

What's new in IBM MQ?

David Ware
Mark Taylor

The IBM Messaging Development team



Here at MQTC...



David Ware



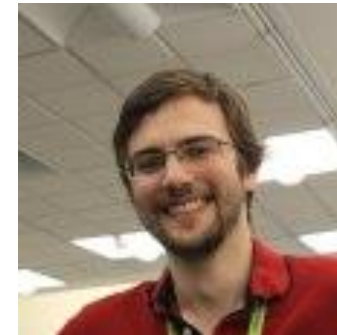
Mark Taylor



Matt Whitehead



Matt Leming



Rob Parker



David Richards

Plus many of IBM's most experienced field experts

IBM Messaging has Solutions to Meet All Needs

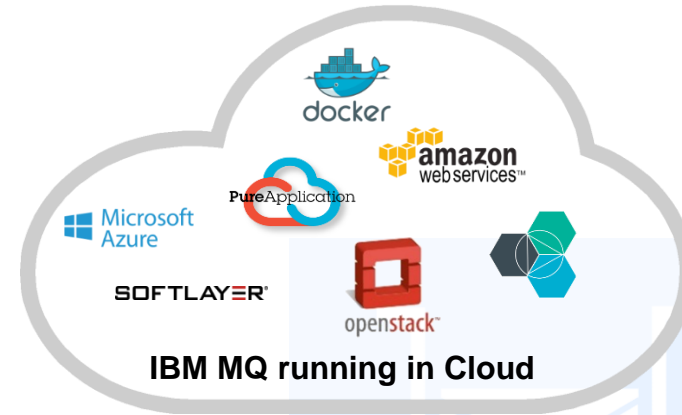
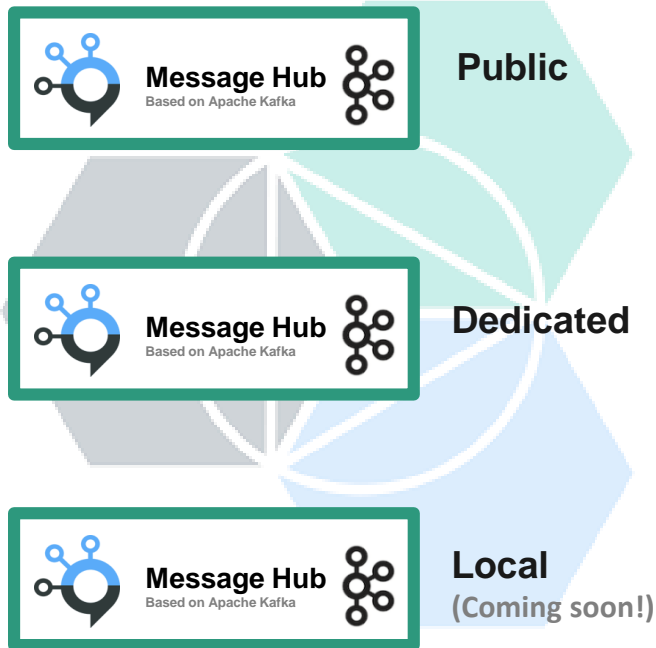
Digital

Enterprise

Cloud

On-Prem

IBM Message Hub for Bluemix



IBM MQ Appliance
M2001

*Secure, reliable exchange of data across applications, systems and services
in the Cloud, on-premise, or in Hybrid environments*

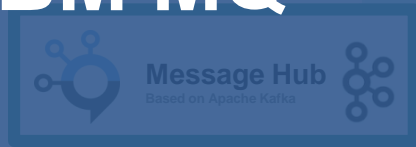
IBM Messaging has Solutions to Meet All Needs

Digital

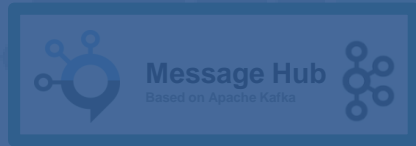
Enterprise

Cloud

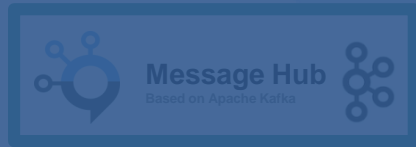
IBM MQ



Public

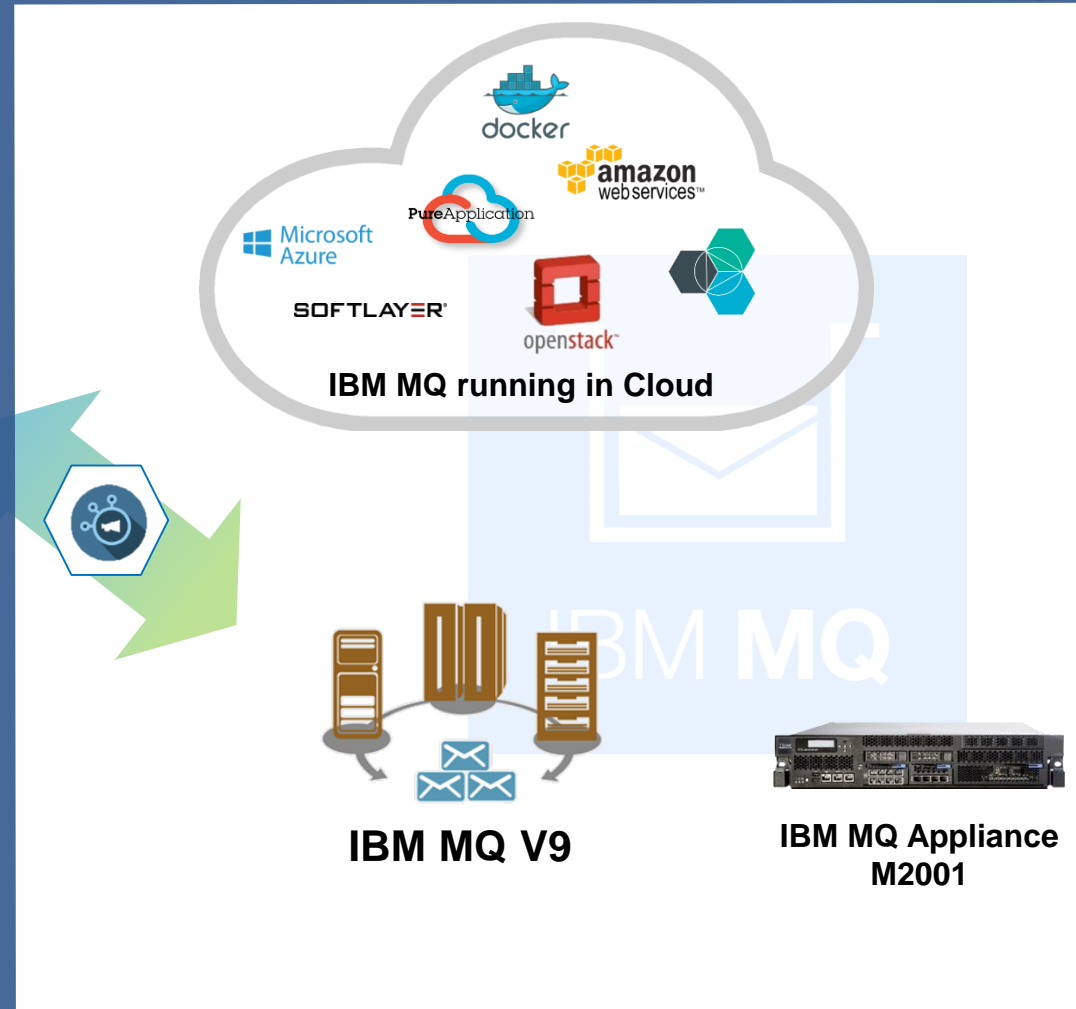


Dedicated



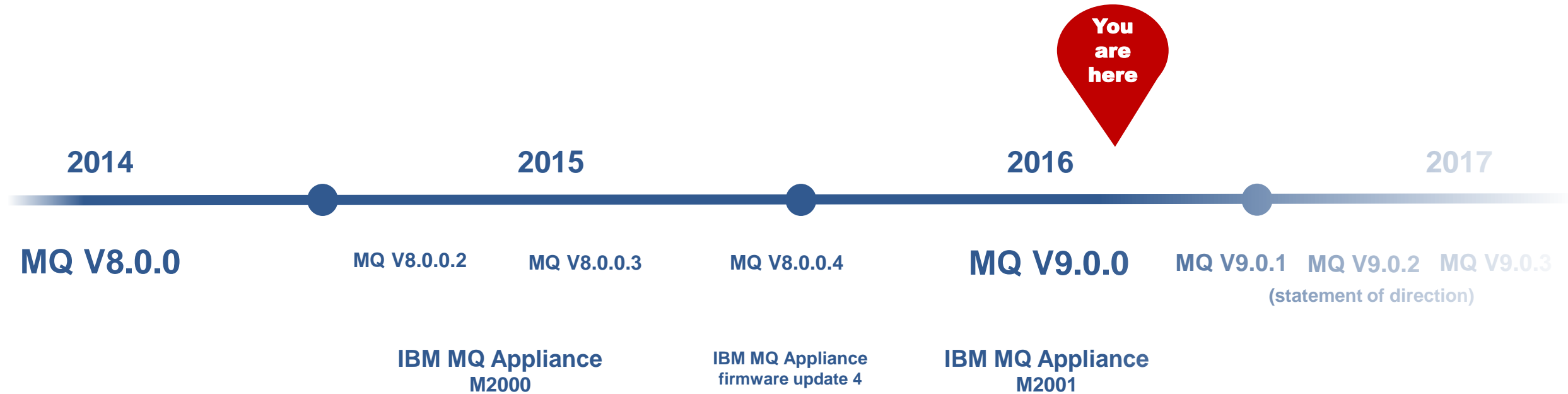
Local
(Coming soon!)

On-Prem



*Secure, reliable exchange of data across applications, systems and services
in the Cloud, on-premise, or in Hybrid environments*

IBM MQ Deliveries



- IBM MQ has been regularly delivering significant new function since MQ V8
 - Through major releases and fix packs
 - New platforms and environments
- Future releases will see **continuous delivery** of new function

End of Service for the old versions



WebSphere MQ 7.0.1

- Already end of service (**September 2015**)

WebSphere MQ 7.1

- End of Service (Distributed) will be **April 2017**
- End of Service (z/OS VUE) will be **September 2017**
- End of Service (z/OS) will be **November 2017**

WebSphere MQ 7.5

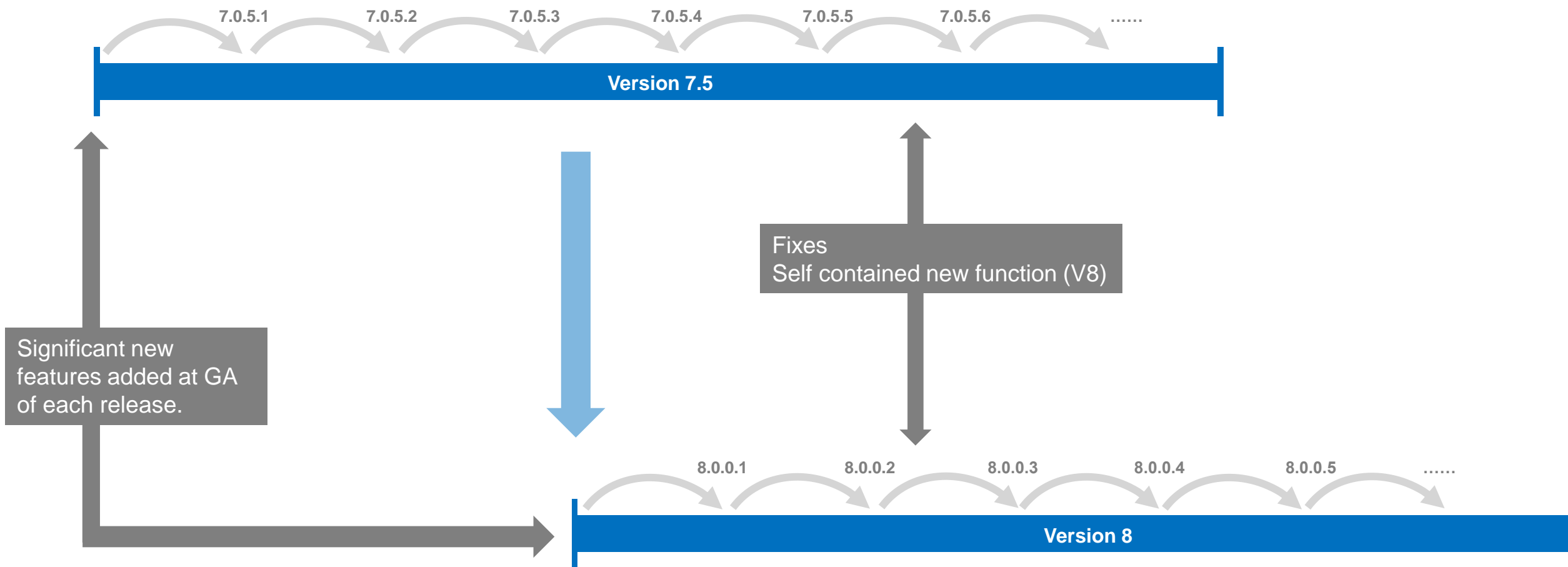
- End of Service (Distributed) will be **April 2018**

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



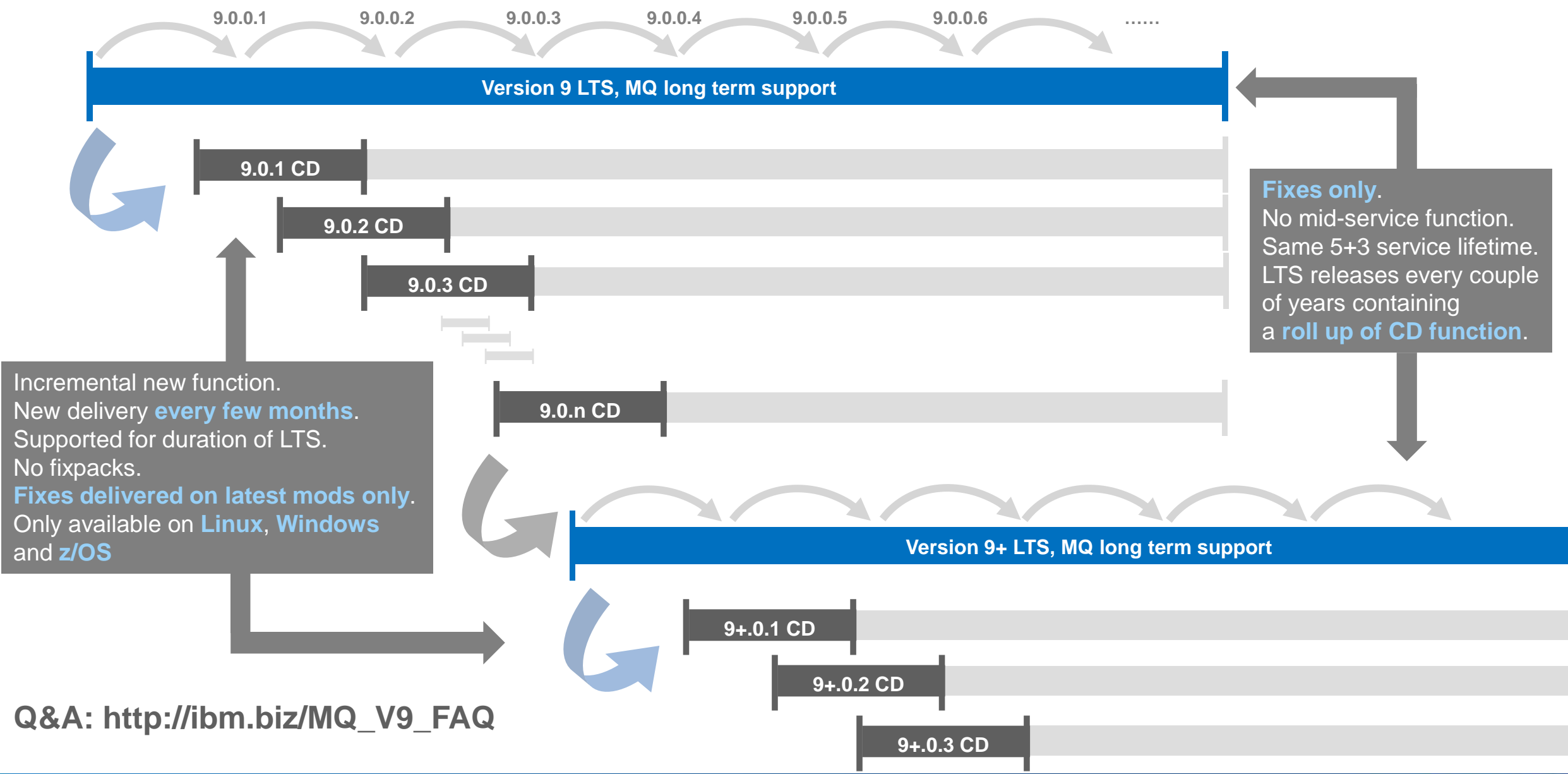
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Up until now: Service and continuous delivery combined



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

Today: Service and continuous delivery separated



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

2014 2015 2016 2017

MQ V8.0.0

MQ V8.0.0.2

MQ V8.0.0.3

MQ V8.0.0.4

IBM MQ Appliance
M2000

IBM MQ Appliance
firmware update 4

IBM MQ Appliance
M2001

You
are
here

A recap on
IBM MQ V8+

- IBM MQ has been regularly delivering significant new function since MQ V8
 - Through major releases and fix packs
 - New platforms and environments
- Future releases will see **continuous delivery** of new function

Platforms & Standards	Security	Scalability	System z exploitation
64-bit for all platforms	Userid authentication via OS & LDAP	Multiplexed client performance	64-bit buffer pools in MQ for z/OS means less paging, more performance
Multiple Cluster Transmit Queue on all platforms	User-based authorisation for Unix	Queue manager vertical scaling	Performance and capacity
Support for JMS 2.0	AMS for IBM i & z/OS	Publish/Subscribe improvements	Performance enhancements for IBM Information Replicator (QRep)
Improved support for .Net and WCF	DNS Hostnames in CHLAUTH records	Routed publish/subscribe	Exploit zEDC compression accelerator
SHA-2 for z, i & NSS	Multiple certificates per queue manager		SMF and shared queue enhancements

- IBM MQ delivered improved scalability, enhanced security and updates to standards and currency.
- A major release, particularly for z/OS

And we didn't stop there...

- The early V8 fixpacks contained more than just fixes
 - *But no more beyond fixpack 4 with the new delivery model!*
- We concentrated on tackling those RFEs that you ask for...

- **Built on the new LDAP features in MQ V8 to support authority records for LDAP users and groups**
 - No need to define OS users/groups for applications
 - Supported for Unix, Linux and IBM i
- **Activity trace data extended to include microsecond call durations**
 - Gives you the insight to see if that performance problem really is in MQ?

RFE
32813

RFE
58147

– Support for authentication via PAM on Unix platforms

- Configure authentication to go via PAM modules
- Gives more flexibility in mechanisms for verification and account validation

RFE
61007

– Protection against SSL security vulnerabilities **Includes z/OS**

- This was the time of Heartbleed, POODLE, BEAST, FREAK, Bar Mitzvah, LogJam, ...
- Before V8.0.0.3, **44** different CipherSpecs to choose from
- With V8.0.0.3, subset of just **17** CipherSpecs

– Extended start events

- Allows system monitoring applications to see when a multi-instance queue manager has failed over and where it is now running

RFE
66286

– Channel exits passed additional information on the connection

- Enables exits to block or log connections from back level clients

RFE
67730
64210
60616

- **Capped message expiry** **Includes z/OS**
 - Administratively impose minimum expiries
 - Applies to queues and topics
- **Redistributable clients**
 - Simple tar/zip image for Windows and Linux
 - Permitted to embed clients with applications
- **Event formatting sample program**
 - Sample amqsevt formats events into readable English(ish) text
- **Security change configuration events**
 - Coverage for all security changes
 - Includes new event formatting sample
- **Obfuscation of database passwords**
 - Queue manager configuration for connecting to resource managers

RFE
21984
37837

RFE
26670
38765
26671
30697
...

RFE
53559

RFE
53133

- Capped message expiry
 - Administratively impose minimum expiries
 - Applies to queues and topics
 - ALTER QL(X) CUSTOM('CAPEXPY(nnn)')
 - ALTER TOPIC(X) CUSTOM('CAPEXPY(ASPARENT)')
 - Apply APAR for MQ on z/OS: PI50761

NOTES

And specifically for z/OS...

– Enhanced Java SE support for MQ JMS on z/OS

- CICS Transaction Server
 - MQ JMS applications in a CICS OSGi JVM server
 - CICS TS V5.2+/V5.3
 - IBM MQ V7.1+/V8+
- IMS
 - MQ JMS applications in IMS
IMS V13 (MPR, BMP, IFP, JMP, JBP regions)
 - MQ V8+
- Plus a statement of direction for MQ JMS in CICS liberty

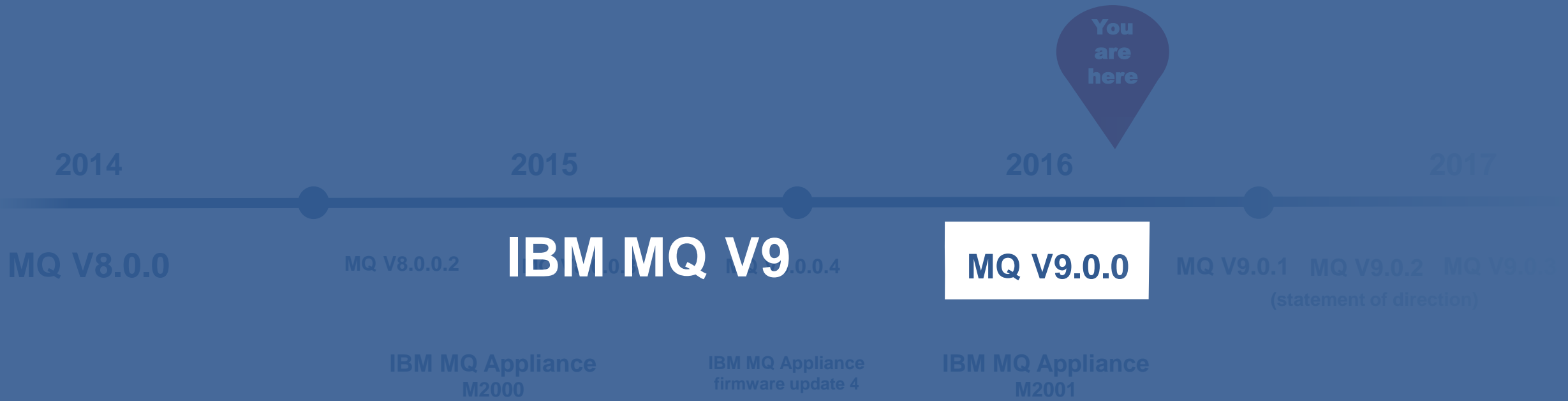
– Additional Active Logs on z/OS

- Maximum active log capacity increased 10x
- Improve resilience to issues affecting log archiving
- Now up to 310 x 4GB active logs.

RFE
27251
44262
61798
31984

RFE
21444

IBM MQ Deliveries

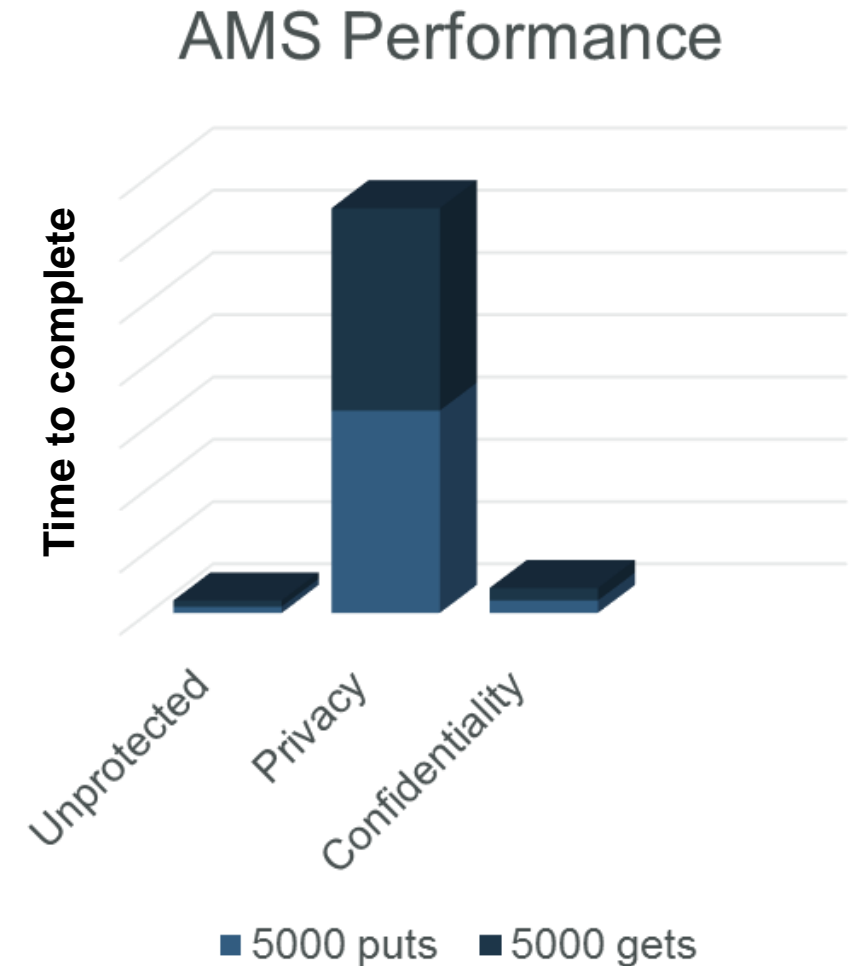


- IBM MQ has been regularly delivering significant new function since MQ V8
 - Through major releases and fix packs
 - New platforms and environments
- Future releases will see **continuous delivery** of new function

- Available **June 2016** for Distributed and z/OS platforms
 - Plus a new MQ for z/OS Advanced VUE
- Primary objective for MQ V9 is as the basis for the new long term service and continuous delivery model
- Rolls up all those post-V8 features into a GA version
- Plus functional changes on top of MQ 8.0.0.4...

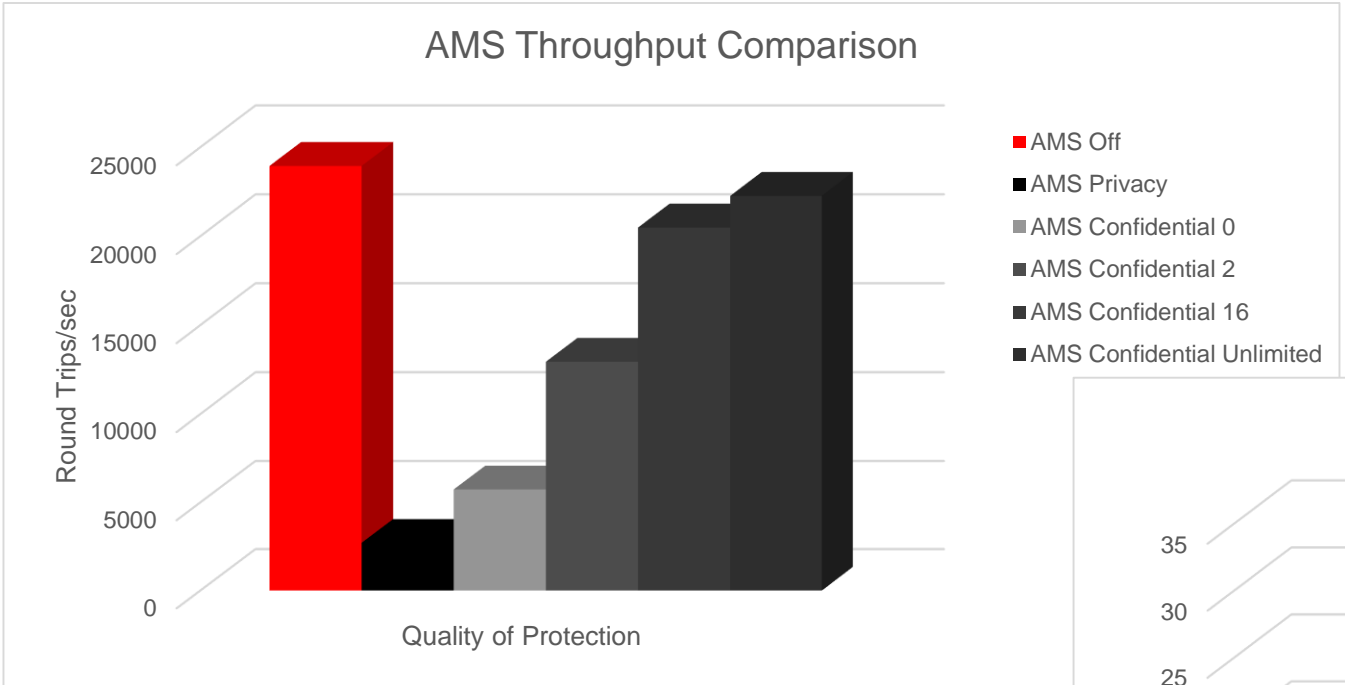
AMS – high performance policy

- New quality of service for AMS
 - We have **Integrity**
 - This proves authenticity through digital signing
 - And **privacy**
 - This adds encryption to the digital signing
- We've added **Confidentiality** to provide encryption *without the digital signing*
 - Significant performance gains over Integrity and Privacy
 - Especially with key reuse
 - Only receiver's certs require distribution
- Available for Distributed and z/OS



AMS Confidentiality performance

AMS Throughput Comparison



**2K Persistent Message
20 Requesters**

AMS CPU Comparison



AMS support for non-IBM JREs

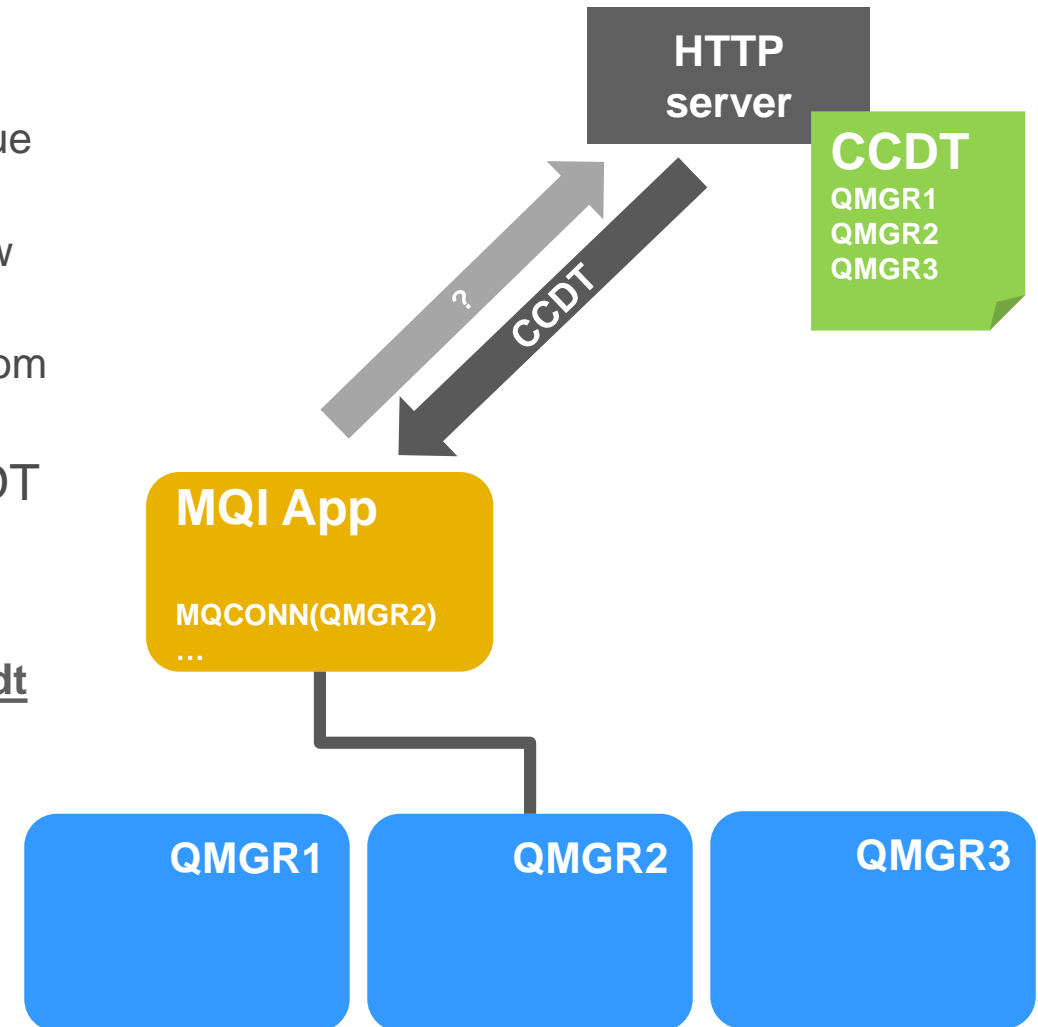
- AMS interceptor for Java programs relied on IBM-provided encryption packages
 - Included in the JRE/JSSE shipped with MQ and other IBM products
 - But not available separately for integration with other JREs
- With V9, AMS layer has been redesigned to use an alternative crypto library
 - The open source Bouncy Castle implementation
 - Built into the MQ Java layer, not the Java Runtime Environment
- Can now use alternative JREs with no need to install additional libraries



RFE
45817
72893

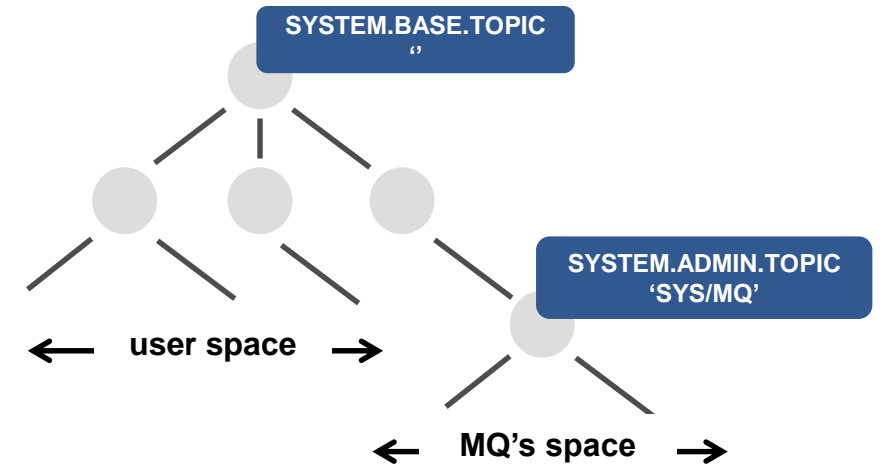
Central provisioning of CCDT

- Client Channel Definition Table is a method to configure MQ client connectivity
 - Holds all the information needed for a client to connect to any queue manager it may need
 - When queue managers or their channel configuration changes new CCDTs are required
 - Usually necessary to push the CCDT out to each client machine from a central point
- Java and .Net clients have already been able to refer to CCDT via URI
- Now also available for C clients to simplify provisioning
 - **export MQCCDTURL=<http://ccdt.example.com/ccdt/MyApp.ccdt>**
 - Automatically retrieved from http or ftp address



System topics on distributed queue managers

- **Distributed queue manager information is published to a range of system topic strings**
 - ***\$SYS/MQ/INFO/QMGR/....***
- **Authorised subscriptions receive their own stream of publications based on the topic string**
 - Administrative subscriptions
 - E.g. For information to be continually sent to defined queues
 - Application subscriptions
 - E.g. To dynamically listen to information as required
- **Unlocks system level information for MQ administrators and DevOps teams**
 - Administrators can grant access to subsets of the data, pertinent to different application teams



Application Activity Trace

- Application activity trace enabled through subscriptions rather than queue manager configuration
- Subscribe to meta topics
 - E.g. `$SYS/MQ/INFO/QMGR/QMGR1/ActivityTrace/AppName/amqsput`
 - Filter by application name, channel or connection id
- When a subscription is created, PCF messages start to flow to the subscriber's queue. When subscription is deleted, messages stop.

RFE
55753
62878

Application Activity Trace Sample

Sample provided to demonstrate usage and format output

```
$ amqsact -m QMGR1 -a amqsput -w 60
Subscribing to the activity trace topic:
 '$SYS/MQ/INFO/QMGR/QMGR1/ActivityTrace/AppName/amqsput'
```

MonitoringType: MQI Activity Trace

...
QueueManager: 'QMGR1'
ApplicationName: 'amqsput'
Application Type: MQAT_UNIX
...

Tid	Date	Time	Operation	CompCode	MQRC	HObj (ObjName)
001	2016-04-14	09:56:53	MQXF_CONNX	MQCC_OK	0000	-
001	2016-04-14	09:56:53	MQXF_OPEN	MQCC_OK	0000	2 (QUEUE1)
001	2016-04-14	09:56:53	MQXF_PUT	MQCC_OK	0000	2 (QUEUE1)
001	2016-04-14	09:56:53	MQXF_PUT	MQCC_OK	0000	2 (QUEUE1)
001	2016-04-14	09:56:53	MQXF_CLOSE	MQCC_OK	0000	2 (QUEUE1)
001	2016-04-14	09:56:53	MQXF_DISC	MQCC_OK	0000	-

```
$ amqsput QUEUE1 QMGR1
Sample AMQSPUT0 start
target queue is Q1
Hello
World

Sample AMQSPUT0 end

$
```

System Monitoring

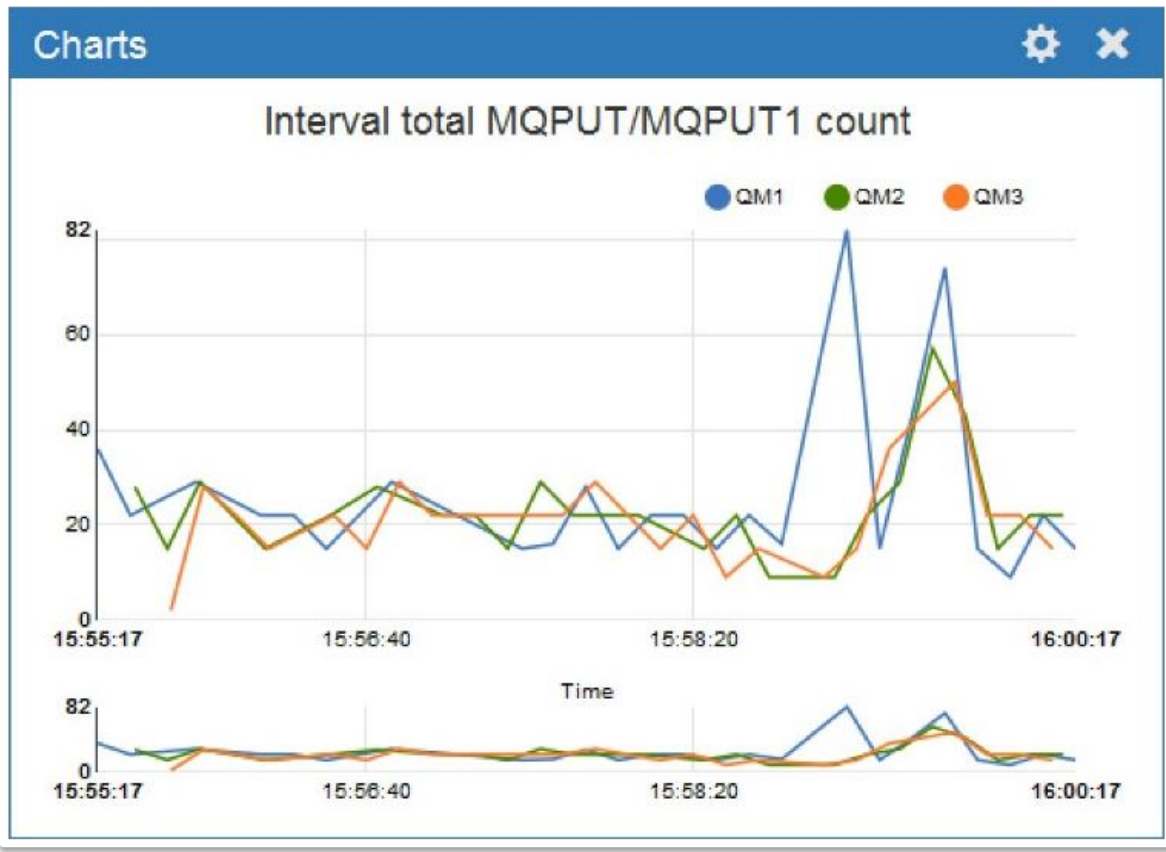
- Familiar statistics available through subscriptions
 - Queue manager wide statistics (connects, disconnects, opens, closes, puts, gets, ...)
 - Queue level statistics (opens, closes, puts, gets, ...)
- Extended to include CPU and Disk usage. For example...
 - Queue manager **CPU time, memory usage**
 - **Disk reads/writes, disk latency,**
- Subscribe to meta-topic to learn which classes of statistics are available
 - `$SYS/MQ/INFO/QMGR/QMGR1/Monitor/METADATA/CLASSES`
 - Then subscribe to specific topics
 - See amqsrua sample program

RFE
71123

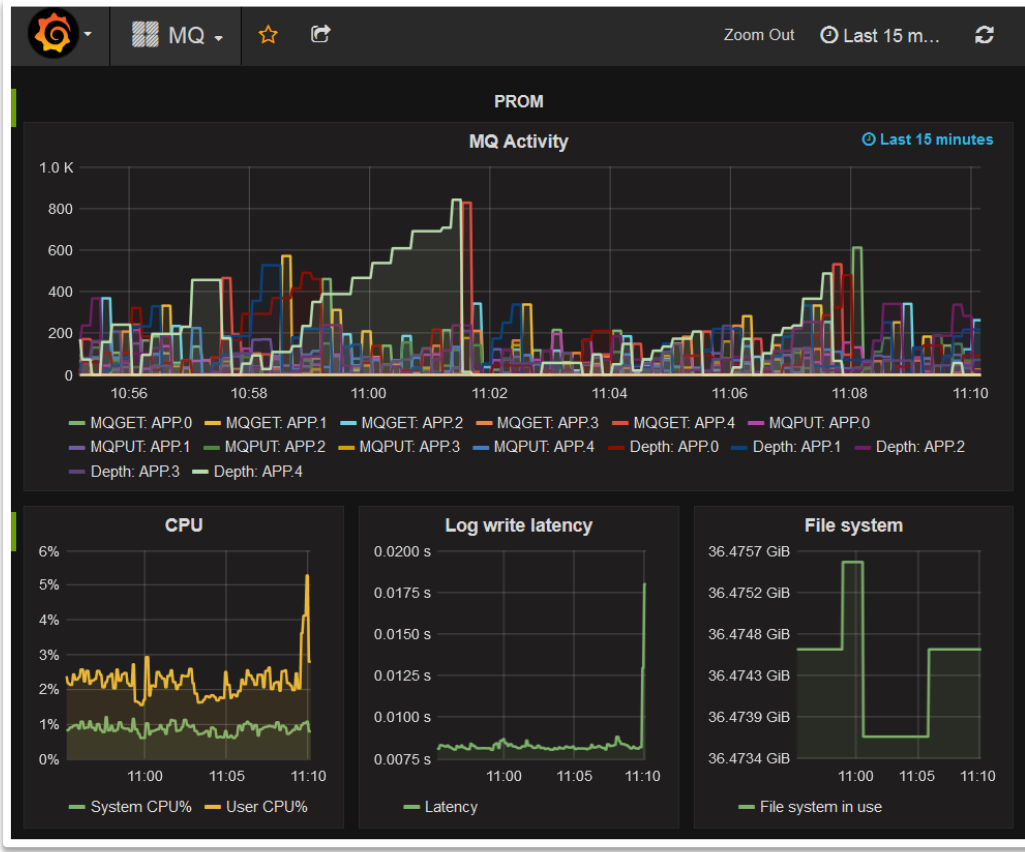
System Monitoring Sample

```
$ amqsrua -m V9000_A
CPU : Platform central processing units
DISK : Platform persistent data stores
STATMQI : API usage statistics
STATQ : API per-queue usage statistics
Enter Class selection
==> CPU
SystemSummary : CPU performance - platform wide
QMgrSummary : CPU performance - running queue manager
Enter Type selection
==> SystemSummary
Publication received PutDate:20160411 PutTime:10465573
User CPU time percentage 0.01%
System CPU time percentage 1.30%
CPU load - one minute average 8.00
CPU load - five minute average 7.50
CPU load - fifteen minute average 7.30
RAM free percentage 2.02%
RAM total bytes 8192MB
Publication received PutDate:20160411 PutTime:10466573
User CPU time percentage 0.01%
System CPU time percentage 1.30%
...
```

Feed that data into tooling



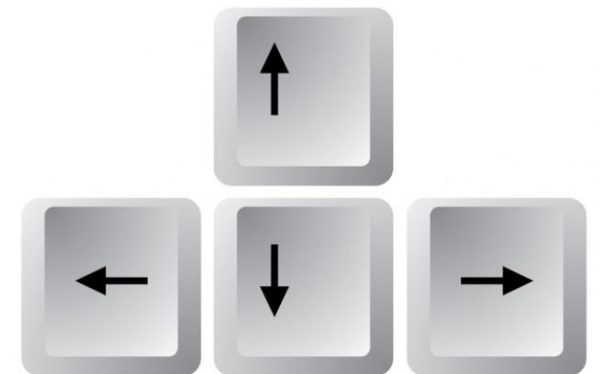
This capability already underpins the charting in the MQ Appliance WebUI



Or use the data to feed your own dashboard
See github.com/ibm-messaging/mq-golang

Command recall and editing for runmqsc on Unix

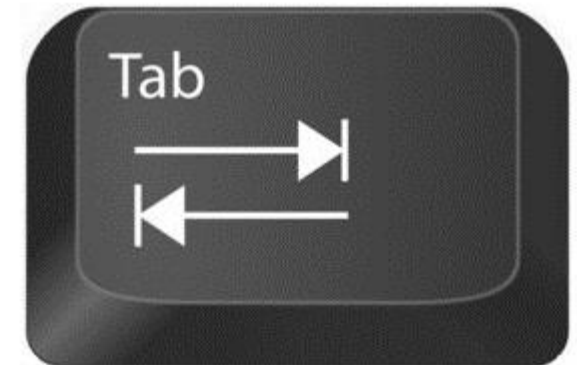
- When running runmqsc on Unix/Linux platforms you can now use cursor keys!
 - Up/down keys for command line recall
 - Customisable for common editing control sequences (emacs/vi modes)
 - Much easier to fix bad typing
- Similar to what has always been available on Windows
- With the added capability of command completion
 - Hit TAB to cycle through and accept possible keywords



Command completion example

```
Telnet rockall
$ runmqsc U9000_A
5724-H72 (C) Copyright IBM Corp. 1994, 2015.
Starting MQSC for queue manager U9000_A.

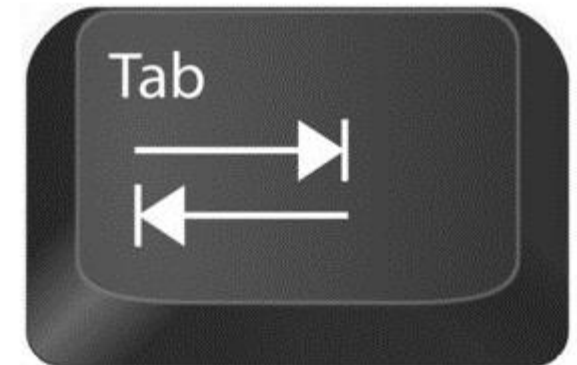
DE_
```



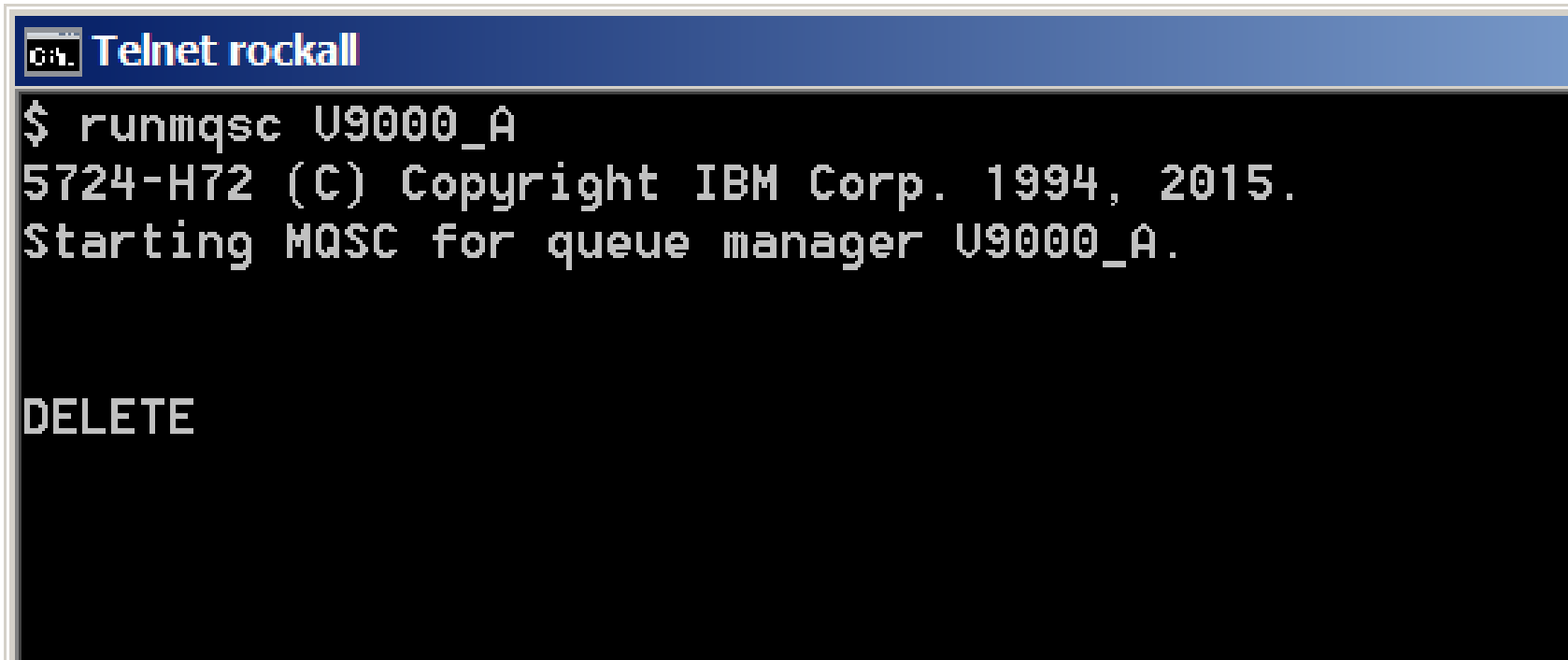
Command completion example

```
Telnet rockall
$ runmqsc U9000_A
5724-H72 (C) Copyright IBM Corp. 1994, 2015.
Starting MQSC for queue manager U9000_A.

DEFINE_
```



Command completion example



```
ov. Telnet rockall
$ runmqsc U9000_A
5724-H72 (C) Copyright IBM Corp. 1994, 2015.
Starting MQSC for queue manager U9000_A.

DELETE
```

Updated MQ Unicode support

- IBM MQ supports all Unicode characters defined in the Unicode 8.0 standard in data conversion
 - Both z/OS and Distributed platforms
- This includes requirements for Chinese characters
- Support added for input and output in
 - UTF-16 surrogate pairs
 - UTF-32 (on distributed platforms only)
 - Extending UTF-8 support for 4 byte characters.

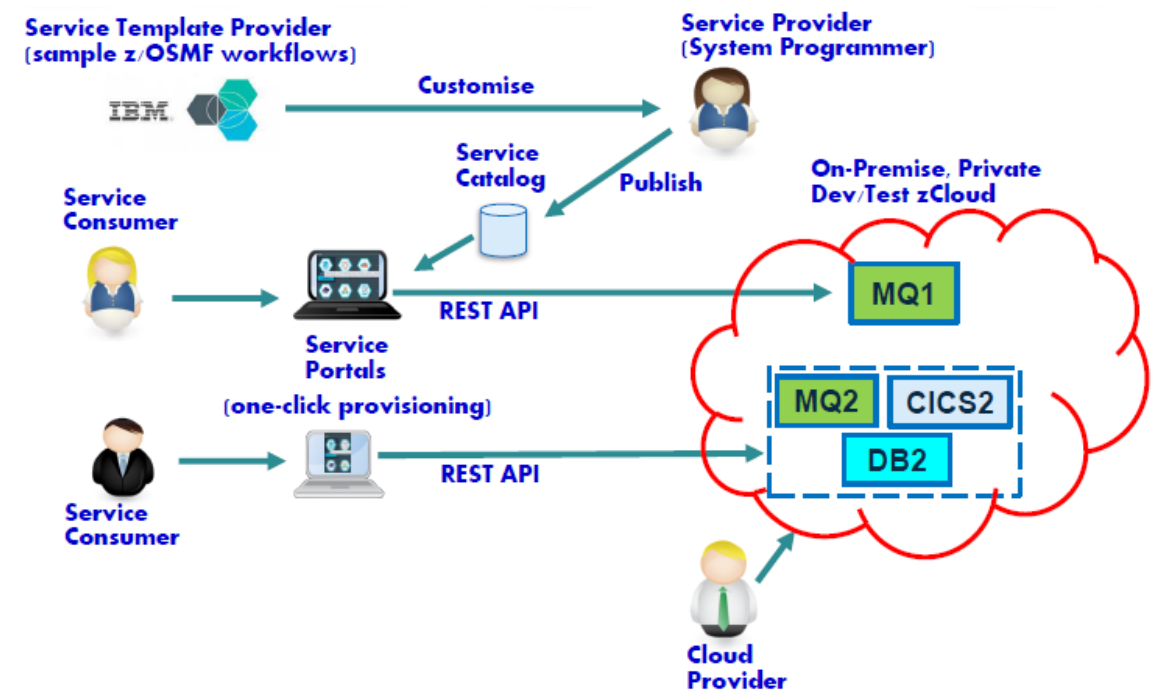


- New SMF information
 - Capacity planning:
 - e.g. how much is my pageset utilization increasing?
 - Problem resolution:
 - e.g. why are private messages slow?
 - System management:
 - e.g. which pageset should I move into a different buffer pool?
- This allows you to see early indicators of pageset storage shortage
- Same data as returned by the DISPLAY USAGE TYPE(PAGESET) command
 - SMF makes it easier for automation tools to analyze

RFE
79681

Sample z/OSMF Workflows

- z/OSMF provides services to help customers rapidly provision/de-provision z/OS middleware
 - Including MQ, DB2, CICS, IMS, WAS
 - Workflows can be implemented to automate tasks
 - Self-service/click of a button
 - Rapidly stand-up/down MQ resources for development/test purposes
 - Help to address future z/OS skills shortage





WAS traditional V9

- WAS traditional will contain an MQ V9 level resource adaptor
 - Previous level was MQ 7.1
- Bringing with it the JMS 2.0 capabilities
- The first time AMS support has been built into the WAS traditional RA, simplifying its configuration

Other application servers

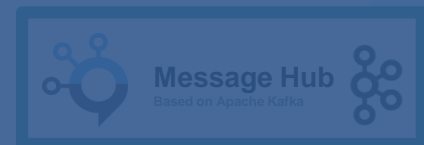
- New AMS capability for non-IBM JREs opens up AMS to a wide range of application servers with the MQ V9 resource adaptor

IBM Messaging has Solutions to Meet All Needs

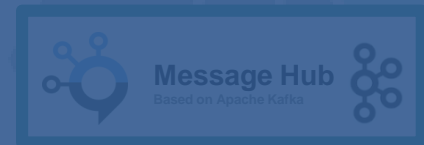
Digital  Enterprise

Cloud

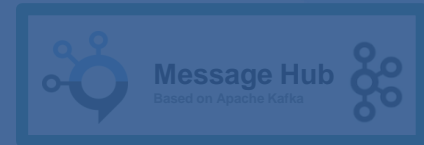
IBM Message Hub for Bluemix



Public



Dedicated



Local
(Coming soon!)

IBM MQ Appliance



IBM MQ V9



IBM MQ Appliance
M2001

On-Prem

*Secure, reliable exchange of data across applications, systems and services
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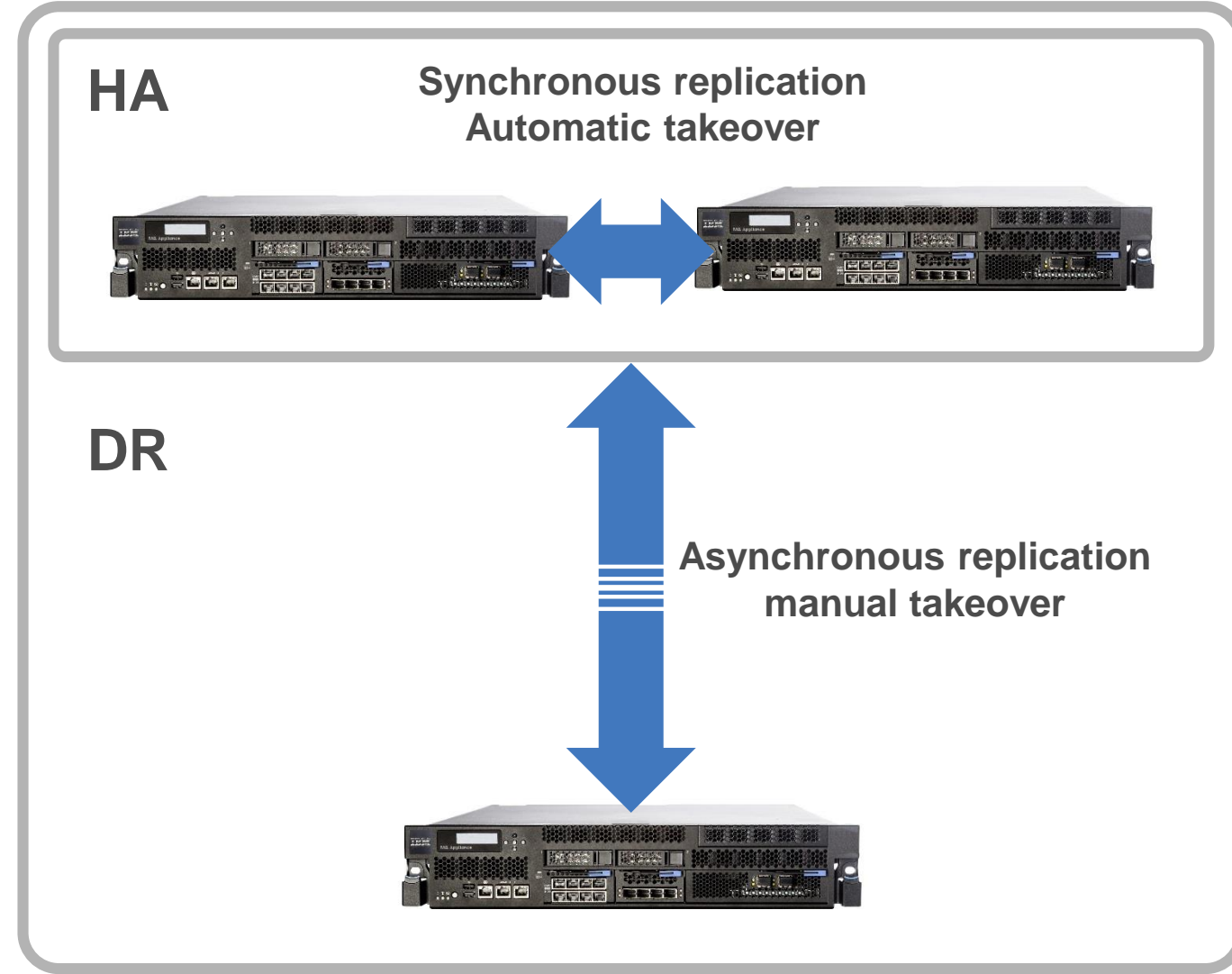
The IBM MQ Appliance



- The scalability, security and reliability of IBM MQ
- The convenience, fast time-to-value and low total cost of ownership of an appliance
- Built in high availability and disaster recovery capabilities
- Ideal for use as a messaging hub running queue managers accessed by clients, or to extend MQ connectivity to a remote location
- Familiar feel for existing MQ users – application interfaces, administration, networking/clustering, security....

MQ Appliance high availability and disaster recovery

- Fully built-in HA and DR capabilities
 - No external components required
 - Per queue manager active/passive topologies
- High availability (HA)
 - Short distance configurations
 - All recoverable data replicated immediately
 - Failures automatically detected and queue managers restarted
- Disaster recovery (firmware update 4)
 - Long distance configurations
 - Manual queue manager takeover
- Combined HA and DR (firmware update 5)



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

Digital

Enterprise

Cloud

New IBM MQ environments and the Cloud

IBM Message Hub for Bluemix
Based on Apache Kafka
Public

Message Hub
Based on Apache Kafka
Dedicated

Message Hub
Based on Apache Kafka
Local
(Coming soon!)

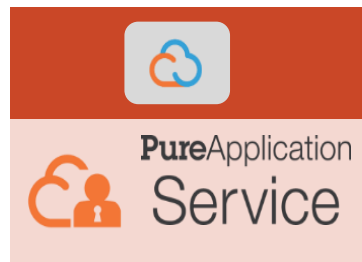
On-Prem



Secure, reliable exchange of data across applications, systems and services in the Cloud, on-premise, or in Hybrid environments

Supporting MQ deployed to the cloud

- Enterprise applications are expanding beyond the datacenter and asynchronous enterprise messaging is expanding with them. It's also the easiest and most efficient way to bridge between globally distributed clouds and datacenters.
- MQ offerings are available on popular public cloud platforms
 - E.g. Azure, EC2, Softlayer
 - Monthly or hourly license options for MQ are available, depending on the platform
 - Or bring your own license
- Or build your own image or container and deploy to the cloud of your choice

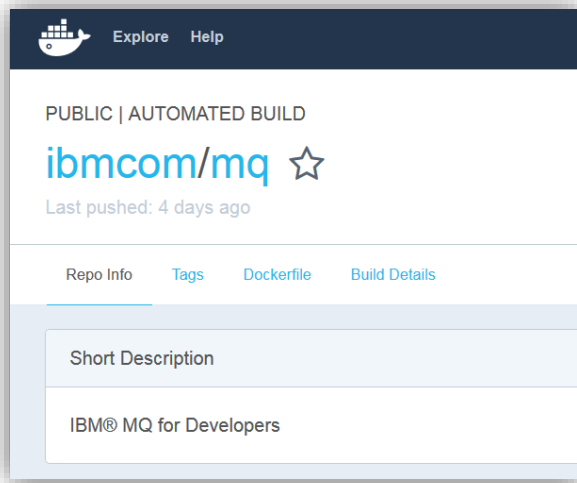


MQ in Docker containers

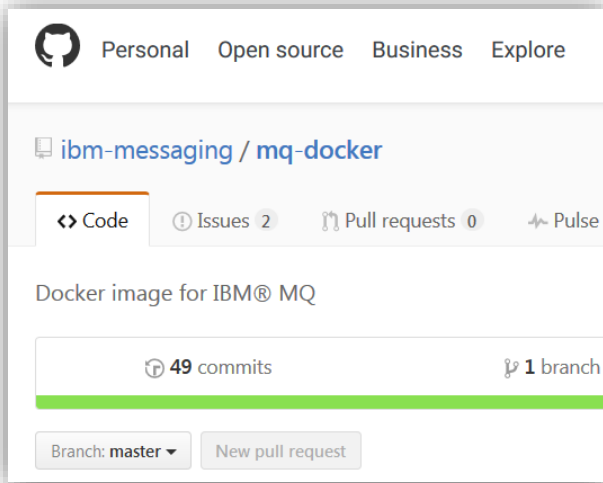


- IBM MQ is supported to run inside a Docker container
- This brings the benefits of Docker to MQ
 - Lightweight containers for running MQ
 - Predictable and standardized units for deploying MQ
 - Process, resource and dependency isolation
 - Best practice guidance

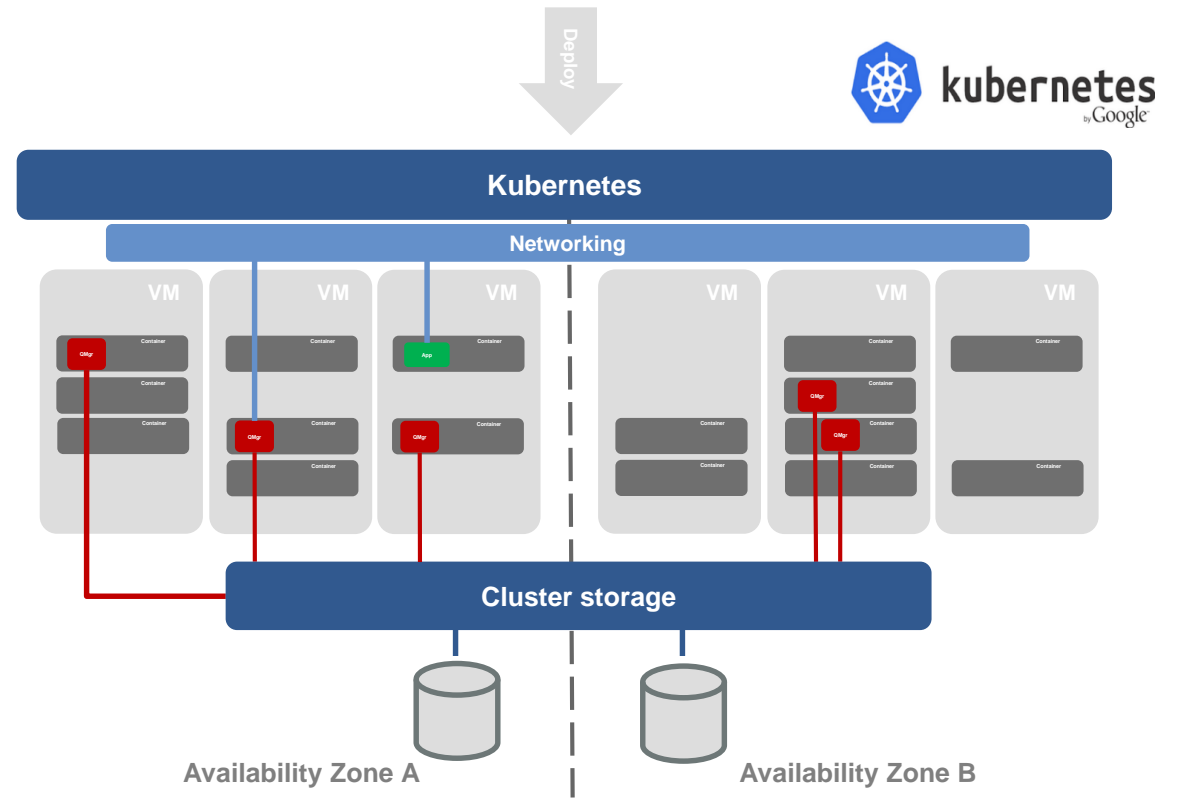
- Docker enables MQ deployments to be provisioned and managed within the same orchestration frameworks that make Docker so exciting
 - Kubernetes, Mesos, Swarm, Fleet, ...
 - Or individual IaaS cloud container services
 - Bluemix, Amazon EC2, Azure, ...



IBM MQ Advanced for Developers V9 available direct from Docker Hub

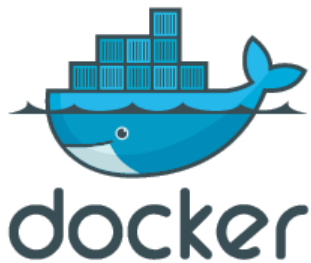


IBM provided sample Docker files for customizing and building your own Docker images



The wider MQ ecosystem

- The ways in which MQ is deployed and managed and where it is installed is continually changing
- Recent updates include...



MQ V9 is available in Docker Hub



Sample cookbook for installing and configuring MQ using Chef



Building an MQ OpenStack image and managing it using Heat



Using Prometheus, Grafana and Logstash to monitor MQ



Setting up MQ on Azure for HA



Deploying MQ and managing MQ in AWS

For the latest updates, check out <https://www.ibm.com/developerworks/community/blogs/messaging?tags=cloud>
Some favourite supportpacs and new samples and tools available on Github: <https://ibm-messaging.github.io/>

MQ Light : Software and Cloud



Messaging that application developers will love to use, helping them make responsive applications that scale easily

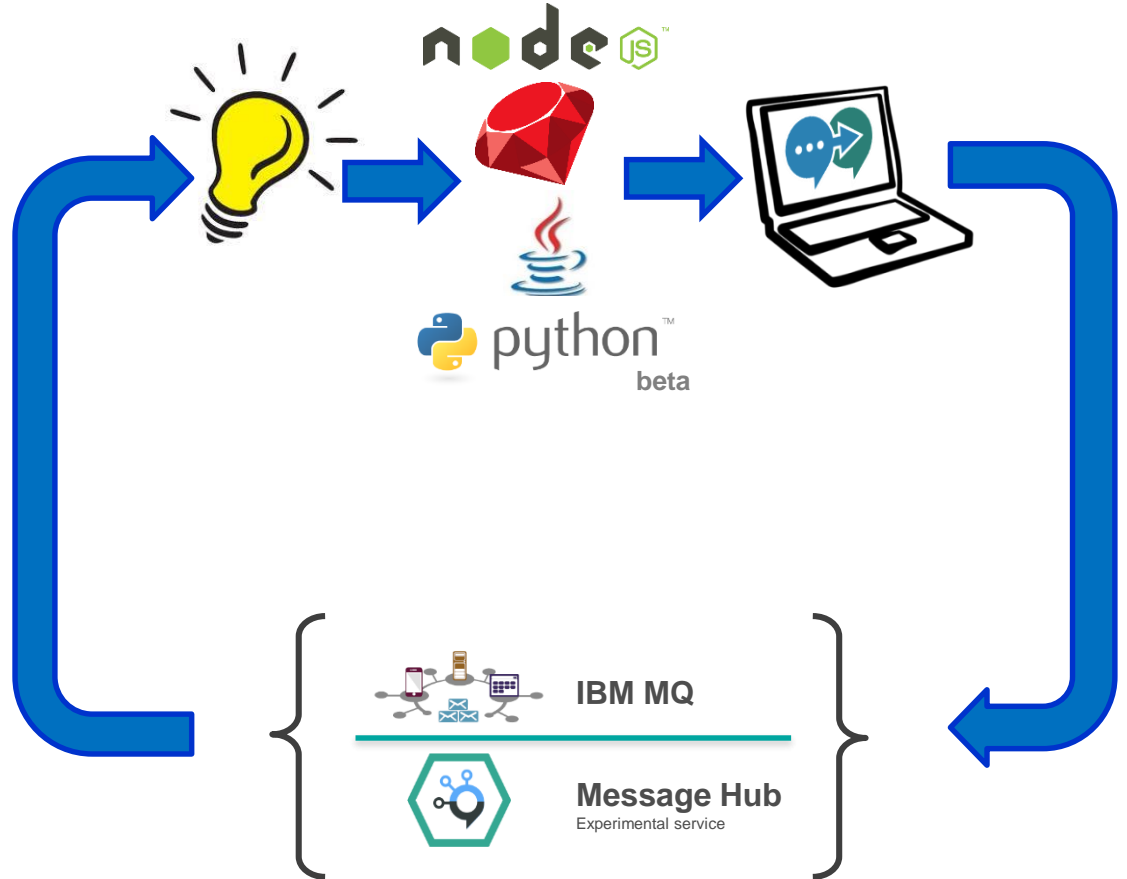
A very simple messaging API

Dedicated development tooling

- **MQ Light software download for developers**

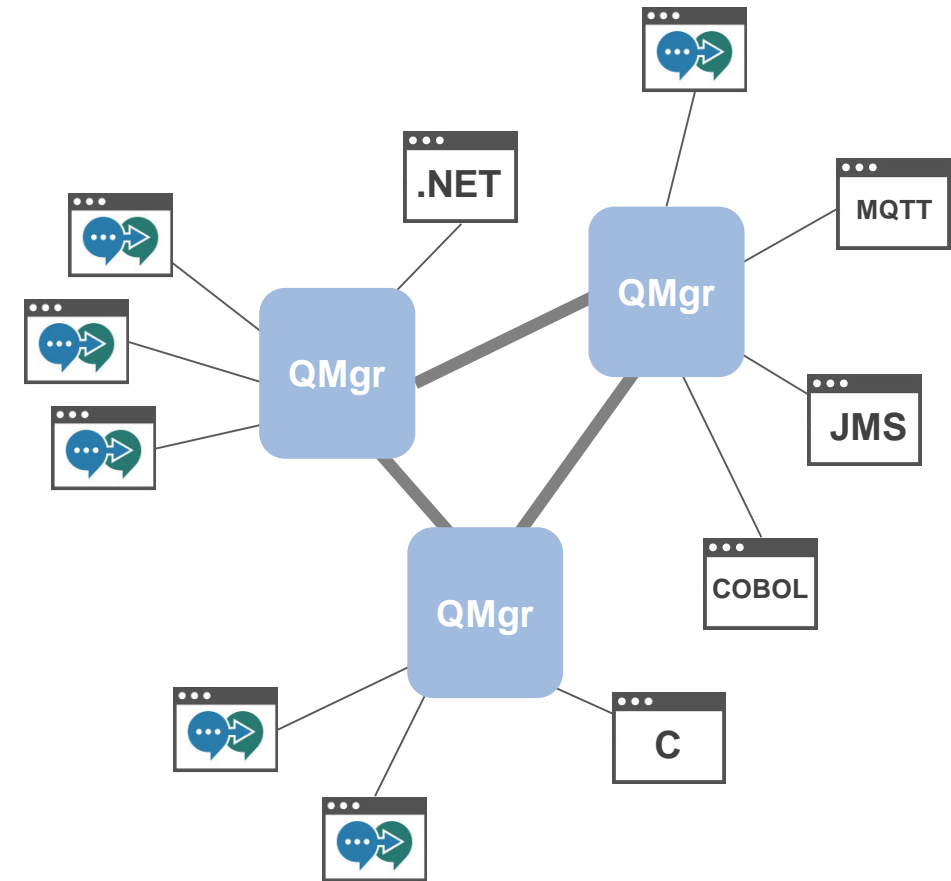
Multiple deployment options

- Directly connected to **MQ V8**
- Connected to **Message Hub**, a managed **Bluemix** service
 - *MQ Light support in experimental service*
 - *Replaces the "MQ Light Service"*



Connecting MQ Light applications to IBM MQ

- MQ Light applications connect directly into distributed MQ queue managers
- A new MQ channel type of “AMQP”
 - Supported from **MQ 8.0.0.4**
 - Similar in style to an MQTT channel
 - Supports the subset of the AMQP 1.0 Oasis specification required for MQ Light applications
- MQ Light applications interoperable with all other MQ applications
 - All share the same topic space

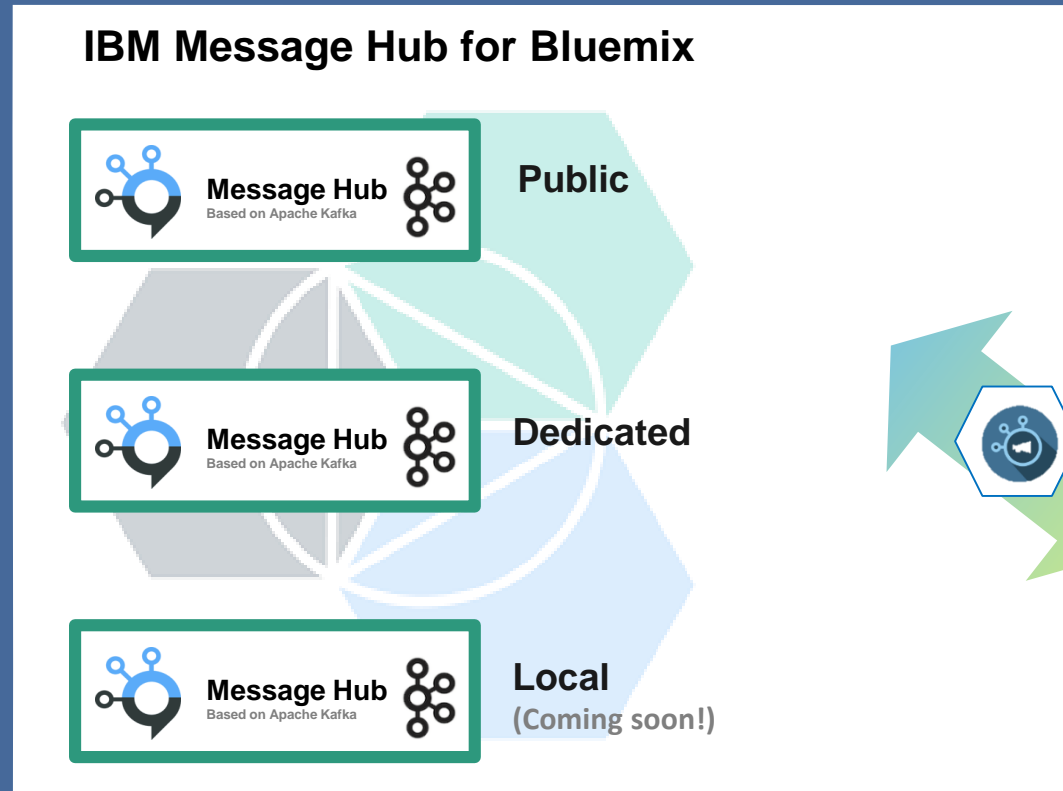


Digital

Enterprise

Cloud

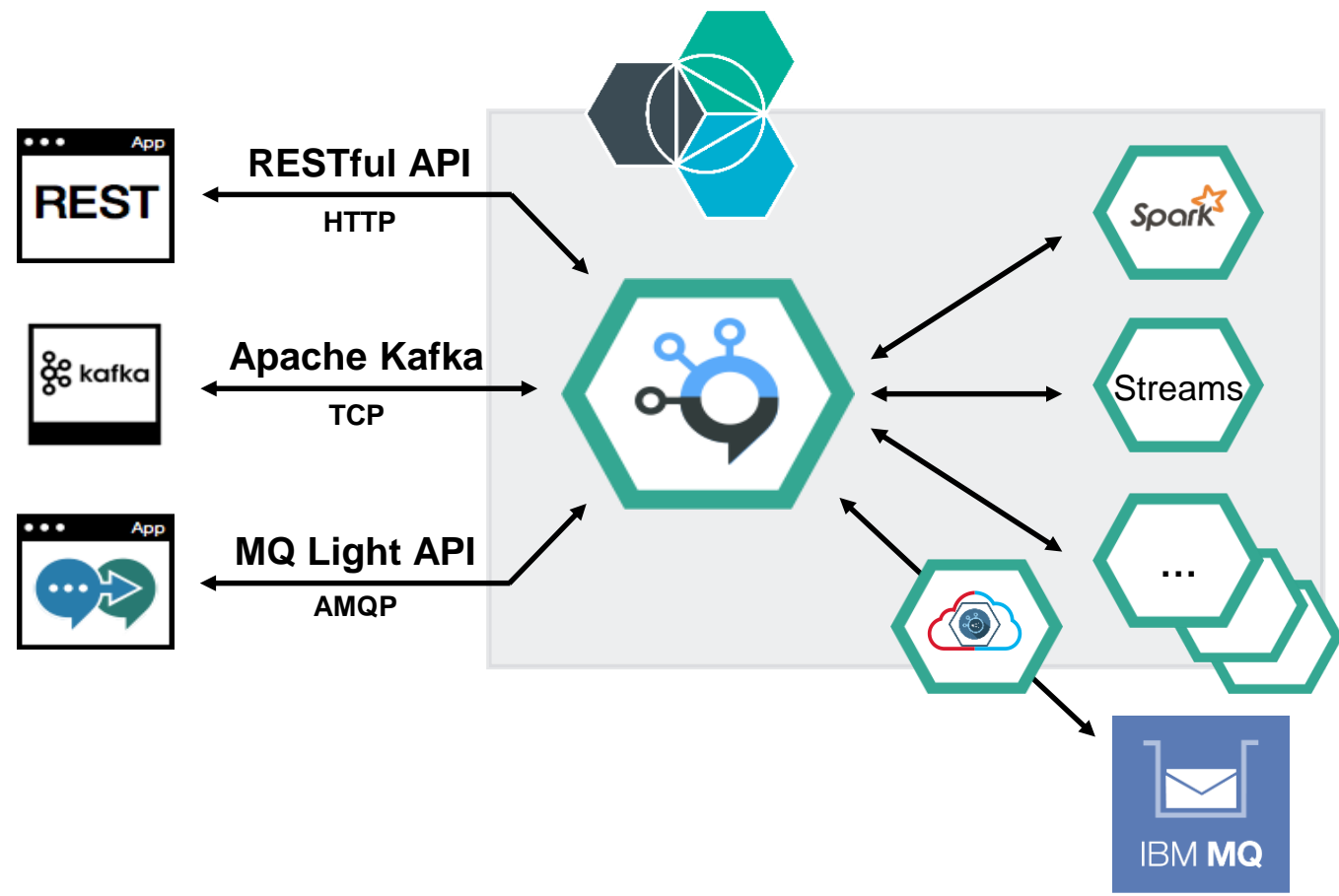
On-Prem



Secure, reliable exchange of data across applications, systems and services in the Cloud, on-premise, or in Hybrid environments

Message Hub

- A scalable, distributed, high throughput message bus based on Apache Kafka
- Wide compatibility via 3 APIs : REST, Kafka and MQ Light over AMQP
- Tightly



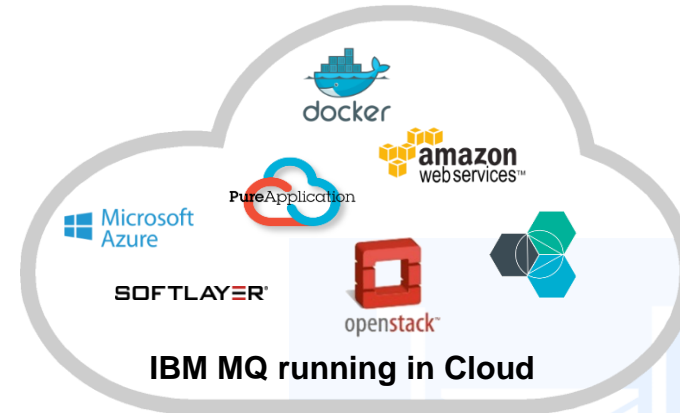
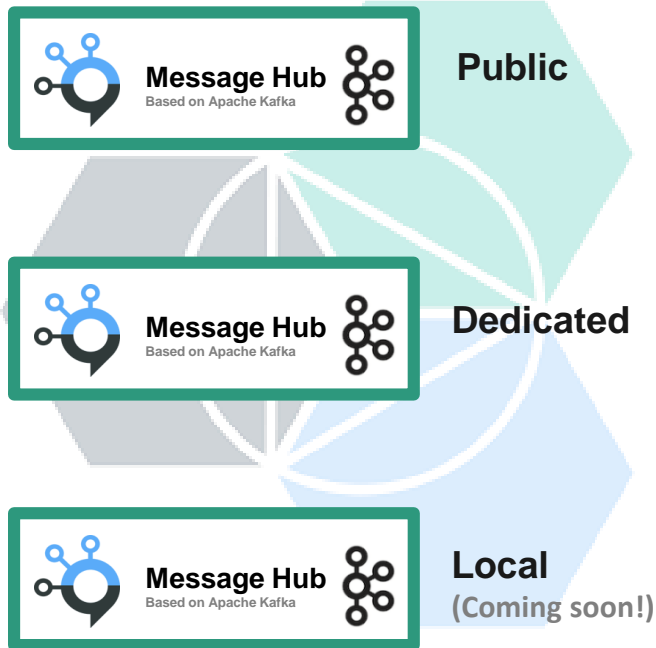
Available for ...	
Bluemix Public	<input checked="" type="checkbox"/>
Bluemix Dedicated	<input checked="" type="checkbox"/>
Bluemix Local (Coming soon)	

IBM Messaging has Solutions to Meet All Needs

Digital  Enterprise

Cloud

IBM Message Hub for Bluemix



IBM MQ V9



IBM MQ Appliance
M2001

On-Prem

*Secure, reliable exchange of data across applications, systems and services
in the Cloud, on-premise, or in Hybrid environments*

MQ Labs Experiment

Booth next to Aloeswood

MQ for z/OS Images

MQ for Distributed Image

**Monday & Tuesday Morning
– drop in**



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IBM Messaging developerWorks

developer.ibm.com/messaging

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

IBM Messaging Youtube

<https://www.youtube.com/IBMmessagingMedia>

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