Integration Technical Conference 2019

From the Enterprise to the Cloud, the evolving world of IBM MQ

David Ware
Chief Architect, IBM MQ

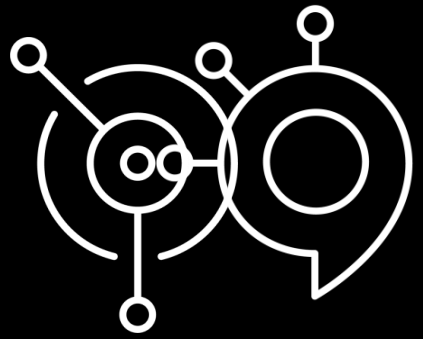
IBM **Cloud**

IBM

IBM MQ is *the* solution for business critical messaging

The world depends on reliable, secure messaging and **85% of the fortune 100 depend on IBM MQ***

Your bank transfers complete without losing your money, with **all of the worlds top 50 banks using IBM MQ***



IBM Messaging

1 + 1 = 2

Simple

Scalable

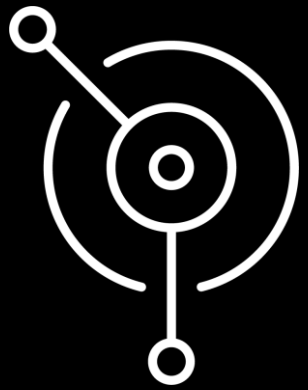
Precise

Connected

Reliable

Secure

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



IBM **MQ**

Messaging, how you need it, where you need it

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

On-premise, software and the MQ Appliance

IBM Z
Linux
AIX
Windows
Solaris
IBMi
HPE NonStop
zLinux
Appliance

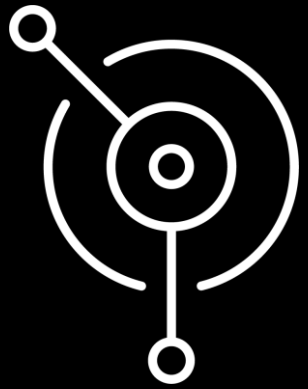
Run MQ yourself in public or private clouds

AWS
Azure
IBM Cloud
IBM Cloud Private
Red Hat OpenShift
Kubernetes

Let IBM host MQ for you with its managed SaaS MQ service in public clouds, IBM Cloud and AWS

IBM Cloud
powered by aws

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



On-premise, software and the MQ Appliance

Run MQ yourself in public or private clouds

Let IBM host MQ for you with its managed SaaS MQ service in public clouds, IBM Cloud and AWS

MQ on Cloud service

Managed for You

Up and Running in Minutes

Hourly billing

Enabled for Hybrid Cloud Connectivity

No credit card required!

IBM **Cloud**

powered by aws

Configured & monitored by the **customer**

- Queues, topics, channels, clustering, applications

Managed & operated by **IBM**

- MQ installation, basic configuration, security, maintenance
- Hardware, virtualization, servers, network, storage

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

MQ in Containers

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

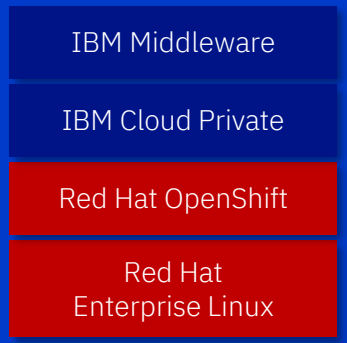
github.com/
ibm-messaging/
mq-container

IBM Cloud Transformation Advisor

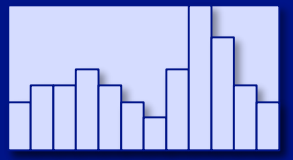
Analyses your queue managers and JEE applications for suitability for moving to IBM containers

MQ Advanced is available as fully supported IBM Cloud Paks with **IBM Cloud Private** and the **IBM Kubernetes Service** on **IBM Cloud**

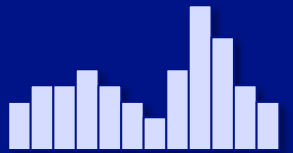
Deploy fully supported IBM certified software containers into an IBM provided **Kubernetes** platform or an existing **Red Hat OpenShift** environment



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



Traditional licensing



Hourly licensing

Introducing the MQ Appliance M2002

The scalability and security of IBM MQ

The same familiar administration model for administrators with MQ skills

Supports the same MQ applications

But, with the convenience, fast time-to-value and low total cost of ownership of an appliance

Easy Integration

Integrates seamlessly into MQ networks and and clusters

Improved Availability

Built-in support for High Availability and Disaster Recovery

Simplified ownership

Repeatable and fast, with less configuration or tuning required

Minimises dependencies on other resources and teams

Simpler licensing and easier to assess for security compliance and audit

The new M2002

New in third quarter 2018, replacing the M2001

Choice of A/B models as today

Adds new 40GB network connectivity
- Particularly useful for HA replication

Doubled storage capacity with new RAID10 controller for improved performance

Based on latest MQ V9.1: Available to run both LTS and CD releases on the MQ Appliance

M2002 headline numbers
- Over **200 thousand persistent**, HA replicated, messages produced and consumed per second
- Over **600 thousand non-persistent** messages produced and consumed per second

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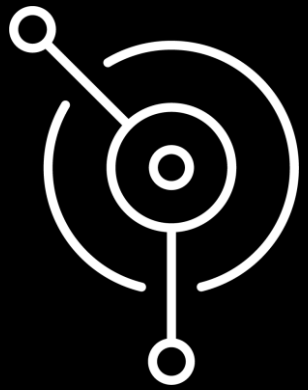
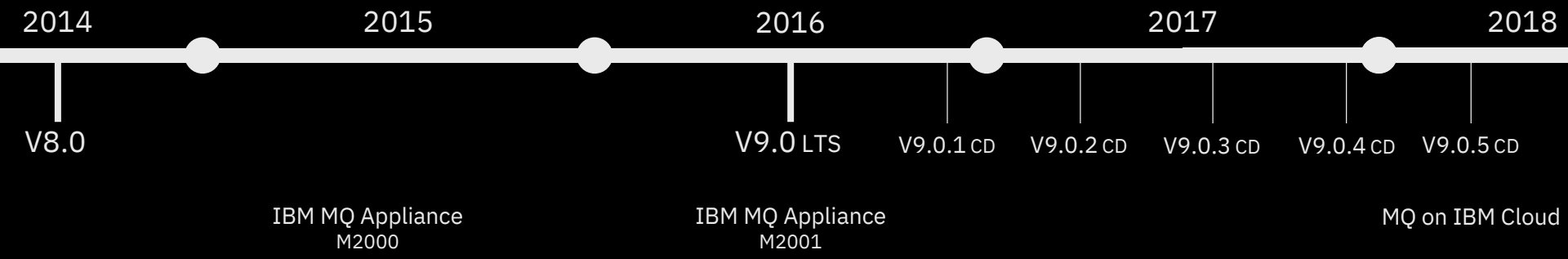


IBM **MQ**

Continuous delivery and innovation

IBM MQ: long term support and continuous delivery



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

Continuous Delivery

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

Intended for those that can continually integrate.

Long Term Support

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

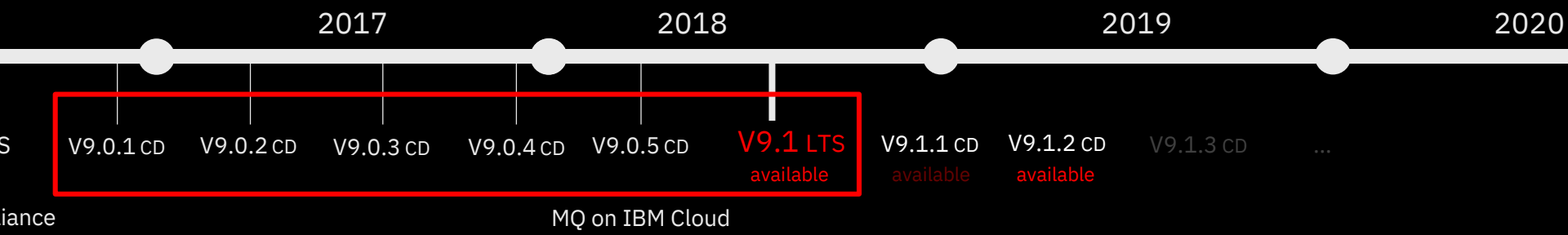
Required by those looking for fixed function.

Mix and Match

Both are available under the same license.

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

IBM MQ: long term support and continuous delivery



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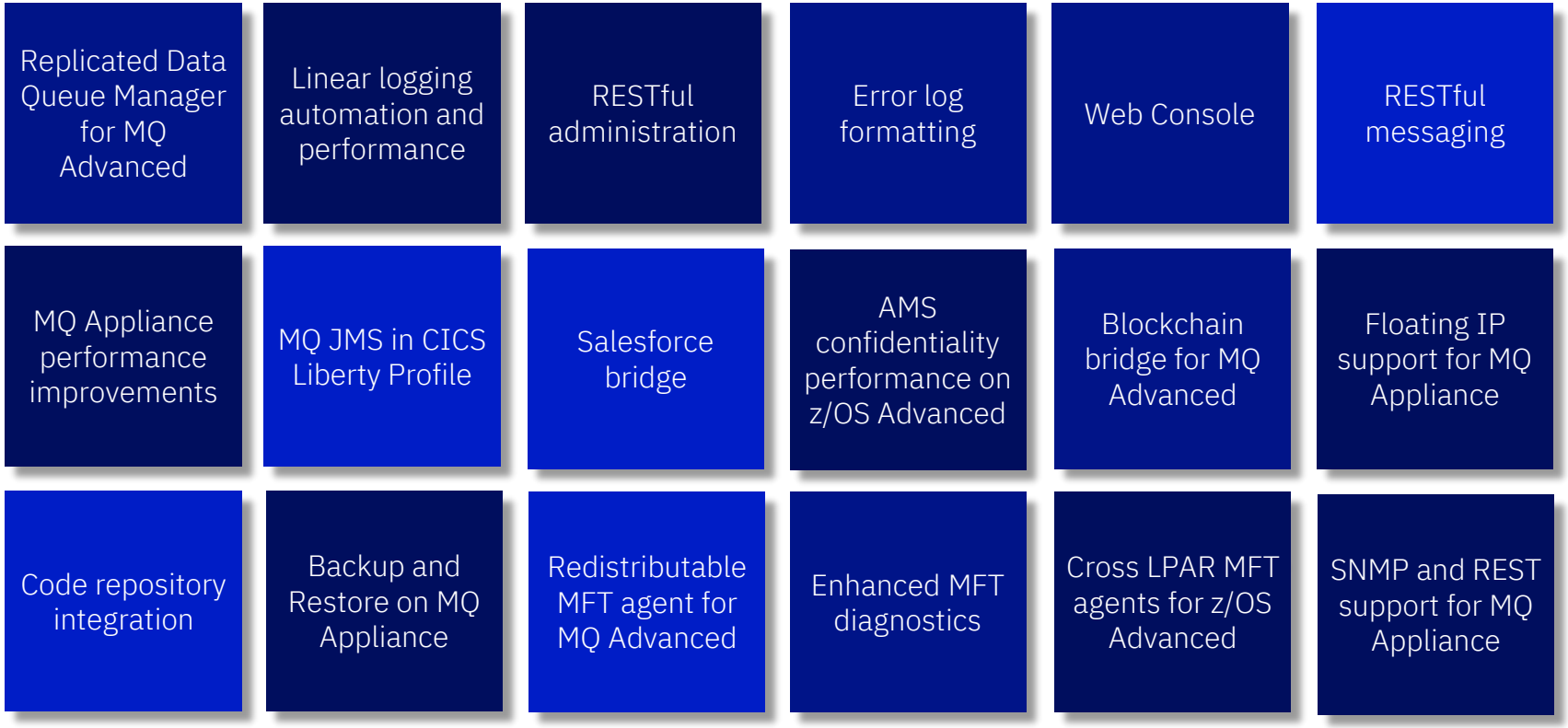
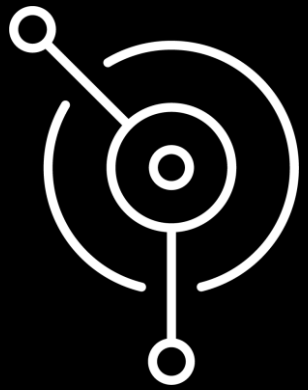
The function delivered in the 9.0.x CD releases is now available in the long term support release **V9.1 LTS**

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





Fault tolerance

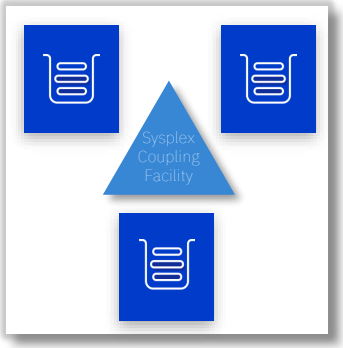
Protecting your critical data

Fault tolerance

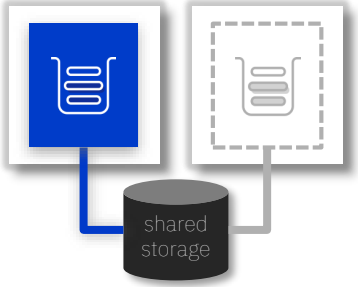
MQ delivers HA through the ability to build horizontally scaled, active-active systems and typically **active-passive HA** of the data itself*, the messages.

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.

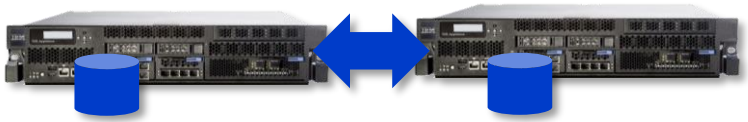
The **MQ Appliance** changed this with a fully integrated HA solution, providing built in machine to machine data replication and failover.



z/OS Queue Sharing Groups



Multi-instance queue managers and HA Cluster



MQ Appliance

* z/OS shared queue provides active-active HA of the message data!

Fault tolerance

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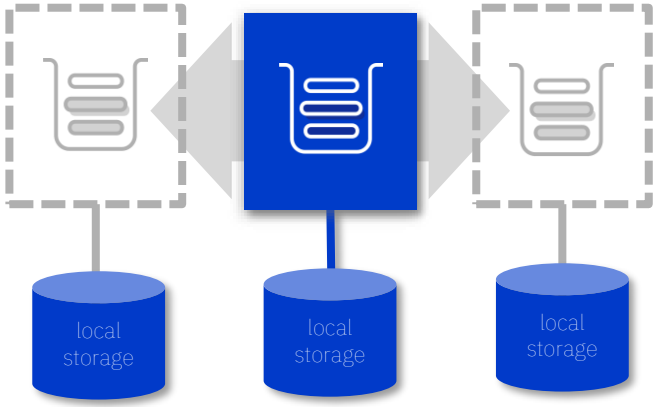
2018 saw a fully integrated, data replication and failover solution arrive on Red Hat x86...



* z/OS shared queue provides active-active HA of the message data!

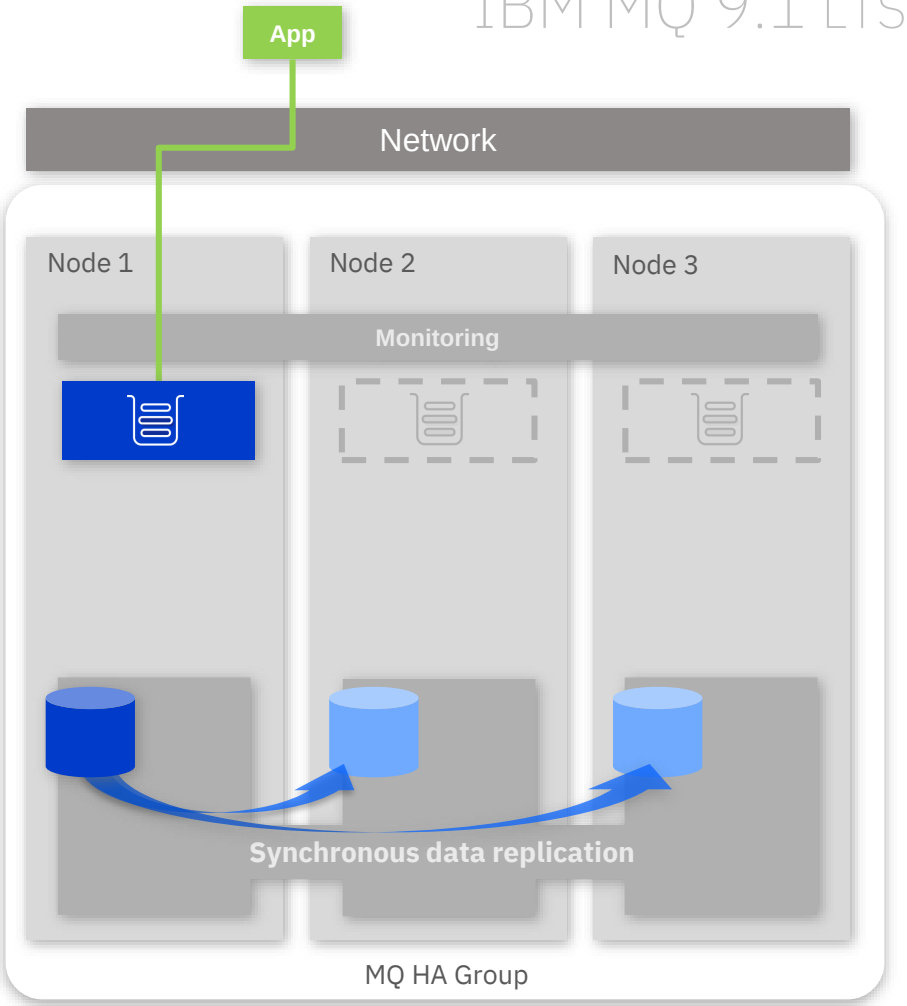
Replicated Data Queue Managers

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

Three-way replication and monitoring for quorum support

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

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



MQ Advanced for RHEL x86-64

Replicated Data Queue Managers

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

Three-way replication and monitoring for quorum support

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

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

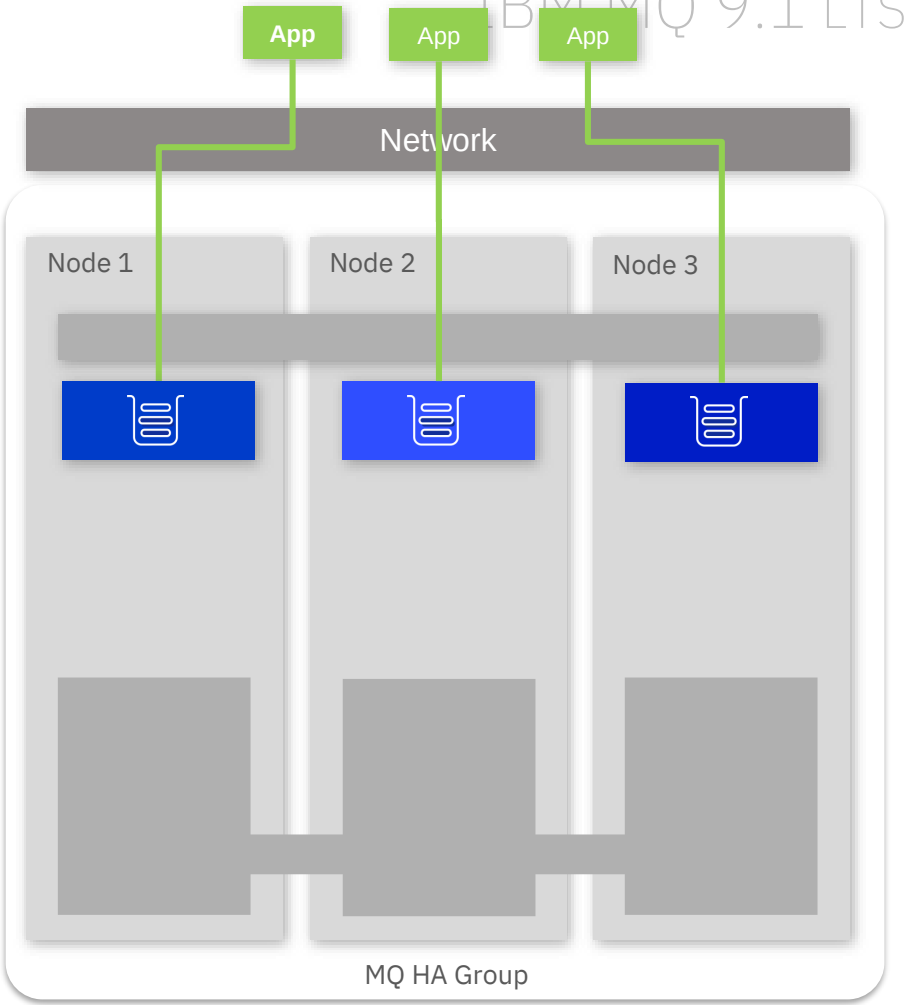
Per queue manager control to support active/active utilisation of nodes

MQ **licensing** is aligned to maximise benefits

Improvements in queue manager restart times

9.1.1 9.1.2

MQ Advanced for RHEL x86-64



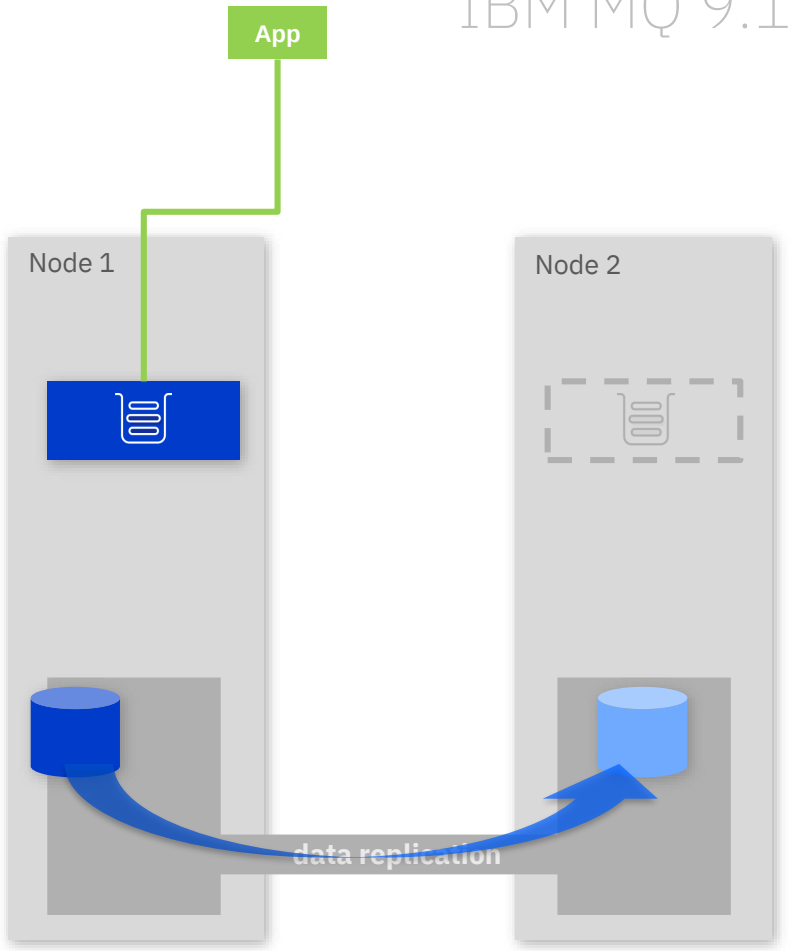
Replicated Data Queue Managers

Manual failover

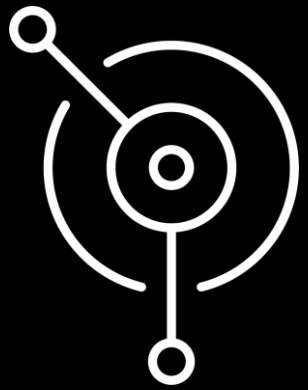
RDQM also supports a looser coupled pair of nodes for data replication but with no automatic failover, often for **Disaster Recovery**

Data replication can be

- **Asynchronous** for systems separated by a high latency network
- **Synchronous** for systems on a low latency network



MQ Advanced for RHEL x86-64



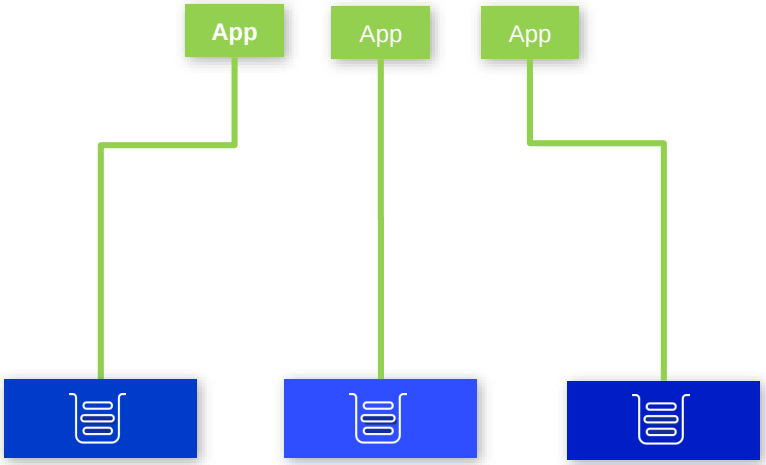
Cloud Native Messaging

Building scalable, fault tolerant, solutions

Building scalable, fault tolerant, solutions

Many of you have built your own continuously available and horizontally scalable solutions over the years

Let's call this the *"**uniform cluster**"* pattern



Building scalable, fault tolerant, solutions

Many of you have built your own continuously available and horizontally scalable solutions over the years

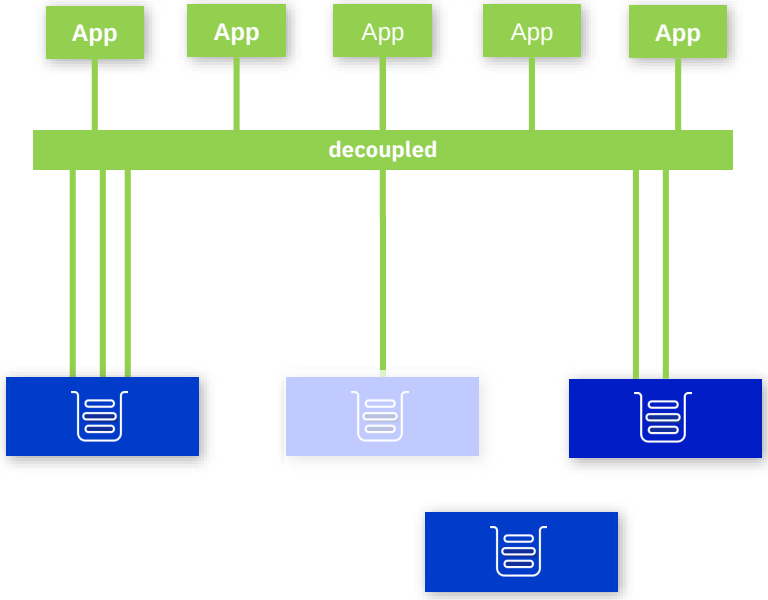
Let's call this the *"**uniform cluster**"* pattern

MQ has provided you many of the building blocks -

- Client auto-reconnect
- CCDT queue manager groups

But you're left to solve some of the problems, particularly with long running applications -

- Efficiently distributing your applications
- Ensuring all messages are processed
- Maintaining availability during maintenance
- Handling growth and contraction of scale



MQ 9.1.2 is starting to make that easier

For the distributed platforms, declare a set of matching queue managers to be following the ***uniform cluster pattern***

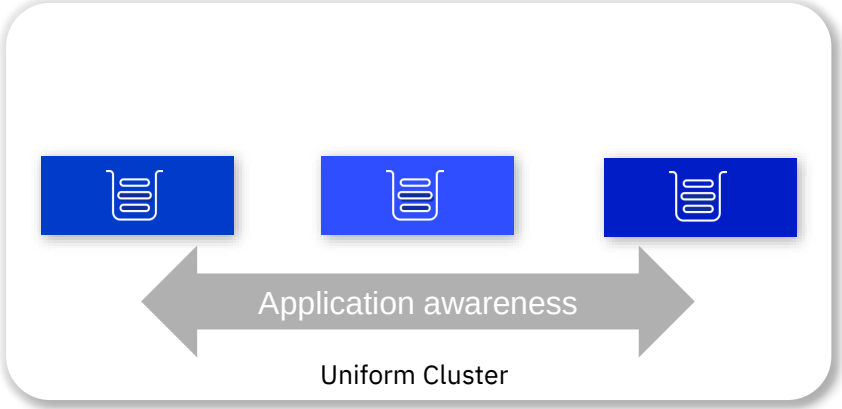
- All members of an MQ Cluster
- Matching queues are defined on every queue manager
- Applications can connect as clients to every queue manager

MQ will automatically share application connectivity knowledge between queue managers

The group will use this knowledge to automatically keep matching application instances balanced across the queue managers

- Matching applications are based on *application name* (new abilities to programmatically define this)

MQ 9.1.2 is starting to roll out the client support for this



Automatic Application balancing

IBM MQ 9.1.2 CD

Application instances can initially connect to any member of the group

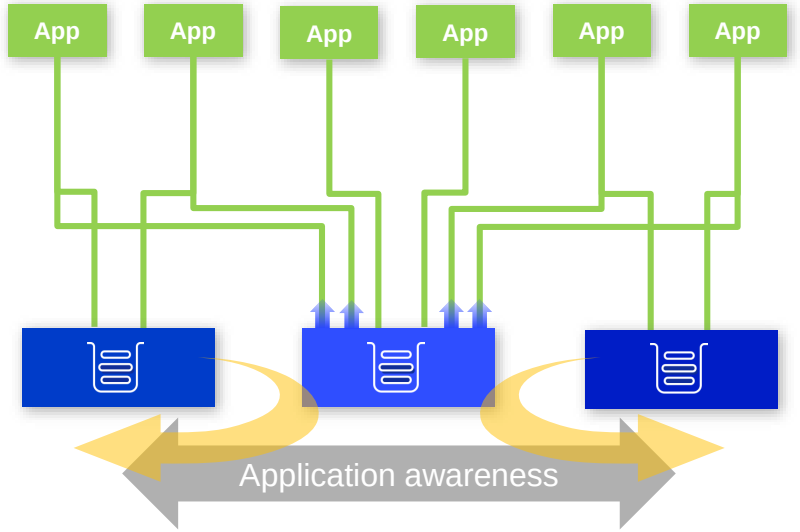
- We recommend you use a queue manager group and CCDT to remove any SPoF

Every member of the uniform cluster will detect an imbalance and request other queue managers to donate their applications

Hosting queue managers will instigate a client *auto-reconnect* with instructions of where to reconnect to

Applications that have enabled *auto-reconnect* will automatically move their connection to the indicated queue manager

- 9.1.2 CD has started with support for C-based applications
- …

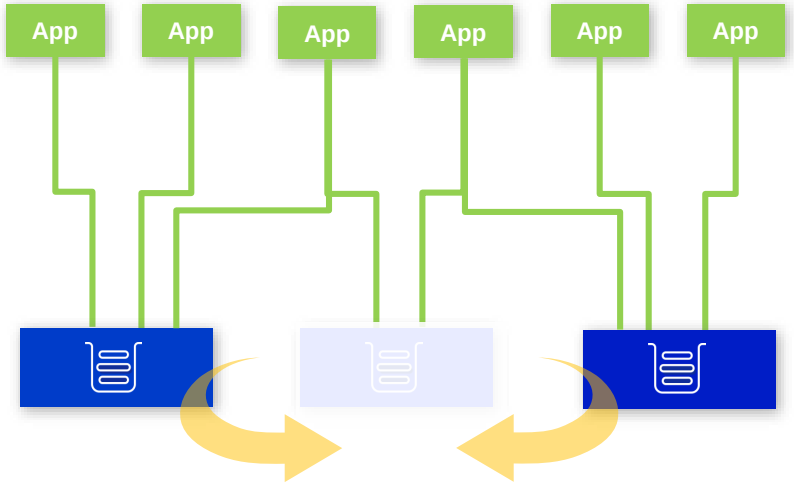


Automatic Application balancing

IBM MQ 9.1.2 CD

Automatically handle rebalancing following planned and unplanned queue manager outages

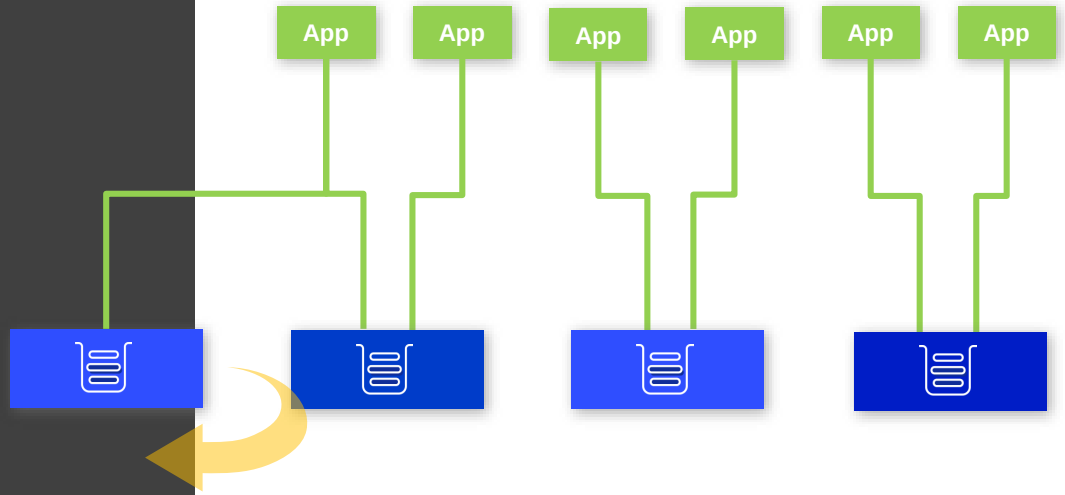
- Existing client auto-reconnect and CCDT queue manager groups will enable initial re-connection on failure
- Uniform Cluster rebalancing will enable automatic rebalancing on recovery



Automatic Application balancing

Even to horizontally scale out a queue manager deployment

- Simply add a new queue manager to the uniform cluster
- The new queue manager will detect an imbalance of applications and request its fair share



MQ 9.1.2 CD is the *start* of the Uniform Cluster journey
http://ibm.biz/MQ-UniCluster

Join the MQ Beta program to see how the Uniform Cluster pattern and client support will evolve

pete_murphy@uk.ibm.com

Building scalable and available solutions

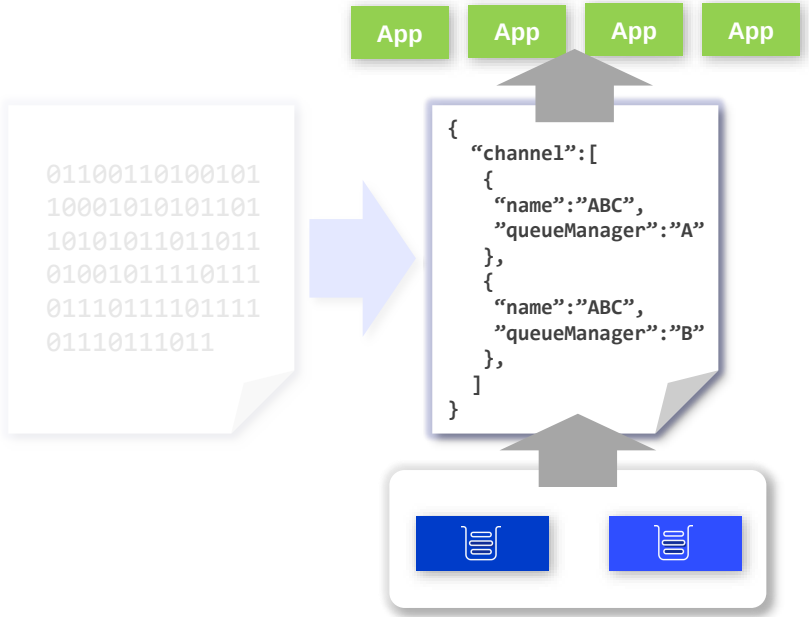
JSON CCDT

Build your **own JSON format CCDTs**

Supports multiple channels of the same name on different queue managers to simplify the building of uniform clusters

Available with all 9.1.2 clients

C, JMS, .NET, Node.js, Golang clients

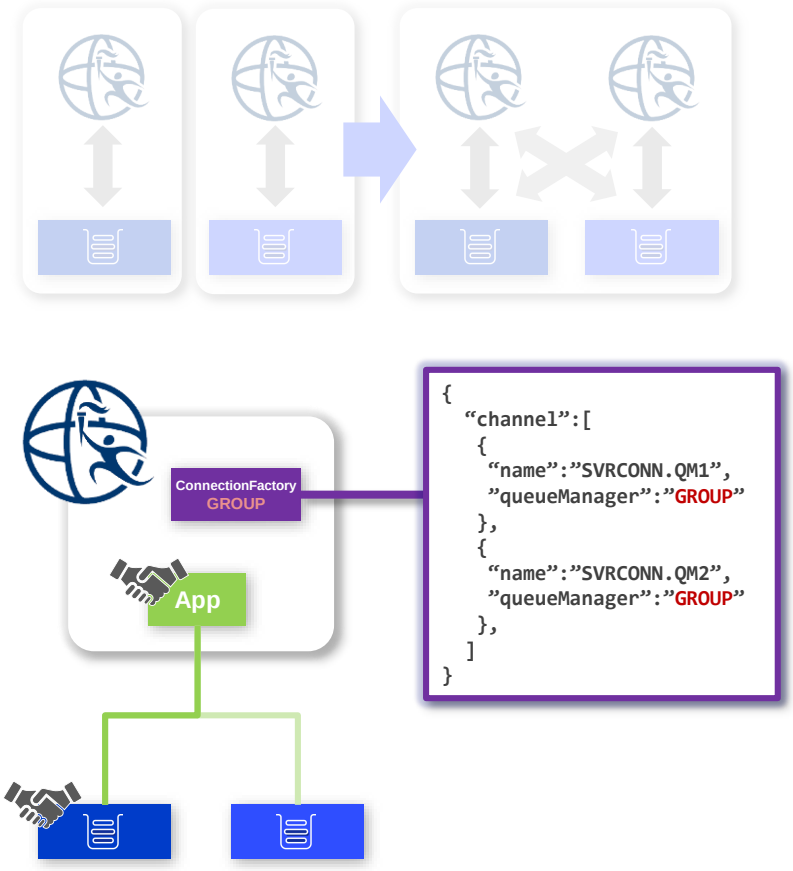


Building scalable and available solutions

WebSphere Liberty Transactions

Global transactions currently require a single queue manager to be named when connecting, complicating deployment and introducing single points of failure

WebSphere Liberty 18.0.0.2 and MQ 9.1.2 support the use of CCDT queue manager groups when connecting



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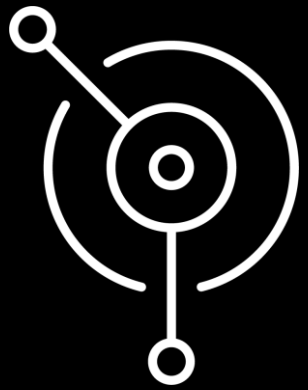
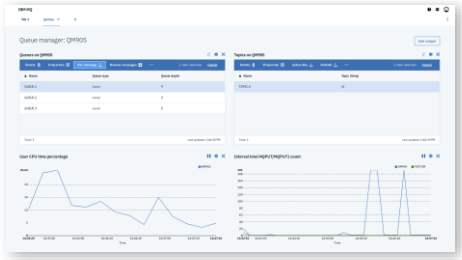


Managing MQ

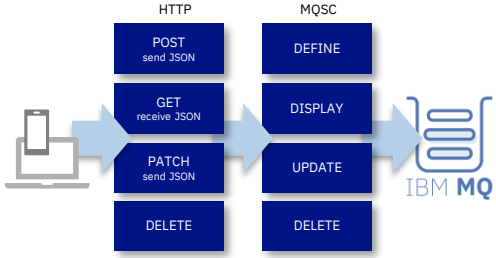
Living with your enterprise messaging system

Making management simpler

Web console
Simple to use, web based administration



RESTful administration
Administer and manage your queue managers over HTTPS



Logging and monitoring
Simplify the streaming of logs and metrics for centralized storage and analyzes

MQ logs streamed to MQ Appliance log targets

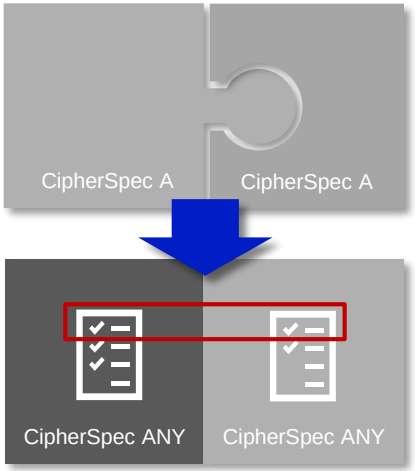
9.1.2

Managing channel CipherSpecs

Making it easier to keep up-to-date with ever changing ciphers, simplifying migration

Rather than needing to match the CipherSpec on both ends of a channel, MQ 9.1.1 CD introduced ***ANY_TLS12*** and MQ will negotiate the strongest CipherSpec available to both ends

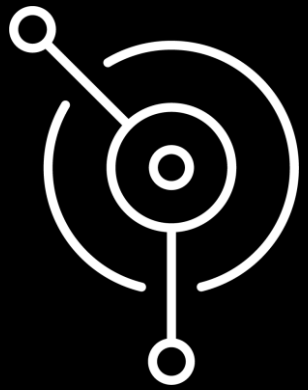
For 9.1.1, the distributed platforms also added the ability to whitelist *exactly* which CipherSpecs a queue manager will accept



Managed File Transfer

MFT manages your file transfers, and now it's even easier for you to manage MFT...

- **Simplified MFT Agent licensing**
  No need to track individual agents with MQ Advanced queue managers
- **Redistributable MFT agent**
  Simply download and unpack
- **Failed transfer timeout**
  Automatically stop transfers after repeated failures
- **Resource monitor backups**
  Simple, single command to backup and restore resource monitors
- **MFT agent, transfer and resource monitor monitoring through REST** — 9.1.1
- **File transfer initiation through simple REST call** — 9.1.2



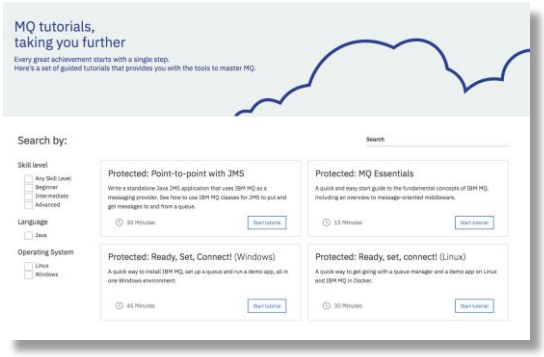
Helping developers

Making it easy to build MQ into your applications

Getting Started

Teach yourself MQ

ibm.biz/learn-mq



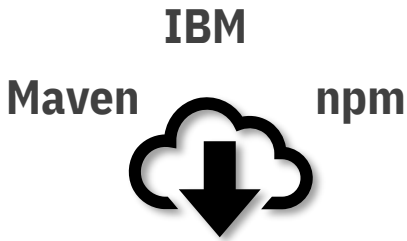
...and prove your skills

Developing applications

Build your applications simply, with no need for an MQ installation

- Pull Java directly from the Maven repository since MQ 9.0.4 CD
- MQ 9.1.1 CD added the **SDK** to the MQ redistributable client
- The redistributable client is now available directly, no need to log into IBM

ibm.biz/mqclientdownload



Develop your applications on the platform of your choice with the addition of the MacOS version of the 9.1.1 MQ client and SDK for Developers

ibm.biz/mqmacos

(The MQ for MacOS toolkit includes runmqsc)

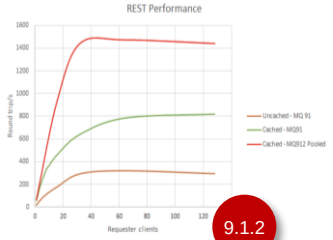
Writing new applications

REST Messaging

Providing a very simple way to get messages in and out of your MQ system

9.1.2 CD will boost the performance capability

REST



9.1.2

.NET Core

9.1.1 CD brought support for .NET Core on Windows

9.1.2 CD will add Linux support

.NET Core

Windows 9.1.1

Linux 9.1.2

Open Source language bindings

Write MQI applications in Node.js and Golang

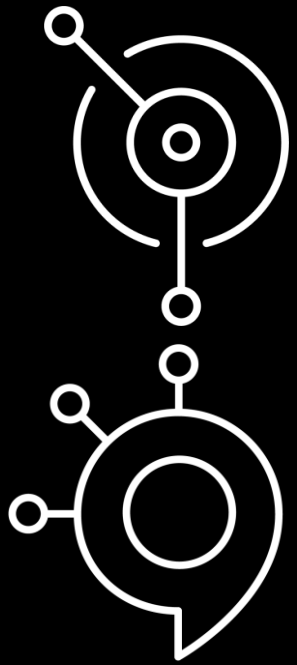
New simpler JMS style API for Golang

github.com/ibm-messaging

Node.js MQI

Golang MQI

Golang JMS NEW



Events

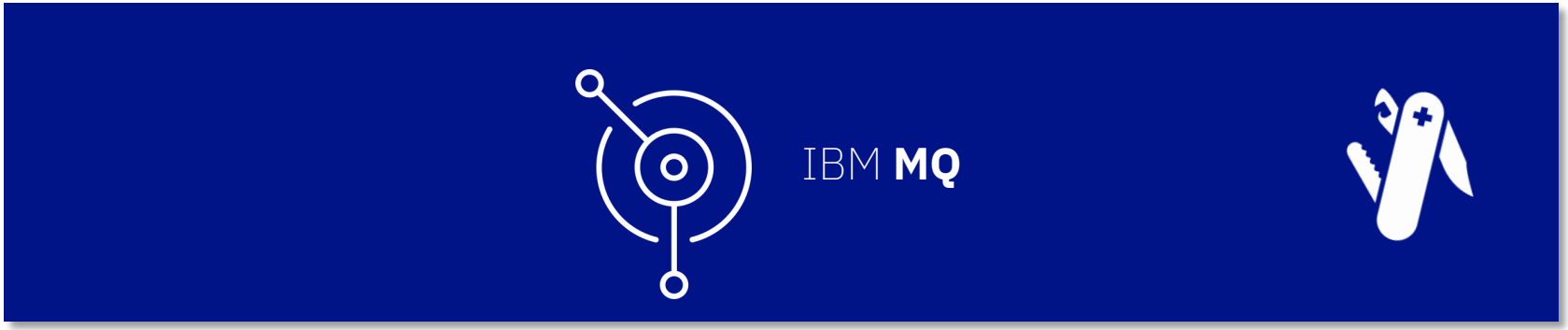
† also known as ***commands*** or ***operations***

Messages or Events?

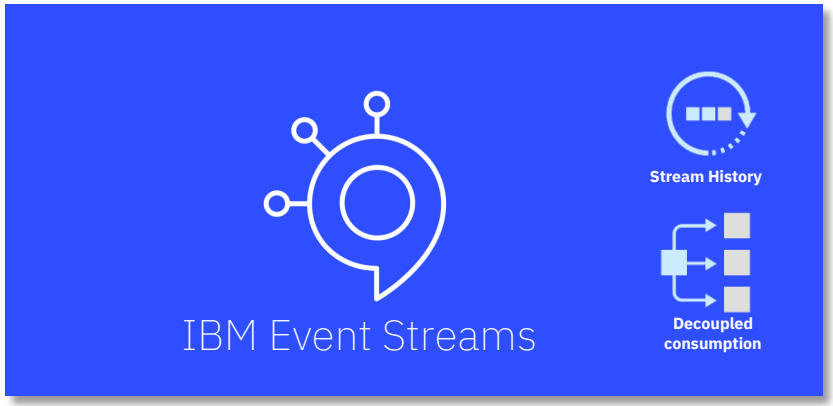
Messages† are *"work that needs to be done"*

Events are *"things that have happened"*

Generalised solution



Specialised technology



Specialised for **message exchange** and **transactions**

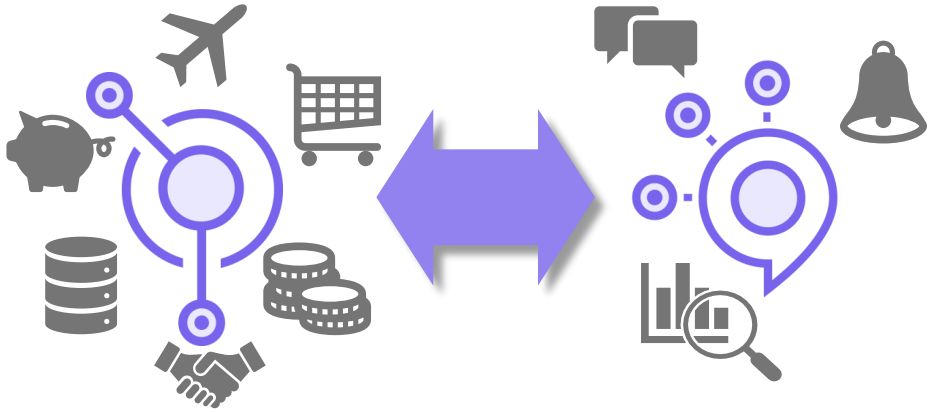
Specialised for **streaming** of **events**

IBM MQ with IBM Event Streams

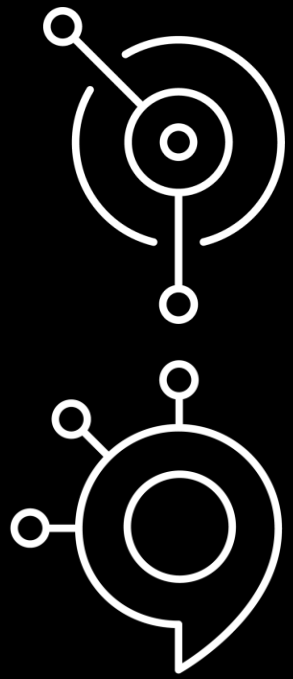
IBM MQ connects mission-critical systems, requiring **transactional**, **once-only delivery**

Event Streams distributes and processes streams of events in real-time to intelligently engage with customers

Connecting the two together, flowing messages and events between then, with the **supported connectors** enables you to unlock the potential of your data



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



Thank You

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