

# openCRX Installation Guide for JBoss 4

Version 1.11.0



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## 1 About this Book

openCRX is the leading open source CRM tool. openCRX is based on the openMDX application framework, an open source application framework based on the OMG's model driven architecture (MDA) standards. This guarantees maximum openness, standards compliance and a state-of-the-art component-based architecture.

This book describes the installation of openCRX for the Jboss application server.

### 1.1 Who this book is for

The intended audience are openCRX administrators and application server system administrators.

### 1.2 What do you need to understand this book

This book describes the installation of openCRX for JBoss. The book assumes that you are familiar with JBoss deployment concepts and administration.

### 1.3 Tips, Warnings, etc.

We make use the following pictograms:



Tip

Information provided as a "Tip" might be helpful for various reasons: time savings, risk reduction, etc.



Important

You should carefully read information marked with "Important". Ignoring such information is typically not a good idea.



Warning

Warnings should not be ignored (risk of data loss, etc.)

## 2 Prerequisites

As a first step select the openCRX version you want to install. Based on the published version compatibility information you can determine the appropriate versions of openMDX, JBoss, and Java JDK/JRE:

<http://www.opencrx.org/faq.htm#versioncompatibility>



Write down the version numbers of the software packages you have chosen to install – this may be helpful in the future in case you require support or want to file a bug report:

openCRX v \_\_\_\_\_  
openMDX v \_\_\_\_\_  
JBoss v \_\_\_\_\_  
JDK v \_\_\_\_\_

Next you need to download the following software packages:

- Download **JBoss** from <http://labs.jboss.com/portal/jbossas/download>
- Download **openMDX** from [http://sourceforge.net/project/showfiles.php?group\\_id=75132](http://sourceforge.net/project/showfiles.php?group_id=75132)
- Download **openCRX** from here <http://www.opencrx.org/downloads.htm>  
You must download the opencrx-core distribution (e.g. opencrx-1.11.0-core.CRX.jre-1.5.zip).

Please note that installation of the appropriate Java Platform is not covered by this manual (i.e. **it is assumed that the appropriate JDK is already installed on your system**).

More information about Java is available from <http://java.sun.com/>

JDK 1.5 is available from <http://java.sun.com/j2se/1.5.0/download.jsp>



Please note that you also **must install the database** as described in the respective openCRX database installation guide **before you continue**. For example, if you want to install openCRX for MySQL you must first install MySQL and the matching openCRX database definitions. A list of all the database installation guides is available at <http://www.opencrx.org/documents.htm>

Once you have successfully installed the database you are ready to continue with the JBoss setup.

### 3 Installing openCRX for JBoss

In a first step you must install JBoss by extracting the delivered JBoss distribution to your program directory, e.g. `d:\pgm\jboss-4.2.1.GA` on Windows or `/opt/jboss` on Linux or any other Posix OS.



Make sure that you add `JAVA_HOME` to your system environment variables, e.g. `JAVA_HOME=D:\pgm\j2sdk1.5` on Windows or `JAVA_HOME=/usr/java/j2sdk1.5` on Linux.

`JAVA_HOME` is required by JBoss in order to compile JSPs.

Next you must deploy openCRX to JBoss. You do this by copying several files to the JBoss deploy directory:

- Copy the file **openmdx-kernel.jar** contained in the openMDX distribution to the directory `d:\pgm\jboss-4.2.1.GA\server\default\lib` on Windows or `/opt/jboss/server/default/lib` on Linux.
- Copy the appropriate database JDBC driver to the directory `d:\pgm\jboss-4.2.1.GA\server\default\lib`. The openCRX database installation manual describes how to download the drivers.
- Copy the file **opencrx-core-CRX-App.ear** contained in the openCRX distribution (please refer to the core/README for instructions on how to assemble this ear) to the JBoss deploy directory `d:\pgm\jboss-4.2.1.GA\server\default\deploy` on Windows or `/opt/jboss/server/default/deploy` on Linux
- Copy the file **opencrx-core-CRX-web.ear** contained in the openCRX distribution (please refer to the core/README for instructions on how to assemble this ear) to the JBoss deploy directory `d:\pgm\jboss-4.2.1.GA\server\default\deploy` on Windows or `/opt/jboss/server/default/deploy` on Linux.



You can also open **opencrx-core-CRX-web.ear** with a ZIP utility and extract the content to the directory

`d:\pgm\jboss-4.2.1.GA\server\default\deploy\opencrx-core-CRX-web.ear` or `/opt/jboss/server/default/deploy/opencrx-core-CRX-web-ear`

If you want to edit the content of the file **opencrx-core-CRX.war** without the zip/unzip roundtrip you can also extract the content with a ZIP utility.

- Install the datasource configuration file, e.g. copy the file **jdbc-opencrx-CRX-mysql-ds.xml** (if you use openCRX with MySQL) contained in the file **opencrx-core.jboss-3-connector.zip** of the openCRX distribution to the directory **d:\pgm\jboss-4.2.1.GA\server\default\deploy** on Windows or **/opt/jboss/server/default/deploy** on Linux.



Verify that database name, user, and password match with your installation.

- Create the file **server.log.properties** in the directory **d:\pgm\jboss-4.2.1.GA\server\default** on Windows or **/opt/jboss/server/default/** on Linux

with the following content:

#### *Listing 1: The file server.log.properties*

```
ApplicationId = openCRX
LogFileExtension = log
LogFilePath = D:/pgm/jboss-4.2.1.GA/server/default/log/
LogLevel = warning
java.LoggingMechanism = SharedDatedFileLoggingMechanism
```



Adapt **D:/pgm/jboss-4.2.1.GA** to your environment!

Next you must set a few Java VM options which are required for the openMDX application framework.

On Windows add the following lines to **d:\pgm\jboss-4.2.1.GA\bin\run.bat** after the lines indicated below. Also uncomment the line

```
set JAVA_OPTS=%JAVA_OPTS% -Xms128m -Xmx512m
```

This gives more memory to the Java VM (and depending on your environment you may want to increase the value of the option Xmx).

#### *Listing 2: Java VM options required for openMDX on Windows*

```
rem Sun JVM memory allocation pool parameters. Uncomment and modify as appropriate.
set JAVA_OPTS=%JAVA_OPTS% -Xms128m -Xmx512m

rem Setup openMDX-specific properties
set JAVA_OPTS=%JAVA_OPTS% -Dorg.openmdx.compatibility.base.application.j2ee.domain=apps
set JAVA_OPTS=%JAVA_OPTS% -Dorg.openmdx.compatibility.base.application.j2ee.server=server1
set JAVA_OPTS=%JAVA_OPTS% -Djava.protocol.handler.pkgs=org.openmdx.kernel.url.protocol
set JAVA_OPTS=%JAVA_OPTS% -Dorg.openmdx.log.config.filename=D:\pgm\jboss-4.2.1.GA\server\default\server.log.properties
```



Adapt **D:\pgm\jboss-4.2.1.GA\server\default\server.log.properties** to your environment and make sure that there are no line breaks in the set commands. Each -D options is of the form **-Dname=value** and must be on a single line.

On Linux add the following lines to `/opt/jboss/bin/run.conf` towards the end of the file.

*Listing 3: Java VM options required for openMDX on Linux*

```
rem Setup openMDX-specific properties
JAVA_OPTS="$JAVA_OPTS -Xms128m -Xmx512m"
JAVA_OPTS="$JAVA_OPTS -Dorg.openmdx.compatibility.base.application.j2ee.domain=apps"
JAVA_OPTS="$JAVA_OPTS -Dorg.openmdx.compatibility.base.application.j2ee.server=server1"
JAVA_OPTS="$JAVA_OPTS -Djava.protocol.handler.pkgs=org.openmdx.kernel.url.protocol"
JAVA_OPTS="$JAVA_OPTS -Dorg.openmdx.log.config.filename=/opt/jboss/server/default/server.log.properties"
```



Adapt `/opt/jboss/server/default/server.log.properties` to your environment and make sure that there are no line breaks in the set commands. Each `-D` options is of the form `-Dname=value` and must be on a single line.

## 4 Configuring Security

As a final step you must activate security for the openCRX application. You can either configure the file-based *UsersRolesLoginModule* or the database-based *DatabaseServerLoginModule*.

### 4.1 Configuring LoginModule



Tip

openCRX stores security information in the database tables **OOCSE1\_\***, i.e.

<b>OOCSE1_Credential</b>	<b>OOCSE1_Credential_</b>
<b>OOCSE1_Permission</b>	<b>OOCSE1_Permission_</b>
<b>OOCSE1_Policy</b>	<b>OOCSE1_Policy_</b>
<b>OOCSE1_Principal</b>	<b>OOCSE1_Principal_</b>
<b>OOCSE1_Privilege</b>	<b>OOCSE1_Privilege_</b>
<b>OOCSE1_Realm</b>	<b>OOCSE1_Realm_</b>
<b>OOCSE1_Role</b>	<b>OOCSE1_Role_</b>
<b>OOCSE1_Segment</b>	<b>OOCSE1_Segment_</b>
<b>OOCSE1_Subject</b>	<b>OOCSE1_Subject_</b>

JBoss can be enabled to access these tables by configuring a database login module. This way users can be managed in openCRX and are immediately available as JBoss logins.



Important

It is strongly recommended that you stay with the file-based *UsersRolesLoginModule* for the user **admin-Root**. This simplifies the openCRX bootstrapping.



Tip

We recommend that you stay with the file-based authentication for all users until you have finished installing openCRX. You avoid situations where you have to trouble-shoot multiple issues at the same time...

Activate JAAS based authentication by adding the following configuration entries for the openCRX servlet to the JBoss configuration file

d:\pgm\jboss-4.2.1.GA\server\default\conf\login\_config.xml  
(login-config.xml on Unix platforms)

**Listing 4: JBoss configuration for JAAS based authentication**

```

<application-policy name="opencrx-core-CRX">
  <authentication>
    <login-module code="org.jboss.security.auth.spi.DatabaseServerLoginModule" flag="sufficient">
      <module-option name="dsJndiName">java:/jdbc_opencrx_CRX</module-option>
      <module-option name="principalsQuery">SELECT c.passwd FROM OOCSE1_PRINCIPAL p, OOCSE1_CREDENTIAL c WHERE
(p.object_id LIKE 'principal/CRX/Root/Default/%') AND (p.credential = c.object_id) AND (p.name = ?)</module-
option>
      <module-option name="rolesQuery">SELECT r.name, 'Roles' FROM OOCSE1_PRINCIPAL_pg, OOCSE1_PRINCIPAL p,
OOCSE1_PRINCIPAL_pn, OOCSE1_ROLE r WHERE (p.object_id = pn.object_id) AND (pn.is_member_of = pg.object_id) AND
(pg.granted_role = r.object_id) AND (p.object_id LIKE 'principal/CRX/Root/Default/%') AND (p.name = ?)</module-
option>
      <module-option name="ignorePasswordCase">>true</module-option>
      <module-option name="hashCharset">UTF-8</module-option>
      <module-option name="hashEncoding">base64</module-option>
      <module-option name="hashAlgorithm">MD5</module-option>
    </login-module>
    <login-module code="org.jboss.security.auth.spi.UsersRolesLoginModule" flag="sufficient" >
      <module-option name="usersProperties">users.properties</module-option>
      <module-option name="rolesProperties">roles.properties</module-option>
    </login-module>
  </authentication>
</application-policy>

```

The settings above enable both **file-based authentication** and **database-based authentication**.

Next you need to create the files **users.properties** and **roles.properties** in the directory `d:\pgm\jboss-4.2.1.GA\server\default\conf` (Windows) or `/opt/jboss/server/default/conf` (Linux).

**Listing 5: File *users.properties* with syntax *user=password***

```

admin-Root=rootSecret
admin-Standard=adminSecret
guest=guest

```

**Listing 6: File *roles.properties* with syntax *user.Roles=role1,role2***

```

admin-Root.Roles=OpenCrxRoot
admin-Standard.Roles=OpenCrxAdministrator
guest.Roles=OpenCrxUser

```



It is strongly recommended that you stay with the file-based UsersRolesLoginModule for the user **admin-Root**. This simplifies the openCRX bootstrapping.

## 5 Starting JBoss

You are now ready to start JBoss. Open a command shell and start `d:\pgm\jboss-4.0.5.GA\bin\run.bat`. You should verify whether the start options match the ones described earlier:

### Listing 7: JBoss console output

```

=====
JBoss Bootstrap Environment
JBoss_HOME: D:\jboss-4.2.1.GA
JAVA: D:\jdk1.5.0\bin\java
JAVA_OPTS: -Dprogram.name=run.bat -server -Xms128m -Xmx1024m -Dorg.openmdx.compatibility.base.application.j2ee.domain=apps -Dorg.openmdx.compatibility.base.application.j2ee.server=server1 -Djava.protocol.handler.pkgs=org.openmdx.kernel.url.protocol -Dorg.openmdx.log.config.filename=D:\jboss-4.2.1.GA\server\default\server.log.properties -Dsun.rmi.dgc.client.gcInterval=3600000 -Dsun.rmi.dgc.server.gcInterval=3600000
CLASSPATH: D:\jdk1.5.0\lib\tools.jar;D:\jboss-4.2.1.GA\bin\run.jar
=====
13:32:04,568 INFO [Server] Starting JBoss (MX MicroKernel)...
13:32:04,568 INFO [Server] Release ID: JBoss [Trinity] 4.2.1.GA (build: SVNTag=JBoss_4_2_1_GA date=200707131605)
13:32:04,583 INFO [Server] Home Dir: D:\jboss-4.2.1.GA
13:32:04,583 INFO [Server] Home URL: file:/D:/jboss-4.2.1.GA/
13:32:04,583 INFO [Server] Patch URL: null
13:32:04,583 INFO [Server] Server Name: default
13:32:04,583 INFO [Server] Server Home Dir: D:\jboss-4.2.1.GA\server\default
13:32:04,583 INFO [Server] Server Home URL: file:/D:/jboss-4.2.1.GA\server/default/
13:32:04,583 INFO [Server] Server Log Dir: D:\jboss-4.2.1.GA\server\default\log
13:32:04,583 INFO [Server] Server Temp Dir: D:\jboss-4.2.1.GA\server\default\tmp
13:32:04,583 INFO [Server] Root Deployment Filename: jboss-service.xml
13:32:05,160 INFO [ServerInfo] Java version: 1.5.0_10,Sun Microsystems Inc.
13:32:05,160 INFO [ServerInfo] Java VM: Java HotSpot(TM) Server VM 1.5.0_10-b03,Sun Microsystems Inc.
13:32:05,160 INFO [ServerInfo] OS-System: Windows XP 5.1,x86
13:32:05,753 INFO [Server] Core system initialized
13:32:10,258 INFO [WebService] Using RMI server codebase: http://127.0.0.1:8083/
13:32:10,273 INFO [Log4jService$URLWatchTimerTask] Configuring from URL: resource:jboss-log4j.xml
.....
13:32:24,506 INFO [testQueue] Bound to JNDI name: queue/testQueue
13:32:24,568 INFO [UILServerILService] JBossMQ UIL service available at : /127.0.0.1:8093
13:32:24,630 INFO [DLQ] Bound to JNDI name: queue/DLQ
13:32:24,833 INFO [ConnectionFactoryBindingService] Bound ConnectionManager 'jboss.jca:service=DataSourceBinding,name=jdbc_opencrx_CRX' to JNDI name 'java:jdbc_opencrx_CRX'
13:32:24,927 INFO [ConnectionFactoryBindingService] Bound ConnectionManager 'jboss.jca:service=ConnectionFactoryBinding,name=JmsXA' to JNDI name 'java:JmsXA'
13:32:24,958 INFO [TomcatDeployer] deploy, ctxPath=/jmx-console, warUrl=../deploy/jmx-console.war/
13:32:27,499 INFO [EARDeployer] Init J2EE application: file:/D:/jboss-4.2.1.GA\server/default/deploy/opencrx-core-CRX-App.ear
13:32:52,971 INFO [EjbModule] Deploying opencrx_core_CRX_gateway_mandatory
13:32:53,017 INFO [EjbModule] Deploying opencrx_core_CRX_gateway_noOrNew
13:32:53,298 INFO [EjbModule] Deploying opencrx_core_CRX_kernel_mandatory
13:32:53,360 INFO [EjbModule] Deploying opencrx_core_CRX_security_mandatory
13:32:53,454 INFO [EjbModule] Deploying opencrx_core_CRX_ui_supports
13:32:53,501 INFO [BaseLocalProxyFactory] Bound EJB LocalHome 'opencrx_core_CRX_gateway_mandatory' to jndi 'org.opencrx.core.CRX.local.mandatory.gateway'
13:32:53,532 INFO [ProxyFactory] Bound EJB Home 'opencrx_core_CRX_gateway_mandatory' to jndi 'org.opencrx.core.CRX.mandatory.gateway'
13:32:53,547 INFO [BaseLocalProxyFactory] Bound EJB LocalHome 'opencrx_core_CRX_gateway_noOrNew' to jndi 'org.opencrx.core.CRX.local.noOrNew.gateway'
13:32:53,547 INFO [ProxyFactory] Bound EJB Home 'opencrx_core_CRX_gateway_noOrNew' to jndi 'org.opencrx.core.CRX.noOrNew.gateway'
13:32:53,547 INFO [EJBDeployer] Deployed: file:/D:/jboss-4.2.1.GA\server/default/tmp/deploy/tmp31572opencrx-core-CRX-App.ear-contents/gateway.jar
13:32:53,625 INFO [BaseLocalProxyFactory] Bound EJB LocalHome 'opencrx_core_CRX_kernel_mandatory' to jndi 'org.opencrx.core.CRX.local.mandatory.kernel'
13:32:53,625 INFO [EJBDeployer] Deployed: file:/D:/jboss-4.2.1.GA\server/default/tmp/deploy/tmp31572opencrx-core-CRX-App.ear-contents/kernel.jar
13:32:53,657 INFO [BaseLocalProxyFactory] Bound EJB LocalHome 'opencrx_core_CRX_security_mandatory' to jndi 'org.opencrx.core.CRX.local.mandatory.security'
13:32:53,657 INFO [EJBDeployer] Deployed: file:/D:/jboss-4.2.1.GA\server/default/tmp/deploy/tmp31572opencrx-core-CRX-App.ear-contents/security.jar
13:32:53,703 INFO [BaseLocalProxyFactory] Bound EJB LocalHome 'opencrx_core_CRX_ui_supports' to jndi 'org.opencrx.core.CRX.local.supports.ui'
13:32:53,703 INFO [EJBDeployer] Deployed: file:/D:/jboss-4.2.1.GA\server/default/tmp/deploy/tmp31572opencrx-core-CRX-App.ear-contents/ui.jar
13:32:53,766 INFO [EARDeployer] Started J2EE application: file:/D:/jboss-4.2.1.GA\server/default/deploy/opencrx-core-CRX-App.ear
13:32:53,766 INFO [EARDeployer] Init J2EE application: file:/D:/jboss-4.2.1.GA\server/default/deploy/opencrx-core-CRX-Web.ear/
13:33:13,548 INFO [TomcatDeployer] deploy, ctxPath=/opencrx-core-CRX-gateway/client-gateway, warUrl=../tmp/deploy/tmp31573client-gateway-exp.war/
13:33:13,688 INFO [TomcatDeployer] deploy, ctxPath=/opencrx-core-CRX, warUrl=../deploy/opencrx-core-CRX-Web.ear/opencrx-core-CRX.war/
13:33:14,499 INFO [[/opencrx-core-CRX]] [CompressingFilter/1.6.4] CompressingFilter has initialized
13:33:14,608 INFO [TomcatDeployer] deploy, ctxPath=/opencrx-core-CRX-gateway/server-gateway, warUrl=../tmp/deploy/tmp31590server-gateway-exp.war/
13:33:14,966 INFO [EARDeployer] Started J2EE application: file:/D:/jboss-4.2.1.GA\server/default/deploy/opencrx-core-CRX-Web.ear/
13:33:15,294 INFO [Http11Protocol] Starting Coyote HTTP/1.1 on http-127.0.0.1-8080
13:33:15,309 INFO [AjpProtocol] Starting Coyote AJP/1.3 on ajp-127.0.0.1-8009
13:33:15,325 INFO [Server] JBoss (MX MicroKernel) [4.2.1.GA (build: SVNTag=JBoss_4_2_1_GA date=200707131605)] Started in 1m:10s:726ms

```

Now you are ready to continue with the openCRX QuickStart Guide or you can Install openCRX as Windows Service.

## 6 Additional JBoss Settings

### 6.1 Performance

- Make sure that your servlet container / application server sends compressed pages to browsers; with JBoss, for example, add/set the Tomcat option **compression="on"** in the file **server.xml** (details on the http connector reference page of the Apache-Jakarta-Project) - compressed pages are much smaller than uncompressed pages (typically by a factor of 10), thereby reducing the load on your network and improving the experience of users connected to the openCRX server with "less than optimal" bandwidth specs.
- Based on our observations, you can speed up the deployment of openCRX on JBoss substantially by expanding the EARs (factor of 2).

### 6.2 UTF-8 Support

- For **full UTF-8 support** it is necessary to add/set the Tomcat option **URIEncoding="UTF-8"** in the file **server.xml** (details on the http connector reference page of the Apache-Jakarta-Project). Full UTF-8 support is for example required if you want to search for UTF-8 encoded characters.

### 6.3 Port Binding and Security

- Newer versions of JBoss (4.2 and newer) bind to localhost only by default (it used to be global 0.0.0.0). You can get this same behavior by starting JBoss with **-b 0.0.0.0**.

If you look in the readme.html in your JBoss distribution there is a link with info on how to secure JBoss once you bind to 0.0.0.0. Alternatively, you can fiddle with the Tomcat options in the file **server.xml**.

## 7 Install openCRX as a Windows Service

If you want to install JBoss / openCRX on a Windows platform as a Windows service you can do this by following instructions from the JBoss Wiki at <http://wiki.jboss.org/wiki/Wiki.jsp?page=RunJBossAsAServiceOnWindows>:

- Download JBoss Web Server 2.0.1.GA from <http://labs.jboss.com/jbossweb/downloads>
- Unzip jboss-native-2.0.1xxx.zip to your JBoss Directory  
`D:\pgm\jboss-4.2.1.GA\`
- Open a DOS shell, navigate to `D:\pgm\jboss-4.2.1.GA\bin` and then execute the following command:

*Listing 8: Installing JBoss as a Windows Service*

```
service.bat install
```



Adapt `d:\pgm\jboss-4.2.1.GA` to your environment!

## 8 Install openCRX as daemon on Linux

This section (provided by Seah Hong Yee) is devoted to the automatic start up of jboss services during the startup phase of a server. It also simplifies manual jboss startup with the use of a System V init script. The following configuration has been tested on Mandrake Linux 10.1 and SuSe Linux Enterprise Server 9. Based on the particular distribution at hand there might be some minor differences in init scripts and configuration, but the following guide should work with RHEL, CentOS, WhiteBox and Fedora.

In the directory `$JBASS_HOME/bin` there should be two init scripts:

- `jboss_init_redhat.sh`
- `jboss_init_suse.sh`

If you are using **Mandrake/Mandriva, RHEL, CentOS, WhiteBox or Fedora**:

- Copy the `jboss_init_redhat.sh` script into `/etc/init.d` and rename it to `jboss`.
- Edit the script and adapt the following parameters: `JBASS_HOME` and `JAVAPATH`
- Although not strictly necessary, you might want to include an entry like:

*Listing 9: Declare location of jdk*

```
export PATH=/usr/java/j2sdk1.5.0_06/bin
(/usr/java/j2sdk1.5.0_06/ being your jdk path, adapt it to your environment)
```

- At the top of the script there is an entry resembling the following one:

*Listing 10: Declare startup sequence*

```
# chkconfig: 3 87 20
```

The second set of digits represents the order sequence of the service startup. Make sure the number is larger than your database startup. Typically postgresql starts with the sequence number of 85, so I have my jboss startup with the sequence of 87

- Type the commands

*Listing 11: Add JBoss to config*

```
# chkconfig --add jboss
# chkconfig jboss on
```

From now on jboss should startup automatically after reboot, or you can do it manually with `service jboss restart`.

If you are using **Suse** Linux:

- Copy the `jboss_init_suse.sh` script into `/etc/init.d` and rename it to `jboss`.
- Edit the script and adapt the following parameters: `JBOSS_HOME` and `JAVAPATH`
- Although not strictly necessary, you might want to include an entry near the top of the script like:

*Listing 12: Declare location of jdk*

```
export PATH=/usr/java/j2sdk1.5.0_06/bin
```

(`/usr/java/j2sdk1.5.0_06/` being your jdk path, adapt it to your environment)

- Type the command `inserv jboss`
- Go into directory `/usr/sbin` and create a symbolic link with `ln -s /etc/init.d/jboss rcjboss`
- Execute the command `chkconfig jboss on`
- You should now be able to start jboss with the command `rcjboss start`

## 9 Next Steps

Now that you have successfully deployed openCRX on your application server you can continue with the openCRX QuickStart guide.