

# **Final Engagement**

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

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**Network Topology & Critical Vulnerabilities**



**Traffic Profile**



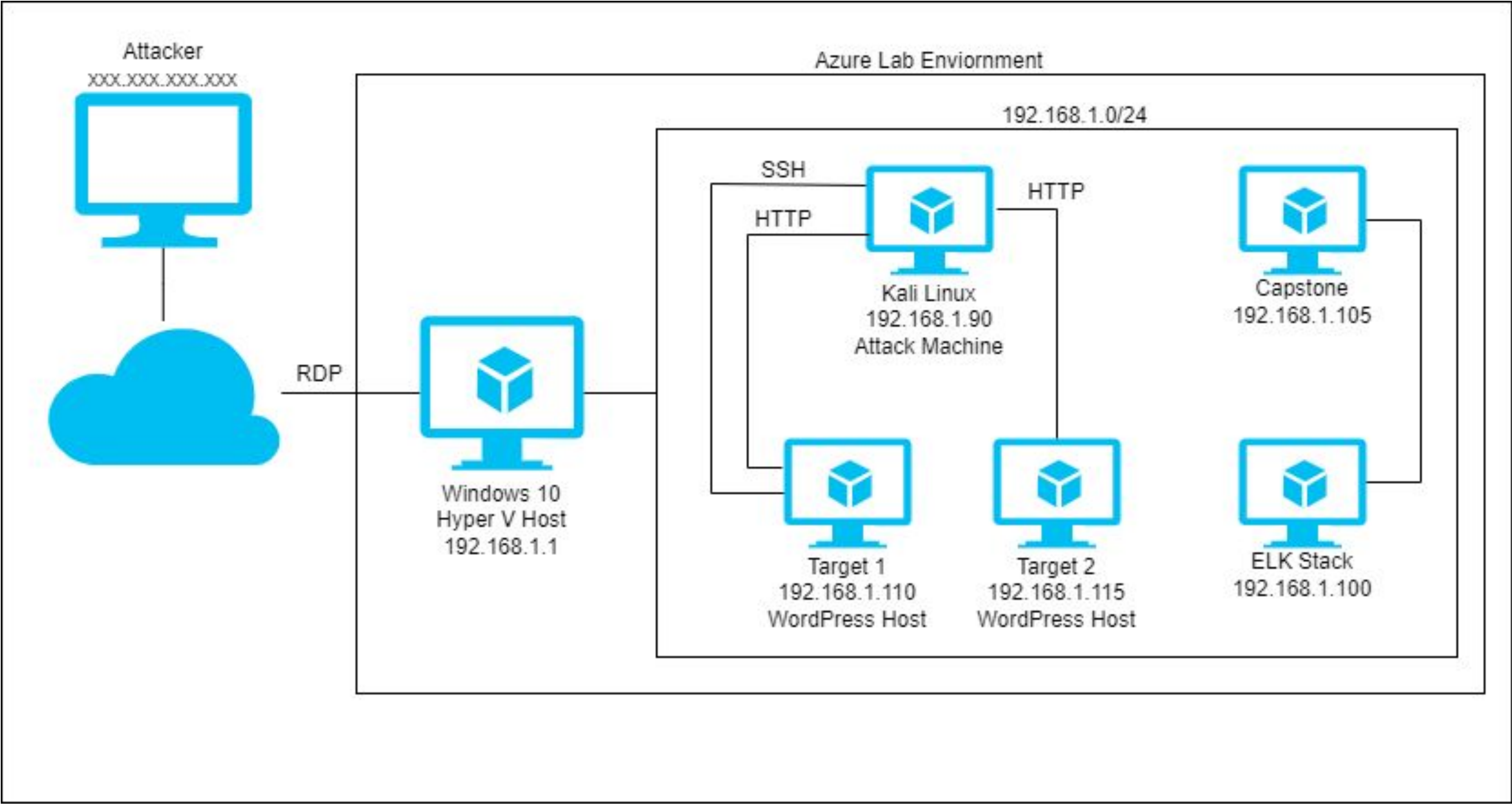
**Normal Activity**



**Malicious Activity**

# 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: Debian Kali 5.4.0  
Hostname: Kali

IPv4: 192.168.1.110  
OS: Debian GNU/Linux 8  
Hostname: Target 1

IPv4: 192.168.1.115  
OS: Debian GNU/ Linux 8  
Hostname: Target 2

IPv4: 192.168.1.105  
OS: Ubuntu 18.04  
Hostname: Capstone

IPv4: 192.168.1.100  
OS: Ubuntu 18.04  
Hostname: ELK

# Critical Vulnerabilities: Target 1

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

Vulnerability	Description	Impact
WordPress Core Username Enumeration CVE-2017-5487	WPScan will attempt to enumerate all users on a given WordPress installation. If successful it will output usernames back to the attacker.	Passwords can be easily bypassed manually and with commands like John the Ripper meaning users are not secure
CVE-2017-7494 SambaCry	Samba version 3.5.0 and before 4.6.4, 4.5.10 and 4.4.14 is vulnerable to remote code execution vulnerability, allowing a malicious client to upload a shared library to a writable share, and then cause the server to load and execute it.	After exploitation Remote Code Execution can be performed by the attacker.
Open Port 80 Apache httpd 2.4.10 (Debian)	An attacker with network access to the web server on port 80/TCP or 443/TCP could execute system commands with administrative privileges.	The security vulnerability could be exploited by an unauthenticated attacker with network access to the affected service.



# Critical Vulnerabilities: Target 1 Cont.

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

Vulnerability	Description	Impact
Weak User Passwords	Easily guessed/Brute Forced passwords.	Passwords can be easily bypassed manually and with commands like John the Ripper meaning users are not secure
Python 2.7.9 Privilege Escalation	Python sudo privileges for user allow for privilege escalation if user is compromised.	Compromised account can be used by attacker to gain root access.
WordPress xml rpc pingback CVE-2013-0235	The pingback feature of XML-RPC API allows attacks like DDOS and Server-Side Request Forgery (SSRF) either against the server hosting WordPress or against a target server	On a successful exploit, an attacker can control a WordPress site to conduct DDOS or Server-Side Request Forgery

# Traffic Profile

# Traffic Profile

Our analysis identified the following characteristics of the traffic on the network:

Feature	Value	Description
Top Talkers (IP Addresses)	<ul style="list-style-type: none"><li>● 185.243.115.84 (17M Bytes)</li><li>● 172.16.4.205 (15M Bytes)</li><li>● 166.62.111.64 (11M Bytes)</li></ul>	Machines that sent the most traffic.
Most Common Protocols	<ul style="list-style-type: none"><li>● TCP (85.9%)<ul style="list-style-type: none"><li>○ TLS (8.2%)</li><li>○ HTTP (3.9%)</li></ul></li><li>● UDP (14%)</li></ul>	Four most common protocols on the network
# of Unique IP Addresses	810	Count of observed IP addresses.
Subnets	<ul style="list-style-type: none"><li>● 10.6.12.0/24</li><li>● 172.16.4.0/24</li><li>● 10.0.0.0/24</li></ul>	Observed subnet ranges.
# of Malware Species	Trojan (june11.dll)	Number of malware binaries identified in traffic.



# Behavioral Analysis

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## Purpose of Traffic on the Network

Users were observed engaging in the following kinds of activity.

### **“Normal” Activity**

- Browsing social media websites
- Browsing news sites
- Visiting healthcare websites

### **Suspicious Activity**

- Setting up custom server to watch YouTube and also bypass security settings
- Users were exposed to malware and user machines were infected
- Illegal downloads from torrent sites

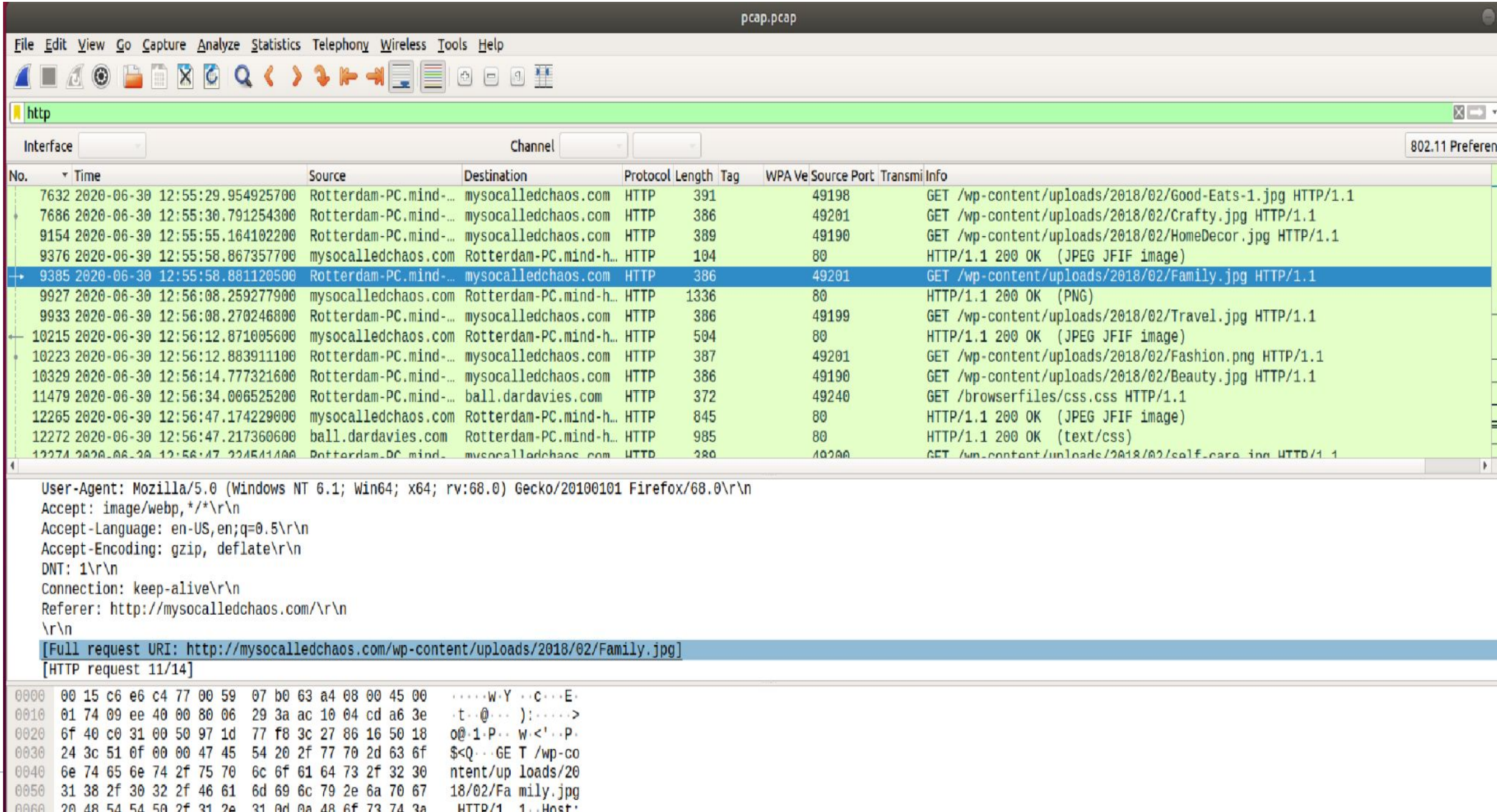


Normal Activity



# Browsing Social Media

- Several HTTP requests to a social media website called mysocalledchaos.com were tracked
- GET requests to view selected images
- Although this activity is discouraged during work hours, social media browsing is not logged as suspicious behavior depending on the site and files involved
- A few pictures were viewed by this user, a image file named family.jpg which showed a baby. We can see with the GET request that these images were selected by the user to be viewed
- A few other images of plants, travel images, and other misc. images



No.	Time	Source	Destination	Protocol	Length	Tag	WPA Ver	Source Port	Transm Info
7632	2020-06-30 12:55:29.954925700	Rotterdam-PC.mind-...	mysocalledchaos.com	HTTP	391			49198	GET /wp-content/uploads/2018/02/Good-Eats-1.jpg HTTP/1.1
7686	2020-06-30 12:55:30.791254300	Rotterdam-PC.mind-...	mysocalledchaos.com	HTTP	386			49201	GET /wp-content/uploads/2018/02/Crafty.jpg HTTP/1.1
9154	2020-06-30 12:55:55.164192200	Rotterdam-PC.mind-...	mysocalledchaos.com	HTTP	389			49190	GET /wp-content/uploads/2018/02/HomeDecor.jpg HTTP/1.1
9376	2020-06-30 12:55:58.867357700	mysocalledchaos.com	Rotterdam-PC.mind-h...	HTTP	104			80	HTTP/1.1 200 OK (JPEG JFIF image)
9385	2020-06-30 12:55:58.881120500	Rotterdam-PC.mind-...	mysocalledchaos.com	HTTP	386			49201	GET /wp-content/uploads/2018/02/Family.jpg HTTP/1.1
9927	2020-06-30 12:56:08.259277900	mysocalledchaos.com	Rotterdam-PC.mind-h...	HTTP	1336			80	HTTP/1.1 200 OK (PNG)
9933	2020-06-30 12:56:08.270246800	Rotterdam-PC.mind-...	mysocalledchaos.com	HTTP	386			49199	GET /wp-content/uploads/2018/02/Travel.jpg HTTP/1.1
10215	2020-06-30 12:56:12.871095600	mysocalledchaos.com	Rotterdam-PC.mind-h...	HTTP	504			80	HTTP/1.1 200 OK (JPEG JFIF image)
10223	2020-06-30 12:56:12.883911100	Rotterdam-PC.mind-...	mysocalledchaos.com	HTTP	387			49201	GET /wp-content/uploads/2018/02/Fashion.png HTTP/1.1
10329	2020-06-30 12:56:14.777321600	Rotterdam-PC.mind-...	mysocalledchaos.com	HTTP	386			49190	GET /wp-content/uploads/2018/02/Beauty.jpg HTTP/1.1
11479	2020-06-30 12:56:34.006525200	Rotterdam-PC.mind-...	ball.dardavies.com	HTTP	372			49240	GET /browserfiles/css.css HTTP/1.1
12265	2020-06-30 12:56:47.174229000	mysocalledchaos.com	Rotterdam-PC.mind-h...	HTTP	845			80	HTTP/1.1 200 OK (JPEG JFIF image)
12272	2020-06-30 12:56:47.217360600	ball.dardavies.com	Rotterdam-PC.mind-h...	HTTP	985			80	HTTP/1.1 200 OK (text/css)
12274	2020-06-30 12:56:47.224541400	Rotterdam-PC.mind-...	mysocalledchaos.com	HTTP	280			49200	GET /wp-content/uploads/2018/02/self-care.jpg HTTP/1.1

User-Agent: Mozilla/5.0 (Windows NT 6.1; Win64; x64; rv:68.0) Gecko/20100101 Firefox/68.0\r\n  
Accept: image/webp, \*/\*\r\n  
Accept-Language: en-US,en;q=0.5\r\n  
Accept-Encoding: gzip, deflate\r\n  
DNT: 1\r\n  
Connection: keep-alive\r\n  
Referer: http://mysocalledchaos.com/\r\n  
\r\n  
[Full request URI: http://mysocalledchaos.com/wp-content/uploads/2018/02/Family.jpg]  
[HTTP request 11/14]

0000 00 15 c6 e6 c4 77 00 59 07 b0 63 a4 08 00 45 00 .....W-Y...C...E-  
0010 01 74 09 ee 40 00 00 06 29 3a ac 10 04 cd a6 3e .t..@...):.....>  
0020 6f 40 c0 31 00 50 97 1d 77 f8 3c 27 86 16 50 18 o@.1.P..w<..P-  
0030 24 3c 51 0f 00 00 47 45 54 20 2f 77 70 2d 63 6f \$<Q...GE T /wp-co  
0040 6e 74 65 66 74 2f 75 70 6c 6f 61 64 73 2f 32 30 ntent/up loads/20  
0050 31 38 2f 30 32 2f 46 61 6d 69 6c 79 2e 6a 70 67 18/02/Fa mily.jpg  
0060 20 48 54 54 50 2f 31 2a 31 0d 0a 48 6f 73 74 3a HTTP/1 1..Host





# Visiting healthcare and health related websites

Summarize the following:

- User visited local hospital website. Several GET requests are tracked indicating navigation through several pages and loading of images on the website
- User selected a link from the hospital website that redirected to another health related site
- We can see in the traffic, the referer is the original hospital site

http

Interface

Channel

802.11 Preferred

No.	Time	Source	Destination	Protocol	Length	Tag	WPA Ver	Source Port	Transm Info
38979	2020-06-30 13:02:09.460815600	www.sabethahospital.com	DESKTOP-B49J3FD.local	HTTP	799		80		HTTP/1.1 200 OK (text/css)
38994	2020-06-30 13:02:09.591363600	www.sabethahospital.com	DESKTOP-B49J3FD.local	HTTP	316		80		HTTP/1.1 200 OK (text/css)
39000	2020-06-30 13:02:09.607182400	www.sabethahospital.com	DESKTOP-B49J3FD.local	HTTP	695		80		HTTP/1.1 200 OK (PNG)
39016	2020-06-30 13:02:09.628871800	DESKTOP-B49J3FD.local	www.sabethahospital.com	HTTP	474		50151		GET /docs/menu_lock.png HTTP/1.1
39017	2020-06-30 13:02:09.636608700	DESKTOP-B49J3FD.local	www.sabethahospital.com	HTTP	483		50152		GET /pictures/content/180215.jpg HTTP/1.1
39018	2020-06-30 13:02:09.643832000	DESKTOP-B49J3FD.local	www.sabethahospital.com	HTTP	451		50153		GET /js/startup.js?script_version=1567795643 HTTP/1.1
39024	2020-06-30 13:02:09.670756700	www.sabethahospital.com	DESKTOP-B49J3FD.local	HTTP	1148		80		HTTP/1.1 200 OK (PNG)
39033	2020-06-30 13:02:09.746776600	www.sabethahospital.com	DESKTOP-B49J3FD.local	HTTP	851		80		HTTP/1.1 200 OK (application/x-javascript)
39077	2020-06-30 13:02:10.163572300	www.sabethahospital.com	DESKTOP-B49J3FD.local	HTTP	1258		80		HTTP/1.1 200 OK (JPEG JFIF image)
39215	2020-06-30 13:02:10.968766800	DESKTOP-B49J3FD.local	pictures.fasthealth.com	HTTP	500		50156		GET /pictures/282567.png?last_modified=1565115571 HTTP/1.1
39223	2020-06-30 13:02:10.983486900	DESKTOP-B49J3FD.local	pictures.fasthealth.com	HTTP	500		50163		GET /pictures/281709.png?last_modified=1563999355 HTTP/1.1
39225	2020-06-30 13:02:10.992450000	DESKTOP-B49J3FD.local	pictures.fasthealth.com	HTTP	500		50155		GET /pictures/270545.png?last_modified=1541605401 HTTP/1.1
39226	2020-06-30 13:02:11.000480300	DESKTOP-B49J3FD.local	pictures.fasthealth.com	HTTP	500		50164		GET /pictures/284947.png?last_modified=1569509992 HTTP/1.1
39227	2020-06-30 13:02:11.008458400	DESKTOP-B49J3FD.local	pictures.fasthealth.com	HTTP	500		50160		GET /pictures/283175.png?last_modified=1566573563 HTTP/1.1
39228	2020-06-30 13:02:11.016476500	DESKTOP-B49J3FD.local	pictures.fasthealth.com	HTTP	500		50162		GET /pictures/282565.png?last_modified=1565115571 HTTP/1.1

GET /prod/assets/themes/magazines/SUBS/templates/velocity/site/td-pcslogin/login.html HTTP/1.1\r\n

[Expert Info (Chat/Sequence): GET /prod/assets/themes/magazines/SUBS/templates/velocity/site/td-pcslogin/login.html HTTP/1.1\r\n]

Request Method: GET

Request URI: /prod/assets/themes/magazines/SUBS/templates/velocity/site/td-pcslogin/login.html

Request Version: HTTP/1.1

Host: subscription-assets.time.com\r\n

[truncated]Cookie: TICM\_omni=c16%3Dphotoessays%7Ec11%3D; TICM\_omni\_lpid=; gpv\_v17=time%7Cphotoessays%7Clibya's%20roman%20ruins; optimizelyBuckets=%7B%7D; optimizelyE

Connection: keep-alive\r\n

Upgrade-Insecure-Requests: 1\r\n

http

Interface

Channel

802.11 Preferred

No.	Time	Source	Destination	Protocol	Length	Tag	WPA Ver	Source Port	Transm Info
38979	2020-06-30 13:02:09.460815600	www.sabethahospital.com	DESKTOP-B49J3FD.local	HTTP	799		80		HTTP/1.1 200 OK (text/css)
38994	2020-06-30 13:02:09.591363600	www.sabethahospital.com	DESKTOP-B49J3FD.local	HTTP	316		80		HTTP/1.1 200 OK (text/css)
39000	2020-06-30 13:02:09.607182400	www.sabethahospital.com	DESKTOP-B49J3FD.local	HTTP	695		80		HTTP/1.1 200 OK (PNG)
39016	2020-06-30 13:02:09.628871800	DESKTOP-B49J3FD.local	www.sabethahospital.com	HTTP	474		50151		GET /docs/menu_lock.png HTTP/1.1
39017	2020-06-30 13:02:09.636608700	DESKTOP-B49J3FD.local	www.sabethahospital.com	HTTP	483		50152		GET /pictures/content/180215.jpg HTTP/1.1
39018	2020-06-30 13:02:09.643832000	DESKTOP-B49J3FD.local	www.sabethahospital.com	HTTP	451		50153		GET /js/startup.js?script_version=1567795643 HTTP/1.1
39024	2020-06-30 13:02:09.670756700	www.sabethahospital.com	DESKTOP-B49J3FD.local	HTTP	1148		80		HTTP/1.1 200 OK (PNG)
39033	2020-06-30 13:02:09.746776600	www.sabethahospital.com	DESKTOP-B49J3FD.local	HTTP	851		80		HTTP/1.1 200 OK (application/x-javascript)
39077	2020-06-30 13:02:10.163572300	www.sabethahospital.com	DESKTOP-B49J3FD.local	HTTP	1258		80		HTTP/1.1 200 OK (JPEG JFIF image)
39215	2020-06-30 13:02:10.968766800	DESKTOP-B49J3FD.local	pictures.fasthealth.com	HTTP	500		50156		GET /pictures/282567.png?last_modified=1565115571 HTTP/1.1
39223	2020-06-30 13:02:10.983486900	DESKTOP-B49J3FD.local	pictures.fasthealth.com	HTTP	500		50163		GET /pictures/281709.png?last_modified=1563999355 HTTP/1.1
39225	2020-06-30 13:02:10.992450000	DESKTOP-B49J3FD.local	pictures.fasthealth.com	HTTP	500		50155		GET /pictures/270545.png?last_modified=1541605401 HTTP/1.1
39226	2020-06-30 13:02:11.000480300	DESKTOP-B49J3FD.local	pictures.fasthealth.com	HTTP	500		50164		GET /pictures/284947.png?last_modified=1569509992 HTTP/1.1
39227	2020-06-30 13:02:11.008458400	DESKTOP-B49J3FD.local	pictures.fasthealth.com	HTTP	500		50160		GET /pictures/283175.png?last_modified=1566573563 HTTP/1.1
39228	2020-06-30 13:02:11.016476500	DESKTOP-B49J3FD.local	pictures.fasthealth.com	HTTP	500		50162		GET /pictures/282565.png?last_modified=1565115571 HTTP/1.1

GET /pictures/282567.png?last\_modified=1565115571 HTTP/1.1\r\n

[Expert Info (Chat/Sequence): GET /pictures/282567.png?last\_modified=1565115571 HTTP/1.1\r\n]

Request Method: GET

Request URI: /pictures/282567.png?last\_modified=1565115571

Request Version: HTTP/1.1

Referer: http://www.sabethahospital.com/getpage.php?name=whatappendixdo\r\n

Accept: image/png, image/svg+xml, image/\*;q=0.8, \*/\*;q=0.5\r\n

Accept-Language: en-US\r\n

Accept-Encoding: gzip, deflate\r\n

User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/70.0.3538.102 Safari/537.36 Edge/18.18362\r\n

- Several PNG files were requested from health site (fasthealth.com)
- These appear to be embedded images in the webpage as the user was navigating



# Malicious Activity



# Time Theft

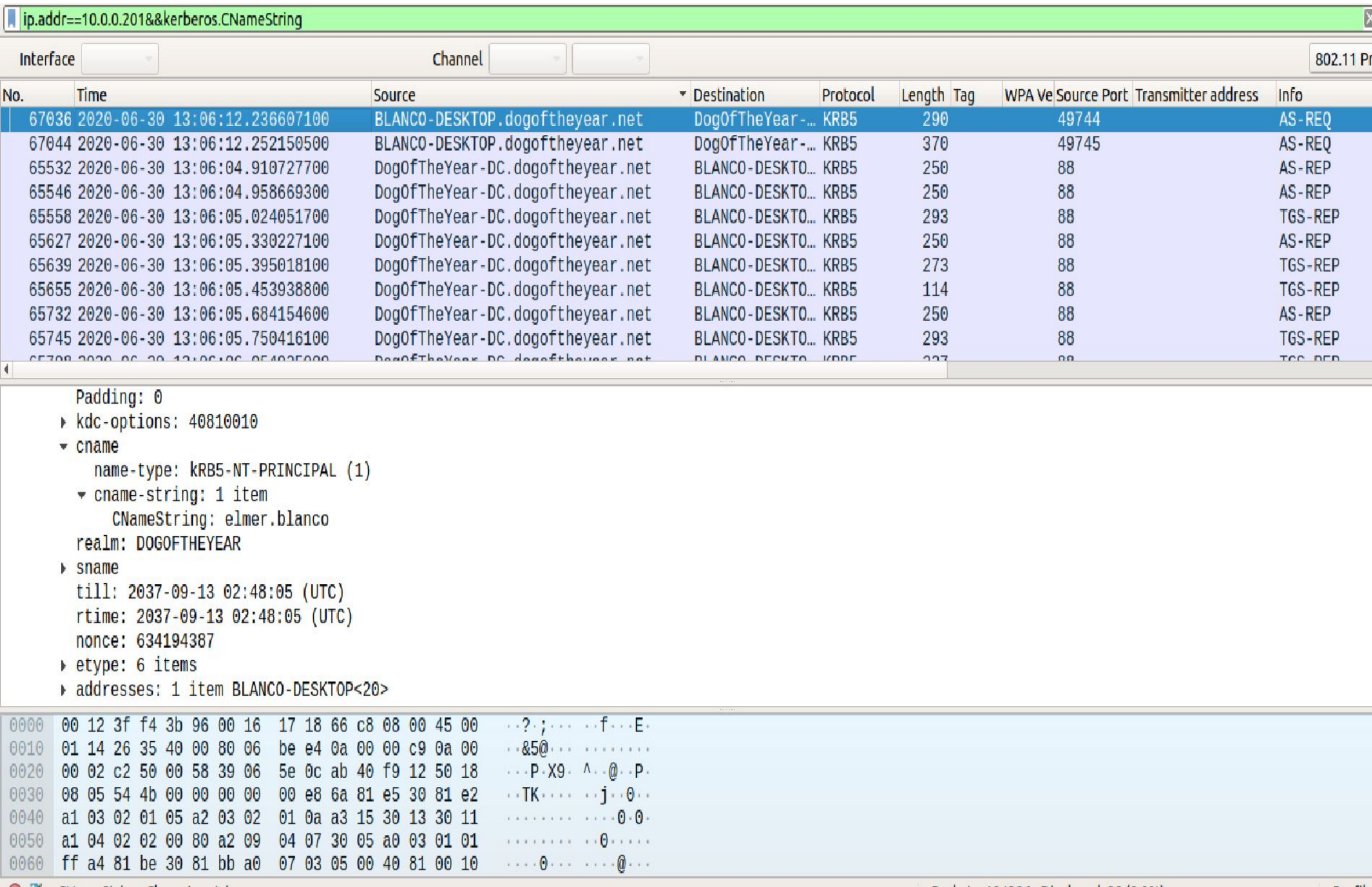
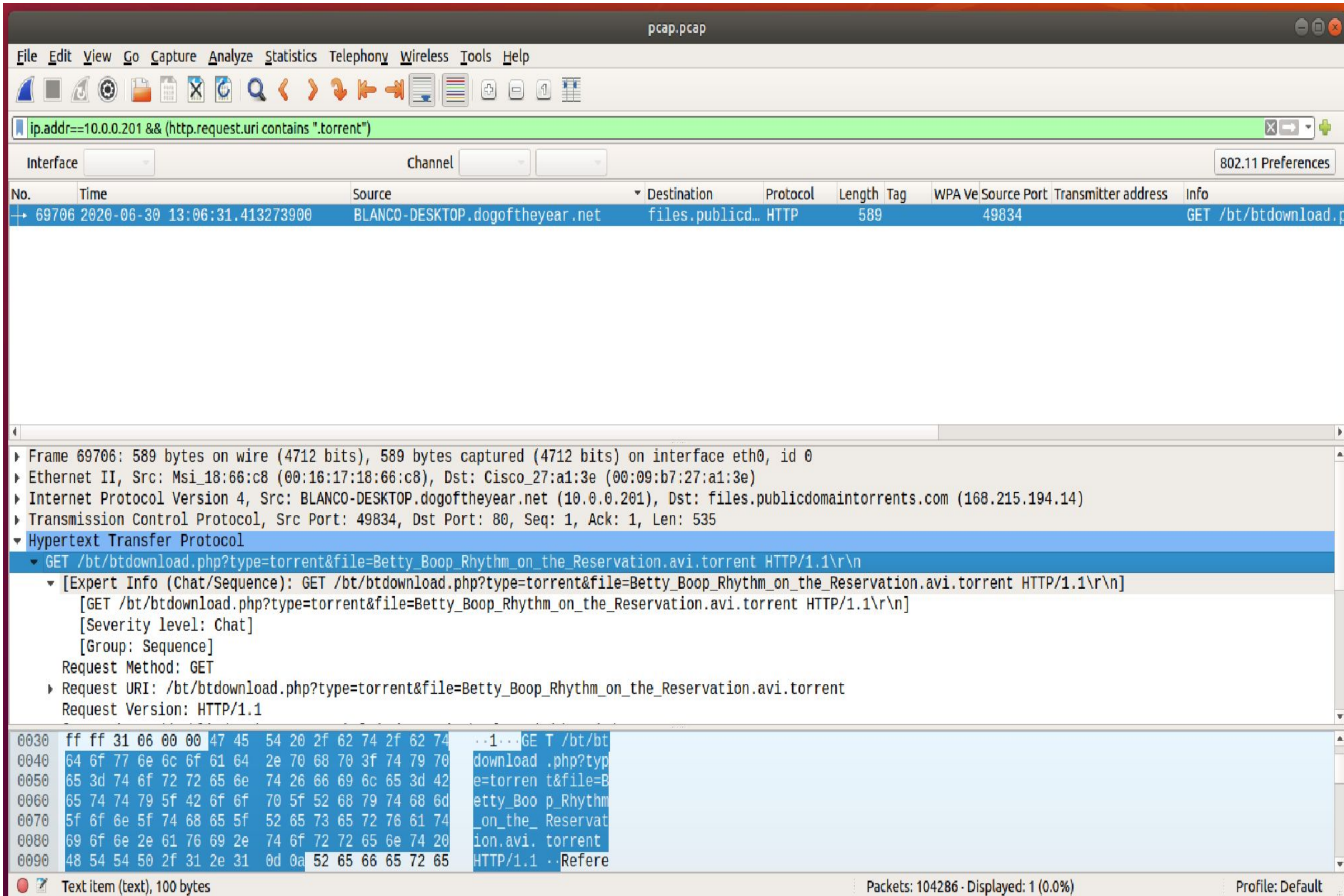
- It was determined that two employees were stealing time by browsing YouTube during work hours
- The users had created their own custom server within the network to use for this purpose, TCP and DNS traffic was tracked to the server
- Also, malware infected a machine on the network as a result of the activity.
- A trojan malware identified as June11.dll was detected being downloaded onto the infected machine.
- TCP traffic was traced to determine source of malware at 185.243.115.84





# Illegal Downloads

- Capture analysis detected a user performing illegal downloads onto their work computer
- HTTP traffic was detected sending a GET request to a torrent site
- A file from a torrent file was downloaded by the user



- The file Betty\_Boop\_Rhythm\_on\_the\_reservation.avi.torrent was downloaded





The End