# What's new in IBM Messaging

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# IBM Messaging – Market segments


## Deliver Messaging Backbone for Enterprise

Focus on traditional MQ values, rock-solid enterprise-class service, ease-of-operation, breadth of platform coverage, availability, z/OS exploitation

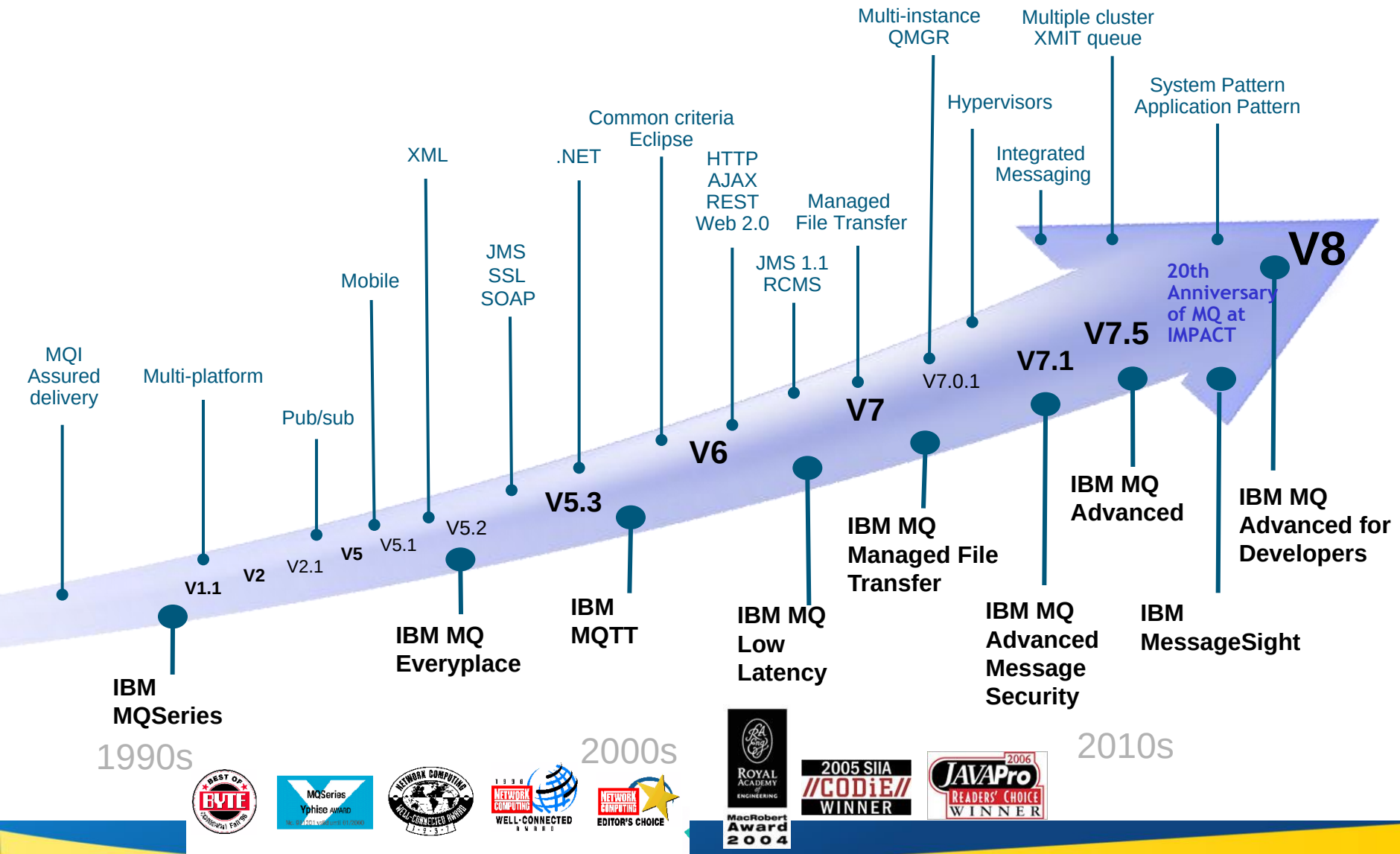

## Capture Big Data from Mobile and Internet of Things

Focus on Internet-scale events, m2m device enablement, zero-admin, security and privacy, feed into real-time analytics, location-based notifications


## Enable Developers to build more scalable, responsive applications

Focus on new app dev use cases, breadth of languages, ease-of-deployment, lightweight services, integration with developer frameworks

# Timeline


MQI
Assured delivery
Multi-platform
Pub/sub
Mobile
XML
JMS
SSL
SOAP
.NET
Common criteria
Eclipse
HTTP
AJAX
REST
Web 2.0
JMS 1.1
RCMS
Managed
File Transfer
Multi-instance
QMGR
Hypervisors
Integrated
Messaging
Multiple cluster
XMIT queue
System Pattern
Application Pattern
20th
Anniversary
of MQ at
IMPACT
V1.1
V2
V2.1
V5
V5.1
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V5.3
V6
V7
V7.0.1
V7.1
V7.5
V8
IBM
MQSeries
IBM MQ
Everyplace
IBM
MQTT
IBM MQ
Low
Latency
IBM MQ
Managed File
Transfer
IBM MQ
Advanced
Message
Security
IBM MQ
Advanced
IBM
MessageSight
IBM MQ
Advanced for
Developers
1990s
2000s
2010s

# WebSphere MQ V7.1: Feature Summary (Nov 2011)

| *New Feature* | *Benefits* | *Details* |
|---|---|---|
| **Multi-Version Install capability on Distributed platforms** | Makes it easier to deploy and upgrade systems and stage version to version migration | Unix and Windows support for multiple versions of MQ V7.x (AND one copy of MQ V7.0.1) down to fixpack levels.<br>Relocatable installation support.<br>Applications can connect to any Qmgr |
| **Enhanced Security** | Simplified Configuration<br><br>Enhanced Authorisation and Auditing | IP address Authorisation capability<br>Additional crypto algorithms<br>More granular authorisation for non-local queues<br>Application Activity Reports |
| **Cloud Support** | Simplifies and support Cloud deployments | Additional HVE images |
| **Enhanced Clustering** | Improves ease-of-use | Authorisation on Cluster Q rather than XMIT Q on Dist. Platforms<br>Bind-on-Group Support |
| **Multicast capability** | New messaging QoS provides low latency with high fan-out capability | MQ Pub/Sub Topic space can now map to multicast Group Addresses<br>Provides direct interoperability with MQ LLM |
| **Improved scalability and availability on z/OS** | Further exploitation of z196<br><br>Customer control over CF storage use<br>CF Connectivity Loss improvements | Code contention reduced to improve multi-processor linear scaling<br>Use of MQ Datasets rather than DB2 significantly improves “large” message capability<br>Structure rebuild capability for CF Connectivity Loss scenarios |
| **Improved Performance on Dist platforms** | Improved multiprocessor exploitation | Various code improvements |

# WebSphere MQ V7.5: Feature Summary (June 2012)

- For Windows, Unix and Linux

| *New Feature* | *Benefits* | *Details* |
|---|---|---|
| **Integrated Installation** | Makes it easier to deploy systems<br>Simpler licensing | Combines several products into a single package<br>Common experience |
| **Enhanced Clustering** | Improves ease-of-use<br>Improves application isolation | Split Cluster Transmission Queue |
| **Java Application Identification** | Makes it easier to distinguish applications | Applications no longer to all have the same name |
| **AMS channel interception** | Provides a level of message protection even when application environment cannot run AMS | Interception in the SVRCONN still protects messages before hitting queues |
| **FTE Logger Options** | Can write FTE audit records to flat file | No longer a requirement for an enterprise database<br>Easier to read data immediately |

# 2013 Updates

# WebSphere MQ: Feature Summary (2013)

- Updates to pricing and function during 2013

| *New Feature* | *Benefits* | *Details* |
|---|---|---|
| **MQ 7.1 Value Unit Edition introduced for z/OS** | One time charge (OTC) pricing for zNALC workloads | Queue managers supporting qualified workloads on System z New Application License Charge (zNALC) LPARs<br>Includes WebSphere MQ Client Attach, allowing free-of-charge connections from MQ Clients to z/OS |
| **SHA-2 CipherSpecs for SSL/TLS on z/OS** | Stronger hashing algorithms<br>Required/recommended by some authorities | Available from V7.1 GA on distributed platforms<br>Now also available on z/OS 7.1, with two APARs* |
| **Internet PassThru (MS81) refresh** | Updates to SOE and crypto algorithms<br>Consistent SSL/TLS support and certificate DN attributes with MQ V7.1 | Uses JRE-provided Java Secure Sockets Extension (JSSE) Support for SHA-2 and elliptic curve encryption, in line with US NIST standard SP800-131A recommendation |
| **MQ JCA RA support in WAS Liberty profile** | MQ 7.5.0.2 RA is easily configured in Liberty<br>Connects to any supported version of MQ | Liberty profile expects resource providers (database, messaging) to supply provider-specific classes<br>Configure “wmqJmsClient.rar.location” variable in server.xml |
| **MQ 7.1 Extended Transactional client for HP NSS platform** | MQ V7.1 function for NonStop applications accessing MQ on other systems<br>Free and fully supported | Supports C/C++, COBOL, pTAL, JMS<br>Supports Guardian and OSS applications including OSS multi-threaded applications<br>Available as SupportPac MAT1 |

*APAR OA39422 needed on z/OS V1R13 for System SSL
*APAR PM77341 for MQ on z/OS V7.1

# End of Service for old platforms and versions

- MQ V7.0.0 and V7.0.1 for multiplatforms – EOM, EOS effective **September 2015**
  - V7.0 will have had more than 7 years of support
- MQ V7.0.1 for z/OS – EOM, EOS effective **September 2015**
  - V7.0 .0 already out of service
- MQ V3 for VSE – EOM, EOS effective **September 2015**
  - Extended support contracts available
- MQ V6 for OpenVMS: EOS effective **April 2016**

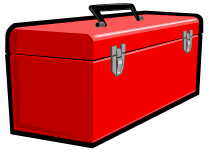
# 2013 enhancements: Developer

| *Enhancement* | *Benefits* | *Details* |
|---|---|---|
| **MQ Advanced for Developers – free for devt use!!** | Development use only edition<br>Free of charge | Full MQ Advanced V7.5 functionality<br>Available free of charge for development use only<br>Download from developerWorks, MQdev community<br>Best effort community assistance |
| **IBM MessageSight for Developers – free for devt use!!** | Development use only edition<br>Free of charge | Virtual MessageSight image, updated to V1.1<br>Available free of charge for development use only<br>Download from developerWorks, IBM Messaging community<br>Best effort community assistance |
| **Mosquitto - Open source MQTT server** | Simple, open access to get on-board with MQTT and MQTT-SN | Proposed Eclipse Mosquitto project for open-source MQTT server for lightweight devt use<br>MQTT-SN (MQTT for sensor networks) specification available |
| **IBM MQ Light – alpha release** | Straight forward, easy to use messaging API for writing scalable and responsive applications | Download and feedback via developerWorks community<br>Available free of charge for development use<br>Currently new API available in Java, more languages to come<br>Regular updates planned introducing new features and responding to feedback |

# IBM MQ Light

- Simplifying Development for developer-led Messaging Applications
- “MQ Light” - a new messaging form factor, easy for developers
  - Straightforward download and unzip – zero install
  - Simple Web UI– no need to be an infrastructure specialist
- Focus on your application – using simplified messaging API
- Support for popular languages and tooling with seamless migration from development into production
- MQ Light runtime not for advanced messaging uses cases, enterprise backbone or highly available/scalable apps

**Developer coding in JavaScript, Java, Python, Ruby, C#, PHP**



**Builds messaging into applications using preferred IDE or CLI and tests in developer sandbox**

# 2013 enhancements: Internet of Things, mobile & m2m

| *Enhancement* | *Benefits* | *Details* |
|---|---|---|
| **IBM MessageSight V1.1** | High-performance, reliable, and scalable messaging - designed specifically for M2M and Mobile scenarios | Balance mobile workloads across your enterprise application server clusters<br>Single sign-on from mobile devices to your enterprise apps<br>Disconnected app notification that messages are waiting |
| **IBM Internet of Things Cloud – statement of direction** | Fully cloud hosted solution for internet of things<br>Freemium, PAYG & custom pricing | Scalable connectivity for small and large numbers of devices<br>Uses industry-standard, MQTT transport<br>Registration of devices for access to the cloud service offering<br>Ability for devices to produce and consume events and messages in near real-time |
| **Mobile Messaging clients** | Updated clients for mobile platforms | Updated clients for Android, iOS & hybrid mobile apps |

# IBM MessageSight – a messaging Appliance

- Extends the IBM Messaging family with a secure, easy to deploy appliance-based messaging server, optimized to address the massive scale requirements of machine to machine (m2m) and mobile use cases
- A million connections, and millions of messages per second
  - Exploits hardware acceleration for performance
- Designed to sit at the edge of the enterprise


- Can extend your existing messaging infrastructure or used standalone
- Complements MQ - provides an offload/accelerator for edge of enterprise scenarios
- Supports familiar APIs with a mixture of standard and high-speed protocols

# 2014 Updates

# MQ Light and MQ Light Service

- MQ Light – Announced September 23
- Standalone or cloud-based messaging provider

- Applications, which are developed using MQ Light, can be deployed with MQ Light or deployed in Bluemix by using MQ Light for Bluemix

- IBM plans for them to be deployable using IBM MQ.

# IBM MQ V8 delivering best in class enterprise messaging

| *Platforms & Standards* | *Security* | *Scalability* | *System z exploitation* |
|---|---|---|---|
| 64-bit for all platforms | Userid authentication via OS & LDAP | Multiplexed client performance | 64-bit buffer pools in MQ for z/OS means less paging, more performance |
| Multiple Cluster Transmit Queue on all platforms | User-based authorisation for Unix | Queue manager vertical scaling | Performance and capacity |
| Support for JMS 2.0 | AMS for IBM i & z/OS | Publish/Subscribe improvements | Performance enhancements for IBM Information Replicator (QRep) |
| Improved support for .Net and WCF | DNS Hostnames in CHLAUTH records | Routed publish/subscribe | Exploit zEDC compression accelerator |
| SHA-2 for z, i & NSS | Multiple certificates per queue manager | | SMF and shared queue enhancements |

## MQ V8 Dates

- Announce: 22 April 2014
- Availability:
  - 23 May 2014 (eGA Distributed)
  - 13 June 2014 (z/OS and pGA Distributed)
- Fixpack 1 for Distributed platforms
  - Now available

# MQ platform and product consistency

- 64-bit server support for all queue manager platforms
  - Completion of platform coverage by adding Windows 64-bit engine
  - Requires Windows 7 or later

- Multiple Cluster Transmit Queue availability on z/OS and IBM i platforms
  - Permits separate monitoring of cluster traffic and prevents one message stream from affecting throughput of others

- Integration of AMS and MFT capabilities into z/OS and IBM i platforms
  - Previously separately installable products

- Client Attach Feature no longer needed on z/OS
  - Single price includes support for clients

# MQ Security - Authentication

- Verify userid and password
  - Typically supplied in MQI CSP structure or from channel security exit
  - Or JMS connect(user,pass) method
  - New client exit and tool provided to help unchanged applications insert passwords
- Can verify against operating system
  - Including PassPhrase for z/OS
- Can verify against LDAP repository on Distributed platforms
  - Enabling centralised identity control
- Still constrained to 12 character userids
  - With LDAP, supplied username may be "long" (eg an email address or full DN)
  - But must have an associated 12 character shortname
- Independent configuration for local bindings and clients
  - Ignored, Optional, Required, Required for admin id

# MQ Security - Authorisation

- Make Unix OAM userid-based
  - Optional configuration
  - Consistent with other platforms
  - Will no longer add primary group to authorities during setmqaut
  - Chosen at queue manager creation or by editing qm.ini
- Default is still group-based authorisations

```
$ crtmqm –oa user QMU

---------------
Service:
        Name=AuthorizationService
        EntryPoints=14
        SecurityPolicy=User
```

# How not to do security?

# MQ Security - Other

- Use DNS hostnames in CHLAUTH records
  - Also provide a way to disable reverse lookup

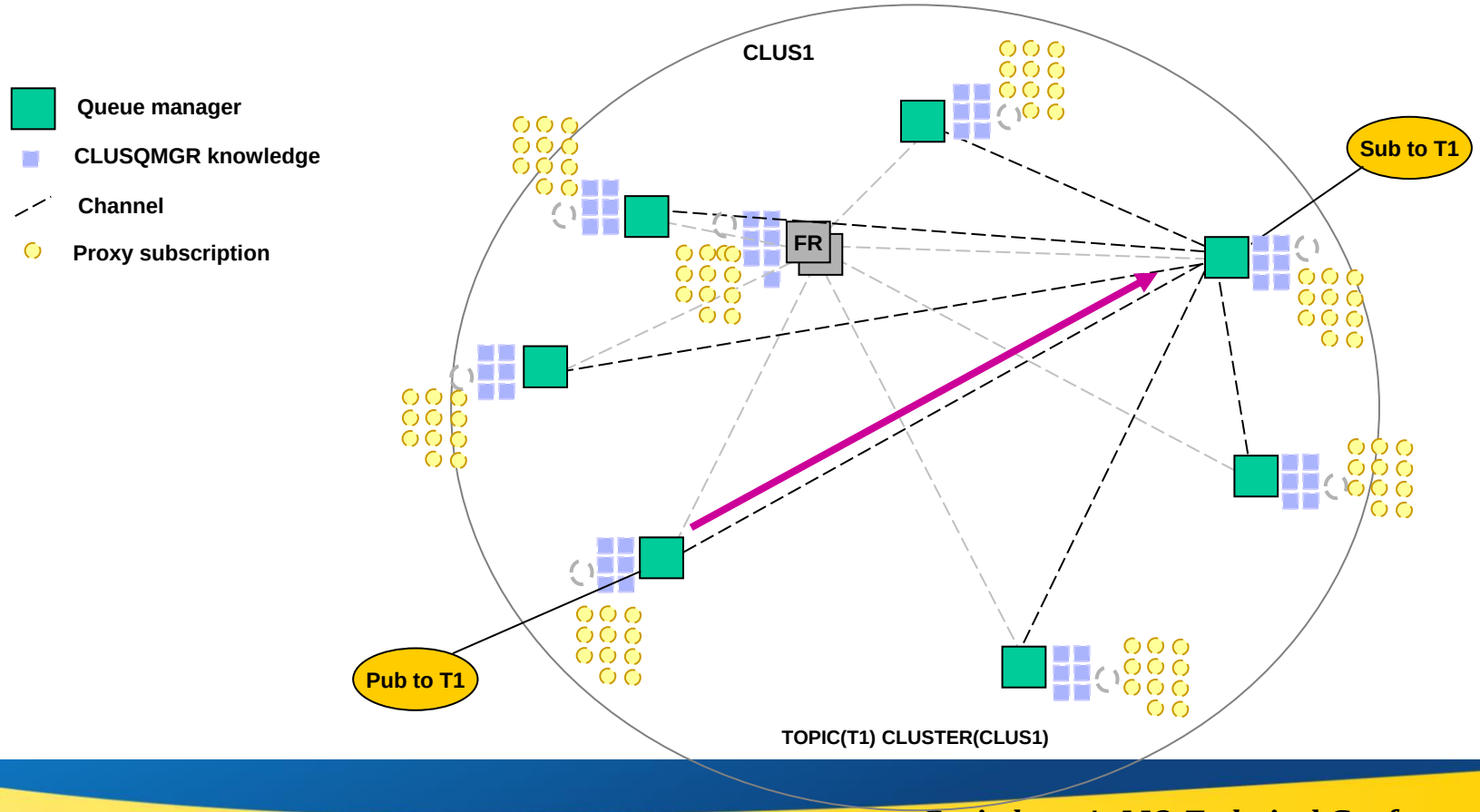
- Configurable default certificate label for qmgrs and clients
  - Instead of "ibmwebspheremq<qmgr>" or "ibmwebspheremq<userid>"

- Channel-level certificates
  - To support different business partners using different CAs.
  - For queue managers and C clients
    - Not Java yet, because Java 7 JSSE does not fully support SNI
  - Both ends must be V8

- Delete Authority record by SID
  - Solve problem of orphaned authorities when Windows id is deleted

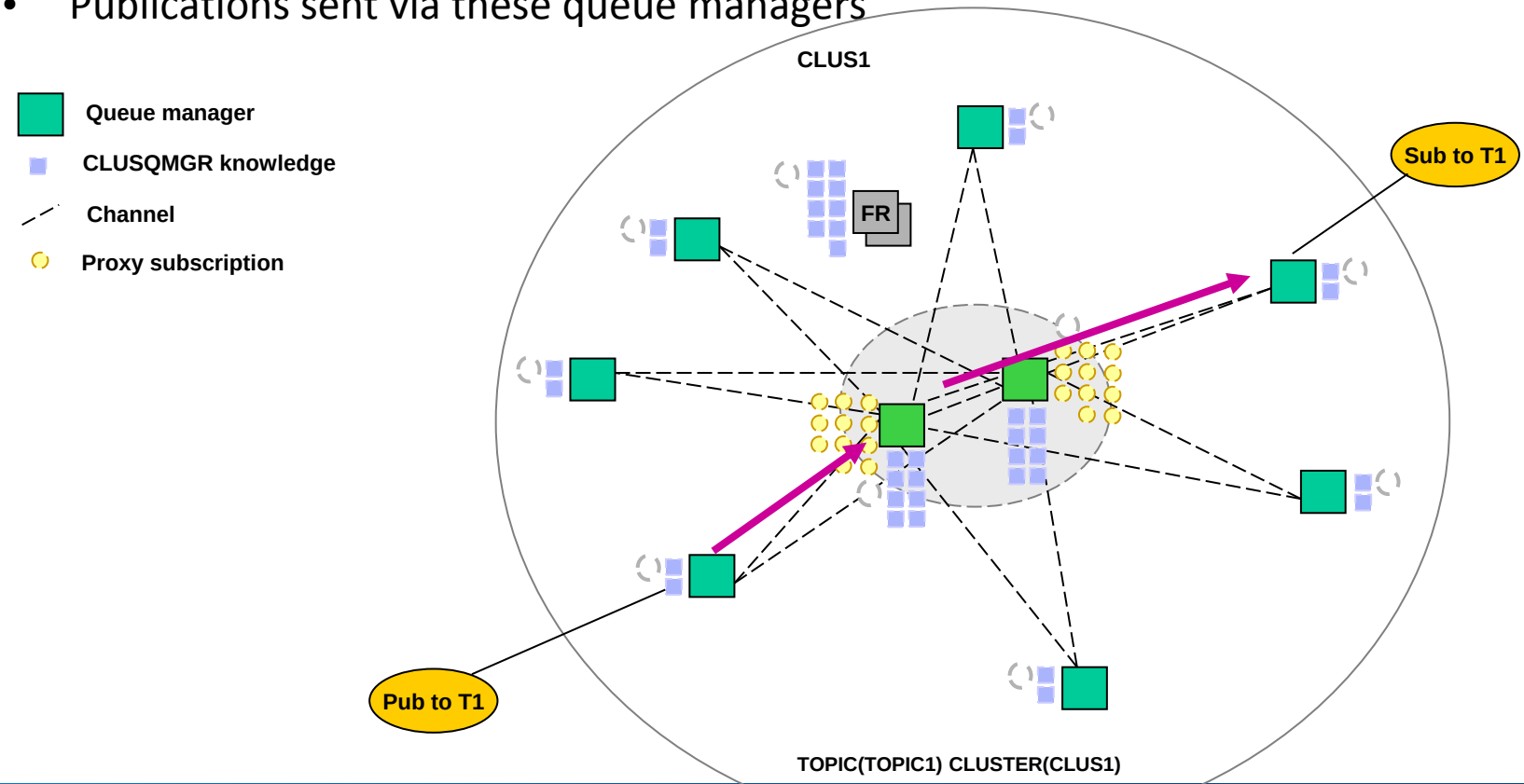
# Pub/sub scalability - cluster behaviour before V8

- All queue managers in a cluster know everything and need to be able to connect to anyone



# Pub/sub scalability - cluster behaviour with V8

- New concept of **"routed"** topics
- Configure subset of queue managers to know everything and connect to everyone
- Publications sent via these queue managers



# Configuration of routed topics

- Topic routing is configured in the TOPIC object definition
  - Uses the CLROUTE property:

```
DEFINE TOPIC(topic)
  CLUSTER(clustername)
  CLROUTE(DIRECT|TOPICHOST)
```

  - DIRECT: Provides V7 behaviour, publications travel directly from publishing queue managers to subscribing queue managers
  - TOPICHOST: publications travel via a topic hosting queue manager

- New function in MQ V8
  - Only V8 queue managers can participate in routed clustered publish/subscribe
  - Full repositories must also be at V8
  - Older queue managers are not told of the routed topic definitions and therefore behave as if the topic was not clustered.
  - All V7 queue managers can continue to participate in direct clustered pub/sub

# Improved pub/sub status reporting

- Additional display attributes on DISPLAY PUBSUB.
- Permits detection of unexpected growth in topics/subscriptions
  - Can gauge the magnitude of a DISPLAY TPSTATUS/SUB/SBSTATUS command.

```
DISPLAY PUBSUB ALL
    3 : DISPLAY PUBSUB ALL
AMQ8723: Display pub/sub status details.
  QMNAME(QMGR3)                TYPE(LOCAL)
  STATUS(ACTIVE)               SUBCOUNT(241)
  TPCOUNT(105)
```

# General pub/sub improvements

- More efficient handling of subscriptions for popular topic sub-trees and dynamic subscriptions
  - MQ V7.x behaviour sends out individual proxy subscriptions
  - MQ V8 topic object with PROXYSUB set to FORCE
    - Generates a single wildcarded subscription
    - Disables individual proxy subs for topic strings lower in the topic tree
- Better pub/sub error handling in multi-queue manager environments
- Selectors are evaluated on the message as published, before modification by the publish operation, for delivery to each subscriber
- More efficient handling of large numbers of topics
  - Linear scaling to at least a million topics

# Changes to runmqsc

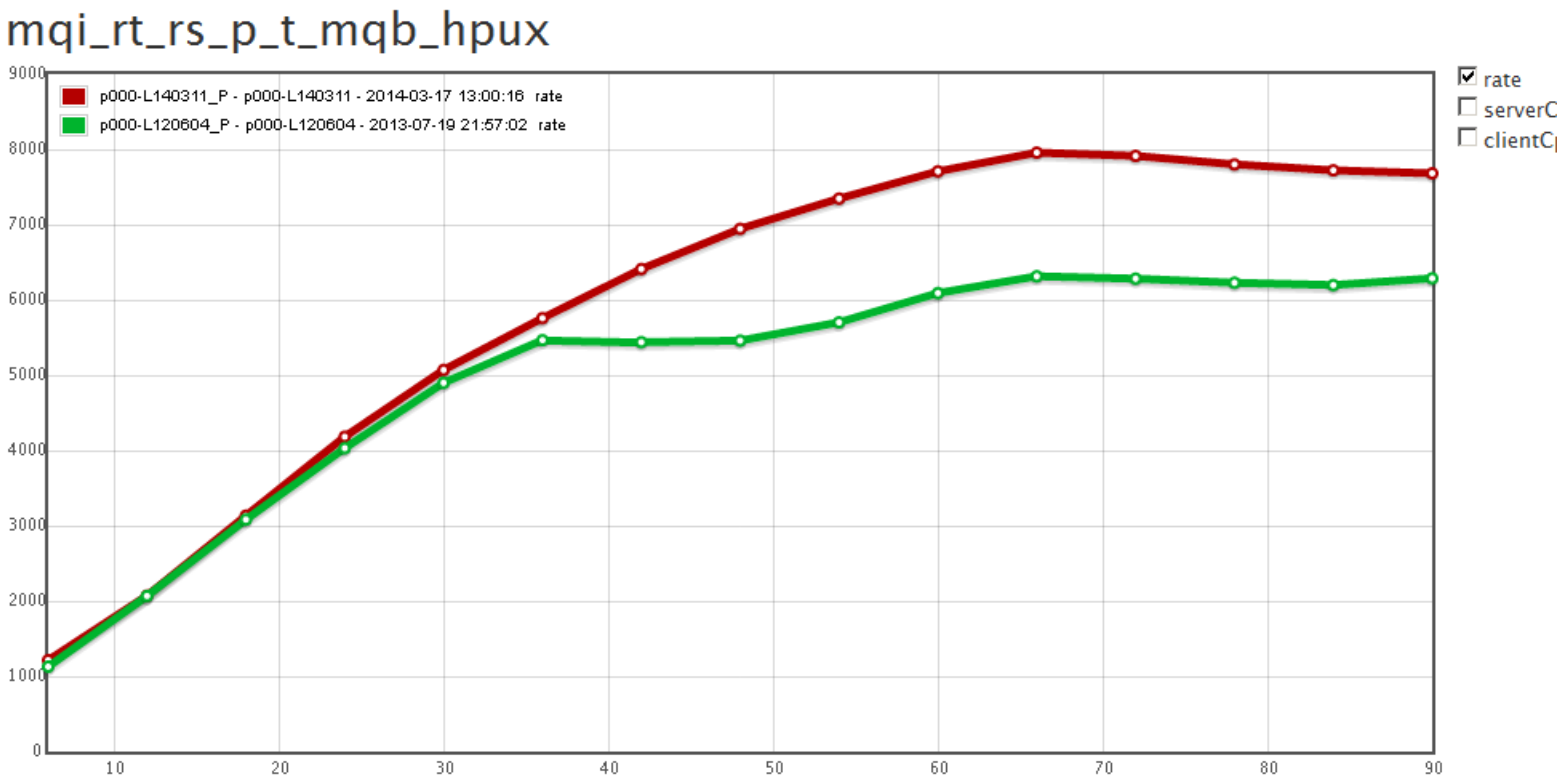
- Can now be run by any user (not just mqm group)
  - Can take a userid/password for authentication: new "-u" flag
- Can now connect as a client to remote systems: new "-c" flag
  - Client channel definitions located by MQSERVER -> MQCHLLIB -> MQCHLTAB
- Can act as standalone program to create local CCDT: new "-n" flag
  - Does not connect to queue manager; commands subset to update local channel definition file

# Distributed Performance

- Improvements to distributed queue manager scaling
  - Improve efficiency
  - Better exploitation of wider SMP machines
- Multiplexed client performance
  - Increase the performance of multiplexed client channels (SHRCONV > 0)
  - Especially for SHRCONV=1
- Other areas that helped:
  - Cache alignment for internal structures
  - Extended 64-bit exploitation for locking primitives
  - RFH2 handling, particularly for waiting-getter
    - Fewer copies of data are needed
  - Better compiler optimisations
  - Faster data conversion (especially for 1208)
    - Many messages are in 1208 codepage
    - Optimised handling when the queue manager needs to convert them

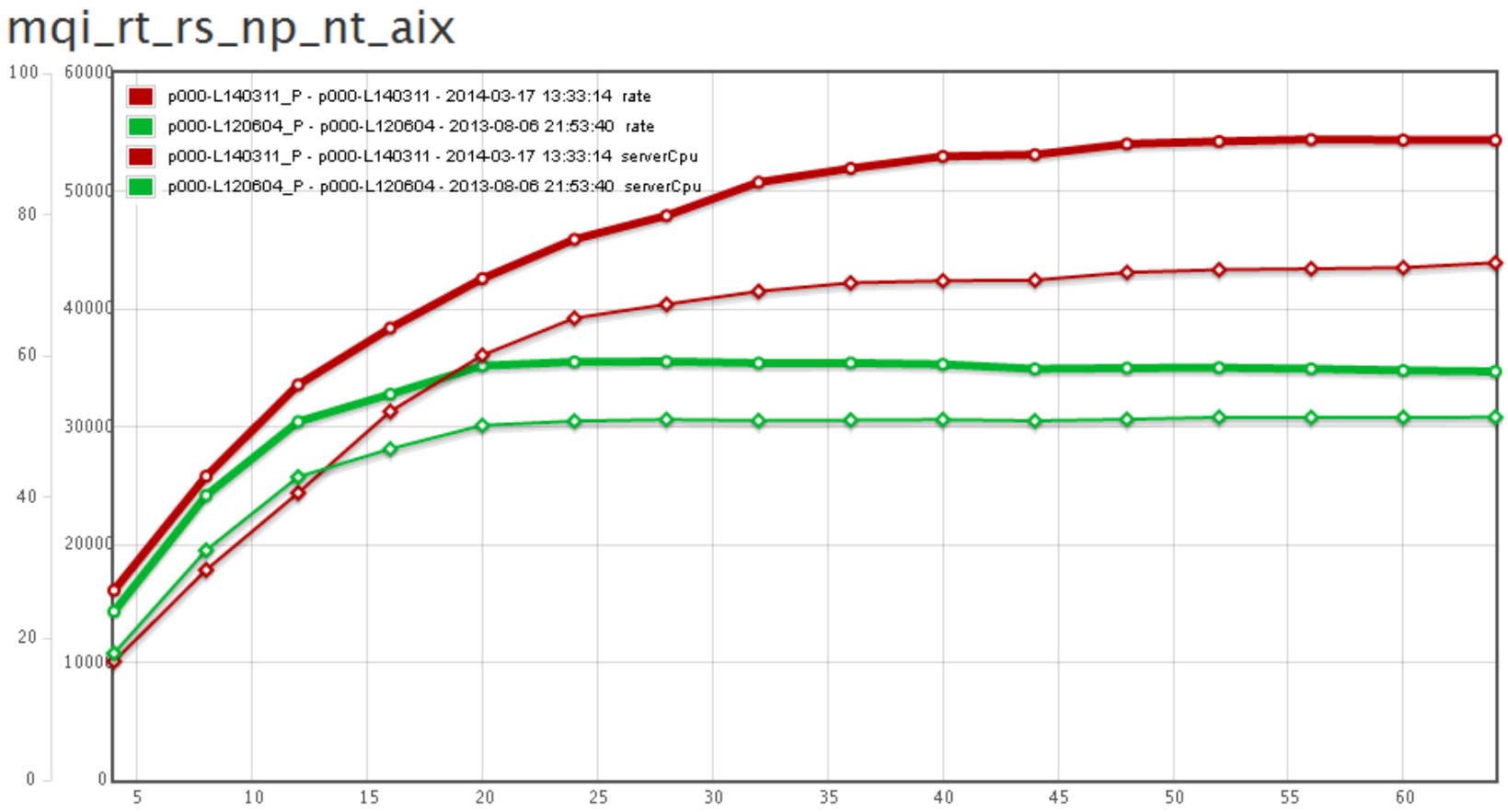
# Distributed Performance: Persistent Messaging

- A *realistic* view of how persistent message performance has improved



# Distributed Performance: Non-persistent Messaging

- Lock Limited example

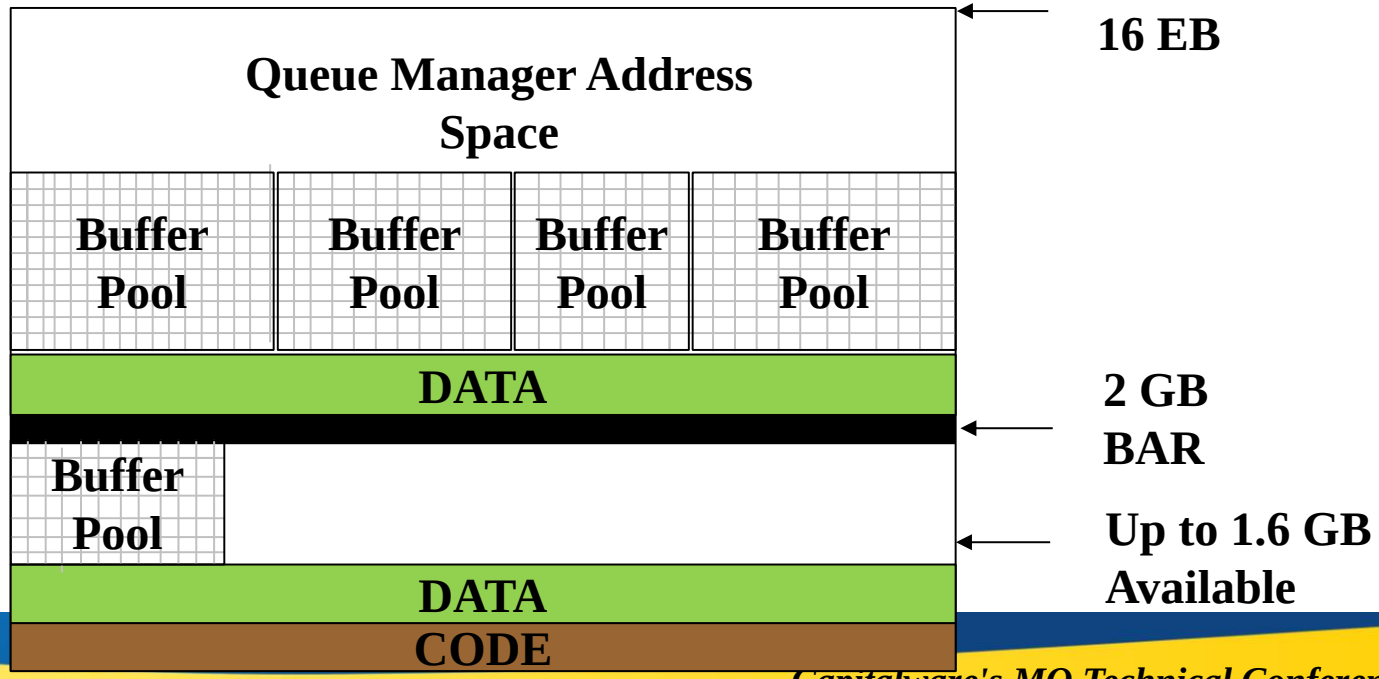


# MQ for z/OS: 64-bit bufferpools

- 64-bit buffer pools in MQ for z/OS
  - Allows large numbers of messages to be cached before writing to pagesets
  - Allows MQ to exploit the vast amount of storage on today's machines
- Improves performance of putting/getting messages by minimizing disk I/O
- Minimizes administrative overhead of managing buffer pools
- Buffer pool LOCATION attribute says where it is located relative to the bar
  - BELOW: The default. Buffer pool is located below the bar in 31 bit storage
  - ABOVE: Buffer pool is located above the bar in 64 bit storage
  - This can be altered dynamically
- Storage can be pinned based on pageclass attribute

# MQ for z/OS: 64-bit bufferpools

- Buffer pools above the bar can (theoretically) use up to 16 EB storage
- Increased maximum size of pool to 999,999,999 buffers
  - Was 500,000
- Allows up to 100 buffer pools
  - Was 16
  - Can have a 1-1 page set – buffer pool mapping



# MQ for z/OS: Performance and Capacity

- Log RBA constraint relief
  - Already improved messages to warn of approaching RBA
  - Now widening RBA field from 6 to 8 bytes
  - At 100MB/sec this will now take about 5578 years to fill

- Support for LP64 batch/RRS C applications

- Performance enhancements for IBM Information Replicator (QRep) and similar application patterns
  - Read-ahead and changes to deferred write processing allows MQ to increase sustainable data rates

- General improvements to channel performance

# MQ for z/OS: Other features

- Exploitation of zEDC compression accelerator
  - SMF
  - Channel compression (zlibfast option) can be useful when using SSL
- Support for Flash Express feature on zEC12 and zBC12 servers
  - Improves resiliency of Coupling Facility with cost-effective standby capacity to handle overflow of shared queues
  - Messages <63K fully held in Flash
  - Messages >63K have pointers in Flash, body in SMDS just as for traditional CF structures
- SMF enhancements
  - Channel statistics allow better monitoring and tuning of channel behaviour
  - Correlation of MQ and CICS statistics
- Message suppression
  - Up to 16 message numbers (particularly X500,X501) can be defined to be excluded
  - Removes cost of writing WTO messages which are then ignored
  - Can now differentiate between messages for client channels and other types

# AMS and MFT integration with z/OS

- Following the model used by MQ V7.5 on distributed for closer integration
- AMS
  - Starts automatically with qmgr
  - Reduced overhead (now only one started task instead of 2)
  - Policies and their administration remain unchanged
- MFT
  - Now looks more natural for a z/OS person
  - Closer integration with standard system facilities such as ARM
  - Started task templates
  - Supported JCL provided instead of samples
  - Job info logged to JCL task
- Both features still separately licensed

# JMS 2.0

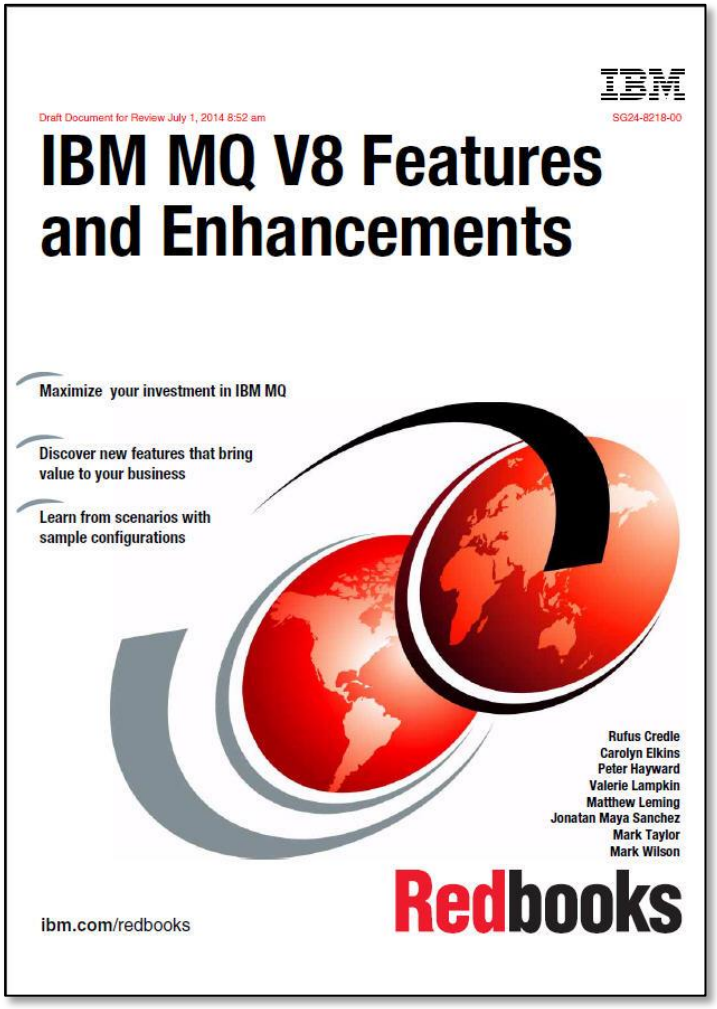
- Long-awaited update from JMS 1.1 standard
- JMS 2.0 – JSR 343 Java Message Service (JMS 2.0)
  - Final release on 21 May 2013.
  - https://java.net/projects/jms-spec/pages/JMS20FinalRelease
- New Messaging Features
  - Delivery Delay
  - Asynchronous Send
  - Subscriptions can be shared across a messaging provider
- API Changes
  - Use of java.lang.AutoCloseable
  - Simplified API [combined connection/session]
  - Session doesn't need parameters (for Java EE)
- Java 7 prereq
- Java EE 7 prereq for use of the Resource Adapter in Application Servers

# .Net enhancements

- MQ .Net classes can now use SSL without needing the C client installed
  - A secure fully-managed .Net implementation
  - Uses Windows native certificate stores
- For MQ .NET classes (aka Base .NET Classes) SSL properties can be set at
  - MQEnvironment.cs
  - Hashtable properties (input parameter to MQQueueManager constructor)
- For XMS .NET, SSL properties can be set as ConnectionFactory properties
- WCF interface extended to non-SOAP, non-JMS messages
  - Making it easier for apps using WCF to communicate with any other MQ application

# Further information in real books

# And … already available (draft)





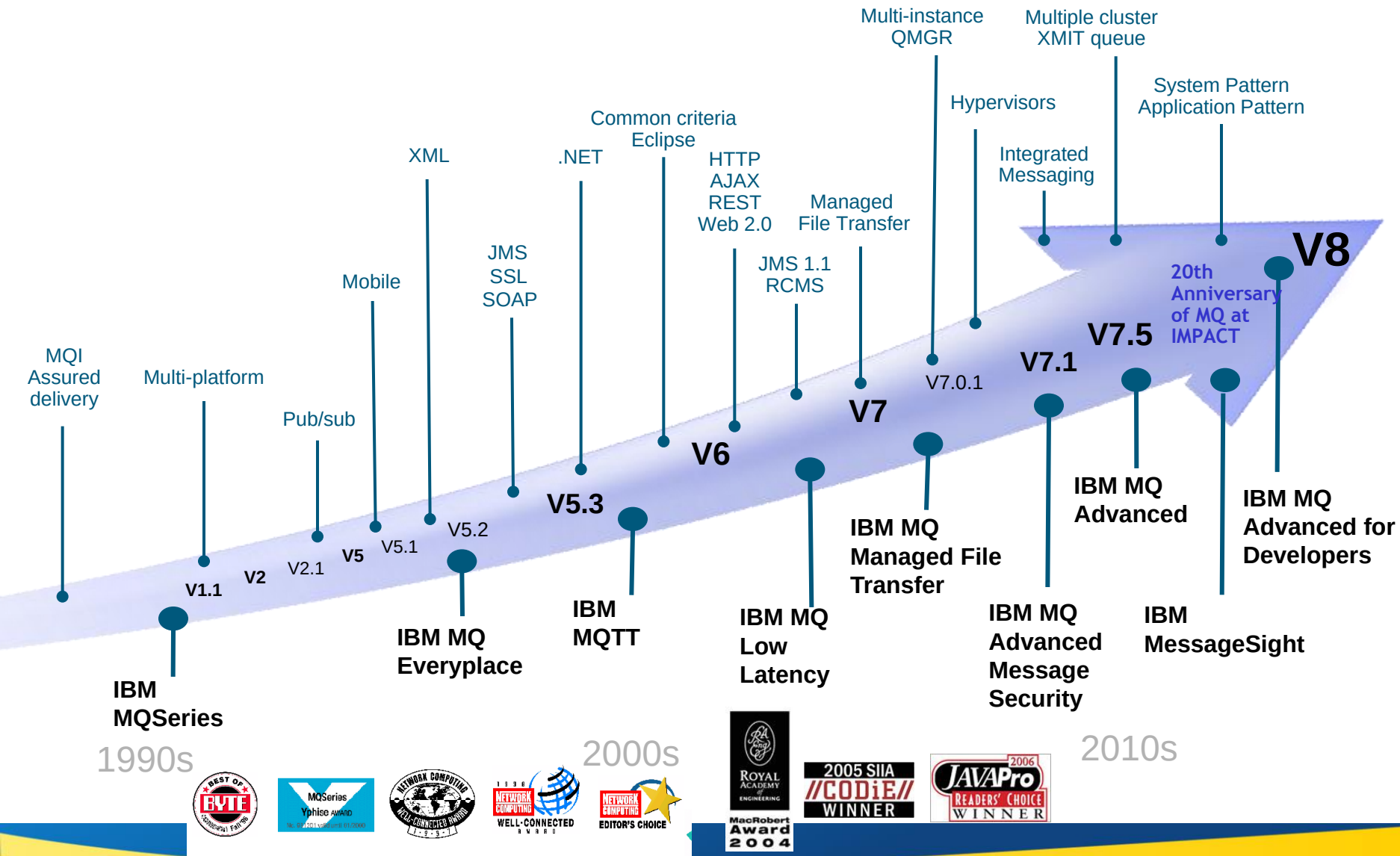






**https://www.redbooks.ibm.com/Redbooks.nsf/RedpieceAbstracts/sg248218.html**

# IBM has a 20 year track record of innovation in Messaging



# And continues to invest in all Messaging markets

- Enterprise Messaging where MQ continues to lead

- Messaging for Mobile and the Internet of Things

- Supporting Cloud deployments with Messaging services

- Helping developers use Application Messaging to create better applications