IBM Software Group

Browsing Message Fields, Properties and Contents in WebSphere MQ V7

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Agenda

- Basic tasks (both V6 and V7):
  - amqsput – sample to put message
  - amqsbcg – sample to browse messages
  - MQ Explorer
- Intermediate tasks (both V6 and V7):
  - Finding reason code from Dead Letter Queue
- Advanced tasks (only V7):
  - amqsbcg – options to show message properties
- SupportPacs

Purpose

- To present the different mechanisms to browse messages in WebSphere MQ V7.
- How to view the message fields, message properties and the contents of the message, reason codes from dead letter queue.
  - Using sample executables and the MQ Explorer.
- First and Second parts of the presentation: the methods that work in both V6 and V7 will be shown.
  - These parts are targeted for beginners.
- Third part, showing only the methods that work with V7.
  - This part is targeted for intermediate users.

Simple C-based samples - V6 and V7

- Let's start with simple samples

- Put: amqsput (bindings) amqsputc (client)
- Get: amqsget (bindings) amqsgetc (client)
  - Destructive read: the message is removed from the queue
- Browse: amqsbcg (bindings) amqsbcgc (client)
  - Non-destructive read: the message remains in the queue

- For simplicity, the "bindings" versions will be used in this presentation.

C samples provided with MQ

- C source and executable files provided with MQ

- Linux®:
- Location of executable: /opt/mqm/samp/bin/amqsput
- Location of C source: /opt/mqm/samp/amqsput0.c
- Fileset: MQSeriesSamples-7.0.1-0

- Windows®:
- Executables:
- C:\Program Files\IBM\WebSphere MQ\tools\c\Samples\bin
- C source:
- C:\Program Files\IBM\WebSphere MQ\tools\c\Samples

MQ Explorer V7 - 1

- MQ Explorer V7 is a GUI tool to interact with a queue manager and its objects.
- For our purposes: It allows to put a message into a queue, to read (get) the message and to browse it.
- Very useful with messages in the Dead Letter Queue:
  - It does the proper formatting of data and reason code.
- Provides remote access to Queue Managers in other hosts
  - It knows how to interact with V6 queue managers

MQ Explorer V7 - 2

- Available for Windows and Linux x86 (Intel®) 32-bit and 64-bit.
  - Server CD or Server download

- Standalone download as SupportPac MS0T:
- http://www-01.ibm.com/support/docview.wss?rs=171&uid=swg24021041
  MS0T: WebSphere MQ Explorer

- Related WSTEs:
- http://www-01.ibm.com/support/docview.wss?uid=swg27014355
- WSTE: What is new in WebSphere MQ Explorer Version 7

- http://www-1.ibm.com/support/docview.wss?rs=171&uid=swg27008431
- WSTE: Remote administration of queue managers using MQ Explorer

Excellent tutorials - Redbooks

- http://www.redbooks.ibm.com/abstracts/SG247128.html?Open
- WebSphere MQ V6 Fundamentals (SG24-7128)
  - Chapter 9. Hands-on introduction to messaging
  - 9.3.4 Display the attributes of the newly created queue
  - 9.3.6 Put test messages onto this queue
  - 9.3.7 Browse messages put to the queue

- http://www.redbooks.ibm.com/abstracts/SG247583.html?Open
- WebSphere MQ V7.0 Features and Enhancements (SG24-7583)

Pre-requisite: Create a local queue

- Via runmqsc:
  - runmqsc QueueManagerName
    - DEFINE QLOCAL(Q1)
- Via MQ Explorer:
  - Left panel (navigator view) expand icon for QMgr
  - Select the Queues folder under QMgr
  - Right-click the Queues folder and select New -> Local Queue. The "Create a Local Queue" wizard opens.
  - Enter the name of the queue: Q1
  - Click Finish

Put message into a queue - amqsput 1

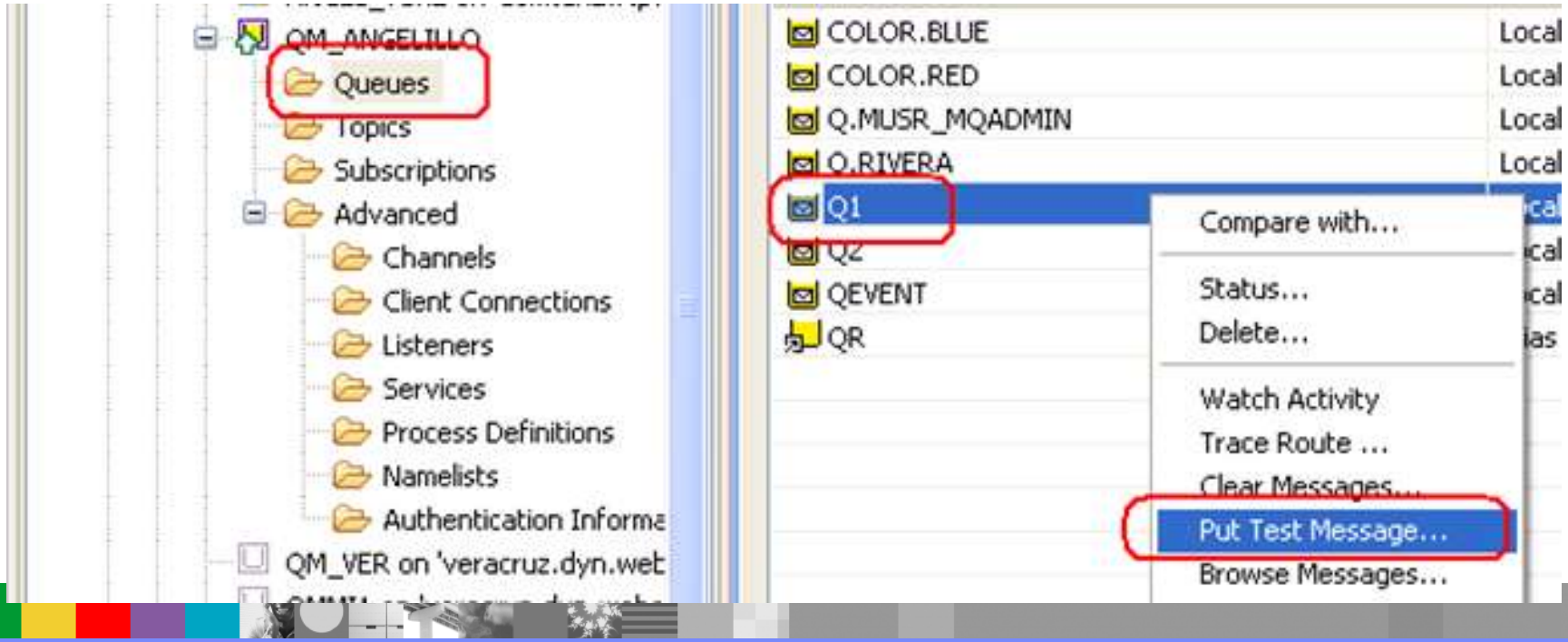
- Execute the following command:
  - amqsput Q1 QMGR
- The following output is displayed, and the command waits for user input:
  - Sample AMQSPUT0 start
  - target queue is Q1
- Type a short message and press Enter.
- You can enter multiple messages, pressing Enter after each one.

Put message into a queue - amqsput 2

- Leave a blank line, and press Enter to exit.
  - Sample AMQSPUT0 start
    TEST MESSAGE 1<enter>
    TEST MESSAGE 2<enter>
    <enter>
    Sample AMQSPUT0 end
  - Limitation: message up to 65535 characters
- http://publib.boulder.ibm.com/infocenter/wmqv7/v7r0/index.jsp?topic=/com.ibm.mq.csqzal.doc/fg17140_.htm
  MQ V7 Information Center - The Put sample programs

Put message into a queue - Explorer 1

- Highlight the Queues folder under QMgr
- Right panel: Right-click the row in the table for Q1
  - Select "Put Test Message".
  - This opens the Put test message window.



Put message into a queue - Explorer 2

Type a message into the Message data field.
Click "Put message".
The Message data field becomes blank.
You can enter multiple test messages, clicking Put message after each one.

How to find out if a Q has messages - 1

- Using runmqsc:
  - DISPLAY QL(Q1) CURDEPTH
  - AMQ8409: Display Queue details.
- QUEUE(Q1) TYPE(QLOCAL)
- CURDEPTH(2)

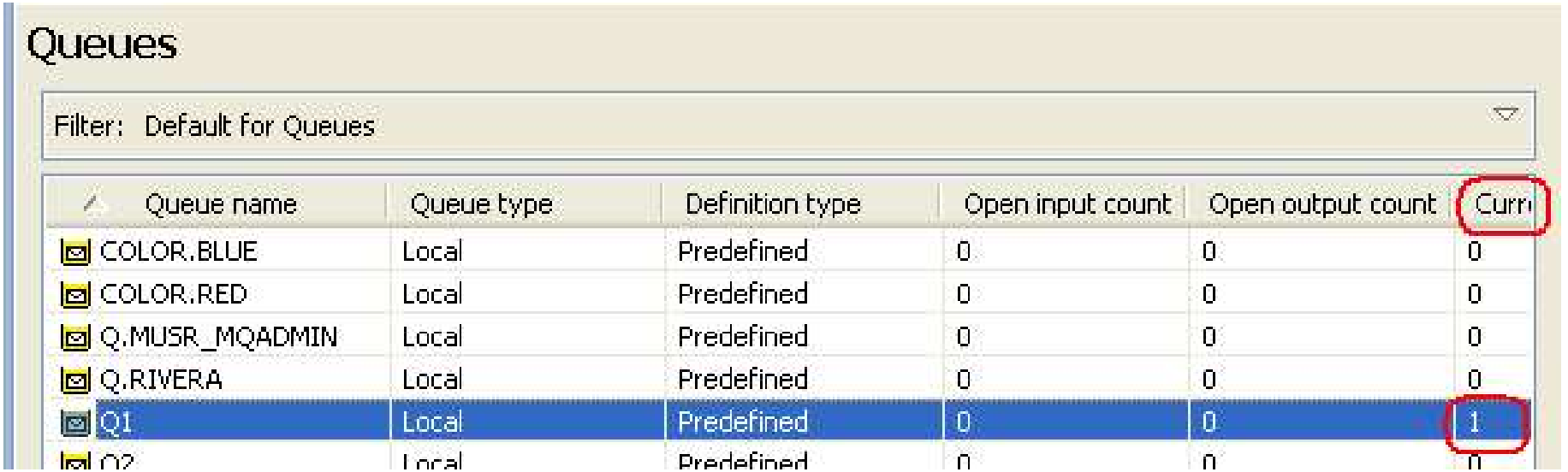
- Windows: echo DISPLAY QL(Q1) CURDEPTH | runmqsc QMgr
- Unix®: echo "DISPLAY QL(Q1) CURDEPTH" | runmqsc QMgr

- http://www-01.ibm.com/support/docview.wss?uid=swg21395807
- How to obtain the value for an attribute from the output of runmqsc

How to find out if a Q has messages - 2

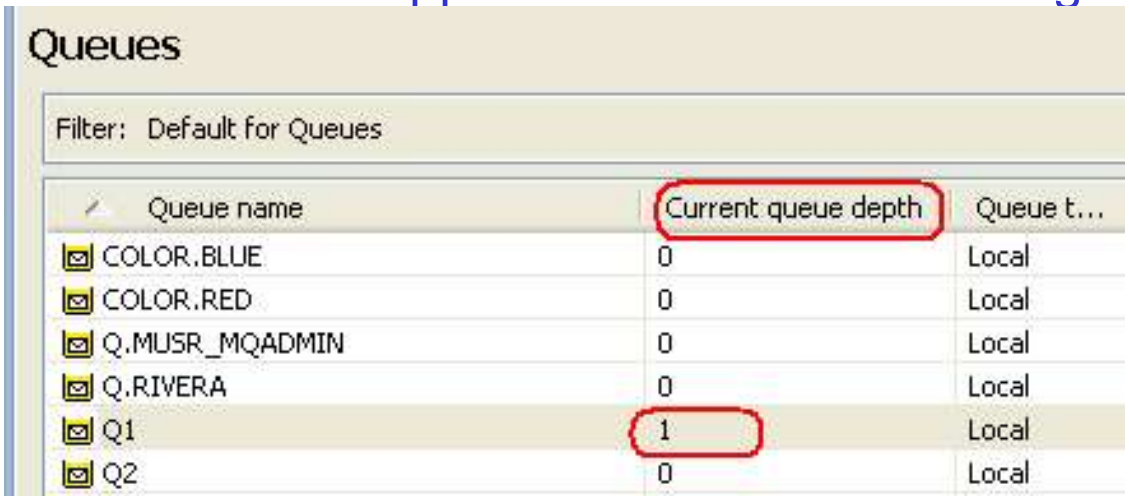
- Using MQ Explorer

- Select Queue Q1 from the right panel.
- Scroll to the right until you see the column "Current queue depth"



How to find out if a Q has messages - 2

- You may want to customize this view and move this column closer to the queue name, to show the number of messages without scrolling to the right.
- See: Slides 46-47: Customizing the order of the columns
- WSTE: What is new in WebSphere MQ Explorer Version 7
- http://www-01.ibm.com/support/docview.wss?uid=swg27014355



Browsing messages – amqsbcg 1

- http://publib.boulder.ibm.com/infocenter/wmqv7/v7r0/index.jsp?topic=/com.ibm.mq.csqzal.doc/fg17270_.htm
- MQ V7 Information Center - The Browser sample program

- Limitation: Prints the first 65535 characters of the message, and fails with the reason truncated msg if a longer message is read.

  - amqsbcg Q1 QM

Browsing messages – amqsbcg 2

- >> TOP PORTION <<

- AMQSBCG0 - starts here
- **********
- MQOPEN - 'Q1'
- MQGET of message number 1

- ****Message descriptor****
- StrucId : 'MD ' Version : 2
- Report : 0 MsgType : 8
- **Expiry : -1** Feedback : 0
- Encoding : 546 **CodedCharSetId : 437**
- **Format : 'MQSTR '**
- **Priority : 0 Persistence : 0**
- **MsgId : X'414D5120514D5F414E47454C494C4C4F6A25774B20002502'**
- **CorrelId : X'000000000000000000000000000000000000000000000000'**
- **BackoutCount : 0** ➔ *If greater than 1, it might be a "poison message"*
- ReplyToQ : ' '
- ReplyToQMgr : 'QM_ANGELILLO '

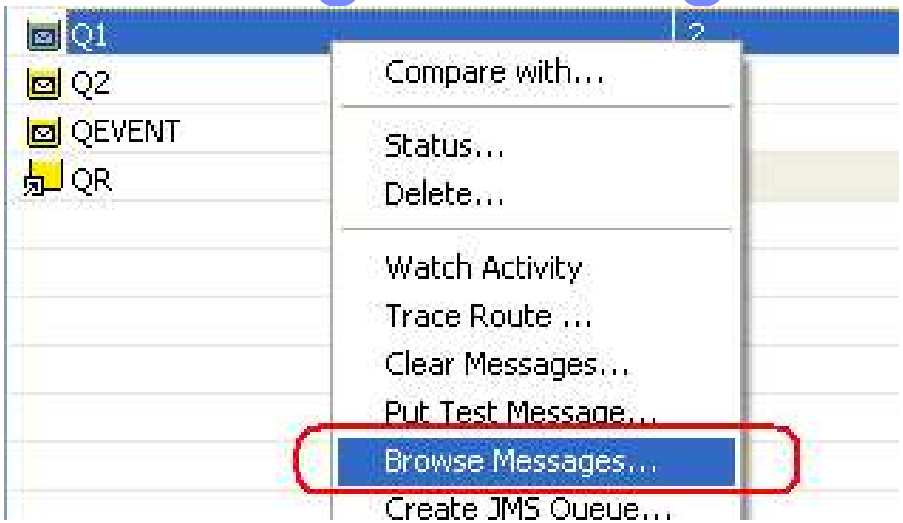
Browsing messages – amqsbcg 3

- >> BOTTOM PORTION <<
- ** Identity Context
- UserIdentifier : 'rivera '
- AccountingToken :
- X'16010515000000F275716EEB186F1B6E69D430EC0300000000000000000000000B'
- ApplIdentityData : ' '
- ** Origin Context
- PutApplType : '11'
- **PutApplName : 'WebSphere MQ\bin\amqsput.exe'**
- **PutDate : '20100213' PutTime : '22314973'**
- ApplOriginData : ' '

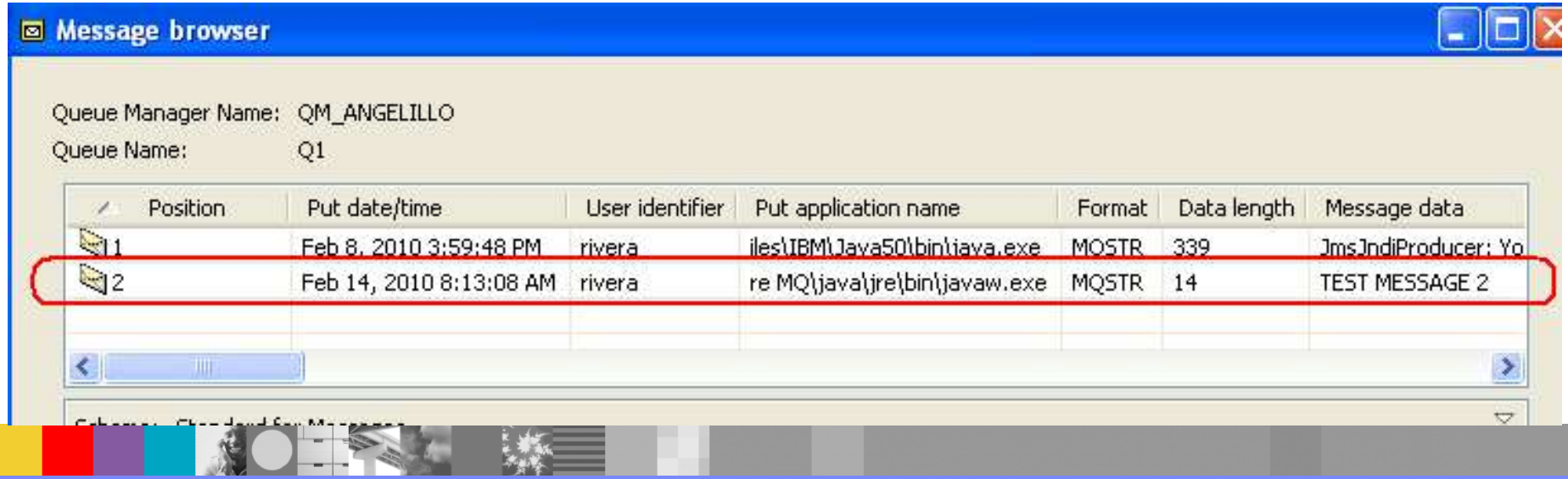
- GroupId : X'000000000000000000000000000000000000000000000000'
- MsgSeqNumber : '1'
- Offset : '0'
- MsgFlags : '0'
- OriginalLength : '-1'

- ****** Message ****** ➔ *This is the "contents" or "payload"*
- **length - 13 bytes**
- **00000000: 5445 5354 204D 4553 5341 4745 'TEST MESSAGE 1 '**

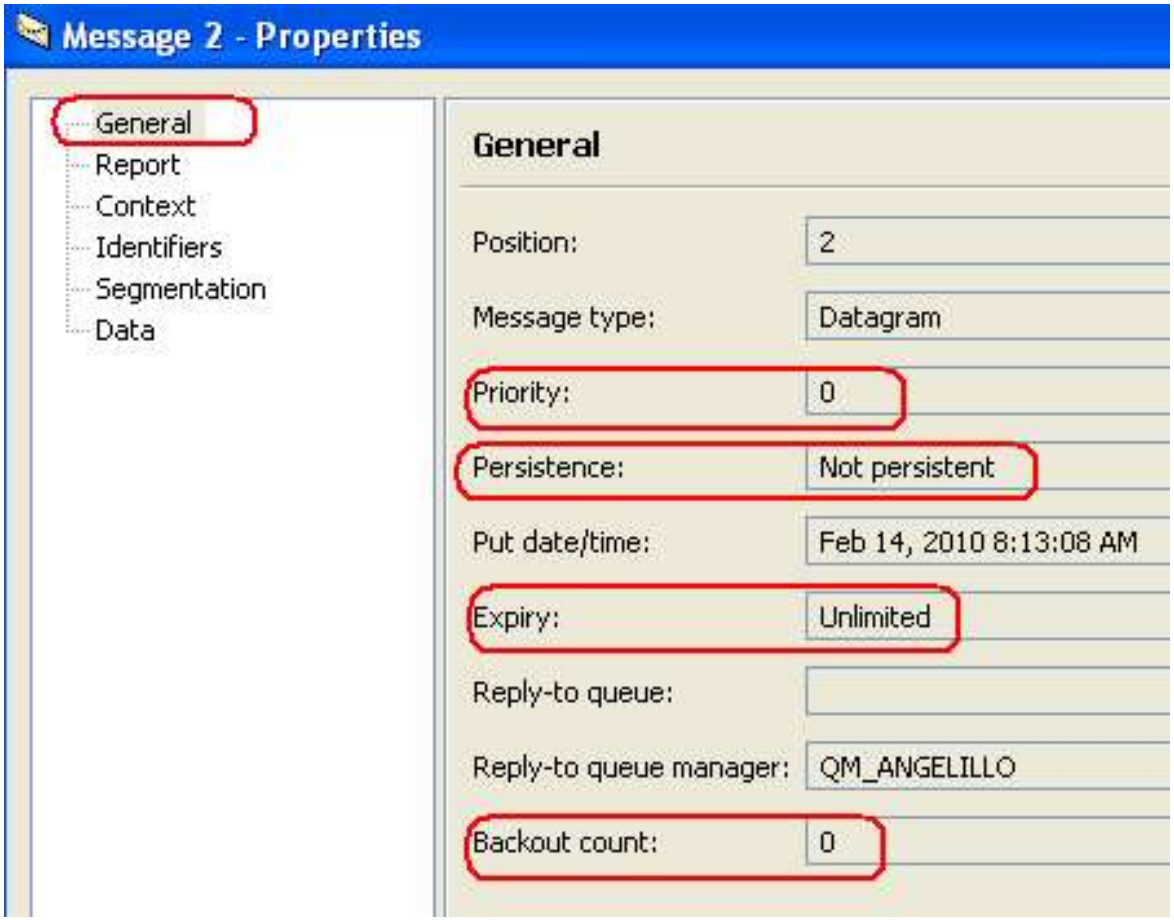
Browsing messages – Explorer 1



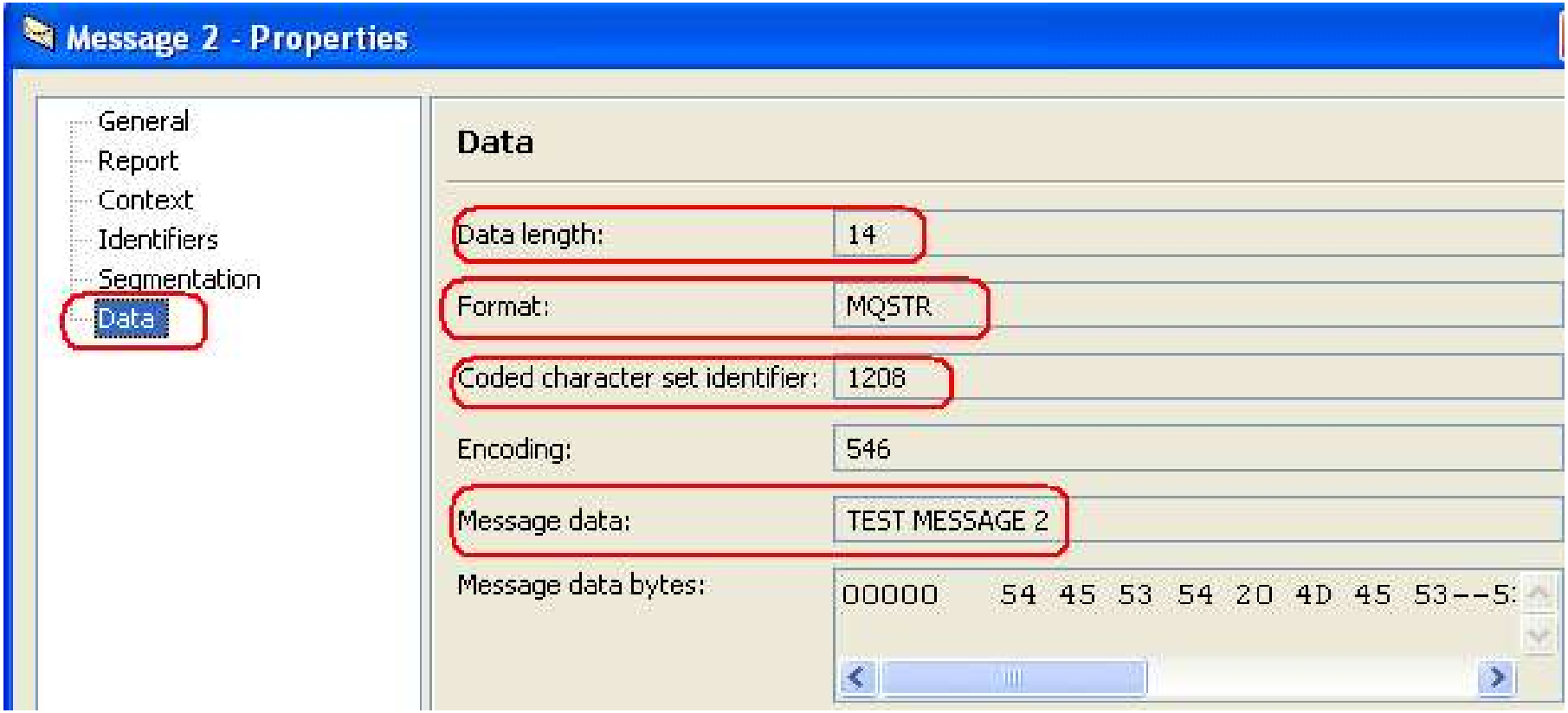
Select the Queue, then right-click and select Browse Messages ...



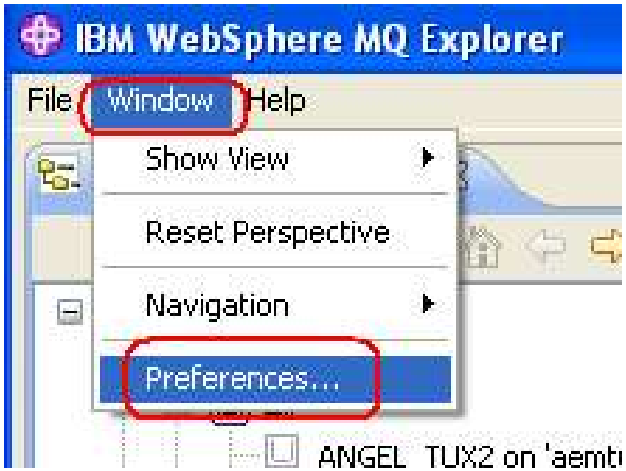
Browsing messages – Explorer 2



Browsing messages – Explorer 3

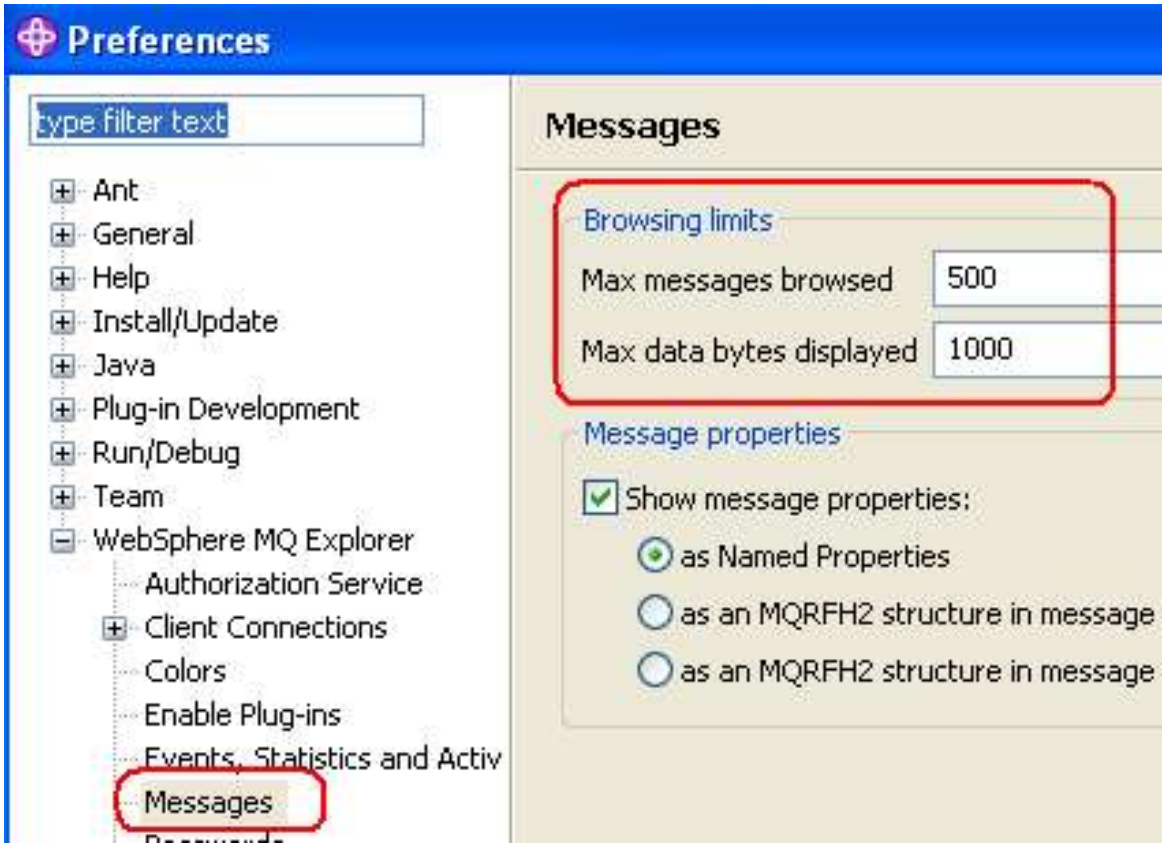


Explorer – Preferences - Messages



V7: You can customize:
how many messages to show in a queue
- how many bytes of data to display

V6: you cannot customize these 2 properties.



JMS messages V6 V7 JmsProducer 1

- Using sample: JmsProducer.java

- Unix: /opt/mqm/samp/jms/samples
- Need to setup the MQ environment variables to run JMS (notice the dot, space, setjmsenv)
  - 32-bit: . setjmsenv
  - 64-bit: . setjmsenv64

- Windows:
- C:\Program Files\IBM\WebSphere MQ\tools\jms\samples
- Note: The installer sets the proper variables.

JMS messages – JmsProducer 2

- C:\> java -Djava.library.path="C:\Program Files\IBM\We
- here MQ\Java\lib" -Dcom.ibm.msg.client.config.location="file:c:/var/mqm/myjms
- nfig" JmsProducer -m QM -d Q1
- Sent message:
- JMSMessage class: jms_text
- JMSType: null
- JMSDeliveryMode: 2
- JMSExpiration: 0
- JMSPriority: 4
- JMSMessageID: ID:414d5120514d5f414e47454c494c4c4fa962794b20009502
- JMSTimestamp: 1266249669343
- JMSCorrelationID: null
- JMSDestination: queue:///Q1
- JMSReplyTo: null
- JMSRedelivered: false
- JMSXAppID: WebSphere MQ Client for Java
- JMSXDeliveryCount: 0
- JMSXUserID: rivera
- JMS_IBM_PutApplType: 28
- JMS_IBM_PutDate: 20100215
- JMS_IBM_PutTime: 16010946
- **JmsProducer: Your lucky number today is 234**
- SUCCESS

JMS messages - JmsBrowser

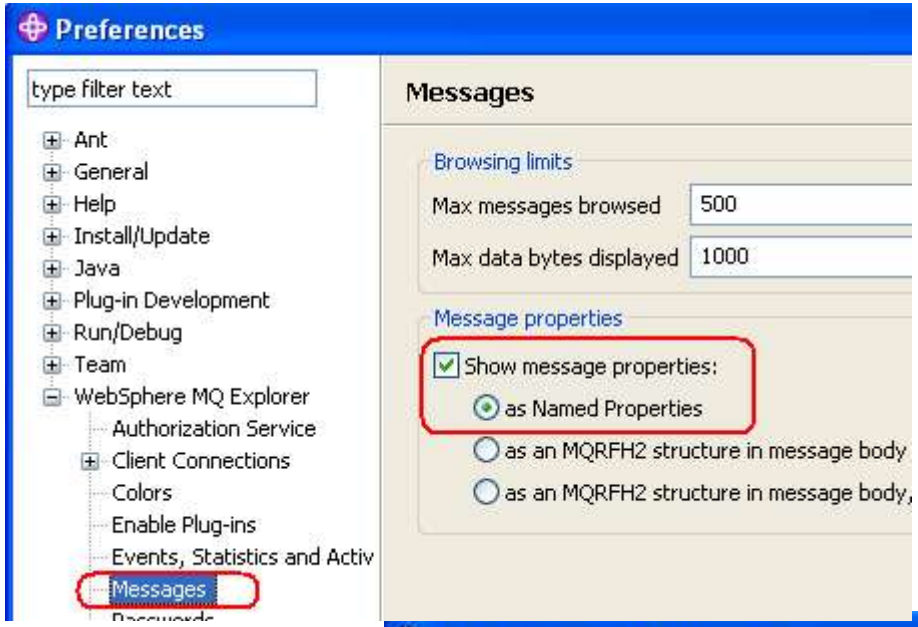
- C:\> java -Djava.library.path="C:\Program Files\IBM\WebSphere MQ\Java\lib" -Dcom.ibm.msg.client.config.location="file:c:/var/mqm/myjmsnfig" JmsBrowser -m QM -d Q1
- Browse starts - Message 1:
- JMSMessage class: jms_text
- JMSType: null
- JMSDeliveryMode: 2
- JMSExpiration: 0
- JMSPriority: 4
- JMSMessageID: ID:414d5120514d5f414e47454c494c4c4fa962794b20009502
- JMSTimestamp: 1266249669343
- JMSCorrelationID: null
- JMSDestination: queue:///Q1
- JMSReplyTo: null
- JMSRedelivered: false
- JMSXAppID: WebSphere MQ Client for Java
- JMSXDeliveryCount: 1
- JMSXUserID: rivera
- **JMS_IBM_Character_Set: UTF-8**
- **JMS_IBM_Encoding: 273**
- **JMS_IBM_Format: MQSTR**
- **JMS_IBM_MsgType: 8**
- JMS_IBM_PutApplType: 28
- JMS_IBM_PutDate: 20100215
- JMS_IBM_PutTime: 16010946
- **JmsProducer: Your lucky number today is 234**

JMS messages - amqsbcg

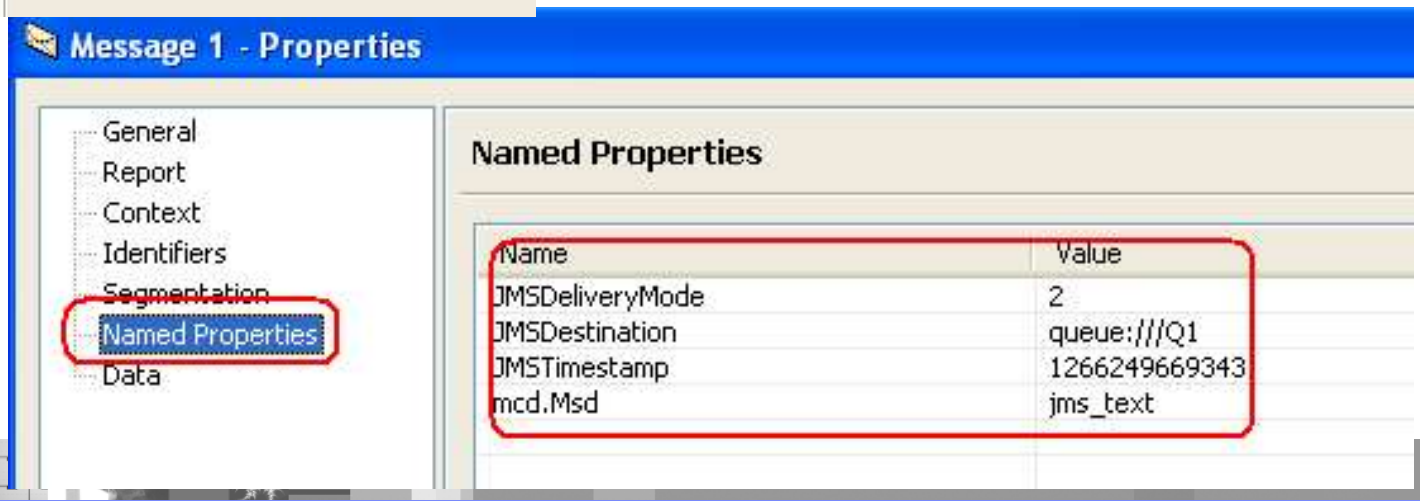
- C:\>amqsbcg Q1 QM_ANGELILLO
- … Encoding : 273 CodedCharSetId : 1208
- **Format : 'MQHRF2 '**
- Priority : 4 Persistence : 1
- … PutApplName : 'WebSphere MQ Client for Java'
- PutDate : '20100215' PutTime : '16010946'

- **** Message ****
- length - 191 bytes
- >>>>>>>> Begin RFH2 header <<<<<<<<<<
- 00000000: 5246 4820 0000 0002 0000 0094 0000 0111 'RFH .....ö....'
- 00000010: 0000 04B8 4D51 5354 5220 2020 0000 0000 '....MQSTR ....'
- 00000020: 0000 04B8 0000 0020 3C6D 6364 3E3C 4D73 '..... <mcd><Ms'
- 00000030: 643E 6A6D 735F 7465 7874 3C2F 4D73 643E 'd>jms_text</Msd>'
- 00000040: 3C2F 6D63 643E 2020 0000 0048 3C6A 6D73 '</mcd> ...H<jms'
- 00000050: 3E3C 4473 743E 7175 6575 653A 2F2F 2F51 '><Dst>queue:///Q'
- 00000060: 313C 2F44 7374 3E3C 546D 733E 3132 3636 '1</Dst><Tms>1266'
- 00000070: 3234 3936 3639 3334 333C 2F54 6D73 3E3C '249669343</Tms><'
- 00000080: 446C 763E 323C 2F44 6C76 3E3C 2F6A 6D73 'Dlv>2</Dlv></jms'
- >>>>>>>> End RFH2 header <<<<<<<<<<
- 00000090: 3E20 2020 4A6D 7350 726F 6475 6365 723A '> JmsProducer:'
- 000000A0: 2059 6F75 7220 6C75 636B 7920 6E75 6D62 ' Your lucky numb'
- 000000B0: 6572 2074 6F64 6179 2069 7320 3233 34 'er today is 234 '

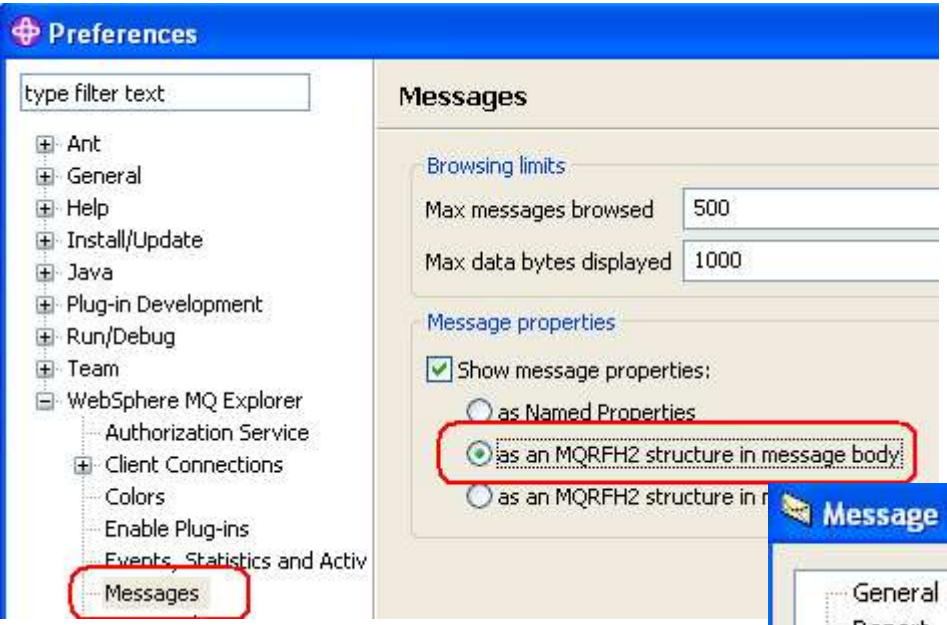
JMS messages – Explorer 1



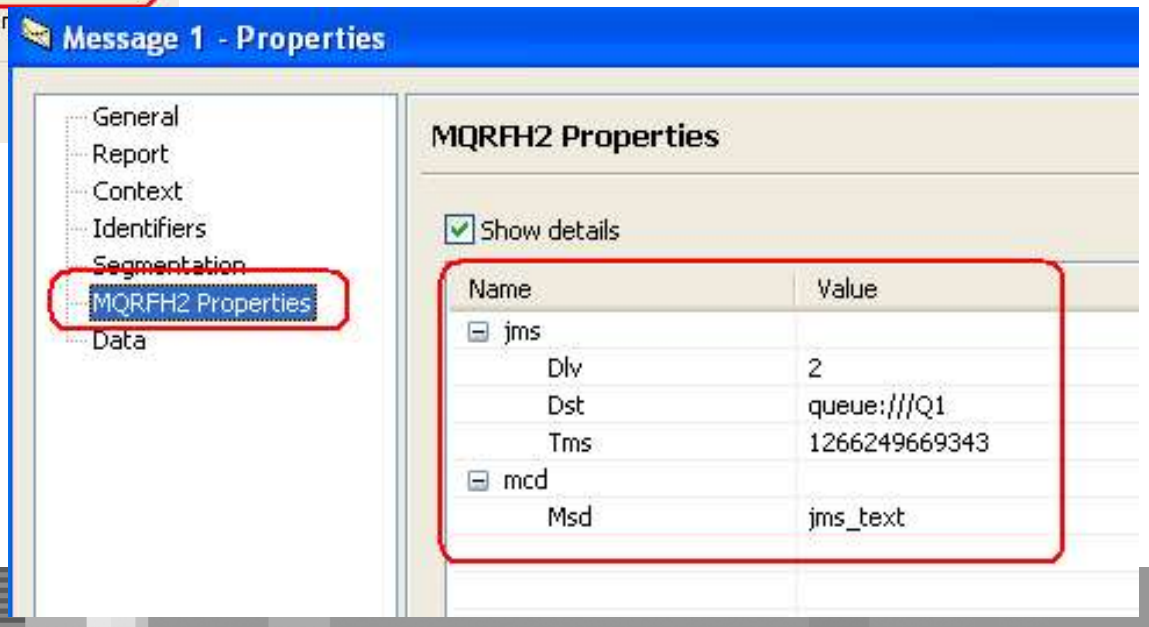
Show message properties:
(*) as Named Properties



JMS messages – Explorer 2



Show message properties:
(*) as an MQRFH2
structure in message body



Dead Letter Queue V6 V7 – amqsbcg 1

- When messages are placed onto the Dead Letter Queue (such as SYSTEM.DEAD.LETTER.QUEUE), a special header is attached to the message giving information on why the message has been put onto the queue (reason code).
- You can use the sample amqsbcg to find out the reason code:
- amqsbcg SYSTEM.DEAD.LETTER.QUEUE QMgrName

Dead Letter Queue – amqsbcg 2

- In the message header, notice: **Format : ‘MQDEAD ‘**

- StrucId : 'MD ' Version : 2
- Report : 0 MsgType : 8
- Expiry : -1 Feedback : 0
- Encoding : 273 CodedCharSetId : 819
- **Format : 'MQDEAD '**
- Priority : 0 Persistence : 0
- MsgId : X'414D5120415744545732303220202020945178452 01F4483'

Dead Letter Queue – amqsbcg 3

- In the message data, see the first line in the output.
- It has an eye catcher: DLH

```
****   Message       ****

 length - 697 bytes

00000000:  444C 4820 0000 0001 0000 07F3 4157 442E 'DLH ....... AWD.'
                               *********      ***
```

- Notice the value for the 9-13 bytes (5th and 6th pairs from the left).
  - In this case it is hexadecimal 0000 007F3 or 000007F3

Dead Letter Queue – amqsbcg 4

- **For Unix (except for Linux on x86 – Intel):**
- You can use the "mqrc" command to find out the meaning of 000007F3
- You have to compose the code to be as follows, in hexadecimal:
- $ mqrc 0x000007f3
- 2035 0x000007f3 MQRC_NOT_AUTHORIZED

Dead Letter Queue – amqsbcg 5

- Keep in mind that the following shortcuts will NOT work with mqrc:

- $ mqrc x'7F3'
- No matching return codes

- $ mqrc x7F3
- No matching return codes

- $ mqrc x07F3
- No matching return codes

Dead Letter Queue – amqsbcg 6

- **For Windows and Linux for Intel:**
- You need to take into account the swapping of the bytes.
- The following is obtained from a DLQ in Windows.
- `00000000:  444C 4820 0100 0000 2508 0000 5133 2020 'DLH ....%...Q3  `
  byte2 byte1

- You cannot use 0x25080000 because it is not a valid reason code:

- C:\> mqrc 0x25080000
  - No matching return codes

Dead Letter Queue – amqsbcg 7

- In Intel, you need to swap the bytes and reverse the order:

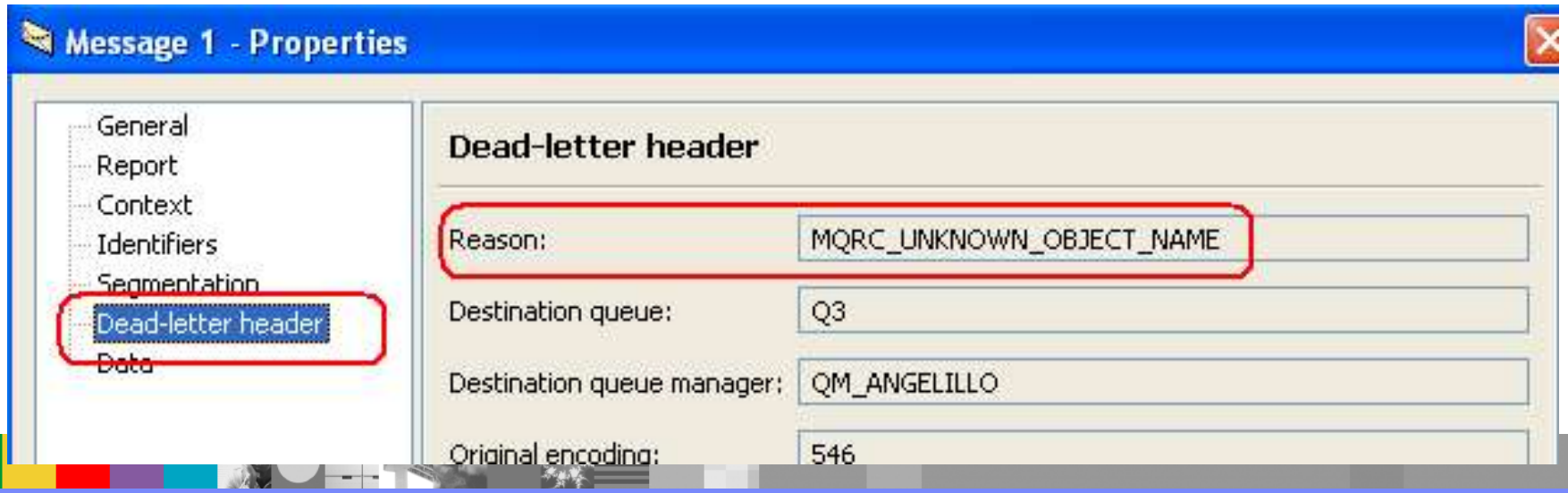
```
2508 0000  => 00 00 08 25
        ++------++
      ++ -------- ++
    ++ ------------ ++
++ ------------------ ++
```

- Thus, the reason code is:
  - 0x00000825

- C:\> mqrc 0x00000825
- 2085 0x00000825 MQRC_UNKNOWN_OBJECT_NAME

Dead Letter Queue – Explorer

- It is far easier to find out the reason code by browsing a message from the DLQ via MQ Explorer.
- It handles the swapping of bytes according to platform.
- You can do reverse lookup via mqrc:
  - $ mqrc MQRC_UNKNOWN_OBJECT_NAME
- 2085 0x00000825



Message Properties in V7 - 1

- http://www-01.ibm.com/support/docview.wss?rs=171&uid=swg27017014
- MQ V7: How to view the message properties and, or RFH2 header from a message

- This document shows the different output that can be obtained with the different choices from the Explorer and the sample amqsbcg to display:
  - the RFH2 header for JMS messages
  - message properties created by non-JMS applications.

Message Properties in V7 - 2

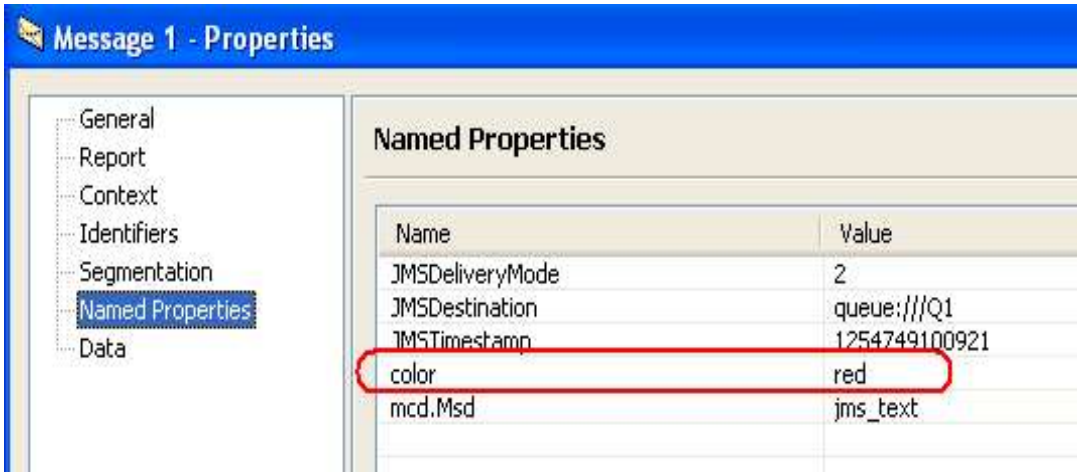
- Samples to create messages with properties

  JMS: See the JMS sample:
- Sample: SampleJMSMsgProperty.java
- Which is provided with techdoc:
  http://www.ibm.com/support/docview.wss?rs=171&uid=swg27016581
  Using an MDB with JMS message selectors with WebSphere MQ V7 and WebSphere Application Server V7

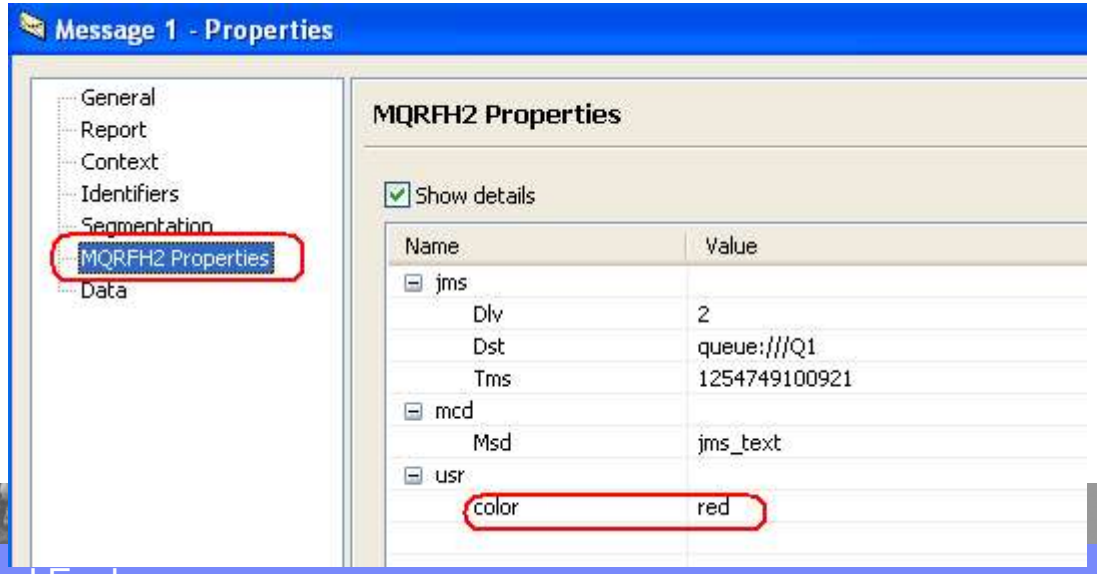
  C-code: See the C sample in the MQ directory tree:
  Unix: /opt/mqm/samp/bin/amqsstm

Message Properties in V7 – Explorer

- As Named
- Properties



As an MQRFH2 structure in message body



amqsbcg – message properties V7

- With amqsbcg, there are 6 different ways to display the message properties.
- The amqsbcg command needs to be invoked with an option (a single digit) as the last input parameter, to indicate the desired way to display the message properties:

PROPS_AS_Q_DEF:	amqsbcg Q1 QM	0
PROPS_IN_MSG_HANDLE:	amqsbcg Q1 QM	1
PROPS_NONE:	amqsbcg Q1 QM	2
PROPS_IN_MQRFH2:	amqsbcg Q1 QM	3
PROPS_COMPATIBILITY:	amqsbcg Q1 QM	4
PROPS_LAST:	amqsbcg Q1 QM	5

PROPS_IN_MSG_HANDLE (1)

- The main differences are:
  a) In the output: **Format : 'MQSTR '**
  b) There is an explicit section with the message properties.
  c) The section for the message data does not show the message properties.

- OriginalLength : '-1'
- ****Message properties****
- **color : 'red'**
- **** Message ****
- length - 72 bytes
- 00000000: 5246 4820 0200

PROPS_NONE (2)

- The main differences are:
  a) In the output: **Format : 'MQSTR '**
  b) The section for the message data does not show the message properties.

- OriginalLength : '-1'
  **** Message ****
- length - 72 bytes
- 00000000: 5246 4820 0200

PROPS_IN_MQRFH2 (3)

- The main differences are:
  a) In the output: **Format : 'MQHRF2 '**
  b) The section for the message data shows the RFH2 header

- `****  Message  ****`

```
 length - 72 bytes

00000000:  5246 4820 0200 0000 4800 0000 2202 0000 'RFH ....H..."...'
00000010:  B501 0000 4D51 5354 5220 2020 0000 0000 '....MQSTR   ....'
00000020:  B804 0000 2000 0000 3C75 7372 3E3C 636F '.... ...<usr><co'
00000030:  6C6F 723E 7265 643C 2F63 6F6C 6F72 3E3C 'lor>red</color><'
                                                  '
00000040:  2F75 7372 3E20 2020                    '/usr>
```

SupportPac IH03 RFHUtil - 1

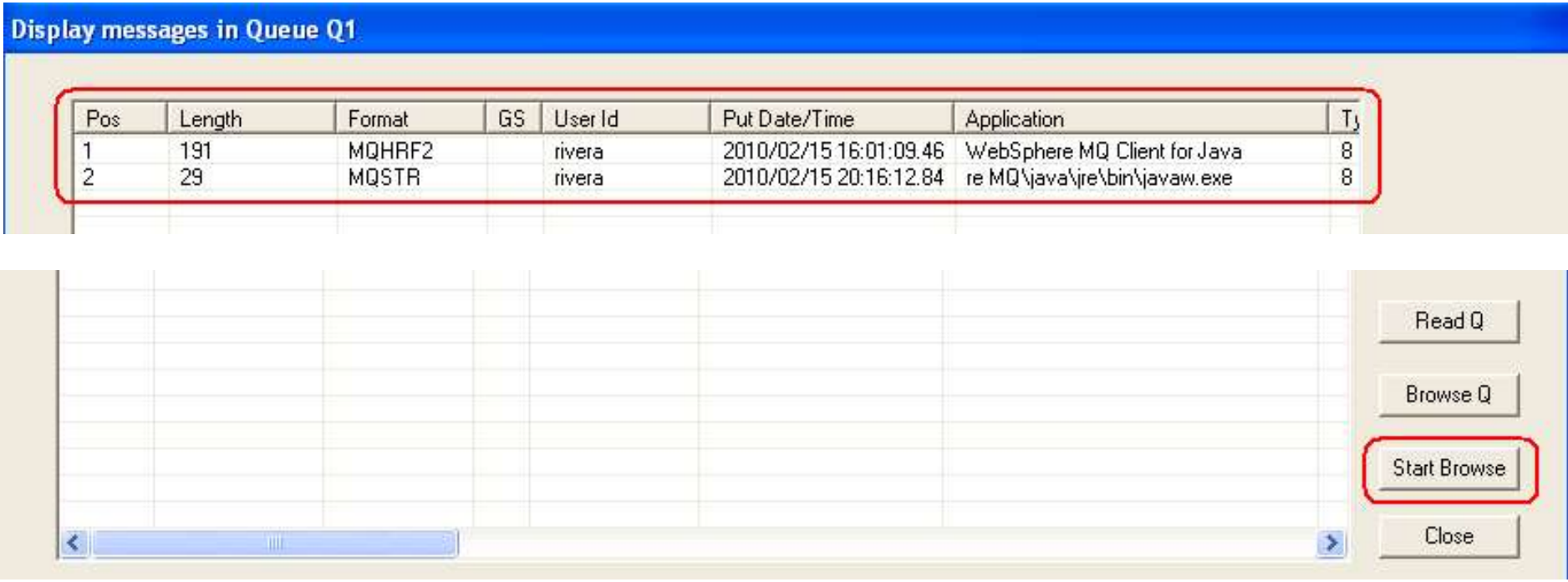
- IH03: WebSphere Message Broker V7 - Message display, test & performance utilities (RFHutil)
- http://www-1.ibm.com/support/docview.wss?rs=171&uid=swg24000637

- It contains a GUI utility for Windows and several line commands for different platforms.
- With the GUI you can browse messages and view the different components such as the message descriptor, the payload (contents/data), the JMS header, etc.

- **Technical support:**
- Category 2 Provided in good faith and AS-IS

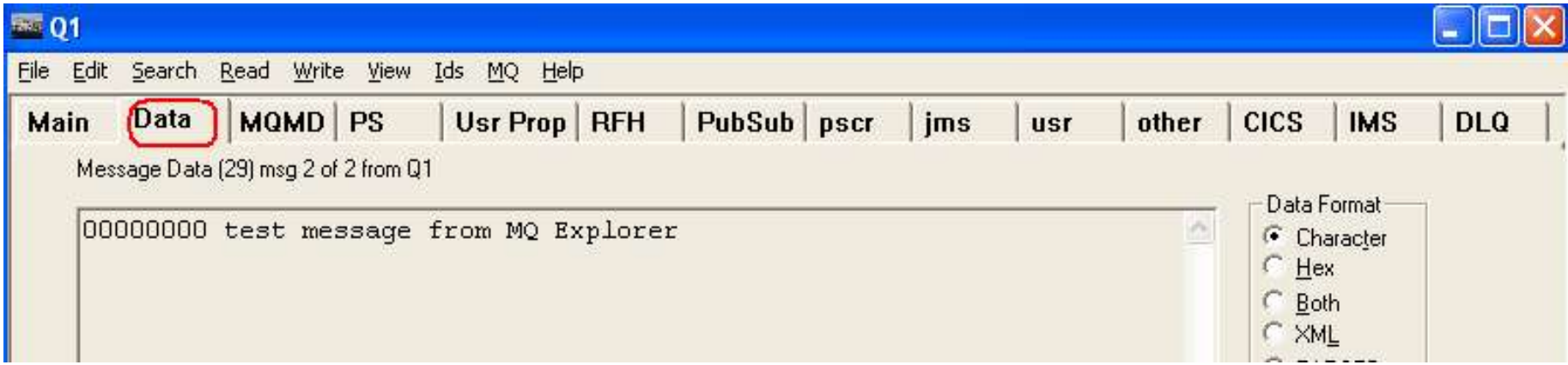
SupportPac IH03 RFHUtil - 2

SupportPac IH03 RFHUtil - 3



SupportPac IH03 RFHUtil - 4

- When browsing, you can click on the different tabs to look at a particular section of a message (data) and the meta-data for the message (MQMD – message descriptor, PS – Pub/Sub, etc.)



SupportPac MA96 Message Browser 1

- MA96: WebSphere MQ - Message Browser
- http://www-01.ibm.com/support/docview.wss?uid=swg24021783

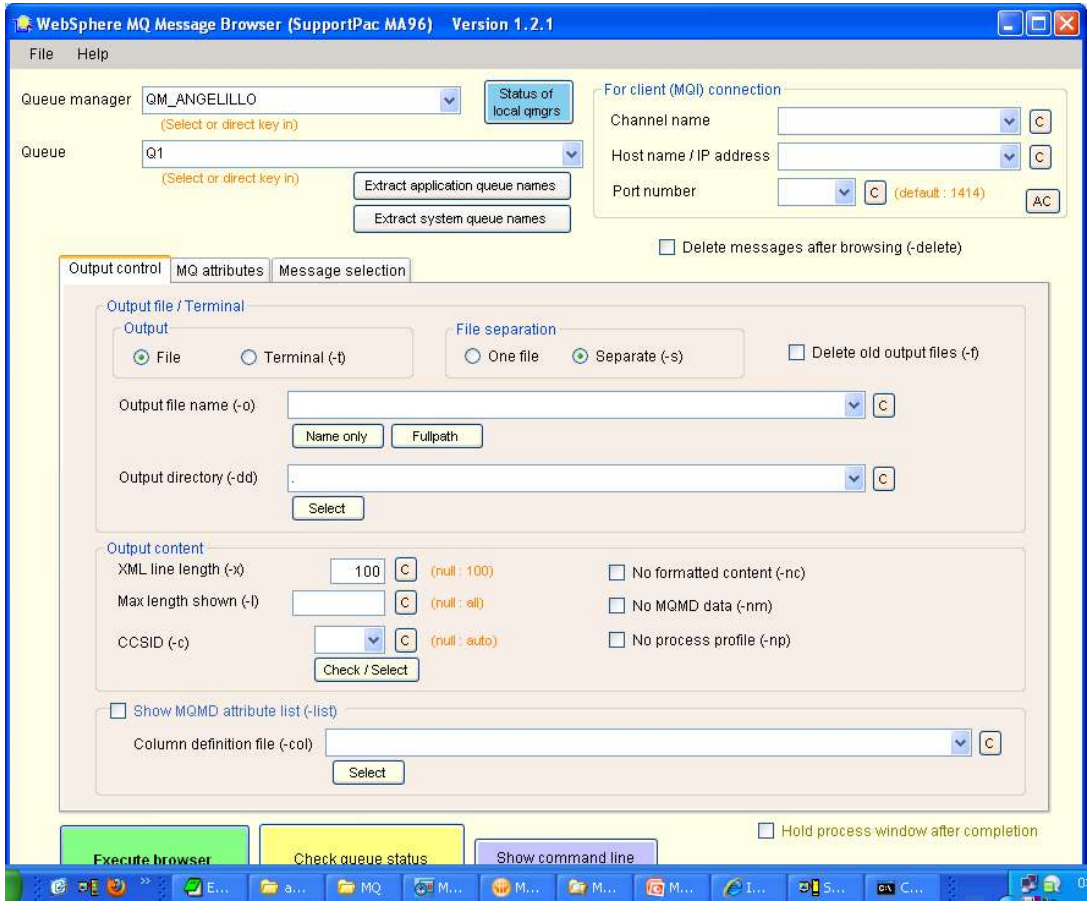
- Message descriptor (MQMD) is shown in parsed format. Each data in MQMD is shown with semantic descriptions in addition to actual value.

- Message content is shown in graphic hexadecimal representation and also in character representation.

- In addition, extended formatting function is provided for MQADMIN, MQDEAD, MQEVENT, MQHDIST, MQHEPCF, MQHMDE, MQHREF, MQHRF, MQHRF2, MQPCF, MQTRIG and MQXMIT format.

- **Technical support:** Category 2 Provided in good faith and AS-IS

SupportPac MA96 Message Browser 2



SupportPacs MO03 Queue Load

- http://www-01.ibm.com/support/docview.wss?rs=171&uid=swg24009368
- MO03: WebSphere MQ Queue Load / Unload Utility

- It allows the user to copy or move the contents of a queue, its messages, to a file.
- This file can be saved away as required and used at some later point to reload the messages back onto the queue.
- This file has a specific format understood by the utility, but is human-readable, so that it can be updated in an editor before being reloaded.

- **Technical support:** Category 2 Provided in good faith and AS-IS

SupportPacs MA17 Msg Handler z/OS

- http://www-01.ibm.com/support/docview.wss?rs=171&uid=swg24000071
- MA17: WebSphere MQ for z/OS - Message Handler Sample

- It provides C and COBOL sample code for a message handling application for WebSphere MQ for MVS/ESA.
- The program will allow users to view, forward and delete messages.

- **Technical support:** Category 2 Provided in good faith and AS-IS

References (1)

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- WebSphere MQ V7 Information Center:

- http://www-1.ibm.com/support/docview.wss?uid=swg27012921
- WSTE: What is new in WebSphere MQ Version

- http://www-01.ibm.com/support/docview.wss?uid=swg27014355
- WSTE: What is new in WebSphere MQ Explorer V7

- http://www-1.ibm.com/support/docview.wss?rs=171&uid=swg27008431
- WSTE: Remote administration of queue managers using WebSphere MQ Explorer

References (2)

- http://www.redbooks.ibm.com/abstracts/SG247128.html?Open
- Redbook: WebSphere MQ V6 Fundamentals (SG24-7128)

- http://www.redbooks.ibm.com/abstracts/SG247583.html?Open
- Redbook: WebSphere MQ V7.0 Features and Enhancements (SG24-7583)

- http://www-01.ibm.com/support/docview.wss?uid=swg21395807
- How to obtain the value for an attribute from the output of runmqsc

- http://www-01.ibm.com/support/docview.wss?rs=171&uid=swg27017014
- MQ V7: How to view the message properties and, or RFH2 header from a message

References (3)

- http://www.ibm.com/support/docview.wss?rs=171&uid=swg27016581
- Using an MDB with JMS message selectors with WebSphere MQ V7 and WebSphere Application Server V7

- http://www-01.ibm.com/support/docview.wss?rs=171&uid=swg24021041
- MS0T: WebSphere MQ Explorer

- http://www-1.ibm.com/support/docview.wss?rs=171&uid=swg24000637
- IH03: WebSphere Message Broker V7 - Message display, test & performance utilities (RFHutil)
- http://www-01.ibm.com/support/docview.wss?uid=swg24021783
- MA96: WebSphere MQ - Message Browser
- http://www-01.ibm.com/support/docview.wss?rs=171&uid=swg24000071
- MA17: WebSphere MQ for z/OS - Message Handler Sample
- http://www-01.ibm.com/support/docview.wss?rs=171&uid=swg24009368
- MO03: WebSphere MQ Queue Load / Unload Utility

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