# Messaging with IBM MQ

IBM MQ 9.2.3 CD

July 2021

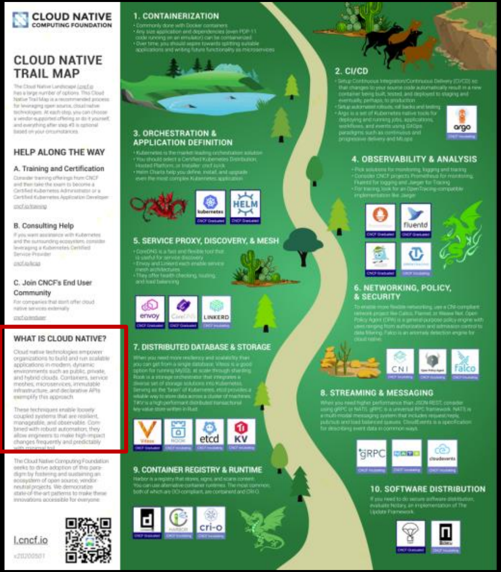
David Ware

IBM MQ Chief Architect

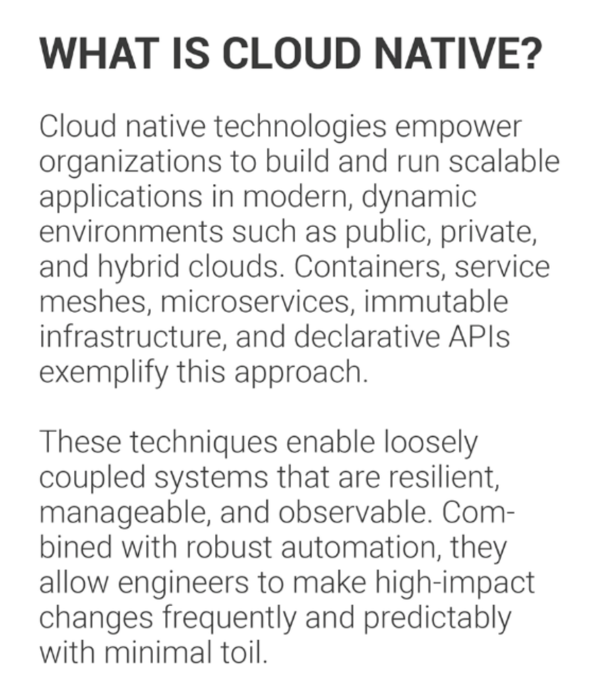
# **Vision:** IBM MQ is the **cloud native** choice for enterprise messaging

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

CLOUD NATIVE
COMPUTING FOUNDATION


CLOUD NATIVE COMPUTING FOUNDATION
CLOUD NATIVE TRAIL MAP
HELP ALONG THE WAY
A. Training and Certification
B. Consulting Help
C. Join CNCF's End User Community
WHAT IS CLOUD NATIVE?
1. CONTAINERIZATION
2. CI/CD
3. ORCHESTRATION & APPLICATION DEFINITION
4. OBSERVABILITY & ANALYSIS
5. SERVICE PROXY, DISCOVERY, & MESH
6. NETWORKING, POLICY, & SECURITY
7. DISTRIBUTED DATABASE & STORAGE
8. STREAMING & MESSAGING
9. CONTAINER REGISTRY & RUNTIME
10. SOFTWARE DISTRIBUTION
l.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.

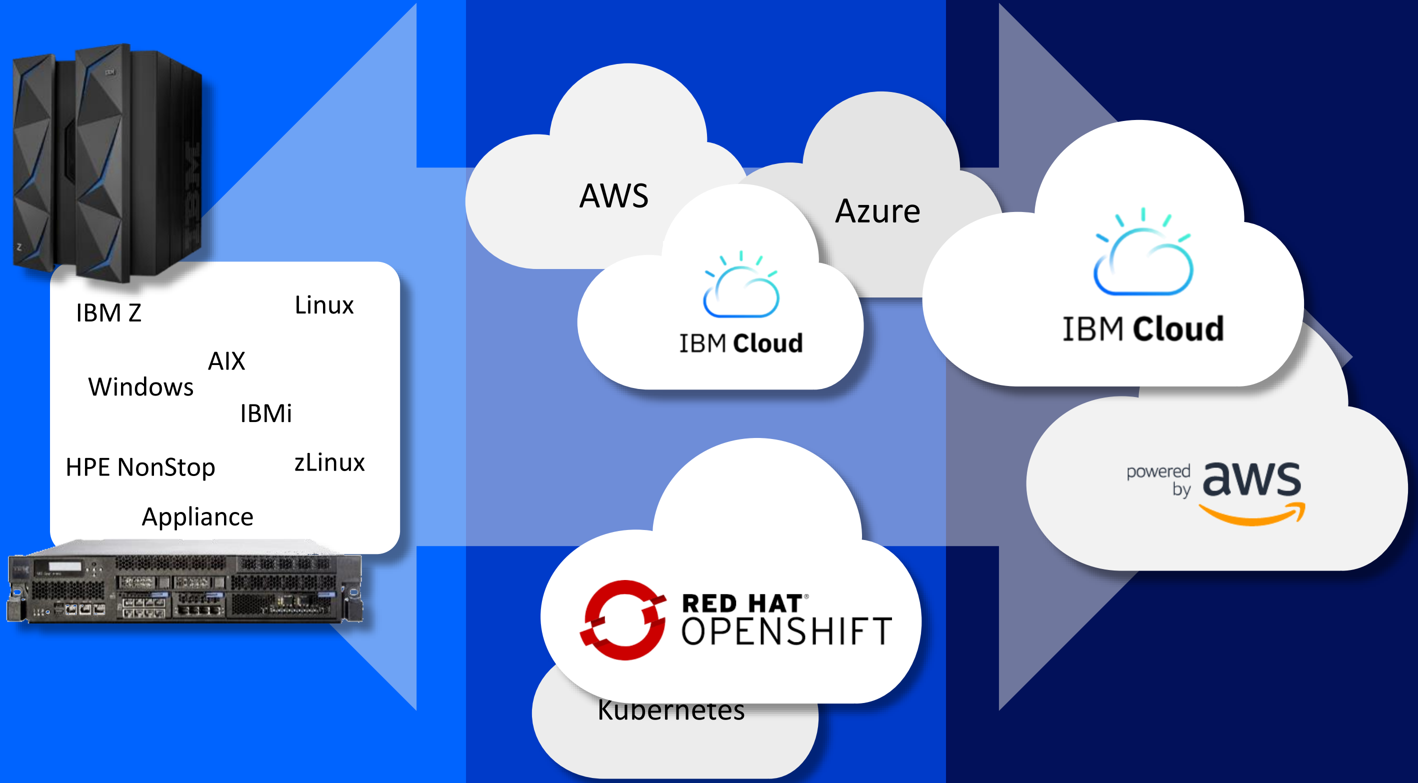
These techniques enable loosely coupled systems that are resilient, manageable, and observable. Combined with robust automation, they allow engineers to make high-impact changes frequently and predictably with minimal toil.

## 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



IBM Z

Linux

AIX

Windows

IBMi

HPE NonStop

zLinux

Appliance

AWS

Azure

IBM Cloud

RED HAT OPENSHIFT

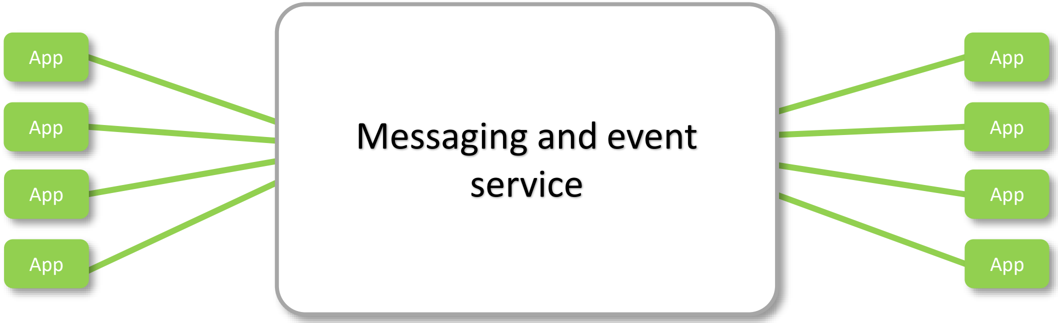
Kubernetes

IBM Cloud

powered by 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

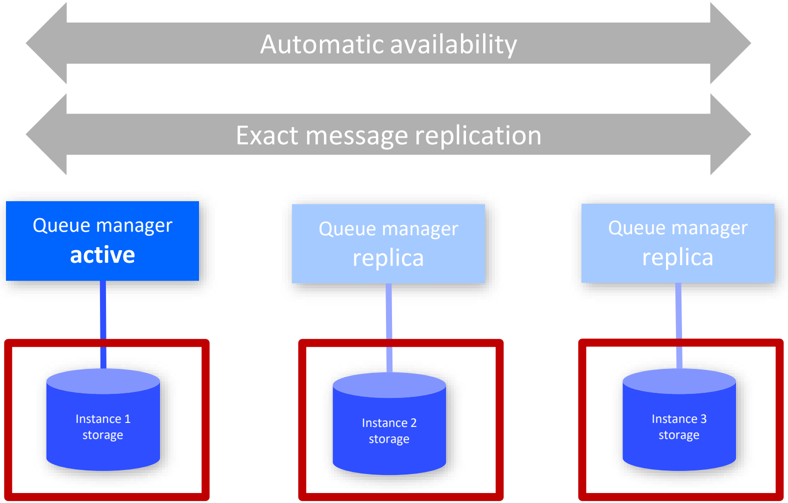
Be more available than the applications

# Cloud native availability

Replication and consensus

# MQ Native HA

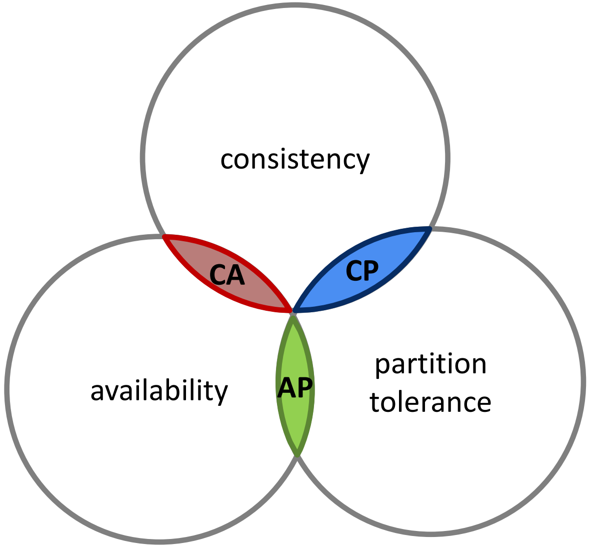
New in MQ 9.2.3
Available for OpenShift with
Cloud Pak for Integration



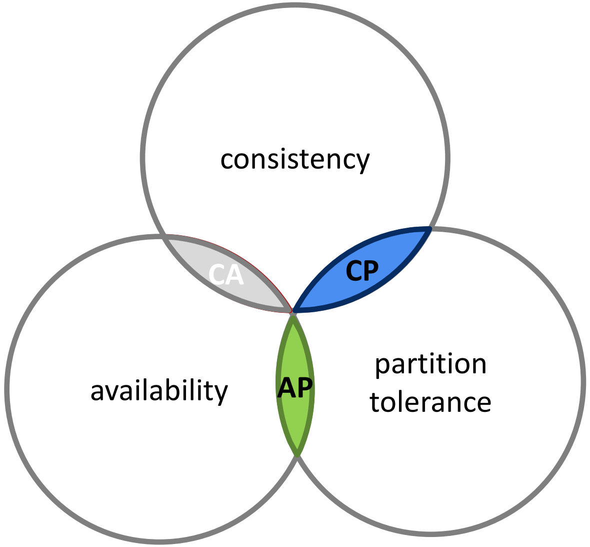
Messages persisted in three locations
Exact replicas, maintaining configuration, message order, transactional state
Quorum ensures consistency and rapid failure detection and recovery

# Demo

# A little bit of CAP theory

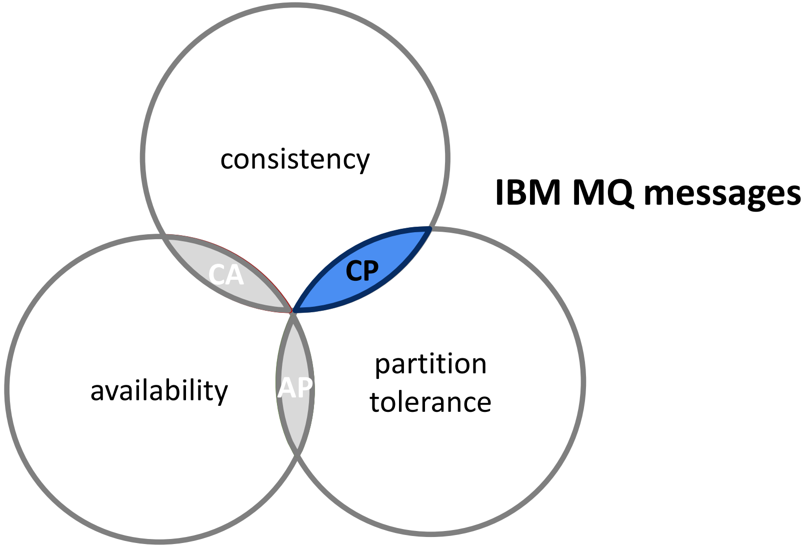


# A little bit of CAP theory



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

# A little bit of CAP theory

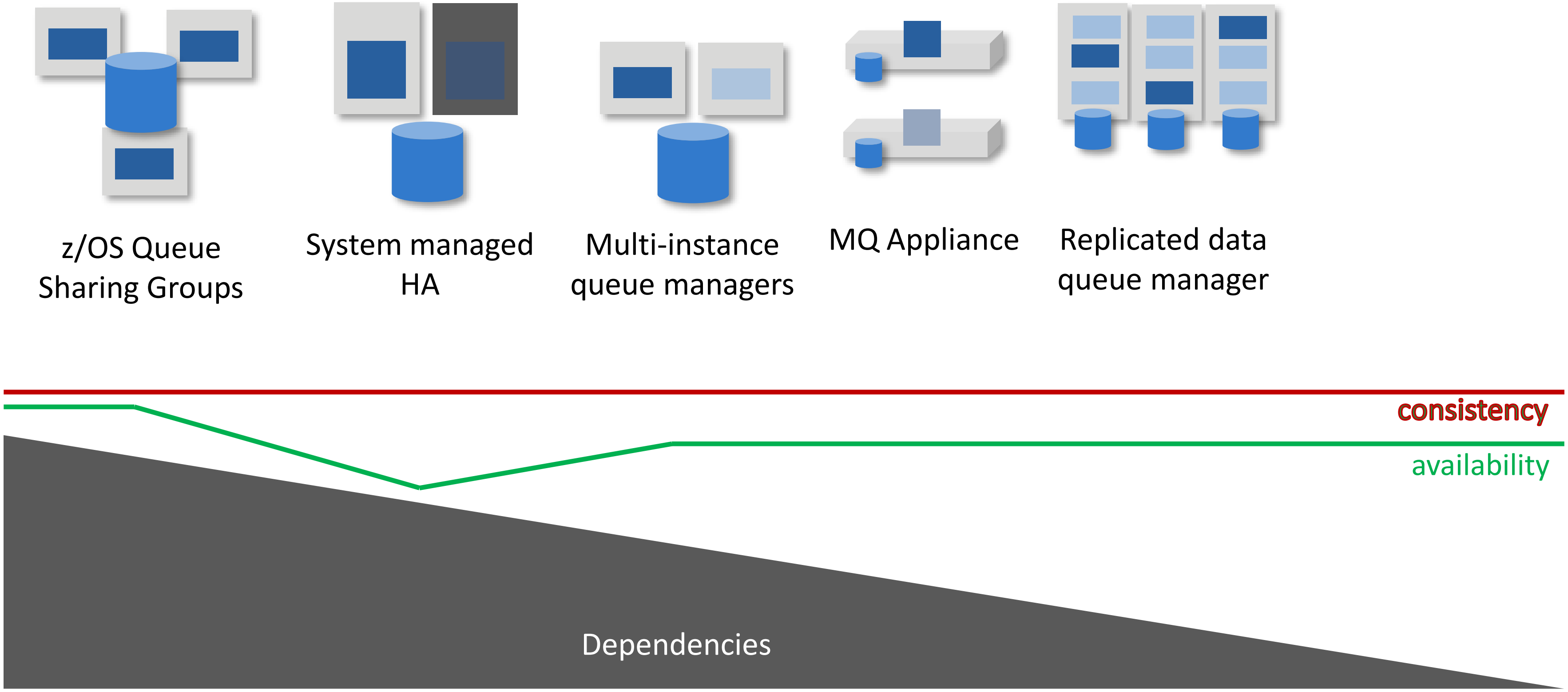


In the event of failures, which will this system sacrifice?
consistency or availability?

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

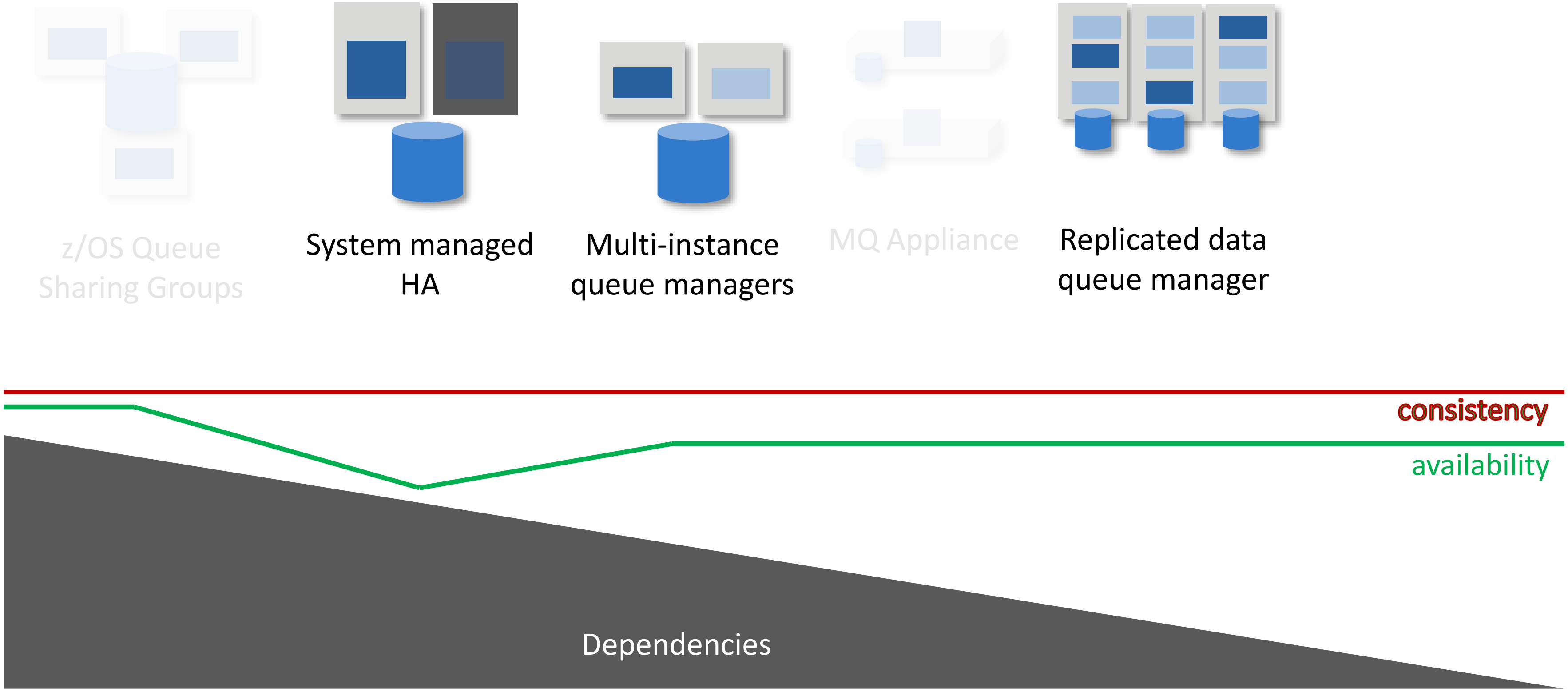
System managed HA

Multi-instance queue managers

MQ Appliance

Replicated data queue manager

# Message availability in the cloud



z/OS Queue Sharing Groups

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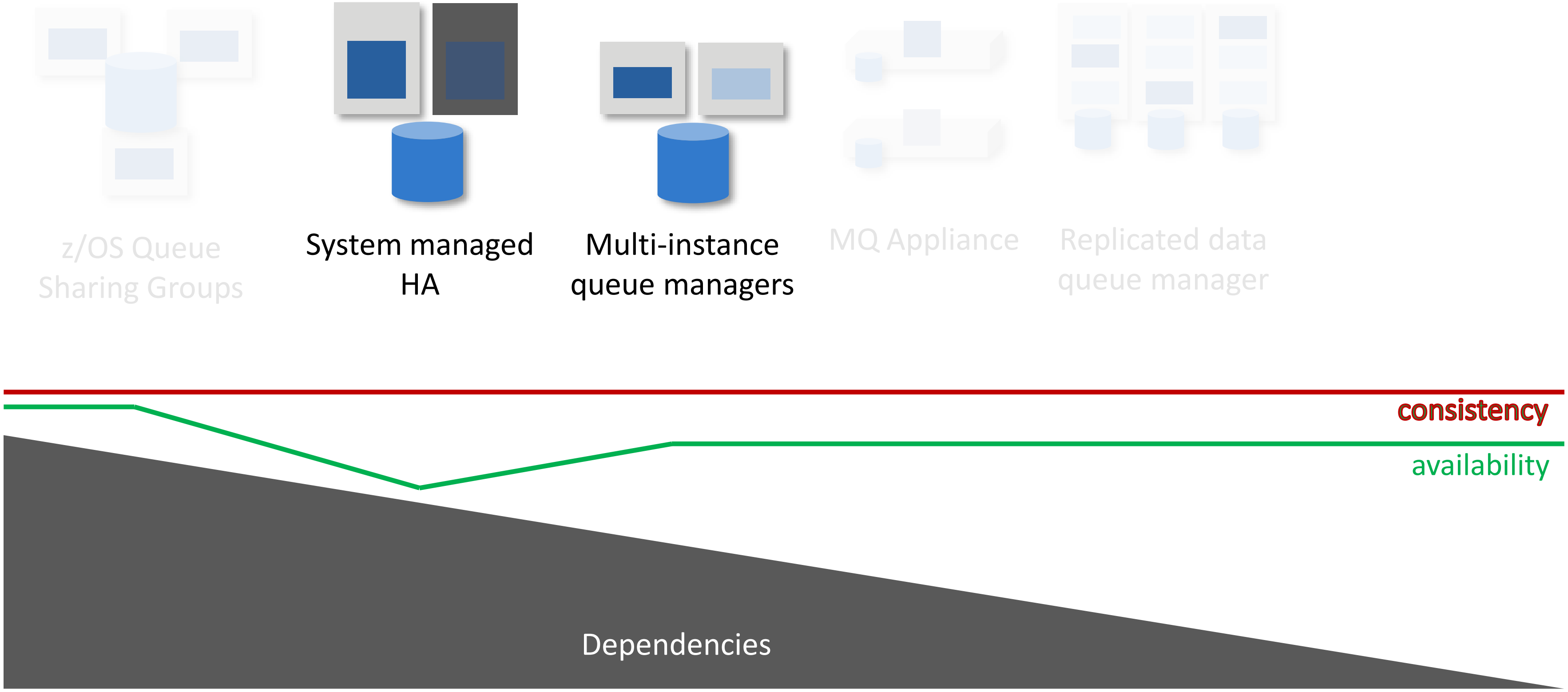
consistency

availability

Dependencies

# Message availability in containers



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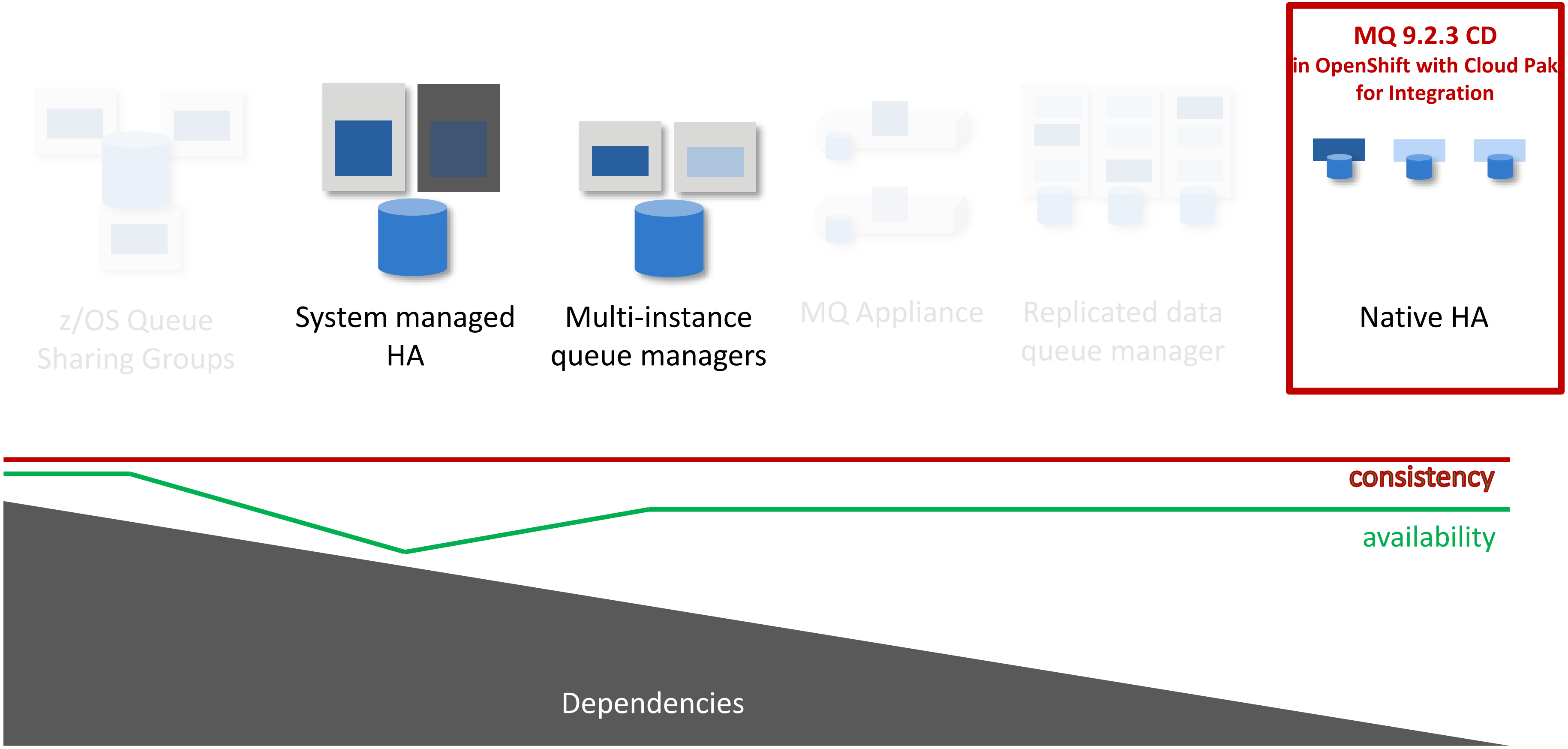
# Cloud native message availability



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**MQ 9.2.3 CD**
**in OpenShift with Cloud Pak for Integration**

Native HA

consistency

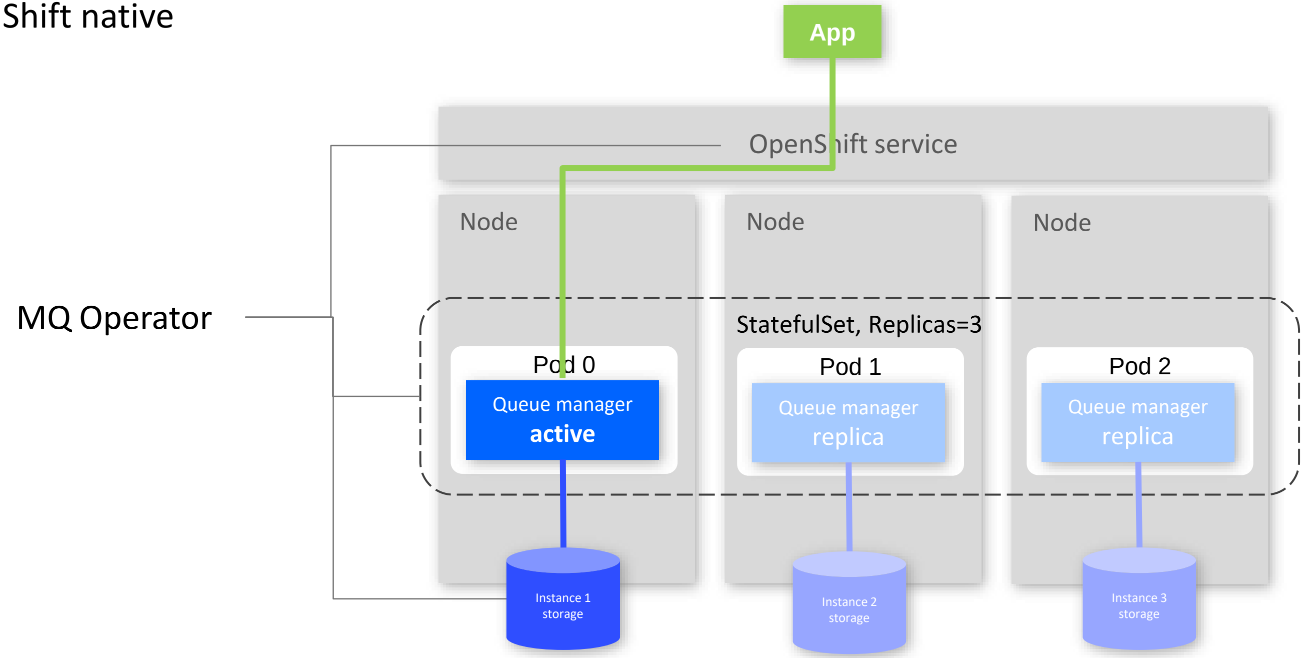
availability

Dependencies

# 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

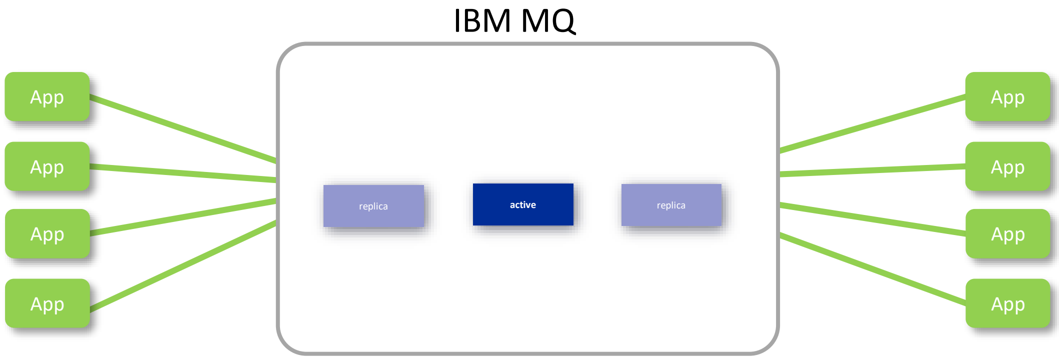
Based on the concept of a **sequential log of state changes**

## 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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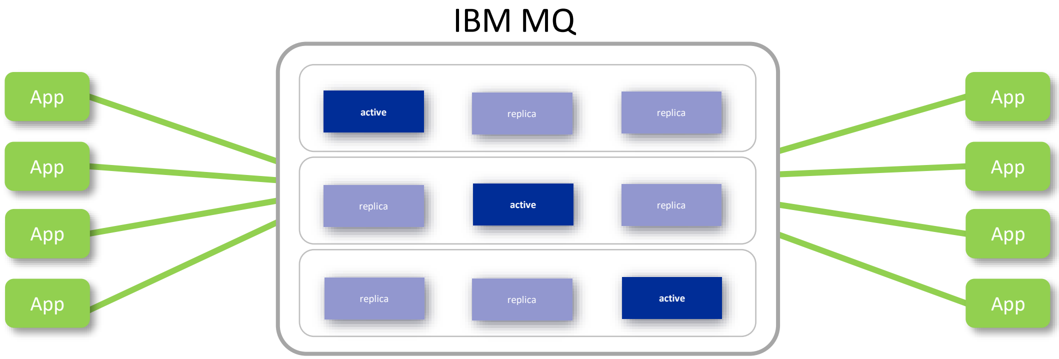

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# Always-on

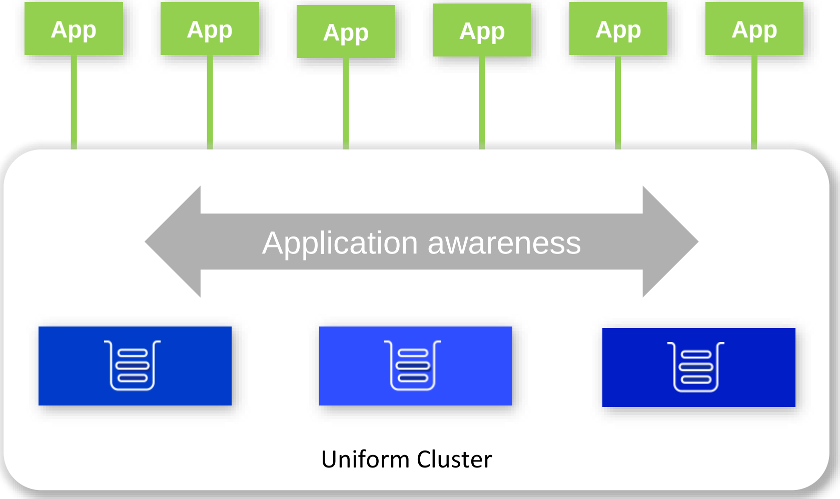
Building scalable, active-active, solutions

# 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



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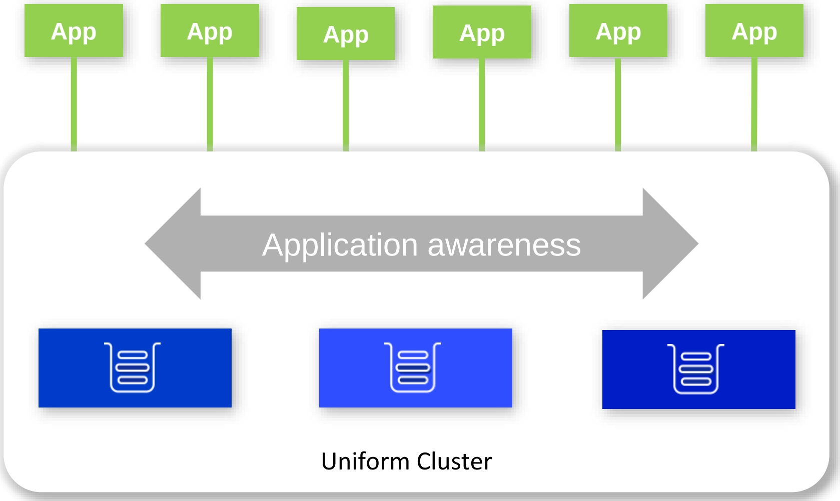


Application language and environment support has been growing ever since MQ first delivered uniform clusters.

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

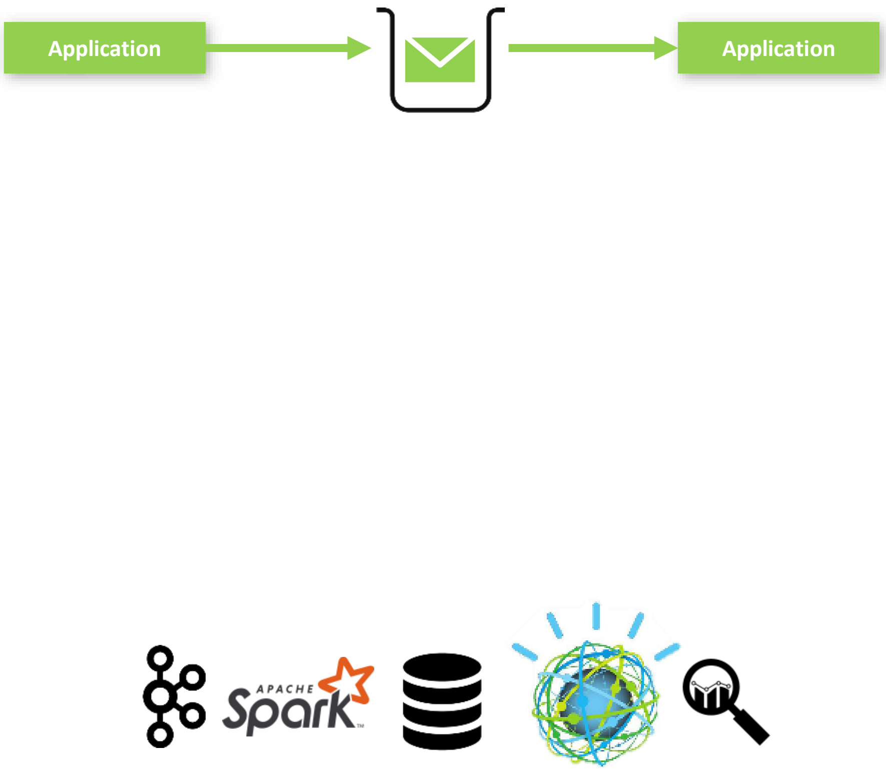
Stream MQ data to new applications

# MQ Streaming Queues

New in MQ 9.2.3
Distributed platforms

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.



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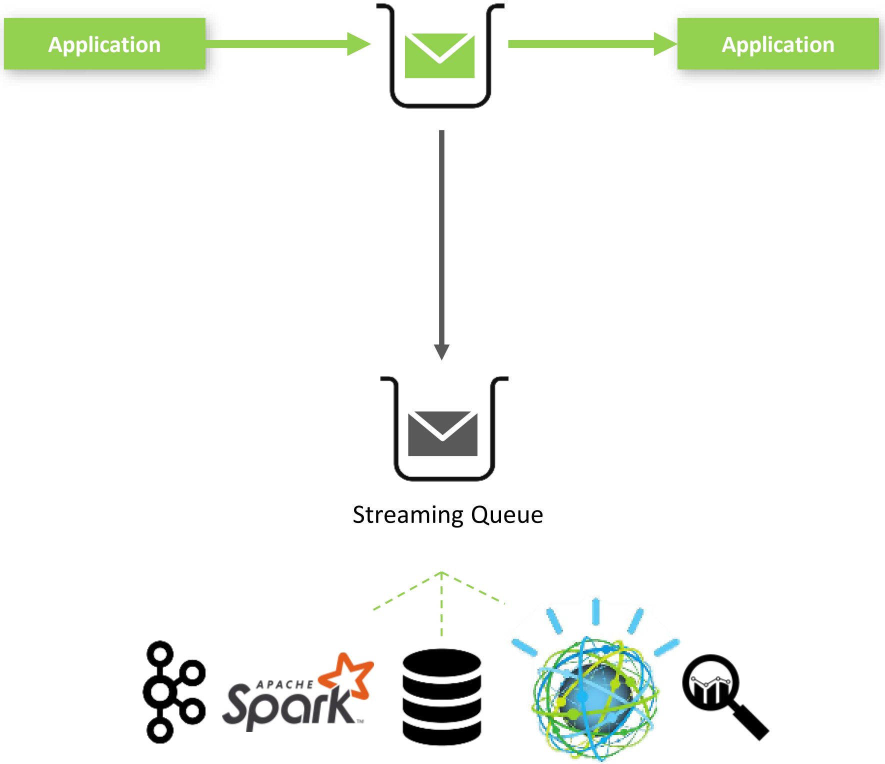


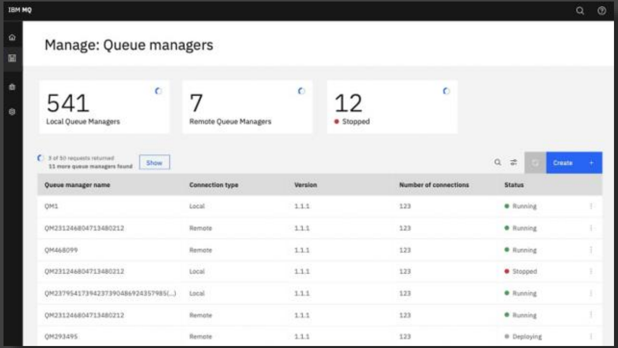
# Demo

# 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

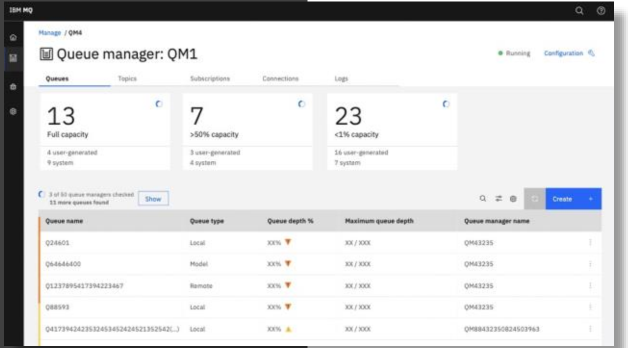
541 Local Queue Managers

7 Remote Queue Managers

12 ● Stopped

3 of 50 requests returned
11 more queue managers found

| Queue manager name | Connection type | Version | Number of connections | Status |
|---|---|---|---|---|
| QM1 | Local | 1.1.1 | 123 | ● Running |
| QM231246804713480212 | Remote | 1.1.1 | 123 | ● Running |
| QM468099 | Remote | 1.1.1 | 123 | ● Running |
| QM231246804713480212 | Local | 1.1.1 | 123 | ● Stopped |
| QM237954173942373904869243579850(...) | Local | 1.1.1 | 123 | ● Running |
| QM231246804713480212 | Remote | 1.1.1 | 123 | ● Running |
| QM293495 | Remote | 1.1.1 | 123 | ● Deploying |



## Queue manager: QM1

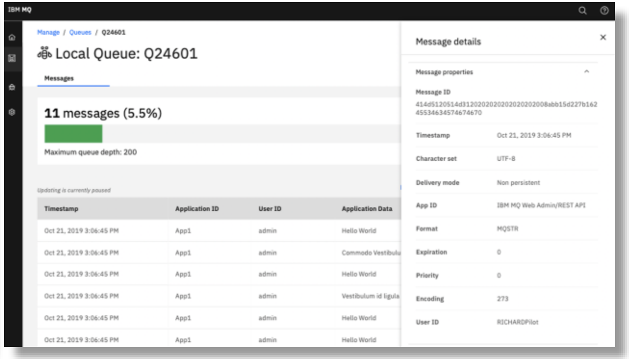
13 Full capacity
4 user-generated
9 system

7 >50% capacity
3 user-generated
4 system

23 <1% capacity
16 user-generated
7 system

3 of 50 queue managers checked
11 more queues found

| Queue name | Queue type | Queue depth % | Maximum queue depth | Queue manager name |
|---|---|---|---|---|
| Q24601 | Local | XX% ▼ | XX / XXX | QM43235 |
| Q64646400 | Model | XX% ▼ | XX / XXX | QM43235 |
| Q1237895417394223467 | Remote | XX% ▼ | XX / XXX | QM43235 |
| Q88593 | Local | XX% ▼ | XX / XXX | QM43235 |
| Q417394242353245345242452135254 2(...) | Local | XX% ▲ | XX / XXX | QM88432350824503963 |



## Local Queue: Q24601

11 messages (5.5%)

Maximum queue depth: 200

*Updating is currently paused*

| 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 Vestibulu |
| Oct 21, 2019 3:06:45 PM | App1 | admin | Hello World |
| Oct 21, 2019 3:06:45 PM | App1 | admin | Vestibulum id ligula |
| Oct 21, 2019 3:06:45 PM | App1 | admin | Hello World |
| Oct 21, 2019 3:06:45 PM | App1 | admin | Hello World |

Message details

Message properties

Message ID
414d5120514d312020202020202020202008abb15d227b162
4553463457467467 0

| | |
|---|---|
| Timestamp | Oct 21, 2019 3:06:45 PM |
| Character set | UTF-8 |
| Delivery mode | Non persistent |
| App ID | IBM MQ Web Admin/REST API |
| Format | MQSTR |
| Expiration | 0 |
| Priority | 0 |
| Encoding | 273 |
| User ID | RICHARDPilot |

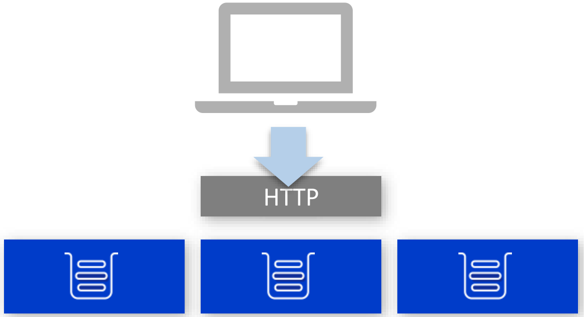
https://community.ibm.com/community/user/imwuc/blogs/callum-jackson1/2020/04/09/enhanced-web-console-in-ibm-mq-915

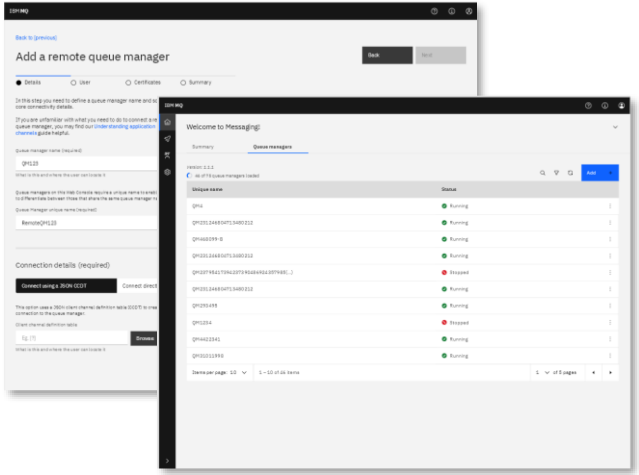
# Central Web Console

New in MQ 9.2.3
All installable platforms

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.




IBM MQ

Back to [previous]

Add a remote queue manager

Back | Next

● Details ○ User ○ Certificates ○ Summary

In this step you need to define a queue manager name and so
core connectivity details.

If you are unfamiliar with what you need to do to connect a re
queue manager, you may find our Understanding application
channels guide helpful.

Queue manager name (required)

QM123

What is this and where the user can locate it

Queue managers on this Web Console require a unique name to enabl
to differentiate between those that share the same queue manager n

Queue Manager unique name (required)

RemoteQM123

Connection details (required)

Connect using a JSON CCDT | Connect direct

This option uses a JSON client channel definition table (CCDT) to crea
connection to the queue manager.

Client channel definition table

Eg. [?] | Browse

What is this and where the user can locate it

IBM MQ

Welcome to Messaging!

Summary | Queue managers

Version: 1.1.1

46 of 75 queue managers loaded

Add +

| Unique name | Status |
|---|---|
| QM4 | ● Running |
| QM231246804713480212 | ● Running |
| QM460099-B | ● Running |
| QM231246804713480212 | ● Running |
| QM237984173942373904869243579 85(...) | ● Stopped |
| QM231246804713480212 | ● Running |
| QM293498 | ● Running |
| QM1234 | ● Stopped |
| QM4422341 | ● Running |
| QM31011990 | ● Running |

Items per page: 10 | 1 – 10 of 46 items | 1 of 5 pages

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☑ IBM MQ

*...continually evolving*

# Thank you

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IBM MQ Chief Architect

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