

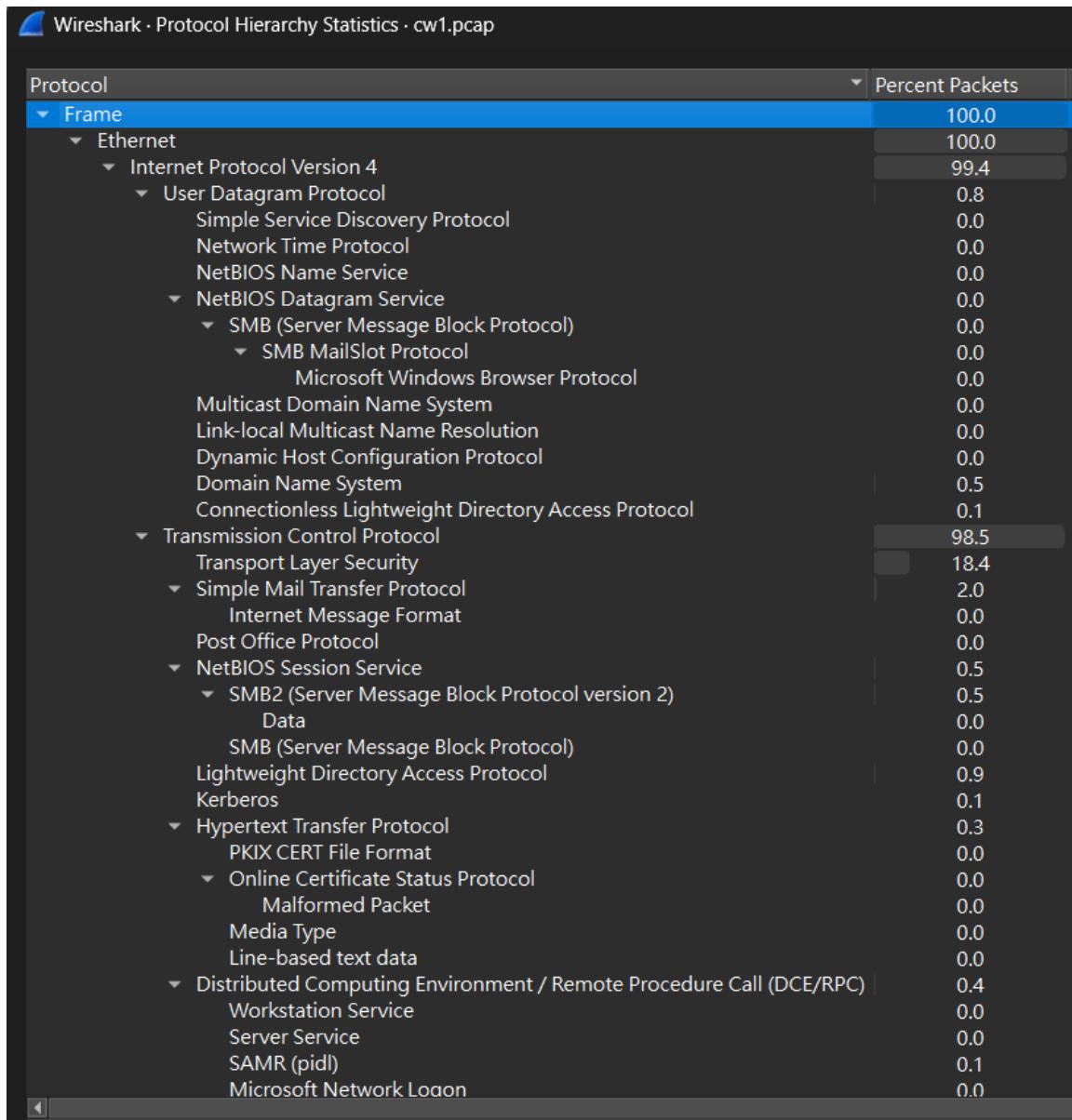
## Incident Report: Malicious Network Traffic Analysis

**Section 1 – Introduction** This incident report documents a comprehensive forensic investigation into suspicious network activity captured in the file cw1.pcap. The analysis was initiated following an endpoint security alert indicating unusual outbound connections from an internal Windows workstation shortly after a user opened an attachment. As a security analyst, the primary objectives were to identify the compromised system, trace the infection vector, classify the malware family, reconstruct the attack chain, and provide actionable recommendations to prevent recurrence.

The investigation leveraged 20 targeted quiz questions that systematically guided the discovery of key indicators of compromise (IOCs), including malicious domains, IP addresses, payloads, command-and-control (C2) infrastructure, and exfiltration attempts. Wireshark served as the core analysis platform, supplemented by manual packet dissection, protocol decoding, and external IOC validation via VirusTotal. The report is structured as follows: methodology (tools, techniques, and step-by-step process), results (detailed findings with evidence), and conclusion (lessons learned and prevention strategies). All timestamps are in UTC unless otherwise stated.

**Section 2 – Methodology** The analysis was performed using **Wireshark** (stable release) as the primary tool due to its powerful filtering engine, protocol dissectors, stream reconstruction, Conversations statistics, and HTTP object export capabilities. No additional commercial tools were required, ensuring reproducibility in resource-constrained environments. The investigative process followed a structured, repeatable approach aligned with NIST SP 800-86 (Guide to Integrating Forensic Techniques into Incident Response):

1. **Initial Triage and Scope Definition** Opened cw1.pcap and reviewed Statistics > Protocol Hierarchy to identify dominant protocols: TCP (majority), HTTP, TLS/HTTPS, DNS, and SMTP. Filtered on the suspected victim IP ip.src == 10.9.23.102 (private 10.0.0.0/8 range) and confirmed the endpoint MAC address 00:08:02:1c:47:ae (Hewlett Packard) as the consistent source of malicious traffic.



### Protocol Hierarchy

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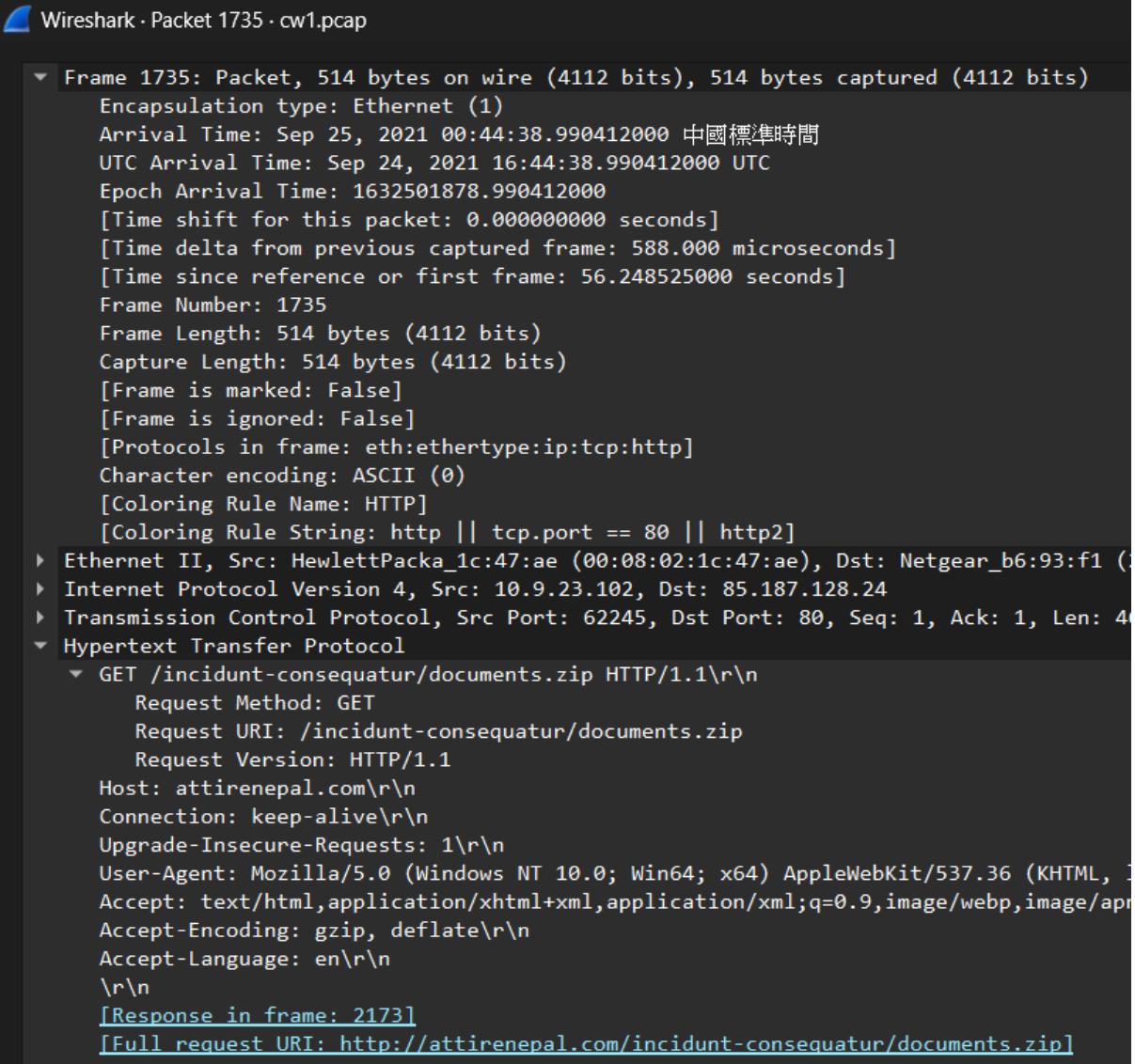
▼ Ethernet II, Src: HewlettPacka_1c:47:ae (00:08:02:1c:47:ae), Dst: IPv4mcast_16 (01:00:5e:00:00:16)
  ▼ Destination: IPv4mcast_16 (01:00:5e:00:00:16)
    .... ..0. .... .... .... = LG bit: Globally unique address (factory default)
    .... ..1. .... .... .... = IG bit: Group address (multicast/broadcast)
  ▼ Source: HewlettPacka_1c:47:ae (00:08:02:1c:47:ae)
    .... ..0. .... .... .... = LG bit: Globally unique address (factory default)
    .... ..0. .... .... .... = IG bit: Individual address (unicast)
Type: IPv4 (0x0800)
[Stream index: 2]

```

MAC address of infected machine

2. **Reconstruction of Initial Infection Vector** Applied filter http to isolate clear-text web traffic. Identified the first malicious HTTP transaction at **2021-09-24 16:44:38 UTC**:

Frame 1735 (GET /incidunt-consequatur/documents.zip HTTP/1.1) to domain [attirenepal.com](http://attirenepal.com). The server response in Frame 2173 returned **documents.zip** (198125 bytes) with headers: Server: **LiteSpeed** (no version disclosed), X-Powered-By: PHP/7.2.34, Content-Disposition: attachment; filename=documents.zip. Exported the file via File > Export Objects > HTTP, decompressed it locally, and discovered the internal file **chart-1530076591.xls** (likely containing malicious VBA macros).



Wireshark - Packet 1735 · cw1.pcap

Frame 1735: Packet, 514 bytes on wire (4112 bits), 514 bytes captured (4112 bits)  
Encapsulation type: Ethernet (1)  
Arrival Time: Sep 25, 2021 00:44:38.990412000 中國標準時間  
UTC Arrival Time: Sep 24, 2021 16:44:38.990412000 UTC  
Epoch Arrival Time: 1632501878.990412000  
[Time shift for this packet: 0.000000000 seconds]  
[Time delta from previous captured frame: 588.000 microseconds]  
[Time since reference or first frame: 56.248525000 seconds]  
Frame Number: 1735  
Frame Length: 514 bytes (4112 bits)  
Capture Length: 514 bytes (4112 bits)  
[Frame is marked: False]  
[Frame is ignored: False]  
[Protocols in frame: eth:ethertype:ip:tcp:http]  
Character encoding: ASCII (0)  
[Coloring Rule Name: HTTP]  
[Coloring Rule String: http || tcp.port == 80 || http2]  
Ethernet II, Src: HewlettPacka\_1c:47:ae (00:08:02:1c:47:ae), Dst: Netgear\_b6:93:f1 (00:0c:29:b6:93:f1)  
Internet Protocol Version 4, Src: 10.9.23.102, Dst: 85.187.128.24  
Transmission Control Protocol, Src Port: 62245, Dst Port: 80, Seq: 1, Ack: 1, Len: 404  
Hypertext Transfer Protocol  
GET /incident-consequatur/documents.zip HTTP/1.1\r\nRequest Method: GET  
Request URI: /incident-consequatur/documents.zip  
Request Version: HTTP/1.1  
Host: attirenepal.com\r\nConnection: keep-alive\r\nUpgrade-Insecure-Requests: 1\r\nUser-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/94.0.4606.61 Safari/537.36  
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,image/apng,\*/\*;q=0.8  
Accept-Encoding: gzip, deflate\r\nAccept-Language: en\r\n\r\n[Response in frame: 2173]  
[Full request URI: http://attirenepal.com/incidunt-consequatur/documents.zip]

Frame 1735

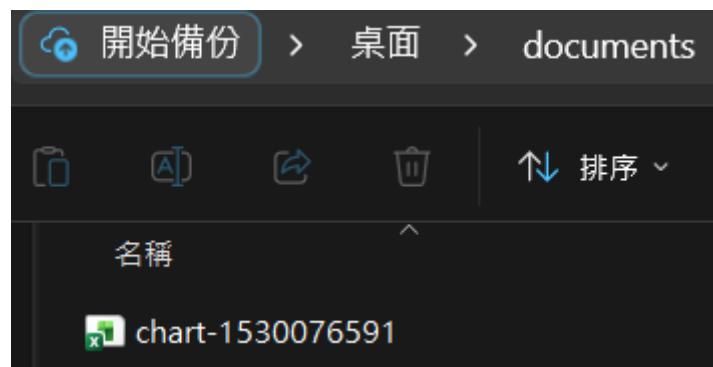
```

Wireshark - Packet 2173 · cw1.pcap

▼ Frame 2173: Packet, 580 bytes on wire (4640 bits), 580 bytes captured (4640 bits)
  Encapsulation type: Ethernet (1)
  Arrival Time: Sep 25, 2021 00:44:41.976037000 中國標準時間
  UTC Arrival Time: Sep 24, 2021 16:44:41.976037000 UTC
  Epoch Arrival Time: 1632501881.976037000
  [Time shift for this packet: 0.000000000 seconds]
  [Time delta from previous captured frame: 7.000 microseconds]
  [Time delta from previous displayed frame: 2.985625000 seconds]
  [Time since reference or first frame: 59.234150000 seconds]
  Frame Number: 2173
  Frame Length: 580 bytes (4640 bits)
  Capture Length: 580 bytes (4640 bits)
  [Frame is marked: False]
  [Frame is ignored: False]
  [Protocols in frame: eth:ethertype:ip:tcp:http:data]
  Character encoding: ASCII (0)
  [Coloring Rule Name: HTTP]
  [Coloring Rule String: http || tcp.port == 80 || http2]
▶ Ethernet II, Src: Netgear_b6:93:f1 (20:e5:2a:b6:93:f1), Dst: HewlettPacka_1c:47
▶ Internet Protocol Version 4, Src: 85.187.128.24, Dst: 10.9.23.102
▶ Transmission Control Protocol, Src Port: 80, Dst Port: 62245, Seq: 198269, Ack: 198270
▶ [148 Reassembled TCP Segments (198794 bytes): #1841(1460), #1842(1236), #1844(134)]
▼ Hypertext Transfer Protocol, has 5 chunks (including last chunk)
  ▼ HTTP/1.1 200 OK\r\n
    Response Version: HTTP/1.1
    Status Code: 200
    [Status Code Description: OK]
    Response Phrase: OK
    Connection: Keep-Alive\r\n
    Keep-Alive: timeout=5, max=100\r\n
    x-powered-by: PHP/7.2.34\r\n
    set-cookie: PHPSESSID=3de638a4b99bd63f8f7b0ca7e3b6f14c; path=/\r\n
    content-description: File Transfer\r\n
    content-type: application/octet-stream\r\n
    content-disposition: attachment; filename=documents.zip\r\n
    content-transfer-encoding: binary\r\n
    expires: 0\r\n
    cache-control: must-revalidate, post-check=0, pre-check=0\r\n
    pragma: public\r\n
    transfer-encoding: chunked\r\n
    date: Fri, 24 Sep 2021 16:44:06 GMT\r\n
    server: LiteSpeed\r\n
    strict-transport-security: max-age=63072000; includeSubDomains\r\n
    x-frame-options: SAMEORIGIN\r\n
    x-content-type-options: nosniff\r\n
  \r\n
  [Request in frame: 1735]

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Frame 2173



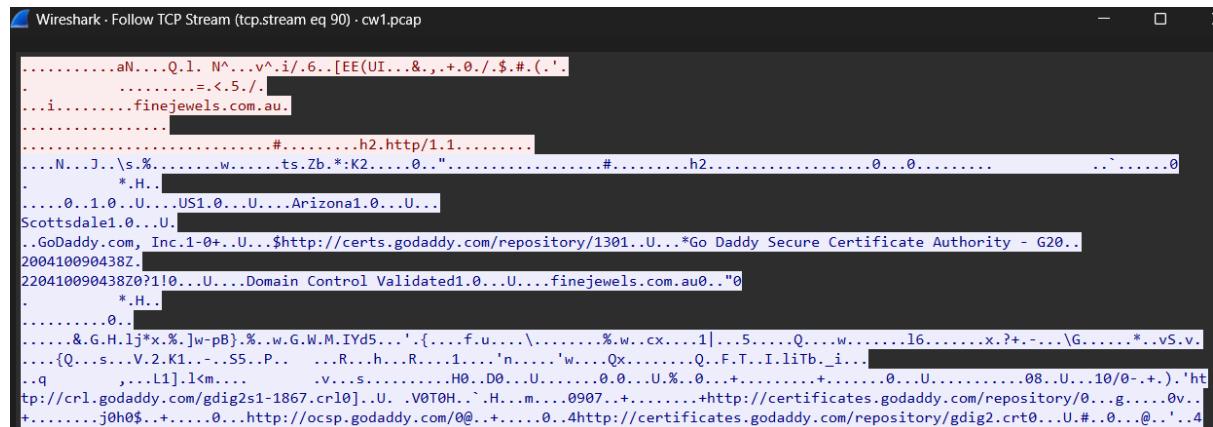
Decompressed documents.zip internal file chart-1530076591.xls

3. Secondary Payload Staging and Lateral Delivery Narrowed analysis to the critical time window 16:45:11 – 16:45:30 UTC (quiz hint) using filter tls. Examined Client Hello packets for Server Name Indication (SNI) extension, revealing three additional malicious domains involved in payload delivery:

- a. **finejewels.com.au** (Frame 2427; certificate chain issued by GoDaddy)
- b. **Thietbiagt.com** (Frame 3009)
- c. **new.americold.com** (Frame 3229)

These domains hosted secondary payloads or loaders that facilitated the next stage of compromise.

| 2427 89.098829 10.9.23.102 148.72.192.206 63368 443 247 Client Hello (SNI=finejewels.com.au)



```
Wireshark - Follow TCP Stream (tcp.stream eq 90) · cw1.pcap
.....aN....Q.l. N^...v^.i/.6..[EE(UI...8.,.+0./$.#.('.'.
.....=<.5./.
.i.....finejewels.com.au.
.....#.....h2.http/1.1.....N..J..s%.....W.....ts.Zb.*:K2....0..".....#.....h2.....0...0.....0
*.H..
....0..1.0..U....US1.0..U....Arizona1.0....U...
Scottsdale1.0..U.
..GoDaddy.com, Inc.1-0+..U...$http://certs.godaddy.com/repository/1301.U...*Go Daddy Secure Certificate Authority - G20..
200410090438Z.
220410090438Z?1!0..U....Domain Control Validated1.0...U....finejewels.com.au0.."0
*.H..
....0...
....&G.H.\j*x.%.]w-pB}%.w.G.W.M.IYd5....'.{....f.u....\.....%w..cx....1|...5....Q....w.....16.....x.?+.-..\G.....*..vS.v.
...{Q...s...V.2.K1...S5.P...R...h...R...1...'n....'w...Qx.....0..F.T.I.liTb_i...
..q ,...L1].l<m... .v...s.....H0..D0..U.....0.0..U.%..0...+.....+....0...U.....08..U...10/0-+.).'ht
tp://crl.godaddy.com/gdig2s1-1867.crl0]..U ..VOTH..H..m...0907..+.....+http://certificates.godaddy.com/repository/0...g....0v...
+.....j0h0$..+....0...http://ocsp.godaddy.com/0@..+....0..4http://certificates.godaddy.com/repository/gdig2.crt0..U.#..0...@..4
```

Frame 2427

| 3009 98.572125 10.9.23.102 210.245.90.247 63375 443 244 Client Hello (SNI=thietbiagt.com)

Frame 3009

| 3229 102.989229 10.9.23.102 148.72.53.144 63376 443 247 Client Hello (SNI=new.americold.com)

Frame 3229

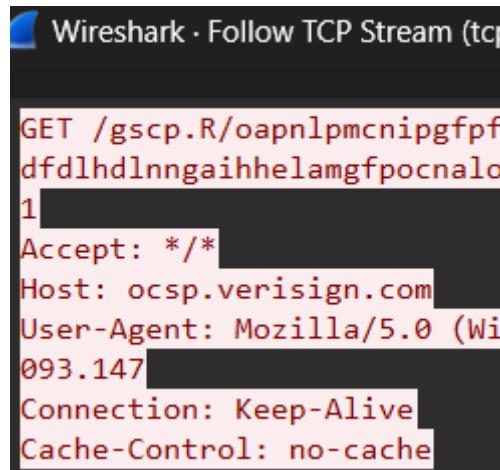
4. Command-and-Control (C2) Infrastructure Identification Used Statistics > Conversations > TCP (sorted by packet count and duration) to detect persistent, periodic outbound connections indicative of beaconing. Identified two Cobalt Strike Team Servers:

- a. **185.106.96.158** (port 80/HTTP): Host header **ocsp.verisign.com** (domain fronting technique), associated domain **survmeter.live**

b. 185.125.204.174 (port 443/HTTPS): SNI securitybusinpuff.com (Frame 7112  
 Client Hello)

No.	Time	ip.src	ip.dst	src port	dst port	Length	info
24088	964.936527	10.9.23.102	185.106.96.158	63579	80	54	63579 → 80 [ACK] Seq=1 Ack=1 Win=65535 Len=0
24089	964.936713	10.9.23.102	185.106.96.158	63579	80	569	GET /gscp.R/oapnlpmcnipgfpfghdahhbhbjigcmfgekipdla...cedhacmaghdehcdaajhnk
24092	965.182666	10.9.23.102	185.106.96.158	63579	80	54	63579 → 80 [ACK] Seq=516 Ack=310 Win=65535 Len=0
24093	965.182797	10.9.23.102	185.106.96.158	63579	80	54	63579 → 80 [FIN, ACK] Seq=516 Ack=310 Win=65535 Len=0
24100	969.883283	10.9.23.102	185.106.96.158	63580	80	66	63580 → 80 [SYN] Seq=0 Win=65535 Len=0 MSS=1460 WS=256 SACK_PERM
24102	970.226286	10.9.23.102	185.106.96.158	63580	80	54	63580 → 80 [ACK] Seq=1 Ack=1 Win=65535 Len=0
24103	970.226632	10.9.23.102	185.106.96.158	63580	80	569	GET /gscp.R/oapnlpmcnipgfpfghdahhbhbjigcmfgekipdla...cedhacmaghdehcdaajhnk
24106	970.532855	10.9.23.102	185.106.96.158	63580	80	54	63580 → 80 [ACK] Seq=516 Ack=310 Win=65535 Len=0
24107	970.533127	10.9.23.102	185.106.96.158	63580	80	54	63580 → 80 [FIN, ACK] Seq=516 Ack=310 Win=65535 Len=0
24112	973.758681	10.9.23.102	185.106.96.158	63581	80	66	63581 → 80 [SYN] Seq=0 Win=65535 Len=0 MSS=1460 WS=256 SACK_PERM
24115	974.011344	10.9.23.102	185.106.96.158	63581	80	54	63581 → 80 [ACK] Seq=516 Ack=310 Win=65535 Len=0
24116	974.011721	10.9.23.102	185.106.96.158	63581	80	569	GET /gscp.R/oapnlpmcnipgfpfghdahhbhbjigcmfgekipdla...cedhacmaghdehcdaajhnk
24119	974.323239	10.9.23.102	185.106.96.158	63581	80	54	63581 → 80 [ACK] Seq=516 Ack=310 Win=65535 Len=0
24120	974.323567	10.9.23.102	185.106.96.158	63581	80	54	63581 → 80 [FIN, ACK] Seq=516 Ack=310 Win=65535 Len=0
24126	978.479001	10.9.23.102	185.106.96.158	63582	80	66	63582 → 80 [SYN] Seq=0 Win=65535 Len=0 MSS=1460 WS=256 SACK_PERM
24128	978.826983	10.9.23.102	185.106.96.158	63582	80	54	63582 → 80 [ACK] Seq=1 Ack=1 Win=65535 Len=0
24129	978.827163	10.9.23.102	185.106.96.158	63582	80	569	GET /gscp.R/oapnlpmcnipgfpfghdahhbhbjigcmfgekipdla...cedhacmaghdehcdaajhnk
24133	979.076217	10.9.23.102	185.106.96.158	63582	80	54	63582 → 80 [ACK] Seq=516 Ack=310 Win=65535 Len=0
24134	979.076416	10.9.23.102	185.106.96.158	63582	80	54	63582 → 80 [FIN, ACK] Seq=516 Ack=310 Win=65535 Len=0
24165	982.148637	10.9.23.102	185.106.96.158	63585	80	66	63585 → 80 [SYN] Seq=0 Win=65535 Len=0 MSS=1460 WS=256 SACK_PERM
24181	982.383628	10.9.23.102	185.106.96.158	63585	80	54	63585 → 80 [ACK] Seq=1 Ack=1 Win=65535 Len=0
24184	982.383854	10.9.23.102	185.106.96.158	63585	80	569	GET /gscp.R/oapnlpmcnipgfpfghdahhbhbjigcmfgekipdla...cedhacmaghdehcdaajhnk
24196	982.628255	10.9.23.102	185.106.96.158	63585	80	54	63585 → 80 [ACK] Seq=516 Ack=310 Win=65535 Len=0
24197	982.628494	10.9.23.102	185.106.96.158	63585	80	54	63585 → 80 [FIN, ACK] Seq=516 Ack=310 Win=65535 Len=0
24275	986.947777	10.9.23.102	185.106.96.158	63586	80	66	63586 → 80 [SYN] Seq=0 Win=65535 Len=0 MSS=1460 WS=256 SACK_PERM
24277	987.199376	10.9.23.102	185.106.96.158	63586	80	54	63586 → 80 [ACK] Seq=1 Ack=1 Win=65535 Len=0
24278	987.199620	10.9.23.102	185.106.96.158	63586	80	569	GET /gscp.R/oapnlpmcnipgfpfghdahhbhbjigcmfgekipdla...cedhacmaghdehcdaajhnk
24281	987.532099	10.9.23.102	185.106.96.158	63586	80	54	63586 → 80 [ACK] Seq=516 Ack=310 Win=65535 Len=0
24282	987.532375	10.9.23.102	185.106.96.158	63586	80	54	63586 → 80 [FIN, ACK] Seq=516 Ack=310 Win=65535 Len=0
24292	991.227850	10.9.23.102	185.106.96.158	63587	80	66	63587 → 80 [SYN] Seq=0 Win=65535 Len=0 MSS=1460 WS=256 SACK_PERM
24294	991.532478	10.9.23.102	185.106.96.158	63587	80	54	63587 → 80 [ACK] Seq=1 Ack=1 Win=65535 Len=0

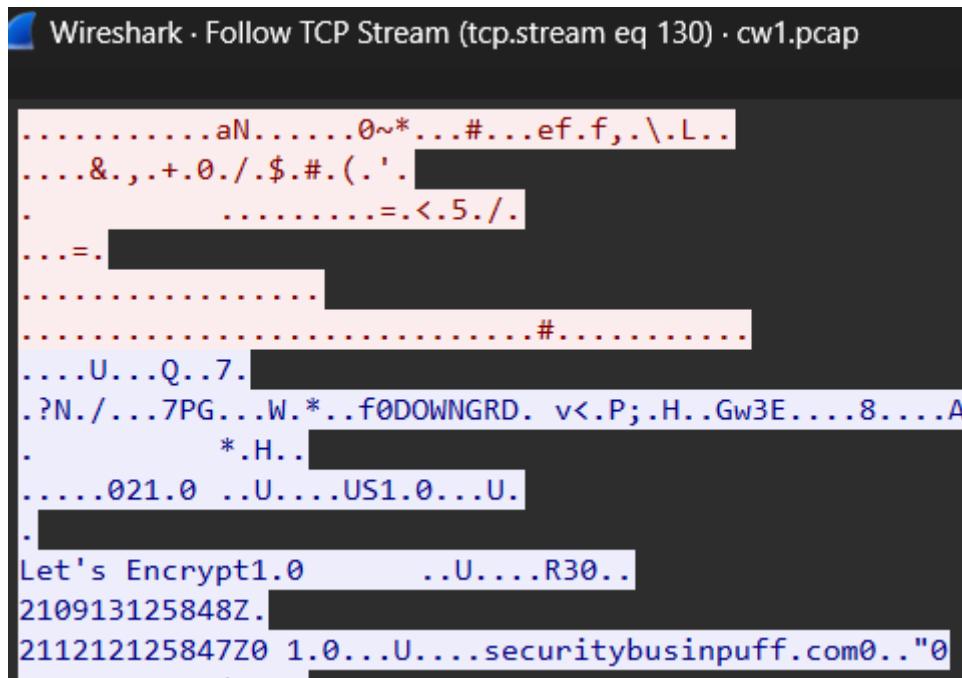
Traffic of 185.106.96.158



Host header ocsp.verisign.com

No.	Time	ip.src	ip.dst	src port	dst port	Length	info
4216	581.342835	10.9.23.102	185.125.204.174	63410	8080	66	63410 → 8080 [SYN] Seq=0 Win=65535 Len=0 MSS=1460 WS=256 SACK
4217	581.504598	185.125.204.1...	10.9.23.102	8080	63410	58	8080 → 63410 [SYN, ACK] Seq=0 Ack=1 Win=64240 Len=0 MSS=1460
4218	581.504879	10.9.23.102	185.125.204.174	63410	8080	54	63410 → 8080 [ACK] Seq=1 Ack=1 Win=65535 Len=0
4219	581.509907	10.9.23.102	185.125.204.174	63410	8080	203	63410 → 8080 [PSH, ACK] Seq=1 Ack=1 Win=65535 Len=149
4220	581.510000	185.125.204.1...	10.9.23.102	8080	63410	54	8080 → 63410 [ACK] Seq=1 Ack=150 Win=64240 Len=0
4221	581.683263	185.125.204.1...	10.9.23.102	8080	63410	144	8080 → 63410 [PSH, ACK] Seq=1 Ack=150 Win=64240 Len=90
4222	581.683508	10.9.23.102	185.125.204.174	63410	8080	54	63410 → 8080 [ACK] Seq=150 Ack=91 Win=65535 Len=0
4223	581.685014	185.125.204.1...	10.9.23.102	8080	63410	1402	8080 → 63410 [PSH, ACK] Seq=91 Ack=150 Win=64240 Len=1348
4224	581.685191	10.9.23.102	185.125.204.174	63410	8080	54	63410 → 8080 [ACK] Seq=150 Ack=1439 Win=65535 Len=0
4225	581.844256	185.125.204.1...	10.9.23.102	8080	63410	367	8080 → 63410 [PSH, ACK] Seq=1439 Ack=150 Win=64240 Len=313
4226	581.844488	10.9.23.102	185.125.204.174	63410	8080	54	63410 → 8080 [ACK] Seq=150 Ack=1752 Win=65535 Len=0
4249	583.867600	10.9.23.102	185.125.204.174	63410	8080	147	63410 → 8080 [PSH, ACK] Seq=150 Ack=1752 Win=65535 Len=93
4250	583.867693	185.125.204.1...	10.9.23.102	8080	63410	54	8080 → 63410 [ACK] Seq=1752 Ack=243 Win=64240 Len=0
4251	584.039040	185.125.204.1...	10.9.23.102	8080	63410	68	8080 → 63410 [PSH, ACK] Seq=1752 Ack=243 Win=64240 Len=6
4252	584.039292	10.9.23.102	185.125.204.174	63410	8080	54	63410 → 8080 [ACK] Seq=150 Ack=243 Win=65535 Len=0
4253	584.208411	185.125.204.1...	10.9.23.102	8080	63410	99	8080 → 63410 [PSH, ACK] Seq=243 Ack=1758 Win=65535 Len=0
4254	584.208634	10.9.23.102	185.125.204.174	63410	8080	54	63410 → 8080 [ACK] Seq=243 Ack=1803 Win=65535 Len=0
4255	584.210999	10.9.23.102	185.125.204.174	63410	8080	449	63410 → 8080 [PSH, ACK] Seq=243 Ack=1803 Win=65535 Len=395
4256	584.211071	185.125.204.1...	10.9.23.102	8080	63410	54	8080 → 63410 [ACK] Seq=1803 Ack=638 Win=64240 Len=0
4257	584.384719	185.125.204.1...	10.9.23.102	8080	63410	353	8080 → 63410 [PSH, ACK] Seq=1803 Ack=638 Win=64240 Len=299
4258	584.384985	10.9.23.102	185.125.204.174	63410	8080	54	63410 → 8080 [ACK] Seq=243 Ack=2102 Win=65535 Len=0
4259	584.385882	185.125.204.1...	10.9.23.102	8080	63410	1514	8080 → 63410 [ACK] Seq=2102 Ack=638 Win=64240 Len=1460
4260	584.385893	185.125.204.1...	10.9.23.102	8080	63410	1290	8080 → 63410 [PSH, ACK] Seq=3562 Ack=638 Win=64240 Len=1236
4261	584.386284	10.9.23.102	185.125.204.174	63410	8080	54	63410 → 8080 [ACK] Seq=638 Ack=4798 Win=65535 Len=0
4262	584.386321	185.125.204.1...	10.9.23.102	8080	63410	1402	8080 → 63410 [PSH, ACK] Seq=4798 Ack=638 Win=64240 Len=1348
4263	584.386423	10.9.23.102	185.125.204.174	63410	8080	54	63410 → 8080 [ACK] Seq=638 Ack=6146 Win=65535 Len=0
4264	584.386635	185.125.204.1...	10.9.23.102	8080	63410	1514	8080 → 63410 [ACK] Seq=6146 Ack=638 Win=64240 Len=1460
4265	584.386667	185.125.204.1...	10.9.23.102	8080	63410	1514	8080 → 63410 [ACK] Seq=7606 Ack=638 Win=64240 Len=1460
4266	584.386698	185.125.204.1...	10.9.23.102	8080	63410	1178	8080 → 63410 [PSH, ACK] Seq=9066 Ack=638 Win=64240 Len=1124
4267	584.386741	185.125.204.1...	10.9.23.102	8080	63410	1402	8080 → 63410 [PSH, ACK] Seq=10190 Ack=638 Win=64240 Len=1348

Traffic of 185.125.204.174



SNI securitybusinpuff.com

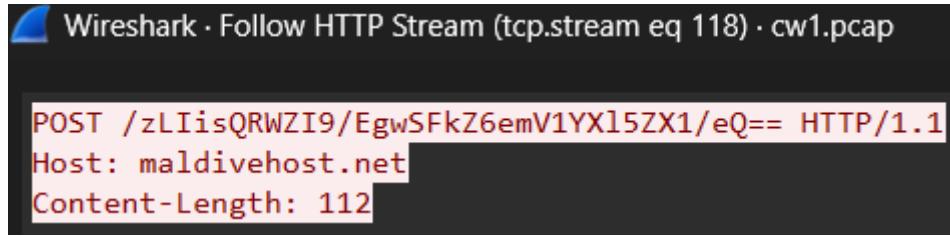
- Post-Infection C2 and Beacon Activity Filtered http.request.method == "POST" to locate active C2 channels. Discovered POST requests to **maldivehost.net** (Frame 3822, 281-byte payload starting zLIisQRWZI9). Server response (Frame 3851) revealed **Apache/2.4.49 (cPanel) OpenSSL/1.1.11 mod\_bwlimited/1.4.**

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

http.request.method == "POST"

No.	Time	ip.src	ip.dst	src port	dst port	Length	info
12426 897.509523	10.9.23.102	185.106.96.158	63516	80	778	POST /supprq/sa/dbdhdfdbdfddhdaedc HTTP/1.1	
+ 13205 813.083594	10.9.23.102	185.106.96.158	63533	80	826	POST /supprq/sa/dbdhdfdbdfddhdaedc HTTP/1.1	
3822 153.653113	10.9.23.102	208.91.128.6	63385	80	281	POST /zLii\$QRWZI9/QoSao1xzHgtfjMcGypGenp1dnFSeNv9f3k= HTTP/1.1 Continuation	
3908 178.767210	10.9.23.102	208.91.128.6	63386	80	285	POST /zLii\$QRWZI9/ASk5xkSPR8l1j5eIg9KnfGyZHI/YXp6eQ== HTTP/1.1 Continuation	
3996 203.829455	10.9.23.102	208.91.128.6	63389	80	285	POST /zLii\$QRWZI9/FXMKlgOnkz/Da15DggB10NgfGyZHI/YXp6eQ== HTTP/1.1 Continuation	
4006 228.842458	10.9.23.102	208.91.128.6	63390	80	273	POST /zLii\$QRWZI9/e0kkAAobInx9rnP6ZxHe11xFx95 HTTP/1.1 Continuation	
4017 254.037243	10.9.23.102	208.91.128.6	63391	80	293	POST /zLii\$QRWZI9/lj+J5oqJQ41B1wiAhr7KngvHgopKbfhfmtkcmJ9eG6R6FH0= HTTP/1.1 Continuation	
4027 279.063986	10.9.23.102	208.91.128.6	63392	80	289	POST /zLii\$QRWZI9/HD9N9ScAAwPKwEFMwI/JT15PEZ6emV1YX15ZX1/eQ== HTTP/1.1 Continuation	
4037 304.108572	10.9.23.102	208.91.128.6	63393	80	273	POST /zLii\$QRWZI9/CsZDz1/Mw9f2VzX58Zxt7fge== HTTP/1.1 Continuation	
4046 329.217819	10.9.23.102	208.91.128.6	63394	80	285	POST /zLii\$QRWZI9/DC1zfTsJDga/AicErRgXChsERx57ZJ1fxKhken9 HTTP/1.1 Continuation	
4090 354.299575	10.9.23.102	208.91.128.6	63396	80	293	POST /zLii\$QRWZI9/EgwEcWohMhk+B0ku3BnHQUlI4GLwpfntkcmJ9eG6R6FH0= HTTP/1.1 Continuation	
4099 379.469159	10.9.23.102	208.91.128.6	63397	80	269	POST /zLii\$QRWZI9/GB9tLyck3p8VXkeXhenp5 HTTP/1.1 Continuation	
4109 404.557049	10.9.23.102	208.91.128.6	63398	80	269	POST /zLii\$QRWZI9/EgwSrk26emV1YX15ZXL/eQ== HTTP/1.1 Continuation	
4118 429.544248	10.9.23.102	208.91.128.6	63399	80	285	POST /zLii\$QRWZI9/CxwglgIIIXh0QkPPHyCOUN6fGyZHI/YXp6eQ== HTTP/1.1 Continuation	
4131 454.726221	10.9.23.102	208.91.128.6	63400	80	277	POST /zLii\$QRWZI9/fskCkegTcg8VvKw950n1/ZXNlfxleIt+ HTTP/1.1 Continuation	
4149 479.894757	10.9.23.102	208.91.128.6	63401	80	265	POST /zLii\$QRWZI9/TITIYRX572HziFxken9 HTTP/1.1 Continuation	
4150 505.0809991	10.9.23.102	208.91.128.6	63402	80	265	POST /zLii\$QRWZI9/0hpCFx9l2V+fGV7e34= HTTP/1.1 Continuation	
4162 530.187719	10.9.23.102	208.91.128.6	63404	80	273	POST /zLii\$QRWZI9/DCzHSYnBRJFfntkcm39eG6Fh0= HTTP/1.1 Continuation	
4179 555.288708	10.9.23.102	208.91.128.6	63406	80	289	POST /zLii\$QRWZI9/mYYFB8/BguIAngKpAM4G0cQ3p8YXjKe9heng5 HTTP/1.1 Continuation	
4207 580.475722	10.9.23.102	208.91.128.6	63409	80	277	POST /zLii\$QRWZI9/eg17AfENQAQAK7e232Zxh4Yn57eA== HTTP/1.1 Continuation	
4581 605.574149	10.9.23.102	208.91.128.6	63418	80	269	POST /zLii\$QRWZI9/QsyzKz6emV1YX15ZXL/eQ== HTTP/1.1 Continuation	
4930 630.656018	10.9.23.102	208.91.128.6	63428	80	289	POST /zLii\$QRWZI9/fskCkegTcg8VvKw950n1/ZXNlfxleIt+ HTTP/1.1 Continuation	
5208 655.639495	10.9.23.102	208.91.128.6	63441	80	265	POST /zLii\$QRWZI9/Aj1cfX9l2V+fGV7e34= HTTP/1.1 Continuation	
6227 680.731212	10.9.23.102	208.91.128.6	63444	80	265	POST /zLii\$QRWZI9/OsdcFx9l2V+fGV7e34= HTTP/1.1 Continuation	
6660 705.826232	10.9.23.102	208.91.128.6	63454	80	297	POST /zLii\$QRWZI9/HiYfeTpyPng4KCF4Pz8E0ggQ0kgO40PBuJ7e232Zxh4Yn57eA== HTTP/1.1 Continuation	
7188 730.806600	10.9.23.102	208.91.128.6	63461	80	285	POST /zLii\$QRWZI9/jhANAz16gw8FBmHABRYGcn9cFx91c2V+fGV7e34= HTTP/1.1 Continuation	
10017 756.507647	10.9.23.102	208.91.128.6	63482	80	277	POST /zLii\$QRWZI9/DRs5e3gJa4w4glik7e232Zxh4Yn57eA== HTTP/1.1 Continuation	
10257 781.698180	10.9.23.102	208.91.128.6	63494	80	281	POST /zLii\$QRWZI9/34KJnkbaSuNPzEYigcwQnt7YnZlehhfn4 HTTP/1.1 Continuation	

active C2 channels



POST requests to **maldivehost.net**

Wireshark · Packet 3822 · cw1.pcap

Frame 3822: Packet, 281 bytes on wire (2248 bits), 281 bytes captured (Encapsulation type: Ethernet (1))  
Arrival Time: Sep 25, 2021 00:46:16.395000000 中國標準時間  
UTC Arrival Time: Sep 24, 2021 16:46:16.395000000 UTC  
Epoch Arrival Time: 1632501976.395000000  
[Time shift for this packet: 0.000000000 seconds]  
[Time delta from previous captured frame: 998.000 microseconds]  
[Time delta from previous displayed frame: 998.000 microseconds]  
[Time since reference or first frame: 2 minutes, 33.653113000 seconds]  
Frame Number: 3822  
Frame Length: 281 bytes (2248 bits)  
Capture Length: 281 bytes (2248 bits)  
[Frame is marked: False]  
[Frame is ignored: False]  
[Protocols in frame: eth:ethertype:ip:tcp:http:data:data]  
Character encoding: ASCII (0)  
[Coloring Rule Name: HTTP]  
[Coloring Rule String: http || tcp.port == 80 || http2]  
Ethernet II, Src: HewlettPacka\_1c:47:ae (00:08:02:1c:47:ae), Dst: Netgear (08:00:27:00:00:00)  
Internet Protocol Version 4, Src: 10.9.23.102, Dst: 208.91.128.6  
Transmission Control Protocol, Src Port: 63385, Dst Port: 80, Seq: 1, A  
Hypertext Transfer Protocol  
POST /zLIisQRWZI9/OQsaDixzHTgtfjMcGypGenpldWF5eWV9f3k= HTTP/1.1\r\nRequest Method: POST  
Request URI: /zLIisQRWZI9/OQsaDixzHTgtfjMcGypGenpldWF5eWV9f3k=  
Protocol Version: HTTP/1.1

Frame 3822

```
Wireshark - Packet 3851 · cw1.pcap

Frame 3851: Packet, 634 bytes on wire (5072 bits), 634 bytes captured (5072 bits)
Encapsulation type: Ethernet (1)
Arrival Time: Sep 25, 2021 00:46:17.143575000 中國標準時間
UTC Arrival Time: Sep 24, 2021 16:46:17.143575000 UTC
Epoch Arrival Time: 1632501977.143575000
[Time shift for this packet: 0.000000000 seconds]
[Time delta from previous captured frame: 16.274000 milliseconds]
[Time delta from previous displayed frame: 16.274000 milliseconds]
[Time since reference or first frame: 2 minutes, 34.401688000 seconds]
Frame Number: 3851
Frame Length: 634 bytes (5072 bits)
Capture Length: 634 bytes (5072 bits)
[Frame is marked: False]
[Frame is ignored: False]
[Protocols in frame: eth:ethertype:ip:tcp:http:data-text-lines]
Character encoding: ASCII (0)
[Coloring Rule Name: HTTP]
[Coloring Rule String: http || tcp.port == 80 || http2]
Ethernet II, Src: Netgear_b6:93:f1 (20:e5:2a:b6:93:f1), Dst: HewlettPacka_1 (08:00:27:00:00:01)
Internet Protocol Version 4, Src: 208.91.128.6, Dst: 10.9.23.102
Transmission Control Protocol, Src Port: 80, Dst Port: 63385, Seq: 1, Ack: 1
Hypertext Transfer Protocol
HTTP/1.1 200 OK\r\n
    Response Version: HTTP/1.1
    Status Code: 200
    [Status Code Description: OK]
    Response Phrase: OK
    Date: Fri, 24 Sep 2021 16:46:15 GMT\r\n
    Server: Apache/2.4.49 (cPanel) OpenSSL/1.1.1l mod_bwlimited/1.4\r\n
```

### Frame 3851

6. Reconnaissance and Exfiltration Filtered dns and identified an A query to [api.ipify.org](https://api.ipify.org) at 2021-09-24 17:00:04 UTC (Frame 24149), used by the malware to determine the victim's public IP. Filtered smtp to detect exfiltration attempts. The first MAIL FROM observed was [farshin@mailfa.com](mailto:farshin@mailfa.com). Following the TCP stream revealed AUTH LOGIN credentials for [ho3ein.sharifi@mailfa.com](mailto:ho3ein.sharifi@mailfa.com) (password decoded from base64: 13691369).

Wireshark · Packet 24149 · cw1.pcap

- ▶ Frame 24149: Packet, 299 bytes on wire
- ▶ Ethernet II, Src: Dell\_c2:09:6a (a4:1f:1e:09:c2:09)
- ▶ Internet Protocol Version 4, Src: 10.9.1.100
- ▶ User Datagram Protocol, Src Port: 53, Dst Port: 53
- ▼ Domain Name System (response)
  - Transaction ID: 0xc92c
  - ▼ Flags: 0x8180 Standard query response
    - 1... .... .... .... = Response: Message
    - .000 0... .... .... = Opcode: Standard query
    - .... .0.. .... .... = Authoritative answer
    - .... ..0. .... .... = Truncated: No
    - .... ...1 .... .... = Recursion desired
    - .... .... 1.... .... = Recursion available
    - .... .... .0.. .... = Z: reserved
    - .... .... ..0. .... = Answer authenticator
    - .... .... ...0 .... = Non-authentication
    - .... .... .... 0000 = Reply code: No error
  - Questions: 1
  - Answer RRs: 10
  - Authority RRs: 0
  - Additional RRs: 0
- ▼ Queries
  - ▼ api.ipify.org: type A, class IN
    - Name: api.ipify.org
    - [Name Length: 13]
    - [Label Count: 3]
    - Type: A (1) (Host Address)
    - Class: IN (0x0001)

Frame 24149

Wireshark - cw1.pcap

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

smtp

No.	Time	ip.src	ip.dst	src port	dst port	Length	info
25424	1040.310581	108.177.15.28	10.9.23.102	25	63602	111 S: 220 smtp-relay.gmail.com ESMTP p14sm62724ej	
25427	1040.328900	108.177.15.28	10.9.23.102	587	63603	111 S: 220 smtp-relay.gmail.com ESMTP v11sm162909w	
27766	1124.990346	108.177.15.28	10.9.23.102	587	63655	110 S: 220 smtp-relay.gmail.com ESMTP 7sm237060wrz	
27791	1125.174995	108.177.15.28	10.9.23.102	25	63652	112 S: 220 smtp-relay.gmail.com ESMTP y28sm114321l	
28158	1137.081223	108.177.15.28	10.9.23.102	25	63665	110 S: 220 smtp-relay.gmail.com ESMTP la2sm66415ej	
28189	1137.432545	108.177.15.28	10.9.23.102	25	63666	110 S: 220 smtp-relay.gmail.com ESMTP b8sm62981lf	
28343	1139.976566	185.4.29.135	10.9.23.102	25	63678	75 S: 220 mail.mailfa.com	
28367	1140.408995	10.9.23.102	185.4.29.135	63678	25	70 C: EHLO localhost	
28395	1141.278848	185.4.29.135	10.9.23.102	25	63678	110 S: 250-mail.mailfa.com   SIZE 30000000   AUTH	
28401	1141.458745	46.16.61.250	10.9.23.102	25	63681	96 S: 220 vxsys-smtpclusterma-03.srv.cat ESMTP	
28410	1141.849946	10.9.23.102	46.16.61.250	63681	25	70 C: EHLO localhost	
28415	1142.013281	46.16.61.250	10.9.23.102	25	63681	253 S: 250-vxsys-smtpclusterma-03.srv.cat   PIPELI	
28420	1142.054497	10.9.23.102	185.4.29.135	63678	25	66 C: AUTH LOGIN	
28448	1142.275010	10.9.23.102	46.16.61.250	63681	25	64 C: STARTTLS	
28450	1142.275468	185.4.29.135	10.9.23.102	25	63678	72 S: 334 VXNlcm5hbWU6	
28457	1142.434629	46.16.61.250	10.9.23.102	25	63681	84 S: 220 2.0.0 Ready to start TLS	
28467	1142.706961	10.9.23.102	185.4.29.135	63678	25	80 C: User: ZmFyc2hpBtYWlsZmEuY29t	
28477	1142.941465	185.4.29.135	10.9.23.102	25	63678	72 S: 334 UGFzc3dvcmQ6	
28480	1142.956561	185.4.29.135	10.9.23.102	25	63686	75 S: 220 mail.mailfa.com	
28504	1143.222316	10.9.23.102	185.4.29.135	63678	25	68 C: Pass: ZGluYW1pdA==	
28506	1143.222457	10.9.23.102	185.4.29.135	63686	25	70 C: EHLO localhost	
28521	1143.450341	185.4.29.135	10.9.23.102	25	63686	110 S: 250-mail.mailfa.com   SIZE 30000000   AUTH	
28524	1143.456304	185.4.29.135	10.9.23.102	25	63678	74 S: 235 authenticated.	
28576	1144.036130	10.9.23.102	185.4.29.135	63678	25	86 C: MAIL FROM:<farshin@mailfa.com>	

First mail received [farshin@mailfa.com](mailto:farshin@mailfa.com)

Wireshark · Follow TCP Stream (tcp.stream eq 383) · cw1.pcap

```

220 mail.mailfa.com
EHLO localhost
250-mail.mailfa.com
250-SIZE 30000000
250 AUTH LOGIN

AUTH LOGIN

334 VXNlcm5hbWU6

ZmFyc2hpBtYWlsZmEuY29t

334 UGFzc3dvcmQ6

ZGluYW1pdA==

235 authenticated.

MAIL FROM:<farshin@mailfa.com>

550 Your SMTP Service is disable please check by your mailservice provider.

```

TCP stream of first mail

**Section 3 – Results** The compromised endpoint is workstation 10.9.23.102 (MAC 00:08:02:1c:47:ae). Initial compromise occurred at 2021-09-24 16:44:38 UTC via a drive-by download of **documents.zip** from [attirenepal.com](http://attirenepal.com) (LiteSpeed server). The archive contained **chart-1530076591.xls**, which, upon execution, likely triggered malicious VBA macros or shellcode.

Secondary payloads were delivered over HTTPS (16:45:11 – 16:45:30 UTC) from [finejewels.com.au](http://finejewels.com.au) (GoDaddy-issued certificate), [thietbiagt.com](http://thietbiagt.com), and [new.americold.com](http://new.americold.com).

Persistent C2 was established using Cobalt Strike beacons to 185.106.96.158 (port 80, Host: ocsp.verisign.com, domain: survmeter.live) and 185.125.204.174 (port 443, SNI: securitybusinpuff.com). Post-infection command-and-control occurred over maldivehost.net (Apache/2.4.49 response), with beacon data beginning zLJisQRWZI9 (first packet to C2: 281 bytes).

The malware performed external IP reconnaissance via DNS query to [api.ipify.org](http://api.ipify.org) at 2021-09-24 17:00:04 UTC. Exfiltration was attempted via SMTP using [farshin@mailfa.com](mailto:farshin@mailfa.com) (first MAIL FROM); credentials for [ho3ein.sharifi@mailfa.com](mailto:ho3ein.sharifi@mailfa.com) were exposed as 13691369.

**Type of Infection** — Cobalt Strike beaconing (commercial adversary emulation tool abused for persistence, C2 over HTTP/HTTPS with domain fronting, obfuscated URIs, and credential exfiltration).

**Section 4 – Conclusion & Recommendations** This incident demonstrates a classic multi-stage attack: phishing-driven file download → user execution of macro-enabled document → staged payloads → deployment of Cobalt Strike → persistent C2 and attempted SMTP exfiltration. The use of domain fronting (ocsp.verisign.com) and legitimate-looking infrastructure delayed detection.

## Prevention & Mitigation

- **Endpoint Hardening** — Disable Office macros by default; enforce Protected View and block external content (Group Policy). Deploy EDR with macro/script scanning and Cobalt Strike behavioral detection.
- **Network Controls** — Implement web filtering/proxy to block known C2 domains/IPs (attirenepal.com, maldivehost.net, survmeter.live, securitybusinpuff.com). Monitor DNS for anomalous queries (api.ipify.org, dynamic update patterns).

- **Email & Attachment Security** — Enhance phishing filters; quarantine ZIP/XLS with macros; enforce strict SMTP relay policies and monitor AUTH attempts.
- **User Awareness** — Conduct regular phishing simulations and training on suspicious attachments and macro prompts.
- **Monitoring & Response** — Enable network packet capture with automated IOC matching; use JA3 fingerprinting for Cobalt Strike detection; maintain updated blocklists.

Remaining challenges include encrypted beacon traffic and legitimate domain abuse — requiring advanced behavioral analytics and continuous threat hunting.

## References

- Wireshark Documentation (filters, Follow Stream, Export Objects)
- MITRE ATT&CK: T1204.002, T1071.001, T1566.001
- VirusTotal IOC reports

My Github link: <https://github.com/Patrick-cybersec/COMP3010HK-Security-Operations-Incident-Management/issues>

My Youtube channel link: [https://www.youtube.com/watch?v=i\\_HA64froz8](https://www.youtube.com/watch?v=i_HA64froz8)

## Generative AI Declaration

I used AI to acquire additional knowledge related to this coursework.

I have searched what is Cobalt Strike servers since I am not very familiar with it. I have learnt the properties of Cobalt Strike servers, C2 server and beacon. I wanted to sort the packet numbers and stream between ips, I have asked AI to find out the conversation function of Wireshark.

Also, I have searched the Indicators of Compromise (IOCs). I was stuck at Q.17 DNS query. After reading the IOCs, I found that “api.ipify.org” is a common domain indicator of DNS query.

Tang Pak Chun

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