Management Information System
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Week – 07
Module – 04
Lecture – 33
Data Centers, Virtualization and Cloud Computing

Hi, welcome to the 4th module of week 7 on our course on "Management Information Systems"! Today, the subject topic is 'data centers, virtualization and cloud computing'.

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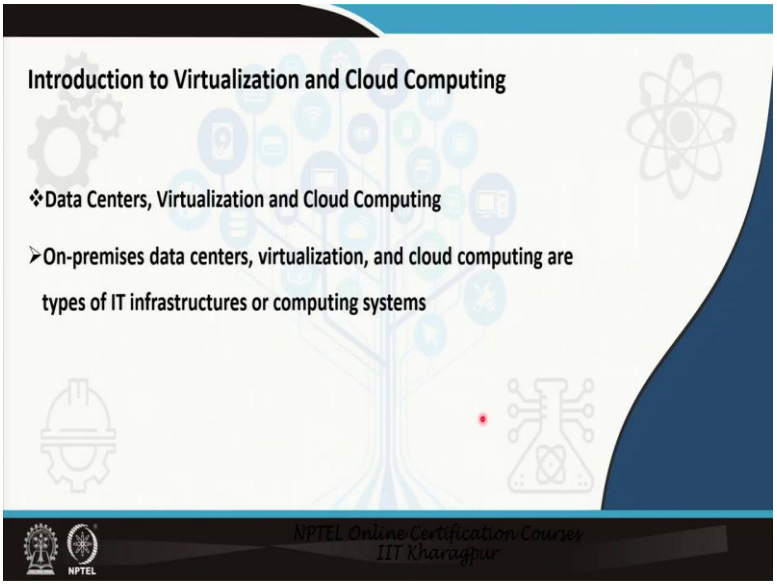

Now, on premises, data centers, virtualization and cloud computing are different types of information technology infrastructures or computing systems.

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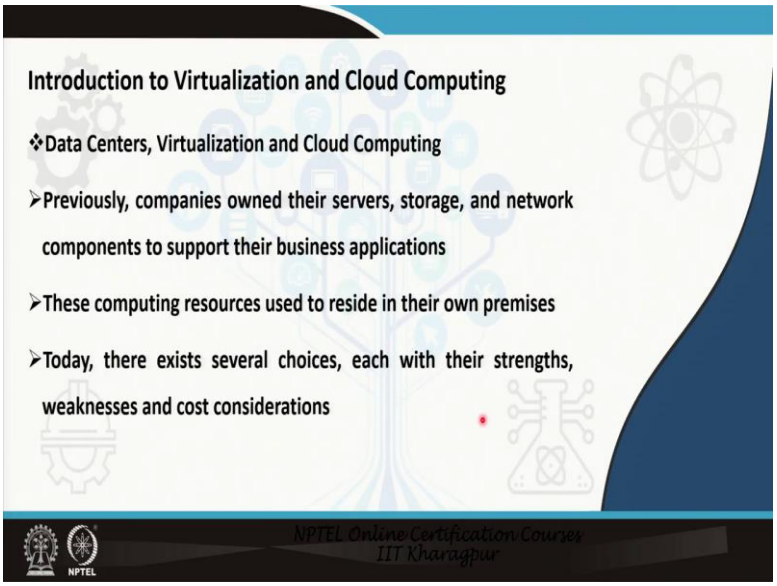

Previously, companies owned their servers, storage facilities and network components to support their business applications. Those computing resources used to reside in their own premises. Today, there exists several choices, and each of these choice have their own strength and weakness and there are cost considerations related to each of these options.

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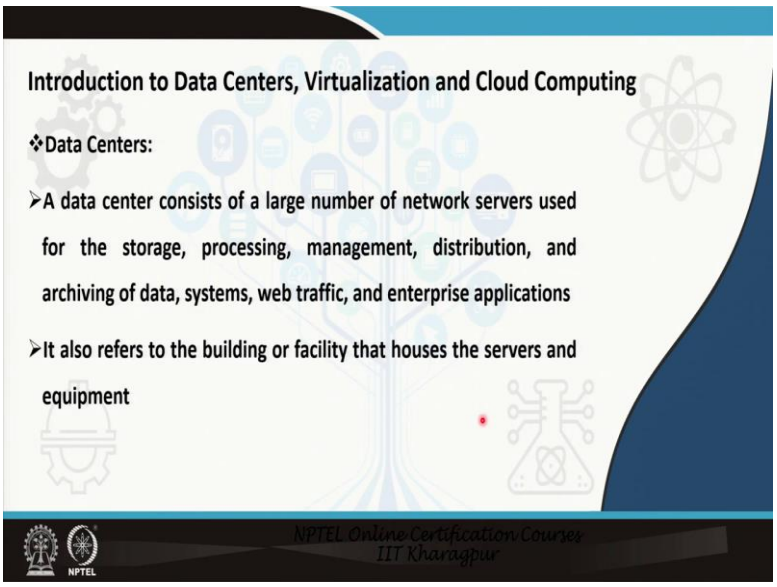

So, what is a data center? A data center consists of a large number of network servers used for the storage, processing, management, distribution, and archiving of data, systems, web traffic, and enterprise applications.

Data centers also refer to the building or facility that houses the servers and the associated equipments.

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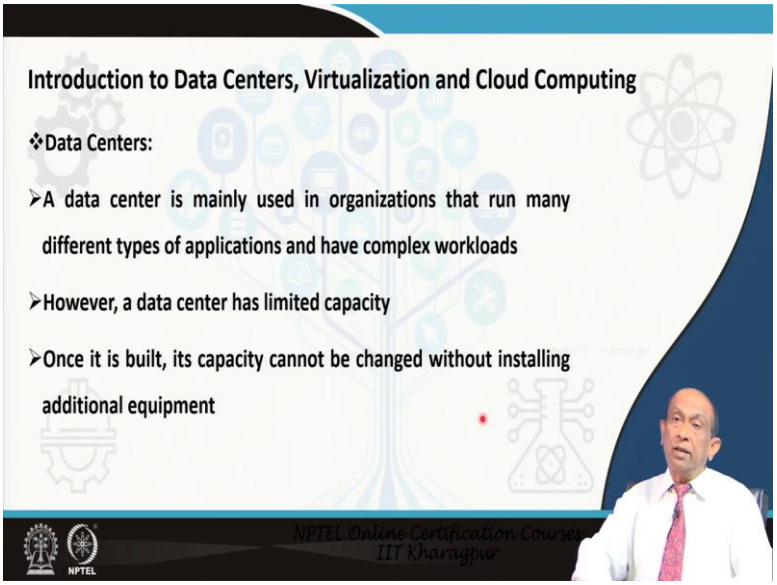

A data center is mainly used in organizations that run many different types of applications and have complex workloads. For example, large automotive organizations till very decent times used to maintain their own data centers because they had complex IAS applications.

However, the flexibility associated with a data center is limited, because of its limited capacity. Once a data center is built, its capacity cannot be changed without installing additional equipment.

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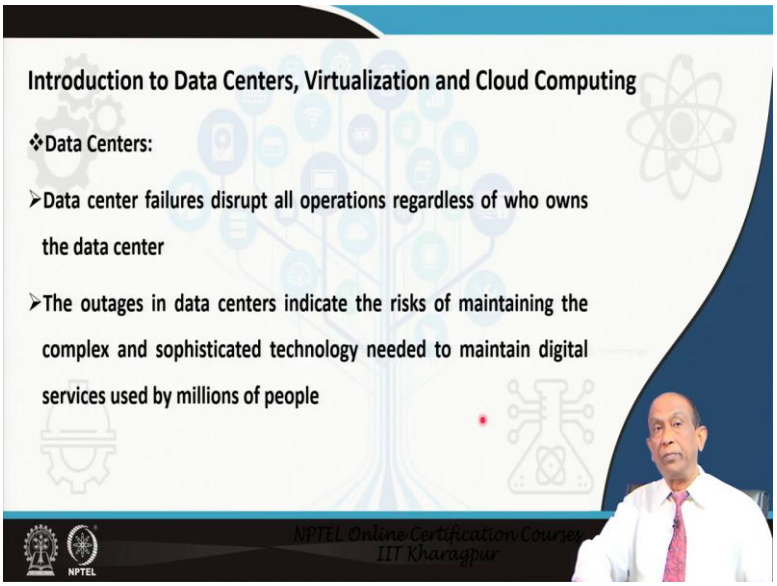

And the problem is that data center failures, if it once occurs, will disrupt all operations regardless of the fact who owns the data center. The outages in data centers basically indicate the risks of maintaining complex and sophisticated technology which are needed to provide and maintain digital services that are used by millions of people.

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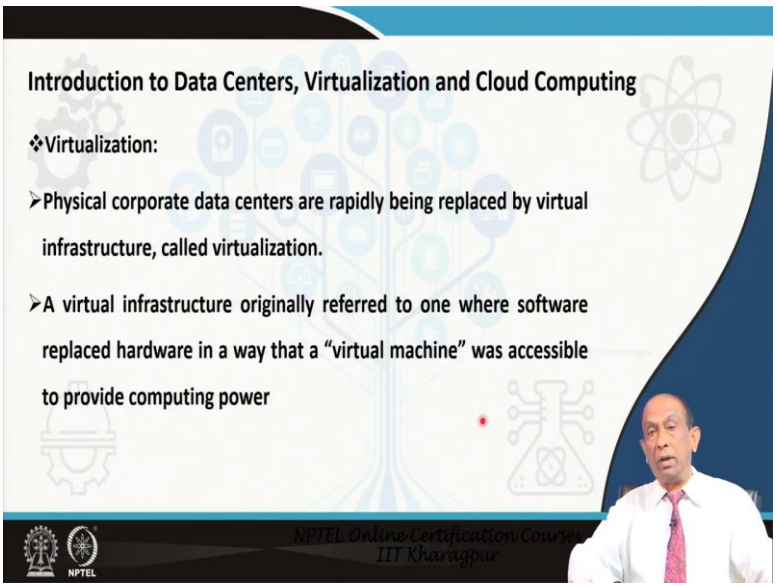

Now, let us talk about virtualization. What is virtualization? Virtualization means, you know software replacing hardware in a way that users, they feel that they are accessing the computing power of a real machine.

Physical corporate data centers, in today's context are rapidly getting replaced by virtual infrastructure, and this is the essence of virtualization. Basically, this concept refers to one where software replaces hardware in a way that a virtual machine is accessible to provide the necessary computing power.

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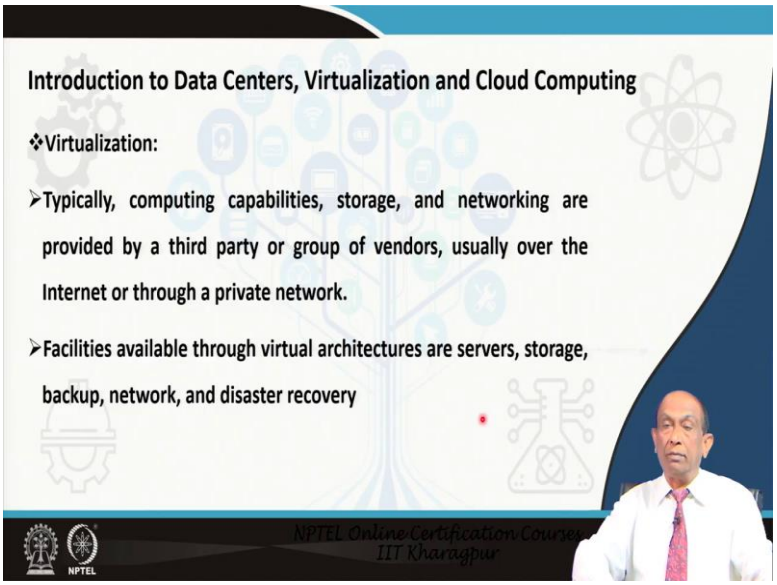

Typically, computing capabilities, storage and networking are provided by a third party, basically the service providers or group of suppliers, usually over the internet or through a private network.

Facilities that are available through this kind of virtual architectures consists of different kinds of servers, storage facilities, backup facilities, network and disaster recovery servers. Even other things that are necessary for disaster recovery.

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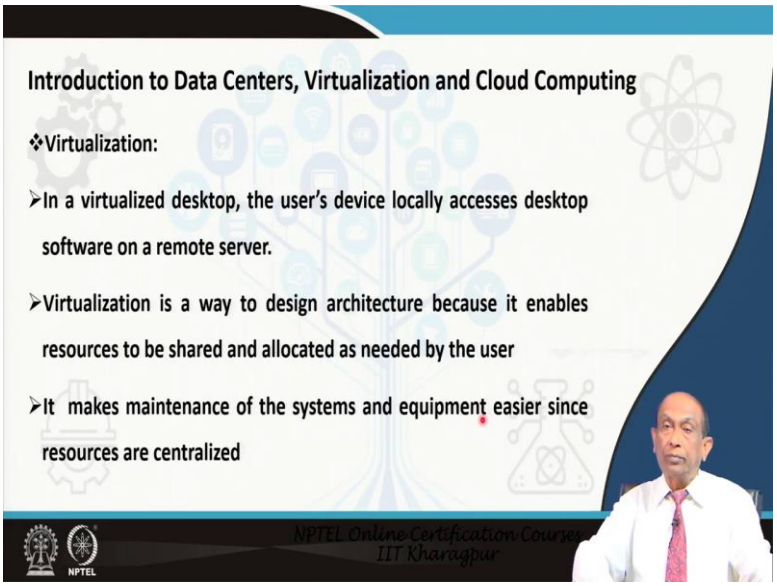

In a virtualized desktop, the user's device locally accesses the desktop software on a remote server. Virtualization is a way to design architecture because it enables resources to be shared and allocated as needed by the user. Basically, it makes maintenance of the systems and equipment easier, since all the resources are centralized.

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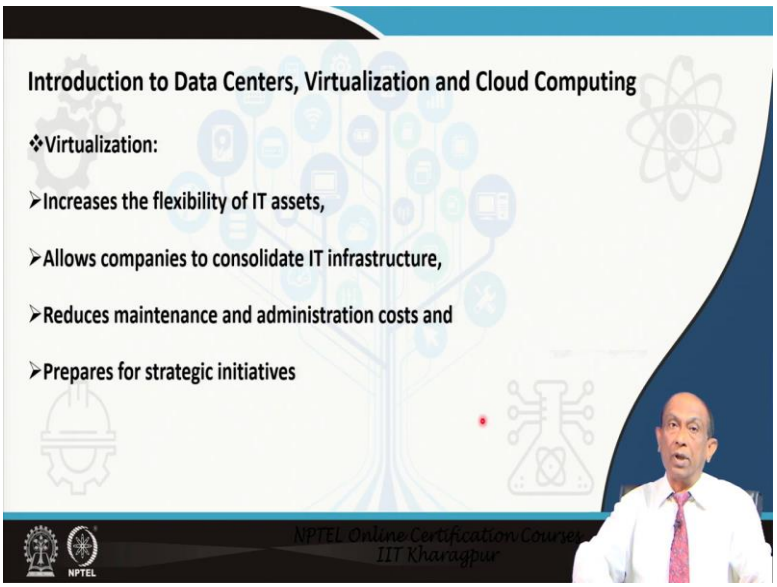

So, in effect, virtualization increases the flexibility of information technology assets. It allows companies to consolidate their IT infrastructure; it reduces maintenance and

administration costs; and it helps the company managers to prepare for the strategic initiatives that they would like to undertake.

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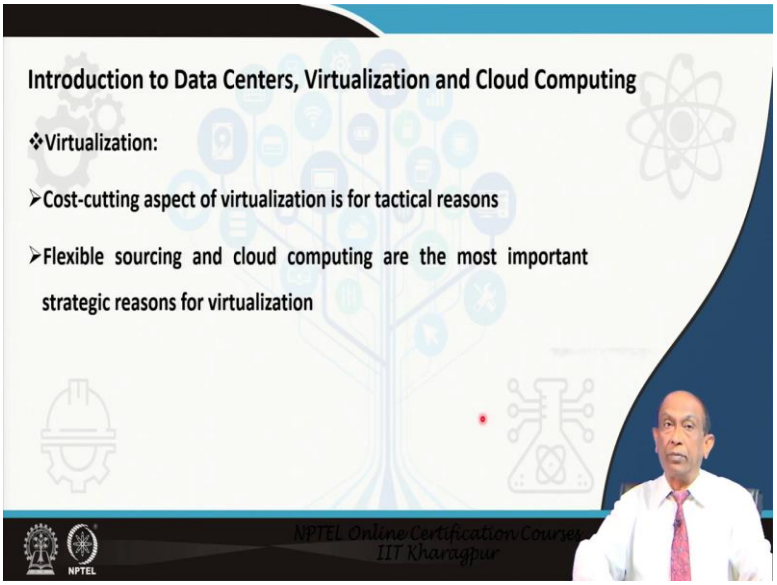

The cost-cutting aspect of virtualization is basically for tactical reasons. Flexible sourcing and cloud computing are the primary reasons behind this strategy of virtualization.

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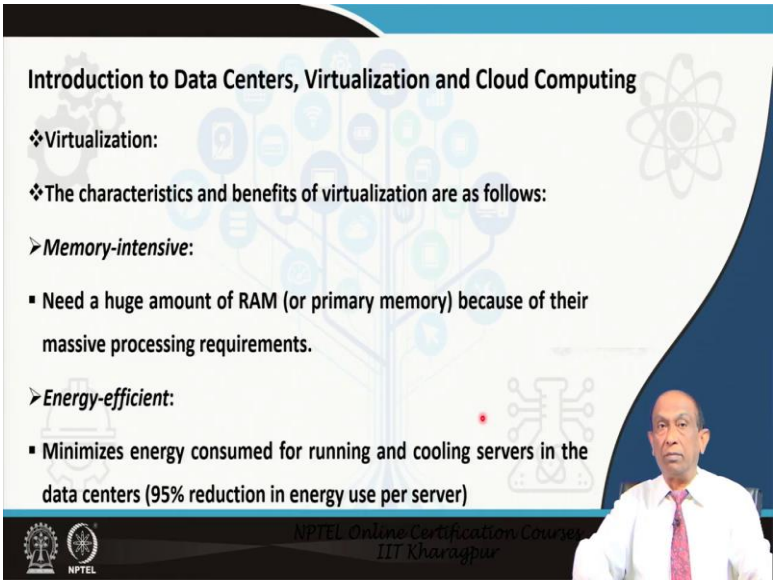

So, let us summarize by noting down the characteristics and the associated benefits of virtualization. The first thing that we should note is that virtualization is memory

intensive. Virtualization needs a huge amount of primary memory; that is basically the ram, because in here the processing requirements are massive.

But, the advantage lies in virtualization becoming or being highly energy efficient. This technology minimizes the total energy consumed for running and cooling servers in the data centers. In fact, it has been observed that there is 95 percent reduction in energy use per server if we deploy virtualization.

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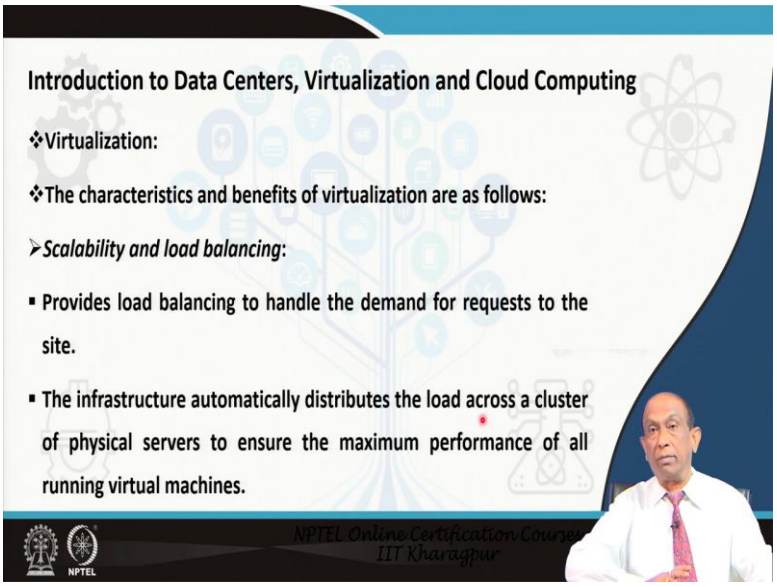

The next important thing is, virtualization provides load balancing to handle the demand for requests to the site by so many users. The infrastructure automatically distributes the load across a cluster of physical servers to ensure maximum performance of all running virtual machines. This concept is known as scalability and load balancing is one of the primary characteristics of virtualization.

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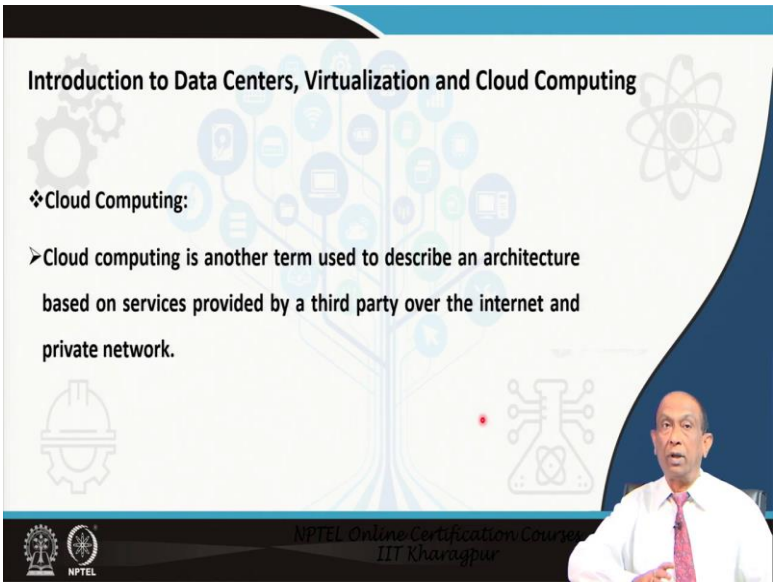

Now, let us come to this concept of cloud computing which has become a very popular concept and widely getting used in various companies across the world. So, what is cloud computing? Basically, cloud computing is a term used to describe an IT architecture based on the services provided by a third party over internet, and maybe along with that the services can be delivered through a private network.

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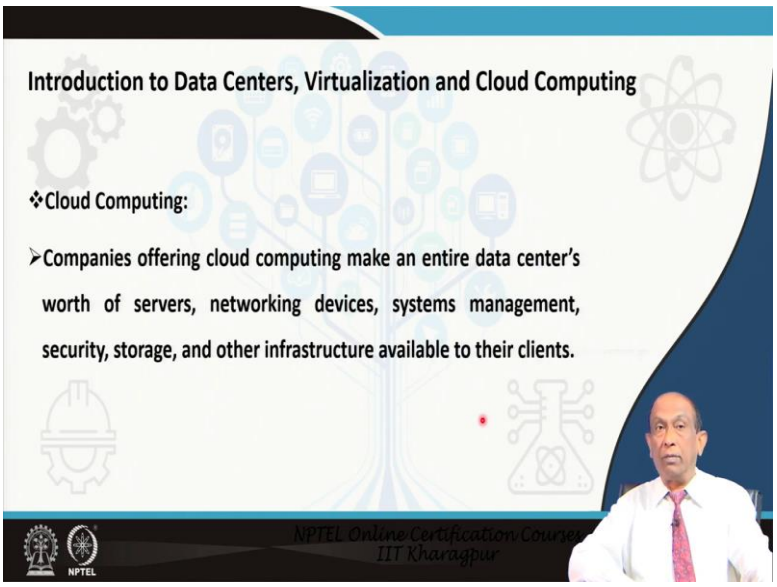

Companies offering cloud computing make an entire data centers worth of servers, networking devices, systems management, security, storage, and other infrastructure available to their clients.

So many companies today, they do not have to maintain any kind of data centers. Cloud company cloud computing give these companies all the facilities that they need and which could have been provided by a data center at a cost which is much much less compared to maintaining own data centers.

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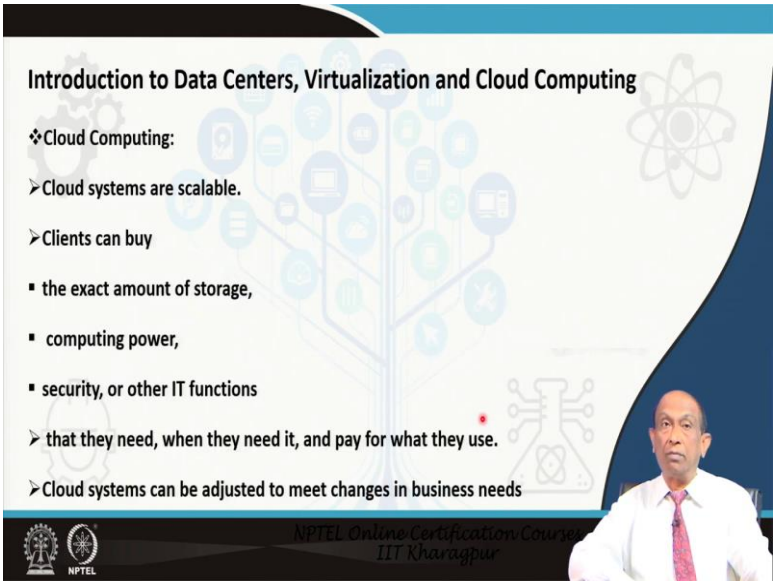

This cloud systems have the advantage that they are scalable; that means, the capacity, the processing power, the storage capacity, everything can be increased or decreased as per the needs of the users.

Clients can buy the exact amount of storage, they can pay for the computing power what they actually need, they get appropriate level of security and other IT functions, and all these things are available when the users need them and the payment is based on actual usage.

So, note this particular points that cloud systems are scalable. Clients can buy the exact amount of storage, computing power, security or other IT functions that they need when they need it and pay for what they use. That means, everything is adaptable, lot of

flexibility is there and cloud systems can be adjusted to meet the changing needs of a business enterprise.

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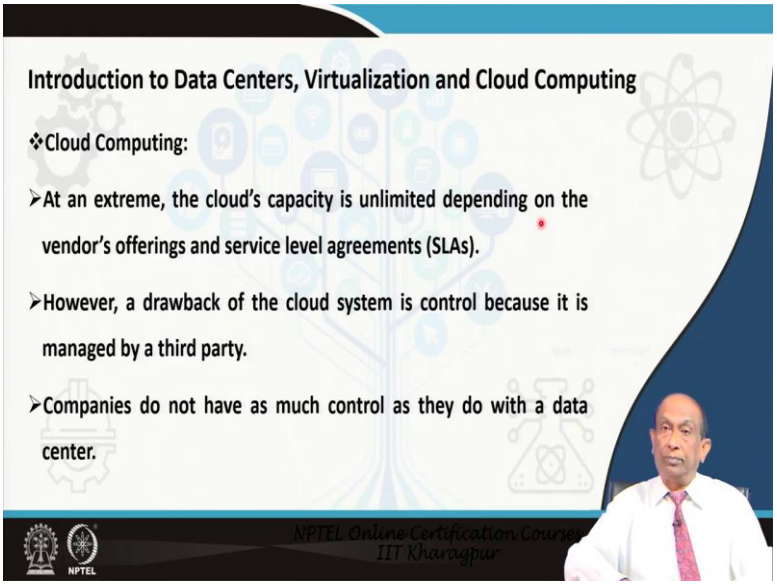

So, at an extreme, the clouds capacity is unlimited depending on what the service provider is offering and the service level agreements that the company or the business enterprise has entered into with this cloud service providers.

But the only drawback of this cloud system is overall control, because the systems are being maintained by a third party service provider. And the companies they really do not have as much control as they can have it with a data center.

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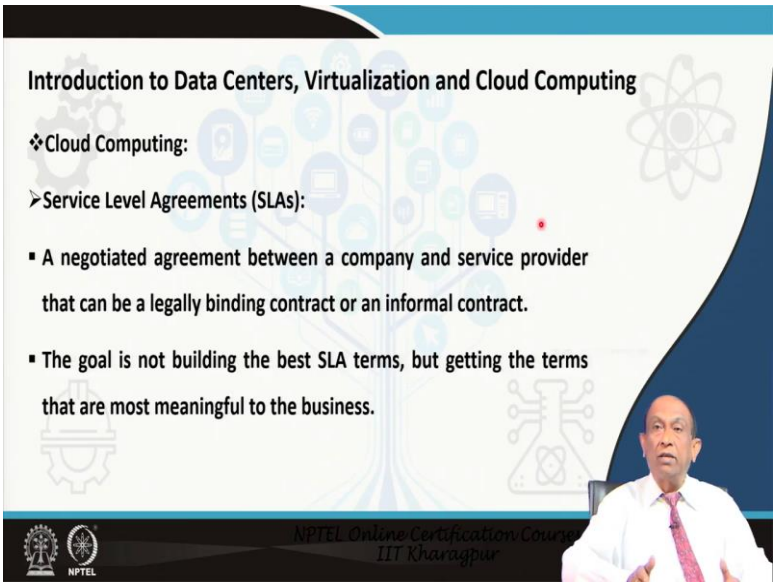

Now, what is this service level agreements? Because this term SLA; service level agreement is widely used in the context of cloud computing. So service level agreement or SLAs refers to a negotiated agreement between a company and the service provider and this agreement can be legally binding contract or in many cases it can be an informal agreement, informal contract.

And when you form this agreement the goal is not to build you know best SLA terms, but getting the terms that are most meaningful to the business in the context of that enterprise.

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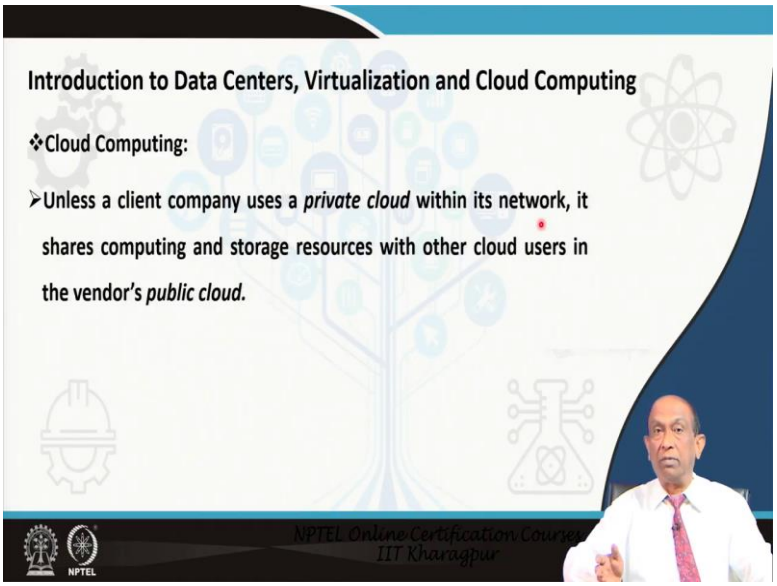

Another important thing is that, since many a companies they receive this IT services over the internet, unless a client company uses a private cloud within its network, the computing and storage resources are shared with other cloud users in the service providers' public cloud.

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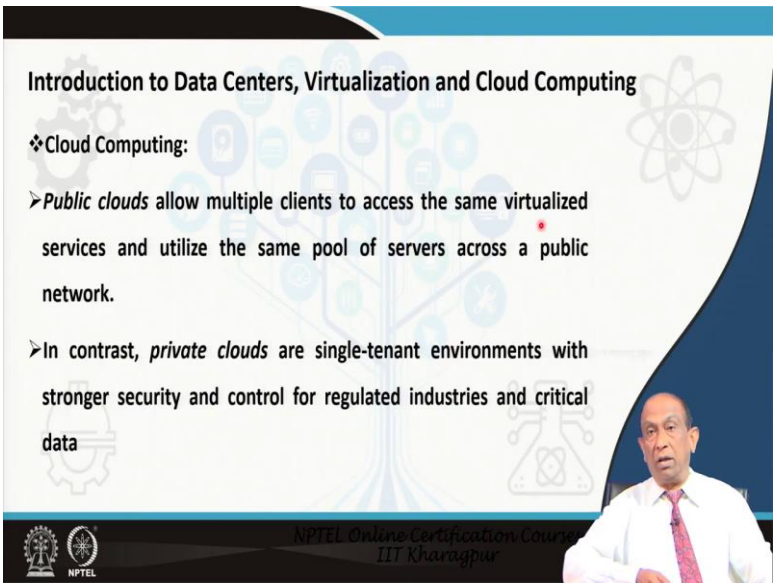

So, public clouds allow multiple clients to access the same virtualized services and utilize the same pool of servers across a public network. So the security question is there.

On the other hand, private clouds are single tenant environments with stronger security and control for regulated industries and where critical data needs to be maintained. Always companies they prefer to have it have the services through a private cloud.

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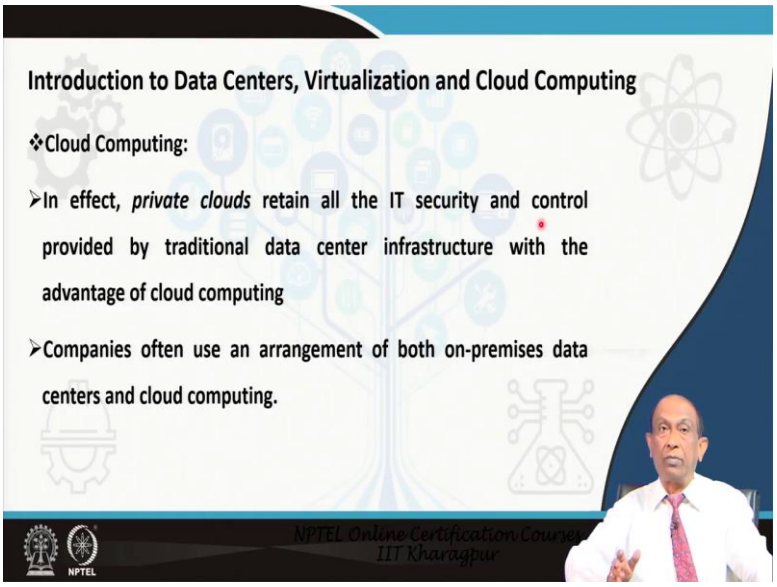

In effect, private clouds retain all the IT security and control that are provided by traditional data center infrastructure with the advantage of cloud computing, at a much lesser cost. Companies often use a combination an arrangement of both on premises data centers and cloud computing to optimize their need for IT infrastructure.

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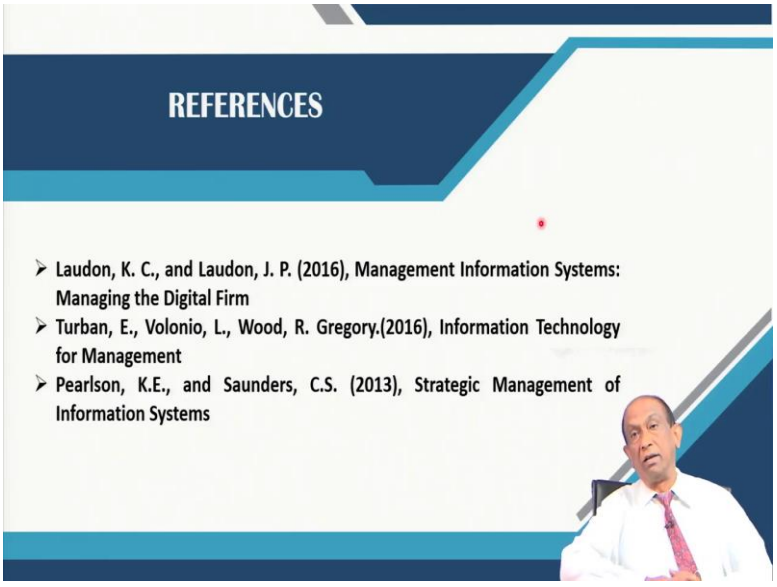

These are the references that have been used in preparing this particular module.

Thank you all for your patience!