What's New in IBM MQ

Jamie Squibb
IBM UK

November 2018
Session JI

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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*Correct as of end 2016 against http://www.relbanks.com/worlds-top-banks/assets and http://beta.fortune.com/fortune500/list/

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Scalable

Connected

Secure

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*Correct as of end 2016 against http://www.relbanks.com/worlds-top-banks/assets and http://beta.fortune.com/fortune500/list/

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

IBM MQ

Celebrating 25 years

On-premise, software and the MQ 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

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MQ on Cloud

MQ as a Service

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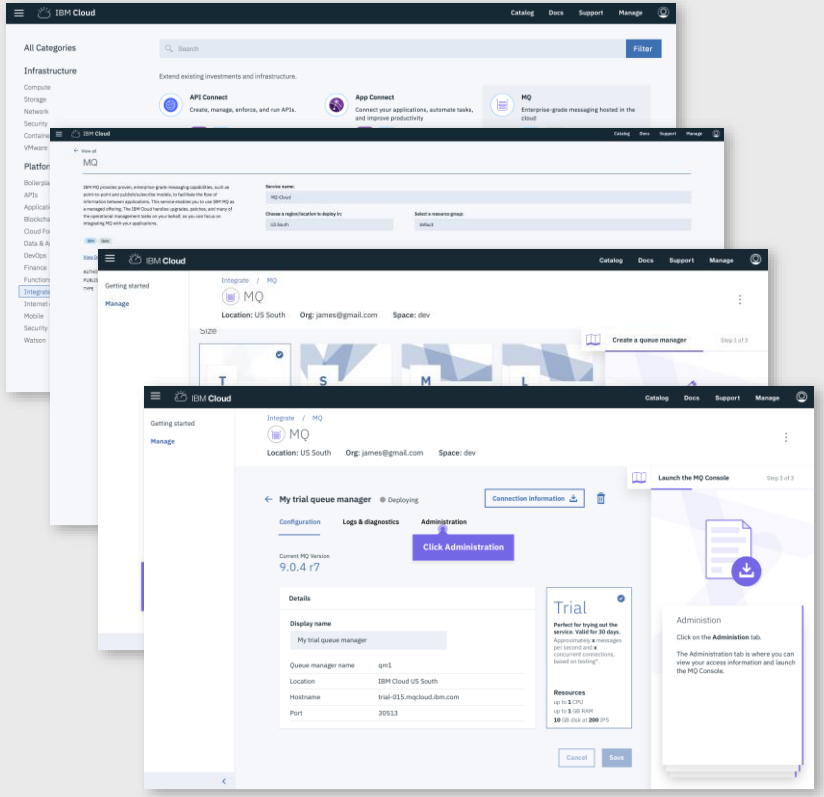
MQ on Cloud

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



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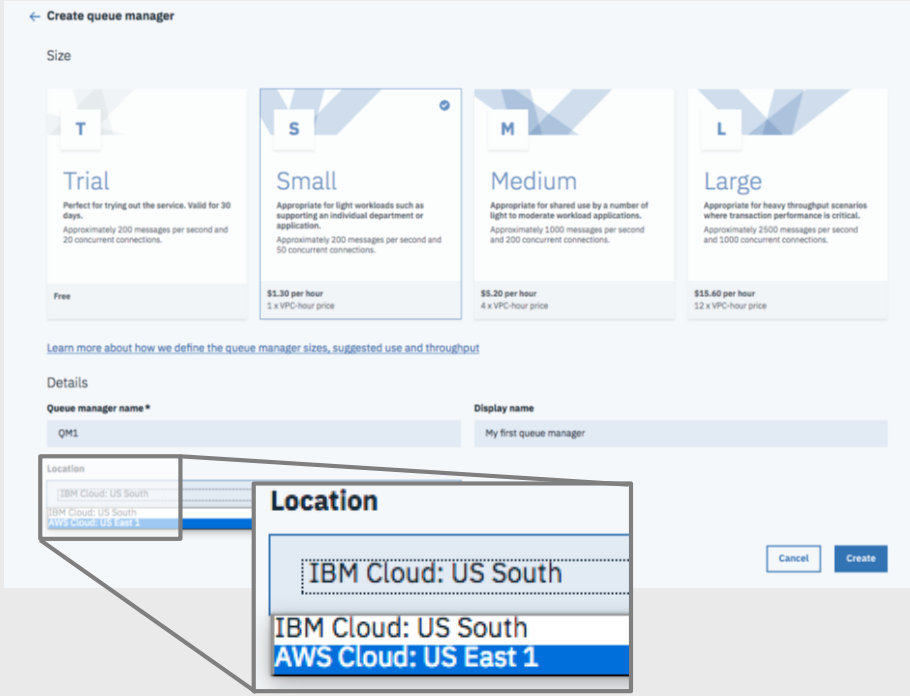
MQ on Cloud

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.

new



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Bring your own license to the Cloud

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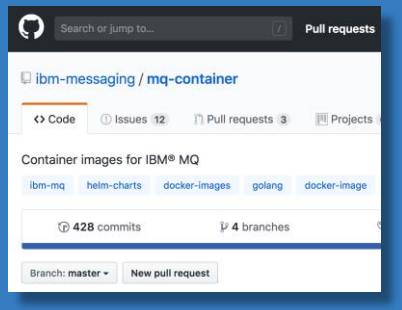
MQ in Containers

github.com/
ibm-messaging/
mq-container

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



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

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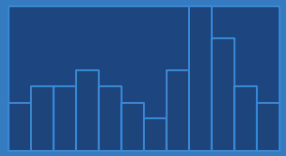
Hourly licensing

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

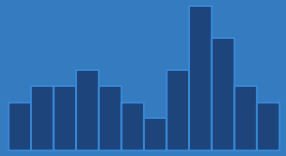
New for MQ 9.1

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

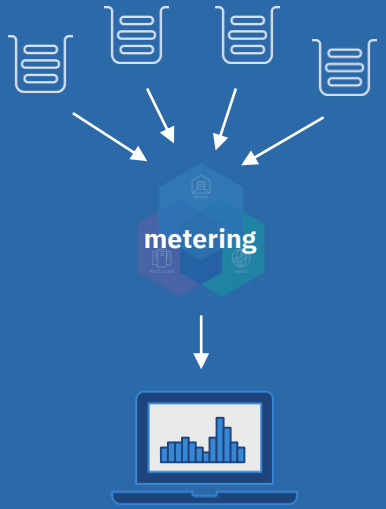
Fully portable

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



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Continuous delivery of new MQ capabilities

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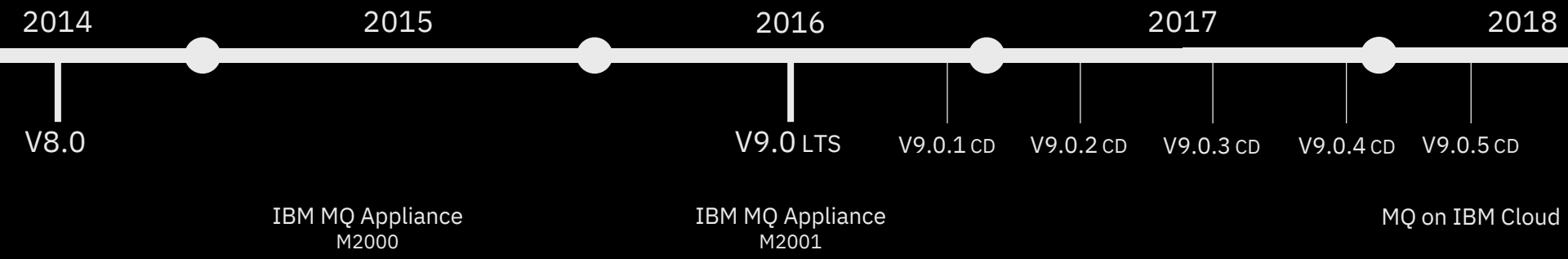
IBM MQ: long term support and continuous delivery



In 2016 MQ introduced a dual Long Term Support and a Continuous Delivery model

Continuous Delivery

New CD versions of MQ are released approximately every four months, incrementally introducing new product capabilities.

Intended for those that can continually integrate.

Long Term Support

Approximately every two years a new LTS version is released, rolling up many of the CD capabilities into a release with 5+3 support attached.

Required by those looking for fixed function.

Mix and Match

Both are available under the same license.

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

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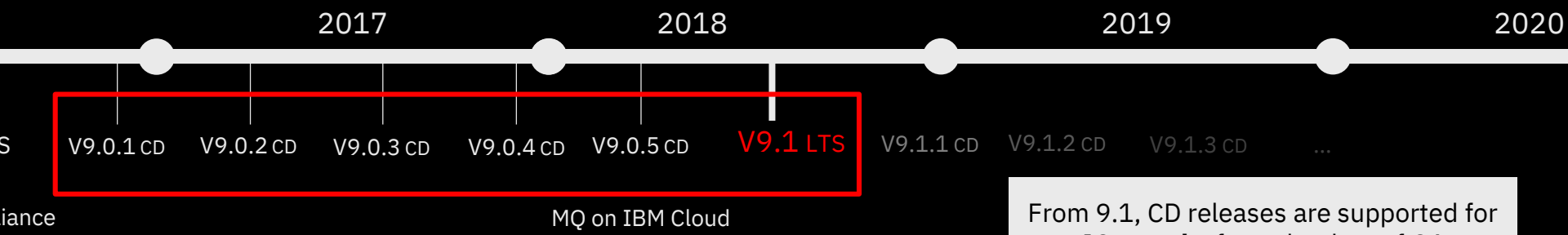
IBM MQ: long term support and continuous delivery



From 9.1, CD releases are supported for **12 months** from the date of GA

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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**

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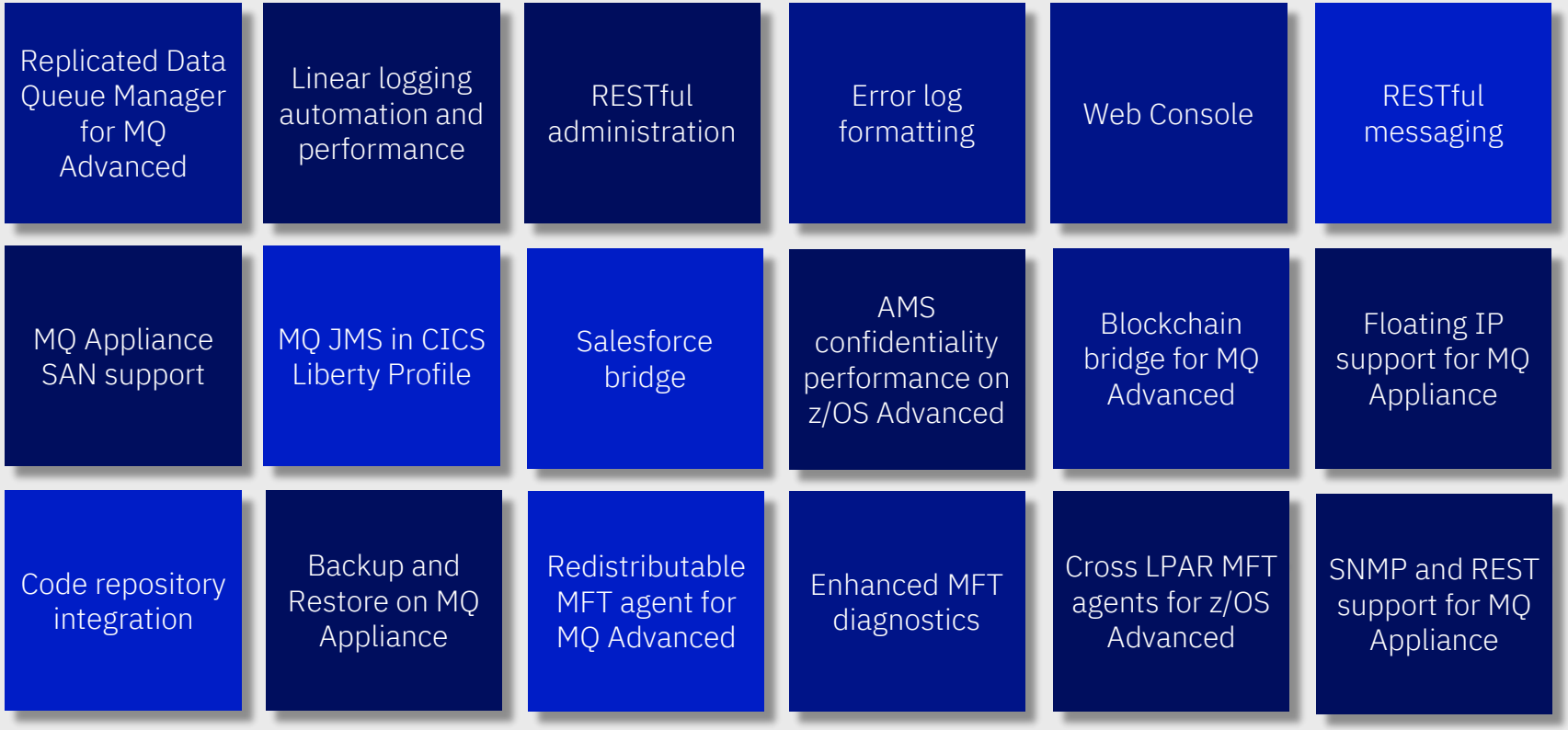
MQ 9.0.x CD content, available with V9.1 LTS



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High availability and disaster recovery

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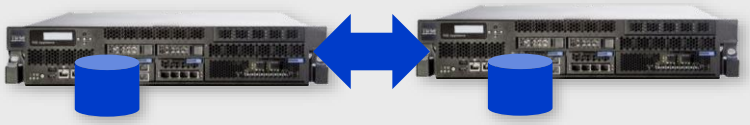
HA, there are no excuses

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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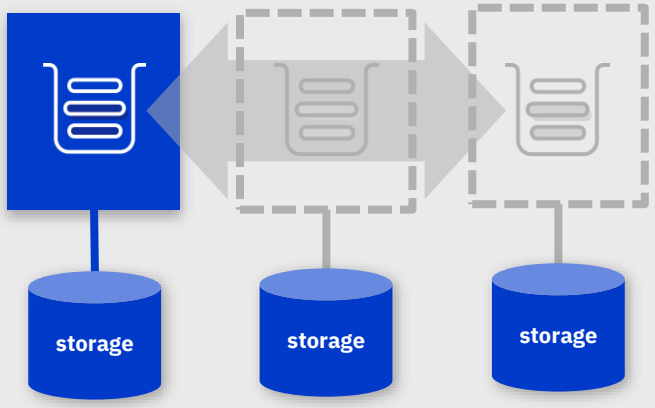

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Replicated Data Queue Managers

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

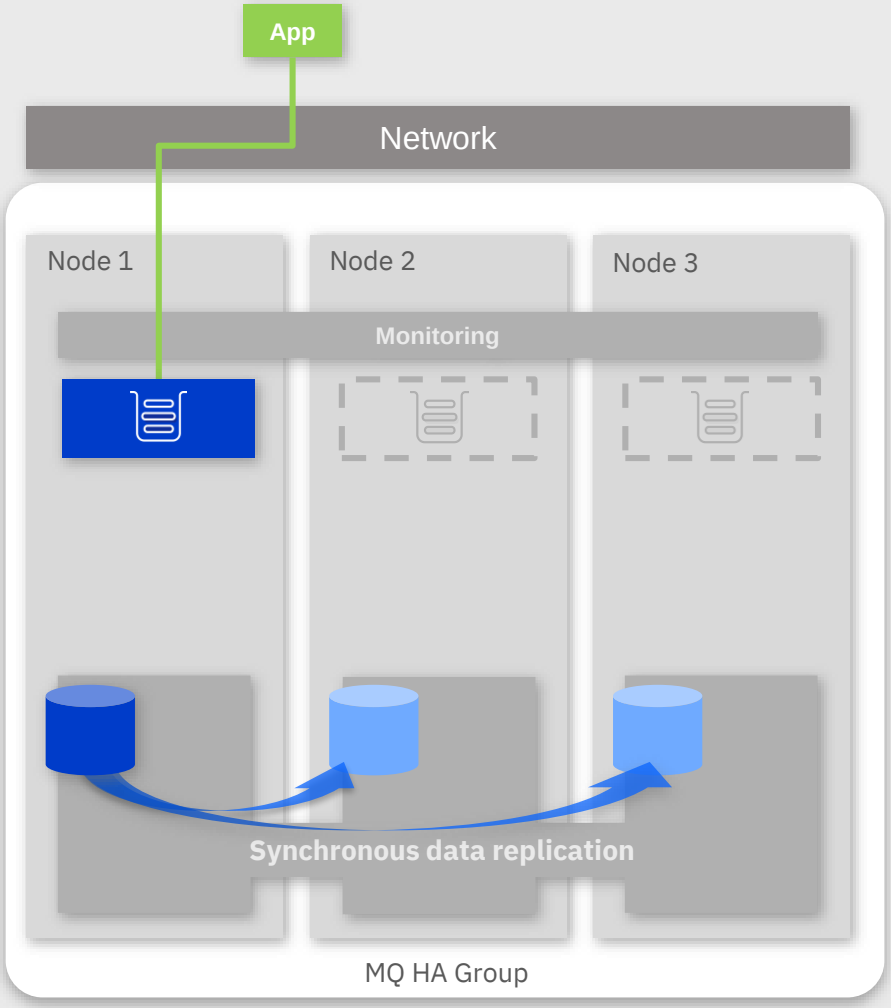
Active/passive queue managers with **automatic takeover**

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**

MQ Advanced for RHEL x86-64



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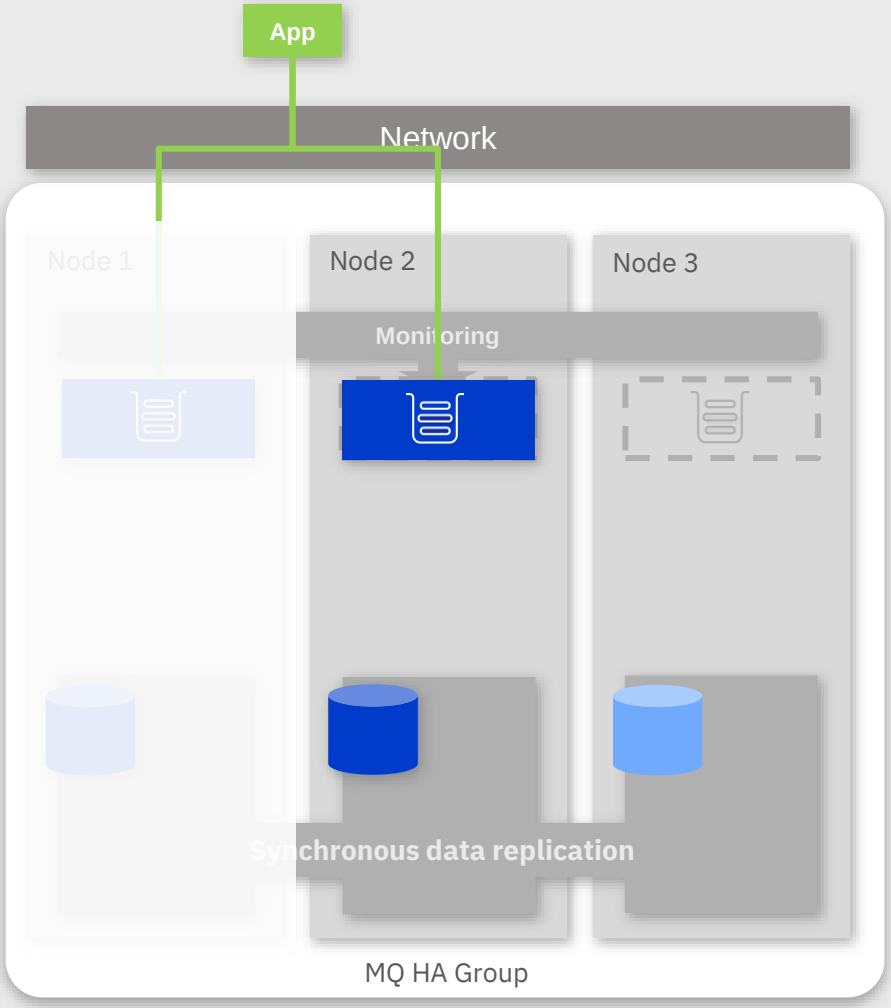

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Replicated Data Queue Managers

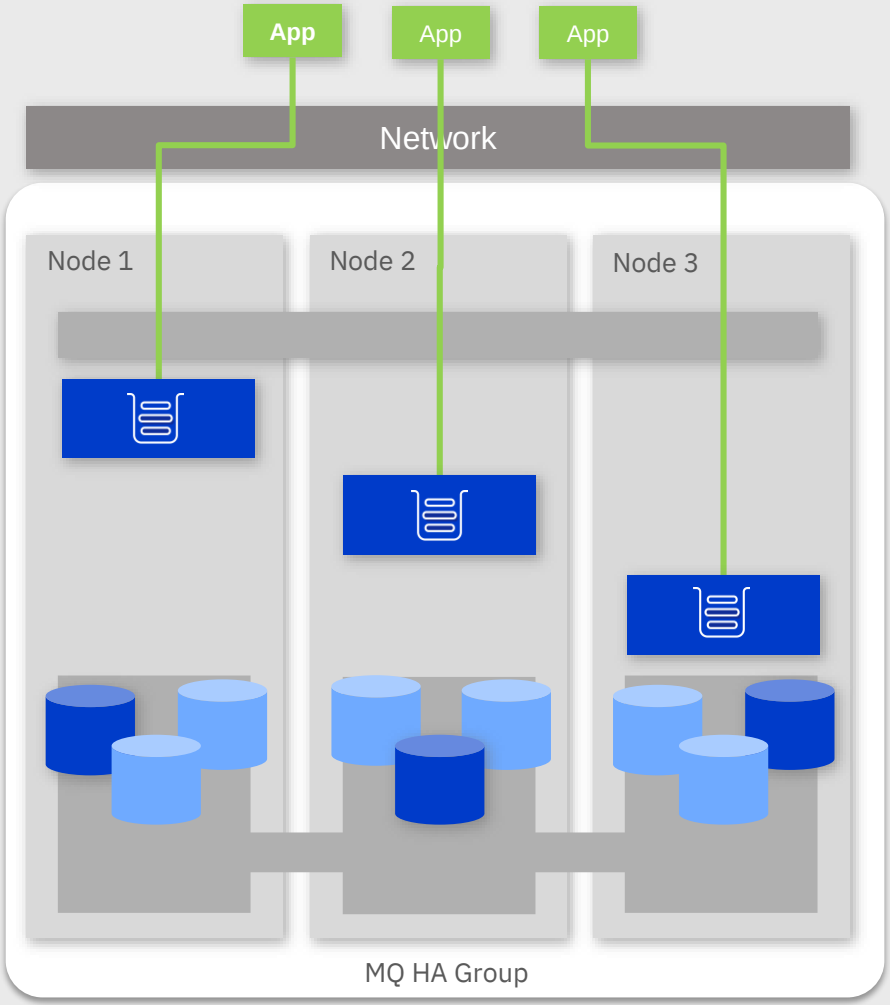
Recommended deployment pattern:

- 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*)

MQ Advanced for RHEL x86-64



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Replicated Data Queue Managers

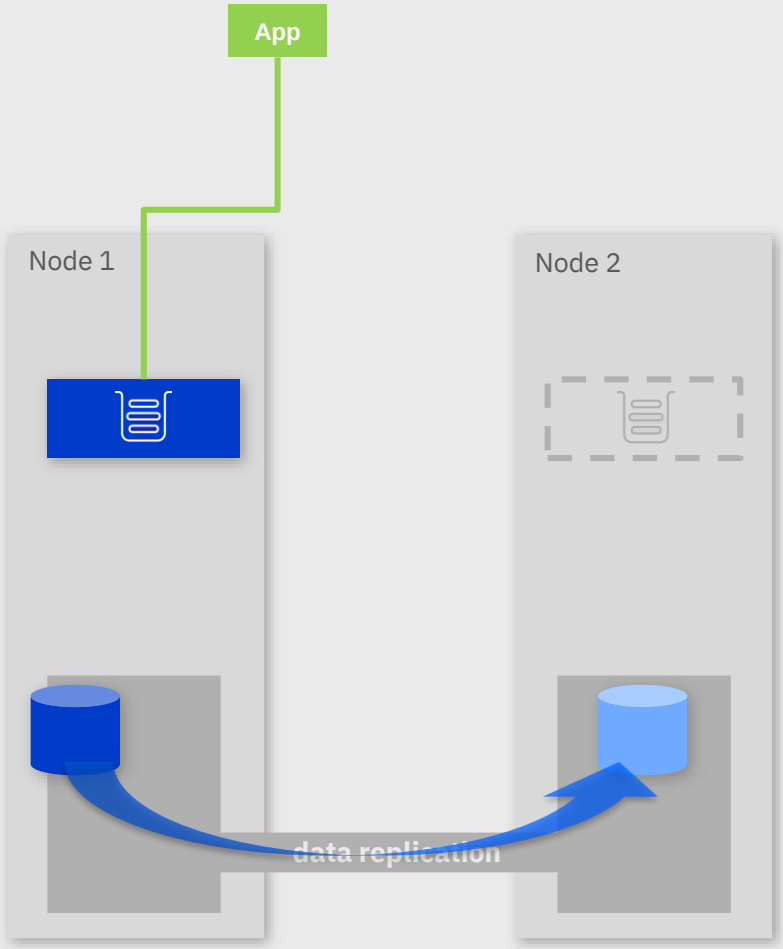
Manual failover

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



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MQ Advanced for RHEL x86-64

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

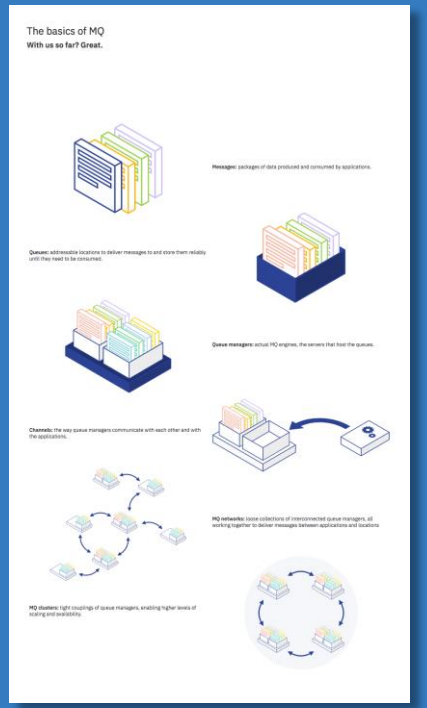
LearnMQ

Finding it hard to get developers started with MQ?

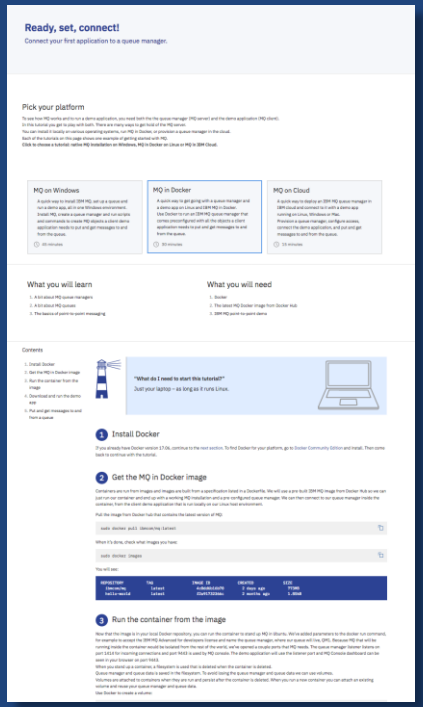
Point them to:

developer.ibm.com/messaging/learn-mq

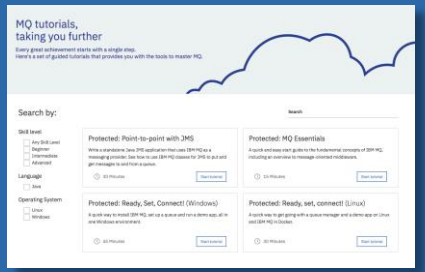
Totally new to MQ? Learn the basics

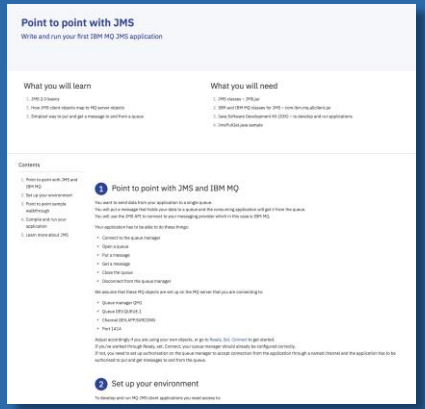


Step-by-step guide to getting up and running with MQ



Tutorials on building your applications





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Developing with MQ

MQ JMS jars available through Maven

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

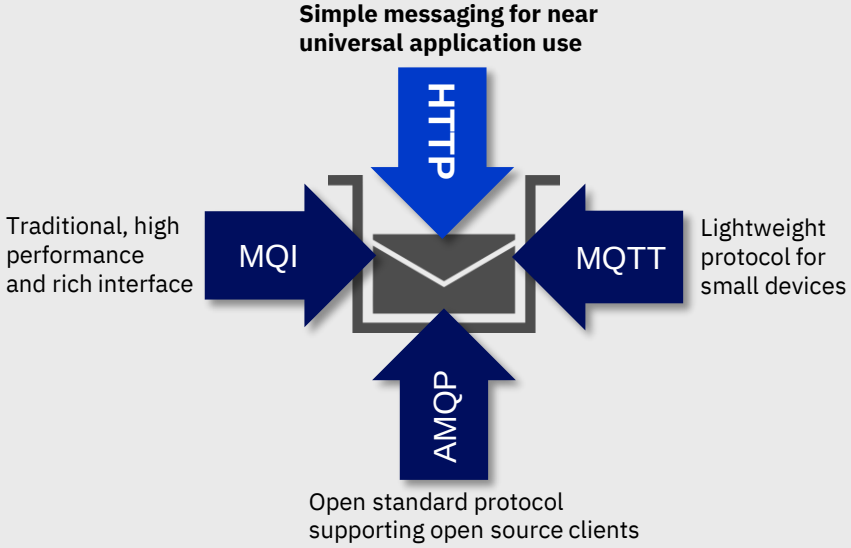
RESTful messaging

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



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

Logging

Request

Status

Monitoring

Updates

Errors

Response

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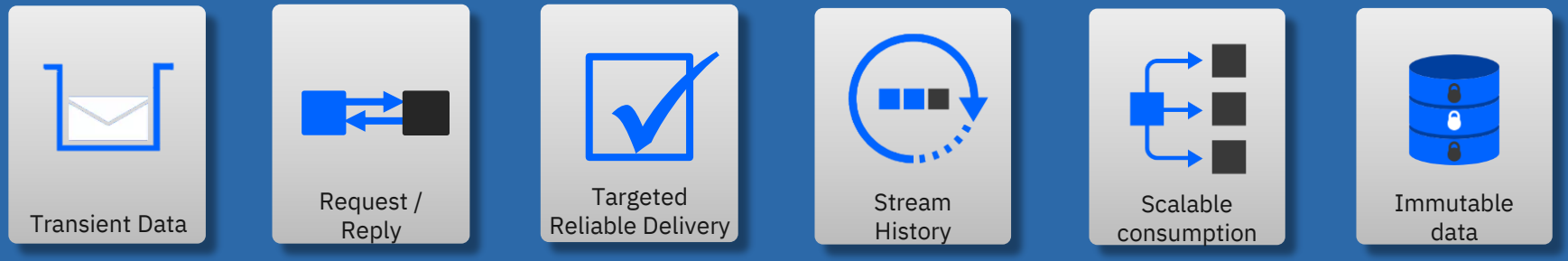
Which require a widening range of capabilities



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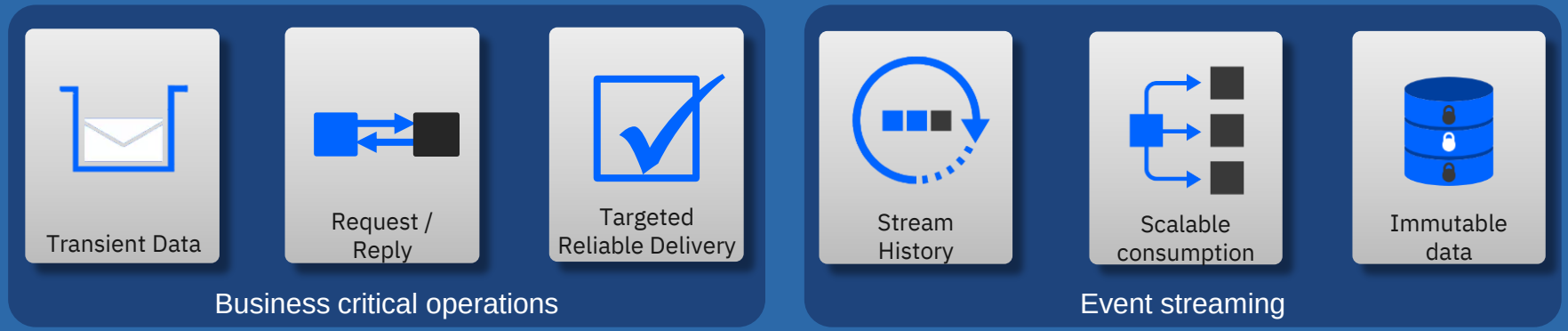
Special problems require specialised solutions



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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**

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

Exploit existing data to become a real Event Driven Enterprise

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Connectivity

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Bridging to MQ

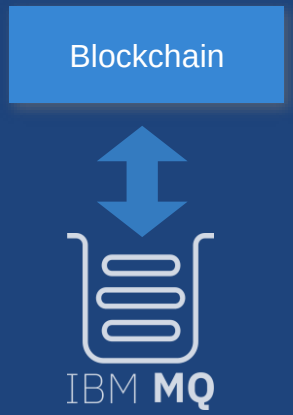
As well as connecting a wide array of applications directly to an MQ system, there are a growing set of bridges and connectors between MQ and external systems

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.

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



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

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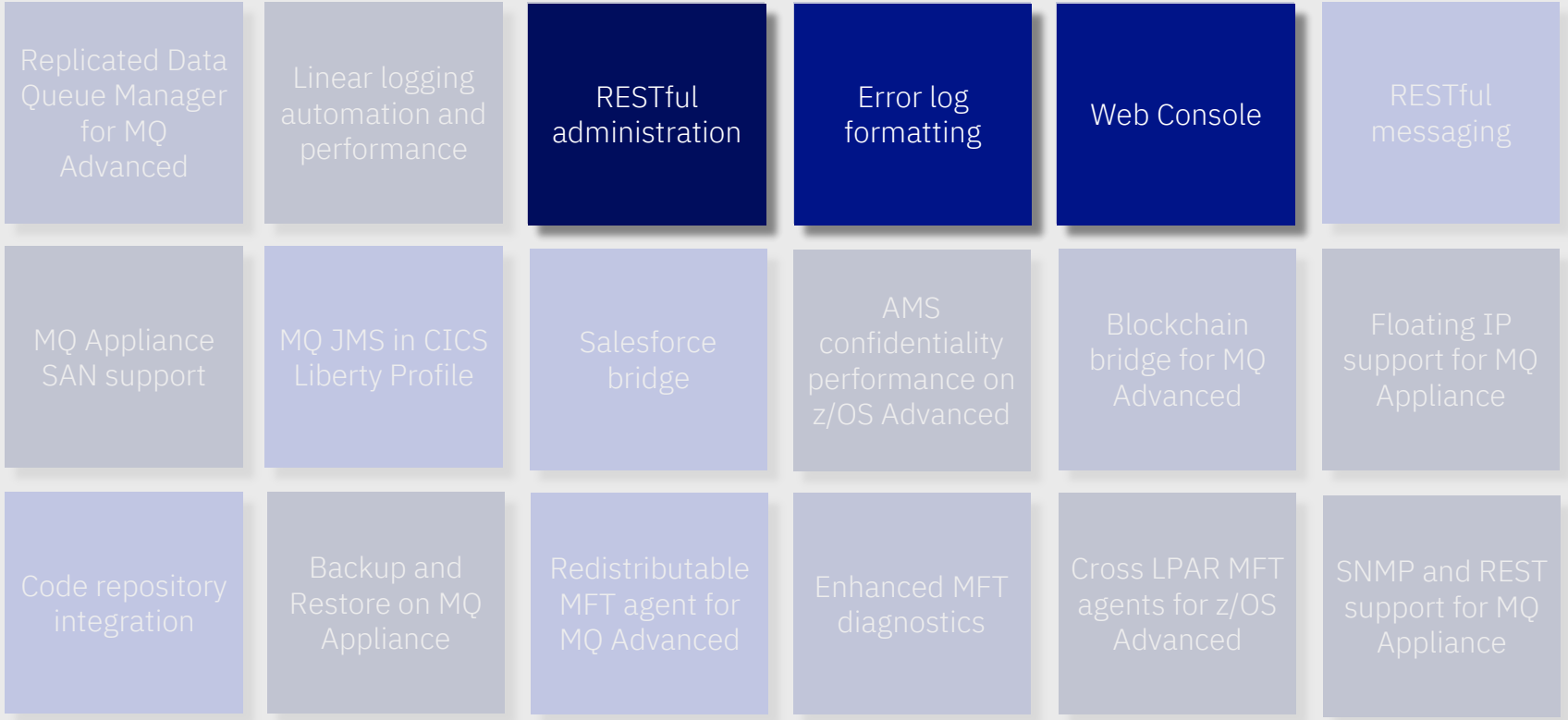
Managing MQ



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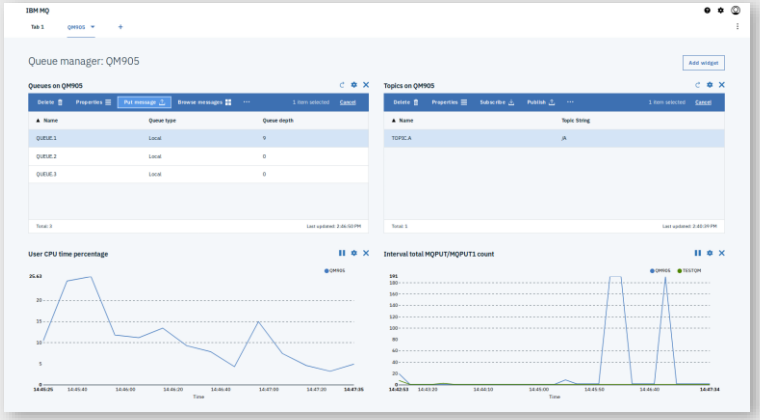
MQ Web Console

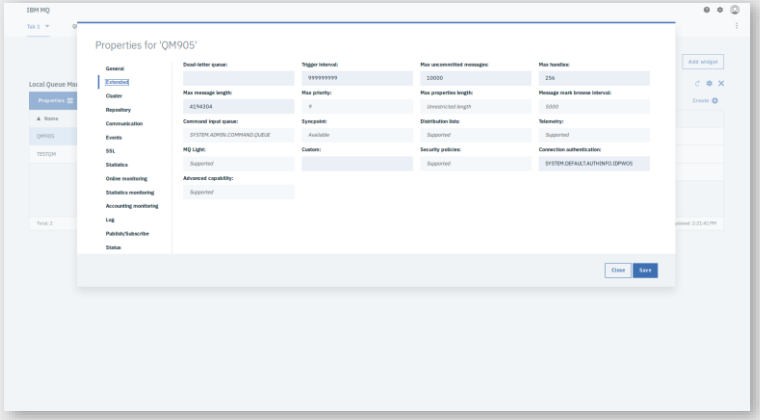
Point a browser at the MQ installation to create and manage queue managers and their resources

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





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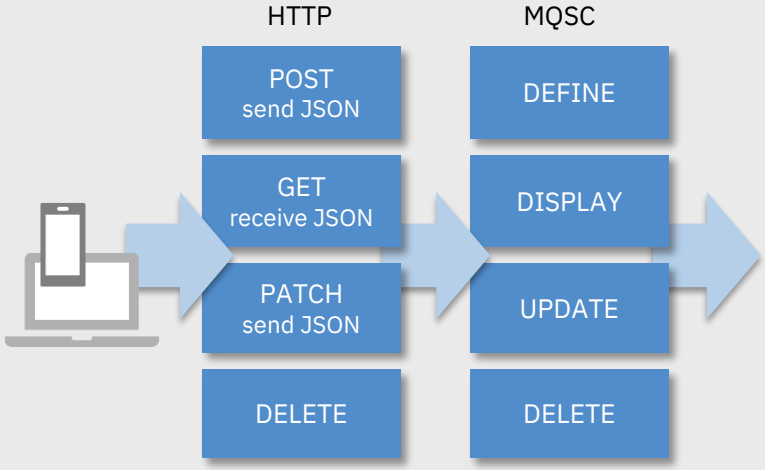
Restful administration

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



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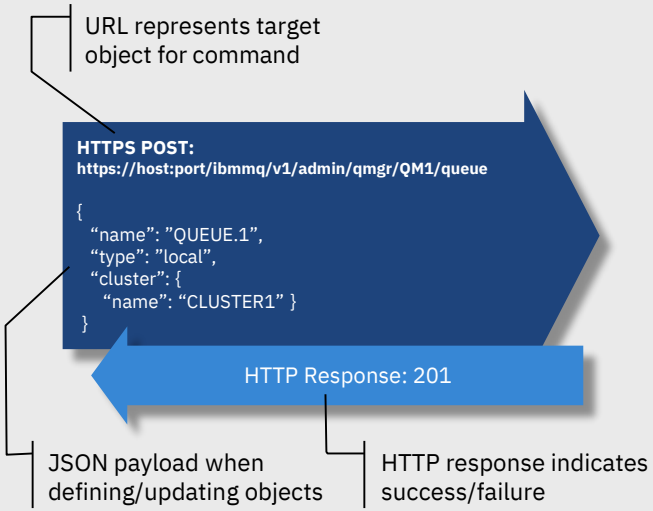
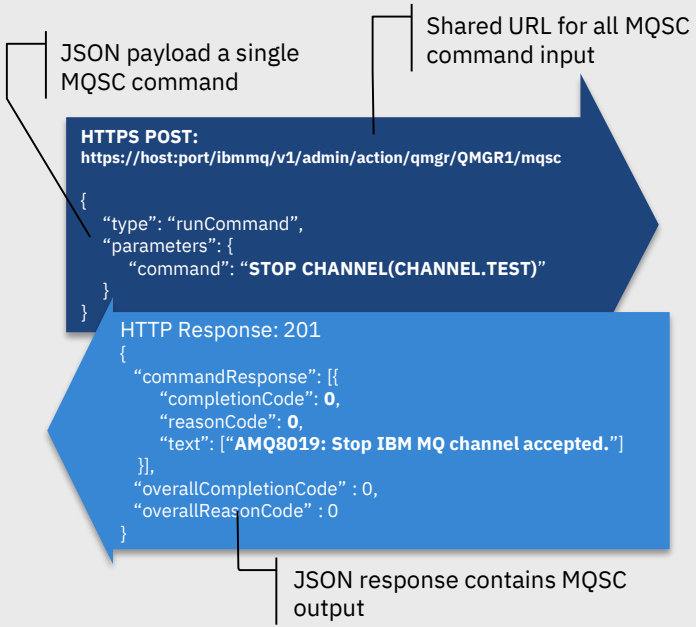
Two approaches

Per object REST



Native JSON based REST calls

MQSC over REST



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

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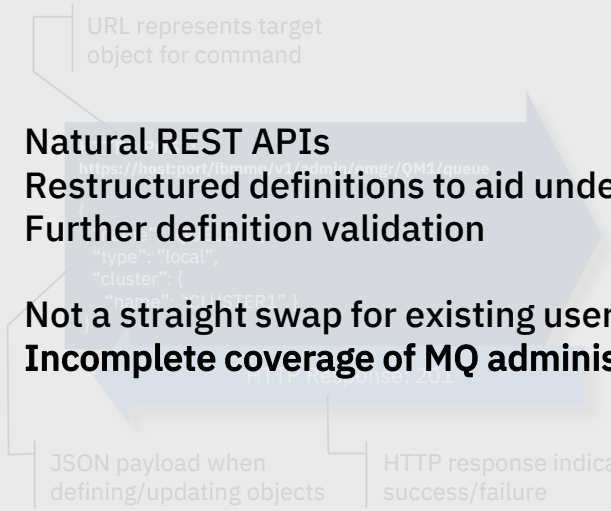
Two approaches

Per object REST



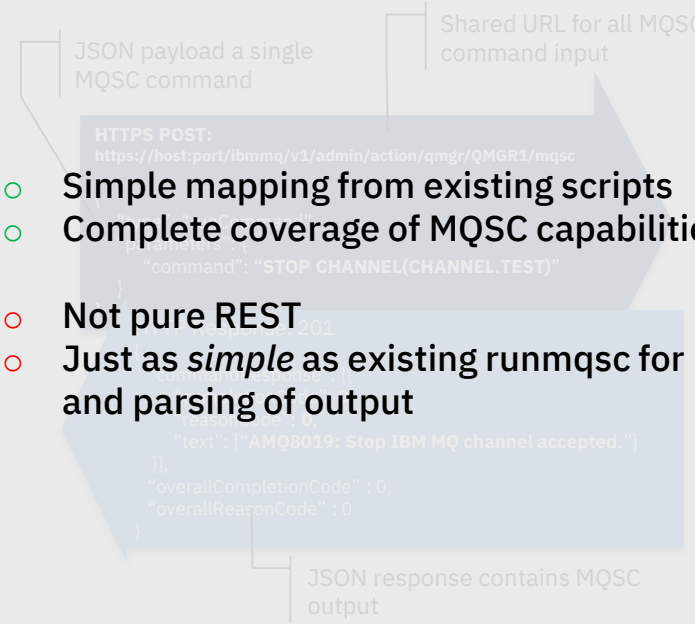
- Natural REST APIs
- Restructured definitions to aid understanding
- Further definition validation

- Not a straight swap for existing users
- **Incomplete coverage of MQ administration**

Native JSON based REST calls

• • •

MQSC over REST



- 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

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

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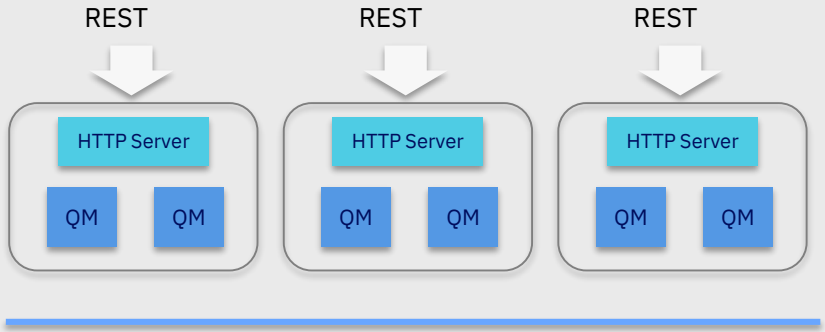
Enabling your whole estate for REST administration

Option 1

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

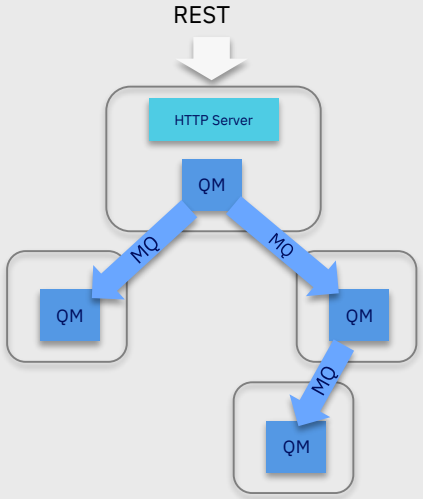


Option 2

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

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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

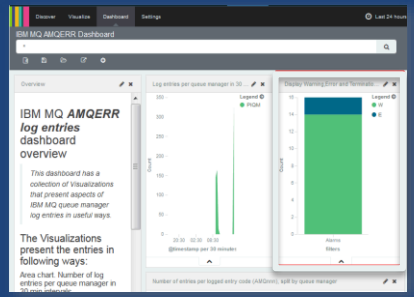
JSON output

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)."
}
```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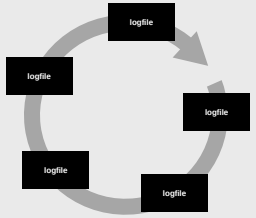
Distributed recovery logs

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

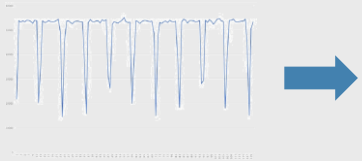


Circular logging

Linear logging

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

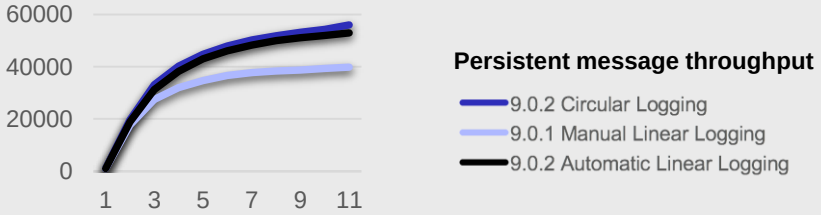


Manually controlled recording

Queue manager controlled recording

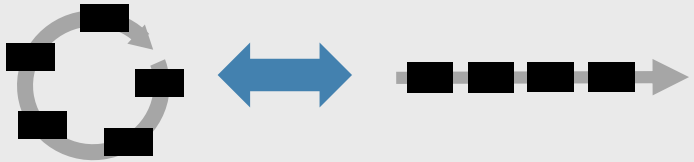
Automatic log reuse

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

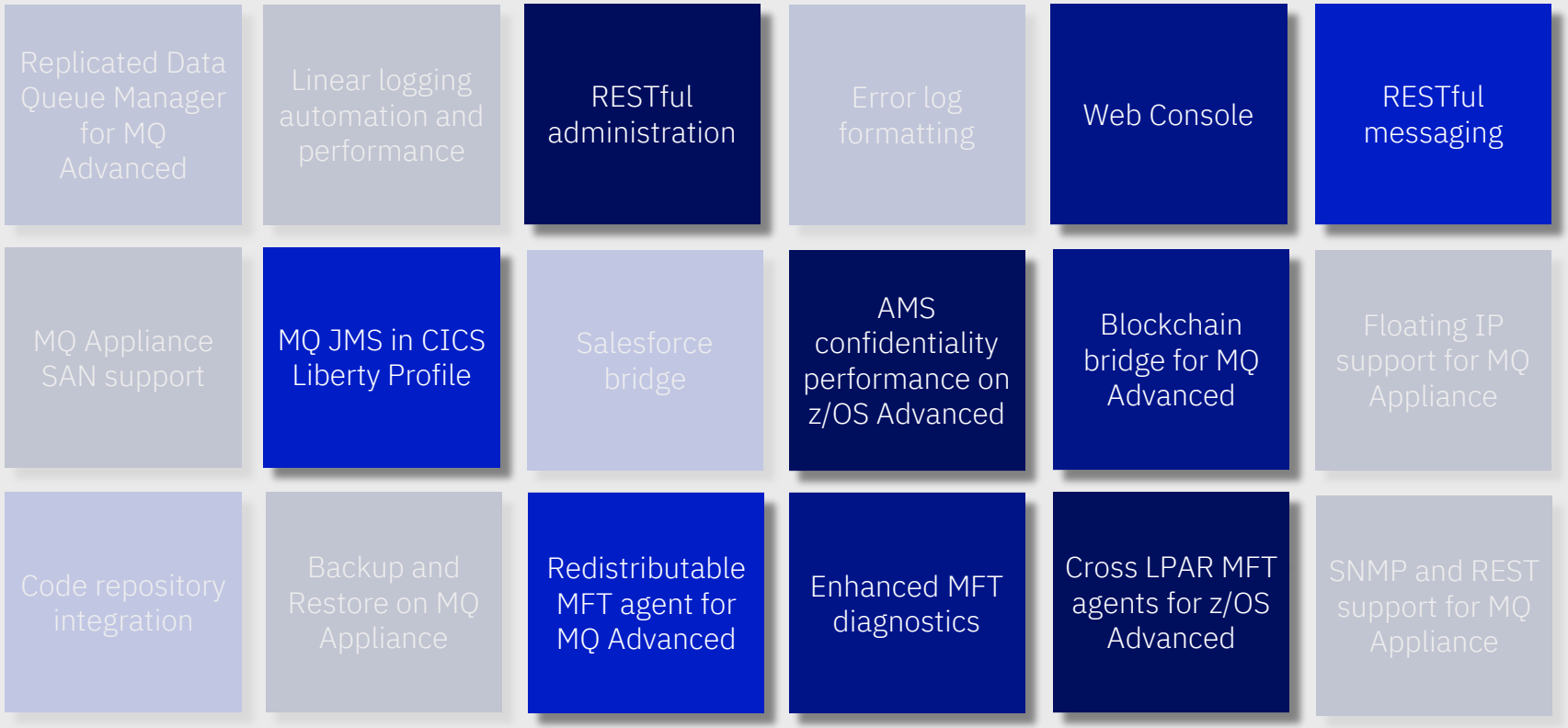


Migrating between linear and circular

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



MQ on z/OS



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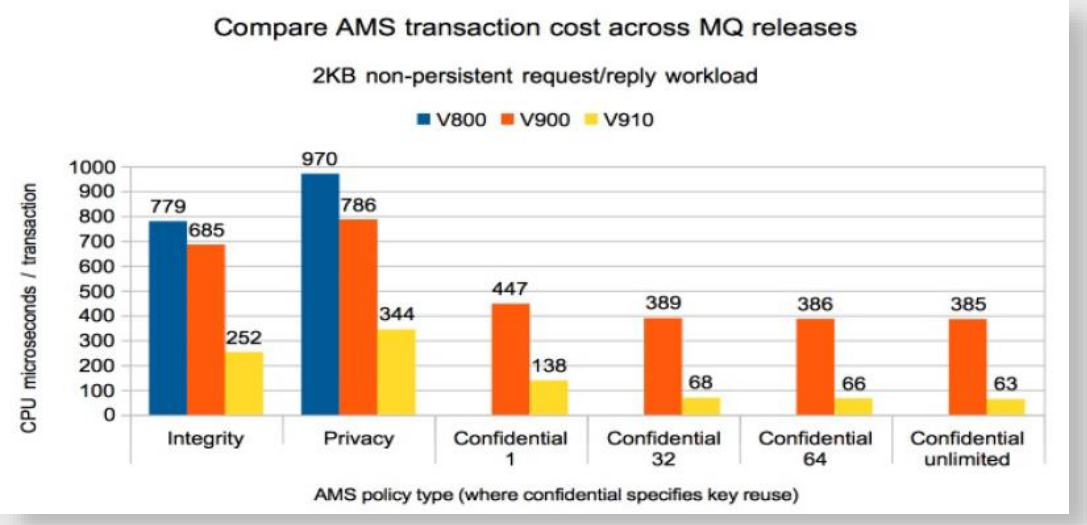
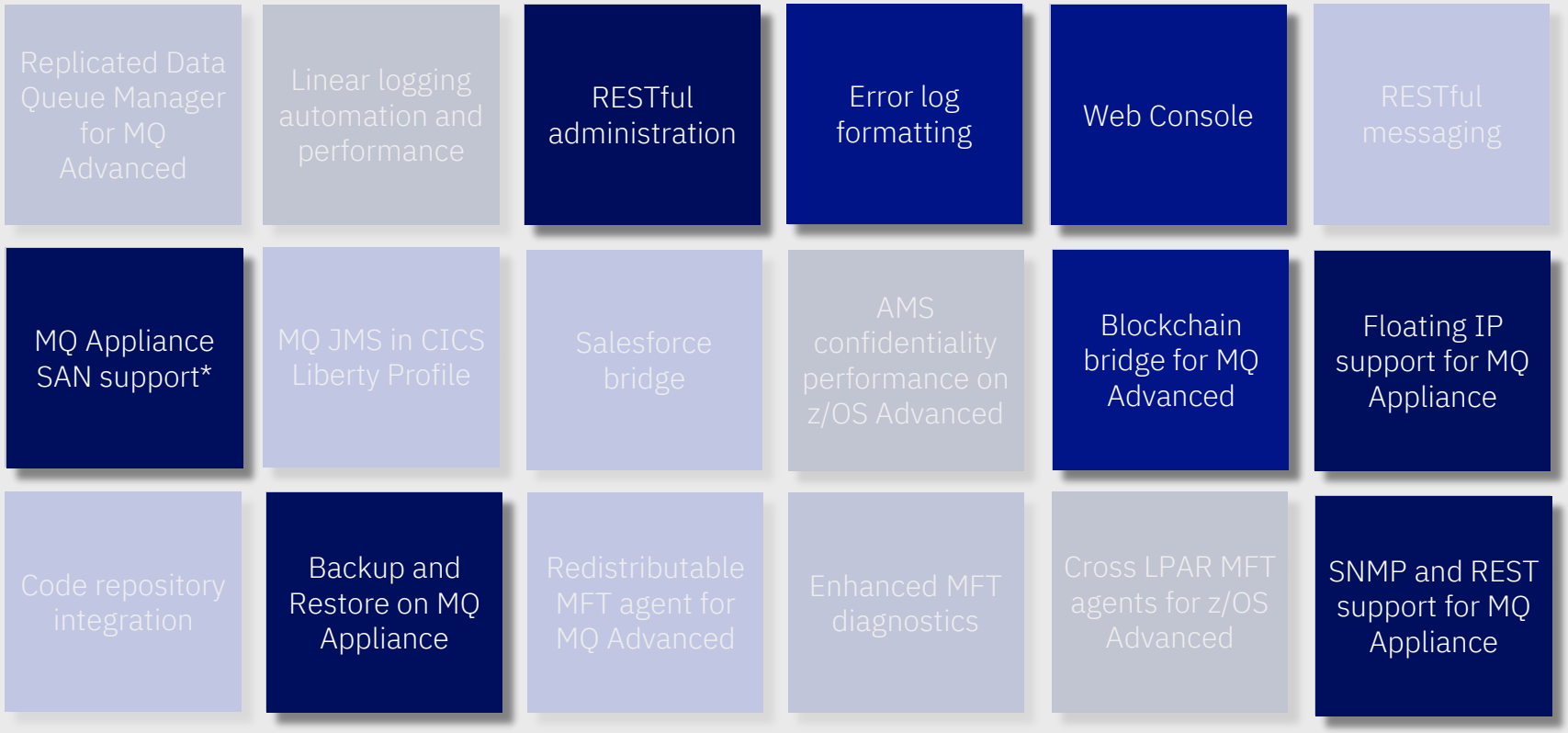
Significant improvement in performance when applying AMS policies



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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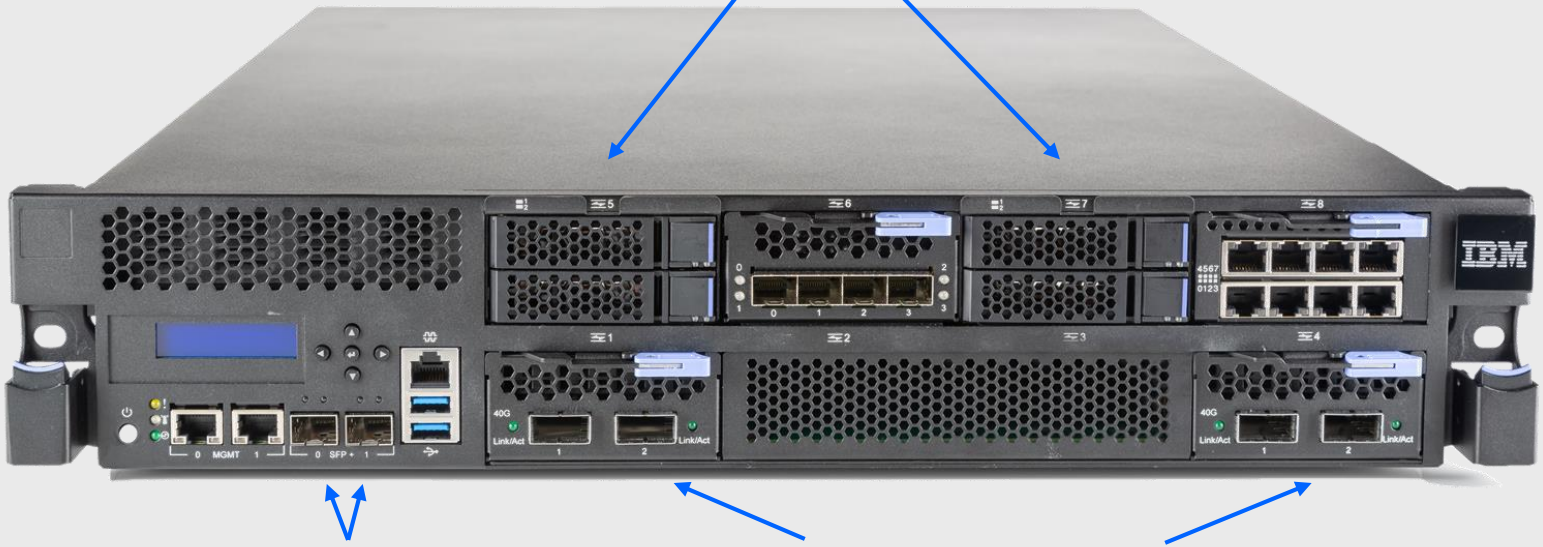
Introducing the **M2002**

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

* Note there is no longer a SAN interface

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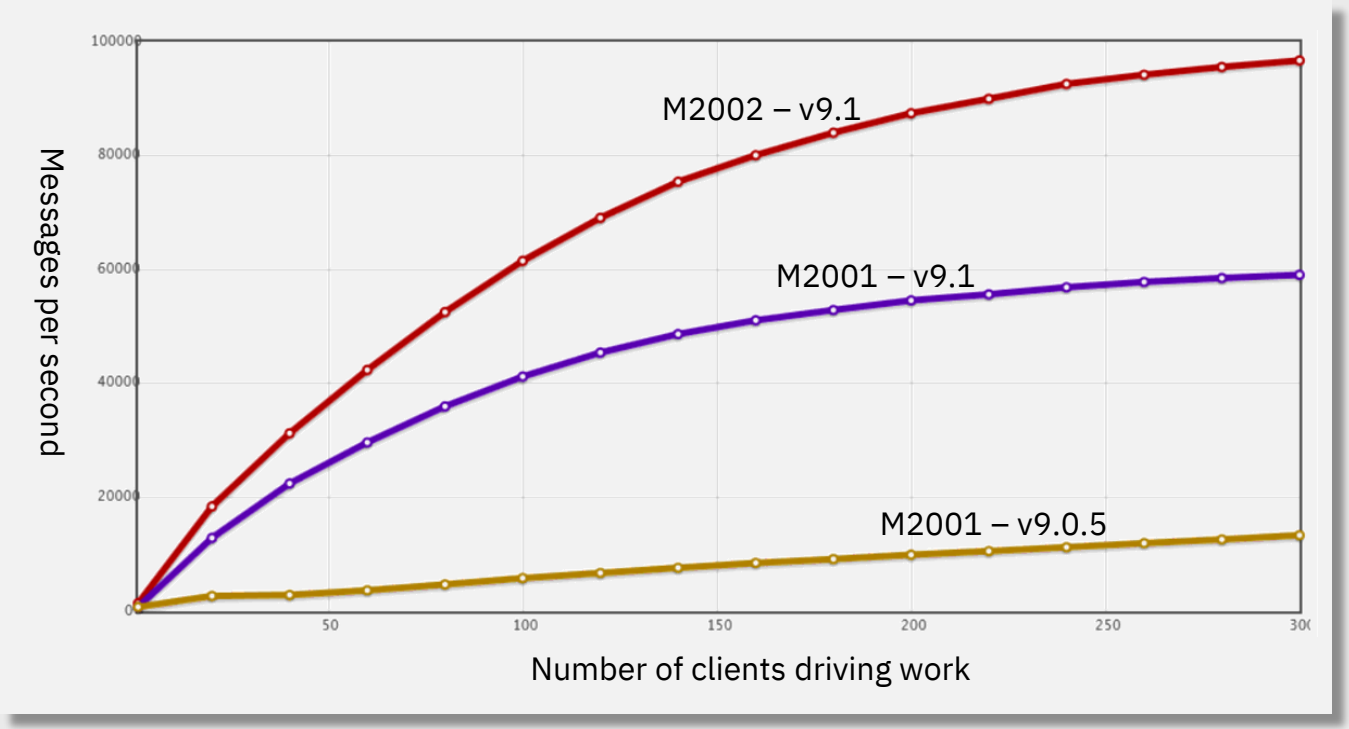
Appliance performance

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



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Platform Coverage for IBM MQ

Historically 'niche' offerings

MQ for HP OpenVMS
- IBM version now EOS
- 3rd 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.
- 3rd 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

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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

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

IBM MQ

Celebrating **25** years

On-premise, software and the MQ 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

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Celebrating

25 years

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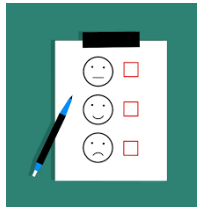
  - http://conferences.gse.org.uk/2018/feedback/JI

- Paper feedback forms are also available from the Chair person

- This session is JI