

# CYBER SECURITY With IBM And

ORadar

LONG TERM INTERNSHIP

WEEK-1

ASSIGNMENT-1

GORUSU LOKESH REDDY  
Dr.L.B.DEGREE AND PG COLLEGE  
721128805325

A.I

INTRODUCTION TO  
**CYBER SECURITY**

The background features a dark blue gradient with glowing blue lines resembling a circuit board or network connections. Light rays and glowing particles are scattered throughout, creating a futuristic and digital feel.

GUIDE TO THE WORLD OF CYBER SECURITY

**DAY -1**

# 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

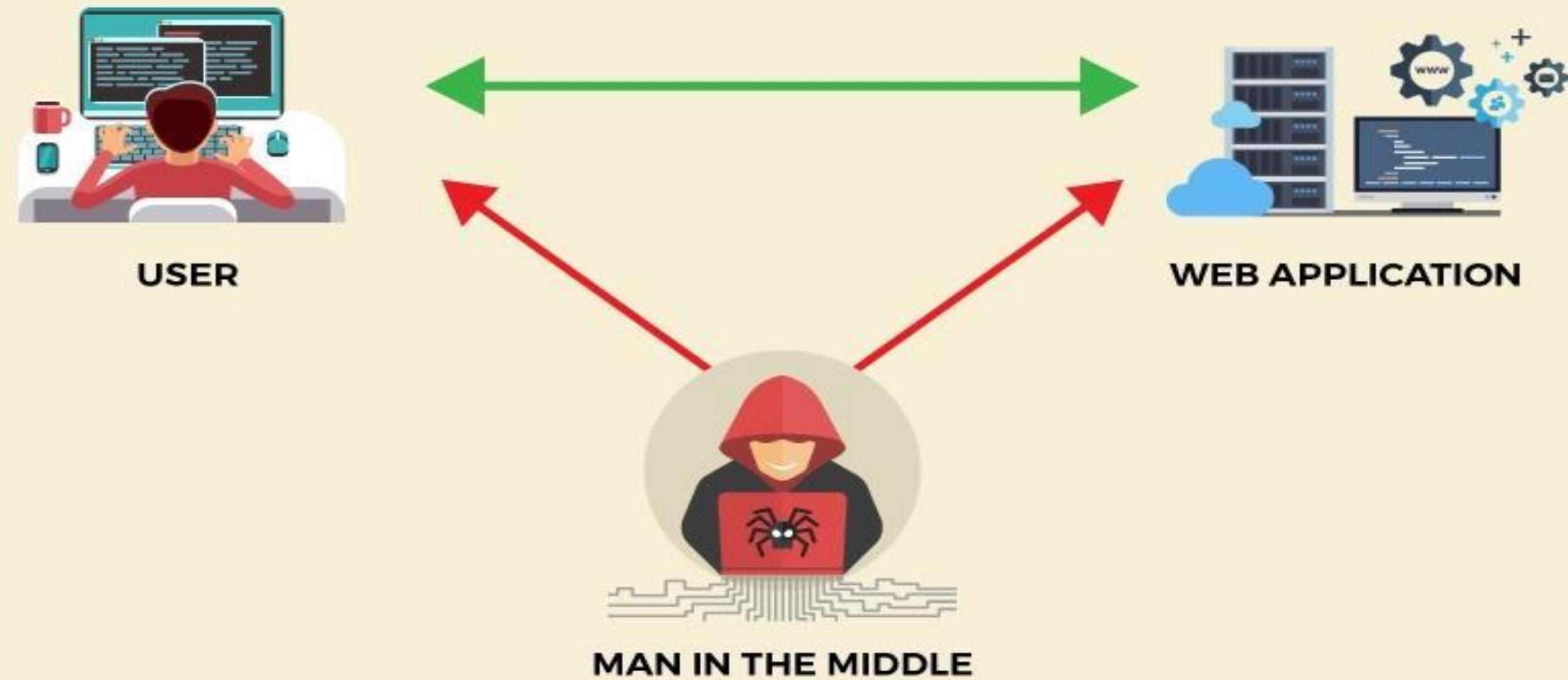
## ➤ Passive attacks

- Interception
  - Release of message contents
  - Traffic analysis

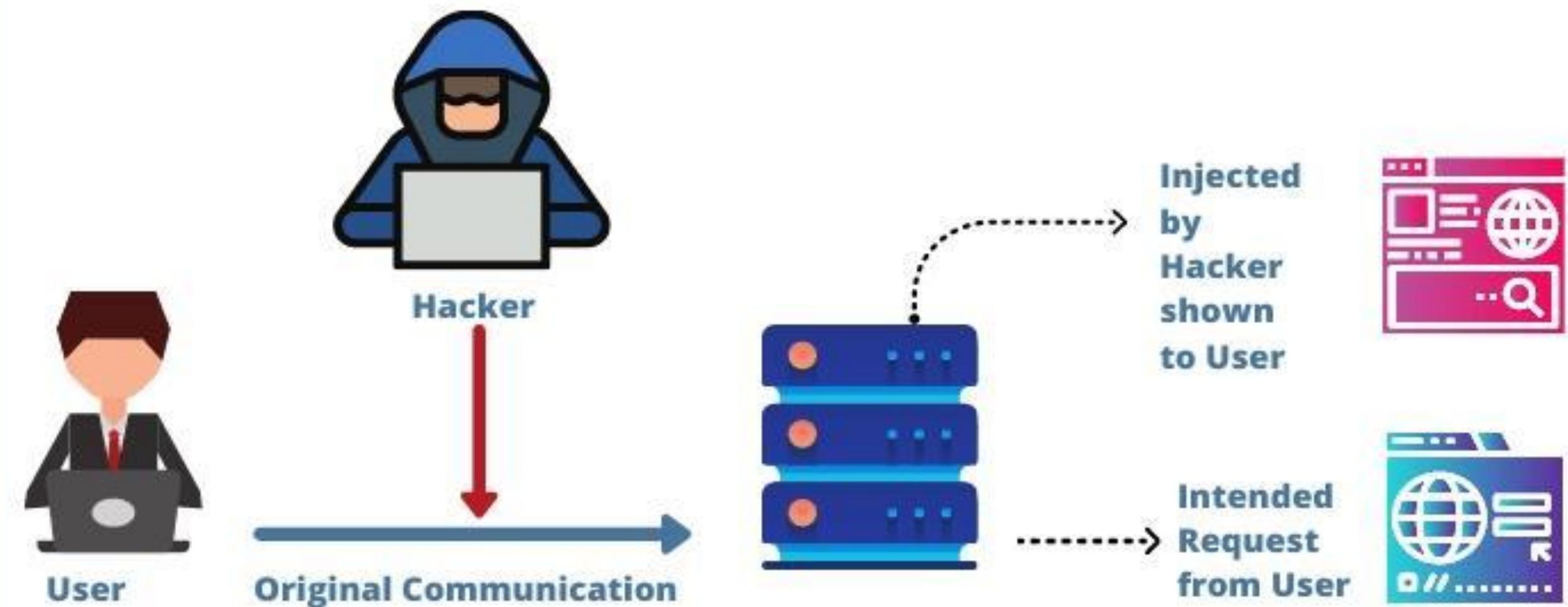
## ➤ Active attacks

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

# HOW MAN-IN-THE-MIDDLE ATTACK WORKS



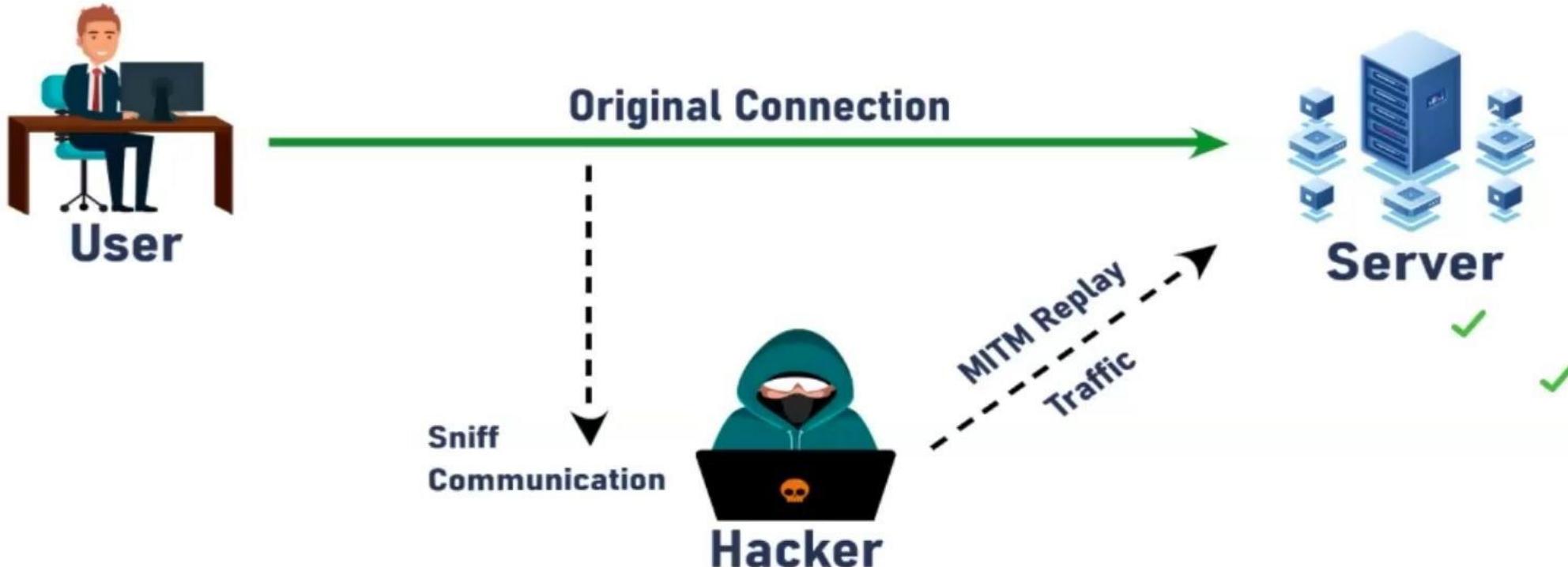
## WHAT IS SPOOFING ATTACK





# 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



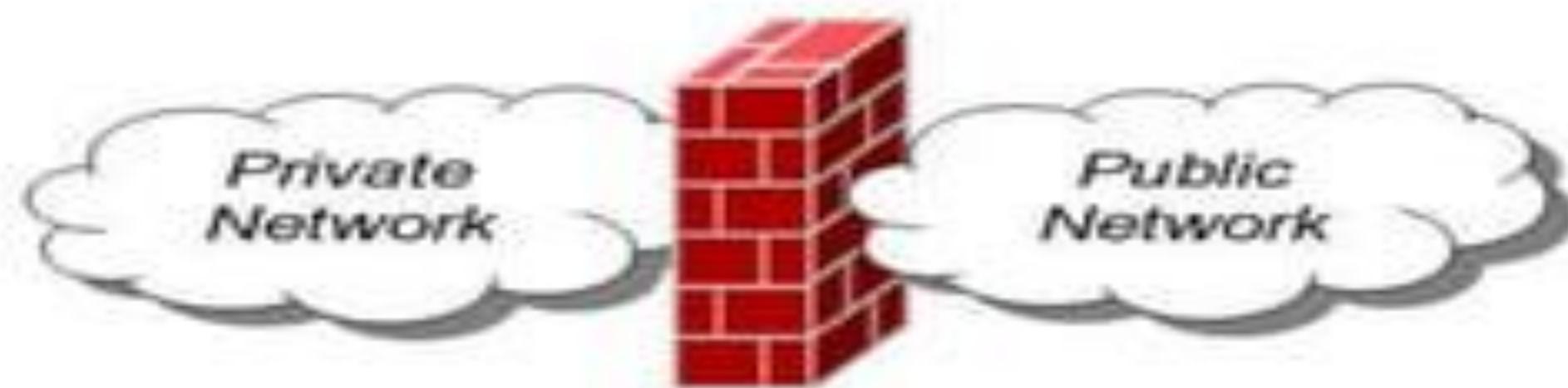
Emails



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

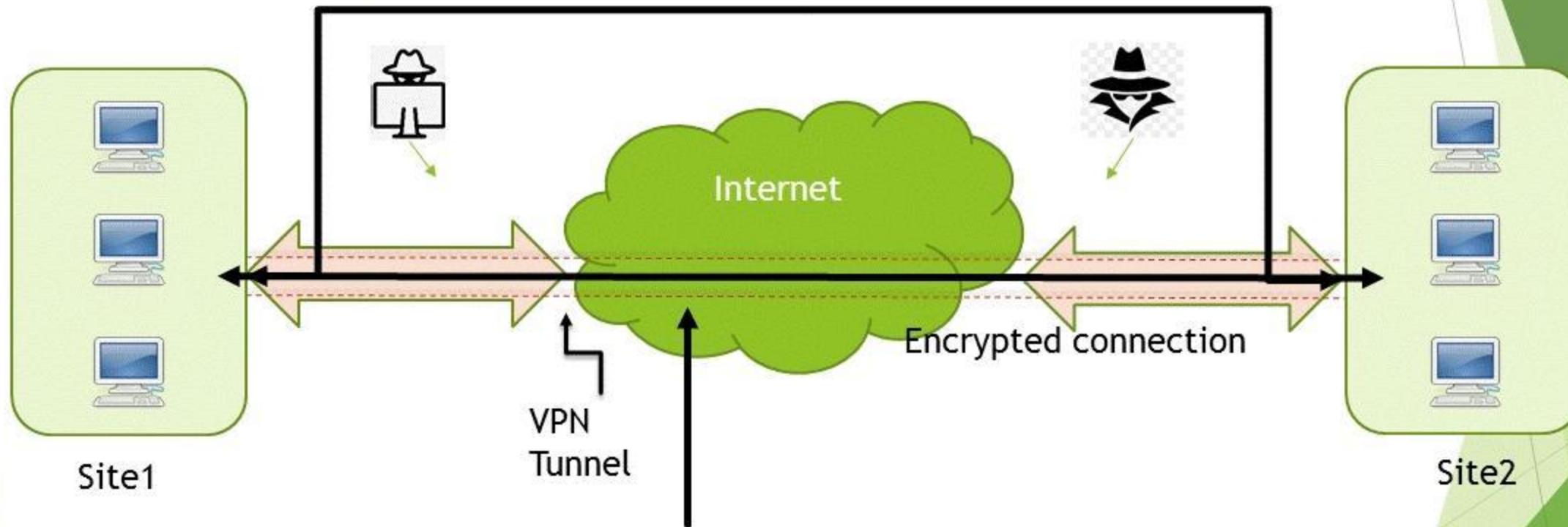
This type of ransomware locks victims out of their device and prevents them from using the device.

### Examples:

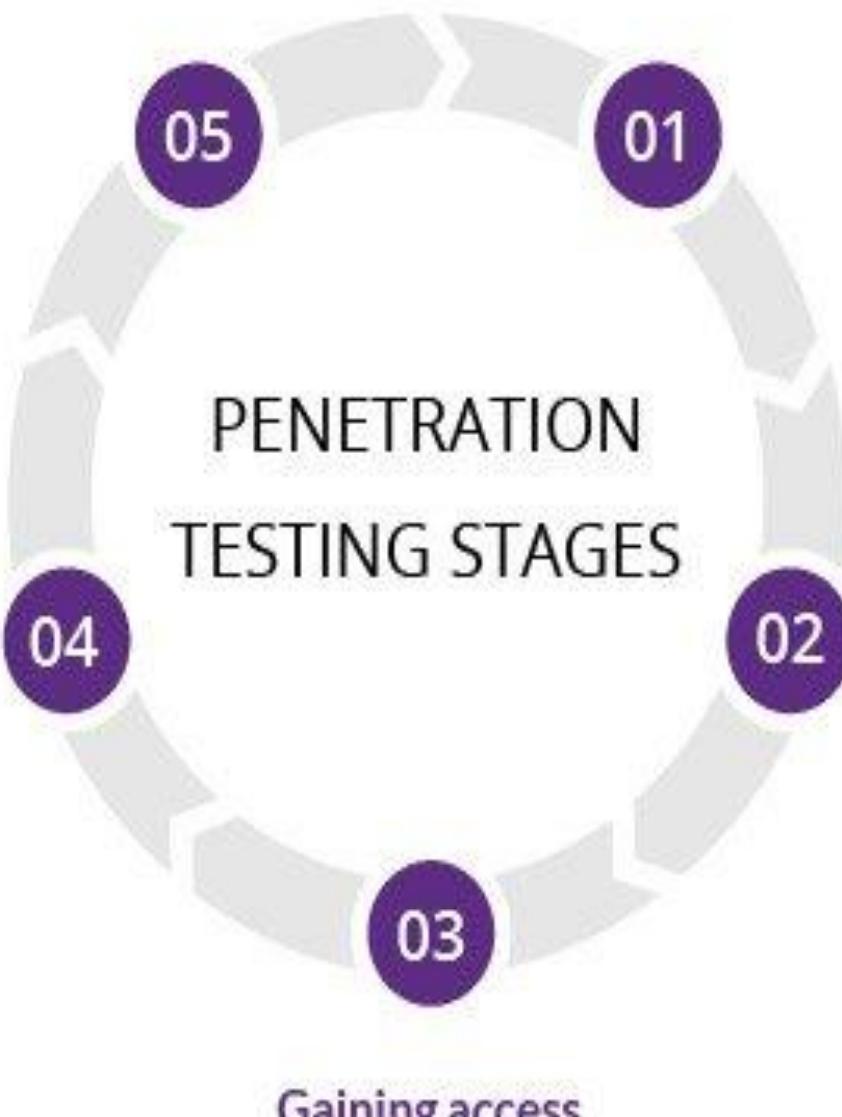
- Ryuk
- WannaCry
- NotPetya and Petya

# 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.



### Gaining access

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

05

01

04

02

03

## PENETRATION TESTING STAGES

### Analysis and WAF configuration

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

### Maintaining access

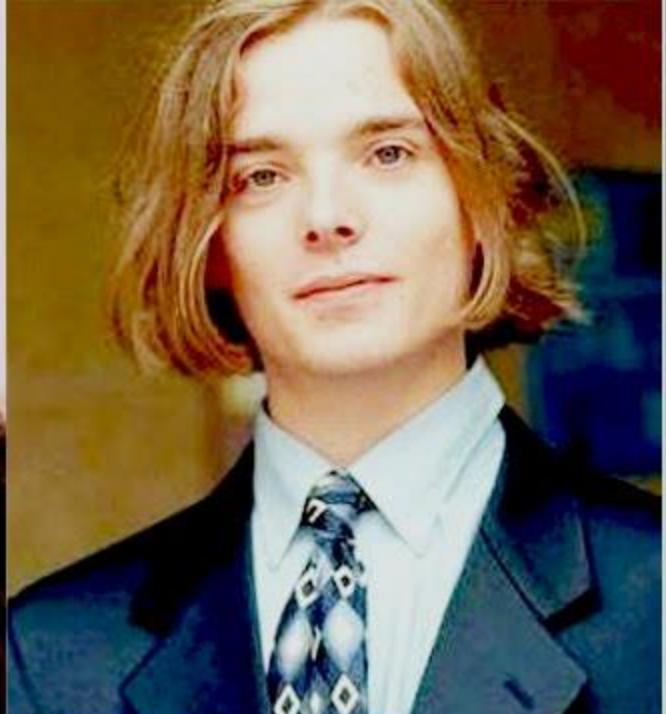
APTs are imitated to see if a vulnerability can be used to maintain access.

### 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**

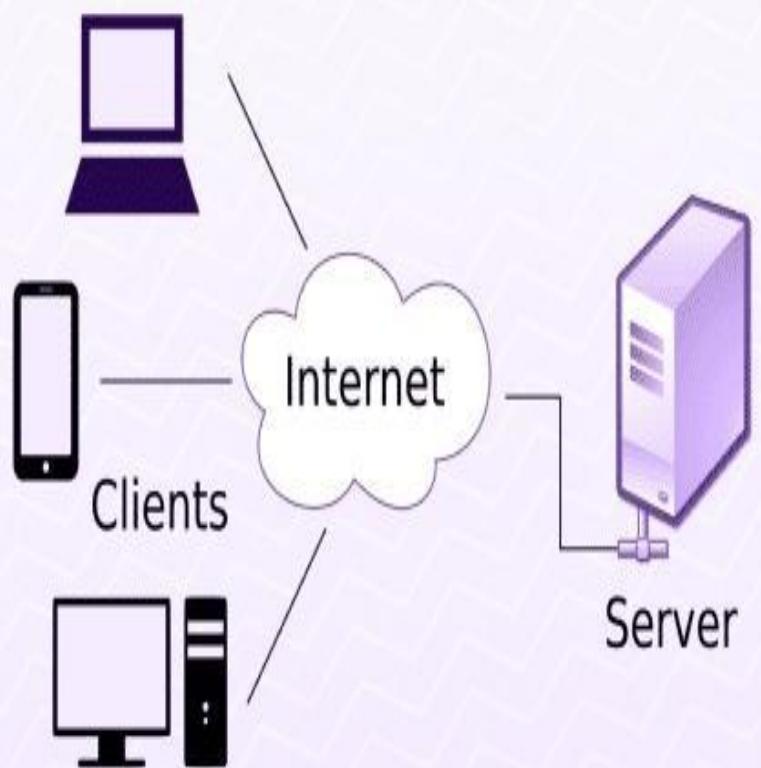


# Introduction To Network Fundamentals: **Network Basics**

**DAY - 2**



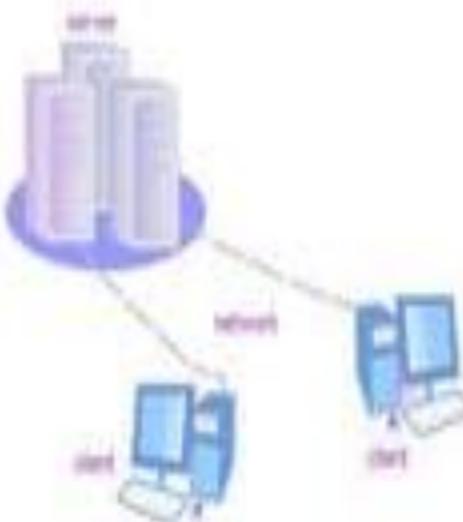
## Client Server Architecture

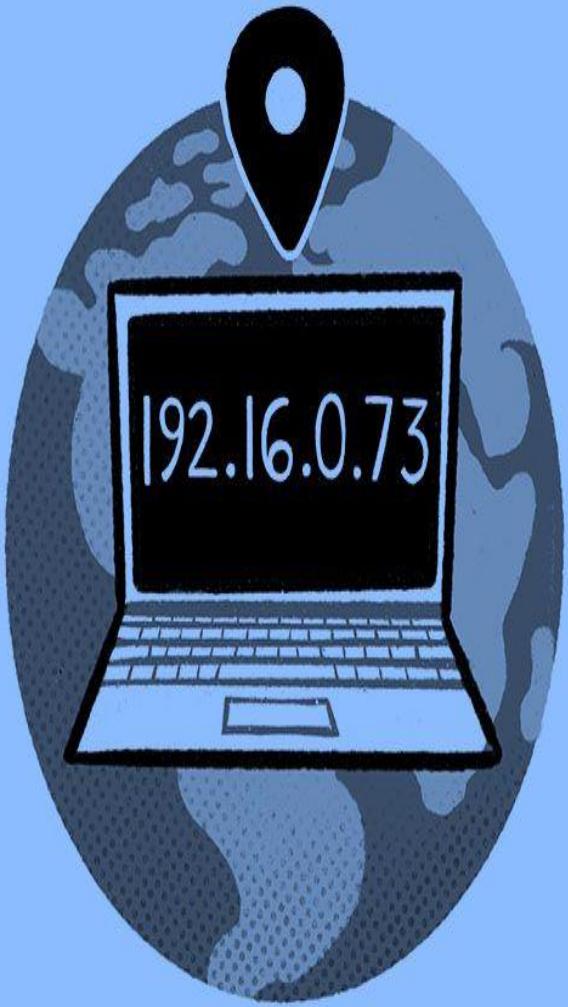


# Definition

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*).





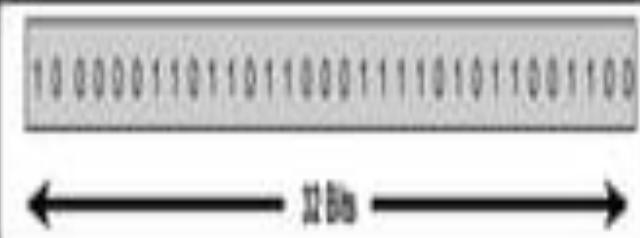
# IP Address

[*ī-pē ə-'dres*]

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

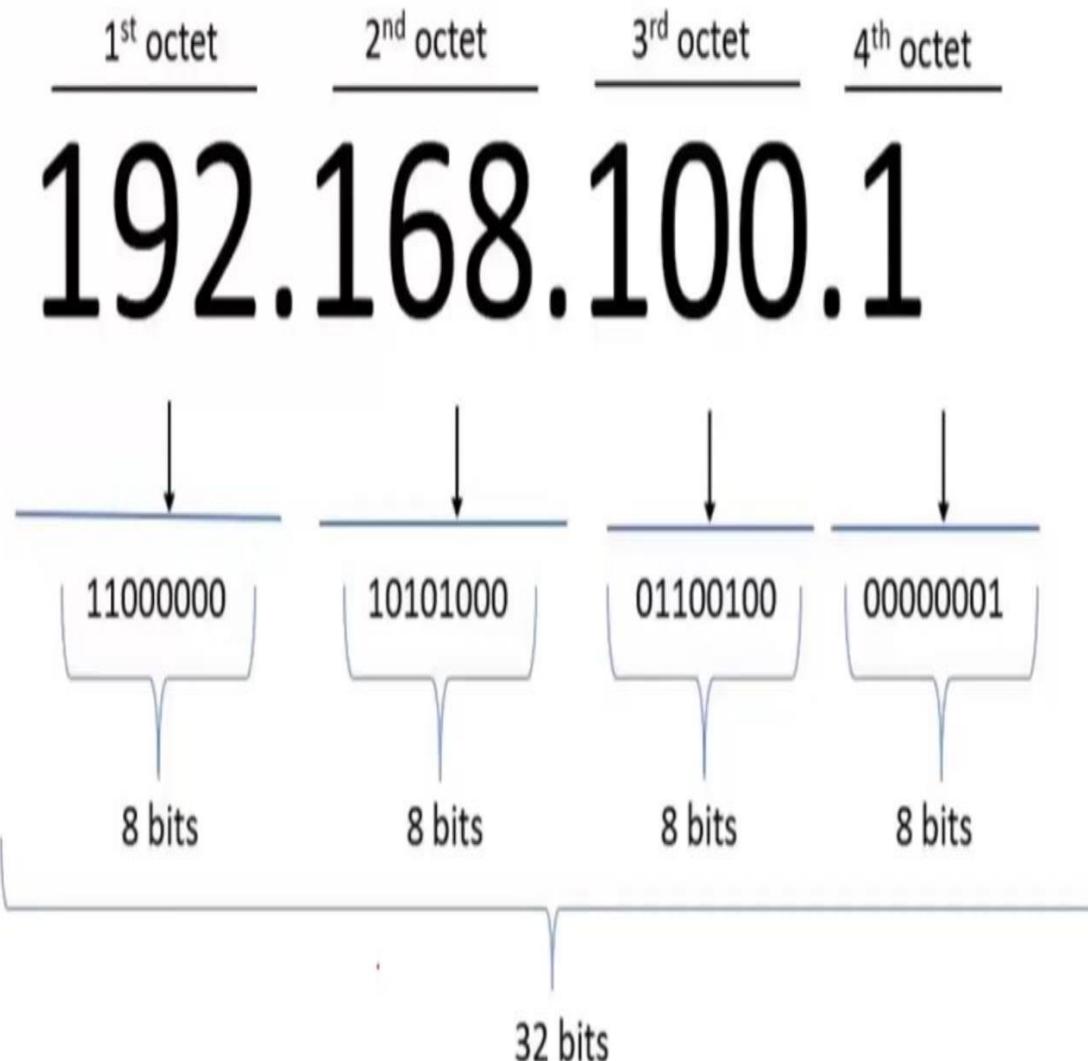
## What is an IP address

- 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)

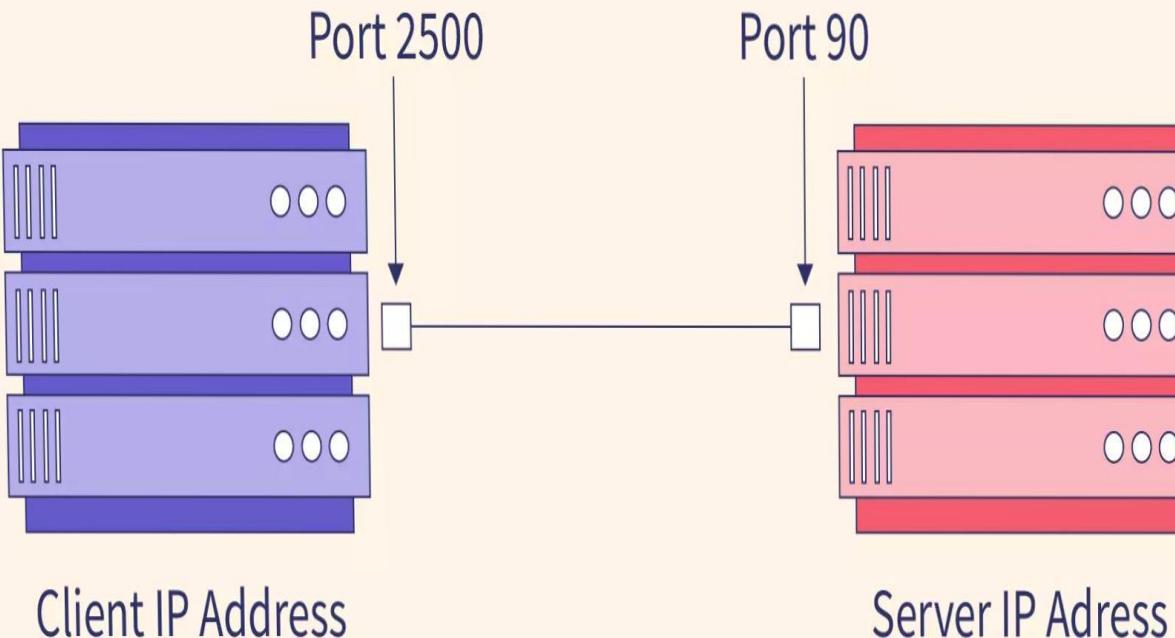
0234 Customer

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



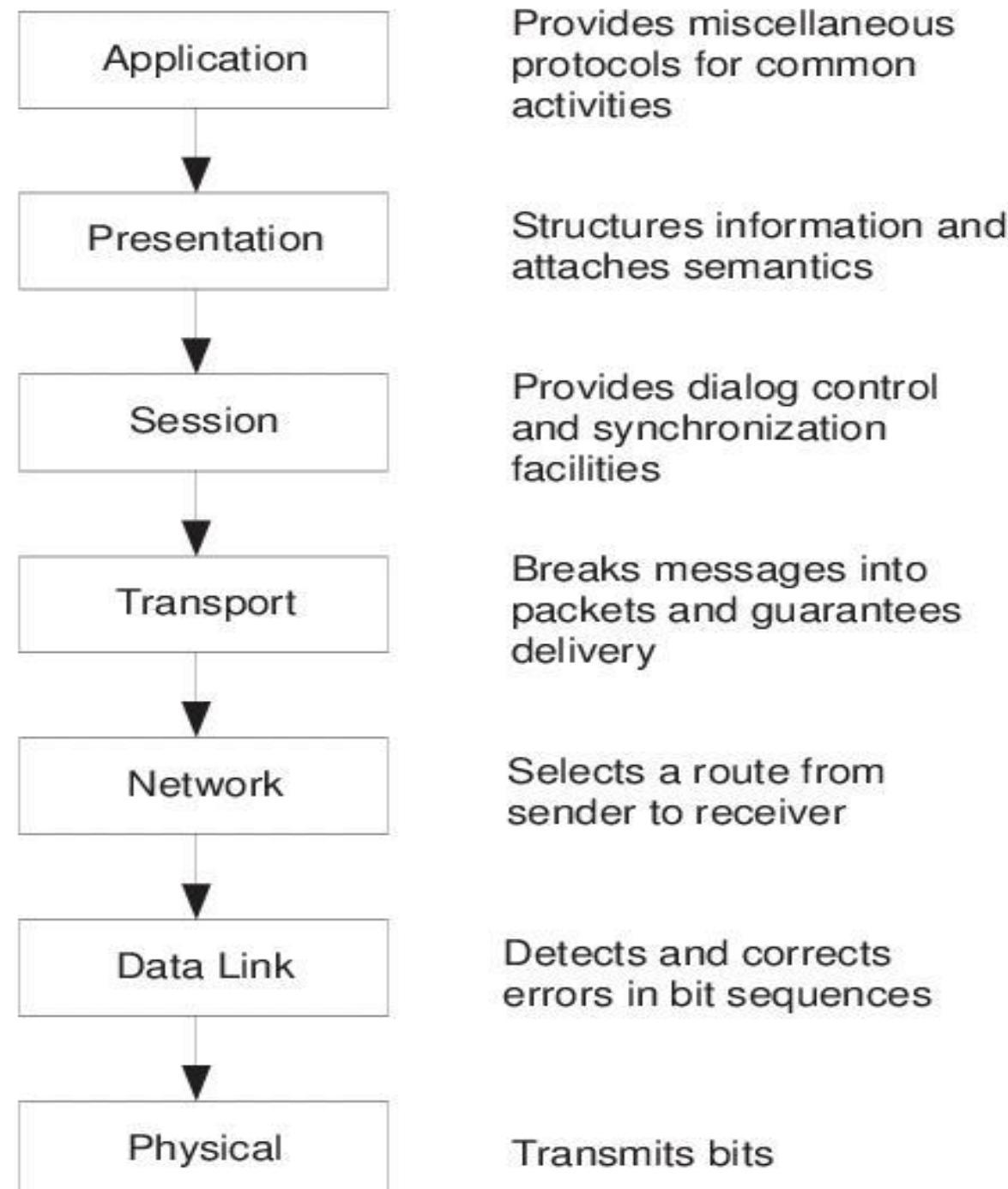
# Common Network Ports Cheat Sheet

Port	Protocol	Name
520	UDP	rip
521	UDP	ripng (ipv6)
540	TCP	uucp
546	TCP/UDP	dhcpv6
547	TCP/UDP	dhcpv6
548	TCP	afp
554	TCP/UDP	rtsp
560	UDP	rmonitor
563	TCP/UDP	nntp over tls/ssl
587	TCP	smtp/submission
591	TCP	filemaker
593	TCP/UDP	microsoft dcom
596	TCP/UDP	smsd
631	TCP	ipp
636	TCP/UDP	ldap over tls/ssl
639	TCP	msdp (pim)
646	TCP/UDP	ldp (mpls)
691	TCP	microsoft exchange
860	TCP	iscsi
873	TCP	rsync
902	TCP/UDP	vmware server
989	TCP	ftps
990	TCP	ftps
992	TCP/UDP	telnets
Port	Protocol	Name
2103	TCP/UDP	zephyr-clt
2104	TCP/UDP	zephyr-hm
2222	TCP	directadmin
2401	TCP	cvspserver
2483	TCP/UDP	oracle
2484	TCP/UDP	oracle
2809	TCP/UDP	corbaloc
2967	TCP/UDP	symantec av
3128	TCP/UDP	http proxy
3222	TCP/UDP	glbp
3260	TCP/UDP	iscsi target
3306	TCP/UDP	mysql
3389	TCP	rdp
3689	TCP	daap
3690	TCP/UDP	svn
4321	TCP	rwhois
4333	TCP	msql
4500	UDP	ipsec nat traversal
4899	TCP	radmin
5000	TCP	upnp
5001	TCP	iperf
5004-5005	UDP	rtp/rtsp
5060	TCP/UDP	sip
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.

# DAY -3



# 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.



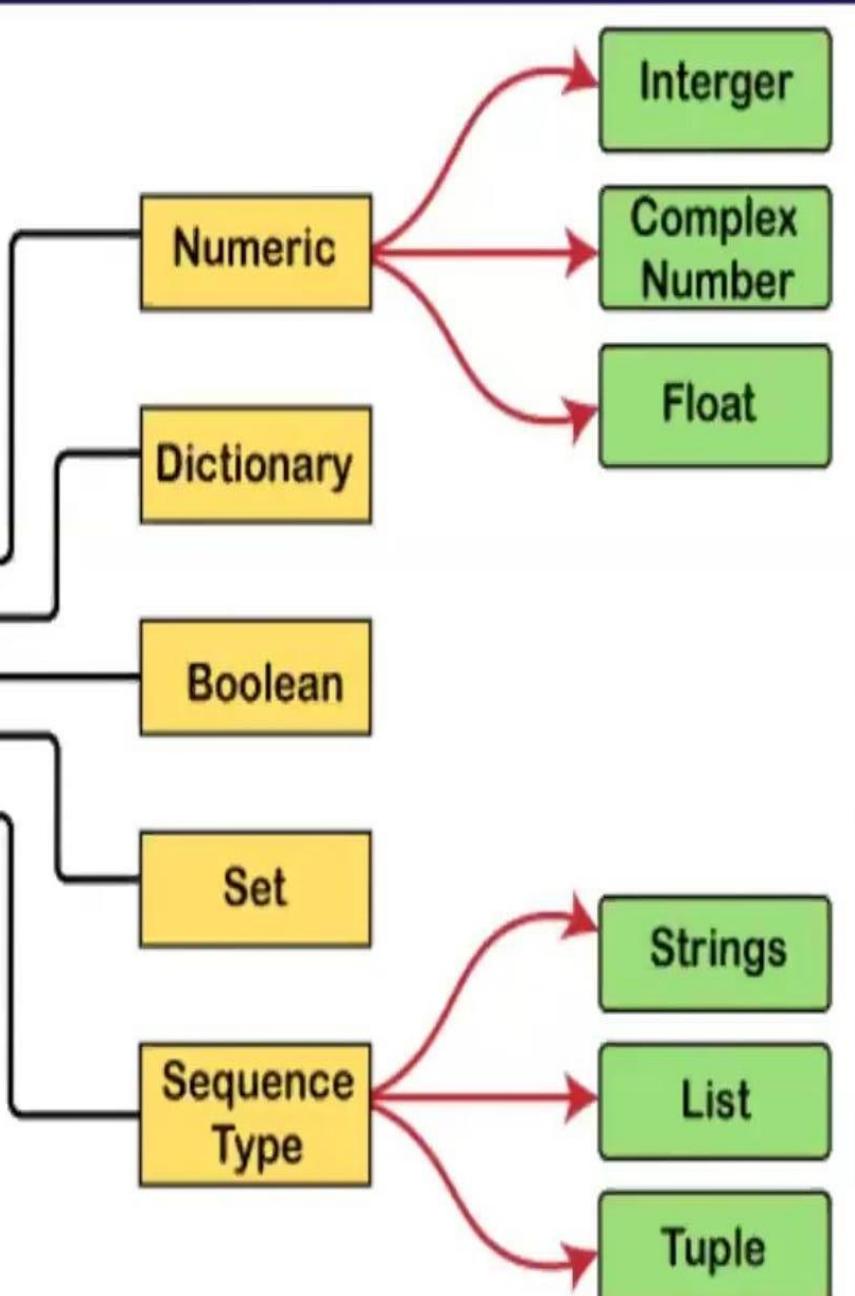
# SETTING UP PYTHON

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



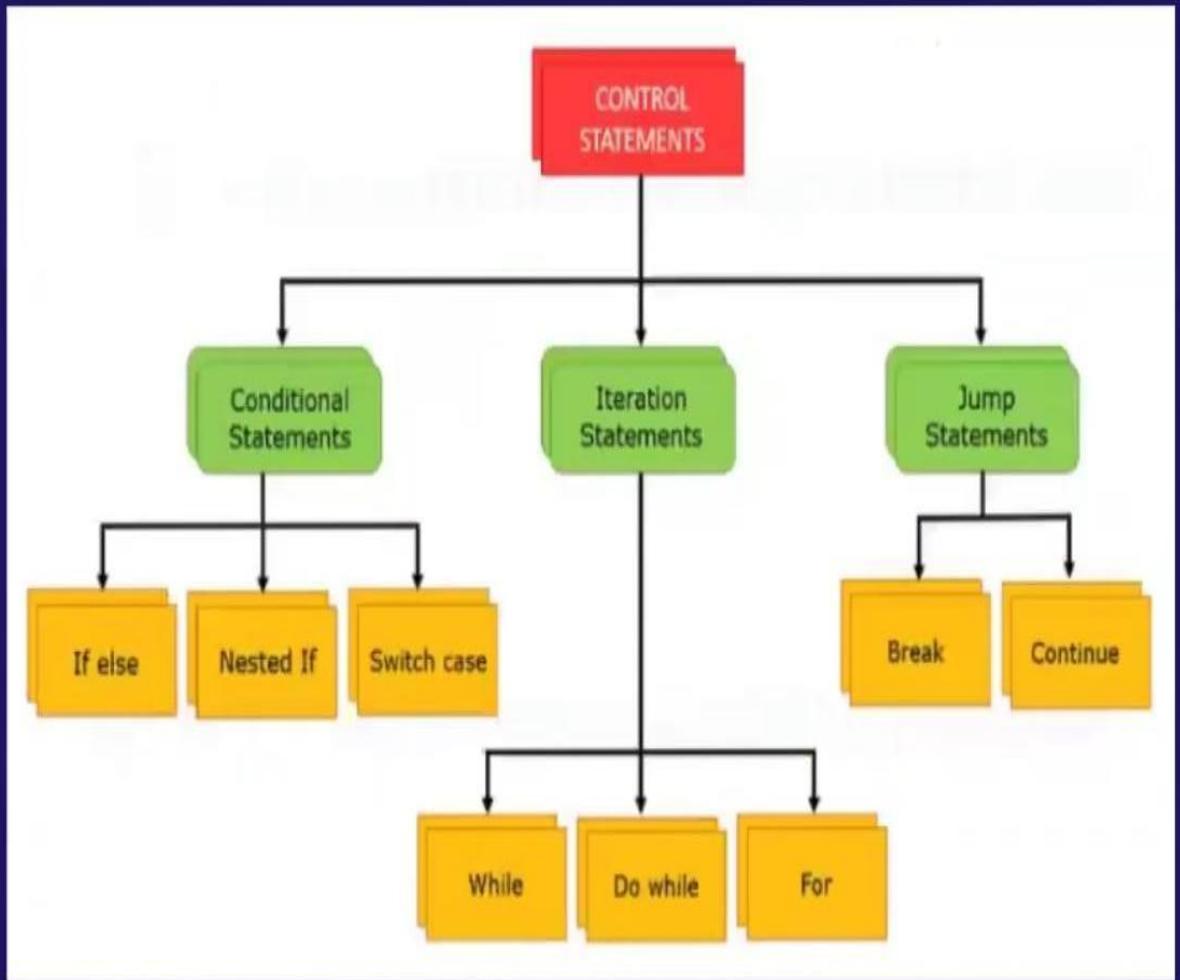
# DATA TYPES

## Python - 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.





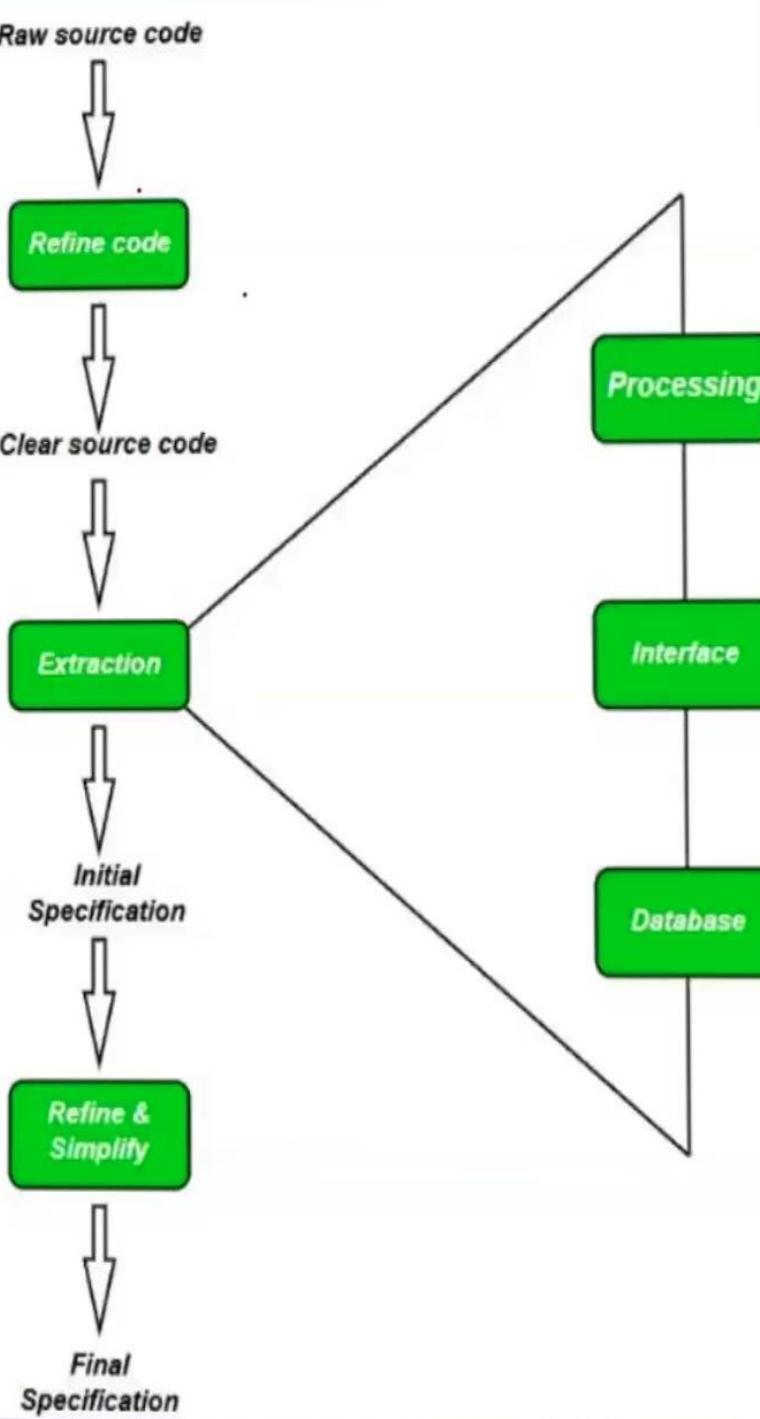
# Cryptography

- 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.

# Python Course For Hackers

## **DAY -4**



# 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



# DAY -5

HACKING WEB APPLICATIONS



# MODULE OBJECTIVES

**UNDERSTANDING WEB APPLICATION CONCEPTS**

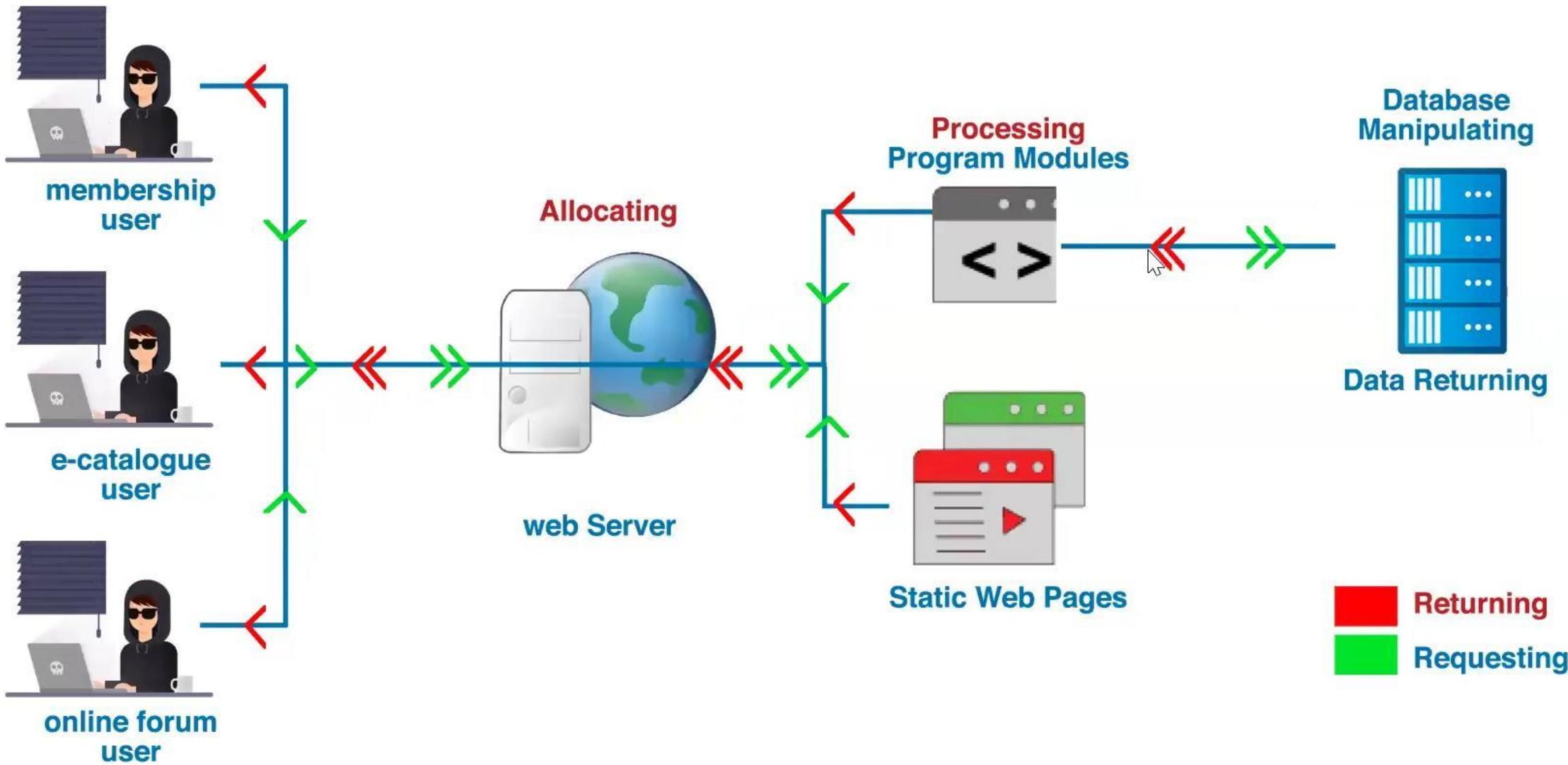
**UNDERSTANDING WEB APPLICATION THREATS**

**UNDERSTANDING WEB APPLICATIONS HACKING METHODOLOGY**

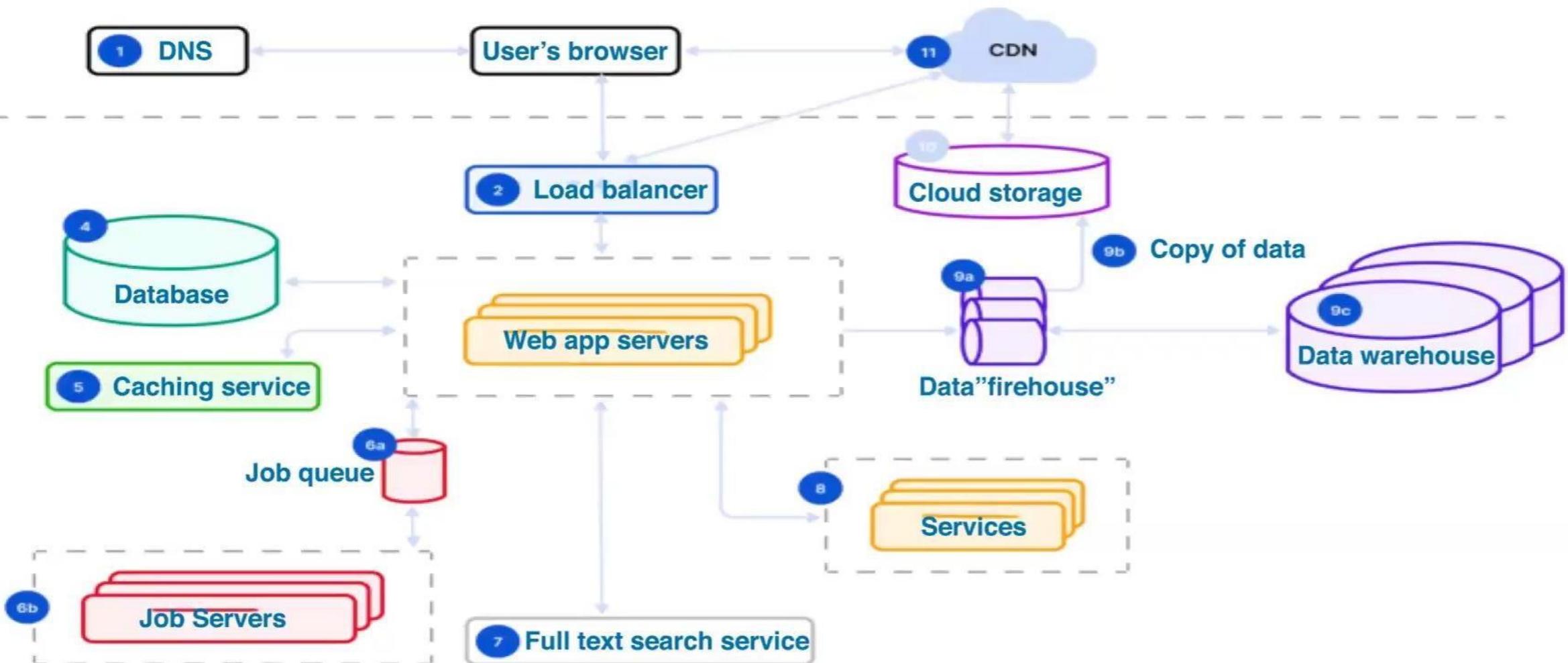
**OVERVIEW OF WEB APPLICATION HACKING TOOLS**



## 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

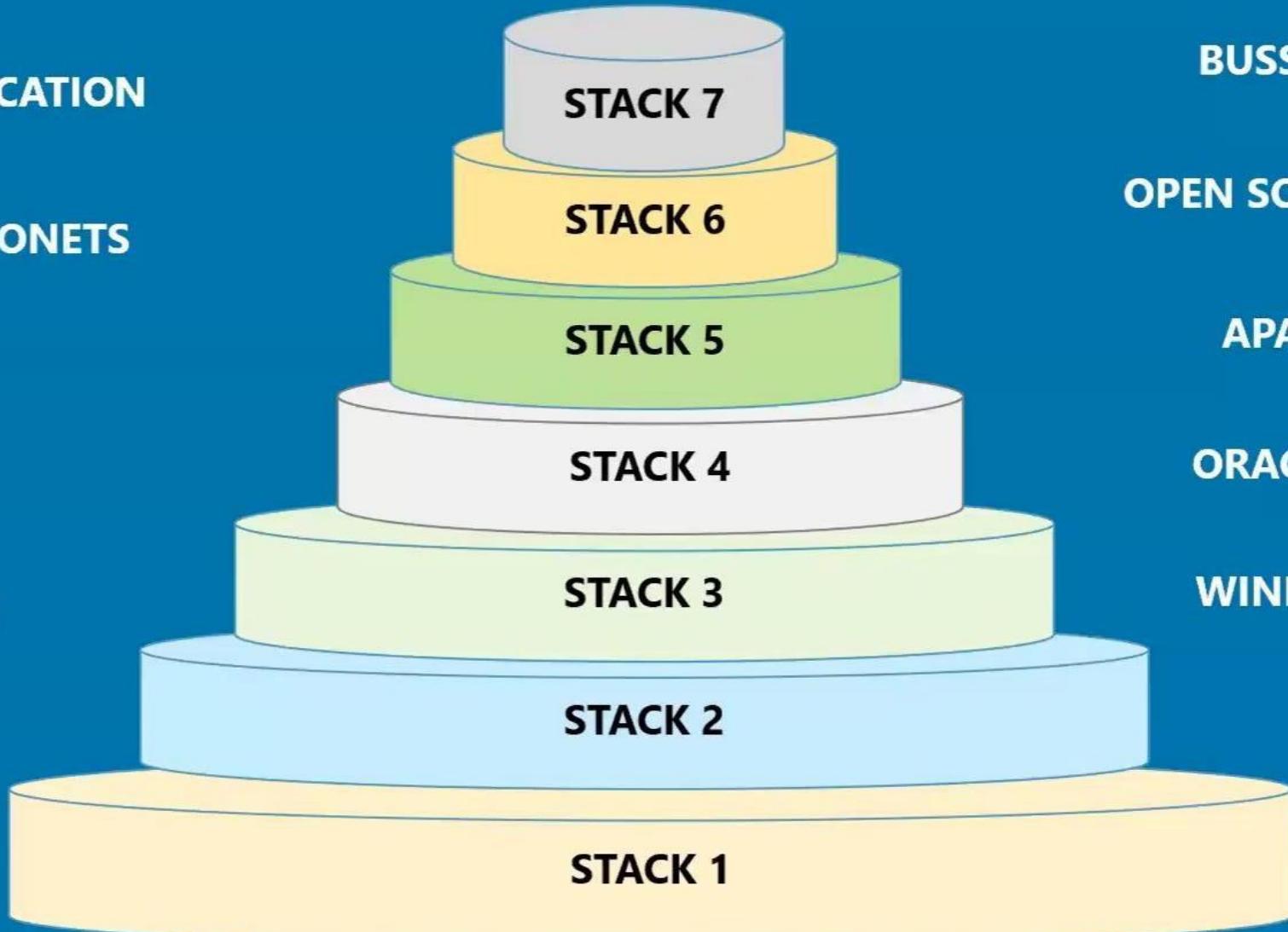
APACHE /MICROSOFT IIS

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

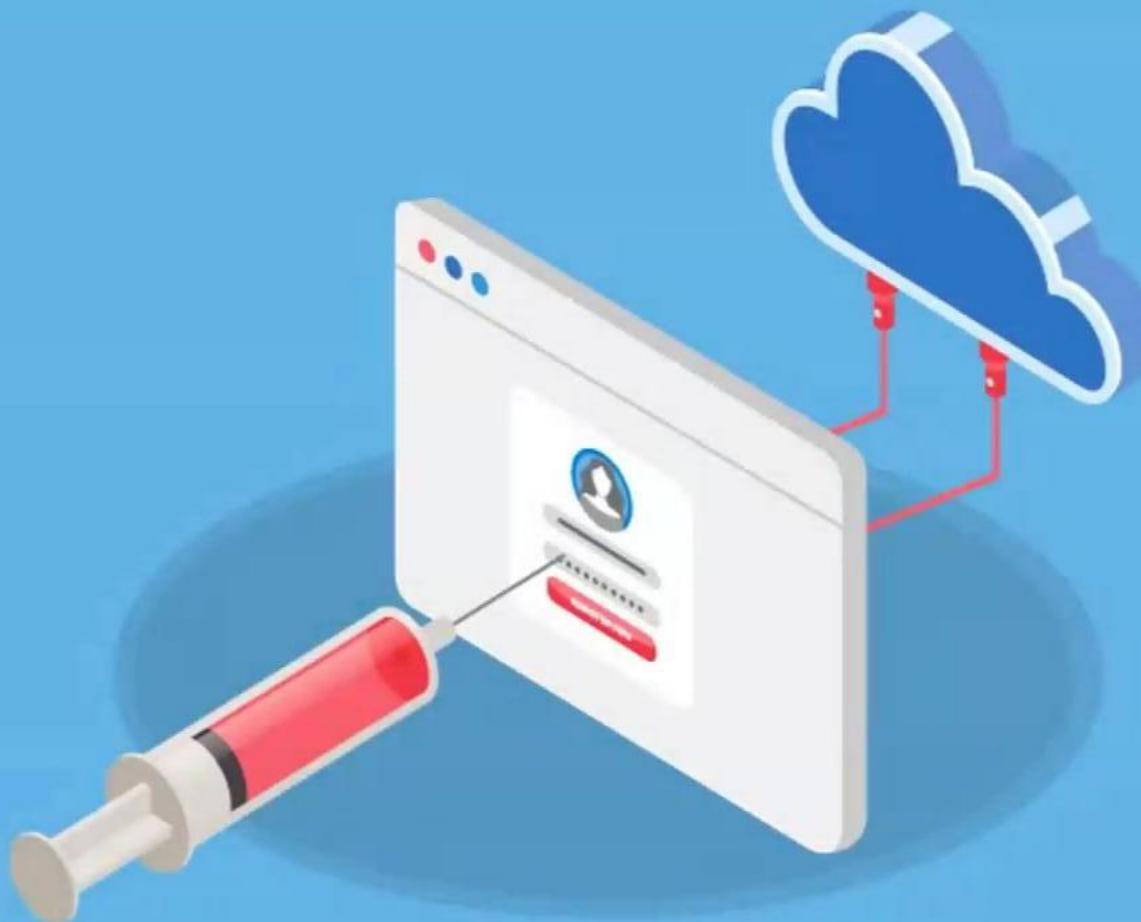
API9 : - IMPROPER ASSETS MANAGEMENT



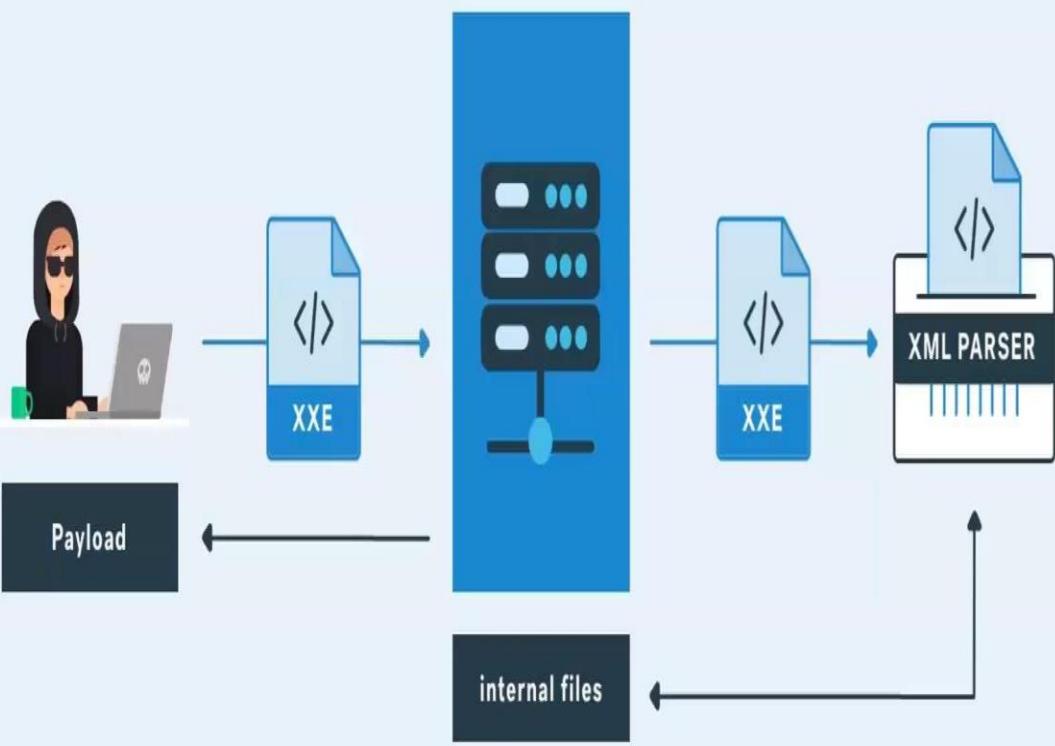
API10 : - INSUFFICIENT LOGGING AND MONITORING



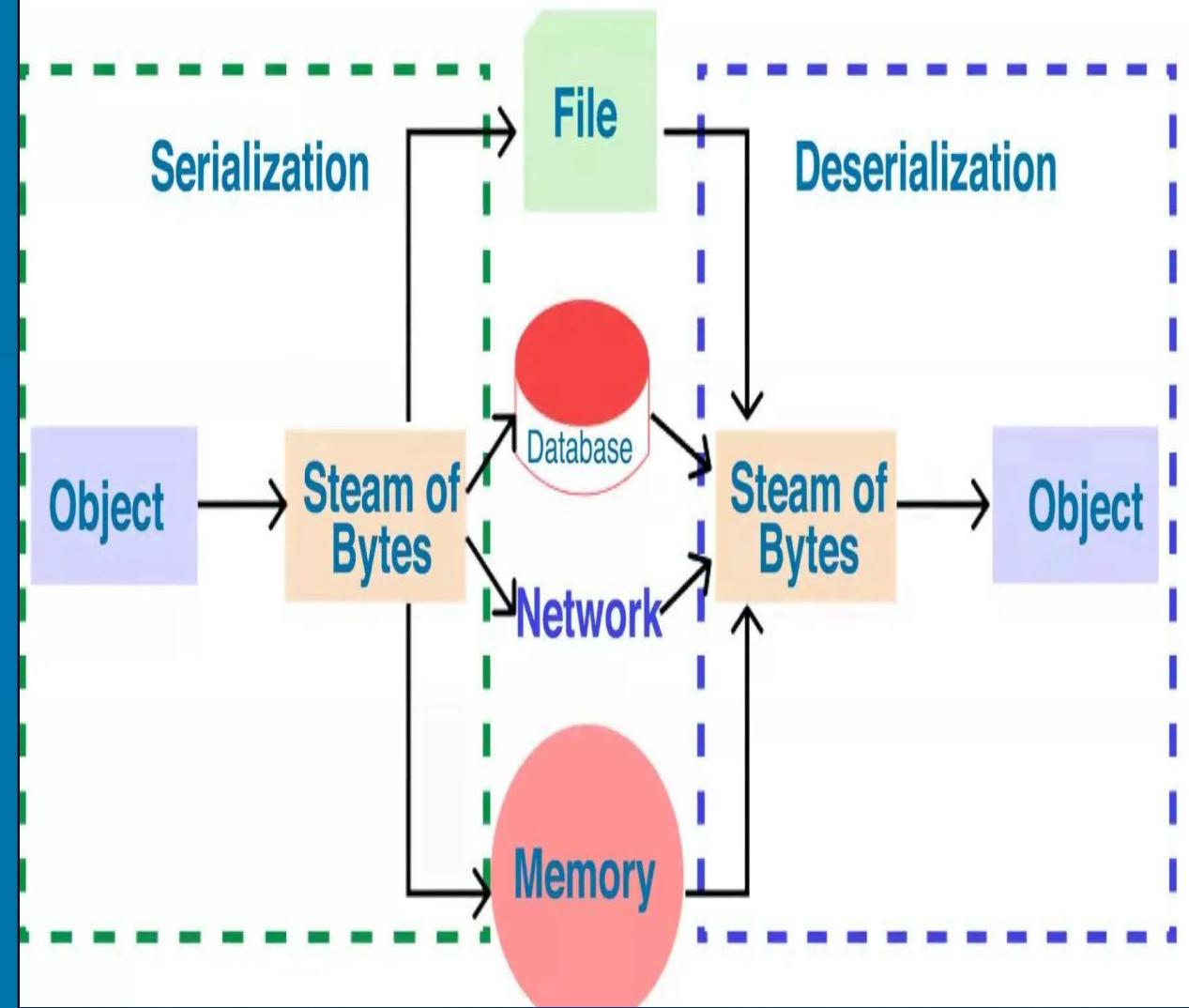
## INJECTION FLAWS



## 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 ENVIRONMENTS

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

G.LOKESH REDDY  
Dr.L.B.College  
721128805325