**What is a Hypervisor?**

A **hypervisor** is a specialized software layer that allows multiple **virtual machines (VMs)** to run on a single **physical machine (host)**. It manages the hardware resources (CPU, memory, storage, etc.) and allocates them to each virtual machine as needed.

### Why is the Hypervisor Important?

Without a hypervisor, each operating system would need its own physical hardware. The hypervisor **abstracts the hardware**, so many operating systems can share the same physical system safely and efficiently.

### Types of Hypervisors

There are two main types:

1. **Type 1 (Bare Metal Hypervisor):**
   * Runs directly on the physical hardware.
   * More efficient and secure.
   * Examples: VMware ESXi, Microsoft Hyper-V, Xen.
2. **Type 2 (Hosted Hypervisor):**
   * Runs on top of a regular operating system (like Windows or Linux).
   * Easier to set up, but less performant.
   * Examples: VMware Workstation, Oracle VirtualBox.

### What Does the Hypervisor Do?

* **Creates and manages VMs**
* **Allocates resources** (CPU, memory, disk) to each VM
* **Isolates VMs** from one another
* Allows VMs to **run different operating systems** on the same physical host

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| The uname command in Linux is used to display system information. |  |  |
| uname | Print system name |  |
| uname -a | All system information | Linux abc 5.14.0-570.17.1.e19\_6.x86\_64 #1 SMP PREEMT\_DYNAMIC Fri May 23 22:4747:81 UTC 2025 x86\_64 x86\_64 x86\_64 GNU/Linux |
| uname -r | Kernal release/version | 5.14.0-570.17.1.e19\_6.x86\_64 |
| uname -s | Kernel name | Linux |
| uname -n | Network domain/node hostname | abc |
| uname -v | Kernel version | #1 SMP PREEMPT\_DYNAMIC Fri May 23 22:4747:81 UTC 2025 |
| uname -m | Machine hardware name | X86\_64 |
| uname -p | Processor type (may show unknown) | X86\_64 |
| uname -i | Hardware plateform (may show unknown | X86\_64 |
| uname -o | Operating system | GM/Linux |
|  |  |  |
| Cat /etc/os\_release | To view the file in ‘etc’ directory |  |
|  |  |  |
| clear | Clear the screen |  |
| Hostname | Display hostname | abc |
| hostnamectl set-hostname myserver | Change hostname to myserver |  |
| /bin/bash | Re initializing |  |
| Bash | Re initializing |  |
|  |  |  |
| cat /etc/shells | will display the list of valid login shells available on your Unix/Linux system. | /bin/sh  /bin/bash  /usr/bin/bash  /usr/bin/sh |
| echo $SHELL | To see current shell | /bin/bash |
| Lscpu | displays **detailed CPU architecture information** about your system. | Architecture: x86\_64  CPU op-mode(s): 32-bit, 64-bit  Byte Order: Little Endian  CPU(s): 8  On-line CPU(s) list: 0-7  Thread(s) per core: 2  Core(s) per socket: 4  Socket(s): 1  Vendor ID: GenuineIntel  Model name: Intel(R) Core(TM) i7-8650U CPU @ 1.90GHz  CPU MHz: 2112.004  Virtualization: VT-x  L1d cache: 32K  L1i cache: 32K  L2 cache: 256K  L3 cache: 8192K |
| pwd | stands for **Print Working Directory**. |  |
|  |  |  |
| total used free shared buff/cache available  Mem: 7947 1523 4321 198 2103 5930  Swap: 2047 0 2047  Swap is disk-based memory used when RAM runs out.  If used under Swap is high, you may be low on RAM.  "Swap ڈسک پر مبنی میموری ہوتی ہے جو اُس وقت استعمال ہوتی ہے جب RAM ختم ہو جائے۔  اگر Swap کے تحت 'used' کی مقدار زیادہ ہو تو اس کا مطلب ہے کہ آپ کے سسٹم میں RAM کم پڑ رہی ہے۔" | | |
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| Ip a: 192.168.100.14 |  |  |
| Ssh [root@192.168.100.14](mailto:root@192.168.100.14) | To check last login |  |
| Pwd | Print working directory |  |
| Cd bin | Change directory |  |
| Cd  Cd / or cd ..  Ls (list of  Ll | Out side the door |  |
| Ctrl c | Kill process |  |
| Cd /etc |  |  |
|  |  |  |
| Login shell:  Login shell is first process  NonLogin Shell: |  |  |
| When login then bash invoked |  |  |
| pS $$  file /bin/bash | Process in kernel | What is standard input |
| Echo $PATH  Echo $USER  Useradd Ali  Passwd ali |  |  |
| System files.  .filename (hidden file) |  |  |
| Init 0 | logout |  |