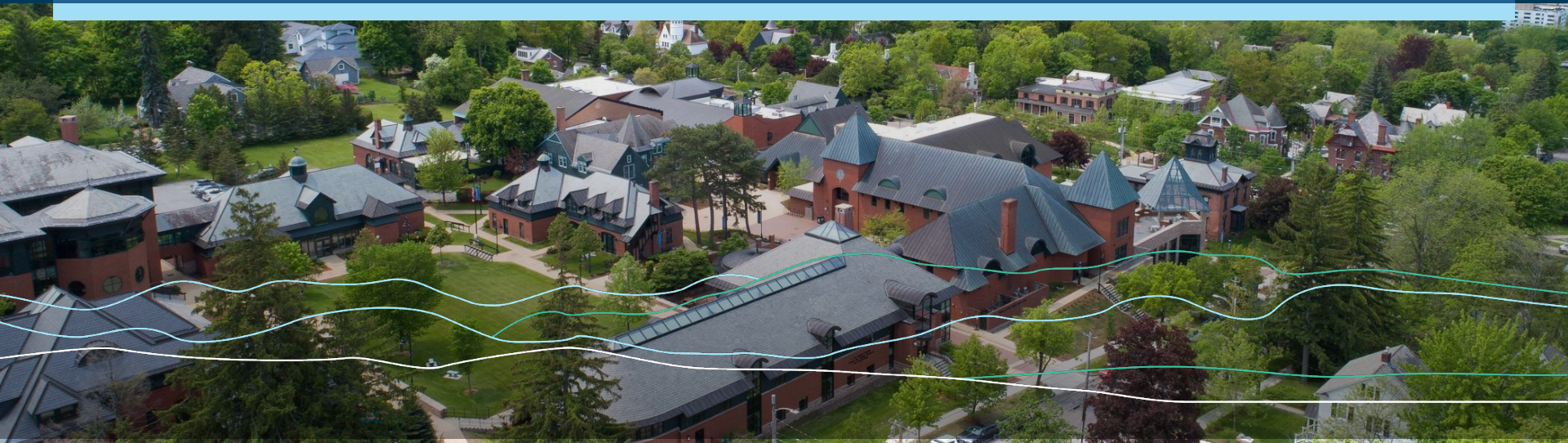
CHAMPLAIN COLLEGE

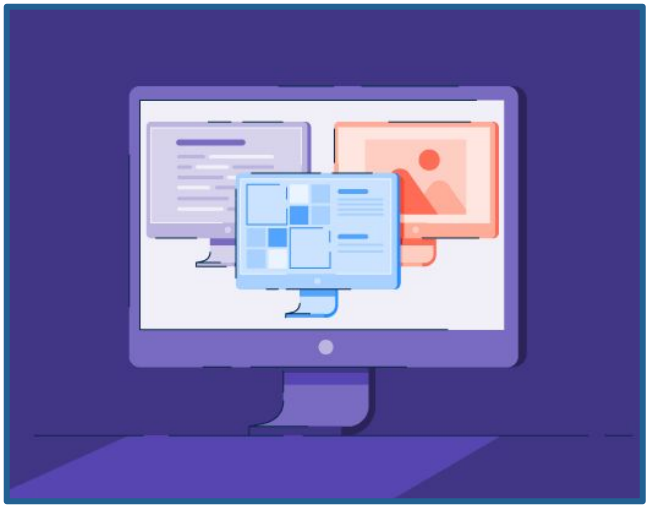
Mod 2 – Intro to VMs and Kali Linux

SEC-110



What is a Virtual Machine?

A **Virtual Machine** (also called a VM or an image) is a digital replica of a computer that is run within another computer (called the **host machine**).



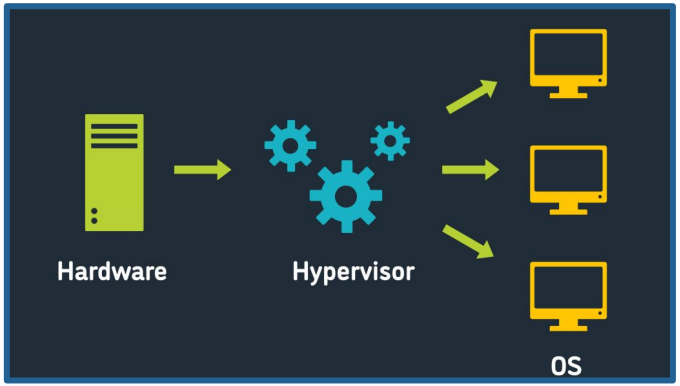
What are VMs used for?

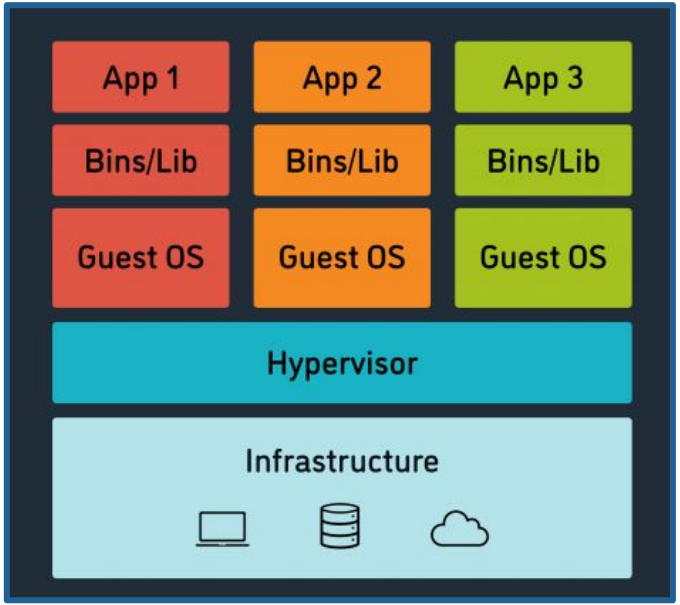
- Run multiple Operating Systems on one computer
- Have a safe virtual environment for testing software or security vulnerabilities without impacting the host machine

What is a Hypervisor?

A **Hypervisor** is software that allows a host machine to create and run VMs. Examples of popular hypervisors include:

- VirtualBox
- Proxmox
- VMWare





What is an Operating System?

An **Operating System (OS)** is the most important software running on a computer.

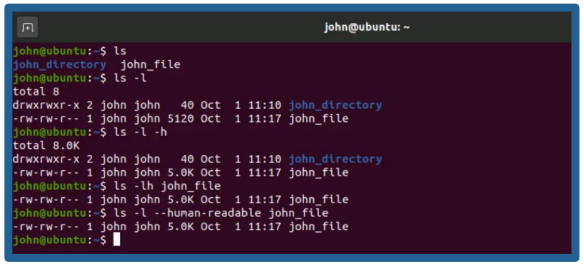
- An OS manages:
  - memory
  - processes
  - all software
  - all hardware

A user interacts with the OS through a:

- graphical user interface (GUI)

OR

- command-line interface (CLI)

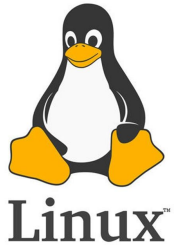


Common Operating Systems

- **Microsoft Windows**

- **macOS**

- **Linux**



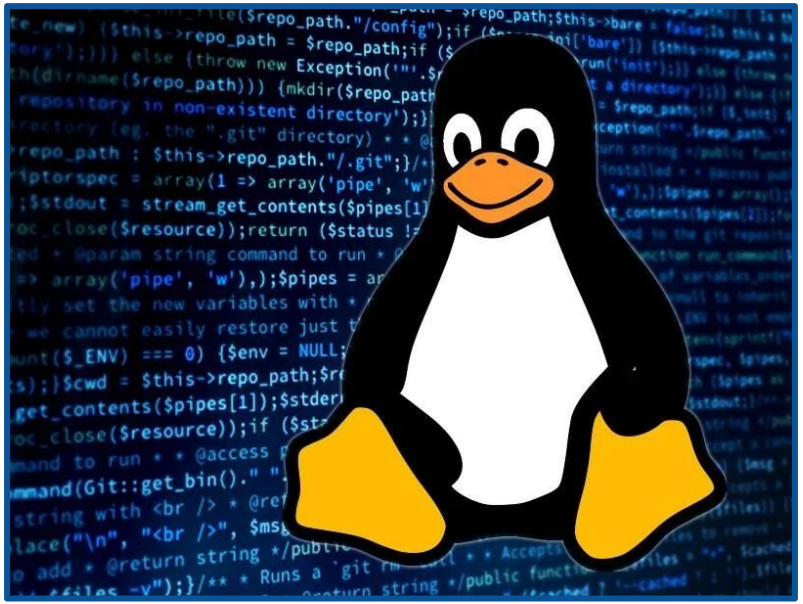
- **iOS (Mobile OS)**

- **Android (Mobile OS)**

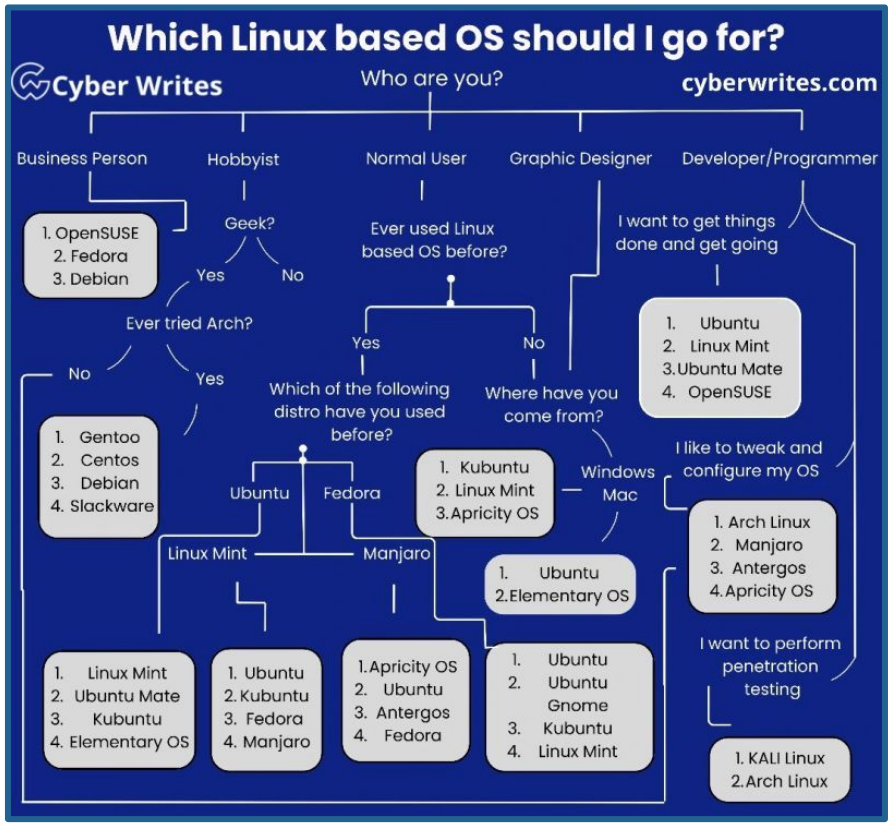
- **ChromeOS**

What is Linux?

- Operating System designed by Linus Torvalds
- Open source
- Zero Entry Cost
- Hundreds of different distributions for different purposes



What are Linux Distributions?



A **Linux distribution** is a version of Linux that contains additional software based on the users needs.

What is Kali?

- A *Debian-based* Linux distribution
- Mainly focuses on advanced penetration testing
- Several hundred tools, configurations, and scripts are available
- Most preferred distribution for cybersecurity.

Useful Kali Commands

- **pwd** (Displays the directory the user is currently in)
- **mkdir** (Creates a directory within the current directory)
- **cd** (Changes the current working directory, ***Ex: cd Desktop***)
- **ls** (Displays all files and directories within the current directory)
- **clear** (Clears the terminal screen)
- **touch** (Creates a file without entering a text editor)
- **mv** (Moves a file to a specified location, ***Ex: mv 123.txt home/desktop***)

Useful Kali Commands

- **cp** (Copies a given file to a new location /name, ***Ex: cp 123.txt 456.txt***)
- **rm** (Deletes the given file or directory, ***Ex: rm 123.txt***)
- **whoami** (Displays the user who is currently logged in)
- **cat** (Prints out the text in a given file ***Ex: cat 123.txt***)
- **sudo** (Runs a command with administrator privilege after authentication)

What is Sudo?

Sudo: or superuser do, executes a command with elevated privileges

- Required for commands like **systemctl** which require authentication / privilege
- Users must be given access to use the **sudo** command

What is Scripting?

Scripting is **writing a set of instructions** (called a script) that a computer can follow to do tasks **automatically.**

Unlike full programming, which builds entire software or apps, scripting is often used to automate repetitive tasks, manage files, or connect different programs.

Common scripting languages:

- Python
- Bash
- Javascript
- Powershell

chmod Command

In order to run scripts, they have to be made executable. If they aren't executable, they won't be able to run! This is when you can run the "chmod" command which stands for change mod.

- None = Permission not granted
- Execute = User can run the file
- Write = User can edit the file
- Read = User can access the file

Symbolic	Numeric	Permission
---	0	None
--x	1	Execute
-w-	2	Write
-wx	3	Write + Execute
r--	4	Read
r-x	5	Read + Execute
rw-	6	Read + Write
rwx	7	Read + Write + Execute

Intro to Python Scripting

- Writing scripts in the Python programming language
- Useful for file manipulation, data processing, or interacting with other software
- **.py** file extension
- Contains a wide range of libraries with a plethora of uses.

Python Script Example

```
print("Hello world!")
name = input("What's your name? ")
print(f"Nice to meet you, {name}! :D")
```

This script greets you based on your input

```
first = int(input("Enter the first number: "))
second = int(input("Enter the second number: "))
operator = input("Enter the operator: ")
print(f"{first} {operator} {second} = " + str(eval(f"{first}{operator}{second}")))

```

This script calculates a simple math problem based on your input of two numbers and the expression (+,-,*,/)

```
PASSWORD = "myfavoritepassword"

letmein = input("Enter the password: ")
while letmein != PASSWORD:
    print("Sorry, that is not the correct password")
    letmein = input("Enter the password: ")

print("you may enter")
```

This script will not continue until you enter the correct password as defined in the variable.

Intro to Bash

- Bash - **Bourne Again Shell**
- Command shell for Unix/Linux operating systems.
- A programming language that lets users communicate with their computer.
- Can be used to write scripts.

Bash Script Example

```
1   echo "Hello world!"
2   read -p "What's your name?" name
3   echo "Nice to meet you, $name! :D"
```

This script greets you based on your input

```
1   read -p "Enter the first number: " first
2   read -p "Enter the second number: " second
3   read -p "Enter the operator: " op
4   res=$(echo "$first $op $second" | bc)
5   echo "$first $op $second = $res"
```

This script calculates a simple math problem based on your input of two numbers and the expression (+,-,*,/)

```
1   export PASSWORD="pleaseletmein"
2   while true; do
3       read -p "Enter the password: " letmein
4       if [[ "$letmein" == "$PASSWORD" ]]; then
5           echo "Well done."
6           break
7       else
8           echo "Wrong password."
9       fi
10  done
```

This script will not continue until you enter the correct password as defined in the variable.

Intro to PowerShell

- A command-line shell and scripting language.
- Built on the .NET framework, which allows it to work with objects.
- More powerful and flexible than normal command-line tools.
- Mainly used for system admin and streamlining.

PowerShell Script Example

```powershell
Write-Host "Hello world!"
Read-Host -Prompt "What's your name?" -OutVariable name
Write-Host "Nice to meet you, $name!"
```

This script greets you based on your input

```powershell
$first = [decimal](Read-Host -Prompt "Enter the first number: ")
$second = [decimal](Read-Host -Prompt "Enter the second number: ")
$op = Read-Host -Prompt "Enter the operator (e.g., +, -, *, /): "
$expression = "$first $op $second"
$res = Invoke-Expression -Command $expression
Write-Host "$first $op $second = $res"
```

This script calculates a simple math problem based on your input of two numbers and the expression (+,-,*,/)

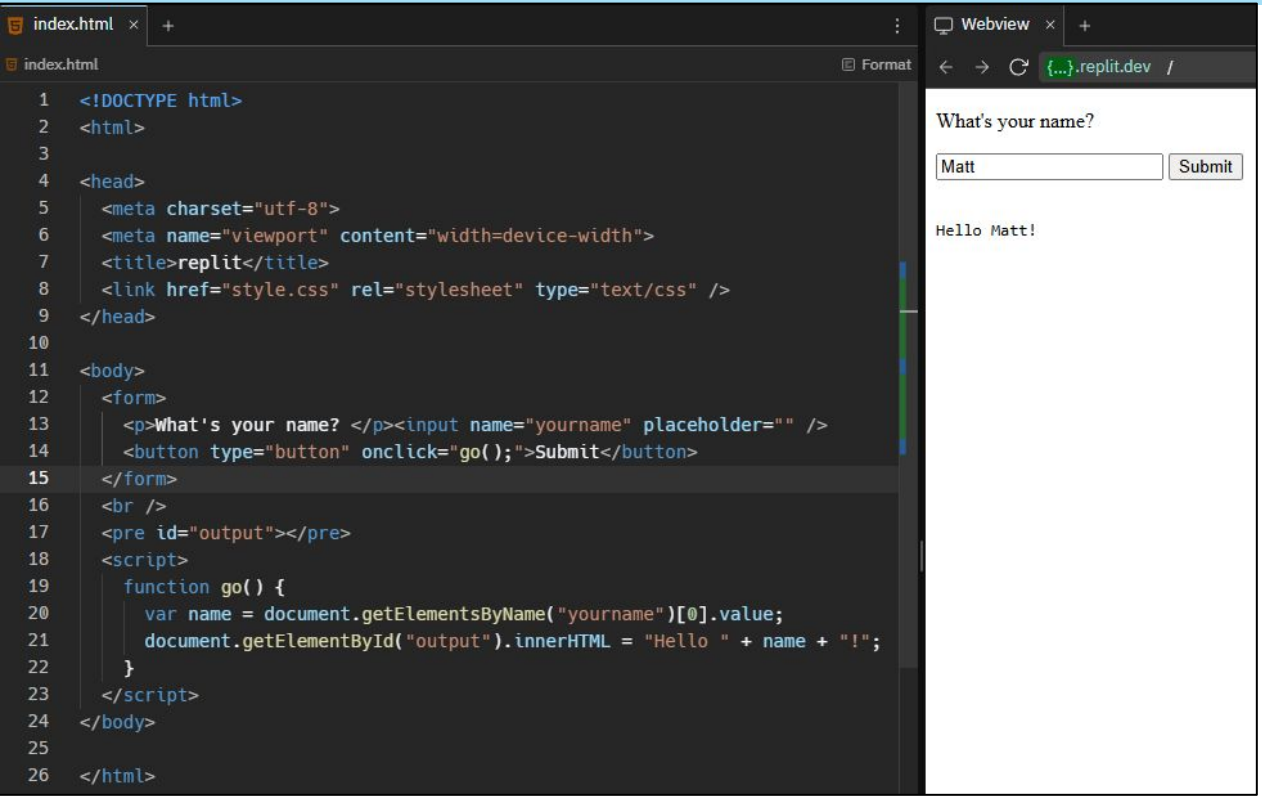
```powershell
$PASSWORD = "pleaseletmein"

while ($true) {
    $letmein = Read-Host -Prompt "Enter the password"

    if ($letmein -eq $PASSWORD) {
        Write-Host "Well done."
        break
    } else {
        Write-Host "Wrong password"
    }
}
```

This script will not continue until you enter the correct password as defined in the variable.

Intro to JavaScript

- Short for **JS.**
- A high-level programming language used to add interaction to web pages.
- Works along with HTML and CSS.
- Makes the web pages interact and reactive with users.

JavaScript Script Example



In this script, the user must enter their name and click the submit button to receive a personalized greeting.