

**SupportPac MS0P: WebSphere MQ Explorer –
Extended Management Plug-ins**

Version 7.2.0.0

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WebSphere MQ Development

IBM Hursley

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Take Note!

Before using this document, be sure to read the general information under “Notices”.

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This edition applies to Version 7.2.0.0 of SupportPac MSOP and to all subsequent releases and modifications unless otherwise indicated in new editions.

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Summary of SupportPac Changes

V1.0 Initial version for Events and Statistics

V2.0 (not shipped externally)

- Added Trace Route generation
- Decoded more information from event messages, such as MQRQ values
- Made many output fields more readable, using mixed-case strings

V2.1 (not shipped externally)

- Improved integration with the Eclipse workbench
- Now appears as view with toolbar buttons for save/refresh
- Added "refresh" to rerun a previous operation
- Added icons
- Added "busy" information during processing
- Added timestamp
- Check for full queues

V3.0

- More trees and icons
- Added a "clear" option so that Refresh works better with destructive gets, building up the information throughout the lifetime of the plug-in. The refresh button in the statistics view respects the setting of the "clear" button on the initial dialog.
- "Find" option to search for text in the reports
- Trace Route allows typing a queue name and iteration count, to test cluster workload distribution.

V3.1

- Added graphical view of trace route distribution within a cluster
- All trace route info shown in the same time zone
- Added time taken for trace route to reach destination on single tests
- Added average time taken to each destination on multiple trace route tests
- Fuller decoding of the MQMD in detailed trace route reports
- Moved trace route menu from "queue manager" node to "queues" folder in Explorer tree
- Added preference for whether you are asked for a loop count when queues are selected for trace route from the queue table. (You are always asked when trace route is invoked from the queues menu.)
- Tested on Linux, and improved the GTK look
- Moved "Advance Logfile" to submenu
- Added preference for font size

V3.2

- Added the Command Event component
- Updated to optionally look for Command Events on all platforms, not just z/OS
- Improved some text formatting
- Added filtering to only format messages put inside a time range

V3.2.0.1

- Stop build-up of queue manager connections

V3.2.0.2

- Fix Refresh button

V4.0.0

- New view created to graphically show activity on queues and channels

V7.0.0

- (July 2008) Major update to packaging
- Update for compatibility with WebSphere MQ V7
- First release of documentation in this format
- Remote Administration and CSV plug-ins added to original events and statistics plug-in
- Version number changed to match prerequisite levels of WebSphere MQ Explorer

V7.0.1

- (August 2009) Yet another update to packaging. Now shipped as Linkable feature.
- Removal of precompiled forms of the Command Event Exit as MQ V7.0.1 makes it redundant
- Remote Administration updates to support:
 - Viewing and deletion of FFDC files
 - Controlling multi-instance queue managers, including start, stop and status options
 - Global security settings can be used for Windows machines
 - TCP port number can be overridden for each protocol
 - Preference settings can be exported and imported using MQ Explorer panels
 - Added timeout preference for long-running commands
- CSV Plug-in
 - Update to understand Sets views
- Events and Statistics
 - Automatic discovery of available event queues
 - Configuration event preferences to exclude MQSET
 - Configuration change events preference to show only differences
 - Some cosmetic changes to menu layouts, including making z/OS more consistent
 - Preference settings can be exported and imported using MQ Explorer panels
 - Ability to set maximum activities for trace route operations
 - Ability to specify a remote queue manager for trace route operations
 - Activity viewer now logs to CSV file
- Added QTune utility
- Added MQIDecode utility
- Added OAM log utility (previously SupportPac MS07)

V7.1

- (March 2012) Updated to support MQ V7.1
 - Remote Admin understands multiple installations on a machine
 - Remote Admin supports 64-bit Windows
 - New events and new event queues supported
- Removed command line interface to the event formatter
- QTune updated for V7.1 qfile format
- Preferences for the Event plug-in split into multiple pages
- Added formatter for Application Activity Trace events
- Added Message Manager plug-in
 - Delete selected messages
 - Move/Copy selected messages to another queue
 - Write (browse) selected messages to file

V7.1.0.1

- (July 2012) Documentation of support for MQV7.5
- Remote Admin capabilities for runmqras data collection
- Remote Admin capabilities for supporting File Transfer Agents
- Multiple Installation configuration shown in new table
 - Collect full installation details of sub-components
- Added PubQStat command
- Added introductory video

V7.1.0.2

- (November 2012) Added the Connection Wizard for simple creation of the queues and channels linking two queue managers
- Added Topic Viewer plug-in to show topic objects as a tree
- Moved video content to YouTube

V7.1.0.3

- (March 2013) Restructured plug-ins to split function into separate components
- Bug fixes in topic viewer
- CSV plugin extended to pop-out windows
- Moved plug-in preferences to a grouped set of pages

V7.2.0.0

- (August 2013) Message Manager can write files in qload format
- CSV external preference on whether to support pop-out windows
- Save queue manager configuration
- User configuration for generating MSOP internal trace
- Bug fixes in remote admin for multi-version installations

Introduction

This SupportPac provides a set of plug-ins for the MQ Explorer, extending its capabilities for configuration of queue managers, and displaying additional information about those queue managers.

Plug-ins

- The original plug-in written for this SupportPac provides a mechanism to format Event messages; it can aggregate the Statistics and Accounting reports generated by MQ from Version 6 onwards.
- There is a plug-in to display current activity on queues and channels as a simple graph.
- The package also implements the "Trace Route" function, reporting on the route that messages take through a network.
- Another plug-in extends the Explorer's ability to manage remote servers, including support for starting and stopping queue managers on those remote machines. Windows, UNIX and Linux systems can be controlled through this interface. Many "command-line only" tasks can be accomplished through this remote management facility.
- A plug-in to allow information shown in many of the Explorer's tables, such as the list of queues defined on a queue manager, to be saved to a CSV (comma-separated value) file where it can be processed by programs such as spreadsheets.
- Another plug-in extends the Message Browser, to allow messages to be deleted, moved to another queue, or written to a file.
- A Wizard makes it simple to define connections between two queue managers.
- The topic objects defined on a queue manager can be displayed in a tree structure, to make it easier to see the relationships between them.
- Queue Manager configurations can be extracted using the `dmpmqcfg` command. This is accessible via the Remote Admin plug-in for queue managers at V7.1 or later, or via the main list of queue managers in the Explorer tree, if the `dmpmqcfg` command is part of that Explorer installation.
- All the plug-ins can now generate trace to a user-defined file. This trace is intended to assist in debugging any issues found with the MSOP plug-ins.

Other components

The SupportPac also provides a (now-redundant) API Exit that can be used to log all commands sent to the Command Server on the Distributed platforms, and an MQSC script to convert event messages into publications.

Finally, some "extras" are

- a utility to tune buffer sizes used internally for queues; this can improve MQ performance
- an installable service that can be used to log authorization requests
- a tool to decode MQI options into symbolic names
- a tool to collect queue statistics and re-publish them in XML format

Prerequisite Software

The plugins in this package can only be installed in the MQ Explorer that is part of MQ V7.1 or V7.5 but it can still manage connections to MQ V6 and V7.0. Some features are only available for specific managed platforms; these are noted in the sections that follow. For example, the Accounting and Statistics messages are only generated by the Distributed platforms, not on z/OS.

The minimum level of MQ Explorer is V7.1.0.0, installed either from product CDs or via SupportPac MS0T.

You do not need the MQ Explorer in order to use the mqidecode or qtune tools; these just require a Java runtime, at least the Java 6 level. Also for mqidecode, you need access to the MQ 7.1 (or later) client jar files.

Previous Versions of MS0P

If you previously installed MS0P V7.0 into this version of the MQ Explorer, it is recommended that you delete that version. Find the directory into which you installed the code and delete the directory or the MS0P plug-ins and their subdirectories. Any preferences you have set from the V7.0 MS0P release will be maintained and carried forward when the new version is installed.

MQ V7.1 supports multiple installed versions, and as part of this can migrate preferences from older workspaces when you install a fresh copy of the MQ Explorer. This SupportPac's preferences are included in the migration process.

For reference, the plug-in directories under the eclipse tree are

```
features\com.ibm.mq.explorer.ms0p.feature_7.*
plugins\com.ibm.mq.explorer.ms0p.csv_7.*
plugins\com.ibm.mq.explorer.ms0p.events_7.*
plugins\com.ibm.mq.explorer.remote.admin.rxa_2.2.0
plugins\com.ibm.mq.explorer.remote.admin_7.*
```

Installation

This SupportPac ships as a zip file that can be unpacked and then linked into any Eclipse runtime that has the MQ Explorer V7.1 installed. There are a variety of mechanisms for adding plug-ins to an existing Eclipse, but the simplest way is to use the dropins directory.

Unpacking the Distribution

All you need to do is unpack the zip file into the dropins directory for the Eclipse instance that you are using. For example, unzip files into

```
C:\Program Files\IBM\WebSphere MQ\MQExplorer\eclipse\dropins\MSOP
```

Eclipse scans this directory on startup.

Alternative mechanism: use links directory

Unzip the image into any other directory on your system.

Edit the MSOP.link file so that it contains the path into which you have unpacked the code. The link file should then contain something like

```
path=C:/Program Files/IBM/WebSphere MQ/MQExplorer/eclipse/MSOP
```

Notice that the entry in the link file has the directory separators as forward slash characters, the Unix standard. This works even on Windows – Eclipse knows how to parse it.

Then copy the modified file into the links subdirectory for your Eclipse installation. For example, copy it into:

```
C:\Program Files\IBM\WebSphere MQ\MQExplorer\eclipse\links
```

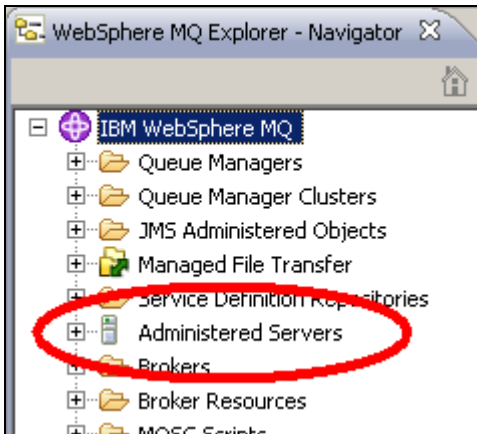
There may be other link files in that directory which point to other extensions you have installed. You can look at those files to check you have the correct format.

Restart the Explorer

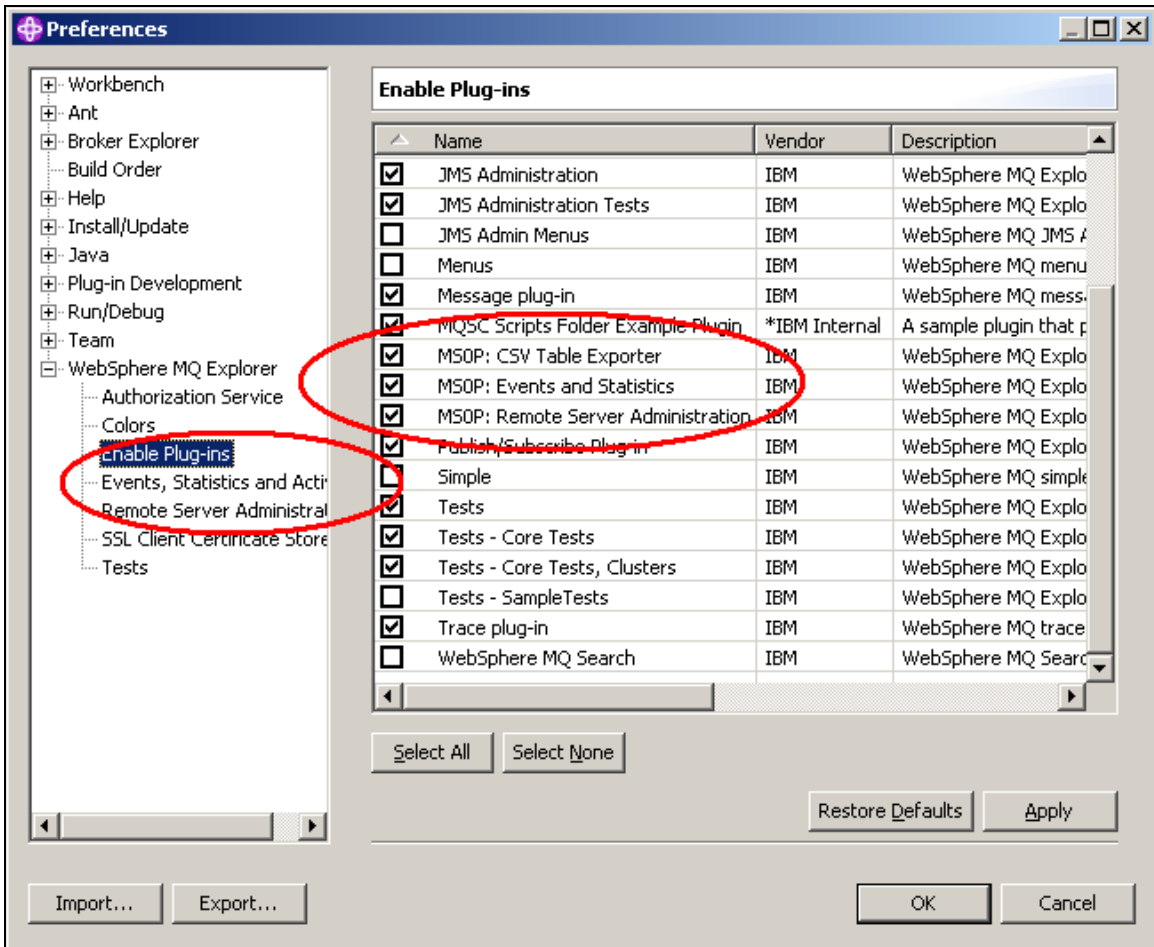
Restart the Explorer.

Verify the Installation

After MQ Explorer restarts, if the installation is successful, there should be one immediately visible change. There is now an additional folder in the MQ Explorer Navigator view, called **Administered Servers**.



A second method of verification is to confirm that there is an entry in the MQ Explorer Preferences under Enable Plug-ins for the MSOP plug-ins.



Debugging Installation Problems

There are a few common problems with installing plug-ins to Eclipse that you might hit. This section tries to help with solving them.

The Eclipse error log can be very helpful. This can be found through two routes. If you are running Eclipse in Workbench mode, then the error log is simply a view that can be opened inside the Workbench. Use the Windows -> Show View -> Other ... menu, and then select the Error Log from within the PDE Runtime category. Alternatively, use the “Help/About MQ Explorer” menu item, select Installation Details, then the Configuration tab, and finally View Error Log. The error log may show missing prerequisites. If you can't find these views, then the error log is stored in <workspace>/.metadata/.log. On Windows, the default workspace is at “C:\Documents and Settings\<userid>\Application Data\IBM\MQ Explorer\.metadata”

To investigate the configuration more completely, the Configuration Details window can be copied to a clipboard and from there into a temporary file or email which makes it easier to look at the whole Eclipse setup. You ought to be able to find references to MSOP in that log; the “configured sites” section should show that the link file has been read.

If the error log shows Java MissingClass error messages, then it's possible that you are not using the correct level of JRE. MSOP requires a JRE 6 level, as shipped with MQ.

Eclipse might need to have some internal caches refreshed in order to pick up changed configurations. This can normally be done with the -c or -i option to the runmqcfg or strmqcfcfg commands. Entering “strmqcfcfg -i” does not restart Eclipse; it just causes it to reread configuration information. So after the command returns to the prompt, you can issue “strmqcfcfg” with no parameters.

Possible Eclipse bug when upgrading MSOP

One thing I've had reported is that Eclipse may get “confused” when upgrading or replacing some extensions. It seems to lose knowledge of the plug-in and will not configure it. The best way I've found to deal with that is completely remove the MSOP directory, restart Explorer so it clears its knowledge of the SupportPac, and then install the code and restart Explorer again.

This appears to be an Eclipse bug, but I couldn't find a guaranteed fix to it; this workaround does seem to work however.

Alternative installation mechanisms

Eclipse has a number of ways of installing extensions; you might prefer to use those if you are experienced with Eclipse configuration. Availability of these approaches can depend on whether you are using the RCP version of the MQ Explorer shipped with MQ, or if you are extending a full workbench Eclipse instance with both MQ and MSOP. The link file described above is an easy way that is known to work; but feel free to use different ways to install if you are comfortable with Eclipse designs.

Introductory Videos – now on YouTube

A previous version of this SupportPac included an introductory video. In the interests of disk space and download time, that video material has now been moved to YouTube, along with some newer content.

Go to <http://www.youtube.com/playlist?list=PLEE594DC49986AB67> to see the MS0P videos. You can then subscribe to updates to this playlist.

Not all aspects of the SupportPac are shown in these videos; it might be expanded in future. Please let me know if it's a good idea.

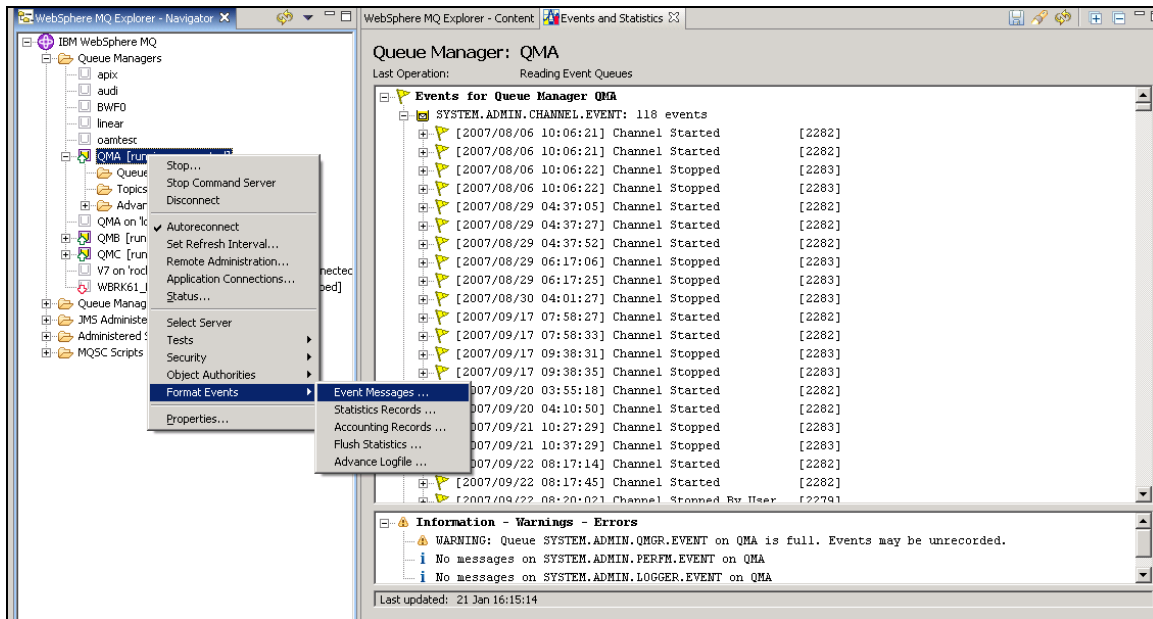
Events and Statistics

Queue Managers can be configured to generate a range of event messages to show when something “interesting” has occurred. For example, it can show authorisation failures, or the start and stop of channels. Command and configuration events show what has changed in the system and who changed it.

The Events and the Activity Viewer panels will be created and displayed when needed. You can also create them in advance, perhaps to design a custom perspective. To do this you must first select the “Window - Reset Perspective” when in the MQ Explorer perspective, and then these MSOP-contributed views will appear as options on the “Window – Show View” menu item.

Events

This plug-in takes raw event messages from their queues, and formats them into something readable. For a full description of all events and how to configure the queue manager to generate them read the Monitoring MQ section of the InfoCenter.



Expanding any of the messages gives all the detailed information about the event. Buttons on the toolbar give the ability to expand (+) or collapse (-) all of the events in the tree with a single click.

[-]	[2007/09/22 08:20:02] Channel Stopped By User	[2279]
	Event Type	: Channel
	Queue Mgr Name	: QMA
	Channel Name	: CLUS.TO.QMA
	Reason Qualifier	: Channel Stopped Disabled [10]
[-]	[2007/09/22 08:22:47] Channel Stopped	[2283]
	Event Type	: Channel
	Queue Mgr Name	: QMA
	Channel Name	: CLUS.TO.QMA
	Connection Name	: 127.0.0.1
	Reason Qualifier	: Channel Stopped Ok [7]
	Error Id	: 0x10009528
	Aux Error Data Int 1	: 0
	Aux Error Data Int 2	: 0
	Aux Error Data Str 1	: CLUS.TO.QMA
	Aux Error Data Str 2	:
	Aux Error Data Str 3	:
[+]	[2007/09/22 08:23:12] Channel Started	[2282]

Accounting and Statistics

Introduced in MQ V6 on the Distributed platforms, Accounting and Statistics events provide information about the activity of the queue manager and about applications.

Statistics and Accounting events are aggregated by this program. That means that there is just a single Statistics report for each queue accessed during the period for which the events are available. Contrast this with the amqsmn sample program, which prints the events individually.

Statistics show queue manager operations, such as how many messages have been put or got in each collection interval. A typical use of Statistics events would be to monitor any trends in increasing activity of a queue manager, for capacity planning.

Accounting and Statistics events are written at intervals, typically every 30 minutes. If you want to force the information to be flushed immediately, then select the "Flush Statistics" action, when right-clicking on the queue manager.

A typical set of statistics looks like this:

Queue Manager: QMA
 Last Operation: Reading from SYSTEM.ADMIN.STATISTICS.QUEUE

Statistics for Queue Manager QMA

Not showing TDQ details
 From 2007-10-23 09.12.10 to 2007-10-25 01.56.25

- Connections : 6839
- Disconnects : 6838
- Actions on Queues

Verb	Success	Fail
Open	93585	0
Close	93585	0
Inq	747578	0
Set	2539	0
- Actions on Queue Manager
- Actions on Channels
- Actions on Listeners
- Other Actions
- Messages
- Used Queue Count: 136**
 - Queue Name : QMB
 - Queue Name : SYSTEM.ADMIN.ACCOUNTING.QUEUE
 - Queue Name : SYSTEM.ADMIN.CHANNEL.EVENT
 - Queue Name : SYSTEM.ADMIN.COMMAND.QUEUE
 - Queue Name : SYSTEM.ADMIN.PERFM.EVENT

Information - Warnings - Errors

WARNING: Queue SYSTEM.ADMIN.STATISTICS.QUEUE on QMA is full. Events may be unrecorded.

Last updated: 21 Jan 16:27:38

Accounting events show the activity of each application that has been connected to the queue manager, again showing how many messages have been put or got, and which queues have been accessed. A typical use of these events would be for chargeback of processing costs from the enterprise infrastructure managers to the application owner.

There is one report for each identifiable application and a summary of the activity for each queue accessed by the application.

WebSphere MQ Explorer - Content Events and Statistics

Queue Manager: QMA

Last Operation: Reading from SYSTEM.ADMIN.ACCOUNTING.QUEUE

Application Accounting for Queue Manager QMA

Not showing TDQ details

Active Application Count : 4

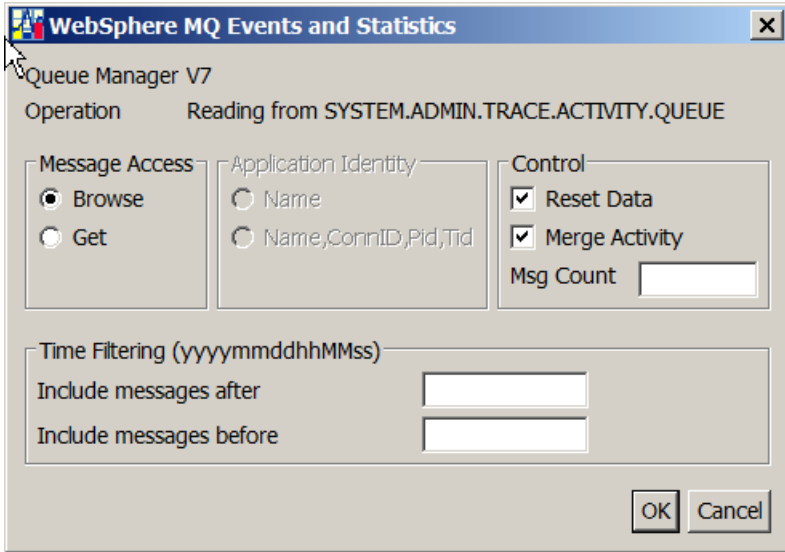
- Application : <unknown>
- Application : javaw.exe
 - From 2008-01-20 22.20.30 to 2008-01-21 05.15.56
 - Full Name : se\eclipse\jre\bin\javaw.exe
 - Userid : metaylor
 - Instances : 892
 - First Connect : before start of period
 - Last Disconnect : 2008-01-21 05.15.56
 - Last Disc Type : Normal
 - Actions on Queues
 - Actions on Queue Manager
 - Other Actions
 - Messages

Type	Non-persistent	Persistent
Put	: 27470	0
Put1	: 0	0
Get	: 38971	0
Browse	: 0	0
Put Bytes	: 2345076	0
Get Bytes	: 47127464	0
Browse Bytes	: 0	0
 - Number of Queues : 7
 - Queue Name : SYSTEM.ADMIN.COMMAND.QUEUE
 - Temporary Dynamic Queue Count: 6

Two alternatives are available to identify and separate unique applications:

- In method 1 a combination of the ConnectionId, program name, process id and thread id is taken as the key
- In method 2 only the 28-character program name (including any available directory information) is used as the key.

The plug-in allows you to select which of these to use. The dialog also allows you to select how many messages to process from the input queue; leaving this blank will cause all messages to be read.

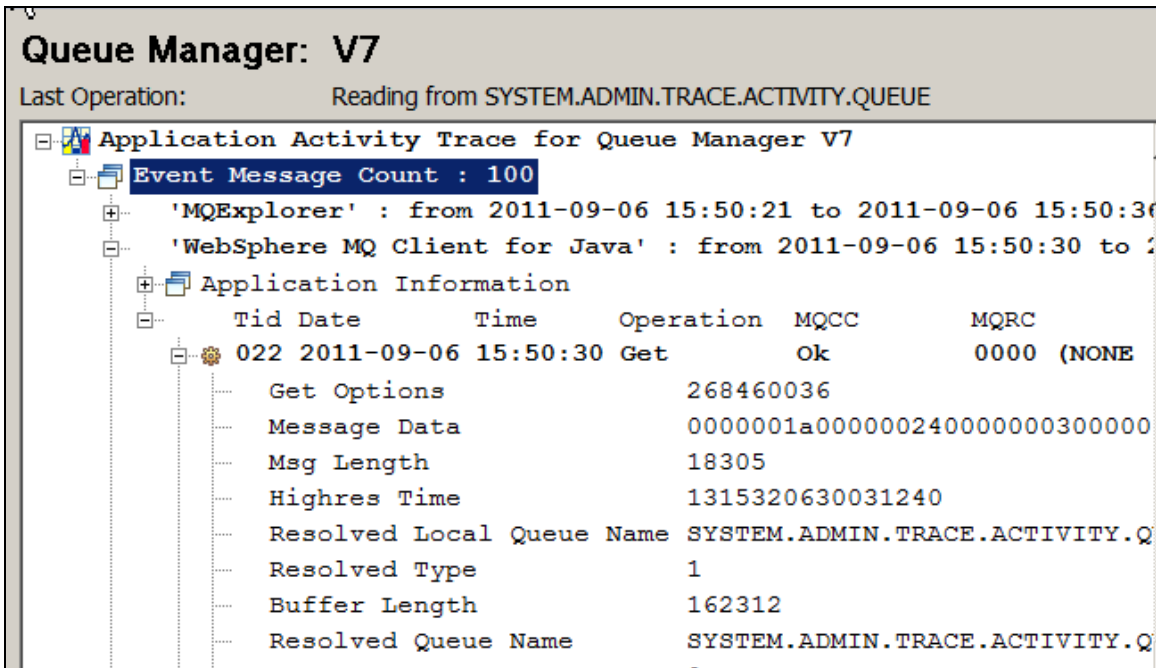


Selecting “Save” from this view’s toolbar (📁) writes the information as a text file; selecting “Find” (🔍) allows you to find a piece of text such as a channel or queue name. The “Refresh” button (🔄) reruns the whole report with the same parameters as previously.

Several reports - for example statistics from one queue manager and accounting for a different queue manager - can be viewed in the panel at the same time, by running a new report and deselecting the "clear" button.

Application Activity Trace

New with MQ V7.1 on the Distributed platforms is the ability to generate traces of the behaviour of an application, and write that trace as event messages. These messages can be formatted by this plug-in and displayed in the same way as other events.



These events may include details of every MQI call including the contents of various parameter structures. The level of detail that is captured is controlled by the mqat.ini file associated with each queue manager.

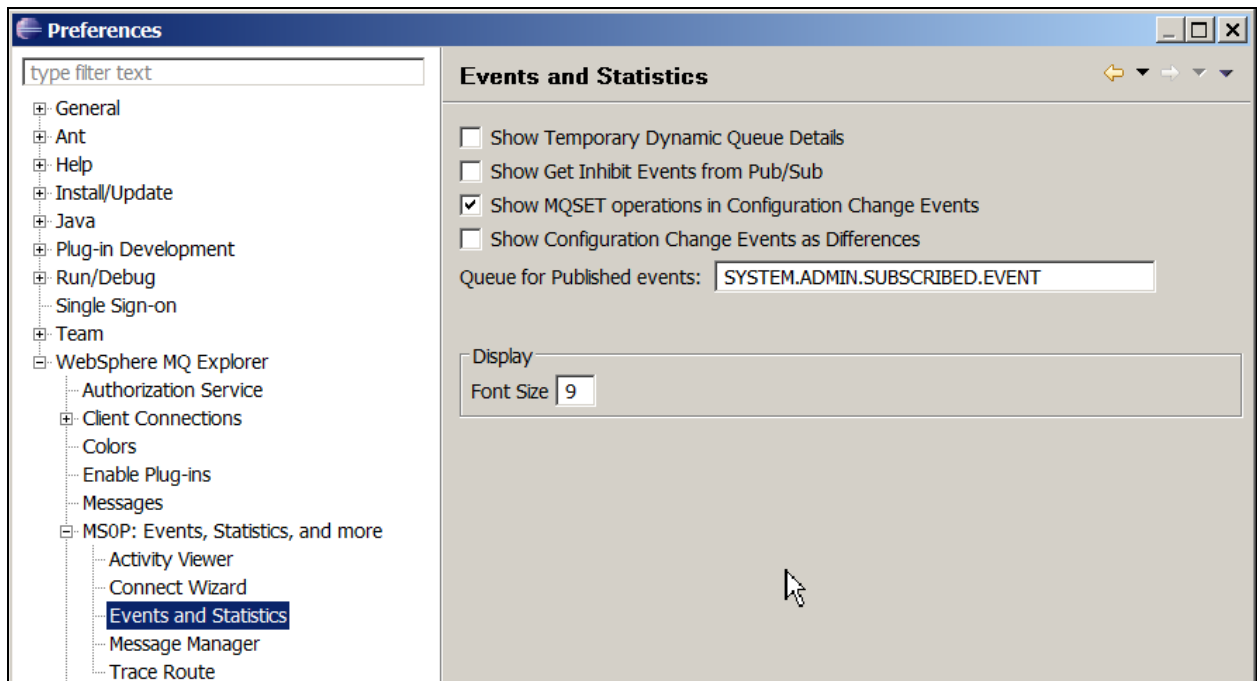
The “merge activity” option on the formatting dialog is only available when working with these application activity reports. The default option is to select this button, and attempt to associate chains of report messages as part of the same application; when it is not selected, each report message is treated as a different application.

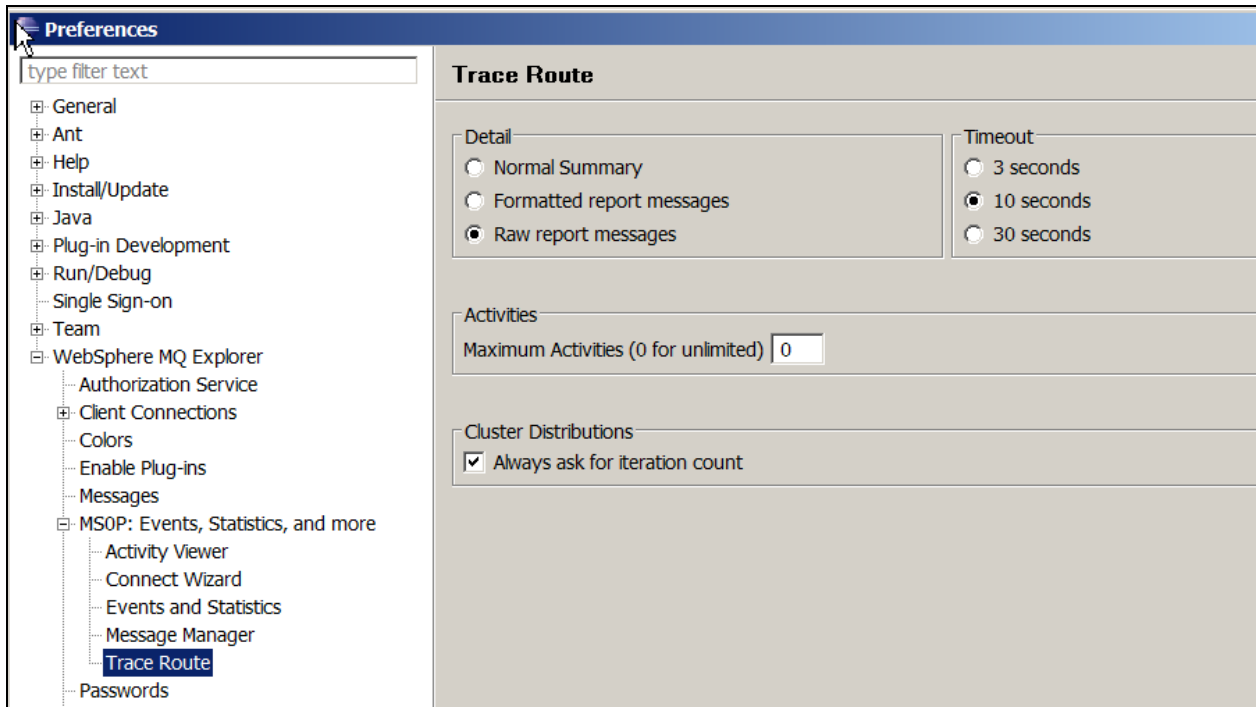
Preferences

A set of Preferences dialogs inside the main MQ Explorer preferences category permits configuration of whether or not to include details of activity on Temporary Dynamic Queues. Not displaying TDQ details can improve performance of the reports as there may be a lot less formatting required.

The publish/subscribe component of MQ will occasionally set its control queues to Get Disabled as part of a health-check process. This is nothing to worry about, but it can cause excessive event messages to appear when these queues are accessed; one of the preference settings makes it possible to hide these events during display. It is particularly noticeable when using the MQ V6 publish/subscribe broker; the V7 engine behaves differently here.

Two other preferences relate to Configuration events. One of these allows you to exclude MQSET operations from the display; some internal changes are made this way (for example when channels start and stop) and you may find these events get in the way of more useful information. The other configuration event preference is to show post-change events in truncated form, only showing the attributes that are different from the pre-change version of the object.





Preference settings can be exported and imported from the MQ Explorer, so they can be copied to other systems.

Publication of Event Messages

MQ V7 allows queues to be automatically redirected as publications on a topic. This means that there can now be more than one consumer for messages that previously could only be read by a single application. It is particularly helpful for event messages, where there might be several management tools that want to deal with the events. Previously there had to be a level of cooperation between the tools, with a message being passed between them. Now, all tools can be given their own copy of a message. An MQSC script is included in this SupportPac that creates a simple pub/sub flow for event messages by deleting the regular queues and replacing them with aliases. All event messages end up on a new queue called `SYSTEM.ADMIN.SUBSCRIBED.EVENT`. You can use the script as-is, or modify it for more complex definitions. The GUI component of the SupportPac is coded to recognise this new event queue and will format events found on it. A preference value allows you to globally change the name of this subscription queue if you use a different name, so the plug-in will look at an alternative queue if it exists.

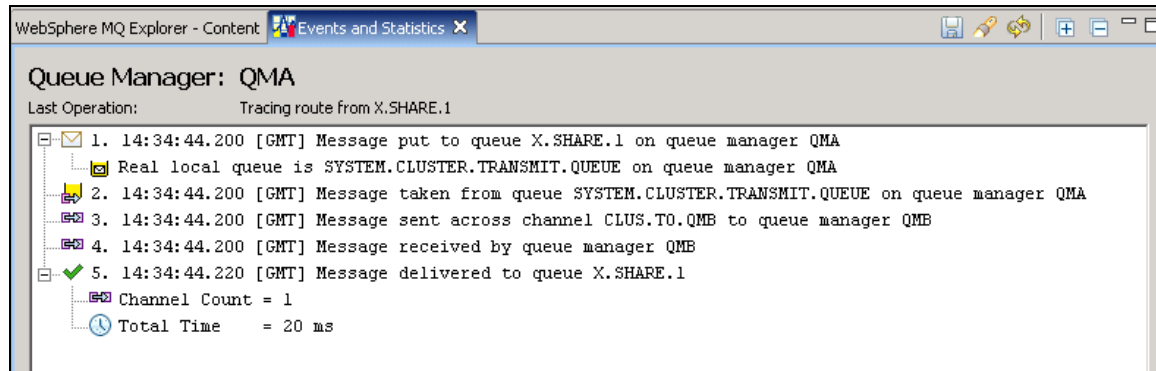
Other Menu Items

This plug-in allows you to force the queue manager to switch to using a new log file, which will cause generation of Logger events if they are enabled. This only works for queue managers using linear logging.

It also allows you to force generation of the Configuration events, describing all the attributes of all the objects on the queue manager. This is equivalent to issuing the “`RESET QMGR TYPE(CONFIGEV)`” command.

Trace Route

The Trace Route and Activity Reports feature in MQ can be used to see the route that a message takes through a network of interconnected queue managers. It shows transmission queues, queue managers and channel names through which the message passes. This can be used to check, for example, that REMOTEQ definitions are correctly resolving the final destination.



The final step shown in this picture is of a message being successfully delivered to a destination queue on a remote queue manager. If there is something wrong with the configured path, then you will see an error as the final stage. The message might have been sent to a dead-letter queue; it might have expired when channels do not start; the reports might not have had a valid return path to the originating queue manager.

Selecting “Save” from this view’s toolbar (📄) writes the information as a text file; selecting “Find” (🔍) allows you to find a piece of text such as a channel or queue name. The “Refresh” button (🔄) reruns the whole trace; this can be useful when you want to see if messages put to a clustered queue are being distributed as expected, or if you have made a configuration change.

There are many options possible for collecting this report information; the SupportPac assumes the simplest and default configuration. It expects there to be a reply path from each queue manager in the network to the originating system, and that the queue managers are set to permit activity reports to be sent to the reply queue.

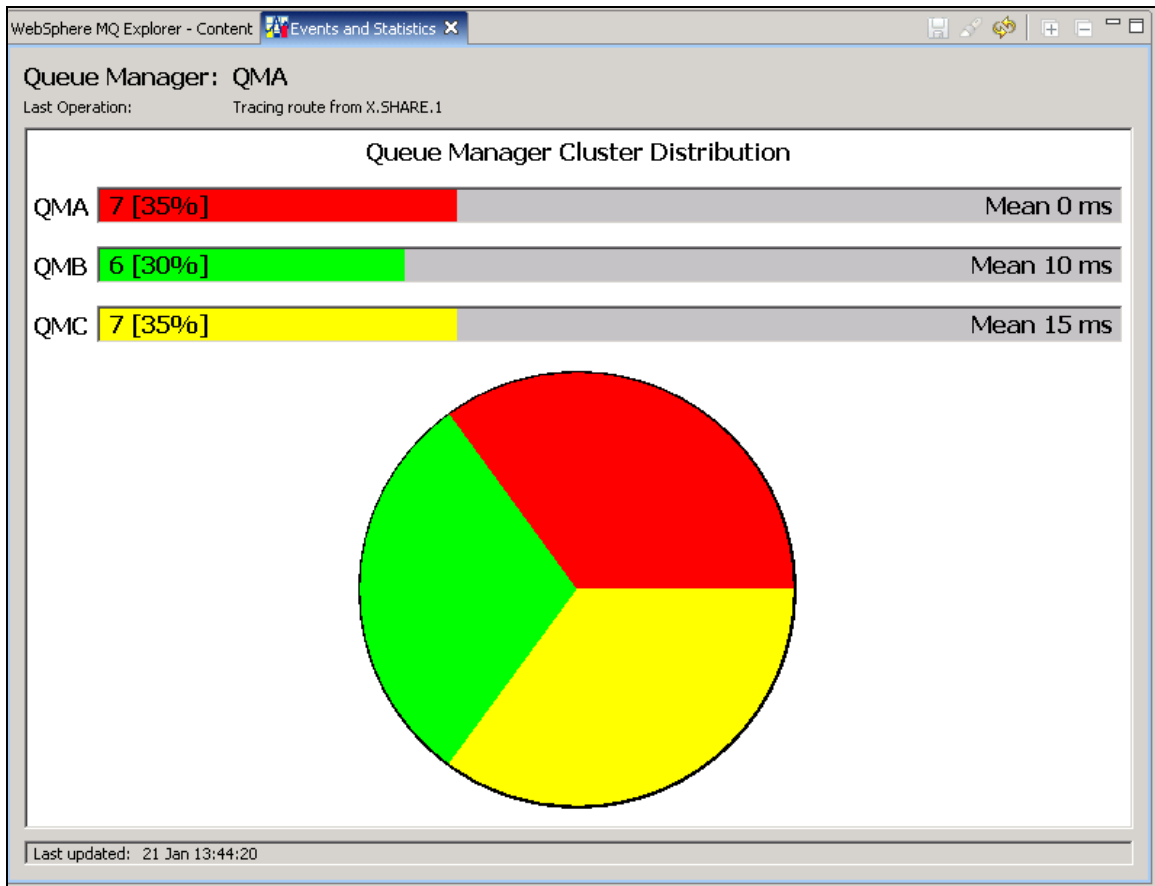
The tracing message generated by this SupportPac is non-persistent and will expire after a configurable amount of time. It is also discarded when it reaches its final destination, so no real application will be able to retrieve it. For greater flexibility, including parsing of previously-generated or collected reports look at the dspmqtrc command, part of MQ on the Distributed platforms.

If there is something wrong with your network or configuration - for example a channel is stopped, or there is no reply path - the reported information will show as far as it can, and then stop. If the message passes through an older version of MQ, such as V5.3, which cannot generate the reports, this will be shown as "missing information".

Although you can put a trace route message to a local queue (or an alias that points to a local queue) you will not get much information in response. It's most useful when pointed at a queue definition that goes through a transmission queue to somewhere else.

Selecting the trace-route option from the "queues" folder in the Navigator allows you to type in the name of a queue such as a clustered queue which is not yet known on that queue manager. Entering a queue manager name directs the message towards the specific queue manager from the currently-connected queue manager.

You can also, from here, ask for multiple traces to be done. That allows validation of the cluster workload configuration, as a summary is shown of which queue managers received the test message. A pie chart is displayed, showing the distribution. If you prefer to see that information as text, there is a sash control at the top of the pane to make a second pane visible.



Preferences

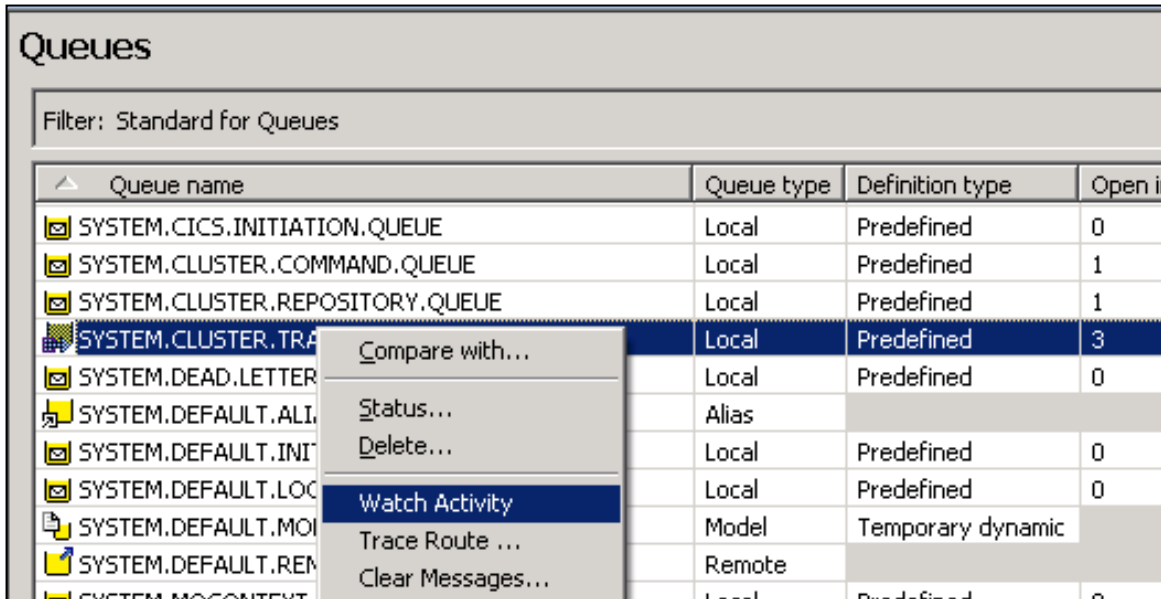
Several options for the behaviour of the Trace Route aspect of the Events, Statistics and Activity plug-in can be tuned in its Preference panel.

1. The timeout used when waiting for a reply message. By default this is set to 3 seconds but it can be increased to 30 seconds.
2. The amount of information when a single trace operation is done can be changed. The default behaviour is to show just the summary of each phase, but it can also be configured to print the individual report messages sent back from each queue manager both in a “decoded” format, and in a raw format.
3. When a queue is selected from the list of queues in the content view, the default behaviour is to send a single message to that queue and report on its path. But you can change this so that you are always asked how many messages to send. This is useful if you are frequently checking the paths for clustered queues.
4. The maximum activity count permitted for this trace operation. If the maximum is exceeded, then the message is not forwarded to any further processing. This is intended to stop tracing through

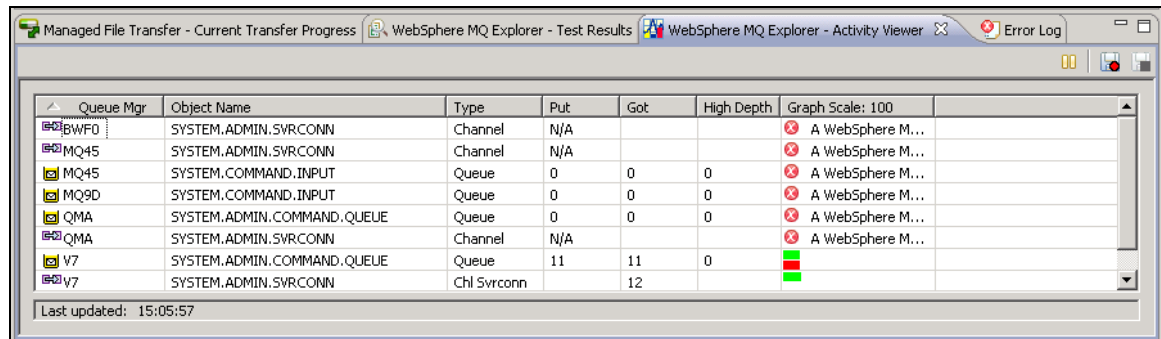
infinite loops in the network. The trace message will normally end up on a dead letter queue which would be seen in the flow. If you leave the value at 0 (the default, for “unlimited”), then this SupportPac imposes a maximum of 1000 activities.

Real-time Activity Viewer

You can watch current activity of a channel or queue by selecting the "Watch Activity" menu item.



This creates a new view, showing a table including a bar chart, of the number of messages passing through the system. The view is automatically opened when you select this menu item; to open it manually you can use the Eclipse "Window > Show View > Other ..." menu action. Columns can be sorted by clicking on the header text.



For monitoring queues, this uses the "RESET QSTATS" command which can only be sensibly used by one application at a time. Do not use the activity viewer if you have other monitoring tools that use this command as the monitors would confuse each other. The queue information includes the number of messages put (shown in green) and got (shown in red) in the last interval, along with the highest depth reached on the queue during that interval.

For channels, it uses the "DISPLAY CHSTATUS CURRENT MSGS" command to show the number of messages transferred in the last interval. If more than one instance of the channel is running, for example a shared RCVR channel, then the number shown is the aggregate of all instances. For sending channels, the GOT column shows the number of messages removed from the transmission queue; for receiving channels, the PUT column shows the number of messages delivered to target queues. For SVRCONN channels it

shows the number of MQI calls made by a client program. In this view, “N/A” means that the information is not available, for example when the channel is stopped.



The reporting interval can be tuned from the “WebSphere MQ Explorer > Events, Statistics and Activity” Preferences panel. By default this interval is set to 60 seconds. The colours for the bars can also be set from this Preferences panel. Collection of the numbers can be temporarily suspended by selecting the Pause button; press the Resume/Play button to continue.

The graph automatically rescales based on the amount of activity on the queues or channels. The column heading shows what 100% activity would be for the current scale. There is a “dampening” effect on the rescaling so it is not continually flipping between two scales, giving some stability in the bar lengths.

The objects are only active for queue managers that are connected in the main Explorer panel. Disconnecting from a queue manager will cause this view to also disconnect and show an “unavailable” error message; reconnecting will restart the monitoring.

The list of objects that are currently being watched can be manually saved and then reloaded when the view is opened. Use a right click within the view to access the save/restore actions. The list can also be saved and distributed using the Import/Export options of the Explorer.

Recording Activity

While the activity is being displayed on the screen, a historical record can also be recorded in a CSV-format file. Select the “Record to File” button  to enable this function. The default filename is activity.csv but this can be overridden in the dialog. The “Stop Recording” button  will close the report file. When collection is suspended in the graphical view, it is also suspended from being recorded in the CSV file.

An example CSV file looks like this:

```
Date,Queue Mgr, Object Name,Type,Put,Got,High Depth
2009-07-17 14:35:37,BWF0,SYSTEM.ADMIN.SVRCONN,Chl Svrconn,,5,
2009-07-17 14:35:37,V7,SYSTEM.ADMIN.COMMAND.QUEUE,Queue,8,8,0
2009-07-17 14:35:37,V7,SYSTEM.ADMIN.SVRCONN,Chl Svrconn,,6,
2009-07-17 14:35:42,BWF0,SYSTEM.ADMIN.SVRCONN,Chl Svrconn,,5,
2009-07-17 14:35:42,V7,SYSTEM.ADMIN.COMMAND.QUEUE,Queue,8,8,0
2009-07-17 14:35:42,V7,SYSTEM.ADMIN.SVRCONN,Chl Svrconn,,6,
2009-07-17 14:35:47,BWF0,SYSTEM.ADMIN.SVRCONN,Chl Svrconn,,6,
2009-07-17 14:35:47,V7,SYSTEM.ADMIN.COMMAND.QUEUE,Queue,11,11,0
2009-07-17 14:35:47,V7,SYSTEM.ADMIN.SVRCONN,Chl Svrconn,,16,
2009-07-17 14:35:52,BWF0,SYSTEM.ADMIN.SVRCONN,Chl Svrconn,,13,
```

This file can then be imported into other tools such as a spreadsheet.


```

Browsing from Queue: MM.TEST.IN

** Origin Context
PutApplType      : 0
PutApplName      : 'PutWMQMessage6-0'
ApplOriginData   : ' '
PutDate          : ' ' PutTime : ' '

GroupId : 0x0000000000000000000000000000000000000000000000000000000000000000
MsgSeqNumber     : 1
Offset           : 0
MsgFlags         : 0
OriginalLength   : Unknown

**** MessageProperties ****

None

**** Headers ****

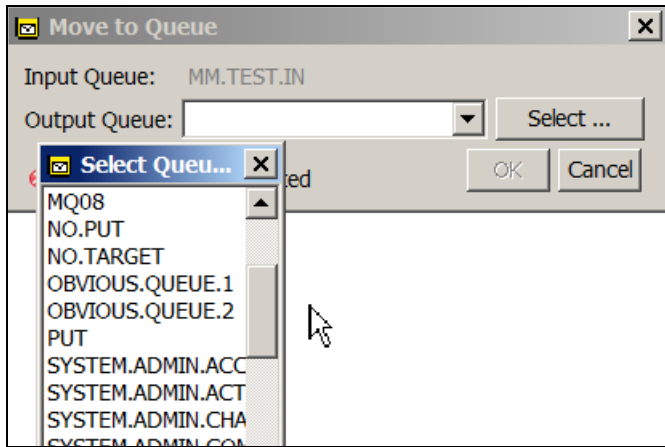
MQCIH
StrucId          : 'CIH '
Version          : 2          (0x2)
StrucLength      : 180       (0xB4)
Encoding         : 273       (0x111)
CodedCharSetId  : 819       (0x333)
Format           : 'MQIMS '
Flags            : 0          (0x0)
ReturnCode       : 0          (0x0)
CompCode         : 0          (0x0)
Reason           : 0          (0x0) MQRC_NONE
UOWControl       : 0          (0x0)
GetWaitInterval : 0          (0x0)
LinkType         : 0          (0x0)
OutputDataLength: -1        (0xFFFFFFFF)
FacilityKeepTime: 0          (0x0)
ADSDescriptor    : 0          (0x0)
ConversationalTa: 0          (0x0)
TaskEndStatus    : 0          (0x0)
Facility         :
00000000: 0000 0000 0000 0000 '.....'

```

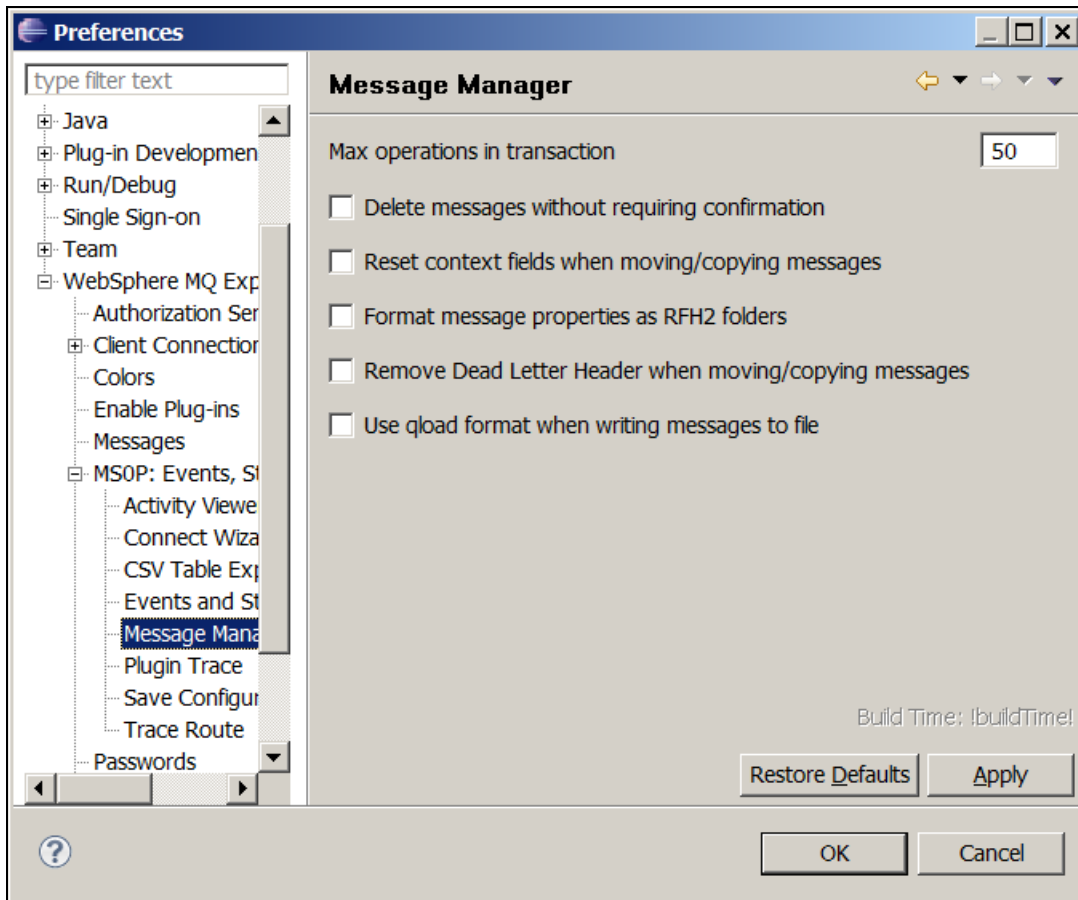
Event messages are parsed into PCF parameters, but the parameters are not decoded into readable strings. If you want to fully-format event messages, then you can use other functions within MSOP.

The Explorer message browser is typically configured to have a maximum limit of the number of messages shown in its panels; for that reason most of the Message Manager functions can be selected to run against ALL messages on the queue even if those messages are not currently being displayed. However, the DELETE operation can only be done performed against explicitly selected messages, to try to minimise the risk of mistakenly deleting all messages.

Messages can be copied from one queue to another, or moved. These operations are done in transactional groups; the default batch size is 50 messages. The target queue can be typed in directly, or selected from a list.



Message Manager Preferences



The preferences for this plug-in allow you to determine how to display and process messages.

- Reset context fields when moving/copying messages

When messages are moved or copied between queues, this option allows you to specify whether to preserve the original context fields. You must have appropriate permissions (setid, passid) for

context-setting to be allowed; otherwise you can copy the message data without completely preserving the message context.

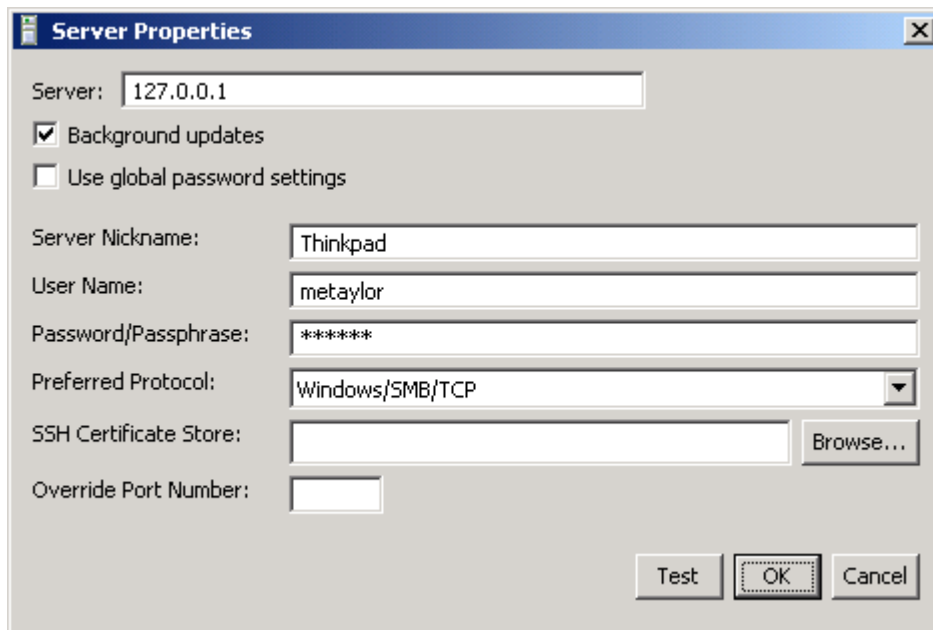
- If you are reading messages from a dead-letter queue, then you can choose whether or not to preserve the DLH structure. Removing the DLH may allow you to redirect the message to a queue where an application can then directly process the message.
- When writing messages to a file, you can choose to save them in the same format that is used by the qload utility. This makes it easy to use the GUI to select some messages, and then use a command line tool to later recreate those selected messages.

Administration of Remote Servers

This plug-in provides a mechanism for the MQ Explorer to control queue managers on machines other than the local one. For example, you can now discover, start and stop queue managers from a central console, integrated with the rest of the MQ Explorer tooling. Access to Windows, UNIX and Linux platforms is available from this plug-in.

Setting up the plug-in

1. Add each server to be administered. You can use either an IP address or hostname to specify the server.
2. You can also set a nickname for each server. This nickname determines the order of the nodes in the tree, so can be used to group related machines regardless of their hostname. Nicknames must be unique.
3. For each server, configure the connection protocol and parameters. Typically this will be a userid and password. There is a Test Connection button to validate these parameters.



The screenshot shows a 'Server Properties' dialog box with the following fields and values:

- Server: 127.0.0.1
- Background updates
- Use global password settings
- Server Nickname: Thinkpad
- User Name: metaylor
- Password/Passphrase: *****
- Preferred Protocol: Windows/SMB/TCP (dropdown menu)
- SSH Certificate Store: [empty] Browse...
- Override Port Number: [empty]

Buttons at the bottom: Test, OK, Cancel.

4. Optionally specify the preferred protocol/platform for this server. If you do not select one, then the plug-in will try various alternatives to pick the most appropriate.

The plug-in supports a range of communications protocols for connecting to the server. When you define a server, you can leave the protocol as "unknown", and the plug-in attempts to select the most appropriate protocol. However if the server is a Windows system, you should manually select one of the two Windows protocols (SMB over either TCP or Netbios) as it is possible for the protocol handlers to get confused by a Windows system running SSH or REXEC. SSH, RSH and REXEC are not supported for connection to a Windows system.

See the notes at the end of this document for some hints on working with Windows systems.

- Each protocol has a default TCP port number that is normally used; if you want to use a different port number (most commonly done for sshd), then you can override it on this panel. This is not related to the port numbers used by MQ's TCP/IP Listeners.
- You should now be able to list the queue managers on the machine, and start and stop them.

Queue Managers on rockall								
Name	Listener ...	QMID	Admin O...	State	Instances	Standby	Version	Installation
ATS_ADX	3414	ATS_ADX_2011-...	Defined	Runni...	Unknown	Not perm...	7.1.0.0	Installation1
INST2	Unknown	Unknown	Unknown	Stopp...	Unknown	N/A	7.1.0.0	Installation2
linear	1414	linear_2011-11-...	Defined	Runni...	Unknown	Not perm...	7.1.0.0	Installation1
oamtest	3415	oamtest_2011-...	Undefined	Runni...	Unknown	Not perm...	7.1.0.0	Installation1
V7	2414	V7_2011-11-29...	Defined	Runni...	Unknown	Permitted	7.1.0.0	Installation1
V72_A	Unknown	Unknown	Unknown	Stopp...	Unknown	N/A	7.2.0.0	Installation3
V7B	2415	V7B_2011-11-2...	Defined	Runni...	Unknown	Not perm...	7.1.0.0	Installation1
V7C	Unknown	Unknown	Unknown	Stopp...	Unknown	N/A	7.1.0.0	Installation1

Note that you can now see the version and installation associated with each queue manager. (This picture shows a V7.2 – that was a dummy I created especially for testing, not a promise that there will be something called V7.2!)

The multi-version support in this plugin will show only those installations that contain the server component – it checks for the existence of the dspmq command – so if you have installed, for example, just the MQ Explorer component then that installation will not show up on these panels.

Queue Managers on rockall					
Name	Listener ...	QMID	Admin O...	State	Instand
ATS_ADX	3414	ATS_ADX_2011-...	Defined	Runni...	Unkno
INST2	Unknown	Unknown	Unknown	Stopp...	Unkno
linear	1414	linear_2011-11-...	Defined	Runni...	Unkno
oamtest	3415	oamtest_2011-...	Undefined	Runni...	Unkno
V7	2414	V7_2011-11-29...	Defined	Runni...	Unkno
V72_A	Unknown	Unknown	Unknown	Stopp...	Unkno
V7B	2415	V7B_2011-11-2...	Defined	Runni...	Unkno
V7C	Unknown	Unknown	Unknown	Stopp...	Unkno

Start ...

Stop ...

Delete

Create Admin Objects

Define instance on another server...

Change installation ...

Select Queue Manager

Browse Error Logs

Browse Properties...

Features

- After a server has been added to the navigator tree, you can list its queue managers and their status. From the Queue Managers folder, select the "Update queue manager status" option. From the same place, you can also choose to look at the system ini file and error logs.
- The plug-in fully supports multi-instance queue managers, introduced in V7.0.1. The status of each queue manager is displayed, including its standby capabilities, and information about any other instances of the queue manager running elsewhere.

V53	Unknown	Unknown	Unknown	Stopped	Unknown
V7	2414	V7_2009-04-21_12.3...	Yes	Running	rockall(Active)
V7B	2415	V7B_2009-04-21_12....	Yes	Running	rockall(Active)
V7C	Unknown	Unknown	Unknown	Running as standby	llareggub(Active), rockall(Standby)

- The plug-in fully support the multi-version installations introduced in V7.1. The installations on a machine are shown in a table that also shows the queue managers associated with each installation. If the machine only has a single installation, older than V7.1, this will show as Installation0 in the list.

MQ Installations on rockall				
Name	Path	Description	Version	Queue Manag
Installation1	/usr/mqm	MyPrimary	7.1.0.0	ATS_AIX, oam
Installation2	/usr/mqm2/usr/mqm		7.1.0.0	INST2
Installation3	/usr/mqm.72/usr/mqm		7.2.0.0	V72_A
Installation4	/usr/mqm.75/usr/mqm		7.5.0.0	V75_A

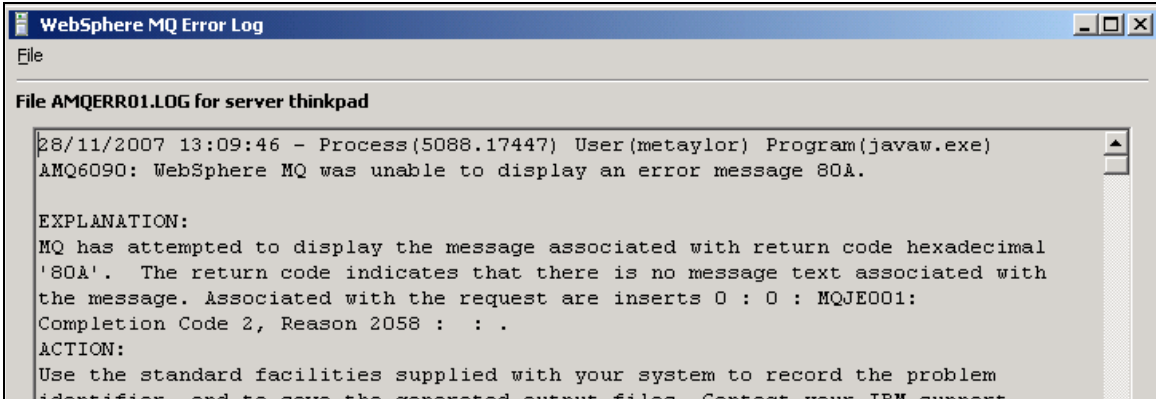
Only a subset of the information on the installations is shown in the table. For full details, including levels of subcomponents contained within the installation, select the “Browse Properties” menu item from the “MQ Installations” node.

- Options are available for starting and stopping queue managers that support the failover and reconnectable capabilities of these queue managers. You can also create the definition of a standby queue manager instance, copying it from one server to another.
- If you are using the multi-install capabilities introduced with MQ V7.1, a queue manager can be moved between installations (read about the setmqm command). This helps with migration from one level to another; the queue managers are moved once the code has been installed. The queue manager must be stopped in order for this option to be available to you.
- The system and queue manager ini files (mqm.ini, qm.ini) and their Windows equivalents can be viewed. No changes can be made to the files, and (unlike the MQ Explorer) they do not show "default" settings for attributes that might be overridden in the ini file.
- The FFDC files can be browsed for each server. Use the “Browse Failure Reports” option on the queue managers folder. The file is transferred to the local machine, and can then be saved to another location. Initially, a summary is shown of all the FFDCs (using the output from the “ffstsummary” command). Double-clicking on a file will show the entire contents. You can also delete the FFDC from the remote server by right-clicking on the file name in the summary table. Multiple files can be viewed at the same time.

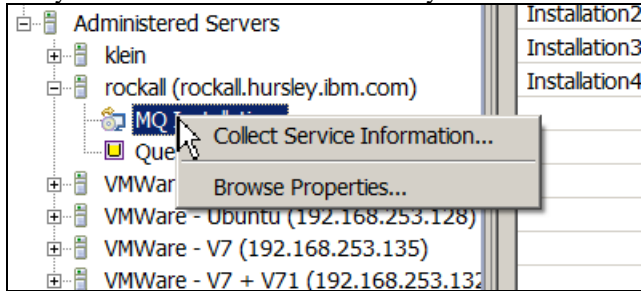
Process ID	Time	Process Name	Probe
1968	2009/04/28 12:45:45.828000+1	javaw	UN:40010 MQContentView.showContent...
5412	2009/04/29 16:33:01.968000+1	javaw	UN704000 DataModel.deleteObserver U...
5220	2009/04/30 23:51:55.734000+1	amqzlaa0	XC514090 xlsRWMutexRequest xecL_W...
5220	2009/05/01 16:31:26.078000+1	amqzlaa0	ZL000010 zlaMain xecF_E_UNEXPECTED...
5460	2009/05/01 16:31:30.937000+1	amqzlaa0	ZL000010 zlaMain xecF_E_UNEXPECTED...
5068	2009/05/01 16:31:30.953000+1	amqzlaa0	ZL000010 zlaMain xecF_E_UNEXPECTED...
5776	2009/05/01 16:31:31.000000+1	amqzmuc0	XC526091 xlsRWMutexHealthCheck xecL...
5984	2009/05/01 16:31:33.406000+1	amqzmur0	ZX092012 zmuStatisticsCollector MQRC...
5984	2009/05/01 16:31:33.562000+1	amqzmur0	P5005019 psiReceivePSCommands MQR...
5984	2009/05/01 16:31:33.593000+1	amqzmur0	P5000035 psiReceivePublications MQRC...
5984	2009/05/01 16:31:33.609000+1	amqzmur0	P5017077 psiProcessProxySubs MQRC...
5984	2009/05/01 16:31:38.593000+1	amqzmur0	ZX118012 zmuBrowseMarkScannerTask ...
5776	2009/05/01 16:31:40.765000+1	amqzmuc0	ZX085061 amqzmuc0 xecP_E_INVALID_P...
5776	2009/05/01 16:31:40.781000+1	amqzmuc0	ZX085131 amqzmuc0 zrcE_UNEXPECTED...
5776	2009/05/01 16:31:41.281000+1	amqzmuc0	XC130031 xehExceptionHandler xecF_E...
5984	2009/05/01 16:31:41.296000+1	amqzmur0	ZX086061 amqzmur0 xecP_E_INVALID_P...
5984	2009/05/01 16:31:41.312000+1	amqzmur0	ZX086131 amqzmur0 zrcE_UNEXPECTED...
3396	2009/05/01 16:33:10.937000+1	amqfcxba	XY193001 xllAccessEventHandle xecF_E...
3396	2009/05/01 16:33:11.015000+1	amqfcxba	XC371020 xstServerRequest xecF_E_UN...
3396	2009/05/01 16:33:11.031000+1	amqfcxba	XY473001 xstMakeSemaphoreRequest x...
3396	2009/05/01 16:33:11.062000+1	amqfcxba	XC031013 xcsCloseEventSem xecF_E_U...
3396	2009/05/01 16:33:11.078000+1	amqfcxba	XC371020 xstServerRequest xecF_E_UN...
3396	2009/05/01 16:33:11.093000+1	amqfcxba	XY205001 xstConnectionRequest xecF...
3396	2009/05/01 16:33:11.109000+1	amqfcxba	XC371020 xstServerRequest xecF_E_UN...
3396	2009/05/01 16:33:11.125000+1	amqfcxba	XY205001 xstConnectionRequest xecF...
5424	2009/05/13 22:44:35.687000+1	amqzlaa0	XC514090 xlsRWMutexRequest xecL_W...
5084	2009/05/14 18:01:57.531000+1	amqzlaa0	XC514090 xlsRWMutexRequest xecL_W...
1512	2009/05/18 09:53:57.484000+1	amqzmuc0	AD025000 adiForceFile xecF_E_UNEXPE...
1512	2009/05/18 09:53:58.328000+1	amqzmuc0	AO198040 aocCheckpointThread krcE_U...
1512	2009/05/18 09:53:58.437000+1	amqzmuc0	AO084120 aocPerformCheckpoint krcE...
1512	2009/05/18 09:53:58.859000+1	amqzmuc0	AL047011 alsCheckpointLoop krcE_UNEX...
1512	2009/05/18 09:54:12.796000+1	amqzmuc0	ZX103020 zmuHealthCheck krcE_UNEXPE...
1512	2009/05/18 09:54:12.812000+1	amqzmuc0	ZX085061 amqzmuc0 krcE_UNEXPECTED...
1512	2009/05/18 09:54:12.843000+1	amqzmuc0	ZX085131 amqzmuc0 zrcE_UNEXPECTED...
4104	2009/05/18 09:54:18.000000+1	amqzma0	ZX005020 zxcProcessChildren zrcX_PRO...
4104	2009/05/18 09:54:18.093000+1	amqzma0	ZX005025 zxcProcessChildren zrcX_PRO...
8720	2009/05/18 09:54:23.578000+1	amqzlsa0	XC526091 xlsRWMutexHealthCheck xecL...
5432	2009/05/18 09:54:24.062000+1	amqzlaa0	XC526035 xlsRWMutexHealthCheck STO...
4652	2009/05/18 09:54:28.062000+1	amqzmur0	ZX086131 amqzmur0 zrcE_UNEXPECTED...
5512	2009/05/18 09:54:28.218000+1	amqzmuf0	ZX135131 amqzmuf0 zrcE_UNEXPECTED...
5172	2009/05/21 00:49:33.828000+1	amqzlaa0	XC514090 xlsRWMutexRequest xecL_W...
4676	2009/05/21 09:17:30.484000+1	amqzlaa0	XC514090 xlsRWMutexRequest xecL_W...

Failure Reports on Thinkpad.

- The error logs can be browsed for each queue manager and the server. The file is transferred to the local machine, and can then be saved to another location.

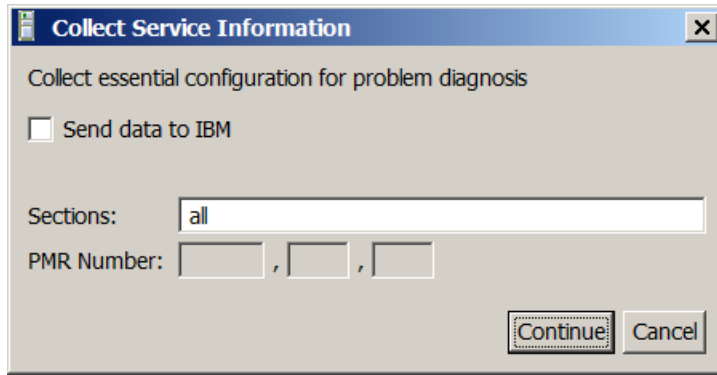


9. Queue Managers are inspected to see if they have the default objects defined that the Explorer would normally use for its administrative tasks. These are the SYSTEM.ADMIN.SVRCONN channel and the SYSTEM.MQEXPLORER.REPLY.MODEL queue. If the queue manager does not have these objects, and is also not available from the Explorer tree, then an option is available from this plug-in to create these objects.
10. There is a "Select Queue Manager" action on queue managers in this part of the tree, and a "Select Server" in the main part of the Explorer tree. It can be used to jump between the two locations. When a queue manager appears in multiple places, for example in several Sets, then one of the nodes in the tree is selected, but it could be any one of the nodes.
11. A background task can be configured to automatically scan for changes to queue manager status and definitions. This is set up in the Preferences dialog. Each defined server has a property that says whether the background task should skip this particular server in its scan.
12. Queue managers can be created and deleted using this plug-in. It uses essentially the same wizard as when you create a queue manager on the local machine. Some of the parameter validation is not available, and there are a couple of additional options, but the System Administration book describes the parameters.
13. If you open a PMR with IBM, you will often be asked to send standard information about your machine's configuration. This information is collected by the dspmqras or runmqras command. On a system running V7.1 or later, this plug-in can run that command, collect the data and transfer it to your local machine or automatically FTP it to IBM Service.



If you select the option to send data to IBM, then you must fill in a valid PMR number.

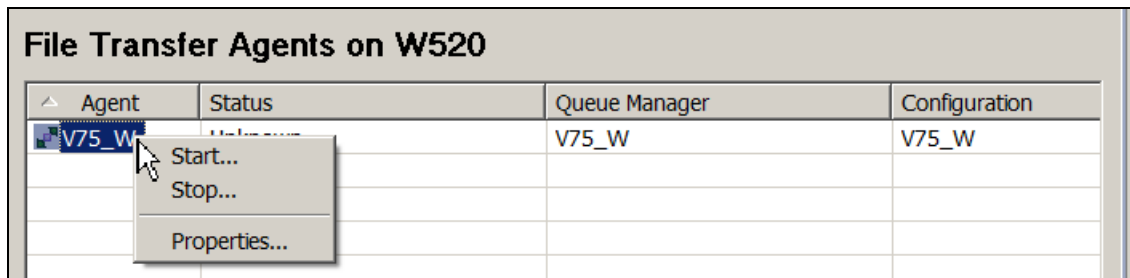
The "sections" field allows you to provide additional control over the behaviour of the dspmqras command; it is free-format to allow for future changes to that command, but the default behaviour should be fine for most people.



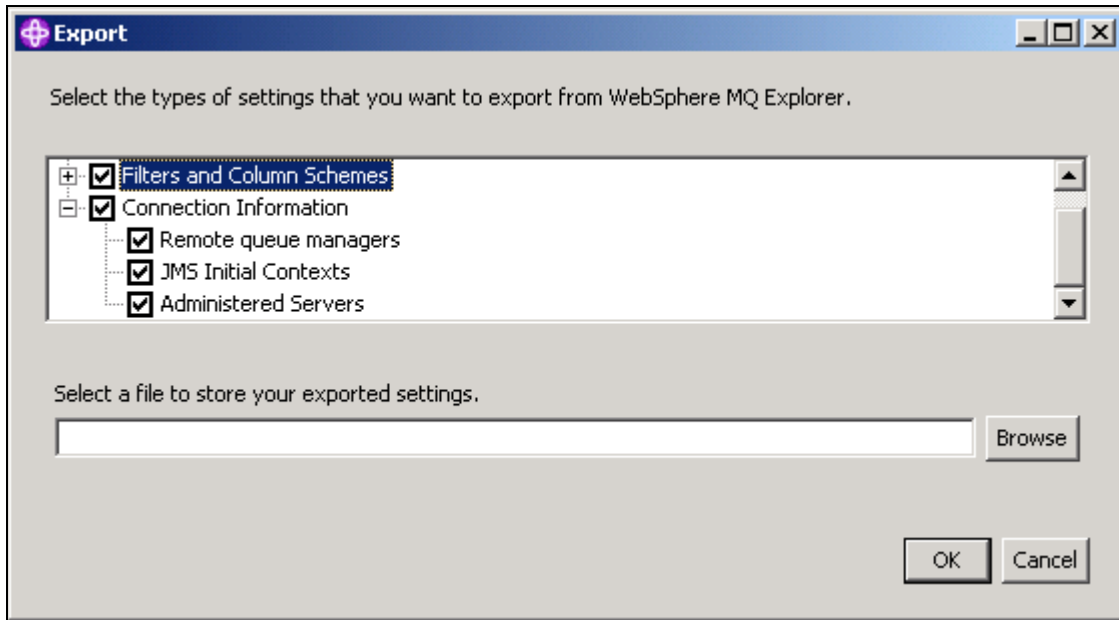
If you do not select the option to send data to IBM, you will be asked to provide a local filename where the created zip file is transferred after the work has been done.

This command may take a while to run; you might need to change the command timeout preference for the Remote Admin component to wait long enough.

14. You can run the `dmpmqcfc` command added in MQ V7.1 to save a queue manager's configuration. This command runs on the remote machine, and the output transferred to your local system as an MQSC script.
15. If the managed machine has MQ V7.5 installed, there is an extra folder to show any configured File Transfer Agents. Agents can be started and stopped, but remember that these will be started with the authority of the userid configured in Eclipse.



16. This plug-in contributes to the MQ Explorer import/export function. The list of managed servers can be exported, and then imported into a different copy of the Explorer. Preference setting can also be exported.



Security

You can set a Master Password for the Remote Administration plug-in¹. The passwords stored for each server are protected using this password. If the master password is not defined, then a technique is used which still obfuscates the server-level passwords in the configuration file but does not really protect them. Regardless, you should always protect the configuration file from being read by unauthorised people.

If the Master Password is set, then it must be correctly entered on future restarts of the Explorer before you can change any server properties or query any remote information. The Master Password can be removed after it has been set, while retaining the server-level passwords - this might be useful if you are certain that no one else can gain access to your configuration file.

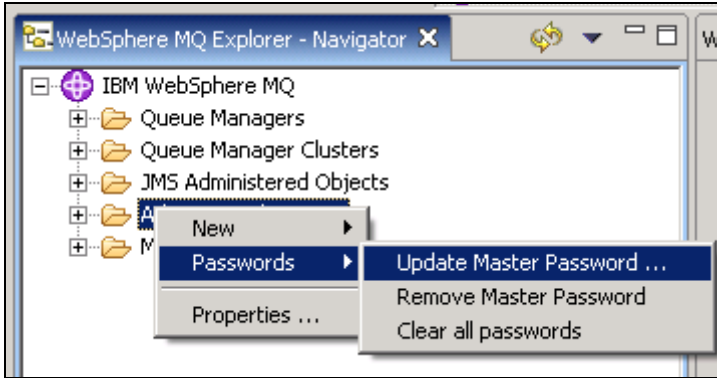
If you forget the master password, or want to share a configuration file with other people (perhaps through the Import/Export capabilities of the Explorer), then you can remove all passwords from the file with a menu item. You will then need to configure passwords again for each server, possibly also changing the userids that remain in the configuration file. A Master Password must be at least 8 characters long.

The configuration file is stored in the current workspace at

```
.metadata/.plugins/com.ibm.mq.explorer.remote.admin/WMQ_Servers.xml
```

Control of the passwords is handled through the menu options available from right-clicking on the Administered Servers node in the MQ Explorer tree.

¹ The MQ Explorer V7 has a similar way of managing passwords for its connections to remote queue managers. Unfortunately, that password manager is not currently an exposed or public interface and therefore could not be used for this plug-in.



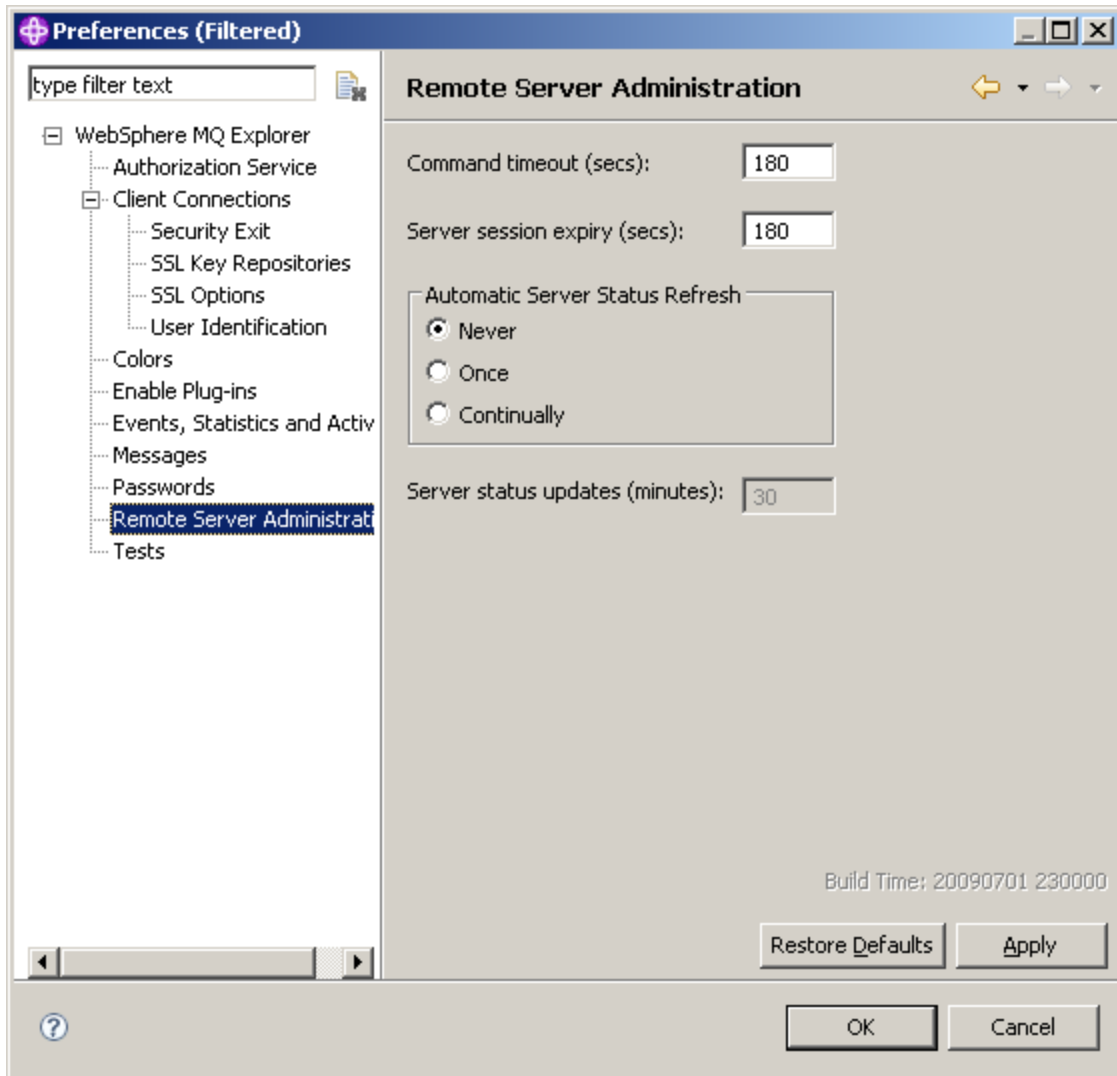
Global security settings

Properties can be set on the Administered Servers node in the Explorer tree. These properties are all for security configuration - a userid, certificate store, and a password that is either used directly or to access that store. The same settings can be used across all protocols, except for the certificate store which is only applicable to SSH.

One of the properties of a server is to choose to use these global parameters instead of using server-specific settings. This allows a much simpler configuration, when the same userid/password is used for many servers.

Plug-in Preferences

The following items can be set in the plug-in's Preferences dialog. The panel can be found in the Remote Server Administration section of the MQ Explorer preferences.



1. Command Timeout

When executing a long-running command, this controls the timeout after which the command is cancelled. It is set by default to 180 seconds, with a minimum of 30 seconds. The commands that are most likely to take a long time are ending a queue manager and collecting service information.

2. Session Expiry

By default set to 180 seconds, this says how long a session (eg an rexec or ssh connection) is allowed to live after it has been used. Keeping the session open will speed up the next operation on a server; holding too many sessions open will result in many open sockets from the JVM. This can be set to 0 seconds, in which case the connection is closed immediately after any command has been issued.

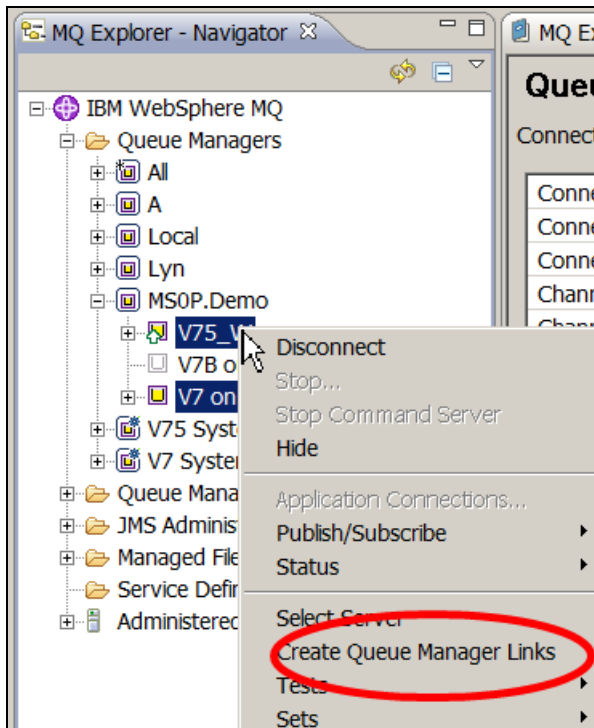
3. Server Status Checks

This indicates whether an automatic full inquiry is performed on each server to list queue managers and retrieve their status. As this can be a slow/expensive operation, the choices are Never (the default), Once (executed as the plug-in is started) or Continually (every N minutes, where N is by default 30 minutes). Even when this is set to Once or Continually, each server has its own overriding property that may be set so that server is bypassed during the scans. This is useful for machines that are known to often be unavailable or very slow to respond.

Connection Wizard

The purpose of this wizard is to give a very simple way of connecting two queue managers together. After completion of the wizard you should have a matching set of channels running between the two queue managers, and some queues which can be used immediately to demonstrate successful message transfer.

Select two queue managers from the Explorer tree or table, right-click and select the "Create Queue Manager Links" option.



The default values on the first page of the wizard are probably appropriate, but you can change all of the generated object names if you want. The "default defaults" can also be changed from the Preferences page or the Connect Wizard component of the MQ Explorer.

Create links between 2 queue managers

Configure properties

Create the definitions.

Configuration for Queue Manager V75_W

Address	metaylor2011(1614)
Channel name	TO.V7
Put messages here	MS0P.CONNECT.PUT.TO.V7
Get messages here	MS0P.CONNECT.GET.FROM.V7

Configuration for Queue Manager V7

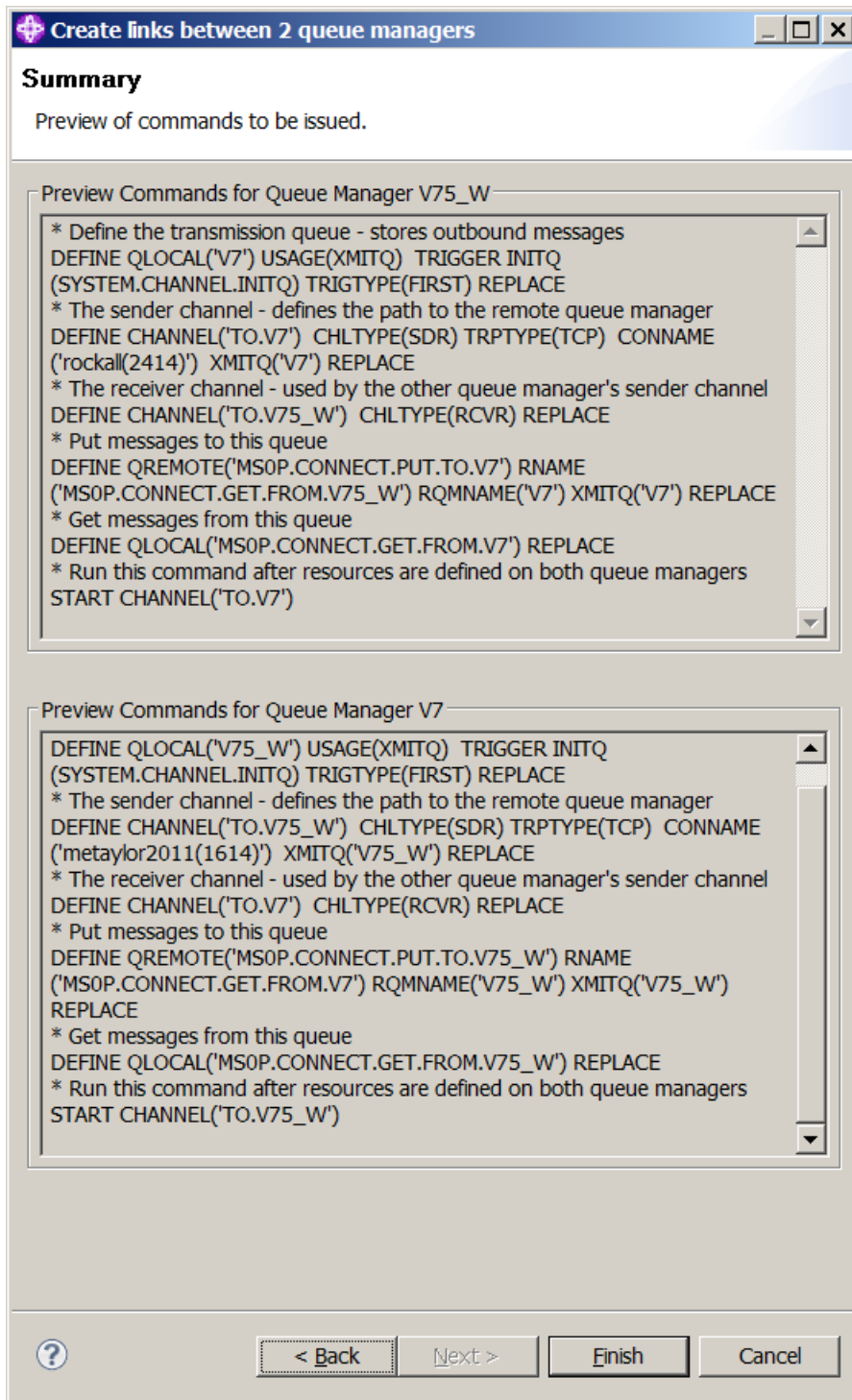
Address	rockall(2414)
Channel name	TO.V75_W
Put messages here	MS0P.CONNECT.PUT.TO.V75_W
Get messages here	MS0P.CONNECT.GET.FROM.V75_W

SSL/TLS CipherSuite: None

Start channels after creation
 Replace any existing definitions
 Create queues for testing

? < Back Next > Finish Cancel

On the final page of the wizard, the generated MQSC commands are shown in two panels with one panel for each queue manager. These commands can be selected and copied into your own scripts for later review and modification.



Security Configuration

One option on the first page is to select an SSL/TLS CipherSuite. The default is to leave this as "None" because you may not yet have set up the certificate configuration for each queue manager, and which is outside the scope of this wizard. However, if you know you already have that part of MQ defined, then select a CipherSuite.

One of the features of MQ V7.1 is to have additional security controls on who can connect to channels; configuration of those CHLAUTH resources is also outside the scope of this wizard.

Object Configuration

The objects created consist of

- A sender channel, named "TO.<the other qmgr name>".
- A receiver channel, named "TO.<this qmgr name>".
- A transmission queue named "<the other qmgr name>". This queue is defined with trigger controls so that the associated channel is automatically started when messages are put to the queue.
- Optionally, a LOCALQ definition where you can receive messages, named "MS0P.CONNECT.GET.FROM.<the other qmgr name>".
- Optionally, a REMOTEQ definition to send messages to the other queue manager, pointing at the corresponding LOCALQ.

The "MS0P.CONNECT" qualifier can be changed in the Preferences panel for the wizard. If the queue manager names would make a generated name too long, then the right-most characters from the name are used to create a name up to the permitted maximum.

Topic Viewer

The topic viewer plug-in gives an alternative way to see the topic objects that are defined on a queue manager. Topic Objects are those entities explicitly defined in a similar way to queues – the purpose of them is to give degrees of granularity on some attributes including security for publish/subscribe applications.

Applications do not have to reference these object names when publishing or subscribing, but the queue manager will use the “closest match” object to determine the behaviour. This means that while many topics may be in-use at a time, it is expected that there will be substantially fewer objects defined.

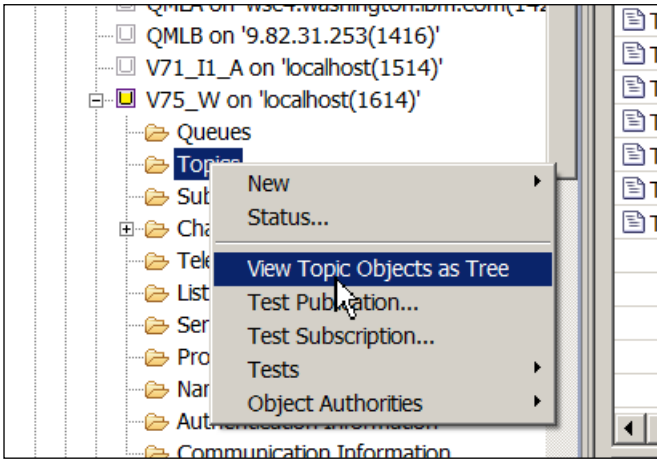
The topic viewer shows only these explicitly defined objects, not the in-use topics or subscriptions.

The standard Explorer view of topics looks very much like the view for queues – a table containing attributes for the objects:

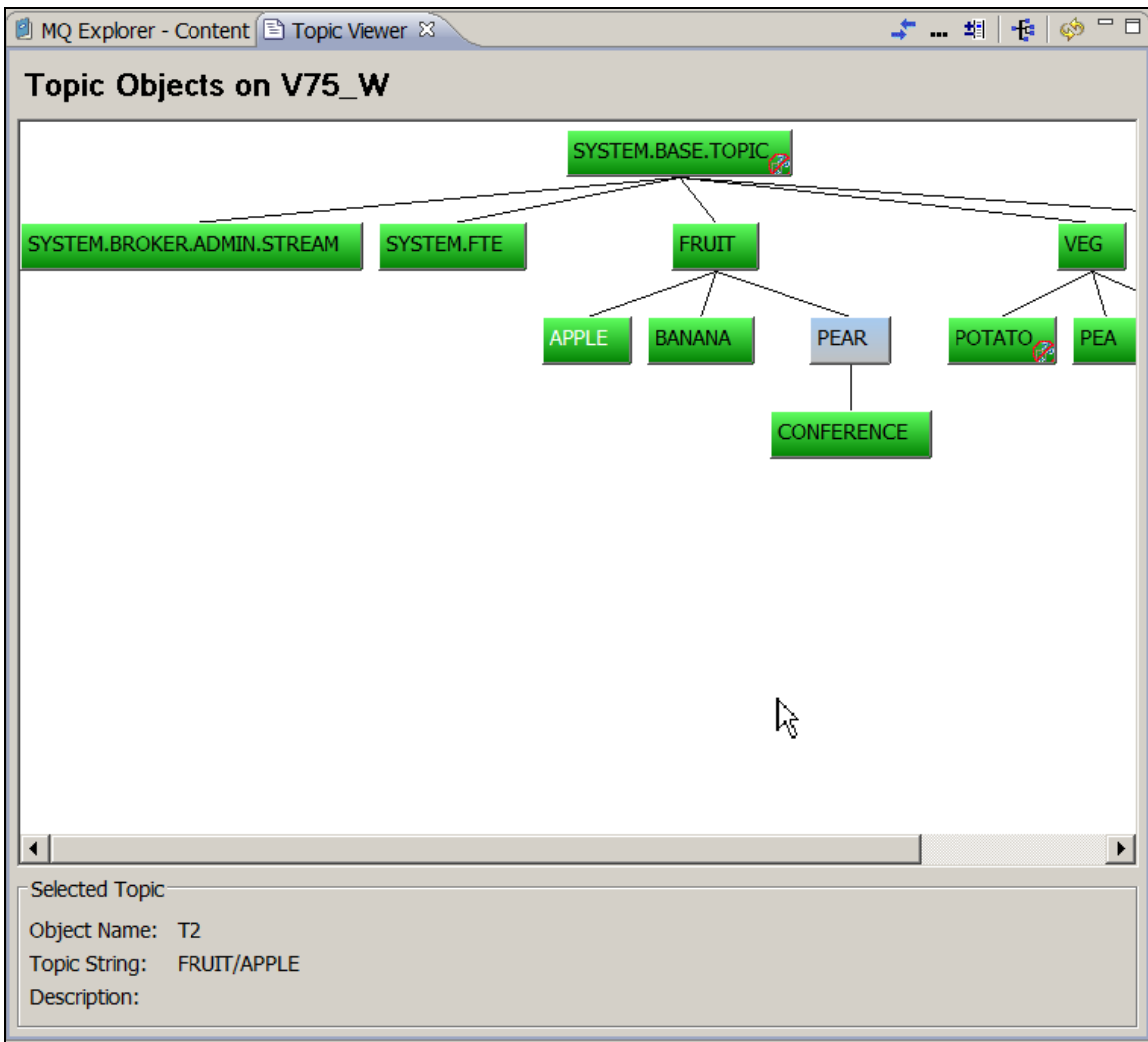
Topics			
Filter: Standard for Topics			
Topic name	Topic type	Topic string	Description
SYSTEM.BASE.TOPIC	Local		Base topic fo
SYSTEM.BROKER.ADMIN.STREAM	Local	SYSTEM.BROKER.ADMIN.STREAM	Admin strear
SYSTEM.BROKER.DEFAULT.STREAM	Local		Default strea
SYSTEM.BROKER.DEFAULT.SUBPOINT	Local		Default RFH2
SYSTEM.DEFAULT.TOPIC	Local		
SYSTEM.FTE	Local	SYSTEM.FTE	
T1	Local	FRUIT	
T10	Local	FRUIT/PEAR/CONFERENCE	
T11	Local	/TV/SHOWS/COLBERT	
T2	Local	FRUIT/APPLE	
T3	Local	FRUIT/BANANA	
T4	Local	VEG	
T5	Local	VEG/POTATO	

This table can of course be sorted by each column. However, unlike queues, topics are related by a parent-child relationship defined through the Topic String attribute.

Many properties of a Topic Object are defined as “as parent”, which can ripple through the entire topic tree until an explicit value of the property is available. While good naming conventions can help, the object name does not necessarily direct you to the parent – you have to look at the topic string, and then find the closest parent topic string. That means that it is useful to be able to view the topics as a tree. The Topic Status panel within the Explorer gives an alternative text-based tree layout for the topics, but this plug-in gives you what I think is an easier, graphical view.








From the Topics folder in the Explorer tree, select the option to view objects as a tree. This opens a new view:





You can now see the parent-child relationships between the topic definitions. Some topics may not have an immediate parent defined; to keep the levels clear, missing parents are inferred and shown in a different colour. In the example above, there are topic objects defined with topic strings of “FRUIT” and “FRUIT/PEAR/CONFERENCE” but there is no object defined with “FRUIT/PEAR” as its topic string.

There are some buttons to modify the layout of this picture:

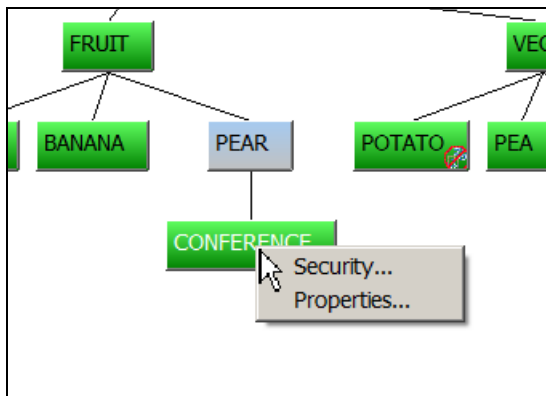
-  compresses the layout by allowing overlaps in the displayed topic objects
-  cuts down the displayed object name, showing only the last element of the name when there are ‘.’ characters in it. This may allow more topics to be visible. When you select the object, the full name is still shown in the lower part of the panel. The SYSTEM.BASE.TOPIC object will not be abbreviated; that is always the root of the tree.
-  flips the orientation to a horizontal layout. Some people may prefer it that way round.
-  is the “show system objects” button. There are a few default objects defined within the queue manager that are not normally directly used by other topics. By default these objects are excluded from the view.

Double-clicking on a topic will collapse its sub-tree, to hide lower levels from view. Collapsed topics are marked with a  and double-clicking again will restore the view.

The final marker that may be shown on a topic ( or ) is an indication of whether the topic is enabled for multicast operation. If no multicast marker is shown, then the value is inherited from its parent.

Checking Properties and Security Permission

Selecting one of the real objects and right-clicking gives two further options. One allows you to jump to the standard full properties panel, and change all the attributes that are permitted. The other allows you to check the permissions for a topic, whether a particular user or group can publish or subscribe.



The Security option takes you to a panel where you can enter a userid or group. Unlike queue permissions, the permissions on topics can be inherited from higher levels in the topic tree. Someone is allowed to publish or subscribe to a topic if they are permitted to access any topic higher in the tree.

Selecting “Check permissions” initiates a check of permissions at each level of the topic tree until a “Yes” response is found. The point at which the authority check passes is shown, as is the final overall decision.

Only real nodes in the tree are checked by the queue manager; inferred nodes are printed in this table in italics for clarity.

Topic Permissions for FRUIT/PEAR/CONFERENCE [X]

Name:

User Group

This panel allows you to check whether a specific user or group is allowed to publish or subscribe to the selected topic. It checks each level in the topic tree until it either receives a "Yes" answer or reaches the root.

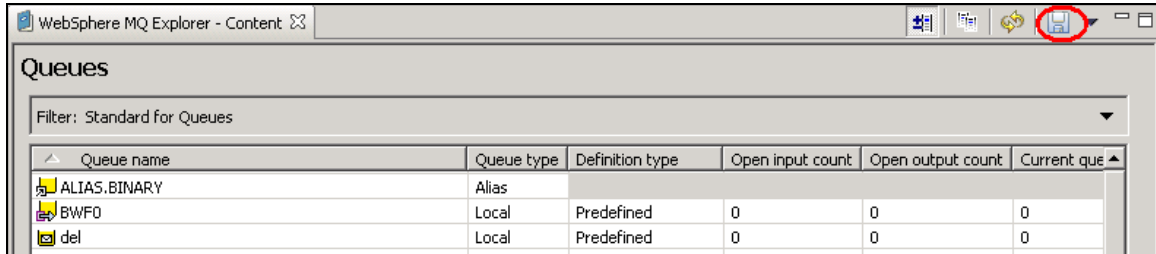
Topic Object	Topic Component	Pub	Sub
T10	CONFERENCE		
	<i>PEAR</i>		
T1	FRUIT	✓ Yes	
SYSTEM.BASE.TOPIC			
Summary		✓ Yes	✗ No

Check Permissions [OK]

CSV Table Exporter

Many of the panels in the MQ Explorer are formatted as tables, containing lists of objects and information about those objects. For example, the list of queues configured on a queue manager will often be used.

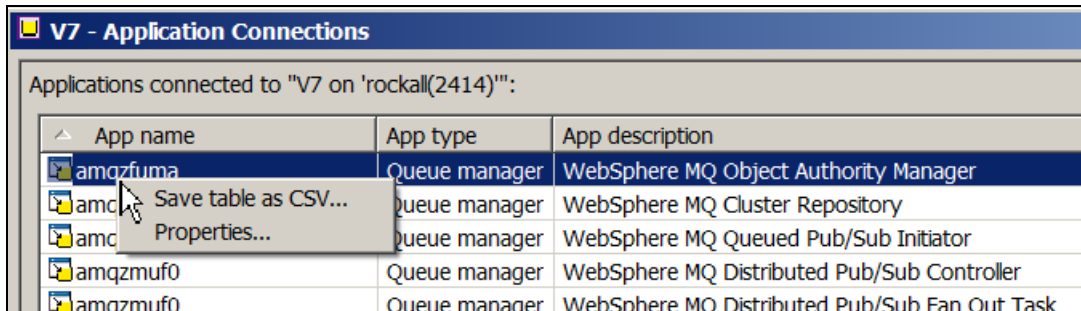
This plug-in allows you to save the displayed information to a CSV (comma-separated value) file, which can then be processed by many applications such as spreadsheets.



The Save icon (📁) is made active for the panels where the information can be exported. This includes all of the objects defined for a queue manager (queues, channels, process definitions etc). It also includes the list of queue managers; the JNDI resources for JMS (including Connection Factories and Destinations); the list of queue managers that are known within a cluster; and the list of remote servers and their queue managers.

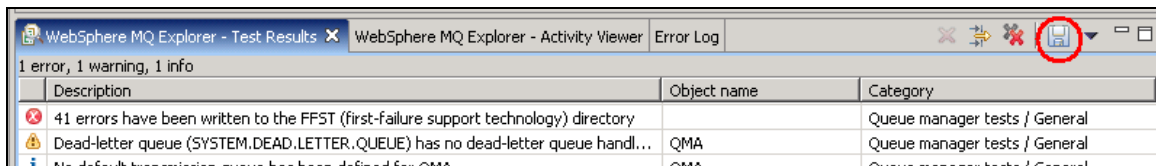
The plug-in respects any filtering, sorting and column schemes that have been applied to the view, saving the table exactly as it is shown in the Explorer.

Pop-out windows, such as that for showing application connections, also have an option to export the contents in CSV format. In these windows, the option is selected by right-clicking on an item in the table as there is no associated toolbar.



Because there is a performance cost to supporting these pop-out windows with the CSV exporter, there is a preference panel to disable this option.

You can also export the list of problems that have been reported through the Tests plug-in.



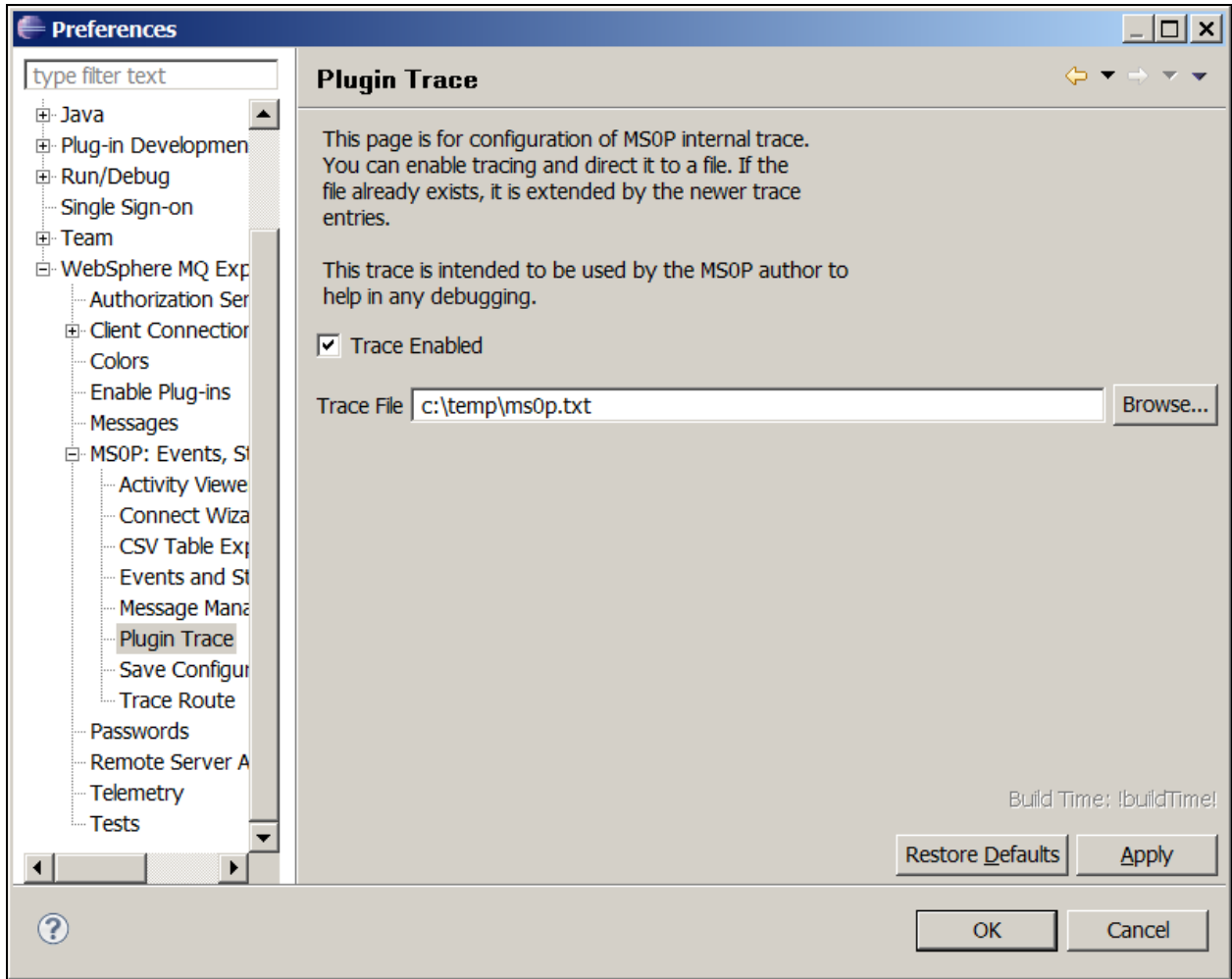
A typical file that has been saved from this plug-in will look like this. Note that the column headers are also included in the file.

```
"Topic name","Publisher count","Subscriber count","Anonymous  
count","Broker count","Stream name"  
"MQ/QMA  
/StreamSupport","0","62","0","0","SYSTEM.BROKER.ADMIN.STREAM"  
"MQ/S/QMA  
/Publishers/Summary/*","","2","0","0","SYSTEM.BROKER.DEFAULT.STREAM"  
"MQ/S/QMA  
/Subscribers/Summary/*","","4","0","0","SYSTEM.BROKER.DEFAULT.STREAM"  
"MQ/S/QMA  
/Subscribers/Summary/*","","1","0","0","SYSTEM.BROKER.ADMIN.STREAM"
```

When you export table contents a default filename is constructed from the context, but this can of course be overridden.

Plug-in Trace

Trace for the MSOP plug-ins can be turned on dynamically, and the output directed to a file using the Preferences panel.



Like the MQ internal trace, this output is not intended for users to understand, but it may help with debugging any issues found.

Save Configuration

MQ V7.1 introduced a new command, `dmpmqcfg`, that saves a queue manager's configuration as an MQSC script. It is intended to replace the old MS03 (saveqmgr) SupportPac.

This package can drive the `dmpmqcfg` command in some configurations.

- When the queue manager is known to the Remote Administration plug-in, and it is at V7.1 or later, the command can be executed on that remote server and the output transferred back to the local machine
- From the main Explorer list of queue managers, a "Save Configuration" option is available provided there is a local copy of `dmpmqcfg` installed. That means that installations that consist of just the Explorer (eg from the MSOT package) do not have the command available, and the plug-in will be automatically disabled. Not all connection methods to the remote queue managers are supported; channel environments such as SSL are not currently enabled, nor are "via" connections.

Command Events

In MQ for z/OS V6, a new type of event message was introduced: the Command Event. The purpose of those events is to generate a record of all commands an administrator issues to the queue manager. It can help answer questions like "who changed that queue attribute and when?"

MQ V7.0.1 fully supports Command and Configuration Events on all platforms, so this exit has become redundant. But it has been left available (in source format only) to allow it to continue to be used on older systems and as an example of an API Exit.

This API Exit code implements a subset of the function for Distributed platforms. It can monitor all commands issued through PCF messages to the command server. This means that work done by programs such as the MQ Explorer or by SupportPac MO71 can be monitored through this exit. It cannot trap runmqsc console commands, as that program does not use the MQI when processing commands.

Just as with the MQ for z/OS events, only **successful** commands are logged. No record is made of commands that fail to execute, regardless of the reason.

Any up-to-date management tool that processes event messages should be able to read these events and format them. Read the "Monitoring MQ" section of the InfoCenter for more details of these Event Messages.

This exit is supplied in source format for you to compile and configure for your systems.

Finding the code

The exit code is installed as part of the Events plug-in, and it can therefore be found in a subdirectory of the Eclipse installation. If you have used the default installation directories, on Windows this will be

```
C:\Program Files\IBM\WebSphere MQ\MQExplorer\eclipse\MS0P\plugins  
\com.ibm.mq.explorer.ms0p.events_<version>\cmdevent
```

Source code and Makefiles are in this directory.

Compilation

Instructions are provided in the Application Programming Guide on how to compile API Exits for all platforms.

This package includes all the files for AIX and Windows, including the awk script that automatically generates the list of Inquire commands embedded into the source.

Configuration

1. Create the SYSTEM.ADMIN.COMMAND.EVENT queue on the queue manager to be monitored. This should be done first; otherwise it will require a further restart of the command server.

2. Add the API Exit to the queue manager configuration. On most platforms this is done by editing either mqs.ini (to affect all queue managers) or the qm.ini file for the specific queue manager. For qm.ini add the stanza

```
ApiExitLocal:  
  Name=CommandEvents  
  Function=EntryPoint  
  Module=cmdevent  
  Data=ENABLED (or NODISPLAY or DISABLED)  
  Sequence=100 (or whatever number you prefer)
```

For mqs.ini you can add the ApiExitCommon stanza and/or ApiExitTemplate with the same attributes. See the System Administration book for more information about configuring API Exits. If you use the ApiExitCommon stanza, then the module name should have a fully-qualified path.

On Windows systems, this information has to be added to the registry instead of an ini file. You can use the Eclipse MQ Explorer to set this up. Use the same attribute values.

The Data attribute should be set to **ENABLED** if you want to log every operation; set it to **NODISPLAY** if you are not interested in tracking Inquire commands. You will have to restart the queue manager if you change this setting. Setting the Data attribute to **DEBUG** will create a log file, to record that the exit is running, and is otherwise the same as **ENABLED**. The attribute can also be set to **DISABLED** if you want to keep the exit configured, but just stop recording events.

3. Compile the exit for your platform and copy it to the appropriate exits directories. Where a platform has both threaded and non-threaded sets of libraries, both forms of the API Exit are required. Similarly, where a platform has both 32-bit and 64-bit interfaces both forms of the API Exit are required.

So for AIX we need 4 versions of the exit code to be compiled and installed in the correct directories, both /var/mqm/exits and /var/mqm/exits64. Only one version will ever be used by the command server, but all applications need to load the exit initially.

4. Restart the queue manager and the command server.

Looking at the Events

If everything has been correctly defined and configured, you should start to see messages appearing on the event queue. Any up-to-date event formatting tool (such as this SupportPac) should be able to decode them.

Monitoring console commands

This API Exit cannot monitor commands entered from the runmqsc console. There are alternative approaches that might be successful. For example, if you make your MQ administrators be members of a group other than "mqm" you can still give them access to runmqsc via a program such as sudo or SupportPac MS0E. Those wrapper programs may then log all input/output through it.

The Command Events implementation in MQ V7.0.1 does monitor runmqsc commands.

Other Features

For convenience, this SupportPac contains some additional features beyond its core design of extending the Eclipse environment.

The QTune Utility

This is a simple standalone Java program that can be used to modify some otherwise hard-to-change attributes of queues, enabling an experienced MQ administrator to potentially improve system performance.

Finding the code

You will find it in the qtune subdirectory in the tree where you unpacked the rest of this SupportPac.

There is a README file in this directory giving more details on the program and how to use it. It can be used on other systems by simply copying the jar file.

The README file includes some warnings and caveats – please read them carefully.

The MQIDecode Utility

Another simple standalone Java program, this one is used to decode MQI options from their numeric to symbolic values.

Finding the code

You will find it in the mqidecode subdirectory in the tree where you unpacked the rest of this SupportPac.

There is a README file in this directory giving more details on the program and how to use it. This program requires access to the MQ V7.1 (or later) Java client jar files and a Java 6 (or later) runtime.

PubQStat

This program is intended to run as a service alongside a queue manager, making regular queries on queue statistics and republishing them on a known topic. It therefore allows multiple consumers to discover the activity on a set of queues.

Finding the code

You will find it in the pubqstat subdirectory in the tree where you unpacked the rest of this SupportPac.

There is a README file in this directory giving more details on the program and how to use it. This program requires access to the MQ V7.1 (or later) Java client jar files and a Java 6 (or later) runtime.

The OAM Logger Installable Service

This was originally available as SupportPac MS07, but had not been updated for several years. It has now been made current with the MQ V7.1 features. It has two purposes:

- Creating a log of all the authorisation requests and changes made to a queue manager's security configuration

- Education and enhanced documentation on how to write your own Authorisation Service. The source code is extensively commented, explaining how the queue manager invokes the service and deals with return codes.

Finding the code

The code is installed as part of the Events plug-in, and it can therefore be found in a subdirectory of the Eclipse installation. If you have used the default installation directories, on Windows this will be

```
C:\Program Files\IBM\WebSphere MQ\MQExplorer\eclipse\plugins  
\com.ibm.mq.explorer.ms0p.events_<version>\oamlog
```

There is a README file in this directory giving more details on how to use this module, including configuration instructions. The source code and some Makefiles are also in this directory.

Notes and Limitations

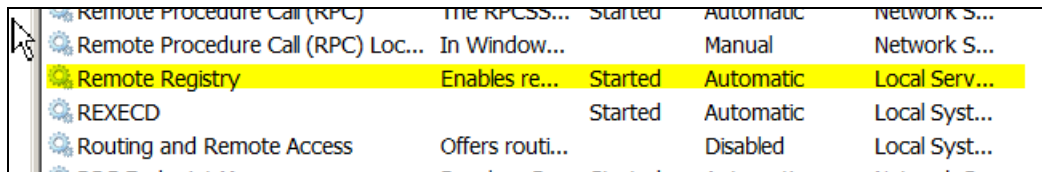
Events and Statistics Plug-in

- The plug-in will deal with any queue manager which is directly connected, either via a client connection or a local binding. It does not currently handle "indirect" or "via" connections.
- The plug-in is also coded to know about the purpose of particular queue names, so that the options to format events do not appear for all queues. It is possible for an installation to have redefined some of the event queues to have non-standard names, for example by replacing the normal objects with QREMOTE or QALIAS definitions. If this is the case at your site, you can either use the command line version of this SupportPac passing the new queue name, or if you are feeling brave you can edit the plugin.xml file that controls when the menu items appear.
- Application program names sometimes appear strange as MQ only provides a 28 character field in which to hold them. So directory names are often truncated on the left.
- Filtering by timestamp has been added to only show event and statistics messages that meet the criteria. This is done based on the time contained in the MQMD, ie when the event was recorded. It will not necessarily be the precise time that the activities occurred, as statistics and accounting records are written at defined intervals such as every 30 minutes.
- The "advance log" operation is shown for any queue manager that implements the command. However there is no way of knowing in advance, in general, whether the queue manager is using linear logging. The command fails when issued against a queue manager that's using circular logging.
- MQ V7 adds support for topics, and QALias definitions that point to topics. While the dspmqrte command understands these, it has not yet been added to the trace-route part of this Explorer SupportPac. The SupportPac attempts to recognise that a topic is involved, and give an appropriate error message.

Remote Administration

- Managing Windows systems - Windows XP and Vista targets must have Simple File Sharing disabled for the controls to work, as Simple Networking forces all logins to authenticate as "guest" which does not have the necessary authorisations.

On Windows 7, the Remote Registry service must be started. This is not the default setting.



Remote Procedure Call (RPC)	The RPCSS...	Started	Automatic	Network S...
Remote Procedure Call (RPC) Loc...	In Window...		Manual	Network S...
Remote Registry	Enables re...	Started	Automatic	Local Serv...
REXECD		Started	Automatic	Local Syst...
Routing and Remote Access	Offers routi...		Disabled	Local Syst...

- The userid used to manage a Windows system must have administrative privileges on that machine. This limitation is imposed by the toolkit used for remote administration.
- Firewalls can sometimes get in the way on Windows systems! In particular, it's not always obvious that the Windows built-in firewall is sometimes overriding the behaviour of other

installed firewalls. Unless the Windows firewall is your preferred tool, make sure it's disabled – there's an option in the Windows Services panels to disable it.

- This code has not been tested with the RSH protocol, although it should work.
- i5/OS and z/OS systems are not currently controllable from this plug-in.

CSV Table Exporter

- One regular request has been for the CSV plug-in to save the information in some other format, for example as an MQSC script or an XML representation of the object's attributes. Unfortunately that is not possible because the plug-in has no semantic knowledge of the object being displayed; it is simply dumping text that appears in table cells. Because the header row of the table might be in any supported language, not just English, it cannot even look at that text to infer what the cell represents.

Comments

If you have any comments on this SupportPac, please send them to the author:

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