

# Java 11 Developer Guidelines

This page is a collaborative entry point for developer resources about developing and testing Jenkins to run on Java 11.

This page is **not** designed to receive status updates for user-facing issues. But you are more than welcome to check and report such issues so that they show on the dedicated [Known Java 11 Compatibility issues](#) wiki page.

- [How to](#)
  - [Run Jenkins using Java 11](#)
  - [Develop and test your plugin for running on Java 11](#)
    - [Make sure your plugin is tested in Continuous Integration on Java 8 and Java 11 at the same time](#)
  - [Release an experimental plugin version specifically for Java 11](#)
  - [Run Plugin Compat Tester \(aka PCT\) using Java 11](#)
  - [Run Acceptance Test Harness \(aka ATH\) using Java 11](#)
  - [Jenkins Core known issues with Java 11](#)
- [Known developer tools issues](#)

## How to

### Run Jenkins using Java 11

See the [Java 11 Preview Availability announcement](#)

### Develop and test your plugin for running on Java 11

As a part of [JEP-211](#), we request all plugins to remain compatible with Java 8 for now. But you may still need to run the tests with Java 11 so that you can verify the plugin's behavior. It is possible to pass "jvm" and extra Java properties to Maven Surefire plugin to just run tests, but it is easier to actually build & test plugins with JDK 11. Jenkins development tools have been updated to support that:

1. For non-experimental releases you should **always** build the plugins with `java.level=8`
2. Use `plugin-pom:3.29+` ([changelog](#)). Versions before 3.29 contain some updates to be able to build and test your plugins using JDK 11
3. Plugins will be able to compile successfully with JDK 11 if and only if Jenkins Core version (`jenkins.version`) is above 2.138+
4. You can update Jenkinsfile to run tests with Java 11. To workaround the Jenkins core requirement, a full configuration matrix may be used in `buildPlugin()`:
  - a. Example: [Jenkinsfile in the Label Verifier Plugin](#)

Some potential pitfalls to remember about:

- The existing "mvn hpi:run" command will not work correctly on Java 11 unless Java modules are downloaded and passed to the environment ( [JENKINS-54807](#) - Getting issue details...  )
- If you use Mockito/PowerMock in your plugin tests, you may need to update to the recent versions with Java 11 support
  - [JENKINS-55098](#) - Getting issue details...  tracks adding the versions to Plugin POM dependency management. Plugin POM 3.32 is recommended
  - You may also need to add test annotations to workaround [PowerMock Issue #864](#). [Example for the Jenkins Core](#)
- In some cases FindBugs may crash in some cases ( [JENKINS-53692](#) - Getting issue details...  ), workarounds may be needed

See the "Known developer tools issues" for more known issues in Plugin POM and Jenkins plugins.

### Make sure your plugin is tested in Continuous Integration on Java 8 and Java 11 at the same time

Since [this addition](#), it is now recommended that you use the following configuration in your plugin:

```
buildPlugin(configurations: buildPlugin.recommendedConfigurations())
```

By default, this will build your plugin:

- on the default configuration, extracted from your pom.xml
- on Jenkins 2.164.1 using a JDK 8
- on Jenkins 2.164.1 using a JDK 11

All this both on Windows and Linux.

### Release an experimental plugin version specifically for Java 11

Although we request all plugins to remain compatible with Java 8, in some cases it may be reasonable to release an **experimental** version for Java 11 early adopters.

In order to do that, we provide an [Experimental Update Center for Java 11](#). Since [Jenkins 2.155](#), if you run using Jenkins versions with Java 11 preview, Jenkins and Jenkins Docker plugins.txt installer (e.g. "workflow-support:experimental") will default to this experimental update center. It allows Java 11 early adopters to get patches without requiring deploying snapshots manually:

In order to do an experimental release for Java 11, **all the following steps must be performed**:

- Develop the Java 11 code in a feature branch (e.g. "java11-support") so that it does not impact main release line
- Add an "alpha" or "beta" marker to the version of your experimental plugin
- Update to plugin-pom:3.29+ so your plugin embeds the new minimum version of Java requirement in its manifest
- Set the `plugin.minimumJavaVersion` property in your pom.xml to 11 (see <https://github.com/jenkinsci/plugin-pom/blob/master/CHANGELOG.md#329>)

If you forget about any of the bullets above, the update may impact Java 8 users. The long-term solution is already on its way, but is not delivered yet.

Follow [JENKINS-55048](#) - Getting issue details...  if you are interested.

## Run Plugin Compat Tester (aka PCT) using Java 11

Documented in the PCT repository: <https://github.com/jenkinsci/plugin-compat-tester#running-pct-with-custom-java-versions>

[Current status of many plugins](#) (please comment there to get access, or send an email if you tested another opensource plugin).

## Run Acceptance Test Harness (aka ATH) using Java 11

Documented on the ATH repository: <https://github.com/jenkinsci/acceptance-test-harness/blob/master/docs/JAVA11.md>

## Jenkins Core known issues with Java 11

If you hit this issue [JENKINS-55150](#) - Getting issue details...  about live reloading of resources in Jenkins, the current workaround is `"mvn org.jenkins-ci.tools:maven-jenkins-dev-plugin:9.4.5.v20170502-jenkins-1:run"`

## Known developer tools issues

*Please add known issues here. The preferred way is to create or find the associated JIRA in the [Jenkins Issue Tracker](#), and add the "java11-devtools-compatibility". Then the issue it will automatically show up in the list below.*

*If you cannot create a JIRA issue, please still feel free to add notes about your findings below.*

*(associated JIRA board for the following filter)*

T	Key	Component/s	Summary	P	Status	Released As
	JENKINS-57341	archetypes	Plugin archetype and tutorial do Java 7 and Java 8 but not Java 11		<input type="button" value="CLOSED"/>	
	JENKINS-57320	plugin-compat-tester	Fix a possible regression introduced on JENKINS-56312		<input type="button" value="RESOLVED"/>	PCT 0.1.0
	JENKINS-56657	jenkinsfile-runner	Can not build jenkinsfile-runner with JDK 11		<input type="button" value="OPEN"/>	
	JENKINS-56492	acceptance-test-harness	[ATH] Fix Javadoc failures on Java11		<input type="button" value="RESOLVED"/>	
	JENKINS-55885	plugin-pom	Update Maven HPI Plugin version to run on Java11		<input type="button" value="RESOLVED"/>	Maven HPI Plugin 3.3, Plugin POM 3.37
	JENKINS-55692	platformlabeler-plugin	Java 11 Javadoc generation fails in maven		<input type="button" value="CLOSED"/>	
	JENKINS-55541	git-plugin	PCT on git plugin with JDK11 fails because of old powermock versions and xstream library dependencies		<input type="button" value="CLOSED"/>	

	JENKI NS-55296	plugin-compat-tester	Add support of running PCT main executable with Java 11		RESOLVED	
	JENKI NS-55290	mailer-plugin, plugin-pom	Missing META-INF/exposed.stapler-beans when building Mailer plugin with Java 11		FIXED BUT UNRELEASED	
	JENKI NS-55205	saml-plugin	Review findbugs error with some OS+JDK		RESOLVED	saml-1.1.2
	JENKI NS-55200	gradle-jpi-plugin	Gradle JPI plugin should be updated to support testing with Java 11		RESOLVED	
	JENKI NS-55199	plugin-compat-tester	PCT fails when cycle dependency on test scope		CLOSED	<a href="https://github.com/jenkinsci/plugin-compat-tester/commit/7d7fa307cbd75e76bb084bac09012bc826a7722f">https://github.com/jenkinsci/plugin-compat-tester/commit/7d7fa307cbd75e76bb084bac09012bc826a7722f</a>
	JENKI NS-55162	core, plugin-pom	Maven JAR Plugin should be updated to 3.1.1 in Plugin POM and Jenkins POM		RESOLVED	Jenkins POM 1.51, Plugin POM 3.30
	JENKI NS-55150	core	[jenkins-dev] jenkins-dev:run no longer has hot reload after 2.152		RESOLVED	
	JENKI NS-55146	plugin-compat-tester, plugin-pom	PCT sometimes crashes on Java 11 due to module read errors when using the docker image		FIXED BUT UNRELEASED	
	JENKI NS-55098	plugin-pom	Build Flow: PowerMock and Mockito need massive updates for Java 11		RESOLVED	Plugin POM 3.32
	JENKI NS-55097	plugin-compat-tester	PCT cannot efficiently run Java 8/11 tests in Docker due to SUREFIRE-1588		RESOLVED	
	JENKI NS-54906	custom-war-packager	Custom WAR Packager should support producing Java 11-compatible JFR images		RESOLVED	
	JENKI NS-54862	plugin-compat-tester	PCT: Add support of passing plugin version overrides		RESOLVED	
	JENKI NS-54844	plugin-pom	Access Modifier Checker 1.16 fails when running with java.level=11		OPEN	

Showing 20 out of 38 issues