Catalys MIS User Guide

Version 2.2 r90102ef2

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Chapter 1. Introduction

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1.1. Catalys Overview

Catalys is CameronTec's integrated software solution designed to meet the broad spectrum of functional needs for firms seeking to utilize advanced FIX connectivity.

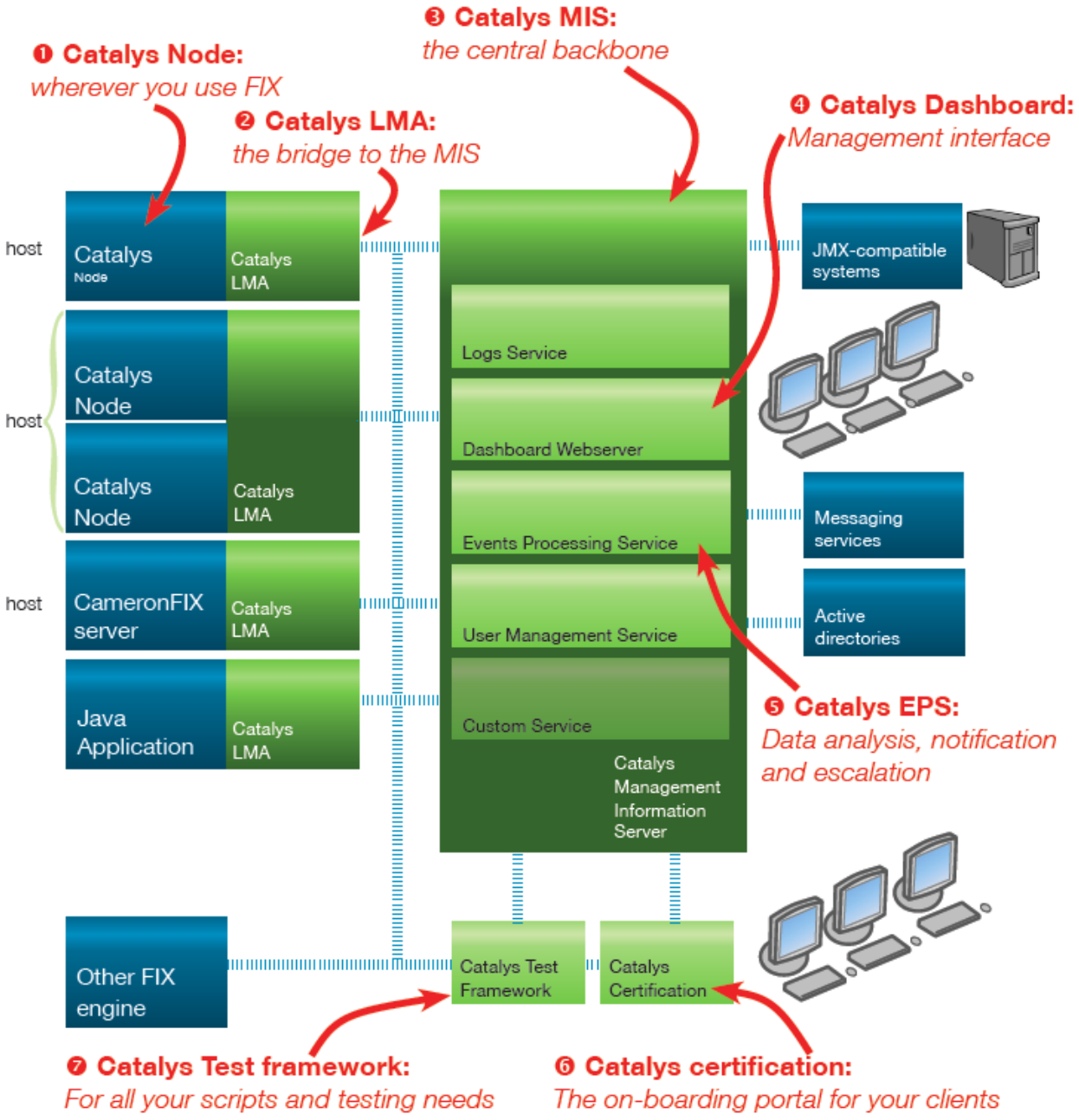
What makes Catalys different is its unique approach: it is an unprecedented environment to develop, deploy and operate your advanced FIX infrastructure as an **ecosystem**.

Multiple components work together inside the Catalys ecosystem:

- The Catalys Nodes handle the FIX message flows. Refer to the Catalys Node Documentation.
- The Catalys LMA connects the nodes to the rest of the ecosystem. Refer to the Catalys LMA Documentation.
- The Catalys MIS is the central backbone for transversal services such as monitoring provided via an API or the Catalys Dashboard user interface. Refer to the Catalys MIS Documentation.

- The Catalys Test Framework produces and runs testing scripts for all aspects of the ecosystem. Refer to the Catalys Test Framework.

The various components are represented in the following diagram. For more information, please consult the specific section of the Catalys documentation.



1.2. Introduction

The CameronTec Management Information Server (MIS) is a Java-based solution for the scalable monitoring and configuration of the CameronTec Catalys and CameronFIX servers.

The MIS consists of:

- The Dashboard, a web-based user interface
- The Management Agent (MA), a JMX management agent that provides an aggregated management API for all of the registered servers
- Other services that process events and logs for data analysis and escalation

1.2.1. Getting Started

Installation

Follow the instructions in the Installation Guide to install the MIS, ensuring you have the correct license file from CameronTec.

Operation

Once installed, the MIS can run automatically (as a service under Windows, and a daemon under Unix and Mac OS X). There is a MIS command that can start, stop, and report the status of the MIS process. Please review the command line options for all the supported commands. It can also be run directly in unwrapped mode.

Configuration

The MIS takes its configuration from a file. This defaults to *conf/mis.conf* in the installation directory. To change the name or location of this file, the `-Dmis.configuration-file` property can be supplied on the Java command line when starting the MIS.

Servers

By default, the MIS will manage servers running on localhost.

To configure other CameronFIX or Catalys hosts into the MIS, add them using the Dashboard (see Managed Hosts), or by modifying the MIS configuration file.

Logs will be available only on those servers which have the CameronTec High Performance Logger configured.

Running Standalone Services

The `startDashboard`, `startMA`, `startEPS` and `startUMS` properties are used to start the MIS components in standalone mode in order to distribute the MIS across more than one host machine.

1.2.2. Compatibility

Java

The MIS requires Java 8 or later to run.

LMA

The MIS is fully compatible with the Catalys LMA version 2.2 or later.

It is also compatible with the Catalys LMA versions 2.0/2.1, and the previous LMA versions 1.1.0-1.2.2 and 2.0; however in this configuration the streaming of logs data generated by the High Performance Logger is not supported, and startup times can be substantially longer.

Catalys Node Servers

The MIS fully manages Catalys Node version 2.2 or later.

It also manages Catalys Node versions 2.0/2.1, however startup times can be substantially longer, and not all High Availability failover scenarios are fully supported.

CameronFIX Servers

Servers and sessions of CameronFIX servers can be managed by the MIS, but their configuration cannot be viewed or modified via the Config Tab.

Events from CameronFIX servers can be managed via the Events Tab providing they are at version 8.0 or later.

1.3. Catalys Releases

Introduction

Catalys products are delivered in three different types of releases: major, minor and maintenance.

Major Releases

A major release delivers new functionality and occasionally includes changes to the public APIs, configuration schemas, data file formats and default configuration values which may not be backward-compatible. New features can also replace previous features that accomplish the same function.

An example of a new major release is 2.0

Minor Releases

A minor release delivers new functionality and bug fixes and will be compatible with the previous release.

An example of a new minor release is 2.1

Maintenance Releases

In between each major and minor release, CameronTec provides iterative updates called Maintenance Releases. These contain the baseline software delivered in the current release plus bug fixes and minor new features. Although it's not required, it is always recommended to download the latest maintenance release for evaluation as it may provide finer tuning, performance improvements or increased stability.

When a maintenance release is created, the product's version number does not change. Rather, the *revision* number is incremented. For example: 2.1 r37928.

Release Notes

Each major release is accompanied by a Release Summary which provides a high-level view of the changes and new features.

Maintenance releases are accompanied by Release Notes that provide an incremental listing of the enhancements and resolved issues in each release.

Here is a sample Release Notes excerpt:

r35564 released 2015-05-18

ENHANCEMENTS	COMPONENTS	SUPPORT CASES
NODE-4752: Provide user feedback when scanning large journals	Buffering File Persistence	

RESOLVED ISSUES		
NODE-734: Re-enable the "s_reprocess" command	Core File Persistence	SERV-60346

All releases, documentation and release notes can be downloaded from the Docs Portal.

1.4. What's New in Catalys 2.2

The following new features are available in Catalys 2.2 products at launch. In addition, Catalys 2.2 includes a large number of new features that were also back-ported to Catalys 2.1 as part of maintenance releases.

For any changes made after the initial release of Catalys 2.2, refer to the release notes for each maintenance release. Release notes are available from the Docs Portal.

1.4.1. Installers

Catalys products are now distributed with an installer, automating the process of install, upgrade and uninstall. The installers are platform-specific and support Linux, Windows (32- and 64-bit) and most Unix-based operating systems.

1.4.2. New Features in Catalys Node 2.2

General

- NODE-4929: SendingTime can now be expressed with millisecond, microsecond, or nanosecond precision.
- NODE-4884: New `-version` command-line switch for Catalys Node.
- NODE-4910: `Session.maximumGapQueueSize` is no longer unbounded by default.
- NODE-3771: New consolidated drop-copy message processor for low impact drop-copy of another Catalys Node's message flow.
- NODE-4727: `MarketMirrorPopulator` now supports message object reuse.
- NODE-4745: Added JMX monitoring for multi-connection sessions.

High Performance Logging

- NODE-4365: Improved performance with many threads logging under intensive load.
- NODE-2428: Display jar file details in stack traces.

High Availability

- NODE-4596: Support for HA replication of a custom service's configuration.
- NODE-4674: HA data replication performance improvements. Introduced new multicast data replication option, as well as a new passive site replication feature allowing periodic pull-based data replication instead of continual push-based data replication. Also added a safety mechanism that will prevent a node from do a resynchronization if it is too far behind.

Collections Framework

- NODE-4765: Collections can now be created at run-time instead of only at startup.
- NODE-4925: High-capacity lists now support set in the middle of the list instead of only at the end.
- NODE-4586: High-capacity lists can now share the same indexer thread.
- NODE-4817: Maps and high-capacity lists can now use an off-heap cache for fast, garbage-free caching of very large amounts of data.

Buffering

- NODE-4350: Message buffers now support message object reuse.
- NODE-4826: Message buffer size is no longer excessively logged.
- NODE-4809: Serialization format changed to be faster and more compact.

Solace Adapter

- NODE-5030: Provide configurable last resort action for consumed Solace messages which cannot be processed.
- NODE-4860: Add option to safeguard against message loss due to windowing.
- NODE-4856: Add option to clear CompIDs in consumed Solace messages before firing to FIX.
- NODE-4821: Create `SolaceEndpoint` component for routing Solace messages.

Advanced Socket Adapter

- NODE-4862: New high-capacity message store option.

Socket Adapter

- NODE-4841: Minimizing logging of undeliverable events when no socket client is connected.

Scheduling

- NODE-4848: New option to execute missed reset tasks on startup.

Multi-threading

- NODE-4617: More descriptive thread naming.
- NODE-4803: Enhanced thread pinning capabilities.

Routing

- NODE-2286: `Link.ignoreSessionSide` attribute removed.

1.4.3. Public API changes Catalys Node 2.2

Catalys Node 2.2 is compatible with Catalys Node 2.1 except that the following XML configuration attributes are no longer necessary and have been removed:

- `ListenerMessageBuffer.setStoresMessages`
- `SourceMessageBuffer.setStoresMessages`

- `Link.ignoreSessionSide`

In addition there is currently a known issue causing an incompatibility between the persistence files of message buffers in 2.1 and 2.2. See issue NODE-5046.

1.4.4. Known Issues in Catalys Node 2.2

- NODE-5046: Message buffer persistence from 2.1 is not compatible with 2.2.
- NODE-5045: RulesEngine round() function is inconsistent with legacy valueOf() function.
- NODE-5038: HA synchronization window warning should only be logged once.
- NODE-5037: Unexpected exception while trying to reload config containing rules.
- NODE-5033: Spurious OpenHFT thread affinity GC warnings.
- NODE-5031: Exception when activating a component that is already active.
- NODE-5016: Installer does not accept relative or home directory-related paths.
- NODE-4999: Node installer reports incorrect required disk space.
- NODE-4978: Uninstall does not remove empty CameronTec directory.
- NODE-4977: Uninstall incorrectly reports that it will delete the parent directory of an installation.
- NODE-4871: MarketDataProcessor leaves a thread running after deactivation.
- NODE-4870: NotifyingMessageBuffer retry thread ignores interrupts.
- NODE-4790: .NET client intermittently reports error when disconnecting.
- NODE-4713: Catalys server should not log errors and warnings when shutdown.

1.4.5. New Features in Catalys Node 2.1 Maintenance Releases

The following features were added to Catalys Node 2.2 and also back-ported to Catalys Node 2.1 as part of maintenance releases, and have been available for some time.

General

- NODE-4577: Safety feature: Duplicate instances of the same Catalys Node will no longer run at the same time.
- NODE-4379: Improved logging at startup.
- NODE-2834: Maven POM file now included in the distribution.
- NODE-4694: Support for explicitly specifying SSL protocols

- NODE-4351: Reload configuration from XML now disables affected sessions automatically.
- NODE-4682: New `license_reload` command.
- NODE-4360: New session configuration attribute `maximumAppQueueSize`.
- NODE-3176: New Multiplexed and non-blocking I/O capability for FIX sessions.
- NODE-3174: Move SendingTime generation off critical outbound latency path.
- NODE-3172: Add core affinity capability to MessageAssembler thread.
- NODE-230: Add ability to control the ordering of tags within an `IFIXMessage`.
- NODE-4558: Removed periodic object creation in `SessionManager`.

High Availability

- NODE-4788: Ability to mark certain cluster nodes as not to be used as data sources during synchronization.

Collections Framework

- NODE-4752: Progress is now logged periodically when scanning very large journals.
- NODE-4636: Collection directory uniqueness is now validated at startup.
- NODE-4747: Journaling persistent stores unnecessarily copy bytes when reading from journal

Scheduling

- NODE-4878: EventLists are now validated so that two tasks will not execute at the same time.

Buffering

- NODE-4763: Introduced output limit to `mb_messages` command.
- NODE-2212: New `mb_remove` command for removing messages from buffers.

Embedded Adapter

- NODE-4380: Added ability to manage sessions from the embedded Catalys Node's owning application.

IBM MQ Adapter

- NODE-4432: SSL support.

Advanced Socket Adapter

- NODE-4525: New `asa_list` command that lists all connected ASA clients and the sessions they are subscribed to.

- NODE-4484: New CONNECT message that supports filtering by SessionID.
- NODE-4472: Added keepAlive configuration option.

Solace Adapter

- NODE-4446: New Technology Adapter: Solace Adapter.
- NODE-4824: Support Solace JCSMP API v7.
- NODE-4823: Add support for reply-to topics.
- NODE-4822: Add support for dynamic error topics.
- NODE-4779: New Solace message transformer that ensures valid tag order, BodyLength and CheckSum.
- NODE-4571: Remove restriction on Solace message type.
- NODE-4567: DMQ support.

.NET Adapter

- NODE-4767: Added ability to get session status from .NET application.

Throttling

- NODE-4864: New inbound message throttling feature based on limiting the speed at which messages are read from the socket rather using message buffering.

Routing

- NODE-2272: Any-to-any routing support. No need to define static session groups.
- NODE-4813: `AutoRoutingResponse` can now be placed anywhere in the message processing chain.

Rules Engine

- NODE-4608: Added the concept of default rules.
- NODE-4619: New action: `ActionStripChars`.
- NODE-4734: New action: `ActionFileLookup`.
- NODE-4589: New action: `ActionLog`.
- NODE-4520: New condition: `ConditionFieldsUnique`.
- NODE-4547: New condition: `ConditionOvernightOrder` to hold and release outbound messages to FIX session based on a schedule.
- NODE-4611: ActionReject can now send application level rejects.

- NODE-4622: New function available in expressions: `round()`.
- NODE-4497: Add the ability to pass the message processor object to custom actions.
- NODE-4496: Add ability to load rules from the config file and apply them to messages outside the Catalys FIX engine.
- NODE-4923: Add verbose output for rules engine tracking.
- NODE-2612: Rules Engine now supports message object reuse.
- NODE-4661: New option for handling Amend or Cancel messages where the original order cannot be found.
- NODE-4877: Reduce garbage creation in rules engine.

1.4.6. New Features in Catalys MIS 2.2

General

- MIS-1563: LDAP connection timeout is now configurable.

Logs

- NODE-2858: Introduced a new high-throughput logs streaming stack. Logs can now be transferred from Catalys Nodes to the MIS at approximately the bandwidth of the network connection.
- MIS-1677: New parallel log insertion algorithm increases the speed at which logs can be inserted into the log events repository.
- MIS-1584, MIS-1477: Log cleanup speed and memory usage drastically improved.
- MIS-1478: Browser memory usage stabilized when tailing logs for long periods of time.
- MIS-1593: Logs tab now provides visual feedback of ongoing searches.
- MIS-1598: Logs tab date selection widget is easier to use.
- MIS-1663: Logs cleanup configuration simplified.
- MIS-1646: New 'find' feature added to logs tab.
- MIS-1393: Custom conversation correlators can now define arbitrary custom message types.
- MIS-1392: Added ability to name custom tags.
- MIS-1699: Log streaming admin page redesigned.

Events

- MIS-1661: New Action: Windows NT Event.

- MIS-916: Add Category filter to Log interests.

1.4.7. Known Issues in Catalys MIS 2.2

- MIS-1844: Logs streaming does not work on Solaris unless `LD_LIBRARY_PATH` contains `/usr/sfw/lib:/usr/sfw/lib/amd64`.
- MIS-1837: JMX cascading suffers poor performance over a slow network.
- MIS-1828: Logs cleanup is significantly slower when logs are being inserted at a high rate.
- MIS-1815: Replicated log files can become corrupt if source log files are modified in unexpected ways while being replicating.
- MIS-1812: Text Search - Escape button does not clear out search field.
- MIS-1811: Text Search - Search results should wrap around to start.
- MIS-1810: Events - Session Report interest taking union of selection when multiple interests configured.
- MIS-1805: Logs tab - Buttons are off screen while re-sizing left section panel.
- MIS-1796: MIS sometimes incorrectly reports that no logs were deleted during cleanup.
- MIS-1795: Admin - log streaming tab has double scroll bars and blank bottom section after exit from full screen mode.
- MIS-1790: Abrupt MIS termination can lead to duplicate log entries in the logs repository.
- MIS-1775: Events - Email password in mis.conf not encrypted.
- MIS-1773: Events - Escalation sequences - Stop-here-on-ack doesn't work correctly.
- MIS-1771: Admin - Permissions - Add escalation sequence permission only works if change escalation sequence permission is assigned.
- MIS-1770: Admin - Permissions - Add interest permission only works if change interest permission is assigned.
- MIS-1769: Admin - Permissions - Admin Tab is hidden unless incorrect set of permissions is assigned.
- MIS-1764: Servers and Sessions - Script info not shown for CameronFIX 8.0 servers.
- MIS-1763: Servers and Sessions - Process info not shown for CameronFIX 8.0 servers.
- MIS-1757: Config - Tooltips should be displayed for configuration tree icons.
- MIS-1756: Config - View changes so far menu item should be disabled when there are no changes.
- MIS-1755: Config - Add top-level selector should be disabled for 2.0 nodes.
- MIS-1754: Config - Unable to delete compression without multiple reloads.

- MIS-1753: Servers and Sessions - Change session sequence number doesn't work for 1.1 Catalys Nodes.
- MIS-1752: Events - Escalation Sequences - Event view of an escalation sequence's progress is faulty.
- MIS-1749: Events - Interests - Session report interest events are unreadable in dashboard.
- MIS-1747: Events - Interests - Log regex interest category field implies that it is a regular expression but is not.
- MIS-1745: Events - Add Interest - Underlined fields do not link to anything.
- MIS-1744: Events - Interest template description is not displayed.
- MIS-1743: Admin - Disabling a user while they are logged in causes their browser to repeatedly logout and login.
- MIS-1731: Uninstalling MIS on Windows does not warn if it cannot remove all directories.
- MIS-1709: Dashboard logged user out automatically after executing a log search after tailing logs overnight.
- MIS-1705: Multiple errors logged if replicated logs directory is deleted when logs replication and insertion into logs repository is in progress.
- MIS-1693: Logs tab apply button sometimes needs to be pressed twice.
- MIS-1640: When log filter end time is earlier than start time, an error comes up on dashboard.
- MIS-1610: Too many error message on dashboard if live streaming is on when shutting down MIS server.
- MIS-1581: If opening an interest after resizing the dashboard GUI smaller, the custom text fields are not popped out.
- MIS-1320: Events - Creation of an interest with incorrect regular expression is allowed by dashboard.
- MIS-461: Rules - Error when renaming rulesPack which is referenced before rules engine is reloaded.

1.4.8. New Features in Catalys MIS 2.1 Maintenance Releases

The following features were added to Catalys MIS 2.2 and also back-ported to Catalys MIS 2.1 as part of maintenance releases, and have been available for some time.

- MIS-1542: Log insertion can now be filtered by message type to exclude high-volume messages that do not need to be stored.
- MIS-1385: Added a calendar for public holidays to the interest schedules.
- MIS-1384: Session status column now takes session's schedule into account.
- MIS-1350: Open conversation view now retains user's current category selection.

- MIS-1301: Improved dashboard responsiveness when monitoring nodes with high latency.
- MIS-811: The MIS can now expose the output of scripts via JMX.
- MIS-1349: Conversation correlators added for SecurityDefinition conversations.

1.4.9. New Features in Catalys LMA 2.2

- NODE-2858: Introduced a new high-throughput logs streaming stack. Logs can now be transferred from Catalys Nodes to the MIS at approximately the bandwidth of the network connection.
- LMA-50: Unwrapped LMA distribution.

1.4.10. Known Issues in Catalys LMA 2.2

- LMA-65: Log4j guest logger support not handling `CR/LF` properly.

1.5. Getting Support

1.5.1. Contacting Support

Email

Send an email to your regional support team with the details of your issue or question and include log files and configuration files if applicable. This automatically creates a support ticket and alerts the support team.

- North America and South America: supportamericas@itiviti.com
- Europe, the Middle East and Africa: supportemea@itiviti.com
- Asia Pacific: supportapac@itiviti.com

Online Form

Submit a request on our support portal. This automatically creates a support ticket and alerts the support team.

Phone

For high priority issues you can call your regional support team. This does not create a support ticket.

- North America and South America: **+1-312-235-5602**
- Europe, the Middle East and Africa: **+44-20-7942-0969**
- Asia Pacific: **+61-29002-4273**

Support Tickets

Emailing support or filling out the online support form automatically creates a support ticket, notifies the support team and sends the customer an automated email with a support ticket number. Any updates made to the ticket will be sent to the customer via email.

You can track and update all tickets submitted by your organization on the Support Portal by clicking on the My activities button on the top of page after logging in.

Support Level Agreement

During the License Term, as a part of the License Fee, Licensor undertakes to provide the software support set out in your contract, with respect to the Software Product. Such software support will be provided to the Customer through the Service Center during the Service Center's normal Business Hours: All Business Days between 8.00 a.m. – 6.00 p.m. local time for the respective Service Center. The Service Center may choose to refer the calls to any other Licensor certified Service Center, or to the relevant third party Service Center as and when needed, during and outside its Business Hours.

1.5.2. Sending Files to Your Support Team

Most support issues require the support team to review certain configuration files or logs from your Catalys environment. These files will vary from product to product.

Catalys Node

- **Configuration File(s)**: One or XML files that contain the configuration for the Node instance. These are located in the *<CATALYS_NODE_INSTANCES>/<INSTANCE>/conf* directory if using the installer.
- **Log File(s)**: One or more log files containing application and FIX message logging for the Node instance. These are located in the *<CATALYS_NODE_INSTANCES>/<INSTANCE>/logs* directory if you used the installer.
- **Log Configuration Files**: The *HighPerformanceLogger.conf* and *logback.xml* files for the Node instances. These are located in the *<CATALYS_NODE_INSTANCES>/<INSTANCE>/conf* directory if using the installer.
- **License File**: *camerontec_license.xml* file located in the root of your CameronTec installation.

Catalys LMA

- **LMA Configuration File**: *lma.conf* file located in the */conf* directory of the standard LMA directory layout.
- **LMA Registry File**: *lma.registry* file located in the */data* directory of the standard LMA directory layout.
- **LMA Log File**: The application log file for the LMA located in the */logs* directory of the standard LMA directory layout.

Catalys MIS

- **MIS Configuration File**: *mis.conf* file located in the */conf* directory of the standard MIS directory layout.
- **MIS Log File**: The application log file for the MIS located in the */logs* directory of the standard MIS directory layout.
- **License File**: *camerontec_license.xml* file.

Chapter 2. Installation and Startup

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2.1. Prerequisites

Java 1.8

The Catalys MIS is a Java application built with Java 8. It can run on any operating system where a Java Runtime Environment (JRE) 8 or later is installed. No other third party libraries or databases are required.

In order to run the MIS Dashboard, the entire JDK (not just the JRE) must be installed so the servlet container can compile the Dashboard Java Server Pages (JSPs).

License File

Our License Team will provide you with an XML license file that contains a license key for the MIS and any other Catalys products for which you are licensed. It will include an expiration date and all of your licensed features. See License Management for details on how to read and install the license.

Write Access

Certain features of the MIS (persistence, logging, rules engine, etc.) create and write to files on the file system. The user account under which the MIS runs must have write access on these directories.

2.2. Support Portal

Registration

To gain access to the Docs Portal you need to request the extranet login to your account manager or at Our support team will review and activate your account.

Software Downloads

Installers for all Catalys products are available here on the Docs Portal. After logging in, click on "Catalys / Cameron FIX" box and then click on the "Catalys FIX" link in the "Software Downloads and Documentation" box. From there you can select the version you require.

Documentation

Documentation for all Catalys products is available from the Docs Portal. After logging in, click on "Catalys / Cameron FIX" box and then click on the "Catalys FIX" link in the "Software Downloads and Documentation" box. From here you can view online versions of the documentation or download a PDF for offline reading.

Release Notes

Each Catalys MIS release is accompanied by up-to-date release notes that explain the incremental changes in the release. You can download the latest release notes from the same location as the software downloads.

2.3. License Management

2.3.1. License File

You will receive an XML license file with one or more license keys for the software you are permitted to run. To use the license file, the name of the file must be *camerontec_license.xml*.

There are a number of ways to instruct the CameronTec software to find the license file. When a CameronTec application starts up it will search the following directories (in the order listed) until a license file is found:

1. Java system property specified in the startup command:

```
java -Dlicense-dir=/path/to/license/directory ...
```

2. `CAMERON_LICENSE_ROOTDIR` environment variable:

```
$ export CAMERON_LICENSE_ROOTDIR=/path/to/license/directory
```

3. Classpath of the Java application:

```
java -cp /path/to/license/directory:...
```

If you use an installer, you will have the option of importing a license file. If selected, the installer will prompt you for the location of the file, which will be copied into the root of the install and renamed accordingly. You must ensure that the license directory is included on the classpath of the Catalys application you are running.

2.3.2. How to Read Your License File

Your license is an XML file distributed by our license management team. One license file can contain multiple license keys for each product and version you are licensed for. It can be viewed with a text editor and is structured as follows:

```
<?xml version="1.0" encoding="UTF-8"?>
<camerontecLicense>
  <!-- Customer identifier -->
  <customer>Customer Name</customer>
  <!-- Licensed product. Multiple product keys can be present in one file. -->
  <product key="Catalys-Node-2.2">
    <license>
      <!--  Type of license, e.g. production or evaluation -->
      <licenseType>Evaluation</licenseType>
      <!-- License expiration date at 23:59:59 -->
      <expirationDate>yyyy-mm-dd</expirationDate>
      <!-- Scope of authorised usage -->
      <scope>Instance</scope>
      <!-- Licensed product features -->
      <features>
        <feature name="FAST" enabled="true" />
        <feature name="FIX Routing" enabled="true" />
        <feature name="High Availability" enabled="true" />
        <feature name="Scheduling" enabled="true" />
        <!-- Number of features (-1 is unlimited) -->
        <limitedFeature name="Sessions Count" count="-1" />
      </features>
    </license>
    <!-- Product key signature, which cannot be modified -->
    <signature>...</signature>
  </product>
```

```
  <product key="Catalys-MIS-2.2">...</product>
</camerontecLicense>
```

2.3.3. License Maintenance

License files expire periodically and customers may be required to replace their existing license. In most cases you can just overwrite the existing *camerontec_license.xml* file with the new one.

2.4. Installation

2.4.1. Introduction

The Catalys MIS application has traditionally been packaged as a zip file which is installed simply by unzipping the package in the desired destination directory. Starting with Catalys v2.2, we provide an automated platform-specific installer. The installer also helps you to:

- Install and start the MIS as a service
- Simplify the upgrade process

We continue to provide the zip package for customers who prefer to manually manage their installation process. However, for all other customers, we recommend using the installer, which is covered in the remainder of this section.

2.4.1.1. Compatibility

Browser Compatibility

We recommend running the Dashboard in the most recent version of your preferred browser.

Catalys LMA Compatibility

The MIS interfaces with the Catalys Local Management Agent (LMA) that runs on the same host where the CameronFIX server or the Catalys Node is running. The LMA is available to download from CameronTec's Support Portal.

It is recommended you use the same version of the LMA as the MIS.

Please consult the compatibility matrix for supported combinations of CameronFIX, Catalys Node, MIS and LMA.

2.4.2. Installation Steps

1. Download the installer for your platform:

- **Linux, Solaris, Mac OSX, and other Unix-based systems**: *catalys-mis-2.2-installer-r<revision>.sh*

  After downloading this file, you may need to make it executable if not already. This can be done by running `chmod +x <filename>`.

- **Windows 64-bit**: *catalys-mis-2.2-installer-64bit-r<revision>.exe*
- **Windows 32-bit**: *catalys-mis-2.2-installer-32bit-r<revision>.exe*

The *r<revision>* indicates the latest maintenance revision number.

Windows installers require a JRE to be installed that matches the architecture of the installer.

2. Launch the installer.

Note

When the Windows installer is launched, a User Access Control dialog appears asking if this installer has permission to make changes to the system as an Administrator. If the installer was launched by a user that is not in the Administrators Group role the dialog also prompts for Administrator credentials. If Yes is clicked (and Administrator credentials are entered if required), the installer will display screens related to Service installation. If Administrator credentials are unavailable or service installation is not needed, click No to close the dialog and resume installation without elevated privileges, with only the service installation screens being unavailable.

3. Select a Destination Directory: This is where the MIS distribution will be installed.
4. Program Group: On Windows, this allows creation of a Start Menu folder and shortcuts for the MIS executables. On Linux/Solaris, this allows creation of symlinks for the MIS executables.
5. Install License File: Enable this step if you would like the installer to place a copy of your license file into the */conf* directory of the installation. There are other ways to reference the license file, which are outlined in License Management.
6. Install EPS: Enable this step if you have a copy of the EPS module zip and would like the installer to import that module into the */lib* directory as part of the installation. This can be done manually after installation by extracting the jar file from the zip archive and placing it into the */lib* directory.
7. Install Service: Select this option to have the installer configure the MIS executable as a background service daemon process. If this option is selected, the final screen of the installer will give the option to attempt to start the service before the installer closes. Note that the service will install and run as Local System account (on Windows) and as root (on Linux/Solaris).

Note

This screen will only be displayed if the installer was launched as a user in the Administrators Group (on Windows) or as root (on Linux/Solaris).

2.4.3. Post-Installation MIS Directories

After the installation is complete, you will see the following MIS directories. The default location is *<INSTALL_BASE>/CameronTec/catalys-mis-2.2*.

- **bin** - contains the MIS executables, including the service executable *mis.[exe|sh]* and the console executable *misconsole.[exe|sh]*
- **conf** - contains logging configuration and the configuration for the MIS executables, as well as the default location for the *camerontec_license.xml* file
- **data** - is an empty directory which is the default location for the persistence files written by the MIS
- **doc** - contains information on our 3rd party libraries and has links to our online documentation
- **ext** - contains 3rd party libraries that cannot be packaged with *catalys-mis.jar* due to licensing constraints
- **jconsole** - contains scripts that allow JConsole to be used as a client of the MIS Management Agent
- **lib** - contains *catalys-mis.jar* along with other MIS jar files
- **resources** - contains resources required by the MIS, including default FIX dictionaries and email templates
- **scripts** - contains scripts executed by the MIS and published as attributes of the `MIS.Scripts` MBean
- **src** - contains sample Java code demonstrating basic examples of custom user details provider and EPS runtime actions Catalys Node API
- **web** - contains the MIS Dashboard web application

2.4.4. Upgrading or Installing Additional Features

The installer can be used for upgrading the Catalys MIS to a newer version, starting at version 2.2 or later. It can also be rerun to choose additional options that weren't selected on a previous installation. When the installer starts it should recognize that a previous installation exists.

Note that after an upgrade it is recommended to clear the browser's cache.

2.4.5. Uninstaller

To uninstall Catalys MIS, run the `uninstall.[sh|exe]` tool located in the Catalys MIS home directory. On Windows, this uninstaller can also be invoked from the Programs and Features tool by selecting the Catalys MIS entry and clicking Uninstall/Change. The uninstaller will delete the Catalys MIS root directory and all files and directories it contains. If the parent directory (*CameronTec* by default) is empty and was created by the installer, it will be deleted as well. If the MIS was installed as a service by the installer, running the uninstaller will remove this service. If the service was installed manually, it must be removed manually be the user - the uninstaller will not attempt to remove it.

2.4.6. Manual Service Installation

The Catalys MIS installer provides the option to install and start the MIS as a service. If this was not done initially, it can be done at a later time by re-running the installer. However, the MIS can also be manually configured to run as a service without using the installer with the following steps.

2.4.6.1. Installation Steps - Windows

1. Open a Command Prompt

Note

If User Account Control (UAC) is enabled on the system, the Command Prompt must be opened by an Administrator (right click on *cmd.exe* and select "Run as administrator").

2. Change the directory to the *\bin* directory under the MIS installation directory
3. Execute the command `mis.exe /install`
   - To install the service with a different name than the default ("mis"), pass in the new name as a second parameter after `/install`. For example: `mis.exe /install Catalys MIS`.
   - To prevent the automatic start of the service when the computer reboots, use the `/install-demand` option instead of `/install`.

If the service installation is successful, the line "Installed service 'mis'" is output to the console. If the service was installed under a different name, that name will be output instead of "mis".

2.4.6.2. Installation Steps - Unix

- Note that the 'root' user must run this installation.

- Create a link in folder */etc/init.d* to the MIS executable. If symlinks were set up, the link should be to the service executable there. If not, link to the service executable in the MIS directory.

```
%> ln -fs /usr/local/bin/mis /etc/init.d
```

or

```
%> ln -fs <MIS_HOME>/bin/mis /etc/init.d
```

- Use the installed service to start the MIS:

```
%> /etc/init.d/mis start
```

- Check that the MIS was successfully started by looking at the end of the MIS log file:

```
%> tail -100 <MIS_HOME>/logs/catalys-mis.log
```

You should see something like:

```
********************************************************************************
Apr 28 10:35:37 mis MIS[44820]:
Apr 28 10:35:37 mis MIS[44820]:   CameronTec - Management Information Server (MIS)
Apr 28 10:35:37 mis MIS[44820]:
Apr 28 10:35:37 mis MIS[44820]:      version  : 2.2
Apr 28 10:35:37 mis MIS[44820]:      revision : 20567
Apr 28 10:35:37 mis MIS[44820]:      build    : 20150428101439
Apr 28 10:35:37 mis MIS[44820]:
Apr 28 10:35:37 mis MIS[44820]:      Copyright (c) 1997-2015 CameronTec.
Apr 28 10:35:37 mis MIS[44820]:      All rights reserved.
Apr 28 10:35:37 mis MIS[44820]:
Apr 28 10:35:37 mis MIS[44820]:
********************************************************************************
```

- Ensure the operating system will start/stop the MIS automatically at the right run level, which involves creating symbolic links in the appropriate rc*.d run-level directories.
  - On Red Hat systems use the chkconfig command:

```
%> chkconfig --add mis
```

  - On Debian and Ubuntu use the following command:

```
%> update-rc.d mis defaults
```

- On Solaris, a startup (S) and process kill (K) link must be created for each desired runlevel. A typical configuration is:

```
ln -s /etc/init.d/mis /etc/rc0.d/K20mis
ln -s /etc/init.d/mis /etc/rc1.d/K20mis
ln -s /etc/init.d/mis /etc/rc2.d/S20mis
ln -s /etc/init.d/mis /etc/rc3.d/S20mis
```

- (Optional) Running the MIS as a non-root user
  While the MIS service must be installed by root, it can be configured to run as any user that has the correct permissions. To enable this, edit the *mis* service executable script. Uncomment the line with the "RUNUSER" variable, and set it to the username that you wish to run the service. Note that the user you have specified needs to have full access to the MIS installation directory, so you may need to either change the ownership of the directory using the `chown` command or change the permissions of the directory using the `chmod` command.

2.4.7. MIS Unwrapped Mode

To run the MIS without the Java Service Wrapper, obtain the unwrapped package from the CameronTec Support Portal and unzip it. The package name is similar to the installer executables but including the string *package*. For example: *catalys-mis-2.2-package-r<revision>.zip*. The *r<revision>* indicates the latest maintenance revision number.

Copy your license file to a directory on the MIS classpath; the default license directory for the unwrapped package is the */resources* directory. Run *bin/mis.sh* (on Unix platforms) or *bin/mis.bat* (Windows) to run the MIS directly as a Java application in a console window. This program will print log messages to that console window. To stop the MIS when it is being run in its unwrapped mode, simply press CTRL-C in the console window.

2.4.8. Verify Installation

Point your browser to the URL containing the name or IP address and the port of the MIS Dashboard Server. The default URL is *http://localhost:8080*.

The MIS login window will appear in the browser. Default login credentials are 'admin'/'admin', and should be changed after logging in for the first time.

If this login window does not appear or the MIS installation has not proceeded successfully then refer to the Troubleshooting section.

2.4.9. MIS Ports

The following are a list of ports the MIS uses in order to communicate with Catalys Node/LMA instances running on a different server and to expose the Dashboard web application. These ports need to be

opened if there is a firewall in front of the MIS server. The configuration attribute is included in case the default port needs to be changed in the *conf/mis.conf* file of your MIS install.

- JMX connector listening port: 10000

  The default value can be changed by uncommenting and modifying this attribute to a new port:

```
mis.jmxConnectorServer/JMXServiceURL
```

- Logs replication listening port: 12000

  The default value can be changed by uncommenting and setting these two attributes to the same port:

```
lrs.logsReplicationServiceClient/connectionManagerListenPortRangeStart
```

```
lrs.logsReplicationServiceClient/connectionManagerListenPortRangeEnd
```

- Dashboard webserver port: 8080

  The default value can be changed by uncommenting and setting this attribute to a new port:

```
dashboard.webServer/port
```

2.4.10. Command Line Options

The `mis.[exe|sh]` service executable provides command line options to interact with the service. In Windows, each of these options is preceded by a forward slash (e.g. `/start` and `/stop`).

Note

In Windows, if the service was installed with a name other than the default ("mis"), that name must be passed as a second parameter after the option. When using the installer on Windows, the service is installed with the name "Catalys MIS".

- `start`: starts the MIS service manually, outputting messages to a file in the */logs* directory of the MIS installation
- `stop`: stops the MIS service manually

- `run`: starts the MIS service in the foreground, outputting messages to the console, as well as in the */logs* directory in the MIS installation. This is intended primarily for debugging the service installation; for extended use of the MIS in a non-service mode, the *misconsole.[exe|sh]* executable is recommended.
- `status`: prints out whether the MIS service is running or not running
- `restart`: stops the MIS service manually and starts it again, outputting messages to a file in the */logs* directory of the MIS installation

2.4.11. Troubleshooting

Below are commonly encountered startup issues and their resolutions.

- Java not installed

  ```
  java: command not found
  ```

  A Java Runtime Environment (JRE) version 8 or higher must be installed to run the MIS.

- Java version mismatch

  ```
  Exception in thread "main" java.lang.UnsupportedClassVersionError: \
    com/camerontec/catalys/server/CatalysServer: Unsupported major.minor version 51.0
  ```

  A Java Runtime Environment (JRE) version 8 or higher must be installed to run the MIS.

- Missing or incorrectly configured license

  The directory where the *camerontec_license.xml* file lives must be on the classpath of the MIS. When using the installer, the default directory for the license is */conf*.

  More information on licensing is located here.

- License version mismatch

  ```
  License Error: Product "Catalys-MIS-2.2" is not present in the license
  ```

  You are attempting to run a version of the MIS that does not match the version in your license. Please contact your account manager for an updated license.

- Dashboard webserver port in use

  The MIS Dashboard starts a web server on port 8080 by default. If another application is using this port then the MIS will not start. Either stop or re-configure the other application, or change the port which the dashboard uses. This is configured in the the MIS configuration file:

  ```
  dashboard.webServer/port = 8081
  ```

- JMXMP Connector port clash

  The MIS uses port 10000 for its JMXMP connector. If this clashes with other applications, then the MIS will not start. This port can be changed to something other than the default in the MIS configuration file:

```
ma.jmxConnectorServer/JMXServiceURL = service:jmx:jmxmp://localhost:15000
```

- Database Server Does Not Start

  The MIS is runs with the H2 database be default, the database server will attempt to listen on all available IP addresses. With certain configurations (e.g. when also running a VPN), the database server may fail to startup because it cannot listen on one of these IP addresses. This will result in messages such as:

```
jvm 1 | com.camerontec.common.components.ExecutableStartException: \
  The embedded H2 database server was unable to start: \
  org.h2.jdbc.JdbcSQLException: Connection is broken [90067-79]
```

  To solve this problem, the H2 database server can be told to bind to a specific IP address using the `-Dh2.bindAddress` system property. Choose an IP address, ensure that it can be pinged, then set the system property in the *conf/wrapper.conf* file, by adding an additional java parameter. For example:

```
wrapper.java.additional.3=-Dh2.bindAddress=192.168.1.5
```

- MIS does not start when running as a Windows Service

  If the MIS is set to run as a Windows Service and the following error is displayed when accessing the Dashboard:

```
HTTP ERROR: 503 Problem accessing /dashboardView.htm. Reason: Service Unavailable
```

  This would be an indication that Jetty was unable to create a tmp dir under the User's temp directory. To confirm this, open *log4.xml* file located under the resources directory and set the `org.eclipse.jetty` category to level `WARN`.

```
<category name="org.eclipse.jetty">
  <level value="WARN"/>
</category>
```

  Restart the MIS and the MIS logfile should contain a similar `IllegalStateException` as followed:

```
WARN [org.eclipse.jetty.webapp.WebAppContext] - Failed startup of context \
  o.e.j.w.WebAppContext{/,null},../web/webapps/dashboard       \
  java.lang.IllegalStateException: Cannot create tmp dir in    \
```

```
  C:\windows\system32\config\systemprofile\AppData\Local\Temp\  \
  for context o.e.j.w.WebAppContext{/,null},../web/webapps/dashboard
```

To resolve this problem, Jetty can be configured to use a different `basetempdir`. The configuration change will need to be done on the *dashboard.xml* file located under *\web\contexts*. Add the following section to the end of the Configure element.

```
<Call name="setAttribute">
  <Arg>org.eclipse.jetty.webapp.basetempdir</Arg>
  <Arg>.</Arg>
</Call>
```

Once the changes are saved, restart the MIS.

- Log Streaming fails on Solaris

  Logs replication makes use of the Snappy Java compression library to compress the data it replicates. This compression library has a dependency on *libstdc++.so.6*. On Solaris this library is not included with Snappy. This will result in an exception when starting the MIS:

```
Exception in thread "LogsReplicationConnectionManager" java.lang.UnsatisfiedLinkError: \
   /var/tmp/snappy-1.1.0.1-a5bb2938-6b34-4175-a40d-528f1b75e55a-libsnappyjava.so: \
   ld.so.1: java: fatal: libstdc++.so.6: open failed: No such file or directory
```

  To solve this problem, it is necessary to make sure Snappy can find this library. This can be done by setting the `LD_LIBRARY_PATH` to `/usr/sfw/lib:/usr/sfw/lib/amd64`.

Chapter 3. Configuration And Maintenance

Table of Contents

3.1. Configuration

3.1.1. Terminology

The following terminology will be used in this section:

- JMX Service URL: It represents an URL of a JMX service and has the following format: `service:jmx:`*`protocol`*`://[host[: port]][url-path].` Please visit this page to find out more about JMX Service URLs.
- JMX Connector Server: It is a connector which is attached to an MBean server and listens for connection requests from JMX clients on a given JMX Service URL. It can be based on various protocols (HTTP, RMI, JMXMP, WS, SMTP...) which is indicated in its JMX Service URL

3.1.2. Configuration File

The start-up scripts of the MIS set the configuration file to *conf/mis.conf* by default. To modify this default, change the `-Dmis.configuration-file` property. If the file specified by this property does not exists then the MIS will create it.

The MIS configuration file contains lines of the form:

```
<property name> = <property value>
```

3.1.2.1. Dashboard Configuration

3.1.2.1.1. Dashboard Refresh Rate

By default the Dashboard refreshes its data every 8 seconds. This can be changed by setting the `dashboard.ui/refreshRateInSeconds` property. The value must be between 1 and 60. If a value outside of this range is used then the property reverts to its default. For example:

```
dashboard.ui/refreshRateInSeconds=5
```

3.1.2.1.2. Dashboard Log Refresh Rate

When refreshing live log views the Dashboard polls the server every 2 seconds by default. This can be changed by setting this property:

```
dashboard.ui/logRefreshRateInSeconds=5
```

3.1.2.1.3. Dashboard Address and Port

By default the Dashboard listens on all network interfaces. To listen on a particular interface, specify the IP address of via this property:

```
dashboard.webServer/host = 187.23.2.101
```

By default the Dashboard listens on port 8080. To change this settings, modify this property:

```
dashboard.webServer/port = 8081
```

3.1.2.1.4. Dashboard User Authentication

By default the Dashboard authenticates users against a local database.

Alternatively, the Dashboard can be configured to use JAAS or LDAP-based user authentication against an external directory server. This approach is limited to authentication; authorization is still performed locally by the Dashboard. Note that users need to be added via the Dashboard Admin tab whether they are authenticated locally or via JAAS or LDAP.

Authentication in the Dashboard always tries to make use of authenticators in the same order: the JAAS authenticator first, then the LDAP authenticator, then the default, UMS-based, authenticator.

Two properties can be set to control the maximum number of concurrent users and sessions:

```
dashboard.maxNumberOfConcurrentUsers = 0
```

```
dashboard.onlyAllowOneSessionPerLoggedUser = false
```

If *dashboard.maxNumberOfConcurrentUsers* is greater than 0, then only that number of users are allowed to be logged on at the same time.

If *dashboard.onlyAllowOneSessionPerLoggedUser* is set to true, then only one session per user is allowed.

These two properties default to 0 and false respectively, and work independently.

3.1.2.1.4.1. JAAS Authentication

JAAS user authentication is configured by specifying the following two properties. The first is the path to a JAAS login configuration file; the second is the name of a login module defined in the file.

```
dashboard.security.jaas.authenticator/loginConfigurationFile=/tmp/jaas-login.conf
dashboard.security.jaas.authenticator/loginContextName=Dashboard
```

Where the file */tmp/jaas-login.conf* contains:

```
Dashboard {
  com.sun.jmx.remote.security.FileLoginModule required \
    passwordFile="/tmp/dashboard-passwords.properties";
};
```

And the passwords file */tmp/dashboard-passwords.properties* contains:

```
user1=password1
user2=password2
...
```

JAAS comes with a number of predefined login modules, as well as allowing custom modules to be written.

3.1.2.1.4.2. LDAP Authentication

Simple LDAP authentication is supported (rather than SASL-based authentication).

Mixed-mode authentication is permitted, whereby some users are authenticated by the LDAP server and the rest are authenticated locally. If LDAP-based authentication is configured but the Distinguished Name (DN) resolution fails, then the MIS will attempt to authenticate the user locally.

LDAP-based user authentication is configured by specifying this property:

```
dashboard.security.ldap.authenticator/ldapServerURL=ldap://mydirectoryserver.mycompany.com:389
```

More than one LDAP URL can be specified in the `ldapServerURL` property in order to enable automatic failover; each URL must be separated by a space. The URLs will be tried in the listed order until a successful attempt is made or all URLs fail.

By default, connection attempts to inaccessible or unresponsive LDAP servers will not timeout until the underlying TCP socket times out. The following properties can be set to change this behavior.

```
# 10 second timeout when connecting to the server
dashboard.security.ldap.authenticator/ldapServerConnectTimeout=10000

# 5 second timeout when waiting for response after successful connection is established
dashboard.security.ldap.authenticator/ldapServerReadTimeout=5000
```

In order to bind to the LDAP server, the Dashboard needs to resolve the Distinguished Name (DN) by which a user attempting to authenticate is known to the LDAP server. Once resolved, this DN and the user-supplied password are used to perform the bind operation. There are two ways to resolve the DN of a username: mapping patterns or a search. Note that it is possible to mix these two methods. The Dashboard will try mapping patterns first and then the search, stopping as soon as a DN is found.

3.1.2.1.4.2.1. Resolve DN with a username to DN mapping

This approach is the simplest but it does require a simple pattern to derive a DN from a username. For example, all DNs in an organization may look like the following:

```
CN=<user name>,OU=Users,DC=mycompany,DC=com
```

The property `userDNMappingPatterns` is used to specify this mapping. This property's value is a comma-separated list of patterns, where each occurrence of the `{0}` placeholder will be replaced by the user-supplied username. For the example above:

```
dashboard.security.ldap.authenticator/userDNMappingPatterns=CN=\{0\},OU=Users,DC=mycompany,DC=com
```

If the DN is more complicated then extra patterns can be added. For example, the DN may have an extra OU field specifying the location of the user:

```
dashboard.security.ldap.authenticator/userDNMappingPatterns=CN=\{0\}, \
  OU=London,OU=Users,DC=mycompany,DC=com, \
  CN=\{0\},OU=New York,OU=Users,DC=mycompany,DC=com, \
  CN=\{0\},OU=Sydney,OU=Users,DC=mycompany,DC=com
```

The Dashboard will use each pattern in turn to attempt to bind to the LDAP server.

Note

If multiple patterns are specified then these must be separated by exactly one comma and one space.

3.1.2.1.4.2.2. Resolve DN with an LDAP search

If the mapping approach is not usable because, for example, the DNs take so many different forms that configuring them all through patterns would not be maintainable, or the DNs do not contain a username that is suitable for authentication purposes, an LDAP search can be used.

LDAP searches use expressions written in the LDAP expression language, as specified by RFC 4515. Such expressions typically make use of LDAP attributes that are not part of user DNs. The search is specified with the following property:

```
dashboard.security.ldap.authenticator/userDNSearchExpression= \
  (&(objectClass=user)(sAMAccountName=\{0\})
```

where once again the `{0}` placeholder will be replaced by the user-supplied username.

Most directory servers do not permit searching from the root directory. The `userDNSearchBase` property specifies a base DN under which to search. For example:

```
dashboard.security.ldap.authenticator/userDNSearchBase=OU=Users,DC=mycompany,DC=com
```

Alternatively the base can be appended to the LDAP Server URL. For example:

```
dashboard.security.ldap.authenticator/ldapServerURL= \
  ldap://mydirectoryserver.mycompany.com:389/OU=Users,DC=mycompany,DC=com
```

Most directory servers also disallow anonymous searches. The `authenticatedSearchUserDN` and `authenticatedSearchUserPassword` properties specify a special user account (typically the administrator account) with which to do the search. Below is a complete configuration based on an LDAP search that uses a base DN and an authenticated search:

```
dashboard.security.ldap.authenticator/ldapServerURL= \
  ldap://mydirectoryserver.mycompany.com:389
dashboard.security.ldap.authenticator/authenticatedSearchUserDN= \
  CN=Administrator,OU=Users,DC=mycompany,DC=com
dashboard.security.ldap.authenticator/authenticatedSearchUserPassword= \
  encryptme://{th1s1s4sup3rs4f34dm1np4ssw0rd}
dashboard.security.ldap.authenticator/userDNSearchExpression= \
  (&(objectClass=user)(sAMAccountName=\{0\}))
dashboard.security.ldap.authenticator/userDNSearchBase= \
  OU=Users,DC=mycompany,DC=com
```

See the Encrypted Properties section for details of the `encryptme` functionality.

3.1.2.1.5. Dashboard User Details Provider

By default, the Dashboard manages user details internally using an embedded H2 database.

User details include:

- Username
- Whether the user is enabled
- Groups that the user belongs to
- Permissions
- First name, last name, email address, locale
- (Optionally) Password. For security users passwords are often not stored with the rest of the user information, but rather are retrieved from an LDAP server.

User details can also be provided by a custom class, which implements the `ICustomUserDetailsProvider` interface.

This class, and any properties of that class, are configured by setting the following properties:

```
ums/customProviderImplementationClassName=custom user details provider class
ums/customProviderProperties[<property name 1>]=property value 1
ums/customProviderProperties[<property name 2>]=property value 2
```

The Dashboard requires a user called "admin" to exist in the UMS. Custom user details providers must ensure that they support an "admin" user, possibly by mapping this user name to some other user defined in the back-end that has administration privileges.

A very basic sample custom user details provider, the `SampleLDAPUserDetailsProvider` comes with the MIS installation. Full source code for this class can be found at: *src/com/camerontec/catalys/mis/ums/ldap/SampleLDAPUserDetailsProvider.java*.

This component is configured by setting the following properties:

```
ums/customProviderImplementationClassName= \
  com.camerontec.catalys.mis.ums.ldap.LDAPUserDetailsProvider
ums/customProviderProperties[ldapServerURL]=ldap://mydirectoryserver.mycompany.com:389
ums/customProviderProperties[authenticationDN]=CN=Administrator,OU=Users,DC=mycompany,DC=com
ums/customProviderProperties[authenticationPassword]=encryptme://{thisIsMyPassword}
ums/customProviderProperties[userDNSearchBase]=OU=Users,DC=mycompany,DC=com
ums/customProviderProperties[userDNSearchPattern]=(&(objectClass=user)(sAMAccountName=%s))
```

For further detail regarding the custom user provider API, refer to the API documentation.

3.1.2.1.6. Configuring Dashboard for SSL

The MIS uses Jetty as its internal web server, which can be configured for SSL. You may wish to do this in order to encrypt user credentials that are passed to the MIS. General information can be found here. The actual configuration changes must be made in *web/etc/CameronWeb.xml* and you can find example configurations in the above link.

3.1.2.2. Managed Hosts Configuration

3.1.2.2.1. Managed Hosts

This configuration entry defines a list of hosts that will be manageable through the MA. The MA will connect to the LMA running on each host using the default URL: *service:jmx:jmxmp:///<host>:10002* or the JMX Service URL configured for this host, and will aggregate the data exposed by each LMA and make it accessible through its API.

Note that this configuration can also be changed via the Dashboard. However, if this configuration is changed via the Dashboard, the configuration file is re-ordered and re-written.

Below is an example configuration that defines one managed host using the default JMX Service URL and one managed host that uses a non-default JMX Service URL:

```
ma/managedHosts = \
    <set>\
    <value>\
    <host>host1</host>\
    </value>\
    <value>\
    <host>host2</host>\
    <jmx-service-url>service:jmx:jmxmp://host2:10004</jmx-service-url>\
    </value>\
    </set>
```

The MA also exposes a public MBean that can be used to configure the set of managed hosts. This public MBean is registered under name `com.camerontec:type="MA"`. Changing the set of managed hosts though this MBean also modifies the MIS's configuration file.

3.1.2.2.2. Managed Hosts Security

By default, no security is configured for the connections to a managed host's LMA. If security is configured for a managed host, the LMA running on the managed should also have its security element configured accordingly (see the LMA documentation for more information).

The example below demonstrates how to configure TLS security for a connection to a managed host called `host3`:

```
ma/managedHosts = \
  <set>\
    <value>\
      <host>host1</host>\
    </value>\
    <value>\
      <host>host2</host>\
      <jmx-service-url>service:jmx:jmxmp://host2:10004</jmx-service-url>\
    </value>\
    <value>\
      <host>host3</host>\
      <security-profile>\
      <socket-factory>MySocketFactoryClass</socket-factory>\
      <protocols>\
        <protocol>p1</protocol>\
      </protocols>\
      <cypher-suites>\
        <cypher-suite>cs1</cypher-suite>\
      </cypher-suites>\
      </security-profile>\
    </value>\
  </set>
```

For a description of these configuration items, please refer to Sun's JSSE reference guide.

3.1.2.3. Connector Server Configuration

3.1.2.3.1. Connector Server URL

The `mis.jmxConnectorServer/JMXServiceURL` property specifies the protocol and port with which the JMX connector server is started by the MIS. By default, this property is set to:

```
mis.jmxConnectorServer/JMXServiceURL=service:jmx:jmxmp://localhost:10000
```

We recommend using the JMXMP protocol as it relies on TCP and Java object serialization. It requires only one port and provides good performance.

Alternatively, you can also RMI or any other transport protocol supported by JMX. Below is a configuration example with an RMI connector server:

```
mis.jmxConnectorServer/JMXServiceURL=service:jmx:rmi:///jndi/rmi://localhost:10000/jmxrmi
```

3.1.2.3.2. Connector Server Security

By default, no encryption is configured for the MIS connector server. If TLS security is configured on the connector server, applications connecting to this connector server should be configured accordingly.

The example below demonstrates how to configure TLS security for the connector server :

```
mis.jmxConnectorServer/securityProfile = \
  <socket-factory>MySocketFactoryClass</socket-factory>\
  <protocols><protocol>protocol1</protocol><protocol>protocol2</protocol></protocols>\
  <cypher-suites><cypher-suite>cs1</cypher-suite><cypher-suite>cs2</cypher-suite></cypher-suites>\
  <need-client-auth>true</need-client-auth>\
  <want-client-auth>false</want-client-auth>
```

For a description of these configuration items, please refer to Sun's JSSE reference guide.

3.1.2.4. JMS Agent Configuration

The JMS agent is in charge of maintaining the JMS queues used by the LMA to export log events into the MA.

3.1.2.4.1. URI on which the JMS Agent is listening

You will need to configure the URI on which the JMS agent is listening if your machine has more than one network adapter. By default, this URI is: *tcp://<IP address of the first network adapter found>:61616*

It is possible to instruct the MA to use a particular URI. Note that changing this setting does not require that you change anything in the configuration of the LMA, since this is taken care of by the handshake protocol between the MA and the LMA.

Below is an example configuration:

```
ma.jmsAgent/JMSBrokerURI = tcp://192.168.100.100:9999
```

This URI should not point to "localhost" or "127.0.0.1". Instead it should point to an IP address or host name of the MA's host, as seen from the LMA's host. IPv6 addresses need to be enclosed within brackets, as in: *tcp://[2001:0:cf2e:308c:10:977:3f57:ffed]:9999*.

3.1.2.4.2. Memory limits

In cases where the MA's Log Events Processor (see below) is not fast enough to process the log events streamed by the LMA, the JMS broker will impose a limit on the amount of memory that can be used

to hold pending messages. When this memory limit is reached, JMS producers on the LMA side will be blocked until some space becomes available in the JMS broker.

By default, the memory limit is as follows:

- 2 MB per JMS queue (the JMS Agent uses one queue per streamed log file)
- 64 MB in total

It is possible to change these settings. Below is an example that illustrates how to instruct the MA to use a limit of 8 MB per queue and 256 MB in total:

```
ma.jmsAgent/memoryLimitPerQueue = 8
ma.jmsAgent/totalMemoryLimit = 256
```

3.1.2.5. Event Processing Service Configuration

3.1.2.5.1. Custom Interest Templates

The Event Processing Service allows observation and escalation of events in the MIS through *interests*. An interest is a definition of a sequence of events and conditions that lead \ to an alert within the MIS.

Pre-configured interests come packaged with the MIS. In addition, if licensed to do so, customers can supply their own interest templates. This configuration property enables those custom interest templates. By default this feature is disabled.

```
eps.interestTemplateLibrary/loadCustomerInterestTemplates = true
```

If this feature is enabled, the MIS searches the class path for a directory called *customer-interest-templates*. Files with the *.epl* suffix are loaded.

3.1.2.5.2. Email Action Configuration

One of the actions that the Event Processing Service can perform as part of an escalation sequence is to email a list of recipients.

To utilize this feature, the MIS must be configured with the details of the email server. In addition there are a number of configuration properties associated with the processing of emails.

3.1.2.5.2.1. Email Server Configuration

To utilize the email action, configuration of an external email server is required using the following properties.

Set the hostname of the email server:

```
eps.emailSender/mailServerHostName = smtp.mycompany.com
```

Set the username of the mail account to be used for sending:

```
eps.emailSender/mailServerUserName = jsmith
```

Set the password of the account. This property can be encrypted using the encryptme directive.

```
eps.emailSender/mailServerPassword = encryptme://{password}
```

Set the port number of the server:

```
eps.emailSender/mailServerHostPort= 587
```

Set the name of the account that the emails are sent from:

```
eps.emailSender/mailServerFromName = Jane Smith
```

Set the address of the sender:

```
eps.emailSender/mailServerFromAddress = jsmith@mycompany.com
```

Enable TLS if the server supports it:

```
eps.emailSender/mailServerUsesTLS = true
```

Sending Email Using Microsoft Exchange SMTP

Microsoft Exchange SMTP servers use a proprietary authentication mechanism known as NTLM.

The MIS bundles the Geronimo Javamail library published under the Apache License 2.0, which does not support the NTLM authentication scheme.

To send emails to an MS Exchange SMTP server, download the free Javamail implementation published by Sun (Oracle) under the CDDL License:

1. Download Javamail from Oracle.
2. Unzip the Sun Javamail archive and copy the *mail.jar* file into *<mis-install-dir>/ext*
3. Edit the *<mis-install-dir>/conf/mis-wrapper.conf* file
4. Change *geronimo-javamail_1.4_mail-1.8.2.jar* to *mail.jar*.

3.1.2.5.2.2. Email Batching

Emails are sent to recipients via an outbox unless the number to send exceeds a configurable maximum, in which case they are batched and sent out at a slower rate. A number of configuration properties are provided for this feature, although the default values for these properties should suffice for most scenarios.

The following property allows you to set the maximum number of emails that can be sent to a group of recipients in a specific time period (`batchCheckPeriod`) before email batching occurs. It defaults to 5.

```
eps.emailHandler/maxNumberEmailsToSendPerRecipients = 5
```

If a specified number of emails (`maxNumberEmailsToSendPerRecipients`) has been sent to a group of recipients within this time period (in milliseconds) then email batching starts. Defaults to 60000 (1 minute).

```
eps.emailHandler/batchCheckPeriod = 60000
```

The number of iterations of a normal outbox check that occurs before a batch outbox check occurs. For example if `outboxPollPeriod` is 5000 and this value is 6, the batch outbox will be checked approximately every 30 seconds. Defaults to 6.

```
eps.emailHandler/numberOutboxIterationsBeforeBatchCheck = 6
```

The time interval between checks on the email outbox. Defaults to 5000 (5 seconds).

```
eps.emailHandler/outboxPollPeriod = 5000
```

If more than this number of emails is in the outbox email directory, then an error will be reported and no emails will be sent. If this value is -1 then no check will be performed. Defaults to 1000 (1 second).

```
eps.emailHandler/maxNumberOutboxEmailsAllowed = 1000
```

The "eps.emailHandler/maxNumberBatchEmailsAllowed" property. Defaults to 2000. If more than this number of emails is in the batch outbox email directory, then an error will be reported and no emails will be sent. If this value is -1 then no check will be performed. For example:

```
eps.emailHandler/maxNumberBatchEmailsAllowed= 2000
```

The "eps.emailHandler/permittedNumberResends" property. Defaults to 3. If an email fails to be sent to the mail server at the first attempt it is inserted into the resend outbox. A resend is then attempted this number of times. Once the limit has been reached the email is then moved to the failed emails directory. For example:

```
eps.emailHandler/permittedNumberResends = 3
```

The "eps.emailHandler/maxNumberFailedEmails" property. Defaults to 10. This is the maximum number of failed emails that can exist in the failed emails directory. If greater than this number of emails are inserted into this directory the oldest ones are deleted until this number of emails is left. To keep all emails specify -1. For example:

```
eps.emailHandler/maxNumberFailedEmails = 10
```

The "eps.emailHandler/maxNumberEmailsInBatchEmail" property. Defaults to 100. This is the maximum number of individual emails that can be batched into a batch email. The maximum this parameter can be is 200. If a number greater than 200 is configured then it is ignored and 200 is used. For example:

```
eps.emailHandler/maxNumberEmailsInBatchEmail = 100
```

3.1.2.5.2.3. Custom Email Template Configuration

If the email action is configured, an email is sent each time the state of the event changes: when the event is first triggered, when the event is acknowledged, and when it is closed.

The contents of the email messages are defined in templates which are located in the *resources/email-templates* directory of the MIS installation. There is one template for each event state.

By default, the templates contain text identifying the event state and the details of the event. The details of the event are encapsulated by the ${onEventMessage} property, which is an interest-specific string, the default values of which are given in the Dashboard Events documentation. For example, see the License Interest Default Messages. The templates also contain the date and time of the event, which is encapsulated by the ${onEventDateAndTime} property.

These templates can be customized. In addition to the above properties, the ${interestType} property can be used to add the name of the interest to the email message.

The value of the ${onEventMessage} property can also be customized through the Dashboard. See the Dashboard Custom Messages documentation for more information.

3.1.2.5.3. Custom Action Configuration

Custom Actions are loaded into the MIS, by adding them to the class path of the MIS, and setting the "dashboard.remote-services.remoteEventService/customActionClassBasePackage" property to the base package of the custom action class(es). All implementations of `IAction` contained in sub-packages of this base are loaded. For example:

```
dashboard.remote-services.remoteEventService/customActionClassBasePackage=com.cameronclient
```

3.1.2.5.4. Probe Configuration

The Events Processing Service accesses underlying events of monitored servers using "Probes". There are two types of probes: the logs probe, which reads the logs database to determine if and when an event has occurred; and the JMX probe, which queries JMX Mbeans. The configuration of these probes are given below. Please note that in most cases, these parameters should not require modification.

3.1.2.5.4.1. Logs Probe Configuration

The "eps.logsProbe/pollPeriod" property specifies the time period (in mS) between polls on the logs database. This property defaults to 200mS (2 seconds). Setting this value higher will decrease the load on the system, with a corresponding delay in the values being reported. For example:

```
eps.logsProbe/pollPeriod = 500
```

The "eps.logsProbe/logBatchSize" specifies the number of log lines to retrieve per poll on the logs database. This property defaults to 10000 lines. For example:

```
eps.logsProbe/logBatchSize = 10000
```

3.1.2.5.4.2. JMX Probe Configuration

The "eps.jmxProbe/pollPeriod" property specifies the time period between polls on the Management Agent (MA), which is polled to retrieve mbean attributes. This property defaults to 2000mS (2 seconds). Setting this value higher will decrease the load on the system, with a corresponding delay in the values being reported. For example:

```
eps.jmxProbe/pollPeriod = 1000
```

The "eps.jmxProbe/cacheRefreshPeriod" property specifies the refresh period (in mS) for the cache of MBeans which have an attribute change notification associated with them. Instead of being polled, the value of these MBeans is stored in the cache when a change notification is received. If an notification has not been received within the value of this property then the MBean is polled. For example:

```
eps.jmxProbe/cacheRefreshPeriod = 20000
```

The "eps.jmxProbe/pollThreadPoolSize" property specifies the maximum number of threads to use to retrieve bean attributes. A thread is allocated to each object name pattern in the probe. If there are more object name patterns than there are threads in the pool, then the remaining object name patterns are queued. This property defaults to 5 threads. For example:

```
eps.jmxProbe/pollThreadPoolSize = 6
```

3.1.2.6. Logs Configuration

The MIS stores and indexes log events so that they can be accessed in sequence, searched, and grouped into "conversations" i.e. messages that are not sequential but are related to each other. For example executions, cancels and amends of an original order.

3.1.2.6.1. Replication

Before they are stored and indexed on the MIS, logs are replicated from the source that generated them. The logs replication functionality consists of two parts: a client and a server. The client is the host that is the destination of the replicated files (in most cases the MIS) and the server is the host that is the source of the logs files (in most cases the LMA).

3.1.2.6.1.1. Client Settings

The "lrs.logsReplicationServiceClient/fileWriteBlockSize" property specifies the file write block size (in bytes) when logs files are written to disk. It defaults to 1MB or 1048576 bytes. To change this to 2MB:

```
lrs.logsReplicationServiceClient/fileWriteBlockSize=2097152
```

The "lrs.logsReplicationServiceClient/connectionManagerListenPortRangeStart" property specifies the start of the range of ports on which the client attempts to create a listening socket to which the replication server connects. It defaults to 12000. To change this to 13000:

```
lrs.logsReplicationServiceClient/connectionManagerListenPortRangeStart=13000
```

The "lrs.logsReplicationServiceClient/connectionManagerListenPortRangeEnd" property specifies the end of the range of ports on which the client attempts to create a listening socket to which the replication server connects. It defaults to 12500. To change it to 13500:

```
lrs.logsReplicationServiceClient/connectionManagerListenPortRangeEnd=13500
```

The "lrs.logsReplicationServiceClient/connectDelayLimit" property specifies the time (in mS) that the client will wait for the server to connect after the client has sent its request. It defaults to 10000 (10 seconds). To change it to 20 seconds:

```
lrs.logsReplicationServiceClient/connectDelayLimit=20000
```

The "lrs.logsReplicationServiceClient/homeDirectory" property specifies the home directory for the replicated files. It defaults to ${mis.data-store}/replicatedLogs, where ${mis.data-store} is substituted with the value of this property. To change it to a different location:

```
lrs.logsReplicationServiceClient/homeDirectory=/tmp/data/logs
```

The "lrs.logsReplicationServiceClient/connectionManagerBindAddress" property specifies the address that the log replication client sends to its log replication server. By default the client sends its first IP address that is up (and is not the loopback address). To change it to another address:

```
lrs.logsReplicationServiceClient/connectionManagerBindAddress=192.168.1.36
```

The "lrs.logsReplicationServiceClient/socketReceiveBufferSize" specifies the size of the socket buffer that the logs replication client uses when receiving files from the server. When this value is set to 0 (the default), the client uses the platform default.

3.1.2.6.1.2. Server Settings

The "lrs.logsReplicationServiceServer/fileReadBlockSize" property specified the amount of data (in bytes) that the server reads each time it accesses the log files on disk. It defaults to 1MB or 1048576 bytes. To change this to 2MB:

```
lrs.logsReplicationServiceClient/fileReadBlockSize = 2097152
```

The "lrs.logsReplicationServiceServer/threadPoolSize" property specifies the number of client requests that the server can process at one time. It defaults to 4. To change it to 8:

```
lrs.logsReplicationServiceServer/threadPoolSize=8
```

The "lrs.logsReplicationServiceServer/useCompression" property specifies whether the data is compressed before sending it to the client. It defaults to true. To set it to false:

```
lrs.logsReplicationServiceServer/useCompression=false
```

The "lrs.logsReplicationServiceServer/socketSendBufferSize" specifies the size of the socket buffer that the logs replication server uses when sending files to the server. When this value is set to 0 (the default), the server uses the platform default.

3.1.2.6.2. Log Events Repository

The Log Events Repository works out of the box without requiring any particular configuration. By default it stores its data on the local file system under the MIS data folder (see section Data folder for details) and uses a 512 MB memory cache to speed up the indexing when high volumes of logs data are encountered.

The Logs Events Repository has the following settings:

- "ma.logEventsRepositoryAccessor/storageLocation": specifies an alternate on-disk storage location for the Log Events Repository. If a relative file path is used, it is interpreted relatively to the location from which the MIS was started. Defaults to: <MIS data folder>/log-events-repository

- "ma.logEventsRepositoryAccessor/memoryLimit": specifies the amount of memory (in MB) that the Log Events Repository is allowed to consume to speed-up the indexing of incoming data. Defaults to 512 MB
- "ma.logEventsRepositoryAccessor/commitPeriodicity": specifies the periodicity, in milliseconds, at which the Log Events Repository should commit newly added data to disk, in order to make it visible to external readers. This is not required when all MIS components run in the same process. Defaults to zero, which means that the Log Events Repository does not perform periodic commits
- "ma.logEventsRepositoryAccessor/commitFrequency": instructs the Log Events Repository to commit newly added data to disk after a certain number of log events have been processed. This guarantees that, should the MIS terminate abruptly, only a relatively small number of log events will need to be streamed again. Defaults to 10000

For example, set an alternative storage location for log events, increase the memory limit of the log index, set a value for the period after which log events are committed to disk, and set a smaller value for the frequency of commits, so that less log events are lost on termination of the MIS:

```
ma.logEventsRepositoryAccessor/storageLocation=/tmp/logs
ma.logEventsRepositoryAccessor/memoryLimit=1024
ma.logEventsRepositoryAccessor/commitPeriodicity=100
ma.logEventsRepositoryAccessor/commitFrequency=1000
```

As well as being able to be viewed via the Dashboard, the repository can be queried by external applications using the Log Events Repository Client.

3.1.2.6.3. Log Events Cleaner

This is a component whose purpose is to cleanup Log Events when the MIS starts up and periodically thereafter. The cleanup operation consists of removing those logs whose timestamp is older than a configurable retention period from the time at which cleanup is performed, i.e. that satisfy the equation:

```
timestamp <= NOW - retention
```

By default the cleaner will cleanup only at startup using a retention of 24 hours. This behavior can be altered through the configuration of these parameters:

- "cleanupAtStartup": a boolean that enables cleanup at start up, defaults to true
- "cleanupPeriodically": a boolean that enables cleanup periodically, defaults to false
- "retention": a long which defaults to 86400000 (24 x 3600 x 1000 or 24 hours)
- "periodicity": a long which defaults to 1800000 (30 x 60 x 1000 or 30 minutes)

When "cleanupPeriodically" is enabled, a cleanup is run every "periodicity" milliseconds to remove logs that are older than "retention" milliseconds. Cleanup can be disabled altogether by setting both

"cleanupPeriodically" and "cleanupAtStartup" to false. The excerpt bellow is an example configuration that disables the cleanup at startup and enables it to run periodically every 2 hours:

```
mis.logEventsCleaner/cleanupAtStartup = false
mis.logEventsCleaner/cleanupPeriodically = true
mis.logEventsCleaner/periodicity = 7200000
```

3.1.2.7. Custom Correlators Configuration

The MIS provides the ability to configure custom correlators that can be used in the conversations.

There are 5 placeholders that can be leveraged for custom correlators:

- ler.fixIdConversationCorrelator.1
- ler.fixIdConversationCorrelator.2
- ler.fixIdConversationCorrelator.3
- ler.fixIdConversationCorrelator.4
- ler.fixIdConversationCorrelator.5

Adding the following properties in the mis configuration file will customize and enable a placeholder correlator:

To enable a specific correlator:

```
ler.fixIdConversationCorrelator.2/enabled=true
```

To define the correlation between the messages:

```
ler.fixIdConversationCorrelator.2/conversationTags=9001:9001
```

To define which message types are included in the conversation:

```
ler.fixIdConversationCorrelator.2/allowedMsgTypes=D,8
```

To define which are the default message types for the conversation:

```
ler.fixIdConversationCorrelator.2/defaultMessageTypes=D,8
```

To specify a different display name for the correlator (Default is *PlaceHolder #*):

```
ler.fixIdConversationCorrelator.2/displayName=Custom_9001_Correlation
```

For a complete list of already defined correlators refer to the Correlators section.

3.1.2.8. Database Configuration

The MIS uses a database to persist a number of items:

- User authentication and authorization data
- User preferences
- Persistent HTTP cookies used by the Dashboard's security layer

The MIS uses an in-process H2 instance to store this user data. Other databases may be supported in future releases.

3.1.2.9. Encrypted Properties

The `encryptme` directive is available to protect sensitive information in the configuration file. For example:

```
dashboard.security.ldap.authenticator/authenticatedSearchUserPassword= \
  encryptme://{th1s1s4sup3rs4f34dm1np4ssw0rd}
```

This directive requires a password, which is either fixed in the MIS software, or (more securely) set via the environment variable CATALYS_MIS_ENCRYPTION_PASSWORD (note this is an environment variable not a system property). For example:

```
export CATALYS_MIS_ENCRYPTION_PASSWORD=th1s1sth33ncrpt10np4ssw0rd
```

When the MIS starts up, it detects the "encryptme" directive, encrypts the password, and writes the encrypted value back into the config file enclosed by the "encrypted" tag. For example:

```
dashboard.security.ldap.authenticator/authenticatedSearchUserPassword= \
  encrypted://{OvsqOOH7JasWiRzb1IyWVw==}
```

Note that when an element in the configuration file is encrypted by this method, the whole configuration file will be parsed and re-written, causing some re-ordering of the configuration properties in the file.

3.1.2.10. Data Folders

Note that if specified as relative paths, these locations are relative to the location of the MIS startup script, which is the *bin* directory of the installation.

3.1.2.10.1. MIS Data Folder

The MIS needs to store data on the local file system in order to:

- Persist log data.

- Persist user-related data (only when an in-process h2 database engine is used).
- Provide a persistence mechanism used to record snapshots of the values of published MBean attributes.
- Persist event configuration and data.

By default, the MIS will store its data in a folder called *../data*, relative to the start-up directory of the MIS.

To change this location from the default use the "mis.data-store" property. For example:

```
mis.data-store = /tmp/mis.data
```

If the MIS cannot find its data folder, it will attempt to create it automatically.

3.1.2.10.2. Dashboard Web Application Folder

The Dashboard web application is delivered in the *web* directory of the installation (*../web* relative to the MIS startup location). If the web application is moved to a different location then the "dashboard.webServer/home" property must be set to reflect the new location. For example:

```
dashboard.webServer/home = /tmp/web
```

3.1.2.11. Distributing the Components of the MIS

By default all components of the MIS run together in the same instance of the MIS. However the MIS can run such that each of these components are distributed across multiple instances of the MIS. When the MIS is distributed, any interfaces to the remote components must be given in the configuration. These are specified below for each component.

3.1.2.11.1. Dashboard

When the Dashboard is running locally:

```
mis/startDashboard = true
```

When the Dashboard is running remotely, there are no external interfaces to specify:

```
mis/startDashboard = false
```

3.1.2.11.2. Management Agent

When the Management Agent is running locally:

```
mis/startMA = true
```

When the Management Agent is running remotely, the configuration must specify the MA's JMX access point and the location of the log indexes. Note that the location of the indexes must be a locally accessible directory (configured with mount points if necessary). For example:

```
mis/startMA=false
mis.maAccessParameters.jmx/JMXServiceURL=service:jmx:jmxmp://localhost:10000
mis.logEventRepositoryAccessParameters.index/storageLocation = \
  /tmp/mis-data/log-events-repository/log-events-index
```

3.1.2.12. User Management Service

When the User Management Service is running locally:

```
mis/startUMS=true
```

When the User Management Service is running remotely, the configuration must specify the JMX access point of the UMS:

```
mis/startUMS=false
mis.umsAccessParameters/JMXServiceURL=service:jmx:jmxmp://localhost:10000
```

3.1.2.13. Event Processing Service

When the Events Processing Service is running locally:

```
mis/startEPS=true
```

When the Event Processing Service us running remotely, the configuration must specify the JMX access point of the EPS:

```
mis/startEPS=false
mis.epsAccessParameters/JMXServiceURL=service:jmx:jmxmp://localhost:10000
```

3.1.3. Script Configuration

The MIS executes any scripts it finds in its scripts directory of the MIS installation, and reports the results of the execution via attributes of the "MA.Scripts" MBean.

Under Unix, a script is any file with the 'x' permission. Under Windows, it is any file in this directory, although the .bat extension is recommended.

The scripts directory is only scanned at MIS startup, so to add new scripts, the MIS must be re-started.

The MA.Scripts MBean contains one attribute for each script, where the attribute name is the same as the script name except that dot extensions are replaced with an underscore. For example, the result of the freespace.sh/bat script provided with the distribution is given by the freespace_sh/bat MBean attribute.

Each script is executed whenever the attribute is accessed, and the value of the attribute is the output of the script.

Note: The results of the script are not cached.

3.1.4. Dashboard timeout Configuration

MIS dashboard is configured to log out the current user automatically if there is no user activity (clicks,button presses etc) for a configured amount of time. This timeout interval can be specified in minutes. This property is to be specified in web.xml, the web application configuration file. This file is by default located in the following drectory:

```
{MIS_INSTALLATION_DIR}/web/webapps/dashboard/WEB-INF/
```

To set this attribute, change the value of timeout entity in the declaration section at the top of the file.

```
 <!ENTITY timeout "1">
```

This value is set to 30 minutes by default.

3.1.5. MIS Secure Access

To access MIS securely using HTTPS, the changes must be made in CameronWeb.xml file which is located in the following directory:

```
{MIS_INSTALLATION_DIR}/web/etc
```

MIS uses Jetty as it's internal web server, which can be configured for SSL.The steps are as follows:

- SSL can be configured as follows: The connector block that was pertaining to the http connection should be commented out and the following SSL connector block should be added as follows:

```
<Call name="addConnector">
  <New id="sslConnector" class="org.eclipse.jetty.server.ServerConnector">
    <Arg name="server"><Ref refid="Server"/></Arg>
    <Arg name="acceptors" type="int"><Property name="jetty.ssl.acceptors"
    deprecated="ssl.acceptors" default="-1"/></Arg>
    <Arg name="selectors" type="int"><Property name="jetty.ssl.selectors"
    deprecated="ssl.selectors" default="-1"/></Arg>
    <Arg name="factories">
    <Array type="org.eclipse.jetty.server.ConnectionFactory">
```

```
      </Array>
    </New>
  </call>
```

- We should add HTTPConfig and sslHTTPConfig elements, we can add the HTTPConfig block under the connector block or create a separate one but we should change the attribute secureScheme as follows:

```
<New id="httpConfig" class="org.eclipse.jetty.server.HttpConfiguration">
   <Set name="secureScheme">https</Set>
   <Set name="securePort"><Property name="jetty.secure.port" default="8443"/></Set>
</New>

<New id="sslHttpConfig" class="org.eclipse.jetty.server.HttpConfiguration">
   <Arg>
      <Ref refid="httpConfig"/>
   </Arg>
   <Call name="addCustomizer">
     <Arg>
        <New class="org.eclipse.jetty.server.SecureRequestCustomizer"></New>
     </Arg>
   </Call>
</New>
```

  SecureScheme attribute in this configuration will change the URL that we use to access the dashboard, from HTTP to HTTPS. We can use MIS dashboard with HTTPS by going to the following URL: https://localhost:8443

- We should create the SslContextFactory element in the CameronWeb.xml file. SslContextFactory is responsible for managing keystore access, managing truststore access, managing protocol selection via Excludes/Includes list, managing Cipher Suite selection via Excludes/Includes list etc. While creating the SslContextFactory element we should make sure that the SSL certificate is placed on the web/etc directory.
- We should configure the HTTPS connector using the configured ID on the connector block as follows:

```
<Ref id="sslConnector">
    <Call name="addConnectionFactory">
      <Arg>
        <New class="org.eclipse.jetty.server.SslConnectionFactory">
           <Arg name="next">http/1.1</Arg>
           <Arg name="sslContextFactory"><Ref refid="sslContextFactory"/></Arg>
        </New>
      </Arg>
   </Call>

   <Call name="addConnectionFactory">
     <Arg>
```

```
          <New class="org.eclipse.jetty.server.HttpConnectionFactory">
             <Arg name="config"><Ref refid="sslHttpConfig"/></Arg>
          </New>
        </Arg>
      </Call>
    </Ref>
```

General information about Jetty and configuration can be found here.

3.2. Maintenance

3.2.1. Logging

The MIS uses Log4j to configure its logging. Edit the contents of the file *resources/log4j.xml* to change the logging configuration.

3.2.2. Browse CameronTec MBeans

The MA (Management Agent) component of the MIS is effectively a JMX management agent and JConsole can be used as a simple interface between the end-user and the monitored applications. The only requirement is that JConsole must use the JMXMP connector, which is not part of the standard connector set. The MIS installation provides the *jconsole/jconsole.sh* and *jconsole/jconsole.bat* scripts which start a JMXMP-enabled JConsole which will attempt to contact the MA on the localhost on port 10000 (properties which can be modified by changing the jconsole script).

To browse the CameronTec MBeans, ensure that the MIS is started, and connect JConsole to it, as described above.

3.2.3. Performance and Scalability

The MIS requires 512 MB of heap size to work properly. For each 100 million events that the repository is expected to store, an additional 256 MB should be added to the maximum JVM heap size.

Logs Repository operations are very I/O intensive - a fast I/O system such as a solid-state disk (SSD) is recommended. The size of the disk also needs to be sufficient to store the volume of logs that are streamed from managed applications. A rough estimate is that the required disk space is three times the amount of logs being processed. Thus if the applications are generating a total of 1 GB of logs every day, the MIS file-system requires a minimum of 3 GB of free space. Some of this space can be reclaimed every day by doing some clean up.

Likewise, if the machine running the MIS is too slow and large amounts of logs data is being streamed, there may be some lag while browsing logs in the GUI.

Log tailing is a CPU and memory-intensive process; for large repositories, tailing can significantly impact the performance of the MIS and so should be used judiciously.

To improve performance, logging and streaming strategies can be adjusted in order to reduce the amount of information exported to the MIS. For example, limiting the level of logging that managed applications generate to INFO, and only using DEBUG if strictly necessary. Alternatively, only streaming logs to the MIS for some sessions.

3.2.4. Logs Clean-up

By default, at start-up, the MIS performs an automatic clean-up of the data in the log events repository (which by default is stored in *data/log-events-repository*), and only retains up to 24 hours of data. The amount of data and the frequency of clean-up can be configured via the Admin Tab of the Dashboard.

This clean-up does not apply to the log files that are replicated from the hosts that generate them (which are by default stored in *data/replicatedLogs*). These files are only deleted if their corresponding source log file is deleted. (The files are re-replicated if they are deleted from this directory).

All the log-related data of the MIS can be safely removed before starting the MIS, by deleting the directory called *data/log-events-repository* under the MIS installation directory. This directory should only be deleted when the MIS process is stopped.

3.3. Management Information Server API

3.3.1. JMX API

The MIS JMX API uses only open MBeans to avoid introducing any binary dependency between the management console and manageable applications.

JMX is a self-descriptive management technology. Each MBean exposes its metadata, which fully describes its management API.

For more details on JMX, please refer to the JMX Technology Home Page.

To look at the MIS JMX API, start the MIS and connect a jconsole to it as described in section Browsing CameronTec MBeans.

For example, any scripts added to the *scripts* directory of the MIS installation are published as attributes of the `MA.Scripts` MBean. The results of these scripts can be used to generate events in the MIS by configuring an interest that inspects the MBean. The *freespace* script that is provided with the MIS installation is one such application, the results of which can be utilized by configuring a numeric gauge interest in the MIS.

3.3.2. JMX authentication

JMX connections can be configured to be authenticated before they exchange data. To enable the authentication, changes would have to be done for both the client side and the server side. Catalys Node acts as a client when connecting to LMA and as a server when connecting to jconsole or any other jmx

client. Credentials properties file would have to be specified on the client side. Whereas, on the server side, access and password files will have to be specified.

For catalys node instance to act as a jmx server, two environment variables will have to be created. Firstly, *JMX_REMOTE_X_ACCESS_FILE*, which specifies the absolute location of the jmx access file and secondly, *JMX_REMOTE_X_PASSWORD_FILE* which specifies the absolute location of the jmx password file. For instance, environment variables can be the following: For access file:

```
JMX_REMOTE_X_ACCESS_FILE=C:\Itiviti\Catalys\Node\resources\jmxremote.access
```

For password file:

```
JMX_REMOTE_X_PASSWORD_FILE=C:\Itiviti\Catalys\Node\resources\jmxremote.password
```

The password file should have restrictive permissions. Only the owning user should have access to this file. JMX access file contains the usernames and their corresponding access levels (readwrite is required for proper operations) and JMX password file should contain the usernames and their corresponding passwords. For example,

JMX access file can contain the following:

username readwrite
(where username is the user for which the access level is to be set. readwrite defines access level to be granted to the user)

And JMX password file can contain the following entry:

username username_password
(where username is the user against which the JMX authentication will be done and username_password is the password of this user)

For Catalys Node instance to act as a jmx client, *JMX_CLIENT_CREDENTIALS_FILE* environment variable will have to be set. The value of this variable is the absolute path of the credentials properties file. For instance, the environment variable can be the following:

```
JMX_CLIENT_CREDENTIALS_FILE=C:\Catalys\windows\jmxHostsCredentials.properties
```

Credentials property file should be defined in below format :

localhost=username:password

(where localhost is a hostname of the device where we are accessing the jmx server. And username:password is the username and password of the user which will be used to connect to the jmx server. Alternative delimiters permitted to be used in the java properties files can also be used)

3.3.3. Custom Escalation Actions

Custom Actions for Events Processing must implement the `IAction` interface OR derive from the `AbstractAction` class.

The custom action must have an empty constructor.

If extending the `AbstractAction` class, the custom action needs to implement 4 methods:

- Implement `getSupportedPropertyNames()` to return a Set of supported property names for the custom action.
- Implement `getMandatoryPropertyNames()` to return a Set of mandatory property names for the custom action.
- Implement `initialize()` to validate the properties of this action, once they have been set by the user via the Dashboard.
- Implement `executeAction()` to perform the desired custom action. This method takes an `ActionSourceEvent` from which all of the available `Event` information can be retrieved, such as the host, node, session, and interest name.

Extending the `AbstractAction` class, grants access to the logging sub-system via the `getLogger()` method.

The following code snippet demonstrates this:

```
package com.cameronclient.event.action;

//Required to extend AbstractAction and implement IAction
public class MyCustomAction extends AbstractAction {

  //Required empty constructor
  public MyCustomAction() {
    //empty
  }

  @Override
  public Set getSupportedPropertyNames() {
    // Should return a Set of supported property names  .
  }

  @Override
  public Set getMandatoryPropertyNames() {
    // Should return a Set of mandatory property names  .
  }
```

```
  @Override
  public void initialize() {
    // Should validate all the properties set on this action.
  }

  // Override the executeAction() method and handle the event in a custom way.
  // The event message, timestamp and interest are available to you.
  @Override
  public Object executeAction(ActionSourceEvent actionSourceEvent) throws Exception {
    System.out.println("onEventMessage = " +
      this.getActionProperties().get("onEventMessage"));
    System.out.println("event time stamp = " +
      actionSourceEvent.getEvent().getEventProperties().get("eventDateTimeStamp "));
    System.out.println("interestName = " +
      actionSourceEvent.getEvent().getEventProperties().get("interestName "));

    return null;
  }
}
```

Any third party libraries must be on the classpath of the MIS.

To configure the location of the package name where the custom events reside, add the dashboard.remote-services.remoteEventService/customActionClassBasePackage property to the *mis.conf* file. For example:

```
<property name="customActionClassBasePackage" value="com.cameronclient"/>
```

All classes below this parent that implement `IAction` are available for selection in the Dashboard.

3.3.3.1. Sample Custom Actions

SNMP Trap Action

The `SampleSNMPAction` class is provided as a sample custom action, and can be modified to meet specific client requirements.

Full source code of this class is provided with the MIS installation, can be found at *src/com/camerontec/catalys/mis/eps/escalationpaths/runtime/actions/SampleSNMPAction.java*.

This class populates an SNMP trap based on a sample MIB, the contents of which are listed in the above Javadoc.

The sample class derives from `BaseSNMPAction`. Client actions can derive from this class too, in which case they need to provide implementations for:

- `populateV1PDU`
- `populateV2PDU`

Alternatively, the client action can implement the `IAction` interface OR derive from the `AbstractAction` class, as described above.

3.3.4. Log Events Repository Client

The Log Events Repository Client is a Java client API bundled within the MA that enables external applications to read from the Log Events Repository.

Below is a sample Java program that demonstrates the use of this client API:

```
// Create a new repository client
LogEventsRepositoryClient client = new LogEventsRepositoryClient();

// Configure the repository client by specifying the on-disk storage location
client.setStorageLocation("/tmp/data/log-events-repository");

// Now initialize the client. This is the point where configuration-related errors
// will be reported.
client.initialize();

// You are ready to use the client to interact with the repository.
// The code below prints the list of available file loggers to the console.
System.out.printf("Available file loggers:\n");
for (FileLoggerID fileLogger: client.fileLoggers())
{
  System.out.printf("\t%s\n", fileLogger);
}

// Shut down the client when done
client.shutdown();
```

In order to build and execute the above client code ensure that the MIS Jar file (*catalys-mis.jar*) is on the classpath.

For the full documentation of the Log Events Repository Client, please refer to the JavaDoc.

3.3.5. Custom User Provider

A custom user details provider implements the `ICustomUserDetailsProvider` interface.

This class must have a public no-args constructor.

The method `setProperties()` is used by the UMS to inject properties read from the MIS configuration file, as described in the configuration documentation.

The method `setLogger()` is used by the UMS to give the custom provider access to a logger.

The methods `initialize()` and `shutdown()` are invoked by the UMS respectively when starting up and shutting down.

This interface extends the `IUserDetailsProvider` interface, whose methods provide the functionality to create, delete, and modify users, and their properties.

At minimum, the custom user provider implementation must support the `admin` user.

For a basic sample implementation, refer to the `SampleLDAPUserDetailsProvider` class, source code for which can be found in *src/com/camerontec/catalys/mis/ums/ldap/SampleLDAPUserDetailsProvider.java*.

Chapter 4. Dashboard Web Interface

Table of Contents

4.1. Overview

4.1.1. Dashboard URL

By default the Dashboard is accessed by the following URL: http://localhost:8080. If the Dashboard has been configured to run on a different interface or port, or it is being accessed from a different host, then the URL needs to contain the actual IP address and port instead.

4.1.2. Login

Login by entering a valid username and password. For fresh installations, these default to 'admin'/'admin'. This default password can be changed after the initial login, and new accounts can be created. The admin user cannot be deleted.

4.1.3. Start Button

At the bottom left corner of the screen is a button labelled 'Start'. This button brings up a menu at the top of which shows the currently logged-in user. The menu items consist of the following operations:

- 'Log Out': logs the current user out.
- 'Profile': brings up a form contains the current user's profile consisting of first name, last name and email address. This form can also be used to change the user's password.
- 'Language': can be used to select the language of the application. Currently two choices are available: English and French.
- 'Reset Settings': will reset the Dashboard settings back to their defaults.

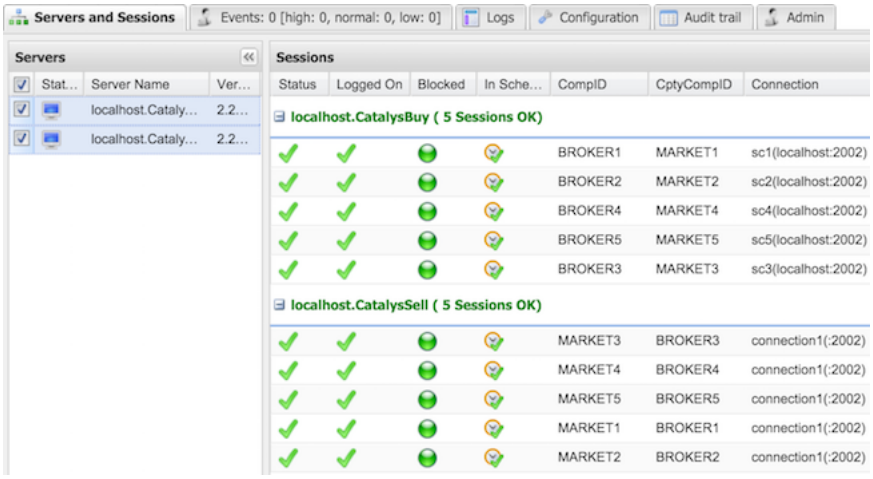
4.1.4. Dashboard Tabs

Once logged in, the Dashboard consists of five main tabs: Servers and Sessions, Events, Log Browsing, Audit Trail and Admin.

4.2. Servers and Sessions

4.2.1. Introduction

The Servers and Sessions tab shows all of the Catalys Nodes and CameronFIX Servers that are being monitored, as well their sessions. The servers and nodes are shown in the left panel, and the sessions are shown in the right panel. Each server has a check box to its left; clicking this on will display the sessions associated with this server, and clicking this off will remove the sessions associated with this server from the display.



4.2.2. Presentation

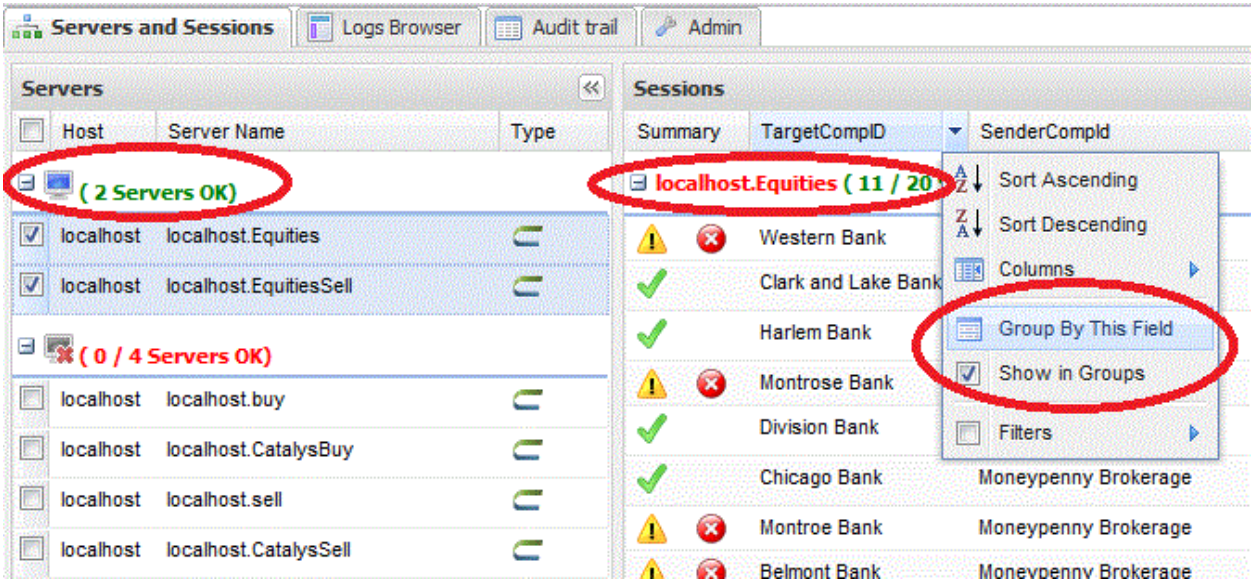
Summary information associated with each server and session is displayed in a row. The fields of these rows (columns) can be used to group the servers and sessions, as well as sort them within their groups; and filter them.

Grouping, sorting and filtering modifications are only available to the current browser session. They are reset to defaults at the beginning of the next session.

Grouping Servers and Sessions

Group servers or sessions by a particular field by clicking on the arrow to the right of the field name. This will bring up the Field Menu. Select 'Group By This Field'. Once grouped by a field, the column associated with that field disappears, and the values of the field are shown as headers of the groups. To group by a different field, repeat the procedure for the new field.

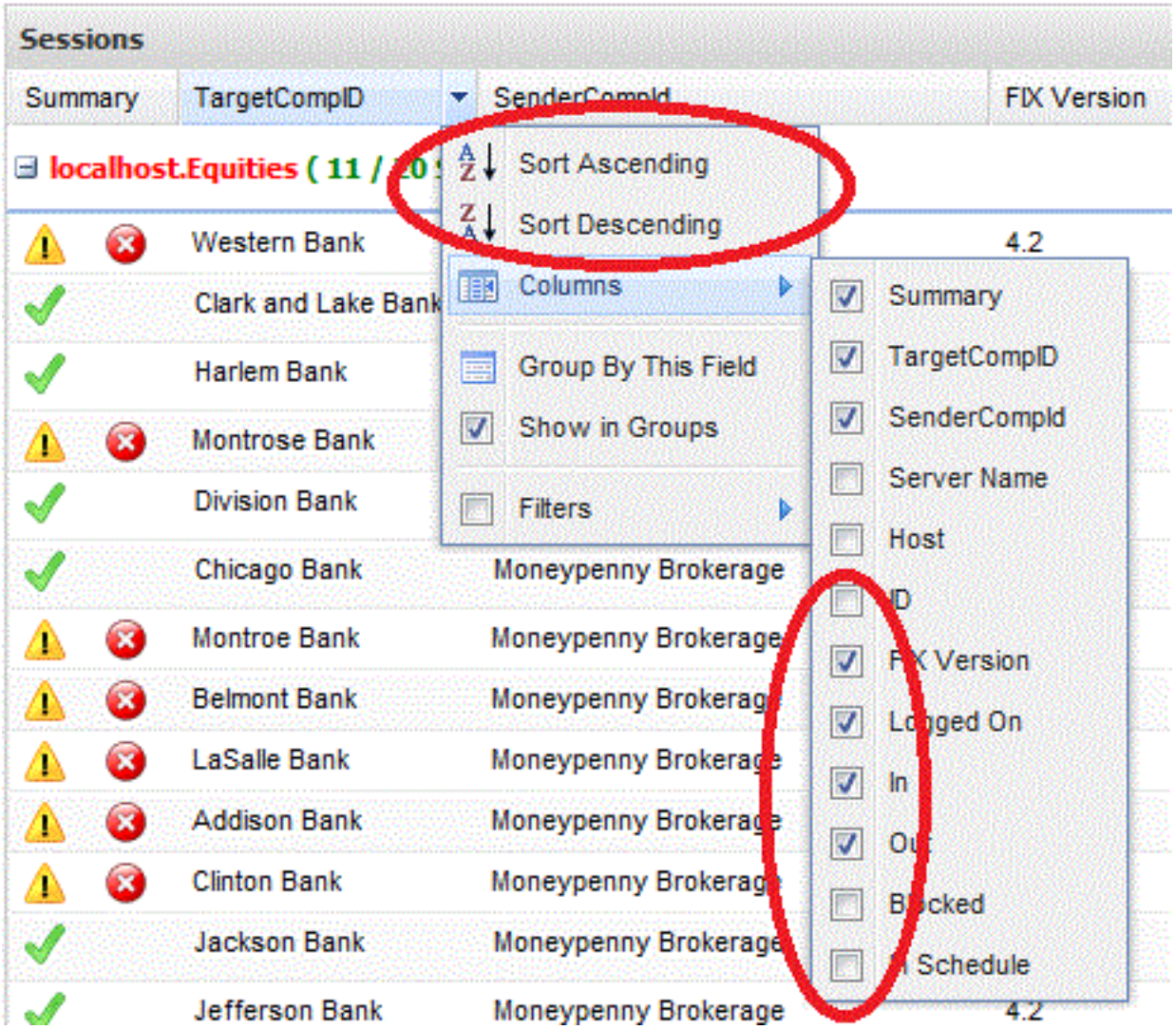
Once grouped, collapse or expand individual groups by clicking the +/- icon to the left of the group name.



Sorting and Showing/Hiding Columns

Sort the rows within their groups by clicking on the Field Menu, then selecting 'Sort Ascending' or 'Sort Descending'. Once sorted by a particular field, an up/down arrow appears on the field title. This can be clicked to change the sorting from ascending to descending and vice versa.

Change the fields that are displayed by selecting the 'Columns' item from the Field Menu. This will bring up a list of fields, which are either checked, or not checked. Check the names of the fields for display, and uncheck those to be hidden.

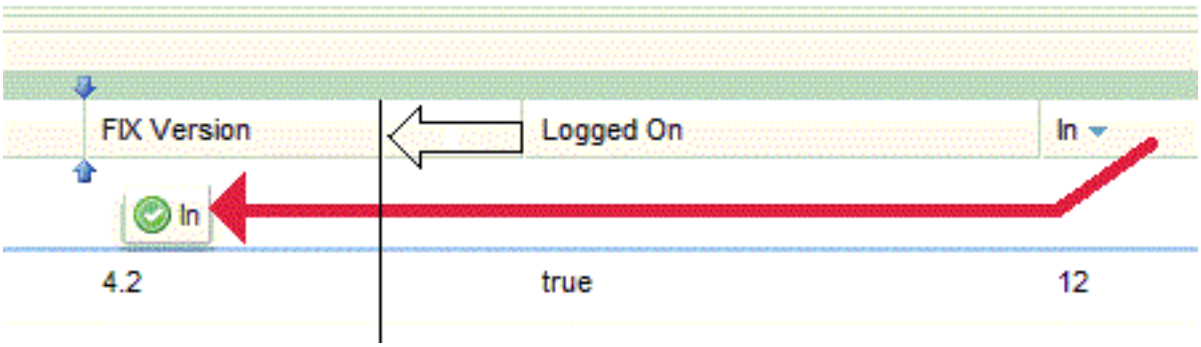


Resizing and Ordering Columns

Resize columns by clicking and dragging any column separator bar.

Reorder columns by clicking and dragging the column header.

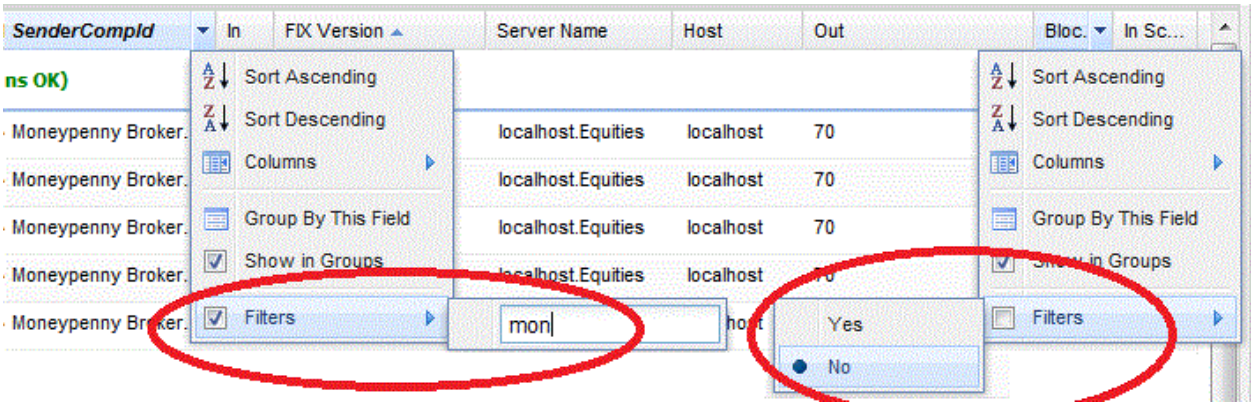
Session column resizing and re-ordering preferences are saved by the Dashboard, and will be available the next time the user logs in. Other (non-session) re-configurations are not saved, and will revert to their defaults.



Session Field Filtering

Filter session rows by hovering over one of the columns, then clicking on the down arrow to the right hand side of the field name. This will bring up the field menu. Click on 'Filtering'. Text fields can be filtered by a matching string; numerical fields can be filtered by a range or an equality.

Once the filter is in place, the text of the column heading will be italicized. The filter can be enabled and disabled by ticking the box to the left of 'Filters' in the Field menu.



4.2.3. Server and Session Popups

Click on any server or session row to bring up a popup window with more information about that server or session; as well as access to operations on that server or session.

To remove the popup from the view, click on the cross in the top right-hand corner of the window.

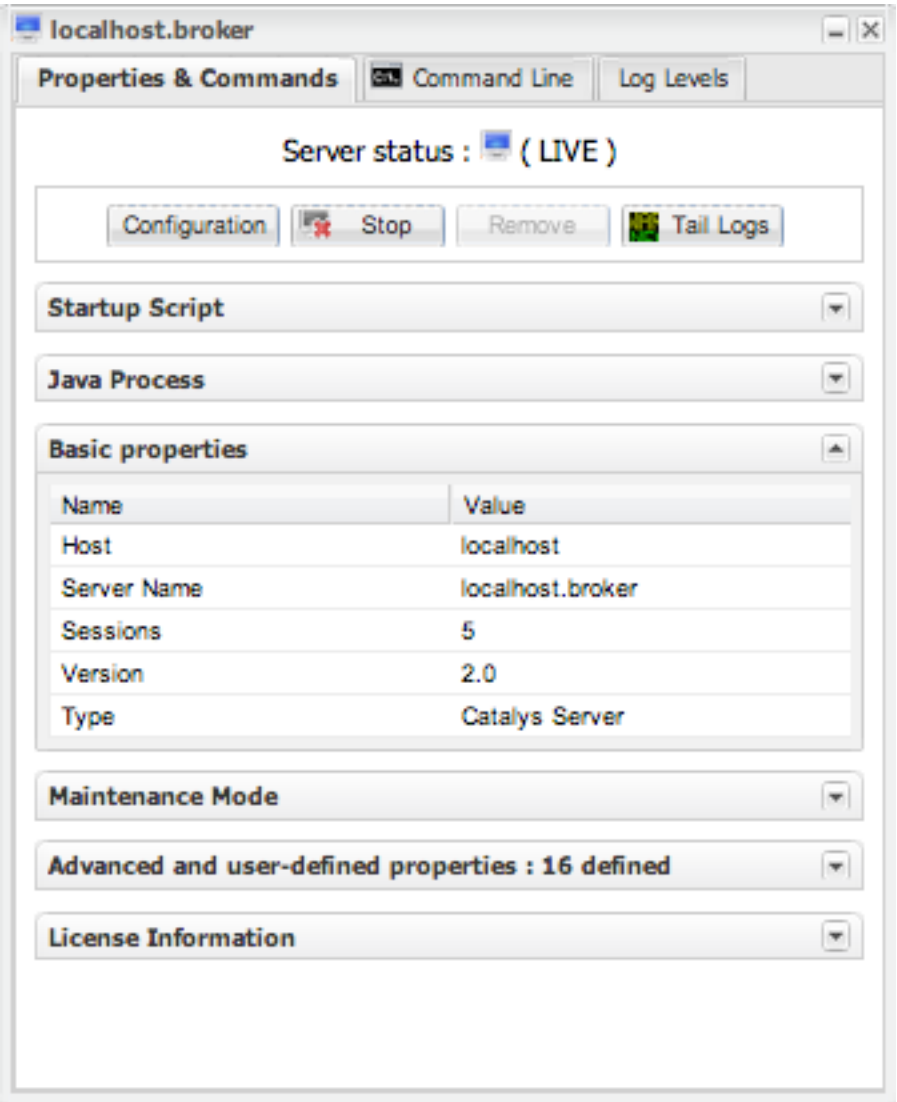
Server Popup

The Server popup window has three tabs: the Properties and Commands tab, the Command Line tab and the Log Levels tab.

Server Properties & Commands Tab

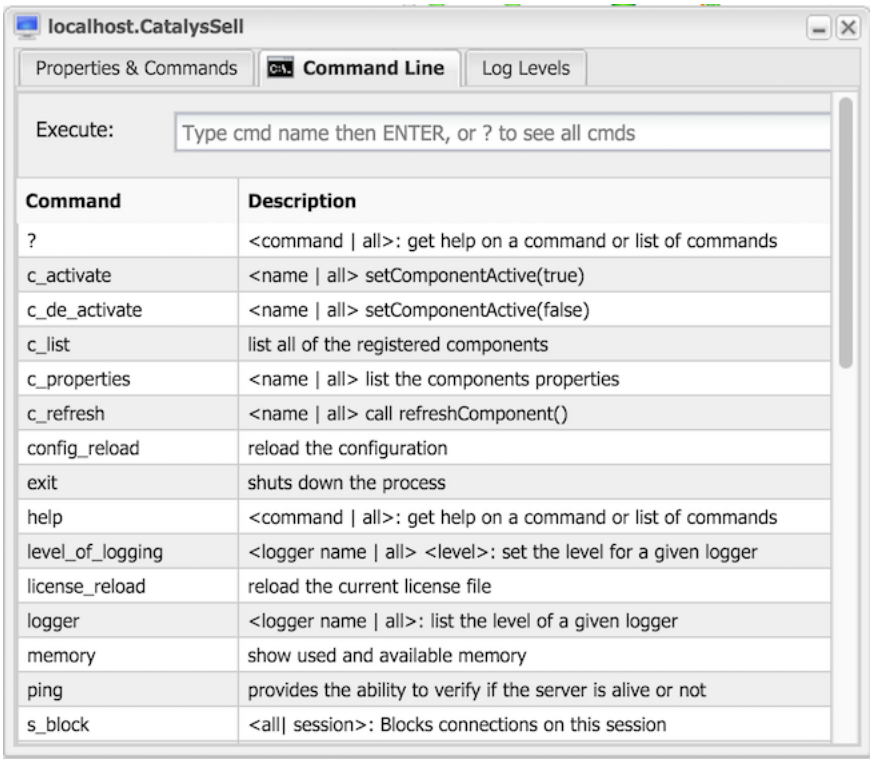
The Server Properties & Commands tab contains the following panels:

- Commands Buttons:
  - Configuration: click this button to go to this server's configuration.
  - Start/Stop: click this button to start or stop the server. Ensure that the CameronTec license is present in the *resources* directory of the installation of the server that is being started.
  - Remove: remove this server from Dashboard monitoring.
  - Tail Logs (if log streaming is enabled for this server). This provides the ability to access the last few lines of a log without leaving the Servers & Sessions tab. It is a floating window, collapsible to its title bar. The window refreshes automatically. The same searching and filtering capabilities as the main Logs tab are available in this window.
- Basic Properties:
  - Host, Server Name, Number of Sessions, Version and Type. This panel can be minimized by clicking on the up-arrow on the top right-hand side of the panel.
- Advanced and User Defined Properties:
  - Displays all of the other standard properties of the server as well as any custom properties. This panel can also be minimized by clicking on the up-arrow on its top right-hand corner.
- (Catalys Nodes only) License Information:
- Displays the expiry date, scope, number of allowed servers and sessions and enabled features associated with the license.



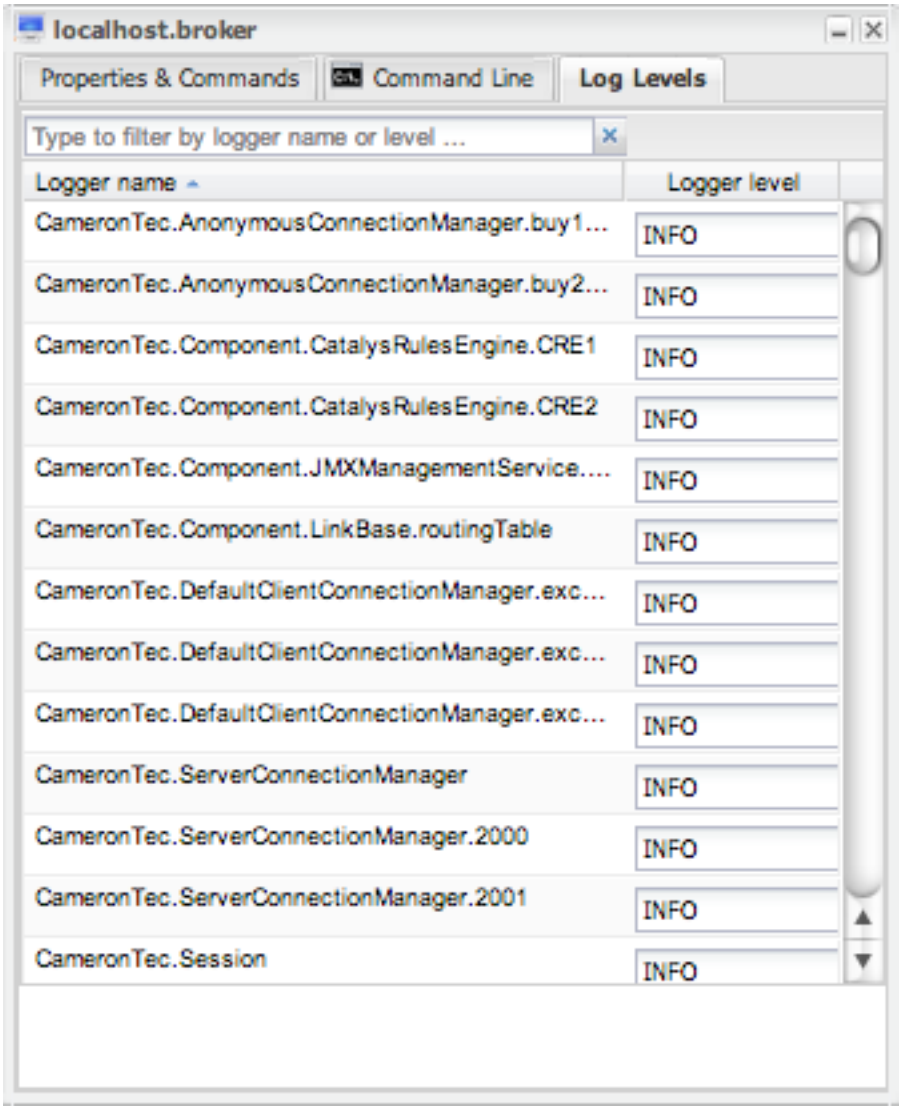
Command Line Tab

The command line interface for an instance is available in the Commands tab. Type 'help' to list the available commands.



Log Levels tab

This tab displays all of this server's loggers, and the level at which they are logging. Note that loggers are only displayed for those servers which are streaming logs.



Session Popup

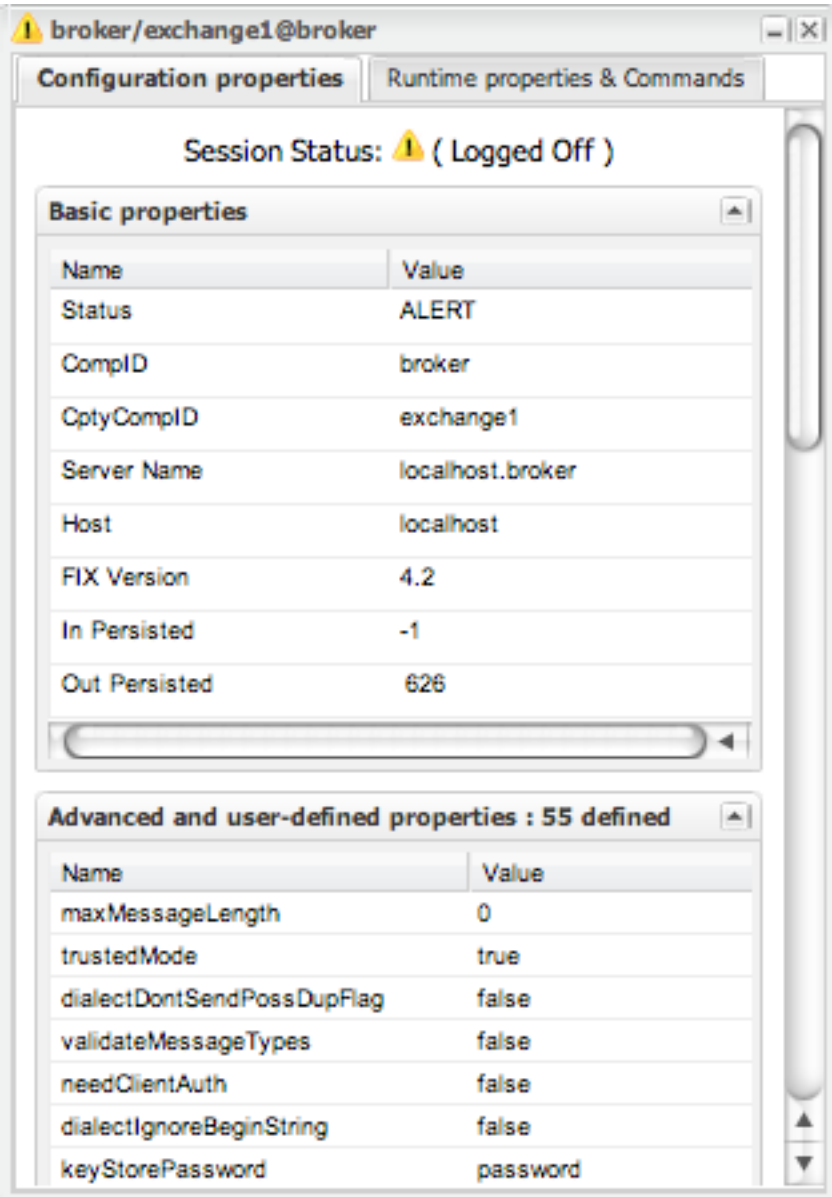
The Session popup window two tabs: Configuration properties; and Runtime properties & Commands.

Configuration Properties

The Configuration Properties tab contains the following panels:

- Session Status:
  - logged on
  - logged off
  - not connected
- Basic Properties:

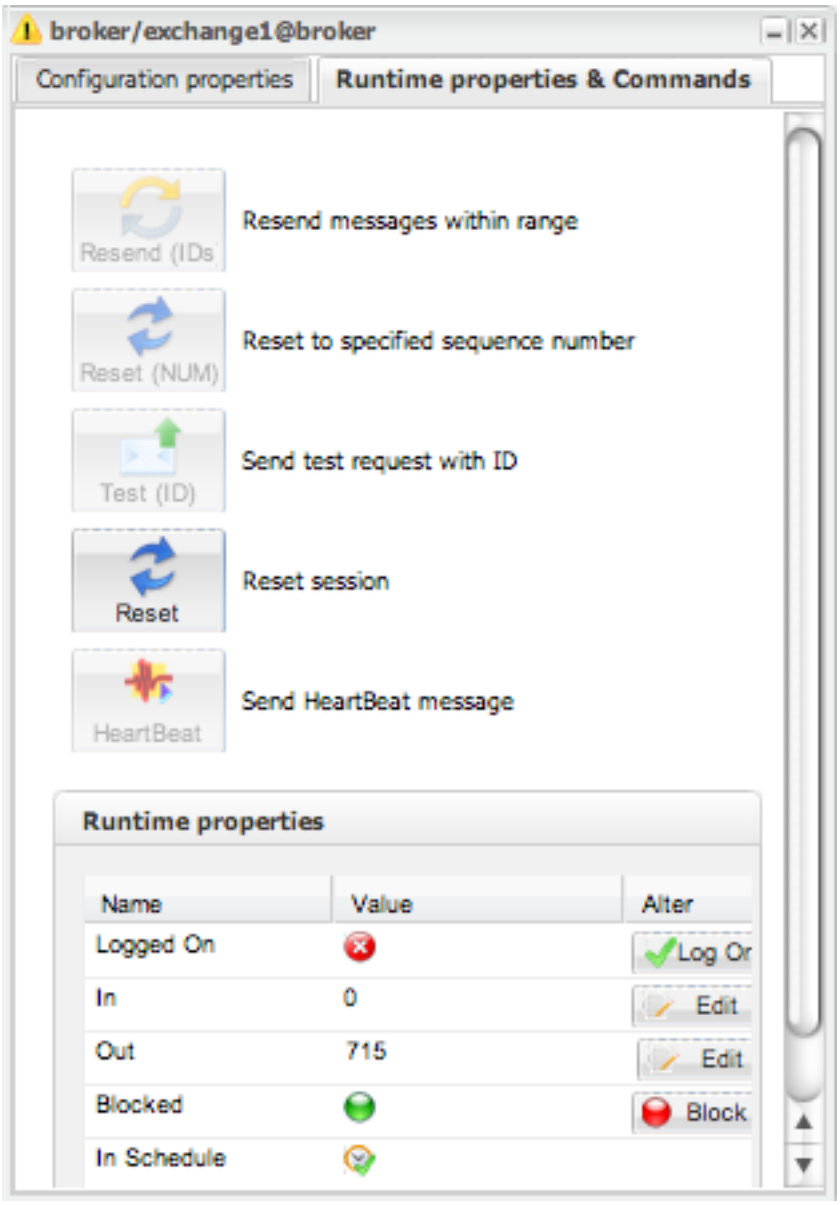
  - host, server name, sender and target comp IDs and the FIX version
- Advanced and User Defined Properties:
  - Displays all of the other standard properties as well as any custom properties.



Runtime properties & Commands

- Commands:
  - Resend messages
  - Send a test request
  - Send a heartbeat message.

  - Reset the session
  - Reset the sequence numbers
- Runtime Properties:
  - session status
  - sequence numbers
  - schedule status



4.2.3.1. Custom Properties

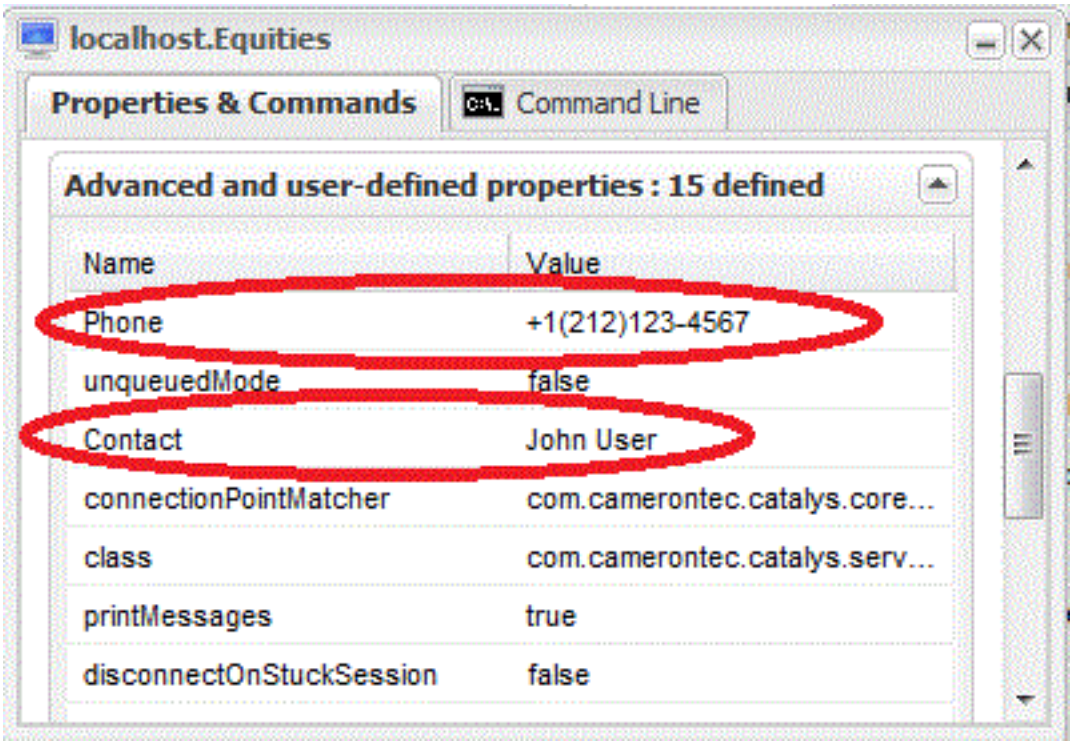
Custom properties can be added to servers and sessions via XML configuration or via the JMX 'addCustomProperty' operation on the server or session MBean.

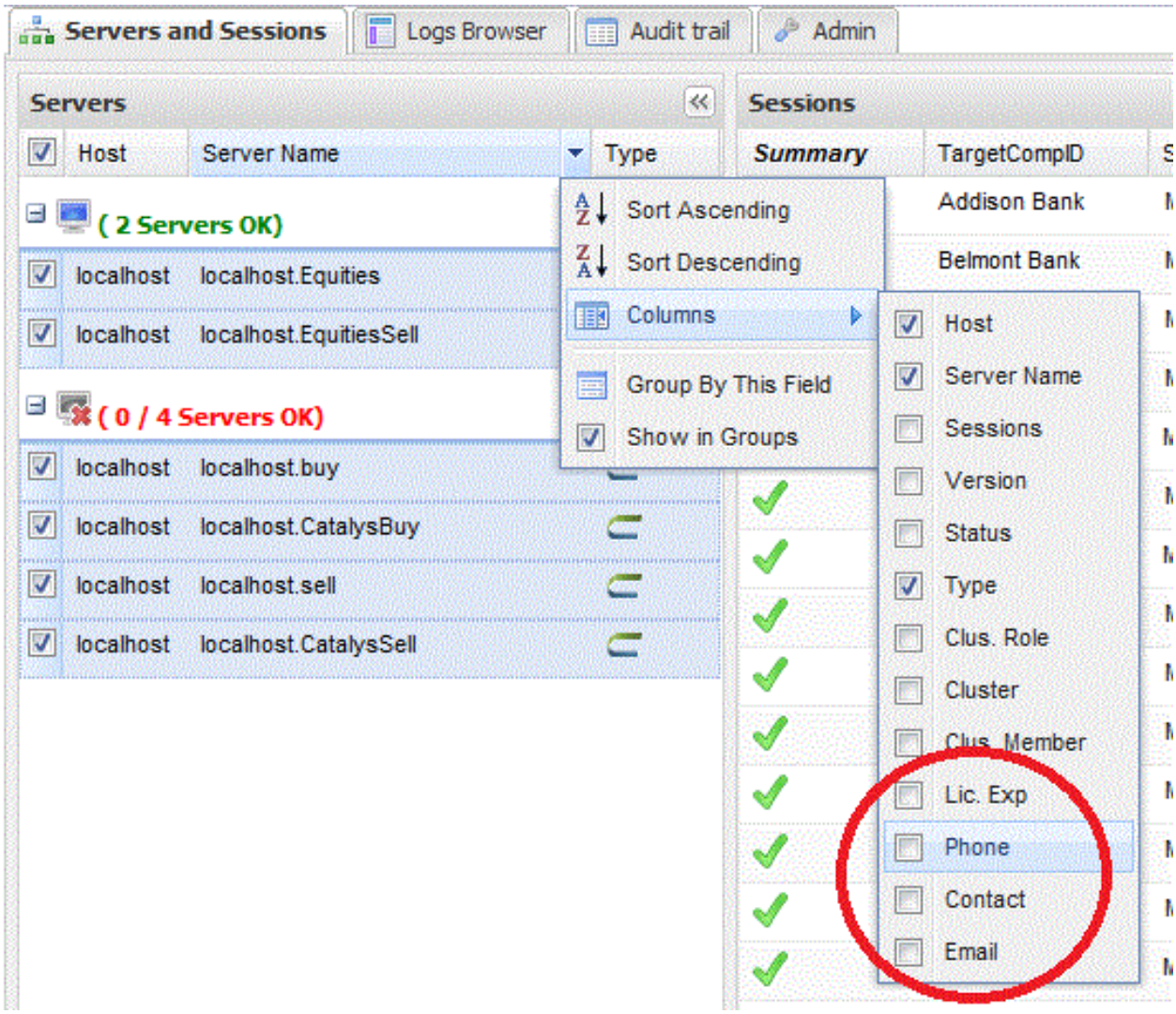
These are displayed in the 'Advanced and User Defined Properties' tab of the Server and Session popup window.

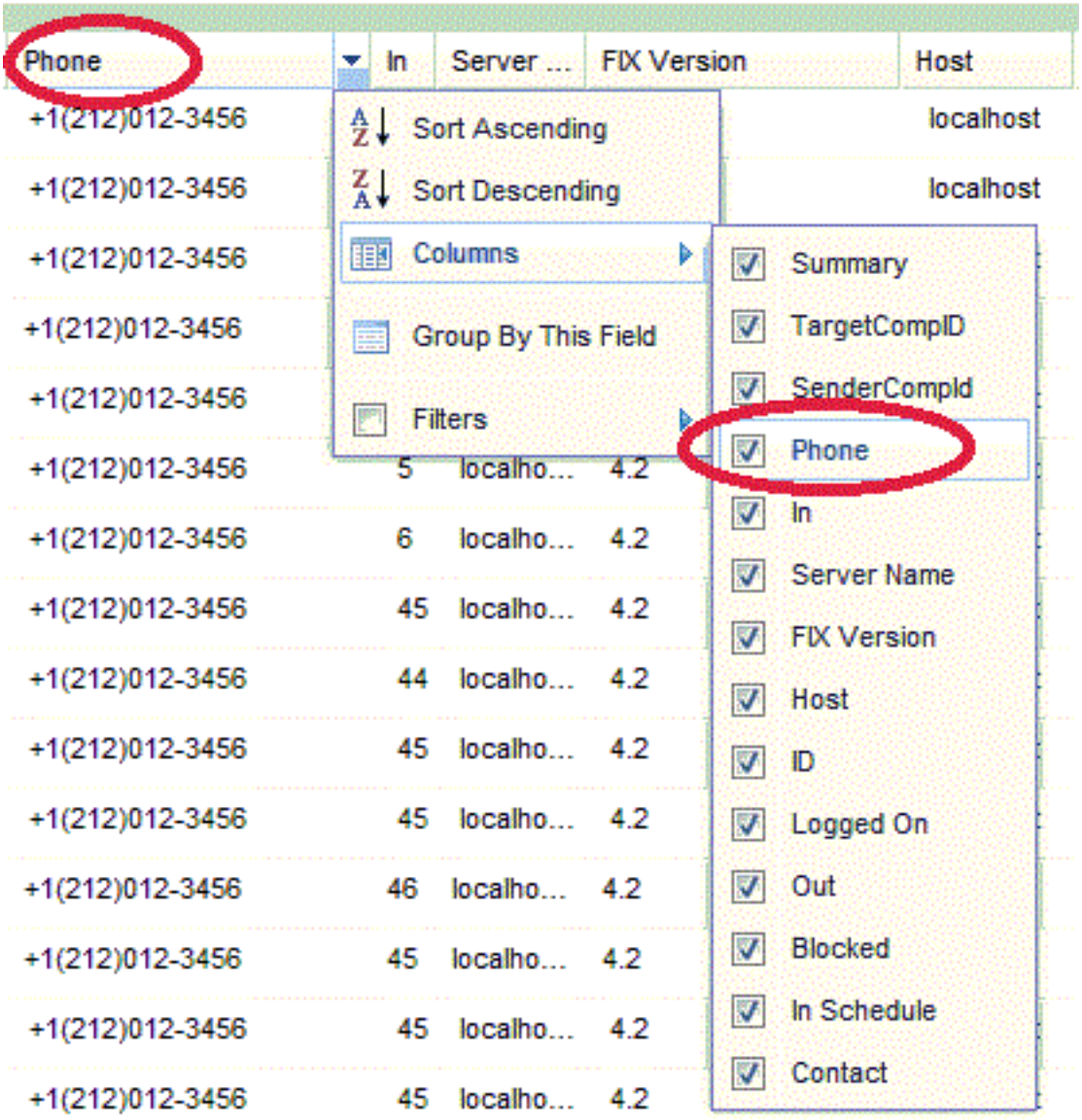
Those properties defined with a # at the beginning of their name are also available to be displayed as columns in the Server and Session panels.

For example, the session below has the additional 'Contact', 'Phone' and 'Email' properties, and the Contact and Email fields are available for display as columns.

```
<Session>
  <Properties>
    <Property  name="#Contact" value="John User" />
    <Property  name="Phone" value="+1(212)123-4567" />
    <Property  name="#Email" value="john@user.com" />
  </Properties>
...
</Session>
```




Servers and Sessions
Logs Browser
Audit trail
Admin
Servers
Sessions
Host
Server Name
Type
Summary
TargetCompID
(2 Servers OK)
localhost
localhost.Equities
localhost
localhost.EquitiesSell
(0 / 4 Servers OK)
localhost
localhost.buy
localhost
localhost.CatalysBuy
localhost
localhost.sell
localhost
localhost.CatalysSell
Addison Bank
Belmont Bank
Sort Ascending
Sort Descending
Columns
Group By This Field
Show in Groups
Host
Server Name
Sessions
Version
Status
Type
Clus. Role
Cluster
Clus. Member
Lic. Exp
Phone
Contact
Email



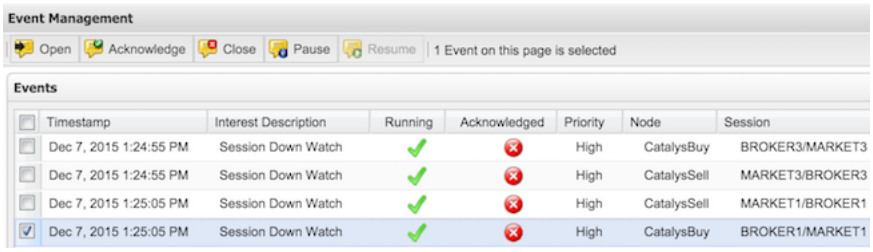
4.3. Events

4.3.1. Introduction

The Events tab shows all of the current events. These events are generated by registering interest in particular states of the system. In addition, a sequence of actions can be defined, which escalate the event the longer that it remains active.

4.3.2. Events

To view the current events in the system, click on the 'Events' item on the navigation panel.



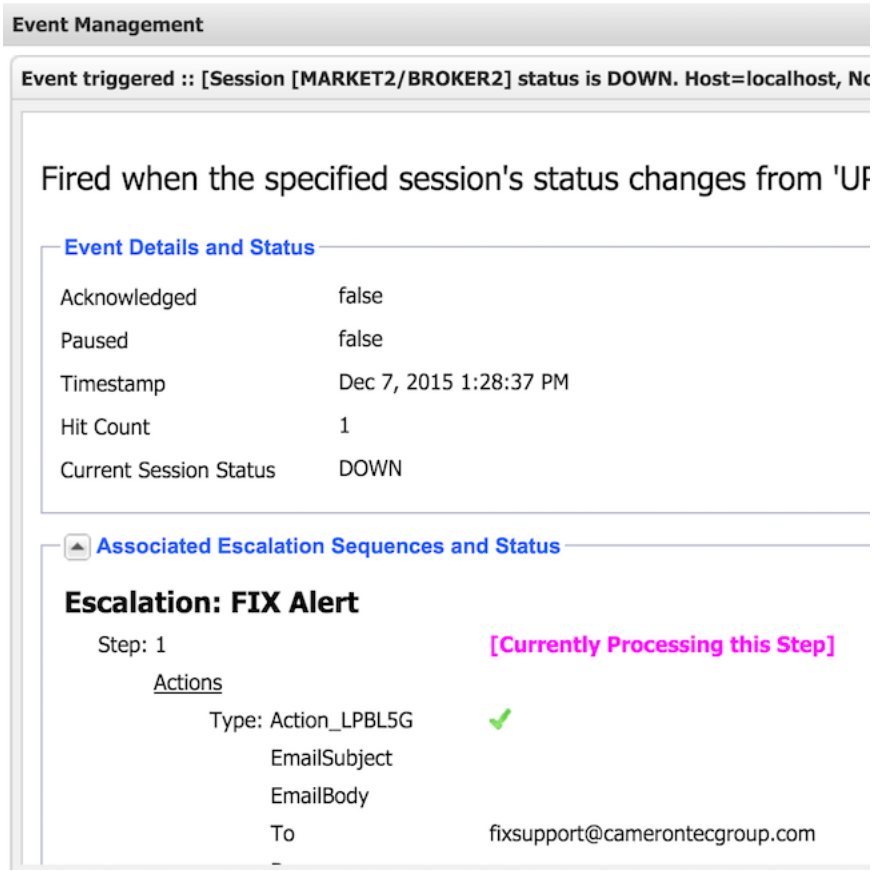
This shows a table of the current events. Each event has a timestamp, priority and type (Alert or Info); flags for whether the events has been acknowledged and are still current; and other information such as the host and session that the event applies to.

This list also shows whether the Event is running or not. An event stops running when it is paused by the user.

The Events in this list can be ordered by any field, and this can be ascending or descending.

Open

To open an event, either select it by clicking on its checkbox, then click on the 'Open' button at the top of the panel; or double-click on the event. This shows all of the information associated with the event.



Only one event can be opened at a time.

Acknowledge

To acknowledge an event, select it by clicking its checkbox, then click the 'Acknowledge' button.

Multiple events can be acknowledged at the same time.

Once an event is acknowledged, this information can be used in an escalation sequence.

Close

To close an event, select it by clicking on its checkbox, then click the 'Close' button.

Multiple events can be closed at the same time.

Closing an event removes it from the current event list.

Once it is closed, this information can be used in an escalation sequence.

Pause

To pause an event, select it by clicking on its checkbox, then click the 'Pause' button.

Multiple events can paused at a time.

Pausing an event suspends any escalation sequences associated with that event. When an event is paused, it will show as not Running.

Resume

To resume an event, select it by clicking on its checkbox, then click the 'Resume' button.

Multiple events can be resumed at the same time.

Resuming an event continues any escalation sequences that have been paused.

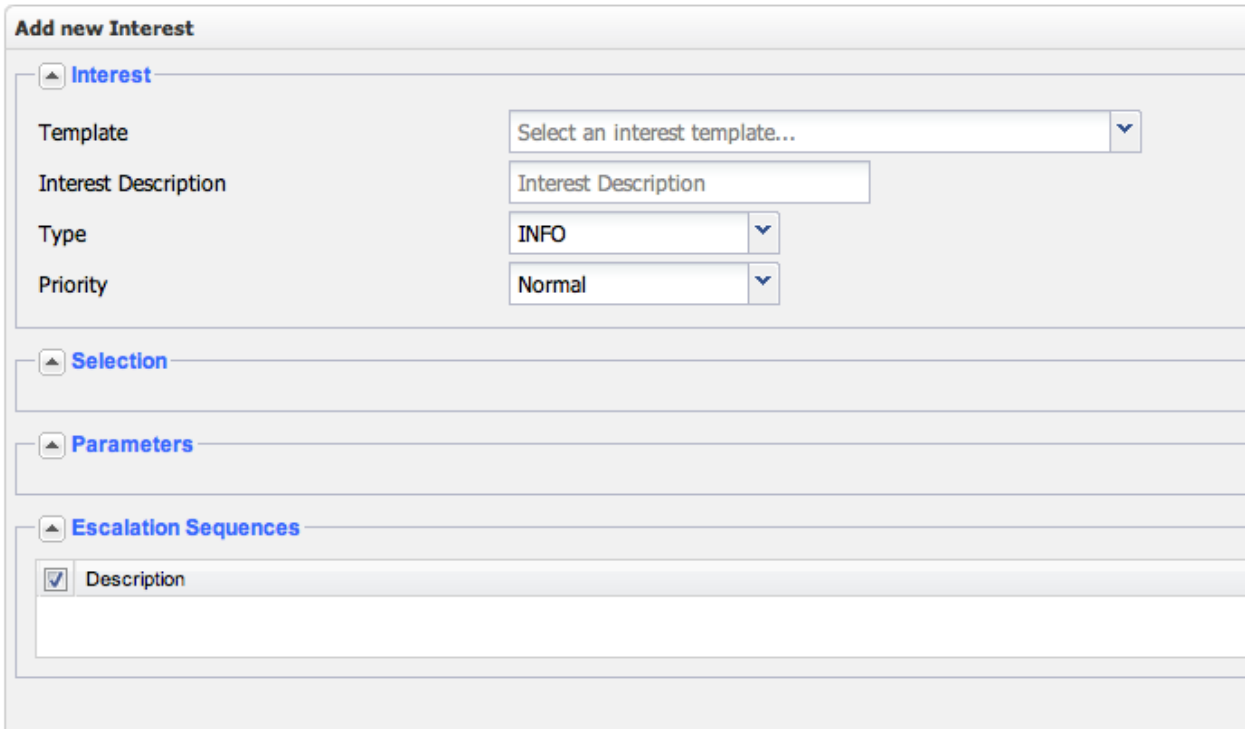
4.3.3. Interests

Events are generated by configured Interests.

To view the current interests and configure new ones, click on the 'Interest' item in the navigation panel.

Add Interest

To add an interest, click on the 'Add' tab.



The 'Add New Interest' dialog contains the following panels for input:

Interest Panel - There is a drop-down list for the Interest Template. This is the type of Event to register interest in.

See Appendix A for a list of available interests and their selections and parameters.

Interest Description - a string describing the interest.

Type - the Type can be Alert or Info.

Priority - the Priority is a number between 1 and 5, with 1 being the highest priority and 5 being the lowest.

Selection Panel

Once the Interest Template has been chosen, this field becomes populated with those elements for which Events of this type can apply to.

The selection tree represents a dynamic view of the hosts, nodes and sessions that are currently visible to the MIS.

When 'All' is selected, hosts, nodes and sessions that come on-line in the future will also be included in the interest.

Similarly when a particular host is selected, all future nodes and sessions will be included in the interest.

To select a particular host, node or session only, that element must be running and available to the MIS (i.e. registered with an LMA or directly connected to the MIS) at the time that the interest is configured.

Parameters Panel

Again, once the Interest Template has been specified, this panel is populated with those parameters specific to the type of Event.

Auto Close

Most interests have the common 'Auto Close' parameter. If this parameters is true (set by clicking the checkbox) then the event will close when the state that generated it no longer exists. For example, if an event is generated when a session goes down, the event automatically closes when the session comes up again. If this parameter is set to false (by leaving the checkbox blank), then the event must be closed manually.

Schedule

Each interest has one of two types of schedules: one that *triggers* the event at the time(s) specified by the schedule (e.g. the Session Report interest); or one that *checks* the state of the selection at the time(s) specified by the schedule, and raises an event if the state corresponds to the interest (e.g. Session Down).

The Trigger Schedule

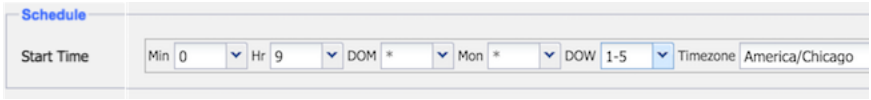
The trigger type schedule is specified in a similar way to the Unix cron command. With this schedule it is possible to specify a particular time, or a set of times at which the event is triggered. This schedule has time fields for Minute, Hour, Day of Month (DOM), Month (Mon), and Day of Week (DOW). These time fields can have the following settings:

- A single value: the event is triggered at that time. For example, the Hour field set to 10 triggers the event at 10am.
- A list of single values: the event is triggered at all of those times. For example, the Minute field set to 0,15,30,45 triggers the event every quarter of an hour.
- A range of values: the event is triggered at all times within the range. For example, the Day of Week field set to 1-5 triggers the event on all week days.
- A range of values plus single values: the event is triggered at all times in the range as well as the single values. For example, the Month field set to 2-6,12 triggers the event in all the months of February through June, as well as December.
- A star (*): the events is triggered at all values of that time field. For example, the Minute field set to * triggers the event every minute.

Note that the Day of Month and Day of Week fields should not be specified within the same schedule.

The timezone field specifies which timezone the schedule applies to. For example: the MIS is running in London and one of the servers is running in New York. Set the timezone for an interest relating to this server to New York, so that events from this server will be monitored at the correct times.

The following example triggers the event at 9am every week day.



The Check Schedule

The check type schedule specifies the range of times that the state of the selection is checked. This schedule type is enabled by clicking the 'Apply Schedule' checkbox.

The Start Time and the End Time determine the range of times over which the state of the selection is checked. If the time is outside of this range, the state is not checked.

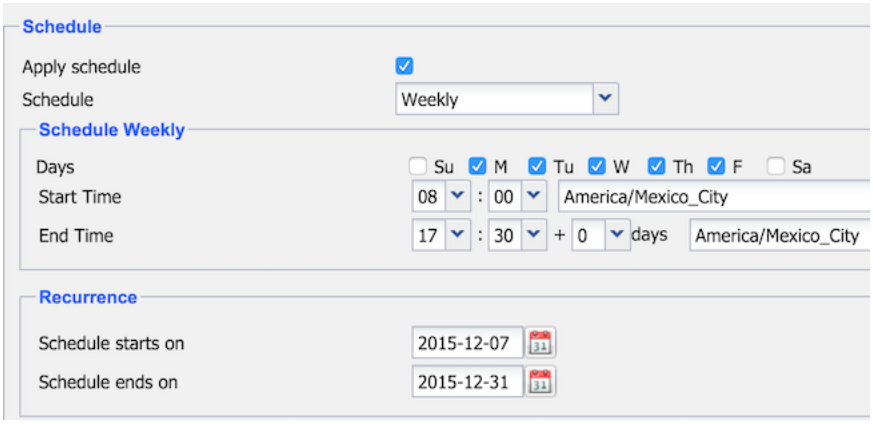
The schedule can be specified as a one-off (Once) or to repeat on a weekly basis (Weekly).

If it is a one-off schedule, the Start Time and End Time specify a time and date range within which the interest will be monitored, and if the conditions for an event are true, the event is raised. The interest is not checked outside of this range.For example the schedule could start at 9am today, and finish at 5:30pm tomorrow.

If it is a weekly schedule, the Start Time and End Time specify a time range (which can extend over multiple days by setting the +days field to a positive integer). The Schedule starts on and Schedule ends on specify an (optional) date range, outside of which the interest is not checked.

Days of the week can be specified by a set of checkboxes. At least one day must be checked.

The following example checks the interest every Monday to Friday between 9am and 7am the next morning. It starts checking at the beginning of February, and finishes at the end of November.



Unless otherwise stated in the Interest Definitions section below, interests have the *check* type schedule.

Escalation Sequence Panel

An escalation sequence is a set of instructions on what actions to take when the specified Event occurs.

When one or more sequences have been defined, these appear as a list in this panel. Select those escalation sequences which apply to this type of Event. See Escalation Sequences for instructions on how to define these.

Custom Messages

The actions associated with an Escalation Sequence contain messages that either get logged, emailed, or delivered via a custom mechanism. These fields allow customization of the messages that are sent when the event is triggered, closed, and/or acknowledged.

A custom message is made up of free form text which can contain properties associated with the interest, the values of which are specified using ${*property name*} notation. The properties associated with each interest, and the default messages for each interest are given in Appendix A.

4.3.4. Delete an Interest

To delete an Interest, select it in the Interest list by clicking on it and press the 'Delete' button.

Multiple Interests can be deleted at once.

4.3.5. Open an Interest

To view or edit an Interest, either select it in the Interest list by clicking on it, and press the 'Open' button; or double-click on the interest.

Multiple Interests can be opened at once.

4.3.6. Disable an Interest

To disable an Interest, select it in the Interest list by clicking on it, and press the 'Disable' button.

While an Interest is disabled it does not generate any events.

Multiple Interests can be disabled at once.

4.3.7. Enable an Interest

To enable an Interest, select it in the Interest list by clicking on it, and press the 'Enable' button.

Multiple Interests can be disabled at once.

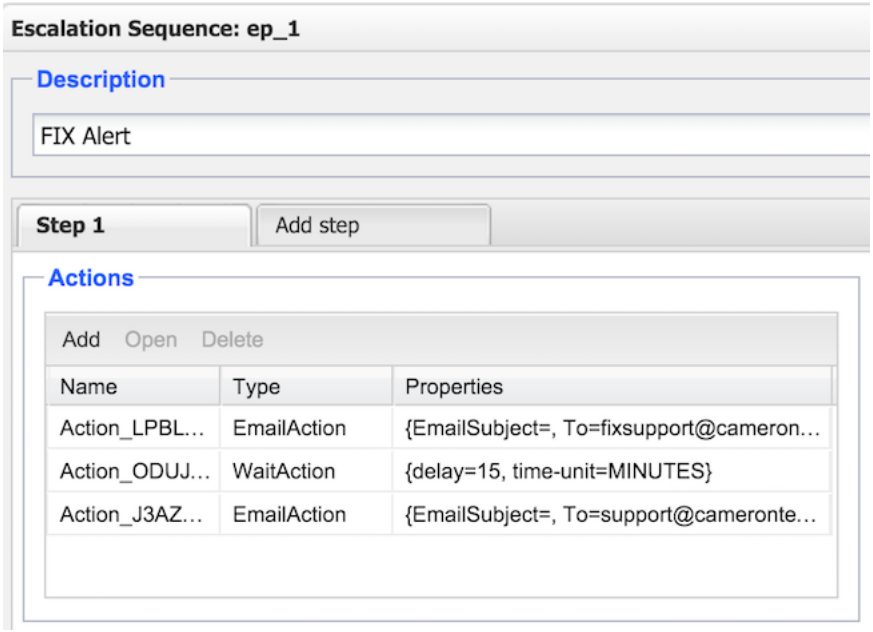
4.3.8. Escalation Sequences

An escalation sequence defines a set of actions in response to an event. These can escalate in severity the longer the state that caused the event persists. For example, the first step could be to log the issue, then wait to see if the issue resolves itself. The second step could be to email the support team. If the issue is acknowledged at this step then the escalation sequence could terminate, but if it has not been acknowledged by the support team, then a third step could implement a custom action to call the support manager.

To view and configure Escalation Sequences, click on the 'Escalation Sequences' item in the navigation panel.

4.3.8.1. Add an Escalation Sequence

To add an Escalation Sequence, click on the 'Add' button.



4.3.8.1.1. Description

Provide a description for the escalation sequence. This description is what is displayed in the list of escalations sequences shown on the Interest screen.

4.3.8.1.2. Steps

An Escalation Sequence consists of one or more (escalating) steps.

A step is defined by:

- The actions (e.g. log, email) that it performs:
- • On entering the step

  - On the event being acked whilst in the step
  - On the event being closed whilst in the step
- Whether the sequence terminates at this step if the event is acked
- Whether the sequence terminates at this step if the event is closed

4.3.8.1.2.1. Step Operations

To add a step, click on the 'Add Step' tab.

To delete a step, click on the cross on the particular step's tab. Only the last step can be deleted.

To edit a step, click on the tab for that step.

To add an action, click on the 'Add' button of one of the action panels.

To delete an action, click on the 'Delete' button of one of the action panels.

To edit or view an action, either click on the 'Open' button of one of the actions panels; or double-click on the action.

4.3.8.1.2.2. Log Action

The Log action writes a message to the system log. The log message contains the default event message, which can also be customized. For more information, refer to the Custom Messages section of each interest definition below.

4.3.8.1.2.3. Windows Event Action

The Windows Event action writes an event to the Windows Event Log with the configured severity level. By default, the severity level is set to INFO and the log message contains the default event message, which can also be customized. For more information, refer to the Custom Messages section of each interest definition below.

To add a Windows Event action, the *NTEventLogAppender.dll* file must be set on the MIS Java library path. The default wrapper configuration will have this path set to the *lib* directory of the MIS. The DLL file can be downloaded from the log4j website. We have successfully tested with version 1.2.17. If using a 32-bit JVM, install the file named *NTEventLogAppender.dll*. If using a 64-bit JVM, install *NTEventLogAppender.amd64.dll* and rename it to *NTEventLogAppender.dll*.

For Windows Event Viewer to properly display the events created by the MIS, the MIS will need to run at least once with administrator rights in order to add the necessary registry key which defines the path to *NTEventLogAppender.dll*. For reference, the key is:

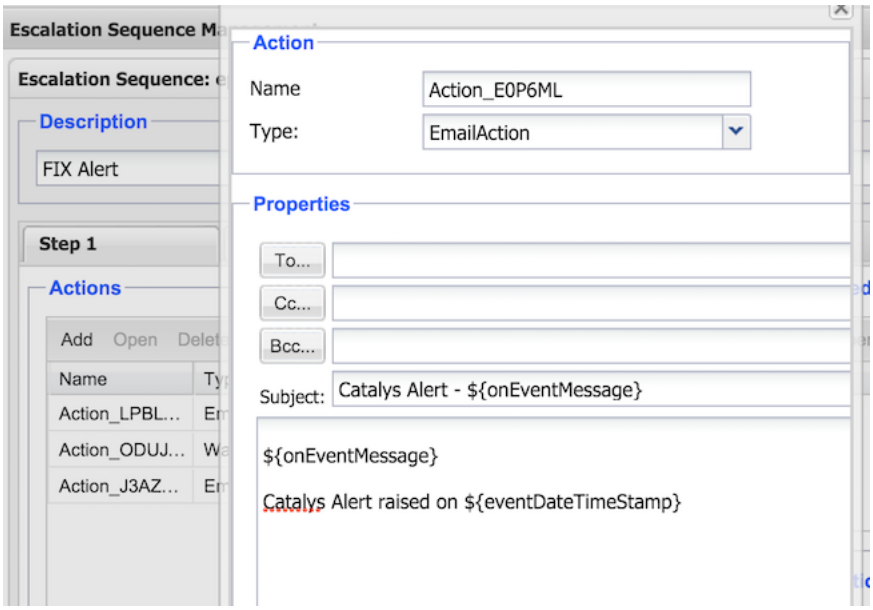
```
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\services\eventlog\Application\Catalys MIS
```

4.3.8.1.2.4. Email Action

The Email action emails one or more users or groups. The recipients can be directly addressed, carbon copied, or blind copied. The subject of the mail is the type of the event, and the body contains any other available information about the event.

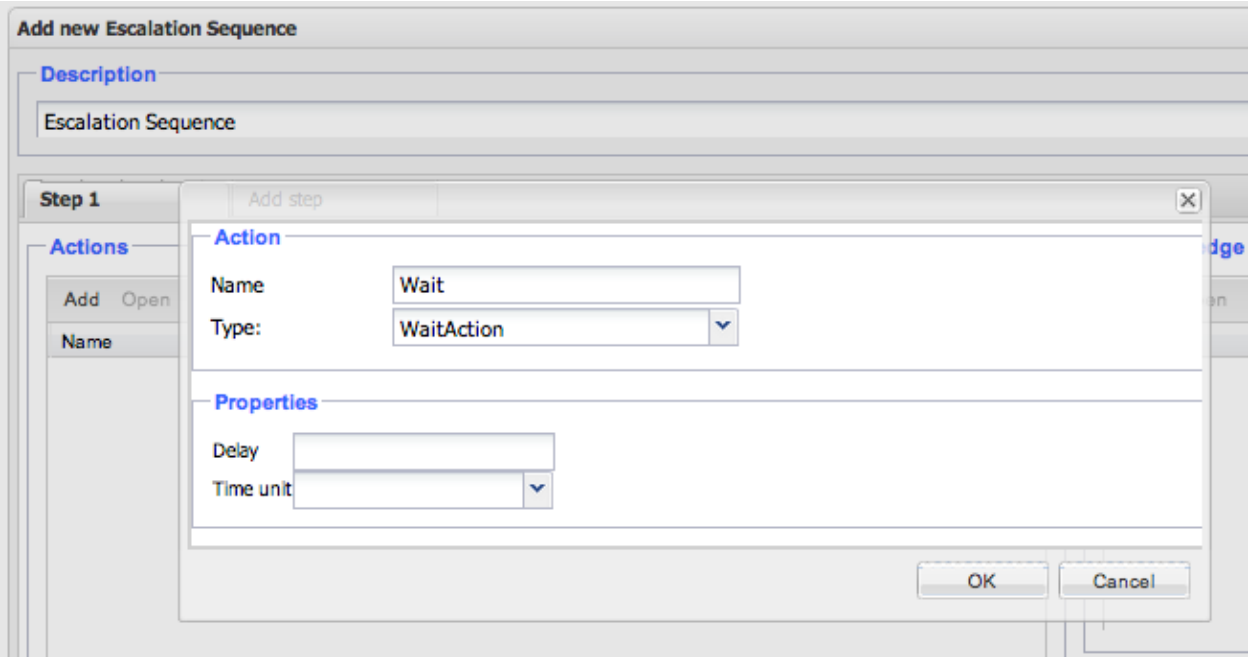
Once the Email action is selected, the Properties panel of the action contains buttons for the 'To', 'Cc' and 'Bc' addresses, as well an entry fields. Clicking on the buttons brings up a screen of all of the configured Users and User Groups within the MIS. These Users and User Groups can be selected as recipients of the Email action, or usernames or full email addresses can be typed into these fields.

The subject and body of the email can be edited. By default, the body of the email contains the default event message, which can also be customized. For more information, refer to the Custom Messages section of each interest definition below.



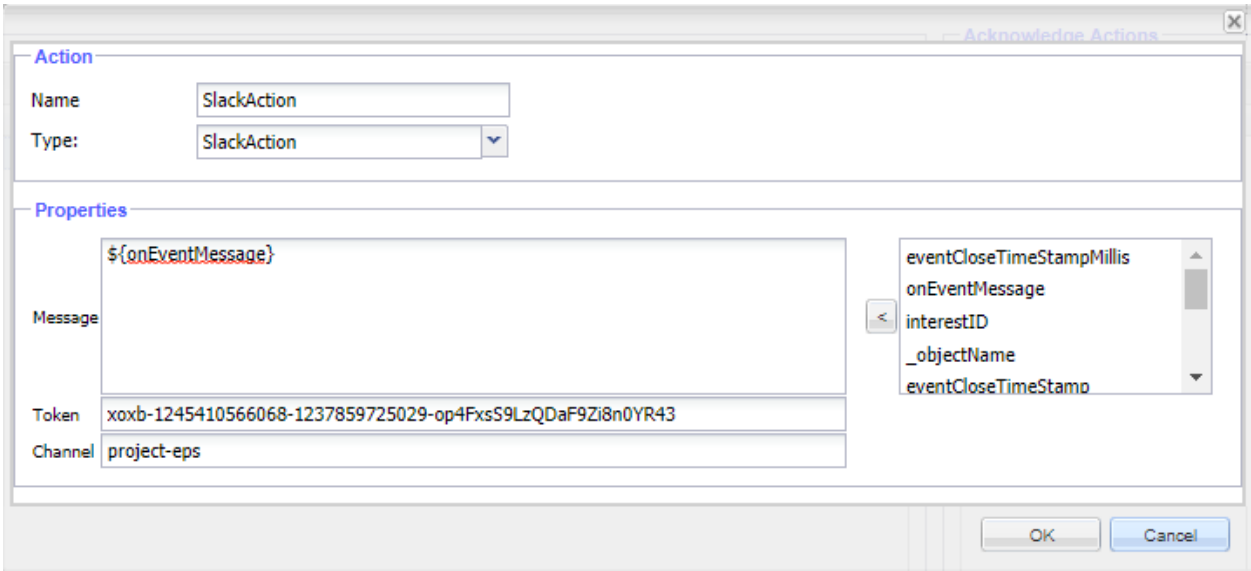
4.3.8.1.2.5. Wait Action

The Wait action waits the specified number of minutes or hours. When this time has elapsed, the escalation sequence moves onto its this step's next action, the next step in the sequence, or it terminates (if there are no more steps).



4.3.8.1.2.6. Slack Action

The Slack action lets you post a message to a Slack channel using a bot user and interested users can join the channel to receive these alerts.



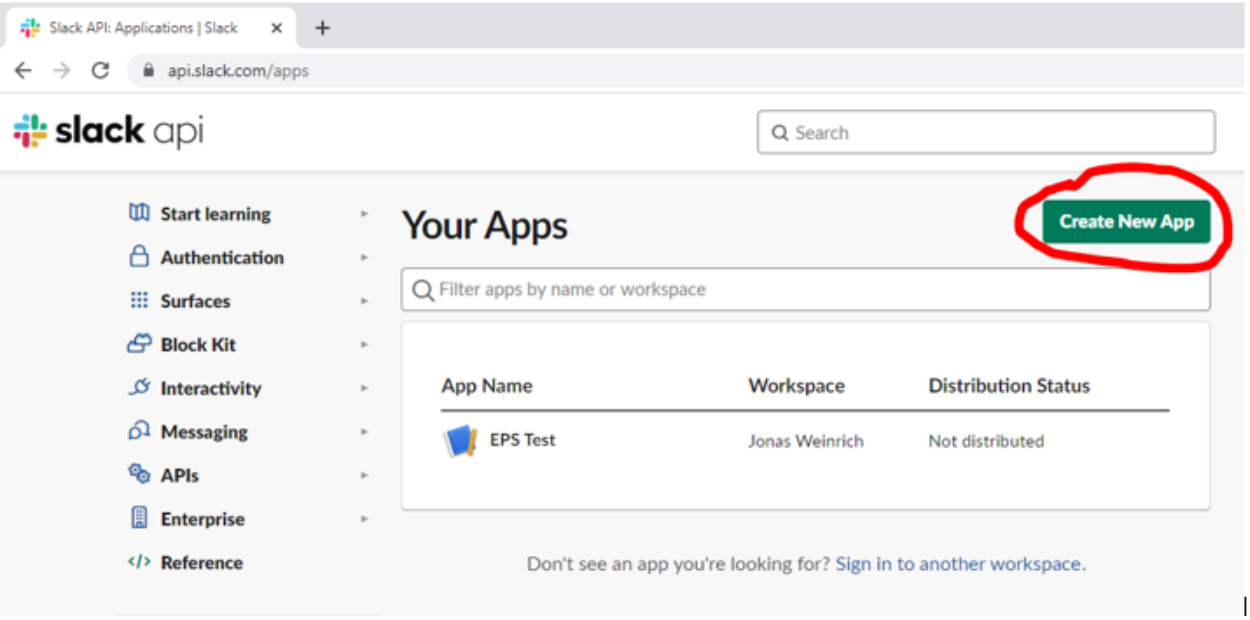
In your Slack workspace you need to create a new app with a bot user which can be utilised to send messages to a specific channel. The OAuth token and channel name associated with that user must be specified in the escalation sequence.

Attribute	Definition
message	The message contains the default event message, which can also be customized. For more information, refer to the Custom Messages section of each interest definition below. Required.
token	The OAuth token as generated in your slack workspace. Please see below for more details. Required.
channel	The Slack channel name which alerts will be written to. Required.

4.3.8.1.2.6.1. Slack Create Catalys Alert App

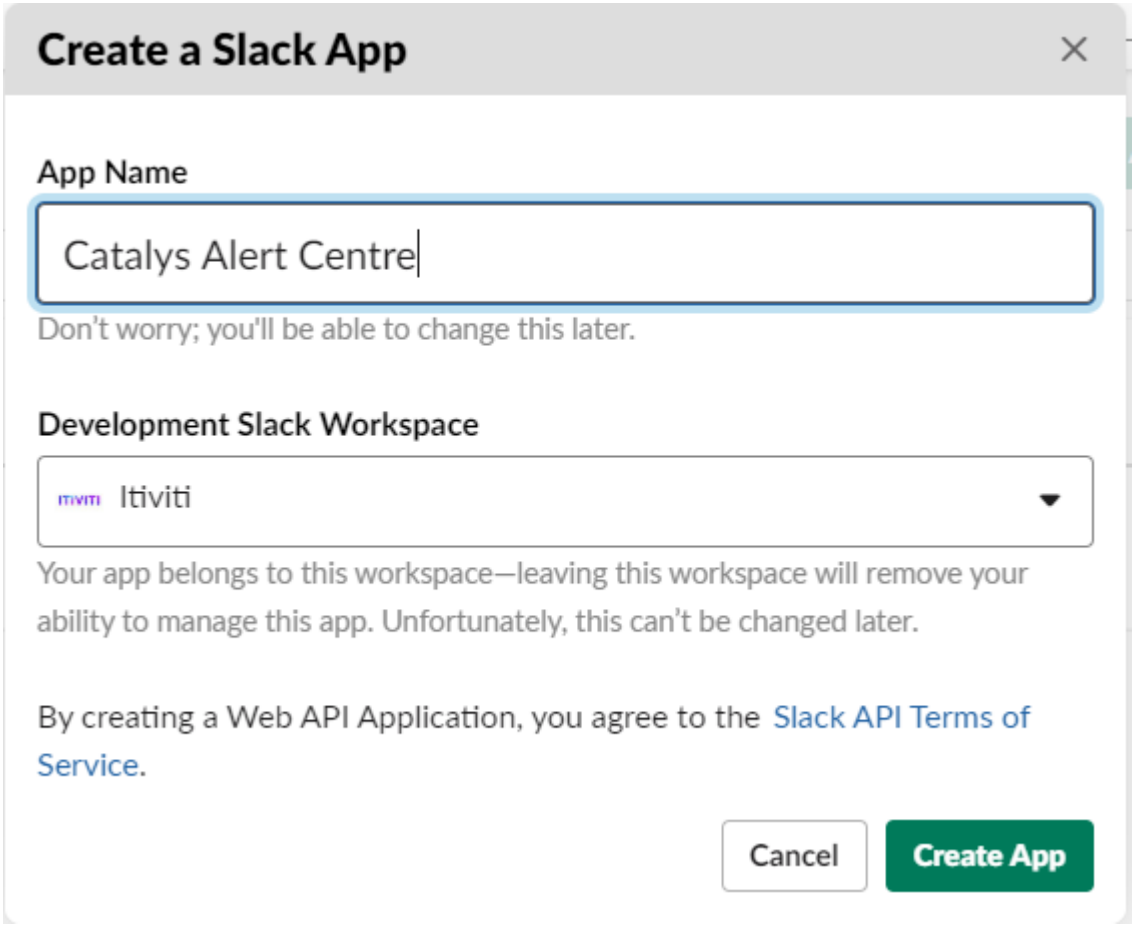
4.3.8.1.2.6.1.1. Slack App Home

Start by navigating to the Slack Apps page while logged on to your workspace and click the "Create New App" button.



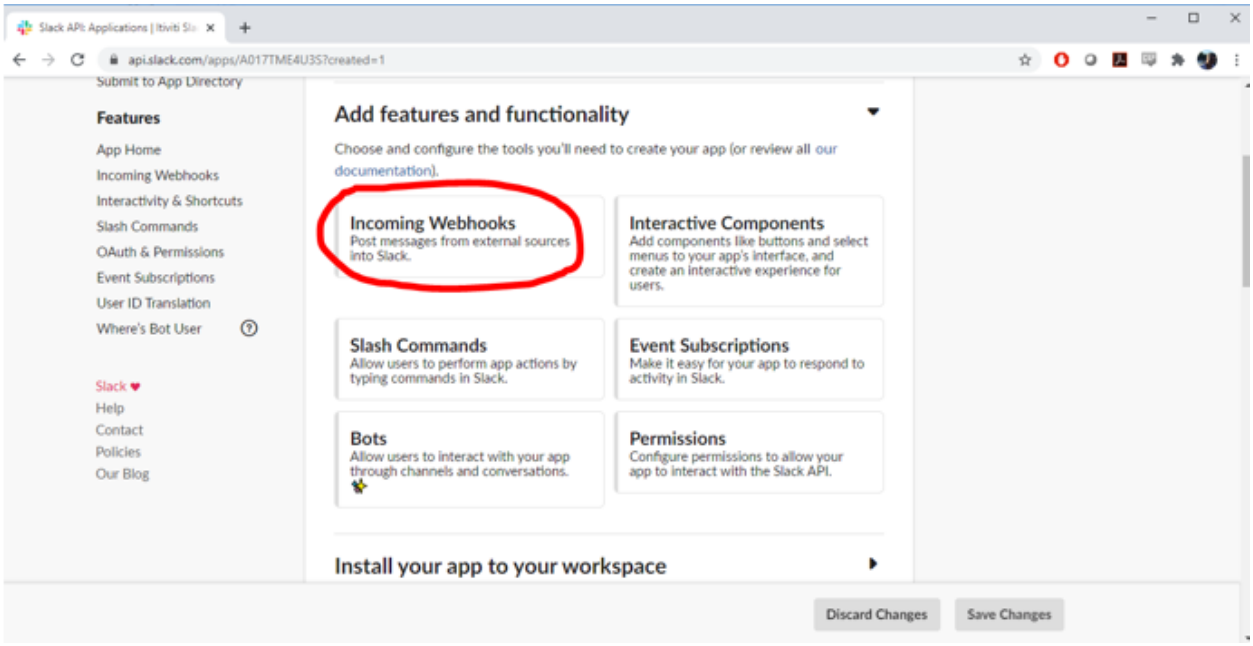
4.3.8.1.2.6.1.2. Create New App

Enter a name and a workspace for your new app.

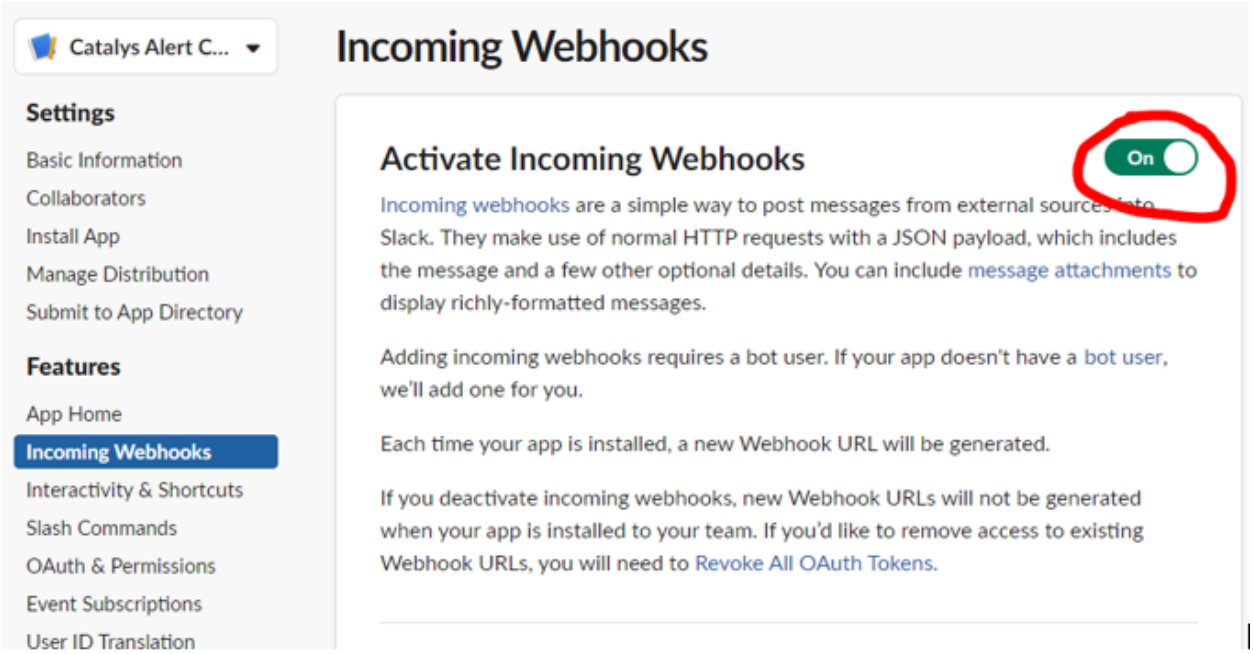


4.3.8.1.2.6.1.3. Add Incoming Webhook

Then you have to add a webhook for incoming POST requests. Please navigate to "Incoming Wekhooks" under the "Add features and functionality" section for you app.

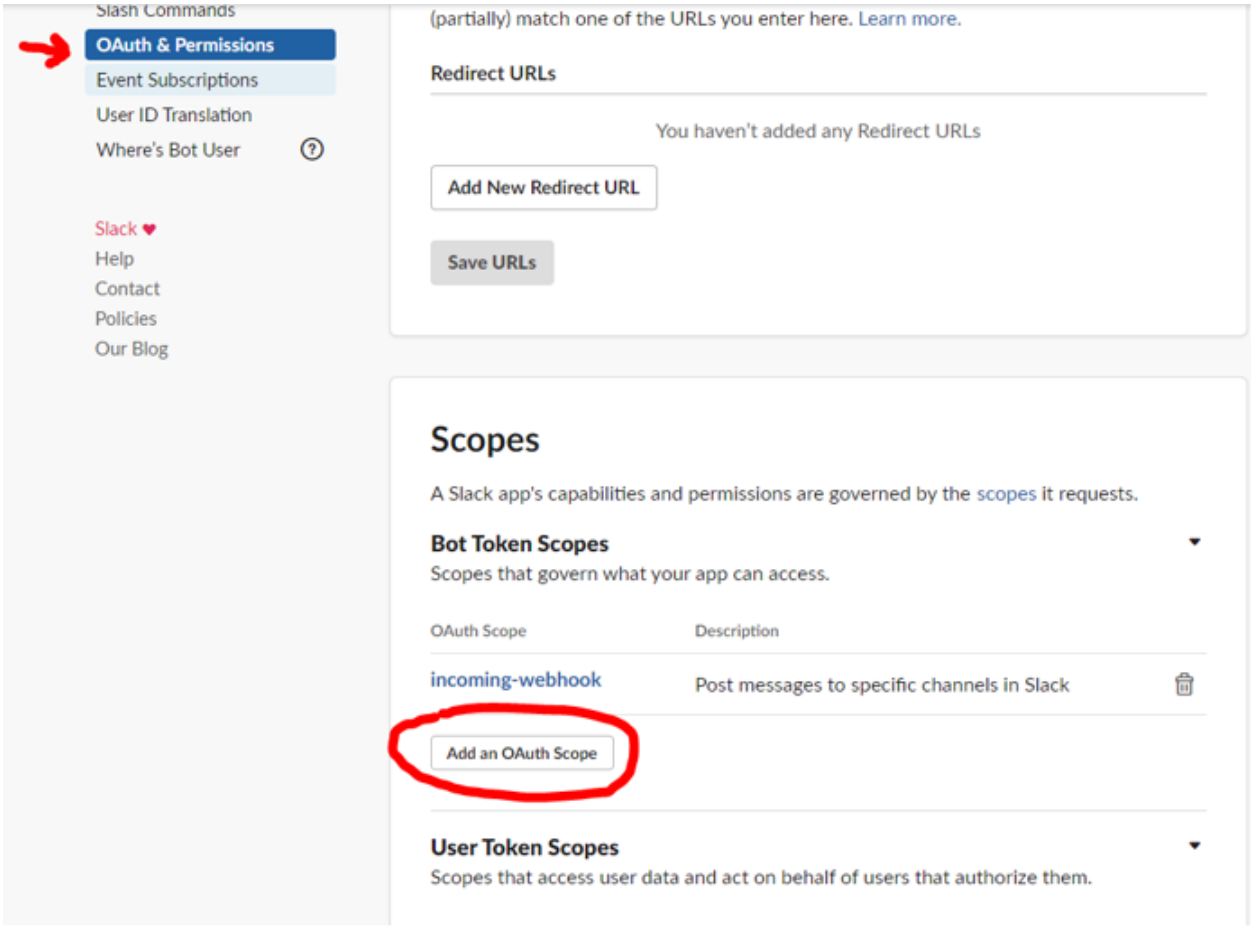


Simply activate your incoming webhooks by switching the button to ON.

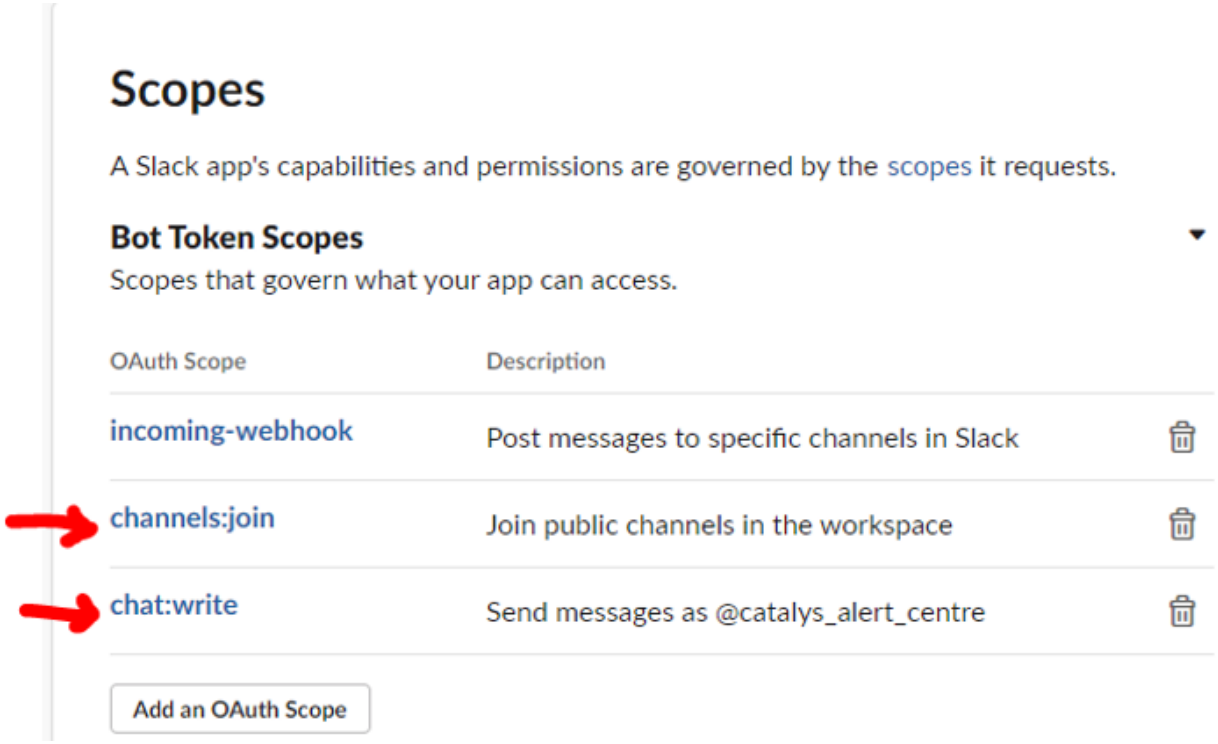


4.3.8.1.2.6.1.4. Add OAuth Scope

On left navigate to "OAuth & Permissions" and scroll down to "Scope" then click the "Add an OAuth Scope" button.

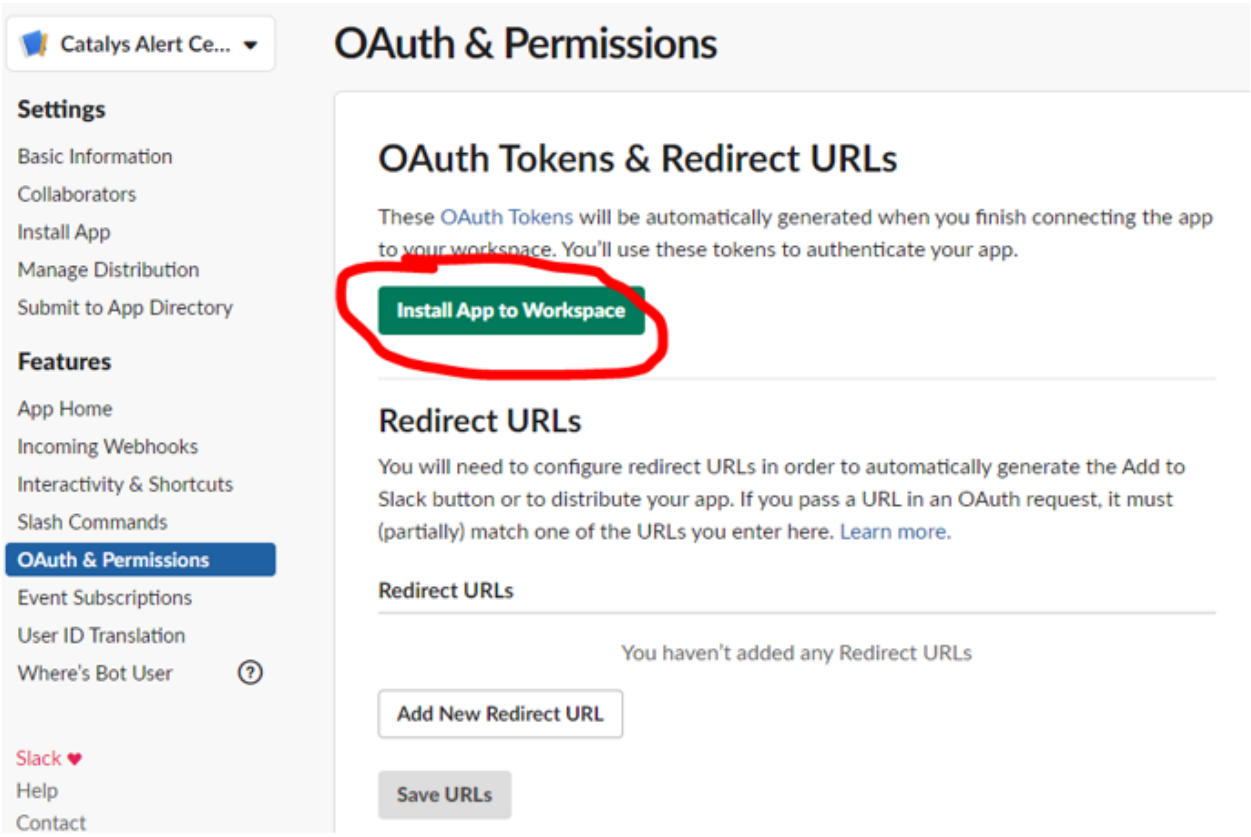


From the list select "channels:join" and "chat:write" and add them.

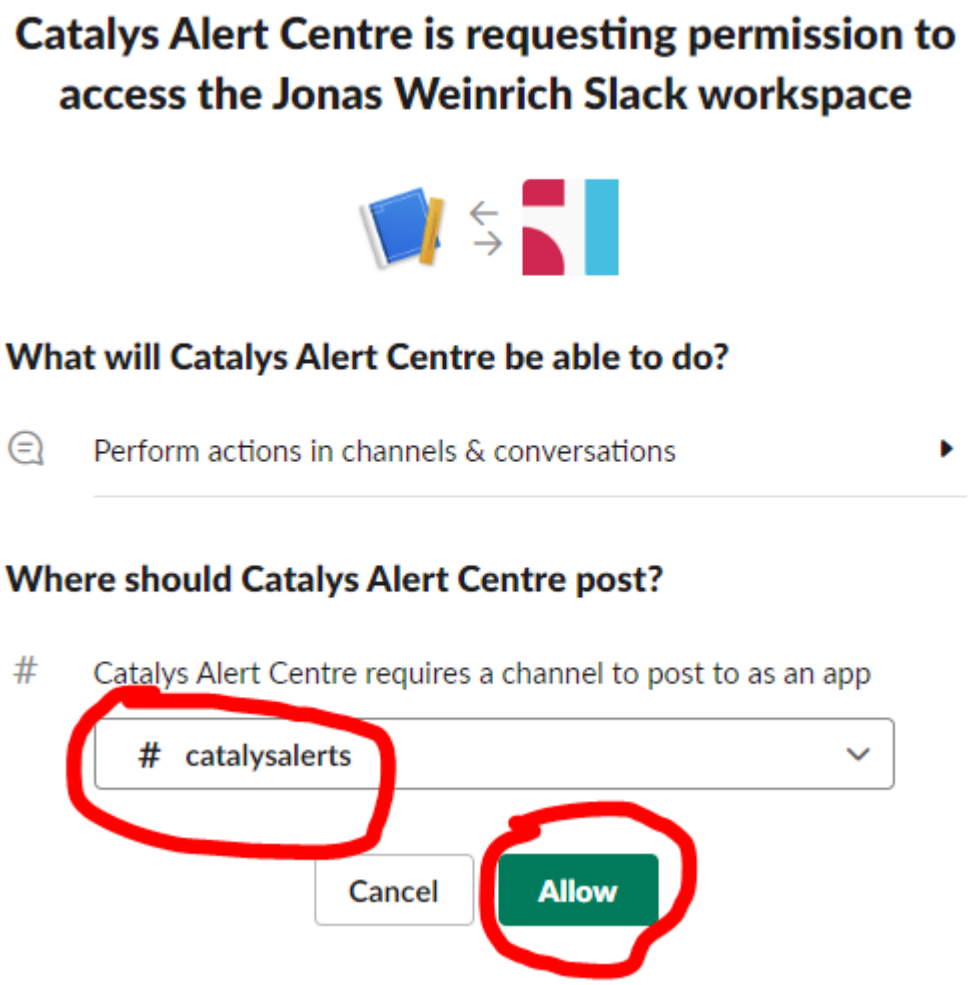


4.3.8.1.2.6.1.5. Add App to Workspace

Scoll back up on that page and click the button "Install App to Workspace"

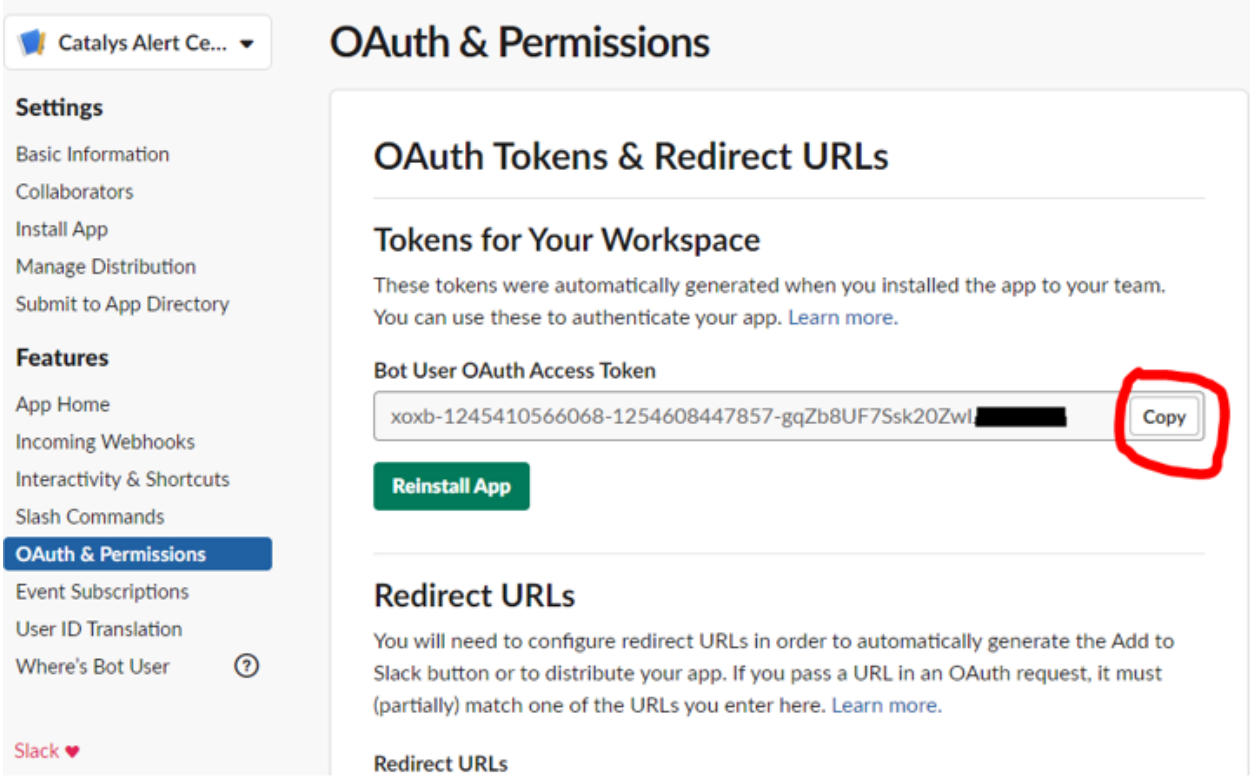


On the next screen you have to enter a channel name to which the bot user should sent the alerts from the Catalys EPS. You can quickly create the channel now before proceeding if it does not exist yet. Please note that you must have admin privileges for your Slack workspace to continue.



4.3.8.1.2.6.1.6. Copy Token

You can then copy the OAuth token on the next page to use within your escalation sequence in the Catlays EPS.



4.3.8.1.2.7. Sample SNMP Action

This is a sample custom action, provided with the MIS distribution, that can be used as the basis for a client-specific SNMP trap action.

This sample populates the SNMP trap according to the sample MIB, which is also provided with the MIS distribution.

This element has the following configuration attributes:

Attribute	Definition
snmp-version	The version of SNMP to use in constructing the trap PDU. Either 1 or 2c. Required.
target-host	The address of the SNMP manager to which the traps are delivered. Optional. Defaults to localhost.
target-port	The port on the target host to which to send the trap.

Attribute	Definition
	Optional. Defaults to 162.
target-community	A string, set on both agent and target, that must match for the trap to be accepted by the target. Optional. Defaults to public.
delivery-retries	The number of times to retry if there is no route to the target host. Optional. Defaults to 2.
delivery-timeout	The amount of time to wait to send a trap if there is no route to the target host. Optional. Defaults to 5000 (mS).
agent-address	The IP address of the SNMP agent sending the trap. Note: this value must be a numerical IP address, not the host name. Required when snmp-version is 1.

Refer to Custom SNMP Action in the API documentation for further details on how to implement a client-specific SNMP trap action.

4.3.8.1.3. Example

For example, the escalation sequence described above would be implemented by adding 3 steps with the following configuration:

4.3.8.1.3.1. Step 1

Add a Log type Action and configure the message. Add a Wait type Action and configure the delay to the maximum amount of time between the event and escalating the event so that the support team gets notified.

Check the 'Stop here on Close' box.

Uncheck the 'Stop here on Ack' box.

4.3.8.1.3.2. Step 2

Add an Email Action and configure the appropriate address. Add a Wait type Action and configure the delay to the maximum allowable time between notifying the support team and notifying the manager.

Check the 'Stop here on Close' box.

Check the 'Stop here on Ack' box.

4.3.8.1.3.3. Step 3

Set the Action to Custom and provide a custom Java class (implementing IAction) which notifies the manager by calling or texting them.

4.3.9. Appendix A: Interest Definitions

This appendix describes all of the available Interests that can be used to generate Events, along with a definition of their parameters.

4.3.9.1. License Warning

Generates an event when the license is due to expire within the configured number of days.

4.3.9.1.1. Selection

All hosts or a selection of hosts.

4.3.9.1.2. Parameters

4.3.9.1.2.1. Number of Days Warning

The number of days before the license expires to generate the event.

4.3.9.1.2.2. Warning Interval

How often this event will be raised (in seconds). Defaults to 86400 (24 hours). Note that a new event will only be raised after this interval if the previous event has been closed. For example, if the warning interval remains at its default of 24 hours and the event is raised but not closed within 24 hours, the original event will remain open and no new event will be generated. However if the event is closed, then a new event will be generated a day later.

4.3.9.1.3. Custom Messages

4.3.9.1.3.1. Properties

The following properties can be used in custom messages for the License Warning interest:

Name	Definition	Value(s)
interestName	The name of this interest	License Warning
expiryDate	The date and time at which the license expires	e.g. Sun Apr 29 00:00:00 BST 2012

Name	Definition	Value(s)
_objectName	The name of the MBean used to generate events from this interest	e.g. com.camerontec:Host="localhost", type="Host.CatalysServer.SoftwareRelease", CatalysServer="CatalysBuy"
_Host	The host associated with this interest.	e.g. localhost
_Node	The node or application associated with this interest	e.g. CatalysSell

4.3.9.1.3.2. Default Messages

The default values for ${onEventMessage} for this interest are:

Event State	Message
Triggered	Event triggered :: [Warning! Host: ${_Host}, Node: ${_Node}, Your license expires on $expiryDate].
Acknowledged	Event acknowledged :: [Warning! Host: ${_Host}, Node: ${_Node}, Your license expires on $expiryDate].
Closed	Event closed :: [Warning! Host: ${_Host}, Node: ${_Node}, Your license expires on $expiryDate].

4.3.9.2. Log Error

Generates an event when an error entry appears in the log of a monitored application.

Note: this interest requires log streaming from the application to the MIS to be enabled.

4.3.9.2.1. Selection

Logs on all sessions, those on a selection of hosts or applications, or individual sessions.

4.3.9.2.2. Custom Messages

4.3.9.2.2.1. Properties

Name	Definition	Value(s)
interestName	The name of this interest	Log Error

Name	Definition	Value(s)
host	The host associated with this interest	e.g. localhost
applicationName	The application associated with this interest	e.g. Catalys Buy
id	The value which uniquely identifies the log message which caused this event	e.g. 54
message	The text of the log message	e.g. Fatal exception reported
timestamp	The time (in mS) at which the log message was printed	e.g. 1334864396032737268
category	The logging category associated with the log error	e.g. CameronTec.SessionManager
level	The logging level of the message	e.g. ERROR
threadName	The name of the thread from which the log message was printed	e.g. SessionManager

4.3.9.2.2.2. Default Messages

The default values for ${onEventMessage} for this interest are:

Event State	Message
Triggered	Event triggered :: [Error log detected. ${host}:${applicationName}:${message}]
Acknowledged	Event acknowledged :: [Error log detected. ${host}:${applicationName}:${message}]
Closed	Event closed :: [Error log detected. ${host}:${applicationName}:${message}]

4.3.9.3. Log Monitor

Generates an event after a period of inactivity in a log.

Note: this interest requires log streaming from the application to the MIS to be enabled.

4.3.9.3.1. Selection

Logs on all sessions, those on a selection of hosts or applications, or individual sessions.

4.3.9.3.2. Custom Messages

4.3.9.3.2.1. Properties

Name	Definition	Value(s)
interestName	The name of this interest	Log Monitor
_Host	The host associated with this interest	e.g. localhost
_Node	The application associated with this interest	e.g. Catalys Buy
_objectName	The name of the JMX object that is being monitored for log events.	e.g. com.camerontec:Host="localhost", Domain="localdomain", type="Domain.Host.CatalysServer.Logger", CatalysServer="CatalysSell"
interestID	The ID assigned to the interest when it is added.	e.g. logMonitor_interest1
interestName	The name of this interest	Monitor Logs
logTimeout	The configured value for the period of inactivity which causes this interest to raise an event	10
templateName	The name of template which generates this interest	Log Monitor

4.3.9.3.2.2. Default Messages

The default values for ${onEventMessage} for this interest are:

Event State	Message
Triggered	Event triggered :: [No logs received in the last ${logTimeout} seconds. Host: ${_Host}, Node: ${_Node}
Acknowledged	Event acknowledged :: [No logs received in the last ${logTimeout} seconds. Host: ${_Host}, Node: ${_Node}
Closed	Event closed :: [No logs received in the last ${logTimeout} seconds. Host: ${_Host}, Node: ${_Node}

4.3.9.4. Third Party Log Monitor

Generates an event after a period of inactivity in a third party log.

Note: this interest requires log streaming from the application to the MIS to be enabled.

4.3.9.4.1. Selection

All third party logs, or a selection of those available.

4.3.9.4.2. Custom Messages

4.3.9.4.2.1. Properties

Name	Definition	Value(s)
interestName	The name of this interest	Third Party Log Monitoring
_Host	The host associated with this interest	e.g. localhost
_Node	The application associated with this interest	e.g. Catalys Buy
_objectName	The name of the JMX object that is being monitored for log events.	
interestID	The ID assigned to the interest when it is added.	e.g. thirdPartyLogMonitor_interest1

Name	Definition	Value(s)
logTimeout	The configured value for the period of inactivity which causes this interest to raise an event	10
loggerType	The configured value for the type of third party logger to monitor	QuickFIX
templateName	The name of template which generates this interest	Third Party Log Monitoring

4.3.9.4.2.2. Default Messages

The default values for ${onEventMessage} for this interest are:

Event State	Message
Triggered	Event triggered :: [No logs received in the last ${logTimeout} seconds. Host: ${_Host}, Node: ${_Node}
Acknowledged	Event acknowledged :: [No logs received in the last ${logTimeout} seconds. Host: ${_Host}, Node: ${_Node}
Closed	Event closed :: [No logs received in the last ${logTimeout} seconds. Host: ${_Host}, Node: ${_Node}

4.3.9.5. Log Regex

Generates an event when the specified field in a log message from a monitored application matches the supplied regular expression.

Note: this interest requires log streaming from the application to the MIS to be enabled.

4.3.9.5.1. Selection

Logs on all sessions, those on a selection of hosts or applications, or individual sessions.

4.3.9.5.2. Parameters

4.3.9.5.2.1. RegEx Value

This is the Java regex pattern to search for in the field specified by 'RegEx Key'.

Example 1 - Generate an event for all Session level rejects (35=3):

```
RegEx Value= ^.*35=3.*$
```

Example 2 - Generate an event for all rejected orders (35=8 and 150=8):

```
RegEx Value= ^.*35=8.*150=8.*$
```

Example 3 - Generate an event for messages between the parties of a particular session, when a specified tag is present and equal to a subset of values, in this case when the value of tag 150 is equal to 1 or 2. The '\u0001' is the field delimiter of the message, and restricts the tag numbers and values exactly to those specified:

```
Regex Value= (?=.*\u000149=CLIENT\u0001.*)(?=.*\u000156=CAMERON\u0001.*).*\u0001150=[12]\u0001.*
```

4.3.9.5.3. Custom Messages

4.3.9.5.3.1. Properties

Name	Definition	Value(s)
interestName	The name of this interest	Log Regex
host	The host associated with this interest	e.g. localhost
applicationName	The application associated with this interest	e.g. Catalys Buy
id	The value which uniquely identifies the log message which caused this event	e.g. 54
message	The text of the log message	e.g. Fatal exception reported
timestamp	The time (in mS) at which the log message was printed	e.g. 1334864396032737268
category	The logging category associated with the log error	e.g. CameronTec.SessionManager
level	The logging level of the message	e.g. ERROR

Name	Definition	Value(s)
threadName	The name of the thread from which the log message was printed	e.g. SessionManager

4.3.9.5.3.2. Default Messages

The default values for ${onEventMessage} for this interest are:

Event State	Message
Triggered	Event triggered :: [Log line match found. ${host}:${applicationName}:${message}]
Acknowledged	Event acknowledged :: [Log line match found. ${host}:${applicationName}:${message}]
Closed	Event closed :: [Log line match found. ${host}:${applicationName}:${message}]

4.3.9.6. Host Down

Generates events when the MIS loses contact with the LMA on any of a selection of hosts.

4.3.9.6.1. Selection

All hosts or a selection of hosts.

4.3.9.6.2. Custom Messages

4.3.9.6.2.1. Properties

Name	Definition	Value(s)
interestName	The name of this interest	Host Down
hostStatus	The status of the host at the time that the message is generated. UP indicates the LMA is contactable, LMA down indicates that LMA is not contactable, but host responds on ping requests and UNKNOWN indicates that host is not contactable.	UP, LMA down, UNKNOWN

Name	Definition	Value(s)
_Host	The name of the host that has gone down	Host Down
_objectName	The name of the MBean used to generate events from this interest	e.g. com.camerontec: Host="localhost", type="Host.LMA"

4.3.9.6.2.2. Default Messages

The default values for ${onEventMessage} for this interest are:

Event State	Message
Triggered	Event triggered :: [Host [${_Host}] went down or became unreachable]
Acknowledged	Event acknowledged :: [Host [${_Host}] went down or became unreachable]
Closed	Event closed :: [Host [${_Host}] went down or became unreachable]

4.3.9.7. Node Down

Generates an event when any of the selected nodes are down.

4.3.9.7.1. Selection

All applications or a selection of node applications.

4.3.9.7.2. Parameters

4.3.9.7.2.1. Suppress UNKNOWN status

If checked then the event will not be generated when the state of the node is unknown. This can happen if the LMA on the host where the node is running goes down.

4.3.9.7.3. Custom Messages

4.3.9.7.3.1. Properties

Name	Definition	Message
interestName	The name of this interest	Node Down

Name	Definition	Message
nodeStatus	The status of the node at the time the message is generated	UP, DOWN, UNKNOWN
maintenance	Whether the node is under-going maintenance at the time the message is generated	true or false
_Host	The host associated with this interest	e.g. localhost
_Node	The name of the node or application associated with this interest	e.g. DEFAULT
_NodeType	The type of node	CatalysServer or CameronFIXServer
_objectName	The name of the MBean used to generate events from this interest	e.g. com.camerontec: name="DEFAULT", Host="localhost", type="Host.CatalysServer"

4.3.9.7.3.2. Default Messages

The default values for ${onEventMessage} for this interest are:

Event State	Message
Triggered	Event triggered :: [Status of Node ${_Node} on host ${_Host} is ${nodeStatus}]
Acknowledged	Event acknowledged :: [Status of Node ${_Node} on host ${_Host} is ${nodeStatus}]
Closed	Event closed :: [Status of Node ${_Node} on host [${_Host} is ${nodeStatus}]

4.3.9.8. Session Down

Generates an event when any of the selected sessions is down.

4.3.9.8.1. Selection

All sessions, those on a selection of hosts or applications, or individual sessions.

4.3.9.8.2. Parameters

4.3.9.8.2.1. Suppress UNKNOWN status

If checked then the event will not be generated when the state of the session is unknown. This can happen if the LMA on the host where the session is running goes down.

4.3.9.8.3. Custom Messages

4.3.9.8.3.1. Properties

Name	Definition	Value(s)
interestName	The name of this interest	Session Down
sessionStatus	The status of the session	DOWN
sessionInSchedule	Whether the session is currently scheduled	e.g. true
_Host	The host associated with this interest	e.g. localhost
_Node	The node or application associated with this interest	e.g. CatalysSell
_NodeType	The type of node or application	e.g. CatalysServer
_Session	The name of the session	e.g. MONYPNY/IINVST
_objectName	The name of the MBean used to generate events from this interest	e.g. com.camerontec: name="MONYPNY/IINVST", Host="localhost", type="Host.CatalysServer.Session"

4.3.9.8.3.2. Default Messages

The default values for ${onEventMessage} for this interest are:

Event State	Message
Triggered	Event triggered :: [Session [${_Session}] status is ${sessionStatus}. Host=${_Host}, Node=${_Node}]
Acknowledged	Event acknowledged :: [Session [${_Session}] status is ${sessionStatus}. Host=${_Host}, Node=${_Node}]
Closed	Event closed :: [Session [${_Session}] status is ${sessionStatus}. Host=${_Host}, Node=${_Node}]

4.3.9.9. Session Down for a Specified Number of Seconds

Generates an event when any of the selected sessions is down for the specified number of seconds.

4.3.9.9.1. Selection

All sessions, those on a selection of hosts or applications, or individual sessions.

4.3.9.9.2. Parameters

4.3.9.9.2.1. Session Down Delay

The number of seconds that the session is down before the event is fired.

4.3.9.9.2.2. Suppress UNKNOWN status

If checked then the event will not be generated when the state of the session is unknown. This can happen if the LMA on the host where the session is running goes down.

4.3.9.9.3. Custom Messages

4.3.9.9.3.1. Properties

As for Session Down Properties.

4.3.9.9.3.2. Default Messages

The default values for ${onEventMessage} for this interest are:

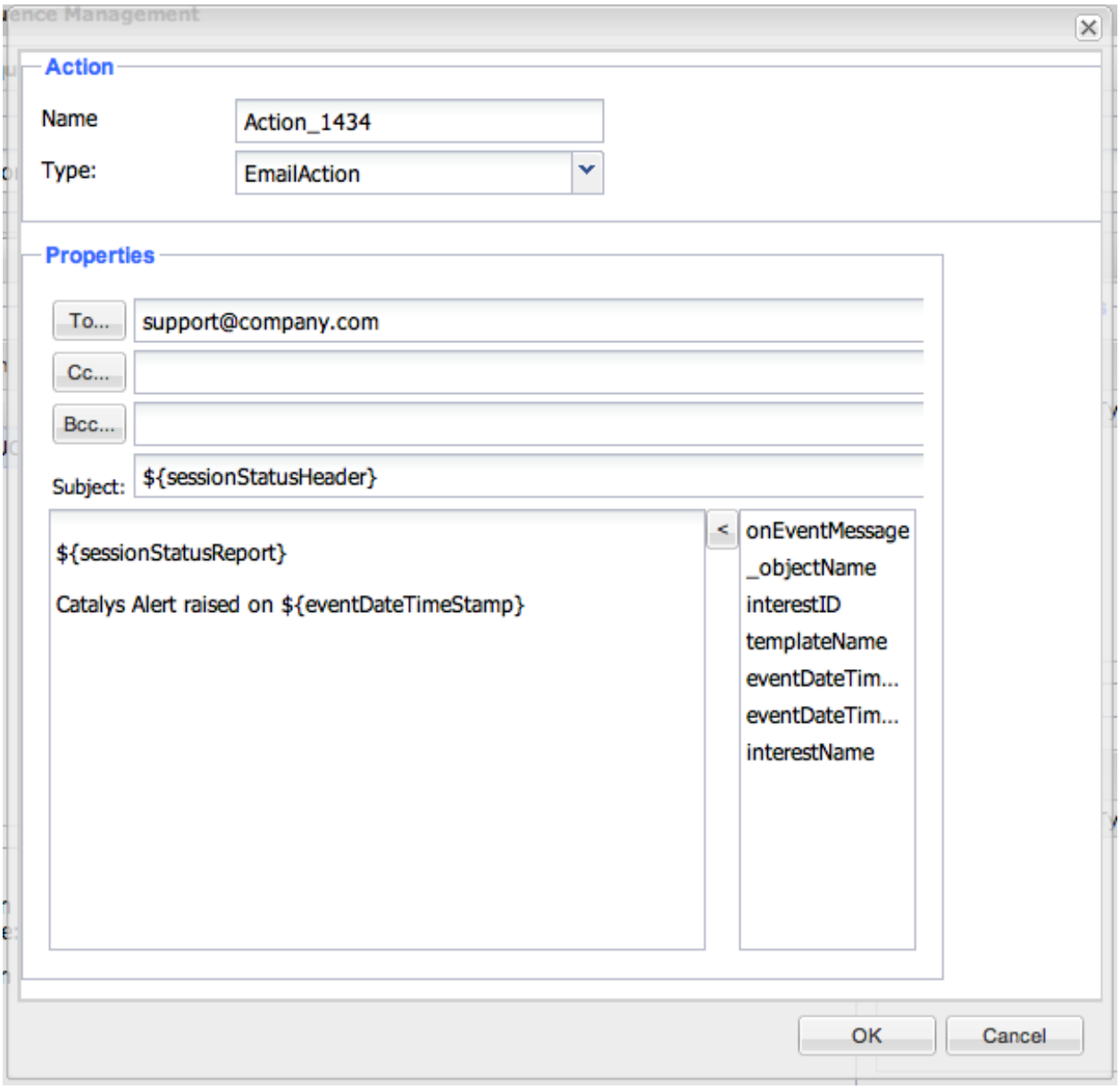
Event State	Message
Triggered	Event triggered :: [Session [${_Session}] is down, and has been down for

Event State	Message
	${sessionStillDownParamDelay} seconds. Host=${_Host}, Node=${_Node}]
Acknowledged	Event acknowledged :: [Session [${_Session}] is down, and has been down for ${sessionStillDownParamDelay} seconds. Host=${_Host}, Node=${_Node}]
Closed	Event closed :: [Session [${_Session}] is down, and has been down for ${sessionStillDownParamDelay} seconds. Host=${_Host}, Node=${_Node}]

4.3.9.10. Session Report

Generates a report of the status of the specified sessions according to the specified schedule.

This interest is most commonly used to send a periodic email of the session status, by adding an Email type escalation. In this case, the sessionStatusHeader and sessionStatusReport properties can be used for the email header and body respectively.



4.3.9.10.1. Selection

All sessions, those on a selection of hosts or applications, or individual sessions.

4.3.9.10.2. Parameters

4.3.9.10.2.1. Schedule

Note that this interest uses the trigger schedule [78] rather than the check schedule. That is, the report is generated periodically according to the schedule, regardless of the actual status of the session(s).

4.3.9.10.3. Custom Messages

4.3.9.10.3.1. Properties

Name	Definition	Value(s)
interestName	The name of this interest	Session Report
interestID	The specified interest description	e.g. Report on all local sessions
eventDateTimestamp	The time at which the event triggers in date/time format	e.g. Friday, April 19, 2013 2:04:00 PM NZST
eventDateTimestampMillis	The time at which the event triggers in milliseconds	e.g. 1366337040394
sessionStatusHeader	Heading of the columns that appear in the sessionStatusReport list.	Host Node Session Status
sessionStatusReport	A list of sessions and their status.	e.g. "host app A/B DOWN"

4.3.9.10.3.2. Default Messages

The default values for ${onEventMessage} for this interest are:

Event State	Message
Triggered	The value of the sessionStatusReport [108] property
Acknowledged	Session Report Acknowledged
Closed	Session Report Closed

4.3.9.11. Session State (Match) & Session State (No Match)

Generate an event when the state of the session equals the configured value (Match) or *does not* equal the configured value (No Match) at the specified time.

This interest is used, for example, to check that all sessions are connected and logged on before a market opens.

4.3.9.11.1. Selection

All sessions, those on a selection of hosts or applications, or individual sessions.

4.3.9.11.2. Parameters

4.3.9.11.2.1. State

This can be:

- UP: the session is connected and logged on
- DOWN: the session is not connected and not logged on
- UNKNOWN: the session state is unknown

4.3.9.11.2.2. Schedule

Note that this interest uses the trigger schedule [78] rather than the check schedule. That is, the event is generated periodically according to the schedule (if the session state matches what has been specified).

4.3.9.11.3. Custom Messages

As for Session Down Properties.

4.3.9.11.3.1. Default Messages

The default values for ${onEventMessage} for this interest are:

Event State	Message
Triggered	Event triggered :: [Status of [${_Session}] is ${sessionStatus}. Host=${_Host}, Node=${_Node}]
Acknowledged	Event acknowledged :: [Status of [${_Session}] is ${sessionStatus}. Host=${_Host}, Node=${_Node}]
Closed	Event closed :: [Status of [${_Session}] is ${sessionStatus}. Host=${_Host}, Node=${_Node}]

4.3.9.12. Session Messages Buffered

This interest generates events when a session starts to buffer messages.

4.3.9.12.1. Selection

All sessions, those on a selection of hosts or applications, or individual sessions.

4.3.9.12.2. Parameters

4.3.9.12.2.1. Direction

This can be:

- IN: incoming messages are buffered
- OUT: outgoing messages are buffered

4.3.9.12.3. Custom Messages

4.3.9.12.3.1. Properties

Name	Definition	Value(s)
interestName	The name of this interest	Session Messages Buffered
bufferSize	The number of buffered messages that cause this interest to generate an event	e.g. 1
nodeInSchedule	Whether this session is in schedule	true or false
_Host	The host associated with this interest	e.g. localhost
_Node	The application or node associated with this interest	e.g. BuyApp
_Session	The session associated with this interest	e.g. MONYPNY/IINVST

4.3.9.12.3.2. Default Messages

The default values for ${onEventMessage} for this interest are:

Event State	Message
Triggered	Event triggered :: [Session [${_Session}] contains buffered messages. Current message buffer count is ${bufferSize}. Host=${_Host}, Node=${_Node}]

Event State	Message
Acknowledged	Event acknowledged :: [Session [${_Session}] contains buffered messages. Current message buffer count is ${bufferSize}. Host=${_Host}, Node=${_Node}]
Closed	Event closed :: [Session [${_Session}] contains buffered messages. Current message buffer count is ${bufferSize}. Host=${_Host}, Node=${_Node}]

4.3.9.13. Latency Max Exceeded

Generates an event when the average latency of messages exceeds the configured threshold.

The application being monitored for latency must be timestamping and timerecording messages for events to be generated from this interest, and the timerecords must be of type HistogramAccumulator. See the Timestamp and Timerecord operations in the Configuration documentation.

4.3.9.13.1. Selection

All sessions, those on a selection of hosts or applications, or individual sessions.

4.3.9.13.2. Parameters

4.3.9.13.2.1. Maximum Latency

The threshold value of the latency (in micro seconds). If the average message latency in any five second period exceeds this value then the event is generated.

4.3.9.13.3. Custom Messages

4.3.9.13.3.1. Properties

Name	Definition	Value(s)
interestName	The name of this interest	Latency Max Exceeded
_Host	The host associated with this interest	e.g. localhost
_Node	The node or application associated with this interest	e.g. CatalysSell
_NodeType	The type of node or application	e.g. CatalysServer

Name	Definition	Value(s)
_Session	The name of the session	e.g. MONYPNY/IINVST
_TimeRecord	The name of the TimeRecord MBean used to generate events from this interest	e.g. com.camerontec: name="Timerecord_1", type="CatalysServer. Configuration. Application. Timerecord", CatalysServer="CatalysSell"
latency	The measured latency in microseconds	e.g. 100

4.3.9.14. HA Split Brain

Generates an event if more than one node in a High Availability cluster is reporting itself as primary.

4.3.9.14.1. Selection

All nodes, or those on a selection of hosts, or particular nodes.

4.3.9.14.2. Parameters

4.3.9.14.2.1. Close Delay

The number of seconds after the Event has cleared before closing the event.

4.3.9.14.3. Custom Messages

4.3.9.14.3.1. Properties

Name	Definition	Value(s)
interestName	The name of this interest	HA Split Brain
Cluster	The HA cluster associated with the split brain state	e.g. sell_cluster

4.3.9.14.3.2. Default Messages

The default values for ${onEventMessage} for this interest are:

Event State	Message
Triggered	Event triggered :: [Split brain detected in HA cluster [${Cluster}]

Event State	Message
Acknowledged	Event acknowledged :: [Split brain detected in HA cluster [${Cluster}]
Closed	Event closed :: [Split brain detected in HA cluster [${Cluster}]

4.3.9.15. HA Configuration Mismatch

Generates an event when there is a mismatch between the configuration of nodes in a High Availability cluster.

Note: this interest requires log streaming from the application to the MIS to be enabled.

4.3.9.15.1. Selection

All nodes, or those on a selection of hosts, or particular nodes.

4.3.9.15.2. Parameters

None

4.3.9.15.3. Custom Messages

4.3.9.15.3.1. Properties

Name	Definition	Value(s)
interestName	The name of this interest	HA Configuration Mismatch
host	The machine where the application with the mismatch is running	e.g. localhost
applicationName	The name of the application containing the configuration mismatch	e.g. sell
message	The text of the log message that identified the configuration mismatch	e.g. Configuration of remote cluster node "[0] sell@sell_site / 127.0.0.1:9001" does not match that of local cluster node - problems are to be expected !

Name	Definition	Value(s)
timestamp	The time (in mS) at which the log message was generated	e.g. 1334863452098738488
category	The logging category associated with the log error	e.g. com.camerontec.catalys.server.ha.cluster.HAContext
level	The logging level of the message	WARN
threadName	The name of the thread from which the log message was printed	main

4.3.9.15.3.2. Default Messages

The default values for ${onEventMessage} for this interest are:

Event State	Message
Triggered	Event triggered :: [HA configuration mismatch detected. ${host}:${applicationName}: ${message}]
Acknowledged	Event acknowledged :: [HA configuration mismatch detected. ${host}:${applicationName}: ${message}]
Closed	Event closed :: [HA configuration mismatch detected. ${host}:${applicationName}: ${message}]

4.3.9.16. HA Data Version Conflict

Generates an event when any of the selected hosts has a mismatch between the data version of its configuration and the data version of its persisted data.

Note: this interest requires log streaming from the application to the MIS to be enabled.

4.3.9.16.1. Selection

All nodes, or those on a selection of hosts, or particular nodes.

4.3.9.16.2. Parameters

None

4.3.9.16.3. Custom Messages

4.3.9.16.3.1. Properties

As for HA Configuration Mismatch Properties.

4.3.9.16.3.2. Default Messages

The default values for ${onEventMessage} for this interest are:

Event State	Message
Triggered	Event triggered :: [HA data version conflict detected. ${host}:${applicationName}: ${message}]
Acknowledged	Event acknowledged :: [HA data version conflict detected. ${host}:${applicationName}: ${message}]
Closed	Event closed :: [HA data version conflict detected. ${host}:${applicationName}:${message}]

4.3.9.17. HA Node Left a Cluster

Generates an event when a node in a High Availability cluster leaves the cluster.

Note: this interest requires log streaming from the application to the MIS to be enabled.

4.3.9.17.1. Selection

All nodes, or those on a selection of hosts, or particular nodes.

4.3.9.17.2. Custom Messages

4.3.9.17.2.1. Properties

Name	Definition	Value(s)
interestName	The name of this interest	HA Node Left a Cluster
host	The machine where the application that detects that a node has left the cluster is running	e.g. localhost

Name	Definition	Value(s)
applicationName	The name of the application that detects that a node has left the cluster	e.g. sell
message	The text of the log message that identifies that the node has left the cluster	e.g. Node [1] sell@sell_site / 127.0.0.1:9002 left the cluster
timestamp	The time (in mS) at which the log message was generated	e.g. 1334863452098738488
category	The logging category associated with the log error	com.camerontec.catalys.server.ha.cluster.DistributedGroupController
level	The logging level of the message	WARN
threadName	The name of the thread from which the log message was printed	GroupMembership-ManagementService

4.3.9.17.2.2. Default Messages

The default values for ${onEventMessage} for this interest are:

Event State	Message
Triggered	Event triggered :: [HA node has left a cluster detected. ${host}:${applicationName}: ${message}]
Acknowledged	Event acknowledged :: [HA node has left a cluster detected. ${host}:${applicationName}: ${message}]
Closed	Event closed :: [HA node has left a cluster detected. ${host}:${applicationName}: ${message}]

4.3.9.18. HA Cluster has Failed Over

Generates an event when a new node in a High Availability cluster becomes primary.

4.3.9.18.1. Selection

All nodes, or those on a selection of hosts, or particular nodes.

4.3.9.18.2. Parameters

None

4.3.9.18.3. Custom Messages

4.3.9.18.3.1. Properties

Name	Definition	Value(s)
interestName	The name of this interest	Cluster has failed over
host	The host on which the failover was detected	e.g. localhost
port	The port on which the nodes of the cluster communicate	e.g. 9002
primary	Whether the node that detected the failover is the primary or not	true or false
serverReference	The name of the MBean used to generate events from this interest	e.g. com.camerontec: name="sell", Host="localhost", type="Host.CatalysServer"
_Cluster	The name of the cluster in which the failover occurred	e.g. cluster_sell
_ClusterMember	The name of the application which detected the failover	e.g. sell

4.3.9.18.3.2. Default Messages

The default values for ${onEventMessage} for this interest are:

Event State	Message
Triggered	[Cluster failover detected. Cluster member [${_ClusterMember}] from cluster [${_Cluster}] has become primary.]

Event State	Message
Acknowledged	[Cluster failover detected. Cluster member [${_ClusterMember}] from cluster [${_Cluster}] has become primary.]
Closed	[Cluster failover detected. Cluster member [${_ClusterMember}] from cluster [${_Cluster}] has become primary.]

4.3.9.19. Numeric Gauge with Maximum Value

Generates an event when a numeric value goes over a threshold, but does not clear the event until the numeric value goes below the threshold minus the specified tolerance (to avoid oscillations).

4.3.9.19.1. Selection

The selection is an MBean. This is selected via a drop-down list, e.g. Host.CatalysServer.Session

For some of these MBeans, an extra selection tree appears. For example if the Host.CatalysServer.Session MBean is selected, then the selection tree allows particular sessions, hosts or all to be selected.

4.3.9.19.2. Parameters

4.3.9.19.2.1. Attribute

The attribute of the selection to be gauged. This must be an integer type, e.g. inMsgBufferSize.

4.3.9.19.2.2. Target

The value at which the event is generated.

4.3.9.19.2.3. Tolerance

The amount that the value has to drop before the event is cleared.

4.3.9.19.3. Custom Messages

4.3.9.19.3.1. Properties

Name	Definition	Value(s)
interestName	The name of this interest	Numeric Gauge Maximum Threshold

Name	Definition	Value(s)
currentValue	The value of the quantity being monitored by this interest, at the time the message is generated	e.g. 100
_objectName	The name of the MBean used to generate events from this interest	e.g. com.camerontec: type="test.numericbean", nature="twostate", name="numericbeantester"

4.3.9.19.3.2. Default Messages

The default values for ${onEventMessage} for this interest are:

Event State	Message
Triggered	Event triggered :: [Max numeric level reached attribute: ${numericGaugeParamAttribute}, target: ${numericGaugeParamTarget}, object name = ${_objectName}]
Acknowledged	Event acknowledged :: [Max numeric level reached attribute: ${numericGaugeParamAttribute}, target: ${numericGaugeParamTarget}, object name = ${_objectName}]
Closed	Event closed :: [Max numeric level reached attribute: ${numericGaugeParamAttribute}, target: ${numericGaugeParamTarget}, object name = ${_objectName}]

4.3.9.20. Numeric Gauge with Minimum Value

Generates an event when a numeric value goes under a threshold, but does not clear the event until the numeric value goes above the threshold plus the specified tolerance (to avoid oscillations).

4.3.9.20.1. Selection

The selection is an MBean. This is selected via a drop-down list, e.g. Host.CatalysServer.Session.

For some of these MBeans, an extra selection tree appears. For example if the Host.CatalysServer.Session MBean is selected, then the selection tree allows particular sessions, hosts or all to be selected.

4.3.9.20.2. Parameters

4.3.9.20.2.1. Attribute

The attribute of the selection, to be gauged. This must be an integer type, e.g. outMsgBufferSize.

4.3.9.20.2.2. Target

The value at which the event is generated.

4.3.9.20.2.3. Tolerance

The amount that the value has to rise before the event is cleared.

4.3.9.20.3. Custom Messages

4.3.9.20.3.1. Properties

Name	Definition	Value(s)
interestName	The name of this interest	Numeric Gauge Min Threshold
currentValue	The value of the quantity that this interest is monitoring, at the time that the message is generated	e.g. com.camerontec: type="test.numericbean", nature="twostate", name="numericbeaninstance"
_objectName	The name of the MBean used to generate events from this interest	e.g. com.camerontec: type="test.numericbean", nature="twostate", name="numericbeaninstance"

4.3.9.20.3.2. Default Messages

The default values for ${onEventMessage} for this interest are:

Event State	Message
Triggered	Event triggered :: [Min numeric level reached attribute: ${numericGaugeParamAttribute}, target: ${numericGaugeParamTarget}, object name = ${_objectName}]
Acknowledged	Event acknowledged :: [Min numeric level reached attribute: ${numericGaugeParamAttribute}, target: ${numericGaugeParamTarget}, object name = ${_objectName}]

Event State	Message
Closed	Event closed :: [Min numeric level reached attribute: ${numericGaugeParamAttribute}, target: ${numericGaugeParamTarget}, object name = ${_objectName}]

4.3.9.21. Boolean Check

Generates an event when a boolean attribute of an MBean matches the configured state.

4.3.9.21.1. Selection

The selection is an MBean. This is selected via a drop-down list, e.g. Host.CatalysServer.Session

For some of these MBeans, an extra selection tree appears. For example if the Host.CatalysServer.Session MBean is selected, then the selection tree allows particular sessions, hosts or all to be selected.

4.3.9.21.2. Parameters

4.3.9.21.2.1. Attribute

The name of the boolean attribute of interest, e.g. inSchedule.

4.3.9.21.2.2. Attribute Trigger

Whether the event is triggered when the attribute is TRUE or FALSE.

4.3.9.21.3. Custom Messages

4.3.9.21.3.1. Properties

Name	Definition	Value(s)
interestName	The name of this interest	Boolean Check
BooleanAttribute	The value of the attribute that the interest should trigger on	true or false
_objectName	The name of the MBean used to generate events from this interest	e.g. com.camerontec: type="test.booleanbean", nature="twostate", name="booleanbeaninstance"

4.3.9.21.3.2. Default Messages

The default values for ${onEventMessage} for this interest are:

Event State	Message
Triggered	Event triggered :: [Boolean check. The value of '${booleanCheckParamAttribute}' is ${inputAttribute}. Object name = ${_objectName}]
Acknowledged	Event acknowledged :: [Boolean check. The value of '${booleanCheckParamAttribute}' is ${inputAttribute}. Object name = ${_objectName}]
Closed	Event closed :: [Boolean check. The value of '${booleanCheckParamAttribute}' is ${inputAttribute}. Object name = ${_objectName}]

4.4. Logs Browsing

4.4.1. Introduction

The Logs Tab displays logs for all managed applications which are streaming their logs.

To stream logs for a particular application or all applications running on a particular host, select Logs Streaming on the Admin Tab.

Logs for a particular instance can also be viewed using the Tail Logs button from the Server administration panel from the Servers and Session tab.

4.4.2. Logs Display Panel

The log entries are shown on the main logs display panel.

The following log panel columns are supported:

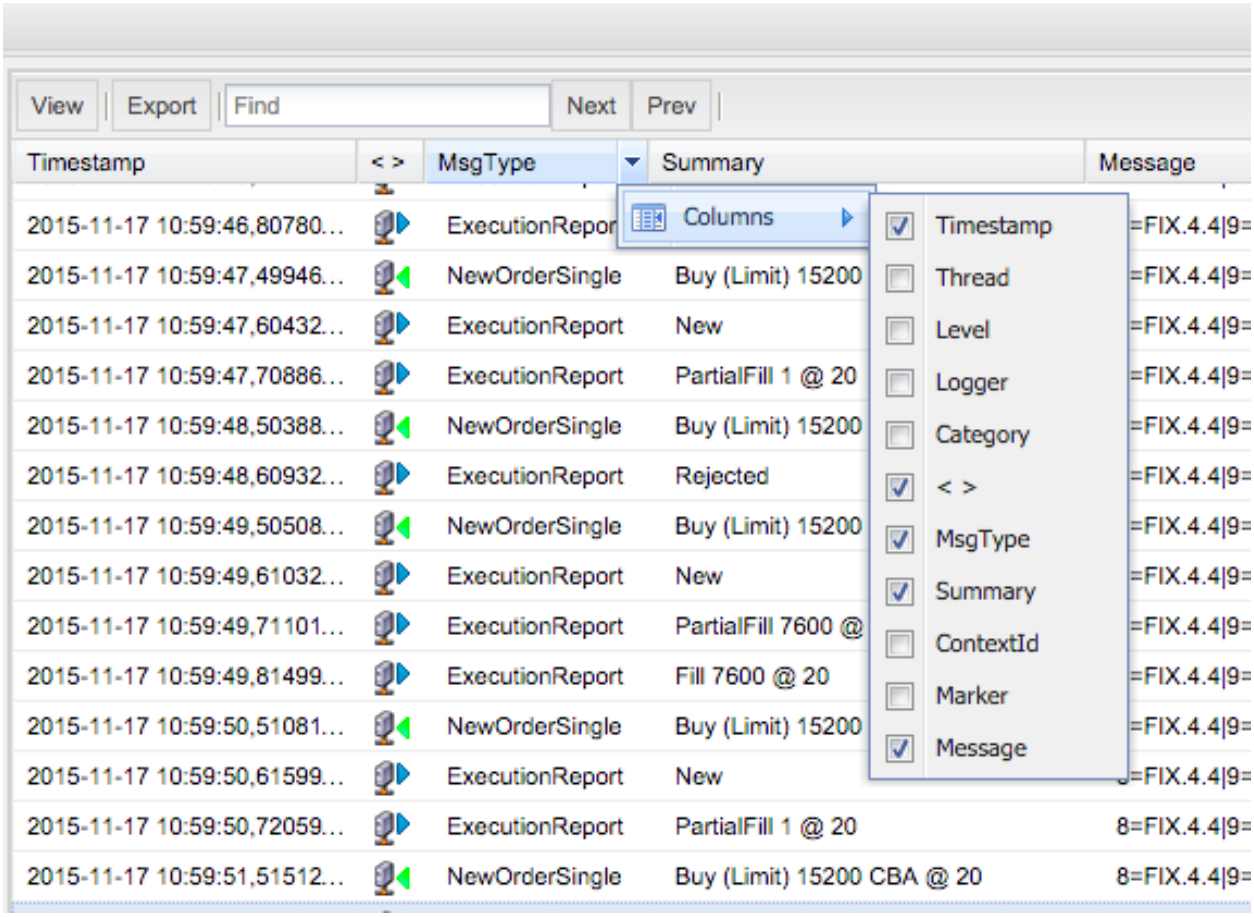
- Timestamp
- Thread that logged the message
- Log level
- Logger
- Category
- Direction of message (FIX only)
- Message type (FIX only)
- Summary of message (FIX only)
- ContextId for message correlation (FIX only)

- Marker (FIX only)
- Message

The color of the log line denotes the log level of the entry: ERROR - red; WARN - yellow; others - white.

Double-clicking on an individual log line will bring up the log info panel for that entry.

The logs can be displayed in historical mode or live mode. When a filter is first applied, the logs are displayed in historical mode, beginning at the oldest entry. When the tail mode is selected (by pressing the "Tail" button), the log entries are updated in real-time, showing the most recent entries.

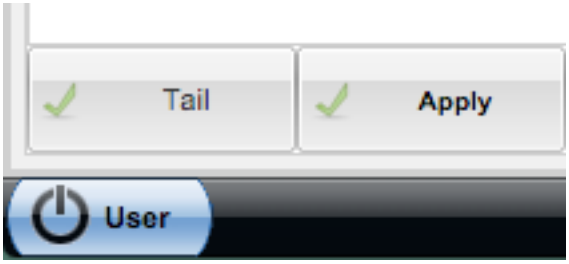


Default Filter

By default, there is no filtering applied. All log events from all applications at all times and levels are shown. This default filter can be edited and saved, or a new specific filter can be added.

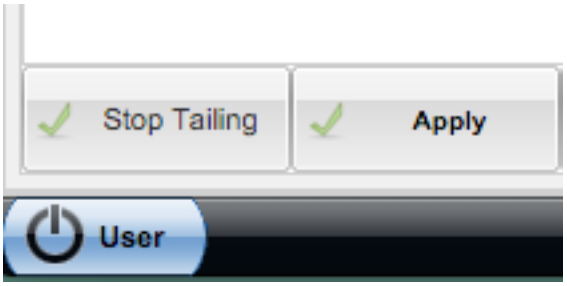
Tail Logs

By default, the logs are shown as a static snapshot. To view live logs, press the 'Tail' button.



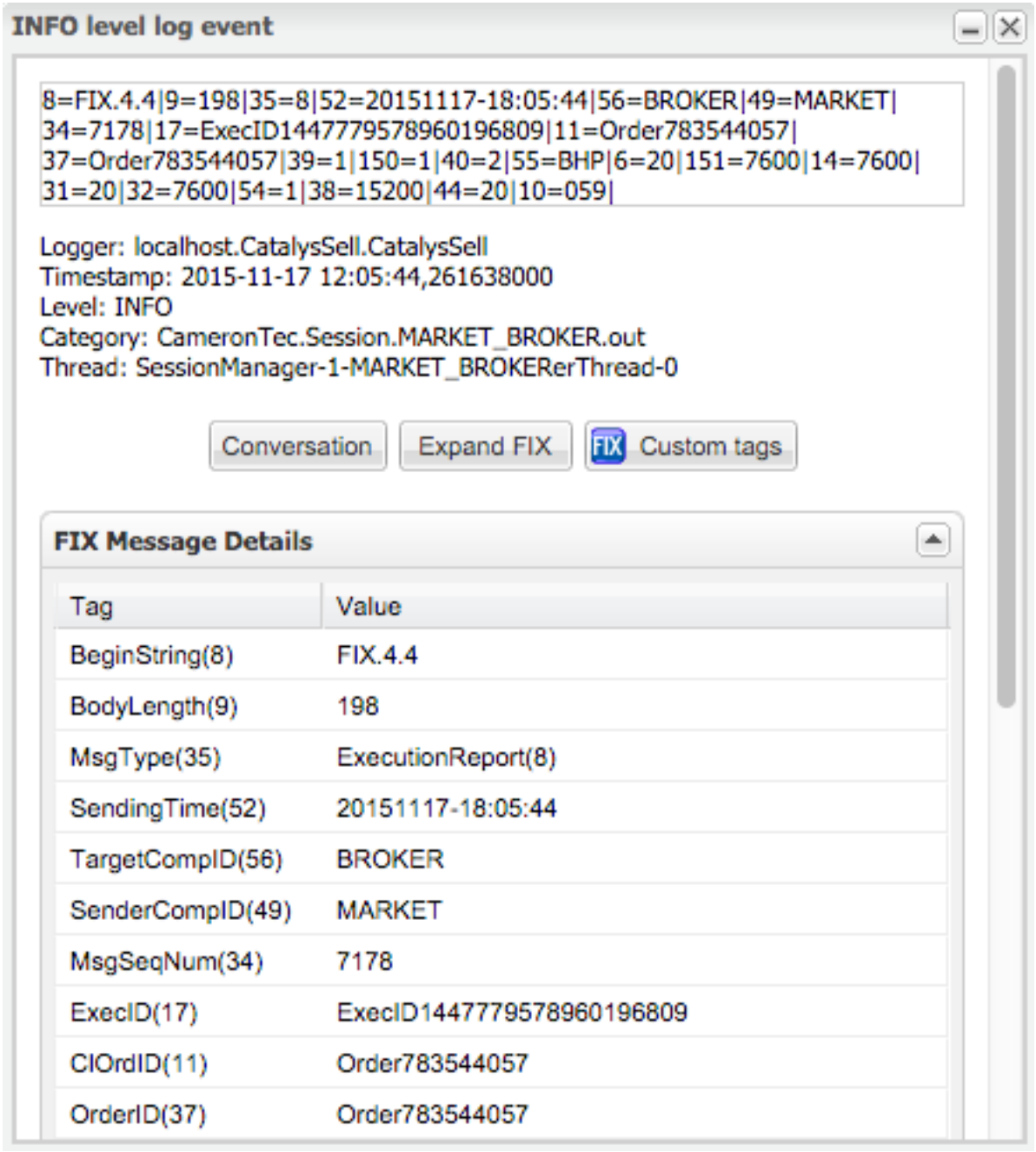
When in tail mode, the logs panel automatically scrolls to the most recent log events and existing filters still take affect.

To view (and filter) a static snapshot of the logs, press the 'Stop Tailing' button.



4.4.3. Log Info View

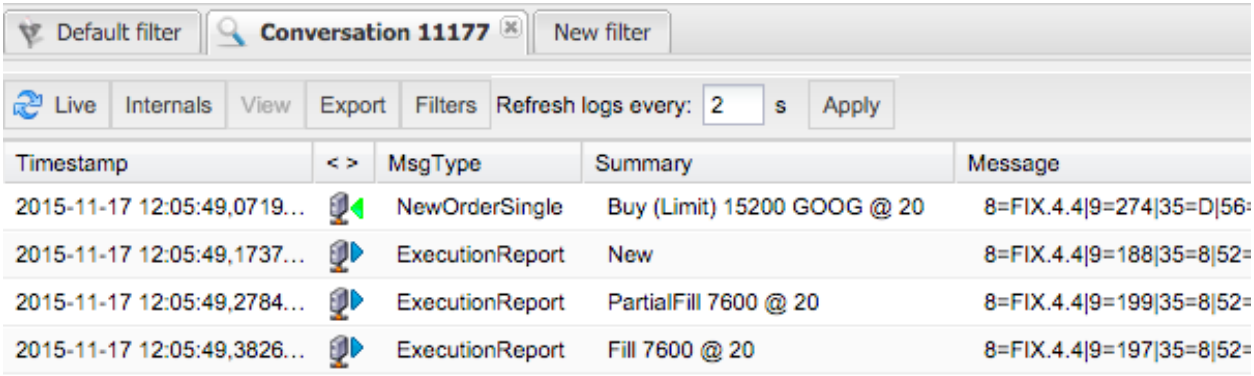
To view more detailed information about a log event, double click on its entry in the logs display panel.



Conversation View

A logs conversation is a collection of logs that are related to each other. For example, all of the FIX messages relating to the same order: the original order, with its fills and other executions, and any cancellations or replacements.

Clicking on the 'Conversation' button brings up a new Conversation Tab, showing these related log entries.

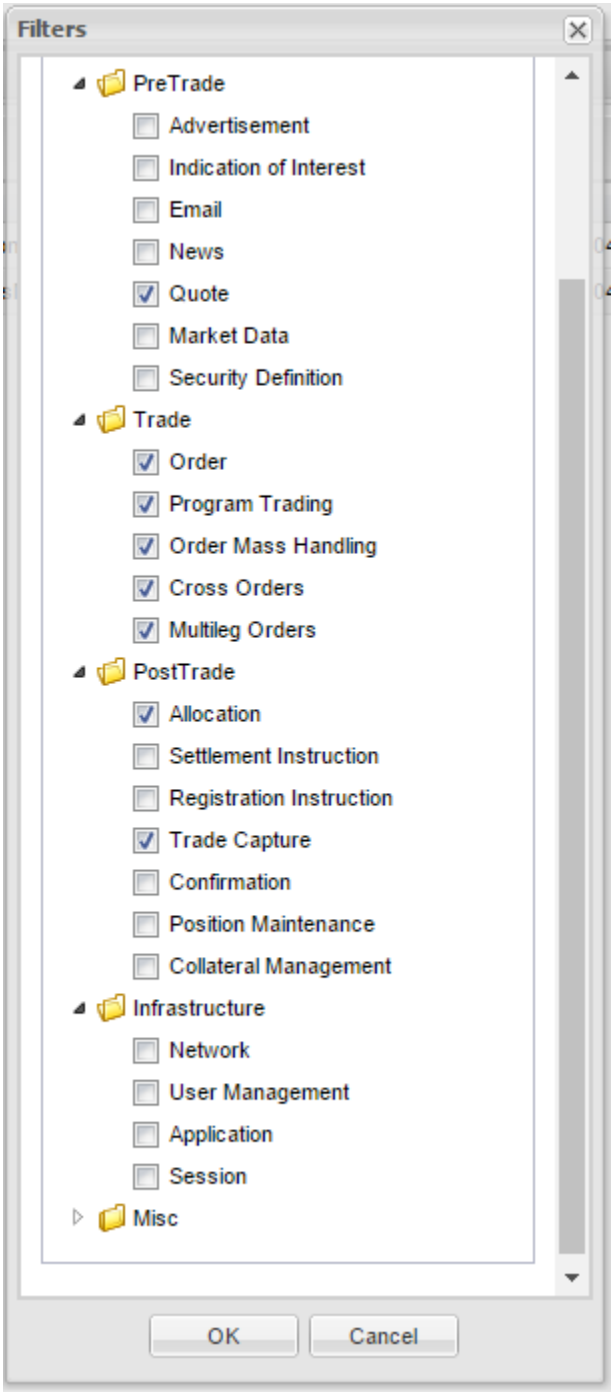


Expand FIX

If the log entry is a FIX message then clicking on the 'Expand FIX' button expands all of the FIX fields and values in the log message to their symbolic values as well as their numeric values.

4.4.4. Correlators

Conversations will always use the ContextId for message correlation. However, correlators will be used in addition to the ContextId to further define how a collection of logs relate to each other creating a specific conversation. The correlators that are used by the conversation depends on the message type of the message from which the conversation query was executed and the default message types of the correlators. For example, if the conversation query was executed from a New Order Single (35=D), the Order Conversation Correlator would be used; however, if the conversation was started from an Execution Report (35=8), the conversation correlators used would be: Quote, Order, Program Trading, Order Mass Handling, Cross Orders, MultiLeg Orders, Allocation and Trade Capture. By clicking the 'Filters' button on a conversation tab the 'Filters' dialog will pop up containing all the correlators available and the ones used will be enabled.



The checkboxes next to the correlators will enable/disable that specific correlator for the conversation.

The following table provides details of each correlator the MIS comes with by default:

Correlator Name	Correlator Group	Default Message Types	Included Message Types	Correlation Tags (TagFrom:TagTo)
Advertisement	PreTrade	7	7	AdvId:AdvId, AdvRefID:AdvId
Indication of Interest	PreTrade	6	t,6,AC,s,AB,D,AJ	IOIID:IOIID, IOIRefID:IOIID
Email	PreTrade	C	C	EmailThreadID:EmailThreadID
News	PreTrade	B	B	NewsID:NewsID
Quote	PreTrade	S,i,b,Z,R,AG,AI,a,AJ,Ai,s,8	S,i,b,Z,R,AG,AI,a,AJ,Ai,s,8,D	QuoteReqID:QuoteReqID, QuoteID:QuoteID, QuoteMsgID:QuoteMsgID, QuoteRespID:QuoteRespID, RFQReqID:RFQReqID, ExecID:ExecID
Market Data	PreTrade	e,f,x,y,Y,V,W,X	e,f,x,y,Y,V,W,X	SecurityReqID:SecurityReqID, SecurityStatusReqID:SecurityStatus MDReqID:MDReqID
Security Definition	PreTrade	AA,z,BR,d,c,BP,y,x,BK,f,e,BS,w,	AA,z,BR,d,c,BP,y,x,BK,f,e,BS,w,	SecurityReportID:SecurityReportID, SecurityReqID:SecurityReqID, SecurityListID:SecurityListID, SecurityListRefID:SecurityListID, SecurityStatusReqID:SecurityStatus
Order	Trade	8,9,D,E,F,G,H,Q,j,3,BN,	8,9,D,E,F,G,H,Q,j,3,BN,	ClOrdID:ClOrdID, OrigClOrdID:ClOrdID, OrderID:OrderID, SecondaryOrderID:OrderID, ExecID:ExecID, SecondaryExecID:ExecID, ExecRefID:ExecID, TradeID:TradeID, OrigTradeID:TradeID
Program Trading	Trade	k,l,K,L,M,m,N,E,8,BN,Q,	k,l,K,L,M,m,N,E,8,BN,Q,	BidID:BidID, ClientBidID:ClientBidID, ListID:ListID, ClOrdID:ClOrdID,

Correlator Name	Correlator Group	Default Message Types	Included Message Types	Correlation Tags (TagFrom:TagTo)
				ExecID:ExecID, ExecRefID:ExecID
Order Mass Handling	Trade	BZ,CA,r,q,AF,8,BN,Q	BZ,CA,r,q,AF,8,BN,Q	MassStatusReqID:MassStatusReqID MassActionReportID:MassActionRep ClOrdID:ClOrdID, ExecID:ExecID, ExecRefID:ExecID
Cross Orders	Trade	t,u,s,8,BN,Q	t,u,s,8,BN,Q	CrossID:CrossID, OrigCrossID:CrossID, HostCrossID:HostCrossID, OrderID:OrderID, ExecID:ExecID, ExecRefID:ExecID
Multileg Orders	Trade	AB,AC,8,BN,Q	AB,AC,8,BN,Q	ClOrdID:ClOrdID, OrigClOrdID:ClOrdID, OrderID:OrderID, ClOrdLinkID:ClOrdLinkID, ExecID:ExecID, ExecRefID:ExecID
Allocation	PostTrade	J,P,BM,AS,AT,8,BN,Q	J,P,BM,AS,AT,D,E,8,AJ,BN	AllocID:AllocID, AllocLinkID:AllocID, RefAllocID:AllocID, AllocReportID:AllocReportID, AllocReportRefID:AllocReportID, OrderID:OrderID, ClOrdID:ClOrdID
Settlement Instruction	PostTrade	AV,T,BQ	AV,T,BQ	SettlInstReqID:SettlInstReqID, SettlInstMsgID:SettlInstMsgID, SettlInstID:SettlInstID, SettlInstRefID:SettlInstID
Registration Instruction	PostTrade	o,p	o,p	RegistID:RegistID, RegistRefID:RegistID, ClOrdID:ClOrdID

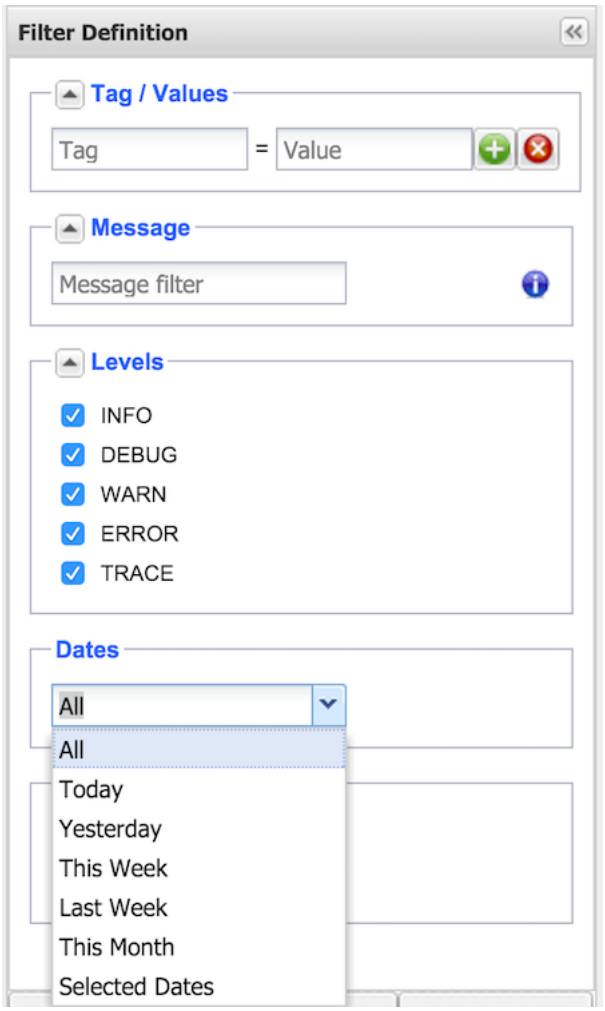
Correlator Name	Correlator Group	Default Message Types	Included Message Types	Correlation Tags (TagFrom:TagTo)
Trade Capture	PostTrade	AE,AR,AD,AQ,8,BN,CAE,AR,AD,AQ,8,BN,C		TradeID:TradeID, TradeReportID:TradeReportID, TradeRequestID:TradeRequestID, OrigTradeID:TradeID, ExecID:ExecID
Confirmation	PostTrade	AK,AU,BH	AK,AU,BH	ConfirmID:ConfirmID, ConfirmReqID:ConfirmReqID, ConfirmRefID:ConfirmRefID, ConfirmRefID:ConfirmID
Position Maintenance	PostTrade	BL,AW,BO,AM,AL,AP,AX,AC	BL,AW,BO,AM,AL,AP,AX,AC	PosMaintRptID:PosMaintRptID, PosMaintRptRefID:PosMaintRptID, AsgnRptID:AsgnRptID, PosReqID:PosReqID, ContIntRptID:ContIntRptID, OrigPosReqRefID:PosReqID
Collateral Management	PostTrade	AY,BB,BG,BA,AX,AZ	AY,BB,BG,BA,AX,AZ	CollAsgnID:CollAsgnID, CollAsgnRefID:CollAsgnRefID, CollAsgnRefID:CollAsgnID, CollReqID:CollReqID, CollInquiryID:CollInquiryID, CollRptID:CollRptID, CollRespID:CollRespID
Network	Infrastructure	BC,BD	BC,BD	NetworkRequestID:NetworkRequest NetworkResponseID:NetworkRespo LastNetworkResponseID:NetworkRe LastNetworkResponseID:LastNetwo
User Management	Infrastructure	CB,BE,BF	CB,BE,BF	UserRequestID:UserRequestID, Username:Username
Application	Infrastructure	BY,BW,BX	BY,BW,BX	ApplReportID:ApplReportID, ApplReqID:ApplReqID, ApplResponseID:ApplResponseID
Session	Infrastructure	0,1,2,3,4,5,A	0,1,2,3,4,5,A	SenderCompID:SenderCompID, TargetCompID:TargetCompID, SenderCompID:TargetCompID,

Correlator Name	Correlator Group	Default Message Types	Included Message Types	Correlation Tags (TagFrom:TagTo)
				TargetCompID:SenderCompID, TestReqID:TestReqID

To create a custom correlator please refer to the Custom Correlators Configuration section.

4.4.5. Filters

Use the filter panel on the left hand side of the screen to limit the set of log entries shown in the logs panel.



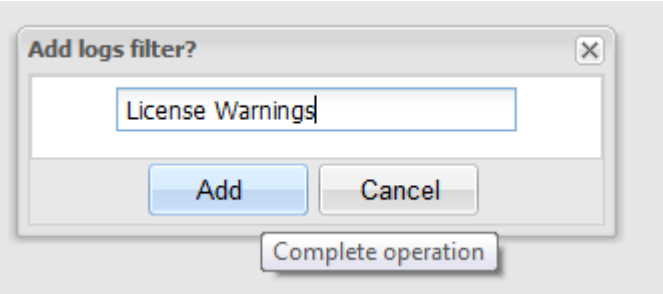
Filters are saved to disk on a per-user basis.

New Filters

Update the default filter by editing it and applying the changes.

Alternatively, add a new filter by clicking on the 'New Filter' tab, and supply a name for the filter.

Right clicking on a Filter Tab will allow it to be renamed.



Text Search

Enter a text string to search for in the entry field of the log event.

The MIS search system tokenizes the log entries and the search field based on the following delimiters:

- the 'space' character
- the 'equals' character: =
- the 'less than' character: <
- the 'greater than' character: >
- the 'start of header' character: <SOH>
- the 'vertical bar' character: |

This means that each log entry is broken down into single word tokens, where the single words are separated by any of the above delimiters.

The delimiter characters are not treated as literal strings, either in the log entry or in the search field.

Word and phrase searches are permitted; a phrase search matches consecutive tokens.

Wildcard characters ('*' and '?') are permitted only in word searches and they must not be positioned at the start of the word.

Multiple word and multiple phrase searches are permitted. By default any of the terms are matches; operators are available to refine this.

Single Whole Word

To search for a single whole word, enter the word by itself, or surrounded by one of the delimiters.

Single Partial Word

To search for a single partial word, use wildcard characters, e.g. GOOG* matches 'GOOG' and 'GOOGLE' (and any other words beginning with 'GOOG').

For a single character wildcard, use the '?' character, e.g. log?n matches 'logon' and 'login'.

Exact Phrase

To search for an exact phrase enter the phrase surrounded by quotes, e.g. "logged on"

Note that a phrase search also matches separate tokens which are consecutive, e.g. "55 GOOG" matches FIX log entries where the value of the symbol field is 'GOOG'.

Multiple words

Multiple unquoted words match entries in which any of the words appear e.g. GOOG IBM matches log entries containing the word GOOG or the word IBM.

To find entries which contain all of the words of a multiple word search, use the AND operator between the words, e.g. GOOG AND IBM.

To find entries definitely containing one word and possibly containing others, use the '+' operator, e.g. +GOOG IBM.

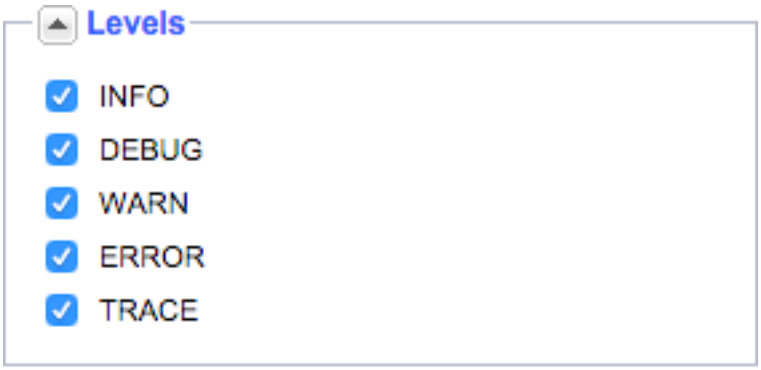
To find entries which do not contain a word, use the '-' operator, e.g. GOOG -MoneyPenny.

Multiple phrases

The above operators also apply to phrases. Like words, two phrases without an operator will match either phrase. Use the operators to refine the search, e.g. "11=GOOG" -"56=MoneyPenny" matches all those entries whose Symbol field is equal to 'GOOG' but whose TargetCompID does not equal 'MoneyPenny'.

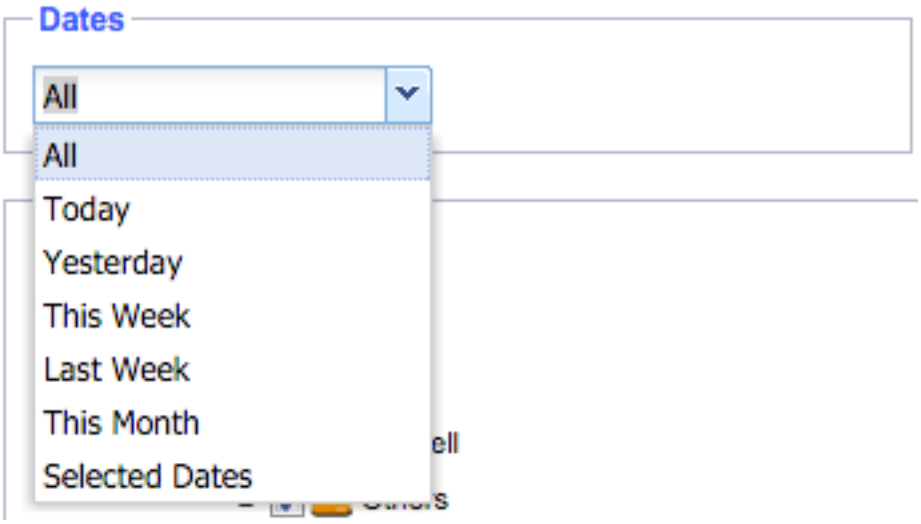
Log Level Filter

Check one or more log levels to filter on.

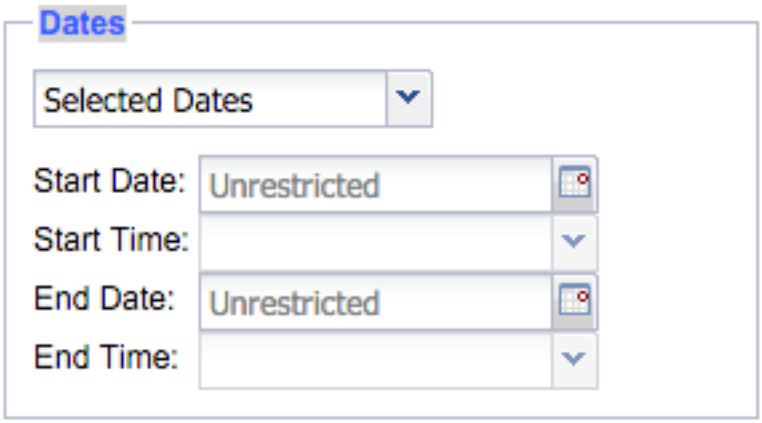


Dates Filter

You can filter dates by a preset set of selections for a different set of previous days.



Or you can filter with a date range using the Selected Dates drop down value.

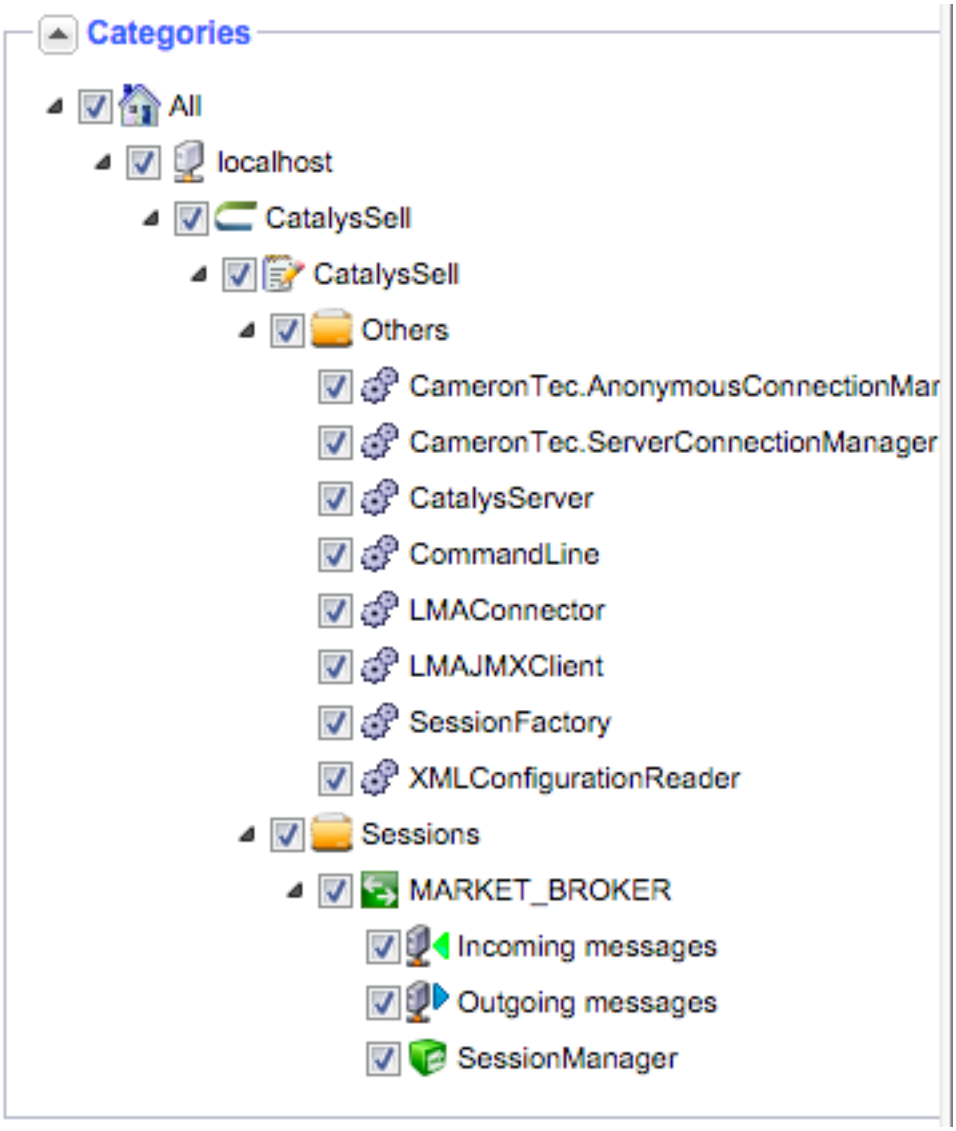


Note

Entering a Start Date without a Start Time will search from 00:00, and entering an End Date without an End Time will search up to 00:00 on the following day.

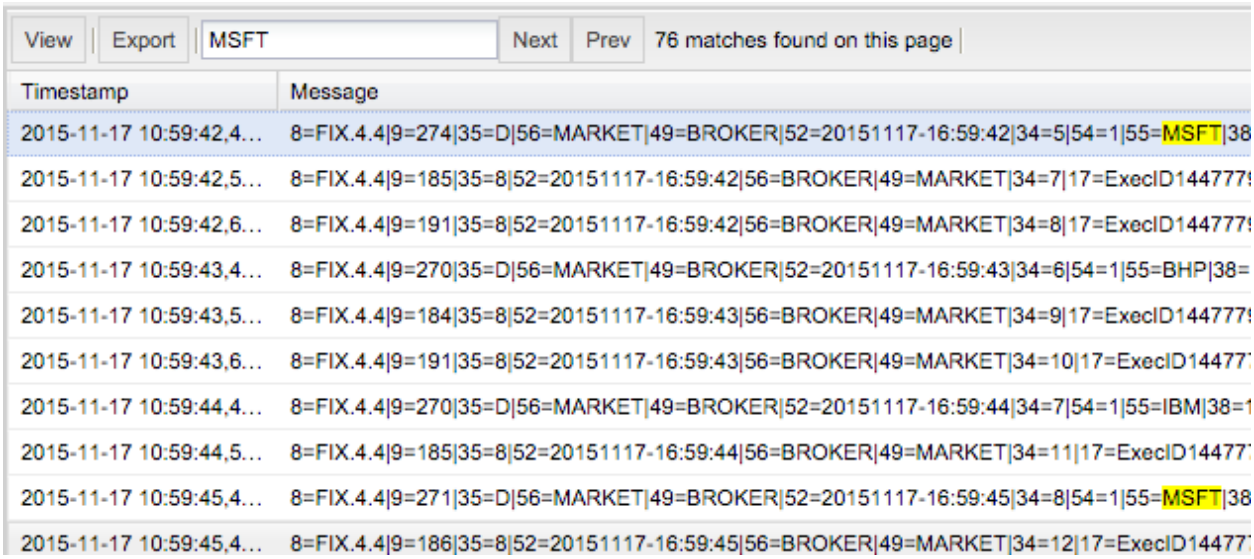
Category Search

The category is the source of the event. This field of the filter is presented as a tree of selections, from 'All', to a specific application, right down to a specific session.



4.4.6. Free Text Search

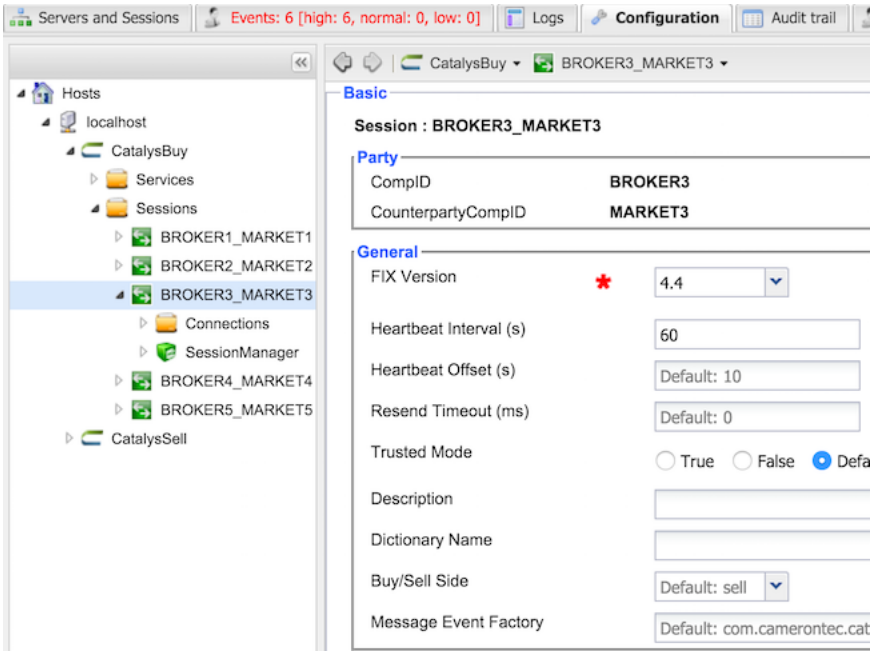
You can search all filtered results by entering a value in the text field in the upper left hand corner of the log results grid. 'Next' and 'Prev' buttons allow you to move from one matching entry to the next.



4.5. Configuration

4.5.1. Introduction

The Configuration Tab of the Dashboard manages the configuration of Catalys Node Servers. Use the Configuration Tab to view and modify existing configurations, add add new configurations.



4.5.2. Navigation

The left hand side of the Configuration Tab shows a tree of configuration elements. This navigation tree consists of all of the managed configuration elements grouped by Host, Application, and then individual element types such as Sessions and Services.

When an element is selected in the navigation tree, it (along with any ancestor elements) appears as a menu, along the top of the Configuration Tab. This menu consists of the operations that can be performed on this element.

Also along the top of the Configuration Tab are forward and backward buttons

. Click the backward button to navigate to previously selected elements; and the forward button to browse back to the current selection.

Individual elements in the tree are also decorated by icons to indicate their current status.

Icons to the left of an element

- 

  Yellow circle with an exclamation mark: an element below this one in the hierarchy has been modified (and not reloaded).

- 

  Grey circle with an exclamation mark: an element below this one in the hierarchy has modified non-refreshable attributes. This means that in order for these changes to take effect, the application being managed must be re-started. This icon only appears after a session or application has been reloaded (indicating that there is saved configuration which is not currently running in the application).

Icons to the right of an element

- 

  Yellow triangle with exclamation mark: this element is modified.

- 

  Blue plus: this element is new i.e. item has not yet been loaded into runtime.

- 

  Red cross: this element has been marked for delete i.e. will be deleted at next reload.

- 

Two circling arrows: element is modified and reloadable.

- 

  Grey triangle with an exclamation mark: the element has non refreshable changes, and node must be restarted for them to take affect.

Hosts

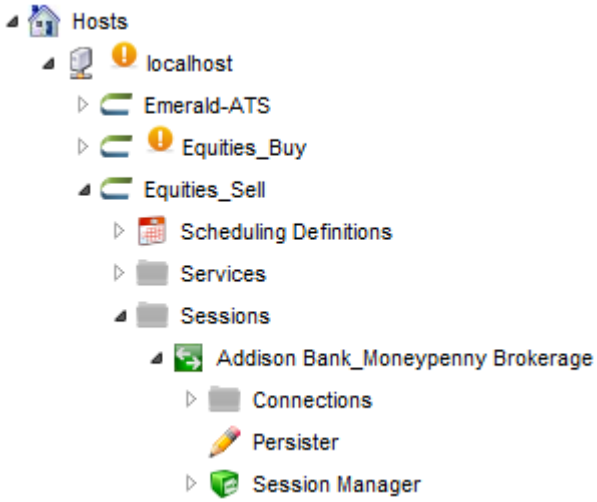
The Hosts node of the tree groups of the managed hosts in the system. When expanded each of these hosts is displayed as a separate node labelled by the name or IP address of the host.

Applications

Beneath each node are the applications running on that node. These are labelled by the name of the application. The application node contains all of its configuration elements, grouped by Application-level elements such as Services, and by Sessions.

Sessions

If the application has any sessions defined, these are grouped in the Sessions node of the navigation tree. The are labelled by their session identifier which is a concatenation of the local party and the counter party.



Connection

The connections of the session are shown beneath the session.

Persister and other Session Level Elements

If configured, the session persister and other Session level elements are also shown beneath the session.

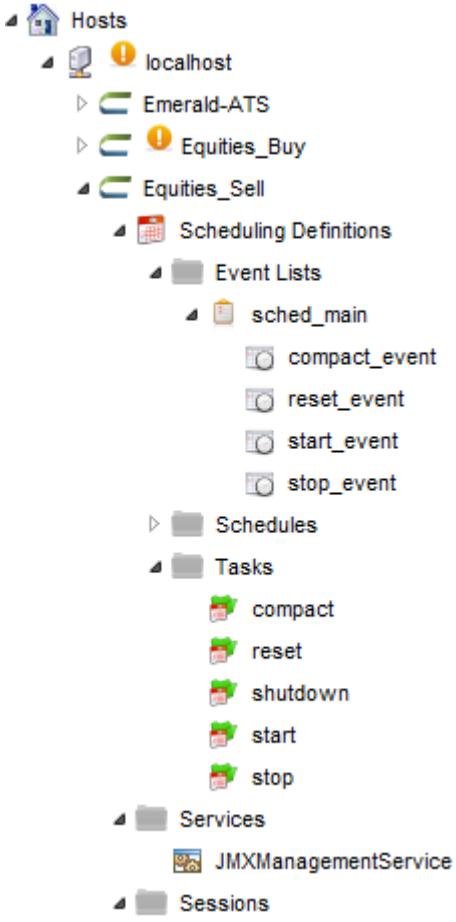
Session Manager

The Session Manager contains the source and listener message processing chains of the session. These appear in the hierarchy in which they are defined.

4.5.3. Services and other Application Level Elements

If the application has any services or other application-level elements these appear beneath the application node. There is at least one service defined which is the JMXManagementService, which allows management of the node by the Dashboard.

Other application level elements include Rules Packs, Message Processing Templates, Message Factories, Compression, Monitors, Scheduling.



4.5.4. Operations

At each node in the navigation tree, there are a set of context sensitive operations that apply to the node's configuration element.

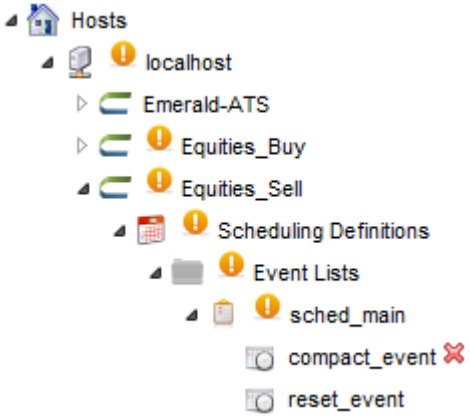
To access the available operations, either right click on a node in the navigation tree, or click on the menu above the right-hand-side attributes panel. If there are no operations available at a node (the grouping nodes for example) then these menus are empty.

4.5.4.1. Common Operations

The operations in this section are common to each node in the configuration hierarchy.

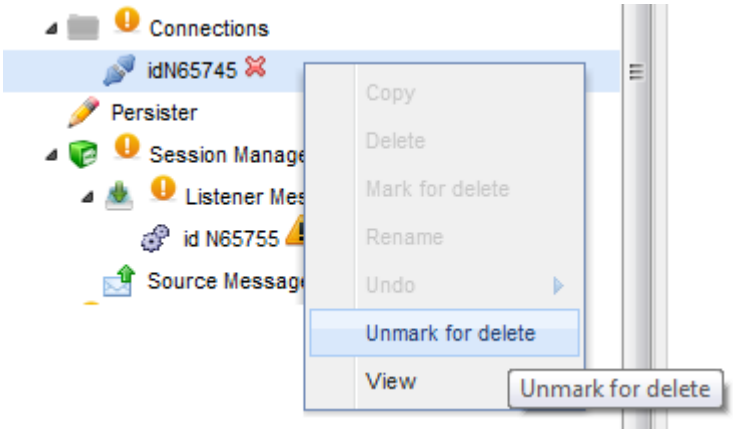
Mark for Delete

Execute this operation to mark a configuration element for deletion. The next time a session or application reload operation is executed the element is deleted from the configuration and runtime.



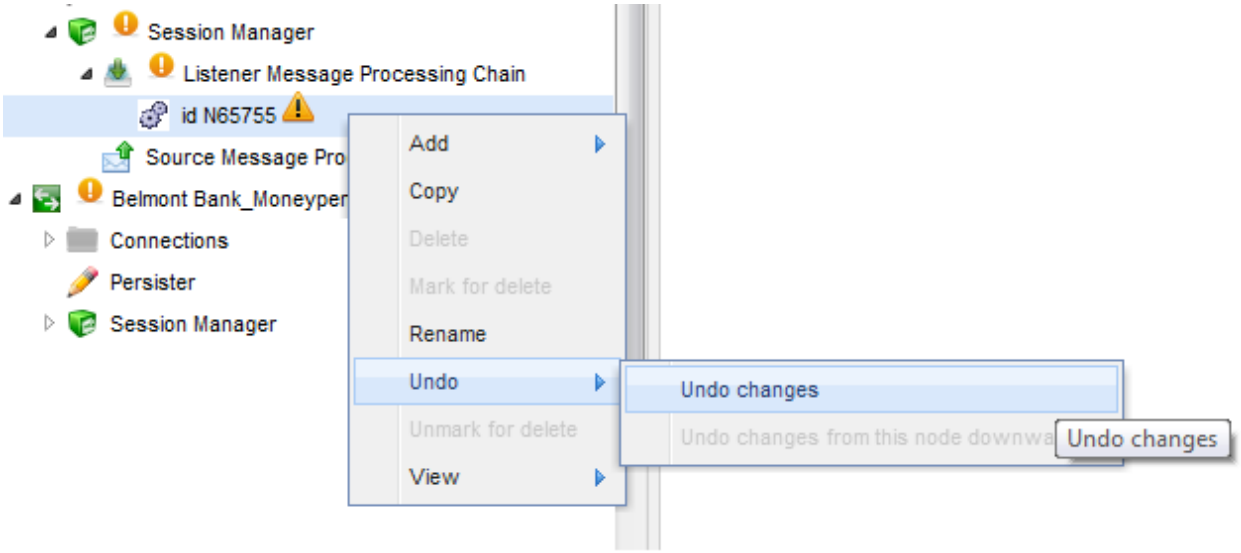
Unmark for Delete

Execute this operation to cancel the deletion of a configuration element.



Undo

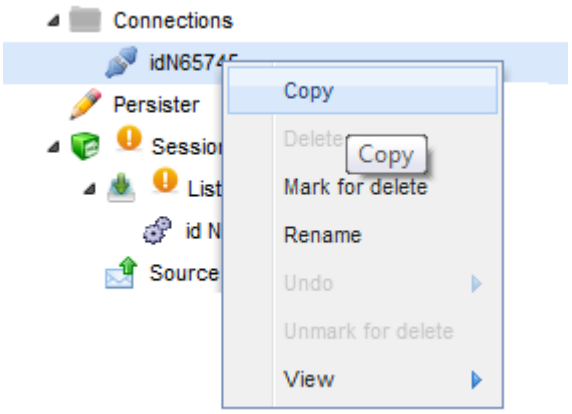
Execute this operation to undo any configuration changes that have been made.



Copy

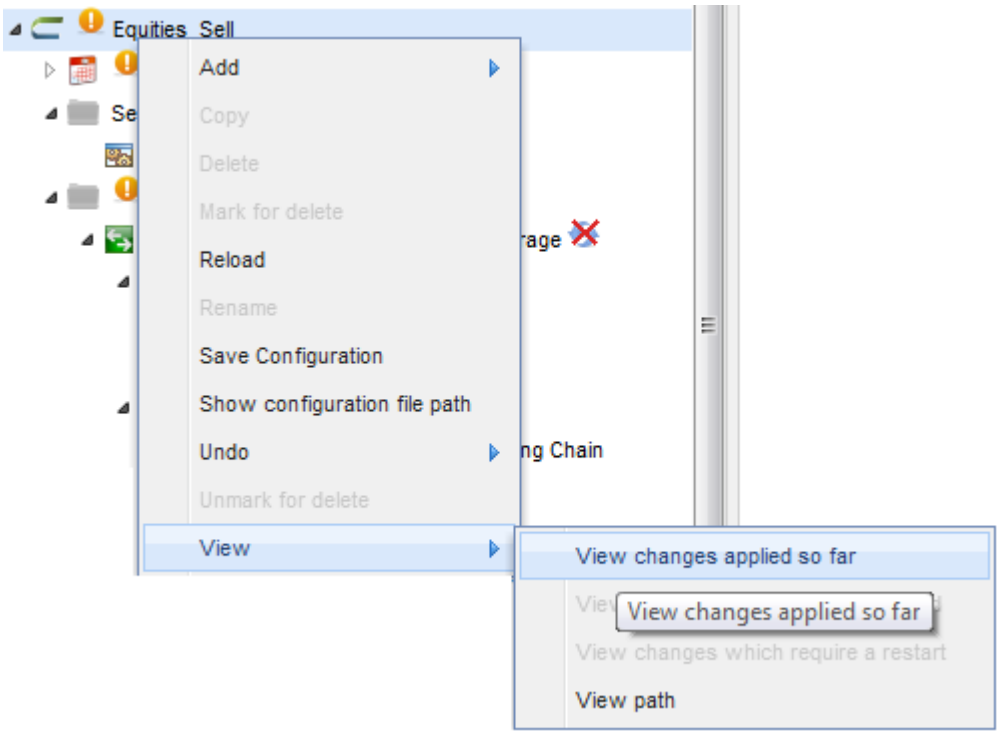
Execute this operation to make a copy of the current configuration element.

This operation brings up a dialog box containing fields that are required for the copy operation. These include the destination name, which is the 'id' that is given to the new element; and for those elements that require it, a prefix or suffix to prepend or append to all of the configurations beneath the parent of the new element (so that all 'id' fields are unique).



View Operations

Execute these operations to view the configuration changes since the last reload.

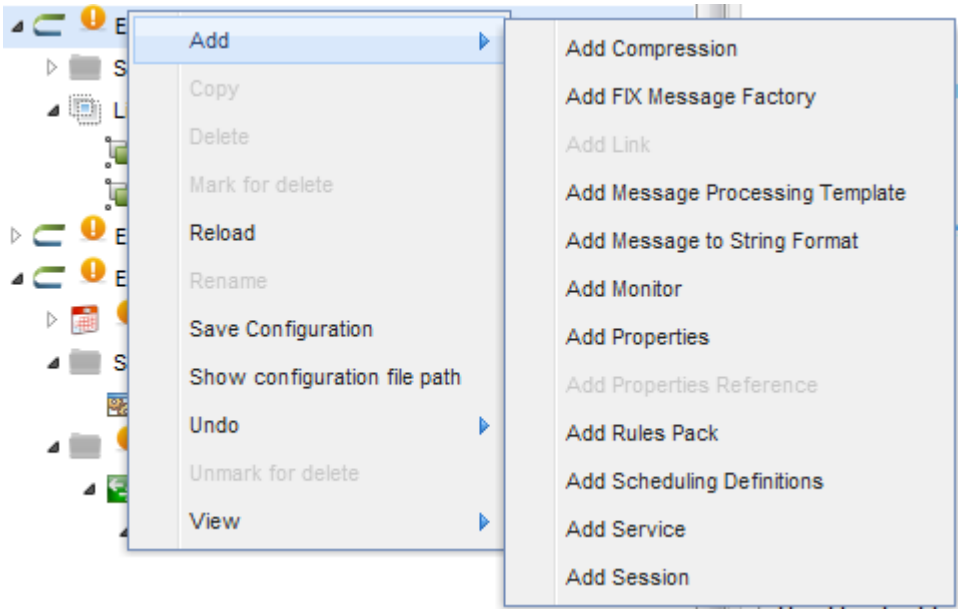


4.5.4.2. Application Operations

Add Operations

Application-level elements are added by these operations.

An ID is automatically generated for those elements which require one. The generated value can be replaced by a custom one.



Once the new element has been added, it has a blue "plus" icon next to it to indicate that it has not yet been loaded into the runtime of the node.

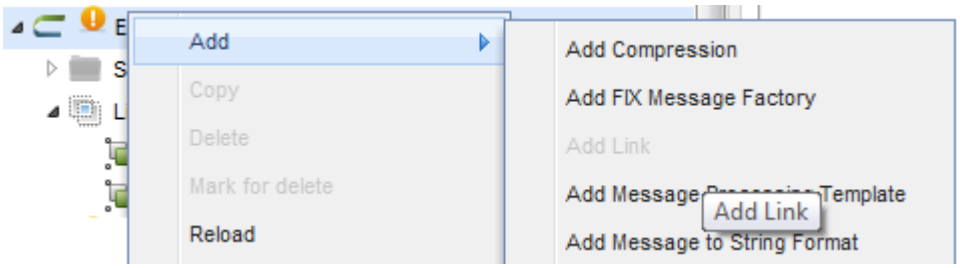
Edit the attributes of the new element using its configuration panel.

To load the new element, execute the reload operation.

Number of Instances

Multiple instances of some elements can be contained within the application. For others only one instance is allowed. For the single instance cases, the Add menu item is grayed out once the element has been added. This indicates that no further instances of this configuration element are allowed. Elements in this category include:

- Link
- Scheduling Definitions



Further Operations

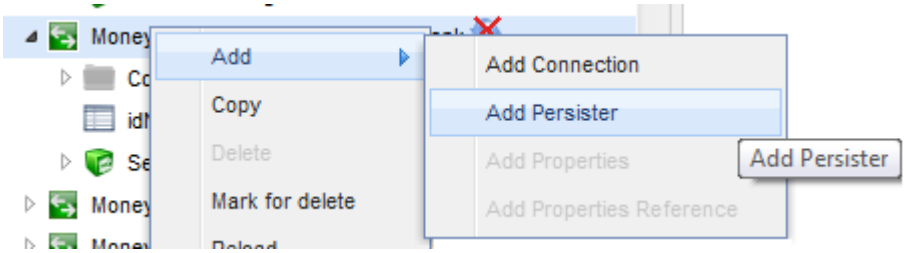
Once a configuration element has been added, it either has a hierarchy of further operations, or it has the standard operations such as Copy, Delete, Rename, View etc.

Those elements which have the standard operations include

- Compression
- FIX Message Factories
- Message To String Formats
- Monitors
- Services

And those elements which have a hierarchy of further operations include:

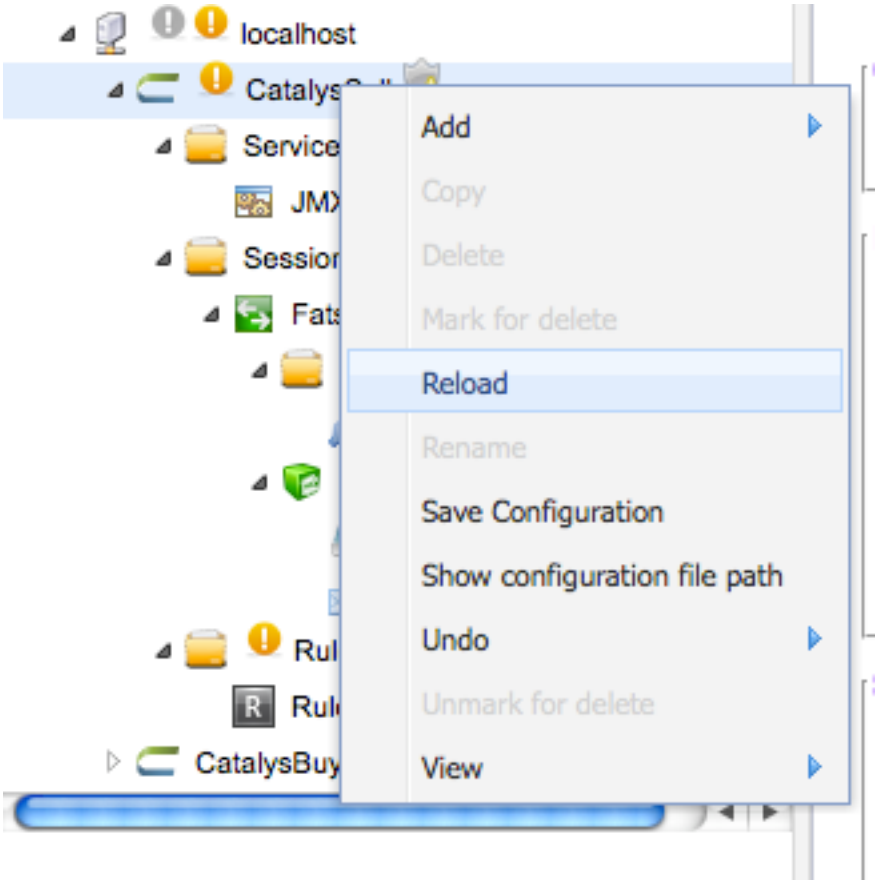
- Session and its contained Session Manager
- Routing Link
- Scheduling Definitions
- Properties



Reload

Executing the application reload operation, loads all application configuration changes into the runtime of the application.

If any sessions are modified then they must be "reloadable" before the application reload can succeed. To be reloadable a session must be stopped (disconnected and de-activated) and blocked from receiving any further connections. If any modified sessions are not reloadable, the Dashboard will stop and block them before reloading, and then restore them to their previous state.



Save Configuration

Each time an application's configuration is reloaded into its runtime, the new configuration is written into the XML configuration file that the application was originally started with. This ensures that if the application is re-started its configuration is consistent with the changes made through the Dashboard.

The configuration can also be manually saved, using the Save Configuration operation. This saves the XML configuration to a file named <*original XML file name*>-*backup*-<*timestamp*>.*xml*, in the directory where the original application was started

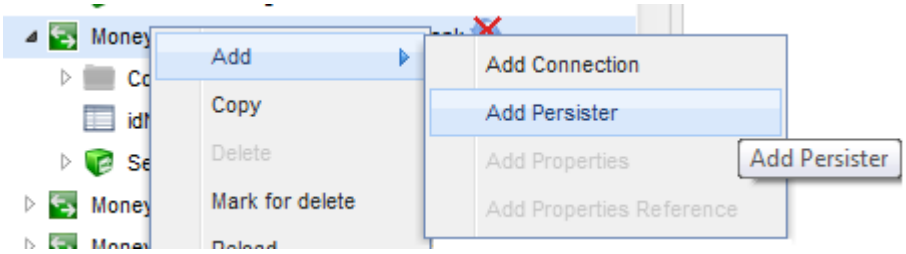
4.5.4.3. Session Operations

Add Operations

To add Session-level elements such as Connections and a Persister execute the Session->Add operations.

As with the elements added by the Application Add operations, some elements are only allowed to be added once. For session-level elements these include:

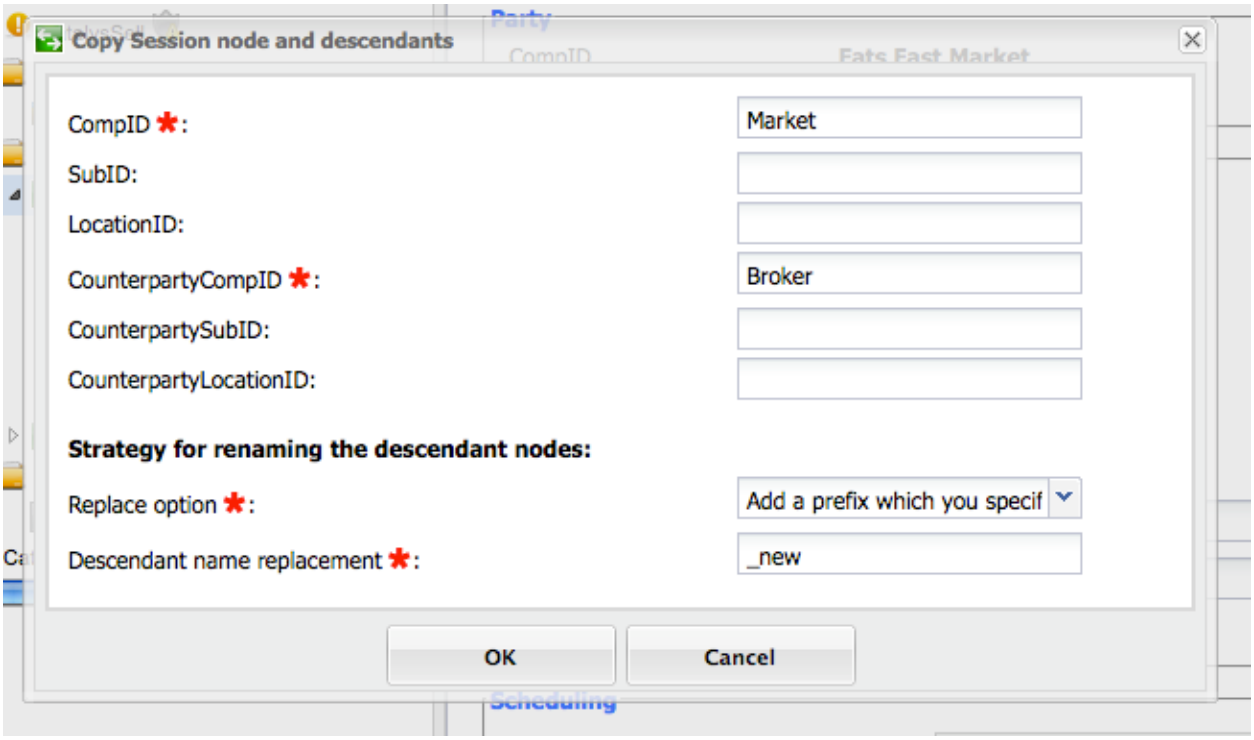
- Persister



Copy

To make a copy of the currently selected session, execute the Session->Copy operation.

This operation brings up a dialog box containing fields for the party and counterparty details, as well as a string which can be prefixed or suffixed to all of the ID fields of the hierarchy of elements in the session (persister, connection etc) so that these ID fields remain unique in the copied session.



Reload

As well as reloading the entire application, individual sessions can be reloaded.

The session must be in the reloadable state. If is not then the Dashboard will prompt the user to allow it to disconnect and deactivate the session and restore it after the reload.

Note

If the session is participating in FIX routing (via the Link element), then it is safest to manually log off the other sessions of the route and deactivate them before reloading the modified session. This is best done outside of trading hours.

Rename

To rename a session, execute the Session->Rename operation. This makes a copy of the current session and marks the original session for delete.

The dialog box contains the same fields as the Copy operation.

4.5.4.4. Session Manager Operations

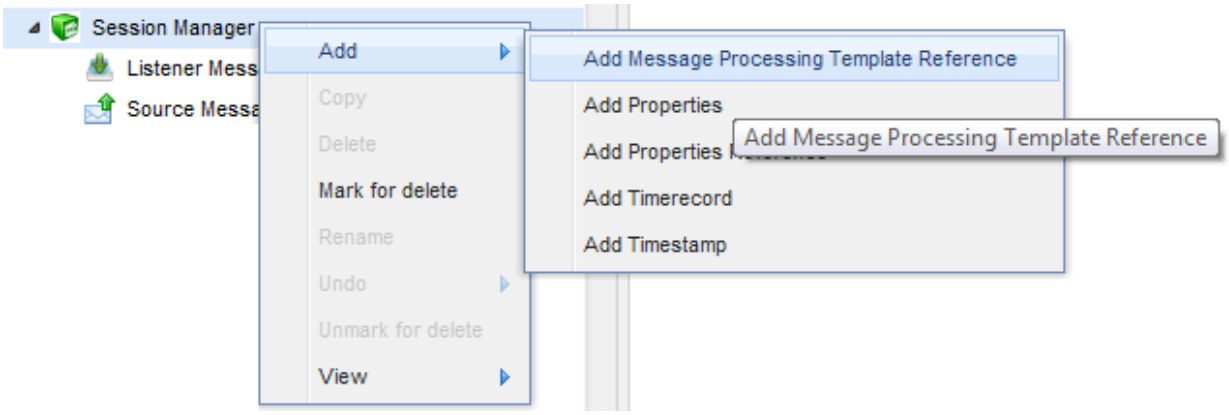
The Session Manager is responsible for the connecting the session and passing messages through a chain of message processors and selectors, in both direction (source and listener) of the session.

When a Session is added, its Session Manager is automatically created. This has a configuration node for the Source Message Processing Chain, and one for the Listener Message Processing Chain. At creation time, these are empty.

Add Message Processing Template Reference Operation

The Session Manager can either reference a Message Processing Template for its message processing chains, or it can define its own message processing chains.

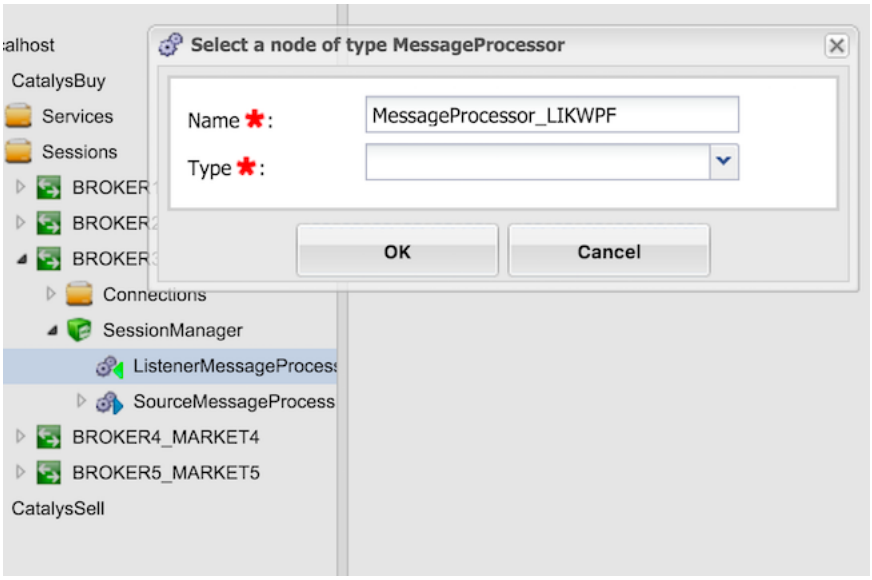
To add a reference to a previously defined template, execute the Session Manager -> Add -> Message Processing Template Reference operation. This brings up a drop-down list of available elements.



Add Message Processor and Selector Operations

To define a Session Manager's own chain of processing, select either the Source Message Processing Chain element or the Listener Message Processing Chain element in the navigation tree. The available operations are: Add Message Processor, Add Message Processor Reference, Add Selector and Add Selector Reference.

These operations are also available on each message processor or selector as they are added to the chain.

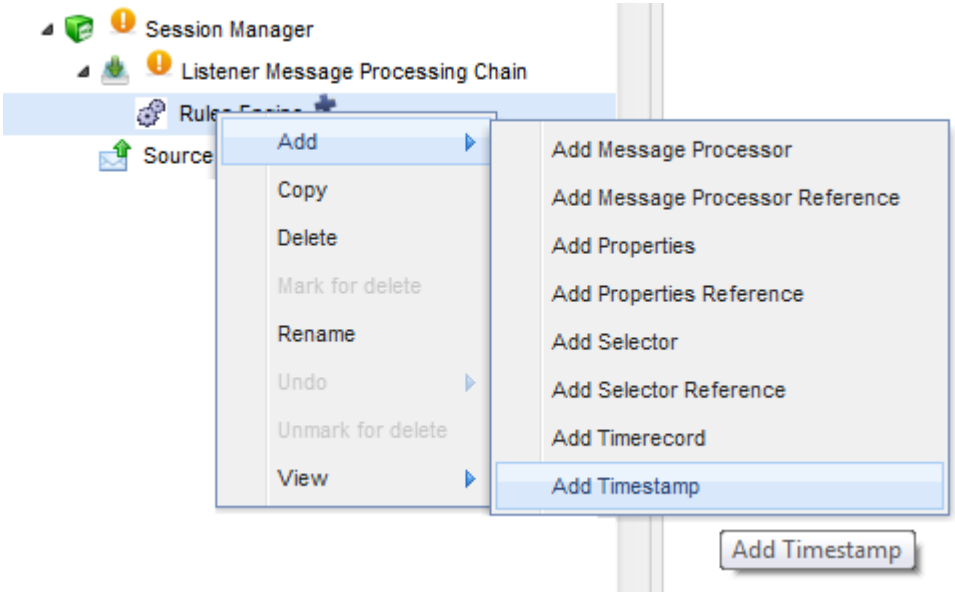


Add Timestamp

Use this operation to add a Timestamp at a particular point in the chain of processing. Timestamps are used (along wit Timerecords) to measure the latency of messages through the processing chain.

The timestamp can be generated before or after the processing of the message processing element to which the timestamp is being added. This is controlled by the 'Time Stamp before/after' checkbox. If this box is checked the timestamp is generated before processing, and if this box is unchecked then the timestamp is generated after processing.

The timestamp can be generated for inbound or outbound messages. This is controlled by the 'Direction' field.



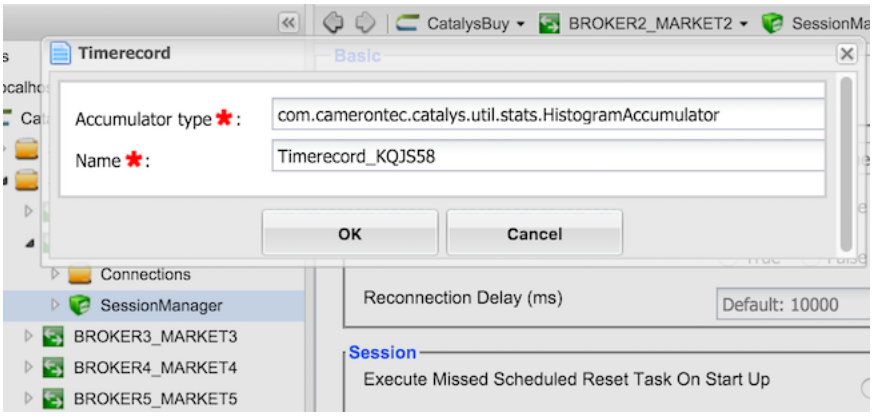
Add Timerecord

Use this operation (in conjunction with a Timestamp) to add a Timerecord at a particular point in the processing.

The time period between the last Timestamp and the point in the processing at which the Timerecord is placed is measured and statistically accumulated. Different types of accumulation can be specified by the 'class' attribute.

As with the Timerecord element, the measurement can be made to before or after the processing of the message processing element to which it is being added. This is specified using the 'is-from-start' checkbox. If it is checked, the measurement stops before processing; if it is unchecked then the processing is included.

The measurement can be made for inbound or outbound messages. This is controlled by the 'direction' field.



4.5.4.5. Scheduling Operations

Add Operations

Execute these operations to add Event Lists, Tasks and Schedules.

A Scheduling Definition consists of a list of Events, where an Event is a Task executed on a particular Schedule.

For example, to add a start schedule:

- Execute Add -> Task, giving the task a name and selecting the StartTask.
- Execute Add -> Schedule, giving the schedule a name and adding the included dates and excluded dates, and an optional parent schedule. A parent schedule is a common schedule that can be referenced by multiple other schedules, and is used to defined common dates such as vacations.
- Execute Add -> Event List, giving the event list a name.

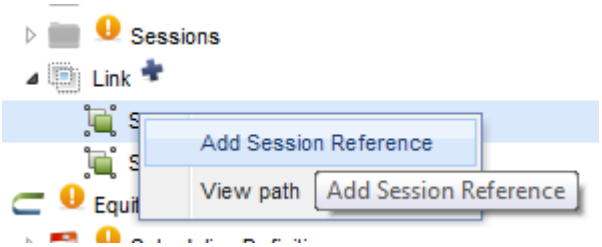
- Select the Event List, and execute Add -> Event, selecting the task and schedule that have just been defined.

This defines a schedule at the application level, which can be used in a session by setting its Scheduling Reference to this Event List.

4.5.4.6. Link Operations

Execute these operations to configure sessions used for routing.

When a Link is added, two Session Group items are also created. These Session Group elements are used to defined the two sides of the routing configuration.



Use the Session Group -> Add Session Reference operation to add sessions to each side of the Link. Note that a session reference can only be added if the application already has defined sessions. If there are no defined sessions then the Add Session Reference menu item is grayed-out.

4.5.4.7. Message Processing Template Operations

Execute these operations to configure the message processors and selectors of a template.

This defines a message processing template, which can be used in a session by adding a Message Processing Template Reference to the Session Manager of the particular session.

4.5.4.8. Rules Operations

When a RulesPack is added using the Application Add -> Rules Pack, the new Rules Pack appears under a Rules Packs node in the navigation tree.

The standard operations (Copy, Rename, View) are available for the RulesPack node.

Add rules to the Rules Pack by selecting the pack in the navigation tree. This brings up the Rules configuration panel.

4.5.5. Configuration Panels

Click on a configuration element in the navigation tree to bring up the configuration attributes for that element.

4.5.5.1. Common Functionality

Attribute Groupings

The attributes are grouped according to their functionality. For example, the Session attributes are grouped into Basic and Advanced groups, with the Basic panel being further partitioned into Party, General, Scheduling, Compression and Message Factory.

The Advanced Panel is minimized by default. When expanded it contains Scheduling, Logs, Operational Flags, FIX Behavior, Encryption, Dialects and Classes sub-panels.

Attribute Types

Required

Attributes that are required are decorated by a red star.

Default

Attributes that have a default value, but whose value has not been explicitly set through the configuration are rendered in grey text.

Fixed

Attributes whose values are fixed are rendered in bold and cannot be edited.

Non-reloadable

Attributes which require a re-start of the node when they are modified are marked by a grey triangle with an exclamation mark.

> **Note**
>
> When a non-reloadable attribute is modified using the Dashboard, its status will not be shown as modified once the configuration has been reloaded. To avoid this limitation, set non-reloadable attributes when a configuration element is added.

Optional

All other attributes are optional and can be modified at runtime. Their new values will take effect once their configuration element has been reloaded.

4.5.5.2. Save

When attributes on a configuration panel are modified, the 'Save' button on that panel is enabled, and the changes can be saved.

If there are unsaved changes, navigating away from the configuration panel will result in a dialog box asking whether the changes should be saved.

Reset

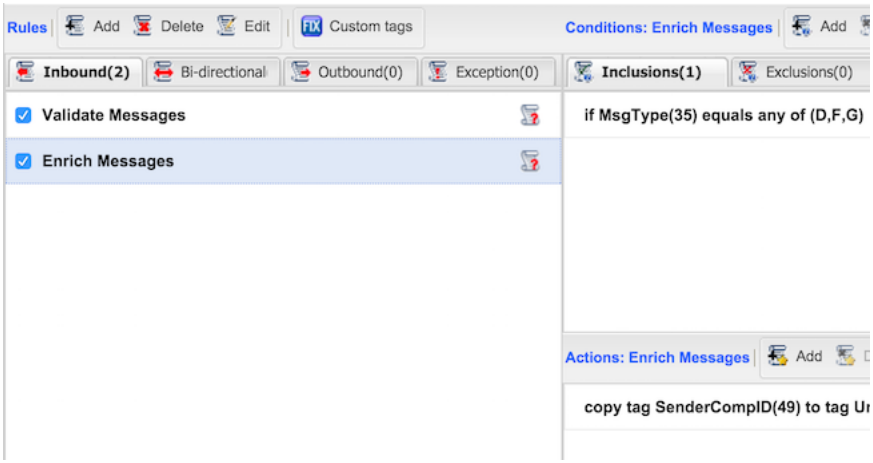
The modifications to a configuration element can also be reset by clicking on the 'Reset' button, which also becomes active once there are any unsaved changes.

4.5.5.3. Specific Configuration Panels

Rules Configuration Panel

Existing rules are displayed in a list down the left-hand side of the panel. The rules are grouped into Inbound, Outbound, Bidirectional and Exception types. These groups define which messages and under what circumstances the rule is applied:

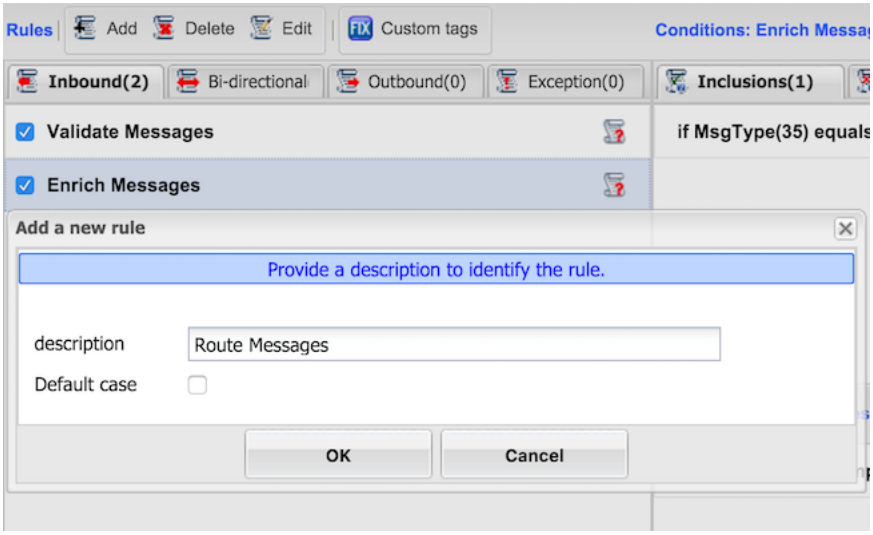
- Inbound rules are applied to inbound messages only
- Outbound rules are applied to outbound messages only
- Bidirectional rules are applied to messages in both directions
- Exception rules are a special type of rule that are applied to inbound messages which cause an exception to be thrown by downstream message processors. These exceptions are caught and transformed into a message configured by the rule's actions.



Add Rule

Select the type of rule by clicking on one of the tabs: 'Inbound', 'Bidirectional', 'Outbound', or 'Exception'.

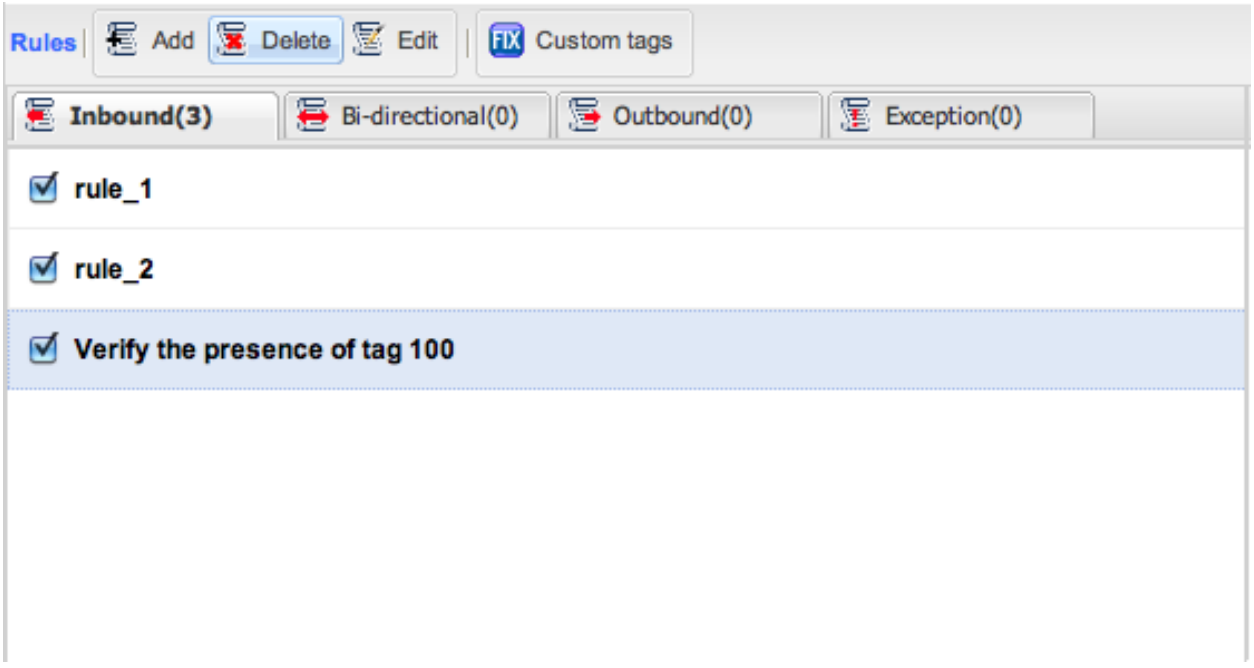
Add a rule of this type by clicking on the 'Add' button.



Give the rule a name, and click 'Ok'. It is added to the list of currently configured rules.

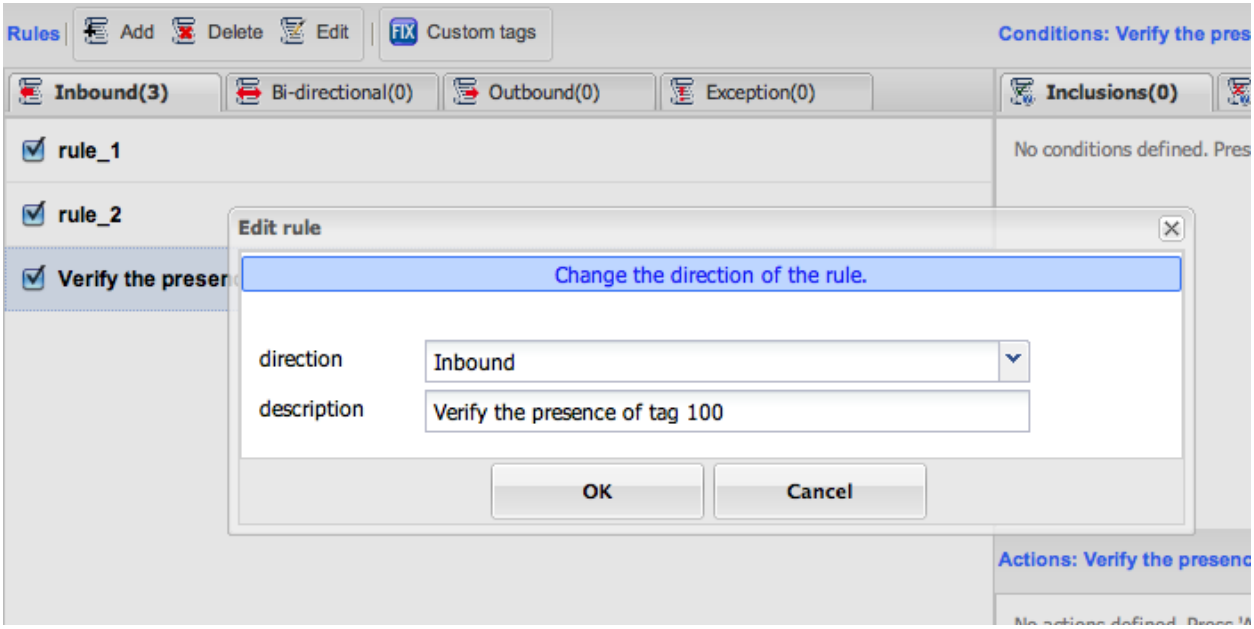
Delete Rule

Delete a rule by selecting it, and clicking on the 'Delete' button in the Rules sub-panel.



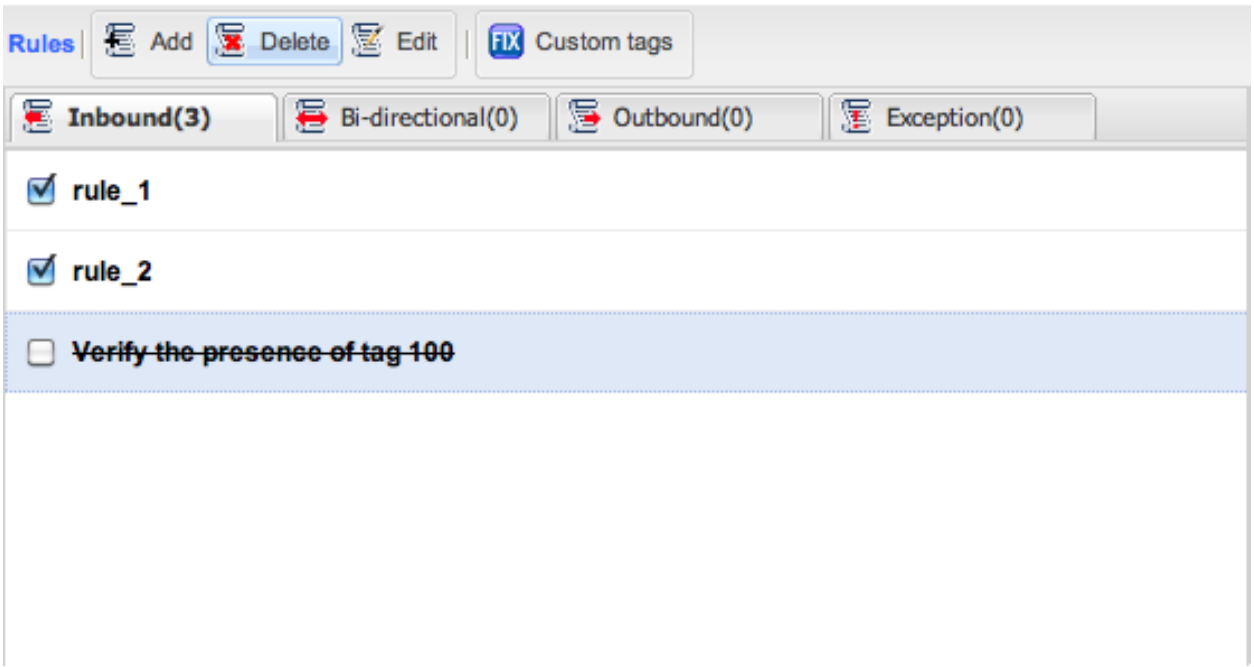
Edit Rule

Edit a rule by selecting it, and clicking on the 'Edit' button in the Rules sub-panel, or double-clicking on the rule. This allows the type (or direction) of the rule to be modified. This moves the rule from one of the type tabs to another.



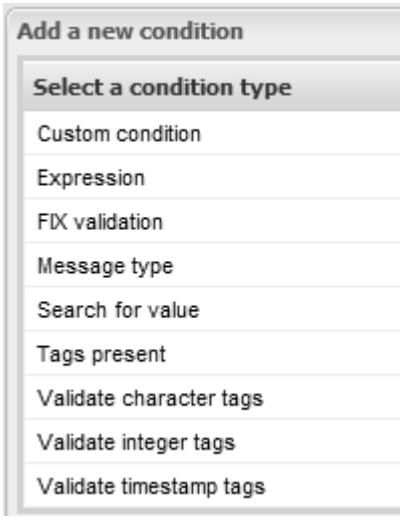
Disable Rule

Disable a rule by clicking the checkbox on the left of its description. Re-enable it by re-clicking the checkbox.

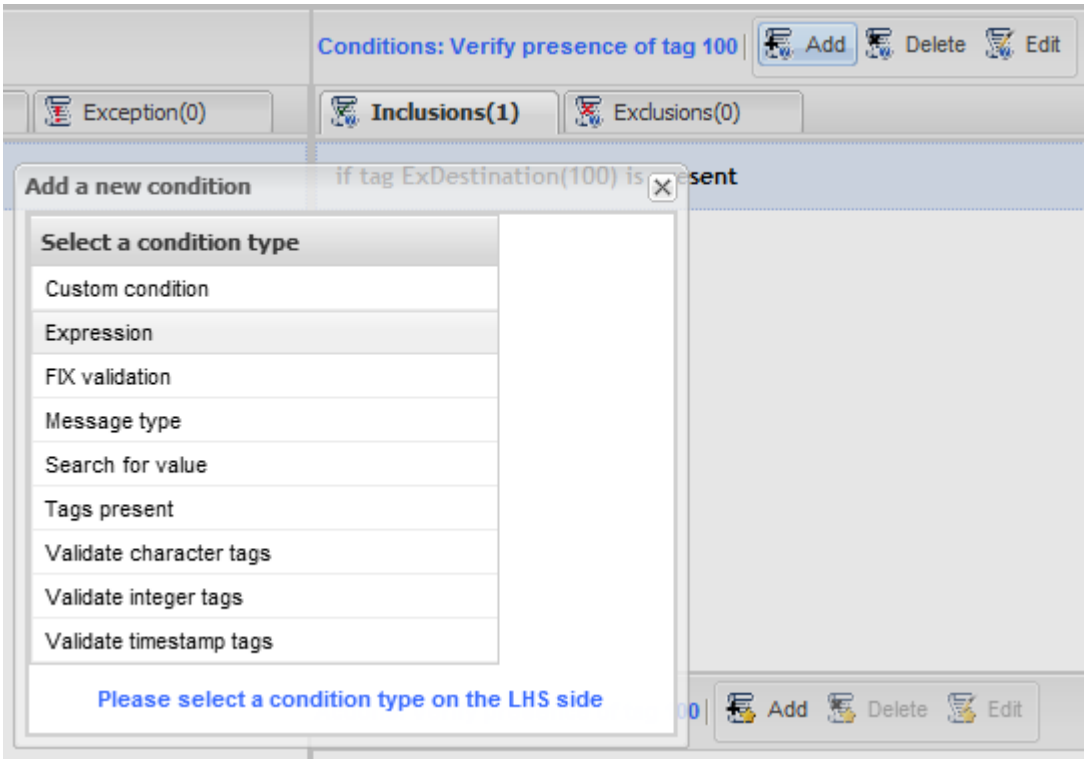


Add Conditions

The set of conditions defines whether the actions of the rule are executed or not. Conditions are divided into 'Inclusions' (those that contribute to the action being executed) and 'Exclusions' (those that preclude the actions from being executed).



To add an included condition to a rule, select the rule and click on the 'Add' button of the 'Inclusions' tab.



To add an excluded condition to a rule, select the rule and click on the 'Add' button of the 'Exclusions' tab.

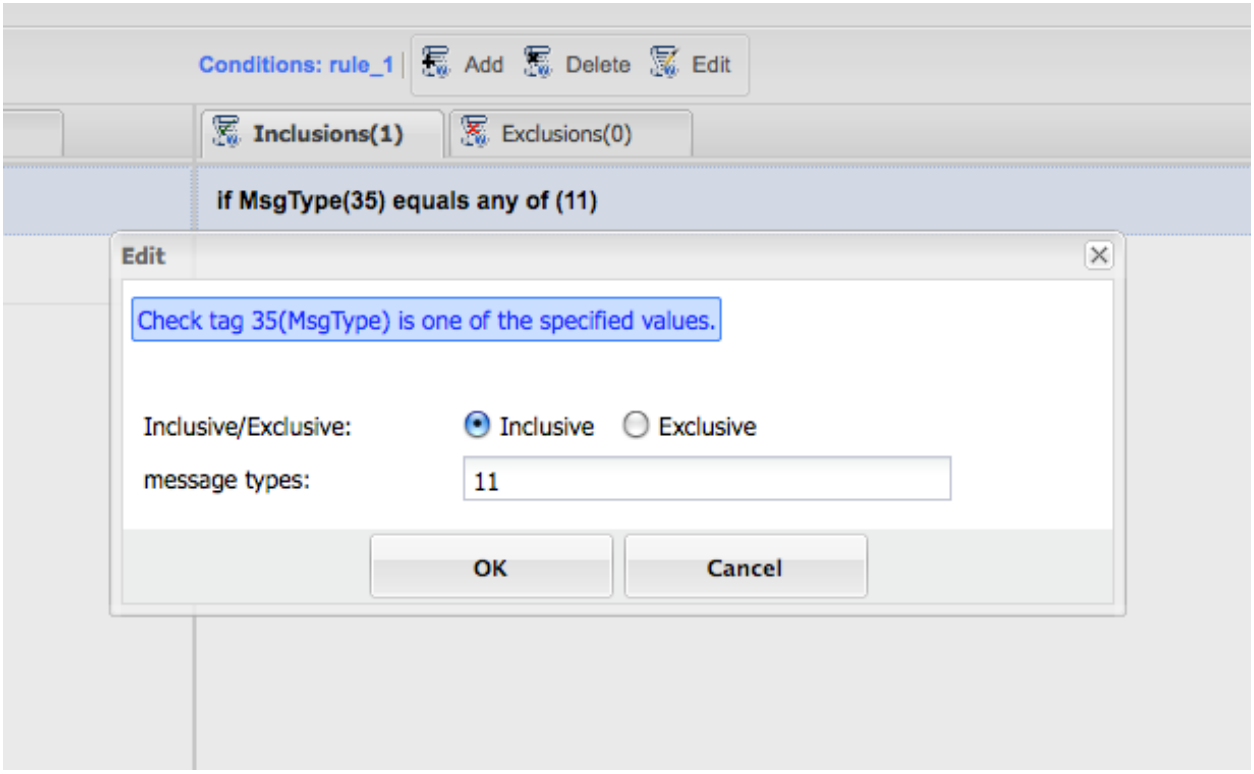
Delete Condition

Delete a condition by selecting it and clicking on the 'Delete' button in the conditions sub-panel.

Edit Condition

Edit a condition by selecting it and clicking on the 'Edit' button in the conditions sub-panel, or double-clicking on the condition.

Modify the parameters of the condition and click on the 'Ok' button.

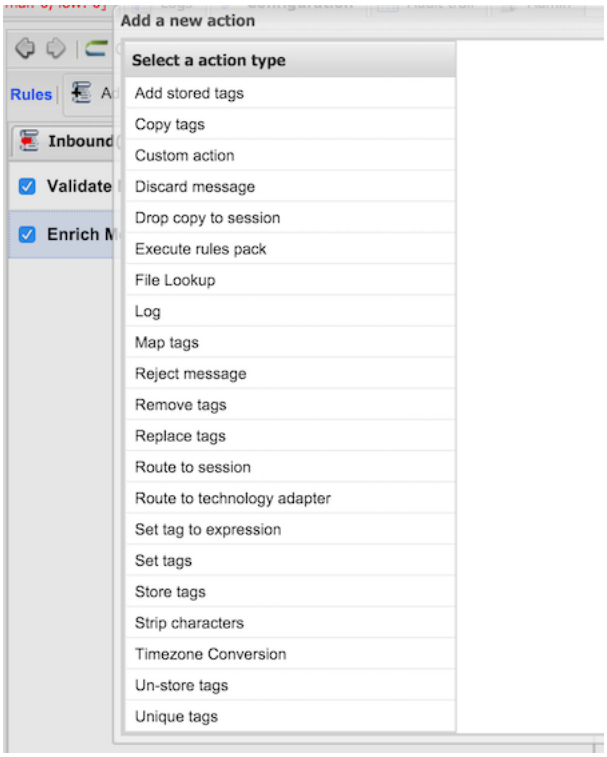


Note that only the condition parameters and whether it is included or excluded can be edited. To change the type, delete the condition, and add a new condition of the new type.

Add Action

The set of Actions defines what happens when all of the conditions of a rule are satisfied.

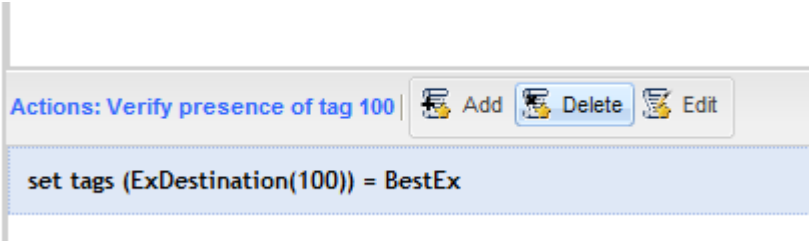
To add an action to a rule, select the rule and click on the 'Add' button of the Actions sub-panel.



Select the type of action, and supply the parameters of that action, then click 'Ok'.

Delete Action

To delete an action of a rule, select the action and click on the 'Delete' button of the Actions sub-panel.



Edit Action

To edit an action of a rule, select the action and click on the 'Edit' button of the Actions sub-panel, or double-click on the action.

Edit the parameters of the action, and press 'Ok'.

Note that only the parameters of the action can be edited. To change the type, delete the action, and add a new action of the new type.

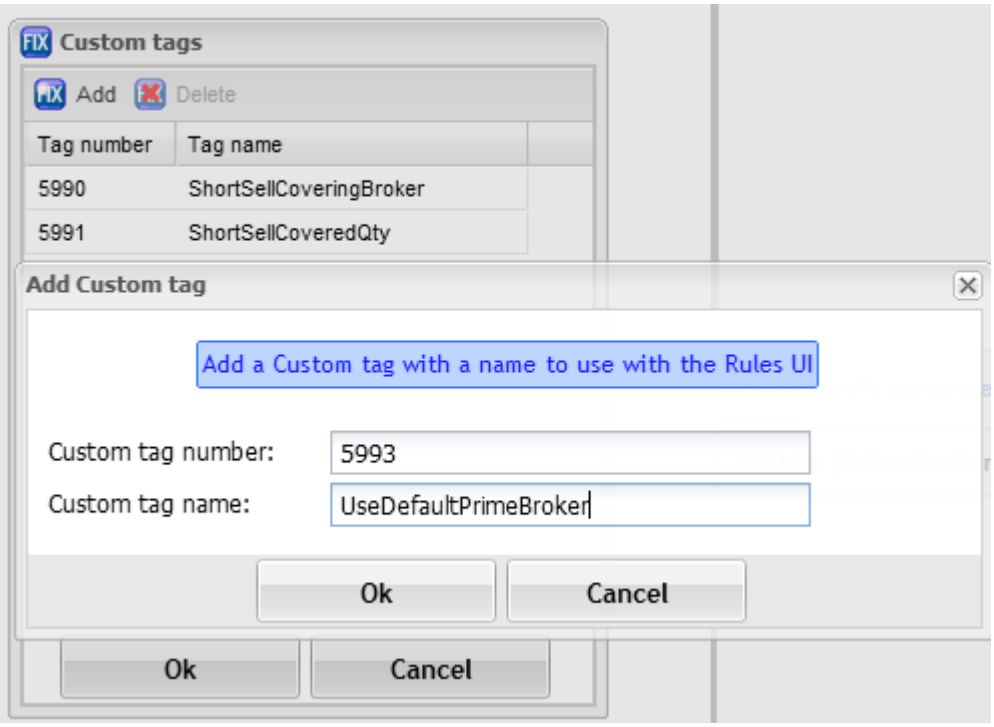
Custom Tags

To view custom tags, click on the 'Custom Tags' button in the top left-hand side of the Rules Configuration Panel.

To add a custom tag, click on the 'Add' button of the Custom Tags dialog box, enter a name and number and click 'Ok'.

To delete a custom tag, select the custom tag and click on the 'Delete' button.

Custom tags appear along with the standard tags for conditions and actions which have a 'Select Tags' button.



4.6. Audit Trail

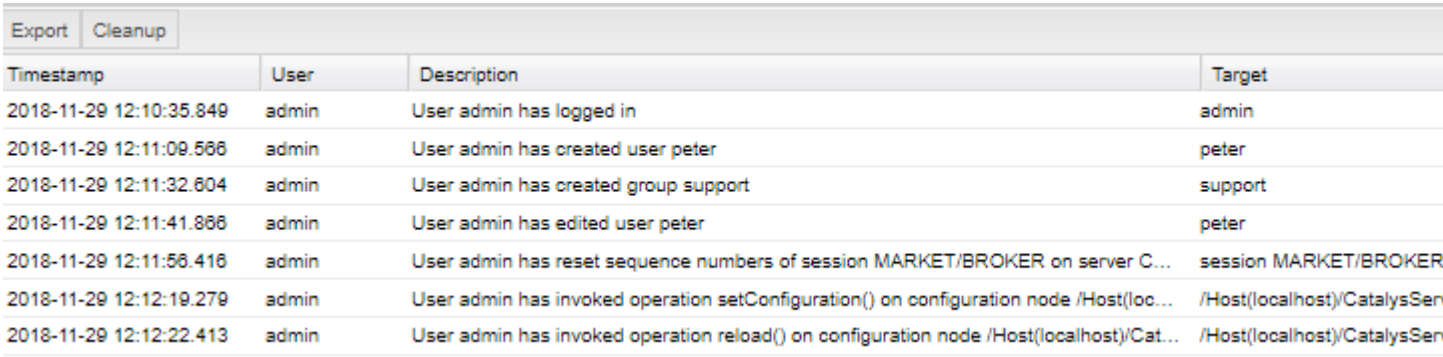
> **Note**
>
> Only users with the AUDIT_USERS permission can see the Audit Trail tab.

4.6.1. Introduction

The Audit Trail Tab displays a grid containing information about events that happened in the system, such as user log in, user creation and deletion, user group operations, and session and server command execution.

Columns in the Audit Trail tab can be hidden. Rows can be sorted by any column.

Audit Trail pages can be navigated using the pagination tool bar at the bottom left corner of the screen.



Export | Cleanup

Timestamp	User	Description	Target
2018-11-29 12:10:35.849	admin	User admin has logged in	admin
2018-11-29 12:11:09.566	admin	User admin has created user peter	peter
2018-11-29 12:11:32.604	admin	User admin has created group support	support
2018-11-29 12:11:41.866	admin	User admin has edited user peter	peter
2018-11-29 12:11:56.416	admin	User admin has reset sequence numbers of session MARKET/BROKER on server C...	session MARKET/BROKER
2018-11-29 12:12:19.279	admin	User admin has invoked operation setConfiguration() on configuration node /Host(loc...	/Host(localhost)/CatalysSer
2018-11-29 12:12:22.413	admin	User admin has invoked operation reload() on configuration node /Host(localhost)/Cat...	/Host(localhost)/CatalysSer

4.6.2. Introduction

The rows in the Audit Trail can be exported by clicking the Export button in the upper left hand side of the grid. A CSV file will automatically be downloaded by your browser.

4.6.3. Cleanup

Note

Only users with the AUDIT_LOG_CLEANUP permission can see the Cleanup button.

Clicking the Cleanup button will delete old audit log entries from the database. There's two attributes in `mis.conf` to control the cleaning up of the audit logs:

```
auditLogCleaner/cleanupAtStartup=false
auditLogCleaner/retention=86400000
```

`auditLogCleaner/retention` specifies the time in milliseconds of audit log entries to keep. `auditLogCleaner/cleanupAtStartup` if set to true a cleanup using the configured retention will be used will be performed every time the MIS starts up.

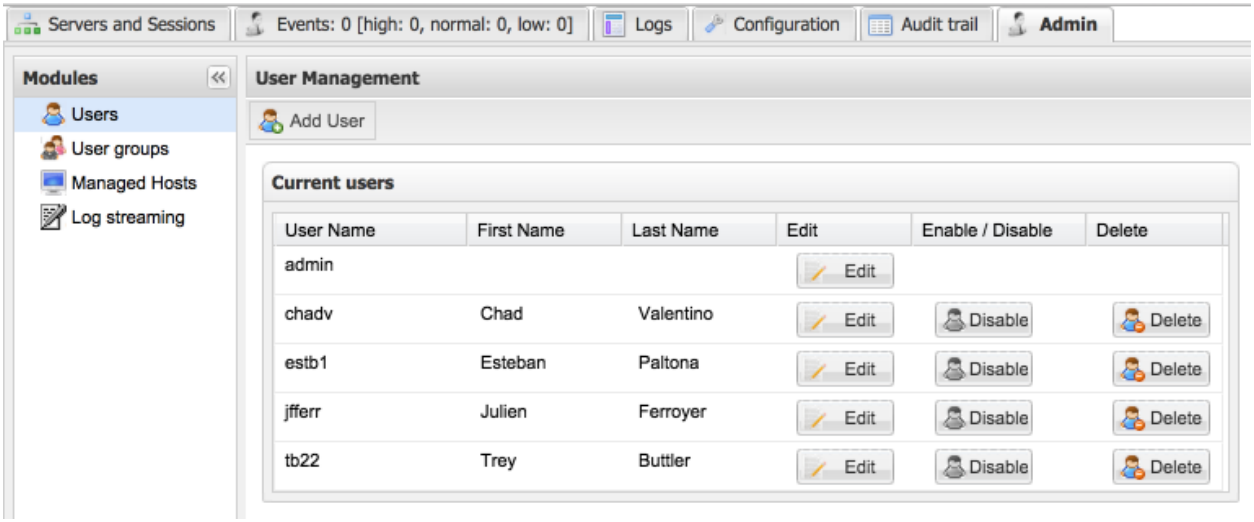
4.7. Admin

4.7.1. Introduction

Note: Only users with 'Admin' permissions are able to see the Admin Tab. Admin permissions include EDIT_USER, EDIT_MANAGED_HOSTS, START_STOP_LOG_STREAMING. If the user has any one of

these permissions they are able to see the Admin Tab. If they do not have all of these permissions then individual items within the tab are greyed out.

On the left-hand panel of the Admin tab are the features of the Dashboard that can be managed: users, user groups, managed hosts, and log streaming.



4.7.2. Users

Click on the 'Users' entry of the navigation panel to show a list of the current users, as well as buttons to add a user and to edit the current users.

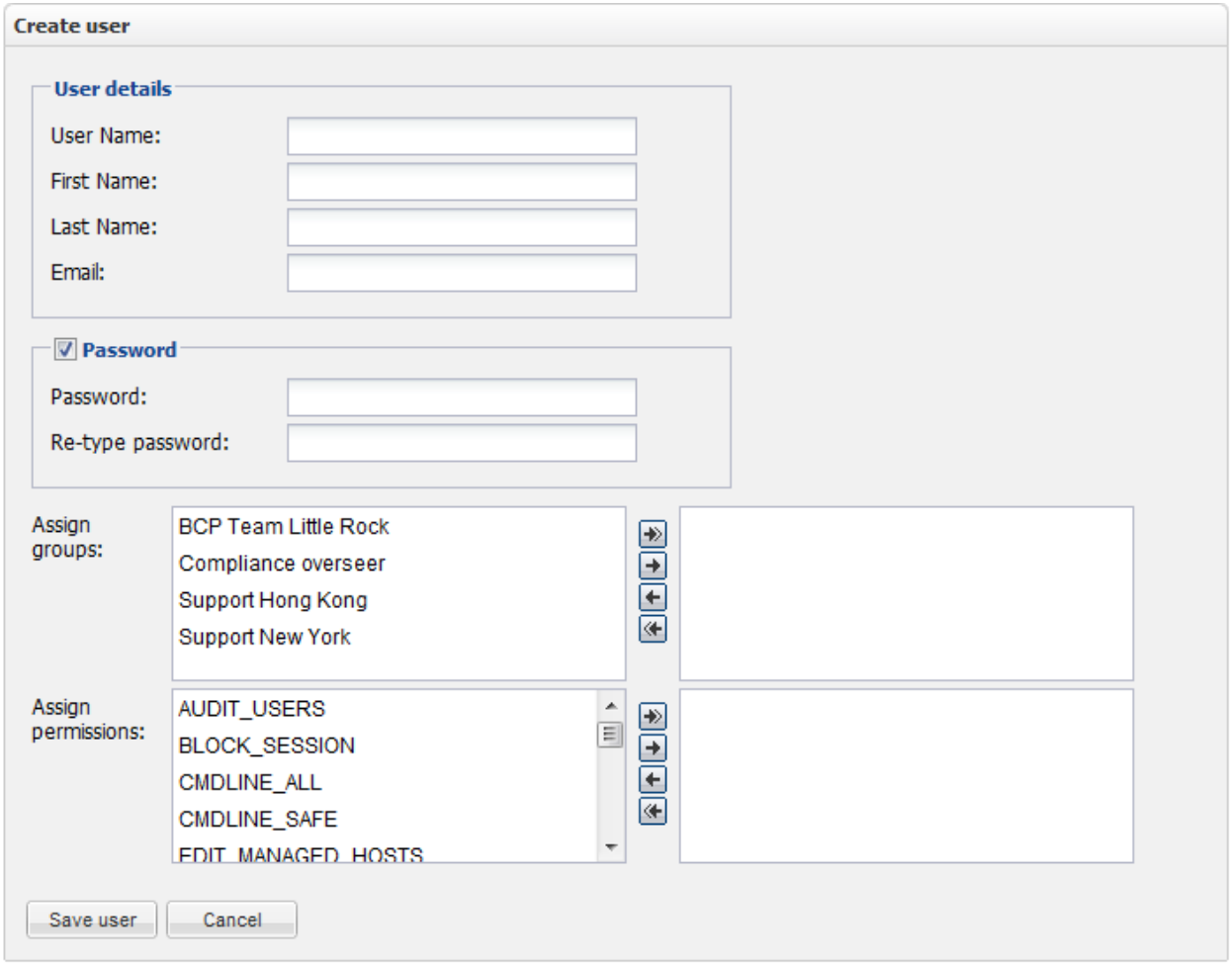
4.7.2.1. Add a User

The 'Add User' button opens the Create User screen, which has fields for all of the user information.

The User Name field is mandatory.

The Password is also required if the user is going to be authenticated locally. If the user is going to be authenticated via LDAP then the password should not be configured.

See the Permissions section below for a list of available user permissions.



4.7.2.1.1. Permissions

The following Permissions are available in the Dashboard. A user with the EDIT_USERS permission (by default the admin user) is able to assign each Permission to Users and User Groups:

Table 4.1.

Role	Purpose
BLOCK_SESSION	Allows user to block sessions using the Session popup
UNBLOCK_SESSION	Allows user to unblock sessions using the Session popup
RESET_SESSION	Allows users to reset sessions using the Session popup

START_SESSION	Allows users to log sessions on using the Session popup
STOP_SESSION	Allows users to log sessions off using the Session popup
SEND_RESEND_REQUEST_SESSION	Allows users to resend session messages using the Session popup
TEST_REQUEST_SESSION	Allows users to send session test requests using the Session popup
SET_SEQUENCE_NUMBERS_SESSION	Allows users set session sequence numbers using the Session popup
SEQUENCE_RESET_SESSION	Allows users to reset session sequence numbers using the Session popup
SEND_HEARTBEAT_SESSION	Allows users to send session heartbeat messages using the Session popup
START_SERVER	Allows users to Start Catalys Servers and CameronFIX Servers using the Server popup
STOP_SERVER	Allows users to Stop Catalys Servers and CameronFIX Servers using the Server popup
REMOVE_SERVER	Allows users to remove Servers using the Server popup
MAKE_PRIMARY_SERVER	Allows users to make a clustered Catalys or CameronFIX Server the primary using the 'Make Primary' button on Clustering Information sub-panel of the Server popup
AUDIT_USERS	Allows user to view the Audit tab
EDIT_USERS	Allows user to add and edit users via the Admin tab
EDIT_MANAGED_HOSTS	Allows user to configure the hosts that this Dashboard is managing via the Admin tab
EXECUTE_ALL_CMDLINE_COMMANDS	Allows users to access all the available commands from the Command Line Tab of the Server popup. Note that if this permission is given

	then it allows the user to execute the operation from the command line (e.g. s_unblock) even if this permission is denied from the GUI (e.g. BLOCK_SESSION)
EXECUTE_SAFE_CMDLINE_COMMANDS	Allows users to access those commands that don't effect the system performance or change the state of the system in any way
VIEW_LOGS	Allows users to view the Logs Tab. Without this permission the user cannot view the Logs Tab at all.
START_STOP_LOG_STREAMING	Allows users to start or stop the log streaming from the Admin Tab.
VIEW_CONFIGURATION	Allows users to view the Configuration Tab. Without this permission the user cannot view the Configuration Tab at all.
CHANGE_CONFIGURATION	Allows users to make changes in the Configuration Tab.
VIEW_EVENTS	Allows users to view events via the Events Tab. Without this permission the user cannot view the Events Tab at all.
ACK_EVENT	Allows users to acknowledge events via the Events Tab.
CLOSE_EVENT	Allows users to close events via the Events Tab.
PAUSE_EVENT	Allows users to pause the escalation sequence for an event via the Events Tab.
RESUME_EVENT	Allows users to resume the escalation sequence for an event via the Events Tab.
ADD_INTEREST	Allows users to add interests via the Events Tab.
CHANGE_INTEREST	Allows users to modify interests via the Events Tab.
DELETE_INTEREST	Allows users to delete interests via the Events Tab.

ENABLE_INTEREST	Allows users to enable interests via the Events Tab.
DISABLE_INTEREST	Allows users to disable interests via the Events Tab.
ADD_ESCALATION	Allows users to add escalation sequences via the Events Tab.
CHANGE_ESCALATION	Allows users to modify an escalation sequence via the Events Tab.
DELETE_ESCALATION	Allows users to delete escalation sequences via the Events Tab.
SET_MAINTENANCE_MODE	Allows users to put a managed server into maintenance mode from the Servers and Sessions Tab. When in this mode alerts from the server are ignored. Server operation is not affected.
CHANGE_LOG_LEVELS	Allows users set the log levels of the configured appenders via the Server and Sessions tab.

4.7.2.2. Edit a User

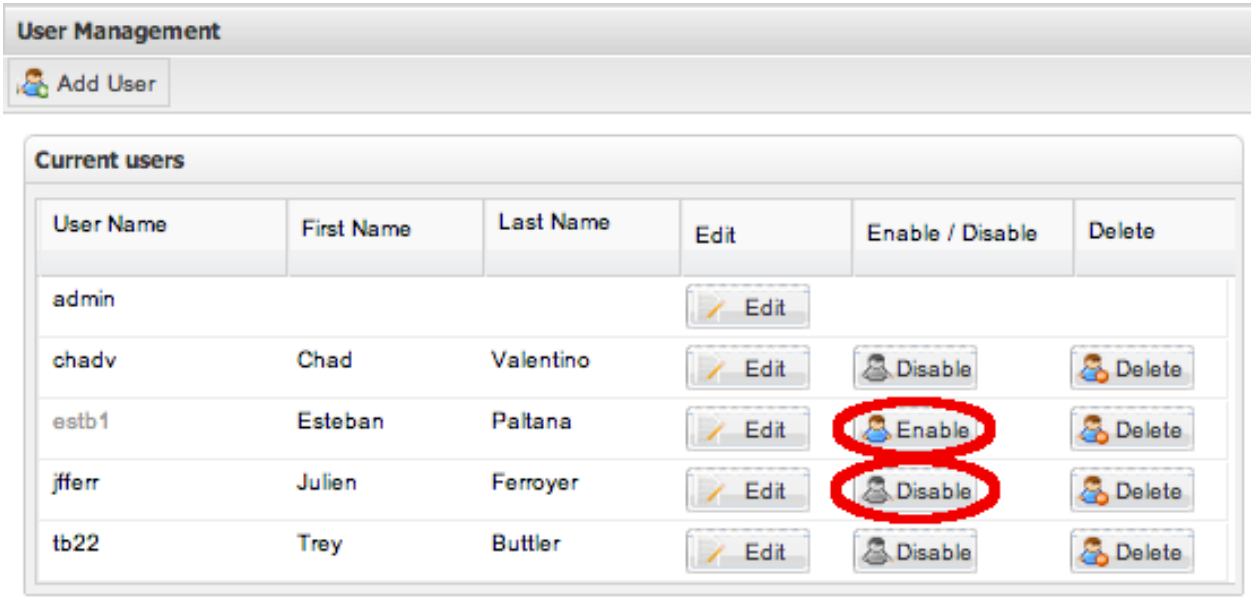
To edit the information associated with an existing user, click on the 'Edit' button next to the user's information in the 'Current Users' list.

The username of the user cannot be modified.

4.7.2.3. Disable and Enable Users

To disable a user, click the 'Disable' button next to the user's information in the 'Current Users' list. To re-enable the user, click the 'Enable' button.

Figure 4.1.



Note: The admin user cannot be disabled.

4.7.2.4. Delete Users

To delete a user, click the 'Delete' button next to the user's information in the 'Current Users' list.

Note: The admin user cannot be deleted, nor can a user delete themselves.

4.7.3. User Groups

Click on the 'User Groups' item of the Admin navigation panel to display a list of current user groups.

4.7.3.1. Add a User Group

Click on the 'Add User Group' button to add a user group.

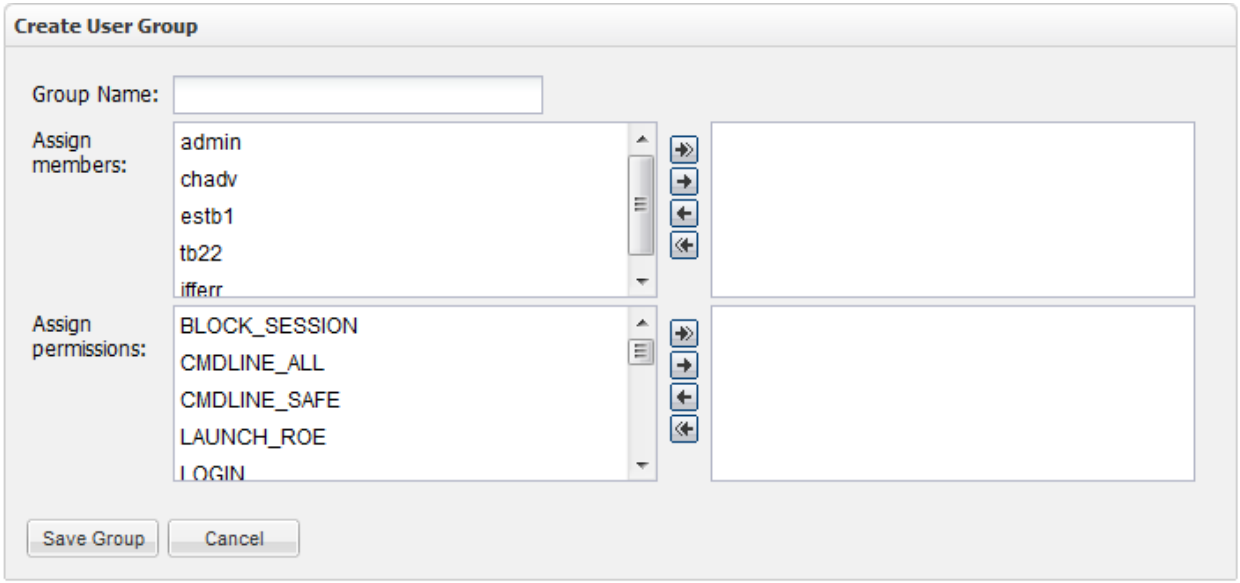
Assign the group a name, and any current users to the group; as well as group permissions (operations that the group is allowed to perform).

Press the 'Save Group' button.

The following fields are mandatory when creating a new User Group:

- Group Name
- Permissions

That is, the newly created group does not need to contain any members.



4.7.3.2. Edit a User Group

To edit a User Group, click on the 'Edit' button next to the group name.

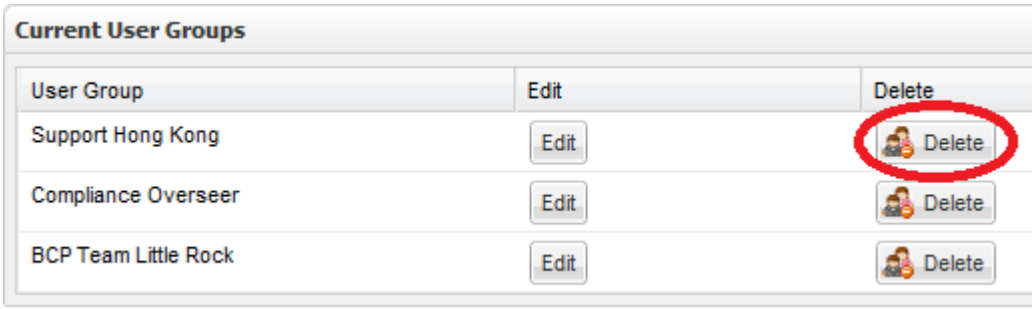
Update the members of the group and the permissions of the group as required.

When a user is added to the group it gains the permissions of the user group. Conversely when a user is removed from a group it loses the permissions of the group (that it does not already have as an individual user).

The name of the user group cannot be modified.

4.7.3.3. Remove a User Group

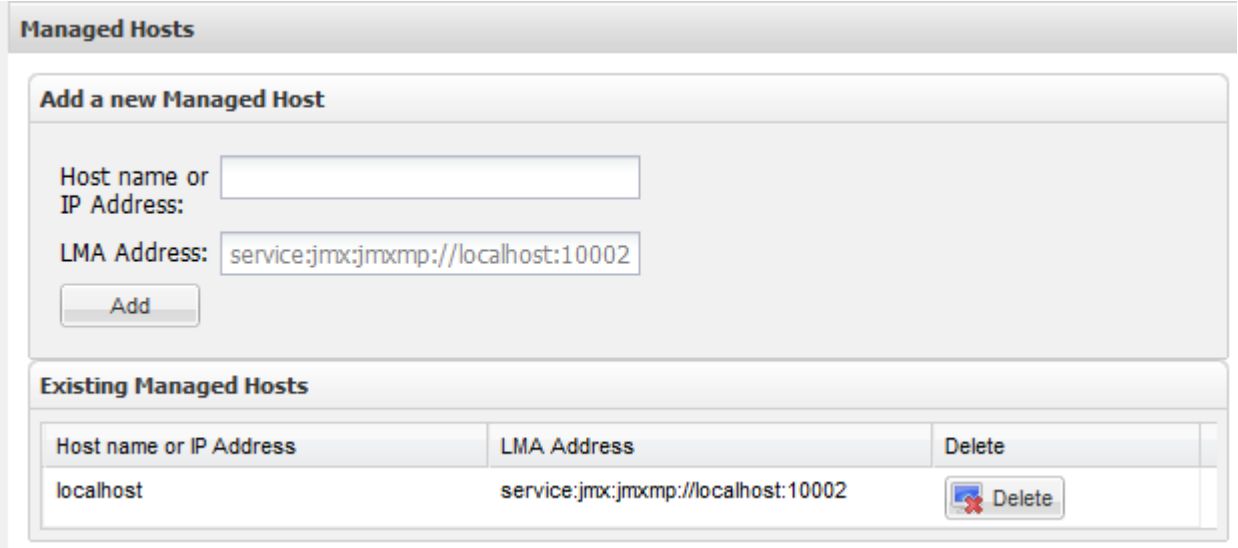
To remove a user group, click on the 'Delete' button next to the group.



4.7.4. Managed Hosts

To display the list of hosts managed by this Dashboard instance, click on 'Managed Hosts' item of the Admin navigation panel.

When the Dashboard is first started, it is initially configured to manage all of the available Server and Node instances running on the local host. To modify the list of hosts managed by the Dashboard, enter a new host and LMA address into the 'Add a New Managed Host' panel, and click the 'Add' button.



4.7.5. Logs Streaming

For logs to be displayed in the Logs Tab, and for the log-based Event Interests to work, logs must be streamed from the managed host or application. Note that only logs generated by applications using the CameronTec HighPerformanceLogger or Guest Loggers can be streamed.

To enable Logs Streaming on all hosts and instances, click the 'Play' button next on the top 'Hosts' logger line.

To enable Logs Streaming for a host, click the 'Play' button next to that host.

To enable Logs Streaming for an application or instance, click the 'Play' button next to that application.

To enable Logs Streaming for one logger, click the 'Play' button next to that logger.

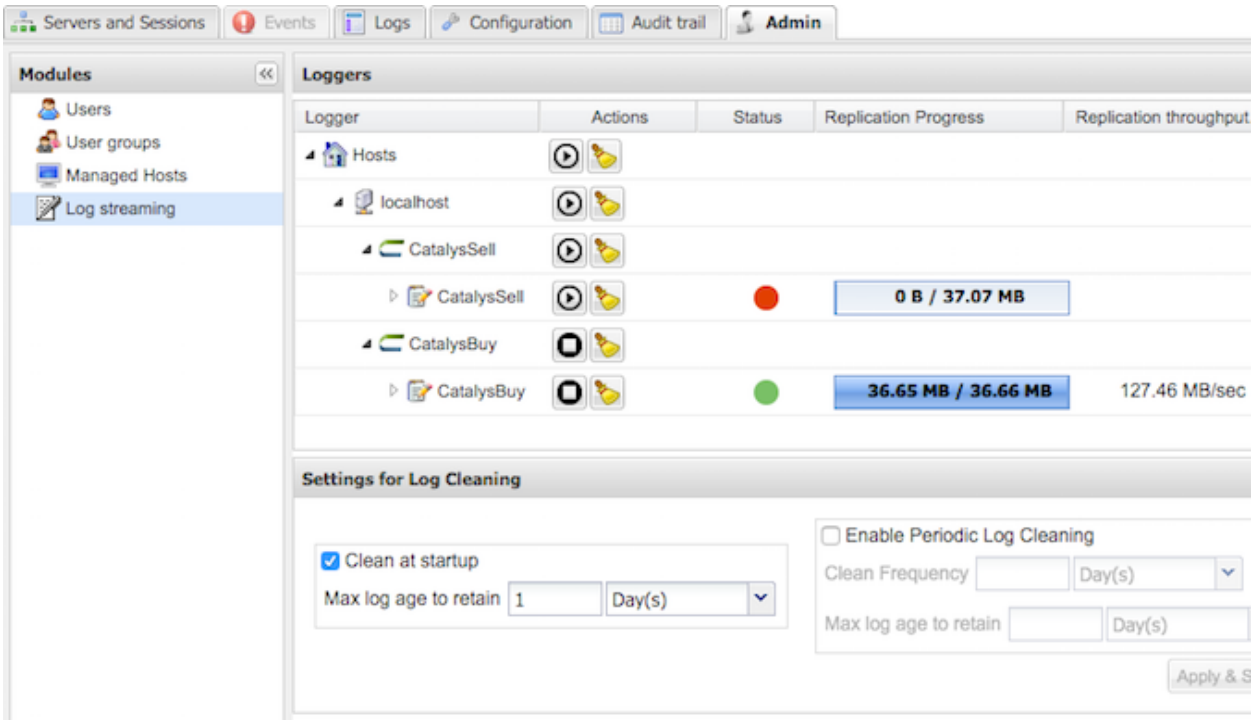
Once a set of loggers starts streaming, the 'Play' button turns into a 'Stop' button and the Status symbol goes from red to green.

These settings are persistent across MIS re-starts.

Once log streaming is enabled, the log files are replicated from the source application to the MIS before being indexed for searching and display in the Logs Tab, and the MIS keeps these files synchronized with the source. If a file is deleted from the source application, then it is also deleted on the MIS. If a file is deleted on the MIS, then it is re-streamed from the source application.

Progress and throughput indicators of log replication and indexing are also shown on the Logs Streaming screen.

Logs cleanup can be configured to happen when the MIS starts up and/or periodically by configuring the 'Log Cleaning' settings. You may also clean a specific logger on demand by clicking the 'Clean logs' button next to the specific Host/Instance/Logger. On demand logs cleaning cascades down.



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CameronTec acknowledges usage of products from Sencha Inc (http://www.sencha.com)

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org.apache.geronimo.javamail:geronimo-javamail_1.4_mail:1.8.4	The Apache Software License, Version 2.0
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org.eclipse.persistence:jakarta.persistence:2.2.3	Eclipse Public License - v 2.0
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org.springframework.security:spring-security-taglibs:5.5.7	The Apache Software License, Version 2.0
org.springframework.security:spring-security-web:5.5.7	The Apache Software License, Version 2.0
org.springframework:spring-aop:5.3.27	The Apache Software License, Version 2.0
org.springframework:spring-beans:5.3.27	The Apache Software License, Version 2.0
org.springframework:spring-context:5.3.27	The Apache Software License, Version 2.0
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Library (GroupID:ArtifactID:Version)	License(s)
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org.springframework:spring-tx:5.3.27	The Apache Software License, Version 2.0
org.springframework:spring-web:5.3.27	The Apache Software License, Version 2.0
org.springframework:spring-webmvc:5.3.27	The Apache Software License, Version 2.0
org.twitter4j:twitter4j-core:3.0.2	The Apache Software License, Version 2.0
org.xerial.snappy:snappy-java:1.1.10.5	The Apache Software License, Version 2.0
org.yaml:snakeyaml:2.2	The Apache Software License, Version 2.0
uk.co.real-logic:sbe:1.0.2-RC2	The Apache Software License, Version 2.0
xmlpull:xmlpull:1.1.3.1	Public Domain

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```
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  If such an object file uses only numerical parameters, data structure layouts and accessors, and small macros and small inline

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