# Adversary Simulation with MITRE CALDERA

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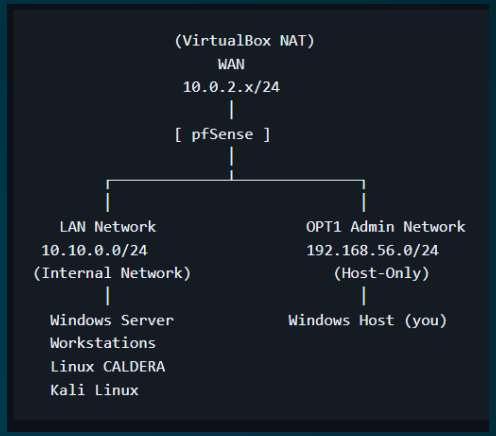
# Sadržaj

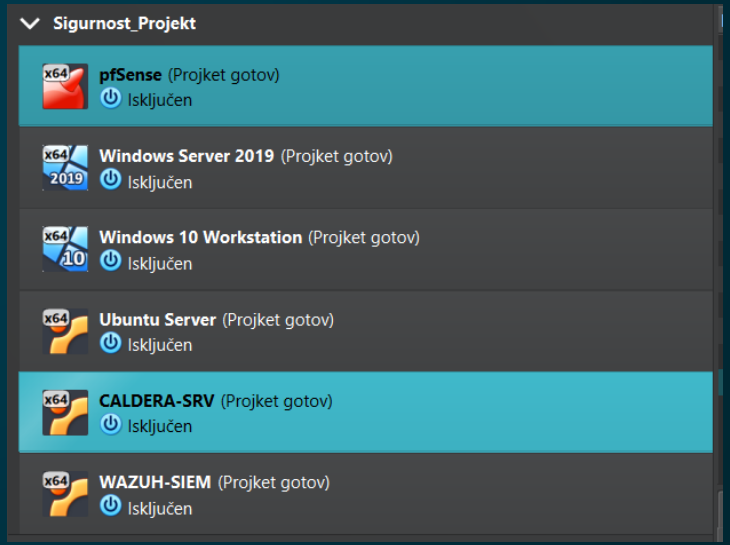


# 01 Infrastrukturni Inženjer

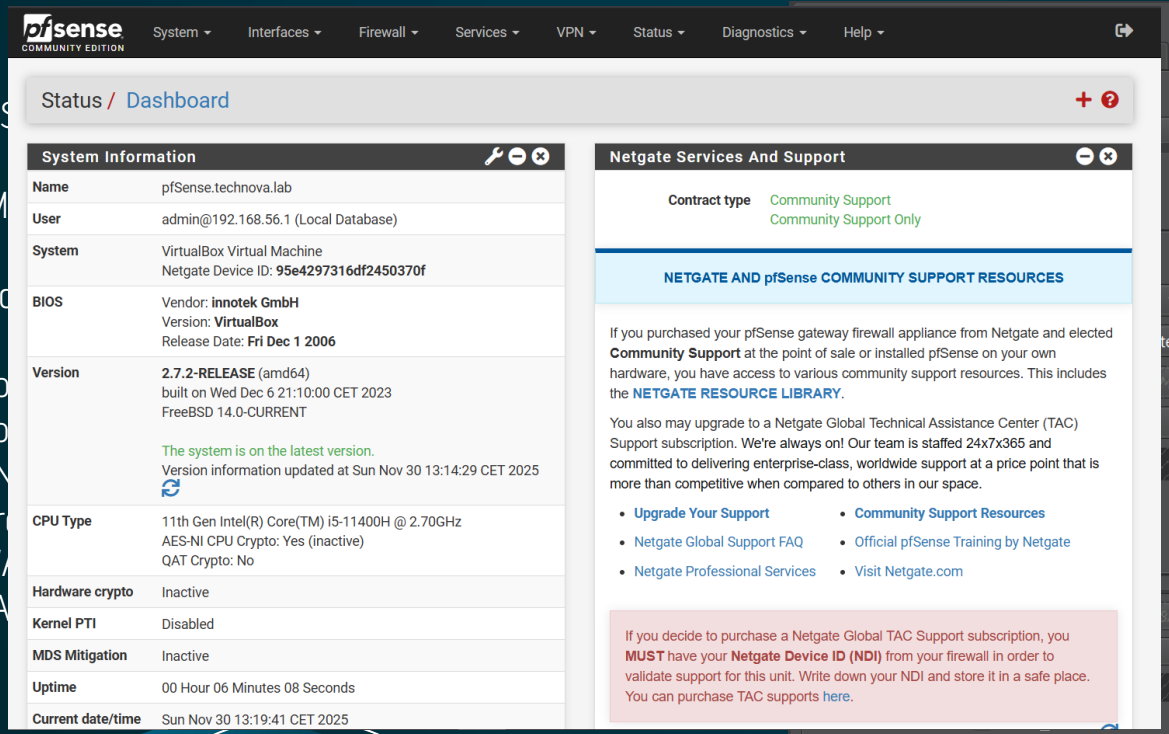
# Misija

- 6 međusobno povezanih virtualnih strojeva
- -Realistična enterprise mreža (TechNovaNet 10.10.0.0/24)
- Namjerno ranjiva za Red Team
- U potpunosti nadzirana za Blue Team



# Mrežna osnova - pfSense



# Active Directory okruženje

- Windows Server 2019 Core
  Controller
- TechNovaNet domena
- Integrirane DNS usluge
- Ranjivi korisnik employe (sl
- Windo

```
C:\Users\vboxuser>ipconfig/all

Windows IP Configuration

   Host Name . . . . . . . . . . . . : DC-SERVER
   Pr
   No
   IP
   WI
   DN

Ether

   Co
   De
   Ph
   DH
   Au
   Li
   IPv4 Address. . . . . . . . . . . : 10.10.0.10(Preferred)

   DNS Servers . . . . . . . . . . . : ::1
                                       10.10.0.10
   NetBIOS over Tcpip. . . . . . . . : Enabled
```

```
PS C:\Users\vboxuser> Get-ADUser -Filter * | Select SamAccountName

SamAccountName
--------------
Administrator
Guest
vboxuser
krbtgt
admin
admin_lab
read_team
blue_team
```

```
Set-ADAccountPassword -Identity employee -Reset `
  -NewPassword (ConvertTo-SecureString "employee123" -AsPlainText -Force)
```

# Ranjivi Linux server

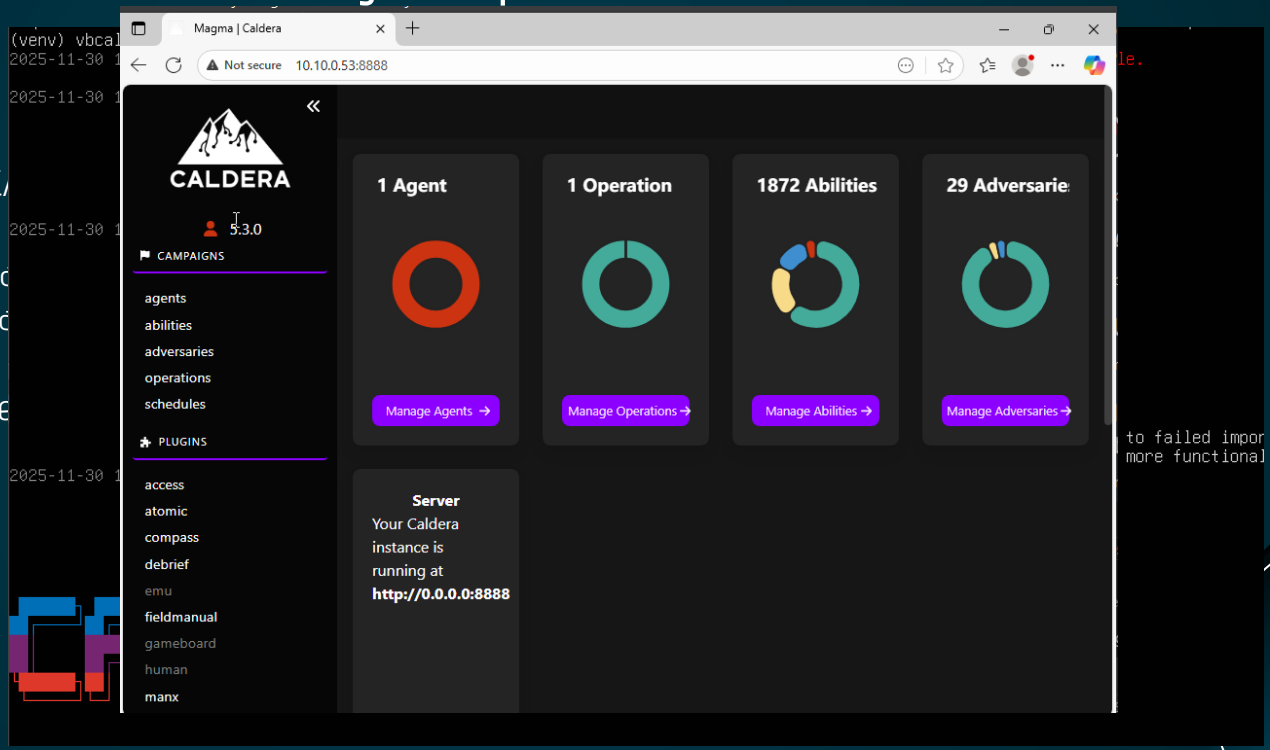
- Ubuntu 24.04 LTS (10.10.0.51)
- Ranjivi korisnik: webadmin/Webadmin123!
- sudo NOPASSWD:ALL pogrešna konfiguracija
- Apache web server na portu 80
- SSH pristup omogućen sa password autentifikacijom

```
vbubuntu@ubuntu-srv:~$ grep webadmin /etc/passwd
webadmin:x:1001:1001:,,,:/home/webadmin:/bin/bash
vbubuntu@ubuntu-srv:~$ groups webadmin
webadmin : webadmin sudo users
vbubuntu@ubuntu-srv:~$ id webadmin
uid=1001(webadmin) gid=1001(webadmin) groups=1001(webadmin),27(sudo),100(users)
vbubuntu@ubuntu-srv:~$
```

```
# User privilege specification
root    ALL=(ALL:ALL) ALL

# Members of the admin group may gain root privileges
%admin ALL=(ALL) ALL

# Allow members of group sudo to execute any command
%sudo   ALL=(ALL:ALL) ALL

# See sudoers(5) for more information on "@include" directives:

@includedir /etc/sudoers.d

webadmin ALL=(ALL) NOPASSWD:ALL
```

# Automatizacija napada - CALDERA

- MITRE C
- Platforma protivnika
- Sandcat age



# Sigurnosni nadzor - Wazuh SIEM

- Mini-Wazuh SIEM (10.10.0.70) - optimiziran

```
^Cvbwazuh@WAZUH-SIEM:~$ sudo /var/ossec/bin/wazuh-control status
wazuh-clusterd not running...
wazuh-modulesd is running...
wazuh-monitord is running...
wazuh-logcollector is running...
wazuh-remoted is running...
wazuh-syscheckd is running...
wazuh-analysisd is running...
```

```
vbubuntu@ubuntu-srv:~$ sudo systemctl daemon-reload
vbubuntu@ubuntu-srv:~$ sudo systemctl enable wazuh-agent
Created symlink /etc/systemd/system/multi-user.target.wants/wazuh-agent.service → /usr/lib/systemd/system/wazuh-agent.service.
vbubuntu@ubuntu-srv:~$ sudo systemctl start wazuh-agent
vbubuntu@ubuntu-srv:~$ systemctl status wazuh-agent
● wazuh-agent.service - Wazuh
     Loaded: loaded (/usr/lib/
     Active: active (running)
    Process: 1172 ExecStart=/
      Tasks: 34 (limit: 2267)
     Memory: 425.0M (peak: 42
        CPU: 4.272s
     CGroup: /system.slice/wa
             ├─1204 /var/ossec
             ├─1212 /var/ossec
             ├─1226 /var/ossec/bin/wazuh-syscheckd
             ├─1236 /var/ossec/bin/wazuh-logcollector
             ├─1253 /var/ossec/bin/wazuh-modulesd
             ├─1447 sh -c -- "/bin/ps -p 235 > /dev/null 2>&1"
             └─1448 /bin/ps -p 235
vbubuntu@ubuntu-srv:~$
```

```
vbwazuh@WAZUH-SIEM:~$ sudo /var/ossec/bin/agent_control -l

Wazuh agent_control. List of available agents:
   ID: 000, Name: WAZUH-SIEM (server), IP: 127.0.0.1, Active/Local
   ID: 004, Name: WIN10, IP: any, Active
   ID: 005, Name: ubuntu-srv, IP: any, Active

List of agentless devices:
```

```
Status   Name              DisplayName
------   ----              -----------
Running  WazuhSvc          Wazuh


PS C:\Windows\system32>
```

# Tailscale VPN

| MACHINE | ADDRESSES | VERSION | LAST SEEN |
|---|---|---|---|
| caldera-srv<br>tag:lab<br>SSH | 100.118.97.74 | 1.90.9<br>Linux 6.8.0-88-generic | 11:34 AM SSH... Share... ••• |
| dc-server<br>tag:lab | 100.67.42.81 | 1.90.9<br>Windows Server 2019 | 2:23 PM GMT+1 ••• |
| desktop-lbf7a9d<br>tag:lab | 100.73.38.37 | 1.90.9<br>Windows 10 21H2 | 1:00 PM GMT+1 ••• |
| pfsense<br>tag:lab<br>SSH | 100.108.74.68 | 1.54.0<br>FreeBSD 14.0-CURRENT | 1:29 PM GMT+1 ••• |
| ubuntu-srv<br>tag:lab<br>SSH | 100.106.9.109 | 1.90.9<br>Linux 6.8.0-88-generic | 11:34 AM GMT+1 ••• |
| wazuh-siem<br>tag:lab<br>SSH | 100.67.231.16 | 1.90.9<br>Linux 6.8.0-71-generic | 11:34 AM GMT+1 ••• |

# 02

# Blue team Inženjer

# Sigurnosni Nadzor i Instrumentacija (Blue Team)

**Cilj:** Uspostava proaktivnog nadzora nad infrastrukturom.

**Fokus:** Praćenje procesa, mrežne aktivnosti i integriteta sustava.

**Pristup:** Osiguravanje potpune vidljivosti svih kritičnih točaka u realnom vremenu.

## Remote Logging Options

**Enable Remote Logging**

- [x] Send log messages to remote syslog server

**Source Address**

Default (any)

This option will allow the logging daemon to bind to a single IP address, rather than all IP addresses. If a single IP is picked, remote syslog servers must all be of that IP type. To mix IPv4 and IPv6 remote syslog servers, bind to all interfaces.

NOTE: If an IP address cannot be located on the chosen interface, the daemon will bind to all addresses.

**IP Protocol**

IPv4

This option is only used when a non-default address is chosen as the source above. This option only expresses a preference; If an IP address of the selected type is not found on the chosen interface, the other type will be tried.

**Remote log servers**

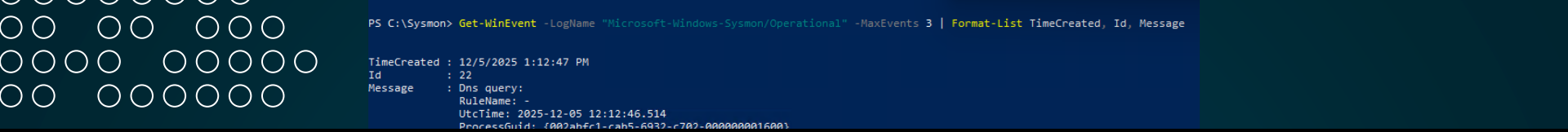
10.10.0.70:514 | IP[:port] | IP[:port]

**Remote Syslog Contents**

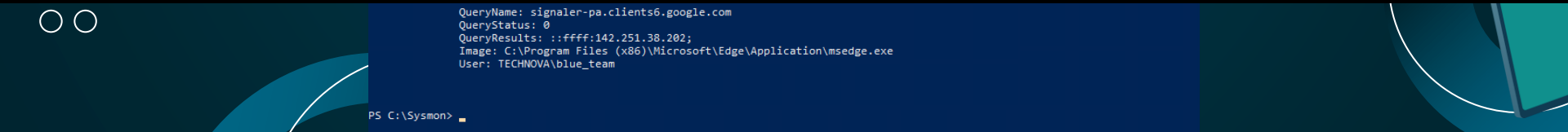
- [ ] Everything
- [ ] System Events
- [x] Firewall Events
- [ ] DNS Events (Resolver/unbound, Forwarder/dnsmasq, filterdns)
- [ ] DHCP Events (DHCP Daemon, DHCP Relay, DHCP Client)
- [ ] PPP Events (PPPoE WAN Client, L2TP WAN Client, PPTP WAN Client)
- [ ] General Authentication Events
- [ ] Captive Portal Events
- [ ] VPN Events (IPsec, OpenVPN, L2TP, PPPoE Server)
- [ ] Gateway Monitor Events
- [ ] Routing Daemon Events (RADVD, UPnP, RIP, OSPF, BGP)
- [ ] Network Time Protocol Events (NTP Daemon, NTP Client)
- [ ] Wireless Events (hostapd)

Syslog sends UDP datagrams to port 514 on the specified remote syslog server, unless another port is specified. Be sure to set syslogd on the remote server to accept syslog messages from pfSense.

Save




```
vbwazuh@WAZUH-SIEM:~$ sudo tail -20 /var/ossec/logs/alerts/alerts.log
Rule: 5402 (level 3) -> 'Successful sudo to ROOT executed.'
User: root
2025-12-05T12:47:37.813547+00:00 ubuntu-srv sudo: vbubuntu : TTY=pts/0 ; PWD=/home/vbubuntu ; USER=root ; COMMAND=/usr/bin/rm
 /etc/cron.d/test_fim
tty: pts/0
pwd: /home/vbubuntu
command: /usr/bin/rm /etc/cron.d/test_fim

** Alert 1764938857.1538596: - pam,syslog,authentication_success,pci_dss_10.2.5,gpg13_7.8,gpg13_7.9,gdpr_IV_32.2,hipaa_164.31
2.b,nist_800_53_AU.14,nist_800_53_AC.7,tsc_CC6.8,tsc_CC7.2,tsc_CC7.3,
2025 Dec 05 12:47:37 (ubuntu-srv) any->/var/log/auth.log
Rule: 5501 (level 3) -> 'PAM: Login session opened.'
User: root
2025-12-05T12:47:37.814193+00:00 ubuntu-srv sudo: pam_unix(sudo:session): session opened for user root(uid=0) by vbubuntu(uid
=1000)
uid: 1000

** Alert 1764938857.1539055: - pam,syslog,pci_dss_10.2.5,gpg13_7.8,gpg13_7.9,gdpr_IV_32.2,hipaa_164.312.b,nist_800_53_AU.14,n
ist_800_53_AC.7,tsc_CC6.8,tsc_CC7.2,tsc_CC7.3,
2025 Dec 05 12:47:37 (ubuntu-srv) any->/var/log/auth.log
Rule: 5502 (level 3) -> 'PAM: Login session closed.'
User: root
2025-12-05T12:47:37.816433+00:00 ubuntu-srv sudo: pam_unix(sudo:session): session closed for user root

vbwazuh@WAZUH-SIEM:~$
```



Tailscale - SSH to wazuh-siem — Mozilla Firefox

about:blank

```
RuleName: -
UtcTime: 2025-12-05 12:46:00.258
vbwazuh@WAZUH-SIEM:~$ sudo tail -20 /var/ossec/logs/alerts/alerts.log
Rule: 5402 (level 3) -> 'Successful sudo to ROOT executed.'
User: root
2025-12-05T12:47:37.813547+00:00 ubuntu-srv sudo: vbubuntu : TTY=pts/0 ; PWD=/home/vbubuntu ; USER=root ; COMMAND=/usr/bin/rm
 /etc/cron.d/test_fim
tty: pts/0
pwd: /home/vbubuntu
command: /usr/bin/rm /etc/cron.d/test_fim

** Alert 1764938857.1538596: - pam,syslog,authentication_success,pci_dss_10.2.5,gpg13_7.8,gpg13_7.9,gdpr_IV_32.2,hipaa_164.31
2.b,nist_800_53_AU.14,nist_800_53_AC.7,tsc_CC6.8,tsc_CC7.2,tsc_CC7.3,
2025 Dec 05 12:47:37 (ubuntu-srv) any->/var/log/auth.log
Rule: 5501 (level 3) -> 'PAM: Login session opened.'
User: root
2025-12-05T12:47:37.814193+00:00 ubuntu-srv sudo: pam_unix(sudo:session): session opened for user root(uid=0) by vbubuntu(uid
=1000)
uid: 1000

** Alert 1764938857.1539055: - pam,syslog,pci_dss_10.2.5,gpg13_7.8,gpg13_7.9,gdpr_IV_32.2,hipaa_164.312.b,nist_800_53_AU.14,n
ist_800_53_AC.7,tsc_CC6.8,tsc_CC7.2,tsc_CC7.3,
2025 Dec 05 12:47:37 (ubuntu-srv) any->/var/log/auth.log
Rule: 5502 (level 3) -> 'PAM: Login session closed.'
User: root
2025-12-05T12:47:37.816433+00:00 ubuntu-srv sudo: pam_unix(sudo:session): session closed for user root

vbwazuh@WAZUH-SIEM:~$
```

```
088B0,IMPHASH=272245E2988E1E430500B852C4FB5E18
win.eventdata.parentProcessGuid: {002abfc1-d3de-6932-2d04-000000001600}
win.eventdata.parentProcessId: 3376
win.eventdata.parentImage: C:\\Windows\\System32\\WindowsPowerShell\\v1.0\\powershell.exe
win.eventdata.parentCommandLine: \"C:\\Windows\\System32\\WindowsPowerShell\\v1.0\\powershell.exe\"
win.eventdata.parentUser: TECHNOVA\\admin_lab

^C
vbwazuh@WAZUH-SIEM:~$
```

## Edit Firewall Rule

**Action** Block

Choose what to do with packets that match the criteria specified below.
Hint: the difference between block and reject is that with reject, a packet (TCP RST or ICMP port unreachable for UDP) is returned to the sender, whereas with block the packet is dropped silently. In either case, the original packet is discarded.

**Disabled** ☐ Disable this rule

Set this option to disable this rule without removing it from the list.

```
PS C:\Windows\system32> Set-NetFirewallProfile -Profile Domain,Public,Private -Enabled True
PS C:\Windows\system32> Get-NetFirewallProfile | Select-Object Name, Enabled

Name    Enabled
----    -------
Domain     True
Private    True
Public     True


PS C:\Windows\system32>
```

SSH Ha
Privileg
Networ
Micro-s

Windows Defender Firewall with Advanced Security

100.73.38.37

File Action View Help

Windows Defender Firewall witl
- Inbound Rules
- Outbound Rules
- Connection Security Rules
- Monitoring

### Inbound Rules

| Name | Group | Profile | Enabled | Action | Override | Program | Local Address | Remote Address |
|---|---|---|---|---|---|---|---|---|
| Allow RDP 3389 over Tailscale | | All | Yes | Allow | No | Any | Any | Any |
| Allow RDP 3389 TS | | All | Yes | Allow | No | Any | Any | Any |
| Block CALDERA Attacker Inbound | | All | Yes | Block | No | Any | Any | 10.10.0.53 |
| Block RPC from Ubuntu Server | | All | Yes | Block | No | Any | Any | 10.10.0.51 |
| Block SMB from Ubuntu Server | | All | Yes | Block | No | Any | Any | 10.10.0.51 |
| Block WMI from External | | All | Yes | Block | No | Any | Any | 10.10.0.51, 10.10.... |

the Status: System Logs: Settings page).

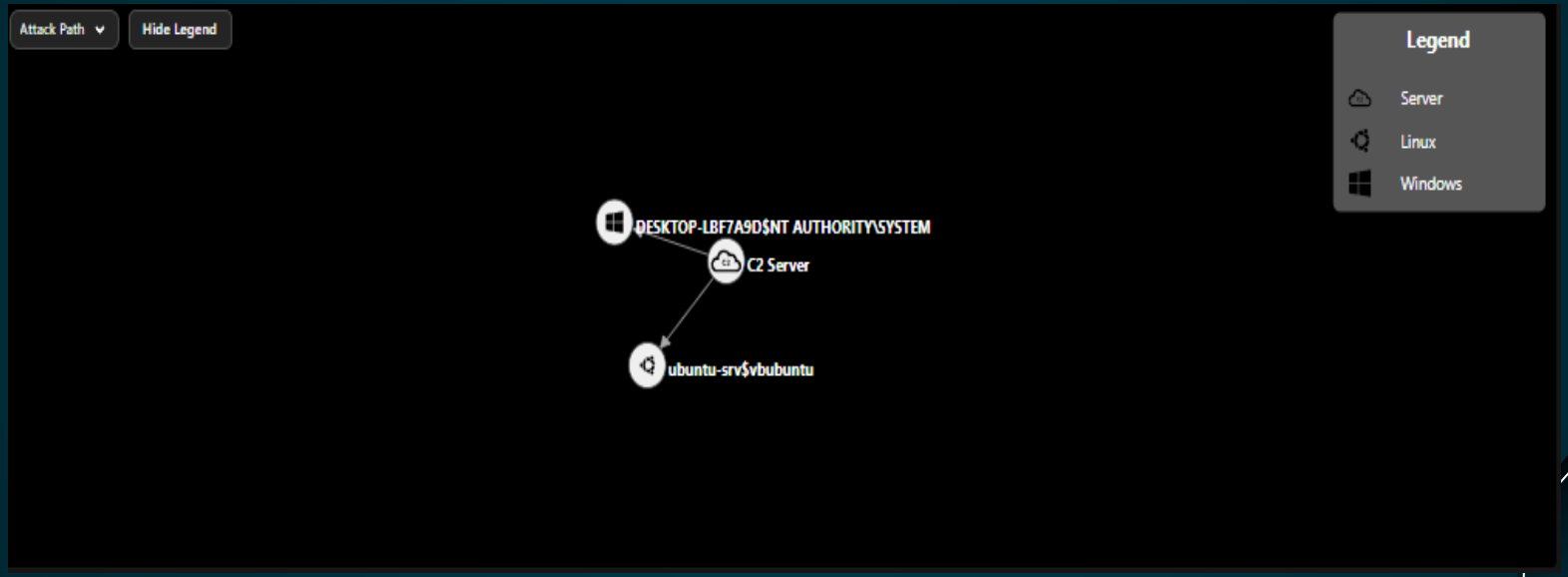
# 03

## Red Team Inženjer

# Red Team: Strategija Napada

- **Cilj:** Simulacija APT napada (Advanced Persistent Threat).
- **Alati:** MITRE CALDERA (Sandcat Agents) + Impacket (Python scripts).
- **Lanac Napada (Kill Chain):**
    1. **Initial Access (T1078):** Compromised Credentials (SSH).
    2. **Persistence (T1053):** Cron Jobs / Systemd Services.
    3. **Lateral Movement (T1021.002):** SMB/PsExec (Linux → Windows).
    4. **Exfiltration (T1041):** HTTP POST (Data Theft).

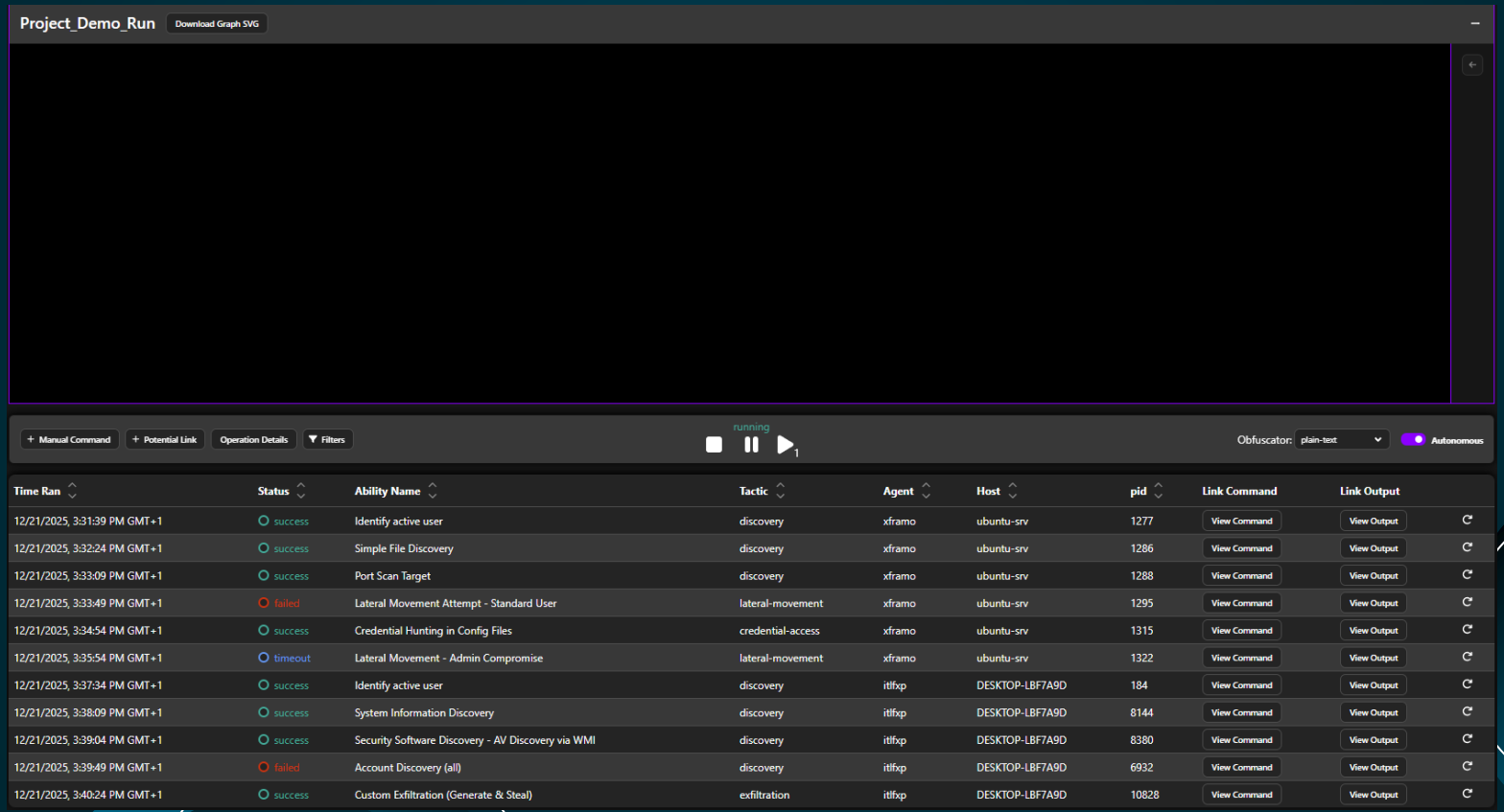
# Red Team: Strategija Napada



# Faza 1: Uspješna Eksploatacija

- **Status:** ✅ **POTPUNI USPJEH**
- **Ključni Vektori Napada:**
  1. **SSH Proboj / Slaba Lozinka** (webadmin).
  2. **Eskalacija Privilegija:** sudo NOPASSWD exploit (Shadow file dump).
  3. **Lateralno Kretanje:** Pronađene hardkodirane Admin vjerodajnice u /tmp.
  4. **Rezultat**: Kompromitiran Domain Admin i instaliran agent na Windowsima.

# Faza 1: Dokaz Uspjeha

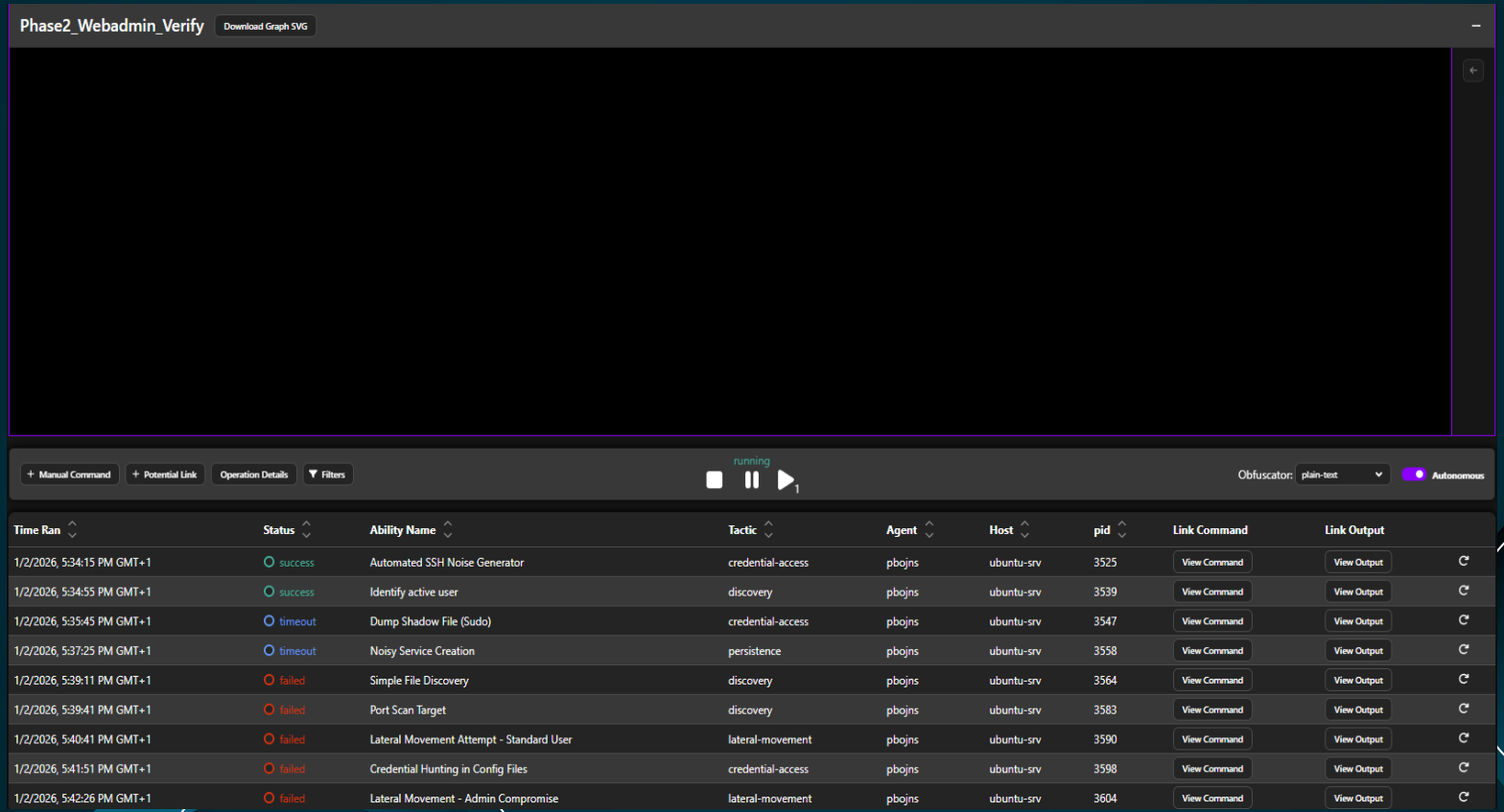



| Time Ran | Status | Ability Name | Tactic | Agent | Host | pid | Link Command | Link Output |
|---|---|---|---|---|---|---|---|---|
| 12/21/2025, 3:31:39 PM GMT+1 | success | Identify active user | discovery | xframo | ubuntu-srv | 1277 | View Command | View Output |
| 12/21/2025, 3:32:24 PM GMT+1 | success | Simple File Discovery | discovery | xframo | ubuntu-srv | 1286 | View Command | View Output |
| 12/21/2025, 3:33:09 PM GMT+1 | success | Port Scan Target | discovery | xframo | ubuntu-srv | 1288 | View Command | View Output |
| 12/21/2025, 3:33:49 PM GMT+1 | failed | Lateral Movement Attempt - Standard User | lateral-movement | xframo | ubuntu-srv | 1295 | View Command | View Output |
| 12/21/2025, 3:34:54 PM GMT+1 | success | Credential Hunting in Config Files | credential-access | xframo | ubuntu-srv | 1315 | View Command | View Output |
| 12/21/2025, 3:35:54 PM GMT+1 | timeout | Lateral Movement - Admin Compromise | lateral-movement | xframo | ubuntu-srv | 1322 | View Command | View Output |
| 12/21/2025, 3:37:34 PM GMT+1 | success | Identify active user | discovery | itlfxp | DESKTOP-LBF7A9D | 184 | View Command | View Output |
| 12/21/2025, 3:38:09 PM GMT+1 | success | System Information Discovery | discovery | itlfxp | DESKTOP-LBF7A9D | 8144 | View Command | View Output |
| 12/21/2025, 3:39:04 PM GMT+1 | success | Security Software Discovery - AV Discovery via WMI | discovery | itlfxp | DESKTOP-LBF7A9D | 8380 | View Command | View Output |
| 12/21/2025, 3:39:49 PM GMT+1 | failed | Account Discovery (all) | discovery | itlfxp | DESKTOP-LBF7A9D | 6932 | View Command | View Output |
| 12/21/2025, 3:40:24 PM GMT+1 | success | Custom Exfiltration (Generate & Steal) | exfiltration | itlfxp | DESKTOP-LBF7A9D | 10828 | View Command | View Output |

# Faza 2: Potvrda Zaštite

- **Status:** 🛡️ **NAPAD BLOKIRAN**
- **Rezultati Validacije :**
  1. **Eskalacija Privilegija:** 🔴 FAILED (Sudo password required).
  2. **Krađa Vjerodajnica:** 🔴 FAILED (File removed).
  3. **Lateralno Kretanje:** 🔴 FAILED (Network Timeout / Firewall Block).
- **Zaključak:** Attack chain broken at Network & Host level.

# Faza 2: Potvrda Zaštite




| Time Ran | Status | Ability Name | Tactic | Agent | Host | pid | Link Command | Link Output |
|---|---|---|---|---|---|---|---|---|
| 1/2/2026, 5:34:15 PM GMT+1 | success | Automated SSH Noise Generator | credential-access | pbojns | ubuntu-srv | 3525 | View Command | View Output |
| 1/2/2026, 5:34:55 PM GMT+1 | success | Identify active user | discovery | pbojns | ubuntu-srv | 3539 | View Command | View Output |
| 1/2/2026, 5:35:45 PM GMT+1 | timeout | Dump Shadow File (Sudo) | credential-access | pbojns | ubuntu-srv | 3547 | View Command | View Output |
| 1/2/2026, 5:37:25 PM GMT+1 | timeout | Noisy Service Creation | persistence | pbojns | ubuntu-srv | 3558 | View Command | View Output |
| 1/2/2026, 5:39:11 PM GMT+1 | failed | Simple File Discovery | discovery | pbojns | ubuntu-srv | 3564 | View Command | View Output |
| 1/2/2026, 5:39:41 PM GMT+1 | failed | Port Scan Target | discovery | pbojns | ubuntu-srv | 3583 | View Command | View Output |
| 1/2/2026, 5:40:41 PM GMT+1 | failed | Lateral Movement Attempt - Standard User | lateral-movement | pbojns | ubuntu-srv | 3590 | View Command | View Output |
| 1/2/2026, 5:41:51 PM GMT+1 | failed | Credential Hunting in Config Files | credential-access | pbojns | ubuntu-srv | 3598 | View Command | View Output |
| 1/2/2026, 5:42:26 PM GMT+1 | failed | Lateral Movement - Admin Compromise | lateral-movement | pbojns | ubuntu-srv | 3604 | View Command | View Output |

# Zaključak i Nalazi

- **Kritični Rizik:** Ravna mrežna topologija omogućila je brzo širenje napada.
- **Ljudska Pogreška:** Tvrdo kodirane (hardcoded) vjerodajnice uzrokovale su kompromitaciju domene.
- **Alati:** Bilo je potrebno koristiti prilagođene alate (Python/Impacket) kako bi se zaobišla zadana ograničenja.
- **Konačni Status:** Sustav je sada siguran od osnovnih TTP-ova (Tactics, Techniques, and Procedures).

04

Threat hunter/Analitičar

# Cilj i fokus analize

- **Cilj:** Analizirati ponašanje napada kroz sve faze (Baseline → Phase 1 → Phase 2)
- **Fokus:** Korelacija host, mrežnih i SIEM podataka
- **Pristup:** Threat hunting temeljen na stvarnim artefaktima, a ne samo alertima
- **Ishod:** Procjena učinkovitosti detekcije, vidljivosti i hardening mjera

# Baseline kao temelj analize

- **Baseline = referentna točka za threat hunting**
- Definira normalno ponašanje sustava i korisnika
- Omogućuje razlikovanje:
  - legitimne aktivnosti
  - pozadinske buke
  - stvarnih napada
- Ključan za pouzdanu interpretaciju alerta i logova

```
vbwazuh@WAZUH-SIEM:~$ sudo /var/ossec/bin/agent_control -l

Wazuh agent_control. List of available agents:
   ID: 000, Name: WAZUH-SIEM (server), IP: 127.0.0.1, Active/Local
   ID: 004, Name: WIN10, IP: any, Active
   ID: 005, Name: ubuntu-srv, IP: any, Active

List of agentless devices:

vbwazuh@WAZUH-SIEM:~$
```

# Što je definirano kao baseline

- **Linux:** legitimni SSH logini i uobičajeno sudo korištenje
- **Windows:** normalne prijave, procesi i RDP aktivnosti
- **Mreža (pfSense):** očekivani promet (HTTPS, DNS, NTP)
- **SIEM (Wazuh):** logovi sustava bez kritičnih upozorenja

```
vbwazuh@WAZUH-SIEM:~$ sudo /var/ossec/bin/wazuh-control status
[sudo] password for vbwazuh:
Sorry, try again.
[sudo] password for vbwazuh:
wazuh-clusterd not running...
wazuh-modulesd is running...
wazuh-monitord is running...
wazuh-logcollector is running...
wazuh-remoted is running...
wazuh-syscheckd is running...
wazuh-analysisd is running...
wazuh-maild not running...
wazuh-execd is running...
wazuh-db is running...
wazuh-authd is running...
wazuh-agentlessd not running...
wazuh-integratord not running...
wazuh-dbd not running...
wazuh-csyslogd not running...
wazuh-apid is running...
vbwazuh@WAZUH-SIEM:~$
```

```
2025-12-10T13:34:01.445217+00:00 ubuntu-srv CRON[2136]: pam_unix(cron:session): session closed for user root
2025-12-10T13:34:13.767162+00:00 ubuntu-srv sudo: pam_unix(sudo:auth): authentication failure; logname=vbubuntu uid=1000 euid=0 tty=/dev/pts/0 ruser=vbubuntu rhost=  use
r=vbubuntu
2025-12-10T13:35:01.447555+00:00 ubuntu-srv CRON[2141]: pam_unix(cron:session): session opened for user root(uid=0) by root(uid=0)
2025-12-10T13:35:01.447769+00:00 ubuntu-srv CRON[2140]: pam_unix(cron:session): session opened for user root(uid=0) by root(uid=0)
2025-12-10T13:35:01.450004+00:00 ubuntu-srv CRON[2140]: pam_unix(cron:session): session closed for user root
2025-12-10T13:35:01.450132+00:00 ubuntu-srv CRON[2141]: pam_unix(cron:session): session closed for user root
2025-12-10T13:35:07.897508+00:00 ubuntu-srv sudo: vbubuntu : 3 incorrect password attempts ; TTY=pts/0 ; PWD=/home/vbubuntu ; USER=root ; COMMAND=/usr/bin/tail -n 50 /va
r/log/auth.log
2025-12-10T13:36:01.453896+00:00 ubuntu-srv CRON[2160]: pam_unix(cron:session): session opened for user root(uid=0) by root(uid=0)
2025-12-10T13:36:01.456804+00:00 ubuntu-srv CRON[2160]: pam_unix(cron:session): session closed for user root
2025-12-10T13:36:46.806943+00:00 ubuntu-srv sudo: vbubuntu : TTY=pts/0 ; PWD=/home/vbubuntu ; USER=root ; COMMAND=/usr/bin/tail -n 50 /var/log/auth.log
2025-12-10T13:36:46.807788+00:00 ubuntu-srv sudo: pam_unix(sudo:session): session opened for user root(uid=0) by vbubuntu(uid=1000)
vbubuntu@ubuntu-srv:~$
```

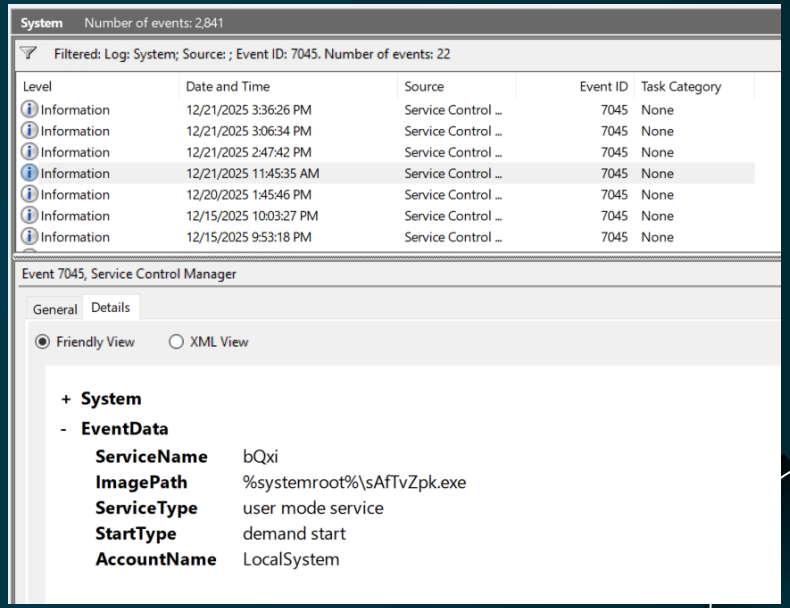
# Faza 1: Analiza napada

- Pojava **uspješnog SSH pristupa** s neuobičajenog izvora
- **Sudo eskalacija bez** lozinke (NOPASSWD)
- Pristup osjetljivim datotekama (/etc/shadow)
- Aktivnosti koje odstupaju od definiranog baselinea


```
vbubuntu@ubuntu-srv:~$ sudo zgrep "Accepted password" /var/log/auth.log.2.gz
2025-12-17T19:52:47.391890+00:00 ubuntu-srv sshd[1881]: Accepted password for webadmin from 10.10.0.50 port 50213 ssh2
grep: /var/log/auth.log.2.gz: binary file matches
vbubuntu@ubuntu-srv:~$
```

# Faza 1: Analiza napada

- Autentikacija na Windows s Linux kredencijalima
- Višestruki failed logoni → uspješan logon
- Service creation kao persistence indikator
- Korelacija Linux → Windows → SIEM



# Faza 2: Analiza nakon hardeninga

- Neuspjeli SSH pokušaji prema Linux hostu
- Nema pristupa osjetljivim datotekama (/etc/shadow)
- Onemogućena sudo eskalacija privilegija
- Napad zaustavljen prije lateralnog kretanja

```
vbubuntu@ubuntu-srv:~$ sudo grep "sudo" /var/log/auth.log | grep webadmin | tail -3
0
2026-01-04T18:25:56.618017+00:00 ubuntu-srv sudo: pam_unix(sudo:auth): auth could n
ot identify password for [webadmin]
2026-01-04T18:25:56.618032+00:00 ubuntu-srv sudo: pam_unix(sudo:auth): auth could n
ot identify password for [webadmin]
vbubuntu@ubuntu-srv:~$
```

```
vbubuntu@ubuntu-srv:~$ sudo grep "Failed password" /var/log/auth.log | grep webadmi
n | tail -20
[sudo] password for vbubuntu:
2026-01-04T18:16:20.251365+00:00 ubuntu-srv sshd[2895]: Failed password for webadmi
n from 127.0.0.1 port 51472 ssh2
vbubuntu@ubuntu-srv:~$
```

# Usporedba faza 1 i 2

| Sigurnosni element | Faza 1 | Faza 2 |
|---|---|---|
| SSH pristup | Uspješan | Neuspješan |
| Privilege escalation | Dozvoljena | Blokirana |
| Pristup /etc/shadow | Ostvaren | Onemogućen |
| Lateral movement | Uspješan | Nije moguć |
| Windows kompromizacija | Da | Ne |
| Persistence | Uspostavljena | Spriječena |

# Zaključak

- Baseline je omogućio pouzdanu analizu i usporedbu
- Faza 1 je potvrdila realnu izloženost napadima
- Faza 2 je dokazala učinkovitost hardening mjera
- Napadni putovi su eliminirani, ne samo detektirani
- SIEM je pružio potvrdu, ne lažan osjećaj sigurnosti

# Hvala na pažnji!