13.1.2 Cloud and Virtualization Overview: Part 2

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Cloud and Virtualization Overview: Part 2 0:00-0:25

In this video, we're going to discuss cloud technologies.

An individual, a small company, or a large enterprise can choose to build and maintain their own local IT infrastructure. This can be a monumental task with the hardware, software, and human expertise required. Faced with these challenges, many individuals and organizations are turning to cloud services and technologies as an alternative solution.

The Cloud and Cloud Services 0:26-1:17

Every organization has local IT resources, like desktop or laptop computers and a local network. But today, many IT resources, including hardware, software, and networking, can be delivered over the cloud. Although cloud services can be delivered through a dedicated WAN, most people rightly equate the cloud with the internet.

When you focus on cloud services, the cloud can be defined as the hardware, networks, storage devices, and interfaces that deliver computing as a service. If you're receiving services from a location that is not local, then you're using a cloud service.

The cloud that you see here might be offered by a cloud provider, a vendor that offers cloud services. It's composed of things like computing hardware, virtual machines, virtual containers, and networks. It can include storage devices, applications, and the special interfaces that allow you to connect to these cloud services from a local device.

Cloud Service Categories 1:18-1:43

You can divide cloud services into categories. These categories are often listed with the suffix "aaS", which stands for "as a Service." The three main cloud service categories are IaaS, Infrastructure as a Service; Paas, Platform as a Service; and SaaS, Software as a Service. Other notable services are CasS, Containers as a Service, and FasS, Function as a Service. The key thing to remember is that cloud services are separate from local devices.

Infrastructure as a Service (IaaS) 1:44-2:03

Let's begin by looking at Infrastructure as a Service, or IaaS.

IaaS is the delivery of what we traditionally associate with computer hardware as a service. It provides client storage and computing resources. Essentially, you can rent storage space in the cloud instead of having to go out and buy a quantity of hard drives that you install and use locally.

Block and Blob Storage 2:04-2:49

Cloud providers offer two types of cloud storage, block storage and blob storage. Block storage is like traditional drive space. It might be offered like a network drive or as a drive that's accessed by a cloud computing resource. Block storage stores files in directories in the same fashion as any other local file system.

Blob is short for binary large object. Blobs can be any type of data, like documents, video and audio, or backup data. You don't store and retrieve blob data in the same way you would on a network drive. Instead, blob storage is managed from a dashboard or webpage. As you upload files, each file or blob is given a URL that's used to access or download the blob. This is especially useful because that URL can be used as a link in other websites.

Computing Power 2:50-3:22

Like cloud storage, you can use computing power from the cloud instead of buying a new server to do a particular job. You simply rent time from an IaaS cloud service provider instead of purchasing new hardware. This saves you money up front and provides flexibility, scalability, and elasticity. For example, if you start a new project that requires a sizable amount of storage and computing power, but for a limited amount of time, you can easily scale up. And when you're done with that project and you don't need that storage or computing power, you can scale back down. You only pay for what you need, and nothing more.

Platform as a Service (PaaS) 3:23-4:30

Platform as a Service, or PaaS, offers a complete development environment. Basically, it's an environment that you can use to create cloud-ready business applications. The cloud service provider delivers an entire solution stack. This solution stack is an integrated set of software that provides the developer with everything they need to build an application.

PaaS is an outgrowth of the traditional concept of web hosting. If you've used a web hosting provider in the past, you know that most of them provide you with a web development interface you can use through a web browser to build your webpage.

PaaS is similar. Instead of just giving you the ability to build websites, it provides you with a complete development environment to create entire integrated application suites. Once again, the primary benefit of choosing this option is that your development and deployment activities take place entirely in the cloud, so you don't have to manage or maintain local systems.

Some cloud services provide development process features, like software design, software development, testing, and deployment. Just as with Infrastructure as a Service, Platform as a Service provides you with the flexibility and the elasticity you need to scale up when you need resources and scale back when you're done.

Software as a Service (SaaS) 4:31-5:14

Software as a Service is typically designed for an average end user. SaaS can provide applications that end users need to do their day-to-day work. Instead of installing the applications locally on their hard drive, users generally open a web browser and go to their cloud service provider. Within that browser, they run the application they need to use—maybe a word processor, presentation software, or spreadsheet software. A good example of Software as a Service is Office 365, which offers an online version of the Microsoft Office Suite.

One of the other key advantages of SaaS is that you can try new software without committing to it. Often, a SaaS provider will allow you to try out an application and pay only for the time you use it. If you like it, you can contract an agreement with the provider.

Linux and Cloud Services 5:15-5:41

With a basic understanding of cloud services, let's turn our attention to how Linux is used to provide those services.

It's estimated that Linux powers 90 percent of the public cloud. But if you've walked through the offices of many schools and businesses, you you've probably seen that their desktops and laptops are running a Windows operating system and using the Microsoft Office Suite. You might think, "Ninety percent? How is that possible?" Let's examine a few use cases and see where Linux hides.

Network Storage as a Service 5:42-6:17

Most companies tell employees to store important documents on a network drive. This way, other employees can view and share the documents. Additionally, network storage is much more reliable. The document is stored on redundant drives and backed up properly.

If the company has purchased storage from a cloud provider, the network drive is virtual. The data in that network drive resides on physical hardware in the cloud provider's data center. The cloud provider's infrastructure, which offers that network drive, most likely includes a physical server connected to physical drives. And what operating system is that server running? Most likely, it's Linux.

Web Hosting and PaaS 6:18-7:42

Let's look at another scenario. Suppose a company contracts with a cloud provider to host a website. That website is to be integrated with a database, also hosted by the cloud provider. Finally, the company requests a development platform with all the tools to develop and test new website features that will be migrated to the company's website periodically. Does the cloud provider purchase specific hardware and software when it brings on this company as a new customer?

Most likely, the cloud provider already has a pool of servers and storage devices along with the network infrastructure and interfaces that can be used to provide these services. Many of the servers in this pool run Linux. If a web service is needed, it could be run on a virtual machine that is a guest on a bare metal Linux-based hypervisor. The database service could also be run inside a container offered by a Linux-based container engine running on a Linux operating system. And that operating system could be running on bare metal or within a virtual machine.

Likewise, the development platform could be a single server running as a virtual machine. Even if this virtual machine runs a Windows operating system, the underlying hypervisor will likely be Linux-based. If the development platform is made up of multiple applications, these could be run in containers, again, from a Linux-based container engine.

Whether the claim that Linux powers 90 percent of the public cloud is plausible or not, it's very clear that Linux provides a major share of cloud services.

Summary 7:43-7:59

So, let's review what we discussed. As a Linux administrator, you should be aware of the cloud services that Linux provides. In this video, we defined the cloud and cloud services. We listed the categories of cloud services, including IaaS, PaaS, and SaaS. We ended by illustrating how Linux is used to provide cloud services.