Volatility

ENG-USTXHOU-148 (jackr-challenge)

ImageInfo

```
$ python2.7 vol.py -f ~/Downloads/jackcr-
challenge/ENG-USTXHOU-148/memdump.bin
imageinfo
```

Suggested Profile(s) : **WinXPSP2x86**, WinXPSP3x86
(Instantiated with WinXPSP2x86)

KDBG : **0x8054cde0**L

Network Connections

```
$ python2.7 vol.py -f ~/Downloads/jackcr-
challenge/ENG-USTXHOU-148/memdump.bin --
profile=WinXPSP2x86 --kdbg=0x8054cde0
connscan
```

Offset(P)	Local Address	Remote Address	Pid
0x01ffa850	172.16.150.20:1291	58.64.132.141:80	1024
0x189e8850	172.16.150.20:1291	58.64.132.141:80	1024

Processes

```
$ python2.7 vol.py -f ~/Downloads/jackcr-
challenge/ENG-USTXHOU-148/memdump.bin --
profile=WinXPSP2x86 --kdbg=0x8054cde0 pstree
```

```
Name                                 Pid   PPid   Thds Hnds Time
-------------------------------- ----- ------- ------ ------ ------------
 0x823c8830:System                    4       0     51    271  1970-01-01 00:00:00 UTC+0000
. 0x821841c8:smss.exe                 356   4       3     19     2012-11-26 22:03:28 UTC+0000
.. 0x82189da0:winlogon.exe            628   356     18    653  2012-11-26 22:03:29 UTC+0000
... 0x82194650:services.exe           680   628     15    243  2012-11-26 22:03:30 UTC+0000
.... 0x820b3da0:svchost.exe           1024  680     76    1645 2012-11-26 22:03:32 UTC+0000
..... 0x82045da0:wuauclt.exe          1628 1024   3     142   2012-11-26 22:04:43 UTC+0000
..... 0x82049690:wc.exe               364    1024   1     27     2012-11-27 01:30:00 UTC+0000
```

Whois

```
$ whois 58.64.132.141
```

```
inetnum:        58.64.132.0 - 58.64.132.255
netname:        NWTiDC-HK
descr:          NWT iDC Data Service
country:        HK
```

Consoles

```
$ python2.7 vol.py -f ~/Downloads/jackcr-challenge/ENG-USTXHOU-148/
memdump.bin --profile=WinXPSP2x86 --kdbg=0x8054cde0 consoles
```

ConsoleProcess: csrss.exe Pid: 604
Console: 0x4f3318 CommandHistorySize: 50
HistoryBufferCount: 1 HistoryBufferMax: 4
OriginalTitle: %SystemRoot%\System32\svchost.exe
Title: C:\WINDOWS\System32\svchost.exe
AttachedProcess: wc.exe Pid: 364 Handle: 0x424

CommandHistory: 0x4f4db0 Application: wc.exe Flags: Allocated
CommandCount: 0 LastAdded: -1 LastDisplayed: -1
FirstCommand: 0 CommandCountMax: 50
ProcessHandle: 0x424

Screen 0x4f3a20 X:80 Y:25
Dump:
WCE v1.3beta (Windows Credentials Editor) - (c) 2010,2011,2012 Amplia Security -
by Hernan Ochoa (hernan@ampliasecurity.com)
Use -h for help.

DLLList

```
$ python2.7 vol.py -f ~/Downloads/jackcr-challenge/ENG-
USTXHOU-148/memdump.bin --profile=WinXPSP2x86 --
kdbg=0x8054cde0 dlllist -p 364

**************************************************************************
```

wc.exe pid: 364
Command line : wc.exe -e -o h.out
Service Pack 3

Base	Size	LoadCount	LoadTime	Path
0x00400000	0x38000	0xffff		C:\WINDOWS\System32\wc.exe

…

-e: Lists logon sessions NTLM credentials indefinitely. Refreshes every time a logon event occurs
[https://github.com/brav0hax/smbexec/blob/master/WCE-README]

DLLDump/ProcDump

```
$ python2.7 vol.py -f ~/Downloads/jackcr-
challenge/ENG-USTXHOU-148/memdump.bin --
profile=WinXPSP2x86 --kdbg=0x8054cde0 dlldump -p
364 --dump-dir binaries/
```

```
Process(V)  Name            Module Base Module Name    Result
----------  --------------- ----------- ------------------ ------
0x82049690 wc.exe          0x000400000 wc.exe             OK: module.364.2049690.400000.dll
...
```

VirusTotal

```
$ md5 module.364.2049690.400000.dll
```
MD5 (module.364.2049690.400000.dll) =
4a5bbe4ea1d9239b2d8cad07dd7f7090

58 / 68

58 engines detected this file

SHA-256	4615db3a06a2fbb2f2eeeab0cba1ff4305800088a424b110c409798c51a501ad
File name	executable.364.exe
File size	203.5 KB
Last analysis	2017-10-27 04:26:14 UTC
Community score	-53

IEHistory

```
$ python2.7 vol.py -f ~/Downloads/jackcr-
challenge/ENG-USTXHOU-148/memdump.bin --
profile=WinXPSP2x86 --kdbg=0x8054cde0
iehistory
**************************************************
Process: 284 explorer.exe
Cache type "DEST" at 0xdcb69
Last modified: 2012-11-26 17:01:53 UTC+0000
Last accessed: 2012-11-26 23:01:54 UTC+0000
URL: callb@http://58.64.132.8/download/Symantec-1.43-1.exe
```

MFT

```
$ python2.7 vol.py -f ~/Downloads/jackcr-challenge/ENG-USTXHOU-148/memdump.bin
--profile=WinXPSP2x86 --kdbg=0x8054cde0 mftparser
```

2012-11-26 23:01:38,2012-11-26 23:01:38,2012-11-26 23:01:38,2012-11-26 23:01:38,
WINDOWS\Prefetch\IEXPLO~1.PF

2012-11-26 23:01:38,2012-11-26 23:01:38,2012-11-26 23:01:38,2012-11-26
23:01:38,WINDOWS\Prefetch\IEXPLORE.EXE-27122324.pf

2012-11-26 23:01:53,2012-11-26 23:01:53,2012-11-26 23:01:53,2012-11-26 23:01:53,
Documents and Settings\callb\Local Settings\History\History.IE5\MSHIST~1

...

2004-08-18 02:00:00,2004-08-18 02:00:00,2012-11-26 23:01:54,2012-11-26 23:01:54,
WINDOWS\system32\6to4ex.dll

…

2012-11-26 23:01:54,2012-11-26 23:01:54,2012-11-26 23:01:54,2012-11-26 23:01:54,
WINDOWS\Prefetch\SYMANT~1.PF

2012-11-26 23:01:54,2012-11-26 23:01:54,2012-11-26 23:01:54,2012-11-26
23:01:54,WINDOWS\Prefetch\SYMANTEC-1.43-1[2].EXE-3793B625.pf

MFT

2012-11-26 23:03:10,2012-11-26 23:03:10,2012-11-26 23:03:10,2012-11-26 23:03:10,WINDOWS\webui
2012-11-26 23:03:21,2012-11-26 23:03:21,2012-11-26 23:03:21,2012-11-26 23:03:21,WINDOWS\Prefetch\IPCONF~1.PF
2012-11-26 23:03:21,2012-11-26 23:03:21,2012-11-26 23:03:21,2012-11-26 23:03:21,WINDOWS\Prefetch\IPCONFIG.EXE-2395F30B.pf
2012-11-26 23:06:34,2012-11-26 23:06:34,2012-11-26 23:06:34,2012-11-26 23:06:34,WINDOWS\ps.exe
2012-11-26 23:06:47,2012-11-26 23:06:47,2012-11-26 23:06:47,2012-11-26 23:06:47,WINDOWS\webui\gs.exe
2012-11-26 23:06:52,2012-11-26 23:06:52,2012-11-26 23:06:52,2012-11-26 23:06:52,WINDOWS\webui\ra.exe
2012-11-26 23:06:56,2012-11-26 23:06:56,2012-11-26 23:06:56,2012-11-26 23:06:56,WINDOWS\webui\sl.exe
2012-11-26 23:06:59,2012-11-26 23:06:59,2012-11-26 23:06:59,2012-11-26 23:06:59,WINDOWS\webui\wc.exe
2012-11-26 23:07:31,2012-11-26 23:07:31,2012-11-26 23:07:31,2012-11-26 23:07:31,WINDOWS\webui\netuse.dll
2012-11-26 23:07:53,2012-11-26 23:07:53,2012-11-26 23:07:53,2012-11-26 23:07:53,WINDOWS\Prefetch\NET.EXE-01A53C2F.pf
2012-11-26 23:08:26,2012-11-26 23:08:26,2012-11-26 23:08:26,2012-11-26 23:08:26,WINDOWS\Prefetch\NET1EX~1.PF
2012-11-26 23:10:35,2012-11-26 23:10:35,2012-11-26 23:10:35,2012-11-26 23:10:35,WINDOWS\Prefetch\SLEXE-~1.PF
2012-11-26 23:10:35,2012-11-26 23:10:35,2012-11-26 23:10:35,2012-11-26 23:10:35,WINDOWS\Prefetch\SL.EXE-010E2A23.pf
2012-11-26 23:11:58,2012-11-26 23:11:58,2012-11-26 23:11:58,2012-11-26 23:11:58,WINDOWS\Prefetch\GSEXE-~1.PF
2012-11-26 23:11:58,2012-11-26 23:11:58,2012-11-26 23:11:58,2012-11-26 23:11:58,WINDOWS\Prefetch\GS.EXE-3796DDD9.pf
2012-11-26 23:15:44,2012-11-26 23:15:44,2012-11-26 23:15:44,2012-11-26 23:15:44,WINDOWS\Prefetch\PINGEX~1.PF
2012-11-26 23:15:44,2012-11-26 23:15:44,2012-11-26 23:15:44,2012-11-26 23:15:44,WINDOWS\Prefetch\PING.EXE-31216D26.pf
2012-11-26 23:58:51,2012-11-26 23:58:51,2012-11-26 23:58:51,2012-11-26 23:58:51,WINDOWS\Temp\wceaux.dll
2012-11-26 23:58:51,2012-11-26 23:58:51,2012-11-26 23:58:51,2012-11-26 23:58:51,WINDOWS\Prefetch\WCEXE-~1.PF
2012-11-26 23:58:51,2012-11-26 23:58:51,2012-11-26 23:58:51,2012-11-26 23:58:51,WINDOWS\Prefetch\WC.EXE-21AD5E60.pf
2012-11-26 23:58:51,2012-11-26 23:59:04,2012-11-26 23:59:04,2012-11-26 23:59:04,WINDOWS\Temp\wceaux.dll
2012-11-27 00:00:57,2012-11-27 00:00:57,2012-11-27 00:00:57,2012-11-27 00:00:57,WINDOWS\Prefetch\PSEXE-~1.PF
2012-11-27 00:00:57,2012-11-27 00:00:57,2012-11-27 00:00:57,2012-11-27 00:00:57,WINDOWS\Prefetch\PS.EXE-09745CC1.pf
2012-11-27 00:10:44,2012-11-27 00:10:44,2012-11-27 00:10:44,2012-11-27 00:10:44,WINDOWS\Temp\wceaux.dll
2012-11-27 00:49:01,2012-11-27 00:49:01,2012-11-27 00:49:01,2012-11-27 00:49:01,WINDOWS\webui\system.dll
2012-11-27 00:57:20,2012-11-27 00:57:20,2012-11-27 00:57:20,2012-11-27 00:57:20,WINDOWS\webui\svchost.dll
2012-11-27 01:01:39,2012-11-27 01:01:39,2012-11-27 01:01:39,2012-11-27 01:01:39,WINDOWS\webui\https.dll
2012-11-27 01:14:48,2012-11-27 01:14:48,2012-11-27 01:14:48,2012-11-27 01:14:48,WINDOWS\webui\netstat.dll
2012-11-27 01:26:47,2012-11-27 01:26:47,2012-11-27 01:26:47,2012-11-27 01:26:47,WINDOWS\webui\system5.bat
2012-11-27 01:27:03,2012-11-27 01:27:03,2012-11-27 01:27:03,2012-11-27 01:27:03,WINDOWS\system32\wc.exe
2012-11-27 01:27:03,2012-11-27 01:27:03,2012-11-27 01:27:03,2012-11-27 01:27:03,WINDOWS\Tasks\At1.job
2012-11-27 01:27:03,2012-11-27 01:27:03,2012-11-27 01:27:03,2012-11-27 01:27:03,WINDOWS\Prefetch\ATEXE-~1.PF
2012-11-27 01:27:03,2012-11-27 01:27:03,2012-11-27 01:27:03,2012-11-27 01:27:03,WINDOWS\Prefetch\AT.EXE-2770DD18.pf
2012-11-27 01:30:00,2012-11-27 01:30:00,2012-11-27 01:30:00,2012-11-27 01:30:00,WINDOWS\system32\h.out
2012-11-27 01:30:00,2012-11-27 01:30:00,2012-11-27 01:30:00,2012-11-27 01:30:00,WINDOWS\Temp\wceaux.dll
2012-11-27 01:30:10,2012-11-27 01:30:10,2012-11-27 01:30:10,2012-11-27 01:30:10,WINDOWS\Prefetch\WCEXE-~2.PF
2012-11-27 01:30:10,2012-11-27 01:30:10,2012-11-27 01:30:10,2012-11-27 01:30:10,WINDOWS\Prefetch\WC.EXE-06BFE764.pf

MFT

WINDOWS\webui\system5.bat
$DATA
0000000000: 40 65 63 68 6f 20 6f 66 66 0d 0a 63 6f 70 79 20 @echo.off..copy.
0000000010: 63 3a 5c 77 69 6e 64 6f 77 73 5c 77 65 62 75 69 c:\windows\webui
0000000020: 5c 77 63 2e 65 78 65 20 63 3a 5c 77 69 6e 64 6f \wc.exe.c:\windo
0000000030: 77 73 5c 73 79 73 74 65 6d 33 32 0d 0a 61 74 20 ws\system32..at.
0000000040: 31 39 3a 33 30 20 77 63 2e 65 78 65 20 2d 65 20 19:30.wc.exe.-e.
0000000050: 2d 6f 20 68 2e 6f 75 74   -o.h.out

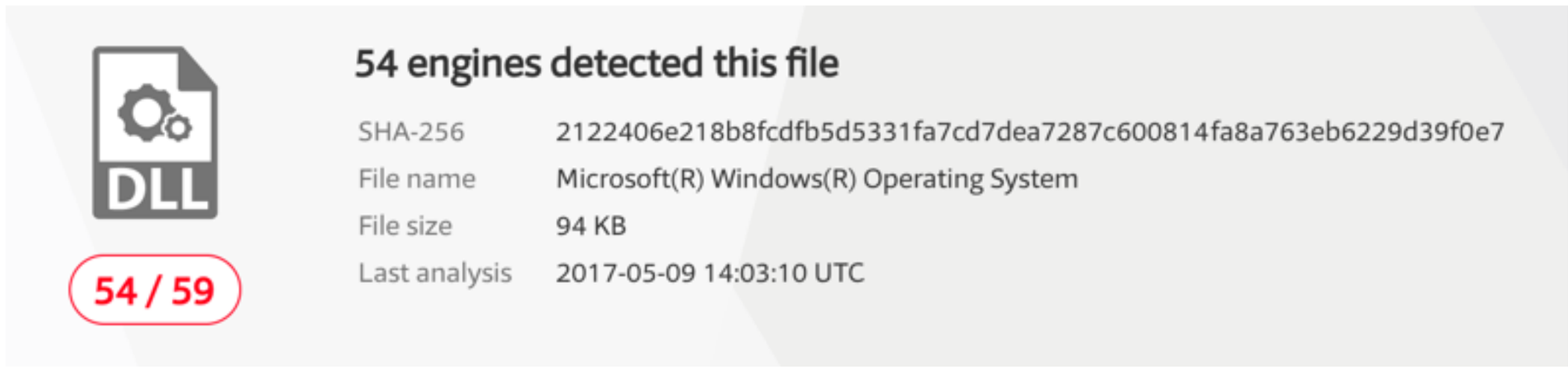
DumpFile

```
$ python2.7 vol.py -f ~/Downloads/jackcr-challenge/ENG-USTXHOU-148/
memdump.bin --profile=WinXPSP2x86 --kdbg=0x8054cde0 dumpfiles --dump-
dir=binaries/ -r 6to4ex\.dll -i -S summary.txt
```

ImageSectionObject 0x821e5c70 1024 \Device\HarddiskVolume1\WINDOWS\system32\6to4ex.dll
DataSectionObject 0x821e5c70 1024 \Device\HarddiskVolume1\WINDOWS\system32\6to4ex.dll

```
$ md5 file.1024.0x8221c5c8.img
```

MD5 (file.1024.0x8221c5c8.img) = 0ed1552f4e73f3b79a21253bac5cab35



DumpFile All

Sophos AV

- one hit as before

VirusTotal

- 41 with >0 hits
- 4 with >4 hits
- Additional is WINDOWS\\explorer.exe (ab227c0aaba17faf8469e9ceb6009ec7)

2012-11-23 16:32:05,2008-04-14 11:42:20,2012-11-23 16:32:06,2012-11-23 16:32:05,
WINDOWS\explorer.exe
2012-11-23 16:45:27,2012-11-23 16:45:27,2012-11-23 16:45:27,2012-11-23 16:45:27,
WINDOWS\Prefetch\EXPLORER.EXE-082F38A9.pf

Grep Files

Security Department
isd@petro-markets.info
amirs@petro-market.org; callb@petro-market.org; wrightd@petro-market.org
<amirs@petro-market.org>; <callb@petro-market.org>; <wrightd@petro-market.org>
DC-USTXHOU.petro-market.org

amirs@petro-market.org
 [is on the phone]
<HTML><META HTTP-EQUIV="content-type" CONTENT="text/html;charset=utf-8">
<FONT size=2 face=Arial><A
href="http://58.64.132.8/download/Symantec-1.43-1.exe">http://58.64.132.8/download/Symantec-1.43-1.exe</A></FONT>

Grep Files

```
URL
http://58.64.132.8/download/Symantec-1.43-1.exe
Symantec-1.43-1[1].exe
HTTP/1.1 200 OK
ETag: "21628-1b667-4cf2b68a20f60"
Content-Length: 112231
Keep-Alive: timeout=15, max=100
Content-Type: application/x-msdos-program
~U:callb

URL
http://58.64.132.8/download/Symantec-1.43-1.exe
Symantec-1.43-1[2].exe
HTTP/1.1 200 OK
ETag: "21628-1b667-4cf2b68a20f60"
Content-Length: 112231
Keep-Alive: timeout=15, max=100
Content-Type: application/x-msdos-program
~U:callb
```

Primary IOCs

> 58.64.132.141
> 58.64.132.8
> http://58.64.132.8/download/Symantec-1.43-1.exe

> Symantec-1.43-1.exe
> 6to4ex.dll (29f6376161007994 0e43abd1d7c9c50ab678fef1da43c4c961069bbb8f7d0628)
> wc.exe (4615db3a06a2fbb2f2eeeab0cba1ff4305800088a424b110c409798c51a501ad)
> wuauclt.exe (f11d7931ae893ac103377cad7ea283cce2d405aeae18745e72d1a206177266b7)

Python Script

```
[i] Using image:
/Users/user/Downloads/jackcr-challenge/ENG-USTXHOU-148/memdump.bin
[i] Starting Volatility process...
[i] Determining profile and kdbg values...
[-] --profile: WinXPSP2x86
[-] --kdbg: 0x8054cde0
[i] Running selected plugins...
[-] connscan
[-] pstree
```

Python Script

```
[i] Checking processes…
[!] Parent process incorrect for explorer.exe (244: mdd.exe)
[i] Checking network connections...
[!] External connection - svchost.exe (1024) to 58.64.132.141:80
[!] svchost.exe connecting externally
[-] Getting child processes
[-] Found wuauclt.exe 1628
[-] Found wc.exe 364
[-] Dumping associated dlls
```

Python Script

```
# Misspelt process names
# Add misspelt process to this list
misspelt = ['scvhost', 'svhost', 'lssass', 'wsock32', 'kerne132', \
    'isass', 'nvcpl.exe', 'crss']
for name in misspelt:
    if name in process[1].lower():
        print '[!] Misspelt process name - '+process[1]+' ('+\
            process[2]+')'

# Check for parents
# Add parents to this dict
parents = { 'svchost.exe':'services.exe', \
            'smss.exe':'System', \
            'wininit.exe':['','smss.exe'], \
            'taskhost.exe':'services.exe', \
            'lsass.exe':['wininit.exe','winlogon.exe'], \
            'winlogon.exe':['','smss.exe'], \
            'iexplore.exe':'explorer.exe', \
            'explorer.exe':['','userinit.exe'], \
            'lsm.exe':'wininit.exe', \
            'services.exe':['wininit.exe','winlogon.exe'], \
            'csrss.exe':['', 'sm
```

```
# Check for external IP address
internal = False
ip = connection[3]

if ip.startswith('10.'): internal = True
for i in range(16,32):
    if ip.startswith('172.'+str(i)+'.'): internal = True
if ip.startswith('172.168.'): internal = True
if ip.startswith('0.'): internal = True
if ip.startswith('127.'): internal = True
if ip.startswith('128.0.'): internal = True
if ip.startswith('169.254.'): internal = True
if ip.startswith('191.255.'): internal = True
if ip.startswith('192.0.0.'): internal = True
if ip.startswith('223.255.255.'): internal = True
```

Integration

```
[-] Performing Sophos AV scan
[!] Virus 'Mal/Whybo-A' found in file
binaries/module.1024.20b3da0.10000000.dll (6to4ex.dll)

[-] Performing VT lookup
[!] f11d7931ae893ac103377cad7ea283cce2d405aeae18745e72d1a206177266b7
(wuauclt.exe - binaries/module.1628.2045da0.400000.dll), Detections: 11
[!] 29f6376161007994 0e43abd1d7c9c50ab678fef1da43c4c961069bbb8f7d0628
(6to4ex.dll - binaries/module.1024.20b3da0.10000000.dll), Detections: 61
[!] 4615db3a06a2fbb2f2eeeab0cba1ff4305800088a424b110c409798c51a501ad
(wc.exe - binaries/module.364.2049690.400000.dll), Detections: 58
```

Integration

```
print '[-] Performing Sophos AV scan'
proc = subprocess.Popen(['sweep','binaries/'], stdout=subprocess.PIPE,\
        stderr=subprocess.PIPE)
out = proc.stdout.read()
alerts = re.findall('>>> Virus.*', out)
```

```
print '[-] Performing VT lookup - this will take some time'
proc = subprocess.Popen(['python2.7','virustotal-search.py','-k',api_key,'binaries/lookup_sha256.txt'], \
    stdout=subprocess.PIPE, stderr=subprocess.PIPE)
out = proc.stdout.read()
```