

What's New in IBM MQ: October 2018

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IBM MQ Development



Celebrating
25 years

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***

Celebrating
25
years

1 + 1 = 2

Simple



Reliable



Precise

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Celebrating
25
years



Scalable



Connected



Secure


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



Celebrating
25 years

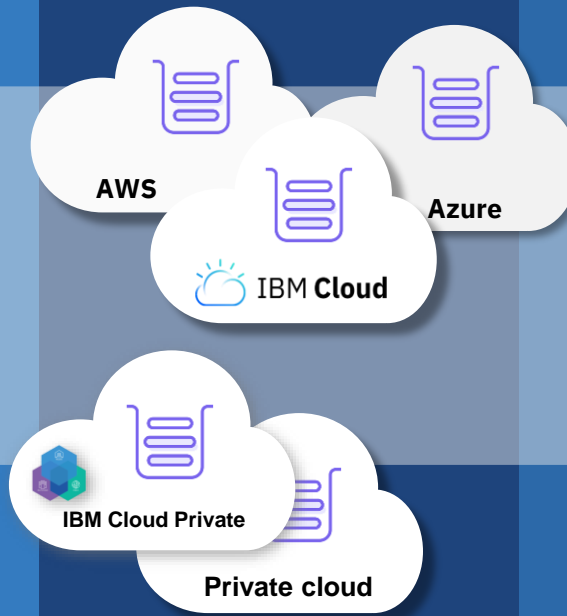
On-premise, software and the MQ Appliance



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 managed SaaS MQ service in public cloud



MQ on Cloud

MQ as a Service

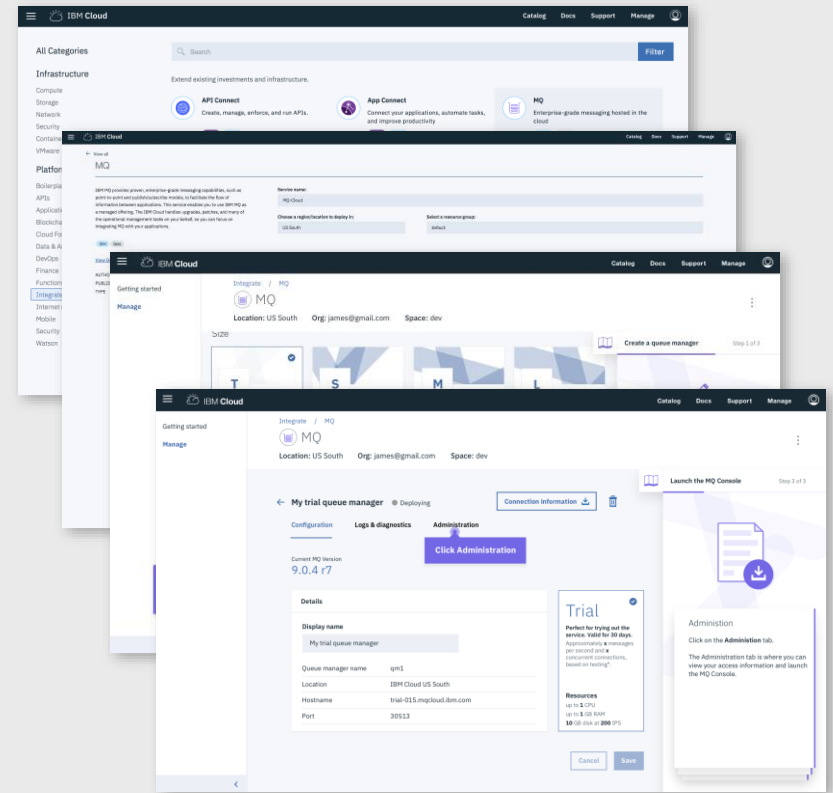
MQ on Cloud

Have IBM provision your queue managers directly into the Cloud

IBM owns the infrastructure and the responsibility to keep the systems up to date and running

The user owns the configuration and the monitoring of the messaging

Try the service for free
www.ibm.com/cloud/mq



MQ on Cloud

MQ on Cloud queue managers can now be provisioned onto infrastructure in **IBM Cloud** and **AWS** ensuring that MQ is exactly where you need it - close to your applications.



← Create queue manager

Size

Size	Description	Price
Trial	Perfect for trying out the service. Valid for 30 days. Approximately 200 messages per second and 20 concurrent connections.	Free
Small	Appropriate for light workloads such as supporting an individual department or application. Approximately 200 messages per second and 50 concurrent connections.	\$1.30 per hour 1 x VPC-hour price
Medium	Appropriate for shared use by a number of light to moderate workload applications. Approximately 1000 messages per second and 200 concurrent connections.	\$5.20 per hour 4 x VPC-hour price
Large	Appropriate for heavy throughput scenarios where transaction performance is critical. Approximately 2500 messages per second and 1000 concurrent connections.	\$15.60 per hour 12 x VPC-hour price

[Learn more about how we define the queue manager sizes, suggested use and throughput](#)

Details

Queue manager name * Display name

Location

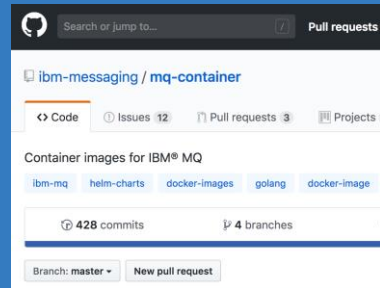
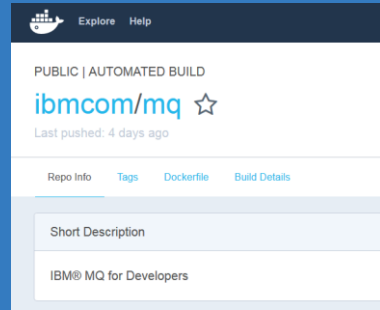
- IBM Cloud: US South
- IBM Cloud: US South
- AWS Cloud: US East 1

Location

- IBM Cloud: US South
- IBM Cloud: US South
- AWS Cloud: US East 1

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)

MQ provides Helm charts for deploying MQ into Kubernetes platform, on-prem or on cloud, such as IBM Kubernetes Service



MQ Advanced is available as a fully supported product with **IBM Cloud Private**

deploy IBM certified software containers into an IBM provided Kubernetes platform or an existing Red Hat OpenShift **new**



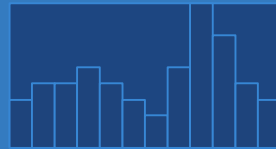
Hourly licensing

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

New for
MQ 9.1

Pre-purchase core hours

Use the hours as needed, whether that's constant or varies across the day, week or year.



Traditional licensing



Hourly licensing

Fully portable

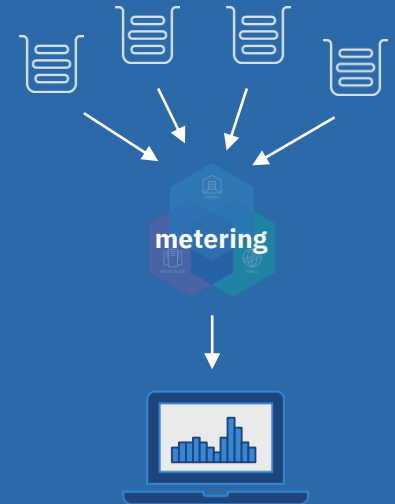
Deploy containers wherever and whenever you want, and move them with ease

Available for Docker containers (including Kubernetes and OpenShift) both on-prem and in the cloud



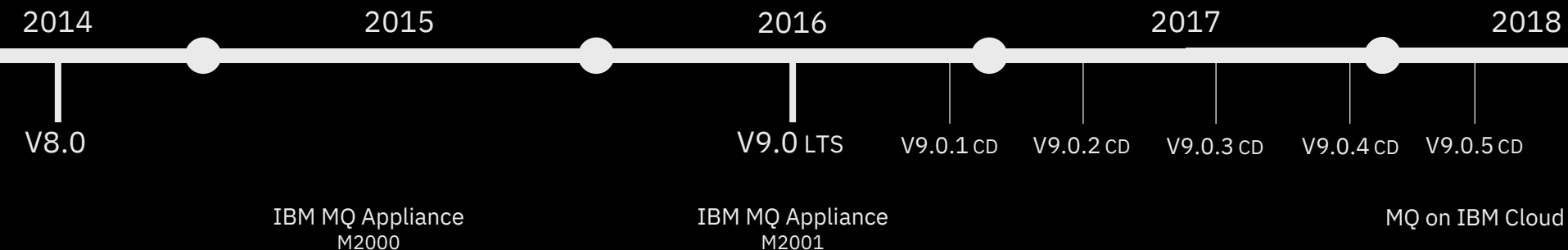
No ILMT requirement

On-prem metering service provided in IBM Cloud Private used to track usage



Continuous delivery of new MQ capabilities

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.

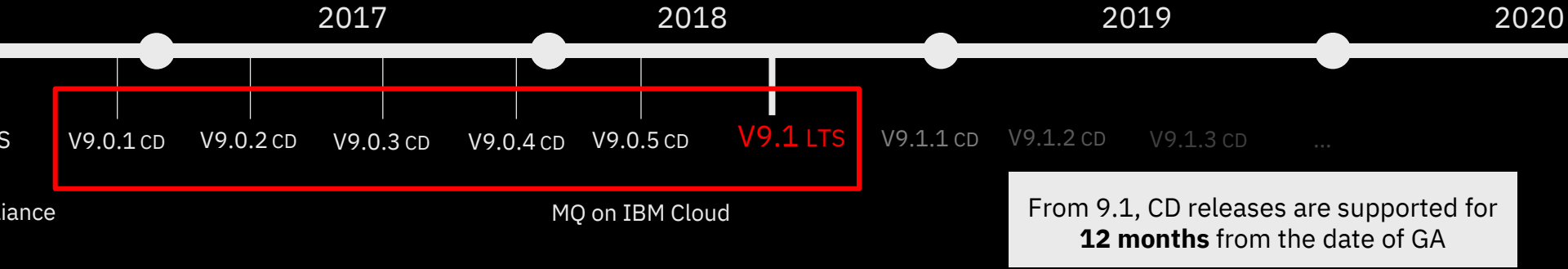
Required by those looking for fixed function.

Mix and Match

Both are available under the same license.

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

IBM MQ: long term support and continuous delivery



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

MQ 9.0.x CD content, 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
SAN support

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
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SNMP and REST
support for MQ
Appliance

High availability and disaster recovery

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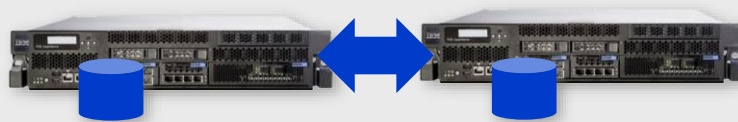
HA, there are no excuses

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!

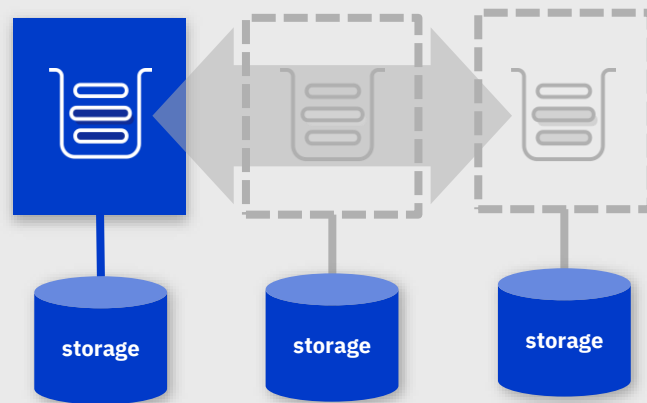


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Replicated Data Queue Managers

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

MQ configures the underlying resources to make setup and operations natural to an MQ user

Three-way replication for quorum support

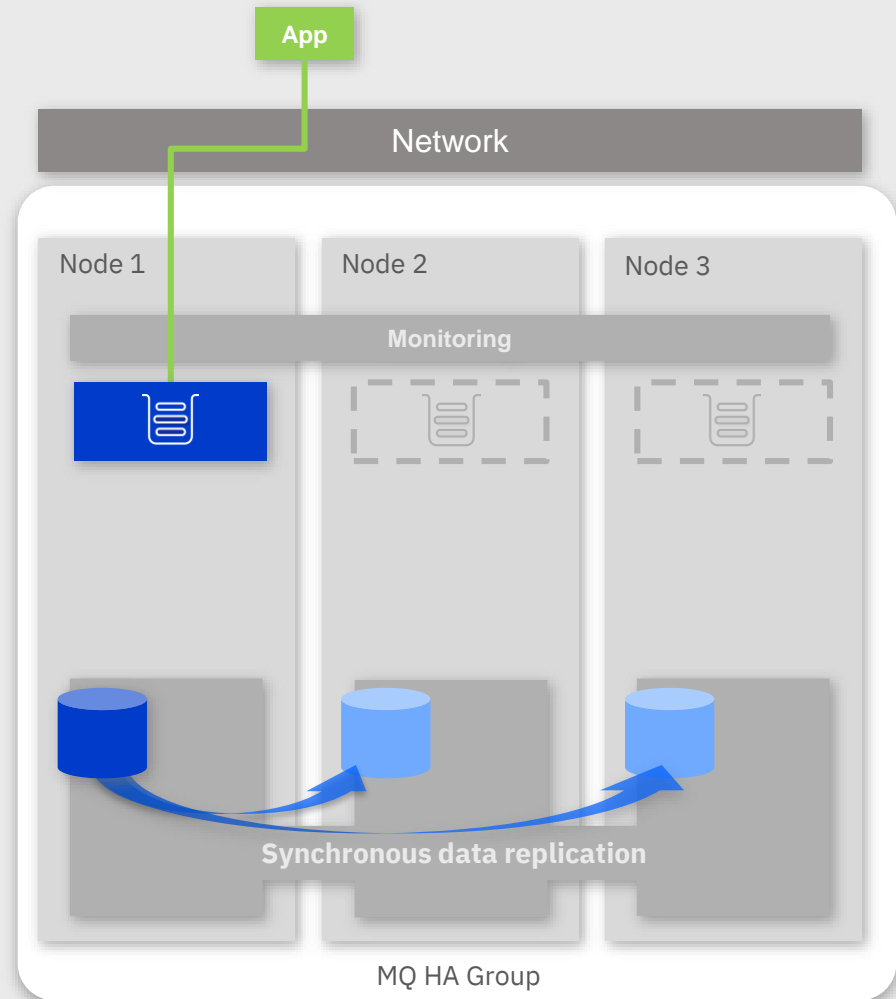
Synchronous data replication for once and once only transactional delivery of messages

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

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

Per queue manager **IP address** to provide simple application setup

Supported on **RHEL v7 x86-64 only**



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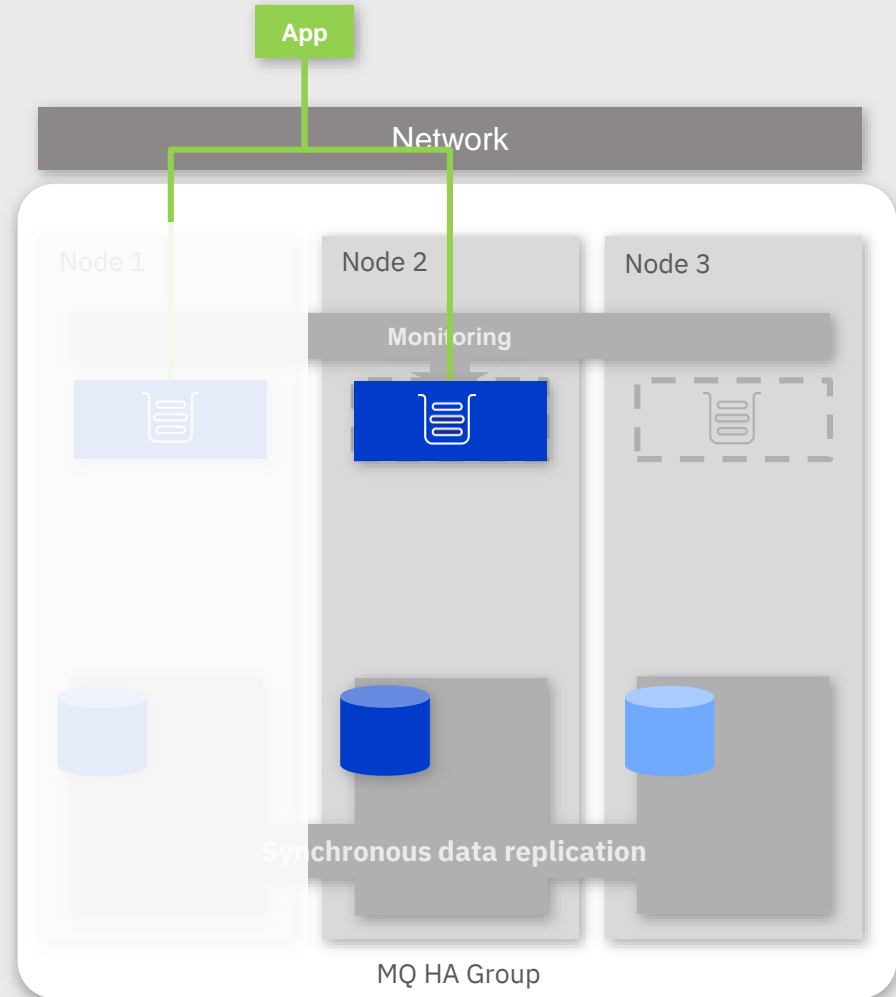
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Replicated Data Queue Managers

Recommended deployment pattern:

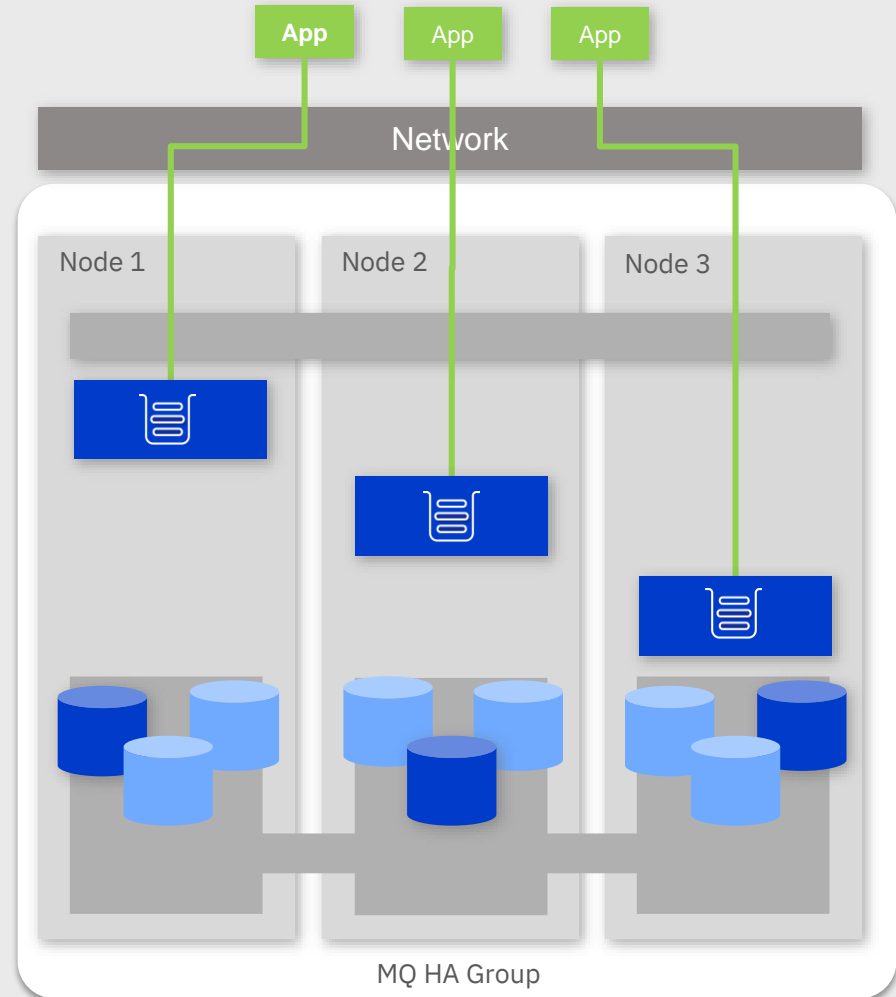
Spread the workload across multiple queue managers and distribute them across all three nodes

Even better, more than one queue manager per node for better failover distribution

Use MQ Clusters for additional routing of messages to work around problems

MQ **licensing** is aligned to maximise benefits

One full **IBM MQ Advanced** license and two **High Availability Replica** licenses (previously named *Idle Standby*)



Replicated Data Queue Managers

Manual failover

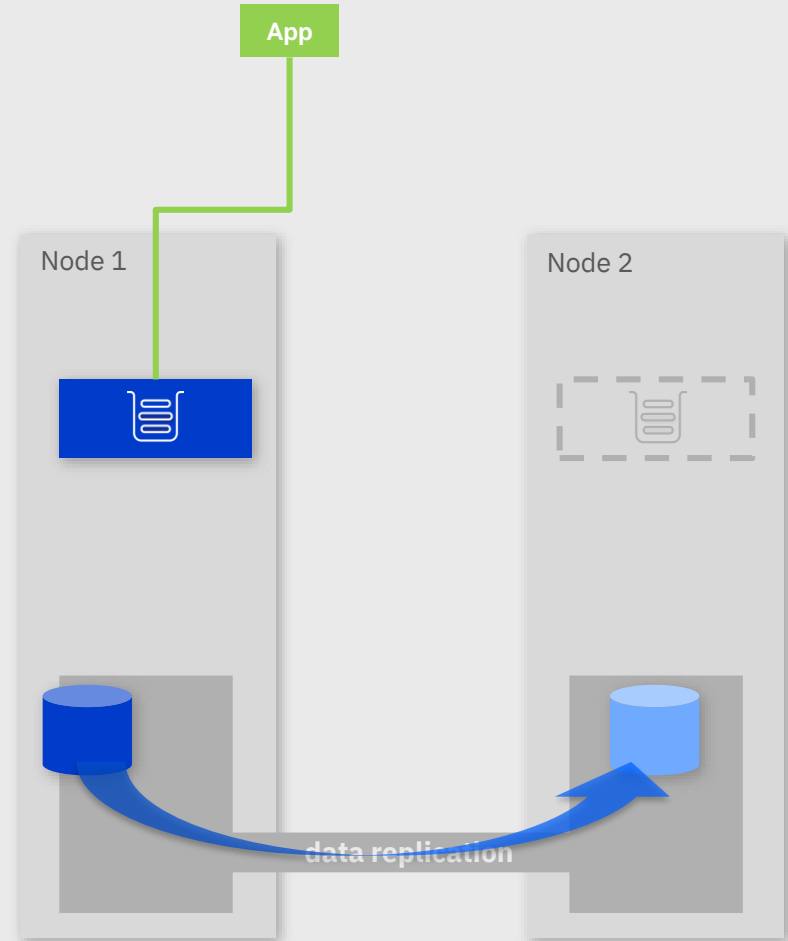
9.0.5 CD MQ Advanced adds the ability to build a looser coupled pair of nodes for data replication but no automatic failover, typically for **Disaster Recovery**

Data replication can be

Asynchronous for systems separated by a high latency network

Synchronous for systems on a low latency network

No automatic takeover means no need for a third node to provide a quorum



Supporting developers

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Mission Statement

To enable a user instructed to use MQ for the first time, to go from zero understanding to running a sample application in a sandbox environment with a fundamental understanding of MQ concepts in two hours

To enable an application developer, instructed to use MQ for the first time, to go from zero understanding to writing their first MQ application in the language and environment of their choice within an afternoon

Finding it hard to get developers started with MQ?

Point them to:

developer.ibm.com/messaging/learn-mq

Totally new to MQ?
Learn the basics

The basics of MQ
With us so far? Great.

Message packages of data produced and consumed by applications.

Queue: intermediate locations to deliver messages to and from them reliably. URLs they need to be consumed.

Queue managers: virtual MQ engines, the servers that host the queues.

Channels: the way queue managers communicate with each other and with the applications.

MQ networks: loose collections of interconnected queue managers, all working together to deliver messages between applications and locations.

MQ clusters: tight groupings of queue managers, enabling higher levels of scaling and availability.

Step-by-step guide to getting up and running with MQ

Ready, set, connect!
Connect your first application to a queue manager.

Pick your platform

- MQ on Windows**
A quick way to learn MQ on a personal or small business PC or laptop. Includes a step-by-step guide to installing and configuring MQ on Windows.
- MQ on Docker**
A quick way to get going with a queue manager and an application on a Docker container. Includes a step-by-step guide to installing and configuring MQ on Docker.
- MQ on Cloud**
A quick way to get going with a queue manager and an application on a cloud platform. Includes a step-by-step guide to installing and configuring MQ on Cloud.

What you will learn

1. Installing MQ queue managers
2. A first MQ queue manager
3. The basics of queue manager messaging

What you will need

- 1. Docker
- 2. The latest MQ Docker image from Docker Hub
- 3. IBM MQ queue manager

Contents

- 1. Install Docker
- 2. Get the MQ in Docker image
- 3. Run the container from the image

1. Install Docker

2. Get the MQ in Docker image

Platform	Image	Version	Size	Downloads
Windows	ibmcom/mq	9.0.0	1.1 GB	1.1K
Linux	ibmcom/mq	9.0.0	1.1 GB	1.1K
macOS	ibmcom/mq	9.0.0	1.1 GB	1.1K

3. Run the container from the image

Tutorials on building your applications with MQ

MQ tutorials, taking you further
Every great advancement starts with a single step. Here's a series of guided tutorials that provide you with the tools to master MQ.

Search by:

Skills level

- Protected: Point-to-point with JMS
- Protected: MQ Essentials

Language

- Protected: Ready, Set, Connect (Windows)
- Protected: Ready, set, connect (Linux)

Point to point with JMS
Write and run your first IBM MQ JMS application

What you will learn

1. MQ JMS
2. MQ JMS
3. MQ JMS

What you will need

- 1. MQ JMS
- 2. MQ JMS
- 3. MQ JMS

Contents

- 1. Point to point with JMS and IBM MQ

Developing with MQ

MQ JMS jars available through Maven

[mvnrepository.com/artifact/
com.ibm.mq/com.ibm.mq.allclient](https://mvnrepository.com/artifact/com.ibm.mq/com.ibm.mq.allclient)

New open source language bindings for MQI

github.com/ibm-messaging/mq-mqi-nodejs
github.com/ibm-messaging/mq-golang

Redistributable clients available over direct
download

ibm.biz/mqclientdownload

Spring Boot starter for MQ

ibm.biz/mqspringboot

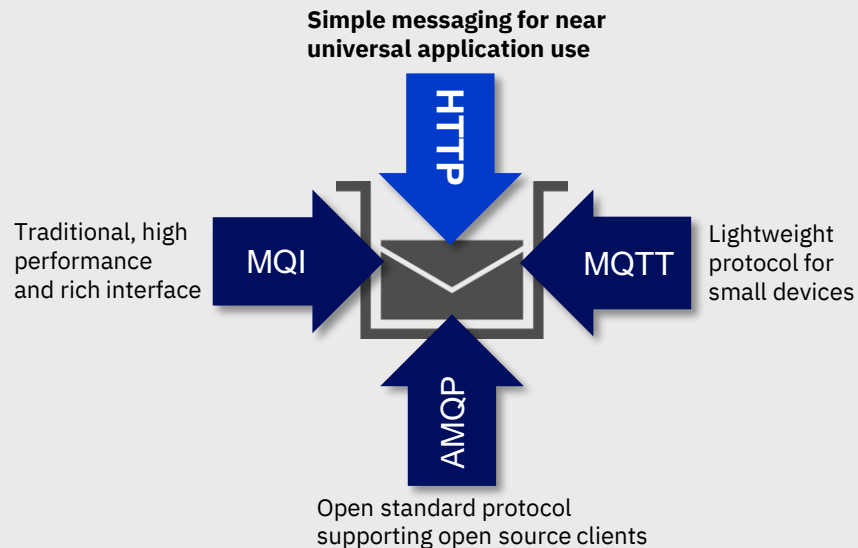
RESTful messaging

MQ supports multiple protocols and APIs

HTTP and REST are the de facto standard for simple, micro service, applications

Messaging over REST provides *good enough* messaging for many applications and an excellent way to get data into a real messaging system as quickly as possible

MQ 9.0.4 delivered the first phase of the new REST messaging support. Providing a simple point-to-point messaging capability, integrated with the MQ installation



We see an ever growing need for messaging
of many different types

Logging

Request

Status

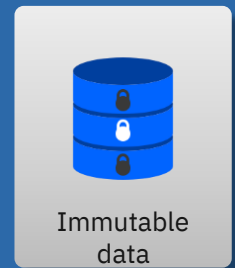
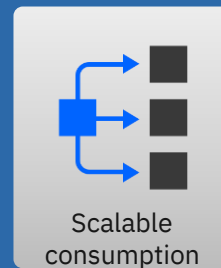
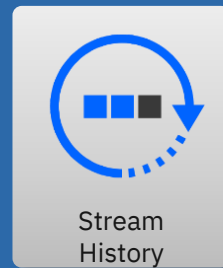
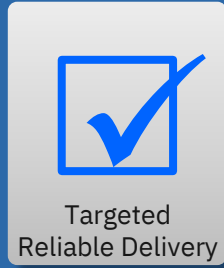
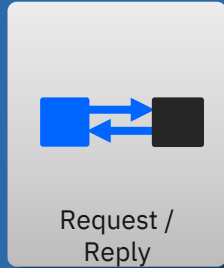
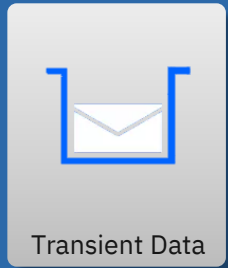
Monitoring

Updates

Errors

Response

Which require a widening range of capabilities



Special problems require specialised solutions



Transient Data



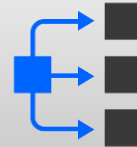
Request /
Reply



Targeted
Reliable Delivery



Stream
History



Scalable
consumption



Immutable
data

Business critical operations

Event streaming

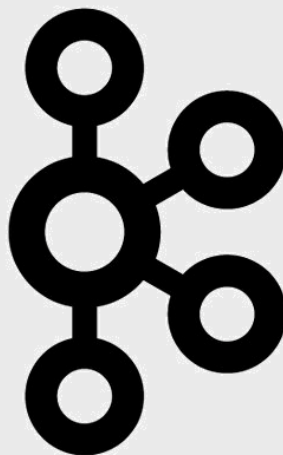
Announcing IBM Event Streams!

Apache Kafka for the Enterprise

React to events in real-time to deliver more engaging experiences for your customers

Deploy **production ready Apache Kafka** onto IBM Cloud Private **in minutes**

Build intelligent apps on Kafka with the **confidence IBM is supporting you**



APACHE
kafka®

Rely on disaster recovery & security designed for **mission-critical use**

Exploit existing data to become a real Event Driven Enterprise

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	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

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

Kafka



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MQ Web Console

Point a browser at the MQ installation to create and manage queue managers and their resources

Provides a very simple way to access MQ resources

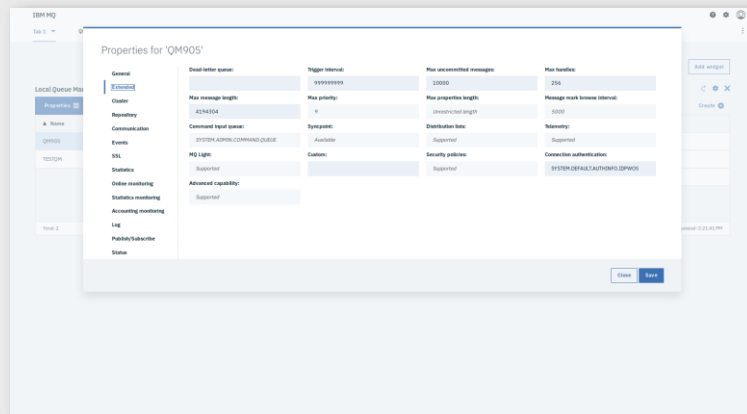
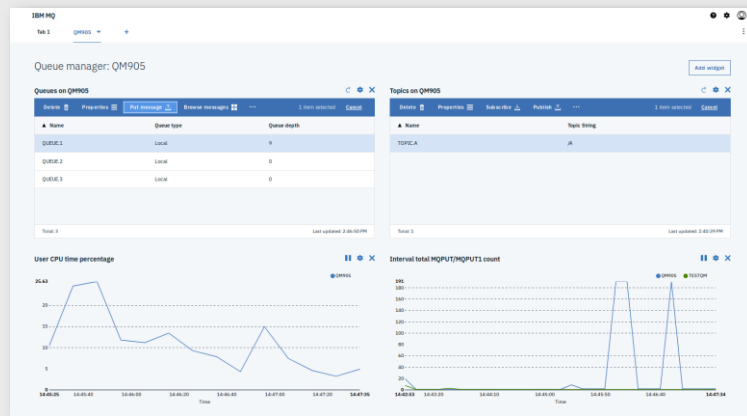
The same solution for all forms of MQ

MQ for Distributed

MQ for z/OS

MQ Appliance

MQ on Cloud

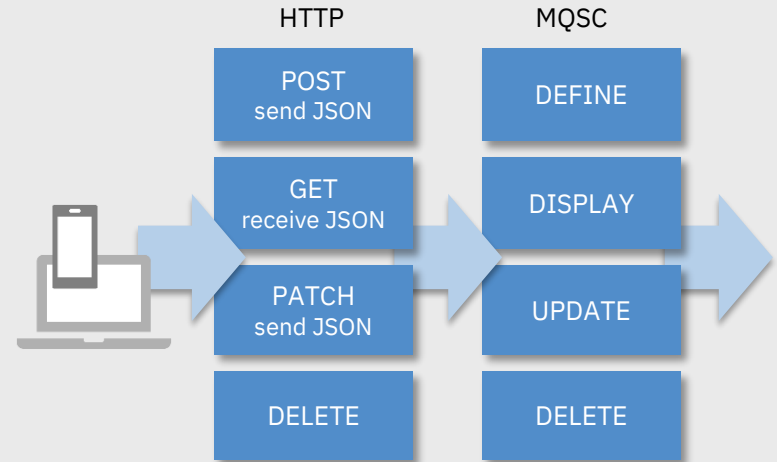


Restful administration

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

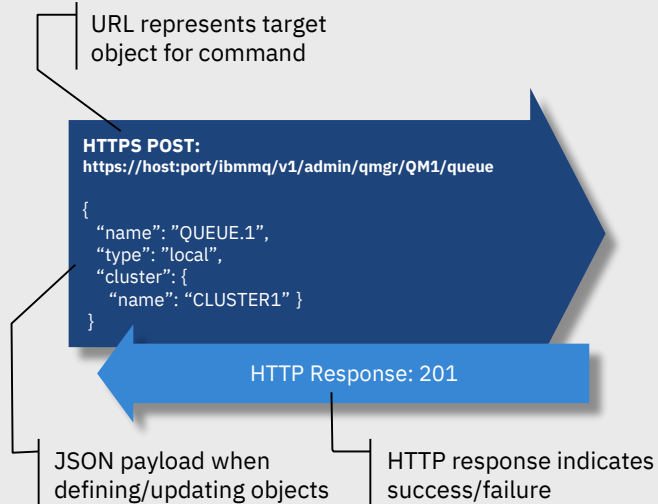
MQ has been incrementally increasing support for RESTful administrative APIs to provide equivalents of what's available today with MQSC and PCF.

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



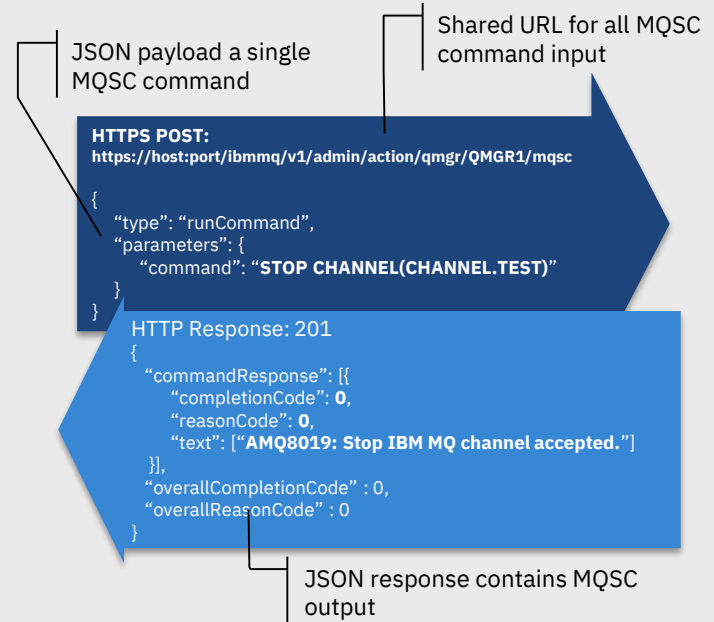
Two approaches

Per object REST



Native JSON based REST calls

MQSC over REST



Direct MQSC command input over REST
MQSC output over REST, minimal parsing

Two approaches

Per object REST

- URL represents target object for command
 - Natural REST APIs
 - Restructured definitions to aid understanding
 - Further definition validation
 - Not a straight swap for existing users
 - Incomplete coverage of MQ administration
- JSON payload when defining/updating objects
- HTTP response indicates success/failure

Native JSON based REST calls

MQSC over REST

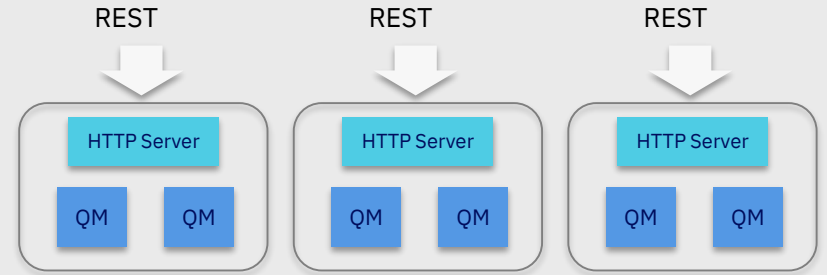
- JSON payload a single MQSC command
 - Shared URL for all MQSC command input
 - Simple mapping from existing scripts
 - Complete coverage of MQSC capabilities
 - Not pure REST
 - Just as *simple* as existing runmqsc for input and parsing of output
- HTTPS POST:
https://host:port/ibmmq/v1/admin/action/qmgr/QMGR1/mqsc
- ```
parameters: {
 "command": "STOP CHANNEL(CHANNEL.TEST)"
},
"overallCompletionCode": 0,
"overallReasonCode": 0,
"text": ["AMQ8019: Stop IBM MQ channel accepted."]
}
```
- JSON response contains MQSC output

Direct MQSC command input over REST  
MQSC output over REST, minimal parsing

# Enabling your whole estate for REST administration

## Option 1

Administer each MQ installation separately, they must all be on the MQ 9.0.x CD release or MQ 9.1 LTS

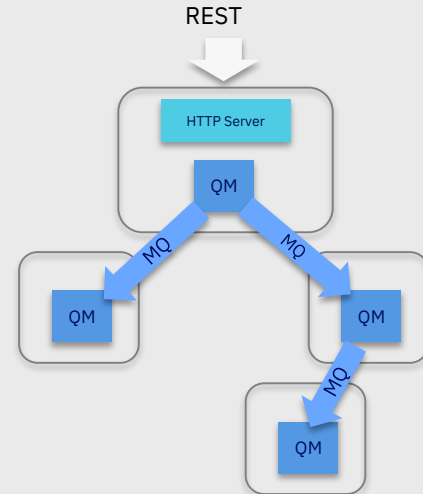


## Option 2

Manage a network of systems through gateway entry points

Not every queue manager will need to expose HTTPS endpoints

Pre-9.0.x queue managers are able to be administered through those gateways



# Restful administration with Managed File Transfer

As well as queue manager administration, MQ has added support for monitoring your Managed File Transfer system with **agent** and **transfer** status lists over REST

**HTTPS GET:**  
**https://host:port/ibmmq/v1/mft/transfer**

```
{
 "transfer": [
 {
 "destinationAgent": {"name": "AGENT.X.BANK"},
 "originator": {
 "host": "192.168.99.1",
 "userId": "ramsubbarao"
 },
 "sourceAgent": {"name": "TESTAGENT"},
 "statistics": {
 "endTime": "2018-01-08T16:22:15.569Z",
 "numberOfFileFailures": 0,
 "numberOfFileSuccesses": 2,
 "numberOfFileWarnings": 0,
 "numberOfFiles": 2,
 "startTime": "2018-01-08T16:22:15.242Z"
 },
 "status": {
 "state": "successful"
 },
 "id": "414D51204D465444454D4F33202020513E525A21109908"
 }
]
}
```

# 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 with *system topics* in MQ V9 makes that even easier

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

Universal timestamps

severity levels

separated inserts

JSON output

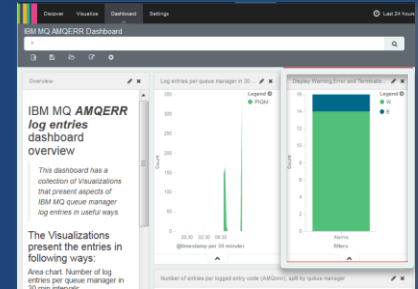
Multiple logs

Syslog output

Publish MQ statistics to Prometheus and Grafana



Forward MQ error logs to Elasticsearch or Splunk



Error logs output JSON for easy parsing

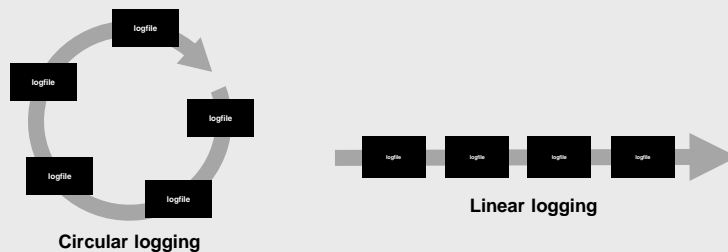
```
{
 "ibm_messageId":"AMQ6287I",
 "ibm_arithInsert1":0,
 "ibm_arithInsert2":0,
 "ibm_commentInsert1":"Linux 4.13.0-36-generic (MQ Linux (x86-64 platform) 64-bit)",
 "ibm_commentInsert2":"/opt/mqm (Installation1)",
 "ibm_commentInsert3":"9.0.5.0 (p905-L180228.1)",
 "ibm_datetime":"2018-03-04T13:18:27.506Z",
 "ibm_serverName":"QM905",
 "type":"mq_log",
 "host":"david-VirtualBox",
 "loglevel":"INFO",
 "module":"amqxeida.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":"AMQ6287I: IBM MQ V9.0.5.0 (p905-L180228.1)."
}
```



# 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



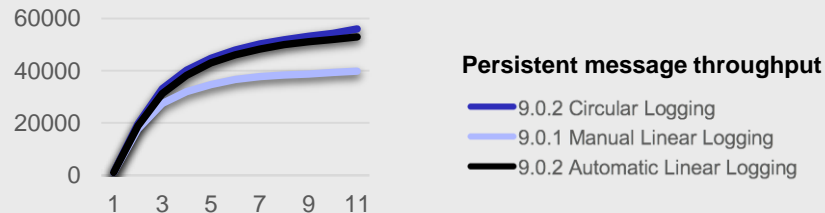
## Automatic media imaging

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



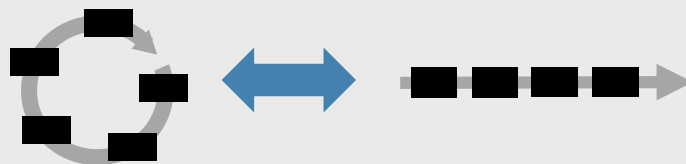
## Automatic log reuse

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



# MQ on z/OS

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

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

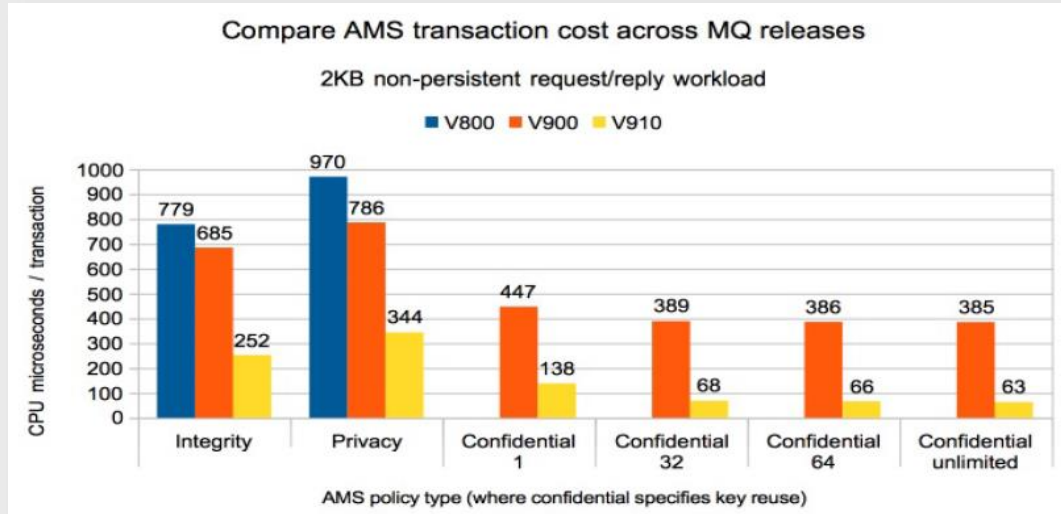
Redistributable  
MFT agent for  
MQ Advanced

Enhanced MFT  
diagnostics

Cross LPAR MFT  
agents for z/OS  
Advanced

SNMP and REST  
support for MQ  
Appliance

# 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

# MQ Appliance

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MQ Advanced

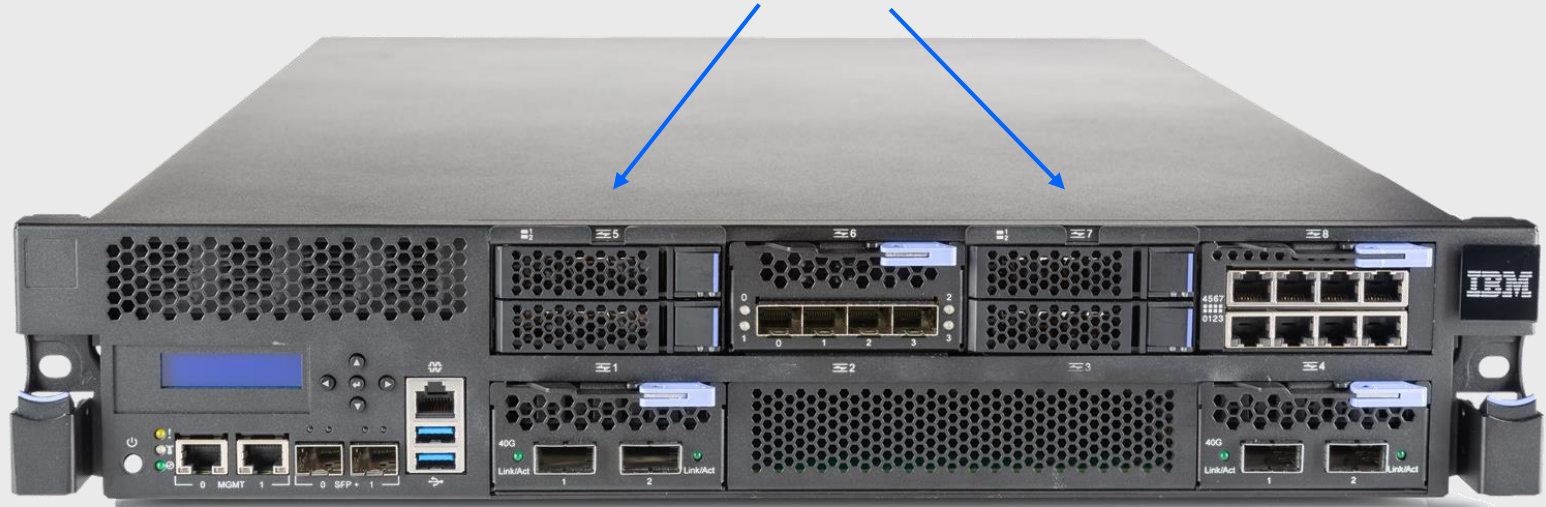
Enhanced MFT  
diagnostics

Cross LPAR MFT  
agents for z/OS  
Advanced

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support for MQ  
Appliance

# Introducing the **M2002**

4 High capacity, High speed SSDs with hardware RAID10



Additional 10GB SFP+ interfaces

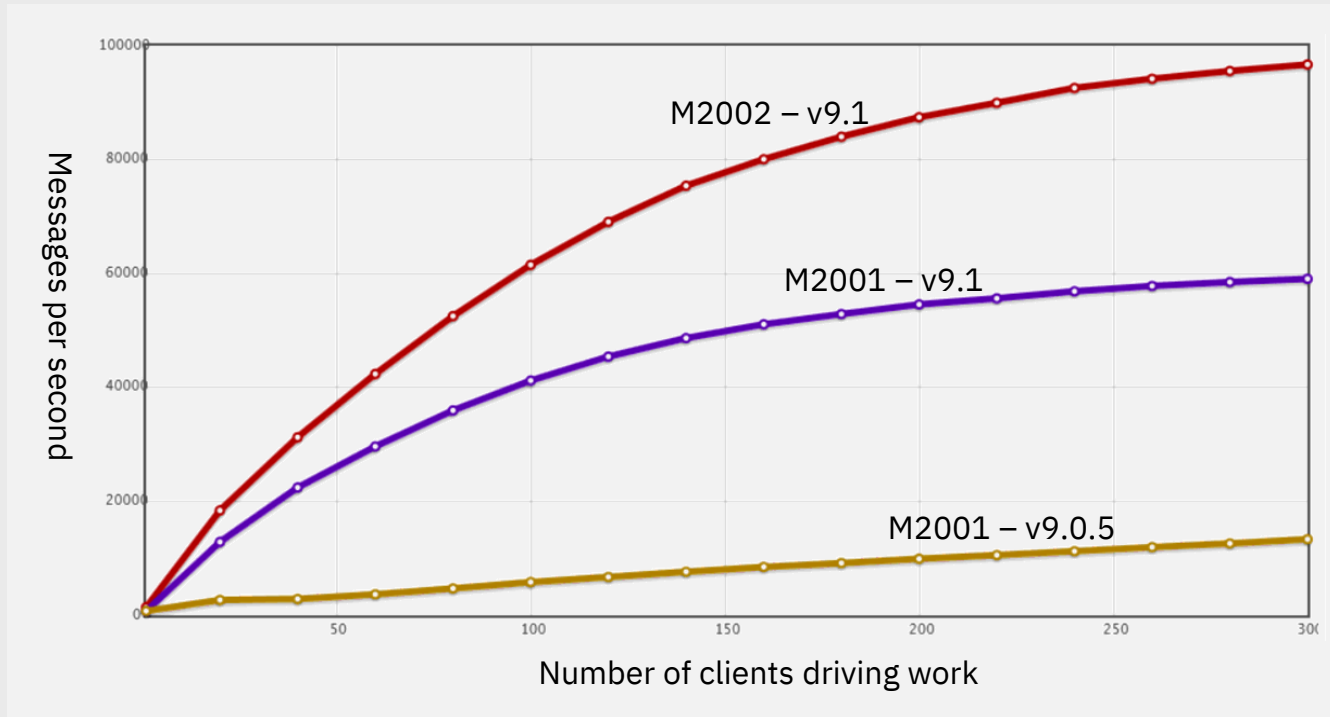
NEW 40GB QSFP+ modules

Plus what you can't see...

- increased CPU cores
- significant jump from Intel™ 'Ivy Bridge' to 'Skylake' architecture
- Doubled RAID cache for increased I/O performance

# Appliance performance

(multi-queue manager, Highly Available, many client applications)



# Platform Coverage for IBM MQ

## Historically 'niche' offerings

### MQ for HP OpenVMS

- IBM version now EOS
- 3<sup>rd</sup> party version available from Willow Technology

### MQ for HPE NonStop Server

- Continuing to be developed
- V8.0.3 now available

### MQ Low Latency Messaging

- IBM version EOM. EOS April 2019.
- 3<sup>rd</sup> party version available as Confinity Low Latency Messaging

## Core MQ platform news

### 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
- Statement of Direction:  
No further releases after 9.1

### Already announced End of Support dates:

- MQ V7.1: September 30 2017
- MQ V7.5: April 30 2018
- MQ V8.0: April 30 2020

# And a few little extras since 9.0.0.0 LTS that are easy to miss...

We'll fix your bad apps!

Faster non-transacted  
persistent puts

TLS 1.0 is now turned off

Customise your prompt  
in runmqsc

No more OPMODE!

It confused the heck out  
of you (and us)

Lose the JRE

If you don't need it, don't  
install it

Transactions get a  
timestamp in dmpmqlog

Universal timestamps and  
severities in the error logs

(did I mention that  
already?)

MFT agents are now  
included in the  
MQ Advanced license




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



Celebrating  
**25** years

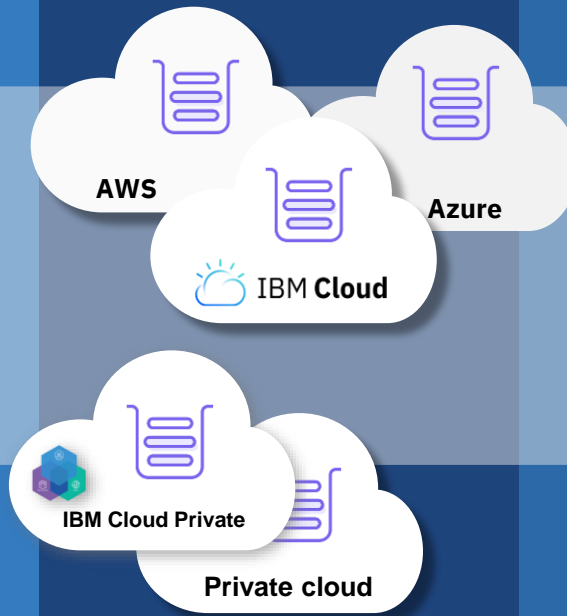
On-premise, software and the MQ Appliance



**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 managed SaaS MQ service in public cloud





Celebrating  
**25** years

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