MQ v8 for HP NonStop Update

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Disclaimer

- MQ V8 Beta is pre-release software
- Features, designs, plans and schedules may change
IBM MQ for HP NonStop to deliver additional deployment options for enterprise messaging

IBM® intends to introduce a new release of IBM MQ for the HP NonStop platform\(^1\) that is based on IBM MQ V8. It is intended for this offering to be available for both the HP Integrity NonStop servers on Intel™ Itanium™, and compatible also for the new HP NonStop platform on x86 architecture. It is planned for this offering to be designed to deliver the capabilities of the current IBM MQ V8 product, but with optimizations for the HP NonStop platform, and will work with other IBM MQ and WebSphere® MQ offerings.

IBM MQ for HP Non Stop Server Early/Beta program

- **Beta program for next version of MQ on HP Non Stop Server**
  - Opportunity to try your applications with the beta code
  - Update and discussion calls with the development team for beta participants
  - Provide feedback to the product team
  - Support for any questions
  - Advance information to help with your planning
  - Invite to any beta program workshops/education events

- **Joining the beta program**
  - Nomination from either your local IBM contact or the beta program manager
  - IBM asks you to accept standard beta program terms and conditions
  - Any questions on the beta program
    - Please ask the beta program manager
    - Email: pete_murphy@uk.ibm.com

Email: pete_murphy@uk.ibm.com
MQ on NonStop Architectures: Today

<table>
<thead>
<tr>
<th>MQ Client</th>
<th>IA64</th>
<th>x86</th>
</tr>
</thead>
<tbody>
<tr>
<td>MQ v7.1 Client</td>
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<td></td>
</tr>
<tr>
<td>RELEASED JUN 2013</td>
<td>Released Jun 2013</td>
<td></td>
</tr>
<tr>
<td>Support PAC MAT1</td>
<td>Support PAC MAT1</td>
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</tbody>
</table>

| MQ v8 Client    | MQ v8 Client          |                      |
| RELEASED SEPT 2014 | Released Sept 2014  |                      |
| Support PAC MQC8 | Support PAC MQC8     |                      |

| MQ Server       | MQ v5.3.1 Server      |                      |
|                 | **v5.3.1.11 level**   |                      |
MQ on NonStop Architectures: Future

<table>
<thead>
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<td><strong>MQ v5.3.1 Server</strong></td>
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<td>v5.3.1.11 level</td>
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<td></td>
<td><strong>MQ v8 Server</strong></td>
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<tr>
<td></td>
<td>v8.0.0.3 or 4 level</td>
<td></td>
</tr>
</tbody>
</table>

- Introducing MQ v8 server (now in beta) across both IA64 and x86
## Beta Release History

<table>
<thead>
<tr>
<th>Beta Release</th>
<th>Features</th>
</tr>
</thead>
</table>
| **Beta 1**   | v8.0.0.2 single CPU queue manager  
MQ applications constrained to HOME cpu  
MQ tooling constrained to HOME cpu  
TMF integration using TMF gateway  
32-bit and 64-bit OSS and Guardian native application support |
| **Beta 2**   | Configurable TCPIP transport for channels and listener  
MQ applications can run in any CPU mqprofile and MQCSTM  
MQ sample source optionally in Guardian  
Complete MQ sample build scripts for OSS and TACL |
| **Beta 3**   | x86 platform support  
SSL channel support with SHA2 and EC  
MQ tooling in any CPU  
MQ administration in TACL  
runmqsc history meta-commands  
Improved installer |
| **Beta 4**   | Java/JMS 2.0  
v8.0.0.3 source rebase |
MQ V8 Proposed Timeline to GA

- Beta 1: March 2015
- Beta 2: May 2015
- Beta 3: Aug 2015
- Beta 4: Dec 2015
- Beta 5: Not before 4Q 2016
- IA64 Single-CPU 8.0.0.2 base v8 feature set
- Apps/CPU TCPIP transport
- x86 platform SSL channels
- Java/JMS 8.0.0.3 rebase
- Functionally Complete
- GA
- Not before 4Q 2016
Beta Program Plans Going Forward

- Regular briefings for Beta participants will continue
- Currently Beta 4 will remain latest driver on both x86 & Itanium
- Beta 5 to be released closer to GA:
  - Functionally complete (or close to)
  - Substantially tested
  - Date to be announced via briefing to Beta customers
Proposed MQ v8 GA-1 features

- **x86 NSX platform**
  - IA64 NSI platform release following soon afterwards (date TBC)

- **MQ v8.0.0.3 or 8.0.0.4 source baseline**

- **Critical files located in Guardian and TMF-audited**
  - Queue files, Object Catalog
  - Supported by RDF and Shadowbase

- **Single CPU queue manager**
  - Internal queue manager processes run in 1 CPU

- **Applications and most MQ tooling can run in any CPU**
  - Application bindings use Guardian IPC

- **Active-passive failover**

- **MQGET MQGMO_SET_SIGNAL API feature**

- **Queue Manager events mapped to EMS**
Proposed Post GA-1 features

- Multi-CPU queue manager
- Partitionable queue files
- TNS non-native app support

- Under review
Active-passive Failover

CPU 0
  Application

CPU 1
  Application

CPU 2
  Application

CPU 3
  Application

Queue Manager
MYQMGR
Active Instance

Queue Manager
MYQMGR
Standby Instance

```
run -cpu=1 strmqm -x MYQMGR
```

```
run -cpu=2 strmqm -x MYQMGR
```

/mq/var/mqm/qmgrs/MYQMGR
$VOL.SUBVOL

Critical files are TMF Audited
TNS non-native applications

- MQ 5.3 API only
  - No support for new MQ v8 API features
- Guardian applications
  - No support for non-native OSS applications
- C, COBOL and TAL language support
- Library name same as MQ 5.3
  - mqmtns
- Sample TACL routines
  - Demonstrate how to compile and link non-native sample MQ apps
- ** Possible post-GA1
MQ v8 server - features carried over from v5.3.1

- Guardian application support
- OSS unthreaded and multi-threaded application support
- Multiple MQ installations per NonStop system
- TMF integration
- SSL channels
- TCPIP transport configuration
- Java/JMS applications
- MQGET SET_SIGNAL
- Enscribe TMF-audited queue files
- EMS Events
MQ v8 server - features *not planned* to be carried over from v5.3.1

- **Standard Posix Threads (SPT) support for OSS applications**
  - However, SPT may be added back for JDK 6 support

- **Principal Database and tooling**
  - `setmqusr` and `dspmqusr` tooling not required by MQ v8
MQ v8 server – missing v8 features - today

- **LDAP support for authorization and authentication**
  - Under review for post-GA release

- **HTTP and MQTT Listener**
  - Not planned
Application support

- **Guardian**
- **OSS 32-bit and 64-bit**
- **OSS 32-bit multi-threaded and 64-bit multi-threaded**
  - Only C apps are supported in multi-threaded form
- **Native language support**
  - C, C++, COBOL, pTAL
  - For MQ C++ classes (imqi) only C++ version3 is supported
- **Non-native language support**
  - C, COBOL, TAL
Compatibility with MQ 5.3

- MQ 5.3 application programs can run without change
  - OSS unthreaded
  - OSS PUT multi-threaded
  - Guardian (native)
  - Guardian (non-native)

- C-language (c89 and c99)
- C++ (version 3 only if using IMQI classes)
- COBOL
- TAL
Co-existence

- MQ 8 server (beta) can be installed multiple times on the same NonStop system

- MQ 8 server can be installed on the same NonStop system as:
  - MQ 5.3 server
  - MQ 7.1 client
  - MQ 8 client

- Each installation needs unique OSS and Guardian install locations
MQ Installation Awareness

- **MQ v8 is very different from MQ 5.3 in this area**

- **MQ 5.3 required** `MQNSKOPTPATH/MQNSKVARPATH` **environment variables and TACL params for**
  - MQ commands
  - Application programs

- **MQ v8 does not need any environment variables or TACL params (normally)**
  - MQ commands (crtmqm, strmqm, runmqsc etc)
  - Application programs
Installation

- Packaged as a runnable OSS program file

  mqs-8.0-hpns-nse64-beta4.run On H and J-Series
  mqs-8.0-hpns-nsx64-beta4.run On L-Series

- Installed from an OSS shell prompt

- One OSS path and one Guardian subvolume

  ./mqs-8.0-hpns-nse64-beta4.run
    -i <OSSpath>
    -g <GuardianSubvol>
./mq8-8.0-hpns-nse64-beta3.run -i mq8beta3 -g data09.mq8beta3
#
# WebSphere MQ Server 8.0 for HP NonStop Server (Beta 3)
#
# Fixpack : 8.0.0.2
# Architecture : nse64
# Build : p800-L20150812-1957
#
# MQ Install Path : /home/david/mq8beta3
# $DATA09.MQ8BETA3 (/G/data09/mq8beta3)
#
# MQ owner : MQM.DAVE 44,11
#
# System Name : MARVIN
# RVU : J06.18
# UNAME : NONSTOP_KERNEL NSE-AB
# Default TCPIP : $ZTC0
#
# Wed Aug 19 2015 14:09:17 EDT
#
# Creating OSS 'opt' tree and Guardian sub-volume ...

100% [========================================] 857/857 files 385MB ET 01:13

Installing SSL libraries [OK]
Setting OSS tree attributes [OK]
Setting Guardian tree attributes [OK]
Generating message catalogs [OK]
Creating OSS 'var' tree [OK]
Generating mqprofile [OK]
MQ install successful [01:37 elapsed] [OK]
NonStop X x86

- MQ v8 Beta 3 introduces support for x86 NS7 systems
- Feature for feature, the x86 version of MQ v8 is presently identical to the IA64 version

- All future beta releases and the GA release will support x86 L-Series in addition to IA64 J-Series
“new” common features

- “new” relative to MQ 5.3.1 on HP NonStop
- Beta releases contain *most* MQ v6.x, v7.x and v8 features
MQ V6 Features

<table>
<thead>
<tr>
<th>Feature</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPV6 Channels</td>
<td>MQ v6.x</td>
</tr>
<tr>
<td>Cluster Workload Balancing</td>
<td>MQ v6.x</td>
</tr>
<tr>
<td>MQSC DISPLAY QSTATUS (enhanced in v6 ??)</td>
<td>MQ v6.x</td>
</tr>
<tr>
<td>MQSC LISTENER</td>
<td>MQ v6.x</td>
</tr>
<tr>
<td>MQSC SERVICES</td>
<td>MQ v6.x</td>
</tr>
<tr>
<td>MQSC FILTER</td>
<td>MQ v6.x</td>
</tr>
<tr>
<td>Accounting Reports</td>
<td>MQ v6.x</td>
</tr>
<tr>
<td>Statistics Reports</td>
<td>MQ v6.x</td>
</tr>
<tr>
<td>TraceRoute Messages</td>
<td>MQ v6.x</td>
</tr>
</tbody>
</table>
## MQ V7.0, 7.0.1, 7.1, 7.5 Features

<table>
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<tr>
<th>Feature</th>
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<tbody>
<tr>
<td>Publish-Subscribe MQI</td>
<td>MQ v7.0</td>
</tr>
<tr>
<td>Message Selectors</td>
<td>MQ v7.0</td>
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<tr>
<td>Message Properties</td>
<td>MQ v7.0</td>
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<td>Async Consume</td>
<td>MQ v7.0</td>
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<td>Conversation Sharing</td>
<td>MQ v7.0</td>
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<tr>
<td>Multi-Instance Queue Managers</td>
<td>MQ v7.0.1</td>
</tr>
<tr>
<td>Command &amp; Configuration Events</td>
<td>MQ v7.0.1</td>
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<tr>
<td>Pubsub Routing Exit</td>
<td>MQ v7.0.1</td>
</tr>
<tr>
<td>Channel access control with CHLAUTH</td>
<td>MQ 7.1</td>
</tr>
<tr>
<td>setmqaut on non-local objects</td>
<td>MQ 7.1</td>
</tr>
<tr>
<td>Channel USEDLQ attribute</td>
<td>MQ 7.1</td>
</tr>
<tr>
<td>dmpmqcfg</td>
<td>MQ 7.1</td>
</tr>
<tr>
<td>Multiple Cluster Transmit Queues</td>
<td>MQ v7.5</td>
</tr>
<tr>
<td>Advanced Message Security</td>
<td>MQ v7.5</td>
</tr>
</tbody>
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## MQ V8 Features

<table>
<thead>
<tr>
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<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic Host Routing for Pubsub Clusters</td>
<td>MQ V8</td>
</tr>
<tr>
<td>JMS 2.0</td>
<td>MQ V8</td>
</tr>
<tr>
<td>LDAP or Local OS authentication</td>
<td>MQ V8</td>
</tr>
<tr>
<td>CHLAUTH domain name support</td>
<td>MQ V8</td>
</tr>
<tr>
<td>QLOAD utility</td>
<td>MQ V8</td>
</tr>
</tbody>
</table>
Connection Authentication – Configuration

**Application ‘user3’ ‘wr0ngpw’**

**Connection Authentication – Configuration**

**ALTER**  
QMgr **CONNAUTH**(USE.PW)

**DEFINE**  
AUTHINFO(USE.PW)  
AUTHTYPE(\textit{IDPWOS} | \textit{IDPWLDAP}) …  
CHECKLOCL(OPTIONAL)  
CHECKCLNT(REQUIRED)

**REFRESH SECURITY TYPE**  
(CONNAUTH)

**Application ‘user3’ ‘correctpw’**

**Passwords can be checked against the OS or LDAP based on the configuration of the AUTHINFO object.**

**APPLICATION ‘user3’ ‘wr0ngpw’**

**Checklocl/Checkclnt**  
Levels of checking can be independently configured for client attached and local applications:  
NONE, OPTIONAL, REQDADM and REQUIRED

---

**Application ‘user3’ ‘correctpw’**

**Inter process Communications**

**Network Communications**
MQ Security – Channel authentication

- **Allow DNS hostnames in CHLAUTH records**
  - Builds on the MQ 7.1 channel authentication feature
  - Used in TYPE(ADDRESSMAP) instead of an IP address
  - Also as an address restrictor on any other mapping type, instead of an IP address, e.g.
    - SET CHLAUTH('*') TYPE(SSLPEERMAP)
      SSLPEER('CN="David Ware"') ADDRESS('*.ibm.com') MCAUSER(DWARE)
  - Must ensure DNS can reverse look-up IP address -> Hostname ...

- **CHLAUTH also hooks into other security features new in V8**
  - Granular connection authentication control with `CHCKCLNT` on CHLAUTH rules
  - Better Certificate DN filtering with `SSLCERTI` on CHLAUTH rules...
SSL channels

- Modern and legacy CIPHERSPECS
- SHA-2
- Elliptic Curve
- RSA and ECDSA signing algorithms
- Multiple Queue Manager Certificates

- New readme dedicated to SSL
  
  readme.beta3.ssl.txt
SSL channels: CIPHERSPECS

SSL 3 and TLS 1.0 Cipherspecs

- DES_SHA_EXPORT
- DES_SHA_EXPORT1024
- NULL_MD5
- NULL_SHA
- RC2_MD5_EXPORT
- RC4_56_SHA_EXPORT1024
- RC4_MD5_EXPORT
- RC4_MD5_US
- RC4_SHA_US
- TRIPLE_DES_SHA_US
- TLS_RSA_WITH_DES_CBC_SHA
- TLS_RSA_WITH_AES_128_CBC_SHA
- TLS_RSA_WITH_AES_256_CBC_SHA
- TLS_RSA_WITH_3DES_EDE_CBC_SHA

TLS 1.2 Cipherspecs

- TLS_RSA_WITH_NULL_SHA256
- TLS_RSA_WITH_AES_128_CBC_SHA256
- TLS_RSA_WITH_AES_128_GCM_SHA256
- TLS_RSA_WITH_AES_256_CBC_SHA256
- TLS_RSA_WITH_AES_256_GCM_SHA384
- ECDHE_RSA_AES_256_GCM_SHA384
- ECDHE_RSA_AES_128_CBC_SHA256
- ECDHE_RSA_AES_128_GCM_SHA256
- ECDHE_RSA_AES_256_CBC_SHA384
- ECDHE_ECDSA_AES_128_CBC_SHA256
- ECDHE_ECDSA_AES_256_CBC_SHA384
- ECDHE_ECDSA_AES_128_GCM_SHA256
- ECDHE_ECDSA_AES_256_GCM_SHA384
MQ Security – SSL Multiple Certificates

- **Configurable default certificate label for qmgrs and clients**
  - Instead of *cert.pem*
  - `ALTER QMGR CERTLABEL('mycertificatename')`
  - Which uses *mycertificatename.pem* instead

- **Channel-level certificates**
  - To support different business partners using different certificate authorities.
  - For queue managers and C clients
    - Not Java yet, because Java 7 JSSE does not fully support SNI
  - `ALTER CHANNEL ... CERTLABEL('Thischannelcertificate')`
  - For receiver channel support, both ends must be V8
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

- Ease of use
  - Customisable prompt using environment variable
  - New "exit" and "quit" synonyms for "end"

```
$ ls -l runmqsc
-r-xr-xr-x  1 mqm   mqm  25930  06 Mar 04:46 runmqsc

$ export MQPROMPT="MQ +MQ_INSTALLATION_NAME+> "
$ runmqsc -u metaylor QM1
5724-H72 (C) Copyright IBM Corp. 1994, 2014.
Enter password: ******
Starting MQSC for queue manager QM1.
MQ Installation5> DIS QMGR
...
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](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**

- **Full presentation can be seen here:**
  - [http://www.slideshare.net/calanais/ibm-mq-v8-and-jms-20](http://www.slideshare.net/calanais/ibm-mq-v8-and-jms-20)
Security - CHLAUTH

- **Set rules (via MQSC, PCF or Explorer) to permit/deny inbound connections**
  - Inbound clients
  - Inbound message channels

- **CHLAUTH Rules can**
  - Allow a connection
  - Allow a connection and assign an MCAUSER
  - Block a connection
  - Block privileged access
  - Control SSL Peer Name matching

- **CHLAUTH Rules can use any of the following identifying data**
  - IP address
  - SSL/TLS DN
  - Client userid
  - Remote queue manager name
Security - CHLAUTH

- Create CHLAUTH rules using
  - MQSC
  - PCF
  - MQ Explorer
Security - CONNAUTH

- The ability for an application to provide a user ID and password when connecting to MQ

- ALTER QMGR CONNAUTH(USE.PW)
- DEFINE AUTHINFO(USE.PW)
  - AUTHTYPE(xxxxxx)
  - CHKCLNT(REQUIRED)
  - CHKLOCL(OPTIONAL)
- REFRESH SECURITY TYPE(CONNAUTH)
MQI Asynchronous Consume

- A message-driven function or routine called by the Queue Manager when a message is ready to be delivered
- No MQGET needed and no buffer need be provided by the applications
- Fewer resources allocated waiting for a message to arrive
- Enabled using the MQCB and MQCTL calls
More information

- MQ v8 Knowledge Center
- MQ v8 PDF documents
  ftp://public.dhe.ibm.com/software/integration/wmq/docs/V8.0/PDFs/
- davidward@us.ibm.com