
Network sniffers

A network sniffer is a software program or a hardware device that is capable of monitoring the network data. It is usually used to examine the network traffic by copying the data without altering the content. With the network sniffer, you can see what information is available in your network.

Previously, network sniffers were used by network engineers to help them solve the network problems, but it can also be used for malicious purposes. If your network data is not encrypted and your network uses a hub to connect all the computers, it is very easy to capture your network traffic, such as your username, password, and e-mail content. Fortunately, things become a little bit complex if your network is using a switch, but your data can still be captured.

There are many tools that can be used as network sniffers. In this section, we will describe some of those which are included in Kali Linux. You may want to do network spoofing (refer to the *Network spoofing tools* section) first because it is often a requirement to conduct a successful sniffing operation.

dsniff

The dsniff tool can be used to capture the passwords available in the network. Currently, it can capture passwords from the following protocols: FTP, Telnet, SMTP, HTTP, POP, poppass, NNTP, IMAP, SNMP, LDAP, Rlogin, RIP, OSPF, PPTP MS-CHAP, NFS, VRRP, YP/NIS, SOCKS, X11, CVS, IRC, AIM, ICQ, Napster, PostgreSQL, Meeting Maker, Citrix ICA, Symantec pcAnywhere, NAI Sniffer, Microsoft SMB, Oracle SQL*Net, Sybase, and Microsoft SQL protocols.

To start dsniff, use the console to execute the following command:

```
# dsniff -h
```

This will display the dsniff usage instructions on your screen. In our exercise, we will capture an FTP password. The FTP client IP address is `192.168.2.20` and the FTP server IP address is `192.168.2.22`, and they are connected by a network hub. The attacker machine has the IP address of `192.168.2.21`.

Start dsniff in the attacker machine by giving the following command:

```
# dsniff -i eth0 -m
```

The `-i eth0` option will make dsniff listen to the `eth0` network interface and the `-m` option will enable automatic protocol detection.

In another machine, open the FTP client and connect to the FTP server by entering the username and password.

The following is the result of dsniff:

```
dsniff: listening on eth0
-----------------
20/08/13 18:54:53 tcp 192.168.2.20.36761 -> 192.168.2.22.21 (ftp)
USER user
PASS user01
```

You will notice that the username and password entered to connect to the FTP server can be captured by dsniff.

tcpdump

The tcpdump network sniffer is used to dump the packet contents on a network interface that matches the expression. If you don't give the expression, it will display all the packets, but if you give it an expression, it will only dump the packet that matches the expression.

The tcpdump network sniffer can also save the packet data to a file, and it reads the packet data from a file too.

To start tcpdump, you need to use the console to execute the following command:

```
# tcpdump –i eth0 –s 96
```

This command will listen on the `eth0` network interface (`-i eth0`) and capture the packet in a size of 96 bytes (`-s 96`).

Let's try to sniff an ICMP packet from a machine with an IP address of `192.168.56.101` to a machine with an IP address of `192.168.56.102`. We sniff on the `eth0` interface (`-i eth0`), don't convert address to names (`-n`), don't print timestamp (`-t`), print packet headers and data in hex and ASCII (`-X`), and set the snaplen value to 64 (`-s`). The command we use in the machine `192.168.56.102` is as follows:

```
# tcpdump -n -t -X -i eth0 -s 64 icmp and src 192.168.56.102 and dst
192.168.56.101
```

The following screenshot shows the result of this command:

```
root@kali:~# tcpdump -i eth0 -s 64 -t -n -X icmp and src 192.168.56.102 and dst 192.168.56.101
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on eth0, link-type EN10MB (Ethernet), capture size 64 bytes
IP 192.168.56.102 > 192.168.56.101: ICMP echo request, id 3860, seq 1, length 64
        0x0000:  4500 0054 9646 4000 4001 b246 c0a8 3866  E..T.F@.@..F..8f
        0x0010:  c0a8 3865 0800 2134 0f14 0001 34fd ee52  ..8e..!4....4..R
        0x0020:  0000 0000 e393 0200 0000 0000 1011 1213  ................
        0x0030:  1415                                     ..
```

The tcpdump network sniffer will only display the packets that match the given expression. In this case, we only want to display the ICMP packet from the machine with an IP address of `192.168.56.102` to the machine with an IP address of `192.168.56.101` .

Wireshark

Wireshark is a network protocol analyzer. The user interface allows the user to understand the information contained in the network packets captured more easily.

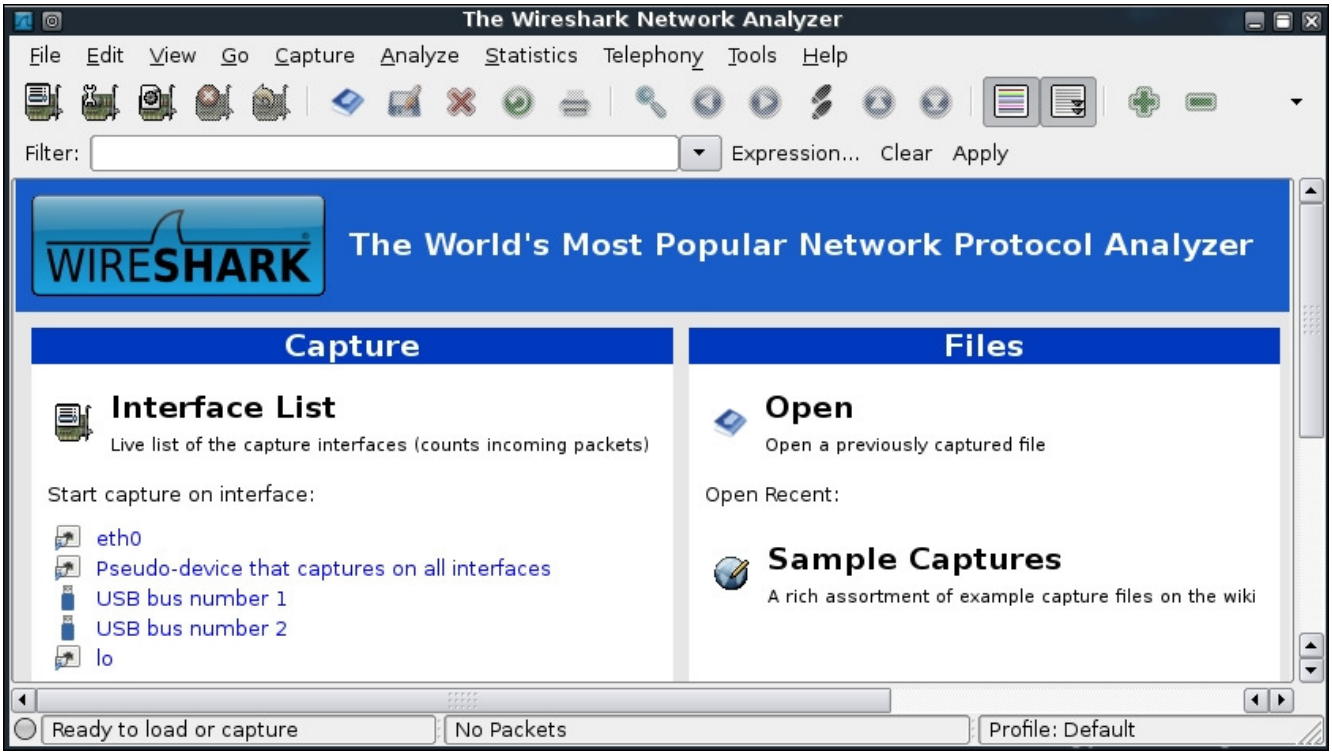
Following are several Wireshark features:

- Supports more than 1,000 protocols
- Ability to do live capture and offline analysis
- Has the most powerful display filters in the industry
- Captured network data can be displayed via GUI or via a command-line TShark tool
- Able to read/write many different capture file formats, such as tcpdump (libpcap), Network General Sniffer, Cisco Secure IDS iplog, Microsoft Network Monitor, and others
- Live data can be read from IEEE 802.11, Bluetooth, and Ethernet
- The output can be exported to XML, Postscript, CSV, and plaintext

To start Wireshark, go to **Kali Linux** | **Sniffing/Spoofing** | **Network Sniffers** | **wireshark**, or use the console to execute the following command:

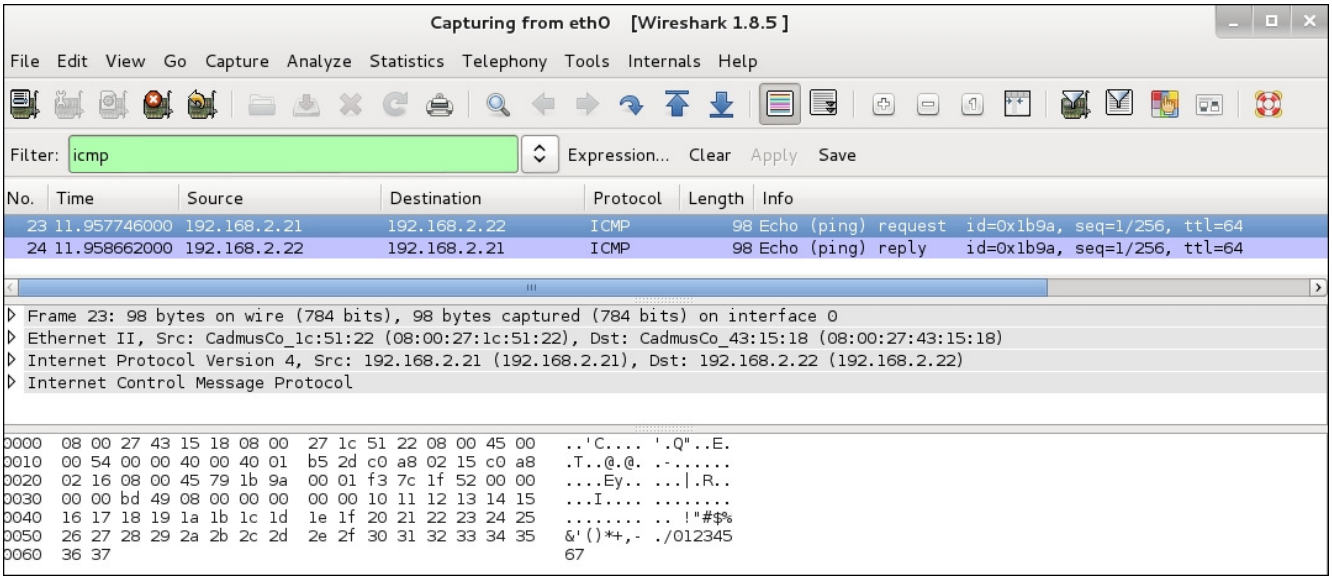
```
# wireshark
```

This will start the Wireshark network protocol analyzer. To start live capture, click on the network interface on which you want to capture network data in the **Interface List**.



If there is network traffic, the packets will be displayed on the Wireshark window. To stop the capture, you can click on the fourth icon on the top entitled **Stop running the live capture**, or you can navigate to **Capture** | **Stop** in the menu.

To only display particular packets, you can set the display filter.



In the preceding screenshot, we only want to see the ICMP packets, so we enter `icmp` in the display filter.

If you want to customize your capture, you can change the options from the menu by navigating to **Capture** | **Options** or select the **Capture Options** from the Wireshark home page.

In this menu, you can change several things such as the following:

- **Network interface**
- **Buffer size**: By default, it is 1 MB
- **Packet limitation (in bytes)**: In the default option, there is no limitation
- **Capture filter to be used**: The default value does not use any capture filters

    - If you want to save the captured data, you need to set the output file in the **Capture File(s)** section.
    - The **Stop Capture** section is used to define the condition when your capture process will be stopped. It can be set based on the number

of packets, packet size, and capture duration.

- In the **Name Resolution** section, you can define whether Wireshark will do the name resolution for MAC, network name, and transport name.