

Elektron Message API Java Edition V3.1.1

ELEKTRON MESSAGE API CONFIGURATION GUIDE



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Chapter 1 Introduction

1.1 About this Manual

This document is authored by Elektron Message API architects and programmers. Several of its authors have designed, developed, and maintained the Elektron Message API product and other Thomson Reuters products which leverage it. As such, this document is concise and addresses realistic scenarios and use cases.

This guide documents the functionality and capabilities of the Elektron Message API Java Edition . The Elektron Message API can also connect to and leverage many different Thomson Reuters and customer components. If you want the Elektron Message API to interact with other components, consult that specific component's documentation to determine the best way to configure and interact with these other devices.

This document explains the configuration parameters for the Elektron Messaging API (simply called the Message API). Message API configuration is specified first via compiled-in configuration values, then via an optional user-provided XML configuration file, and finally via programmatic changes introduced via the software.

Configuration works in the same fashion across all platforms.

1.2 Audience

This manual provides information that aids software developers and local site administrators in understanding Elektron Message API configuration parameters. You can obtain further information from the *Elektron Message Java Edition API Developer's Guide*.

1.3 Acronyms and Abbreviations

ACRONYM	MEANING
ADH	Advanced Data Hub is the horizontally scalable service component within Thomson Reuters Enterprise Platform (TREP) providing high availability for publication and contribution messaging, subscription management with optional persistence, conflation and delay capabilities.
ADS	Advanced Distribution Server is the horizontally scalable distribution component within Thomson Reuters Enterprise Platform (TREP) providing highly available services for tailored streaming and snapshot data, publication and contribution messaging with optional persistence, conflation and delay capabilities.
API	Application Programming Interface
ASCII	American Standard Code for Information Interchange
EED	Elektron Edge Device
EMA	Elektron Message API, referred to simply as the Message API
ETA	Elektron Transport API, referred to simply as the Transport API. Formerly referred to as UPA.
HTTP	Hypertext Transfer Protocol

Table 1: Acronyms and Abbreviations

ACRONYM	MEANING
HTTPS	Hypertext Transfer Protocol (Secure)
OMM	Open Message Model
QoS	Quality of Service
RDM	Reuters Domain Model
Reactor	The Reactor is a low-level, open-source, easy-to-use layer above ETA. It offers heartbeat management, connection and item recovery, and many other features to help simplify application code for users.
RMTES	Reuters Multi-Lingual Text Encoding Standard
RSSL	Reuters Source Sink Library
RWF	Reuters Wire Format, a Thomson Reuters proprietary format.
TR-DFD	Thomson Reuters Data Feed Direct
TREP	Thomson Reuters Enterprise Platform
UML	Unified Modeling Language
UTF-8	8-bit Unicode Transformation Format

Table 1: Acronyms and Abbreviations

1.4 References

1. Elektron Message API Java Edition *RDM Usage Guide*
2. *API Concepts Guide*
3. *EMA Java Edition Reference Manual*
4. Elektron Message API Java Edition *Developers Guide*
5. Transport API Java Edition *Value Added Components Developers Guide*
6. *Transport API Java Edition Developers Guide*
7. The [Thomson Reuters Professional Developer Community](#)

1.5 Documentation Feedback

While we make every effort to ensure the documentation is accurate and up-to-date, if you notice any errors, or would like to see more details on a particular topic, you have the following options:

- Send us your comments via email at apidocumentation@thomsonreuters.com.
- Add your comments to the PDF using Adobe's **Comment** feature. After adding your comments, submit the entire PDF to Thomson Reuters by clicking **Send File** in the **File** menu. Use the apidocumentation@thomsonreuters.com address.

1.6 Document Conventions

This document uses the following types of conventions:

- Typographic
- Field and Text Values

1.6.1 Typographic

- Java classes, methods, in-line code snippets, and types are shown in **orange, Courier New** font.
- Parameters, filenames, tools, utilities, and directories are shown in **Bold** font.
- Document titles and variable values are shown in *italics*.
- When initially introduced, concepts are shown in ***Bold, Italics***.
- Longer code examples are shown in Courier New font against an orange background. For example:

```
AppClient client = new AppClient();

OmmConsumerConfig config = EmaFactory.createOmmConsumerConfig();

OmmConsumer consumer =
    EmaFactory.createOmmConsumer(config.operationModel(OperationModel.USER_DISPATCH)
        .host("localhost:14002").username("user"));

ReqMsg reqMsg = EmaFactory.createReqMsg();

consumer.registerClient(reqMsg.domainType(EmaRdm.MMT_MARKET_BY_PRICE).serviceName(
    ("DIRECT_FEED").name("BBH.ITC"), client);
```

1.6.2 Field and Text Values

The value for individual fields in XML files are specified as **<fieldName value="field_value"/>** where:

- **fieldName** is the name of the field and cannot contain white space.
- **field_value** sets the field's value and is always included in double quotes.

Note: Except for examples, double quotes are omitted from the field (parameter) descriptions throughout the remainder of this document.

Though enumerations have text values (i.e., SOCKET), in the software, text values are represented as numbers (required for programmatic configuration). When introduced, enumerations are listed along with their textual values.

1.6.3 Boolean Values

When configuring a Boolean expression, you can use any number; however EMA interprets such expressions in the following manner:

- **0** (or any other value): false
- **1**: true

Chapter 2 EMA Configuration General Overview

2.1 About Message API Configuration

You write the Message API configuration using a simple XML schema, some settings of which can be changed via software function calls. The initial configuration compiled into the Message API software defines a minimal set of configuration parameters. Message API users can also supply their own custom XML file (e.g., **EmaConfig.xml**) to specify configuration parameters. For details on deploying a custom XML file, refer to Section 4.3.1. Additionally, programmatic interfaces can change parameter settings.

Message API configuration data is divided into the following groups:

- **Consumer:** Consumer configuration data is the highest-level description of the application. Such settings typically select entries from the channel, and dictionary groups.
- **NiProvider:** Non-interactive provider configuration data is the highest-level description of the application. Such settings typically select entries from the channel, and directory groups.
- **Channel:** Channel configuration data describe various connection alternatives and provides configuration alternatives for those connections.
- **Dictionary:** Dictionary configuration data sets the location information for dictionary alternatives.
- **Directory:** Directory configuration data configures source directory refresh information.

The Consumer and NiProvider groups are top-level configuration groups. Specific consumer and non-interactive provider applications select their configurations using the consumer and non-interactive provider names, which are passed in using the `consumerName()` and `providerName()` methods (for details on these methods, refer to Section 4.4.1).

This manual discusses the six configuration groups and the configuration parameters available to each group.

2.2 Parameter Overview

Many default behaviors are hard-coded into the EMA library and globally enforced. However, if you need to change EMA behaviors or configure EMA for your specific deployment, you can use EMA's XML configuration file (**EmaConfig.xml**) and adjust behaviors using the appropriate parameters (discussed in this section). While EMA globally enforces a set of default behaviors, certain other default behaviors are dependent on the use of the XML file and its settings.

For a list of default behaviors (and the parameters that you can use to change these behaviors) refer to Section 2.3.

For details on editing **EmaConfig.xml** and its XML schema, refer to Chapter 2, EMA Configuration General Overview.

2.3 Default Behaviors

When the EMA library needs a parameter, it behaves according to its hard coded configuration. You can change the behavior of EMA by providing a valid alternate value either through the use of **EmaConfig.xml**, function calls, or programmatic methods.

PARAMETER	TYPE	DEFAULT BEHAVIOR	NOTES
Host	String	localhost	Specifies the host name of the server to which the application connects. The parameter value can be a remote host name or IP address.
Port	String	14002	Specifies the port number on the server to which the application connects.
DefaultConsumer	String	EmaConsumer	If consumer components are configured, this parameter is ignored.
RdmFieldDictionaryFileName	String	./RDMFieldDictionary	Specifies the path and name of the RdmFieldDictionary file.
EnumTypeDefFileName	String	./enumtype.def	Specifies the path and name of the enumtypeDef dictionary file.

Table 2: Global Configuration

Chapter 3 Configuration Groups

3.1 ConsumerGroup

A **ConsumerGroup** contains two elements:

- A **DefaultConsumer** element, which you can use to specify a default **Consumer** component. If a default **Consumer** is not specified in the **ConsumerGroup**, EMA uses the first Consumer listed in the **ConsumerList**. For details on configuring a default **Consumer**, refer to Section 3.1.2.
- A **ConsumerList** element, which contains one or more **Consumer** components (each should be uniquely identified by a **<Name .../>** entry). The consumer component is the highest-level abstraction within an application and typically refers to **Channel** and/or **Dictionary** components which specify consumer capabilities.

For a generic **ConsumerGroup** XML schema, refer to Section 3.1.1.

For details on configuring a **ConsumerGroup**, refer to Section 3.1.3.

For a list of parameters you can use in configuring a **Consumer**, refer to Section 3.1.4.

3.1.1 Generic XML Schema for ConsumerGroup

The generic XML schema for **ConsumerGroup** is as follows:

```
<ConsumerGroup>
  <DefaultConsumer value="VALUE" />
  <ConsumerList>
    <Consumer>
      <Name value="VALUE" />
      ...
    </Consumer>
  </ConsumerList>
</ConsumerGroup>
```

3.1.2 Setting a Default Consumer

If a **DefaultConsumer** is not specified, then the EMA uses the first **Consumer** component in the **ConsumerGroup**. However, you can specify a default consumer by including the following parameter on a unique line inside **ConsumerGroup** but outside **ConsumerList** (for an example, refer to Appendix A).

```
<DefaultConsumer value="VALUE" />
```

3.1.3 Configuring Consumers in a ConsumerGroup

To configure a **Consumer** component, add the appropriate parameters to the target consumer in the XML schema, each on a unique line (for a list of available **Consumer** parameters, refer to Section 3.1.4).

For example, if your configuration includes channel schemas, you specify the desired channel schema by adding the following parameter inside the appropriate **Consumer** section:

```
<Channel value="VALUE" />
```

Consumer components can use different channel schemas if the configuration includes more than one.

3.1.4 Consumer Entry Parameters

Use the following parameters when configuring a **Consumer** in EMA.

PARAMETER	TYPE	DEFAULT	DESCRIPTION
Channel	String	N/A	<p>Specifies the channel that the Consumer component should use. This channel must match the Name parameter from the appropriate <Channel> entry in the ChannelGroup configuration.</p> <p>If Channel is not specified, the EMA resorts to default channel behavior when needed. For further details on the <Channel> entry and default behaviors, refer to Section 3.3.</p>
ChannelSet	String	N/A	<p>Specifies a comma-separated set of channels names. Each listed channel name should have an appropriate <Channel> entry in the ChannelGroup. Channels in the set will be tried with each reconnection attempt until a successful connection is made. For further details refer to Section 3.3.4</p> <p>Note: If both Channel and ChannelSet are configured, then EMA uses the parameter that is configured last in the file. For example, if <Channel> is configured after <ChannelSet> then EMA uses <Channel>, but if <ChannelSet> is configured after <Channel> then EMA uses <ChannelSet>.</p>
Dictionary	String	N/A	<p>Specifies how the consumer should access its dictionaries (it must match the Name parameter from the appropriate <Dictionary> entry in the DictionaryGroup configuration).</p> <p>If Dictionary is not specified, the EMA uses the channel's dictionary when needed. For further details on this default behavior, refer to Section 3.5.</p>

Table 3: Consumer Group Parameters

PARAMETER	TYPE	DEFAULT	DESCRIPTION
DictionaryRequestTimeout	long	45,000	<p>Specifies the amount of time (in milliseconds) the application has to download dictionaries from a provider before the OmmConsumer throws an exception.</p> <p>If set to 0, EMA will wait for a response indefinitely.</p> <p>Note: If ChannelSet is configured:</p> <ul style="list-style-type: none"> EMA honors DictionaryRequestTimeout only on its first connection. If the channel supporting the first connection goes down, EMA does not use DictionaryRequestTimeout on subsequent connections.
DirectoryRequestTimeout	long	45,000	<p>Specifies the amount of time (in milliseconds) the provider has to respond with a source directory refresh message before the OmmConsumer throws an exception.</p> <p>If set to 0, EMA will wait for a response indefinitely.</p> <p>Note: If ChannelSet is configured:</p> <ul style="list-style-type: none"> EMA honors DirectoryRequestTimeout only on its first connection. If the channel supporting the first connection goes down, EMA does not use DirectoryRequestTimeout on subsequent connections.
DispatchTimeoutApiThread	int	0	<p>Specifies the duration (in microseconds) for which the internal EMA thread is inactive before going active to check whether a message was received.</p> <p>If set to zero, the EMA internal thread goes active only if it gets notified about a received message.</p>
ItemCountHint	long	100,000	<p>Specifies the number of items the application expects to request. If set to 0, EMA resets it to 1024.</p> <p>For better performance, the application can set this to the approximate number of item requests it expects.</p>
LoginRequestTimeout	long	45,000	<p>Specifies the amount of time (in milliseconds) the provider has to respond with a login refresh message before the OmmConsumer throws an exception.</p> <p>If set to 0, EMA will wait for a response indefinitely.</p> <p>Note: If ChannelSet is configured:</p> <ul style="list-style-type: none"> EMA honors LoginRequestTimeout only on its first connection. If the channel supporting the first connection goes down, EMA does not use LoginRequestTimeout on subsequent connections.
MaxDispatchCountApiThread	long	100	Specifies the maximum number of messages the EMA dispatches before taking a real-time break.
MaxDispatchCountUserThread	long	100	Specifies the maximum number of messages the EMA can dispatch in a single call to the OmmConsumer::dispatch() .

Table 3: Consumer Group Parameters (Continued)

PARAMETER	TYPE	DEFAULT	DESCRIPTION
MaxOutstandingPosts	long	100,000	Specifies the maximum allowable number of on-stream posts waiting for an acknowledgment before the OmmConsumer disconnects.
MsgKeyInUpdates	int	1	Specifies whether EMA fills in message key values on updates using the message key provided with the request. Available values include: <ul style="list-style-type: none"> 0 (false): Do not fill in the message's key values (values received from the wire are preserved). 1 (true): Fill in the message's key values (values received from the wire are overridden).
Name	String	N/A	Specifies the name of this Consumer component. Name is required when creating a Consumer component. You can use any value for Name .
ObeyOpenWindow	int	1	Specifies whether the OmmConsumer obeys the OpenWindow from services advertised in a provider's Source Directory response. Available values include: <ul style="list-style-type: none"> 0 (false) 1 (true)
PostAckTimeout	long	15,000	Specifies the length of time (in milliseconds) a stream waits to receive an ACK for an outstanding post before forwarding a negative acknowledgment to the application. If set to 0 , EMA will wait for a response indefinitely.
ReconnectAttemptLimit	int	-1	Specifies the maximum number of times the consumer and non-interactive provider attempt to reconnect to a channel when it fails. If set to -1 , the consumer and non-interactive provider continually attempt to reconnect.
ReconnectMaxDelay	int	5000	Sets the maximum amount of time the consumer and non-interactive provider wait (in milliseconds) before attempting to reconnect a failed channel. Refer also to the ReconnectMinDelay parameter.
ReconnectMinDelay	int	1000	Specifies the minimum amount of time the consumer and non-interactive provider wait (in milliseconds) before attempting to reconnect a failed channel. This wait time increases with each connection attempt, from reconnectMinDelay to reconnectMaxDelay .
RequestTimeout	long	15,000	Specifies the amount of time (in milliseconds) the OmmConsumer waits for a response to a request before sending another request. If set to 0 , EMA will wait for a response indefinitely.
ServiceCountHint	long	513	Sets the size of directory structures for managing services. If the application specifies 0 , EMA resets it to 513 .
XmlTraceToStdout	int	0	Specifies whether EMA traces its messages in XML format to stdout. Possible values are: <ul style="list-style-type: none"> 0 (false): Turns off tracing. 1 (true): Turns on tracing to stdout.

Table 3: Consumer Group Parameters (Continued)

3.2 Provider Groups

The EMA supports both interactive and non-interactive provider groups. The type of provider you configure will determine the group names and parameters that you use. To simplify the content in this guide, parameters and names use the variable **Provider**. Throughout this section (and the remainder of the manual), the value for **Provider** is dependent on the type of provider which you configure:

- For non-interactive providers, **Provider** is **NiProvider**.
- For interactive providers, **Provider** is **IProvider**.

A **ProviderGroup** contains two elements:

- A **DefaultProvider** element, which you can use to specify a default **NiProvider** component. If a default **Provider** is not specified in the **ProviderGroup**, EMA uses the first non-interactive provider listed in the **ProviderList**. For details on configuring a default **Provider**, refer to Section 3.2.2.
- A **ProviderList** element, which contains one or more **Provider** components (each should be uniquely identified by a **<Name .../>** entry). The non-interactive provider component is the highest-level abstraction within an application and typically refers to **Channel** (used by non-interactive providers) **Server** (used by interactive providers) and/or **Directory** components which specify provider capabilities.

For a generic **ProviderGroup** XML schema, refer to Section 3.2.1.

For details on configuring a **ProviderGroup**, refer to Section 3.2.3.

For a list of parameters you can use in configuring a **Provider**, refer to Section 3.2.4.

3.2.1 Generic XML Schema for Provider Group

The generic XML schema for **ProviderGroup** is as follows:

```
<ProviderGroup>
  <DefaultProvider value="VALUE" />
  <ProviderList>
    <Provider>
      <Name value="VALUE" />
      ...
    </Provider>
  </ProviderList>
</ProviderGroup>
```

3.2.2 Setting a Default Provider

If a **DefaultProvider** is not specified, then the EMA uses the first **Provider** component in the **ProviderGroup**. However, you can specify a default provider by including the following parameter on a unique line inside **ProviderGroup** but outside **ProviderList** (for an example, refer to Appendix A).

```
<DefaultProvider value="VALUE" />
```

3.2.3 Configuring a *Provider* in a *ProviderGroup*

To configure a **Provider** component, add the appropriate parameters to the `target` in the XML schema, each on a unique line (for a list of available **Provider** parameters, refer to Section 3.2.4).

For example, if your configuration includes channel schemas, you specify the desired channel schema by adding the following parameter inside the appropriate **Provider** section:

```
<Channel value="VALUE" />
```

If your provider component needs more than one channel schema, you can configure each unique schema in the XML file.

3.2.4 Provider Entry Parameters

Use the following parameters when configuring a **Provider**. Certain parameters can only be used with a specific provider type (e.g., **Channel** can only be used with an **NiProvider**). The parameter's description will mention any provider-type restrictions.

PARAMETER	TYPE	DEFAULT	DESCRIPTION
AcceptDirMessageWithoutMinFilters	int	0	Used only with IPProvider . Sets the IPProvider to accept incoming directory request messages without the minimum required INFO and STATE directory filters.
AcceptMessageSameKeyButDiffStream	int	0	Used only with IPProvider . Sets the IPProvider to accept incoming request messages even though they have a message key, domain, and private stream flag that match those of an existing request which uses a different stream ID.
AcceptMessageThatChangesService	int	0	Used only with IPProvider . Sets the IPProvider to accept incoming request messages for reissuing the service name of an existing item stream.
AcceptMessageWithoutAcceptingRequests	int	0	Used only with IPProvider . Sets the IPProvider to accept incoming request messages even though the source directory is not accepting requests.
AcceptMessageWithoutBeingLogin	int	0	Used only with IPProvider . Sets the IPProvider to accept incoming request messages even though the interactive provider has not accepted a login request.
AcceptMessageWithoutQosInRange	int	0	Used only with IPProvider . Sets the IPProvider to accept incoming request messages even though the requesting QoS is not in the QoS range of the source directory.

Table 4: ProviderGroup Parameters

PARAMETER	TYPE	DEFAULT	DESCRIPTION
Channel	String	N/A	<p>Used only with NiProvider.</p> <p>Specifies the channel that the NiProvider component should use. This channel must match the Name parameter from the appropriate <Channel> entry in the ChannelGroup configuration.</p> <p>If Channel is not specified, the EMA resorts to default channel behavior when needed. For further details on the <Channel> entry and default behaviors, refer to Section 3.3.</p>
ChannelSet	String	N/A	<p>Used only with NiProvider.</p> <p>Specifies a comma-separated set of channel names. Each channel name must have a corresponding <Channel> entry in the ChannelGroup. In the event of a reconnection, Channels in the set are tried until a successful connection is made. For further details, refer to Section 3.3.4.</p>
			<p>Note: If both Channel and ChannelSet are configured, EMA uses the parameter configured last (linearly) in the file.</p> <p>For example:</p> <ul style="list-style-type: none"> If <Channel> is configured after <ChannelSet>, EMA uses <Channel>. If <ChannelSet> is configured after <Channel>, EMA uses <ChannelSet>.
EnumTypeFragmentSize	int	128000	Used only with IPProvider . Sets the maximum enumeration types fragmentation size (in bytes) for each multi-part refresh message.
FieldDictionaryFragmentSize	int	8192	Used only with IPProvider . Sets the maximum field dictionary fragmentation size (in bytes) for each multi-part refresh message.
Server	String	N/A	<p>Used only with IPProvider.</p> <p>Specifies the channel that the IPProvider component should use. This channel must match the Name parameter from the appropriate <Server> entry in the ServerGroup configuration.</p> <p>If Server is not specified, the EMA resorts to default channel behavior when needed. For further details on the <Server> entry and default behaviors, refer to Section 3.4.</p>
DispatchTimeoutApiThread	int	0	<p>Specifies the duration (in microseconds) for which the internal EMA thread is inactive before going active to check whether a message was received.</p> <p>If set to zero, the EMA internal thread goes active only if it gets notified about a received message.</p>

Table 4: *ProviderGroup* Parameters (Continued)

PARAMETER	TYPE	DEFAULT	DESCRIPTION
ItemCountHint	long	100,000	Specifies the number of items the application expects to maintain. If set to 0 , EMA resets it to 1024 . For better performance, the application can set this to the approximate number of items it maintains.
LoginRequestTimeout	long	45,000	Used only with NiProvider . Specifies the amount of time (in milliseconds) the provider has to respond with a login refresh message before the OmmProvider throws an exception. If set to 0 , EMA will wait for a response indefinitely. Note: When ChannelSet is configured, EMA honors LoginRequestTimeout only on its first connection. If the channel supporting the first connection goes down, EMA does not use LoginRequestTimeout on subsequent connections.
MaxDispatchCountApiThread	long	100	Specifies the maximum number of messages the EMA dispatches before taking a real-time break.
MaxDispatchCountUserThread	long	100	Specifies the maximum number of messages the EMA can dispatch in a single call to the OmmProvider::dispatch() .
MergeSourceDirectoryStreams	long	1	Used only with NiProvider . Specifies whether EMA merges all source directory streams (configured and user-submitted) into one stream: <ul style="list-style-type: none"> • 1 (true) • 0 (false)
Name	String	N/A	Specifies the name of this Provider component. Name is required when creating a Provider component. You can use any value for Name .
ReconnectAttemptLimit	int	-1	Used only with NiProvider . Specifies the maximum number of times the consumer and non-interactive provider attempt to reconnect to a channel to a channel when it fails. If set to -1 , the consumer and non-interactive provider continually attempt to reconnect.
ReconnectMaxDelay	int	5000	Used only with NiProvider . Sets the maximum amount of time the consumer and non-interactive provider wait (in milliseconds) before attempting to reconnect a failed channel. Refer also to the ReconnectMinDelay parameter.

Table 4: *ProviderGroup* Parameters (Continued)

PARAMETER	TYPE	DEFAULT	DESCRIPTION
ReconnectMinDelay	int	1000	Used only with NiProvider . Specifies the minimum amount of time the consumer and non-interactive provider wait (in milliseconds) before attempting to reconnect a failed channel. This wait time increases with each connection attempt, from reconnectMinDelay to reconnectMaxDelay .
RecoverUserSubmitSourceDirectory	long	1	Used only with NiProvider . Specifies whether EMA recovers user-submitted source directories when recovering from a disconnect: <ul style="list-style-type: none"> • 1 (true) • 0 (false)
RefreshFirstRequired	long	1	Specifies whether EMA requires the application to send a refresh message prior to sending update messages. Available values include: <ul style="list-style-type: none"> • 1 (true) • 0 (false)
RemoveItemsOnDisconnect	long	1	Used only with NiProvider . Specifies whether EMA removes items from its internal hash table whenever it disconnects from the ADH: <ul style="list-style-type: none"> • 1 (true) • 0 (false)
RequestTimeout	UInt64	15000	Specifies the length of time (in milliseconds) the OmmProvider waits for a response to a request before sending another request (the DICTIONARY domain will not send another request). If set to 0, EMA waits for a response indefinitely.
ServiceCountHint	long	513	Sets the size of directory structures for managing services. If the application specifies 0, EMA resets it to 513.
XmlTraceToStdout	int	0	Specifies whether EMA traces its messages in XML format to stdout. Possible values are: <ul style="list-style-type: none"> • 0 (false): Turns off tracing. • 1 (true): Turns on tracing to stdout.

Table 4: *ProviderGroup* Parameters (Continued)

3.3 Channel Group

ChannelGroup is used only with an **NiProvider**.

The **ChannelGroup** contains a **ChannelList**, which contains one or more **Channel** entries (each uniquely identified by a **<Name .../>** entry). Each channel includes a set of connection parameters for a specific connection or connection type.

There is no default channel. If an EMA application needs a specific channel, you must specify this in the appropriate **Consumer** or **NiProvider** section.

- For details on the parameters you can use to configure the **Consumer** component, refer to Section 3.1.4.
- For details on the parameters you can use to configure the **NiProvider** component, refer to Section 3.2.4
- For a generic **ChannelGroup** XML schema, refer to Section 3.3.1.
- For a list of universal parameters you can use in configuring any type of **Channel** regardless of the channel type, refer to Section 3.3.2.
- For a list of parameters you can use only when configuring a **Channel** whose channel type is **RSSL_SOCKET**, refer to Section 3.3.3.

3.3.1 Generic XML Schema for ChannelGroup

The top-level XML schema for the **ChannelGroup** is as follows:

```
<ChannelGroup>
  <ChannelList>
    <Channel>
      <Name value="VALUE" />
      ...
    </Channel>
  </ChannelList>
</ChannelGroup>
```

3.3.2 Universal Channel Entry Parameters

You can use the following parameters in any **<Channel>** entry, regardless of the **ChannelType**.

PARAMETER NAME	TYPE	DEFAULT	NOTES
ChannelType	String	RSSL_SOCKET	Specifies the type of channel or connection used to connect to the server. Calling the host function can change this field. For details on this event, refer to Section 4.4.2. Currently RSSL_SOCKET (0) is the only available value.
ConnectionPingTimeout	long	30000	Specifies the duration (in milliseconds) after which the EMA terminates the connection if it does not receive communication or pings from the server.

Table 5: Universal <Channel> Parameters

PARAMETER NAME	TYPE	DEFAULT	NOTES
GuaranteedOutputBuffers	long	100	Specifies the number of guaranteed buffers (allocated at initialization time) available for use by each RsslChannel when writing data. Each buffer is created to contain maxFragmentSize bytes. For details on RsslChannel and maxFragmentSize , refer to the <i>Transport API Developers Guide</i> .
HighWaterMark	long	6144	Specifies the upper buffer-usage threshold for the channel.
InterfaceName	String	""	Specifies a character representation of the IP address or hostname of the local network interface over which the EMA sends and receives content. InterfaceName is for use in systems that have multiple network interface cards. If unspecified, the default network interface is used.
Name	String		Specifies the Channel 's name.
NumInputBuffers	long	10	Specifies the number of buffers used to read data. Buffers are sized according to maxFragmentSize . For details on RsslChannel and maxFragmentSize , refer to the <i>Transport API Developers Guide</i> .
SysRecvBufSize	long	0	Specifies the size (in KB) of the system's receive buffer for this channel.
SysSendBufSize	long	0	Specifies the size (in KB) of the system's send buffer for this channel.

Table 5: Universal <Channel> Parameters (Continued)

3.3.3 Parameters for Use with Channel Type: RSSL_SOCKET

In addition to the universal parameters listed in Section 3.3.2, you can use the following parameters to configure a channel whose type is **RSSL_SOCKET**.

PARAMETER NAME	TYPE	DEFAULT	NOTES
CompressionThreshold	long	30	Sets the message size threshold (in bytes, the allowed value is 30-Integer.MAX_VALUE), above which all messages are compressed (thus individual messages might not be compressed). Different compression types have different behaviors and compression efficiency can vary depending on message size.

Table 6: Parameters for Channel Type: RSSL_SOCKET

PARAMETER NAME	TYPE	DEFAULT	NOTES
CompressionType	String	None	<p>Specifies the EMA's preferred type of compression. Compression is negotiated between the client and server: if the server supports the preferred compression type, the server will compress data at that level.</p> <p>Available values are:</p> <ul style="list-style-type: none"> • None (0) • ZLib (1) • LZ4 (2) <p>Note: A server can be configured to force a particular compression type, regardless of client settings.</p>
DirectWrite	int	0	<p>Specifies whether to set the direct socket write flag when sending data on a channel.</p> <p>When the flag is set, every package is sent on the wire immediately on the submit call. If direct write is not set, the package might be placed into an internal queue which is later flushed onto the wire.</p> <p>Possible values are:</p> <ul style="list-style-type: none"> • 0: Send data without the direct socket write flag. • 1: Send data with the direct socket write flag.
Host	String	localhost	Specifies the host name of the server to which the EMA connects. The parameter value can be a remote host name or IP address.
Port	String	14002	Specifies the port on the remote server to which the EMA connects.
TcpNodelay	int	1	<p>Specifies whether to use Nagle's algorithm when sending data. Available values are:</p> <ul style="list-style-type: none"> • 0: Send data using Nagle's algorithm. • 1: Send data without delay.

Table 6: Parameters for Channel Type: RSSL_SOCKET (Continued)

3.3.4 Example XML Schema for Configuring ChannelSet

The following an example XML schema for use in configuring a **ChannelSet**:

```
<ConsumerGroup>
  <ConsumerList>
    <Consumer>
      ...
      <!-- ChannelSet specifies an ordered list of Channels to which OmmConsumer will attempt -->
      <!-- to connect, one at a time, if the previous one fails to connect -->
      <ChannelSet value="VALUE1, VALUE2, ..."/>
      ...
    </Consumer>
  </ConsumerList>
</ConsumerGroup>
```

3.3.5 Example Configuration for ChannelSet

The following is an example of a specific ChannelSet configuration using the XML schema introduced in Section 3.3.4:

```
<ConsumerGroup>
  <ConsumerList>
    <Consumer>
      <Name value="Consumer_1"/>
      <!-- ChannelSet specifies an ordered list of Channels to which OmmConsumer will attempt -->
      <!-- to connect, one at a time, if the previous one fails to connect -->
      <ChannelSet value="Channel_1, Channel_2"/>
      <ReconnectAttemptLimit value="10"/>
      <XmlTraceToStdout value="1"/>
    </Consumer>
  </ConsumerList>
</ConsumerGroup>
<ChannelGroup>
  <ChannelList>
    <Channel>
      <Name value="Channel_1"/>
      <ChannelType value="ChannelType::RSSL_SOCKET"/>
      <Host value="localhost"/>
      <Port value="14002"/>
    </Channel>
    <Channel>
      <Name value="Channel_2"/>
      <ChannelType value="ChannelType::RSSL_SOCKET"/>
      <Host value=" localhost "/>
      <Port value="14008"/>
    </Channel>
  </ChannelList>
</ChannelGroup>
```

3.4 Server Group

ServerGroup is used only with an **IProvider**.

The **ServerGroup** contains a **ServerList**, which contains one or more **Server** entries (each uniquely identified by a **<Name .../>** entry). Each channel includes a set of connection parameters for a specific connection or connection type.

There is no default server. If an EMA application needs a specific server, you need to specify this in the appropriate **Consumer** or **IProvider** section.

- For details on the parameters you can use to configure the **Consumer** component, refer to Section 3.1.4.
- For details on the parameters you can use to configure the **IProvider** component, refer to Section 3.2.4.
- For a generic **ServerGroup** XML schema, refer to Section 3.4.1.
- For a list of parameters you can use in configuring **Server**, refer to Section 3.4.2.

3.4.1 Generic XML Schema for ServerGroup

The top-level XML schema for the **ServerGroup** is as follows:

```
<ServerGroup>
  <ServerList>
    <Server>
      <Name value="VALUE" />
      ...
    </Server>
  </ServerList>
</ServerGroup>
```

3.4.2 Server Entry Parameters

You can use the following parameters in any **<Server>** entry, regardless of the **ServerType**.

PARAMETER NAME	TYPE	DEFAULT	NOTES
ConnectionMinPingTimeout	long	20000	Configures the minimum length of time (in milliseconds) to use as a timeout for a connected channel.
ConnectionPingTimeout	long	60000	Specifies the duration (in milliseconds) after which the EMA terminates the connection if it does not receive communication or pings from the server.
CompressionThreshold	long	30	Sets the message size threshold (in bytes, the allowed value is 30-Integer.MAX_VALUE), above which all messages are compressed (thus individual messages might not be compressed). Different compression types have different behaviors and compression efficiency can vary depending on message size.

Table 7: Universal <Server> Parameters

PARAMETER NAME	TYPE	DEFAULT	NOTES
CompressionType	String	None	<p>Specifies the EMA's preferred type of compression. Compression is negotiated between the client and server: if the server supports the preferred compression type, the server will compress data at that level.</p> <p>Available values are:</p> <ul style="list-style-type: none"> • None (0) • ZLib (1) • LZ4 (2) <p>Note: A server can be configured to force a particular compression type, regardless of client settings.</p>
DirectWrite	int	0	<p>Specifies whether to set the direct socket write flag when sending data on a channel.</p> <p>When the flag is set, every package is sent on the wire immediately on the submit call. If direct write is not set, the package might be placed into an internal queue which is later flushed onto the wire.</p> <p>Possible values are:</p> <ul style="list-style-type: none"> • 0: Send data without the direct socket write flag. • 1: Send data with the direct socket write flag.
GuaranteedOutputBuffers	long	100	<p>Specifies the number of guaranteed buffers (allocated at initialization time) available for use by each RsslChannel when writing data. Each buffer is created to contain maxFragmentSize bytes.</p> <p>For details on RsslChannel and maxFragmentSize, refer to the <i>Transport API Developers Guide</i>.</p>
HighWaterMark	long	6144	Specifies the upper buffer-usage threshold for the channel.
InterfaceName	String	""	<p>Specifies a character representation of the IP address or hostname of the local network interface over which the EMA sends and receives content.</p> <p>InterfaceName is for use in systems that have multiple network interface cards. If unspecified, the default network interface is used.</p>
Name	String		Specifies the Server 's name.
NumInputBuffers	long	10	<p>Specifies the number of buffers used to read data. Buffers are sized according to maxFragmentSize.</p> <p>For details on RsslChannel and maxFragmentSize, refer to the <i>Transport API Developers Guide</i>.</p>
Port	String	14002	Specifies the port on the remote server to which the EMA connects.

Table 7: Universal <Server> Parameters (Continued)

PARAMETER NAME	TYPE	DEFAULT	NOTES
ServerType	String	RSSL_SOCKET	Specifies the type of channel or connection used to connect to the server. Calling the host function can change this field. For details on this event, refer to Section 4.4.2. Use enumeration values with EMA's programmatic configuration (for details, refer to in Section 4.5). Currently RSSL_SOCKET (0) is the only available value.
SysRecvBufSize	long	0	Specifies the size (in KB) of the system's receive buffer for this channel.
SysSendBufSize	long	0	Specifies the size (in KB) of the system's send buffer for this channel.
TcpNodelay	int	1	Specifies whether to use Nagle's algorithm when sending data. Available values are: <ul style="list-style-type: none"> 0: Send data using Nagle's algorithm. 1: Send data without delay.

Table 7: Universal <Server> Parameters (Continued)

3.5 Dictionary Group

The **DictionaryGroup** contains a **DictionaryList**, which contains one or more **Dictionary** components (each uniquely identified by a <Name .../> entry). Each **Dictionary** component defines parameters relating to how the dictionary is accessed.

3.5.1 Generic XML Schema for DictionaryGroup

The top-level XML schema for **DictionaryGroup** is as follows:

```
<DictionaryGroup>
  <DictionaryList>
    <Dictionary>
      <Name value="..." />
      ...
    </Dictionary>
  </DictionaryList>
</DictionaryGroup>
```

3.5.2 Dictionary Entry Parameters

Use the following parameters when configuring a **Dictionary** entry in the EMA.

PARAMETER NAME	TYPE	DEFAULT	NOTES
DictionaryType	String	ChannelDictionary	Specifies the dictionary loading mode. Possible values are: <ul style="list-style-type: none"> FileDictionary (0): The EMA loads the dictionaries from the files specified in the parameters RdmFieldDictionaryFileName and EnumTypeDefFileName. ChannelDictionary (1): The EMA downloads dictionaries by requesting the dictionaries from the upstream provider.
EnumTypeDefFileName	String		Sets the location of the EnumTypeDef file.
EnumTypeDefItemName	String	RWFEnum	Sets the name of the EnumTypeDef item specified in the source directory InfoFilter.DictionariesProvided , and InfoFilter.DictionariesUsed elements.
Name	String		Sets a unique name for a Dictionary component in the DictionaryList .
RdmFieldDictionaryFileName	String		Sets the location of the RdmFieldDictionary .
RdmFieldDictionaryItemName	String	RWFFld	Sets the name of the RdmFieldDictionary item specified in the source directory InfoFilter.DictionariesProvided , and InfoFilter.DictionariesUsed elements.

Table 8: Dictionary Group Parameters

3.6 Directory Group

The **DirectoryGroup** contains a **DirectoryList**, which contains one or more **Directory** components (each uniquely identified by a **<Name .../>** entry). Each **Directory** component defines a list of **Service** components (which in turn define parameters that relate to the Service **InfoFilter** and **StateFilter**).

3.6.1 Generic XML Schema for Directory Entry

The top-level XML schema for **DirectoryGroup** is as follows:

```

<DirectoryGroup>
  <DefaultDirectory value="..." />
  <DirectoryList>
    <Directory>
      <Name value="..." />
      <Service>
        <Name value="..." />
        <InfoFilter>
          ...
        </InfoFilter>
        <StateFilter>
          ...
        </StateFilter>
      </Service>
    </Directory>
  </DirectoryList>
</DirectoryGroup>

```

```
        </Service>
        ...
    </Directory>
    ...
</DirectoryList>
</DirectoryGroup>
```

3.6.2 Setting Default Directory

If you do not specify a **DefaultDirectory**, then the EMA uses the first **Directory** component in the **DirectoryGroup**. However, you can specify a default directory by including the following parameter on a unique line inside **DirectoryGroup** but outside **DirectoryList** (for an example, refer to Appendix A).

```
<DefaultDirectory value="VALUE" />
```

3.6.3 Configuring a Directory in a DirectoryGroup

To configure a **Directory** component, add the following parameters (as appropriate) to the target directory in the XML Schema, each on a separate line:

PARAMETER	TYPE	DEFAULT	DESCRIPTION
Name	String	N/A	Specifies the name of this Directory component. Name is required when creating a Directory component. You can use any value for Name .
Service	Component Name	N/A	Specifies InfoFilter and StateFilter values for the given Service . Note: A Directory may contain several Service components.

Table 9: Directory Entry Parameters

3.6.4 Service Entry Parameters

The Service Entry resembles the RDM's Source Directory Domain payload. For further details, refer to the *EMA Java Edition RDM Usage Guide*. The EMA supports only the RDM entries **InfoFilter** and **StateFilter**. Use the following parameters when configuring a Service in EMA:

PARAMETER	TYPE	DEFAULT	DESCRIPTION
Name	String	N/A	Specifies the name of this Service component. You can use any value for Name .
InfoFilter	Component Name	N/A	Specifies InfoFilter values for the given Service . InfoFilter values set a filter on the types of information EMA sends out.
StateFilter	Component Name	N/A	Specifies StateFilter values for the given Service . EMA sends StateFilter values to describe the service's state.

Table 10: Service Entry Parameters

3.6.5 InfoFilter Entry Parameters

EMA uses the following **InfoFilter** parameters to set filters on the types of information EMA sends out over its services (as specified in the **EmaConfig.xml**).

For an example of structuring sections (e.g., **InfoFilter**) and components (e.g., **Capabilities** or **DictionariesProvided**) in **EmaConfig.xml** refer to Appendix A.

PARAMETER	TYPE	DEFAULT	DESCRIPTION
ServiceId	int	N/A	Specifies the Service 's unique identifier. Available values include 0 - 65535.
Vendor	String	N/A	Specifies the name of the vendor that provides the service.
IsSource	int	0	Specifies whether the source of data sent on this service is its original publisher: <ul style="list-style-type: none"> 1: The service's data is provided directly by an original publisher 0: The service's data is a consolidation of multiple sources into a single service.

Table 11: Source Directory Info Parameters

PARAMETER	TYPE	DEFAULT	DESCRIPTION
Capabilities	Component Name	N/A	A component that includes CapabilitiesEntry parameters, which define the message domain types that can be requested from the service. For details on the parameter used in this section, refer to Section 3.6.5.1.
ItemList	String	N/A	Specifies the name of the SymbolList that includes all items provided by this service.
DictionariesProvided	Component Name	N/A	A component that includes DictionariesProvidedEntry parameters, which define the dictionaries that the provider makes available. When specifying a dictionary, use the Dictionary 's component name whose *ItemName entries are used in this Service's RDM DictionariesProvided entry. For details on the parameter used in this section, refer to Section 3.6.5.2.
AcceptingConsumerStatus	int	1	Indicates whether a service can accept and process messages related to Source Mirroring. <ul style="list-style-type: none"> 0: The provider does not accept consumer status 1: The provider accept consumer status
DictionariesUsed	Component Name	N/A	A component that includes DictionariesUsedEntry parameters, which define the dictionaries that the provider uses. When specifying a dictionary, use the Dictionary 's component name whose *ItemName entries are used in this Service's RDM DictionariesUsed entry. For details on the parameter used in this section, refer to Section 3.6.5.3.
QoS	Component Name	Includes a single QoSEntry	A component that includes QoSEntry sections, with each QoSEntry section defining a QoS Timeliness and Rate supported by this Service. For details on the parameter used in this section, refer to Section 3.6.5.4.
SupportsQoSRange	int	0	Indicates whether the provider supports a QoS range when requesting an item. <ul style="list-style-type: none"> 0: The provider does not support a QoS Range. 1: The provider supports a QoS Range. For further details on using QoS ranges, refer to the <i>RDM Java Edition Usage Guide</i> .
SupportsOutOfBandSnapshots	int	For non-interactive provider: 0	Indicates whether the provider supports Snapshot requests after the OpenLimit has been reached: <ul style="list-style-type: none"> 0: The provider does not support snapshot requests. 1: The providers supports snapshot requests. For details on OpenLimit , refer to the <i>RDM Java Edition Usage Guide</i> .

Table 11: Source Directory Info Parameters (Continued)

3.6.5.1 CapabilitiesEntry Parameter

Use the **CapabilitiesEntry** parameter to configure the message domain type supported by the **Service** component:

PARAMETER	TYPE	DEFAULT	DESCRIPTION
CapabilitiesEntry	int or String	N/A	Specifies the message domain type supported by the Service component. Accepted names are listed in the EmaRdm interface.
			Note: You can set CapabilitiesEntry to be an RDM domain number or name (e.g. 6 or MMT_MARKET_PRICE).

Table 12: CapabilitiesEntry Parameter

3.6.5.2 DictionariesProvided Entry Parameter

Use the **DictionariesProvidedEntry** parameter to configure the dictionaries provided for the **Service's InfoFilter**:

PARAMETER	TYPE	DEFAULT	DESCRIPTION
DictionariesProvidedEntry	String	RWFFId for RdmFieldDictionaryItemName RWFFEnum for enumTypeDefItemName	Specifies the name of a Dictionary component from the DictionaryGroup section whose RdmFieldDictionaryItemName and enumTypeDefItemName parameters are used in this Service's RDM DictionariesProvided entry.

Table 13: DictionariesProvided Parameter

3.6.5.3 DictionariesUsed Entry Parameter

Use the **DictionariesUsedEntry** parameter to configure the types of dictionaries used by the **Service's InfoFilter**:

PARAMETER	TYPE	DEFAULT	DESCRIPTION
DictionariesUsedEntry	String	RWFFId for RdmFieldDictionaryItemName RWFFEnum for enumTypeDefItemName	Specifies the name of a Dictionary component from the DictionaryGroup section whose RdmFieldDictionaryItemName and enumTypeDefItemName are used in this Service's RDM DictionariesUsed entry.

Table 14: DictionariesUsedEntry Parameter

3.6.5.4 QoSEntry Section and Associated Parameters

Use a **QoSEntry** section to configure a specific QoS supported by the **Service's InfoFilter**. You can include multiple QoSEntry sections in a parent **QoS** section. For an example of how to structure QoS entries in the **EmaConfig.xml**, refer to Appendix A.

PARAMETER	TYPE	DEFAULT	DESCRIPTION
QoSEntry		N/A	QoSEntry is the name of a section that contains parameters specifying the Timeliness and Rate parameters for a given QoS. You can use multiple QoSEntry sections for a Service's InfoFilter .
Timeliness	int or String	Timeliness::Realtime	Specifies the QoS timeliness, which describes the age of the data (e.g., real time). Note: You can use numbers or names. Accepted names are listed in the OmmQos.Timeliness class.
Rate	int or String	Rate:TickByTick	Specifies the QoS rate, which is the rate of change for data sent over the Service . Note: You can use numbers or names. Accepted names are listed in the OmmQos.Rate class.

Table 15: QoSEntry Section and Associated Parameters

3.6.6 StateFilter Entry Parameters

Use the following parameters to configure the **Service's StateFilter** (as specified in the **EmaConfig.xml**), which communicates the service's state.

PARAMETER	TYPE	DEFAULT	DESCRIPTION
ServiceState	int	N/A	Specifies whether the service is up or down: <ul style="list-style-type: none"> 0: Service is down 1: Service is up
AcceptingRequests	int	For non-interactive provider: 0	Specifies whether the service accepts request messages: <ul style="list-style-type: none"> 0: The provider does not accept request messages. 1: The provider accepts request messages.
Status		Open / Ok / None / ""	Specifies a change in status to apply to all items provided by this service. The status only applies to items that received an OPEN/OK in a refresh or status message.

Table 16: StateFilter Parameters

3.6.7 Status Entry Parameters

Use the following parameters when configuring the **Service's StateFilter**:

PARAMETER	TYPE	DEFAULT	DESCRIPTION
StreamState	String	StreamState::Open	Specifies the state of the item stream.
			Note: Acceptable StreamState values are listed in the OmmState.StreamState class.
DataState	String	DataState::Ok	Specifies the state of the item data.
			Note: Acceptable DataState values are listed in the OmmState.DataState class.
StatusCode	String	StatusCode::None	Specifies the item status code.
			Note: Codes and their meanings are listed in the OmmState.StatusCode class.
StatusText	String	""	Specific StatusText regarding the current data and stream state. Typically used for informational purposes. StatusText has an encoded text with a maximum allowed length of 32,767 bytes.

Table 17: Service Entry Parameters

Chapter 4 EMA Configuration Processing

4.1 Overview

The EMA configuration is determined by hard-coded behaviors, customized behaviors as specified in a configuration file (i.e., **EmaConfig.xml**), programmatic changes, and other internal processing. All of these vectors affect EMA's configuration as used by application components.

4.2 Default Configuration

4.2.1 Default Consumer Configuration

Each EMA consumer-type application must eventually instantiate an **OmmConsumer** object. Constructors for **OmmConsumer** require a **OmmConsumerConfig** object. The **OmmConsumerConfig** constructor can read and process an optional XML file, which applications can use to modify EMA's default consumer behavior. By default this file is named **EmaConfig.xml** and stored in the working directory. For details on using non-default names and directories for your XML configuration file, refer to Section 4.3.1.2.

EMA provides a hard-coded configuration for use whenever an **OmmConsumerConfig** object is instantiated without a configuration file (such as **EmaConfig.xml**) in the run-time environment. The resulting EMA configuration is created by taking the defaults from the various configuration groups. For example, the default (hard-coded) behavior for a **Channel** adheres to the following configuration:

- **ChannelType** value="RSSSL_SOCKET"
- **CompressionType** value="None"
- **TcpNoDelay** value="1"
- **Host** value="localhost"
- **Port** value="14002"

Note that unlike EMA's default behavior of choosing the first **Consumer** component in the **ConsumerList**, EMA applications will not choose the first **Channel** or **Dictionary** in their respective lists. Instead, if an application wants to use a specific channel or dictionary configuration, the application must explicitly configure it in the appropriate **Consumer** section of the XML file.

For specifics on EMA's default configuration, refer to Section 2.3.

4.2.2 Default Provider Configurations

Each EMA provider-type application must eventually instantiate an **OmmProvider** object. Constructors for **OmmProvider** require a **OmmProviderConfig** object. The **OmmProviderConfig** constructor can read and process an optional XML file, which applications can use to modify EMA's default provider behavior. By default this file is named **EmaConfig.xml** and stored in the working directory. For details on using non-default names and directories for your XML configuration file, refer to Section 4.3.1.2.

EMA provides a hard-coded configuration for use whenever an **OmmProviderConfig** object is instantiated without an **EmaConfig.xml** file in the run-time environment. The resulting EMA configuration is created by taking the defaults from the various configuration groups.

4.2.2.1 Example: Default Channel Behavior (NiProvider)

The default (hard-coded) behavior for a **Channel** adheres to the following configuration:

- **ChannelType** value="RSSL_SOCKET"
- **CompressionType** value="None"
- **TcpNoDelay** value="1"
- **Host** value="localhost"
- **Port** value="14003"

Note that unlike EMA's default behavior of choosing the first **NiProvider** component in the **NiProviderList**, EMA applications will not choose the first or **Channel** in their respective lists. Instead, if an application wants to use a specific channel or dictionary configuration, the application must explicitly configure it in the appropriate **NiProvider** section of the XML file.

4.2.2.2 Example: Default Server Behavior (IProvider)

The default (hard-coded) behavior for a **Server** adheres to the following configuration:

- **ServerType** value="RSSL_SOCKET"
- **CompressionType** value="None"
- **TcpNoDelay** value="1"
- **Port** value="14002"

Note that unlike EMA's default behavior of choosing the first **IProvider** component in the **IProviderList**, EMA applications will not choose the first or **Server** in their respective lists. Instead, if an application wants to use a specific server or dictionary configuration, the application must explicitly configure it in the appropriate **IProvider** section of the XML file.

4.3 Processing EMA's XML Configuration File

The Elektron SDK package installs into EMA's working directory a default configuration file named **EmaConfig.xml**. By default, EMA looks for a configuration file with this name in the working directory. If you want to use a different name for your configuration file, and/or store the file in a directory other than the working directory, you must specify this filename and/or directory in your configuration object. For further details on using the configuration object, how it functions as regards paths and filenames, and how EMA determines its configuration, refer to Section 4.3.1.

Except for the parameters **DefaultConsumer** and **DefaultNiProvider**, you must wrap all other elements defined in the EMA's configuration file in a component definition (i.e., **Consumer**, **NiProvider**, **Channel**, **Directory**, or **Dictionary**) otherwise EMA ignores the element. This section includes some examples that illustrate this requirement. Appendix A illustrates the proper placement of **DefaultConsumer** and **DefaultNiProvider** in the configuration file.

4.3.1 Reading the Configuration File

Note: The following section uses EMA Consumer objects (i.e., **OmmConsumer** and **OmmConsumerConfig**) to illustrate how EMA checks for a configuration file, and if one exists, how EMA starts to process it. For details on interactive and non-interactive providers (instead of consumers) and their OmmProvider-type objects, refer to the *EMA Java Developers Guide*.

The **OmmConsumer** constructor expects an **OmmConsumerConfig** object. By default, **OmmConsumerConfig** searches its working directory for a configuration file by the name of **EmaConfig.xml**. However, if you store your configuration file elsewhere on the system, or use a custom filename, you can include an argument with the configuration object to specify the alternate path and/or name of your configuration file.

4.3.1.1 Using EmaConfig.xml in the Working Directory

If **OmmConsumerConfig** lacks an argument, the application attempts to open a configuration file named **EmaConfig.xml** in the current working directory:

- If **EmaConfig.xml** exists and contains valid XML, EMA uses the XML to modify its configuration.
- If **EmaConfig.xml** exists, but is empty or contains malformed XML, the application uses the default configuration (for details on the default configuration, refer to Section 4.2).
- If **EmaConfig.xml** does not exist, the application uses the default configuration (for details on the default configuration, refer to Section 4.2).

For example, to use an **EmaConfig.xml** stored in the working directory, have the application create an **OmmConsumerConfig** object (for details on this object, refer to the *EMA Java Developers Guide*) and pass it to the **OmmConsumer** object as follows:

```
OmmConsumerConfig config = EmaFactory.createOmmConsumerConfig();

consumer = EmaFactory.createOmmConsumer(config);
```

For complete details, you can refer to the example *example100__MarketPrice__Streaming* included with the Elektron SDK.

4.3.1.2 Using a Custom Filename and/or Directory

If you include a path with `OmmConsumerConfig`, the application creates a filename from the argument and attempts to open a file with that name, as follows:

- If the argument represents only a directory, EMA appends **EmaConfig.xml** to the argument and verifies whether **EmaConfig.xml** exists in the specified directory.
- If the argument represents a directory and filename, EMA verifies whether the specified file exists.
- If the specified file does not exist, the application throws an `IceException`, which indicates the specified path and the current working directory.
- If the argument represents neither a file nor a directory, an `IceException` is thrown.

At this point, the application attempts to create an XML configuration from the filename. If the attempt fails, the application throws an `IceException`.

For example, if you want to specify a custom path and filename, have the application create an `OmmConsumerConfig` object with the path and filename in the argument (for details on this object, refer to the *EMA Java Developers Guide*) and pass it to the `OmmConsumer` object as follows (where *PATH* is the alternate path and/or filename you want to use for your configuration file):

```
OmmConsumerConfig config = EmaFactory.createOmmConsumerConfig(PATH);

consumer = EmaFactory.createOmmConsumer(config);
```

For complete details, you can refer to the example *example111__MarketPrice__UserSpecifiedFileConfig* included with the Elektron SDK.

4.3.2 Use of the Correct Order in the XML Schema

In the following configuration file snippet (only those parts needed for the example are included), the application creates a consumer with a **Name** of **Consumer_1**.

```
<ConsumerGroup>
  <ConsumerList>
    <Consumer>
      <Name value="Consumer_1" />
    </Consumer>
  </ConsumerList>
</ConsumerGroup>
```

Now assume that the following was not included in the XML configuration:

```
<Directory>
  <Name value="Directory_1" />
```

In this case, the EMA application relies on its hard-coded behavior.

However, if the snippet is configured in either of the following configurations, the EMA application reverts to its default behaviors because the parameters are not in the correct order (i.e., the **Name** parameter needs to be contained in a **Directory** component entry):

- Configuration 1:

```
<DirectoryGroup>
  <Name value="Name" />
  <DirectoryList>
    ...
```

- Configuration 2:

```
<DirectoryGroup>
  <DirectoryList>
    <Name value="Name" />
    <Directory>
      ...
```

4.3.3 Processing the Consumer “Name”

The EMA is hard-coded to use a default consumer of **EmaConsumer**. However, you can change this by using the configuration file (e.g., **EmaConfig.xml**). When you use the XML file, the default **Consumer Name** is either specified by the **DefaultConsumer** element, or if this parameter is not set, then the EMA application will default to the name of the first Consumer component.

- If **DefaultConsumer** uses an invalid name (i.e., no **Consumer** components in the XML file use that name), the EMA throws an exception indicating that **DefaultConsumer** is invalid.
- If the configuration file has no **Consumer** components, the EMA application uses **EmaConsumer**.

4.3.4 Processing the Provider “Name”

The EMA is hard-coded to use a default non-interactive provider of **EmaProvider**. However, you can change this by using the configuration file (e.g., **EmaConfig.xml**). When you use the XML file, the default **Provider Name** is either specified by the **DefaultProvider** element, or if this parameter is not set, then the EMA application will default to the name of the first non-interactive provider component.

- If **DefaultProvider** uses an invalid name (i.e., no **Provider** components in the XML file use that name), the EMA throws an exception indicating that **DefaultProvider** is invalid.
- If the **EmaConfig.xml** has no **Provider** components, the EMA application uses **EmaProvider**.

4.4 Configuring EMA Using Function Calls

From an application standpoint, instantiating `OmmConsumerConfig` and `OmmNiProviderConfig` objects creates the initial configuration from the an EMA XML configuration file (if one exists). Certain variables can then be altered via function calls on the `OmmConsumerConfig` and `OmmNiProviderConfig` objects.

Note: Function calls override any settings in a configuration XML file.

4.4.1 EMA Configuration Function Calls

4.4.1.1 OmmConsumerConfig Class Function Calls

You can use the following function calls in an EMA consumer application:

FUNCTION	DESCRIPTION
<code>addAdminMsg(ReqMsg)</code>	Populates part of or all of the login request message, directory request message, or dictionary request message according to the specification discussed in the <i>EMA Reuters Domain Models (RDM) Usage Guide</i> specific to the programming language you use.
<code>applicationId(String)</code>	Sets the applicationId variable. applicationId has no default value.
<code>clear()</code>	Clears existing content from the <code>OmmConsumerConfig</code> object.
<code>config(const Data&)</code>	Passes in the consumer's programmatic configuration.
<code>consumerName(String)</code>	Sets the consumer name, which is used to select a specific consumer as defined in EMA's configuration. If a consumer does not exist with that name, the application throws an exception.
<code>host(String)</code>	Sets the host and port parameters. For details, refer to Section 4.4.2.
<code>operationModel(OperationModel)</code>	Sets the operation model to either <code>OperationModel.API_DISPATCH</code> (which is the default) or <code>OperationModel.USER_DISPATCH</code> .
<code>password(String)</code>	Sets the password variable. password has no default value.
<code>position(String)</code>	Sets the position variable. position has no default value.
<code>username(String)</code>	Sets the username variable. If username is not set, the application extracts a username from the run-time environment.

Table 18: `OmmConsumerConfig` Class Function Calls

4.4.1.2 OmmProviderConfig Class Function Calls

You can use the following function calls in an EMA **Provider** application. For further details on variables, refer to the *EMA Java RDM Usage Guide*. Certain function calls can only be used with a specific provider type (e.g., `addAdminMsg(const ReqMsg&)` can only be used with an **NiProvider**). The parameter's description will mention any provider-type restrictions.

FUNCTION	DESCRIPTION
<code>addAdminMsg(ReqMsg)</code>	Used only with NiProvider . Populates part of or all of the login request message according to the specification discussed in the <i>EMA Java RDM Usage Guide</i> .
<code>addAdminMsg(RefreshMsg)</code>	Populates part of or all of the initial directory refresh message according to the specification discussed in the <i>EMA Java RDM Usage Guide</i> .
<code>adminControlDirectory(int)</code>	Specifies whether the API or the user controls the sending of Directory refresh messages. Available values include: <ul style="list-style-type: none"> <code>OmmProviderConfig.AdminControl.API_CONTROL</code> (which is the default) <code>OmmProviderConfig.AdminControl.USER_CONTROL</code> For details on control models, refer to OmmProviderConfig.h .
<code>applicationId(String)</code>	Used only with NiProvider . Sets the <i>applicationId</i> variable. <i>applicationId</i> has no default value.
<code>clear()</code>	Clears existing content from the <code>OmmNiProviderConfig</code> object.
<code>config(Data)</code>	Passes in the provider's programmatic configuration.
<code>host(String)</code>	Used only with NiProvider . Sets the host and port parameters. For details, refer to Section 4.4.2.
<code>instanceId(String)</code>	Used only with NiProvider . Sets the <i>instanceId</i> variable. <i>instanceId</i> has no default value.
<code>operationModel(int)</code>	Specifies whether the API or the user controls the thread (i.e., the operation model). Available values include: <ul style="list-style-type: none"> <code>OmmProviderConfig.OperationModel.API_DISPATCH</code> (which is the default) <code>OmmProviderConfig.OperationModel.USER_DISPATCH</code> For details on operation models, refer to OmmProviderConfig.h .
<code>password(String)</code>	Used only with NiProvider . Sets the <i>password</i> variable. <i>password</i> has no default value.
<code>port()</code>	Sets the port parameters.

Table 19: OmmNi ProviderConfig Class Function Calls

FUNCTION	DESCRIPTION
position(String)	Used only with NiProvider . Sets the position variable. position has no default value.
providerName(String)	Sets the provider's name, which is used to select a specific provider as defined in EMA's configuration. If a provider does not exist with that name, the application throws an exception.
username(String)	Used only with NiProvider . Sets the username variable. If username is not set, the application extracts a username from the run-time environment.

Table 19: **OmmNiProviderConfig** Class Function Calls (Continued)

4.4.2 Using the `host()` Function: How “Host” and “Port” are Processed

Host and **Port** parameters both have global default values. Thus, if either an **OmmConsumerConfig** or **OmmNiProviderConfig** object exists, its **Host** and **Port** will always have values (either the default value or some other value as specified in a configuration XML file such as **EmaConfig.xml**).

- The default **Host:Port** value for **OmmConsumerConfig** is **localhost:14002**.
- The default **Host:Port** value for **OmmNiProviderConfig** is **localhost:14003**.

If needed, you can have the application reset both host and port values by calling the `host(String)` method on the object using the syntax: **HostValue:PortValue**.

Note: Calling the `host()` function sets **channelType** (refer to Section 3.3.2) to **RSSL_SOCKET**, regardless of how it was previously configured.

Host and **Port** values observe the following rules when updating due to the `host(String)` method:

- If the host parameter is missing or empty, then host and port reset to their global default values.
- If the host parameter is set to the string “:”, then host and port reset to their global default values.
- If the host parameter is a string (not containing a :), then host is set to that string and port resets to its default value.
- If the parameter begins with a : and is followed by some text, then host is set to its global default value and port is set to that text.
- If the parameter is **HostValue:PortValue**, where both **HostValue** and **PortValue** have values, then host is set to **HostValue** and port is set to **PortValue**.

Appendix A EmaConfig.xml Configuration File

This is the current version of the **EmaConfig.xml** file distributed with the training examples:

```
<?xml version="1.0" encoding="UTF-8"?>
<EmaConfig>

  <ConsumerGroup>
    <!-- DefaultConsumer parameter defines which consumer configuration is used by OmmConsumer -->
    <!-- if application does not specify it through OmmConsumerConfig::consumerName() -->
    <!-- first consumer on the ConsumerList is a default consumer if this parameter is not specified -->
    <DefaultConsumer value="Consumer_1"/>
    <ConsumerList>
      <Consumer>
        <Name value="Consumer_1"/>

        <!-- Channel is optional: defaulted to "RSSL_SOCKET + localhost + 14002" -->
        <Channel value="Channel_1"/>

        <!-- Dictionary is optional: defaulted to "ChannelDictionary" -->
        <Dictionary value="Dictionary_1"/>
      </Consumer>
      <Consumer>
        <Name value="Consumer_2"/>
        <Channel value="Channel_2"/>
        <Dictionary value="Dictionary_2"/>
      </Consumer>
    </ConsumerList>
  </ConsumerGroup>

  <!-- NiProviderGroup provides set of detailed configurations to be used by named providers -->
  <!-- Application specifies which configuration to use by setting OmmNiProviderConfig::providerName() -->
  <NiProviderGroup>
    <!-- DefaultNiProvider parameter defines which provider configuration is used by OmmProvider -->
    <!-- if application does not specify it through OmmNiProviderConfig::providerName() -->
    <!-- first provider on the NiProviderList is a DefaultNiProvider if this parameter is not specified -->
    <DefaultNiProvider value="Provider_1"/>
    <NiProviderList>
      <NiProvider>
        <!-- Name is mandatory -->
        <Name value="Provider_1"/>
        <!-- Channel is optional: defaulted to "RSSL_SOCKET + localhost + 14003" -->
        <Channel value="Channel_10"/>

        <!-- Directory is optional. -->
        <!-- EMA provides hardcoded directory containing a single service named "NI_PUB". -->
        <!-- EMA defaults the OmmNiProviderConfig::adminControlDirectory() to ApiControlEnum. -->
        <!-- applications can use the hardcoded "NI_PUB" service to publish all items. -->
      </NiProvider>
    </NiProviderList>
  </NiProviderGroup>
</EmaConfig>
```

```

<!-- if desired, a custom directory can be configured, named, and used instead of the -->
<!-- hardcoded one. Refer to the examples in the DirectoryGroup. -->
<!-- the directory may also be specified using OmmNiProviderConfig::addAdminMsg(). -->
<!-- if desired the OmmNiProviderConfig::adminControlDirectory() to UserControlEnum -->
<!-- which allows applications to specify and control the directory. -->
<!-- EMA defaults its RDM capability to MARKET_PRICE (6), MARKET_BY_ORDER (7), -->
<!-- MARKET_BY_PRICE (8) and MARKET_MAKER (9 -->
<Directory value="Directory_1"/>
</NiProvider>

<NiProvider>
  <Name value="Provider_2"/>
  <Channel value="Channel_4"/>
  <Directory value="Directory_2"/>
</NiProvider>
</NiProviderList>
</NiProviderGroup>
<ChannelGroup>
  <ChannelList>
    <Channel>
      <Name value="Channel_1"/>

      <!-- ChannelType possible values are: -->
      <!-- ChannelType::RSSL_SOCKET - TCP IP connection type -->
<!--><!-->      <ChannelType value="ChannelType::RSSL_SOCKET"/>

      <!-- CompressionType is optional: defaulted to None -->
      <!-- possible values: None, ZLib, LZ4 -->
      <CompressionType value="CompressionType::None"/>
      <GuaranteedOutputBuffers value="5000"/>

      <!-- ConnectionPingTimeout is optional: defaulted to 30000 -->
      <ConnectionPingTimeout value="30000"/>

      <!-- TcpNoDelay is optional: defaulted to 1 -->
      <!-- possible values: 1 (tcp_nodelay option set), 0 (tcp_nodelay not set) -->
      <TcpNoDelay value="1"/>
      <Host value="localhost"/>
      <Port value="14002"/>
    </Channel>
    <Channel>
      <Name value="Channel_2"/>
      <ChannelType value="ChannelType::RSSL_SOCKET"/>
      <CompressionType value="CompressionType::None"/>
      <GuaranteedOutputBuffers value="5000"/>
      <Host value="122.1.1.100"/>
      <Port value="14002"/>
    </Channel>
  </ChannelList>
</ChannelGroup>
<!-- source directory refresh configuration used by provider -->
<DirectoryGroup>

```

```

<!-- DefaultDirectory specifies Directory used as default if providers do not specify Directory name
-->
<DefaultDirectory value="Directory_1"/>
<DirectoryList>
  <!-- providers refer to the Directory by name -->
  <!-- Directory is a set of Services (one or more) on which a provider will provide item data -->
  <Directory>
    <Name value="Directory_1"/>
    <Service>
      <Name value="TEST_NI_PUB"/>
      <InfoFilter>
        <!-- optional value; if not specified EMA will assign it -->
        <ServiceId value="0"/>
        <!-- optional value -->
        <Vendor value="company name"/>
        <!-- possible values: 0 - means consolidation service, 1 - means original provider
        -->
        <IsSource value="0"/>
        <!-- an array of market domains supported by this service -->
        <!-- domains defined in the RDM Usage Guide may be referred by name -->
        <!-- names of the RDM defined domains are listed in the EmaRdm.h file -->
        <!-- e.g. MMT_MARKET_PRICE, MMT_MARKET_BY_ORDER -->
        <!-- note that the capabilities may be specified with names and or numbers -->
        <Capabilities>
          <CapabilitiesEntry value="MMT_MARKET_PRICE"/>
          <CapabilitiesEntry value="MMT_MARKET_BY_ORDER"/>
        </Capabilities>
        <!-- list of dictionary names specified in the DictionaryGroup -->
        <!-- EMA will populate the Service::InfoFilter::DictionariesProvided element -->
        <!-- with the respective <>ItemName values -->
        <DictionariesProvided>
          <DictionariesProvidedEntry value="Dictionary_1"/>
          <DictionariesProvidedEntry value="Dictionary_3"/>
        </DictionariesProvided>

        <!-- list of dictionary names specified in the DictionaryGroup -->
        <!-- EMA will populate the Service::InfoFilter::DictionariesUsed element -->
        <!-- with the respective <>ItemName values -->
        <DictionariesUsed>
          <DictionariesUsedEntry value="Dictionary_1"/>
        </DictionariesUsed>
        <!-- list of QoS values supported by this service -->
        <!-- possible values are listed in the OmmQos.h file of the EMA -->
        <QoS>
          <QoSEntry>
            <Timeliness value="Timeliness::RealTime"/>
            <Rate value="Rate::TickByTick"/>
          </QoSEntry>
          <QoSEntry>
            <Timeliness value="Timeliness::InexactDelayed"/>

```

```

        <Rate value="Rate::JustInTimeConflated"/>
    </QoSEntry>
</QoS>

<!-- 0 means does not support, 1 - means supports QoS range -->
<SupportsQoSRange value="0"/>
<!-- name of item list -->
<ItemList value="#.itemlist"/>
<!-- 0 means does not accept, 1 - means accepts consumer status -->
<AcceptingConsumerStatus value="0"/>
<!-- 0 means does not support, 1 - means supports out of band snapshots -->
<SupportsOutOfBandSnapshots value="0"/>
</InfoFilter>
<!-- StateFilter is optional -->
<!-- EMA will default the values as follows: -->
<!-- for interactive provider: ServiceState is "up" and AcceptingRequests is "Yes" -->
<!-- for non interactive provider: ServiceState is "up" and AcceptingRequests is "No" -->
<StateFilter>
    <!-- 0 means service is down, 1 - means service is up (default; 1) -->
    <ServiceState value="1"/>
    <!-- 0 means service does not accept, 1 - means service accepts (default; 1) -->
    <AcceptingRequests value="1"/>
    <!-- optional; specifies status change to apply to all items provided by this service
        -->
    <!-- possible values are listed in the OmmState.h file of the EMA -->
    <Status>
        <!-- possible values are: Open, Close, CloseRecover -->
        <StreamState value="StreamState::Open"/>
        <!-- possible values are: NoChange, Ok, Suspect -->
        <DataState value="DataState::Ok"/>
        <!-- possible values are: None, DacsDown, etc -->
        <StatusCode value="StatusCode::None"/>
        <!-- a text field -->
        <StatusText value=""/>
    </Status>
</StateFilter>
</Service>
<Service>
    <Name value="NI_PUB"/>
    <InfoFilter>
        <DictionariesProvided>
            <DictionariesProvidedEntry value="Dictionary_1"/>
        </DictionariesProvided>
        <DictionariesUsed>
            <DictionariesUsedEntry value="Dictionary_2"/>
        </DictionariesUsed>

        <Vendor value="company name"/>
        <IsSource value="0"/>
        <Capabilities>

```

```

        <CapabilitiesEntry value="6"/>
        <CapabilitiesEntry value="MMT_MARKET_BY_ORDER"/>
    </Capabilities>
    <QoS>
        <QoSEntry>
            <Timeliness value="Timeliness::RealTime"/>
            <Rate value="Rate::TickByTick"/>
        </QoSEntry>
    </QoS>
    <SupportsQoSRange value="0"/>
</InfoFilter>
</Service>
</Directory>
</DirectoryList>
</DirectoryGroup>
<DictionaryGroup>
    <DictionaryList>
        <Dictionary>
            <Name value="Dictionary_1"/>
            <!-- DictionaryType is optional: defaulted to ChannelDictionary -->
            <!-- possible values: FileDictionary, ChannelDictionary -->
            <!-- if DictionaryType is set to ChannelDictionary, file names are ignored -->
            <DictionaryType value="DictionaryType::ChannelDictionary"/>
        </Dictionary>
        <Dictionary>
            <Name value="Dictionary_2"/>
            <DictionaryType value="DictionaryType::FileDictionary"/>

            <!-- dictionary names are optional: defaulted to RDMFieldDictionary and enumtype.def -->
            <RdmFieldDictionaryFileName value="./RDMFieldDictionary"/>
            <EnumTypeDefFileName value="./enumtype.def"/>
        </Dictionary>
        <Dictionary>
            <Name value="Dictionary_3"/>
            <!-- providers always assume DictionaryType = DictionaryType::FileDictionary -->
            <DictionaryType value="DictionaryType::FileDictionary"/>

            <!-- dictionary file names are optional: defaulted to ./RDMFieldDictionary and ./enumtype.def -->
            <RdmFieldDictionaryFileName value="./RDMFieldDictionary_ID3"/>
            <EnumTypeDefFileName value="./enumtype_ID3.def"/>

            <!-- <dictionary>ItemName represents the names shown in DictionariesProvided and
                DictionariesUsed elements of the Directory InfoFilter -->
            <!-- <dictionary>ItemName is optional; default values are "RWFFld" for the RdmFieldDictionary
                and "RWFFEnum" for the enumtype.def -->
            <RdmFieldDictionaryItemName value="RWFFld_ID3"/>
            <EnumTypeDefItemName value="RWFFEnum_ID3"/>
        </Dictionary>
    </DictionaryList>
</DictionaryGroup>

```

```
<Name value="Dictionary_4"/>
<DictionaryType value="DictionaryType::FileDictionary"/>
<RdmFieldDictionaryFileName value="./RDMFieldDictionary_ID4"/>
<EnumTypeDefFileName value="./enumtype_ID4.def"/>
<RdmFieldDictionaryItemName value="RWFFld_ID4"/>
<EnumTypeDefItemName value="RWFEnum_ID4"/>
</Dictionary>
</DictionaryList>
</DictionaryGroup>
</EmaConfig>
```

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