Footprinting and Reconnaissance

Module 02

Footprinting a Target Network

Footprinting refers to collecting as much information as possible regarding a target network from publicly accessible sources.

ICON KEY

- Valuable information
- Test your knowledge
- Web exercise
- Workbook review

Lab Scenario

Reconnaissance refers to collecting information about a target. It has its roots in military operations where it refers to the missions to collect information about an enemy. Information gathering is the first step in any attack on information systems. It helps attackers to narrow down the scope of their efforts and helps them select the weapons of attack. Attackers use information about the target to create a blueprint or footprint of the organization, which helps them in selecting the most effective strategy to compromise system and network security.

Similarly, the security assessment of a system or network starts with the reconnaissance and footprinting of the target. Ethical hackers and penetration (pen) testers must collect enough information about the target of the evaluation before starting the assessments. Ethical hackers and pen testers should simulate all the steps that an attacker usually follows in order to obtain a fair idea of the security posture of the target organization.

In this scenario, you work as an ethical hacker with a large organization. Your organization is alarmed at the news stories about new attack vectors plaguing large organizations around the world. Your organization was also a target of a major security breach in the past where the personal data of several of its customers were exposed on social networking sites.

You have been asked by top management to perform a proactive security assessment of the company. Before you can start any assessment, you should discuss and define the scope of this assessment with the management. Scope of the assessment identifies the systems, network, policies and procedures, human resources, and any other component of the system that requires security assessment. You should also agree with management on rules of engagement (RoE—the do's and don'ts for assessment. Once you have the necessary approvals to perform ethical hacking for your organization, you should start gathering information about the target organization from public sources. The labs in this module will give you real-time experience in collecting information from various open sources.

Lab Objectives

The objective of the lab is to extract information about the target organization that includes, but is not limited to:

- Internet Protocol (IP) address and IP range associated with the target
- Purpose of organization and why it exists
- Size of the organization

- Class of its IP block
- People and contacts at the target
- Types of operating systems (OS) and network topology in use
- Type of firewall implemented, either hardware or software or combination
- Type of remote access used, either SSH or VPN

Lab Environment

This lab requires:

- Web browsers with Internet connection
- Administrator privileges to run the tools
- The labs in this module will work in the CEH lab environment containing Windows Server 2016, Windows 10, Windows Server 2012, Kali Linux and Windows 8 machines.

Lab Duration

Time: 145 Minutes

Overview of Footprinting

Tools demonstrated in this lab are available in Z:\CEH-Tools\CEHv10 Module 02 Footprinting and Reconnaissance

Footprinting, the first step in ethical hacking, refers to the process of collecting information about a target network and its environment. Using footprinting, you can find various ways to intrude into the target organization's network.

Once you begin the footprinting process in a methodological manner, you will obtain a blueprint of the security profile of the target organization. The term blueprint refers to the unique system profile of the target organization as the result of footprinting.

Lab Tasks

Ethical hackers or pen testers use numerous tools and techniques to collect information about the target. Recommended labs that will assist you in learning various footprinting techniques include:

- Open Source Information Gathering using **Windows Command Line Utilities**
- Finding Company's Sub-domains using **Sublist3r**
- Gathering Personal Information using Online **People Search Services**
- Gathering Information from LinkedIn using **InSpy**
- Collecting Information About a Target Website using **Firebug**
- Extracting a Company's Data using **Web Data Extractor**
- Mirroring Website using **HTTrack Web Site Copier**

- Collecting Information About a Target by **Tracing Emails**
- Gathering IP and Domain Name Information using **Whois Lookup**
- Advanced Network Route Tracing using **Path Analyzer Pro**
- Footprinting a Target using **Maltego**
- Performing Automated **Network Reconnaissance** using **Recon-ng**
- Using the Open-source Reconnaissance Tool **Recon-ng** to Gather **Personnel Information**
- Collecting Information from Social Networking Sites using **Recon-ng Pushpin**
- Automated Fingerprinting of an Organization using **FOCA**
- Open Source Intelligence Gathering using **OSRFramework**
- Information Gathering using **Metasploit**
- Information Gathering using **theHarvester**

Lab Analysis

Analyze and document the results of the lab exercise. Give your opinion on your target's security posture and exposure through free public information.

PLEASE TALK TO YOUR INSTRUCTOR IF YOU HAVE QUESTIONS ABOUT THIS LAB.

Lab 1

Open Source Information Gathering using Windows Command Line Utilities

Windows offers several powerful command line utilities that help attackers as well as ethical hackers and pen testers to gather open source information about the target of the evaluation.

ICON KEY

- Valuable Information
- Test Your Knowledge
- Web Exercise
- Workbook Review

Lab Scenario

As a professional Ethical Hacker or Pen Tester, your first step will be to check for the reachability of a computer in the target network. Operating systems offer several utilities that you can readily use for primary information-gathering. Windows command-line utilities such as ping, nslookup, and tracert gather important information like IP address, maximum Packet Fame size, etc. about a target network or system that form a base for security assessment and pen test.

Lab Objectives

This lab demonstrates how to use ping, nslookup, and tracert utilities to gather information about a target. The lab teaches how to:

- Use ping utility to find the IP address of a target domain
- Use ping utility to emulate the tracert (traceroute) command
- Find the maximum frame size for the network
- Identify Internet Control Message Protocol (ICMP) type and the code for echo request and echo reply packets

Tools demonstrated in this lab are available in Z:\CEH-Tools\CEHv10 Module 02 Footprinting and Reconnaissance

Lab Environment

To carry out this lab, you need:

- Administrator privileges to run the tools
- TCP/IP settings correctly configured, and an accessible DNS server
- Windows Server 2016 running as a machine

Lab Duration

Time: 10 Minutes

Overview of The Lab

Ping is a network administration utility used to test the reachability of a host on an IP network and to measure the round-trip time for messages sent from the originating host to a destination computer. The ping command sends ICMP echo request packets to the target host and waits for an ICMP response. During this request-response process, ping measures the time from transmission to reception, known as round-trip time, and records any loss of packets. The ICMP type and code in the ping reply provide important insight into the network.

The nslookup is a network administration command-line tool generally used for querying the Domain Name System (DNS) to obtain a domain name or IP address mapping or for any other specific DNS record.

The traceroute is a computer network diagnostic tool for displaying the route (path) and measuring transit delays of packets across an IP network.

Lab Tasks

TASK 1

Finding IP Address of a Target Domain

1. Find the IP address for **http://www.certifiedhacker.com**.
2. Right-click the **Windows** icon at the lower-left corner of the screen.

FIGURE 1.1: Windows Server 2016 – Desktop view

PING stands for Packet Internet Groper.

Ping command Syntax: ping [-q] [-v] [-R] [-c Count] [-i Wait] [-s PacketSize] Host.

3. Click **Command Prompt** from the context menu to launch.

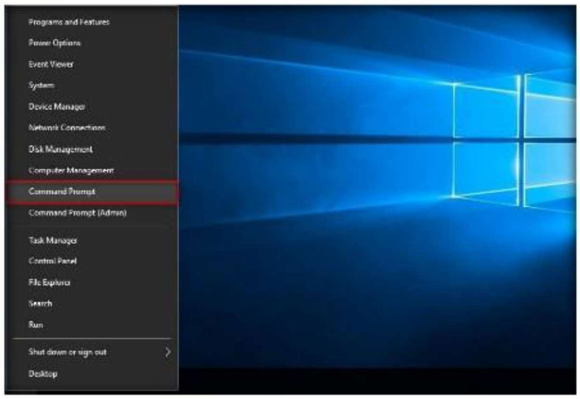


FIGURE 1.2: Windows Server 2016 – Apps

4. Type **ping www.certifiedhacker.com** in the command prompt window, and press **Enter** to find its IP address. The displayed response should be similar to the one shown in the following screenshot.

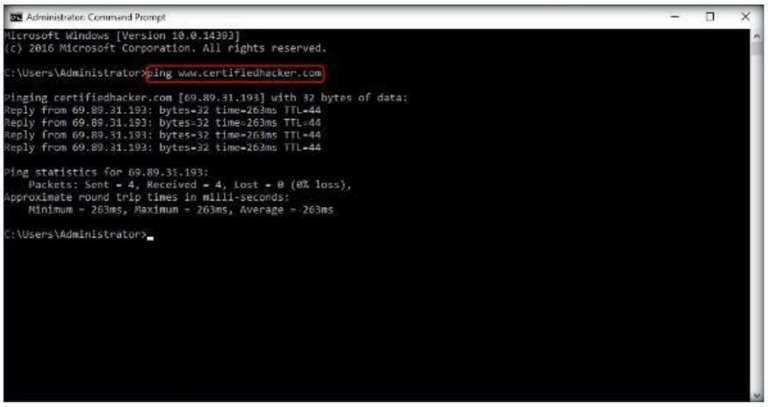


FIGURE 1.3: The ping command to extract the IP address for www.certifiedhacker.com

For the command, ping -c count, specify the number of echo requests to send.

5. Note the target domain's IP address in the result above:**69.89.31.193**. You also get information on Ping Statistics, such as packets sent, packets received, packets lost, and Approximate round-trip time.

   Note: The IP address may differ in your lab environment.

6. Now, find the maximum frame size on the network. In the command prompt window, type **ping www.certifiedhacker.com –f –l 1500**

TASK 2

Finding Maximum Frame Size

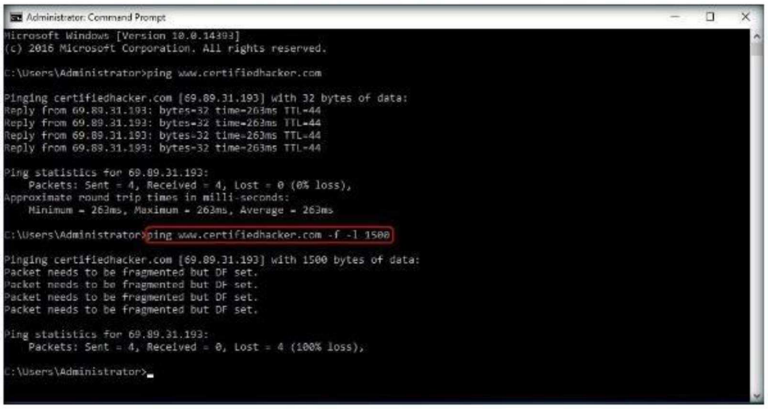


FIGURE 1.4: The ping command for www.certifiedhacker.com with –f –l 1500 options

-f switch sets the Do Not Fragment bit on the ping packet. By default, the ping packet allows fragmentation.

7. The response, **Packet needs to be fragmented but DF set**, means that the frame is too large to be on the network and needs to be fragmented. Since we used the -f switch with the ping command, the packet was not sent, and the ping command returned this error.

8. Type **ping www.certifiedhacker.com–f –l 1300.**

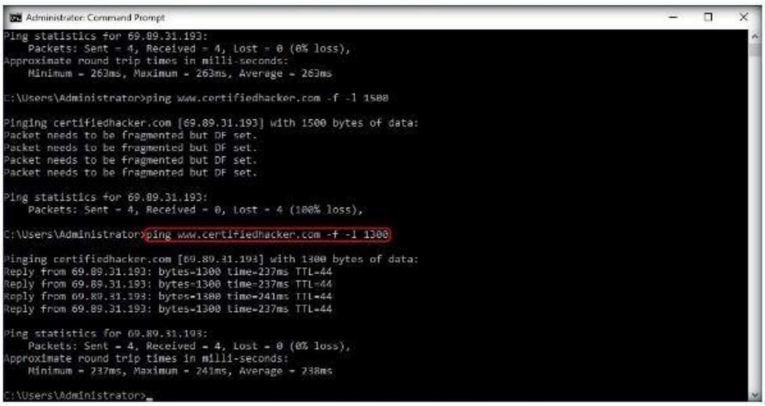


FIGURE 1.5: The ping command for www.certifiedhacker.com with –f –l 1300 options

In the ping command, the –l size option means to send the buffer size.

9. Observe that the maximum packet size is less than 1500 bytes and more than 1300 bytes.
10. Now, try different values until you find the maximum frame size. For instance, **ping www.certifiedhacker.com–f –l 1473** replies with **Packet needs to be fragmented but DF set**, and **ping www.certifiedhacker.com –f –l 1472** replies with a successful ping. It indicates that 1472 bytes is the maximum frame size on this machine's network.

Note: The maximum frame size will differ depending upon on the target network.

In the ping command, "Ping –q," means quiet output, only summary lines at startup and completion.

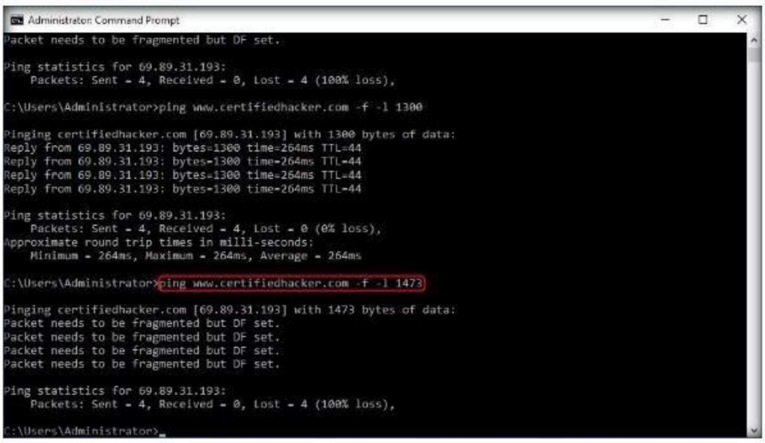


FIGURE 1.6: The ping command for www.certifiedhacker.com with –f –l 1473 options

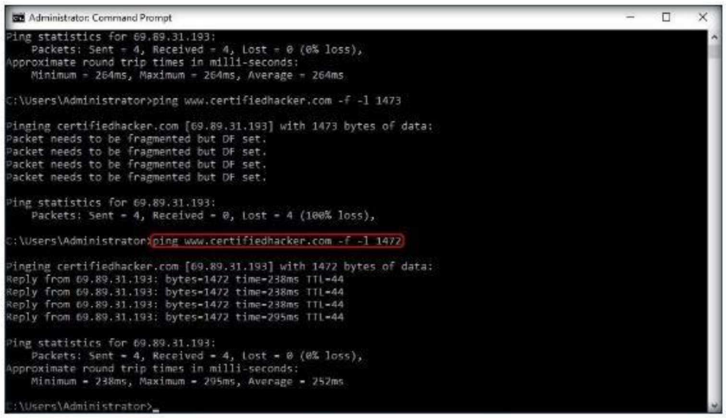


FIGURE 1.7: The ping command for www.certifiedhacker.com with –f –l 1472 options

The ping command, "Ping –R," means record route. It turns on route recording for the Echo Request packets, and displays the route buffer on returned packets (ignored by many routers).

11. Now, find out what happens when TTL (Time to Live) expires. Every frame on the network has TTL defined. If TTL reaches 0, the router discards the packet. This mechanism prevents the loss of packets.
12. In the command prompt, type **ping www.certifiedhacker.com -i 3**. This option sets the time to live (**-i**) value as **3**.

Note: The maximum value you can set for TTL is 255.

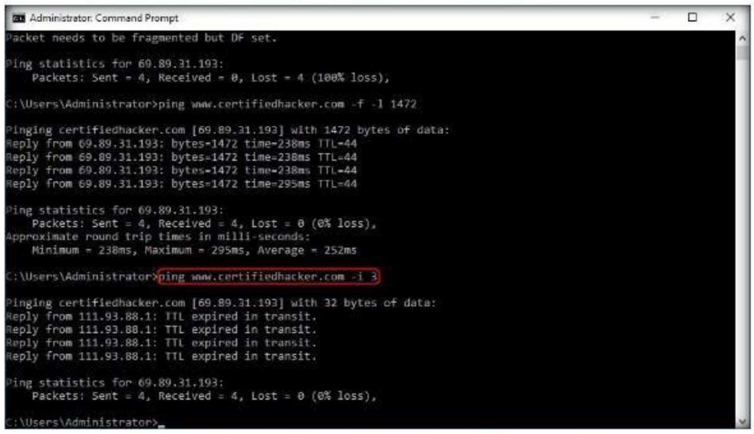


FIGURE 1.8: The ping command for www.certifiedhacker.com with –i 3 options

The ping command, "ping –i wait," means wait time, that is the number of seconds to wait between each ping.

13. Reply from 69.89.31.193: TTL expired in transit means that the router (69.89.31.193, students will have some other IP address) discarded the frame, because its TTL has expired (reached 0).
14. We will use the ping command to emulate a traceroute.
15. Find the traceroute from your PC to **www.certifiedhacker.com** using the **tracert** command.

TASK 3

Emulate Tracert

16. The results you receive might differ from those in this lab.

The router discards packets when TTL reaches 0(Zero) value.

17. Launch a new command prompt and type **tracert www.certifiedhacker.com**. This command traceroutes the network configuration information of the target domain.

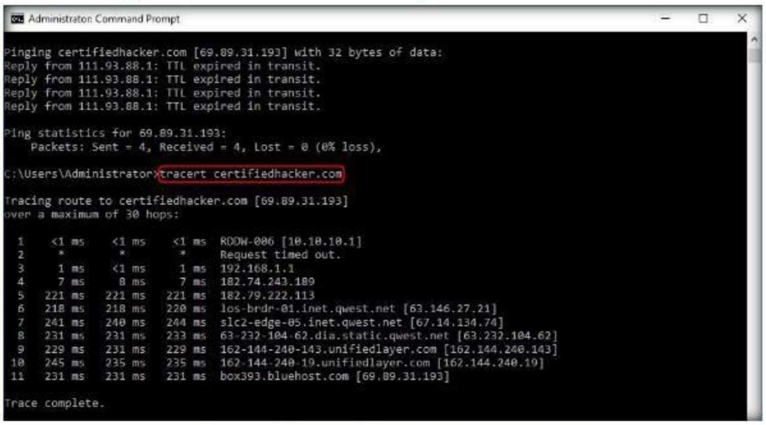


FIGURE 1.9: The tracert command for www.certifiedhacker.com

18. Minimize the command prompt shown above and launch a new command prompt. In the command prompt window, type **ping www.certifiedhacker.com -i 2 –n 1**. The only difference from the previous ping command is that we are setting the TTL to two in an attempt to check the life span of the packet.

In the ping command, -t means to ping the specified host until stopped.

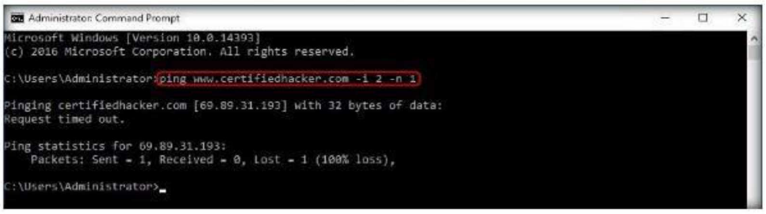


FIGURE 1.10: The ping command for www.certifiedhacker.com with –i 2 –n 1 options

In the ping command, the -v option means verbose output, which lists individual ICMP packets, as well as echo responses.

19. In the command prompt window, type **ping www.certifiedhacker.com -i 3 –n 1**. This sets the TTL value to **3**.

FIGURE 1.11: The ping command for www.certifiedhacker.com with –i 3 –n 1 options

20. Observe that there is a reply coming from the IP address **69.89.31.193** and there is no packet loss.

Note: The result displayed in the above step might differ in your lab environment.

21. In the command prompt, type **ping www.certifiedhacker.com -i 4 -n 1**. This sets the time to live value as **4**.

In the ping command, the -w option represents the timeout in milliseconds to wait for each reply.

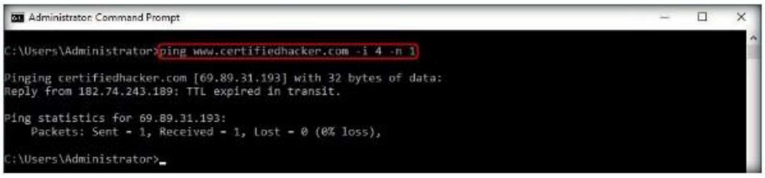


FIGURE 1.12: The ping command for www.certifiedhacker.com with –i 4 –n 1 options

22. Repeat the above step until you reach the IP address for **www.certifiedhacker.com** (in this case, **69.89.31.193**).

Traceroute sends a sequence of Internet Control Message Protocol (ICMP) echo request packets addressed to a destination host.

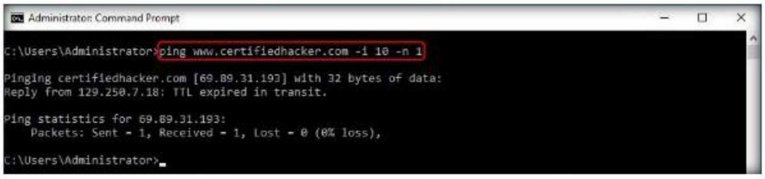


FIGURE 1.13: The ping command for www.certifiedhacker.com with –i 10 –n 1 options

23. Here the successful ping to reach **www.certifiedhacker.com** is 17 hops. The output will be similar to the trace route results.

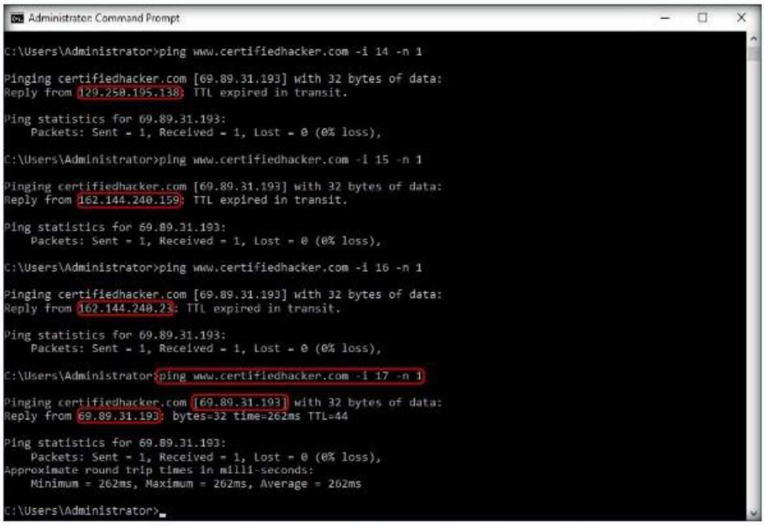


FIGURE 1.14: The ping command for www.certifiedhacker.com with –i 17 –n 1

24. This implies that, at a time to live value of 17, the reply is received from the destination host (69.89.31.193).

Note: This result might vary in your lab environment.

25. Make a note of all the IP addresses from which you receive a reply during the ping to emulate tracert.

TASK 4

Launch nslookup terminal

26. Launch a new command prompt, type **nslookup**, and press **Enter**. This displays the default server and its address assigned to **Windows Server 2016** machine.

FIGURE 1.15: Command prompt with nslookup command

Note: The DNS server Address (8.8.8.8) may differ in your lab environment

TASK 5

Obtain the IP Address of the Target Domain using nslookup

27. In the nslookup **interactive** mode, type **set type=a** and press **Enter**.

Setting the type as **a** configures nslookup to query for the IP address of a given domain.

28. Type the target domain **www.certifiedhacker.com** and press **Enter**. This resolves the IP address and displays the result shown in the following screenshot:

FIGURE 1.16: In nslookup command, set type=a option

29. The first two lines in the result are:

google-public-dns-a.google.com and **8.8.8.8**

This specifies that the result was directed to the default server hosted on the local machine (**Windows Server 2016**) that resolves your requested domain.

Typing "help" or "?" at the command prompt generates a list of available commands.

30. Thus, if the response is coming from your local machine's server (Google), but not the server that legitimately hosts the domain **www.certifiedhacker.com**, it is considered to be a non-authoritative answer.

www.certifiedhacker.com

69.89.31.193

31. Since the result returned is non-authoritative, you need to obtain the domain's authoritative name server.

TASK 6

Find Cname

32. Type **set type=cname** and press **Enter**.

    The CNAME lookup is done directly against the domain's authoritative name server and lists the CNAME records for a domain.

33. Type **certifiedhacker.com** and press **Enter**.

34. This returns the domain's authoritative name server, along with the mail server address shown in the following screenshot:

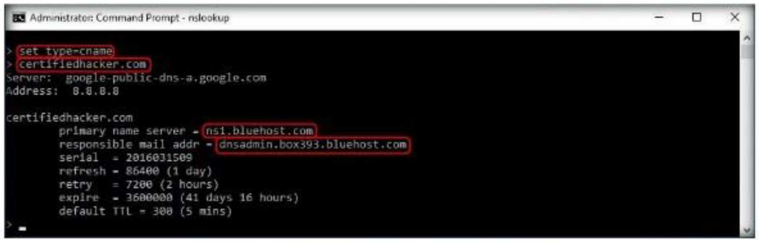


FIGURE 1.17: In nslookup command, set type=cname option

35. Since you have obtained the authoritative name server, you will need to determine the IP address of the name server.

TASK 7

Obtain the IP Address of the Primary Name Server

36. Issue the command **set type=a** and press **Enter**.

37. Type **ns1.bluehost.com** (or the primary name server that is displayed in your lab environment) and press **Enter**. This returns the IP address of the server as shown in the following screenshot:

FIGURE 1.18: Screenshot showing returns the IP address of the server

To make query type of NS a default option for your nslookup commands, place one of the following statements in the user_id.NSLOOKUP.ENV data set: set querytype=ns or querytype=ns.

38. The authoritative name server stores the records associated with the domain. So, if an attacker can determine the authoritative name server (primary name server) and obtain its associated IP address, he/she might attempt to exploit the server to perform attacks which include DoS, DDoS, URL Redirection and so on.

Lab Analysis

Document all the IP addresses, reply request IP addresses, their TTLs, DNS server names, and other DNS information.

PLEASE TALK TO YOUR INSTRUCTOR IF YOU HAVE QUESTIONS ABOUT THIS LAB.

Internet Connection Required	
☑ Yes	☐ No
Platform Supported	
☑ Classroom	☑ iLabs

Lab 2

Finding Company's Sub-domains using Sublist3r

Sublist3r is a python tool designed to enumerate subdomains of websites using OSINT.

Lab Scenario

ICON KEY

- Valuable information
- Test your knowledge
- Web exercise
- Workbook review

As a professional ethical hacker, you should be able to extract information on the target using an automated tool such as Sublist3r. It uses multiple search engines to gather the subdomains of a target domain. This lab will demonstrate extracting information using Sublist3r.

Lab Objectives

The objective of this lab is to demonstrate how to extract subdomain details of a target domain.

Lab Environment

Tools demonstrated in this lab are available in Z:\CEH-Tools\CEHv10 Module 02 Footprinting and Reconnaissance

To carryout the lab you need:

- Kali Linux running as virtual machine
- Web browser with internet access

Lab Duration

Time: 5 Minutes

Overview of Sublist3r

It helps penetration testers and bug hunters collect and gather subdomains for the domain they are targeting. Sublist3r enumerates subdomains using many search engines such as Google, Yahoo, Bing, Baidu, and Ask. Sublist3r also enumerates subdomains using Netcraft, VirusTotal, ThreatCrowd, DNSdumpster, and ReverseDNS.

Lab Tasks

TASK 1

Install Sublist3r

1. Log into **Kali Linux** machine with **root/toor**.
2. Launch a command line terminal by clicking on Terminal icon from the taskbar.

FIGURE 2.1: Kali Linux- Desktop view

3. Install **Sublist3r**. To install Sublist3r, type **apt update && apt -y install sublist3r** and press **Enter**.

   Note: If **Sublist3r** is already installed skip to Step #5.

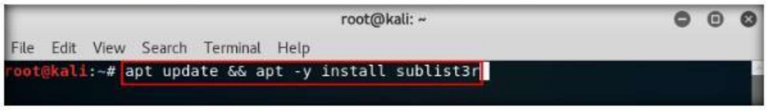


FIGURE 2.2: Install sublist3r through command line

4. Sublist3r will start installing as shown in the screenshot. Wait until it completes the installation.

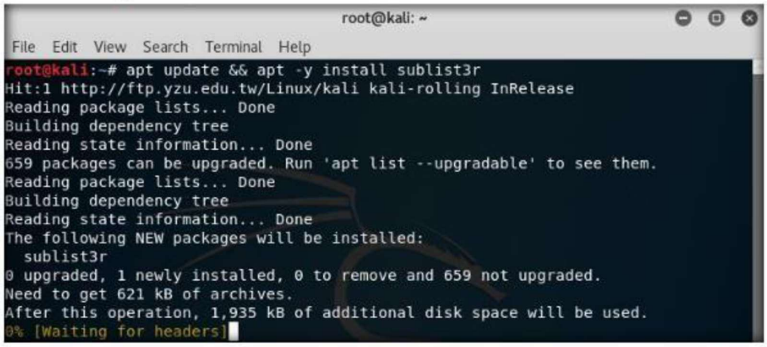


FIGURE 2.3: Kali installing sublist3r

5. Once the installation is completed, type **sublist3r -h** and press **Enter**. This command prints an overview of all options that are available to us with a description.

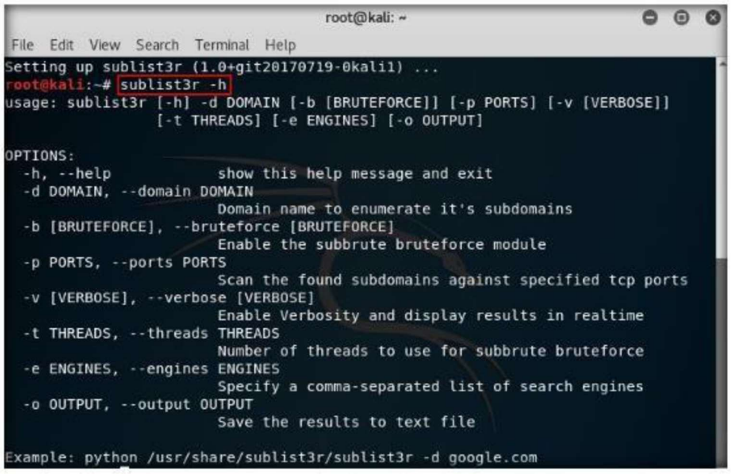


FIGURE 2.4: Sublist3r help command

TASK 2

Run Sublist3r against a website

6. Type **sublist3r -d google.com -t 3 -e bing** and press **Enter**. Here -d is to search the subdomains, -t 3 with 3 threads, and -e bing is for search in the bing.

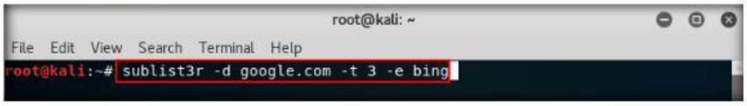


FIGURE 2.5: Sublist3r command to search for unique subdomains

7. We have found the Subdomains that are present in google.com, as shown in the screenshot.

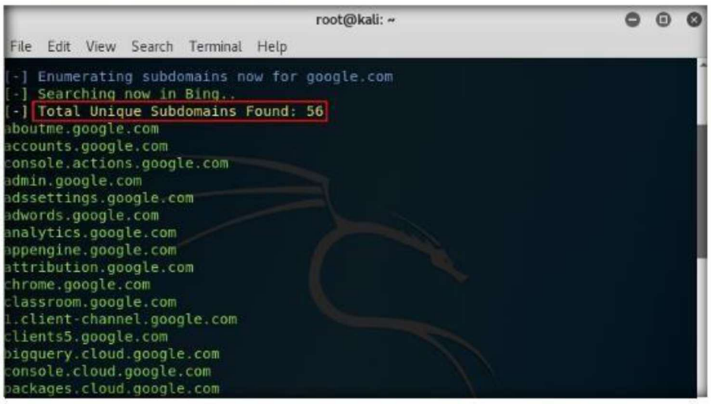


FIGURE 2.6: Sublist3r showing unique subdomains found

TASK 3

Run Sublist3r for a specific port

8. Now, find in which subdomain port 80 is open in google.com. Type **sublist3r -d google.com -p 80 -e bing** and press **Enter**.

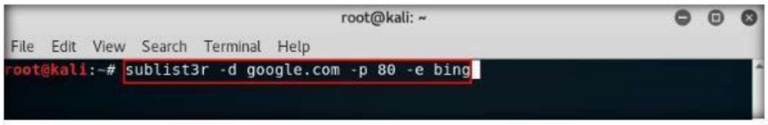


FIGURE 2.7: Sublist3r command to search for domains with port 80 open

9. **Sublist3r** will list out all the subdomains of google.com with port 80 open as shown in the screenshot.

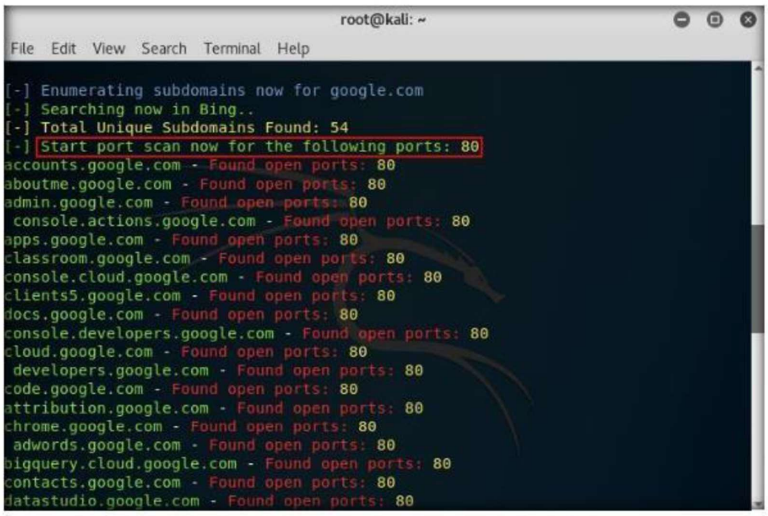


FIGURE 2.8: Sublist3r listing out google.com subdomains with port 80 open

Lab Analysis

This helps in gathering subdomains of a target domain.

PLEASE TALK TO YOUR INSTRUCTOR IF YOU HAVE QUESTIONS ABOUT THIS LAB.

Internet Connection Required	
☑ Yes	☐ No
Platform Supported	
☑ Classroom	☐ iLabs

Lab 3

Gathering Personal Information using Online People Search Services

Online people search services provide real-time information about people. These tools help to perform online footprinting and discover information about people.

ICON KEY

- Valuable information
- Test your knowledge
- Web exercise
- Workbook review

Lab Scenario

During information gathering, you need to gather personal information about employees working on critical positions in the target organization such as Network Administrator, Help Desk Employees, Receptionist, etc. The information collected can be useful in performing social engineering. This lab will demonstrate how you can search for personal information using online people search services.

Lab Objectives

The objective of this lab is to gather personal information using pipl, a utility that can be found at **https://pipl.com/**.

Tools demonstrated in this lab are available in Z:\CEH-Tools\CEHv10 Module 02 Footprinting and Reconnaissance

Lab Environment

In the lab, you need:

- A Web browser with an Internet connection
- Administrator privileges to run the tools
- Windows Server 2016 running as a machine

Lab Duration

Time: 5 Minutes

Overview of Pipl

Pipl aggregates vast quantities of public data and organizes the information into easy-to-follow profiles. Information like name, email address, phone number, street address and username can be easily found using this tool.

Lab Tasks

TASK 1

Launch Web Browser

1. Click the **Windows** icon at the lower-left corner of the screen.

FIGURE 3.1: Windows Server 2016 – Desktop view

2. The **Start** menu appears. In the **Apps** list, scroll down to find **Google Chrome**.

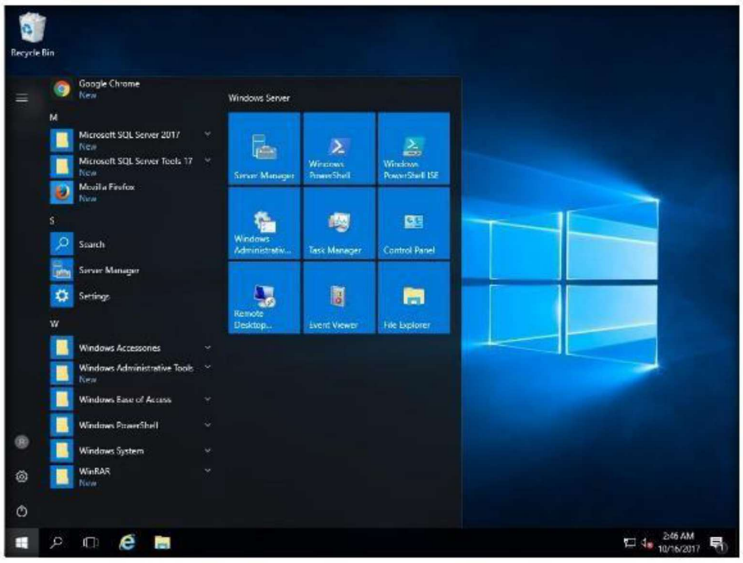


FIGURE 3.2: Scroll down to view installed apps in Windows Server 2016

PIPL people search allows you to find old friends, reunite with classmates, teammates and military buddies, or find lost and distant family.

3. Click **Google Chrome** to launch the Chrome browser (or launch any other browser of your choice).

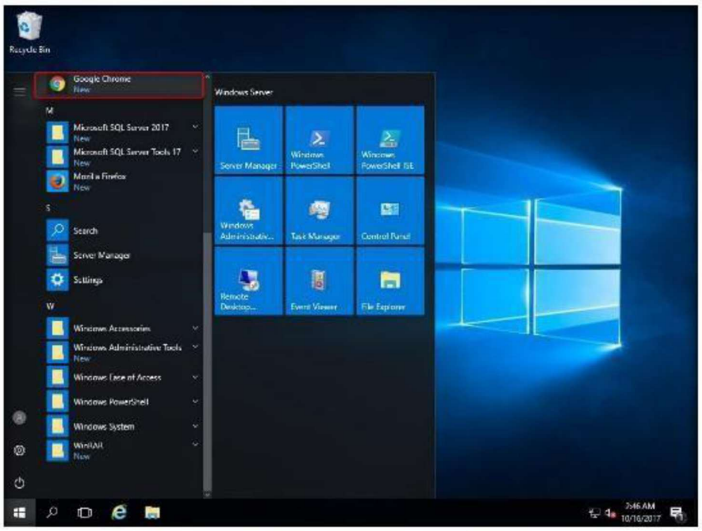


FIGURE 3.3: Installed apps in Windows Server 2016

Usernames in use by the person online. This includes screen names, handles and nicknames from across the web, social media sites, forums and more.

TASK 2

People Search using pipl

4. The Google Chrome browser window appears.
5. In the browser, type **https://pipl.com** in the address bar and press **Enter**.
6. The Pipl home page appears as shown in the following screenshot.

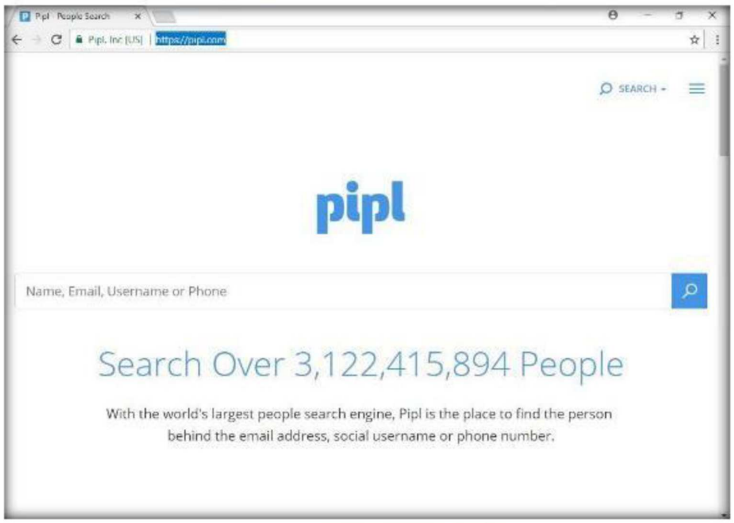


FIGURE 3.4: Pipl home page https://pipl.com/

Apart from Name search, pipl supports four types of search:

- Email Address
- Phone Number
- Username
- Residential Address

7. To begin the search, enter the details of the person you want to search for in the **Name, Email, Username or Phone** fields and click the **Search** icon.

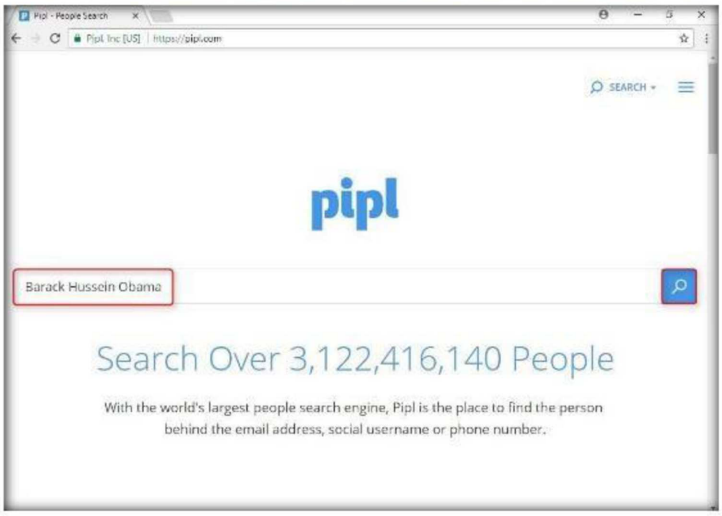


FIGURE 3.5: Pipl - Name Search

Image URL of profile images and other images that are related to the person. Each image includes a thumbnail token for our complementary thumbnail service.

8. Pipl returns search results with the name you have entered.

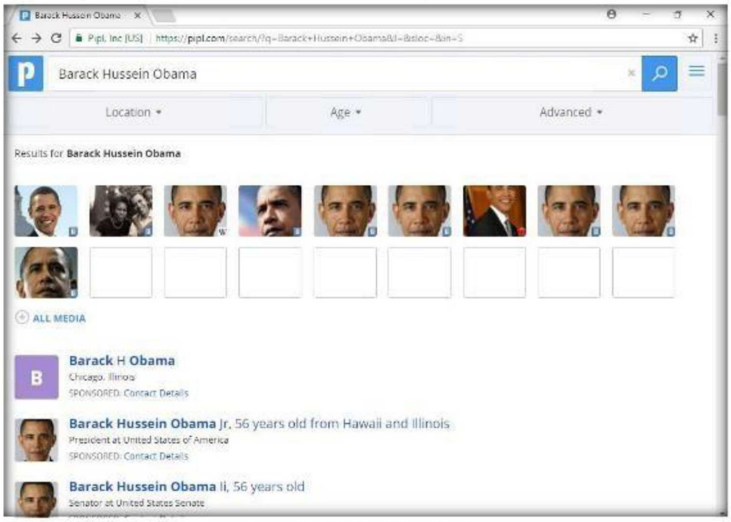


FIGURE 3.6: Pipl People Search Results

Public profiles from social networks are aggregated in pipl and many places, including search engines.

9. Click any of the links for more information on the person.

Date of Birth, might be given as a range if the exact date is unknown.

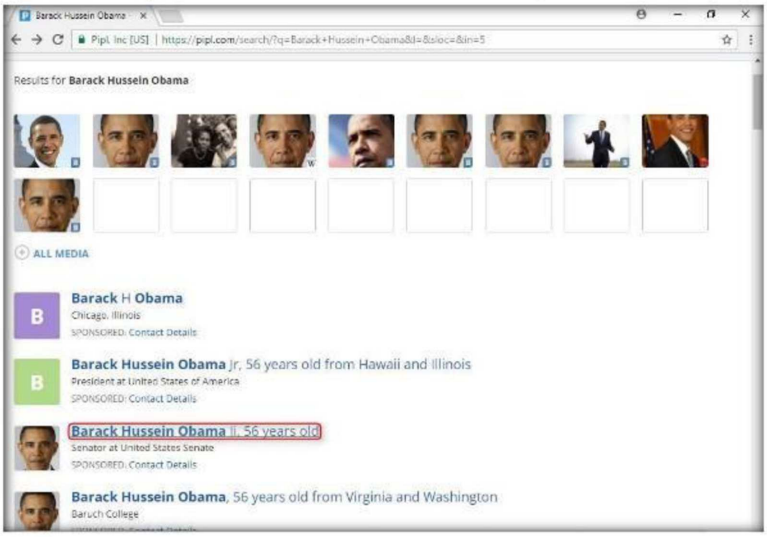


FIGURE 3.7: Pipl People Search Results

10. Pipl displays the complete information as shown in the below screenshot.
11. This will show career, education, usernames, phones, etc. information.

Home and work, current and past addresses associated with the person. Includes house number, street, city, ZIP code, state and country.

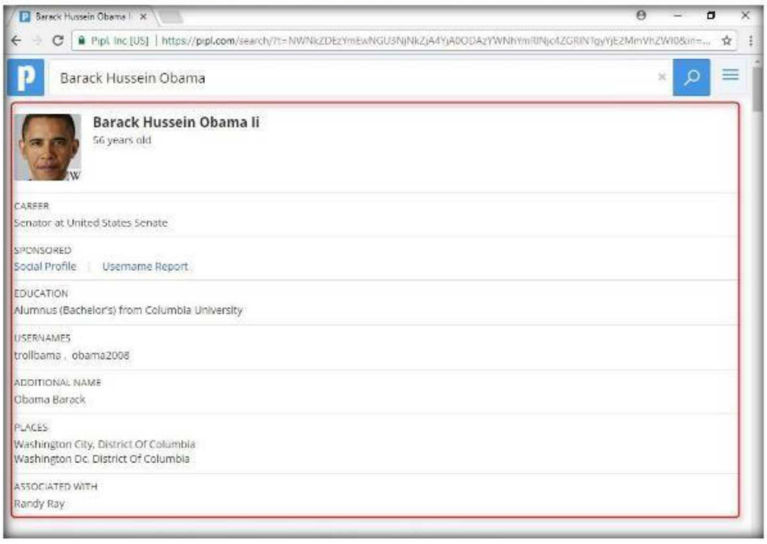


FIGURE 3.8: Pipl People Search Results

12. To learn the places where the person visited, click any link in the **Places** section.

Friends, family, colleagues, social media followers and other people associated with the person.

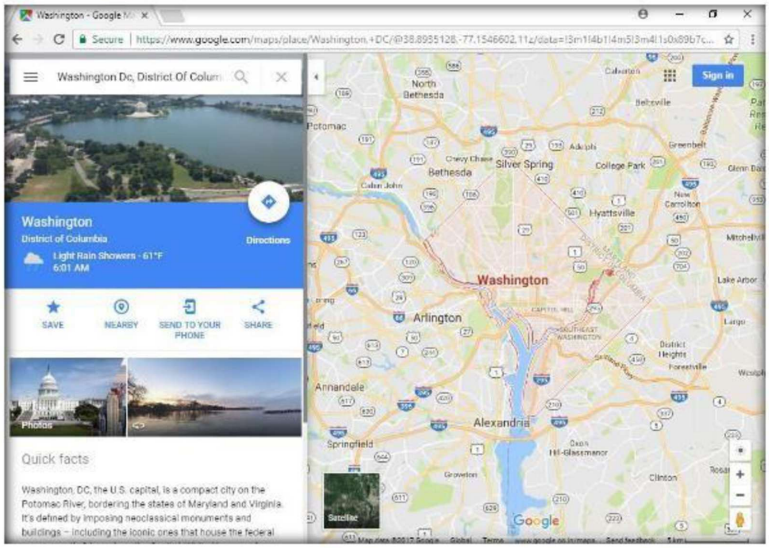


FIGURE 3.9: Pipl Places section

Lab Analysis

Analyze and document all the results discovered in the lab exercise.

PLEASE TALK TO YOUR INSTRUCTOR IF YOU HAVE QUESTIONS ABOUT THIS LAB.

Internet Connection Required	
☑ Yes	☐ No
Platform Supported	
☑ Classroom	☐ iLabs

Lab 4

Gathering Information from LinkedIn using InSpy

InSpy is a python based LinkedIn enumeration tool. InSpy has two functionalities: TechSpy and EmpSpy.

Lab Scenario

ICON KEY

- Valuable information
- Test your knowledge
- Web exercise
- Workbook review

As a professional ethical hacker, you should be able to extract information on the target using an automated tool such as InSpy. It uses Google to extract valuable information about the employees of an organization through their twitter profiles. This lab will demonstrate extracting information using InSpy.

Lab Objectives

The objective of this lab is to demonstrate how to identify employees of a company and their job profiles.

Lab Environment

Tools demonstrated in this lab are available in Z:\CEH-Tools\CEHv10 Module 02 Footprinting and Reconnaissance

To carryout the lab you need:

- Kali Linux running as virtual machine with internet access

Lab Duration

Time: 5 Minutes

Overview of InSpy

InSpy is a small but useful utility that performs enumeration on LinkedIn and can find people based on job title, company, or email address.

Lab Tasks

1. Log into Kali Linux machine with **root/toor**.

TASK 1

Install Inspy

2. Launch a command line terminal by clicking on Terminal icon from the taskbar.

FIGURE 4.1: Launch command line terminal window

3. Install **InSpy**, to install InSpy, type **apt update && apt -y install inspy** and press **Enter**.

   Note: If **InSpy** is already installed skip to Step #5.

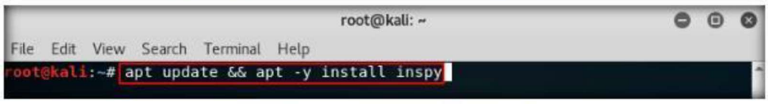


FIGURE 4.2: Install inspy through command line

4. InSpy will start installing as shown in the screenshot, wait until it completes the installation.

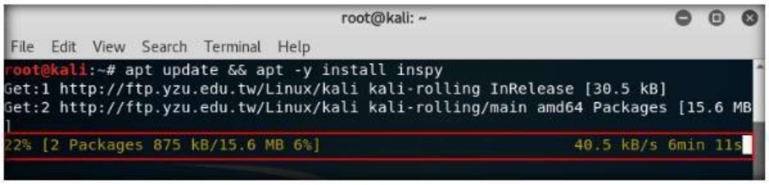


FIGURE 4.3: Kali updating and installing Inspy

5. Once the installation is completed, type inspy -h and press Enter. This command prints an overview of all options that are available to us with a description.

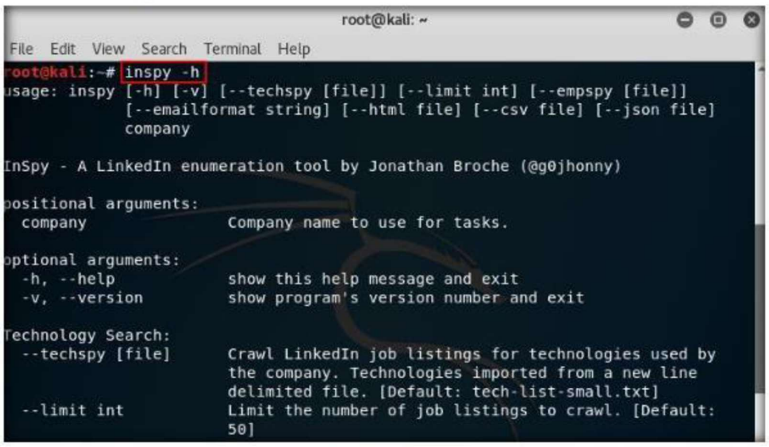


FIGURE 4.4: Inspy help command

TASK 2

Locating Wordlists

6. Type **ls -ls /usr/share/inspy/wordlists/** and press **Enter**. This command will show you that the wordlist directory contains 4 different wordlists from which 2 contain the titles and are meant to be used in EmSpy mode. The other 2 lists are meant to be used in the TechSpy mode.

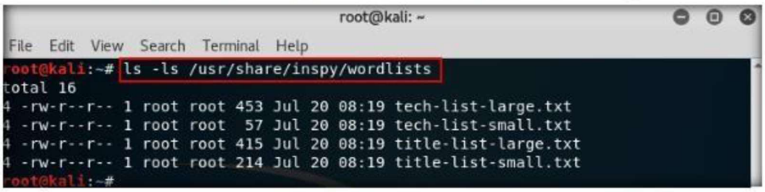


FIGURE 4.5: Locating the wordlists

7. Now that we have got the wordlists files' location, with the help of these files we can use them to search the employees for Google with their LinkedIn profiles.
8. Now type **inspy --empspy /usr/share/inspy/wordlists/title-list-large.txt google** and press **Enter**.

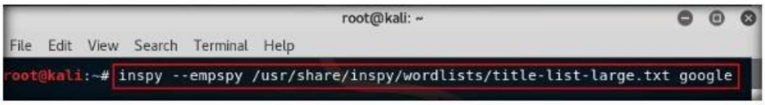


FIGURE 4.6: Using the wordlist to search for google employees

TASK 3

Run InSpy

9. InSpy will list down all the employee profile details that are working in Google.

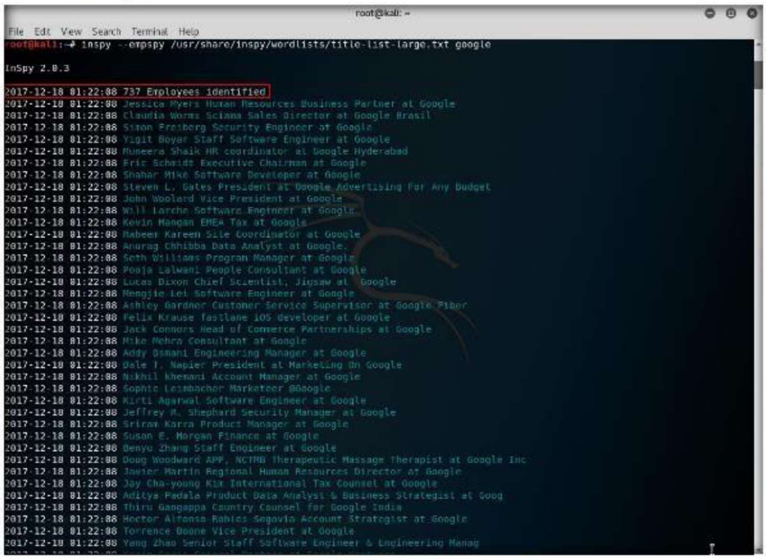


FIGURE 4.7: Inspy showing identified google employees

Lab Analysis

This helps in gathering employee details.

PLEASE TALK TO YOUR INSTRUCTOR IF YOU HAVE QUESTIONS ABOUT THIS LAB.

Internet Connection Required	
☑ Yes	☐ No
Platform Supported	
☑ Classroom	☐ iLabs

Lab 5

Collecting Information About a Target Website using Firebug

Firebug integrates with Firefox providing a lot of development tools to edit, debug, and monitor CSS, HTML, and JavaScript live in any web page.

ICON KEY

- Valuable information
- Test your knowledge
- Web exercise
- Workbook review

Lab Scenario

As a part of information gathering activity, you have been asked to collect information on the target website and extract the source code of the web pages built in HMTL, Java Script, CSS script etc. This activity may reveal potential vulnerabilities in the web application that can be exploited later in the security assessment phases. This lab will demonstrate how to reveal source code and collect information about a target website.

Lab Objectives

The objective of this lab is to help students learn editing, debugging, and monitoring CSS, HTML and JavaScript, and also obtain server-side technologies and cookies.

Tools demonstrated in this lab are available in Z:\CEH-Tools\CEHv10 Module 02 Footprinting and Reconnaissance

Lab Environment

In the lab, you need:

- A Web browser with an Internet connection
- Administrator privileges to run the tools
- Windows Server 2016 running as a machine
- Kali Linux running as a machine
- Perform this lab on Kali Linux virtual machine.

Lab Duration

Time: 10 Minutes

Overview of Firebug

Firebug is an add-on tool for Mozilla Firefox. Running Firebug displays information like directory structure, internal URLs, cookies, session IDs, etc.

Lab Tasks

TASK 1

Launch Firefox

1. Login to Kali Linux machine with Username: **root** and Password: **toor**
2. Launch **Firefox** browser from taskbar as shown in the screenshot.

FIGURE 5.1: Kali Linux- Desktop view

Firebug includes a lot of features such as debugging, HTML inspecting, profiling, etc. which are very useful for web development.

3. Firefox main window appears, type **http://www.moviescope.com** in the address bar and press **Enter**.
4. Click the Firebug add-on on the top-right corner of the **Navigation Toolbar** to enable the Firebug control panel.

The console panel offers a JavaScript command line, lists all kinds of messages and offers a profiler for JavaScript commands.

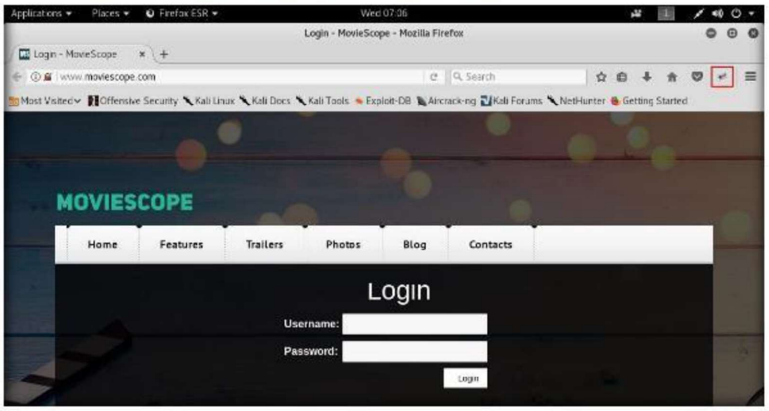


FIGURE 5.2: Launching Firebug add-on

TASK 2

Examine Console Tab

The HTML panel displays the generated HTML/XML of the currently opened page. It differs from the normal source code view, because it also displays all manipulations on the DOM tree. On the right side it shows the CSS styles defined for the currently selected tag, the computed styles for it, layout information and the DOM variables assigned to it in different tabs.

5. The Firebug panel appears at the lower end of the screen by default with **Console** tab as shown in the screenshot.

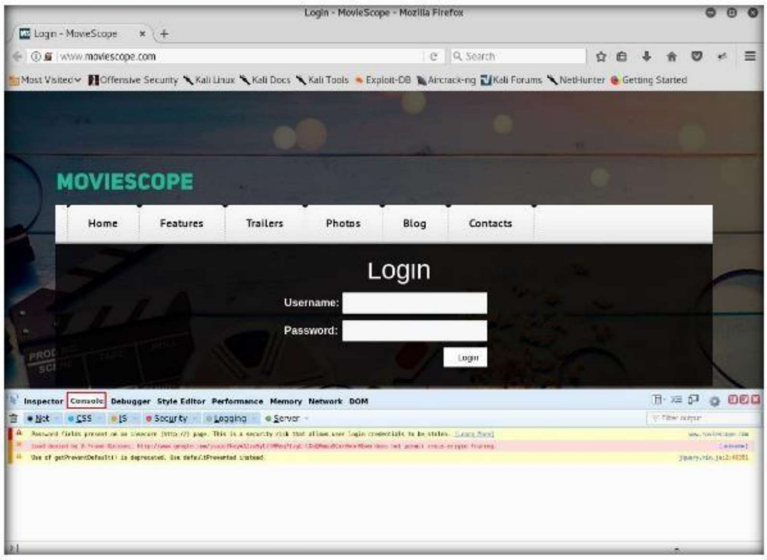


FIGURE 5.3: Selecting Console tab from Firebug panel

6. Click drop-down node from Security tab under Console. Check **Warnings** option.

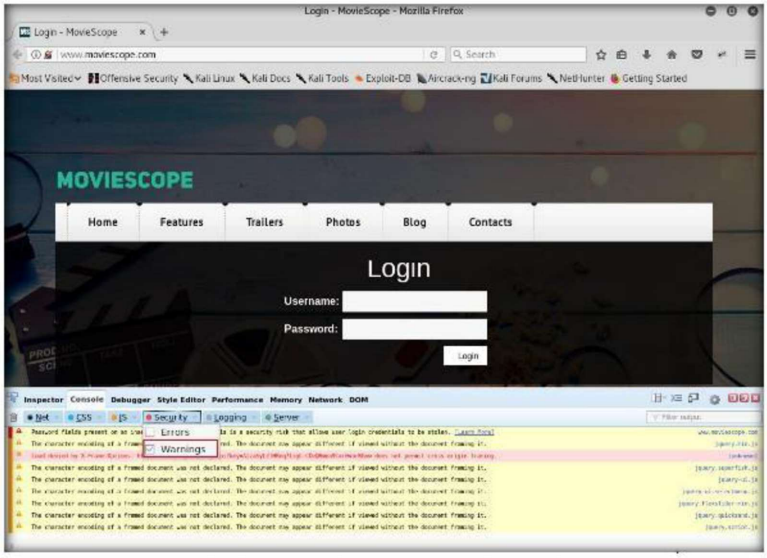


FIGURE 5.4: Selecting the warning options under security tab

7. Press **F5** on the keyboard to refresh the webpage.
8. The **Security** tab is under the **Console** section. Under this tab, Firebug displays all the issues related to the security of the website's architecture, as shown in the following screenshot:

Net Panel's purpose is to monitor HTTP traffic initiated by a web page and present all collected and computed information to the user. Its content is composed of a list of entries where each entry represents one request/response round trip made by the page.

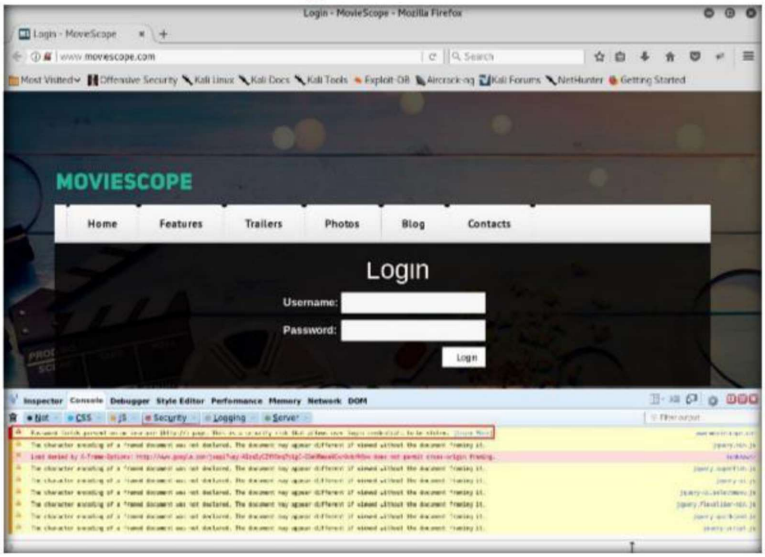


FIGURE 5.5: Firebug Panel Displaying Warning

9. The warning returned in the above screenshot states that the password fields are present on an insecure (http://) page. This vulnerability allows attackers to easily sniff the passwords in plain text.

Note: The warning results may vary depending on the websites you access.

10. You can view the results in all the other tabs under the **Console** section, which might return useful information related to the website/web application.

TASK 3

Examine HTML Tab

11. Click the **Inspector** tab in the Firebug UI. The Inspector section contains two tags: **head** and **body**, which contain scripts and text that might reveal the build of the website.

Note: If you find this section empty, refresh the webpage.

FIGURE 5.6: Firebug HTML tags

12. The head and body tags contain information related to the authentication of the username and password fields, such as the type of input that is to be given in the fields (numbers or characters, or combination of numbers and characters, etc.) which allows attackers to narrow down their exploitation techniques.

    For example, an attacker who knows that the password field takes only numbers can perform a brute force attack with only combinations of numbers (instead of applying random combinations of numbers, letters, and special characters).

13. Expand these nodes and observe the script written to develop the webpage.

Script panel debugs JavaScript code. Therefore, the script panel integrates a powerful debugging tool based on features like different kinds of breakpoints, step-by-step execution of scripts, a display for the variable stack, watch expressions and more.

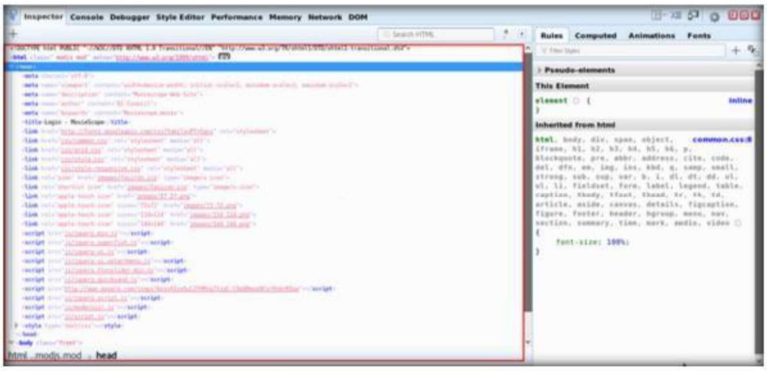


FIGURE 5.7: Firebug HTML tags

14. Refer to tabs such as **Rules**, **Computed**, **Animations** and so on in the right pane in order to observe the script used to design the webpage.

Export cookies for this site - exports all cookies of the current website as text file. Therefore, the Save as dialog is opened allowing you to select the path and choose a name for the exported file.

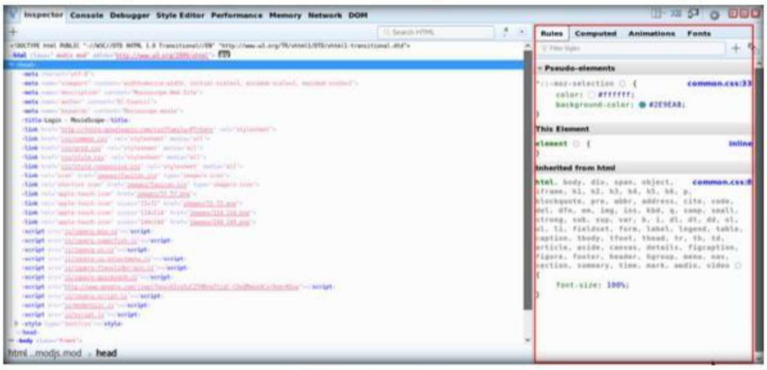


FIGURE 5.8: Firebug additional tabs

TASK 4

Examine CSS and Script Tab

15. The **Style Editor** tab provides the information of **CSS** and **Script** of the HTML and Java scripts that were used to design the webpage.

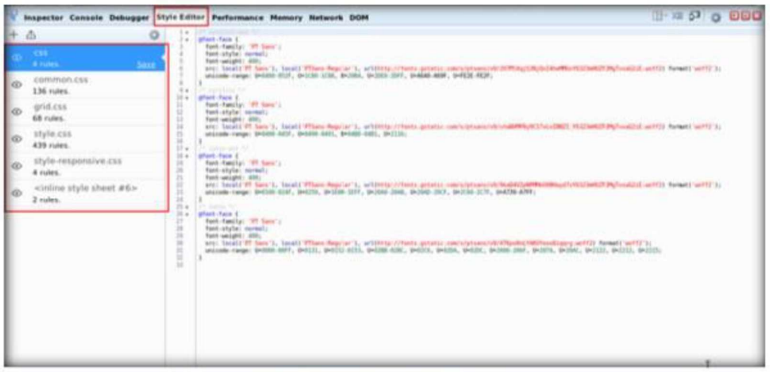


FIGURE 5.9: Firebug Style Editor tab

16. Attackers could use these scripts to build a similar website (cloned website) which could be used to serve malicious purposes such as harvesting the data entered in specific fields.

TASK 5

Examine DOM Tab

17. Click **DOM** (Document Object Model) tab in the Firebug control panel.

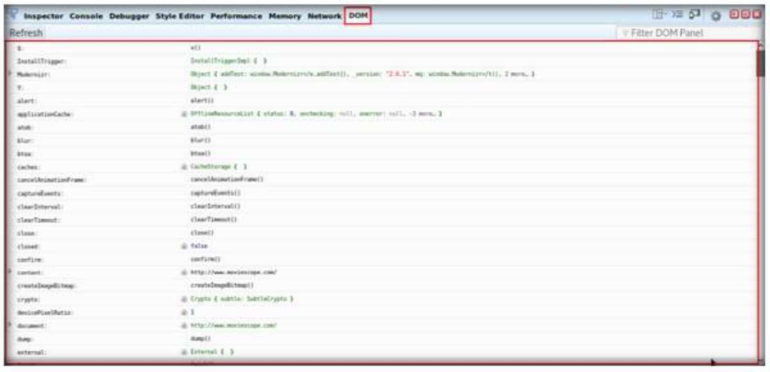


FIGURE 5.10: Firebug Document Object Model tab

18. This tab contains scripts written in various web technologies such as html5, jQuery, etc. This allows attackers to perform exploitation techniques on a specific version of a web application, which leads to exposure of sensitive information.

TASK 6

Examine NET Tab

19. Now, click the **Network** tab in the Firebug control panel.
20. By default, **All** tab under this section is selected.

21. This tab displays the GET requests and responses for all the items in the **Net** section such as **HTML**, **CSS**, etc., along with their size, status, timeline, domain and remote IP.

Firebug's CSS tabs tell you everything you need to know about the styles in your web pages, and if you don't like what it's telling you, you can make changes and see them take effect instantly.

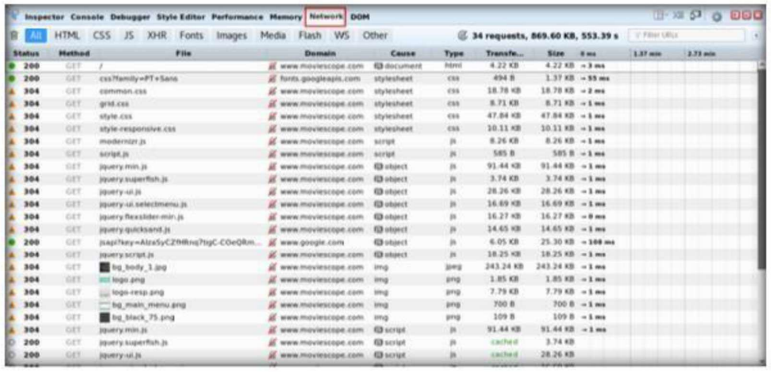


FIGURE 5.11: Firebug Net tab

When your CSS boxes aren't lining up correctly it can be difficult to understand why. Let Firebug be your eyes and it will measure and illustrate all the offsets, margins, borders, padding, and sizes for you.

22. Under this tab, click a **GET** request related to **moviescope**.
23. Under the **Headers** tab, expand the **Response headers** node.

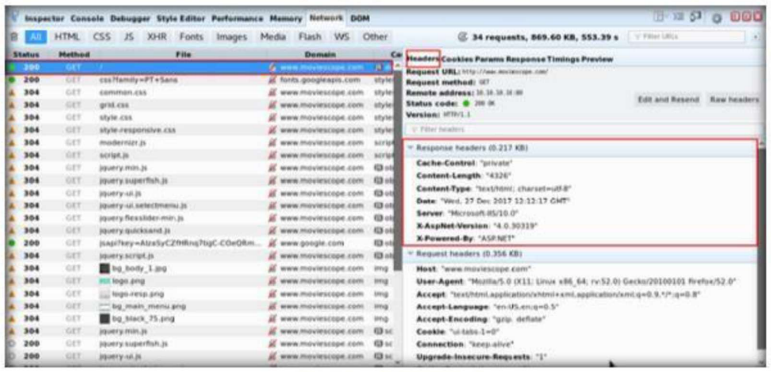


FIGURE 5.12: Firebug All tab

24. Observe the server name (IIS) and its version, along with the web application framework (ASP.NET) used to develop the website and its version. By learning this, attackers can target the vulnerabilities of that specific version in an attempt to exploit the web application.

25. Attackers can use sniffing techniques to steal the cookies and manipulate them, thereby hijacking the session of an authenticated user without the need of entering legitimate credentials.
26. By gaining the information described in the lab, an attacker can obtain the script related to a web page, identify the server-side technologies and manipulate the cookies, which allow them to perform fraudulent activities such as entering the web application, cloning a web page, hijacking a session, stealing database information, etc.

Lab Analysis

Collect information like internal URLs, cookie details, directory structure, session IDs, etc. for different websites using Firebug.

PLEASE TALK TO YOUR INSTRUCTOR IF YOU HAVE QUESTIONS ABOUT THIS LAB.

Internet Connection Required	
☐ Yes	☑ No
Platform Supported	
☑ Classroom	☑ iLabs

Lab 6

Extracting a Company's Data using Web Data Extractor

Web Data Extractor is used to extract a targeted company's contact details or data such as emails, fax, phone through web for responsible b2b communication.

ICON KEY

- Valuable information
- Test your knowledge
- Web exercise
- Workbook review

Lab Scenario

In the process of information gathering, your next task will be to extract information from the organization website. You are required to perform web data extraction in order to gain useful information from the website. This lab will show you how to perform web data extraction on the target website.

Lab Objectives

The objective of this lab is to demonstrate how to extract a company's data using Web Data Extractor. Students will learn how to:

- Extract meta tag, email, phone/fax from the web pages

Lab Environment

To carry out the lab, you need:

Tools demonstrated in this lab are available in Z:\CEH-Tools\CEHv10 Module 02 Footprinting and Reconnaissance

- Web Data Extractor, which can be acquired from **Z:\CEH-Tools\CEHv10 Module 02 Footprinting and Reconnaissance\Web Spiders\Web Data Extractor**.
- You can download the latest version of Web Data Extractor from the link **http://www.webextractor.com/download.htm**. If you decide to download the latest version, then screenshots shown in the lab might differ
- Windows Server 2016 running as a machine
- A Web browser with an Internet connection
- Administrator privileges to run the tools

Lab Duration

Time: 5 Minutes

Overview of Web Data Extracting

Web Data Extraction is the process of extracting data from web pages. It is also referred as Web Scraping or Web Data Mining

Lab Tasks

TASK 1

Install Web Data Extractor

1. Navigate to **Z:\CEH-Tools\CEHv10 Module 02 Footprinting and Reconnaissance\Web Spiders\Web Data Extractor** and double-click **wde.exe**.
2. If the **Open File - Security Warning** pop-up appears, click **Run**.
3. Follow the wizard steps to install Web Data Extractor.

WDE - Phone, Fax Harvester module is designed to spider the web for fresh Tel, FAX numbers targeted to the group that you want to market your product or services

FIGURE 6.1: Web Data Extraction Setup Pop-up Wizard

4. On installation, launch **Web Data Extractor** from the **Desktop**.

FIGURE 6.2: Installed apps in Windows Server 2016– Selecting Web Data Extractor

TASK 2

Configuring Web Data Extractor

5. Web Data Extractor's main window appears. Click **New** to start a new session.

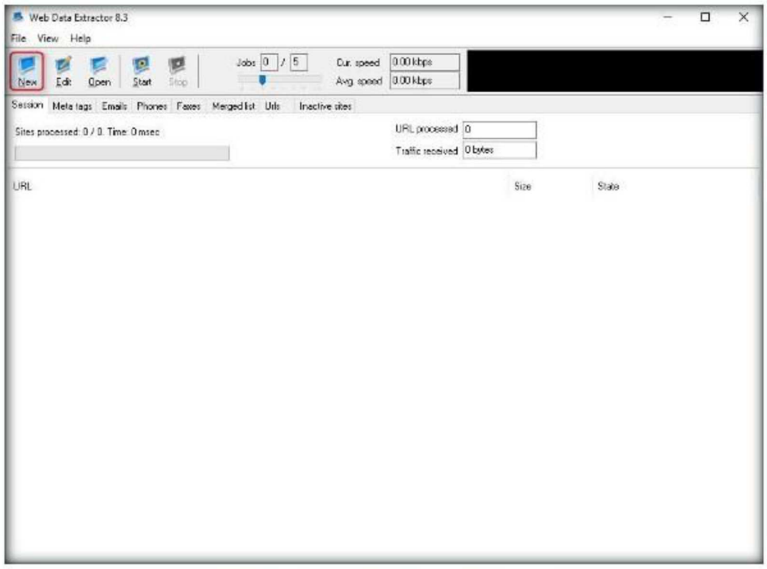


FIGURE 6.3: The Web Data Extractor main window

It has various limiters of scanning range - url filter, page text filter, domain filter - using which you can extract only the links or data you actually need from web pages, instead of extracting all the links present there, as a result, you create your own custom and targeted data base of urls/links collection

6. Clicking **New** opens the **Session settings** window.
7. Type a URL (**http://www.certifiedhacker.com**) in the **Starting URL** field. Check all the options as shown in the following screenshot, and click **OK**.

Web Data Extractor automatically gets list of meta-tags, e-mails, phone and fax numbers, etc. and stores them in different formats for future use

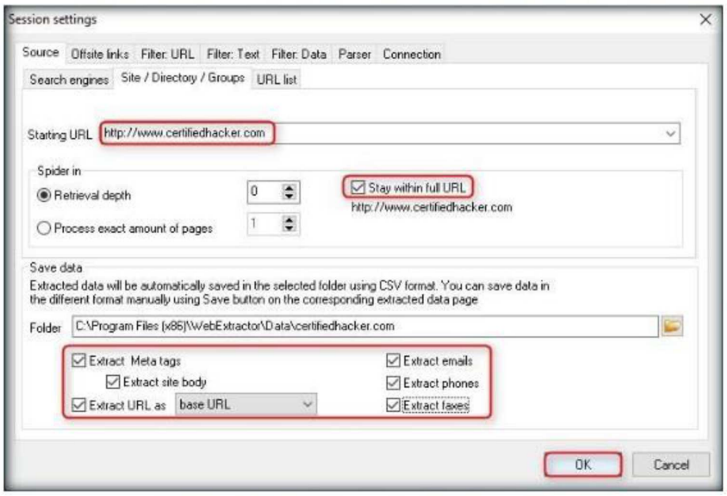


FIGURE 6.4: Web Data Extractor the Session setting window

TASK 3

Extracting Data from Web Data Extractor

8. Click **Start** to initiate the Data Extraction.

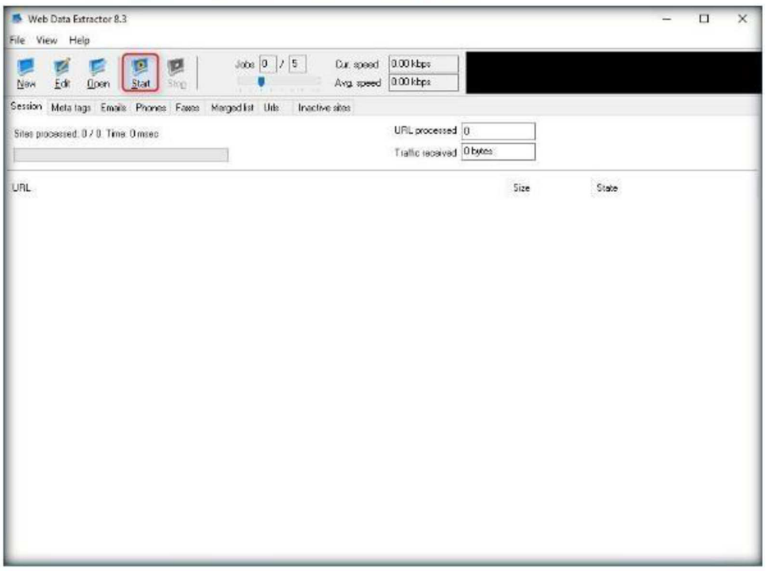


FIGURE 6.5: Web Data Extractor initiating the data extraction windows

9. Web Data Extractor will start collecting information (emails, Phones, Faxes, etc.).

It supports operation through proxy-server and works very fast, as it is able to load several pages simultaneously, and requires very few resources. Powerful, highly targeted email spider harvester

FIGURE 6.6: Web Data Extractor collecting information

Fixed "Stay with full url" and "Follow offsite links" options which failed for some sites before

Meta Tag Extractor module is designed to extract URL, meta tag (title, description, keyword) from web-pages, search results, open web directories, list of urls from local file

10. Once the data extraction process is completed, an **Information** dialog box appears. Click **OK**.

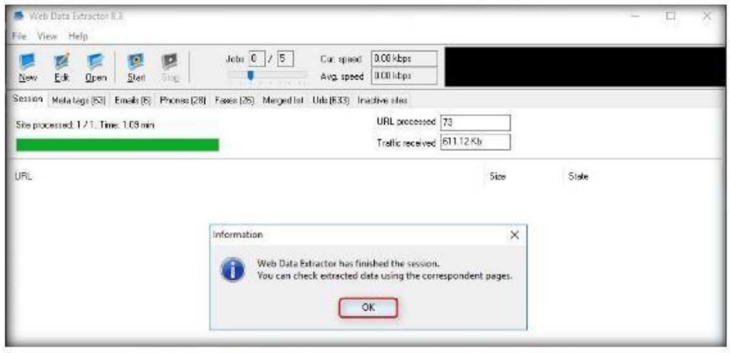


FIGURE 6.7: Web Data Extractor Data Extraction information windows

11. View the extracted information by clicking the tabs.

TASK 4

Examine the Collected Data

FIGURE 6.8: Web Data Extractor Data Extraction windows

WDE sends queries to search engines to get matching website URLs. Next it visits those matching websites for data extraction. How many deep it spiders in the matching websites depends on "Depth" setting of "External Site" tab

12. Select **Meta tags** tab to view the URL, title, keywords, description, host, domain, etc.

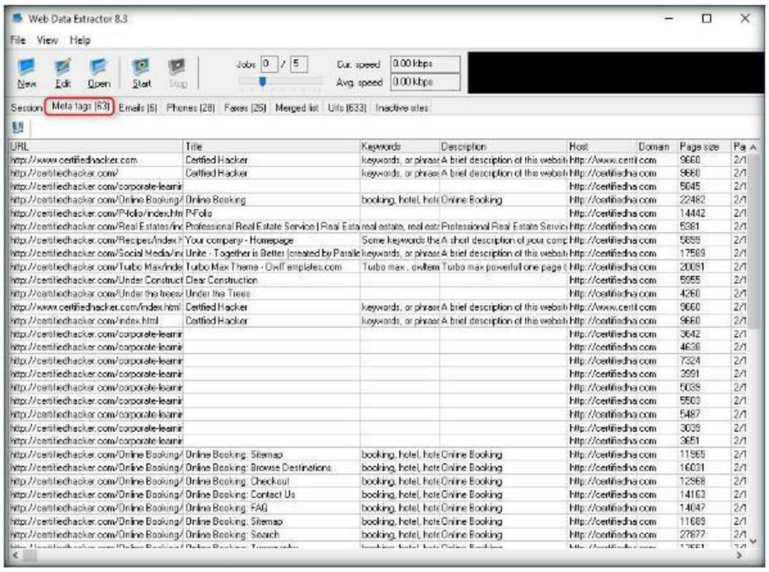


FIGURE 6.9: Web Data Extractor Extracted emails windows

13. Select the **Emails** tab to view the email address, name, URL, Title, host, keywords density, etc. information related to emails.

The option "No duplicate domains" is really useful when a list contains e-mails in corporative domains. Using this option, you avoid mailing the same message to the same company repeatedly. But at the same time you keep only one e-mail address per web-based service (domains yahoo, Hotmail, msn, etc.), while in fact each address in such domains belongs to a different person.

FIGURE 6.10: Web Data Extractor Extracted Phone details window

14. Select **Phones** tab to view the phone number, source, tag, etc.

Save extracted links directly to disk file, so there is no limit in number of link extraction per session. It supports operation through proxy-server and works very fast, as it is able to load several pages simultaneously, and requires very few resources

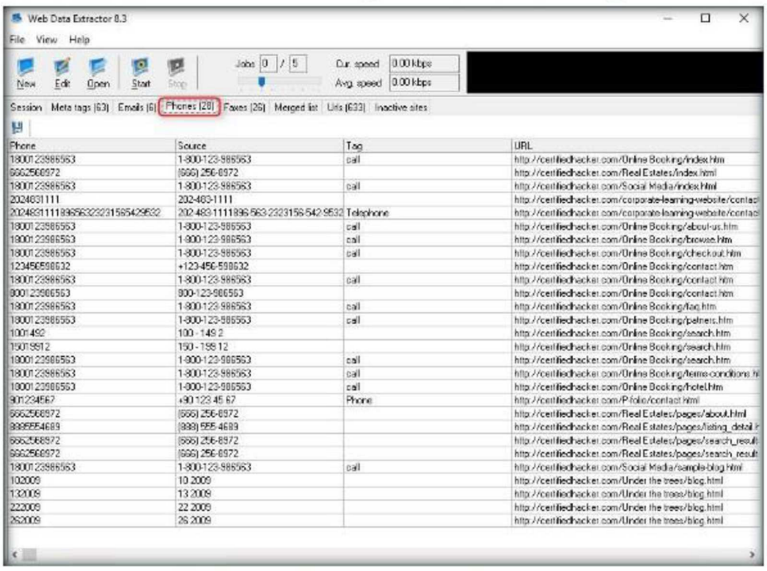


FIGURE 6.11: Web Data Extractor Extracted Phone details window

15. Check for more information under the Faxes, Merged list, Urls, and Inactive sites tabs.

TASK 5

Save a Session

16. To save the session, choose **File** and click **Save session**.

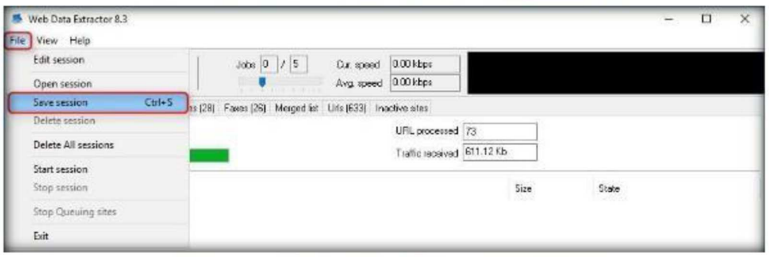


FIGURE 6.12: Web Data Extractor Extracted Phone details window

17. Specify the session name in the **Save session** dialog box and click **OK.**

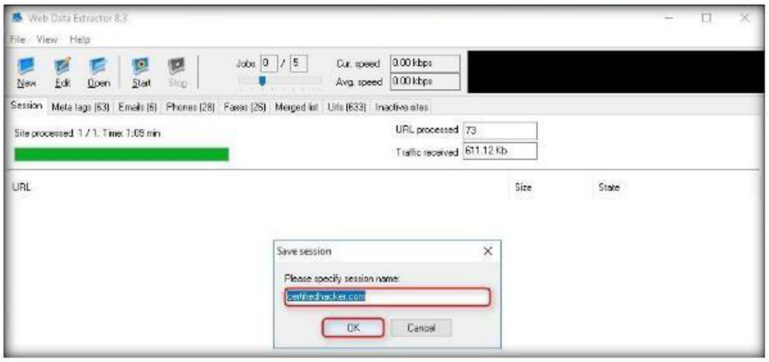


FIGURE 6.13: Web Data Extractor Extracted Phone details window

WDE will query 18+ popular search engines, extract all matching URLs from search results, remove duplicate URLs and finally visits those websites and extracts data from there

18. Click the **Meta tags** tab and then **click** the **floppy** icon.

WDE sends queries to search engines to get matching website URLs

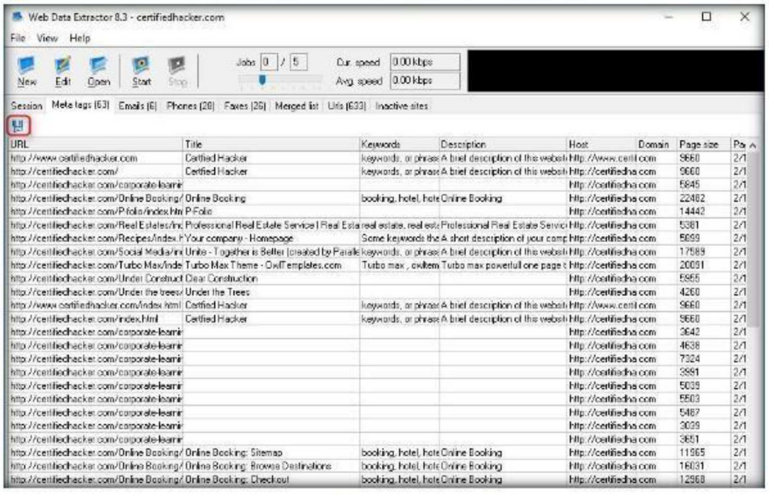


FIGURE 6.14: Web Data Extractor Mega tab

19. An **Information** pop-up may appear with the message, **You cannot save more than 10 records in Demo Version**. Click **OK**.

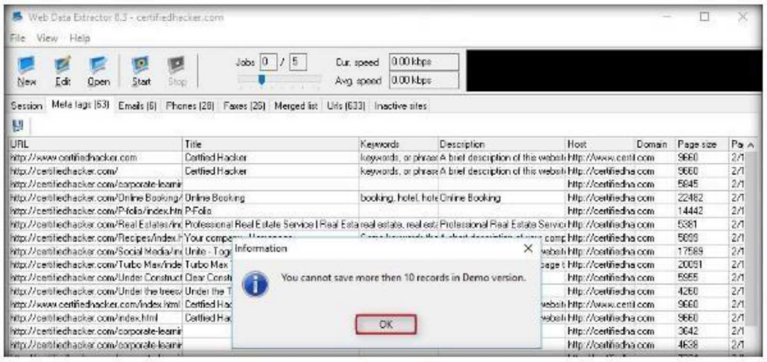


FIGURE 6.15: Web Data Extractor saving information window

If you want WDE to stay within first page, just select "Process First Page Only". A setting of "0" will process and look for data in whole website. A setting of "1" will process index or home page with associated files under root dir only.

20. Select the **Location** and **File format** and click **Save**.

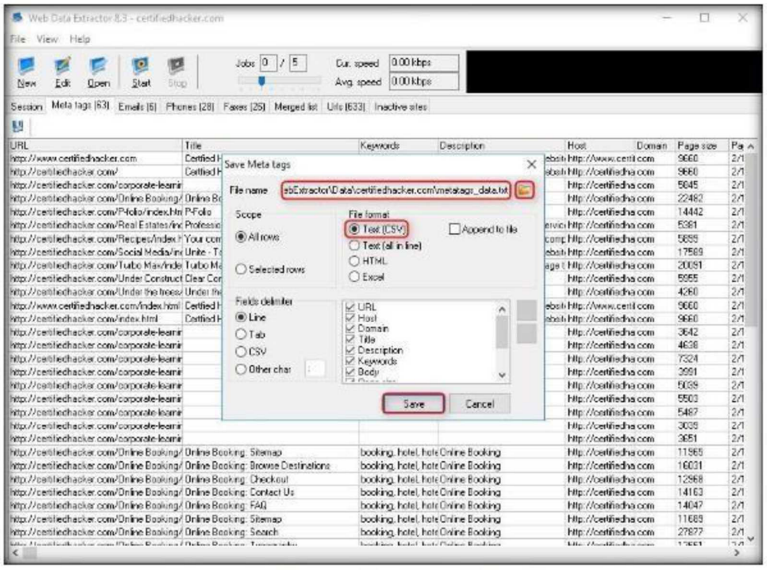


FIGURE 6.16: Web Data Extractor saving window

If you access the Internet via a dial-up, xDSL, cable modem or LAN that DOES NOT use a firewall or proxy server, then select the Direct connection to the internet option. However, if your connection is through a firewall or proxy server, you will have to choose the Connect through proxy option and supply the required data.

21. By default, the session will be saved at **C:\Program Files (x86)\WebExtractor\Data\certifiedhacker.com**.

22. You can save information from the Emails, Phones, Faxes, Merged list, Urls and Inactive sites tabs.

Lab Analysis

Document all the Meta Tags, Emails, and Phone/Fax.

PLEASE TALK TO YOUR INSTRUCTOR IF YOU HAVE QUESTIONS ABOUT THIS LAB.

Internet Connection Required	
☑ Yes	☐ No
Platform Supported	
☑ Classroom	☐ iLabs

Lab 7

Mirroring Website using HTTrack Web Site Copier

HTTrack Web Site Copier is an offline browser utility that downloads a Web site to a local directory.

ICON KEY

- Valuable information
- Test your knowledge
- Web exercise
- Workbook review

Lab Scenario

It can be difficult to perform footprinting on a live website. In that case, you may need to mirror the target website. This mirroring of the website helps you to footprint the web site thoroughly on your local system. As a professional ethical hacker or pen tester, you should be able to mirror the website of the target organization. This lab will demonstrate how to mirror a target website.

Lab Objectives

The objective of this lab is to help students learn mirroring websites using HTTrack Web Site Copier.

Lab Environment

To carryout the lab, you need:

Tools demonstrated in this lab are available in Z:\CEH-Tools\CEHv10 Module 02 Footprinting and Reconnaissance

- HTTrack Web Site Copier, located at **Z:\CEH-Tools\CEHv10 Module 02 Footprinting and Reconnaissance\Website Mirroring Tools\HTTrack Web Site Copier**.
- You can download the latest version of HTTrack Web Site Copier from the link **http://www.httrack.com/page/2/en index.html**. If you decide to download the latest version, then **screenshots** shown in the lab might differ
- Windows Server 2016 running as a machine
- A Web browser with an Internet connection
- Administrator privileges to run the tools

Lab Duration

Time: 10 Minutes

Overview of Web Site Mirroring

Web site mirroring creates a replica of an existing site. It allows you to download a website to a local directory, analyze all directories, HTML, images, flash, videos and other files from the server on your computer.

Lab Tasks

TASK 1

Install and Configure HTTTrack Web Site Copier

1. Navigate to **Z:\CEH-Tools\CEHv10 Module 02 Footprinting and Reconnaissance\Website Mirroring Tools\HTTrack Web Site Copier** and double-click **httrack_x64-3.49.2.exe**.
2. If the **Open File - Security Warning** pop-up appears, click **Run**.
3. Follow the wizard steps to install **HTTrack Web Site Copier**.
4. In the last step of the installation wizard, uncheck **View history.txtfile** options and click **Finish**.
5. The **WinHTTrack Website Copier** main window appears. Click **OK** and then click **Next** to create a **New Project**.

Note: If the application doesn't launch, you can launch it manually from the **Apps** screen.

WinHTTrack arranges the original site's relative link-structure.

Quickly updates downloaded sites and **resumes** interrupted downloads (due to connection break, crash, etc.)

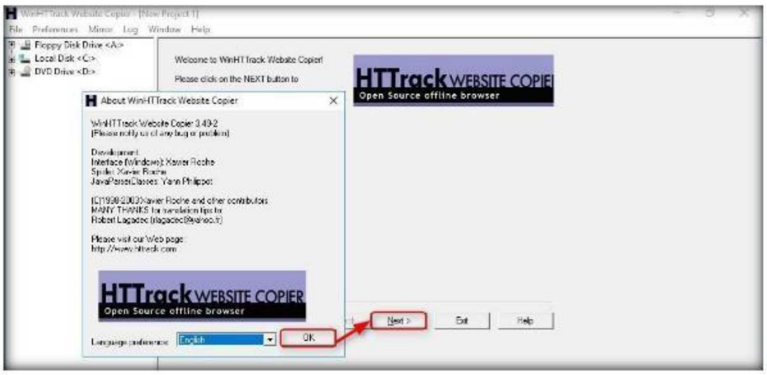


FIGURE 7.1: HTTrack Website Copier main window

6. Enter the name of the project in the **New project name** field. Select the Base path to store the copied files. Click **Next**.

Wizard to specify which links must be loaded (accept/refuse: link, all domain, all directory)

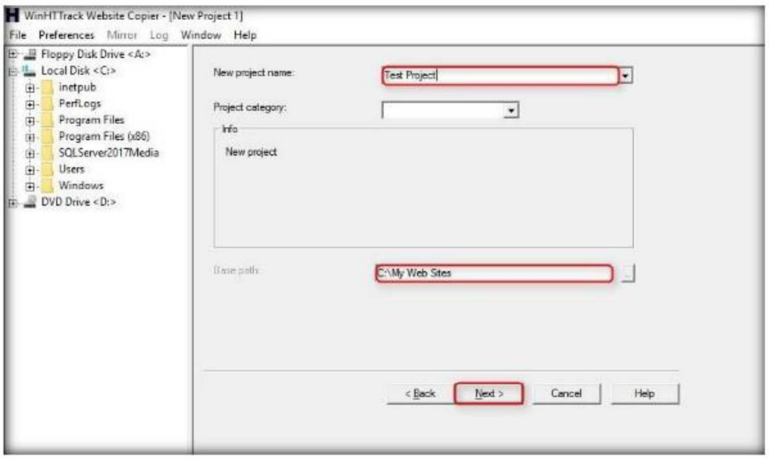


FIGURE 7.2: HTTrack Website Copier selecting a New Project

File names with original structure kept or split mode (one html folder, and one image folder), dos 8-3 filenames option and user-defined structure

7. Enter **www.certifiedhacker.com** in the Web Addresses: (URL) field and click **Set options**.

Timeout and minimum transfer rate manager to abandon slowest sites

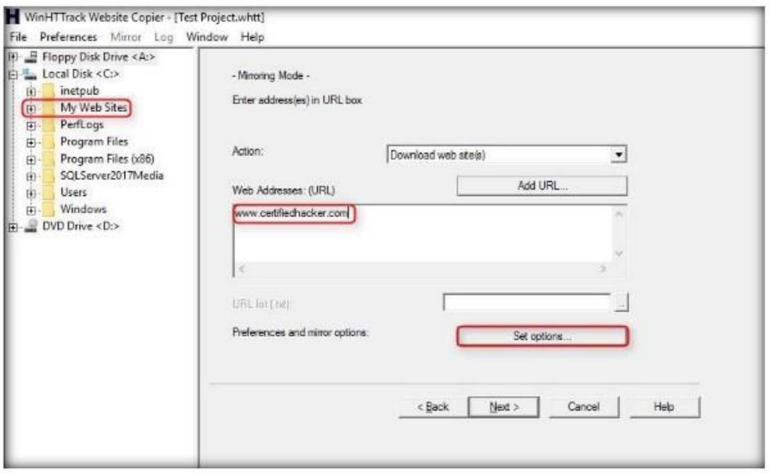


FIGURE 7.3: Setting options in HTTrack Website Copier

8. Click the **Set options** button to launch the **WinHTTrack** window.

9. Click the **Scan Rules** tab and select the check boxes for the file types as shown in the following screenshot, then click **OK**.

WinHTTrack works as a command-line program or through a shell for both private (capture) and professional (on-line web mirror) use.

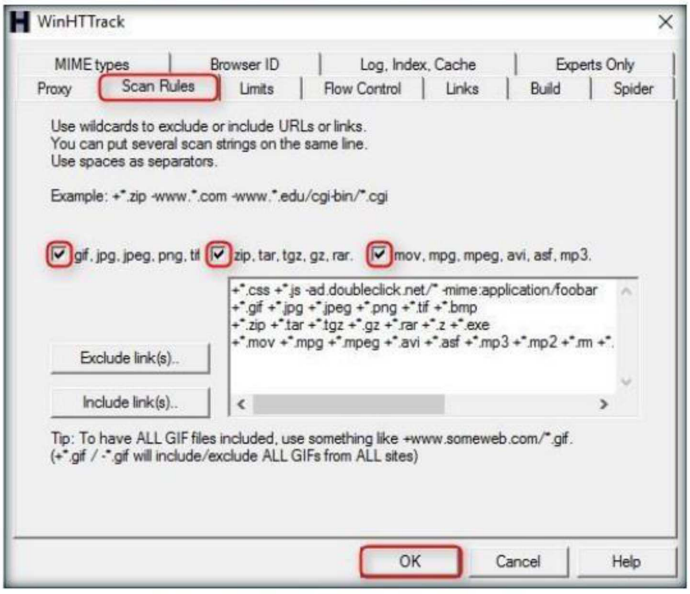


FIGURE 7.4: Scan Rules tab in HTTrack Website Copier

HTML parsing and tag analysis, including javaScript code/embedded HTML code

10. Click **Next**.

Proxy support to maximize speed, with optional authentication

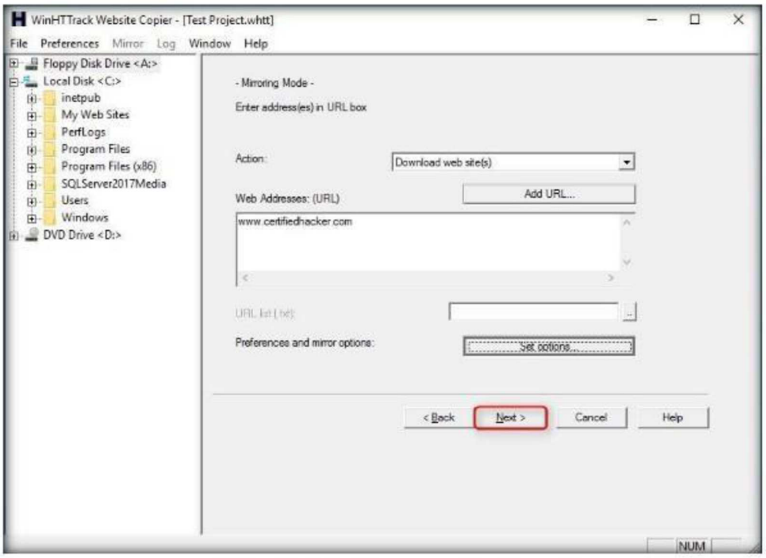


FIGURE 7.5: HTTrack Website Copier Select a project window

11. By default, the radio button will be selected for **Please adjust connection parameters if necessary, then press FINISH to launch the mirroring operation** and check **Disconnect when finished**.
12. Click **Finish**, to start mirroring the website.

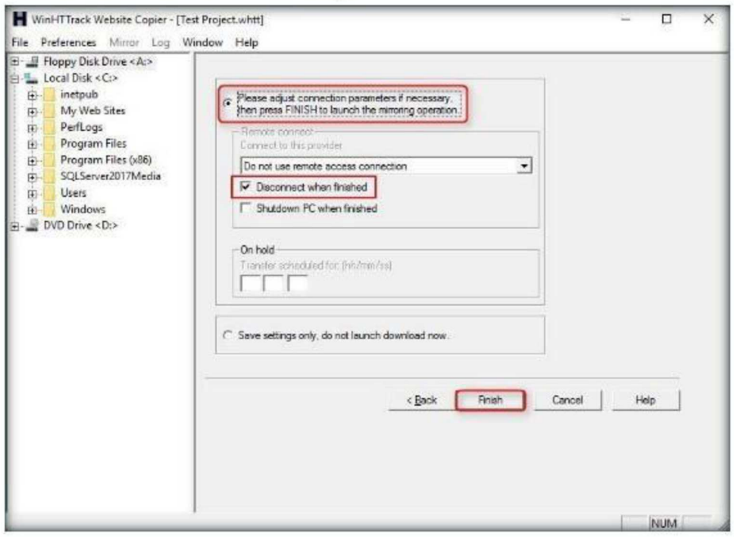


FIGURE 7.6: HTTrack Website Copier launching mirroring operation

The tool has integrated DNS cache and native https and ipv6 support

HTTrack can also update an existing mirrored site and resume interrupted downloads. HTTrack is fully configurable by options and by filters

13. Site mirroring progress will be displayed as in the following screenshot:

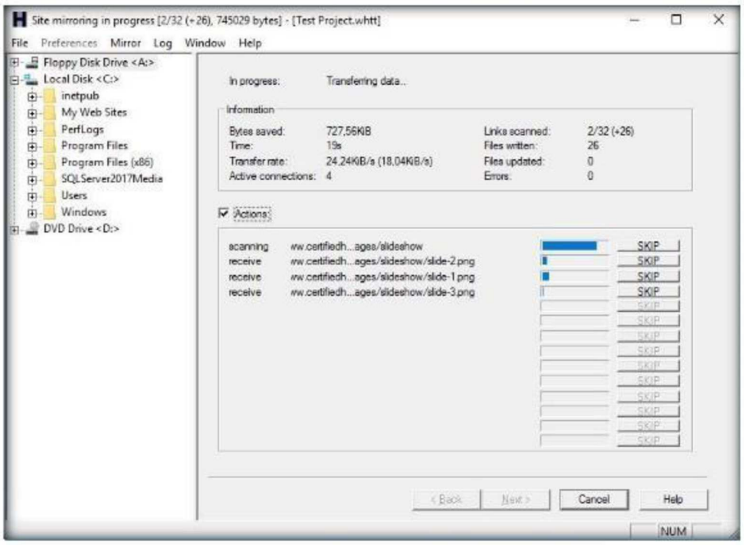


FIGURE 7.7: HTTrack Website Copierdisplaying site mirroring progress

14. WinHTTrack displays the message **Mirroring operation complete**, once the site mirroring is completed. Click **Browse Mirrored Website**.

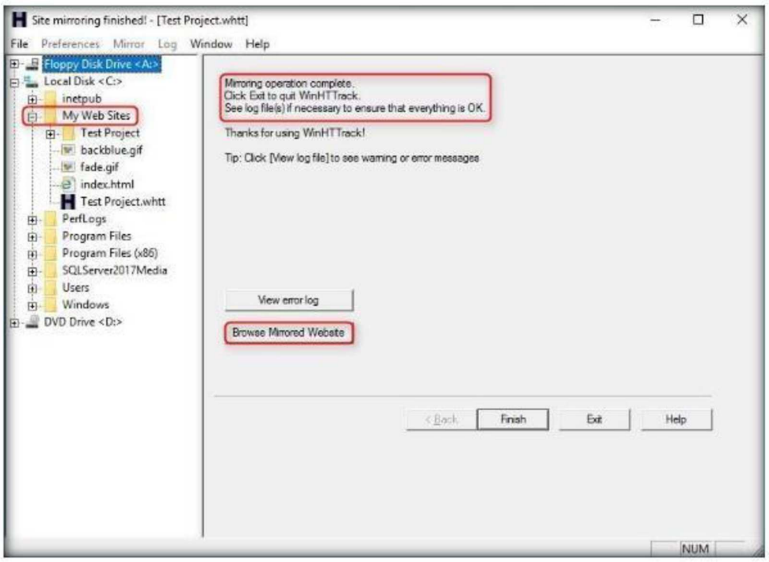


FIGURE 7.8: Browsing a mirrored website

Filter by file type, link location, structure depth, file size, site size, accepted or refused sites or filename (with advanced wild cards).

TASK 2

Browse the Mirrored Website

15. The mirrored website for **www.certifiedhacker.com** launches. The URL displayed in the address bar indicates that the website's image is stored on the local machine.

Note: If the webpage does not open, navigate to the directory where you mirrored the website and open **index.html** with any browser.

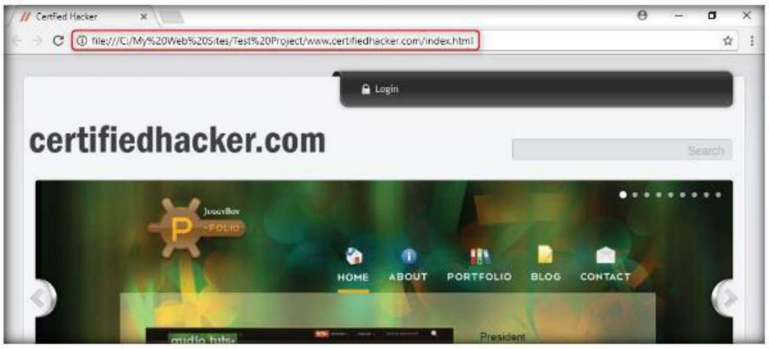


FIGURE 7.9: HTTrack Website Copier Mirrored Website Image

Use bandwidth limits, connection limits, size limits and time limits

Optional log file with error-log and comments-log.

Do not download too large websites: use filters; try not to download during working hours

16. Some websites are very large and it might take a long time to mirror the complete site.

17. If you wish to stop the mirroring in progress, Click **Cancel** on the Site mirroring progress window.
18. The site will work like a **live hosted website**.

Lab Analysis

Document the mirrored websites directories, getting HTML, images, and other files.

PLEASE TALK TO YOUR INSTRUCTOR IF YOU HAVE QUESTIONS ABOUT THIS LAB.

Internet Connection Required	
☑ Yes	☑ No
Platform Supported	
☑ Classroom	☐ iLabs

Lab 8

Collecting Information About a Target by Tracing Emails

Tracing emails involves analyzing the email header to discover details about the sender.

ICON KEY

- Valuable information
- Test your knowledge
- Web exercise
- Workbook review

Lab Scenario

An attacker may send malicious emails to a victim (employee) in order to carry out an attack on a target organization. As a professional ethical hacker, you should be able to trace out information about such malicious email. It involves analyzing the email headers of suspicious email to extract information such as the date that an email was received or opened, geographical information, etc.

Lab Objectives

The objective of this lab is to demonstrate email tracing using eMailTrackerPro. Students will learn how to:

- Trace an email to its true geographical source
- Collect Network (ISP) and domain Whois information for any email traced

Tools demonstrated in this lab are available in Z:\CEH-Tools\CEHv10 Module 02 Footprinting and Reconnaissance

Lab Environment

In the lab, you will need:

- eMailTrackerPro, which is located at **Z:\CEH-Tools\CEHv10 Module 02 Footprinting and Reconnaissance\Email Tracking Tools\eMailTrackerPro**.
- You can download the latest version of eMailTrackerPro from the link **http://www.emailtrackerpro.com/download.html**. If you decide to download the latest version, then screenshots shown in the lab might differ. This tool installs Java runtime.
- Windows Server 2016 running as a machine
- A Web browser with an Internet connection
- Administrator privileges to run the tools

- A valid email account (Hotmail, Gmail, yahoo, etc.). We suggest you to sign up with any of these services to obtain a new email account for this lab. *Do not* use your real email account and password in this exercise.

Lab Duration

Time: 5 Minutes

eMailTrackerPro helps identify the true source of emails to help track suspects, verify the sender of a message, trace and report email abusers.

Overview of Email Tracing/Tracking

E-mail tracking is a method to monitor or spy on email delivered to the intended recipient. It reveals information such as:

- When an email message was received and read
- If a destructive email was sent
- The GPS coordinates and map location of the recipient
- The time spent reading the email
- Whether or not the recipient visited any links sent in the email
- PDFs and other types of attachments
- If messages were set to expire after a specified time

Lab Tasks

TASK 1

Install eMailTrackerPro

1. Navigate to **Z:\CEH-Tools\CEHv10 Module 02 Footprinting and Reconnaissance\Email Tracking Tools\eMailTrackerPro** and double-click **emt.exe**.
2. If the **Open File - Security Policy** pop-up appears, click **Run**.
3. Follow the wizard steps (by selecting default options) to install eMailTrackerPro.
4. In the last step of installation, uncheck Show Readme option and click **Finish**.
5. If the application does not launch automatically, then launch **eMailTrackerPro** from the **Start** menu.

6. The main window of eMailTrackerPro appears along with the **Edition Selection** pop-up. Click **OK**.

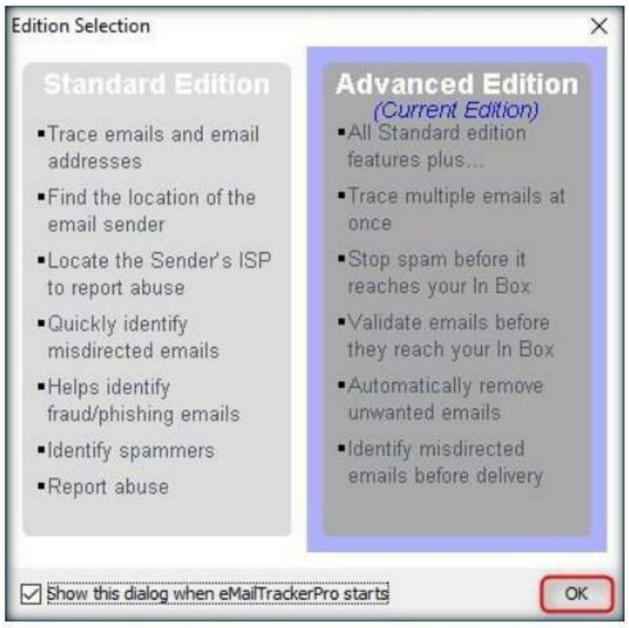


FIGURE 8.1: eMailTrackerPro edition Selection pop-up window

eMailTrackerPro Advanced Edition includes an online mail checker which allows you to view all your emails on the server before delivery to your computer.

7. The **eMailTrackerPro** main window appears as shown in the following screenshot:

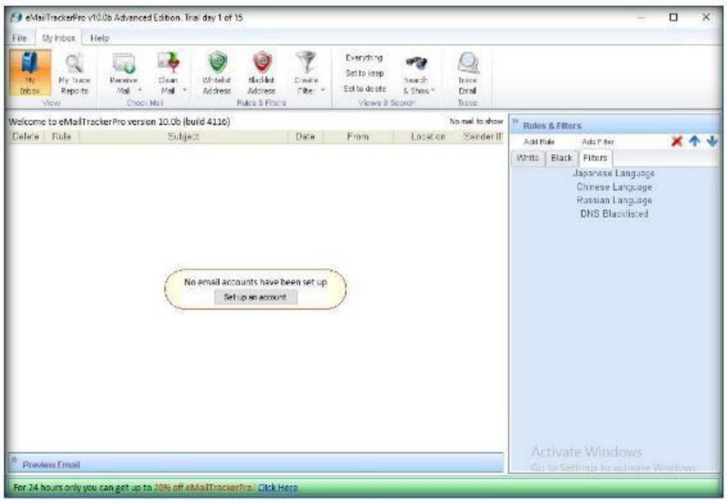


FIGURE 8.2: eMailTrackerPro main window

This tool also uncovers common SPAM tactics.

TASK 2

Trace Email headers

8. Click **My Trace Reports.**

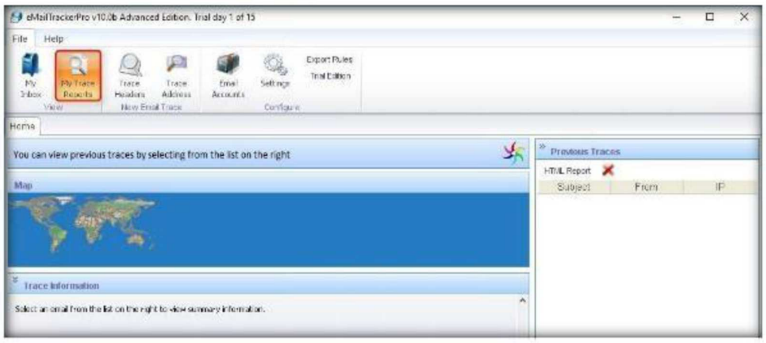


FIGURE 8.3: The eMailTrackerPro Main window

9. Click **Trace Headers** to start the trace.
10. Select **Trace an email I have received**. Copy the email header from the email you wish to trace and paste it in the **Email headers** field under **Enter Details**.

The filter system in eMailTrackerPro allows you to create custom filters to match your incoming mail.

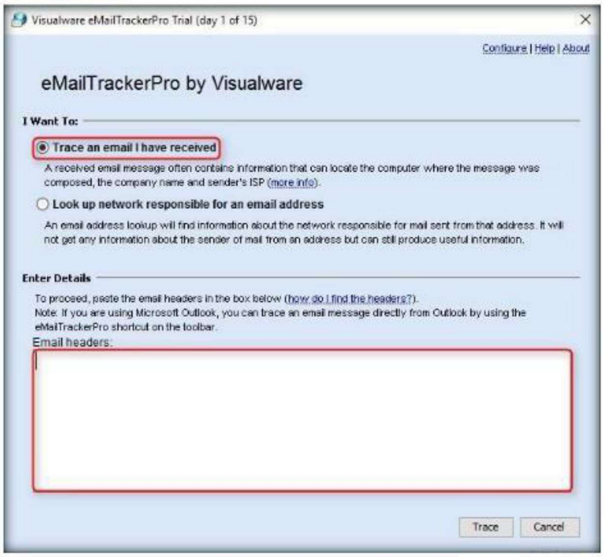


FIGURE 8.4: The eMailTrackerPro entering details window

TASK 3

Finding Email Header

11. Log in to an email account and open the message you'd like to view headers for.
12. Click the down arrow next to **Reply**, at the top of the message pane.
13. Select **Show Original** from the drop-down list.

Note: In Outlook, find the email header by following the steps below:

- Double-click the email to open it in a new window.
- Click the small arrow in the lower right corner of the **Tags** toolbar box to open **Message Options** information box.
- Under **Internet headers**, you will find the **Email header**.

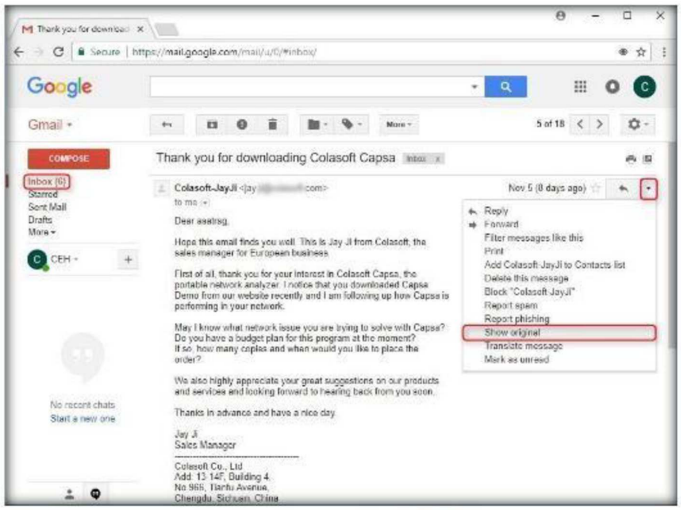


FIGURE 8.5: Finding Email Header in email

The abuse report option from the My **Trace Reports** window automatically launches a browser window with the abuse report included.

14. The header appears in a new tab as shown in the following screenshot:

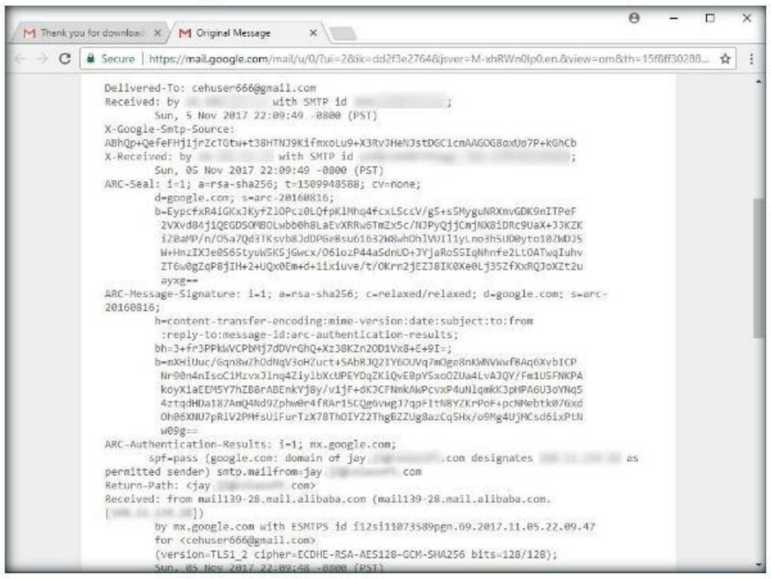


FIGURE 8.6: header appearing tab in browser

✉ Each email message includes an Internet header with valuable information. eMailTrackerPro analyzes the message header and reports the IP address of the computer where the message originated, its estimated location, the individual or organization the IP address is registered to, the network provider, and additional information as available

15. Copy the entire text and paste it in the **Email headers** field, and click **Trace**.

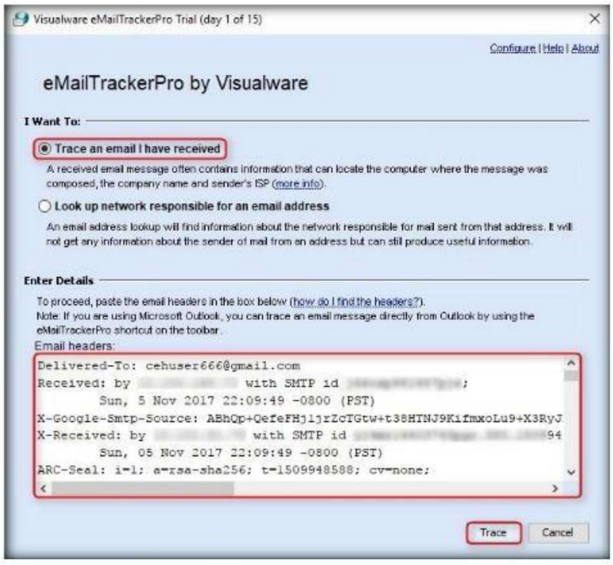


FIGURE 8.7: Email headers and Tracing emails

eMailTrackerPro can detect abnormalities in the email header and warn you that the email may be spam

16. The **My Trace Reports** window opens.
17. The email location is traced in a GUI world map. The location and IP addresses may vary. You can also view the summary by selecting **Email Summary** on the right side of the window.
18. The **Table** section right below the Map shows the entire hop in the route, with the **IP** and suspected locations for each hop.

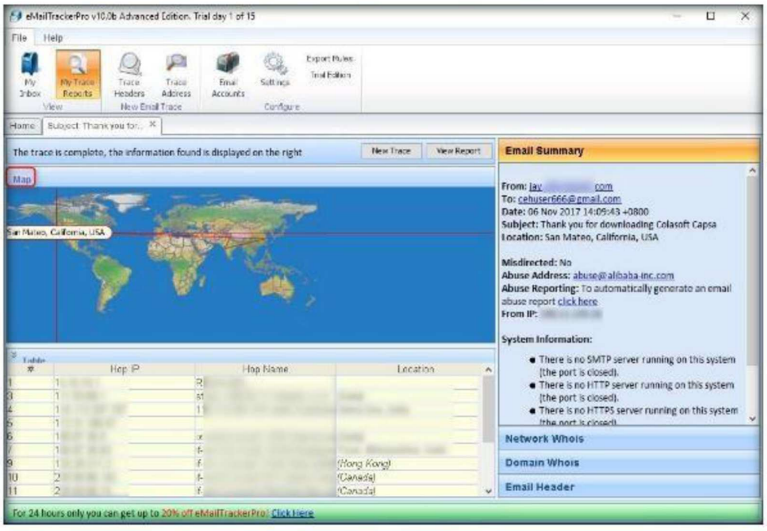


FIGURE 8.8: eMailTrackerPro – Email Trace Report

TASK 4

Examine the Report

19. Click **View Report** to view the complete trace report.

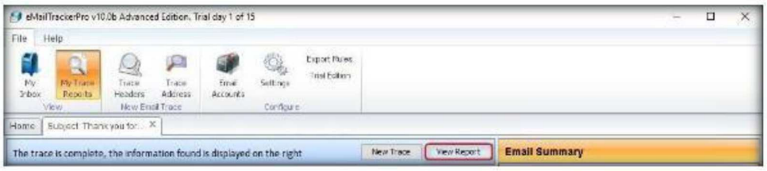


FIGURE 8.9: The eMailTrackerPro - My Trace Reports tab

20. The complete report appears in the default browser.

21. Expand each section to view detailed information.

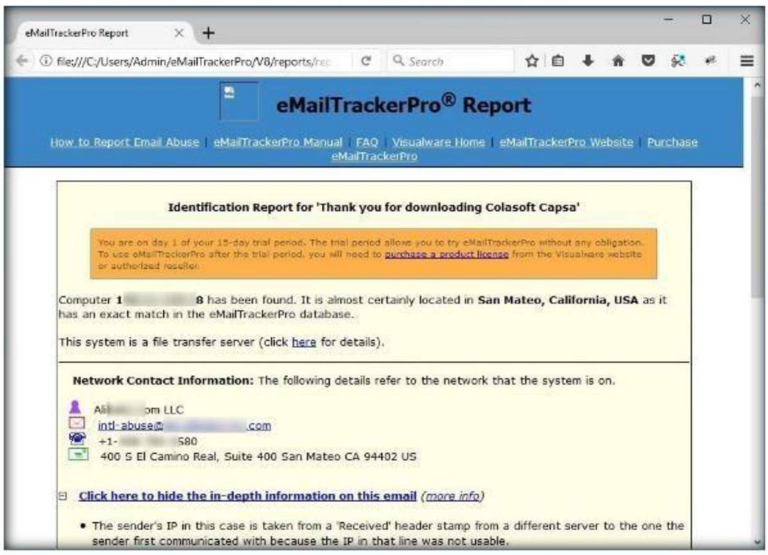


FIGURE 8.10: eMailTrackerPro – detailed information Report

Tracking an email is useful for identifying the company and network providing service for the address.

Lab Analysis

Document all the live emails discovered during the lab with all additional information.

PLEASE TALK TO YOUR INSTRUCTOR IF YOU HAVE QUESTIONS ABOUT THIS LAB.

Internet Connection Required	
☑ Yes	☐ No
Platform Supported	
☑ Classroom	☐ iLabs

Lab 9

Gathering IP and Domain Name Information using Whois Lookup

Whois lookup reveals available information on a hostname, IP address, or domain.

ICON KEY

- Valuable information
- Test your knowledge
- Web exercise
- Workbook review

Lab Scenario

During the information gathering process, you will be asked to perform WHOIS foot printing on the target domain name or IP addresses. It involves gathering information on the target IP and domain obtained during previous information gathering steps. As a professional ethical hacker or pen tester, you should be able to perform WHOIS foot printing on the target. With this kind of footprinting, you can extract information such as the IP addresses or host names of the company's DNS servers and contact information usually containing the address and phone number.

Lab Objectives

The objective of this lab is to help students analyze domain and IP address queries. This lab helps you to get information including host name, IP address, and domain.

Lab Environment

Tools demonstrated in this lab are available in Z:\CEH-Tools\CEHv10 Module 02 Footprinting and Reconnaissance

In the lab you need:

- A computer running any version of Windows with Internet access
- Administrator privileges to run SmartWhois
- The **SmartWhois** tool is available at **Z:\CEH-Tools\CEHv10 Module 02 Footprinting and Reconnaissance\Whois Lookup Tools\SmartWhois** or can be downloaded from **https://www.tamos.com/download/main/**. If you decide to download the latest version, then screenshots shown in the lab might differ.

Lab Duration

http://www.tamos.com

Time: 5 Minutes

Overview of Whois Lookup

The WHOIS database is a searchable list of every domain currently registered. Whois Lookup reveals who owns a particular domain name.

Lab Tasks

TASK 1

Lookup IP

1. Navigate to **Z:\CEH-Tools\CEHv10 Module 02 Footprinting and Reconnaissance\Whois Lookup Tools\SmartWhois**-and double-click **setup.exe**.
2. If the **Open File - Security Warning** pop-up appears, click **Run**.
3. The **Welcome** wizard; click **Next**.
4. Follow the wizard steps (by choosing default options) to install SmartWhois.
5. In the **Optional Components** window, uncheck all options and click **Next**.
6. The **SmartWhois Setup** dialog box appears. Click **Yes**.
7. Launch **SmartWhois** from the **Apps** screen.
8. The **SmartWhois** application updates pop-up appears. Click **No**.

SmartWhois can save obtained information to an archive file. Users can load this archive the next time the program is launched and add more information to it. This feature allows you to build and maintain your own database of IP addresses and host names.

SmartWhois can be configured to work from behind a firewall by using HTTP/HTTPS proxy servers. Different SOCKS versions are also supported.

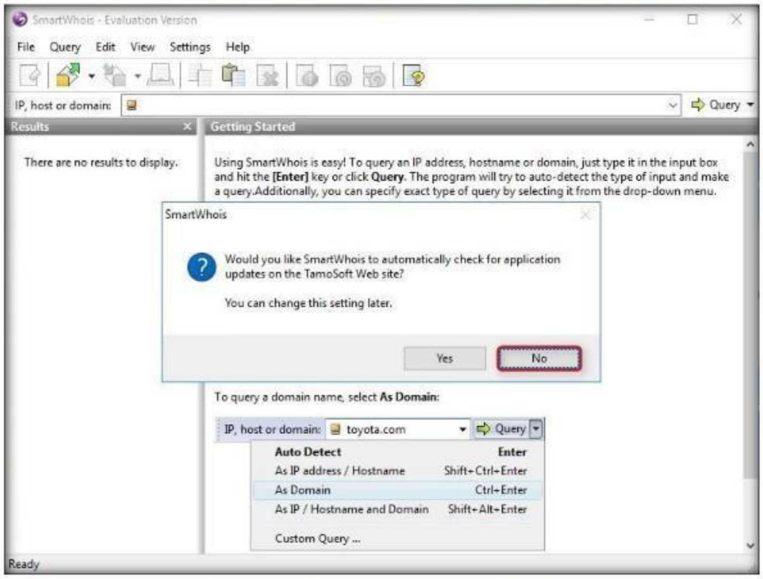


FIGURE 9.1: SmartWhois main settings pop-up windows

TASK 2

Perform Domain Lookup

9. The **SmartWhois** main window appears. Type an IP address, hostname, or domain name in the **IP, host or domain** text field. An example of a Domain name query is shown below for **www.google.com**.

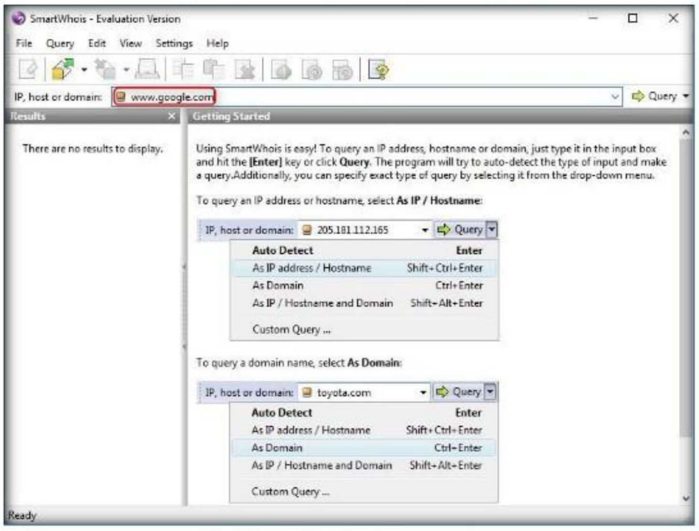


FIGURE 9.2: A SmartWhois domain search

If you need to query a non-default whois server or make a special query click View→Whois Console from the menu or click the Query button and select Custom Query.

10. Click the **Query** drop-down list and select **As Domain**.

Note: To query an **IP address** or **hostname**, select **As IP / Hostname**. To query a **domain** name, select **As Domain**.

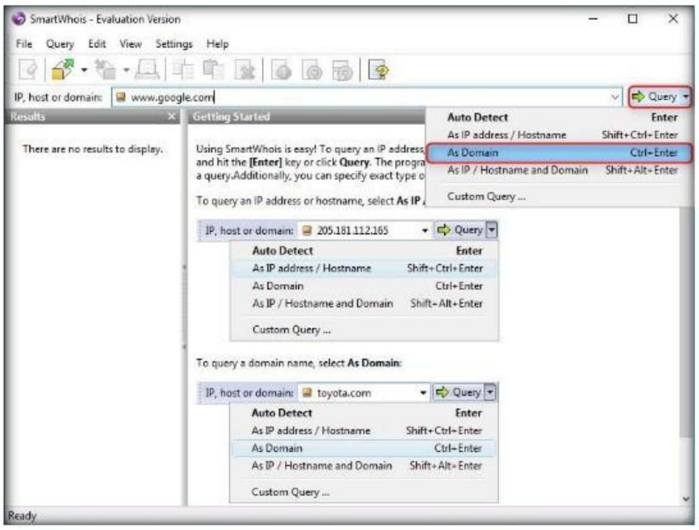


FIGURE 9.3: The SmartWhois – Selecting Query type

SmartWhois is capable of caching query results, which reduces the time needed to query an address; if the information is in the cache file it is immediately displayed and no connections to the whois servers are required.

11. The domain displays in the left pane and the result of the query displays in the right pane, as shown in the following screenshot:

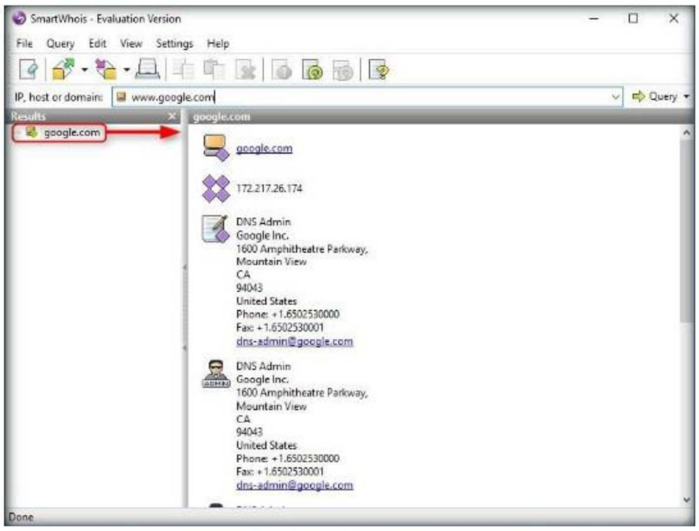


FIGURE 9.4: The SmartWhois – Domain query result

SmartWhois can process lists of IP addresses, hostnames, or domain names saved as plain text (ASCII) or Unicode files. The valid format for such batch files is simple: Each line must begin with an IP address, hostname, or domain. If you want to process domain names, they must be located in a separate file from IP addresses and hostnames.

Note: The IP address displayed in the result may vary in your lab environment.

12. Click the **Clear** icon in the toolbar to clear the history.

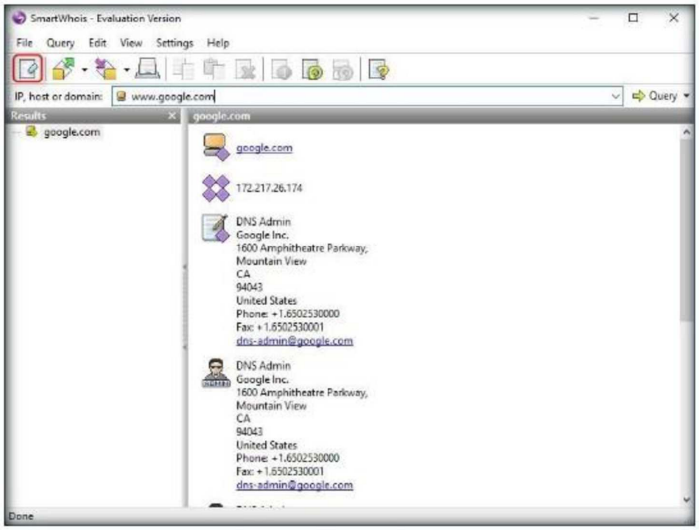


FIGURE 9.5: A SmartWhois toolbar

TASK 3

Perform IP/Hostname Lookup

13. To perform a sample **host name query**, type **www.facebook.com** in the **IP, host or domain** text field.
14. Click the **Query** drop-down list and choose **As IP address / Hostname**.

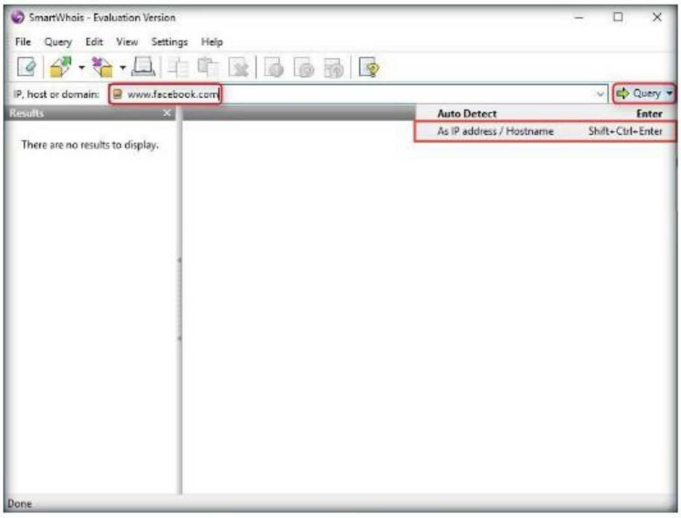


FIGURE 9.6: A SmartWhois host name query

15. In the left pane, the resultant query displays, and the right pane displays the results of your query, as shown in the following screenshot:

Note: This result may vary in your lab environment.

If you want to query a domain registration database, enter a domain name and hit the Enter key while holding the Ctrl key, or just select As Domain from the Query dropdown menu.

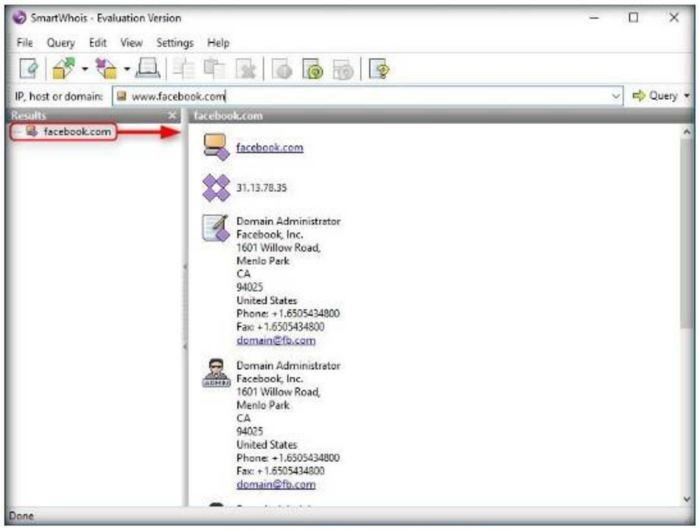


FIGURE 9.7: A SmartWhois host name query result

16. Click the **Clear** icon in the toolbar to clear the history.

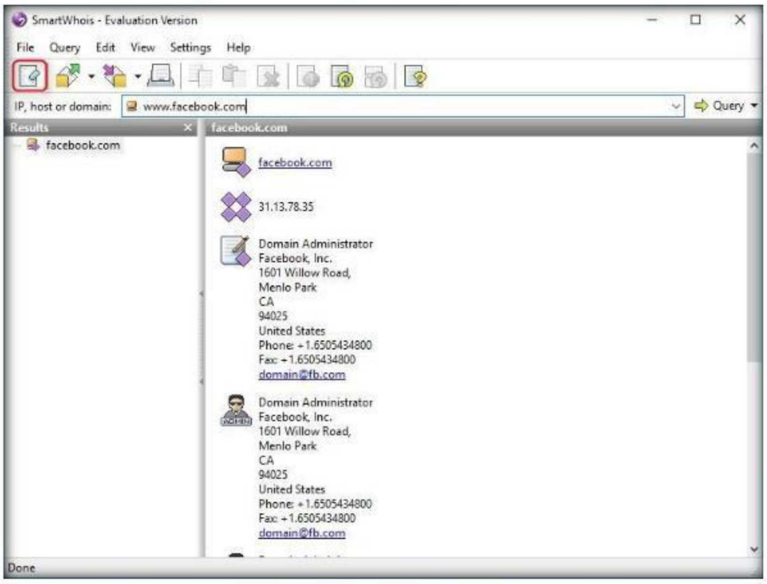


FIGURE 9.8: A SmartWhois clearing history

If you're saving results as a text file, you can specify the data fields to be saved. For example, you can exclude name servers or billing contacts from the output file. Click Settings→Options→Text& XML to configure the options.

17. To perform a sample IP Address query, enter the IP address of the **Windows 10** virtual machine, i.e., **10.10.10.10** in the **IP, host or domain** text field and click **Query**.

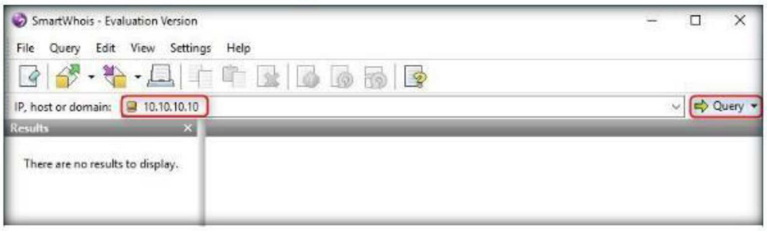


FIGURE 9.9: A SmartWhois IP address query

Note: 10.10.10.10 is the IP address of **Windows 10** virtual machine. The IP address of this machine may differ in your lab environment.

SmartWhois supports command line parameters specifying IP address/hostname/domain, as well as files to be opened/saved.

18. The IP address displays in the left pane and the result of your query displays in the right pane, as shown in the following screenshot:

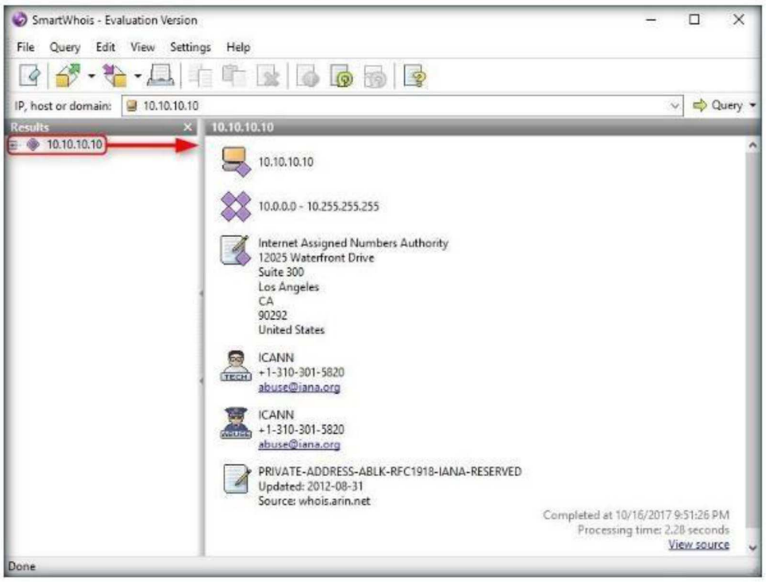


FIGURE 9.10: The SmartWhois IP query result

Lab Analysis

Document all the IP addresses/Hostnames for the Lab for further information.

PLEASE TALK TO YOUR INSTRUCTOR IF YOU HAVE QUESTIONS ABOUT THIS LAB.

Internet Connection Required	
☑ Yes	☐ No
Platform Supported	
☑ Classroom	☐ iLabs

Lab

10

Advanced Network Route Tracing using Path Analyzer Pro

Path Analyzer Pro delivers advanced network route tracing with performance tests, DNS, whois, and network resolution to investigate network issues.

ICON KEY

- Valuable information
- Test your knowledge
- Web exercise
- Workbook review

Lab Scenario

With the IP address, hostname, and domain obtained in the previous information gathering steps, your next task will be to trace the route of the target network in order to detect the trusted routers, firewall, and network topology used in the network. This lab will demonstrate how to perform route tracing on the target network.

Lab Objectives

The objective of this lab is to help students trace out network paths along with IP addresses of intermediate nodes.

Lab Environment

Tools demonstrated in this lab are available in Z:\CEH-Tools\CEHv10 Module 02 Footprinting and Reconnaissance

In the lab, you will need:

- **Z:\CEH-Tools\CEHv10 Module 02 Footprinting and Reconnaissance\Traceroute Tools\Path Analyzer Pro**. You can download the latest version of Path Analyzer Pro from the link **http://www.pathanalyzer.com/**. If you decide to download the latest version, then **screenshots** shown in the lab might differ
- Windows Server 2016 running as a machine
- Administrator privileges to run the tools

Lab Duration

Time: 5 Minutes

Overview of Network Route Tracing

Network route tracing can determine the intermediate nodes traversed towards the destination and can detect the complete route (path) from source to destination.

Lab Tasks

TASK 1

Install Path Analyzer Pro

1. Navigate to **Z:\CEH-Tools\CEHv10 Module 02 Footprinting and Reconnaissance\Traceroute Tools\Path Analyzer Pro** and double-click **PAPro27.msi**.
2. If the **Open File - Security Warning** pop-up appears, click **Run**.
3. Follow the wizard steps (by selecting default options) to install Path Analyzer Pro.
4. Launch **Path Analyzer Pro** from the **Start** menu.

Path Analyzer Pro summarizes a given trace within seconds by generating a simple report with all the important information on the target--we call this the Synopsis.

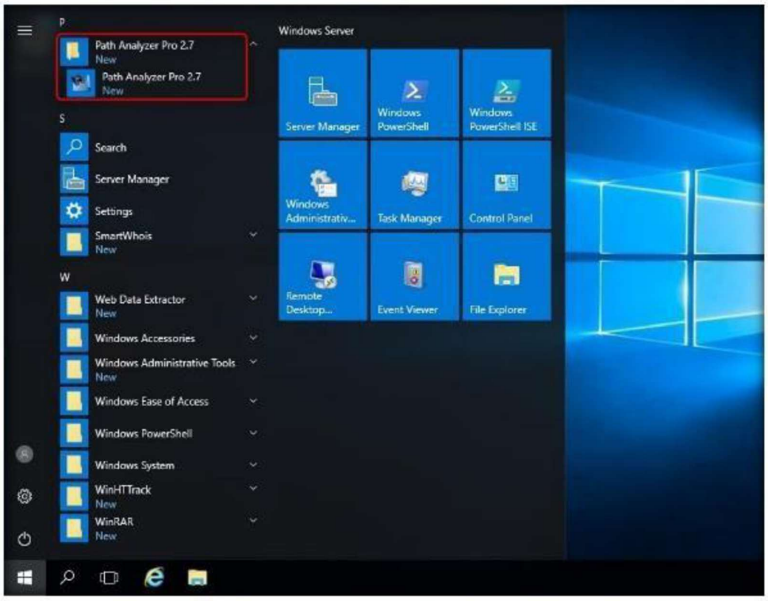


FIGURE 10.1: Installed apps in windows Server 2016 -Selecting Path Analyzer Pro 2.7

5. The Path Analyzer Pro window appears along with a **Registration Form** pop-up. Click **Evaluate** in the pop-up.

Path Analyzer Pro summarizes all the relevant background information on its target, be it an IP address, a hostname, or an email address.

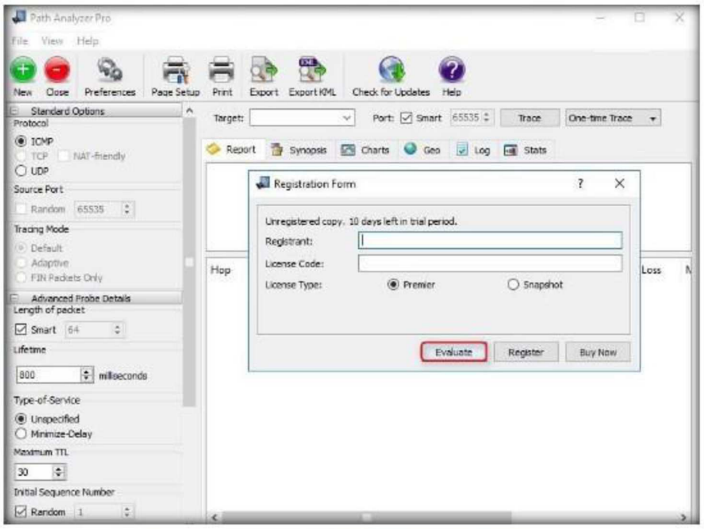


FIGURE 10.2: Path Analyzer Pro 2.7 Registration Form window

6. The Main window of **Path Analyzer Pro** appears as shown in the screenshot
7. In the **Standard Options** and **Advanced Probe Details** sections, a few options are set to default.
8. Ensure that the **ICMP** radio button under the **Protocol** field is selected.
9. In the **Advanced Probe Details** section, ensure that the **Smart** option is checked under the **Length of packet** field.

Note: If you have a firewall it must be disabled for appropriate output.

TASK 2

Trace a Target Network

FIN Packets Only- generates only TCP packets with the FIN flag set in order to solicit an RST or TCP reset packet as a response from the target. This option may get beyond a firewall at the target, thus giving the user more trace data, but it could be misconstrued as a malicious attack.

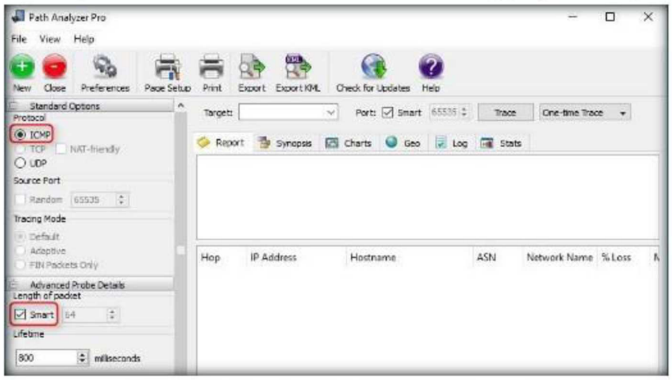


FIGURE 10.3: The Path Analyzer Pro Advanced Probe Details window

10. In the **Advanced Tracing Details** section, a few options are set to default.
11. Ensure that the **Stop on control messages (ICMP)** option is checked in the **Advanced Tracing Details** section.

Note: Path Analyzer Pro is not designed to be used as an attack tool.

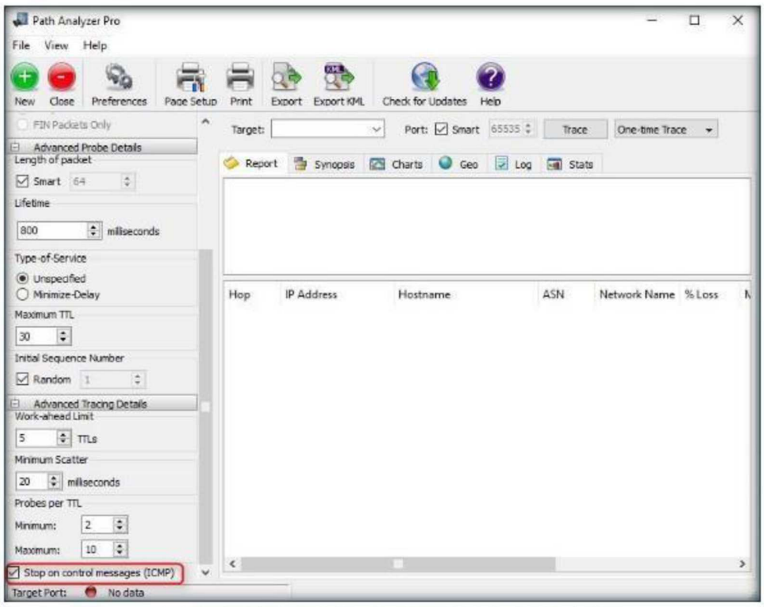


FIGURE 10.4: The Path Analyzer Pro Advanced Tracing Details window

12. To perform the trace, enter the host name in the Target field (for instance **www.google.com**), and check **Smart** under the **Port** field as default **(65535)**.
13. From the drop-down menu, choose **Timed Trace** and click **Trace**.

Traceroute is a system administrators utility to trace the route IP packets take from a source system to some destination system.

FIGURE 10.5: A Path Analyzer Pro Advance Tracing Details option

14. The **Type time of trace** dialog box appears. Specify the time of trace in HH: MM: SS format and click **Accept**.

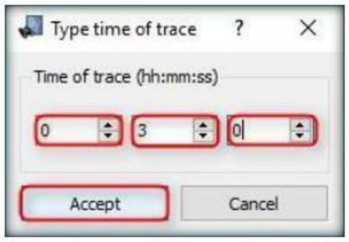


FIGURE 10.6: The Path Analyzer Pro Type time of trace option

The Advanced Probe Details settings determine how probes are generated to perform the trace. These include the Length of packet, Lifetime, Type of Service, Maximum TTL, and Initial Sequence Number.

15. While Path Analyzer Pro performs this trace, the **Trace** tab changes automatically to **Stop**.

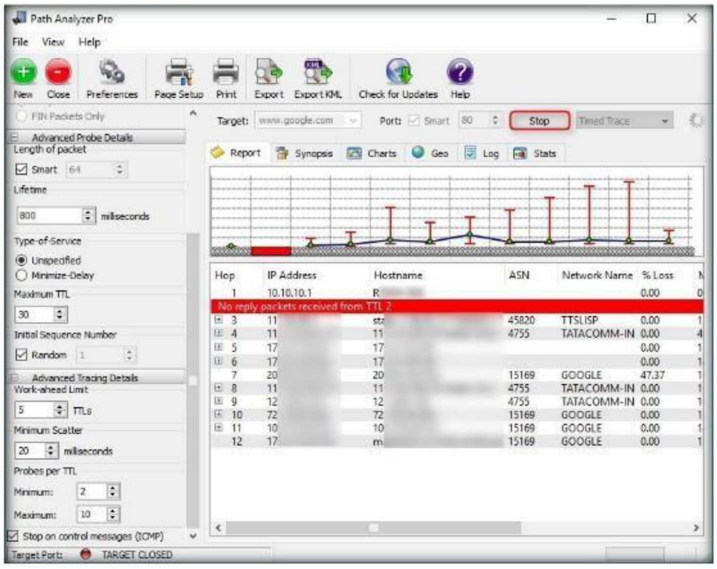


FIGURE 10.7: A Path Analyzer Pro Target Option

TASK 3

Examine the Results

16. The trace results are displayed under the **Report** tab in the form of a **linear chart** depicting the number of hops between you and the target.

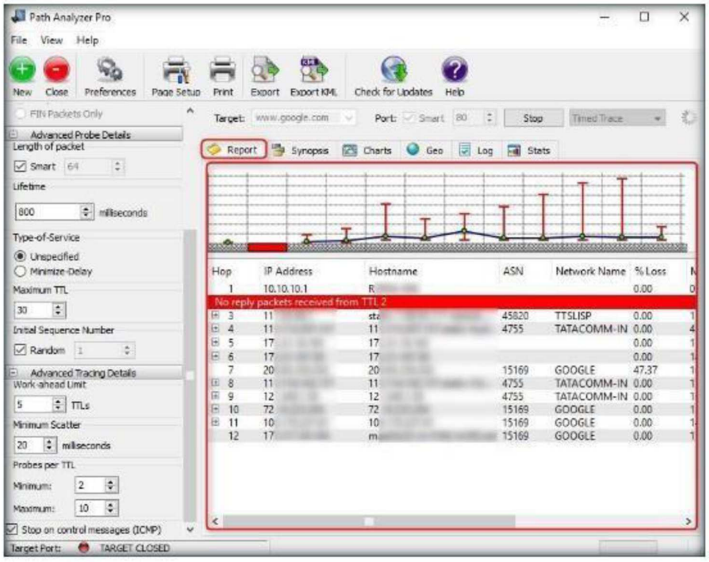


FIGURE 10.8: A Path Analyzer Pro Target option

17. Click the **Synopsis** tab, which displays a one-page summary of trace results.

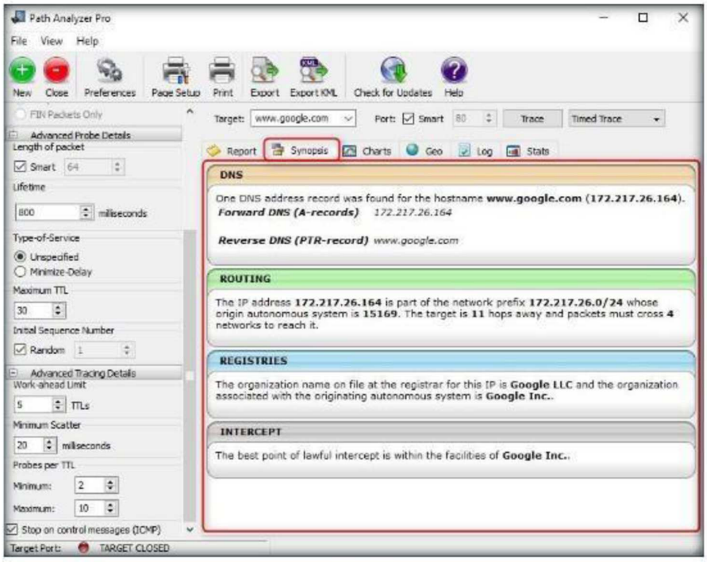


FIGURE 10.9: A Path Analyzer Pro Target option

Length of packet: This option allows you to set the length of the packet for a trace. The minimum size of a packet, as a general rule, is approximately 64 bytes, depending on the protocol used. The maximum size of a packet depends on the physical network but is generally 1500 bytes for a regular Ethernet network or 9000 bytes using Gigabit Ethernet networking with jumbo frames.

TASK 4

View Charts

18. Click the **Charts** tab to view the results of the trace.

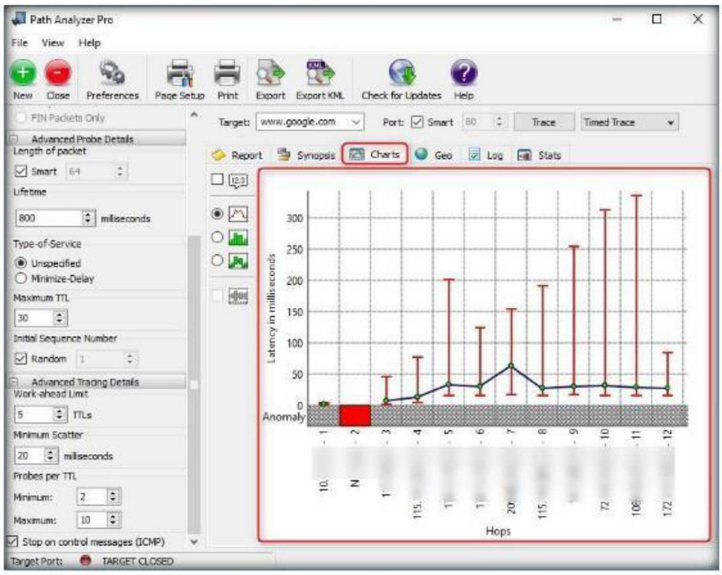


FIGURE 10.10: The Path Analyzer Pro Chart Window

TASK 5

Inspect the Geographical Location

19. Click **Geo**, which displays a world map of the trace route.

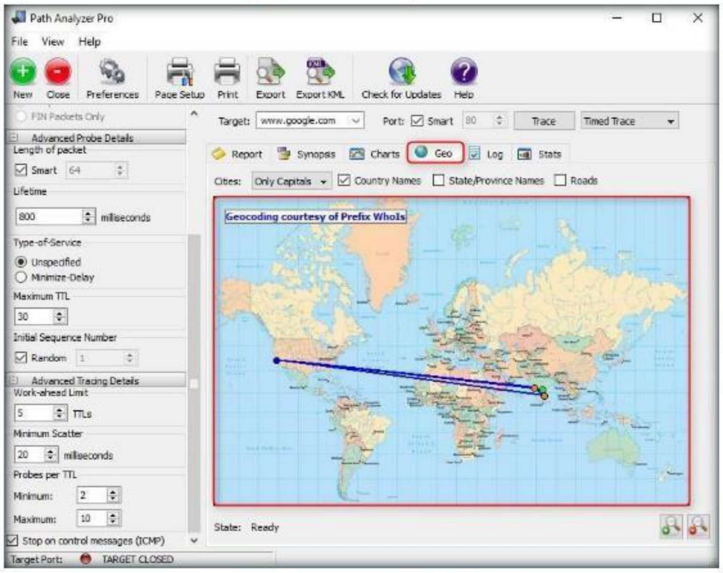


FIGURE 10.11: The Path Analyzer Pro chart window

Path Analyzer Pro uses Smart as the default Length of packet. When the Smart option is checked, the software automatically selects the minimum size of packets based on the protocol selected under Standard Options.

TASK 6

Examine the Logs

20. Click the **Log** tab to view the **Current Trace Log** and **Session Log**.

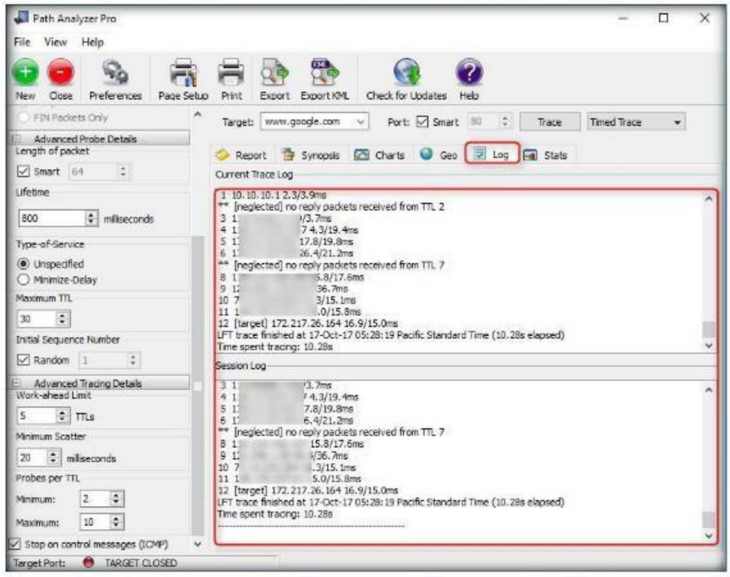


FIGURE 10.12: The Path Analyzer Pro Current Trace Log and Session Log window

TASK 7

Observe the Statistics

21. Click the **Stats** tab, which features the **Vital Statistics** of the current trace.

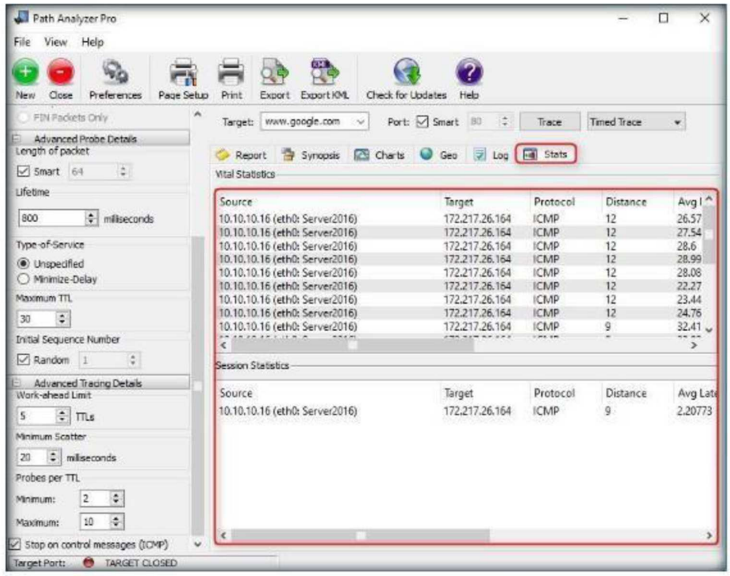


FIGURE 10.13: The Path Analyzer Pro Statistics window

Maximum TTL: The maximum Time to Live (TTL) is the maximum number of hops to probe in an attempt to reach the target. The default number of hops is set to 30. The Maximum TTL that can be used is 255.

TASK 8

Export Results

22. Click **Export** in the toolbar to export the report.

FIGURE 10.14: The Path Analyzer Pro Save Report As window

23. By default, the Report will be saved at **C:\Program Files (x86)\Path Analyzer Pro 2.7**. However, you may change it to a preferred location.
24. Specify the name of the file in **File name** field and click **Save**.

The Initial Sequence Number is set as a counting mechanism within the packet between the source and the target. It is set to Random as the default, but you can choose another starting number by unchecking the Random button and filling in another number. Please Note: The Initial Sequence Number applies only to TCP connections.

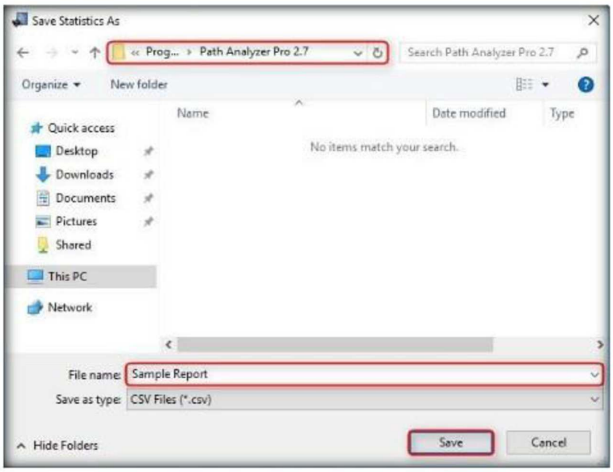


FIGURE 10.15: The Path Analyzer Pro Save Report As window

Lab Analysis

Document the IP addresses that are traced for the lab for further information.

PLEASE TALK TO YOUR INSTRUCTOR IF YOU HAVE QUESTIONS ABOUT THIS LAB.

Internet Connection Required	
☐ Yes	☑ No
Platform Supported	
☑ Classroom	☑ iLabs

Lab 11

Footprinting a Target using Maltego

Maltego is an open source intelligence and forensics application. It gathers information about a target and represents this information in an easily-understandable format.

ICON KEY

- Valuable information
- Test your knowledge
- Web exercise
- Workbook review

Lab Scenario

The information gathered in the previous steps might not be sufficient to reveal potential vulnerabilities of the target. There could be more information available that could help in finding loopholes in the target. As an ethical hacker, you should look for as much information as possible about the target. This lab will demonstrate what other information you can extract from the target.

Lab Objectives

The objective of this lab is to help students gather as much information as possible about the target. With this lab the student can:

- Identify the Server Side Technology
- Identify the Domain
- Identify the Domain Name Schema
- Identify the Service Oriented Architecture (SOA) Information
- Identify the Mail Exchanger
- Identify the Name Server
- Identify the IP Address
- Identify the Geographical Location
- Identify the Entities
- Find out the Email Addresses
- Find out the Phone Numbers

Lab Environment

In this lab, you will need:

Tools demonstrated in this lab are available in Z:\CEH-Tools\CEHv10 Module 02 Footprinting and Reconnaissance

- Maltego, which can be found at **Z:\CEH-Tools\CEHv10 Module 02 Footprinting and Reconnaissance\Footprinting Tools\Maltego**.
- You can download the latest version of **Maltego** from the link **https://www.paterva.com/web6/products/download2.php**.If you download the latest version, then screenshots shown in the lab might differ.

  Note: This tool installs Java runtime.
- Kali Linux virtual machine
- A Web browser with an Internet connection
- Administrator privileges to run the tools
- A valid email account (Hotmail, Gmail, yahoo, etc.). We suggest you sign up with any of these services to obtain a new email account for this lab. Do not use your real email accounts and passwords in these exercises.

Run this lab on Kali Linux machine

Lab Duration

Time: 15 Minutes

Overview of Maltego

Maltego is a Footprinting tool, used to gather maximum information for the purpose of ethical hacking, and forensic and pen testing. It provides a library of transforms for discovery of data from open sources, and visualizing that information in a graph format, suitable for link analysis and data mining.

Lab Tasks

TASK 1

Obtain the Target's Website URL

1. Launch a web browser, type the URL (**www.google.com**) in the address bar, and press **Enter**.

FIGURE 11.1: Google Webpage

2. Type the target in the Search field and press **Enter**. The URL of the target is displayed as shown in the following screenshot:

Maltego takes various bits of information (referred to as Entities within the application), and converts these (via code known as transforms) to other Entities.

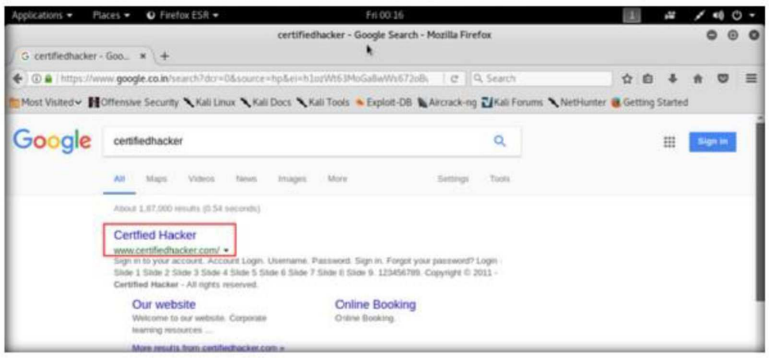


FIGURE 11.2: Google's Search Engine Result Page

TASK 2

Configure Maltego

3. Note down the URL and close the web browser. Launch **Maltego** from the **taskbar** from left hand side.
4. A **Product Selection** wizard appears on the Maltego GUI. Click **Run** from **Maltego CE (Free)** option.

Maltego provides you with a graphical interface that makes seeing these relationships, instant and accurate and even making it possible to see hidden connections.

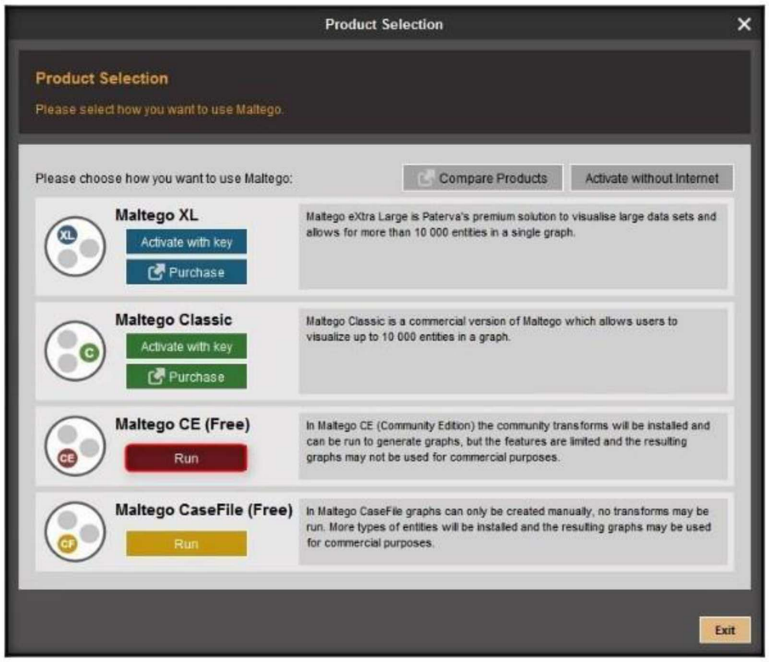


FIGURE 11.3: Maltego Product Selection wizard

5. You will be redirected to the **Login** section. Click **register here**.

Using the graphical user interface (GUI) you can see relationships easily - even if they are three or four degrees of separation away.

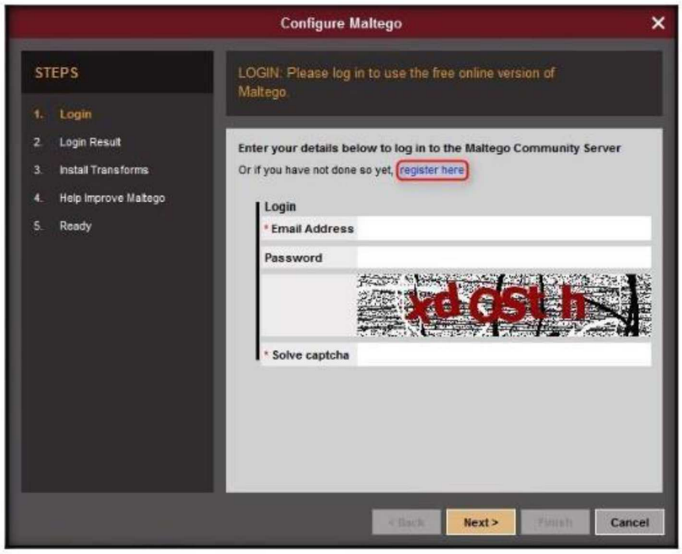


FIGURE 11.4: Maltego Login section

6. Register your account and activate it. By filling up the required details as shown in the screenshot.

   Note: Please provide working email ID at the time of registration. Once the registration is done, you will receive an activation email. Activate your account as instructed in the email in order to use the tool.

Maltego is unique because it uses a powerful, flexible framework that makes customizing possible, where Maltego can be adapted to your own, unique requirements.

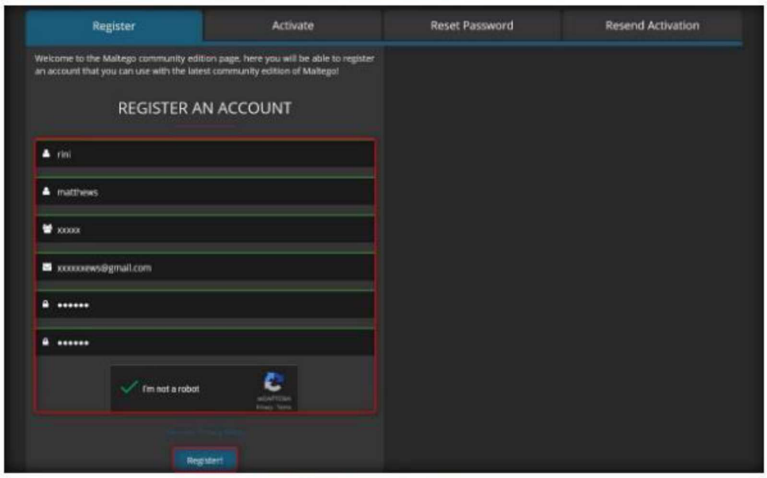


FIGURE 11.5: Registration Section

7. Minimize the web browser, and go back to the setup wizard and enter the **Email Address** and **Password** specified at the time of registration, solve the **captcha,** and click **Next**.

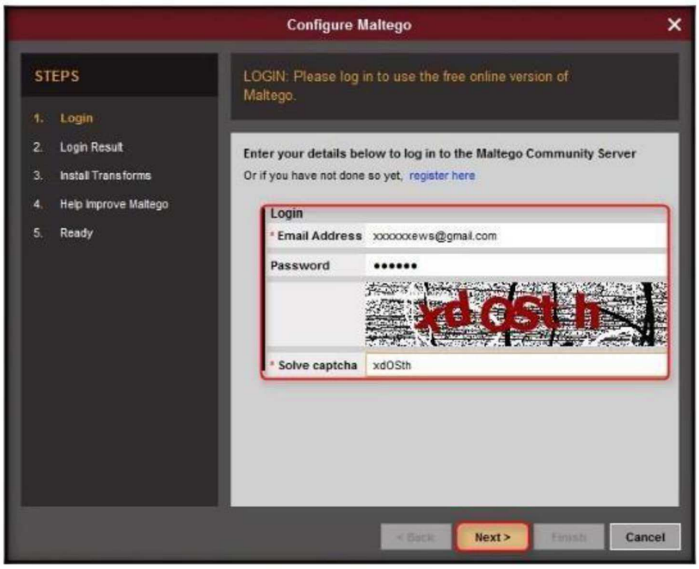


FIGURE 11.6: Maltego Login Section

8. The **Login Result** section displays your personal details. Click **Next**.

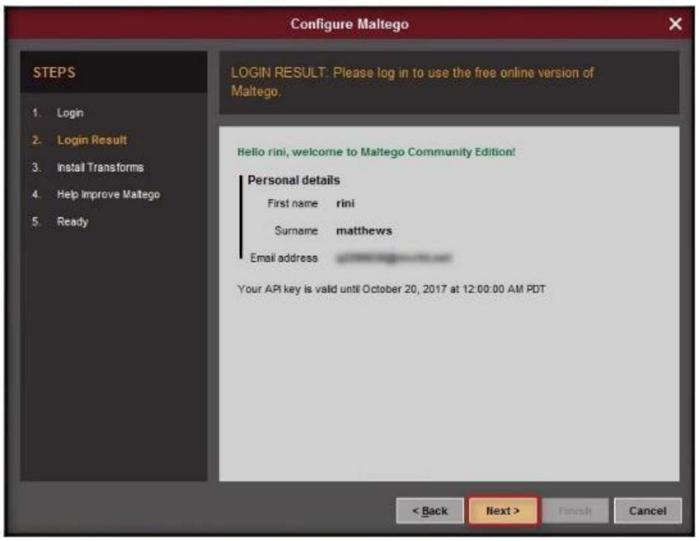


FIGURE 11.7: Maltego Login result section

The mapping of a network and understanding how everything fits together is an important step in getting to know a target. The process can be labour intensive and only some aspects can be automated successfully.

Maltego tries to consolidate some of the required functions easily and accurately. Maltego provides accurate results that will also have been obtained when utilising other available tools and commands manually.

9. The **Install Transforms** section appears. Leave the settings to default and click **Next**.

Assuming a certain level of knowledge and experience, Maltego is easy to understand and utilise.

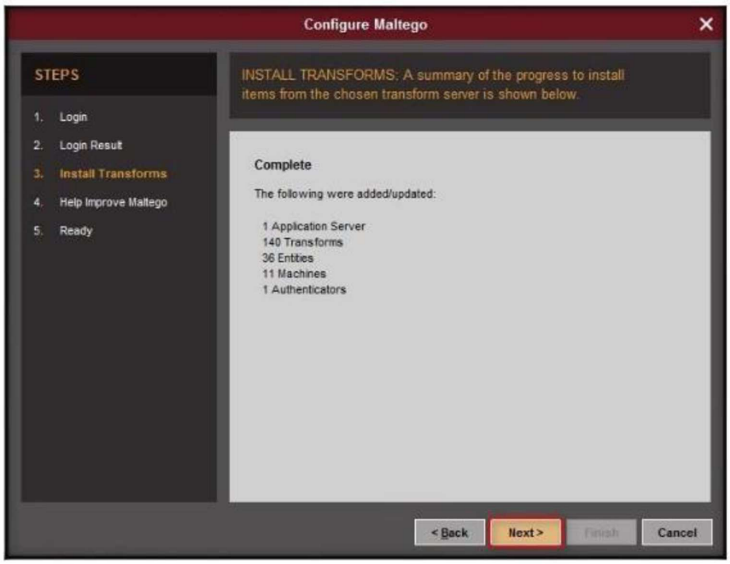


FIGURE 11.8: Maltego Install Transforms section

10. The **Help Improve Maltego** section appears. Leave the options set to default and click **Next**.

Maltego uses Java version 8(1.6 - at least update 10) which is available for most popular operating systems. Maltego will not function correctly with version 7(1.5). The Maltego installer will not install or upgrade your system to Java 8, but this should be a painless procedure.

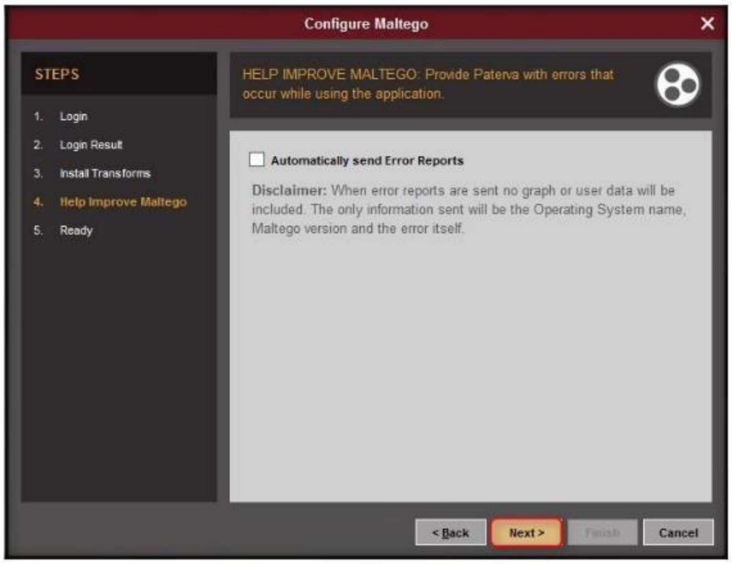


FIGURE 11.9: Maltego Help Improve Maltego section

11. The **Ready** section appears. Select the radio button of **Open a blank graph and let me play around** and click **Finish** in order to perform foot printing manually.

Maltego loves memory and raw CPU power. Rendering views take a lot of computing power and the slower your computer, the longer it will take.

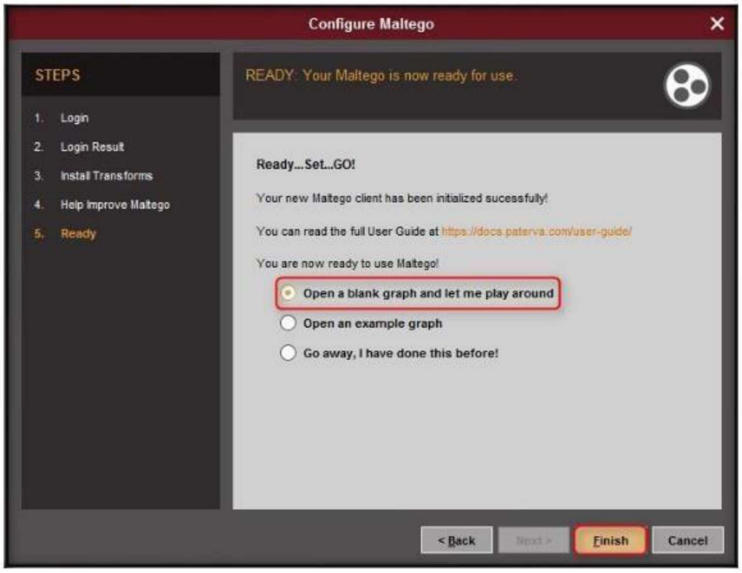


FIGURE 11.10: Maltego Ready wizard

As this is a Community edition, the application displays only 12 entities of a result

12. The Maltego GUI appears as shown in the following screenshot:

If your computer is under-powered this can become frustrating. If you plan to work on large graphs you'll also need some memory.

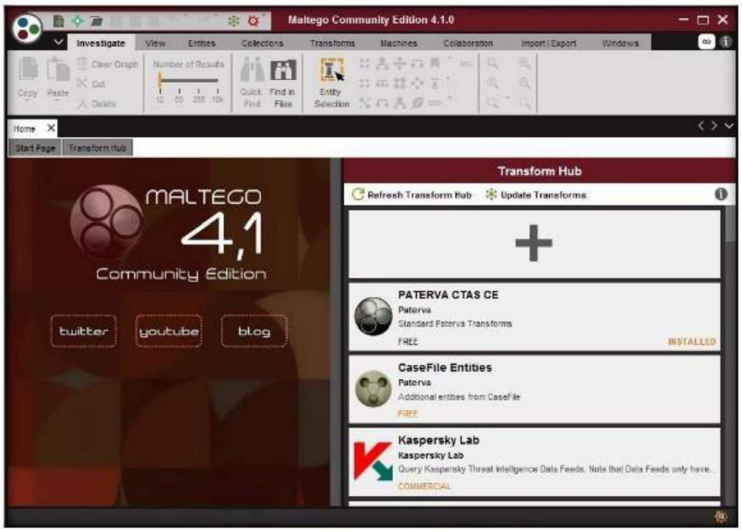


FIGURE 11.11: Maltego GUI

TASK 3

Adding a Domain Entity

13. Click the icon located at the top-left corner of the GUI (in the toolbar) to start a new graph.

FIGURE 11.12: Maltego Toolbar

Maltego server is delivered as a VMWare image allowing you to run your Maltego server on practically anything that supports VMWare or a virtual machine system that can 'play' VMWare images. As such any operating system capable of running a virtual machine system can be used.

14. The **New Graph (1)** window appears along with a **Palette** in the left pane. It contains a list of default built-in transforms.
15. Expand the **Infrastructure** node under **Entity Palette**.

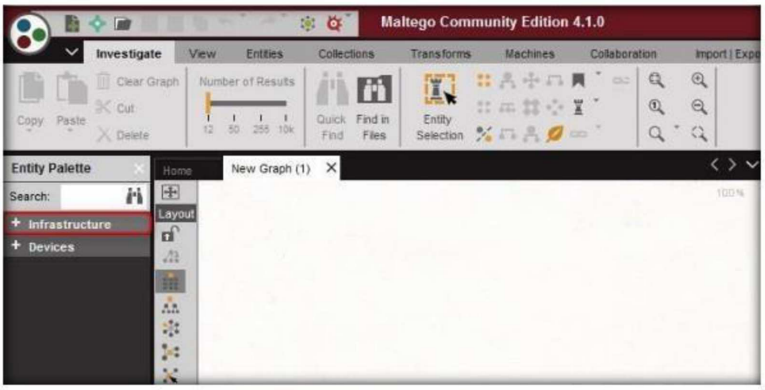


FIGURE 11.13: Maltego New Graph (1) window

16. Expand the node and observe a list of entities such as AS, DNS Name, Domain, etc.

17. Drag the **Website** entity onto the **New Graph (1)** section.

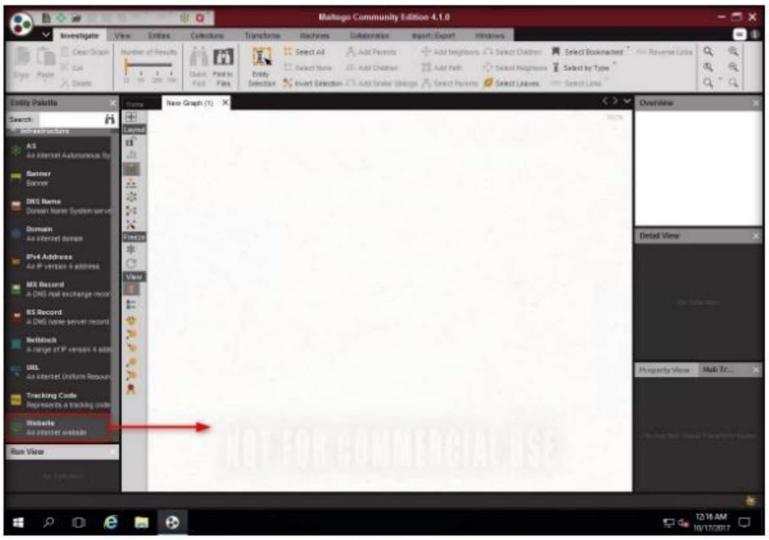


FIGURE 11.14: Selecting a Website Entity

Maltego requires the sun-java JDK and it is important that you install this version rather than the open jdk that comes with a lot of the operating systems.

18. The entity appears on the new graph, with the **www.paterva.com** URL selected by default.

FIGURE 11.15: Website Entity in New Graph (1) Section

Make 100% sure that you can read and write in the directory where you've installed the application – for instance - when you've installed the application as root and you run it under a normal user you might find that reading and writing your configuration files fails. This might cause problems.

19. Double-click **paterva.com** and rename the domain name to **www.certifiedhacker.com**. Press **Enter**.

FIGURE 11.16: Website Entity in New Graph (1) Section

You can create a new graph at any time by clicking on this button. The keyboard shortcut for creating a new graph is Control T (new tab). Once you open your first graph it becomes available to add entities and to change those entities to new entities.

TASK 4

Identify the Server Side Technology

20. Right-click the entity and select **All Transforms**.

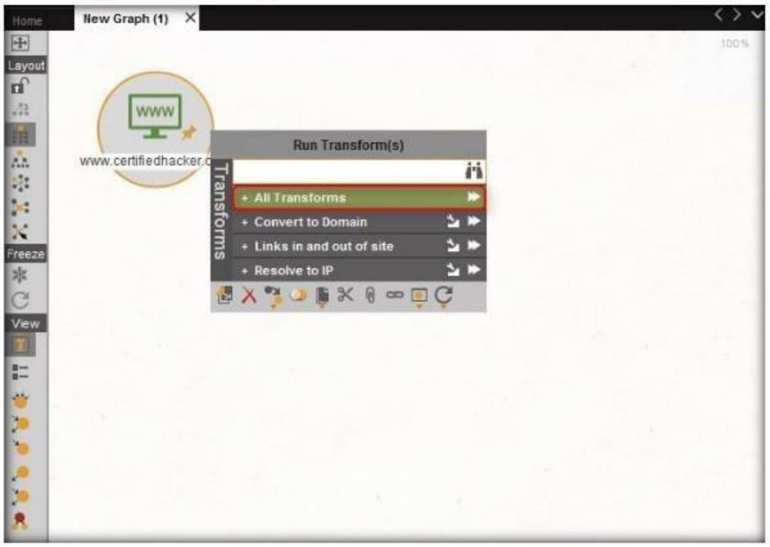


FIGURE 11.17: Selecting To Server Technologies Website

21. The Run Transform(s) list appears. Click **To Server Technologies [Using BuiltWith]**

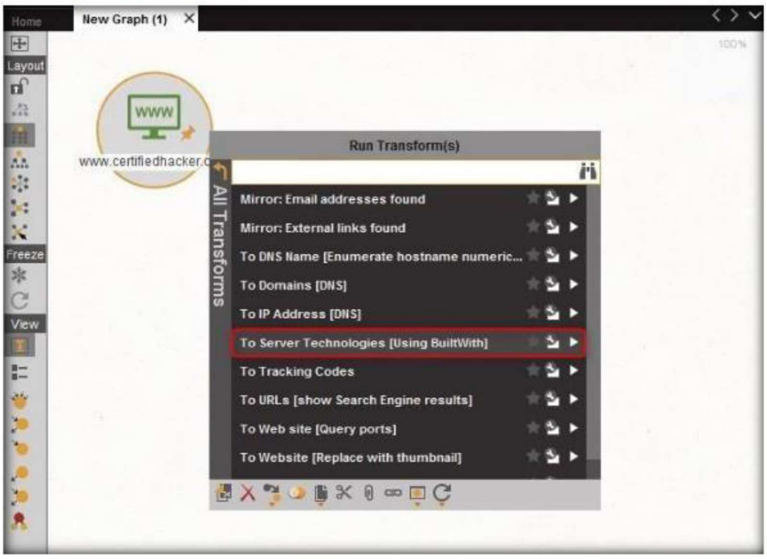


FIGURE 11.18: Run Transform(s) list

22. Maltego starts running the transform **To Server Technologies [Using BuiltWith]** entity. Observe the status in the progress bar.

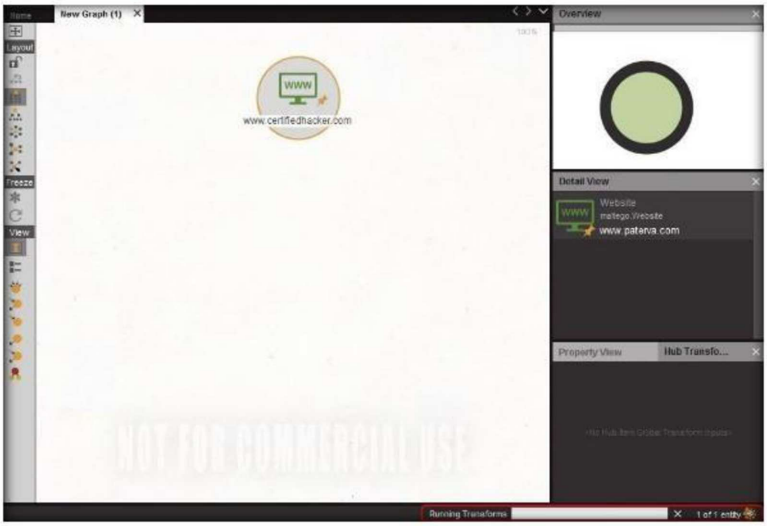


FIGURE 11.19: Progress bar pop-up

The 'add path' selection shortcut is most useful. It selects the nodes in the path between. Multiple is disabled unless multiple nodes are selected.

'Zoom to selection' was introduced in Maltego 3.0.3. This allows the user to select a portion of the graph using normal selection techniques and then quickly zoom to the area.

23. Once Maltego completes the Transforming Server Side Technologies, it displays the technology implemented on the server that hosts the website, as shown in the following screenshot:

Maltego can be used for the information gathering phase of all security related work. It will save you time and will allow you to work more accurately and smarter.

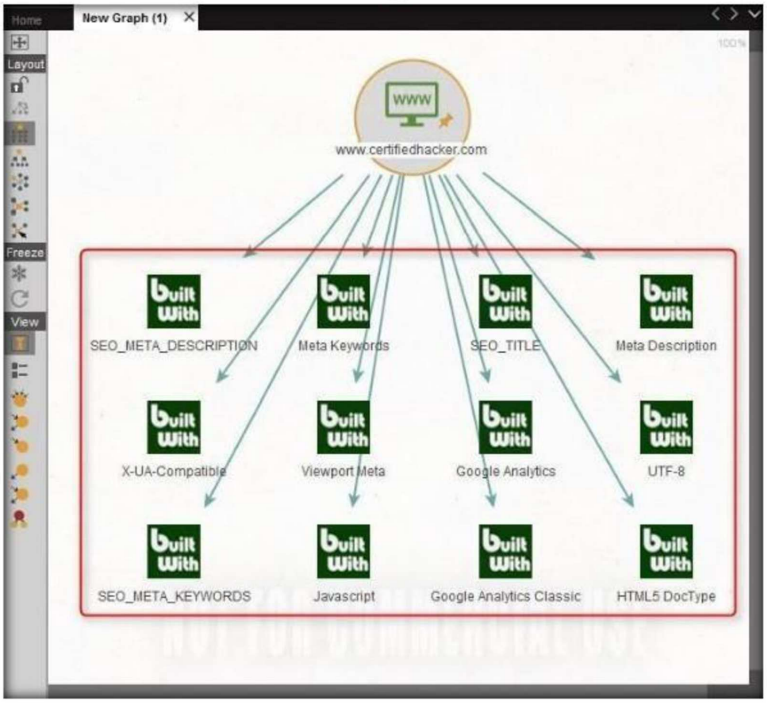


FIGURE 11.20: Server Side Technologies in www.certifiedhacker.com

24. After obtaining the built-in technologies of the server, attackers might search for vulnerabilities related to any of them and simulate exploitation techniques to hack them.

Hackers use this information and perform research on these technologies in order to find any vulnerabilities that could be used to exploit them.

25. To start a new transform, select all the entities by pressing **Ctrl+A** on the keyboard and press **Delete**.

26. A **Delete** pop-up appears. Click **Yes**.

FIGURE 11.21: Delete pop-up

27. Follow steps **18-20** to create a website entity with the URL **www.certifiedhacker.com**.

TASK 5

Identify the Domain

28. Right-click the entity and select **All Transforms → To Domains [DNS]**.

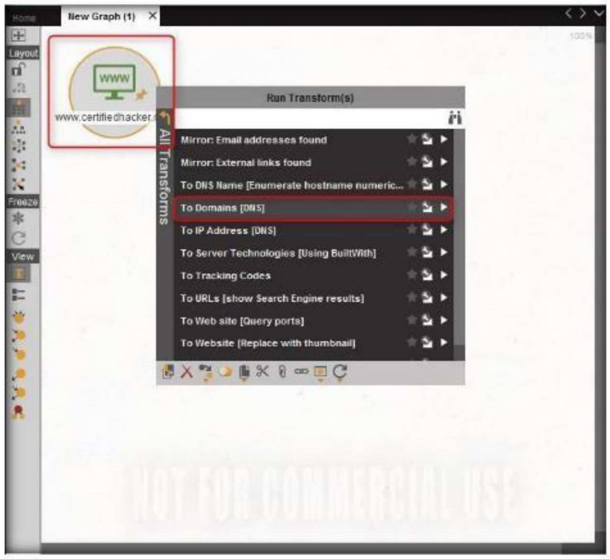


FIGURE 11.22: Selecting To Domains [DNS]

Maltego aids you in your thinking process by visually demonstrating interconnected links between searched items.

29. The domain corresponding to the website displays, as shown in the following screenshot:

Note: Some of the screenshots may differ in your lab environment.

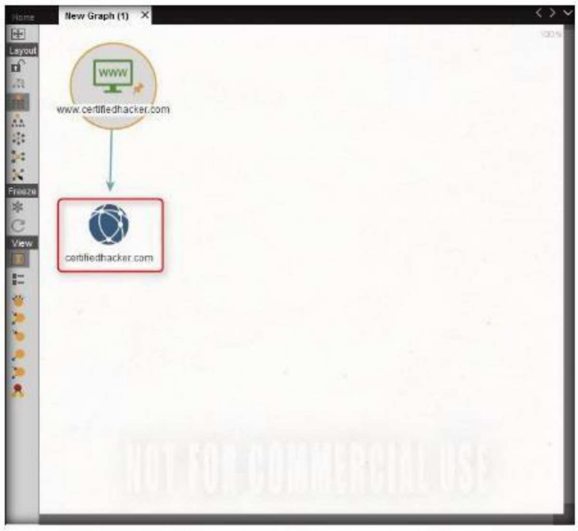


FIGURE 11.23: Domain Name of the Corresponding Website

TASK 6

Identify the Domain Name Schema

30. Right-click the entity and select **All Transforms → To DNS Name [Using Name Schema diction...]**.

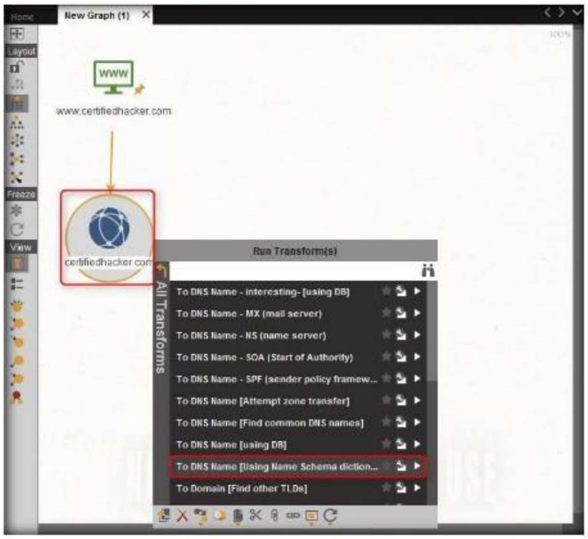


FIGURE 11.24: Selecting To DNS Name [Using Name Schema diction…]

31. Observe the status in the progress bar

If access to "hidden" information determines your success, Maltego can help you discover it.

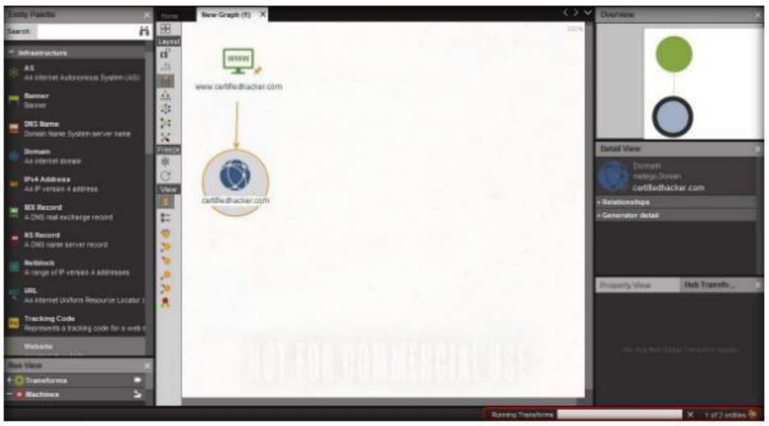


FIGURE 11.25: Progress bar pop-up

32. This transform will attempt to test various name schemas against a domain and try to identify a specific name schema for the domain as shown in the following screenshot:

Maltego is unique because it uses a powerful, flexible framework that makes customizing possible. As such, Maltego can be adapted to your own, unique requirements.

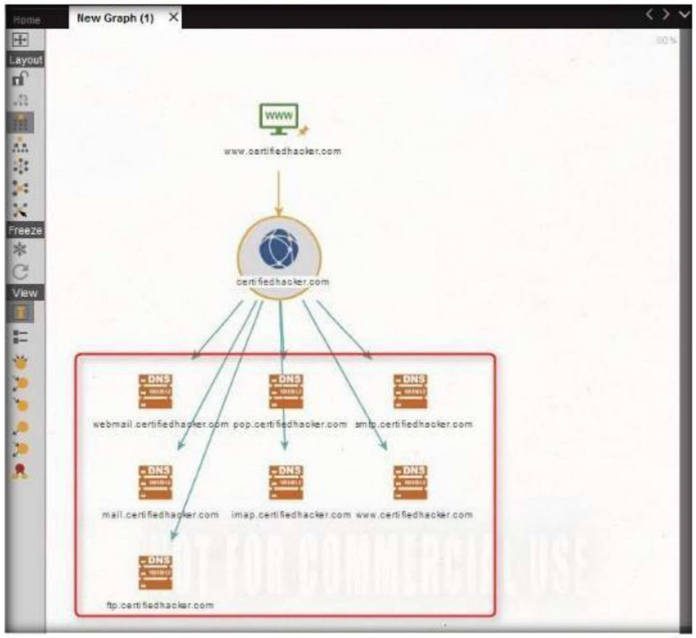


FIGURE 11.26: DNSNameSchema of certifiedhacker.com

33. After identifying the name schema, attackers attempt to simulate various exploitation techniques to gain sensitive information related to the resultant name schemas. For example, an attacker may implement a bruteforce or dictionary attack to log in to **ftp.certifiedhacker.com** and gain confidential information.
34. Select only the name schemas by dragging and deleting them.

Using the graphical user interface (GUI) you can see relationships easily - even if they are three or four degrees of separation away.

FIGURE 11.27: Deleting the Name Schemas

35. Right-click the entity and select **All Transforms → To DNS Name – SOA (Start of Authority)**.

TASK 7

Identify the Service Oriented Architecture (SOA) Information

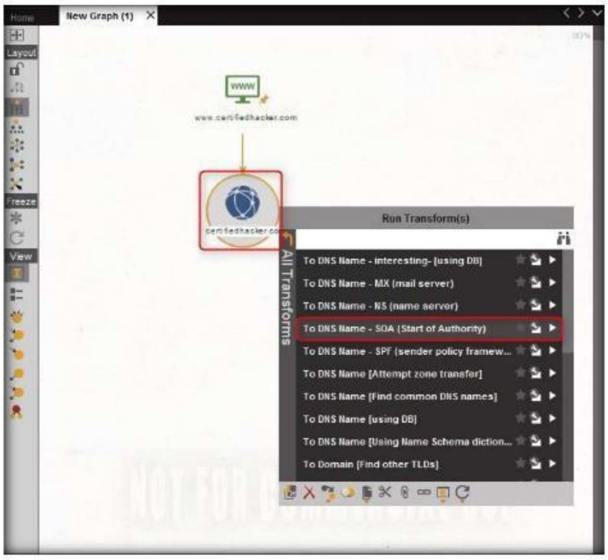


FIGURE 11.28: Selecting To DNS Name - SOA

36. This returns the primary name server and the email of the domain administrator, as shown in the following screenshot:

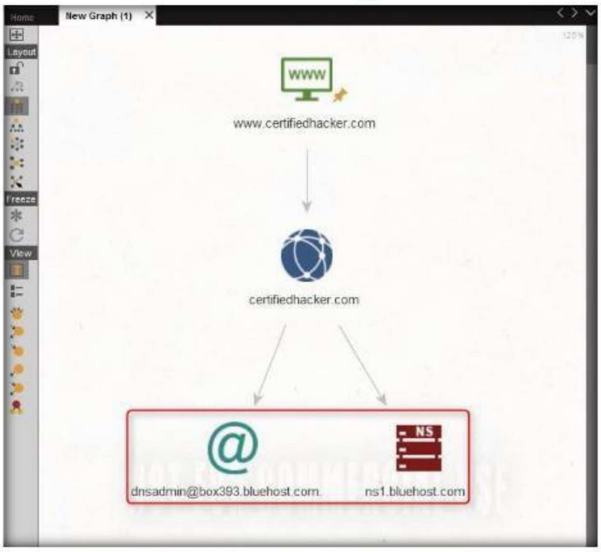


FIGURE 11.29: Primary Name Server and the Email of the Domain

Maltego provides you with a graphical interface that makes seeing these relationships instant and accurate - making it possible to see hidden connections.

37. By extracting the SOA related information, attackers attempt to find vulnerabilities in their services and architectures, and exploit them.
38. Select both the name server and the email by dragging and deleting them.

Maltego is easy and quick to install - it uses Java, so it runs on Windows, Mac and Linux.

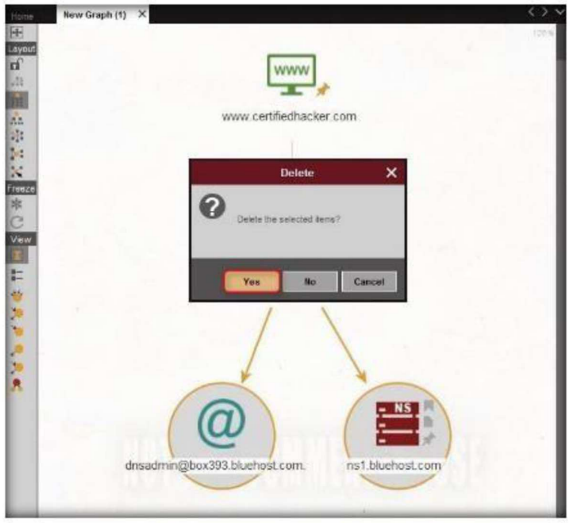


FIGURE 11.30: Deleting the Primary Name Server and the Email of the Domain

TASK 8

Identify the Mail Exchanger

39. Right-click the entity and select **All Transforms → To DNS Name - MX (mail server)**.

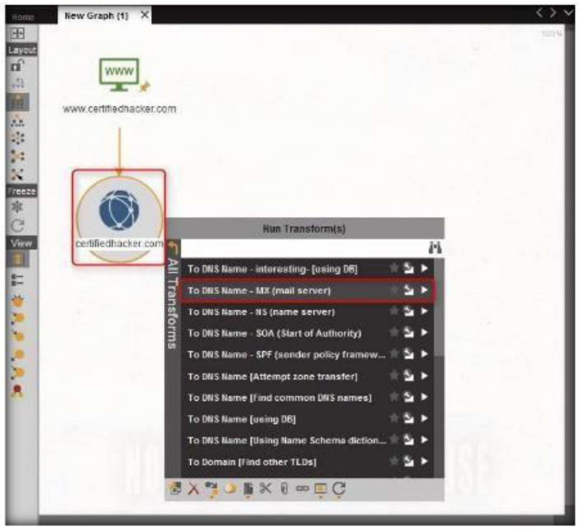


FIGURE 11.31: Selecting To DNS Name - MX (mail server)

40. This transform returns the mail server associated with the certifiedhacker.com domain, as shown in the following screenshot:

FIGURE 11.32: Mail Server Associated with the certifiedhacker.com

Maltego offers the user with unprecedented information. Information is leverage. Information is power. Information is Maltego.

41. By identifying the mail exchanger server, attackers attempt to exploit the vulnerabilities in the server and thereby use it to perform malicious activities such as sending spam e-mails.

42. Select only the mail server by dragging and deleting it.

The unique perspective that Maltego offers to both network and resource based entities is the aggregation of information posted all over the internet - whether it's the current configuration of a router poised on the edge of your network or the current whereabouts of your Vice President on his international visits, Maltego can locate, aggregate and visualize this information.

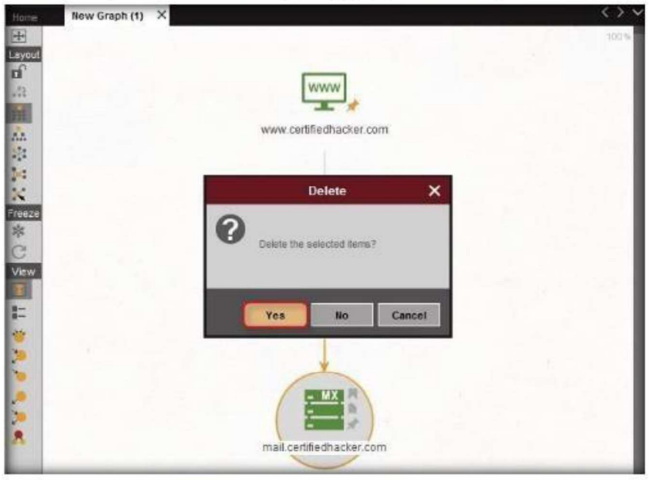


FIGURE 11.33: Deleting the Mail Server Entity

TASK 9

Identify the Name Server

43. Right-click the entity and select **All Transforms → To DNS Name - NS (name server)**.

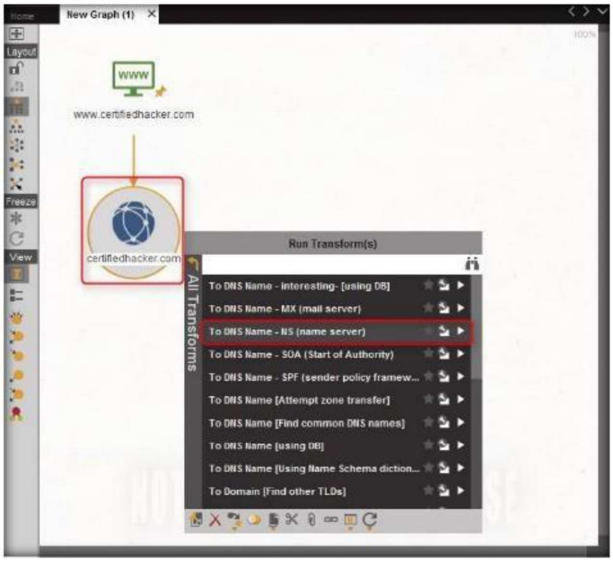


FIGURE 11.34: Selecting To DNS Name - NS (name server)

44. This returns the name servers associated with the domain, as shown in the following screenshot:

Maltego is a unique platform developed to deliver a clear threat picture to the environment that an organization owns and operates.

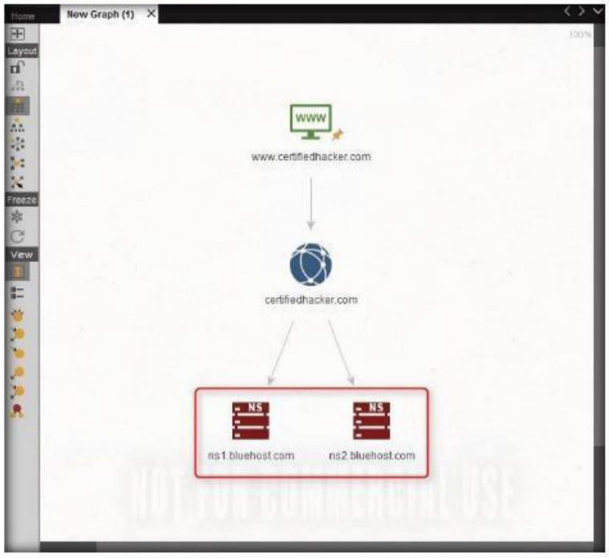


FIGURE 11.35: Name Server Associated with the Domain

45. By identifying the primary name server, an attacker can implement various techniques to exploit the server and thereby perform malicious activities such as DNS Hijacking, and URL redirection.
46. Select both the domain and the name server by dragging and deleting them.

TASK 10

Identify the IP Address

47. Right-click the entity and select **All Transforms → To IP Address [DNS]**.

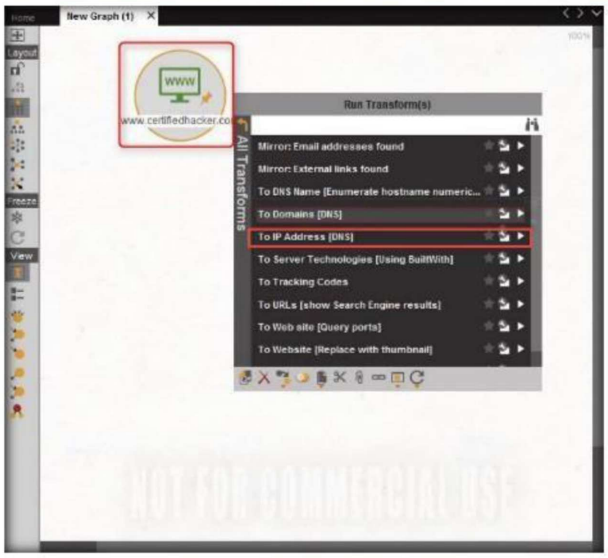


FIGURE 11.36: Selecting To IP Address [DNS]

Maltego's unique advantage is to demonstrate the complexity and severity of single points of failure as well as trust relationships that exist currently within the scope of your infrastructure.

48. This displays the IP address of the website, as shown in the following screenshot:

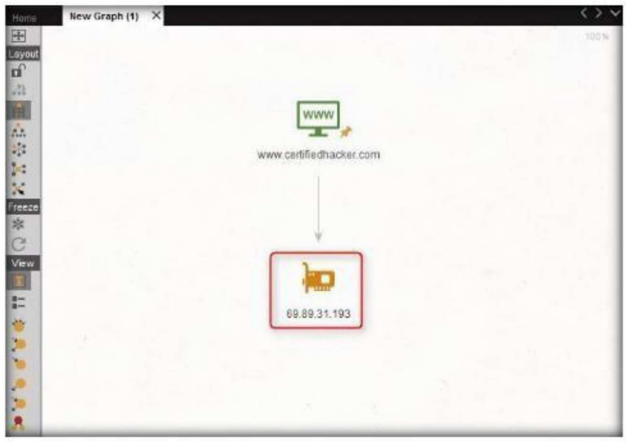


FIGURE 11.37: IP address of the website

49. By obtaining the IP address of the website, an attacker can simulate various scanning techniques to find open ports and vulnerabilities, and thereby attempt to intrude in the network and exploit them.

TASK 11

Identify the Geographical Location

50. Right-click the entity and select **All Transforms → To location [city, country]**.

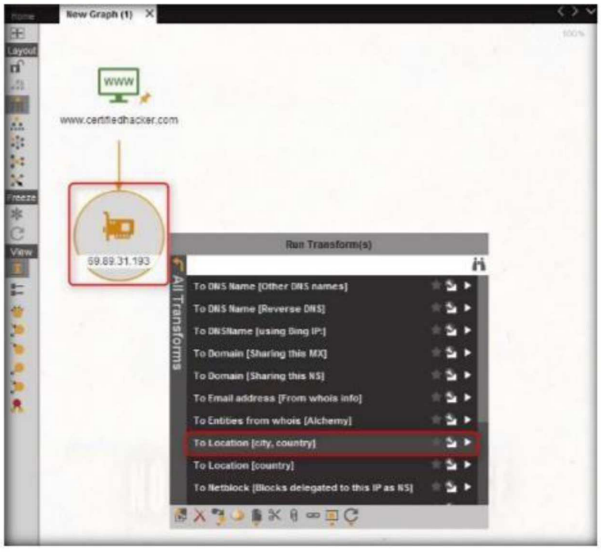


FIGURE 11.38: Selecting To location [city, country]

51. This transform identifies the geographical location where the IP address is located, as shown in the following location:

Custom entities can easily be shared between users by exporting and importing them. It's also possible to share entities by simply saving a graph containing custom entities and loading it in another (clean) Maltego.

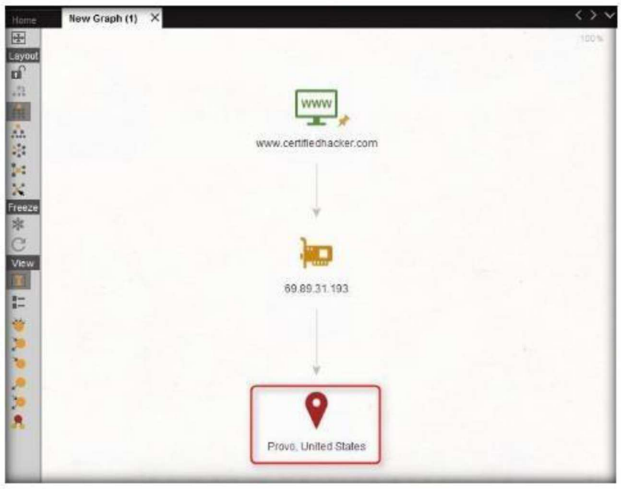


FIGURE 11.39: Geographical Location where the IP Address is Located

52. By obtaining the information related to geographical location, attackers can perform social engineering attacks by making voice calls (vishing) to an individual in an attempt to leverage sensitive information.
53. Follow **Step 28** to resolve the domain name of the website.

FIGURE 11.40: Domain Name Corresponding to the Website

By putting an exclamation mark in front of a phrase you can invert the selection - e.g. if you want to that do not match the word 'linode' you need to search for '!linode'.

TASK 12

Identify the Entities

54. Right-click the domain entity (certifiedhacker.com) and select **Run Transform → To Entities from whois [Alchemy]**.

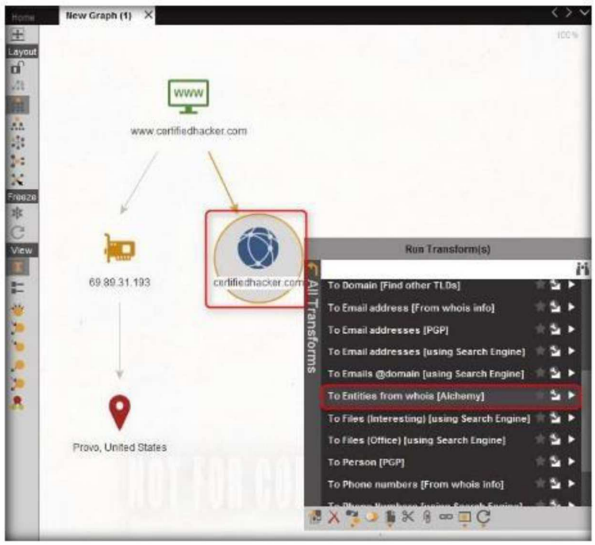


FIGURE 11.41: Selecting To Entities from whois [Alchemy]

55. This transform returns the entities pertaining to the owner of the domain, as shown in the following screenshot:

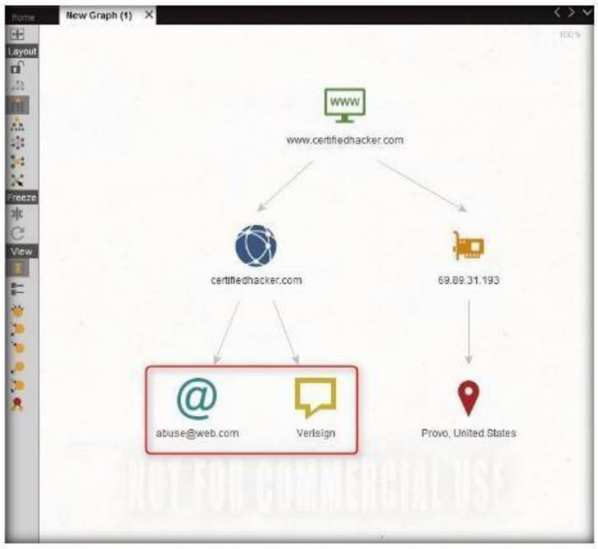


FIGURE 11.42: Entities Pertaining to the Owner of the Domain

The Find (Control F) functionality with the secondary search in the Detail View gives a lot a flexibility and power.

56. By obtaining this information, an attacker can exploit the servers displayed in the result or simulate a brute force attack or any other technique to hack in to the admin mail account and send phishing mails to the contacts in that account.

TASK 13

Identify the Email Address

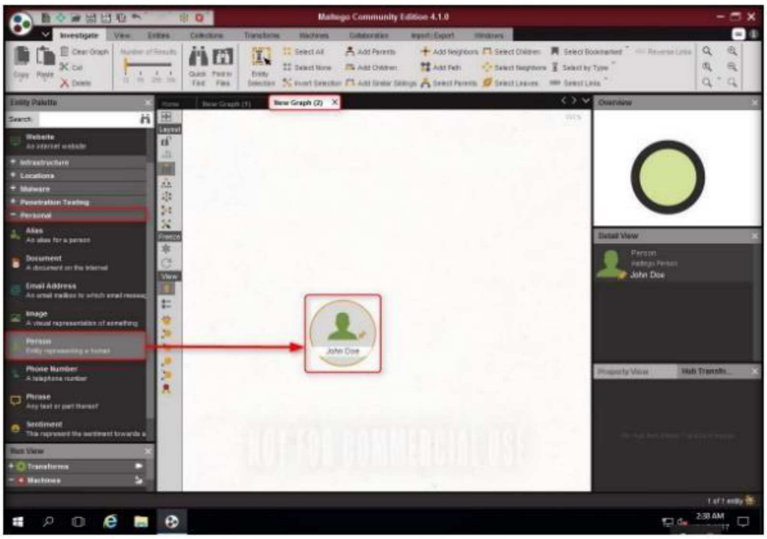
57. Perform footprinting on a target person to obtain the email address and phone number.

58. Click the icon located at the top-left corner of the GUI (in the toolbar) to start a new graph

FIGURE 11.43: Creating a New Graph

59. A new graph (**New Graph (2)**) appears in Maltego. Expand the **Personal** tab in the left pane and drag the **Person** entity to the **New Graph (2)** section.

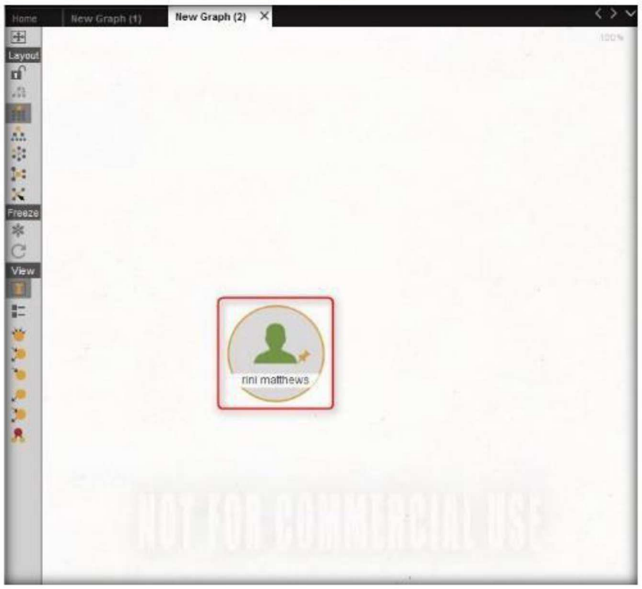
60. The name of the entity is set as **John Doe** by default.



- The detail view contains information about the entity that cannot be displayed in the main graph window. These are things that the transform author wants you to see about the entity.

FIGURE 11.44: Adding a Person Entity

61. To assign a target person name, double-click **John Doe** and type the name of the person (here, **rini matthews**).



- As the mouse is moved over entities both the entity properties and detail view is updated.

FIGURE 11.45: Renaming the Entity

62. Right-click the entity and select **All Transforms → To Email Address [Verify common]**.

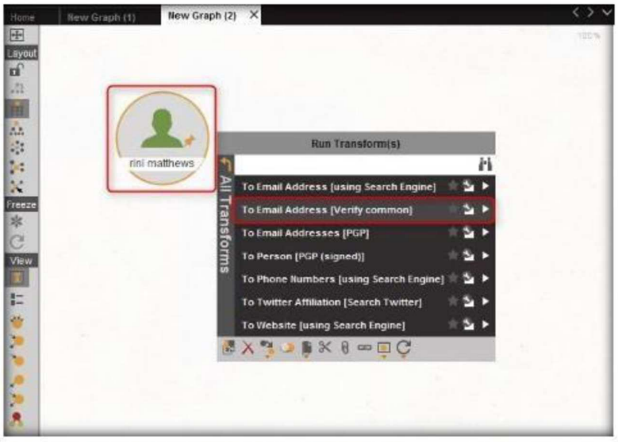


FIGURE 11.46: Setting To Email Address [Verify common] Option

Each entity has a number of properties and may have a detailed view. Most of the pro while the detailed view is read-only.

63. Maltego displays all the valid email addresses (which have the name in common) corresponding to the given name, as shown in the following screenshot:

Note: The email IDs and phone numbers shown in this lab are dummies and will not appear in your lab environment. Use a legitimate user name to get valid e-mail IDs and phone numbers.

The properties of an entity are used by transforms and are passed along with the entity's value to the transform. Detailed view information is not passed to the transform.

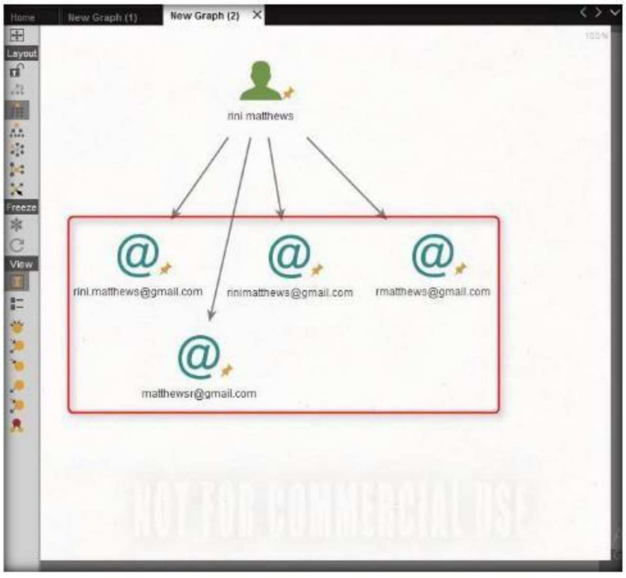


FIGURE 11.47: Setting To Email Address [Verify common] Option

64. Assess the Email addresses and determine which one belongs to the target person.
65. Select all the Email addresses and delete them.

TASK 14

Identify the Phone Number

66. Right-click the **person** entity (rini matthews) and select **All Transforms → To Phone Numbers [using Search Engine].**

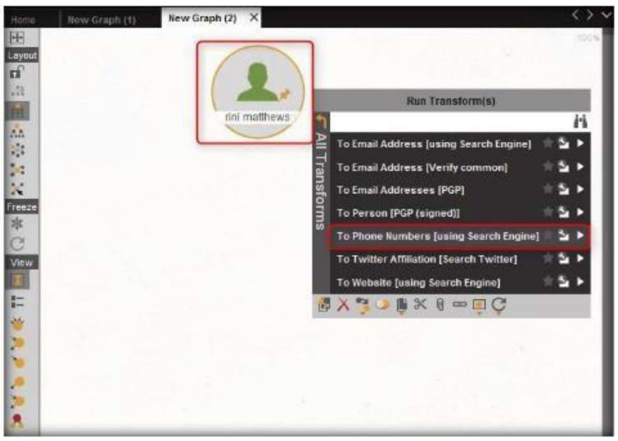


FIGURE 11.48: Selecting a Transform

The windows can also be ragged around to snap into place in different configurations.

67. Maltego displays a list of phone numbers associated to a person, as shown in the following screenshot:

The show opened documents list button that are open. Graphs that have not been saved yet will be displayed as "New Graph (number)".

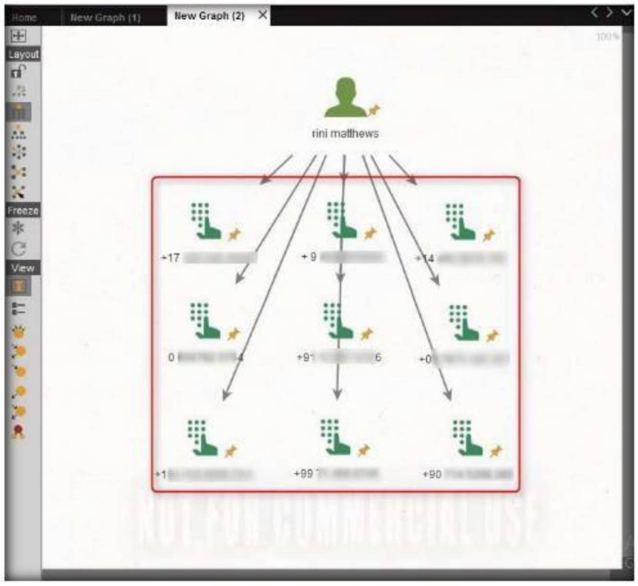


FIGURE 11.49: Phone Numbers Identified

68. Check each number with online people search tools such as yellow pages in order to confirm that a particular phone number belongs to the target person.
69. Select all the entities in the section and delete them.
70. By extracting all this information, an attacker can simulate actions such as enumeration, web application hacking, social engineering, etc. which may allow access to a system or network, gain credentials, etc.
71. Apart from the transforms mentioned above, there are also transforms that can track accounts and conversations of individuals who are registered in social networking sites such as Facebook and Twitter.

Lab Analysis

Collect and document the Information obtained in this lab.

PLEASE TALK TO YOUR INSTRUCTOR IF YOU HAVE QUESTIONS ABOUT THIS LAB.

Internet Connection Required	
☑ Yes	☐ No
Platform Supported	
☑ Classroom	☐ iLabs

Lab

12

Performing Automated Network Reconnaissance using Recon-ng

Recon-ng is a web-based open-source reconnaissance tool used to extract information from a target organization and its personnel.

ICON KEY

- Valuable information
- Test your knowledge
- Web exercise
- Workbook review

Lab Scenario

As an ethical hacker or pen tester, you should also perform host discovery on the target to get information about additional domains. This activity will enable you to find all the hosts present on the target. This lab will demonstrate how to discover additional hosts from the target.

Lab Objectives

The objective of this lab is to help students learn how to perform network reconnaissance of a target and:

- Gather hosts related to a domain
- Reverse lookup the IP address obtained during the network reconnaissance

Lab Environment

To carry out the lab, you need:

- Kali Linux running as a virtual machine
- A web browser with internet access

Lab Duration

Time: 10 Minutes

Overview of Recon-ng

Recon-ng is a full-featured Web Reconnaissance framework written in Python. Complete with independent modules, database interaction, built in convenience functions, interactive help, and command completion.

Recon-ng is a Web Reconnaissance framework consisting of modules that perform host discovery on the target. It includes these modules that can be used for host discovery

- hosts_baidu – Baidu Hostname Enumerator
- hosts_bing – Bing Hostname Enumerator
- hosts_brute_force – DNS Hostname Brute Forcer
- hosts_google – Google Hostname Enumerator
- hosts_netcraft – Netcraft Hostname Enumerator
- hosts_shodan – Shodan Hostname Enumerator
- hosts_yahoo – Yahoo Hostname Enumerator

Lab Tasks

TASK 1

Launch recon-ng

1. Launch the Kali Linux virtual machine from VMware Workstation, and log in to it using the credentials: **root/toor.**
2. Launch a command line terminal.
3. Type the command **recon-ng** and press **Enter** to launch the application.

Recon-ng provides a powerful environment in which open source web-based reconnaissance can be conducted quickly and thoroughly.

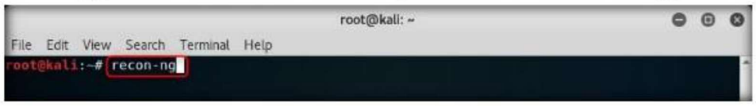


FIGURE 12.1: Launching recon-ng

4. Type **show modules** and press **Enter** to view all the modules contained in recon-ng.

5. You will be able to perform network discovery, exploitation, reconnaissance, etc. by loading the required modules.

Recon-ng has a look and feel similar to the Metasploit Framework, reducing the learning curve for leveraging the framework.

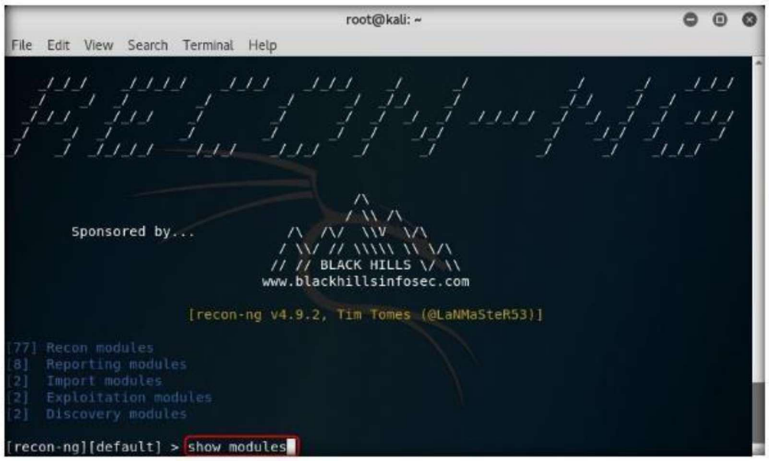


FIGURE 12.2: Viewing Modules

6. Type **help** and press **Enter** to view all the commands that allow you to add/delete records to a database, query a database, etc.

However, it is quite different. Recon-ng is not intended to compete with existing frameworks, as it is designed exclusively for web-based open source reconnaissance.

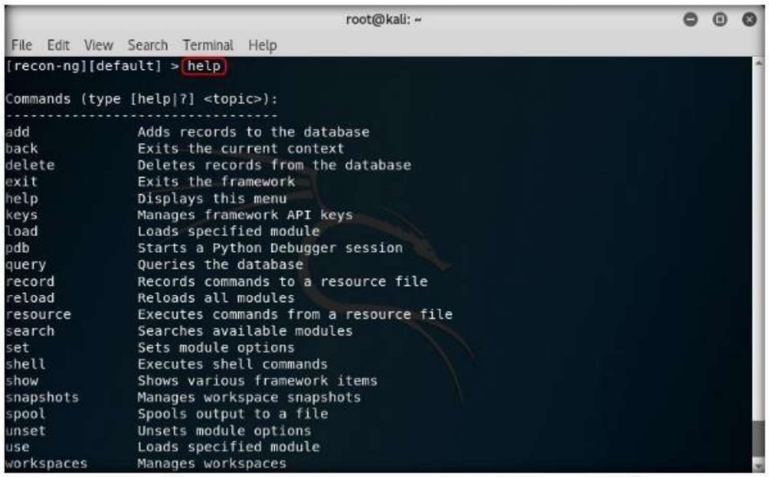


FIGURE 12.3: Viewing recon-ng Commands

TASK 2

Add a workspace

7. Type **workspaces** command and press **Enter**. This displays the usage commands related to the workspaces.

FIGURE 12.4: Viewing Workspaces Related Commands

8. Add a workspace in which to perform network reconnaissance. In this lab, we shall be adding a workspace named **CEH**.
9. To add the workspace, type the command **workspaces add CEH** and press **Enter**. This creates a workspace named CEH.:

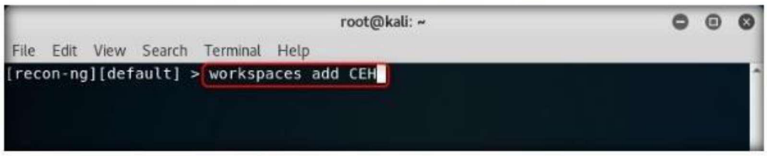


FIGURE 12.5: Adding a Workspace

Note: You can alternatively issue the command **workspaces select CEH** to create a workspace named CEH. Ignore the errors while running the commands

10. Enter **workspaces list**. This displays a list of workspaces (along with the workspace added in the previous step) that are present with in the Workspaces databases.

If you want to exploit, use the Metasploit Framework. If you want to social engineer, use the Social-Engineer Toolkit.

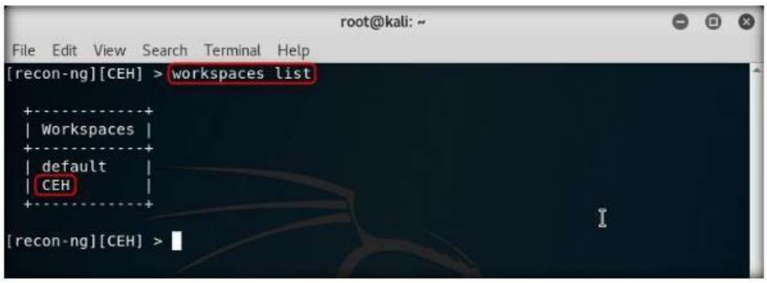


FIGURE 12.6: Viewing the Added Workspaces

TASK 3

Add a Domain

11. Add a domain in which to perform network reconnaissance
12. So, type the command **add domains certifiedhacker.com** and press **Enter**. This adds certifiedhacker.com to the present workspace.

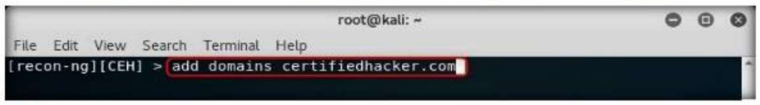


FIGURE 12.7: Adding a Domain

13. You can view the added domain by issuing the **show domains** command as shown in the following screenshot:

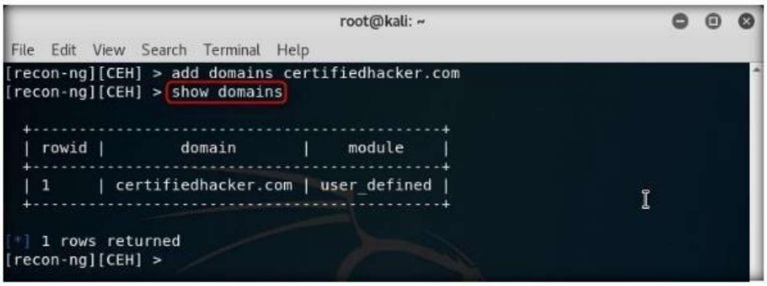


FIGURE 12.8: Viewing the Added Domain

TASK 4

Resolve Hosts Using Netcraft Module

14. Harvest the hosts-related information associated with certifiedhacker.com by loading network reconnaissance modules such as netcraft, bing and brute_hosts.
15. Type the command **search netcraft** and press **Enter** to view the modules related to Netcraft.

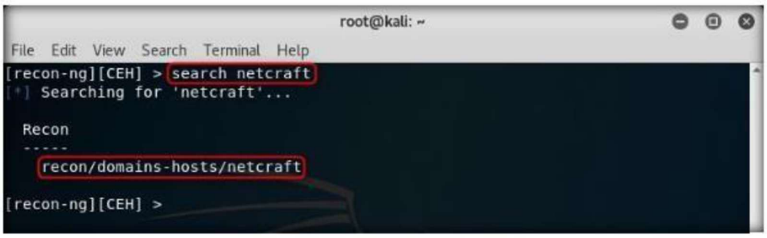


FIGURE 12.9: Searching netcraft Module

Recon-ng is a completely modular framework and makes it easy for even the newest of Python developers to contribute.

16. Load the **recon/domains-hosts/netcraft** module to harvest the hosts. To load this module, enter **load recon/domains-hosts/netcraft**.

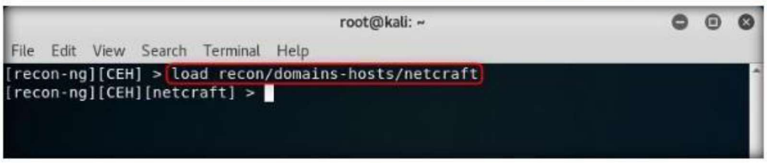


FIGURE 12.10: Loaded netcraft Module

17. Type **run** and press **Enter**. This executes the module and begins to harvest the hosts as shown in the following screenshot:

Each module is a subclass of the "module" class. The "module" class is a customized "cmd" interpreter equipped with built-in functionality that provides simple interfaces to common tasks such as standardizing output, interacting with the database, making web requests, and managing API keys.

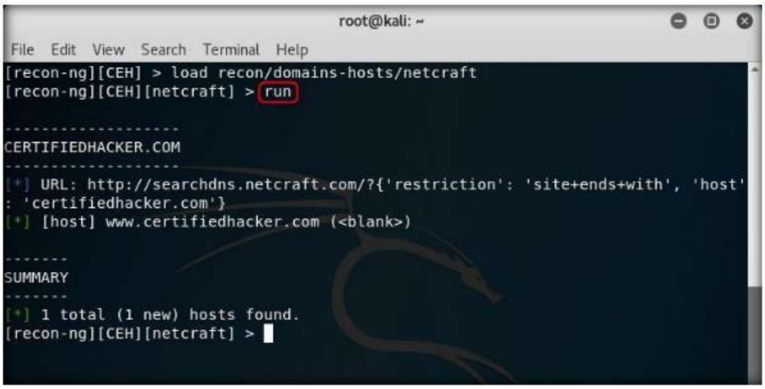


FIGURE 12.11: Running netcraft Module

18. You have harvested the hosts related to certifiedhacker.com using the netcraft module. You can use other modules such as Bing to harvest more hosts.

TASK 5

Resolve Hosts Using Bing Module

19. Type **load bing** (or **search bing**) command and press **Enter** to view all the modules related to Bing. In this lab, you will be using **recon/domains-hosts/bing_domain_web** module to harvest hosts.

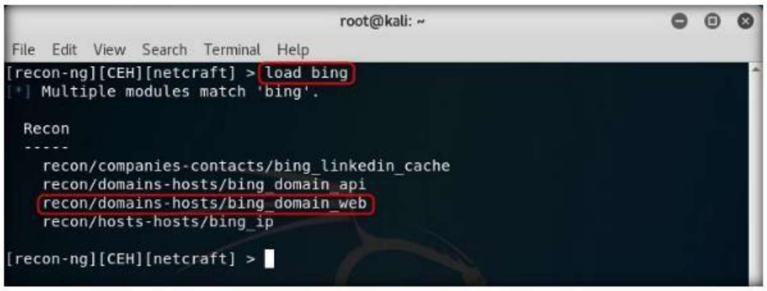


FIGURE 12.12: Searching for bing Module

20. To load the **recon/domains-hosts/bing_domain_web** module, type load **recon/domains-hosts/bing_domain_web** command and press **Enter**

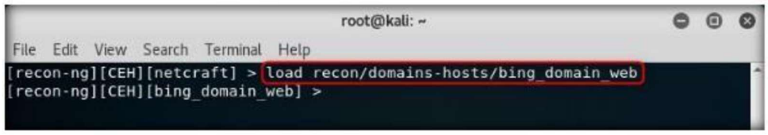


FIGURE 12.13: Loading bing Module

21. Type **run** and press **Enter**. This begins to harvest the hosts as shown in the following screenshot:

Therefore, all the hard work has been done. Building modules is simple and takes little more than a few minutes.

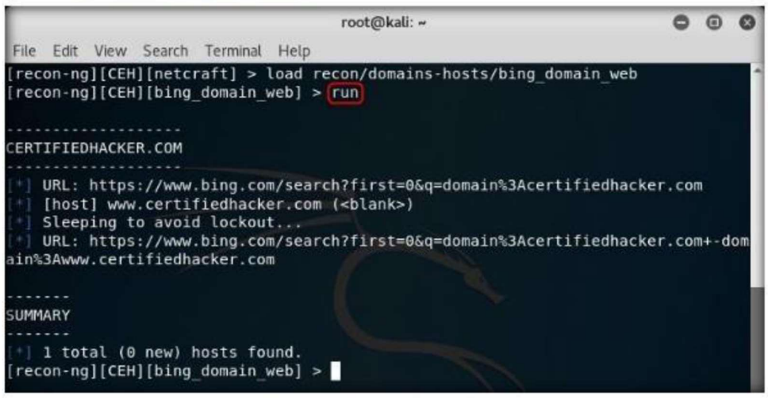


FIGURE 12.14: Running the bing Module

22. Observe that a few more hosts have been harvested. You can use other modules such as **brute_hosts** to harvest more hosts.

TASK 6

Resolve Hosts Using brute_hosts Module

23. Type **load brute** (or **search brute**) command and press **Enter** to view all the modules related to brute forcing. In this lab, you will be using the **recon/domains-hosts/brute_hosts** module to harvest hosts.

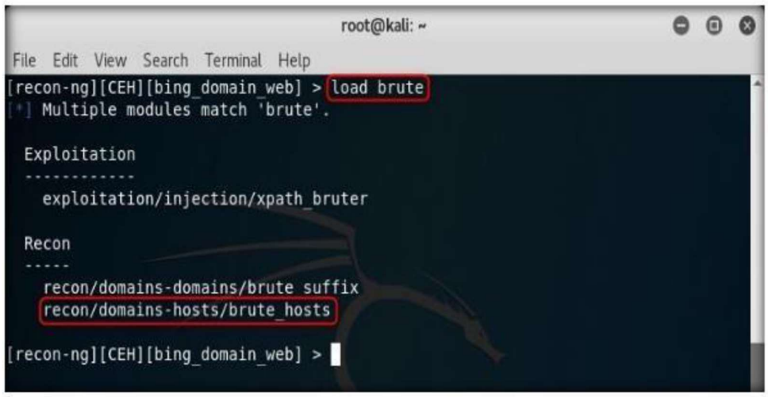


FIGURE 12.15: Searching for brute Module

24. To load the **recon/domains-hosts/brute_hosts** module, type **loadrecon/domains-hosts/brute_hosts** command and press **Enter**

The "libs" folder is for small 3rd party dependancies not available through the Python Package Index (PIP). The "libs" folder is added to the Python path at runtime. Place modules here and import as normal into modules.

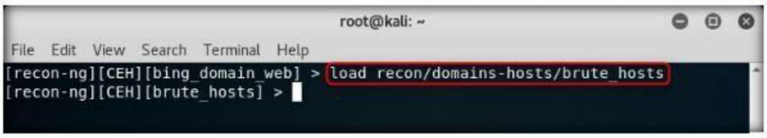


FIGURE 12.16: Loading brute Module

25. Type **run** and press **Enter**. This begins to harvest the hosts as shown in the following screenshot:

The "modules" folder is crawled at runtime to establish the module tree from which all modules are loaded. Place new modules where it makes logical sense, or create a new folder to expand the module tree.

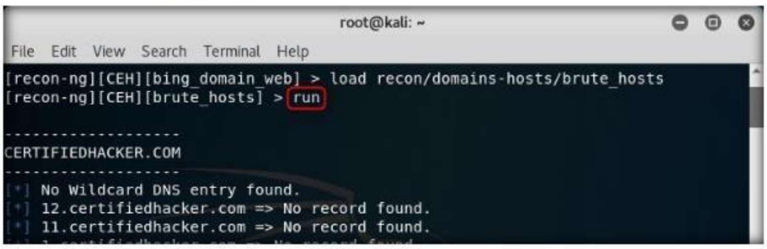


FIGURE 12.17: Running brute Module

26. Observe that a few more hosts have been added by running the **recon/domains-hosts/brute_hosts** module.

Modules are loaded on-demand, giving developers the ability to reload modules without restarting the framework by backing into the global context and reloading the module.

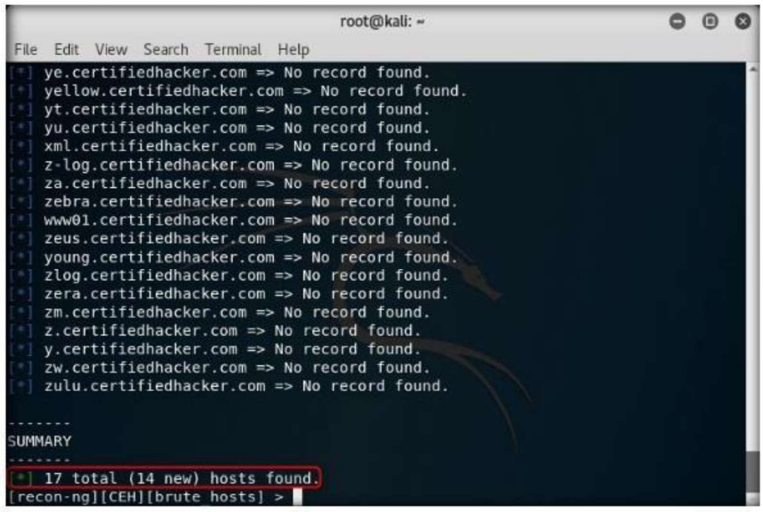


FIGURE 12.18: Newly Added Hosts

27. Perform a reverse lookup for each IP address (the IP address that is obtained during the reconnaissance process) to resolve to respective hostnames

TASK 7

Perform Reverse Lookup Using reverse_resolve module

During module development, developers will need to repeatedly reload framework modules to test code changes. On-demand reloading provides the capability to reload modules while maintaining command history and global options settings.

28. Type load **reverse_resolve** command and press **Enter** to view all the modules associated with the reverse_resolve keyword. In this lab, we are using **recon/hosts-hosts/reverse_resolve** module.
29. So, type **load recon/hosts-hosts/reverse_resolve** command and press Enter to load the module

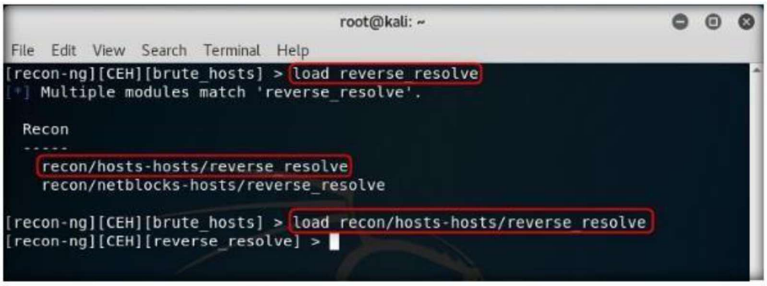


FIGURE 12.19: Search for reverse_resolve Module

30. Issue the **run** command to begin reverse lookup

Note: Ignore the if any Syntax Error occur.

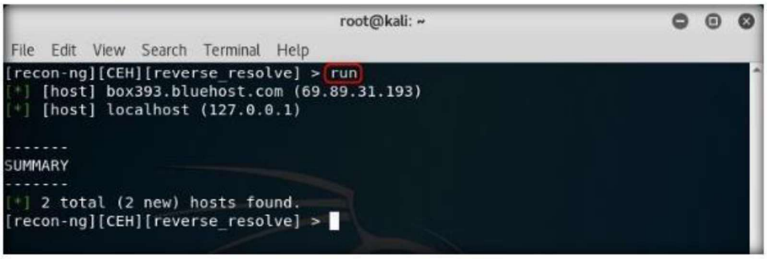


FIGURE 12.20: Running the Module

31. Once done with the reverse lookup process, type **show hosts** command and press **Enter**. This displays all the hosts that are harvested so far, as shown in the following screenshot:

Squash all commits into a single commit before submitting pull requests. This can be done from the command line by checking out the source fork with the git checkout <fork> command and issuing the git rebase -i command.

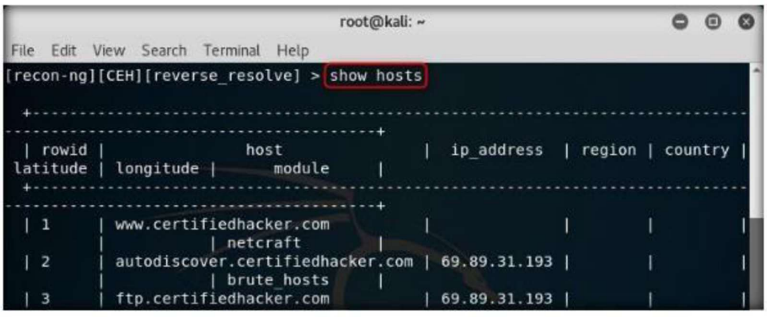


FIGURE 12.21: Viewing the Harvested Hosts

32. Now, type **back** command and press **Enter** to go back to the CEH attributes terminal

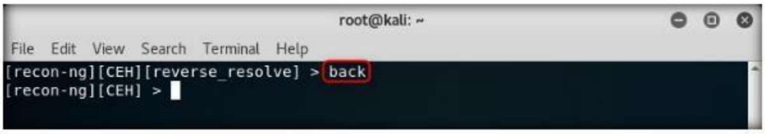


FIGURE 12.22: Going back to the Attributes Section

TASK 8

Generate a Report

33. Now that you have harvested a number of hosts, you will prepare a report containing all the hosts

34. Type **load reporting** command and press **Enter** to view all the modules associated with the reporting keyword. In this lab, we shall be saving the report in html format. So the module used is **reporting/html**.

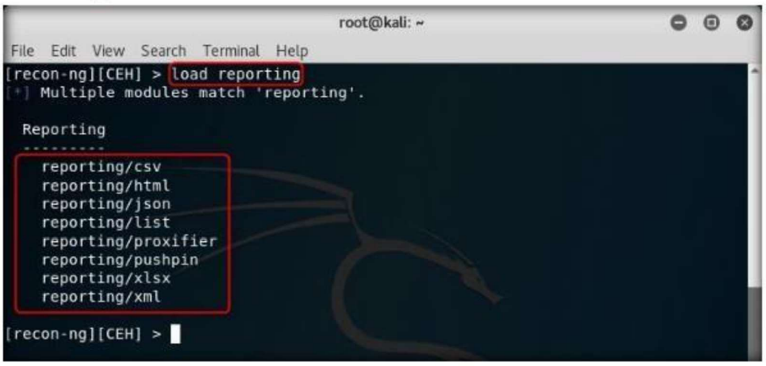


FIGURE 12.23: Searching for reporting Module

Choose "squash" for all of your commits, except the first one, and consolidate the commit messages to a single message that summarizes the pull request.

35. Type **load reporting/html** command and press **Enter**. Now, you need to know which options are to be configured to generate the html report. To know this, type **show options** command and press Enter.

36. Observe that you need to assign values for **CREATOR** and **CUSTOMER** options, while the **FILENAME** value is already set and you may change the value if required. Leave the SANITIZE option's value set to default.

37. Type:

    a. **set FILENAME /root/Desktop/CEH results.html** and press **Enter**. By issuing this command, you are setting the report name as **CEH_results** and the path to store the file as **Desktop**.

    b. **set CREATOR [your name]** (here, **Jason**) and press **Enter**

    c. **set CUSTOMER Certifiedhacker Networks** (since, you have performed network reconnaissance on **certifiedhacker.com** domain) and press **Enter**

Push the modified fork to the remote repository with the git push -f command.

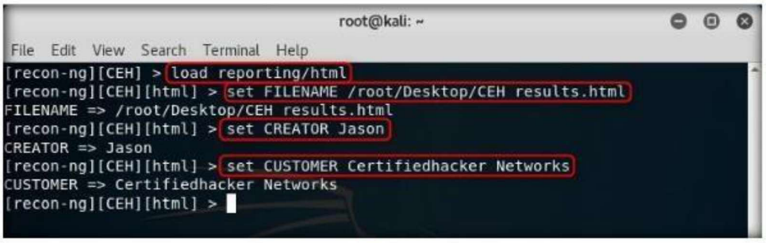


FIGURE 12.24: Saving a Report

38. Type **run** command and press **Enter** to create a report for all the hosts that have been harvested.

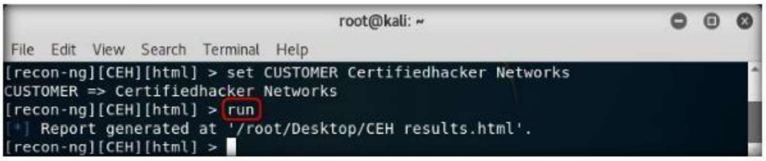


FIGURE 12.25: Running the Module

39. The generated report is saved to the **Desktop**. Double-click the **CEH results.html** file.

This technique will automatically update existing pull requests from the affected source fork.

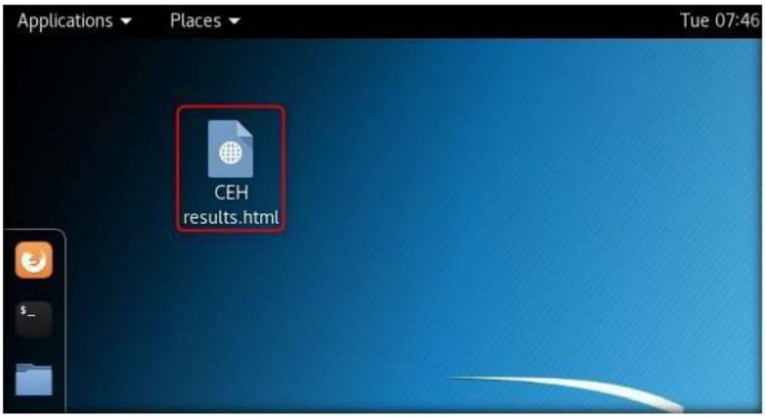


FIGURE 12.26: Viewing the Report

40. The generated report appears in the **Firefox ESR** web browser displaying the summary of the harvested hosts. Expand the **Hosts** node to view all the harvested hosts and analyze them.

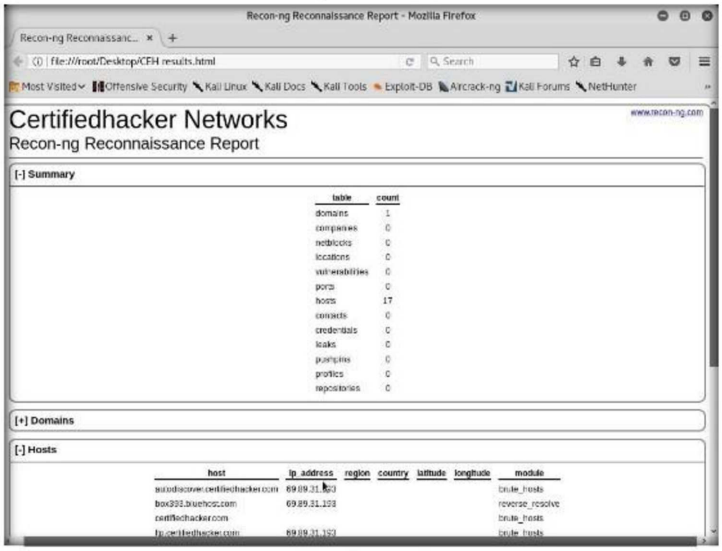


FIGURE 12.27: Viewing the Report

There is not much in this report, but when you start running multiple modules and add in geolocation reports can get pretty complex, and recon-ng does a great job keeping track of everything.

41. Recon-ng performs network reconnaissance on a target domain.

Lab Analysis

Analyze and document the results related to the lab exercise. Give your opinion on your target's security posture and exposure.

PLEASE TALK TO YOUR INSTRUCTOR IF YOU HAVE QUESTIONS ABOUT THIS LAB.

Internet Connection Required	
☑ Yes	☐ No
Platform Supported	
☑ Classroom	☐ iLabs

Lab

13

Using Open-source Reconnaissance Tool Recon-ng to Gather Personnel Information

Recon-ng is a web-based open-source reconnaissance tool that extracts information about the target organization and its personnel

ICON KEY

- Valuable information
- Test your knowledge
- Web exercise
- Workbook review

Lab Scenario

During information gathering, you are required to discover personal information on the target. This personal information can be used later to perform other attacks such as social engineering attacks. So as a professional ethical hacker or pen tester, you should be able to discover the personal information of a target company. This lab will demonstrate how to discover personal information about the target organization.

Lab Objectives

The objective of this lab is to help students learn how to:

- Obtain contacts of personnel working in an organization
- Validate the existence of usernames on specific websites
- Find the existence of user profiles on various websites

Lab Environment

To carry out the lab, you need:

- Kali Linux running as a virtual machine
- Web browser with internet access

Lab Duration

Time: 10 Minutes

Overview of Personal Information Gathering

Gathering personal information involves discovering contact details such as email address, address, etc. present on the target organization's web site. The Recon-ng contains various modules for harvesting and discovering contact information about a certain company. Some of the Recon-ng modules for discovering personal information are:

- recon/domain-contacts
- recon/companies-contacts
- recon/domain-contacts/namechk

Lab Tasks

TASK 1

Launch recon-ng

1. Launch Kali Linux virtual machine from VMware Workstation and log in to it using the credentials: **root/toor**.
2. Launch a command line terminal.
3. Type the command **recon-ng** and press **Enter** in order to launch the application.
4. Add a workspace in which to perform information gathering. In this lab, we are adding a workspace named **reconnaissance**.
5. To add the workspace, type the command **workspaces add reconnaissance** and press **Enter**. This creates a workspace named reconnaissance.

Some Recon-ng modules require the use of an API key, OAuth Token, etc. To prevent users from having to continually input keys and regenerate tokens, Recon-ng provides methods which assist in storing, managing and accessing these items.

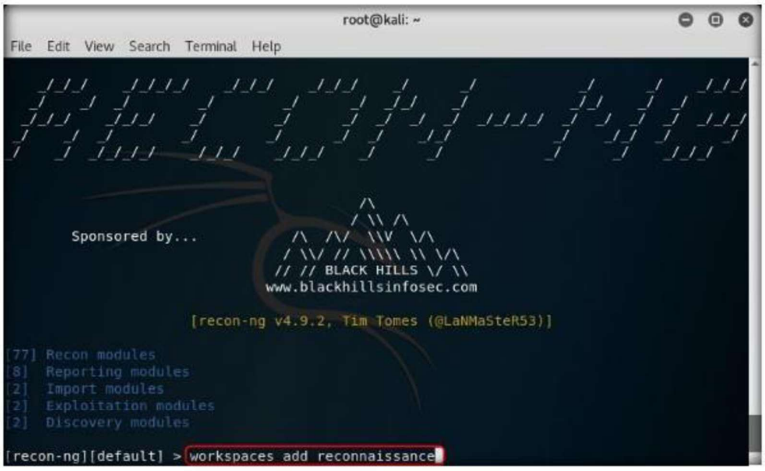


FIGURE 13.1: Launching recon-ng

TASK 2

Gather Contacts Associated with a Domain

6. Set a domain and perform footprinting on it to extract contacts available in the domain.
7. Type **load recon/domains-contacts/whois_pocs** and press **Enter**. This module uses the ARIN Whois RWS to harvest POC data from whois queries for the given domain.
8. Type **show info/show options** command and press **Enter** to view the options required to run this module.
9. Type **set SOURCE facebook.com** and press **Enter** to add facebook.com domain.

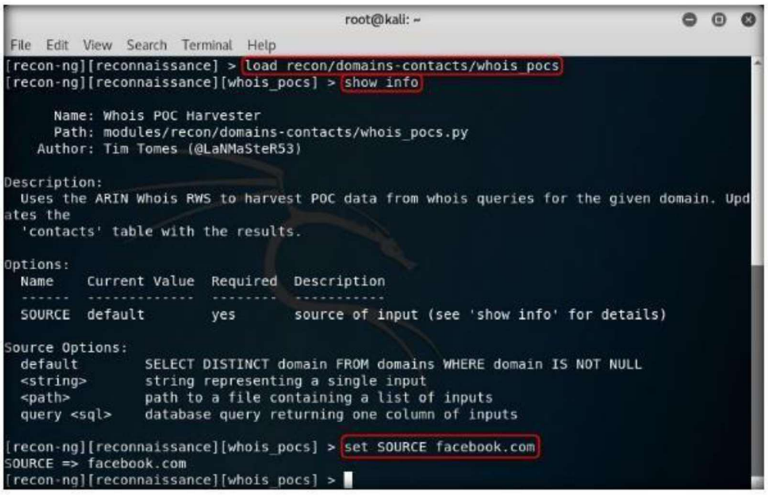


FIGURE 13.2: Harvesting Contacts from Domain

Some Recon-ng modules may require the use of popular search engines and social media sites with complex OAuth authentication schemes.

10. Type **run** command and press **Enter**. The **load recon/domains-contacts/whois_pocs** module extracts the contacts associated with the domain, and displays them as shown in the following screenshot:

Recon-ng provides developers with an easy way to create OAuth tokens for the LinkedIn and Twitter APIs, and interface with the Google, Bing, and Shodan search APIs.

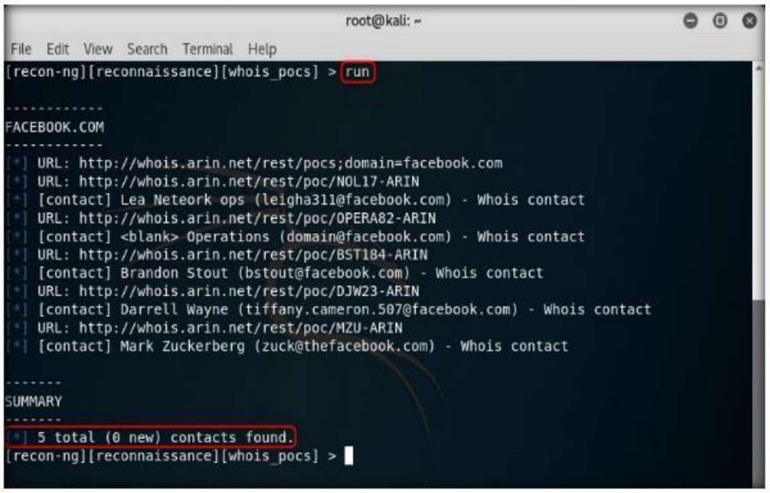


FIGURE 13.3: Running Module

The most important capability of a tool which specializes in web based reconnaissance is the ability to make web requests. Recon-ng relieves the burden of complicated request building logic by providing a custom method for handling web requests.

11. Type **back** and press **Enter** to go back to the workspaces (**reconnaissance**) terminal

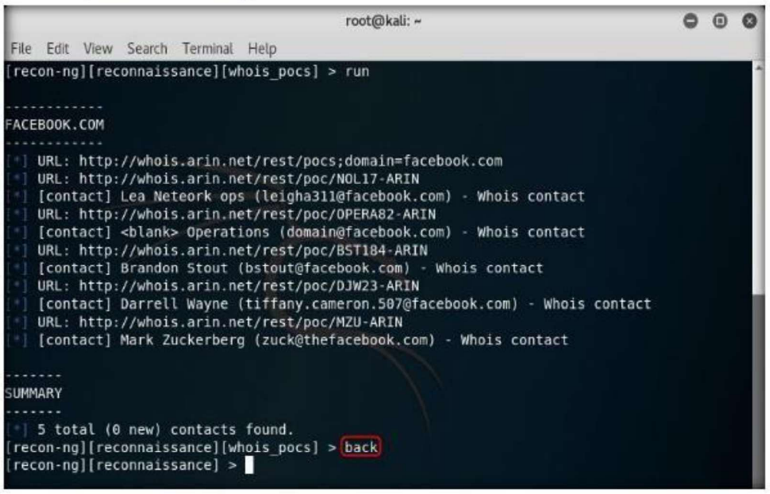


FIGURE 13.4: Going back to workspaces terminal

TASK 3

Check for User Existence

12. Now that you have obtained contacts related to the domains, note down these contacts' names and validate the existence of their names (usernames) on specific websites.
13. The **recon/profiles-profiles/namechk** module validates the username existence of a specified contact. The contact we are going to use in this lab is **Mark Zuckerberg**.
14. Type **load recon/profiles-profiles/namechk** command and press **Enter** to load this module
15. Type **set SOURCE MarkZuckerberg** and press **Enter**. This command sets MarkZuckerberg as the source, for which you want to find the user existence on specific websites.
16. Type **run** and press **Enter**. This begins the search for the keyword MarkZuckerberg on various websites.
17. Recon-ng begins to search the internet for the presence of the username on websites and, if found, it returns the result stating "**User Exists!**".

Note: Ignore the Errors.

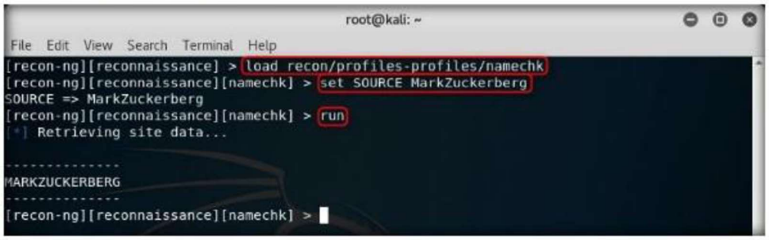


FIGURE 13.5: Running a Module

timeout (optional) is an integer representing the socket timeout for the request. If not set, the socket timeout defaults to the global option setting.

payload (optional) is a dictionary of name:value pairs to be encoded as request parameters. payload should be used for "GET" and "POST" methods as the request method will encode and build the request as needed for the given method.

18. Type **back** command and press **Enter** to go back to the workspaces (reconnaissance) terminal.
19. Find the existence of user profiles in various websites, for which you need to load the recon/profiles-profiles/profiler module.
20. Type **load recon/profiles-profiles/profiler** command and press **Enter**
21. Type **set SOURCE MarkZuckerberg** command and press **Enter**.

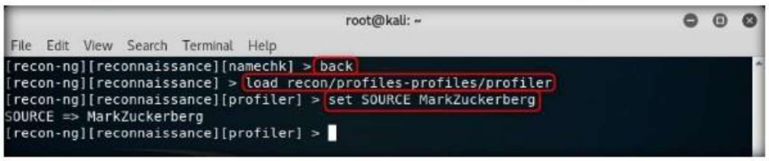


FIGURE 13.6: Configuring Module

TASK 4

Check for Profile Existence

22. Type **run** command and press **Enter**. The recon/profiles-profiles/profiler module searches for this username and returns the URL of the profile (found with the matching username):

Note: Ignore the Errors.

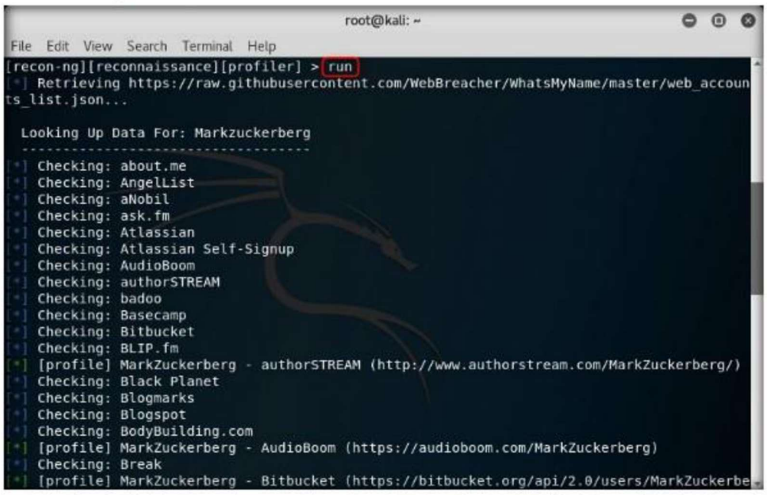


FIGURE 13.7: Running Module

content (optional) is a string indicating the content subtype of the POST payload. By default, the standard for a URL encoded POST payload is applied. Currently, only the default and "JSON" subtypes are available. Submitting a content subtype for any method other than a POST request raises a Request Exception.

TASK 5

Generate Report

23. Type **back** and press **Enter** to go back to the workspaces terminal.
24. Now that you have verified the user existence and obtained the profile URL, you will prepare a report containing the result.
25. Type **load reporting** command and press **Enter** to view all the modules associated with the reporting keyword. In this lab, we shall be saving the report in html format. So the module used is **reporting/html**.
26. Type **loadreporting/html** command and press **Enter**. Assign values for **CREATOR**, **CUSTOMER**, and **FILENAME**.

27. Type:

    a. **set FILENAME Reconnaissance.html** and press **Enter**. By issuing this command, you are setting the report name as **Reconnaissance**. This file will be saved to the location **/usr/share/recon-ng**.

    b. **set CREATOR [your name]** (here, **Jason**) and press **Enter**

    c. **set CUSTOMER Mark Zuckerberg** (since, you have performed information gathering on the name of **Mark Zuckerberg**) and press **Enter**

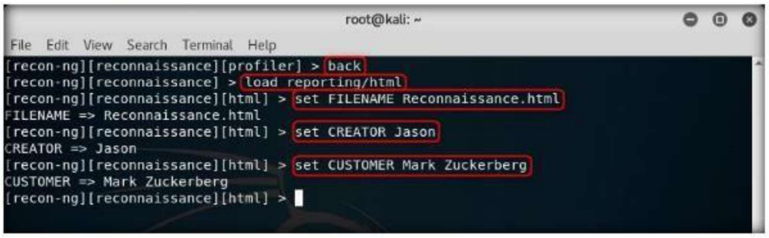


FIGURE 13.8: Configuring a Report

28. Type **run** command and press **Enter** to create a report for all the hosts that have been harvested.

💻 method (optional) is the method of the request. Currently, only "GET" or "POST" are available.

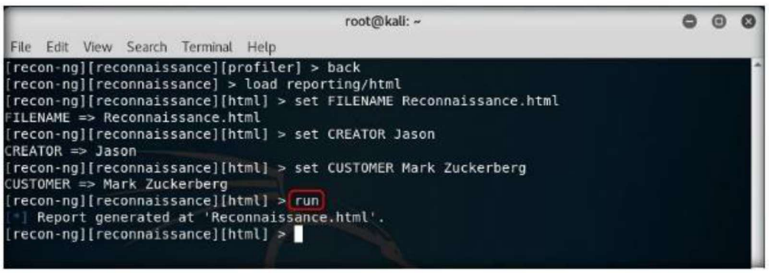


FIGURE 13.9: Running the Report Module

29. The generated report is saved to **/usr/share/recon-ng**. Navigate to the location and double-click the **Reconnaissance.html** file.

Recon-ng comes equipped with an RPC interface, ./recon-rpc.py, to provide 3rd party tools with a standardized protocol for accessing the data gathered and stored by the framework.

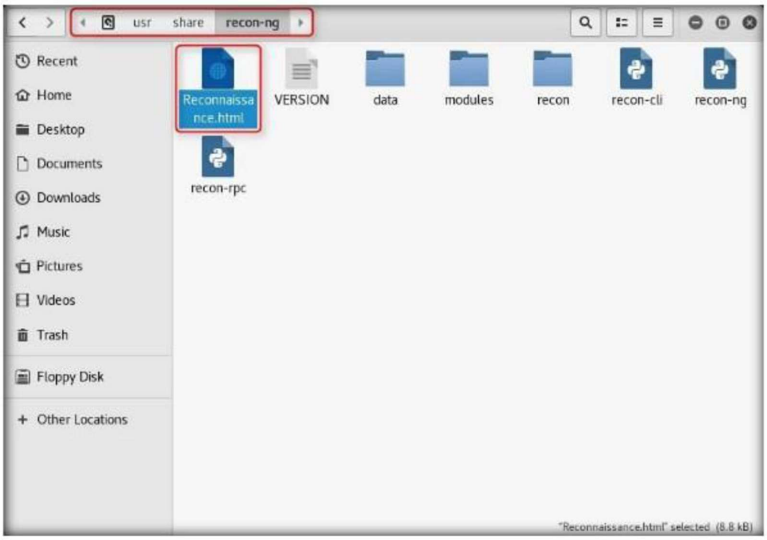


FIGURE 13.10: Viewing the Report

30. The generated report appears in the **Firefox ESR** web browser displaying the summary of the result. You can expand the **Contacts** and **Profiles** nodes to view all the obtained results.

Both JSONRPC and XMLRPC protocols are supported, as well as MultiCall objects, and session IDs are used to provide a multi-user environment. Use ./recon-rpc.py -h for information on runtime options.

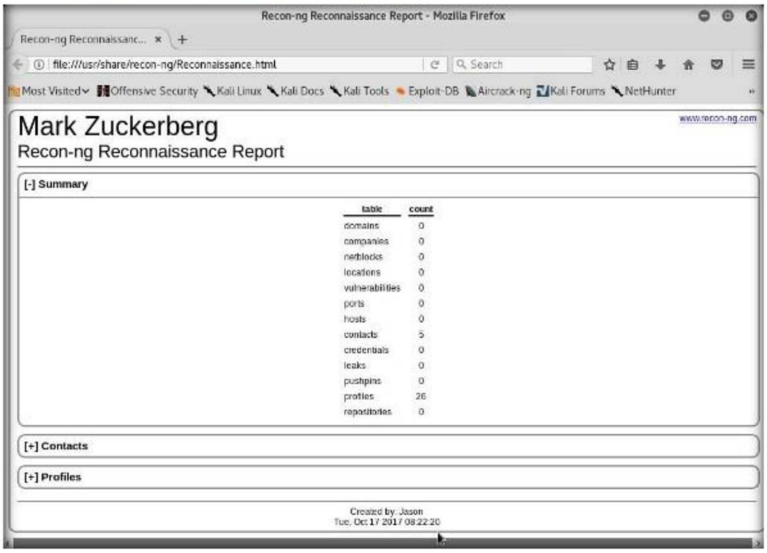


FIGURE 13.11: Viewing the Report

31. You have now gathered information on the personnel working in an organization.

Lab Analysis

Analyze and document the results related to the lab exercise.

PLEASE TALK TO YOUR INSTRUCTOR IF YOU HAVE QUESTIONS ABOUT THIS LAB.

Internet Connection Required	
☑ Yes	☐ No
Platform Supported	
☑ Classroom	☐ iLabs

Lab

14

Collecting Information from Social Networking Sites using Recon-ng Pushpin

ICON KEY

- Valuable information
- Test your knowledge
- Web exercise
- Workbook review

Pushpin is a small Python script that identifies every tweet, flicker pic, and YouTube video within an area of a specific Geo address.

Lab Scenario

For a security assessment, you can gather information about social networking data such as tweets, profiles, pictures, etc. at a specified location. As a professional ethical hacker you should be able to extract such social networking information from a specified geographical location. This lab will demonstrate how to collect information from social networking sites from a specific geographical location.

Lab Objectives

The objective of this lab is to demonstrate how to collect social networking media files and map file using Recon-ng Pushpin module.

Tools demonstrated in this lab are available in Z:\CEH-Tools\CEHv10 Module 02 Footprinting and Reconnaissance

Lab Environment

To carry out the lab, you need:

- Kali Linux running as virtual machine
- Web browser with internet access

Lab Duration

Time: 10 Minutes

Overview of Recon-ng Pushpin

Pushpin's integration into the Recon-ng enables pen testers to collect information on social networking sites such as the profile name, latitude, longitude, time, profile URL, screen name, etc.

Lab Tasks

TASK 1

Launch recon-ng

1. Launch **Kali Linux** virtual machine from your VMware Workstation.
2. Launch new terminal window, now type **recon-ng** and press **Enter**.
3. The Recon-ng console opens, as shown in the screenshot below.

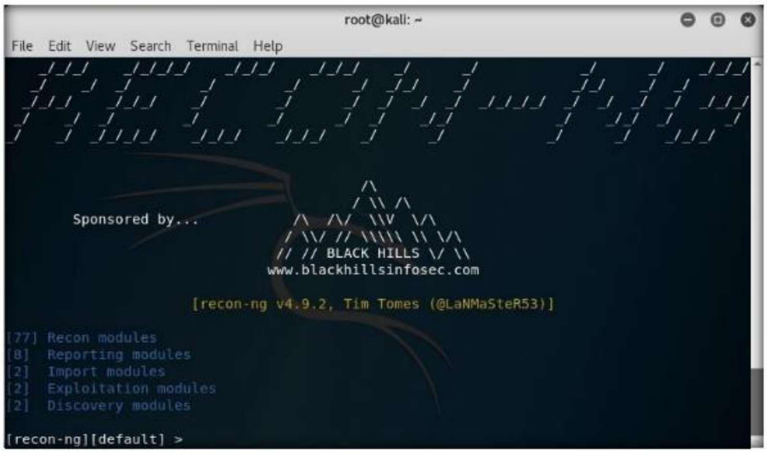


FIGURE 14.1: Launching recon-ng

TASK 2

Add a Workspace

4. Now select workspaces, type **workspaces select <Workspace name>** (here, **EC_Council**) and press **Enter**.

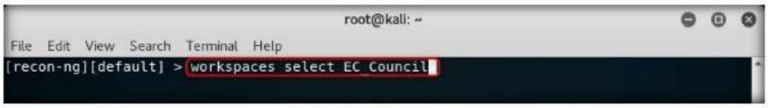


FIGURE 14.2: Adding a Workspace

TASK 3

Configure Location

5. Type **show schema** and press **Enter** to view default schemas.

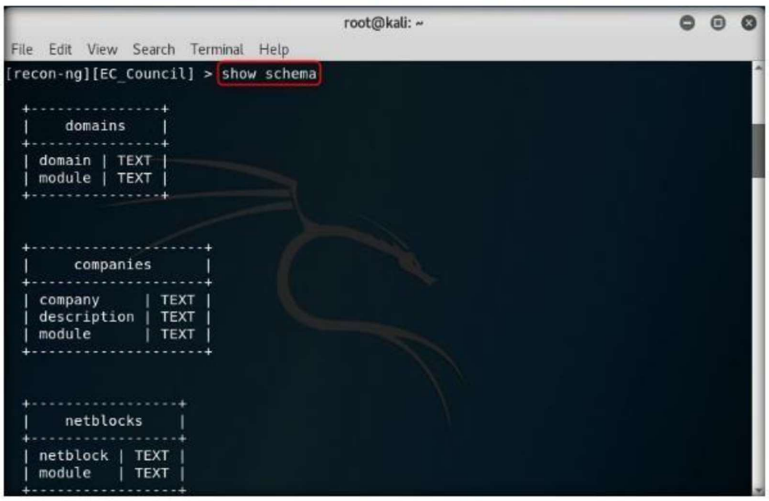


FIGURE 14.3: Viewing the Schema

6. This command displays the list of schemas in Recon. Now choose **street_address** from the **locations** schema.

Pushpin – Awesome little Python script that will identify every tweet, flicker pic and YouTube video within an area of a specific Geo address.

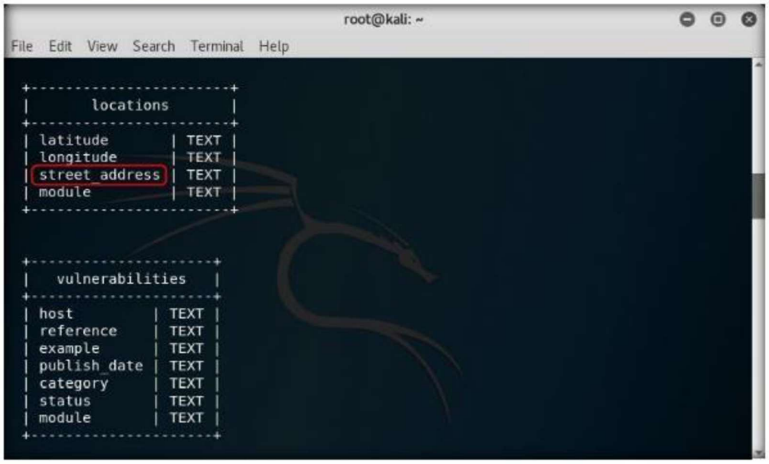


FIGURE 14.4: Viewing the Schema

7. Now type **add locations** and press **Enter**.
8. Press **Enter** twice to get the **street_address (TEXT):** field, as shown in the below screenshot.

Recon-ng persists module options between sessions. If upgrading to >= 3.3.0, it is recommended that all old configuration files be purged (rm ~/.recon-ng/workspaces/*/config.dat). Failure to remove old configuration files will result in a failure to load saved option values.

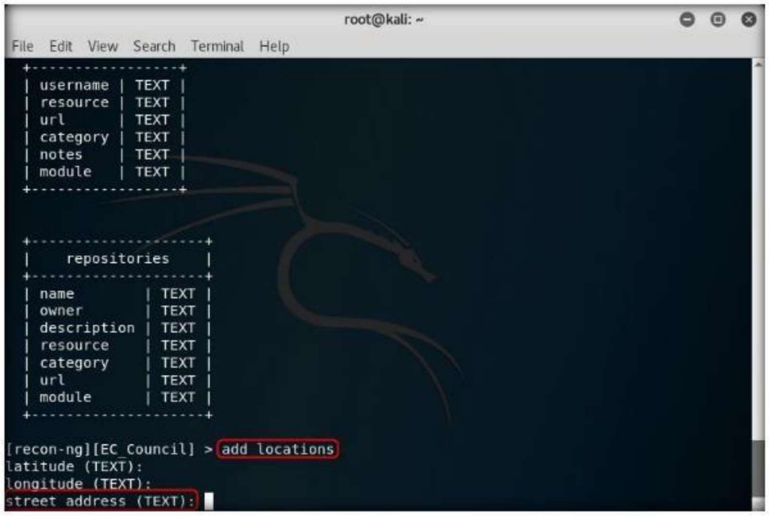


FIGURE 14.5: Adding Location

9. Open a web browser and Google the target's organization address.
10. **Copy** the address as shown in the screenshot below.

Install Recon-ngapt-get update && apt-get install recon-ng

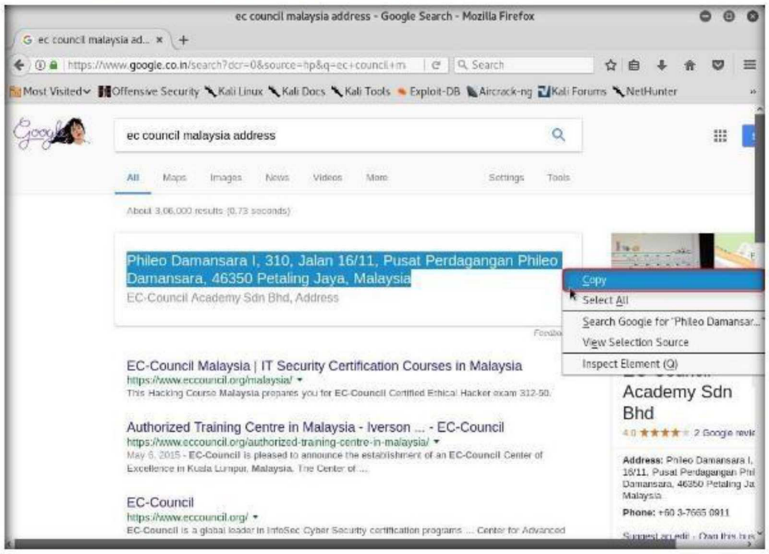


FIGURE 14.6: Adding Location

11. Paste the address in the **street_address (TEXT):** field, and press **Enter**.

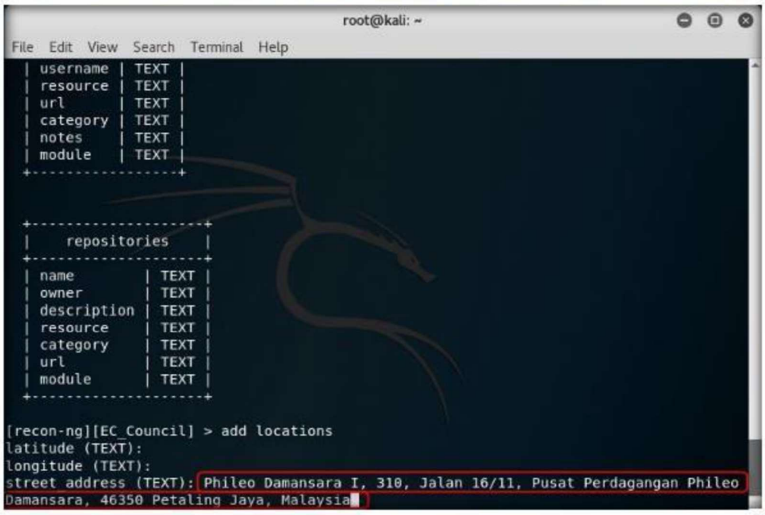


FIGURE 14.7: Adding Location

The Recon-ng project consists of a one-man development team in terms of sustaining the framework. When things break, as they often do when dealing with evolving web technologies, users don't got to the module developer, they go to the Recon-ng Issue Tracker or directly to me.

12. Now type **show locations** and press **Enter**, this command displays the entered address.

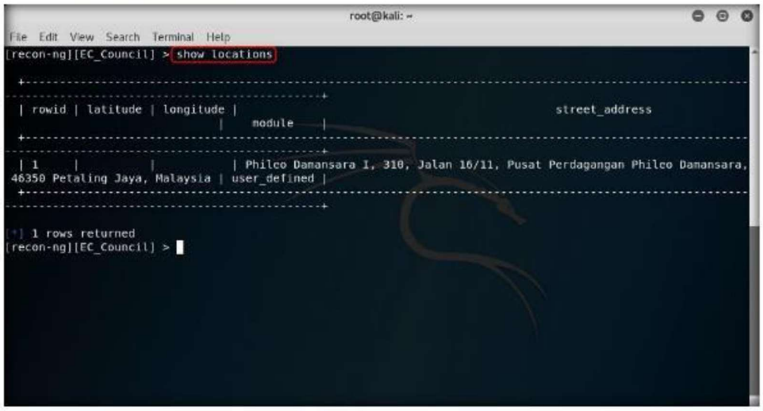


FIGURE 14.8: Viewing the Added Location

As the framework grows, module issues become more and more frequent. I needed a way to "trim the fat" in the framework and determine the best approach to maintaining broken modules.

13. Now type **load geocode** command and press **Enter** to list out the geocode available exploits.

FIGURE 14.9: Searching for geocode Module

14. Now type **load recon/locations-locations/geocode** and press **Enter**

Therefore, I decided to add an analytics element (eab6307) which would allow me to track the most commonly used modules.

That way, when a user comes to me and says, "There is a problem with module X." I can look at my analytics and determine whether or not it is worth the effort to fix myself, ask them to fix, or remove from the framework all together.

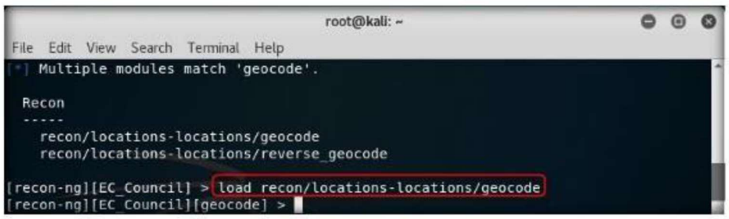


FIGURE 14.10: Loading geocode Module

15. Now type **run** command and press **Enter** to get **Latitude** and **Longitude** information of the provided address.

People use the Internet every day to visit web pages and logically attribute themselves to shady places.

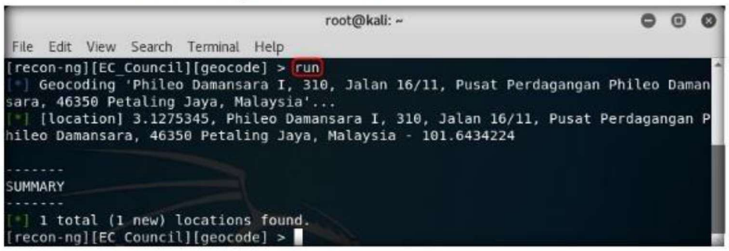


FIGURE 14.11: Running the Module

16. The screenshot below shows the latitude and longitude information for the provided address.

There is no such thing as "leaking" an external IP address. It is a part of layer 3 communication and the way the Internet works.

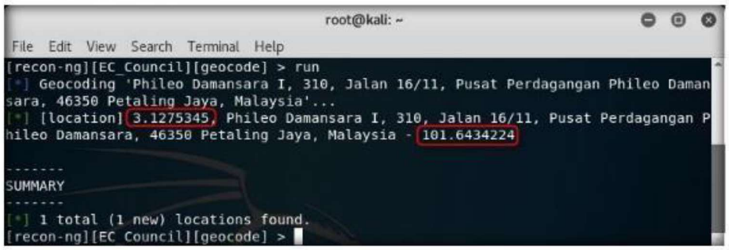


FIGURE 14.12: Viewing the Location

17. Now type **show locations** and press **Enter** to view the updated location information.

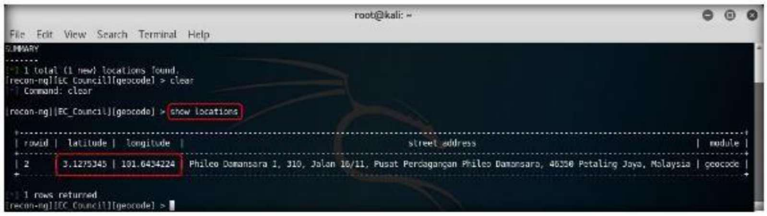
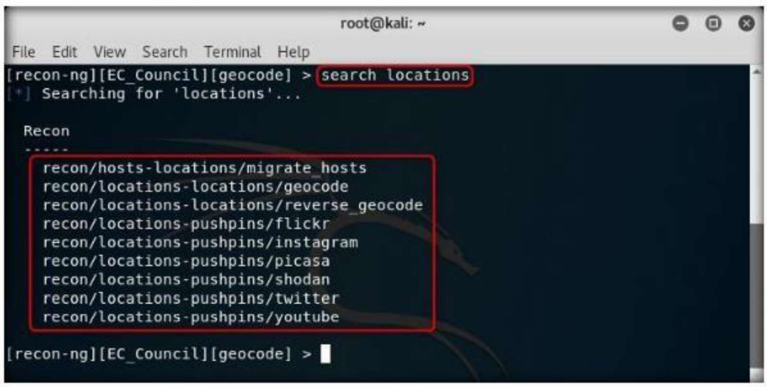


FIGURE 14.13: Viewing the Locations

TASK 4

Obtain Information

18. Type **search locations** and press **Enter** to list out the information gathering options.

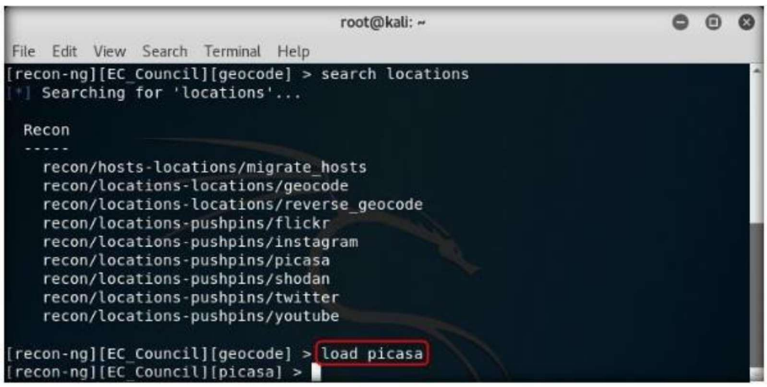


If you don't want your IP leaked, don't use the Internet, or use an anonymizing service. There is no targeting or harvested information included in the analytics. I encourage users to watch the traffic and validate for themselves.

FIGURE 14.14: Searching for Locations Modules

19. The screenshots below show the Recon modules from which to gather information.

20. Type **load picasa** and press **Enter**.



The first time Recon-ng runs, it creates a file in the user's home ~/.recon-ng directory called .cid.

FIGURE 14.15: Loading a Location Module

21. Type **show options** and press **Enter** to view **picasa** values and details.

Analytics requests are sent each time a module is loaded using the load or use command.

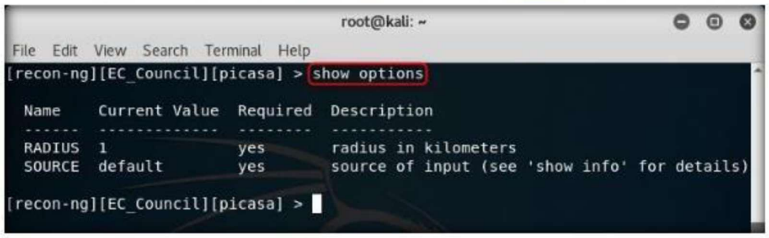


FIGURE 14.16: Viewing Options

22. Type **show info** and press **Enter**. This displays the information related to the location of Picasa as shown in the following screenshot:

The analytics request includes the UUID, the module name, and the version of Recon-ng. No analytics requests are made when loading custom modules (modules that reside in the users home ~/.recon-ng/modules/ directory), and the entire system can be disabled by running Recon-ng with the --no-analytics flag.

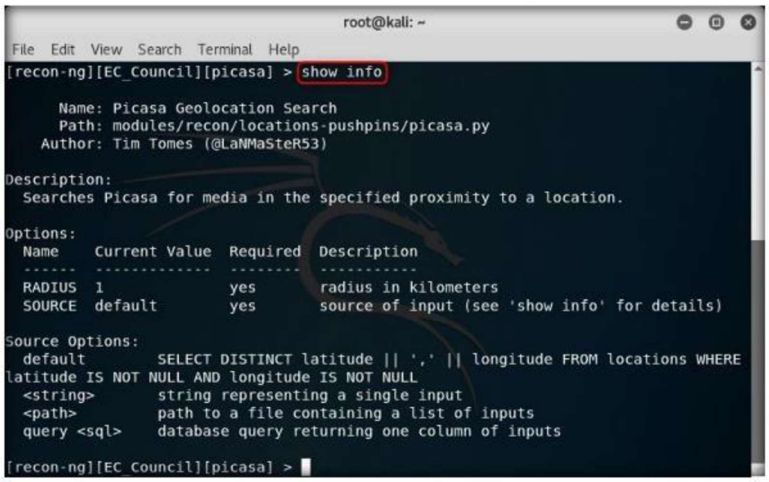


FIGURE 14.17: Viewing Info

23. Type **run** and press **Enter**. The pushpin plugin initiates and begins to collect data associated with Picasa in the default location (because no location was specified), as shown in the following screenshot:

If external shell scripting is preferred, the framework includes a tool called ./recon-cli.py which makes all of the functionality of the Recon-ng framework accessible from the command line. Use ./recon-cli.py -h for information on runtime options.

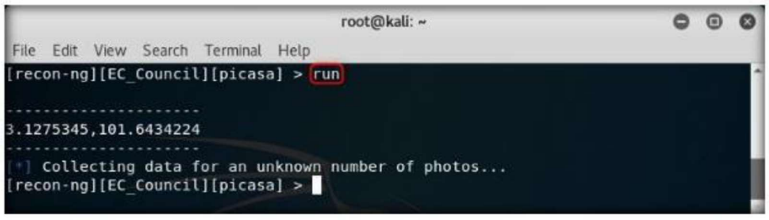


FIGURE 14.18: Running the Module

24. Type **show dashboard** and press **Enter** to view the results summary.

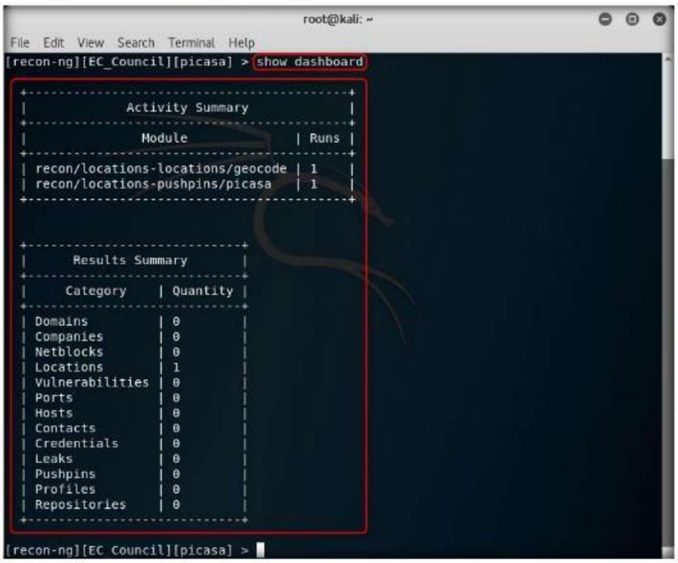


FIGURE 14.19: Viewing Dashboard

To make it easy to create resource files, the framework is equipped with the ability to record commands. The "record" command gives users the ability to start and stop command recording, or check the current recording status.

25. Type the command **load reporting/pushpin** and press **Enter**.

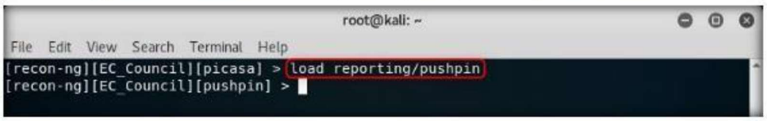


FIGURE 14.20: Loading a Reporting Module

The destination file for the recorded commands is set as a parameter of the "record start" command, record start <filename>. Use help record for more information on the "record" command.

26. Type the command **show options** and press **Enter** to view the options required to run pushpin on Picasa.

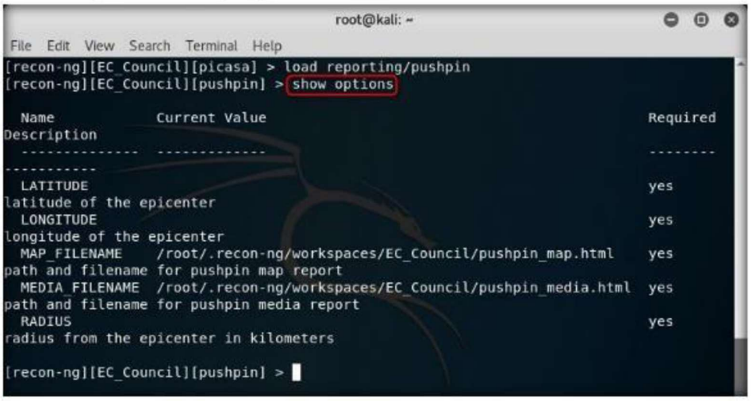


FIGURE 14.21: Viewing Options

The entire framework is scriptable through the use of a resource file. A resource file is a plain text file containing a list of commands for the framework.

27. Type the command **show locations** and press **Enter** to view the location that you have added in the previous steps.
28. Make a note of the latitude and longitude.

Bing API Key (bing_api) - Sign up for the free subscription to the Bing Search API here. Sign in to the Windows Azure Marketplace and go to the "My Account" tab. The API key will be available under the "My Account Keys" page.

FIGURE 14.22: Viewing Locations

TASK 5

Generate a Report

29. Issue the following commands:
    a. **set LATITUDE [latitude obtained in your lab]**
    b. **set LONGITUDE [longitude obtained in your lab]**
    c. **set RADIUS 1**
    d. **set MAP_FILENAME picasa_map.html** (By issuing this command, the file named **picasa_map.html** will be saved to **/usr/share/recon-ng**)
    e. **set MEDIA_FILENAME picasa_media.html** (By issuing this command, the file named **picasa_media.html** will be saved to **/usr/share/recon-ng**)

A recorded session of all activity is essential for many penetration testers, but builtin OS tools like "tee" and "script" break needed functionality, like tab completion, and muck with output formatting.

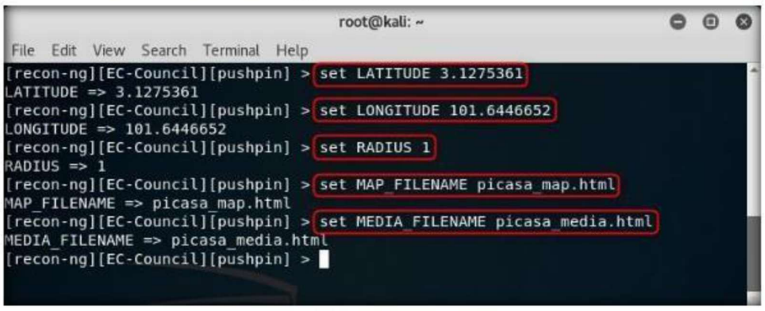


FIGURE 14.23: Configuring Options

30. Now, type **run** and press **Enter**. This extracts the media and map information related to Picasa in the specified location and stores the files in **/usr/share/recon-ng** by default.

The destination file for the spooled data is set as a parameter of the "spool start" command, spool start <filename>. Use help spool for more information on the "spool" command.

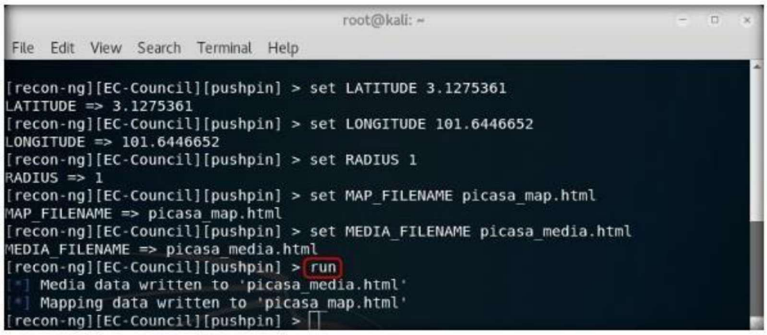


FIGURE 14.24: Running the Reporting Module

31. The resulting files open automatically in the **Firefox ESR** web browser, as shown in the following screenshot:

Every piece of information stored in the Recon-ng database is a potential input "seed" from which new information can be harvested. The "add" command allows users to add initial records to the database which will become input for modules.

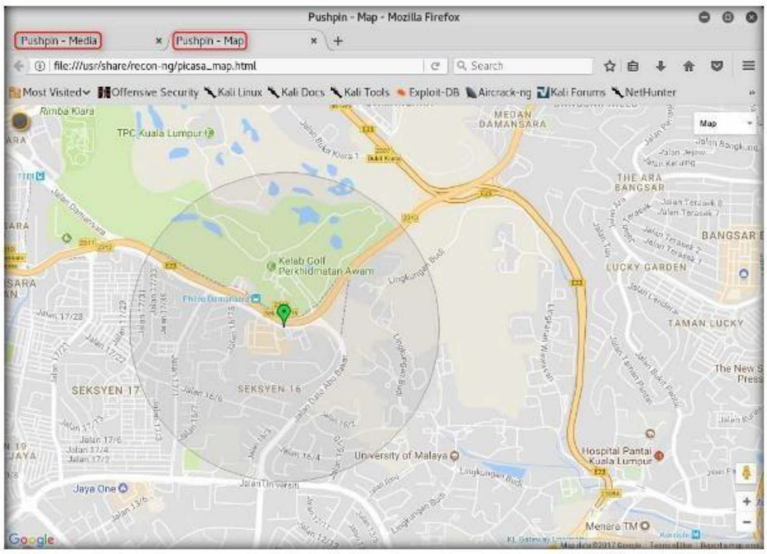


FIGURE 14.25: Viewing the Report

32. Use both the tabs to examine the information that was obtained.
33. Follow Steps 20-32 to extract information associated with Flickr, Instagram, etc.in a specified location.

Note: Some recon modules may require Google API keys, without which you cannot extract information. Google/Bing search engines flag multiple continuous search queries as bot activity and display errors such as "Auto-resuming in 15 minutes." You need to purchase and use Google/Bing Search APIs to avoid this.

Lab Analysis

Analyze and document the results related to the lab exercise.

PLEASE TALK TO YOUR INSTRUCTOR IF YOU HAVE QUESTIONS ABOUT THIS LAB.

Internet Connection Required	
☑ Yes	☐ No
Platform Supported	
☑ Classroom	☐ iLabs

Lab

15

Automated Fingerprinting of an Organization using FOCA

ICON KEY

Valuable information

Test your knowledge

Web exercise

Workbook review

FOCA (Fingerprinting Organizations with Collected Archives) is a tool that reveals metadata and shrouded data. These archives may be on site pages, and can be downloaded and dissected with FOCA.

Lab Scenario

Useful information may reside on the target organization's website in the form of pdf documents, Microsoft Word files, etc. As an ethical hacker, you should be able to extract valuable data including metadata and hidden information from such documents. This lab will demonstrate how to extract valuable information from website archives.

Lab Objectives

The objective of this lab is to demonstrate how to extract documents and domain information using FOCA. Students will learn how to perform:

Tools demonstrated in this lab are available in Z:\CEH-Tools\CEHv10 Module 02 Footprinting and Reconnaissance

- Metadata Extraction
- Network Analysis
- DNS Snooping
- Search for common files
- Juicy Files
- Proxies Search
- Technologies Identification
- Fingerprinting
- Leaks
- Backups Search
- Error Forcing
- Open Directories Search

Lab Environment

To carryout the lab you need:

- FOCA, which is located at **Z:\CEH-Tools\CEHv10 Module 02 Footprinting and Reconnaissance\Footprinting Tools\FOCA\bin**. You can also download the latest version of FOCA from the link **https://www.elevenpaths.com/labstools/foca/index.html**. If you decide to download the latest version, then **screenshots** shown in the lab might differ.
- Windows Server 2016 with MSSQL running

Lab Duration

Time: 10 Minutes

Overview of FOCA

FOCA examines a wide mixture of records, with the most widely recognized being Microsoft Office, Open Office, or PDF documents. It may also work with Adobe InDesign or SVG files.

Lab Tasks

TASK 1

Launch FOCA

1. To launch **FOCA,** navigate to **Z:\CEH-Tools\CEHv10 Module 02 Footprinting and Reconnaissance\Footprinting Tools\FOCA\bin** and double-click **FOCA.exe**.
2. If the **Open File - Security Warning** pop-up appears, click **Run**.
3. The **FOCA** main window appears, as shown in the figure below.

FOCA began as a metadata analysis tool to draw a network based on said metadata.

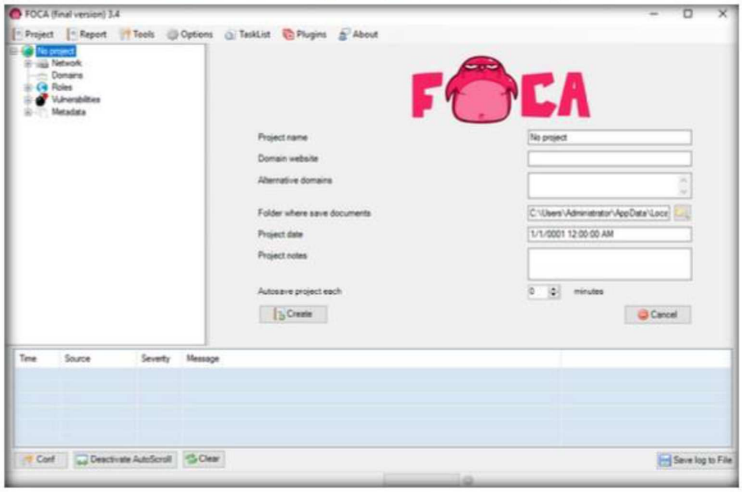


FIGURE 15.1: FOCA main window

TASK 2

Creating New Project

4. Create a new project by navigating to **Project,** and click **New project** on the menu bar.

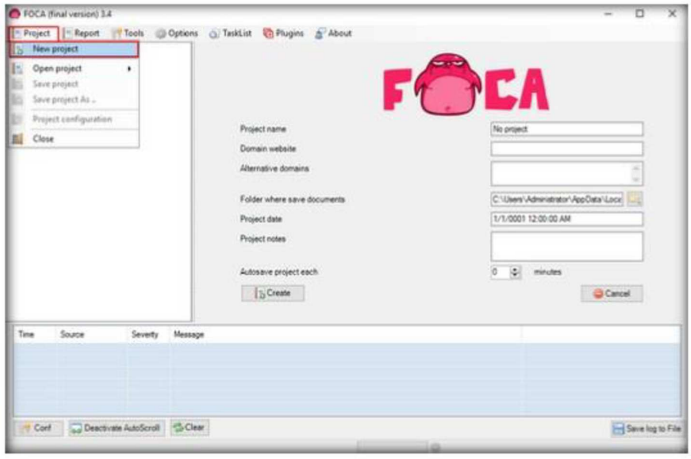


FIGURE 15.2: FOCA creating a new project

FOCA includes a server discovery module, whose purpose is to automate the servers search process using recursively interconnected routines.

5. The **FOCA** new project wizard appears as shown in the screenshot below:
   a. Enter a Project name in **Project name** field.
   b. Enter domain website in **Domain website** field.
   c. You can leave the optional Alternative domains field empty.
6. Click **Folder** to save the document that is extracted by FOCA in the **Folder where save documents** field, leave the other settings to default, and click **Create**.

Web Search

Searches for hosts and domain names through URLs associated to the main domain. Each link is analyzed to extract from it new host and domain names.

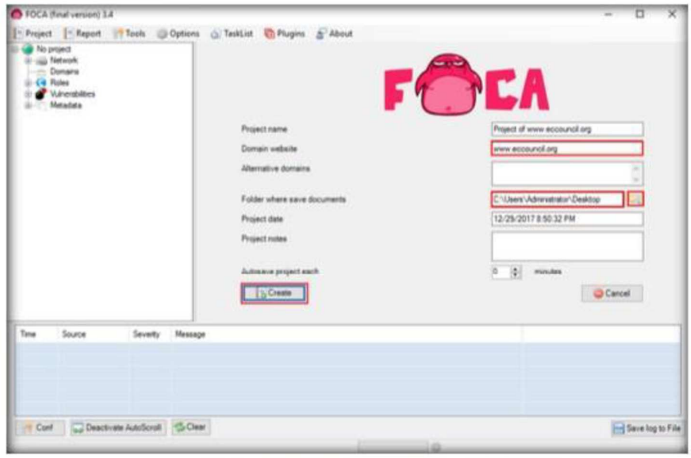


FIGURE 15.3: FOCA providing details for new project

DNS Search

Each domain is checked to ascertain which are the host names configured in NS, MX, and SPF servers to discover new host and domain names.

7. Save project as window appears. Provide desired location to save the FOCA project and type file a name in **File name** field and click **Save**.

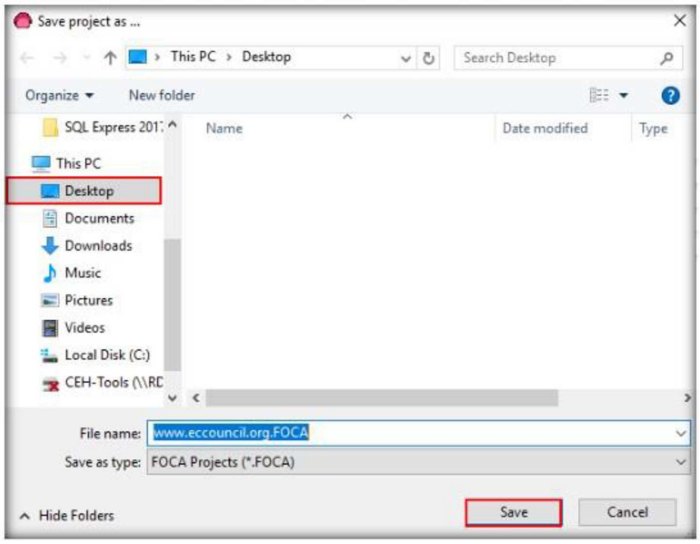


FIGURE 15.4: FOCA Save project as window

PTR Scanning

To find more servers in the same segment of a determined address, IP FOCA executes a PTR logs scan.

8. Project Saved successfully pop-up appears. Click **OK**.

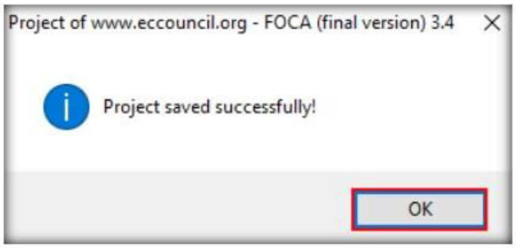


FIGURE 15.5: FOCA Project Saved

IP resolution

Each host name is resolved by comparison to the DNS to obtain the IP address associated to this server name. To perform this task as accurately as possible, the analysis is carried out against a DNS that is internal to the organization.

TASK 3

Extracting Domain Information

9. To extract the information of the targeted domain, select the search engines and click **Search All**.

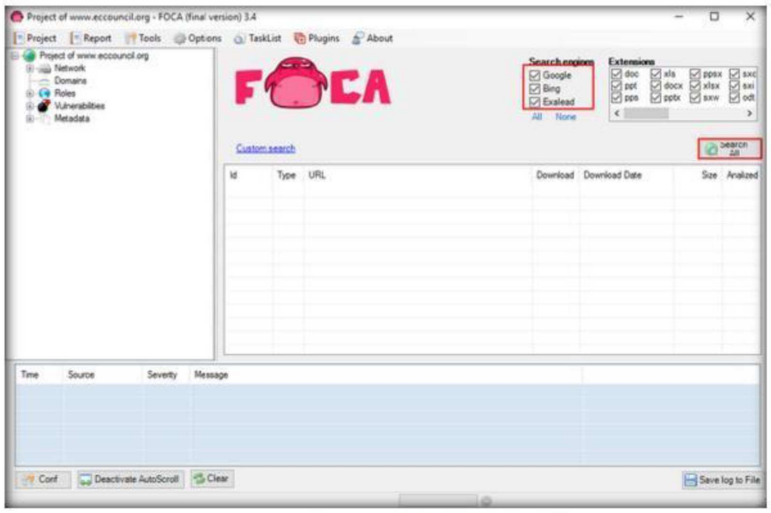


FIGURE 15.6: FOCA Extracting Information

Bing IP

For each IP address discovered, a search process is launched for new domain names associated to that IP address.

10. The **Search All** button automatically toggles the **Stop** button and you can see the result in the lower panes.

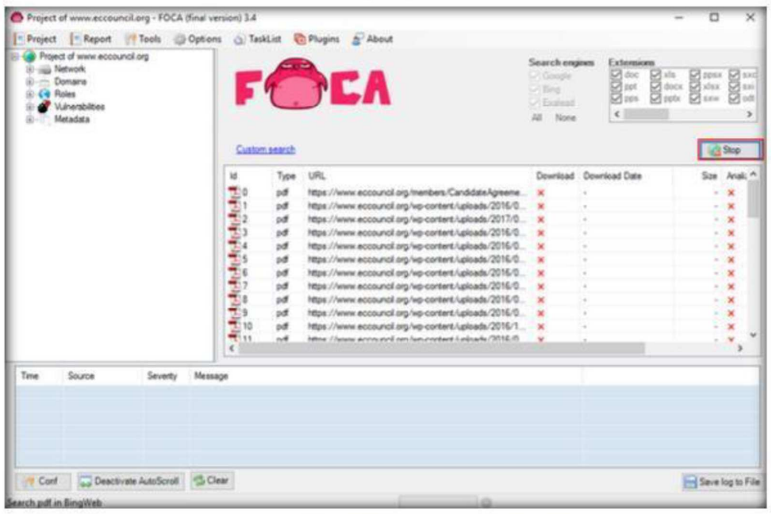


FIGURE 15.7: FOCA Extracted Information

Common names

This module is designed to carry out dictionary attacks against the DNS. It uses a text file containing a list of common host names such as ftp, pc01, pc02, intranet, extranet, internal, test, etc.

DNS Prediction

Used for those environments where a machine name has been discovered that is reason to suspect that a pattern is used in the naming system.

11. Now that the file information is stored in the domain, you can view it. To view the information, right-click the file and click **Link → Open in browser** from the context menu.

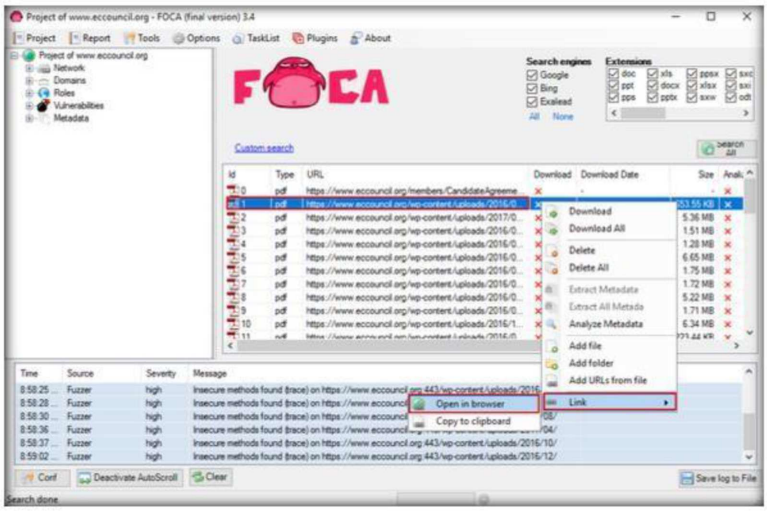


FIGURE 15.8: FOCA examining the extracted information of the file

Robtex

The Robtex service is one of many services available on the Internet to analyze IP addresses and domain names. FOCA uses it in its attempt to discover new domains by searching the information available in Robtext on the latter.

12. You have now extracted the files from the domain by using **FOCA**. Close the web browser.

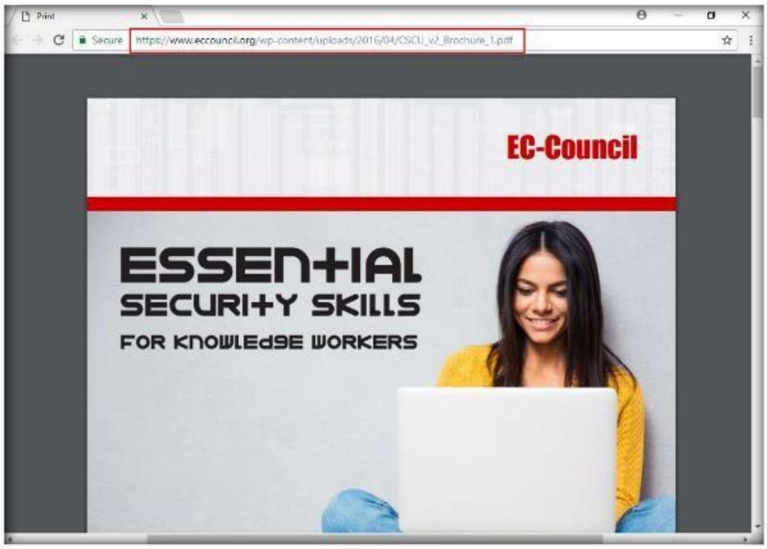


FIGURE 15.9: FOCA Extracted file

The documents are searched for using three possible search engines: Google, Bing, and Exalead. The sum of the results from the three engines amounts to a lot of documents. It is also possible to add local files to extract the EXIF information from graphic files, and a complete analysis of the information discovered through the URL is conducted even before downloading the file.

TASK 4

Network Structure Information

13. Click **Network** node in the left pane of the window to view the network structure.
14. If the domain has any of the associated **Clients** or **Servers** it displays the related information.

Note: In this lab the domain we used doesn't have associated clients or servers.

All the data extracted from all files, FOCA matches information in an attempt to identify which documents have been created by the same team and what servers and clients may be inferred from them.

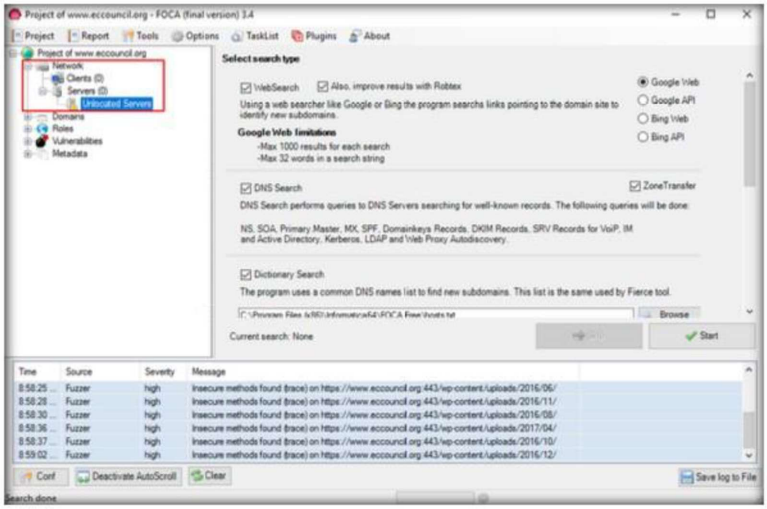


FIGURE 15.10: FOCA Network Information

TASK 5

Domain Information

15. Expand the **Domains** node and it displays the **Domain IP Address**.

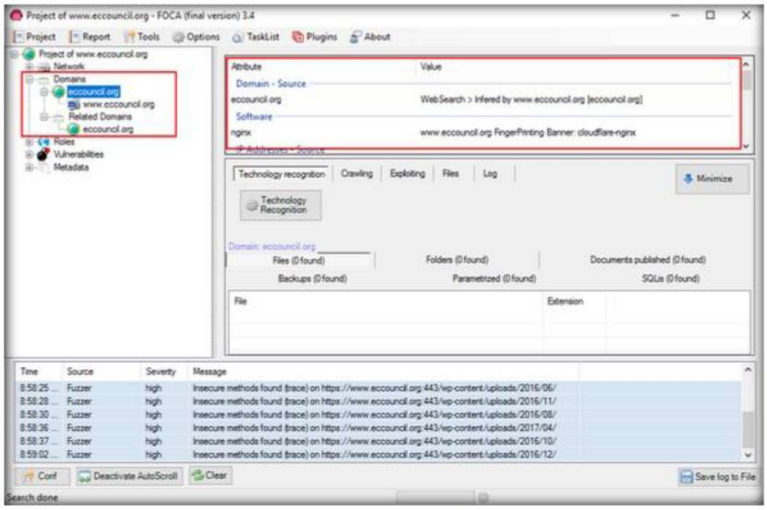


FIGURE 15.11: FOCA Domain Information

TASK 6

HTTP(s) Fingerprinting

16. Expand the **Roles** node, right-click on **Https,** and click **HTTP(s) Fingerprinting** from the context menu to fingerprint the site or domain.

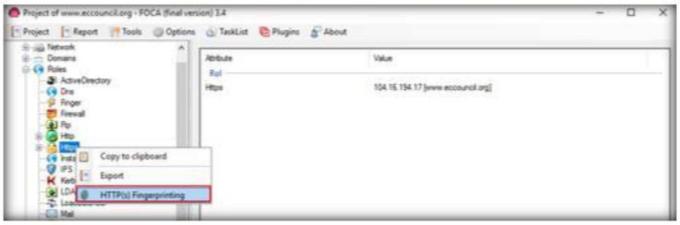


FIGURE 15.12: FOCA HTTP(s) Finger Printing

17. Expand the **Https** node and click **Domain** to see the **IIS version** installed in the server in the right pane.

FOCA has a series of plugins to increase the functionality or number of attacks that can be carried out to elements obtained during the analysis.

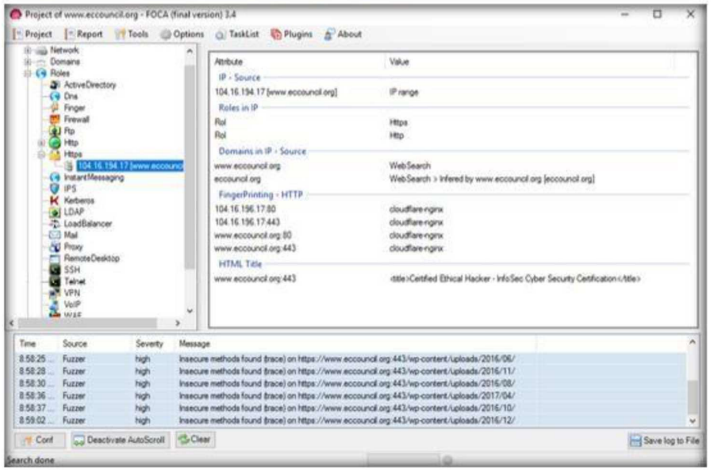


FIGURE 15.13: FOCA HTTP(s) Finger Printing Information

Lab Analysis

Analyze and document the results related to the lab exercise.

PLEASE TALK TO YOUR INSTRUCTOR IF YOU HAVE QUESTIONS ABOUT THIS LAB.

Internet Connection Required	
☑ Yes	☐ No
Platform Supported	
☑ Classroom	☐ iLabs

Lab

16

Open Source Intelligence Gathering Using OSRFramework

OSRFramework is a set of libraries to perform Open Source Intelligence tasks. They include references to a bunch of different applications related to username checking, DNS lookups, information leaks research, deep web search, regular expressions extraction, and many others.

Lab Scenario

ICON KEY

- Valuable information
- Test your knowledge
- Web exercise
- Workbook review

As a professional ethical hacker, you should be able to extract information on the target using an automated tool such as Usuf.py. It extracts the user aliases from multiple social media platforms. This lab will demonstrate extracting information using Usuf.py.

Lab Objectives

The objective of this lab is to demonstrate how to identify usernames of the target on different social media platforms.

Lab Environment

Tools demonstrated in this lab are available in Z:\CEH-Tools\CEHv10 Module 02 Footprinting and Reconnaissance

To carryout the lab you need:

- Kali Linux running as virtual machine
- Web browser with internet access

Lab Duration

Time: 5 Minutes

Overview of OSRFramework

OSRFramework is a set of libraries to perform Open Source Intelligence tasks. They include references to a bunch of different applications related to username checking, DNS lookups, information leaks research, deep web search, regular expressions extraction, and many others. At the same time, by means of ad-hoc Maltego

transforms, OSRFramework provides a way of making these queries graphically as well as several interfaces to interact with like OSRFConsole or a Web interface.

Lab Tasks

TASK 1

Install OSRFramework

1. Log into Kali Linux machine with **root/toor**.
2. Launch a command line terminal by clicking on Terminal icon from the taskbar.

FIGURE 16.1: Kali Linux- Desktop view

3. Install **OSRFramework**, to install Sublist3r, type **apt update && apt -y install osrframework** and press **Enter**.

   Note: If **osrframework** is already installed skip to **Step #5**.

FIGURE 16.2: Install OSRFramework through command line

4. **OSRFramework** will start installing as shown in the screenshot. Wait until it completes the installation. This will take 10 to 15 minutes.

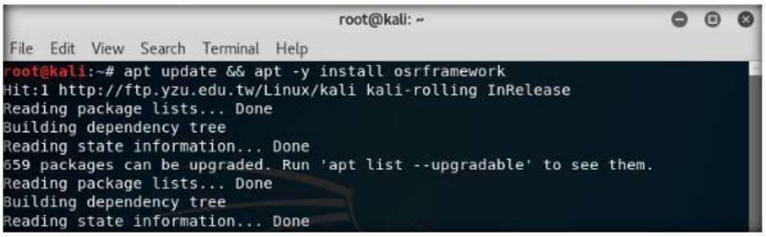


FIGURE 16.3: Kali installing OSRFramework

TASK 2

Run usuf.py against a target

5. usufy.py checks for the existence of a profile for given user details in the different platforms. Type **usufy.py -n <target user name or profile name> -p twitter facebook youtube** and press **Enter**.

   Note: -n is the list of nick names to process, -p is for platform for search

FIGURE 16.4: Using usufy.py to search twitter, YouTube and Facebook for users

6. The usufy.py will search the user details in the mentioned platform and will provide you with existence of the user as shown in the screenshot.

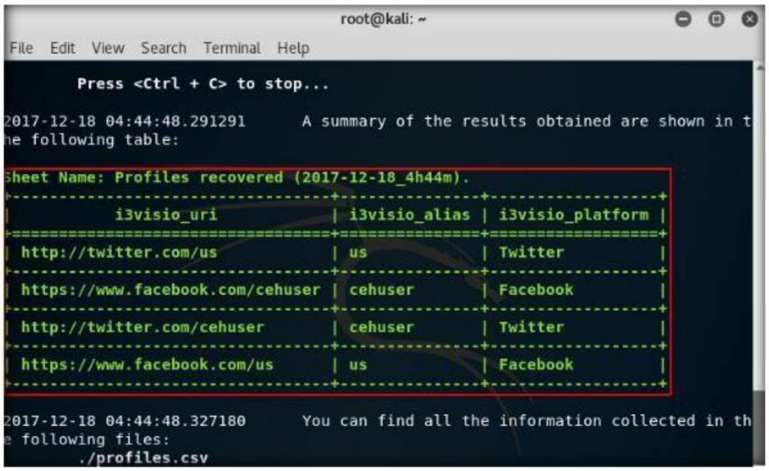


FIGURE 16.5: Usufy.py showing a summary of the results obtained through search

TASK 3

Run serachfy.py against a Target

7. Searchfy.py checks with the existing users of a pages/handlers for given details in the all the social networking platforms. Type **searchfy.py –q <Page Name or Handler Name>**and press **Enter**.

FIGURE 16.6: using searchfy.py with ECCOUNCIL as target page

8. It will pull out all the user details who are subscribed to targeted social networking pages that are provided.

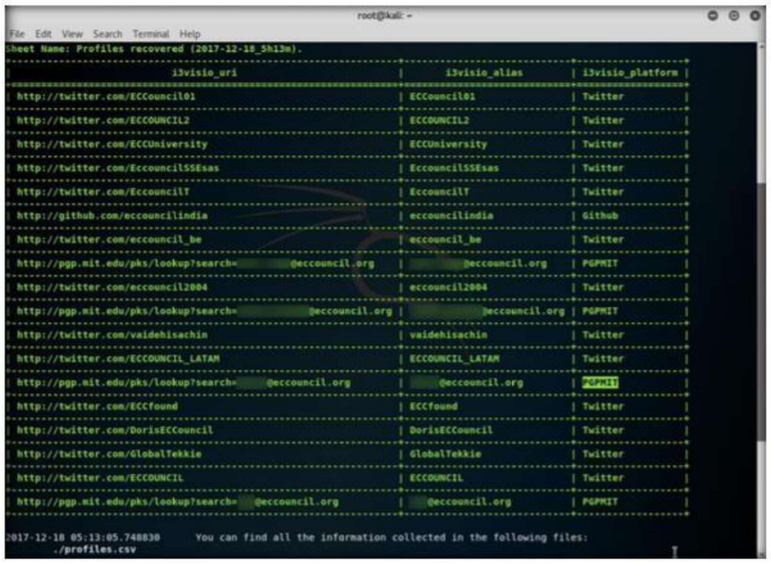


FIGURE 16.7: List of users on targeted social webpages

Lab Analysis

This helps in gathering user details who are subscribed to targeted social media pages.

PLEASE TALK TO YOUR INSTRUCTOR IF YOU HAVE QUESTIONS ABOUT THIS LAB.

Internet Connection Required	
☑ Yes	☐ No
Platform Supported	
☑ Classroom	☐ iLabs

Lab

17

Information Gathering Using Metasploit

The Metasploit Framework is a tool that provides information about security vulnerabilities and aids in penetration testing and IDS signature development.

Lab Scenario

ICON KEY

- Valuable information
- Test your knowledge
- Web exercise
- Workbook review

As a professional ethical hacker, you should be able to extract information on the target using an automated tool such as Metasploit. Metasploit can be used to test the vulnerability of computer systems or to break into remote systems. This lab will demonstrate extracting information using Metasploit Framework.

Lab Objectives

The objective of this lab is to demonstrate how to identify vulnerabilities and information disclosures using Metasploit Framework. Students will learn how to:

- Extract accurate information about a network using Metasploit Framework.

Lab Environment

Tools demonstrated in this lab are available in Z:\CEH-Tools\CEHv10 Module 02 Footprinting and Reconnaissance

To carryout the lab you need:

- Kali Linux running as virtual machine
- Windows Server 2012 running as virtual machine

Lab Duration

Time: 15 Minutes

Overview of Metasploit Framework

Metasploit Framework facilitates the tasks of attackers, exploit writers and payload writers. A major advantage of the framework is the modular approach i.e. allowing the combination of any exploit with any payload. Metasploit Framework operates as

an open-source project and accepts contributions from the community through GitHub.com pull requests.

Lab Tasks

TASK 1

Link Metasploit Framework to database

1. Log into **Kali Linux** machine and open a **Terminal** window.
2. Type **service postgresql start** and hit **Enter**.

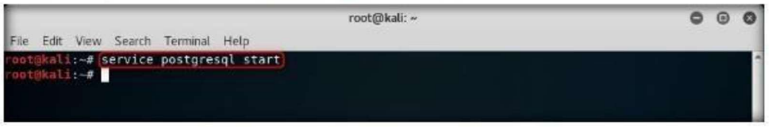


FIGURE 17.1: Start postgresql service through command line

3. Now type **msfconsole** and hit Enter to launch Metasploit.

FIGURE 17.2 Launch Metasploit framework

4. Msf command line appears. Type **db_status** and hit **Enter** to check if Metasploit is connected to the database successfully. If you get the message "postgersql selected, no connection" then the database did not connect to msf.

   Note: If the message you get is "postgresql connected to msf" then skip to step #6

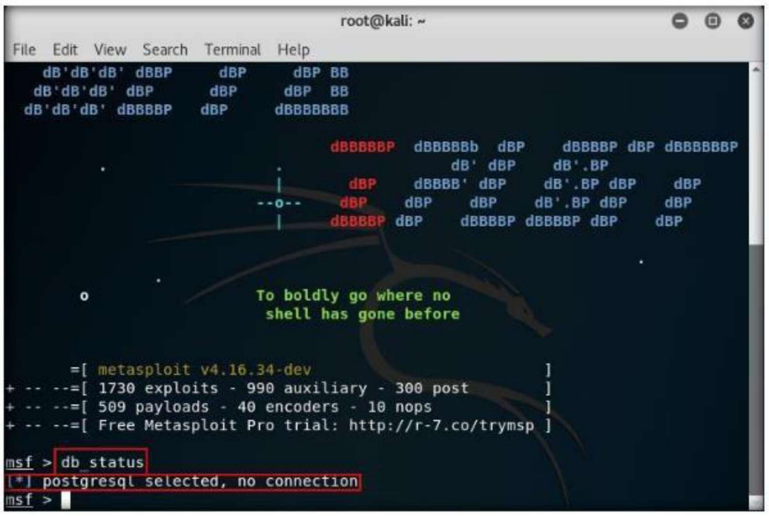


FIGURE 17.3: Database not connected to msf

5. Exit the metasploit framework by typing **exit** and press **Enter**. Then to initiate the database type **msfdb init** and press **Enter**.

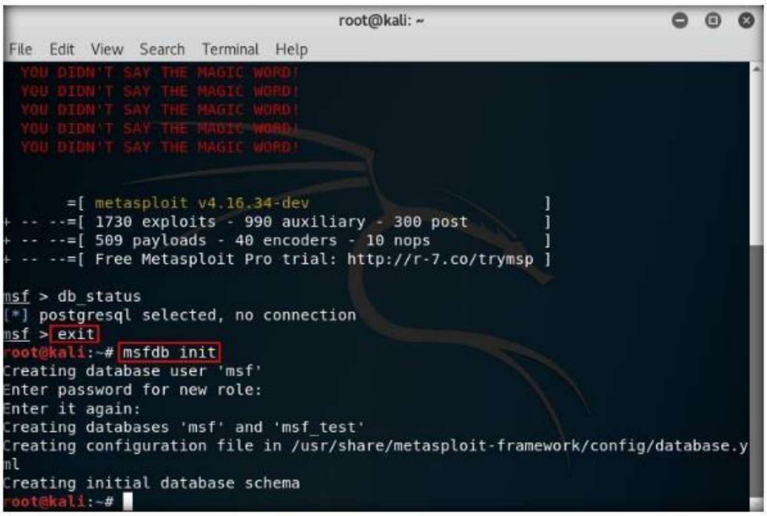


FIGURE 17.4: Initialise the database

6. To restart the postgresql service type **service postgresql restart** and press **Enter**. Now start the Metasploit Framework again by typing **msfconsole** and pressing **Enter**.

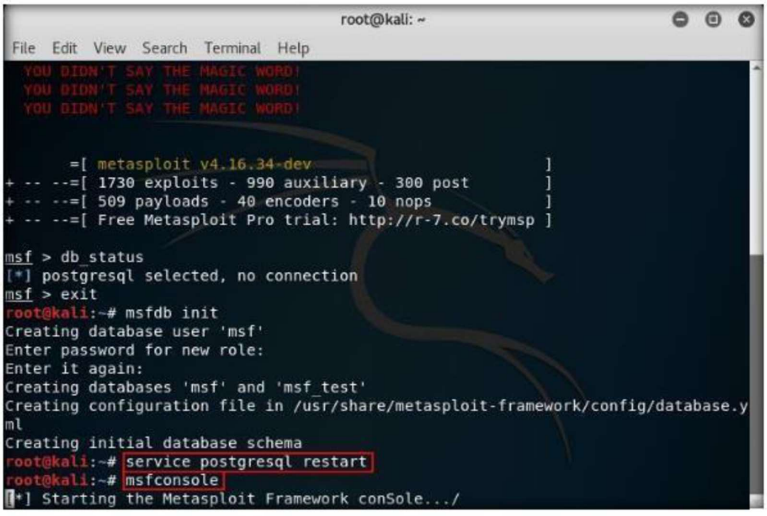


FIGURE 17.5: Launch Metasploit framework

7. Check the database status by typing **db_status** and press **Enter**. This time the database should successfully connect to msf as shown in the screenshot.

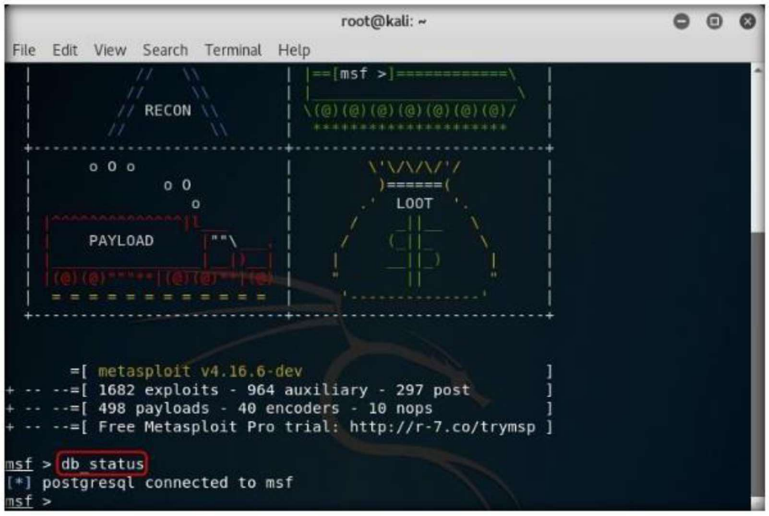


FIGURE 17.6: Verify that database is successfully connected to Metasploit framework

8. Type **nmap –Pn –sS -A –oX Test 10.10.10.0/24** and hit **Enter** to scan the subnet as shown in the screenshot.

TASK 2

Find Alive Hosts

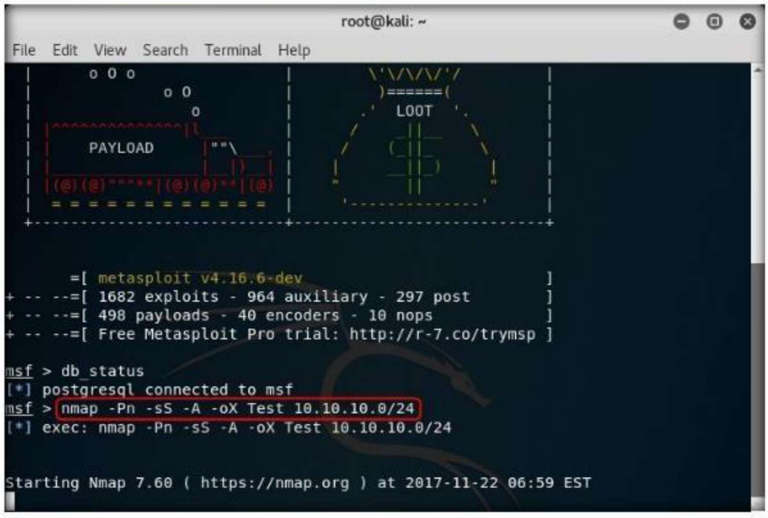


FIGURE 17.7: Run an Nmap scan on the subnet

9. Nmap starts scanning the subnet and starts displaying the results on the screen. It takes approximately 10 minutes for the scan to finish.

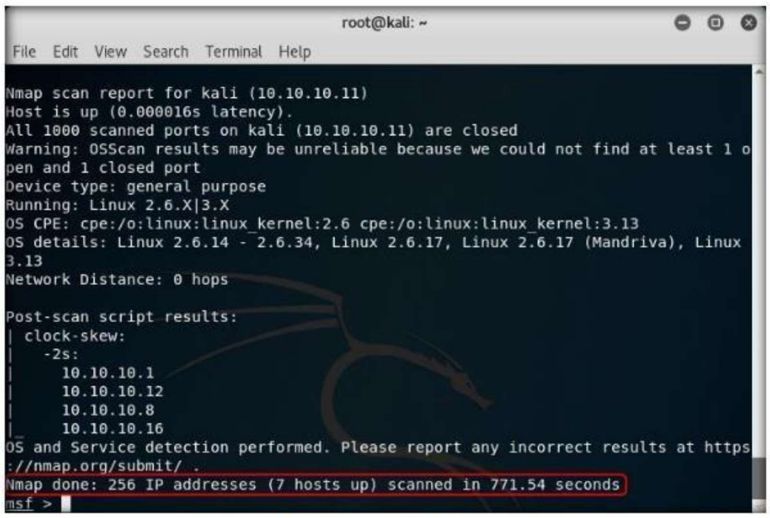


FIGURE 17.8: Nmap showing new found hosts in the subnet

10. Type **db_import Test** and hit Enter to import the Nmap results from the database.

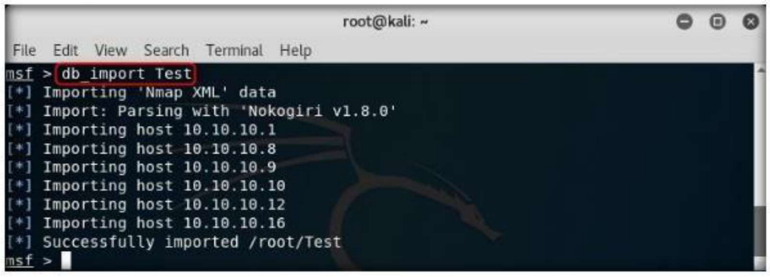


FIGURE 17.9: Importing Nmap results from the database into metasploit

11. Type **hosts** and hit **Enter** to see the hosts and their details discovered by Nmap as shown in the screenshot.

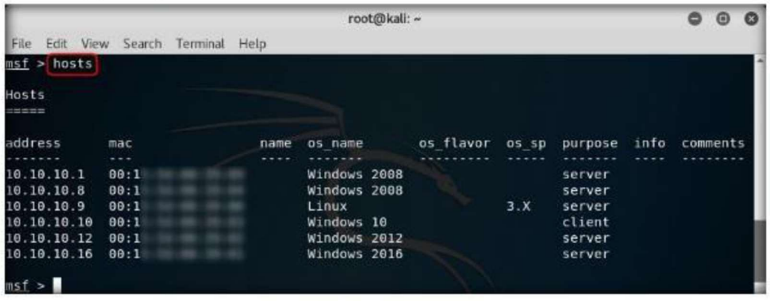


FIGURE 17.10: List of live hosts in the subnet

12. Now we scan the **Windows Server 2016** machine to check the services running on the system.
13. Type **db_nmap –sS –A 10.10.10.16** and hit **Enter**.

Note: The IP address may vary in your lab environment.

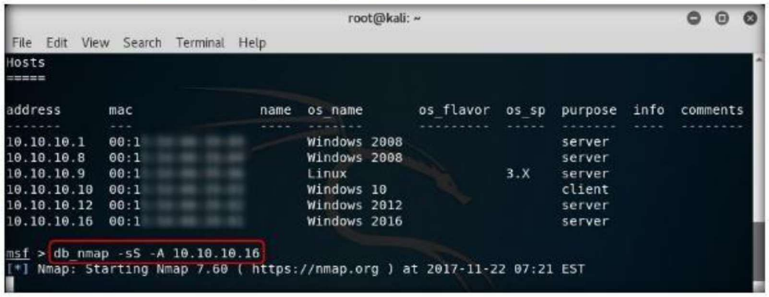


FIGURE 17.11: Scanning windows server 2016 machine for running services

14. Nmap starts to footprint the system and list out the OS details as shown in the screenshot.

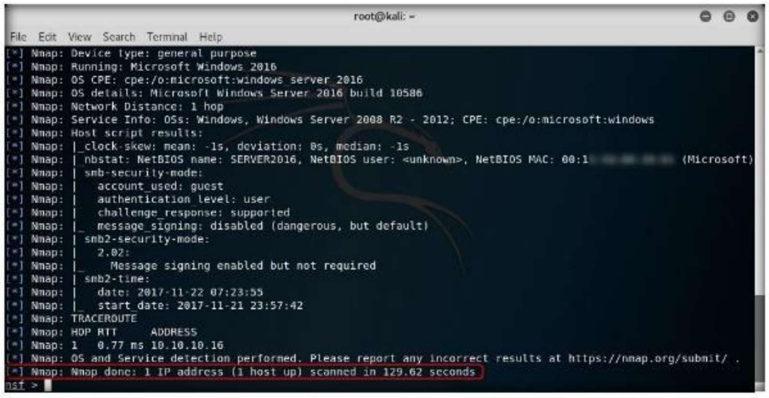


FIGURE 17.12: Nmap finished scanning windows server 2016

15. Type **services** or **db_services** and hit **Enter** to get a list of the services running on the hosts as shown in the screenshot.

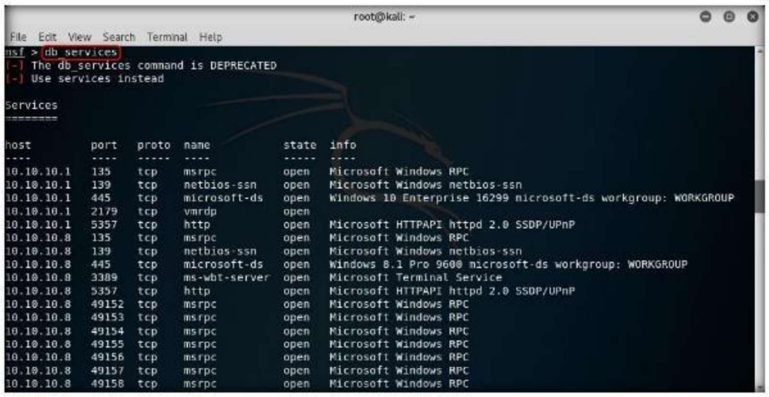


FIGURE 17.13: Getting list of services running on the hosts in the subnet

TASK 3

Scan for open ports and services

16. Type **search portscan** and hit **Enter** to view the port scanning modules in metasploit.

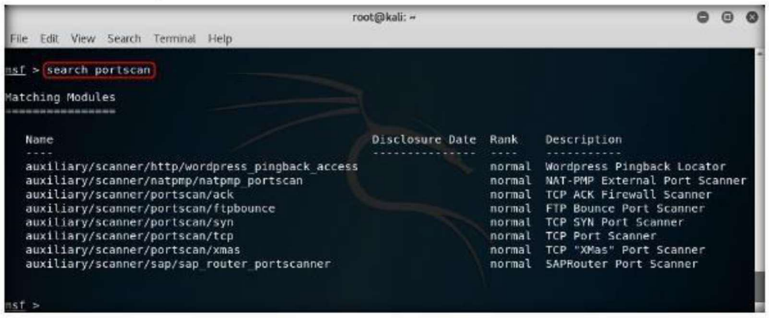


FIGURE 17.14: Searching for portscan modules

17. Type **use scanner/portscan/syn** and hit **Enter**.

18. Type **show options** and hit **Enter**.

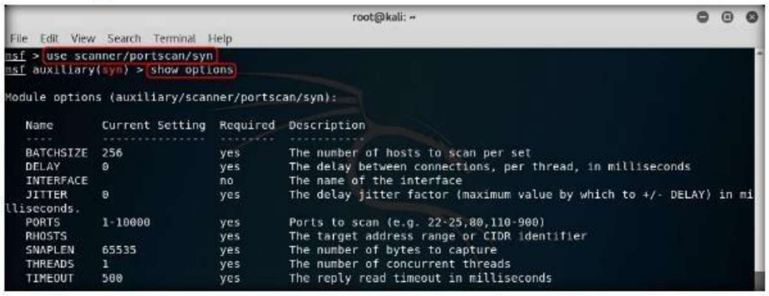


FIGURE 17.15: Port scanner options

19. Type **set RHOSTS 10.10.10.12** and hit **Enter**.
20. Type **set THREADS 100** and hit **Enter**.
21. Type **run** and hit **Enter** to launch the module.

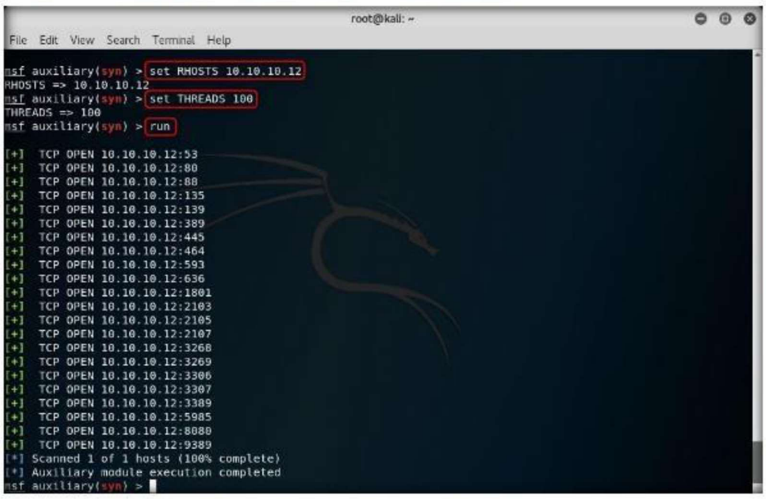


FIGURE 17.16: Running portscan module on windows server 2012

22. Type **use scanner/smb/smb_version** and hit **Enter**.
23. Type **show options** and hit **Enter**.

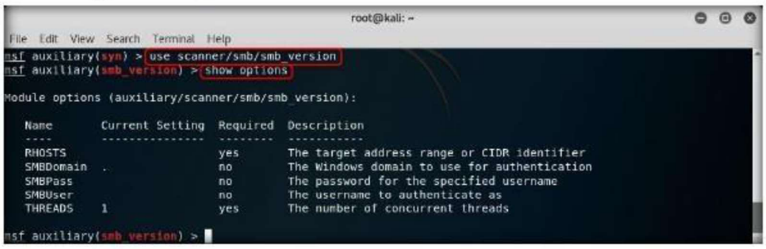


FIGURE 17.17: Viewing the smb scanner module's options

24. Type **set RHOSTS 10.10.10.8-16** and hit **Enter**.
25. Type **set THREADS 100** and hit **Enter**.
26. Type **run** and hit **Enter**.
27. Metasploit will start to find the OS_flavor through this module

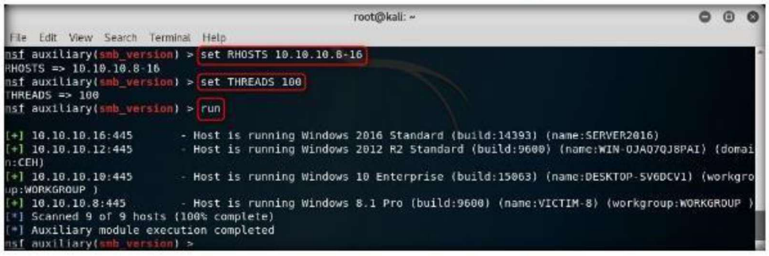


FIGURE 17.18: Launching the smb scanner module with alive hosts as targets

28. Type **hosts** and hit **Enter** to view the os_flavor of the hosts in the subnet.

FIGURE 17.19: Host details shown by the host command

Lab Analysis

Collect different error messages to learn the vulnerabilities, and note the information disclosed about the network.

PLEASE TALK TO YOUR INSTRUCTOR IF YOU HAVE QUESTIONS ABOUT THIS LAB.

Internet Connection Required	
☐ Yes	☑ No
Platform Supported	
☑ Classroom	☑ iLabs

Lab

18

Information Gathering using theHarvester

TheHarvester gathers emails, subdomains, hosts, employee names, open ports and banners from different public sources like search engines, PGP key servers and SHODAN computer database.

Lab Scenario

ICON KEY

- Valuable information
- Test your knowledge
- Web exercise
- Workbook review

As a professional ethical hacker, you should be able to extract information on the target using an automated tool such as The Harvester. It uses Google, Bing, SHODAN, etc. to extract valuable information from the target domain. This lab will demonstrate extracting information using TheHarvester.

Lab Objectives

The objective of this lab is to demonstrate how to identify vulnerabilities and information disclosures in search engines using TheHarvester. Students will learn how to:

- Extract Email, subdomain names, virtual hosts, etc. from the web pages

Lab Environment

Tools demonstrated in this lab are available in Z:\CEH-Tools\CEHv10 Module 02 Footprinting and Reconnaissance

To carryout the lab you need:

- Kali Linux running as virtual machine

Lab Duration

Time: 5 Minutes

Overview of theHarvester

TheHarvester has been developed in Python by Christian Martorella. It is a very helpful tool in the early stages of a penetration test i.e. when a pen-tester needs to understand the customer footprint on the internet. Some professionals also use TheHarvester to review the information available to an attacker through the internet.

Lab Tasks

TASK 1

Run theHarvester against a target

1. Log into **Kali Linux** machine and open a **Terminal** window.
2. Type **theharvester –d certifiedhacker.com –l 300 –b all** and hit **Enter** to launch theHarvester.

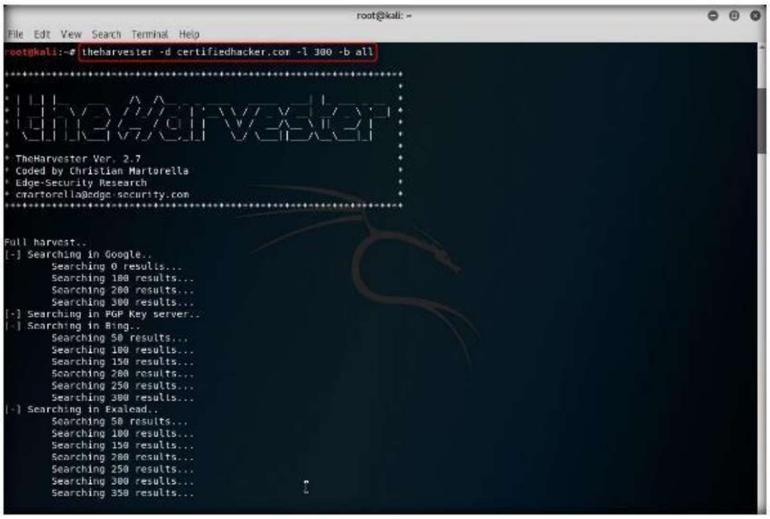


FIGURE 18.1: TheHarvester performing a full harvest on the target

3. TheHarvester starts extracting the details and displays them on the screen as shown in the screenshot. Since there is so much information to go through, we will write the output to an HTML file for better readability.
4. Press **Ctrl+C** to terminate the current session.

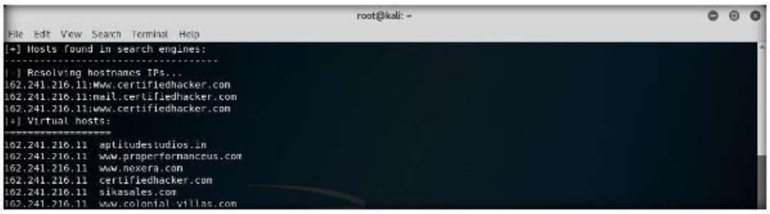


FIGURE 18.2: Terminating current session

5. Type **theharvester –d certifiedhacker.com –l 300 –b all –f test** and hit **Enter** to export the results as a file named **test**.

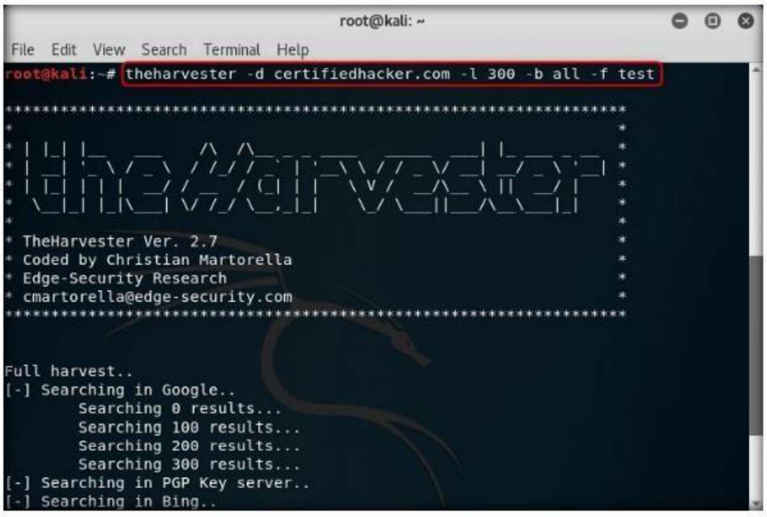


FIGURE 18.3: TheHarvester with export results option enabled

6. Navigate to the home folder in kali machine and you will find two files named as test, one in **HTML format** and one in **XML** format. Open the HTML format file to view the results.

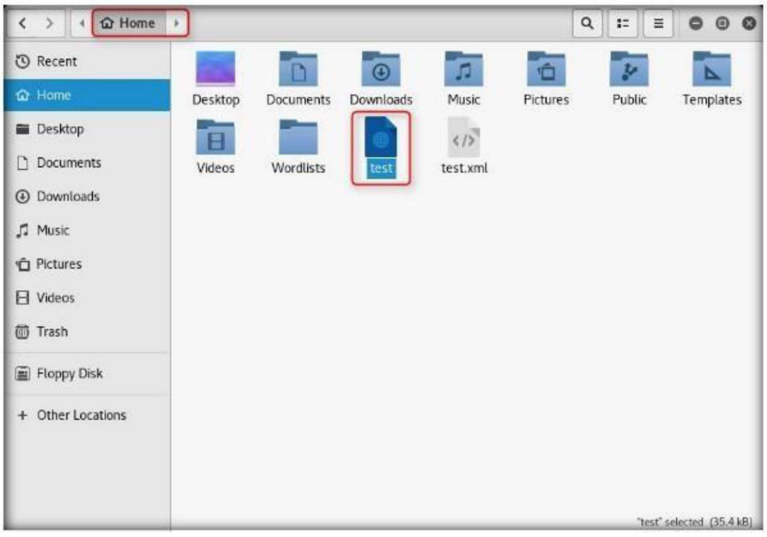


FIGURE 18.4: TheHarvester results saved in test.html file

7. Here you can also see a graph of all the different information extracted by theHarvester displayed for better analysis.

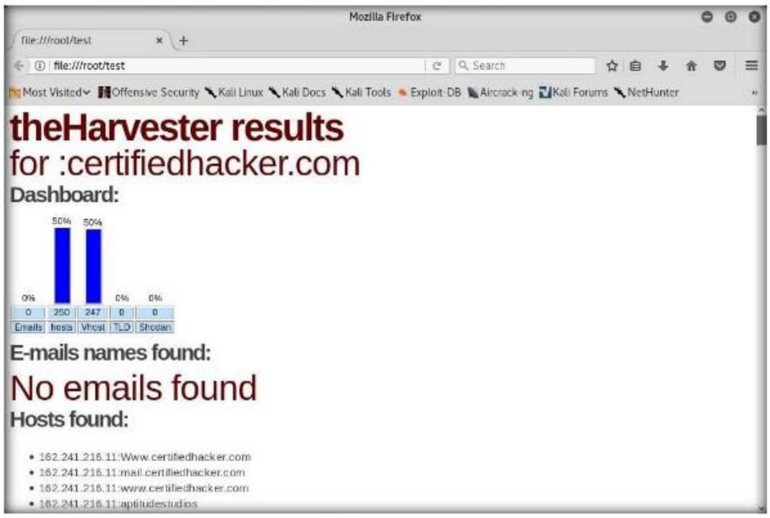


FIGURE 18.5: Viewing results file

Lab Analysis

Collect and note the information disclosed about the target.

PLEASE TALK TO YOUR INSTRUCTOR IF YOU HAVE QUESTIONS ABOUT THIS LAB.

Internet Connection Required	
☑ Yes	☐ No
Platform Supported	
☑ Classroom	☐ iLabs