



# KPLABS Course

Certified Kubernetes Security Specialist

Supply Chain Security

ISSUED BY

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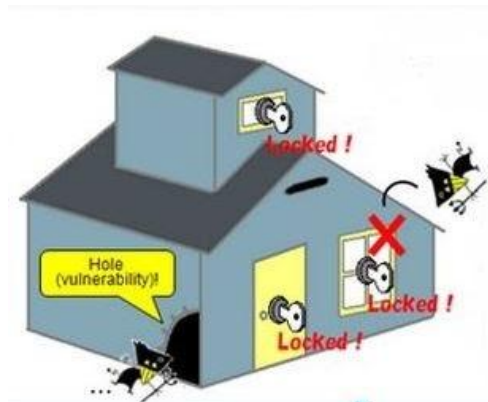
# Module 1: Vulnerability, Exploit and Payload

Let us understand the basics about this topic with an analogy of a house.

Vulnerability :- Hole on the Side of the House

Exploit :- The Robber

Payload :- What Robber does inside the house



In security terminology, these are defined as follows:

Vulnerability :- Bad Software Code

Exploit :- Program that exploits code to get inside.

Payload :- Stealing Data, Ransomwares etc.

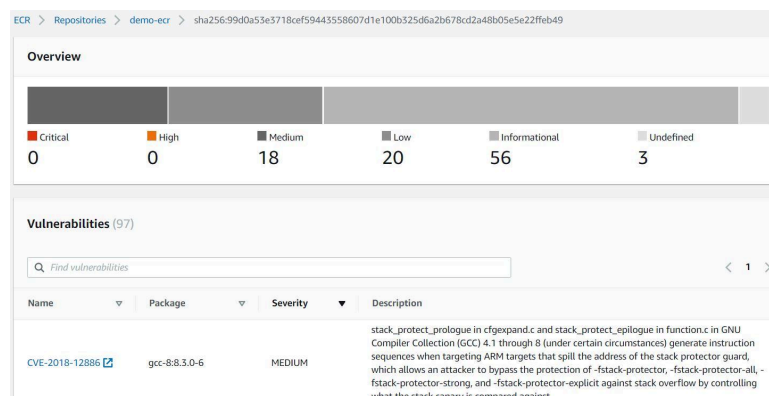
There are multiple scanners which can scan systems, applications for potential vulnerabilities.

Internal Scan			
CURRENT RESULTS: TODAY AT 9:55 PM			
<a href="#">Configure</a> <a href="#">Audit Trail</a> <a href="#">Launch</a> <a href="#">Export</a>			
Hosts > 127.0.0.1 > Vulnerabilities 164			
Severity	Plugin Name	Plugin Family	Count
CRITICAL	Ubuntu 12.04 LTS / 14.04 LTS / 16.04 LTS / 16.10 : firefox regression (USN-3216-2)	Ubuntu Local Security Checks	1
CRITICAL	Ubuntu 12.04 LTS / 14.04 LTS / 16.04 LTS / 16.10 : icu vulnerabilities (USN-3227-1)	Ubuntu Local Security Checks	1
CRITICAL	Ubuntu 12.04 LTS / 14.04 LTS / 16.04 LTS / 16.10 : libxml2 vulnerabilities (USN-3235-1)	Ubuntu Local Security Checks	1
CRITICAL	Ubuntu 12.04 LTS / 14.04 LTS / 16.04 LTS : python2.7, python3.2, python3.4, python3.5 vulnerabilities (USN-3134-1) (httpoxy)	Ubuntu Local Security Checks	1
HIGH	PostgreSQL Default Unpassworded Account	Databases	1
HIGH	Ubuntu 12.04 LTS / 14.04 LTS / 15.10 / 16.04 LTS : nspr vulnerability (USN-3028-1)	Ubuntu Local Security Checks	1
HIGH	Ubuntu 12.04 LTS / 14.04 LTS / 15.10 / 16.04 LTS : nss vulnerability (USN-3029-1)	Ubuntu Local Security Checks	1
HIGH	Ubuntu 12.04 LTS / 14.04 LTS / 15.10 / 16.04 LTS : thunderbird vulnerabilities (USN-3023-1)	Ubuntu Local Security Checks	1
HIGH	Ubuntu 12.04 LTS / 14.04 LTS / 15.10 : pidgin vulnerabilities (USN-3031-1)	Ubuntu Local Security Checks	1

## Module 2: Container Security Scanning

Docker Containers can have security vulnerabilities.

If blindly pulled and if containers are running in production, it can result in breach.



There are multiple vulnerability scanners available for scanning the vulnerabilities in a container.

Some of these include:

- Anchore
- Docker Trusted Registry
- Tenable
- Trivy

Depending on the type of scanner, certain features would change.

## Module 3: Scanning with Trivy

Trivy is a open-source based simple and comprehensive vulnerability Scanner for containers

```
bash-3.2$ trivy knqyf263/test-image:1.2.3
2019-05-13T15:19:03.912+0900 INFO Updating vulnerability database...
2019-05-13T15:19:05.983+0900 INFO Detecting Alpine vulnerabilities...
2019-05-13T15:19:06.987+0900 INFO Updating rpm security DB...
2019-05-13T15:19:07.048+0900 INFO Detecting rpm vulnerabilities...
2019-05-13T15:19:07.048+0900 INFO Updating pipenv Security DB...
2019-05-13T15:19:08.507+0900 INFO Detecting pipenv vulnerabilities...
2019-05-13T15:19:08.588+0900 INFO Updating bundler Security DB...
2019-05-13T15:19:09.574+0900 INFO Detecting bundler vulnerabilities...
2019-05-13T15:19:09.575+0900 INFO Updating cargo Security DB...
2019-05-13T15:19:10.441+0900 INFO Detecting cargo vulnerabilities...
2019-05-13T15:19:10.441+0900 INFO Updating composer Security DB...
2019-05-13T15:19:11.649+0900 INFO Detecting composer vulnerabilities...

knqyf263/test-image:1.2.3 (alpine 3.7.1)
=====
Total: 26 (UNKNOWN: 0, LOW: 3, MEDIUM: 10, HIGH: 5, CRITICAL: 2)

+-----+-----+-----+-----+-----+-----+
| LIBRARY | VULNERABILITY ID | SEVERITY | INSTALLED VERSION | FIXED VERSION | TITLE |
+-----+-----+-----+-----+-----+-----+
| curl    | CVE-2018-14618   | CRITICAL | 7.61.0-r0         | 7.61.1-r0     | curl: NTLM password overflow |
|          |                 |          |                   |               | via integer overflow |
|          | CVE-2018-16839   | HIGH     |                   | 7.61.1-r1     | curl: Integer overflow leading |
|          |                 |          |                   |               | to heap-based buffer overflow in |
|          |                 |          |                   |               | Curl_sasl_create_plain_message() |
|          | CVE-2019-3822    |          |                   | 7.61.1-r2     | curl: NTLMv2 type-3 header |
|          |                 |          |                   |               | stack buffer overflow |
|          | CVE-2018-16840   |          |                   | 7.61.1-r1     | curl: Use-after-free when |
|          |                 |          |                   |               | closing "easy" handle in |
|          |                 |          |                   |               | Curl_close() |
|          | CVE-2018-16890   | MEDIUM  |                   | 7.61.1-r2     | curl: NTLM type-2 heap |
|          |                 |          |                   |               | out-of-bounds buffer read |
|          | CVE-2019-3823    |          |                   |               | curl: SMTP end-of-response |
|          |                 |          |                   |               | out-of-bounds read |
|          | CVE-2018-16842   |          |                   | 7.61.1-r1     | curl: Heap-based buffer |
|          |                 |          |                   |               | over-read in the curl tool |
|          |                 |          |                   |               | warning formatting |
| git     | CVE-2018-19486   | HIGH     | 2.15.2-r0         | 2.15.3-r0     | git: Improper handling of |
|          |                 |          |                   |               | PATH allows for commands to be |
|          |                 |          |                   |               | executed from... |
+-----+-----+-----+-----+-----+-----+
```

## Module 4: CIS Benchmark Scans with kube-bench

kube-bench is a Go application that checks whether Kubernetes is deployed securely by running the checks documented in the CIS Kubernetes Benchmark.

```
root@ip-172-26-4-221:~# kube-bench
[INFO] 2 Worker Node Security Configuration
[INFO] 2.1 Kubelet
[FAIL] 2.1.1 Ensure that the --allow-privileged argument is set to false (Scored)
[PASS] 2.1.2 Ensure that the --anonymous-auth argument is set to false (Scored)
[PASS] 2.1.3 Ensure that the --authorization-mode argument is not set to AlwaysAllow (Scored)
[PASS] 2.1.4 Ensure that the --client-ca-file argument is set as appropriate (Scored)
[FAIL] 2.1.5 Ensure that the --read-only-port argument is set to 0 (Scored)
[PASS] 2.1.6 Ensure that the --streaming-connection-idle-timeout argument is not set to 0 (Scored)
[FAIL] 2.1.7 Ensure that the --protect-kernel-defaults argument is set to true (Scored)
[PASS] 2.1.8 Ensure that the --make-iptables-util-chains argument is set to true (Scored)
[PASS] 2.1.9 Ensure that the --hostname-override argument is not set (Scored)
[FAIL] 2.1.10 Ensure that the --event-qps argument is set to 0 (Scored)
```