code intelligence

Lessons from Log4j

Continuous Security Testing of open-source components is possible!

OSS can be a security risk in your supply chain

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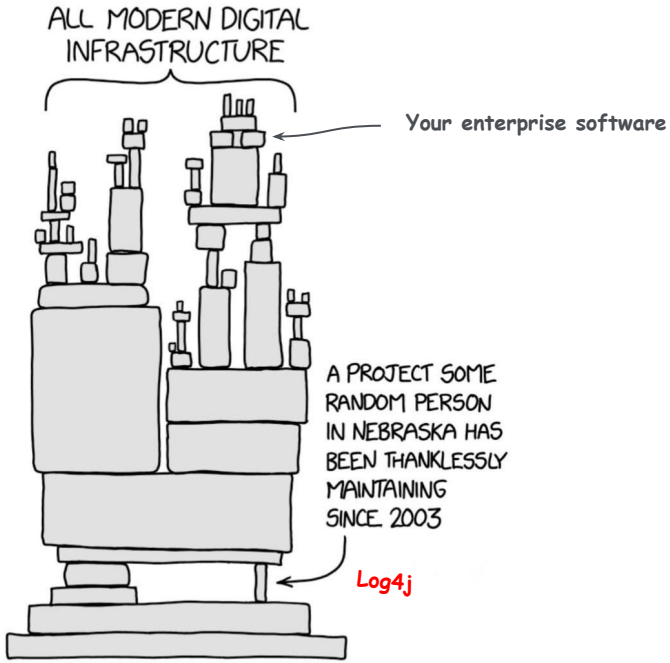

Aspects of product security

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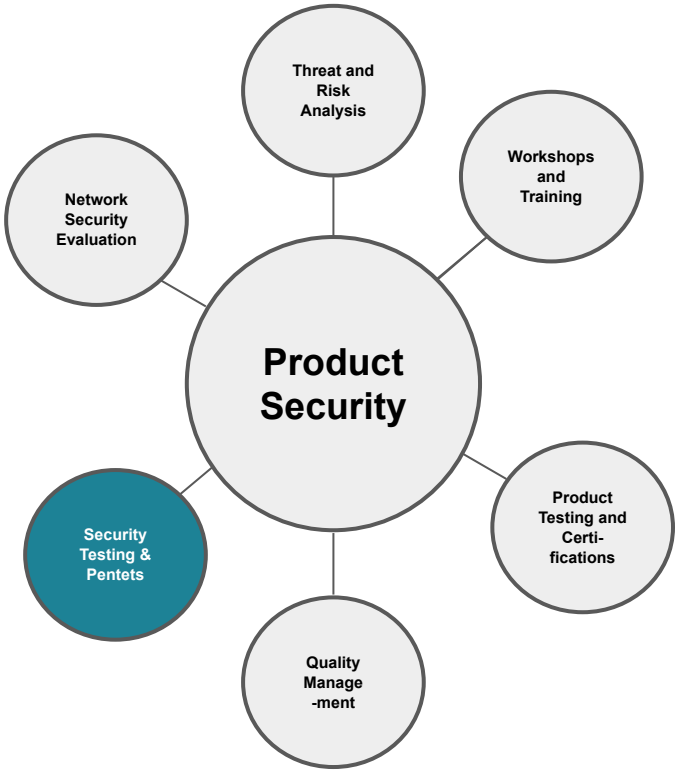
“There are no shortcuts!
All open-source components
in your software supply chain
need to be tested”



What can we learn from large tech companies like Google or Alibaba?

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Alibaba fixed more than 100 critical vulnerabilities[1] in **fastjson2**, since 2021

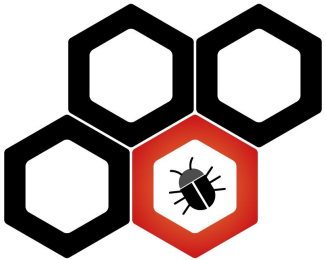
- The library gets continuously tested
- With state-of-the-art security tests
- And they use this service for free

But How?

Fastjson2 is a Java library that can be used to convert Java Objects into their JSON representation. It can also be used to convert a JSON string to an equivalent Java object. Fastjson can work with arbitrary Java objects, including pre-existing objects that you do not have source-code of.

[1]https://bugs.chromium.org/p/oss-fuzz/issues/list?q=alibaba%20type%3DBug-Security&can=1

Their secret weapon: OSS-Fuzz



A service to secure open-source software at scale

As of July 2022, OSS-Fuzz has found
over **40,500** bugs in **650** open source projects.

Which projects qualify for OSS-Fuzz?

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master · oss-fuzz / projects / · Go to file

ksztyber spdk: update Michal Berger's e-mail (#8591) ··· ff4a2d0 4 hours ago History

..		
abseil-cpp	abseil-cpp: fix build (#8015)	2 months ago
adal	Add vendors to Python projects. (#8547)	15 hours ago
aiohttp	Add vendors to Python projects. (#8547)	15 hours ago
airflow	Add vendors to Python projects. (#8547)	15 hours ago
alembic	Set flags to use old pass manger (#7828)	4 months ago
ansible	Add vendors to Python projects. (#8547)	15 hours ago
antlr4-java	Initial commit [antlr4] (#8019)	2 months ago
apache-commons-cli	[apache-commons-cli] Initial Integration (#8255)	last month
apache-commons-codec	Update project.yaml for several projects (#8032)	2 months ago
apache-commons-collections	[commons-collections] Initial Integration (#8280)	last month
apache-commons-configuration	Changes to apache-commons-configuration and new fuzz targets for http...	20 days ago
apache-commons-io	adding project maintainer (#8386)	25 days ago
apache-commons-jxpath	Update project.yaml for several projects (#8032)	2 months ago
apache-commons-lang	Update project.yaml for several projects (#8032)	2 months ago
apache-commons-logging	[apache-commons-logging] Initial Integration (#8362)	28 days ago
apache-commons	[apache-commons] Add some fuzz-targets for commons-math (#8089)	2 months ago

- ☑ Is it open-source?
- ☑ Is it relevant for a broader community?
- ☑ Is it actively maintained?
- ☑ Are the maintainers willing to cooperate?
- ☑ Does it meet technical prerequisites?

https://github.com/google/oss-fuzz/tree/master/projects

Do your open-source components qualify for OSS-Fuzz?

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Probably, yes!

If you're not sure, please reach out to our open-source security team
oss-security@code-intelligence.com

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Co-founder & Chief Scientist

Norbert Schneider

Open-Source Security Engineer

Fabian Meumertzheim

Open-Source Security Engineer

How to onboard new open-source projects to OSS-Fuzz

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Step 1: Find a relevant open source project

Step 2: Understand if the project has potential for it to be fuzzed

Step 3: Make the target compilable with fuzzer instrumentation

Step 4: implement a fuzzer for the given project

Step 5: Integrate the project into the OSS-Fuzz infrastructure.

Step 6: merge your code into OSS-Fuzz Github repository.

Next steps: collect integration reward and continue work

https://adalogics.com/blog/fuzzing-100-open-source-projects-with-oss-fuzz

How does it work?

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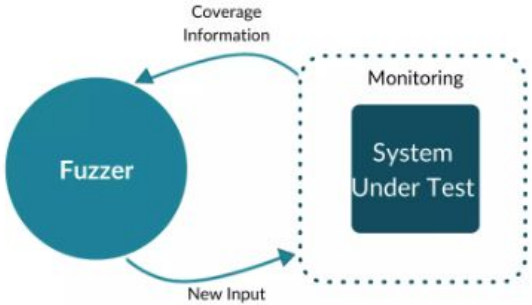
The secret ingredient: Fuzz Testing

Fuzz Testing is a highly scalable application security testing method which helps developers to find **functional bugs** and **security issues** in software.



Fuzz Testing most promising approach for tech leaders and OSS

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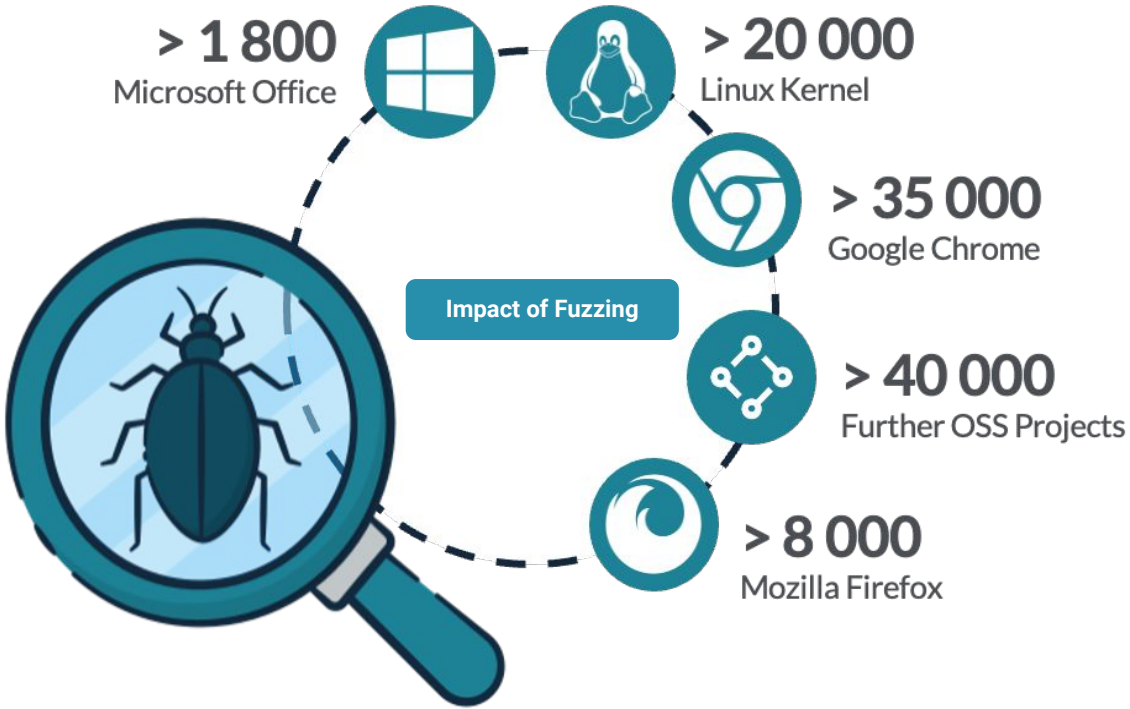

What bugs can you find with fuzzing? (1/2)

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CWE-119	Improper Restriction of Operations within the Bounds of a Memory Buffer
CWE-823	Use of Out-of-range Pointer Offset
CWE-786	Access of Memory Location Before Start of Buffer
CWE-680	Integer Overflow to Buffer Overflow
CWE-466	Return of Pointer Value Outside of Expected Range
CWE-787	Out-of-bounds Write
CWE-125	Out-of-bounds Read
CWE-129	Improper Validation of Array Index
CWE-131	Incorrect Calculation of Buffer Size
CWE-193	Off-by-one Error
CWE-195	Signed to Unsigned Conversion Error
CWE-839	Numeric Range Comparison Without Minimum Check
CWE-843	Access of Resource Using Incompatible Type ('Type Confusion')
CWE-1257	Improper Access Control Applied to Mirrored or Aliased Memory Regions
CWE-1260	Improper Handling of Overlap Between Protected Memory Ranges
CWE-190	Integer Overflow or Wraparound
CWE-20	Improper Input Validation
CWE-415	Double Free
CWE-416	Use After Free
CWE-476	NULL Pointer Dereference
CWE-590	Free of Memory not on the Heap
CWE-362	Concurrent Execution using Shared Resource with Improper Synchronization
CWE-364	Signal Handler Race Condition
CWE-366	Race Condition within a Thread
CWE-367	Time-of-check Time-of-use (TOCTOU) Race Condition
CWE-368	Context Switching Race Condition
CWE-421	Race Condition During Access to Alternate Channel
CWE-1223	Context Switching Race Condition
CWE-662	Improper Synchronization
CWE-758	Reliance on Undefined, Unspecified, or Implementation-Defined Behavior
CWE-562	Return of Stack Variable Address
CWE-587	Assignment of a Fixed Address to a Pointer
CWE-588	Attempt to Access Child of a Non-structure Pointer
CWE-1102	Reliance on Machine-Dependent Data Representation
CWE-1103	Use of Platform-Dependent Third Party Components
CWE-1105	Insufficient Encapsulation of Machine-Dependent Functionality

https://www.code-intelligence.com/blog/what-bugs-can-you-find-with-fuzzing

What bugs can you find with fuzzing? (2/2)

A1: 2017	Injection
A2: 2017	Broken Authentication
A3: 2017	Sensitive Data Exposure
A4: 2017	XML External Entities (XXE)
A5: 2017	Broken Access Control
A6: 2017	Security Misconfiguration
A7: 2017	Cross-Site Scripting XSS
A8: 2017	Insecure Deserialization
A9: 2017	Using Components with Known Vulnerabilities
A10: 2017	Insufficient Logging & Monitoring

CWE-79	Improper Neutralization of Input During Web Page Generation
CWE-1275	Sensitive Cookie with Improper SameSite Attribute
CWE-1004	Sensitive Cookie Without 'HttpOnly' Flag
CWE-614	Sensitive Cookie in HTTPS Session Without 'Secure' Attribute
CWE-778	Insufficient Logging
CWE-779	Logging of Excessive Data
CWE-200	Exposure of Sensitive Information to an Unauthorized Actor
CWE-209	Generation of Error Message Containing Sensitive Information

https://www.code-intelligence.com/blog/what-bugs-can-you-find-with-fuzzing

Google provides a free fuzzing infrastructure for open-source projects

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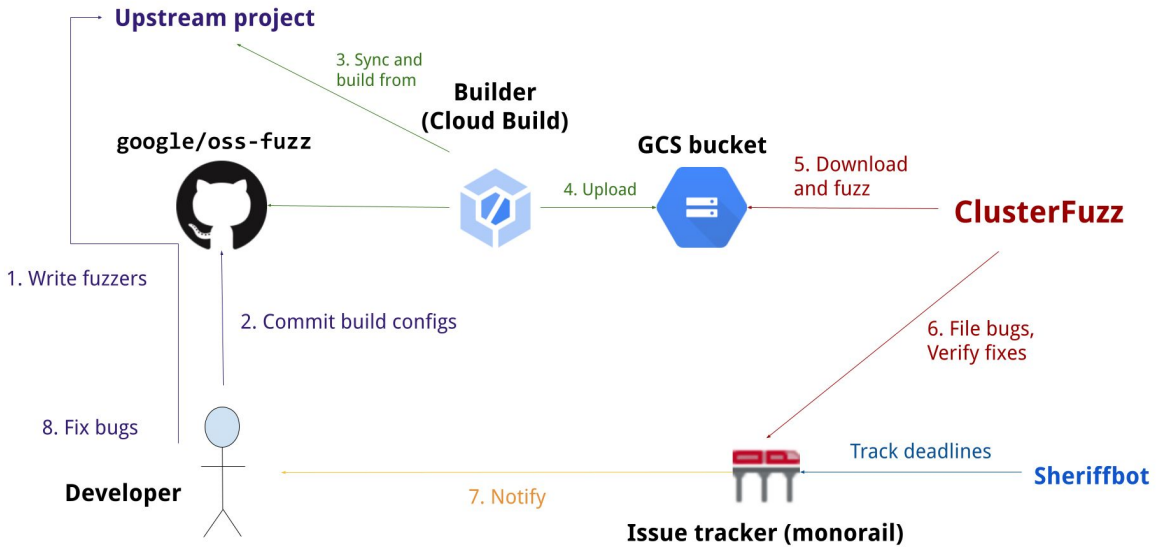

https://github.com/google/oss-fuzz

The service supports common programming languages

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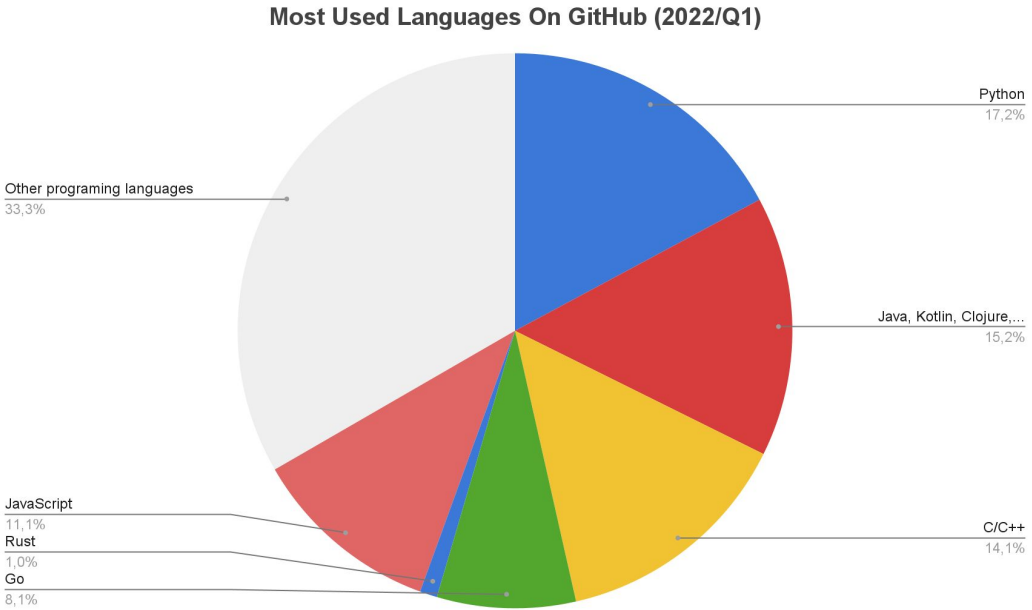
We will add language support for even more programming languages to OSS-Fuzz soon



https://madnight.github.io/githut/#/pull_requests/2022/1

How about closed-sourced projects?

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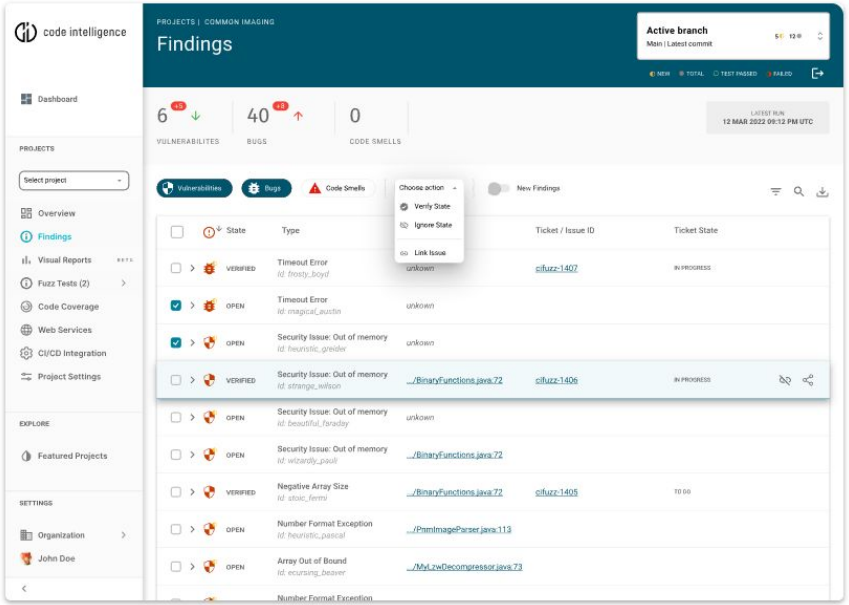
Code Intelligence offers a security testing platform with fuzzing technologies, optimized for enterprise use-cases and collaboration in large teams



- Works in your development environment
- Enables you to set up continuous fuzz tests in minutes
- As SaaS or On Premise

https://www.code-intelligence.com/

Contact Details

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Trusted by