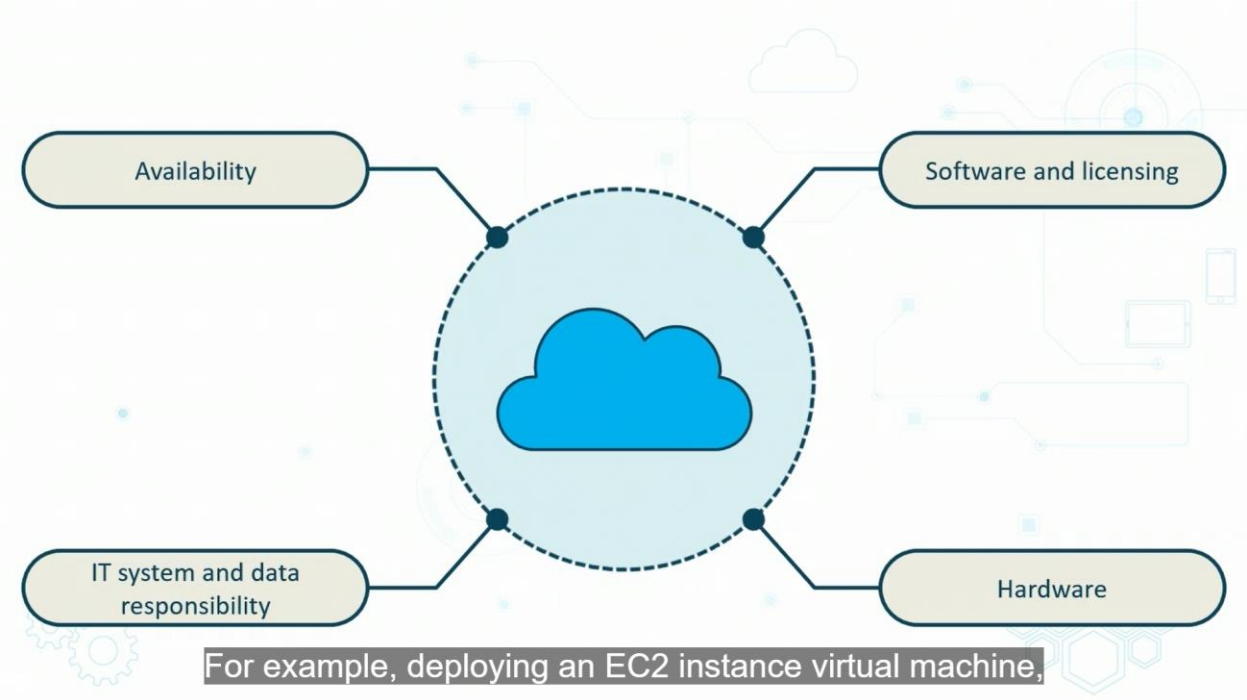
Module 1: Cloud Concepts and Technology

1.1 Cloud Basics

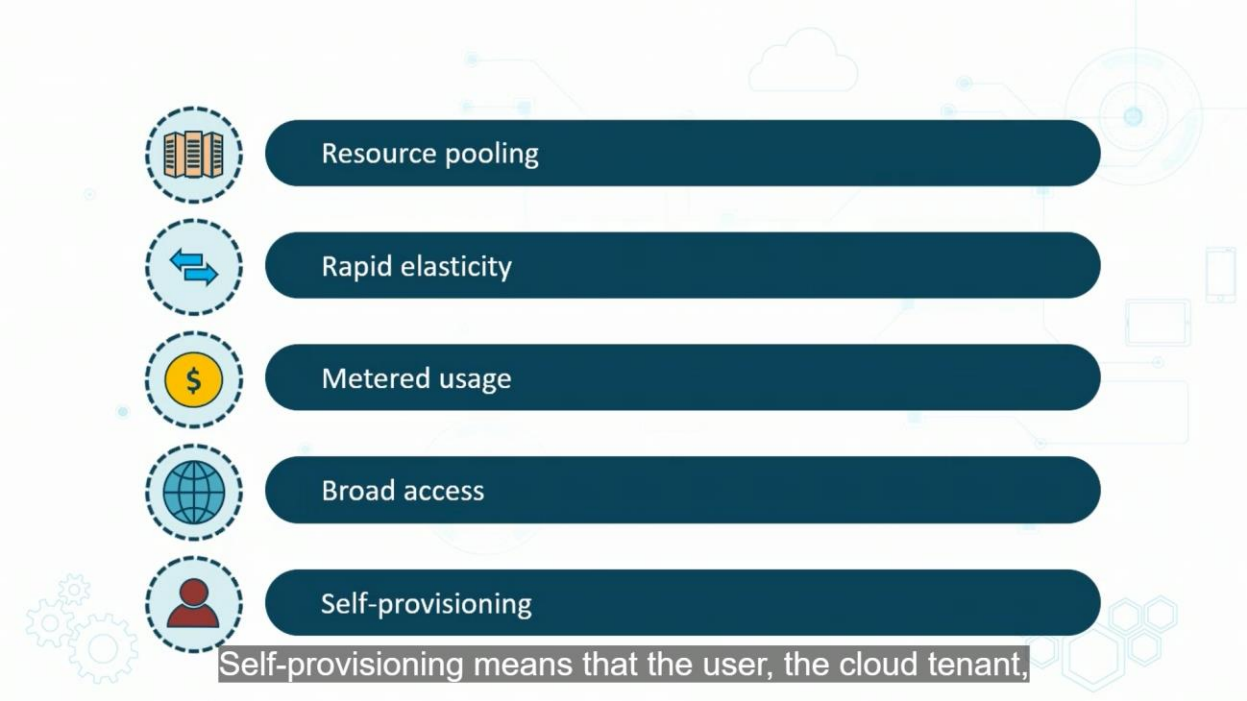
Overview

AWS management tools, including the AWS console, CLI, PowerShell, and the AWS Toolkit for Microsoft Visual Studio.

Cloud Characteristics



Characteristics



Resource pooling. This means that the cloud service provider pulls resources together for use by cloud tenants. Now, resources could include storage or virtual machine compute power potential that is available or could be the underlying network infrastructure that can be configured to support things like web applications.

Rapid elasticity refers to the fact that it's very quick and easy to deploy resources in the cloud. An example would be by just deploying an EC2 instance or virtual machine, as a result of a few clicks.

Metered usage means that the use of IT services in the cloud is charged based on usage, much like you would with utility like power or water.

Broad access means that access to those services is available across a network. So it doesn't have to be run directly on a device, and it's also available across a number of different types of devices.

Self-provisioning means that the user, the cloud tenant, will have some way of provisioning cloud resources as they need them. Whether it's through a GUI or whether it's through command line tools.

Cloud Computing Considerations

Cloud services that meet business needs

On-premises system/data cloud migration

Technical expertise of IT staff

Total cost of ownership (TCO)

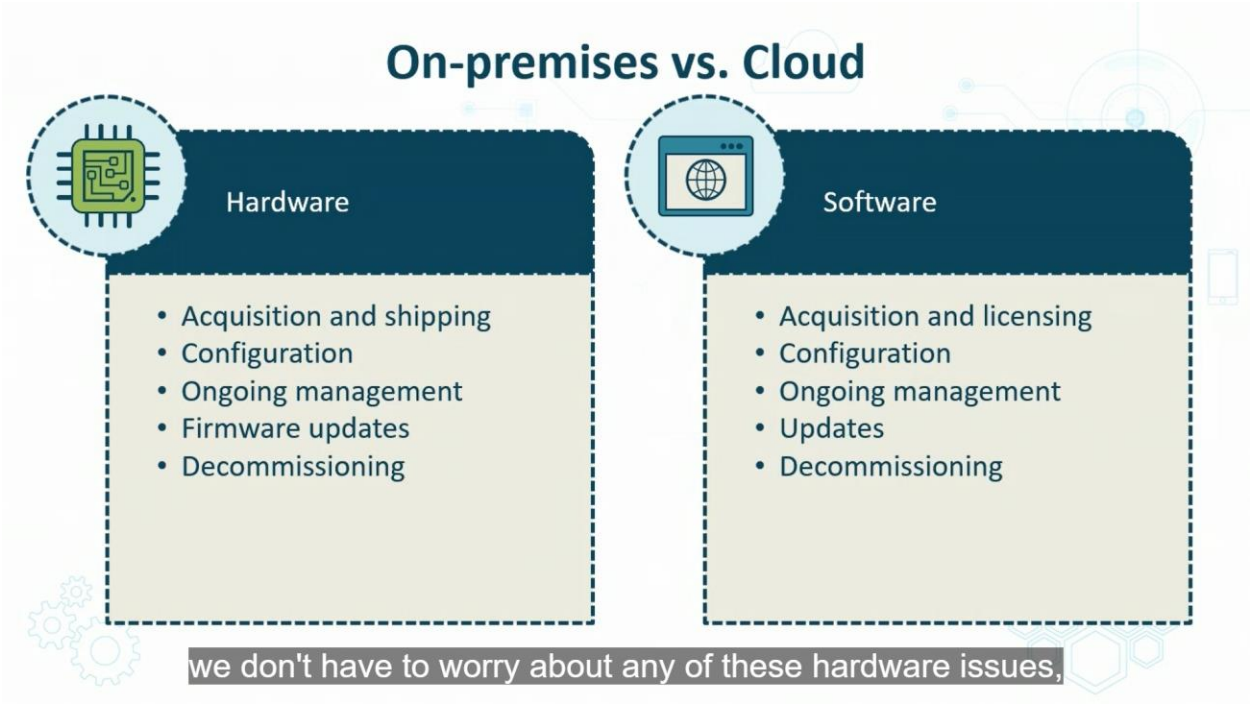
Data privacy and laws/regulations

Then there are data privacy and laws and regulations

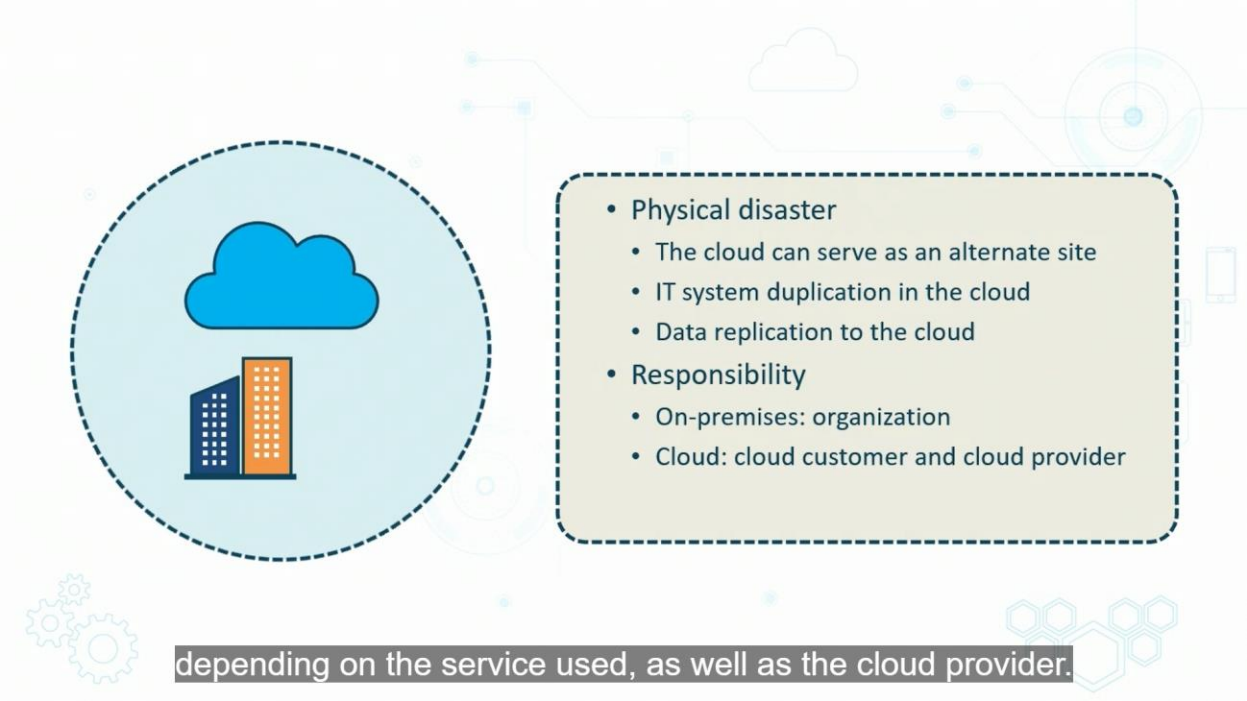
Cloud Computing Benefits

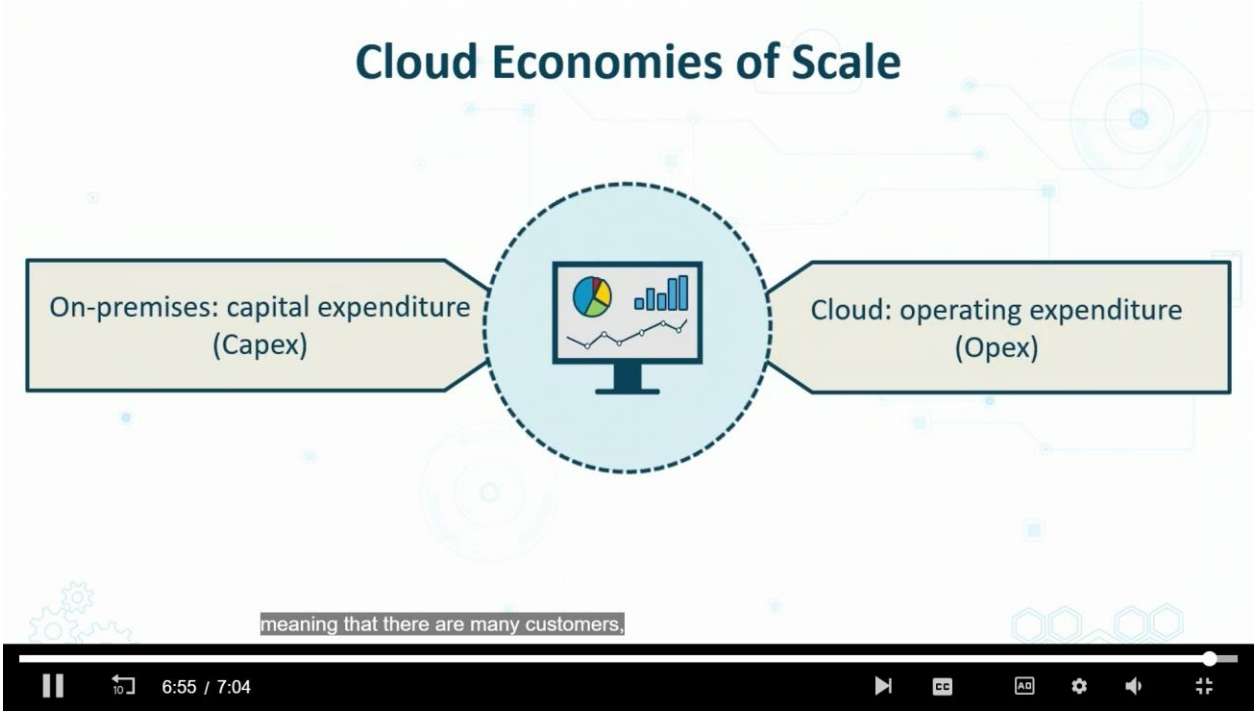
- No up-front capital expenditure
- Cloud provider security accreditations
- Quick IT solution deployment
- Hidden underlying technical complexities
- Less on-premises space, power, and HVAC

by the cloud provider data center environment.



On-premises vs. Cloud





An on-premises IT environment means capital expenditures,otherwise called **Capex** on equipment and licensing.Whereas **in the cloud**, it's an ongoing operational expenditure,otherwise referred to as **Opex**. Due to cloud economies of scale, meaning that

there are many customers, it means that it drives down the costsfor the use of cloud computing for all cloud tenants.

Public clouds

Public Clouds

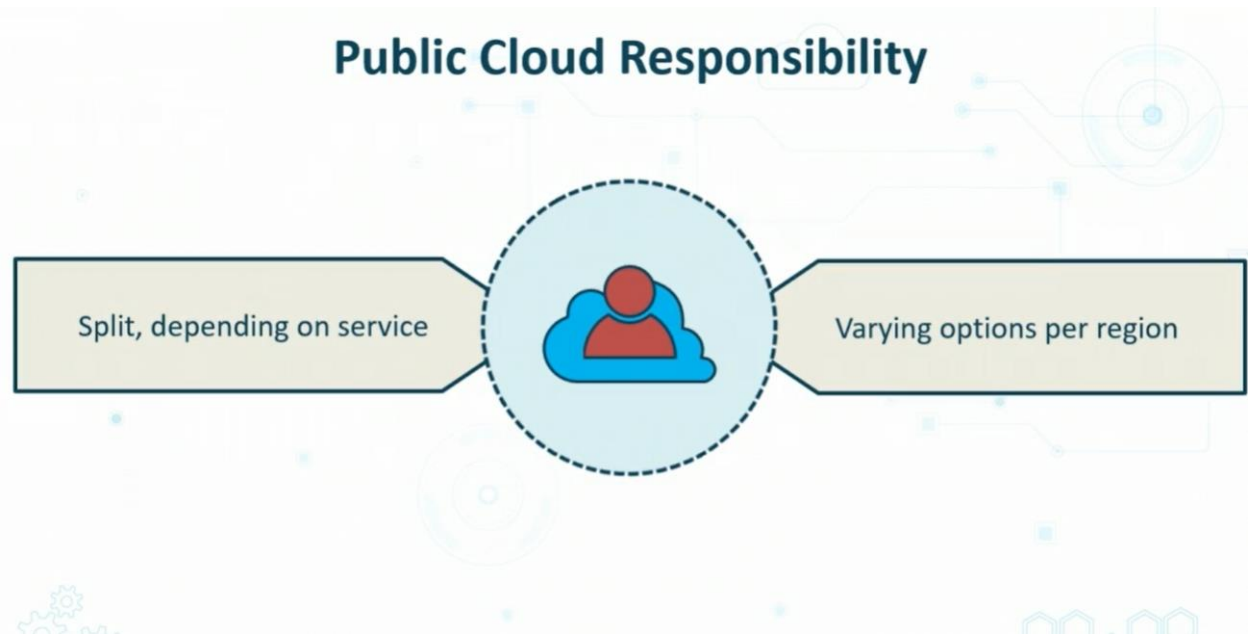
- Broad access
- Resource pooling
- Rapid elasticity
- Self-provisioning
- Metered usage

Although there are some extra variations on that one,

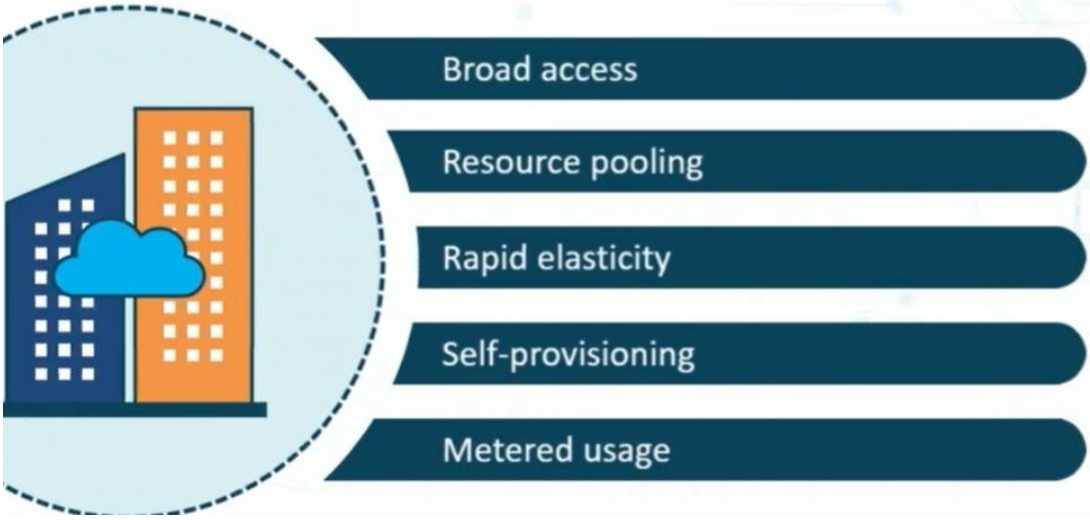
- Available to anybody over the Internet
- An account must be created
- Cloud provider owns the IT infrastructure

that all cloud services run on.

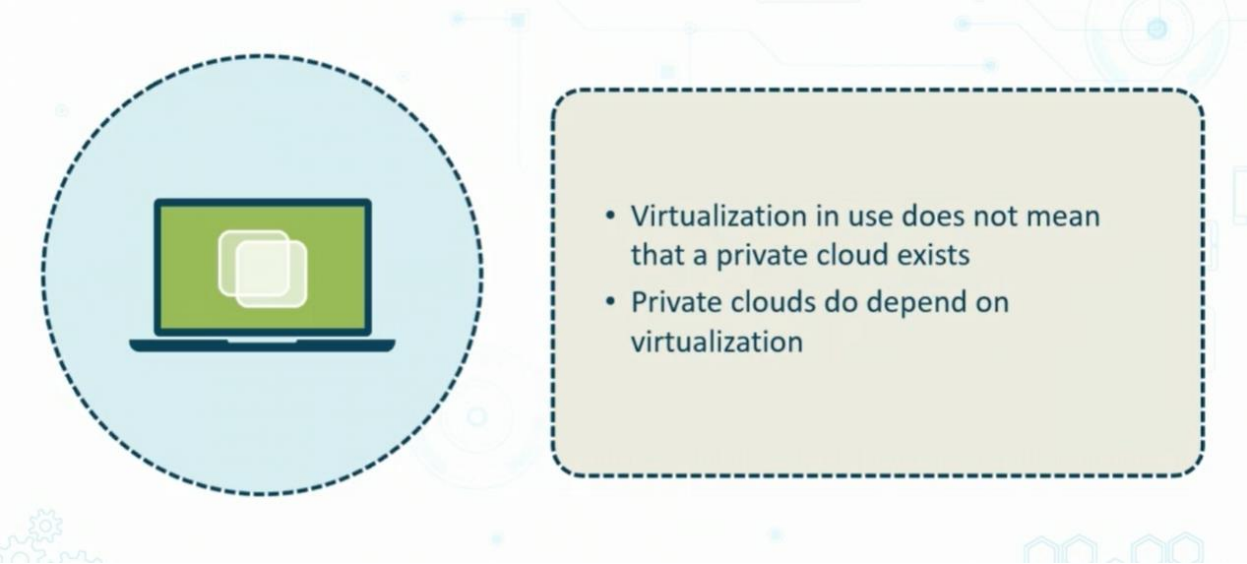
using command line tools like PowerShell or the AWS CLI.

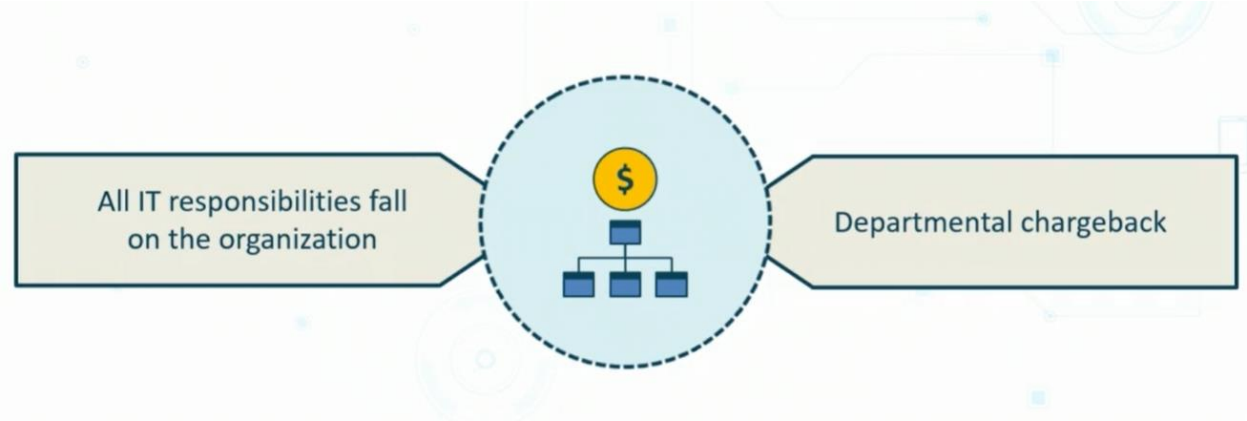


Private Clouds



Private Clouds





Hybrid Clouds

- Broad access
- Resource pooling
- Rapid elasticity
- Self-provisioning
- Metered usage

Hybrid Clouds

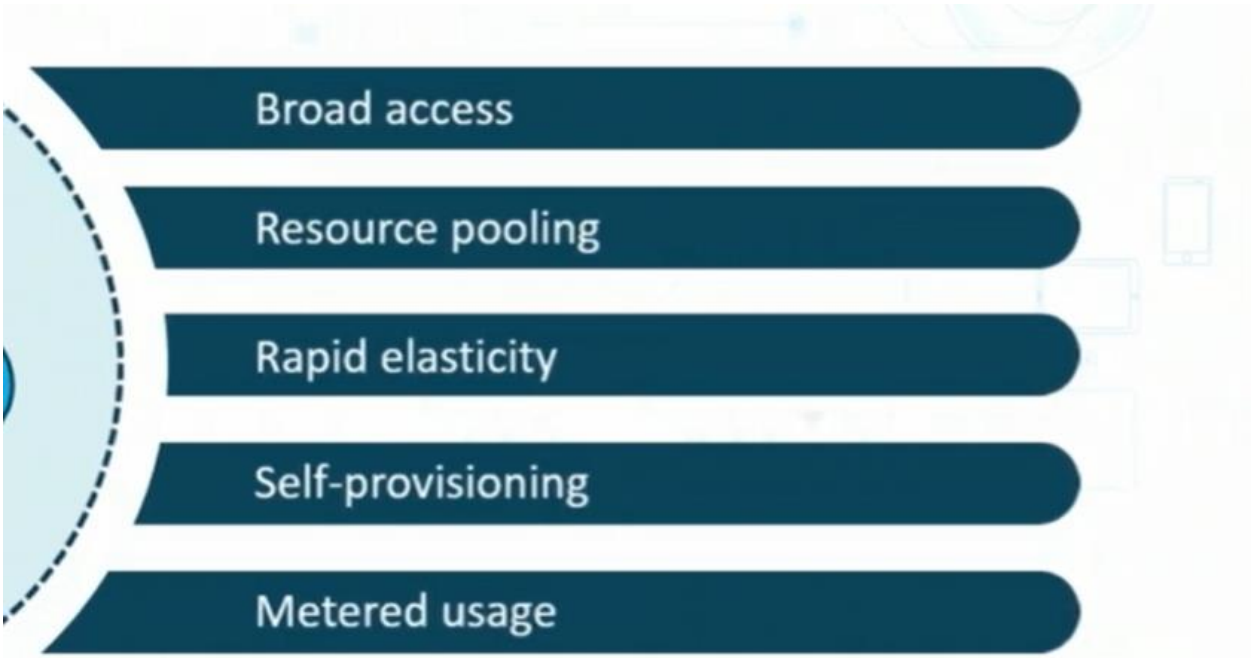
The use of public cloud services

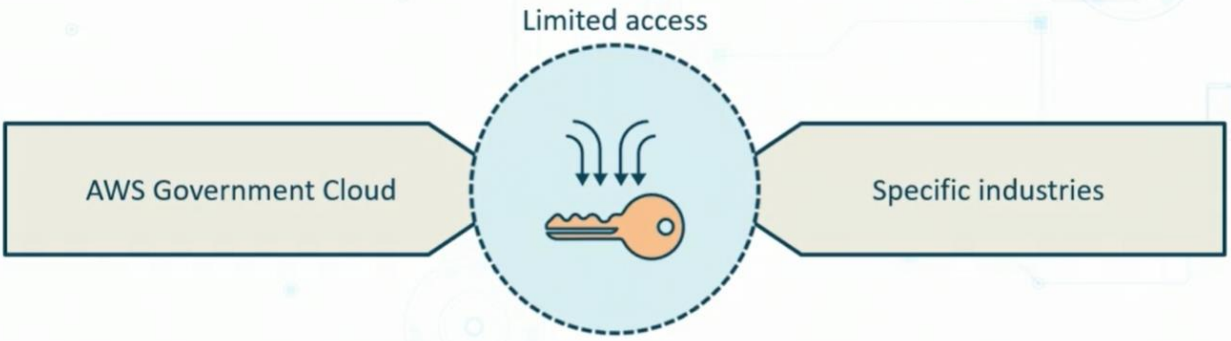
The use of private cloud services

The use of on-premises services

- Commonly used during on-premises migration of IT systems and data to the public cloud
- Parallel systems running on-premises and in the public cloud
- On-premises data replicated to the public cloud

Community Clouds



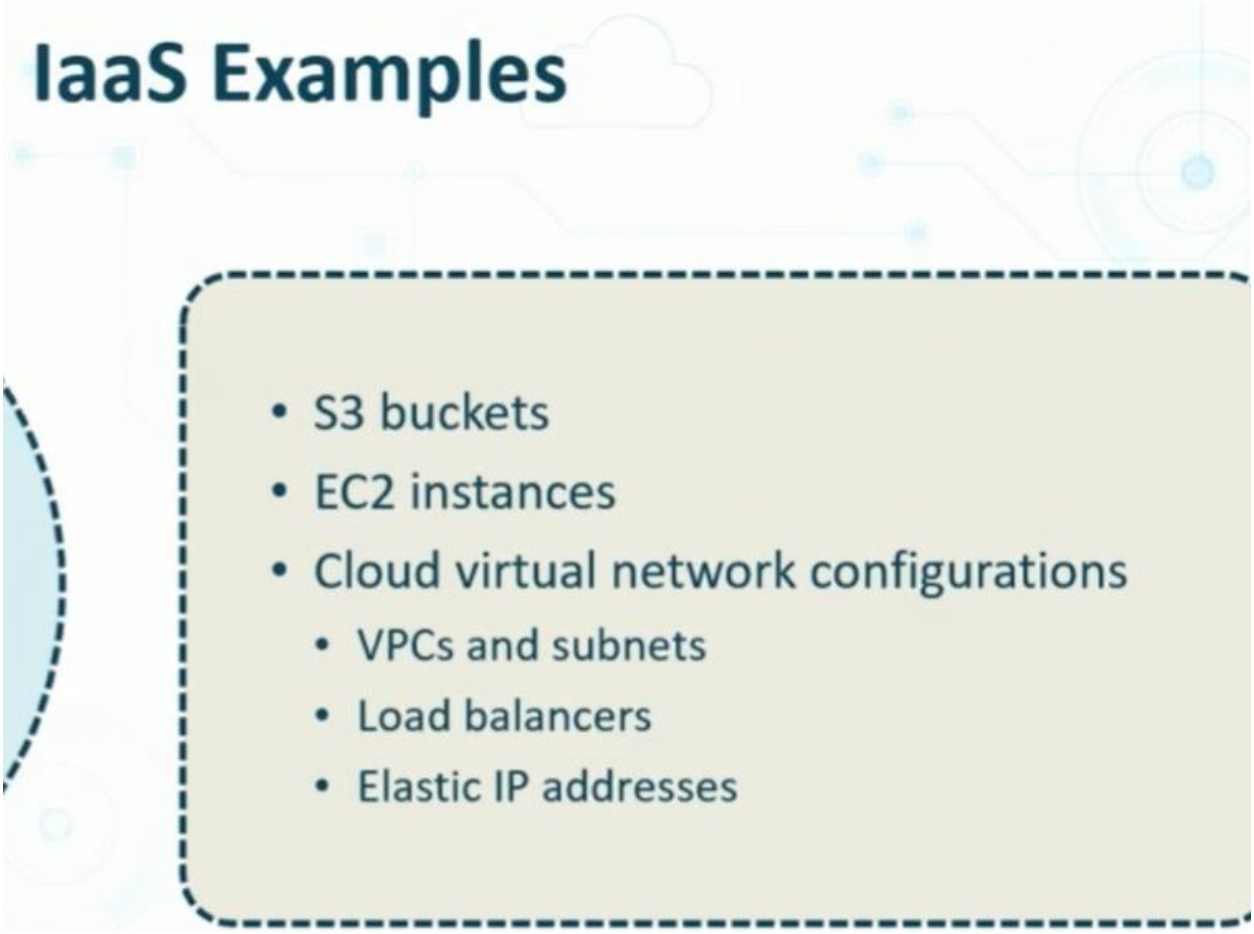


- Groups with the same IT computing requirements
  - Laws and regulations
  - Physical location of data
  - Specific security controls
  - Industry-specific cloud software

Infrastructure as a Service (IaaS)

- IT administrators

involved with the acquisition and configuration and ongoing management of on-premises infrastructure, things related to network infrastructure, storage and compute.



Responsibilities:

Cloud Provider: responsible for things like the underlying equipment to make services run, things like physical hypervisor servers, network hardware, physical storage appliances.

Cloud Customer: responsible for working with cloud services on top of the cloud provider equipment, things like deploying EC2 instances, configuring VPCs and provisioning new S3 buckets.

Platform as a Service (PaaS)

- IT administrators and developers

Offers **managed services**. A managed service means that we don't have to worry about the underlying configuration, such as setting up servers or installing software for operating systems or databases. It's taken care of for us already by the cloud service provider.

Examples

- **AWS Simple AD**: an active directory service without you, the cloud customer having to provision the virtual machines and configuring active directory software.
- **AWS RDS**: Relational Database. MySQL or Microsoft SQL
- **CloudFront**: This is a content delivery network configuration whereby you configure content perhaps referenced by a Web app to be copied to different regions to put that content closer to users in those regions that might request it.
- **AWS Lambda Function**: just focus on writing the code for your Lambda function. Sometimes also called serverless computing.

Software as a Service (SaaS)

- Provides services used by end users
- Custom or off-the-shelf

Examples

- Cloud based
  - Email
  - Calendaring
  - Amazon Workspaces
  - Amazon AppStream

Responsibilities

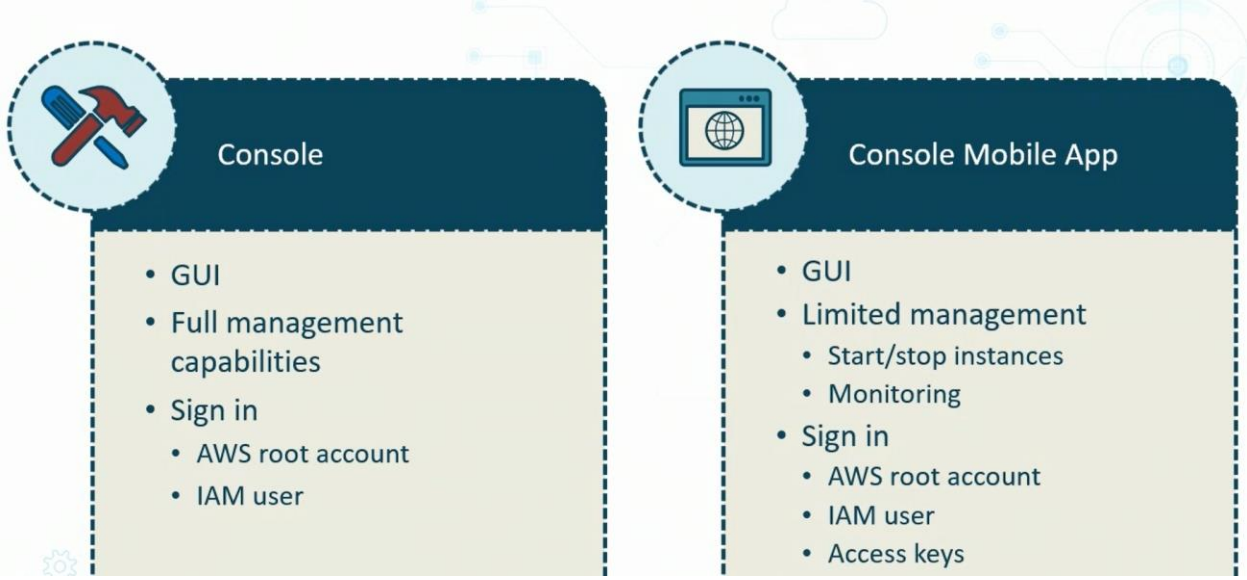
- **Cloud provider:** they need to supply and manage the underlying infrastructure that supports the SaaS. So, this would mean things like the underlying storage or servers that would run mail server software or office productivity software.
- **Cloud Customer:** user configuration settings, for example, for a calendaring app or which AppStream apps are made available to cloud consumers over the Internet and of course, any resultant data that might result from the use of SaaS solutions, how that data is treated, where it's stored, how it's encrypted, if at all.

Anything as a Service (XaaS)

- General cloud service model category
- Metered service available over the network

Cloud Service	Abbreviation	AWS Solution
Backup as a Service	BaaS	AWS Backup
Disaster Recovery as a Service	DRaaS	CloudEndure DR
Monitoring as a Service	MaaS	CloudWatch
Communication as a Service	CaaS	Amazon Chime

AWS Management Tool Overview



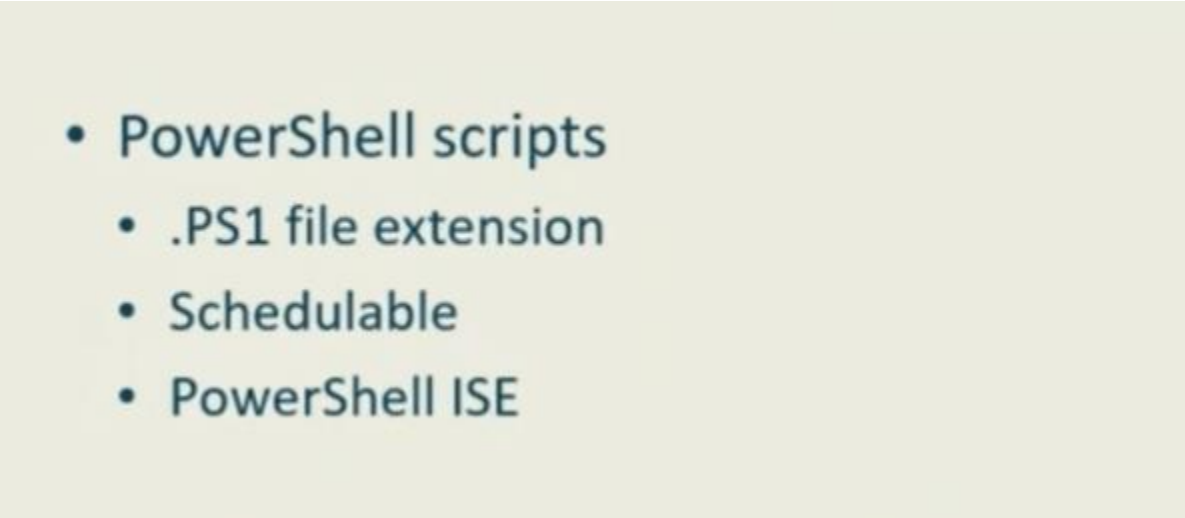
AWS CLI works on:

- Windows
- Linux
- MacOS

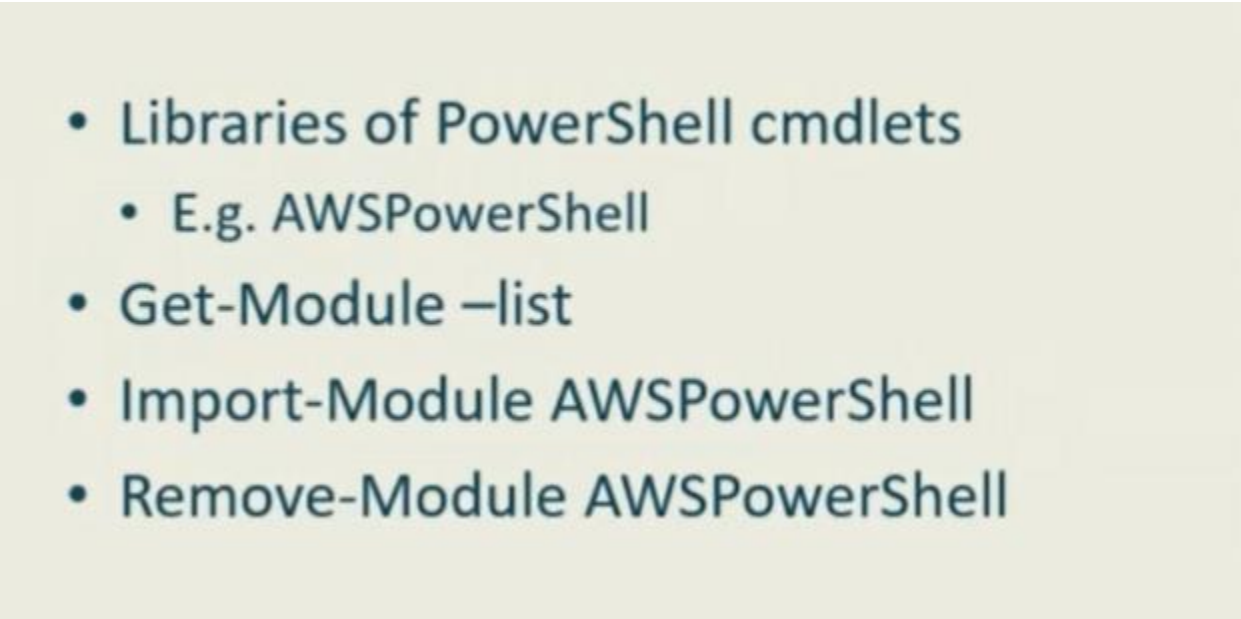
AWS CLI

AWS PowerShell

- For administrators
- Automation



PowerShell Modules



AWS API's

- AWS cloud services are exposed via APIs
- API integration with custom APIs
- API keys, secrets, and authorization tokens
- HTTP/REST APIs
- WebSocket APIs

AWS Third party mgmt. Tools

- **Cloud Aware:** allow you to analyze your costs to help reduce those charges.
- **Cloud Conformity:** threat detection type of tool.
- **Tubonomic:** allows you to assess any on-premises components that might be suitable for migration into the AWS cloud.

Using the AWS Console

aws.amazon.com/console – sign in here

root user login