RMQ Transport Adaptor Installation Guide

Overview

The RabbitMQ Transport Adaptor (hereinafter the RMQ TA) is intended to communicate FIX messages to other applications using RabbitMQ as middleware. The document describes common steps required to install Transport for the FIX Edge.

RMQ TA Functionality

RMQTA is able to have one or more producers and consumers.

Producer is used to transfer messages from FIXEdge to the configured RabbitMQ server's queue. Producer connects to the queue immediately or at configured time (see parameter "StartTime") if connection is available and the queue exists.

Consumer listens for the incoming messages from MQ and publishes these messages to the FIXEdge. If heartbeat processing is disabled (see parameter "HeartBeat.Enable"), the consumer connects to the queue immediately or at configured time (refer to parameter "StartTime" for details) when connection is available and the queue exists. Otherwise, consumer connects to the queue when first message (no matter heartbeat or any other message) is received.

Heartbeat Processing

RMQ TA supports internal heartbeat processing that allows to determine if counterparties are in the state of inactivity.

The format of Heartbeat message is configurable via "HeartBeat.MessageFile" property. The content of the file is read as byte sequence that is compared with incoming message as is.

Reconnection Procedure

Producer

Reconnection procedure starts (see parameter "Reconnect") if connection is unavailable or the queue does not exist. Producer attempts to reconnect configured number of tries in the configured time intervals (see parameters "ReconnectTries" and "ReconnectInterval" for details).

Consumer

Reconnection procedure starts (see parameter "Reconnect") if connection becomes unavailable or no message is received in the configured time interval. Consumer attempts to reconnect configured number of tries in the configured time intervals (see parameters "ReconnectTries" and "ReconnectInterval" for details).

Client Groups

Clients can be grouped via "ClientGroups" property. Grouped clients are available for work if all clients in this group are connected to their queues. In other words, if one client is disconnected – all clients-members of the group will be also in Disconnected state.

Typically it is used for pairs of Producer-Consumer when there is no sense to leave one of the clients in Connected state when another one is disconnected.

RMQ TA Configuration

TA distribution package contains following folders:

- etc – contains the configuration files;
- lib – contains the libraries for working RMQ TA.

In order to setup RMQ TA for FIX Edge you need:

1. **Copy TA distribution package to the FIX Edge folder**
   a. Copy *lib* folder from distribution package to the *conf* directory, e.g. to the *FIXGW/FIXEdge1/conf/amqp-ta-distribution*.
   b. Copy *log4j.properties* and *JVM_Options.jvmopts* configuration files from the *etc* to the configuration directory of the FIX Edge, e.g. *FIXGW/FIXEdge1/conf*.
   c. Check and correct the paths in the *JVM_Options.jvmopts* configuration file to the *libs* and *log4j.properties* according your workspace.
   d. Check path to the jvm folder in path environment variable If your operating system is the windows. If your system is unix check the path in *FixEdge1.run.sh* which located in *bin* directory of the FIXEdge.
2. **Configure TA**
   a. In the '*Transport Layer Section*' of the *FIXEdge.properties* add RMQ TA to the list of supported adapters:

```
TransportLayer.TransportAdapters = TransportLayer.RMQTA
```

   b. Add RMQ TA section to the FIXEdge.properties which located in conf directory of the FIXEdge.
      Sample set of properties is given below:

```
TransportLayer.JVMOptionsFile = ../FixEdge1/conf/JVM_Options.jvmopts

TransportLayer.RMQTA.DllName = libUniversalTADll-gcc44-MD-x64.so
TransportLayer.RMQTA.Description = RMQ Transport Adaptor
TransportLayer.RMQTA.JavaClass = com.epam.fe.jms.jni.JMSAdaptor
TransportLayer.RMQTA.AllowRejectMessages = true
TransportLayer.RMQTA.ConnectionNames = Connection1
TransportLayer.RMQTA.ClientNames = TradeFlowMQProducer, TradeFlowMQConsumer

TransportLayer.RMQTA.Connection.Connection1.ProviderURI = amqp://127.0.0.1:5672
TransportLayer.RMQTA.Connection.Connection1.User = sam1203
TransportLayer.RMQTA.Connection.Connection1.Password = test
TransportLayer.RMQTA.Connection.Connection1.Reconnect = true
TransportLayer.RMQTA.Connection.Connection1.ReconnectTries = 300
TransportLayer.RMQTA.Connection.Connection1.ReconnectInterval = 30000

TransportLayer.RMQTA.Client.TradeFlowMQProducer.ConnectionName = Connection1
TransportLayer.RMQTA.Client.TradeFlowMQProducer.StorageDir = ../FixEdge1/log
TransportLayer.RMQTA.Client.TradeFlowMQProducer.SessionType = Producer
TransportLayer.RMQTA.Client.TradeFlowMQProducer.DestinationURI = TradeFlow
TransportLayer.RMQTA.Client.TradeFlowMQProducer.ExchangeName = exchange.OUT
TransportLayer.RMQTA.Client.TradeFlowMQProducer.HeartBeat.Enable = true
TransportLayer.RMQTA.Client.TradeFlowMQProducer.HeartBeat.Interval = 20
TransportLayer.RMQTA.Client.TradeFlowMQProducer.HeartBeat.MessageFile = ../FixEdge1/conf
/rabbitMQHB.msg
TransportLayer.RMQTA.Client.TradeFlowMQProducer.MessageProcessingOnMQDisconnect = reject
TransportLayer.RMQTA.Client.TradeFlowMQProducer.StartTime= 09:00
TransportLayer.RMQTA.Client.TradeFlowMQProducer.EndTime= 18:00

TransportLayer.RMQTA.Client.TradeFlowMQConsumer.ConnectionName = Connection1
TransportLayer.RMQTA.Client.TradeFlowMQConsumer.StorageDir = ../FixEdge1/log
TransportLayer.RMQTA.Client.TradeFlowMQConsumer.SessionType = Consumer
TransportLayer.RMQTA.Client.TradeFlowMQConsumer.DestinationURI = TradeFlow
TransportLayer.RMQTA.Client.TradeFlowMQConsumer.HeartBeat.Enable = true
TransportLayer.RMQTA.Client.TradeFlowMQConsumer.HeartBeat.Interval = 20
TransportLayer.RMQTA.Client.TradeFlowMQConsumer.HeartBeat.MessageFile = ../FixEdge1/conf
/rabbitMQHB.msg
TransportLayer.RMQTA.Client.TradeFlowMQConsumer.HeartBeat.MissedCountBeforeDisconnect = 3
```

   c. Make sure the RabbitMQ's user, password and queue you use are configured on the server side.
   d. Change TA logging settings in the *log4j.properties* if necessary. Paths to logs dir must be absolute.
3. **Restart FIX Edge to apply the changes.**

Routing Messages to/from RMQ TA Clients

RMQ Clients can be referred on the business layer (BL) by their names specified in the *FIXEdge.properties* file. Below is an example of the *BL_Config.xml* for the two RMQ clients specified above.

BL_Config.xml

```xml
<?xml version="1.0" encoding="UTF-8" ?>
<!--
                FIXEdge - the XML Configuration file
                $Revision: 1.17.2.7 $
                <!DOCTYPE FIXEdge SYSTEM "BusinessLayer.dtd">
-->
<FIXEdge>
                <BusinessLayer>
                        <Rule>
                                <Source>
                                                <FixSession SenderCompID="FIXCLIENT" TargetCompID="FIXEDGE"/>
                                </Source>
                                <Condition>
                                                <MatchField Field="35" Value="D|G|F|n" />
                                </Condition>
                                <Action>
                                                <Send Name="TradeFlowMQProducer" />
                                </Action>
                        </Rule>
                        <Rule>
                                <Source Name="TradeFlowMQConsumer"/>
                                <Condition>
                                                <MatchField Field="35" Value="8|9|j|n" />
                                </Condition>
                                <Action>
                                                <Send>
                                                        <FixSession SenderCompID="FIXEDGE" TargetCompID="
FIXCLIENT"/>
                                                </Send>
                                </Action>
                        </Rule>
                        <DefaultRule>
                                <Action>
                                                <DoNothing/>
                                </Action>
                        </DefaultRule>
                </BusinessLayer>
</FIXEdge>
```

RMQ TA Configuration Parameters

Configuration of RMQ Adaptor contains list of registered RMQ client names and other parameters which takes part in message routing.

In configuration of RMQ TA can be present default parameters:

Property Name	Description	Required	Default Value
TransportLayer.RMQTA.Description	TA Description	Y	RMQ Transport Adaptor
TransportLayer.RMQTA.DllName	TA library file name. *libUniversalTADll-gcc44-MD-x64.so* should be used.	Y	
TransportLayer.RMQTA.JVMOptionsFile	Path to the TA configuration file name	Y	
TransportLayer.RMQTA.JavaClass	Java class to be used. *com.epam.fe.jms.jni.JMSAdaptor* should be used.	Y	
TransportLayer.RMQTA. AllowRejectMessages	When option is true, FE rejects messages if unable to send to the MQ or error was fired. False by default.	N	false
TransportLayer.RMQTA. AllowRepeatedStatusNotification	When option is true, FE allows to call onLogout() callback if no onLogon() callback was called. False by default.	N	false
TransportLayer.RMQTA. ConnectionNames	Comma delimited list of TA connections. Separate configuration section for each listed connection should be specified	Y	
TransportLayer.RMQTA.ClientNames	Comma delimited list of TA clients. Separate configuration section for each listed client should be specified	Y	

TransportLayer.RMQTA.ClientGroups	Comma delimited list of clients group.	N	
TransportLayer.RMQTA.[GroupName].Clients	Comma delimited list of TA clients that are grouped.	N	
Connection Parameters			
TransportLayer.RMQTA.Connection.[ConnectionName].ProviderURI	URI has the following format: amqp://\<host\>:\<port\>/\<vhost\> *Default values*: port => 5672; vhost => "/" *For example*: «amqp://localhost», «amqp://localhost:8734/vhost»	N	

TransportLayer.RMQTA.Connection.[ConnectionName].Addresses	Addresses list. Necessary for clustered solutions to switch between addresses in case of disconnects.
	
	Note, reconnect attempts or intervals are not configurable - when first connection is down, adapter switches to the next connection immediately.
	
	Example:
	
	RMQ.properties
	
	`#Addresses list without amqp://`
	`TransportLayer.RMQTA.Connection.rabbit.Addresses = mqprod1:`
	`5672, mqprod2:5672`
	
	Should be specified one of the parameters - ProviderURI or Addresses.
		N	

TransportLayer.RMQTA.Connection.[ConnectionName].User	User name	Y	
TransportLayer.RMQTA.Connection.[ConnectionName].Password	User Password	Y	
TransportLayer.RMQTA.Connection.[ConnectionName].Reconnect	Enables or disables reconnect procedure for connection restore	N	false
TransportLayer.RMQTA.Connection.[ConnectionName].ReconnectInterval	Fixed interval in milliseconds between reconnection attempts.	N	2000
TransportLayer.RMQTA.Connection.[ConnectionName].ReconnectTries	Number of reconnect tries or -1 for an infinite number of attempts	N	3
Client Parameters			
TransportLayer.RMQTA.Client.[ClientName].ConnectionName	Name of primary connection used by client. Connection should be registered in ConnectionNames enumeration and has all required parameters	Y	
TransportLayer.RMQTA.Client.[ClientName].SessionType	Session type: • **Producer** - session is a message producer • **Consumer** - session is a message consumer	Y	
TransportLayer.RMQTA.Client.[ClientName].DestinationURI	URI of session destination (Queue name). Required for *Consumer session type*. For *Producer session type* should be specified one of the parameters - DestinationURI or ExchangeName - or both of them.	N	
TransportLayer.RMQTA.Client.[ClientName].ExchangeName	Name of the Exchange. See RabbitMQ tutorial for details: https://www.rabbitmq.com/tutorials/amqp-concepts.html. *Only for Producer session type*. Works with "topic" and "direct" exchange types - on RabbitMQ queues can be bound to an exchange, in this case DestinationURI parameter will be used as routing key.	N	
TransportLayer.RMQTA.Client.[ClientName].StorageDir	Directory where persistence file is stored in case the communication problem	Y	
TransportLayer.RMQTA.Client.[ClientName].HeartBeat.Enable	If parameter is true then TA sends and expects HeartBeat messages in configured time interval	N	false
TransportLayer.RMQTA.Client.[ClientName].HeartBeat.Interval	Time interval in seconds before sending or expecting incoming HeartBeat message	N	30
TransportLayer.RMQTA.Client.[ClientName].HeartBeat.MessageFile	Path to binary file that contains HeartBeat message	Y	
TransportLayer.RMQTA.Client.[ClientName].HeartBeat.MissedCountBeforeDisconnect	Number of missed messages before disconnect	N	3
TransportLayer.RMQTA.Client.[ClientName].MessageProcessingOnMQDisconnect	Type of action that TA executes in case it's unable to deliver outgoing messages to the queue: • **Save** – save in storage file and resend after reconnect • **Reject** – send reject event to FIXEdge	N	reject

TransportLayer.RMQTA.Client.[ClientName].ChannelTransacted	The property turns on transactions to ensure that the messages are stored on the disk. Values: true | false NOTE: This property affects performance.	N	false
TransportLayer.RMQTA.Client.[ClientName].StartTime	Client start time. It supports following masks: - HH:mm:ss - HH:mm	N	
TransportLayer.RMQTA.Client.[ClientName].EndTime	Client stop time. It supports following masks: - HH:mm:ss - HH:mm	N	