# *The new MQ Appliance "Messaging in a Box" and "MQ/MFT Hub" solution*

Sandeep Chellingi

**Solution Architect** 

**Prolifics** 

# Agenda

### Introducing IBM MQ Appliance

- Why an appliance?
- Key characteristics of the IBM MQ Appliance
- Major difference from "MQ on Distributed Platforms"

## Expected uses of the IBM MQ Appliance

- Simplify Complex Messaging Estate
- Messaging Hub using the IBM MQ Appliance
- Provision connectivity to a remote location
- Messaging Outpost using the IBM MQ Appliance
- Connectivity Hub for MQ/Managed File Transfer

### MQ Appliance Capabilities

- Administration
  - CLI / File Access
- MQ Console
  - Web UI & Dash Boards
  - Statement of Direction
- Security
- Connectivity
- High Availability
- External Storage
- Performance
- Applying Fixes
- Summary

# **Introducing IBM MQ Appliance**



- The scalability and security of IBM MQ V8
  - 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
- General availability since 13 March 2015

# Why an appliance?

### Fixed hardware specification allows IBM to tune the firmware

- Having fewer POVs makes it easier to deploy and manage
- Less performance tuning should be needed

### Standardisation accelerates deployment

- Repeatable and fast, less configuration/tuning required
- Post-deployment resource definition or lock down before deployment

### "Hub" pattern separates messaging from applications/middleware

- Organisational independence from application teams
- Improved availability, due to reduction of downtime
- Predictable performance, simpler capacity planning

### Simplified ownership

- Self-contained: avoids dependencies on other resources/teams
- Licensing: Simpler than calculating licensing costs (e.g. by PVU)
- Security: Easier to assess for security compliance audit

# **Key characteristics of IBM MQ Appliance**

- "MQ V8" (+/-) delivered as a state-of-the-art appliance
- Built using the latest DataPower appliance hardware and OS
  - "Firmware includes the MQ V8 product and capabilities
  - Participates in MQ networks or clusters
  - Existing MQ applications connect as clients, with no code changes
- Two models, to suit different uses and performance requirements
  - Either model of appliance can run multiple queue managers, subject to overall throughput
- Familiar administration concepts and syntax, with a choice of interfaces
- Familiar security model for authentication and authorisation of messaging users, with greater flexibility for scalable administration
- Built-in High Availability (HA) & Advance Message Security (AMS)
  - Per queue manager monitoring and automatic restart/failover
  - Without external dependencies like shared file systems or disks
  - Encrypt messages end-to-end including while at rest (in queue)
    - PCI Compliance

# Major difference from "MQ on Distributed Platforms"

# No traditional "Operating System"

- No "shell"
- **No** OS maintenance Simple firmware upgrades
  - Single "fix pack package" quick and easy to apply
  - "iFixes" will be supplied which will include latest fix pack
  - Full support for "rollback" of entire fix pack
- **No** OS user management (only 2 types of users defined, more in Security charts)
- **No** tuning of OS Kernal parameters, systems services etc
- No File System (other than limited URI's for transfer on and off)
- Everything required to Manage and Monitor the system provided directly and focused on MQ
- All Components on the Box are built by IBM!"
  - If things break, IBM can be called to fix it ;-)!
  - Single command to collect PMR Info (runmqras).

# **Expected uses of the IBM MQ Appliance**

How an appliance may help to achieve the following requirements



One or more dedicated messaging servers to which applications connect

A messaging server located in a remote location with limited skills and facilities

A dedicated server that handles all traffic from a remote messaging system

A messaging server located in a business partner that needs to resilient and safe connectivity to your MQ infrastructure

# **Simplify Complex Messaging Estate**

### Objective

You need to reduce overall costs and want to reduce the number and diversity of servers that are running MQ, standardising for efficiency and ease of future migration

## Challenges

- Mixture of platforms and versions
- Complex dependencies; impact analysis is difficult
- Migrations are difficult due to lack of standardisation
- Application downtime impacts messaging and hence other applications



# Messaging Hub using the IBM MQ Appliance

## Benefits

- The appliance is easy to deploy, has familiar MQ admin interfaces, supports existing MQ definitions and security
- The firmware has fewer POVs and supports rapid migrations
- Downtime reduced by separating applications and middleware
- Appliance HA avoids external dependencies such as storage team



# Provision connectivity to a remote location

# Objective

- You need resilient connectivity to a remote part of your organisation, e.g. a branch, factory, warehouse
- Extend MQ messaging beyond your Datacenter to a remote location with limited infrastructure...and scarce local MQ skills

# Challenges

- Geographic remoteness suggests that you may have to rely on getting outside assistance
- It would be very difficult or impossible to support failover due to the difficulty of provisioning a shared file system, shared disk or SAN in the remote location



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# Messaging Outpost using the IBM MQ Appliance

### Benefits

- Order one or a pair of appliances to be delivered on-site, or pre-configure appliances and dispatch them to the remote site
- Following simple physical deployment, remotely configure and manage the appliances
- HA without external dependencies



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# **Isolation of Partner Connection**

### Objective

- You need to extend connectivity to an external business partner and want to tightly control what the partner can connect to and the resources affected by partner traffic
- You decide to deploy an MQ gateway to which the partner channel will connect

### Challenges

You don't want to spend the cost/time it would take to build a server, with operating system, utilities and middleware and provision for HA



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# Messaging Gateway using the IBM MQ Appliance

### Benefits

- The MQ appliance is easy to deploy and manage with familiar MQ admin interfaces
- A pair of appliances can provide HA without introducing external dependencies



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# **Remote Partner Connectivity**

### Objective

- Your organisation wants to on-board a business partner as quickly as possible
- The business partner needs to connect to your organisation using MQ; but the partner does not have MQ skills
- You want to be confident that the MQ configuration (which is outside your domain) is correct and meets your organisation's standards

## Challenges

The partner could use a 3rd party vendor, but ideally you'd like to verify yourself that the solution meets your standards



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# Messaging Partner using the IBM MQ Appliance

# Benefits

- The MQ appliance is easy to physically deploy and you can pre-configure it so all the partner need do is plug in and go
- A pair of appliances could provide HA at the partner location without requiring external dependencies that the partner might struggle to provide



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# **Connectivity Hub for MQ/Managed File Transfer**

Yes

Do you have MFT Agents on other machines?

No

You can use the IBM MQ Appliance in any Role (Coordination, Command or Agent Hosting) within your MQ/MFT Landscape IBM MQ Appliance does not include MFT Agents. To use MFT, you need separate Client MFT/FTE Agents Licenses

# **Administration**

### Command-line Interface

- Supports appliance-specific commands such as configuring network interfaces, importing certificates, …
- Also offers a familiar subset of MQ control commands
- You can also use MQSC interactively, or run scripts remotely

### MQ Console

- Browser-based UI for administering the appliance
- Modern "Widget based" Design
- Phase 1, so while many new features, constantly growing.
- Very convenient developer / add hoc use

### MQ Explorer

Can still be used where needed

## PCF

Supports remote administration using all of the existing MQ tools

# **Command Line Interface "CLI"**

- Required for certain tasks
- Convenient for others
- Available over SSH or local serial connections
- After initial setup (network settings etc) likely to spend most time in the "mqcli"
- 'Sub-shell' model use of the context specific help

🛃 192.168.1.1	10 - PuTTY			23			
M2000# mqc	li						
M2000 (mqcl	i)# help						
The follow	ing help topic	s are available. Type help <topic name=""> for more</topic>					
informatio	n.						
mq	General MQ adm	ral MQ administration commands					
cert	Channel securi	ty certificate administration commands					
diag	MQ problem dia	gnosis commands					
ha	High availabil	h availability administration commands					
user M2000 (mmal	Messaging user	and group administration					
M2000 (mqc1	ing MO command	a are available. Ture balm commands for more					
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crtmom	Creates a	gueue manager					
dltmqm	Deletes a	queue manager					
dspmq	Displays i	nformation about queue managers					
dspmqini	Displays q	ueue manager initialization parameters					
dspmqtrn	Displays i	n-doubt and heuristically completed transactions					
dspmqvar	Displays g	lobal and queue manager environment variables					
endmqm	Stops a qu	eue manager					
rsvmqtrn	Resolves i	Stops a queue manager Resolves in-doubt and heuristically completed transactions Runs MOSC commands					
runmqsc	Runs MQSC	commands					
runswchl	Switches t	ransmission queue for cluster channel					
setmqini Configures		queue manager initialization parameters		1			
setmqvar Configures		global and queue manager environment variables					
status Displays s		tatus information					
Strmqm M2000 (mggl	i)# owit	leue manager					
M2000 (mqc1	n exit						
clock	E.	Sets the date or time					
configure	terminal	Enters Global Configuration Mode					
diagnostic	:5	Provides diagnostic information					
disable		Enters User Mode					
disconnect		Terminates a user session					
echo		Echoes text to the console					
exec		Executes a configuration script					
exit		Terminates the CLI connection					
help		Displays general or command-specific help					
login		Logs in as a specific user					
mqcli		Enters MQ Configuration Mode					
ntp		Identifies a network time server					
ping		Sends an ICMP ECHO_REQUEST					
Show		Displays statistical or configuration data		*			

# **File Access**

Where interaction with a file would normally be required in MQ, typically a new or modified command is available – e.g.

Operation	Appliance command
Certificate management	crtmqm – implicitly manages key store for queue manager behind the scenes
	Help cert – show new certificate manipulation commands (no direct 'gskit' wrangling)
Show system log	dspmqerr -s
Show FFSTs	dspmqerr -f
Show Queue Manager Errors	dspmqerr –m <qmname></qmname>
Capture diagnostics	runmqras
Modify/Display ini settings for a queue manager	setmqini / dspmqini



# **High Level Architecture**



# MQ Console REST Interface MQ HTTP REST API

```
Create a topic:
```

```
POST /api/wmq/qmgr/QM1/topic/mytopic
{"topicString": "a/b" }
```

```
Modify a topic:
```

{

```
PUT /api/wmq/qmgr/QM1/topic/mytopic
```

```
"description" : "this is a test queue"
```

```
Delete a topic:
```

```
DELETE /api/wmq/qmgr/QM1/topic/mytopic
```

# **MQ Console Screen Shots**

			IBM MQ Console: Dashbo	ard - Mozilla Firefox			
NQ Console: Das × 👍 ps://nemesis.hursley.ibm.com:9090/mq/#pag	je=home				✓ ♂ ☐ S ✓ Google		
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Name	•	Queue type	Queue depth	1,600 - 1,400 -	Λ		
queue1		Local	0	1,200 -			
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queue3		Local	100	400			
queue4		Local	0	200-0	/. AV.	$ \rightarrow $	
Total: 4 Selected: 1	∢ 1	¥	Last updated: 5:59:22 PM	5:57:00 PM 5:57:30 PM	5:58:00 PM 5:58:30 PM 5:59:00 I Time	PM 5:59:30 PM	
				Resource to monitor —			
SYSTEM.ADMIN.COMM	AND.QUEUE	Local	0				

# **MQ Console Screen Shots**

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# **MQ Console Statement of Direction**

### Cross platform support for MQ Console

- Central management of diverse Queue Manager Landscape / Estate
- Dashboard / Profile approach for "Role based Monitoring & Management"
- Many possibilities for enhancements using this new JSON/REST/JavaScript



# **Security**

### Built-in AMS (Advance Message Security)

- Encryption of messages end-to-end including while at rest (in queue).
- An appliance administrator can be authorised to perform MQ administration
  - Can separate roles of appliance administrator and messaging administrator
  - Both are separate from messaging users

### The appliance supports secure connectivity over SSL/TLS

Certificates can be imported to the appliance

### The appliance supports scalable security administration

- For a small number of messaging users, you can define them locally
- For larger communities, you can use an off-board repository
  - Using external LDAP repository
  - Authorization checks can include group memberships from LDAP
  - Messaging users don't need to be defined in each server/appliance

### IBM does not recommend deploying a queue manager in the DMZ

"MQ Internet Pass-Thru" (MS81: MQIPT) provides tunnelling or proxy

IBM may add appropriate hardening in a future version of the appliance

# Connectivity

- The IBM MQ Appliance supports a number of protocols for message transmission
  - 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 queue managers
    - This will support sender-receiver channels and server-requester channels, including cluster flows

### Subject to customer interest we may add further protocols such as:

- MQTT for internet of things and mobile/web messaging
- AMQP for MQ Light API client connectivity

# **High Availability**

### Primary

### Secondary



### • A pair of MQ Appliances can be deployed as an HA group

- HA group manage availability of HA queue managers
- Automatic failover of HA queue managers
- Failure detection for hardware and software problems
- Supports manual failover for rolling upgrades

#### Easier to set up than other HA solutions (no shared file system/disks) Only 3 simple commands:

- prepareha -s "secretKey" -a (IP Address of MQ APPL2)
- crthagrp -s "secretKey" -a (IP Address of MQ APPL1
- crtmqm -sx -p 1414 -fs 2 -lf 65535 -lp 4 -ls 2 -x 20000 HA\_QM1

### Replication is synchronous over Ethernet, for 100% fidelity

Routable but not intended for long distances

# **Console Output for HA Setup**

#### M2000(mqcli)# crtmqm -sx -p 1415 -fs 1 -lf 65535 -lp 2 -ls 2 -x 20000 HA\_QM1

- Please wait while 1024 MB file system is initialized for queue manager 'HA\_QM1'.
- Performing initial high availability configuration
- Configuring appliance MQAPPL1
- Configuring this appliance
- Initial high availability configuration succeeded
- IBM MQ Appliance queue manager created.
- The queue manager is associated with installation 'MQAppliance'.
- Creating or replacing default objects for queue manager 'HA\_QM1'.
- Default objects statistics : 84 created. 0 replaced. 0 failed.
- Completing setup.
- Setup completed.
- Performing final high availability configuration
- Final high availability configuration succeeded

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# **External Storage (Statement of Direction)**

- The IBM MQ Appliance includes a fibre channel card
- IBM intends to support fibre channel connectivity to connect the IBM MQ Appliance to external storage
- This will enable additional capabilities, such as:
- 1. Use of an external storage for QM data and log files
  - Continues to support internal storage for HA
  - Storage can also be replicated for out-of-region recovery

### Primary



- 2. External storage may be used to expand storage for SLAs with a very long outage requirement
  - Such as a consuming application down for an extended maintenance period

# **Performance and capacity**

- The IBM MQ Appliance will be available in two models, to suit a range of performance and capacity requirements
  - Not priced on a PVU-basis
  - Model M2000A approximately 1400 PVUs
  - Model M2000B approximately 420 PVUs

### Appliance is dedicated to running messaging server workload

- No other workload (applications or middleware)
- Performance should be predictable
- Capacity planning should be easier

### Performance report available soon

Appliance comes pre-tuned for best performance

# **Applying maintenance**

- Firmware updates are distributed as 'scrypt' files. Digitally signed so that only appropriate firmware can be installed.
  - Includes all updates to base system, drivers etc. and MQ function in single image
  - Copy onto system with 'copy' command (from an SCP/FTP server)
  - Config->flash->boot-image [name]
  - Wait 5 minutes...
- Firmware 'rollback' available to instantly revert (although only within usual MQ parameters)
  - Fix pack rollback ok for a new version, after starting a QM at new level, can still rollback but no longer start that QM.
- With HA group, can upgrade without ever taking QMs offline.

# Key differences compared with installable MQ

- "Hub/Gateway" pattern; no applications deployed to the appliance
  - Applications must connect as remote clients
- No user exits can be run on the appliance
  - CHLAUTH and application activity trace
- Appliance-specific HA technology
  - With no shared file system or shared disk
- Authentication and authorisation via on-board or central repository
- Command-line interface on the appliance is not a general-purpose shell
  - A few new commands, such as dspmqerr
  - No runmqlsr, because MQ listeners run under QM control

# Summary

- IBM MQ Appliance available since 13 March 2015
- Two models to suit different use cases and performance requirements
- Existing MQ features with simple deployment and administration
  - Including highly simplified built-in HA support
  - Without customisation via exits
    - (Most Common Exits functions now embedded in QMGR such as CHLAUTH and API Status Subscriptions)

### Four expected usage patterns:

- Messaging hub optimize messaging and separate applications
- Messaging outpost easily deploy remote messaging server
- Messaging gateway managed endpoint for inbound connectivity
- Messaging partner confidently deploy remote connectivity

# **Requirements and future direction**

- RFE process up and running first RFEs for the appliance already received!
- Huge interest in the appliance. Without going into any confidential detail, some common requests and areas IBM may look at (<u>this is not a</u> <u>commitment to any future plans</u>)
  - Monitoring greater support for both hardware level monitoring standards and external messaging monitoring tools
  - Management protocols
  - WebUI enhancements (all CLI capability in WebUI?)
  - Finer grained security models or more integration with external security mechanisms

# Let's Continue the Conversation....

# SANDEEP CHELLINGI

sandeep.chellingi@prolifics.com

https://www.linkedin.com/pub/sandeep-chellingi/59/383/106

# **Questions & Answers**

