# Verifying Hidden Reapers

Spice Labs has discovered thousands of Hidden Reapers… software artifacts that contain vulnerabilities not flagged by GitHub Dependabot or other vulnerability scanning software.

This is a quick guide to show you how to verify Spice Labs' claims.

# Claimed Reaper Artifacts

Software components, also called artifacts, can be identified by a "Package URL" or pURL.

You should have received a text file that's also a machine readable "JSON" file that contains a set of Hidden Reapers. Each of the artifacts with a Hidden Reaper has an "artifact" field. For example:
"artifact":"pkg:maven/ca.uhnresearch.pughlab/java-server@1.0.5"

This field can be used to look up information about the artifact in a 3rd party site, MVN Repository. The link to look up the artifact is also included:
"mvnrepository":"https://mvnrepository.com/artifact/ca.uhnresearch.pughlab/java-server/1.0.5"

By clicking on the link, you can see the dependencies and vulnerability information. There are no listed dependencies for
"pkg:maven/ch.qos.logback/logback-classic@1.1.8",
"pkg:maven/org.apache.tomcat.embed/tomcat-embed-core@8.0.0-RC10", or
"pkg:maven/ch.qos.logback/logback-core@1.1.8"

And the Common Vulnerabilities and Exposures (CVEs) associated with the Hidden dependencies are not listed.

# Confirming the Reapers are Hidden

You can verify that the above packages (e.g., logback-core 1.1.8) are embedded in the code.

First, download the JAR file (the computer code) by clicking on the "jar (7.2MB)" link:

Home » ca.uhnresearch.pughlab » java-server » 1.0.5

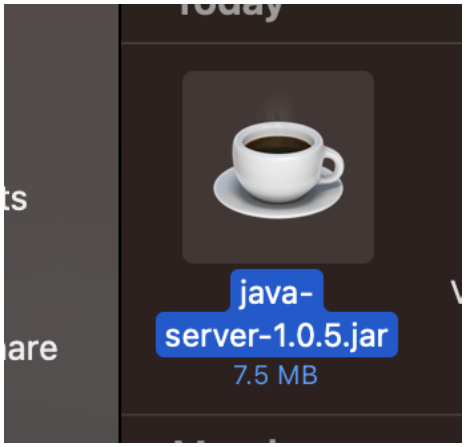
## Generic Server Container » 1.0.5

A generic server container for the tracker, cbioPortal, and other Java-base

| | |
|---|---|
| **License** | BSD 3-clause |
| **Tags** | server |
| **HomePage** | https://github.com/pughlab/java-server |
| **Date** | Jan 12, 2017 |
| **Files** | pom (7 KB) jar (7.2 MB) View All |

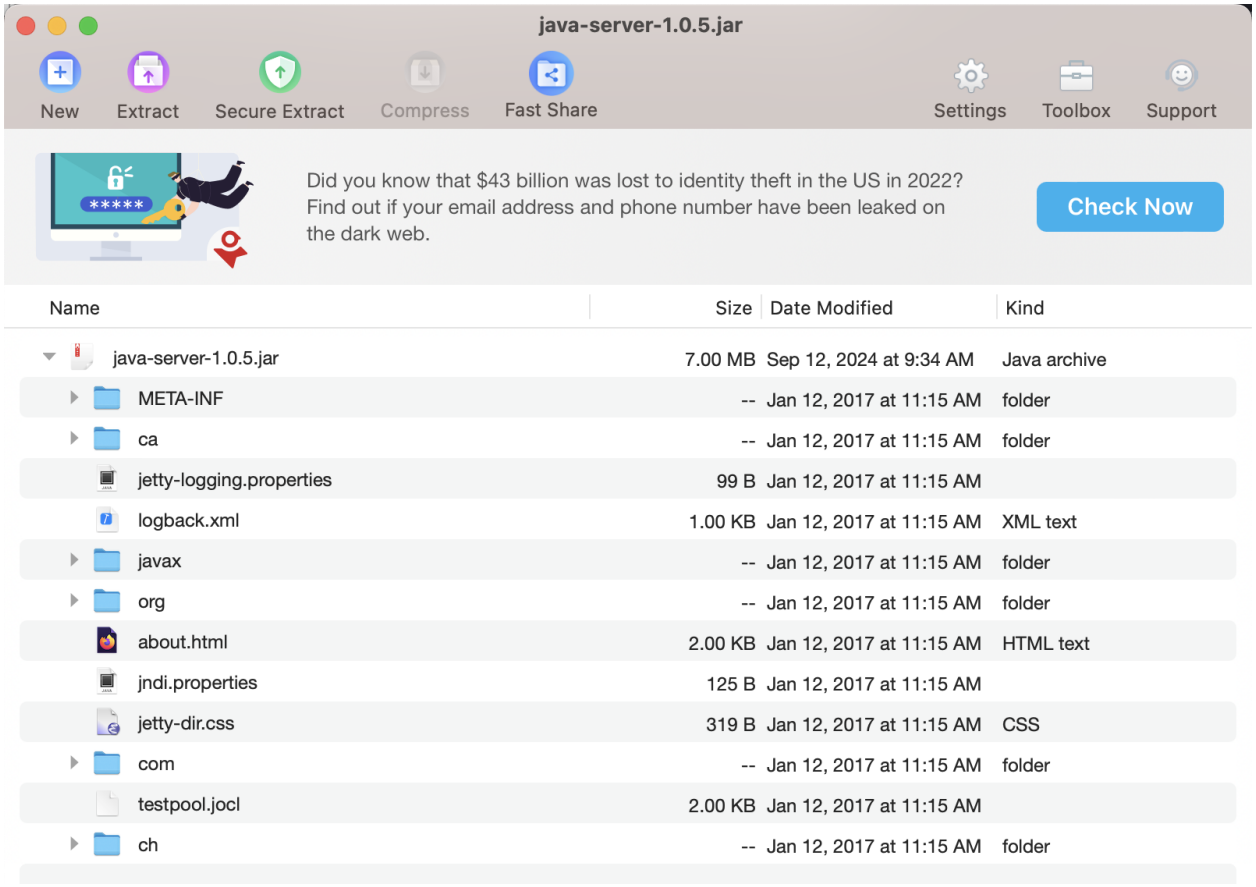
Next, open the file using a Zip file tool because Java JAR files are just Zip files. For the purposes of this document, we are using Trend Micro's Unzip One on a Mac.

In your Download file, right-click on the "java-server-1.0.5.jar" file:

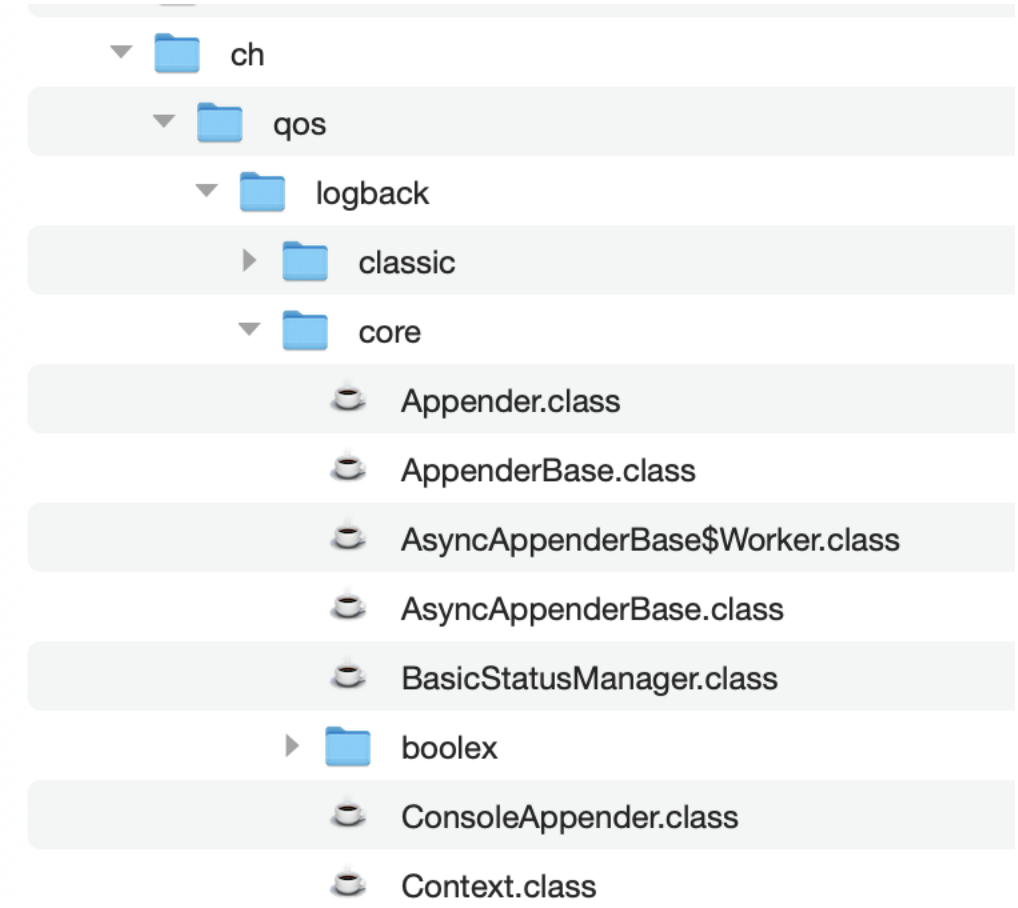



And select "Open With > Unzip One.app"

You should see the contents of the JAR file:



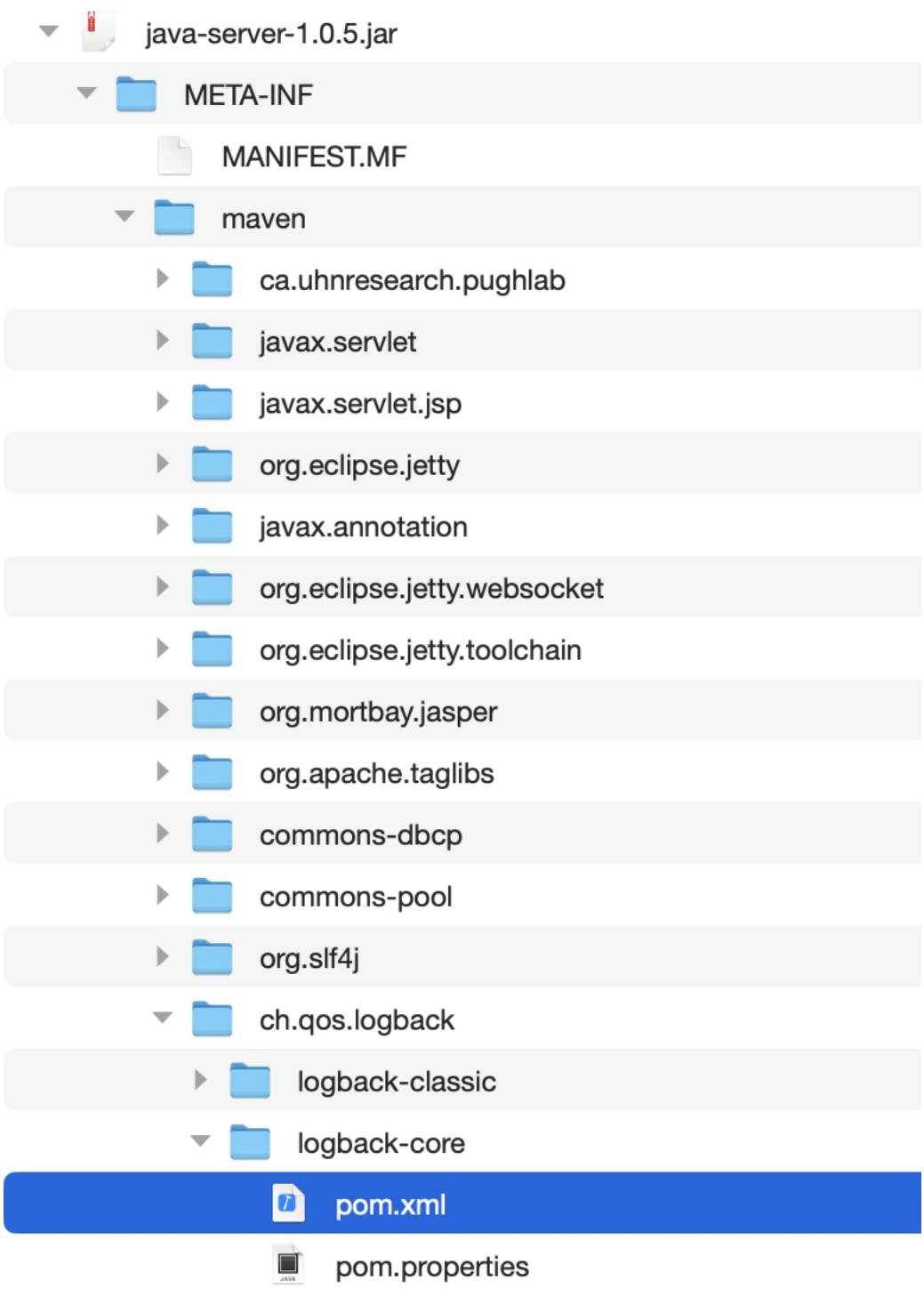

Within the JAR file, you can see directories for “ch”. Click to open the directory:




You can see that the class files exist for the package that’s not listed.

Next, let’s make sure that it’s really logback core 1.1.8, an artifact with a critical vulnerability.

Navigate through META-INF > Maven > ch.qos.logback > logback-core and extract the “pom.xml” file.




Open the pom.xml file with TextEdit.app and note that the file is based on logback 1.18:

```
<parent>
  <groupId>ch.qos.logback</groupId>
  <artifactId>logback-parent</artifactId>
  <version>1.1.8</version>
</parent>
```

Thus, you can confirm the Hidden Reaper exists in the file yet it is not listed as a dependency and its critical vulnerability is not included in any package information.