МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ

Національний аерокосмічний університет ім. М. Є. Жуковського «Харківський авіаційний інститут»

Факультет радіоелектроніки, комп'ютерних систем та інфокомунікацій Кафедра комп'ютерних систем, мереж і кібербезпеки

Практичне завдання №3

з дисципліни «Безпека індустріальних систем та Інтернету речей»

(назва дисципліни)

Виконав: студент <u>5</u> курсу групи № 555ім
напряму підготовки (спеціальності)
125 Кібербезпека та захист
інформації
(шифр і назва напряму підготовки (спеціальності))
Орлов Станіслав Валерійович
(прізвище й ініціали студента)
Прийняв: доцент, кандидат технічних наук
Бабешко Євген Васильович
(посада, науковий ступінь, прізвище й ініціали)
Національна шкала:
Кількість балів:
Оцінка: ECTS

Ідентифікація компонентів

Підключення по SSH

```
PS C:\Users\sorlo> ssh admin@192.168.0.105 -p 5555
The authenticity of host '[192.168.0.105]:5555 ([192.168.0.105]:5555)' can't be established.
ED25519 key fingerprint is SHA256:yet8GUdrycqLJewy9iPqtMfMTiJxkE0E10iTXpZ2Ps4.
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes Warning: Permanently added '[192.168.0.105]:5555' (ED25519) to the list of known hosts.
Wichtiger Hinweis zur Verwendung der Simulation:
Die Simulation hat gegenüber dem realen Artikel Abweichungen
in Bezug auf Performance, Jitter und Funktion.
Dadurch kann ein simuliertes Projekt Abweichungen
im Vergleich zur realen Applikation haben.
Details hierzu sind in der Dokumentation aufgeführt.
Durch die weitere Verwendung der Simulation
erklären Sie sich mit diesen Bedingungen einverstanden.
Important note on the use of the simulation:
The simulation has deviations compared to the real article
in terms of performance, jitter and function.
Therefore a simulated project can have deviations
compared to the real application.
Details are listed in the documentation.
By continuing to use this simulation, you agree to these terms.admin@192.168.0.105's password:
Permission denied, please try again. admin@192.168.0.105's password:
```

Username: admin Password: plcnext

OpenSSL

Ідентифікація версії openssl

```
admin@i92.100.0.105's password:
admin@sim-axcf1152:~$ openssl version
OpenSSL 1.1.1l 24 Aug 2021
admin@sim-axcf1152:~$
```

База даних вразливостей CVEDetails (https://www.cvedetails.com/)

https://www.cvedetails.com/version/681123/Openssl-Openssl-1.1.11.html

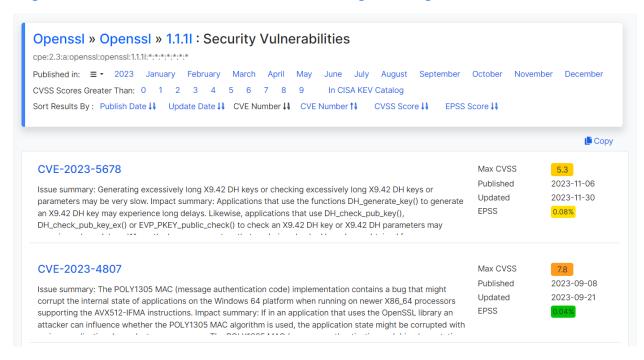


Рисунок 1 - База даних вразливостей CVEDetails

CVE-2023-4807 Issue summary: The POLY1305 MAC (message authentication code) implementation contains a bug that might corrupt the internal state of applications on the Windows 64 platform when running on newer X86_64 processors supporting the AVX512-IFMA instructions. Impact summary: If in an application that uses the OpenSSL library an attacker can influence whether the POLY1305 MAC algorithm is used, the application state might be corrupted with	Max CVSS Published Updated EPSS	7.8 2023-09-08 2023-09-21
CVE-2023-3817 Issue summary: Checking excessively long DH keys or parameters may be very slow. Impact summary: Applications that use the functions DH_check(), DH_check_ex() or EVP_PKEY_param_check() to check a DH key or DH parameters may experience long delays. Where the key or parameters that are being checked have been obtained from an untrusted source this may lead to a Denial of Service. The function DH_check() performs various checks on	Max CVSS Published Updated EPSS	5.3 2023-07-31 2023-11-06 0.13%
CVE-2023-2650 Issue summary: Processing some specially crafted ASN.1 object identifiers or data containing them may be very slow. Impact summary: Applications that use OBJ_obj2txt() directly, or use any of the OpenSSL subsystems OCSP, PKCS7/SMIME, CMS, CMP/CRMF or TS with no message size limit may experience notable to very long delays when processing those messages, which may lead to a Denial of Service. An OBJECT IDENTIFIER is composed of a	Max CVSS Published Updated EPSS	6.5 2023-05-30 2023-10-27 0.14%
CVE-2023-0466 The function X509_VERIFY_PARAM_add0_policy() is documented to implicitly enable the certificate policy check when doing certificate verification. However the implementation of the function does not enable the check which allows certificates with invalid or incorrect policies to pass the certificate verification. As suddenly enabling the policy check could break existing deployments it was decided to keep the existing behavior of the	Max CVSS Published Updated EPSS	5.3 2023-03-28 2023-09-28 0.13%

Рисунок 2 - Перегляд уразливостей через каталог уразливостей CVE (https://www.cve.org/)

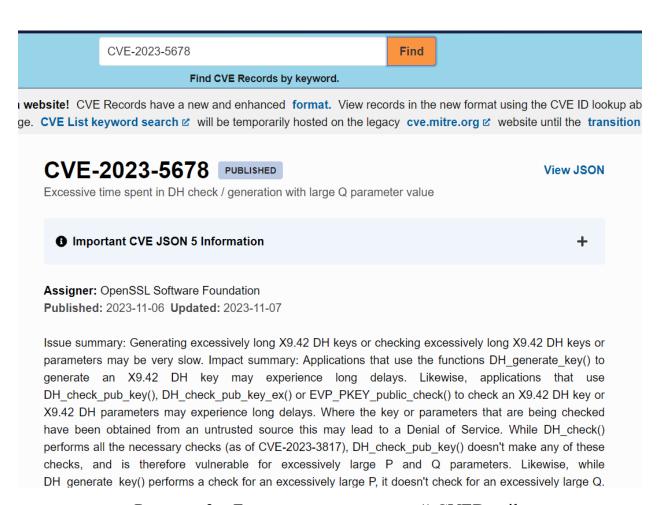


Рисунок 3 – База даних вразливостей CVEDetails



Issue summary: The POLY1305 MAC (message authentication code) implementation contains a bug that might corrupt the internal state of applications on the Windows 64 platform when running on newer X86_64 processors supporting the AVX512-IFMA instructions. Impact summary: If in an application that uses the OpenSSL library an attacker can influence whether the POLY1305 MAC algorithm is used, the application state might be corrupted with various application dependent consequences. The POLY1305 MAC (message authentication code) implementation in OpenSSL does not save the contents of non-volatile XMM registers on Windows 64 platform when calculating the MAC of data larger than 64 bytes. Before returning to the caller all the XMM registers are set to zero rather than restoring their previous content. The vulnerable code is used only on newer x86_64 processors supporting the AVX512-IFMA instructions. The consequences of this kind

Рисунок 4 - База даних вразливостей CVEDetails



Рисунок 5 – База даних вразливостей https://nvd.nist.gov/

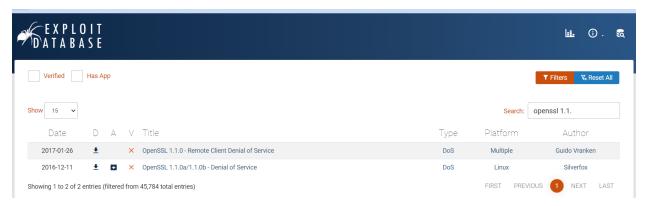


Рисунок 6 – база даних https://www.exploit-db.com/

Linux

https://www.cvedetails.com/version/1187513/Linux-Linux-Kernel-5.4.47.html

Ідентифікація версії Linux

Linux » Linux Kernel » 5.4.47 (Operating system)

Vulnerabilities (622)

Metasploit Modules

- Linux Kernel 5.4.47
- cpe:2.3:o:linux:linux_kernel:5.4.47:*:*:*:*:*:
- cpe:/o:linux:linux_kernel:5.4.47

Vulnerability trends over time

Year	Overflow	Memory Corruption	SqI Injection	XSS	Directory Traversal	File Inclusion	CSRF	XXE	SSRF	Open Redirect	Input Validation
2017		1									
2019		1									
2020	5	26			1						2
2021	16	37			2						4
2022	26	112									1
2023	9	116									1
Total	56	293			3						8

Vulnerabilities by impact types

Year	Code Execution	Bypass	Privilege Escalation	Denial of Service	Information Leak
2017				1	
2019				2	
2020			2	13	2
2021	4	1	2	18	3
2022	6	9	11	35	16
2023	9	1	27	30	6
Total	19	11	42	99	27

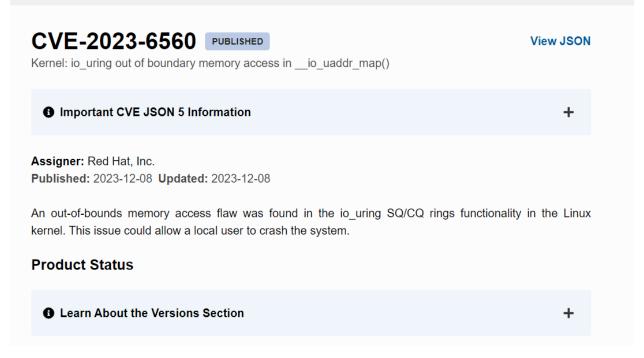


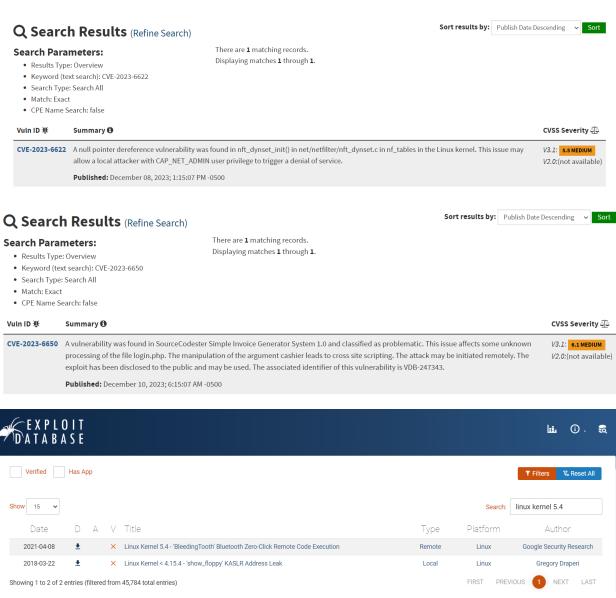
a website! CVE Records have a new and enhanced format. View records in the new format using the CVE ID lookup above age. CVE List keyword search & will be temporarily hosted on the legacy cve.mitre.org & website until the transition is a

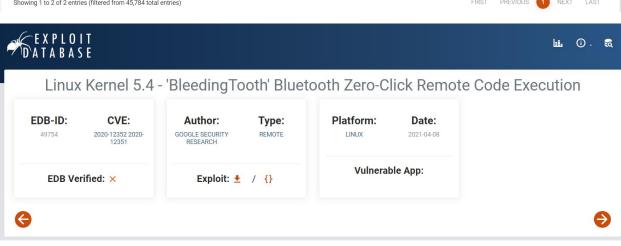




website! CVE Records have a new and enhanced format. View records in the new format using the CVE ID lookup abo
e. CVE List keyword search & will be temporarily hosted on the legacy cve.mitre.org & website until the transition is

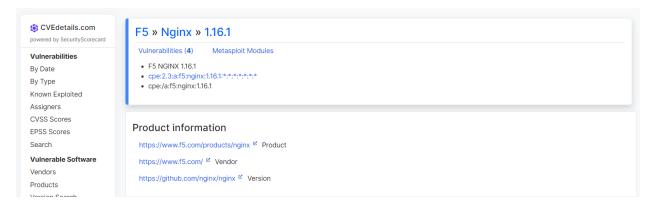






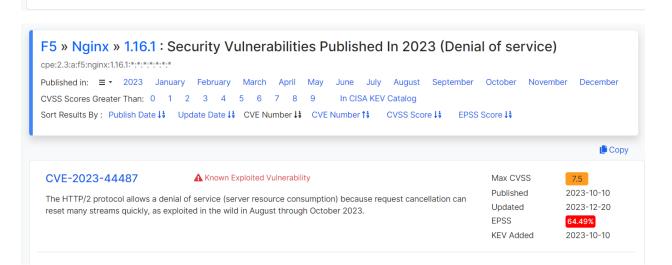
Nginx

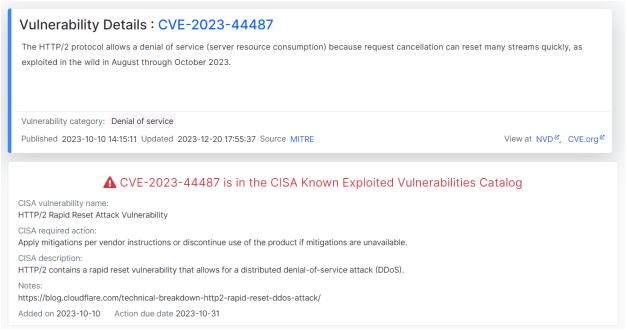
```
admin@sim-axcf1152:~$ nginx -v
nginx version: nginx/1.16.1
admin@sim-axcf1152:~$ |
```



Vulnerabilities by impact types

Year	Code Execution	Bypass	Privilege Escalation	Denial of Service	Information Leak
2020					
2021					
2022					
2023				1	
Total				1	







References

- https://github.com/dotnet/core/blob/e4613450ea0da7fd2fc6b61dfb2c1c1dec1ce9ec/releasenotes/6.0/6.0.23/6.0.23.md?plain=1#L73 ☑
- https://blog.cloudflare.com/technical-breakdown-http2-rapid-reset-ddos-attack/
 ≥
- https://aws.amazon.com/security/security-bulletins/AWS-2023-011/
 ☑
- · https://cloud.google.com/blog/products/identity-security/how-it-works-the-novel-http2-rapid-reset-ddos-attack &
- · https://cloud.google.com/blog/products/identity-security/google-cloud-mitigated-largest-ddos-attack-peaking-above-398-million-rps/ &
- https://news.ycombinator.com/item?id=37831062 ☑
- https://blog.cloudflare.com/zero-day-rapid-reset-http2-record-breaking-ddos-attack/ ≥
- https://www.phoronix.com/news/HTTP2-Rapid-Reset-Attack ≥
- https://github.com/envoyproxy/envoy/pull/30055 ≥
- https://github.com/haproxy/haproxy/issues/2312 ☑
- https://github.com/eclipse/jetty.project/issues/10679
- https://forums.swift.org/t/swift-nio-http2-security-update-cve-2023-44487-http-2-dos/67764

 ☑
- https://github.com/nghttp2/nghttp2/pull/1961 ☑
- https://github.com/netty/netty/commit/58f75f665aa81a8cbcf6ffa74820042a285c5e61 ≥
- https://github.com/alibaba/tengine/issues/1872 ☑
- https://github.com/apache/tomcat/tree/main/java/org/apache/coyote/http2 ≥

Information Technology Laboratory

NATIONAL VULNERABILITY DATABASE



Sort results by: Publish Date Descending V Sort

VULNERABILITIES SEARCH AND STATISTICS

Q Search Results (Refine Search)

Search Parameters:

Results Type: Overview

Keyword (text search): CVF-2023-44487

- Search Type: Search All
- CPE Name Search: false

There are 1 matching records. Displaying matches 1 through 1.

Vuln ID 🐺

CVSS Severity 🕰

CVE-2023-44487 The HTTP/2 protocol allows a denial of service (server resource consumption) because request cancellation can reset many streams quickly, as exploited in the wild in August through October 2023.

Published: October 10, 2023: 10:15:10 AM -0400

V3.1: **7.5 HIGH** V2.0:(not available)

₩CVE-2023-44487 Detail

Description

The HTTP/2 protocol allows a denial of service (server resource consumption) because request cancellation can reset many streams quickly, as exploited in the wild in August through October 2023.

