Cloud Gaming

Edge computing course
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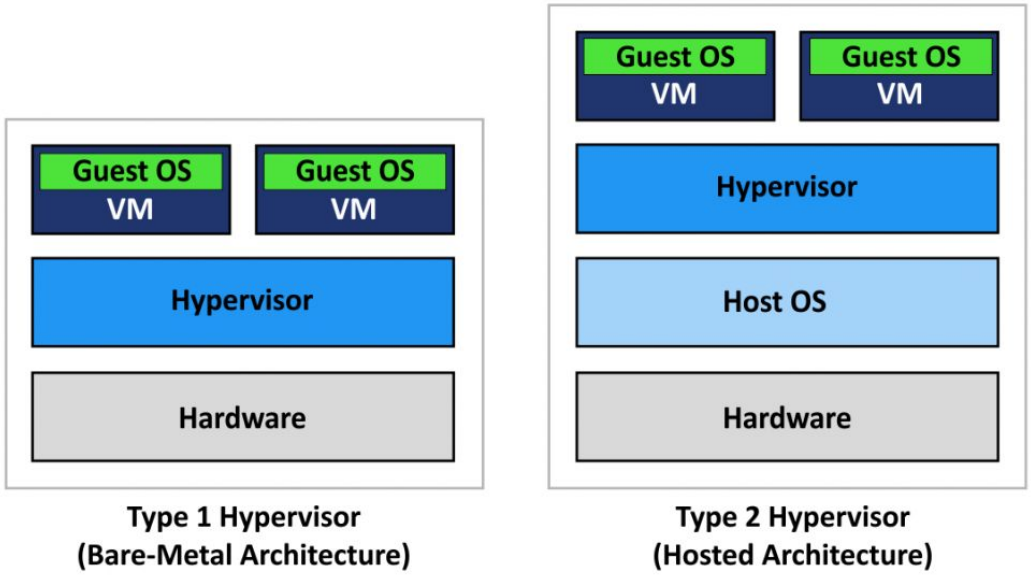
Presenter: Vitor Ramos

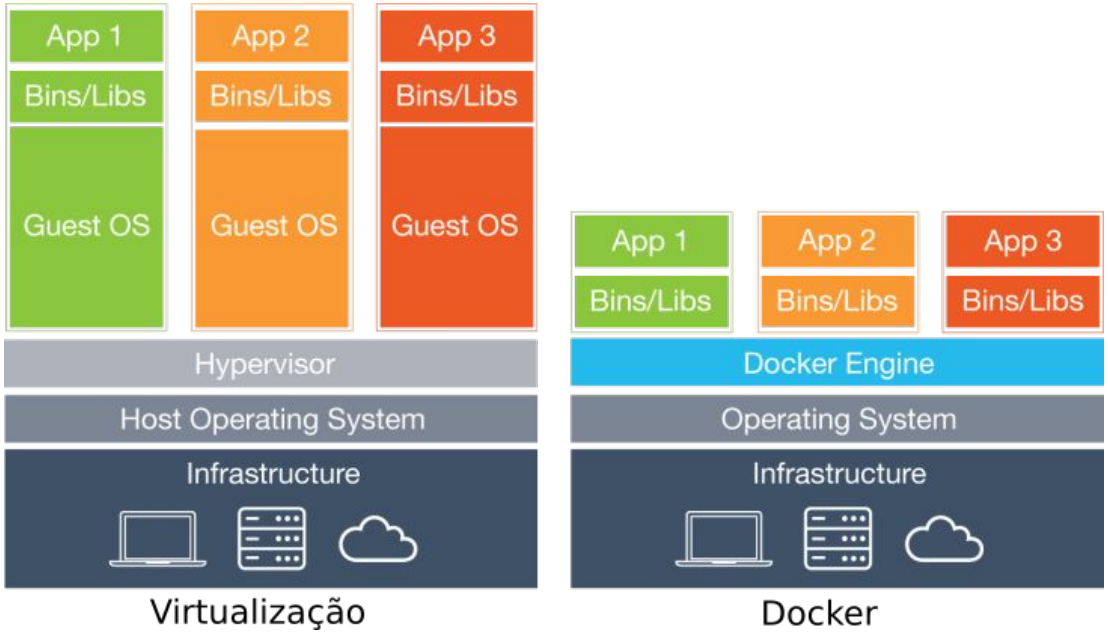
Technologies

- Virtualization Methods
  - Hypervisor type 1
    - VMware
    - VirtualBox
  - Hypervisor type 2
    - VMware
    - Kernel virtual machine (KVM)
    - Hyper-V
  - Namespaces (Containers)
    - Docker
    - Podman
- Device passthrough
  - USB
  - PCI
- Programming (python)
  - Inter-process communication
  - Parallel programing
- Linux basics
- Git

Virtualization Methods (hypervisor)



Virtualization Methods (namespaces)



Hypervisor vs namespaces

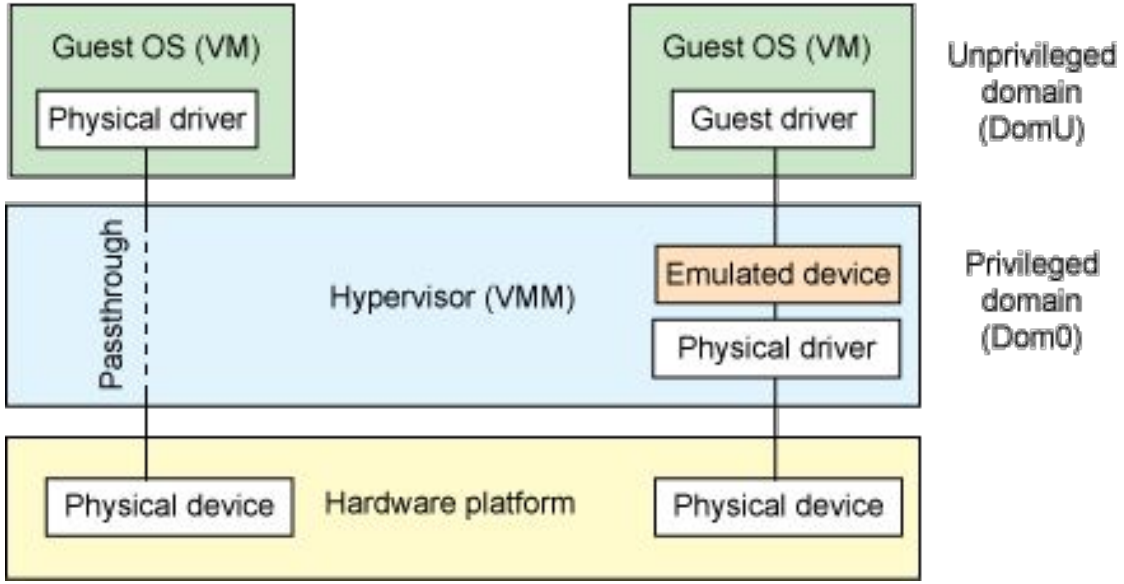
Hypervisors

- Allow an operating system to run independently from the underlying hardware through the use of virtual machines.
- Share virtual computing, storage and memory resources.
- Can run multiple operating systems on top of one server (bare-metal hypervisor) or installed on top of one standard operating system and isolated from it (hosted hypervisor).

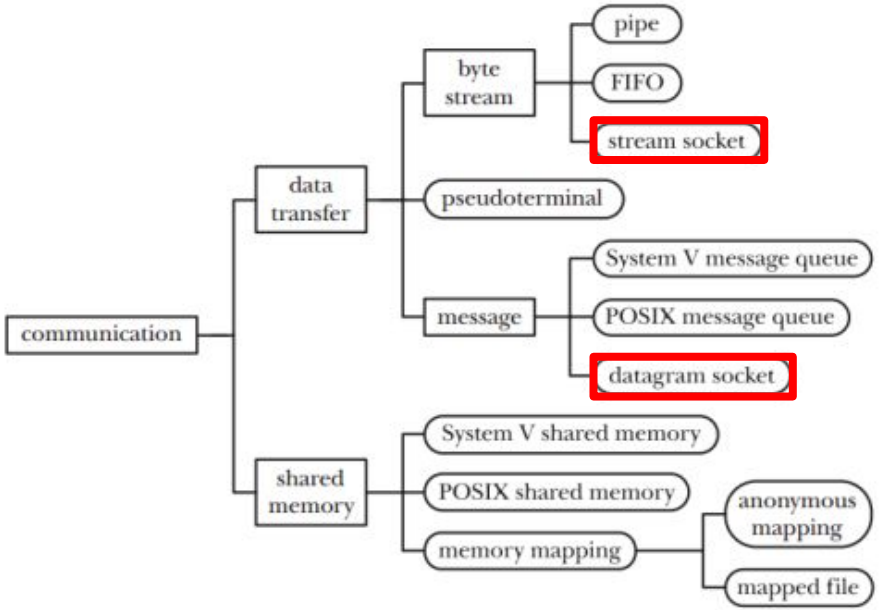
Namespaces:

- Allow applications to run independently of an operating system.
- Can run on any operating system—all they need is a container engine to run.
- Are extremely portable since in a container, an application has everything it needs to run.

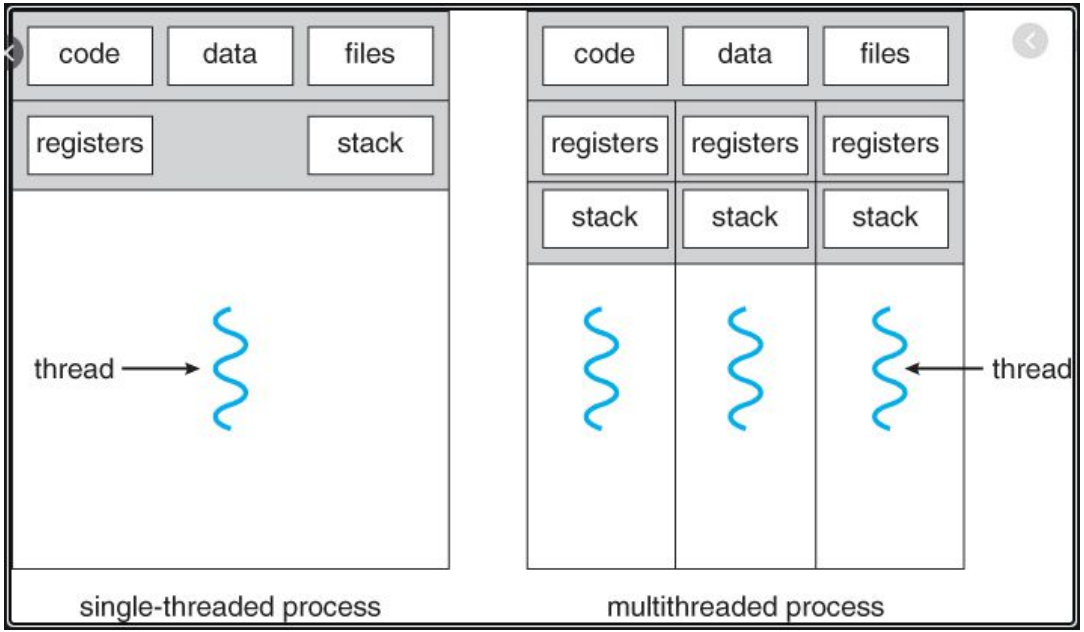
Device passthrough

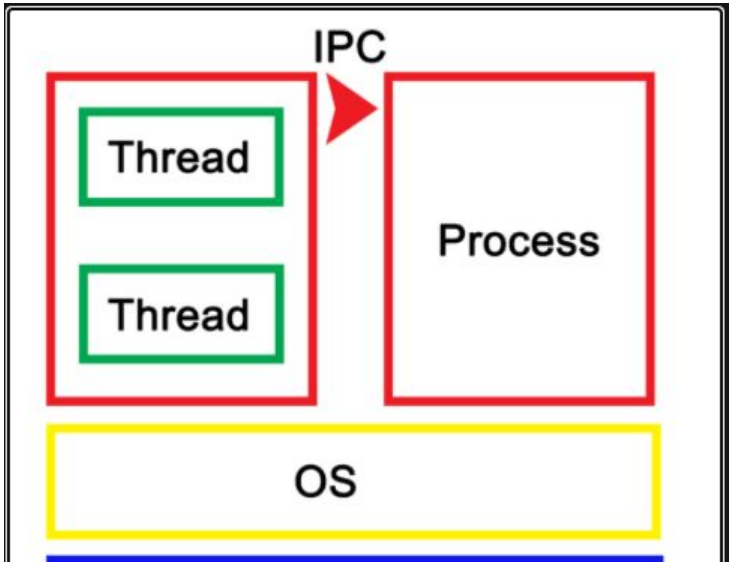


Inter-process communication : Methods

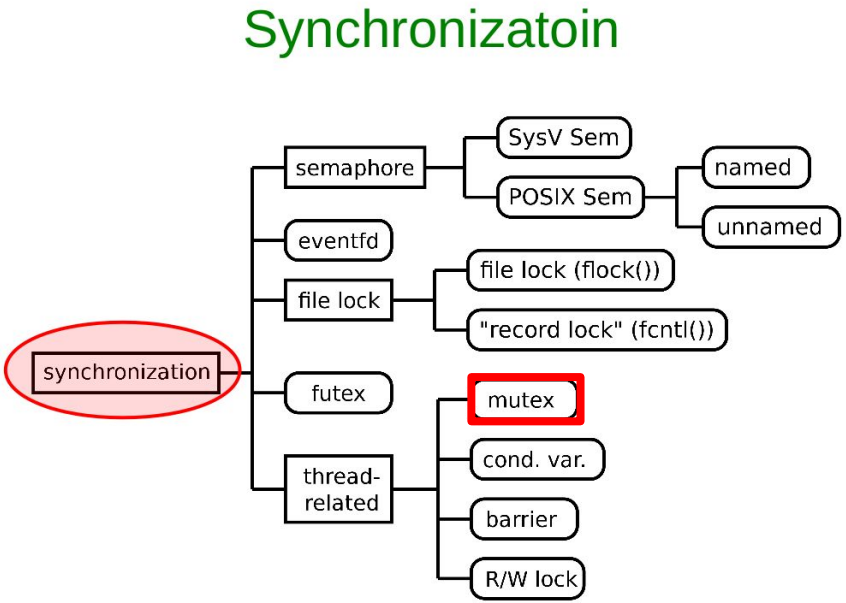


Parallel programming : Thread vs Process





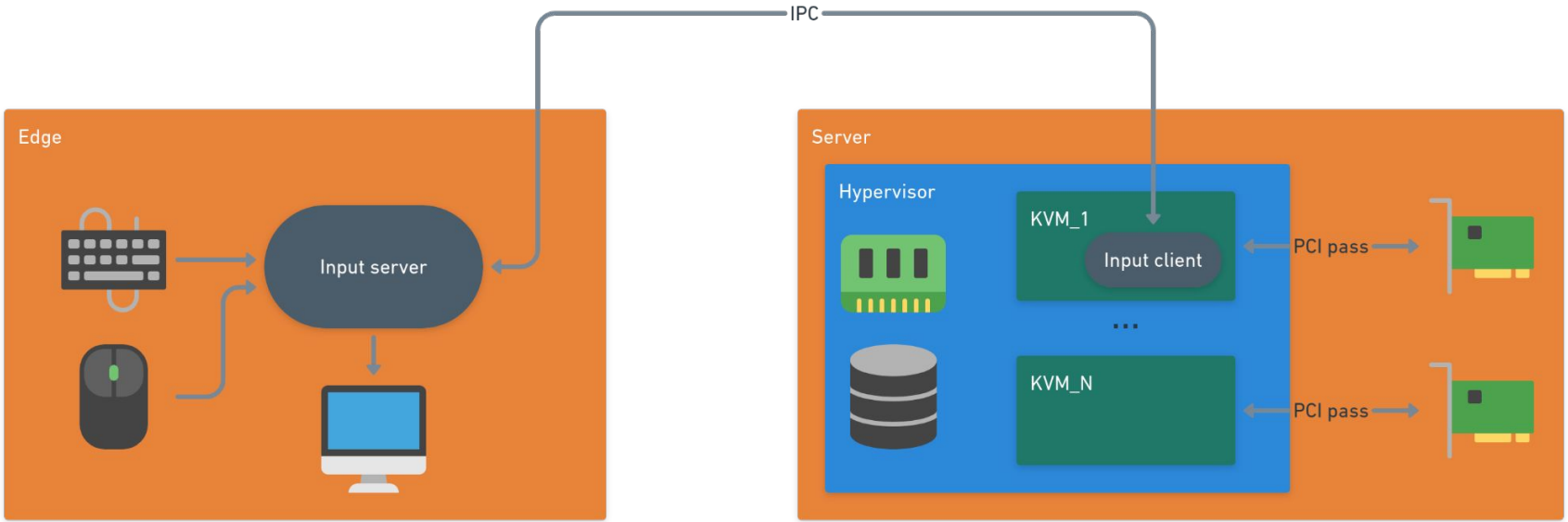
Parallel programming : Sync



Linux basics

- Basic linux architecture
  - Filesystem
  - Display server (xorg)
  - Input devices
- Basic Shell
- Create KVMs, Docker
- Configure PCI passthrough

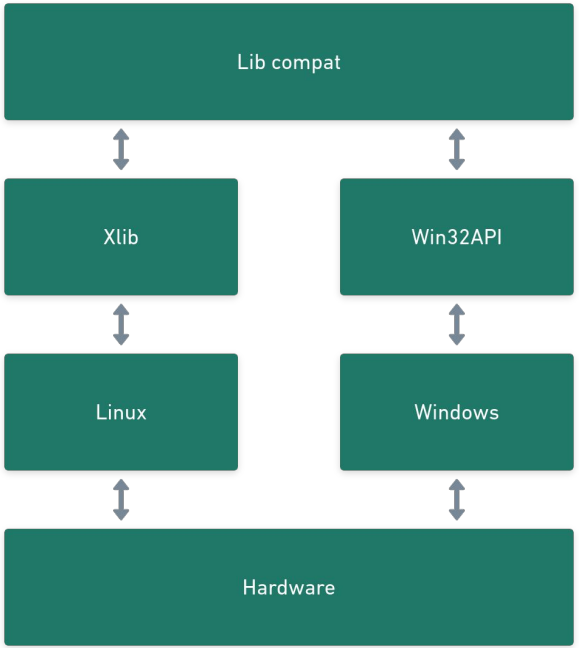
Cloud Gaming: Architecture



Cloud Gaming: Specifications

- IPC
  - tcp socket keyboard
  - tcp socket mouse key
  - tcp socket mouse x-y position
- Python threading (single thread**)
  - Mouse events
  - Keyboard events
- Input events
  - Xlib
  - Win32

Input events (Windows vs Linux)



Cloud Gaming: Input protocol

- Keyboard:
  - Message: “{key}_{state}”
- Mouse
  - Message: “K_{key}_{state}”
  - Message: “P_{x}_{y}”
- States:
  - Key up
  - Key down

Cloud Gaming: Display

- ...