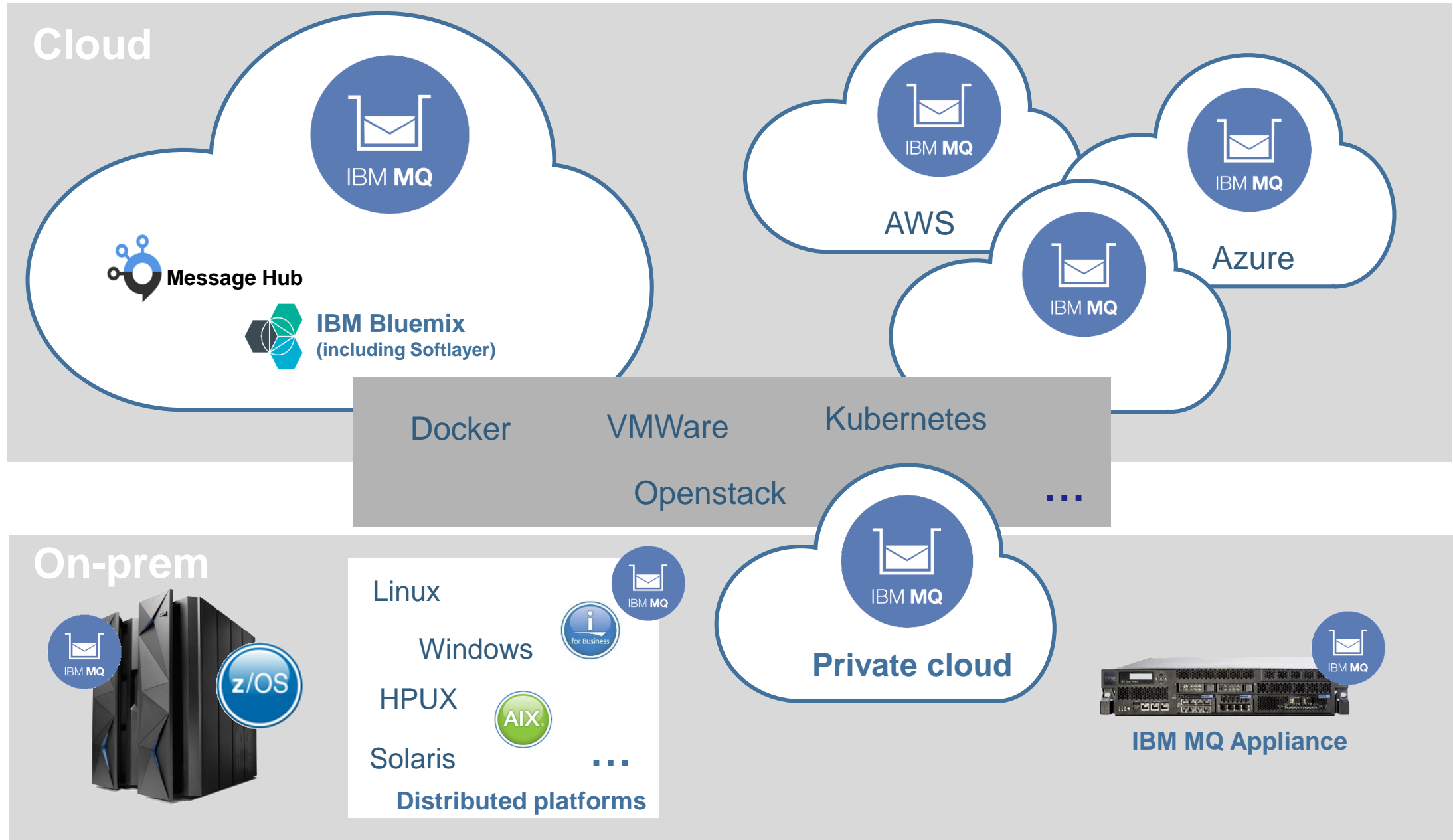# IBM MQ Update

Hursley Summit 2017

David Ware
Chief Architect, IBM MQ
dware@uk.ibm.com

IBM Messaging
Tuesday, 10 October 2017

Run MQ, exactly how and where you need it

Cloud

IBM MQ

Message Hub

IBM Bluemix
(including Softlayer)

IBM MQ

AWS

IBM MQ

IBM MQ

Azure

Docker   VMWare   Kubernetes

Openstack   ...

On-prem

IBM MQ

z/OS

Linux

IBM MQ

Windows

i for Business

HPUX

AIX

Solaris   ...

Distributed platforms

IBM MQ

Private cloud

IBM MQ

IBM MQ Appliance

2

Plan your summit …

IBM MQ Futures
Tuesday
10:10am / 11:30am

IBM MQ Appliance
Wednesday
9:15am / 10:20am

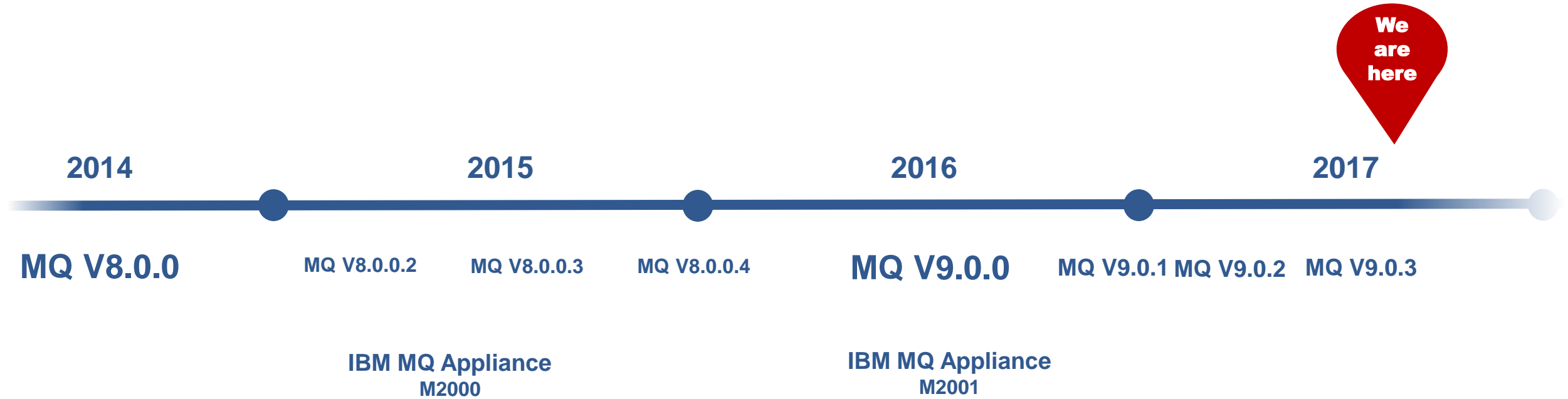**IBM MQ in the Cloud**
Tuesday
2:00pm / 3:15pm

IBM MQ as a Hosted Service
Wednesday
3:10pm / 4:30pm

Becoming an event-driven Enterprise
Wednesday
3:10pm / 4:30pm

IBM MQ

2014   **2015**   **2016**   **2017**

We are here

MQ V8.0.0   MQ V8.0.0.2   MQ V8.0.0.3   MQ V8.0.0.4   **MQ V9.0.0**   MQ V9.0.1   MQ V9.0.2   MQ V9.0.3

IBM MQ Appliance M2000

IBM MQ Appliance M2001

2016 was the start of MQ's **continuous delivery** model

     Long Term Support for static feature content

     Continuous Delivery for the latest capabilities

End of Service for the old versions

2009   **2010**   **2011**   **2012**

MQ V7.0.1   **MQ V7.1**   **MQ V7.5**

MQ AMQ V7.0.1   MQ FTE V7.0.4
                      MQ HVE V7.0.1

WebSphere MQ 7.1

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

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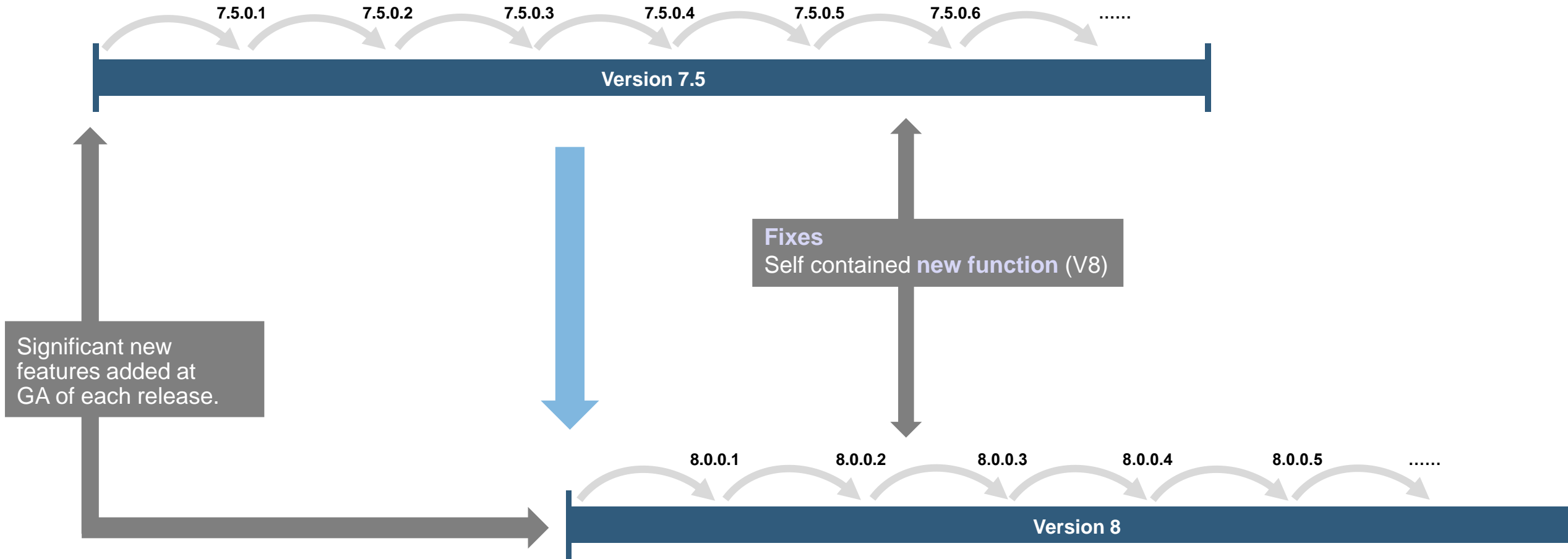**September 2017**

End of Service (z/OS) will be **November 2017**

WebSphere MQ 7.5

End of Service (Distributed) will be **April 2018**

MQ FTE V7.0.x, **MQ AMS 7.0.x** & **MQ HVE 7.0.1**
EOS was **September 2017**

Continuous delivery

Previously: Service and continuous delivery combined

7.5.0.1   7.5.0.2   7.5.0.3   7.5.0.4   7.5.0.5   7.5.0.6   ……

Version 7.5

Fixes
Self contained **new function** (V8)

Significant new features added at GA of each release.

8.0.0.1   8.0.0.2   8.0.0.3   8.0.0.4   8.0.0.5   ……

Version 8

Q&A: http://ibm.biz/MQ_V9_FAQ

Today: Service and continuous delivery separated

9.0.0.1 9.0.0.2 9.0.0.3 9.0.0.4 9.0.0.5 9.0.0.6 ......

Version 9 LTS, MQ long term support

9.0.1 CD

9.0.2 CD

9.0.3 CD

9.0.n CD

Fixes only.
No mid-service function.
Same 5+3 service lifetime.
LTS releases every couple of years containing
a **roll up of CD function**.

Incremental new function.
New delivery **every few months**.
Supported for duration of LTS.
No fixpacks.
Fixes delivered on latest mods only.
Only available on **Linux**, **Windows**, **z/OS** and **MQ Appliance**

Version 9+ LTS, MQ long term support

9+.0.1 CD

9+.0.2 CD

9+.0.3 CD

Q&A: http://ibm.biz/MQ_V9_FAQ

IBM MQ V9 LTS (in a slide)

MQ V9 Long Term Support

Advanced Message Security IBM MQ Advanced

AMS added a new high performance policy for encryption, not signing. 3x-4x performance gains are typical, if not more

Support for non-IBM JREs

AMS Performance

- 5000 puts
- 5000 gets
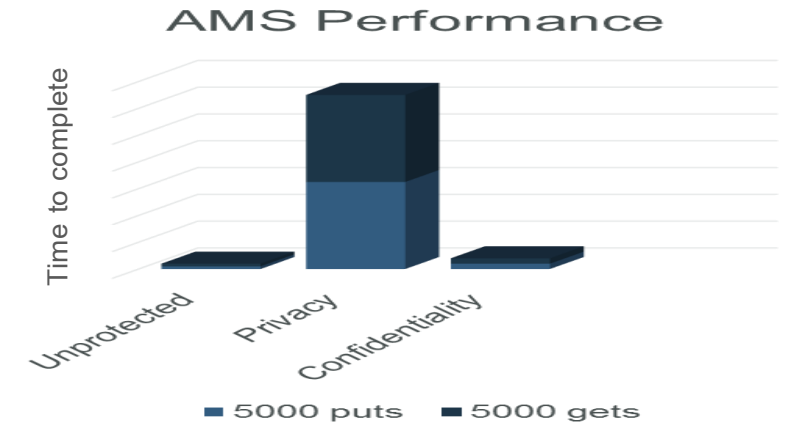
Centralised hosting of CCDTs

Clients can automatically retrieve a remotely located CCDT over HTTP or FTP when connecting. Enabler for dynamically changing MQ configurations and a simpler application setup
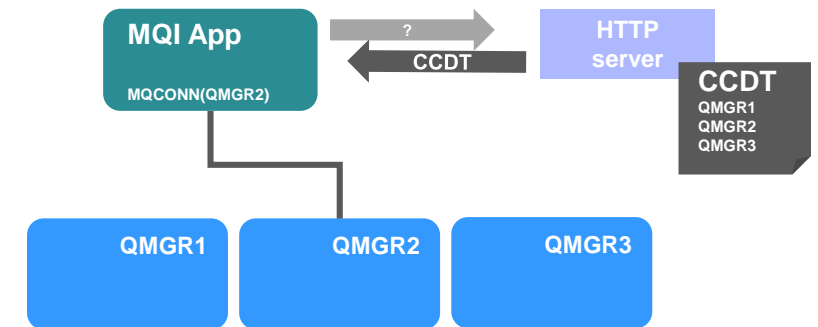
System topics

Distributed queue managers publish statistics and application trace data to dynamic subscribers
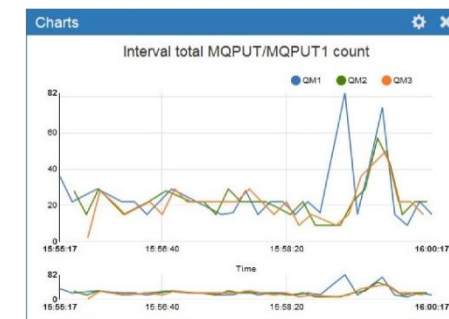
IBM MQ V9.0.x CD

IBM MQ 9.0.x CD releases

2014   2015   2016   2017

MQ V8.0.0

MQ V8.0.0.2   MQ V8.0.0.3   MQ V8.0.0.4   **MQ V9.0.0**   MQ V9.0.1   MQ V9.0.2   MQ V9.0.3

**IBM MQ Appliance
M2000**

**IBM MQ Appliance
M2001**
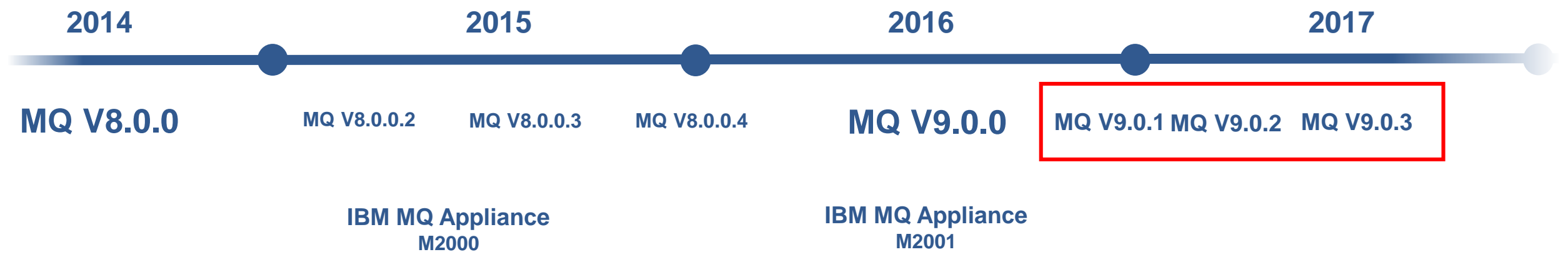
V9.0.1 CD	**November 2016**
V9.0.2 CD	**March 2017**
V9.0.3 CD	**July 2017**
...	***Soon***

Managing MQ

Managing your MQ estate

Management of MQ is evolving into a **cattle** not **pets** model.

- Consistent configuration and operations across multiple queue managers

- Automated deployment

- Configuration as code

- Self service

- Collection and analysis of diagnostic data

- Simple integration into standard devops and automation tooling

Software MQ Web Console

In 2015 the IBM MQ Appliance introduced a **web based admin console.** MQ 9.0.1 saw this across all CD platforms (Linux, z/OS, Windows)

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

Provides a simple way to access MQ resources

Introducing new roles such as "read-only"

Will not see the full richness of capability from MQ Explorer

Targeted at each individual installation, not a network of MQ systems
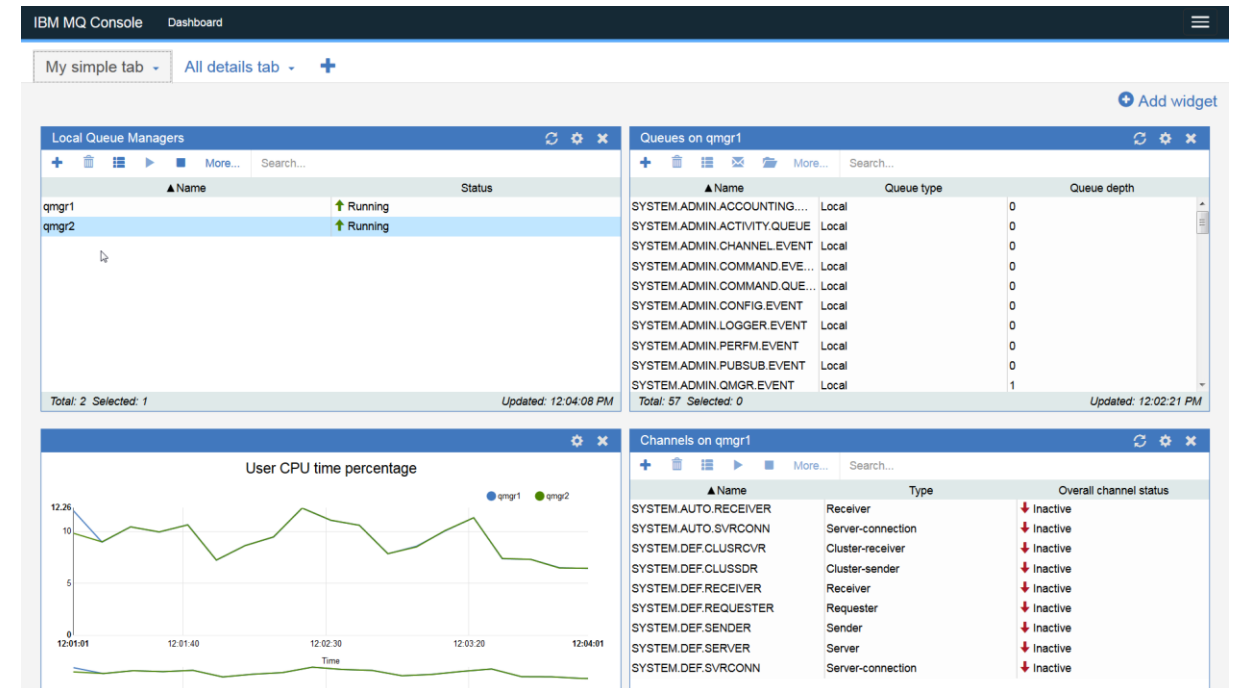
Behind the scenes

MQ installs a copy of **WebSphere Liberty Profile** (WLP) for the MQ installation's use

MQ masks WLP's complexity for those that don't need it

A small subset of WLP's configuration is exposed

MQ commands manage the WLP runtime

strmqweb, **dspmqweb**, **endmqweb**

Security options to suit your setup

Basic, LDAP, SAF

Assign users to roles

Full administrator
Read only
Fine grained MQ access control

System

MQ Installation

Queue manager

HTTP server
(WebSphere Liberty Profile)

Rest Interface

Queue manager

MQ Console

Web Browser

Queue manager
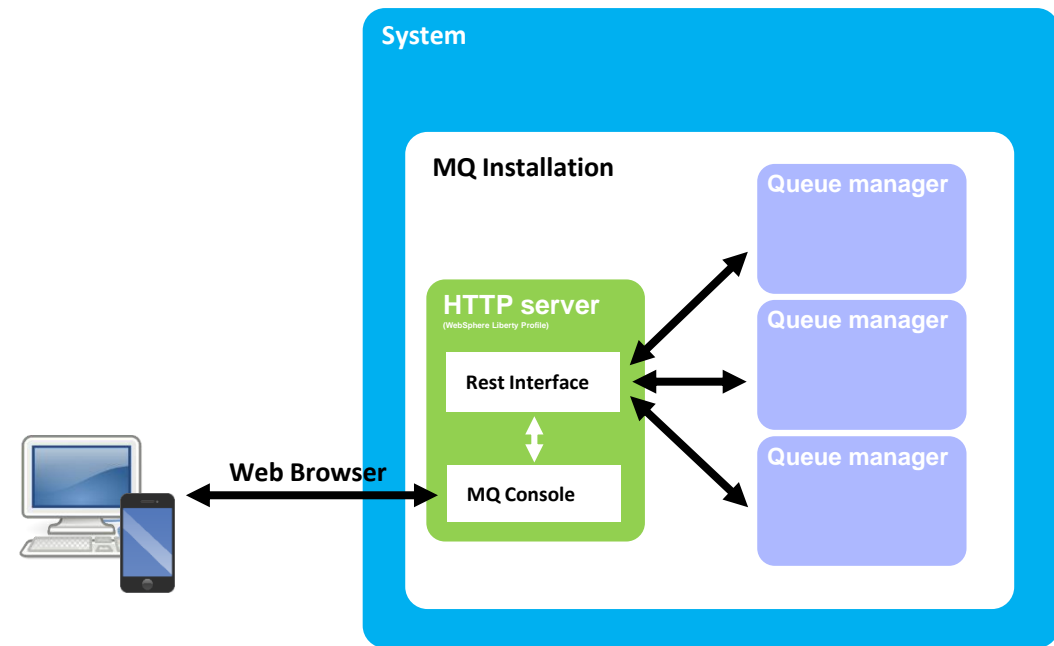
This enables an even more exciting capability for MQ - REST

RESTful Administration

MQ has supported scripting and programmatic administration for many, many years, but it is a little 'proprietary'

MQSC and **PCF** are powerful, but can be hard to get going with. They also require MQ tooling to be in place to use (runmqsc, MQ clients)

MQ is rolling out 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

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

HTTP

MQSC

POST
send JSON

DEFINE

GET
receive JSON

DISPLAY

PATCH
send JSON

UPDATE

DELETE

DELETE
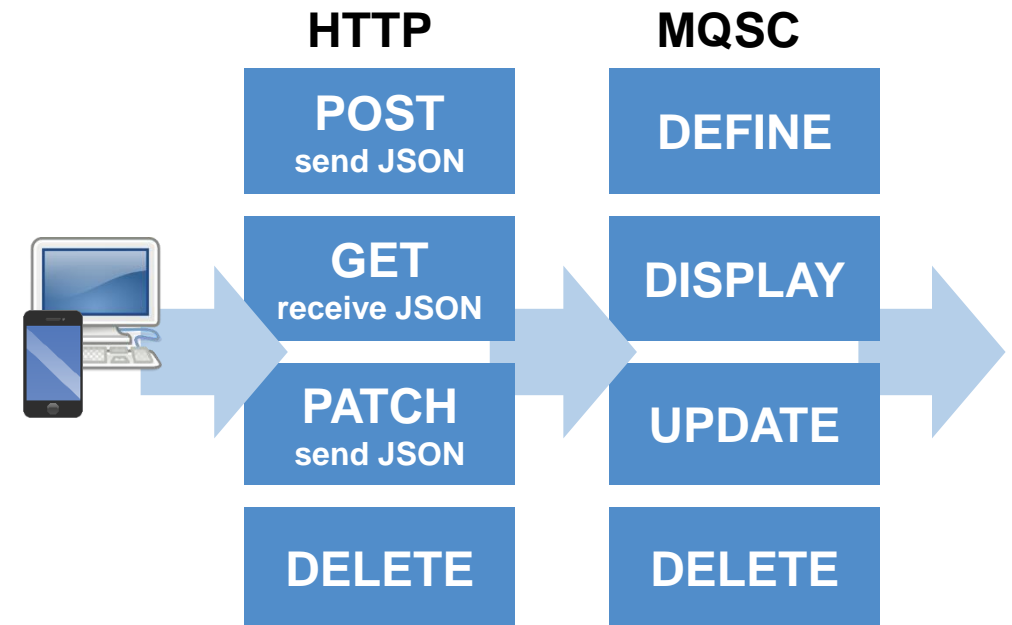
Using REST

...

Based off underlying MQ capabilities such as PCF and control commands, but adjusted to adhere to RESTful practices

URL represents target object for command

HTTP POST: https://host:port/ibmmq/v1/qmgr/QM1/queue

```
{
  "name": "QUEUE.1",
  "type": "local",
  "cluster": {
    "name": "CLUSTER1" }
}
```

HTTP Response: 201

JSON payload when defining/updating objects

HTTP response indicates success/failure

HTTP GET: https://hostname:portNumber/ibmmq/v1/qmgr

```
{
  "qmgr": [
    {
      "qmgrName": "QMTEST01",
      "status": "running"
    },
    {
      "qmgrName": "QMTEST02",
      "status": "ended"
    }
  ]
}
```

JSON payload returned when querying

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Evolution of the MQ REST API
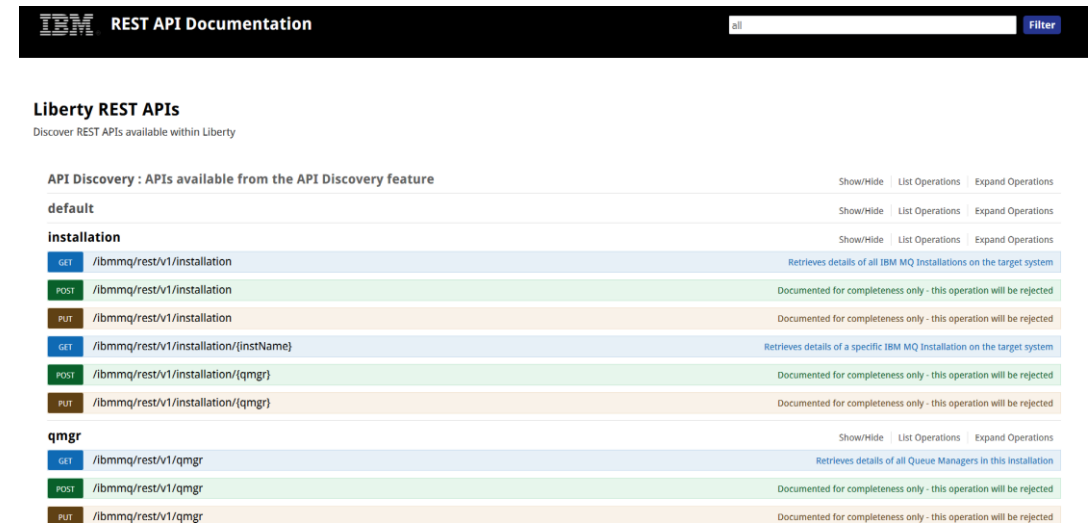
- Iteratively developed in CD releases
  - **9.0.1**
    - REST API introduced
    - Contains ability to list queue managers (dspmq) and their installation (dspmqver)
    - Not integrated into mqweb server/MQ security so disabled by default
  - **9.0.2**
    - Integrated into mqweb server and MQ security, enabled by default
    - Contains CRUD for queues and the ability to display queue status
    - Supported on MQ Appliance
  - **9.0.3**
    - Support for subset of DIS QMSTATUS on all platforms including z/OS
  - *And continues…*

- Same function on **Distributed** and **z/OS**
- Currently restricted to the installation and thus the queue managers associated with the MQ install
  - *But evolving…*

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Distributed error Log Enhancements

Modifications to the error log content.
Added to aid central log collection and error detection

Universal timestamps added

Ability to add severity information to the message codes

More to come…

```
------------------------------------------------------------------------
05/11/2017 12:13:44 PM – Process(429.1) User(bld-adm) Program(amqzxma0)
          Host(c5ab153621a5) Installation(Docker)
          VRMF(9.0.3.0) QMgr(QM1)
          Time(2017-05-11T11:13:44.705Z)

AMQ5008E:    ssential IBM MQ process 442 (zllCRIT) cannot be found and is
assumed to be terminated.
```
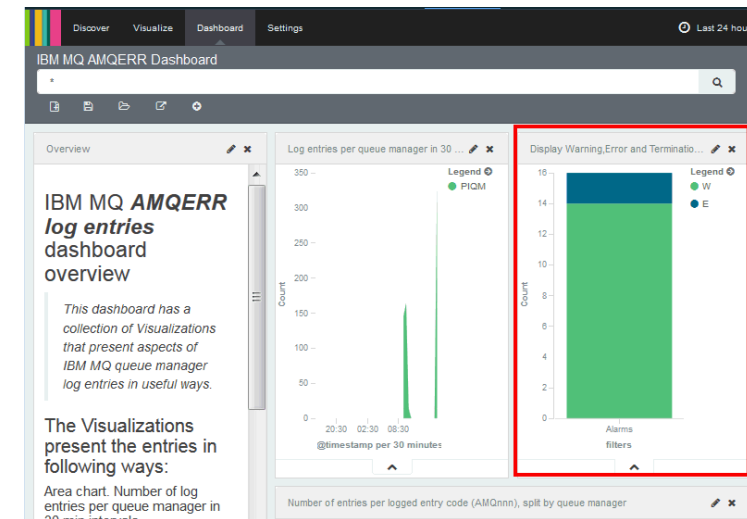
Connectivity

Bridging MQ with external systems

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

Message Hub

Connect MQ to the Bluemix messaging service

Salesforce

Integrate MQ's publish/subscribe with Salesforce events

Blockchain

Use MQ messages to query and update the blockchain

Kafka

Use open source Kafka connectors to join MQ with Kafka

IBM Integration Bus

IBM's integration solution for everything else!

Blockchain

Salesforce

IBM **MQ**

Kafka

MQ Bridge for Salesforce

...

Safesforce's cloud-based CRM platform enables events to be emitted when changes are made to data, or when applications run

You can inject these Salesforce events into your own systems using the new MQ Bridge for Salesforce with no need for your backend applications to connect to Salesforce

Supports Salesforce Platform Events and PushTopics

Events are published into the MQ network

The bridge runs on Linux, but connects to any queue manager and is enabled for monitoring with system topic metrics

Salesforce

Platform Event

PushTopic

IBM MQ Bridge for Salesforce

MQ Publication

IBM MQ

23
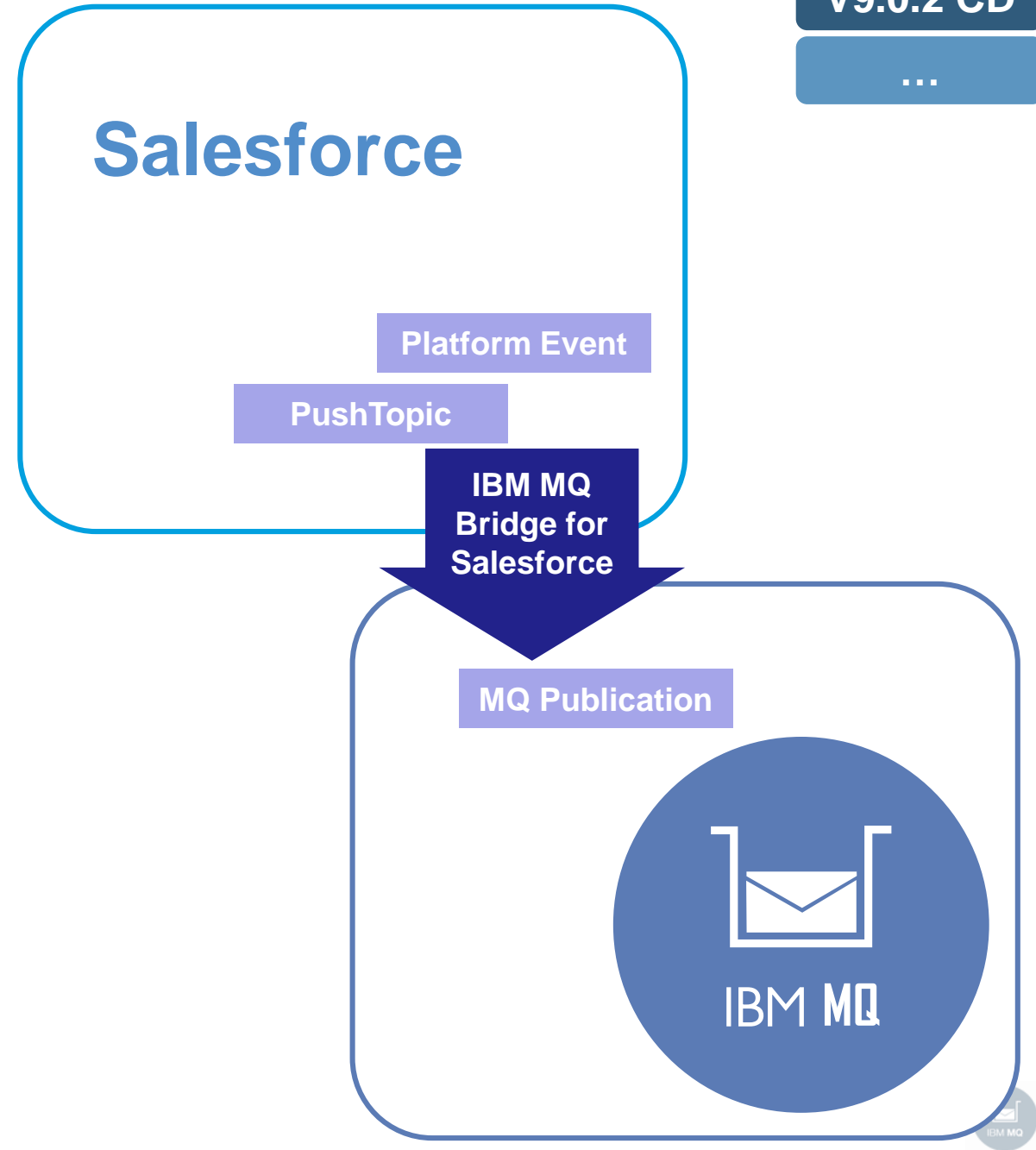
Blockchain Bridge

MQ is a natural fit to connect existing business transaction systems to remote intra-business ledger services

Asynchronous request reply MQ message flow for applications to **request information from Blockchain** over MQ messages

For example "what is the value of the balance on this account?"

Blockchain

IBM MQ Bridge for Blockchain

IBM **MQ**

Message Hub Bridge

Message Hub is a scalable messaging service for **IBM Bluemix**. Based on Apache Kafka and ideally suited for streaming analytics

You can use the **new MQ Bridge** capability to connect your MQ network to your Message Hub service in Bluemix, enabling the flow of MQ message data into your Bluemix applications

Connects to MQ as an MQI client

At-least-once reliability (as expected by Kafka)

Data partitioned into Kafka topics

IBM Cloud

Message Hub Bridge for IBM MQ

IBM MQ
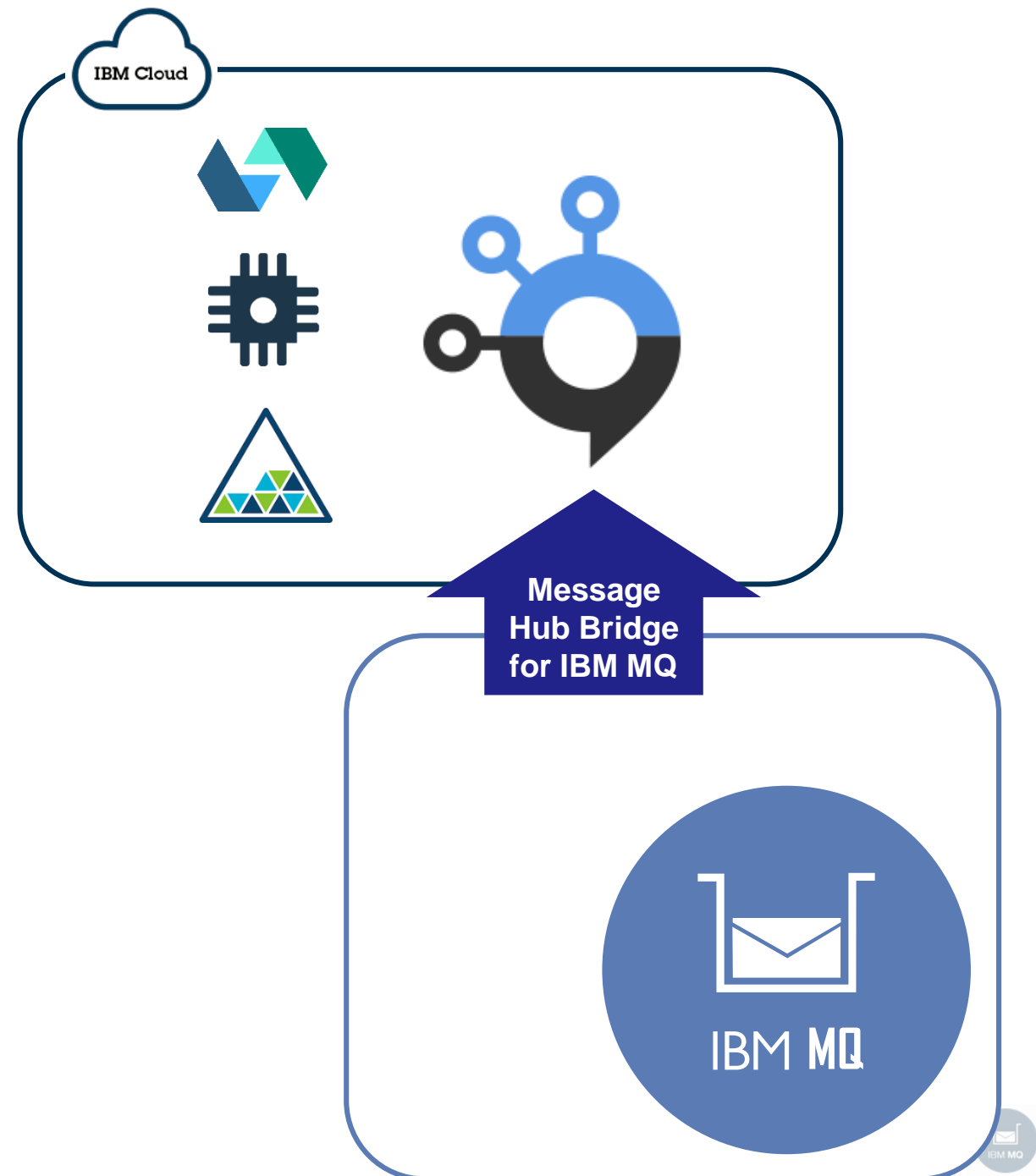
Kafka Connectors for MQ

There is an increasing need to bridge between your MQ messaging platform and your Kafka stream data platform, unlocking your enterprise and your stream data

Kafka Connect is a framework included in Apache Kafka that enables this

IBM MQ sink and source connectors are currently being openly developed by IBM

https://www.confluent.io/product/connectors/
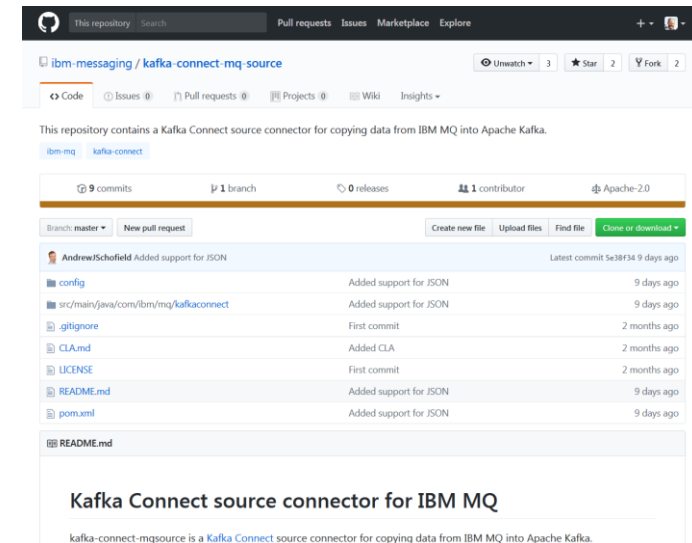
Managed File Transfer

Simplified licensing

MFT Agents are now no longer separately and individually licensed but are free to deploy and use when connected to **MQ Advanced entitled queue managers**

Redistributable MFT Agent

The MFT agent now available from FixCentral, users simply **download and unzip**

Improved diagnostics

Comprehensive fine grain coverage of FTP errors

Enhanced logging of FTP communications for post diagnosis

File transfer recovery timeout control, new option to automatically cancel failing transfers

MFT agent status reporting, aids problem diagnosis by reporting last contact time

Files exchanged between MFT and FTP/FTPS/SFTP
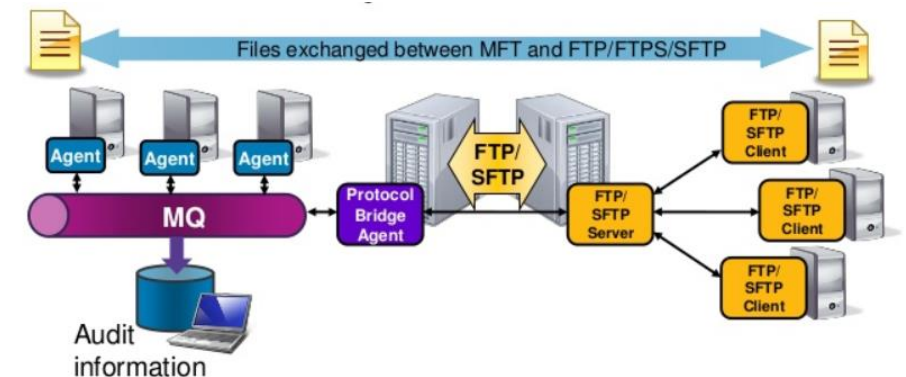
Cloud

IBM MQ in the Cloud
Tuesday
2:00pm / 3:15pm

IBM MQ as a Hosted Service
Wednesday
3:10pm / 4:30pm
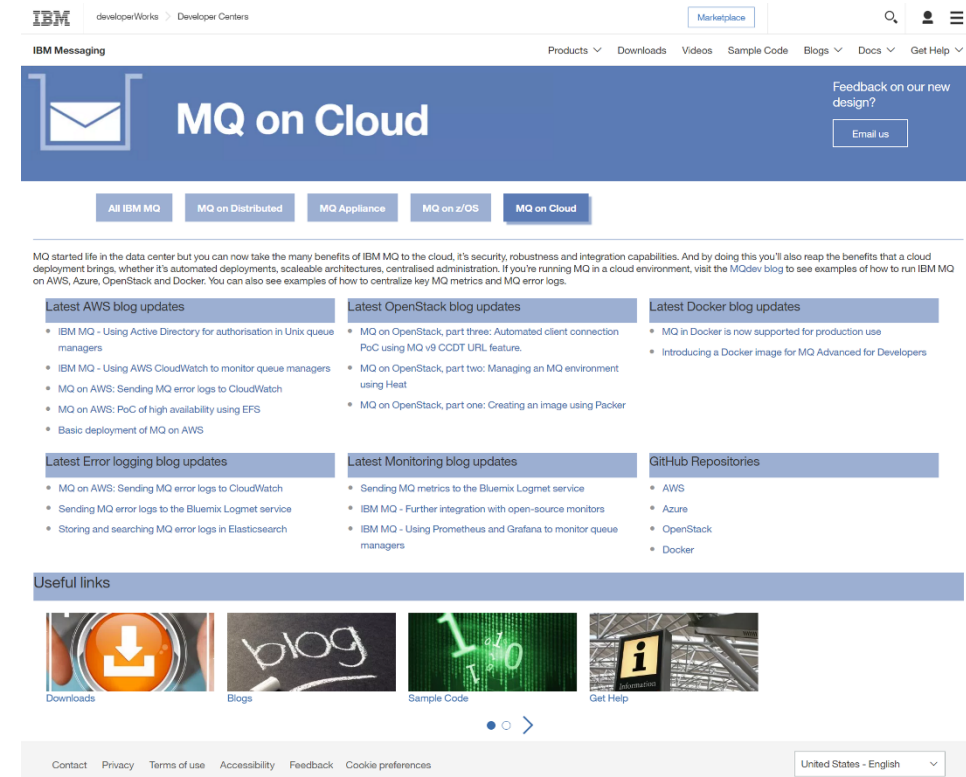
Run MQ, exactly how and where you need it

Cloud

IBM MQ

Message Hub

IBM Bluemix
(including Softlayer)

IBM MQ — AWS

IBM MQ

IBM MQ — Azure

Docker   VMWare   Kubernetes

Openstack   ...

On-prem

IBM MQ

z/OS

Linux

Windows

IBM MQ

i for Business

HPUX

AIX

Solaris ...

Distributed platforms

IBM MQ

Private cloud

IBM MQ

IBM MQ Appliance
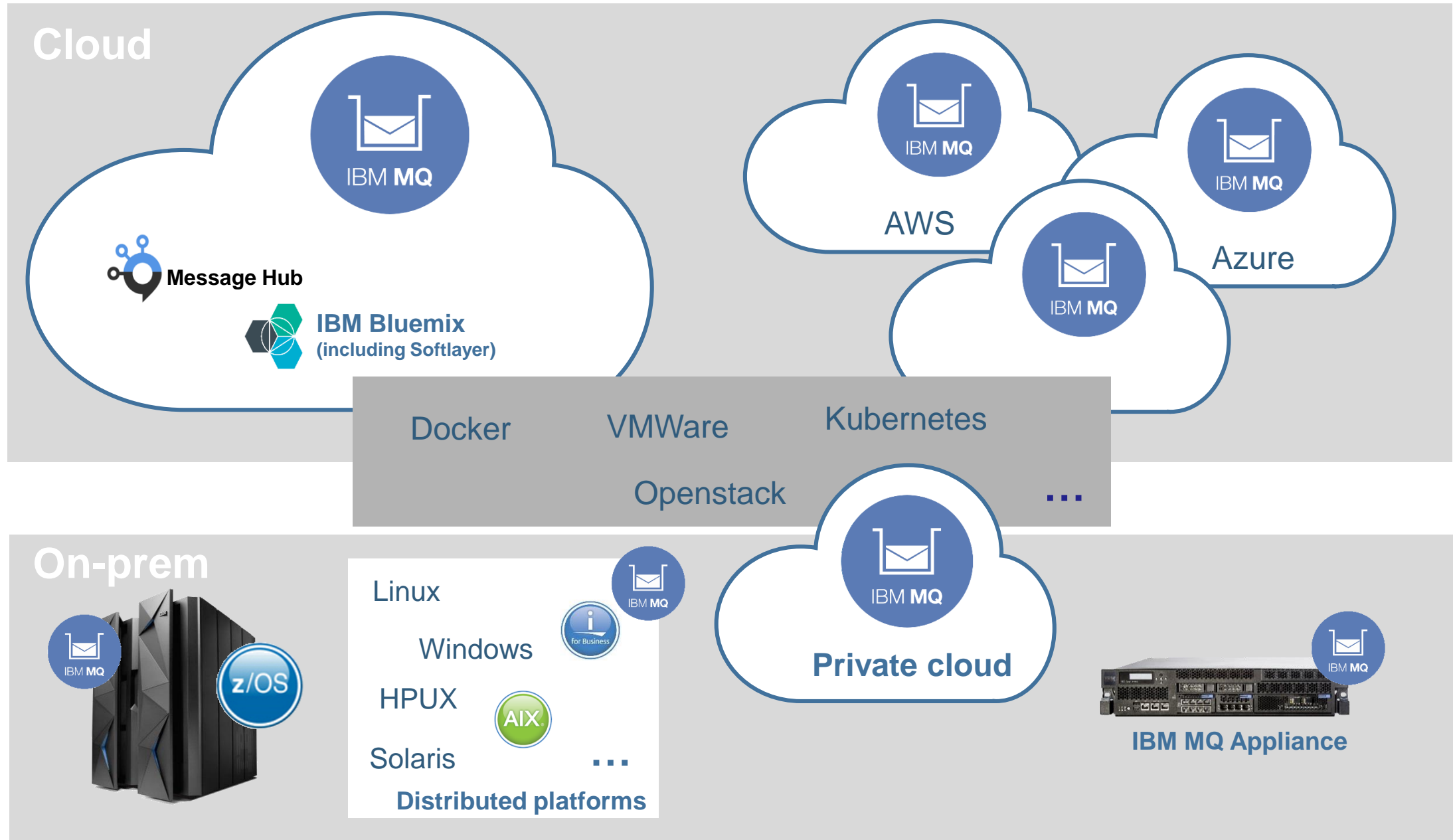
Help and advice with MQ in the Cloud

It has always been critical for MQ to run where it is needed and integrated into the tools of your choice

For many that means **clouds**

We have investigated running MQ in various **public** and **private** clouds.

Using a variety of tooling for provisioning, configuration and monitoring

And we've been sharing that information to everyone to use

**https://developer.ibm.com/messaging/mq-on-cloud/**

Getting started quickly

Getting up and running with MQ quickly is important, but running it in the best possible way is critical

MQ is publishing quick starts and preconfigured environments to show best practice
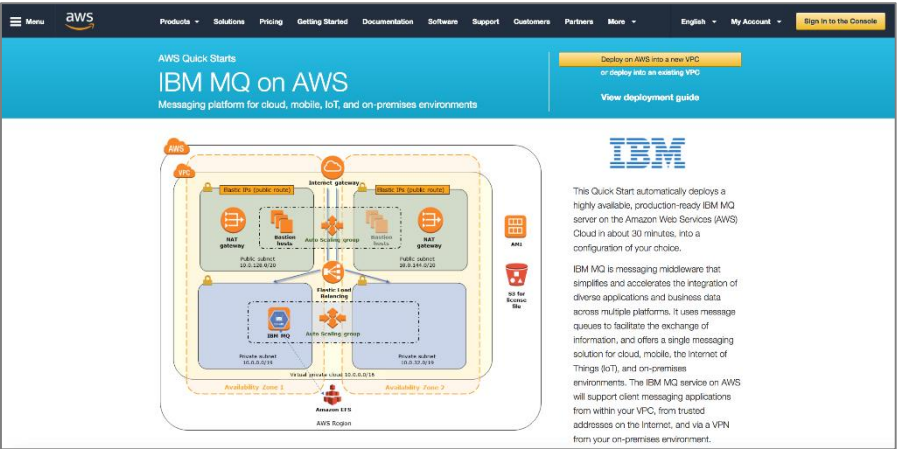
IBM MQ is the first IBM product to work with Amazon to publish an AWS Quick Start, deploying a highly available MQ setup in AWS in less than thirty minutes
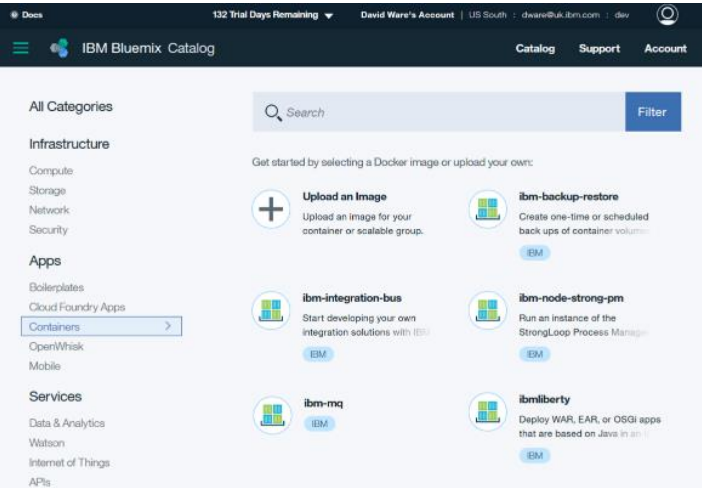
IBM MQ's developer container is preconfigured with essential MQ resources to get going as quickly as possible

MQ in Containers

IBM MQ is supported to run inside Docker containers, bringing the benefits of containers to MQ

- Lightweight containers for running MQ

- Predictable and standardized units for deploying MQ

- Process, resource and dependency isolation

- Best practice guidance

IBM provided sample Docker files for customizing and building your own Docker images on **GitHub**

IBM MQ Advanced for Developers V9 available direct from **Docker Hub**

MQ has recently started to publish Helm Charts, showing best practice for running MQ in **Kubernetes**

IBM Cloud Product Insights
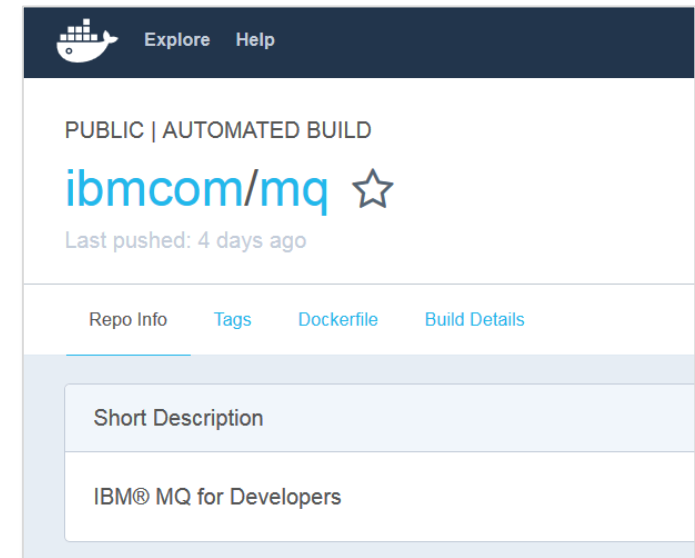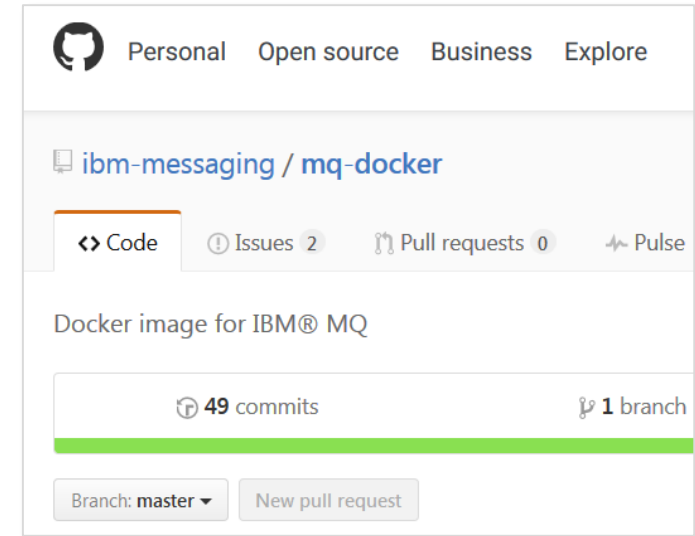
Product Insights is a **cloud service** that enhances the way IBM on-premise products can be registered and tracked, organizations can extend on-premise products achieving the benefits of cloud environments.

IT administrators register IBM Enterprise Software to create an inventory to track each instance, report on usage metrics.

For example:
    What level of MQ is that queue manager?
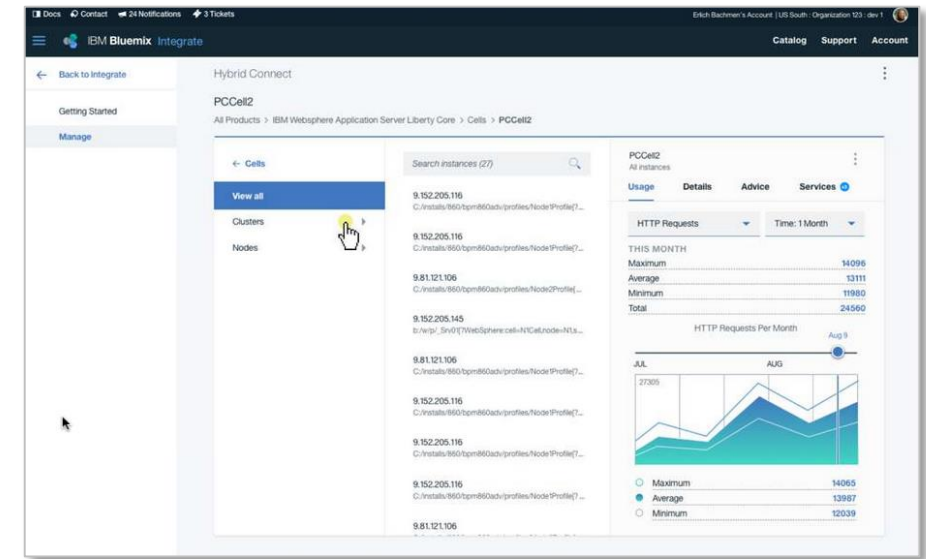   What MQ packages are installed?
    Is that queue manager running?

High level usage information is regularly collected to give a high level overview of the system usage and any trends
    How many persistent and non-persistent messages put
    How many persistent and non-persistent bytes put
    Giving a very high level overview of the system usage.

Platforms

z/OS

Quick Reminder: MQ for z/OS Portfolio

MLC

IBM MQ for z/OS
- Provides MQ capability, connectivity on and off the z/OS platform & excellent integration with z/OS s/w like CICS, IMS, WAS, DB2

OTC Offerings

IBM MQ for z/OS Value Unit Edition (VUE)
- Same functionality as MQ for z/OS, but intended for new workloads running within a zNALC LPAR only. Can coexist and interact with MQ MLC offerings in other LPARs

IBM MQ Managed File Transfer (MFT) for z/OS
- Equivalent function as MFT on distributed platforms though more closely integrated with base MQ offering as of V8. Must be locally bound to a z/OS Queue Manager, no client/agent support hosted on z/OS

IBM MQ Advanced Message Security (AMS) for z/OS
- Provides end to end encryption of messages throughout the MQ network
- Data is encrypted at rest, not just on the wire

IBM MQ Advanced for z/OS
- Soft bundling of MQ MFT for z/OS and MQ AMS for z/OS only (i.e. *no MQ z/OS included*)
- Can be deployed with MQ MLC or VUE offerings

IBM MQ Advanced for z/OS Value Unit Edition
- Soft bundling of IBM MQ for z/OS VUE + IBM MQ MFT for z/OS + IBM MQ AMS for z/OS

MQ Advanced for z/OS VUE unique function

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

IBM Cloud Product Insights support

> Provides registration and usage information to the Cloud Product Insights Service to offer insight into the usage of the entire MQ estate across z/OS and distributed systems

MQ Blockchain connector

> Enables application integration with the IBM Blockchain service running in Bluemix, mediated via MQ.

Managed File Transfer Agent Connectivity

> Allows a z/OS Managed File Transfer Agent to remotely connect to a z/OS Queue Manager to simplify the deployment of MFT on z/OS

> The same MFT workload may require fewer z/OS queue managers

NEW

Connector Pack

IBM MQ Managed File Transfer for z/OS

IBM MQ Advanced Message Security for z/OS

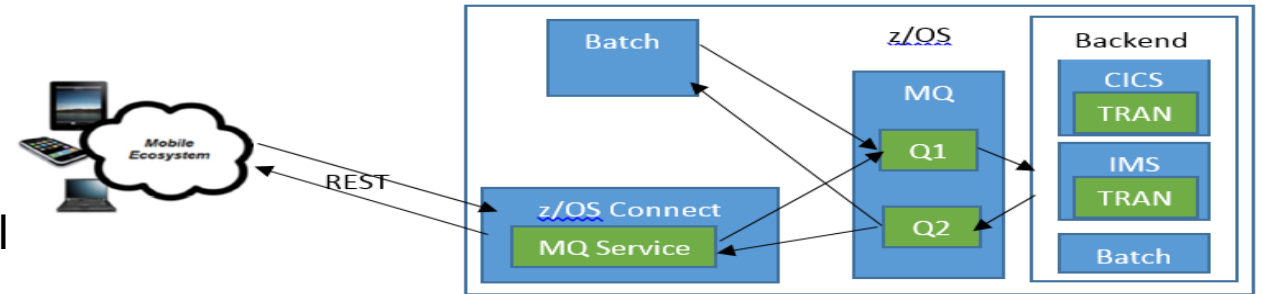**IBM MQ for z/OS Value Unit Edition**

For the Developers on z/OS

z/OS Connect

z/OS Connect is about exposing mainframe resources to applications via a modern REST and JSON interface.

The MQ Service Provider allows existing services that are fronted by MQ to be accessed via a RESTful front end.
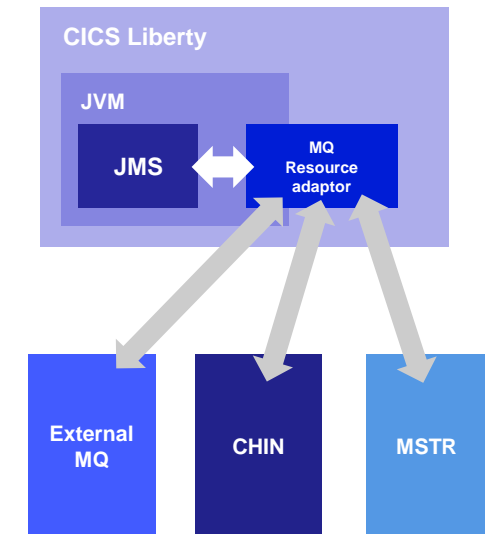
Client's applications need have no knowledge of MQ.

MQ JMS in CICS Liberty Profile

Allow CICS Liberty to use the MQ resource adapter Just like normal Liberty, allowing you to run Liberty messaging apps such as MDBs inside CICS.

Connections to MQ supported using either client or bindings mode.

# Distributed

Distributed recovery logs

MQ always logs all the data you need to recover from a queue manager failure in a recovery log

Restart recovery (**circular** and **linear** logging)

Enough information held in the log files to rebuild MQ resources to the level that they were at prior to the queue manager stopping

Media recovery (**linear** logging only)

Enough information held in the log files to rebuild MQ resources in the event of losing or corrupting MQ data
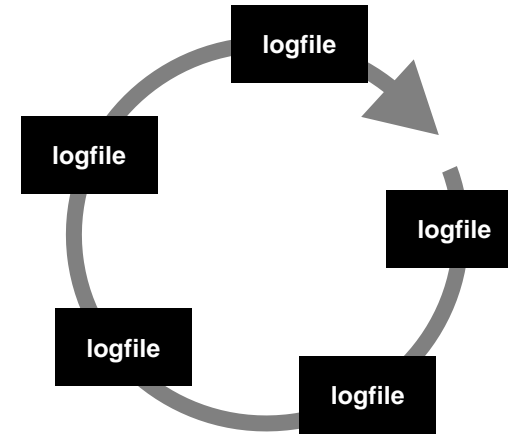
Circular logging

Linear logging

41

Significantly reducing the overheads of linear logging

Automatic Media Imaging

Media images allow logs to be archived or reused, reducing space and speeding up recovery time

Previously this was up to the administrator

New ability for the queue manager to **automatically schedule** the recording of media images

The frequency of imaging can be controlled based on **time interval** or **data written**

New ability to exclude certain objects from media recovery logging to reduce overheads

Queue manager controlled imaging **reduces the impact on other workload** during recording

Manually controlled recording

Queue manager controlled recording
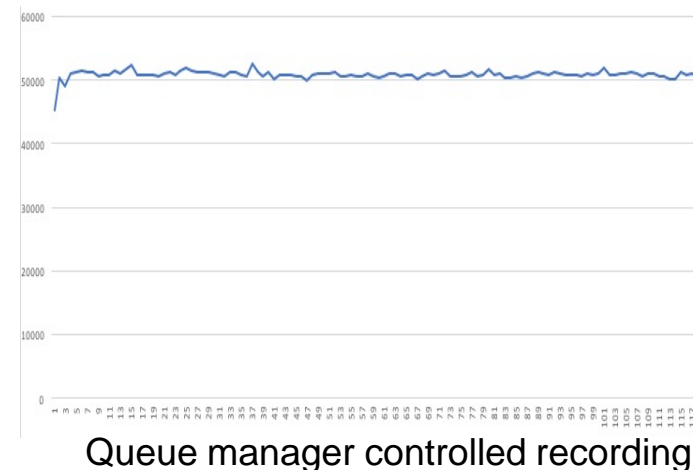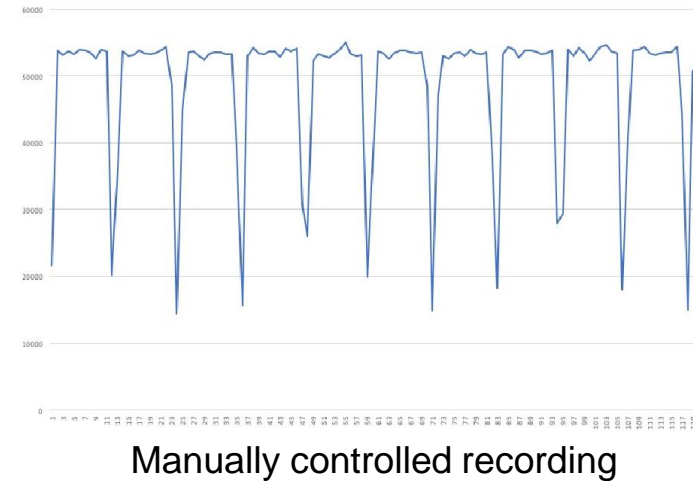
Significantly reducing the overheads of linear logging

Automatic log reuse

Linear log extents must be removed from the system to free up space

> You may choose to archive them before deleting

You can now create a queue manager where **log extents are automatically reused** as soon as they are no longer required for media recovery

> Alternatively they can be automatically reused when no longer required and have been marked as archived

Significant performance improvements over user managed linear logging, comparable to circular logging

And in general

Extra information added to queue manager status on log utilization to aid better log configurations

Persistent Message Throughput

- 9.0.2 Circular Logging
- 9.0.1 Manual Linear Logging
- 9.0.2 Automatic Linear Logging
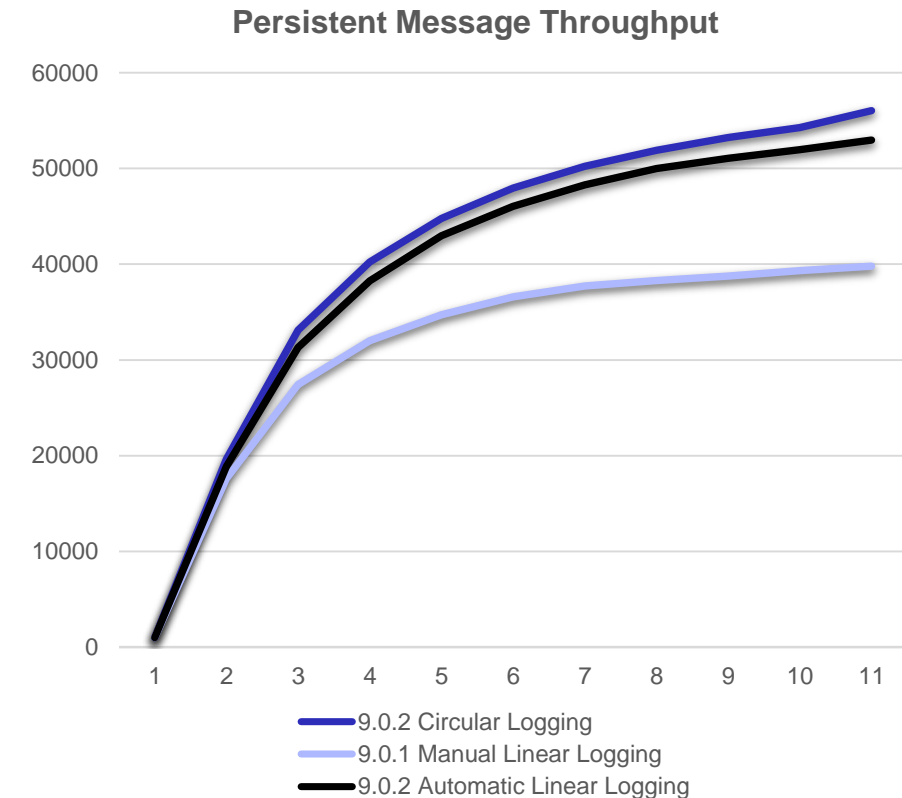
MQ Appliance

IBM MQ Appliance
Wednesday
9:15am / 10:20am

Hardware updated in June 2016 to the M2001

Original 1.2TB HDDs replaced with 3.2TB SSDs
A potential 3x performance gain for heavily persistent workloads

10GB network ports extended from 2 to 4
For combined HA and DR configurations two 10GB ports are required
**Leaving two 10GB ports for messaging traffic**

MQ Appliance

Hardware Update *better capacity and performance*

Increased performance and capacity with new 3.2TB SSDs.

Increased connectivity with additional 10GB network ports

Floating IP support *simpler application failovers*

Added floating IP support. Each HA queue manager can be associated with an IP address that automatically moves with the queue manager
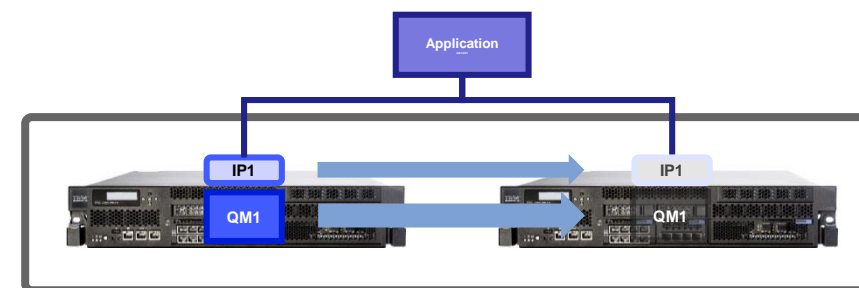
Administration *better admin experience*

Added a host of administrative improvements, including SNMP support, administrative REST support for the appliance, new authentication and role based security and backup and restore capabilities

46
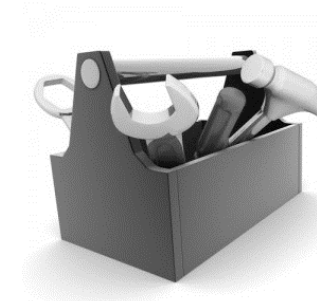
MQ for HPE NonStop

IBM MQ for HPE NonStop

MQ V8 functionality is now offered on the HPE Integrity NonStop platform for both the **NonStop X** servers and **NonStop i** servers

Released in June 2017

Provides many of the MQ V8 capabilities plus some of the unique HP NonStop capabilities from the previous version, MQ V5.3

Will follow the **Continuous Delivery** model of incrementally extending the capabilities to bring functional parity with the HP NonStop V5.3 features

What's next ?

IBM MQ Futures
Tuesday
10:10am / 11:30am

IBM Messaging

Tuesday, 10 October 2017