



Week3: Introduction to Cloud Computing

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Outline

- Introduction to cloud computing
- Advantages of cloud computing
- Introduction to Amazon Web Services (AWS)
- In-class activity: AWS Academy Learner Lab Demo

Part 1: Introduction to Cloud Computing

What is cloud computing?



Cloud computing defined

Cloud computing is the **on-demand** delivery of computer system resources, especially data storage and computing power, without active management by users.



What cloud computing tries to solve

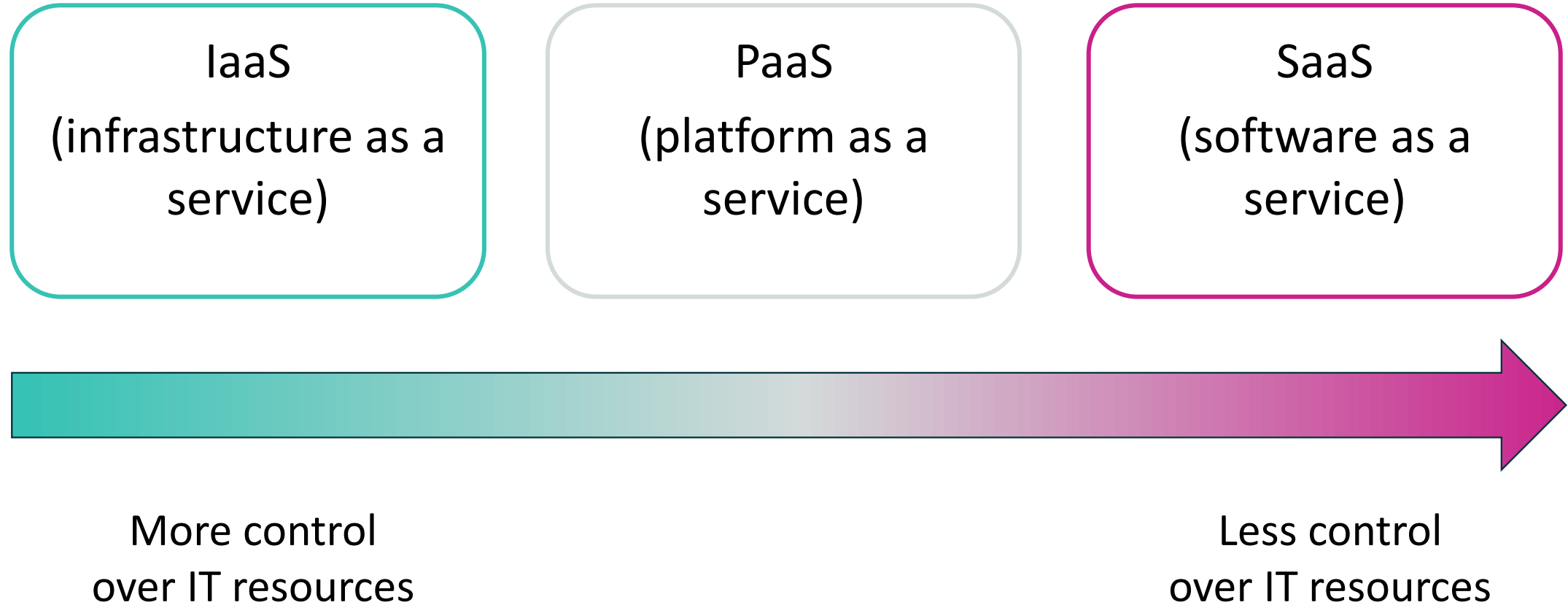


- Before the cloud, deploying web services was a very expensive process
- A web application deployment:
 - Purchase servers
 - Correct amount of storage and memory
 - Setup process
 - Additional costs: electricity, security concerns
 - Lack of expert in server management

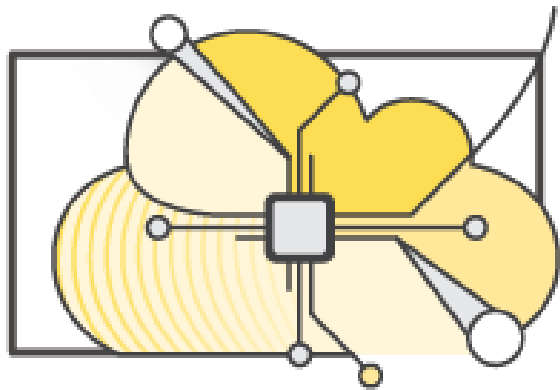
Cloud service providers

- **Amazon AWS (Amazon Web Services)**
- **Google (Google Cloud Platform)**
- **Microsoft (Azure)**

Different cloud services



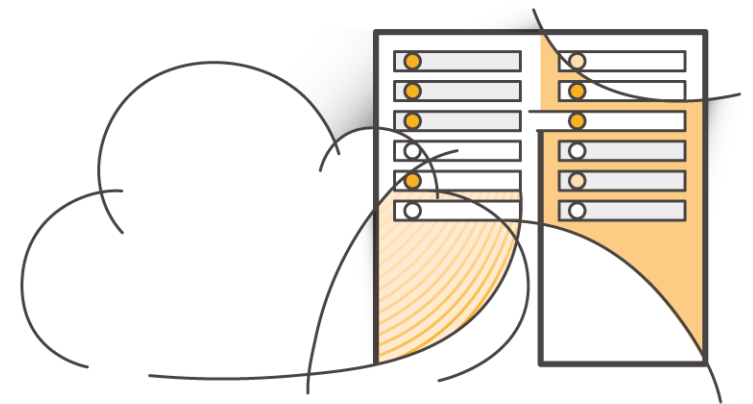
Cloud computing deployment models



Cloud



Hybrid



On-premises
(private cloud)

Key takeaways



- Cloud computing is the on-demand delivery of computer system resources.
- 3 cloud service models:
 - IaaS
 - PaaS
 - SaaS
- 3 cloud deployment models:
 - cloud
 - hybrid
 - on-premises or private cloud
- Almost anything you can implement with traditional IT can also be implemented with cloud computing service.

Part 2: Advantages of cloud computing

Massive economies of scale

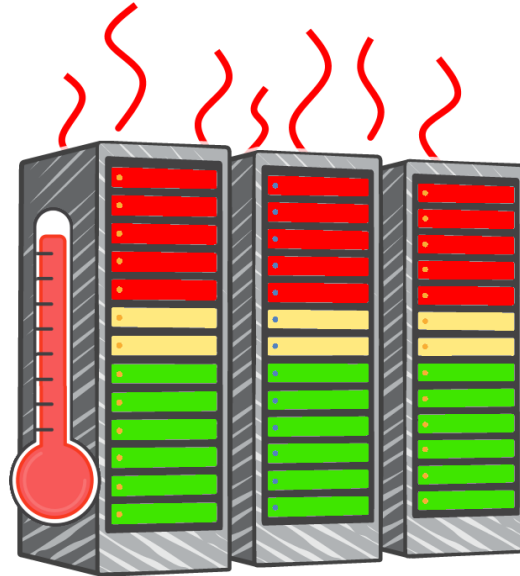
Because of aggregate usage from all customers, AWS can achieve higher economies of scale and pass savings on to customers.



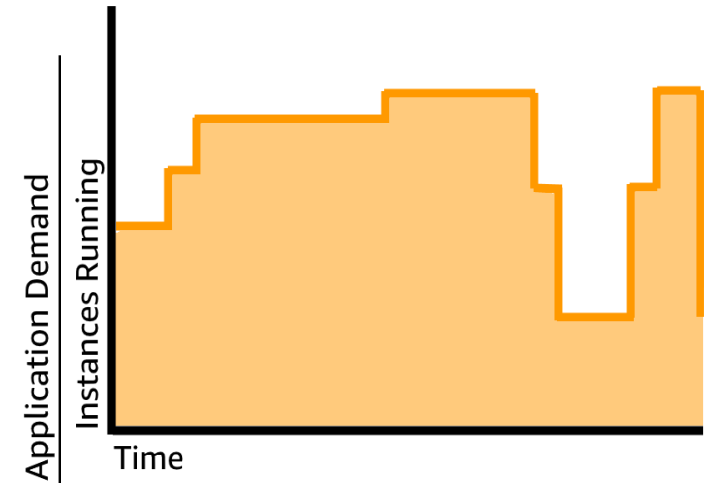
Stop guessing capacity



Overestimated server capacity



Underestimated server capacity



Scaling on demand

Increase speed and agility

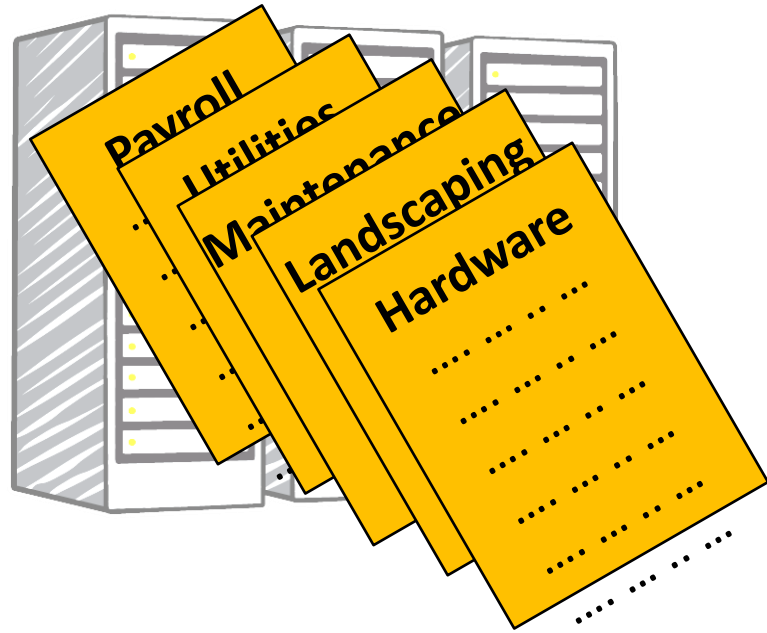


Weeks between wanting resources and having resources

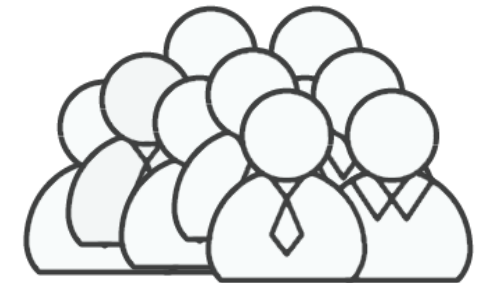
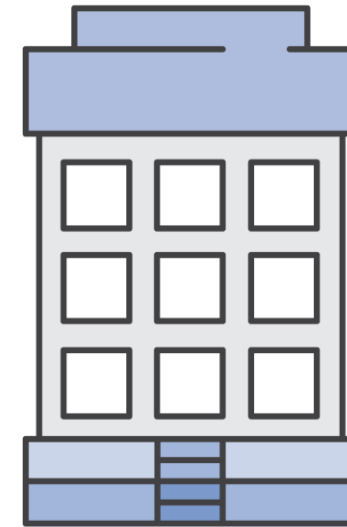
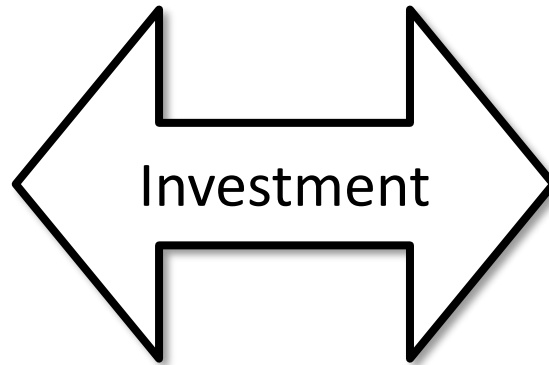


Minutes between wanting resources and having resources

Stop spending money on running and maintaining data centers



Running data centers



Business and customers

Go global in minutes

The image shows a screenshot of the AWS console interface overlaid on a world map. The console displays the 'AWS services' section with a search bar and a list of 'Recently visited services' including EC2, Elastic Transcoder, AWS Budgets, and S3. Below this is the 'Build a solution' section, which offers four quick-start options: 'Launch a virtual machine' (With EC2, ~2-3 minutes), 'Build a web app' (With Elastic Beanstalk, ~6 minutes), 'Connect an IoT device' (With AWS IoT, ~5 minutes), and 'Start a development project' (With CodeStar, ~5 minutes). On the right side of the console, a dropdown menu lists various AWS regions, with 'US West (Oregon)' highlighted in orange. Other regions listed include US East (N. Virginia), US East (Ohio), US West (N. California), Asia Pacific (Mumbai), Asia Pacific (Osaka-Local), Asia Pacific (Seoul), Asia Pacific (Singapore), Asia Pacific (Sydney), Asia Pacific (Tokyo), Canada (Central), EU (Frankfurt), EU (Ireland), EU (London), EU (Paris), and South America (São Paulo). Three callout boxes with icons (blue, purple, and green) are positioned around the console, with arrows pointing to specific regions on the map: the blue box points to the US West region, the purple box points to the Asia Pacific region, and the green box points to the South America region.

Key takeaways



- Benefit from massive economies of scale
- Stop guessing capacity
- Increase speed and agility
- Stop spending money on running and maintaining data centers
- Go global in minutes

Part 3: Introduction to Amazon Web Services (AWS)

What is AWS?

- AWS is a **secure cloud platform**
- Offers a **broad set of global cloud-based products**.
- AWS provides you with **on-demand access** to compute, storage, network, database, and other IT resources.
- **Pay only for the services you need**, for as long as you use them.
- AWS services **work together** like building blocks.

Categories of AWS services



Analytics



Application Integration



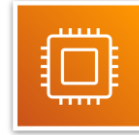
AR and VR



Blockchain



Business Applications



Compute



Cost Management



Customer Engagement



Database



Developer Tools



End User Computing



Game Tech



Internet of Things



Machine Learning



Management and Governance



Media Services



Migration and Transfer



Mobile



Networking and Content Delivery



Robotics



Satellite

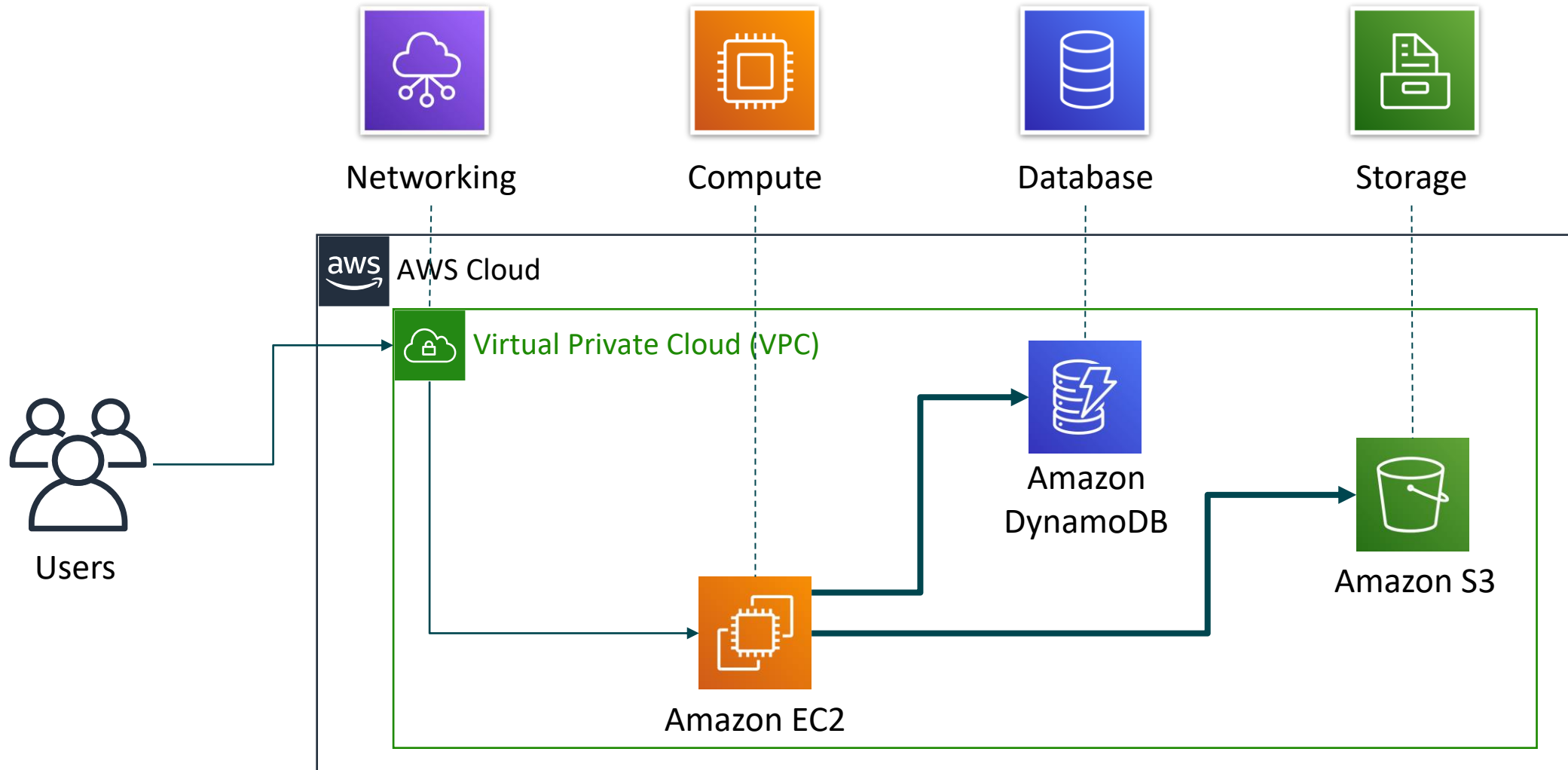


Security, Identity, and Compliance



Storage

Simple solution example



Three ways to interact with AWS



AWS Management Console

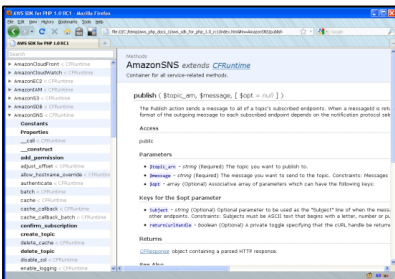
Easy-to-use graphical interface

```
AWS Storage Gateway Network Configuration
1: Describe Adapter
2: Configure DHCP
3: Configure Static IP
4: Reset all to DHCP
5: Set default adapter
6: View DNS Configuration
7: View Routes

Press "x" to exit
Enter command: 2
Available adapters: eth0
Enter Network Adapter: eth0
Reset to DHCP (y/n): y
Adapter eth0 set to use DHCP
You must exit Network Configuration to complete this configuration.
Press Return to Continue_
```

Command Line Interface (AWS CLI)

Access to services by discrete commands or scripts



Software Development Kits (SDKs)

Access services directly from your code (such as Java, Python, and others)

Key takeaways



- AWS is a secure cloud platform
- Offers a broad set of global cloud-based products called services.
- Many categories of AWS services
- Choose a service based on your research goals and technology requirements
- 3 ways to interact with AWS services
 - AWS Management Console
 - AWS Command Line Interface (CLI)
 - Software Development Kits (SDKs)

Summary

In this class, you learned how to:

- Define different types of cloud computing models
- Describe six advantages of cloud computing
- Recognize the main AWS service categories and core services

In-Class Activity:

AWS Academy Learner Lab Demo

Let's Take a 10-min Break!



In-Class Activity:

AWS Academy Learner Lab Demo

Resources

In UIUC Canvas page, go to “In-Class Activity” module:

- Week3: AWS Academy Learner Lab Demo
- Log in with your account and password
- Let’s walk through all the steps together!