

RM4GS Reference Guide

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Abstract

This document describes references of RM4GS (Reliable Messaging for Grid Services).

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1. Introduction

1.1 Goal

The goal of this document is:

To help the readers to use RM4GS. This document is a user manual for developers. It describes how to use RM4GS for developing Grid applications that require reliable messaging.

1.2 External packages and components

- Java2 SDK, Standard Edition (J2SE)
J2SE is Java an environment for developing and executing.
- Java2 SDK, Enterprise Edition Developer Release (J2EE)
J2EE is an enterprise Java environment for developing and executing.
- PostgreSQL Server (PostgreSQL)
PostgreSQL is a database server.
- Apache Axis (Axis)
Axis is an implement of SOAP.

1.3 Terminology

- MSH: Message Service Handler.
- GroupID: The identifier of a sequence of messages those are subject to similar reliability requirements.
- MDB: Message Driven Bean

1.4 Notes

This document describes how to operate RM4GS on a local machine. It also describes how RM4GS can remotely access PostgreSQL on another server. In this case, we will call "PostgreSQL Machine" the remote server operating PostgreSQL.

This document describes how to operate RM4GS on Linux.

The following prompts will be used to indicate the source of command line instructions:

\$ → Linux user
→ Linux super user
postgres\$ → PostgreSQL Administrative user.
rm4gs\$ → RM4GS operating user.

On Linux, use the "su -l" command for changing super user.

2. Command Reference

Table 2-1 List of RM4GS command

Command name	Detail
create-queue	Create a message queue.
delete-queue	Delete a message queue.

2.1 create-queue

NAME

create-queue - create a message queue.

SYNOPSIS

create-queue <queue name> [-forward <forwarded MSH URL>] -qtype <queue type>

DESCRIPTION

The create-queue command will create a message queue for message transfer.

OPTIONS

- qname queue name
- forward forwarded MSH URL
- qtype queue type.

EXIT STATUS

The following exit values are returned:

- 0 executed successfully.
- > 0 (greater than 0) An error occurred.

2.2 delete-queue

NAME

delete-queue - delete a message queue.

SYNOPSIS

delete-queue <queue name>

DESCRIPTION

The delete-queue command will delete a message queue.

OPTIONS

-qname queue name

EXIT STATUS

The following exit values are returned:

- 0 executed successfully.
- > 0 (greater than 0) An error occurred.

3. API Reference

See javadoc.

4. Configuration Reference

This section describes the configuration parameters of RM4GS. Configuration parameters are specified in the deployment descriptor(DD). The following deployment descriptor files are used:

- ra.xml is a DD of RM4GS,
- web.xml is a DD of RM4GS servlet,
- ejb-jar.xml is a DD of MessageDrivenBean(MDB) made by application programmer.

4.1 Configuration parameters for the entire RM4GS package

This section describes the configuration parameters specified in **ra.xml**. These parameters concern the entire RM4GS package.

name	unit	default	example
MaxSendThreads	Number	4	10
MaxListenerThreads	Number	5	10
ResendInterval	Second	10	20

ResendTimerInterval	Second	1	1
GroupIDPrefix	String	rm4gs	rm4gsmsg
ReplyPattern	Response / Callback	Callback	Callback
RemoveAfter	Second	86400 (= a day)	100000
ExpiryTime	Second	3600 (= an hour)	7200
DBKind	String	- (no default value)	postgres
DBName	String	- (no default value)	rm4gsdb
DBSchemaName	String	- (no default value)	queue
DBPortNumber	Number	- (no default value)	5432
DBServerName	String	- (no default value)	172.21.100.33
DBUser	String	- (no default value)	myuser
DBPasswd	String	- (no default value)	mypasswd
DestinationBaseURL	String	- (no default value)	http://172.21.10.33/rm4gs
SystemDestination	String	rm4gsControl	rm4gsControl

4.1.1 MaxSendThreads

Specify a number of threads for resending messages.

RM4GS may have to resend messages to destination if necessary, due to reliability requirements. When resending messages, RM4GS is using other threads beside the main application thread. Some resending threads are created and pooled beforehand to reduce overhead.

4.1.2 MaxListenerThreads

Specify a number of threads in the Listener or MessageDrivenBean for receiving messages.

In case an application registers a Listener object by ReceivingSession#setMessageListner, RM4GS calls the onMessage method on this object when a message is received. In case a MessageDrivenBean instance is registered, RM4GS calls the onMessage method of MessageDrivenBean when a message is received. These calls are executed by the thread that RM4GS created and pooled beforehand.

4.1.3 ResendInterval

Specify the interval of resending in seconds.

If ResendInterval is reduced, the frequency of resending a failed message increases, and the load on the MSH also increases. If ResendInterval is greater, it will take a longer time for a resent message to reach its destination. ResendInterval must be set depending on applications requirements and MSH load.

4.1.4 ResendTimerInterval

Specify the interval for checking the presence of untransferred messages in seconds.

If ResendTimerInterval is reduced, the check of untransferred messages occurs more frequently, and the load on the MSH increases. If ResendTimerInterval is greater, it takes a longer time for messages to be resent and to reach to destination. ResendTimerInterval must be less than ResendInterval.

4.1.5 GroupIDPrefix

Specify a string for the prefix of the GroupID that RM4GS implicitly creates (type: string).

When an application does not specify a GroupID, RM4GS creates a global unique GroupID. Specify a string that doesn't collide with GroupID values that the application specifies.

4.1.6 ReplyPattern

Specify a value of either "Callback" or "Response" that defines the way acknowledgements is expected to be sent (type: string).

RM4GS uses the high-reliability messaging protocol "WS-Reliability" which defines the acknowledgement rule for guaranteed delivery. The acknowledgement message refers to a previously sent message, and guarantees to the Sender that this message was well received by the Receiver. There are two ways of sending an acknowledgement. One is "Callback" and another is "Response". Callback means the Receiver will send the acknowledgement in a new HTTP request. Response means the Receiver sends the acknowledgement message using the HTTP Response corresponding to the HTTP request used by the reliable message.

4.1.7 RemoveAfter

Specify the lifespan of a group of message, in seconds.

When applications require guaranteed delivery for a group of messages, RM4GS use GroupID parameter to identify the message group. After the sending application executes SendingSession#close or ReusableSendingSession#delete, RM4GS automatically terminates the group and deletes the corresponding GroupID after RM4GS confirmed that all messages were either acknowledged or faulted. If a sending application does not execute SendingSession#close or ReusableSendingSession#delete, RemoveAfter provides RM4GS with the time limit after which the group is terminated and GroupID deleted.

4.1.8 ExpiryTime

Specify the availability period of each message in seconds.

ExpiryTime is the maximum elapsed time period allowed between the first sending of the message (measured at sending side) and the successful reception and delivery (measured on receiver side). If ExpiryTime has passed, the Sender will not resend the message. When a Receiver receives a message with expired ExpiryTime, it will throw it away, and therefore the Sender will get a delivery failure notice by lack of acknowledgement (in case guaranteed acknowledgement was required). ExpiryTime should be set to accommodate the expected network latency, and also be compatible with the values of resending parameters.

4.1.9 DBKind

Specify the type of Database used by RM4GS (type: string).

Currently RM4GS only supports PostgreSQL. So "postgresql" is the only value allowed currently.

4.1.10 DBName

Specify the name of the Database system used by RM4GS (type: string).

4.1.11 DBSchemaName

Specify the schema name of the table used by RM4GS (type: string).

4.1.12 DBPortNumber

Specify the port number used by RM4GS when accessing the Database with JDBC (type: number).

4.1.13 DBServerName

Specify the hostname or IP address of the Database used by RM4GS (type: string).

4.1.14 DBUser

Specify the user name of the Database used by RM4GS (type: string).

4.1.15 DBPasswd

Specify the user password of the Database used by RM4GS (type: string).

4.1.16 DestinationBaseURL

Specify the URL used by RM4GS for receiving control messages (type: string).

Note: DestinationBaseURL must not be "localhost".

4.1.17 SystemDestination

Specify the destination used by RM4GS for receiving control messages (type: string).

4.2 Configuration parameters for the MDB

This section describes configuration parameters that control the MDB (Message Driven Bean). They are specified in [ejb-jar.xml](#).

name	unit	default	sample
Destination	String	- (no default value)	foo
MaxThreads	Number	1	10

4.2.1 Destination

Specify the destination used by the MDB for receiving messages (type: string).

When a message arrives at the specified destination, the onMessage method is called on MDB.

4.2.2 MaxThreads

Specify a number of threads (size of the thread pool) for receiving messages by the MDB (type: number).

In case the message listener for RM4GS is implemented and deployed as a Message Driven Bean, RM4GS calls the onMessage method of MDB on reception of each message. When messages from different sessions (with different GroupID) are received, RM4GS will call the onMessage method on different MDB instances. MaxThreads means the maximum number of threads available to the RM4GS when calling an MDB instance.