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What's New in WebSphere MQ: V7.1 and V7.5

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SHARE in Anaheim 2012

IBM MQ Connectivity for a Smarter and Secure Planet

A Universal Message Bus providing connectivity to, from and within your Enterprise to access data *wherever it exists* to support your business

Provides a comprehensive range of Messaging capabilities to support your Business requirements for data integration:-

-- Messaging integration patterns
-- Reliability and availability QoS
-- Managed File Transfer
-- SOA foundation
-- EDA foundation

Provides appropriate data access and data privacy controls to help meet audit and regulatory requirements

Provides a range of messaging on-ramps appropriate to your business needs and developer skills

Provides a range of messaging topologies and deployments to meet your business and IT needs

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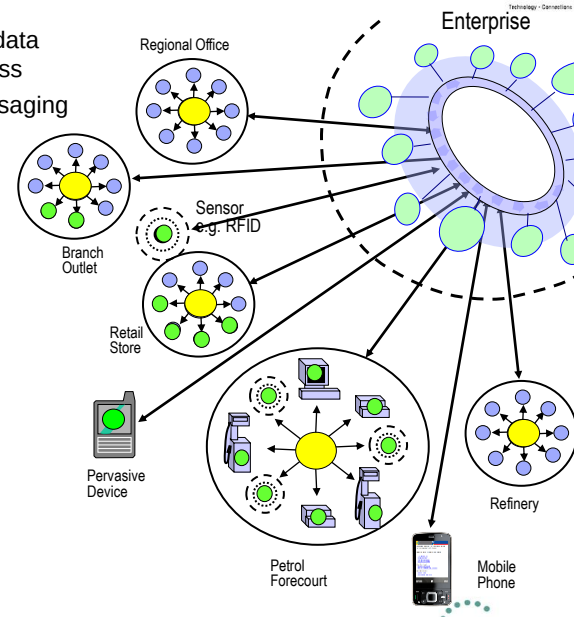
How WebSphere MQ meets your Connectivity needs

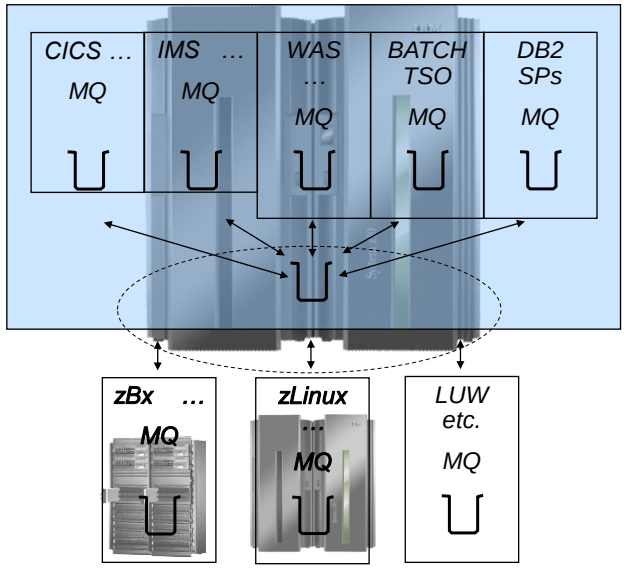
*Dynamic network that delivers the **data** you require from wherever it resides to wherever you want it in whatever way you want it at whatever time you want it*

WebSphere MQ Value: Connectivity to, from and within an Enterprise

- A Universal Message Bus for access to data wherever it exists to support your business
- Provides a comprehensive range of Messaging capabilities to support your Business requirements for data integration
  - Managed File Transfer
  - Messaging integration patterns
  - Reliability and availability QoS
  - SOA foundation
- Provides appropriate data access and data privacy controls to help meet audit and regulatory requirements
- WMQ Telemetry is one step in extending the reach of WMQ to a wider world of data relevant to your business



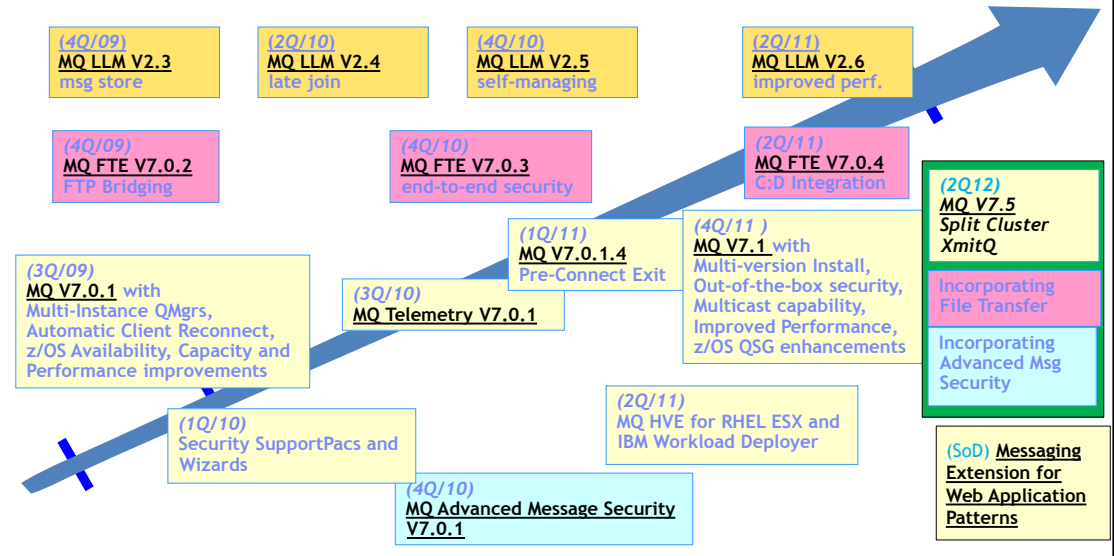
Connectivity to, from and within zEnterprise



Sysplex Shared Queue Message Availability:
Goal is to provide as near as possible continuous message data access under ALL failure scenarios (These scenarios include Application/Transaction failures, Application Execution Env. failures, Qmgr failures, CF failures, DASD failures, Network failures, CEC failures)

Sysplex Shared Queue Message Capacity:
Goal is to provide Terabytes of affordable message capacity such that MQ is capable of meeting all business requirements for reliable message storage when processing applications are unable to run for whatever reason

WMQ Family Roadmap – continual delivery of customer value



WebSphere MQ V7.1 and V7.5

WebSphere MQ V7.1: Feature Summary

WebSphere MQ V7.1
Announced: 4 October 2011
Availability: 11 November 2011

Simplification

New Feature	*Benefits*	
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. Relocatable installation support. Applications can connect to any Qmgr
Enhanced Security	Simplified Configuration Enhanced Authorisation and Auditing	IP address Authorisation capability Additional crypto algorithms More granular authorisation for non-local queues Application Activity Reports
Cloud Support	Simplifies and support Cloud deployments	Additional HVE images
Enhanced Clustering	Improves ease-of-use	Authorisation to Cluster Q rather than XMIT Q on Dist. Platforms Bind-on-Group Support
Multicast capability	New messaging QoS provides low latency with high fan-out capability	MQ Pub/Sub Topic Space map to multicast Group Addresses Provides direct interoperability with MQ LLM
Improved scalability and availability on z/OS	Further exploitation of z196 Customer control over CF storage use CF Connectivity Loss improvements	Code contention reduced to improve multiprocessor linear scaling Use of MQ Datasets rather than DB2 significantly improves "large" message capability Structure rebuild capability for CF Connectivity Loss scenarios
Improved Performance on Dist platforms	Improved multiprocessor exploitation	Various code improvements

WebSphere MQ V7.5: Content Summary

- For Windows, Unix and Linux

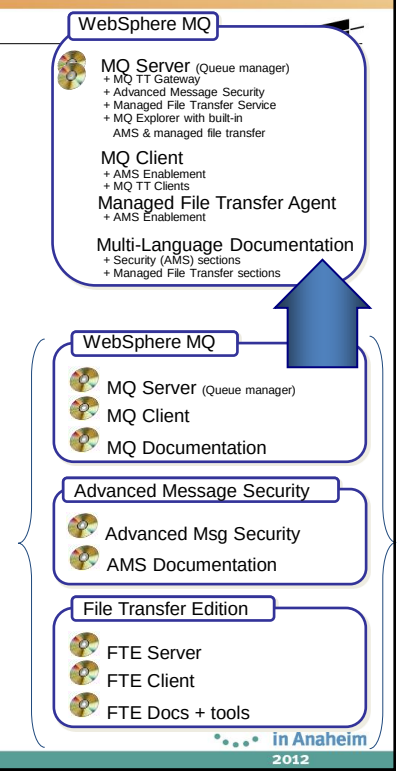
WebSphere MQ V7.5
Announced: 24 April 2012
Availability: 20 June 2012

Simplification

New Feature	*Benefits*	*Details*
Integrated Installation	Makes it easier to deploy systems Simpler licensing	Combines several products into a single package [illegible]
Enhanced Clustering	Improves ease-of-use Improves application isolation	Split Cluster [illegible]
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 Easier to read data immediately

WebSphere MQ V7.5

- Integrated Messaging Offering
  - Single install, packaging & tooling for all Messaging options
  - Reduce time to value, simplify usage
- What's being delivered?
  - Integration of MQ with MQ FTE, MQ AMS and MQ Telemetry
  - Single install, common integrated tooling and management, simplified licensing and entitlements
  - Updated MQ Explorer tooling for all platforms
  - More complete, easy to use messaging infrastructure, enabling you to gain full range of messaging, swiftly & easily
- All messaging functions & capabilities available to all customers, new and existing with rich choice of qualities of service
  - Removal of charge for MQ XA client
  - Reduced pricing metric for standard MQ Telemetry client
    - Lower cost for larger numbers of clients



Multi-Version Installation

- MQ on Unix and Windows can install multiple levels on a system
  - Relocatable to user-chosen directories
  - Can have multiple copies even at the same fixpack level
- Simplifies migration
  - Can move applications as needed, not all at once
  - No need for parallel hardware
- Easier for ISVs to imbed MQ in solutions
  - Can install in “private” locations without worrying about other copies
  - Reduces support concerns
- Permits a single copy of V7.0.1 to remain on system
  - So existing systems can be migrated
  - Must be 7.0.1.6 or later

Security: Channel Access Control

- Simplifying configuration for channel access
  - Clients and queue managers
- SET CHLAUTH definitions control who can use channels
  - Name mapping
  - Access blocking
- Easy to test rules that you define
  - DISPLAY CHLAUTH can “execute” rules
- Rules can be applied in WARNING mode
  - Not actually blocked, but errors generated
- **MIGRATION NOTE**: Standard rules block clients on new queue managers
  - “Secure by default”
  - Migrated queue managers behave as before until you enable the rules
  - Queue manager attribute CHLAUTH(ENABLED|DISABLED) provides overall control

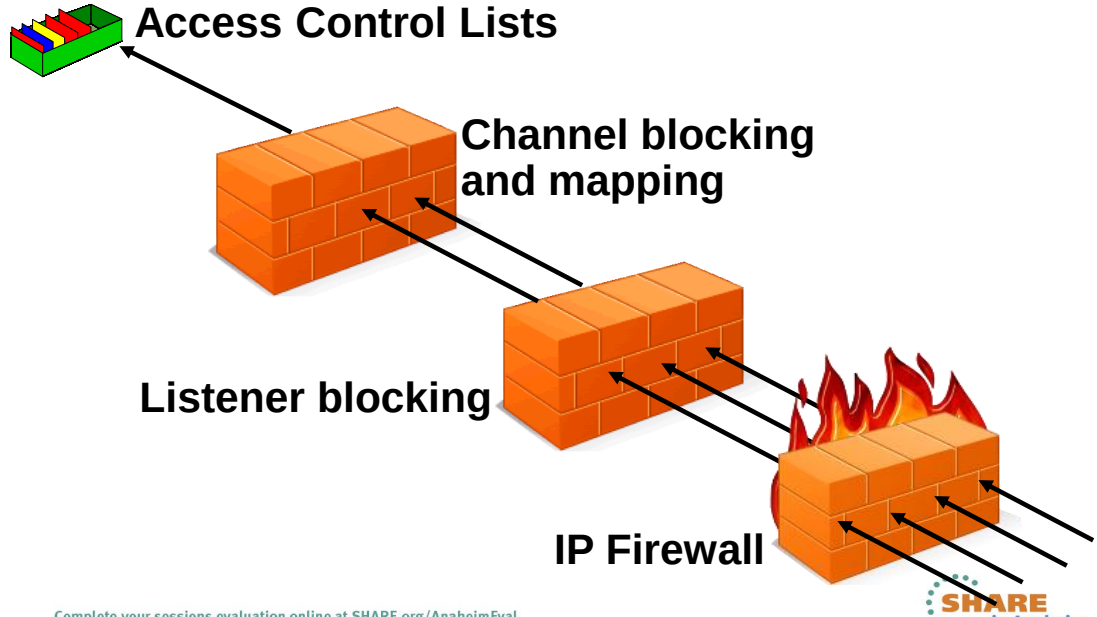
Security: Channel Access Control – example uses

- Block connections from specific IP addresses
- Block connections from specific Userids

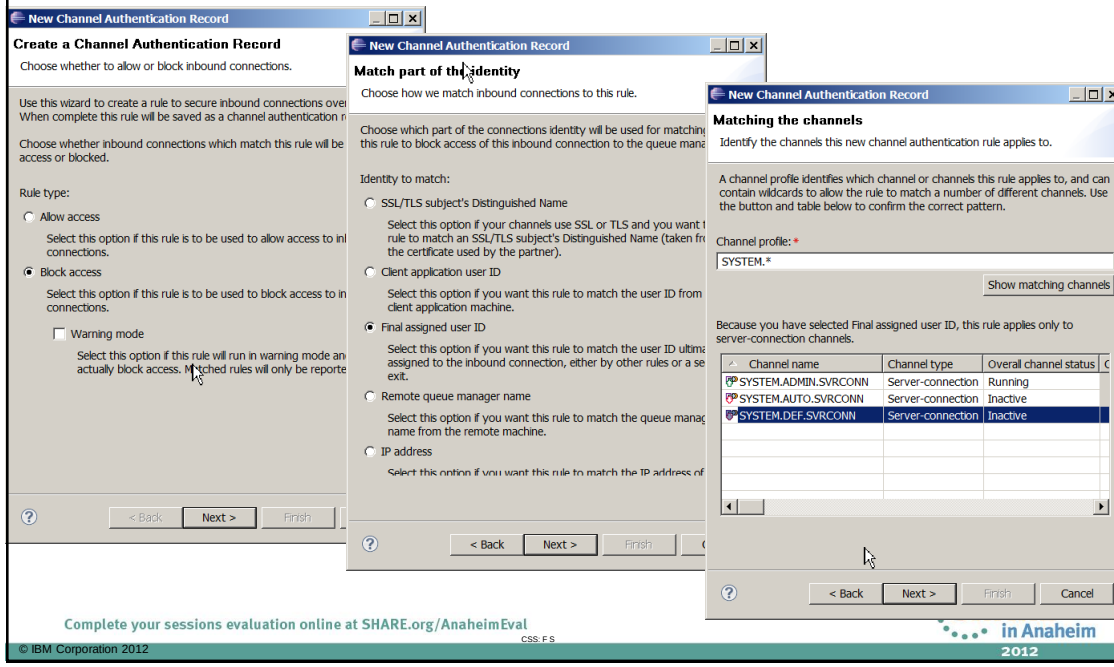
- Set MCAUSER value used for any channel coming from a specific IP address
- Set MCAUSER value used for any channel having a specific SSL or TLS DN
- Set MCAUSER value used for any channel connecting from a specific Qmgr

- Block connections claiming to be from a particular Qmgr unless the connection is from a specific IP address
- Block connections claiming to be from a particular Client Userid unless the connection is from a specific IP address
- Block connections presenting a particular SSL or TLS certificate unless the connection is from a specific IP address

Channel Access Blocking Points



Channel Blocking and Mapping from the Explorer



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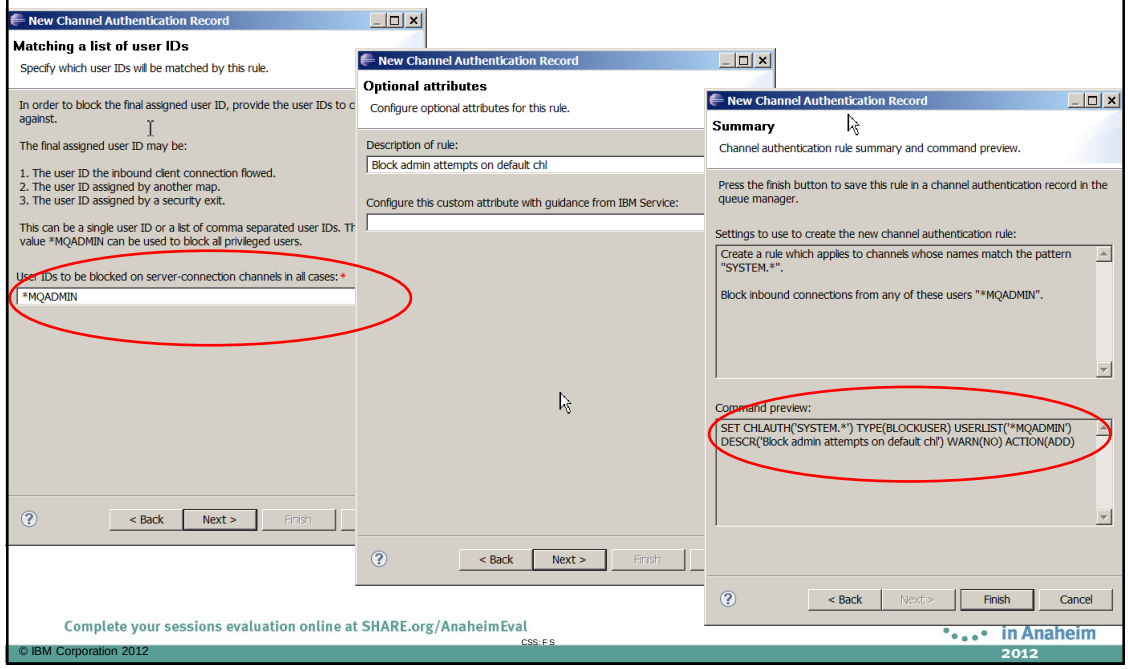


Security: SSL

- More crypto algorithms supported for SSL
  - Stronger algorithms are now available and recommended
  - MQ V7.0.1 added some SHA-2
  - MQ V7.1 adds more, with support for the NSA “Suite B” standard which includes Elliptic Curve cryptography
- Some older algorithms (eg SHA-1) should be considered deprecated
  - No plans to withdraw older algorithms immediately
  - But expect them to be removed in a future version of MQ
- Newer algorithms supported by gskit8 on Distributed platforms
  - Waiting for z/OS and iSeries SSL implementations before MQ can support them there
- The gskit toolkit is now provided inside the MQ installation
  - Will not clash with alternative levels from other MQ installations or other products

Security: Authorisations for Non-Local (Clustered) Queues

- Distributed platforms now have authorisations for non-local queues
  - Including clustered queues
  - Making it consistent with z/OS
  - Also consistent with Topic authorisations
- So there is no longer a need to authorise access to the cluster transmit queue
- Grant authorisation to the remote queue manager instead
  - A new pseudo-object known to the OAM

```
setmqaut -m QM1 -t queue -n SYSTEM.CLUSTER.TRANSMIT.QUEUE -p mquser +put
                                BECOMES
setmqaut -m QM1 -t rqmname -n QM2 -p mquser +put
```

Application Activity Reports

- New set of events to report on MQI operations by applications
  - One PCF event may contain multiple MQI operations
- Configurable in granularity
  - Amount of data
  - Which applications
- Enables scenarios such as
  - Application audit trail
  - Message duplication
  - Resource usage: which queues or topics are actually being used
  - Problem Determination: most recent MQI calls by applications
  - Application Coding Standards: does everyone use the MQI in the recommended way
  - And more …
- On all Distributed platforms

SupportPac MS0P V7.1

```
Application Activity Trace for Queue Manager V71_I1_A
  Application Count : 1
    'WebSphere MQ Client for Java' : from 2011-12-06 14:28:05 to 2011-12-06 14:28
      Application Information
        Tid Date       Time     Operation  MQCC       MQRC
        004 2011-12-06 14:28:05 Cb         Ok         0000 (NONE
        004 2011-12-06 14:28:05 Callback
        004 2011-12-06 14:28:05 Callback
        004 2011-12-06 14:28:05 Inq        Ok         0000 (NONE
          Object Type               Queue
          Object Queue Manager Name
          Resolved Queue Name       SYSTEM.ADMIN.COMMAND.QUEUE
          Resolved Queue Manager    V71_I1_A
          Resolved Local Queue Name SYSTEM.ADMIN.COMMAND.QUEUE
          Resolved Local Queue Manager V71_I1_A
          Resolved Type             Queue
          Selector Count            1
          Selectors
```

```
004 2011-12-06 14:28:35 Connx      Ok         0000 (NONE
004 2011-12-06 14:28:35 Open       Ok         0000 (NONE
  Object Type                 Queue Manager
  Object Queue Manager Name
  Open Options                0x00000020 [inq ]
  Object Type                 Queue Manager
  Object Queue Manager Name
  Resolved Type               Queue Manager
  Dynamic Queue Name          AMQ.*
```

Clustering

- "Bind on group"
  - All messages within a logical group are routed to the same queue manager
  - Workload balancing is done for each group
  - Simpler for applications that use message groups
  - Previously would have had to close and reopen the queue
- New option in the MQI and DEFBIND attribute for queues
- Once a group has started its path to a selected queue manager, messages in that group will not be reallocated in the event of a failure
- New sample **amqsclm** to monitor queues and redistribute delivered messages
  - If a queue has no getters, block further deliveries and redistribute existing messages
  - Includes source code, so easy to modify

Clustering – Split Transmit Queue Requirements

- Separation of Message Traffic
  - With a single transmission queue there is potential for pending messages for cluster channel 'A' to interfere with messages pending for cluster channel 'B'
- Management of messages
  - Use of queue concepts such as MAXDEPTH not useful when using a single transmission queue for more than one channel
- Monitoring
  - Tracking the number of messages processed by a cluster channel currently difficult
  - Some information available via Channel Status

Clustering – Split Transmit Queue

- With V7.5 a queue manager can automatically define a PERMANENT-DYNAMIC queue for each CLUSSDR channel.
  - Dynamic queues based upon new model queue “SYSTEM.CLUSTER.TRANSMIT.MODEL”
  - Well known queue names: “SYSTEM.CLUSTER.TRANSMIT.<CHANNEL-NAME>”
- Controlled via attribute affecting all cluster-sdr channels on the queue manager

```
ALTER QMGR DEFCLXQ( SCTQ | CHANNEL )
```

- Also have manual definitions
  - Multiple queues can be defined to cover all, or a subset of the cluster channels.

```
DEFINE QLOCAL(APPQMGR.CLUSTER1.XMITQ)
CHLNAME(CLUSTER1.TO.APPQMGR) USAGE(XMITQ)
```

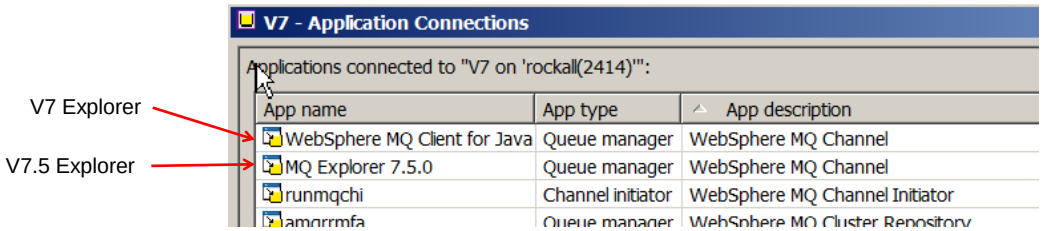
- Automatic and Manual are not mutually exclusive
  - They could be used together

MQ Clients

- A client is now available on System i enabling connectivity from C and RPG programs without needing a local queue manager
  - Platform already had a Java client
- MQI libraries like libmqm connect to local and remote queue managers
  - Smart switching for clients, as well as handling multi-version systems
- API Exits available in C clients
  - Same interface as available for local binding applications

Java Application Identification

- Java client applications now fill in APPLTAG field
- No longer appear as “WebSphere MQ Client for Java”
- Application-provided property
- Or the Main class



MQ Clients – Multicast

- Publish/Subscribe is enhanced to support multicast communication
  - Uses technology from the MQ Low Latency Messaging product
  - So it is interoperable with LLM
- Provides new Quality of Service
  - Low latency with high fan-out
  - Provides higher speeds for non-persistent messages
  - Provides higher availability as queue manager can be removed without affecting flow
  - Provides “fairness” as all recipients of a message get it at the same time
  - Higher scalability as additional subscribers cause no additional traffic
- Mapping MQ topic space to multicast group addresses
  - Can have mix of multicast and queue-based subscribers
  - Topic objects have associated COMMINFO objects to define addresses and other attributes
- Supports direct communication from publisher to subscriber, bypassing qmgr
- Queue manager maintains status and statistics for monitoring

Channels

- See the MQ version of connecting partner
  - Level of clients and queue managers available in channel status
  - For example a V7.0.0.1 client shows as RVERSION(07000001)
  - Can distinguish Java, C, .Net client programs
  - Helps administrator determine whether partner needs upgrading
- Distributed platforms now use DISCINT to disconnect idle clients
  - ClientIdle qm.ini parameter ignored
  - Consistent with z/OS
- Alternative channel batch control based on byte counts
  - BATCHLIM attribute
  - Useful when a transmission queue holds mix of large and small messages
  - Can make batch time (latency) more consistent
  - Batch is ended when first of either bytes or messages transferred reach configured limit
- Per-channel control of Dead Letter Queue
  - New channel attribute USEDLQ(YES|NO)

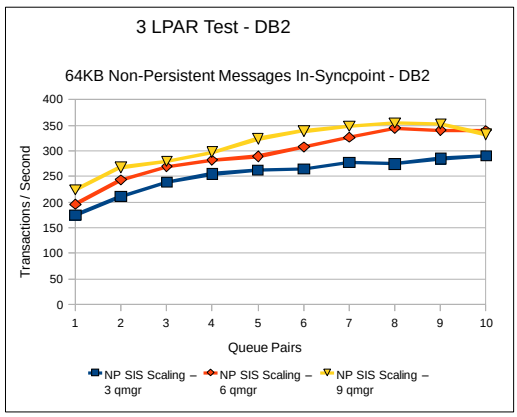
z/OS Performance and Availability

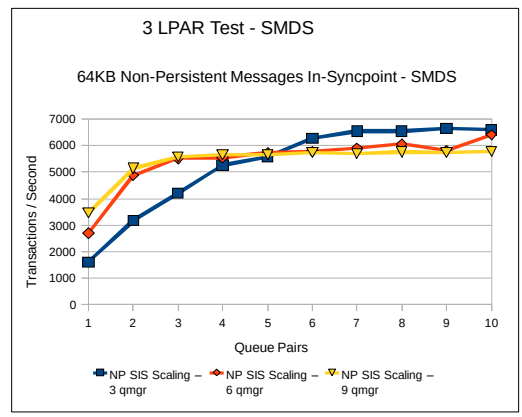
- Performance
  - z196 Scaling improvements for both non-shared and shared queues
    - Have successfully processed more than ONE MILLION non-shared messages/sec through a single queue manager
    - Have also successfully processed 150K shared msgs/sec with 3 queue managers
  - Improved performance by using SMDS for large messages on shared queues
- Availability
  - Structure rebuild when connectivity to CF is lost improves availability of Shared Queues
  - GroupUR function from MQ V7.0.1 for Distributed QSG connections available for CICS usage
    - CICS 4.2 can use this to enhance the MQ Group Attach originally provided in CICS 4.1

Large Shared Queue Messages: SMDS

- Using DB2 BLOBs to store large (>63KB) messages is expensive
  - Both CPU and pathlength
- Shared Message DataSets (SMDS) removes DB2 for large message storage
  - DB2 still needed for storing shared definitions
  - CF still holds small messages and pointers for offloaded messages
- Shared VSAM datasets increase shared queues capacity and performance
  - All queue managers in the QSG can access the datasets
- CF Structure message reference still controls locking, ordering, deletion etc.
  - So every message still has a “pointer” in the CF
- Rules control offload message size and % Structure-full offload trigger
  - Set per CF structure
  - Offloading messages at 63K gives 1.25M messages on a 100GB structure
  - Offloading all messages at 1KB gives 45M messages on same structure
- All QSG members must be at new level to access queues with this capability

SMDS Performance Improvement





- Early Test Results on z196
- Tests show comparable CPU savings making SMDS a more usable feature for managing your CF storage
- SMDS per CF structure provides better scaling than DB2 BLOB storage

Scalability & Performance – Distributed platforms

- Performance measured and improved for a range of scenarios
  - Hardware capabilities have evolved over years to have more CPUs, more memory etc
  - MQ topologies have evolved to have more clients and larger/fewer queue managers
- "Fastest MQ ever": better performance than V6 and V7
- Multicast faster than traditional non-persistent
  - Over 5x for one-many publications
- Performance reports now available from SupportPac site

Scalability & Performance – MQ Explorer

- Design changes to MQ Explorer reduce its footprint and improve performance
- Now does not include full Eclipse development workbench
  - But Explorer can be easily added to other Eclipse installations and products
- Many Explorer installs are supported within the overall multi-version support
  - But each Explorer only fully manages queue managers associated with its own installation
  - Use client connections for other installation queue managers on same machine

	V7.0.1	**V7.1**
Time to install MS0T	203 seconds	92 seconds
Startup Time	6 seconds	4 seconds
Connect to 100 queue managers	At least 53 seconds	7 seconds
Enable and disable Sets for 100 queue managers	35 seconds	1 second

Management of Distributed platforms

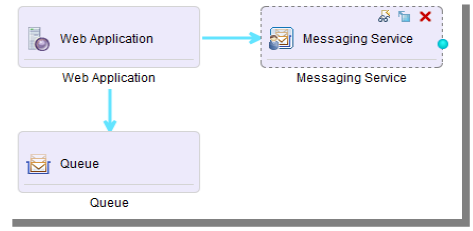
- New integrated command (dmpmqcfg) to extract configuration
  - Fulfills the role that MS03 (saveqmgr) has done over many years
    - Backup your configuration, change control, rebuild systems etc
  - MAKEDEF already available on z/OS
  - Different syntax than MS03, but similar function
- MQSC commands equivalent to setmqaut/dspmqaut
  - So you don't need to drop out of the command interface to modify security
  - Can simplify scripting of configuration changes
  - No current plans to remove *mqaut commands
- Multi-instance Queue Managers on Windows
  - The need for domain controllers ("domainlets") has been removed
  - New option when creating queue managers to define ownership

Extending the reach of MQ – MQ Telemetry Transport (MQTT)

- IBM developed a protocol for constrained systems like industrial controllers
  - Later renamed MQ Telemetry Transport (MQTT) due to broader telemetry adoption
  - Built for low bandwidth, high latency, unreliable, high cost networks
  - Tailored for resource-constrained client application environments
- Traditional messaging qualities of service provided where environment allows
- Feature available from MQ 7.0.1.4; server platform coverage extended in V7.1
  - Highly scalable
    - A single queue manager can handle up to 100K concurrently connected devices
  - Fully integrated / interoperable with WMQ
    - Publishers and subscribers can exchange messages with MQI and JMS applications
- In addition any 3rd party, open source or roll your own MQTT client can be used

New “Messaging Extension for Web Application Pattern”

- New Messaging pattern type for IBM Workload Deployer and IBM PureApplication System
  - Extends Web Application Pattern



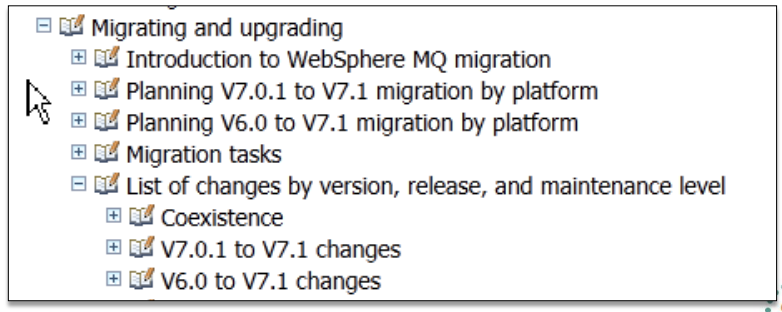
- Simplifies Web application deployment by:
  - Provisioning a new Virtual machine containing a queue manager when required
  - Creating queues and topics in queue manager
  - Linking new resources to JNDI objects used by application

MQ Cloud Support: Pre-Connect Exit

- Supports movement by some to “Utility Compute”, Private Cloud configs, etc.
  - Rapid provision of applications allied with need to further decouple Client/Server connectivity
  - Server applications might move location – new addresses or queue managers
- MQ Client connects to a “service” rather than specific Queue Manager
- Can transparently change location of MQ server-side applications
  - No client code changes needed
  - No configuration files need to be updated at the client machine
  - JMS/XMS applications already do this via JNDI lookup
- Exit run during MQCONN queries a repository to discover real location
  - MQ V7.1 incorporates the LDAP implementation from SupportPac MA98

No Longer Supported

- V7.1 removes a few older features including
  - Support for HP-UX on PA-RISC hardware
  - Windows Performance Monitor
  - Windows Active Directory Service Interface
- See Migration Guide in InfoCenter



MQ 7.5: Enhancements to newly-integrated components

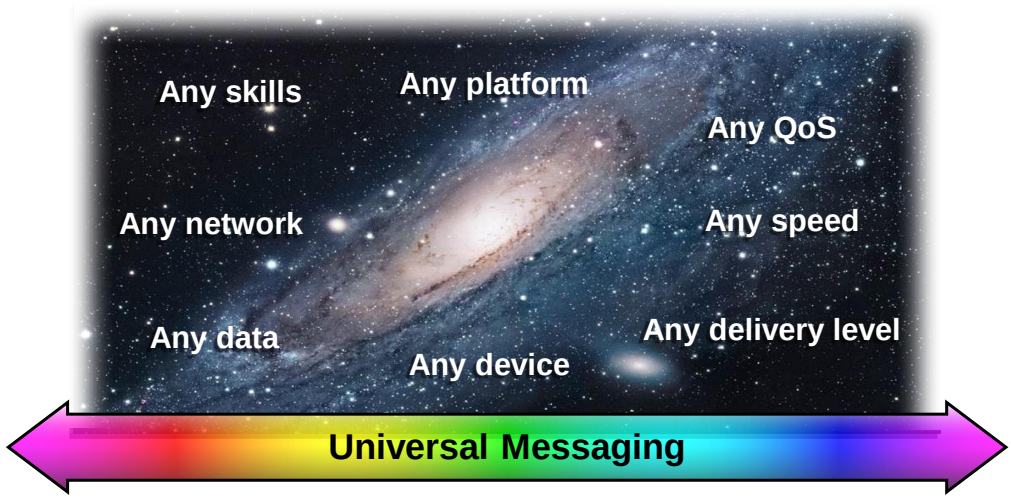
- Managed File Transfer
  - Logger can now write to a file
- AMS
  - V7.0.1.2 enhancements
    - Supports SHA-2 Digest algorithms
    - Command and Configuration Events for Policy changes
    - Audit trail of who has changed configuration
  - SVRCONN interception

Why WebSphere MQ ?

Over 17 years of proven experience	Leader in Messaging technology innovation
Connect virtually anything	Broad coverage of platforms, technologies, languages Draw skills from a larger pool – use who you have today Over 9,300 certified developers for IBM Messaging alone
Most widely deployed Messaging Backbone	Over 10,000 customers using IBM Messaging Backbone Over 90% of the Fortune 50 and 9 of the Fortune 10 Over 80% of the Global 25 and 7 of the Global 10
Entrusted with Tens of billions of messages each day	Government client sends 675 million messages per day* Banking client handles over 213 million messages per day on z/OS alone*
Relied upon as the mission-critical Backbone	Financial Markets client handles $1 trillion worth of traffic per day on one MQ network* Banking client sends $7-$35 trillion worth of traffic per day on just one MQ-based SWIFT gateway*
Continuously Investing and Innovating	Over 120 patents and filings within messaging space New WebSphere MQ family products Regular enhancements, updates and new releases

❖ ***Results reported from actual MQ implementations***

Universal Messaging with WebSphere MQ



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