

IT Security course

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NET 1

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October 16, 2017

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Chapter 1

NET 1

1.1 Introduction

1.2 Handin

Don't be late!

1.3 Instructions

Here is what you MUST respect to make your work:

1. If a list of function is given at the beginning of the exercise, you can ONLY use these for that exercise.
2. If no function name is listed at the beginning of an exercise, you can use any function you want for that exercise.
3. The sign > represents the prompt of your shell. The line where you can write inputs.
4. You can do the work on team of 2 people max if you want. Only one will give a tarball back with both names in the file AUTHORS.
5. You MUST give back a tarball using template name: *your_lastname.tar.bz2*
6. Your tarball must be clean. No binaries, temporary files, ... or any other files than the ones asked.
7. Your solutions to the exercises MUST run on GNU/Linux 32bits machines using Debian-like operating systems (Ubuntu is OK).

The tarball you'll be giving back must looks like this (using *tree* command):

```
> tree your_lastname
your_lastname
|-- ANSWERS
|-- AUTHORS
|-- ex1
|   --- ports.txt
|-- ex2
|   --- os.txt
|-- ex3
|   --- arp.txt
|-- ex4
|   --- tcp.txt
|-- ex5
|   --- forge.txt
|-- ex6
|   --- pk.sh
--- README
```

6 directories, 9 files

- ANSWERS contains your answers (questions out of exercises).
- AUTHORS contains you firstname + lastname (and the ones of your mates if you work in team).
- README contains comments on how you did the exercises. Short sentences are enough.

Hints:

- Remember to use the *man* command!

1.4 Network understanding

What you'll have to understand today is how the network works. To be able to exploit vulnerabilities in network protocols, you need to have a clearly understanding on how a packet goes from one computer to another one and how these computers handle the network. By knowing which OS is running on a computer will let you choose a better exploit to get control of the remote computer. An exploit for Linux will not run on Windows, even if they are running the same buggy program (FTP server for example).

1.5 OSI model

Remember the layers.

Layer	Name	Protocols examples
7	Application	DNS & FTP & HTTP
6	Presentation	TLS
5	Session	SOCKS
4	Transport	TCP & UDP
3	Network	IPv4 & IPv6 & ICMP
2	Data Link	Ethernet & ATM & Token Ring
1	Physical	802.3

1.6 Tools

To exploit network, you must know how to get informations from the network packets. To get that information, you have to sniff the network you are on and capture everything you can hear. To do that, many programs exists. For the purpose of that lesson, we will learn how to use the most famous a them.

1.6.1 Sniffing

tcpdump

tcpdump is a command line tool which can capture network packets using the libpcap.

Wireshark

Wireshark is a graphical tool which can capture network packets using the libpcap either.

Wireshark has a command line tool too, called "tshark".

File format

The file format pcap is the one used by the libpcap library and therefore by the tools using it. Then tcpdump and Wireshark knows how to read it. Every capture you will do MUST be using the pcap format (this is the default for both programs).

1.6.2 Probing and discovery

nmap

nmap is the right tool to get informations from a network computer. It can do port scanning, OS fingerprinting and many others funny things.

hping3

hping3 lets you forge Layer 3 & 4 packets. By settings flags with wrong values, you can make other computers leak informations or misbehave, giving you the opportunity to get information about the OS running on that computer.

1.7 Exercise 0: Learn

Learn how to use the tools. Read the manuals of the tools. Try them on your computer and try to understand what you are seeing when running them on your network card interface.

1.8 Exercise 1: Port scanning

Try to list the opened port on the website given to you on the blackboard.

Write the list of the open ports in a file named *ports.txt*.

1.9 Exercise 2: OS fingerprinting

Find the running OS behind the IP given to you on the blackboard.

Write the OS and the version found behind that IP in a file named *os.txt*.

1.10 Exercise 3: Sniff layer 3

Using tcpdump, get every ARP traffic on the network.

Write the command you used to do that in a file named *arp.txt*.

1.11 Exercise 4: Sniff layer 4

Using tcpdump, get every TCP port 80 traffic on the network.

Write the command you used to do that in a file named *tcp.txt*.

1.12 Exercise 5: Port Knocking

Using `hping3`, forge an UDP/IP packet and send it to the IPv4 loopback address.

Your packet MUST contains :

- UDP source port number 4242
- UDP destination port number 666
- IP source address 234.150.0.2
- IP TOS flag to 0
- IP TTL flag set to 12
- IP ID flag set to 5000
- IP no fragmentation flag

Write the command you used to do that in a file named *forge.txt*.

1.13 Exercise 6: Port Knocking

Using *tcpdump*, write a shell script doing port knocking using the sequence:

1. listen on port 2121 for a UDP packet.
2. listen on port 4242 for a TCP packet.
3. listen on port 9367 for a UDP packet.
4. start a echo server on port 12000 using netcat.

Write that script in a file named *pk.sh*.

Chapter 2

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