IBM MQ 9.4

What’s new

9.4 Announce: 14 May 2024
GA: 18 June 2024, 5 July 2024 (z/OS)

9.4.1 Announce: 08 Oct 2024
GA: 24 Oct 2024 (most), 8 Nov 2024 (z/OS)

IBM MQ 9.4 LTS

V9.4 LTS available 18 June 2024
z/OS and the MQ Appliance in July

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 who 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 longer-term support.

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.

All the function delivered in the 9.3.x CD releases is available in the long-term support release **V9.4 LTS**

IBM MQ 9.4 LTS

Enhanced Observability

Identify potential issues with simple, real-time analysis of queue managers, applications, and MQ networks.

Updated MQ Console aids in identifying and resolving issues.

Improved Admin & Developer Experience

MQ 9.4 has many updates or enhancements to provide a simplified Administration experience and a better developer experience.

Cloud-Native Security

Authenticate with tokens, improving security and centralizing identity management for queue managers.

Cloud-Native Resiliency

Fast and efficient data compression for Native HA data replication reduces network load – increase traffic without increased infrastructure costs!

Insight into Business Events

Tap into MQ data and deliver it seamlessly into Kafka through IBM-supported sink and source connectors to become an event-driven business.

Performance & Scalability

Reduce the risk of applications becoming slow, unresponsive, or crashing through LZ4 compression and Uniform Clusters.

Managed File Transfer Enhancements

Use the updated Managed File Transfer (MFT) in MQ Advanced for gaining diagnostics related to file transfer and to understand & troubleshoot performance of MFT agents.

Amazon Web Services Deployments

Purchase via AWS Cloud Marketplace, Tooling and Cloud native learning path, and a partner solution for rapid deployment of a reference architecture.

New in IBM MQ 9.4 LTS

.NET 6 libraries	CAPEXPRY	RDQM on RHEL 9	MQIPT MQCSP password protection	64-bit Channel Initiator	SMF queue statistic enhancement	Streaming queues for shared queues	Console observability	Instana transaction tracing with CP4I in OCP	ANY* generic CipherSpecs for AMQP
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New in IBM MQ 9.4 LTS

Applications

Security

Availability

Operations

.NET 6 libraries

CAPEXPRY

RDQM on RHEL 9

MQIPT MQCSP password protection

64-bit Channel Initiator

SMF queue statistic enhancement

Streaming queues for shared queues

Console observability

Instana transaction tracing with CP4I in OCP

ANY* generic CipherSpecs for AMQP

Enhanced DIS QMSTATUS

TLS 1.3 for managed .NET clients

MQ Console application

Java modular application

Simplified REST Messaging API security

Native HA entitlement with MQ Advanced

SMF116 STREAMEDN for

Appliance DR between

Developer Essentials badge for AWS

Restricted MQ Operator permissions

MQ Console, object and application association linkage

AMQP performance enhancement

Remote REST messaging

JSON web tokens, initial support

Native HA auto recovery of damaged objects

Comprehensive per-queue SMF stats

Appliance CLI SSH certificate authentication

Appliance disk space monitoring

Arm Developer container for MacOS

Configurable LogFilePages with MQ Operator

Smarter recovery log media image scheduling

MQ Console overview landing p

Tuning options for log I/O

Supported Kafka Connectors

Enhanced Appliance support for SSH signatures

Smarter JMS Uniform Cluster auto balancing

Exactly-once Kafka

Simplified Java and JMS topologies for

Automated installs with Ansible Galaxy

Message property support for CSQ1LOGP

Stand-alone IBM MQ Web Server install

Open Telemetry tracing

Expanded JWT support for JMS applications

MQ Console application and network observability tabs

Updated compiler support for AIX C applications

Simpler zHyperWrite enablement on z/OS

Appliance secure backup and restore

AMQP samples

Developer tutorials for Uniform Clusters

MacOS client toolkit in Homebrew

JWKS for token authentication

Updated cipher support with Managed File Transfer

Persistent Volume flexibility (containers)

LZ4 compression

TLS certification bypass option

.NET 8 support

Automate MQ fix pack version upgrades

Non-production tags for IBMi

RedHat OCP odd version support

New 5+1+3 lifecycle

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z/OS

Appliance

Containers

Software

Cloud

IBM MQ | 9.4.1 CD Release Highlights

MQ 9.4.1 is the follow-on Continuous Delivery (CD) release to MQ 9.4.0 LTS, and it includes enhancements that enable clients to accelerate cloud-native container-based deployments to increase operational agility at scale. It also brings several security enhancements across a range of MQ components to align to industry best practices and reduce risk.

Distributed Software

IBM MQ Advanced

Rapidly deploy production-ready IBM MQ Advanced in containers

Clients can now utilize the pre-built MQ Advanced container image, for rapid deployment into container runtimes managed by Containerd, cri-o, Podman, or Docker.

Enhanced security for SFTP

MFT clients may leverage OpenSSH private keys for SFTP servers, bolstering security.

Distributed Software

IBM MQ Advanced & IBM MQ

IBM MQ on Azure Marketplace

Azure businesses can buy IBM MQ licenses using their cloud credits or credit cards from the Azure marketplace.

Improved certificate management for seamless connectivity

Administrators can configure alerts when TLS certificates are near expiry thereby reducing the risk of unplanned downtime.

Set non-production licenses in Container

Administrators can select the appropriate licenses for non-production workloads in the MQ Container.

And these additional features that are available to all form factors including MQ for z/OS:

(IBM MQ & MQ Advanced)

Securely retrieve connection configuration

Applications can access CCDTs (client channel definition table) via HTTPS URLs secured by TLS.

Easier message handling

Administrators can view message headers in the MQ Console, speeding message handling decision-making.

Enhanced MQ Console user interface

Experience an enhanced Carbon 11 based MQ Console for better observability & efficiency.

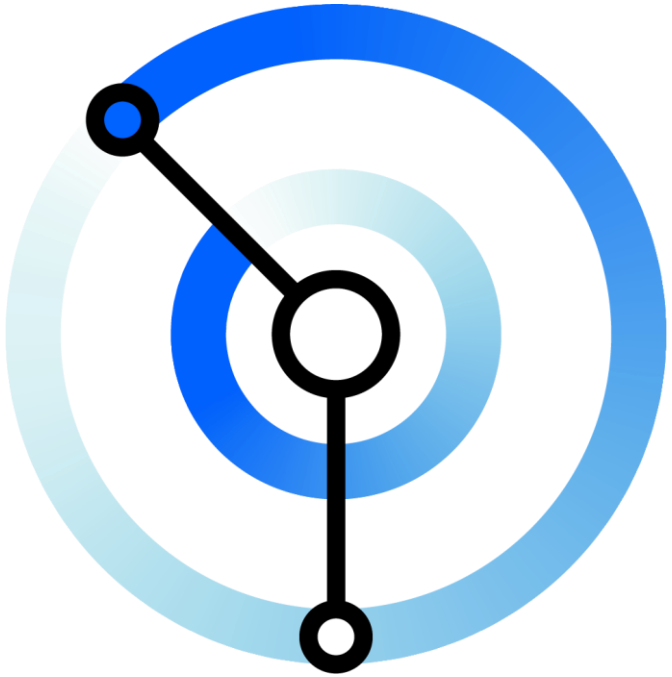
IBM MQ support lifecycle

New 5+1+3 support lifecycle for MQ 9.4 LTS, based on IBM’s Support Cycle-5 policy for MQ on Multiplatforms

- 5 years of standard support
- plus 1 year of extended code fix support
- plus 3 years of extended usage support

IBM Software Support Lifecycle Policies

https://www.ibm.com/support/pages/node/718165



IBM MQ maintenance

Effective January 2023 for all in-support releases.

Two types of maintenance for distributed platforms:

- **Fix packs**
  Cumulative updates for Long Term Support (LTS) releases, as per previous practice.

- **Cumulative security updates (CSUs)**
  Smaller updates that provide security fixes and which are released monthly (when required).

This model also applies to the JMS, MFT and web UI features on z/OS, but the model for other z/OS maintenance remains unchanged.

See https://ibm.biz/GetMQFix to help with automation

How do I obtain and install CSUs?
CSUs are provided as per fix packs and they are installed in the same way.

How do I identify fix packs and CSUs?
The V.R.M.F is updated for both. Fix packs are identified by an F-digit that is a multiple of 5 (5, 10, 15, ...), and CSUs use the other F-digit values (1, 2, 3, 4, 6, 7, ...).

Are updates cumulative?
Yes. Each CSU is built on the latest fix pack that precedes it.

What releases are CSUs produced for?
All LTS releases (including those in extended support), plus the latest CD release.

https://www.ibm.com/support/pages/changes-ibm-mqs-maintenance-delivery-model

IBM MQ 9.4 deprecations & removals

- The MQ REST API v1 is deprecated – the replacement is the MQ REST API v2.
- The Salesforce bridge has been removed.
- The IBM MQ classes for .NET Standard library was deprecated in 9.3.1 – it has been removed in 9.4.
  - The IBM MQ classes for .NET and the IBM MQ classes for .NET Framework libraries are still provided.
- For the IBM MQ .NET and IBM MQ XMS for .NET classes, the methods WriteObject(), ReadObject(), CreateObjectMessage() and classes ObjectMessage and XmsObjectMessageImpl used for serialization and deserialization of data are deprecated.
- MQ 9.4 LTS is the last MQ release to support Secure Sockets Layer v3 (SSLv3) and Transport Layer Security (TLS) 1.0
- MQ 9.4 LTS is the last MQ release to support Advanced Message Security (AMS) encryption with RC2, Data Encryption Standard (DES), or Triple Data Encryption (3DES) ciphers and AMS Signing with 3DES, Message-digest algorithm (MD5), or Secure Hash Algorithm 1 (SHA1) ciphers, across all MQ form factors.

IBM MQ 9.4.1 deprecations

- TLS RSA Key Exchange CipherSpecs are deprecated in MQ 9.4.1. Any CipherSpec beginning TLS_RSA_WITH_ will be disabled by default, but can be re-enabled if required. Clients are recommended to migrate to CipherSpecs that use Elliptic-Curve Diffie-Hellman for key exchange. These CipherSpecs begin with ECDHE_RSA_.

- The service used to start MQIPT automatically at system startup on Linux is deprecated in MQ 9.4.1. The service on Linux uses System V init, which is not supported on some recent versions of Linux. An alternative, such as systemd, can be used to start MQIPT automatically.

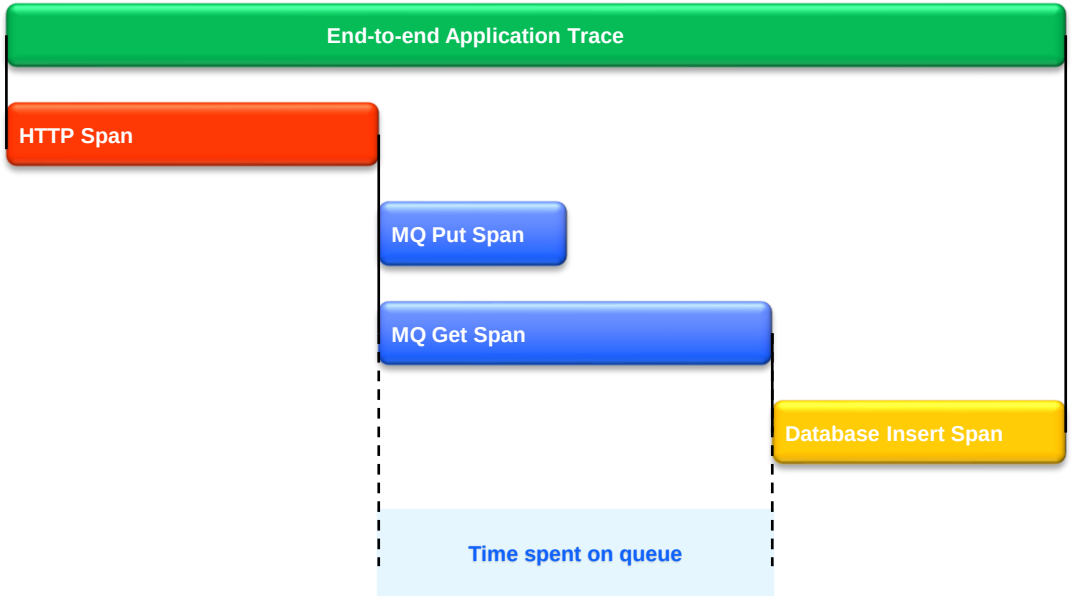
Observability

OpenTelemetry Tracing

Available for Unix-based (AIX and Linux p/x/z) and Windows

What is OpenTelemetry ?

- An observability framework and toolkit designed to create and manage trace, metrics, and log data.
- It is **vendor and tool agnostic** - it can be used with a broad variety of observability solutions:
  - Commercial offerings such as **IBM Instana**
  - Open-source tools like Jaeger and Prometheus



Diagnose problems across multiple systems fast, using data to pinpoint where issues are

Gain insights to optimise performance end-to-end, ultimately improving customer experience

Futureproof – open and likely to become a cross-industry de facto standard for observability

CLOUD NATIVE COMPUTING FOUNDATION

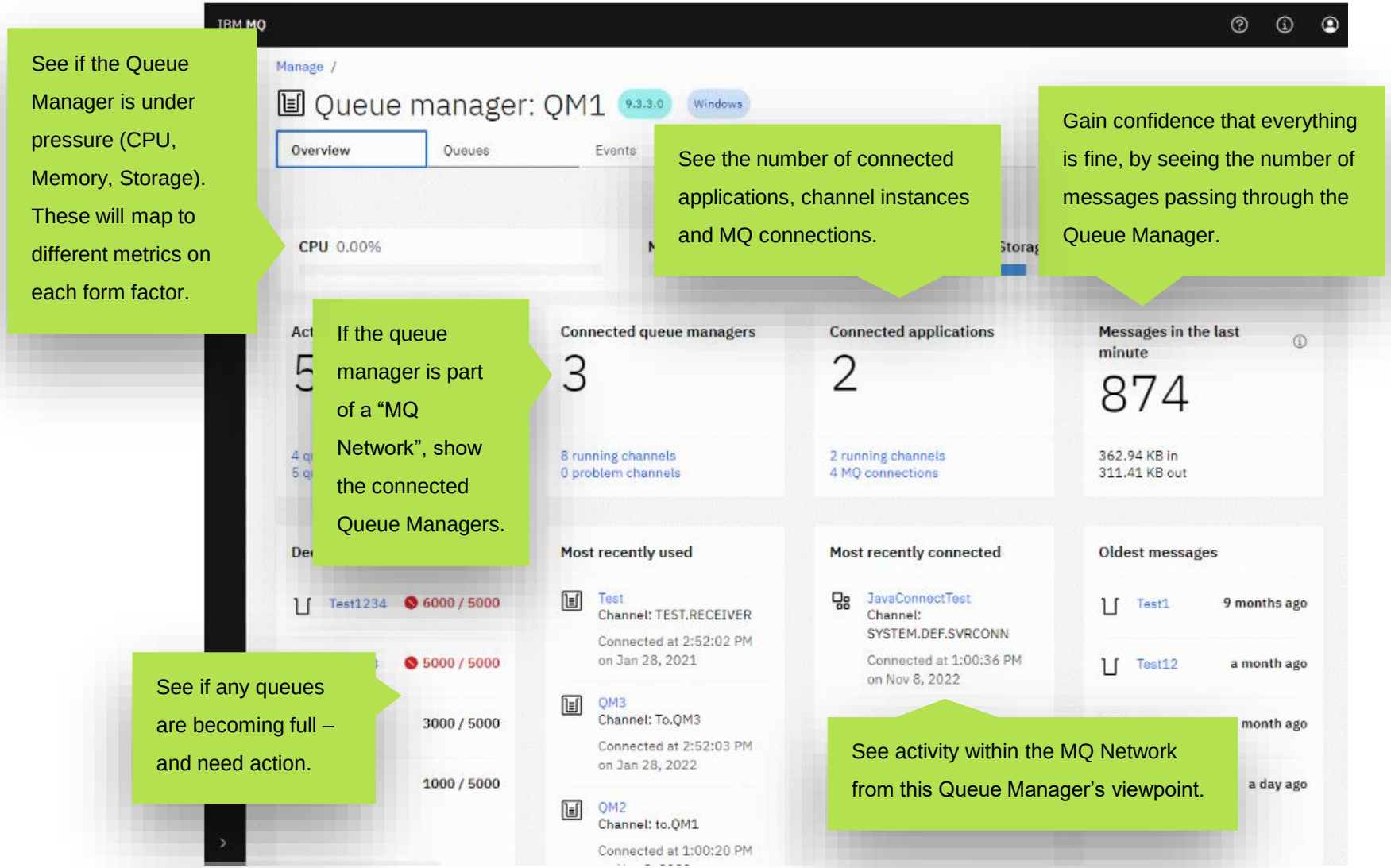
What you need to know:

- Available for Windows and Unix-based platforms (AIX, Linux p/x/z) in VMs and containers. Not available on IBM MQ Appliance.
- Instana Exit shipped with IBM MQ as a supporting program

MQ Console dashboards (1/2)

The IBM MQ Console enables administrators to perform common tasks via a graphical user interface.

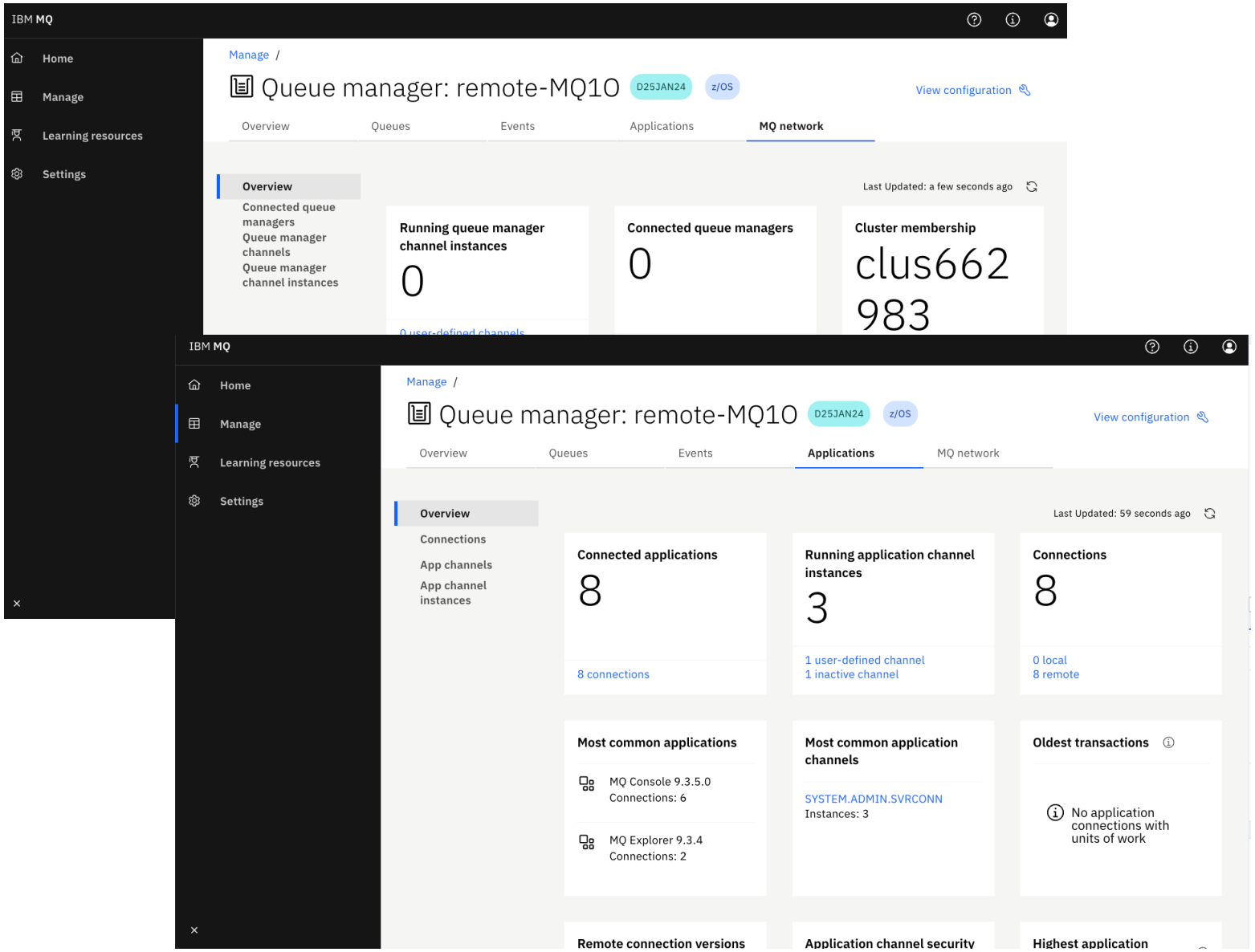
The new **Overview** tab of the queue manager page **eliminates manual look-up** so administrators can immediately understand the overall state of the queue manager and act on any emerging issues before they become problems.



MQ Console dashboards (2/2)

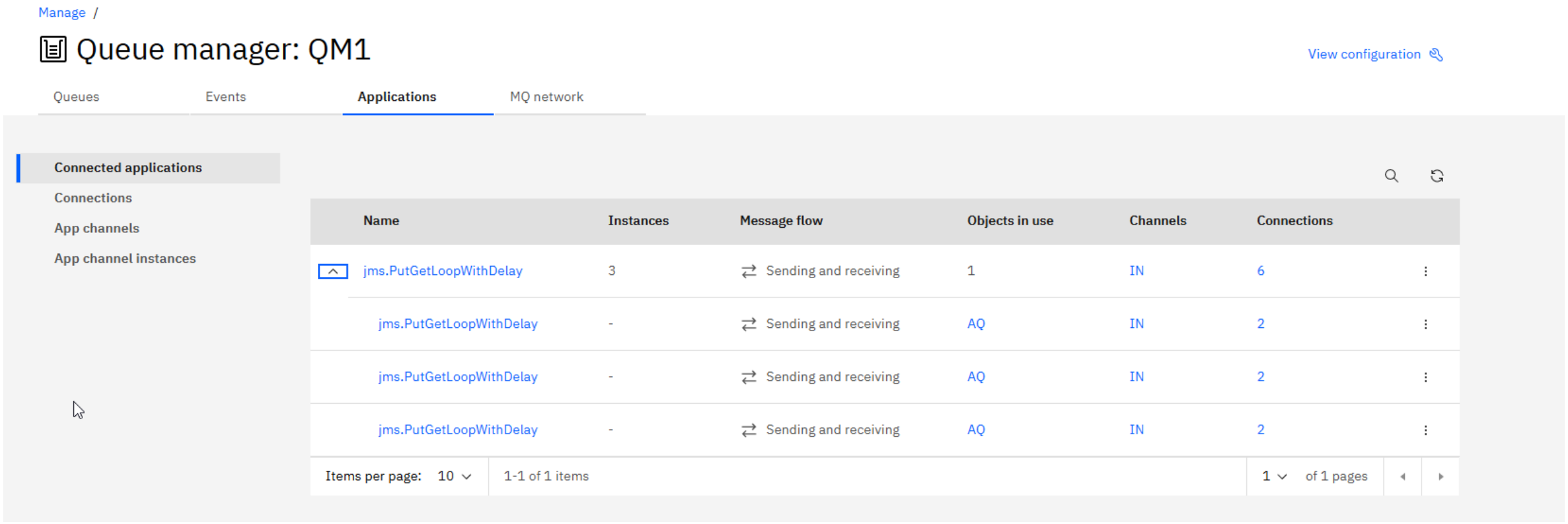
The new Applications and MQ network tabs in the queue manager pages give a quick view of connected applications and connections within the MQ network.

- ✓ Easier for admins and developers to perform real-time analysis of:
  - Application connectivity
  - Queue manager-to-queue manager networking
- ✓ Reduce the time to resolution of issues
- ✓ Allow less skilled users to carry out analysis



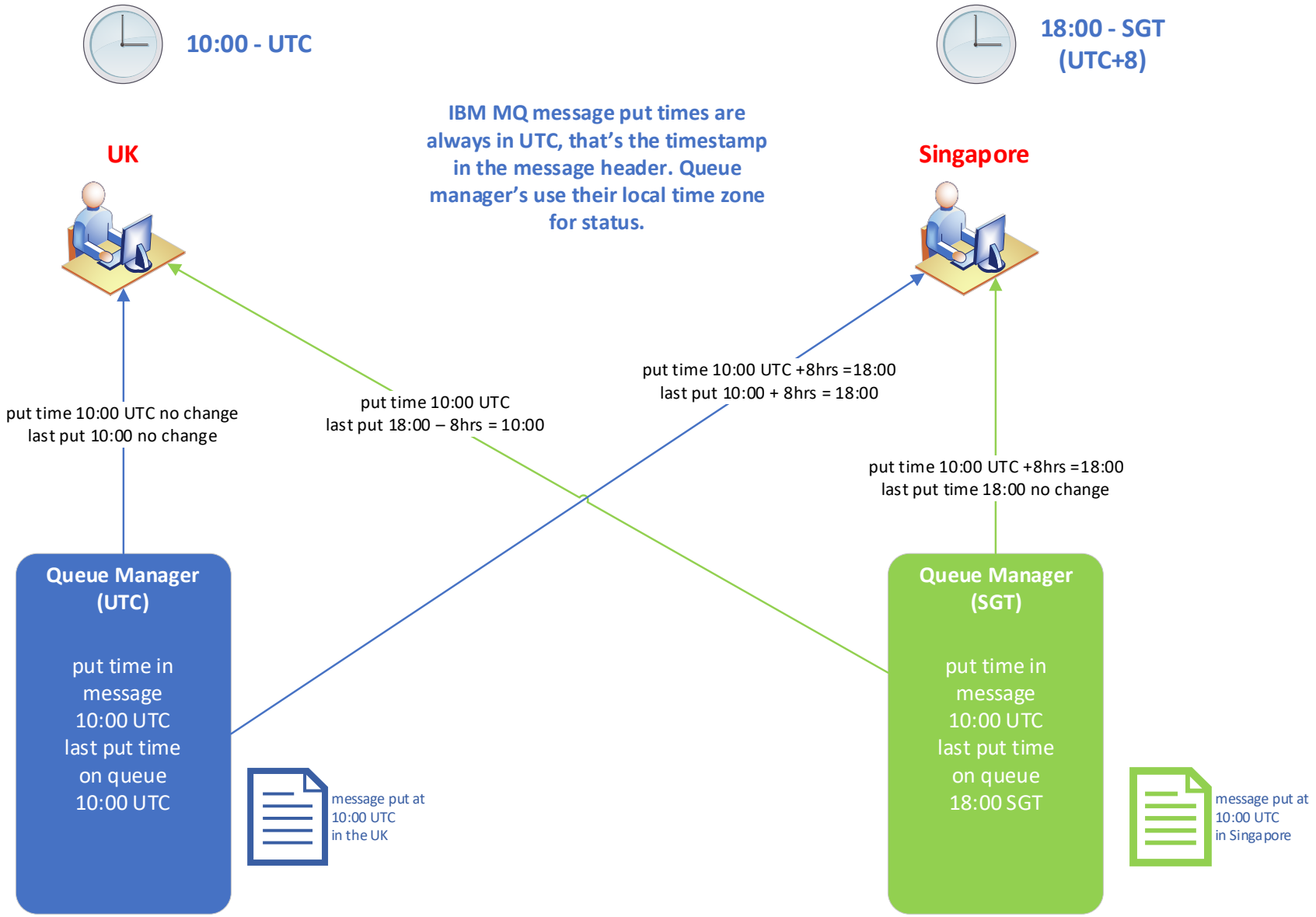
MQ Console observability

MQ Console adds support for improving observability of applications, either local or remote



MQ Console time zones

Timestamps that are associated with queue managers are displayed in the time zone where the queue manager is running, rather than the time zone of the IBM MQ Console.



Insight into Business Events

IBM MQ and Apache Kafka

Messaging is essential for building fully connected, efficient and scalable solutions - more now than ever before.

Messaging patterns

Critical exchange of information from one system to another

Messages must get through, no questions asked. The system must be secure and distributed.

Real-time event notification for microservice scalability

Must be frictionless, scalable and lightweight. The system must be simple to exploit, invisible to the application.

Event streaming for data caching and processing

Must maintain a projection of the data for efficient repeatable processing. The system must scale for large data volumes.

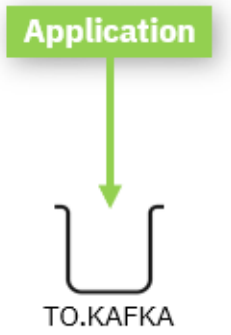
IBM MQ

Apache Kafka

Connecting to Apache Kafka

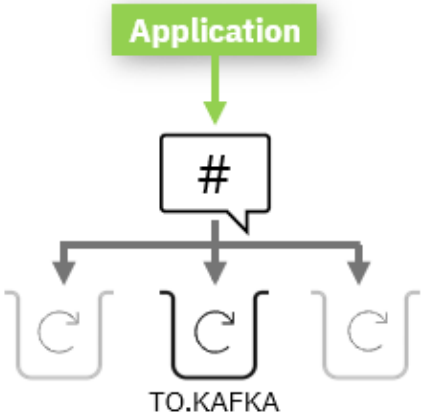
Data from core systems can flow uninterrupted without loss or duplication to Apache Kafka with new assured-delivery sink and source connectors, enabling businesses to drive seamless customer experiences and support strategic business processes.

Direct to queue



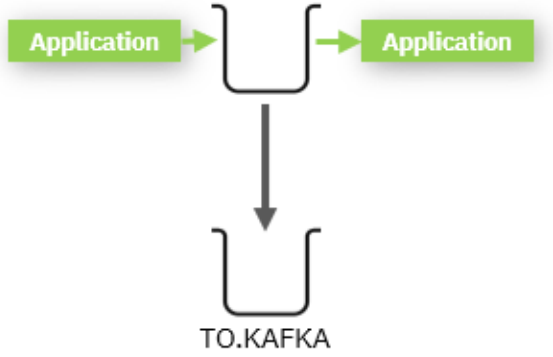
New applications, or applications that are being changed, can put messages **directly to a queue** used by the source connector.

Subscribe to topic



If messages are already being published to a **topic**, it's simple to generate another copy for a queue used by the source connector.

Streaming queue copy



Tap into your mission-critical data as it flows around the enterprise with **Streaming Queues**, without impacting the existing flow of data. Create a copy of every message onto a second queue that is used by the source connector.

Supported Kafka Connectors

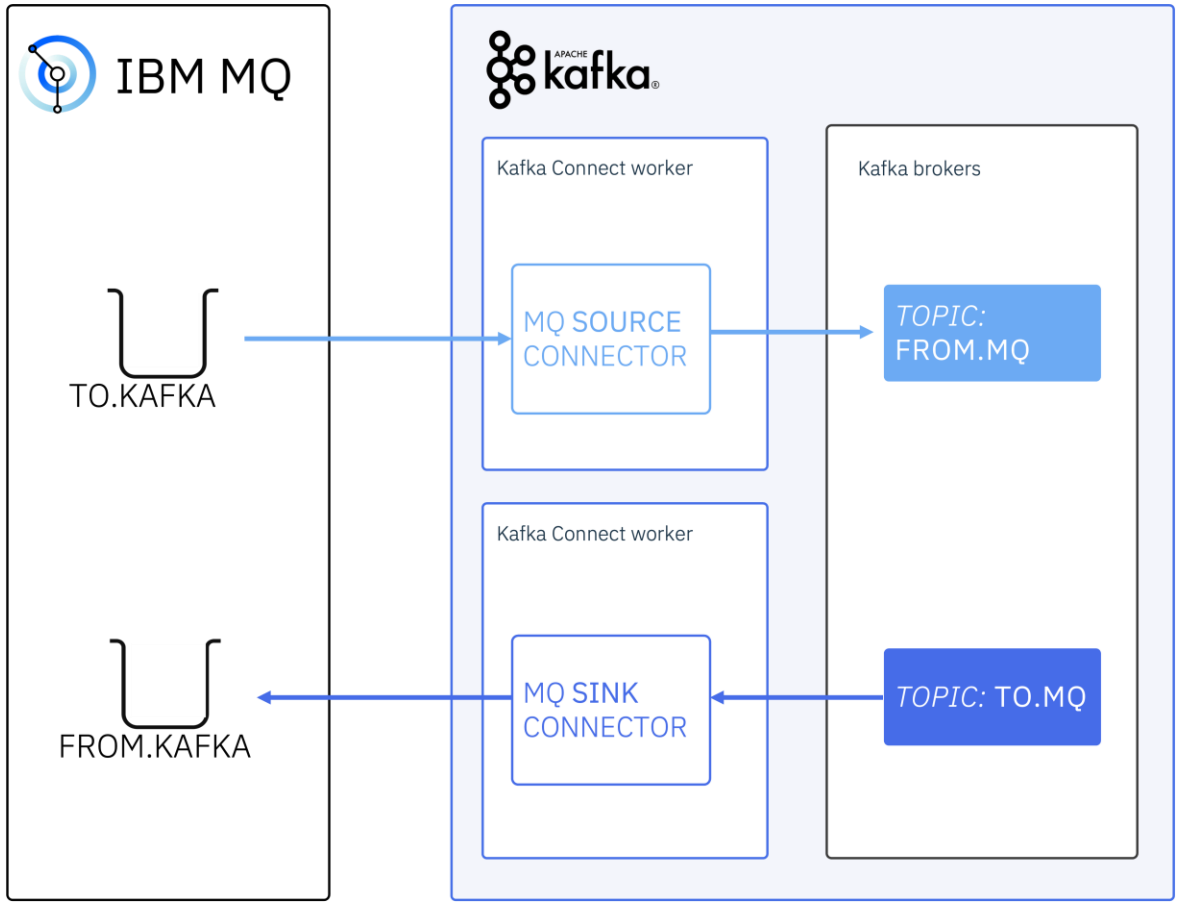
Several sink and source connectors exist for connecting MQ queues to Apache Kafka topics.

The source connector is the most used, enabling MQ to be used as a source for events into Apache Kafka.

Functionally identical connectors are available from IBM:

- Version 1: Unsupported open source
  - IBM MQ (base) and the free Developer Edition
- Version 2: Assured-delivery and fully-supported
  - IBM MQ Advanced
  - Cloud Pak for Integration

Confluent also provides a supported connector.



Version 2 of the Kafka connectors support “exactly-once” delivery of messages.

Security

Token-based authentication

IBM MQ can use a password-less approach to authentication with JSON Web Tokens (JWT) enabling applications to operate in a secure, Multi-Factor Authentication (MFA) environment.

Secure

Token-based authentication eliminates the need for storing and transmitting passwords, which can be a security vulnerability.

Scalable

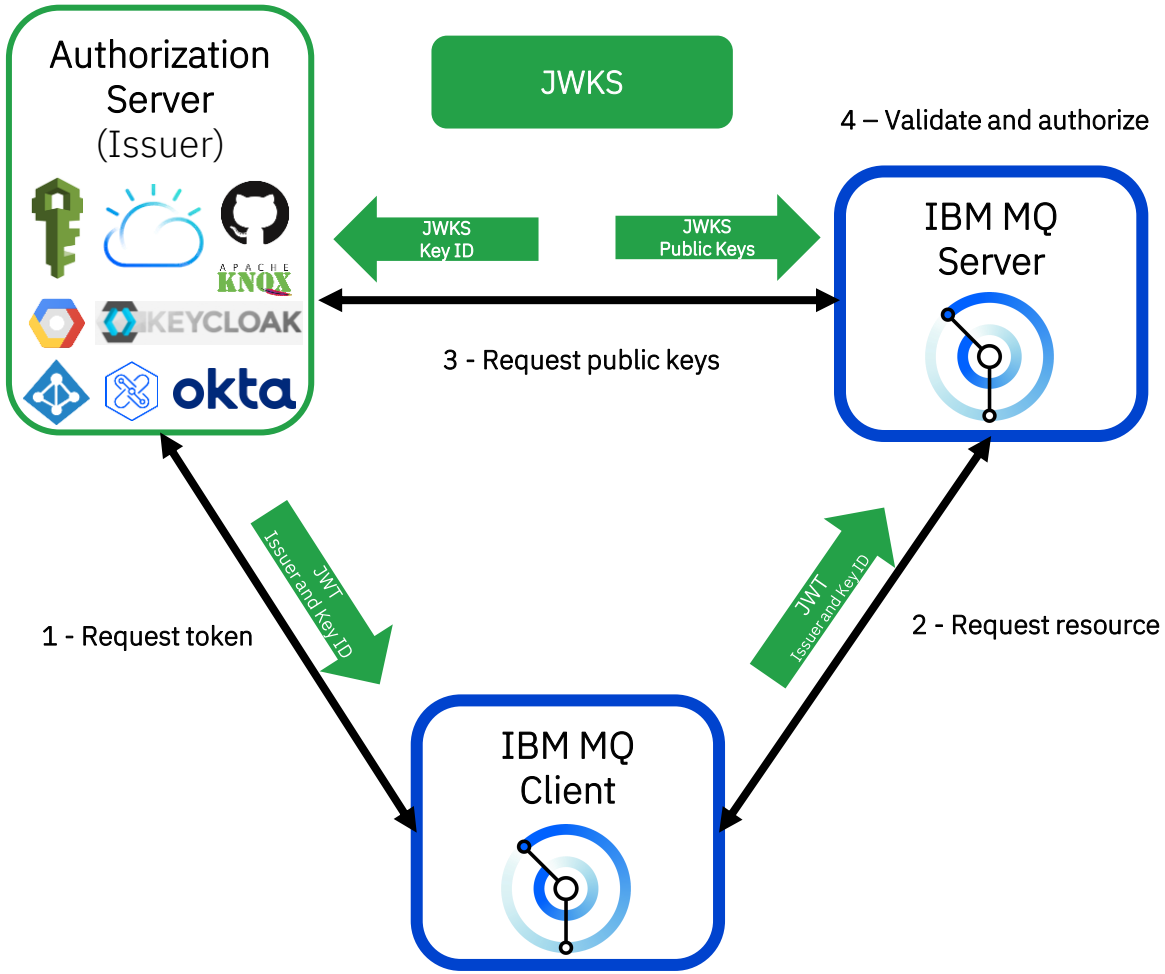
You can use one trusted JSON Web Key Sets (JWKS) issuer so your applications can authenticate with many services without separately registering with all of them.

Flexible

Tokens can be used across multiple, diverse applications or other endpoints, enabling easier secure collaboration between enterprises and platforms.

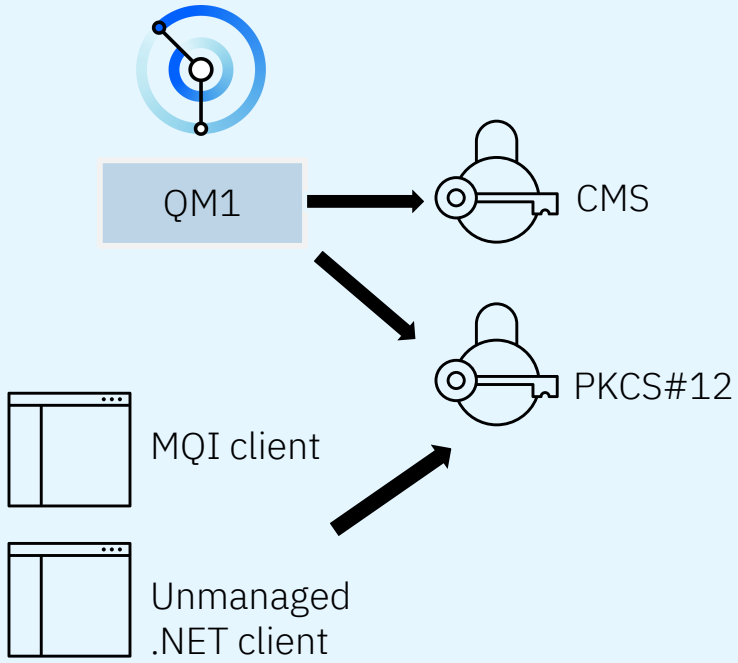
Easier

Using a JWKS issuer makes it easier to manage certificate rotation, expiry, and revocation. Keys are cached to tolerate outages and improve performance.



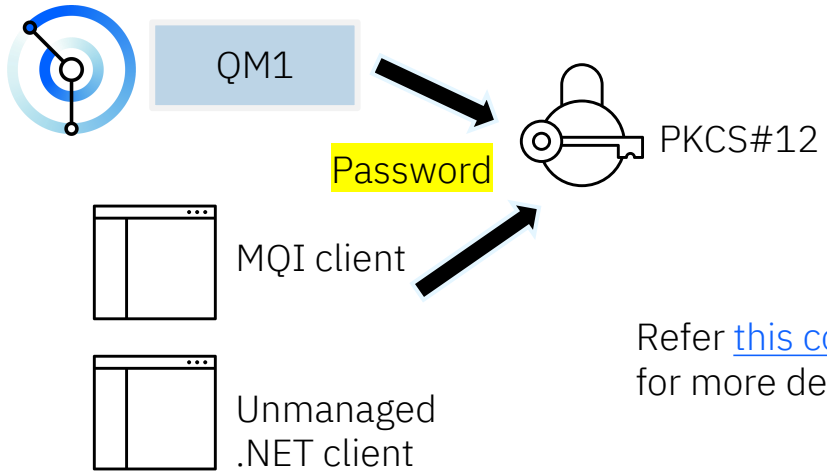
PKCS#12 keystores

- Use a PKCS#12 keystore in place of a CMS keystore
- Use existing mechanism to point MQ at the keystore
- Change applicable for MQI, Unmanaged .NET clients
  - Java/JMS can use JRE for PKCS#12 support
  - Managed .NET uses windows certificate store



Password support:

- Provide the keystore password directly to IBM MQ
  - ✓ Allows alternative to the stash file.
- Queue Manager command: MQSC QMGR **KEYRPWD**
- Clients:
  - ✓ MQSCO.KeyRepoPassword fields
  - ✓ MQKEYRPWD environment variable
  - ✓ SSL Stanza SSLKeyRepositoryPassword
- Password must be protected
  - ✓ Queue Manager does this for you
  - ✓ Encryption tools provided for client apps



Refer this command for more details.

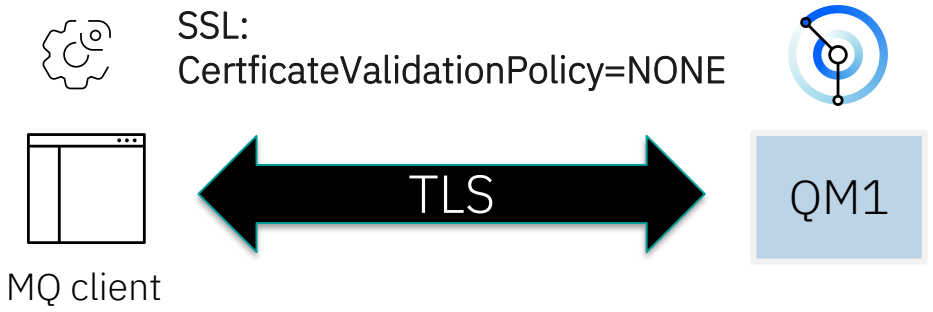
Other important security updates

Read-only root filesystem

- Read-only root filesystem can be enabled for MQ running in Containers.
- This improves security by preventing writes to files inside the container at runtime.
- Not enabled by default
  - Needs to be explicitly enabled by setting, spec.securityContext.readOnlyRootFilesystem QueueManager API to true.
- The readOnlyRootFilesystem option is accompanied by additional options to configure the size of the "scratch" and "tmp" volumes that are mounted to allow writing of temporary files.

Skip TLS certificate validation

- When SSL/TLS is enabled on MQ channels there is a significant risk of impact if TLS certificates are not renewed in time. It can also be complicated to ensure all partners have the necessary CA certificates when they change.
- MQ now provides an easy way to skip TLS certificate validation.
- Does not validate a peer TLS certificate, but still secures communications.
- Not recommended for production use, but useful as a quick start/test.



IBM MQ | TLS Certificate Management (9.4.1)

- New command “dspmqcert” available
- Quickly see information about certificates within IBM MQ keystores
- Filter on certificates expiring within a certain timeframe
- Output in different machine-readable formats
- When run as an automated process, enables you to build alerts when certificates are near expiry.

```
$ dspmqcert -m QM1 –o json
{
 "QM1": [ {
   "label": "MET1",
   "type": "Self-signed",
   "version": 3,
   "serial": "45124bf4ea9c44c7",
   "subjectDn": "CN=MET1,OU=IBM",
   "issuerDn": "CN=MET1,OU=IBM",
   "keystorePath":
      “/var/mqm/qmgrs/QM1/ssl/key.kdb",
   "keySize": 4096,
   "notBefore": "2023-07-03 13:31:37",
   "notAfter": "2025-07-03 13:31:37",
   "daysExpiry": 263
  } ]
}
```

```
$ dspmqcert -h
Usage: dspmqcert [-h] [-o <output>] [-d <days>] [
Options:
    -h this help
    -o output: <json|csv|text> default text
    -d days: print certs due to expire within the
    -m pattern: match queue manager names, ie. QM1, ERR*, default *
    -a include CA intermediate certificates
    -e exit error (127) if -d specified and there are certs expiring
    -f path: location of INI file mapping QM names and keystore location
```

Resiliency & Scalability

LZ4 compression

LZ4 is a lossless data compression algorithm that is focused on compression and decompression speed. It belongs to the LZ77 family of byte-oriented compression schemes.

From MQ 9.4, users can use LZ4 compression for network communication to:

- Reduce cost
- Improve performance

Available for communication between:

- Queue manager channels
- Native HA replicated queue managers

Choose whether to prioritize speed or compression using these values for COMPMSG when working with channels:

LZ4FAST

Message data compression is performed using LZ4 encoding with speed prioritized.

LZ4HIGH

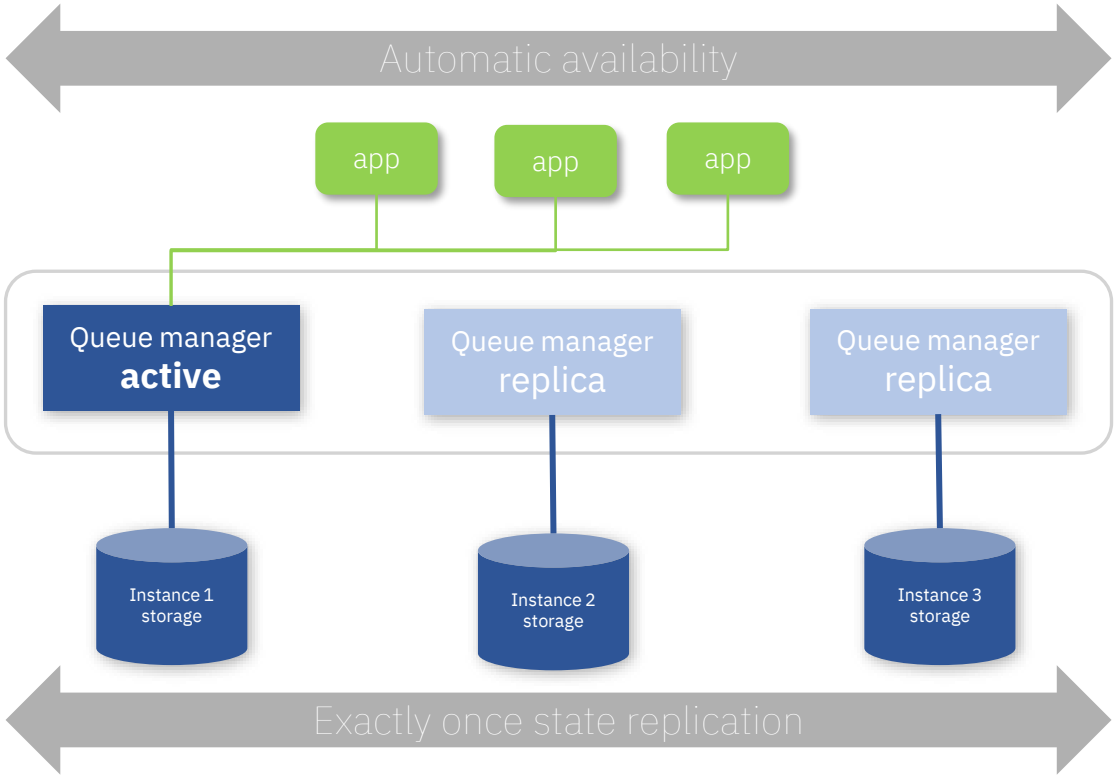
Message data compression is performed using LZ4 encoding with compression prioritized.

Native High Availability (HA)

Entitlement: IBM MQ Advanced & CP4I
Deployment: OpenShift and Kubernetes

Updates in 9.4

- Reduced network load and the associated costs through smarter media imaging.
- Automated recovery of damaged objects without the need for manual intervention.
  - Recovery is periodically retried if required, such as when object is in use
  - Damaged objects can still be recovered manually by using **rcrmqobj**
- Option to increase performance of replication with LZ4 compression.



Persistent volume resizing for containers

- Persistent volumes provide long-lived storage for containers – used to store MQ messages and logs
- From 9.4, MQ supports expanding persistent volumes as workloads change

Steps to enable

- The storage class must have **.allowVolumeExpansion** field set to **true**.
- To allow expansion of a queue manager volume, **.spec.queueManager.storage.allowVolumeExpansion** field needs to be set to **true**.
- Alter **.size** fields for each of the desired queue manager volume type, for example: **.spec.queueManager.storage.queueManager.size: 2Gi → 5Gi**

Administration & Application Development

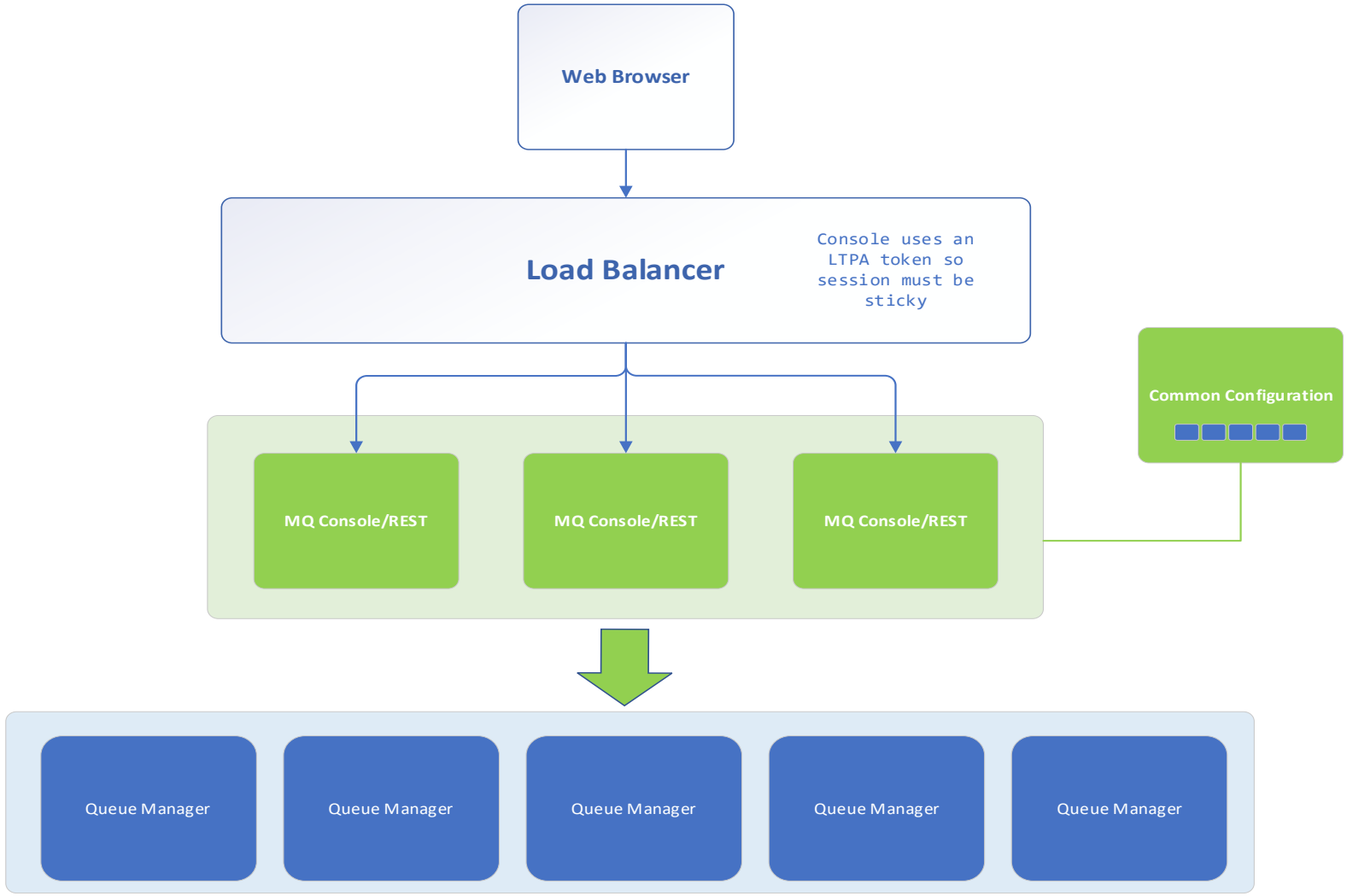
Standalone Web Server

Decoupled, backwards compatible, scalable and highly available

Rapidly configure remote queue managers without the need for a full MQ installation.

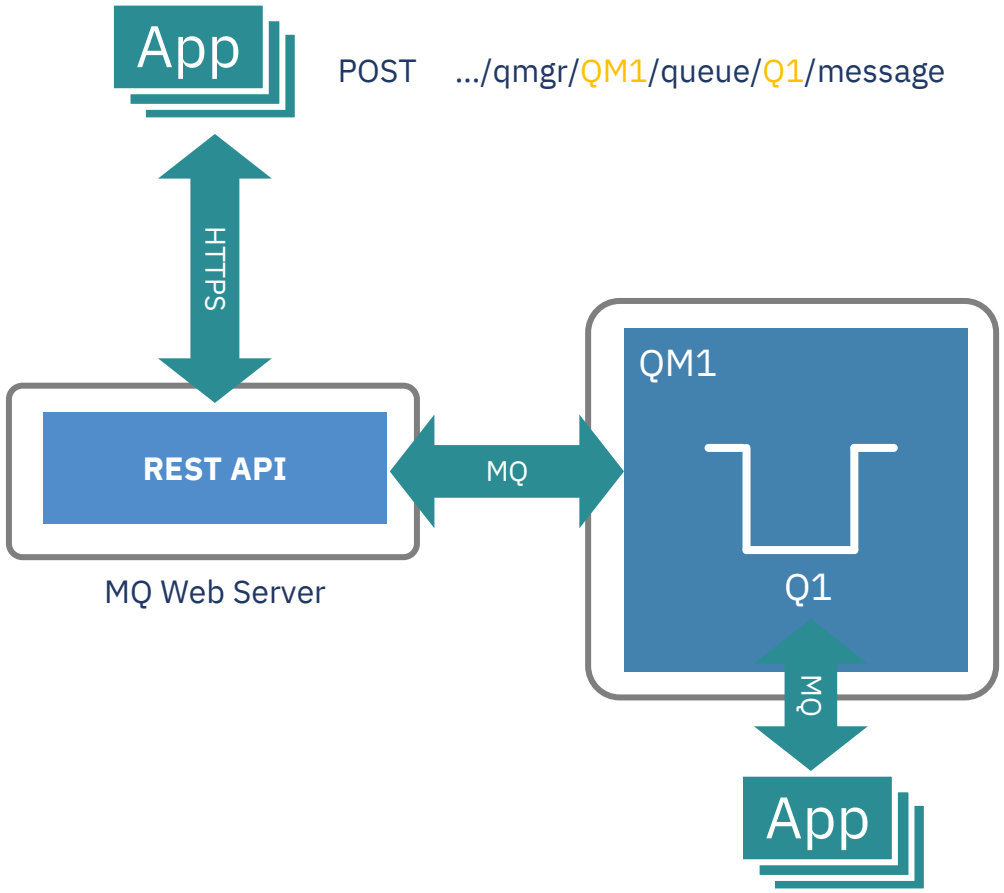
Update the MQ Console independently to queue managers.

Centralise administration for your MQ estate.



REST Messaging: Remote queue manager support

- The REST Messaging API can now be used with remote queue managers, enabling you to interact with any queue manager in your estate, running at any version
- Previously, it could only be used with queue managers local to the MQ web server:
  - Same installation on distributed platforms
  - Same LPAR and at the same version as the MQ web server on z/OS



IBM MQ | Pre-built MQ Advanced Containers

Wider platform support

For OpenShift users, IBM offers a pre-built MQ container image and an MQ Operator, while customers deploying MQ in other container environments need to build the image from a sample, which requires more effort and skills

From 9.4.1, IBM provides a pre-built MQ Advanced container image that can be deployed into container runtime environments provided by containerd, cri-o, Podman or Docker

What does it mean?

Use the pre-built container image to deploy MQ instead of building an image from a sample

What's supported?

IBM provides defect and usage support for the IBM MQ, IBM-supplied MQ container enablement code, but is not able to help users configure and debug problems with their container environment or deployment pipeline

Where to download it from and what entitlement is required?

Download from IBM Container Registry, for which the client needs to have either MQ Advanced or Cloud Pak for Integration entitlement

Note:

- Whilst containers can run on any Linux OS, Red Hat provides support for Red Hat packages for containers running only on Red Hat Enterprise Linux or Red Hat Enterprise Linux CoreOS hosts
- IBM Container licensing policy is supported in Kubernetes based platforms only
- Interim fixes will be available for the pre-built container image and can be downloaded from IBM Container Registry

Run MQ anywhere

you want!

Container Infrastructure

Deploy and run in the cloud or on premises

cri-o containerd docker podman

Orchestration

Automate deployment and management of containers

RED HAT OPENSHIFT Container Platform Kubernetes

MQ as a Service Reserved Instance

Single Tenant: Client SaaS queue managers will run in a dedicated IBM managed cluster, increasing security and reducing the chances of performance being impacted by other client workloads.

Multi-Zone high availability: Data replication across 3 availability zones protects against data loss in the event of a failure. Upgrades can also be performed on a rolling basis across availability zones, maintaining service during upgrades.

Private network endpoints: Provides a higher level of network control and an additional layer of network security so message traffic or endpoints are not exposed to the public internet.

Automated deployment: Automating the deployment of SaaS queue managers in a repeatable and programmatic way allows MQ as a Service to be used at scale, helping save on administration costs, reducing errors and deployment time.

Other updates

- **Message expiration**
  First class CAPEXPRY attribute to configure how long messages are kept on queues

- **Non-production entitlement**
  Reduce the cost of licenses in non-production environments and gain better visibility into the size and deployment of license distribution across your estate.

- **MacOS support**
  MacOS developers can now build and run an IBM MQ container image natively on Apple Silicon without the need for Rosetta emulation.

- **Managed File Transfer**
  Additional resource monitor logging events and updates to diagnostic capture.

- **Libraries and AIX support**
  MQ supports .NET 8 & .NET 6 libraries.

  Support for the XL C/C++ 17 compiler on AIX alongside the existing XL C/C++ 16 compiler.

- **MQ Classes support for JMS and Jakarta**
  Support for using modular applications with IBM MQ classes for JMS and IBM MQ classes for Jakarta Messaging.

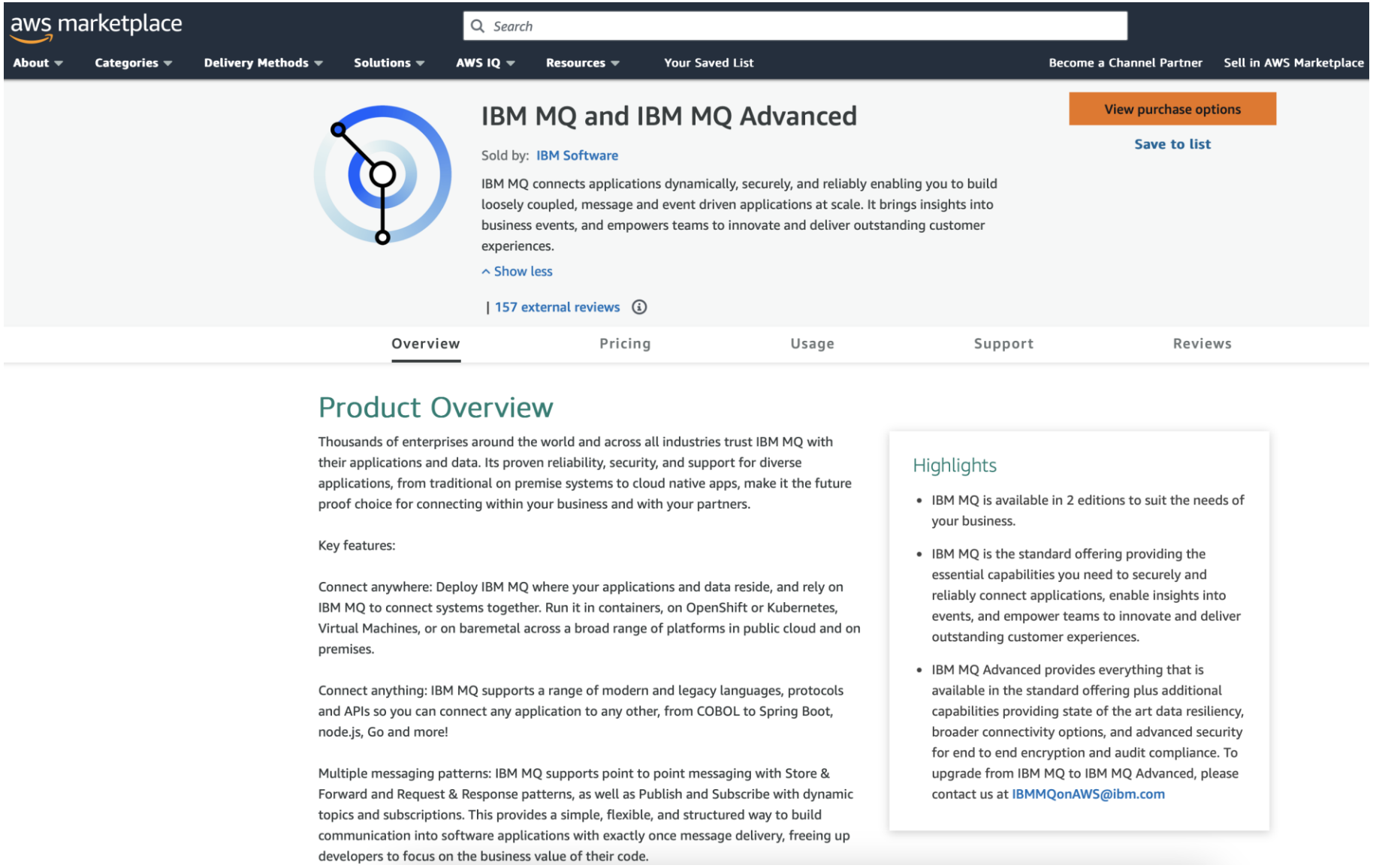
- **Automated workload balancing for JMS**
  Uniform Clusters automatically balance JMS workloads, enabling users to build resilient, horizontally scalable messaging systems.
- **MacOS client installable via Homebrew**
- **MacOS client TLS provider (9.4.1)**
  ARM64 now the same as other platforms (kdb/p12 stores)

Amazon Web Services (AWS)

AWS Marketplace

Businesses with an AWS strategy can purchase either IBM MQ or IBM MQ Advanced SW licenses via the AWS Marketplace.

Explore now: https://aws.amazon.com/marketplace/pp/prodview-oo2o5363yebmo

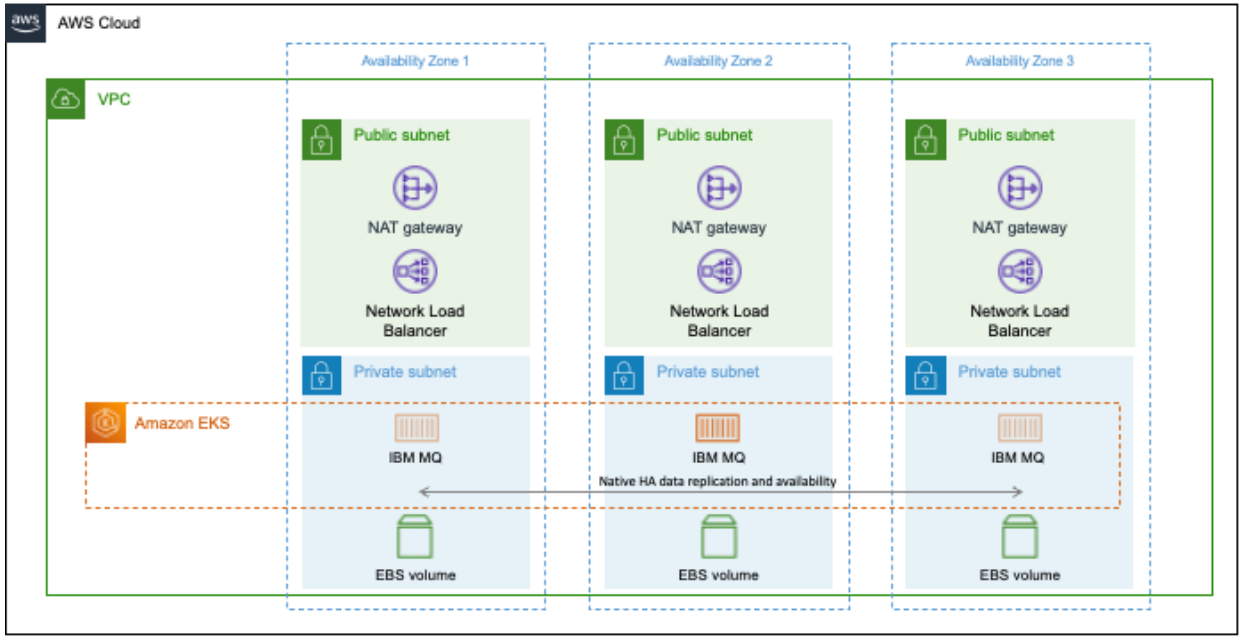


AWS Partner Solution

The IBM MQ AWS Partner Solution is a best-practice deployment of an IBM MQ Native HA queue manager running on the AWS Elastic Kubernetes Service (EKS) platform.

Reduce hundreds of manual procedures to just a few steps to build and start a best-practice deployment of IBM MQ on AWS Elastic Kubernetes Service (EKS) within minutes.

To get started, visit:
aws.amazon.com/solutions/partners/ibm-mq/



Rapid deployment
Deploy fully-functional MQ software on the AWS Cloud with a single click

Proven topology
Benefit from container-ready, highly available reference architecture

Resilient connectivity
Use the market leader for reliable, secure, scalable message distribution

z/OS 9.4 Updates

MQ for z/OS offerings: Before

OTC

IBM MQ Advanced for z/OS (5655-AV9)

- IBM MQ MFT for z/OS
  Integrate file data into an MQ network
- IBM MQ AMS for z/OS
  End to end protection for message data

MLC

IBM MQ z/OS (5655-MQ9)

Core MQ product

OTC

IBM MQ z/OS VUE (5655-VU9)

Core MQ product

OTC

IBM MQ Advanced for z/OS VUE (5655-AV1)

- Connector Pack
  Aspera fasp.io Gateway and Kafka Connector
- Extra support for TCP/IP
  Java/JMS/MFT agents connecting to remote z/OS queue managers
- IBM MQ MFT for z/OS
  Integrate file data into an MQ network
- IBM MQ AMS for z/OS
  End to end protection for message data
- IBM MQ for z/OS VUE
  Core MQ product

MQ for z/OS offerings: Now

JMS/Java batch connections will be supported to remote z/OS queue managers regardless of product entitlement

*APAR required for 9.3 and 9.2

OTC

IBM MQ Advanced for z/OS (5655-AV9)

Connector Pack
Aspera fasp.io Gateway and Kafka Connector

Extra support for TCP/IP
MFT agents connecting to remote z/OS queue managers

IBM MQ MFT for z/OS
Integrate file data into an MQ network

IBM MQ AMS for z/OS
End to end protection for message data

MLC

IBM MQ z/OS (5655-MQ9)
Core MQ product

OTC

IBM MQ z/OS VUE (5655-VU9)
Core MQ product

OTC

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Extra support for TCP/IP
MFT agents connecting to remote z/OS queue managers

IBM MQ MFT for z/OS
Integrate file data into an MQ network

IBM MQ AMS for z/OS
End to end protection for message data

IBM MQ for z/OS VUE
Core MQ product

64-bit Channel Initiator

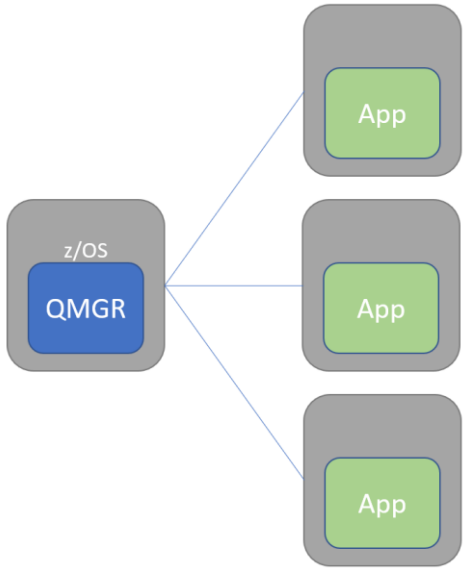
Previously, server-connection channel messages were staged by the channel initiator in a set of buffers in 31-bit storage

Large messages would limit the maximum number of active channels

Now with 64-bit storage in the channel initiator, a larger number of channels can connect at the same time

Samples have been changed to have MEMLIMIT=2G

- 2GB of 64-bit storage by default



For 104 concurrent clients sending 10MB messages...

Memory footprint per client:

	9.3.0	9.3.x
31 bit	10.4MB	112KB
64 bit	0	11.6MB

Assuming 1.3GB free space below the bar, this implies a maximum of 128 clients at 9.3.0

At 9.3.1, we can get to 9999 clients (the maximum), assuming a suitable MEMLIMIT

Flexible monitoring on z/OS

Enhanced SMF statistics for queues that extends initial support added in 9.3.

DISPLAY QSTATUS information is now available in the SMF record

The format of the queue statistics data record is described in assembler macro **thlqual.SCSQMACS(CSQDQQST)**

Note: Data captured regardless of the MONQ attribute on the queue

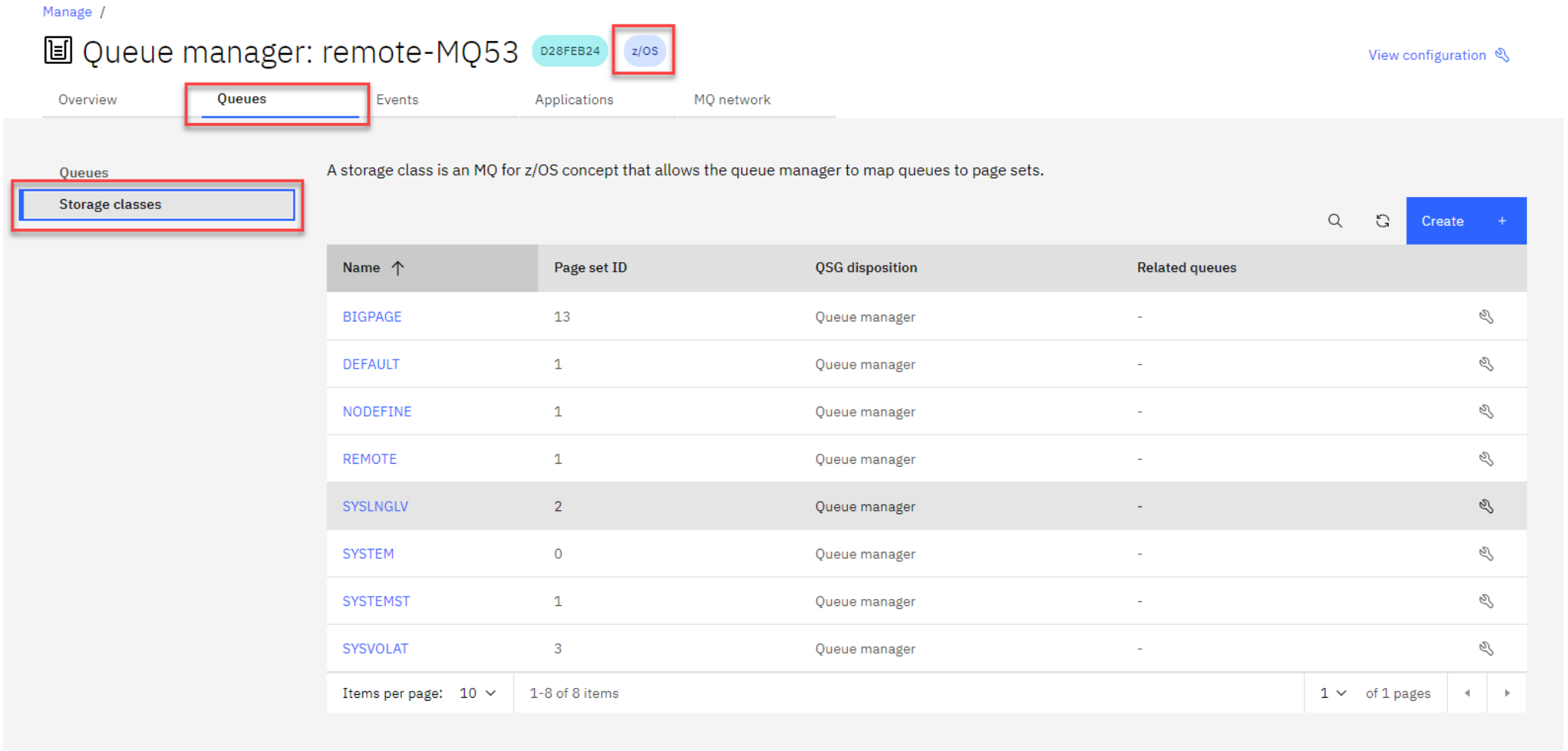
```
MV4A,MQ27,2022/06/24,11:27:29,VRM:931,
Queue Name.........Q1
Disposition.........Private
Pageset ID.........4
Bufferpoll ID.......0
THIS IS A FULL RECORD
Current Depth.......10
Open Output Count...2
Open Input Count....1
QTIME Short.........5029503
QTIME Long..........5029503
Last Put Time.......DBB3F45BDA390805
Last Get Time.......DBB3E8DCEC8C0114
Oldest Message Age..64
```

UNCOM(YES|NO) data is also captured

https://www.ibm.com/docs/en/ibm-mq/9.3?topic=statistics-queue-data-records-version-931-release

MQ Console | New for z/OS

Support for z/OS specific concepts: Storage classes

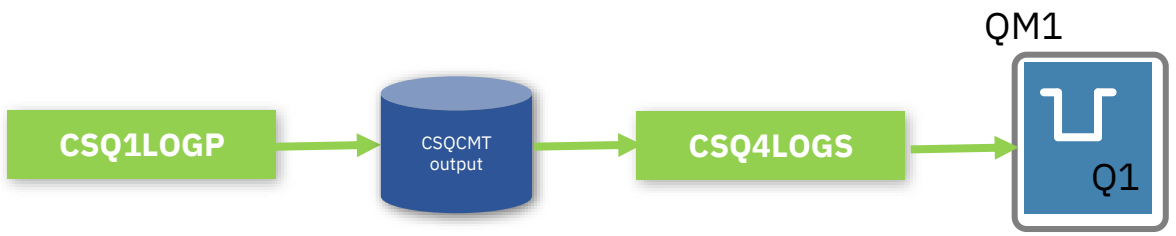


CSQ1LOGP EXTRACT supports message properties

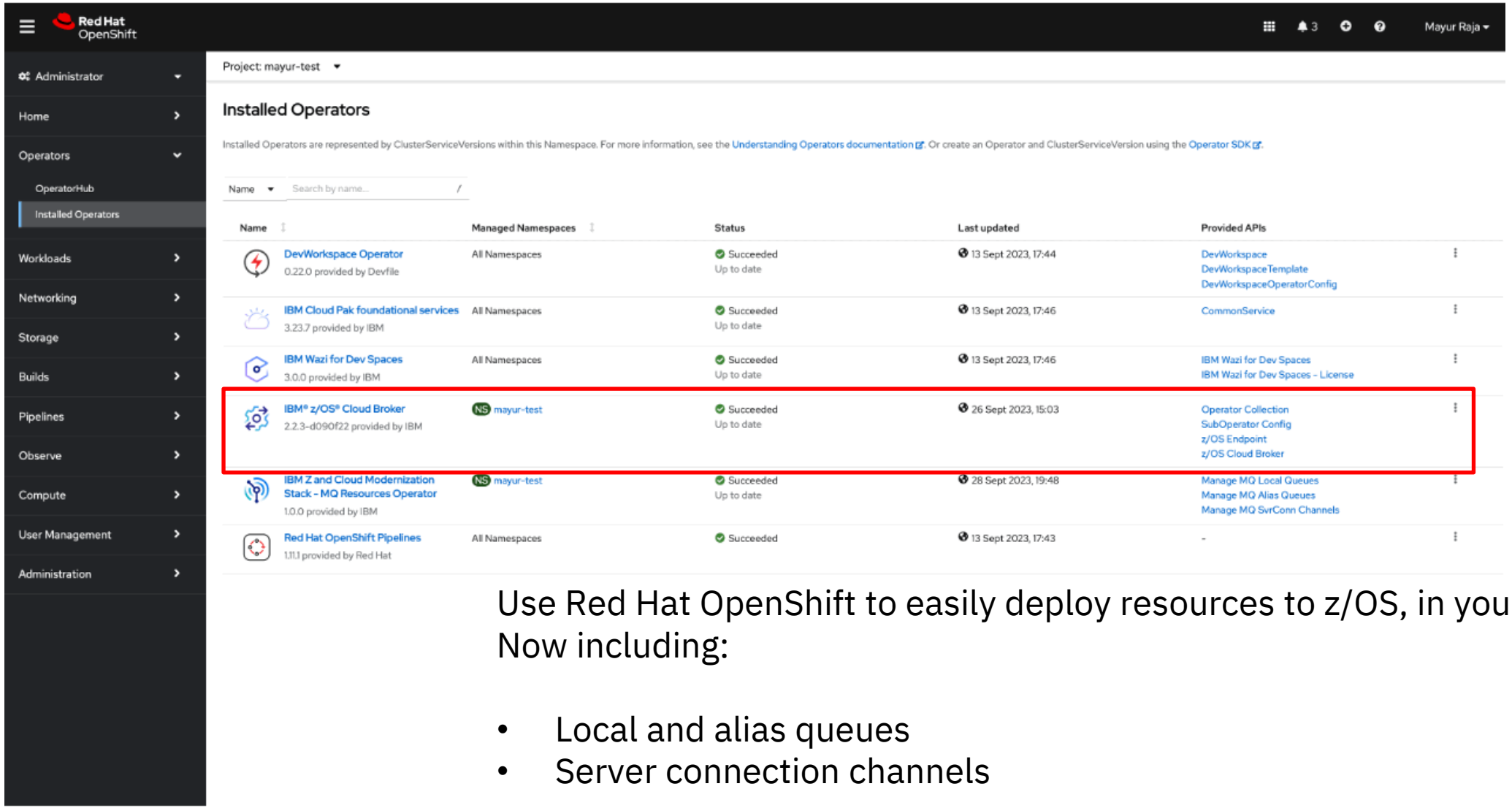
CSQ1LOGP EXTRACT enhanced to fully extract messages with message properties, with the message properties going into an RFH2 header

This means that, if needed, those messages can be replayed, including the properties, using CSQ4LOGS, just like any other message

```
//STEP1 EXEC PGM=CSQ1LOGP,REGION=0M
//STEPLIB DD DISP=SHR,DSN=thlqual.SCSQANLE
//        DD DISP=SHR,DSN=thlqual.SCSQAUTH
//        DD DISP=SHR,DSN=thlqual.SCSQLOAD
//ARCHIVE DD DISP=SHR,DSN=xxx.yyy.A0030620
//        DD DISP=SHR,DSN=xxx.yyy.A0030621
//SYSPRINT DD SYSOUT=*
//SYSSUMRY DD SYSOUT=*
//CSQCMT DD DSN=xxx.MSGS.COMMIT,
// DISP=(NEW,CATLG),SPACE=(CYL,(1,10),RLSE),UNIT=SYSDA
//SYSIN DD *
EXTRACT(YES) SUMMARY(NO)
URID(xxxxxxxxxxx)
/*
//STEP2 EXEC PGM=CSQ4LOGS,PARM=('QM1 REPLAY'),REGION=0M
//STEPLIB DD DSN=thlqual.SCSQANLE,DISP=SHR
//        DD DSN=thlqual.SCSQAUTH,DISP=SHR
//        DD DSN=thlqual.SCSQLOAD,DISP=SHR
//FILEIN DD DSN=xxx.MSGS.COMMIT,DISP=SHR
//SYSDBOUT DD SYSOUT=*
//SYSABOUT DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
//SYSOUT DD SYSOUT=*
/*
```



MQ available in IBM z/OS Cloud Broker



Use Red Hat OpenShift to easily deploy resources to z/OS, in your hybrid cloud. Now including:

- Local and alias queues
- Server connection channels

https://github.com/IBM/zos_mq_operator

z/OS HyperWrite behaviour changes

- Previously, when a user set the value of ZHYWRITE(YES), the queue manager would check if it believes it has the capability of performing zHyperWrite’s for log writes.

- However, a drawback was discovered in that the queue manager assessed its zHyperWrite capability at start-up despite the potential for this state to change while it is running.

- If the queue manager checked the zHyperWrite capability while this was temporarily unavailable, then it could result in a scenario in which zHyperWrite is not attempted until the queue manager is restarted.

- Now, irrespective of a log's perceived zHyperWrite capability, the queue manager will always attempt to utilise zHyperWrite if configured to do so (via ZHYWRITE(YES)).

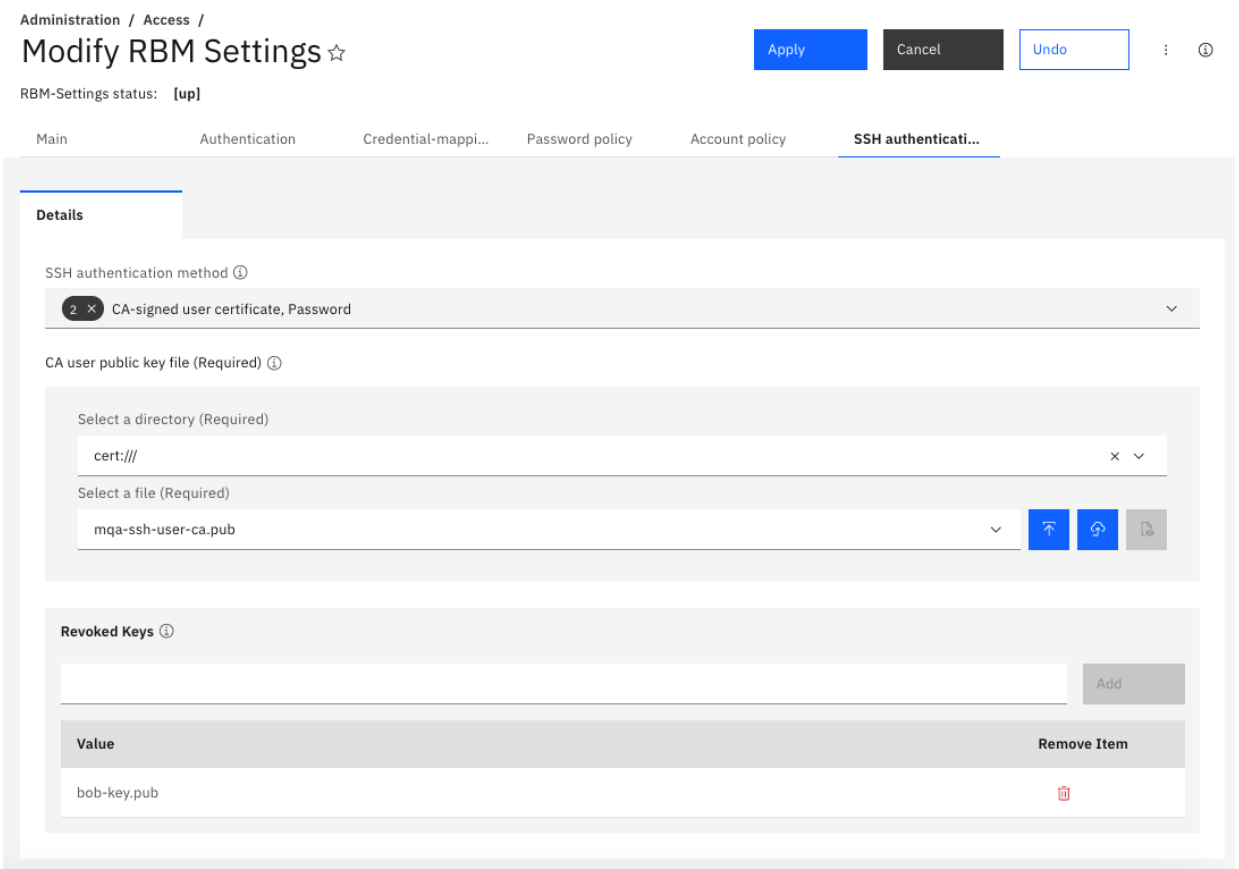
MQ Appliance 9.4 updates

IBM MQ Appliance SSH Password and Certificate Authentication

SSH service enhanced to support standard password and certificate authentication

CA-signed certificates simplify automation and offer improved security over passwords

Revoke individual user certificates, if required




```
$ ssh -i admin-key admin@m2003a00
m2003a00
Unauthorized access prohibited.

Welcome to IBM MQ Appliance M2003A console configuration.
Copyright IBM Corporation 1999, 2023

Version: MQ00.9.3.3.0 build 351779mq on May 11, 2023 12:31:32 PM
Delivery type: CD
Serial number: 0123456

mqa#
```

IBM MQ Appliance Disaster Recovery between HA Groups

DR between two HA groups

Automatic fail over and synchronous replication within each HA group

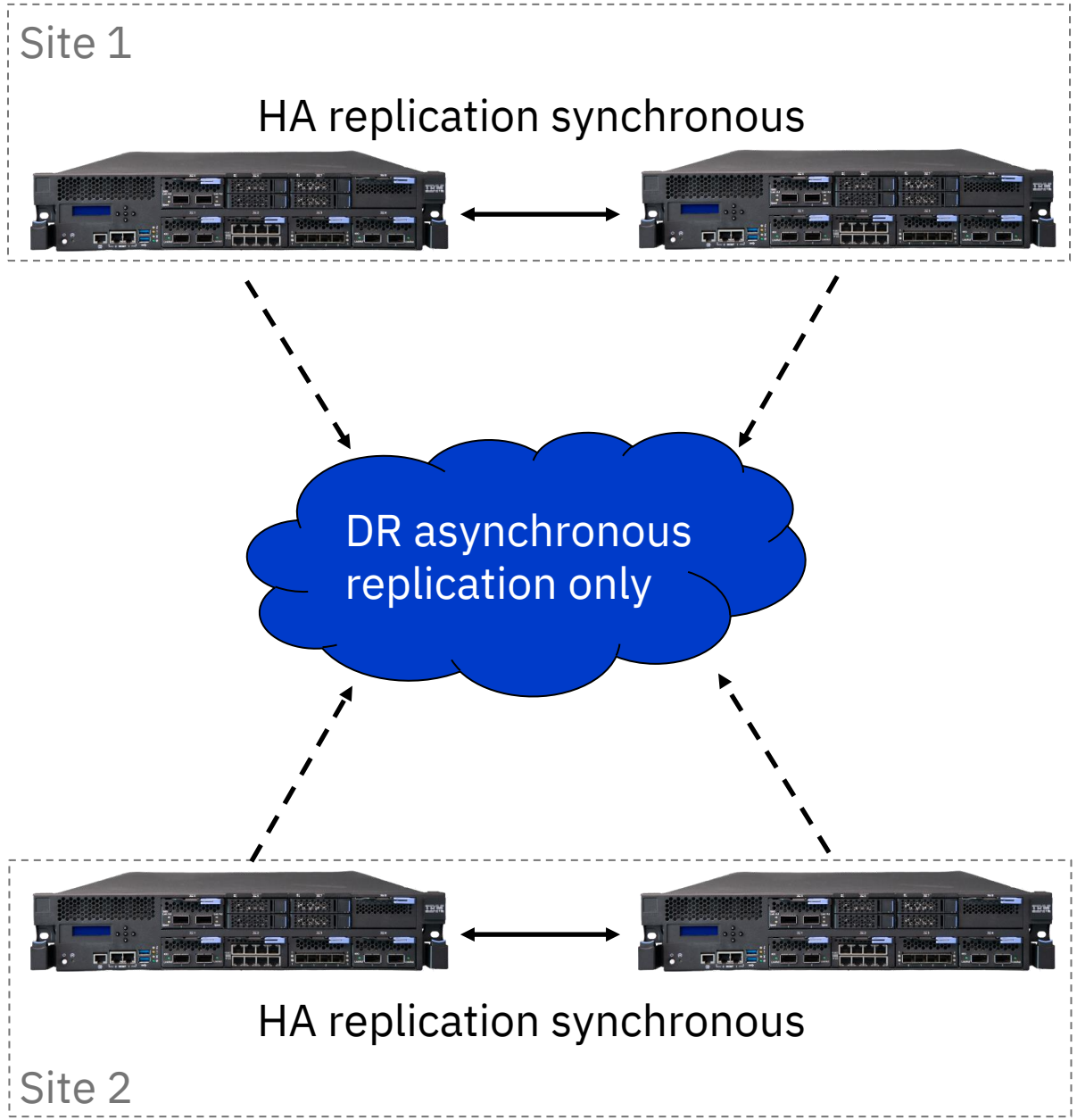
Manual fail over and asynchronous replication for DR between the HA groups

Both HA groups can have active queue managers

Some queue managers can be active at site 1 and others at site 2

If one site fails, then all queue managers can be active at the remaining site

Each HA group can have a floating IP address, but a floating IP cannot span the two sites



IBM MQ Appliance File System Usage Monitor

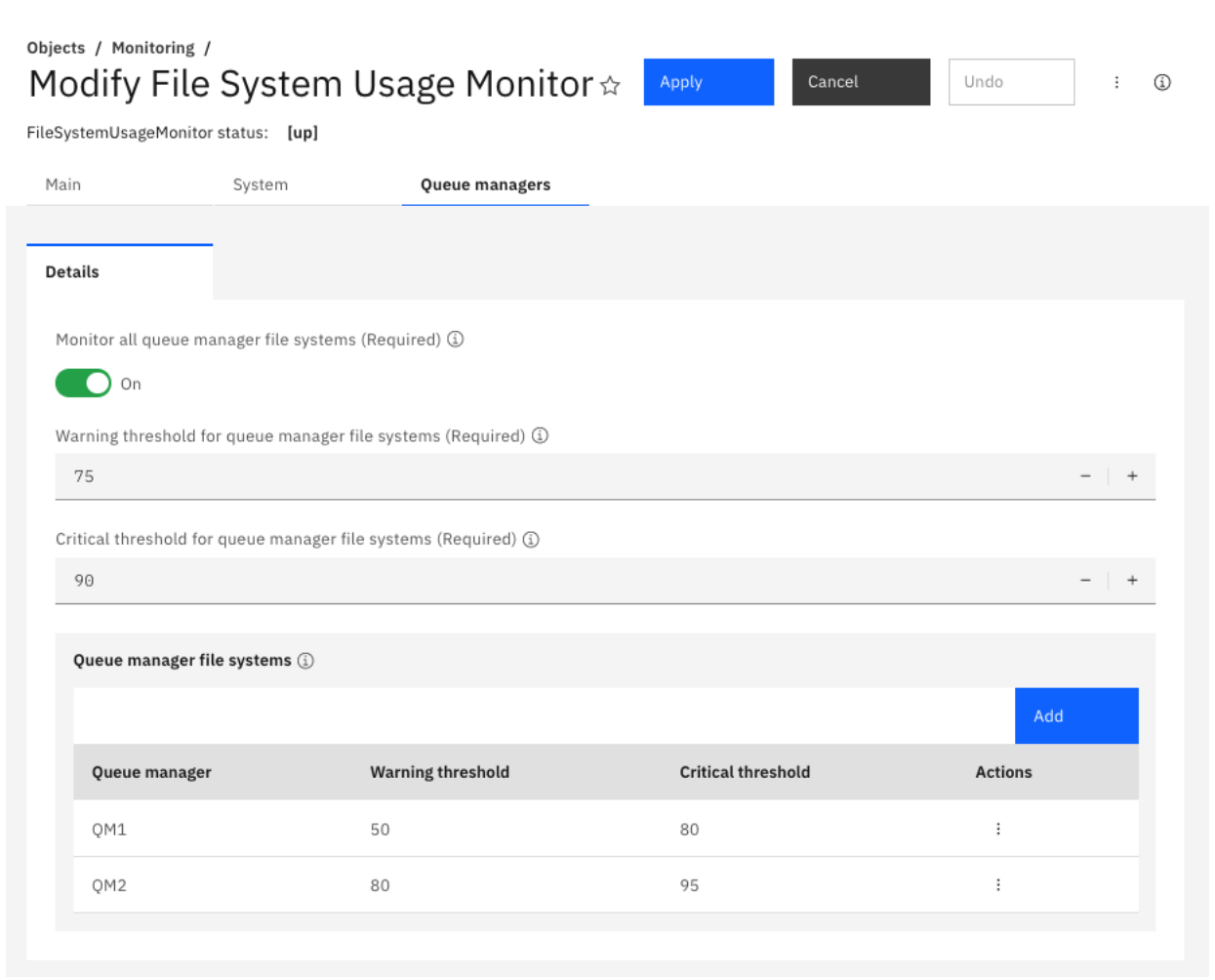
Reports file system usage for queue manager and system file systems at a configurable interval

Avoids need for manual polling

Generates log events that can be consumed by logging targets, and optionally forwarded to central monitoring tools, such as Splunk or Elastic Stack

Generates informational, warning, or critical alerts based on configurable usage thresholds

- Set default thresholds for all file systems
- Set specific thresholds for individual file systems




```
[warn] File system for queue manager 'QM1' is 55%
used, 28862 MB free.

[info] File system for queue manager 'QM2' is 0%
used, 64139 MB free.
```

IBM MQ Appliance Secure Backup

Encrypted backup of system settings that can be restored on the same or a different appliance

Avoids need to backup individual resource definitions

Equivalent to the same capability that exists for the DataPower Gateway

Includes all system settings, local users and system certificates

Does not include queue manager configuration or data - queue managers are backed up and restored separately

Secure Backup

```
mqa(config)# secure-backup mybackupcert temporary:///myBackup
Secure backup to 'temporary:///myBackup' scheduled (may take a few minutes to complete).
Secure backup is complete.

mqa(config)# dir temporary:///myBackup
   File Name                 Last Modified                 Size
   ---------                 -------------                 ----
   backupmanifest.xml        Oct 2, 2023 7:13:04 PM        5240
   root.tgz                  Oct 2, 2023 7:13:04 PM        6808
   config.tgz                Oct 2, 2023 7:13:03 PM        4152
   cert.tgz                  Oct 2, 2023 7:13:03 PM        5688
   local.tgz                 Oct 2, 2023 7:13:03 PM        2592
   password-map.tgz          Oct 2, 2023 7:13:03 PM        304
   mq-users.tgz              Oct 2, 2023 7:13:03 PM        432

   5115.3 MB available to temporary:///myBackup
```

Questions?