



## jPOS Programmer's Guide

1.9.0

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# Preface

This book covers **jPOS 1.9.0**.

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# Chapter 1. The jPOS Project

## 1.1. About jPOS.org

The jPOS project is hosted at <http://jpos.org>. For an up to date list of project resources, you can visit the <http://jpos.org/resources> page there. In order to stay up-to-date with jPOS news, you may want to visit the jPOS website at <http://jpos.org> as well as its blog at <http://jpos.org/blog>. There's also a low traffic **jPOS News** mailing list where we post important announcements, such as the availability of new versions of this guide. You're encouraged to register by visiting the project's main page at <http://jpos.org>.

Code is hosted at <http://github.com/jpos/jPOS>.

You may also want to follow us on Twitter, where we keep a list of users who regularly tweet about jPOS at [@apr/jpos](http://twitter.com/apr/jpos) [<http://twitter.com/apr/jpos>].

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## 1.3. About ISO-8583

We assume the reader is familiar with the ISO-8583 standard.

For starters, you can take a look at the Wikipedia **ISO\_8583** [[http://en.wikipedia.org/wiki/ISO\\_8583](http://en.wikipedia.org/wiki/ISO_8583)] page, but for any serious work you need to get a copy of the standard from <http://www.iso.org>.

This is a high level standard where vendors have implemented it in slightly different ways. You also need the protocol specifications for your particular interchange.

If you are starting a new payments application and you have full control over your spec, you may want to consider using the ISO-8583 v2003 based jPOS Common Message Format described in <http://jpos.org/doc/jPOS-CMF.pdf>.



The jPOS-CMF is an open source project, you can get the DocBook sources in the jPOS Github repository at <http://github.com/jPOS/jPOS-CMF> and modify it to fit your needs. This is an open spec, we expect institutions using it to get in touch with us in order to improve it.

## 1.4. Downloading jPOS

The community edition of jPOS can be downloaded from the **jPOS Download** [<http://jpos.org/download>] page.

The repository has many branches and tags. Unless you are dealing with a legacy jPOS application, You want to use the `master` branch.

If you are looking for older jPOS versions, you can find them in the **SourceForge** [<http://sourceforge.net/projects/jpos/files/jpos/>] repository but please note all development activity takes place in the **Github** [<http://github.com/jpos/jPOS>] repository, though.

## 1.5. Directory structure

jPOS uses **Gradle** [<http://www.gradle.org/>] with a **multi-module** setup.

The modules are defined in the `settings.gradle` file and listed below:

- **jpos** : this is the jPOS system
- **compat\_1\_5\_2** : compatibility with older versions

You'll find the jPOS sources in the `jpos/src` directory.

```

|-- COPYRIGHT                                ❶
|-- CREDITS
|-- LICENSE
|-- README.md                                ❷
|-- build.gradle                             ❸
|-- settings.gradle                          ❹
...
...

|-- gradlew                                  ❺
|-- gradlew.bat
|-- gradle
|   |-- wrapper
|       |-- gradle-wrapper.jar
|       |-- gradle-wrapper.properties
...
...

|-- jpos                                     ❻
|   |-- build.gradle
|   |-- src
|       |-- main
|           |-- java
|       |-- main
|           |-- resources
|       |-- dist                               ❼
|           |-- bin
|               |-- bsh
|               |-- q2
|               |-- start
|               |-- stop
|           |-- cfg
|               |-- packager
|                   |-- base1.xml
|                   |-- base24-eps.xml
|                   |-- base24.xml
...
...
|   |   |   |-- deploy
|   |   |       |-- 00_logger.xml
|   |   |       |-- 99_sysmon.xml
|   |   |-- log
|   |       |-- q2.log
...
...

```

- ❶ Copyright notice
- ❷ Readme file in markdown format shown in the **GitHub** [<https://github.com/jpos/jPOS>] repository
- ❸ Main Gradle configuration file
- ❹ Gradle's settings file, lists the modules to be compiled, in this case, jpos and compat\_1\_5\_2.
- ❺ It is recommended that you install Gradle locally, but for a quick build, you can use the Gradle wrapper (gradlew in Unix, gradlew.bat in Windows).
- ❻ Home for the jPOS module
- ❼ Template for a production distribution directory with its deploy, cfg, bin and log directories



```
repositories {
    mavenLocal()
    mavenCentral()
    mavenRepo name: 'oracle', url: "http://download.oracle.com/maven"
    mavenRepo name: 'jline', url: "http://jline.sourceforge.net/m2repo"
    mavenRepo url: "http://jpos.org/maven"
}

dependencies {
    compile group:'org.jpos', name:'jpos', version:'1.9.0+'
    testCompile group:'junit', name:'junit', version:'4.8.2'
}
```



If you're building a jPOS application, the easiest way is to clone the **jPOS Template** [<http://github.com/jpos/jPOS-template>] project and take it from there.

## 1.7. Building jPOS

jPOS uses **Gradle** [<http://www.gradle.org/>] as its build system. For a quick build, you don't even need to install Gradle, you can use the handy `gradlew` (or `gradlew.bat` if you're on Windows) Gradle *wrapper* that automatically downloads Gradle for you, but for daily development, it's a good idea to install it locally.



Whenever we mention the `gradle` command in this guide, you can either use your locally installed Gradle, or the `gradlew` wrapper scripts mentioned above.



Gradle has the ability to run in background, dramatically reducing the load time. In order to enable that feature, you can use its `--daemon` parameter or

```
export GRADLE_OPTS=-Dorg.gradle.daemon=true
```

### 1.7.1. Available tasks

Running `gradle tasks` provides a list of available tasks.

Most of them are standard in the Gradle build system and have self-explanatory names (i.e. `jar` to build the jPOS jar, `javadoc` to build the javadoc documentation). A few deserve further explanation, though:

- **installApp** is a handy task defined in the `jpos` module that can be used to create a runtime environment inside the `build/installs` directory. That runtime environment copies all the scripts coming from the `src/dist` directory and it's ready to execute the jPOS system using the `bin/q2` (or `bin\q2.bat`) scripts. The `installApp` task is similar to running the `dist` task to create a `tar.gz` tarball and then extracting that tarball into a local directory, ready to run.
- **version** can be used to build jPOS and run it to query its own version.



#### Note about releases

jPOS stable releases (non SNAPSHOTs) are signed and published to Maven Central. If you are trying to build a stable release, you'd have to hack

`build.gradle` to trick the `isSnapshot` variable to be true, otherwise the build will fail because you don't have the PGP private keys required to sign a build.

If you're making some changes to jPOS off a stable release, you should change the version number to avoid confusion.

But remember, you don't have to build jPOS in order to use it, just add it to your *pom* as a dependency.



### The *clean* task is your friend

Out of all the available tasks, there's one that will keep you out of trouble: **clean**. While Gradle is very smart when it comes to figure out which dependencies have been modified and need to be rebuilt, there's nothing like the extra confidence that a good old `clean` gives. When in doubt, `gradle clean`.

## 1.8. Running jPOS

From the `jpos` directory, run `gradle installApp` to create a working jPOS in the `build/install/jpos` directory.

Change directory there and you will see a `jpos-x.x.x.jar` (i.e `jpos-1.9.1-SNAPSHOT.jar`).

You can run the jar using `java -jar jpos-1.9.1-SNAPSHOT.jar` or use the `bin/q2` or `bin/q2.bat` scripts.

Once started, the output should look like this:

```
<log realm="org.jpos.q2.qbean.SystemMonitor" at="Fri Jul 12 11:51:37 UYT 2013.882">
  <info>
    OS: Mac OS X
    host: Macintosh-2.local/192.168.2.20
    version: 1.9.1-SNAPSHOT (fb4cc76)
    instance: cd5013af-1d38-4a5e-b771-e807904212e1
    uptime: 00:00:00.218
    processors: 2
    drift : 0
    memory(t/u/f): 85/7/77
    threads: 4
      Thread[Reference Handler,10,system]
      Thread[Finalizer,8,system]
      Thread[Signal Dispatcher,9,system]
      Thread[RMI TCP Accept-0,5,system]
      Thread[Q2-cd5013af-1d38-4a5e-b771-e807904212e1,5,main]
      Thread[DestroyJavaVM,5,main]
      Thread[Timer-0,5,main]
      Thread[SystemMonitor,5,main]
    name-registrar:
      logger.Q2.buffered: org.jpos.util.BufferedLogListener
      logger.Q2: org.jpos.util.Logger
  </info>
</log>
```

You may want to review the content in the `deploy` directory, that comes from the `src/dist` source tree.

---

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Version 3, 19 November 2007

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