Amazon Corretto: Corretto 11 User Guide
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What Is Amazon Corretto 11?

Amazon Corretto is a no-cost, multiplatform, production-ready distribution of the Open Java Development Kit (OpenJDK). Corretto comes with long-term support that includes performance enhancements and security fixes. Corretto is certified as compatible with the Java SE standard and is used internally at Amazon for many production services. With Corretto, you can develop and run Java applications on operating systems such as Amazon Linux 2, Windows, and macOS.

This guide includes a list of patches applied to the OpenJDK for this release of Amazon Corretto 11, and installation instructions for the platforms supported by this version.

Related Information

In addition to this guide, see the following resources for developers:

- [Amazon Corretto 11 Overview](#)
- GitHub:
  - [Documentation source](#)
  - [JDK Source](#)

Contributing to the SDK

Developers can contribute feedback in the following ways:

- Submit issues on GitHub:
  - [Submit documentation issues](#)
  - [Report a bug or request a feature](#)
- Submit pull requests in the documentation or JDK source GitHub repositories to contribute to the JDK development
List of Patches for Amazon Corretto 11

This section lists all the patches applied to OpenJDK for Amazon Corretto 11. We also provide links to the issues in the OpenJDK project.

**Back port from OpenJDK 12, fixing JDK-8202353: "os::readdir should use readdir instead of readdir_r".**

Enables compilation on Amazon Linux 2, as readdir_r has been deprecated in glibc >= 2.24. Additionally, this also fixes JDK-8202835: "jfr/event/os/TestSystemProcess.java fails on missing events".

**Back port from OpenJDK 12, fixing JDK-8202794: "Native Unix code should use readdir rather than readdir_r".**

Enables compilation on Amazon Linux 2, as readdir_r has been deprecated in glibc >= 2.24.

**Back port from OpenJDK 12, fixing JDK-8207340: "UnixNativeDispatcher close and readdir usages should be fixed".**

Enables compilation on Amazon Linux 2, as readdir_r has been deprecated in glibc >= 2.24.

**Back port from OpenJDK 12, fixing JDK-8207748: "Fix for 8202794 breaks tier1 builds".**

Enables compilation on Amazon Linux 2, as readdir_r has been deprecated in glibc >= 2.24.

**Updates to vendor-related metadata.**

Identifies Amazon as the vendor of this OpenJDK distribution and adds hyperlinks for reporting issues.
Amazon Corretto 11 Guide for Linux

The topics in this section describe installation instructions for Amazon Corretto 11 on Linux platforms.

Topics

- Amazon Corretto 11 Installation Instructions for Debian-Based and RPM-Based Linux Distributions (p. 3)
- Amazon Corretto 11 Installation Instructions for Amazon Linux 2 (p. 6)

Amazon Corretto 11 Installation Instructions for Debian-Based and RPM-Based Linux Distributions

This topic describes how to install Amazon Corretto 11 on Debian-based and RPM-based Linux distributions.

Install Amazon Corretto 11 on Debian-Based Linux

This section describes how to install and uninstall Amazon Corretto 11 on a host or container running a Debian-based operating system.

Using apt

To use the Corretto Apt repositories on Debian-based systems, such as Ubuntu, import the Corretto public key and then add the repository to the system list by using the following commands:

Example

```
wget -O- https://apt.corretto.aws/corretto.key | sudo apt-key add -
sudo add-apt-repository 'deb https://apt.corretto.aws stable main'
```

After the repo has been added, you can install Corretto 11 by running this command:

Example

```
sudo apt-get update; sudo apt-get install -y java-11-amazon-corretto-jdk
```

Download and Install the Debian Package Manually

1. Before you install the JDK, install the `java-common` package.

   Example
   
   ```
sudo apt-get update && sudo apt-get install java-common
   ```

2. Download the Linux `.deb` file from the Downloads (p. 14) page.

3. Install the `.deb` file by using `sudo dpkg --install`. 
Verify Your Installation

In the terminal, run the following command to verify the installation.

**Example**

```bash
touch ~/tmp
```

**Expected output for 11.0.6:**

```
openjdk version "11.0.6" 2020-01-14 LTS
OpenJDK Runtime Environment Corretto-11.0.6.10.1 (build 11.0.6+10-LTS)
OpenJDK 64-Bit Server VM Corretto-11.0.6.10.1 (build 11.0.6+10-LTS, mixed mode)
```

If you see a version string that doesn't mention Corretto, run the following command to change the default java or javac providers.

**Example**

```bash
sudo update-alternatives --config java
```

If you're using the JDK, you should also run the following.

```bash
sudo update-alternatives --config javac
```

Uninstall Amazon Corretto 11

You can uninstall Amazon Corretto 11 by using the following command.

**Example**

```bash
sudo dpkg --remove java-11-amazon-corretto-jdk
```

Install Amazon Corretto 11 on RPM-Based Linux

Using yum

To use Corretto RPM repositories with the yum package manager (such as Amazon Linux AMI), import the Corretto public key and then add the repository to the system list. For most systems, you must run the following commands:

**Example**

```bash
sudo rpm --import https://yum.corretto.aws/corretto.key
sudo curl -L -o /etc/yum.repos.d/corretto.repo https://yum.corretto.aws/corretto.repo
```
After the repository is added, you can install Corretto 11 by running this command:

**Example**

```
sudo yum install -y java-11-amazon-corretto-devel
```

Using zypper

To use Corretto RPM repositories with the zypper package manager (such as openSUSE), import the Corretto public key and then add the repository to the system list by running the following commands:

**Example**

```
sudo zypper addrepo https://yum.corretto.aws/corretto.repo; sudo zypper refresh
```

After the repository is added, you can install Corretto 11 by running this command:

**Example**

```
sudo zypper install java-11-amazon-corretto-devel
```

**Download and install RPM package manually**

1. Download the Linux `.rpm` file from the Downloads (p. 14) page.
2. Install the downloaded `.rpm` file using `yum localinstall`.

**Example**

```
sudo yum localinstall
```

**Verify Your Installation**

In the terminal, run the following command to verify the installation.

**Example**

```
java -version
```

This is the expected output for 11.0.6:

```
openjdk version "11.0.6" 2020-01-14 LTS
OpenJDK Runtime Environment Corretto-11.0.6.10.1 (build 11.0.6+10-LTS)
OpenJDK 64-Bit Server VM Corretto-11.0.6.10.1 (build 11.0.6+10-LTS, mixed mode)
```

If you see a version string that doesn't mention Corretto, run the following command to change the default `java` or `javac` providers.

**Example**

```
sudo alternatives --config java
```
If you're using the JDK, you should also run the following.

```
sudo alternatives --config javac
```

**Uninstall Amazon Corretto 11**

You can uninstall Amazon Corretto 11 by using the following command:

**Example**

```
sudo yum remove java-11-amazon-corretto-devel
```

---

**Amazon Corretto 11 Installation Instructions for Amazon Linux 2**

This topic describes how to install and uninstall Amazon Corretto 11 on a host or container running the Amazon Linux 2 operating system.

**Install using the yum Package Manager on Amazon Linux**

Amazon Corretto 11 has a 'headless' variant available. This variant omits runtime dependencies that are typically associated with GUI applications such as X11 and ALSA and is worth considering for server-oriented workloads.

**Option 1: Install headless Amazon Corretto 11:**

**Example**

```
sudo yum install java-11-amazon-corretto-headless
```

**Option 2: Install the full Amazon Corretto 11:**

**Example**

```
sudo yum install java-11-amazon-corretto
```

The installation location is `/usr/lib/jvm/java-11-amazon-corretto.<cpu_arch>`.

**Verify Your Installation**

To verify the installation, run `java -version` in a console. If the version string doesn't mention Corretto, run the following command to change the default java provider.

**Example**

```
sudo alternatives --config java
```
Uninstall Amazon Corretto 11

You can uninstall Amazon Corretto 11 with the following commands.

Uninstall headless:

**Example**

```
sudo yum remove java-11-amazon-corretto-headless
```

Uninstall full:

**Example**

```
sudo yum remove java-11-amazon-corretto
```
Amazon Corretto 11 Guide on Windows

The topics in this section describe installation instructions for Amazon Corretto 11 on the Windows operating system. Windows builds are supported on versions 7, 10, Server 2008, Server 2012, and Server 2016.

Topics
- Amazon Corretto 11 Installation Instructions for Windows 7 or Later (p. 8)

Amazon Corretto 11 Installation Instructions for Windows 7 or Later

This topic describes how to install and uninstall Amazon Corretto 11 on a host or container running the Windows 7 or later Windows operating system.

Install Amazon Corretto 11

1. Download a Windows .msi file from the Downloads (p. 14) page.
2. Double-click the .msi file to start the installation wizard.
3. Follow the steps in the wizard.
   
   You have the option of setting a custom installation path. By default, Amazon Corretto 11 is installed at C:\Program Files\Amazon Corretto\. If you set a custom path, make a note of it for the next step.
4. Once the install wizard is finished, set the JAVA_HOME and PATH environment variables.
   
   Set JAVA_HOME to the installation location, noting that the directory contains the currently-installed version. For example, if the default directory is used for 11.0.6, then set JAVA_HOME as C:\Program Files\Amazon Corretto\jdk11.0.6_10.
   
   Add %JAVA_HOME%\bin to the current PATH variable.
5. Verify the installation by running java -version in a command prompt. You should see the following output.

Example

```
openjdk version "11.0.6" 2020-01-14 LTS
OpenJDK Runtime Environment Corretto-11.0.6.10.1 (build 11.0.6+10-LTS)
OpenJDK 64-Bit Server VM Corretto-11.0.6.10.1 (build 11.0.6+10-LTS, mixed mode)
```

Uninstall Amazon Corretto 11

You can uninstall Amazon Corretto 11 by following the standard steps to uninstall an application from Windows.
1. Open Programs and Features.
2. Search for Amazon Corretto 11 and then select it.
3. Choose uninstall.
Amazon Corretto 11 Guide for macOS

The topics in this section describe installation instructions for Amazon Corretto 11 on macOS.

Topics
• Amazon Corretto 11 Installation Instructions for macOS 10.13 or later (p. 10)

Amazon Corretto 11 Installation Instructions for macOS 10.13 or later

This topic describes how to install and uninstall Amazon Corretto 11 on a host running the Mac OS version 10.13 or later. You must have administrator permissions to install and uninstall Amazon Corretto 11.

Install Amazon Corretto 11

1. Download the Mac .pkg file from the Downloads (p. 14) page.
2. Double-click the downloaded file to begin the installation wizard and follow the steps in the wizard.
3. Once the wizard completes, Amazon Corretto 11 is installed in /Library/Java/JavaVirtualMachines/.

You can run the following command in a terminal to get the complete installation path.

Example
/usr/libexec/java_home --verbose

4. Run the following command in the terminal to set the JAVA_HOME variable to the Amazon Corretto 11 version of the JDK. If this was set to another version previously, it is overridden.

Example
export JAVA_HOME=/Library/Java/JavaVirtualMachines/amazon-corretto-11.jdk/Contents/Home

Uninstall Amazon Corretto 11

You can uninstall Amazon Corretto 11 by running the following commands in a terminal.

Example

cd /Library/Java/JavaVirtualMachines/
sudo rm -rf amazon-corretto-11.jdk
Amazon Corretto 11 Guide for Docker

This section describes simple use cases for using Amazon Corretto 11 in Docker containers.

Topics
- Getting Started with Amazon Corretto 11 on Docker Images (p. 11)

Getting Started with Amazon Corretto 11 on Docker Images

This topic describes how to build and launch a Docker image that uses Amazon Corretto 11. You must have the latest version of Docker installed.

Using the official image for Amazon Corretto 11.

Amazon Corretto 11 is available as an official image on Docker Hub. The following example runs a container and displays Corretto's version.

Example

docker run amazoncorretto:11 java -version

Output:

Example

openjdk version "11.0.6" 2019-10-15 LTS
OpenJDK Runtime Environment Corretto-11.0.6.10.1 (build 11.0.6+10-LTS)
OpenJDK 64-Bit Server VM Corretto-11.0.6.10.1 (build 11.0.6+10-LTS, mixed mode)

Using the Corretto ECR Instance

To use the Corretto ECR instance, first authenticate the docker client to the Corretto registry (registry id: 489478819445) with the help of the instructions in this page. Once you have logged in, Corretto 11 images can be pulled or run using one of the following commands:

Example

docker pull 489478819445.dkr.ecr.us-west-2.amazonaws.com/corretto11:latest
docker run -it 489478819445.dkr.ecr.us-west-2.amazonaws.com/corretto11:latest /bin/bash

You can see the list of available images using:
Build a Docker Image with Amazon Corretto 11

Run the following command to build an image that uses Amazon Corretto 11.

Example

docker build -t amazon-corretto-11 github.com/corretto/corretto-11-docker

After the command completes, you have an image called *amazon-corretto-11*.

To launch this image locally, run the following command.

Example

docker run -it amazon-corretto-11

You can also push this image to Amazon ECR. See the Pushing an Image topic in the Amazon Elastic Container Registry User Guide for details.

Create an Image

You can create a new Docker image using Corretto’s official Docker Hub image.

1. Create a Dockerfile with the following content.

Example

```java
FROM amazoncorretto:11
RUN echo $'
public class Hello { 
public static void main(String[] args) { 
System.out.println("Welcome to Amazon Corretto!"); 
}
} 
' > Hello.java
RUN javac Hello.java
CMD ["java", "Hello"]
```

2. Build the new image.

Example

docker build -t hello-app .

3. Run the new image.

Example

docker run hello-app

You get the following output.
Welcome to Amazon Corretto!
Downloads for Amazon Corretto 11

This topic lists all the downloads available for Amazon Corretto 11. You can choose Permanent URLs pointing to the latest version, or use Version Specific URLs which point to a specific version.

Amazon Corretto 11 Permanent URLs

Permanent URLs always point to the most recent release of a package. For example, to retrieve the latest Linux Corretto 11 .tgz package by using a Permanent URL, run the following command from the CLI:

**Example**

```
wget https://corretto.aws/downloads/latest/amazon-corretto-11-x64-linux-jdk.tar.gz
```

You can also run the following curl command.

**Example**

```
curl -LO https://corretto.aws/downloads/latest/amazon-corretto-11-x64-linux-jdk.tar.gz
```

**Note:** Permanent URL's are redirected (HTTP 302) to actual artifact's URL.

These links can be used in scripts to pull the latest version of Amazon Corretto 11.

<table>
<thead>
<tr>
<th>Platform</th>
<th>Type</th>
<th>Download Link</th>
<th>Checksum (MD5)</th>
<th>Sig File</th>
<th>Pub</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linux x64 (p. 3)</td>
<td>JDK</td>
<td><a href="https://corretto.aws/downloads/latest/amazon-corretto-11-x64-linux-jdk.deb">https://corretto.aws/downloads/latest/amazon-corretto-11-x64-linux-jdk.deb</a></td>
<td><a href="https://corretto.aws/downloads/latest_checksum/amazon-corretto-11-x64-linux-jdk.deb">https://corretto.aws/downloads/latest_checksum/amazon-corretto-11-x64-linux-jdk.deb</a></td>
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</tbody>
</table>

**Note:** Notice that the above links follow this format:

https://corretto.aws/[latest/latest_checksum]/amazon-corretto-[corretto_version]-[cpu_arch]-[os]-[package_type].[file_extension]
Signature Verification

The public key to verify the SIGNATURE file can be downloaded [here](#).

Versioned Downloads

For versioned downloads and earlier versions, see [Corretto-11 Releases](#) on GitHub.

Change Logs

For change logs, see [Corretto-11 Change logs](#) on Github.
## Document History for User Guide

The following table describes the documentation for this release of Amazon Corretto 11. To be notified of new releases, please subscribe to this RSS feed.

<table>
<thead>
<tr>
<th>update-history-change</th>
<th>update-history-description</th>
<th>update-history-date</th>
</tr>
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<tr>
<td>Added YUM and APT repositories topic (p. 18)</td>
<td>Added information about using YUM and APT repositories.</td>
<td>December 18, 2019</td>
</tr>
<tr>
<td>Corretto update (11.0.5.10.2). (p. 18)</td>
<td>Bug fix release for MacOS.</td>
<td>November 20, 2019</td>
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<tr>
<td>Quarterly Corretto update (11.0.5.10.1). (p. 18)</td>
<td>October 2019 update of security fixes for Amazon Corretto 11.</td>
<td>October 15, 2019</td>
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<tr>
<td>Quarterly Corretto update (11.0.4.11.1). (p. 18)</td>
<td>July 2019 update of security fixes for Amazon Corretto 11.</td>
<td>July 16, 2019</td>
</tr>
<tr>
<td>Aarch64 preview release (p. 18)</td>
<td>Amazon Corretto 11 is preview on Aarch64. Documentation has been updated to include installation instructions.</td>
<td>June 28, 2019</td>
</tr>
<tr>
<td>Support for Amazon Linux 2. (p. 18)</td>
<td>Amazon Corretto 11 is now available in Amazon Linux 2. Documentation has been updated to include installation instructions.</td>
<td>June 19, 2019</td>
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<tr>
<td>Quarterly Corretto update (11.0.3.7.1). (p. 18)</td>
<td>April 2019 update of security fixes for Amazon Corretto 11.</td>
<td>April 16, 2019</td>
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<tr>
<td>Provide new Corretto 11 (11.0.2.9.3) MacOS installer. (p. 18)</td>
<td>Fix issues in Corretto 11 MacOS installer.</td>
<td>March 19, 2019</td>
</tr>
<tr>
<td>Amazon Corretto 11 (11.0.2.9.3) is now in GA. (p. 18)</td>
<td>No changes have been made from the RC.</td>
<td>March 14, 2019</td>
</tr>
<tr>
<td>RC Release (11.0.2.9.2) (p. 18)</td>
<td>Release of Amazon Corretto 11 Release Candidate.</td>
<td>March 4, 2019</td>
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<tr>
<td>Initial Release (11.0.2.9.1) (p. 18)</td>
<td>Initial release of Amazon Corretto 11 Developer Preview.</td>
<td>February 12, 2019</td>
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