

# Amazon Web Services

A 15-Minute Introduction

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2022-05-27

# Outline

1. Introduction
2. Key Services
3. CloudFormation
4. Sample Deployment
5. Certification

# Cloud Service Types

- Software as a Service (SaaS)
  - Dropbox, WebEx, Microsoft Office, Logic Pro
- Platform as a Service (PaaS)
  - Elastic Beanstalk, Heroku, Google App Engine, Netlify, Vercel
- Infrastructure as a Service (IaaS)
  - AWS, Digital Ocean, Google Cloud Platform, Microsoft Azure
- Serverless
  - Lambda, Fargate, SQS, SNS, API Gateway, S3, DynamoDB, Amazon Aurora Serverless

# What is Amazon Web Services (AWS)?

- A Cloud provider offering **over 200 Web services** from global data centers
- Users can build sophisticated, distributed, and scalable solutions
- Millions of customers, including **Amazon.com, Netflix, NASA, Ministry of Defense**
- \$62 billion USD in 2021 revenue



**Jeff Bezos**   
@JeffBezos

I have this old 2006 BusinessWeek framed as a reminder. The “risky bet” that Wall Street disliked was AWS, which generated revenue of more than \$62 billion last year.



3:11 PM · May 18, 2022 · Twitter for iPhone

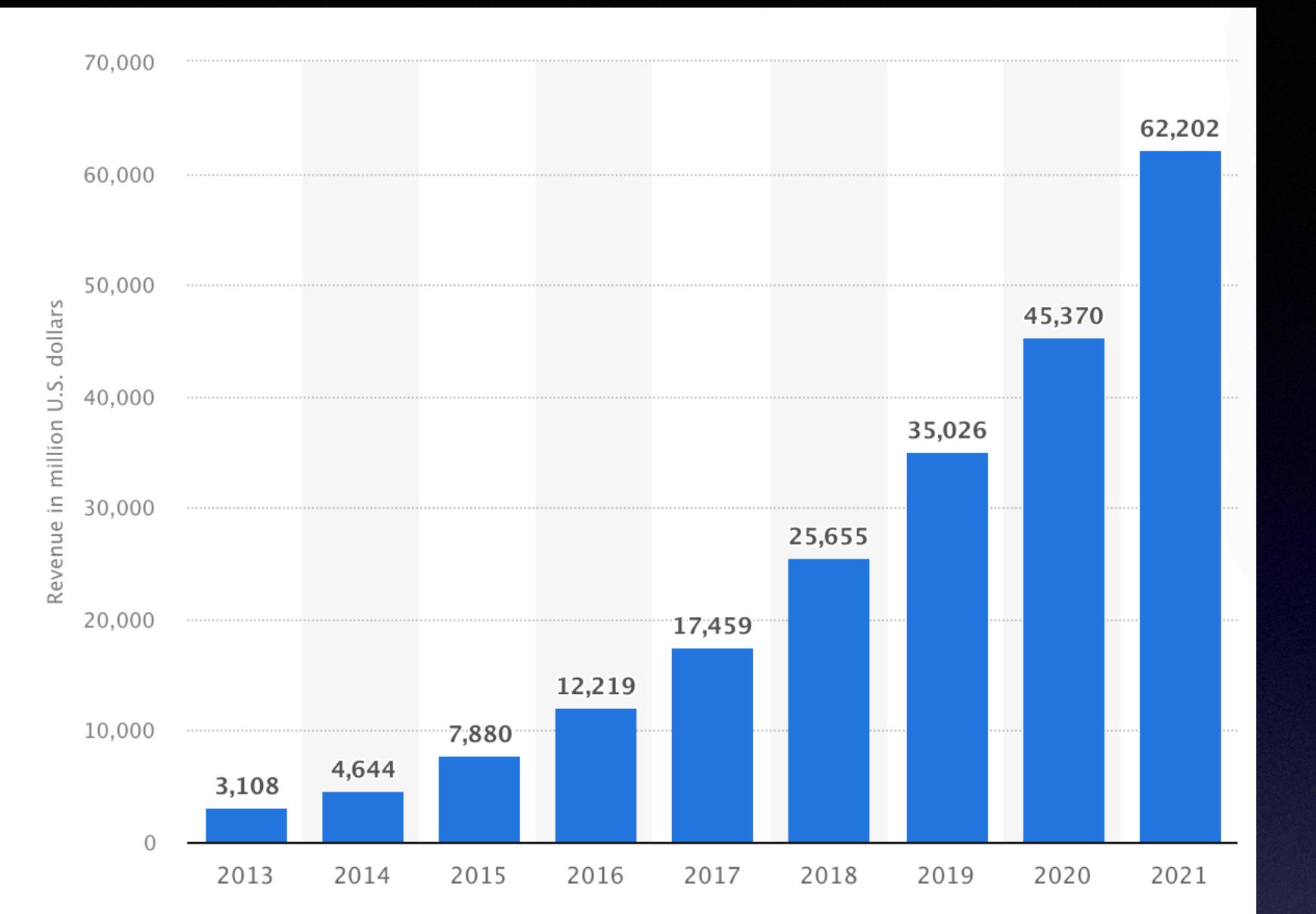
12.4K Retweets 1,569 Quote Tweets 116.3K Likes



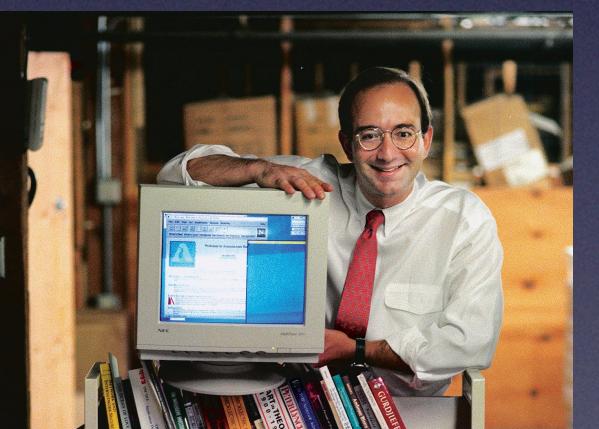
**Disruption Research** @DisruptResearch · May 18  
Replying to @JeffBezos  
What's the next AWS?

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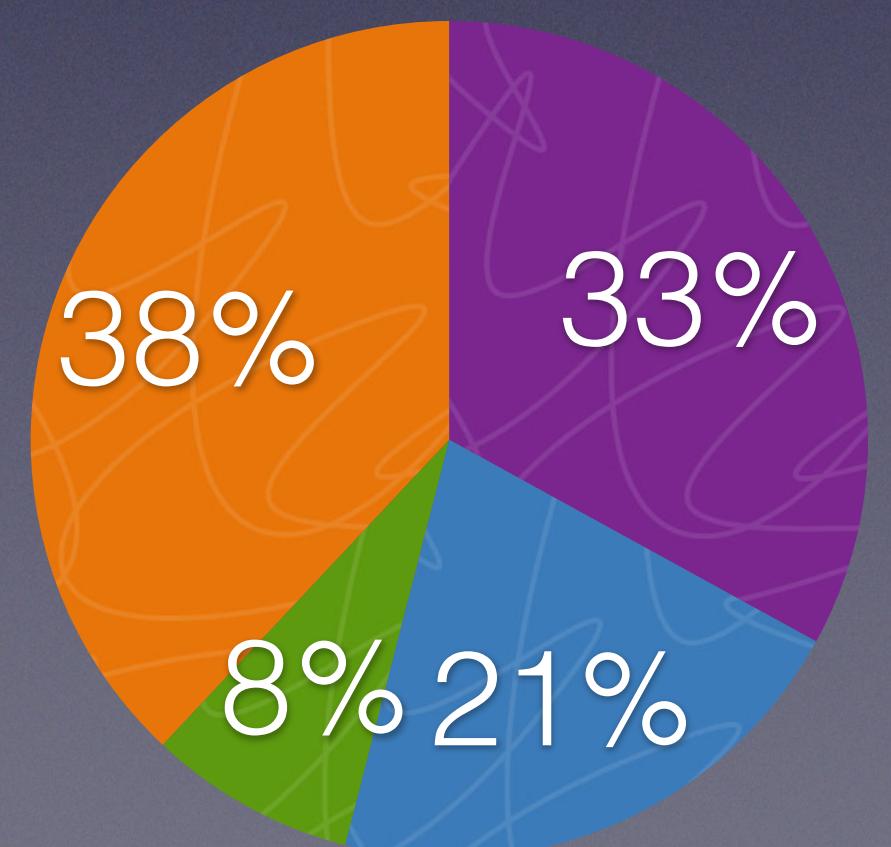
## AWS Annual Revenue



Source: <https://www.statista.com/statistics/233725/development-of-amazon-web-services-revenue>



## Cloud Market Share



# AWS History

- **2004:** AWS launches first infrastructure service for public use: Simple Queue Service (SQS)
- **2006 - 2010:** Simple Storage Service (S3), Elastic Compute Cloud (EC2), Elastic Block Store (EBS), Elastic Beanstalk, and CloudFront are launched
- **2012:** Netflix CEO announces 100% migration of infrastructure to AWS
- **2022:** Over 200 services available!

# Service Domains

- Storage
  - S3, Elastic Block Store, Snowball, Snowmobile
- Machine Learning
  - Lex, Polly, Rekognition, SageMaker, Transcribe, Translate
- Databases
  - Aurora, DynamoDB, Relational Database Service, Neptune, Database Migration Service
- Developer Tools
  - Cloud9, CodeBuild, CodeCommit, CodeDeploy, X-Ray, Cloud Development Kit, CloudShell
- Compute
  - EC2 (general-purpose, memory-optimized, storage-optimized, and compute-optimized instances)
- Containers
  - EKS, ECS, ECR, Fargate
- Networking and Content Delivery
  - VPC, Route 53, CloudFront, Elastic Load Balancing, Global Accelerator
- Analytics
  - EMR, Kinesis, Glue, Athena, Redshift
- Application Integration
  - SQS, SNS, MQ, AppSync

# Snowmobile



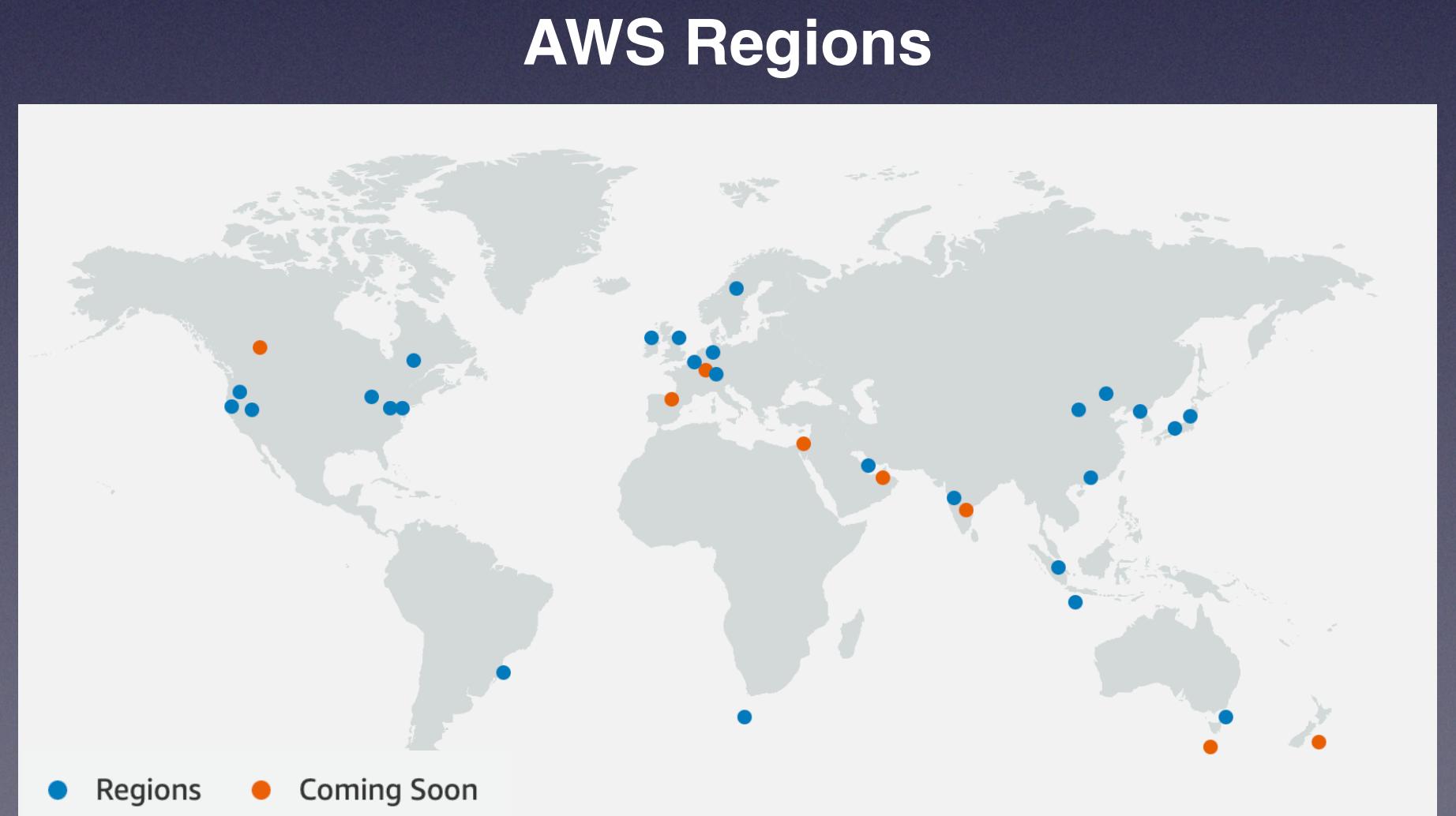
<https://www.geekwire.com/2016/use-amazons-snowball-snowballs-unleashes-45-foot-truck-model>

# Extra Service Domains

- VR & AR
  - Sumerian
- Game Technology
  - GameLift, GameKit, GameSparks, Open 3D Engine
- Blockchain
  - Amazon Managed Blockchain, Quantum Ledger Database (QLDB)
- Quantum Technologies
  - Braket
- Robotics
  - RoboMaker
- Contact Center
  - Connect

# AWS Global Infrastructure

- 26 geographic Regions
- 84 Availability Zones
- Multiple data centers in each Availability Zone
- 245 countries & territories served
- 310+ points of presence



# Popular Services



Amazon Simple Storage  
Service (Amazon S3)



Amazon CloudFront



Amazon Route 53



Amazon Elastic Container  
Service (Amazon ECS)



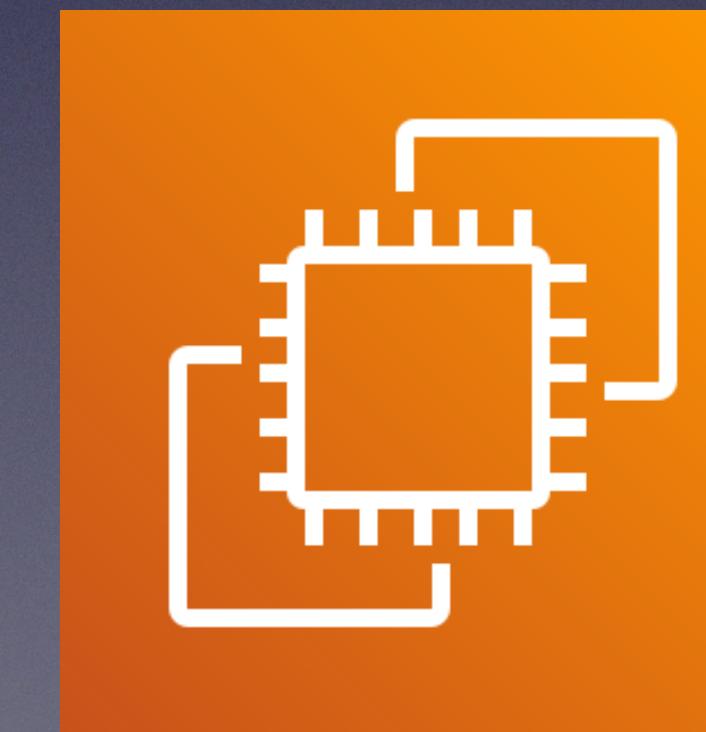
Amazon Elastic  
Kubernetes Service  
(Amazon EKS)



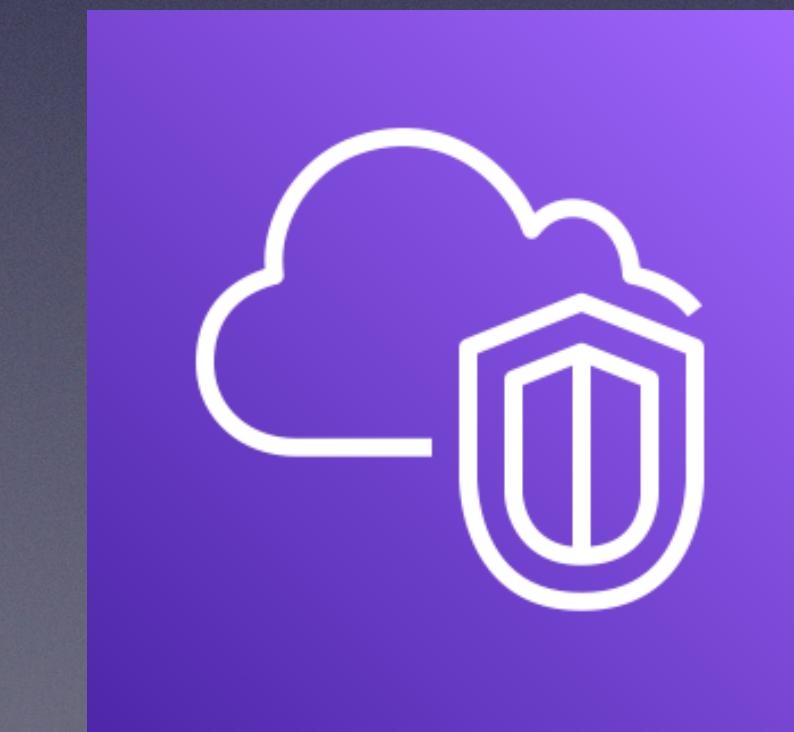
Amazon Elastic Container  
Registry (Amazon ECR)



AWS Identity and Access  
Management (IAM)



Amazon Elastic Compute  
Cloud (Amazon EC2)



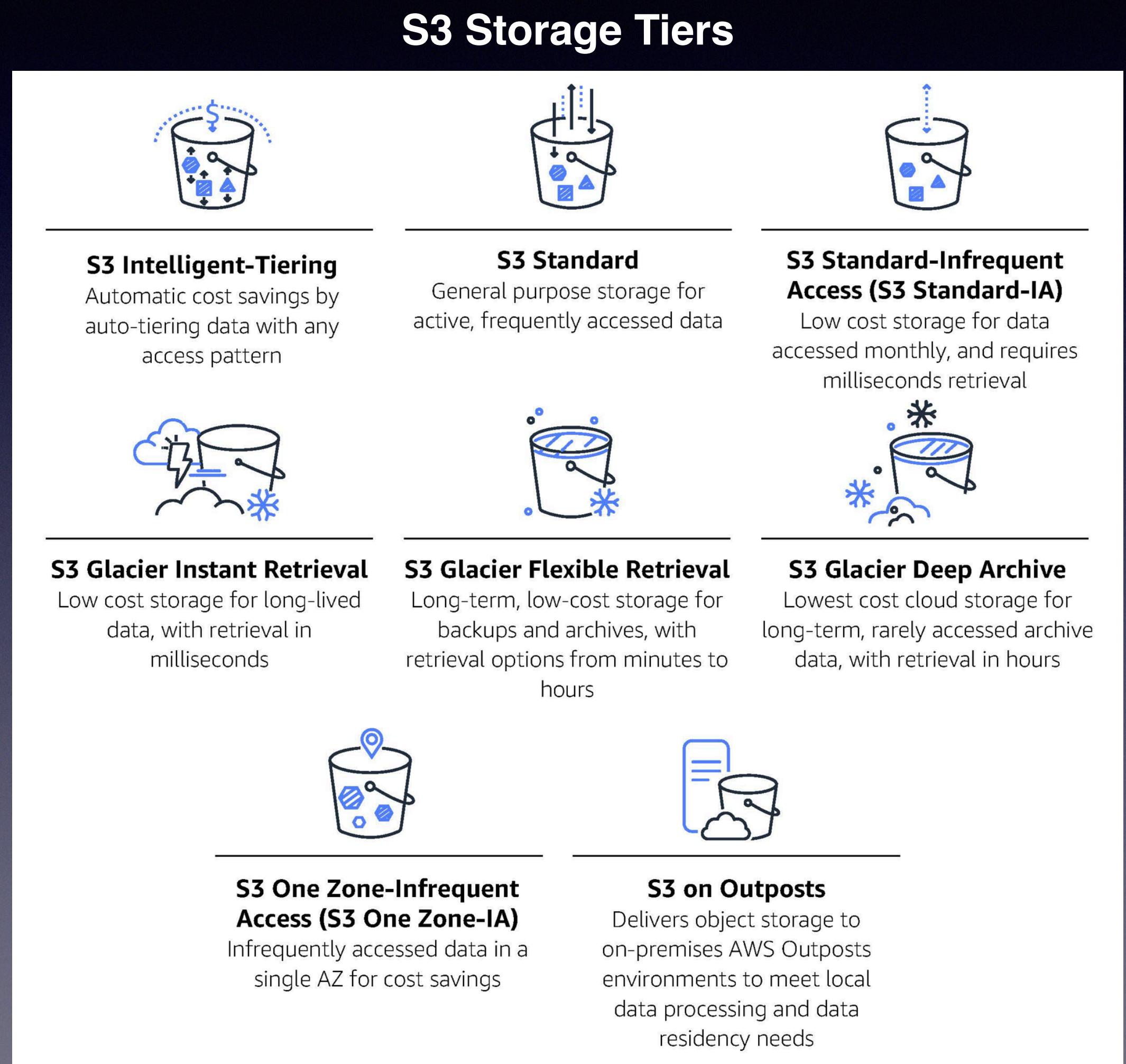
Amazon Virtual Private  
Cloud (Amazon VPC)



AWS Lambda

# Amazon Simple Storage Service (S3)

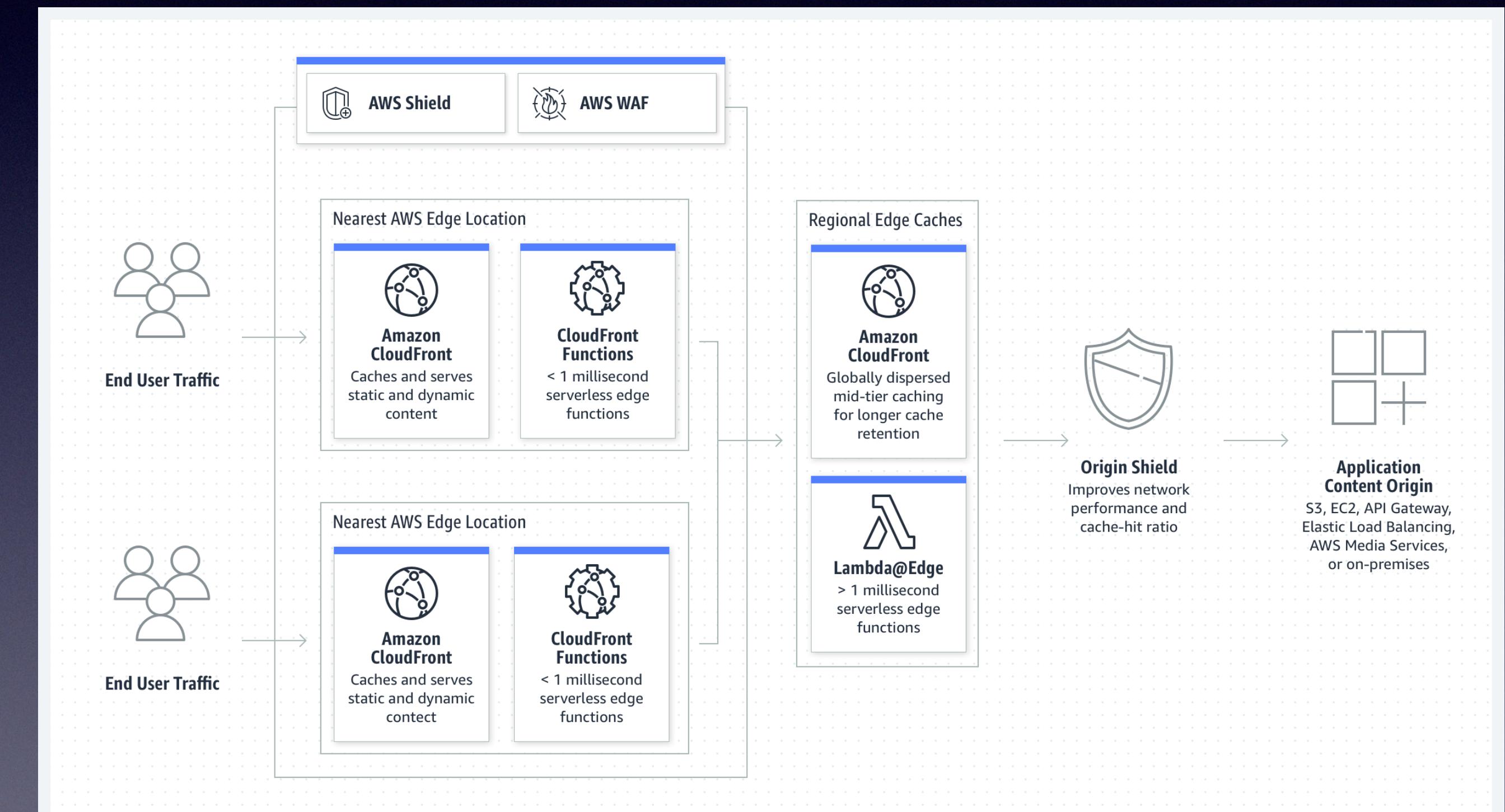
- “Infinitely scaling” storage
- Multiple tiers
- Data are stored in “buckets” (directories) defined at the region level
- Versioning
- Files up to 5 TB in size
- Encryption
- Hosts static HTTP websites



# CloudFront

- Content delivery network (CDN) service
- Connects end users with “origins,” where content is stored
- Leverages AWS ‘edge’ locations to cache and serve static and dynamic content
- CloudFront Functions and Lambda Functions
- Flexible price tiers
- Prevent DDoS and other attacks with AWS Shield and AWS Web Application Firewall

**Example CloudFront Architecture**



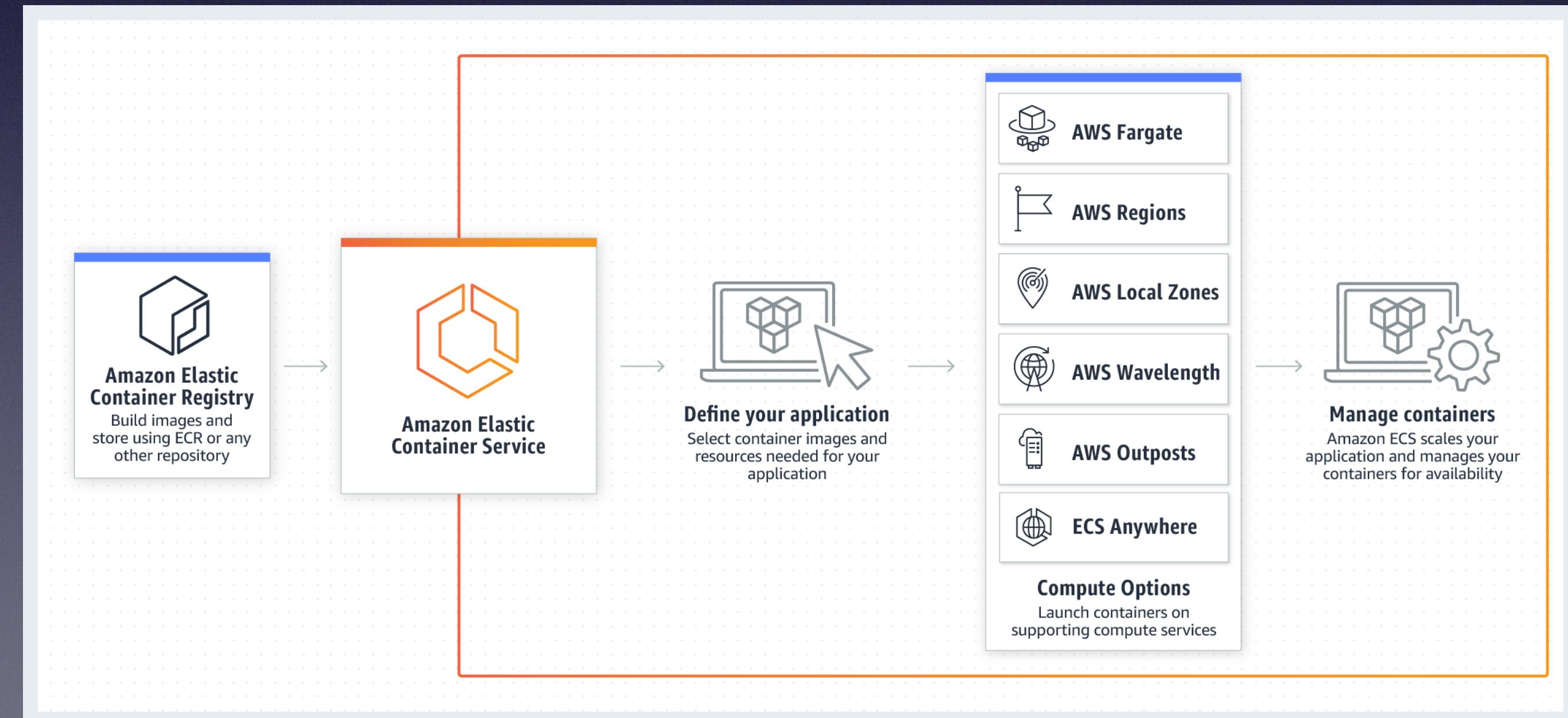
<https://aws.amazon.com/cloudfront>

# Elastic Container Service

- ECS is AWS' fully managed container orchestration service
- Serverless offerings with AWS Fargate and Elastic Kubernetes Service (EKS)

- Other features:
  - Docker and Compose support
  - Repository support
  - Task definitions
  - Multiple deployment types (blue/green, etc.)
  - Scheduling and task placement
  - Service Discovery with AWS Cloud Map

## ECS Overview

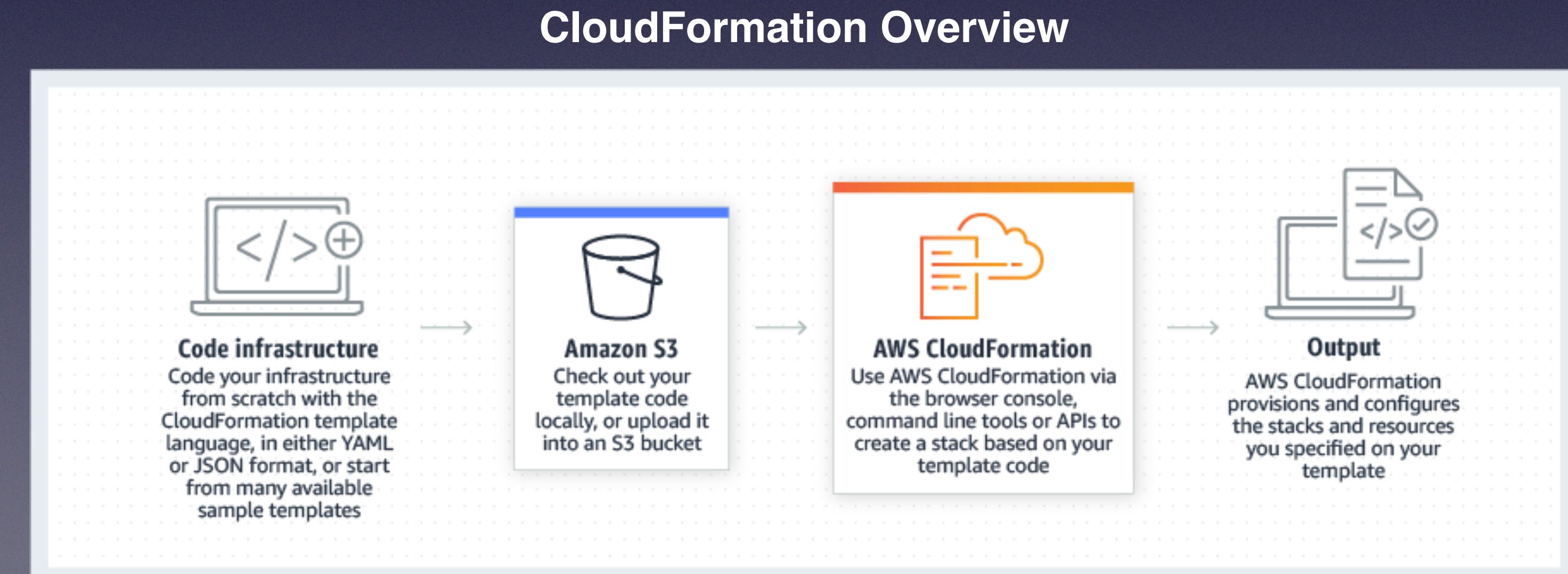


# Developer Tools

- CodeCommit
- CodeBuild
- CodeDeploy
- CodePipeline
- Cloud9

# CloudFormation - Overview

- Infrastructure as *code* (JSON or YAML)
- 4 ways to provision infrastructure
- Setting up infrastructure manually requires time and effort; hard to remember all configurations
- What if we want our architecture:
  - In another region?
  - On a different account?
  - Deployed intermittently?



# CloudFormation - Benefits

- Version control
- Cost
- Productivity
- Separation of concerns

# CloudFormation - Templates

- Template sections
  - Resources (mandatory)
  - Parameters
  - Mappings
  - Outputs
  - Conditionals
  - Metadata

# Example Stack - Resources

```
ServiceSecurityGroup:
  Type: AWS::EC2::SecurityGroup
  Properties:
    GroupDescription: !Sub '${AWS::StackName} containers Security Group'
    VpcId: !GetAtt NetworkStack.Outputs.VPC
    SecurityGroupEgress:
      - IpProtocol: tcp
        FromPort: 0
        ToPort: 65535
        CidrIp: 0.0.0.0/0

ContainerSecurityGroupInboundRule:
  Type: AWS::EC2::SecurityGroupIngress
  Properties:
    IpProtocol: tcp
    FromPort: 1080
    ToPort: 1085
    SourceSecurityGroupId: !GetAtt LoadBalancerSecurityGroup.GroupId
    GroupId: !GetAtt ServiceSecurityGroup.GroupId

LoadBalancer:
  Type: AWS::ElasticLoadBalancingV2::LoadBalancer
  Properties:
    Name: !Sub
      - '${ServiceName}-ALB'
      - { ServiceName: !Ref ServiceName }
    Scheme: internet-facing
    Type: application
    Subnets:
      - !GetAtt NetworkStack.Outputs.PublicSubnet1
      - !GetAtt NetworkStack.Outputs.PublicSubnet2
    SecurityGroups:
      - !Ref LoadBalancerSecurityGroup
    IpAddressType: ipv4
    LoadBalancerAttributes:
      - Key: access_logs.s3.enabled
        Value: true
      - Key: access_logs.s3.bucket
        Value: !Sub '${AWS::StackName}-load-balancer-logs'
```

# Example Stack - Parameters

```
ContainerCpu:  
  Type: Number  
  Default: 256  
  Description: How many CPU to assign to the container (1024 = 1 CPU)  
ContainerMemory:  
  Type: Number  
  Default: 512  
  Description: How many MB of memory to assign to the container  
DesiredCount:  
  Type: Number  
  Default: 1  
  Description: The number of copies of the service task to run
```

# Example Stack - Conditions

## Conditions:

```
CreatePipelineBucket: !Equals [!Ref ExistingPipelineBucket, '']  
  
CreateDeployBucketAndPolicy: !Equals [!Ref ExistingDeployBucket, '']  
  
CreateDistributionLogsBucket:  
| Equals [!Ref ExistingDistributionLogsBucket, '']  
  
CreateLoadBalancerLogsBucketAndPolicy:  
| Equals [!Ref ExistingLoadBalancerLogsBucket, '']
```

# Example Stack - Outputs

```
Outputs:  
  Certificate:  
    Value: !Ref Certificate  
    Export:  
      Name: !Sub '${AWS::StackName}-certificate'  
  
  CloudFrontFunctionCanonicalUrl:  
    Value: !Ref CloudFrontFunctionCanonicalUrl  
    Export:  
      Name: !Sub '${AWS::StackName}-cloudfront-function-canonical-url'  
  
  CloudFrontFunctionSecurityHeaders:  
    Value: !Ref CloudFrontFunctionSecurityHeaders  
    Export:  
      Name: !Sub '${AWS::StackName}-cloudfront-function-security-headers'  
  
  CodeBuildRole:  
    Value: !GetAtt CodeBuildRole.Arn  
    Export:  
      Name: !Sub '${AWS::StackName}-codebuild-role'  
  
  CodePipelineRole:  
    Value: !GetAtt CodePipelineRole.Arn  
    Export:  
      Name: !Sub '${AWS::StackName}-codepipeline-role'
```

# Real Example

# AWS Certification

<https://aws.amazon.com/certification>

## Available AWS Certifications

Select a certification badge below to learn more.

### FOUNDATIONAL

**Six months** of fundamental AWS Cloud and industry knowledge



### PROFESSIONAL

**Two years** of experience designing, operating, and troubleshooting solutions using the AWS Cloud



### ASSOCIATE

**One year** of experience solving problems and implementing solutions using the AWS Cloud



### SPECIALTY

Technical AWS Cloud experience in the Specialty domain as specified in the exam guide



This certification validates cloud fluency and foundational AWS knowledge.

**Exam price:** 100 USD

**Languages:** English, French (France), German, Indonesian



This certification validates the ability to write and deploy cloud-based applications.

**Exam price:** 150 USD

**Languages:** English, French (France), German, Italian, Japanese



This certification validates the ability to design and implement distributed systems on AWS.

**Exam price:** 150 USD

**Languages:** English, French (France), German, Italian, Japanese



This certification validates the ability to deploy, manage, and operate workloads on AWS.

**Exam price:** 150 USD

**Languages:** English, Japanese, Korean, Simplified Chinese



This certification validates the ability to automate the testing and deployment of AWS infrastructure and applications.

**Exam price:** 300 USD

**Languages:** English, Japanese



This certification validates the ability to design, deploy, and evaluate applications on AWS within diverse, complex requirements.

**Exam price:** 300 USD

**Languages:** English, Japanese



This certification validates expertise in designing and maintaining network architecture for the breadth of AWS services.

**Exam price:** 300 USD

**Languages:** English, Japanese



This certification validates expertise in using AWS data lakes and analytics services to get insights from data.

**Exam price:** 300 USD

**Languages:** English, Japanese



This certification validates expertise in recommending, designing, and maintaining optimal AWS database solutions.

**Exam price:** 300 USD

**Languages:** English, Japanese



This certification validates expertise in building, training, tuning, and deploying machine learning models on AWS.

**Exam price:** 300 USD

**Languages:** English, Japanese



This certification validates expertise in securing data and workloads in the AWS Cloud.

**Exam price:** 300 USD

**Languages:** English, French (France), German, Italian, Japanese



This certification validates expertise in designing, implementing, migrating, and operating SAP workloads on AWS.

**Exam price:** 300 USD

**Languages:** English, French (France), German, Italian, Japanese

Questions?