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WebSphere MQ 6 Troubleshooting
A brief overview on MQ itself, troubleshooting process, useful tips & links

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AGENDA

MQ Overview

- – Messaging Fundamentals
- – Message & Queue
- – Queue Manager
- – MQ API
- – Administration

MQ Troubleshooting

- – Error logs
- – FFST
- – Traces
- – MustGather

MQ Known Issues

- – communication issues
- – JMS application
- – messages & codes
- – APARs, technotes search

MQ Tips & Tricks

- – analyzing FFST
- – system requirements, lifecycle
- – useful links

WebSphere MQ 6 Troubleshooting

MQ Overview

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MQ Overview
Messaging Fundamentals

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Infrastructure of a business

– **Often includes different hardware platforms, programming languages, operating systems, and communication links.**

Services are built on this infrastructure

– **provides a facility to perform an action or gain information.**
– **can be provided for use internally by the business or for use by suppliers and customers.**

System

– **services and the infrastructure of the business that supports them.**

Software *applications*

– **developed by a business to provide and request services need to communicate with the existing services provided by the system.**

Middleware

– **provide a layer of abstraction between the infrastructure components and the applications that access those components in order to provide services.**

Message queuing

– **a middleware technology that greatly simplifies communication between the nodes of a system and between the nodes that connect systems together.**
– **allows services to communicate in a flexible way that does not require detailed knowledge of a target service or the current availability of that service.**
– **regardless of the complexity of the infrastructure connecting the nodes in the system**
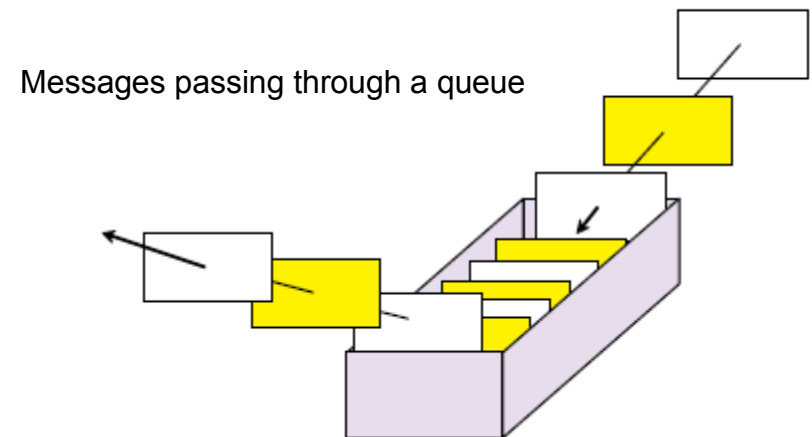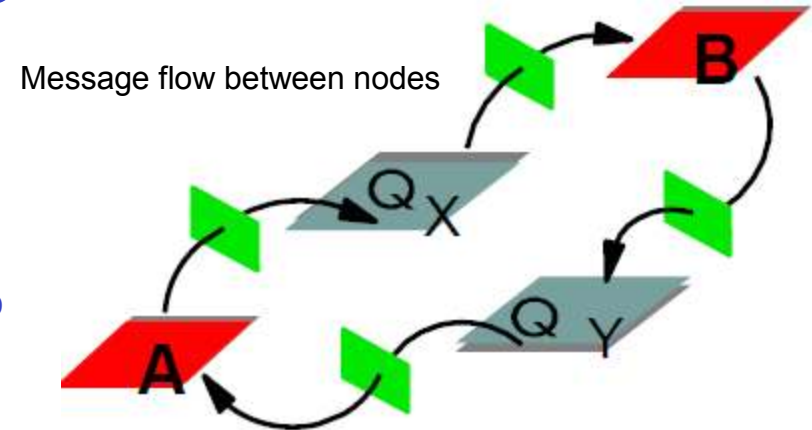
MQ Overview
Message & Queue

Two basic concepts: messages and queues.

Message flow between nodes

- **Message**
  - contains of Header & Data
  - Header is IDs, routing and other administration info
  - Data is any sequence of bytes

Messages passing through a queue

- **Queue**
  - container of messages
  - can be local, alias, remote, model
  - dynamic or predefined
 - different access types: FIFO, priority, etc.

MQ Overview
Queue Manager

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- **QMs** are nodes within a WebSphere MQ message queuing infrastructure.

- Multiple **QMs** can run on a single physical server.

- **QMs** maintain the queues of the message queuing infrastructure and all of the messages that reside on those queues waiting to be processed or routed.

- **QMs** within the infrastructure are connected with *channels*.

- **MCA** (Message channel agent) establishes a *channel* with a partner **MCA** hosted by a **QM** through the listener provided by that **QM**.
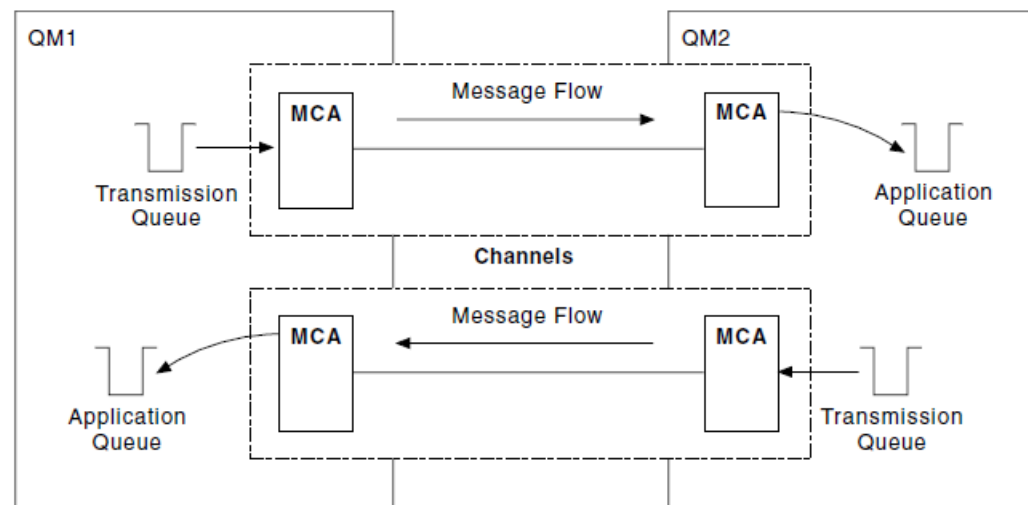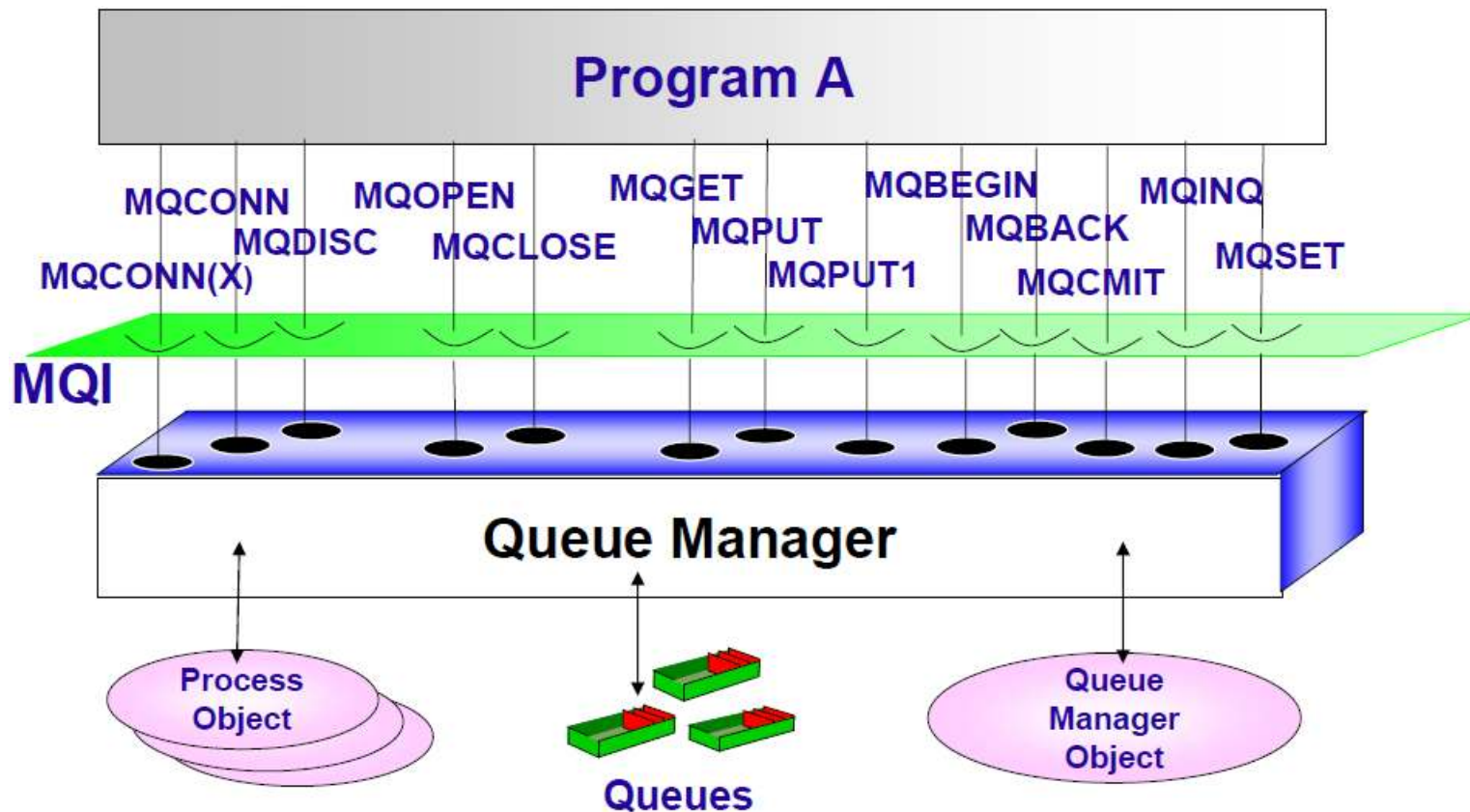
MQ Overview
MQ API also called as MQI

- **MQI** is a procedural API and as such is suitable for applications developed within procedural programming languages.

MQ Overview
Administration

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- ## WebSphere MQ Explorer

  - an application that runs under the Eclipse platform and is available with WebSphere MQ for Windows® and WebSphere MQ for Linux® (x86 platform)
  - GUI allows to perform administration tasks using a series of Content Views and Property dialogs
  - Provides remote administration

- ## WebSphere MQ Script (MQSC) commands

  - implement change management procedures to track and log the executed commands.
  - allow to create scripts to perform common administration commands, and the output from these scripts can be processed in order to generate a pass/fail result with associated diagnostic information

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MQ Troubleshooting

MQ Troubleshooting
Error logs

- **Error logs**
  - Two types – Queue Manager Error Logs & System Error Logs

- **Filenames**
  - AMQERR01.LOG, AMQERR02.LOG & AMQERR03.LOG

- **Location depends on Operating System**
  - UNIX & Linux
    - System   /var/mqm/errors
    - QM   /var/mqm/qmgrs/<qmname>/errors
  - Windows
    - System   c:\Program Files\IBM\WebSphere MQ\errors
    - QM   c:\Program Files\IBM\WebSphere MQ\qmgrs\<qmname>\errors

- **Other OS & related notes**
  - http://www-01.ibm.com/support/docview.wss?uid=swg21172370

MQ Troubleshooting
FFST

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- ### FFST (First-failure support technology)

  - provides report of unexpected event has been detected by a QM, which might affect the ability of that QM to perform its function.
  - can be read directly by an experienced MQ administrator.
  - created some time previous to external symptoms of a problem being observed can be instrumental in understanding the reason for a problem being experienced.
  - **keep any FFST files created by MQ for a reasonable period to provide it to IBM Service representatives**

- ### Filenames & Locations (Windows, UNIX)

  - **AMQ*nnnnnnnn_mm*.FDC** (*nnnnnnnn* – process ID, mm – sequence number normally 0)
  - UNIX   /var/mqm/errors
  - Windows   c:\Program Files\IBM\WebSphere MQ\errors

- ### Other OS & related notes

  - http://www-01.ibm.com/support/docview.wss?uid=swg21173468

Check for FFST files regularly

MQ Troubleshooting
Traces

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- **Traces**

  - powerful feature of the MQ, in which all internal operations of MQ are logged to files on the file system.
  - enables IBM Service to investigate an issue without requiring access to machines or making any modifications to the environment.
  - can be started and stopped while QMs are running on a machine.

- **Start/Stop & Where to collect (Windows example)**

  - **strmqtrc -l 5 -t all -t detail** (start a high detail wrapping trace and limit the file size to ~5MB)
  - **endmqtrc**
  - **C:\Program Files\IBM\WebSphere MQ\trace\AMQppppp.TRC**
    - ppppp is the process identifier or pid which created the file

- **Detailed instructions depending on OS**

  - http://www-01.ibm.com/support/docview.wss?uid=swg21174924

MQ Troubleshooting
MustGather

- **MustGather Technotes**

  - depends on the issue or the component
  - provide a detailed description of the documentation required by the support team to diagnose your problem.
  - save time resolving WebSphere MQ Problem Management Records (PMRs)
  - always requested by IBM Services prior to investigate the PMR

- **Data collected in accordance to the particular MustGather technote**

  - Environment topology details
  - Operating system version and release
  - WebSphere MQ version, release and maintenance level
  - General description of the issue in terms of 3 described points above
  - Error logs
  - FFST
  - Traces (may be requested, so usually there is no need for traces upon first contact)

- **MustGather: Read first for WebSphere MQ**

  - http://www-01.ibm.com/support/docview.wss?uid=swg21229861

MQ Known Issues

MQ Known Issues
communication issues

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- **Troubleshooting steps**

  - Ensure that the queue manager is running.
  - Check the information about the return code from the connection action.
  - For applications connecting as clients, ensure that a listener is running for the QM.
  - Ensure that the transport (usually TCP) and connection name are correct for the QM.
  - If a client channel definition table (CCDT) is being used, ensure that the location specified for this file is correct.
  - For JMS applications, these are specified on the connection factory object in the directory being accessed through JNDI, which must be accessible from the application.
  - For applications connecting as clients, ensure that the channel name being used matches a server connection channel on the queue manager, or that the channel auto-definition (CHAD) has been enabled on the QM.
  - Channel names are case-sensitive and must match.
  - Ensure that the QM name specified by the application is correct, including the case. For applications connecting as clients using a CCDT, ensure that the client connection channel object, defined on the QM that created the CCDT, has the correct QM name (QMNAME) attribute.
  - View the WebSphere MQ system error logs.
  - View the queue manager error logs for the queue manager to which the connection is failing.
  - Ensure that the user identifier under which the application is connecting has authority to connect to the QM.

- **Conclusion**

  When MQ is experiencing communications problem then by the rule it is a victim and not a source of the issue.

MQ Known Issues
JMS application

- **Configuration**

  - MQ requires that certain configuration is performed on the QM in order for JMS applications to access the capabilities of the publish/subscribe broker on that QM.

  - For details of the MQ JMS Administration tool and the objects that can be created, refer to MQ V6.0 Using Java
    - http://www-01.ibm.com/support/docview.wss?uid=pub1sc34693500

- **MQ behind JMS application**

  - Often with customers who are hardly aware that MQ is behind their JMS application. Source of problem is in application itself or mismatch between JMS and MQ definitions.

  - Only exceptional the source is MQ malfunction.

MQ Known Issues
messages & codes

- **Messages**

  - **AMQxxxx** – xxxx is between 4000 and 9999
  - information displayed to a user *administering* a MQ infrastructure in response to an action or to signify an event

- **Codes**

  - **MQCC** (completion codes)
    - 0 Successful completion (MQCC_OK)
    - 1 Warning (partial completion) (MQCC_WARNING)
    - 2 Call failed (MQCC_FAILED)
  - **MQRC** (reason codes)
    - caused by all actions performed *programmatically* against MQ and do not completed successfully or only completed partially

- **Additional info on particular message or code can be obtain**

  - locally by running **mqrc** for particular message/code
  - on MQ InfoCenter or WebSphere MQ Messages (GC34-6601)
  - For common reason codes:
    - http://www-01.ibm.com/support/docview.wss?uid=swg21167821

- **WebSphere MQ Messages GC34-6601**

  - http://www.elink.ibmlink.ibm.com/publications/servlet/pbi.wss?CTY=US&FNC=SRX&PBL=GC34-6601-00

MQ Known Issues
APARs, technotes search

- ## APAR (Authorized Program Analysis Report)

  - a formal report to IBM development, of a problem caused by a suspected defect in a current unaltered release of an IBM program.
  - may also be used by development to document new function being delivered in the maintenance stream.

- ## APARs, technotes search

  - by number or by keywords
  - by AMQxxxx
  - by completion or reason code
  - by FFST content – will be described below

- ## WebSphere MQ Support Search

  - http://www-01.ibm.com/software/integration/wmq/support/search.html

WebSphere MQ 6 Troubleshooting

MQ Tips & Tricks

MQ Tips & Tricks
analyzing FFST

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- **Reasons of occur**
  - Known WMQ defect.
  - Unknown WMQ defect.
  - OS related problem.
  - User problem.
  - Just for information.

- **Key parameters**
  - Time and date of the FFST record, find the closest to the issue
    - Probe Id.
    - Component.
    - Process name or Program name.
    - Major error code.

- **Use WebSphere MQ Search by key parameters**
  - http://www-01.ibm.com/software/integration/wmq/support/search.html

MQ Tips & Tricks
analyzing FFST example

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```
WebSphere MQ First Failure Symptom Report
==========================================
Date/Time :- Monday January 22 09:31:28 EST 2007
Host Name :- ctest11 (HP-UX B.11.11)
PIDS :- 5724H7202
LVLS :- 6.0.1.1
Product Long Name :- WebSphere MQ for HP-UX (PA-RISC platform)
Vendor :- IBM
Probe Id :- XY324192
Application Name :- MQM
Component :- GetSubpoolsLock
SCCS Info :- lib/cs/unix/generic/amqxiinx.c, 1.231.1.3
Line Number :- 1531
Build Date :- May 4 2006
CMVC level :- p600-101-060504
Build Type :- IKAP - (Production)
UserID :- 00000108 (root)
Program Name :- runmqsc
Addressing mode :- 64-bit
Process :- 8791
Thread(n) :- 1
QueueManager :- MY.QMGR
ConnId(3) QM-P :- 881
Major Errorcode :- xecF_E_UNEXPECTED_SYSTEM_RC
Minor Errorcode :- OK
Probe Type :- MSGAMQ6119
Probe Severity :- 2
Probe Description :- AMQ6119: An internal WebSphere MQ error has
occurred ('22 - Invalid argument' from semop.)
FDCSequenceNumber :- 0
Arith1 :- 22 16
Comment1 :- '22 - Invalid argument' from semop.
```

- **Understanding First-failure support technology (FFST) records**

  - http://www-01.ibm.com/support/docview.wss?uid=swg21304647

MQ Tips & Tricks
system requirements, lifecycle

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- **Lifecycle**

  - Be sure that the product is fully supported by IBM, End of Support (EoS) date isn't reached
  - The customer has extension contract for the particular version
  - Examples:
    - **MQSeries for Compaq NonStop Kernel** 5.1 EoS 30-Apr-2008
    - **WebSphere MQ for AIX** 5.3 EoS 28-Sep-2007
  - Product Support Lifecycle link located on the main WebSphere MQ Support page

- **System requirements**

  - Depends on the used OS
  - Depends on the type of install client/server
  - Described on InfoCenter in chapters 'Checking prerequisite hardware and software' for particular OS

- **WebSphere MQ InfoCenter**

  - http://publib.boulder.ibm.com/infocenter/wmqv6/v6r0/index.jsp

MQ Tips & Tricks
useful links

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- **WebSphere MQ Support**   http://www-01.ibm.com/software/integration/wmq/support/index.html
- **WebSphere MQ Support Search**   http://www-01.ibm.com/software/integration/wmq/support/search.html
- **WebSphere MQ Library**   http://www-01.ibm.com/software/integration/wmq/library/library60.html
- **WebSphere MQ information center**   http://publib.boulder.ibm.com/infocenter/wmqv6/v6r0/index.jsp

- **WebSphere MQ V6 Fundamentals**   http://www.redbooks.ibm.com/abstracts/sg247128.html
- **WebSphere MQ System Administration Guide**

  http://www.elink.ibmlink.ibm.com/publications/servlet/pbi.wss?CTY=US&FNC=SRX&PBL=SC34658402

- **WebSphere MQ V6.0 Using Java**

  http://www-01.ibm.com/support/docview.wss?uid=pub1sc34693500

- **MustGather: Read first for WebSphere MQ**

  http://www-01.ibm.com/support/docview.wss?uid=swg21229861

- **WebSphere MQ error logs**   http://www-01.ibm.com/support/docview.wss?uid=swg21172370
- **WebSphere MQ Dumps and FFSTs are written to the following locations**

  http://www-01.ibm.com/support/docview.wss?uid=swg21173468

- **MustGather: Directions to start, end and format trace**

  http://www-01.ibm.com/support/docview.wss?uid=swg21174924

- **WebSphere MQ Messages GC34-6601**

  http://www.elink.ibmlink.ibm.com/publications/servlet/pbi.wss?CTY=US&FNC=SRX&PBL=GC34-6601-00

- **Understanding First-failure support technology (FFST) records**

  http://www-01.ibm.com/support/docview.wss?uid=swg21304647

- **Remote administration of queue managers using WebSphere MQ Explorer**

  http://www-01.ibm.com/support/docview.wss?uid=swg27008431

- **MQSC Client for WebSphere MQ**   http://www-01.ibm.com/support/docview.wss?uid=swg24007769

Thank You

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