Processing Segmented Messages in DataPower® using MQ® V7

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Agenda

- Overview of MQ File Transfer Edition (MQFTE)
- MQFTE Components
- Overview of MQ Segmented Messages
- DataPower Service Configurations
- Demonstration of Message Flow
- Troubleshooting Techniques
- Useful Links
- Questions and Answers

Overview of MQ File Transfer Edition(MQFTE)

- WebSphere MQ File Transfer Edition (MQFTE) transfers files between systems in a managed and auditable way, regardless of file size or the operating systems

- Compared to regular FTP, MQFTE has the following advantages:
    - Reliability
    - Security
    - Automation
    - Visibility
    - Flexibility
    - Integrated

Overview of MQ File Transfer Edition(MQFTE)

- ## MQFTE vs FTP
  - ▸ Any file size (Kb, Mb, Gb, Tb…)
  - ▸ Reliable delivery leveraging MQ
  - ▸ Guaranteed 100% Integrity
  - ▸ Full logging for audit purpose
  - ▸ High Performance
  - ▸ Character set conversion
  - ▸ Very Secure with Industry standard SSL security
  - ▸ XML scripting (Ant Scripting) for distributed job automation
  - ▸ Multi-purpose solution – transports both messages and files
  - ▸ Supports many platforms
  - ▸ Multi-instance fail-over capability

MQFTE Components

Agent
FTE agent is a process which transfers from one agent (source) to another agent (destination)

Agent Queue Manager
A queue manager that hosts an agent's queues.
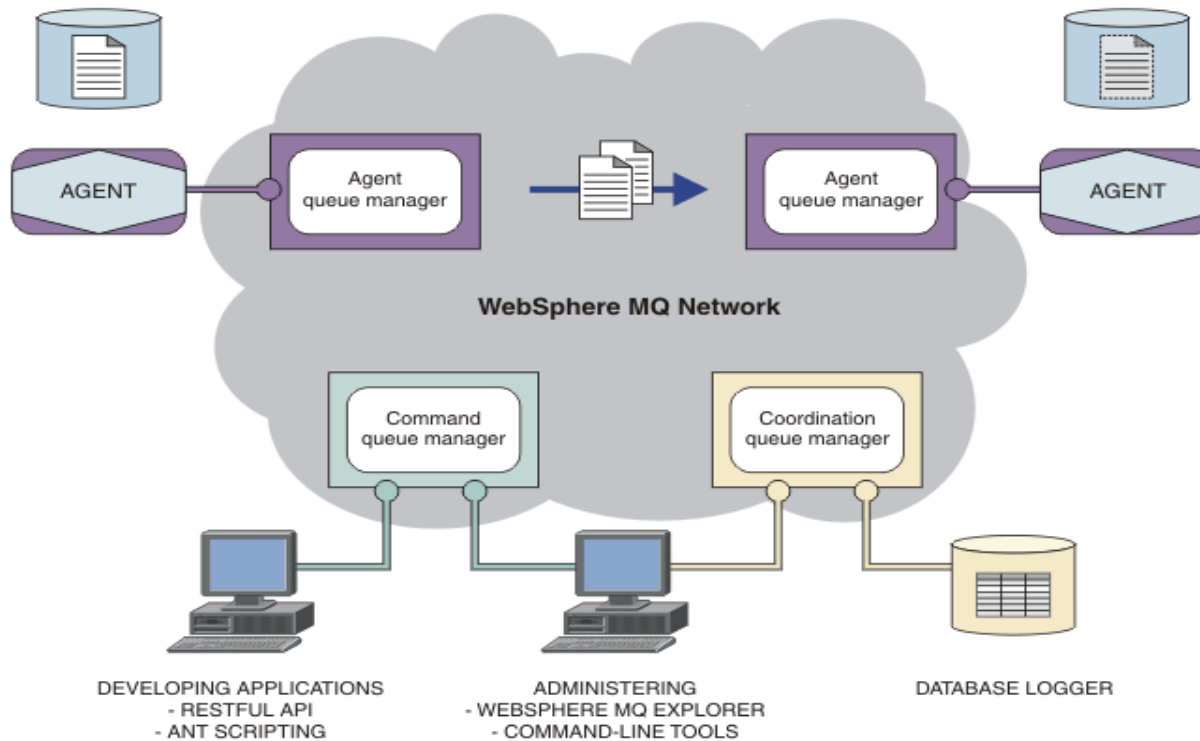
Coordination Queue Manager
The coordination queue manager broadcasts audit of file transfer also this QM in the MQ network that acts as a central location.

Command Queue Manager
The command queue manager is used to connect to the WebSphere MQ network and is the queue manager connected to when you issue MQFTE commands

MQFTE Components in MQ Network

# MQFTE Agent queue manager showing in MQ Explorer Tool

Overview of MQ Segmented Message

- ## Message Segmentation

  - ▶ When the Message is too large for the queue or queue manager (qmgr), the message can be segmented to smaller size to PUT in the queue for further processing

  - ▶ The segmented messages are identified by GroupId and MsgSeqNumber fields

  - ▶ The MsgSeqNumber starts at 1 for the first message within a group, and if a message is not in a group, the value of the field is 1
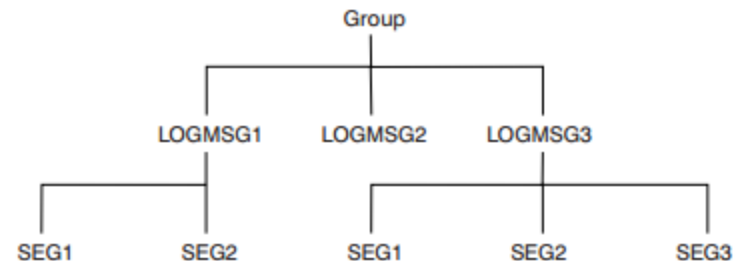
Group

LOGMSG1   LOGMSG2   LOGMSG3
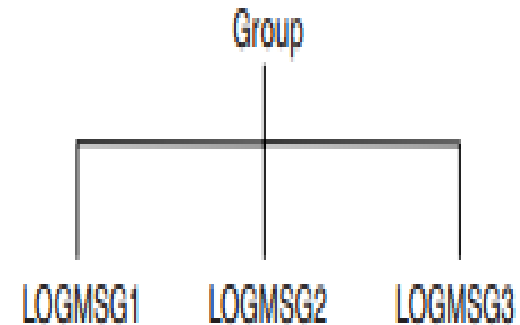
Overview of MQ Logical Message

- Logical messages are used within a group to Ensure ordering
- Applications allow to group together similar messages
- Each message within a group consists of one physical message, unless it is split into segments
- Each message is logically a separate message, and only the GroupId and MsgSeqNumber fields in the MQMD need bear any relationship to other messages in the group
- Other fields in the MQMD are independent; some might be identical for all messages in the group whereas others might be different. For example, messages in a group can have different format names, CCSIDs, encodings, and so on

MQ Segmented Message

- Segments are used to handle messages that are too large for either the putting or getting application or the queue manager (including intervening queue managers through which the message passes)
- A segment of a message is identified by the GroupId, MsgSeqNumber, and Offset fields
- The Offset field starts at zero for the first segment within a message
- Each segment consists of one physical message that might belong to a Group

- A segment is logically part of a single message, so only the MsgId, Offset, and SegmentFlag fields in the MQMD should differ between separate segments of the same message

The figure below shows a group of logical messages, some of which are segmented:

Sample MQ Segmented Message

- One physical message is segmented to three logical messages with MsgSeqNumber showing as 1, 2 and 3 having the same GroupId

Flags	Group identifier	Group identifier bytes	Logical sequence number	Message identifier	Message identifier bytes	Message type	Offset
Message in group	AMQ QM_LINUX	414D5120514D5F4C494E5558202020202000CD9853044E3E20	1	í	CD000000000000000000000000000000000000000000000000	Datagram	0
Message in group	AMQ QM_LINUX	414D5120514D5F4C494E5558202020202000CD9853044E3E20	2	AMQ QM_LINUX	414D5120514D5F4C494E5558202020202000CD9853054E3E20	Datagram	0
Message in group , Last message in group	AMQ QM_LINUX	414D5120514D5F4C494E5558202020202000CD9853044E3E20	3	AMQ QM_LINUX	414D5120514D5F4C494E5558202020202000CD9853064E3E20	Datagram	0

Configuration of DataPower Service and its associated Objects

DataPower Service Configuration – Best Practices

▶ Create Multi-Protocol Gateway Service

▶ Create Front Side Handlers such as MQ and MQFTE

▶ Create mq-mq Object and its associated parameters

▶ Create Style Policy, Rules and Multi-steps

▶ Configure Backside MQ / MQFTE URLs

▶ Configure additional Multi-Protocol Gateway attributes for MQ traffic

DataPower Multi-Protocol Gateway (MPGW) Service Configuration for MQ Traffic

- ▶ Request Rule only, no Response Rule

- ▶ May have Error Rule

- ▶ Process Backend Errors is "off" under the advanced tab of the Multi-Protocol Gateway (MPGW) Service

- ▶ Request Type as "XML", "SOAP", "non-XML" or "pass-thru"

- ▶ Response Type as "pass-thru"

- ▶ Propagate URI as "off"

- ▶ Backside MQ URL specifies "Request Queue"

- ▶ Backside MQ URL can add "Transactional=true" tag if units-of-work is configured in mq-qm object

DataPower Multi-Protocol Gateway (MPGW) Configuration

DataPower Multi-Protocol Gateway Configuration

Back attachment processing format
- ● Dynamic
- ○ MIME
- ○ DIME
- ○ Detect

Back Side Timeout

| 120 | *

Stream Output to Back
- ● Buffer Messages
- ○ Stream Messages

HTTP Version to Server
- ○ HTTP 1.0
- ● HTTP 1.1

Propagate URI
- ○ on ● off

Compression
- ○ on ● off

Front attachment processing format
- ● Dynamic
- ○ MIME
- ○ DIME
- ○ Detect

Front Side Timeout

| 120 | *

Stream Output to Front
- ● Buffer Messages
- ○ Stream Messages

DataPower MPGW Configuration – Advanced Tab

Configure Multi-Protocol Gateway

General | **Advanced** | Stylesheet Params | Headers | Monitors | WS-Addressing | WS-Reliabl

Apply | Cancel | Delete   Export | View Log | View Status | Show Probe | Validate Conformance | Help

Multi-Protocol Gateway status: [up]

Advanced settings

Persistent Connections
◉ on ○ off

Allow Cache-Control Header
○ on ◉ off

Loop Detection
○ on ◉ off

Follow Redirects
◉ on ○ off

Allow Chunked Uploads
○ on ◉ off

Process Backend Errors
◉ on ○ off

Front Persistent Timeout
180   seconds *

Back Persistent Timeout
180   seconds *

MIME Back Header Processing
◉ on ○ off

MIME Front Header Processing
◉ on ○ off

Service Priority
Normal ▾

Default Param Namespace
http://www.datapower.com/param/config

Query Param Namespace
http://www.datapower.com/param/query

SOAP Schema URL
store:///schemas/soap-envelope.x

Load Balancer Hash Header

Message Processing Modes
☐ Request rule in order
☐ Backend in order
☐ Response rule in order

Process Messages Whose Body Is Empty
○ on ◉ off

DataPower MQ Front Side Handler

Configure MQ Front Side Handler

Main

MQ Front Side Handler: message-to-file-fsh [up]

Apply Cancel Undo

Export | View Log | View Status | Help
Quiesce | Unquiesce

General

Administrative State	⦿ enabled ○ disabled
Comments	
Queue Manager	BIG-MSG-QM ▼ + ... *
Get Queue	QUEUE10 *
Put Queue	
The number of concurrent MQ connections	1
Get Message Options	4097
Polling Interval	30 seconds
Retrieve Backout Settings	○ on ⦿ off
Use Queue Manager in URL	○ on ⦿ off
CCSI	0

Publish and Subscribe

Subscribe Topic String	
Subscription Name	
Publish Topic String	

DataPower MQFTE Front Side Handler

Configure MQFTE Front Side Handler

Main

MQFTE Front Side Handler: msg-to-msg-mqfte-fsh [up]

[Apply] [Cancel] [Undo]

Export | View Log | View Status | Help
Quiesce | Unquiesce

General

Administrative State	● enabled ○ disabled
Comments	
Queue Manager	LINUX-MQ ▼ [+] [...] *
Get Queue	MESSAGE.TO.FILE.TEST1 *
The number of concurrent MQ connections	1
Get Message Options	36865
Polling Interval	30 seconds
Retrieve Backout Settings	○ on ● off
Use Queue Manager in URL	○ on ● off

Other Properties

Ignore backout errors	○ on ● off

DataPower MQ Queue Manager (mq-qm) Object Configuration

Configure MQ Queue Manager

Main   Connections   CCSI   MQCSP

MQ Queue Manager: BIG-MSG-QM [up]

Apply   Cancel   Delete   Undo   Export | View Log | View Status | Help

General Configuration

Administrative State	⦿ enabled ○ disabled
Comments	
Host Name	9.27.52.240(1620) *
Queue Manager Name	QM_LINUX
Channel Name	BIG.MSG.CHANNEL1
Channel Heartbeat	300 seconds
User Name	mqm
Alternate User	⦿ on ○ off
XML Manager	queue-to-sftp-xml-mgr ▾ [+] [...] *
Maximum Message Size	104857600 bytes
Cache Timeout	60 seconds

Units of Work and Backout

Units of Work	1
Automatic Backout	⦿ on ○ off
Backout Threshold	1
Backout Queue Name	ERROR.Q2

DataPower mq-qm Object Configuration – Connection Tab

DataPower Multi-Protocol Gateway Policy and Multi-Steps Configurations

Configure Multi-Protocol Gateway Style Policy

Policy:

Policy Name: message-to-file-policy *

Apply Policy   Cancel

Export | View Log | View Status | Close Window

Rule:

Rule Name: message-to-file-policy_rule_4   Rule Direction: Client to Server ▾

New Rule   Delete Rule

Create rule: Click New, drag action icons onto line.   Edit rule: Click on rule, double-click on action

Filter Sign Verify Validate Encrypt Decrypt Transform Route AAA Results Advanced

CLIENT

Action: Match
matchAll
Match Rule:
Type : url
Url : *
Method : default
MatchWithPCRE : off
CombineWithOr : off

ORIGIN SERVER

Create Reusable Rule

Configured Rules				
Order	Rule Name	Direction	Actions	
⇧⇩	message-to-file-policy_rule_4	Client to Server	◇ ⏎	delete rule

Example DataPower MQ and MQFTE Backend URLs (Note: MQFTE URL uses "&" separator)

- Example MQFTE URL with Transactional tag:

  dpmqfte://LINUX-MQ/?RequestQueue=QUEUE11&

  DestAgent=AGENT2&DestQM=QM_LINUX&

  DestFile=test2.xml&Transactional=true

- Example MQFTE URL without Transactional tag:

  dpmqfte://LINUX-MQ/?RequestQueue=QUEUE11&

  DestAgent=AGENT2&DestQM=QM_LINUX&DestFile=test2.xml

- Example MQ URL with Transactional tag:

  dpmq://LINUX-

  MQ/?RequestQueue=QUEUE12;Transactional=true

- Example MQ URL without Transactional tag:

  dpmqfte://LINUX-MQ/?RequestQueue=QUEUE12

Demonstration of Message Flow using DataPower Application

Requirements for Processing Large MQ messages in DataPower

- MQ server side requirements:

  ▶ MQ **queue manager** (qmgr), **Channel** and **queue** should have MAXMSGL attribute value equal or greater than the estimated message size. The default value is 4 MB

- DataPower side requirements:

  ▶ The mq-qm object should have the **Maximum Message Size** attribute value equal or greater than estimated message size. The default is 1 MB

  ▶ The associated XML Manager's **XML Bytes Scanned** attribute should have the value equal or greater than estimated message size

Segmented Message Processing Scenario 1:

- Scenario 1: One Message to multiple segmented messages (queue to queue)

  - ▸ Configure MQ, HTTP(S) or SFTP Poller as the Front Side Handler in the MPGW service

  - ▸ Configure MQFTE URL for the Backend Destination

  - ▸ Configure mq-qm object with the "Maximum Message Size" with a value smaller than the request message size

  - ▸ DataPower will create segmented messages based on the defined message size in the mq-qm object used in MQFTE URL

Segmented Message Processing Scenario 2

- Scenario 2: Multiple segmented messages to one single message (queue-to-queue)

  ▶ Multiple segmented messages are created using MQFTE Agent in the queue

  ▶ Configure MQFTE as the Front Side Handler in the MPGW service to GET messages from that queue

  ▶ Configure MQFTE URL for the Backend Destination

  ▶ Configure mq-qm object with the "Maximum Message Size" with a value larger or equal to the estimated outbound message size

  ▶ DataPower will create one message for the destination queue by assembling segmented messages

Segmented Message Processing Scenario 3

- Scenario 3: Multiple segmented messages to one single message (queue-to-file)

  ▶ Configure MQ, HTTP(S) or SFTP Poller as the Front Side Handler in the MPGW service

  ▶ Configure MQFTE URL for the Backend Destination

  ▶ Configure mq-qm object with the "Maximum Message Size" with a value smaller than the request message size

  ▶ DataPower will create segmented messages based on the defined message size in the mq-qm object used in MQFTE URL

  ▶ Once segmented messages are PUT to the destination queue, MQFTE Agent can assemble these messages to create one single message in the File System. The MQFTE Agent needs to be configured in the Agent queue manager to process these messages

fteCreateTransfer command syntax

- /opt/ibm/WMQFTE/bin/fteCreateTransfer -sa AGENT1 -da AGENT2
  -dm QM_LINUX -dq WSTE.2014.Q1 -dqp true -qmp true
  -md DPMQFTEDestinationQM=QM_LINUX,
       DPMQFTEDestinationAgent=AGENT2,
       DPMQFTEDestinationFile=/opt/fte/wste2014/output/wste2014-merged-
       file.xml,DPMQFTEContentType=text/xml
  - qs 900K -sd delete -t binary /opt/fte/wste2014/input

Explanation of the flags:

-sa source_agent_nameRequired

-da destination_agent_nameRequired

-dm destination_agent_qmgr_nameOptional

-md user-defined metadata. It can take one or more key-value pairs separated by commas. Optional

-qs specifies whether to split the file into multiple fixed-length messages

-sd specifies the action that is taken on a source file. The valid options are as "delete" or "leave"

 -t specifies the type of file transfer: binary mode or text mode

fteCreateMonitor command syntax

- /opt/ibm/WMQFTE/bin/fteCreateMonitor -ma AGENT1
  -mq WSTE.2014.Q1 -mn "q-to-file monitor"
  -mt /opt/fte/wste2014/q2f1.xml -tr completeGroups
  -pu minutes -pi 3

Explanation of the flags:

-ma *monitoring_agent_name*

-mq *queue_name*

-mn monitor_name

-mt *task_definition_file_name*

-tr *condition*

-pu *units*

-pi *interval_period*

Task Definition File Example

```xml
<?xml version="1.0" encoding="UTF-8"?>
<request version="4.00" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
 xsi:noNamespaceSchemaLocation="FileTransfer.xsd">
 <managedTransfer>
  <originator>
   <hostName>9.x1.x2.x3</hostName>
   <userID>mqm</userID>
  </originator>
  <sourceAgent QMgr="QM_LINUX" agent="AGENT1"/>
  <destinationAgent QMgr="${DPMQFTEDestinationQM}"
 agent="${DPMQFTEDestinationAgent}"/>
  <transferSet>
   <item checksumMethod="MD5" mode="text">
    <source disposition="delete" recursive="false" type="queue">
     <queue groupId="${GROUPID}" useGroups="true">WSTE.2014.Q1</queue>
    </source>
    <destination type="file" exist="overwrite">
     <file>${DPMQFTEDestinationFile}.${CurrentTimeStamp}</file>
    </destination>
   </item>
  </transferSet>
 </managedTransfer>
</request>
```

Troubleshooting

- Enable log level to "debug" using trouble shooting icon on the control panel
- Enable probe for the particular MPGW service
- Enable Packet Capture for MQ connection errors due to MQ queue manager or network
- Enable Custom Log Target to capture MQ specific errors at debug log level
- In you encounter "MQ Reason Code 2010" error , increase Max Message Size in the mq-qm object so that DataPower can process the message

Trouble Shooting : Enable Debug Logging and Probe for Service

Enable Debug logging

Enable probe for service

Trouble Shooting : Packet Capture from webGUI

Trouble Shooting : Custom Log Target

Configure Log Target

| Main | Event Filters | Object Filters | IP Address Filters | Event Triggers | Event Subscriptions |

Log Target: mq-msg-id [up]

[Apply] [Cancel] [Delete] [Undo]

General Configuration

Administrative State	◉ enabled ○ disabled
Comments	[ ]
Target Type	File ▼ *
Log Format	Text ▼
Timestamp Format	syslog ▼
Feedback Detection	○ on ◉ off
Identical Event Detection	○ on ◉ off

Destination Configuration

File Name	logtemp:///mq-debug-log.txt *

Archival

Log Size	500 kilobytes *
Archive Mode	Rotate ▼ *
Number of Rotations	3 *

Security

Signing Mode	○ on ◉ off
Encryption Mode	○ on ◉ off

Trouble Shooting : Custom Log Target

Security and Other properties

Security

Signing Mode   ○ on ◉ off

Encryption Mode   ○ on ◉ off

Other Properties

Backup Log   (none) ▼ [+] [...]

Event Subscriptions

Configure Log Target

| Main | Event Filters | Object Filters | IP Address Filters | Event Triggers | **Event Subscriptions** |

Log Target: mq-msg-id [up]

[Apply] [Cancel] [Delete] [Undo]

Event Subscriptions

Event Category	Minimum Event Priority	
mgmt	debug	✎ ✖
mq	debug	✎ ✖
network	debug	✎ ✖
		[Add]

Troubleshooting Continued..

- Contact DataPower Support Team if problem is not resolved
- Contact DataPower Forum for help http://www.ibm.com/developerworks/forums/forum.jspa?forumID=1198
- Contact DataPower Facebook Community for help http://www.websphereusergroup.org/go/thread/view/108057/23860133/

References

- Using WebSphere DataPower and WebSphere MQ File Transfer Edition to manage file transfers http://www.ibm.com/developerworks/websphere/library/techarticles/1208_zampieri/1208_zampieri.html
- Configuring DataPower Multi-Protocol Gateway (MPGW) and WebSphere MQ File Transfer Edition for successful message-to-file transfer

http://www.ibm.com/support/docview.wss?uid=swg21608405
- DataPower InfoCenter (http://publib.boulder.ibm.com/infocenter/wsdatap/4mt/index.jsp)

References Continued..

- Managed File Transfer Solutions using DataPower and WebSphere MQ File Transfer Edition

http://www.mqug.org.uk/downloads/201107/201107%20-%20MQ02%20-%20DataPowerMQFTEManagedFileTransfer.pdf

- DataPower Firmware and Documentation download site http://www.ibm.com/support/docview.wss?uid=swg24014405

- WebSphere MQ File Transfer Edition information center home

http://pic.dhe.ibm.com/infocenter/wmqfte/v7r0/index.jsp?topic=/com.ibm.wmqfte.doc/new_703.htm

Questions and Answers

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