INTRODUCTION TO CLOUD COMPUTING

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Lesson Overview

- **Objectives:**

  o Understand the basic concept of cloud computing

  o Learn historical context and evolution of cloud services

  o Learn the key drivers of cloud adoption

  o Explore real-world use cases

Key Words

- **Compute power**: a computer system's ability to perform calculations and execute instructions efficiently
- **Internet**: global network that connects devices and users
- **Virtualization**: technology that you can use to create virtual representations of servers, storage, networks, and other physical machines.

The Water Supply Analogy

Imagine your town's water system:

- **Water Source & Treatment Plant:** Water is collected and cleaned, ensuring it's safe to use.

- **Pipes & Distribution Network:** The clean water is then delivered through pipes to households.

- **On-Demand Access & Billing:** Residents pay for what they use, and they simply turn on the tap when needed without worrying about the underlying infrastructure.

In the same way, cloud computing provides computing resources (like storage, processing, and software) from centralized data centers, and users access these resources on demand.

By Definition

Cloud Computing is the on-demand delivery of IT resources over the internet with pay-as-you-go pricing

Key words: on-demand(when needed), IT resources, internet, pay for what you use

Traditional vs Cloud

- How do you normally receive learning materials
- Do you handle group projects? How do you do them?

Traditional vs Cloud

1. Access to Learning Materials

- **Traditional Setting:**

  Students can only access textbooks, notes, or assignments stored on classroom computers or printed by teachers. If they miss a class or lose a handout, it's difficult to catch up.
- **Cloud Setting:**

  Learning materials are stored on platforms like Google Classroom or Microsoft OneDrive. Students and teachers can access and update resources from any device, anywhere, at any time.

2. Collaboration and Communication

- **Traditional Setting:**

  Group projects rely on in-person meetings or physical exchanges of files via USB. Communication is limited to school hours or paper notices.
- **Cloud Setting:**

  Students collaborate in real-time using cloud tools like Google Docs or Teams. Teachers send updates, feedback, and announcements instantly through cloud-based platforms.

Intro to Cloud

History and Evolution of Cloud computing

History and Evolution: Part 1

1. Early Beginnings (1950s - 1960s)

The concept of cloud computing began with the question: "What if…" in 1960s with **John McCarthy and Christopher Strachey**, who envisioned the possibility of computing as a utility. In the 1960s, time-sharing systems allowed multiple users to share a mainframe, setting the stage for resource-sharing models.

2. The Advent of Virtualization (1960s - 1970s)

Virtualization technology emerged in the 1960s and 1970s, enabling multiple virtual machines to run on a single physical server. This efficiency and the rise of the internet laid the foundation for cloud computing.

In the 1990s, the **internet boom** also played a role in shaping the future of cloud computing. Companies were beginning to offer remote storage and hosted services, though not yet under the banner of "cloud computing."

3. The Birth of Cloud Computing (2000s)

Cloud computing took off in the 2000s with Amazon Web Services (AWS) launching EC2 in 2006, offering on-demand computing power. Google and Microsoft followed suit with their own cloud platforms, such as Google Apps and Windows Azure.

History and Evolution: Part 2

4. Cloud Services Model (2000s - 2010s)

Three primary cloud service models emerged:

- **IaaS** (e.g., AWS, Azure) provided infrastructure on demand.
- **PaaS** (e.g., Heroku, Google App Engine) allowed developers to build apps without managing underlying hardware.
- **SaaS** (e.g., Google Workspace, Salesforce) offered software hosted online.

5. Growth and Innovation (2010s - Present)

Cloud computing expanded rapidly with services like AI, machine learning, and serverless computing. The cloud became integral to digital transformation, supporting technologies like IoT and edge computing. Remote work and collaboration tools further fueled cloud adoption.

6. Cloud Computing Today and the Future

Cloud computing is now a core part of industries worldwide. Multi-cloud strategies and cloud-native technologies are on the rise, while edge computing and quantum computing represent the future of cloud evolution.

Benefits of Cloud Adoption

Cost Efficiency: You only pay for what you use, instead of spending a lot upfront on hardware and data centers.
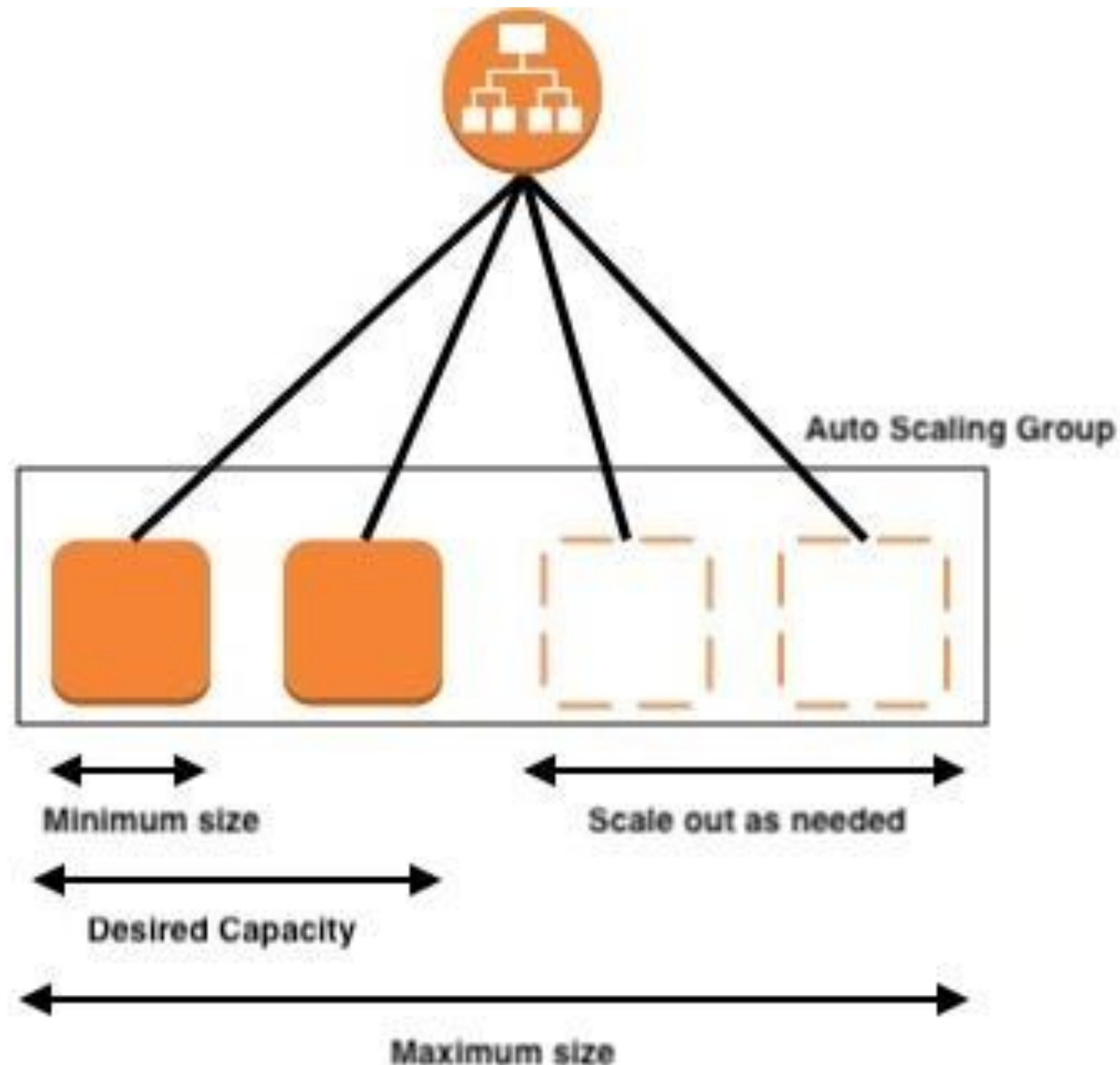
Benefits of Cloud Adoption

Speed and Agility: New resources can be set up in minutes, helping teams move faster and innovate quickly.
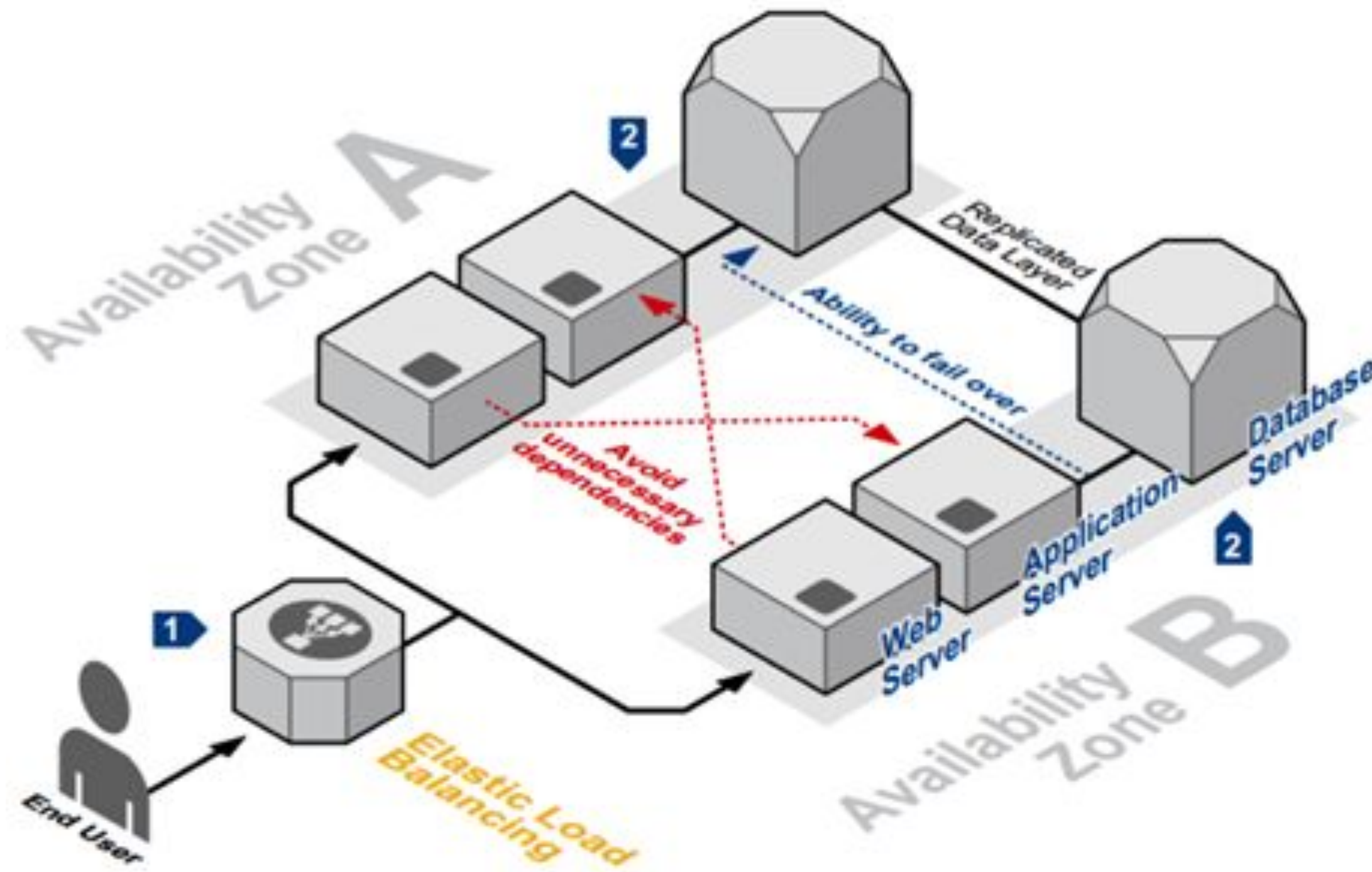
Benefits of Cloud Adoption

Economies of Scale: Because cloud providers serve many customers, they can offer services at lower prices.

Benefits of Cloud Adoption

Auto Scaling Group

Minimum size

Scale out as needed

Desired Capacity

Maximum size

Scalability: You can quickly add or remove resources based on your needs—no need to guess or overbuy.

Benefits of Cloud Adoption

Reliability and High Availability: Cloud systems are designed to keep running smoothly, even if something breaks.

Benefits of Cloud Adoption

Focus on Core Business: With the cloud handling infrastructure, teams can focus more on what makes their business unique.

Benefits of Cloud Adoption

Global Reach: You can run apps and services around the world, giving users fast, local access.

Brainstorm

Identify a personal case or in your community where cloud adoptions would be/or is already of great use.

Brainstorm

Give examples of real-word use cases of Cloud Adoption eg: **Business Apps, mobile app, education, media**

Real -World Applications

o **Business Applications:**

    ○ **ERP & CRM:** Centralized systems that integrate and streamline processes

o **Data Storage & Backup:**

    ○ **Document Storage:** Secure "reservoir" for your data (Dropbox, Google Drive)

    ○ **Disaster Recovery:** Backup solutions for data restoration

o **Web & Mobile Applications:**

    ○ **Scalable Hosting:** Adjusting resources like increasing water flow during a festival

    ○ **Development Platforms:** Customizing services without building full infrastructure

o **Media & Entertainment:**

    ○ **Streaming Services & CDNs:** Reliable, on-demand delivery of content

o **Scientific Research & Big Data:**

    ○ **Data Analysis & HPC:** Processing large datasets and running simulations

o **Education & Collaboration:**

Online Learning & Collaboration Tools: Delivering knowledge like a public water system

Recap

o Cloud computing delivers resources as needed, just like water

o Cloud computing addresses the challenges faces with traditional settings

o Real-world applications span business, education, media, research, and more

Knowledge check

Let's play a kahoot game:

https://create.kahoot.it/my-library/kahoots/all