Security Training for Developers

Part 2: Section 1: Vulnerability Management Introduction

About This Training

- For Developers
- Designed in three parts
  - **Foundations and Systems Security** (for all Contributors)
  - **Vulnerability Management** (for all Contributors)
  - **Advanced Subjects** (for Committers and future Committers)

- Each part has a number of sections
  - Typically 15 minutes of study
  - Choose what matches your needs
- Content
  - Videos (live or pre-recorded)
  - Readings
  - Exercises

What is a vulnerability?

- Confidentiality
- Integrity
- Availability

Vulnerability definition

- ***An instance of one or more weaknesses*** *in a Product that* ***can be exploited****, causing a negative impact to* ***confidentiality, integrity, or availability****; a set of conditions or behaviors that allows the violation of an explicit or implicit security policy. (CVE Programme Glossary https://www.cve.org/ResourcesSupport/Glossary#glossaryVulnerability)*
- *'vulnerability' means a weakness, susceptibility or flaw of a product with digital elements that can be exploited by a cyber threat; (The Cyber Resilience Act, Article 3)*

Exercise

Vulnerability 1: true or false?

- In a web application, a user can log in to any account by using the password ‘12345’, instead of the actual password. This additional password cannot be disabled by a configuration option.

Vulnerability 1: true or false?

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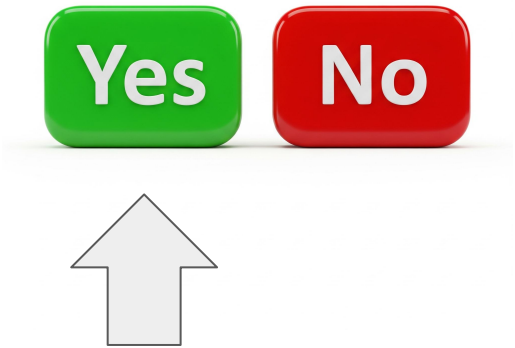

Vulnerability 2: true or false?

- A web server crashes when receiving a GET request of a specific URL with a set of specific parameters. The service needs to be restarted to function.

Vulnerability 2: true or false?

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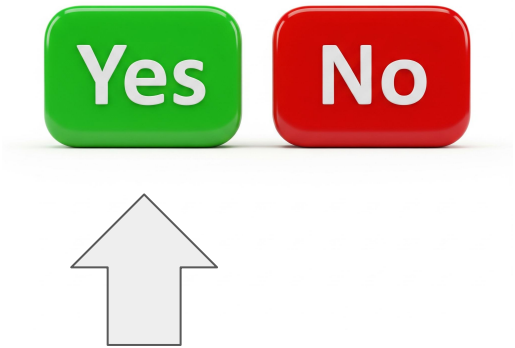

Vulnerability 3: true or false?

- In a text editor, the text color in one of the windows makes it very hard to read.

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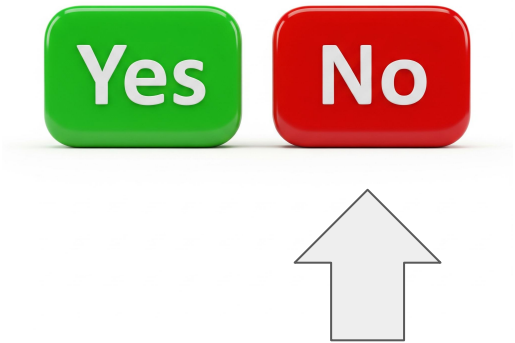


The vulnerability handling ecosystem

CVE (Common Vulnerabilities and Exposures)

- The biggest vulnerability database
  - Scope: known vulnerabilities in all products (commercial, open source…)
  - Data since 1999
- Assigns CVE IDs, like CVE-1900-1234
  - The entry contains a description, possible vendor, severity information
  - Various format over the years, currently all data available in a JSON format https://github.com/CVEProject/cvelistV5
  - Data quality varies
- The Eclipse Foundation assigns CVE IDs
  - Technically, the EF is a CNA - CVE Numbering Authority
- Recent issues
  - Financed by US government
  - Funding issue memo leaked on April 15, 2025 - issue resolved since, but community trust issue

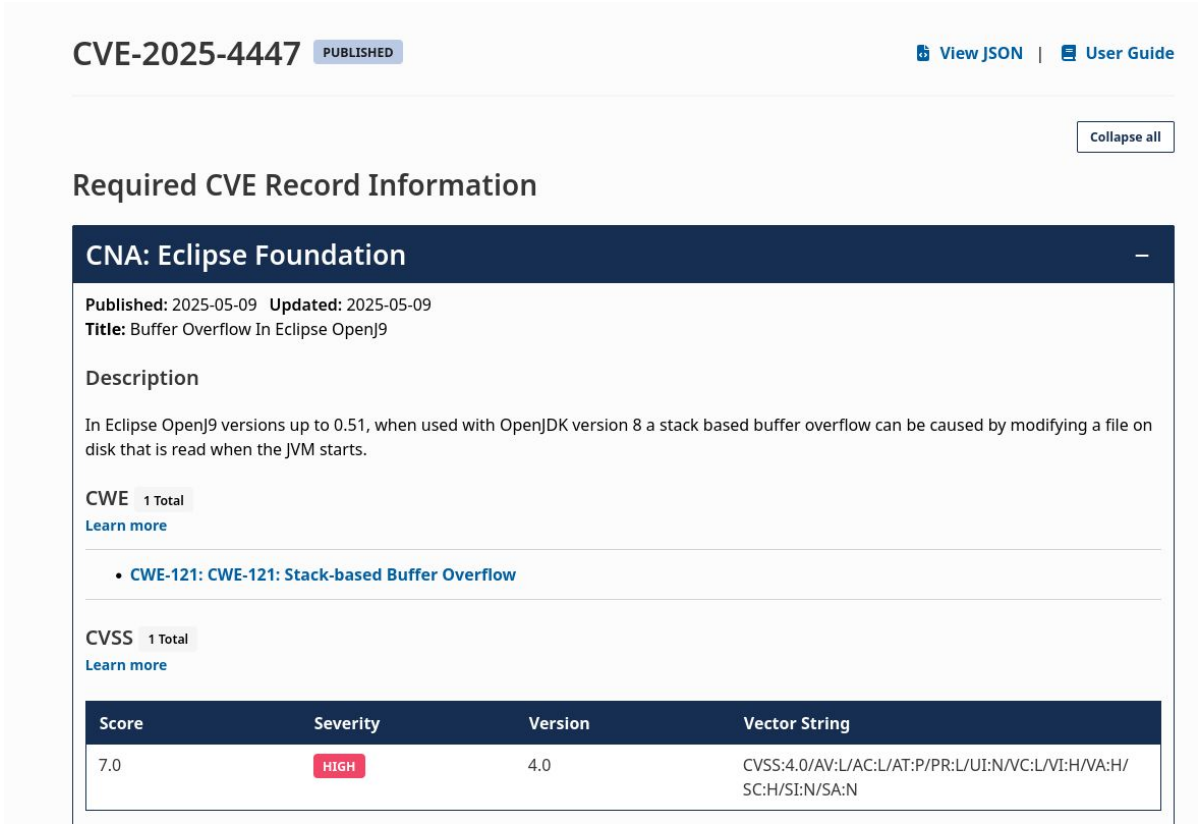
NVD (National Vulnerability Database)

- Augments CVE with information like:
  - Machine-readable product/vendor information (necessary for automatic scanners)
  - Severity information (for prioritization purposes)
- Currently preferred source for vulnerability scanners
- Recent issues
  - Stopped adding new entries in February 2024, restarted since
  - But still an important backlog

Other vulnerability databases

- GitHub Advisories https://github.com/advisories
  - Generated from GitHub private advisories
- OSV for open source projects only https://osv.dev/
  - Machine-readable format by default
  - Supported by Google
- EUVD (new, in beta) https://euvd.enisa.europa.eu/
  - Currently assembling existing sources
  - Will be used in the context of the CRA (Cyber Resilience Act)

How to read a CVE entry (1)



CVE-2025-4447 PUBLISHED

View JSON | User Guide

Collapse all

Required CVE Record Information

CNA: Eclipse Foundation

Published: 2025-05-09 **Updated:** 2025-05-09
Title: Buffer Overflow In Eclipse OpenJ9

Description

In Eclipse OpenJ9 versions up to 0.51, when used with OpenJDK version 8 a stack based buffer overflow can be caused by modifying a file on disk that is read when the JVM starts.

CWE 1 Total
Learn more

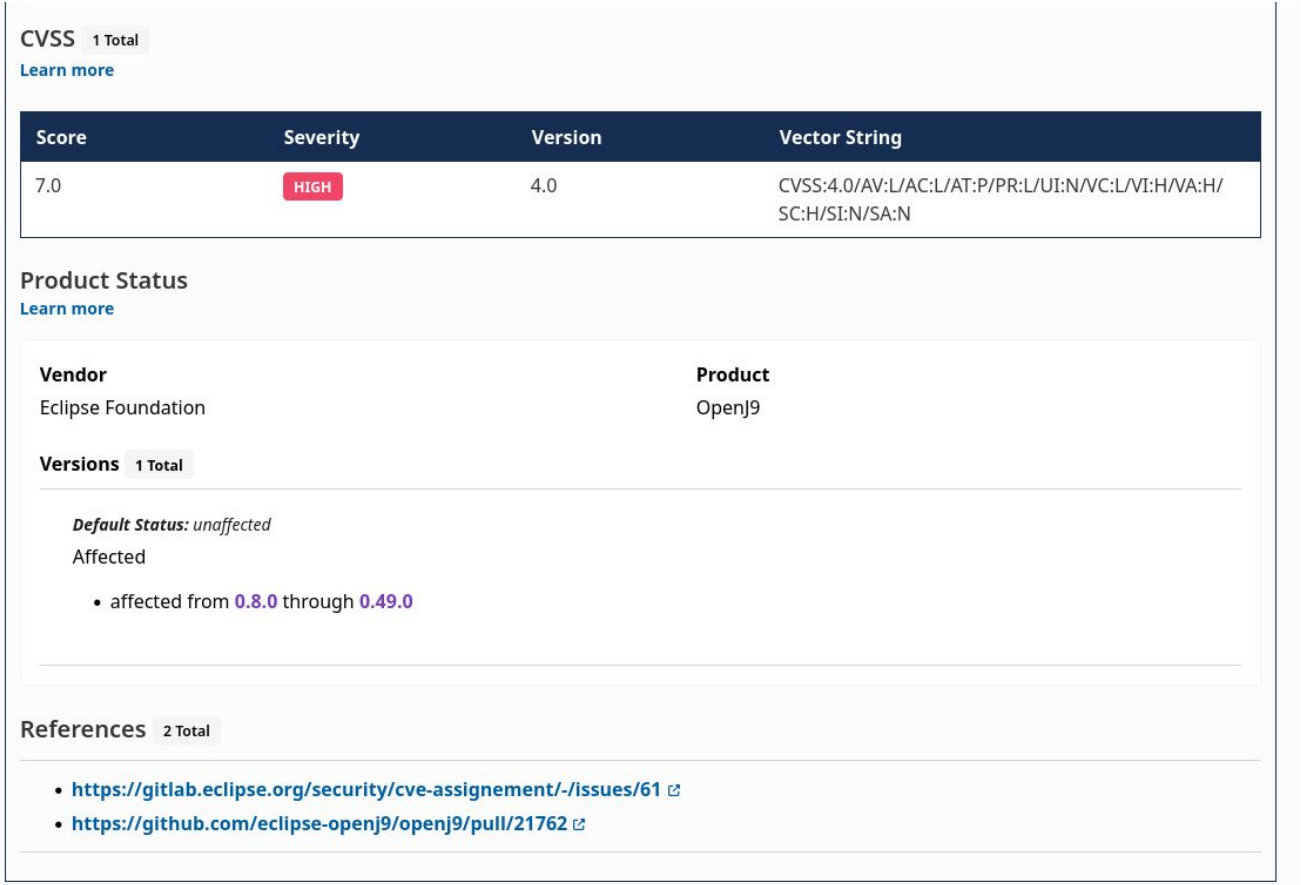
- CWE-121: CWE-121: Stack-based Buffer Overflow

CVSS 1 Total
Learn more

Score	Severity	Version	Vector String
7.0	HIGH	4.0	CVSS:4.0/AV:L/AC:L/AT:P/PR:L/UI:N/VC:L/VI:H/VA:H/SC:H/SI:N/SA:N

From: https://www.cve.org/cverecord?id=CVE-2025-4447

How to read a CVE entry (2)



CVSS 1 Total

Learn more

Score	Severity	Version	Vector String
7.0	HIGH	4.0	CVSS:4.0/AV:L/AC:L/AT:P/PR:L/UI:N/VC:L/VI:H/VA:H/SC:H/SI:N/SA:N

Product Status

Learn more

Vendor
Eclipse Foundation

Product
OpenJ9

Versions 1 Total

Default Status: *unaffected*

Affected

- affected from 0.8.0 through 0.49.0

References 2 Total

- https://gitlab.eclipse.org/security/cve-assignement/-/issues/61
- https://github.com/eclipse-openj9/openj9/pull/21762

From:
https://www.cve.org/cverecord?id=CVE-2025-4447

Vulnerability reporting

Who can report vulnerabilities?

- Security researchers
- Other developers
- Users
- YOU!

Reporting DOs

- Find a confidential way to contact the affected Project
  - A dedicated mailing list
  - A dedicated security bug tracker
  - GitHub Private advisories (if enabled)
  - Bug bounty program (if the Project has one)
- Send details helping to reproduce
  - The exact version
  - Same information as in a regular bug request
- Answer follow-up questions
- Talk about the issue publicly AFTER the Project has released a fix
  - Agree with them on the date

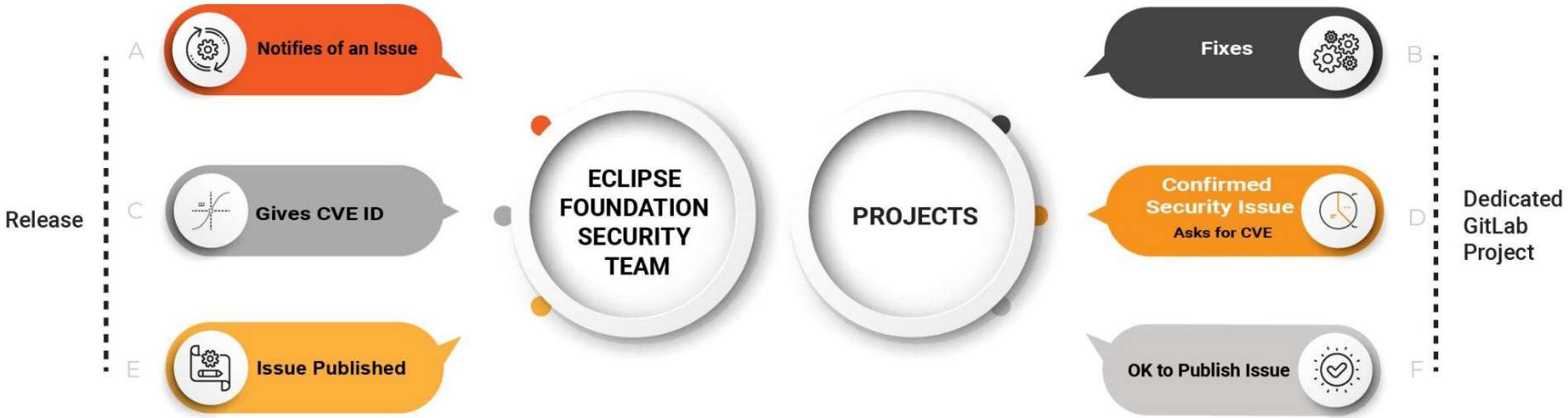
Reporting DON’Ts

- Don’t use public channels
  - Public mailing lists
  - IRC, Discord….
  - Public bug tracker issues
- Don’t request payments for your discovery from open source projects
  - Except if a project has a paid bug bounty program
- Don’t send results from automatic tools without verification
  - Verification of an issue requires precious time
- Don’t talk about unfixed vulnerabilities
  - Before they get fixed

How to find out where to report: the SECURITY file

- The SECURITY(.txt, .md…) file
  - A common place to find the vulnerability reporting method
  - For source code repositories
- You may include other items
  - Supported versions
  - Links to security documentation of the Project
- Eclipse Foundation template if you do not have one:
  - https://github.com/eclipse-csi/security-handbook/tree/main/templates

Vulnerability Handling at EF



Quiz

Readings

- Eclipse Foundation Security Policy: https://www.eclipse.org/security/policy/
- Eclipse Foundation Handbook on Vulnerability Management: https://www.eclipse.org/projects/handbook/#vulnerability
- CVE Program Rules https://www.cve.org/resourcessupport/allresources/cnarules
- Guide to implementing a coordinated vulnerability disclosure process for open source projects https://github.com/ossf/oss-vulnerability-guide/blob/main/maintainer-guide.md#readme