



Red Hat build of OpenJDK 21

Using alt-java

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Abstract

Red Hat build of OpenJDK 21 is a Red Hat offering on the Red Hat Enterprise Linux platform. The Using alt-java guide provides an overview of alt-java, defines the differences between java and alt-java binaries, and explains how to use alt-java.

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MAKING OPEN SOURCE MORE INCLUSIVE

Red Hat is committed to replacing problematic language in our code, documentation, and web properties. We are beginning with these four terms: master, slave, blacklist, and whitelist. Because of the enormity of this endeavor, these changes will be implemented gradually over several upcoming releases. For more details, see [our CTO Chris Wright's message](#).

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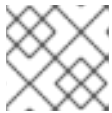
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CHAPTER 1. OVERVIEW OF ALT-JAVA

Red Hat packages contain a mitigation for the SSB vulnerability in the form of a patch for the **java** binary. This patch disables an optimization present in x86-64 (Intel and AMD) processors. Disabling that optimization reduces the risk of kernel side-channel attacks, but also reduces CPU performance.

Since the patch reduces performance, it has been removed from the **java** launcher. A new binary **alt-java** is now available. From the January 2021 Critical Patch Update release (1.8.0 282.b08, 11.0.10.9) onwards, the **alt-java** binary is included in Red Hat build of OpenJDK 21 and Red Hat build of OpenJDK 11 GA RPM packages.

Additional resources

- For more information about the performance impact of SSB mitigation, see [Kernel Side-Channel Attack using Speculative Store Bypass - CVE-2018-3639](#) on the Red Hat Customer Portal
- For more information about the **java** binary patch, see [RH1566890](#) in the *Red Hat Bugzilla* documentation.

CHAPTER 2. DIFFERENCES BETWEEN JAVA AND ALT-JAVA

Similarities exist between **alt-java** and **java** binaries, with the exception of the SSB mitigation.

Although the SBB mitigation patch exists only for x86-64 architecture, Intel and AMD, the **alt-java** exists on all architectures. For non-x86 architectures, the **alt-java** binary is identical to **java** binary, except **alt-java** has no patches.

Additional resources

- For more information about similarities between **alt-java** and **java**, see [RH1750419](#) in the *Red Hat Bugzilla* documentation.

CHAPTER 3. ALT-JAVA AND JAVA USES

Depending on your needs, you can use either the **alt-java** binary or the **java** binary to run your application's code.

3.1. ALT-JAVA USAGE

Use **alt-java** for any applications that run untrusted code. Be aware that using **alt-java** is not a solution to all speculative execution vulnerabilities.

3.2. JAVA USAGE

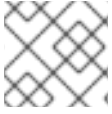
Use the **java** binary for performance-critical tasks in a secure environment.

Additional resources

- See [Java and Speculative Execution Vulnerabilities](#).

CHAPTER 4. PERFORMANCE IMPACT OF ALT-JAVA

The **alt-java** binary contains the SSB mitigation, so the SSB mitigation performance impact no longer exists on **java**.



NOTE

Using **alt-java** might significantly reduce the performance of Java programs.

You can find detailed information of some Java performance issues that might exist with using **alt-java** by selecting any of the Red Hat Bugzilla links listed in the *Additional resources* section.

Additional resources

- [\(java-11-openjdk\) Seccomp related performance regression in RHEL8](#) .
- [\(java-1.8.0-openjdk\) Seccomp related performance regression in RHEL8](#) .
- [CVE-2018-3639 Detail](#).
- [CVE-2018-3639 hw: cpu: speculative store bypass](#) .
- [CVE-2018-3639 java-1.8.0-openjdk: hw: cpu: speculative store bypass \(rhel-7.6\)](#)

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