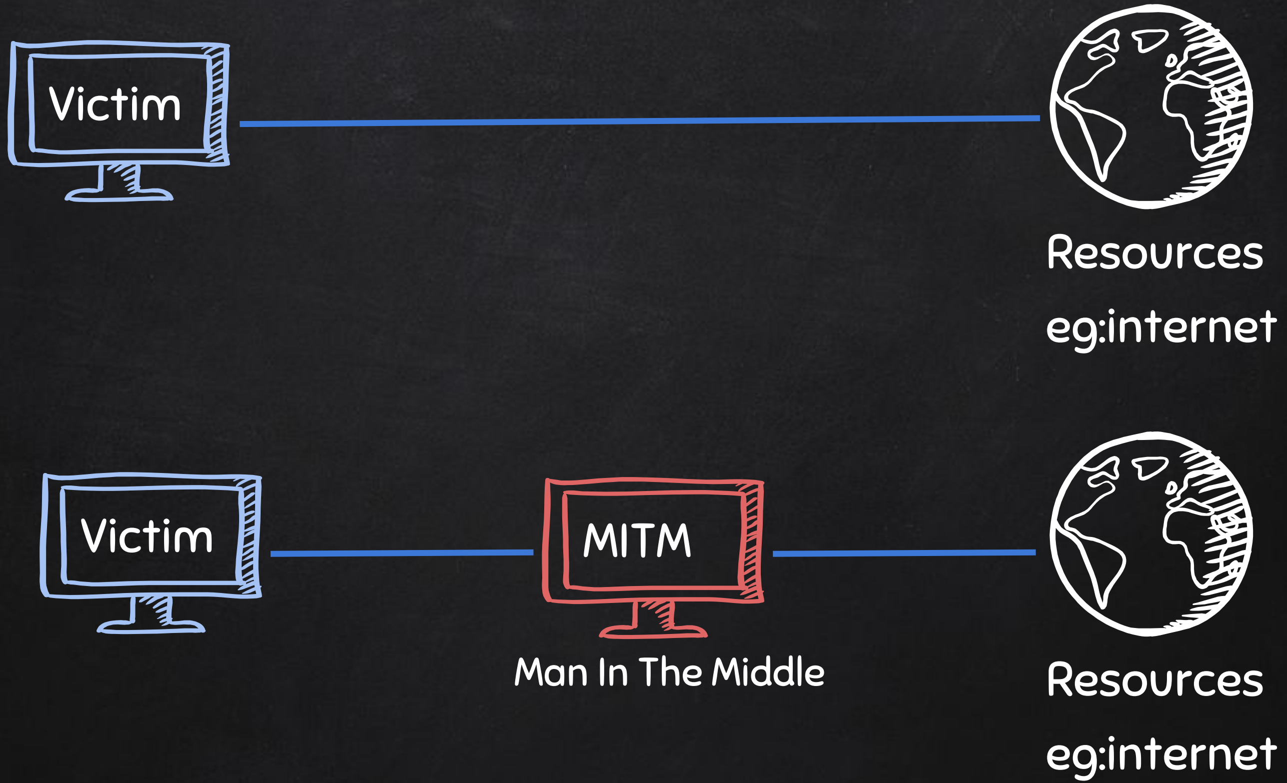
Network Mapping

Nmap / Zenmap

- HUGE security scanner.
- From an IP/IP range it can discover:
    - Open ports.
    - Running services.
    - Operating system.
    - Connected clients.
    - + more

MITM Attacks

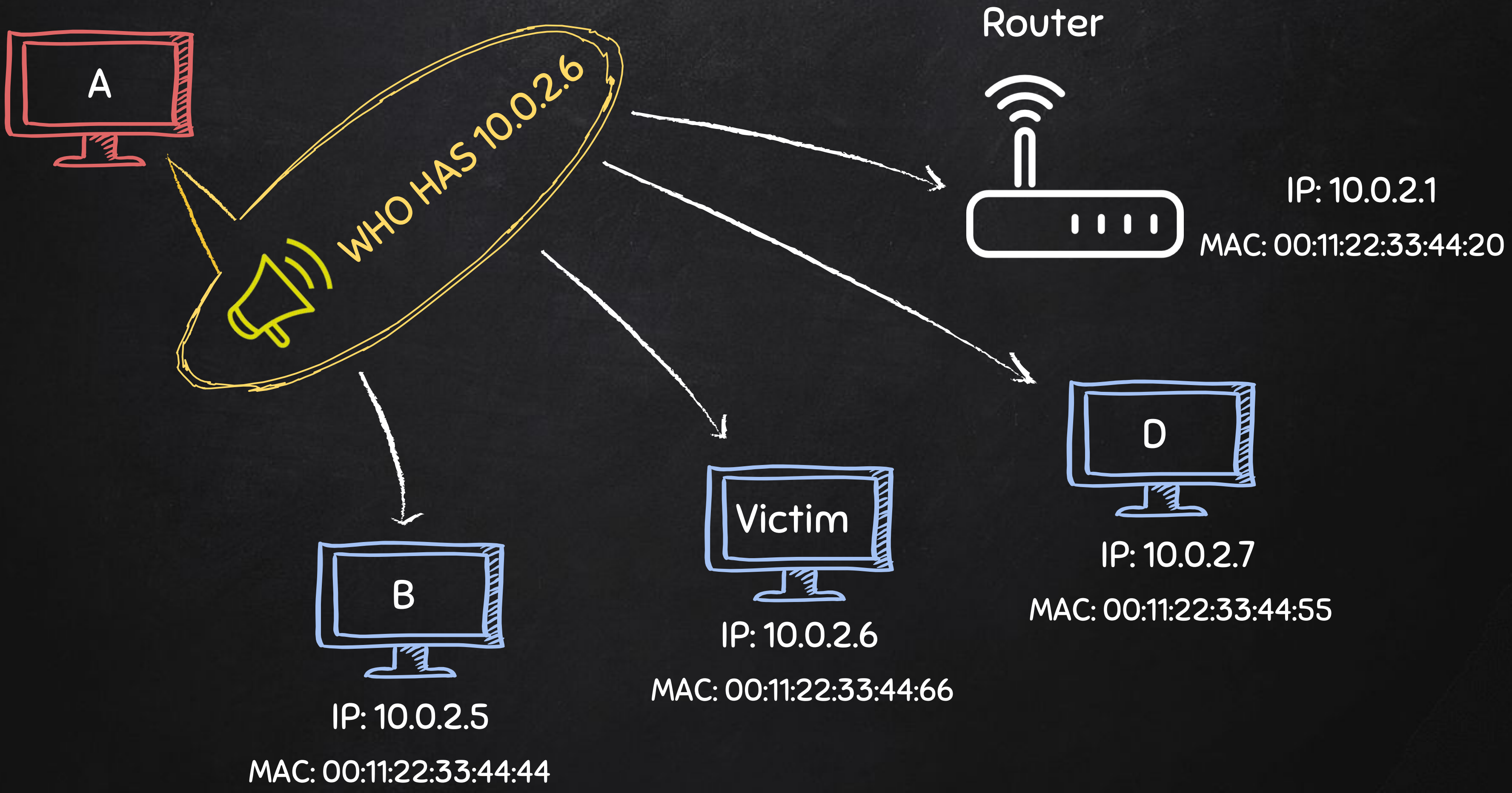


Address Resolution Protocol

(ARP)

→ Simple protocol used to map IP Address of a machine to its MAC address.

ARP Request



A

WHO HAS 10.0.2.6

Router

IP: 10.0.2.1

MAC: 00:11:22:33:44:20

B

IP: 10.0.2.5

MAC: 00:11:22:33:44:44

Victim

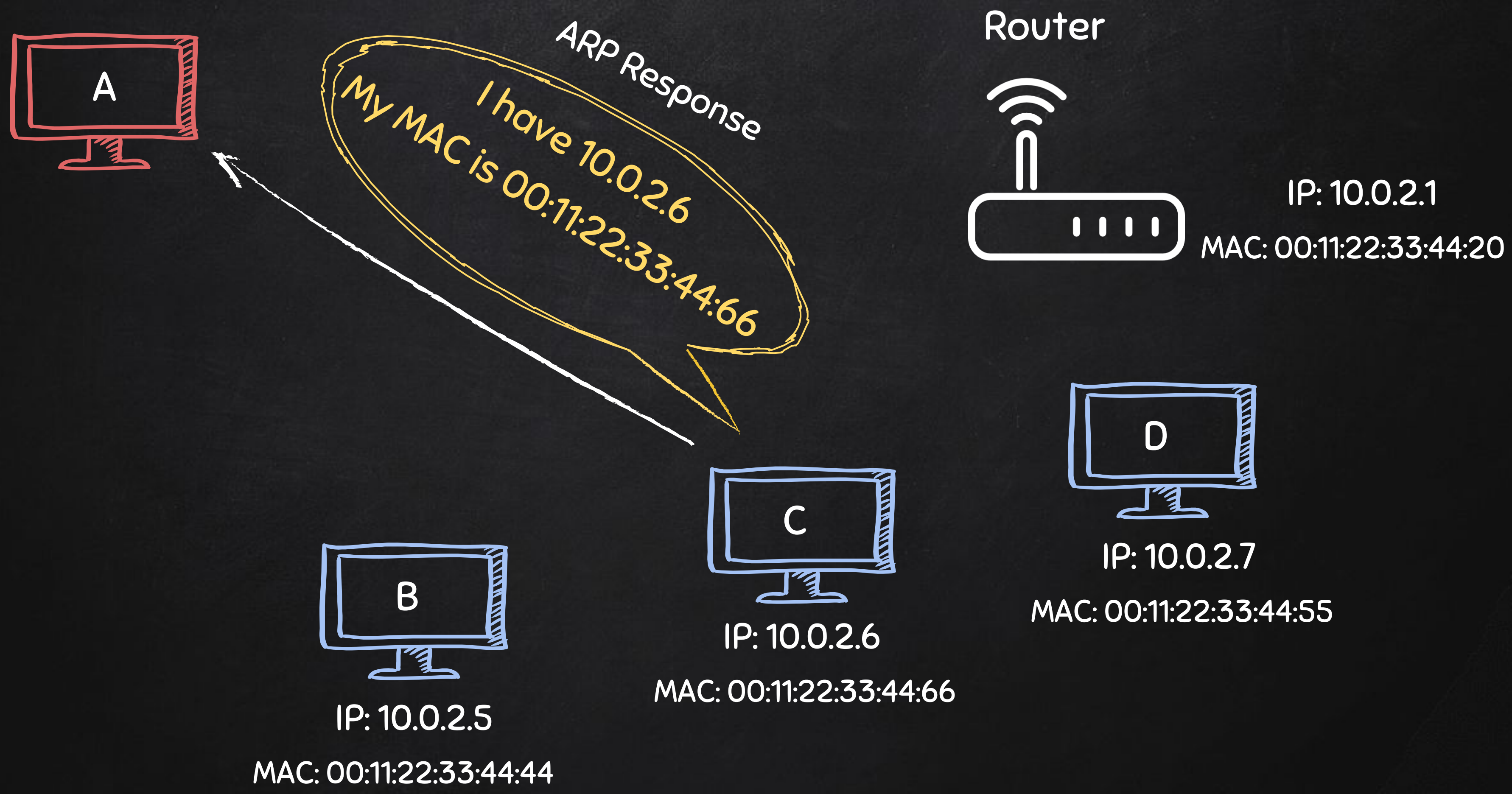
IP: 10.0.2.6

MAC: 00:11:22:33:44:66

D

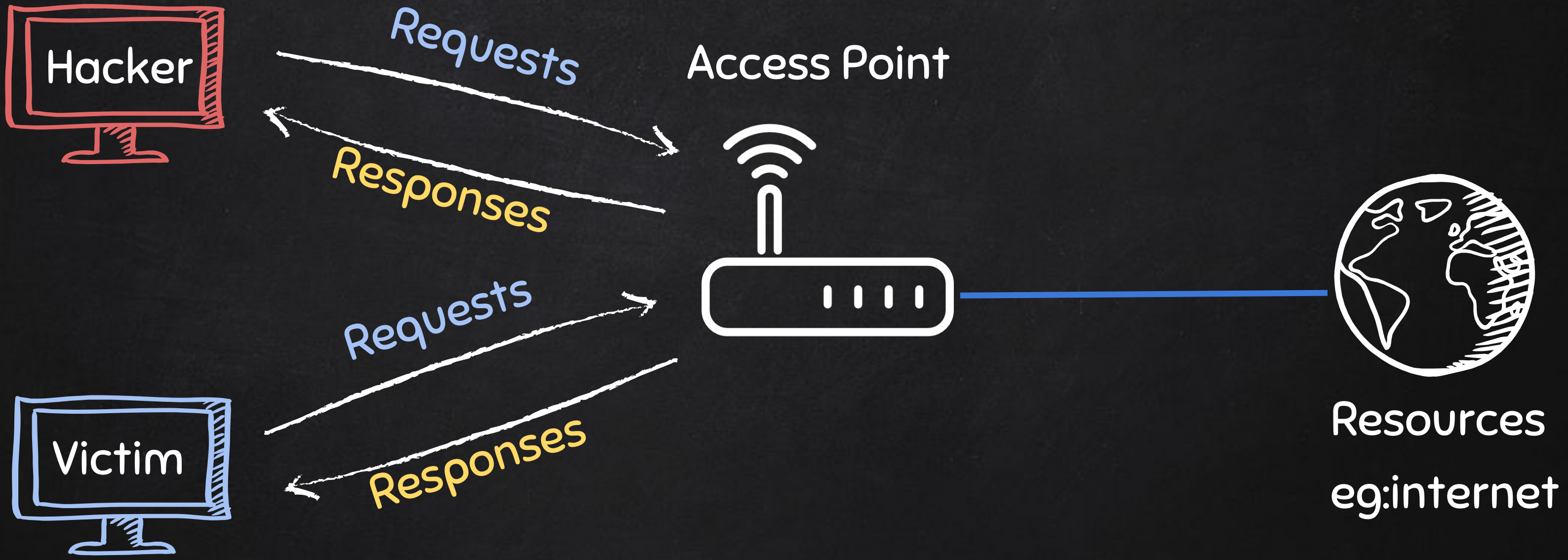
IP: 10.0.2.7

MAC: 00:11:22:33:44:55



A
ARP Response
I have 10.0.2.6
My MAC is 00:11:22:33:44:66
Router
IP: 10.0.2.1
MAC: 00:11:22:33:44:20
D
IP: 10.0.2.7
MAC: 00:11:22:33:44:55
C
IP: 10.0.2.6
MAC: 00:11:22:33:44:66
B
IP: 10.0.2.5
MAC: 00:11:22:33:44:44

Typical Network



Hacker

Requests

Responses

Access Point

Requests

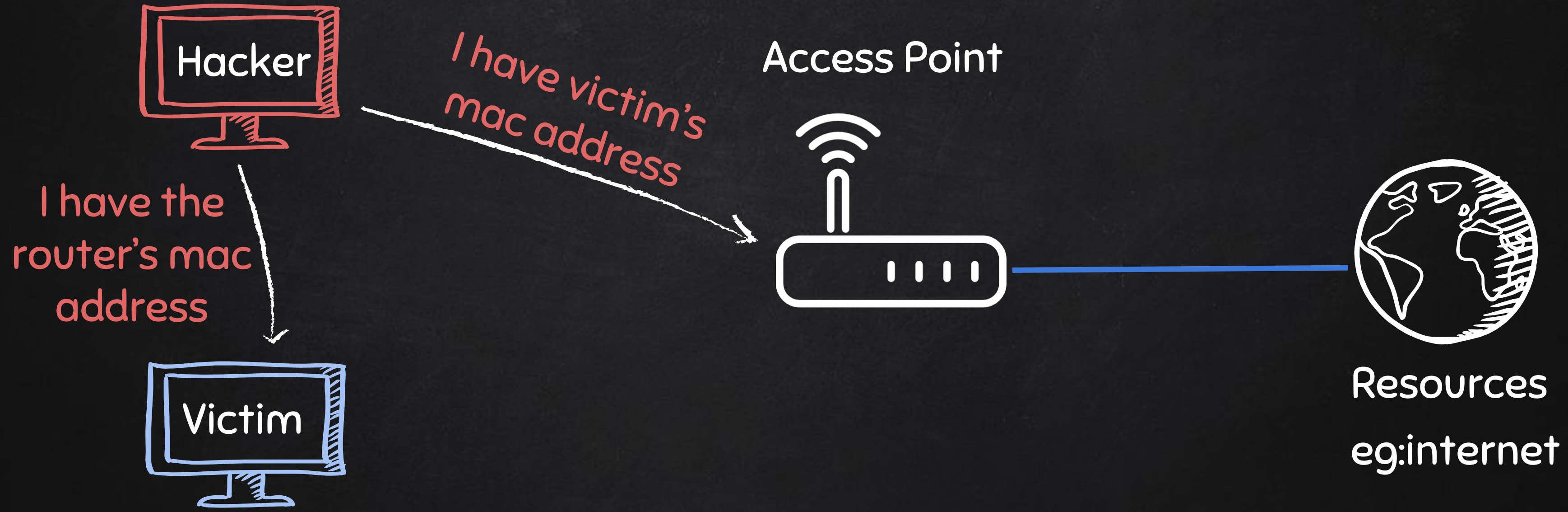
Responses

Victim

Resources

eg:internet

ARP Spoofing



Hacker

I have victim's mac address

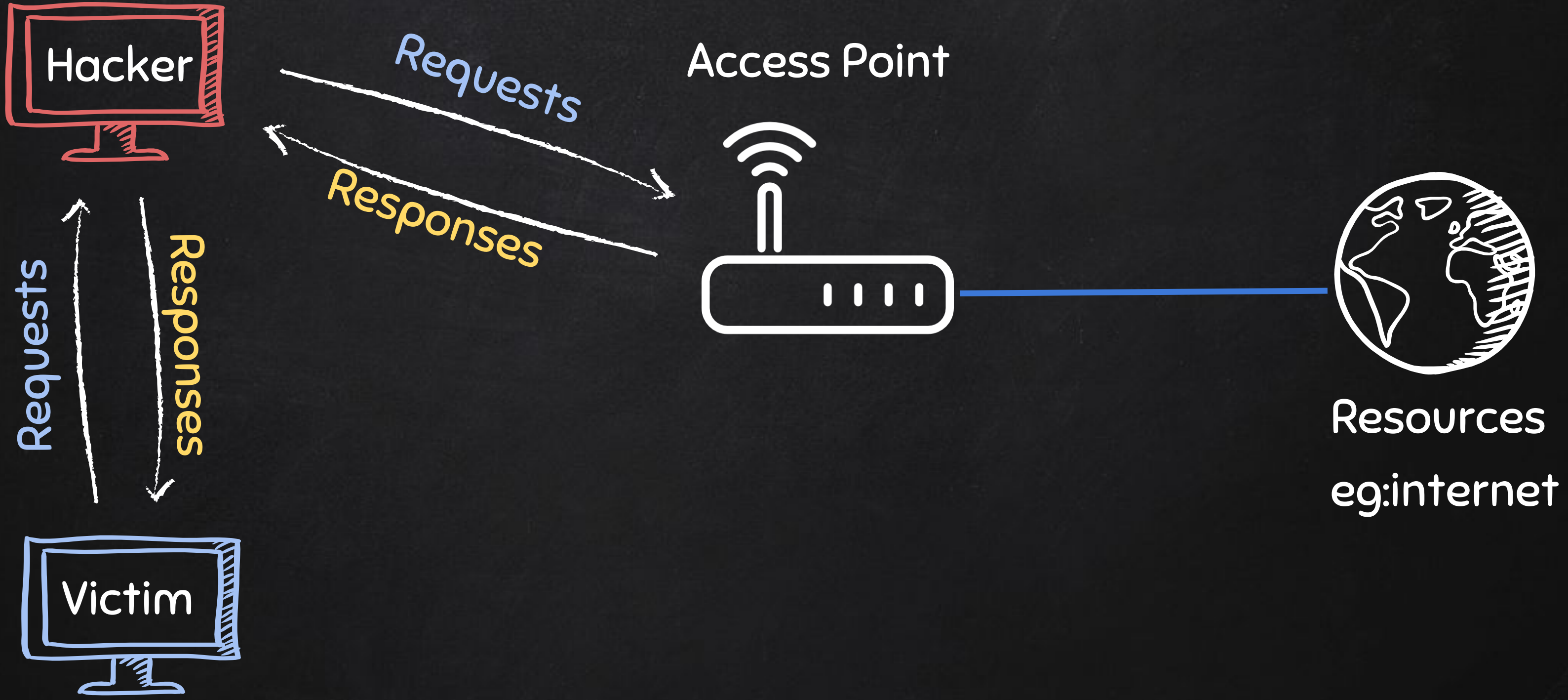
Access Point

I have the router's mac address

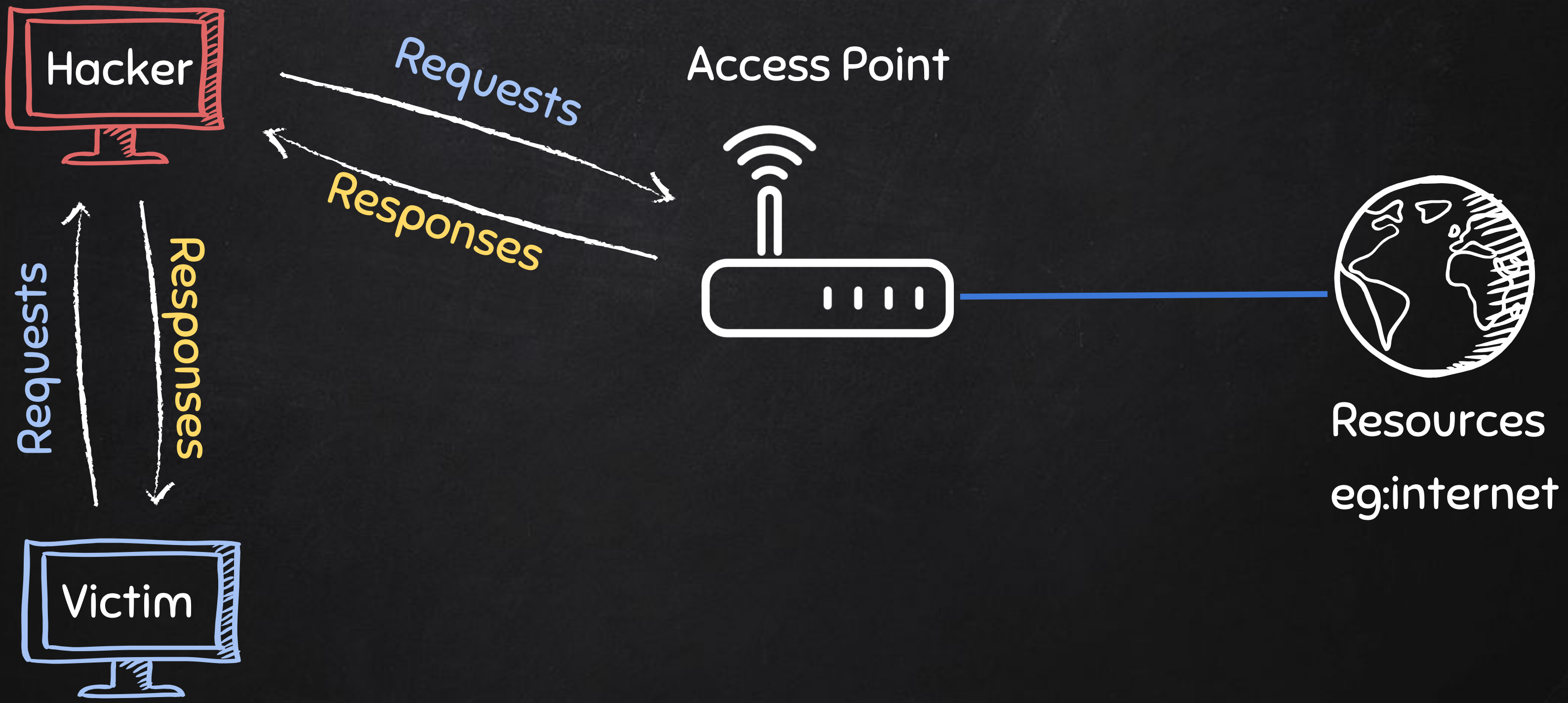
Victim

Resources eg:internet

ARP Spoofing



ARP Spoofing



ARP Spoofing

Using arpspoof

- arpspoof tool to run arp spoofing attacks.
- Simple and reliable.
- Ported to most operating systems including Android and iOS.
- Usage is always the same.

use:

```
arpspoof -i [interface] -t [clientIP] [gatewayIP]
arpspoof -i [interface] -t [gatewayIP] [clientIP]
```

ARP Spoofing Using MITMf

- Framework to run MITM attacks.
- Can be used to :
  - ○ ARP Spoof targets (redirect the flow of packets)
  - ○ Sniff data (urls, username passwords).
  - ○ Bypass HTTPS.
  - ○ Redirect domain requests (DNS Spoofing).
  - ○ Inject code in loaded pages.
  - ○ And more!

use:

```
mitmf --arp --spoof -i [interface] --target [clientIP] --gateway [gatewayIP]
```

HTTPS

Problem:

- Data in HTTP is sent as plain text.
- A MITM can read and edit requests and responses.

→ not secure

Solution:

- Use HTTPS.
- HTTPS is an adaptation of HTTP.
- Encrypt HTTP using TLS (Transport Layer Security) or SSL (Secure Sockets Layer).

Bypassing HTTPS

Problem:

- Most websites use HTTPS

→ Sniffed data will be encrypted.

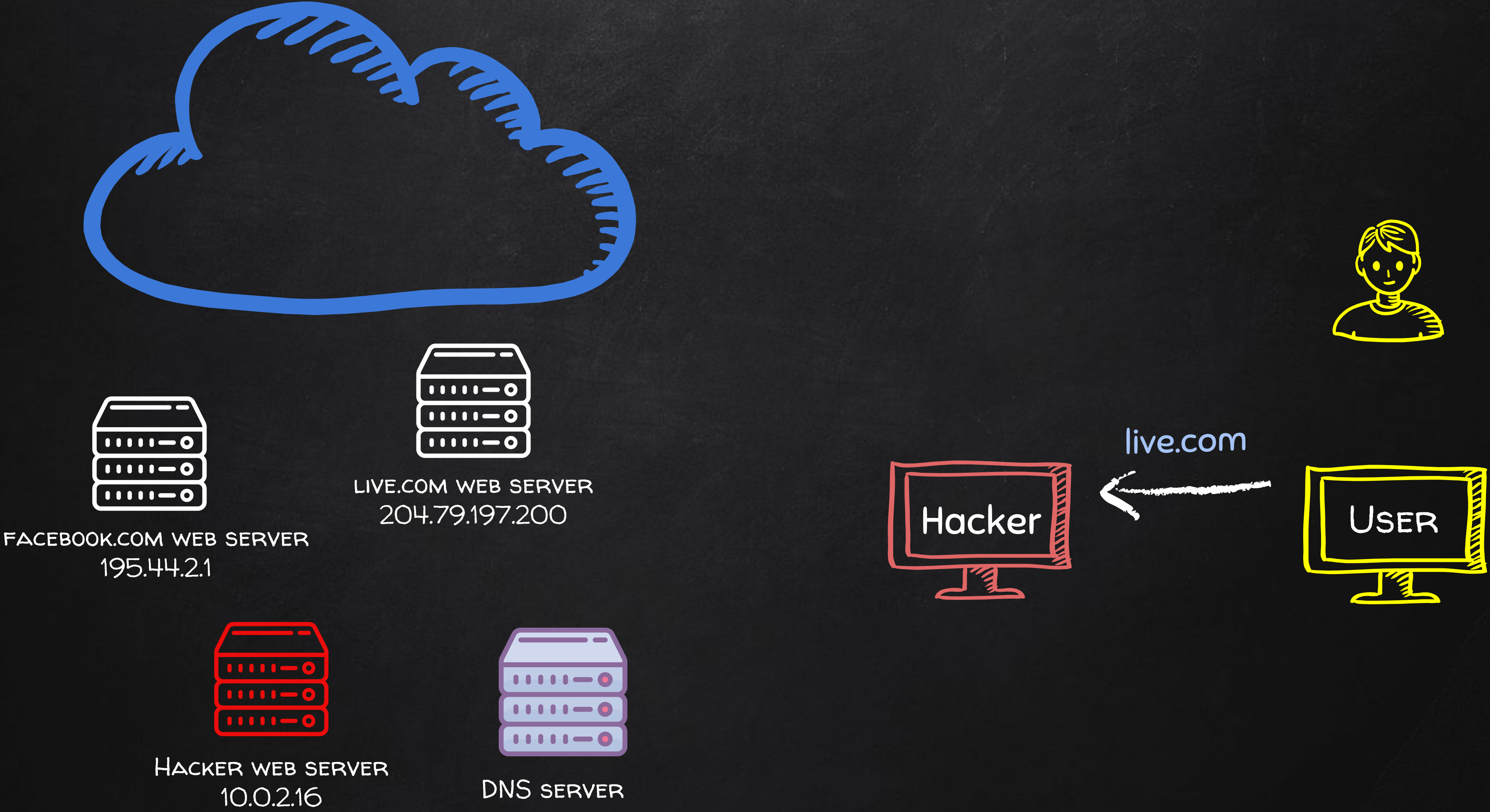
Solution:

- Downgrade HTTPS to HTTP.

DNS Spoofing

- DNS → Domain Name System.
- Translates domain names to IP addresses.
- Eg: links www.google.com to the IP of Google's server.

bing.com	A	204.79.197.200
facebook.com	A	195.44.2.1
zsecurity.org	A	104.27.153.174
……..etc		



FACEBOOK.COM WEB SERVER
195.44.2.1

LIVE.COM WEB SERVER
204.79.197.200

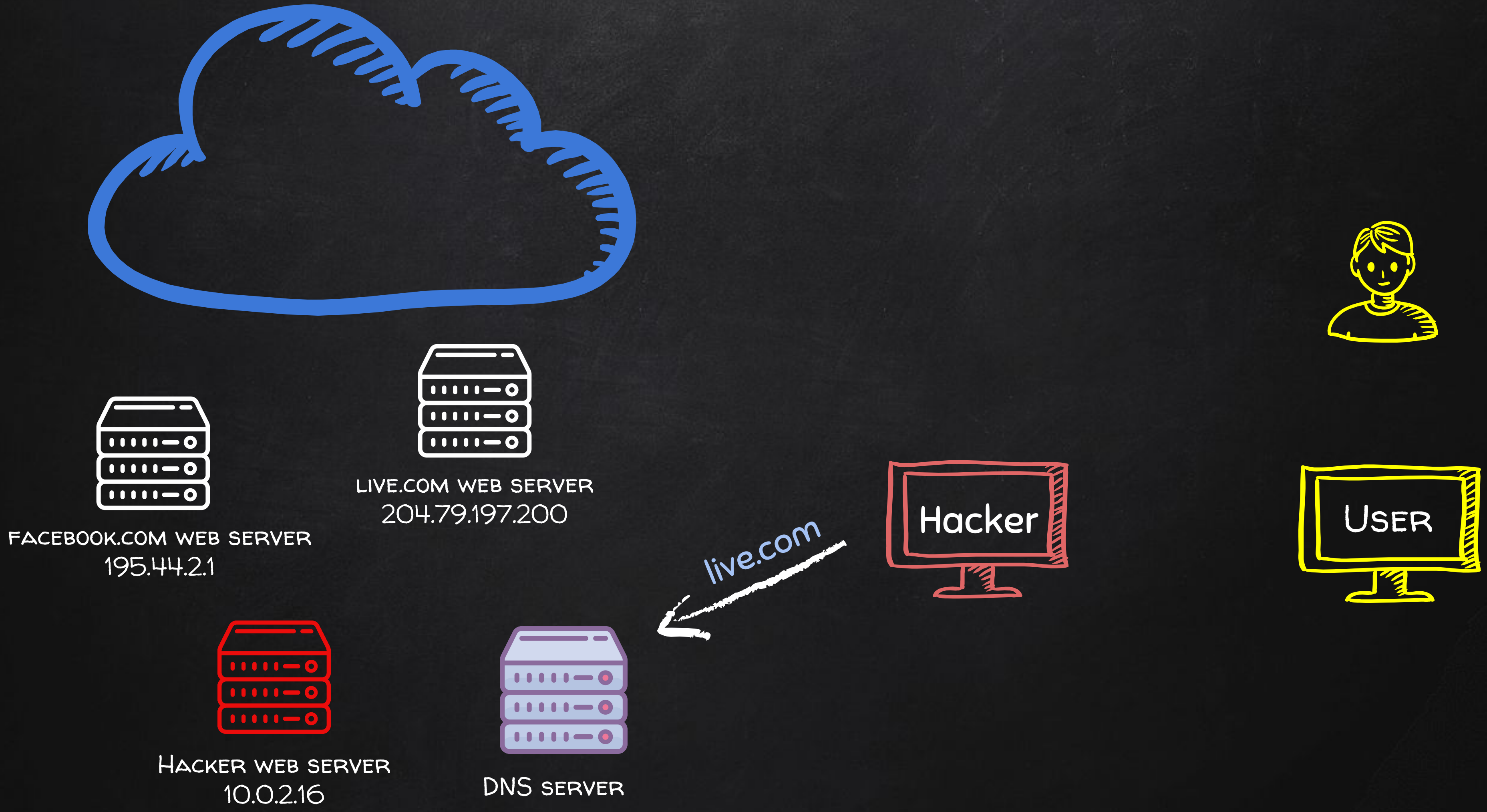
HACKER WEB SERVER
10.0.2.16

DNS SERVER

Hacker

live.com

USER



FACEBOOK.COM WEB SERVER
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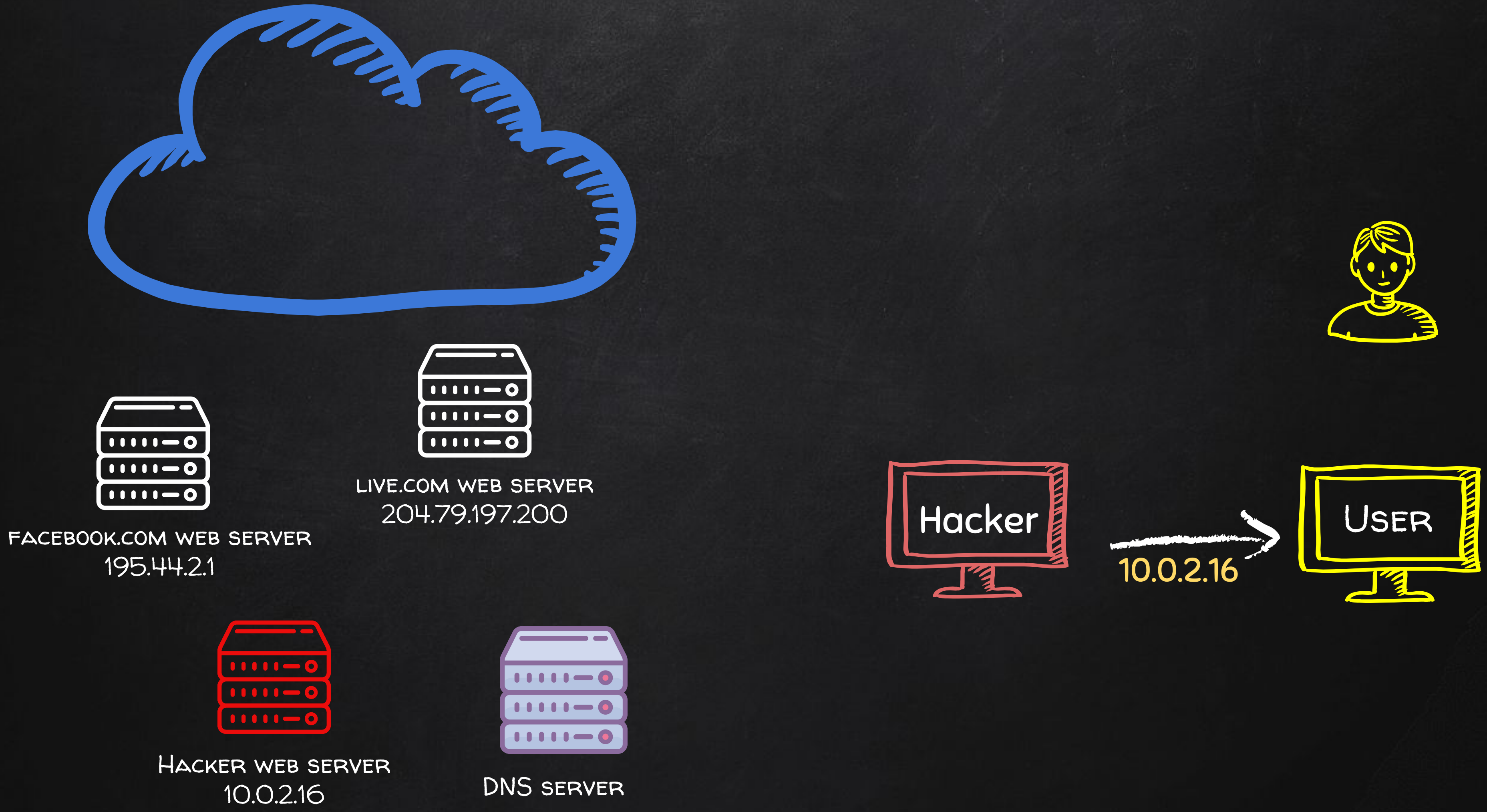
LIVE.COM WEB SERVER
204.79.197.200

HACKER WEB SERVER
10.0.2.16

DNS SERVER



FACEBOOK.COM WEB SERVER
195.44.2.1

LIVE.COM WEB SERVER
204.79.197.200

HACKER WEB SERVER
10.0.2.16

DNS SERVER

Hacker

10.0.2.16

USER

MITM

Code Injection

- Inject Javascript/HTML code.
- Code gets executed by the target browser

→ use the `--inject` plugin

Code can be

1. Stored in a file `--js-file` or `--html-file`
2. Stored online `--js-url` or `--html-url`
3. Supplied through the command line `--js-payload` or `--html-payload`

Creating a Fake Access Point Using Mana-Toolkit

- Tools run rogue access point attacks.
- It can:
  - Automatically configure and create fake AP.
  - Automatically sniff data.
  - Automatically bypass https.
  - ....etc

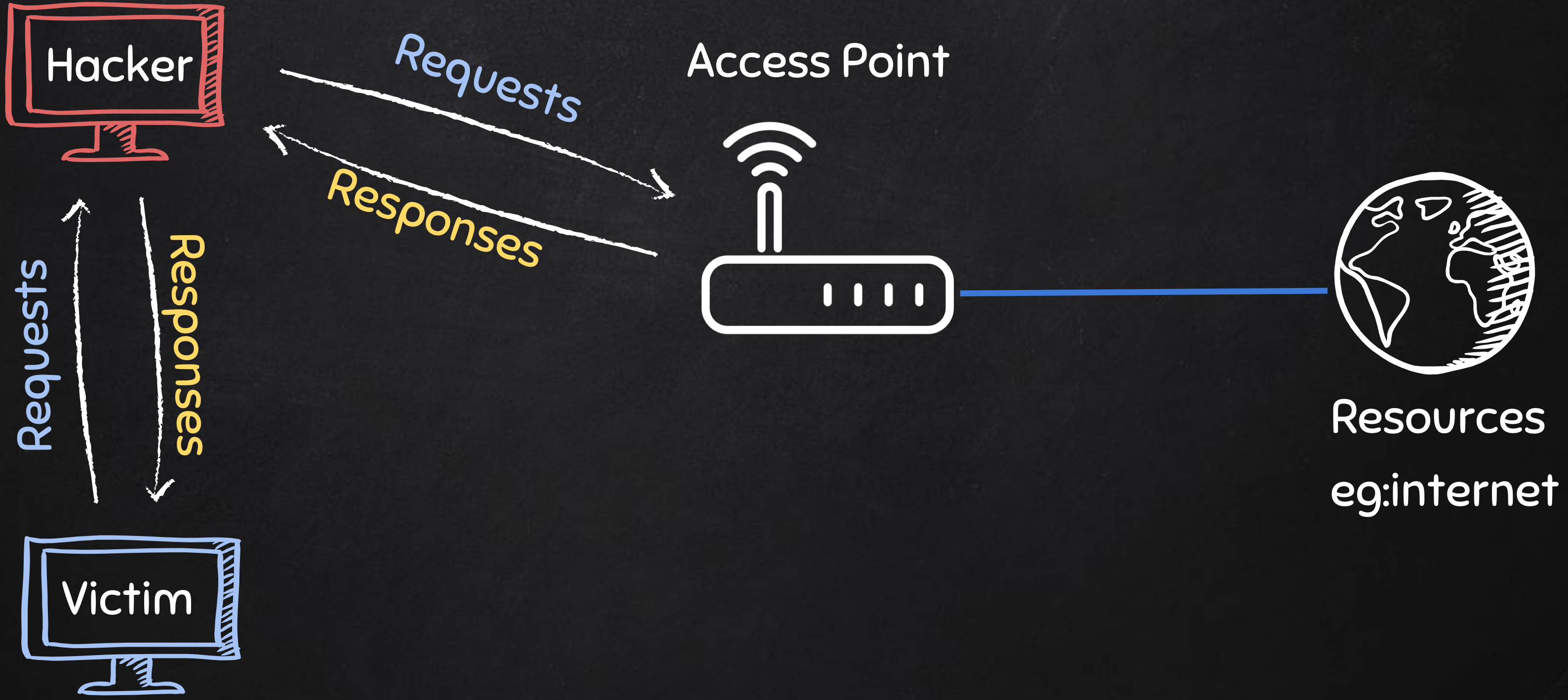
Creating a Fake Access Point Using Mana-Toolkit

- Tools run rogue access point attacks.
- It can:
  - Automatically configure and create fake AP.
  - Automatically sniff data.
  - Automatically bypass https.
  - ....etc

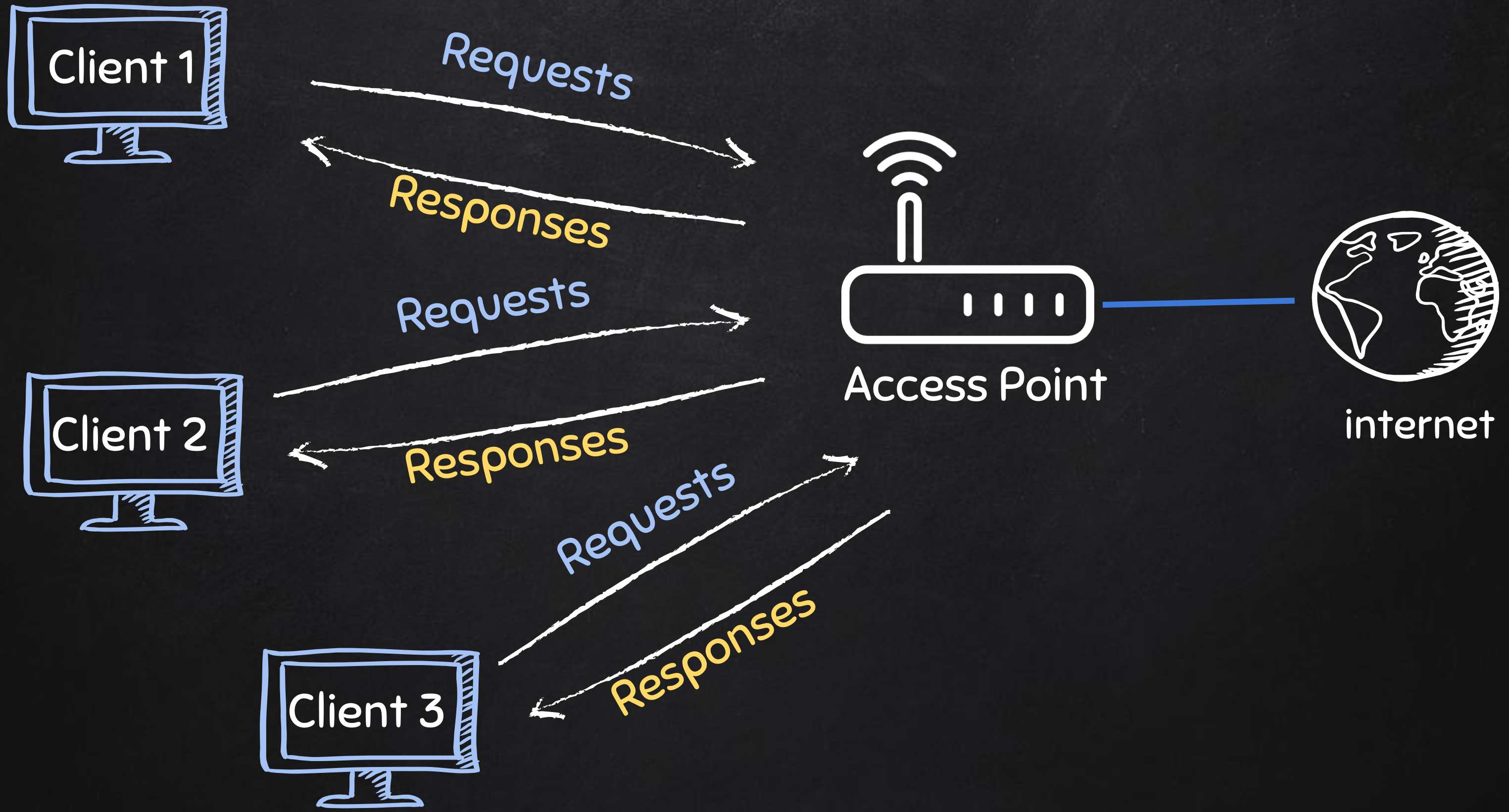
Mana has 3 main start scripts:

1. start-noupstream.sh – starts fake AP with no internet access.
2. start-nat-simple.sh – starts fake AP with internet access.
3. start-nat-full.sh – starts fake AP with internet access, and automatically starts sniffing data, bypass https.

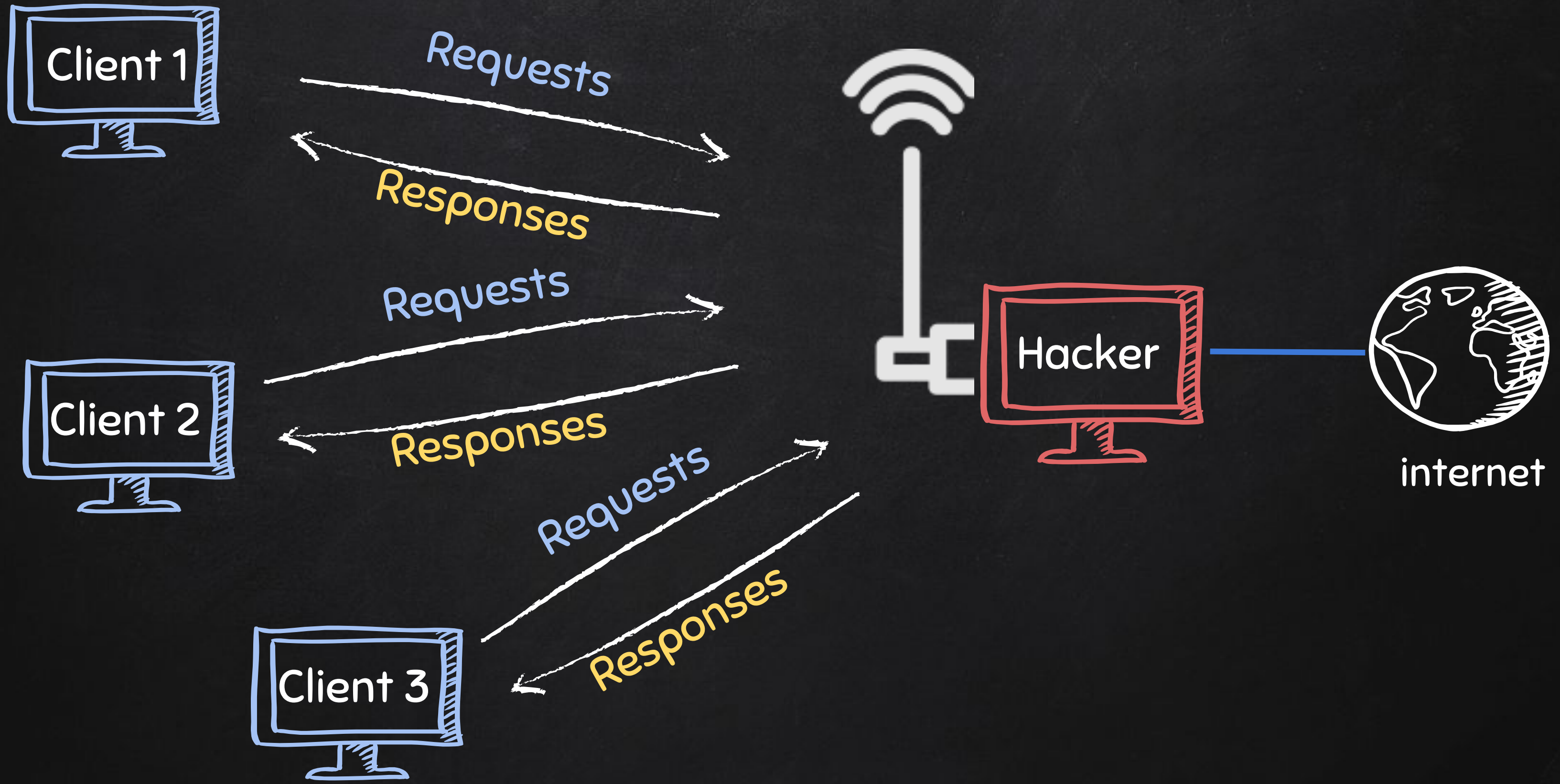
ARP Spoofing



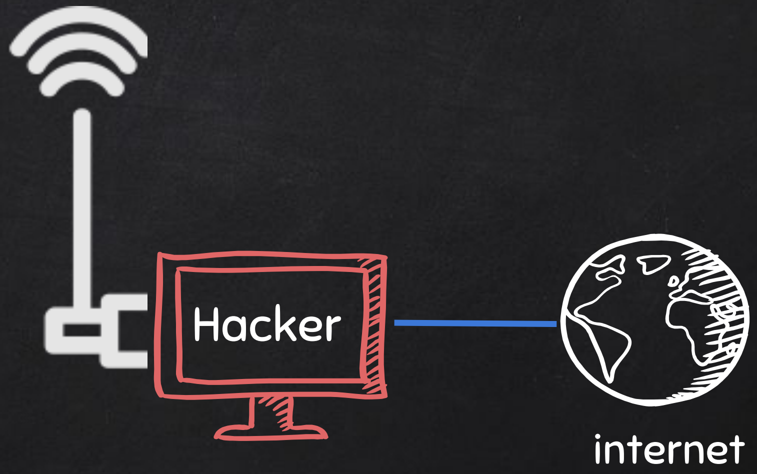
Typical Network



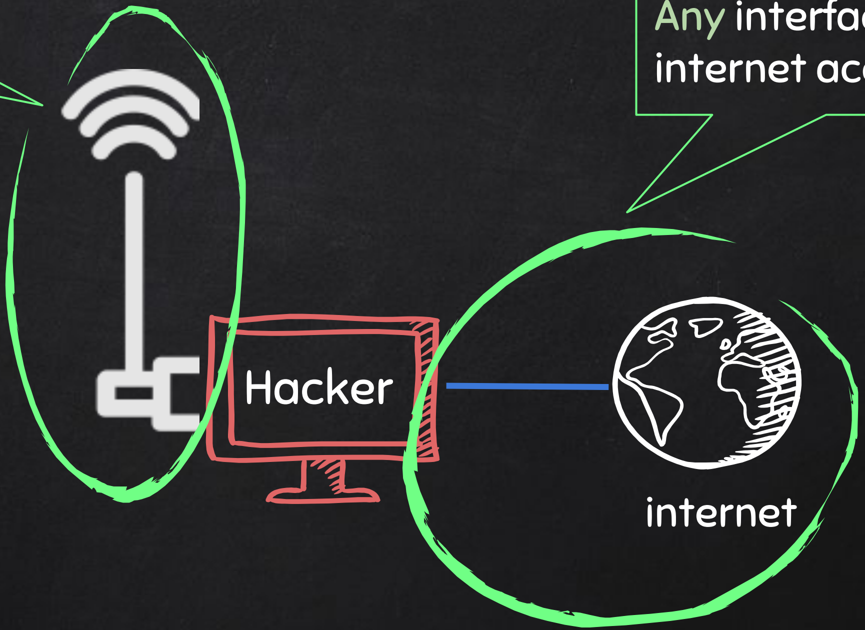
Creating a Fake Access Point



Creating a Fake Access Point



Creating a Fake Access Point



Wireless adapter that supports AP mode

Any interface with internet access