

SupportPac IS03 – Message Flow Statistics Visualiser For WebSphere Message Broker.

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Description

SupportPac IS03 provides a graphical means of viewing WebSphere Message Broker message flow statistics. The visualisation has the 'look and feel' of the WebSphere Message Broker Toolkit and allows the user to view all available statistics in an intuitive manner. Both SnapShot and Archive statistics can be viewed using IS03 and it is highly configurable to enable the graphing of exactly the statistics which the user is interested in seeing.

IS03 runs as a standalone java application (it does not run as an eclipse plug-in) and utilises an MQ client connection to connect to the Message Broker Queue Manager in order to retrieve statistics data. The SupportPac can therefore be run on any supported system which is able to connect to the Message Broker Queue Manager.

IS03 contains additional capabilities to see the real time and historic statistics data in tables, along with the capability to export all recorded data to CSV to enable custom user processing.

System requirements

Windows (XP or later) or a Linux system which has a IBM Java 6 JRE installed (Other versions of Java may work but have not been tested)

WebSphere Message Broker Toolkit v7.0.0.2 or later (When using with version 7 of WebSphere Message Broker – If using with v8 of Message Broker, the required files are included in the product runtime and the Toolkit is not required)

WebSphere MQ client JAR files.

Skill level required

Intermediate or advanced skill level at administering WebSphere Message Broker.

Supplied files

- IS03_v1.1.0.jar - Core SupportPac code
- RunIS03v7.bat - Executable batch file to run the SupportPac on Windows platforms when using v7 of WebSphere Message Broker
- RunIS03v7.sh - Executable shell script to run the SupportPac on Linux platforms when using v7 of WebSphere Message Broker
- RunIS03v8.bat - Executable batch file to run the SupportPac on Windows platforms when using v8 of WebSphere Message Broker

- `RunIS03v8.sh` - Executable shell script to run the SupportPac on Linux platforms when using v8 of WebSphere Message Broker
- `IS03.pdf` - SupportPac documentation
- `Licences` - Licences directory

Installation

Copy the file `IS03.zip` to a temporary directory on your chosen system and uncompress using an unzip utility.

Depending on if you are using the SupportPac with WebSphere Message Broker v7 or v8, the installation instructions differ:

WebSphere Message Broker v7

You will need to edit the `RunIS03v7.bat` (on Windows) or `RunIS03v7.sh` (on Linux) file and modify it as follows:

1. Modify the `BASE_MQ_INSTALL` variable to point to the correct location.
2. Modify the `BASE_TOOLKIT_INSTALL` variable to point to the correct location (This variable should point to your SDPShared plugins directory)
3. Modify the `CLASSPATH` variable to ensure that it points to an existing `com.ibm.broker.config.appdev*` directory. To check this, navigate to the `BASE_TOOLKIT_INSTALL` directory and look for a directory starting with `com.ibm.broker.config.appdev`. Ensure the full name of this directory is the one which is included in the `CLASSPATH` variable (If multiple `com.ibm.broker.config.appdev.*` directories exist, use the one with the latest version number). If a `com.ibm.broker.config.appdev*` directory does not exist, ensure that you have WebSphere Message Broker Toolkit 7.0.0.2 or higher installed (version 7.0.0.0 does not contain the required files).

IBM Java 6 must also be on the system PATH. Check this by running the command `'java -version'` at a command prompt.

IS03 can then be started by invoking the `RunIS03v7.bat` (on Windows) or `RunIS03v7.sh` (on Linux) script.

WebSphere Message Broker v8

You will need to edit the `RunIS03v8.bat` (on Windows) or `RunIS03v8.sh` (on Linux) file and modify it as follows:

1. Modify the `BASE_MQ_INSTALL` variable to point to the correct location.
2. Modify the `BASE_WMB_INSTALL` variable to point to the correct location.

IBM Java 6 must also be on the system PATH. Check this by running the command '`java -version`' at a command prompt.

IS03 can then be started by invoking the `RunIS03v8.bat` (on Windows) or `RunIS03v8.sh` (on Linux) script.

Configuring the IS03 SupportPac

There are a number of set up steps which must be carried out before IS03 will correctly function. These should be performed in the sequence listed in this document:

1) Ensure the Message Broker Queue Manager will accept client connections

- Configure and start a TCP Server-connection channel on the Message Broker Queue Manager.
- Configure and start a TCP Listener on the Message Broker Queue Manager.
- For more information on these steps visit the WebSphere MQ Infocenter: <http://www-01.ibm.com/software/integration/wmq/library/#Information%20centers> (find information on the two tasks listed above by searching for 'Defining a server-connection channel on the server' and 'Receiving on TCP')

2) Ensure that Message Flow Statistics are enabled.

- IS03 requires XML message flow statistics to be enabled for the flows you wish to visualise. Use the 'mqsichangeflowstats' command to configure this e.g:

```
mqsichangeflowstats MB7BROKER -s -g -j -n advanced -t basic -b basic -c active -o xml
```

- Visit the WebSphere Message Broker infocenter for more information on using this command: <http://www-01.ibm.com/software/integration/wbimessagebroker/library>

3) Configuring the 'General Config' settings .

The IS03 GUI provides a 'General Config' area (Figure 3.1) which allows you to configure how it connects to the Message Broker Queue Manager, along other configuration parameters.

General Config

Connection Status: Not connected to Queue Manager

Queue Manager Hostname: localhost

Queue Manager TCP Port: 2414

Queue Manager Name: MB7QMGR

Server-connection channel name: SYSTEM.DEF.SVRCONN

Stats Subscription Topic: \$SYS/Broker/+/StatisticsAccounting/SnapShot/#

Stats Queue: Browse?:

Accounting Origin:

Start stats collection Add message flows

Reset all data

Figure 3.1 – General Config options

Each of the configuration parameters are explained below:

- **Queue Manager Hostname** – The hostname or IP address of the system where the Message Broker Queue Manager is running. **This parameter is required.**
- **Queue Manager TCP Port** – The port which the Message Broker Queue Manager has a TCP Listener configured and running on (which was set up in step 1 above). **This parameter is required.**
- **Queue Manager Name** – The name of the Message Broker Queue Manager. **This parameter is required.**
- **Server-connection channel name** – The name of the Message Broker Queue Manager Server-connection channel which should be used to connect. **This parameter is required.**
- **Stats Subscription Topic** – The name of the topic which IS03 will subscribe to in order to receive message flow statistics data. A default of '\$SYS/Broker/+/StatisticsAccounting/SnapShot/#' is specified which means that IS03 will receive SnapShot statistics for all running message flows, in any execution group. This default value can generally be left, unless you wish to subscribe to Archive statistics instead of SnapShot (In which case change it to: \$SYS/Broker/+/StatisticsAccounting/Archive/#). **This parameter is required unless Stats Queue is specified. If both Stats Subscription Topic and Stats Queue parameters are specified, Stats Subscription Topic will take precedence and Stats Queue will be ignored.**
- **Stats Queue** – Instead of gathering statistics data via the topic subscription mechanism, IS03 can read statistics data off a queue. This can be useful, for example, if you use a custom subscription to store statistics on queues for archiving purposes (read the section below for a guide on how to perform this). By default, IS03 will perform a destructive GET when reading off the queue. To instead browse the queue, check the 'Browse?' option. **This parameter is optional. To use it ensure that the Stats Subscription Topic field is cleared.**
- **Accounting Origin** – If your flows use accounting origin, you can enter a value here to display only data for only the specified accounting origin. If this field is left blank, it will use the 'Anonymous' accounting origin (which is the default value WebSphere Message Broker uses if no Accounting Origin has been manually set). Note that if you want to have graphs which show data for two different accounting origins e.g. Company1 and Company2, you will need to run two instances of IS03, one configured to use Accounting Origin: Company1, and the other configured to use Accounting Origin: Company2. **This parameter is optional.**

This section describes how you would set up a Subscription in your Queue Manager to be able to store archive statistics for later visualisation using IS03:

1. Create a Local Queue on your Queue Manager where Archive statistics will be stored. In this example it will be called STATSARCHIVE.
2. Create a new Subscription and specify the following options (See Figure 3.2)
Name = STATS_ARCHIVE_SUBSCRIPTION
Topic string = \$SYS/Broker/+/StatisticsAccounting/Archive/#
Destination name = STATSARCHIVE
3. Published archive statistics data will now be stored on the STATSARCHIVE queue.
4. At a later time, when you wish to visualise the statistics archive data, perform the following:
In the IS03 GUI, set Stats Queue to STATSARCHIVE and clear the 'Stats Subscription Topic' field. Select 'Start stats collection'. All the Archive statistics data will be read off the STATSARCHIVE queue and will be displayed on the IS03 graphs. You can utilise the timeline functionality to scroll back through the data. You must ensure that you have loaded the required Message Flows into the IS03 tool before selecting 'Start stats collection'.

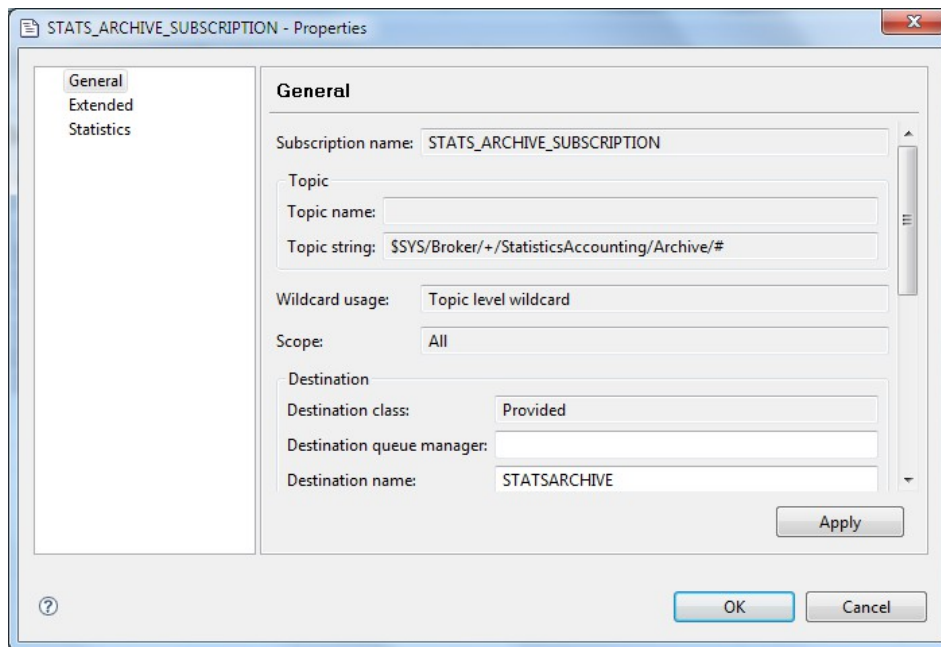


Figure 3.2 – Archive statistics subscription

Using the IS03 SupportPac

1) Loading in Message Flows and Sub-flows

IS03 requires you to load in Message Flows before it is able to display them. You do this by pointing it at their msgflow files. Perform the following steps to load in Message Flow files:

1. Select the `add message flows` button on the Config tab.
2. Select the parent directory where the msgflow files reside. This is likely to be the message flow project directory where Message Broker Toolkit stores the files.
3. IS03 will detect all the msgflow files within this parent directory and will prompt you with a dialogue (Figure 3.2) allowing you to load one or more of each of the flows. You will need to load in the correct number of each msgflow file. For example, if you have a simple flow which has no subflows, simply select '1' next to the msgflow file. If you have a more complex flow e.g. a main flow, `mainflow.msgflow`, which uses two instances of the subflow `tracesubflow.msgflow` and one instance of the subflow `errorhandler.msgflow` then you would select 1 x `mainflow.msgflow`, 2 x `tracesubflow.msgflow`, 1 x `errorhandler.msgflow`.
4. Select `Submit` and this will load each flow into a separate tab in the IS03 GUI.

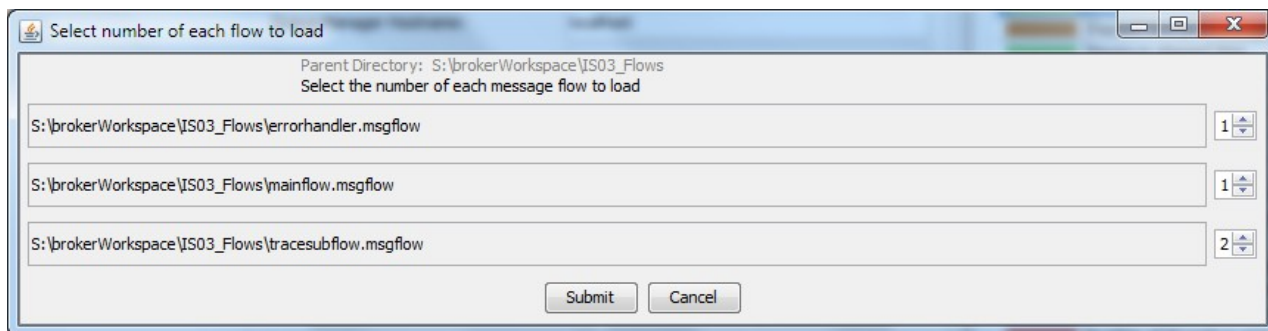


Figure 3.2 – Load flows dialogue

After loading in a flow, you can view it by selecting its tab along the top of the GUI. Note that the layout of the nodes is based on the layout of the nodes in the WebSphere Message Broker Toolkit, so the nodes may need to be dragged around in the IS03 GUI for it to look correct.

2) Configuring which Statistics to graph

IS03 allows you to configure which statistics it will graph. These settings can be modified at any time.

The Config tab allows you to configure which statistics are displayed on each of the three graph types (Message Flow Statistics, Node Statistics, Thread Statistics). To show or hide a particular statistic, simply select or deselect the 'selected to graph' checkbox (Figure 3.3). The color of line a particular statistic should use can also be modified by clicking on the coloured region and selecting a new color.

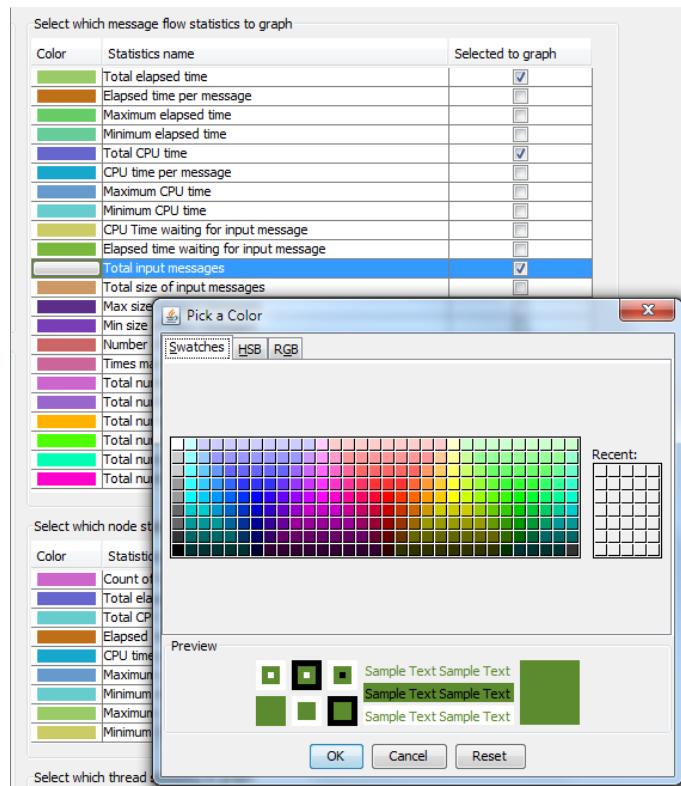


Figure 3.3 – Selecting which stats to display

3) Starting statistics capture

Before you start statistics capture, ensure you have specified the 'General config' options correctly, as specified in the 'Configuring the IS03 SupportPac' section of this document. To start statistics collection simply click the `Start stats collection` button. The `connection status` field should go green and indicate that IS03 is successfully connected to the Queue Manager. If it goes red, indicating an error connecting, recheck your connection settings and retry.

4) Viewing statistics data

After statistics collection has successfully begun, data points will start being displayed in the node graphs. A new data point will appear each time that Message Broker publishes statistics data (i.e. every 20 seconds for Snapshot statistics). If your flow uses subflows, the statistics data for the subflow will be displayed on the subflow's tab.

Figure 4.1 gives an overview of the GUI when a message flow tab is selected. Each of the highlighted parts of the diagram are explained in more detail below.

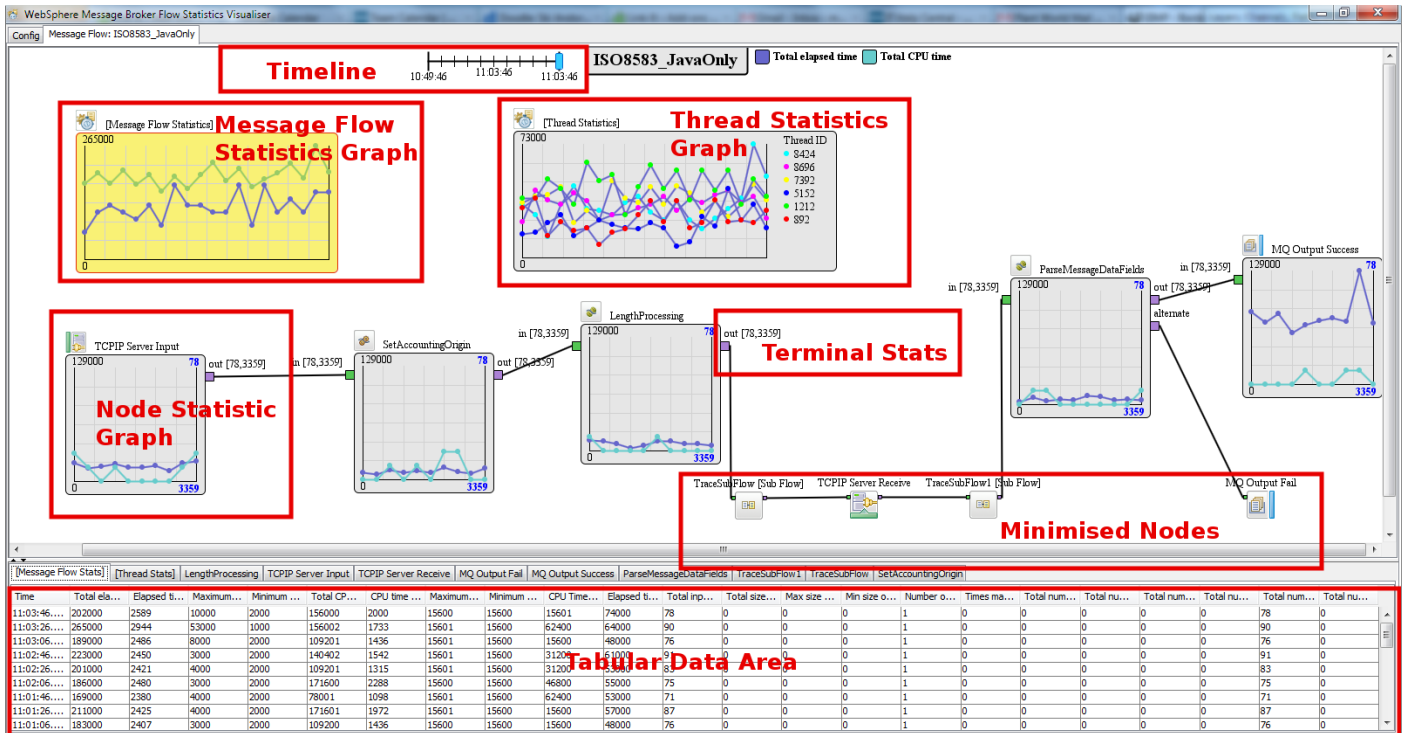


Figure 4.1 – The message flow GUI

Node Statistic Graph – Each node in your message flow is represented by a graph which shows the statistics data for that individual node. Note that some special nodes, such as Input/Output and Subflow nodes, do not have statistics data associated with them.

Message Flow Statistics Graph – Message flow statistics represent statistics which are associated with the whole message flow (not a particular node in it). This data is displayed in a separate graph on the GUI.

Thread Statistics Graph – Thread statistics show statistics for each of the threads running in your message flow. This data is displayed in a separate graph on the GUI. Note that in this graph, the line color depicts the statistic being graphed, and the 'dot' color depicts the thread it is associated with (there is a key on the right of the graph which displays the thread id to color map). Note: Thread statistics will only be displayed if they are enabled to be output. See the `mqsischange flowstats` command in the WebSphere Message Broker infocentre for more information.

Terminal Statistics – Terminal statistics will be output next to all terminals which have processed at least 1 message. Note: Terminal statistics will only be displayed if they are enabled to be output. See the `mqsischange flowstats` command in the WebSphere Message Broker infocentre for more information.

Minimised Nodes – All nodes in the GUI (including the Message Flow Statistics and Thread Statistics graphs), can be toggled between a minimised and maximised state by clicking on the graphical icon which is connected to them. Minimising nodes give you more screen real estate to view the nodes you are interested in.

Timeline – Each of the nodes only shows up to 10 data points (except the Message Flow Statistics and Thread Statistics graphs which show up to 20 data points), this means that for Snapshot statistics, it will show data for up to the last 200 seconds. The Timeline bar allows you to move back through time and see data points which have already 'scrolled off' the graph. See Figure 4.2 for an example of what moving through the timeline does. You move through the timeline by dragging the blue slider.

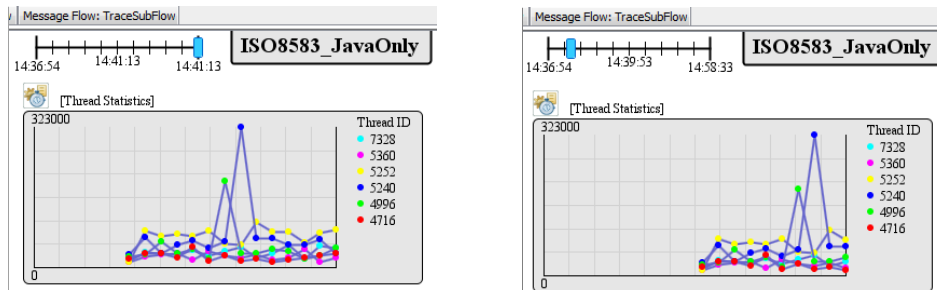


Figure 4.2 – Moving through the timeline

Tabular Data Area – As well as showing statistics data in the graphical format, IS03 also show the data in a tabular format. Clicking on a node in the GUI will select the corresponding tabular data tab and will allow you to interrogate the raw data.

Figure 4.3 shows a close up of a single node in the GUI. The numbered parts are explained below.

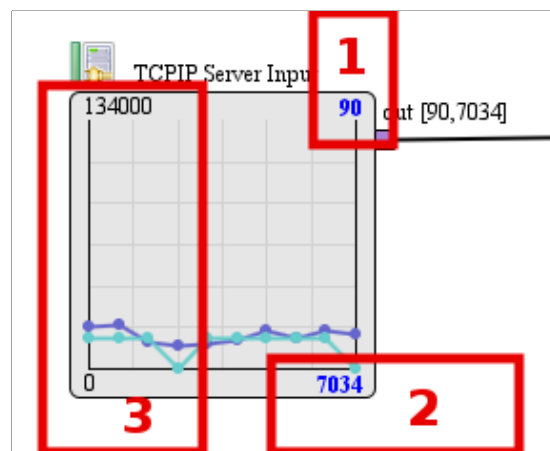


Figure 4.3 – A node in the GUI

- 1 - The node invocation count for the last data point.
- 2 - The cumulative node invocation count since data collection started.
- 3 - The node scale is displayed on the left of it. This scale will dynamically adjust depending on the data which is being displayed. All nodes on a particular tab (with the exception of the Message Flow Statistics and Thread Statistics graphs) will use the same scale to enable relative comparisons to be performed simply. Note that when you are graphing a time based metric, e.g. 'Total CPU time', the number represents the

number of microseconds (10^{-6} second) as this is the format in which WebSphere Message Broker output elapsed time durations.

Two special statistics can be viewed using IS03 which are not standard statistics as published by WebSphere Message Broker. These are 'Average elapsed time per message' and 'Average CPU time per message' and these can be used as useful performance metrics. These statistics can be enabled or disabled in the same way as all other statistics by selecting the corresponding checkbox on the Config tab of the IS03 GUI.

5) Exporting statistics data to CSV

IS03 is able to export all the statistics data which it has collected into a CSV format. This is done via the 'export options' area on the Config tab (Figure 5.1). The interface gives you a configurable set of options to allow you to export exactly the statistics you are interested in.

Export options

Select message flow: ISO8583_JavaOnly

Current number of statistics entries stored for this flow: 116

Choose which statistics entries to export:

Select All Select None

Select for export	Statistics entry time
<input checked="" type="checkbox"/>	15:15:13.498
<input checked="" type="checkbox"/>	15:14:53.605
<input checked="" type="checkbox"/>	15:14:33.897999
<input checked="" type="checkbox"/>	15:14:13.725
<input checked="" type="checkbox"/>	15:13:53.645
<input checked="" type="checkbox"/>	15:13:33.167999
<input checked="" type="checkbox"/>	15:13:13.777

Type of stats to export

Message flow stats

Node stats

Terminal stats

Thread stats

Only export 'Selected to graph' stats

Export to CSV

Figure 5.1 – Export to CSV options

The CSV data is exported in a self documenting format whereby the first row of the data defines the data fields, and the subsequent rows contain the data itself.

6) Resetting all statistics data

Select the 'Reset all data' button on the Config tab to clear all graphs. Note that after resetting the data, it is irretrievably lost and can no longer be exported.

Troubleshooting problems

There is basic trace information which can be enabled if you are encountering problems. This could be useful for diagnosing connection problems or may provide insight into why graphs are not displaying data correctly.

To enable it, modify the RunIS03.bat (RunIS03.sh on Linux) file and change the line:

```
java com.ibm.wmb.is03.gui.VisualiserGUI  
to:  
java com.ibm.wmb.is03.gui.VisualiserGUI -trace
```

The trace file will be output to %TEMP% on windows, /tmp on Linux.

Note that this is 'developer trace', which is intended to be understood by the developer of the product and not necessarily the user.

Version History

V1.0 – Initial release.

V1.1 – Update to support WMBv8. Bug Fixes.