



# ft\_nmap

*Summary: This project is about recoding a part of the nmap port scanner.*

*Version: 3.3*

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# Chapter I

## Introduction

Nmap is a free ports scanner created by Fyodor and distributed by Insecure.org. It is conceived to detect open ports, identify hosted services and obtain information on the operating system of a distant computer. This software has become a reference for network admin because the audit of Nmap reports give indications on the network security. It is available for Windows, Mac OS X, Linux, BSD and Solaris.

# Chapter II

## Objectives

The goal of this project is to make you recode a part of nmap and therefore discover a new very powerful library.

You will have to use the threads in order to reduce drastically the time spent to scan the chosen ports.

```
> man nmap
```



This project implies to use mostly the PCAP library (-lpcap) and  
THREAD (-lpthread)

# Chapter III

## General Instructions

- This project will be corrected by humans only. You're allowed to organise and name your files as you see fit, but you must follow the following rules
- You must use C and submit a Makefile
- Your Makefile must compile the project and must contain the usual rules. It must recompile and re-link the program only if necessary.
- You have to handle errors carefully. In no way can your program quit in an unexpected manner (Segmentation fault, bus error, double free, etc).
- Within the mandatory part, you are allowed to use the following functions:
  - alarm
  - bind
  - connect / close
  - exit
  - fflush, fileno, fopen, fwrite, fclose
  - freeifaddrs, freeaddrinfo
  - getservbyport, getaddrinfo, getifaddrs
  - gettimeofday
  - getuid
  - htonl, htons, ntohs, ntohl
  - inet\_addr
  - inet\_ntoa, inet\_ntop, inet\_pton
  - pcap\_breakloop, pcap\_close, pcap\_compile, pcap\_dispatch
  - pcap\_geterr, pcap\_lookupdev, pcap\_lookupnet, pcap\_open\_live
  - pcap\_setfilter
  - perror, strerror, gai\_strerror.

- poll
- pthread\_create, pthread\_exit, pthread\_join
- pthread\_mutex\_init, pthread\_mutex\_lock, pthread\_mutex\_unlock
- sendto, recvfrom, recv
- setsockopt, socket
- sigaction, sigemptyset
- printf and its family.
- Your libft functions.
- You are allowed to use other functions to complete the bonus part as long as their use is justified during your defense. Be smart.

# Chapter IV

## Mandatory Part

Usage :

```
> ft_nmap [--help] [--ports [NOMBRE/PLAGE]] --ip ADRESSE IP [--speedup [NOMBRE]] [--scan [TYPE]]
```

or

```
> ft_nmap [--help] [--ports [NOMBRE/PLAGE]] --file FICHIER [--speedup [NOMBRE]] [--scan [TYPE]]
```

- The executable must be named ft\_nmap.
- A help menu will have to be available.
- You must only manage a simple IPv4 (address/hostname) as parameter for your scans.
- You must manage FQDN however you don't have to make the DNS resolution.
- It must be possible to choose the number of threads (default:0 max:250), to make the scan faster.
- it must be possible to read an IP list from a file (the formatting is free).
- Your program must be able to run the following scans:

- SYN, NULL, ACK, FIN, XMAS, UDP

If the type of scan isn't specified, then all 6 types will be used.

- We must be able to run each type of scan individually, and several scans simultaneously.
- The ports to be scanned can be read as a range or individually. In the case, no port is specified the scan must run with the range 1-1024.
- The maximum limit of the number of ports scanned cannot exceed 1024
- The resolution of service types will be requested (not the version but only the TYPE).
- The result of a scan will have to be as clean and clear as possible. The timeframe will have to be easy to read.



For the smarty pants (or not)... Obviously you are NOT allowed to call a real nmap.



- Here is an example of help screen allowed:

```
./ft_nmap --help
Help Screen
ft_nmap [OPTIONS]
--help      Print this help screen
--ports     ports to scan (eg: 1-10 or 1,2,3 or 1,5-15)
--ip        ip addresses to scan in dot format
--file      File name containing IP addresses to scan,
--speedup   [250 max] number of parallel threads to use
--scan      SYN/NULL/FIN/XMAS/ACK/UDP
```

- Here is an example of a possible result:

```
> ./ft_nmap --ip x.x.x.x --speedup 70 --port 70-90 --scan SYN
Scan Configurations
Target Ip-Address : x.x.x.x
No of Ports to scan : 20
Scans to be performed : SYN
No of threads : 70
Scanning..
.....
Scan took 8.32132 secs
IP address: x.x.x.x
Open ports:
Port      Service Name (if applicable) Results          Conclusion
-----
80        http                      SYN(Open)          Open

Closed/Filtered/Unfiltered ports:
Port      Service Name (if applicable) Results          Conclusion
-----
90        Unassigned                SYN(Filtered)     Filtered
89        Unassigned                SYN(Filtered)     Filtered
88        kerberos                  SYN(Filtered)     Filtered
87        link                      SYN(Filtered)     Filtered
86        Unassigned                SYN(Filtered)     Filtered
85        Unassigned                SYN(Filtered)     Filtered
84        Unassigned                SYN(Filtered)     Filtered
83        Unassigned                SYN(Filtered)     Filtered
82        Unassigned                SYN(Filtered)     Filtered
81        Unassigned                SYN(Filtered)     Filtered
79        finger                    SYN(Filtered)     Filtered
78        Unassigned                SYN(Filtered)     Filtered
77        rje                       SYN(Filtered)     Filtered
76        Unassigned                SYN(Filtered)     Filtered
75        Unassigned                SYN(Filtered)     Filtered
74        Unassigned                SYN(Filtered)     Filtered
73        Unassigned                SYN(Filtered)     Filtered
72        Unassigned                SYN(Filtered)     Filtered
71        Unassigned                SYN(Filtered)     Filtered
70        gopher                    SYN(Filtered)     Filtered
```

- Here is another example of a possible result:

```
>./ft_nmap --ip x.x.x.x --speedup 200 --port 75-85
Scan Configurations
Target Ip-Address : x.x.x.x
No of Ports to scan : 10
Scans to be performed : SYN NULL FIN XMAS ACK UDP
No of threads : 200
Scanning..
.....
Scan took 16.21338 secs
IP address: x.x.x.x
Open ports:
Port      Service Name (if applicable) Results                      Conclusion
-----
80        http                      SYN(Open) NULL(Closed) FIN(Closed)
                      XMAS(Closed) ACK(Unfiltered)
                      UDP(Open|Filtered)                      Open

Closed/Filtered/Unfiltered ports:
Port      Service Name (if applicable) Results                      Conclusion
-----
85        Unassigned                SYN(Filtered) NULL(Closed) FIN(Closed)
                      XMAS(Closed) ACK(Unfiltered)
                      UDP(Open|Filtered)                      Closed
84        Unassigned                SYN(Filtered) NULL(Closed) FIN(Closed)
                      XMAS(Closed) ACK(Unfiltered)
                      UDP(Open|Filtered)                      Closed
83        Unassigned                SYN(Filtered) NULL(Closed) FIN(Closed)
                      XMAS(Closed) ACK(Unfiltered)
                      UDP(Open|Filtered)                      Closed
82        Unassigned                SYN(Filtered) NULL(Closed) FIN(Closed)
                      XMAS(Open|Filtered) ACK(Unfiltered)
                      UDP(Open|Filtered)                      Closed
81        Unassigned                SYN(Filtered) NULL(Closed) FIN(Closed)
                      XMAS(Closed) ACK(Unfiltered)
                      UDP(Open|Filtered)                      Closed
79        finger                    SYN(Filtered) NULL(Closed) FIN(Closed)
                      XMAS(Closed) ACK(Unfiltered)
                      UDP(Open|Filtered)                      Closed
78        Unassigned                SYN(Filtered) NULL(Closed) FIN(Closed)
                      XMAS(Closed) ACK(Unfiltered)
                      UDP(Open|Filtered)                      Closed
77        rje                      SYN(Filtered) NULL(Open|Filtered)
                      FIN(Closed) XMAS(Closed) ACK(Unfiltered)
                      UDP(Open|Filtered)                      Closed
76        Unassigned                SYN(Filtered) NULL(Open|Filtered)
                      FIN(Closed) XMAS(Closed) ACK(Unfiltered)
                      UDP(Open|Filtered)                      Closed
75        Unassigned                SYN(Filtered) NULL(Closed) FIN(Closed)
                      XMAS(Closed) ACK(Unfiltered)
                      UDP(Open|Filtered)                      Closed
```

# Chapter V

## Bonus Part

Find below a few ideas of interesting bonuses:

- DNS/Version management.
- OS detection.
- Flag to go over the IDS/Firewall.
- Being able to hide the source address.
- Additional flags...



The `-v/-V` flag is not a valid bonus.



The bonus part will only be assessed if the mandatory part is PERFECT. Perfect means the mandatory part has been integrally done and works without malfunctioning. If you have not passed ALL the mandatory requirements, your bonus part will not be evaluated at all.

# Chapter VI

## Submission and peer-evaluation

Turn in your assignment in your `Git` repository as usual. Only the work inside your repository will be evaluated during the defense. Don't hesitate to double check the names of your folders and files to ensure they are correct.

- You have to be in a VM with a Linux kernel  $> 3.14$ . Note that grading was designed on a Debian 7.0 stable.