

# CYBER SECURITY WITH IBM QRADAR

LONG TERM INTERNSHIP  
WEEK-1  
ASSIGNMENT-1

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DAY-1

# INTRODUCTION TO **CYBER SECURITY**

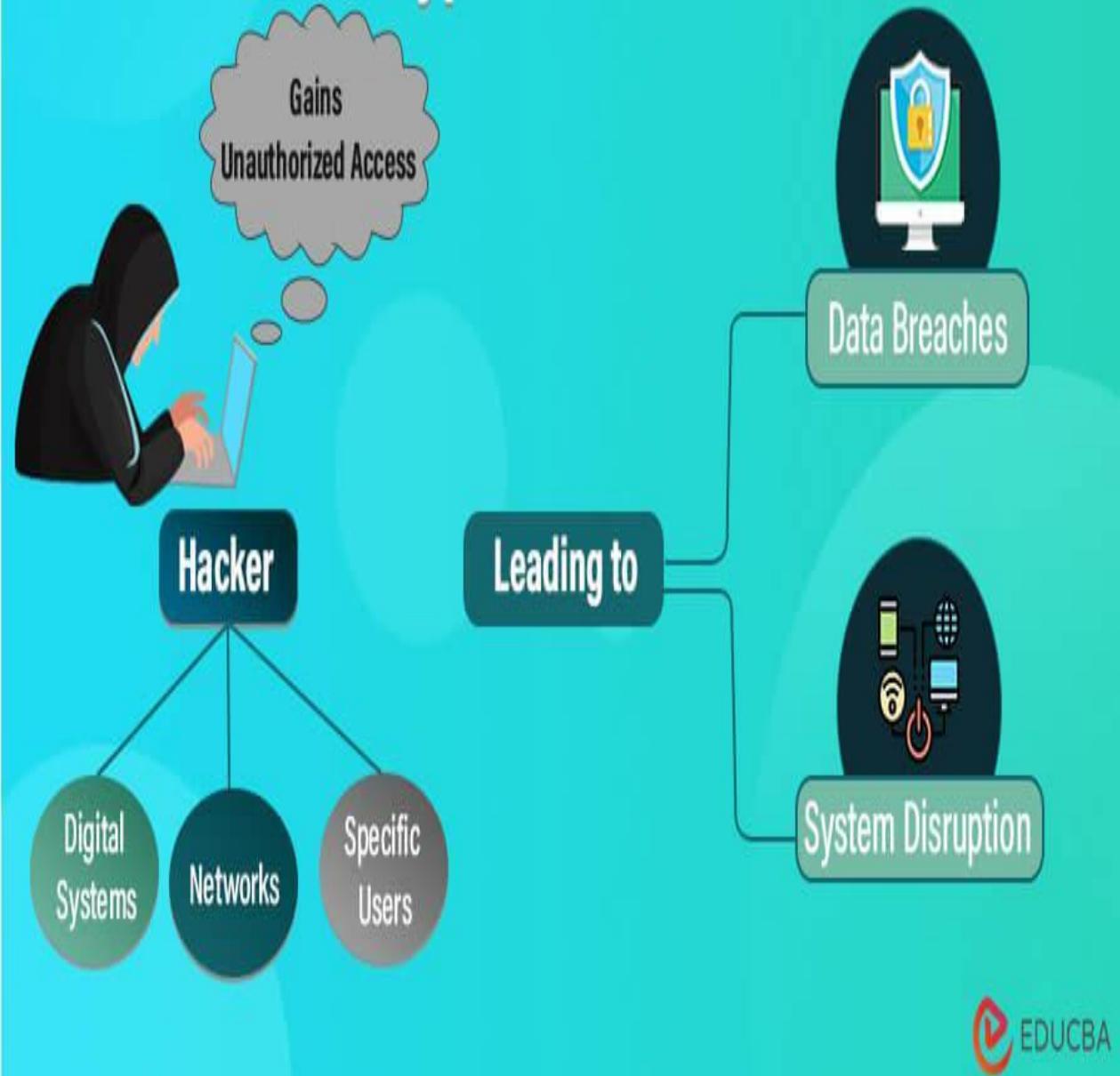
GUIDE TO THE WORLD OF CYBER SECURITY



# What is Cyber Security?

Cyber security consists of technologies, processes and controls designed to protect systems, networks, programs, devices and data from cyber attacks.

# Types of Attack



# Attacks

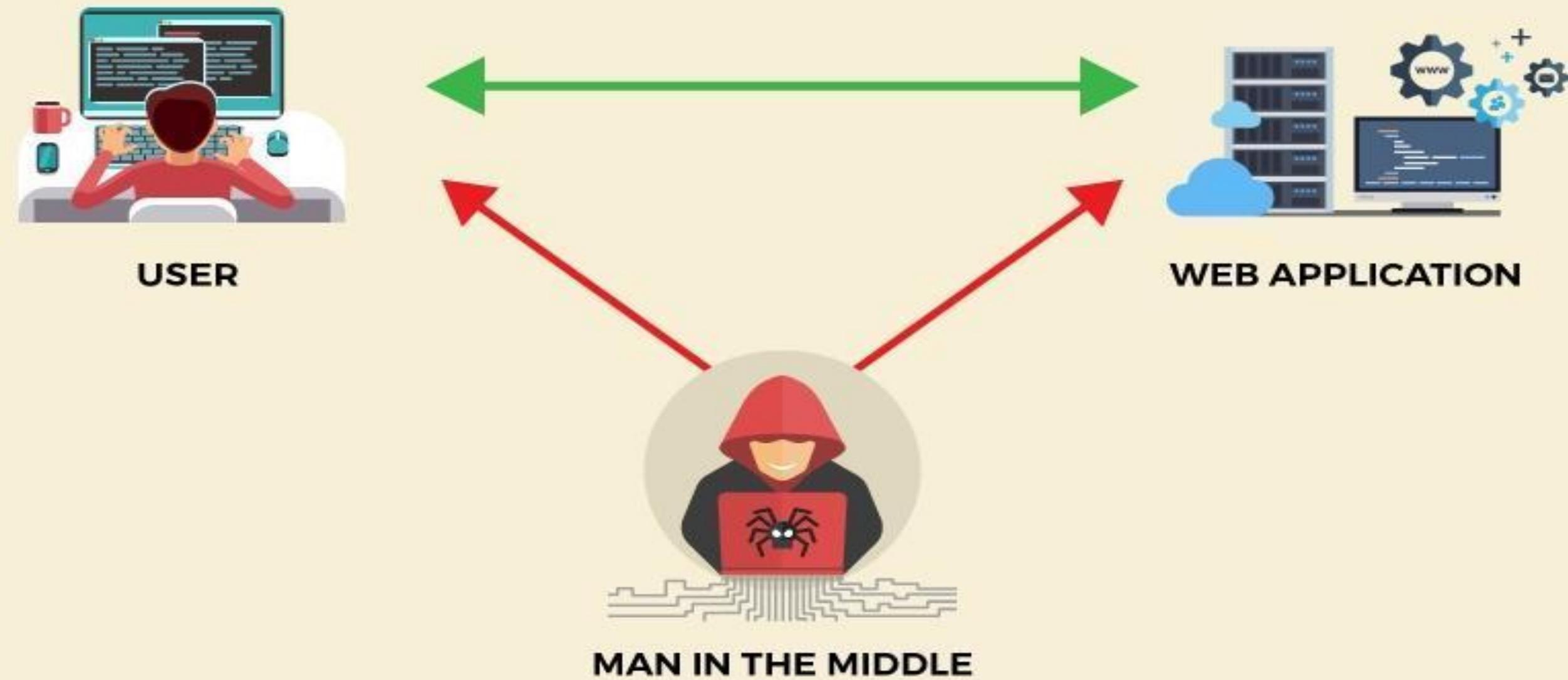
## ➤ Passive attacks

- Interception
  - Release of message contents
  - Traffic analysis

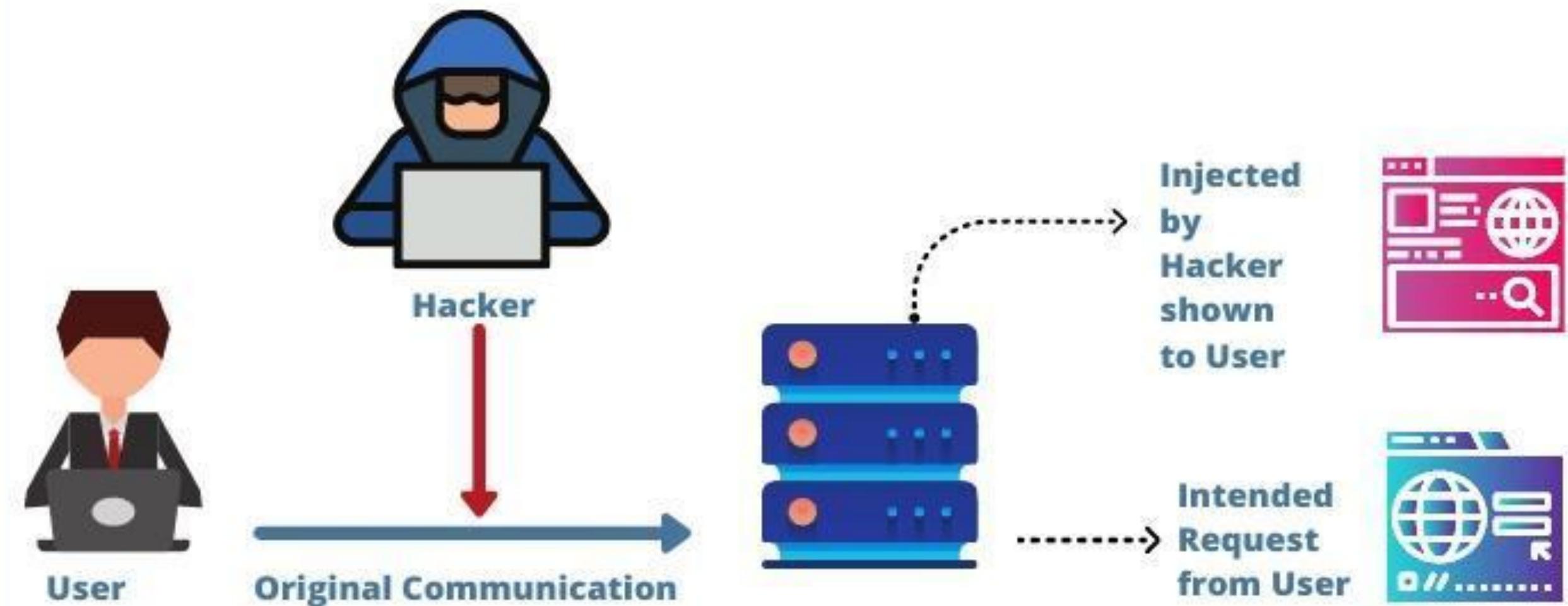
## ➤ Active attacks

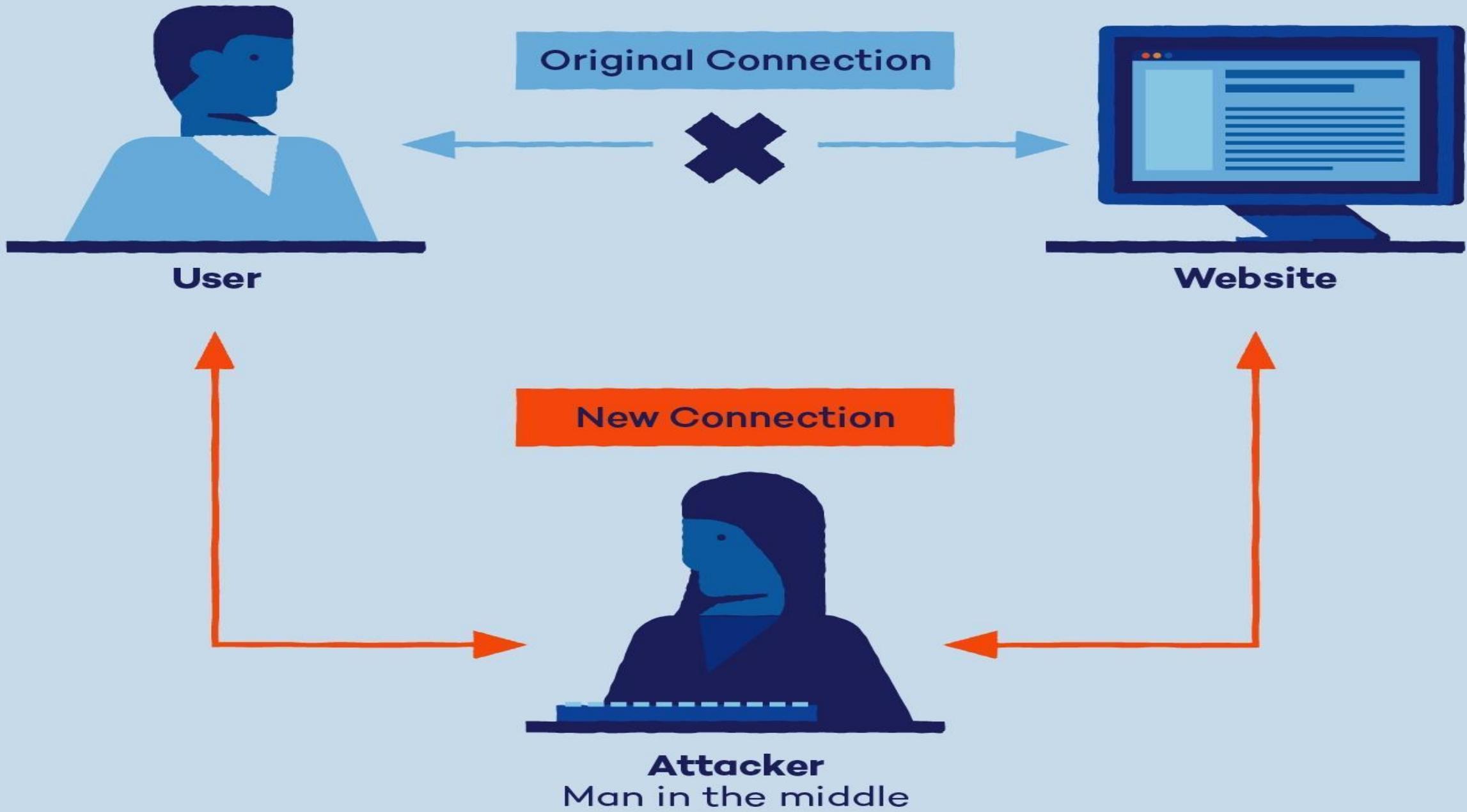
- Interruption, modification, fabrication
  - Masquerade
  - Replay
  - Modification
  - Denial of service

# HOW MAN-IN-THE-MIDDLE ATTACK WORKS



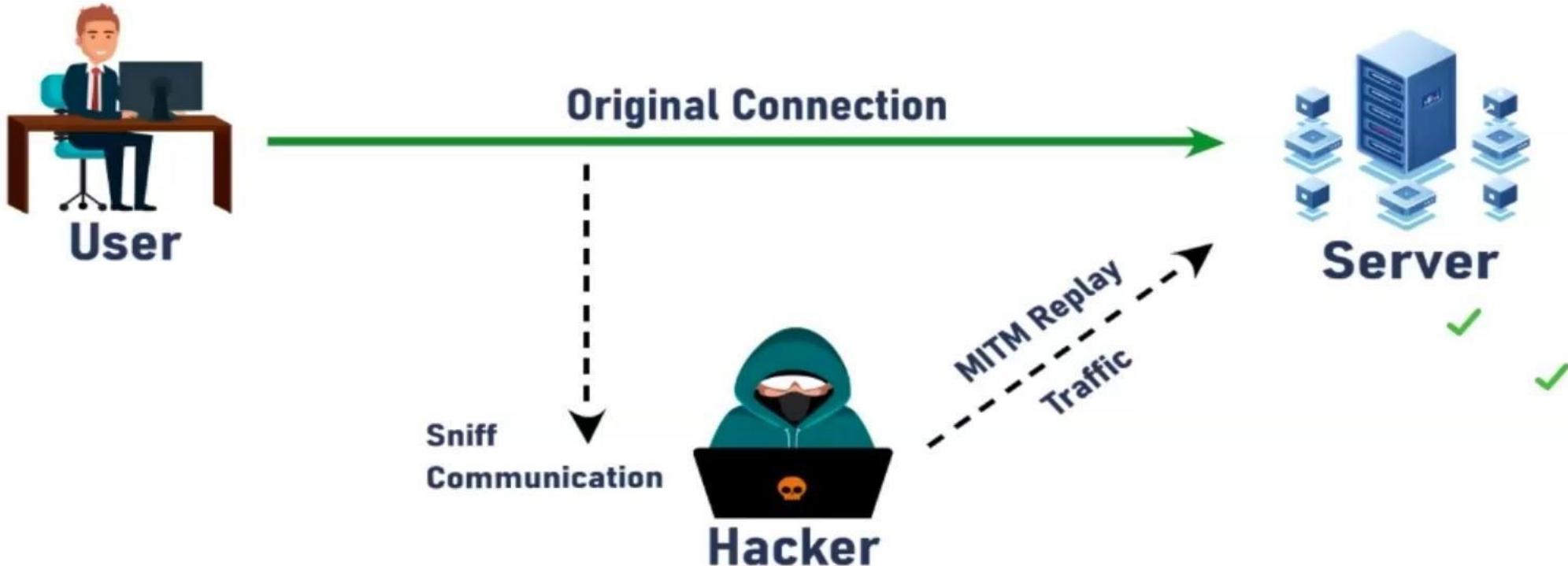
## WHAT IS SPOOFING ATTACK





# REPLAY ATTACK

## Session Replay Attack





# NETWORK SECURITY

A hooded figure stands in front of a background composed of a dense grid of binary code (0s and 1s). The figure is wearing a dark hoodie and is positioned centrally. The background has a blue and white color palette.

# SECURITY HACKER

# IP Addresses: An Overview

They're so much more than a string of numbers.



IP addresses are a **unique identifier assigned to internet-connected devices** and they're required for your device to access the internet.

# What is Phishing?

Phishing is a cybercrime in which scammers try to lure you into giving up your personal information by impersonating a trusted source. Phishers can trick you through:



Text Messages



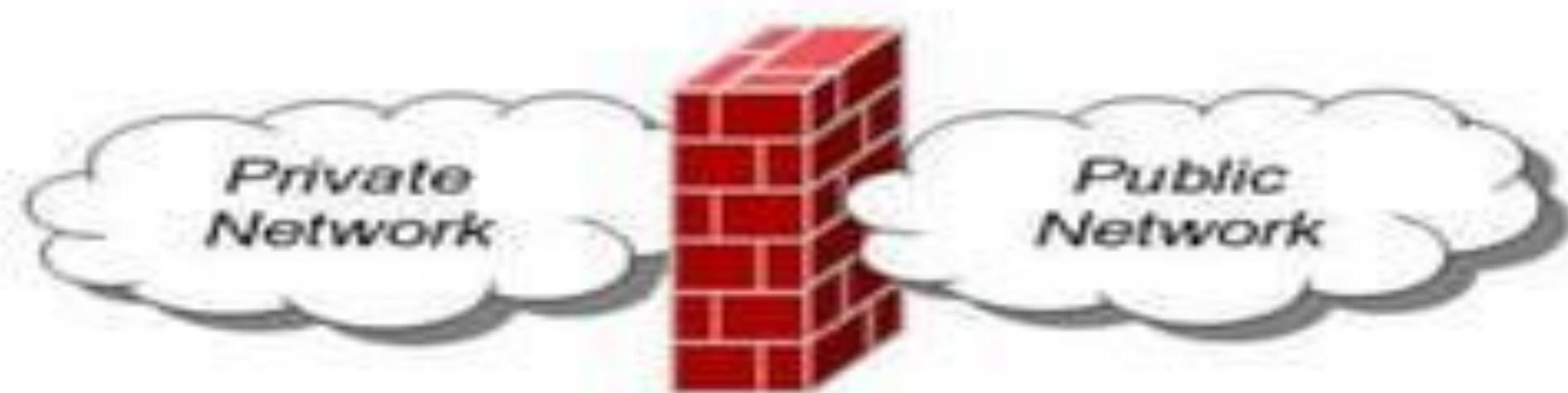
Emails



Phone Calls

# Firewall

- **Definition:** A Network Firewall is a system or group of systems used to control access between two networks — a trusted network and an untrusted network — using pre-configured rules or filters.



# Types of Ransomware



## Crypto Ransomware

This type of ransomware encrypts files on a computer so that the user loses access to essential files.

### Examples:

- BadRabbit
- Cryptolocker
- SamSam
- Thanos

## Locker Ransomware

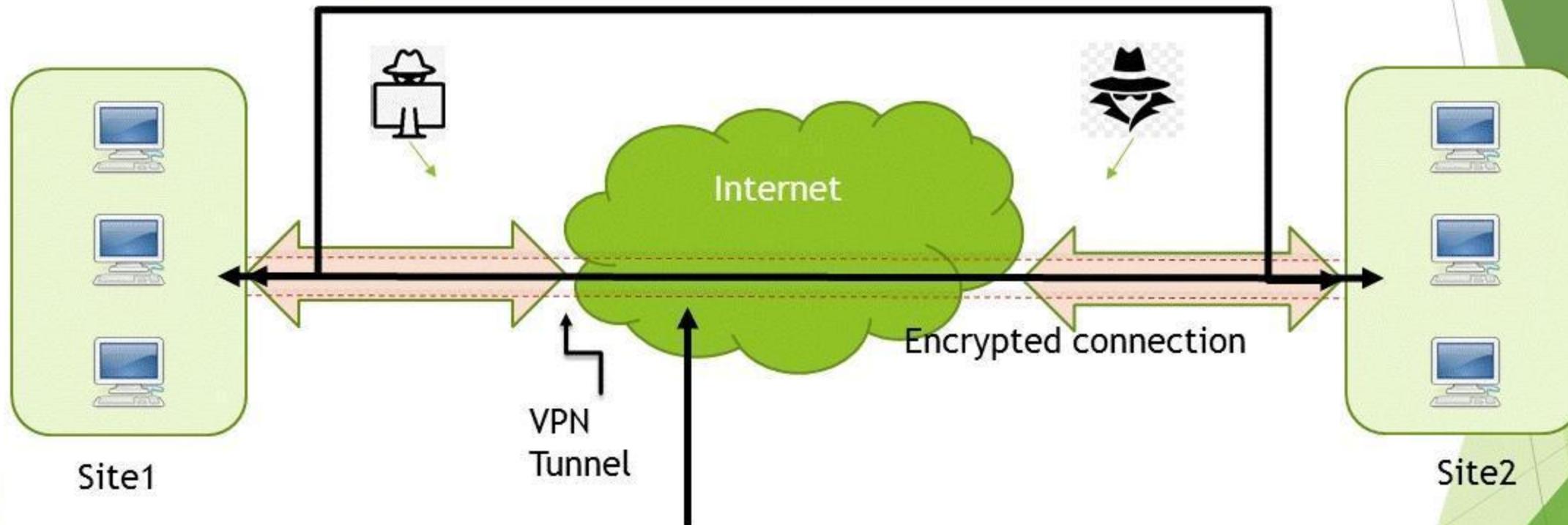
This type of ransomware locks victims out of their device and prevents them from using the device.

### Examples:

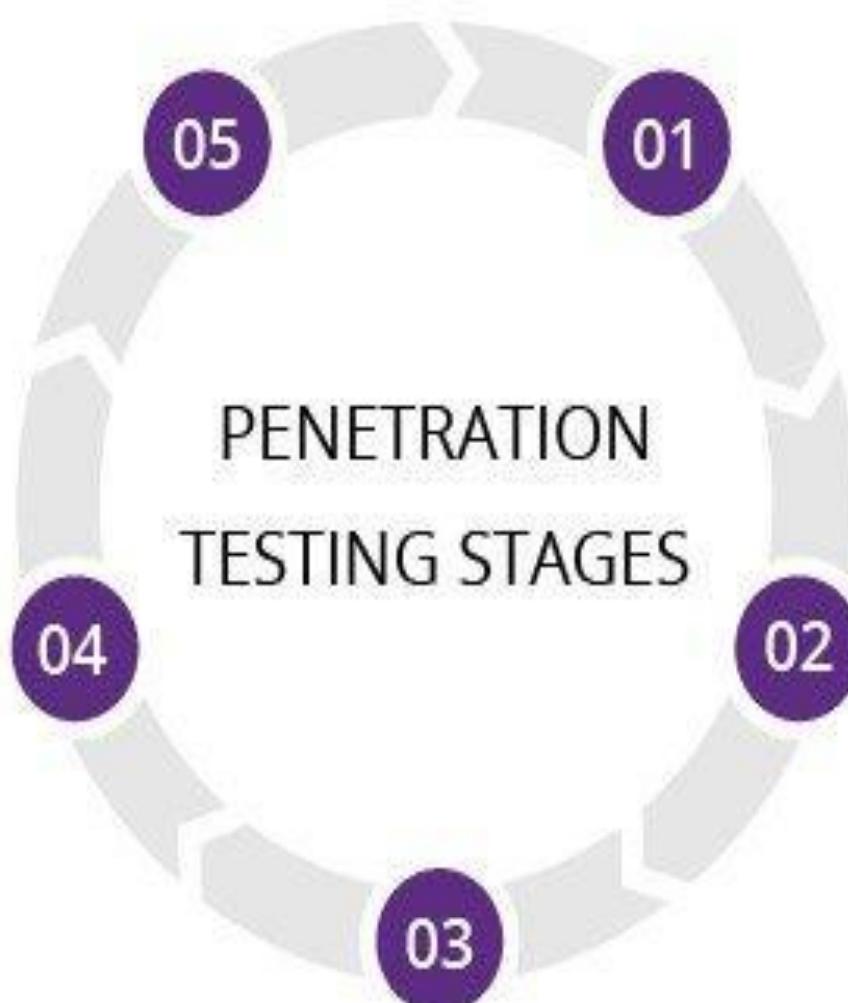
- Ryuk
- WannaCry
- NotPetya and Petya

# VPN : Virtual Private Network

- ▶ extends a private network across a public network
- ▶ A virtual point-to-point connection



- ▶ Created through the use of dedicated circuits or with tunnelling protocols over existing networks.



### Analysis and WAF configuration

Results are used to configure WAF settings before testing is run again.

### Maintaining access

APTs are imitated to see if a vulnerability can be used to maintain access.

### Gaining access

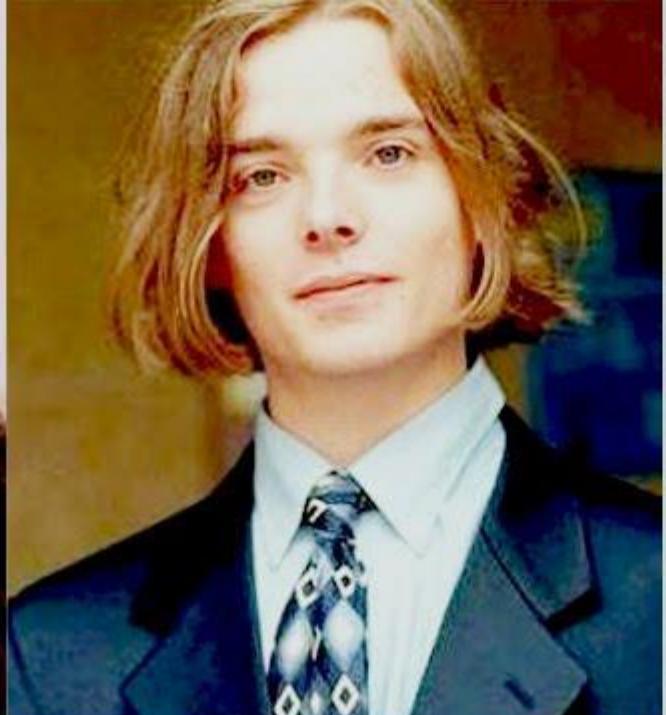
Web application attacks are staged to uncover a target's vulnerabilities.

### Planning and reconnaissance

Test goals are defined and intelligence is gathered.

### Scanning

Scanning tools are used to understand how a target responds to intrusions.



# TOP 10

HD newsglitz

# HACKERS



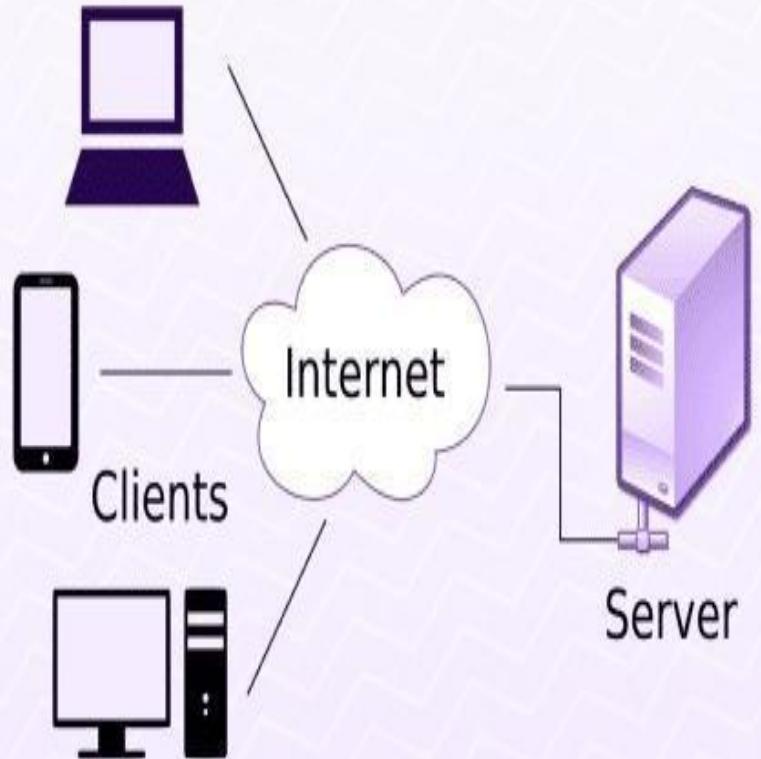
# 5 Phases of **Ethical Hacking**



# Introduction To Network Fundamentals: **Network Basics**



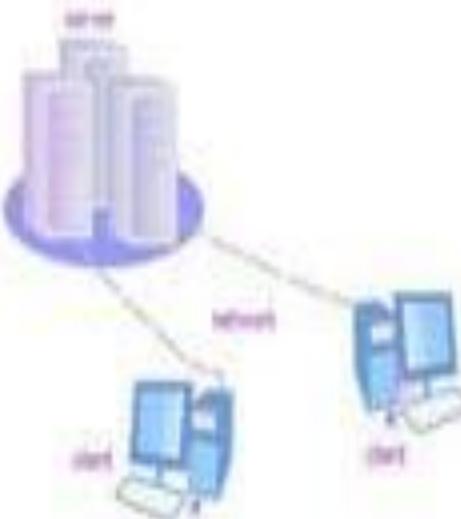
## Client Server Architecture

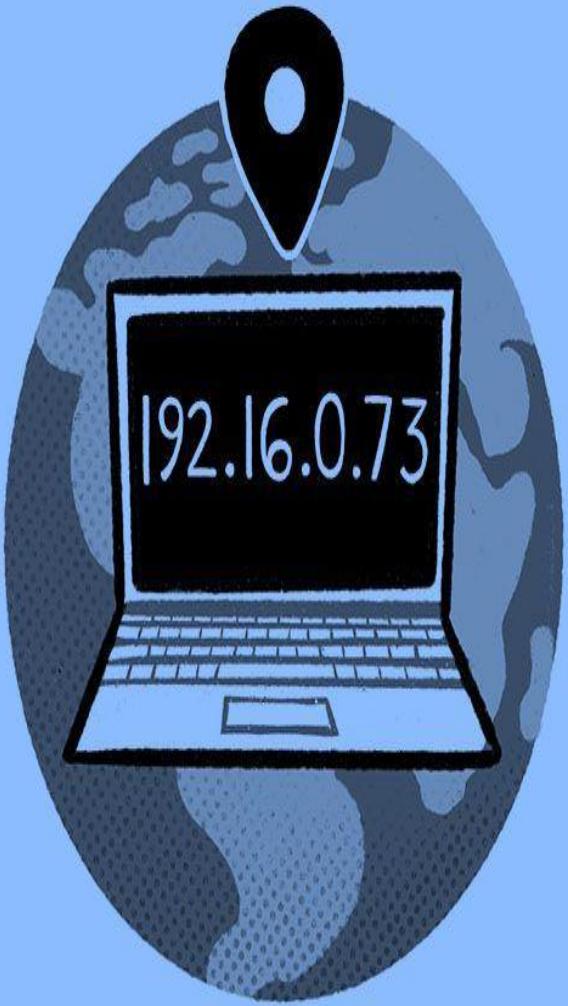


# Definition

The term '**Client-Server**' refers to the Network Architecture, where one or more computers are connected a server.

That one computer (*the Client*) or more sends a service request to another computer (*the Server*).





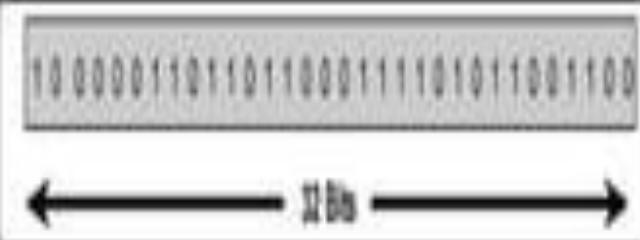
# IP Address

[*ī-pē ə-'dres*]

A number used to identify a computer or network of computers.

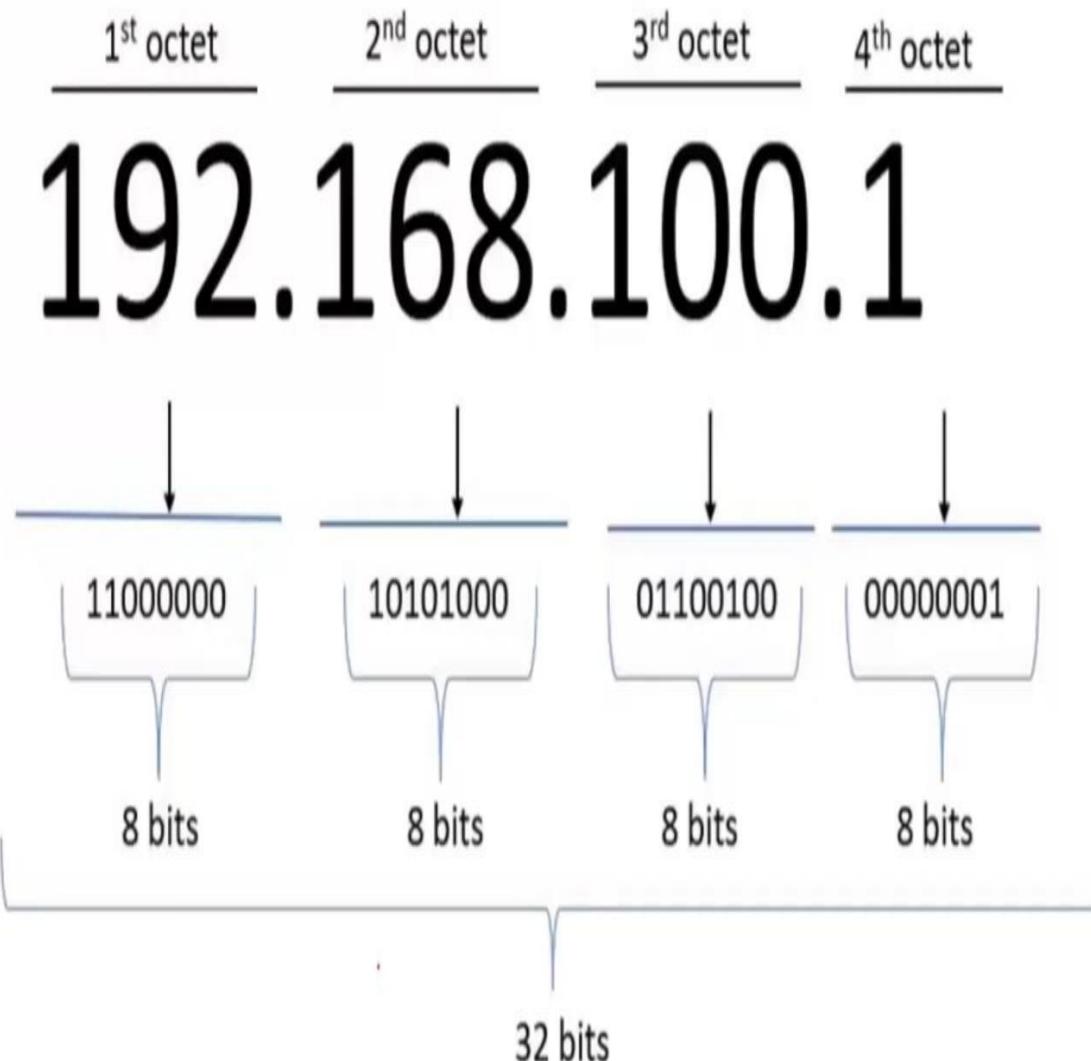
## What is an IP address

- An IP address is a 32-bit sequence of 1s and 0s.
- A way to identify machines on a network
- A unique identifier
- A numerical label





## IPv4 Address 4-Octet



# IPV6

BREAKDOWN OF 128-BIT IPv6 NUMBER

2001:0DB8:0234:AB00:0123:4567:8901:ABCD

2 Global Unicast  
Address Indicator

001 Region

0DB8 Local Internet Registry (LIR)  
or Internet Service Provider (ISP)

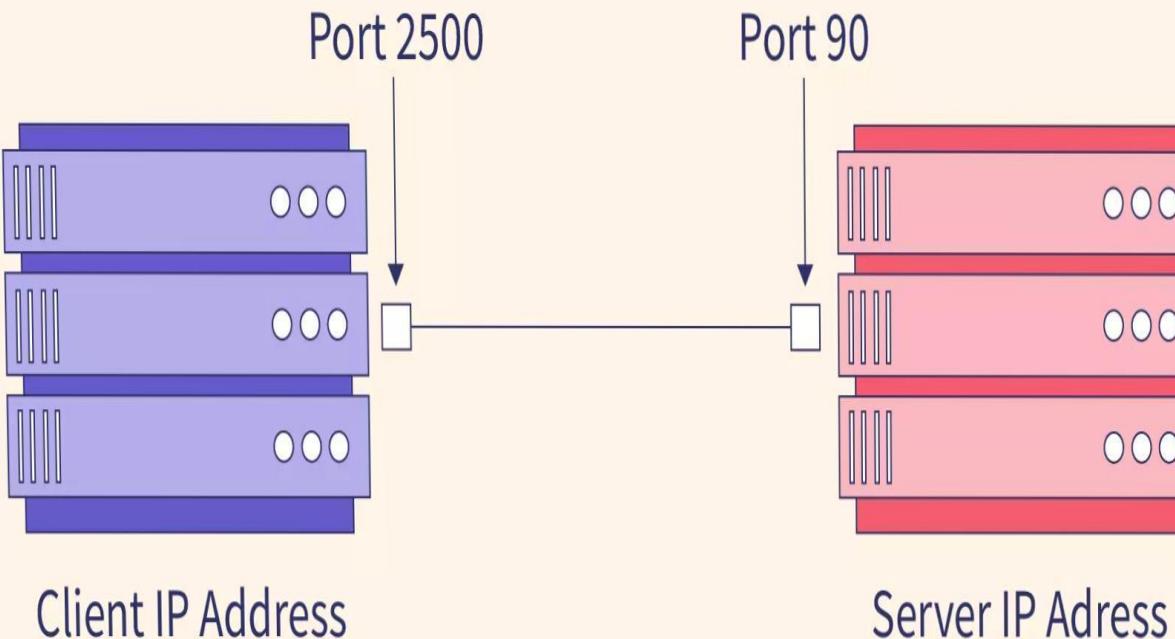
0234 Customer

AB00 Subnet

0123:4567:8901:ABCD

The 64-bit Extended Unique Identifier  
(EUI-64TM)

## What is Port ?



## NETWORK PORTS

Well-known Ports

0 - 1023

Registered Ports

1024 - 49151

Dynamic Ports

49152 - 65565

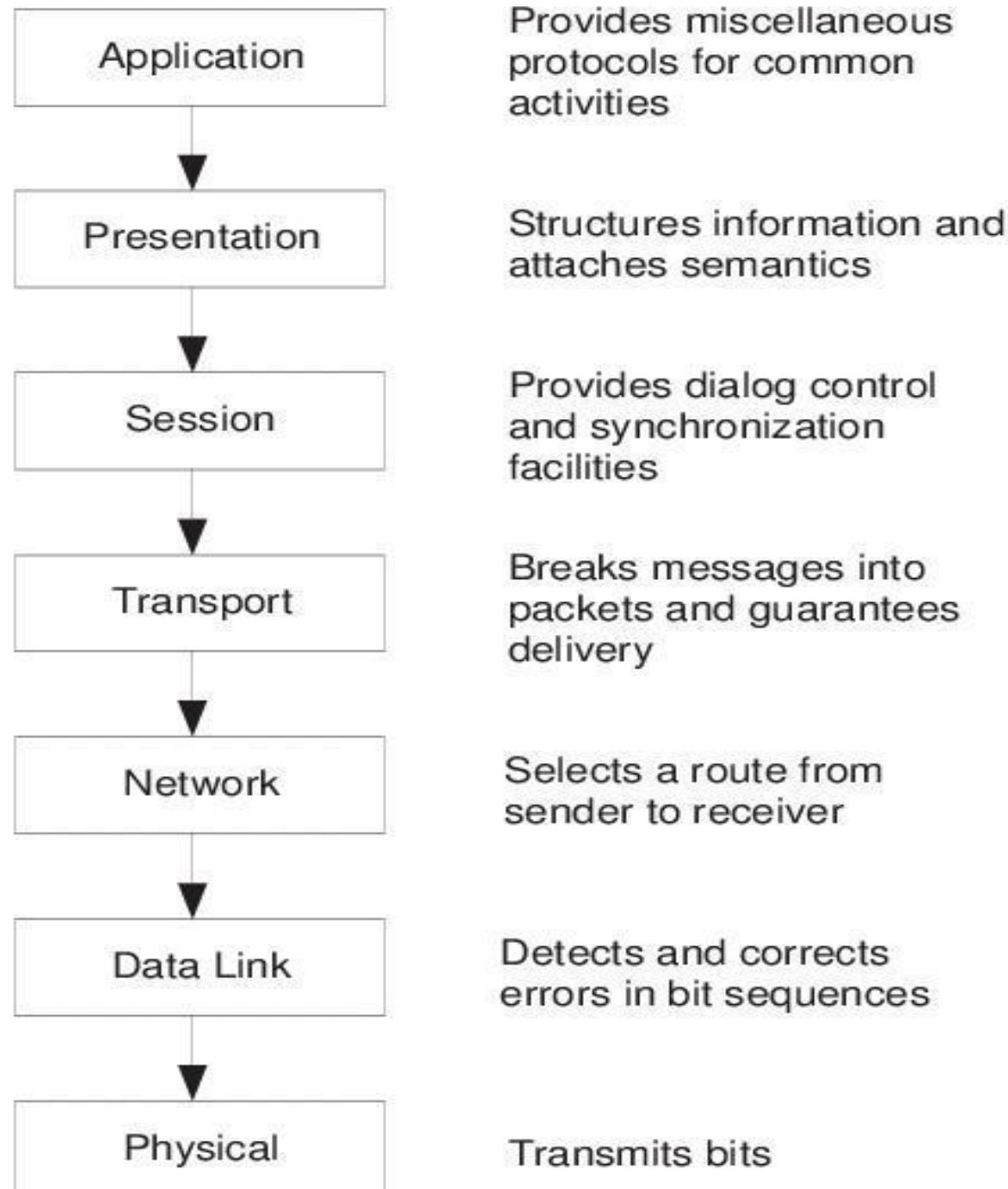
# Common Network Ports Cheat Sheet

Port	Protocol	Name	Port	Protocol	Name	Port	Protocol	Name
1	TCP/UDP	echo	520	UDP	rip	2103	TCP/UDP	zephyr-clt
2	TCP/UDP	discard	521	UDP	ripng (ipv6)	2104	TCP/UDP	zephyr-hm
3	TCP/UDP	chargen	540	TCP	uucp	2222	TCP	directadmin
4	TCP/SCTP	ftp-data	546	TCP/UDP	dhcpv6	2401	TCP	cvspserver
5	TCP/UDP/SCTP	ftp	547	TCP/UDP	dhcpv6	2483	TCP/UDP	oracle
6	TCP/UDP/SCTP	ssh/scp/sftp	548	TCP	afp	2484	TCP/UDP	oracle
7	TCP	telnet	554	TCP/UDP	rtsp	2809	TCP/UDP	corbaloc
8	TCP	smtp	560	UDP	rmonitor	2967	TCP/UDP	symantec av
9	TCP/UDP	wins replication	563	TCP/UDP	nntp over tls/ssl	3128	TCP/UDP	http proxy
10	TCP/UDP	whois	587	TCP	smtp/submission	3222	TCP/UDP	glbp
11	UDP	tacacs	591	TCP	filemaker	3260	TCP/UDP	iscsi target
12	TCP/UDP	dns	593	TCP/UDP	microsoft dcom	3306	TCP/UDP	mysql
13	UDP	dhcp/bootp	596	TCP/UDP	smsd	3389	TCP	rdp
14	UDP	dhcp/bootp	631	TCP	ipp	3689	TCP	daap
15	UDP	tftp	636	TCP/UDP	ldap over tls/ssl	3690	TCP/UDP	svn
16	TCP	gopher	639	TCP	msdp (pim)	4321	TCP	rwhois
17	TCP	finger	646	TCP/UDP	ldp (mpls)	4333	TCP	msql
18	TCP/UDP/SCTP	http	691	TCP	microsoft exchange	4500	UDP	ipsec nat traversal
19	TCP/UDP	kerberos	860	TCP	iscsi	4899	TCP	radmin
20	TCP	hostname	873	TCP	rsync	5000	TCP	upnp
21	TCP	microsoft exchange iso-tsap	902	TCP/UDP	vmware server	5001	TCP	iperf
22	TCP	pop3	989	TCP	ftps	5004-5005	UDP	rtp/rtsp
23	TCP	ident	990	TCP	ftps	5060	TCP/UDP	sip
24	TCP	nntp (usenet)	992	TCP/UDP	telnets	5061	TCP	sip-tls

## Examples of Protocols

- **TCP/IP** (Transmission Control Protocol/Internet Protocol)
- **HTTP** (Hyper Text Transfer Protocol)
- **HTTPS** (Hyper Text Transfer Protocol Secure)
- **FTP** (File Transfer Protocol)
- **POP** (Post Office Protocol)
- **IMAP** (Internet Message Access Protocol)
- **SMTP** (Simple Mail Transfer Protocol)

You only need to know what these are – you don't need to know how they work.



# INTRODUCTION

Python, a versatile programming language, is widely used in the field of cybersecurity and hacking due to its simplicity, flexibility, and extensive libraries.



# WHY PYTHON?

Python offers readability, ease of learning, and a vast ecosystem of libraries, making it ideal for hacking tasks such as penetration testing, network scanning, and automation.

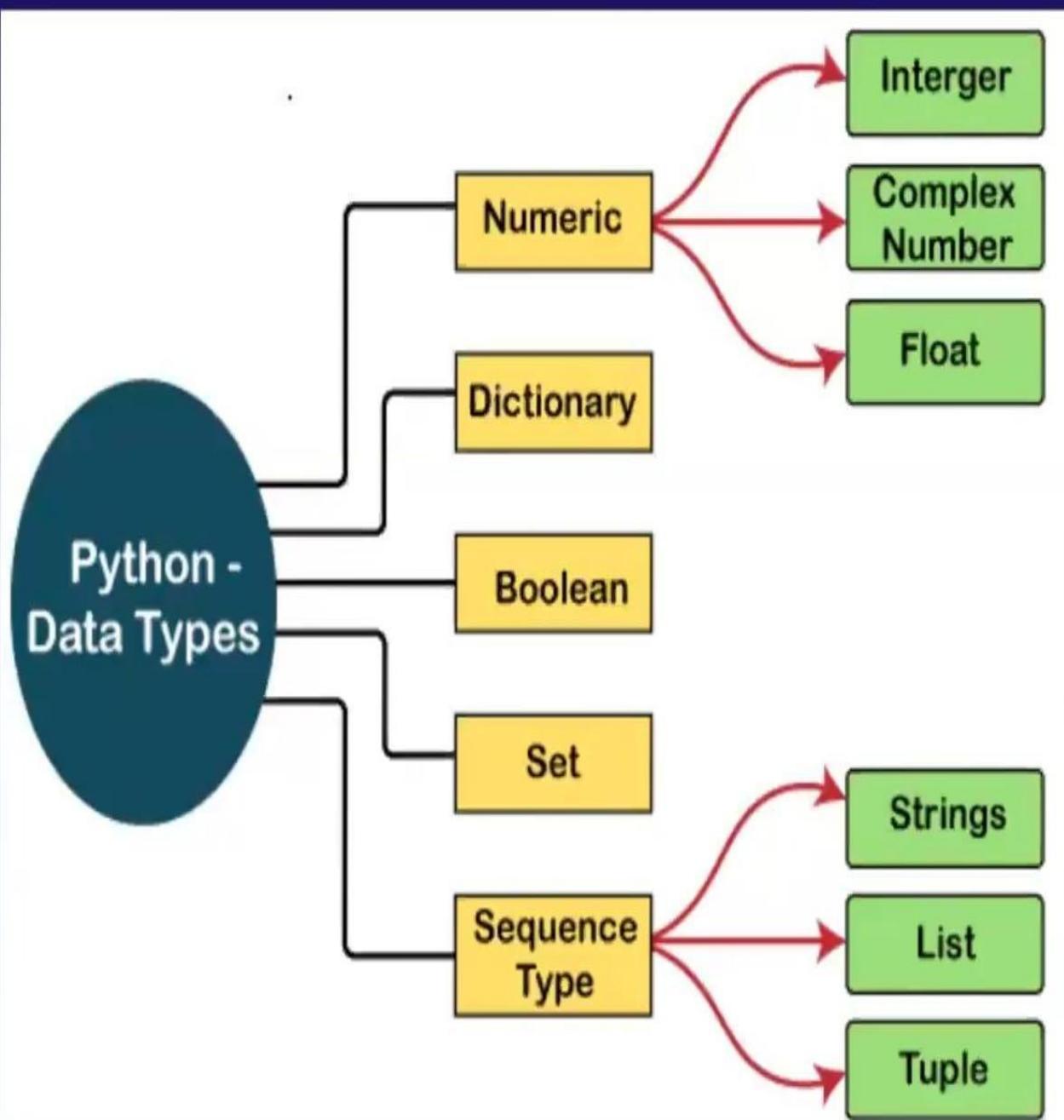


# SETTING UP PYTHON

- Install Python from the official website or package manager.
- Optionally, use virtual environments to isolate project dependencies.

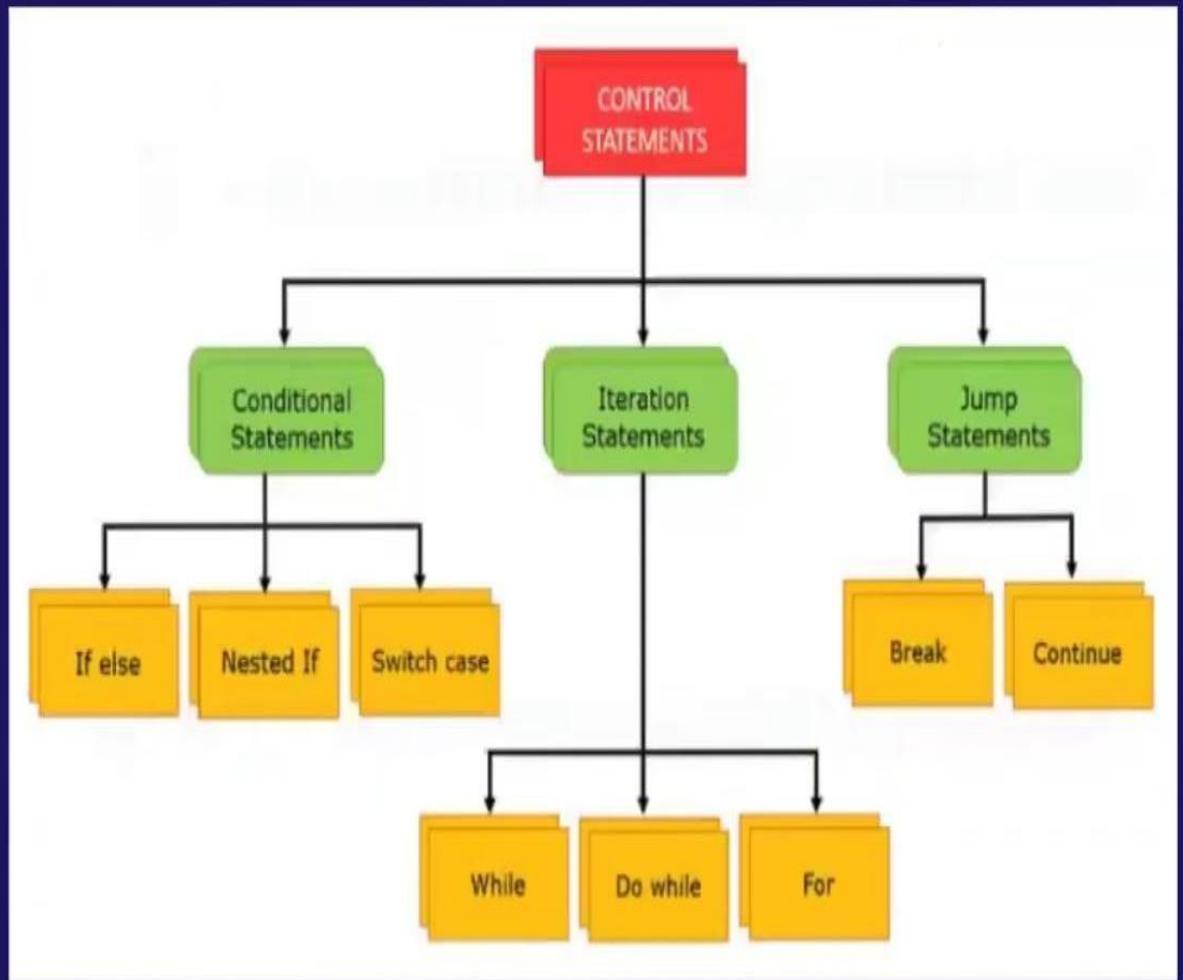


# DATA TYPES



- Python supports various data types including integers, floats, strings, lists, tuples, dictionaries, and sets.

# Control Structures



- Python provides control structures like if-else statements, loops, and exception handling for managing program flow.

# FILE HANDLING



- Python offers robust file handling capabilities, allowing hackers to read, write, and manipulate files easily.



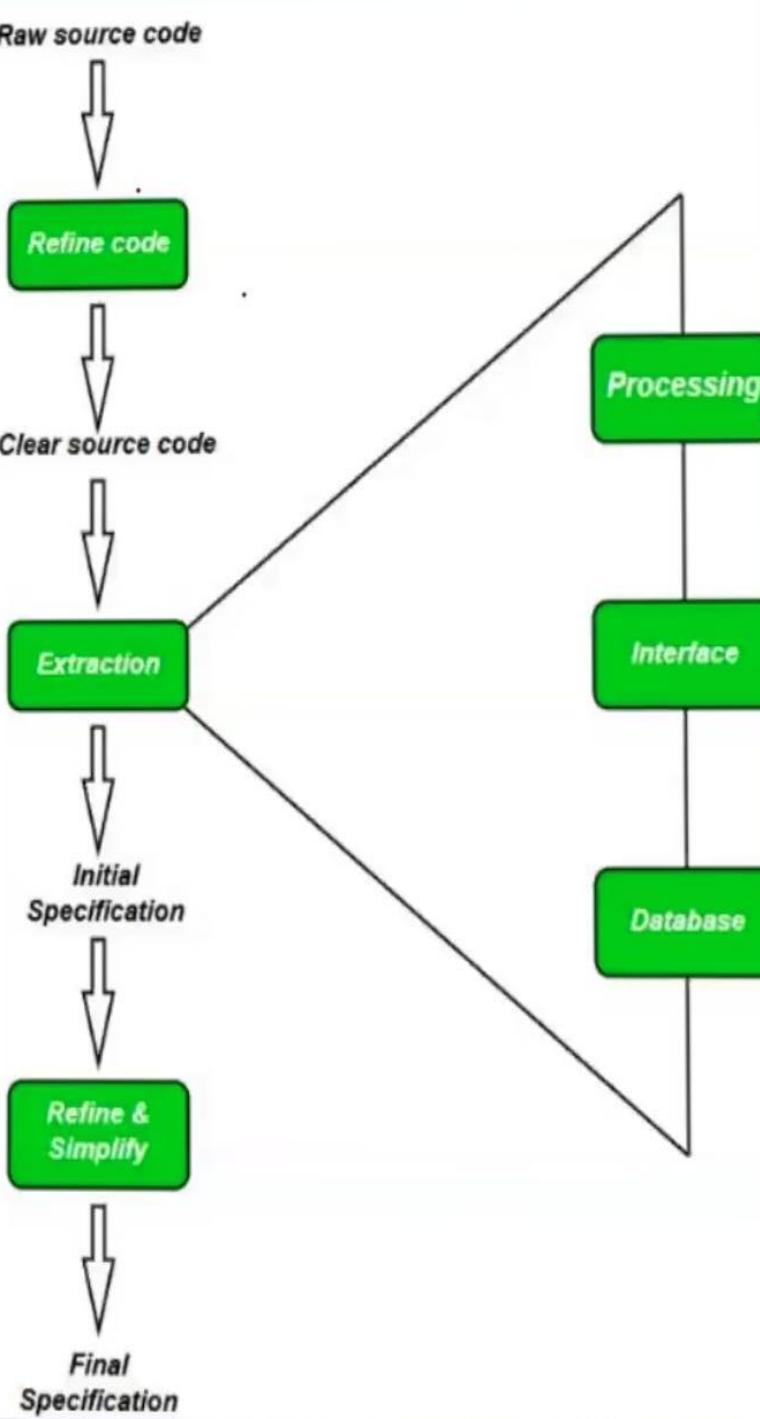
# Cryptography

- Python's cryptography library provides tools for encryption, decryption, hashing, and secure communication, crucial for securing sensitive data.

# EXPLOIT DEVELOPMENT



- Python can be used for exploit development, with libraries like 'pwntools' providing primitives for interacting with binaries, network protocols, and more.



# REVERSE ENGINEERING

- Python, along with tools like 'IDA Pro' and 'Ghidra', aids in reverse engineering tasks such as analyzing and understanding binary executables.

DAY-4

# Python Course For Hackers



# Agenda

- Cryptography for hashing.
- Text based hashing
- Packet analyzers
- Cryptoforce
- Port scanners
- Brute force
- Rever shell
- Fuzzers

# CRYPTOGRAPHY

Cryptography Theory &  
Practice Made Easy!



SOLIS TECH

security

# HACKING

password

How to Hack Computers, Basic  
Security and Penetration Testing

Solis Tech

access

## Cryptography

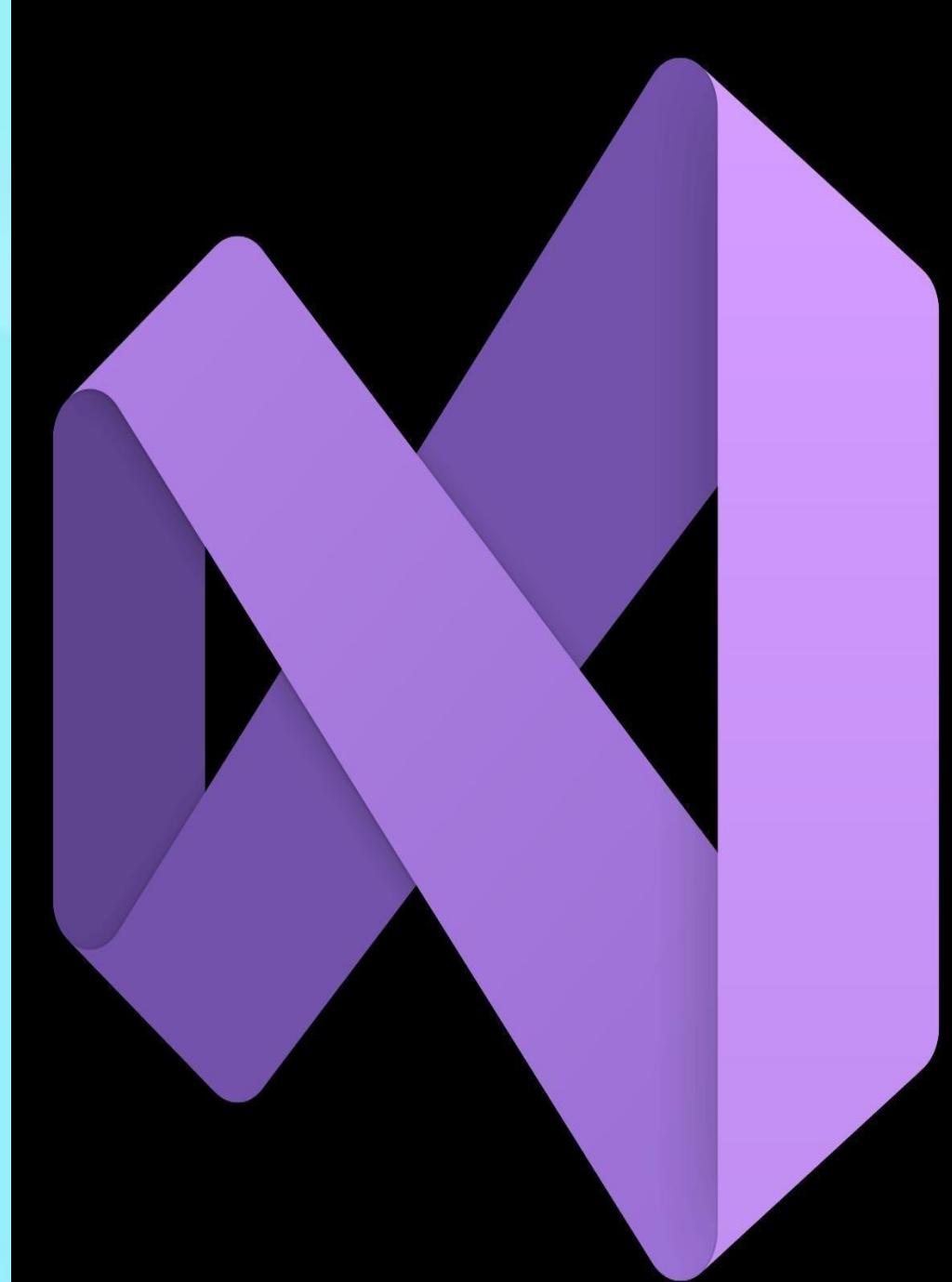
- can characterize cryptographic system by:
  - type of encryption operations used
    - substitution
    - transposition
    - product
  - number of keys used
    - single-key or private
    - two-key or public
  - way in which plaintext is processed
    - block
    - stream

visual studio

codes and it's

importants

# Visual Studio Code



# OWASP Top 10 - 2021

A01:2021	Broken Access Control
A02:2021	Cryptographic Failures
A03:2021	Injection
A04:2021	Insecure Design
A05:2021	Security Misconfiguration
A06:2021	Vulnerable and Outdated Components
A07:2021	Identification and Authentication Failures
A08:2021	Software and Data Integrity Failures
A09:2021	Security Logging and Monitoring Failures
A010:2021	Server-Side Request Forgery

- **A01:2021-Broken Access Control** moves up from the fifth position to the category with the most serious web application security risk; the contributed data indicates that on average, 3.81% of applications tested had one or more Common Weakness Enumerations (CWEs) with more than 318k occurrences of CWEs in this risk category. The 34 CWEs mapped to Broken Access Control had more occurrences in applications than any other category.

- **A02:2021-Cryptographic Failures** shifts up one position to #2, previously known as **A3:2017-Sensitive Data Exposure**, which was broad symptom rather than a root cause. The renewed name focuses on failures related to cryptography as it has been implicitly before. This category often leads to sensitive data exposure or system compromise.

- **A03:2021-Injection** slides down to the third position. 94% of the applications were tested for some form of injection with a max incidence rate of 19%, an average incidence rate of 3.37%, and the 33 CWEs mapped into this category have the second most occurrences in applications with 274k occurrences. Cross-site Scripting is now part of this category in this edition.

- **A04:2021-Insecure Design** is a new category for 2021, with a focus on risks related to design flaws. If we genuinely want to "move left" as an industry, we need more threat modeling, secure design patterns and principles, and reference architectures. An insecure design cannot be fixed by a perfect implementation as by definition, needed security controls were never created to defend against specific attacks.

- **A05:2021-Security Misconfiguration**

moves up from #6 in the previous edition; 90% of applications were tested for some form of misconfiguration, with an average incidence rate of 4.5%, and over 208k occurrences of CWEs mapped to this risk category. With more shifts into highly configurable software, it's not surprising to see this category move up. The former category for **A4:2017-XML External Entities (XXE)** is now part of this risk category.

- **A06:2021-Vulnerable and Outdated Components** was previously titled Using Components with Known Vulnerabilities and is #2 in the Top 10 community survey, but also had enough data to make the Top 10 via data analysis. This category moves up from #9 in 2017 and is a known issue that we struggle to test and assess risk. It is the only category not to have any Common Vulnerability and Exposures (CVEs) mapped to the included CWEs, so a default exploit and impact weights of 5.0 are factored into their scores.

- **A07:2021-Identification and Authentication Failures** was previously Broken Authentication and is sliding down from the second position, and now includes CWEs that are more related to identification failures. This category is still an integral part of the Top 10, but the increased availability of standardized frameworks seems to be helping.

- **A08:2021-Software and Data Integrity Failures** is a new category for 2021, focusing on making assumptions related to software updates, critical data, and CI/CD pipelines without verifying integrity. One of the highest weighted impacts from Common Vulnerability and Exposures/Common Vulnerability Scoring System (CVE/CVSS) data mapped to the 10 CWEs in this category. **A8:2017-Insecure Deserialization** is now a part of this larger category.

- A09:2021-Security Logging and Monitoring Failures was previously A10:2017-Insufficient Logging & Monitoring and is added from the Top 10 community survey (#3), moving up from #10 previously. This category is expanded to include more types of failures, is challenging to test for, and isn't well represented in the CVE/CVSS data. However, failures in this category can directly impact visibility, incident alerting, and forensics.
- A10:2021-Server-Side Request Forgery is added from the Top 10 community survey (#1). The data shows a relatively low incidence rate with above average testing coverage, along with above-average ratings for Exploit and Impact potential. This category represents the scenario where the security community members are telling us this is important, even though it's not illustrated in the data at this time.

# CEH COURSE



HACKING WEB APPLICATIONS



# MODULE OBJECTIVES

**UNDERSTANDING WEB APPLICATION CONCEPTS**

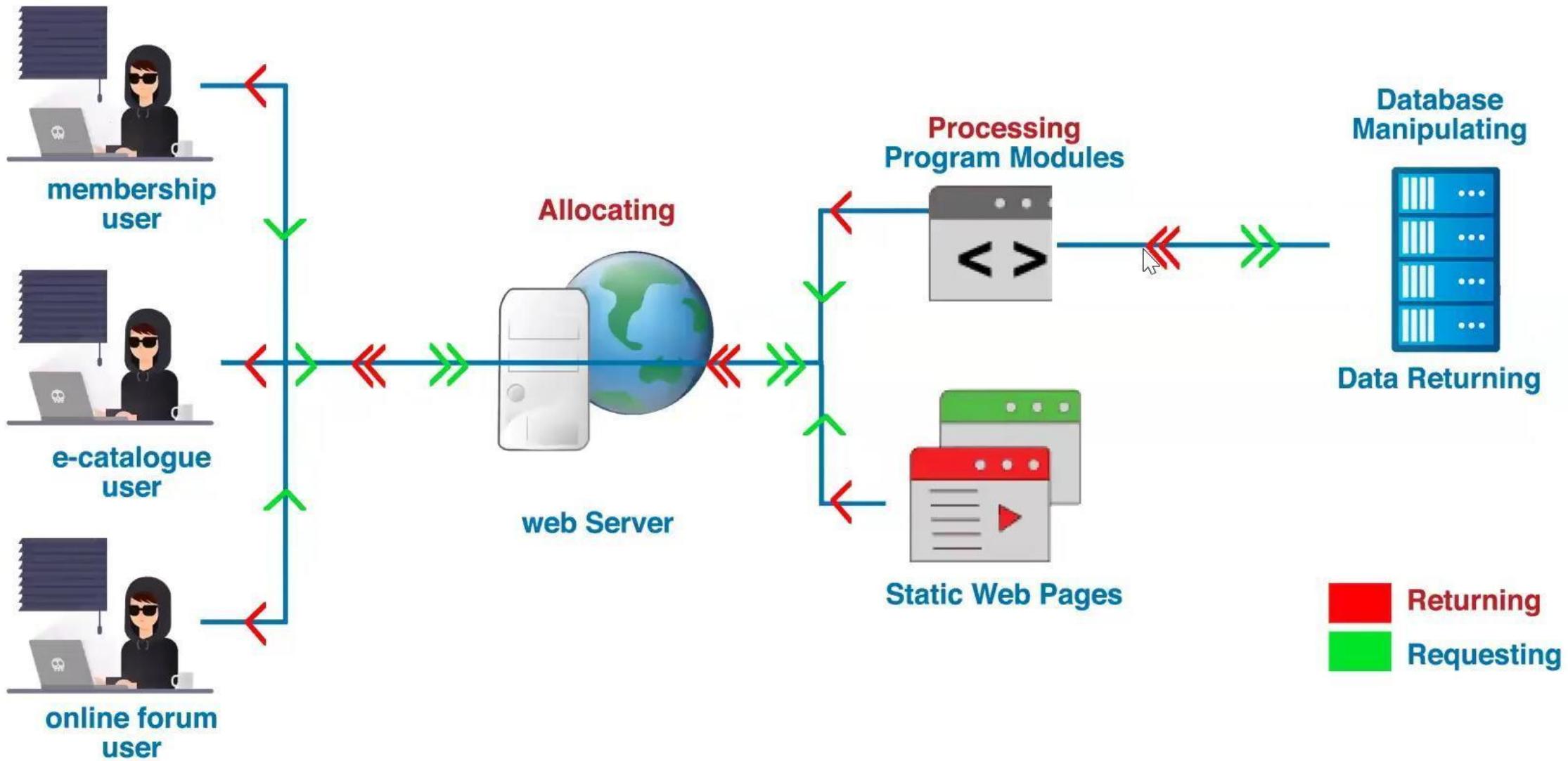
**UNDERSTANDING WEB APPLICATION THREATS**

**UNDERSTANDING WEB APPLICATIONS HACKING METHODOLOGY**

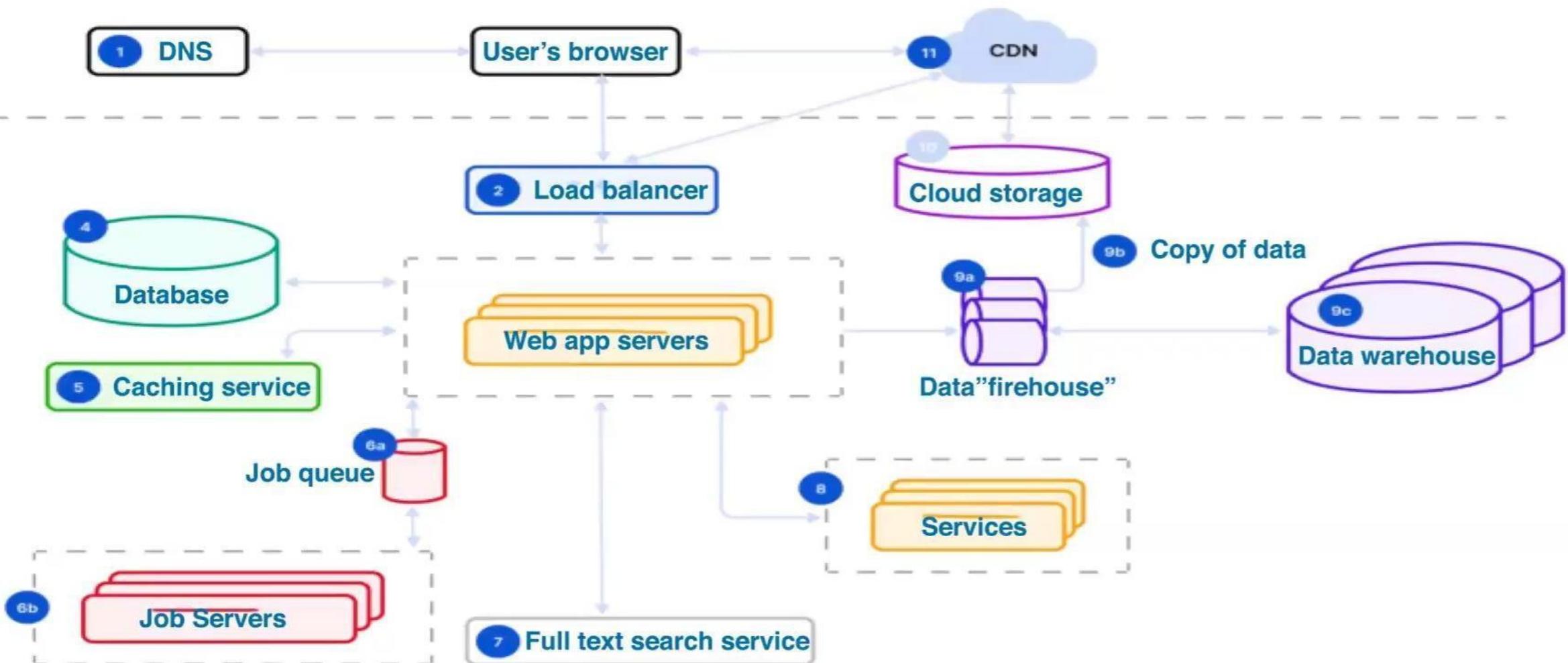
**OVERVIEW OF WEB APPLICATION HACKING TOOLS**



## HOW WEB APPLICATIONS WORKS



# WEB APPLICATION ARCHITECTURE



## VULNERABILITY STACK

CUSTOM WEB APPLICATION

THRID-PARTY COMPONENTS

WEB SERVER

DATABASE

OPERATING SYSTEM

NETWORK

SECURITY

BUSSINESS LOGIC FLAWS

OPEN SOURCE /COMMERCIAL

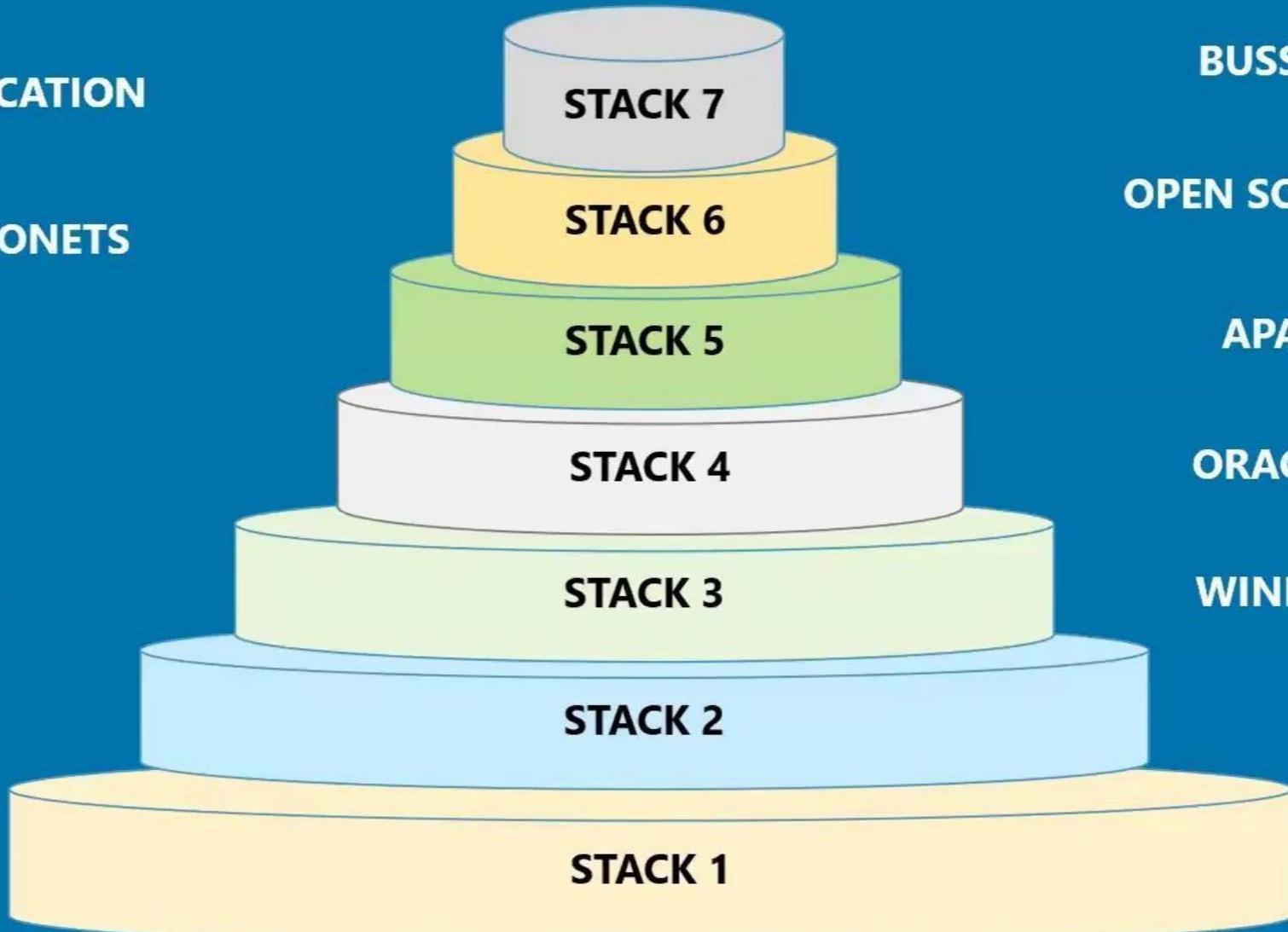
APACHE /MICROSOFT IIS

ORACLE / MYSQL / MS SQL

WINDOWS / LINUX / OS X

ROUTERS SWITCH

IPS /IDS



“

# OWASP TOP 10 APPLICATIONS SECURITY RISK - 2021 ..!



## OWASP TOP 10 API SECURITY RISKS

**API1 : - BROKEN OBJECT LEVEL AUTHORIZATION**

**API2 : - BROKEN USER AUTHENTICATION**

**API3 : - EXCESSIVE DATA EXPOSURE**

**API4 : - LACK OF RESOURCES AND RATE LIMITING**

**API5 : - BROKEN FUNCTION LEVEL AUTHORIZATION**



**API6 : - MASS ASSIGNMENT**

**API7 : - SECURITY MISCONFIGURATION**

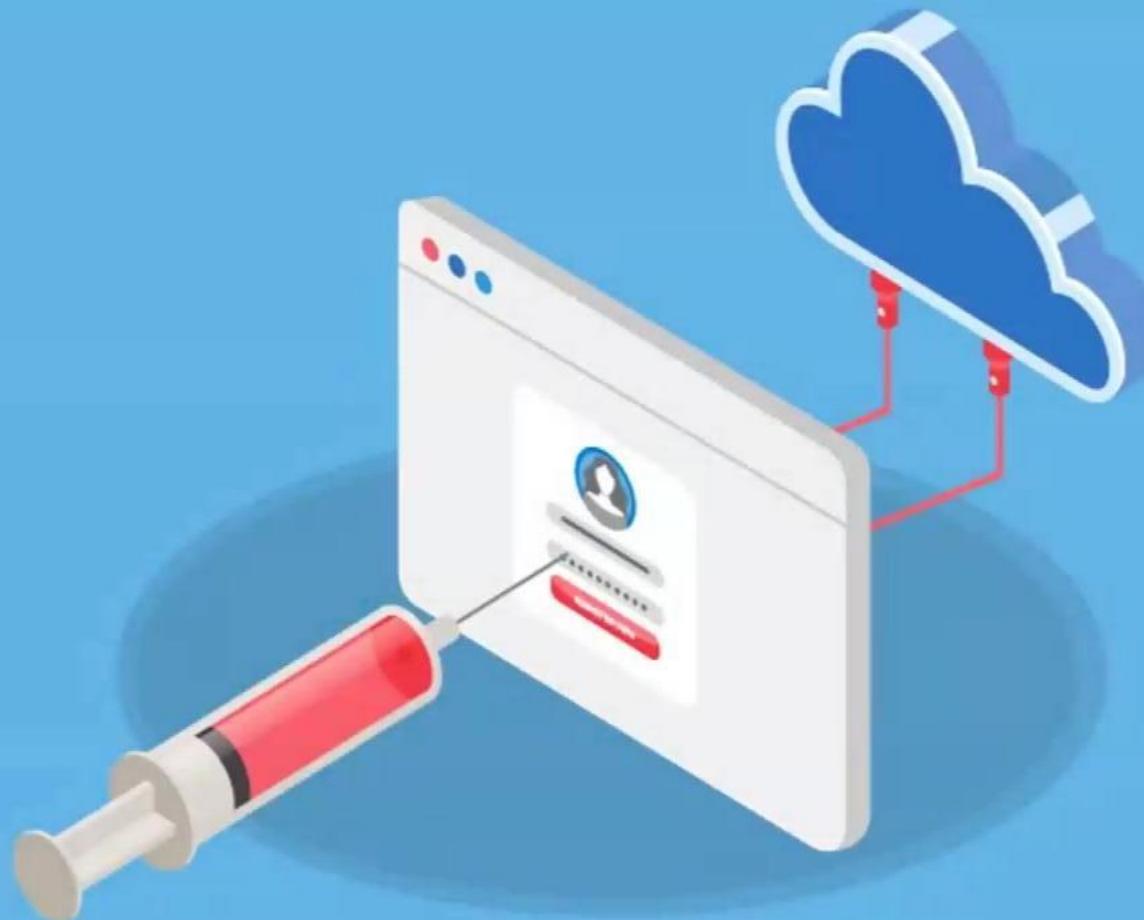
**API8 : - INJECTIONS**

**API9 : - IMPROPER ASSETS MANAGEMENT**

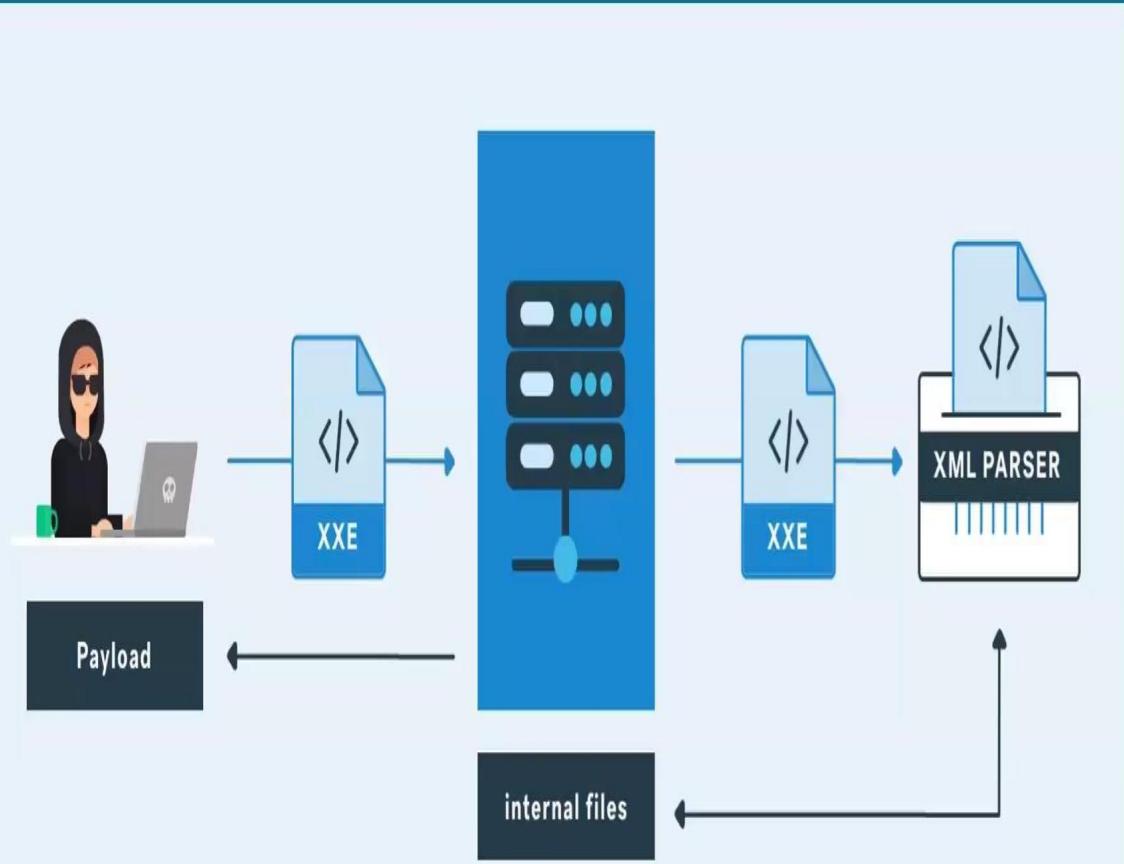
**API10 : - INSUFFICIENT LOGGING AND MONITORING**



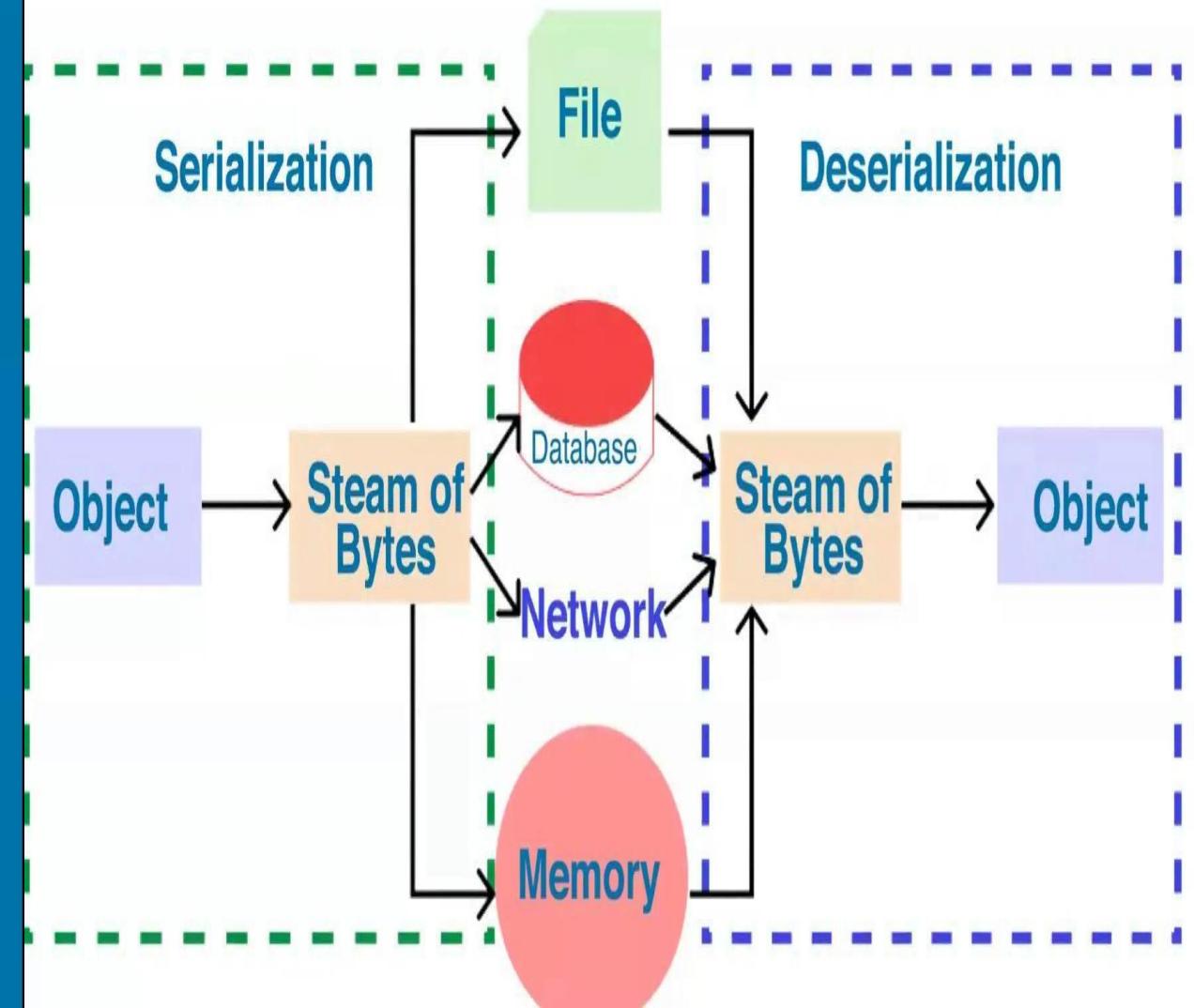
## INJECTION FLAWS



## XML EXTERNAL ENTITY



## INSECURE DESERIALIZATION



1 : - FOOTPRINT WEB INFRASTRUCTURE

5 : - ATTACK AUTHORIZATION SCHEMES

9 : - ATTACK APPLICATION LOGIC FLAWS

2 : - ANALYZE WEB APPLICATION

6 : - ATTACK ACCESS CONTROLS

10 : - ATTACK SHARED ENVIRMENTS

3 : - BYPASS CLIENT-SIDE CONTROLS

7 : - ATTACK SESSION MANAGEMENT MECHANISM

11 : - ATTACK DATABASE CONNECTIVITY

4 : - ATTACK AUTHENTICATION MECHANISM

8 : - PERFORM INJECTION ATTACKS

12 : - ATTACK WEB APP CLIENT

# THANK YOU

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