Enterprise Message API Java Edition 3.6.2.L1

ENTERPRISE MESSAGE API CONFIGURATION GUIDE

Document Version: 3.6.2.L1
Date of issue: June 2021
Document ID: EMAJ362CG.210

REFINITIV™

Contents

1 Introduction

1.1 About this Manual

This document is authored by Enterprise Message API architects and programmers. Several of its authors have designed, developed, and maintained the Enterprise Message API product and other Refinitiv 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 Enterprise Message API Java Edition . The Enterprise Message API can also connect to and leverage many different Refinitiv and customer components. If you want the Enterprise Message API to interact with other components, consult that specific component's documentation to determine the best way to configure for optimal interaction..

This document explains the configuration parameters for the Enterprise 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 Enterprise Message API configuration parameters. You can obtain further information from the *Enterprise Message Java Edition API Developer's Guide*.

1.3 Acronyms and Abbreviations

ACRONYM / TERM	MEANING
ADH	Refinitiv Real-Time Advanced Data Hub is the horizontally scalable service component within the Refinitiv Real-Time Distribution System providing high availability for publication and contribution messaging, subscription management with optional persistence, conflation and delay capabilities.
ADS	Refinitiv Real-Time Advanced Distribution Server is the horizontally scalable distribution component within the Refinitiv Real-Time Distribution System 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
Enterprise Message API	The Enterprise Message API (EMA) is an ease of use, open source, Open Message Model API. EMA is designed to provide clients rapid development of applications, minimizing lines of code and providing a broad range of flexibility. It provides flexible configuration with default values to simplify use and deployment. EMA is written on top of the Enterprise Transport API (ETA) utilizing the Value Added Reactor and Watchlist features of ETA.
Enterprise Transport API (ETA)	Enterprise Transport API is a high performance, low latency, foundation of the Refinitiv Real-Time SDK. It consists of transport, buffer management, compression, fragmentation and packing over each transport and encoders and decoders that implement the Open Message Model. Applications written to this layer achieve the highest throughput, lowest latency, low memory utilization, and low CPU utilization using a binary Refinitiv Wire Format when publishing or consuming content to/from Refinitiv Real-Time Distribution Systems.
HTTP	Hypertext Transfer Protocol
HTTPS	Hypertext Transfer Protocol (Secure)

Table 1: Acronyms and Abbreviations

ACRONYM / TERM	MEANING
OMM	Open Message Model
QoS	Quality of Service
RDM	Refinitiv Domain Model
Refinitiv Real-Time Distribution System	Refinitiv Real-Time Distribution System is Refinitiv's financial market data distribution platform. It consists of the Refinitiv Real-Time Advanced Distribution Server and Refinitiv Real-Time Advanced Data Hub. Applications written to the Refinitiv Real-Time SDK can connect to this distribution system.
Reactor	The Reactor is a low-level, open-source, easy-to-use layer above the Enterprise Transport API. It offers heartbeat management, connection and item recovery, and many other features to help simplify application code for users.
RMTES	A multi-lingual text encoding standard
RSSL	Refinitiv Source Sink Library
RTT	Round Trip Time, this definition is used for round trip latency monitoring feature.
RWF	Refinitiv Wire Format, a Refinitiv proprietary binary format for data representation.
RDF-D	Refinitiv Data Feed Direct
UML	Unified Modeling Language
UTF-8	8-bit Unicode Transformation Format

Table 1: Acronyms and Abbreviations

1.4 References

1. Enterprise Message API Java Edition *Refinitiv Domain Model Usage Guide*
2. *API Concepts Guide*
3. *Enterprise Message API Java Edition Reference Manual*
4. Enterprise Message API Java Edition *Developers Guide*
5. The Refinitiv 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@refinitiv.com.
- Add your comments to the PDF using Adobe's **Comment** feature. After adding your comments, submit the entire PDF to Refinitiv by clicking **Send File** in the **File** menu. Use the apidocumentation@refinitiv.com address.

1.6 Document Conventions

This document uses the following types of conventions:

- Typographic
- Field and Text Values
- Boolean Values

1.6.1 Typographic

This document uses the following types of conventions:

- Java classes, methods, in-line code snippets, and types are shown in **`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 a gray 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

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 are the highest-level description of the application. Such settings typically select entries from the channel, and dictionary groups.
- ***Provider***: Where *Provider* is either an IProvider or NiProvider. *Provider* configuration data is the highest-level description of the application. Such settings typically select entries from the channel (NiProvider only), and directory groups.
- ***Channel***: Channel configuration data describe various connection alternatives and provide configuration alternatives for those connections.
- ***Dictionary***: Dictionary configuration data set the location information for dictionary alternatives.
- ***Directory***: Directory configuration data configure source directory refresh information.

The Consumer and *Provider* groups are top-level configuration groups. Specific consumer and provider applications select their configurations according to the name specified in the **`consumerName()`** or **`providerName()`** method (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 Enterprise Message API library and globally enforced. However, if you need to change API behaviors or configure the API for your specific deployment, you can use the Enterprise Message API's XML configuration file (**EmaConfig.xml**) and adjust behaviors using the appropriate parameters (discussed in this section). While the Enterprise Message API 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.

2.3 Default Behaviors

When the Enterprise Message API library needs a parameter, it behaves according to its hard coded configuration. You can change the APIs behavior 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 (for consumers) 14003 (for non-interactive providers)	Specifies the port number on the server to which the application connects.
DefaultConsumer	String	EmaConsumer	If consumer components are configured, the Enterprise Message API ignores this parameter.
DefaultIProvider	String	EmaIProvider	If interactive provider components are configured, the Enterprise Message API ignores this parameter.
DefaultNiProvider	String	EmaNiProvider	If non-interactive provider components are configured, the Enterprise Message API ignores this parameter.
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

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**, the Enterprise Message API 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 Enterprise Message API 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**.

```
<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**.

PARAMETER	TYPE	DEFAULT	DESCRIPTION
CatchUnknownJsonFids	int	1	Specifies whether the RWF/JSON conversion catches unknown JSON field IDs. Possible values are: • **0** (false): Do not catch unknown JSON field IDs. • **1** (true): Catch unknown JSON field IDs.
CatchUnknownJsonKeys	int	0	Specifies whether the RWF/JSON conversion catches unknown JSON keys. Possible values are: • **0** (false): Do not catch unknown JSON keys. • **1** (true): Catch unknown JSON keys.
Channel	String	N/A	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. If **Channel** is not specified, the Enterprise Message API resorts to default channel behavior when needed. For further details on the **<Channel>** entry and default behaviors, refer to Section 3.3.
ChannelSet	String	N/A	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 3.3.7 **NOTE:** If both **Channel** and **ChannelSet** are configured, then the Enterprise Message API uses the parameter that is configured last in the file. For example, if **<Channel>** is configured after **<ChannelSet>** then the Enterprise Message API uses **<Channel>**, but if **<ChannelSet>** is configured after **<Channel>** then the Enterprise Message API uses **<ChannelSet>**.
CloseChannelFromConverterFailure	int	1	Specifies that the Enterprise Message API should close the channel if the Enterprise Message API fails to parse JSON messages or if the Enterprise Message API receives JSON error messages. Possible values are: • **0** (false): Do not close the channel. • **1** (true): Close the channel.

Table 3: Consumer Group Parameters

PARAMETER	TYPE	DEFAULT	DESCRIPTION
DefaultServiceID	int	1	Specifies a default service ID for RWF/JSON conversion if both service name and ID are missing. The maximum allowable value is **65535**.
Dictionary	String	N/A	Specifies how the consumer should access its dictionaries (it must match the **Name** parameter from the appropriate **<Dictionary>** entry in the **DictionaryGroup** configuration). If **Dictionary** is not specified, the Enterprise Message API uses the channel's dictionary when needed. For further details on this default behavior, refer to Section 3.5.
DictionaryRequestTimeOut	long	45,000	Specifies the amount of time (in milliseconds) the application has to download dictionaries from a provider before the **OmmConsumer** throws an exception. If set to **0**, the Enterprise Message API will wait for a response indefinitely. **NOTE:** If **ChannelSet** is configured: • The Enterprise Message API honors **DictionaryRequestTimeOut** only on its first connection. • If the channel supporting the first connection goes down, the Enterprise Message API does not use **DictionaryRequestTimeOut** on subsequent connections.
DirectoryRequestTimeOut	long	45,000	Specifies the amount of time (in milliseconds) the provider has to respond with a source directory refresh message before the **OmmConsumer** throws an exception. If set to **0**, the Enterprise Message API will wait for a response indefinitely. **NOTE:** If **ChannelSet** is configured: • The Enterprise Message API honors **DirectoryRequestTimeOut** only on its first connection. • If the channel supporting the first connection goes down, the Enterprise Message API does not use **DirectoryRequestTimeOut** on subsequent connections.
DispatchTimeoutApiThread	int	0	Specifies the duration (in microseconds) for which the internal Enterprise Message API thread is inactive before going active to check whether a message was received. If set to zero, the Enterprise Message API internal thread goes active only if it gets notified about a received message.
EnableRtt	long	0	Specifies whether the **OmmConsumer** supports gathering **RoundTripLatency** statistics. If enabled, the Watchlist handles automatic processing of RTT requests sent by the provider. **EnableRtt** expresses the consumer's consent to process RTT requests. The provider may choose either to send or not to send the requests at its own discretion. Available values include: • 0 (false) • Any value > 0 (true)
ItemCountHint	long	100,000	Specifies the number of items the application expects to request. If set to **0**, the Enterprise Message API resets it to **1024**. For better performance, the application can set this to the approximate number of item requests it expects.

Table 3: Consumer Group Parameters (Continued)

PARAMETER	TYPE	DEFAULT	DESCRIPTION
JsonExpandedEnumFields	int	0	Sets the RWF/JSON conversion to expand enumerated values in field entries to their display values for JSON protocol. Possible values are: • **0** (false): Do not expand enumerated fields. • **1** (true): Expand enumerated fields.
LoginRequestTimeOut	long	45,000	Specifies the amount of time (in milliseconds) the provider has to respond with a login refresh message before the **OmmConsumer** throws an exception. If set to **0**, the Enterprise Message API will wait for a response indefinitely. **NOTE:** If **ChannelSet** is configured: • The Enterprise Message API honors **LoginRequestTimeOut** only on its first connection. • If the channel supporting the first connection goes down, the Enterprise Message API does not use **LoginRequestTimeOut** on subsequent connections.
MaxDispatchCountApiThread	long	100	Specifies the maximum number of messages the Enterprise Message API dispatches before taking a real-time break.
MaxDispatchCountUserThread	long	100	Specifies the maximum number of messages the Enterprise Message API can dispatch in a single call to the `OmmConsumer::dispatch()`.
MaxOutstandingPosts	long	100,000	Specifies the maximum allowable number of on-stream posts waiting for an acknowledgment before the **OmmConsumer** disconnects.
MaxEventsInPool	int	-1	Specifies the maximum number of event objects in the event's pool.
MsgKeyInUpdates	int	1	Specifies whether the Enterprise Message API fills in message key values on updates using the message key provided with the request. Available values include: • **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: • **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**, the Enterprise Message API 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.

Table 3: Consumer Group Parameters (Continued)

PARAMETER	TYPE	DEFAULT	DESCRIPTION
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**.
ReissueTokenAttemptInterval	int	5000	Sets the delay (in milliseconds) before the OMMConsumer attempts to reissue the token. The minimum interval is 1000 milliseconds, while the default setting is 5000.
ReissueTokenAttemptLimit	int	-1	Specifies the maximum number of times the OMMConsumer attempts to reissue the token. If set to default (i.e., **-1**), there is no maximum limit.
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**, the Enterprise Message API will wait for a response indefinitely.
RestRequestTimeOut	long	45000	Specifies the timeout (in milliseconds) for token service and service discovery request. If the request times out, the OMMConsumer resends the token reissue and the timeout restarts. If the request times out, the OMMConsumer does not retry. If set to **0**, there is no timeout.
ServiceCountHint	long	513	Sets the size of directory structures for managing services. If the application specifies **0**, the Enterprise Message API resets it to **513**.
TokenReissueRatio	Double	.8	Specifies the ratio with which to multiply the access token's expiration time (in seconds) to determine the length of time the OMMConsumer waits before retrieving a new access token and refreshing its connection to Refinitiv Real-Time - Optimized. The valid range is from `0.05` to `0.95`.
XmlTraceToStdout	int	0	Specifies whether the Enterprise Message API traces its messages in XML format to stdout. Possible values are: • **0** (false): Turns off tracing. • **1** (true): Turns on tracing to stdout.

Table 3: Consumer Group Parameters (Continued)

3.2 Provider Groups

The Enterprise Message API 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 ***Provider*Group** contains two elements:

- A **Default*Provider*** element, which you can use to specify a default **NiProvider** component. If a default ***Provider*** is not specified in the ***Provider*Group**, The Enterprise Message API uses the first non-interactive provider listed in the ***Provider*List**. For details on configuring a default ***Provider***, refer to Section 3.2.2.
- A ***Provider*List** 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 ***Provider*Group** XML schema, refer to Section 3.2.1.

For details on configuring a ***Provider*Group**, 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 ***Provider*Group** is as follows:

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

3.2.2 Setting a Default Provider

If a **Default*Provider*** is not specified, then the Enterprise Message API uses the first ***Provider*** component in the ***Provider*Group**. However, you can specify a default provider by including the following parameter on a unique line inside ***Provider*Group** but outside ***Provider*List**.

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

3.2.3 Configuring a *Provider* in a *Provider*Group

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 **IProvider**. Sets the **IProvider** to accept incoming directory request messages without the minimum required INFO and STATE directory filters.
AcceptMessageSameKeyButDiffStream	int	0	Used only with **IProvider**. Sets the **IProvider** 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 **IProvider**. Sets the **IProvider** to accept incoming request messages for reissuing the service name of an existing item stream.
AcceptMessageWithoutAcceptingRequests	int	0	Used only with **IProvider**. Sets the **IProvider** to accept incoming request messages even though the source directory is not accepting requests.
AcceptMessageWithoutBeingLogin	int	0	Used only with **IProvider**. Sets the **IProvider** to accept incoming request messages even though the interactive provider has not accepted a login request.
AcceptMessageWithoutQosInRange	int	0	Used only with **IProvider**. Sets the **IProvider** to accept incoming request messages even though the requesting QoS is not in the QoS range of the source directory.
CatchUnknownJsonFids	int	1	Specifies whether the RWF/JSON conversion catches unknown JSON field IDs. Possible values are: • **0** (false): Do not catch unknown JSON field IDs. • **1** (true): Catch unknown JSON field IDs.

Table 4: *Provider*Group Parameters

PARAMETER	TYPE	DEFAULT	DESCRIPTION
CatchUnknownJsonKeys	int	0	Specifies whether the RWF/JSON conversion catches unknown JSON keys. Possible values are: • **0** (false): Do not catch unknown JSON keys. • **1** (true): Catch unknown JSON keys.
Channel	String	N/A	Used only with **NiProvider**. 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. If **Channel** is not specified, the Enterprise Message API resorts to default channel behavior when needed. For further details on the **<Channel>** entry and default behaviors, refer to Section 3.3.
ChannelSet	String	N/A	Used only with **NiProvider**. 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 3.3.7. **NOTE:** If both **Channel** and **ChannelSet** are configured, the Enterprise Message API uses the parameter configured last (linearly) in the file. For example: • If **<Channel>** is configured after **<ChannelSet>**, the Enterprise Message API uses **<Channel>**. • If **<ChannelSet>** is configured after **<Channel>**, the Enterprise Message API uses **<ChannelSet>**.
CloseChannelFromConverterFailure	int	1	Specifies that the Enterprise Message API should close the channel if it fails to parse JSON messages or if it receives JSON error messages. Possible values are: • **0** (false): Do not close the channel. • **1** (true): Close the channel.
DefaultServiceID	int	1	Specifies a default service ID for RWF/JSON conversion if both service name and ID are missing. The maximum allowable value is **65535**.
DispatchTimeoutApiThread	int	0	Specifies the duration (in microseconds) for which the internal Enterprise Message API thread is inactive before going active to check whether a message was received. If set to zero, the thread goes active only if notified about a received message.
EnforceAckIDValidation	long	0	Used only with IProvider. Specifies whether IProvider has to validate the **AckId** attribute when an **AckMsg** calls **`OmmProvider::submit()`**. If validation is turned on, then **AckId** must be equal to the **PostId** of **PostMsg** received by the IProvider. Available values include: • 1 (true): Validate the **AckId**. • 0 (false): Do not validate the **AckId**.

Table 4: *Provider*Group Parameters (Continued)

PARAMETER	TYPE	DEFAULT	DESCRIPTION
EnumTypeFragmentSize	int	128000	Used only with **IProvider**. Sets the maximum enumeration types fragmentation size (in bytes) for each multi-part refresh message.
FieldDictionaryFragmentSize	int	8192	Used only with **IProvider**. Sets the maximum field dictionary fragmentation size (in bytes) for each multi-part refresh message.
ItemCountHint	long	100,000	Specifies the number of items the application expects to maintain. If set to **0**, the Enterprise Message API resets it to **1024**. For better performance, the application can set this to the approximate number of items it maintains.
JsonExpandedEnumFields	int	0	Sets the RWF/JSON conversion to expand enumerated values in field entries to their display values for JSON protocol. Possible values are: • **0** (false): Do not expand enumerated fields. • **1** (true): Expand enumerated fields.
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**, the Enterprise Message API will wait for a response indefinitely. **NOTE:** When **ChannelSet** is configured, the Enterprise Message API honors **LoginRequestTimeOut** only on its first connection. If the channel supporting the first connection goes down, the Enterprise Message API does not use **LoginRequestTimeOut** on subsequent connections.
MaxDispatchCountApiThread	long	100	Specifies the maximum number of messages the Enterprise Message API dispatches before taking a real-time break.
MaxDispatchCountUserThread	long	100	Specifies the maximum number of messages the Enterprise Message API can dispatch in a single call to the **`OmmProvider::dispatch()`**.
MergeSourceDirectoryStreams	long	1	Used only with **NiProvider**. Specifies whether the Enterprise Message API merges all source directory streams (configured and user-submitted) into one stream: • **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.

Table 4: *Provider*Group Parameters (Continued)

PARAMETER	TYPE	DEFAULT	DESCRIPTION
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.
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 the Enterprise Message API recovers user-submitted source directories when recovering from a disconnect: • **1** (true) • **0** (false)
RefreshFirstRequired	long	1	Specifies whether the Enterprise Message API requires the application to send a refresh message prior to sending update messages. Available values include: • **1** (true) • **0** (false)
RemoveItemsOnDisconnect	long	1	Used only with **NiProvider**. Specifies whether the Enterprise Message API removes items from its internal hash table whenever it disconnects from the Refinitiv Real-Time Advanced Data Hub: • **1** (true) • **0** (false)
RequestTimeout	long	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**, the Message API waits for a response indefinitely.
Server	String	N/A	Used only with **IProvider**. Specifies the channel that the **IProvider** component should use. This channel must match the **Name** parameter from the appropriate **<Server>** entry in the **ServerGroup** configuration. If **Server** is not specified, the Enterprise Message API resorts to default channel behavior when needed. For further details on the **<Server>** entry and default behaviors, refer to Section 3.4.

Table 4: *Provider*Group Parameters (Continued)

PARAMETER	TYPE	DEFAULT	DESCRIPTION
ServiceCountHint	long	513	Sets the size of directory structures for managing services. If the application specifies **0**, the Enterprise Message API resets it to **513**.
XmlTraceToStdout	int	0	Specifies whether the Enterprise Message API traces its messages in XML format to stdout. Possible values are: • **0** (false): Turns off tracing. • **1** (true): Turns on tracing to stdout.

Table 4: *Provider*Group Parameters (Continued)

3.3 Channel Group

ChannelGroup is used only with the **Consumer** and **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 Enterprise Message API 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.
- For a list of parameters you can use only when configuring a **Channel** whose channel type is **RSSL_ENCRYPTED**, refer to Section 3.3.4.
- For a list of parameters you can use only when configuring a **Channel** whose channel type is **RSSL_HTTP**, refer to Section 3.3.4.

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. Use strings with Enterprise Message API's programmatic configuration (for further details, refer to Section 4.5). Available values include: • **RSSL_SOCKET** • **RSSL_ENCRYPTED** • **RSSL_HTTP** • **WEBSOCKET**
ConnectionPingTimeout	long	30000	Specifies the duration (in milliseconds) after which the Enterprise Message API terminates the connection if it does not receive communication or pings from the server.
EnableSessionManagement	long	0	Specifies whether the channel manages the authentication token on behalf of the user used to keep the session alive. If set to **1**, the channel obtains the authentication token and refreshes it on behalf of user to keep session active. The default setting is **0**. You can use this parameter only in with Enterprise Message API consumers. You can use **EnableSessionManagement** only on an **RSSL_ENCRYPTED** ChannelType.
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 *Transport API Developers Guide*.
HighWaterMark	long	6144	Specifies the upper buffer-usage threshold for the channel.
InitializationTimeout	long	5 (10 when used with **RSSL_ENCRYPTED** ChannelType)	Specifies the time (in seconds) to wait for the successful initialization of a channel.
InterfaceName	String	""	Specifies a character representation of the IP address or hostname of the local network interface over which the Enterprise Message API sends and receives content. **InterfaceName** is for use in systems that have multiple network interface cards. If unspecified, the default network interface is used.

Table 5: Universal <Channel> Parameters

PARAMETER NAME	TYPE	DEFAULT	NOTES
Location	String	us-east	Used only when **host** and **port** are unspecified, **Location** specifies the cloud location of the service provider endpoint to which the RTSDK API establishes a connection. If **Location** is not specified, the default setting is **us-east**. In any particular cloud location, the Enterprise Message API connects to the endpoint that provides two available zones for the location (e.g., **[us-east-1a, us-east-1b]**). You can use **Location** only on an **RSSL_ENCRYPTED** ChannelType.
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 *Transport API Developers Guide*.
SysRecvBufSize	long	0	Specifies the size (in bytes) of the system's receive buffer for this channel. For exact, effective values, refer to your operating system documentation..
SysSendBufSize	long	0	Specifies the size (in bytes) of the system's send buffer for this channel. For exact, effective values, refer to your operating system documentation..

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.
CompressionType	String	None	Specifies the Enterprise Message API'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. Use strings with Enterprise Message API's programmatic configuration (for further details, refer to Section 4.5). Available values include: • **None** • **ZLib** • **LZ4** **NOTE:** A server can be configured to force a particular compression type, regardless of client settings.
DirectWrite	int	0	Specifies whether to set the direct socket write flag when sending data on a channel. 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. Possible values are: • **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 Enterprise Message API 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 Enterprise Message API connects.
ProxyHost	String	""	Specifies the host name of the proxy to which the Enterprise Message API connects. The parameter value can be a host name or an IP address. Any value provided by a function call overrides the setting in configuration file.
ProxyPort	String	""	Specifies the port on the proxy to which the Enterprise Message API connects. Any value provided by a function call overrides the setting in configuration file.
TcpNodelay	int	1	Specifies whether to use Nagle's algorithm when sending data. Available values are: • **0**: Send data using Nagle's algorithm. • **1**: Send data without delay.

Table 6: Parameters for Channel Type: RSSL_SOCKET

3.3.4 Parameters for Use with Channel Types: RSSL_HTTP

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_HTTP**.

PARAMETER NAME	TYPE	DEFAULT	NOTES
CompressionThreshold	int	30	Sets the message size threshold (in bytes, the allowed value is 30-UInt32 MAX), 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.
CompressionType	String	None	Specifies the Enterprise Message API'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. Use strings with Enterprise Message API's programmatic configuration (for further details, refer to Section 4.5). Available values include: • **None** • **ZLib** • **LZ4** **NOTE:** A server can be configured to force a particular compression type, regardless of client settings.
Host	String	localhost	Specifies the host name of the server to which the Enterprise Message API connects. The parameter value can be a remote host name or IP address.
ObjectName	String	""	Specifies the object name to pass along with the underlying URL in HTTP and HTTPS connection messages.
Port	String	14002	Specifies the port on the remote server to which the Enterprise Message API connects.
ProxyHost	String	""	Specifies the host name of the proxy to which the Enterprise Message API connects. The parameter value can be a host name or an IP address. Any value provided by a function call overrides the setting in configuration file.
ProxyPort	String	""	Specifies the port on the proxy to which the Enterprise Message API connects. Any value provided by a function call overrides the setting in configuration file.
TcpNodelay	int	1	Specifies whether to use Nagle's algorithm when sending data. Available values are: • **0**: Send data using Nagle's algorithm. • **1**: Send data without delay.

Table 7: Parameters for Channel Type: RSSL_HTTP

3.3.5 Parameters for Use with Channel Types: WEBSOCKET

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 **WEBSOCKET**. A **WEBSOCKET** channel does not support the LZ4 compression type.

PARAMETER NAME	TYPE	DEFAULT	NOTES
WsMaxMsgSize	int	61440	Specifies the maximum size of messages that the WebSocket transport can send or read.
WsProtocols	String	tr_json2, rssl.rwf, rssl.json.v2	Specifies a list of supported/preferred protocols in order of preference from highest to lowest.

Table 8: Parameters for Channel Types: WEBSOCKET

3.3.6 Parameters for Use with Channel Types: RSSL_ENCRYPTED

In addition to the universal parameters listed in Section 3.3.2, and the parameters listed in the section specific to the protocol type you use (i.e., Section 3.3.3 for socket connections or Section 3.3.4 for HTTP connections), use the following parameters to configure a channel whose type is **RSSL_ENCRYPTED**.

PARAMETER NAME	TYPE	DEFAULT	NOTES
EncryptedProtocolType	String	RSSL_HTTP	Specifies the type of protocol used for this encrypted connection. • **RSSL_SOCKET** (0) • **RSSL_HTTP** (2) • **WEBSOCKET** (7)

Table 9: Parameters for Channel Types: RSSL_ENCRYPTED

3.3.7 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>
```

3.3.8 Example ChannelSet XML Configuraoion

The following XML example illustrates a specific ChannelSet configuration using the XML schema introduced in Section 3.3.7:

```
<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>
```

3.3.9 Example Programmatic Configuration for ChannelSet

The following XML example illustrates a programmatic ChannelSet configuration in Java:

```
Map innerMap = EmaFactory.createMap();
Map configMap = EmaFactory.createMap();
ElementList elementList = EmaFactory.createElementList();
ElementList innerElementList = EmaFactory.createElementList();

elementList.add(EmaFactory.createElementEntry().ascii("DefaultConsumer", "Consumer_1"));
innerElementList.add(EmaFactory.createElementEntry().ascii("ChannelSet", "Channel_1, Channel_2"));
innerElementList.add(EmaFactory.createElementEntry().ascii("Dictionary", "Dictionary_1"));
innerMap.add(EmaFactory.createMapEntry().keyAscii( "Consumer_1", MapEntry.MapAction.ADD,
        innerElementList));
innerElementList.clear();

elementList.add(EmaFactory.createElementEntry().map( "ConsumerList", innerMap ));
innerMap.clear();
configMap.add(EmaFactory.createMapEntry().keyAscii( "ConsumerGroup", MapEntry.MapAction.ADD,
        elementList ));
elementList.clear();

innerElementList.add(EmaFactory.createElementEntry().ascii("ChannelType",
        "ChannelType::RSSL_SOCKET"));
innerElementList.add(EmaFactory.createElementEntry().ascii("Host", "localhost"));
innerElementList.add(EmaFactory.createElementEntry().ascii("Port", "14002"));
innerMap.add(EmaFactory.createMapEntry().keyAscii( "Channel_1", MapEntry.MapAction.ADD,
        innerElementList));
innerElementList.clear();

innerElementList.add(EmaFactory.createElementEntry().ascii("ChannelType",
        "ChannelType::RSSL_SOCKET"));
innerElementList.add(EmaFactory.createElementEntry().ascii("Host", "121.1.1.100"));
innerElementList.add(EmaFactory.createElementEntry().ascii("Port", "14008"));
innerMap.add(EmaFactory.createMapEntry().keyAscii( "Channel_2", MapEntry.MapAction.ADD,
        innerElementList));
innerElementList.clear();

elementList.add(EmaFactory.createElementEntry().map( "ChannelList", innerMap ));
innerMap.clear();

configMap.add(EmaFactory.createMapEntry().keyAscii( "ChannelGroup", MapEntry.MapAction.ADD,
        elementList ));
elementList.clear();

innerElementList.add(EmaFactory.createElementEntry().ascii("DictionaryType",
        "DictionaryType::ChannelDictionary"));
innerElementList.add(EmaFactory.createElementEntry().ascii("RdmFieldDictionaryFileName",
        "./RDMFieldDictionary"));
innerElementList.add(EmaFactory.createElementEntry().ascii("EnumTypeDefFileName", "./enumtype.def"));
```

```
innerMap.add(EmaFactory.createMapEntry().keyAscii( "Dictionary_1", MapEntry.MapAction.ADD,
        innerElementList));
innerElementList.clear();

elementList.add(EmaFactory.createElementEntry().map( "DictionaryList", innerMap ));
configMap.add(EmaFactory.createMapEntry().keyAscii( "DictionaryGroup", MapEntry.MapAction.ADD,
        elementList ));
elementList.clear();
```

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 Enterprise Message API 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 Enterprise Message API 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.
CompressionType	String	None	Specifies the Enterprise Message API'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. Use strings with Enterprise Message API's programmatic configuration (for further details, refer to Section 4.5). Available values include: • **None** • **ZLib** • **LZ4** **NOTE:** You can configure a server to force a particular compression type, regardless of client settings.
DirectWrite	int	0	Specifies whether to set the direct socket write flag when sending data on a channel. 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. Possible values are: • **0**: Send data without the direct socket write flag. • **1**: Send data with the direct socket write flag.
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 *Transport API Java Edition Developers Guide*.
HighWaterMark	long	6144	Specifies the upper buffer-usage threshold for the channel.
InitializationTimeout	long	60	Specifies the time (in seconds) to wait for the successful initialization of a channel.
InterfaceName	String	""	Specifies a character representation of the IP address or hostname of the local network interface over which the Enterprise Message API 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 **Server**'s name.

Table 10: Universal <Server> Parameters

PARAMETER NAME	TYPE	DEFAULT	NOTES
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 *Transport API Java Edition Developers Guide*.
Port	String	14002	Specifies the port on the remote server to which the Enterprise Message API connects.
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 strings with Enterprise Message API's programmatic configuration (for further details, refer to Section 4.5). Available values include **RSSL_SOCKET (0)**, **RSSL_ENCRYPTED (1)**, or **WEBSOCKET (7)**. **RSSL_ENCRYPTED** requires additional configuration provided via **OmmIProviderConfig** and programmatic configuration. For details, refer to Section 4.4.1.
			NOTE: Setting **ServerType** to **RSSL_SOCKET** or **WEBSOCKET** has the same behavior. An open WebSocket request from the client side notifies the server to update the socket to a WebSocket connection type. The application is responsible for accepting or rejecting traffic based on a protocol that it intends to support.
SysRecvBufSize	long	0	Specifies the size (in bytes) of the system's receive buffer for this channel. For exact, effective values, refer to your operating system documentation.
SysSendBufSize	long	0	Specifies the size (in bytes) of the system's send buffer for this channel. For exact, effective values, refer to your operating system documentation.
TcpNodelay	int	1	Specifies whether to use Nagle's algorithm when sending data. Available values are: • **0**: Send data using Nagle's algorithm. • **1**: Send data without delay.

Table 10: Universal <Server> Parameters (Continued)

3.4.3 Parameters for Use with ServerType WEBSOCKET

You can use the following parameter when **ServerType** is set to **WEBSOCKET**.

PARAMETER NAME	TYPE	DEFAULT	DESCRIPTION
WsProtocols	String	tr_json2, rssl.rwf, rssl.json.v2	Specifies a list of supported protocols in order of preference. Current protocols supported include **`rssl.json.v2`**, **`rssl.rwf`**, and **`tr_json2`**.

Table 11: WEBSOCKET ServerType Parameter

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 Enterprise Message API.

PARAMETER NAME	TYPE	DEFAULT	NOTES
DictionaryType	String	ChannelDictionary	Specifies the dictionary loading mode. Use strings with Enterprise Message API's programmatic configuration (for further details, refer to Section 4.5).Possible values are: • **FileDictionary** (0): The Enterprise Message API loads the dictionaries from the files specified in the parameters **RdmFieldDictionaryFileName** and **EnumTypeDefFileName**. • **ChannelDictionary** (1): The Enterprise Message API 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 12: 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>
```

3.6.2 Setting Default Directory

If you do not specify a **DefaultDirectory**, then the Enterprise Message API 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**.

```
<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 13: 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 *Enterprise Message API Java Edition RDM Usage Guide*. The Enterprise Message API supports only the RDM entries **InfoFilter** and **StateFilter**. Use the following parameters when configuring a Service in the Enterprise Message API:

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 that the Enterprise Message API sends out.
StateFilter	Component Name	N/A	Specifies **StateFilter** values for the given **Service**. The Enterprise Message API sends **StateFilter** values to describe the service's state.

Table 14: Service Entry Parameters

3.6.5 InfoFilter Entry Parameters

The Enterprise Message API uses the following **InfoFilter** parameters to set filters on the types of information it sends overs its services (as specified in the **EmaConfig.xml**).

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: • **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 15: 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. • 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. • 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 *RDM Java Edition Usage Guide*.
SupportsOutOfBandSnapshots	int	For non-interactive provider: 0	Indicates whether the provider supports Snapshot requests after the OpenLimit has been reached: • 0: The provider does not support snapshot requests. • 1: The providers supports snapshot requests. For details on **OpenLimit**, refer to the *RDM Java Edition Usage Guide*.

Table 15: Source Directory Info Parameters (Continued)

3.6.5.1 Capabilities Entry 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 16: 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 **RWFEnum** 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 17: 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 RWFEnum 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 18: 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.

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 19: 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: • 0: Service is down • 1: Service is up
AcceptingRequests	int	For non-interactive provider: 0	Specifies whether the service accepts request messages: • 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 20: 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.T

Table 21: Status Entry Parameters

3.7 Global Configuration

GlobalConfig contains parameters that relate to the entire application.

3.7.1 Generic XML Schema for GlobalConfig

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

```
<GlobalConfig>
...
</GlobalConfig>
```

3.7.2 Parameters

Enterprise Message API uses the following global parameters. All parameters are optional.

PARAMETER	TYPE	DEFAULT	DESCRIPTION
ReactorMsgEventPoolLimit	int	-1	Specifies the maximum number of events in the **ReactorMsgEvent** pool. When the limit is reached, events will be created outside of the pool and garbage collected later. If this value is negative (such as the default setting), then amount of events is unlimited.
ReactorChannelEventPoolLimit	int	-1	Specifies the maximum number of events in the **ReactorChannelEvent** pool. When the limit is reached, events are created outside of the pool and garbage collected later. If this value is negative (such as the default setting), then the amount of events is unlimited.
WorkerEventPoolLimit	int	-1	Specifies the maximum number of events in the **WorkerEvent** pool. When the limit is reached, events are created outside of the pool and garbage collected later. If the value is negative (such as the default setting), then the amount of events is unlimited.
TunnelStreamMsgEventPoolLimit	int	-1	Specifies the maximum number of events in the **TunnelStreamMsgEvent** pool. When the limit is reached, events are created outside of the pool and will be garbage collected later. If value is negative (such as the default setting), then the amount of events is unlimited.
TunnelStreamStatusEventPoolLimit	int	-1	Specifies the maximum number of events in the **TunnelStreamStatusEvent** pool. When the limit is reached. events are created outside of the pool and garbage collected later. If the value is negative, then the amount of events is unlimited.

Table 22: Global Configuration Parameters

4 EMA Configuration Processing

4.1 Overview and Configuration Precedence

The Enterprise Message API 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 Enterprise Message API's configuration as used by application components. The Enterprise Message API merges configuration parameters specified from all vectors with the following precedence: Function calls, Programmatic Configuration, File Configuration (such as **EmaConfix.xml**), and finally the default configuration (i.e., if parameters are specified in both function calls and the programmatic configuration, the function call configuration takes precedence).

4.2 Default Configuration

4.2.1 Default Consumer Configuration

Each Enterprise Message API 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 Enterprise Message API'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.

The Enterprise Message API 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 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="RSSL_SOCKET"
- **CompressionType** value="None"
- **TcpNoDelay** value="1"
- **Host** value="localhost"
- **Port** value="14002"

Note that unlike the Enterprise Message API's default behavior of choosing the first **Consumer** component in the **ConsumerList**, Enterprise Message API 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 Enterprise Message API's default configuration, refer to Section 2.3.

4.2.2 Default *Provider* Configurations

Each Enterprise Message API provider-type application must eventually instantiate an ***OmmProvider*** object. Constructors for **`OmmProvider`** require a **Omm*Provider*Config** object. The **`Omm*Provider*Config`** constructor can read and process an optional XML file, which applications can use to modify the Enterprise Message API'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.

The Enterprise Message API provides a hard-coded configuration for use whenever an **`Omm*Provider*Config`** object is instantiated without an **EmaConfig.xml** file in the run-time environment. The resulting Enterprise Message API 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 the Enterprise Message API's default behavior of choosing the first **NiProvider** component in the **NiProviderList**, Enterprise Message API 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 the Enterprise Message API's default behavior of choosing the first **IProvider** component in the **IProviderList**, Enterprise Message API 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 Refinitiv Real-Time SDK package installs a default configuration file named **EmaConfig.xml** into the Enterprise Message API's working directory. By default, the Enterprise Message API 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 the Enterprise Message API 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 Enterprise Message API's configuration file in a component definition (i.e., **Consumer**, **NiProvider**, **Channel**, **Directory**, or **Dictionary**) otherwise the Enterprise Message API ignores the element. This section includes some examples that illustrate this requirement.

4.3.1 Reading the Configuration File

NOTE: The following section uses Consumer objects (i.e., **`OmmConsumer`** and **`OmmConsumerConfig`**) to illustrate how the Enterprise Message API checks for a configuration file, and if one exists, how the Enterprise Message API starts to process it. For details on interactive and non-interactive providers (instead of consumers) and their OmmProvider-type objects, refer to the *Enterprise Message API 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 CLASSPATH or in the Working Directory

If **`OmmConsumerConfig`** lacks an argument, the application attempts to open a configuration file named **EmaConfig.xml**, which must be located in either the **CLASSPATH** root directories or in the current working directory. By precedence, the Enterprise Message API uses the **EmaConfig.xml** from the **CLASSPATH** root directories; if one does not exist in the **CLASSPATH**, then the Enterprise Message API uses the **EmaConfig.xml** from the current working directory. If the Enterprise Message API does not find an **EmaConfig.xml**, the application uses the default configuration. Additionally, if the **EmaConfig.xml** file is empty or contains malformed XML, 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 CLASSPATH or in the working directory, have the application create an **`OmmConsumerConfig`** object (for details on this object, refer to the *Enterprise Message API 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 Refinitiv Real-Time 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, the Enterprise Message API appends **EmaConfig.xml** to the argument and verifies whether **EmaConfig.xml** exists in the specified directory.
- If the argument represents a directory and filename, the Enterprise Message API 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.

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 *Enterprise Message API 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 an example of how to specify a custom configuration file name, refer to *Example 111* (**example111__MarketPrice__UserSpecifiedFileConfig**) included with the package.

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 Enterprise Message API application relies on its hard-coded behavior.

However, if the snippet is configured in either of the following configurations, the Enterprise Message API 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 Enterprise Message API 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 Enterprise Message API 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 Enterprise Message API throws an exception indicating that **DefaultConsumer** is invalid.
- If the configuration file has no **Consumer** components, the Enterprise Message API application uses **EmaConsumer**.

4.3.4 Processing the *Provider* "Name"

The Enterprise Message API is hard-coded to use a default non-interactive provider of **Ema*Provider***. 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 **Default*Provider*** element, or if this parameter is not set, then the Enterprise Message API application will default to the name of the first non-interactive provider component.

- If **Default*Provider*** uses an invalid name (i.e., no ***Provider*** components in the XML file use that name), the Enterprise Message API throws an exception indicating that **Default*Provider*** is invalid.
- If the **EmaConfig.xml** has no ***Provider*** components, the Enterprise Message API application uses **Ema*Provider***.

4.4 Configuring EMA Using Function Calls

From an application standpoint, instantiating **OmmConsumerConfig** and **OmmNiProviderConfig** objects creates the initial configuration from the Enterprise Message API's XML configuration file (if one exists). Certain variables can then be altered via function calls on the **OmmConsumerConfig** and **Omm*Provider*Config** objects.

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

4.4.1 EMA Configuration Method Calls

4.4.1.1 OmmConsumerConfig Class Method Calls

You can use the following method calls in an Enterprise Message API consumer application:

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

Table 23: OmmConsumerConfig Class Method Calls

4.4.1.2 Omm*Provider*Config Class Method Calls

You can use the following method calls in an Enterprise Message API ***Provider*** application. For further details on variables, refer to the *Enterprise Message API Java RDM Usage Guide*. Certain method 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.

METHOD	DESCRIPTION
addAdminMsg(ReqMsg)	Used only with **NiProvider**. Populates part of or all of the login request message according to the specification discussed in the *Enterprise Message API Java RDM Usage Guide*.
addAdminMsg(RefreshMsg)	Populates part of or all of the initial directory refresh message according to the specification discussed in the *Enterprise Message API Java RDM Usage Guide*.
adminControlDirectory(int)	Specifies whether the API or the user controls the sending of Directory refresh messages. Available values include: • **`OmmProviderConfig.AdminControl.API_CONTROL`** (which is the default) • **`OmmProviderConfig.AdminControl.USER_CONTROL`** For details on control models, refer to **Omm*Provider*Config.h**.
applicationId(String)	Used only with **NiProvider**. Sets the ***applicationId*** variable. ***applicationId*** has no default value.
clear()	Clears existing content from the **`OmmProviderConfig`** object.
config(Data)	Passes in the provider's programmatic configuration.
host(String)	Used only with **NiProvider**. Sets the **host** and **port** parameters. For details, refer to Section 4.4.2.
instanceId(String)	Used only with **NiProvider**. Sets the ***instanceId*** variable. ***instanceId*** has no default value.
keyManagerAlgorithm(String)	Used only with **IProvider**. Specifies the key manager algorithm for the configured server. This defaults to **SunX509**.
keystoreFile(String)	Used only with **IProvider** Specifies the keystore file for an encrypted connection, containing the server private key and certificate. If **`keystoreFile( String )`** is not set, by default, the application loads the JVM's default keystore set with **javax.net.ssl.keystore**.
keystorePasswd(String)	Used only with **IProvider**. Specifies the keystore password for the configured keystore. If **`keystorePasswd( String )`** is not set, by default, the application loads the JVM's default keystore set with **javax.net.ssl.keystorepassword**.
keystoreType(String)	Used only with **IProvider**. Specifies the keystore type for the configured keystore. This defaults to **JKS**.
operationModel(int)	Specifies whether the API or the user controls the thead (i.e., the operation model). Available values include: • **`OmmProviderConfig.OperationModel.API_DISPATCH`**(which is the default) • **`OmmProviderConfig.OperationModel.USER_DISPATCH`** For details on operation models, refer to **Omm*Provider*Config.h**.

Table 24: `OmmProviderConfig` Class Method Calls

METHOD	DESCRIPTION
password(String)	Used only with **NiProvider**. Sets the ***password*** variable. ***password*** has no default value.
port()	Sets the **port** parameters.
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 the Enterprise Message API's configuration. If a provider does not exist with that name, the application throws an exception.
securityProtocol(String)	Used only with **IProvider**. Specifies which TLS protocol to use with this server. This defaults to **TLSv1.2**.
securityProvider(String)	Used only with **IProvider**. Specifies the security provider type for the configured server. This defaults to **SunJSSE**.
trustManagerAlgorithm(String)	Used only with **IProvider**. Specifies the trust manager algorithm for the configured server. This defaults to **PKIX**.
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 24: `Omm`*`Provider`*`Config` Class Method Calls (Continued)

4.4.2 Using the `host()` Function: How Host and Port Parameters 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***.

4.5 Programmatic Configuration

In addition to changing the Enterprise Message API's configuration via an XML configuration file (e.g., **EmaConfig.xml**) or function calls, you can programmatically change the API's behavior via an OMM data structure.

4.5.1 OMM Data Structure

Programmatic configuration of the Enterprise Message API provides a way of configuring all parameters using an OMM data structure, which is divided into four tiers:

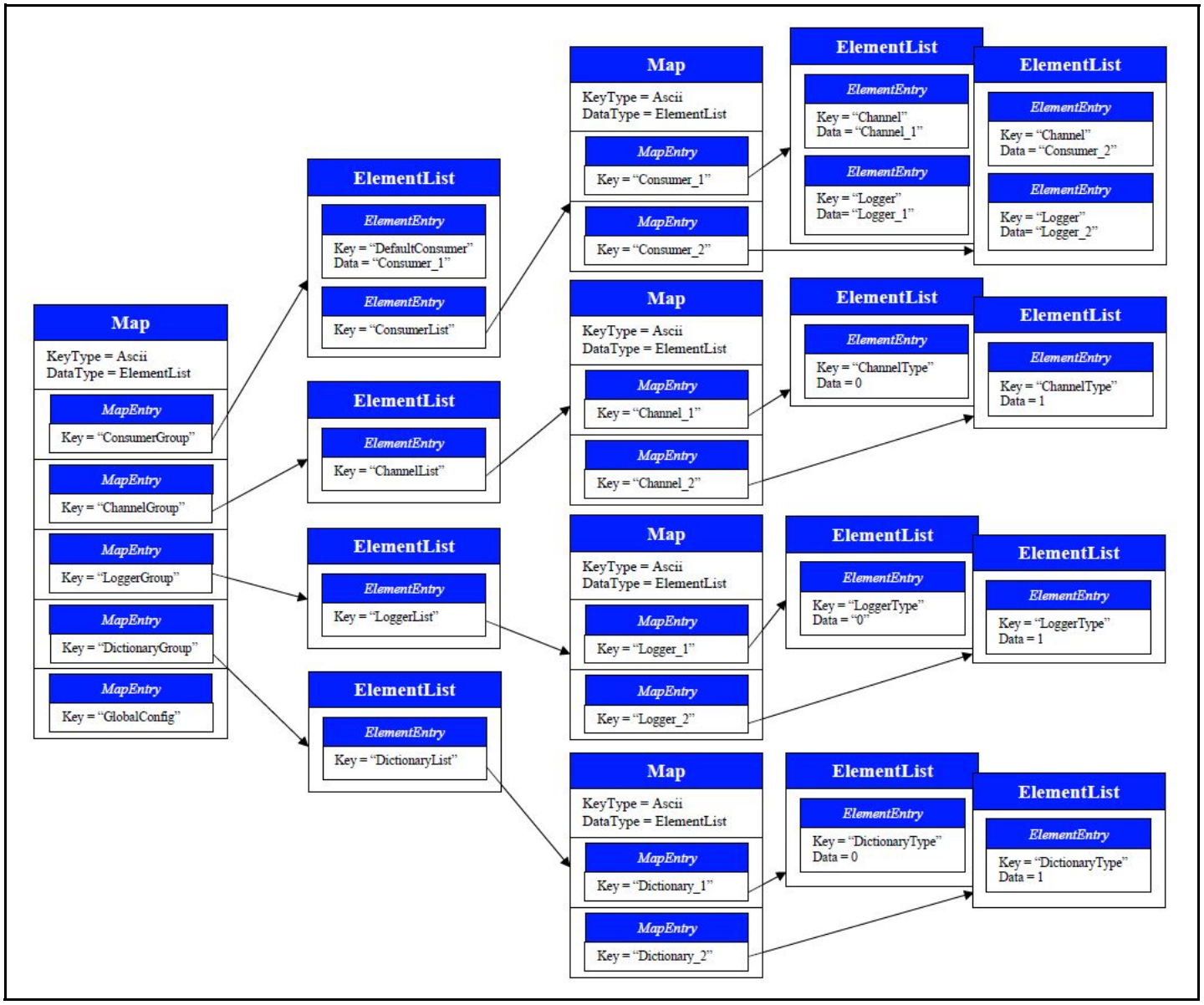
- The 1st tier lists the Enterprise Message API's Consumer, IProvider, NiProvider, Channel, Logger, Directory, and Dictionary components; each of which has its own list in the 2nd tier.
- The 2nd tier includes each component's list and the default consumers and providers for use when loading configuration parameters.
- The 3rd tier defines individual names for these components, which then have their own configuration parameters in 4th tier.
- The 4th tier defines configuration parameters that are assigned to specific components.

4.5.2 Creating a Programmatic Configuration for a Consumer

NOTE: When encoding OMM types, you must follow the OMM data structure and configuration parameter types listed in this document.

▶ To programmatically configure an Enterprise Message API consumer:

1. Create a map with the following hierarchy to configure Enterprise Message API configuration parameters:



2. Call the **`config`** method on an **`OmmConsumerConfig`** object, and pass the Map (which represents the programmatic OMM structure) as a parameter to the **`config`** method.

   You can pass in multiple maps, each programmatic configuration being applied to create the application's active configuration during instantiation of the **`OmmConsumer`** or **`OmmProvider`**.

4.5.3 Example: Programmatic Configuration of the Consumer

The following example illustrates programmatically configuring a consumer:

```
Map innerMap = EmaFactory.createMap();
Map configMap = EmaFactory.createMap();
ElementList elementList = EmaFactory.createElementList();
ElementList innerElementList = EmaFactory.createElementList();

innerElementList.add(EmaFactory.createElementEntry().intValue("ReactorMsgEventPoolLimit", 2000));
innerElementList.add(EmaFactory.createElementEntry().intValue("ReactorChannelEventPoolLimit", 1500));
innerElementList.add(EmaFactory.createElementEntry().intValue("WorkerEventPoolLimit", 1000));
innerElementList.add(EmaFactory.createElementEntry().intValue("TunnelStreamMsgEventPoolLimit",
        2500));
innerElementList.add(EmaFactory.createElementEntry().intValue("TunnelStreamStatusEventPoolLimit",
        3000));
configMap.add(EmaFactory.createMapEntry().keyAscii( "GlobalConfig", MapEntry.MapAction.ADD,
        innerElementList ));
innerElementList.clear();

elementList.add(EmaFactory.createElementEntry().ascii("DefaultConsumer", "Consumer_1"));
innerElementList.add(EmaFactory.createElementEntry().ascii("ChannelSet", "Channel_1, Channel_2"));
innerElementList.add(EmaFactory.createElementEntry().ascii("Dictionary", "Dictionary_1"));
innerMap.add(EmaFactory.createMapEntry().keyAscii( "Consumer_1", MapEntry.MapAction.ADD,
        innerElementList));
innerElementList.clear();

elementList.add(EmaFactory.createElementEntry().map( "ConsumerList", innerMap ));
innerMap.clear();
configMap.add(EmaFactory.createMapEntry().keyAscii( "ConsumerGroup", MapEntry.MapAction.ADD,
        elementList ));
elementList.clear();

innerElementList.add(EmaFactory.createElementEntry().ascii("ChannelType",
        "ChannelType::RSSL_SOCKET"));
innerElementList.add(EmaFactory.createElementEntry().ascii("Host", "localhost"));
innerElementList.add(EmaFactory.createElementEntry().ascii("Port", "14002"));
innerMap.add(EmaFactory.createMapEntry().keyAscii( "Channel_1", MapEntry.MapAction.ADD,
        innerElementList));
innerElementList));

innerElementList.add(EmaFactory.createElementEntry().ascii("ChannelType",
    "ChannelType::RSSL_SOCKET"));
innerElementList.add(EmaFactory.createElementEntry().ascii("Host", "121.1.1.100"));
innerElementList.add(EmaFactory.createElementEntry().ascii("Port", "14008"));
innerMap.add(EmaFactory.createMapEntry().keyAscii( "Channel_2", MapEntry.MapAction.ADD,
        innerElementList));
innerElementList.clear();

elementList.add(EmaFactory.createElementEntry().map( "ChannelList", innerMap ));
```

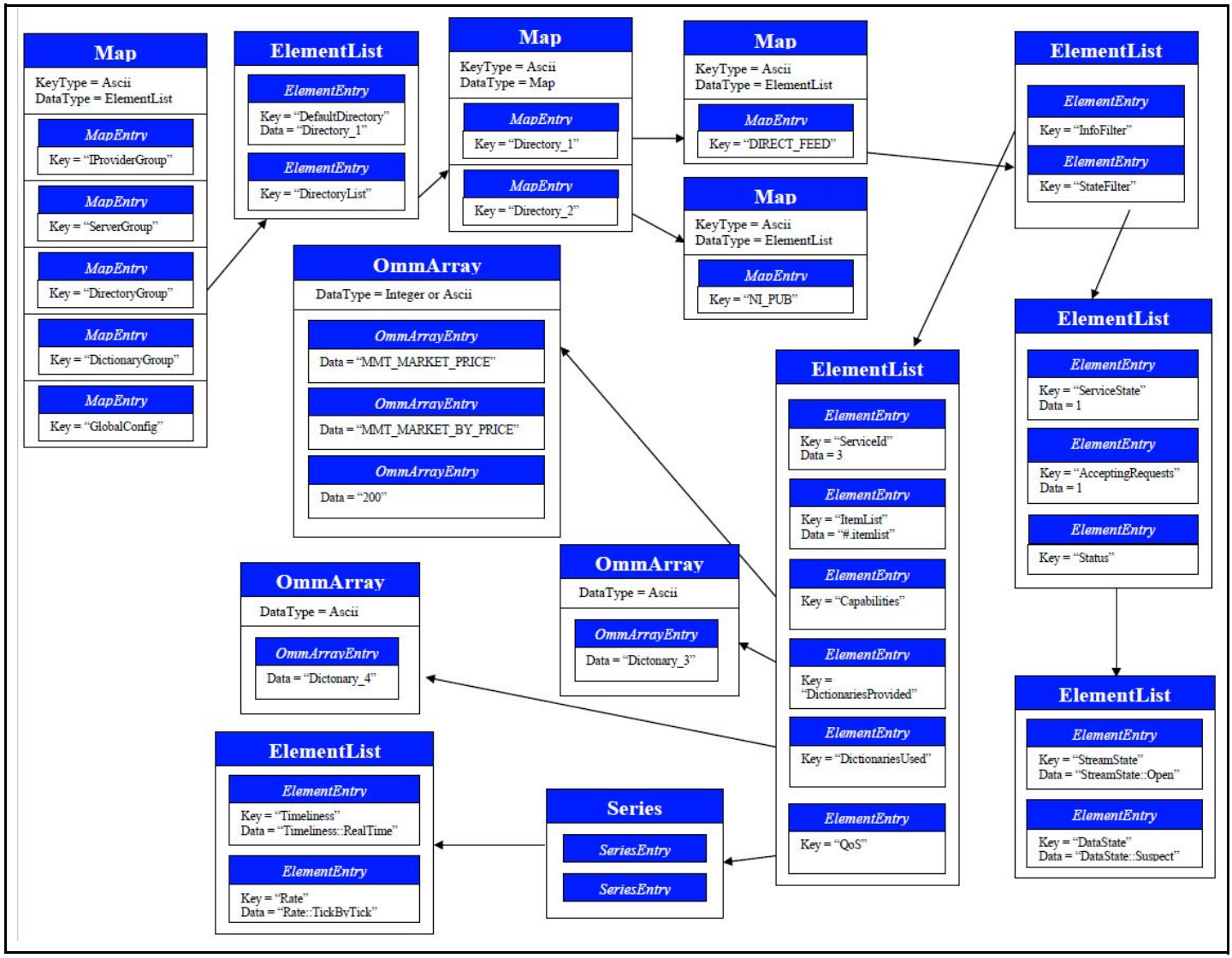
```
innerMap.clear();

configMap.add(EmaFactory.createMapEntry().keyAscii( "ChannelGroup", MapEntry.MapAction.ADD,
        elementList ));
elementList.clear();

innerElementList.add(EmaFactory.createElementEntry().ascii("DictionaryType",
        "DictionaryType::ChannelDictionary"));
innerElementList.add(EmaFactory.createElementEntry().ascii("RdmFieldDictionaryFileName", "./
        RDMFieldDictionary"));
innerElementList.add(EmaFactory.createElementEntry().ascii("EnumTypeDefFileName", "./enumtype.def"));
innerMap.add(EmaFactory.createMapEntry().keyAscii( "Dictionary_1", MapEntry.MapAction.ADD,
        innerElementList));
innerElementList.clear();

elementList.add(EmaFactory.createElementEntry().map( "DictionaryList", innerMap ));
configMap.add(EmaFactory.createMapEntry().keyAscii( "DictionaryGroup", MapEntry.MapAction.ADD,
        elementList ));
elementList.clear();

...

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

4.5.4 Creating a Programmatic Configuration for a *Provider*

NOTE: When encoding OMM types, you must follow the OMM data structure and configuration parameter types listed in this document.

▶ To programmatically configure an Enterprise Message API *Provider*:

1. To configure an Enterprise Message API directory's configuration parameters, create a map with the following hierarchy:



2. Call the **`config`** method on an **`OmmProviderConfig`** object, and pass the Map (which represents the programmatic OMM structure) as a parameter to the **`config`** method.

   You can pass in multiple maps, each programmatic configuration being applied to create the application's active configuration during instantiation of the **`OmmConsumer`** or **`OmmProvider`**.

NOTE: You must set **adminControlDirectory** and **adminControlDictionary** to their default settings (**`ApiControlEnum`**) when programmatically configuring:

- A Directory Refresh message published by a *Provider*, or
- A Dictionary Refresh message published by an IProvider

4.5.5 Example: Programmatic Configuration of a *Provider*

The following example illustrates programmatically configuring a *Provider*:

```
Map outermostMap = EmaFactory.createMap();
Map innerMap = EmaFactory.createMap();
ElementList elementList = EmaFactory.createElementList();
ElementList innerElementList = EmaFactory.createElementList();

innerElementList.add(EmaFactory.createElementEntry().intValue("ReactorMsgEventPoolLimit", 2000));
innerElementList.add(EmaFactory.createElementEntry().intValue("ReactorChannelEventPoolLimit", 1500));
innerElementList.add(EmaFactory.createElementEntry().intValue("WorkerEventPoolLimit", 1000));
innerElementList.add(EmaFactory.createElementEntry().intValue("TunnelStreamMsgEventPoolLimit",
        2500));
innerElementList.add(EmaFactory.createElementEntry().intValue("TunnelStreamStatusEventPoolLimit",
        3000));
outermostMap.add(EmaFactory.createMapEntry().keyAscii( "GlobalConfig", MapEntry.MapAction.ADD,
        innerElementList ));
innerElementList.clear();

elementList.add(EmaFactory.createElementEntry().ascii("DefaultIProvider", "Provider_1"));

innerElementList.add(EmaFactory.createElementEntry().ascii("Server", "Server_1"));
innerElementList.add(EmaFactory.createElementEntry().ascii("Directory", "Directory_1"));

innerElementList.add(EmaFactory.createElementEntry().intValue("ItemCountHint", 5000));
innerElementList.add(EmaFactory.createElementEntry().intValue("ServiceCountHint", 5000));
innerElementList.add(EmaFactory.createElementEntry().intValue("AcceptDirMessageWithoutMinFilters",
        0));
innerElementList.add(EmaFactory.createElementEntry().intValue("AcceptMessageSameKeyButDiffStream",
        0));
innerElementList.add(EmaFactory.createElementEntry().intValue("RefreshFirstRequired", 1));
innerElementList.add(EmaFactory.createElementEntry().intValue("RequestTimeout", 5000));
innerElementList.add(EmaFactory.createElementEntry().intValue("DispatchTimeoutApiThread", 5656));
innerElementList.add(EmaFactory.createElementEntry().intValue("MaxDispatchCountApiThread", 500));
innerElementList.add(EmaFactory.createElementEntry().intValue("MaxDispatchCountUserThread", 500));
innerElementList.add(EmaFactory.createElementEntry().intValue("XmlTraceToStdout", 0));

innerMap.add(EmaFactory.createMapEntry().keyAscii( "Provider_1", MapEntry.MapAction.ADD,
        innerElementList));
innerElementList.clear();

elementList.add(EmaFactory.createElementEntry().map("IProviderList", innerMap));
innerMap.clear();

outermostMap.add(EmaFactory.createMapEntry().keyAscii( "IProviderGroup", MapEntry.MapAction.ADD,
        elementList));
elementList.clear();
```

```
innerElementList.add(EmaFactory.createElementEntry().ascii("ServerType", "ServerType::RSSL_SOCKET"));
innerElementList.add(EmaFactory.createElementEntry().ascii("CompressionType",
        "CompressionType::LZ4"));
innerElementList.add(EmaFactory.createElementEntry().intValue("GuaranteedOutputBuffers", 7000));
innerElementList.add(EmaFactory.createElementEntry().intValue("NumInputBuffers", 5000));
innerElementList.add(EmaFactory.createElementEntry().intValue("ConnectionPingTimeout", 70000));
innerElementList.add(EmaFactory.createElementEntry().ascii("Port", "14003"));
innerElementList.add(EmaFactory.createElementEntry().intValue("TcpNodelay", 1));
innerMap.add(EmaFactory.createMapEntry().keyAscii( "Server_1", MapEntry.MapAction.ADD,
        innerElementList));
innerElementList.clear();

elementList.add(EmaFactory.createElementEntry().map("ServerList", innerMap));
innerMap.clear();

outermostMap.add(EmaFactory.createMapEntry().keyAscii( "ServerGroup", MapEntry.MapAction.ADD,
        elementList));
elementList.clear();

innerElementList.add(EmaFactory.createElementEntry().ascii("DictionaryType",
    "DictionaryType::FileDictionary"));
innerElementList.add(EmaFactory.createElementEntry().ascii("RdmFieldDictionaryItemName", "RWFFld"));
innerElementList.add(EmaFactory.createElementEntry().ascii("EnumTypeDefItemName", "RWFEnum"));
innerElementList.add(EmaFactory.createElementEntry().ascii("RdmFieldDictionaryFileName", "./
        RDMFieldDictionary"));
innerElementList.add(EmaFactory.createElementEntry().ascii("EnumTypeDefFileName", "./enumtype.def"));
innerMap.add(EmaFactory.createMapEntry().keyAscii( "Dictionary_1", MapEntry.MapAction.ADD,
        innerElementList));
innerElementList.clear();

elementList.add(EmaFactory.createElementEntry().map("DictionaryList", innerMap));
innerMap.clear();

outermostMap.add(EmaFactory.createMapEntry().keyAscii( "DictionaryGroup", MapEntry.MapAction.ADD,
        elementList));
elementList.clear();

Map serviceMap = EmaFactory.createMap();
ElementList infoElementList = EmaFactory.createElementList();
ElementList stateElementList = EmaFactory.createElementList();
OmmArray infoArray = EmaFactory.createOmmArray();
Series qosSeries = EmaFactory.createSeries();

infoElementList.add(EmaFactory.createElementEntry().intValue("ServiceId", 1));
infoElementList.add(EmaFactory.createElementEntry().ascii("Vendor", "Vendor"));
infoElementList.add(EmaFactory.createElementEntry().intValue("IsSource", 1));
infoElementList.add(EmaFactory.createElementEntry().intValue("AcceptingConsumerStatus", 1));
infoElementList.add(EmaFactory.createElementEntry().intValue("SupportsQoSRange", 1));
infoElementList.add(EmaFactory.createElementEntry().intValue("SupportsOutOfBandSnapshots", 1));
infoElementList.add(EmaFactory.createElementEntry().ascii("ItemList", "#.itemlist"));
```

```
infoArray.add(EmaFactory.createOmmArrayEntry().ascii("MMT_MARKET_PRICE"));
infoArray.add(EmaFactory.createOmmArrayEntry().ascii("MMT_MARKET_BY_PRICE"));
infoArray.add(EmaFactory.createOmmArrayEntry().ascii("MMT_MARKET_BY_ORDER"));
infoArray.add(EmaFactory.createOmmArrayEntry().ascii("130"));
infoElementList.add(EmaFactory.createElementEntry().array("Capabilities", infoArray));
infoArray.clear();

infoArray.add(EmaFactory.createOmmArrayEntry().ascii("Dictionary_1"));
infoElementList.add(EmaFactory.createElementEntry().array("DictionariesProvided", infoArray));
infoArray.clear();
infoArray.add(EmaFactory.createOmmArrayEntry().ascii("Dictionary_1"));
infoElementList.add(EmaFactory.createElementEntry().array("DictionariesUsed", infoArray));
infoArray.clear();

innerElementList.add(EmaFactory.createElementEntry().ascii("Timeliness", "Timeliness::RealTime"));
innerElementList.add(EmaFactory.createElementEntry().ascii("Rate", "Rate::TickByTick"));
qosSeries.add(EmaFactory.createSeriesEntry().elementList(innerElementList));
innerElementList.clear();

infoElementList.add(EmaFactory.createElementEntry().series("QoS", qosSeries));
qosSeries.clear();

stateElementList.add(EmaFactory.createElementEntry().intValue("ServiceState", 1));
stateElementList.add(EmaFactory.createElementEntry().intValue("AcceptingRequests", 1));

innerElementList.add(EmaFactory.createElementEntry().ascii("StreamState", "StreamState::Open"));
innerElementList.add(EmaFactory.createElementEntry().ascii("DataState", "DataState::Suspect"));
innerElementList.add(EmaFactory.createElementEntry().ascii("StatusCode", "StatusCode::DacsDown"));
innerElementList.add(EmaFactory.createElementEntry().ascii("StatusText", "dacsDown"));

stateElementList.add(EmaFactory.createElementEntry().elementList("Status", innerElementList));
innerElementList.clear();

innerElementList.add(EmaFactory.createElementEntry().elementList("InfoFilter", infoElementList));
infoElementList.clear();
innerElementList.add(EmaFactory.createElementEntry().elementList("StateFilter", stateElementList));
stateElementList.clear();

serviceMap.add(EmaFactory.createMapEntry().keyAscii( "DIRECT_FEED", MapEntry.MapAction.ADD,
        innerElementList));
innerElementList.clear();
innerMap.add(EmaFactory.createMapEntry().keyAscii( "Directory_1", MapEntry.MapAction.ADD,
        serviceMap));
serviceMap.clear();

elementList.add(EmaFactory.createElementEntry().map("DirectoryList", innerMap));
innerMap.clear();

outermostMap.add(EmaFactory.createMapEntry().keyAscii( "DirectoryGroup", MapEntry.MapAction.ADD,
        elementList));
```

```
provider = EmaFactory.createOmmProvider(
        EmaFactory.createOmmIProviderConfig().config(outermostMap).operationModel(
        OmmIProviderConfig.OperationModel.USER_DISPATCH ), appClient );
```

Document ID: EMAJ362CG.210
Date of issue: June 2021