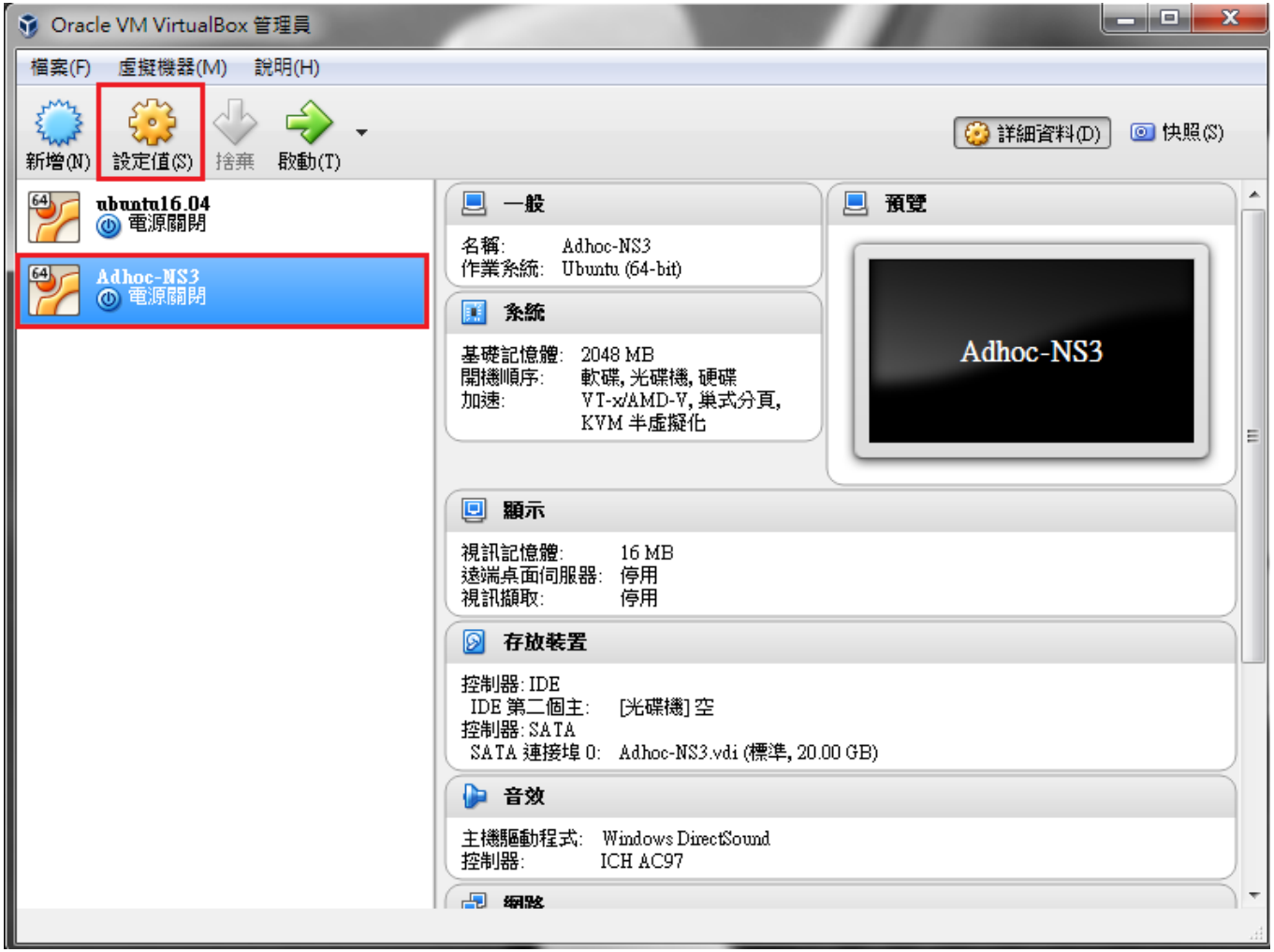
Wireless Ad Hoc Networks Lab 1

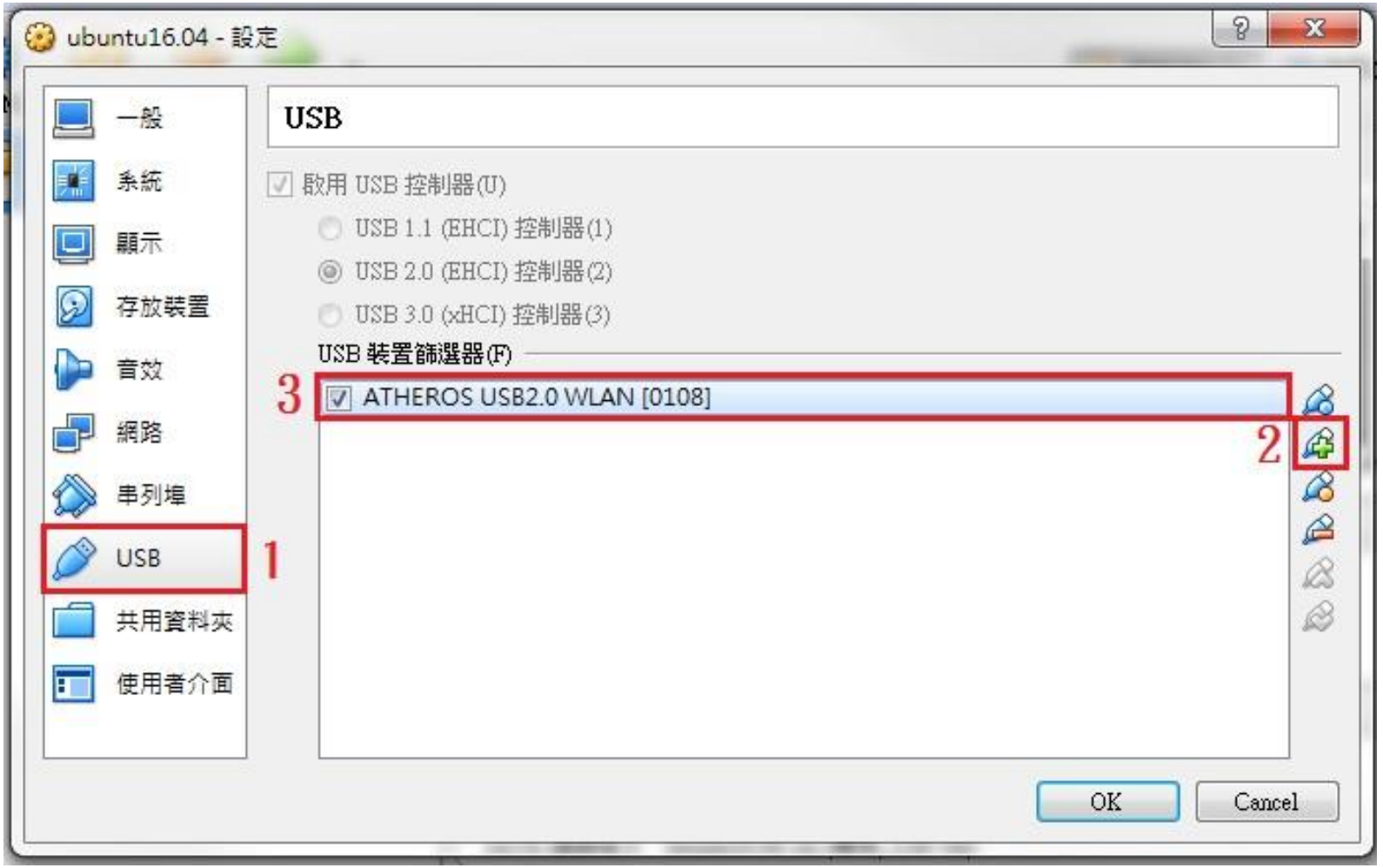
Wireshark

Packets Sniff Experiment

Open VM VirtualBox - Setting



Isolate wireless USB adapter



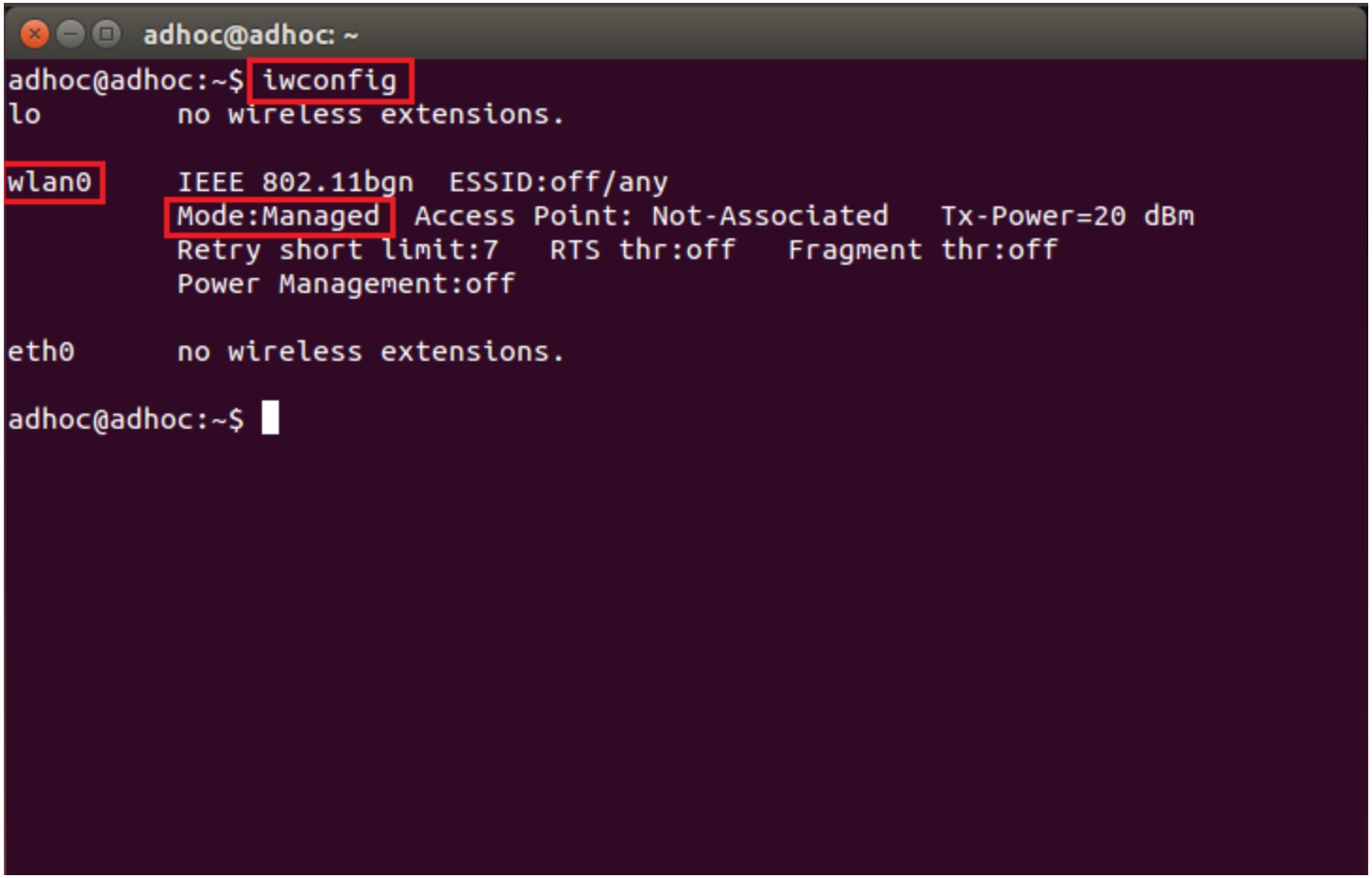
VirtualBox Start

Password : ImBun

Check wireless USB adapter has been driven or not?

1. Open terminal
2. *iwconfig*
3. Check wireless USB adapter has been driven.
   (If not, change USB port.)

Check wireless USB adapter has been driven or not?



Packets Sniff Experiment

- Lab Purpose
  - Understand wireless network by capturing packets.
- Equipments
  - PC / NB (Root Password : **ImBun**)
  - Atheros-chipset wireless NIC (support IEEE 802.11 b/g)
  - Linux with iw (linux wireless package)
  - Wireshark (network protocol analyzer)
  - WiFi Access Point (Open Access / Encrypted)

Wireshark Introduction

- A Free and Open-Source Packet Analyzer
- Available for UNIX and Windows
  - https://www.wireshark.org/
- Capture live packet data from a network interface
- Purpose:
  - *Network Administrators* : troubleshoot network problems
  - *Network Security Engineers* : examine security problems
  - *Developers* : debug protocol implementations
  - *People* : learn network protocol internals
- Installation on Ubuntu
  - *sudo apt-get install wireshark*
  - *sudo wireshark*

Wireshark Installation (from source)

- Package Download Link :

  https://1.as.dl.wireshark.org/src/wireshark-2.2.2.tar.bz2
- Open the terminal, then type these commands:
  - Unpack the source file:

    tar xaf wireshark-1.12.8.tar.bz2
  - Go to the Wireshark source directory:

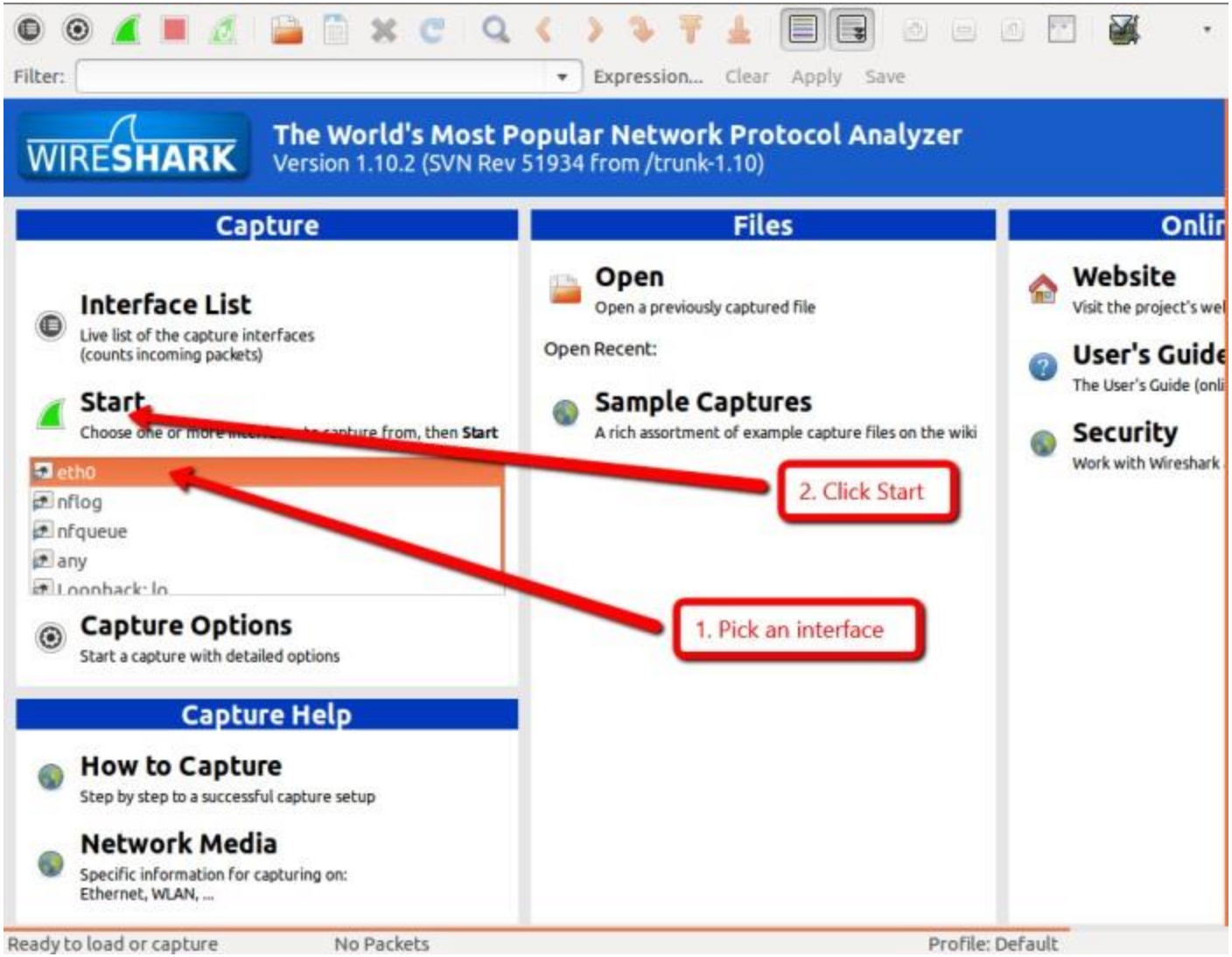
    cd wireshark-2.2.2
  - configure the source:

    ./configure
  - Build the source:

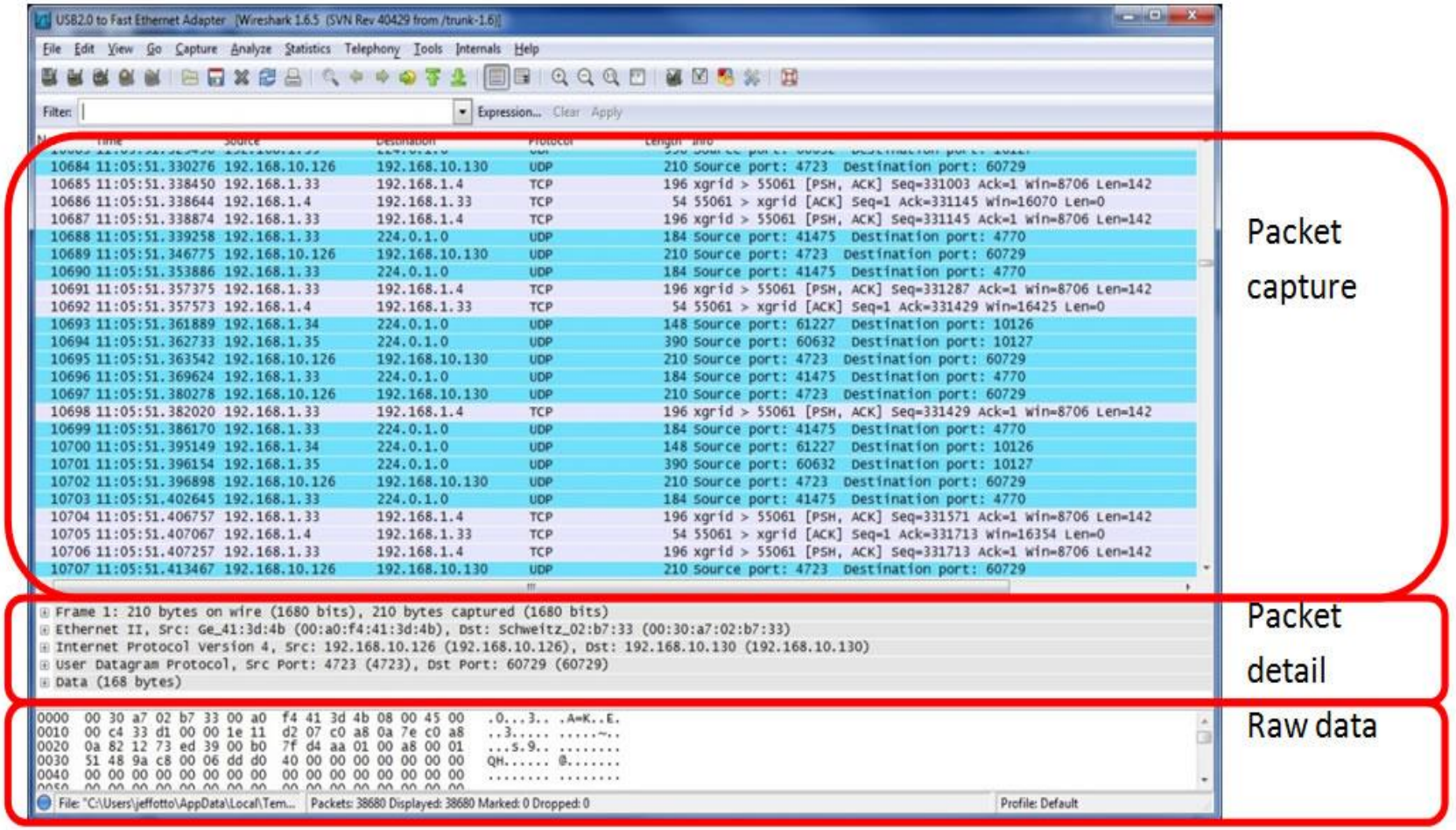
    make
  - Install:

    make install

Wireshark User Interface (I)



Wireshark User Interface (II)



Linux Introduction w/ network command

- ifconfig - configure a network interface
  - Set IP address, MAC address … etc

```
eth0      Link encap:Ethernet  HWaddr 00:26:18:37:B9:8D
          inet addr:192.168.2.52  Bcast:192.168.2.255  Mask:255.255.255.0
          inet6 addr: fe80::226:18ff:fe37:b98d/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:32487 errors:0 dropped:0 overruns:0 frame:0
          TX packets:2753 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:2504197 (2.3 MiB)  TX bytes:661455 (645.9 KiB)
          Interrupt:17 Base address:0x4000
```

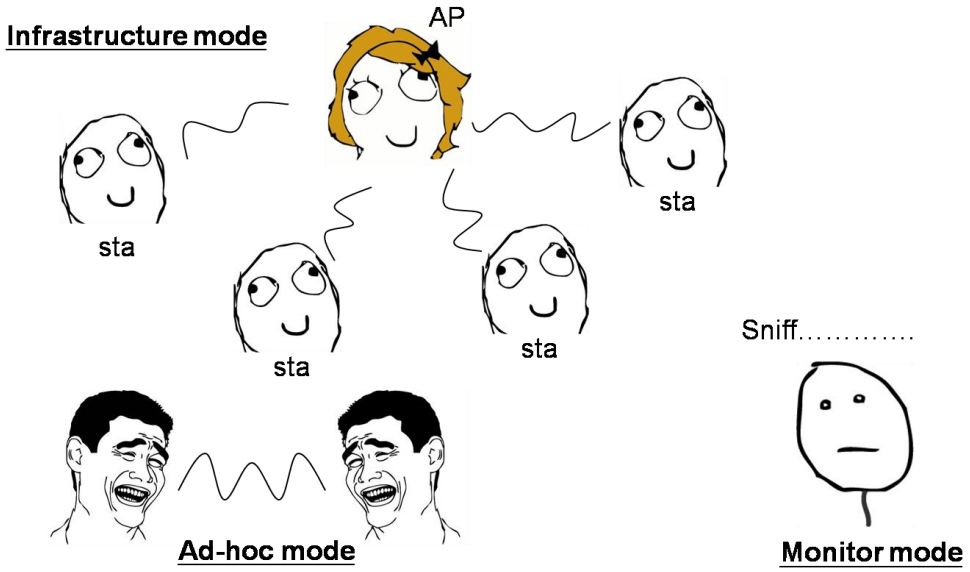
Linux Introduction w/ wireless network command

- iwconfig - configure a wireless network interface
  - Set ESSID, channel, rate …etc

```
ath0      IEEE 802.11b  ESSID:""  Nickname:""
          Mode:Managed  Channel:0  Access Point: Not-Associated
          Bit Rate:0 kb/s   Tx-Power:0 dBm   Sensitivity=1/1
          Retry:off   RTS thr:off   Fragment thr:off
          Encryption key:off
          Power Management:off
          Link Quality=0/70  Signal level=-256 dBm  Noise level=-256 dBm
          Rx invalid nwid:0  Rx invalid crypt:0  Rx invalid frag:0
          Tx excessive retries:0  Invalid misc:0   Missed beacon:0
```

Wireless Operating Modes

- Wi-Fi modes of operation (802.11 or Wi-Fi)
  - Station (STA) infrastructure mode
    - This mode is also called **“ Managed “**
  - AccessPoint (AP) infrastructure mode
  - Ad-Hoc (IBSS) mode
  - Monitor (MON) mode (i.e, Sniff mode)
    - Don’t need to connect any AP



Monitor mode – Wireless Channel

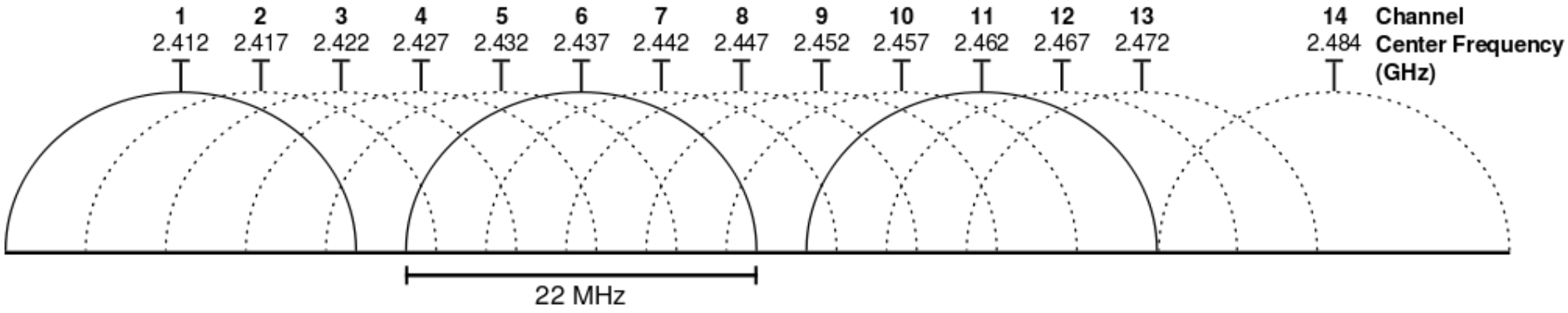


Fig. 2.4 GHz Wi-Fi channels (802.11b,g WLAN)

Packets Sniff Experiment

- [Step 1] Install Unix-like operating system. (Done For You)
- [Step 2] Download & install Wireshark. (Done For You)
- [Step 3] Switch the wireless NIC to monitor mode.
  - delete the normal *wlan#* interface if it's unused :

    iw dev ⟵ (to list the available devices)

    sudo iw dev wlan# del ⟵ (change # to the specific number)
  - add a monitor interface called *mon?* :

    sudo iw phy phy# interface add mon? type monitor ⟵ (change ? to the a number)
  - enable the *mon?* interface using ifconfig :

    sudo ifconfig mon? up
  - specify the wireless LAN frequency you want to capture on :

    sudo iwconfig mon? channel x

    or *sudo iw dev mon0 set freq 24yz*
- [Step 4] Open Wireshark to capture and observe the packets
  - sudo wireshark ⟵ (Use Wireshark with root authority)

Questions & Report

- TA will use our own devices to access Internet via an AP (Open Access/Encrypted).
- TA will generate HTTP, FTP, Telnet and SSH packets.
- Questions:
  - # Q1 :

    Can you get any detail information from received packets for HTTP, FTP, Telnet and SSH via Open Access AP!?

    (ex: username, password)
  - # Q2 :

    Can you get any detail information from received packets for HTTP, FTP, Telnet and SSH via Encrypted AP!?
- You need to answer these questions and then write a full report with your thoughts or analysis(individual report).
  - Deadline : **2019 / 11 / 19**