Ethical Hacking Basics Course

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Module 3
Information Gathering.

Definition of Information Gathering

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Types of Information Gathering

- Passive Information Gathering.
- Active Information Gathering.

Passive Information Gathering

- Collecting / Gathering data without interact with the real host (Company).
- Don’t excpect a lot of data.
- Examples :
  * Google /GHDB.
  * Whois.
  * Social Media.
  * Bing Search Engine.
  * TheHarvester.
  * Netcraft.

Google

- Use Google to collect (gather) data about the host.
- Examples :

  * site:www.example.com.
  * inurl:admin.
  * filetype:php.
  * intext:example.

Google Hacking Database

- Less targeted.
- random attack method.
- https://www.exploit-db.com/google-hacking-database/

Whois

- Great way to gather personal data such as Emails , Phone numbers , domain servers.
- Web interface.
  * http://www.who.is
- We can use it from terminal using whois command.

Social Media

- Twitter.
- Linkedin.
- Facebook.
- etc ..

Bing search engine

- Most common way to search for ip address.
- ip:127.0.0.1
- http://bing.com.

The Harvester

- Python script for gather emails.
- SHODAN support.
- Ex : python theHarvester.py -d microsoft -l 200 -b linkedin.

-d Domain.
-l Limit number of results.
-b Data source : google , linkedin , twitter ..

Netcraft

- Great source to know information about domains and servers.
- Web interface.
- Widely used by security guys.
- http://searchdns.netcraft.com.

Active Information Gathering

- Collecting / Gathering data by interacting with the real host (Company).
- Excpect a lot of data.
- Examples :
  * host.
  * ping.
  * dig.
  * nslookup.
  * netcat.
  * manual enumeration.

host command

- Performing DNS lookups.
- Mainly used to convert names to IP addresses.
- linux terminal command.
- simple type : host example.com.

host command arguments

- -4 for detecting ipv4.
- -6 for detecting ipv6.
- -t [query type] such as MX , A , CNAME etc ...

Dig command

- Tool for querying DNS nameservers for information about host addresses, mail exchanges, nameservers, and related information.

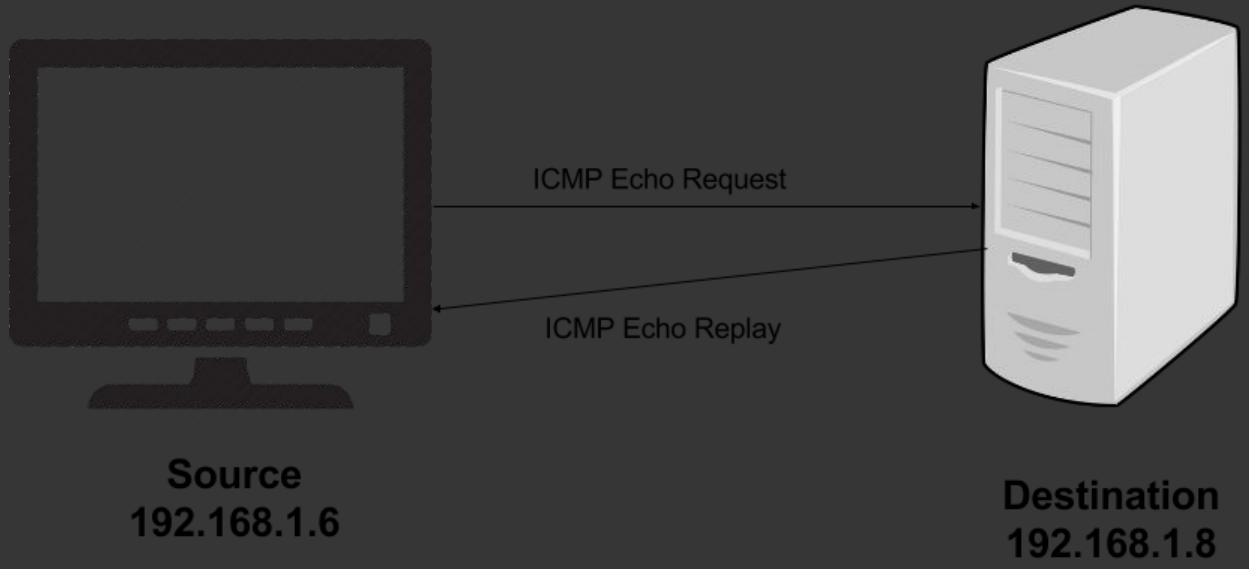
Nslookup

- Interactive mode.
- Non-interactive method.
- easy to use tool.

ping command

- Used to test the ability of the source computer to reach a specified destination computer.
- Internet Control Message Protocol (ICMP).
- Send Request (Echo Request) messages and wait for response (Echo Response).

ping command



Ping Sweep

- use this technique to detect all working (up) machines on the network.
- use the same technique that used by ping , but on multiple hosts.
- Write bash script to do that.
- Doing it using Nmap (Later).

Port Scanning

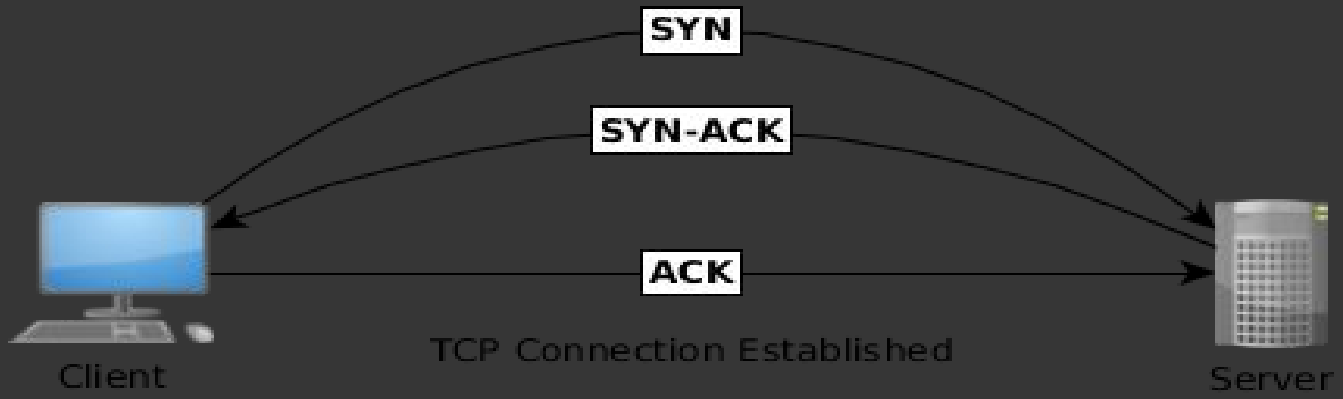
- Technique that used to detect all open ports and services on the target.
- Also we Could use Scanning technique to detect the target OS.

Transmission Control Protocol

- Known as TCP.
- The responsible protocol about data exchange on the network.
- We will have deep look on it later.

TCP - How it works

- Using Three Way handshake.



TCP segment structure

TCP Header

Offsets	Octet	0								1								2								3							
Octet	Bit	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
0	0	Source port																Destination port															
4	32	Sequence number																															
8	64	Acknowledgment number (if ACK set)																															
12	96	Data offset				Reserved 0 0 0				N S	C W R	E C E	U R G	A C K	P S H	R S T	S Y N	F I N	Window Size															
16	128	Checksum																Urgent pointer (if URG set)															
20 ...	160 ...	Options (if *data offset* > 5. Padded at the end with "0" bytes if necessary.) ...																															

Banner Grabbing

- Technique used to gather information about a computer system on a network and the services running on it’s open ports.
- Manual Banner Grabbing using netcat.
- Using Nmap to perform Banner Grabbing.

Nmap

- Nmap - Network Mapper.
- The most popular scanning tool.
- Open Source tool.
- We can depend on it to perform port scanning , banner grabbing and much more.

Nmap

- Nmap has GUI called Znmap.
- Programmed by Lua programming Language.
- Nmap has many options and techniques to detect open ports and running services on the host.

Nmap Scan Types

- Syn Scan.
- TCP Scan.
- UDP Scan.
- TCP NULL, FIN, and Xmas scans.

Nmap Timing (-T)

- 0 = Paranoid.
- 1 = Sneaky.
- 2 = Polite.
- 3 = Normal.
- 4 = Aggressive.
- 5 = Insane.
- Example : nmap -T5 -sS 192.168.1.1

Identify Hostnames

- Do a simple DNS query for the specified ip.
- This allows you to find hostnames for all of the ip's in a subnet without having send a packet to the individual hosts themselves.
- Example : nmap -sL 192.168.1.0/24

Syn Scan

- SYN scan is the default and most popular scan option for good reasons.
- can be performed quickly, scanning thousands of ports per second on a fast network not hampered by restrictive firewalls.
- Port status could be open , filtered or closed.
- This technique is often referred to as half-open scanning, because you don't open a full TCP connection.

Syn Scan

- A SYN/ACK indicates the port is listening (open), while a RST (reset) is indicative of a non-listener.
- We can perform Syn Scan using -sS option.
- Example : nmap -sS 192.168.1.1

TCP Scan

- This scan is the default scan for nmap.
- This scan nmap will attempt a TCP SYN connection to 1000 of the most common ports.
- also will send icmp echo request to determine if a host is up.
- We can perform it using -sT option.
- Example : nmap -sT 192.168.1.1

UDP Scan

- Search for based on UDP services such as DNS:53 , DHCP:67/68 SNMP:161/162.
- very heavy and slow scan.
- Example : nmap -sU 192.168.1.1

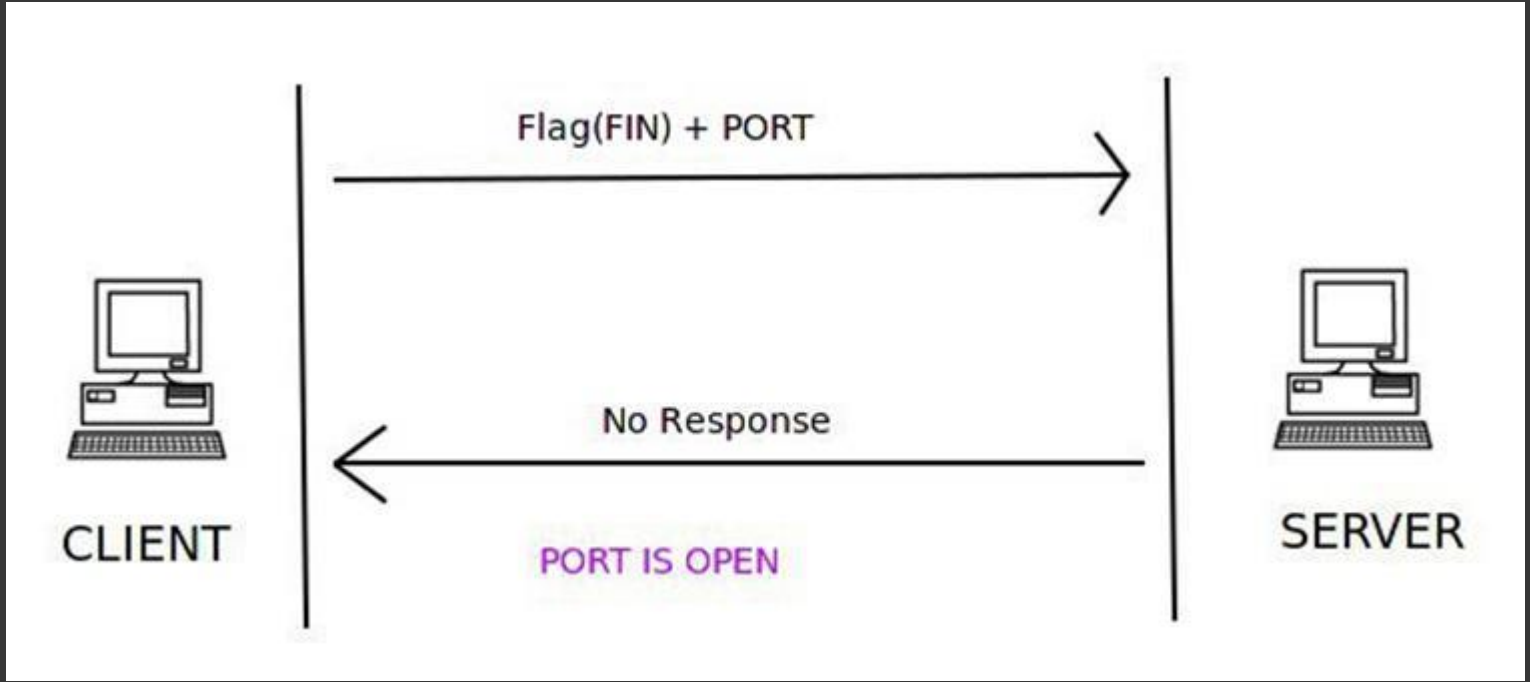
Xmas scan

- Work only with Linux OS.
- Send a packet with URG , FIN , PSH flags to the host.
- If the result was RST that means the port is closed.
- If the host ignored the connection , that means the port is open

FIN scan

- Work only with Linux OS.
- Send a packet with FIN.
- If the result was RST that means the port is closed.
- If the host ignored the connection , that means the port is open

FIN scan



Null scan

- Work only with Linux OS.
- Send a packet with 0 flags to the host.
- If the result was RST that means the port is closed.
- If the host ignored the connection , that means the port is open

Exporting Nmap Scan

- You can export nmap scan result to various types.
- -oN : export the result as normal output.
- -OX : export the result as XML file.
- -oG : export a deprecated result.

Netcat

- AKA The Swiss Army Knife.
- Great network pentesting tool.
- you can deal with both TCP and UDP protocols.
- https://www.sans.org/security-resources/sec560/netcat_cheat_sheet_v1.pdf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Nmap Scripting Engine

- Some extra Scripts that wrote especially for nmap.
- /usr/share/nmap/scripts/ - here you can find all scripts.
- https://nmap.org/nsedoc.