

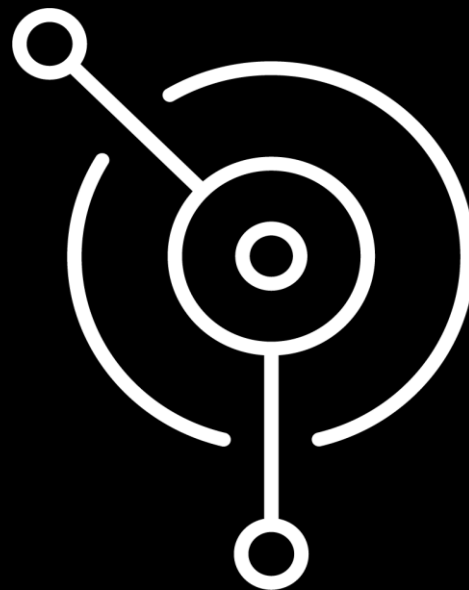
Messaging with IBM MQ

IBM MQ 9.2.3 CD

July 2021

David Ware

IBM MQ Chief Architect



Vision: IBM MQ is the cloud native choice for enterprise messaging

How can IBM MQ be cloud native? What is *cloud native*?

The infographic is titled "CLOUD NATIVE COMPUTING FOUNDATION" and "CLOUD NATIVE TRAIL MAP". It features a central winding path through a landscape with various icons representing different cloud native technologies. The path is divided into 10 numbered sections, each with a title and a list of associated technologies or concepts. The technologies shown include Docker, Kubernetes, Helm, Istio, Envoy, Linkerd, CNF, etcd, KV, V, CRP, CR, CRP, and CRP. The infographic also includes a "HELP ALONG THE WAY" section with sub-sections A, B, and C, and a "WHAT IS CLOUD NATIVE?" section. The "WHAT IS CLOUD NATIVE?" section is highlighted with a red box and contains the following text: "Cloud native technologies empower organizations to build and run scalable applications in modern, dynamic environments such as public, private, and hybrid clouds. Containers, service meshes, microservices, immutable infrastructure, and declarative APIs exemplify this approach. These techniques enable loosely coupled systems that are resilient, manageable, and observable. Combined with robust automation, they allow engineers to make high-impact changes frequently and predictably with minimal toil." The infographic also includes the CNCF logo, a QR code, and the website "cncf.io".

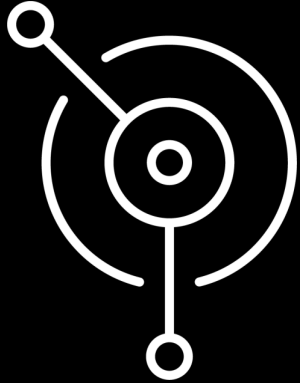
github.com/cncf/landscape#trail-map

WHAT IS CLOUD NATIVE?

Cloud native technologies empower organizations to build and run scalable applications in modern, dynamic environments such as public, private, and hybrid clouds. Containers, service meshes, microservices, immutable infrastructure, and declarative APIs exemplify this approach.

These techniques enable loosely coupled systems that are resilient, manageable, and observable. Combined with robust automation, they allow engineers to make high-impact changes frequently and predictably with minimal toil.

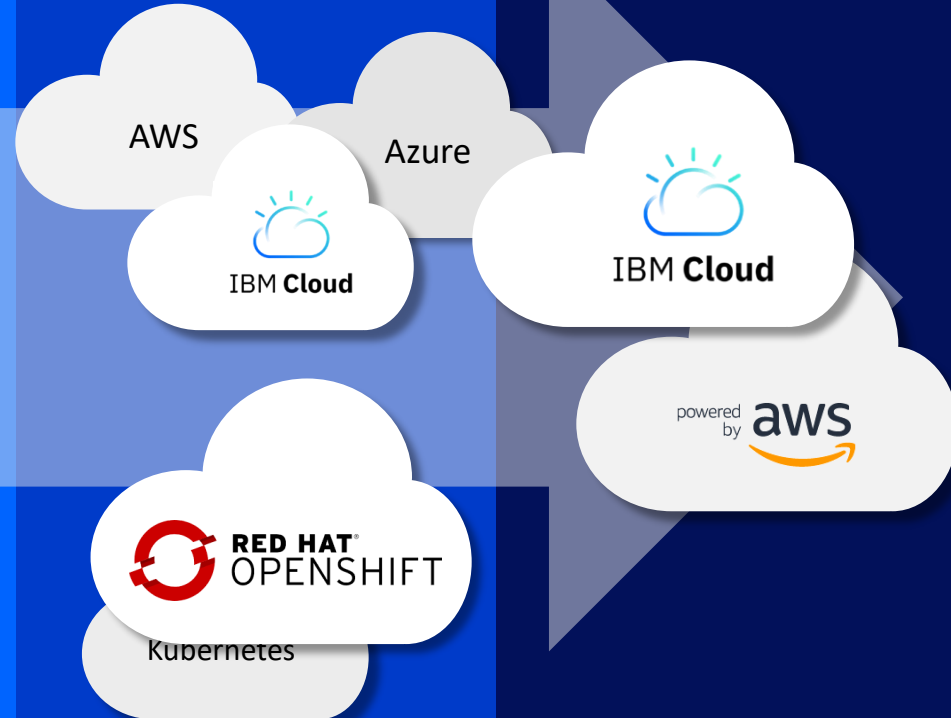
A focus on where you need MQ today and tomorrow



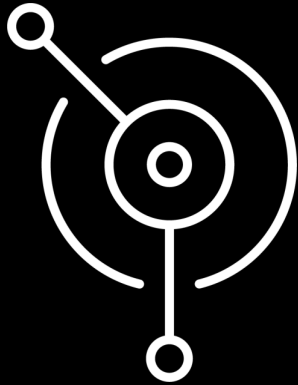
On-premise, software and the MQ Appliance, exactly as you need it



Run MQ yourself in public or private clouds, virtual machines or containers

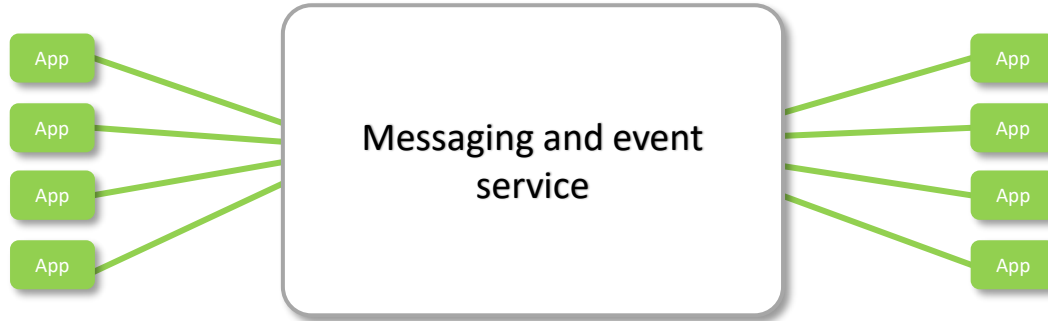


Let IBM host MQ for you with its managed SaaS MQ service in public clouds, IBM Cloud and AWS



Availability and scalability

A messaging and event service

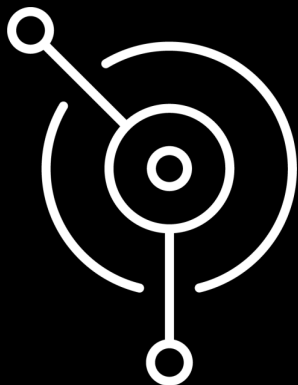


Purpose

Loosely couple applications
Shield applications from their own availability issues

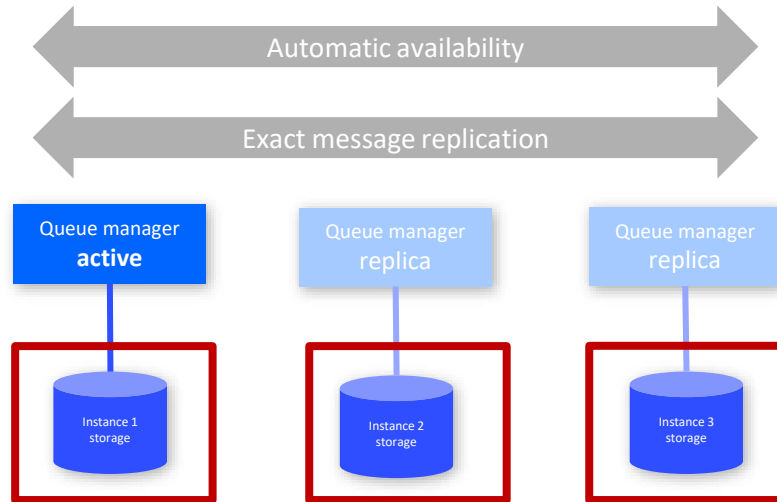
Requirements

Scale with the application
Don't lose the messages
Be more available than the applications



Cloud native availability

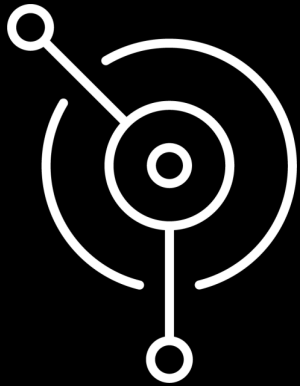
Replication and consensus



Messages persisted in three locations

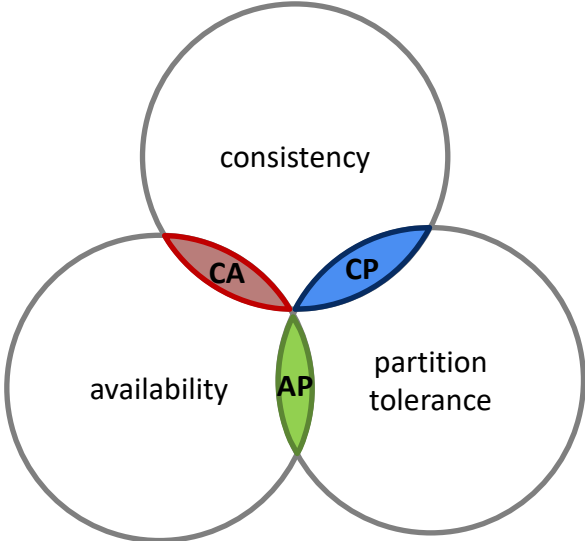
Exact replicas, maintaining configuration, message order, transactional state

Quorum ensures consistency and rapid failure detection and recovery

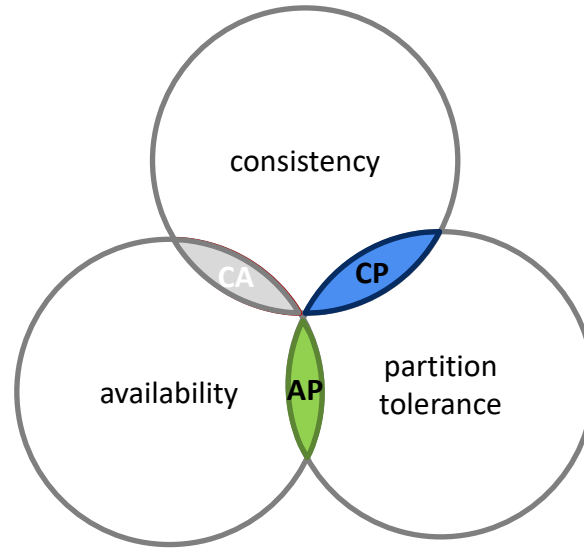


Demo

A little bit of CAP theory

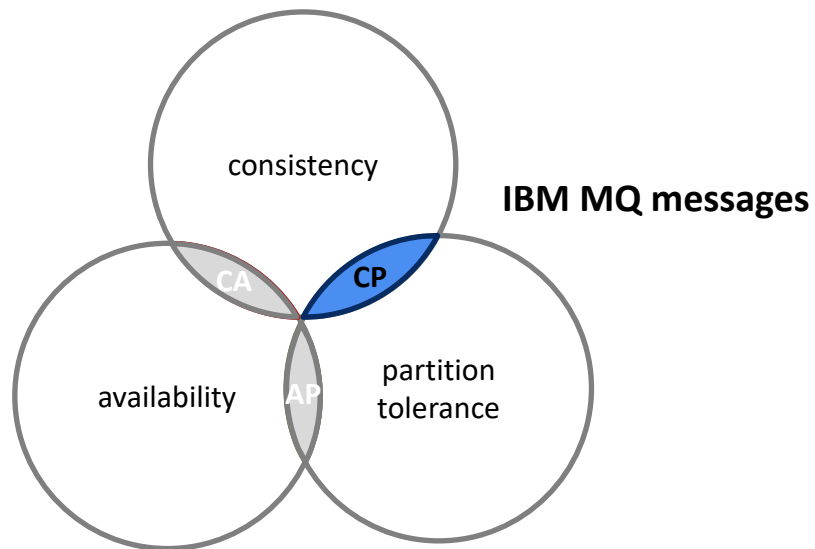


A little bit of CAP theory



In the event of failures, which will this system sacrifice?
consistency or availability?

A little bit of CAP theory

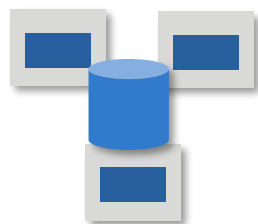


In the event of failures, which will this system sacrifice?
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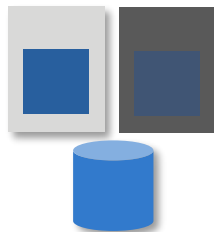
When choosing consistency, it's about **maximizing** availability
as much as possible, it's never an RTO of zero

The solution as a **leader/follower** model

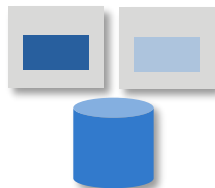
Constantly evolving to meet your availability needs



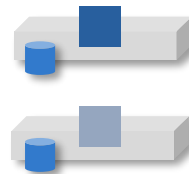
z/OS Queue Sharing Groups



System managed HA



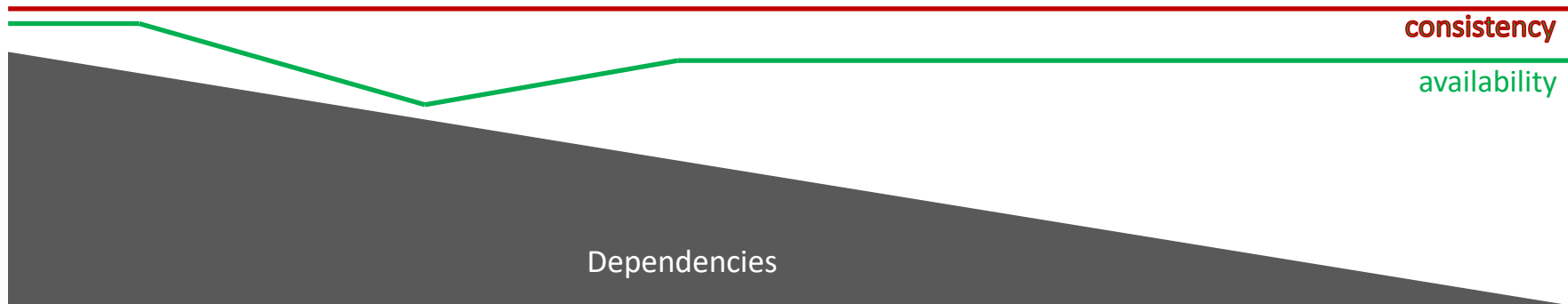
Multi-instance queue managers



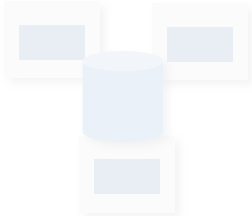
MQ Appliance



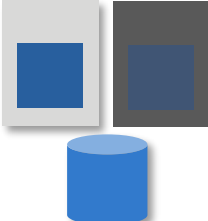
Replicated data queue manager



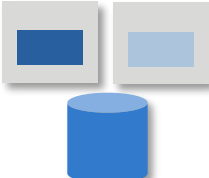
Message availability in the cloud



z/OS Queue Sharing Groups



System managed HA



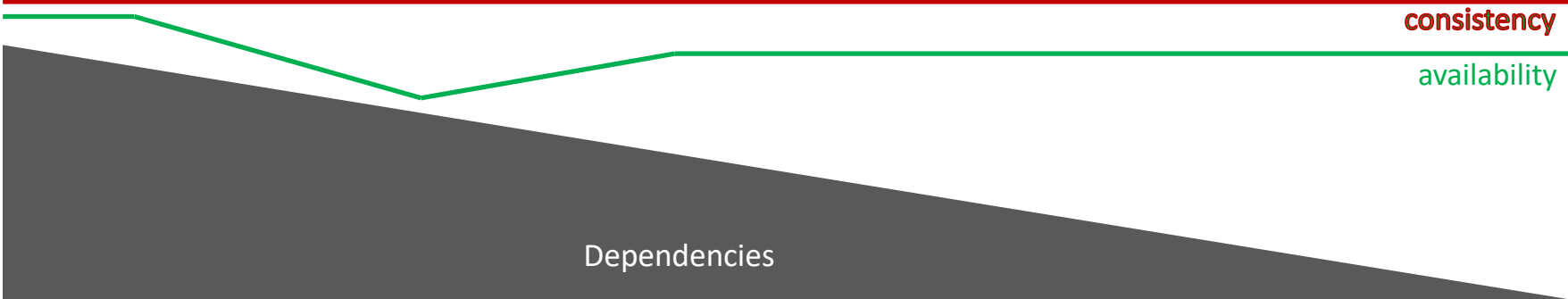
Multi-instance queue managers



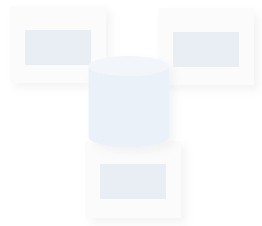
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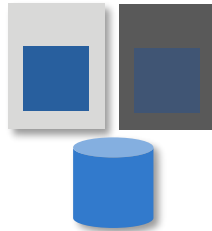
Replicated data queue manager



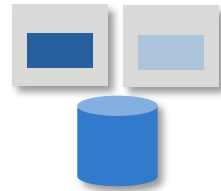
Message availability in containers



z/OS Queue
Sharing Groups



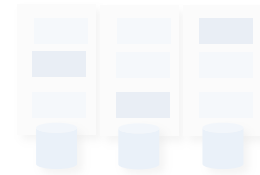
System managed
HA



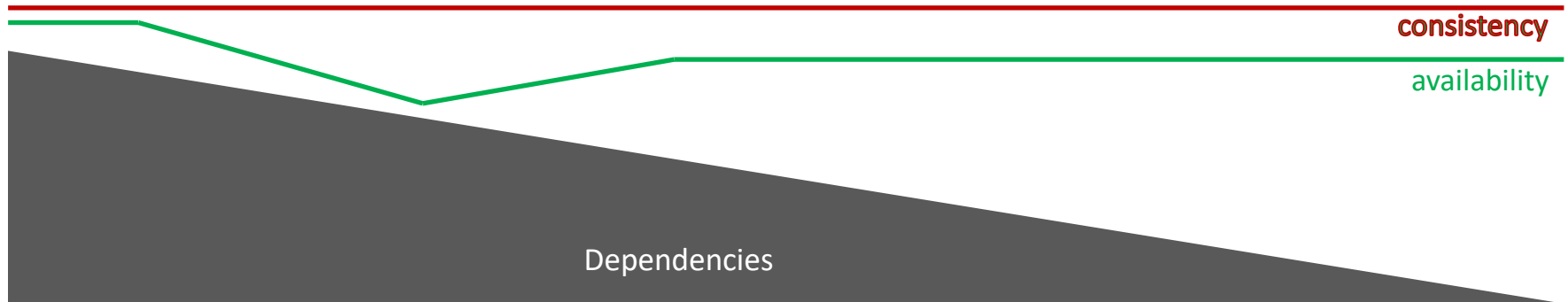
Multi-instance
queue managers



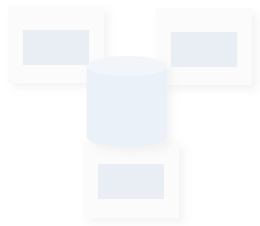
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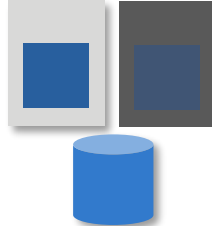
Replicated data
queue manager



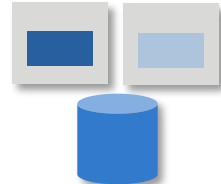
Cloud native message availability



z/OS Queue Sharing Groups



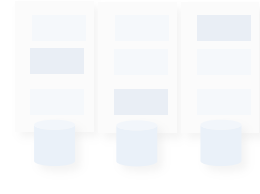
System managed HA



Multi-instance queue managers



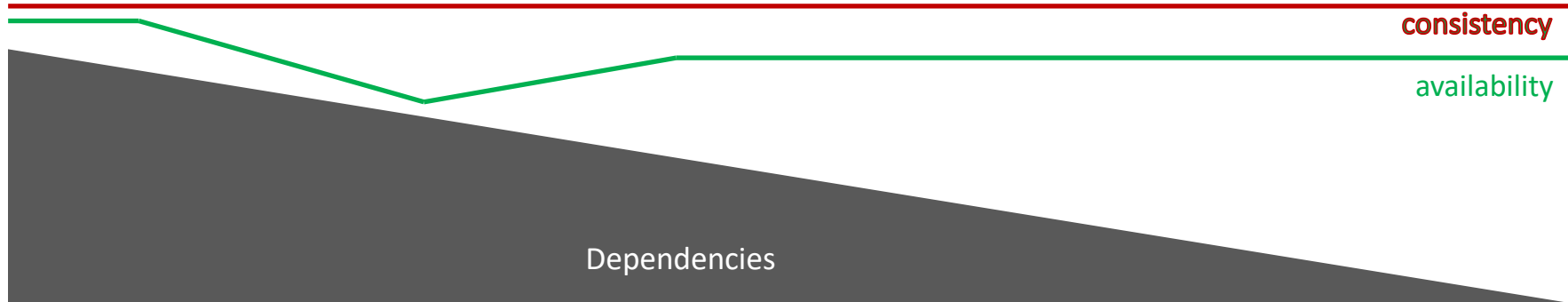
MQ Appliance



Replicated data queue manager

MQ 9.2.3 CD
in OpenShift with Cloud Pak
for Integration

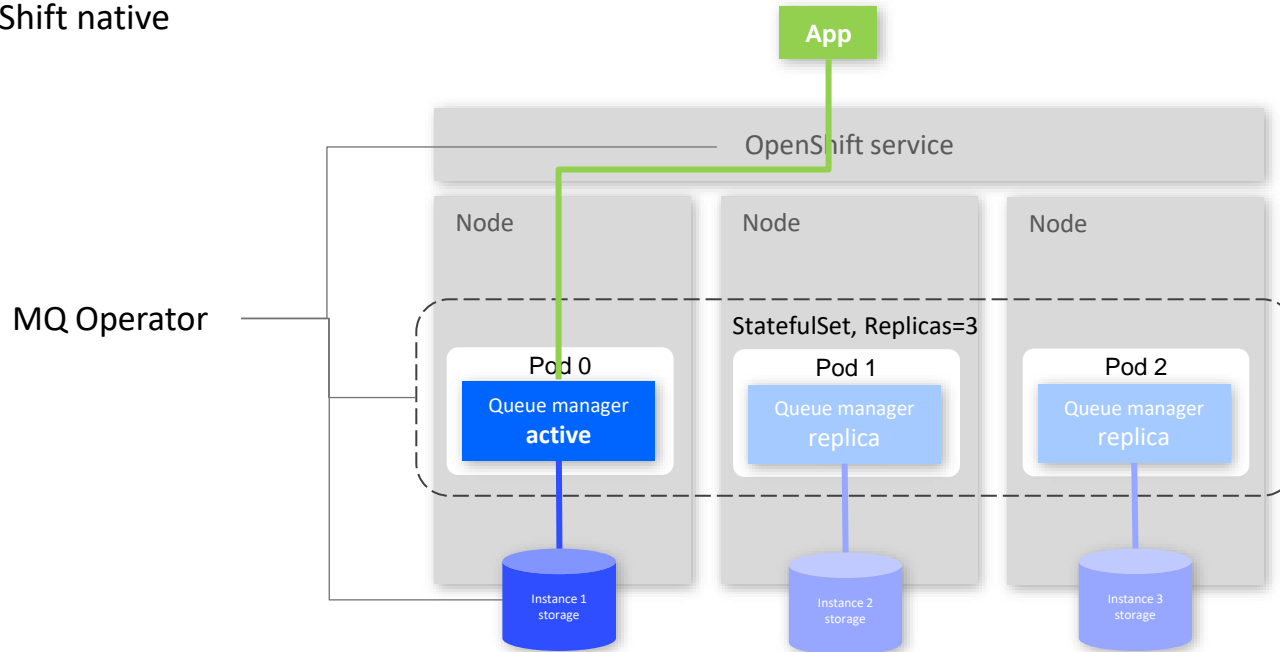
Native HA



MQ Native HA

OpenShift native

New in MQ 9.2.3
Available for OpenShift with
Cloud Pak for Integration



Availability:

cross AZ **RPO=0**, RTO “a few seconds”

Compatibility:

simple RWO block storage requirement

Cost:

Included in CP4I license (MQ Advanced ratio)

Complexity:

No external services to manage

Performance:

Network + block storage

MQ Native HA

Solution: Convert MQ's persistence layer to be cloud native

New in MQ 9.2.3
Available for OpenShift with
Cloud Pak for Integration

Problems to solve:

MQ persistent data replicated across AZs
Consistency across replicas guaranteed
Fast and reliable failure detection and fail over

Raft

A proven, yet *understandable*, consensus algorithm

Based on the concept of a **sequential log of state changes**



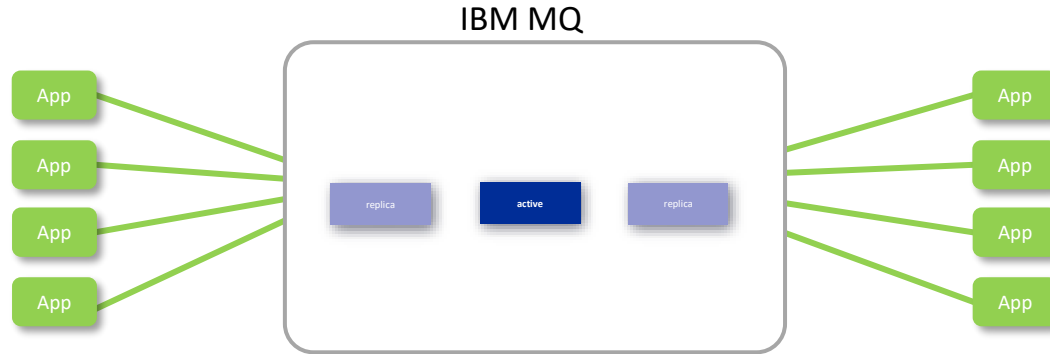
IBM MQ

A proven, high performing and reliable, messaging solution

Built from day one around a **sequential log of state changes**



A messaging and event service



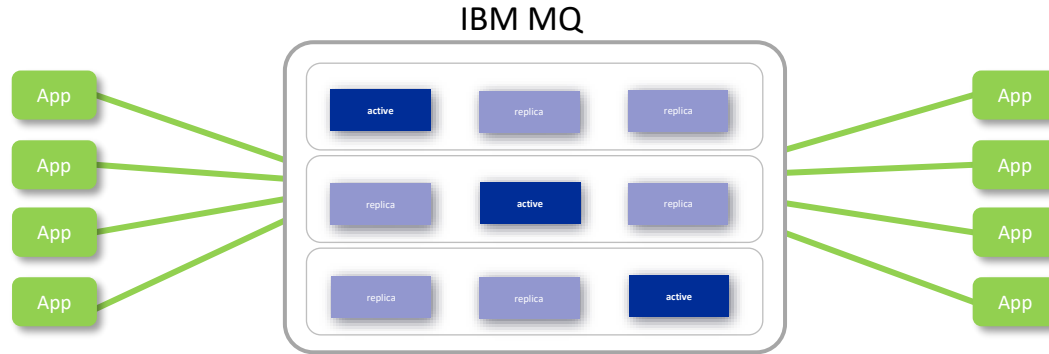
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Loosely couple applications
Shield applications from their own availability issues

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Don't lose the messages
Be more available than the applications

A messaging and event service

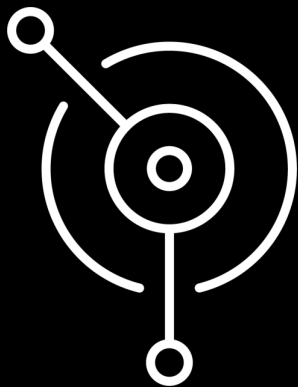


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Always-on

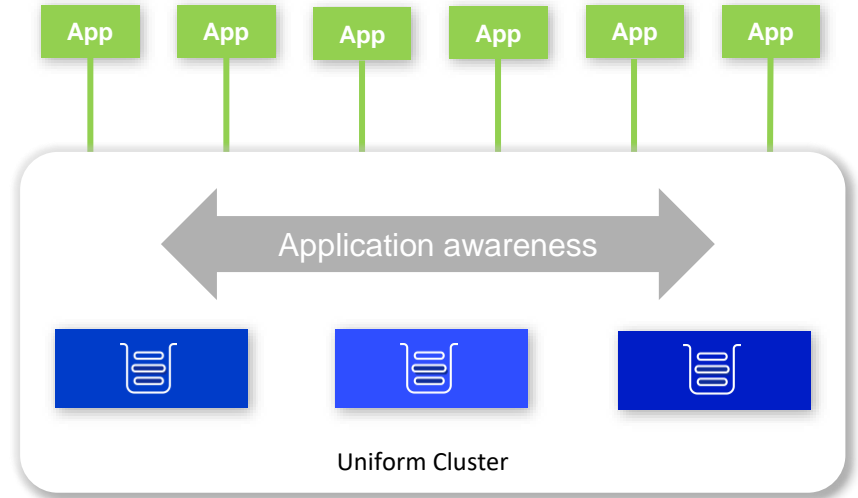
Building scalable, active-active, solutions

Always-on MQ

To provide an active/active, solution you need to consider multiple active queue managers acting as a *single messaging service*

Applications should treat the queue managers as interchangeable and want to connect to the group in the most efficient and available distribution

With IBM MQ 9.2 LTS, queue managers can form a **uniform cluster**, each queue manager provides the same messaging capabilities



Always-on MQ

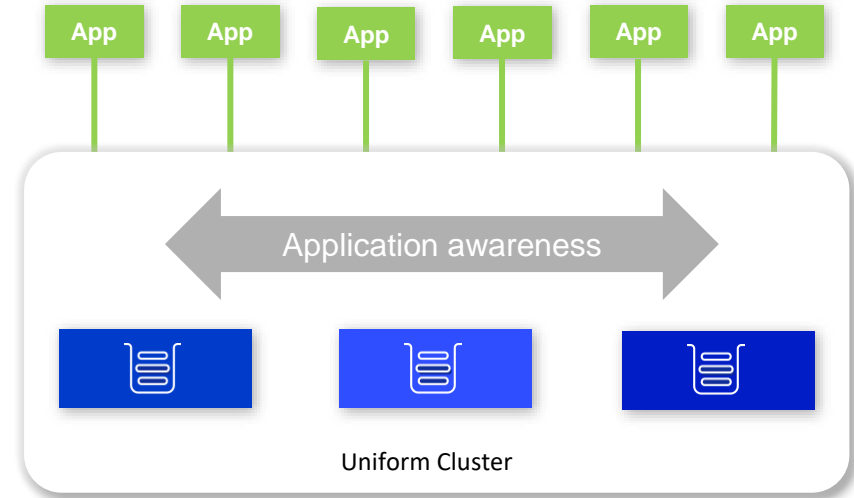
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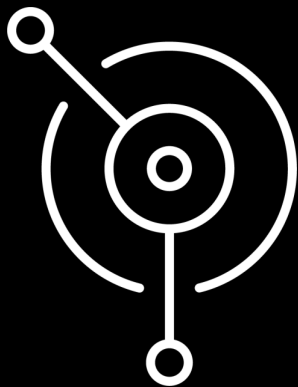
With IBM MQ 9.2 LTS, queue managers can form a **uniform cluster**, each queue manager provides the same messaging capabilities

Application language and environment support has been growing ever since MQ first delivered uniform clusters.

IBM MQ 9.2.3 Resource Adapter adds JEE Message Driven Bean support to automatically balance your clustered MDB applications.



New in MQ 9.2.3
Resource Adapter



Insight to your data

Stream MQ data to new applications

MQ Streaming Queues

Tap into the value of existing data flowing over MQ by making message data available to Kafka, AI, and analytics applications with **zero impact to the existing applications or their messages**, and without a need for re-architecting your message flows.

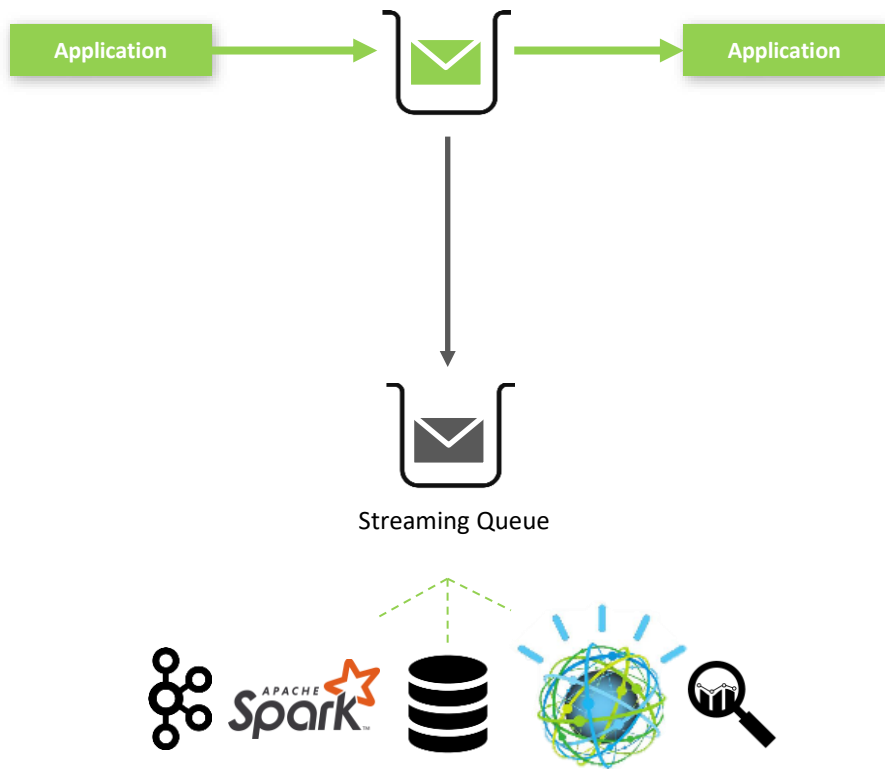
- 1. **Streaming Processing** to accelerate time to insight from existing data.
- 2. **Real world data** to accurately simulate production workloads to test the impact of architectural changes on applications.
- 3. **Auditing and Replay** of data in the event of disasters. Auditing and replay use cases require exact duplicates of message content as well as message attributes including Message IDs, coral IDs etc.

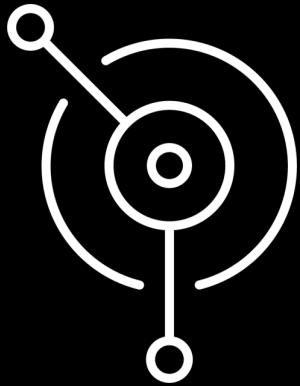


MQ Streaming Queues

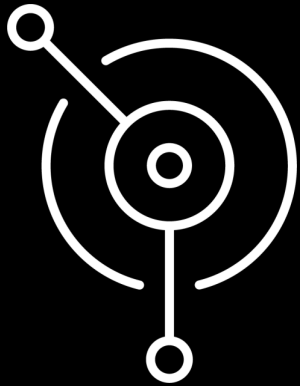
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Demo



Managing MQ

New Web Console

MQ 9.2 replaces the existing web console with a new web console across all platforms

Focus is on user experience and consistency across IBM products

Manage: Queue managers

541 Local Queue Managers | 7 Remote Queue Managers | 12 Stopped

Queue manager name	Connection type	Version	Number of connections	Status
QM1	Local	1.1.1	123	Running
QM23126804713480212	Remote	1.1.1	123	Running
QM468099	Remote	1.1.1	123	Running
QM23126804713480212	Local	1.1.1	123	Stopped
QM23795417394237390486V2433985L	Local	1.1.1	123	Running
QM23126804713480212	Remote	1.1.1	123	Running
QM293495	Remote	1.1.1	123	Deploying

Queue manager: QM1

13 Full capacity | 7 >50% capacity | 23 <1% capacity

Queue name	Queue type	Queue depth %	Maximum queue depth	Queue manager name
Q24605	Local	XX / XXX		QM63235
QM468400	Model	XXX /	XX / XXX	QM63235
Q12379941739423346F	Remote	XXX /	XX / XXX	QM63235
QM8993	Local	XXX /	XX / XXX	QM63235
Q4179434239245494242452352542L	Local	XXX /	XX / XXX	QM88339082450963

Local Queue: Q24601

11 messages (5.5%) | Maximum queue depth: 200

Timestamp	Application ID	User ID	Application Data
Oct 21, 2019 3:06:45 PM	App1	admin	Hello World
Oct 21, 2019 3:06:45 PM	App1	admin	Commodo Vestibulum
Oct 21, 2019 3:06:45 PM	App1	admin	Hello World
Oct 21, 2019 3:06:45 PM	App1	admin	Vestibulum id Egesta
Oct 21, 2019 3:06:45 PM	App1	admin	Hello World
Oct 21, 2019 3:06:45 PM	App1	admin	Hello World

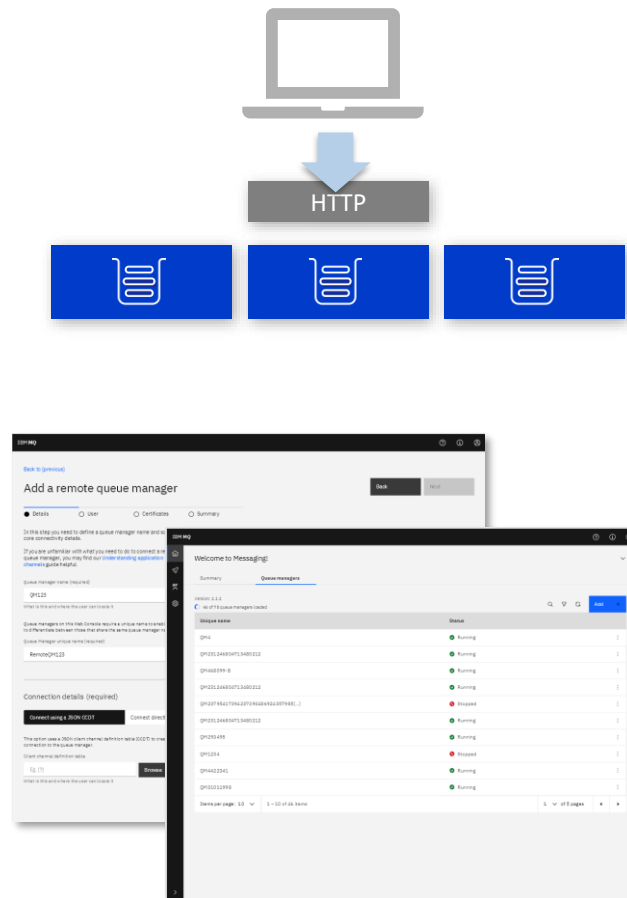
<https://community.ibm.com/community/user/imwuc/blogs/callum-jackson1/2020/04/09/enhanced-web-console-in-ibm-mq-915>

Central Web Console

Originally, the web server component of MQ that underpins the web console was collocated with the queue managers. A simple way to point at each MQ installation and see the queue managers there.

With IBM MQ 9.2.3 CD you can point a browser at a single system, one that just hosts the MQ web server, and now manage multiple queue managers across multiple systems, of any type.

New in MQ 9.2.3
All installable platforms



Vision: IBM MQ is the cloud native choice for enterprise messaging

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...continually evolving

Thank you

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IBM MQ Chief Architect

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