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Introduction

Module 1

What's Coming Up?

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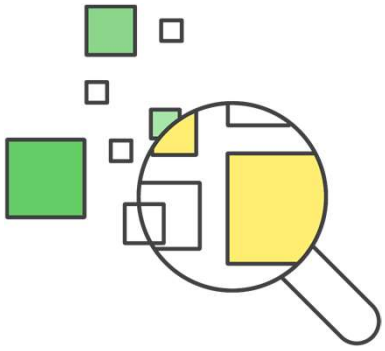
A quick review:

- What is the cloud? What is AWS?
- Design guidelines of the cloud
- The Well-Architected Framework
- AWS global infrastructure
- Large-scale architectural design



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"The Internet Operating System"

Module 1

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The architectural need

It's 2000, and Amazon.com's new shopping website service is struggling to become highly available and scale efficiently.

Amazon.com

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Amazon.com's e-commerce tools were "a jumbled mess:"

- Applications and architectures were built without proper planning
- Services had to be separated from each other

Solution: Tools became a set of well-documented APIs, which became the standard for service development at Amazon.

Problems Persisted

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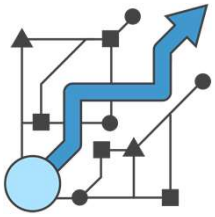
Amazon.com still struggled to build applications quickly.

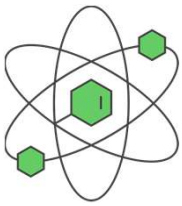
- Database, compute, and storage components took 3 months to build.
- Each team built their own resources, with no planning for scale or re-usability.

Solution: Built internal services to create highly available, scalable, and reliable architectures on top of their infrastructure. In 2006, started selling these services as AWS.

What is the Cloud? What is AWS?



Programmable resources



Dynamic abilities

Pay as you go

What other advantages does the cloud offer?

Six Advantages of Cloud Computing

Trade capital expense for variable expense

Benefit from massive economies of scale

Stop guessing about capacity

Increase speed and agility

Focus on what matters

Go global in minutes

Characteristics of Cloud Computing

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On-demand Self-service

Ubiquitous Network Access

Resource Pooling

Rapid Elasticity

Measured Service

Service Models of Cloud Computing

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Deployment Models of Cloud Computing

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Public Cloud **Hybrid Cloud** **Private Cloud**

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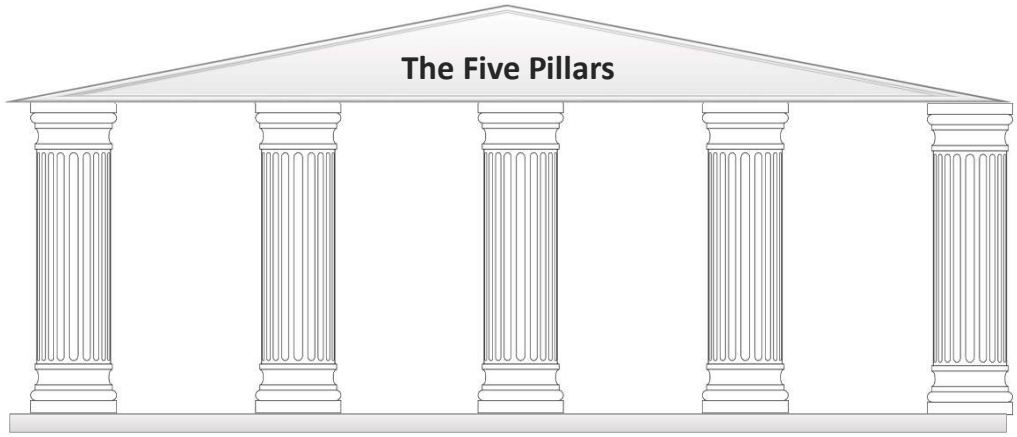
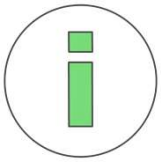
The Well-Architected Framework (WAF)

The AWS Well-Architected Framework



Security | Reliability | Cost Optimization | Performance Efficiency | Operational Excellence

Security



Identity foundation

Enabling traceability

Security at all layers

Risk assessment and mitigation strategies

Reliability

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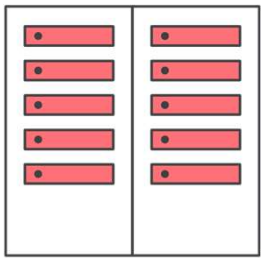
- Dynamically acquire computing resources to meet demand
- Recover quickly from infrastructure or service failures
- Mitigate disruptions such as:
  - Misconfigurations
  - Transient network issues



Cost Optimization

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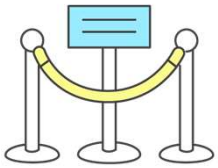
- Measure efficiency
- Eliminate unneeded expense
- Consider using managed services

Operational Excellence

- The ability to run and monitor systems
- To continually improve supporting process and procedures

Deployed

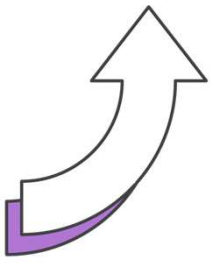
Updated



Operated

Performance Efficiency

- Choose efficient resources and maintain their efficiency as demand changes
- Democratize advanced technologies
- Mechanical sympathy



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AWS Global Infrastructure

AWS Data Centers

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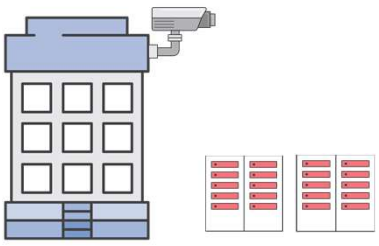
- A single data center typically houses tens of thousands of servers
- All data centers are online, not “cold”
- AWS custom network equipment:
  - Multi-ODM sourced
  - Customized network protocol stack



AWS Availability Zones

Each Availability Zone is:

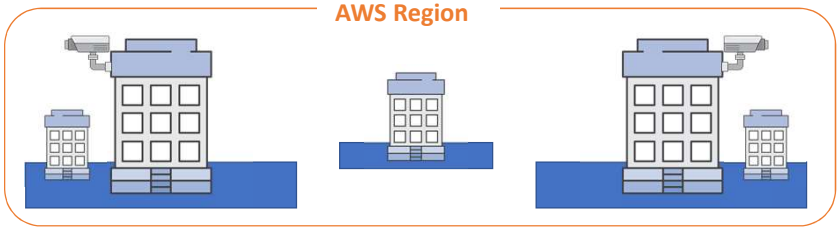
- Made up of **one or more** data centers
- Designed for **fault isolation**
- Interconnected with other Availability Zones using high-speed **private** links

- You can choose your Availability Zones
- AWS recommends replicating across Availability Zones for resiliency

AWS Regions

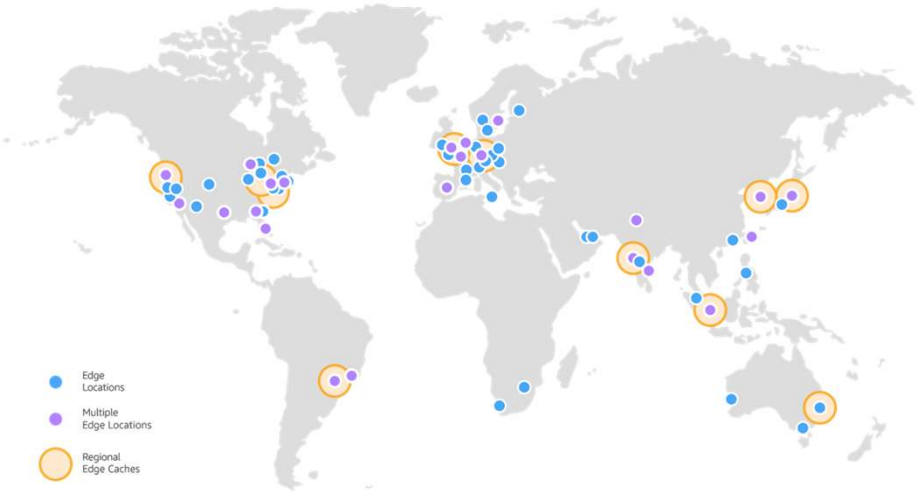
Each AWS Region is made up of **two or more Availability Zones**.

- AWS has **18 regions** worldwide.
- You enable and control **data replication** across regions.
- Communication between regions uses **AWS backbone network** infrastructure.



AWS Global Infrastructure: Current Regions

AWS Global Infrastructure: Edge Locations



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By the end of the class

Large Scale Architectural Diagram

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