

# Qflex User Guide

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# Chapter 1

## What's New In Qflex 2.0

- Support for WebSphere MQ 6.0
- Monitoring of failures and statistical data in WebSphere Business Integration Message Broker 5.x and 6.x
- New graphical installer that makes installing Qflex as easy as pie on either Unix or Windows platforms.
- No third party products need to be installed by the user except JDK.
- Installs as a service on Windows platforms.
- Start/Stop scripts available for Unix platforms.
- Includes Cflex, a module that detects changes to any MQ objects. Changes can be approved or rejected (reinstating objects to their previous state) in Standard version only. See Chapter 8 for more details.
- Improved error handling. Any MQ Errors are presented to the user.
- Express edition now uses embedded HSQLDB requiring no MySQL expertise on the part of the user.
- Upgrades will no longer require running SQL scripts
- Save customized reports for future reuse.
- New and improved utilities for editing messages as well as finding and deleting messages matching certain criteria. New \$variables that can be used in alert message content. See Section 3.2.5

## Chapter 2

# Managing Resources

### 2.1 Managing Queue Managers

This chapter will explain how to add, edit and delete queue managers from Qflex domain.

#### 2.1.1 Adding Queue Managers

Before anything productive can be done with Qflex, we must add or register WebSphere MQ Queue Manager with Qflex. In the left panel expand *Resources* and click on *Queue Managers*. You will be presented with a screen that shows the list of the existing Queue Managers and also presents a form to add new queue managers.

**Queue Manager Name** is the name of the WebSphere MQ queue manager that is to be added into Qflex monitoring domain.

**Queue Manager Alias** See 2.1.1

**Host Name** is the name of the server where where queue manager resides. IP addresses or DNS names are allowed.

**Port** is the port number where queue manager listener is accepting connections from WebSphere MQ Clients.

**Channel Name** is the SVRCONN type channel that has been defined for Qflex to use.

**Command Server Queue Name** is the queue which is serviced by the queue manager command server process. For WebSphere MQ on Z/OS the default value of the command server queue name is SYSTEM.COMMAND.INPUT however specific systems might be configured differently <sup>1</sup>.

**Command Server Reply Queue** has to be a local or an alias queue that has been defined for use by Qflex. Qflex will us

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<sup>1</sup>This parameter is only required for WebSphere MQ Z/OS

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**Operating System** As of release 1.0.x Qflex only distinguishes between PCF aware and non-PCF aware queue managers. However it is highly recommended that correct operating system is selected in order to take advantage of future operating system specific functionalities in Qflex and WebSphere MQ 6.0.

After filling out all of the necessary fields, hit the *Save Queue Manager* button. The queue manager, queue manager listener and command server all have to be available at the time queue manager is added. If Qflex fails to connect to the queue manager, it will not be added into monitoring domain.

### Queue Manager Alias

In certain instances when there is more than one queue manager in Qflex domain with the same name or queue manager name is too long and using a shortcut name would be more preferential, one can define queue manager aliases. These aliases are Qflex aliases not WebSphere MQ Queue Manager aliases. By default, alias name is the same as queue manager, however should the alias be defined, it will be used in lieu of real queue manager name when working with:

- Performance Reports
- Monitors
- Alerts

### 2.1.2 Editing Queue Managers

To edit the queue manager, navigate to *Resources then Queue Managers* and click on the icon which shows piece of paper and pen to edit the queue manager. Change whichever properties you would like to change and hit save. The green or red icon in the status column indicates whether Qflex is able to connect to the queue manager at the moment. If there are more queue managers added to Qflex domain than fit on a single page, there will be >and >>buttons at the bottom that will allow to scroll to the next and last pages listing queue manager names.

### Finding Specific Objects

In order to find a queue manager with a specific name, use the searching tool bar above the table. In order to use regular expressions, see Sun JDK 1.4.2 `java.util.regex` class javadoc for more details.

### 2.1.3 Deleting Queue Managers

To delete queue manager, navigate to *Resources then Queue Managers* and click on the red cross icon to delete the queue manager. Deleting the queue manager will delete all data associated with that queue manager:

- Statistics
- Monitors
- Existing Alerts

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## 2.2 Managing Brokers

**Broker Name** is the name of the WebSphere Message Broker that is to be added into Qflex monitoring domain.

**Broker Alias** If the environment contains multiple brokers with the same name, aliases could be used to differentiate brokers. See 2.1.1

**Broker Queue Manager** is the name of the broker queue manager.

**Broker Durable Subscription Queue** is the name of the queue that Qflex will use to create various broker subscriptions. Note this queue has to begin with prefix *SYSTEM.JMS.D.\**, e.g. *SYSTEM.JMS.D.QFLEX*. It is not recommended to use generic durable subscription queues used by other subscribers such as *SYSTEM.JMS.D.CC.SUBSCRIBER.QUEUE*.

## Chapter 3

# Problem Management

### 3.1 Monitoring Templates

Monitoring Templates are an easy way create many monitors and apply them to n number of objects. Once the monitor had been created using a template there is no relationship between the monitor and the monitoring template. For example, if the property of the template which was used to create a monitor is modified the change will not affect the monitor. Templates are simply cookie cutters for creating monitors monitors. Templates define all attributes of a monitors except triggering condition and the object name. Any other attribute of a monitor can be customized after it had been created with the template.

To create a template Navigate to *Problem Management then Monitoring Templates*. This screen shows the list of existing templates and a form to create new templates. To edit or delete an existing template, click on the edit icon next to the template. In order to find a particular template, search toolbar is available. For more details see 2.1.2

#### 3.1.1 Monitor Object Type

In order to monitor status of the queue manager, choose *Queue Manager* as monitor object type. For channel events such as channel stopping, channel binding, etc., choose *Channel*. For queue related attributes such as depth or number input processes, choose *Queue*. Monitor object can also be *Broker* and *Flow* for broker related conditions as well as *QoS* for advanced monitoring.

#### 3.1.2 Criticality

Choose appropriate criticality level as you see fit. As of release 1.0.x, Qflex will not perform any special behavior for different criticality levels. In the future, however there will be functionalities that will rely on criticality for various types of handling of alert messages.

Criticality is passed along with the alert via all notification methods. You may choose to instruct your staff to act differently upon receiving alerts with various criticality levels.

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### 3.1.3 Notification Method

Regardless of what notification method is chosen, all alerts with status New will be displayed in the Qflex Web Console. Following notification methods are currently supported:

- Write to console<sup>1</sup>
- Write to log file
- SMTP
- SNMP
- AOL AIM<sup>2</sup>

Read Chapter 4 for more details on configuring these options.

### 3.1.4 Triggering Condition

Triggering Conditions are displayed based on the monitoring object type selected to narrow down the specific type of event. Triggering condition parameters or values can be selected during creation of the actual monitors.

### 3.1.5 Template Name

Template Names are assigned automatically. It is recommend that you accept auto generated name however you are free to use your own template names.

### 3.1.6 Polling Interval

Polling Interval(minutes) allows controls frequency with which monitored condition is checked. Minimal value is 1 minute.

### 3.1.7 Interval Between Occurrences

Interval Between Occurrences(minutes) allows to ignore subsequent occurrences of the alarm for a specified period of time, after monitoring condition occurred for the first time.

For example, Monitor Template A has Polling Interval set to 1 minute and Interval Between Occurrences is set to 3 minutes. After Qflex notices that the condition has occurred for the first time, it will send an alarm however it will not send another alarm until three minutes have elapsed provided during that time condition remained true. Once the alert is sent, message in the web console will also show all times and number of occurrences that monitoring condition was true but no alert was sent out. If condition had no longer been met during the interval between occurrence the counter is reset.

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<sup>1</sup>This option is default and had been deprecated after 2.0

<sup>2</sup>This option had been deprecated after 2.0

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## 3.2 Monitors

Monitors are different from monitoring templates because they are bound to specific WebSphere MQ and WebSphere Message Broker objects. Monitors are also bound to specific triggering conditions values or parameters. Changing the monitor properties does not affect the template and vice versa. All properties inherited from the template can be over written.

Any changes to the monitor are picked up automatically during next polling interval. To create a monitor Navigate to *Problem Management then Monitors*. Select the parent template to use to for monitor creating. Once the template is selected most of the variables will be filled in based on the inheritance from template configuration. However additional parameters must be configured in order to create an instance of the monitor.

### 3.2.1 Log File

If *Write to Log File* is the notification method for the monitor, select file location where log files should be written. Any valid file path for the operating system hosting Qflex is allowed.

### 3.2.2 Triggering Condition Parameter

Provide a value for this field if Queue is the monitor object type. For example, to set up monitor that checks if the depth is over 10, triggering condition parameter should be *Depth >* and triggering condition parameter 10. For monitors with monitor object type *Queue Manager or Channel* this field is irrelevant.

### 3.2.3 Queue Manager Name

Select the queue manager where the monitored object resides. If and only if monitoring object type is *Queue Manager* multiple queue managers can be selected by holding Ctrl-Key while clicking on the names of queue managers. Template can then be applied to multiple queue managers.

### 3.2.4 Object Name

Select the object name that is to be monitored Object names should be either a channel name or queue name depending on the monitor object type selected. Hold Ctrl-Key and click on object names to select multiple objects. The template will then be applied to all objects selected.

### 3.2.5 Alert Text

Alert Text provides a way to customize messages for each monitor. Following custom tags can be used in the message body. These tags will be replaced with the actual values at runtime.

\$date - Date,

\$qm\_nm - Queue Manager Name,

\$qm\_alias - Qflex Queue Manager Alias,

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\$q\_nm - Queue Name,  
\$q\_depth - Current Queue Depth,  
\$q\_in\_count and \$q\_out\_out - Queue Input and Output Count  
\$channel\_nm - Channel Name,  
\$channel\_sts - Channel Status,  
\$channel\_start - Channel Start Time,  
\$channel\_tp - Channel Type,  
\$connection\_count - Number of Current Channel Connections,  
\$monitor\_nm - Monitor Name,  
\$severity - Alert Severity,  
\$trig\_condition\_param - Triggering Condition Parameter,  
\$monitor\_nm - Monitor Name,  
\$recovery\_text - Special Instructions Text,  
\$msg\_id - Message ID of a Stale Message,  
\$msg\_body - Message Body of a Stale Message,  
\$msg\_put\_time - Message Put Time of a Stale Message,  
\$brk\_nm - Broker Name,  
\$flow\_nm - Flow Name,  
\$seg\_nm - Execution Group Name

### **Advanced Stale Message Alert Text**

QoS Stale Message monitor allows Qflex end user not only list the basic details of a stale message at the top of the queue, but also display any message header variable and loop through a number of stale messages on the queue. Qflex 2.0 introduced new variable called \$stale\_message. Using this variable once access following fields:

\$stale\_message.id - Same as \$msg\_id  
\$stale\_message.data - Same as \$msg\_body  
\$stale\_message.messageHeader - Object that provides access to MQMD  
\$stale\_message.messageHeader.accountingToken  
\$stale\_message.messageHeader.applicationId  
\$stale\_message.messageHeader.applicationOrigin  
\$stale\_message.messageHeader.backoutCount  
\$stale\_message.messageHeader.Coa  
\$stale\_message.messageHeader.Cod  
\$stale\_message.messageHeader.CodePage  
\$stale\_message.messageHeader.CorrelationId  
\$stale\_message.messageHeader.expiration  
\$stale\_message.messageHeader.expiry  
\$stale\_message.messageHeader.groupId  
\$stale\_message.messageHeader.messageFormat  
\$stale\_message.messageHeader.messageType  
\$stale\_message.messageHeader.persistence  
\$stale\_message.messageHeader.priority  
\$stale\_message.messageHeader.putApplicationName  
\$stale\_message.messageHeader.putTime  
\$stale\_message.messageHeader.replyToQueueName  
\$stale\_message.messageHeader.replyToQmanagerName  
\$stale\_message.messageHeader.messageSequenceNumber

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`$stale_message.messageHeader.userId`  
`$stale_message.messageHeader.messageFlags`  
`$stale_message.messageHeader.originalLength`  
`$stale_message.messageHeader.characterSet`  
`$stale_message.messageHeader.encoding`  
`$stale_message.messageHeader.feedback`

To see more advanced examples how to perform a loop or execute a conditional statement inside alert text go to [here](#)

### 3.2.6 Recovery Text

Recovery Text provides a way to customize messages for each monitor. You are encouraged to use this field to instruct your operations and data center staff about handling of this alarm. You can use all the custom tags that are used in Alert Text.

## 3.3 Existing Alerts

To search through the log of existing alerts. Go to *Problem Management then Existing Alerts*. This screen presents the list of all alarms with status "New." Alerts can have three possible states.

- New
- Acknowledged
- Resolved

Use this form to search for Alerts based on any or all of the search parameters available on the form. Once the list of the alerts is returned, alerts can be edited by changing the status of the alert as well as putting in comments regarding the incident.

# Chapter 4

## Options

This chapter explains how to configure various options in Qflex.

### 4.1 SMTP

SMTP needs to be configured if you are planning to use Email for alert notification and to send bug reports to Netflexity. Navigate to *Options then SMTP* and check boxes next to the fields that you will be changing.

- SMTP\_EMAIL\_FROM is the email address that will be used as from address when sending alerts and bug reports. This must be a valid email address in your domain.
- SMTP\_EMAIL\_TO is a field where one or more email addresses can be specified. These addresses will receive alerts when monitoring conditions occur. To specify multiple addresses, separate them with semicolons.
- SMTP\_PASSWORD is required by some SMTP servers. This field is optional depending on your local configuration.
- SMTP\_SERVER is the host name of the server hosting SMTP server.
- SMTP\_USERNAME is the user name that must be used in combination with SMTP\_PASSWORD field. It is optional depending on your local SMTP configuration.

*Note: You must check boxes next to the fields that are being updated.*

### 4.2 SNMP

Download qflex.mib file from Netflexity's website. You may import this mib file into enterprise consoles such as HP OpenView, Tivoli Enterprise Console, Nagios and Big Brother. Go to *Options then SNMP* and place a checkbox next to the fields you would like to edit. You must specify Server, port, SNMP version and community in order for Qflex to send alerts via SNMP traps. Contact your SNMP administrator for more details.

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## 4.3 Data Collection

Data Collection provides a way to configure how often Qflex will query queue managers performance data. Note that this value does not affect polling intervals of the monitors defined in Qflex. If it is important to see data on a minute by minute basis, configure collection to run every 1 minute. See A for more details on Performance Considerations.

One collection policy can be applied to all queue managers at once or click plus icon next to the queue manager name to add specific collection policy for that queue manager. Alternatively, you can edit collection policies for specific queue managers by clicking plus icon and then edit icon.

### 4.3.1 Data Frequency Resolution

Consider a scenario where Qflex collects performance data from some queue manager every 5 minutes. Within that interval some application enqueued 100 messages and another application dequeue all of those messages. Because Qflex relies on the queue manager to keep track of stats it simply retrieves those counters at a collection interval, this activity will be recorded by Qflex. Even if the collection interval is set to every 60 minutes and some application enqueues/dequeues 10K messages in one second, Qflex will record that traffic activity however it will not be able to show exactly when that occurred since it only retrieved counter values once an hour.

### 4.3.2 Filtering

Qflex allows users to specify certain queues which should be excluded from having statistical data gathered and stored for those queues. There are two ways to add a filter to a collection policy. Click on the plus sign next to a collection policy and place a filter value into the filter box. You can specify multiple filters as comma delimited values, in addition you can use wild cards at the end of the filter like this SYSTEM\* such a filter would prevent the statistical data from being gathered for any queue that begins with SYSTEM\*

There is also a way to add filters to multiple queue managers at once by adding the filter directly from the collections page however the filter will not be displayed until you edit collection policies for specific queue managers.

*Important Note. Even though after adding filters for certain queues, those queues will still show up in reports however they should have 0 values for statistics.*

## 4.4 Data Archival

Performance data in Qflex is stored using database records that have somewhat following format. ID1,...IDx, MSGS\_IN, MSGS\_OUT, START\_TIME, END\_TIME. START\_TIME and END\_TIME indicate for what period in time this statistics applies. If the difference between START\_TIME and END\_TIME is a minute or less, we categorize that type of record as a *Minutely* Data. Same principle applies to hourly, daily, etc. types of data.

Data is archived in the straightforward fashion. To convert minutely data into hourly, Qflex adds all MSG\_IN and MSG\_OUT values for the past hour. The

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Qflex creates a new record with the `START_TIME` of the EARLIEST minutely record and `END_TIME` of the LATEST minutely record for the past hour, then places the `MSG_IN` and `MSG_OUT` values calculated in the previous step and creates a new performance record. Qflex then deletes all the *Minutely* data for the past hour. So instead of having 60 records (1:00 to 1:01, 1:01 to 1:02) you now have one record from (1:00 to 2:00).

Qflex allows you to have flexibility to configure for how long you would like to keep each *Type* of data. For example, you can decide that you need hourly data for the entire month and your collection frequency is every hour. You can configure following Archival Policy. Frequency = Hourly, Interval = 1 Month. Qflex will not archive this data into a monthly interval until it is one month old. Similarly, you can then configure how often to archive monthly data and so on. See Section Performance Considerations for more details.

You can add one archival policy to all queue managers at once. To add a collection policy for a chosen queue manager, click on the plus sign next to a specific queue manager and edit the archival/compression policy for that queue manager. Nothing else needs to be done for the archival to go in the effect. As soon as you submit it, Qflex archival thread will notice it and archive the data when necessary.

*Note: Qflex Express will delete all the performance data that is more than 24 hours old.*

See A for more details on Performance Considerations.

## 4.5 Broker Subscriptions

In order to turn on broker statistics, select the broker, execution group and flow name by expanding the topology tree and clicking on the appropriate object. Optionally click on the broker to subscribe for statistics on everything or click on execution group to subscribe for statistics for all flows in that execution group.

## 4.6 Broker Compressions

Qflex Express discards all broker statistics that is older than 3 hours. However Standard version can be configured to support more flexible long term statistical archiving similar to Queue Stats Archival.

## 4.7 Security

In order to change Administrators information such as password or email. Navigate to *Options then Security* and click on the edit icon next to Administrator. Change values to suit your needs and hit save. Every time Administrator options are changed, you must supply the password in the second password field.

As of Qflex 1.0.x role value is ignored.

## Chapter 5

# Report Viewing

### 5.1 Report Types

Qflex allows viewing of the performance data about the queue managers that had been added to Qflex. In order to view the performance data, ensure that you have set up a Data Collection Policy and it had been started in the Operations Console.

Reports can be viewed at the Queue for a specific Queue Manager or at the Queue Managers Level. At the queue level, you will be able to see statistics for all queues for a particular interval in time. At the queue manager level, you will be able to see the total statistics for each queue manager.

In order to see the statistics for a particular queue or set of queues, navigate to *Reports then Queues*. If you would like to see statistics for a particular period in time, go to *By Data* or if you would like to see performance data for the past X minutes, go to *By Interval*. Select the queue manager and select the time interval in which you are interested. Hit *Generate Report*

### 5.2 Understanding Report Data

Once the reported is presented you, at the top you will see the date interval for which the report is relevant. The table with queue names and other statistics will be presented. To sort by any specific attribute of the table simple click on it. To sort in the opposite order, click on the column name one more time. To search for specific objects using the searching facility in the upper right corner of the table. See 2.1.2 for more details.

**Messages In** column shows how many messages had been PUT on the queue during the interval.

**Messages Out** column shows how many messages were removed from the queue either using MQGET or CLEAR commands.

**High Depth** shows maximum depth of the queue that had been reached during that interval.

**Total Throughput** is an arithmetic expression of Messages In + Messages Out.

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To compare the statistics between two or more queue managers, check box next to queue name and hit *Compare*

If you selected type of report *By Interval*, clicking on refresh will refresh the report for last X minutes that you have selected, starting from current time, not the time report was generated

All the way at the bottom of the screen there is Idleness Report. Idleness Report shows times during which collection could not take place for reasons such as:

- Collection Disabled
- Queue Manager Not Available.

If Qflex was turned off for a period of time, it will show up as *Collection Disabled*.

### 5.2.1 Queue Based Performance Data

To see detailed data about a specific queue, click on the queue name. Several charts depicting detailed queue statistics will be presented as well as textual representation of the graphical data. Use textual data if to see precise interval times for performance data.

Under following condition textual data will not match graphical charts. If you specified an interval for which there are performance records that place OUTSIDE of the interval, the data will not be presented graphically however it will be presented textually.

*Example.* There are two time-adjacent performance records. Record A shows all the performance data from January 1st to February 1st 12AM. Record B shows all the performance data from February 1st 12:01 AM to February 1st 3AM. If you select to see all the data from February 1st 10AM or 3AM, the chart will not be able to scale in a meaningful way so such data is not displayed graphically, however it is available in textual format.

### 5.2.2 Broker Reports

To see details about a specific flow statistics, select one of the broker reports.

## Chapter 6

# Operations Console

Operations console allows you to control following activities in Qflex:

- Start/Stop Monitoring for specific Queue Managers.
- Start/Stop Collections for specific Queue Managers.

This is useful when your queue manager is undergoing a migration and you would like to prevent all clients from connecting to the queue manager. Simply suspend those activities and Qflex will not be connecting to the queue manager.

If all monitors for specific queue managers are deleted, the monitoring will automatically turn off. Monitoring will need to be manually turned back on when new monitors are created.

Changing of the collection policy automatically shuts down the process of collection. After a collection policy had been modified, it will need to be re-started manually.

# Chapter 7

## Utilities

### 7.1 Web Based Browser

Qflex allows its users to browse the queues of any Queue Manager that had been added into the Qflex. To browse a queue, navigate to *Utilities the Queue Browser* and select the queue manager name as well as queue name that you would like to browse. If you would like to browse all messages on the queue, simply hit *Browse*.

To retrieve messages of specific sequence put in values for the starting message sequence number and/or ending. You will be presented with the list of messages. Messages will be converted to the native CCSID of the J2EE Server where Qflex resides. Queue browser can only display MQMD header. At this point Queue Browser will not display MQHFR2 headers or any other. Click on the *i* icon next to the message to view MQMD and message data.

## Chapter 8

# Change Control

Qflex can detect changes to MQ objects such as queue or a channel. In order to do that, config collection has to be turned on. For queue managers with over 500 queues, config collection interval less than 10 minutes is not recommended as keeping track of object changes is a CPU intensive operation. Once the the config collection had been created and enabled, Qflex will load an initial tree of all object definitions and assign a version to each object. As changes to the objects made, Qflex will detect them and assign a new revision to one or more changes that had been detected during the collection interval. Detected changes can be approved or rejected. If the change is approved, Qflex accepts that revision as a last approved queue definition. In case of multiple revisions, all revisions up to and including approved revision are approved. If the revision that is approved is not the latest revision, remaining revisions will remain outstanding and can be rejected. If a change is rejected queue is reverted to the last approved state. If multiple changes are rejected, all changes up to and including the rejected revision are rejected. If the revision that is rejected is not the latest revision, remaining revisions will remain outstanding and can be approved or rejected at a later time. Approval and rejection is not supported in Qflex Express.

## Chapter 9

# Support Information

### 9.1 Company Information

Using this screen to update the company information. It will make it easier for Netflexity to get in touch with you when you submit a problem. A serial number that you have received maybe updated here to switch to a full version of the Qflex or to allow Qflex to upgrade to a newer major release.

### 9.2 Reporting Bugs

If you have identified a bug or other type of inconsistency in Qflex, please submit a problem report via Qflex built-in bug report form by navigating to *Support Info then Problem Report*. Fill out the necessary values, attach necessary files to submit a problem. If you are receiving a server error, please include compressed TOMCAT\_HOME/logs and C:\home\QFLEX\logs directories. The email message containing problem report will be sent to [qflex@netflexity.com](mailto:qflex@netflexity.com)

### 9.3 License

Qflex licencing details can be obtained by going to *Support Information then Licenses*.

## Appendix A

# Performance Considerations

Qflex performance will be affected by the number of factors such as:

1. Total number of queues for all queue managers for which performance data is collected.
2. Collection Policy
3. Archival Policy

Consider following scenario.

- 4 Queue Managers
- 200 queues per queue manager
- Collection Policy is every 1 minute
- Archival Policy is Convert minutely data to hourly every 12 hours

By the time 12 hours have elapsed your database will contain

$$Records = queues * frequency * time \rightarrow 4 * 200 * (1 * 60 * 12) = 576,000 Records \quad (A.1)$$

On a Pentium 4 with an IDE drive, your response times will be over 2 minutes due to high IO despite the fact that each performance record is only about 150 bytes. This is clearly unacceptable. The solution is either reduce collection frequency or increase frequency with which the data is archived. We recommend that the data is collected every 15 minutes and hourly data is archived every 1 or 2 days. Note that this limitation is not caused by the way Qflex handles the data but rather by the ability of your database and hardware to process X amount of data.