

RM4GS Install Guide

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Abstract

This document describes how to install configure and operate RM4GS (Reliable Messaging for Grid Services) and other required software.

1.	INTRODUCTION	4
1.1	Goal.....	4
1.2	External packages and components	4
1.3	Notes	4
2.	PREPARATION	5
2.1	Create user accounts	5
2.2	Setting environment variables.....	5
3.	INSTALLING AND SETTING-UP THE REQUIRED SOFTWARE	6
3.1	List of required software.....	6
3.2	Compile and install the RM4GS	6
3.3	Installing and configuring PostgreSQL.....	7
3.3.1	<i>DOWNLOADING RPM PACKAGES</i>	8
3.3.2	<i>INSTALLING RPM PACKAGES</i>	8
3.3.3	<i>MODIFYING START UP SCRIPT</i>	9
3.3.4	<i>CREATING A DATABASE CLUSTER</i>	10
3.3.5	<i>MODIFYING POSTGRESQL.CONF</i>	10
3.3.6	<i>CONFIGURING SECURITY SETTINGS</i>	10
3.3.7	<i>CONFIGURING AUTO-LAUNCH SETTINGS</i>	11
3.3.8	<i>CREATING THE DATABASE FOR RM4GS</i>	11
3.4	Configuring RMI Registry	13
3.5	Configuring J2EE.....	14
3.5.1	<i>CONFIGURE POLICY</i>	14
3.5.2	<i>CONFIGURE JVM CLASSPATH</i>	14
3.6	Notes	15
3.6.1	<i>AUTO-LAUNCH</i>	15
4.	INSTALLING AND CONFIGURING RM4GS	16
4.1	Configuring and deploying RM4GS	16
4.1.1	<i>MODIFYING CONFIGURATION FILES OF RM4GS AND MAKING WAR FILE</i>	16
4.1.2	<i>DEPLOY RM4GS</i>	17
5.	OPERATING RM4GS	19
5.1	List of required software.....	19
5.2	Starting.....	19
5.2.1	<i>START POSTGRESQL</i>	19
5.2.2	<i>START RMI REGISTRY</i>	19

RM4GS Install Guide

5.2.3	<i>START J2EE SERVER</i>	20
5.3	Stop.....	20
5.3.1	<i>STOP J2EE SERVER</i>	20
5.3.2	<i>STOP RMI REGISTRY</i>	20
5.3.3	<i>STOP POSTGRESQL</i>	20

1. Introduction

1.1 Goal

The goal of this document is:

To help the readers to install, set-up and operate RM4GS (Reliable Messaging for Grid Services) and other required software.

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 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. Preparation

2.1 Create user accounts

User accounts required for operating RM4GS are described below. If the accounts are not present, the user needs to create them.

Table 2-1 List of required user accounts

Account name	Use	Notes
postgres	PostgreSQL Administrative user	Created automatically when installing RPM package. So users should not need to create it manually.
rm4gs	RM4GS operating user	It is not needed on PostgreSQL Machine.

2.2 Setting environment variables

Environment variables required by RM4GS are described below. The user should verify that the following variables are set appropriately.

Table 2-2 List of required environment variables

Variable name	Value	Default value in this document
RM4GS_HOME	RM4GS install directory	/opt/rm4gs
JAVA_HOME	J2SDK install directory	/opt/SUNWappserver/jdk or /usr/java/j2sdk1.4.2_02
J2EE_HOME	J2EE install directory	/opt/SUNWappserver
PATH (*2)	PostgreSQL command directory(*1) \${J2EE_HOME}/bin \${JAVA_HOME}/bin \${RM4GS_HOME}/bin	

Notes

(*1) This is not needed if you use PostgreSQL in other machine. Also, the path should be: /usr/bin if you installed PostgreSQL from the RPM package.

(*2) On PostgreSQL Machine, they are not needed except PATH.

3. Installing and setting-up the required software

3.1 List of required software

The list of required software (including RM4GS itself) is shown below.

Table 3-1 List of required software

Name URL	Version	J2EE environment	PostgreSQL L Machine	Notes
RM4GS		O		
Red Hat Linux	8.0 or later	O	O	(*1)
J2SE http://java.sun.com/j2se/1.4.2/download.html	1.4.2	O		(*1)
J2EE (Sun Java System Application Server) http://java.sun.com/j2ee/download.html	Platform Edition 8 Update 1	O		(*1)
PostgreSQL ftp://ftp.postgresql.org/pub/binary/v7.4/redhat/ (*3)	7.4	O (*2)	O	JDBC driver is to be updated. Refer to 3.3 for details.
RMI Registry	-	O		(*4)
Axis http://ws.apache.org/axis/download.cgi	1.1	O		

(*1) For detailed method of installation, consult the specific to each package.

(*2) This is not needed in case RM4GS accesses PostgreSQL on another server.

(*3) Mirror list : <http://www.postgresql.org/mirrors-ftp.html>

(*4) The user does not need to install the RMI Registry because it is installed with J2SE.

3.2 Compile and install the RM4GS

RM4GS archive is extracted as follows.

```
# mkdir ${RM4GS_HOME}
# chown rm4gs ${RM4GS_HOME}
# su -l rm4gs
```

```
rm4gs$ cd /tmp/
rm4gs$ gzip -dc rm4gs.tar.gz | tar xvf -
```

Apache Axis and JDBC driver are needed to compile and execute RM4GS. So before compiling RM4GS, download them and install appropriate directory ([extracted rm4gs tarball directory]/lib) as follows.

Package name	File name	Note
JDBC driver for PostgreSQL	pg74.[x].jdbc3.jar ([x] is bulid number) (for PostgreSQL 7.4) http://jdbc.postgresql.org/download.html	JDBC driver in postgresql-jdbc-7.4-0.3PGDG.i386.rpm has problems.
Axis	axis-1_1.tar.gz or axis-1_1.zip http://ws.apache.org/axis/download.cgi	

1. Copy pg74.[x].jdbc3.jar to [extracted rm4gs tarball directory]/lib.
2. Extract the Axis package file in any directory.
3. Copy [extracted axis directory]/lib/*.jar files to [extracted rm4gs tarball directory]/lib

After copying the files, you may delete [extracted axis directory].

After preparing, compile RM4GS and install as follows.

```
rm4gs$ cd /tmp/rm4gs/src
rm4gs$ asant
```

You may choose to install another directory. This document assumes that RM4GS is installed at \${RM4GS_HOME}.

3.3 Installing and configuring PostgreSQL

The sequence for installing and configuring PostgreSQL is described in Figure 3-1.

If you don't install PostgreSQL on the local server, and access PostgreSQL remotely on the other server (PostgreSQL Machine), you need to run this sequence on the PostgreSQL Machine. Even in that case, since the JDBC driver is needed on the local server, you should download and copy a JDBC driver to the appropriate location.

For details, refer to 3.3.1 Downloading RPM packages

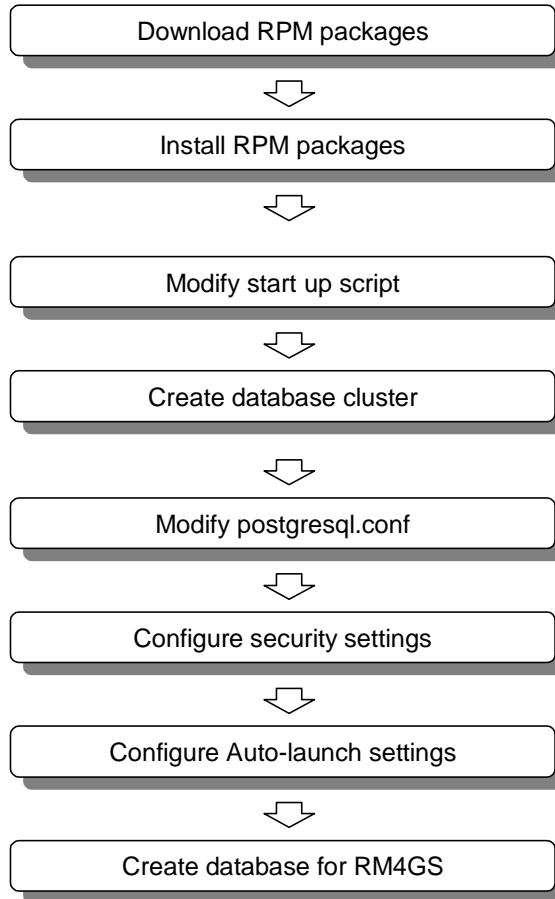


Figure 3-1 The sequence of installing and configuring PostgreSQL

3.3.1 Downloading RPM packages

Download the followings.

Package name	File name	Note
PostgreSQL Server	postgresql-7.4-0.[x]PGDG.i386.rpm postgresql-libs-7.4-0.[x]PGDG.i386.rpm postgresql-server-7.4-0.[x]PGDG.i386.rpm ftp://ftp.postgresql.org/pub/binary/v7.4/redhat/	[x] is any number.

3.3.2 Installing RPM packages

Install PostgreSQL packages.

```
# rpm -ivh postgresql-libs-7.4-0.[x]PGDG.i386.rpm
```

```
# rpm -ivh postgresql-7.4-0.[x]PGDG.i386.rpm
# rpm -ivh postgresql-server-7.4-0.[x]PGDG.i386.rpm
Note) [x] is any number
```

3.3.3 Modifying start up script

Modify start up script (/etc/init.d/postgresql) as explaining below.

(1) Port Number

Specify port number to variable PGPORT PostgreSQL uses near line 78.

Before	<code>export PGPORT=5432</code>
After	<code>export PGPORT=Port number you specified</code>

(2) Directory for database cluster

Specify the directory name for database cluster in the variable PGDATA near line 79 and 83. Since both database administration data and user data are stored in the database cluster, enough storage needs to be allocated.

Before	<code>export PGDATA=/var/lib/pgsql</code>
After	<code>export PGDATA=parent directory of database cluster directory</code>

Before	<code>export PGDATA=/var/lib/pgsql/data</code>
After	<code>export PGDATA=directory for database cluster</code>

If you change the PGDATA variable, you must set appropriate access permission to the directory. The database cluster directory is read/written by PostgreSQL Administrative user. An example is explained below. In our example PGDATA is /usr/local/pgsql. In this document, we call [PGDATA]. The database cluster directory.

```
# mkdir -p /usr/local/pgsql
# chown postgres:[group name of postgres] /usr/local/pgsql
```

(3) Startup option

Add [-o '-i'] to PostgreSQL start up option in order to allow access from remote server near line 173.

Before	<code>su -l postgres -s /bin/sh -c "/usr/bin/pg_ctl -D \${PGDATA} -p /usr/bin/postmaster -o '-p \${PGPORT}' start > /dev/null 2>&1" < /dev/null</code>
--------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------

After	<pre>su -l postgres -s /bin/sh -c "/usr/bin/pg_ctl -D \${PGDATA} -p /usr/bin/postmaster -o '-p \${PGPORT}' -o '-i' start > /dev/null 2>&1" < /dev/null</pre>
-------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------

3.3.4 Creating a database cluster

Start PostgreSQL by using the start up script to create the database cluster. At 1st starting PostgreSQL time, PostgreSQL automatically creates database cluster. Once the database cluster has been created, PostgreSQL uses it.

<pre># sh /etc/init.d/postgresql start</pre>	
Initializing database:	[OK]
Starting postgresql service:	[OK]

[Initializing database: [OK]] is displayed, creating the database cluster is successful. After this section, you may modify the configuration file in database cluster.

3.3.5 Modifying postgresql.conf

Modify [PGDATA]/postgresql.conf to allow connection PostgreSQL server by TCP/IP near line 30.

Before	<pre>#tcpip_socket = false max_connections = 100</pre>
After	<pre>tcpip_socket = true max_connections = 100</pre>

3.3.6 Configuring security settings

Modify [PGDATA]/pg_hba.conf near line 66.

Before	<pre>local all all ident sameuser</pre>
After	<pre>local all all trust</pre>

Add a line in the bottom of [PGDATA]/pg_hba.conf.

<pre>host all all 0.0.0.0 0.0.0.0 password</pre>

Restart PostgreSQL to reflect modifying pg_hba.conf, postgresql.conf

<pre># sh /etc/init.d/postgresql restart</pre>	
Stopping postgresql service:	[OK]
Starting postgresql service:	[OK]

After restart, confirm the PostgreSQL status waiting requests or not.

```
# netstat -a | grep postgres
tcp          0          0  *:postgres    *.*        LISTEN
```

3.3.7 Configuring auto-launch settings

Configure auto-launch settings of PostgreSQL by using chkconfig command.

```
# chkconfig postgresql on
```

3.3.8 Creating the database for RM4GS

The sequence for creating the database for RM4GS is shown below. All sequence must be operated by PostgreSQL Administrative user.

(1) Modify postgresql.conf

Modify [PGDATA]/postgresql.conf.

directive	contents
max_connections	Maximum connections. Specify more than (DBMaxConnections + 5). For details of DBMaxConnections, refer to Table 4-1 List of the setting of PostgreSQL.
shared_buffers	Number of shared buffers. Specify more than (max_connection x 2)

(2) Create a database by using rm4gsDbUtil.sh

Extract \${RM4GS_HOME}/rm4gsDbUtil.tar.gz to any directory and chdir to rm4gsutil directory just created. Even if in the case of PostgreSQL Machine, extract RM4GS package to any directory.

After extracting, execute rm4gsDbUtil.sh. Since rm4gsDbUtil.sh makes temporary files in rm4gsutil directory, set write permission for user postgres to the directories under here.

```
# cd ${RM4GS_HOME}
# gzip -dc rm4gsDbUtil.tar.gz | tar xvf -
# cd rm4gsutil
# chown -R postgres:postgres .
# su -l postgres
postgres$ cd ${RM4GS_HOME}/rm4gsutil
postgres$ ./rm4gsDbUtil.sh -p 5432 -L /usr/bin
```

(*1) -p option: specify the port number specified at 3.3.3(1).

(*2) -L option: specify PostgreSQL command install directory. If you install RPM package, this is /usr/bin

rm4gsDbUtil.sh display menu.

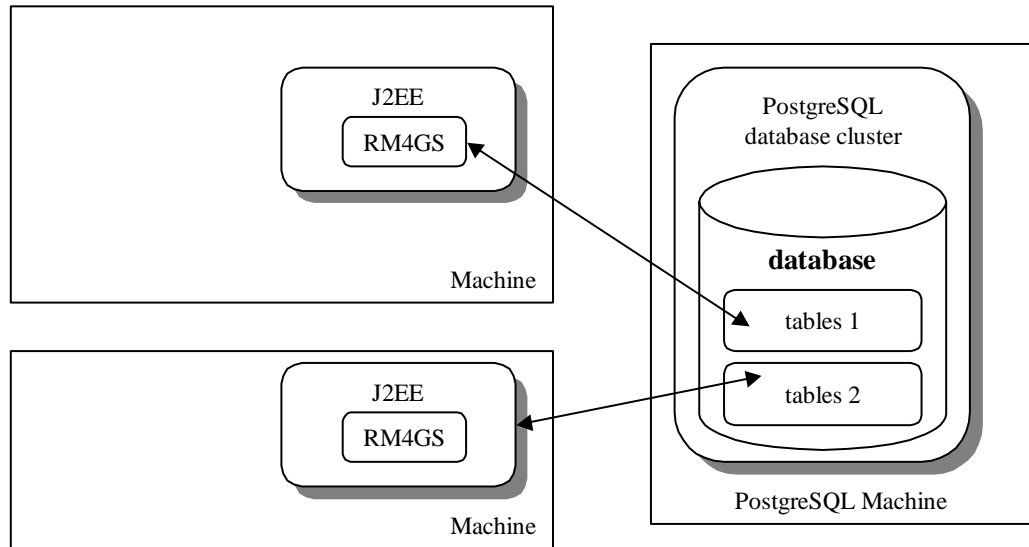
```
Main Menu:
1 Create Database for RM4GS
2 Create user connecting to the Database for RM4GS
3 Create queue management tables for RM4GS
4 Drop user connecting to the Database for RM4GS
5 Drop Database for RM4GS
Q Quit this utility
-----
Please select operation. [1,2,3,4,5,Q]:
```

1. At 1st, select “1” to create the database. After selecting “1”, type a database name. If you type only [enter], default database name “queue” is selected.
2. Select “2” to create a database user. After selecting “2”, type database name (specified at 1st step), username (default value is “rm4gs”) and password (default value is “rm4gs”).
3. Select “3” to create a set of tables for RM4GS. After selecting “3”, type database name, username, password (they are specified 1st or 2nd step) and schema name (default value is “PUBLIC”). Even if you specify the name by lower case characters, the result of shell display upper case characters. Because PostgreSQL system treat upper case and lower case characters in schema name as same.
4. Select “Q” to exit shell.

If you don’t use PostgreSQL in the local server, access PostgreSQL server remotely. There are some notes for creating the database described below.

1. Create a set of database tables (created by 3 on menu) for each environment of deployed RM4GS. The same database (created by 1 on menu) can be shared by database tables and database users for different RM4GS installations.

- Database used by multiple RM4GS is created into a database cluster, set the summations of each RM4GS uses the connections to “max_connections” directive.



3.4 Configuring RMI Registry

RM4GS requires the RMI Registry to be started. On Linux, you can configure the system to start the RMI Registry automatically at OS startup.

First, modify the script. The script is included in RM4GS package.

Script name	<code>\${RM4GS_HOME}/tools/rmiregistry</code>
Modify point	<code>export JAVA_HOME</code>
Set string	J2SDK install directory (ex. <code>/usr/java/j2sdk1.4.2_02</code>)

Second, copy the script and configure the system.

```
# cp ${RM4GS_HOME}/tools/rmiregistry /etc/init.d
# chmod +x /etc/init.d/rmiregistry
# cd /etc/init.d
# chkconfig --add rmiregistry
```

The script supposes the followings. If you use RMI Registry with other settings, modify the contents of the script.

RMI Registry execution user	rm4gs
-----------------------------	-------

3.5 Configuring J2EE

3.5.1 Configure policy

Add description shown following in `${J2EE_HOME}/domains/domain1/config/server.policy`.

```
grant {  
    permission java.util.PropertyPermission "java.protocol.handler.pkgs", "write,read";  
    permission java.net.SocketPermission "localhost", "connect,resolve";  
    permission java.net.SocketPermission "*", "accept,resolve";  
    permission java.lang.RuntimePermission "modifyThread";  
    permission java.lang.RuntimePermission "modifyThreadGroup";  
    permission java.util.PropertyPermission "rm4gs.msm.log.enabled", "read";  
};  
grant codeBase "file:/opt/rm4gs/lib/-" {  
    permission java.security.AllPermission;  
};
```

Note1: Permitting in “AllPermission” manner is not recommended in Java security description, but it is unfortunately required for the first release. The description will be improved in future releases.

Note2: This file forbids writing environment variable, so you cannot write `${RM4GS_HOME}`. Write full path name of RM4GS installed directory.

3.5.2 Configure JVM Classpath

Add jar files in JVM Classpath.

1. Start J2EE Server following command: `${J2EE_HOME}/bin/asadmin start-domain domain1`
2. Start J2EE AdminConsole (<http://localhost:4848/asadmin/>)
3. Click [JVM Settings] tab.
4. Click [Path Settings] tab.
5. Enter jar file names with absolute path name in [Classpath Suffix] field and save settings.
`/${RM4GS_HOME}/lib/axis.jar`
`/${RM4GS_HOME}/lib/commons-discovery.jar`
6. Restart J2EE.

3.6 Notes

3.6.1 Auto-launch

Pay attention to the order of starting software if you use auto-launch with OS starting. Configure system to start software in the correct order. The order is described below. Finally, the order for stopping software must be the reverse sequence.

Table 3-2 The order of starting software

No	Software name
1	PostgreSQL
2	RMI Registry
3	J2EE Server

4. Installing and configuring RM4GS

4.1 Configuring and deploying RM4GS

Since configuring and deploying RM4GS use PostgreSQL, RMI Registry and J2EE server, operate them before configuring and deploying RM4GS.

The sequence for configuring and deploying RM4GS is described below;

1. Modify configuration files of RM4GS and make war file.
2. Deploy RM4GS

4.1.1 Modifying configuration files of RM4GS and making war file

This section explains setting of RM4GS.

(1) Modify configuration files

Modify `${RM4GS_HOME}/config/ra.xml` or `${RM4GS_HOME}/config/j2ee/web.xml` by text editor. Use text editor adaptable for UTF-8. The meaning and contents of each setting are explained at comment.

At first, you must modify the setting below.

Item	Meaning	Default value	File
DestinationBaseURL	URL RM4GS uses it for receiving control messages. Specify a string including your server's hostname. <u>localhost</u> cannot be specified.	http://hostname:8080/rm4gs	ra.xml

Next, if you access remotely PostgreSQL on another Linux server, you must modify the setting below.

Item	Meaning	Default value	File
DBServerName	Hostname or IP address RM4GS accesses PostgreSQL server.	localhost	ra.xml

If you modified configurations of PostgreSQL at 3.3 Installing and configuring PostgreSQL, you must modify the settings below.

Table 4-1 List of the setting of PostgreSQL

Item	Meaning	Default value	File
DBName	Database name RM4GS uses	queue	ra.xml
DBSchemaName	Schema name in which tables RM4GS uses was stored	public	ra.xml
DBPortNumber	Portnumber RM4GS accesses database through JDBC	5432	ra.xml
DBUser	Username of database RM4GS uses.	rm4gs	ra.xml
DBPasswd	Password of database RM4GS uses.	rm4gs	ra.xml
DBMaxConnections	Maximum value of connections to database RM4GS uses. Specify "Maximum value of connections used user application + 5"	37	ra.xml

(2) Make war file

Execute the following command to reflect modified configurations.

```
# cd ${RM4GS_HOME}/config
# asant config
```

4.1.2 Deploy RM4GS

In case of a J2EE environment, before deploying RM4GS, modify \${RM4GS_HOME}/config/build.properties according to your environment.

Table 4-2 List of build.properties

Item	Meaning	Default value	Modify?
j2ee.home	J2EE install directory	/opt/SUNWappserver	
j2ee.domain	J2EE server domain name in which RM4GS is deployed.	domain1	
admin.password	Password of J2EE server administrator.	yourpassword	Must
admin.host	Host J2EE AdminConsole is operating.	localhost	
admin.user	Account name of J2EE server administrator.	admin	Must
admin.port	Portnumber of J2EE AdminConsole	4848	

After finishing modifications of build.properties, execute a command at \${RM4GS_HOME}/config directory to deploy.

```
# asant install_for_j2ee
```

5. Operating RM4GS

5.1 List of required software

Start the required software components in the order described below. RM4GS is started automatically when starting J2EE server.

Table 5-1 List of require software

Order	Name	For J2EE	Note
1	PostgreSQL	O	
2	RMI Registry	O	
3	J2EE Server	O	

5.2 Starting

5.2.1 Start PostgreSQL

(1) In case of auto-launch

No action is needed.

(2) In case of manual start

```
# pg_ctl start -D ${PGDATA} -o "-i"
```

5.2.2 Start RMI Registry

(1) In case of auto-launch

No action is needed.

(2) In case of manual start

```
Clear environment variable CLASSPATH
in case of sh:
# unset CLASSPATH
in case of csh:
# unsetenv CLASSPATH

Start RMI Registry
# ${JAVA_HOME}/bin/rmiregistry

Note) While rmiregistry is operating, rmiregistry does not return a prompt.
You can leave the command window as it is during RM4GS is operating.
```

5.2.3 Start J2EE Server

(1) In case of auto-launch

No action is needed.

(2) In case of manual start

```
# ${J2EE_HOME}/bin/asadmin start-domain domain1
```

RM4GS is initialized and started when J2EE Server started.

5.3 Stop

5.3.1 Stop J2EE Server

(1) In case of auto-launch

No action is needed.

(2) In case of manual stop

```
# ${J2EE_HOME}/bin/asadmin stop-domain domain1
```

5.3.2 Stop RMI Registry

(1) In case of auto-launch

No action is needed.

(2) In case of manual stop

Stop operating RMI Registry by CTRL-C.

5.3.3 Stop PostgreSQL

(1) In case of auto-launch

No action is needed.

(2) In case of manual stop

```
# pg_ctl stop -D ${PGDAGA}
```