

# How do process abstraction & hardware differ

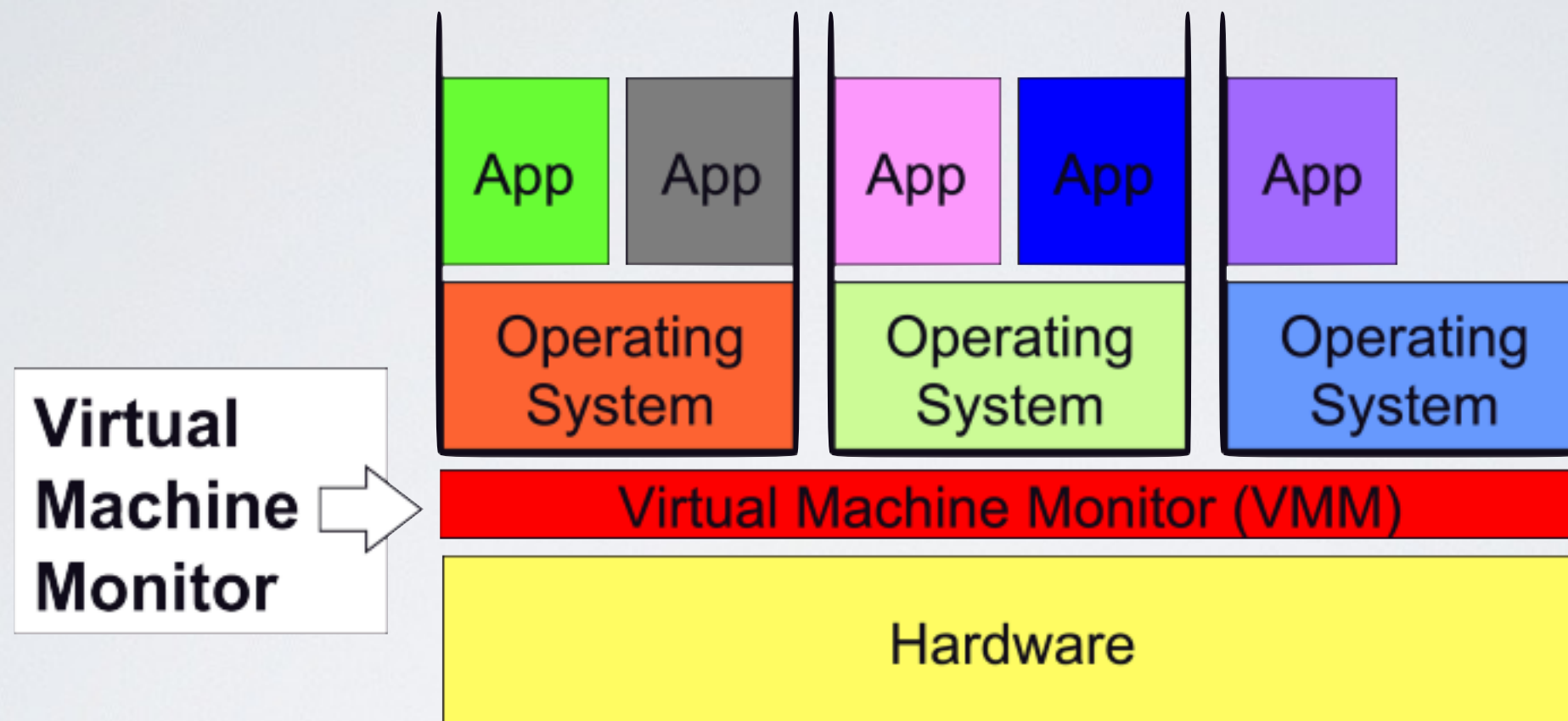
## Process

- Non-privileged registers and instructions
- Virtual memory
- Errors and signals
- File systems, directories, files, raw devices

## Hardware

- All registers and instructions
- Both virtual and physical memory, MMU functions, TLB/page tables ...
- Trap, interrupts
- I/O devices accessed through programmed I/O, DMA, interrupts

# VMM - Virtual Machine Monitor



Thin layer of software that virtualizes the hardware

- Exports a virtual machine abstraction that looks like the hardware
- Provides the illusion that software has full control over the hardware

➔ **The Virtual Machine Monitor (a.k.a Hypervisor)**  
runs multiple OSes simultaneously on the same physical machine