

- Each time you run the command it creates another file, for example:
  TopicDump.639096.1
  TopicDump.639112.1

amqldmpa – dumping the Match Space

```
Topic node [ <NULL> ]
{
  hSelf { 02::06::06-00718872 }
  hNext { 00::00::00-00000000 }
  hPrevious { 00::00::00-00000000 }
```

The above is the top (root) node in the Match Space. It has an identifier, but Next and Previous don't because they don't exist. There are only child nodes off of the root node.

amqldmpa – Dumping the Match Space

In this case, the root node has two child nodes:

```
 Links to child nodes
   TopicLink
   {
     hSelf { 02::06::06-00733488 }
     hPrevious { 00::00::00-00000000 }
     hNext { 02::06::06-00722200 }
     TopicStringLength ( 17 )
     TopicString ( 'FILM.THEATER.NEWS' )
   }
   TopicLink
   {
     hSelf { 02::06::06-00722200 }
     hPrevious { 02::06::06-00733488 }
     hNext { 00::00::00-00000000 }
     TopicStringLength ( 26 )
     TopicString ( 'SYSTEM.BROKER.ADMIN.STREAM' )
   }
```

amqldmpa – Dumping the Match Space

```
Topic node [ FILM.THEATER.NEWS ]
{
  hSelf { 02::06::06-00731816 }
  …

Links to subscribers
    TopicLink
    {
      hSelf { 02::06::06-00735048 }
      hPrevious { 00::00::00-00000000 }
      hNext { 00::00::00-00000000 }
      hEntry { 02::06::06-00733592 }
      hParent { 02::06::06-00731816 }
      bWildCard ( No )
    }
```

Traces

- Use the command you are accustomed to using:

strmqtrc –m QMGR_NAME –t detail –t all

- In WMQ v7, you can focus your trace on a single process, which produces only one file, but this is not recommended unless disk space is a significant issue. A full trace will probably create that file, as well as many others that might be needed by support.

Traces – what to look for

For those who want to look at trace files, take these preliminary steps:

Start and end the trace
Change directories to /var/mqm/trace
Run “dspmqtrc *”

You may now search the formatted files, those that end in “.FMT”

Traces – Subscriptions

- First, find the file that contains MQSUB

```
% grep "MQSUB >>" *
  AMQ553106.0.FMT: 17:11:40.395587   553106.1      :      MQSUB >>
```

- “>>” marks the beginning of the MQI verb MQSUB. This is true of all MQI verbs that are recorded in trace files.
- “MQSUB <<“ will mark the end of the routine.
- At this point, open the file, find “MQSUB >>” and start reviewing. Read until you reach “MQSUB <<“
- Most Match Space routines begin with “kqiTopic”.

Traces - Subscriptions

Using the application amqssub, I get the results below. The first column is the line number in the file, second is the timestamp and the third is ProcessID.ThreadID (PID.TID).

```
% grep -n ">>" AMQ553106.0.FMT
   76: 17:11:40.381449   553106.1        :       MQCONN >>
1088: 17:11:40.395587   553106.1        :       MQSUB >>
1217: 17:11:40.410253   553106.1        :       MQGET >>
1387: 17:11:47.180198   553106.1        :       MQGET >>
1615: 17:11:51.297803   553106.1        :       MQGET >>
1865: 17:12:17.513194   553106.1        :       MQGET >>
2083: 17:12:24.786439   553106.1        :       MQGET >>
```

- You can also search the other trace files for the PID.TID.

Traces - Publications

```
% grep -n  ">>" AMQ991352.0.FMT

   76: 17:11:36.045675   991352.1          :          MQCONN >>
1070: 17:11:36.059534   991352.1          :          MQOPEN >>
1254: 17:11:47.177044   991352.1          :          MQPUT >>
1429: 17:11:51.295198   991352.1          :          MQPUT >>
1704: 17:12:17.510545   991352.1          :          MQPUT >>
1895: 17:12:24.783826   991352.1          :          MQPUT >>
2107: 17:12:31.193349   991352.1          :          MQCLOSE >>
2173: 17:12:31.194274   991352.1          :          MQDISC >>
```

Traces

- For more information on running the trace command:

http://publib.boulder.ibm.com/infocenter/wmqv7/v7r0/topic/com.ibm.mq.amqzag.doc/fa16100_.htm

- For information on all tracing commands:

http://www-01.ibm.com/support/docview.wss?rs=171&context=SSFKSJ&context=SSEP7X&q1=trace&uid=swg21174924&loc=en_US&cs=utf-8&lang=en

- For directions on submitting files to IBM:

http://www-01.ibm.com/software/support/exchangeinfo.html

Miscellaneous

- Shouldn't define topic with '#' in name
- Shouldn't define topic with trailing'/'
- There has been some confusion about apparently conflicting results from DIS TPSTATUS and DIS SUB, where the number of subscriptions doesn't match. The reason for this is that while DIS SUB by default does not show subscriptions with subtype of PROXY (only API and ADMIN) the SUBCOUNT returned on DIS TPSTATUS does include proxy subscriptions. The solution is to specify SUBTYPE(ALL) on the DIS SUB command which includes all three (API, ADMIN and PROXY).

Miscellaneous continued

- DISPLAY TOPIC(*) displays only topic objects; although there will be corresponding topic nodes for these in the Match Space, there will also be topic nodes which have been created for other reasons (for example, those that were published or subscribed to), and nodes which ensure the tree is contiguous (creation of a/b/c -> creation of a and a/b).

Miscellaneous

- Retained Publications –

Browse SYSTEM.RETAINED.PUB.QUEUE with amqsbcg. Setting PropOptions to '1' shows MQTopicString values:

amqsbcg SYSTEM.RETAINED.PUB.QUEUE PJO_AIX2 1

Includes this line in the output:

"MQTopicString : 'SYSTEM.BROKER.ADMIN.STREAM/MQ/PJO_AIX2 /StreamSupport'"

Miscellaneous

- dmpmqaut updated for topic objects, but not topic strings. See the manual:
http://publib.boulder.ibm.com/infocenter/wmqv7/v7r0/topic/com.ibm.mq.amqzag.doc/fa15670_.htm

- Leading and trailing spaces are acceptable in topic string names, therefore that should be considered when troubleshooting.

Miscellaneous

- The use of streams is deprecated in WebSphere MQ Version 7.0, however -
- Mixing retained and non-retained publications on the same topic in a stream is not recommended. If an application does this and publishes a non-retained publication, any previously retained publication is still retained.
- It is not recommended for two or more applications to publish retained publications to the same topic and stream. If two applications do publish a retained publication about the same topic on the same stream simultaneously, it is difficult to determine which publication is retained. If these publishers use two different brokers, it is possible that different retained publications could be active at different brokers for the same topic and stream.

Samples

- amqspub, amqssub, and amqssbx can be used to test the Match Space.
- amqspub and amqssub use a very simple publish subscribe model
- amqssbx allows more options when subscribing.
- Check out the source code for each sample. In AIX, they are found in /usr/mqm/samp. The files are:
- amqssbxa.c, amqspuba.c and amqssuba.c

Samples – command line options

- The command line options are recorded in the source code near the beginning. For example, amqspub has these lines:

```
/**************************************************************/
/*                                                            */
/*   AMQSPUBA has the following parameters                    */
/*      required:                                             */
/*               (1) The name of the target topic             */
/*      optional:                                             */
/*               (2) Queue manager name                       */
/*               (3) The open options                         */
/*               (4) The close options                        */
```

The “open” and “close” options are the standard MQI options used by other MQI calls.

Samples

- The samples can be used to publish or subscribe to any topic. Use them in place of your applications when you need to test. However, keep in mind that amqssub uses managed destinations, meaning it wont use the queue or queue manager specified in your subscription.
- Use amqssbx to test using a specific destination queue
- Also, check out the samples in /usr/mqm/samp/pubsub (on AIX). These include soccer matches, RFH1, RFH2 and so forth.

Summary

- Read up on topic and subscription objects
- Use trace the way you always have
- Debug with samples

Additional WebSphere Product Resources

- 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/
- Learn about other upcoming webcasts, conferences and events: http://www.ibm.com/software/websphere/events_1.html
- Join the Global WebSphere User Group Community: http://www.websphere.org
- Access key product show-me demos and tutorials by visiting IBM Education Assistant: http://www.ibm.com/software/info/education/assistant
- View a Flash replay with step-by-step instructions for using the Electronic Service Request (ESR) 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

Questions and Answers