- **Farhood Nishat** (Cloud Architect, Ethical Hacker, Security Expert)
- **10 years** of industry experience in IT operations, networks, systems, cloud and information security.
- **Sr. Manager Cloud & Security Managed Services, XTIUM, USA.**
- **Sr. Trainer for Cloud Computing and Cyber Security, NAVTTC, Pakistan.**
- **Consultant Architect** for Corvit, CSA, EIX Global, Kidan.
- **Visiting faculty** for COMSATS, SZABIST, RIPHAH.
- Industrial Advisory Board Member – **Pak Fazaia**
- Facilitator Board Member – **AWS Pakistan.**
- Professional Member **- IEEE**
- **National Best Trainer Award 2023** for **Cloud and Cyber Security** – MoIT, Pakistan – **Hackathon 2023**

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- Bachelors in Electrical (Telecommunication) Engineering.
- Masters in Information Security
- **Co-authored 2 books** published by CRC Taylor and Francis Group, UK/USA.
  - Low-Power Wide Area Network for Large Scale Internet of Things - Architectures, Communication Protocols and Recent Trends
  - Artificial Intelligence for Intelligent Systems - Fundamentals, Challenges, and Applications
- **6 research papers** on the topics of
  - LeNet Enabled Intrusion Detection System for IoT Networks
  - Storage Level Data Integrity Strategies in Cloud Computing: classification, security obstructions, and vulnerability
  - Cloud Computing: Security Issues and Research Challenges
  - Security in Wireless Mesh Networks (WMNs): A Comprehensive Approach
  - Overcoming Challenges and Implementing Effective Information Security Policies for Remote Work Environments
  - IT Governance and Compliance in Banking Insights from US Regulatory Frameworks
- **38 International Certifications**
  - 8 Cloud Infrastructures
  - 20 Cyber Security
  - 3 Computer System Management
  - 3 Computer Networks
  - 2 Project Management
  - 2 Information System Audits

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Optimize your learning

Rest during breaks.

Have fun.

Participate.

Ask questions.

Make your learning important.

Do the labs.

farhoodnishat@hotmail.com

- Name
- University or Organization
- Degree or Job Role
- Hobbies

HCCDP-Solution Architectures

Chapter/Section	Objective
Architecture Design Methodology on Huawei Cloud	Understand the developments of cloud computing and the core requirements for migrating applications to the cloud.
Typical Service Implementation Solutions on the Cloud	Understand the infrastructure services and service system construction solutions on Huawei Cloud.
Cloud Compute Solution Design	Understand the use of compute services on Huawei Cloud and design computing solutions based on the five principles.
Cloud Storage Solution Design	Understand the use of storage services on Huawei Cloud and design storage solutions based on the five principles.
Cloud Network Solution Design	Understand the use of network services on Huawei Cloud and design network solutions based on the five principles.
Cloud Database Solution Design	Understand the use of database services on Huawei Cloud and design database solutions based on the five principles.
Cloud Security Solution Design	Understand the use of security services on Huawei Cloud and design security solutions based on the five principles.
Cloud O&M Solution Design	Understand the use of O&M services on Huawei Cloud and design O&M solutions based on the five principles.
Distributed Architecture Design	Understand the basic concepts of the distributed system and the implementation of distributed systems on Huawei Cloud, and design a distributed system based on the five principles.
Highly Scalable System Design	Understand the basic concepts of the scalable system and the implementation of scalable systems on Huawei Cloud, and design a scalable system based on the five principles.
Disaster Recovery System Design	Understand the importance of DR and develop the cross-AZ HA architecture design capability to design a DR system based on the five principles.
Automated Deployment	Understand resource orchestration and deployment using RFS.
Containers and Agility	Understand the benefits and use of containers, the methods of building an agile system, and develop the capability of deploying microservice applications in Huawei Cloud containers.
Huawei Cloud Advanced Services	Understand cloud services of big data and AI.
Exam Outline and Sample Questions	Learn about the knowledge points and weighting of the certification exam.

Traditional IT

How websites work?

Traditional IT

What is a server composed of?

- Compute: CPU
- Memory: RAM

- Storage: Data

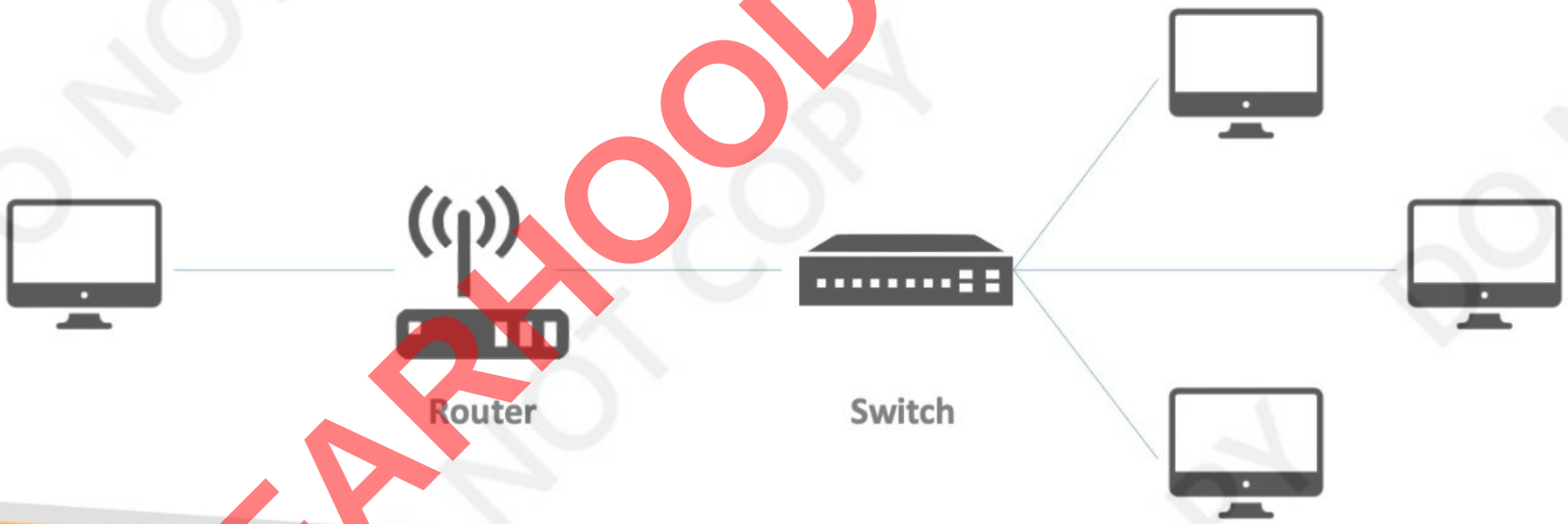
- Database: Store data in a structured way

- Network: Routers, switch, DNS server

Traditional IT

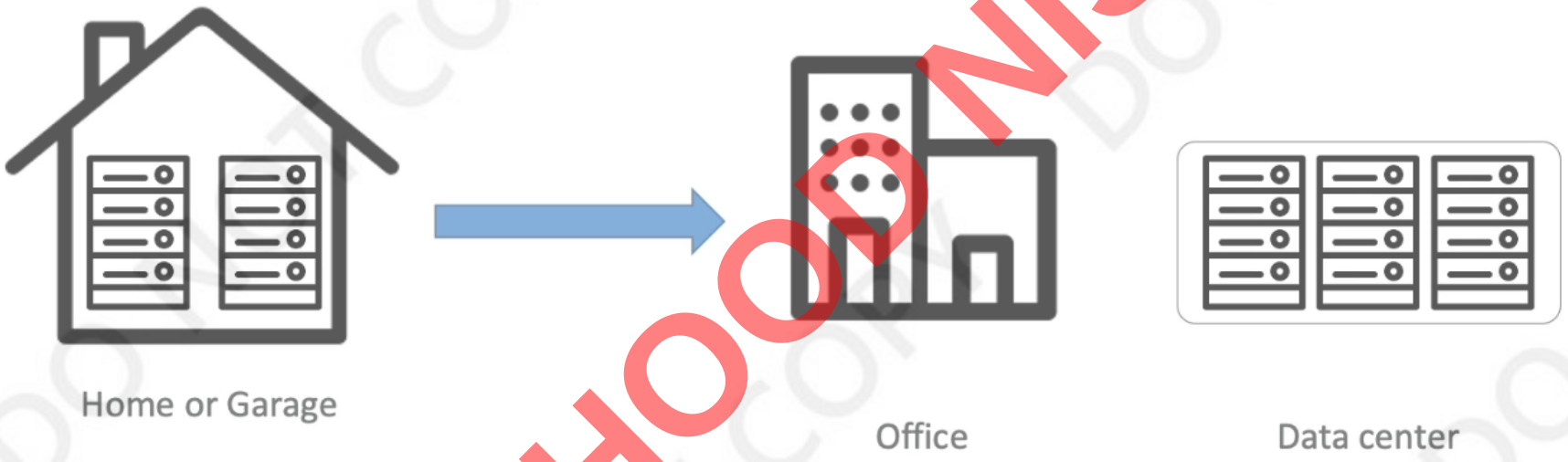
IT Terminology

- **Network:** cables, routers and servers connected with each other
- **Router:** A networking device that forwards data packets between computer networks. They know where to send your packets on the internet!
- **Switch:** Takes a packet and send it to the correct server / client on your network



Traditional IT

Traditionally, how to build infrastructure



Traditional IT

Problems with traditional IT approach

- Pay for the rent for the data center
- Pay for power supply, cooling, maintenance
- Adding and replacing hardware takes time
- Scaling is limited
- Hire 24/7 team to monitor the infrastructure
- How to deal with disasters? (earthquake, power shutdown, fire…)

- Can we externalize all this?

A Timeline of Virtualization History

1964

IBM began to explore virtualization on mainframes.

1972

IBM launched VMs running on mainframes.

1999

VMware launched x86-based virtualization products.

2002

Xen was officially open sourced.

2006

Qumranet first announced KVM.

2007

HP launched HP-UX Integrity VMs.

2008

Microsoft added Hyper-V in Windows Server 2008 R2.

2008

Linux Container LXC was launched.

2008

By default, RHEL 6.0 supported KVM as the only virtualization option.

2011

IBM, Red Hat, HP, and Intel formed the Open Virtualization Alliance to accelerate KVM adoption.

2013

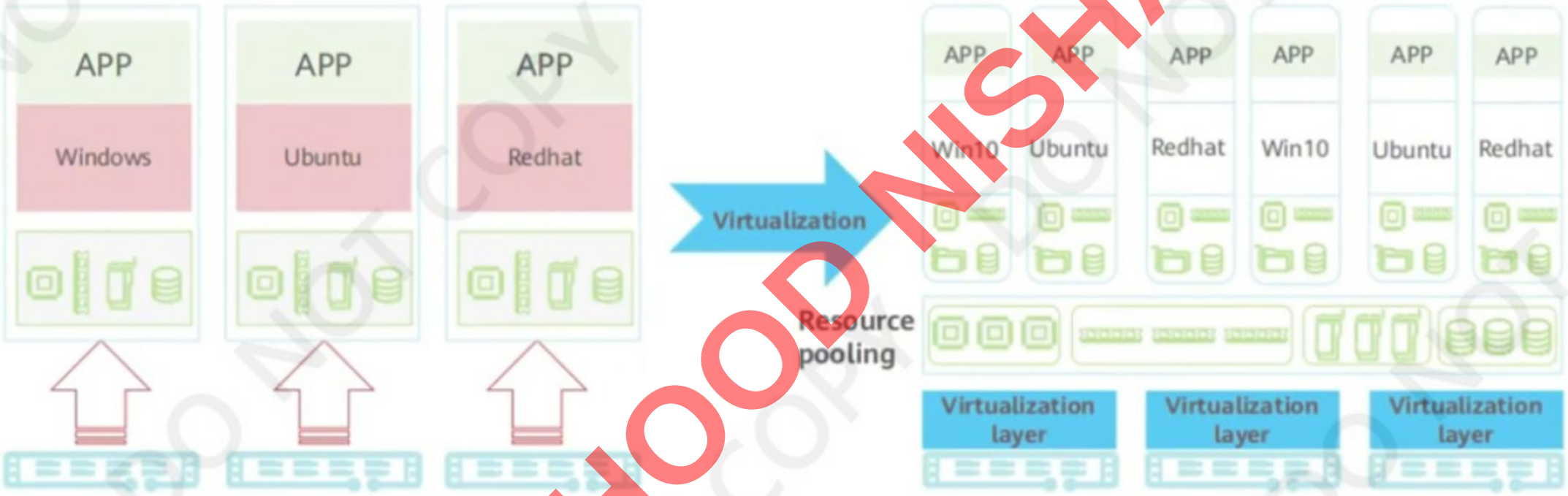
Docker was launched.

2014

Rocket was launched.

What Is Virtualization?

- Virtualization is the act of creating a virtual version of something, a logical representation of resources.



- IT resources are independent.
- The operating system (OS) is tightly coupled to the physical hardware.

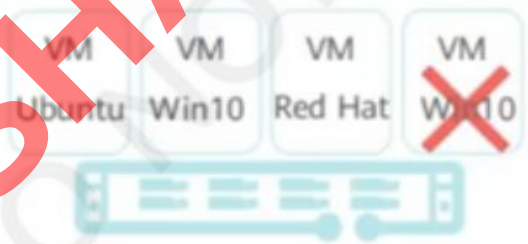
- Resources are virtualized and placed in a shared resource pool.
- Resources are decoupled from the physical hardware, so the OS can allocate resources more flexibly.

Virtualization Characteristics

Partitioning

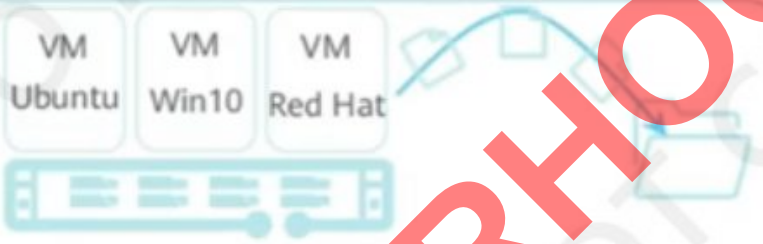
Multiple VMs can concurrently run on the same physical server.

Isolation



VMs running on the same physical server are isolated from each other.

Encapsulation



The VM operating environment is encapsulated into an independent file. Users can migrate VMs by moving files.

Hardware Independence

VMs can run on any server. No modifications are needed.

Definition of Cloud Computing

- The National Institute of Standards and Technology (NIST) defines cloud computing as follows:
  - Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or interaction with service providers.
- Wikipedia:
  - Cloud computing is the on-demand availability of computer system resources, especially data storage and computing power, without direct active management by the user.

Cloud Computing

- Cloud computing is the **on-demand delivery** of compute power, database storage, applications, and other IT resources.
- Through a cloud services platform with **pay-as-you-go** pricing.
- You can **provision exactly the right type and size of computing** resources you need.
- You can access as many resources as you need, **almost instantly.**
- Simple way to access **servers, storage, databases** and a set of **application services.**

- Huawei owns and maintains the network-connected hardware required for these application services, while you provision and use what you need via a web application.

Cloud computing

You've been using some Cloud Services

Gmail

- E-mail cloud service
- Pay for ONLY your emails stored (no infrastructure, etc.)

Dropbox

- Cloud Storage Service
- Originally built on AWS

Netflix

- Built on AWS
- Video on Demand

Development of Cloud Computing

Cloud Computing 1.0

Computing virtualization

Hyper-V

Xen KVM

VMware ESX

Virtualization

Higher resource utilization

Cloud Computing 2.0

Software-defined, integration

OpenStack

VMware AWS

Cloud-based infrastructure

Standardization and automation of resource services

Cloud Computing 3.0

Cloud native, app redesign

Docker

CoreOS

Cloud Foundry

Cloud-native applications

Agile application development and lifecycle management

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Cloud Deployment Models

Private Cloud:

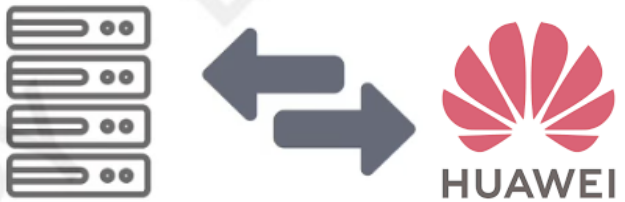
- Cloud services used by a single organization, not exposed to the public.
- Complete control
- Security for sensitive applications
- Meet specific business needs

Public Cloud:

- Cloud resources owned and operated by a third-party cloud service provider delivered over the Internet.
- Six Advantages of Cloud Computing

Hybrid Cloud:

- Keep some servers on premises and extend some capabilities to the Cloud
- Control over sensitive assets in your private infrastructure



5 Characteristics of Cloud Computing

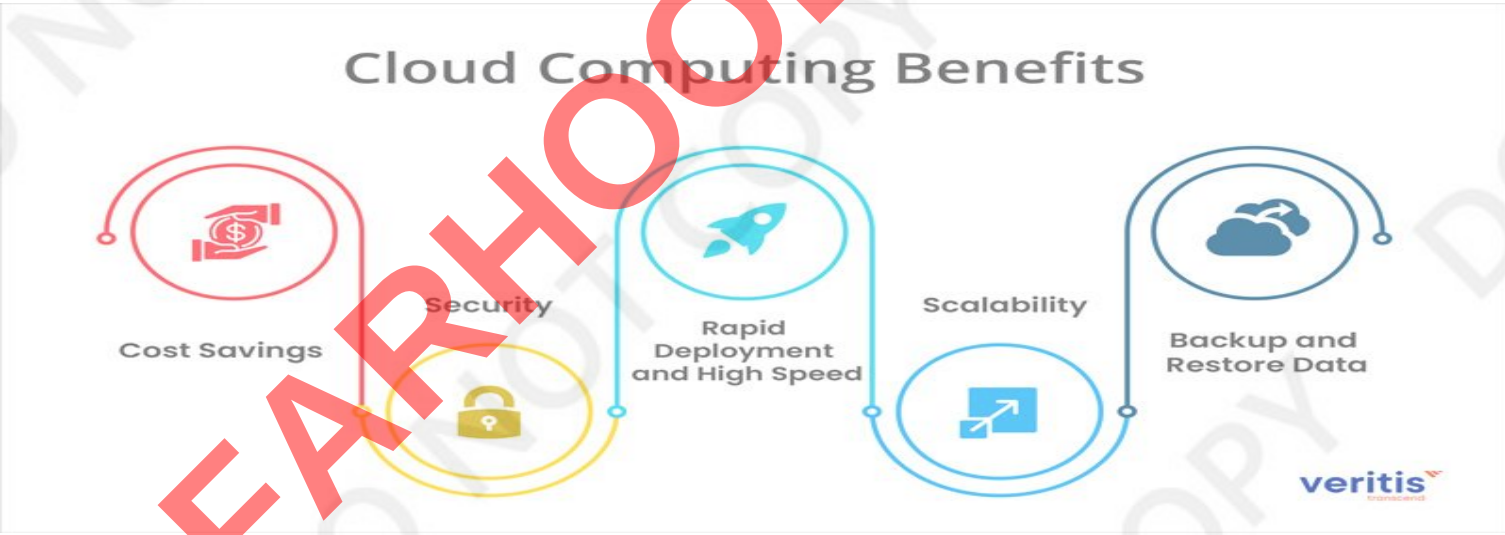
- **On-Demand Self Service:**
  - Users can provision resources and use them without human interaction from the service provider
- **Broad Network Access:**
  - Resources available over the network, and can be accessed by diverse client platforms.
- **Multi-tenancy and Resource Pooling:**
  - Multiple customers can share the same infrastructure and applications with security and privacy.
  - Multiple customers are services from the same physical resources.
- **Rapid Elasticity and Scalability:**
  - Automatically and quickly acquire and dispose resources when needed.
  - Quickly and easily scale based on demand.
- **Measured Service:**
  - Usage is measured, users pay correctly for what they have used.

6 Advantages of Cloud Computing

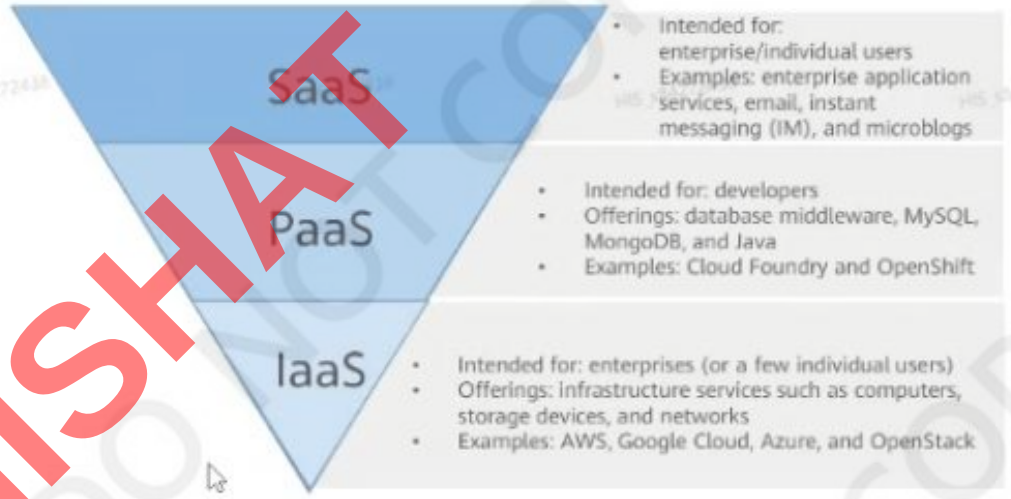
- **Trade Capital Expense (CAPEX) for operational expense (OPEX)**
  - Pay On-Demand: don't own hardware.
  - Reduced Total Cost of Ownership (TCO) & Operational Expense (OPEX)
- **Benefit from Massive Economies of Scale**
  - Prices are reduced as AWS is more efficient due to large scale.
- **Stop Guessing Capacity**
  - Scale based on actual measured usage.
- **Increase speed and agility**
- **Stop spending money running and maintaining data centers**
- **Go global in minutes:** leverage the AWS global infrastructure

Problems Solved By The Cloud

- **Flexibility:** change resources types when needed.
- **Cost-Effectiveness**: pay as you go, for what you use.
- **Scalability:** accommodate larger loads by making hardware stronger or adding additional nodes.
- **Elasticity:** ability to scale out and scale-in when needed.
- **High-availability and fault-tolerance:** build across data centers.
- **Agility:** rapidly develop, test and launch software applications.

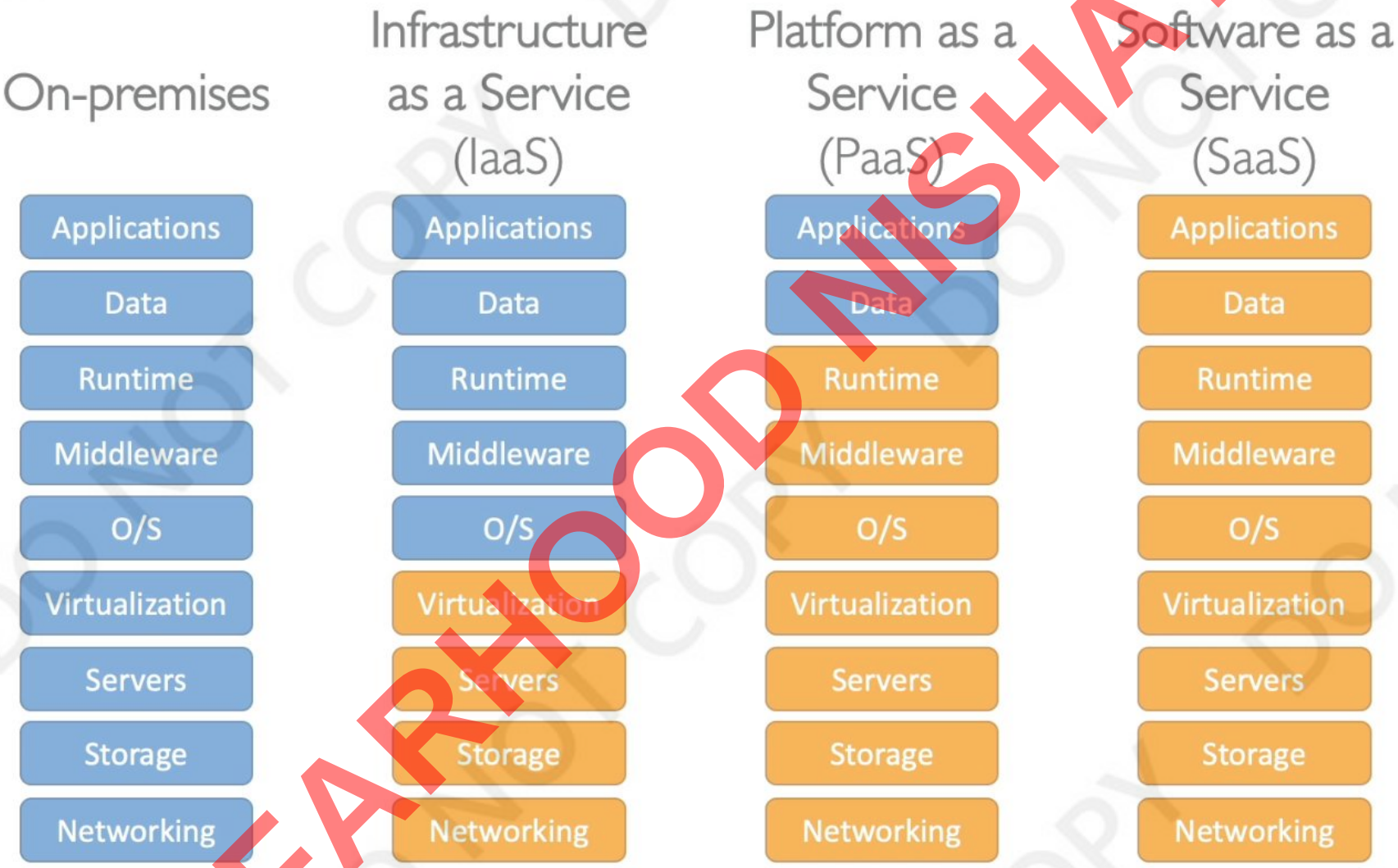


Types of Cloud Computing



- **Infrastructure as a Service (IaaS)**
  - Provide building blocks for cloud IT
  - Provides networking, computers, data storage space
  - Highest level of flexibility
  - Easy parallel with traditional on-premises IT
- **Platform as Service (PaaS)**
  - Removes the need for your organization to manage the underlaying infrastructure
  - Focus on the deployment and management of your applications
- **Software as s Service (SaaS)**
  - Completed product that is run and managed by the service provider.

Types of Cloud Computing



Vendors and representative technologies

HUAWEI	HUAWEI CLOUD is a one-stop cloud service platform launched by Huawei. It provides a wide range of cloud computing products and solutions. It aims to become a world-leading cloud computing service provider and help customers achieve digital transformation and business success. **Representing technologies** include Elastic Computing Service (ECS), Object Storage Service (OBS), Elastic Volume Service (EVS), Cloud Container Engine (CCE), etc.
Amazon	AWS, Amazon's cloud computing platform service. AWS provides users with a complete set of cloud computing services, including elastic computing, storage, databases, and applications, helping enterprises reduce IT investment and maintenance costs. **Representative technologies** include EC2, S3, RDS, etc.
Microsoft	Azure is Microsoft's cloud computing platform. It provides various cloud services, including computing, storage, database, and artificial intelligence. **Representative technologies** include virtual machines, Azure Blob storage, Azure SQL Database, etc.
Google	Google Cloud provides comprehensive cloud computing services, including computing, storage, database, and artificial intelligence. **Representative technologies** include Google Compute Engine, Google Cloud Storage, etc.
IBM	IBM Cloud provides a variety of cloud computing services, including computing, storage, databases, and artificial intelligence. **Representative technologies** include IBM Cloud Virtual Servers, IBM Cloud Object Storage, etc.
Alibaba	Alibaba Cloud is a cloud computing platform of Alibaba Group. It provides comprehensive cloud services, including computing, storage, database, and artificial intelligence. **Representative technologies** include Elastic Compute Service, Object Storage Service, etc.
VMware	VMware Cloud Foundation is a full-stack cloud infrastructure platform that provides a solution for quickly deploying and managing private, public, and edge clouds. **Representative technologies** include VMware vSphere, VMware NSX, VMware vSAN, VMware Workstation, etc.

HUAWEI CLOUD Everything as a Service

800 + e-Government cloud	**300 +** Financial customers	**90%** Top 30 Chinese automakers	**90%** Top 50 Chinese e-commerce companies	**85%** Top 50 Chinese Game Enterprises	**75%** Top 50 Chinese Audio and Video Enterprises	**300 +** SAP cloudification customers	**120 +** Carriers

Technology as a Service

Put innovation at their fingertips and accelerate application modernization

Experience as a Service

Replicate excellent products and enable industry cloudification.

Infrastructure as a Service

Build a single network for global storage and computing, enabling services to be accessible globally.

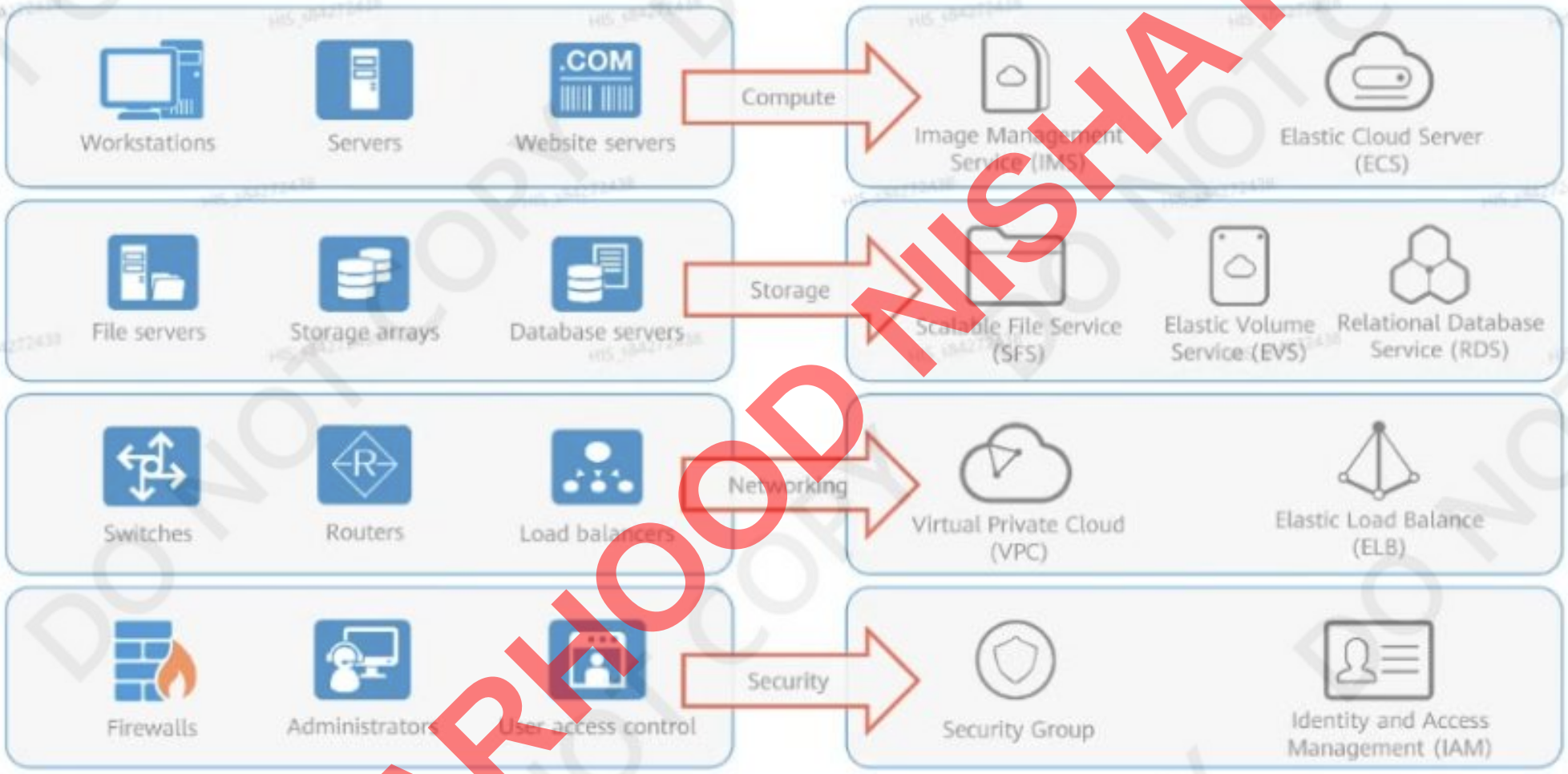
240+ cloud services

41000+ Partners

4+ million developers

10,000 + Item Quantity

Huawei Cloud Services for Common Components



240+ HUAWEI CLOUD Services