

Video Tutorial - Cloud and Virtualization (5 min)

In general, when we're talking about the cloud, we're talking about three things: data centers, cloud computing or cloud services and virtualization, or virtual computing. Though data centers can be smaller, they're generally large facilities which provide massive amounts of power, cooling and bandwidth. Only very large organizations like Facebook or Google can afford to build their own private data centers to provide services to their users. Other, smaller organizations lease space from a data center.

Cloud service providers like Cisco, or Amazon Web Services or Microsoft Azure offer their services out of data centers. There are two basic types of clouds: public clouds and private clouds. Public clouds offer services and applications to the general population, whereas private clouds are intended for specific organizations or entities, such as governments and are only accessed by those private organizations. There are different categories of cloud services. SaaS, or software as a service, refers to on demand software, or a subscription model where the license and delivery of the software happens through the cloud. You'll find this with things like Office 365 or Adobe Creative Cloud or even computing gaming software in which access to the software happens typically through a web browser. The software is typically not owned but rather leased.

PaaS, or platform as a service, is where the cloud service provider provides the platform, like the Java or dot net platform for a developer to develop an application or app. This oftentimes involves providing databases and tools to the developer so that they can quickly develop an app. Infrastructure as a service refers to virtual computing that can be provided over the internet on demand. This includes virtual computing, such as virtual servers as well as virtualized storage, and virtualized networking capabilities that can be provisioned, allocated and supplied on demand on an as needed basis.

Virtualization is the ability to abstract or separate the operating system from the physical hardware. To create a virtual computer, the dedicated physical hardware needs to be shared with the virtual computer. In this slide, we see a Windows 7 virtual computer that is sharing the physical dedicated resources of the host computer. This is done through a hypervisor. There are two types of hypervisors used in virtualization: a Type 1 hypervisor known as a bare metal hypervisor and a Type 2 hypervisor known as a hosted hypervisor. A Type 1 bare metal hypervisor is a virtualization server. The hypervisor is an operating system that's installed unto the hardware directly, after which, virtual computers can be created. There are different types of Type I hypervisors: KVM, Red Hat Enterprise Virtualization, Xen, Citrix XenServer, VMware ESXi, VMware vSphere and Microsoft Hyper-V.

A Type 2 hypervisor is known as a hosted hypervisor. In this situation, the hypervisor is an application or program that is installed on top of the host operating system. In other words, you install the hypervisor, like Virtualbox, or VMware Workstation, Parallels, Virtual OC on top of the host computer. You install Virtualbox, let's say, on top of the Windows operating system. Then you can create virtual computers. In addition to virtual computing, we can also virtualize switching and routing. In this slide, we can see two VMware EXSi hypervisors. The virtual computers are all networked together with a Cisco Nexus 1000v virtual switch. The virtual switch brings the power of a Cisco switch to the virtualized network environment.