Introduction to Programming

Week – *0*, Lecture – *3*

Virtual Machines

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Windows and Macintosh, are known to be closer to the user

- … meaning that they may “hide” finer-grained details of how the hardware is managed

OS on top of OS – Virtual Machines

What if I like one OS a lot, but I am stuck with another OS?

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Basically, they make a *layer* over your OS

- This layer behaves pretty much the same way that the hardware does

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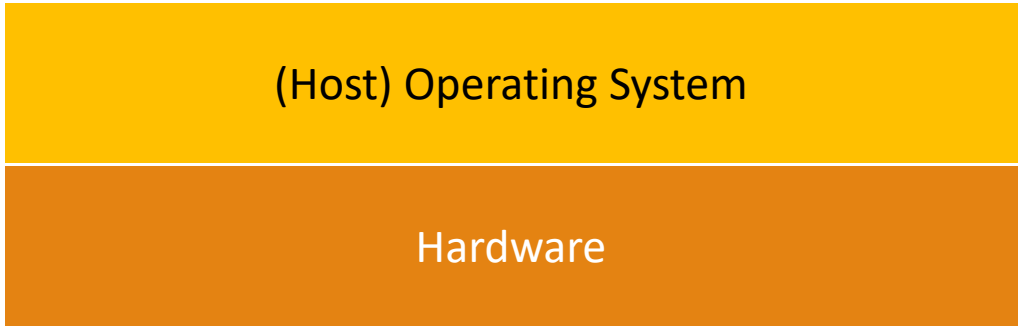
So, you can now *install* an OS over this *emulated* hardware

- We call this emulated hardware a **Virtual Machine** – because it is not real, but virtual
- … and this OS can be different from the OS running directly over your hardware

OS on top of OS – Virtual Machines

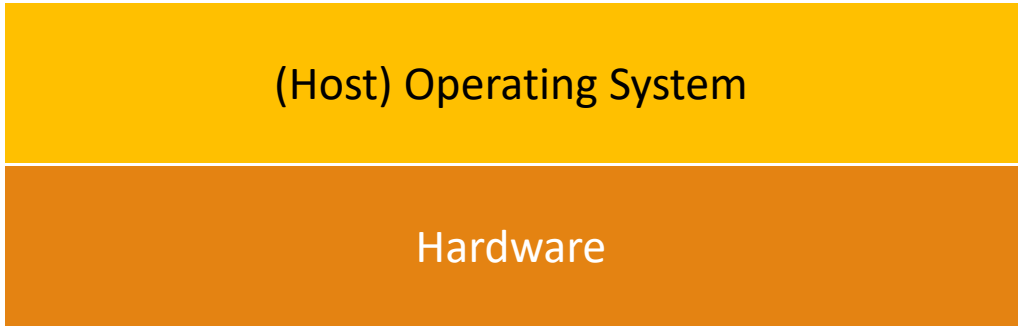
This is your hardware

OS on top of OS – Virtual Machines



You install an Operating System over it

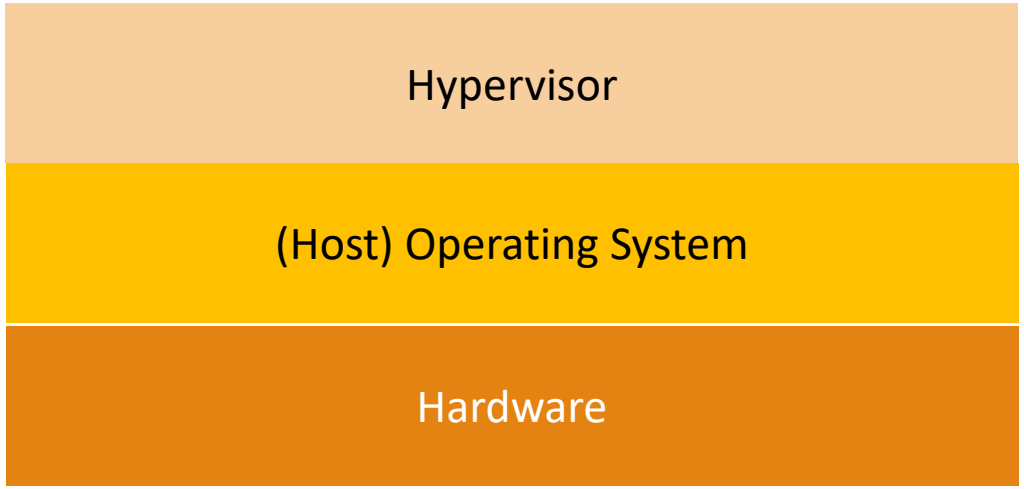
OS on top of OS – Virtual Machines



We also call it the *host* Operating System

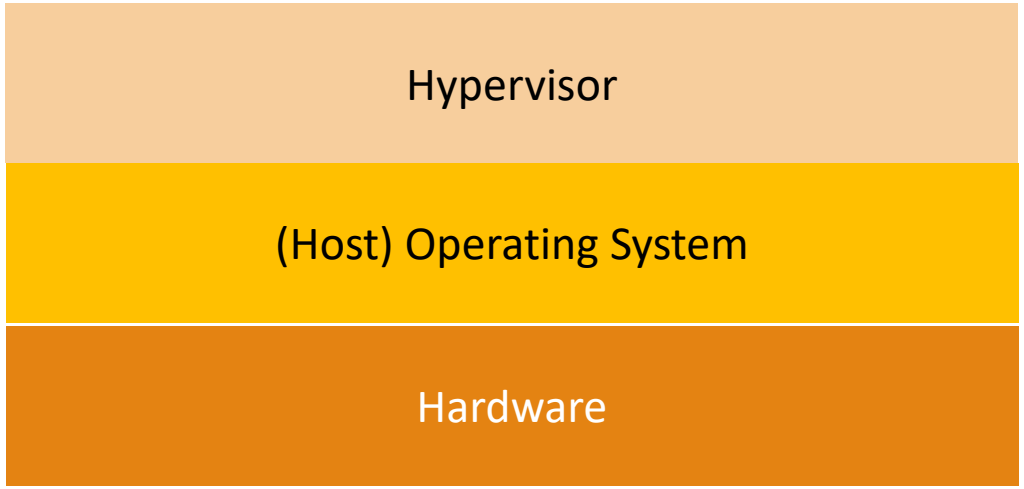
You install an Operating System over it

OS on top of OS – Virtual Machines



You install a Hypervisor over your Operating System

OS on top of OS – Virtual Machines



Just like you install any other software tool

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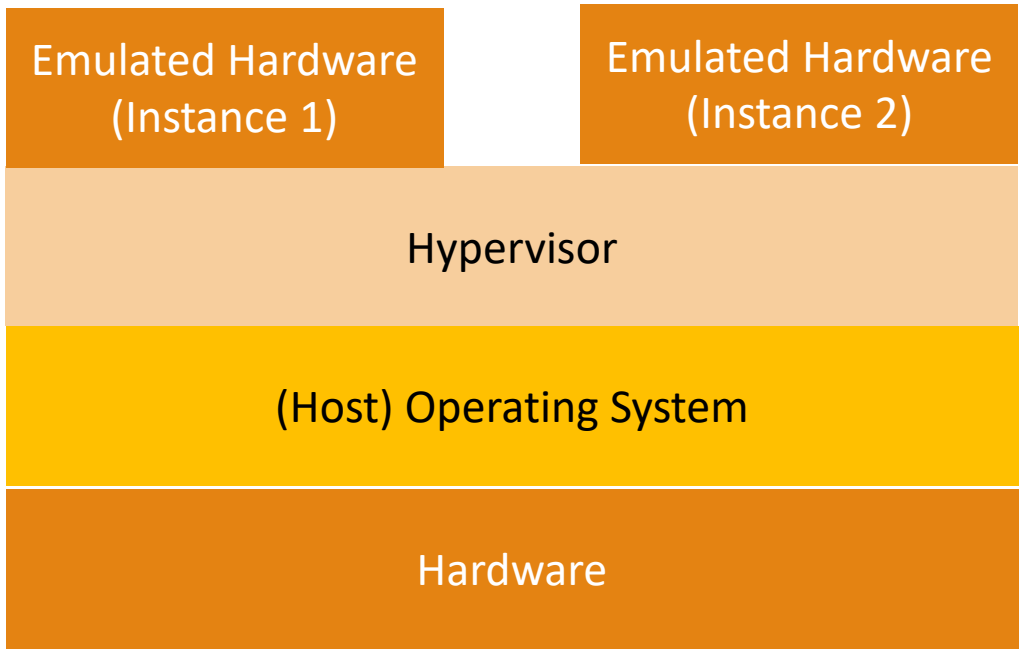
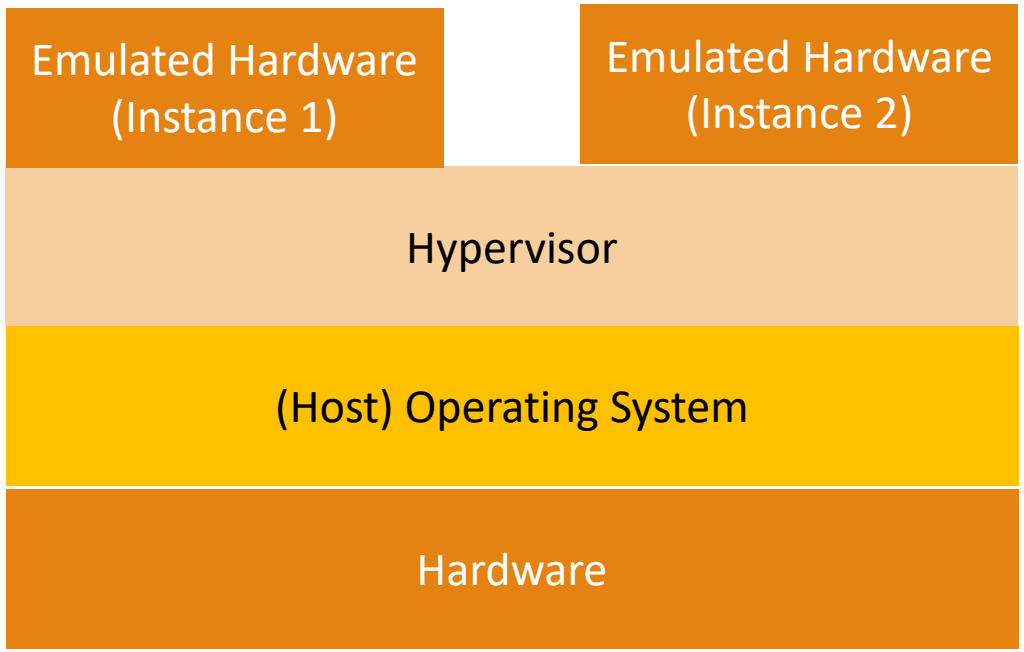


The Hypervisor can create one or more hardware emulations

OS on top of OS – Virtual Machines



Each emulation emulates every type of essential hardware – CPU, I/O, Main Memory etc.

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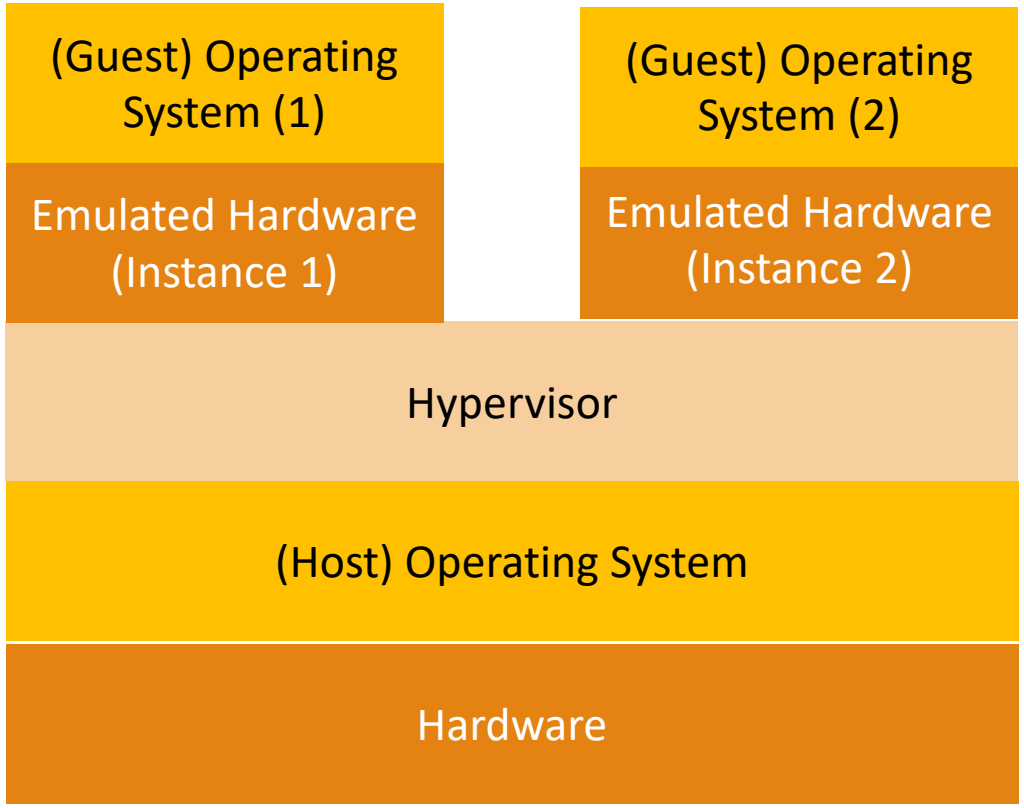
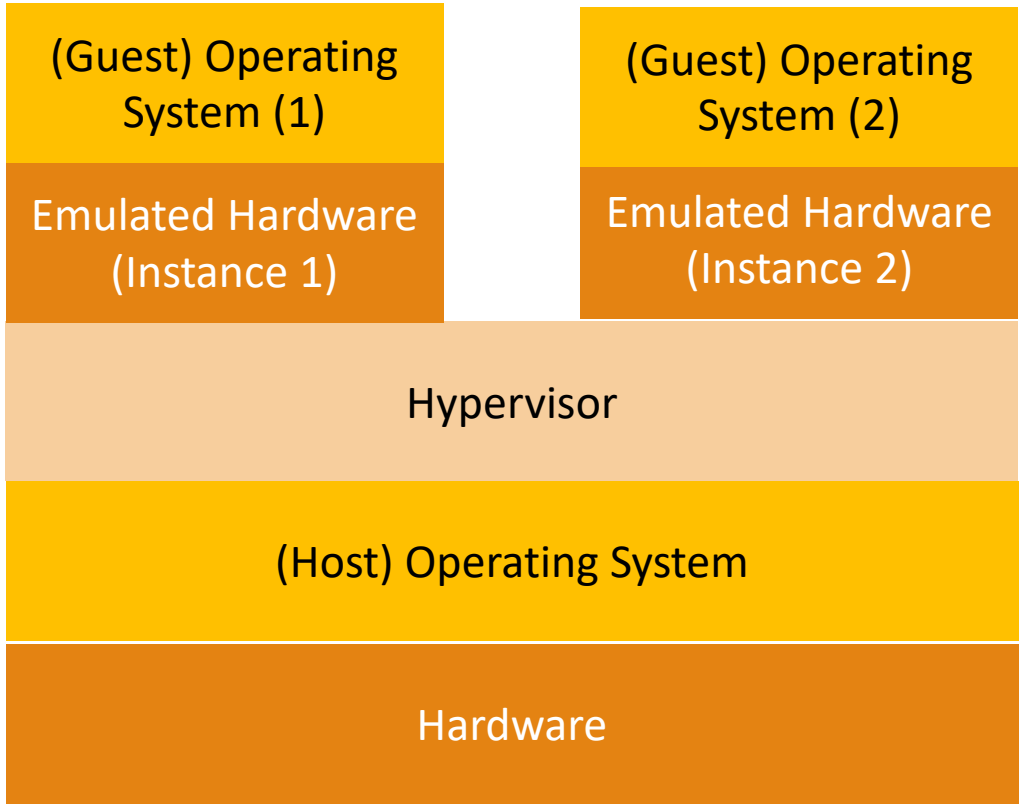


You can now install one or more Operating Systems over the emulated hardware

OS on top of OS – Virtual Machines



We call these Operating Systems *guest* Operating Systems

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Using Virtual Machines for the Course

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- You will have to do that as part of your first lab – so practice now

Homework !!

What we saw today is known as *type-2* Hypervisor

- There is another type of Hypervisor, called *type-1* Hypervisor

Read about the difference between the two

- Reading this short article should be enough: https://www.ibm.com/cloud/learn/hypervisors

There is one awesome feature of Virtual Machines – Snapshots

- Read more about snapshoting
- This article provides a basic introduction: https://www.techrepublic.com/article/how-to-use-snapshots-in-virtualbox/