



آموزش نتورک پلاس

# Cloud and the Datacenter

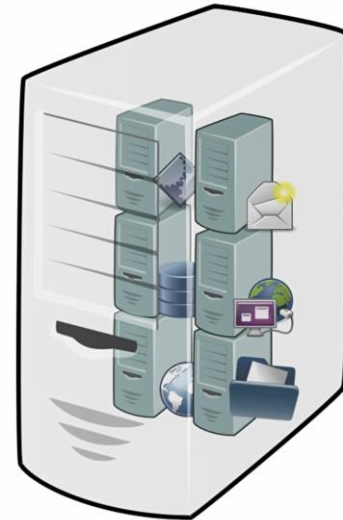
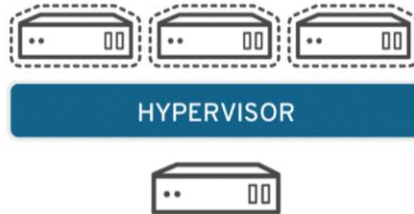
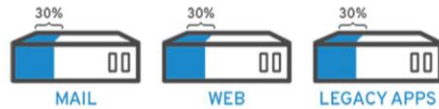
# Virtual Network Devices

- Servers and Services
- Routers, Switches, Firewalls
- Desktops
- VoIP
- Cloud Computing
- Software-defined Networking

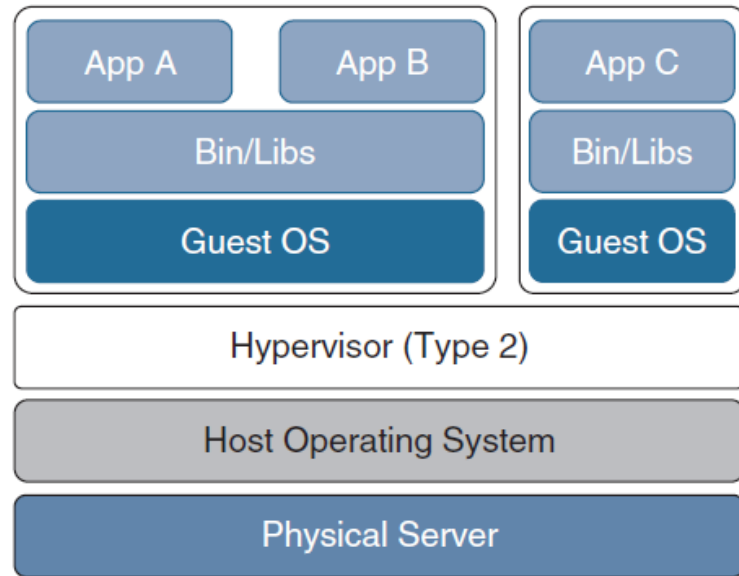
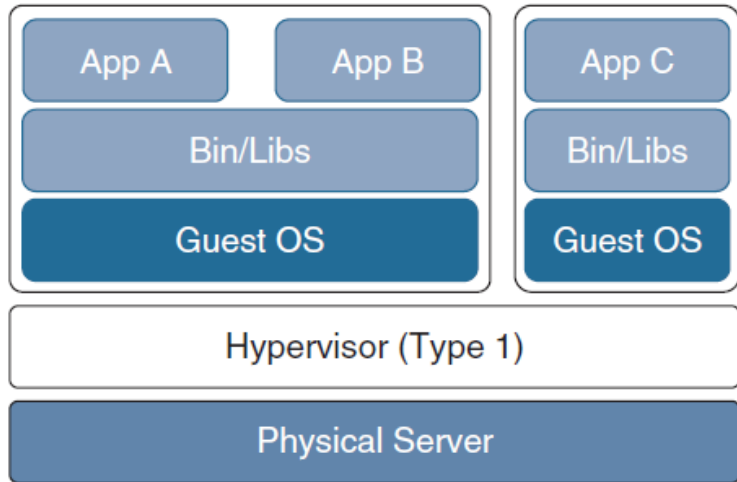


# Virtualization

- Allow multiple virtual instances to exist on a single physical server
- Hypervisor

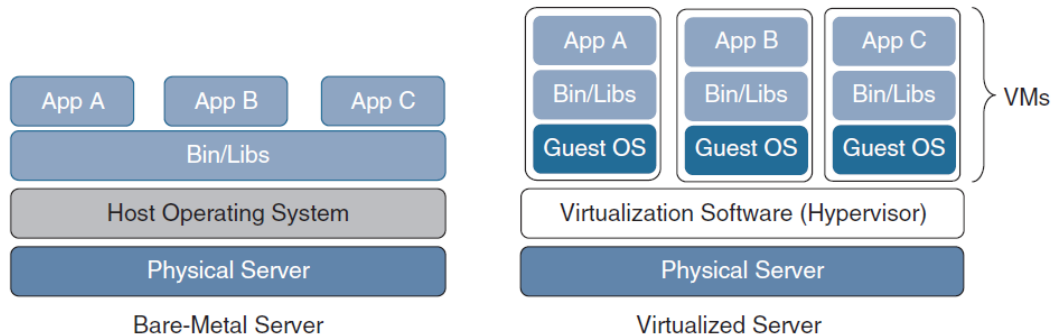


# There are two types of hypervisors



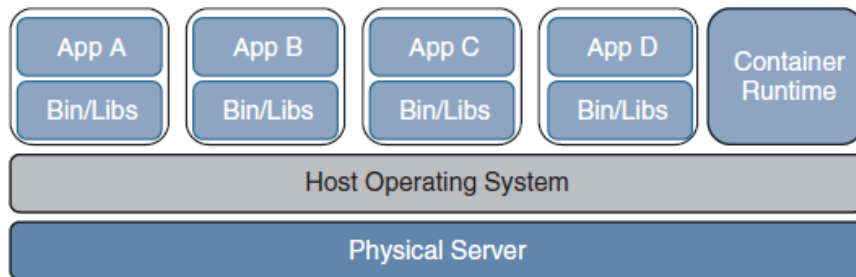
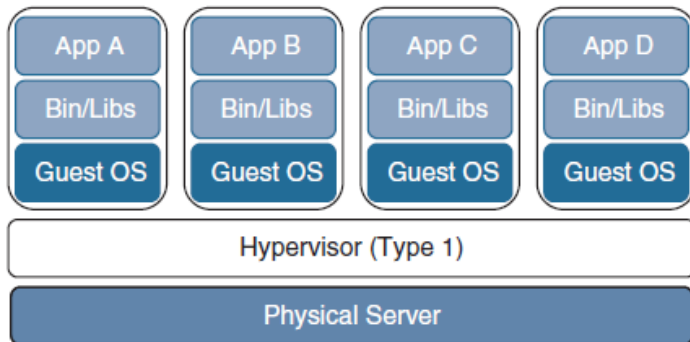
# Virtual Machines

- VMware vSphere, Microsoft Hyper-V, Citrix XenServer, and Red Hat Kernel-based Virtual Machine (KVM) are the most popular hypervisors in the server virtualization market



# Container

- Notice that each VM requires an OS and that containers all share the same OS while remaining isolated from each other.






# Fully virtualized networks

- With virtual switches, routers, and firewalls.
- They provide the same features as their physical counterparts.

# Virtual Desktop

- A desktop computer that is run on a browser using web, laptop, tablet, or phone.



Client Type	Thick Clients	Thin Clients	Zero Clients
			
What is it?	PCs with operating system running client software that connects to the desktop itself.	Virtual desktops hosted in the data center. The thin client serves as a terminal to the back-end server.	Virtual desktops hosted in the data center with no operating system, no moving parts or local storage.



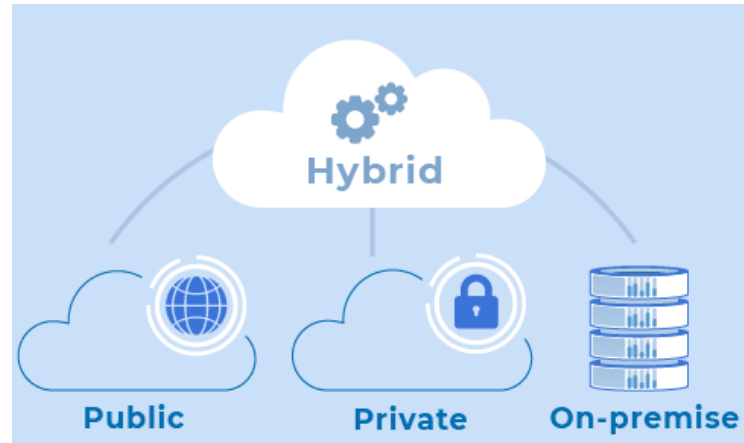
# Voice over IP (VOIP)

- Digitizes voice traffic to be treated like other data on the network.
- Session Initiation Protocol (SIP)  
Used to setup, maintain, and tear down calls.

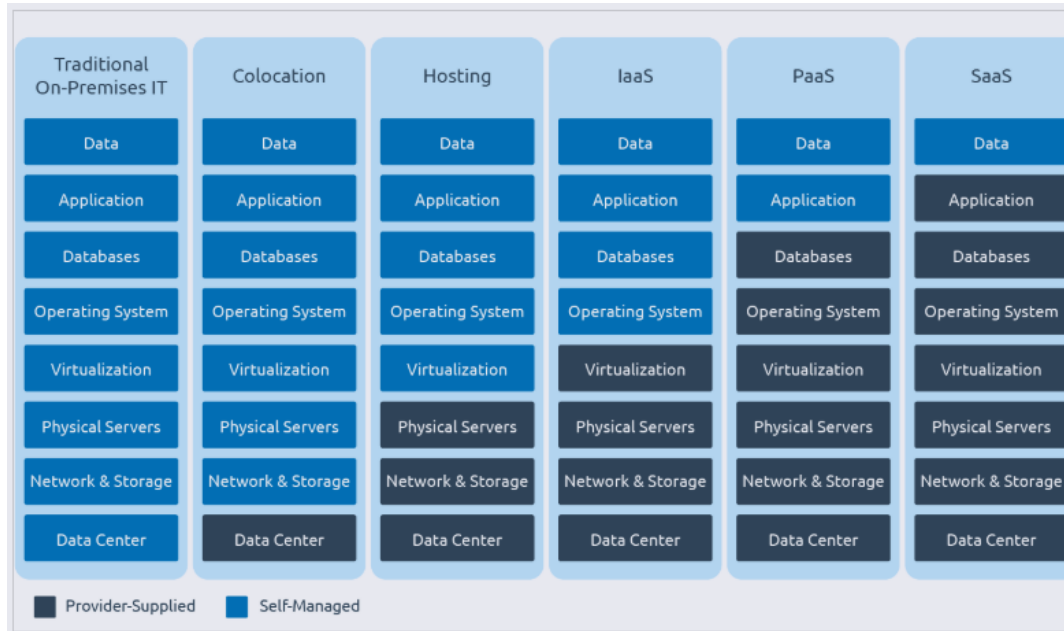


# Cloud Computing

- Private
- Public
- Hybrid
- Community



# Cloud Computing



# Infrastructure as a Service (IaaS)

- Allow for the outsourcing of the infrastructure of the servers and desktops to a service provider.



# Software as a Service (SaaS)

- Users interact with a web-based application and the details of how it works are hidden.
- SaaS products always get updated and upgraded to their latest versions.

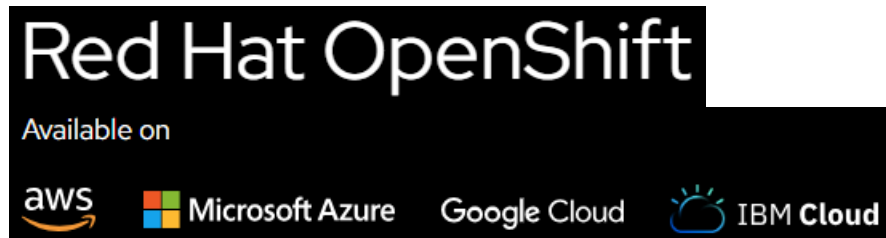


Office is now Microsoft 365



# Platform as a Service (PaaS)

- Provides a platform for companies that develops applications without the need for infrastructure.



# Network as a Service (NaaS)

- Allows for the outsourcing of a network to a service provider.  
Amazon Virtual Private Cloud (VPC)



# Desktop as a Service (DaaS)

- Provides a desktop environment that is accessible through the internet in the form of a cloud desktop or virtual desktop environment.

## Amazon WorkSpaces products



### Amazon WorkSpaces Thin Client

Cost-effective, secure access to virtual desktops



### Amazon WorkSpaces

All-inclusive, fully persistent, virtual desktops for all worker types



### Amazon WorkSpaces Core

Virtual desktop infrastructure APIs for third-party VDI software



### Amazon WorkSpaces Web

Secure, low-cost browser service for access to internal websites and SaaS apps





## Cloud Concepts

- The National Institute of Standards Technology (NIST) lists five essential characteristics of cloud computing:  
on-demand self-service, broad network access, resource pooling, rapid elasticity, and measured service.

# Cloud Concepts

- Elasticity
- Scalability



# Elasticity

Elasticity is focused on meeting the sudden  
**increases** and **decreases**  
in the workload



# Scalability

- Handles the growing workload required to maintain good performance and efficiency for a given software or application.

# Elasticity vs Scalability

- **Elasticity**

Short-term addition or subtraction of resources.

- **Scalability**

Long-term planning and adoption

# Vertical Scaling (Scaling Up)

- Increasing the power of the existing resources in the working environment.

The screenshot shows the AWS Amazon Lightsail Virtual servers pricing page. The page has a dark blue header with the AWS logo, navigation links (Contact Us, Support, English, My Account), and a 'Create an AWS Account' button. Below the header is a navigation bar with links for Products, Solutions, Pricing, Documentation, Learn, Partner Network, AWS Marketplace, and a search icon. The main content area is titled 'Virtual servers' and has tabs for 'Linux/Unix' (selected) and 'Windows'. Below the tabs, there are seven pricing cards arranged in two rows. Each card displays a price in USD/month, a list of specifications (Memory, Core Processor, SSD Disk, and Transfer), and a small asterisk indicating additional terms.

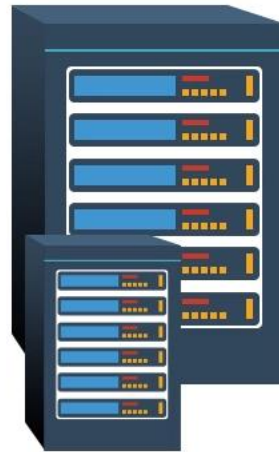
Price (USD/mo)	Specifications
\$3.50	512 MB Memory, 1 Core Processor, 20 GB SSD Disk, 1 TB Transfer*
\$5	1 GB Memory, 1 Core Processor, 40 GB SSD Disk, 2 TB Transfer*
\$10	2 GB Memory, 1 Core Processor, 60 GB SSD Disk, 3 TB Transfer*
\$20	4 GB Memory, 2 Core Processor, 80 GB SSD Disk, 4 TB Transfer*
\$40	8 GB Memory, 2 Core Processor, 160 GB SSD Disk, 5 TB Transfer*
\$80	16 GB Memory, 4 Core Processor, 320 GB SSD Disk, 6 TB Transfer*
\$160	32 GB Memory, 8 Core Processor, 640 GB SSD Disk, 7 TB Transfer*

## Horizontal Scaling (Scaling Out)

- Adding additional resources to help handle the extra load being experienced.
- Scaling out provides more redundancy and results less downtime.

# Elasticity vs Scalability

- **Vertical** > Scalability
- **Horizontal** > Elasticity



Vertical Scaling  
(Scaling up)

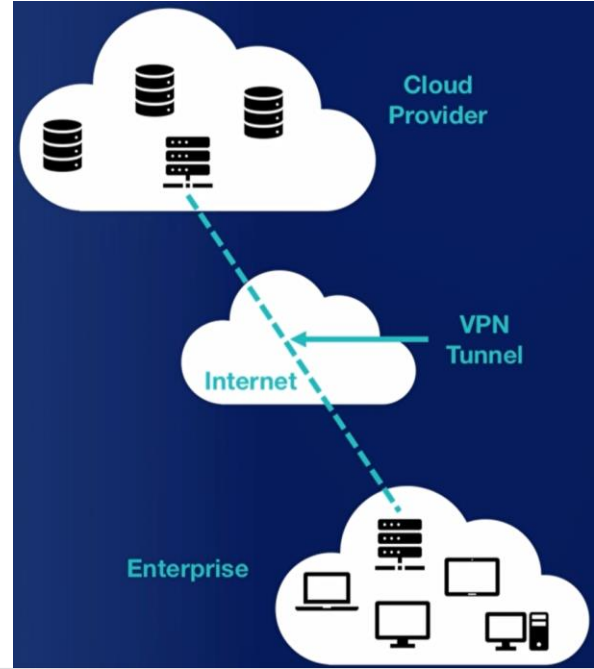


Horizontal Scaling  
(Scaling out)



# Virtual Private Network (VPN)

- Establishes a secure connection between on-premises network, remote offices, client devices, and provider's global network.
- Overlay vs Underlay



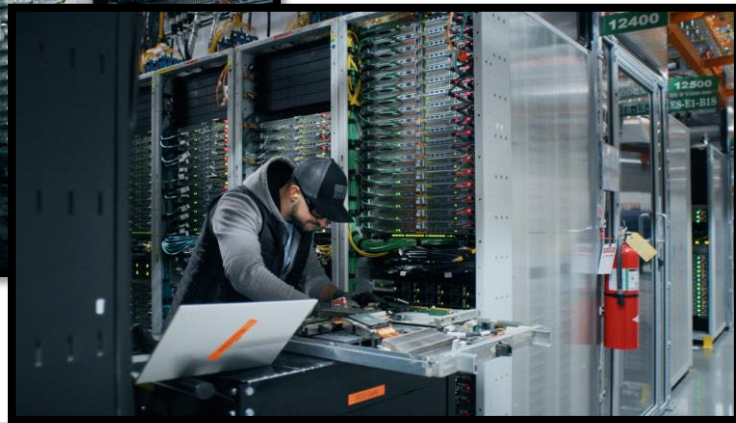
# Datacenter

AWS Data-center



Utah Data Center

# Datacenter

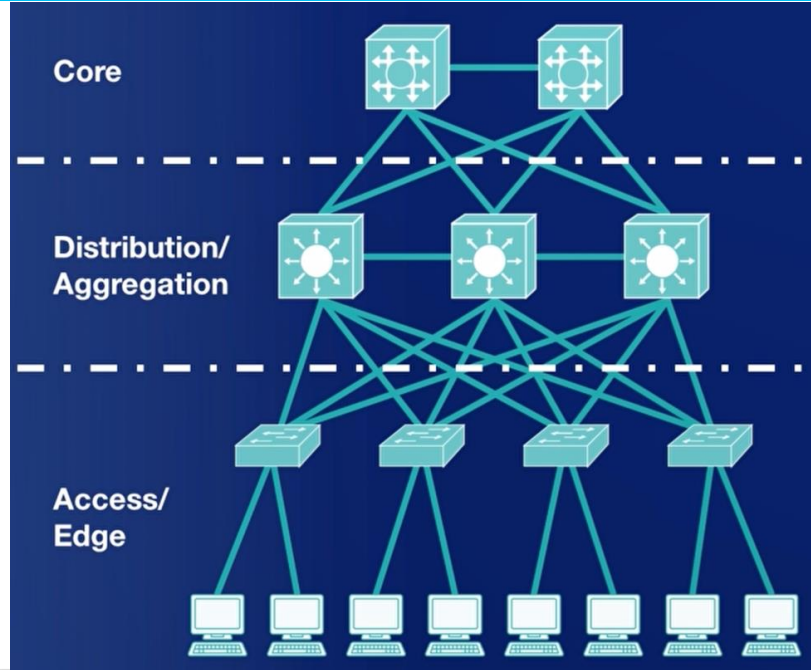


# Datacenter Architecture

- Three-tiered hierarchy
- Spine and leaf architecture
- Software-defined networking
- Traffic flow
- On-premise versus hosted datacentres

# Three-tiered hierarchy

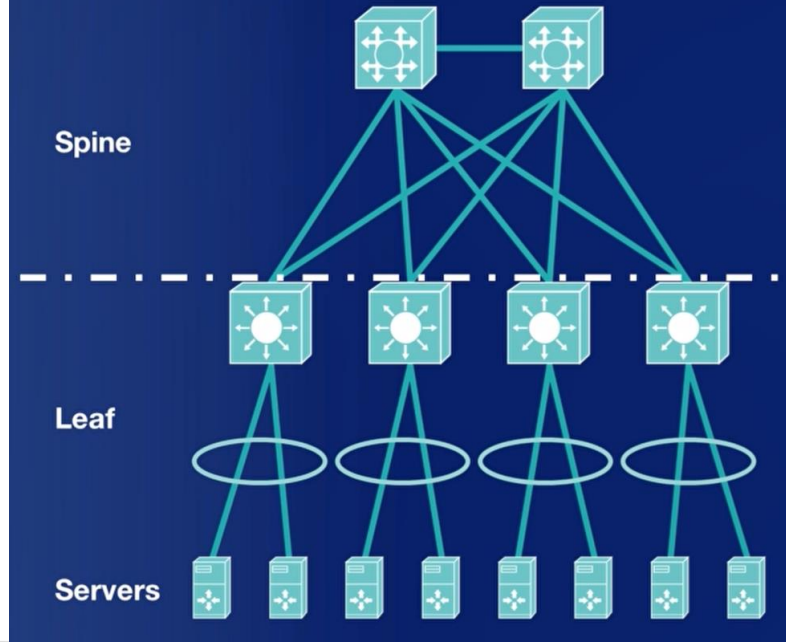
- Performance
- Management
- Scalability
- Redundancy





# Spine and Leaf Architecture

- An alternative type of network architecture that focuses on the communication within the datacenter itself.
- Faster Speeds and lower latency

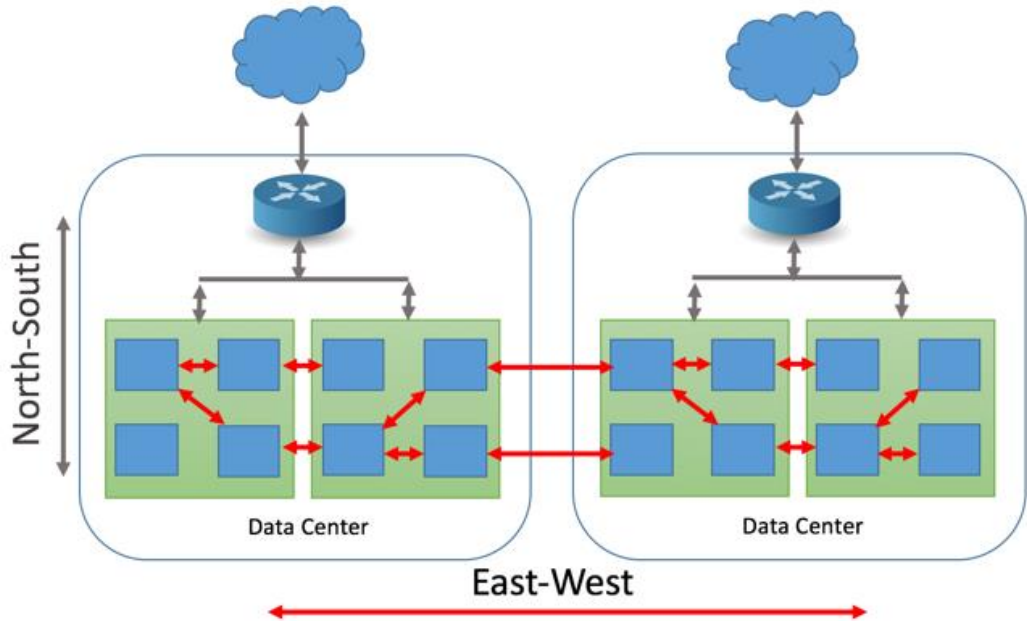


# Software-Defined Networking (SDN)

- Enables the network to be intelligently and centrally controlled, or programmed, using software applications.

# Network traffic flowing into and out of a data center

- North-South
- East-West





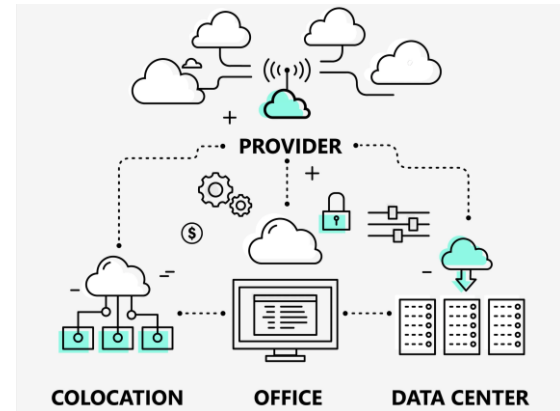
# On-premise datacenter

- A traditional, private data infrastructure usually located in the same building as the main office.



# Co-Located

- Migrating company data out of own server and data-centree and into a cloud service provider's servers and data-centers.



# Cloud-Based

- A datacenter environment owned by another company





**عباس ولی زاده**

مدرس دوره های شبکه و امنیت