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GMAC Configuration Guide

R2017-1.2 | Confidential

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Revisions

Revision	Date	Description of Changes
R2017-1.2	03 OCT 2017	Release R2017-1.2 - Miscellaneous typo corrections - Added config.gmac.markets.market.symbol-ref-file to OPTIQ
R2017-1.1	24 JUL 2017	Release R2017-1.1 - Added config.gmac.markets.market.max-channel-buffer to MDI, EMDI and EOBI - Added config.gmac.markets.market.max-buffer-timeout-ns to MDI, EMDI and EOBI - Added socket support to config.gmac.markets.market.channels.channel - Updated config.gmac.markets.channels.channel for ICE
R2017-1.0	24 MAR 2017	Release R2017-1.0 - Added plugin ITCH_BIST - Added plugin GTP - Added plugin CTA - Added plugin EURONEXT_OPTIQ - Added config.gmac.markets.market.symbol-ref-file to ITCH_OMX - Added config.gmac.markets.market.max-channel-buffer to NYSE_XDP, OPTIONS_XDP, UTP, CURRENEXT - Added config.gmac.markets.market.max-buffer-timeout-ns to NYSE_XDP, OPTIONS_XDP, UTP, CURRENEXT - Added config.gmac.markets.market.extension-messages to BATS, OPTIONS_XDP - Updated config.gmac.markets.market.symbol-ref-file for BATS - Updated config.gmac.verbosity - Renamed EUREX_EMDI to EMDI, EUREX_EOBI to EOBI and EUREX_MDI to MDI - Removed plugins UQDF and UTDF
R2016-2.0	22 NOV 2016	Release R2016-2.0 - Added config.gmac.markets.market.extension-messages to BATS_OPTIONS - Added allowable value ‘local’ to config.gmac.markets.market.time-zone - Added config.gmac.markets.market.symbol-ref-file to EURONEXT - Added config.gmac.markets.market.book-type to CME_BINARY - Updated config.gmac.markets.market.symbol-ref-file for CME_BINARY - Updated config.gmac.markets.market.produc-name for NYSE_XDP - Updated config.gmac.markets.market.test for OSLO_MIL - Removed config.gmac.ade-verbosity - Removed config.gmac.recovery-logfile - Removed config.gmac.recovery-log-socket - Removed plugin ISE_MDI
R2016-1.5	03 OCT 2016	Release R2016-1.5 - Updated config.gmac.markets.market.version allowable values for EUREX_MDI, EUREX_EMDI and EUREX_EOBI
R2016-1.4	24 AUG 2016	Release R2016-1.4 - Added plugin UTP

Revision	Date	Description of Changes
R2016-1.3	28 JUL 2016	Release R2016-1.3 - Added plugin NYSE_XDP - Added config.gmac.markets.market.symbol-ref-queue to CME_BINARY and LMAX
R2016-1.2	14 JUN 2016	Release R2016-1.2 - Added config.gmac.markets.market.symbol-ref-file to CME_BINARY - Updated config.gmac.markets.market.channels.channel for ICE
R2016-1.1	13 MAY 2016	Release R2016-1.1 - Added plugin BME_HFMEFFGATE - Added plugin FXALL - Updated HOTSPOT configuration settings - Made the content table clearer
R2016-1.0	01 APR 2016	Release R2016-1.0 - Added clxng_shared support to config.gmac.markets.market.channels.channel - Added config.gmac.max-hw-waiting-packets - Added config.gmac.markets.market.venue-filtering to OPRA_BINARY - Updated config.gmac.markets.market.extension-messages for ICE - Updated config.gmac.markets.market.trading-status-monitoring for NYSE - Updated default value of config.gmac.markets.market.max-channel-buffer for CME_BINARY - Updated default value of config.gmac.markets.market.max-buffer-timeout-ns for CME_BINARY - Updated configuration settings for EURONEXT_DERIVATIVES - Removed config.gmac.markets.market.source-message-logfile from ICAP_XML - Removed usage of source plugin TOE from ICAP_XML - Removed config.gmac.markets.market.fast-decoding
R2015-6.4	08 MAR 2016	Release R2015-6.4 - Added config.gmac.markets.market.version to ISE_MDI_BINARY
R2015-6.0	14 DEC 2015	Release R2015-6.0 - Added plugin LMAX - Added plugin FASTMATCH - Removed plugin ARCA_OPTIONS - Removed plugin CME2 - Removed lldt2 support
R2015-5.2	26 OCT 2015	Release R2015-5.2 - Added plugin OPTIONS_XDP
R2015-5.1	22 OCT 2015	Release R2015-5.1 - Added config.gmac.markets.market.version to ITCH_OMX - Added config.gmac.markets.market.extension-messages to ITCH_OMX - Updated config.gmac.markets.market.version for EUREX_EMDI and EUREX_EOBI
R2015-5.0	02 OCT 2015	Release R2015-5.0 - Added config.gmac.markets.market.secondary-snapshots to EURONEXT - Added clxng support to config.gmac.markets.market.channels.channel

Revision	Date	Description of Changes
		- Added config.gmac.markets.market.extension-messages to ITCH_ESPEED
R2015-4.4	08 SEP 2015	Release R2015-4.4 - Updated configuration settings for BME_HFSMARTGATE
R2015-4.0	15 JUL 2015	Release R2015-4.0 - Renamed plugin NYSE_XDP into NYSE_XDP_TRADES
R2015-3.2	03 JUL 2015	Release R2015-3.2 - Added config.gmac.markets.market.extension-messages to CQS, CTS, UQDF and UTDF - Updated config.gmac.markets.market.packet-timeout-ms description
R2015-3.1	17 JUN 2015	Release R2015-3.1 - Added config.gmac.markets.market.extension-messages to ITCH_BROKERTEC
R2015-3.0	09 JUN 2015	Release R2015-3.0 - Updated config.gmac.markets.market.channels.channel description for ICE
R2015-2.1	07 MAY 2015	Release R2015-2.1 - Added config.gmac.markets.market.hardware-arbitrage to CME_BINARY
R2015-2.0	16 APR 2015	Release R2015-2.0 - Added config.gmac.markets.market.snapshot-enabled to ITCH_OMX - Added config.gmac.markets.market.snapshots.channel to ITCH_OMX - Added config.gmac.markets.market.max-channel-buffer to CME_BINARY - Added config.gmac.markets.market.max-buffer-timeout-ns to CME_BINARY - Added config.gmac.markets.market.referentials-channels to CME_BINARY
R2015-1.2	27 MAR 2015	Release R2015-1.2 - Added config.gmac.markets.market.version to TURQUOISE_MIL - Added config.gmac.markets.market.version to OSLO_MIL
R2015-1.0	27 FEB 2015	Release R2015-1.0 - Added config.gmac.markets.market.extension-messages to BIT_MIL and OSLO_MIL - Updated config.gmac.markets.market.symbol-ref-file description for TURQUOISE_MIL - Replaced GMACMessageDummyV3 with GMACMessageInformationV3 - Removed plugin DIRECTEDGE
R2014-7.3	12 FEB 2015	Release R2014-7.3 - Added config.gmac.markets.market.extension-messages to BME_HFSMARTGATE
R2014-7.2	30 JAN 2015	Release R2014-7.2 - Added config.gmac.markets.market.extension-messages to EURONEXT
R2014-7.0	18 DEC 2014	Release R2014-7.0 - Added config.gmac.markets.market.symbol-ref-file to BATS - Added plugin BME_HFSMARTGATE - Fixed config.gmac.markets.market.grp for BATS - Removed plugin ITCH41 - Removed plugin BME - Renamed plugin XDP into EURONEXT_DERIVATIVES_XDP

Revision	Date	Description of Changes
R2014-6.2	05 NOV 2014	Release R2014-6.2 - Added config.gmac.markets.market.recovery To ITCH_ESPEED
R2014-6.1	24 OCT 2014	Release R2014-6.1 - Added config.gmac.markets.market.recovery.channel to SIX_IMI - Updated config.gmac.markets.market.version allowable values for EUREX_MDI, EUREX_EMDI and EUREX_EOBI
R2014-6.0	03 OCT 2014	Release R2014-6.0 - Added plugin EUREX_EOBI - Added plugin ITCH_ESPEED - Added lldt2 support to config.gmac.markets.market.channels.channel - Added specific configurations to CME2 - Added a note to section line arbitration related to plugins BATS and ITCH50 - Removed legacy plugins ARCA and ARCA_UNCOMPACTED - Renamed section NYSE Euronext into Euronext Cash Markets - Renamed section Liffe XDP into Euronext Derivatives Markets
R2014-5.2	12 SEP 2014	Release R2014-5.2 - Added a warning to section line arbitration related to plugins BATS and ITCH50 - Updated config.gmac.markets.market.generate-referential for ITCH50
R2014-5.1	29 AUG 2014	Release R2014-5.1 - Added config.gmac.markets.market.generate-referential to ITCH50 - Updated config.gmac.markets.market.use-symbols for ITCH50 - Updated config.gmac.markets.market.preferred-channel for XETRA
R2014-5.0	08 AUG 2014	Release R2014-5.0 - Updated config.gmac.bufferpool description
R2014-4.2	25 JUL 2014	Release R2014-4.2 - Added gap recovery configuration settings to SIX_IMI
R2014-4.1	02 JUL 2014	Release R2014-4.1 - Removed XDPUS
R2014-4.0	18 JUN 2014	Release R2014-4.0 - Added config.gmac.markets.market.extension-messages to ARCA_XDP
R2014-3.2	11 JUN 2014	Release R2014-3.2 - Added config.gmac.markets.market.use-symbols to ITCH50
R2014-3.0	30 APR 2014	Release R2014-3.0 - Removed Eurex EBS, ICAP EBS, OPRA FAST, PICO RF and TSX
R2014-2.2	02 APR 2014	Release R2014-2.2 - Updated config.gmac.markets.market.snapshots.channel description for BATS
R2014-2.1	28 MAR 2014	Release R2014-2.1 - Updated config.gmac.markets.market.version allowable values for EUREX_MDI and EUREX_EMDI
R2014-2.0	13 MAR 2014	Release R2014-2.0 - Added plugin CME_BINARY

Revision	Date	Description of Changes
		- Added plugin ITCH50 - Added config.gmac.markets.market.extension-messages to CSM
R2014-1.2	28 FEB 2014	Release R2014-1.2 - Added config.gmac.markets.market.recovery.channel to OSLO_MIL - Added config.gmac.markets.market.recovery.channel to BIT_MIL
R2014-1.1	14 FEB 2014	Release R2014-1.1 - Added config.gmac.markets.market.recovery.channel to TURQUOISE_MIL - Updated config.gmac.markets.market.maximum-gap description - Updated config.gmac.markets.market.channels.channel description - Updated config.gmac.markets.market.task-time-ms-to-retry description - Removed LSE Infolect
R2014-1.0	29 JAN 2014	Release R2014-1.0 - Added config.gmac.markets.market.snapshot-enabled to SIX_IMI - Added config.gmac.markets.market.snapshots.channel to SIX_IMI - Added config.gmac.markets.market.ignore-trade-messages to ARCA_XDP - Added config.gmac.markets.market.enable-order-executed-trades to ARCA_XDP - Added config.gmac.markets.market.recovery to ITCH_OMX - Removed CBOE CFE plug-in
R2013-7.2	29 NOV 2013	Release R2013-7.2 - Updated config.gmac.markets.market.test for OSLO_MIL
R2013-7.1	08 NOV 2013	Release R2013-7.1 - Added config.gmac.markets.market.test to OSLO_MIL - Added config.gmac.markets.market.version to CSM - Updated config.gmac.markets.market.version allowable values for EUREX_MDI and EUREX_EMDI - Updated config.gmac.markets.market.time-zone description
R2013-6.3	23 OCT 2013	Release R2013-6.3 - Added config.gmac.markets.market.trading-status-monitoring to NYSE
R2013-6.2	16 OCT 2013	Release R2013-6.2 - Added config.gmac.markets.market.snapshot-enabled to BIT_MIL, OSLO_MIL and TURQUOISE_MIL - Added config.gmac.markets.market.snapshots.channel to BIT_MIL, OSLO_MIL and TURQUOISE_MIL
R2013-6.0	17 SEP 2013	Release R2013-6.0 - Added config.gmac.markets.market.venue-ids.venue to UQDF, UTDF, CQS, CTS and OPRA_BINARY - Added a note related to the reference channel to EUREX, EUREX_MDI, EUREX_EMDI and XETRA - Removed config.gmac.markets.market.symbol-ref-file from UQDF
R2013-5.0	31 JUL 2013	Release R2013-5.0 - Updated details to config.gmac.hardware-filtering - Updated config.gmac.markets.market.extension-messages: enabled by default except for EUREX_MDI and EUREX_EMDI
R2013-4.0	18 JUN 2013	Release R2013-4.0 - Added config.gmac.markets.market.snapshot-enabled to DE - Added config.gmac.markets.market.snapshots.channel to DE

Revision	Date	Description of Changes
		- Added config.gmac.markets.market.snapshot-enabled to NYSE - Added config.gmac.markets.market.snapshots.channel to NYSE - Added a note to config.gmac.fast-decoding
R2013-3.0	30 APR 2013	Release R2013-3.0 - Added a note to config.gmac.markets.market.channels.channel for NYSE in relation to hardware symbol filtering - Added plugin ITCH_OMX - Added plugin SIX_IMI - Updated config.gmac.markets.market.preferred-channel for EUREX_MDI and EUREX_EMDI to support A/B line arbitration
R2013-2.3	09 APR 2013	Release R2013-2.3 - Added plugin BATS_OPTIONS
R2013-2.0	15 MAR 2013	Release R2013-2.0 - Updated config.gmac.markets.market.channels.channel for ICAP_XML to support the usage of the TOE plugin
R2013-1.3	28 FEB 2013	Release R2013-1.2 - Added plugin BIT_MIL - Added plugin OSLO_MIL
R2013-1.2	19 FEB 2013	Release R2013-1.2 - Added plugin TURQUOISE_MIL - Added config.gmac.markets.market.trades-enabled to NYSE
R2013-1.1	13 FEB 2013	Release R2013-1.1 - Updated details to config.gmac.hardware-filtering
R2013-1.0	29 JAN2013	Release R2013-1.0 - Added details to config.gmac.hardware-filtering - Added plugin XDPUS
R2012-8.3	11 JAN 2013	Release R2012-8.3 - Added config.gmac.markets.market.version to EUREX_MDI and EUREX_EMDI
R2012-8.1	20 DEC 2012	Release R2012-8.1 - Added details related to hardware symbol filtering when configuring channels (see config.gmac.markets.market.channels.channel) - Removed Terminology section (refer to GMAC Product Overview)
R2012-8.0	29 NOV 2012	Release R2012-8.0 - Added plugin EUREX_MDI - Added plugin EUREX_EMDI - Added plugin PICO_RF - Added config.gmac.fast-decoding - Added config.gmac.markets.market.fast-decoding - Added config.gmac.markets.market.socket-backoff-period-s
R2012-7.2	16 NOV 2012	Release R2012-7.2 - Added config.gmac.logfile
R2012-7.1	30 OCT 2012	Release R2012-7.1 - Updated config.gmac.markets.market.task-time-ms-to-live and config.gmac.markets.market.task-time-ms-to-retry descriptions - Added config.gmac.markets.market.task-number-of-retries

Revision	Date	Description of Changes
R2012-7.0	09 OCT 2012	Release R2012-7.0 - Added plugin PHLXTOPOPLUS - Added plugin ISE_MDI_BINARY - Added config.gmac.markets.market.source-message-logfile to ICAP_XML
R2012-6.3	25 SEP 2012	Release R2012-6.3 - Added plugin ITCH_BROKERTEC - Updated DMA queue definition in section Terminology - Updated section Configuring Multiple Queues - Updated parameter numQueue definition in section Standard Multicast Channel Settings and Standard Recovery Channel Settings
R2012-6.2	12 SEP 2012	Release R2012-6.2 - Added config.gmac.markets.market.snapshots.channel to CME2
R2012-6.0	17 AUG 2012	Release R2012-6.0 - Added config.gmac.ade-dump-on-payload-error (DMA Buffer Dumping) - Added config.gmac.ade-dump-file-name (DMA Buffer Dumping) - Added config.gmac.ade-dump-max-interval-us (DMA Buffer Dumping) - Added config.gmac.ade-dump-max-packets (DMA Buffer Dumping) - Added plugin PHLXTOPOV3 - Added plugin OPRA_BINARY
R2012-5.2	17 AUG 2012	Release R2012-5.2 - Added config.gmac.markets.market.normal-hours-orders-only to ARCA_XDP
R2012-5.1	08 AUG 2012	Release R2012-5.1 - Added config.gmac.markets.market.remove-routed-trades to BATS
R2012-5.0	10 JUL 2012	Release R2012-5.0 - Added config.gmac.register-affinity - Added config.gmac.other-affinity - Added config.gmac.register-directory - Added config.gmac.register-no-sigabrt - Added config.gmac.reissue-subscriptions - Added config.gmac.send-multicast-timeout-messages - Added config.gmac.markets.market.socket-max-retries - Added config.gmac.markets.market.socket-max-retries-us - Added config.gmac.markets.market.task-time-ms-to-retry to ITCH 4.1 - Added plugin ICAP_XML - Added plugin BME
R2012-4.2	05 JUN 2012	Release R2012-4.2 - Added config.gmac.markets.market.exchange-timestamp to ARCA_XDP
2.2	25 MAY 2012	Release R2012-4.0 - Chi-X UDP is removed - Snapshot channels are now only configured using config.gmac.markets.market.snapshots.channel for all relevant plug-ins - Snapshot recovery is now only enabled using config.gmac.markets.market.snapshot-enabled for all relevant plug-ins

Revision	Date	Description of Changes
		- Added config.gmac.print-absent-fields - Updated symbol reference file location for ARCA_XDP - NYSE Amex is renamed NYSE MKT - Added details regarding the timeouts configuration
2.1	20 APR 2012	Release R2012-3.1 - Added configuration for XETRA
2.0	22 FEB 2012	- New template - Added config.gmac.hardware-filtering - Added config.gmac.markets.market.hardware-filtering - Added config.gmac.markets.market.preferred-interface to EUREX - Added config.gmac.markets.market.extension-messages to LSE Millennium - Added config.gmac.markets.market/refresh-enabled and config.gmac.markets.market.snapshots.channel to BATS - Added note regarding hardware filtering to ITCH 4.1 - Updated section EUREX / config.gmac.markets.market.preferred-channel: addition of value P for parameter prefChan - Updated section LIFFE XDP / config.gmac.markets.market.channels.channel: addition of parameter chanType - Updated section LIFFE XDP / config.gmac.markets.market.recovery.channel: addition of a note for parameter svcID - Updated section LIFFE XDP / config.gmac.markets.market.symbol-ref-file: addition of an example script - Updated section config.gmac.markets.market.channels.channel: a particular interface on a VLAN can be specified - Updated section config.gmac.markets.market.time-zone - Updated section ICE / config.gmac.markets.market.tcp_server: addition of tcp-recovery-enabled - Removed sections related to plugins Chi-X MD Europe and Chi-X MD Canada
<= 1.15		Older versions

1. Introduction

This document should be read in conjunction with:

- GMAC Product Overview
- GMAC API Reference Guide
- GMAC V1 and V3 Messages Templates

The GMAC (Generic Market capture ACcelerator) is configured using an XML-style '.cfg' file. This configuration file is loaded by the GMAC libraries when GMAC is initialised.

Example configuration files are shipped with your software. These files were created using reliable, fully tested settings. This document explains these configuration files and describes the configuration options available in the Celoxica software.

Celoxica highly recommends creating backup copies of any configuration files before editing.

Note:

Each market feed requires specific settings, but it is possible to configure multiple market feeds in one configuration file, see *Configuring Multiple Markets*.

Boolean variables in the configuration files can have any of the following values. These values are fully interchangeable:

on	off
1	0
true	false
yes	no
enable	disable
enabled	disabled
t	f
y	n

2. Configuration File Schema

The basic structure of a GMAC configuration file is shown in the following schema. Some tags may not be required for your configuration. Tags are shown in the schema, values are not.

```
<config>
      <gmac>
            <verbosity>
            <logfile>
            <bufferpool>
            <force-raw-operation>
            <recovery>
            <recovery-affinity>
            <simulated-dropping-chance>
            <simulated-dropping-gap-range>
            <simulated-dropping-on-signal>
            <simulated-dropping-logfile>
            <hardware-filtering>
            <print-absent-fields>
            <subscription>
            <fast-decoding>
            <!-- See Note 1 below -->
            <markets>
                  <market> 0
                        <verbosity>
                        <time-zone>
                        <v3>
                        <hardware-filtering>
                        <channels>
                              <channel> 0
                              <channel> 1
                              <channel> n
                        </channels>
                        <recovery>
                              <channel> 0
                              <channel> 1
                              <channel> n
                        </recovery>
                  </market>
                  <!-- See Note 2 below -->
                  <market> 1
                  <market> n
            </markets>
      </gmac>
</config>
```

Note #1:

For information on general configuration settings, see *General Configuration Settings*.

Note #2:

For further information on market-specific configurations, see *Market Specific Configuration Settings*.

3. General Configuration Settings

The first settings in a configuration file are general configurations (i.e. they are not market-dependent). This section describes each of these settings.

3.1 GMAC Configuration

3.1.1 config

Description This tag initiates a body for GMAC or Order Book configurations to be made in a file. This tag is at the top of the file.

Usage `<config>`

3.1.2 config.gmac

Description This tag initiates a body for GMAC configurations to be made.

Usage `<gmac>`

3.2 General Configuration

The following tags are under `config.gmac`.

3.2.1 print-absent-fields

Description Selects whether fields set as 'not present' in GMAC messages (presence bit not set) should be printed as '<undefined>' or simply not printed when using `GMACPrintMessages()` or `GMACPrintMessagesEx()`.

Usage `<print-absent-fields> enable </print-absent-fields>`

Parameters

`enable`	Boolean which enables or disables printing of not present fields. Default is off.

Example `<print-absent-fields> on </print-absent-fields>`

3.2.2 register-affinity

Description Specifies the CPUs on which the Celoxica register thread is allowed to run, as a bitmask. The Celoxica register thread is used across the product range for logging, and is not latency-critical.

If used, the environment variable CELOXICA_AFFINITY_REGISTER supersedes `<register-affinity>`.

Usage `<register-affinity> CPU </register-affinity>`

Parameters

`CPU`	Integer.

Example `<register-affinity> 1 </register-affinity>`

3.2.3 other-affinity

Description Specifies the CPUs on which other non-latency-critical Celoxica threads are allowed to run, as a bitmask. Such threads include the network emulation thread, which enables the accelerator card to exchange non-offloaded traffic

with the OS network stack, the Order Book snapshot management thread and the GMAC scheduler thread.

If used, the environment variable CELOXICA_AFFINITY_OTHER supersedes `<other-affinity>`.

Usage `<other-affinity> CPU </other-affinity>`

Parameters `CPU` Integer.

Example `<other-affinity> 1 </other-affinity>`

3.2.4 register-directory

Description Specifies the location of the log file generated by the Celoxica register thread. If not set, the log file is written to ./log/default.log.

If used, the environment variable CELOXICA_REGISTER_DIR supersedes `<register-directory>`.

Usage `<register-directory> string </register-directory>`

Parameters `String` Log file location

Example `<register-directory> ./log/default.log </register-directory>`

3.2.5 register-no-sigabrt

Description The register library traps the SIGABRT signal and the pending logs are flushed before the application quits.

If set, any pending logs will be lost on application assert or abort.

If used, the environment variable CELOXICA_REGISTER_NO_SIGABRT supersedes `<register-no-sigabrt>`.

Usage `<register-no-sigabrt> enable </register-no-sigabrt>`

Parameters `enable` Boolean.

Default is off.

Example `<register-no-sigabrt> on </register-no-sigabrt>`

3.2.6 fast-decoding

Description Enables or disables globally the hardware FAST decoding.

When enabled globally, the hardware FAST decoding can be disabled on a per market basis.

Hardware FAST decoding is transparent to GMAC client code: no API or template changes apply.

Note:

> When using multiple GMAC processes (using multiple configurations) accessing data through the same interface, the FAST decoding process must be started first, otherwise an error will be generated.

Usage `<fast-decoding> enable </fast-decoding>`

Parameters `enable` Boolean.

Default is off.

Example `<fast-decoding> on </fast-decoding>`

3.3 Log

The following tags are under `config.gmac`.

3.3.1 verbosity

Description Configures the GMAC logging verbosity.

All levels are syslog levels.

Allowable values are:

- NOTICE Default logging level
- INFO Info mode logging level
- DEBUG Debug mode level
- EMERG System is unusable
- ALERT Action must be taken immediately
- CRIT Critical conditions
- ERR Error conditions
- WARNING Warning conditions

Usage `<verbosity> verbosity </verbosity>`

Parameters `verbosity` Logging level

Example `<verbosity> INFO </verbosity>`

3.3.2 logfile

Description Configures the file where the GMAC verbosity output is logged.

The file is created in "./logs" by default. The path can be adjusted using the environment variable CELOXICA_REGISTER_DIR.

GMAC logs messages to stdout if `<logfile>` is not set.

Usage `<logfile> logFile </logfile>`

Parameters `logFile` File name

Example `<logfile> gmac.log </logfile>`

3.4 Timeouts

The following tags are under `config.gmac`.

3.4.1 multicast-timeout-us

Description The time to wait without receiving a multicast message (heartbeat or any) before issuing a GMAC_TYPE_MULTICAST_TIMEOUT message.

Usage `<multicast-timeout-us> mTimeout </multicast-timeout-us>`

Parameters `mTimeout` Time to wait for multicast heartbeats.

This number is in microseconds.

Example

```
<multicast-timeout-us> 1000000 </multicast-timeout-us>
```

3.4.2 reissue-subscriptions

Description Number of multicast timeouts.

The IGMP subscription to router is re-issued when the number of multicast timeouts is greater than `<reissue-subscriptions>`.

Note:

> The IGMP subscription is only attempted for channels that support subscription i.e. not file, TCP or null channels.

Usage

```
<reissue-subscriptions> Nbr </reissue-subscriptions>
```

Parameters `Nbr` Integer

Example

```
<reissue-subscriptions> 5 </reissue-subscriptions>
```

3.4.3 send-multicast-timeout-messages

Description Enables or disables the generation of GMAC timeout messages when the multicast timeout is in use.

Usage

```
<send-multicast-timeout-messages> enable </send-multicast-timeout-messages>
```

Parameters `enable` Boolean.

Default is yes.

Example

```
<send-multicast-timeout-messages> No </send-multicast-timeout-messages>
```

3.5 Reorder / Recovery

The following tags are under `config.gmac`.

3.5.1 bufferpool

Description Configures the reorder/recovery buffer settings; Celoxica does not recommend adjusting these settings.

Usage

```
<bufferpool> numBytes numBuffers </bufferpool>
```

Parameters `numBytes` Number of bytes per buffer.

Defaulted to 1048576.

`numBuffers` Number of buffers.

Defaulted to 2.

Example

```
<bufferpool> 1048576 64 </bufferpool>
```

3.5.2 reorder-max

See Line Arbitration.

3.5.3 reorder-timeout-ns

See Line Arbitration.

3.5.4 force-raw-operation

Description Configures the raw operation.

Usage `<force-raw-operation> enable </force-raw-operation>`

Parameters

`enable`	Boolean which enables raw operation. Packets are not reordered in raw operation. Default is off.

Example `<force-raw-operation> off </force-raw-operation>`

3.6 Recovery Settings

Recovery allows the user to recover dropped packets on supported markets. The following settings are configured at the start of the configuration file, for information on configuring the recovery channel settings see *Market Configuration Settings*.

The following tags are under `config.gmac`.

Note:

If you have multiple markets configured, market recovery has to be configured on all the markets directed to a channel or GMAC returns a configuration error, see *Configuring Multiple Markets*.

3.6.1 recovery

Description Configures the recovery.

Usage `<recovery-enabled> enable </recovery-enabled>`

Parameters

`enable`	Boolean which enables or disables market recovery globally. Default is off.

Example `<recovery-enabled> on </recovery-enabled>`

3.6.2 recovery-affinity

Description Recovery affinity allows for the recovery thread to be processed by a dedicated CPU in the system.

Usage `<recovery-affinity> recAffinity </recovery-affinity>`

Parameters

`recAffinity`	Mask for CPU affinity, i.e. 15 = 0xFF = any free CPU. Default is 0xFF.

Example `<recovery-affinity> 15 </recovery-affinity>`

3.6.3 recovery-reconnect-max-retries

Description Option specifying how many times GMAC will retry to establish a broken TCP connection in the recovery thread.

When no maximum is required, the word 'infinity' can be used instead of an integer.

The retry counter is reset on successful TCP connection.

Usage
```
<recovery-reconnect-max-retries> retries
</recovery-reconnect-max-retries>
```

Parameters `retries` Integer specifying maximum number of retries.

Default is 3.

Example
```
<recovery-reconnect-max-retries> 10 </recovery-
reconnect-max-retries>
```

3.6.4 recovery-reconnect-backoff-max-seconds

Description The recovery thread uses a dynamic back-off timer to delay the retries between TCP connection failures.

The back-off intervals are 0, 1, 2, 5, 10, 20 and 30 seconds.

The dynamic back-off timer is reset on successful TCP connection.

The setting constrains the maximum delay for the back-off timer.

Usage
```
<recovery-reconnect-backoff-max-seconds> max
</recovery-reconnect-backoff-max-seconds>
```

Parameters `max` Integer specifying the maximum number of seconds for the back-off timer.

Default is 30 seconds.

Example
```
<recovery-reconnect-backoff-max-seconds> 10
</recovery-reconnect-backoff-max-seconds>
```

3.7 Hardware Handling

The following tags are under `config.gmac`.

3.7.1 hardware-filtering

Description Enables or disables the hardware symbol filtering globally.

When enabled, packets will be directed through the filtering modules for supported markets. However, these packets will not be filtered until filtering is enabled for the market using the GMAC API call `GMACFilteringEnable()`.

For plugins supporting hardware symbol filtering **except ITCH50 and OPRA_BINARY**: GMAC and its underlying libraries permit a single instance of a particular market to have hardware filtering enabled per card. Additionally multi-queue filtering on a single market is not permitted.

For plugins ITCH50 and OPRA_BINARY only: hardware symbol filtering can be enabled on separate queues with separate symbol lists on interface ac0 and interface ac1.

Note #1:

> `GMACFilteringEnable()` will be called automatically for markets that support hardware symbol filtering when using the Celoxica order book.

Note #2:

> See <channel> for details about the channels configuration when hardware symbol filtering is enabled.

Usage <hardware-filtering> enable </hardware-filtering>

Parameters

enable	Boolean setting to enable or disable this feature

Example <hardware-filtering> on </hardware-filtering>

3.7.2 max-hw-waiting-packets

Description Sets the maximum number of waiting packets in the hardware queue.

Some packets will be lost if this number is exceeded.

This configuration tag is relevant only when clxng is used.

Usage <max-hw-waiting-packets> max </max-hw-waiting-packets>

Parameters

max	Integer, rounded up to the nearest power of 2 (if 1025 is set, 2048 will be configured)

Example <max-hw-waiting-packets> 2048 </max-hw-waiting-packets>

3.8 Subscriptions

The following tags are under config.gmac.

3.8.1 subscription

Description Configures the sending of subscription IGMP packets.

Usage <subscription> enable </subscription>

Parameters

enable	Boolean which enables the GMAC sending subscription IGMP packets. Default is on.

Example <subscription> on </subscription>

4. Testing Configuration Settings

This chapter explains the settings involved in configuring GMAC for testing or debugging purpose.

4.1 Simulated Dropping

GMAC can be forced to drop packets for the purposes of testing recovery.

If you are not testing `<simulated-dropping-on-signal>` should be off as simulated dropping interferes with receiving accurate data.

The following tags are under `config.gmac`.

4.1.1 simulated-dropping-chance

Description Configures the likelihood of a packet being dropped, this is a decimal between 0 and 1, for example; 0.10000 = one packet in ten and 0.00100 = one packet in a thousand.

Usage

```
<simulated-dropping-chance> chance </simulated-dropping-chance>
```

Parameters

`chance`	A decimal representing the likelihood of a packet being dropped

Example

```
<simulated-dropping-chance> 0.00100 </simulated-dropping-chance>
```

4.1.2 simulated-dropping-gap-range

Description Configures the range of dropped packets in each group of dropped packets, i.e. the number of dropped packets in each group is between the integers min and max.

Usage

```
<simulated-dropping-gap-range> min max </simulated-dropping-gap-range>
```

Parameters

`min`	Minimum number of dropped packets in a group
`max`	Maximum number of dropped packets in a group

Example

```
<simulated-dropping-gap-range> 5 20 </simulated-dropping-gap-range>
```

4.1.3 simulated-dropping-logfile

Description Configures the file where dropping information is logged.

Usage

```
<simulated-dropping-logfile> logFile </simulated-dropping-logfile>
```

Parameters

`logFile`	File where dropping information is logged

Example

```
<simulated-dropping-logfile> dropping.log </simulated-dropping-logfile>
```

4.1.4 simulated-dropping-on-signal

Description Enables or disables simulated dropping.

Usage `<simulated-dropping-on-signal> drop </simulated-dropping-on-signal>`

Parameters

`drop`	Boolean enabling or disabling simulated dropping

Example `<simulated-dropping-on-signal> yes </simulated-dropping-on-signal>`

4.2 DMA Buffer Dumping

GMAC can dump the DMA buffer on payload error for testing or debugging purpose.

Enabling DMA buffer dumping is done by setting `<ade-dump-on-payload-error>` to yes.

The following tags are under `config.gmac`.

4.2.1 ade-dump-on-payload-error

Description Enables or disables DMA buffer dumping on payload error.

If set, `<ade-dump-file-name>` must be supplied.

Usage `<ade-dump-on-payload-error> enable </ade-dump-on-payload-error>`

Parameters

`enable`	Boolean which enables the DMA buffer dumping on payload error. Default is off.

Example `<ade-dump-on-payload-error> on </ade-dump-on-payload-error>`

4.2.2 ade-dump-file-name

Description Sets the path and file name used for DMA buffer dumping.

The name given will have the queue number and the dump number appended to it. For example, if set to ade-dump.txt, dump files will be given names in the format ade-dump.txt.<queue number>.<dump number> - e.g. ade-dump.txt.0.0.

Note that dump files can be converted to human-readable format using the 'ade_dump_to_text' utility which is included in the GMAC package.

Usage `<ade-dump-file-name> file </ade-dump-file-name>`

Parameters

`file`	File name

Example `<ade-dump-file-name> ade-dump.txt </ade-dump-file-name>`

4.2.3 ade-dump-max-interval-us

Description Sets the maximum DMA buffer dumping rate.

This is the minimum period of time that must elapse between dumping the lldt buffer for each queue.

There is no limit if set to 0.

Usage `<ade-dump-max-interval-us> rate </ade-dump-max-interval-us>`

Parameters `Rate` Time in microseconds.

Default is 0.

Example
```
<ade-dump-max-interval-us> 100 </ade-dump-max-interval-us>
```

4.2.4 ade-dump-max-packets

Description Sets the maximum number of packets to dump in each dump file.

There is no limit if set to 0.

Usage
```
<ade-dump-max-packets> packets </ade-dump-max-packets>
```

Parameters `packets` Integer.

Default is 0.

Example
```
<ade-dump-max-packets> 0 </ade-dump-max-packets>
```

5. Market Configuration Settings

This chapter explains the settings involved in configuring the markets and channels on GMAC.

5.1 Markets Configuration

For more information on configuring multiple markets, see *Configuring Multiple Markets.*

The following tags are under `config.gmac.markets`.

5.1.1 market

Description Configures a market with integer id and string name used to identify the market.

See the market specific configurations sections for details of each market / protocol.

Usage

```
<market> id name optLabel
```

Parameters

`id`	Id of the market
`name`	Name of the market
`optLabel`	Optional label for this market. Allows a user-defined label to be used for each market. Useful when using multiple market sections for the same exchange. If set, the label will be returned by `GMACMulticastGetMarketID()` as the market name, and referenced in log messages.

Example

```
<market> 0 LSE_MIL
<market> 2 BATS EDGA
<market> 3 BATS EDGX
```

5.2 Market Parameters Configuration

The following tags are under `config.gmac.markets.market`.

5.2.1 start-seq

Description Specifies the first sequence number to be re-requested by this market in the event of a mid-day start, default is 0. This setting is only valid if recovery is enabled. `startSeq` is an integer greater than or equal to 0, or if set to undefined, GMAC takes the first sequence number it sees as the first sequence number.

Usage

```
<start-seq> startSeq </start-seq>
```

Parameters

`startSeq`	The first sequence number to be re-requested in the event of a mid-day start

Example

```
<start-seq> undefined </start-seq>
```

5.2.2 maximum-gap

Description Maximum-gap configures the maximum size of gap which can be requested for recovery. The request size is limited by increasing the start number of the sequence to be recovered. Note that the exchange definitions are not affected by maximum-gap.

Usage

```
<maximum-gap> max </maximum-gap>
```

Parameters `max` Maximum recovery gap requested, if set to zero or below, nothing is requested

Example `<maximum-gap> -1 </maximum-gap>`

Notes `<maximum-gap>` is defaulted to 1000 for plugins ITCH_OMX and ITCH50.

5.2.3 verbosity

Description Configures the verbosity for this market.

Allowable values are:

- NOTICE Default logging level
- INFO Info mode logging level
- DEBUG Debug mode level
- EMERG System is unusable
- ALERT Action must be taken immediately
- CRIT Critical conditions
- ERR Error conditions
- WARNING Warning conditions

Usage `<verbosity> marketVrb </verbosity>`

Parameters `marketVrb` Verbosity displayed by this market

Example `<verbosity> INFO </verbosity>`

5.2.4 time-zone

Description Configures the current time-zone for this market.

The `tmz` value may be set to the number of hours the market's time-zone is east of Greenwich (London). If you would like to have timestamps set to the exchange time then set this value to 0. This value must be changed for Daylight Savings Time. Setting a time-zone less than -23 and greater than 23 results in an error.

The `tmz` value may also be set to:

- 'auto' The exchange timestamp is automatically corrected to UTC
- 'local' The exchange timestamp is automatically corrected to the local time zone of the machine.

Corrected timestamps will wrap around if the time-zone correction push them beyond midnight in either direction.

Note #1:

The time-zone correction is logged and is expressed in hours. The correction can be greater than 24 hours when the exchange timestamp is provided in time units since an epoch i.e. since midnight 1st January 1970.

Note #2:

This setting is **not** effective for plugin LSE_MIL.

Usage `<time-zone> tmz </time-zone>`

Parameters `tmz` Time-zone for this market

Example To convert TSX (Toronto) to LSE (London) time, with a time difference of 4 hours, use:

```
<time-zone> -4 </time-zone>
```

5.2.5 packet-timeout-ms

Description Maximum time the GMAC core will hold a packet in the reorder queue (the queue/buffer that is used for reordering and buffering, including while waiting for gap recovery).

Once this timeout is reached, the packet is released to the user immediately.

This setting is also a safety-measure in case a gap recovery task fails to time-out based on `<task-time-ms-to-live>` or `<task-number-of-retries>`.

Note:

> This setting is **not** effective for the following plugins: CME_BINARY, CTA, CQS, CTS, ICE and UTP.

Usage

```
<packet-timeout-ms> ptm </packet-timeout-ms>
```

Parameters `ptm` Packet timeout in milliseconds

Example

```
<packet-timeout-ms> 3000 </packet-timeout-ms>
```

5.2.6 task-time-ms-to-live

Description Configures the lifespan of a single gap recovery task.

Only one task can exist at any time on the multicast.

Note:

> This setting is **not** effective for the following plugins: CME_BINARY, CTA, CQS, CTS and UTP.

Usage

```
<task-time-ms-to-live> tTime </task-time-ms-to-live>
```

Parameters `tTime` Timeout in milliseconds

Example

```
<task-time-ms-to-live> 1500 </task-time-ms-to-live>
```

5.2.7 task-time-ms-to-retry

Description Configures the time to wait for the reception of the next packet within the gap recovery task before retrying the task, in milliseconds.

Note:

> This setting is **only** effective for the following plugins: BATS, EURONEXT_DERIVATIVES_XDP, LSE_MIL, ITCH_BROKERTEC, ITCH_OMX, ITCH50, BIT_MIL, OSLO_MIL and TURQUOISE_MIL.

Usage

```
<task-time-ms-to-retry> tRetry </task-time-ms-to-
```

retry>

Parameters `tRetry` Timeout in milliseconds

Example `<task-time-ms-to-retry> 2000 </task-time-ms-to-retry>`

5.2.8 task-number-of-retries

Description Configures a number of times to retry a gap recovery task.

Note:

> This setting is **only** effective for the following plugins: EURONEXT_DERIVATIVES_XDP and ITCH_BROKERTEC.

Usage `<task-number-of-retries> retryNo </task-number-of-retries>`

Parameters `retryNo` Integer.

Default is 3.

Example `<task-number-of-retries> 3 </task-number-of-retries>`

5.2.9 v3

Description The V1 transcoder is used by default for any markets with v3 capabilities combined with V1 capabilities. The `<v3>` tag must be enabled in order to generate messages from the V3 transcoder.

See the Market Data Market Support Matrix for details of which version of the API to use with each supported feed.

Usage `<v3> enable </v3>`

Parameters `enable` Enable messages generated by the GMAC V3 transcoder

Example `<v3> off </v3>`

5.2.10 use-order-depth-multiple

Description Enables order depth messages to be combined into one message in the GMAC framework. This is relevant when multiple order depths are received in a single message from the exchange (for example, NYSE).

Usage `<use-order-depth-multiple> enable </use-order-depth-multiple>`

Parameters `enable` Boolean which enables combining multiple order depths into one message.

Default is off.

Example `<use-order-depth-multiple> off </use-order-depth-multiple>`

5.2.11 symbol-ref-file

Description For some markets, it is possible to specify a symbol reference file or files that will be processed. This parameter specifies the path to the file(s).

The path may be:

- To a local or remote drive visible to the host system
  - A URL, in which case `wget` will be invoked to copy the file to the local directory. This is useful for downloading reference files that the exchange makes available via ftp or http. If the local file already exists it will be overwritten (unless `wget` can determine that the local file is already up-to-date).
  - Note that the `wget` output will be seen unless verbosity is zero. If verbosity is WARNING(4) or NOTICE(5) or INFO(6) or DEBUG(7) there will be some additional trace.
  - Note that currently it is not possible to download files using the accelerator card; another interface (e.g. a port on a regular NIC) must be used, which must have access to the network from which the file is accessible.
- To a script, which may for instance download/rename/copy the necessary file(s):
  - The script must only output a (whitespace-separated) file list to `stdout`, which GMAC will use as its input. Any other logging must therefore be suppressed or written to a file so that GMAC only receives a file list.
  - The script must return 0 upon completion, else GMAC will issue a 'failed to initialise' error message and quit.
  - When specifying a script, prefix its path with `'cmd://'`
  - For the first of the two cases above, if the path includes any `strftime` type format specifiers, these are expanded using the current local time.

Usage

```
<symbol-ref-file> path </symbol-ref-file>
```

Parameters

`path`	Path to file(s) or script, or URL

Example

```
<symbol-ref-file> path/file.txt </symbol-ref-file>
```

```
<symbol-ref-file> http://host:port /path/file.txt
</symbol-ref-file>
```

```
<symbol-ref-file>
    ftp://user:password@host/path/file.txt </symbol-ref-
file>
```

```
<symbol-ref-file>
    ftp://USER:PASS@194.169.8.155:21/%Y%m%d_XLON_Instrument.csv
</symbol-ref-file>
```

```
<symbol-ref-file> cmd://myscript.sh </symbol-ref-
file>
```

5.2.12 symbol-ref-queue

Description This optional configuration tag allows the user to specify the GMAC queue where the GMAC reference data messages generated by the process of a symbol reference file (see `<symbol-ref-file>`) will be delivered to.

If the tag is not configured on a given market, the GMAC reference data messages will be delivered to the first configured GMAC queue for the said market.

Usage

```
<symbol-ref-queue> numQueue </symbol-ref-queue>
```

Parameters `numQueue` The DMA queue number

Example `<symbol-ref-queue> 1 </symbol-ref-queue>`

5.2.13 market-hours

Description Allows users to specify the trading hours for the current market, to enable GMAC to infer the market trading status in the event of a mid-day start, before a full refresh is processed (or in the absence of one). GMAC uses the exchange timestamps to determine the time of the day, and hence this feature is only supported on exchanges that disseminate timestamps.

To query the inferred market state, use API method `GMACQueryMarketHours()` – see GMAC API Reference Guide for details. The Celoxica Order Book is also able to use this feature, depending on the setting in configuration node `config.book.deepbook.market-status-correction` – see Order Book Configuration Guide for details.

Usage `<market-hours> openingTime closingTime </market-hours>`

Parameters `openingTime` Start of trading hours

`closingTime` End of trading hours

Example `<market-hours> 08:59:30 16:30:00 </market-hours>`

5.2.14 market-prefix

Description Allows users to specify the 'Extended ISIN' prefix string.

If specified, it must be exactly 4 characters and it will replace the value normally used by the transcoder plugin.

This can be useful to ensure that 2 (or more) markets using the same transcoder have different EISIN prefixes.

Usage `<market-prefix> prefix </market-prefix>`

Parameters `prefix` The 4 character prefix to use

Example `<market-prefix> UDEA </market-prefix>`

5.2.15 socket-max-retries

Description Sets the maximum number of times to attempt reconnection within a given time frame.

Sets -1 to retry forever.

This config node only applies to TCP feeds using the socket plugin.

Usage `<socket-max-retries> nbr </socket-max-retries>`

Parameters `nbr` Integer

Example `<socket-max-retries> 3 </socket-max-retries>`

5.2.16 socket-max-retries-us

Description Sets the time frame used by `<socket-max-retries>`.

Usage

```
<socket-max-retries-us> time </socket-max-retries-us>
```

Parameters

`time`	Expressed in microseconds.

Example

```
<socket-max-retries-us> 10000 </socket-max-retries-us>
```

5.2.17 socket-backoff-period-s

Description Sets the time to wait between TCP reconnections.

This config node should be used in conjunction with `<socket-max-retries>`.

Sets 0 to retry as quickly as possible.

This config node only applies to TCP feeds using the socket plugin.

Usage

```
<socket-backoff-period-s> time </socket-backoff-period-s>
```

Parameters

`time`	Expressed in seconds.

Example

```
<socket-backoff-period-s> 1 </socket-backoff-period-s>
```

5.3 Standard Multicast Channel Settings

The following tags are under `config.gmac.markets.market.channels`.

5.3.1 channel

Description Configures the list of live multicast channels. Standard parameters are illustrated; parameters are set differently for multicast channels in some markets below.

Usage

```
<channel> localChanId numQueue srcPlugin interface
srcIP:port:type enblRec startSeq useDumps enable
</channel>
```

Parameters

`localChanId`	The local id for this channel, must be unique for the market
`numQueue`	The DMA queue number which this channel is delivered. Can be set to 0 or 1 for the 1G cards. Can be set from 0 to 16 for the 10G cards.
`srcPlugin`	The source for this channel, set to: • `lldt` when using the Celoxica legacy ADE solution to monitor the accelerator card • `clxng` when using the Celoxica CLX-NG solution to monitor the accelerator card, the multicast being used by a **private pipeline**. One pipeline is created per GMAC queue. When `clxng` is used, the multicast data cannot be shared across several GMAC instances. Note that CLX-NG is automatically configured using the GMAC configuration. • `clxng_shared` when using the Celoxica CLX-NG

solution to monitor the accelerator card, the multicast being used by a **shared pipeline**.

One pipeline is created per GMAC queue.

See the notes below for details on `clxng_shared`.

Note that CLX-NG is automatically configured using the GMAC configuration.

- `file` when using a pcap file to test a trading strategy. For proper testing of GMAC, it is strongly recommended broadcasting a pcap and using the FPGA card.
- `socket` when listening to TCP feeds

`interface` The interface, set to:

- The physical interface on the accelerator card where the channel is received. If required, a particular interface on a VLAN can be specified.
- The path to the pcap file when the channel source is set to `file`.

`srcIP:port` The multicast IP address and port for this channel

`type` The type of connection for the channel, t for TCP and u for UDP

`enblRec` Boolean argument enabling or disabling recovery on this channel. Can be set to '-' in order to use the global or default value.

Note:

> `<recovery>` must be enabled for this setting to function.

Default is off.

`startSeq` Sets the first sequence number to be re-requested by this channel in the event of a mid-day start, can be set to '-' in order to use the global or default value. This is an integer greater than or equal to 0, or can be set to undefined, for more information see `<start-seq>`.

`useDumps` Legacy setting, always ignored: set to '-'

`enable` Boolean which enables or disables (default) the channel at start-up. This can also be done in the GMAC API using `GMACCommand()`.

Example

1) Using the lldt source plugin:

```
<channel> 0 0 lldt ac0 224.0.62.2:30001 no
undefined - on </channel>
```

2) Using the lldt source plugin with interface on VLAN 444:

```
<channel> 0 0 lldt ac0.444 224.0.62.2:30001 no
undefined - on </channel>
```

3) Using the clxng source plugin for a private pipeline:

```
<channel> 0 0 clxng clx0 224.0.59.64:11064 - - -
on </channel>
```

4) Using the clxng_shared source plugin for a shared pipeline:

a) First GMAC instance

```
<channel> 0 0 clxng_shared clx0
224.0.59.64:11064 - - - on </channel>
```

```
<channel> 1 0 clxng_shared clx0
```

```
224.0.59.66:11064 - - - on </channel>
```

b) Second GMAC instance

```
<channel> 2 0 clxng_shared clx0
224.0.59.64:11064 - - - on </channel>
```

5) Using the file source plugin:

```
<channel> 0 0 file /pcap_path/pcap.pcap
224.0.62.2:30001 - - - on </channel>
```

Note #1

The number of multicast channels is limited to **256** per port (interface).

Besides, the channels must be declared in an optimal order when using filtering firmware. Indeed, the hardware symbol filtering module can only handle channels with router tags **<= 127**. Router tags are allocated internally in the order that channels are declared in the configuration and thus bear no relation to the localChanIds.

It is therefore not possible to configure more than 128 lldt channels that use hardware symbol filtering.

It is however possible to configure more than 128 lldt channels in total as long as channels using hardware symbol filtering are strictly within the first 128. This means:

- If using multiple queues, the queues comprising channels with hardware symbol filtering should be declared first.
- If using a single queue, markets using hardware symbol filtering should be declared first.

For plugins supporting hardware symbol filtering except ITCH: multi-queue hardware filtering on single markets is not supported.

For ITCH plugin only: hardware symbol filtering can be enabled on two separate queues with separate symbol lists on interface ac0 and interface ac1.

Note #2

1) `clxng_shared` is used to share multicast data between several GMAC instances. In such a case, the relevant multicasts must be configured in each GMAC configuration file (one file per GMAC instance) with the same `numQueue`, `interface` and `srcIP:port`.

   The second and subsequent GMAC instances can only use the full set or a subset of multicasts configured for the first GMAC instance i.e. the GMAC which was started the first.

   For example:

   a) First GMAC instance

   ```
   <channel> 0 0 clxng_shared clx0
   224.0.59.64:11064 - - - on </channel>

   <channel> 1 0 clxng_shared clx0
   224.0.59.66:11064 - - - on </channel>

   <channel> 2 1 clxng_shared clx0
   224.0.59.68:11064 - - - on </channel>

   <channel> 3 2 clxng clx0
   224.0.59.70:11064 - - - on </channel>
   ```

   b) Second GMAC instance

   ```
   <channel> 4 0 clxng_shared clx0
   224.0.59.64:11064 - - - on </channel>
   ```

2) The shared hardware queue is driven by the slower GMAC instance consuming the data, see configuration tag `max-hw-waiting-packets` for details.

3) The DMA queue number `numQueue` is not a queue ID. The queue numbers must be defined from 0 in each GMAC instance configuration.

   For example, the following second GMAC instance would not be correct (the first GMAC instance being configured as above):

   ```
   <channel> 4 1 clxng_shared clx0
   ```

```
224.0.59.68:11064 - - - on </channel>
```

A correct configuration of the second GMAC instance would be:

```
<channel> 4 0 clxng_shared clx0
224.0.59.64:11064 - - - on </channel>

<channel> 5 1 clxng_shared clx0
224.0.59.68:11064 - - - on </channel>
```

5.4 Standard Multicast Snapshot / Refresh Channel Settings

The following tags are under `config.gmac.markets.market.snapshots`.

5.4.1 channel

Description Configures a snapshot/refresh channel, and associates it with the corresponding live/incremental update channel (as per Standard Multicast Channel Settings).

When a snapshot channel is configured, the snapshot recovery must be enabled/disabled using `<snapshot-enabled>`.

Usage

```
<channel> localChanId numQueue srcPlugin interface
srcIP:port enblRec startSeq useDumps enable
</channel>
```

Parameters

`localChanId`	The local id for this channel, must be unique for the market. This must match the `localChanId` for the corresponding live channel (see the live/incremental channel config node `<channel>`).
`numQueue`	The DMA queue number which this channel is delivered. Can be set to 0 or 1 for the 1G cards. Can be set from 0 to 16 for the 10G cards.
`srcPlugin`	The source for this channel
`interface`	The physical interface on the accelerator card where the channel is received.
`srcIP:port`	The multicast IP address and port for this channel
`enblRec`	Not used for snapshot channels. Always set to '-'.
`startSeq`	Not used for snapshot channels. Always set to '-'.
`useDumps`	Not used for snapshot channels. Always set to '-'.
`enable`	Boolean which enables or disables (default) the channel at start-up. This can also be done in the GMAC API using `GMACCommand()`.

Example

```
<channel> 0 0 lldt ac0 224.0.26.21:11003 - - - on
</channel>
```

5.5 Line Arbitration

UDP IP protocol market feeds are transmitted on duplicate physical lines from stock exchanges to compensate for UDP unreliability. Line arbitration replaces lost data on a UDP market data feed with data from a duplicated feed. Data packets then undergo other tasks such as sequence number checking before being sent to processor cores.

Note #1:

Dumping to file must be disabled when line arbitration is configured.

Arbitrage is only supported on incremental channels for CME. Attempting to configure it for snapshot or security definition channels will result in a GMAC error.

Note #2:

Software arbitrage for ITCH50 and BATS plugins can pass duplicate messages on some rare occasions where the packets need to be stored on the GMAC reorder buffer.

It is recommended to monitor the message sequence number to avoid the possibility of processing the duplicate messages.

Note that another possibility to avoid duplicated messages is to set reorder-max to 0 (see `<reorder-max>` for details). However, the gap recovery is not supported in this case.

Warning:

Arbitrage may not be used in conjunction with hardware filtering for plugins BATS and ITCH50, doing so can result in gaps and duplicates being received.

5.5.1 channel (Line arbitration)

Description

This tag is under `config.gmac.markets.market.channels`.

The `<channel>` setting can be used to configure multicast channels for line arbitration. To enable arbitration on a channel, two `<channel>` settings must be configured, one for each arbitration channel (A and B).

Note #1:

Arbitrage channels may not be configured under the `<snapshot>` tag.

Attempting to do so will result in a GMAC error.

Note #2:

Duplicated feeds must be connected to a single GMAC. Feeds must be received on the same channel (`localChanId`) and must be sent to the same queue (`numQueue`).

Usage

```
<channel> localChanId numQueue srcPlugin interface
srcIP:port enblRec startSeq useDumps enable
</channel>
```

Parameters

`localChanId`	The local id for this channel; must be unique for the market. This is an integer followed by a character to indicate the arbitration channel
`numQueue`	See *Standard Multicast Channel Settings*
`srcPlugin`	See *Standard Multicast Channel Settings*
`interface`	See *Standard Multicast Channel Settings*
`srcIP:port`	See *Standard Multicast Channel Settings*
`enblRec`	Boolean argument enabling or disabling recovery on this channel. Can be set to '-' in order to use the global or default value. **Note:** `<recovery>` must be enabled for this setting to function. Default is off.
`startSeq`	Sets the first sequence number to be re-requested by this channel in the event of a mid-day start, can be set to '-' in order to use the global or default value. This is an integer greater than or equal to 0, or can be set to undefined, for more information see `<start-seq>`.
`useDumps`	Legacy setting, always ignored: set to '-'
`enable`	Boolean which enables or disables (default) the channel at start-up. This can also be done in the GMAC API using

GMACCommand().

Example A GMAC receives two market data feeds:

- Feed 0 and Feed 1 are received on ac0.
- A duplicate of Feed 0 is received on ac1.

Line arbitration is configured for Feed 0 (from 224.1.2.133:60000). Multicast channels 0A and 0B are seen below, these are sent to queue 0.

Line arbitration is NOT configured for Feed 1 (from 224.1.2.133:60001). Multicast channel 1A is seen below, this is sent to queue 1.

```
<channel> 0A 0 lldt ac0 224.1.2.133:60000 - - - on
</channel>
<channel> 1A 1 lldt ac0 224.1.2.133:60001 - - - on
</channel>
<channel> 0B 0 lldt ac1 224.1.2.133:60000 - - - on
</channel>
```

5.5.2 reorder-max

Description This tag is under `config.gmac`.

Sets the maximum number of packets to be stored in the reorder/recovery buffer. This is only applicable if GMAC is not instructed to buffer the data.

If GMAC is instructed to buffer the data e.g. for snapshot, this limit will not be applicable and GMAC will buffer the data until the limit defined by `<bufferpool>`.

See the GMAC API Reference Guide.

Usage `<reorder-max> rMax </reorder-max>`

Parameters `rMax` Maximum packets to buffer.

Default is 16.

Example `<reorder-max> 10000000 </reorder-max>`

5.5.3 reorder-timeout-ns

Description This tag is under `config.gmac`.

Sets the time for data to be stored in the reorder/recovery buffer.

Usage `<reorder-timeout-ns> timeout </reorder-timeout-ns>`

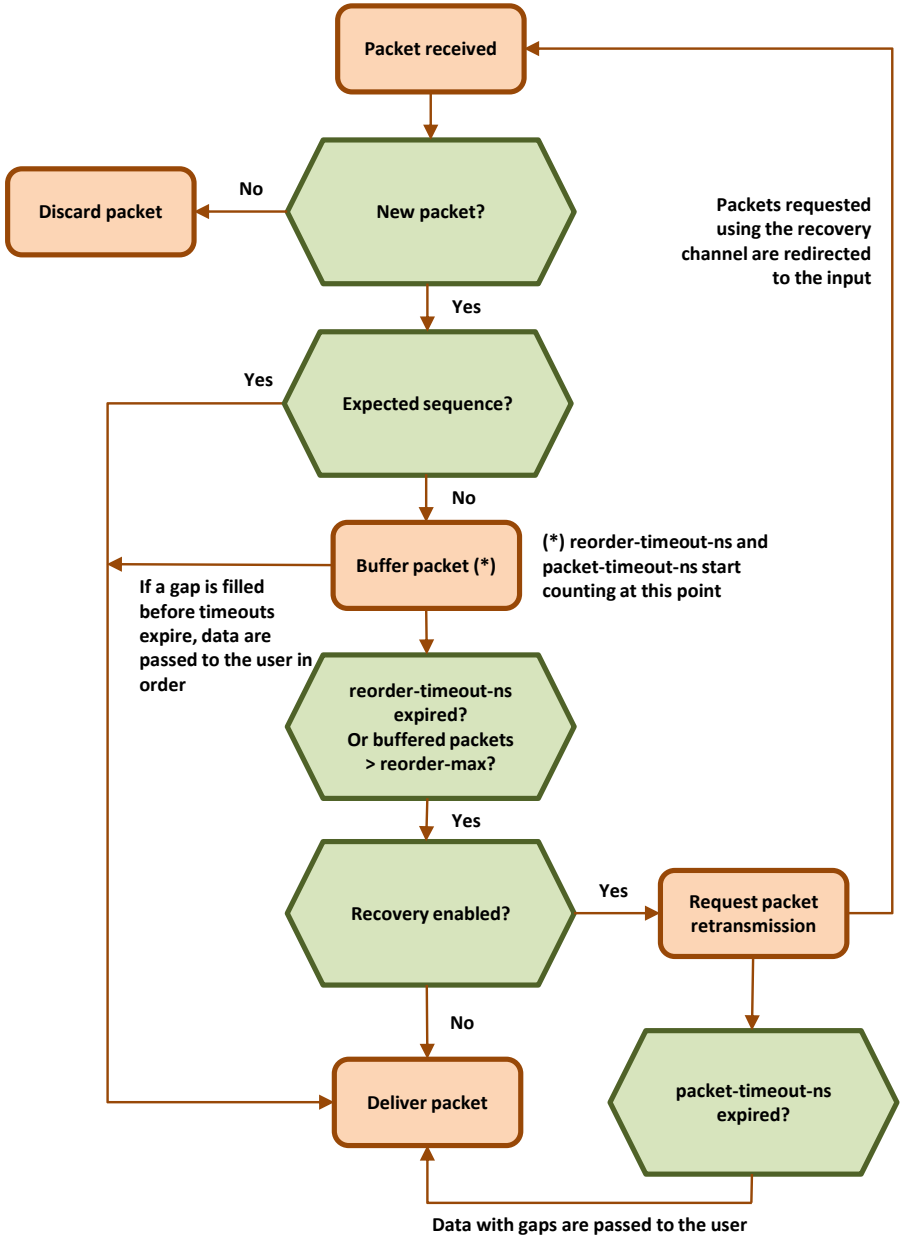
Parameters `timeout` Number of nanoseconds to buffer packets in the reorder/recovery buffer.

Default is 10*1000*1000 ns i.e.10 ms.

Example `<reorder-timeout-ns> 100000 </reorder-timeout-ns>`

5.5.4 Configuring Timeouts

The following diagram illustrates the timeout behaviour.



The values for the timeouts are determined by whether reordering and recovery are enabled.

5.5.4.1 Reordering enabled, Recovery enabled

If recovery is enabled:

- `<reorder-max>` should be configured to a large number, in order to allow for packets awaiting recovery
- `<reorder-timeout-ns>` should be configured to a small value to ensure that recovery is activated promptly
- `<packet-timeout-ms>` must always be significantly larger than `<reorder-timeout-ns>` to allow for packet retransmission.

For example:

```
<reorder-max> 10000 </reorder-max>
<reorder-timeout-ns> 30000 </reorder-timeout-ns>
<packet-timeout-ms> 3000 </packet-timeout-ms>
```

5.5.4.2 Reordering enabled, Recovery disabled

If recovery is disabled:

- Both `<reorder-max>` and `<reorder-timeout-ns>` should be configured to small values. This allows for out of order packets to be re-ordered without introducing excessive delay.
- `<packet-timeout-ms>` is ignored when recovery is disabled.

For example:

```
<reorder-max> 4 </reorder-max>
<reorder-timeout-ns> 30000 </reorder-timeout-ns>
<packet-timeout-ms> 0 </packet-timeout-ms>
```

5.5.4.3 Reordering disabled, Recovery disabled

Reordering can only be disabled when recovery is disabled. Celoxica does not recommend this, as enabling reordering significantly reduces the risk of sending out-of-sequence packets

to the user application. <reorder-timeout-ms> and <packet-timeout-ms> are ignored when reordering and recovery are disabled.

For example:

```
<reorder-max> 0 </reorder-max>
<reorder-timeout-ns> 0 </reorder-timeout-ns>
<packet-timeout-ms> 0 </packet-timeout-ms>
```

5.5.4.4 Reordering disabled, Recovery enabled

Celoxica does not recommend this setting. Reordering should always be enabled when recovery is enabled. This allows for the buffering of data while awaiting packet retransmission.

5.6 Standard Recovery Channel Settings

The following tags are under `config.gmac.markets.market.recovery`.

5.6.1 channel

Description Configures a recovery channel for the market. Standard parameters are illustrated; parameters are set differently for recovery channels in some markets below.

Usage

```
<channel> chanId numQueue plugin interface
recIP:port enblRec startSeq useDumps enable
</channel>
```

Parameters

`chanId`	The local id for this channel, must be unique for the market
`numQueue`	The DMA queue number which this channel is delivered. Can be set to 0 or 1 for the 1G cards. Can be set from 0 to 16 for the 10G cards.
`plugin`	The source for this channel
`interface`	The physical interface on the accelerator card where the channel is received
`recIP:port`	The IP address and port of the TCP connection used to receive retransmission requests
`enblRec`	Always ignored, set to '-'
`startSeq`	Sets the first sequence number to be re-requested by this recovery channel in the event of a mid-day start, can be set to '-' in order to use the global or default value. This is an integer greater than or equal to 0, or can be set to undefined, for more information see `<start-seq>`.
`useDumps`	Legacy setting, always ignored: set to '-'
`enable`	Boolean which enables or disables (default) the channel at start-up. This can also be done in the GMAC API using `GMACCommand()`.

Example

```
<channel> 0 0 lldt ac1 224.0.62.3:30001 -
undefined - on </channel>
```

5.7 Hardware Symbol Filtering

The following tags are under `config.gmac.markets.market`.

5.7.1 hardware-filtering

Description This option is used to disable GMAC filtering on a per-market basis when symbol filtering is enabled globally.

Note #1:

> This parameter will be ignored for markets that do not support filtering.

Note #2:

> See `<channel>` for details about the channels configuration when hardware symbol filtering is enabled.

Usage `<hardware-filtering> enable </hardware-filtering>`

Parameters

`enable`	Boolean setting to enable or disable this feature

Example `<hardware-filtering> off </hardware-filtering>`

6. Market Specific Configuration Settings

This chapter describes the configurations specific to individual markets.

Note:

Some configurations may be located outside the `<markets>` tag, as stated.

6.1 ARCA XDP

Tag config.gmac.markets.market ARCA_XDP

The basic structure of the market specific parameters configuration for ARCA_XDP is shown in the following schema:

```
<market>
      <normal-hours-orders-only>
      <symbol-ref-file>
      <snapshot-enabled>
      <exchange-timestamp>
      <recovery>
            <channel>
      </recovery>
      <snapshots>
            <channel>
      </snapshots>
      <ignore-trade-messages>
      <enable-order-executed-trades>
      <extension-messages>
</market>
```

6.1.1 normal-hours-orders-only

Description When enabled, only orders flagged as 'normal hours' are forwarded.

Usage `<normal-hours-orders-only> enable </normal-hours-orders-only>`

Parameters

`enable`	Boolean. Default is off.

Example `<normal-hours-orders-only> on </normal-hours-orders-only>`

6.1.2 symbol-ref-file

Description This setting specifies the location of the XML or TXT reference files provided by the exchange, and is only needed when reading symbol references from file.

Usage `<symbol-ref-file> symbFile </symbol-ref-file>`

Parameters

`symbFile`	Location of the symbol reference file

Example

`<symbol-ref-file>`
ftp://ftp.nysedata.com/ARCASymbolMapping/ARCASymbolMapping.txt
`</symbol-ref-file>`

`<symbol-ref-file>`
ftp://ftp.nysedata.com/ARCASymbolMapping/ARCASymbolMapping.xml

```
</symbol-ref-file>
```

6.1.3 recovery.channel

Description Configures a recovery channel for the market.

Usage

```
<channel> chanId numQueue plugin interface
srcIP:port enblRec startSeq useDumps recSrcIP
recSrcPort sourceID NYSEProduct NYSEChannel
</channel>
```

Parameters

`chanId`	See *Standard Multicast Channel Settings*
`numQueue`	See *Standard Multicast Channel Settings*
`plugin`	See *Standard Multicast Channel Settings*
`interface`	See *Standard Multicast Channel Settings*
`srcIP:port`	See *Standard Multicast Channel Settings*
`enblRec`	See *Standard Multicast Channel Settings*
`startSeq`	See *Standard Multicast Channel Settings*
`useDumps`	See *Standard Multicast Channel Settings*
`recSrcIP`	IP address of the TCP connection used to request retransmissions
`recSrcPort`	Port of the TCP connection used to request retransmissions
`sourceID`	SourceID provided by ARCA for each customer
`NYSEProduct`	NYSE product identifier used for recovery. Possible values are: 151 NYSE ArcaBook 152 NYSE Arca BBO 153 NYSE Arca Trades 158 NYSE Arca Imbalances
`NYSEChannel`	NYSE channel

Example

```
<channel> 0 0 socket eth0 224.1.2.143:13042 - - -
159.125.74.166 52015 _SOURCE_ID_ 157 2 </channel>
```

6.1.4 snapshot-enabled

Description Configures the snapshot/refresh recovery.

Usage

```
<snapshot-enabled> enable </snapshot-enabled>
```

Parameters

`enable`	Boolean which enables or disables snapshot/refresh recovery

Example

```
<snapshot-enabled> no </snapshot-enabled>
```

6.1.5 snapshots.channel

Description Configures a snapshot channel for the market.

Note:

> `chanIds` must match the `localChanIds` in `<channel`

Usage

```
<channel> chanId numQueue plugin interface
recIP:port enblRec startSeq useDumps recSrcIP
recSrcPort sourceID NYSEProduct NYSEChannel
</channel>
```

Parameters

`ChanId`	See *Standard Multicast Channel Settings*
`numQueue`	See *Standard Multicast Channel Settings*
`plugin`	See *Standard Multicast Channel Settings*
`interface`	See *Standard Multicast Channel Settings*
`recIP:port`	See *Standard Multicast Channel Settings*
`enblRec`	See *Standard Multicast Channel Settings*
`startSeq`	See *Standard Multicast Channel Settings*
`useDumps`	See *Standard Multicast Channel Settings*
`recSrcIP`	IP address of the TCP connection used to request retransmissions
`recSrcPort`	Port of the TCP connection used to request retransmissions
`sourceID`	SourceID provided by ARCA for each customer
`NYSEProduct`	NYSE product identifier used for recovery. Possible values are: 151 NYSE ArcaBook 152 NYSE Arca BBO 153 NYSE Arca Trades 158 NYSE Arca Imbalances
`NYSEChannel`	NYSE channel

Example

```
<channel> 0 0 lldt ac0 224.1.2.143:13042
172.27.6.114 - - - 159.125.74.166 52015
_SOURCE_ID_ 157 2 </channel>
```

6.1.6 exchange-timestamp

Description Configures the reference timestamp transcoding.

When set, the ARCA XDP Source Time Reference message is transcoded into either GMACMessageTimeReference (when GMAC API version V1 is used) or GMACMessageTimeReferenceV3 (when GMAC API version V3 is used).

When not set, the ARCA XDP Source Time Reference message is not transcoded.

Usage

```
<exchange-timestamp> enable </exchange-timestamp>
```

Parameters

`enable`	Boolean which configures the timestamp transcoding Default is no.

Example

```
<exchange-timestamp> no </exchange-timestamp>
```

6.1.7 ignore-trade-messages

Description Configures the trade messages (type 220) transcoding.

When set, the trade message (type 220) is transcoded into GMACMessageInformationV3.

When not set, the trade message (type 220) is transcoded into GMACMessageTradeV3.

Usage `<ignore-trade-messages> enable </ignore-trade-messages>`

Parameters

`enable`	Boolean which configures the trade messages transcoding Default is no.

Example `<ignore-trade-messages> no </ignore-trade-messages>`

6.1.8 enable-order-executed-trades

Description Configures the order book execution messages (type 103) transcoding.

When set, the order book execution message (type 103) is transcoded into GMACMessageOrderExecutedV3.

When not set, the order book execution message (type 103) is processed as follows:

- If ReasonCode is equal to 3 (filled) or 7 (partial fill), it will be transcoded into GMACMessageOrderDecreaseV3
- If ReasonCode is equal to 0, it will be ignored

Usage `<enable-order-executed-trades> enable </enable-order-executed-trades>`

Parameters

`enable`	Boolean which configures the order book execution messages transcoding Default is no.

Example `<enable-order-executed-trades> yes </enable-order-executed-trades>`

6.1.9 extension-messages

Description Enables the generation of extension messages, by default these are disabled.

Usage `<extension-messages> extMsgs </extension-messages>`

Parameters

`extMsgs`	Boolean which enables/disables setting

Example `<extension-messages> on </extension-messages>`

6.2 BATS Exchange (US and Europe)

Tag config.gmac.markets.market BATS

The basic structure of the market specific parameters configuration for BATS is shown in the following schema:

```
<market>
      <remove-routed-trades>
      <snapshot-enabled>
      <grp>
            <ssid>
            <host>
            <port>
            <login>
            <pwd>
      </grp>
      <channels>
            <channel>
      </channels>
      <snapshots>
            <channel>
      </snapshots>
      <symbol-ref-file>
      <extension-message>
</market>
```

6.2.1 remove-routed-trades

Description Disables the transcoding and publishing of all routed order executions and routed trades.

Usage `<remove-routed-trades> enable </remove-routed-trades>`

Parameters

`enable`	Boolean. Default is off.

Example `<remove-routed-trades> no </remove-routed-trades>`

6.2.2 channels.channel

Description Configures a multicast channel for BATS. An additional parameter must be provided with the 'Unit' number to be handled by the multicast.

Note:

> Multicasts with more than one unit are not supported.

Usage `<channel> localChanId numQueue srcPlugin interface srcIP:port enblRec startSeq - unit </channel>`

Parameters

`localChanId`	See *Standard Multicast Channel Settings*
`numQueue`	See *Standard Multicast Channel Settings*
`srcPlugin`	See *Standard Multicast Channel Settings*
`interface`	See *Standard Multicast Channel Settings*
`srcIP:port`	See *Standard Multicast Channel Settings*
`enblRec`	See *Standard Multicast Channel Settings*
`startSeq`	See *Standard Multicast Channel Settings*
`unit`	Specifies the 'Unit' number.

Available from the BATS specification.

Example

```
<channel> 2 0 lldt ac0 224.0.83.2:31203 - - - 3
</channel>
```

6.2.3 snapshot-enabled

Description Configures the snapshot/refresh recovery.

Usage

```
<snapshot-enabled> enable </snapshot-enabled>
```

Parameters

`enable`	Boolean which enables or disables snapshot/refresh recovery

Example

```
<snapshot-enabled> no </snapshot-enabled>
```

6.2.4 snapshots.channel

Description Configures a snapshot channel for the market.

Note:

> The SessionSubID below needs to be 4 chars exactly e.g. 0050.

Usage

```
<channel> localChanId address port ssid username
password </channel>
```

Parameters

`localChanId`	The local id for this channel
`address`	IP address
`port`	Port for this channel
`ssid`	SessionSubID provided by BATS
`username`	Username provided by BATS
`password`	Password provided by BATS

Example

```
<channel> 0 95.130.109.64 18999 SESSION_SUB_ID
USERNAME PASSWORD </channel>
```

6.2.5 grp

Description Configures a recovery group server.

Note:

> The SessionSubID below needs to be 4 chars exactly e.g. 0050.

Usage

```
<grp>
```

Nested tokens

`ssid`	SessionSubID provided by BATS
`host`	IP address
`port`	Port for this channel
`login`	Username provided by BATS
`pwd`	Password provided by BATS

Example

```
<grp>
        <ssid> SESSION_SUB_ID </ssid>
        <host> 95.130.109.64 </host>
        <port> 18999 </port>
```

```
            <login> USERNAME </login>
            <pwd> PASSWORD </pwd>
        </grp>
```

6.2.6 symbol-ref-file

Description This setting, intended for BATS Europe only, specifies the location of the csv reference file provided by the exchange, and is only needed when reading symbol references from file.

Symbol file is accessible on BATS Europe website, and can be downloaded using the following command:

- CXE: wget -O CXESymbols-PROD.csv https://www.bats.com/europe/equities/market_statistics/symbols_traded/csv/?mkt=cxe
- BXE: wget -O BATSSymbols-PROD.csv https://www.bats.com/europe/equities/market_statistics/symbols_traded/csv/?mkt=bxe
- TRF: wget -O TRFSymbols-PROD.csv https://www.bats.com/europe/equities/market_statistics/symbols_traded/csv/?mkt=trf

Usage `<symbol-ref-file> file </symbol-ref-file>`

Parameters

`file`	Location of the symbol reference file for the exchange

Example

```
<symbol-ref-file> CXESymbols-PROD.csv </symbol-ref-file>
```

6.2.7 extension-messages

Description Enables the generation of extension messages, by default these are disabled.

Usage `<extension-messages> extMsgs </extension-messages>`

Parameters

`extMsgs`	Boolean which enables/disables setting

Example `<extension-messages> on </extension-messages>`

6.3 BATS Options

Tag config.gmac.markets.market BATS_OPTIONS

The basic structure of the market specific parameters configuration for BATS_OPTIONS is shown in the following schema:

```
<market>
      <symbol-ref-file>
      <channels>
            <channel>
      </channels>
      <extension-messages>
</market>
```

6.3.1 channels.channel

Description Configures a multicast channel for BATS Options. An additional parameter must be provided with the 'Unit' number to be handled by the multicast.

Note:

> Multicasts with more than one unit are not supported.

Usage

```
<channel> localChanId numQueue srcPlugin interface
srcIP:port enblRec startSeq - unit </channel>
```

Parameters

`localChanId`	See *Standard Multicast Channel Settings*
`numQueue`	See *Standard Multicast Channel Settings*
`srcPlugin`	See *Standard Multicast Channel Settings*
`interface`	See *Standard Multicast Channel Settings*
`srcIP:port`	See *Standard Multicast Channel Settings*
`enblRec`	See *Standard Multicast Channel Settings*
`startSeq`	See *Standard Multicast Channel Settings*
`unit`	Specifies the 'Unit' number. Available from the BATS specification.

Example

```
<channel> 2 0 lldt ac0 224.0.83.2:31203 - - - 3
</channel>
```

6.3.2 symbol-ref-file

Description This setting specifies the location of the csv reference file provided by the exchange, and is only needed when reading symbol references from file.

Symbol file is accessible on BATS website, and can be downloaded using the following command:

wget -O bats_optsymbolref.csv
http://www.batsoptions.com/optsymbolref/?listed=1

Usage

```
<symbol-ref-file> file </symbol-ref-file>
```

Parameters

`file`	Location of the symbol reference file for the exchange

Example

```
<symbol-ref-file> bats_optsymbolref.csv </symbol-
ref-file>
```

6.3.3 extension-messages

Description Enables the generation of extension messages, by default these are disabled.

Usage `<extension-messages> extMsgs </extension-messages>`

Parameters

`extMsgs`	Boolean which enables/disables setting

Example `<extension-messages> on </extension-messages>`

6.4 BME HF MEFFGate

Tag config.gmac.markets.market BME_HFMEFFGATE

The basic structure of the market specific parameters configuration for BME_HFMEFFGATE is shown in the following schema:

```
<market>
      <authentications>
            <authentication>
                  <sender-comp-id>
                  <target-comp-id>
                  <sender-sub-id>
                  <target-sub-id>
                  <username>
                  <password>
            </authentication>
      </authentications>
      <extension-messages>
</market>
```

6.4.1 authentications.authentication

Description Configures the local channel ID for which the authentication is defined. Authentication is required per channel.

Local channel ID must match with the local channel ID of the defined channel, see *Standard Multicast Channel Settings* for details.

Usage `<authentication> localChanId`

Parameters `localChanId` Local channel ID

Example `<authentication> 0`

6.4.2 authentications.authentication.sender-comp-id

Description Configures SenderCompID [49] in the BME FIX message header.

Usage `<sender-comp-id> SCID </sender-comp-id>`

Parameters `SCID` SenderCompID [49]

Example `<sender-comp-id> SCID </sender-comp-id>`

6.4.3 authentications.authentication.target-comp-id

Description Configures TargetCompID [56] in the BME FIX message header.

Usage `<target-comp-id> TCID </target-comp-id>`

Parameters `TCID` TargetCompID [56]

Example `<target-comp-id> TCID </target-comp-id>`

6.4.4 authentications.authentication.sender-sub-id

Description Configures SenderSubID [50] in the BME FIX message header.

Usage `<sender-sub-id> SSID </sender-sub-id>`

Parameters `SSID` SenderSubID [50]

Example `<sender-sub-id> SSID </sender-sub-id>`

6.4.5 authentications.authentication.target-sub-id

Description Configures TargetSubID [57] in the BME FIX message header.

Usage `<target-sub-id> TSID </target-sub-id>`

Parameters `TSID` TargetSubID [57]

Example `<target-sub-id> TSID </target-sub-id>`

6.4.6 authentications.authentication.username

Description Configures Username [553] in the BME Logon message.

Usage `<username> username </username>`

Parameters `username` Identifier of the user assigned by BME

Example `<username> username </username>`

6.4.7 authentications.authentication.password

Description Configures Password [554] in the BME Logon message.

Usage `<password> password </password>`

Parameters `Password` User password

Example `<password> password </password>`

6.4.8 extension-messages

Description Enables the generation of extension messages, by default these are disabled.

Usage `<extension-messages> extMsgs </extension-messages>`

Parameters `extMsgs` Boolean which enables/disables setting

Example `<extension-messages> on </extension-messages>`

6.5 BME HF SMARTGate

Tag config.gmac.markets.market BME_HFSMARTGATE

The basic structure of the market specific parameters configuration for BME_HFSMARTGATE is shown in the following schema:

```
<market>
      <market-mode>
      <authentications>
            <authentication>
                  <sender-comp-id>
                  <target-comp-id>
                  <sender-sub-id>
                  <target-sub-id>
                  <username>
                  <password>
            </authentication>
      </authentications>
      <extension-messages>
</market>
```

6.5.1 market-mode

Description Configures AggregatedBook [266] in the Market Data Request message.

This tag is mandatory.

Allowable values are:

- 'market-by-price': AggregatedBook [266] = 'Y' (Market Data Prices)
- 'market-by-order': AggregatedBook [266] = 'N' (Market Data Orders)
- 'market-by-price-and-order': AggregatedBook [266] is not specified (Market Data Prices and Orders)

Usage `<market-mode> mode </market-mode>`

Parameters `mode` Market data request mode

Example `<market-mode> market-by-price </market-mode>`

6.5.2 authentications.authentication

Description Configures the local channel ID for which the authentication is defined. Authentication is required per channel.

Local channel ID must match with the local channel ID of the defined channel, see *Standard Multicast Channel Settings* for details.

Usage `<authentication> localChanId`

Parameters `localChanId` Local channel ID

Example `<authentication> 0`

6.5.3 authentications.authentication.sender-comp-id

Description Configures SenderCompID [49] in the BME FIX message header.

Usage `<sender-comp-id> SCID </sender-comp-id>`

Parameters `SCID` SenderCompID [49]

Example `<sender-comp-id> SCID </sender-comp-id>`

6.5.4 authentications.authentication.target-comp-id

Description Configures TargetCompID [56] in the BME FIX message header.

Usage `<target-comp-id> TCID </target-comp-id>`

Parameters `TCID` TargetCompID [56]

Example `<target-comp-id> TCID </target-comp-id>`

6.5.5 authentications.authentication.sender-sub-id

Description Configures SenderSubID [50] in the BME FIX message header.

Usage `<sender-sub-id> SSID </sender-sub-id>`

Parameters `SSID` SenderSubID [50]

Example `<sender-sub-id> SSID </sender-sub-id>`

6.5.6 authentications.authentication.target-sub-id

Description Configures TargetSubID [57] in the BME FIX message header.

Usage `<target-sub-id> TSID </target-sub-id>`

Parameters `TSID` TargetSubID [57]

Example `<target-sub-id> TSID </target-sub-id>`

6.5.7 authentications.authentication.username

Description Configures Username [553] in the BME Logon message.

Usage `<username> username </username>`

Parameters `username` Identifier of the user assigned by BME

Example `<username> username </username>`

6.5.8 authentications.authentication.password

Description Configures Password [554] in the BME Logon message.

Usage `<password> password </password>`

Parameters `Password` User password

Example `<password> password </password>`

6.5.9 extension-messages

Description Enables the generation of extension messages, by default these are disabled.

Usage `<extension-messages> extMsgs </extension-messages>`

Parameters `extMsgs` Boolean which enables/disables setting

Example `<extension-messages> on </extension-messages>`

6.6 Borsa Istanbul ITCH

Tag config.gmac.markets.market ITCH_BIST

The basic structure of the market specific parameters configuration for ITCH_BIST is shown in the following schema:

```
<market>
      <retransmission>
            <channel>
      </retransmission>
      <authentications>
            <authentication>
                  <linked-channel-id>
                  <sender-comp-id>
                  <target-comp-id>
                  <sender-sub-id>
                  <username>
                  <password>
            </authentication>
      </authentications>
      <extension-messages>
      <max-channel-buffer>
      <max-buffer-timeout-ns>
</market>
```

6.6.1 retransmission

Description Configures retransmission request channels for the Glimpse (retransmission of missing live ITCH data) and for the FIX (retransmission of Genium INET FIX reference data for GMAC to retrieve the partition on which a security is traded).

Allowable values are:

- ITCH
- FIX

Usage `<retransmission> protocol`

Parameters `protocol` Protocol

Example `<retransmission> ITCH`

6.6.2 retransmission.channel

Description Configures a retransmission request channel (either the Glimpse or FIX channel)

Usage
```
<channel> localChanId numQueue srcPlugin interface
srcIP:port:t enblRec startSeq useDumps </channel>
```

Parameters

`localChanId`	See *Standard Multicast Channel Settings*
`numQueue`	See *Standard Multicast Channel Settings*
`srcPlugin`	See *Standard Multicast Channel Settings*
`interface`	See *Standard Multicast Channel Settings*
`srcIP:port`	See *Standard Multicast Channel Settings*
`enblRec`	See *Standard Multicast Channel Settings*
`startSeq`	See *Standard Multicast Channel Settings*
`useDumps`	See *Standard Multicast Channel Settings*

Example `<retransmission> ITCH`

```
   <channel> 1 0 socket eth0 172.29.29.106:21802:t
- - - </channel>
</retransmission>
```

6.6.3 authentications.authentication

Description Configures the authentication per channel.

Usage `<authentication> protocol`

Parameters `protocol` Protocol

Example `<authentication> ITCH`

6.6.4 authentications.authentication.linked-channel-id

Description Configures the local channel ID for which the authentication is defined. Local channel ID must match with the local channel ID of the defined channel.

Usage `<linked-channel-id> localChanId </linked-channel-id>`

Parameters `localChanId` See *Standard Multicast Channel Settings*

Example `<linked-channel-id> 1 </linked-channel-id>`

6.6.5 authentications.authentication.sender-comp-id

Description Configures SenderCompID [49] in the Borsa Istanbul FIX message header.

This tag is not required when `protocol` is set to ITCH.

Usage `<sender-comp-id> SCID </sender-comp-id>`

Parameters `SCID` SenderCompID [49]

Example `<sender-comp-id> SCID </sender-comp-id>`

6.6.6 authentications.authentication.target-comp-id

Description Configures TargetCompID [56] in the Borsa Istanbul FIX message header.

This tag is not required when `protocol` is set to ITCH.

Usage `<target-comp-id> TCID </target-comp-id>`

Parameters `TCID` TargetCompID [56]

Example `<target-comp-id> TCID </target-comp-id>`

6.6.7 authentications.authentication.sender-sub-id

Description Configures SenderSubID [50] in the Borsa Istanbul FIX message header.

This tag is not required when `protocol` is set to ITCH.

Usage `<sender-sub-id> SSID </sender-sub-id>`

Parameters `SSID` SenderSubID [50]

Example `<sender-sub-id> SSID </sender-sub-id>`

6.6.8 authentications.authentication.username

Description Configures the user name.

Usage `<username> username </username>`

Parameters `username` User name

Example `<username> username </username>`

6.6.9 authentications.authentication.password

Description Configures the user password.

Usage `<password> password </password>`

Parameters `Password` User password

Example `<password> password </password>`

6.6.10 extension-messages

Description Enables the generation of extension messages, by default these are disabled.

Usage `<extension-messages> extMsgs </extension-messages>`

Parameters `extMsgs` Boolean which enables/disables setting

Example `<extension-messages> on </extension-messages>`

6.6.11 max-channel-buffer

Description Sets the maximum number of packets to be stored in the reorder/recovery buffer per multicast.

Note:

> The plugin is no longer sensitive to `<reorder-max>`

Usage `<max-channel-buffer> max </max-channel-buffer>`

Parameters `max` Maximum packets to buffer.

Default is 50 packets.

Reordering is disabled when set to 0.

Example `<max-channel-buffer> 300 </max-channel-buffer>`

6.6.12 max-buffer-timeout-ns

Description Sets the amount of time for data to be stored in the reorder/recovery buffer.

Note:

> The plugin is no longer sensitive to `<reorder-timeout-ns>`

Usage `<max-buffer-timeout-ns> timeout </max-buffer-timeout-ns>`

Parameters

`timeout`	Number of nanoseconds to buffer packets in the reorder/recovery buffer. Default is 10,000 ns. Note that this setting is meaningless and has no effect unless `<max-channel-buffer>` is set to a value greater than 0.

Example `<max-buffer-timeout-ns> 30000 </max-buffer-timeout-ns>`

6.7 Borsa Italiana Millennium

Tag config.gmac.markets.market BIT_MIL

The basic structure of the market specific parameters configuration for BIT_MIL is shown in the following schema:

```
<market>
      <symbol-ref-file>
      <snapshot-enabled>
      <snapshots>
            <channel>
      </snapshots>
      <recovery>
            <channel>
      </recovery>
      <extension-messages>
</market>
```

6.7.1 symbol-ref-file

Description This setting specifies the path to the symbol reference file, and is therefore only needed when reading symbol references from file.

The plugin currently supports the following markets:

Market		File Name
MTA	Italian Equity Markets	Instr_REFDATA_MTA_yyyymmdd.csv
MAC	Mercato Alternativo del Capitale	
AIM Italia		
MIV	Market for Investment Vehicles	
ETF	Exchanged Traded Funds	Instr_REFDATA_ETF_yyyymmdd.csv
Trading After Hours		Instr_REFDATA_TAH_yyyymmdd.csv

Note:

> The path can also be a URL, in which case GMAC fetches the file using `wget` – also see standard `<symbol-ref-file>` tag description.

Usage `<symbol-ref-file> file </symbol-ref-file>`

Parameters

`file`	Location of the symbol reference file for the exchange

Example

```
<symbol-ref-file>
path/Instr_REFDATA_MTA_yyyymmdd.csv  </symbol-ref-file>
```

6.7.2 snapshot-enabled

Description Configures the snapshot/refresh recovery.

Usage `<snapshot-enabled> enable </snapshot-enabled>`

Parameters

`enable`	Boolean which enables or disables snapshot/refresh recovery

Example `<snapshot-enabled> no </snapshot-enabled>`

6.7.3 snapshots.channel

Description Configures a TCP snapshot channel for requesting refreshes and snapshots from the market.

Usage
```
<channel> chanId numQueue - - recIP:port - - -
compId password </channel>
```

Parameters

`chanId`	The local id for this channel, must match the equivalent recovery channel for this market
`numQueue`	The DMA queue number, must match the equivalent recovery DMA queue for this market
`recIP:port`	The IP address and port of the TCP connection used for requesting snapshots and refreshes
`compId`	The comp ID provided by the exchange
`password`	The password provided by the exchange

Example
```
<channel> 0 0 - - 224.4.2.192:60200 - - - compid
password </channel>
```

6.7.4 recovery.channel

Description Configures a recovery channel for the market.

Usage
```
<channel> chanId numQueue - - recIP:port - - -
compId password </channel>
```

Parameters

`chanId`	See *Standard Multicast Channel Settings*
`numQueue`	See *Standard Multicast Channel Settings*
`recIP:port`	See *Standard Multicast Channel Settings*
`compId`	The comp ID provided by the exchange
`password`	The password provided by the exchange

Example
```
<channel> 0 0 - - 224.4.2.130:60100 - - - compid
password </channel>
```

6.7.5 extension-messages

Description Enables the generation of extension messages, by default these are disabled.

Usage `<extension-messages> extMsgs </extension-messages>`

Parameters

`extMsgs`	Boolean which enables/disables setting

Example `<extension-messages> on </extension-messages>`

6.8 CBOE Streaming Market

Tag config.gmac.markets.market CSM

The basic structure of the market specific parameters configuration for CSM is shown in the following schema:

```
<market>
      <version>
      <extension-messages>
</market>
```

6.8.1 version

Description The version of CBOE Streaming Market to be used, as specified in the API for CBOE Streaming Market manual.

Allowable values are:

- 1.3
- 1.4

Usage `<version> version </version>`

Parameters `version` CBOE Streaming Market version

Example `<version> 1.4 </version>`

6.8.2 extension-messages

Description Enables the generation of extension messages, by default these are disabled.

Usage `<extension-messages> extMsgs </extension-messages>`

Parameters `extMsgs` Boolean which enables/disables setting

Example `<extension-messages> on </extension-messages>`

6.9 Chicago Mercantile Exchange CME Binary

Tag config.gmac.markets.market CME_BINARY

The basic structure of the market specific parameters configuration for CME_BINARY is shown in the following schema:

```
<market>
      <max-channel-buffer>
      <max-buffer-timeout-ns>
      <extension-messages>
      <snapshot-enabled>
      <referentials>
            <channel>
      </referentials>
      <hardware-arbitrage>
      <symbol-ref-file>
      <symbol-ref-queue>
      <book-type>
</market>
```

6.9.1 snapshot-enabled

Description Configures the snapshot/refresh recovery.

Usage `<snapshot-enabled> enable </snapshot-enabled>`

Parameters

`enable`	Boolean which enables or disables snapshot/refresh recovery

Example `<snapshot-enabled> no </snapshot-enabled>`

6.9.2 extension-messages

Description Configures the generation of extension messages.

Usage `<extension-messages> extMsgs </extension-messages>`

Parameters

`extMsgs`	Boolean which enables the generation of extension messages, by default these are disabled

Example `<extension-messages> on </extension-messages>`

6.9.3 referentials.channel

Description Configures a referential channel for CME_BINARY.

Usage

```
<channel> localChanId numQueue srcPlugin interface
srcIP:port enblRec startSeq useDumps enable
</channel>
```

Parameters

`localChanId`	See *Standard Multicast Channel Settings*
`numQueue`	See *Standard Multicast Channel Settings*
`srcPlugin`	See *Standard Multicast Channel Settings*
`interface`	See *Standard Multicast Channel Settings*
`srcIP:port`	See *Standard Multicast Channel Settings*
`enblRec`	See *Standard Multicast Channel Settings*

	`startSeq`	See *Standard Multicast Channel Settings*
	`useDumps`	See *Standard Multicast Channel Settings*
	`enable`	Configures if the channel will start up enabled or disabled (default)

Example `<channel> 311 0 lldt ac0 224.0.28.86:6311 - - - on </channel> <!--311NA instrument replay -->`

6.9.4 max-channel-buffer

Description Sets the maximum number of packets to be stored in the reorder/recovery buffer per multicast.

Note:

> The plugin is no longer sensitive to `<reorder-max>`

Usage `<max-channel-buffer> max </max-channel-buffer>`

Parameters	`max`	Maximum packets to buffer. Default is 50 packets. Reordering is disabled when set to 0.

Example `<max-channel-buffer> 300 </max-channel-buffer>`

6.9.5 max-buffer-timeout-ns

Description Sets the amount of time for data to be stored in the reorder/recovery buffer.

Note:

> The plugin is no longer sensitive to `<reorder-timeout-ns>`

Usage `<max-buffer-timeout-ns> timeout </max-buffer-timeout-ns>`

Parameters	`timeout`	Number of nanoseconds to buffer packets in the reorder/recovery buffer. Default is 10,000 ns. Note that this setting is meaningless and has no effect unless `<max-channel-buffer>` is set to a value greater than 0.

Example `<max-buffer-timeout-ns> 30000 </max-buffer-timeout-ns>`

6.9.6 hardware-arbitrage

Description Enables or disables the hardware arbitrage on the Celoxica legacy ADE stack.

This parameter has no effect when the new stack CLX-NG is used: hardware arbitrage is configurable using JSON file in that case.

Usage `<hardware-arbitrage> enable </hardware-arbitrage>`

Parameters	`enable`	Boolean Default is yes

Example `<hardware-arbitrage> yes </hardware-arbitrage>`

6.9.7 symbol-ref-file

Description This setting configures the path to the Futures PRF clearing file and/or the Options PRF clearing file.

Up to 2 different files can be configured.

Note:

> The parameter can also be a URL – also see standard `<symbol-ref-file>` tag description.

Usage `<symbol-ref-file> file </symbol-ref-file>`

Parameters

`file`	Location of the symbol reference file for the exchange

Example

```
<!-- CBOT Futures PRF clearing file -->
<symbol-ref-file>
ftp://ftp.cmegroup.com/fprf/cmeg.cbt.fut.prf.xml
</symbol-ref-file>
<!-- CBOT Options PRF clearing file -->
<symbol-ref-file>
ftp://ftp.cmegroup.com/fprf/cmeg.cbt.opt.prf.xml
</symbol-ref-file>
```

6.9.8 symbol-ref-queue

Description This optional configuration tag allows the user to specify the GMAC queue where the GMAC reference data messages generated by the process of a symbol reference file will be delivered to.

If the tag is not configured, the GMAC reference data messages will be delivered to the first configured GMAC queue.

Usage `<symbol-ref-queue> numQueue </symbol-ref-queue>`

Parameters

`numQueue`	The DMA queue number

Example `<symbol-ref-queue> 1 </symbol-ref-queue>`

6.9.9 book-type

Description This optional configuration tag allows the user to specify the type of book processed by the plugin while listening to the incremental multicast channels.

Allowable values are:

- mbp Market By Price (default)
- mbo Market By Order
- both MBP and MBO

Usage `<book-type> bookType </book-type>`

Parameters

`bookType`	The type of book

Example `<book-type> mbp </book-type>`

6.10 Consolidated Quotation System CQS

Tag config.gmac.markets.market CQS

The basic structure of the market specific parameters configuration for CQS is shown in the following schema:

```
<market>
      <venue-ids>
            <venue>
      </venue-ids>
      <extension-messages>
</market>
```

6.10.1 venue-ids.venue

Description Configures the user mapping for the venue identifier.

This mapping allows the user to set its own venue identifiers which therefore can be shared across different market data feeds.

Usage `<venue> user-id exchange-id </venue>`

Parameters

`user-id`	Venue identifier as defined by the user
`exchange-id`	Venue identifier as provided by the exchange

Example

```
<venue> 10 A </venue> <!--NYSE American-->
<venue> 5 J </venue> <!--Direct Edge A-->
```

6.10.2 extension-messages

Description Enables the generation of extension messages, by default these are disabled.

Usage `<extension-messages> extMsgs </extension-messages>`

Parameters

`extMsgs`	Boolean which enables/disables setting

Example `<extension-messages> on </extension-messages>`

6.11 Consolidated Tape System CTS

Tag config.gmac.markets.market CTS

The basic structure of the market specific parameters configuration for CTS is shown in the following schema:

```
<market>
      <venue-ids>
            <venue>
      </venue-ids>
      <extension-messages>
</market>
```

6.11.1 venue-ids.venue

Description Configures the user mapping for the venue identifier.

This mapping allows the user to set its own venue identifiers which therefore can be shared across different market data feeds.

Usage `<venue> user-id exchange-id </venue>`

Parameters

`user-id`	Venue identifier as defined by the user
`exchange-id`	Venue identifier as provided by the exchange

Example

```
<venue> 10 A </venue> <!--NYSE American-->
<venue> 5 J </venue> <!--Direct Edge A-->
```

6.11.2 extension-messages

Description Enables the generation of extension messages, by default these are disabled.

Usage `<extension-messages> extMsgs </extension-messages>`

Parameters

`extMsgs`	Boolean which enables/disables setting

Example `<extension-messages> on </extension-messages>`

6.12 CTA SIP Binary Data Services

Tag config.gmac.markets.market CTA

The basic structure of the market specific parameters configuration for CTA is shown in the following schema:

```
<market>
      <venue-ids>
            <venue>
      </venue-ids>
      <extension-messages>
      <max-channel-buffer>
      <max-buffer-timeout-ns>
</market>
```

6.12.1 venue-ids.venue

Description Configures the user mapping for the venue identifier.

This mapping allows the user to set its own venue identifiers which therefore can be shared across different market data feeds.

Usage `<venue> user-id exchange-id </venue>`

Parameters

`user-id`	Venue identifier as defined by the user
`exchange-id`	Venue identifier as provided by the exchange

Example

```
<venue> 10 A </venue> <!--NYSE American-->
<venue> 5 J </venue> <!--Bats EDGA-->
```

6.12.2 extension-messages

Description Enables the generation of extension messages, by default these are disabled.

Usage `<extension-messages> extMsgs </extension-messages>`

Parameters

`extMsgs`	Boolean which enables/disables setting

Example `<extension-messages> on </extension-messages>`

6.12.3 max-channel-buffer

Description Sets the maximum number of packets to be stored in the reorder/recovery buffer per multicast.

Note:

> The plugin is no longer sensitive to `<reorder-max>`

Usage `<max-channel-buffer> max </max-channel-buffer>`

Parameters

`max`	Maximum packets to buffer. Default is 50 packets. Reordering is disabled when set to 0.

Example `<max-channel-buffer> 300 </max-channel-buffer>`

6.12.4 max-buffer-timeout-ns

Description Sets the amount of time for data to be stored in the reorder/recovery buffer.

Note:

> The plugin is no longer sensitive to `<reorder-timeout-ns>`

Usage `<max-buffer-timeout-ns> timeout </max-buffer-timeout-ns>`

Parameters

`timeout`	Number of nanoseconds to buffer packets in the reorder/recovery buffer. Default is 10,000 ns. Note that this setting is meaningless and has no effect unless `<max-channel-buffer>` is set to a value greater than 0.

Example `<max-buffer-timeout-ns> 30000 </max-buffer-timeout-ns>`

6.13 Currenex ITCH

Tag config.gmac.markets.market CURRENEX

The basic structure of the market specific parameters configuration for CTA is shown in the following schema:

```
<market>
      <max-channel-buffer>
      <max-buffer-timeout-ns>
</market>
```

6.13.1 max-channel-buffer

Description Sets the maximum number of packets to be stored in the reorder/recovery buffer per multicast.

Note:

> The plugin is no longer sensitive to `<reorder-max>`

Usage `<max-channel-buffer> max </max-channel-buffer>`

Parameters

`max`	Maximum packets to buffer. Default is 50 packets. Reordering is disabled when set to 0.

Example `<max-channel-buffer> 300 </max-channel-buffer>`

6.13.2 max-buffer-timeout-ns

Description Sets the amount of time for data to be stored in the reorder/recovery buffer.

Note:

> The plugin is no longer sensitive to `<reorder-timeout-ns>`

Usage `<max-buffer-timeout-ns> timeout </max-buffer-timeout-ns>`

Parameters

`timeout`	Number of nanoseconds to buffer packets in the reorder/recovery buffer. Default is 10,000 ns. Note that this setting is meaningless and has no effect unless `<max-channel-buffer>` is set to a value greater than 0.

Example `<max-buffer-timeout-ns> 30000 </max-buffer-timeout-ns>`

6.14 eSpeed Market Data Publisher

Tag config.gmac.markets.market ESPEED

There are no market-specific configurations for ESPEED, see *Market Configuration Settings*.

6.15 eSpeed ITCH

Tag config.gmac.markets.market ITCH_ESPEED

The basic structure of the market specific parameters configuration for ITCH_ESPEED is shown in the following schema:

```
<market>
      <recovery>
            <host>
            <port>
      </recovery>
      <extension-messages>
</market>
```

6.15.1 recovery

Description Configures the recovery server.

Usage <recovery>

Nested tokens

<host>	The host IP address for the TCP server
<port>	The port on the host server used for TCP

Example

```
<recovery>
   <host> 206.200.106.85 </host>
   <port> 56323 </port>
</recovery>
```

6.15.2 extension-messages

Description Enables the generation of extension messages, by default these are disabled.

Usage `<extension-messages> extMsgs </extension-messages>`

Parameters

extMsgs	Boolean which enables/disables setting

Example `<extension-messages> on </extension-messages>`

6.16 Euronext Cash Markets

Tag config.gmac.markets.market EURONEXT

The basic structure of the market specific parameters configuration for EURONEXT is shown in the following schema:

```
<market>
      <extension-messages>
      <secondary-snapshots>
      <symbol-ref-file>
</market>
```

6.16.1 extension-messages

Description Enables the generation of extension messages, by default these are disabled.

Usage `<extension-messages> extMsgs </extension-messages>`

Parameters `extMsgs` Boolean which enables/disables setting

Example `<extension-messages> on </extension-messages>`

6.16.2 secondary-snapshots

Description Container tag for a list of snapshot/refresh channels targeting the secondary refresh server.

GMAC attempts to establish a TCP connection to the secondary refresh server when the TCP connection to the primary refresh server failed.

See *Standard Multicast Channel Settings* section for details on the snapshot server configuration.

Usage `<secondary-snapshots>`

6.16.3 symbol-ref-file

Description This setting specifies the location of the CSV reference file provided by the exchange, and is only needed when reading symbol references from file. Note that the XML file is not supported.

Usage `<symbol-ref-file> symbFile </symbol-ref-file>`

Parameters `symbFile` Location of the symbol reference file

Example

```
<symbol-ref-file>
ftp://ftp.data.euronext.com/SH_EU_ENXT_REF_MASTER_BOD/CURRENT/XDP_CSH_EU_ENXT_REF_BOD_101_pr_20160905.csv
</symbol-ref-file>
```

6.17 Euronext Derivatives Markets

Tag config.gmac.markets.market EURONEXT_DERIVATIVES_XDP

The basic structure of the market specific parameters configuration for EURONEXT_DERIVATIVES_XDP is shown in the following schema:

```
<market>
      <channels>
            <channel>
      </channels>
      <recovery>
            <channel>
      </recovery>
      <snapshot-enabled>
      <snapshots>
            <channel>
      </snapshots>
      <connect-wait-sec>
      <extension-messages>
      <symbol-ref-file>
      <depth-mode>
</market>
```

6.17.1 channels.channel

Description Configures a multicast channel for the market.

Usage

```
<channel> localChanId numQueue srcPlugin interface
srcIP:port:type enblRec startSeq useDumps chanType
</channel>
```

Parameters

`localChanId`	See *Standard Multicast Channel Settings*
`numQueue`	See *Standard Multicast Channel Settings*
`srcPlugin`	See *Standard Multicast Channel Settings*
`interface`	See *Standard Multicast Channel Settings*
`srcIP:port`	See *Standard Multicast Channel Settings*
`type`	The type of connection for the channel, t for TCP and u for UDP
`enblRec`	See *Standard Multicast Channel Settings*
`startSeq`	See *Standard Multicast Channel Settings*
`useDumps`	See *Standard Multicast Channel Settings*
`chanType`	The type of channel 'ref' for standing data channel. '-' for live / updates channels.

Example

```
Live / updates channel:

<channel> 0 0 lldt ac0 224.0.64.2:55001:u - - - -
</channel> <!-- Equity & Index Derivatives - Level
1 (ServiceID: 701)


Standing data channel:

<channel> 1 0 lldt ac0 224.0.64.2:55002:u - - -
ref </channel> <!-- Equity & Index Derivatives -
Standing Data (ServiceID: 751)
```

6.17.2 recovery.channel

Description Configures a recovery channel for the market.

Usage

```
<channel> chanId numQueue plugin interface
recIP:port:type enblRec startSeq useDumps svcID
sourceID </channel>
```

Parameters

`chanId`	See *Standard Multicast Channel Settings*
`numQueue`	See *Standard Multicast Channel Settings*
`plugin`	See *Standard Multicast Channel Settings*
`interface`	See *Standard Multicast Channel Settings*
`recIP:port:type`	See *Standard Multicast Channel Settings*
`enblRec`	See *Standard Multicast Channel Settings*
`startSeq`	See *Standard Multicast Channel Settings*
`useDumps`	See *Standard Multicast Channel Settings*
`svcID`	Service ID which refers to a market segment, this is specified by the market

Note:

> The Service ID for recovery and refresh is the live Service ID.

`sourceID`	Source ID supplied by the market

Example

```
<channel> 0 0 socket eth0 156.48.97.142:4444:t - -
- 701 SourceID </channel> <!-- Equity & Index
Derivatives - Level 1 (ServiceID: 701)
```

6.17.3 connect-wait-sec

Description Configures the number of seconds to allow for a recovery connection.

Usage

```
<connect-wait-sec> waitSec </connect-wait-sec>
```

Parameters

`waitSec`	Number of seconds to allow for a recovery connection

Example

```
<connect-wait-sec> 3 </connect-wait-sec>
```

6.17.4 depth-mode

Description This setting allows the user to specify the types of book updates that GMAC should publish for the market.

Usage

```
<depth-mode> depthMode </depth-mode>
```

Parameters

`depthMode`	'normal' (default) will cause GMAC to only publish bid/ask with level not set. 'best' will cause GMAC to only publish best bid/ask with level 0. 'all' will cause GMAC to publish all updates.

Example

```
<depth-mode> all </depth-mode>
```

6.17.5 symbol-ref-file

Description This setting specifies the location of the FIXML reference files provided by the exchange, and is only needed when reading symbol references from

file.

Note:

> The parameter can also be a URL or a script that downloads the files and outputs the file list for GMAC to process – see standard `<symbol-ref-file>` tag description.

Usage `<symbol-ref-file> file </symbol-ref-file>`

Parameters

`file`	Location of the symbol reference file for the exchange

Example

```
<symbol-ref-file> path/SymbolMap.xml </symbol-ref-file>

<symbol-ref-file>
ftp://ftp.nysedata.com/OpenBook/SymbolMapping/SymbolMap.xml
</symbol-ref-file>

Example script provided with the installation:
<symbol-ref-file>
cmd://celoxica_get_euronext_derivatives_refdata.sh
</symbol-ref-file>
```

6.17.6 extension-messages

Description Configures the generation of extension messages.

Usage `<extension-messages> extMsgs </extension-messages>`

Parameters

`extMsgs`	Boolean which enables the generation of extension messages, by default these are disabled

Example `<extension-messages> on </extension-messages>`

6.17.7 snapshot-enabled

Description Configures the snapshot/refresh recovery.

Usage `<snapshot-enabled> enable </snapshot-enabled>`

Parameters

`enable`	Boolean which enables or disables snapshot/refresh recovery

Example `<snapshot-enabled> no </snapshot-enabled>`

6.17.8 snapshots.channel

Description Configures a snapshot channel for the market.

Usage

```
<channel> chanId numQueue plugin interface
recIP:port:type enblRec startSeq useDumps svcID
sourceID </channel>
```

Parameters

`chanId`	See *Standard Multicast Channel Settings*
`numQueue`	See *Standard Multicast Channel Settings*

`plugin`	See *Standard Multicast Channel Settings*
`interface`	See *Standard Multicast Channel Settings*
`recIP:port:type`	See *Standard Multicast Channel Settings*
`enblRec`	See *Standard Multicast Channel Settings*
`startSeq`	See *Standard Multicast Channel Settings*
`useDumps`	See *Standard Multicast Channel Settings*
`RFSIP`	RFS IP address
`RFSport`	RFS port
`svcID`	Service ID which refers to a market segment, this is specified by the market
`sourceID`	Source ID supplied by the market

Example

```
<channel> 0 0 lldt ac0 224.0.64.2:55003:u - - -
156.48.97.151 5555 801 SourceID </channel> <!--
Equity & Index Derivatives - Level 1 (ServiceID:
801)
```

6.18 Euronext Optiq

Tag config.gmac.markets.market EURONEXT_OPTIQ

The basic structure of the market specific parameters configuration for EURONEXT_OPTIQ is shown in the following schema:

```
<market>
      <extension-messages>
      <max-channel-buffer>
      <max-buffer-timeout-ns>
      <symbol-ref-file>
</market>
```

6.18.1 extension-messages

Description Enables the generation of extension messages, by default these are disabled.

Usage `<extension-messages> extMsgs </extension-messages>`

Parameters `extMsgs` Boolean which enables/disables setting

Example `<extension-messages> on </extension-messages>`

6.18.2 max-channel-buffer

Description Sets the maximum number of packets to be stored in the reorder/recovery buffer per multicast.

Note:

> The plugin is no longer sensitive to `<reorder-max>`

Usage `<max-channel-buffer> max </max-channel-buffer>`

Parameters

`max`	Maximum packets to buffer. Default is 50 packets. Reordering is disabled when set to 0.

Example `<max-channel-buffer> 300 </max-channel-buffer>`

6.18.3 max-buffer-timeout-ns

Description Sets the amount of time for data to be stored in the reorder/recovery buffer.

Note:

> The plugin is no longer sensitive to `<reorder-timeout-ns>`

Usage `<max-buffer-timeout-ns> timeout </max-buffer-timeout-ns>`

Parameters

`timeout`	Number of nanoseconds to buffer packets in the reorder/recovery buffer. Default is 10,000 ns. Note that this setting is meaningless and has no effect

unless <max-channel-buffer> is set to a value greater than 0.

Example

```
<max-buffer-timeout-ns> 30000 </max-buffer-timeout-ns>
```

6.18.4 symbol-ref-file

Description This setting configures the path to Optiq cash and derivatives reference data files.

Up to 24 files can be configured.

Note:

> The parameter can also be a URL – also see standard <symbol-ref-file> tag description.

Usage

```
<symbol-ref-file> file </symbol-ref-file>
```

Parameters

file	Location of the symbol reference file for the exchange

Example

```
<!-- Optiq cash standing data file -->
<symbol-ref-file> OptiqMDG_p-EUA_CashStandingDataFile_Equities_20170503.xml
 </symbol-ref-file>

<!-- Optiq derivatives futures standing data file -->
<symbol-ref-file> OptiqMDG_p-EUA_DerivativesStandingDataFile_Futures_20170508.xml
 </symbol-ref-file>
```

6.19 FASTMATCH

Tag config.gmac.markets.market FASTMATCH

The basic structure of the market specific parameters configuration for FASTMATCH is shown in the following schema:

```
<market>
      <authentications>
            <authentication>
                  <sender-comp-id>
                  <target-comp-id>
            </authentication>
      </authentications>
</market>
```

6.19.1 authentications.authentication

Description Configures the local channel ID for which the authentication is defined. Authentication is required per channel.

Local channel ID must match with the local channel ID of the defined channel, see *Standard Multicast Channel Settings* for details.

Usage `<authentication> localChanId`

Parameters `localChanId` Local channel ID

Example `<authentication> 0`

6.19.2 authentications.authentication.sender-comp-id

Description Configures SenderCompID [49] in the FASTMATCH FIX message header.

Usage `<sender-comp-id> SCID </sender-comp-id>`

Parameters `SCID` SenderCompID [49]

Example `<sender-comp-id> SCID </sender-comp-id>`

6.19.3 authentications.authentication.target-comp-id

Description Configures TargetCompID [56] in the FASTMATCH FIX message header.

Usage `<target-comp-id> TCID </target-comp-id>`

Parameters `TCID` TargetCompID [56]

Example `<target-comp-id> TCID </target-comp-id>`

6.20 FXall

Tag config.gmac.markets.market FXALL

The basic structure of the market specific parameters configuration for FXALL is shown in the following schema:

```
<market>
      <authentications>
            <authentication>
                  <sender-comp-id>
                  <target-comp-id>
                  <username>
                  <password>
            </authentication>
      </authentications>
</market>
```

6.20.1 authentications.authentication

Description Configures the local channel ID for which the authentication is defined. Authentication is required per channel.

Local channel ID must match with the local channel ID of the defined channel, see *Standard Multicast Channel Settings* for details.

Usage `<authentication> localChanId`

Parameters `localChanId` Local channel ID

Example `<authentication> 0`

6.20.2 authentications.authentication.sender-comp-id

Description Configures SenderCompID [49] in the FXall FIX message header.

Usage `<sender-comp-id> SCID </sender-comp-id>`

Parameters `SCID` SenderCompID [49]

Example `<sender-comp-id> SCID </sender-comp-id>`

6.20.3 authentications.authentication.target-comp-id

Description Configures TargetCompID [56] in the FXall FIX message header.

Usage `<target-comp-id> TCID </target-comp-id>`

Parameters `TCID` TargetCompID [56]

Example `<target-comp-id> TCID </target-comp-id>`

6.20.4 authentications.authentication.username

Description Configures Username [553] in the FXall Logon message.

Usage `<username> username </username>`

Parameters `username` Identifier of the user

Example `<username> username </username>`

6.20.5 authentications.authentication.password

Description Configures Password [554] in the FXall Logon message.

Usage `<password> password </password>`

Parameters `Password` User password

Example `<password> password </password>`

6.21 Hotspot FX

Tag config.gmac.markets.market HOTSPOT

```
<market>
      <extension-messages>
      <authentications>
            <authentication>
                  <username>
                  <password>
            </authentication>
      </authentications>
</market>
```

6.21.1 extension-messages

Description Configures the generation of extension messages.

Usage `<extension-messages> extMsgs </extension-messages>`

Parameters `extMsgs` Boolean which enables the generation of extension messages, by default these are disabled

Example `<extension-messages> on </extension-messages>`

6.21.2 authentications.authentication

Description Configures the local channel ID for which the authentication is defined. Authentication is required per channel. Local channel ID must match with the local channel ID of the defined channel, see *Standard Multicast Channel Settings* for details.

Usage `<authentication> localChanId`

Parameters `localChanId` Local channel ID

Example `<authentication> 0`

6.21.3 authentications.authentication.username

Description Configures Login Name in the Hotspot FX Login message.

Usage `<username> username </username>`

Parameters `username` Identifier of the user

Example `<username> username </username>`

6.21.4 authentications.authentication.password

Description Configures Password in the Hotspot FX Login message.

Usage `<password> password </password>`

Parameters `Password` User password

Example `<password> password </password>`

6.22 ICAP XML

Tag config.gmac.markets.market ICAP_XML

The basic structure of the market specific parameters configuration for ICAP_XML is shown in the following schema:

```
<market>
      <channels>
            <channel>
      </channels>
</market>
```

6.22.1 channels.channel

Description Configures a multicast channel for ICAP XML using the socket plugin.

Usage

```
<channel> localChanId numQueue srcPlugin interface
srcIP:port:t </channel>
```

Parameters

`localChanId`	See *Standard Multicast Channel Settings*
`numQueue`	See *Standard Multicast Channel Settings*
`srcPlugin`	socket
`interface`	See *Standard Multicast Channel Settings*
`srcIP:port`	See *Standard Multicast Channel Settings*
`:t`	Specifies that this is a TCP connection

Example

```
<channel> 1 0 socket eth0 127.0.0.1:4002:t
</channel>
```

6.23 Intercontinental Exchange ICE

Tag config.gmac.markets.market ICE

The basic structure of the market specific parameters configuration for ICE is shown in the following schema:

```
<market>
      <channels>
            <channel>
      </channels>
      <extension-messages>
      <snapshot-enabled>
      <tcp_server>
            <host>
            <port>
            <login>
            <pwd>
            <tcp-recovery-enabled>
      </tcp_server>
</market>
```

6.23.1 channels.channel

Description Configures a multicast channel for ICE.

GMAC requests definitions of all markets types. Upon receipt of responses (ICE TCP messages), GMAC posts the received definitions of market types to the channels on which the market types are configured using `secType` and `mrktType`. Hence definitions of market types that are not configured are explicitly filtered out.

However, new intra-day market definitions received using ICE Multicast messages are not filtered out.

Usage

```
<channel> localChanId numQueue srcPlugin interface
srcIP:port enblRec startSeq useDumps enable
[secType] [mrktType] </channel>
```

Parameters

`localChanId`	See *Standard Multicast Channel Settings*
`numQueue`	See *Standard Multicast Channel Settings*
`srcPlugin`	See *Standard Multicast Channel Settings*
`interface`	See *Standard Multicast Channel Settings*
`srcIP:port`	See *Standard Multicast Channel Settings*
`enblRec`	See *Standard Multicast Channel Settings*
`startSeq`	See *Standard Multicast Channel Settings*
`useDumps`	See *Standard Multicast Channel Settings*
`enable`	Boolean which enables or disables this channel on startup
`secType`	Set the security type to ‘F’ for futures, ‘O’ for options, ‘U’ for UDS options or ‘D’ for UDS futures as follows: • F `[mrktType]` • O `[mrktType]` • U `[mrktType]` • D `[mrktType]` • F (or O or U or D) `[mrktType]` O (or F or U or D) `[mrktType]` U (or O or F or D) `[mrktType]` D (or O or F or U) `[mrktType]`
`[mrktType]`	A list of market types for the configured `secType` (security type), for more information see www.theice.com

Example

```
<channel> 0 0 lldt ac0 233.156.208.232:21243 - - -
on F 211 212 213 214 215 O 211 212 213 214 215
```

```
</channel>
<channel> 0 0 lldt ac0 233.156.208.232:21243 - - -
on F 211 212 213 214 215 </channel>
```

6.23.2 snapshot-enabled

Description Configures the snapshot/refresh recovery.

Usage `<snapshot-enabled> enable </snapshot-enabled>`

Parameters

`enable`	Boolean which enables or disables snapshot/refresh recovery

Example

```
<snapshot-enabled> no </snapshot-enabled>
```

6.23.3 tcp_server

Description Configures information on the TCP server.

Usage `<tcp_server>`

Nested tokens

`<host>`	The host IP address for the TCP server
`<port>`	The port on the host server used for TCP
`<login>`	Login name used for the TCP server
`<pwd>`	Password for the TCP server
`<tcp-recovery-enabled>`	Boolean which enables or disables the product definition request. Default is on. Overrides the configuration node `<recovery>`.

Example

```
<tcp_server>
   <host> 63.247.113.163 </host>
   <port> 3000 </port>
   <login> celoxica_pf1 </login>
   <pwd> Starts123 </pwd>
   <tcp-recovery-enabled>  on  </tcp-recovery-
enabled>
</tcp_server>
```

6.23.4 extension-messages

Description Configures the generation of extension messages.

Usage `<extension-messages> extMsgs </extension-messages>`

Parameters

`extMsgs`	Boolean which enables the generation of extension messages, by default these are disabled

Example

```
<extension-messages> on </extension-messages>
```

6.24 ITCH BrokerTec

Tag config.gmac.markets.market ITCH_BROKERTEC

The basic structure of the market specific parameters configuration for ITCH_BROKERTEC is shown in the following schema:

```
<market>
      <extension-messages>
</market>
```

6.24.1 extension-messages

Description Enables the generation of extension messages, by default these are disabled.

Usage `<extension-messages> extMsgs </extension-messages>`

Parameters `extMsgs` Boolean which enables/disables setting

Example `<extension-messages> on </extension-messages>`

6.25 LMAX

Tag config.gmac.markets.market LMAX

The basic structure of the market specific parameters configuration for LMAX is shown in the following schema:

```
<market>
      <authentications>
            <authentication>
                  <sender-comp-id>
                  <target-comp-id>
                  <username>
                  <password>
            </authentication>
      </authentications>
      <symbol-ref-file>
      <symbol-ref-queue>
</market>
```

6.25.1 authentications.authentication

Description Configures the local channel ID for which the authentication is defined. Authentication is required per channel.

Local channel ID must match with the local channel ID of the defined channel, see *Standard Multicast Channel Settings* for details.

Usage `<authentication> localChanId`

Parameters `localChanId` Local channel ID

Example `<authentication> 0`

6.25.2 authentications.authentication.sender-comp-id

Description Configures SenderCompID [49] in the LMAX FIX message header.

Usage `<sender-comp-id> SCID </sender-comp-id>`

Parameters `SCID` SenderCompID [49]

Example `<sender-comp-id> SCID </sender-comp-id>`

6.25.3 authentications.authentication.target-comp-id

Description Configures TargetCompID [56] in the LMAX FIX message header.

Usage `<target-comp-id> TCID </target-comp-id>`

Parameters `TCID` TargetCompID [56]

Example `<target-comp-id> TCID </target-comp-id>`

6.25.4 authentications.authentication.username

Description Configures Username [553] in the LMAX Logon message.

Usage `<username> username </username>`

Parameters `username` Identifier of the user

Example `<username> username </username>`

6.25.5 authentications.authentication.password

Description Configures Password [554] in the LMAX Logon message.

Usage `<password> password </password>`

Parameters `Password` User password

Example `<password> password </password>`

6.25.6 symbol-ref-file

Description This setting specifies the path to the symbol reference file, and is therefore only needed when reading symbol references from file.

Note:

> The path can also be a URL, in which case GMAC fetches the file using `wget` – also see standard `<symbol-ref-file>` tag description.

Usage `<symbol-ref-file> file </symbol-ref-file>`

Parameters `file` Location of the symbol reference file for the exchange

Example
```
<symbol-ref-file> LMAX-instruments.csv </symbol-
ref-file>
```

6.25.7 symbol-ref-queue

Description This optional configuration tag allows the user to specify the GMAC queue where the GMAC reference data messages generated by the process of a symbol reference file will be delivered to.

If the tag is not configured, the GMAC reference data messages will be delivered to the first configured GMAC queue.

Usage `<symbol-ref-queue> numQueue </symbol-ref-queue>`

Parameters `numQueue` The DMA queue number

Example `<symbol-ref-queue> 1 </symbol-ref-queue>`

6.26 NASDAQ OMX TotalView ITCH 5.0

Tag config.gmac.markets.market ITCH50

Note:

ITCH50 hardware symbol filtering is only supported for one multicast per card.

Where more than one ITCH50 market is used only one should have hardware symbol filtering enabled: this is achieved by disabling filtering on the other markets using the configuration node `<hardware-filtering>`.

The basic structure of the market specific parameters configuration for ITCH50 is shown in the following schema:

```
<market>
      <recovery>
            <host>
            <port>
      </recovery>
      <snapshot-enabled>
      <snapshots>
            <channel>
      </snapshots>
      <use-symbols>
      <generate-referential>
</market>
```

6.26.1 recovery

Description Configures the recovery server.

Usage <recovery>

Nested tokens

<host>	The host IP address for the TCP server
<port>	The port on the host server used for TCP

Example

```
<recovery>
   <host> 206.200.81.198 </host>
   <port> 36987 </port>
</recovery>
```

6.26.2 snapshot-enabled

Description Configures the snapshot/refresh recovery.

Note:

Plugin ITCH50 throws an initialisation error if snapshots are enabled but extension messages are disabled, and the GMAC V1 template is being used.

Usage `<snapshot-enabled> enable </snapshot-enabled>`

Parameters

`enable`	Boolean which enables or disables snapshot/refresh recovery

Example `<snapshot-enabled> no </snapshot-enabled>`

6.26.3 snapshots.channel

Description Configures a snapshot channel for this market.

Note:

> `localChanId` must match the `localChanId` in `<channel`.

Usage

```
<channel> localChanId tcpServerIp tcpServerPort
username password </channel>
```

Parameters

`localChanId`	Snapshot channel, must be unique for the market
`tcpServerIp`	Address for the snapshot channel
`tcpServerPort`	Port for the snapshot channel
`username`	Username for the snapshot channel
`password`	Password for the snapshot channel

Example

```
<channel> 0 206.200.81.228 26477 user pass
</channel>
```

6.26.4 use-symbols

Description When enabled, some GMAC messages are issued with InstrumentName present and set while InstrumentIndex is not present.

When disabled or not present (default behaviour), some GMAC messages are issued with InstrumentIndex present and set while InstrumentName is not present.

See the GMAC ITCH50 mappings for more details.

Note:

> The OB application **requires** this configuration tag to be **enabled**.

Usage

```
<use-symbols> enable </use-symbols>
```

Parameters

`enable`	Boolean Default is no

Example

```
<use-symbols> yes </use-symbols>
```

6.26.5 generate-referential

Description This configuration tag is valid for **GMAC V1 only**.

When enabled, GMAC generates synthetic referential messages. This feature is essential when:

- `<hardware-filtering>` is enabled. This feature requires symbol indexes. See `<hardware-filtering` for details.
- And the early morning referential messages are missing due to intra-day start and / or glimpse unavailability: in such a case, depending on `<use-symbols>`, some instrument names or instrument indexes are missing. See `<use-symbols` for details.

This feature also enables the OB application to start intra-day without glimpse requirement and with hardware filtering enabled.

Usage

```
<use-symbols> enable </use-symbols>
```

Parameters

`enable`	Boolean Default is no	

Example

```
<generate-referential> yes </generate-referential>
```

6.27 NASDAQ OMX Nordic TotalView ITCH

Tag config.gmac.markets.market ITCH_OMX

The basic structure of the market specific parameters configuration for ITCH_OMX is shown in the following schema:

```
<market>
      <recovery>
            <host>
            <port>
      </recovery>
      <snapshot-enabled>
      <snapshots>
            <channel>
      </snapshots>
      <version>
      <extension-messages>
      <symbol-ref-file>
</market>
```

6.27.1 recovery

Description Configures the recovery server.

Usage <recovery>

Nested tokens

<host>	The host IP address for the TCP server
<port>	The port on the host server used for TCP

Example

```
<recovery>
        <host> 194.110.98.11 </host>
        <port> 31541 </port>
</recovery>
```

6.27.2 snapshot-enabled

Description Configures the snapshot/refresh recovery.

Usage `<snapshot-enabled> enable </snapshot-enabled>`

Parameters

`enable`	Boolean which enables or disables snapshot/refresh recovery

Example `<snapshot-enabled> no </snapshot-enabled>`

6.27.3 snapshots.channel

Description Configures a snapshot channel for this market.

Note:

> `localChanId` must match the `localChanId` in `<channel`.

Usage `<channel> localChanId tcpServerIp tcpServerPort username password </channel>`

Parameters

`localChanId`	Snapshot channel, must be unique for the market
`tcpServerIp`	Address for the snapshot channel

	`tcpServerPort`	Port for the snapshot channel
	`username`	Username for the snapshot channel
	`password`	Password for the snapshot channel

Example `<channel> 0 206.200.81.228 26477 user pass </channel>`

6.27.4 version

Description The version of Nasdaq Nordic ITCH specifications to be used, as specified in the Nordic Equity TotalView ITCH manual.

Allowable values are:

- 2.0 (default, ASCII version)
- 3.0 (binary version)

Usage `<version> version </version>`

Parameters `version` Nasdaq Nordic ITCH specifications version

Example `<version> 3.0 </version>`

6.27.5 extension-messages

Description Enables the generation of extension messages, by default these are disabled.

Usage `<extension-messages> extMsgs </extension-messages>`

Parameters `extMsgs` Boolean which enables/disables setting

Example `<extension-messages> on </extension-messages>`

6.27.6 symbol-ref-file

Description This setting specifies the location of the GCF TIP reference files.

Usage `<symbol-ref-file> symbFile </symbol-ref-file>`

Parameters `symbFile` Location of the symbol reference file

Example `<symbol-ref-file> XSTO_Stock_BasicData.tip </symbol-ref-file>`

6.28 LSE Group Ticker Plant

Tag config.gmac.markets.market GTP

The basic structure of the market specific parameters configuration for GTP is shown in the following schema:

```
<market>
      <retransmission>
            <channel>
      </retransmission>
      <authentications>
            <authentication>
                  <linked-channel-id>
                  <sender-comp-id>
                  <market-data-group>
            </authentication>
      </authentications>
      <extension-messages>
      <max-channel-buffer>
      <max-buffer-timeout-ns>
</market>
```

6.28.1 retransmission

Description Configures retransmission request channels for the Replay service (retransmission of finite number of missing messages) and for the Recovery service (retransmission of a large scale data loss).

Allowable values are:

- Recovery
- Replay

Usage `<retransmission> service`

Parameters

`Service`	Service

Example `<retransmission> Recovery`

6.28.2 retransmission.channel

Description Configures a retransmission request channel (either the Replay service or the Recovery service).

Usage

```
<channel> localChanId numQueue srcPlugin interface
srcIP:port </channel>
```

Parameters

`localChanId`	See *Standard Multicast Channel Settings*
`numQueue`	See *Standard Multicast Channel Settings*
`srcPlugin`	See *Standard Multicast Channel Settings*
`interface`	See *Standard Multicast Channel Settings*
`srcIP:port`	See *Standard Multicast Channel Settings*

Example

```
<retransmission> Recovery
   <channel> 1 0 socket eth0 159.125.64.153:1069
</channel>
</retransmission>
```

6.28.3 authentications.authentication

Description Configures the authentication per channel.

Usage `<authentication>`

6.28.4 authentications.authentication.linked-channel-id

Description Configures the local channel ID for which the authentication is defined. Local channel ID must match with the local channel ID of the defined channel.

Usage `<linked-channel-id> localChanId </linked-channel-id>`

Parameters `localChanId` See *Standard Multicast Channel Settings*

Example `<linked-channel-id> 1 </linked-channel-id>`

6.28.5 authentications.authentication.sender-comp-id

Description Configures field Username of the LSE GTP Login Request message.

Usage `<sender-comp-id> SCID </sender-comp-id>`

Parameters `SCID` Username

Example `<sender-comp-id> SCID </sender-comp-id>`

6.28.6 authentications.authentication.market-data-group

Description Configures the LSE GTP market data group.

Usage `<market-data-group> MDG </market-data-group>`

Parameters `MDG` Market data group

Example `<market-data-group> A </market-data-group>`

6.28.7 extension-messages

Description Enables the generation of extension messages, by default these are disabled.

Usage `<extension-messages> extMsgs </extension-messages>`

Parameters `extMsgs` Boolean which enables/disables setting

Example `<extension-messages> on </extension-messages>`

6.28.8 max-channel-buffer

Description Sets the maximum number of packets to be stored in the reorder/recovery buffer per multicast.

Note:

> The plugin is no longer sensitive to `<reorder-max>`

Usage `<max-channel-buffer> max </max-channel-buffer>`

Parameters

`max`	Maximum packets to buffer. Default is 50 packets. Reordering is disabled when set to 0.

Example `<max-channel-buffer> 300 </max-channel-buffer>`

6.28.9 max-buffer-timeout-ns

Description Sets the amount of time for data to be stored in the reorder/recovery buffer.

Note:

> The plugin is no longer sensitive to `<reorder-timeout-ns>`

Usage `<max-buffer-timeout-ns> timeout </max-buffer-timeout-ns>`

Parameters

`timeout`	Number of nanoseconds to buffer packets in the reorder/recovery buffer. Default is 10,000 ns. Note that this setting is meaningless and has no effect unless `<max-channel-buffer>` is set to a value greater than 0.

Example `<max-buffer-timeout-ns> 30000 </max-buffer-timeout-ns>`

6.29 LSE Millennium

Tag config.gmac.markets.market LSE_MIL

This market has UDP feed multicasts with separate TCP connections for Retransmissions (replay or gap-filling) and for Snapshots (refresh). The retransmitted data is received over the TCP connections. The Snapshots connection can also be used to get Index-Mapping.

The basic structure of the market specific parameters configuration for LSE_MIL is shown in the following schema:

```
<market>
      <firm-quote>
      <extension-messages>
      <symbol-ref-file>
      <snapshot-enabled>
      <snapshots>
            <channel>
      </snapshots>
      <recovery>
            <channel>
      </recovery>
</market>
```

6.29.1 symbol-ref-file

Description This setting specifies the path to the symbol reference file, and is therefore only needed when reading symbol references from file.

Note:

> The path can also be a URL, in which case GMAC fetches the file using `wget` – also see standard `<symbol-ref-file>` tag description.

Usage `<symbol-ref-file> file </symbol-ref-file>`

Parameters

`file`	Location of the symbol reference file for the exchange

Example

```
<symbol-ref-file>    path/%Y%m%d_XLON_Instrument.csv
</symbol-ref-file>
```

```
<symbol-ref-file>
ftp://USER:PASS@194.169.8.155:21/%Y%m%d_XLON_Instrument.csv
</symbol-ref-file>
```

6.29.2 snapshot-enabled

Description Configures the snapshot/refresh recovery.

Usage `<snapshot-enabled> enable </snapshot-enabled>`

Parameters

`enable`	Boolean which enables or disables snapshot/refresh recovery

Example `<snapshot-enabled> no </snapshot-enabled>`

6.29.3 snapshots.channel

Description Configures a TCP snapshot channel for requesting refreshes and snapshots from the market.

Usage `<channel> chanId numQueue - - recIP:port - - - compId password </channel>`

Parameters

`chanId`	The local id for this channel, must match the equivalent recovery channel for this market
`numQueue`	The DMA queue number, must match the equivalent recovery DMA queue for this market
`recIP:port`	The IP address and port of the TCP connection used for requesting snapshots and refreshes
`compId`	The comp ID provided by the exchange
`password`	The password provided by the exchange

Example `<channel> 0 0 - - 224.0.62.3:30001 - - - compid password </channel>`

6.29.4 extension-messages

Description Configures the generation of extension messages.

Usage `<extension-messages> extMsgs </extension-messages>`

Parameters

`extMsgs`	Boolean which enables the generation of extension messages, by default these are disabled

Example `<extension-messages> on </extension-messages>`

6.29.5 firm-quote

Description When enabled, the firm quote flagged messages will be transcoded.

When disabled, the firm quote flagged messages will be ignored.

Usage `<firm-quote> firmQuote </firm-quote>`

Parameters

`firmQuote`	Boolean

Example `<firm-quote> off </firm-quote>`

6.29.6 recovery.channel

Description Configures a recovery channel for the market.

Usage `<channel> chanId numQueue - - recIP:port - - - compId password </channel>`

Parameters

`chanId`	See *Standard Multicast Channel Settings*
`numQueue`	See *Standard Multicast Channel Settings*
`recIP:port`	See *Standard Multicast Channel Settings*
`compId`	The comp ID provided by the exchange
`password`	The password provided by the exchange

Example `<channel> 0 0 - - 224.0.62.3:30001 - - - compid password </channel>`

6.30 NYSE

Tag config.gmac.markets.market NYSE

This plugin supports the following NYSE feeds:

- Open Book Ultra
- Alerts

This market has UDP feed multicasts, each with a TCP connection for Retransmissions (replay or gap-filling) and for Snapshots (refresh). The retransmitted data is received over additional multicasts for Retransmissions and for Snapshots (and index-mapping). Index-Mapping is also received on the Snapshots multicast.

The basic structure of the market specific parameters configuration for NYSE is shown in the following schema:

```
<market>
      <source-id>
      <symbol-ref-file>
      <channels>
            <channel>
      </channels>
      <recovery>
            <timeout-connect>
      </recovery>
      <get-index-map>
      <exchange-timestamp>
      <ignore-slow-quote>
      <drop-unknown-instruments>
      <trades-enabled>
      <trading-status-monitoring>
      <snapshot-enabled>
</market>
```

6.30.1 source-id

Description Configures the source id.

Usage `<source-id> sid </source-id>`

Parameters

`sid`	The source id provided by NYSE for each customer

Example `<source-id> foo </source-id>`

6.30.2 symbol-ref-file

Description This setting configures the path to the symbol reference file; this is only needed when reading symbol references from file.

Note:

> The parameter can also be a URL – also see standard `<symbol-ref-file>` tag description.

Usage `<symbol-ref-file> file </symbol-ref-file>`

Parameters

`file`	Location of the symbol reference file for the exchange

Example `<symbol-ref-file> path/SymbolMap.xml </symbol-ref-file>`

`<symbol-ref-file>`
`ftp://ftp.nysedata.com/OpenBook/SymbolMapping/SymbolMap.xml`

```
</symbol-ref-file>
```

6.30.3 channels.channel

Description Configures a multicast channel for NYSE.

Usage

```
<channel> localChanId numQueue srcPlugin interface
srcIP:port enblRec startSeq useDumps prId
</channel>
```

Parameters

`localChanId`	See *Standard Multicast Channel Settings*
`numQueue`	See *Standard Multicast Channel Settings*
`srcPlugin`	See *Standard Multicast Channel Settings*
`interface`	See *Standard Multicast Channel Settings*
`srcIP:port`	See *Standard Multicast Channel Settings*
`enblRec`	See *Standard Multicast Channel Settings*
`startSeq`	See *Standard Multicast Channel Settings*
`useDumps`	See *Standard Multicast Channel Settings*
`prId`	Product ID supplied by NYSE. Possible values are: 104 NYSE Alerts feed 115 NYSE Open Book Ultra feed

Example

```
<channel> 0 0 lldt ac0 224.0.26.3:10003 - - - on
spin </channel>
```

Notes NYSE Open Book Ultra feed is the only NYSE plugin feed supported by the hardware symbol filtering module. As a consequence, when hardware symbol filtering is enabled, the NYSE alerts and NYSE Order Imbalances feeds must not be configured in the same queue as the NYSE Open Book Ultra feed.

6.30.4 recovery.timeout-connect

Description Configures the time to allow for recovery connection.

Usage

```
<timeout-connect> tConnect </timeout-connect>
```

Parameters

`tConnect`	The number of milliseconds to allow for recovery connection

Example

```
<timeout-connect> 5000 </timeout-connect>
```

6.30.5 get-index-map

Description Enables the retrieval of index mapping messages for OpenBook Ultra.

If enabled they will be requested once the heartbeat has been exchanged on the TCP connection (provided the snapshot multicast is configured).

Usage

```
<get-index-map> enable </get-index-map>
```

Parameters

`enable`	Boolean

Example

```
<get-index-map> on </get-index-map>
```

6.30.6 exchange-timestamp

Description Selects the exchange field that will be used to populate the ExchangeTimestamp in GMAC messages (GMACMessageHeader.ExchangeTimestamp).

Usage
```
<exchange-timestamp> timestamps </exchange-timestamp>
```

Parameters

`timestamps`	Boolean which enables use of the SourceTime fields (where available) for timestamps, by default uses the SendTime fields

Example
```
<exchange-timestamp> on </exchange-timestamp>
```

6.30.7 ignore-slow-quote

Description Enabling this causes all quotes for an instrument in a 'slow quote' state (from the QuoteCondition field) to be dropped by GMAC. This may affect the orders on either one or both sides. Additionally all levels will be deleted for the affected side(s).

Levels will be forwarded again if the condition goes away, but only if the exchange sends them (i.e. unchanged orders are likely to be lost).

By default this setting is disabled, meaning that all orders are forwarded.

Usage
```
<ignore-slow-quote> enable </ignore-slow-quote>
```

Parameters

`enable`	Boolean Default is off.

Example
```
<ignore-slow-quote> on </ignore-slow-quote>
```

6.30.8 drop-unknown-instruments

Description Enables the dropping of OB messages for unknown instruments. **This option is not recommended**, if index mapping is not available then **all** OB update messages are dropped.

Please use correct reference data files where possible.

Usage
```
<drop-unknown-instruments> dropInst </drop-unknown-instruments>
```

Parameters

`dropInst`	Boolean which enables dropping of OB message from unknown instruments. Default is off.

Example
```
<drop-unknown-instruments> off </drop-unknown-instruments>
```

6.30.9 trades-enabled

Description Enables or disables the generation of the trade messages.

When set, the trades messages are forwarded to the user.

By default, the trade messages are not generated.

Usage
```
<trades-enabled> enable </trades-enabled>
```

Parameters `enable` Boolean which enables or disables the trade messages

Example `<trades-enabled> no </trades-enabled>`

6.30.10 snapshot-enabled

Description Configures the snapshot/refresh recovery.

Usage `<snapshot-enabled> enable </snapshot-enabled>`

Parameters `enable` Boolean which enables or disables snapshot/refresh recovery

Example `<snapshot-enabled> no </snapshot-enabled>`

6.30.11 trading-status-monitoring

Description When enabled, the trading status is remembered; it is published using a GMACMessageTradingStatusV3 only if the trading status changes.

When disabled, the trading status is not remembered; it is always published using a GMACMessageTradingStatusV3.

Usage `<trading-status-monitoring> enable </trading-status-monitoring>`

Parameters `enable` Boolean

Default is on.

Example `<trading-status-monitoring> off </trading-status-monitoring>`

6.31 NYSE XDP

Tag config.gmac.markets.market NYSE_XDP

This plugin supports the following NYSE XDP feeds:

- NYSE Integrated
- NYSE Imbalance
- NYSE Trade
- NYSE BBO
- NYSE Arca Integrated
- NYSE American Integrated
- NYSE American Imbalance
- NYSE American Trade
- NYSE American BBO

The basic structure of the market specific parameters configuration for NYSE_XDP is shown in the following schema:

```
<market>
      <product-name>
      <source-id>
      <symbol-ref-file>
      <symbol-ref-queue>
      <channels>
            <channel>
      </channels>
      <retransmission>
            <channel>
      </retransmission>
      <recovery>
            <channel>
      </recovery>
      <snapshot-enabled>
      <snapshots>
            <channel>
      </snapshots>
      <extension-messages>
      <max-channel-buffer>
      <max-buffer-timeout-ns>
</market>
```

6.31.1 product-name

Description Configures the product id.

Usage `<product-name> pid </product-name>`

Parameters `pid` The product id.

Possible values are:

- “nyse-integrated” NYSE XDP Integrated feed
- “nyse-mkt-integrated” NYSE American XDP Integrated feed
- “nyse-arca-integrated” NYSE Arca XDP Integrated feed
- “nyse-trades” NYSE XDP Trades feed
- “nyse-mkt-trades” NYSE American XDP Trades feed
- “nyse-bbo” NYSE XDP BBO feed

- “nyse-mkt-bbo” NYSE American XDP BBO feed
- “nyse-imbalance” NYSE XDP Imbalance feed
- “nyse-mkt-imbalance” NYSE American XDP Imbalance feed

Example `<product-name> nyse-integrated </product-name>`

6.31.2 source-id

Description Configures the source id.

Usage `<source-id> sid </source-id>`

Parameters `sid` The source id provided by NYSE for each customer

Example `<source-id> my_source_id </source-id>`

6.31.3 symbol-ref-file

Description This setting configures the path to the symbol reference file; this is only needed when reading symbol references from file.

Note:

> The parameter can also be a URL – also see standard `<symbol-ref-file>` tag description.

Usage `<symbol-ref-file> file </symbol-ref-file>`

Parameters `file` Location of the symbol reference file for the exchange

Example
```
<symbol-ref-file>
ftp://ftp.nyxdata.com/NYSESymbolMapping/NYSESymbolMapping_NMS.XML
</symbol-ref-file>
```

6.31.4 symbol-ref-queue

Description This optional configuration tag allows the user to specify the GMAC queue where the GMAC reference data messages generated by the process of a symbol reference file will be delivered to.

If the tag is not configured, the GMAC reference data messages will be delivered to the first configured GMAC queue.

Usage `<symbol-ref-queue> numQueue </symbol-ref-queue>`

Parameters `numQueue` The DMA queue number

Example `<symbol-ref-queue> 1 </symbol-ref-queue>`

6.31.5 channels.channel

Description Configures a live multicast channel for NYSE XDP (publisher channel in NYSE terminology).

Usage `<channel> localChanId numQueue srcPlugin interface srcIP:port enblRec startSeq useDumps </channel>`

Parameters

`localChanId`	See *Standard Multicast Channel Settings* `localChanId` must contain one single digit and match the NYSE XDP Channel ID e.g. 1A for Channel ID = 1 and line A
`numQueue`	See *Standard Multicast Channel Settings*
`srcPlugin`	See *Standard Multicast Channel Settings*
`interface`	See *Standard Multicast Channel Settings*
`srcIP:port`	See *Standard Multicast Channel Settings*
`enblRec`	See *Standard Multicast Channel Settings*
`startSeq`	See *Standard Multicast Channel Settings*
`useDumps`	See *Standard Multicast Channel Settings*

Example

```
<channel> 1A 0 lldt ac0 233.125.89.24:11064 - - -
</channel>
```

6.31.6 retransmission.channel

Description Configures a retransmission request channel for NYSE XDP.

Usage `<channel> localChanId numQueue srcPlugin interface srcIP:port </channel>`

Parameters

`localChanId`	See *Standard Multicast Channel Settings*
`numQueue`	Set to '-'
`srcPlugin`	See *Standard Multicast Channel Settings*
`interface`	See *Standard Multicast Channel Settings*
`srcIP:port`	See *Standard Multicast Channel Settings*

Example

```
<channel> 1 - socket eth0 159.125.64.153:1069
</channel>
```

6.31.7 recovery.channel

Description Configures a recovery channel for NYSE XDP (retransmission channel in NYSE terminology).

Note:

> `localChanId` must match the `localChanIds` in `<channels.channel>`.

Usage `<channel> localChanId numQueue srcPlugin interface srcIP:port enblRec startSeq useDumps </channel>`

Parameters

`localChanId`	See *Standard Multicast Channel Settings*
`numQueue`	See *Standard Multicast Channel Settings*
`srcPlugin`	See *Standard Multicast Channel Settings*
`interface`	See *Standard Multicast Channel Settings*
`srcIP:port`	See *Standard Multicast Channel Settings*
`enblRec`	See *Standard Multicast Channel Settings*
`startSeq`	See *Standard Multicast Channel Settings*
`useDumps`	See *Standard Multicast Channel Settings*

Example `<channel> 1A 0 lldt ac0 233.125.89.28:11068 - - - </channel>`

6.31.8 snapshot-enabled

Description Configures the snapshot/refresh recovery.

Usage `<snapshot-enabled> enable </snapshot-enabled>`

Parameters

`enable`	Boolean which enables or disables snapshot/refresh recovery

Example `<snapshot-enabled> no </snapshot-enabled>`

6.31.9 snapshots.channel

Description Configures a snapshot channel for NYSE XDP (refresh channel in NYSE terminology).

Note:

> `localChanId` must match the `localChanIds` in `<channels.channel>`.

Usage `<channel> localChanId numQueue srcPlugin interface srcIP:port enblRec startSeq useDumps </channel>`

Parameters

`localChanId`	See *Standard Multicast Channel Settings*
`numQueue`	See *Standard Multicast Channel Settings*
`srcPlugin`	See *Standard Multicast Channel Settings*
`interface`	See *Standard Multicast Channel Settings*
`srcIP:port`	See *Standard Multicast Channel Settings*
`enblRec`	See *Standard Multicast Channel Settings*
`startSeq`	See *Standard Multicast Channel Settings*
`useDumps`	See *Standard Multicast Channel Settings*

Example `<channel> 1A 0 lldt ac0 233.125.89.32:11072 </channel>`

6.31.10 extension-messages

Description Enables the generation of extension messages, by default these are disabled.

Usage `<extension-messages> extMsgs </extension-messages>`

Parameters

`extMsgs`	Boolean which enables/disables setting

Example `<extension-messages> on </extension-messages>`

6.31.11 max-channel-buffer

Description Sets the maximum number of packets to be stored in the reorder/recovery buffer per multicast.

Note:

> The plugin is no longer sensitive to `<reorder-max>`

Usage `<max-channel-buffer> max </max-channel-buffer>`

Parameters

`max`	Maximum packets to buffer. Default is 50 packets. Reordering is disabled when set to 0.

Example `<max-channel-buffer> 300 </max-channel-buffer>`

6.31.12 max-buffer-timeout-ns

Description Sets the amount of time for data to be stored in the reorder/recovery buffer.

Note:

> The plugin is no longer sensitive to `<reorder-timeout-ns>`

Usage `<max-buffer-timeout-ns> timeout </max-buffer-timeout-ns>`

Parameters

`timeout`	Number of nanoseconds to buffer packets in the reorder/recovery buffer. Default is 10,000 ns. Note that this setting is meaningless and has no effect unless `<max-channel-buffer>` is set to a value greater than 0.

Example `<max-buffer-timeout-ns> 30000 </max-buffer-timeout-ns>`

6.32 NYSE XDP Trades

Tag config.gmac.markets.market NYSE_XDP_TRADES

This plugin supports the NYSE XDP Trades feed and uses GMAC V1 templates only.

The basic structure of the market specific parameters configuration for NYSE_XDP_TRADES is shown in the following schema:

```
<market>
      <symbol-ref-file>
      <exchange-timestamp>
</market>
```

6.32.1 symbol-ref-file

Description This setting configures the path to the symbol reference file; this is only needed when reading symbol references from file.

Note:

> The parameter can also be a URL – also see standard `<symbol-ref-file>` tag description.

Usage `<symbol-ref-file> file </symbol-ref-file>`

Parameters

`file`	Location of the symbol reference file for the exchange

Example `<symbol-ref-file> path/NYSESymbolMapping_NMS.XML </symbol-ref-file>`

```
<symbol-ref-file>
ftp://ftp.nyxdata.com/NYSESymbolMapping/NYSESymbolMapping_NMS.XML
</symbol-ref-file>
```

6.32.2 exchange-timestamp

Description Configures the SourceTime field use.

Usage `<exchange-timestamp> timestamps </exchange-timestamp>`

Parameters

`timestamps`	Boolean which enables use of the SourceTime fields (where available) for timestamps, by default uses the SendTime fields

Example `<exchange-timestamp> on </exchange-timestamp>`

6.33 Options Price Reporting Authority OPRA Binary

Tag config.gmac.markets.market OPRA_BINARY

The basic structure of the market specific parameters configuration for OPRA_BINARY is shown in the following schema:

```
<market>
      <venue-ids>
            <venue>
      </venue-ids>
      <venue-filtering>
</market>
```

6.33.1 venue-ids.venue

Description Configures the user mapping for the raw exchange venue identifier.

This mapping allows the user to set its own venue identifiers which therefore can be shared across different market data feeds.

Usage `<venue> user-id exchange-id </venue>`

Parameters

`user-id`	Venue identifier as defined by the user
`exchange-id`	Venue identifier as provided by the exchange

Example

```
<venue> 10 A </venue> <!--NYSE AMEX-->
<venue> 5 C </venue> <!--CBOE-->
```

6.33.2 venue-filtering

Description Sets the list of venues to be filtering in using the OPRA participant ID. Other venues are filtered out by the card.

This configuration tag is only relevant when multicast channels are defined with srcPlugin = clxng.

Usage `<venue-filtering> venues </venue-filtering>`

Parameters

`Venues`	List of venues to be filtered in

Example

```
<!-- venues NYSE AMEX, CBOE, ISE only -->
<venue-filtering> ACI </venue-filtering>
```

6.34 OSLO Millennium

Tag config.gmac.markets.market OSLO_MIL

The basic structure of the market specific parameters configuration for OSLO_MIL is shown in the following schema:

```
<market>
      <symbol-ref-file>
      <test>
      <snapshot-enabled>
      <snapshots>
            <channel>
      </snapshots>
      <recovery>
            <channel>
      </recovery>
      <extension-messages>
      <version>
</market>
```

6.34.1 symbol-ref-file

Description This setting specifies the path to the symbol reference file, and is therefore only needed when reading symbol references from file.

Note:

> The path can also be a URL, in which case GMAC fetches the file using `wget` – also see standard `<symbol-ref-file>` tag description.

Usage `<symbol-ref-file> file </symbol-ref-file>`

Parameters

`file`	Location of the symbol reference file for the exchange

Example

```
<symbol-ref-file>
path/YYYYMMDD_XOSL_Instrument_Delta.csv </symbol-
ref-file>
```

6.34.2 snapshot-enabled

Description Configures the snapshot/refresh recovery.

Usage `<snapshot-enabled> enable </snapshot-enabled>`

Parameters

`enable`	Boolean which enables or disables snapshot/refresh recovery

Example `<snapshot-enabled> no </snapshot-enabled>`

6.34.3 snapshots.channel

Description Configures a TCP snapshot channel for requesting refreshes and snapshots from the market.

Usage

```
<channel> chanId numQueue - - recIP:port - - -
compId password </channel>
```

Parameters

`chanId`	The local id for this channel, must match the equivalent recovery channel for this market
`numQueue`	The DMA queue number, must match the equivalent recovery DMA queue for this market
`recIP:port`	The IP address and port of the TCP connection used for requesting snapshots and refreshes
`compId`	The comp ID provided by the exchange
`password`	The password provided by the exchange

Example

```
<channel> 0 0 - - 224.4.2.224:60300 - - - compid password </channel>
```

6.34.4 test

Description When set to false, GMAC is instructed to use the instrument record layout as described in OSLMIT 401 Reference Data - issue 4.2 (Millennium exchange release 8.6).

When set to true, GMAC is instructed to use the instrument record layout as described in OSLMIT 401 Reference Data - issue 5.1 (Millennium exchange release 9.1 and onwards until further notice).

When wrongly set, GMAC however automatically adjusts the instrument record columns.

Usage

```
<test> enable </test>
```

Parameters

`enable`	Boolean. Default is true.

Example

```
<test> true </test>
```

6.34.5 recovery.channel

Description Configures a recovery channel for the market.

Usage

```
<channel> chanId numQueue - - recIP:port - - - compId password </channel>
```

Parameters

`chanId`	See *Standard Multicast Channel Settings*
`numQueue`	See *Standard Multicast Channel Settings*
`recIP:port`	See *Standard Multicast Channel Settings*
`compId`	The comp ID provided by the exchange
`password`	The password provided by the exchange

Example

```
<channel> 0 0 - - 224.4.2.130:60100 - - - compid password </channel>
```

6.34.6 extension-messages

Description Enables the generation of extension messages, by default these are disabled.

Usage

```
<extension-messages> extMsgs </extension-messages>
```

Parameters

`extMsgs`	Boolean which enables/disables setting

Example `<extension-messages> on </extension-messages>`

6.34.7 version

Description The version of Oslo MITCH specifications to be used, as specified in the API for Oslo 303 MITCH Gateway manual.

Allowable values are:

- 3.3 (default)
- 4.1 (version for Millennium Exchange Release 8.6 and beyond)

Usage `<version> version </version>`

Parameters

`version`	Oslo MITCH specifications version

Example `<version> 4.1 </version>`

6.35 PHLX Order Plus

Tag config.gmac.markets.market PHLXTOPOPLUS

There are no market-specific configurations for PHLXTOPOPLUS, see *Market Configuration Settings*.

6.36 Top of PHLX Options (TOPO)

Tag config.gmac.markets.market PHLXTOPOV3

There are no market-specific configurations for PHLXTOPOV3, see *Market Configuration Settings*.

6.37 T7 EMDI

Tag config.gmac.markets.market EMDI

Note:

Only one reference channel is supported by the EMDI plugin. See the EMDI example configuration file shipped with your software.

The basic structure of the market specific parameters configuration for EMDI is shown in the following schema:

```
<market>
      <snapshot-enabled>
      <preferred-channel>
      <preferred-interface>
      <channel-definition-file>
      <extension-messages>
      <symbol-ref-file>
      <write-symbol-ref-file>
      <version>
      <max-channel-buffer>
      <max-buffer-timeout-ns>
</market>
```

6.37.1 snapshot-enabled

Description Configures the snapshot/refresh recovery.

When set, GMAC opens the snapshot channels.

Usage `<snapshot-enabled> enable </snapshot-enabled>`

Parameters `enable` Boolean which enables or disables snapshot/refresh recovery

Example `<snapshot-enabled> no </snapshot-enabled>`

6.37.2 preferred-channel

Description T7 specifies the preferred multicast to use for each product via the gateway location id in T7 Product Reference messages: GMAC will use the preferred multicast.

This setting allows the user to override the T7 recommendation.

Usage `<preferred-channel> prefChan </preferred-channel>`

Parameters `prefChan`

0 or A	Use channel A
1 or B	Use channel B
G	Use the channel that the exchange recommends (default)
P	Use the opposite channel that the exchange recommends
R	Globally enable A/B arbitrage for all snapshot and incremental channels. For the Reference Data Interface (RDI) channel, A/B arbitrage is configured manually, see section 5.5 for more details.

Example `<preferred-channel> G </preferred-channel>`

6.37.3 preferred-interface

Description Allows users to specify the physical interfaces to use for the A and B channels.

The first interface given is used for the A channels, and the second is used for the B channels.

If this setting is not used, the same interface will be used for the A and B channels i.e. the interface specified for the reference channel.

The plugin to use for the A and B channels is still taken from the setting used for the reference channel. It is therefore not possible to use different plugins for the A and B channels.

Note:

> Using an invalid interface will generate an error.

Usage

```
<preferred-interface> interface_A interface_B
</preferred-interface>
```

Parameters

`interface_A`	First interface used for the A channels
`interface_B`	Second interface used for the B channels

Example

```
<preferred-interface> ac0 ac1 </preferred-
interface>
```

6.37.4 channel-definition-file

Description Selects the preferred product types.

When the file is empty or this configuration is missing, GMAC will select all product types. The file is a white-space separated list.

The product type comes from ParentMktSegmID [1325].

Product type examples: OSTK, OINX, FINX, FBND.

Usage

```
<channel-definition-file> fileName </channel-
definition-file>
```

Parameters

`fileName`	Channel definition file

Example

```
<channel-definition-file>
../eurex_emdi_products.txt </channel-definition-
file>
```

6.37.5 extension-messages

Description Enables the generation of extension messages, by default these are disabled.

Usage

```
<extension-messages> extMsgs </extension-messages>
```

Parameters

`extMsgs`	Boolean which enables/disables setting

Example

```
<extension-messages> on </extension-messages>
```

6.37.6 symbol-ref-file

Description Location of the symbol reference file, which may be generated by GMAC

from the symbol reference information received on the live reference channel (see notes on write-symbol-ref-file option, below). If this option is used, GMAC will read the reference data from the file specified instead of reading it from the live reference channel, making it possible to perform quick mid-day starts, and will open the appropriate channels immediately.

Note #1:

> Usual time to receive complete reference data for simulation environment is less than 10 seconds, not counting the time needed for IGMP to get the data.

Note #2:

> If the file is malformed or incomplete, GMAC will issue a configuration error and quit.
>
> This option cannot be used simultaneously with write-symbol-ref-file (see below). Attempt to do so will result in a GMAC configuration error.

Usage `<symbol-ref-file> symbFile </symbol-ref-file>`

Parameters `symbFile` Location of the symbol reference file

Example
```
<symbol-ref-file> eurex_emdi.ref </symbol-ref-file>
```

6.37.7 write-symbol-ref-file

Description Symbol reference file destination. If this is specified, GMAC attempts to write the symbol reference file when the symbol reference information is received from the live reference channel. One complete cycle will be processed and written, unless the process is terminated prematurely or the feed is interrupted. Any existing reference file with the same file name is overwritten.

Note:

> This option cannot be used simultaneously with symbol-ref-file (see above). Attempt to do so will result in a GMAC configuration error.

Usage
```
<write-symbol-ref-file> symbFile </ write-symbol-ref-file>
```

Parameters `symbFile` Symbol reference file destination

Example
```
<write-symbol-ref-file> eurex_emdi.ref </ write-symbol-ref-file>
```

6.37.8 version

Description The version of T7 new trading architecture to be used, as specified in the T7 Market and Reference Data Interfaces manual.

When set to “auto” (default), the version is deduced from the T7 packet header template ID.

Allowable values are:

- 4.0
- 5.0
- “auto”

Usage `<version> version </version>`

Parameters `version` T7 manual version

Example `<version> auto </version>`

6.37.9 max-channel-buffer

Description Sets the maximum number of packets to be stored in the reorder/recovery buffer per multicast.

Note:

> The plugin is no longer sensitive to `<reorder-max>`

Usage `<max-channel-buffer> max </max-channel-buffer>`

Parameters

`max`	Maximum packets to buffer. Default is 50 packets. Reordering is disabled when set to 0.

Example `<max-channel-buffer> 300 </max-channel-buffer>`

6.37.10 max-buffer-timeout-ns

Description Sets the amount of time for data to be stored in the reorder/recovery buffer.

Note:

> The plugin is no longer sensitive to `<reorder-timeout-ns>`

Usage `<max-buffer-timeout-ns> timeout </max-buffer-timeout-ns>`

Parameters

`timeout`	Number of nanoseconds to buffer packets in the reorder/recovery buffer. Default is 10,000 ns. Note that this setting is meaningless and has no effect unless `<max-channel-buffer>` is set to a value greater than 0.

Example `<max-buffer-timeout-ns> 30000 </max-buffer-timeout-ns>`

6.38 T7 EOBI

Tag config.gmac.markets.market EOBI

Note:

Only one reference channel is supported by the EOBI plugin. See the EOBI example configuration file shipped with your software.

The basic structure of the market specific parameters configuration for EOBI is shown in the following schema:

```
<market>
      <snapshot-enabled>
      <preferred-channel>
      <preferred-interface>
      <channel-definition-file>
      <extension-messages>
      <symbol-ref-file>
      <write-symbol-ref-file>
      <version>
      <max-channel-buffer>
      <max-buffer-timeout-ns>
</market>
```

6.38.1 snapshot-enabled

Description Configures the snapshot/refresh recovery.

When set, GMAC opens the snapshot channels.

Usage `<snapshot-enabled> enable </snapshot-enabled>`

Parameters `enable` Boolean which enables or disables snapshot/refresh recovery

Example `<snapshot-enabled> no </snapshot-enabled>`

6.38.2 preferred-channel

Description T7 specifies the preferred multicast to use for each product via the gateway location id in T7 Product Reference messages: GMAC will use the preferred multicast.

This setting allows the user to override the T7 recommendation.

Usage `<preferred-channel> prefChan </preferred-channel>`

Parameters `prefChan`

0 or A	Use channel A
1 or B	Use channel B
G	Use the channel that the exchange recommends (default)
P	Use the opposite channel that the exchange recommends
R	Globally enable A/B arbitrage for all snapshot and incremental channels. For the Reference Data Interface (RDI) channel, A/B arbitrage is configured manually, see section 5.5 for more details.

Example `<preferred-channel> G </preferred-channel>`

6.38.3 preferred-interface

Description Allows users to specify the physical interfaces to use for the A and B channels.

The first interface given is used for the A channels, and the second is used for the B channels.

If this setting is not used, the same interface will be used for the A and B channels i.e. the interface specified for the reference channel.

The plugin to use for the A and B channels is still taken from the setting used for the reference channel. It is therefore not possible to use different plugins for the A and B channels.

Note:

> Using an invalid interface will generate an error.

Usage

```
<preferred-interface> interface_A interface_B
</preferred-interface>
```

Parameters

`interface_A`	First interface used for the A channels
`interface_B`	Second interface used for the B channels

Example

```
<preferred-interface> ac0 ac1 </preferred-
interface>
```

6.38.4 channel-definition-file

Description Selects the preferred product types.

When the file is empty or this configuration is missing, GMAC will select all product types. The file is a white-space separated list.

Product type examples: OSTK, OINX, FINX, FBND.

Usage

```
<channel-definition-file> fileName </channel-
definition-file>
```

Parameters

`fileName`	Channel definition file

Example

```
<channel-definition-file>
../eurex_eobi_products.txt </channel-definition-
file>
```

6.38.5 extension-messages

Description Enables the generation of extension messages, by default these are disabled.

Usage

```
<extension-messages> extMsgs </extension-messages>
```

Parameters

`extMsgs`	Boolean which enables/disables setting

Example

```
<extension-messages> on </extension-messages>
```

6.38.6 symbol-ref-file

Description Location of the symbol reference file, which may be generated by GMAC from the symbol reference information received on the live reference channel (see notes on write-symbol-ref-file option, below). If this option is

used, GMAC will read the reference data from the file specified instead of reading it from the live reference channel, making it possible to perform quick mid-day starts, and will open the appropriate channels immediately.

Note #1:

> Usual time to receive complete reference data for simulation environment is less than 10 seconds, not counting the time needed for IGMP to get the data.

Note #2:

> If the file is malformed or incomplete, GMAC will issue a configuration error and quit.
>
> This option cannot be used simultaneously with write-symbol-ref-file (see below). Attempt to do so will result in a GMAC configuration error.

Usage `<symbol-ref-file> symbFile </symbol-ref-file>`

Parameters `symbFile` Location of the symbol reference file

Example
```
<symbol-ref-file> eurex_eobi.ref </symbol-ref-file>
```

6.38.7 write-symbol-ref-file

Description Symbol reference file destination. If this is specified, GMAC attempts to write the symbol reference file when the symbol reference information is received from the live reference channel. One complete cycle will be processed and written, unless the process is terminated prematurely or the feed is interrupted. Any existing reference file with the same file name is overwritten.

Note:

> This option cannot be used simultaneously with symbol-ref-file (see above). Attempt to do so will result in a GMAC configuration error.

Usage
```
<write-symbol-ref-file> symbFile </ write-symbol-ref-file>
```

Parameters `symbFile` Symbol reference file destination

Example
```
<write-symbol-ref-file> eurex_emdi.ref </ write-symbol-ref-file>
```

6.38.8 version

Description The version of T7 new trading architecture to be used, as specified in the T7 Enhanced Order Book Interface manual.

When set to “auto” (default), the version is deduced from the T7 packet header template ID.

Allowable values are:

- 4.0
- 5.0
- “auto”

Usage `<version> version </version>`

Parameters `version` T7 manual version

Example `<version> 2.1 </version>`

6.38.9 max-channel-buffer

Description Sets the maximum number of packets to be stored in the reorder/recovery buffer per multicast.

Note:

> The plugin is no longer sensitive to `<reorder-max>`

Usage `<max-channel-buffer> max </max-channel-buffer>`

Parameters

`max`	Maximum packets to buffer. Default is 50 packets. Reordering is disabled when set to 0.

Example `<max-channel-buffer> 300 </max-channel-buffer>`

6.38.10 max-buffer-timeout-ns

Description Sets the amount of time for data to be stored in the reorder/recovery buffer.

Note:

> The plugin is no longer sensitive to `<reorder-timeout-ns>`

Usage `<max-buffer-timeout-ns> timeout </max-buffer-timeout-ns>`

Parameters

`timeout`	Number of nanoseconds to buffer packets in the reorder/recovery buffer. Default is 10,000 ns. Note that this setting is meaningless and has no effect unless `<max-channel-buffer>` is set to a value greater than 0.

Example `<max-buffer-timeout-ns> 30000 </max-buffer-timeout-ns>`

6.39 T7 MDI

Tag config.gmac.markets.market MDI

Note:

Only one reference channel is supported by the MDI plugin. See the MDI example configuration file shipped with your software.

The basic structure of the market specific parameters configuration for MDI is shown in the following schema:

```
<market>
      <snapshot-enabled>
      <preferred-channel>
      <preferred-interface>
      <channel-definition-file>
      <extension-messages>
      <symbol-ref-file>
      <write-symbol-ref-file>
      <version>
      <max-channel-buffer>
      <max-buffer-timeout-ns>
</market>
```

6.39.1 snapshot-enabled

Description Configures the snapshot/refresh recovery.

When set, GMAC opens the snapshot channels.

Usage `<snapshot-enabled> enable </snapshot-enabled>`

Parameters `enable` Boolean which enables or disables snapshot/refresh recovery

Example `<snapshot-enabled> no </snapshot-enabled>`

6.39.2 preferred-channel

Description T7 specifies the preferred multicast to use for each product via the gateway location id in T7 Product Reference messages: GMAC will use the preferred multicast.

This setting allows the user to override the T7 recommendation.

Usage `<preferred-channel> prefChan </preferred-channel>`

Parameters `prefChan`

0 or A	Use channel A
1 or B	Use channel B
G	Use the channel that the exchange recommends (default)
P	Use the opposite channel that the exchange recommends
R	Globally enable A/B arbitrage for all snapshot and incremental channels. For the Reference Data Interface (RDI) channel, A/B arbitrage is configured manually, see section 5.5 for more details.

Example `<preferred-channel> G </preferred-channel>`

6.39.3 preferred-interface

Description Allows users to specify the physical interfaces to use for the A and B channels.

The first interface given is used for the A channels, and the second is used for the B channels.

If this setting is not used, the same interface will be used for the A and B channels i.e. the interface specified for the reference channel.

The plugin to use for the A and B channels is still taken from the setting used for the reference channel. It is therefore not possible to use different plugins for the A and B channels.

Note:

> Using an invalid interface will generate an error.

Usage

```
<preferred-interface> interface_A interface_B
</preferred-interface>
```

Parameters

`interface_A`	First interface used for the A channels
`interface_B`	Second interface used for the B channels

Example

```
<preferred-interface> ac0 ac1 </preferred-
interface>
```

6.39.4 channel-definition-file

Description Selects the preferred product types.

When the file is empty or this configuration is missing, GMAC will select all product types. The file is a white-space separated list.

The product type comes from ParentMktSegmID [1325].

Product type examples: OSTK, OINX, FINX, FBND.

Usage

```
<channel-definition-file> fileName </channel-
definition-file>
```

Parameters

`fileName`	Channel definition file

Example

```
<channel-definition-file> ../eurex-
mdi_products.txt </channel-definition-file>
```

6.39.5 extension-messages

Description Enables the generation of extension messages, by default these are disabled.

Usage

```
<extension-messages> extMsgs </extension-messages>
```

Parameters

`extMsgs`	Boolean which enables/disables setting

Example

```
<extension-messages> on </extension-messages>
```

6.39.6 symbol-ref-file

Description Location of the symbol reference file, which may be generated by GMAC from the symbol reference information received on the live reference

channel (see notes on write-symbol-ref-file option, below). If this option is used, GMAC will read the reference data from the file specified instead of reading it from the live reference channel, making it possible to perform quick mid-day starts, and will open the appropriate channels immediately.

Note #1:

> Usual time to receive complete reference data for simulation environment is less than 10 seconds, not counting the time needed for IGMP to get the data.

Note #2:

> If the file is malformed or incomplete, GMAC will issue a configuration error and quit.
>
> This option cannot be used simultaneously with write-symbol-ref-file (see below). Attempt to do so will result in a GMAC configuration error.

Usage `<symbol-ref-file> symbFile </symbol-ref-file>`

Parameters `symbFile` Location of the symbol reference file

Example `<symbol-ref-file> eurex_mdi.ref </symbol-ref-file>`

6.39.7 write-symbol-ref-file

Description Symbol reference file destination. If this is specified, GMAC attempts to write the symbol reference file when the symbol reference information is received from the live reference channel. One complete cycle will be processed and written, unless the process is terminated prematurely or the feed is interrupted. Any existing reference file with the same file name is overwritten.

Note:

> This option cannot be used simultaneously with symbol-ref-file (see above). Attempt to do so will result in a GMAC configuration error.

Usage `<write-symbol-ref-file> symbFile </ write-symbol-ref-file>`

Parameters `symbFile` Symbol reference file destination

Example `<write-symbol-ref-file> eurex_mdi.ref </ write-symbol-ref-file>`

6.39.8 version

Description The version of T7 new trading architecture to be used, as specified in the T7 Market and Reference Data Interfaces manual.

When set to “auto” (default), the version is deduced from the T7 packet header template ID.

Allowable values are:

- 4.0
- 5.0
- “auto”

Usage `<version> version </version>`

Parameters `version` T7 manual version

Example `<version> 2.0 </version>`

6.39.9 max-channel-buffer

Description Sets the maximum number of packets to be stored in the reorder/recovery buffer per multicast.

Note:

> The plugin is no longer sensitive to `<reorder-max>`

Usage `<max-channel-buffer> max </max-channel-buffer>`

Parameters

`max`	Maximum packets to buffer. Default is 50 packets. Reordering is disabled when set to 0.

Example `<max-channel-buffer> 300 </max-channel-buffer>`

6.39.10 max-buffer-timeout-ns

Description Sets the amount of time for data to be stored in the reorder/recovery buffer.

Note:

> The plugin is no longer sensitive to `<reorder-timeout-ns>`

Usage `<max-buffer-timeout-ns> timeout </max-buffer-timeout-ns>`

Parameters

`timeout`	Number of nanoseconds to buffer packets in the reorder/recovery buffer. Default is 10,000 ns. Note that this setting is meaningless and has no effect unless `<max-channel-buffer>` is set to a value greater than 0.

Example `<max-buffer-timeout-ns> 30000 </max-buffer-timeout-ns>`

6.40 SIX ITCH Market Data Interface

Tag config.gmac.markets.market SIX_IMI

The basic structure of the market specific parameters configuration for ITCH50 is shown in the following schema:

```
<market>
      <channels>
            <channel>
      </channels>
      <snapshot-enabled>
      <snapshots>
            <channel>
      </snapshots>
      <recovery>
            <channel>
      </recovery>
</market>
```

6.40.1 channels.channel

Description Configures a multicast channel for this market.

Usage `<channel> localChanId numQueue srcPlugin interface srcIP:port</channel>`

Parameters

`localChanId`	See *Standard Multicast Channel Settings* *Must be greater than or equal to 1000 for referential channels*
`numQueue`	See *Standard Multicast Channel Settings*
`srcPlugin`	See *Standard Multicast Channel Settings*
`interface`	See *Standard Multicast Channel Settings*
`srcIP:port`	See *Standard Multicast Channel Settings*

Example `<channel> 0 0 lldt ac0 239.49.67.1:7300</channel>`

6.40.2 snapshot-enabled

Description Configures the snapshot/refresh recovery.

Usage `<snapshot-enabled> enable </snapshot-enabled>`

Parameters

`enable`	Boolean which enables or disables snapshot/refresh recovery

Example `<snapshot-enabled> no </snapshot-enabled>`

6.40.3 snapshots.channel

Description Configures a snapshot channel (Glimpse SoupBinTCP) for this market.

Usage `<channel> localChanId tcpServerIp tcpServerPort username password </channel>`

Parameters

`localChanId`	Snapshot channel, must be unique for the market
`tcpServerIp`	Address for the snapshot channel

`tcpServerPort`	Port for the snapshot channel
`username`	Username for the snapshot channel
`password`	Password for the snapshot channel

Example

```
<channel> 0 146.109.45.252 23330 user pass
</channel>
```

6.40.4 recovery.channel

Description Configures a recovery channel (MoldUDP64) per live channel for this market.

Usage

```
<channel>    localChanId    ServerIp    ServerPort
</channel>
```

Parameters

`localChanId`	Recovery channel, must be unique for the market
`ServerIp`	UDP unicast address of the gap recovery server
`ServerPort`	UDP port

Example

```
<channel> 0 10.155.128.252 7310 </channel>
```

6.41 Turquoise Millennium

Tag config.gmac.markets.market TURQUOISE_MIL

The basic structure of the market specific parameters configuration for TURQUOISE_MIL is shown in the following schema:

```
<market>
      <symbol-ref-file>
      <snapshot-enabled>
      <snapshots>
            <channel>
      </snapshots>
      <recovery>
            <channel>
      </recovery>
      <version>
</market>
```

6.41.1 symbol-ref-file

Description This setting specifies the path to the symbol reference file, and is therefore only needed when reading symbol references from file.

Note:

> The path can also be a URL, in which case GMAC fetches the file using `wget` – also see standard `<symbol-ref-file>` tag description.

Usage `<symbol-ref-file> file1 file2 </symbol-ref-file>`

Parameters

`file1`	Location of the symbol reference file YYYYMMDD_TRQX_Instrument. This file is required.
`file2`	Location of the symbol reference file Tq_Eq_RefFile_YYYYMMDD. This file is optional: it is used to fill the TargetBook member of GMACMessageReferenceSecurityV3.

Example

```
<symbol-ref-file>   path/%Y%m%d_TRQX_Instrument.csv
path/Tq_Eq_RefFile_%Y%m%d.csv </symbol-ref-file>
```

6.41.2 snapshot-enabled

Description Configures the snapshot/refresh recovery.

Usage `<snapshot-enabled> enable </snapshot-enabled>`

Parameters

`enable`	Boolean which enables or disables snapshot/refresh recovery

Example `<snapshot-enabled> no </snapshot-enabled>`

6.41.3 snapshots.channel

Description Configures a TCP snapshot channel for requesting refreshes and snapshots from the market.

Usage

```
<channel> chanId numQueue - - recIP:port - - -
compId password </channel>
```

Parameters

`chanId`	The local id for this channel, must match the equivalent recovery channel for this market
`numQueue`	The DMA queue number, must match the equivalent recovery DMA queue for this market
`recIP:port`	The IP address and port of the TCP connection used for requesting snapshots and refreshes
`compId`	The comp ID provided by the exchange
`password`	The password provided by the exchange

Example

```
<channel> 0 0 - - 224.4.2.130:60100 - - - compid
password </channel>
```

6.41.4 recovery.channel

Description Configures a recovery channel for the market.

Usage

```
<channel> chanId numQueue - - recIP:port - - -
compId password </channel>
```

Parameters

`chanId`	See *Standard Multicast Channel Settings*
`numQueue`	See *Standard Multicast Channel Settings*
`recIP:port`	See *Standard Multicast Channel Settings*
`compId`	The comp ID provided by the exchange
`password`	The password provided by the exchange

Example

```
<channel> 0 0 - - 224.4.2.130:60100 - - - compid
password </channel>
```

6.41.5 version

Description The version of Turquoise MITCH specifications to be used, as specified in the API for Turquoise level 2 MITCH UDP market data manual.

Allowable values are:

- 3.3 (default)
- 3.4 (version for Millennium Exchange Release 9.1)

Usage

```
<version> version </version>
```

Parameters

`version`	Turquoise MITCH specifications version

Example

```
<version> 3.4 </version>
```

6.42 UTP SIP Binary Data Services

Tag config.gmac.markets.market UTP

The basic structure of the market specific parameters configuration for UTP is shown in the following schema:

```
<market>
      <venue-ids>
            <venue>
      </venue-ids>
      <extension-messages>
      <max-channel-buffer>
      <max-buffer-timeout-ns>
</market>
```

6.42.1 venue-ids.venue

Description Configures the user mapping for the venue identifier.

This mapping allows the user to set its own venue identifiers which therefore can be shared across different market data feeds.

Usage `<venue> user-id exchange-id </venue>`

Parameters

`user-id`	Venue identifier as defined by the user
`exchange-id`	Venue identifier as provided by the exchange

Example

```
<venue> 10 A </venue> <!--NYSE American-->
<venue> 5 J </venue> <!--Direct Edge A-->
```

6.42.2 extension-messages

Description Enables the generation of extension messages, by default these are disabled.

Usage `<extension-messages> extMsgs </extension-messages>`

Parameters

`extMsgs`	Boolean which enables/disables setting

Example `<extension-messages> on </extension-messages>`

6.42.3 max-channel-buffer

Description Sets the maximum number of packets to be stored in the reorder/recovery buffer per multicast.

Note:

> The plugin is no longer sensitive to `<reorder-max>`

Usage `<max-channel-buffer> max </max-channel-buffer>`

Parameters

`max`	Maximum packets to buffer. Default is 50 packets. Reordering is disabled when set to 0.

Example `<max-channel-buffer> 300 </max-channel-buffer>`

6.42.4 max-buffer-timeout-ns

Description Sets the amount of time for data to be stored in the reorder/recovery buffer.

Note:

> The plugin is no longer sensitive to `<reorder-timeout-ns>`

Usage `<max-buffer-timeout-ns> timeout </max-buffer-timeout-ns>`

Parameters

`timeout`	Number of nanoseconds to buffer packets in the reorder/recovery buffer. Default is 10,000 ns. Note that this setting is meaningless and has no effect unless `<max-channel-buffer>` is set to a value greater than 0.

Example `<max-buffer-timeout-ns> 30000 </max-buffer-timeout-ns>`

6.43 XDP Options

Tag config.gmac.markets.market OPTIONS_XDP

The basic structure of the market specific parameters configuration for OPTIONS_XDP is shown in the following schema:

```
<market>
      <source-id>
      <snapshots>
            <channel>
      </snapshots>
      <snapshot-enabled>
      <max-channel-buffer>
      <max-buffer-timeout-ns>
      <extension-messages>
</market>
```

6.43.1 source-id

Description Configures the name of the requestor which is required in the TCP login request.

Usage `<source-id> SourceID </source-id>`

Parameters

`SourceID`	Name of the requestor

Example `<source-id> MySource </source-id>`

6.43.2 snapshots.channel

Description Configures the snapshot channel to download all available symbol data.

Usage

```
<channel> localChanId numQueue srcPlugin interface
srcIP:port enblRec startSeq useDumps password
</channel>
```

Parameters

`localChanId`	See *Standard Multicast Channel Settings*
`numQueue`	See *Standard Multicast Channel Settings*
`srcPlugin`	See *Standard Multicast Channel Settings*
`interface`	See *Standard Multicast Channel Settings*
`srcIP:port`	See *Standard Multicast Channel Settings*
`enblRec`	See *Standard Multicast Channel Settings*
`startSeq`	See *Standard Multicast Channel Settings*
`useDumps`	See *Standard Multicast Channel Settings*
`password`	Password in the TCP login request

Example

```
<channel> 0 0 lldt ac0 159.125.66.105:51700:t - -
- MyPassword </channel>
```

6.43.3 snapshot-enabled

Description Configures the snapshot/refresh recovery.

When set, GMAC opens the snapshot channels.

Usage `<snapshot-enabled> enable </snapshot-enabled>`

Parameters

`enable`	Boolean which enables or disables snapshot/refresh recovery

Example `<snapshot-enabled> no </snapshot-enabled>`

6.43.4 max-channel-buffer

Description Sets the maximum number of packets to be stored in the reorder/recovery buffer per multicast.

Note:

> The plugin is no longer sensitive to `<reorder-max>`

Usage `<max-channel-buffer> max </max-channel-buffer>`

Parameters

`max`	Maximum packets to buffer. Default is 50 packets. Reordering is disabled when set to 0.

Example `<max-channel-buffer> 300 </max-channel-buffer>`

6.43.5 max-buffer-timeout-ns

Description Sets the amount of time for data to be stored in the reorder/recovery buffer.

Note:

> The plugin is no longer sensitive to `<reorder-timeout-ns>`

Usage `<max-buffer-timeout-ns> timeout </max-buffer-timeout-ns>`

Parameters

`timeout`	Number of nanoseconds to buffer packets in the reorder/recovery buffer. Default is 10,000 ns. Note that this setting is meaningless and has no effect unless `<max-channel-buffer>` is set to a value greater than 0.

Example `<max-buffer-timeout-ns> 30000 </max-buffer-timeout-ns>`

6.43.6 extension-messages

Description Enables the generation of extension messages, by default these are disabled.

Usage `<extension-messages> extMsgs </extension-messages>`

Parameters

`extMsgs`	Boolean which enables/disables setting

Example `<extension-messages> on </extension-messages>`

6.44 XETRA EBS

Tag config.gmac.markets.market XETRA

Note:

Only one reference channel is supported by the XETRA plugin. See the XETRA example configuration file shipped with your software.

The basic structure of the market specific parameters configuration for XETRA is shown in the following schema:

```
<market>
      <snapshot-enabled>
      <trades-enabled>
      <preferred-channel>
      <preferred-interface>
      <channel-definition-file>
      <extension-messages>
      <symbol-ref-file>
      <write-symbol-ref-file>
</market>
```

6.44.1 snapshot-enabled

Description Configures the snapshot/refresh recovery.

When set, GMAC opens the snapshot channels.

Usage `<snapshot-enabled> enable </snapshot-enabled>`

Parameters `enable` Boolean which enables or disables snapshot/refresh recovery

Example `<snapshot-enabled> no </snapshot-enabled>`

6.44.2 trades-enabled

Description Enables or disables the trade channels.

When set, GMAC opens the trade channels.

Usage `<trades-enabled> enable </trades-enabled>`

Parameters `enable` Boolean which enables or disables the trade channels

Example `<trades-enabled> no </trades-enabled>`

6.44.3 preferred-channel

Description XETRA specifies the preferred multicast to use for each product via the gateway location id in XETRA Instrument Reference messages.GMAC will use the preferred multicast.

This setting allows the user to override the XETRA recommendation.

Usage `<preferred-channel> prefChan </preferred-channel>`

Parameters `prefChan` 0 or A Use channel A

1 or B Use channel B

G Use the channel that the exchange recommends (default)

P Use the opposite channel that the exchange recommends

R Globally enable A/B arbitrage for all snapshot and incremental channels.

Example `<preferred-channel> G </preferred-channel>`

6.44.4 preferred-interface

Description Allows users to specify the physical interfaces to use for the A and B channels.

The first interface given is used for the A channels, and the second is used for the B channels.

If this setting is not used, the same interface will be used for the A and B channels i.e. the interface specified for the reference channel.

The plugin to use for the A and B channels is still taken from the setting used for the reference channel. It is therefore not possible to use different plugins for the A and B channels.

Note:

> Using an invalid interface will generate an error.

Usage

```
<preferred-interface> interface_A interface_B
</preferred-interface>
```

Parameters

`interface_A` First interface used for the A channels

`interface_B` Second interface used for the B channels

Example

```
<preferred-interface> ac0 ac1 </preferred-
interface>
```

6.44.5 channel-definition-file

Description Selects the preferred instrument groups.

GMAC will select all the instrument groups when the file is empty or this configuration is missing. The list of all XETRA reference groups is displayed by GMAC after the reference information is received when market verbosity is CRIT(2); the file must be empty. The user can then adjust his definition file. The groups are white-space separated.

Note #1:

> The maintenance channel is in group MAINTENANCE.

Note #2:

> The instrument group name is the InstGrp - Instrument Group Type field in the Xetra Enhanced Broadcast Solution documentation.

Usage

```
<channel-definition-file> fileName </channel-
definition-file>
```

Parameters

`fileName` Channel definition file

Example

```
<channel-definition-file>
../xetra_channel_definition </channel-definition-
file>
```

6.44.6 extension-messages

Description Enables the generation of extension messages, by default these are disabled.

Usage `<extension-messages> extMsgs </extension-messages>`

Parameters `extMsgs` Boolean which enables/disables setting

Example `<extension-messages> on </extension-messages>`

6.44.7 symbol-ref-file

Description Location of the symbol reference file, which may be generated by GMAC from the symbol reference information received on the live reference channel (see notes on write-symbol-ref-file option, below). If this option is used, GMAC will read the reference data from the file specified instead of reading it from the live reference channel, making it possible to perform quick mid-day starts, and will open the appropriate channels immediately.

Note #1:

> Usual time to receive complete reference data for simulation environment is less than 10 seconds, not counting the time needed for IGMP to get the data.

Note #2:

> If the file is malformed or incomplete, GMAC will issue a configuration error and quit.

> This option cannot be used simultaneously with write-symbol-ref-file (see below). Attempt to do so will result in a GMAC configuration error.

Usage `<symbol-ref-file> symbFile </symbol-ref-file>`

Parameters `symbFile` Location of the symbol reference file

Example `<symbol-ref-file> xetra_reference </symbol-ref-file>`

6.44.8 write-symbol-ref-file

Description Symbol reference file destination. If this is specified, GMAC attempts to write the symbol reference file when the symbol reference information is received from the live reference channel. One complete cycle will be processed and written, unless the process is terminated prematurely or the feed is interrupted. Any existing reference file with the same file name is overwritten.

Note:

> This option cannot be used simultaneously with symbol-ref-file (see above). Attempt to do so will result in a GMAC configuration error.

Usage `<write-symbol-ref-file> symbFile </ write-symbol-ref-file>`

Parameters `symbFile` Symbol reference file destination

Example `<write-symbol-ref-file> xetra_reference </ write-symbol-ref-file>`

7. Configuring Multiple Markets

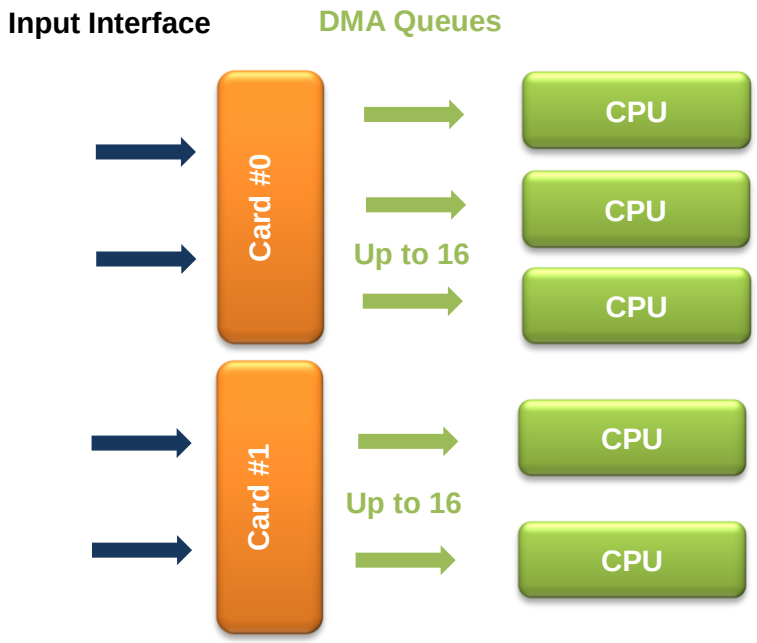
When configuring multiple markets, recovery is enabled per channel. That is, if enabling recovery, then all markets directed to a channel must have recovery configured.

8. Configuring Multiple Queues

Using multiple queues allows the user to scale the load efficiently to multiple processor cores. The Celoxica accelerator card can spread the data flow based on simple filtering rules.

Both 1G and 10G cards support up to 16 DMA (or GMAC) queues. Multiple cards can be used to make use of more queues and thus more CPUs.

The following figure illustrates a multi-queue solution:



There is no correspondence between queues and the physical input interfaces (ac0, ac1). It is therefore possible to route data from either interface to any queue. However, it is not possible to route the same traffic from one interface to multiple queues simultaneously. It is also not possible to route data from one card to a queue on another card.

8.1 GMAC

The user application will be written to spawn multiple threads and open multiple DMA queues as necessary. It is also possible to run multiple applications on the same machine as long as the following rules are obeyed:

- Each application uses a unique configuration file: the configuration file specifies the routing of multicasts to DMA queues.
- Multiple applications can't share the same queue.
- The total number of queues used by all applications using the same card doesn't exceed 16.
- Multiple applications don't subscribe to the same multicast on a single interface.
- Any one application doesn’t subscribe to the same multicast on the same interface but on multiple queues.

Note that queue arbitration is handled by the Celoxica driver. The queue number in the configuration file is therefore not the actual queue DMA queue used on the card. Hence, queue numbers can be reused between configuration files for multiple applications.

8.2 Order Book

The Order Book configuration file should specify the number of DMA queue reading threads (Book threads) to be spawned.

The GMAC part of the configuration must follow the same rules as for GMAC-only set-ups as concerns the mapping of multicasts to DMA queues. Additionally, all multicasts on a given market should be routed to the same queue in OB configurations.

Note:

This is a requirement for the Celoxica Order Book application; it is not required for the GMAC.

9. Examples

9.1 Multiple Queues

The following example shows configuration where Nasdaq ITCH is routed to DMA queue 0 and ARCA XDP is routed to queue 1. The queue setting appears in **bold**.

```
<markets>
      <market> 0 ITCH50
            <channels>
                  <channel> 0 0 clxng clx0 233.54.12.111:26477 </channel>
            </channels>
            <start-seq> undefined </start-seq>
            <recovery>
                  <host> 206.200.246.219 </host>
                  <port> 36987 </port>
            </recovery>
      </market>
      <market> 1 ARCA_XDP
            <symbol-ref-file> ./ArcaSymIdx.20100902 </symbol-ref-file>
            <channels>
                  <channel> 0 1 clxng clx0 224.0.59.64:11064:u </channel> <!-- Integrated Book XDP Production 1 -->
                  <channel> 1 1 clxng clx0 224.0.59.65:11065:u </channel> <!-- Integrated Book XDP Production 2 -->
                  <channel> 2 1 clxng clx0 224.0.59.66:11066:u </channel> <!-- Integrated Book XDP Production 3 -->
                  <channel> 3 1 clxng clx0 224.0.59.67:11067:u </channel> <!-- Integrated Book XDP Production 4 -->
            </channels>
            <start-seq> undefined </start-seq>
      </market>
</markets>
```

The Order Book configuration file also has to specify:

```
<max-queues> 2 </max-queues>
```

For more information on configuring the Order Book, see the Order Book configuration guide.

9.2 Single Market

The following example shows configuration for CME_BINARY plugin.

```
<config>
      <gmac>
            <!-- Log -->
            <verbosity> INFO </verbosity>
            <logfile> /tmp/gmac.log </logfile>

            <!-- reorder/recovery buffer pool -->
            <bufferpool> 1048576 4 </bufferpool>

            <!-- recovery settings -->
            <recovery> off </recovery>
            <recovery-affinity> 15 </recovery-affinity>

            <!-- specifies, if GMAC should send subscription IGMP packets. -->
            <subscription> on </subscription>

            <multicast-timeout-us> 3000000</multicast-timeout-us>
            <reissue-subscriptions> 5 </reissue-subscriptions>
            <send-multicast-timeout-messages> No </send-multicast-timeout-messages>

            <markets>
                  <!-- market ID = Market name -->
                  <market> 0 CME_BINARY
                        <v3> on </v3>
                        <time-zone> -6 </time-zone>

                        <!-- Activate extensions -->
                        <extension-messages>1</extension-messages>

                        <!—Reordering settings -->
                        <max-channel-buffer> 16 </max-channel-buffer>
                        <max-buffer-timeout-ns> 30000 </max-buffer-timeout-ns>

                        <!-- Instrument replay channels -->
                        <referentials>
```

```
                        <channel> 310 0 clxng clx0 224.0.31.43:14310 - - - on </channel> <!-- 310NA instrument replay -->
                        <channel> 311 0 clxng clx0 224.0.31.44:14311 - - - on </channel> <!-- 311NA instrument replay -->
                    </referentials>

                    <!-- Incremental channels -->
                    <channels>
                        <channel> 310A 0 clxng clx0 224.0.28.1:14310 - - - on </channel> <!-- 310IA incremental -->
                        <channel> 310B 0 clxng clx1 224.0.28.128:15310 - - - on </channel> <!-- 310IB incremental -->
                        <channel> 311A 0 clxng clx0 224.0.28.2:14311 - - - on </channel> <!-- 311IA incremental -->
                        <channel> 311B 0 clxng clx1 224.0.28.129:15311 - - - on </channel> <!-- 311IB incremental -->
                    </channels>

                    <!-- Snapshot channels -->
                    <snapshot-enabled> yes </snapshot-enabled>
                    <snapshots>
                        <channel> 310 0 clxng clx0 224.0.31.22:14310 - - - off </channel> <!-- 310SA incremental -->
                        <channel> 311 0 clxng clx0 224.0.31.23:14311 - - - off </channel> <!-- 311SA incremental -->
                    </snasphot>
                </market>
            </markets>
        </gmac>
</config>
```