

What's new in IBM MQ for z/OS 9.1

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Announcement materials

Business value of MQ

MQ for z/OS enhancements

MQ Advanced for z/OS VUE
enhancements



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zGA on 10th August 2018

Announcement Letters (US):

[IBM MQ for z/OS V9.1](#)

[IBM MQ Advanced for z/OS VUE V9.1](#)

Blogs:

[IBM MQ 9.1 and IBM Appliance M2002 are announced..](#)

[MQ9.1 delivers the latest features in a Long Term Support release..](#)

Performance Report: <https://ibm-messaging.github.io/mqperf/MQ%20for%20zOS%20V910%20Performance.pdf>

Best of breed messaging



Built to exploit the strength of the underlying platform

Best of breed hardware



Strong integration with all other major software offerings on z/OS

Announcement materials

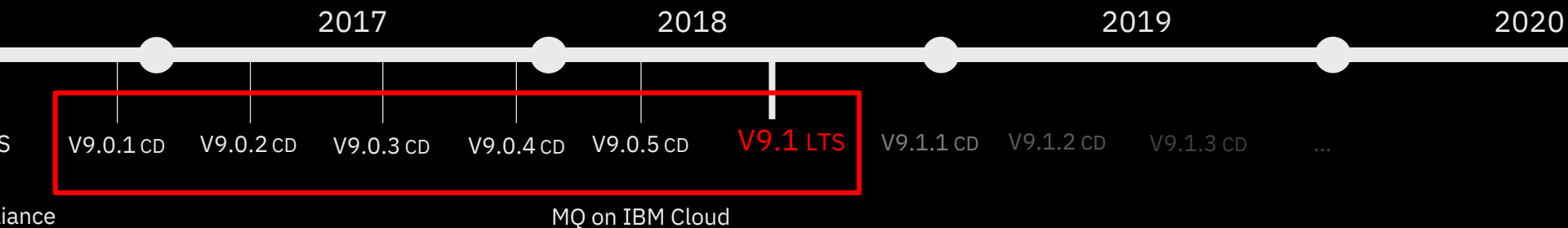
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IBM MQ: long term support and continuous delivery



In 2016 MQ introduced a dual Long Term Support and Continuous Delivery model

Continuous Delivery

New CD versions of MQ are released approximately every four months, incrementally introducing new product capabilities.

Intended for those that can continually integrate.

Long Term Support

Approximately every two years a new LTS version is released, rolling up many of the CD capabilities into a release with 5+3 support attached.

Required by those looking for fixed function.

Mix and Match

Both are available under the same license.

Both can interoperate, just like any previous version of MQ.

The function delivered in the 9.0.x CD releases made available as a long term support release, **9.1.0 LTS**.

IBM MQ is *the* solution for business critical messaging

Your bank transfers complete without losing your money, with **all of the worlds top 50 banks using IBM MQ***

The world depends on reliable, secure messaging and **85% of the fortune 100 depend on IBM MQ***

$$1 + 1 = 2$$

Simple



Scalable



Precise

IBM MQ is *the* solution for business critical messaging

Your bank transfers complete without losing your money, with **all of the worlds top 50 banks using IBM MQ***

The world depends on reliable, secure messaging and **85% of the fortune 100 depend on IBM MQ***



Connected



Reliable



Secure

Run IBM MQ in any location or cloud exactly as you need it



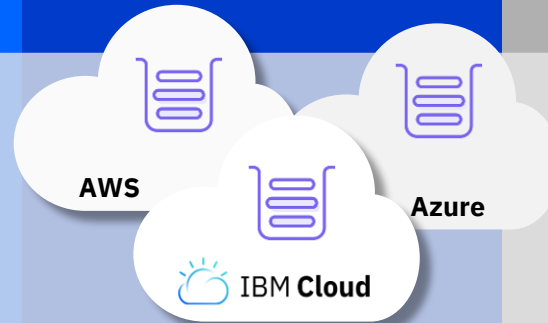
On-premise, software and the MQ Appliance



IBM Z
Linux AIX
Windows Solaris
HPE IBMi
Appliance ...



Run it yourself in any cloud, public or private



Let IBM host it for you with its new managed MQ service in IBM Cloud



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MQ for z/OS enhancements

MQ Console for web-based administration

MQ REST API for administration & messaging

Improved Java support in CICS

MQ service provider for IBM z/OS Connect Enterprise Edition

Dataset and CF encryption

Improved workload balancing options for shared queues

Simplified migration experience



MQ Console feature for web-based administration

Point a browser at an MQ installation to allow configuration of your MQ resources, as well as basic validation by sending/receiving messages

No need to install MQ Explorer on multiple machines

Easily share dashboard configuration between users, to allow you to get going quickly

Currently provides a subset of the capabilities of MQ Explorer

The screenshot displays the IBM MQ Console web interface. At the top, the title 'IBM MQ' is visible. Below it, there's a tab labeled 'Tab 1'. The main content area is divided into two sections: 'Local Queue Managers' and 'Queues on MQ1A'. The 'Local Queue Managers' section contains a table with columns 'Name' and 'Status'. The 'Queues on MQ1A' section contains a table with columns 'Name', 'Queue type', and 'Queue depth'. A 'Properties for 'LQ1'' dialog is open in the foreground, showing fields for 'Queue name', 'Queue type', 'Description', 'Enable put', and 'Enable get'. The 'Queue name' field is set to 'LQ1', 'Queue type' is 'Local', 'Description' is empty, 'Enable put' is 'Allowed', and 'Enable get' is empty. The dialog has 'Close' and 'Save' buttons at the bottom.

IBM MQ

Tab 1

Add widget

Local Queue Managers

Name	Status
MQ1A	Running
MQ1B	Running
MQ1C	Stopped

Queues on MQ1A

Name	Queue type	Queue depth
AQ1	Alias	
LQ1	Local	0
LQ2	Local	0

Properties for 'LQ1'

General

Queue name: LQ1

Queue type: Local

Description:

Enable put: Allowed

Enable get:

Close Save

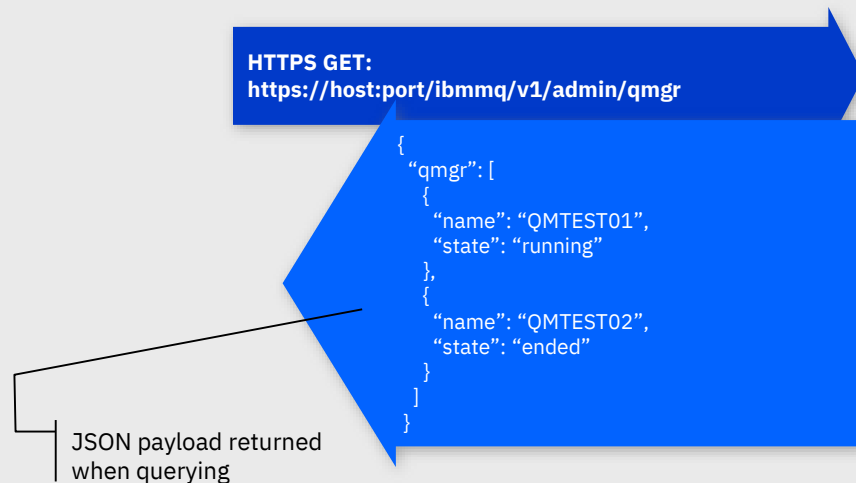
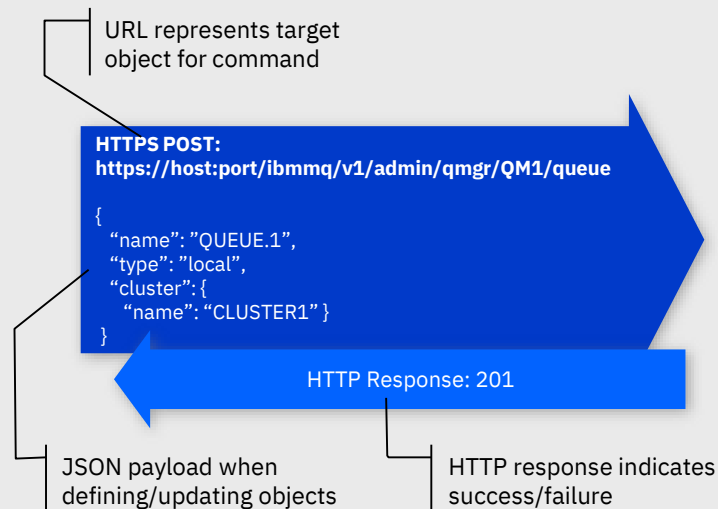
MQ REST API for administration

MQ has supported scripting and programmatic administration for many years, but it requires MQ knowledge and tooling

MQ has been increasing support for a RESTful administrative API to enable much of what's available today with MQSC and PCF. But in a more intuitive way to many, using the URL and structured JSON payloads to define the operations

Being over HTTPS also enables the embedding of MQ administrative operations into many environments and tools that previously would not be possible

Evolution of the REST API will continue in 9.1.x CD



MQ REST API for messaging

A simple light-weight, built-in, REST API for messaging

Doesn't require installation of an MQ client

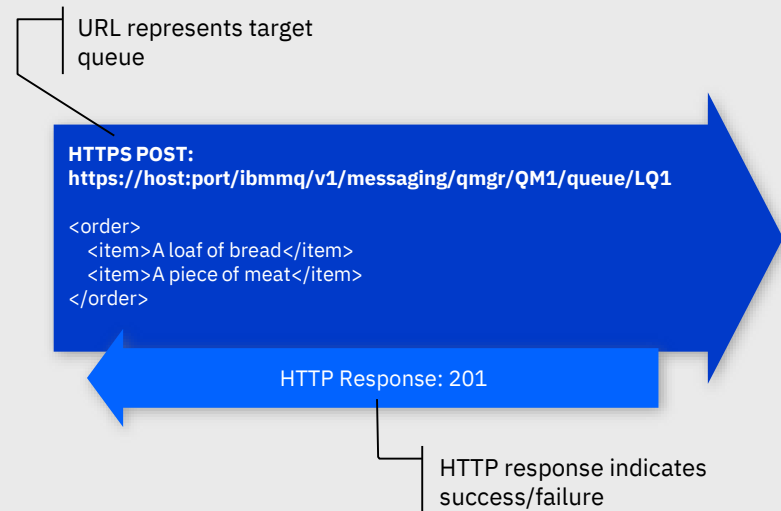
Allows you to build messaging into your applications regardless of where they run, or the language they are written in

Currently supports point-to-point text based messaging

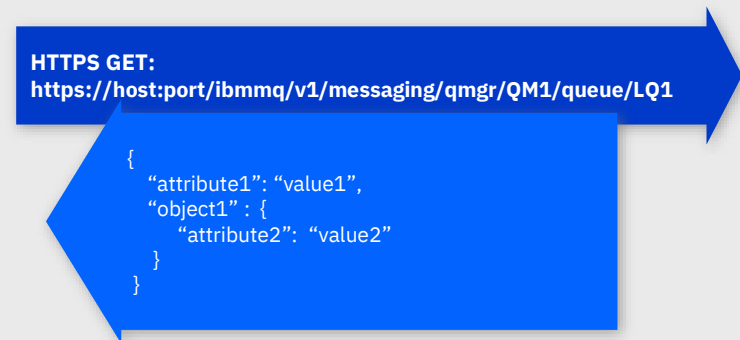
Evolution of the messaging REST API will continue in 9.1.x CD

Replaces the HTTP bridge which has now been removed

Send a message



Receive a message



New web server

Optional ZFS feature containing a web server (mqweb)

Runs on a bundled version of WebSphere Liberty Profile

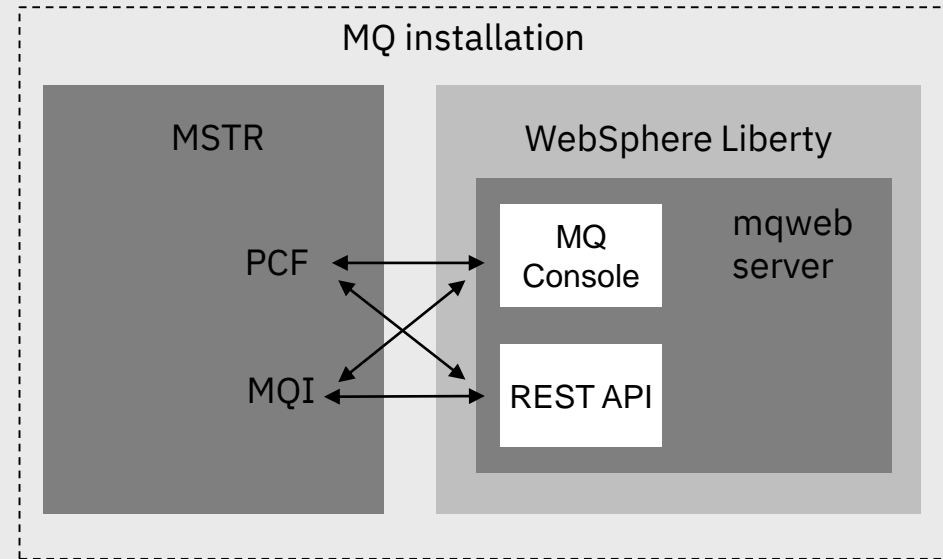
Enables both the MQ Console and REST APIs

Simple configuration using xml

Samples provided to get started quickly

Commands provided to simplify some configuration

Flexible role based security, can reuse existing RACF configuration



```
*****
/*
/*          PROC
/*
/*  SET  INSTDIR='/u/mleming/mqm/V9R1M0/web'
/*  SET  USERDIR='/u/mleming/mqm_user/V9R1M0'
/*
/*STEP1  EXEC PGM=BPXBATSL,REGION=0M,TIME=NOLIMIT,
/*  PARM='PGM &INSTDIR./lib/native/zos/s390x/bbgzsrv mqweb --clean'
/*WLPUDIR DD PATH='&USERDIR.'
/*STEPLIB DD DSN=ANTZ.MQ.V910.DFCT.OUT.SCSQANLE,DISP=SHR
/*        DD DSN=ANTZ.MQ.V910.DFCT.OUT.SCSQAUTH,DISP=SHR
/*STDOUT  DD SYSOUT=*
/*STDERR  DD SYSOUT=*
/*STDIN   DD DUMMY
/*STDENV  DD *
JAVA_HOME=/java/java80_64/J8.0_64
PATH=/u/mleming/mqm/V9R1M0/web/bin:/bin:/usr/sbin
LIBPATH=/u/mleming/mqm/V9R1M0/java/lib
/*
```

Improving Java support within CICS

MQ V8 added support for MQ JMS in CICS
(standalone Java environment)

CICS now provides embedded Liberty server – JEE
resources can exploit CICS resources

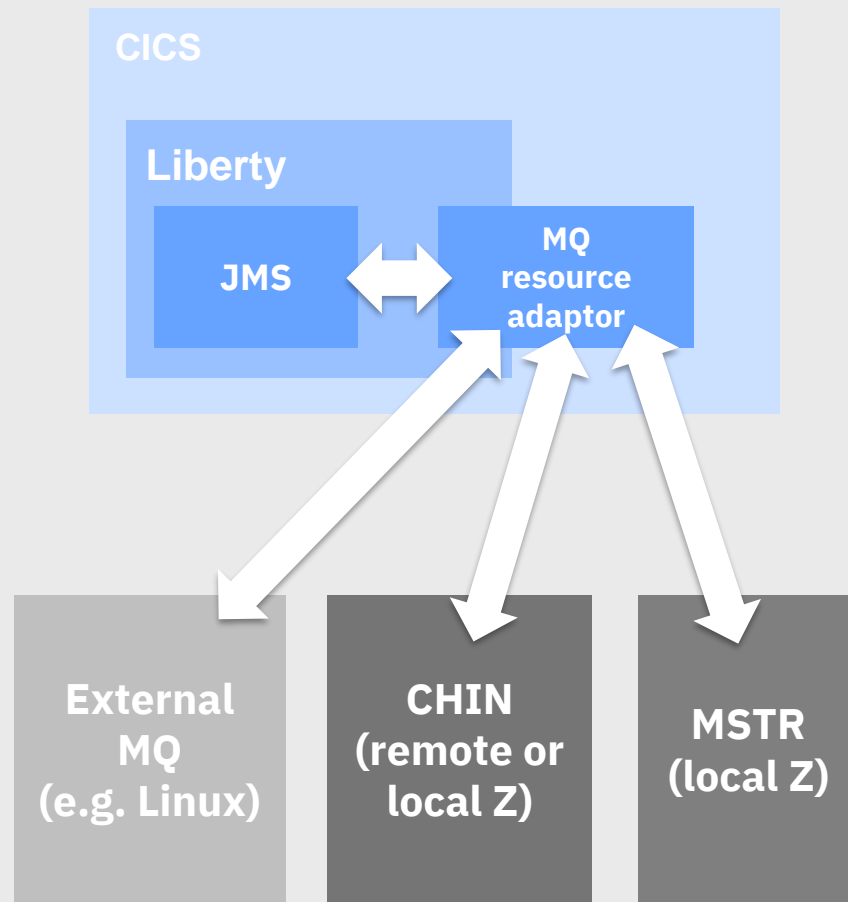
Allows CICS Liberty to use MQ resource adapter
just like normal Liberty

Run existing Liberty messaging apps such as MDBs
inside CICS

Connections to MQ supported using either client or
bindings mode

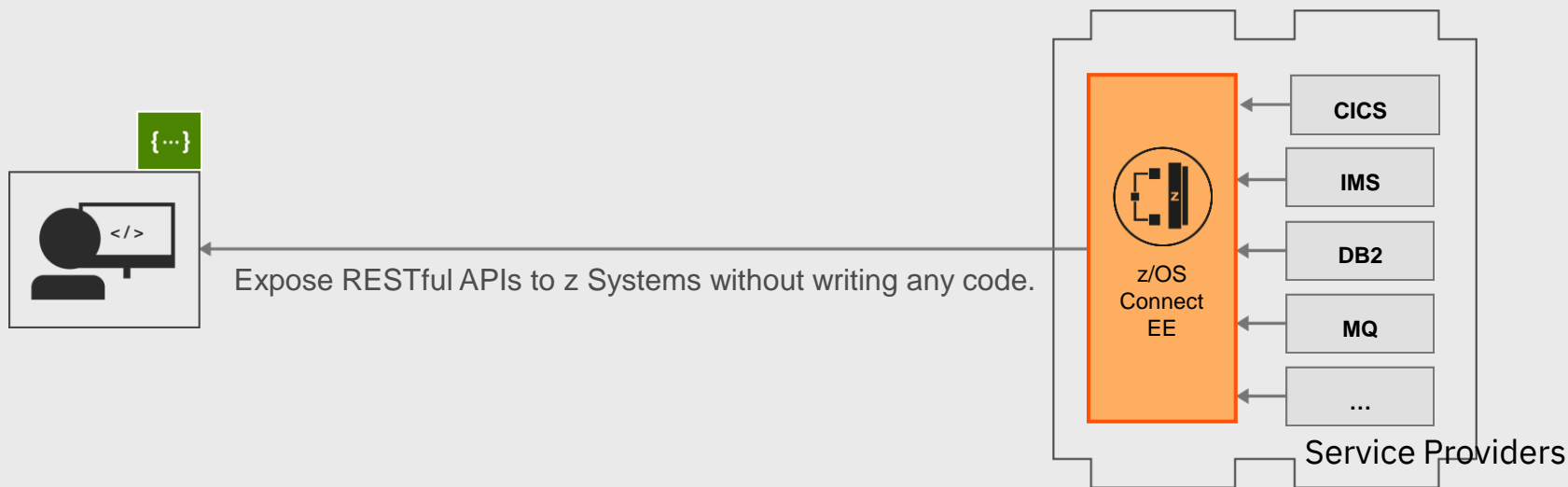
Requires CICS 5.3 + PI58375 + MQ 9.1.0 resource
adaptor, or one from an earlier CD release (9.0.1
and later)

MQ JMS in CICS Liberty Profile



z/OS Connect EE

z/OS Connect EE provides a single, RESTful entry point to your z systems assets and data
Enables reuse of existing assets, exposing them to environments where it is natural to use REST
Those new consumers do not need to understand or be aware of the specifics of the subsystems
No changes to subsystems required, all handled via configuration



New MQ service provider for IBM z/OS Connect Enterprise Edition

Free of charge z/OS Connect service provider that allows existing services that are fronted by MQ to be accessed via a RESTful front end

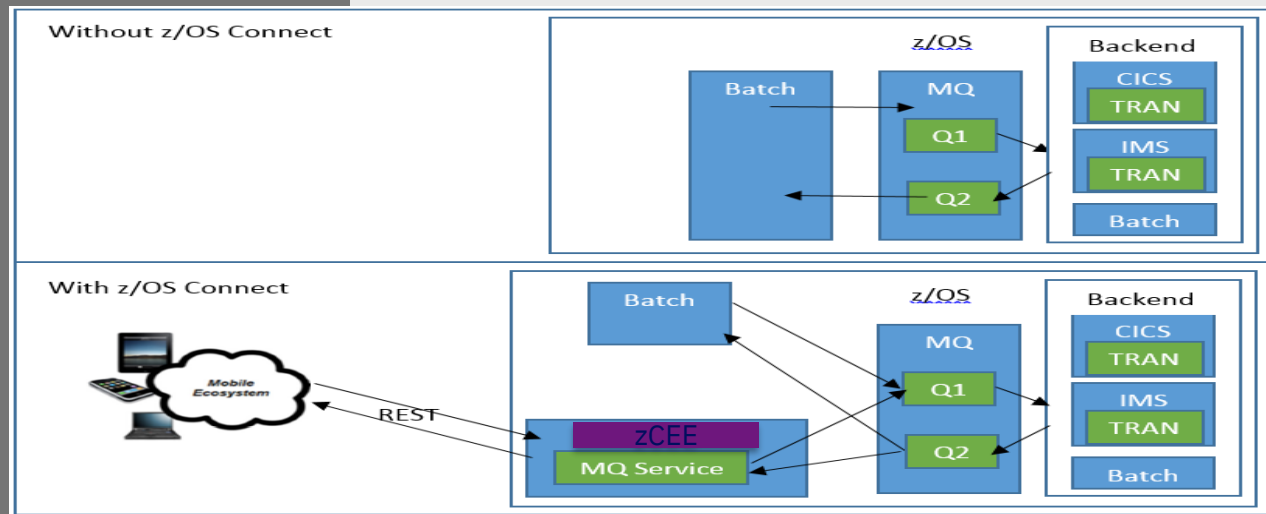
Supported with MQ 8 and onwards

Shipped with MQ 9.1.0 (plus earlier CD releases) or obtain from FixCentral

Clients need have no knowledge of MQ

MQ information hidden by configuration, but advanced users can specify some MQ attributes using HTTP headers

Existing MQ environment, CICS and IMS consuming data via MQI, driven by batch or WAS environments



Expose **bespoke** REST APIs for particular MQ resources to new consumers, who don't understand COBOL copybooks / PL/I. Backend is hidden and invoked using JSON / HTTP. No changes to batch etc.

Dataset encryption

Last year z/OS added support for policy based dataset encryption in z/OS 2.1 and later

Requires a CryptoExpress coprocessor to use!

Dataset encryption can be used with a subset of MQ's datasets

Supported datasets:

- BSDS
- CSQINP*
- Archive logs

Unsupported datasets (will get errors if policy defined and used):

- Pagesets
- Logs
- SMDS

If you want to ensure that your message data is protected at REST in all cases then we recommend you make use of AMS

Pervasive encryption with IBM z Systems

Integrated Crypto Hardware



Data at Rest



Network



Clustering



Data in Use



<https://developer.ibm.com/messaging/2017/08/30/mq-use-dataset-encryption-ibm-zos-v2-2/>

CF encryption

z/OS 2.3 added support for encryption of data sent to CF list and cache structures

Encryption protects data both inflight, and when at rest in the structure

Encryption/decryption is performed by z/OS LPARs connected to the CF, not the CF itself

Requires a CryptoExpress coprocessor to use!

Entirely transparent to MQ, and fully supported

Measurements in the lab have shown that using CF encryption with MQ has a low overhead, less than 6%

Pervasive encryption with IBM z Systems

Integrated Crypto Hardware



Data at Rest



Network



Clustering



Data in Use



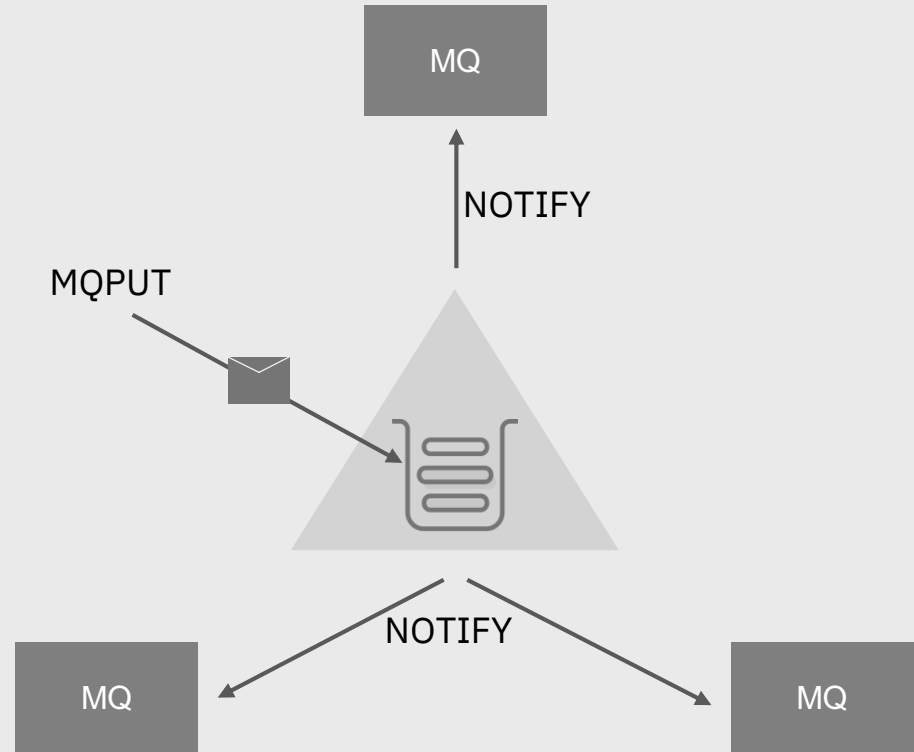
Improved workload balancing options for shared queues

CF list monitoring is used to monitor the state of list structures containing shared queues

When a queue's depth transitions from zero to non-zero, the CF notifies queue managers in the queue sharing group

The queue managers might perform a number of actions, including notifying trigger monitors that are using TRIGGER(FIRST), or applications which are performing a get-wait

All queue managers notified at the same time which causes a race for the messages and in some cases workload skewing or a large number of empty gets



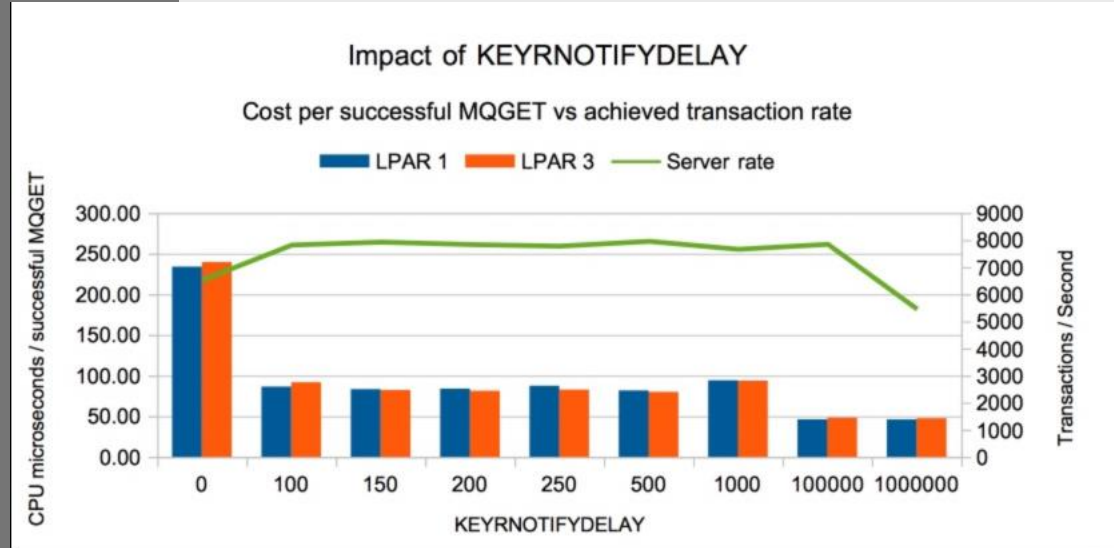
Improved workload balancing options for shared queues

z/OS 2.3 introduces a new CFRM attribute: KEYRNOTIFYDELAY

Can be used to notify one queue manager earlier than the others which **might** reduce skewing/empty gets

If the target queue manager doesn't action the notify in the time period, in microseconds, specified by the attribute, all other queue managers are notified

Very dependent on environment and workload. Your mileage may vary!



```
STRUCTURE
  NAME(QSG1STRUCT1)
  SIZE(1024M)
  KEYRNOTIFYDELAY(500)
  ...
```

Simplified migration experience

OPMODE removed at 9.1.0

Recompiling zparm at 9.1.0 with OPMODE specified will generate a warning. But old zparm modules can be used

OPMODE output removed from the DIS SYSTEM command

New message indicates whether backwards migration is support or not, and if it is where you can migrate back to

Backwards migration always supported to 8.0.0 or 9.0.0 if migration PTFs applied

PI95928 for 8.0.0
PI95939 for 9.0.0

CSQY039I !MQ21 Backwards migration is supported to Version 9.0.0

CSQY040I !MQ21 Backwards migration not supported

Reminder: backwards migration is not supported in continuous delivery.

I.e. you can go from 9.0.5 to 9.1.0 but you can't go back

Similarly you can go from 9.0.0 to 9.0.5 but you can't go back

qTypes

There will be two qType APARs. Numbers are:

PH02328

PH02329

We recommend that you apply these APARs as soon as they become available and before going into production with 9.1.0



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IBM MQ Advanced for z/OS Value Unit Edition

The Richest Set of z/OS Messaging Capabilities in a Single, Simple to Deploy Offering

IBM MQ Advanced for z/OS Value Unit Edition



Connector Pack

Enables applications and systems to participate in a Blockchain network via MQ, performing CRUD operations on Hyperledger Fabric Blockchain running in IBM Cloud or running locally



IBM MQ Managed File Transfer for z/OS

Provides reliable, secure and auditable file transfer that reduces the need for manual processes, and management tools that help reduce wasted time when dealing with failure analysis



IBM MQ Advanced Message Security for z/OS

Provides end-to-end encryption of message contents to protect sensitive data from all forms of intrusion, attack or accidental disclosure, and with no need for application change



IBM MQ for z/OS

Enables the secure, reliable exchange of business data across applications, systems and services on-premises, in the Cloud, or in Hybrid environments

MQ Advanced for z/OS VUE enhancements

AMS performance improvements

Managed File Transfer enhancements

Enhanced Blockchain connectivity

Client connection flexibility



MQ Advanced for z/OS VUE delivers pervasive encryption

Apply end-to-end encryption to existing messaging infrastructure easily and with no application changes

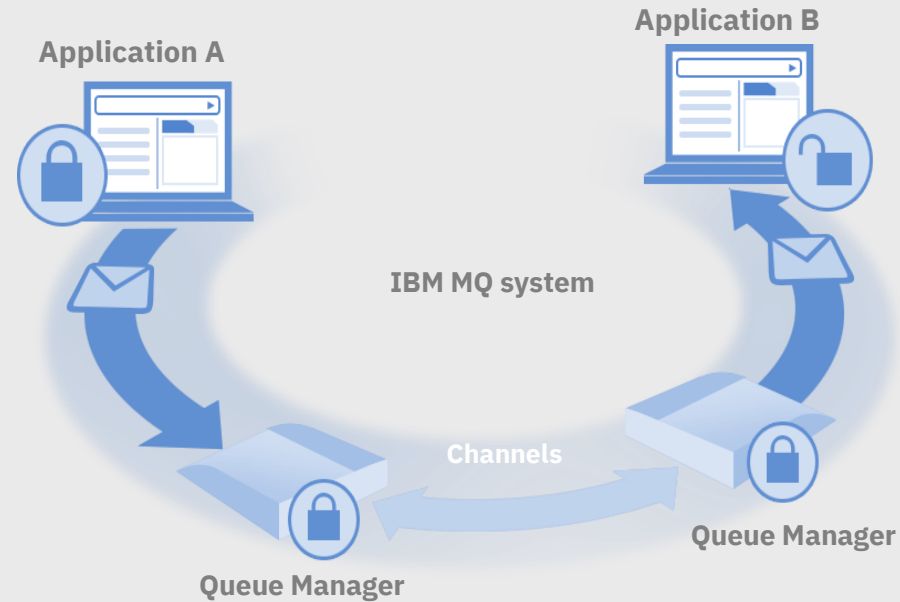
Authenticate and protect messages across the enterprise making audit simple

Reduce time and skills needed to comply with aspects of common security standards

Detect and remove rogue messages

New Confidentiality option for encryption has minimal performance impact

Advanced Message Security (AMS) protects data at rest, in-flight and in-memory to guarantee privacy of message contents



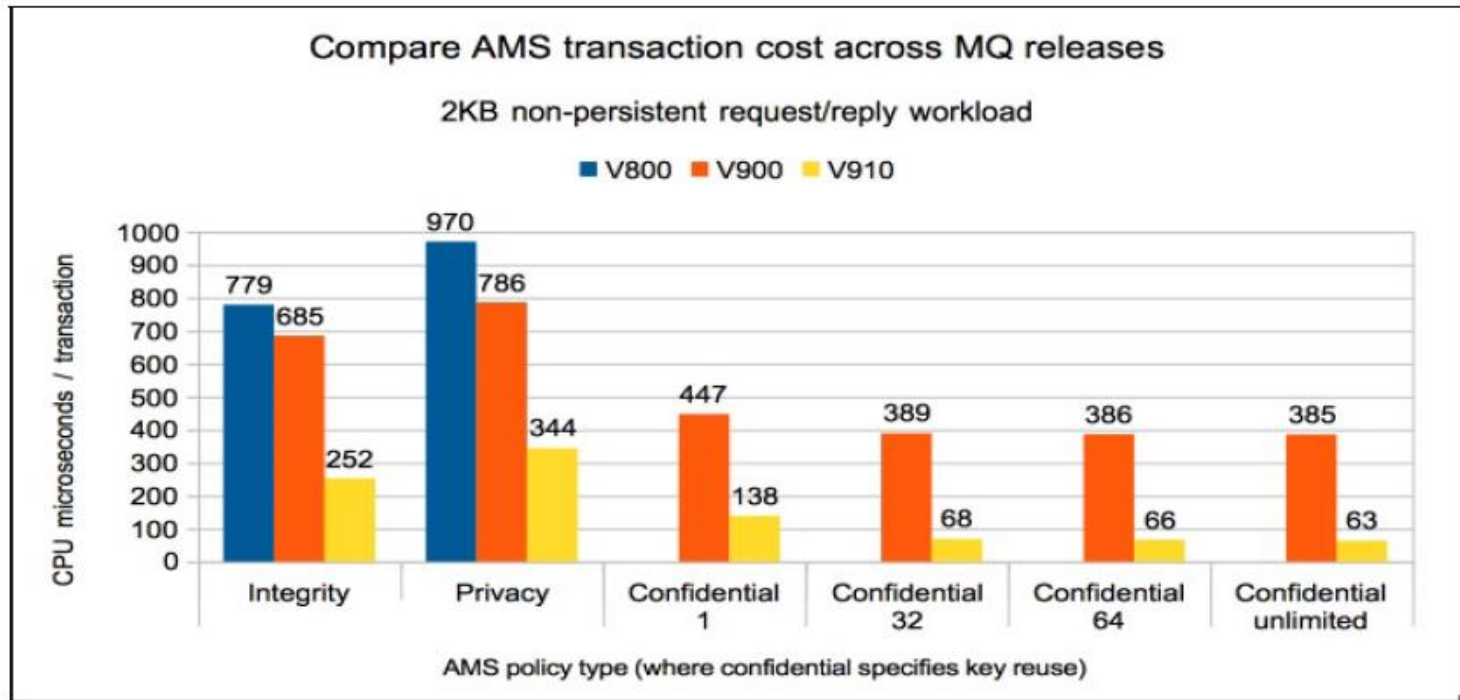
Significant improvement in performance when applying AMS policies

A cost comparison between version 9.1.0 and 9.0.0 shows:

Integrity: 37% of the equivalent version 9.0.0 measurement

Privacy: 44% of the equivalent version 9.0.0 measurement

Confidentiality: 17-32% of the equivalent version 9.0.0 measurements (depending on the key reuse value)



Move Data and Files with MQ Advanced for z/OS VUE

How:

- ⇒ File-to-file
- ⇒ File-to-message
- ⇒ Message-to-file

Benefits:

Reliability of delivery
Increased security of system and data
Integrated management and recovery

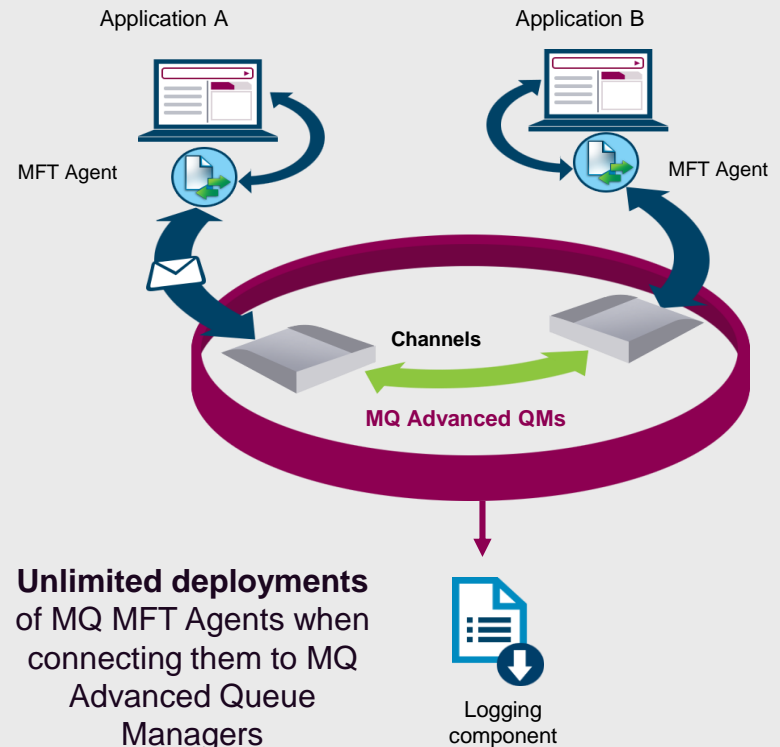
MFT Agent:

Performs the fundamental file transfer function of sending and receiving files from the local system

MFT Service:

Installs a file transfer agent on MQ server with additional capabilities

Managed File Transfer (MFT) enables a consistent approach to transporting application data and file data as messages



Managed File Transfer Enhancements

Create a “File Hub” using simplified MFT Agent connectivity

MFT agents deployed wherever files are to be sourced or delivered

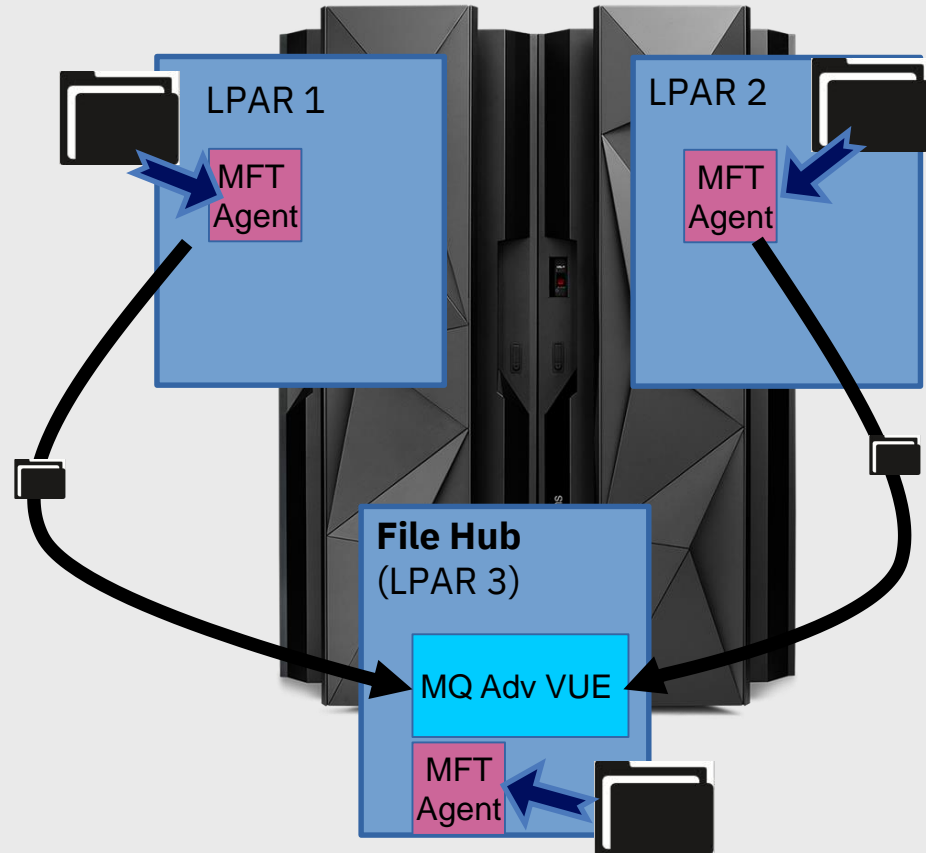
No requirement for a local z/OS queue manager - choose where to handle file workload

Files transferred across the MQ network between local and remote agents

Reduce the number of queue managers required - simplified topology for easier administration

MFT file logger can now use client mode to connect to the coordination queue manager

Monitor current MFT transfers via the MQ REST API and query the status of MFT agents



Blockchain requires connectivity for data sharing

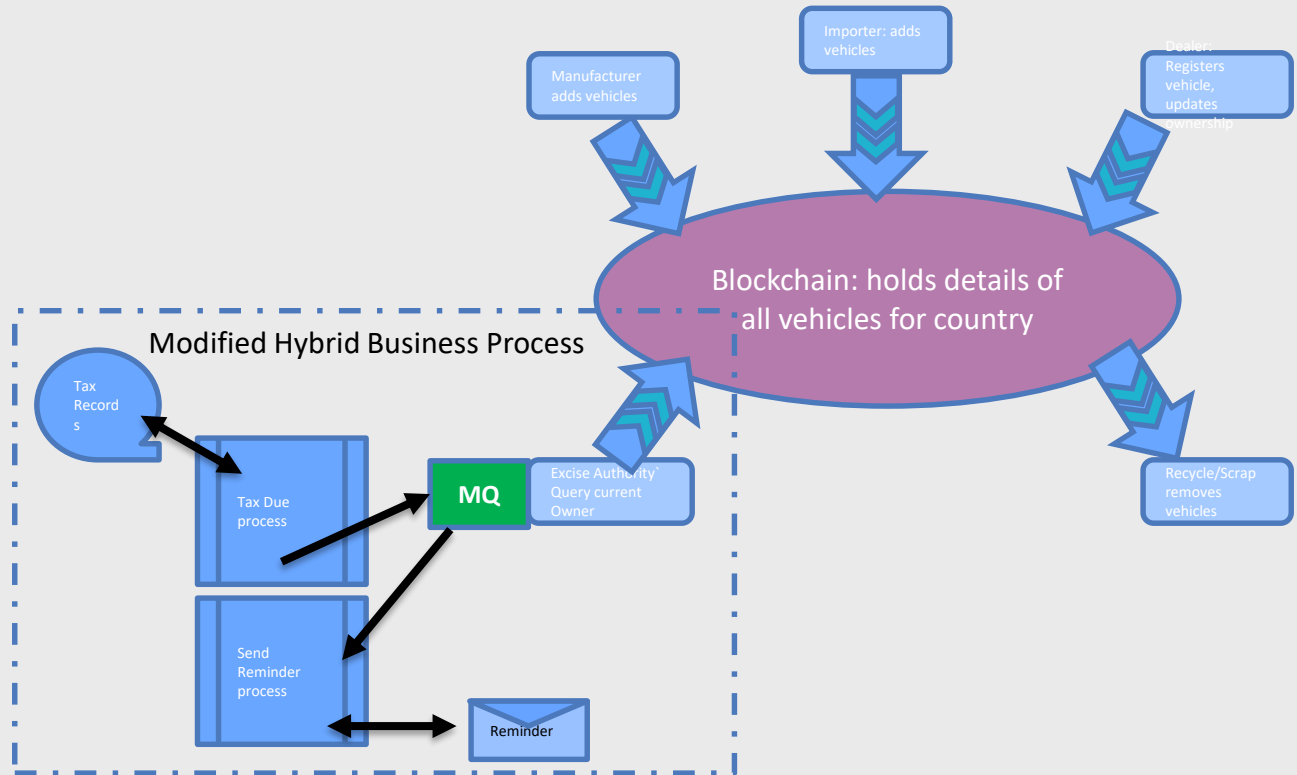
Parties in the business network need to exchange data often held in Systems of Record

Requirements...

Enable a range of different applications and systems to send updates to a Blockchain network

Ensure data integrity following changes to shared assets

Transport critical business data securely and reliably



Connect to Blockchain with MQ Advanced for z/OS VUE

Deploy IBM MQ Bridge to Blockchain to enable applications and systems to participate

Bridge allows an MQ application to connect to Hyperledger Composer Blockchain running in IBM Cloud or running locally

Utilise request-reply MQ messages to query information from Blockchain (e.g. what is the value of the balance on this account)

Use MQ to drive create, read, update and delete operations on Blockchain-managed assets

No need to understand the ledger-specific APIs, configuration or controls

Connection to Queue Manager

```
-----  
Queue Manager                : []MQ21  
Bridge Input Queue           :  
[SYSTEM.BLOCKCHAIN.INPUT.QUEUE]  
MQ Channel                   : []  
MQ Conname                   : []  
MQ CCDT URL                  : []  
JNDI implementation class    :  
[com.sun.jndi.fscontext.RefFSContextFactory]  
JNDI provider URL           : []  
MQ Userid                    : []MLEMING  
MQ Password                   : []
```

User Identification

```
-----  
Userid                       : []MLEMING  
Password                     : []
```

```
API path for login           : [auth/users/login]
```



Run the IBM MQ bridge to Blockchain on z/OS

The bridge can be run on USS and connect via bindings to your z/OS queue manager

No need to install in an x86 Linux environment

Three step process to set up

- 1) Define necessary queues using CSQ4BCBQ
- 2) Generate configuration file in USS:
runmqbc -o config.json
- 3) Run the bridge either in USS or using JCL:
CSQ4BCB sample provided

```
/u/mleming/mqm/V9R1M0/mqbc:>ls -l
bin
lib
prereqs
samp
/u/mleming/mqm/V9R1M0/mqbc:>ls bin
runmqbc
```

```
/u/mleming/mqm/V9R1M0/mqbc/bin:>./runmqbc -o ~config.json
2018-06-21 09:56:05.970 BST IBM MQ Bridge to Blockchain
5724-H72 (C) Copyright IBM Corp. 2017, 2018
Level : V910-DFCT6-L180619
```

Enter new values for the configuration attributes.
Current values are shown in square brackets.

Press ENTER to accept current values; use SPACE+ENTER
to clear values; use <new value>ENTER to set a new value.

If lists of values are required these may be separated by commas
or entered on multiple lines. A blank line terminates the list.

NOTE: You cannot edit existing values - you can only keep, replace or

Connection to Queue Manager

```
-----
Queue Manager           : [ ]MQ21
Bridge Input Queue      : [SYSTEM.BLOCKCHAIN.INPUT.QUEUE]
MQ Channel              : [ ]
MQ Connname             : [ ]
```

```
//CSQ4BCB JOB MSGCLASS=H,NOTIFY=&SYSUID
//*
// SET INSTDIR='/u/mleming/mqm/V9R1M0/mqbc'
//*
//STEP1 EXEC PGM=BPXBATSL,REGION=0M,TIME=NOLIMIT,MEMLIMIT=NOLIMIT,
// PARM='PGM &INSTDIR./bin/runmqbc -f /u/mleming/bcb/config.json -d 2'
//STEPLIB DD DSN=ANTZ.MQ.V910.DFCT.OUT.SCSQANLE,DISP=SHR
// DD DSN=ANTZ.MQ.V910.DFCT.OUT.SCSQAUTH,DISP=SHR
//STDOUT DD SYSOUT=*
//STDERR DD SYSOUT=*
//STDIN DD DUMMY
//STDENV DD PATH='/u/mleming/bcb/stdenv.txt',PATHOPTS=ORDONLY
```

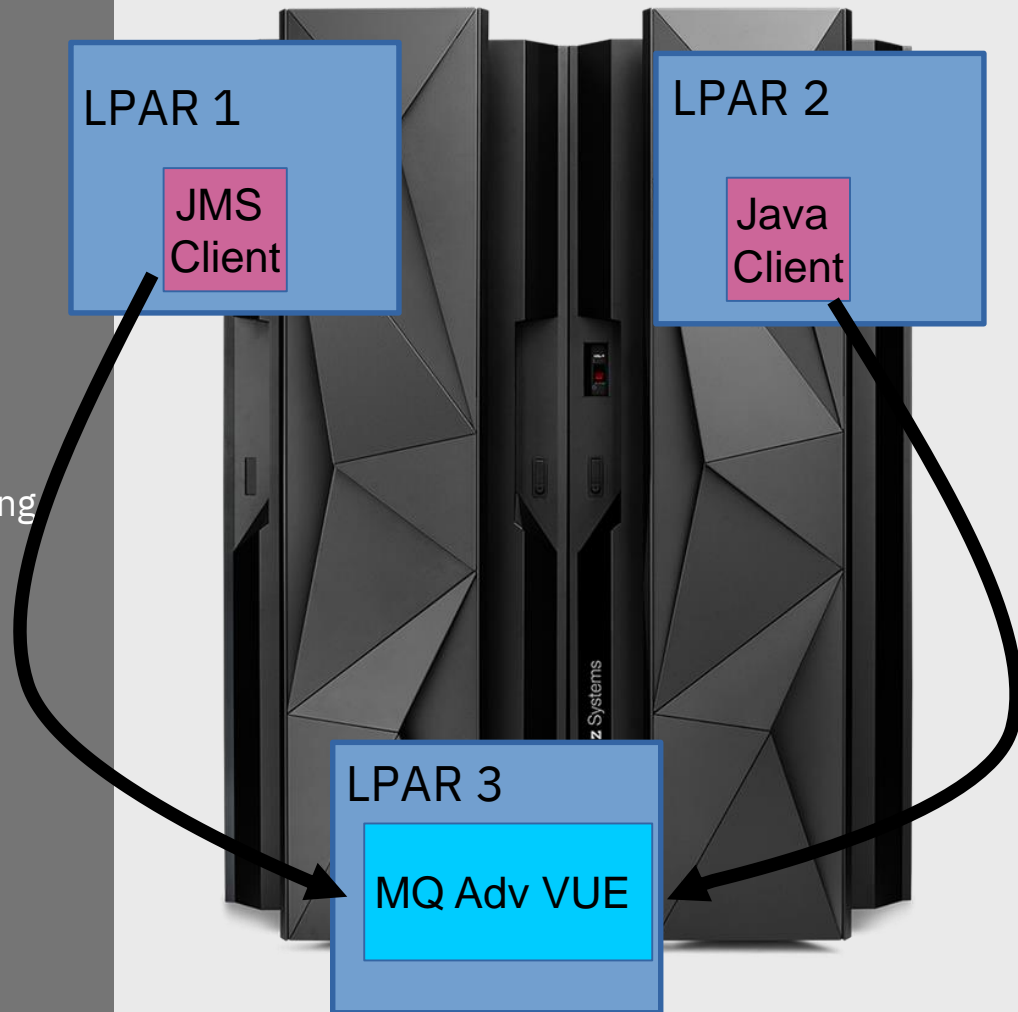
Client connection flexibility

Traditionally we have supported Java client connections in JEE environments only (tWAS, Liberty, and now CICS Liberty)

Support now added for client connections from Java applications to MQ Advanced for z/OS VUE queue managers running on other LPARs

Including AMS support for Java applications using client connections

Allows you to have more flexibility when setting up your MQ topologies



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Thank you

