

# 24598: What's New in IBM Messaging

## Messaging for the Modern Era

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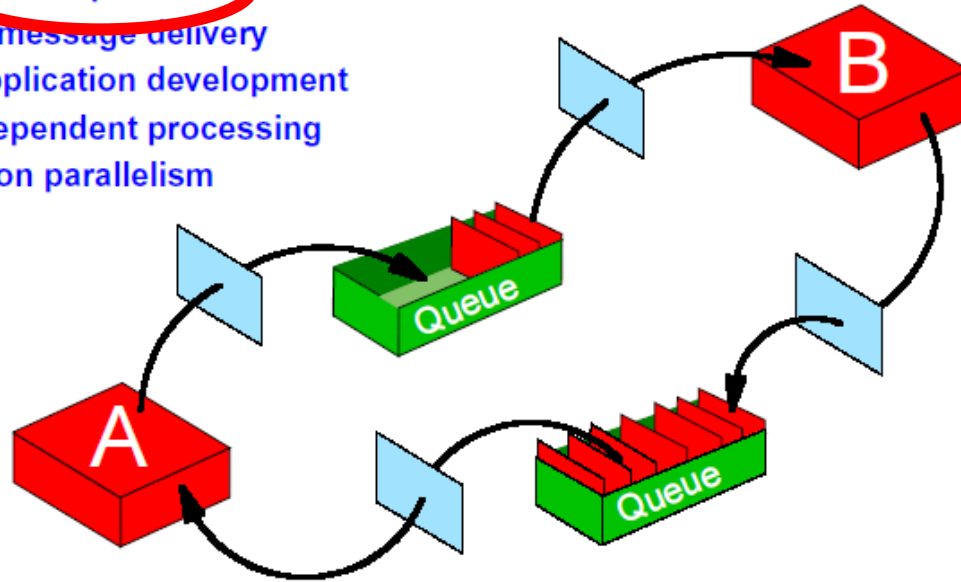


# What is MQ – the 1995 version



## MQSeries Commercial Messaging

- A single, multi-platform API
- Assured message delivery
- Faster application development
- Time independent processing
- Application parallelism



MQSeries

Commercial Messaging



# MQ for z/OS V 9.1 Enhancements

MQ Console for web-based administration

MQ REST API for administration & messaging

Learn MQ

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



Celebrating  
**25**  
years

# 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 bar reads "IBM MQ" with navigation icons. Below the title bar, there's a tab labeled "Tab 1" and a "+" icon. The main content area is divided into two panels: "Local Queue Managers" and "Queues on MQ1A".

**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

A "Properties for 'LQ1'" dialog is open in the foreground. It has a sidebar with tabs: General, Extended, Cluster, Triggering, Events, Storage, Statistics, and Status. The "General" tab is selected. The dialog contains the following fields:

- Queue name: LQ1
- Queue type: Local
- Description: (empty text area)
- Enable put: Allowed (dropdown menu)
- Enable get: (empty text area)

At the bottom of the dialog are "Close" and "Save" buttons.

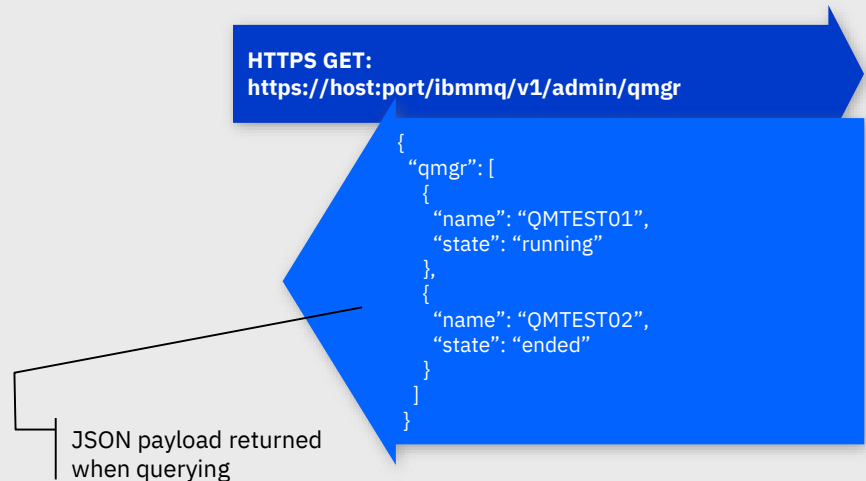
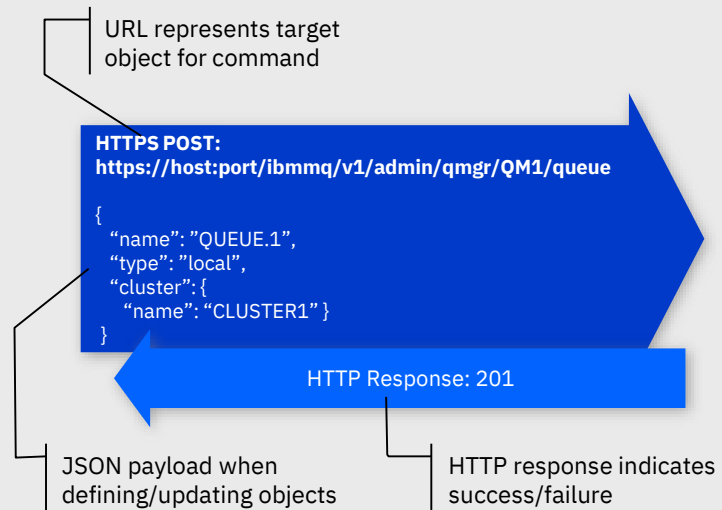
# MQ REST API for administration

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

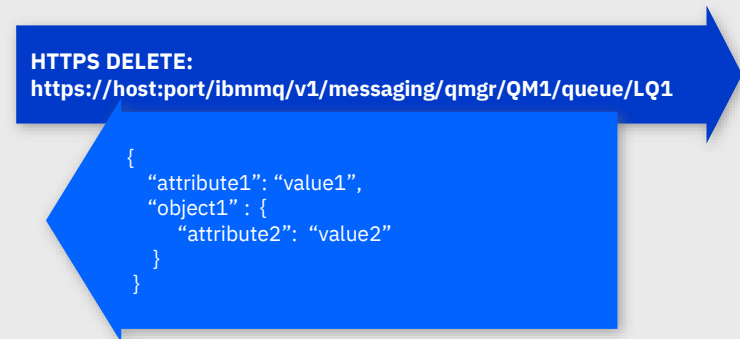
Evolution of the messaging REST API is continuing in 9.1.x CD stream

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

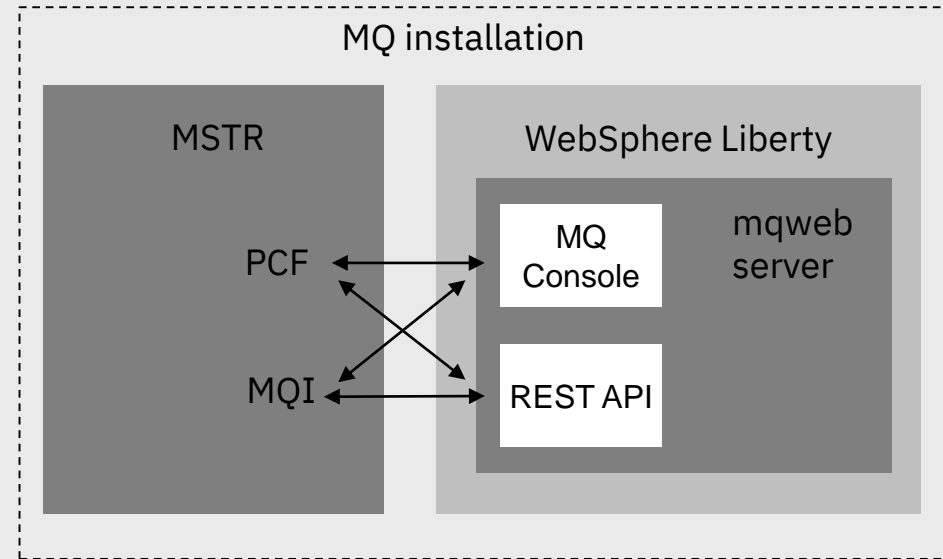
Enables both the MQ Console and REST APIs

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 OSGi JVM Servers

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

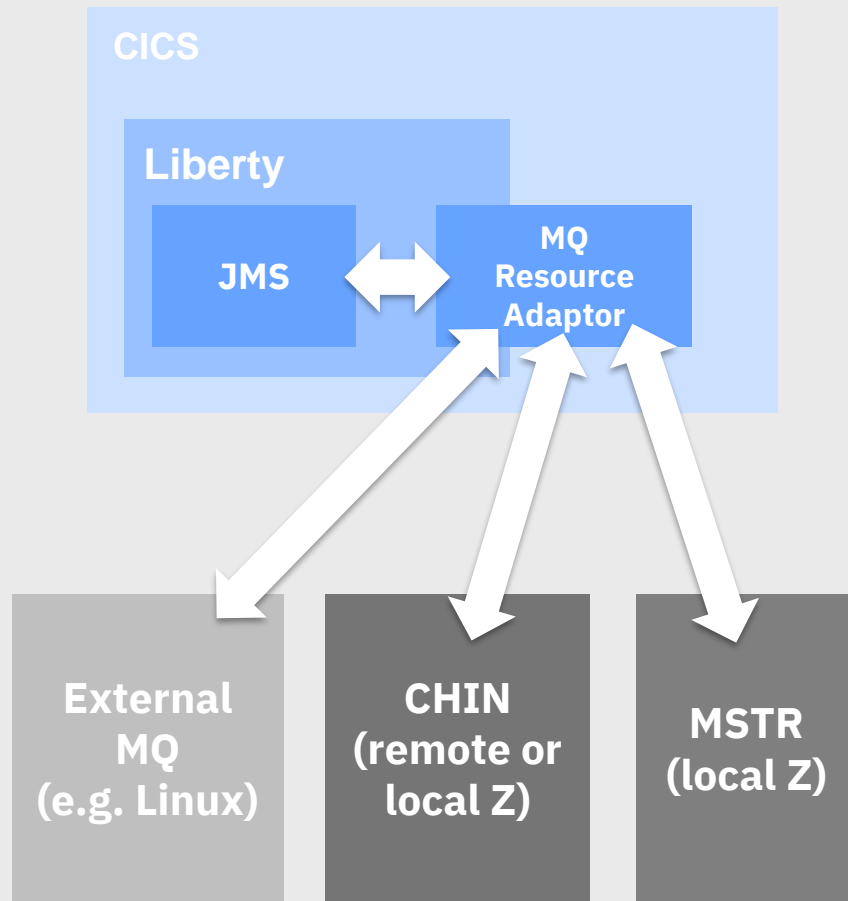
Allows CICS Liberty to use MQ Resource Adaptor just like normal Liberty

Run existing Liberty messaging apps such as MDBs inside CICS

Connections to MQ supported using either client or bindings mode

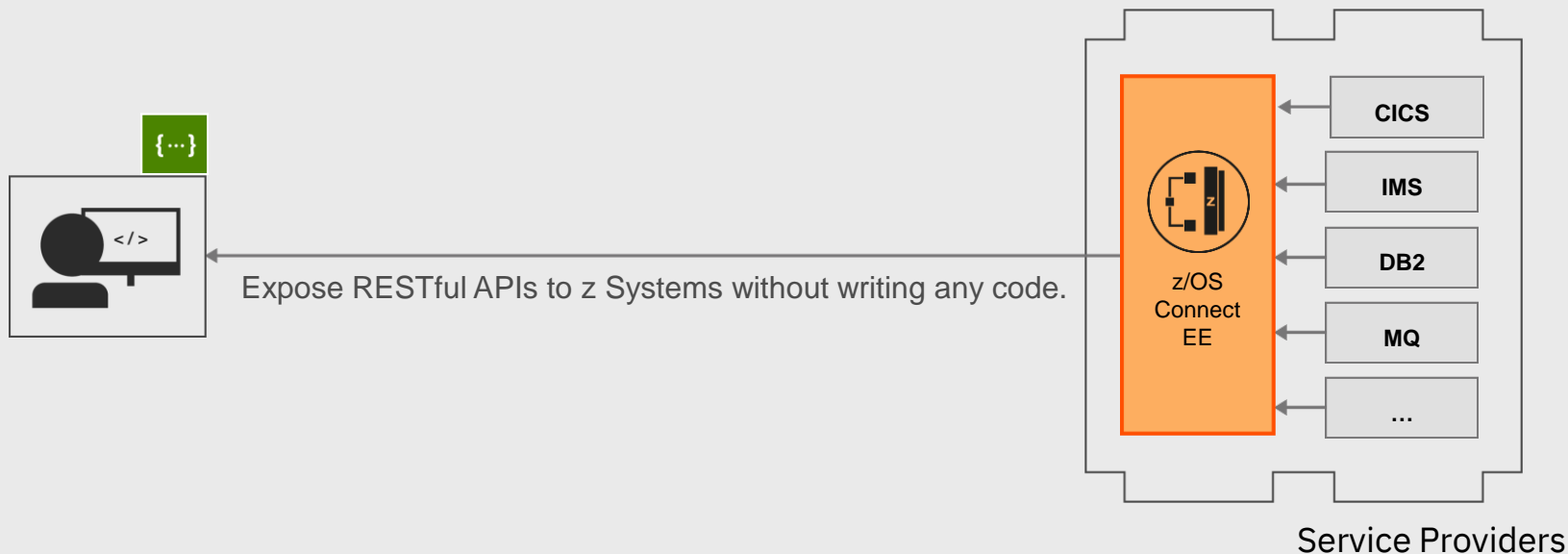
Requires CICS 5.3 + PI58375 + MQ 9.1.0 resource adapter, or one from an earlier CD release (9.0.1 and later)

## 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

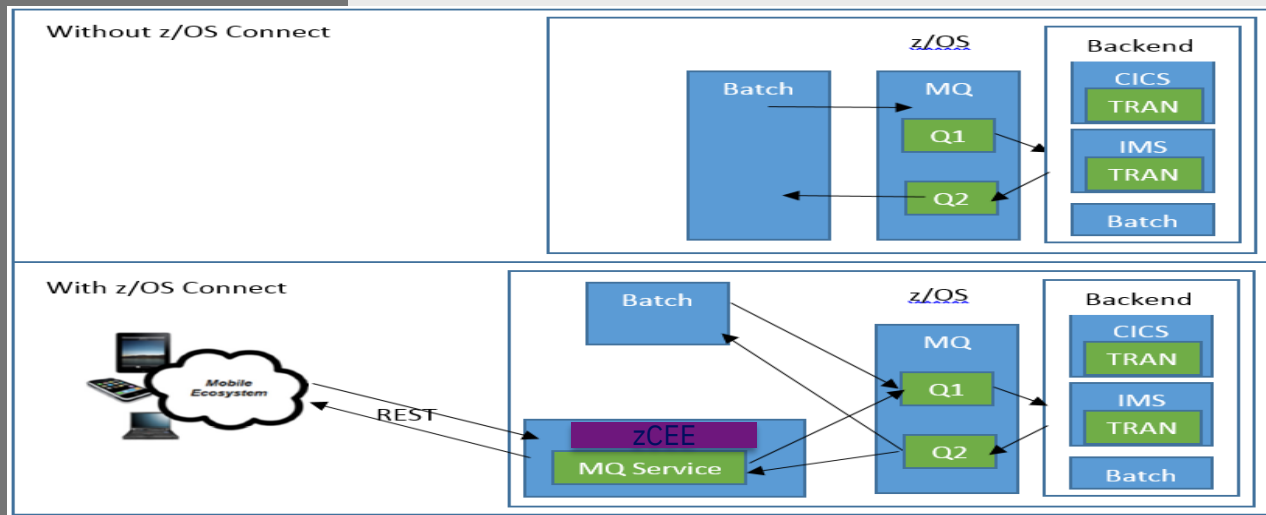
Supported with MQ 8 and onwards

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

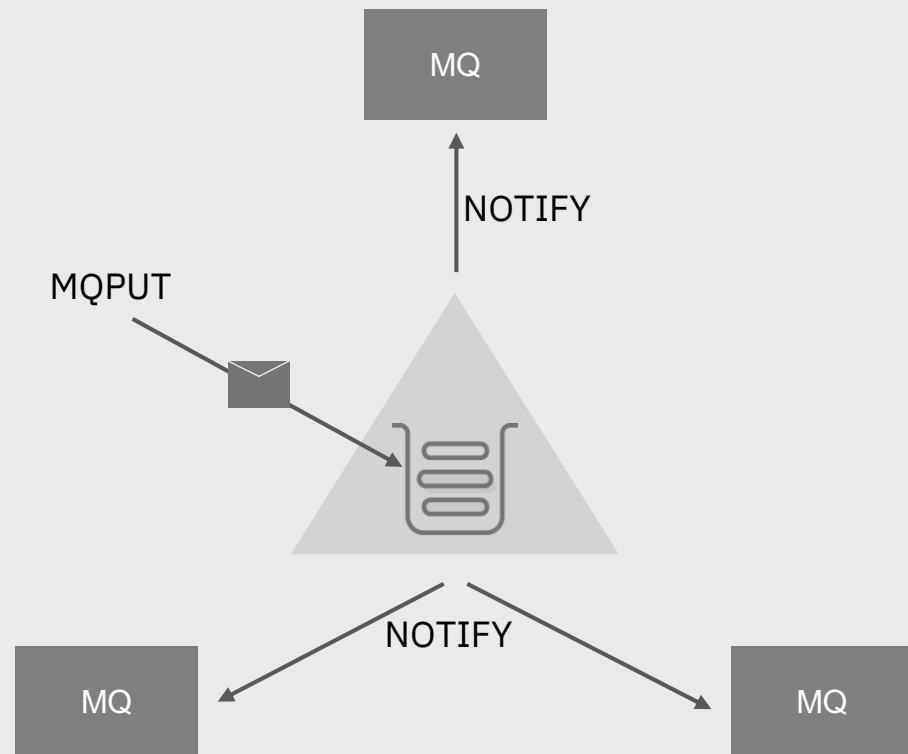
CF list monitoring is used to monitor the state of list structures containing shared queues

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

Also see z104074: Using MQ for z/OS shared queues to gain high availability



# Improved workload balancing options for shared queues

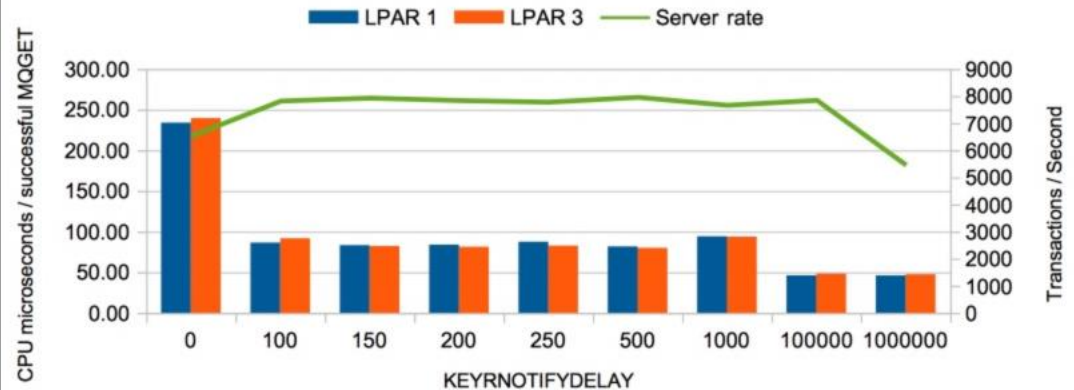
z/OS 2.3 introduces a new CFRM attribute: KEYRNOTIFYDELAY

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 will vary!

Impact of KEYRNOTIFYDELAY  
Cost per successful MQGET vs achieved transaction rate



```
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 are two qType APARs. Numbers are:

PH02328

PH02329



Celebrating  
**25**  
years

Announcement materials

Business value of MQ

MQ for z/OS enhancements

MQ Advanced for z/OS VUE  
enhancements



Celebrating  
**25**  
years

So What's new in 9.1.2???

# IBM MQ is *the* solution for business critical messaging

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

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



# IBM Messaging

# 1 + 1 = 2

# Simple



# Scalable



# Precise



# Connected



# Reliable



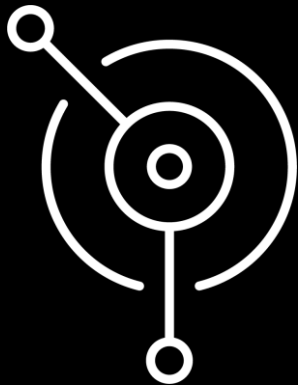
# Secure



# IBM **MQ**

Messaging, how you need it, where you need it

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



On-premise, software and the MQ Appliance



Linux AIX IBM Z  
Windows Solaris  
IBMi  
HPE NonStop zLinux  
Appliance



Run MQ yourself in public or private clouds

AWS

Azure



IBM Cloud Private

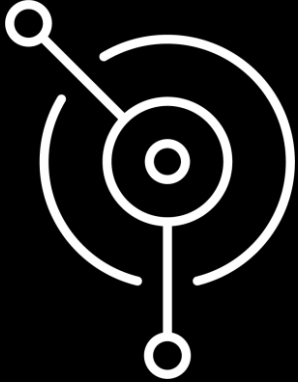
Red Hat OpenShift

Kubernetes

Let IBM host MQ for you with its managed SaaS MQ service in public clouds, IBM Cloud and AWS



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



On-premise, software and the MQ Appliance

Run MQ yourself in public or private clouds

Let IBM host MQ for you with its managed SaaS MQ service in public clouds, IBM Cloud and AWS



# MQ on Cloud service



**Managed for You**



**Up and Running in Minutes**



**Hourly billing**



**Enabled for Hybrid Cloud Connectivity**



**IBM Cloud**



Configured &  
monitored  
by the  
**customer**

Queues, topics, channels,  
clustering, applications

Managed &  
operated  
by **IBM**

MQ installation, basic  
configuration, security,  
maintenance

Hardware, virtualization,  
servers, network, storage

Try the service for free [www.ibm.com/cloud/mq](https://www.ibm.com/cloud/mq)

No  
credit card  
required!



## MQ in Containers

MQ has been supporting Docker containers since 2015 with images on Docker Hub and Docker Store and sample setups on Github

[github.com/  
ibm-messaging/  
mq-container](https://github.com/ibm-messaging/mq-container)

### IBM Cloud Transformation Advisor

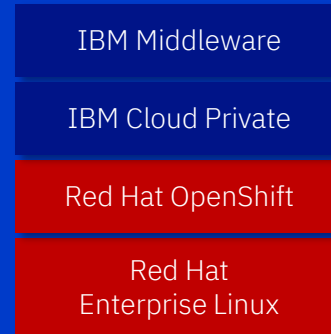
Analyses your queue managers and JEE applications for suitability for moving to IBM containers



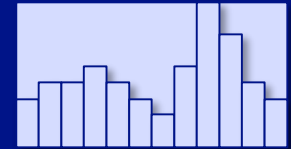
MQ Advanced is available as fully supported IBM Cloud Paks with **IBM Cloud Private** and the **IBM Kubernetes Service** on **IBM Cloud**



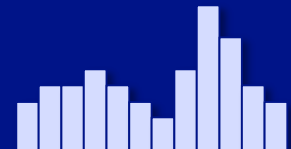
Deploy fully supported IBM certified software containers into an IBM provided **Kubernetes** platform or an existing **Red Hat OpenShift** environment



IBM has introduced the ability to purchase an entitlement based on the container size in Virtual Processor Cores and the number of hours that MQ was deployed in each container



Traditional licensing



Hourly licensing

# Introducing the MQ Appliance M2002

The scalability and security of IBM MQ

The same familiar administration model for administrators with MQ skills

Supports the same MQ applications

But, with the convenience, fast time-to-value and low total cost of ownership of an appliance



## Easy Integration

Integrates seamlessly into MQ networks and clusters

## Improved Availability

Built-in support for High Availability and Disaster Recovery

## Simplified ownership

Repeatable and fast, with less configuration or tuning required

Minimises dependencies on other resources and teams

Simpler licensing and easier to assess for security compliance and audit

# The new M2002

New in third quarter 2018, replacing the M2001

Choice of A/B models as today

Adds new 40GB network connectivity

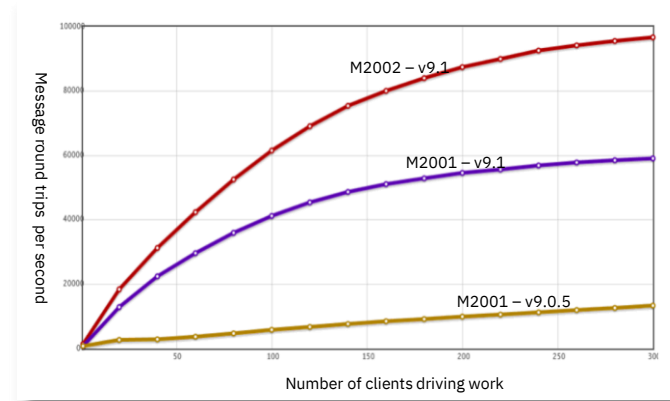
- Particularly useful for HA replication

Doubled storage capacity with new RAID10 controller for improved performance

Based on latest MQ V9.1: Available to run both LTS and CD releases on the MQ Appliance

M2002 headline numbers

- Over **200 thousand persistent**, HA replicated, messages produced and consumed per second
- Over **600 thousand non-persistent** messages produced and consumed per second

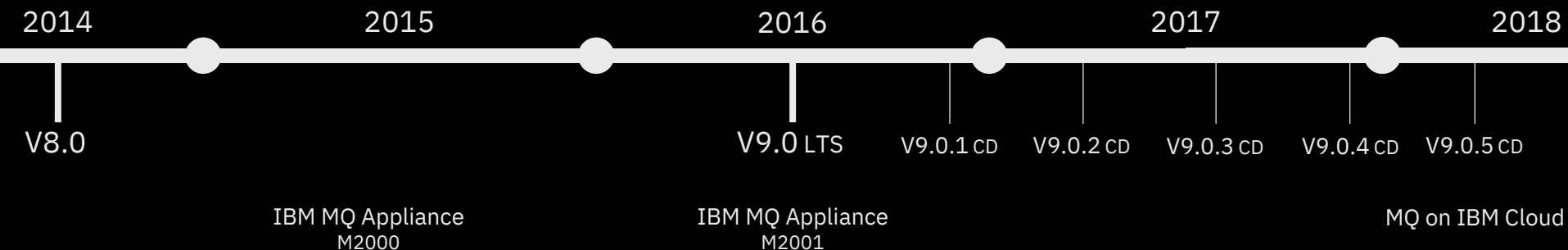




IBM **MQ**

Continuous delivery and innovation

# IBM MQ: long term support and continuous delivery



In 2016 MQ introduced a dual Long Term Support and a 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.

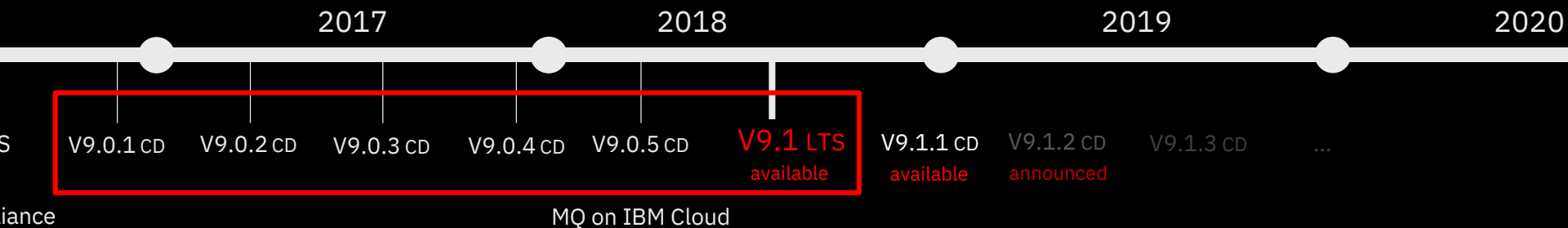
Required by those looking for fixed function.

## Mix and Match

Both are available under the same license.

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

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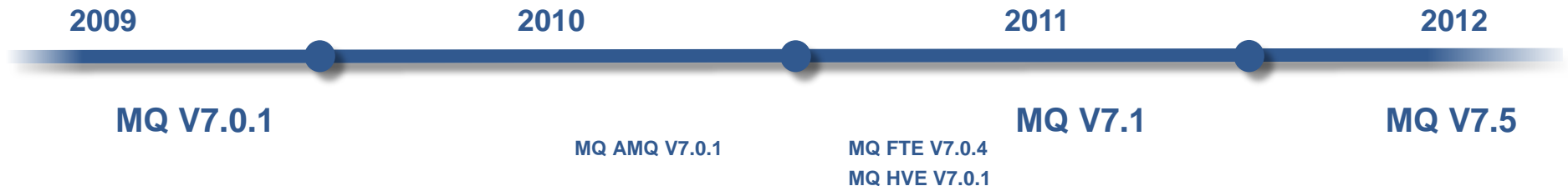
## Mix and Match

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The function delivered in the 9.0.x CD releases is now available in the long term support release **V9.1 LTS**

# End of Service for old versions



## WebSphere MQ 7.1

End of Service (Distributed) was **April 2017**

End of Service (z/OS VUE) was **September 2017**

End of Service (z/OS) was **November 2017**

## WebSphere MQ 7.5

End of Service (Distributed) was **April 2018**

**MQ FTE V7.0.x, MQ AMS 7.0.x & MQ HVE 7.0.1**

EOS was **September 2017**

## MQ on HP-UX

- Not on CD stream. Last release: MQ V9.0 LTS
- Statement of Direction: No further releases

## MQ on Solaris

- Not on CD stream. Last release: MQ V9.1 LTS
- Anticipated SoD: V9.1 will be final Solaris release

**IBM MQ V8, V5.3 for Non-Stop (Tandem)**

**EOS will be April 2020**

# V9 summary

---

- Central provisioning of CCDT
- AMS Confidentiality Policy for higher performance
- Resource statistics via pub/sub topics
- Application Activity Trace via pub/sub topics
- runmqsc command line recall
- SMF Pageset statistics
- z/OSMF provisioning workflows
- Java environments extended



# MQ 9.0.x CD content, now available with V9.1 LTS

Replicated Data  
Queue Manager  
for MQ  
Advanced

Linear logging  
automation and  
performance

RESTful  
administration

Error log  
formatting

Web Console

RESTful  
messaging

MQ Appliance  
performance  
improvements

MQ JMS in CICS  
Liberty Profile

Salesforce  
bridge

AMS  
confidentiality  
performance on  
z/OS Advanced

Blockchain  
bridge for MQ  
Advanced

Floating IP  
support for MQ  
Appliance

Code repository  
integration

Backup and  
Restore on MQ  
Appliance

Redistributable  
MFT agent for  
MQ Advanced

Enhanced MFT  
diagnostics

Cross LPAR MFT  
agents for z/OS  
Advanced

SNMP and REST  
support for MQ  
Appliance

# MQ release-to-release changes

Always read the **What's new and changed** sections of the Knowledge Centre to see what each release adds

## - IBM MQ

### - Product overview

Introduction to IBM MQ

+ IBM MQ license information

Pricing metric for Virtual Processor Cores

+ What's new and changed in IBM MQ Version 9.0.0

### - What's new and changed in Version 9.0.x Continuous Delivery

#### + What's new and changed in IBM MQ Version 9.0.3

+ What's new and changed in IBM MQ Version 9.0.2

+ What's new and changed in IBM MQ Version 9.0.1

### - What's changed in Version 9.0.0.x Long Term Support

+ What's changed in Version 9.0.0, Fix Pack 1

What changed in earlier releases

IBM MQ > Product overview > What's new and changed in Version 9.0.x Continuous Delivery >



## What's new and changed in IBM MQ Version 9.0.3

IBM® MQ Version 9.0.3, which is a Continuous Delivery (CD) release, delivers a number of new and enhanced features on Linux, Windows, and z/OS®.

### Subtopics

#### + What's new in IBM MQ Version 9.0.3

IBM MQ Version 9.0.3 delivers a number of new and enhanced features on Linux, Windows, and z/OS.

#### + What's changed in Version 9.0.3

Changes to functions and resources in Version 9.0.3 are described in this section. Review these changes before upgrading queue managers to the latest product version and decide whether you must plan to make changes to existing applications, scripts, and procedures before starting to migrate your systems.

#### + New and changed messages in Version 9.0.3

A summary of the new messages that have been added for IBM MQ Version 9.0.3, with links to further information. Any messages that have been changed are also listed.

### Parent topic:

+ What's new and changed in Version 9.0.x Continuous Delivery

### Related concepts:

+ What's new and changed in IBM MQ Version 9.0.2

+ What's new and changed in IBM MQ Version 9.0.1

### Related information:

➔ System Requirements for IBM MQ and IBM WebSphere® MQ

➔ IBM MQ, WebSphere MQ, and MQSeries product readmes web page



# Fault tolerance

Protecting your critical data

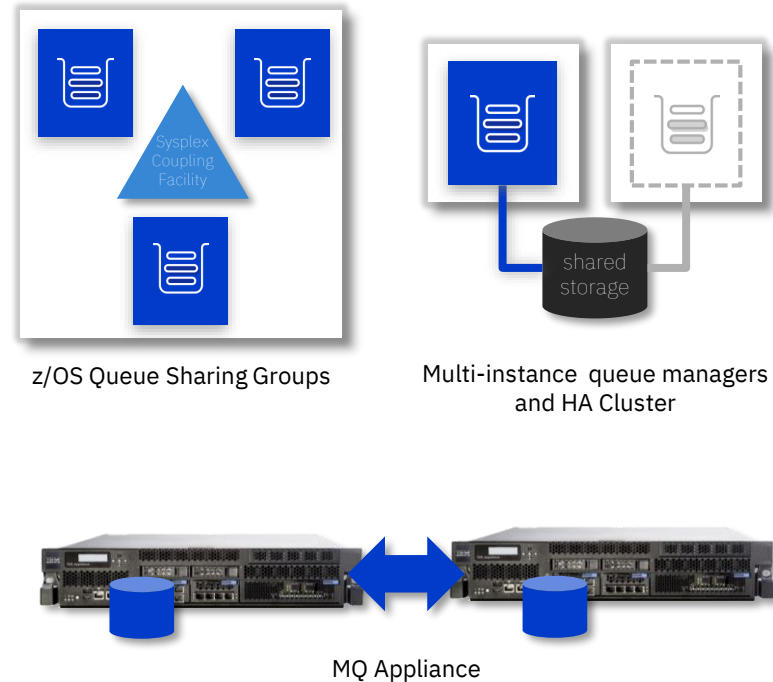
# Fault tolerance

MQ delivers HA through the ability to build horizontally scaled, active-active systems and typically **active-passive HA** of the data itself\*, the messages.

Traditionally active-passive HA has been achieved through **HA clusters** or **multi instance** queue managers. Both rely on highly available infrastructure to be setup and relied on.

The **MQ Appliance** changed this with a fully integrated HA solution, providing built in machine to machine data replication and failover.

\* z/OS shared queue provides active-active HA of the message data!



# Fault tolerance

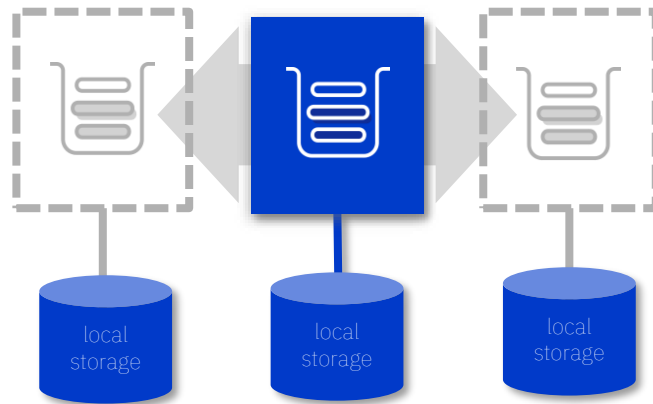
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**2018 saw a fully integrated, data replication and failover solution arrive on Red Hat x86...**

\* z/OS shared queue provides active-active HA of the message data!



# Replicated Data Queue Managers

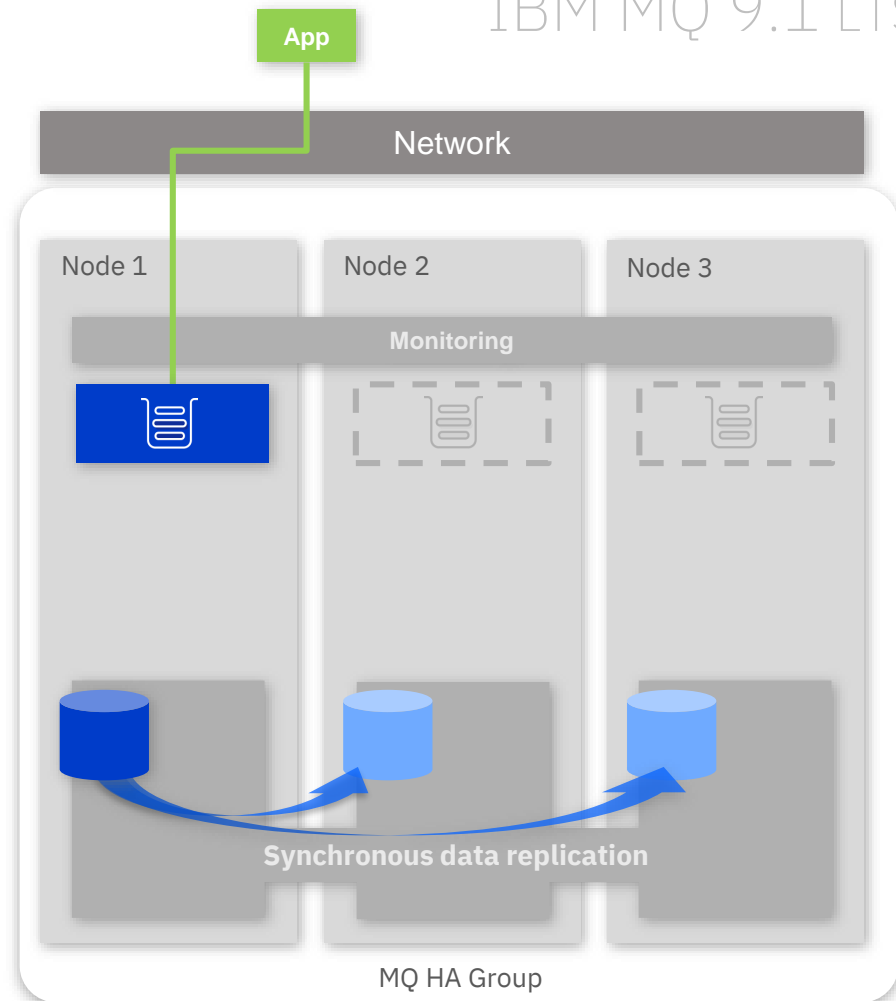
**Linux only, MQ Advanced** HA solution with no need for a shared file system or HA cluster

Three-way replication and monitoring for quorum support

**Synchronous** data replication for once and once only transactional delivery of messages

Active/passive queue managers with **automatic takeover**

IBM MQ 9.1 LTS



# Replicated Data Queue Managers

**Linux only, MQ Advanced** HA solution with no need for a shared file system or HA cluster

Three-way replication and monitoring for quorum support

**Synchronous** data replication for once and once only transactional delivery of messages

Active/passive queue managers with **automatic takeover**

Per queue manager control to support active/active utilisation of nodes

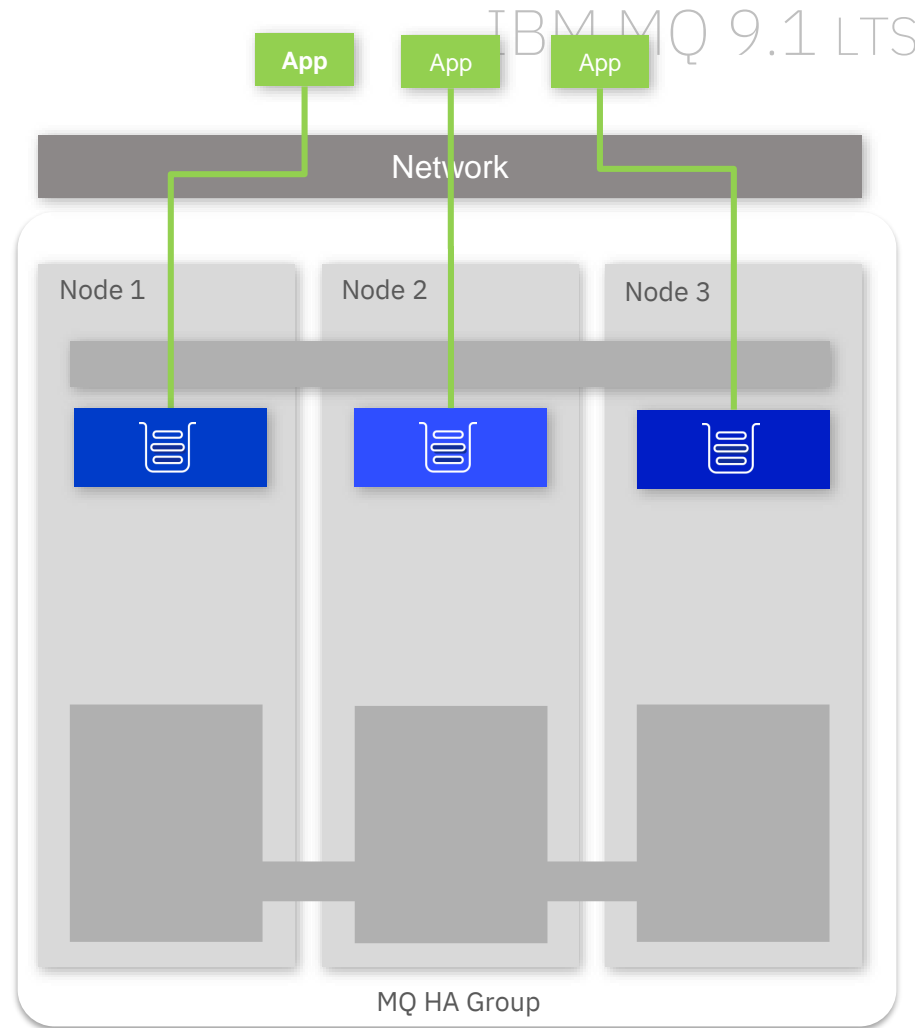
MQ **licensing** is aligned to maximise benefits

Improvements in queue manager restart times

MQ Advanced for RHEL x86-64

9.1.1

9.1.2



# Replicated Data Queue Managers

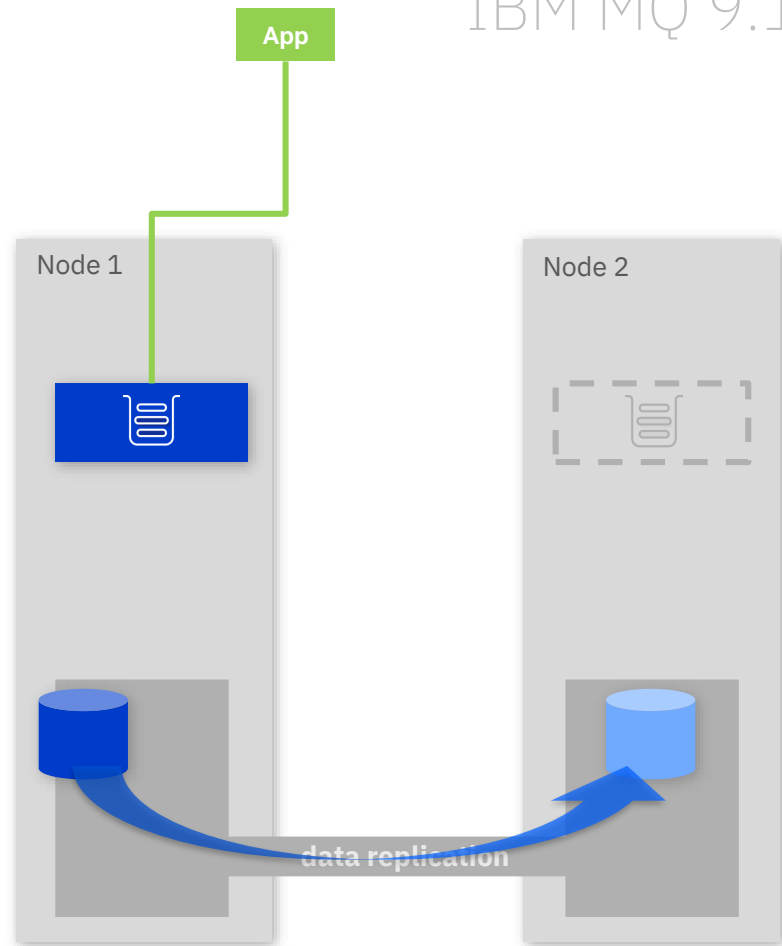
## Manual failover

RDQM also supports a looser coupled pair of nodes for data replication but with no automatic failover, often for **Disaster Recovery**

Data replication can be

**Asynchronous** for systems separated by a high latency network

**Synchronous** for systems on a low latency network







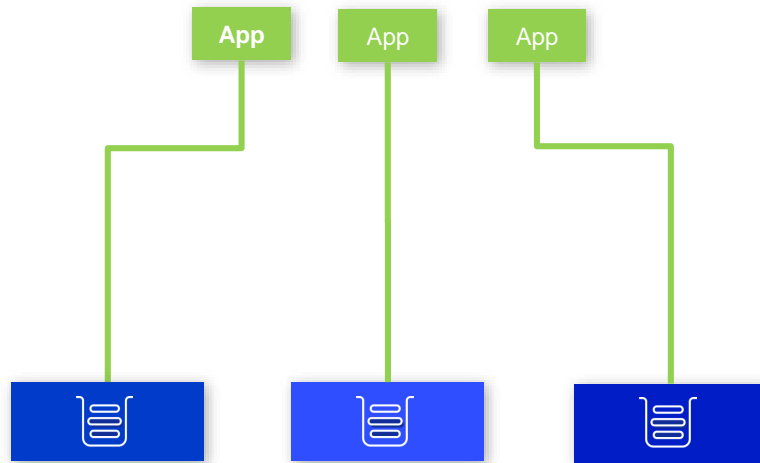
# Cloud Native Messaging

Building scalable, fault tolerant, solutions

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Many of you have built your own continuously available and horizontally scalable solutions over the years

Let's call this the “*uniform cluster*” pattern



# Building scalable, fault tolerant, solutions

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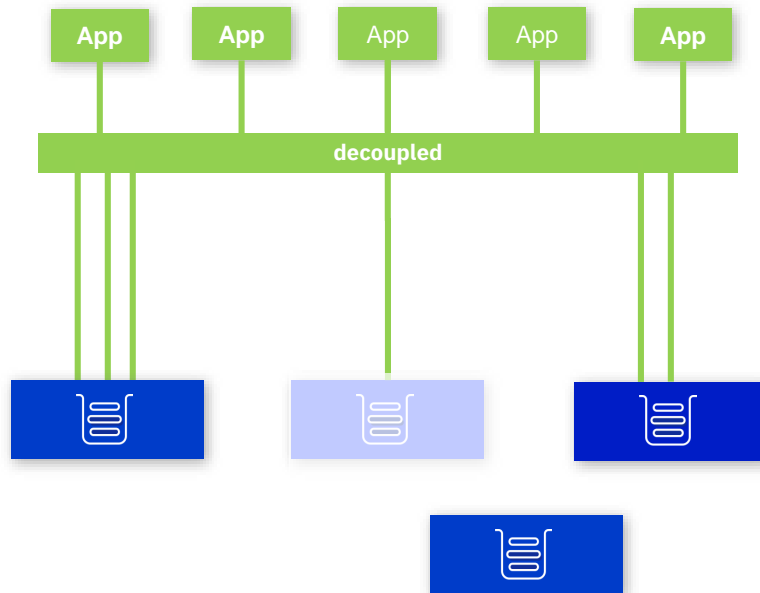
Let's call this the “***uniform cluster***” pattern

MQ has provided you many of the building blocks -

- Client auto-reconnect
- CCDT queue manager groups

But you're left to solve some of the problems, particularly with long running applications -

- Efficiently distributing your applications
- Ensuring all messages are processed
- Maintaining availability during maintenance
- Handling growth and contraction of scale



## MQ 9.1.2 is starting to make that easier

For the distributed platforms, declare a set of matching queue managers to be following the ***uniform cluster pattern***

- All members of an MQ Cluster

- Matching queues are defined on every queue manager

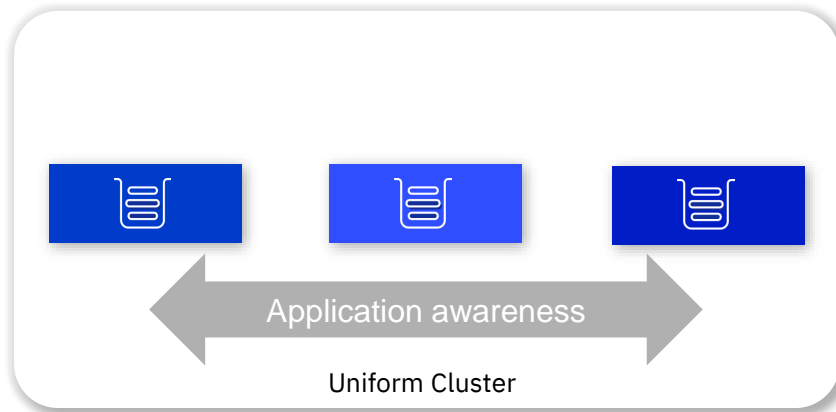
- Applications can connect as clients to every queue manager

MQ will automatically share application connectivity knowledge between queue managers

The group will use this knowledge to automatically keep matching application instances balanced across the queue managers

- Matching applications are based on *application name* (new abilities to programmatically define this)

MQ 9.1.2 is starting to roll out the client support for this



# Automatic Application balancing

Application instances can initially connect to any member of the group

We recommend you use a queue manager group and CCDT to remove any SPoF

Every member of the uniform cluster will detect an imbalance and request other queue managers to donate their applications

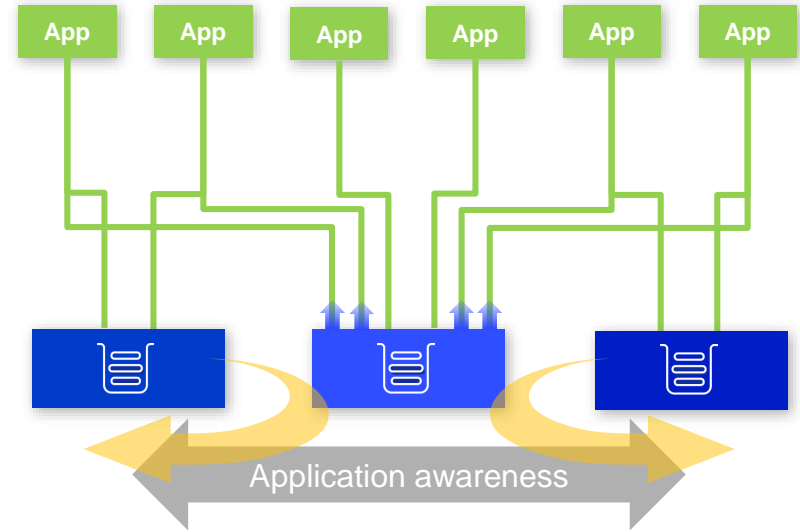
Hosting queue managers will instigate a client *auto-reconnect* with instructions of where to reconnect to

Applications that have enabled *auto-reconnect* will automatically move their connection to the indicated queue manager

9.1.2 CD has started with support for C-based applications

...

IBM MQ 9.1.2 CD



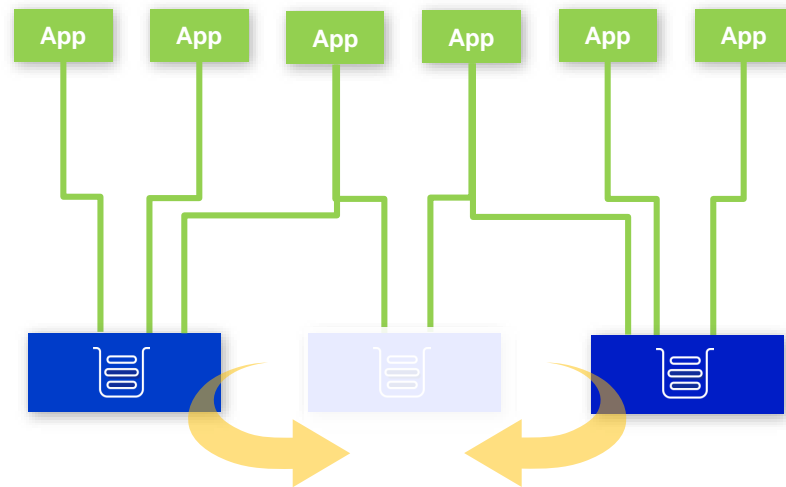
# Automatic Application balancing

Automatically handle rebalancing following planned and unplanned queue manager outages

Existing client auto-reconnect and CCDT queue manager groups will enable initial re-connection on failure

Uniform Cluster rebalancing will enable automatic rebalancing on recovery

IBM MQ 9.1.2 CD

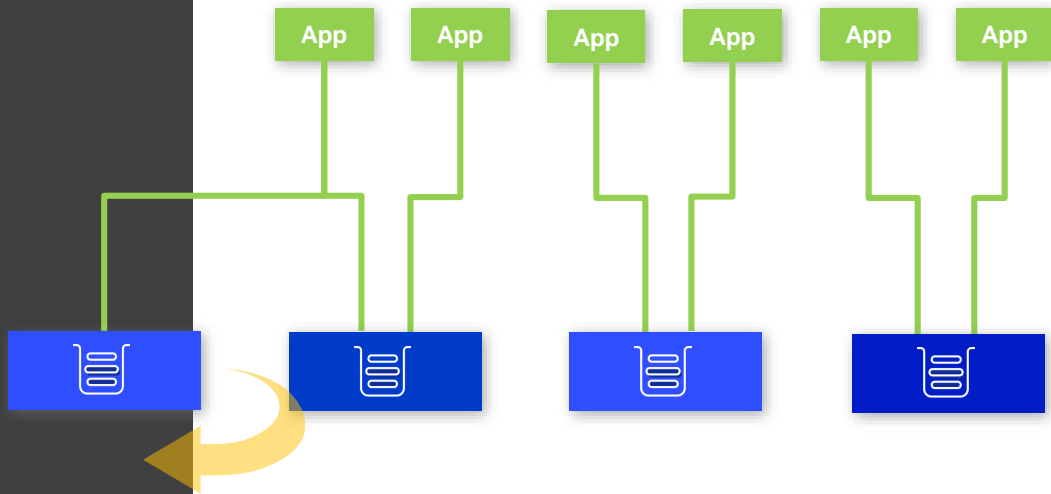


# Automatic Application balancing

Even to horizontally scale out a queue manager deployment

Simply add a new queue manager to the uniform cluster

The new queue manager will detect an imbalance of applications and request its fair share



IBM MQ 9.1.2 CD

MQ 9.1.2 CD is the *start* of the Uniform Cluster journey

Join the **MQ Beta** program to see how the Uniform Cluster pattern and client support will evolve

**[pete\\_murphy@uk.ibm.com](mailto:pete_murphy@uk.ibm.com)**

# Building scalable and available solutions

## JSON CCDT

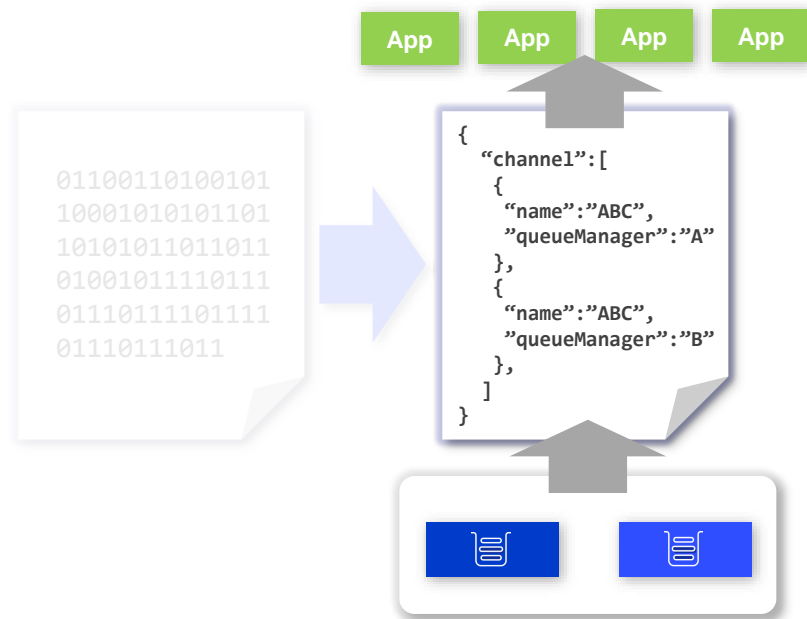
Build your own JSON format CCDTs

Supports multiple channels of the same name on different queue managers to simplify the building of uniform clusters

Available with all 9.1.2 clients

C, JMS, .NET, Node.js, Golang clients

IBM MQ 9.1.2 CD





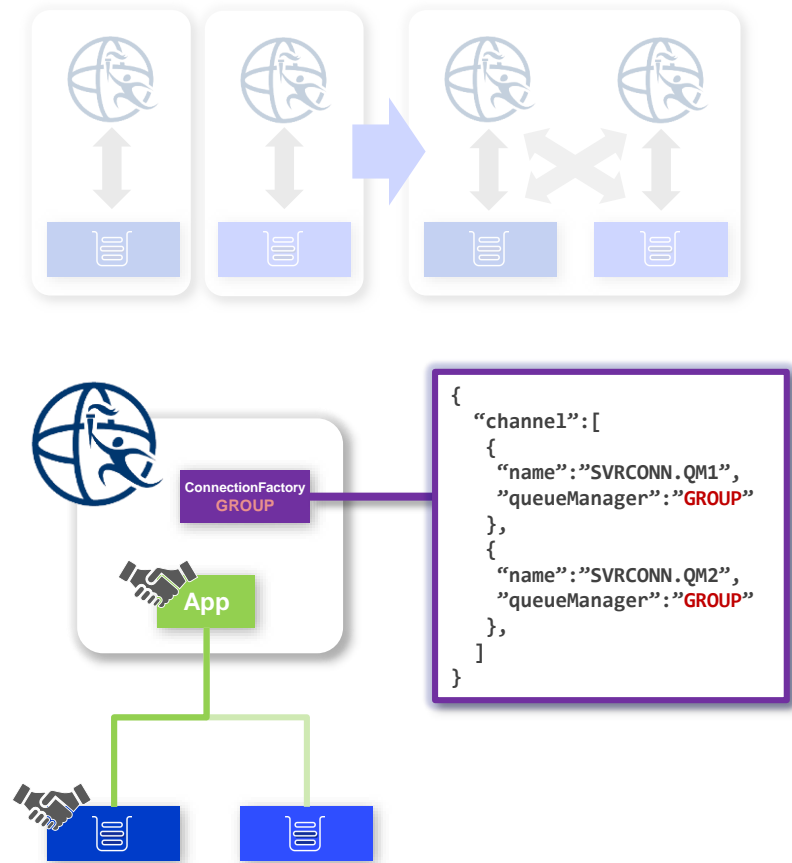
# Building scalable and available solutions

## WebSphere Liberty Transactions

Global transactions currently require a single queue manager to be named when connecting, complicating deployment and introducing single points of failure

WebSphere Liberty 18.0.0.2 and MQ 9.1.2 support the use of CCDT queue manager groups when connecting

IBM MQ 9.1.2 CD





# Managing MQ

Living with your enterprise messaging system

# Making management simpler

## Web console

Simple to use, web based administration

## RESTful administration

Administer and manage your queue managers over HTTPS

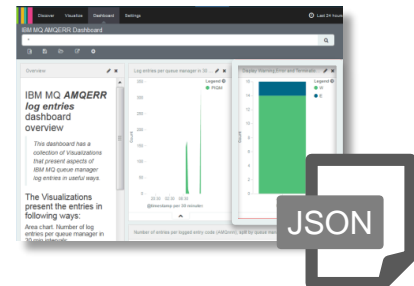
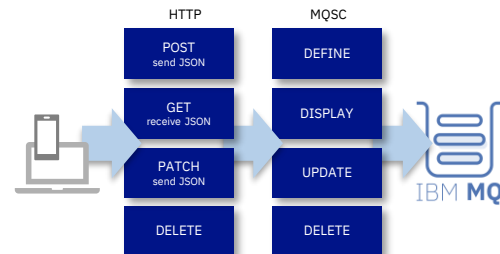
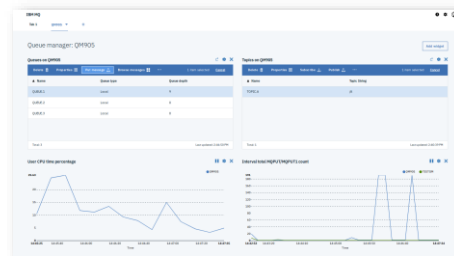
## Logging and monitoring

Simplify the streaming of logs and metrics for centralized storage and analyzes

MQ logs streamed to MQ Appliance log targets

9.1.2

IBM MQ 9.1 LTS



# Managing diagnostic data

The need to centrally collect and analyse diagnostic data is increasing, using tools such as Splunk, Elasticsearch and Grafana

MQ generates a wide range of information and has demonstrated how this can be collected using off the shelf tooling

Subscribing to metrics in MQ V9 makes that even easier

MQ 9.0.x has seen enhancements to the error log data it generates to aid such solutions

Universal timestamps and severity levels

Separated inserts

JSON output

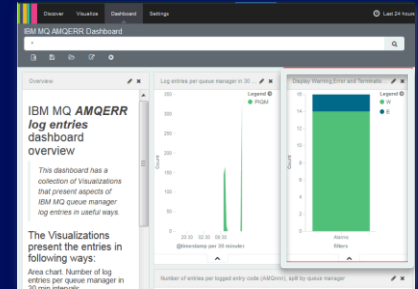
Multiple logs

Syslog output

Publish MQ statistics to Prometheus and Grafana



Forward MQ error logs to Elasticsearch or Splunk



Error logs output JSON for easy parsing

```
{
  "ibm_messageId":"AMQ62871",
  "ibm_arithInsert1":0,
  "ibm_arithInsert2":0,
  "ibm_commentInsert1":"Linux 4.13.0-36-generic (MQ Linux (x86-64 platform) 64-bit)",
  "ibm_commentInsert2":"/opt/mqm (Installation1)",
  "ibm_commentInsert3":"9.0.5.0 (p905-L180228.1)",
  "ibm_datetime":"2018-03-04T13:18:27.506Z",
  "ibm_serverName":"QM905",
  "type":"mq_log",
  "host":"david-VirtualBox",
  "loglevel":"INFO",
  "module":"amqxaida.c:6238",
  "ibm_sequence":"1520169507_506462655",
  "ibm_processId":2119,
  "ibm_threadId":1,
  "ibm_version":"9.0.5.0",
  "ibm_processName":"strmqm",
  "ibm_userName":"david",
  "ibm_installationName":"Installation1",
  "ibm_installationDir":"/opt/mqm",
  "message":"AMQ62871: IBM MQ V9.0.5.0 (p905-L180228.1),"
}
```

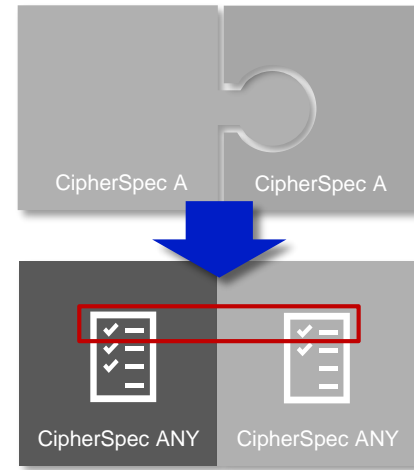
# Managing channel CipherSpecs

Making it easier to keep up-to-date with ever changing ciphers, simplifying migration

Rather than needing to match the CipherSpec on both ends of a channel, MQ 9.1.1 CD introduced **ANY\_TLS12** and MQ will negotiate the strongest CipherSpec available to both ends

For 9.1.1, the distributed platforms also added the ability to whitelist *exactly* which CipherSpecs a queue manager will accept

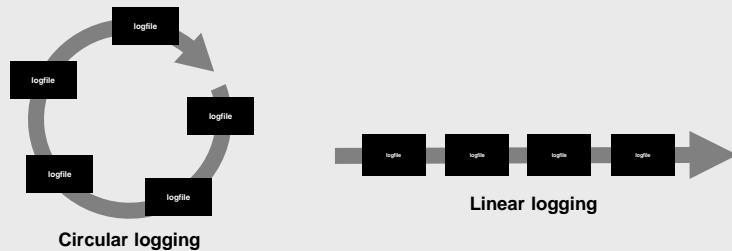
IBM MQ 9.1.1 CD



# Distributed recovery logs

## Linear logging

MQ always logs all the data you need to recover from a queue manager failure in a recovery log. Linear logging adds media recovery support to rebuild MQ resources in the event of losing or corrupting MQ data



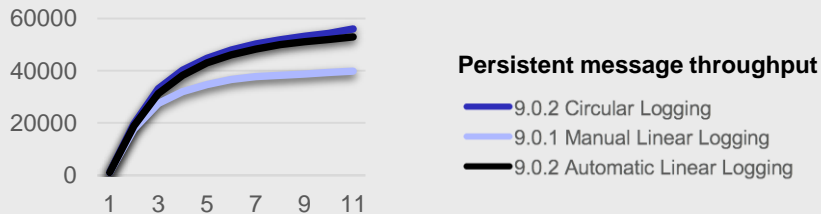
## Automatic media imaging

Media images can now be automatically scheduled by the queue manager, simplifying the administrative tasks and smoothing out the performance impact, simplifying the problem of when to take an image



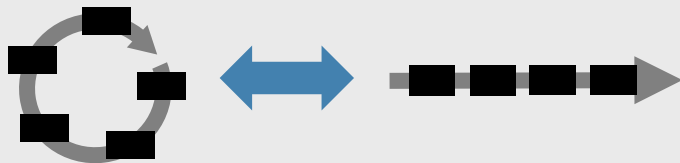
## Automatic log reuse

Constantly creating new linear logs reduces MQ's performance. Logs can now be reused by a queue manager to regain that performance. Choosing automatic reuse removes another administrative task of constantly deleting linear logs



## Migrating between linear and circular

MQ now makes it possible to migrate a queue manager from linear to circular logging and vice versa



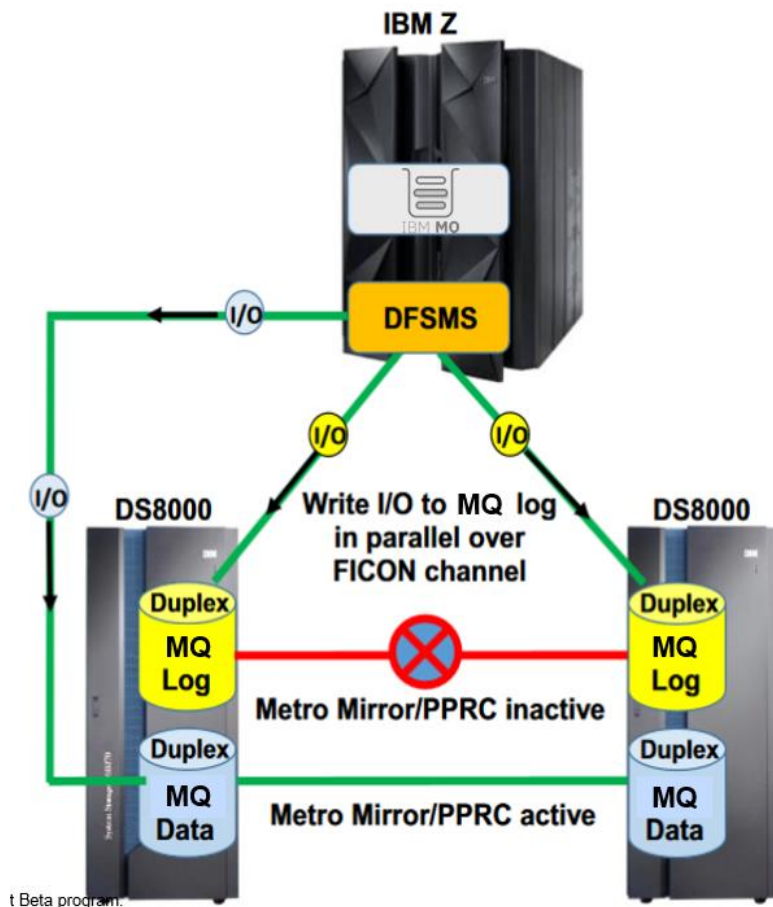
## z/OS zHyperwrite

Reduces the cost of using PPRC (Metro-Mirror) to synchronously replicate log data by issuing the write to the primary and secondary copies of the data at the DFSMS (Media Manager) level.

This allows the writes to occur in parallel instead of in series.

- Reduced I/O times by **up to 60%**.
- Reduced elapsed time for commit by **up to 60%**, which can reduce contention.
- Improved the sustained log rate, allowing each queue manager to process **up to 2.4 times** the volume of workload.

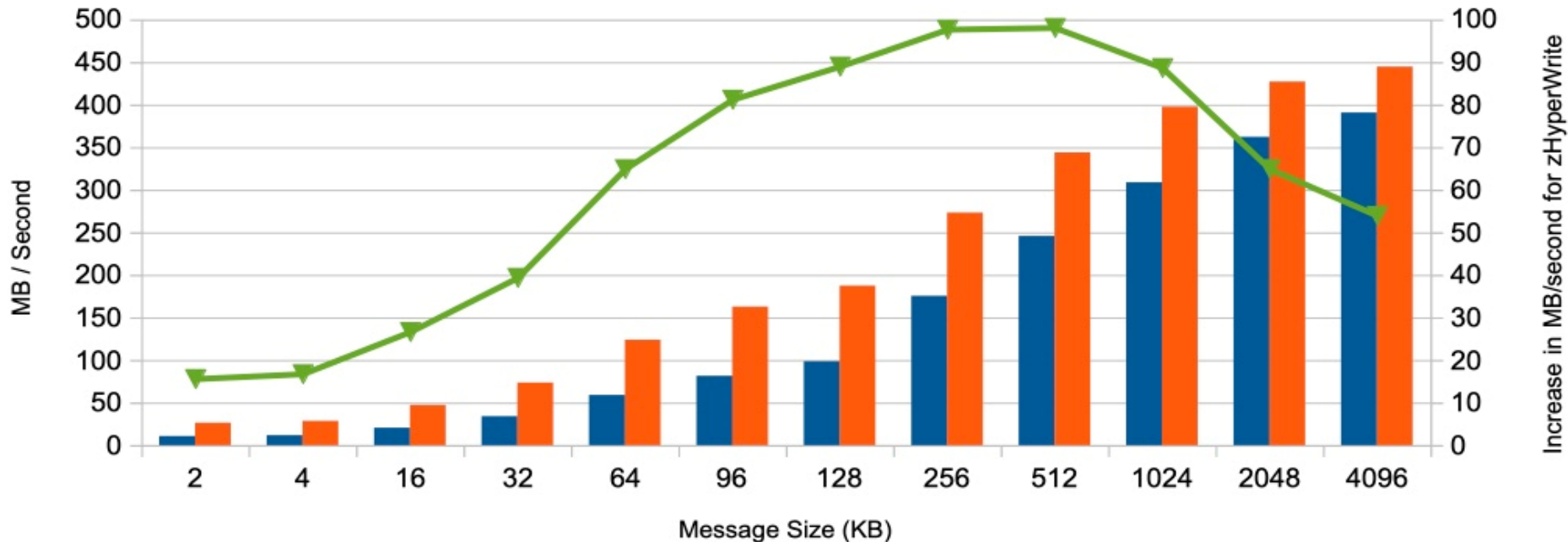
IBM MQ 9.1.2 CD



## MQ Logger - Sustained log rate (MB/second)

Single log configuration

PPRC zHyperWrite zHyperWrite increase over PPRC





# Managed File Transfer

MFT manages your file transfers, and now it's even easier for you to manage MFT...

IBM MQ 9.1 LTS +



## Simplified MFT Agent licensing

No need to track individual agents with MQ Advanced queue managers

## Redistributable MFT agent

Simply download and unpack

## Failed transfer timeout

Automatically stop transfers after repeated failures

## Resource monitor backups

Simple, single command to backup and restore resource monitors

MFT agent, transfer and resource monitor  
monitoring through REST

9.1.1

File transfer initiation through  
simple REST call

9.1.2



# Helping developers

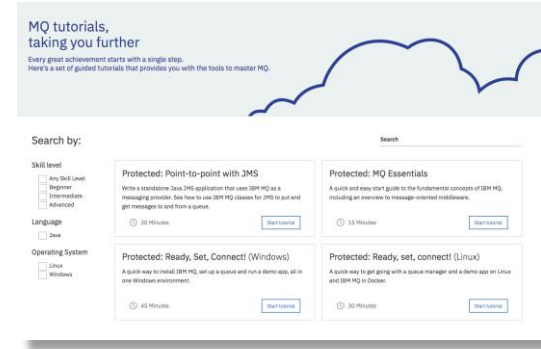
Making it easy to build MQ into your applications

# Getting Started

Teach yourself MQ

**ibm.biz/learn-mq**

...and prove your skills



# Developing applications

Build your applications simply, with no need for an MQ installation

Pull Java directly from the Maven repository since MQ 9.0.4 CD

MQ 9.1.1 CD added the **SDK** to the MQ redistributable client

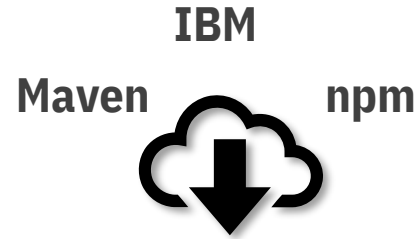
The redistributable client is now available directly, no need to log into IBM

**[ibm.biz/mqclientdownload](https://ibm.biz/mqclientdownload)**

Develop your applications on the platform of your choice with the addition of the MacOS version of the 9.1.1 MQ client and SDK for Developers

**[ibm.biz/mqmacos](https://ibm.biz/mqmacos)**

*(The MQ for MacOS toolkit includes runmqsc)*



# Writing new applications

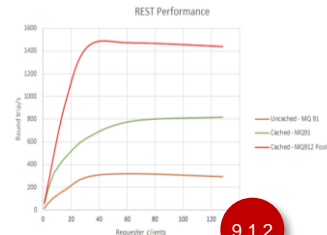
## REST Messaging

Providing a very simple way to get messages in and out of your MQ system

9.1.2 CD will boost the performance capability



**REST**



9.1.2

## .NET Core

9.1.1 CD brought support for .NET Core on Windows

9.1.2 CD will add Linux support



**.NET Core**

**Windows**

9.1.1

**Linux**

9.1.2

## Open Source language bindings

Write MQI applications in Node.js and Golang

New simpler JMS style API for Golang

[github.com/ibm-messaging](https://github.com/ibm-messaging)



**Node.js MQI**



**Golang MQI**



**Golang JMS**

NEW

Events

# Messages or Events?

**Messages** are *“work that needs to be done”*

**Events** are *“things that have happened”*

Generalised solution



IBM MQ

Specialised technology



IBM MQ



Request / Reply



Assured Delivery

Specialised for **message exchange** and **transactions**



IBM Event Streams



Stream History



Decoupled consumption

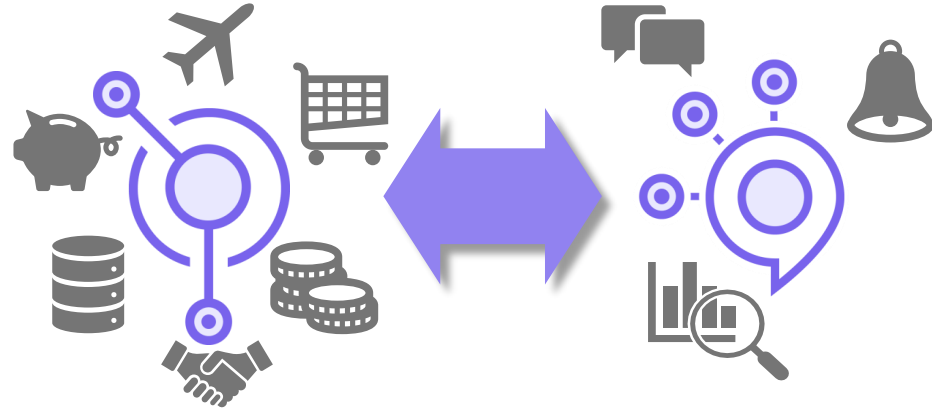
Specialised for **streaming** of **events**

# IBM MQ with IBM Event Streams

**IBM MQ** connects mission-critical systems, requiring **transactional, once-only delivery**

**Event Streams** distributes and processes streams of events in real-time to intelligently engage with customers

Connecting the two together, flowing messages and events between them, with the **supported connectors** enables you to unlock the potential of your data





# Connectivity

Replicated Data Queue Manager for MQ Advanced	Linear logging automation and performance	RESTful administration	Error log formatting	Web Console	RESTful messaging
MQ Appliance SAN support	MQ JMS in CICS Liberty Profile	<b>Salesforce bridge</b>	AMS confidentiality performance on z/OS Advanced	<b>Blockchain bridge for MQ Advanced</b>	Floating IP support for MQ Appliance
Code repository integration	Backup and Restore on MQ Appliance	Redistributable MFT agent for MQ Advanced	Enhanced MFT diagnostics	Cross LPAR MFT agents for z/OS Advanced	SNMP and REST support for MQ Appliance

## Bridging to MQ

As well as connecting a wide array of applications directly to an MQ system, there are a growing set of bridges and connectors between MQ and external systems

### Salesforce

Integrate MQ's publish/subscribe with Salesforce. Exchange **Salesforce events** and **MQ publications** using the MQ Bridge for Salesforce with no need for your backend applications to connect to Salesforce directly.

Salesforce



### Blockchain

Use MQ messages to query and update a Blockchain ledger. Connects to **Hyperledger** Fabric networks in IBM Cloud and locally. Supported for use with V9.0.x **MQ Advanced** queue managers

Blockchain



### Kafka

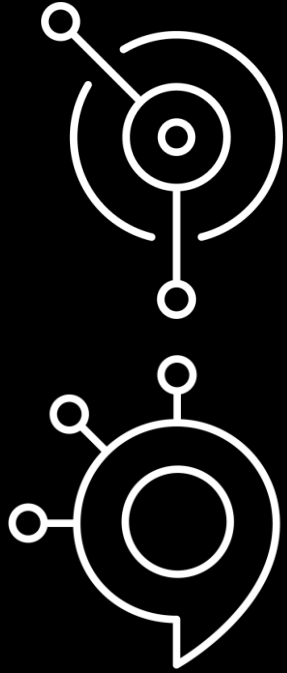
IBM MQ sink and source connectors are currently being openly developed by IBM and provides **as-is**, allowing you to connect your MQ systems with your Kafka clusters

[www.confluent.io/product/connectors](http://www.confluent.io/product/connectors)

Kafka



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



Linux      AIX      IBM Z  
Windows      Solaris  
                IBMi  
HPE NonStop      zLinux  
Appliance



# Shameless Promotion - MQ for z/OS WildFire Workshops currently in plan

## — **IMQ09 - MQ V9 for z/OS Wildfire Workshop**

- New York, NY - July 16 - 18, 2019 (TBA)

## — **MQPERF1 - MQ z/OS Performance & SMF Evaluation Wildfire Workshop**

- Dublin, OH - June 19 - 20, 2019
- San Antonio, TX – August 28-29, 2019  
(tentative dates)
- Dublin, OH – September 10 - 11, 2019  
(tentative dates)

## — **ZCONNEE - z/OS Connect Wildfire Workshop**

- San Antonio, TX - April 3, 2019
- Des Moines, IA - April 10, 2019
- Palisades, NY - April 17, 2019
- Jacksonville, FL - April 25, 2019
- Herndon, VA - May 15, 2019