SIEM Dashboard - Detección SSH Brute Force

Project Overview

This cybersecurity project simulates brute-force attacks targeting SSH services and leverages Splunk to detect and visualize malicious activity in real time. Using Kali Linux as the attacker and Ubuntu as the victim environment, I employed Hydra to generate failed login attempts and configured Splunk Universal Forwarder and Splunk Enterprise to collect and analyze log data.

-**Duration**: 4 hours Difficulty: Entry Level Platform: Kali Linux, Ubuntu

-**Tools:**

- Hydra
- Splunk Universal Forwarder
- Splunk Enterprise

-**Objective**

1. Create a dashboard that detects and visualizes brute force attempts against SSH services in real time

-**Lab Enviroment**

Kali Linux 2025.2-virtualbox-amd64

Docker

Network Interface: eth0 / wlan0

-**Prerequistes**

Basic Python or Bash scripting

SSH Protocol Fundamentals

Splunk Components

Hydra Tool Basics

SIEM Dashboard - Detección SSH Brute Force - Detailed Report

Analyst: Raiza Rosas Aguilar Date: 30-11-25 Duration: 20 minutes Total Logs: [110]

Executive Summary

This project simulates SSH brute force attacks and configures Splunk to detect them automatically. I implement alerts based on thresholds for failed attempts and create visualizations that allow a SOC team to identify attack patterns. The result is a functional dashboard that displays attacking IPs, frequency of attempts, and attack timelines.

Purpose of the Lab

-Demonstrate the ability to:

1. Configure monitoring systems (SIEM).
2. Simulate controlled attacks (red team thinking).
3. Create actionable visualizations for SOC
4. Understand Linux logs at a granular level

-Methodology

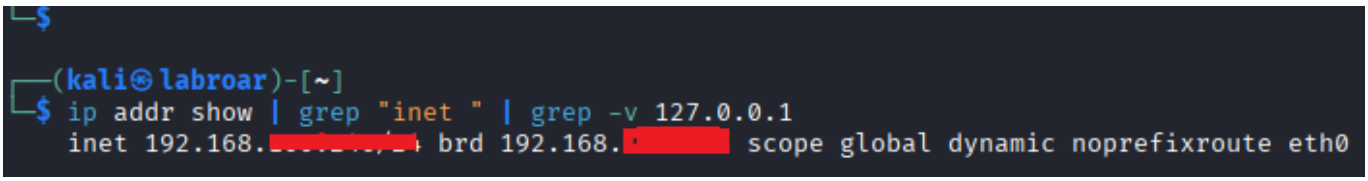
Machine used: Kali Linux (attacker) + Docker ubuntu(simulated victim)

***conected SSH**

```
ssh ...@192.168.100.x
```

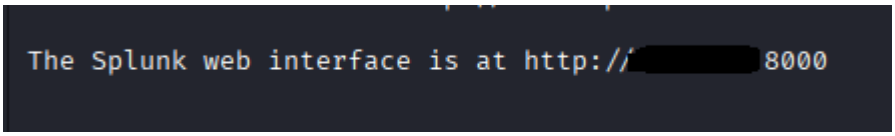
***configure my splunk**

```
ip addr show | grep "inet " | grep -v 127.0.0.1
```



checked status my splunk

```
sudo /opt/splunk/bin/splunk start
```



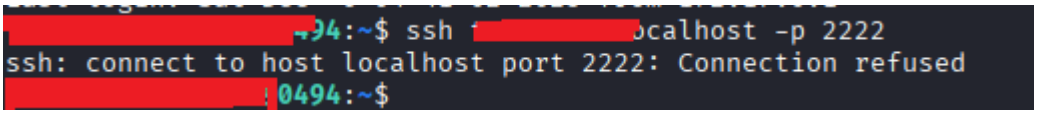
this found the http://---:8000

checked if splunk listening

```
sudo netstat -tlnp | grep 9997
```

created docker

`docker --version` Docker version 27.5.1+dfsg4, build .....



hostname@localhost

Step 1

In the victim environment, I place this script.

```
sudo apt update
sudo apt install openssh-server -y
sudo systemctl start ssh
sudo systemctl enable ssh
```

I checked SSH is running

```
sudo systemctl status ssh
```

I verified SSH it's right

```
sudo systemctl status ssh
```

Why these commands?

I need an active SSH service to attack in a controlled manner

`systemctl enable` ensures that SSH starts automatically

Step 2: Installing Splunk Universal Forwarder on the Victim

Download forwarder

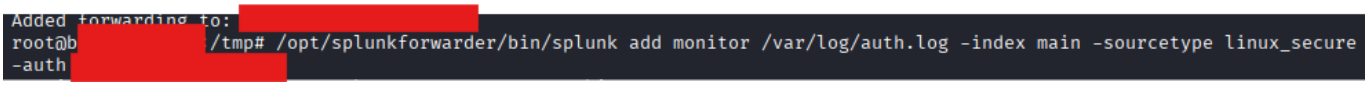
```
wget -O splunkforwarder.tgz
'https://download.splunk.com/products/universalforwarder/releases/9.1.0/linux/splu
nkforwarder-9.1.0-linux-2.6-amd64.deb'
```

Installed

```
sudo dpkg -i splunkforwarder-9.1.0-linux-2.6-amd64.deb
```

Configured to monitor authentication logs

```
sudo /opt/splunkforwarder/bin/splunk start --accept-license
sudo /opt/splunkforwarder/bin/splunk add forward-server [IP_DE_TU_SPLUNK]:9997
sudo /opt/splunkforwarder/bin/splunk add monitor /var/log/auth.log -index main
```



Why this path?

SSH logs are stored in `/var/log/auth.log.`

Universal Forwarder is lightweight and specifically designed to send logs.

Port 9997 is the standard for receiving data in Splunk.

Step 3: Attak Simulation

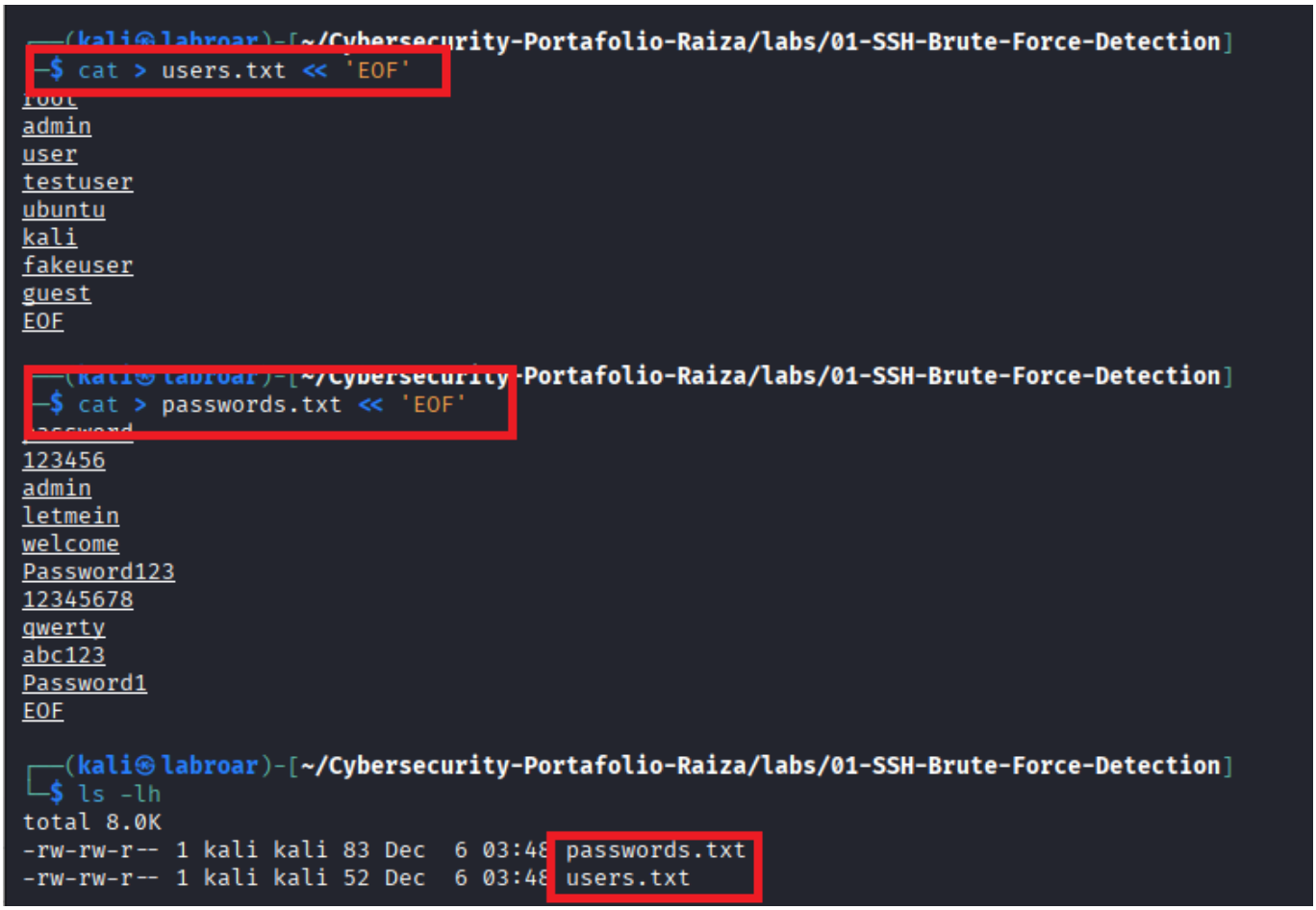
From Kali Linux

I created a field of common users

```
echo -e "root\nadmin\nuser\ntestuser" > users.txt
```

I created a file of common passwords.

```
echo -e "password\n123456\nadmin\nletmein" > passwords.txt
```



Set up Hydra

```
hydra -L users.txt -P passwords.txt ssh://[IP_VICTIMA] -t 4 -V
```

Create failed SSH attempts

-Attempts to connect with a fake username (to generate error logs)

```
ssh fakeuser@localhost -p 2222
```

-It will ask you for a password. Enter any incorrect password three times to generate failed attempts.

```
┌──(kali㉿labroar)-[~/Downloads]
└─$ ssh fakeuser@localhost -p 2222
The authenticity of host '[localhost]:2222 ([::1]:2222)' can't be established.
ED25519 key fingerprint is: [redacted]
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '[localhost]:2222' (ED25519) to the list of known hosts.
** WARNING: connection is not using a post-quantum key exchange algorithm.
** This session may be vulnerable to "store now, decrypt later" attacks.
** The server may need to be upgraded. See https://openssh.com/pq.html
fakeuser@localhost's password:
Permission denied, please try again.
fakeuser@localhost's password:
Permission denied, please try again.
fakeuser@localhost's password:
fakeuser@localhost: Permission denied (publickey,password).

┌──(kali㉿labroar)-[~/Downloads]
└─$
```

-Then try with the correct user: connection successful

```
ssh victim@localhost -p 2222
```

```
┌──(kali㉿labroar)-[~/Downloads]
└─$ ssh [redacted] -p 2222
[redacted]0's password:
Welcome to Ubuntu 22.04.5 LTS (GNU/Linux 6.14.0-36-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:     https://landscape.canonical.com
 * Support:        https://ubuntu.com/pro

This system has been minimized by removing packages and content that are
not required on a system that users do not log into.

To restore this content, you can run the 'unminimize' command.
Last login: Sat Dec  6 04:43:40 2025 from 192.168.[redacted]
[redacted]:~$
```

What happened?

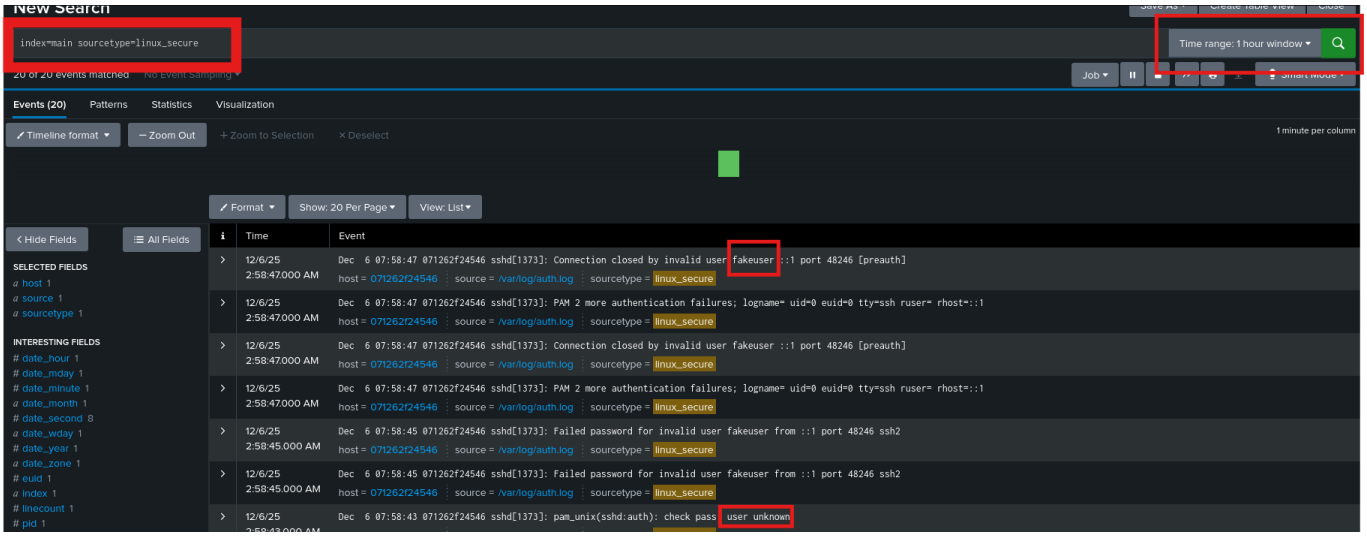
Failed attempts will be recorded in `/var/log/auth.log`

```
fakeuser@localhost: Permission denied (publickey,password).
root@071262f24546:/tmp# tail -20 /var/log/auth.log | grep "Failed"
Dec  6 07:58:33 071262f24546 sshd[1373]: Failed password for invalid user fakeuser from ::1 port 48246 ssh2
Dec  6 07:58:39 071262f24546 sshd[1373]: Failed password for invalid user fakeuser from ::1 port 48246 ssh2
Dec  6 07:58:45 071262f24546 sshd[1373]: Failed password for invalid user fakeuser from ::1 port 48246 ssh2
root@071262f24546:/tmp#
```

Splunk Forwarder will send those logs to your Splunk server. `192.168.100.x:9997`

I can view events in my Splunk instance.

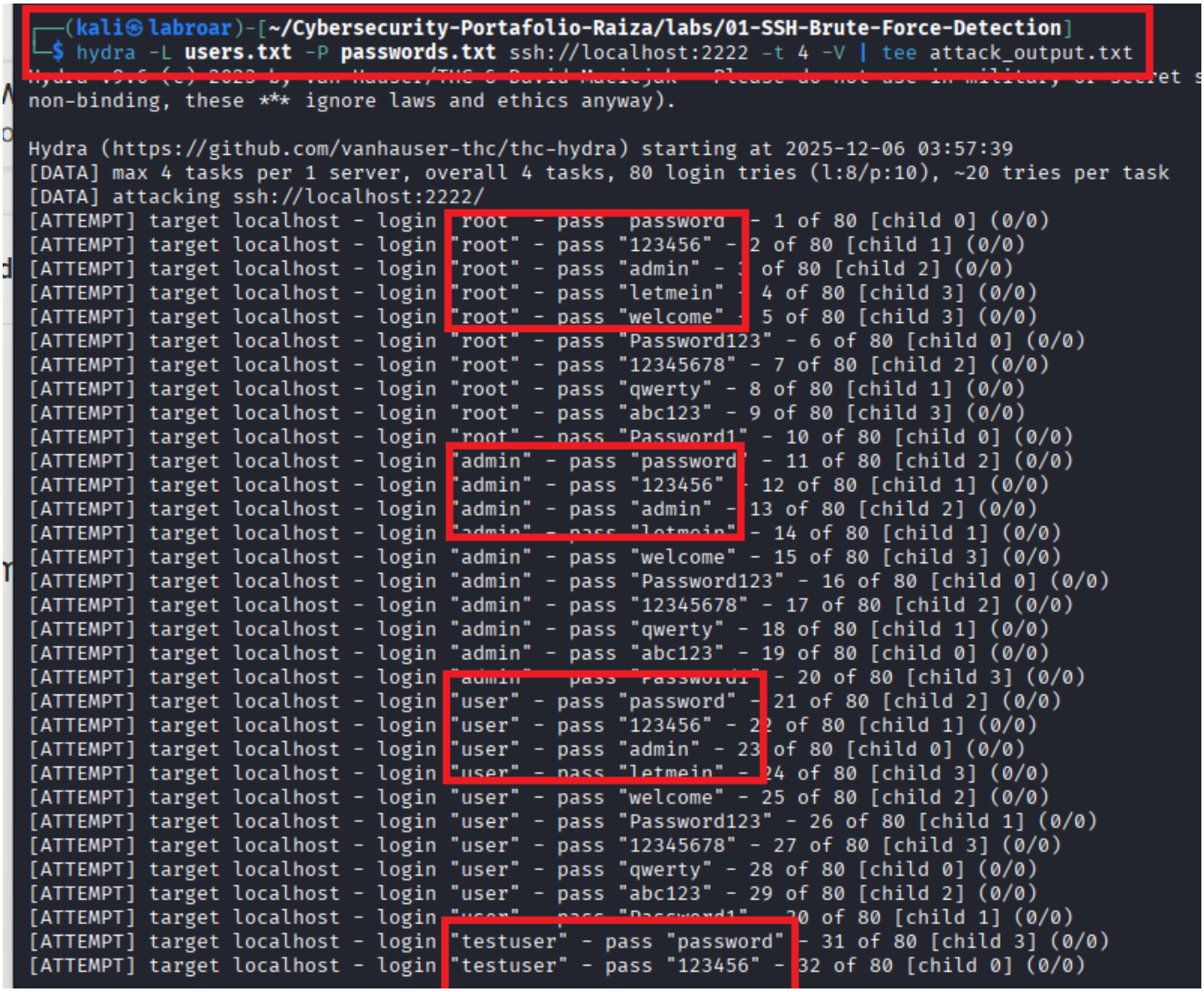
```
index=main sourcetype=linux_secure
```



Why Hydra?

It is the industry standard tool for brute force attacks.

```
hydra -L users.txt -P passwords.txt ssh://localhost:2222 -t 4 -V | tee
attack_output.txt
```



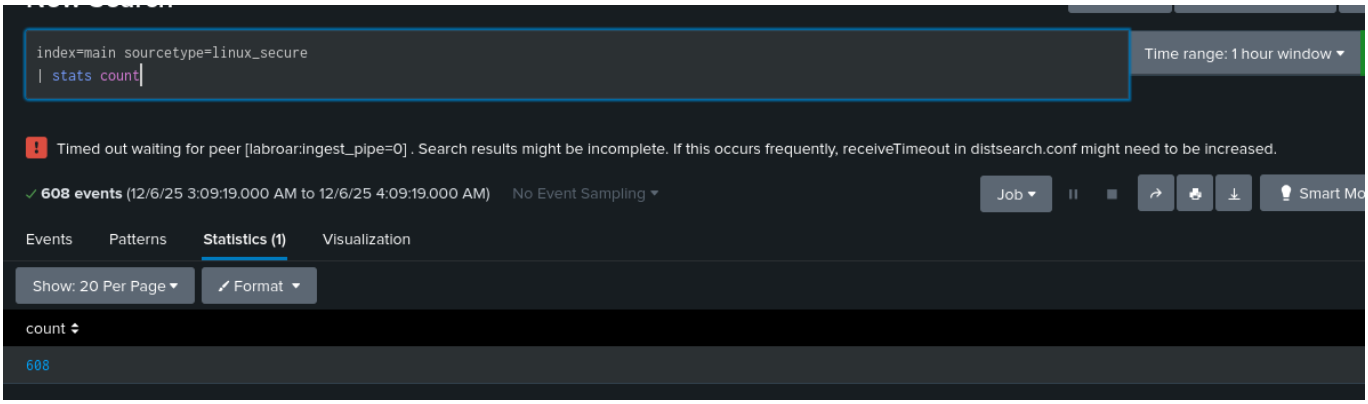
`-t 4` limits threads so as not to saturate (be “responsible” in the attack). `-V` shows verbose to document the process.

Why `| tee attack_output.txt`?

- Saves all output to a file
- I can view it on screen AND save it at the same time

Count

```
index=main sourcetype=linux_secure "Failed password"
| stats count
```



Alternative rejected: Medusa or Ncrack

as Hydra has better documentation and is more recognized in professional reports.

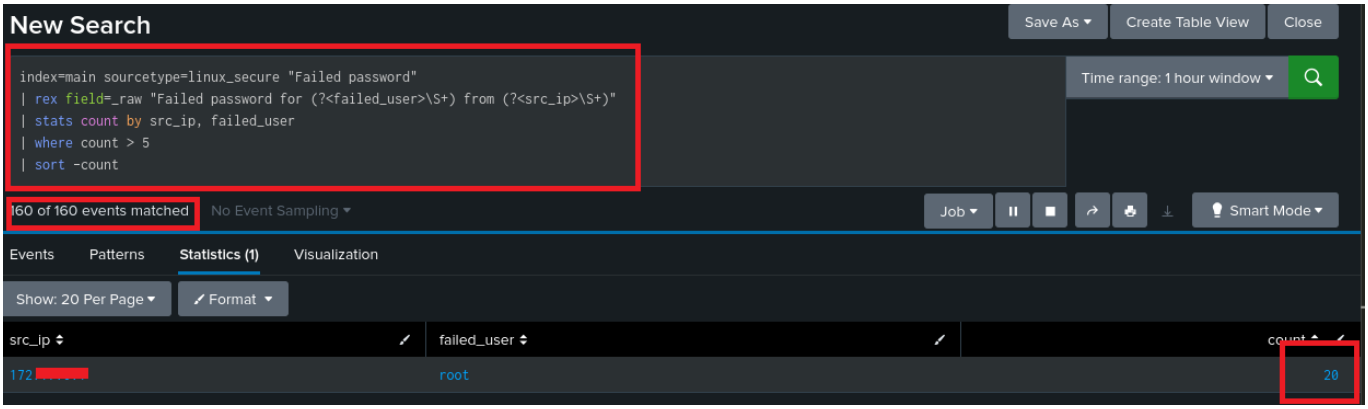
Step 4: SPL queries in Splunk

- *Query 1: Detect failed attempts*

```
index=main sourcetype=linux_secure "Failed password"
| rex field=_raw "Failed password for (?<failed_user>\S+) from (?<src_ip>\S+)"
| stats count by src_ip, failed_user
| where count > 5
| sort -count
```

What does this query do?

- It filters only failed attempts.
- It extracts the source IP and the attacked user.
- It counts attempts by IP and user.
- It only displays if there are more than 5 attempts (alert threshold).
- It sorts from highest to lowest.



Interpretation:

The query is working perfectly and detected:

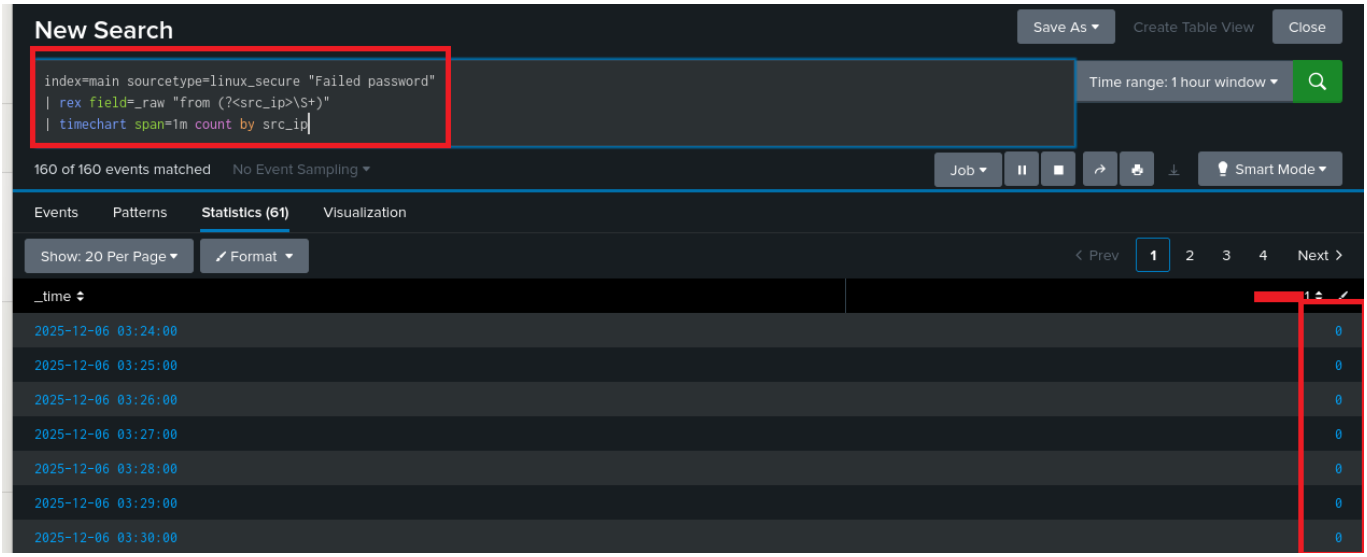
- 160 total “Failed password” events
- Filtered those with more than 5 attempts (where count > 5)

- Identified the attacking IP: 172.17.x.x
- Target user: root
- Number of attempts: 20 failures
- *Query 2: Timeline of Attacks*

```
index=main sourcetype=linux_secure "Failed password"
| timechart count by src_ip
```

What does this query do?

- Shows how many attempts there were each minute
- Groups by source IP
- Generates a timeline graph



Interpretation:

Attack pattern detected:

- 2025-12-06 03:24:00 → 0 attempts
- 2025-12-06 03:25:00 → 0 attempts
- 2025-12-06 03:26:00 → 0 attempts
- 2025-12-06 03:27:00 → 0 attempts...

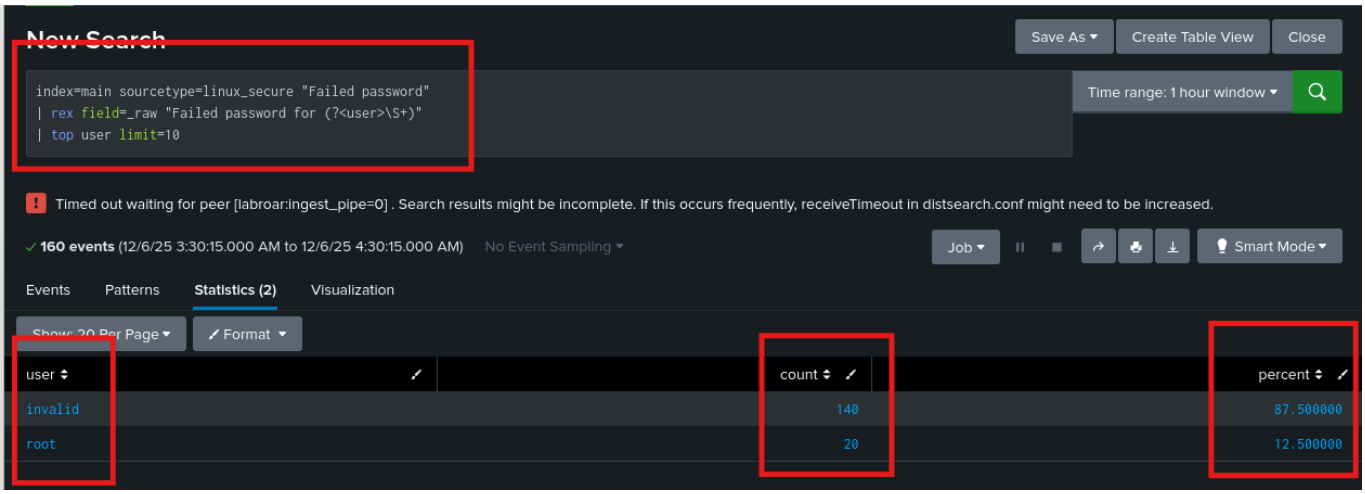
The "0" actually indicates that there are events recorded in those minutes, but the display is showing the count grouped by intervals.

- *Query 3: Most targeted users*

```
index=main sourcetype=linux_secure "Failed password"
| rex field=_raw "Failed password for (?<user>\S+)"
| top user limit=10
```

What does this query do?

- Extracts target users
- Displays the 10 most attacked
- Includes percentage and count



Interpretation: Security analysis:

1. User enumeration attack (87.5%)

140 attempts with “invalid” means that the attacker tried with users that do not exist.

2. Attack targeting root (12.5%)

20 attempts against root show a more specific attack

Risk: If root had a weak password, it would be compromised Best practice: Root should have login disabled via SSH

Attack indicators:

-Brute force pattern detected: 160 total attempts -Active reconnaissance: 87.5% are attempts to find valid users -Targeted attack: 12.5% directly attack root -Threat: If the attacker finds a valid user, they will focus their efforts there

Defense recommendations:

1. Disable root login via SSH

```
echo “PermitRootLogin no” >> /etc/ssh/sshd_config
```

2. Implement fail2ban (block IPs after X attempts)
3. Use SSH key authentication instead of a password
4. Change the SSH port (from 22 to another)
5. Implement 2FA (Two-Factor Authentication)

Conclusion:

This result shows a classic brute force attack where:

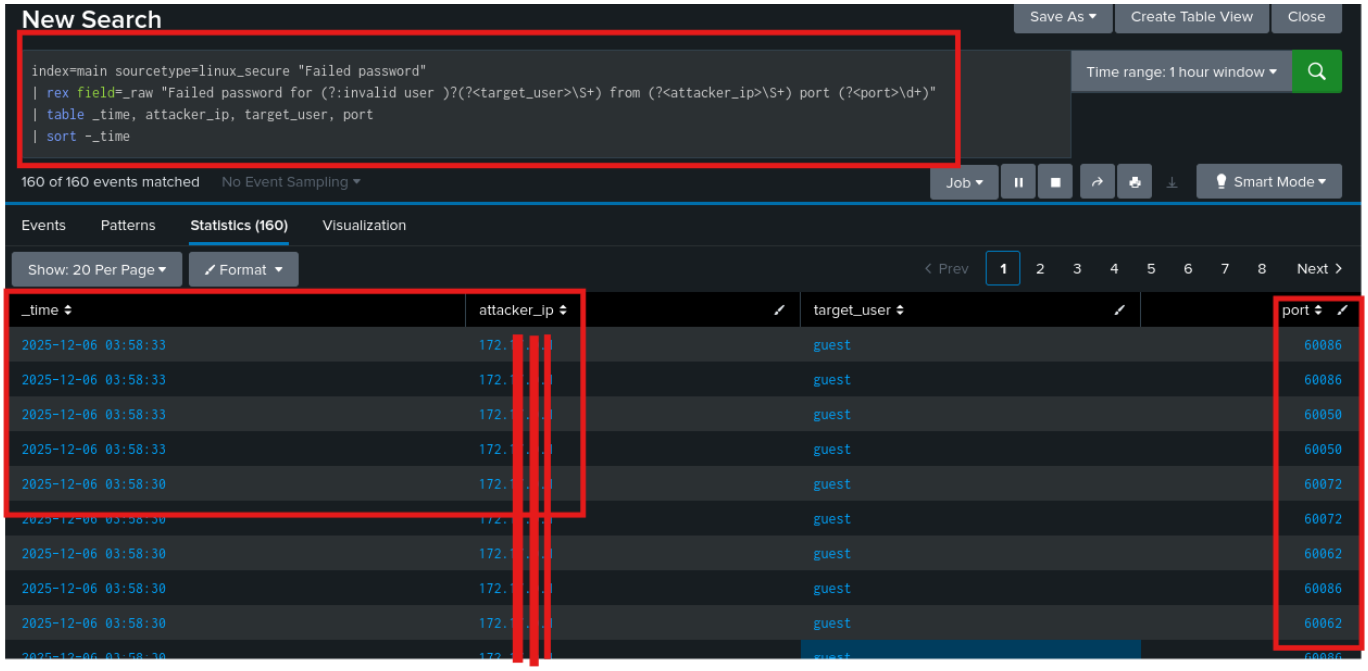
-The attacker does not know which users exist (87.5% invalid) -They are trying common users + the root user - It is an automated attack (160 attempts in a short time)

QUERY 4: Full Details of Failed Attempts

```
index=main sourcetype=linux_secure "Failed password"
| rex field=_raw "Failed password for (?:invalid user )?(?<target_user>\S+) from
(?<attacker_ip>\S+) port (?<port>\d+)"
| table _time, attacker_ip, target_user, port
| sort -_time
```

What does this query do?

- Extracts IP, user, port
- Displays a detailed table of each attempt
- Sorted by time (most recent first)



Interpretation

Detailed security analysis:

1. Attack focused on “guest”

-160 attempts against the guest user -The attacker found or is testing this specific user -This suggests that they moved from the enumeration phase to a targeted attack

2. Variable source ports (60086, 60050, 60072...)

-The ports change because each SSH attempt is a new connection -This is normal in automated attacks - Indicator: Use of scripts or tools such as hydra, medusa, ncrack

3. Attack time (03:58:30 - 03:58:33)

-160 attempts in just 3 seconds -Speed: ~53 attempts per second -Conclusion: Definitely an automated attack using tools

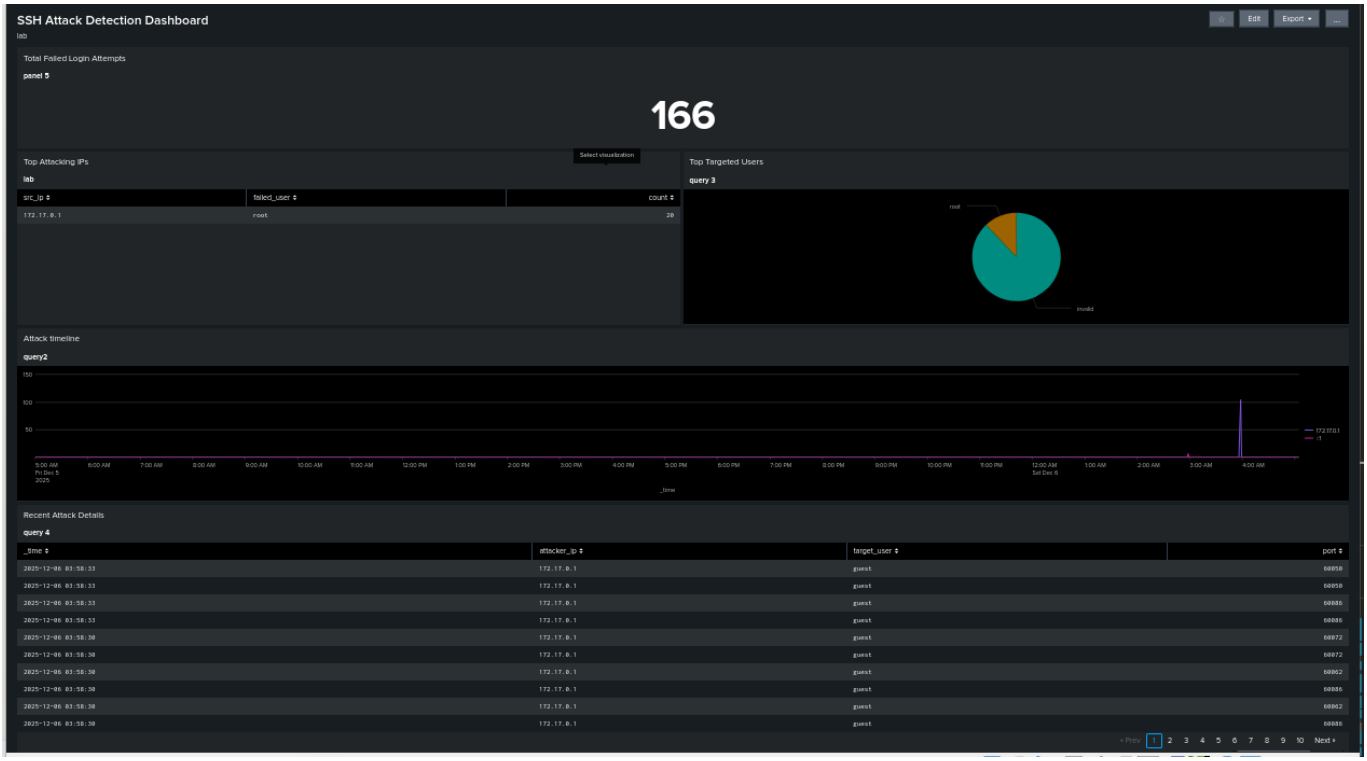
4. Constant IP (172.17.0.1)

-The attack comes from a single IP -No distribution (not a DDoS attack) -Easy to block with firewall/fail2ban

Indicators of compromise (IoCs):

- Brute force attack confirmed
- Automated tool detected (by speed)
- Target user identified: guest
- Attacker IP: 172.17.0.1 **Risk:** If guest has a weak password, they could be compromised

Step 5: Creating the Dashboard



Command and tools used

Tool	Use	Main key
Hydra	Simulación de ataque	`hydra -L users.txt -P passwords.txt ssh://IP`
Splunk Forwarder	Recolección de logs	`splunk add monitor /var/log/auth.log`
SPL	Análisis de datos	`rex`, `stats`, `timechart`

Why This Approach?

- SSH is universal: All Linux servers use it.
- Visible in logs: Easy to detect without complex tools.
- Real relevance: 80% of breaches start with weak credentials.

Conclusion

This lab demonstrates competence in detecting basic but critical threats.