Running IBM MQ in the Cloud

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I/O configuration, the storage configuration, and the workload processed. Therefore, no assurance can be given that an individual user will achieve results similar to those
stated here.

Agenda

- **Moving to the Cloud**

- **Why MQ**

- **Adopting best practices for MQ (in the cloud)**

- **Things to be considering before running MQ (in the cloud)**

- **What is available now?**
  - Private cloud
  - Public cloud
  - Hybrid

- **Questions**

MOVING TO THE CLOUD

Top business drivers for cloud

TOP BUSINESS DRIVERS

Standardize on the same open platform and APIs that power a global network of public and private clouds — 13% | 10% | 71% | **97%**

Avoid vendor lock-in with an open platform, including flexibility of underlying technology choices — 4% | 15% | 26% | 47% | **92%**

Accelerate my organization's ability to **innovate** and compete by **deploying applications faster** — 7% | 24% | 48% | **79%**

Increase **operational efficiency** — 21% | 54% | **75%**

Save money over alternative infrastructure choices — 66% | **66%**

Attract top technical talent by participating in an active global technology community — 10% | 22% | 14% | **50%**

Achieve **security and/or privacy** goals with control of platform — 21% | 15% | **41%**

Top 3

Legend:
- ■ #1 priority
- ■ #2 priority
- ■ #3 priority
- ■ #4 priority
- ☐ #5 priority
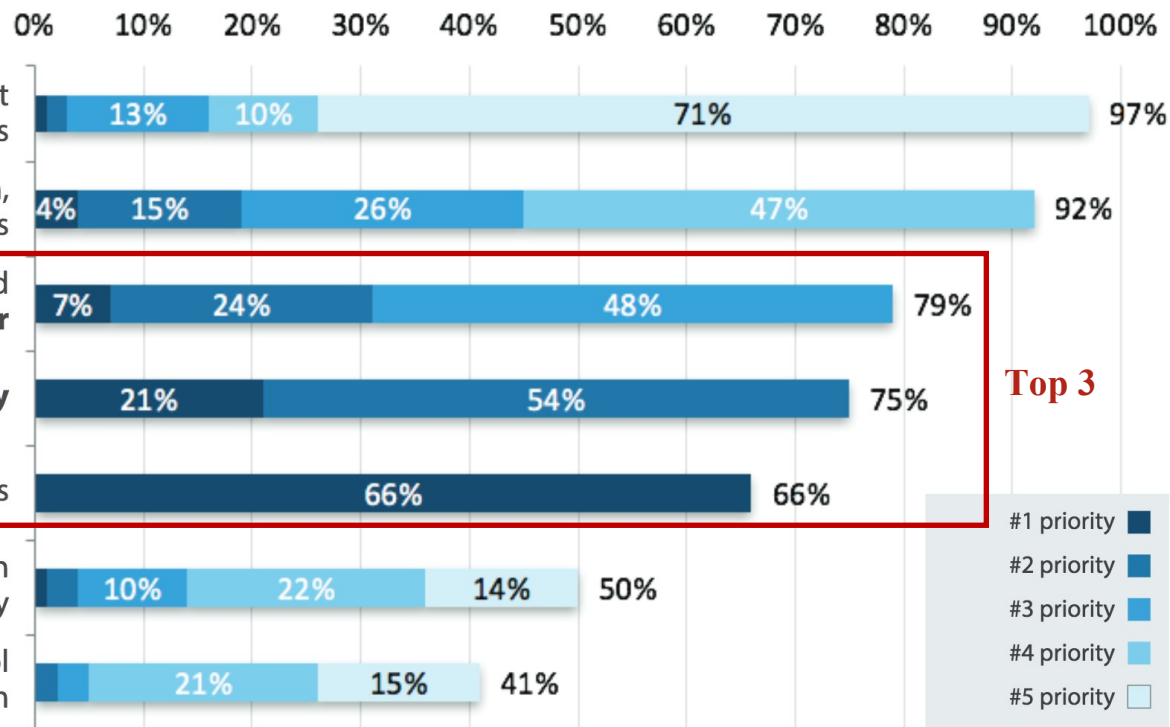
Figure 2.1 n=1183

SOURCE: OPENSTACK USER SURVEY,

In other words…

Be more effective!

…increase rate of innovation
…achieve more
…save money

Characteristics of a cloud environment

- **Self-service**
  - Empowers users to provision resources without requiring human intervention, most likely using a web-based portal or an API.

- **Elastic scaling**
  - Enables scaling up and down on demand, driving the need for high levels of automation.

- **Shared resources**
  - Offers economies of scale through the use of shared infrastructure and software, securely separating the resources at a logical level.

- **Metered usage**
  - Allows pay-as-you-go billing through monitoring, measurement and reporting of usage.

WHY MQ?

- **MQ's key value capabilities and why they matter...**

- **The world depends on reliable, secure messaging**

- **IBM MQ is the most reliable and trusted messaging solution**

- **Your bank transfers complete without losing your money**

- **Your credit card information is kept safe**

- **You move your customer data between systems without exposing it to hackers**

- **Your developers focus on the business needs, not transaction recovery or security**

Simple

- **Your applications are focused on the business, not fixing connectivity problems or tracking their progress**

Scalable

- **Scales to meet the needs of your business, handling billions of messages per day**

Exactly once delivery

- **MQ is designed from the ground up to ensure that when messages of worth are being processed and exactly once, transactional, messages are required, that really means exactly once**

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Connectivity

- **Simple queues and topics provide simple application messaging but MQ provides true routing capabilities to join applications and systems together, locally and globally**

Reliable

- **Only MQ has 25 years of proven reliability and robustness when used by the most demanding customers in the most demanding systems, without you even knowing it's there**

Secure

- **MQ is secure by design, from fine grain authentication and authorization of messaging resources, to encryption of data from one application to another, without the application even knowing or the administrators gaining access**

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

- **On-premise, software and the MQ Appliance**

- **Run it yourself in any cloud, public or private**

- **Let IBM host it for you with its new managed MQ service in IBM Cloud**

IBM **MQ**

IBM Z
Linux
AIX
Windows
Solaris
HPE
IBMi
Appliance
. . .

AWS
Azure
IBM **Cloud**
IBM Cloud Private
Private cloud
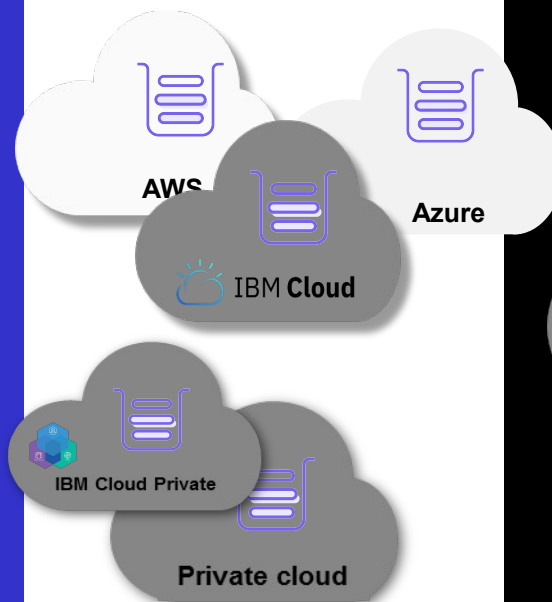
IBM **Cloud**

ADOPTING BEST PRACTICES

Adopting best practices

■ **MQ's capabilities have always been a perfect fit for cloud scenarios;**
- Integrating remote or heterogenous systems
- Dynamic client connectivity
- Dynamic scaling
- Workload balancing
- High security
- High scale and robustness
- Repeatable, remote administration and monitoring
- …

■ **But are you using these?**

Rethink your use of MQ

- **How many of these do you have?**
  - Hand crafted, shared queue managers
  - Applications hard coding connection details
  - Applications bound to a single IP address
  - Edge security at most
  - Internal architecture complexity exposed to the applications
  - A lengthy change control process
  - Manual installation, deployment and configuration

- **Don't confuse old MQ practices for MQ itself**
  - "MQ is too hard to use"
  - "Our MQ system is too complicated to change"
  - "MQ isn't cloud, it's too old!"

- **Re-Think how you use MQ!**

Managing MQ

- **Management of systems is evolving towards <u>cattle</u> not <u>pets</u>. What does that mean for MQ?**

  - Consistent configuration and operations across multiple queue managers
  - Automated deployment
  - Configuration as code
  - Self service
  - Collection and analysis of diagnostic data
  - Simple integration into standard devops and automation tooling
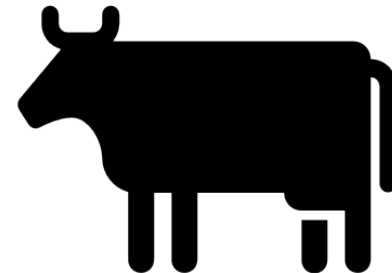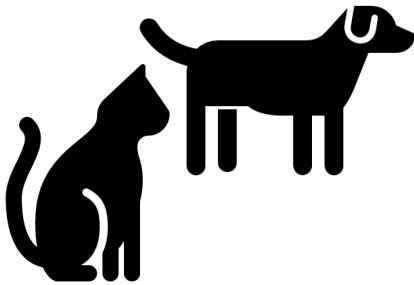
Marks & Spencer – UK retailer

MQ PRINCIPLES

- Cloud QMs are Disposable & Immutable

- Script Everything

- Dedicated MQ QMs per App
  - Client connections
  - JMS
  - Common Message Envelopes

- MQ QM "t-shirt" Models for on-Prem

M&S
EST. 1884

MQ and Cloud at
Marks & Spencer

Session #9176

James Blackburn

IBM Think, March 2018

M&S
EST. 1884

LEARNINGS

MQ Cloud Journey challenged us to 'Think Differently'.

- Bigger fewer QMs are often more complex to manage

- MQ on Cloud, 'just worked'

- MQ CD stream is stable

- MQ QMs really can be disposable

- Everyone can be an MQ admin

- Delivery Organisation, a Hybrid Team for a Hybrid Solution

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EST. 1884
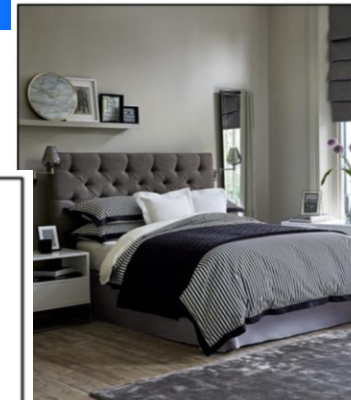
think 2018

THINGS TO CONSIDER BEFORE RUNNING MQ IN THE CLOUD

Storage

- **If you are using a cloud container service you should be aware about container data.**
  - To prevent data loss you should use a persistent volume.
  - You can mount a portion of the host filesystem as a volume
  - Cloud container systems provide interfaces to use other storages.

- **Reliability of storage**
  - Replicated across failure domains / availability zones?
  - Are disk writes cached?
  - What's the failure rate of disks?

- **Connecting to the right persistent storage**
  - When a queue manager's is moved (e.g. run a container in a different VM), then something needs to re-connect the queue manager to the correct storage.

High Availability
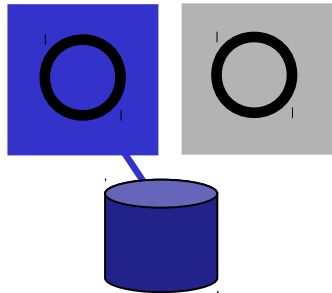
Single resilient queue manager

- Cloud manages fail-over to somewhere with spare capacity

- Networked storage (block or filesystem), managed by separate subsystem
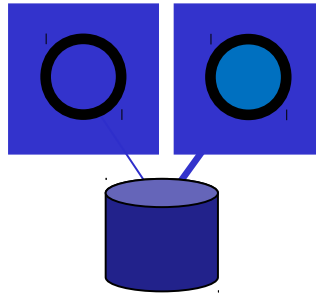
Multi-instance queue manager

- MQ manages fail-over

- Networked storage (filesystem), managed by separate subsystem
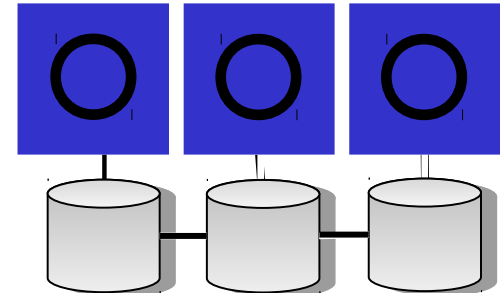
Replicated data queue manager

- MQ manages fail-over

- Local block storage, synchronously replicated by MQ

Who is my provider?

- **What does my provider give me that I can use instead?**
  - Does their storage provider have backup capability?
  - Do they have automatic failover and retry?

- **What other features does my provider have that I want to take advantage of?**
  - Do they have a large catalog of services that I will want to use?

Log Management/Monitoring

- **Cloud processes only run as long as their control program runs**
  - If you have tied this in to the life of the queue manager a it will stop with the queue manager.

- **If there is a problem you may not be able to log into the machine to get error logs**
  - Although you should be avoiding this as much as possible.
  - You may also only know where the problem is later and so now you can't identify the failing container.

- **Machines could also be running anywhere which makes locating a particular one troublesome**

- **You should be centralizing your logs and monitoring data so you can quickly see your full infrastructure and debug even if a queue mangaer is failing.**

Use cloud systems to centralize.

- **Publish MQ statistics to Prometheus and Grafana**
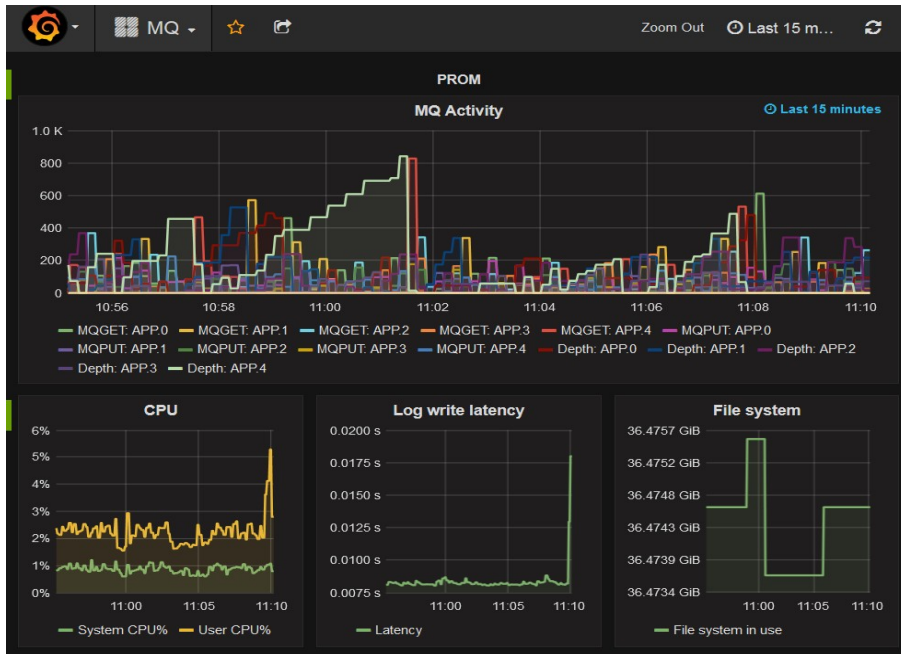
- **Forward MQ error logs to ElasticSearch or Splunk**
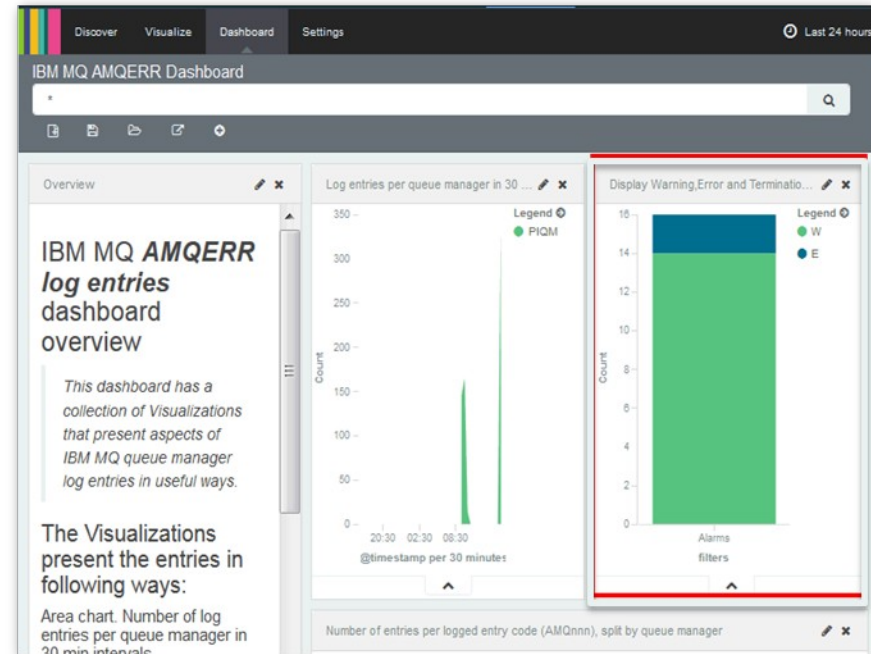
- **Error logs can output JSON for easy parsing**

Security/User Management

- **What will you use as a user repository?**

- **IBM MQ supports many different user repositories**
  - OS
  - LDAP
  - PAM

- **OS may not work effectively in a cloud.**
  - OS uses user details stored in /etc/passwd
  - If this isn't stored in a persistent volume it will be reset.

- **Does you cloud provider have an IAM system you want to link in with?**
  - MQ on Cloud service does this!
  - PAM modules are your friend.

Data Security

- **Is my disk adequately protected?**
  - Can I ensure that sensitive data on that disk is encrypted?
  - Do I need to do more?

- **Is communication to/from and within the cloud protected?**
  - Could a man in the middle attack occur?

- **MQ has native features to protect this:**
  - TLS connections can be used to protect communications
  - AMS can be used to protect message data.
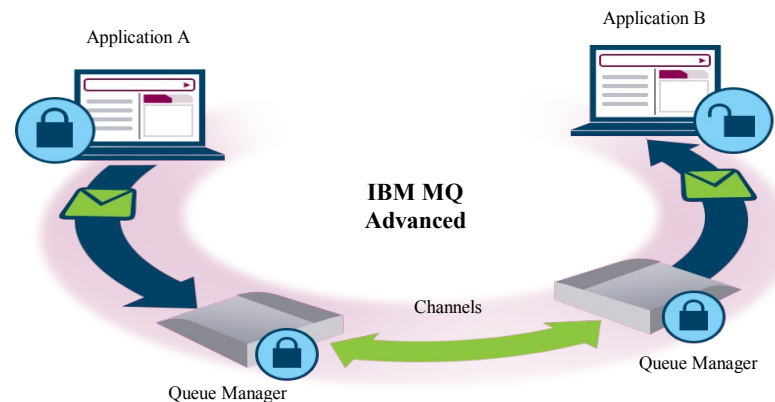
Certificate Management

- **Certificate management has similar problems as User management.**

- **Keystore should be stored under /var/mqm which should be on a persistent volume.**

- **But how can you quickly and effectively update certificates if needed?**

Licensing

- **How can I effectively track my VPCs?**
    - If queue managers are being created and deleted dynamically how can I ensure I am correctly tracking this.

- **Some cloud providers have this information built in**
    - But if you use mixtures of cloud and on-prem you'll have multiple tracking systems.

- **How will you link back in with ILMT?**

IBM MQ Hourly Model

VPC/PVU pricing **today**

Pay for maximum concurrency

=60 VPCs or 4,200 PVUs

Proposed hourly pricing

Pay for total hours of runtime

= 105 core hours
(cheaper than 60 VPC)
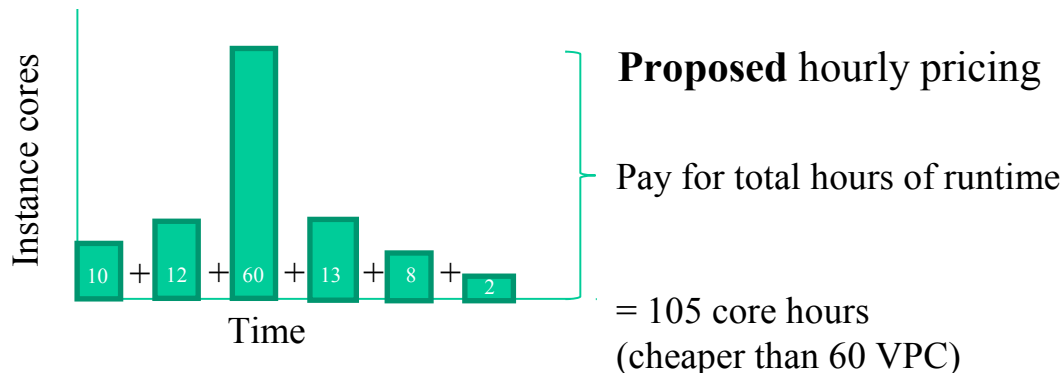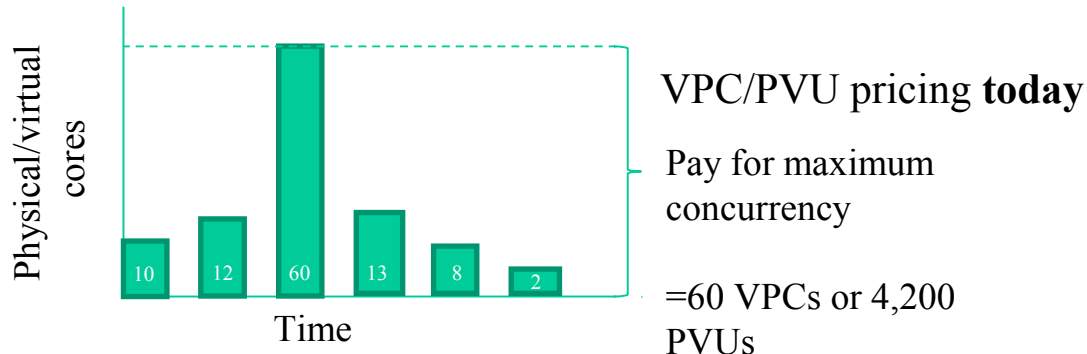
✓ **Pre-purchase "core hours"**

- Each instance consumes these hours as they run

- Core hours consumption is multiplied by the number of CPU cores available to an instance

- Core hours can be consumed at any rate during 12 month period

WHAT IS AVAILABLE NOW?

- **MQ in Containers**

- **MQ has been supporting Docker containers since 2015 with images on Docker Hub and Docker Store and sample setups on Github**
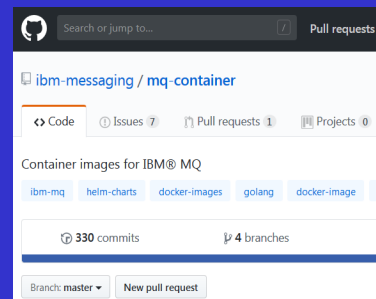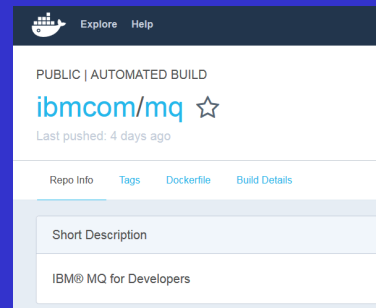
- **More recently it has been demonstrating how to get the most from containers using Kubernetes**
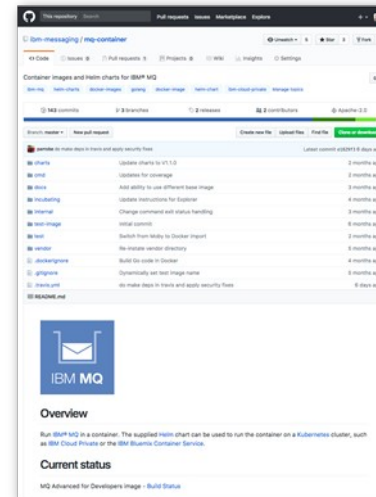
- **Including RedHat OpenShift + Pivotal Container Service**

- **And now MQ Advanced is available as a fully supported product with IBM Cloud Private, a Kubernetes-based solution from IBM**

MQ on the IBM Kubernetes service

■ **Trivial to get started**

■ **Default developer configuration**

■ **Continue to use your favourite administration tooling**


```
# Create a free Kubernetes cluster
bx cs cluster-create --name mq-test

# Launch MQ using public image from the IBM Cloud docker registry
kubectl run my-mq --image=registry.eu-gb.bluemix.net/ibm-mq \
      --env="LICENSE=accept" --env="MQ_QMGR_NAME=QM1"
```
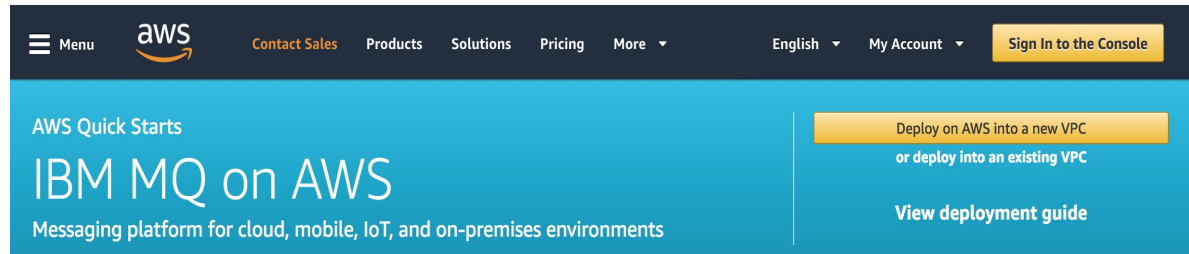
IBM MQ on AWS Quick Start

- **Getting up and running with MQ quickly is important, but running it in the best possible way is critical**

- **The MQ AWS QuickStart demonstrates AWS architectural best practice**

- **Deployed from scratch in around 30 minutes**

This Quick Start automatically deploys a highly available, production-ready IBM MQ server on the Amazon Web Services (AWS) Cloud in about 30 minutes, into a configuration of your choice.

IBM MQ is messaging middleware that simplifies and accelerates the integration of diverse applications and business data across multiple platforms. It uses message queues to facilitate the exchange of information, and offers a single messaging solution for cloud, mobile, the Internet of Things (IoT), and on-premises environments. The IBM MQ service on AWS will support client messaging applications from within your VPC, from trusted addresses on the Internet, and via a VPN from your on-premises environment.

This Quick Start deploys IBM MQ into a
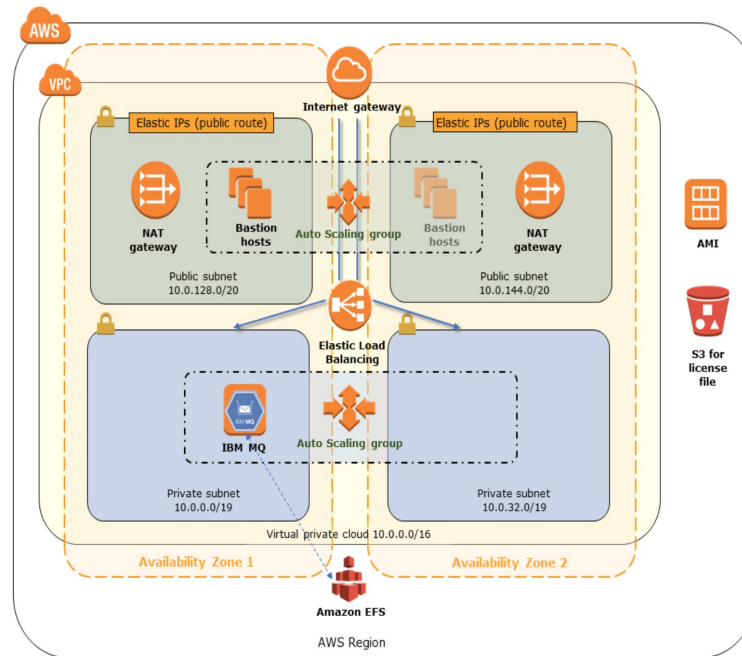
For step-by-step instructions to deploy and get started with IBM MQ on AWS, see the Quick Start

IBM MQ SaaS offering

■ **Let IBM host it for you with its new managed MQ service in IBM Cloud**
  - Now available to deploy in AWS!
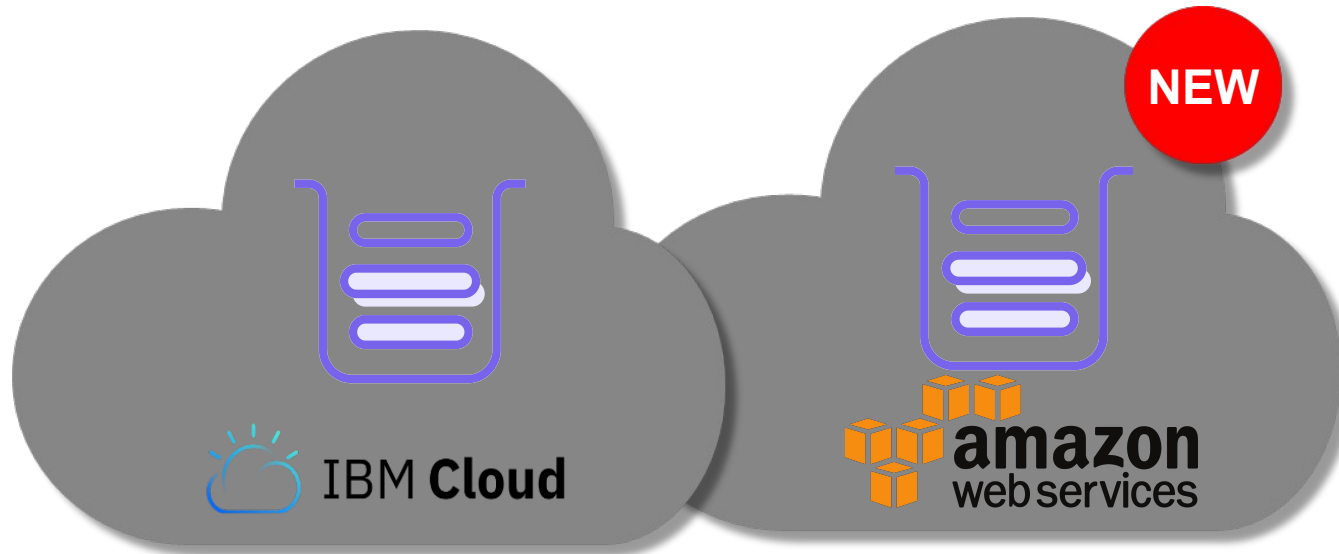
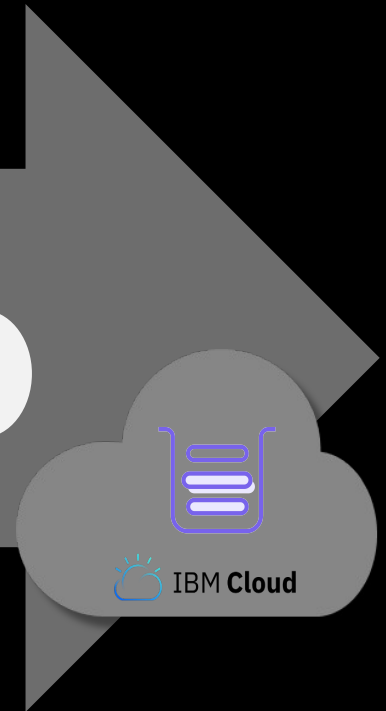- Run IBM MQ in any location or cloud exactly as you need it
- On-premise, software and the MQ Appliance
- Run it yourself in any cloud, public or private
- Let IBM host it for you with its new managed MQ service in IBM Cloud

IBM MQ

IBM Z
Linux
AIX
Windows
Solaris
HPE
IBMi
Appliance
. . .

AWS
Azure
IBM Cloud

IBM Cloud Private
Private cloud
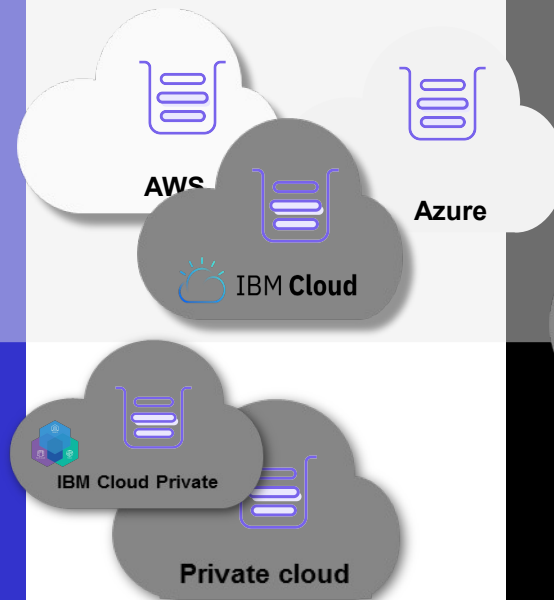
IBM Cloud

Where can I get more information?

IBM Messaging developerWorks
developer.ibm.com/messaging

IBM Messaging Youtube
https:// ibm.biz/MQplaylist

LinkedIn
https://ibm.biz/ibmmessaging

MQ Labs here at MQTC!

Blog posts tagged with "cloud"

IBM **MQ**

Questions & Answers

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