IBM MQ Appliance: A Messaging Solution in a Box

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Agenda

- **What and Why?**
  - What is the MQ Appliance?
  - Why would I want one?
  - What you can do with an appliance
- **MQ Appliance Administration**
  - CLI
  - Web Interface
- **MQ Appliance Features**
  - Security
  - MQ Light
  - High Availability and Floating IP
  - Disaster Recovery
- **Monitoring and Performance**
  - REST/SNMP/SSH
  - Performance Capacity
- **Whats New?**

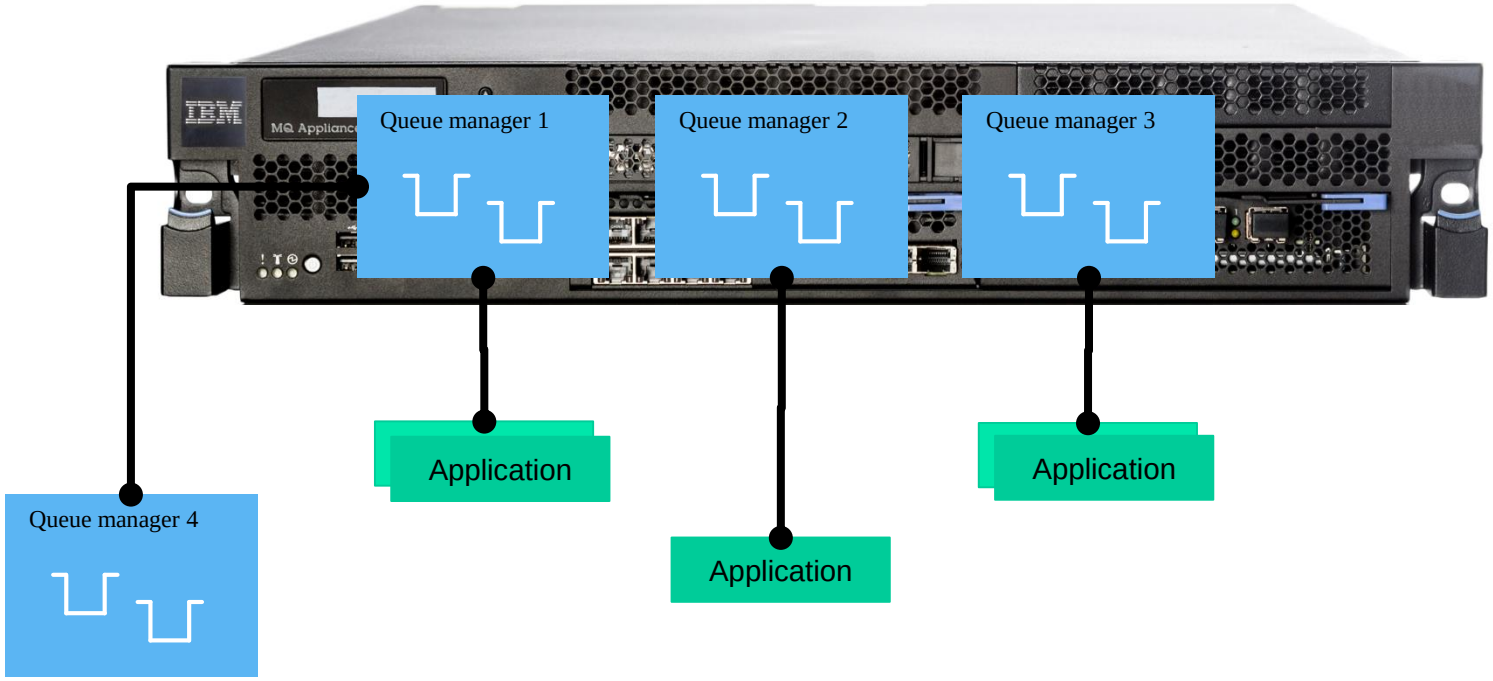
IBM MQ Appliance
What is it and Why would I want one?

What is an MQ Appliance? Why would I want it?

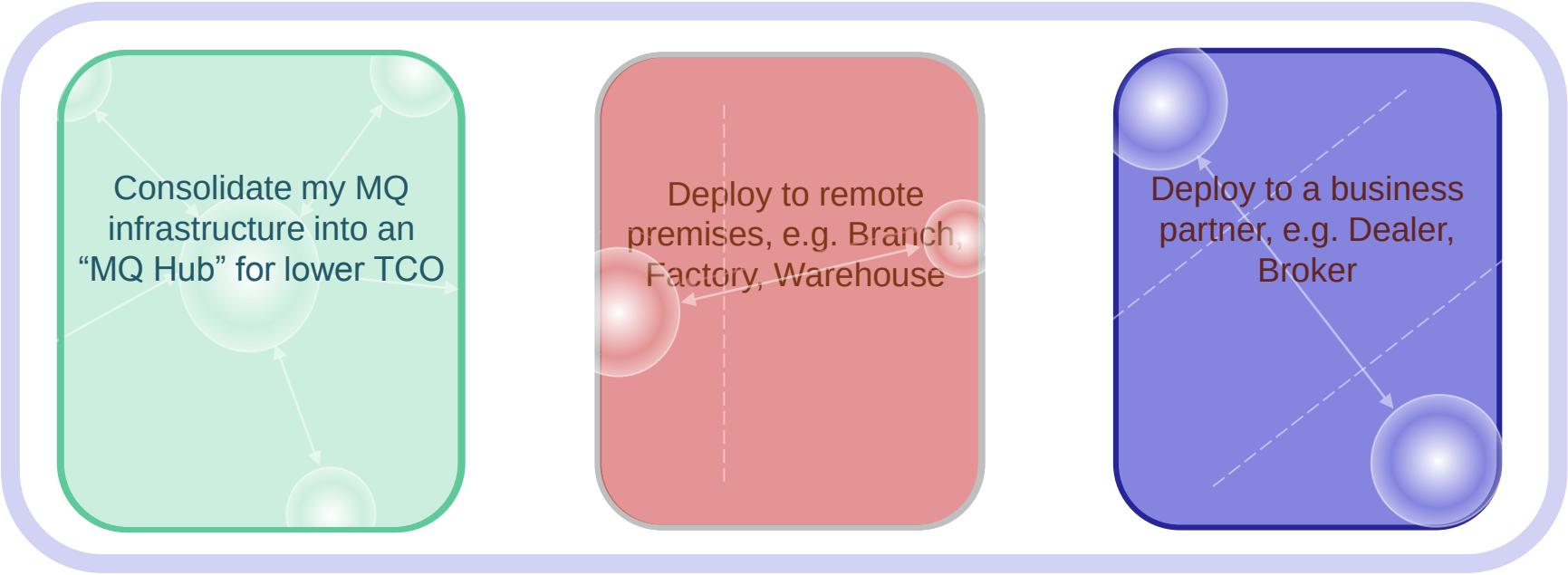
- **The scalability and security of IBM MQ - now 9.0.3**
  - Integrates seamlessly into MQ networks and clusters
  - Familiar administration model for administrators with MQ skills
- **The convenience, fast time-to-value and low total cost of ownership of an appliance**
- **Ideal for use as a messaging hub running queue managers accessed by clients, or to extend MQ connectivity to a remote location**
- **Familiar feel for existing MQ users – application interfaces, administration, networking/clustering, security….**
- **Plus new appliance specific features – e.g. built in high availability**

Or, to really simplify it…

- A box where you create and run queue managers…



What do you want to do?



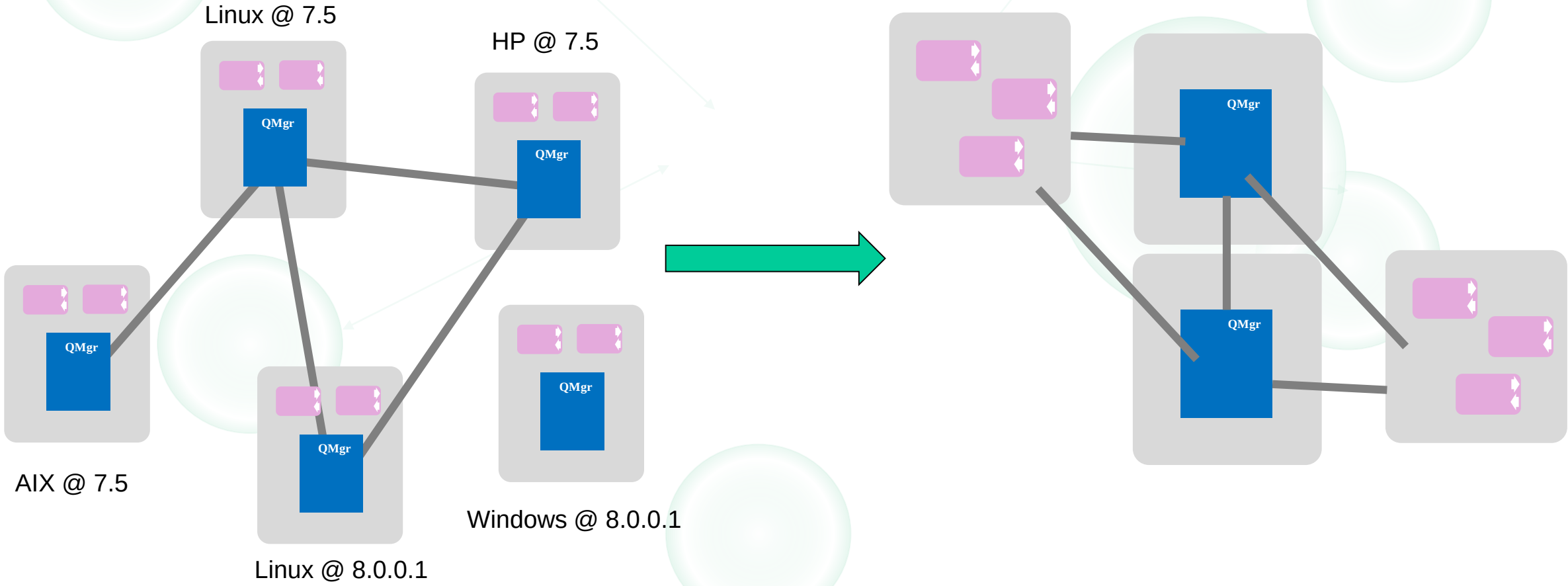
IBM MQ Appliance offers:

Optimized solutions to meet the needs of these use cases

Differentiation compared to MQ software deployment approaches

2 price points to meet different deployment-based business needs

Consolidate my MQ infrastructure into an “MQ Hub” for lower TCO



Consolidate my MQ infrastructure into an “MQ Hub” for lower TCO

Objectives

Reduce TCO

Reduce footprint

Standardise deployments

Build 'hub' - concentrate expertise

Challenges

Mixture of platforms and versions

Migrations difficult – lack of standardization

Infrastructure downtime impacts other applications

Benefits

- Easy to deploy.
- Simplified maintenance.
- Familiar administration.
- Separates applications from Infrastructure.
- Supports existing MQ definitions, concepts and security model.
- HA avoiding external dependencies.

Deploy to a remote premises

Objectives

Resilient connectivity to remote location

Robust and secure

Flexibility, minimal time to value at new sites

Challenges

Avoiding single points of failure

Outside assistance needed – lack of local skills and resources

Benefits

- Standardization makes ‘pre-canned’ rollout simpler
- Remote configuration and management
- High availability requires no additional systems or skills

Deploying to business partner: Appliances as 'Gateways'

Objectives

Extend connectivity to external business partner

Rapid onboarding

Control and limit access

QOS expectations from both parties

Challenges

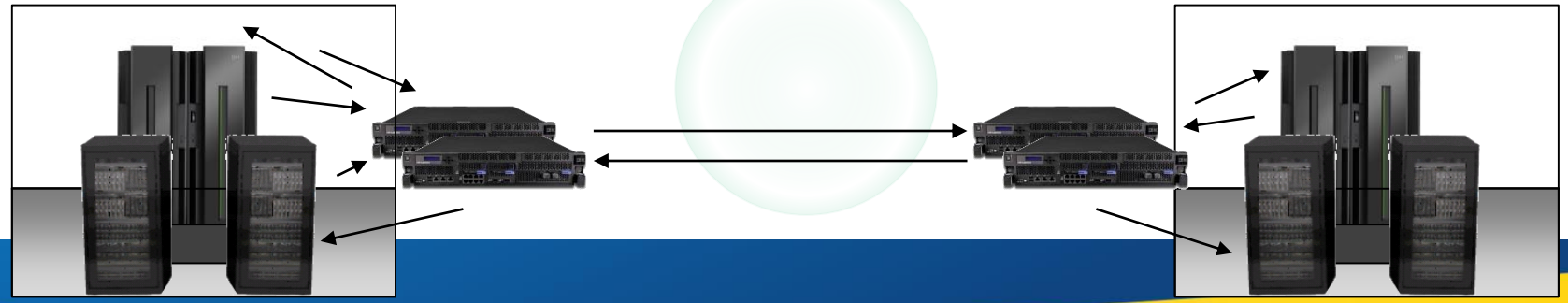
Partner may not have MQ or MQ skills today

Configuration needs to meet a set of standards

Downtime directly effects business relationship

Benefits

- Easy to deploy
- Simplified maintenance
- Ability to preconfigure a very standard system both helps ensure standards applied and speed deployment
- HA avoiding external dependencies

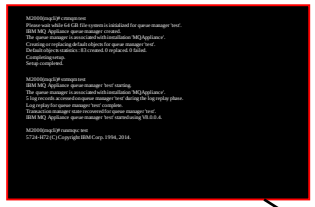


Summary: Why an Appliance?

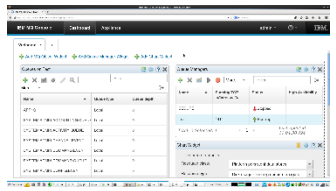
- Fixed hardware specification allows IBM to simplify and tune the firmware
- Standardisation accelerates deployment
- “Hub” pattern separates messaging from applications/middleware
- Simplified ownership

MQ Appliance Administration

Administration

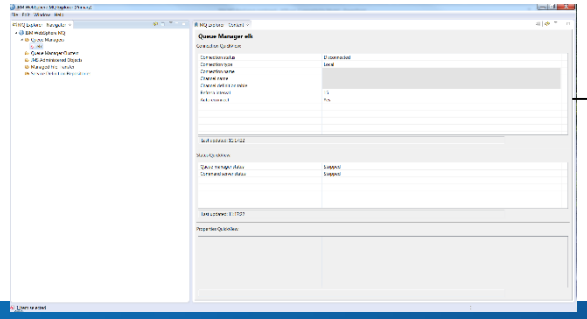


Serial/SSH

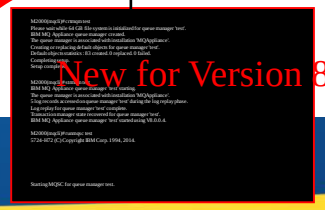


HTTP

REST – new for 901!



MQ Channel (PCF)



New for Version 8!

Command Line Interface

```
login: admin
Password: *******

Welcome to IBM MQ Appliance M2001A console configuration.
Copyright IBM Corporation 1999-2017

Version: MQ00.9.0.3.0 build mq-rel.265326 on Mar 05, 2017 11:10:38 AM
Serial number: 7800537

M2000# mqcli
M2000(mqcli)# dspmqver
Name:        IBM MQ Appliance
Version:     9.0.3.0
Level:       p903-L170305
BuildType:   IKAP - (Production)
Platform:    IBM MQ Appliance
MaxCmdLevel: 903
```

Command Line Interface

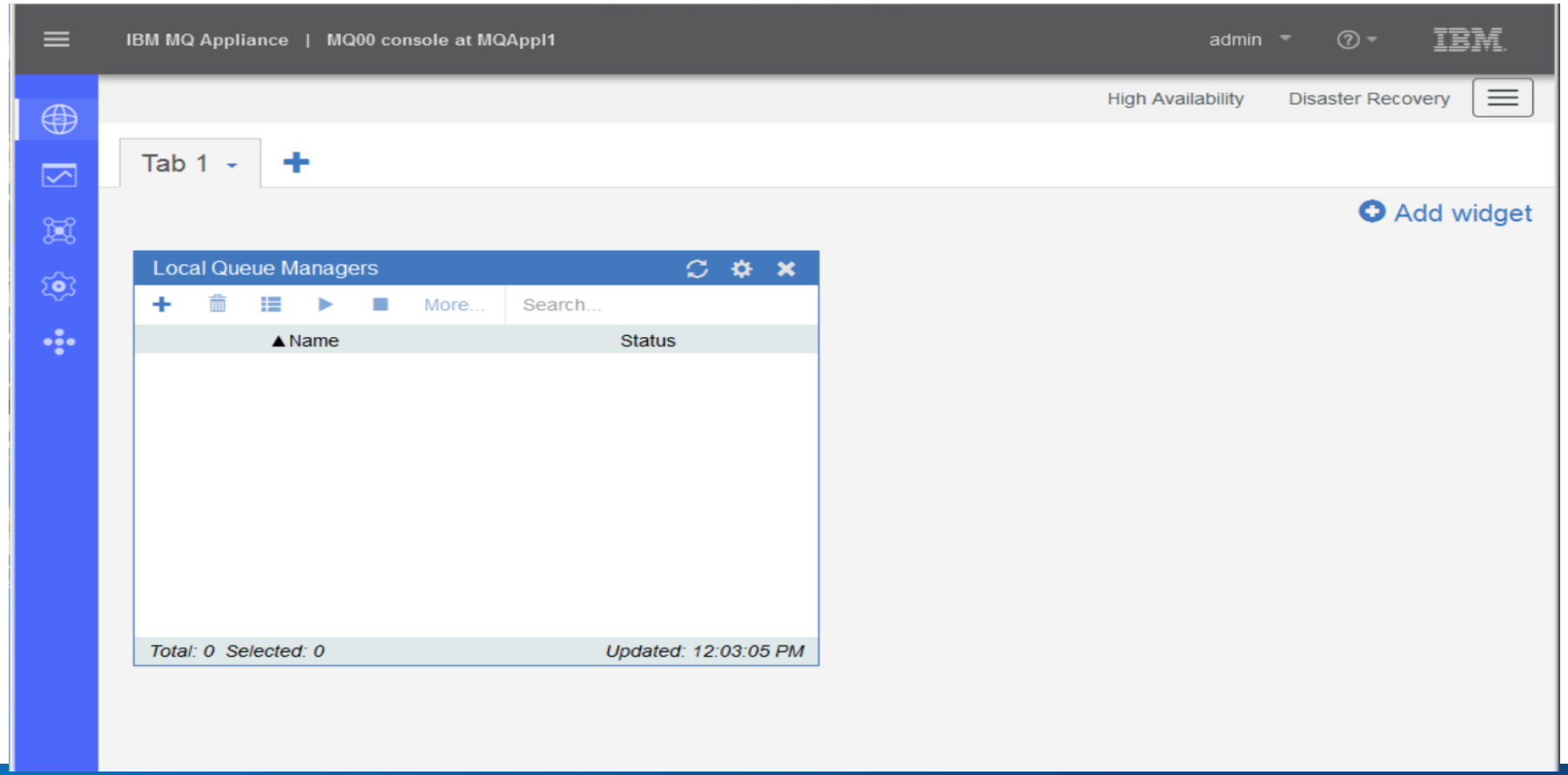
```
M2000(mqcli)# crtmqm test
Please wait while 64 GB file system is initialized for queue manager 'test'.
IBM MQ Appliance queue manager created.
The queue manager is associated with installation 'MQAppliance'.
Creating or replacing default objects for queue manager 'test'.
Default objects statistics : 83 created. 0 replaced. 0 failed.
Completing setup.
Setup completed.

M2000(mqcli)# strmqm test
IBM MQ Appliance queue manager 'test' starting.
The queue manager is associated with installation 'MQAppliance'.
5 log records accessed on queue manager 'test' during the log replay phase.
Log replay for queue manager 'test' complete.
Transaction manager state recovered for queue manager 'test'.
IBM MQ Appliance queue manager 'test' started using V9.0.3.0

M2000(mqcli)# runmqsc test
5724-H72 (C) Copyright IBM Corp. 1994, 2014.
Starting MQSC for queue manager test.
```

Web-based Administration - IBM MQ Appliance web UI

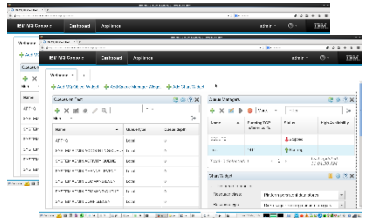
- Browser-based user interface allows management of the physical appliance (Ethernet ports, security, etc.) and MQ, with role based access

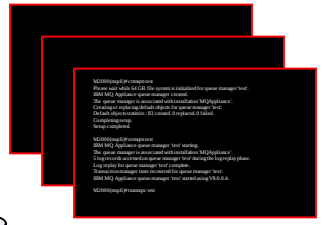


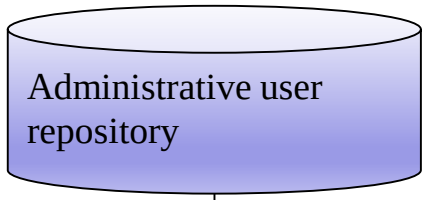
MQ Appliance Features

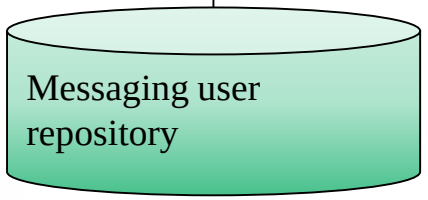
Security – Users

Administrators defined locally on the appliance or in LDAP repository and can connect via SSH, WebUI, or REST to administer all aspects of the system





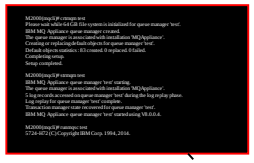




Messaging Users may be defined locally or in LDAP repository (choice per QM), and remote MQ applications always connect with these credentials.

Security – Messages and connections

addcert
createcert



New certificate management commands

Application

TLS (SSL) on channels

End to end and at-rest encryption using AMS built in and included as standard

Traditional MQ (software) Queue Manager

Application

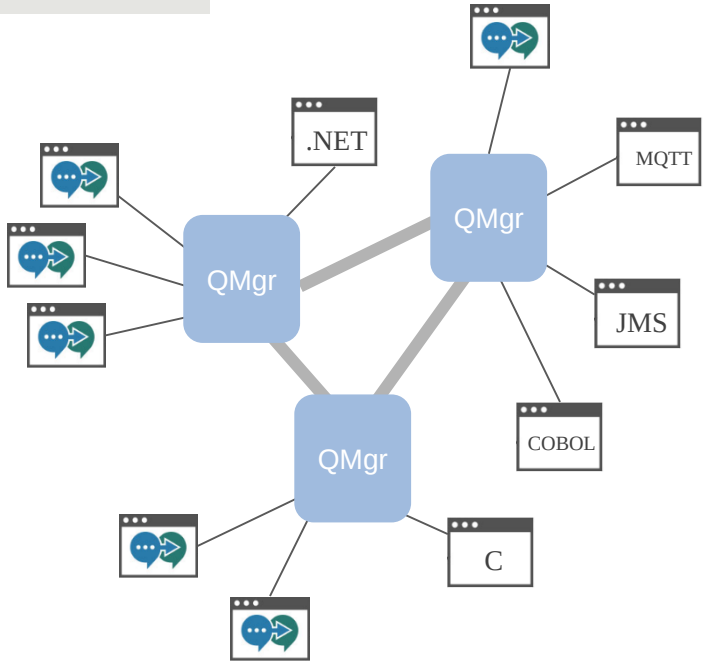
Connectivity

- The IBM MQ Appliance supports a number of protocols for message transmission
- As you would expect, all the usual connectivity to MQ infrastructure:
  - MQ client protocol – for connectivity from applications
    - Client libraries available in the usual places, not shipped with the appliance
  - MQ server protocol – for connectivity with other queue managers
    - This will support sender-receiver channels and server-requester channels
  - MQ Clustering – for simplified administration and workload management
    - Appliance queue managers can join existing clusters or host Full Repositories

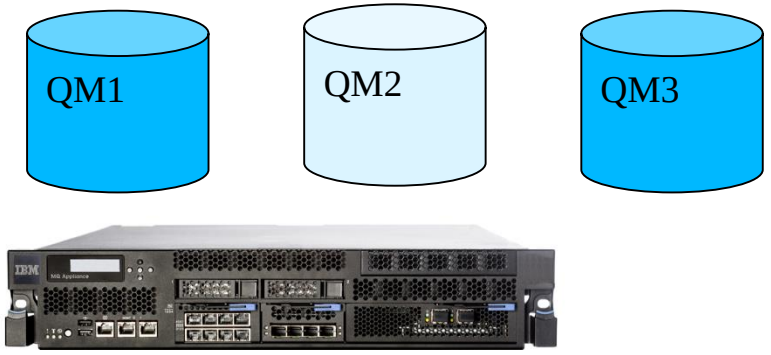
Connect MQ Light applications directly to MQ Appliance

Messaging that application developers will love to use, helping them make responsive applications that scale easily

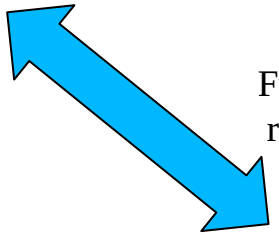
- **Very simple messaging API**
  - Support in variety of languages and runtimes; Node.js, Python, Java, etc…
- **MQ support through a new channel type AMQP now (8.0.0.5) also available on the Appliance.**
  - Similar in style to an MQTT channel
  - Supports the subset of the AMQP 1.0 Oasis specification required for MQ Light applications
- **MQ Light applications interoperable with all other MQ applications**
  - All share the same topic space



High Availability - Concept



Appliance 1



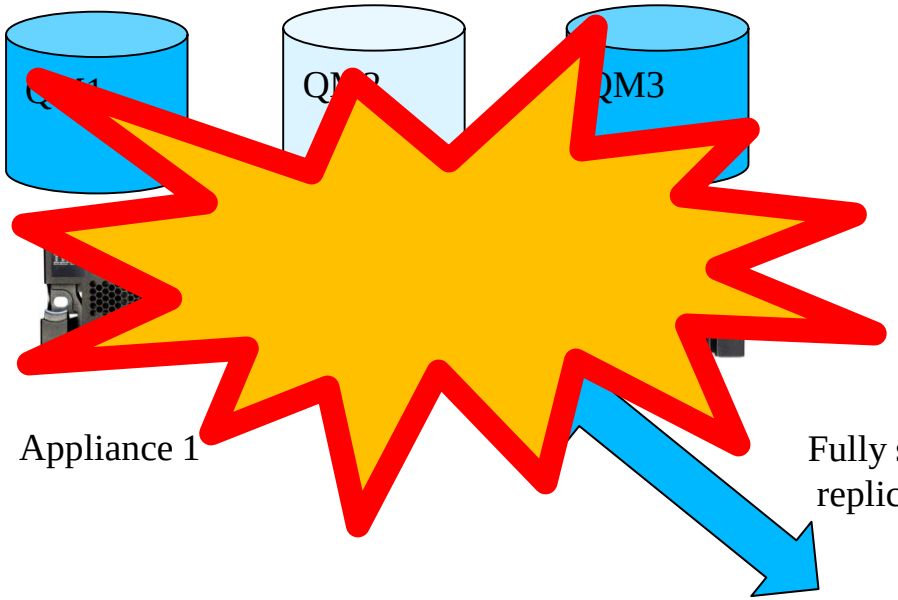
Fully synchronous replication

Appliance 2

- **No persistent data loss on failure**
- **No external storage**
- **No additional skills required**

- **Manual control of failover for migration/maintenance**
- **Queue manager level active/passive (i.e. both appliances can run workload)**

High Availability – Failure scenario

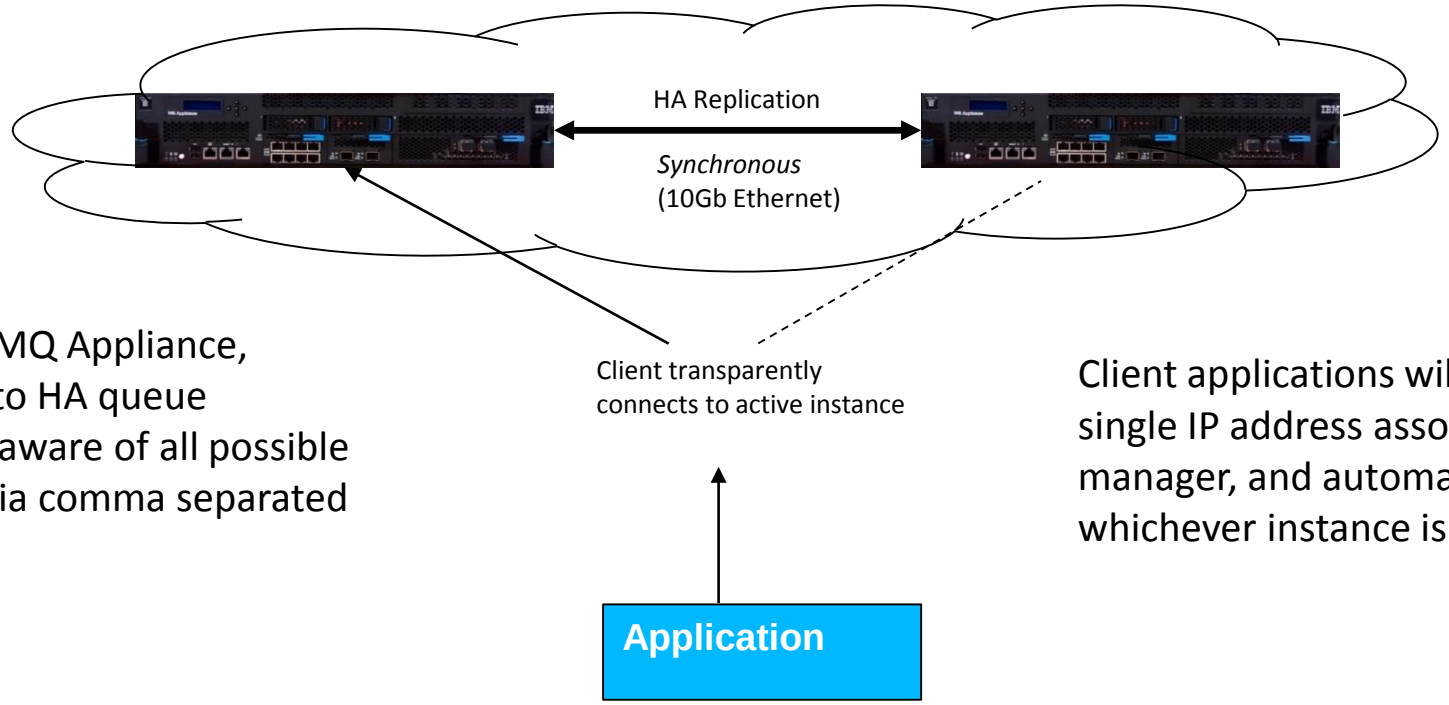


- **Clients (and other Queue managers) reconnect to alternative IP**
- **Usually transparent to application**

Appliance 2

MQ Appliance – HA & DR Deep Dive
Room: Zebrawood
September 26th 08:30 – 09:40 &
September 27th 15:50 – 17:00

New in 901! Floating IP support



In version 8 of the MQ Appliance, clients connecting to HA queue managers must be aware of all possible IP addresses (e.g. via comma separated list or CCDT)

Client applications will now be able to use a single IP address associated with the queue manager, and automatically adopted by whichever instance is currently active

This is particularly useful when replacing existing standalone queue managers with HA Appliance queue managers, requiring no changes on the application side.

Floating IP configuration (CLI)

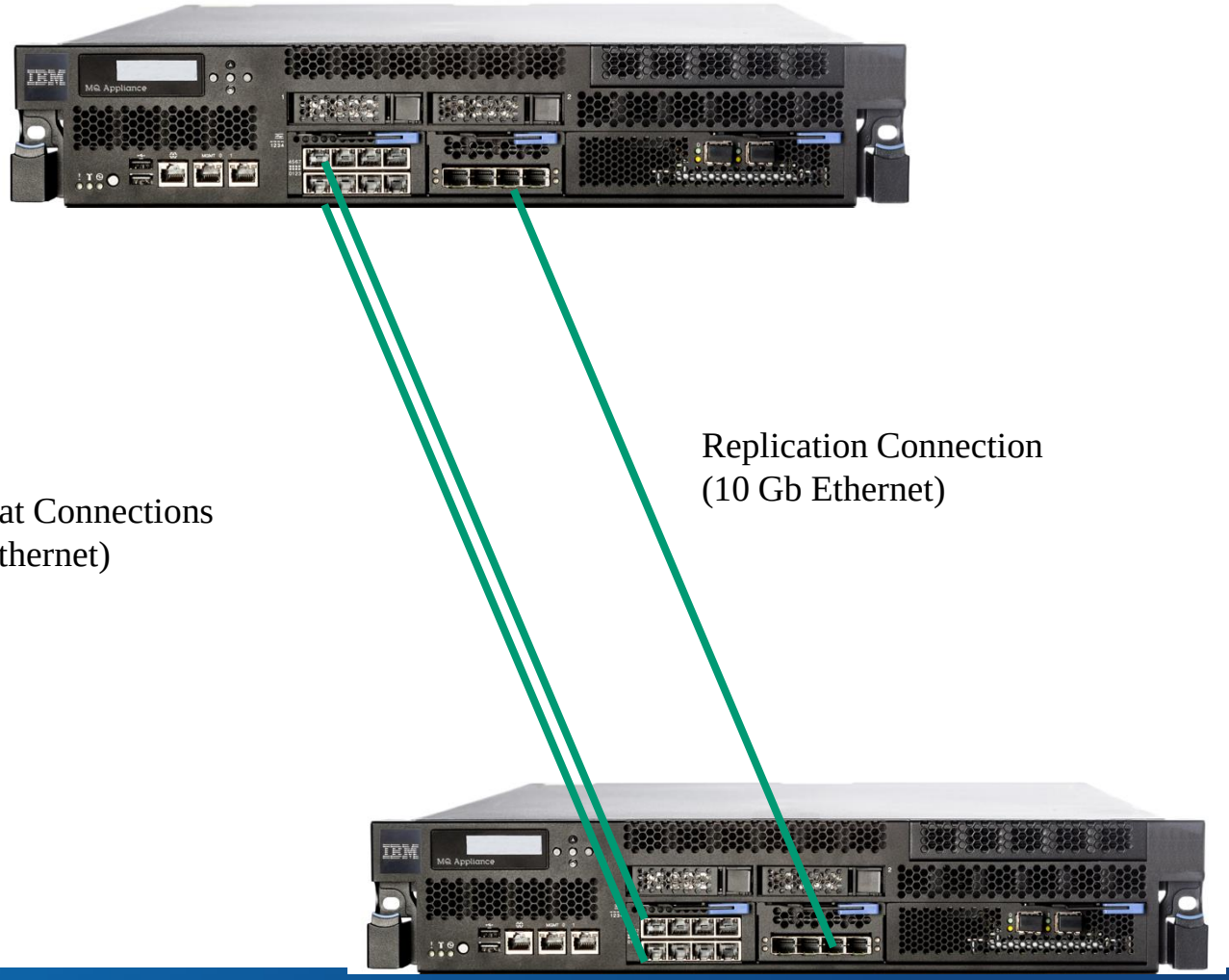
- A new **sethaint** command can be used to configure a HA floating IP address for a queue manager
- The **dspmq** command has been updated to display the IP information

```
mqa(mqcli)# sethaint -m HA1 -a -f 9.20.87.200 -l eth10
The sethaint command succeeded.

mqa(mqcli)# dspmq -o ha
QMNAME(HA1)       HA(Replicated) HALSADDR(9.20.87.200) HALSINT(eth10)
```

- Define a listener to use the floating IP for inbound connections
  - DEFINE LISTENER(mylist) IPADDR(9.20.87.200)
- Use LOCLADDR for outbound connections
  - DEFINE CHANNEL(mysdr) CHLTYPE(SDR) LOCLADDR(9.20.87.200)

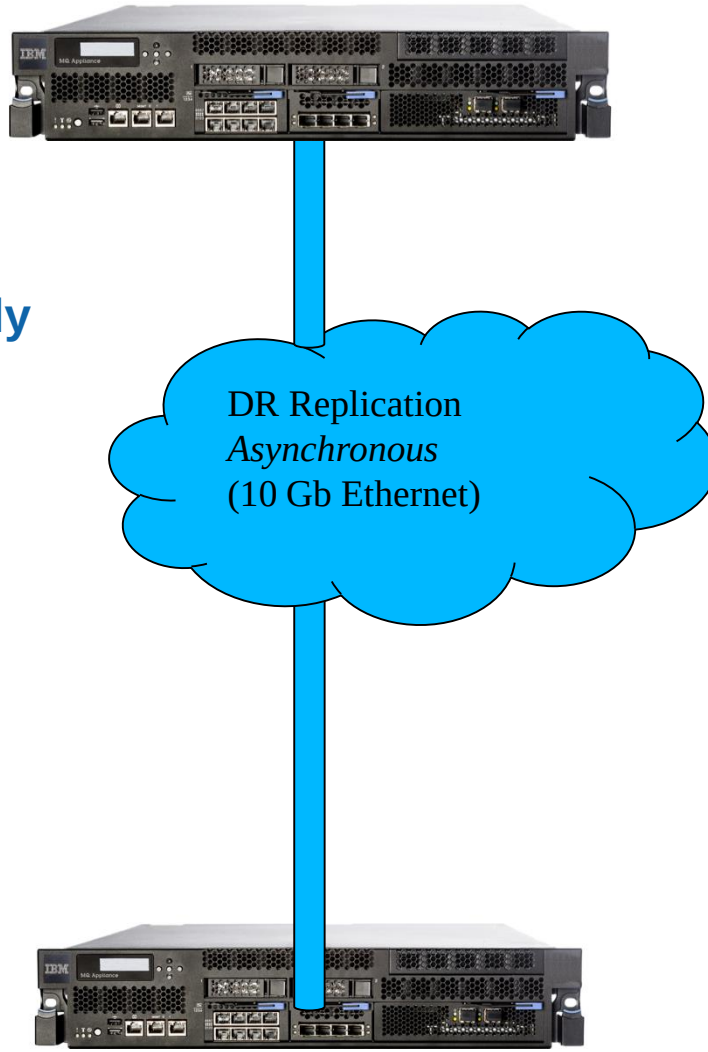
High Availability – Physical layout



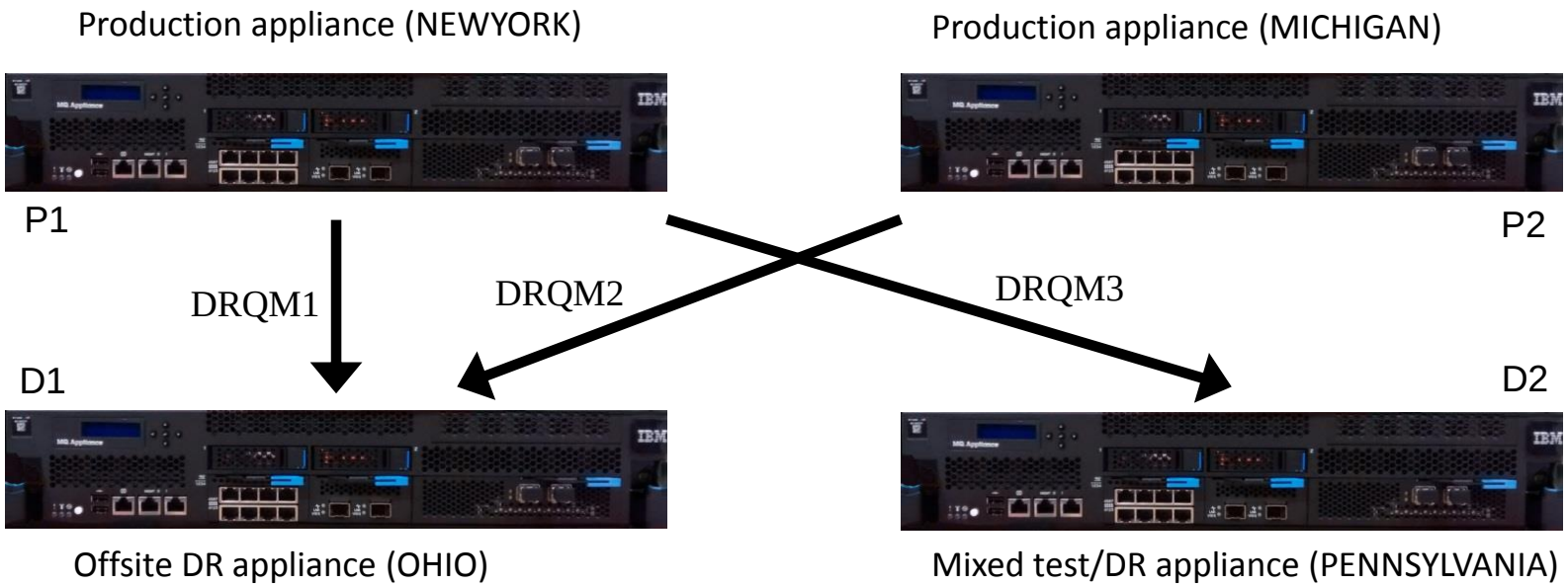
Disaster Recovery – (8.0.0.4)

- **Provides for longer distance recovery than HA**
  - e.g. Out Of Region standby site
- **Still ultimately requires high bandwidth connectivity as all persistent data fully mirrored**
- ***asynchronous* - better choice than HA for higher latency, 'bursty' or 'lossy' networks)**
  - Also means most recent messages are potentially lost on failover, and application logic must consider
- **Manual interaction required to trigger failover/fail back.**

MQ Appliance – HA & DR Deep Dive
Room: Zebrawood
September 26th 08:30 – 09:40 &
September 27th 15:50 – 17:00

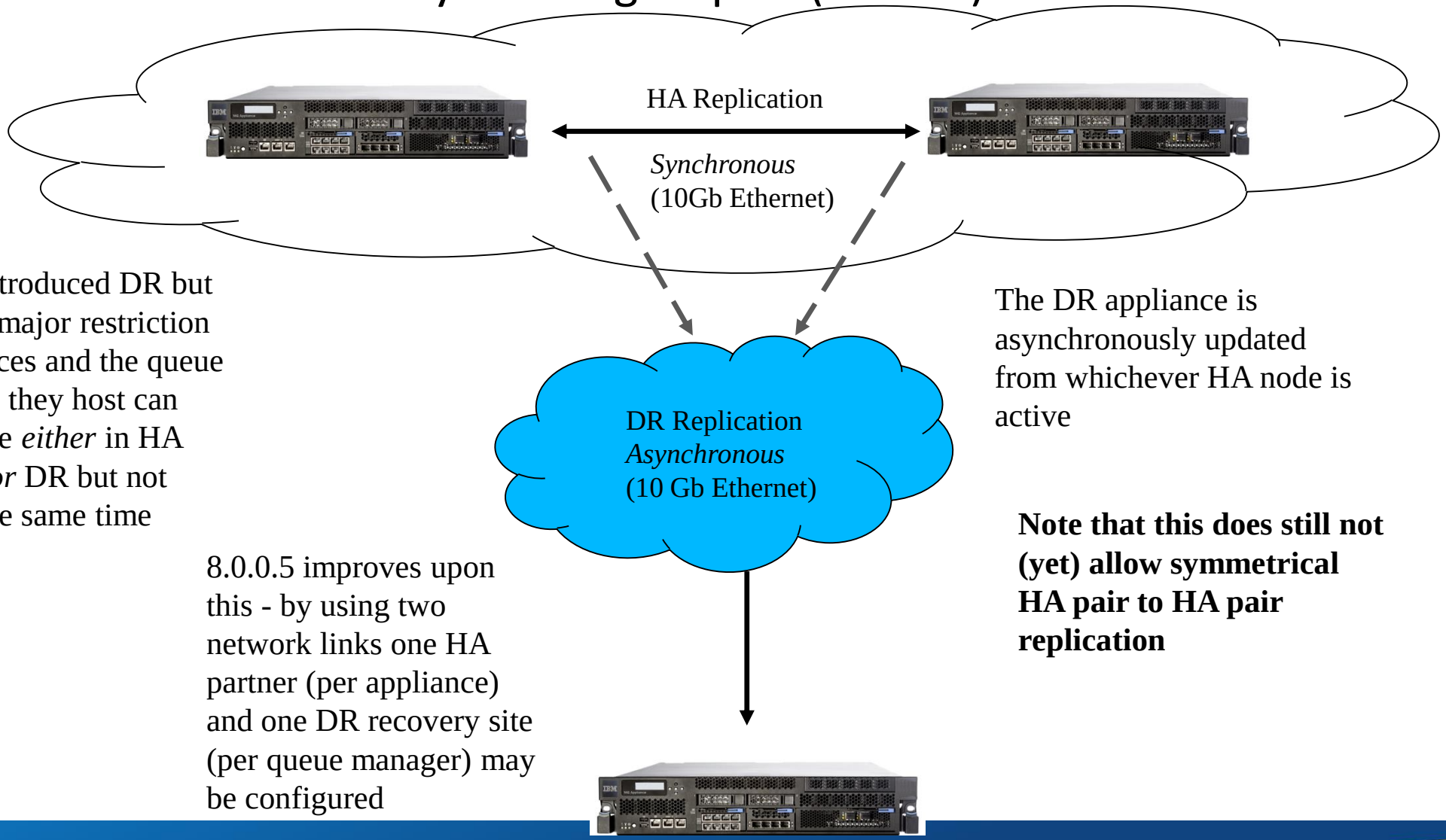


Disaster recovery: Flexible topologies



Each QM independently configures replication to a particular appliance. You can configure a single ‘DR’ site covering live appliances at multiple sites

Disaster Recovery for HA groups – (8.0.0.5)



8.0.0.4 introduced DR but with one major restriction – appliances and the queue managers they host can participate *either* in HA Groups, *or* DR but not both at the same time

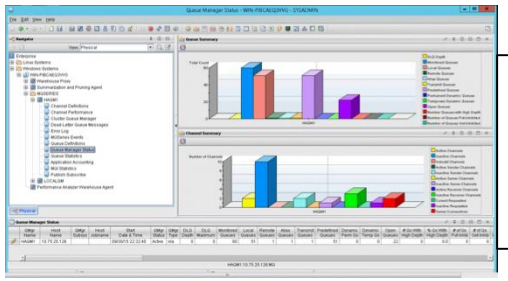
8.0.0.5 improves upon this - by using two network links one HA partner (per appliance) and one DR recovery site (per queue manager) may be configured

The DR appliance is asynchronously updated from whichever HA node is active

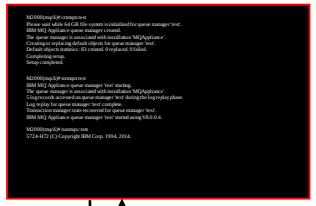
Note that this does still not (yet) allow symmetrical HA pair to HA pair replication

Monitoring and Performance

Monitoring



Custom
Plugin
Sample



SSH (e.g. ‘expect’)

SNMP

Syslog

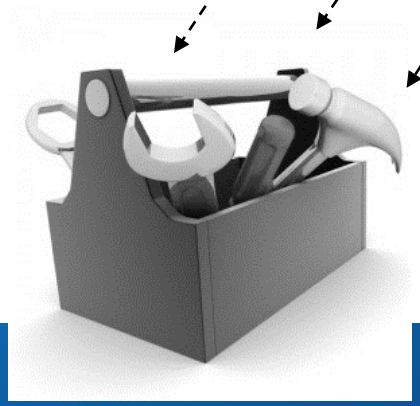
SMTP

…

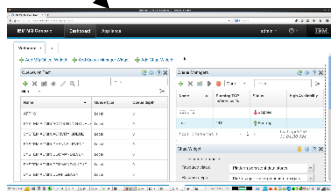
REST

Remote Agent

PCF



WebUI
(especially charts)

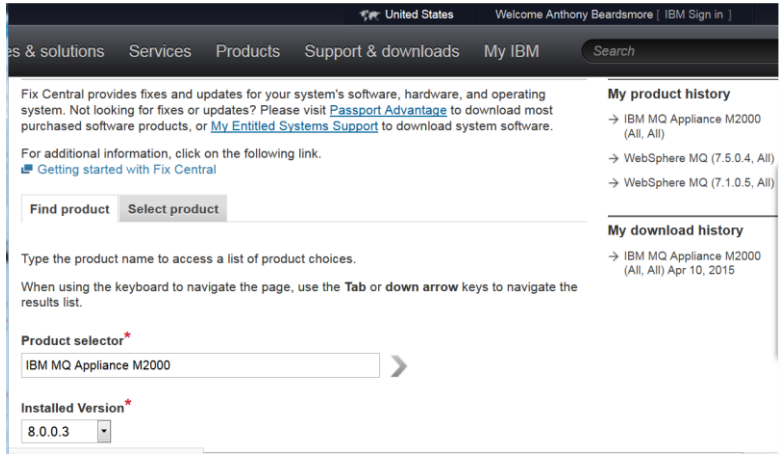


Performance and Capacity

- The IBM MQ Appliance is available in two models, to suit a range of performance and capacity requirements
  - They're not sold on a PVU basis – but approximately 420 & 1400 PVU
  - 'B' upgrade can be purchased to 'B+' (equivalent to A)
- Appliance is dedicated to running messaging server workload
  - No other workload (applications or middleware)
  - Performance should be predictable
  - Capacity planning should be easier
- Firmware comes pre-tuned for maximum messaging performance
  - Placement of workload, resource utilisation, etc.
- Performance reports
  - MPA1 – general performance, model A/B comparison
  - MPA2 – high availability and DR, including scaling to high latencies
  - Updated for M2001 model (SSD) in 2016

M2001 – A/B

Updating and maintaining



Visit fix central to download appliance updates to a local server ready to deploy

Updates are supplied as a simple single file download, signed and secure, and are the only thing which can be installed on the appliance hardware.

Mq-appliance-9.0.3.0.scrypt3

Copy to appliance – update, and reboot. All driver, system and MQ updates are applied as a single operation

Whats new?

AMS MCA Interception (9.0.3)

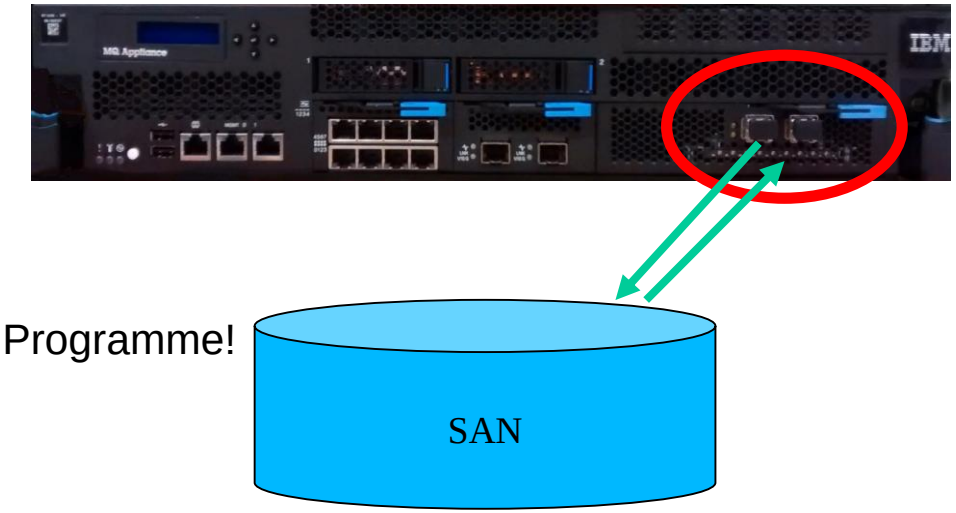
- **Offers parity of function with software MQ**
- **Queue manager can perform AMS digital signing and/or cryptographic operations on behalf of client applications**
- **Configured per server-connection channel using setamschl / dspamschl**
  - Always use SSL/TLS channels – AMS policies applied on queue manager entry/exit
- **Use cases:**
  - For clients that are not AMS-capable (e.g. Message Service client for .NET)
  - When it is not practical to configure AMS for each client instance
    - For example, 1000s of clients

AMS MCA Interception (9.0.3)

- **Not equivalent to full end-to-end signing/encryption using client-side certificates or full disk encryption**
  - All clients connecting over a channel share the same certificate
  - The certificates are stored on the same disk as the queue manager data files and are available to MQ administrators or anyone with access to the physical disks
  - We're looking at improvements we can make to alleviate this vulnerability

Planned: SAN support

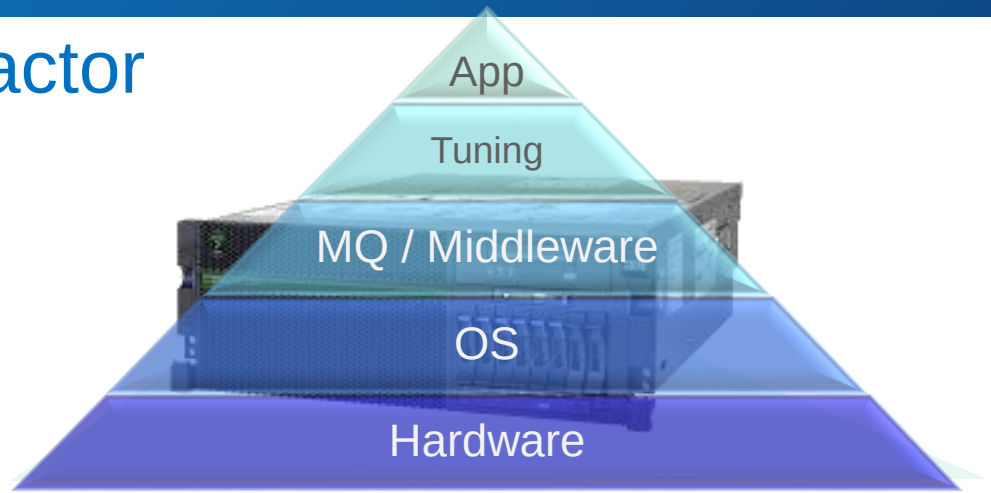
- **Supports use of external SAN storage for queue manager data**
  - Exploits Fibre Channel adapters in the M2000 and M2001
- **Requested by customers with high storage or I/O performance requirements, or who employ a SAN solution for disaster recovery**
- **Firstly, standalone queue managers only (not HA)**
  HA later
- **Configure the appliance to use SAN**
  - Specify a queue manager uses SAN storage when you create it
  - Each queue manager uses a separate SAN partition (disk/volume)
- **But, this could change!**
  - For more information about upcoming features, enquire about our Beta Programme!



Key Differences with Appliance Form-factor

IBM MQ Appliance

- Prebuilt for Hub pattern – no Apps on device
- No additional software installation
  - No user Exits in MQ
  - Monitoring agents must be remote
- High Availability out-of-the-box
- Pre-tuned
- Single Firmware update for whole appliance
  - Firmware update inc. appliance and MQ Fixpack
  - Can be rolled back as an single unit



IBM MQ V8 on Custom Server

- DIY Hub *or* Generic server – Apps + Middleware
- Install any software
  - Build & maintain your own custom extensions
  - Add local monitoring agents
- Needs HA Cluster SW or Network Storage for HA
- Custom tuning for each layer (OS/Middleware)
- Discrete maintenance for each layer
  - MQ Fixpacks
  - OS maintenance, security patches etc.

Summary / More information

- The MQ appliance is available now!
- Two models, to suit different uses and performance requirements
- Existing MQ features with simple deployment and administration
  - Including built-in HA support
  - Without customisation via exits
- Particularly suited to consolidation (“Hub”), and messaging gateway scenarios – as well as any other situation requiring an easy to deploy, low time-to-value MQ configuration

http://www-01.ibm.com/support/knowledgecenter/SS5K6E/welcome

https://github.com/ibm-messaging/mq-appliance

http://www.redbooks.ibm.com/Redbooks.nsf/RedpieceAbstracts/sg248283.html

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