IBM MQ Lab Tour – Paris – 26 September 2017

IBM MQ Update

Paul Kettley
paulk@uk.ibm.com

Preface

IBM's statements regarding its plans, directions and intent are subject to change or withdrawal at IBM's sole discretion. Information regarding potential future products is intended to outline our general product direction, and it should not be relied on in making a purchasing decision. The information mentioned regarding potential future products is not a commitment, promise, or legal obligation to deliver any material, code or functionality. Information about potential future products may not be incorporated into any contract. The development, release, and timing of any future features or functionality described for our products remains at our sole discretion.

- **Content Authority**. The workshops, sessions and materials have been prepared by IBM or the session speakers and reflect their own views. They are provided for informational purposes only, and are neither intended to, nor shall have the effect of being, legal or other guidance or advice to any participant. While efforts were made to verify the completeness and accuracy of the information contained in this presentation, it is provided AS-IS, without warranty of any kind, express or implied. IBM shall not be responsible for any damages arising out of the use of, or otherwise related to, this presentation or any other materials. Nothing contained in this presentation is intended to, nor shall have the effect of, creating any warranties or representations from IBM or its suppliers or licensors, or altering the terms and conditions of the applicable license agreement governing the use of IBM software.

- **Performance**. Performance is based on measurements and projections using standard IBM benchmarks in a controlled environment. The actual throughput or performance that any user will experience will vary depending upon many factors, including considerations such as the amount of multiprogramming in the user's job stream, the I/O configuration, the storage configuration, and the workload processed. Therefore, no assurance can be given that an individual user will achieve results similar to those stated here.

- **Customer Examples**. All customer examples described are presented as illustrations of how those customers have used IBM products and the results they may have achieved. Actual environmental costs and performance characteristics may vary by customer. Nothing contained in these materials is intended to, nor shall have the effect of, stating or implying that any activities undertaken by you will result in any specific sales, revenue growth or other results.

- **Availability**. References in this presentation to IBM products, programs, or services do not imply that they will be available in all countries in which IBM operates.

Trademark Statement

- IBM and the IBM logo are trademarks of International Business Machines Corporation, registered in many jurisdictions. Other marks may be trademarks or registered trademarks of their respective owners.

- Microsoft, Windows, Windows NT, and the Windows logo are trademarks of Microsoft Corporation in the United States, other countries, or both.

- Java and all Java-based trademarks and logos are trademarks or registered trademarks of Oracle and/or its affiliates.

- Other company, product and service names may be trademarks, registered marks or service marks of their respective owners.

- References in this publication to IBM products and services do not imply that IBM intends to make them available in all countries in which IBM operates.

Important Disclaimer

- THE INFORMATION CONTAINED IN THIS PRESENTATION IS PROVIDED FOR INFORMATIONAL PURPOSES ONLY.

- WHILST EFFORTS WERE MADE TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION CONTAINED IN THIS PRESENTATION, IT IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED.

- IN ADDITION, THIS INFORMATION IS BASED ON IBM'S CURRENT PRODUCT PLANS AND STRATEGY, WHICH ARE SUBJECT TO CHANGE BY IBM WITHOUT NOTICE.

- IBM SHALL NOT BE RESPONSIBLE FOR ANY DAMAGES ARISING OUT OF THE USE OF, OR OTHERWISE RELATED TO, THIS PRESENTATION OR ANY OTHER DOCUMENTATION.

- NOTHING CONTAINED IN THIS PRESENTATION IS INTENDED TO, OR SHALL HAVE THE EFFECT OF:

  - CREATING ANY WARRANTY OR REPRESENTATION FROM IBM (OR ITS AFFILIATES OR ITS OR THEIR SUPPLIERS AND/OR LICENSORS); OR

  - ALTERING THE TERMS AND CONDITIONS OF THE APPLICABLE LICENSE AGREEMENT GOVERNING THE USE OF IBM SOFTWARE.
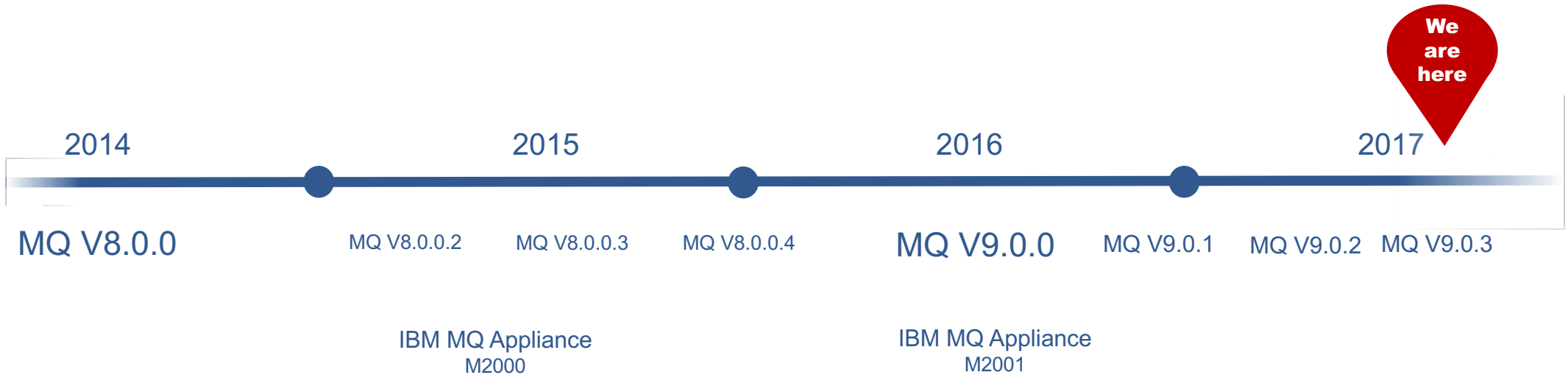
Recent IBM MQ Activity and a look to the future

- ❑ A quick recap
- ❑ Some ideas for Future direction
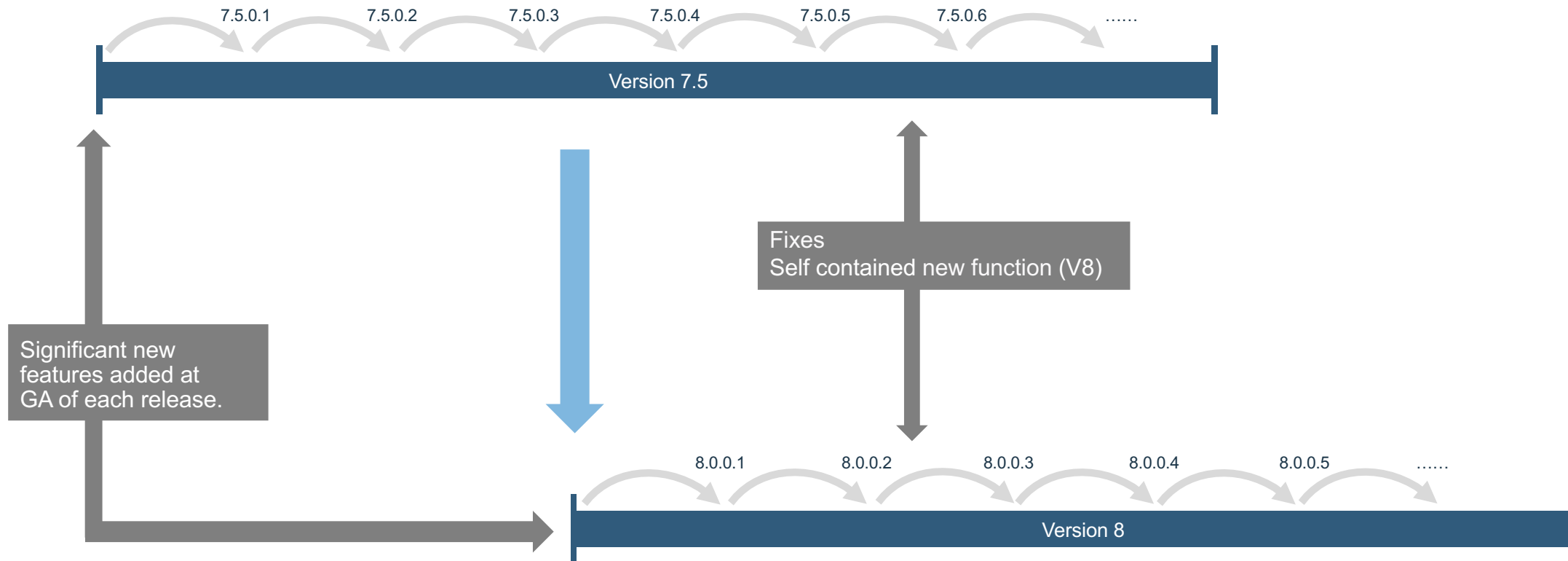
9/26/17

The last twelve months

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

IBM MQ has been regularly delivering new function release on release

    Through releases

    New platforms and environments

2016 was the start of MQ's **continuous delivery** model
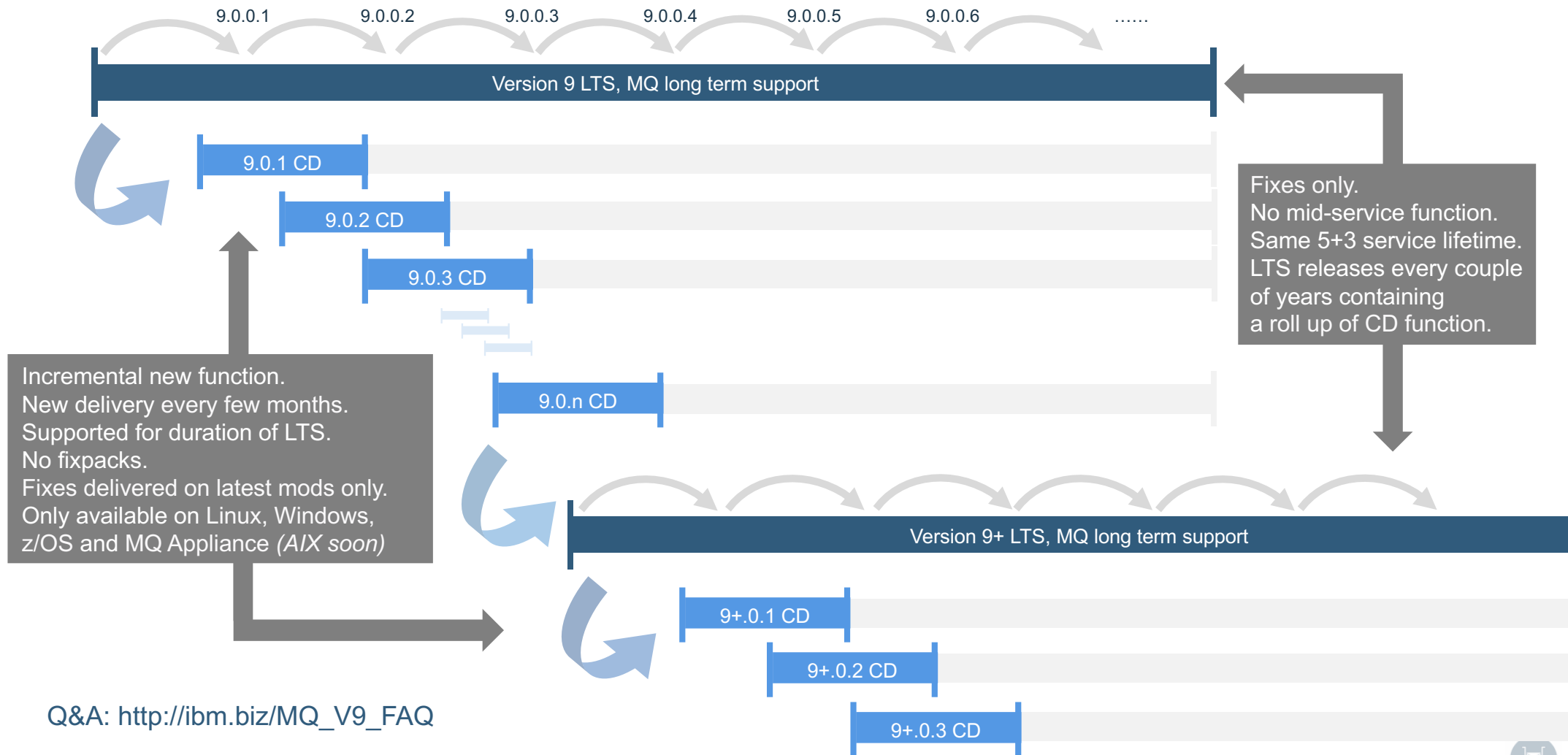
    Three CD releases so far

Previously: Service and continuous delivery combined

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

LTS and CD: Service and features 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 *(AIX soon)*

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

9

Be aware: Versions of MQ reached/reaching EoS

- IBM Services are ready to support migration planning if needed

Product	EOS Date
MQ V7.5 distributed	April 30 2018
MQ V7.1 distributed	April 30 2017
MQ V7.1 z/OS VUE	September 11 2017
MQ FTE 7.0.x distributed and z/OS	September 30 2017
MQ AMS 7.0.1 distributed and z/OS	September 30 2017
MQ HVE 7.0.1 RHEL and AIX	September 30 2017
MQ V7.1 z/OS	November 6 2017

MQ V9 LTS June 2016

Advanced Message Security

AMS added a new high performance policy for encryption, not signing. 3x-4x performance gains are typical, if not more
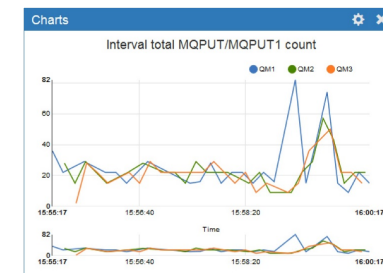
Support for non-IBM JREs
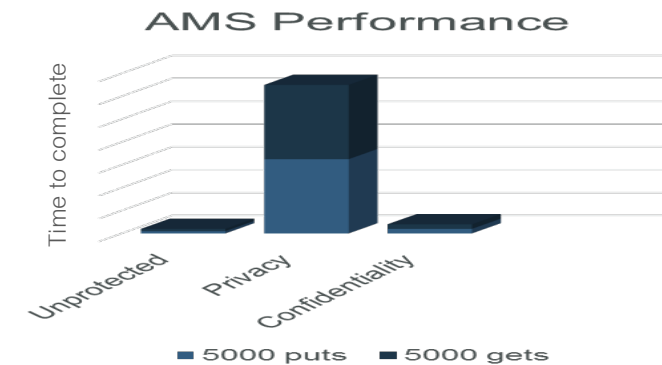
Centralised hosting of CCDTs

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
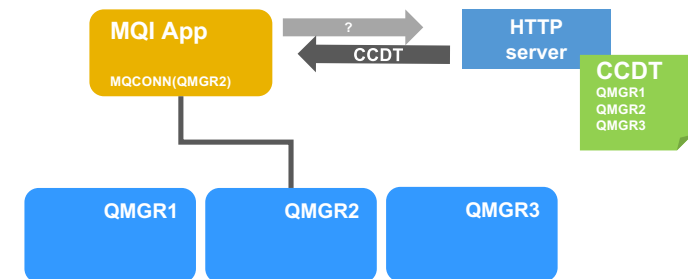
System topics

Distributed queue managers publish statistics and application trace data to dynamic subscribers

11   9/26/17

MQ V9.0.1 CD November 2016

Software MQ Web Console

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

Available on all CD platforms; Linux, Windows, z/OS and MQ Appliance

The start of the RESTful admin interface

First pieces of a new, more intuitive, administrative interface

Advanced Message Security

AMS Confidentiality option for encryption only, not signing. Major z/OS performance improvements.

9/26/17
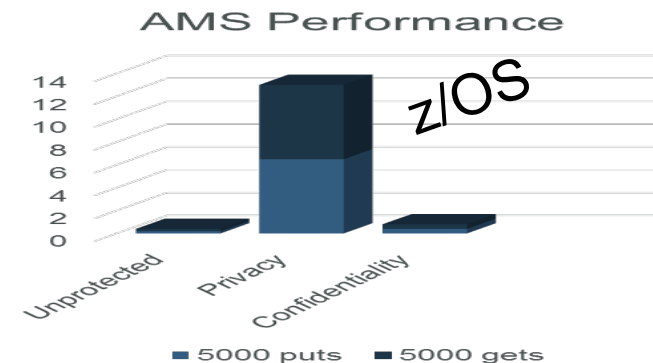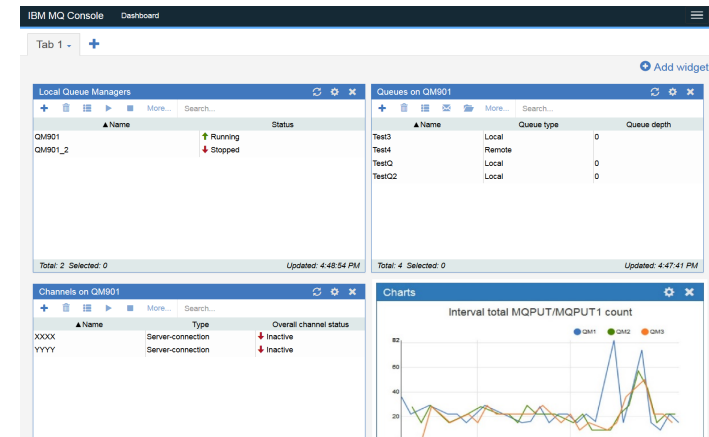
MQ V9.0.2 CD March 2017

Evolution of RESTful admin interface

Continued delivery of RESTful commands, focusing on queue creation, deletion, display and alter

Secure by default, using provided Liberty Server, managed through MQ.

```
$ curl http://localhost:9080/ibmmq/rest/v1/qmgr

{"qmgr": [
  {
    "qmgrName": "QM901A",
    "status": "running"
  },
  {
    "qmgrName": "QM901B",
    "status": "endedImmediately"
  }
]}
```
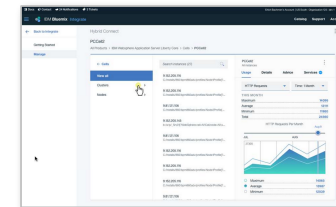
Distributed recovery logs

Significantly reduced the administrative and performance overheads of linear logging through automatic media imaging and log reuse
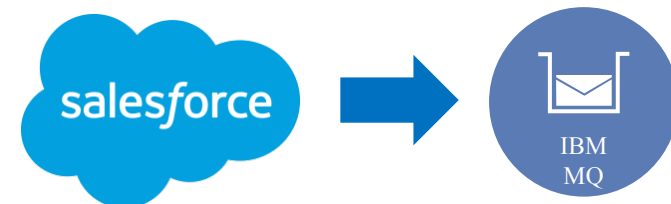

IBM Cloud Product Insights

Support for MQ in IBM's cloud service for keeping track of your IBM resources

Salesforce Bridge

Inject Salesforce platform events and PushTopics into your MQ publish/subscribe network

9/26/17

MQ V9.0.3 CD June 2017

New Connector Pack in IBM Advanced for z/OS VUE

Now the most functionally rich offering with connectors to IBM Blockchain and Product Insights cloud services, plus a simplification of MFT deployments across z/OS estate.

Further evolution of RESTful admin interface

Queue manager status. Service availability and active connections

```
$ curl http://localhost:9080/ibmmq/rest/v1/qmgr

{"qmgr": [
  {
    "qmgrName": "QM901A",
    "status": "running"
  },
  {
    "qmgrName": "QM901B",
    "status": "endedImmediately"
  }
]}
```

Enhanced Error Logging

Simplify log analytics. Error messages now contain a severity indicator and ISO timestamp to quickly identify important and related messages.

9/26/17

MQ Appliance Update

Hardware Update

Increased performance and capacity with new 3.2TB SSDs.
Increased connectivity with additional 10GB network ports

MQ 9.0.1 CD Firmware Update

Added floating IP support. Each HA queue manager can be
associated with an IP address that automatically moves with
the queue manager

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
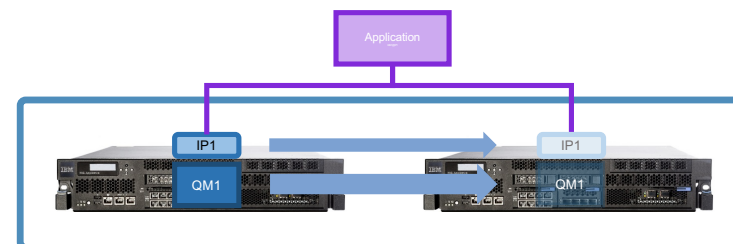
MQ 9.0.2 CD Firmware Update

Added SSH Key renewal to match best practices
Supports the MQ administrative REST API

What's next for MQ?

Items that are being considered for CD deliverables in the future

Blockchain : extending the story …

Initially only delivered as supported offering
on the z/OS platform in V903

- Name Value pair query
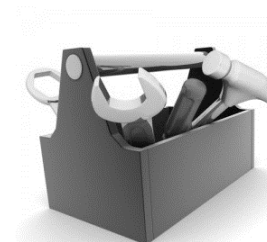- Connecting to High Security Business Network
  (HSBN) Hyperledger Fabric V1 service within
  IBM Bluemix

Looking ahead:

- Provided supported Blockchain bridge for
  distributed MQ
- Look to go beyond Query support. Full CRUD
  capability?
- Connect to local instantiation of Hyperledger
  Fabric
- Investigate connectivity to other Blockchain
  providers
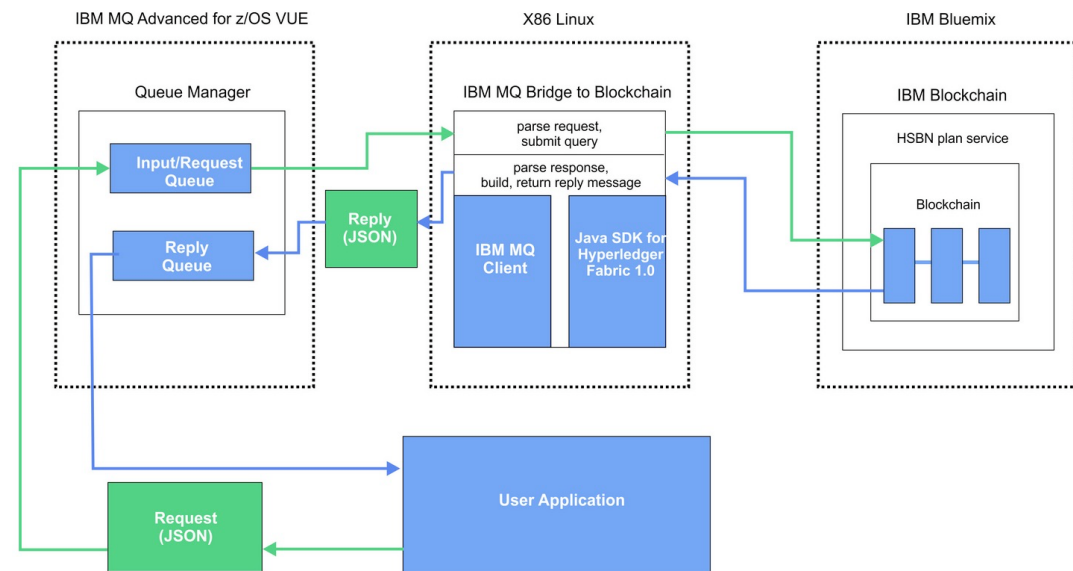
REST: Continuing the story …

RESTful interface to MQ systems

    Published, supported interface

    Simpler alternative to existing PCF and MQSC mechanisms for tooling

    Secure

MQ resource configuration

    Queue managers, Queues

    What objects next?

Installation level control

    Queue manager creation, starting, stopping

The MQ REST API is being iteratively delivered across the CD releases, adding control over more MQ objects each time

To query the list of queue managers for an installation of MQ:

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

```json
{
  "installation": [
    {
      "instName" : "IBM MQ v9.0.1 Installation",
      "instPath" : "C:\Program Files\IBM\MQ\MQ901",
      "instVersion" : "9.0.1.0",
      "instDescription" : "MQ 9.0.1 Evaluation",
      "platform" : "windows",
      "operatingSystem" : "Windows 7 Professional x64 Edition, …",
      "buildLevel" : "p903-L170313",
      "hostName" : "test_pc.ibm.com",

      "qmgr": [
        {
          "qmgrName": "QMTEST01",
          "isDefaultQMgr": true,
          "permitStandby": "notPermitted",
          "status": "running"
        },
        {
          "qmgrName": "QMTEST02",
          "isDefaultQMgr": false,
          "permitStandby": "notPermitted",
          "status": "ended"
        }
      ]
    }
  ]
}
```

REST: A Catchall REST capability ...

Tailored RESTful support for individual MQ objects and actions are in the works…

We are investigating providing MQ admin support over REST in the form of MQSC commands over REST

✓ Gives complete MQSC coverage quickly

✓ Simple to convert existing scripts

✗ Will not benefit from improved usability

To stop a channel:

HTTP POST: https://hostname:portNumber/ibmmq/v1/action/qmgr/QMGR1/mqsc

```
{
    "type": "runCommand",
    "parameters": {
        "command": "STOP CHANNEL(CHANNEL.TEST)"
    }
}

{
  "commandResponse": [{
      "completionCode": 0,
      "reasonCode": 0,
      "text": ["AMQ8019: Stop IBM MQ channel accepted."]
  }],
  "overallCompletionCode" : 0,
  "overallReasonCode" : 0
}
```

19

REST: Enabling more systems

Currently REST can only be used to administer each MQ installation separately and they must all be on the MQ 9.0.x CD release

We are looking at managing a network of systems through a single entry point

This will mean that not every queue manager will need to expose HTTPS endpoints

Pre-9.0.x queue managers will be able to be administered.

Investigating

REST   REST   REST

HTTP Server   HTTP Server   HTTP Server

QM   QM   QM   QM   QM   QM

Today

REST

HTTP Server

QM

MQ   MQ

QM   QM

MQ

QM

Next
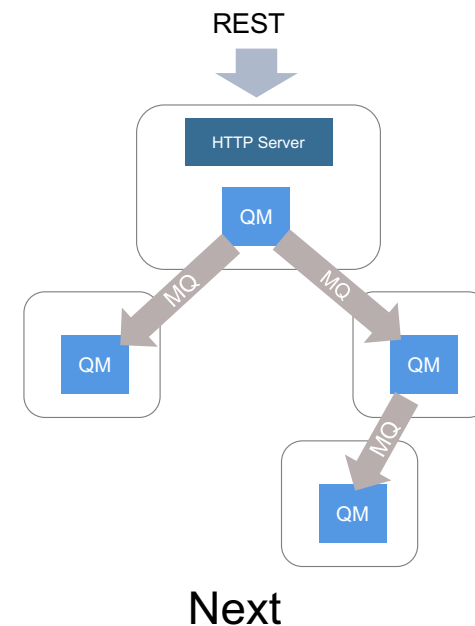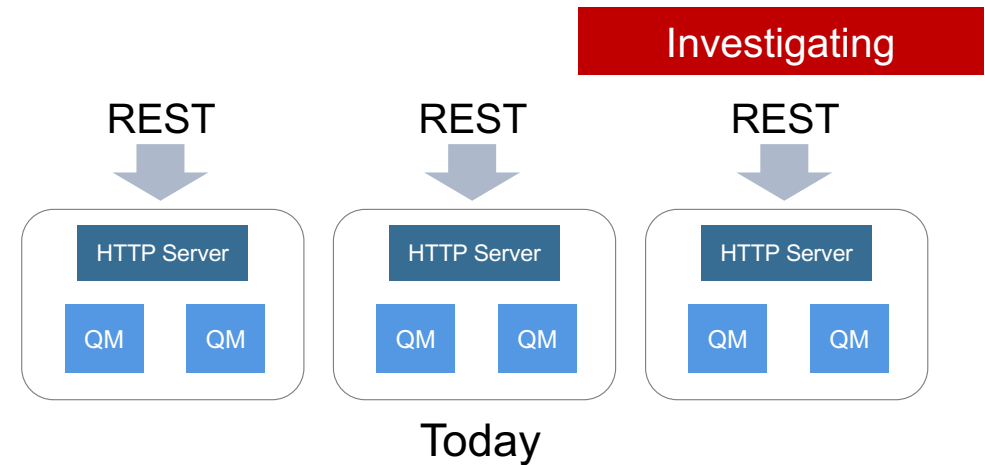
REST: We want REST for Developers

Many users just want the **simplest** way to get messages in and out of an MQ system

A RESTful API will give you that. Easily enabling messaging from just about **any environment**

MQ previously exposed its messaging capabilities using the *IBM MQ bridge for HTTP*. This required your own HTTP server and setup.

The new HTTP server support in MQ 9.0.x provides the perfect platform for a properly integrated REST API solution

CD releases will start to see our REST API evolve, potential for simple synchronous point-to-point support, followed by asynchronous and publish/subscribe capabilities

App

POST …/qmgr/QM1/queue/Q1/message

DELETE…/qmgr/QM1/queue/Q1/message

HTTPS

REST API

QM1

Existing channels

TCP/IP

App

Q1

MQPUT(Q1)

MQGET(Q1)
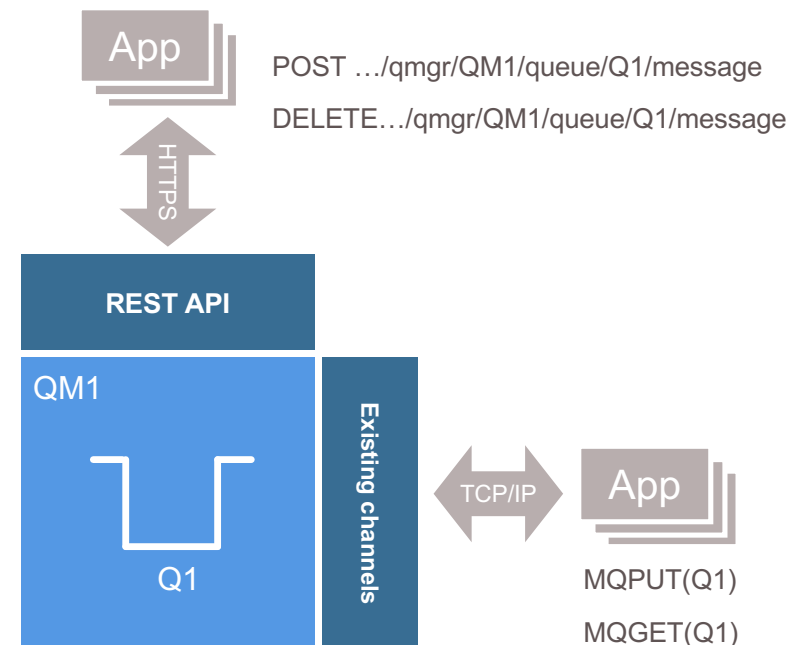
MQ in the Cloud

Run MQ, exactly how and where you need it
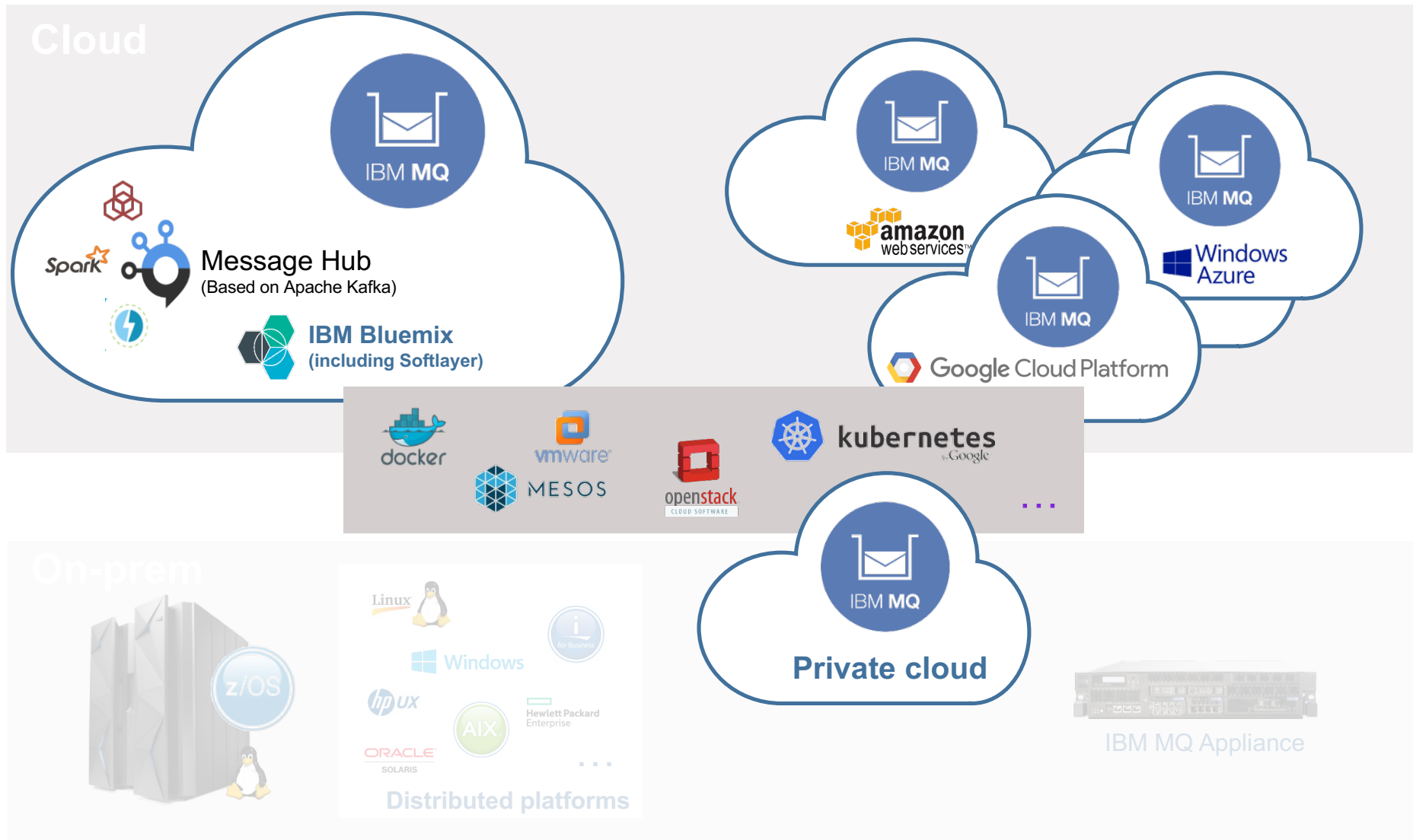
Help and advice with MQ in the Cloud

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

For many that now 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/
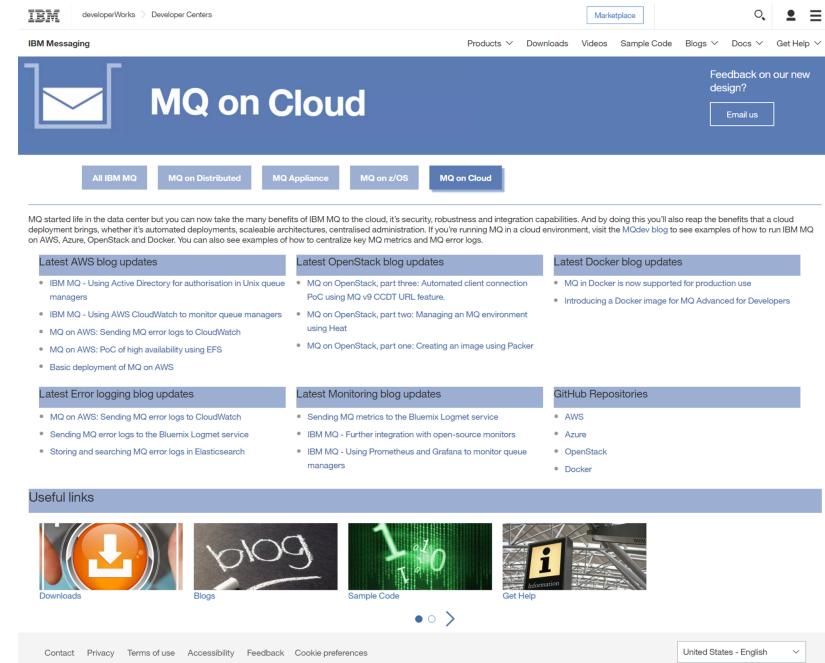
MQ in Docker containers

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

IBM MQ Advanced for Developers V9 available direct from Docker Hub
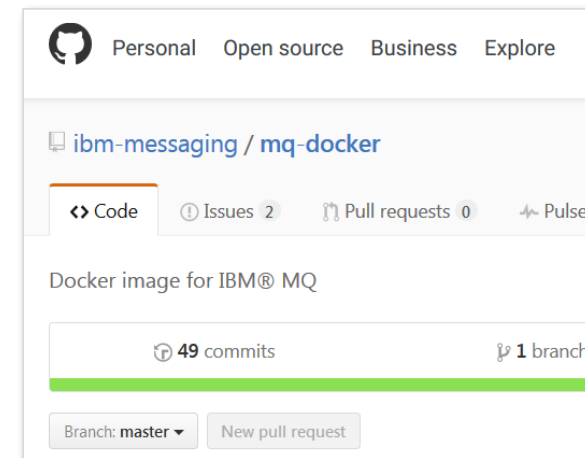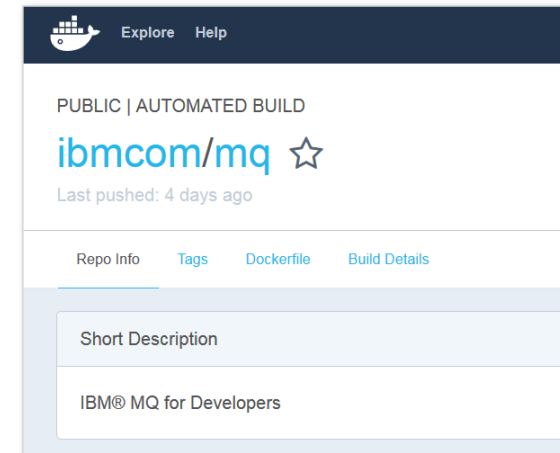
MQ Advanced for Developers in the Bluemix Container Service

It is now possible to spin up MQ queue managers in
~~the Bluemix Container Service with just a couple of~~
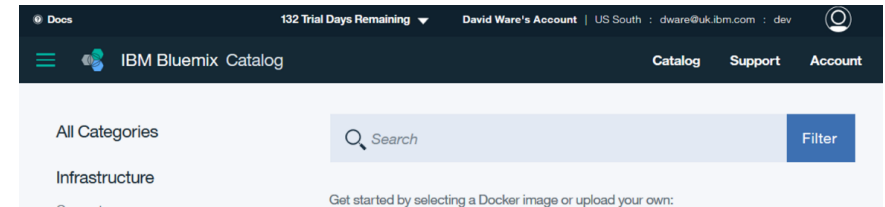
**Recently replaced by deployment in Kubernetes service **

Details at :

https://developer.ibm.com/messaging/2017/09/04/kubernetes-service-mq-docker-bluemix/
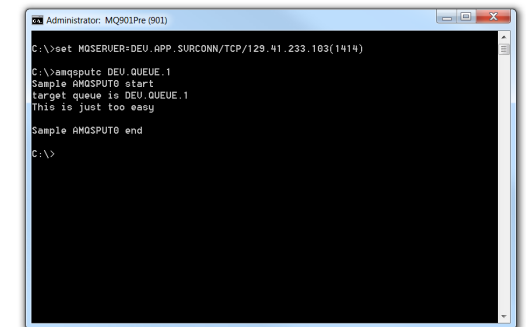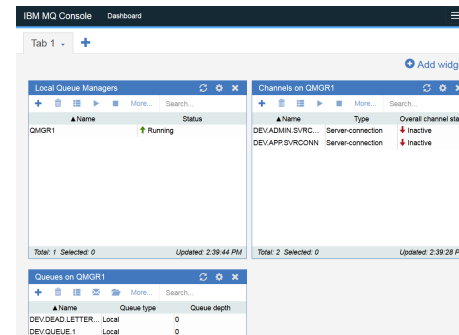
IBM MQ on AWS Quick Start – first IBM offering

Deploy a simple, highly available, production-ready IBM MQ server on the AWS Cloud in Minutes!

Who is this offering for?

MQ Specialist trying to deploy on AWS for the first time	✓
AWS specialist trying to deploy MQ for the first time	✓
Application owner looking to accelerate their AWS solution	✓

What do you get?

MQ deployed in AWS quickly and simply	✓
A highly available MQ deployment without complexity	✓
A secure MQ deployment without pain!	✓

amazon
web services

IBM MQ

...at the click of a button!

Menu   amazon web services   Products ▾   Solutions   Pricing   Getting Started   Documentation   More ▾   English ▾   My Account ▾   Create an AWS Account

AWS Quick Starts
Automated gold-standard deployments on AWS

https://aws.amazon.com/quickstart/architecture/ibm-mq/   ⟵   **Start here**

© IBM Corporation

27

IBM MQ on AWS Quick Start – first IBM offering

Quick Start automatically deploys a HA, production-ready IBM MQ server on the AWS in about 30 minutes.

A virtual private cloud (VPC) that spans two Availability Zones – providing security and high availability.

An Internet gateway to allow access to the Internet.

In a public subnet, a bastion host to provide secure Secure Shell (SSH) access to the IBM MQ server. The bastion host is in an Auto Scaling group of 1.

In a private subnet, an IBM MQ server in an Auto Scaling group of 1.

Amazon Elastic File System (Amazon EFS) automatically mounted on the IBM MQ server instance. Provides persistence across Availability Zones.

Elastic Load Balancing to automatically distribute connections to the active IBM MQ server.

Appropriate security groups for each instance or function to restrict access as required.

Messaging

IBM MQ

Messaging solution that connects apps and data across multiple platforms
Learn more | View guide

28
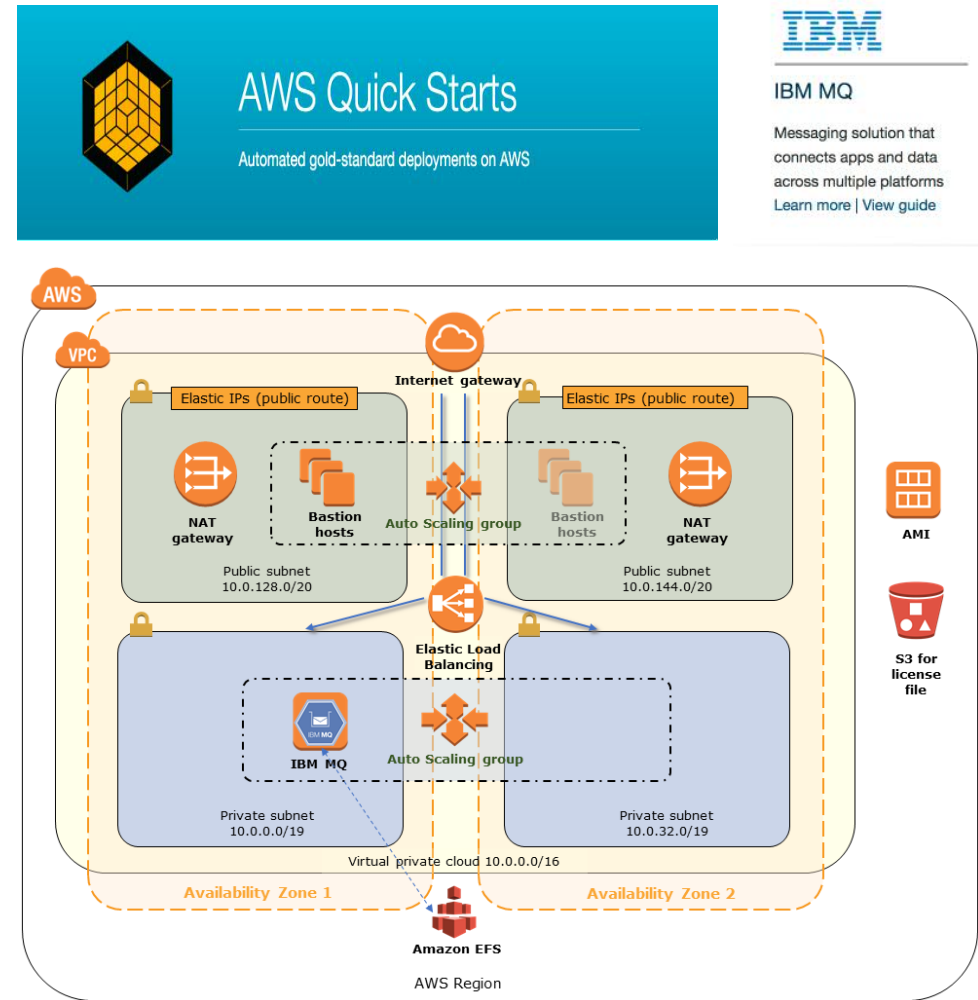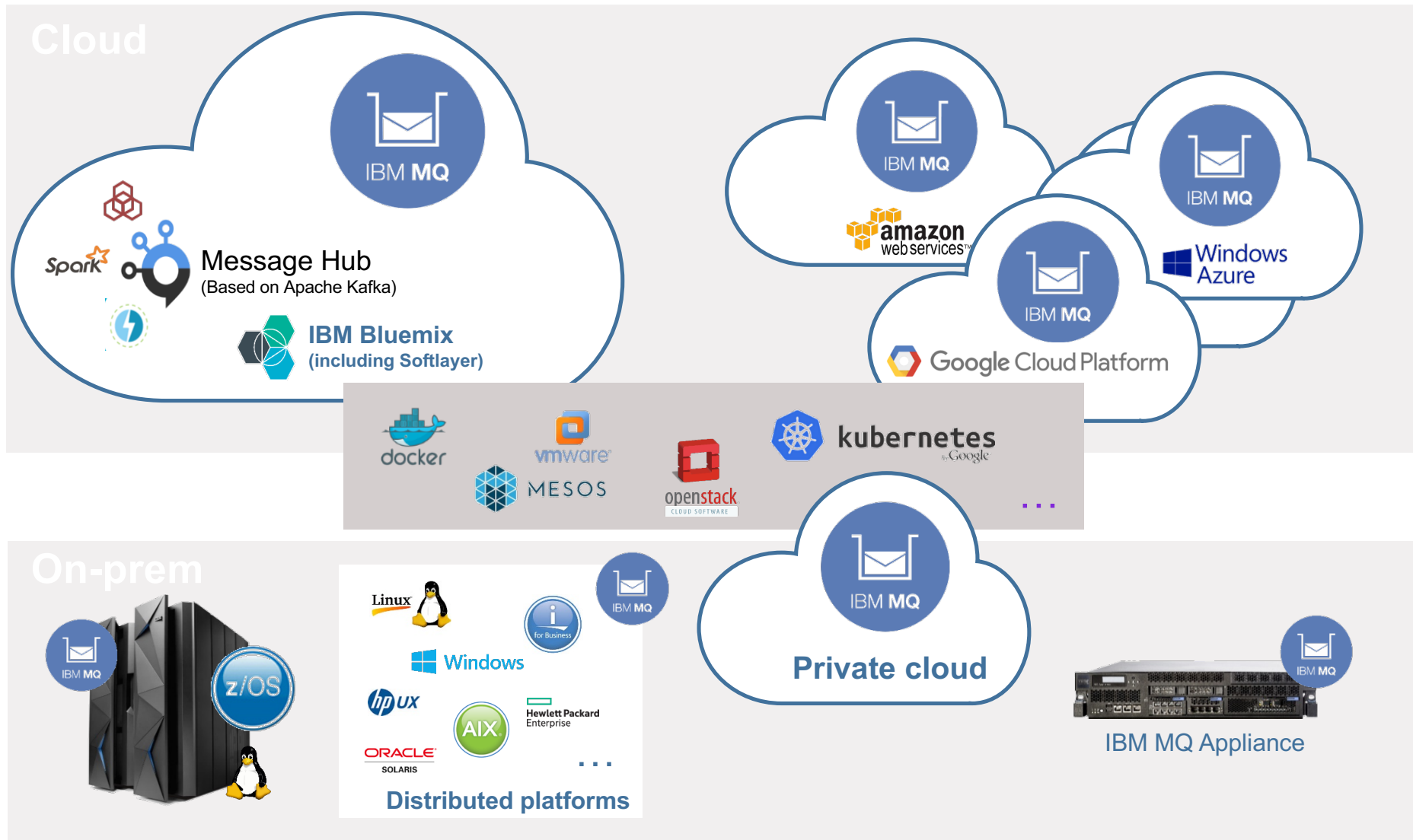
Run MQ, exactly how and where you need it

… or Let IBM host MQ for you and use it from where you need it

Cloud

Spark

Message Hub
(Based on Apache Kafka)

IBM Bluemix
(including Softlayer)

amazon webservices

Google Cloud Platform

Windows Azure

docker

MQ hosted SaaS

bernetes by Google

OpenStack CLOUD SOFTWARE

. . .

On-prem

z/OS

Linux

Windows

for Business

hp ux

AIX

Hewlett Packard Enterprise

ORACLE SOLARIS

. . .

Distributed platforms

Private cloud

IBM MQ Appliance

30

… or Let IBM host MQ for you and use it from where you need it

Cloud

Spark

Message Hub
(Based on Apache Kafka)

IBM Bluemix
(including Softlayer)

IBM MQ

MQ hosted SaaS

amazon
web services™

Google Cloud Platform

Windows
Azure

On-prem

Linux

Windows

for Business

hp UX

AIX

Hewlett Packard
Enterprise

ORACLE
SOLARIS

. . .

Distributed platforms

z/OS

Private cloud

31

Division of labour and skills - On-premise v Cloud

Traditional on premises customer managed	Public or Private Clouds Bring-Your-Own License	(Future?) Hosted Offering managed by IBM
MQ configuration for applications	MQ configuration for applications	MQ configuration for applications
MQ operations and maintenance	MQ operations and maintenance	MQ operations and maintenance
Hardware provisioning availability and operations	Hardware provisioning availability and operations	Hardware provisioning availability and operations

Points of variability reducing… Reliance on 3rd party increasing →

← Increasing flexibility ... Increased need for QM and infrastructure skills

Key: Customer Controlled   IBM/Vendor Controlled

32

Software MQ – HA investigations

Software HA for MQ – learning from ourselves!

MQ's excellent data resiliency is underpinned by the filesystem. Multi-instance and HA cluster high availability is based on shared access to that one filesystem.

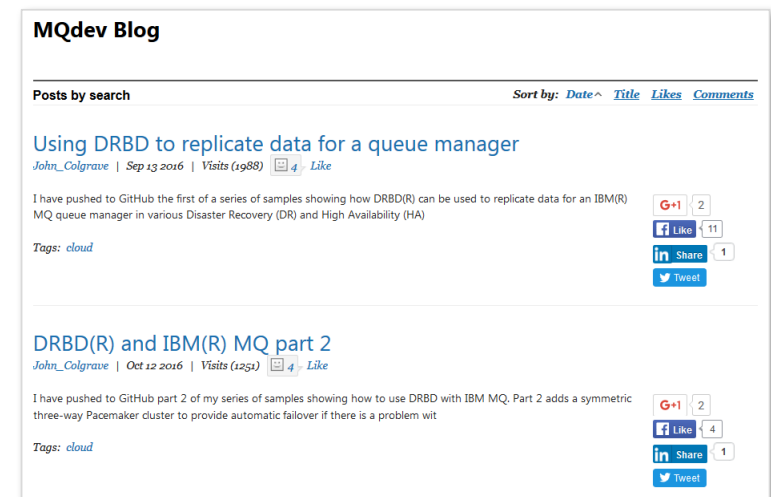The IBM MQ Appliance introduced shared nothing HA through direct data replication

One way to build your own equivalent is to look to a DRBD based solution (guidance given ➔)

IBM is working on an HA solution to provide this capability built into a future **IBM MQ Advanced**…

MQdev Blog

Posts by search   Sort by: *Date*^ Title Likes Comments

Using DRBD to replicate data for a queue manager
John_Colgrave | *Sep 13 2016* | *Visits (1988)* | 4 *Like*

I have pushed to GitHub the first of a series of samples showing how DRBD(R) can be used to replicate data for an IBM(R) MQ queue manager in various Disaster Recovery (DR) and High Availability (HA)

Tags: *cloud*

DRBD(R) and IBM(R) MQ part 2
John_Colgrave | *Oct 12 2016* | *Visits (1251)* | 4 *Like*

I have pushed to GitHub part 2 of my series of samples showing how to use DRBD with IBM MQ. Part 2 adds a symmetric three-way Pacemaker cluster to provide automatic failover if there is a problem wit

Tags: *cloud*

https://www.ibm.com/developerworks/community/blogs/messaging/

34

Initial thinking

Always **Linux only**
 but only RHEL 7.3 x86-64 initially

Initial focus on bare metal and VM environments
  Unsuitable for containers (orchestration layers provide alternative capabilities)

Three servers are required for quorum, no more, no less

Initially only **synchronous replication with automatic HA**
  Potential to add manual takeover (no quorum) synchronous and asynchronous replication later

35
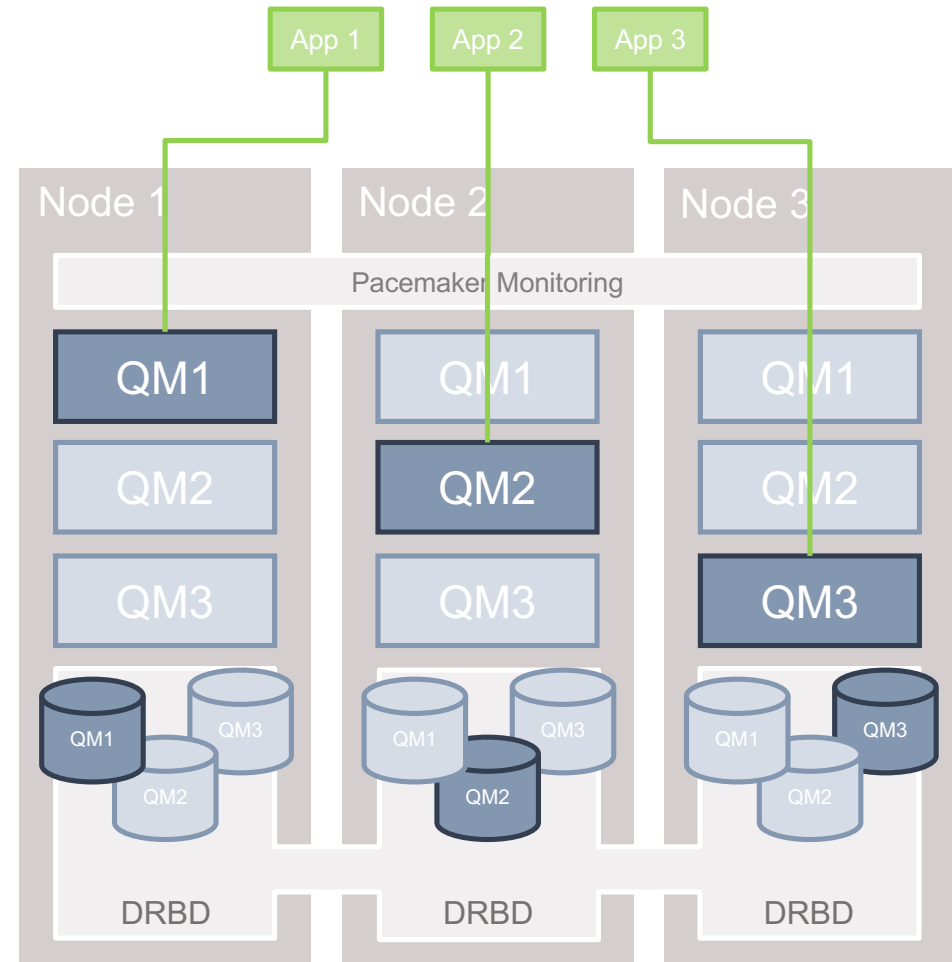
IBM MQ Lab Tour – Paris – 26 September 2017

Questions?