TASK 4: Network Intrusion Detection System

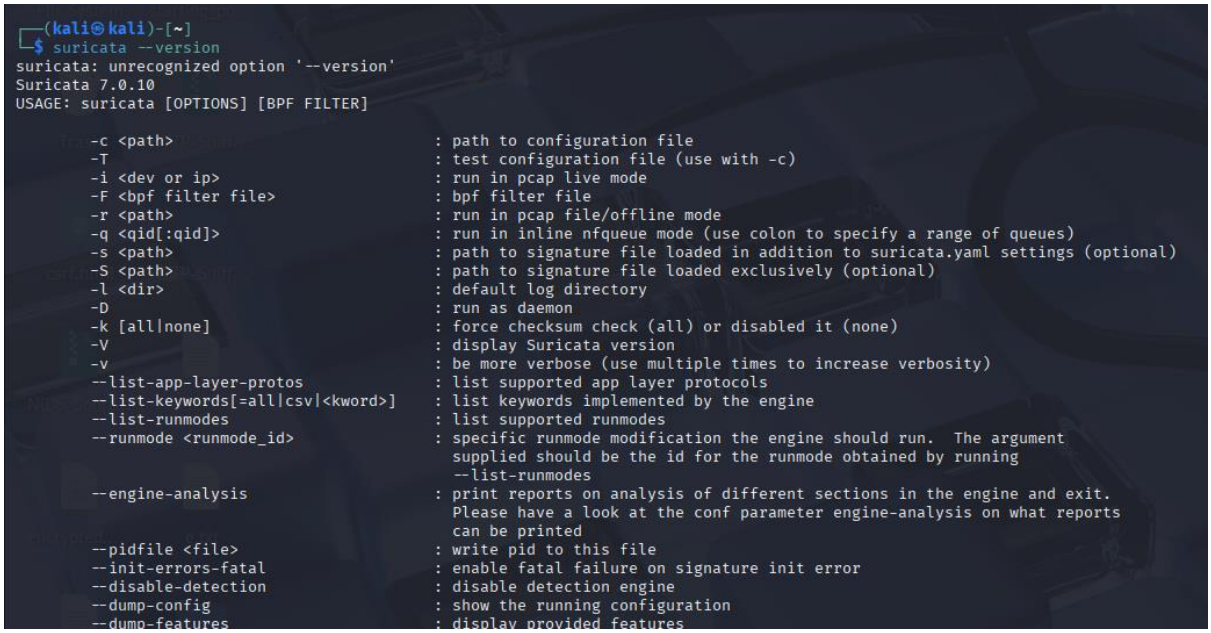
Step 1: Install Suricata (Recommended)

Command: sudo apt update

sudo apt install suricata -y

Verify installation:

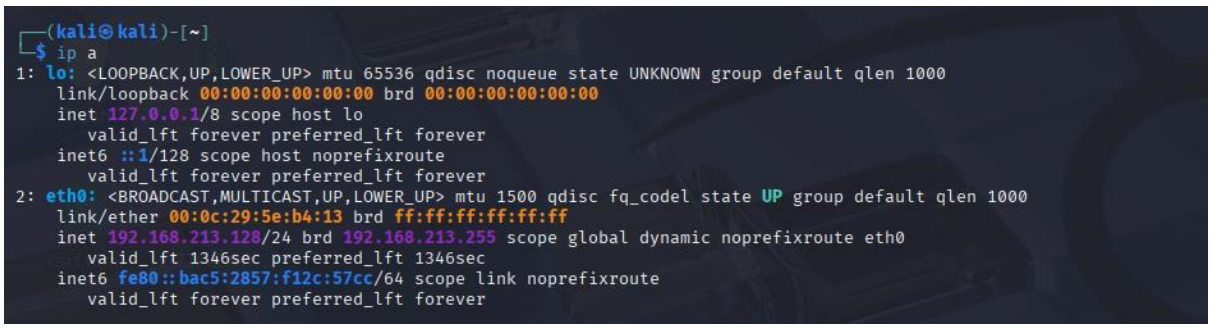
Command: suricata –version



Step 2: Identify Your Network Interface

Run this to find your active interface (e.g., eth0, wlan0):

Command: ip a



Note down the correct interface for monitoring.

Step 3: Configure Suricata

Edit the config file:

Command: sudo nano /etc/suricata/suricata.yaml

```
##
## Step 3: Configure common capture settings
##
## See "Advanced Capture Options" below for more options, including Netmap
## and PF_RING.
##

# Linux high speed capture support
af-packet:
  - interface: eth0
    # Number of receive threads. "auto" uses the number of cores
    #threads: auto
    # Default clusterid. AF_PACKET will load balance packets based on flow.
    cluster-id: 99
```

Step 4: Enable and Test Suricata Rules

Suricata uses .rules files (like Snort). Make sure rules are enabled.

You can download or update rule sets:

Command: sudo suricata-update

```
┌──(kali㉿kali)-[~]
└─$ sudo suricata-update
5/7/2025 -- 02:27:11 - <Info> -- Using data-directory /var/lib/suricata.
5/7/2025 -- 02:27:11 - <Info> -- Using Suricata configuration /etc/suricata/suricata.yaml
5/7/2025 -- 02:27:11 - <Info> -- Using /etc/suricata/rules for Suricata provided rules.
5/7/2025 -- 02:27:11 - <Info> -- Found Suricata version 7.0.10 at /usr/bin/suricata.
5/7/2025 -- 02:27:11 - <Info> -- Loading /etc/suricata/suricata.yaml
5/7/2025 -- 02:27:11 - <Info> -- Disabling rules for protocol pgsql
5/7/2025 -- 02:27:11 - <Info> -- Disabling rules for protocol modbus
5/7/2025 -- 02:27:11 - <Info> -- Disabling rules for protocol dnp3
5/7/2025 -- 02:27:11 - <Info> -- Disabling rules for protocol enip
5/7/2025 -- 02:27:11 - <Info> -- No sources configured, will use Emerging Threats Open
5/7/2025 -- 02:27:11 - <Info> -- Fetching https://rules.emergingthreats.net/open/suricata-7.0.10/emerging.rules.tar.gz.
 100% - 4961765/4961765
5/7/2025 -- 02:27:19 - <Info> -- Done.
5/7/2025 -- 02:27:20 - <Info> -- Loading distribution rule file /etc/suricata/rules/app-layer-events.rules
5/7/2025 -- 02:27:20 - <Info> -- Loading distribution rule file /etc/suricata/rules/decoder-events.rules
5/7/2025 -- 02:27:20 - <Info> -- Loading distribution rule file /etc/suricata/rules/dhcp-events.rules
5/7/2025 -- 02:27:20 - <Info> -- Loading distribution rule file /etc/suricata/rules/dnp3-events.rules
5/7/2025 -- 02:27:20 - <Info> -- Loading distribution rule file /etc/suricata/rules/dns-events.rules
5/7/2025 -- 02:27:20 - <Info> -- Loading distribution rule file /etc/suricata/rules/files.rules
5/7/2025 -- 02:27:20 - <Info> -- Loading distribution rule file /etc/suricata/rules/http2-events.rules
5/7/2025 -- 02:27:20 - <Info> -- Loading distribution rule file /etc/suricata/rules/http-events.rules
5/7/2025 -- 02:27:20 - <Info> -- Loading distribution rule file /etc/suricata/rules/ipsec-events.rules
5/7/2025 -- 02:27:20 - <Info> -- Loading distribution rule file /etc/suricata/rules/kerberos-events.rules
5/7/2025 -- 02:27:20 - <Info> -- Loading distribution rule file /etc/suricata/rules/modbus-events.rules
5/7/2025 -- 02:27:20 - <Info> -- Loading distribution rule file /etc/suricata/rules/mqtt-events.rules
5/7/2025 -- 02:27:20 - <Info> -- Loading distribution rule file /etc/suricata/rules/nfs-events.rules
5/7/2025 -- 02:27:20 - <Info> -- Loading distribution rule file /etc/suricata/rules/ntp-events.rules
5/7/2025 -- 02:27:20 - <Info> -- Loading distribution rule file /etc/suricata/rules/quic-events.rules
5/7/2025 -- 02:27:20 - <Info> -- Loading distribution rule file /etc/suricata/rules/rfb-events.rules
5/7/2025 -- 02:27:20 - <Info> -- Loading distribution rule file /etc/suricata/rules/smb-events.rules
5/7/2025 -- 02:27:20 - <Info> -- Loading distribution rule file /etc/suricata/rules/smtp-events.rules
5/7/2025 -- 02:27:20 - <Info> -- Loading distribution rule file /etc/suricata/rules/ssh-events.rules
5/7/2025 -- 02:27:20 - <Info> -- Loading distribution rule file /etc/suricata/rules/stream-events.rules
5/7/2025 -- 02:27:20 - <Info> -- Loading distribution rule file /etc/suricata/rules/tls-events.rules
5/7/2025 -- 02:27:20 - <Info> -- Ignoring file f625293e2432dbf07497d06349de6f0b/rules/emerging-deleted.rules
5/7/2025 -- 02:27:22 - <Info> -- Loaded 59707 rules.
5/7/2025 -- 02:27:22 - <Info> -- Disabled 13 rules.
5/7/2025 -- 02:27:22 - <Info> -- Enabled 0 rules.
5/7/2025 -- 02:27:22 - <Info> -- Modified 0 rules.
5/7/2025 -- 02:27:22 - <Info> -- Dropped 0 rules.
5/7/2025 -- 02:27:23 - <Info> -- Enabled 136 rules for flowbit dependencies.
5/7/2025 -- 02:27:23 - <Info> -- Backing up current rules.
5/7/2025 -- 02:27:23 - <Info> -- Writing rules to /var/lib/suricata/rules/suricata.rules: total: 59707; enabled: 44113; added: 59707; remov
```

You'll find default rules in:

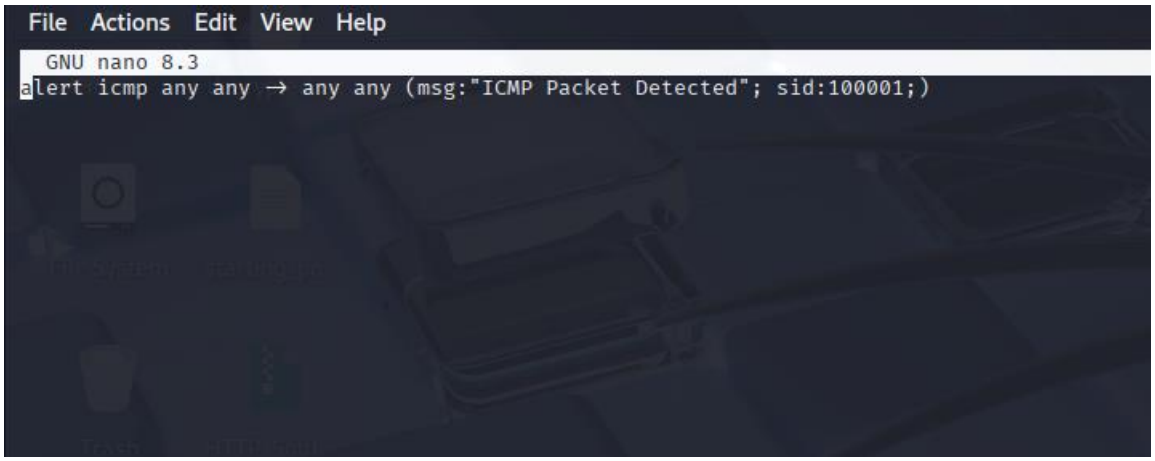
Command: /etc/suricata/rules/

Example rule format (to detect ICMP ping):

alert icmp any any -> any any (msg:"ICMP Packet Detected"; sid:100001;)

Add this to a custom rule file:

Command: sudo nano /etc/suricata/rules/custom.rules



And add the rule above.

Now include that in your config:

Command: sudo nano /etc/suricata/suricata.yaml

And add this under rule-files:

- custom.rules

Step 5: Start Suricata in Live Mode

Now run Suricata in **IDS mode**:

Command: sudo suricata -c /etc/suricata/suricata.yaml -i eth0

This will monitor traffic **live**.

```
┌──(kali㉿kali)-[~]
└─$ sudo suricata -c /etc/suricata/suricata.yaml -i eth0

i: suricata: This is Suricata version 7.0.10 RELEASE running in SYSTEM mode
W: af-packet: eth0: AF_PACKET tpacket-v3 is recommended for non-inline operation
i: threads: Threads created → W: 4 FM: 1 FR: 1   Engine started.
```

Step 6: Simulate Attacks / Scan

From another machine in same network:

Command: ping <Kali-IP>

nmap <Kali-IP>

```
Command Prompt
Microsoft Windows [Version 10.0.22631.5549]
(c) Microsoft Corporation. All rights reserved.

C:\Users\bhone>ping 192.168.213.128

Pinging 192.168.213.128 with 32 bytes of data:
Reply from 192.168.213.128: bytes=32 time<1ms TTL=64
Reply from 192.168.213.128: bytes=32 time=1ms TTL=64
Reply from 192.168.213.128: bytes=32 time=1ms TTL=64
Reply from 192.168.213.128: bytes=32 time=1ms TTL=64

Ping statistics for 192.168.213.128:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

From Kali you can simulate attack too:

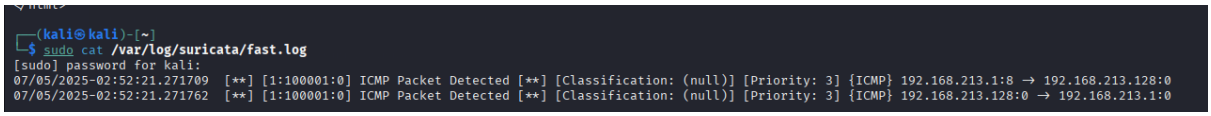
Command: curl http://example.com

```
┌──(kali㉿kali)-[~]
└─$ curl http://example.com
<!doctype html>
<html>
<head>
    <title>Example Domain</title>

    <meta charset="utf-8" />
    <meta http-equiv="Content-type" content="text/html; charset=utf-8" />
    <meta name="viewport" content="width=device-width, initial-scale=1" />
    <style type="text/css">
    body {
        background-color: #f0f0f2;
        margin: 0;
        padding: 0;
        font-family: -apple-system, system-ui, BlinkMacSystemFont, "Segoe UI", "Open Sans", "Helvetica Neue", Helvetica, Arial, sans-serif;

    }
    div {
        width: 600px;
        margin: 5em auto;
        padding: 2em;
        background-color: #fdfdff;
        border-radius: 0.5em;
        box-shadow: 2px 3px 7px 2px rgba(0,0,0,0.02);
    }
    a:link, a:visited {
        color: #38488f;
        text-decoration: none;
    }
    @media (max-width: 700px) {
        div {
            margin: 0 auto;
            width: auto;
        }
    }
    </style>
</head>

<body>
<div>
    <h1>Example Domain</h1>
```

Step 7: View Alerts

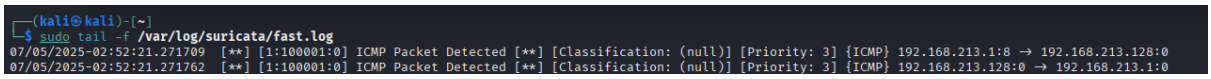
Alerts will be saved in:

Command: sudo cat /var/log/suricata/fast.log



You can also open in tail:

Command: sudo tail -f /var/log/suricata/fast.log

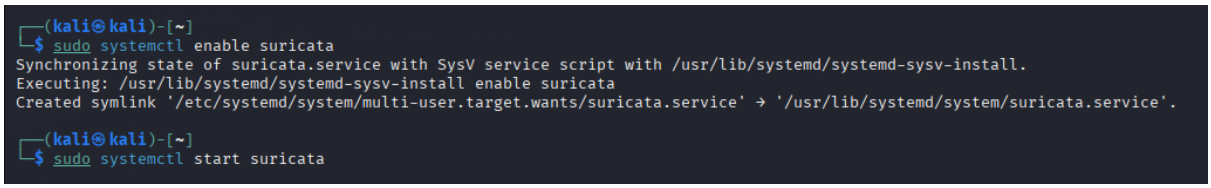


Step 8: Make Suricata Run at Boot

If you want Suricata to always start:

Command: sudo systemctl enable suricata

sudo systemctl start suricata



✅ Final Report Structure:

Section	Details
Tool Used	Suricata
Interface Monitored	eth0 (example)
Custom Rule	ICMP detection
Test Performed	ping, nmap, curl
Logs Captured	/var/log/suricata/fast.log
Mitigation Plan	Block offending IPs, firewall integration
Future Plan	Integrate with Kibana, automate alerts

Step 9 : Goal: Block IPs that trigger a Suricata alert.

Step 1: Create an ipset list

sudo ipset create blacklist hash:ip

Step 2: Add IPTables Rule to Block Blacklisted IPs

Command: sudo iptables -I INPUT -m set --match-set blacklist src -j DROP

Step 3: Create a Response Script

This script adds attacker IPs from Suricata alerts (fast.log) to the blacklist.

Command: sudo nano /usr/local/bin/suricata-ipblocker.sh

Paste this:

```
#!/bin/bash
LOG_FILE="/var/log/suricata/fast.log"
tail -Fn0 "$LOG_FILE" | \
while read line; do
    echo "$line" | grep -oP '\d+\.\d+\.\d+\.\d+' | while read ip; do
        if ! ipset test blacklist $ip &>/dev/null; then
            echo "[+] Blocking IP: $ip"
            ipset add blacklist $ip
        fi
    done
done
```

Step 4: Make Script Executable and Run It

Command: sudo chmod +x /usr/local/bin/suricata-ipblocker.sh

Command: sudo /usr/local/bin/suricata-ipblocker.sh

This script monitors Suricata logs and auto-bans detected attacker IPs.

Custom Rule Set Template

```
# File: /etc/suricata/rules/custom.rules


alert icmp any any -> any any (msg:"ICMP Ping Detected"; sid:100001; rev:1;)
```

alert http any any -> any any (msg:"HTTP Traffic Detected"; sid:100002; rev:1;)

alert dns any any -> any any (msg:"DNS Request Detected"; sid:100003; rev:1;)

---

1. Tool Used

- Suricata 7.0.10

2. Setup

- Kali Linux with Suricata installed.
- Network interface: eth0
- Rule path: /etc/suricata/rules/

3. Rules Implemented

- ICMP alert rule (`sid:100001`)
- HTTP alert rule (`sid:100002`)
- DNS alert rule (`sid:100003`)

4. Detection Example

- Used `ping` to generate ICMP traffic.
- Alert confirmed in `/var/log/suricata/fast.log`.

5. Response Mechanism

- Auto-blocking IPs that triggered alerts using `ipset` and `iptables`.
- Script used: `/usr/local/bin/suricata-ipblocker.sh`
- Verified that repeated alerts from same IP were blocked.

6. Reflection

- Suricata effectively detected traffic types.
- Adding auto-blocking improves defense but should be reviewed to avoid false positives.