



IBM Software Group

Great Expectations – Working with the WebSphere MQ z/OS L2 Support Team

WebSphere MQ L2 Team
18 May 2011



WebSphere® Support Technical Exchange



Agenda

- Introduction of L2 Presenters
- Best Practices when working with L2
- Component debugging guidelines
- Closing comments and references



WMQ - L2 Presenters

L2 Presenter	Topic
Blanche Ishida	Best practices, ABENDs, Hangs, Loops
Kenneth Langhorne	ABENDs, Hangs, Loops
Rick Armstrong	Best practices, Trace, Channel
Mark Womack	Security/SSL, Clusters
Greg Woods	Shared queues
Beverly Kingsley	IMS, Performance
Doug Bender	CICS, Java™, JMS
Zigman Zulkowski	Java, JMS

WMQ Best Practices - Communication

- State problem concisely but completely
- Description of environment(s)
- Preferred method of contact
- Frank and open discussion regarding the problem
- ONE problem per SR (PMR)
- Business impact
- WMQ Support portal
 - ▶ http://www.ibm.com/support/entry/portal/Overview/Software/WebSphere/WebSphere_MQ

WMQ Best Practices - Sending documentation

- Prefer FTP
- Pack all data sets with AMATERSE (replaced TRSMAIN)
- Encryption needed?
 - ▶ Use the new MTFTP tool
 - <ftp://ftp.software.ibm.com/s390/mvs/tools/mtftp/>
- File naming convention (include SR/PMR name)
 - ▶ 99999.999.000.MSTRlog.trs
- What is the documentation?
- Use correct directory - /toibm/mvs
- <http://www.ibm.com/software/support/exchangeinfo.html>



WMQ - ABEND

- WebSphere® MQ for z/OS® uses two system abend completion codes, X'5C6' and X'6C6'.
- X'5C6' An X'5C6' abend completion code indicates that WebSphere MQ has detected an internal error and has terminated an internal task (TCB) or a user-connected task abnormally. Errors associated with a X'5C6' abend completion code might be preceded by a z/OS system code, or by internal errors.

WMQ – ABEND (cont)

- X'6C6' An X'6C6' abend completion code indicates that WebSphere MQ has detected a severe error and has terminated the queue manager abnormally. When a X'6C6' is issued, WebSphere MQ has determined that continued operation could result in the loss of data integrity. Errors associated with a X'6C6' abend completion code might be preceded by a z/OS system error, one or more X'5C6' abend completion codes, or by error message CSQV086E indicating abnormal termination of WebSphere MQ.
- http://publib.boulder.ibm.com/infocenter/wmqv7/v7r0/topic/com.ibm.mq.csqsaq.doc/zp11130_.htm



WMQ – ABEND (cont)

- For example: Abend 5C6 00E7014F An internal error has occurred. This is normally as a result of some previous error.
- Review WMQ Joblog, Syslog or Logrec (software records) for previous abends/errors.
- http://publib.boulder.ibm.com/infocenter/wmqv7/v7r0/index.jsp?topic=/com.ibm.mq.csqsaq.doc/zp11130_.htm



WMQ - ABEND (cont)

- Documentation required to pursue:
 - ▶ Joblogs – MSTR and CHIN (CHINIT)
 - ▶ Dumps generated at the point of failure
 - ▶ LOGREC – From prior to the ABEND
 - ▶ z/OS SYSLOG – From prior to the ABEND
- Check the syslog for an IEA611I or IEA911E message to see whether the dump was complete or partial. If insufficient disk space is the reason for the problem, there may not be sufficient information in the dump to diagnose the problem.

WMQ - ABEND (cont)

- Dumps may be suppressed by Dump Analysis and Elimination (DAE). In this case, some symptoms may not appear in the syslog, or joblog, but they will appear in logrec.
- See the z/OS MVS Diagnosis: Tools and Service Aids manual for further information regarding management of DAE.



WMQ - ABEND (cont)

- Search for known problems from the WebSphere MQ Support Portal using:
 - ▶ Abend code
 - ▶ Reason code
 - ▶ Program name listed in the Dump
- Dump Title, for example:

```
CSQ1,ABN=0C4-00000011,U=xxxxxx ,C=R3600.701.MMC -  
CSQMFMH1,M=CSQGFRCV,LOC=CSQMGPLM. CSQMFMH1+00000432
```



WMQ - ABEND (cont)

- Search string:
 - ▶ CSQMFMH1 ABN 0C4 returns 3 hits (PM16841)
 - ▶ CSQMFMH1 00000432 returns one hit (PM16841)
 - ▶ CSQMFMH1 ABEND 0C4 returns 5 hits (PM16841)
- Collect troubleshooting data for an ABEND problem in WebSphere MQ for z/OS
- <http://www.ibm.com/support/docview.wss?uid=swg21293442>

WMQ - HANG / WAIT / LOOP

- Documentation required to pursue:
 - ▶ Joblogs – MSTR and CHIN
 - ▶ Dumps generated at the point of failure
 - ▶ Dumps taken at the point of failure
 - ▶ Logrec (EREP)
- Additional data
 - ▶ GTF trace
 - ▶ MSTR internal trace
 - ▶ CHIN trace
- <http://www.ibm.com/support/docview.wss?uid=swg21293178>

WMQ Trace

- Two types of trace
 - ▶ Queue Manager
 - ▶ Channel Initiator (CHINIT)
- Queue Manager capture
 - ▶ Internally
 - /cpf START TRACE(GLOBAL) DEST(RES) CLASS(*) RMID(*)
 - /cpf STOP TRACE(GLOBAL) DEST(RES) CLASS(*) RMID(*)
 - ▶ GTF
 - /cpf START TRACE(GLOBAL) DEST(GTF) CLASS(*) RMID(*)
 - /cpf STOP TRACE(GLOBAL) DEST(GTF) CLASS(*) RMID(*)

WMQ Trace (cont)

- CHINIT capture
 - ▶ /cpf START TRACE(CHINIT)
 - ▶ /cpf STOP TRACE(CHINIT)
 - ▶ Internally to dataspace CSQXTRDS
- Changing trace capture size
 - ▶ MSTR
 - +cpf SET SYSTEM TRACTBL(500) [# 4k blocks1-999]
 - ▶ CHINIT
 - +cpf ALTER QMGR TRAXTBL(999) [MB 2-2048]



WMQ Trace (cont)

- Performance

- ▶ Further information on traces (including performance impacts) can be found at prior WSTE

<http://www.ibm.com/support/docview.wss?uid=swg27018159>



WMQ Channel/Client

- Channel is the communication tool between Queue Managers
- What is the network topology?
- Mostly TCP/IP (some LU 6.2)
 - ▶ Does other communications work across network
 - PING, FTP, Telnet, etc
- Work closely with network engineers



WMQ Channel/Client (cont)

- Message?
- Type of channel
 - ▶ Sender, receiver, shared, cluster, etc
- Documentation
 - ▶ CHINIT joblog
 - ▶ Displays of channel(s)
 - ▶ CHINIT trace (optional)
 - ▶ CHINIT dump (optional)



WMQ SSL

- Certificate fails check
 - ▶ Remote check fails – missing local cert signer
 - ▶ Local check fails – missing remote cert signer
- RACDCERT output should be reviewed
- Chain-of-trust should be confirmed



WMQ Security

- Review Security Manual
 - ▶ Security Tasks for WebSphere MQ
 - Leads to Administrative Topics
 - ▶ Overviews SSL and TLS support
 - ▶ Outlines use of channel exits for security
- Trace as a last resort
 - ▶ GTF, MSTR, and CHIN trace most useful



WMQ Cluster

- Be sure all most current cluster fixes are applied
- CLUSQMGR output most useful to start with
- Joblog output inclusive of CLUSTER displays
- CHIN and MSTR dump
- MSTR and CHIN traces

WMQ Shared Queue Documentation

- System Log, CHIN joblog, MSTR joblog
- Dump taken at point of failure
- CF Structure Dump
- MSTR Internal Trace (optional)
- CHIN Internal Trace (optional)
- GTF Trace (optional)
- Shared Queue troubleshooting MustGather

<http://www-01.ibm.com/support/docview.wss?uid=swg21177414>



WMQ Shared queue DUMP command

- Capture CF Structure dump

- ▶ Use DUMP command with STRLIST subcommand

/dump comm=(title)

**/r xx,strlist=(strname=QSGnameStructurename,(listnum=all,
adjunct=capture,entrydata=unser),eventqs,(emcontrols=all))**

- Example of structure name is CSQ1APPLICATION where CSQ1 is the queue sharing group name.

WMQ Shared queue commands

- **DISPLAY QUEUE**
 - ▶ display attributes of queues relating to CF structure.
- **DISPLAY GROUP**
 - ▶ To display information about the queue sharing group.
- **DISPLAY CFSTRUCT**
 - ▶ To display attributes of the CF structure
- **DISPLAY CFSTATUS**
 - ▶ To display status of CF Structure



WMQ IMS

- WMQ has two Interfaces with IMS

- ▶ IMS adapter

- Applications use API (MQGET MQPUT) to get and put messages to WMQ queues

- ▶ IMS bridge

- Uses the IMS OTMA interface to pass WMQ messages to IMS queues
 - IMS applications use the IMS interface (GU, ISRT) to access WMQ messages



WMQ IMS (cont)

- Problems areas
 - ▶ Connection
 - ▶ Performance
 - ▶ Security
 - ▶ Tpipe synchronization (bridge)
 - ▶ Format errors (bridge)
 - ▶ Linking the language interface stub (adapter - 0C4s)
 - ▶ Library authorization (adapter)



WMQ IMS (cont)

- Documentation required to pursue
 - ▶ MSTR & CHIN joblogs & syslog
 - ▶ Any dumps generated from the error



WMQ IMS (cont)

- Documentation required to pursue
 - ▶ If problem can be re-created collect:
 - GTF trace with JOBNAME=(ssidMSTR,IMSCTL/MPR/BMP/IFP)
 - Ensure trace is on for Qmgr and IMS
 - Once problem has recurred, take a dump of MSTR,IMSCTL/MPP/BMP/IFP:
 - DUMP COMM=(dump title)
Rnn,JOBNAME=(ssidMSTR,IMSCTL/MPR/BMP/IFP),cont
Rnn,SDATA=(CSA,RGN,PSA,SQA,LSQA,TRT,SUM),END
where ssidMSTR is the MQ Qmgr and IMSCTL is the IMS Control region.
 - In case IMS support help is needed, save:
 - OLDS log, IMS CTL and IMS MPR/BMP JESMSG LG

WMQ IMS (cont)

- Provide any CSQ2xxxx(bridge) or CSQQxxxx(adapter) message numbers, error / feedback codes
- Bridge/adaptor queue name
- Verification that:
 - ▶ target IMS is running & connected to OTMA (bridge)
 - ▶ IMS subsystem is started (adapter)
 - ▶ the trigger monitor is running (CSQQTRMN)
 - ▶ OTMA has been started (bridge)
 - ▶ the bridge is defined with XCF storage class

WMQ IMS (cont)

- Messages stuck on queues (bridge, local adapter, DLQ):
 - ▶ Provide a copy of messages
- Output from Tpipe Display – bridge
 - ▶ `/display tmember client tpipe tpipename`
****Where *client* is queue-manager name
- IMS Bridge & adapter troubleshooting Doc Technote
<http://www.ibm.com/support/docview.wss?uid=swg21242366>
- More detailed analysis:
 - ▶ To be covered in a later WMQ IMS presentation

WMQ Performance

- There are different aspects to the concept of performance:
 - ▶ Throughput
 - ▶ Measurement
 - ▶ Availability
 - ▶ High CPU & loop
- First level of investigation:
 - ▶ Use Supportpac MP16
 - ▶ Investigate with your own performance team
 - ▶ Consider using IBM®'s performance services



WMQ Performance (cont)

- Identify the problem area:
 - ▶ Collect performance data – SMF, RMF
 - SMF115 (Statistics) & SMF116 (accounting)
 - /START TRACE(ACCTG) DEST(SMF) CLASS(01:03)
 - /START TRACE(STAT) DEST(SMF) CLASS(01)
 - Use Supportpacs to understand the factors affecting performance & to interpret the data (MP1B, MP1D, MP1F, MP1G)
 - ▶ Make use of monitoring tools such Tivoli Omegamon, Strobe
 - ▶ If you believe this is an WMQ defect, contact WMQ L2 support

WMQ Performance (cont)

- Documentation required to pursue:
 - ▶ If possible increase WMQ trace table to maximum size:
 - If trace is running, issue
`/cpf STOP TRACE(GLOBAL) DEST(RES) CLASS(*) RMID(*)`
`/cpf SET SYSTEM TRACTBL=99`
 - ▶ Start internal WMQ trace as follows:
 - `/cpf START TRACE(GLOBAL) RMID(*) CLASS(*) DEST(RES)`
 - ▶ Take Dump of WMQ during problem period as follows:
 - `DUMP COMM=(dump title)`
`Rnn,JOBNAME=(ssidMSTR,ssidCHIN),cont`
`Rnn,DSPNAME=('ssidCHIN'.CSQXTRDS),cont`
`Rnn,SDATA=(CSA,RGN,PSA,SQA,LSQA,TRT,SUM),END`

WMQ Performance (cont)

- Documentation required to pursue (cont):
 - ▶ ssidMSTR and ssidCHIN job logs
 - ▶ Monitoring reports / data
- Performance troubleshooting Doc Technote:
<http://www.ibm.com/support/docview.wss?uid=swg21291192>
- More detailed analysis:
 - ▶ To be covered in a later WMQ Performance presentation



WMQ CICS

- There are two Interfaces with CICS-MQ
 - ▶ CICS-MQ adapter
 - The CICS adapter connects a CICS subsystem to a queue manager, enabling CICS application programs to use the MQI.
 - A set of control functions for use by system programmers and administrators to manage the adapter.
 - ▶ CICS-MQ bridge
 - The CICS-WebSphere MQ bridge is a component that allows direct access from WebSphere® MQ applications to applications on your CICS system.



WMQ CICS (cont)

- **For CICS Transaction Server V3.2 or higher:**
 - ▶ Components transferred from WebSphere MQ - The components to connect CICS and WebSphere MQ for z/OS have been enhanced and are now integrated with CICS TS V3.2.
 - ▶ The components transferred include the CICS-MQ adapter, the CICS-MQ trigger monitor, and the CICS-MQ bridge.
- Please use the MUSTGATHER from the CICS Support site:
<http://www.ibm.com/support/docview.wss?uid=swg21208053>



WMQ CICS (cont)

■ For CICS Transaction Server V3.1 or below

▶ Documentation required to pursue

- MSTR & CHIN joblogs and CICS joblog
- Any dumps generated from the error
- If a problem is occurring, please ensure that you dump both WMQ MSTR and the CICS region in the same dump
- DUMP COMM=(dump title)

Rnn,JOBNAME=(ssidMSTR,cics_jobname),cont

Rnn,SDATA=(CSA,RGN,PSA,SQA,LSQA,TRT,SUM),END

where ssidMSTR is the WMQ Qmgr

cics_jobname is the jobname for CICS region.

WMQ - Java and JMS

■ What is Java and JMS?

- ▶ The best place to find detail information is:

WebSphere MQ Using Java (SC34-6591-00)

<http://www.ibm.com/support/docview.wss?uid=pub1sc34659100>

- ▶ WebSphere MQ classes for Java to referred to as WebSphere MQ base Java.
- ▶ WebSphere MQ classes for Java Message Service (WebSphere MQ JMS) is a set of Java classes that implement Sun's Java Message Service (JMS) interfaces to enable JMS programs to access WebSphere MQ systems.

WMQ - Java and JMS (cont)

- Collect troubleshooting data for a Java or JMS problem in WebSphere MQ for z/OS
 - ▶ <http://www.ibm.com/support/docview.wss?rs=171&uid=swg21290330>
- A complete description of the problem, including the following:
 - ▶ WebSphere MQ version, release, and maintenance level
 - ▶ Operating system version, release, and maintenance level
 - Related products version, and release levels if applicable



WMQ - Java and JMS (cont)

- The majority of WebSphere MQ (WMQ) Java failures are caused by setup / configuration problems.
 - ▶ Client or bindings mode
 - ▶ JMS or Java
 - ▶ Type of Queues (shared or local)
 - ▶ Shared queue / Private queue
 - ▶ WebSphere Application Server



WMQ - Java and JMS (cont)

- WebSphere Application Server (WAS)
 - ▶ Supply the joblogs from the Control Region (CR), Servant Region (SR), and Adjunct Region(CRA).
 - ▶ If in a cluster, then all the joblogs.
- On z/OS, jar & config files.
 - <WAS_ROOT>/DeploymentManager/profiles/default directory
 - jar -cf /tmp/<pmr.number>.hfs jar \$(find . -name '*.xm*' -o -name '*.props' -o -name '*.txt' -o -name '*.log')**
 - Where <pmr.number> is some thing like 12345,678,000
- On the distributed platforms, run the collector tool.

WMQ - Java and JMS (cont)

- Things to check or verify
 - ▶ WebSphere Application Server 7.x now ships MQ Resource Adapter with the product.
 - This is where the main JMS and JCA come from.
 - ▶ Verify the queue manager, and/or listener programs are running.
 - ▶ Verify the server connection channel, Sender or Receiver channel, are defined on the server to support the queue or topic connection.
 - ▶ Test the client connection using WMQ Java client or C client sample programs or WMQ IVT program.
 - ▶ Try a TCP/IP ping from client to server.



Reminders

- Communication is the key
 - ▶ We need to know what you know
- Terse FTP all documentation
 - ▶ Unless otherwise directed
- Each WMQ component has its nuances...follow MustGathers



WMQ References

- http://www-947.ibm.com/support/entry/portal/Overview/Software/WebSphere/WebSphere_MQ
WMQ Support Portal
- <http://www.ibm.com/software/support/exchangeinfo.html>
Exchanging data with IBM
- <http://www.ibm.com/support/docview.wss?uid=swg21229861>
WMQ MustGather
- <http://www.ibm.com/support/docview.wss?uid=swg21293442>
MustGather for ABENDs
- <http://www.ibm.com/support/docview.wss?uid=swg21293178>
MustGather for wait, hang or loop
- <http://www.ibm.com/support/docview.wss?uid=swg27018159>
Trace WSTE
- <http://www.ibm.com/support/docview.wss?uid=swg21242366>
Mustgather for WMQ IMS
- <http://www.ibm.com/support/docview.wss?uid=swg21291192>
MustGather for performance
- <http://www.ibm.com/support/docview.wss?uid=swg21208053>
MustGather for WMQ CICS

WMQ References

- <http://publib.boulder.ibm.com/infocenter/wmqv7/v7r0/index.jsp>
z/OS Problem Determination Guide (WebSphere MQ 7.0.1.5)
- <ftp://ftp.software.ibm.com/software/integration/wmq/docs/V7.0/csqsasq05.pdf>
WebSphere MQ for z/OS Problem Determination Guide Version 7.0 GC34-6944-01
- <http://publib.boulder.ibm.com/infocenter/zos/basics/index.jsp>
z/OS basic skills information center
- <http://www-01.ibm.com/support/docview.wss?uid=swg21177414>
MustGather for WMQ Shared Queues



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
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- 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>

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