

AWS for Hydrosat DAP

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Cloud Specialist

Course modules

1. Introduction to the AWS Cloud
2. Getting started with the cloud
3. Building in the cloud
4. Secure your cloud applications
5. AWS pricing, support and architecting

AWSOME DAY
ONLINE CONFERENCE

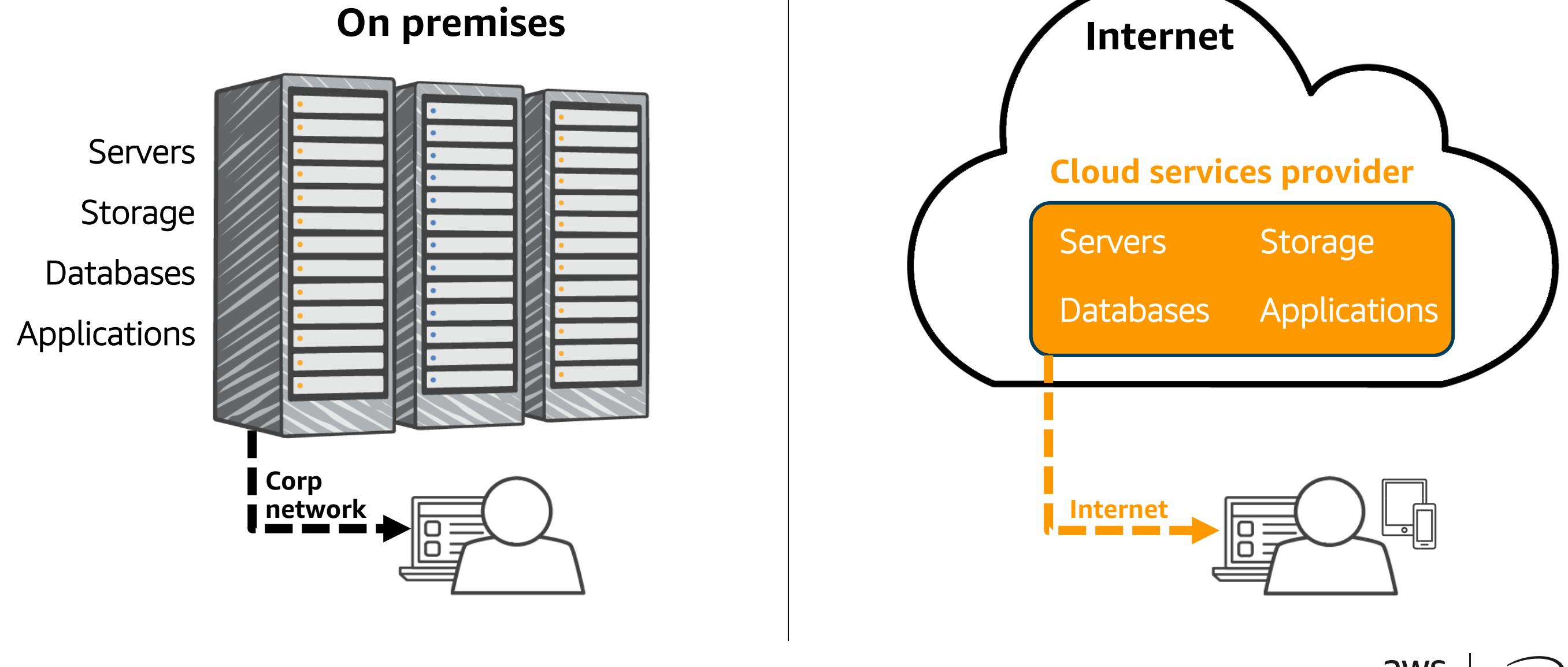
Module 1: Introduction to the AWS Cloud



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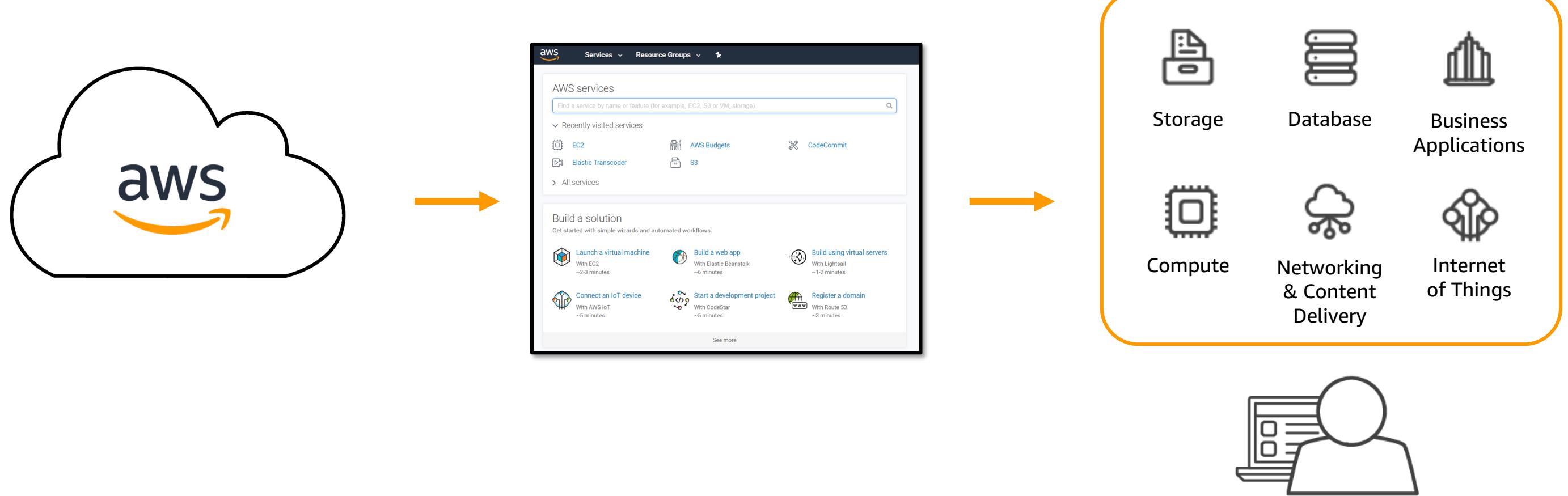
What is the AWS Cloud?

What is the cloud?

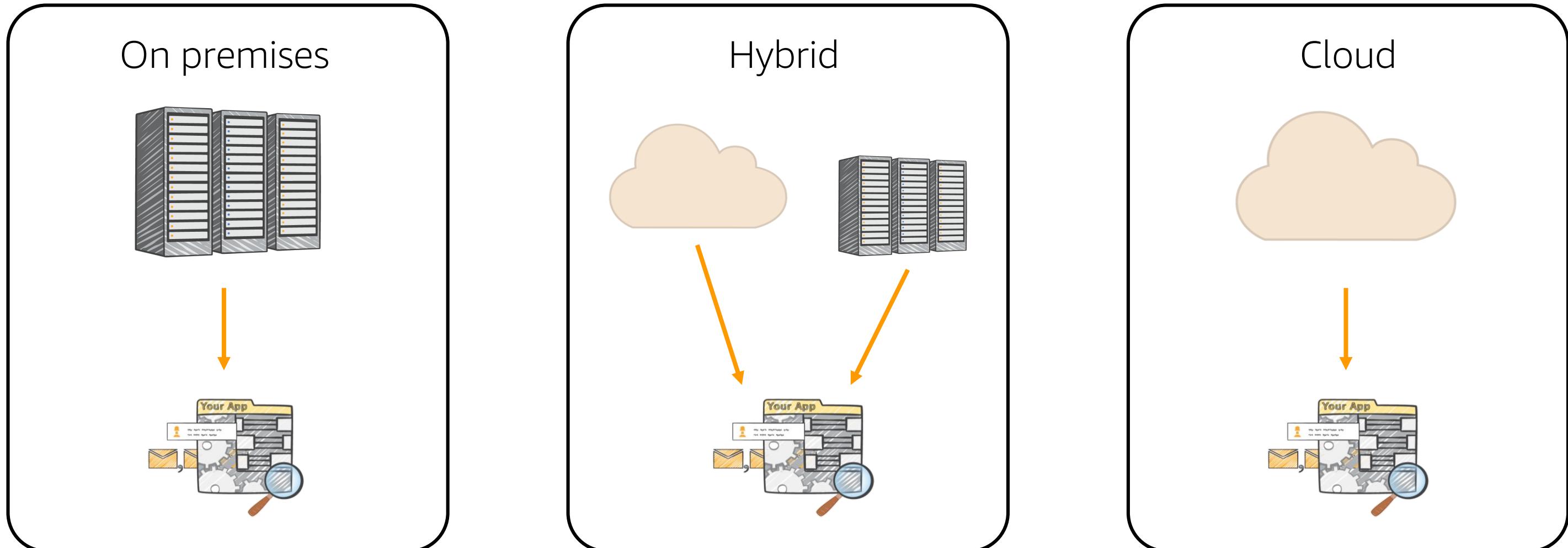


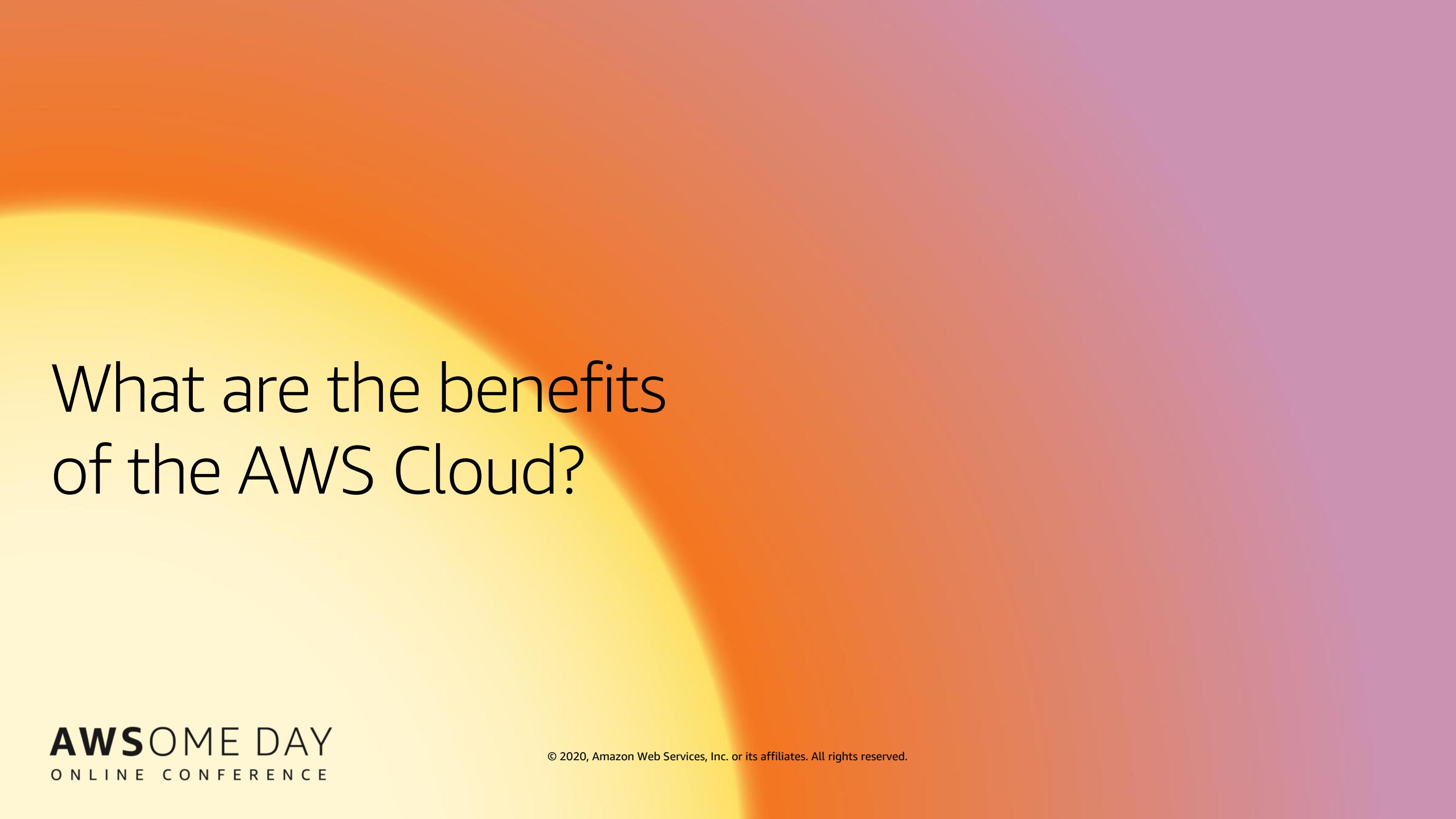
How does it work?

- AWS owns and maintains the network-connected hardware
- You provision and use what you need



Cloud deployment models



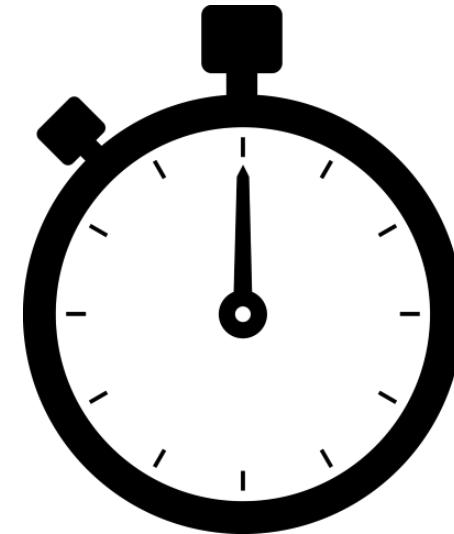


What are the benefits of the AWS Cloud?

Trade capital expense for variable expense



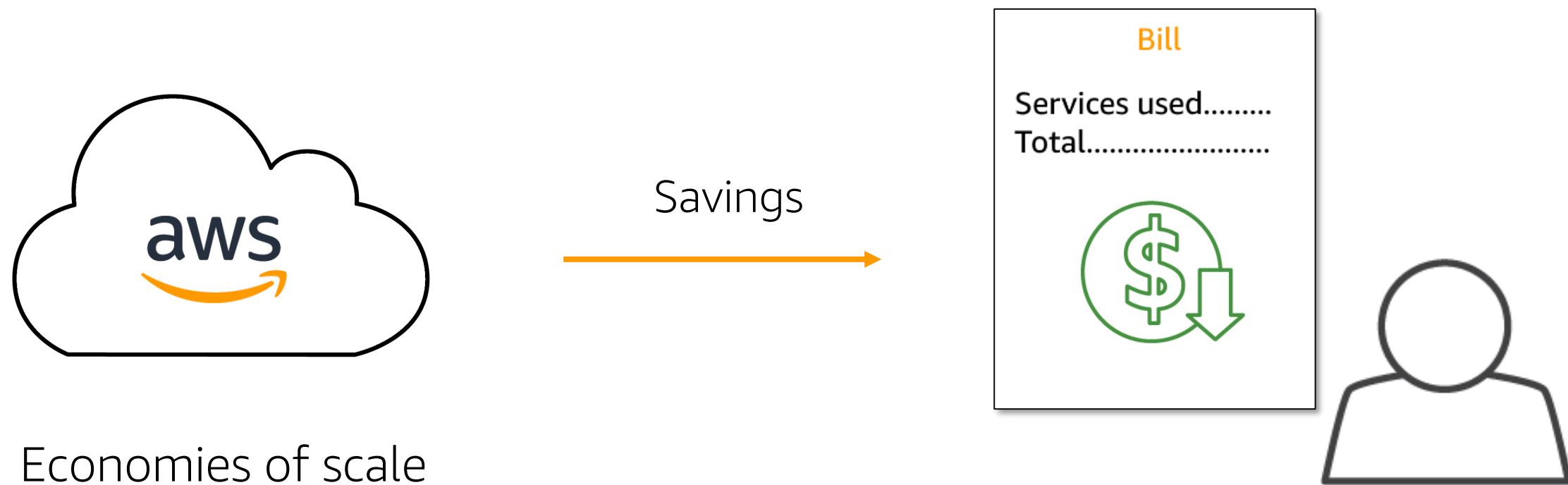
Data center investment
based upon forecast



Pay only for the amount
you consume

Massive economies of scale

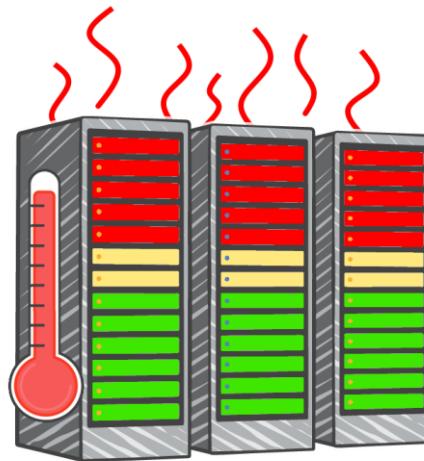
Because of aggregate usage from all customers, AWS can achieve higher economies of scale and pass savings on to customers



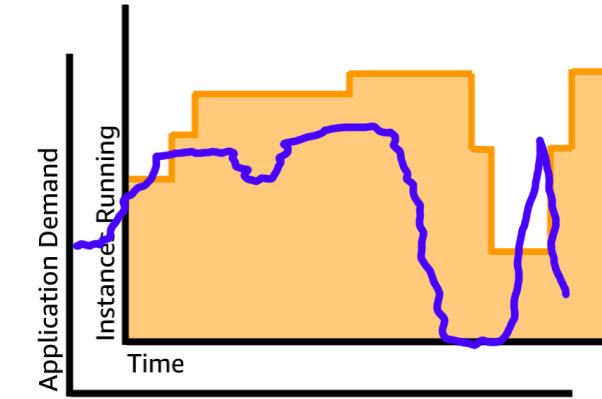
Stop guessing capacity



Overestimated
server capacity

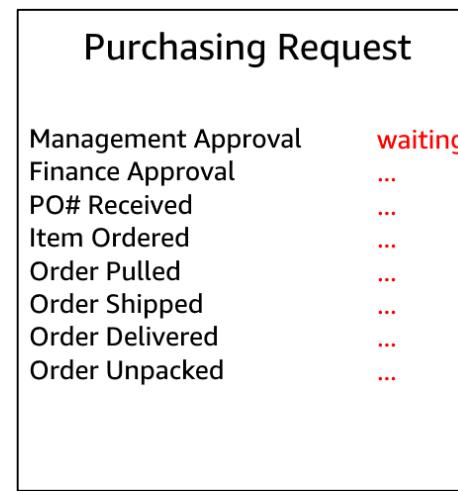


Underestimated
server capacity



Scaling
on demand

Increase speed and agility



Weeks between wanting resources and having resources

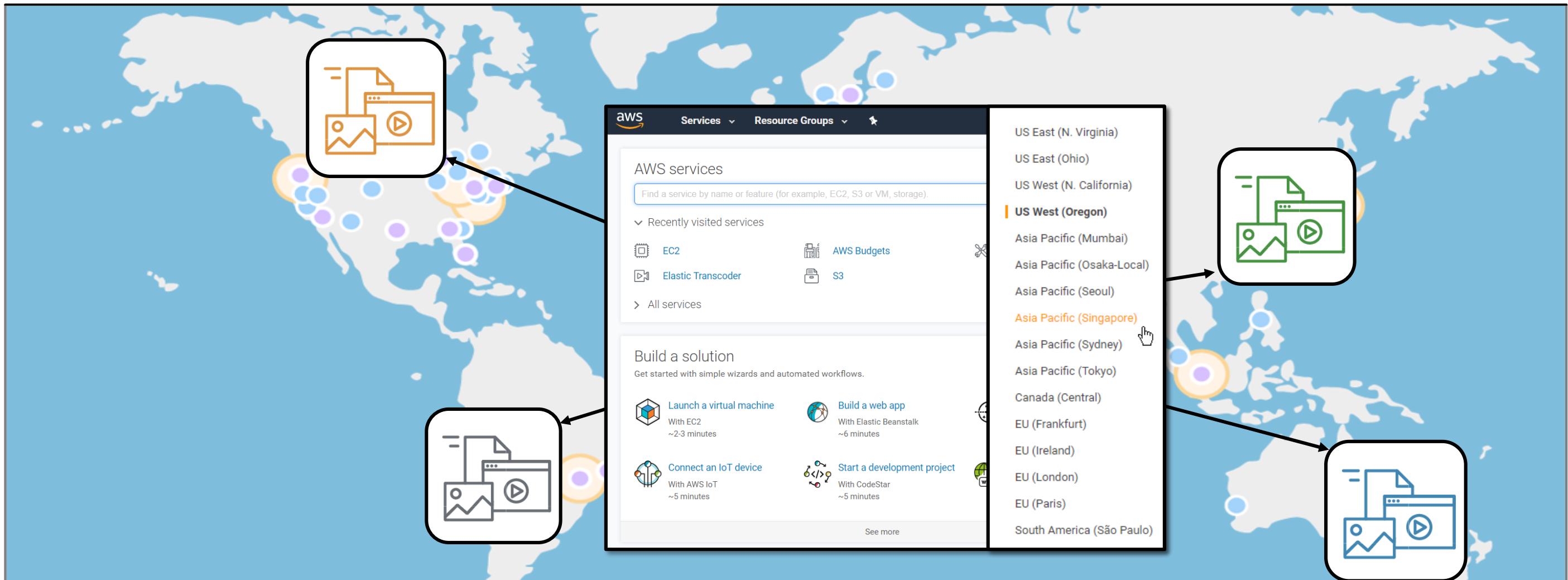


Minutes between wanting resources and having resources

Stop spending money on running and maintaining datacenters



Go global in minutes



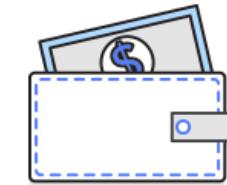
AWS security



Keep your data safe



Meet compliance requirements



Save money



Scale quickly

AWS service categories



Analytics



Application Integration



AR & VR



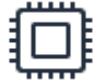
AWS Cost Management



Blockchain



Business Applications



Compute



Customer Engagement



Database



Developer Tools



End User Computing



Game Tech



Internet of Things



Machine Learning



Management & Governance



Media Services



Migration & Transfer



Mobile



Networking &
Content Delivery



Robotics



Satellite



Security, Identity
& Compliance

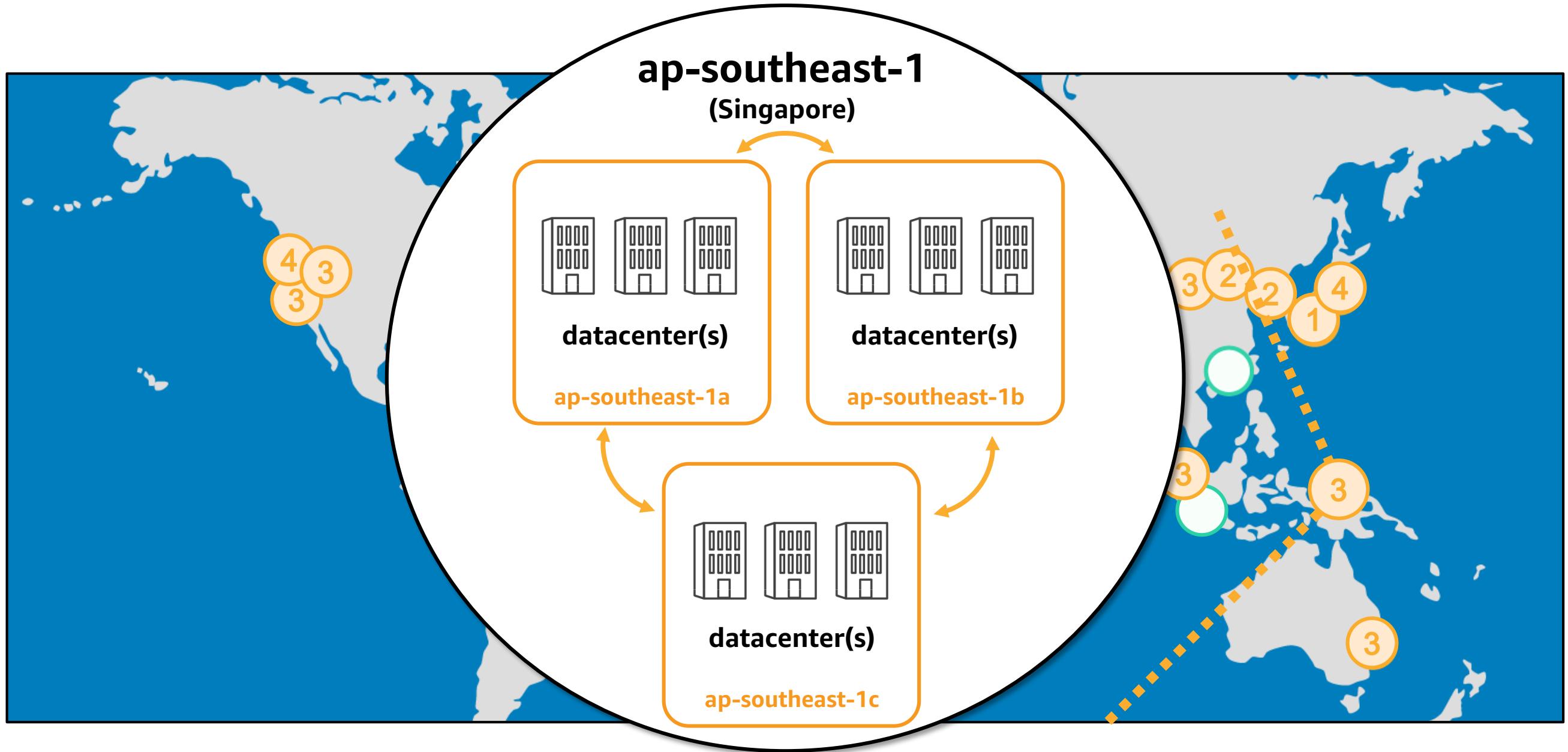


Storage

Demo

AWS global infrastructure

Availability zones



Selecting a region

Determine the right region for your services, applications, and data based on these factors



Data governance,
legal requirements



Proximity to
customers (latency)

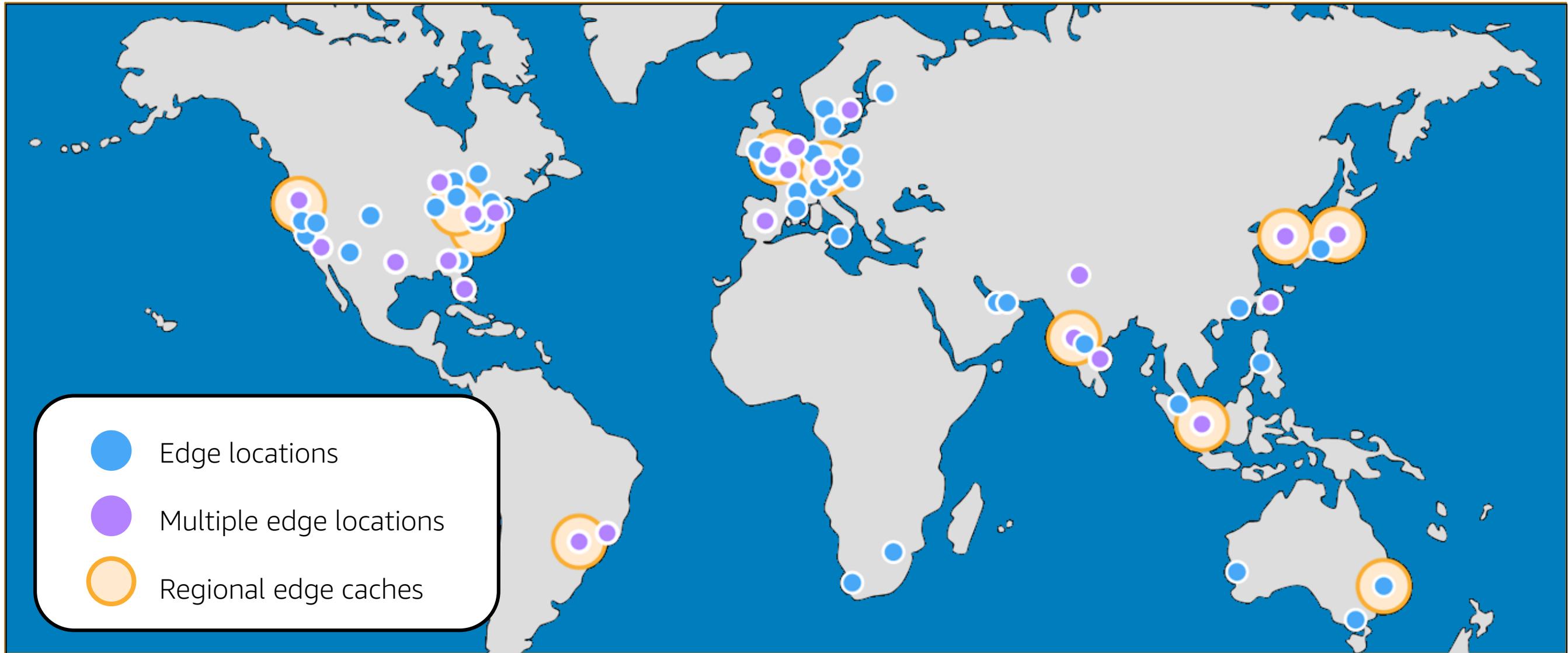


Services available
within the region



Costs
(vary by region)

Edge locations: reaching distant customers



AWS management interfaces

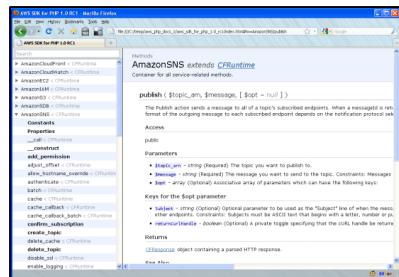
Three ways to interact with AWS



AWS Management Console
Easy-to-use graphical interface

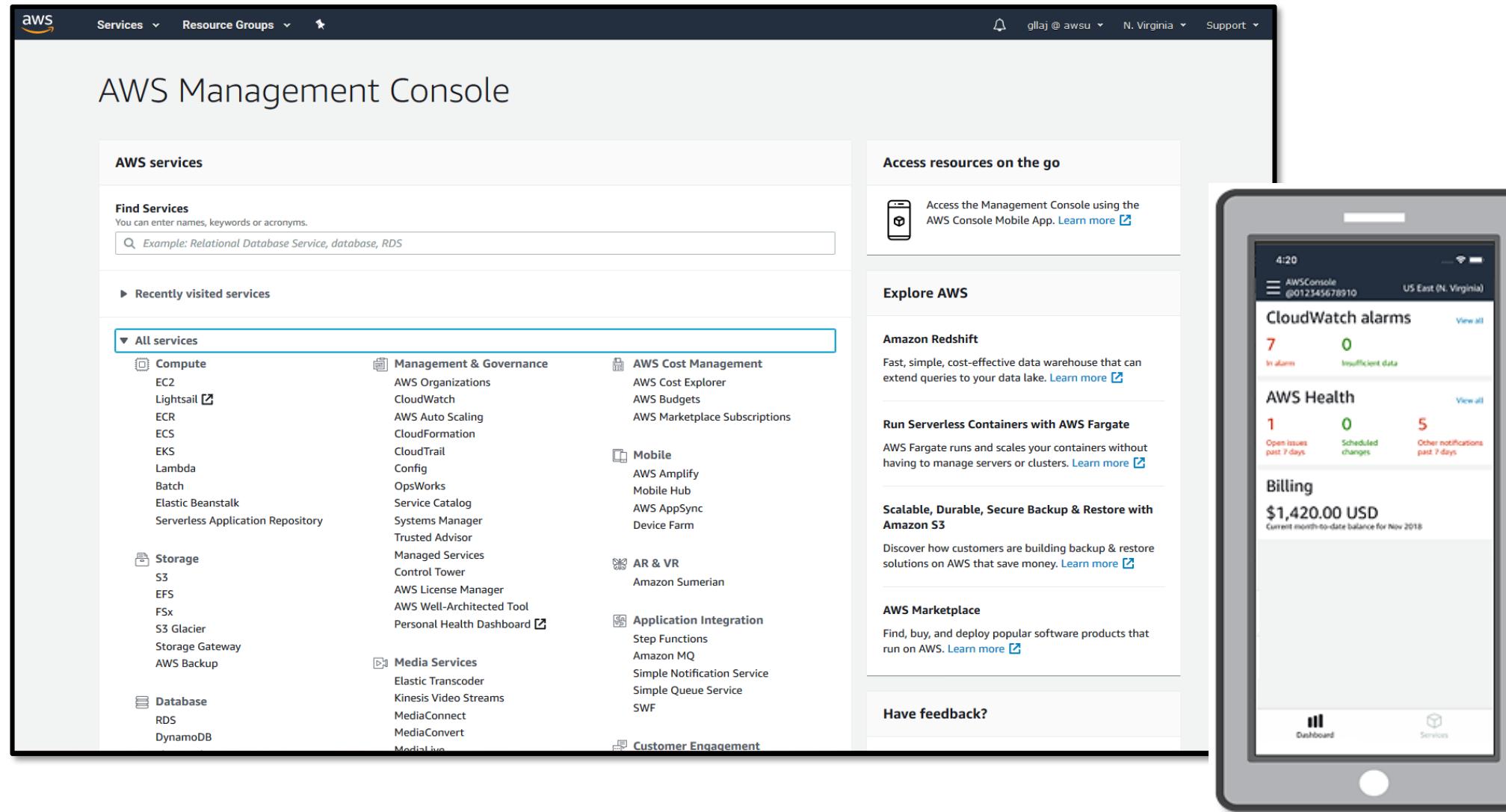
```
AWS Storage Gateway Network Configuration
1: Describe Adapter
2: Configure DHCP
3: Assign static IP
4: Reset all to DHCP
5: Set Default Adapter
6: View DNS Configuration
7: View Routes
Press "x" to exit
Enter command: 2
Available adapters: eth0
Enter Network Adapter: eth0
Reset to DHCP [y/n]: y
Adapter 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 command



Software Development Kits (SDKs)
Access services in your code

AWS Management Console



The image shows the AWS Management Console homepage on the left and a preview of the AWS Console Mobile App on the right. The console homepage features a search bar, a 'Recently visited services' section, and a large 'All services' category. The 'All services' section is expanded, showing categories like Compute, Storage, Database, Management & Governance, AWS Cost Management, Mobile, Application Integration, Media Services, and Customer Engagement. The mobile app preview shows a dashboard with CloudWatch alarms (7 in alarm, 0 insufficient data), AWS Health (1 open issues, 0 scheduled changes, 5 other notifications), and Billing (\$1,420.00 USD).

AWS Management Console

AWS services

Find Services
You can enter names, keywords or acronyms.
Example: Relational Database Service, database, RDS

▶ Recently visited services

▼ All services

- Compute
 - EC2
 - Lightsail
 - ECR
 - ECS
 - EKS
 - Lambda
 - Batch
 - Elastic Beanstalk
 - Serverless Application Repository
- Storage
 - S3
 - EFS
 - FSx
 - S3 Glacier
 - Storage Gateway
 - AWS Backup
- Database
 - RDS
 - DynamoDB
- Management & Governance
 - AWS Organizations
 - CloudWatch
 - AWS Auto Scaling
 - CloudFormation
 - CloudTrail
 - Config
 - OpsWorks
 - Service Catalog
 - Systems Manager
 - Trusted Advisor
 - Managed Services
 - Control Tower
 - AWS License Manager
 - AWS Well-Architected Tool
 - Personal Health Dashboard
- AWS Cost Management
 - AWS Cost Explorer
 - AWS Budgets
 - AWS Marketplace Subscriptions
- Mobile
 - AWS Amplify
 - Mobile Hub
 - AWS AppSync
 - Device Farm
- AR & VR
 - Amazon Sumerian
- Application Integration
 - Step Functions
 - Amazon MQ
 - Simple Notification Service
 - Simple Queue Service
 - SWF
- Media Services
 - Elastic Transcoder
 - Kinesis Video Streams
 - MediaConnect
 - MediaConvert
 - MediaLive
- Customer Engagement

Access resources on the go

Access the Management Console using the AWS Console Mobile App. [Learn more](#)

Explore AWS

Amazon Redshift
Fast, simple, cost-effective data warehouse that can extend queries to your data lake. [Learn more](#)

Run Serverless Containers with AWS Fargate
AWS Fargate runs and scales your containers without having to manage servers or clusters. [Learn more](#)

Scalable, Durable, Secure Backup & Restore with Amazon S3
Discover how customers are building backup & restore solutions on AWS that save money. [Learn more](#)

AWS Marketplace
Find, buy, and deploy popular software products that run on AWS. [Learn more](#)

Have feedback?

AWSConsole @012345678910 US East (N. Virginia)

CloudWatch alarms

7 In alarm 0 Insufficient data

AWS Health

1 Open issues past 7 days 0 Scheduled changes 5 Other notifications past 7 days

Billing

\$1,420.00 USD

Current month-to-date balance for Nov 2018

AWS CLI

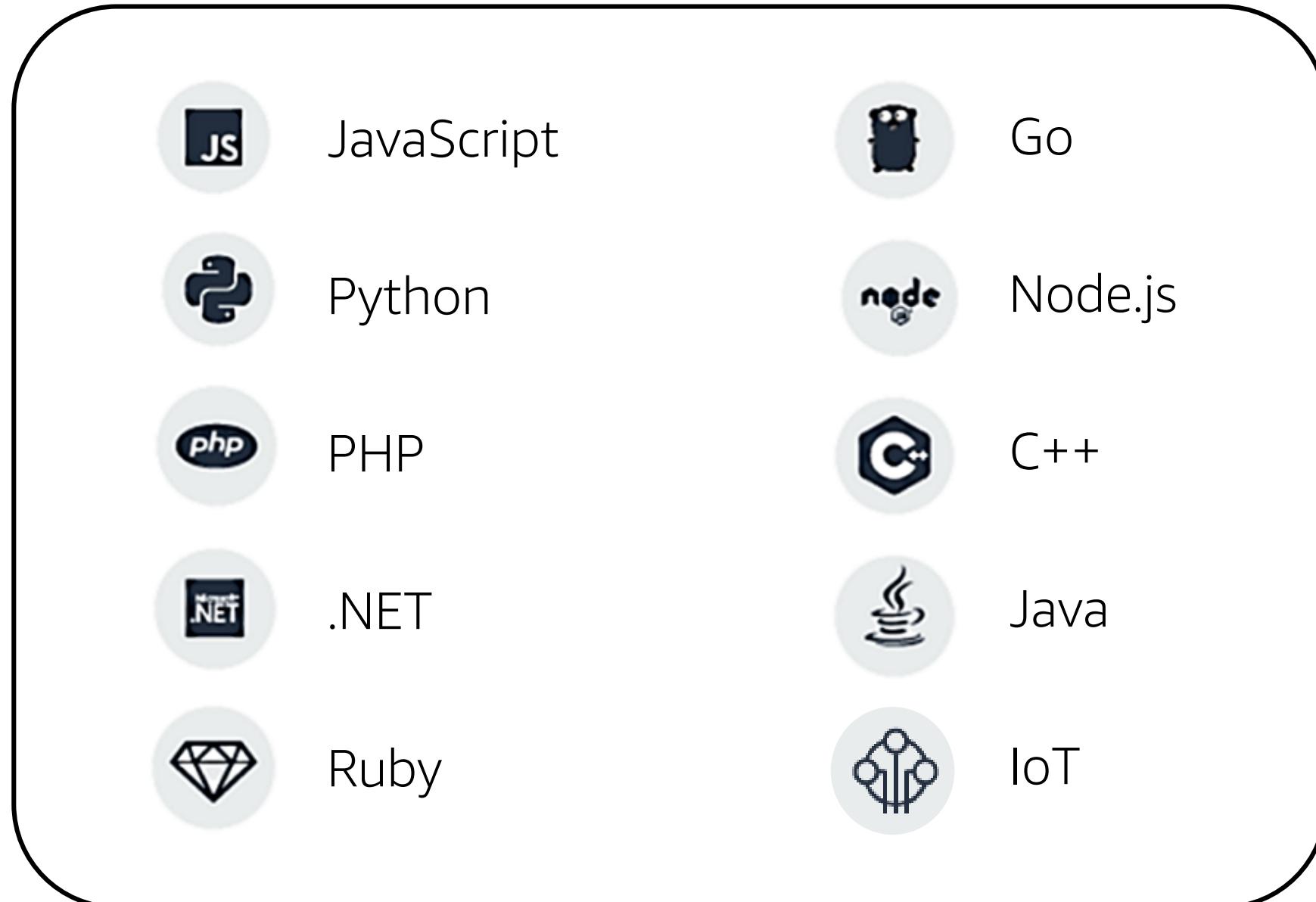
Open source tool for interacting with AWS services

Environments

- Linux
- MacOS
- Windows



AWS SDKs



End of Module 1

Test your knowledge

Module 2: Getting started with the cloud

Getting started with AWS services

AWS products

The screenshot shows the AWS homepage with a dark blue header. The header includes the AWS logo, navigation links for Products, Solutions, Pricing, Documentation, Learn, Partner Network, AWS Marketplace, Explore More, a search bar, and user options for Contact Sales, Support, English, and My Account.

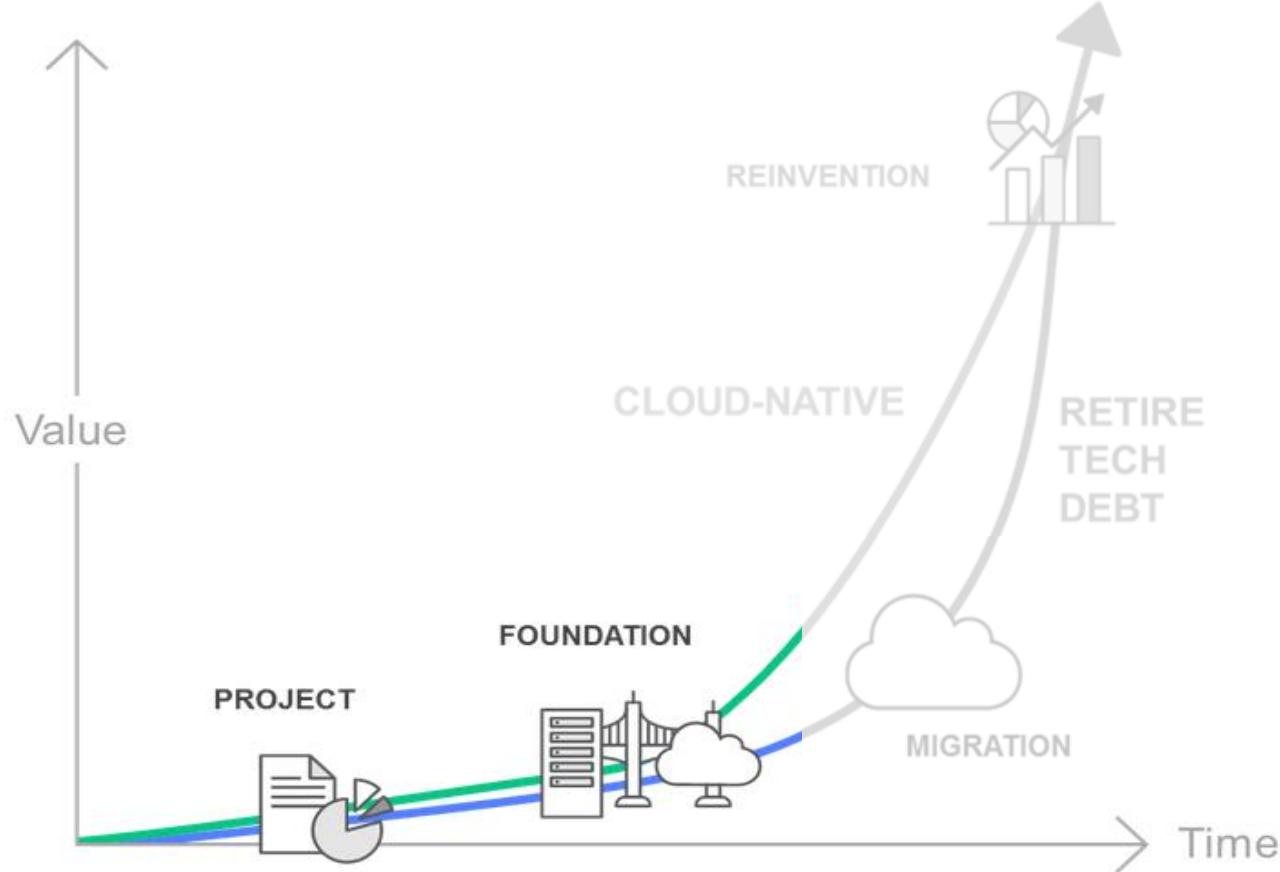
The main content area features a large banner for "AWS Deep Learning Containers". The banner includes a sub-headline: "Quickly set up deep learning environments with optimized, pre-packaged Docker images", a "Learn more" button, and a decorative graphic of a brain inside a bowl with a whale tail.

Below the banner, there are four cards with AWS product highlights:

- Amazon Lightsail**: Everything you need to get started on AWS—for a low, predictable price.
- Amazon EC2 M5ad & R5ad Instances**: 10% lower cost compute and memory compared to comparable instances.
- Amazon S3 Glacier Deep Archive**: A new S3 storage class that provides secure, durable object storage for long-term data retention.
- 110,000+ Databases Migrated to AWS**: Save time & cost—migrate to fully managed databases.

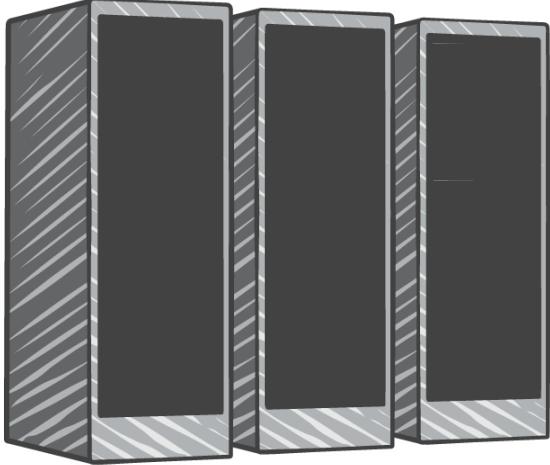
A "Customer News" banner at the bottom left mentions Volkswagen Group's plans to build the Volkswagen Industrial Cloud. A "Explore Our Products" link is at the bottom center.

Cloud journey



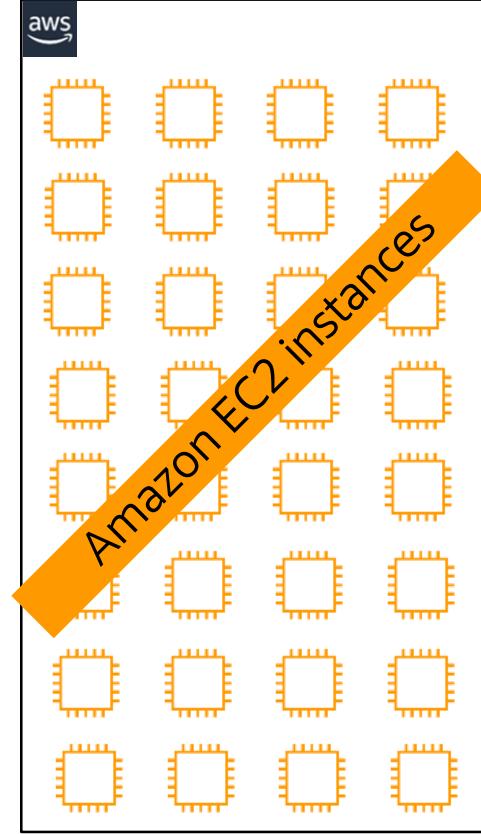
Build your infrastructure

What is Amazon EC2?



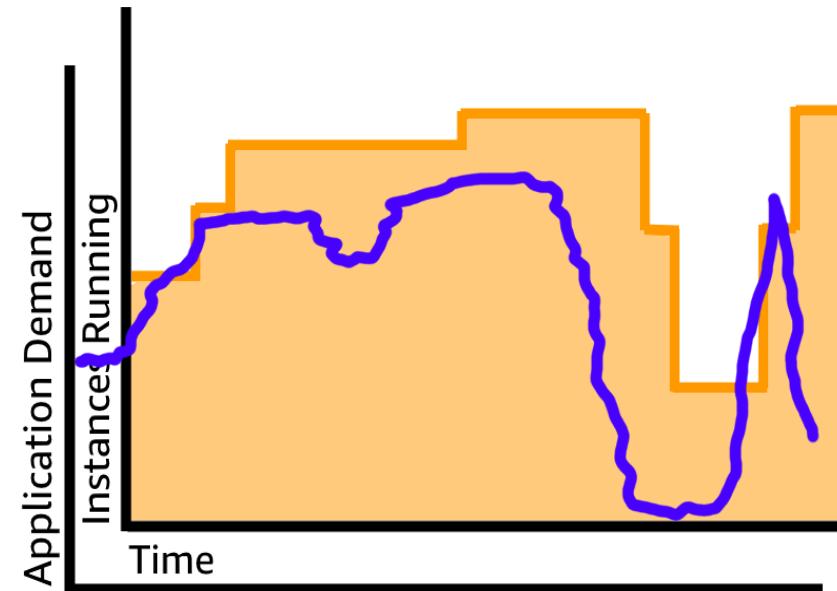
On-premises servers

- ✓ Application server
- ✓ Web server
- ✓ Database server
- ✓ Game server
- ✓ Mail server
- ✓ Media server
- ✓ Catalog server
- ✓ File server
- ✓ Computing server
- ✓ Proxy server



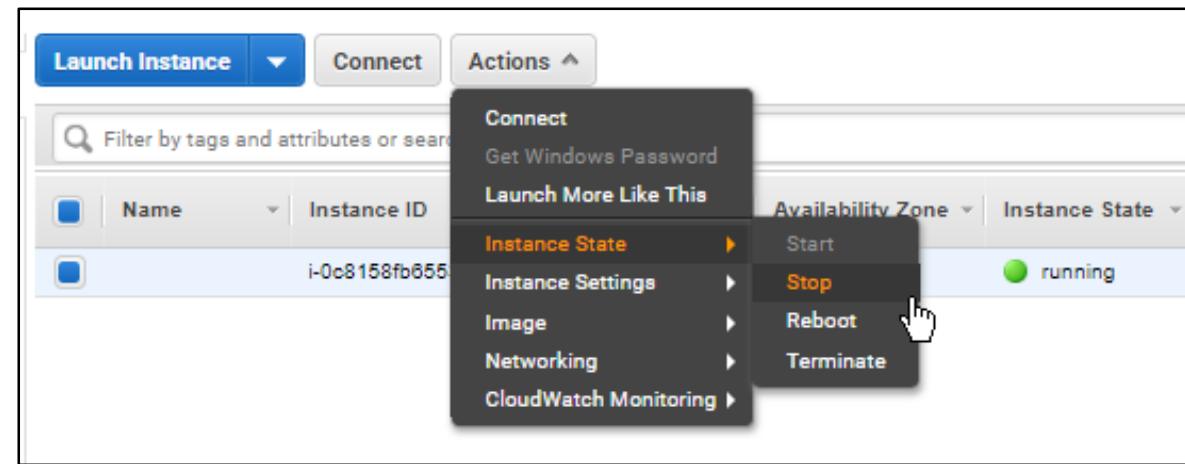
Benefits of Amazon EC2

- Elasticity



Benefits of Amazon EC2

- Elasticity
- Control



Benefits of Amazon EC2

- Elasticity
- Control
- Flexibility

Step 2: Choose an Instance Type
applications. [Learn more](#) about instance types and how they can meet your computing needs.

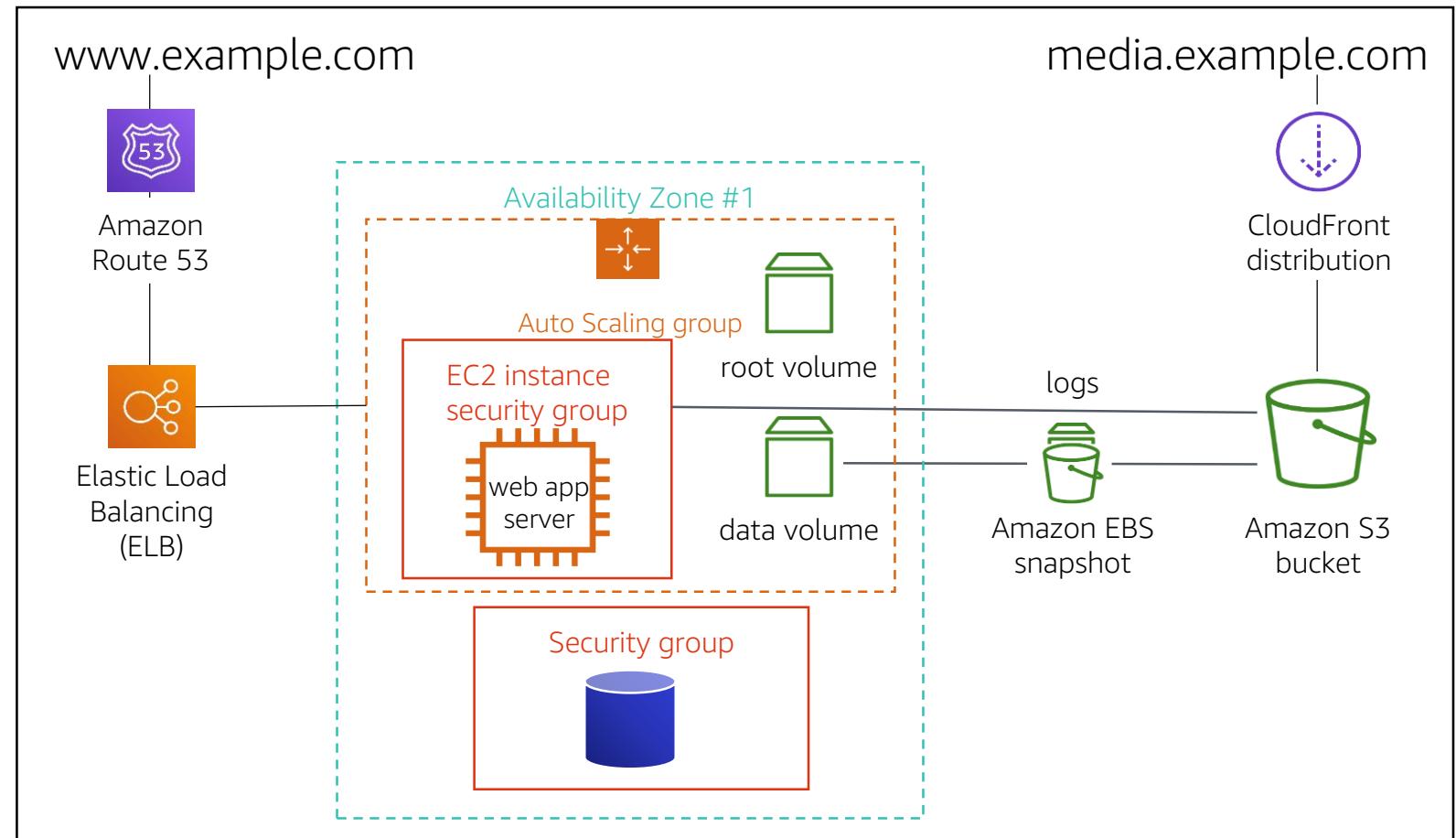
Filter by: [Compute optimized](#) [Current generation](#) [Show/Hide Columns](#)

Currently selected: t2.micro (Variable ECUs, 1 vCPUs, 2.5 GHz, Intel Xeon Family, 1 GiB memory, EBS only)

	Family	Type	vCPUs	Memory (GiB)	Instance Storage (GB)	EBS-Optimized Available	Network Performance	IPv6 Support
1	Compute optimized	c5d.large	2	4	1 x 50 (SSD)	Yes	Up to 10 Gigabit	Yes
2	Compute optimized	c5d.xlarge	4	8	1 x 100 (SSD)	Yes	Up to 10 Gigabit	Yes
3	Compute optimized	c5d.2xlarge	8	16	1 x 200 (SSD)	Yes	Up to 10 Gigabit	Yes
4	Compute optimized	c5d.4xlarge	16	32	1 x 400 (SSD)	Yes	Up to 10 Gigabit	Yes
5	Compute optimized	c5d.9xlarge	36	72	1 x 900 (SSD)	Yes	10 Gigabit	Yes
6	Compute optimized	c5d.18xlarge	72	144	2 x 900 (SSD)	Yes	25 Gigabit	Yes
7	Compute optimized	c5.large	2	4	EBS only	Yes	Up to 10 Gigabit	Yes
8	Compute optimized	c5.xlarge	4	8	EBS only	Yes	Up to 10 Gigabit	Yes
9	Compute optimized	c5.2xlarge	8	16	EBS only	Yes	Up to 10 Gigabit	Yes
10	Compute optimized	c5.4xlarge	16	32	EBS only	Yes	Up to 10 Gigabit	Yes
11	Compute optimized	c5.9xlarge	36	72	EBS only	Yes	10 Gigabit	Yes
12	Compute optimized	c5.18xlarge	72	144	EBS only	Yes	25 Gigabit	Yes
13	Compute optimized	c4.large	2	3.75	EBS only	Yes	Moderate	Yes
14	Compute optimized	c4.xlarge	4	7.5	EBS only	Yes	High	Yes

Benefits of Amazon EC2

- Elasticity
- Control
- Flexibility
- Integrated



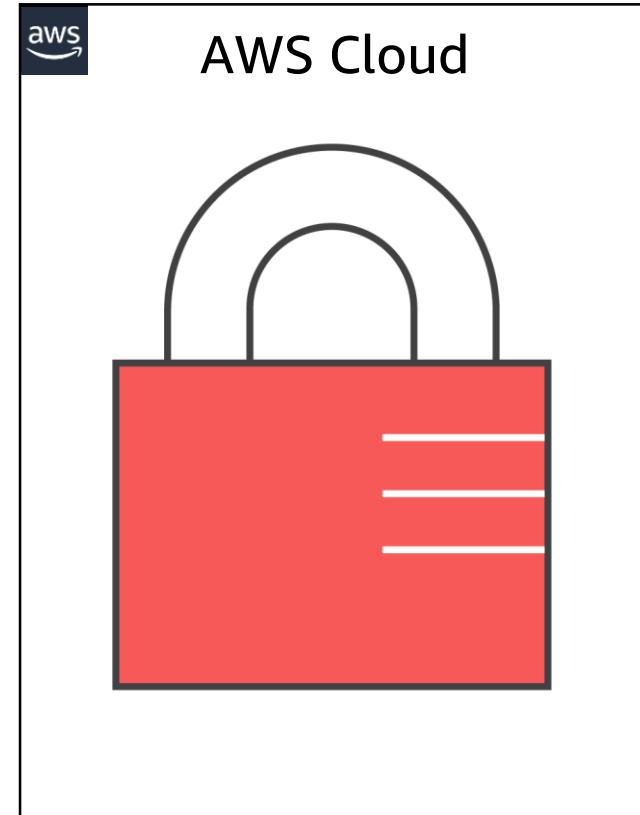
Benefits of Amazon EC2

- Elasticity
- Control
- Flexibility
- Integrated
- Reliable



Benefits of Amazon EC2

- Elasticity
- Control
- Flexibility
- Integrated
- Reliable
- Secure



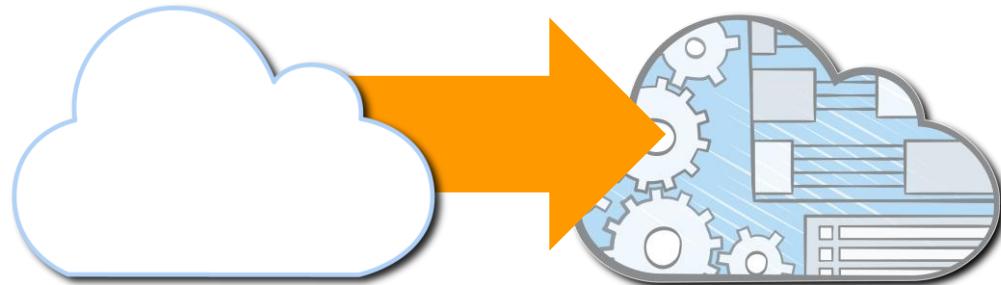
Benefits of Amazon EC2

- Elasticity
- Control
- Flexibility
- Integrated
- Reliable
- Secure
- Inexpensive



Benefits of Amazon EC2

- Elasticity
- Control
- Flexibility
- Integrated
- Reliable
- Secure
- Inexpensive
- Easy



Choosing the right Amazon EC2 instances



- EC2 Instance types are optimized for different use cases, workloads & come in multiple sizes. This allows you to optimally scale resources to your workload requirements.
- AWS utilizes Intel® Xeon® processors for EC2 Instances providing customers with high performance and value.
- Consider the following when choosing your instances: core count, memory size, storage size & type, network performance, I/O requirements & CPU technologies.
- Hurry Up & Go Idle - A larger compute instance can save you time and money, therefore paying more per hour for a shorter amount of time can be less expensive.

EC2 instances powered by Intel Technologies



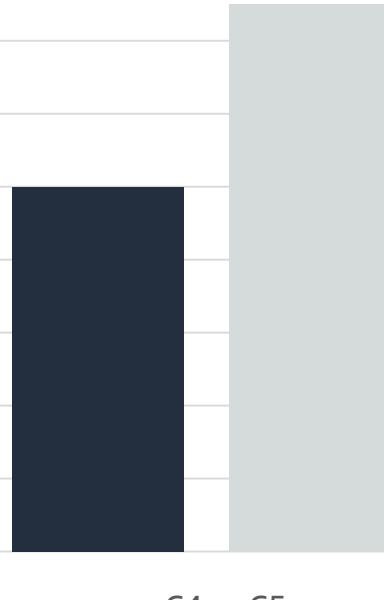
EC2 instance type	Compute optimized		General purpose			Memory optimized			Storage optimized		
	C5	C4	M5	M4	T2	X1	X1e	R4	H1	I3	D2
Intel processor	Xeon Platinum 8175M	Xeon E5 2666 v3	Xeon Platinum 8175M	Xeon E5 2686 v4 2676 v3	Xeon Family	Xeon E7 8880 v3	Xeon E7 8880 v3	Xeon E5 2686 v4	Xeon E5 2686 v4	Xeon E5 2686 v4	Xeon E5 2676 v3
Intel processor technology	Skylake	Haswell	Skylake	Broadwell Haswell	Yes	Haswell	Haswell	Broadwell	Broadwell	Broadwell	Haswell
Intel AVX	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Intel AVX2	Yes	Yes	Yes	Yes	-	Yes	Yes	Yes	Yes	Yes	Yes
Intel AVX-512	Yes	-	Yes	-	-	-	-	-	-	-	-
Intel turbo boost	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Storage	EBS-only	EBS-only	EBS-only	EBS-only	EBS-only	SSD EBS-Opt	SSD EBS-Opt	-	HDD	SSD	HDD



C5: Compute-optimized instances



25% price/performance improvement over C4



- Based on 3.0 GHz Intel Xeon Scalable Processors (Skylake)
- Up to 72 vCPUs and 144 GiB of memory (2:1 Memory:vCPU ratio)
- 25 Gbps NW bandwidth
- Support for Intel AVX-512



"We saw significant performance improvement on Amazon EC2 C5, with up to a 140% performance improvement in industry standard CPU benchmarks over C4."



"We are eager to migrate onto the AVX-512 enabled c5.18xlarge instance size.... We expect to decrease the processing time of some of our key workloads by more than 30%."



C5n: fastest networking in the cloud

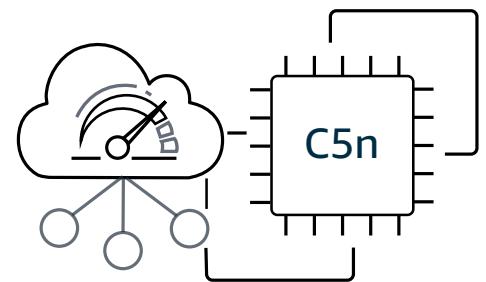


Featuring Intel Xeon Scalable processors

100 Gbps
network bandwidth
on largest
instance sizes

25 Gbps
peak bandwidth
on smaller
instance sizes

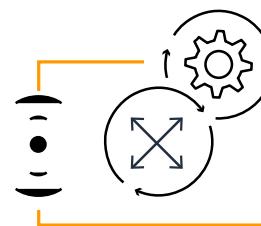
33%
Increased memory
footprint over
C5 instances



Faster analytics and
big data workloads



Lower costs for
network-bound workloads



All of the elasticity, security,
and scalability of AWS

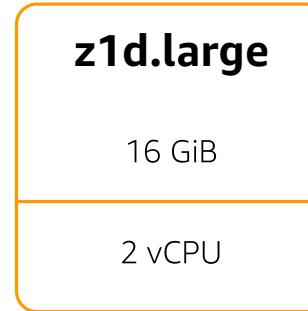


z1d: high frequency for specialized workloads

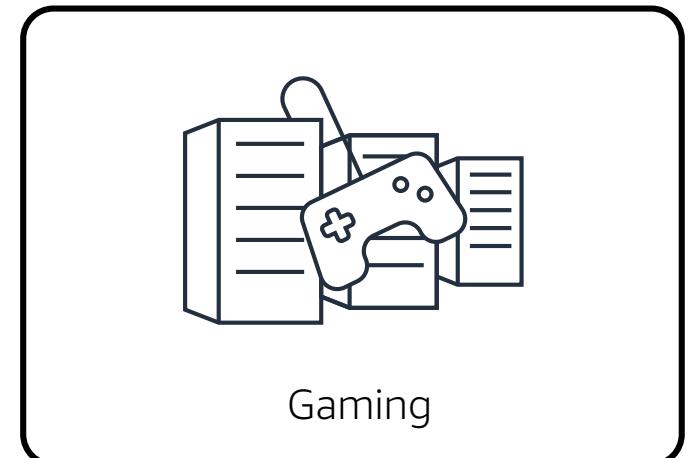
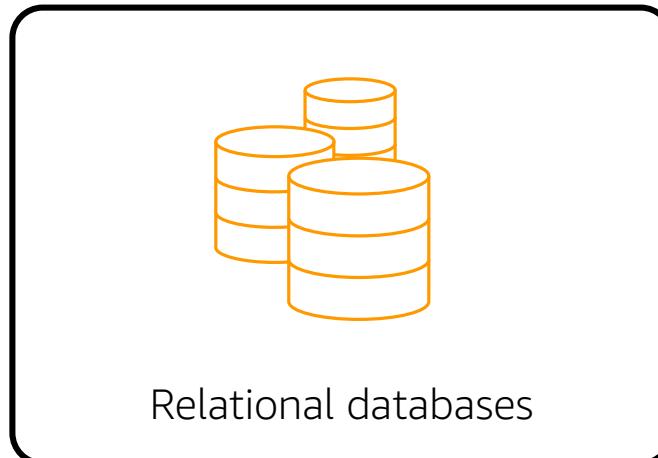
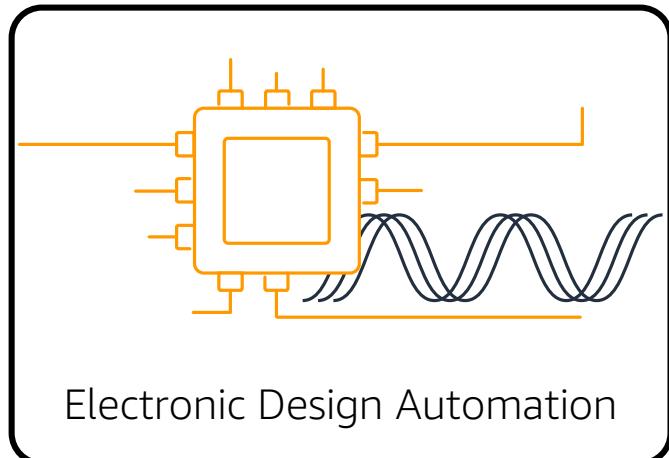
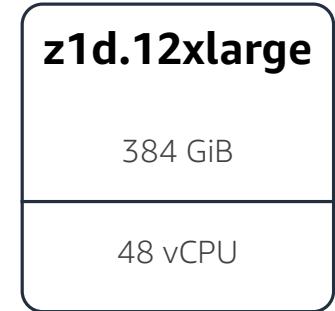


High Frequency instances with custom Intel Xeon Scalable processors running at sustained 4 GHz all core turbo
8:1 GiB to vCPU ratio

Up to 25 Gbps network bandwidth and up to 1.8 TB of local NVMe storage



6 sizes
• • •



z1d.metal Bare Metal instances coming soon



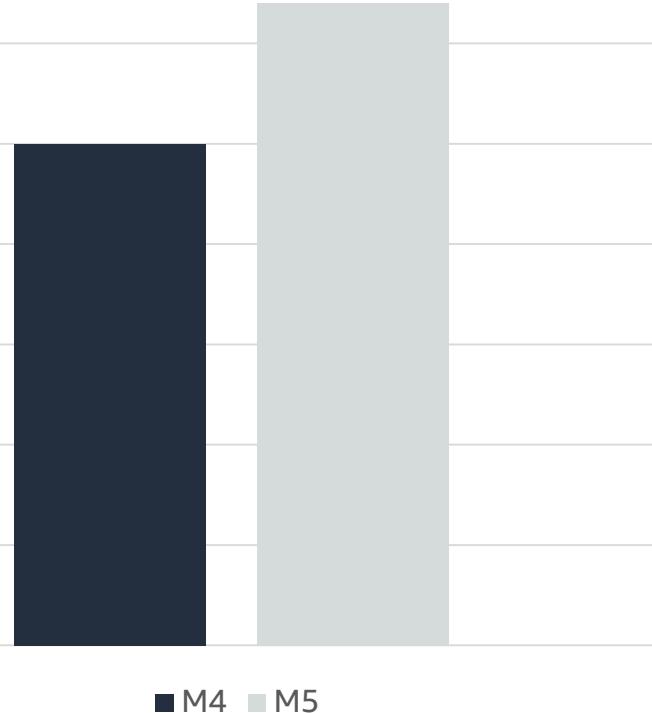
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M5: Next-gen general purpose instances



14% price/performance improvement With M5

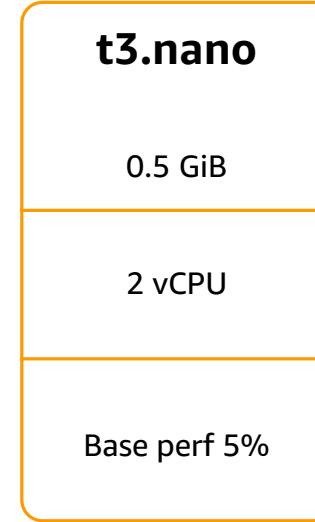


- Powered by 2.5 GHz Intel Xeon Scalable Processors (Skylake)
- New larger instance size—m5.24xlarge with 96 vCPUs and 384 GiB of memory (4:1 Memory:vCPU ratio)
- Improved network and EBS performance on smaller instance sizes
- Support for Intel AVX-512 offering up to twice the performance for vector and floating point workloads

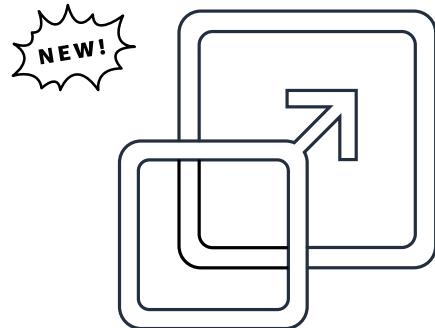
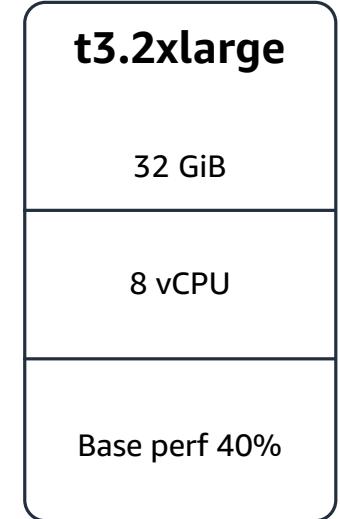
T3: burstable general-purpose instances



- Balance of compute, memory, and network
- Baseline level of CPU performance with the ability to burst CPU usage when needed at any time for as long as required
- Lowest cost instance at \$0.0052 per hour and up to 30% better price performance over T2 using Intel Xeon Scalable Processors



7 sizes
● ● ●



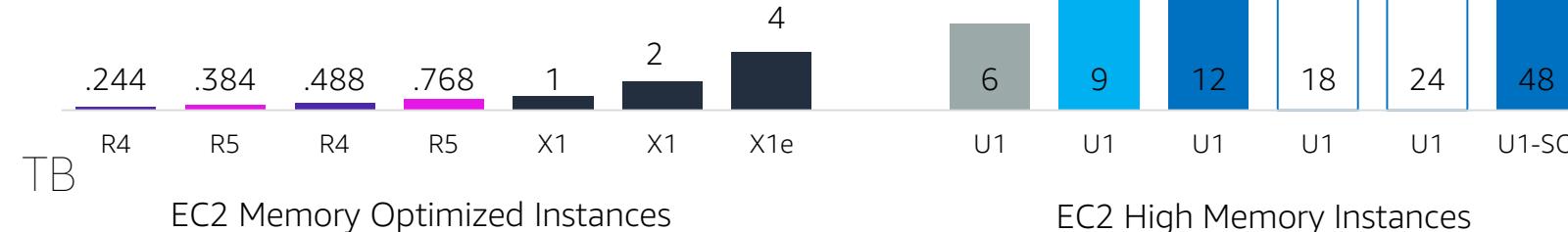
With T3 Unlimited bursting over baseline is only \$0.05 per vCPU-hour, averaged over 24 hours

Amazon EC2 instances for SAP HANA

Introducing 48TB support for S/4HANA Deployments



- Up to 12TB Memory; SAP-Certified
- Custom Intel® Xeon® Scalable Processor
- Out-of-box integration Native to AWS
- Simple management: AWS CLI, Console, IAM
- Flexibility to scale; Resize in minutes
- 18 and 24 TB instance coming in 2019

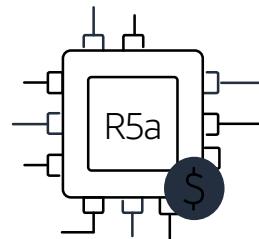
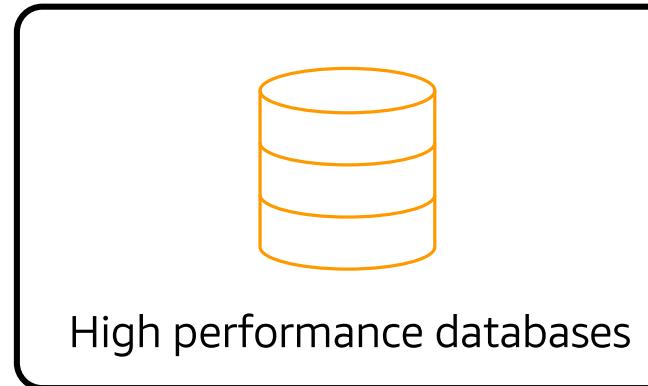
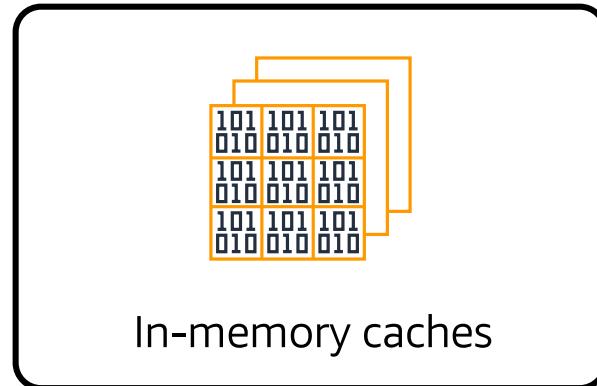
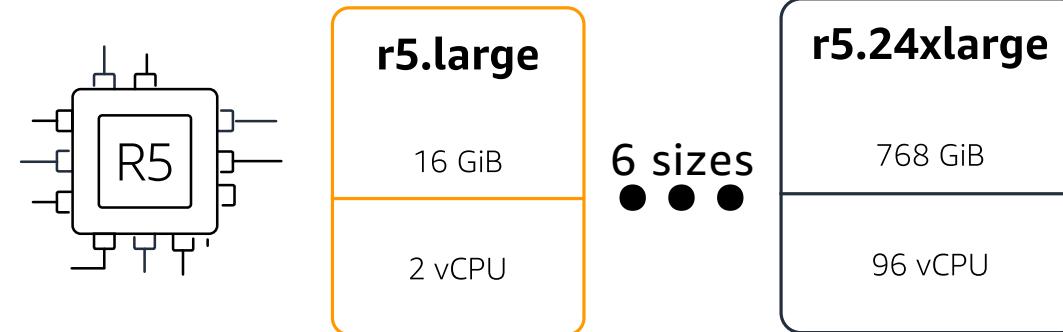


- Grow-as-you-Go
- Flexibility
- Linear Pricing
- TCO
- Seamless access to all AWS Services
- Breath
- Near Infinite Elastic Scalability for Mission-Critical Deployments
- Scale
- AWS owned and operated
- Secure
- <1 hour provisioning times
- 100% Software Defined
- Speed

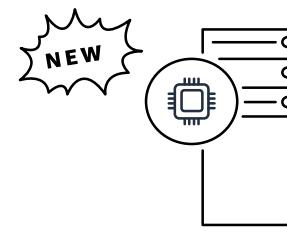
R5: memory-optimized instances



2.5 GHz Intel Xeon Scalable processors (Skylake)
Memory-optimized instances with 8:1 GiB to vCPU
Up to 25 Gbps NW bandwidth
R5d instances include up to 3.6 TB of local NVMe SSD



R5a: Now available with
AMD EPYC 7000 processor



R5.metal Bare Metal instances
coming soon on Intel Xeon
Scalable processors



EC2 High Memory Instance architecture

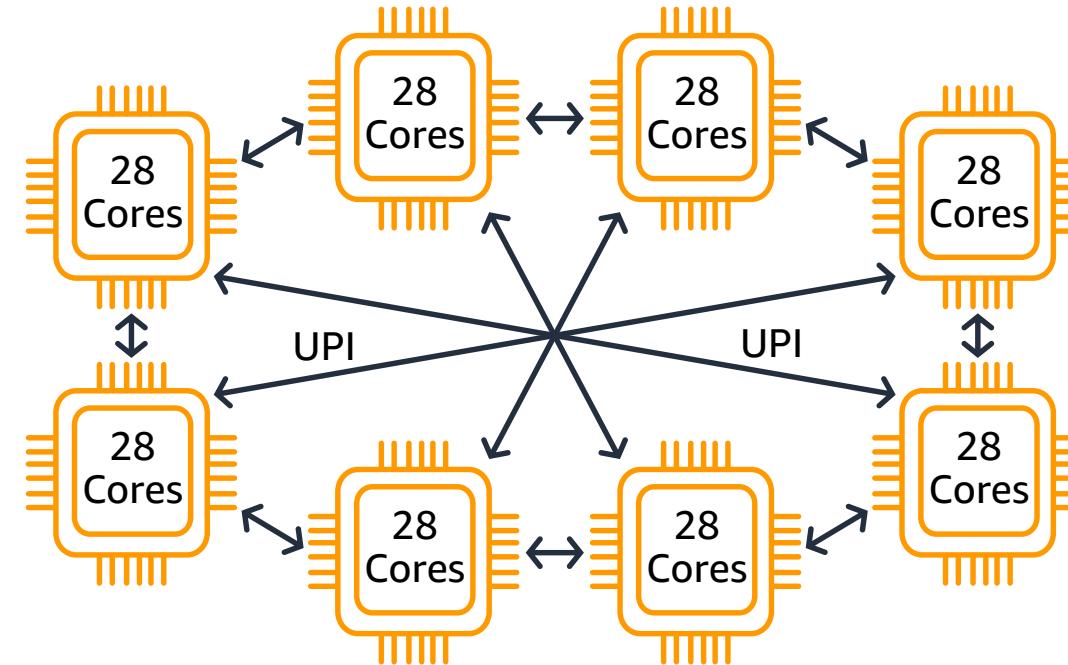


The most memory of any
EC2 Instance SAP-certified

12 TB of memory

8x Intel Xeon Platinum 8176M (Skylake)
processors with total of 224 cores / 448
Hyperthreads

18TB and 24TB coming in 2019



What's your platform?

Step 1: Choose an Amazon Machine Image (AMI)

An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. You can select an AMI provided by AWS, our user community, or the AWS Marketplace; or you can select one of your own AMIs.

Search for an AMI by entering a search term e.g. "Windows"

Quick Start

My AMIs

AWS Marketplace

Community AMIs

Free tier only (i)

Amazon Linux 2 AMI (HVM), SSD Volume Type - ami-0d1000aff9a9bad89 Select 64-bit

Amazon Linux 2 comes with five years support. It provides Linux kernel 4.14 tuned for optimal performance on Amazon EC2, systemd 219, GCC 7.3, Glibc 2.26, Binutils 2.29.1, and the latest software packages through extras.

Root device type: ebs Virtualization type: hvm ENA Enabled: Yes

Amazon Linux AMI 2018.03.0 (HVM), SSD Volume Type - ami-a0cfeed8 Select 64-bit

The Amazon Linux AMI is an EBS-backed, AWS-supported image. The default image includes AWS command line tools, Python, Ruby, Perl, and Java. The repositories include Docker, PHP, MySQL, PostgreSQL, and other packages.

Root device type: ebs Virtualization type: hvm ENA Enabled: Yes

Red Hat Enterprise Linux 7.5 (HVM), SSD Volume Type - ami-28e07e50 Select 64-bit

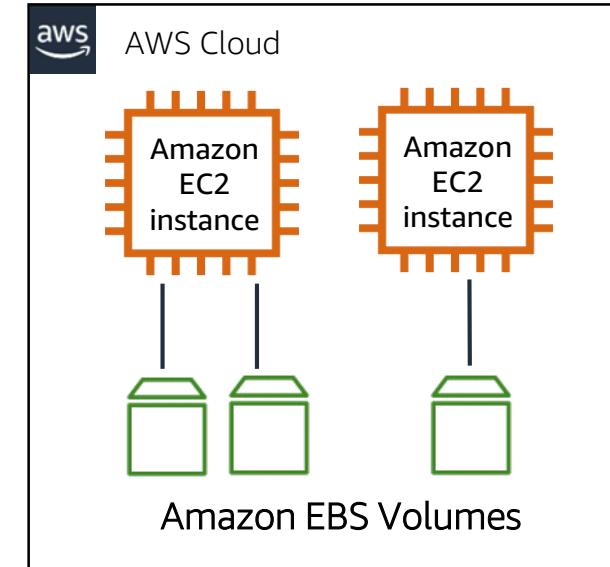
Red Hat Enterprise Linux version 7.5 (HVM), EBS General Purpose (SSD) Volume Type

Root device type: ebs Virtualization type: hvm ENA Enabled: Yes

Store your data

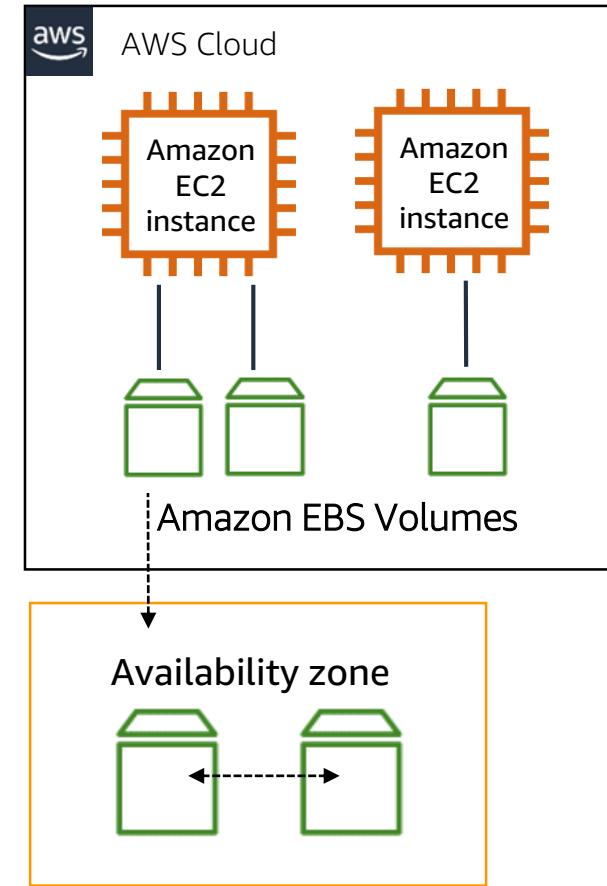
Amazon Elastic Block Store (Amazon EBS)

- Persistent block storage for instances



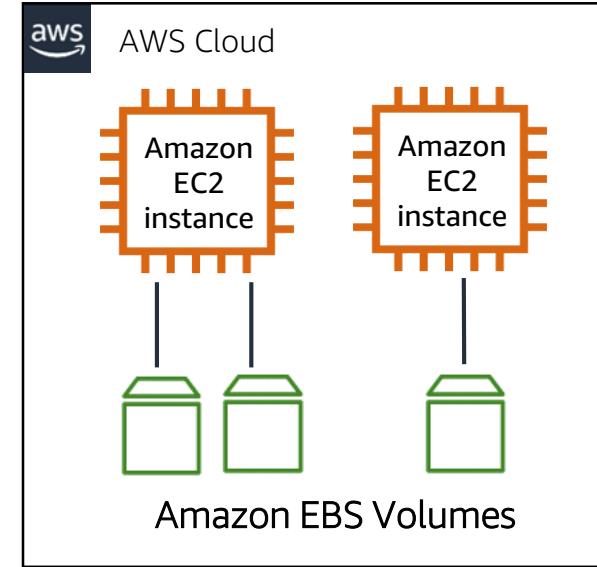
Amazon Elastic Block Store (Amazon EBS)

- Persistent block storage for instances
- Protected through replication



Amazon Elastic Block Store (Amazon EBS)

- Persistent block storage for instances
- Protected through replication
- Different drive types



Solid State Drives (SSD)

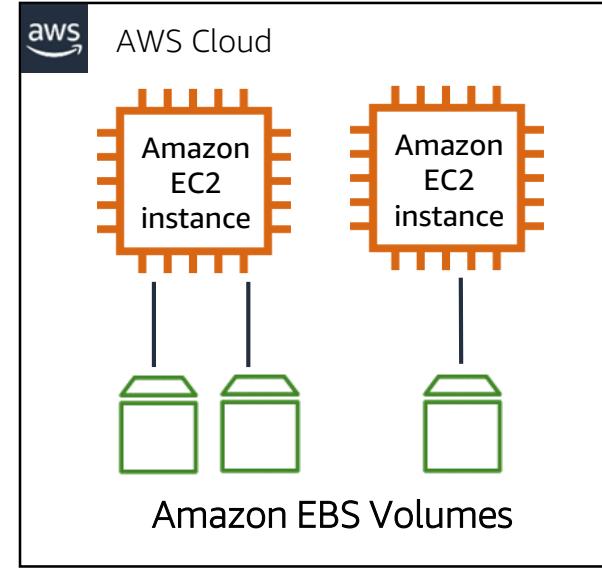
- Provisioned IOPS SSD (io1) Volumes
- General Purpose SSD (gp2) Volumes

Hard Disk Drives (HDD)

- Throughput Optimized HDD (st1) Volumes
- Cold HDD (sc1) Volumes

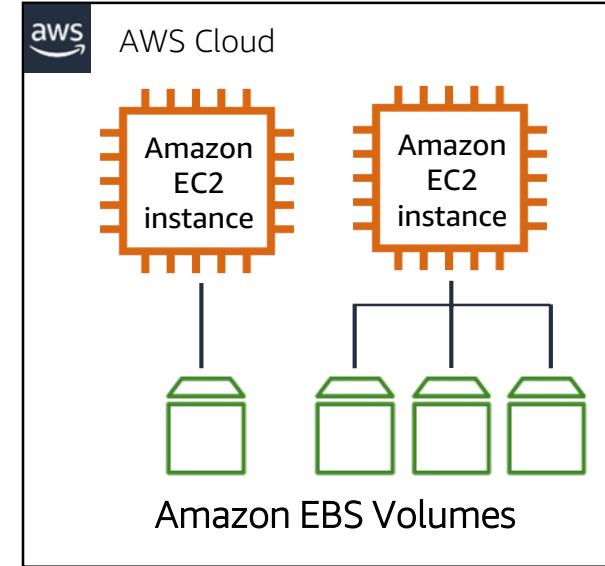
Amazon Elastic Block Store (Amazon EBS)

- Persistent block storage for instances
- Protected through replication
- Different drive types
- Scale up or down in minutes



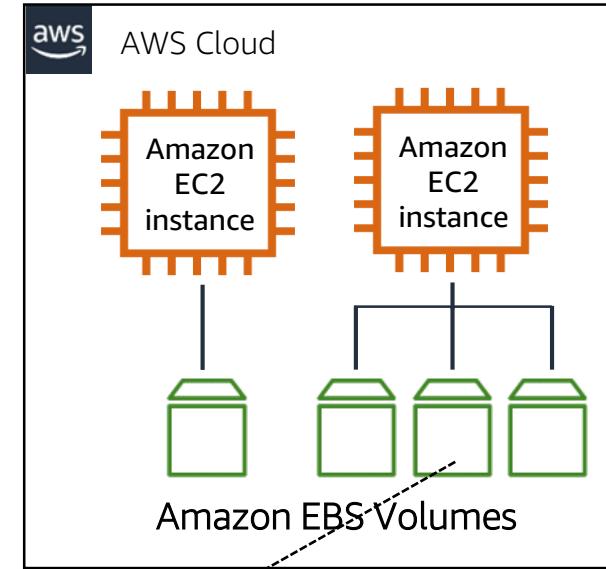
Amazon Elastic Block Store (Amazon EBS)

- Persistent block storage for instances
- Protected through replication
- Different drive types
- Scale up or down in minutes
- Pay for only what you provision



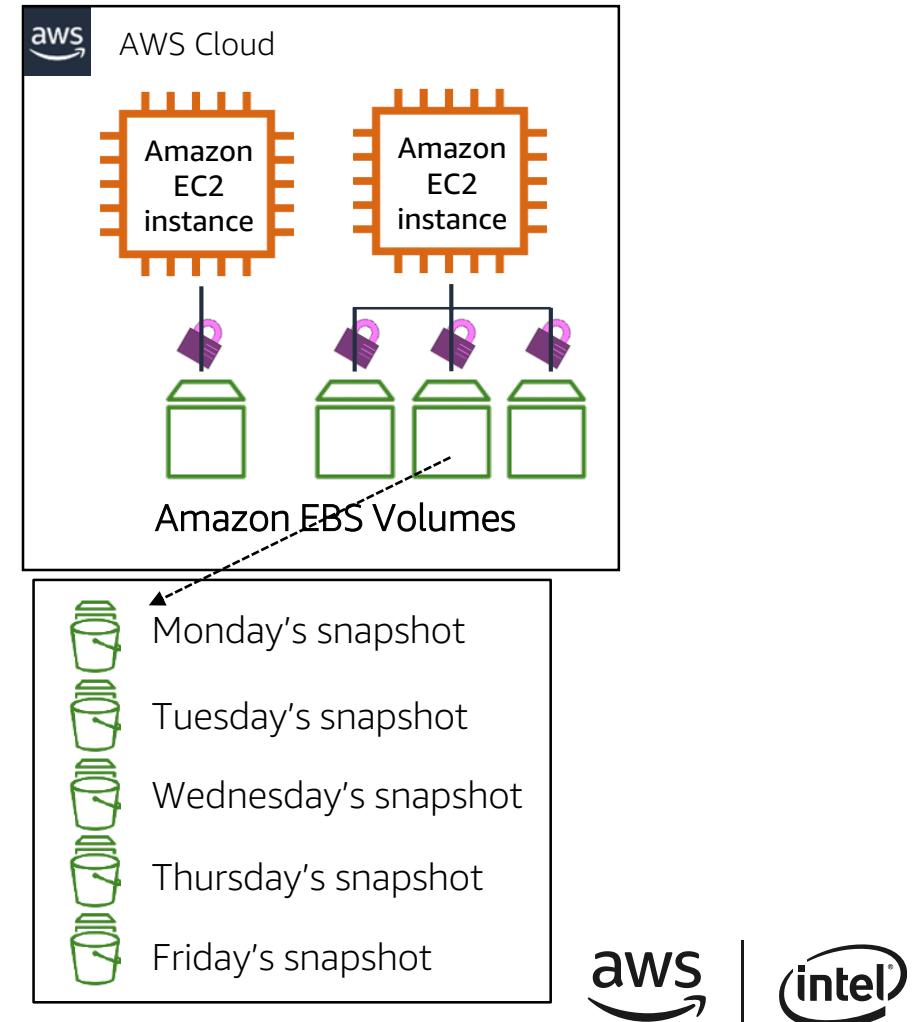
Amazon Elastic Block Store (Amazon EBS)

- Persistent block storage for instances
- Protected through replication
- Different drive types
- Scale up or down in minutes
- Pay for only what you provision
- Snapshot functionality



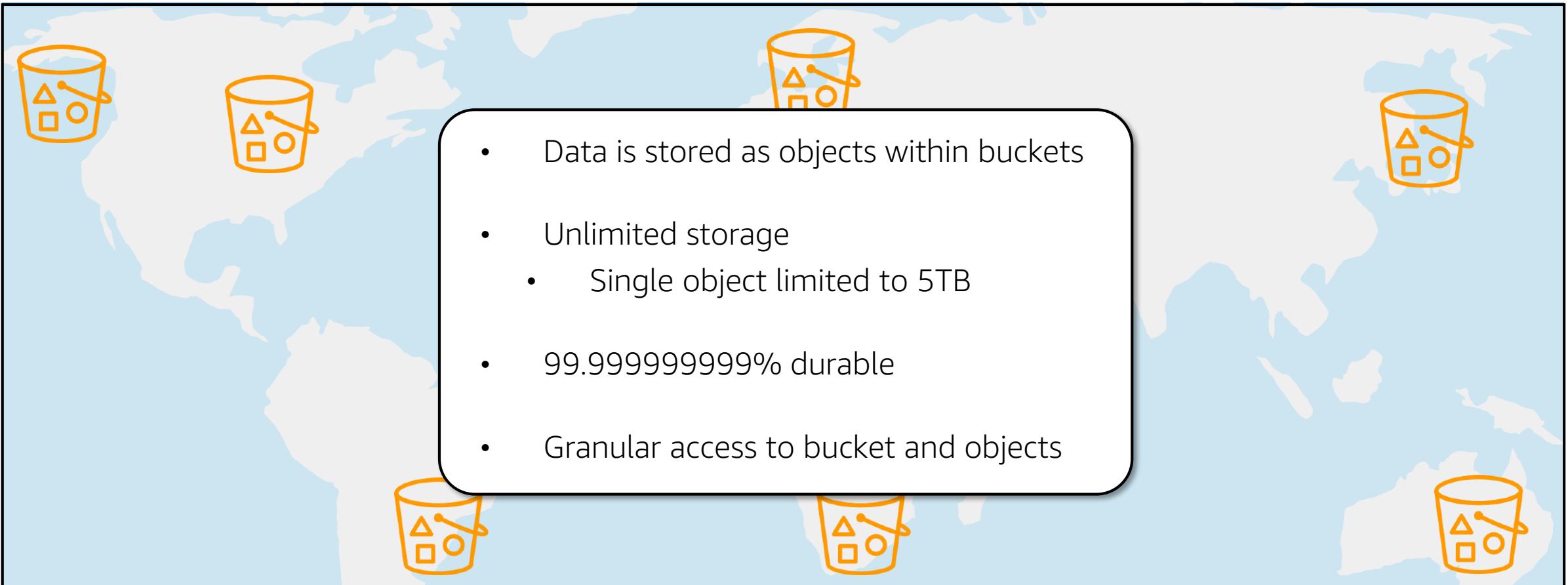
Amazon Elastic Block Store (Amazon EBS)

- Persistent block storage for instances
- Protected through replication
- Different drive types
- Scale up or down in minutes
- Pay for only what you provision
- Snapshot functionality
- Encryption available



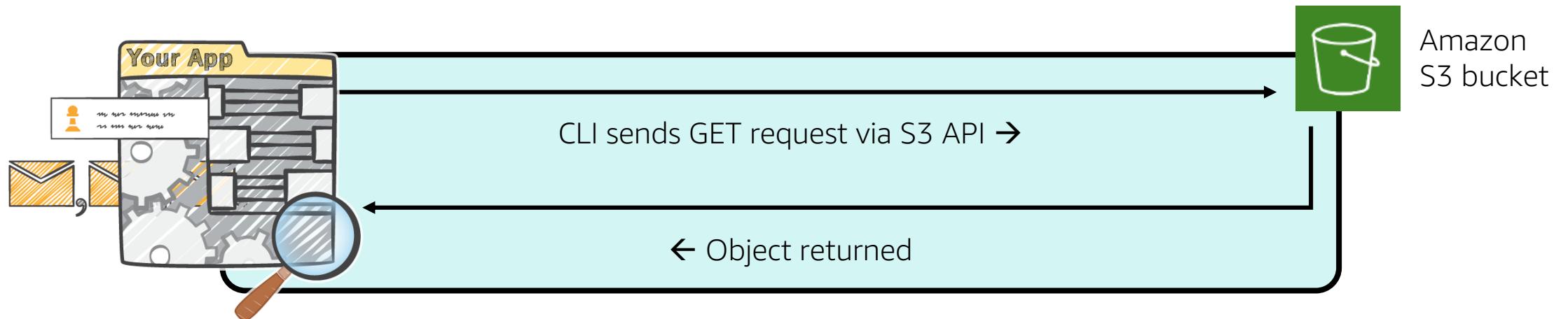
What is Amazon S3?

- Data is stored as objects within buckets
- Unlimited storage
 - Single object limited to 5TB
- 99.99999999% durable
- Granular access to bucket and objects



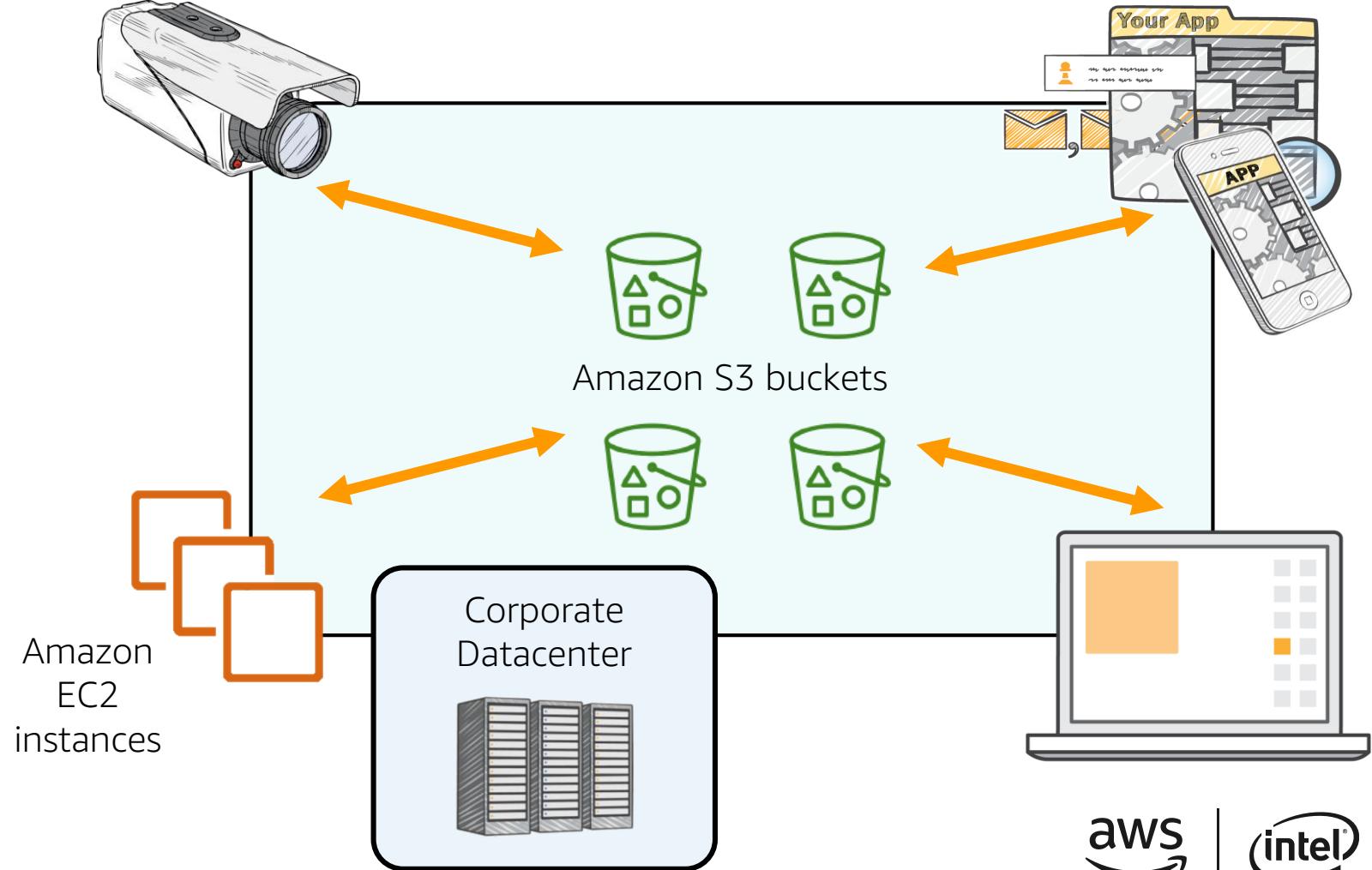
Amazon S3 core functionality

- Fast, durable, highly available key-based access to objects
- Object storage built to store and retrieve data
- Not a file system

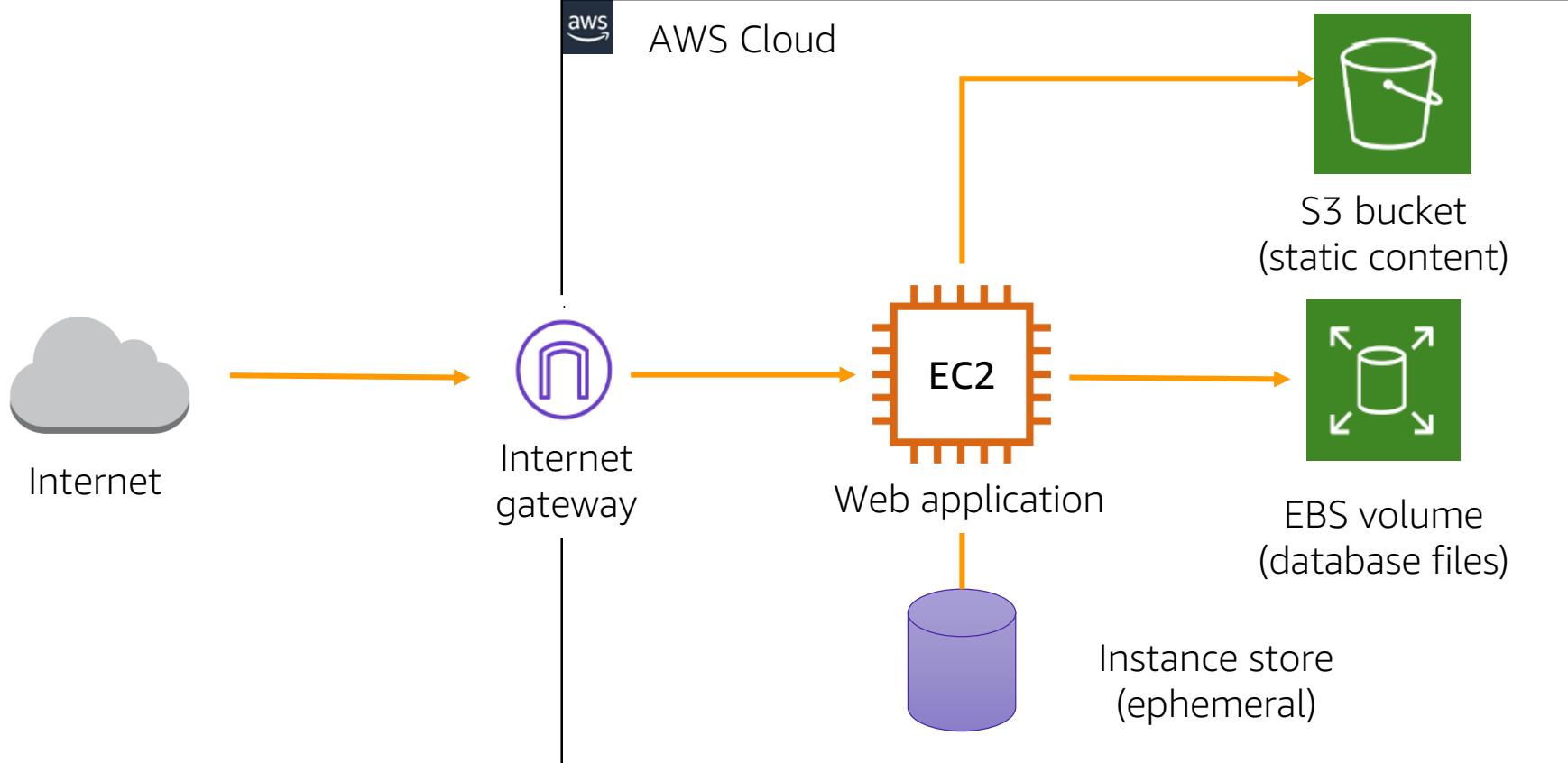


Amazon S3 common scenarios

- Backup and storage
- Application hosting
- Media hosting
- Software delivery



Architecture example



Demo

Deploy database services

What is Amazon Relational Database Service?

A database service that makes it easy to set up,
operate, and scale a relational database in the cloud

Amazon RDS Engines



- Easily scalable
- Automatic software patching
- Automated backups
- Database snapshots
- Multi-AZ deployments
- Automatic host replacement
- Encryption at rest and in transit

What is Amazon Aurora?

- Enterprise-class relational database
- MySQL- or PostgreSQL-compatible
- Up to 5X faster than standard MySQL databases
- Up to 3X faster than standard PostgreSQL databases
- Continuous backup to Amazon S3
- Up to 15 low-latency read replicas



Relational vs key-value databases

	Relational (SQL)	Key-value (NoSQL)												
Data storage	Rows and columns	Key-value, document, graph												
Schemas	Fixed	Dynamic												
Querying	Using SQL	Focused on collection of documents												
Scalability	Vertical	Horizontal												
Example	<table border="1"><thead><tr><th>ISBN</th><th>Title</th><th>Author</th><th>Format</th></tr></thead><tbody><tr><td>3111111223439</td><td>Withering Depths</td><td>Tark, Frank</td><td>Paperback</td></tr><tr><td>3122222223439</td><td>Wily Willy</td><td>Felton, Maria</td><td>eBook</td></tr></tbody></table>	ISBN	Title	Author	Format	3111111223439	Withering Depths	Tark, Frank	Paperback	3122222223439	Wily Willy	Felton, Maria	eBook	{ ISBN: 3111111223439, Title: "Withering Depths", Author: "Tark, Frank", Format: "Paperback" }
ISBN	Title	Author	Format											
3111111223439	Withering Depths	Tark, Frank	Paperback											
3122222223439	Wily Willy	Felton, Maria	eBook											

What is Amazon DynamoDB?

Fast and flexible NoSQL database service for any scale

- Fully managed
- Low-latency queries
- Fine-grained access control
- Regional and global options

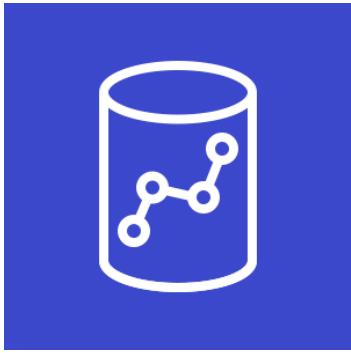


Amazon DynamoDB use cases

- Serverless web applications
- Microservices data store
- Mobile backends
- Ad tech
- Gaming
- Internet of Things (IoT)



Other purpose-built database services



Amazon Redshift

Fast, scalable
data warehouse



Amazon DocumentDB

MongoDB-compatible
database



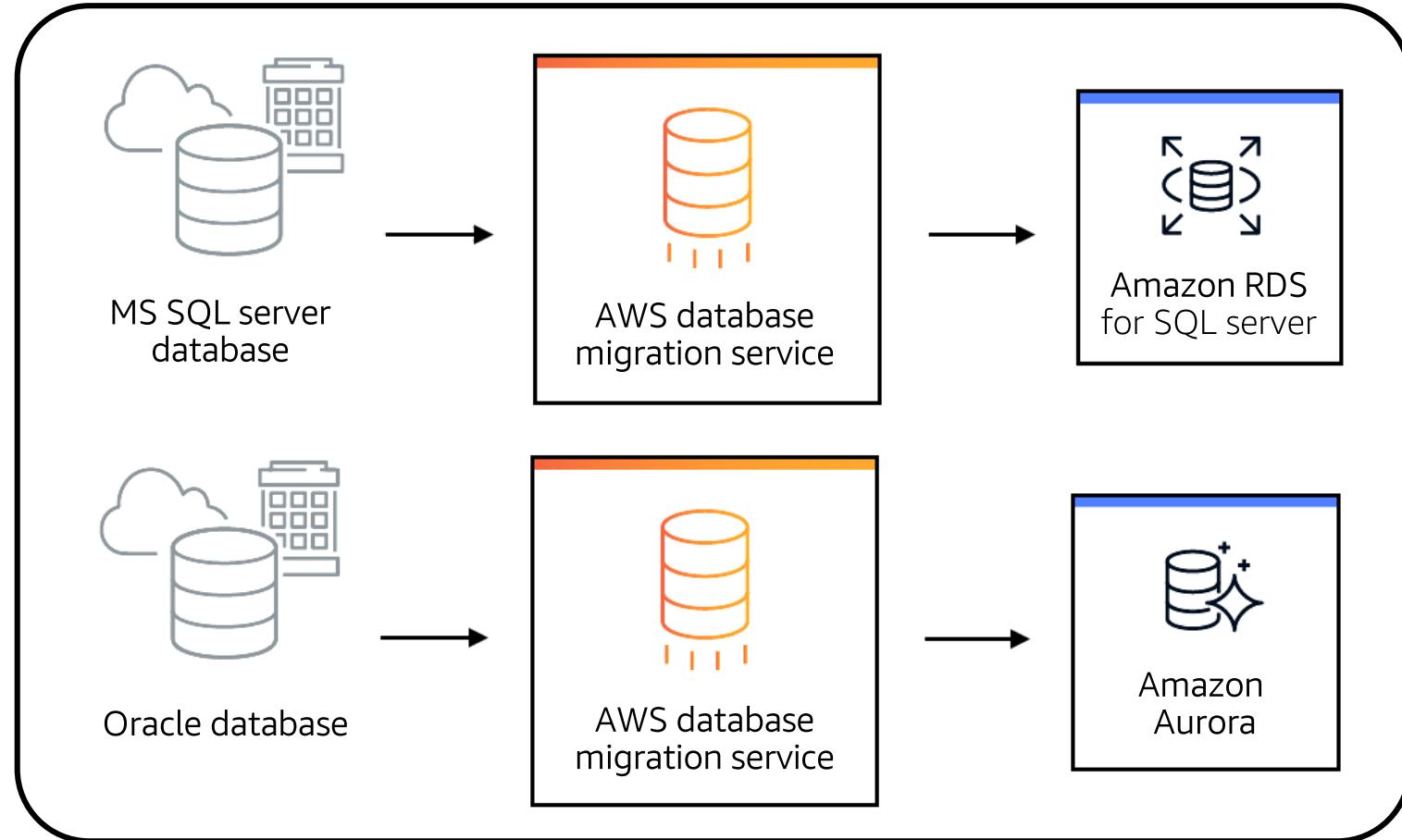
Amazon Neptune

Graph database



What is AWS Database Migration Service?

Migrate databases to AWS quickly and securely



The right tool for the right job

What are my requirements?	
Enterprise class relational database	Amazon Relational Database Service (Amazon RDS)
Fast and flexible NoSQL database service for any scale	Amazon DynamoDB
Operating system access or application features not supported by AWS database services	Databases on EC2
Specific case-driven requirements (Machine learning, data warehouse, graphs)	AWS purpose-built database services

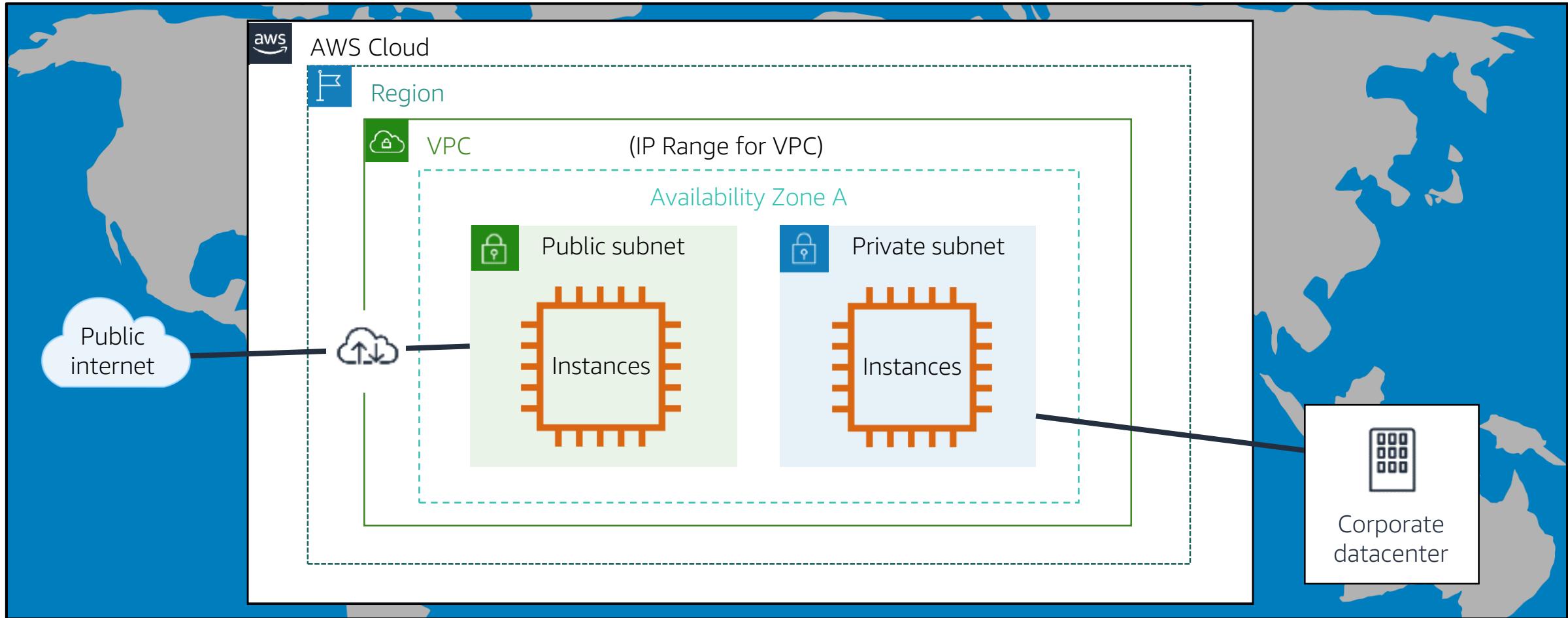
Demo

End of Module 2

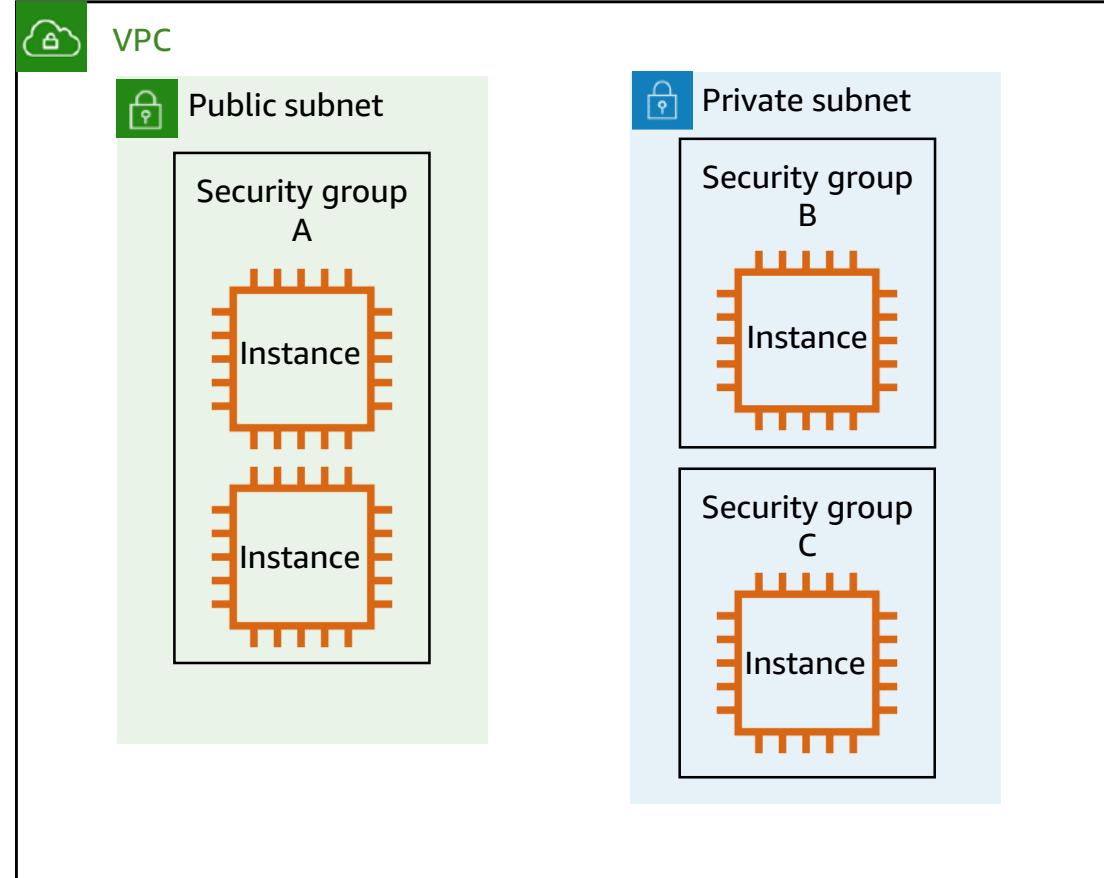
Test your knowledge

Secure your data

Amazon Virtual Private Cloud (Amazon VPC)



Security groups



Security Group A

Inbound		
Source	Protocol	Port Range
0.0.0.0/0	TCP	80
0.0.0.0/0	TCP	443

Security Group-B

Inbound		
Source	Protocol	Port Range
10.0.1.0/24	TCP	22

Security Group-C

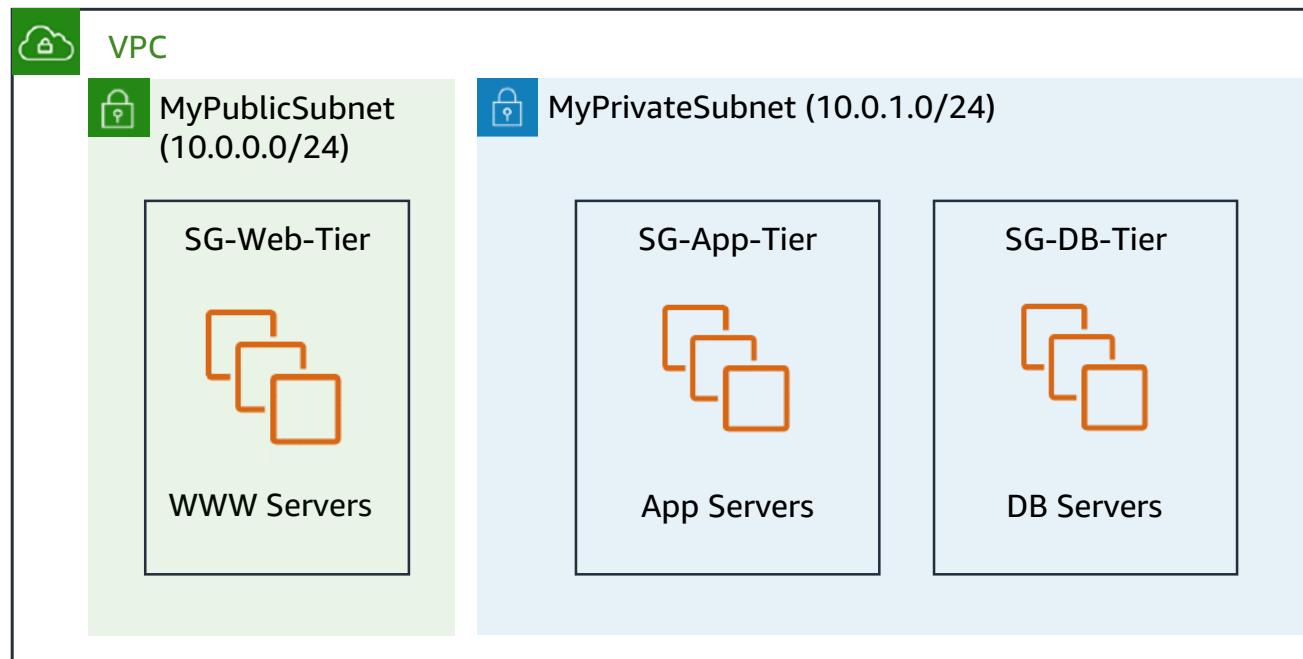
Inbound		
Source	Protocol	Port Range
ID of Security Group B	All	All

Security group details

- Only “allow” rules; no “deny” rules
- Default values:
 - No inbound traffic allowed
 - All outbound traffic allowed
- Stateful:
 - Allows responses from allowed inbound traffic



Security groups example



Inbound		
Source	Protocol	Port Range
0.0.0.0/0	TCP	80
0.0.0.0/0	TCP	443
10.0.16.0/20	TCP	22

SG-Web-Tier

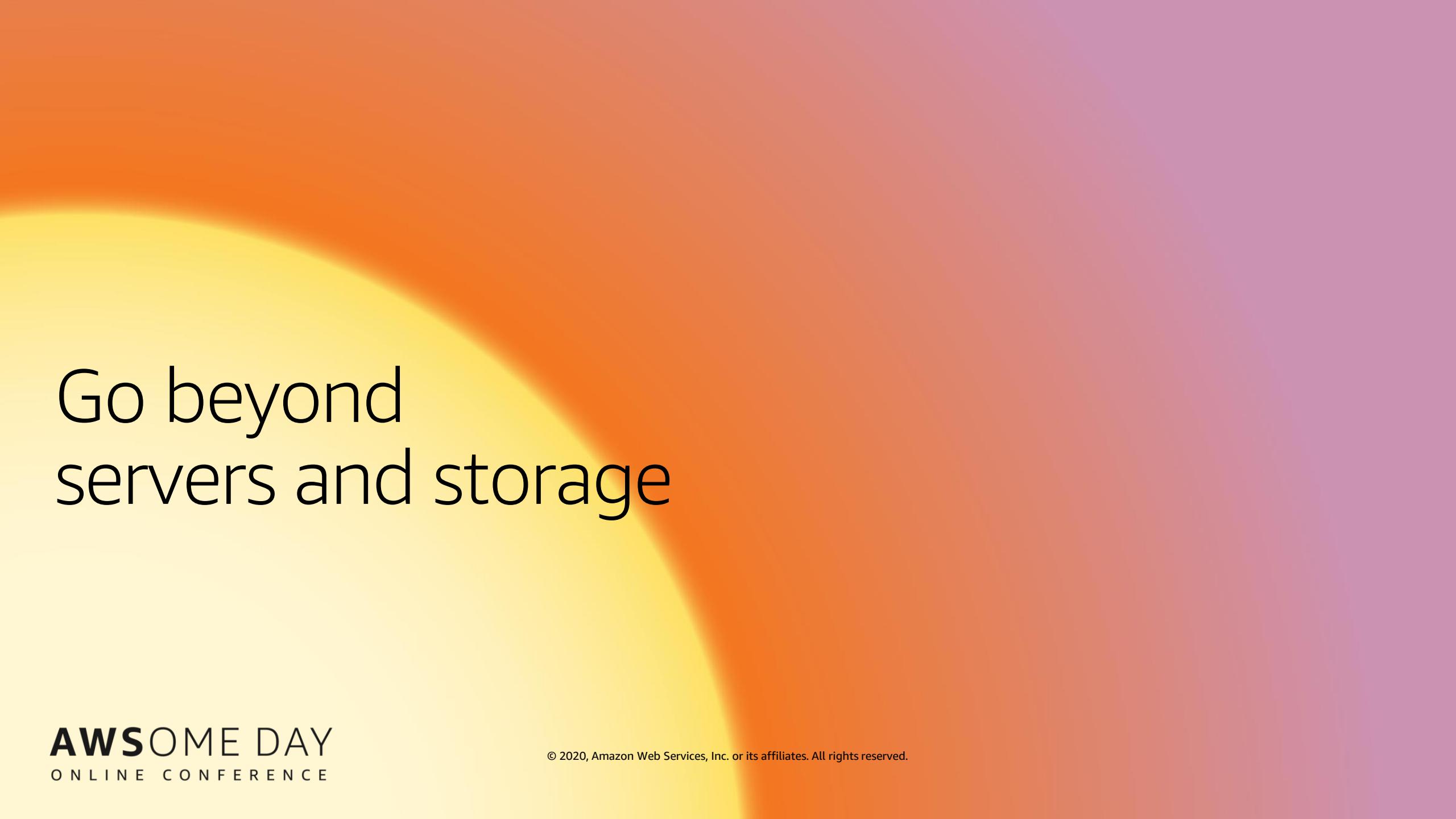
Inbound		
Source	Protocol	Port Range
ID of SG-Web-Tier	TCP	6455
10.0.16.0/20	TCP	22

SG-App-Tier

Inbound		
Source	Protocol	Port Range
ID of SG-App-Tier	TCP	3306
10.0.16.0/20	TCP	22

SG-DB-Tier

Module 3: Building in the cloud

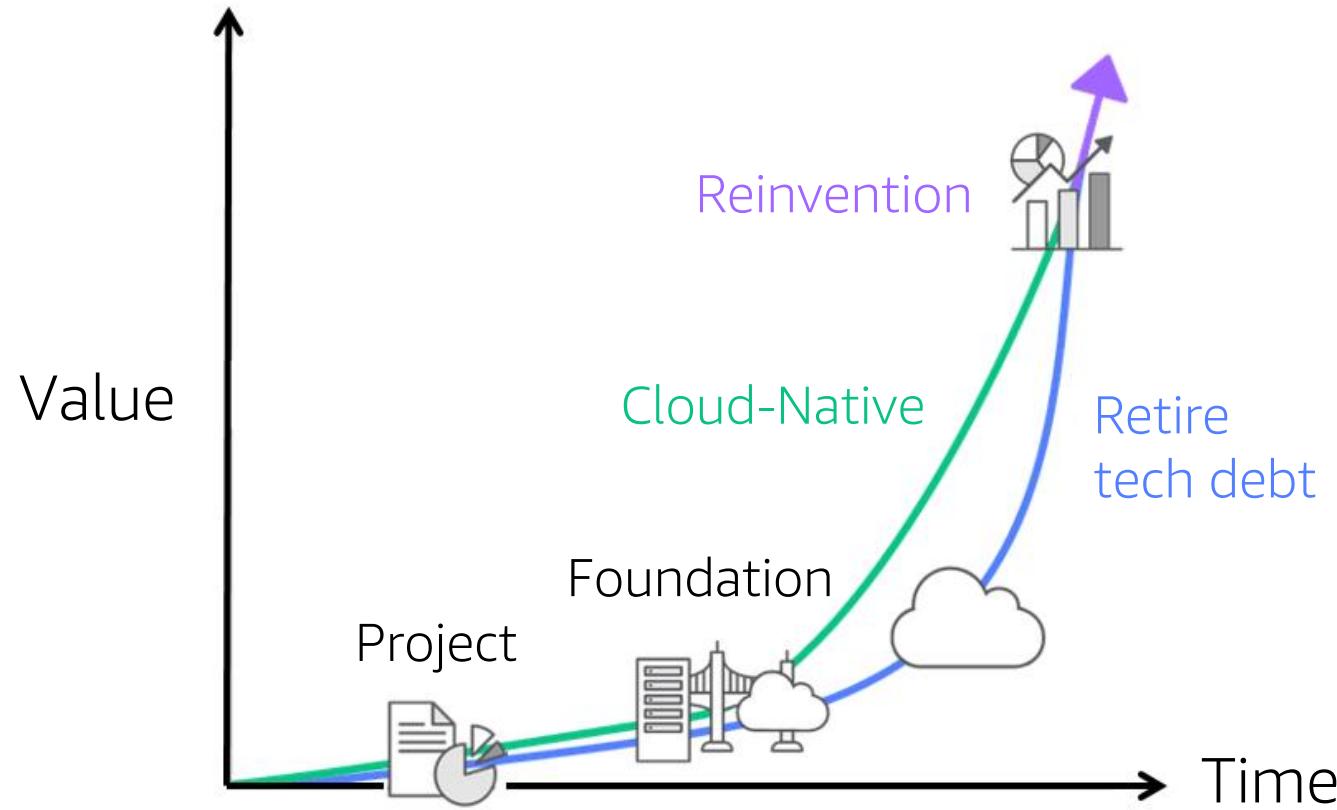


Go beyond
servers and storage

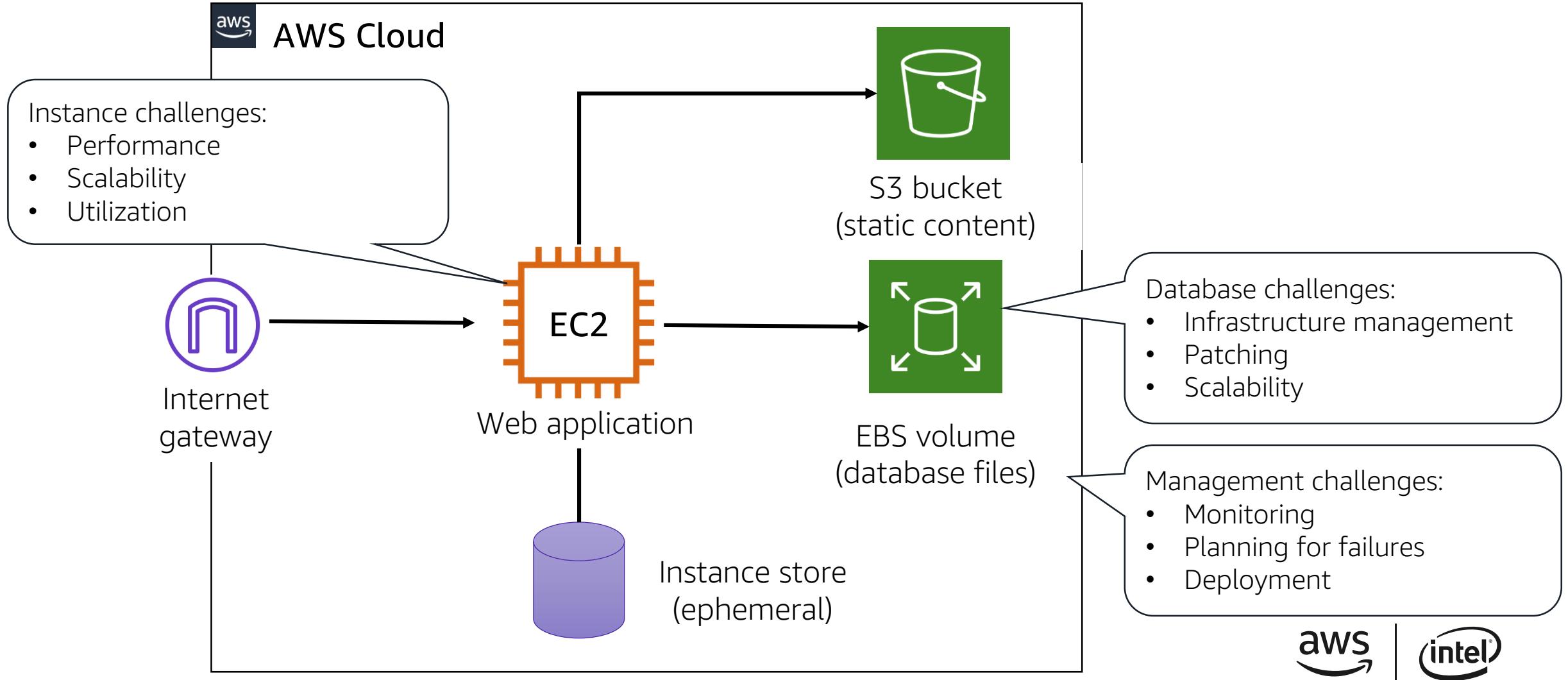
AWSOME DAY
ONLINE CONFERENCE

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Migration and reinvention

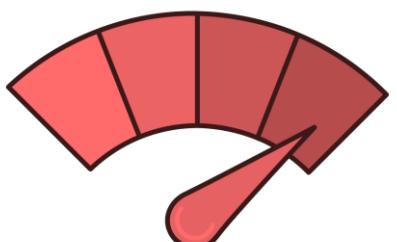
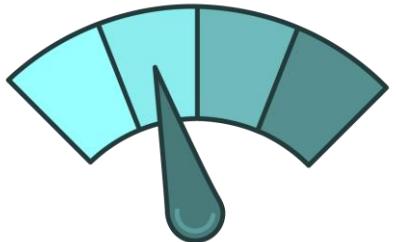


Improving your initial project



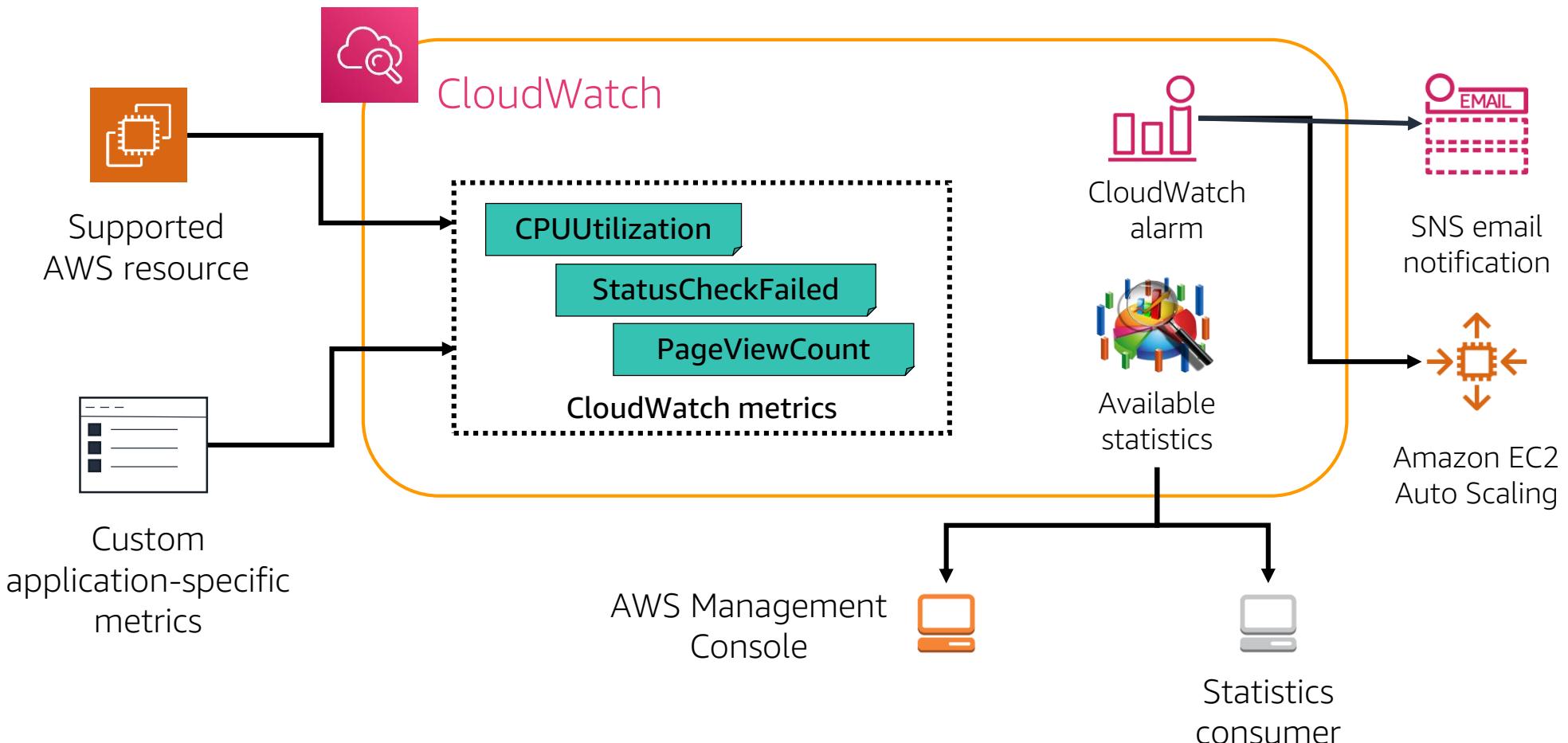
Monitor AWS resources

What is Amazon CloudWatch?



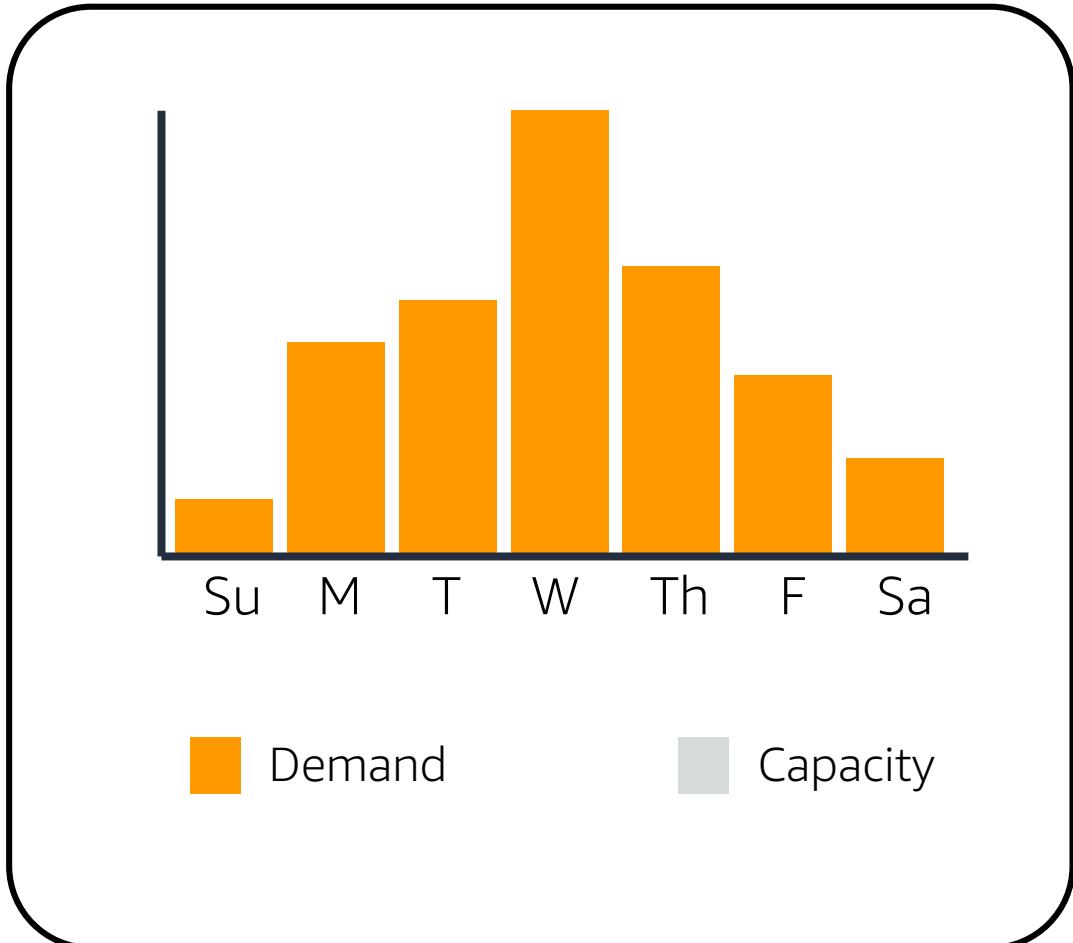
- Monitors:
 - AWS resources
 - Applications running on AWS
- Collects and tracks:
 - Standard metrics
 - Custom metrics
- Alarms:
 - Send notifications
 - Automatically make changes based on rules you define

How CloudWatch works



Manage demand efficiently

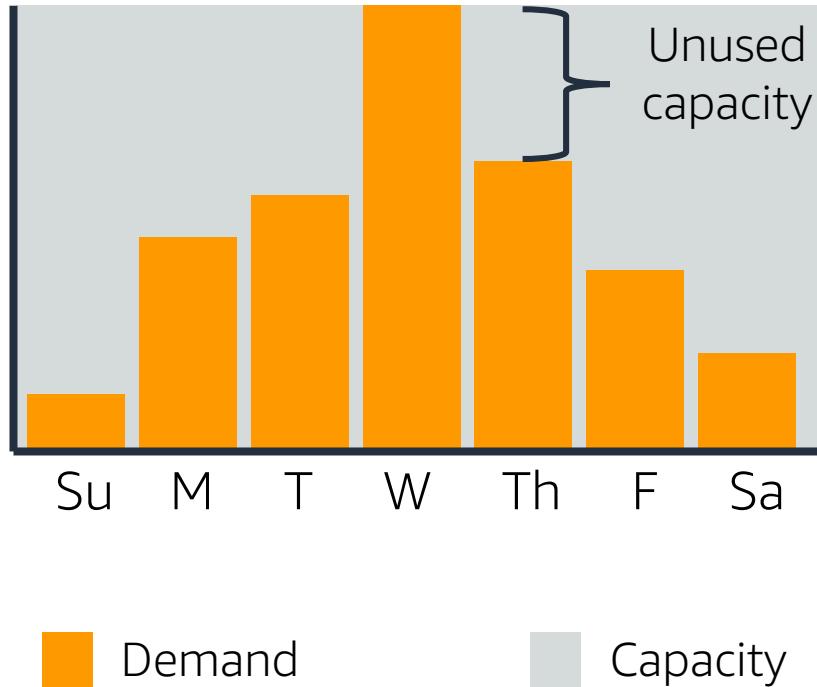
Why scaling matters



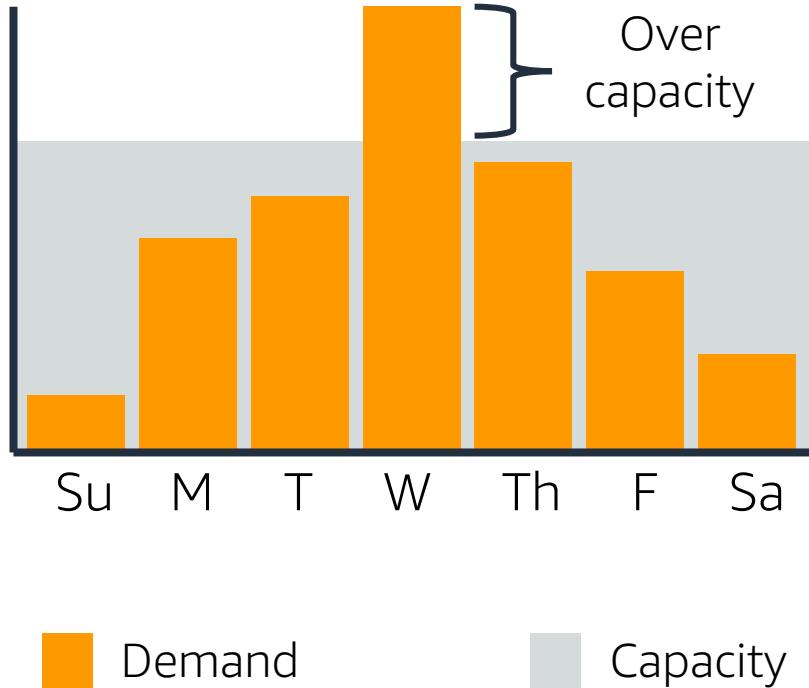
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Why scaling matters



Why scaling matters



Why scaling matters



Amazon EC2 Auto Scaling adjusts capacity as needed

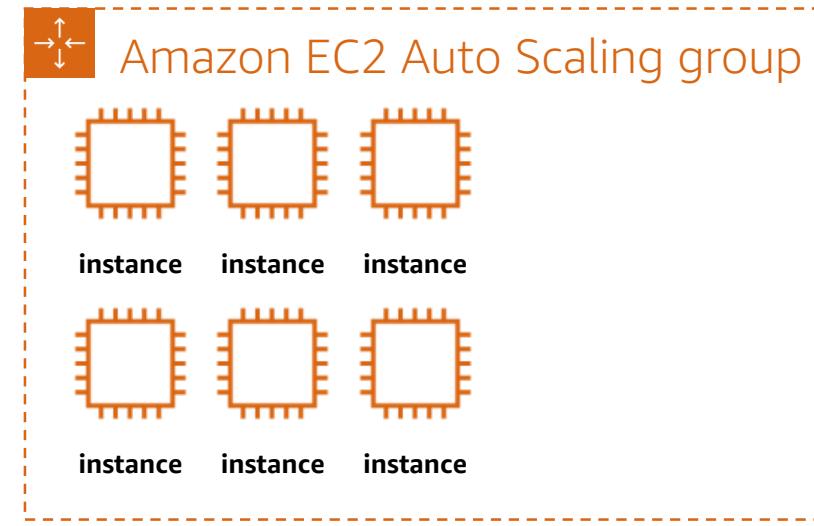
- Scale out for spikes
- Scale in during off-peak
- Replace unhealthy instances
- Pay only for what you use

Dynamic scaling with Amazon EC2 Auto Scaling

Follow the demand curve for your applications

- Select a load metric for your application
- Set as conditional and/or scheduled
- Use with CloudWatch, optionally

Max	10
Min	2
Desired	6



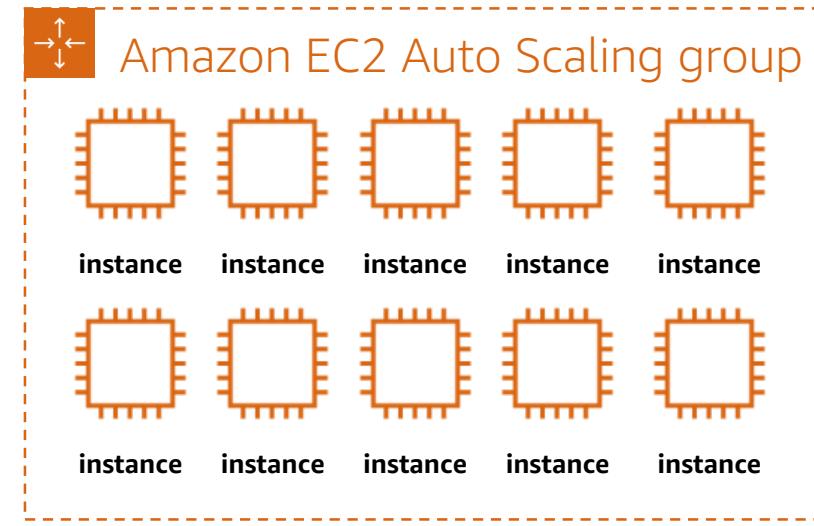
Average Demand

Dynamic scaling with Amazon EC2 Auto Scaling

Follow the demand curve for your applications

- Select a load metric for your application
- Set as conditional and/or scheduled
- Use with CloudWatch, optionally

Max	10
Min	2
Desired	10



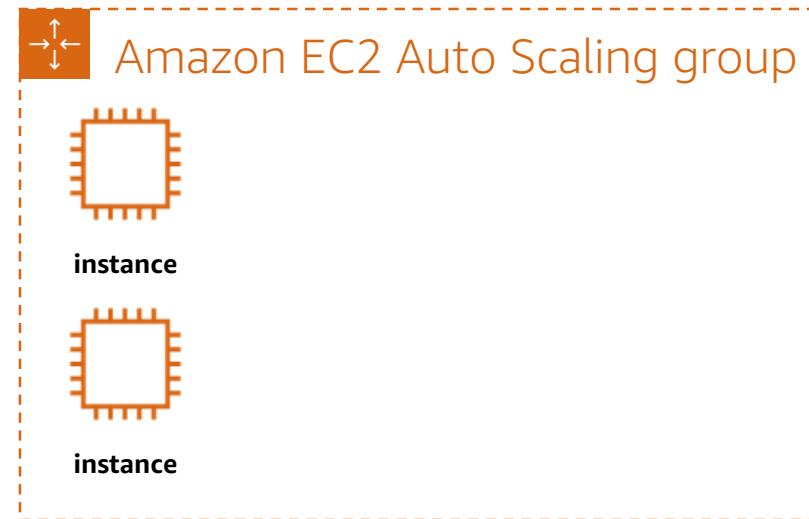
High demand

Dynamic scaling with Amazon EC2 Auto Scaling

Follow the demand curve for your applications

- Select a load metric for your application
- Set as conditional and/or scheduled
- Use with CloudWatch, optionally

Max	10
Min	2
Desired	2



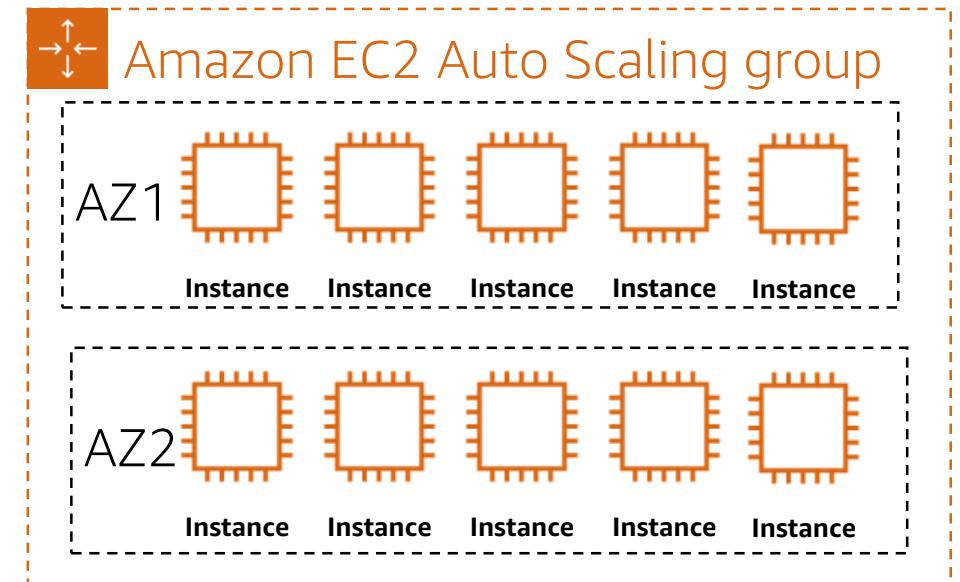
Low demand

Fleet management with Amazon EC2 Auto Scaling

Replace impaired Amazon EC2 instances without intervention

- Monitor the health of running instances
- Replace impaired instances automatically
- Balance capacity across Availability Zones

Max	10
Min	2
Desired	10



DIY vs. AWS database services



Databases on Amazon EC2

- Operating system access
- Need features of specific application



AWS Database Services

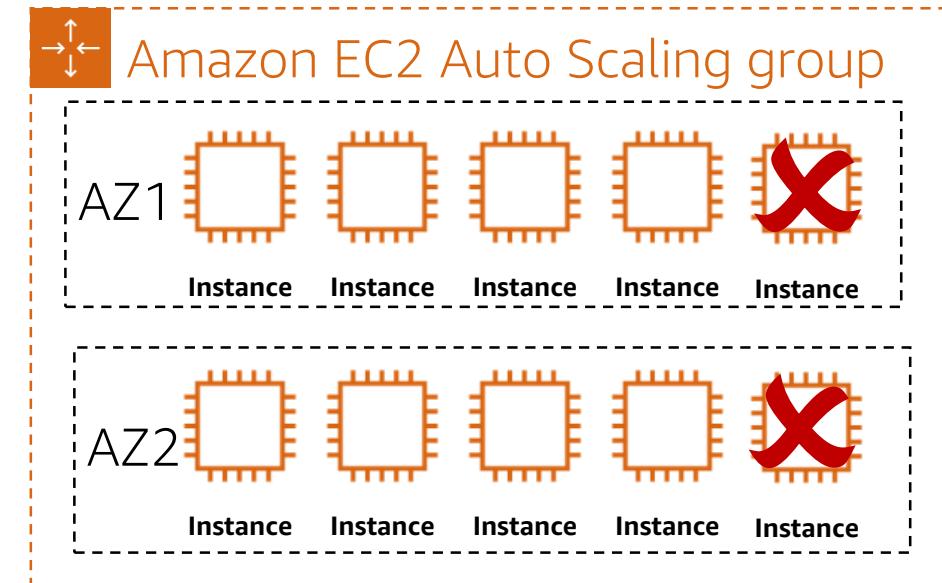
- Easy to set up, manage, maintain
- Push-button high availability
- Focus on performance
- Managed infrastructure

Fleet management with Amazon EC2 Auto Scaling

Replace impaired Amazon EC2 instances without intervention

- Monitor the health of running instances
- Replace impaired instances automatically
- Balance capacity across Availability Zones

Max	10
Min	2
Desired	10

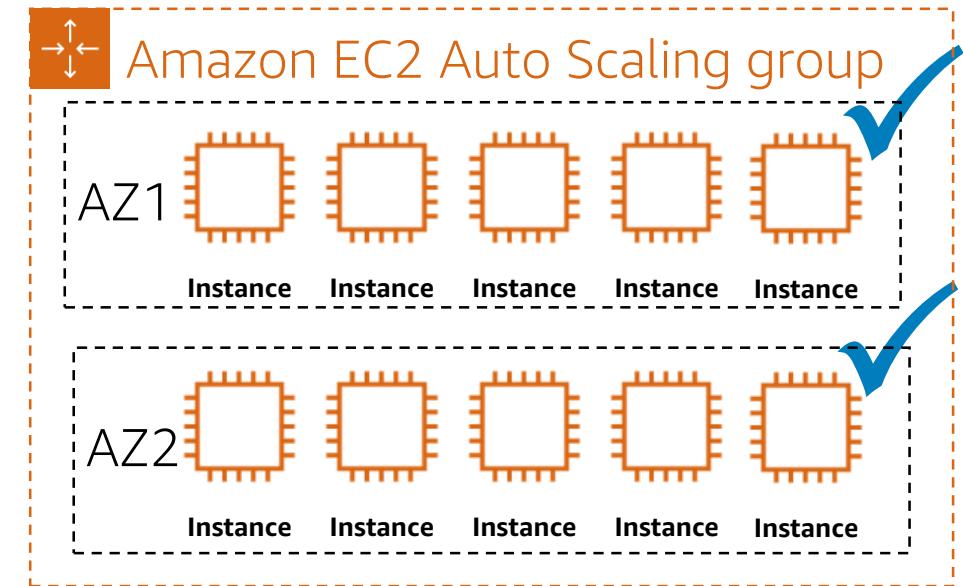


Fleet management with Amazon EC2 Auto Scaling

Replace impaired Amazon EC2 instances without intervention

- Monitor the health of running instances
- Replace impaired instances automatically
- Balance capacity across Availability Zones

Max	10
Min	2
Desired	10



Elastic Load Balancing

Automatically distribute traffic across multiple targets



High availability



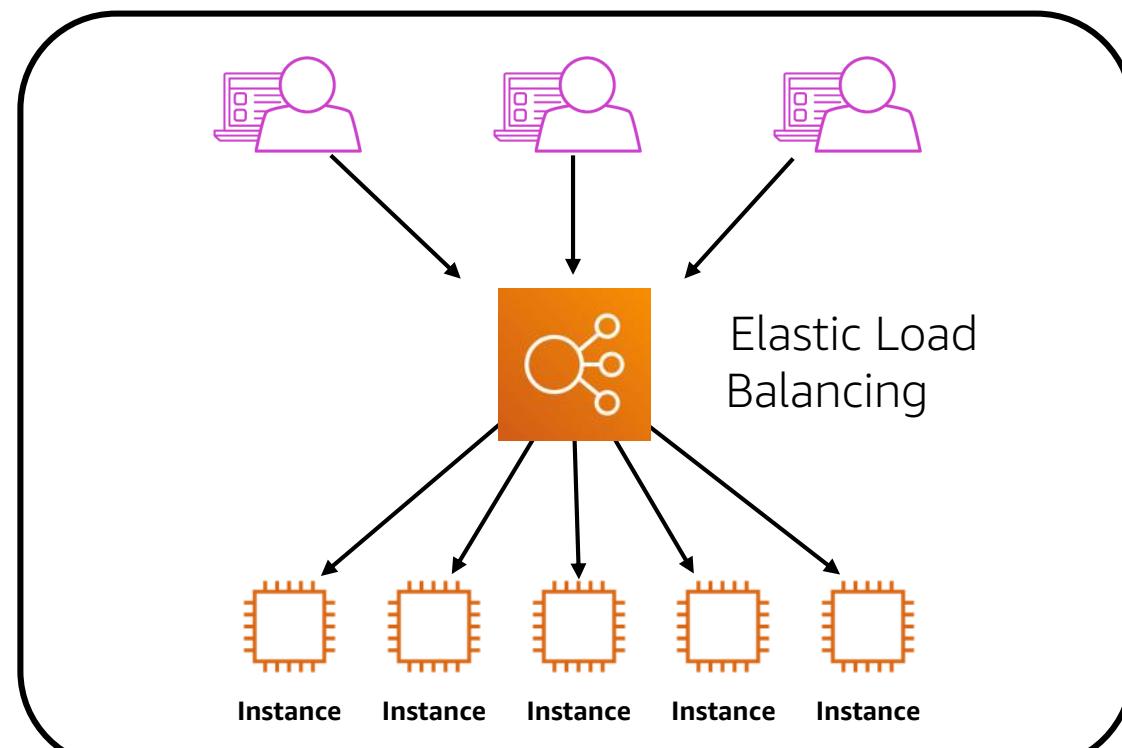
Health checks



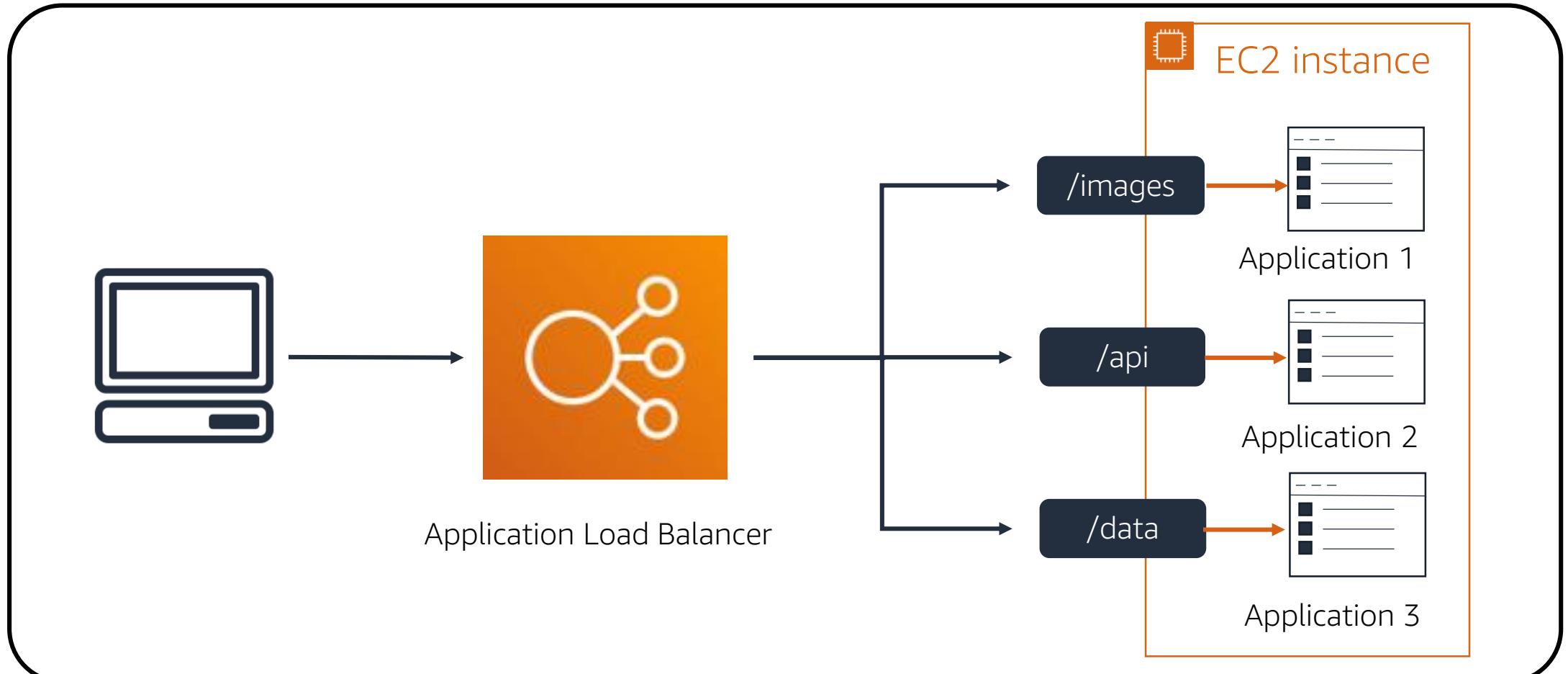
SSL/TLS termination



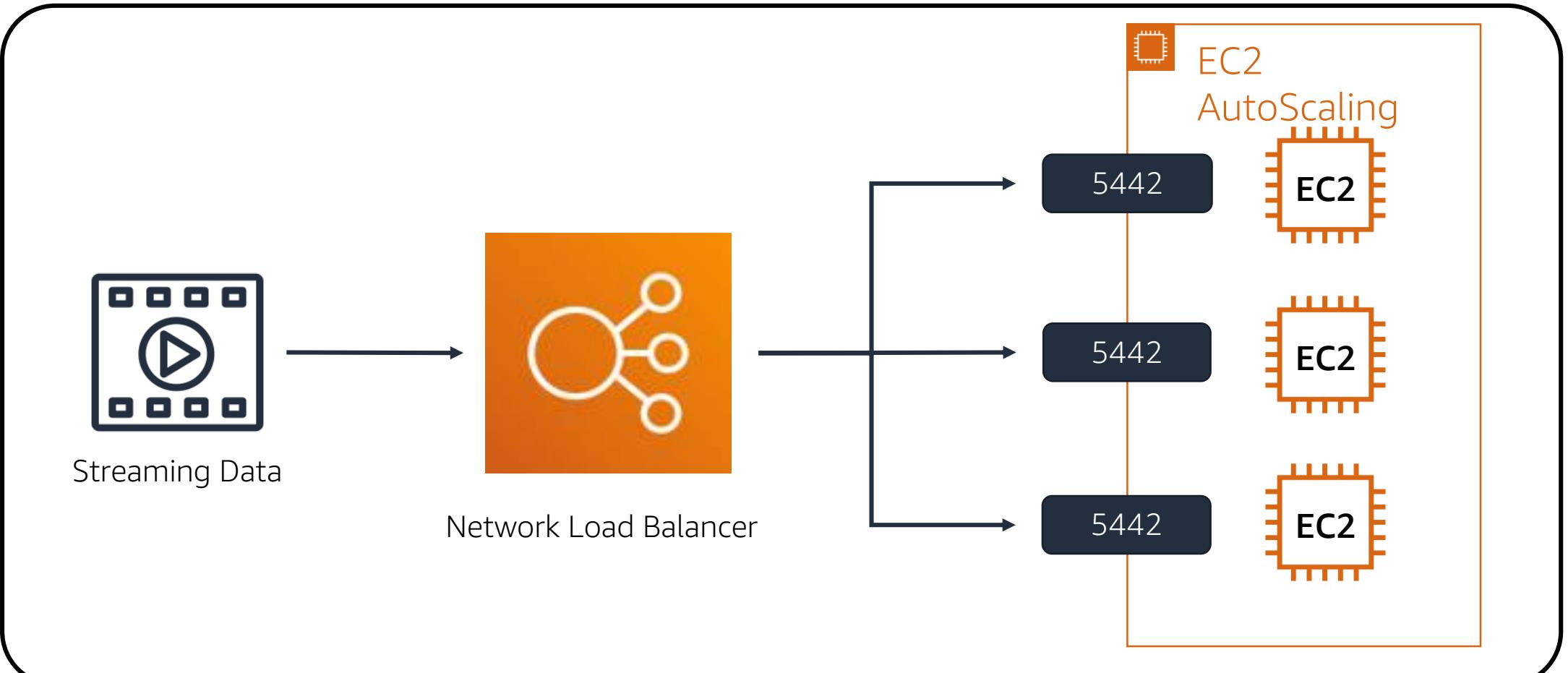
Operational monitoring



Application Load Balancer example



Network Load Balancer example



Automate deployment

What is AWS CloudFormation?

Model and provision all your cloud infrastructure resources



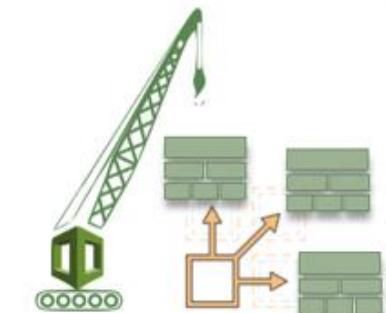
Code your infrastructure template in either YAML or JSON format



Check out your template code locally or upload to an S3 bucket.

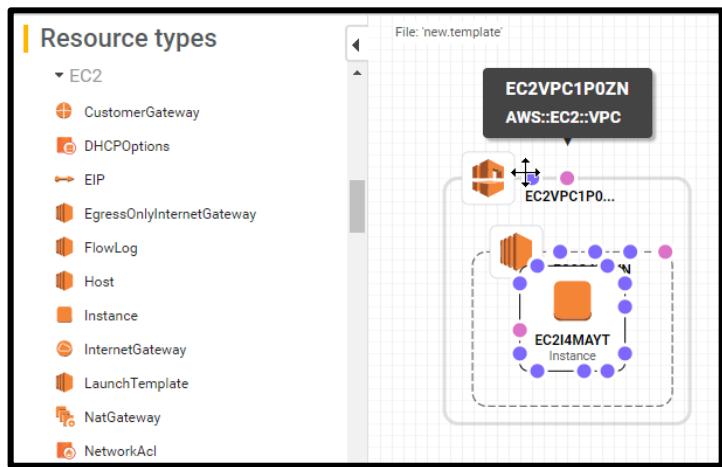


Create a stack based on your template code

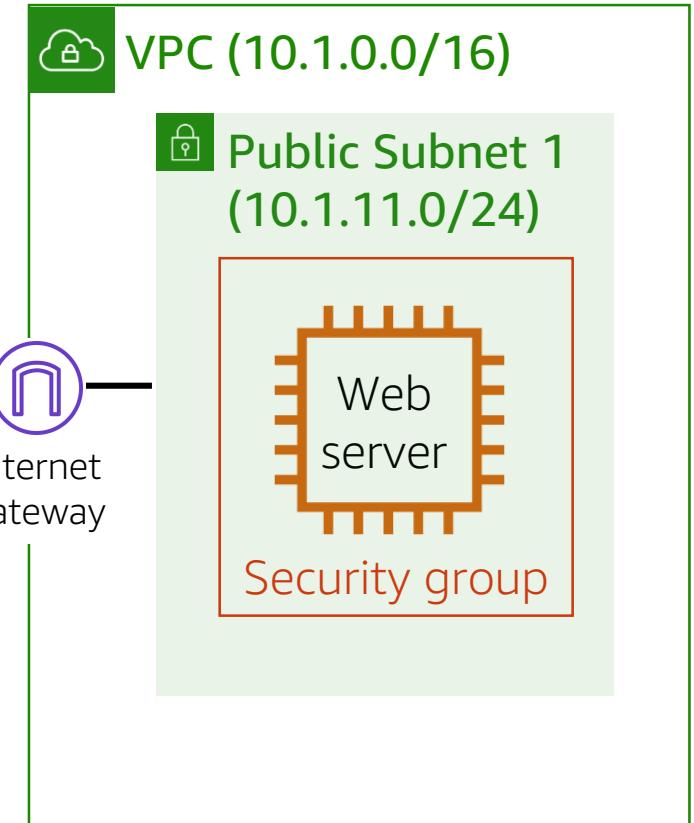
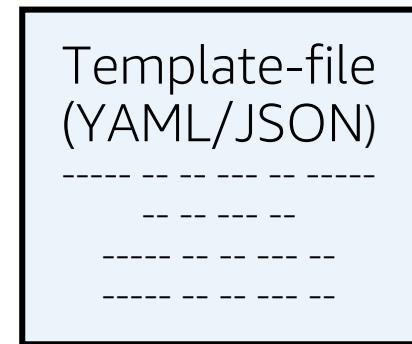


AWS CloudFormation provisions the resources

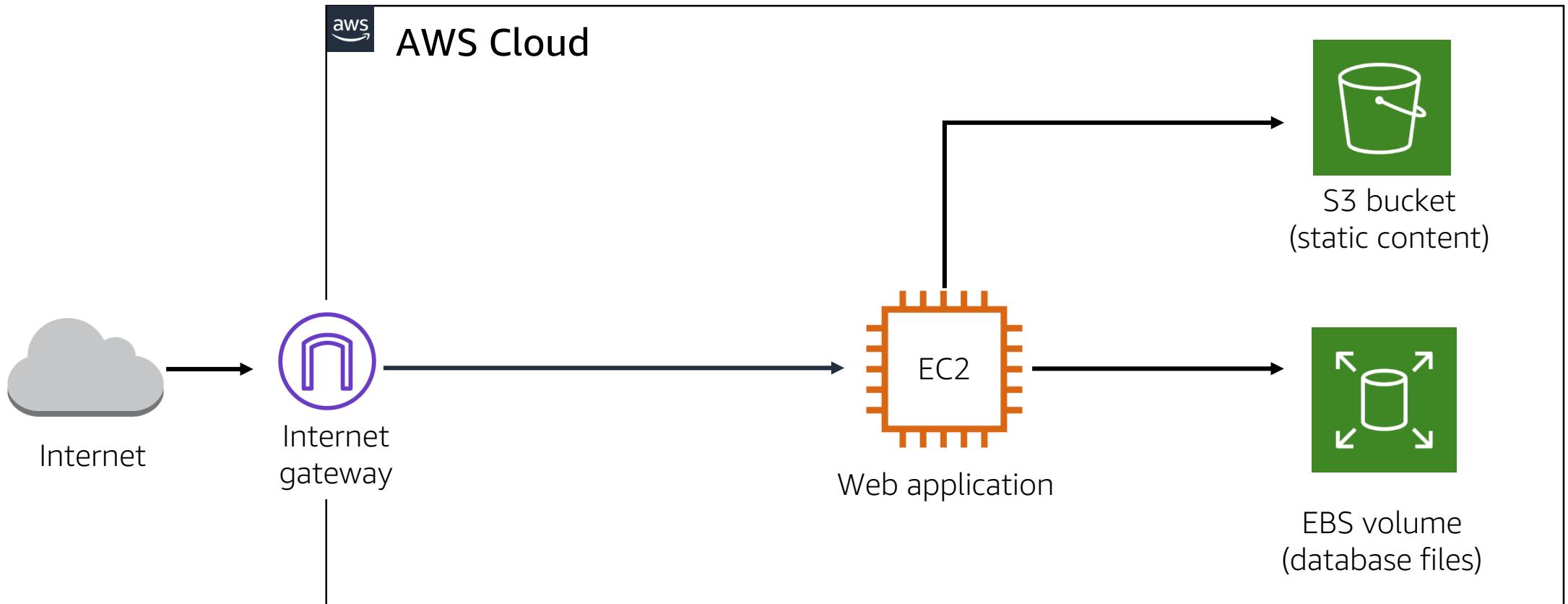
AWS CloudFormation example



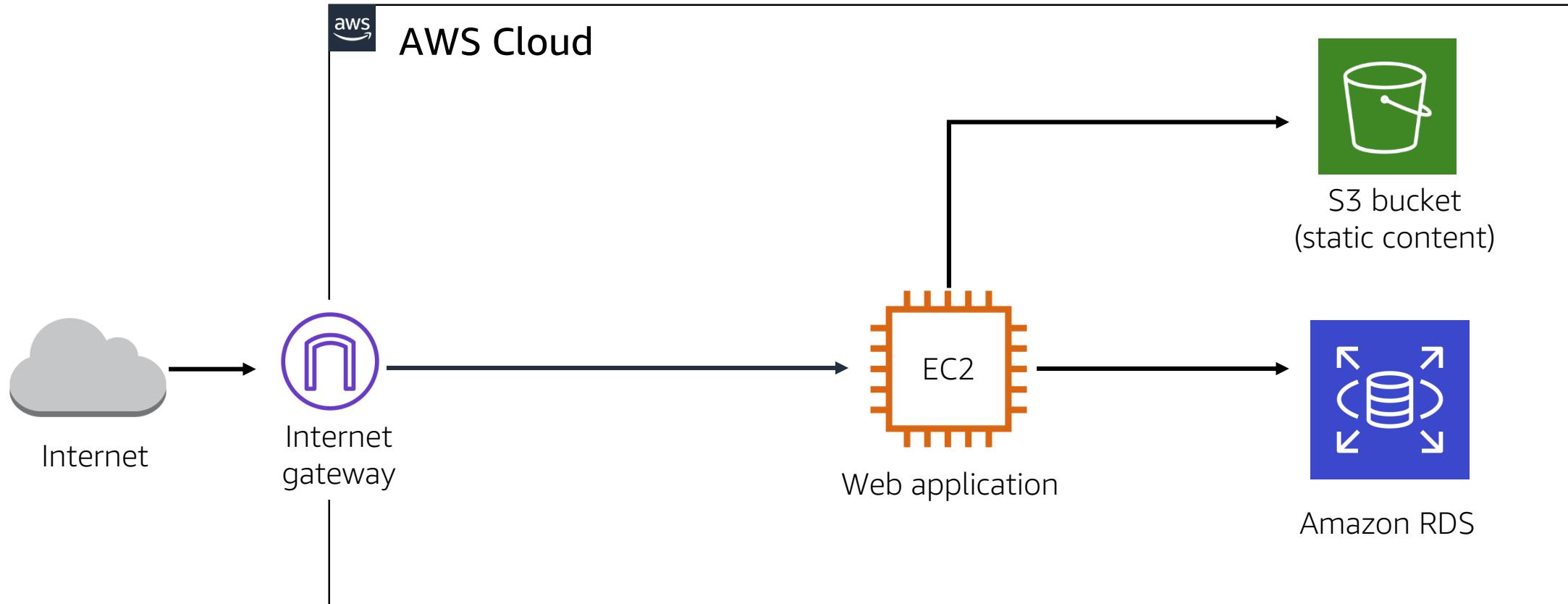
CloudFormation Designer



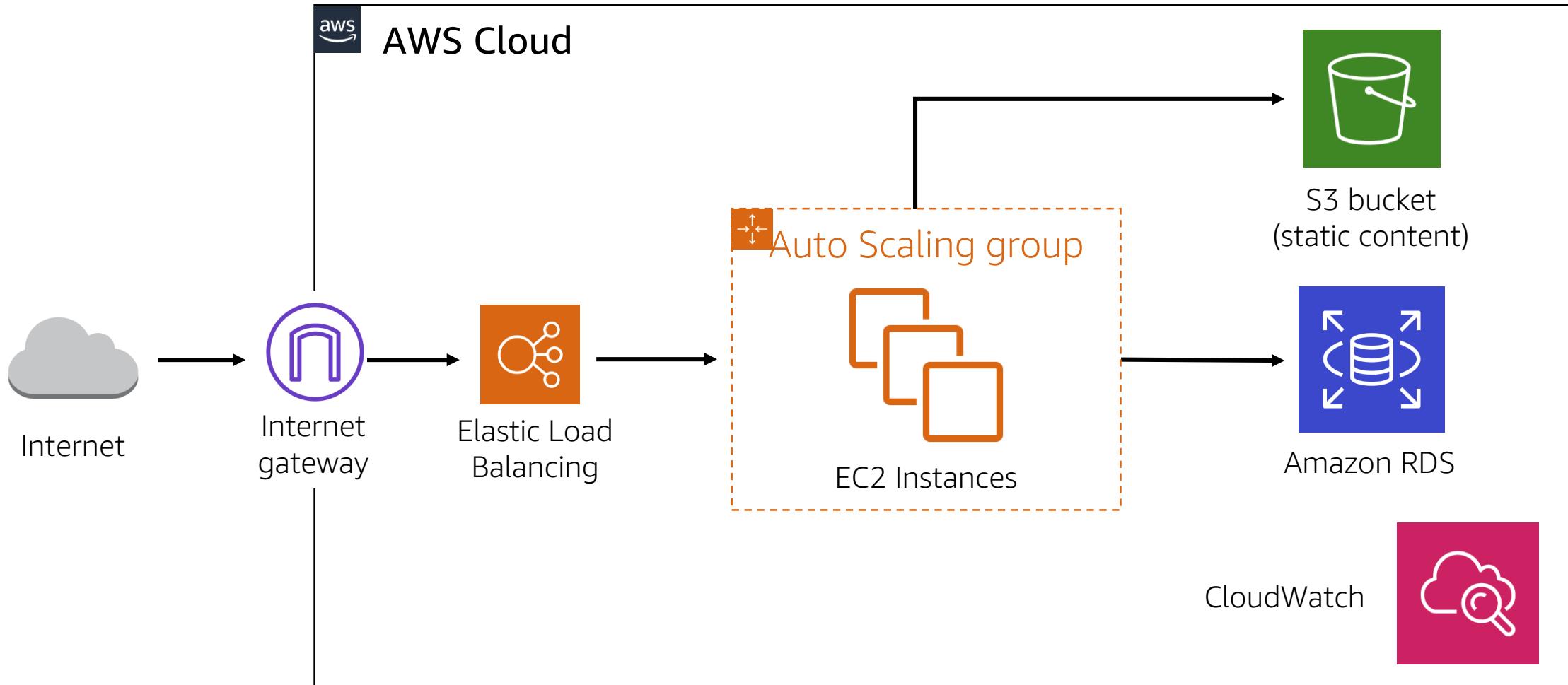
Putting it all together (1 of 4)



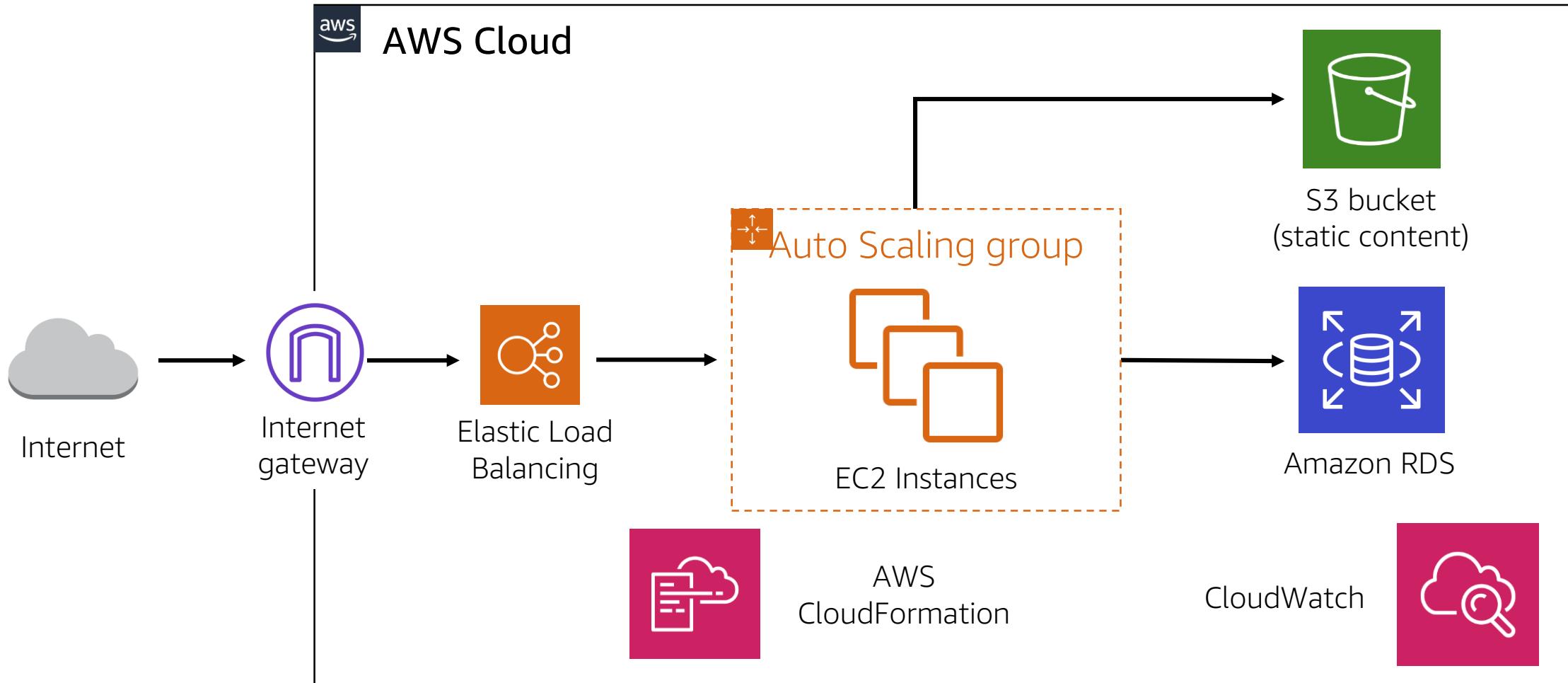
Putting it all together (2 of 4)



Putting it all together (3 of 4)



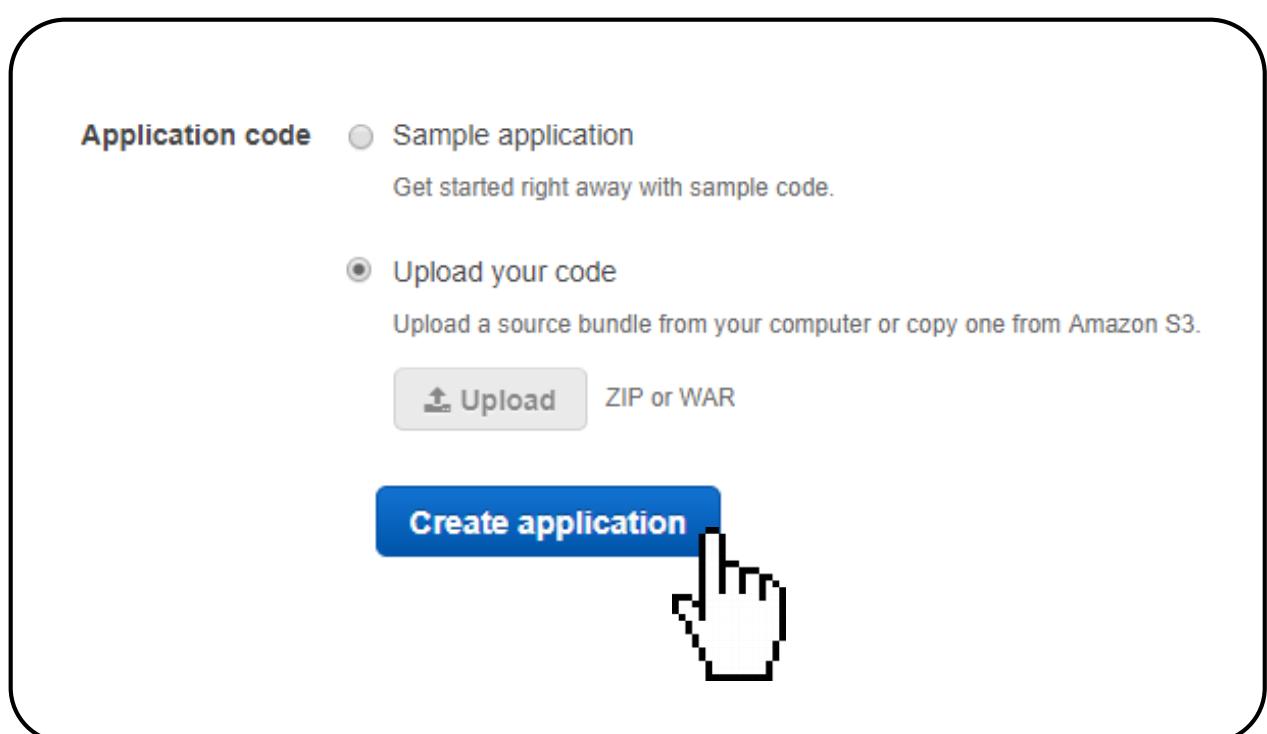
Putting it all together (4 of 4)



How can I deploy without managing infrastructure?

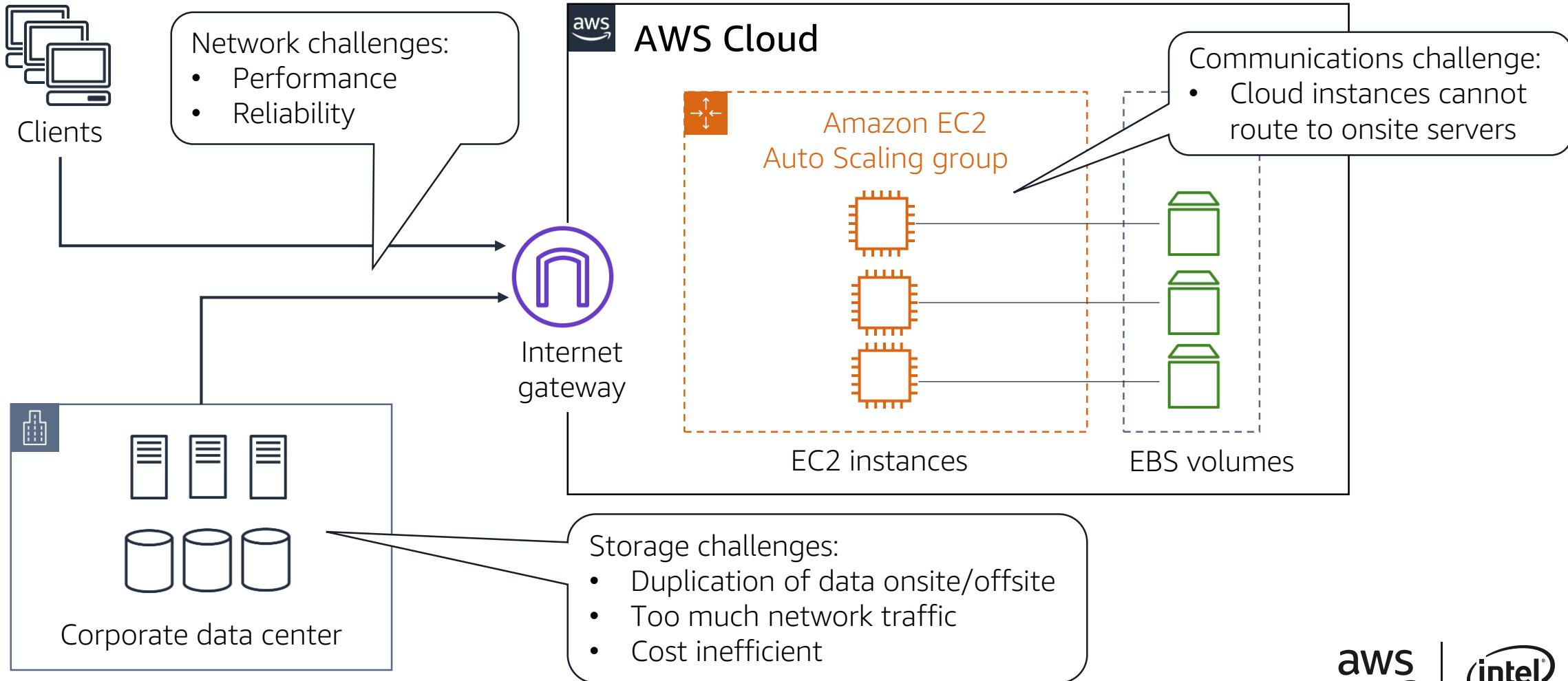
Quickly deploy and manage applications with AWS Elastic Beanstalk

- Upload your application code
- The service handles:
 - ✓ Resource provisioning
 - ✓ Load balancing
 - ✓ Automatic scaling
 - ✓ Monitoring
- Support applications that scale to serve millions of users



Connect and share data

Challenge: hybrid cloud



What is AWS Direct Connect?

A dedicated network connection from your premises to AWS



Reduces network costs



Creates consistent network performance



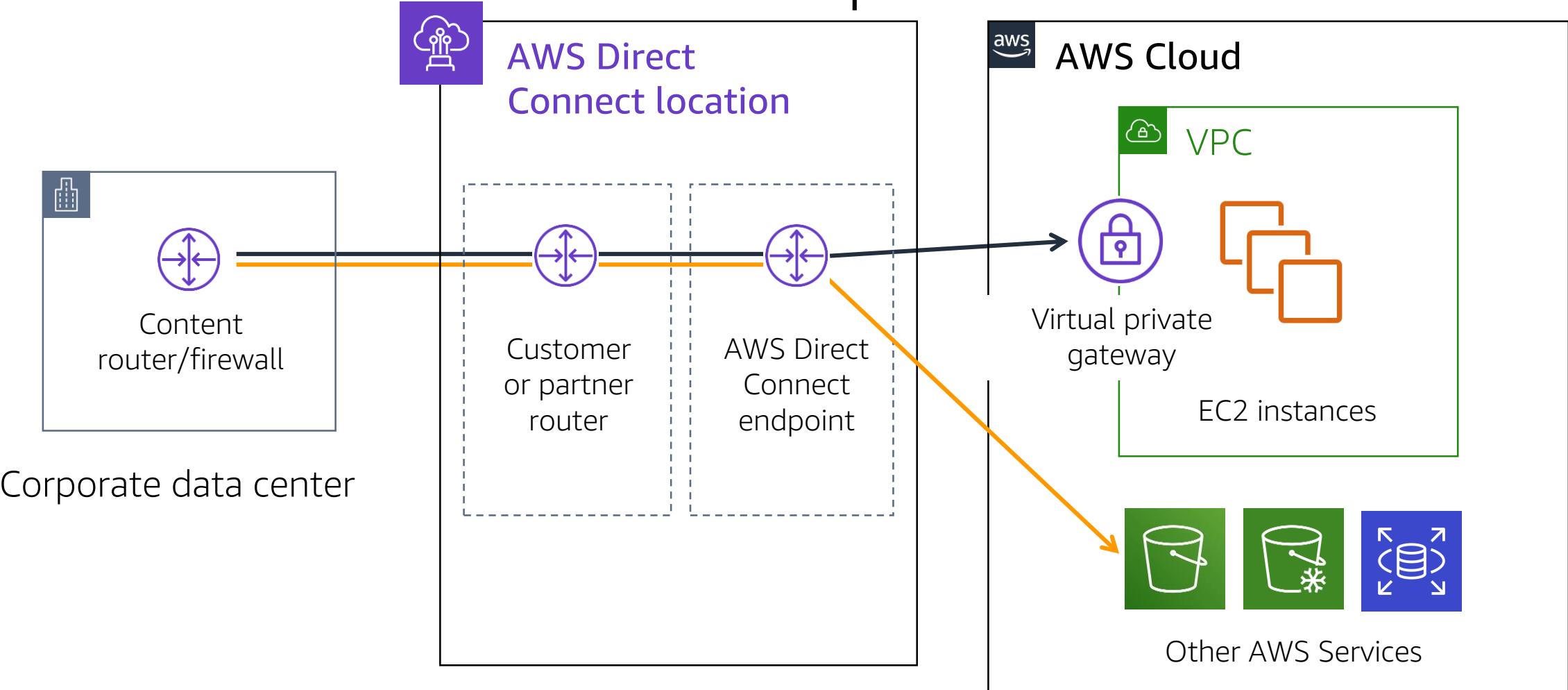
Provides private connectivity to your Amazon VPC



Scales easily



AWS Direct Connect example



What is Amazon Route 53?

A highly available and scalable Domain Name System (DNS) web service



Register domain names



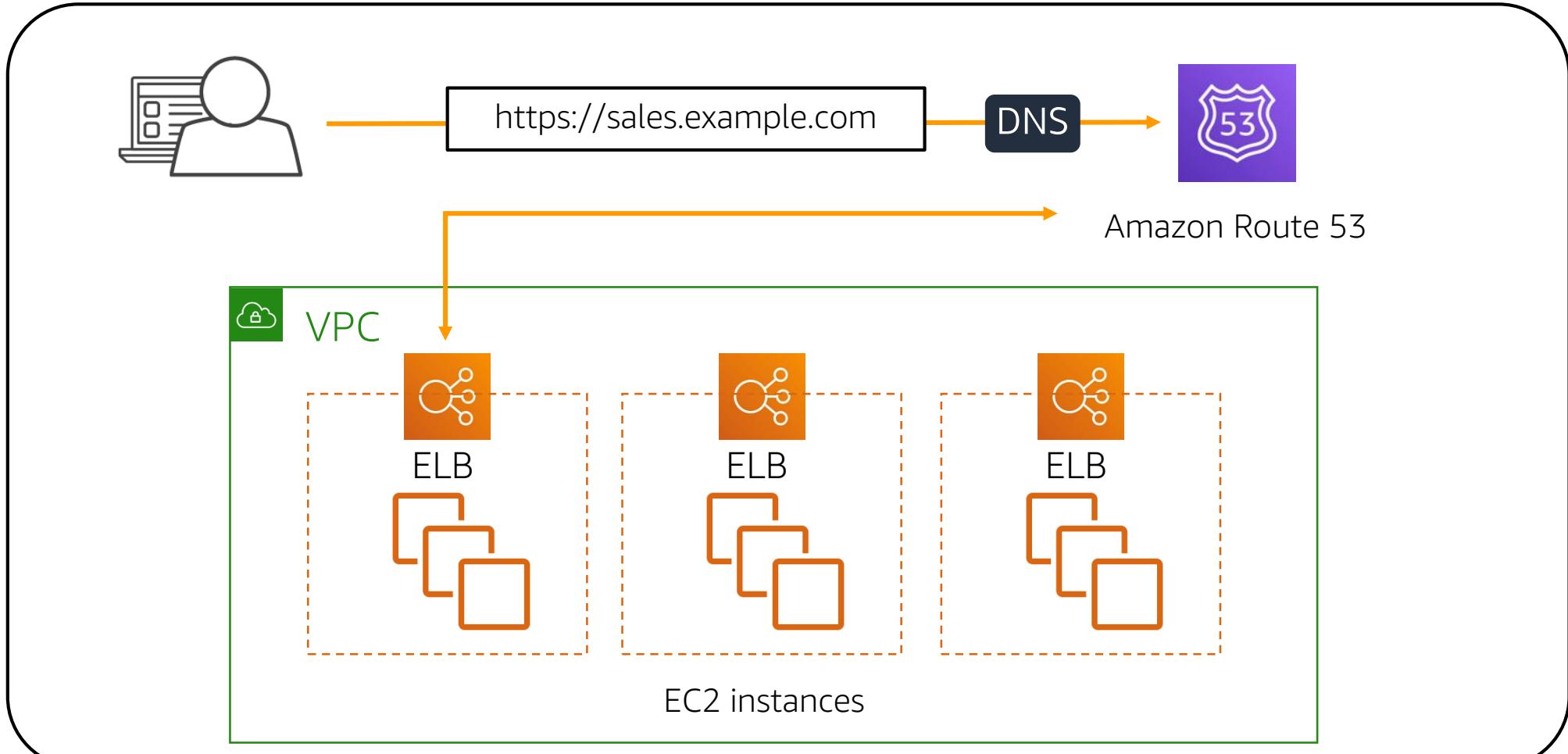
Route internet traffic to the resources for your domain



Check the health of your resources



Routing traffic



What is Amazon Elastic File System (Amazon EFS)?

A scalable, elastic, cloud-native file system for Linux



Dynamic elasticity



Scalable performance



Shared file storage

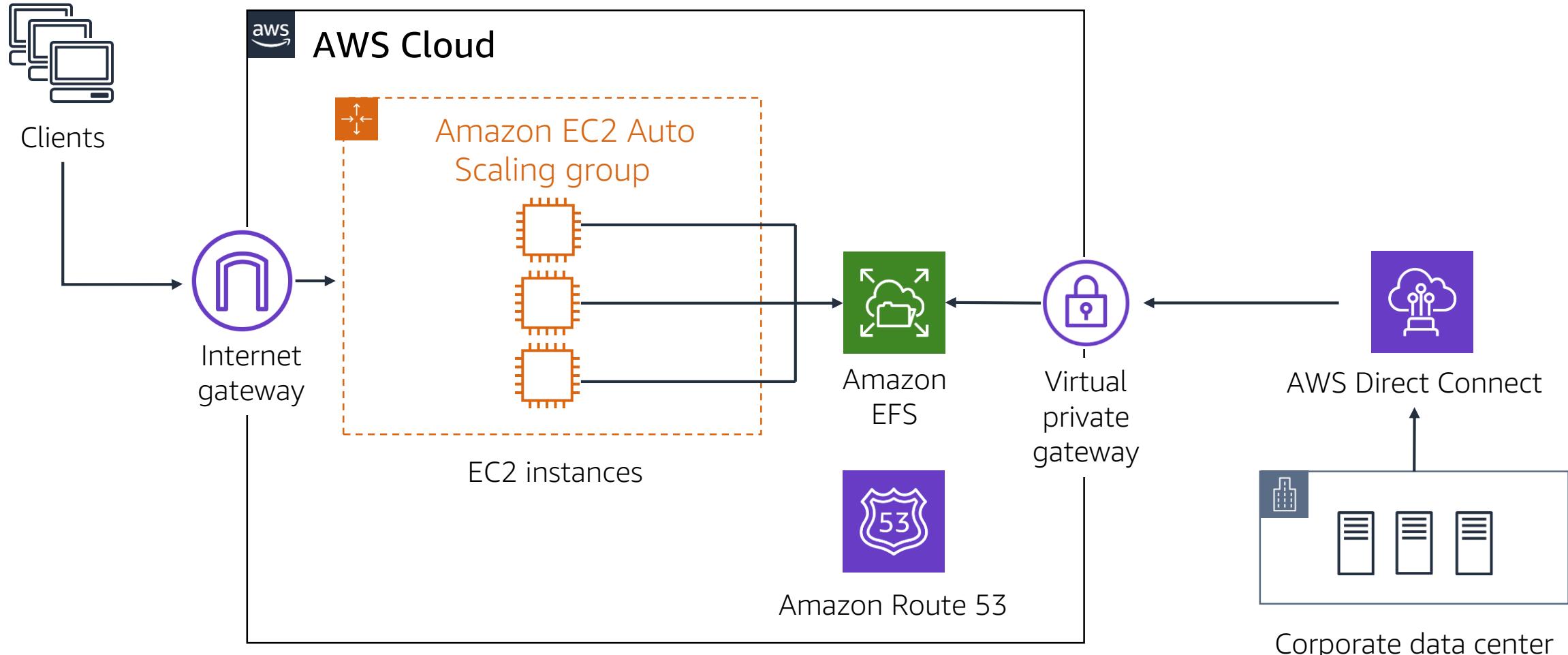


Fully managed



Cost-effective

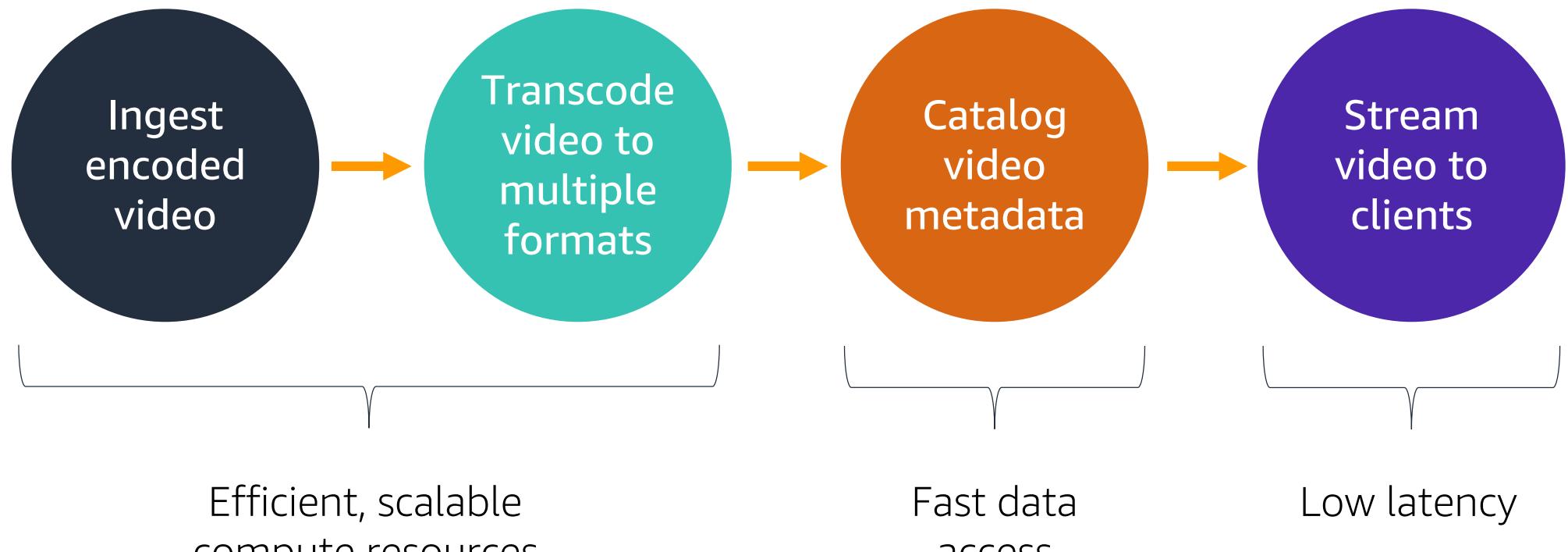
Putting it all together



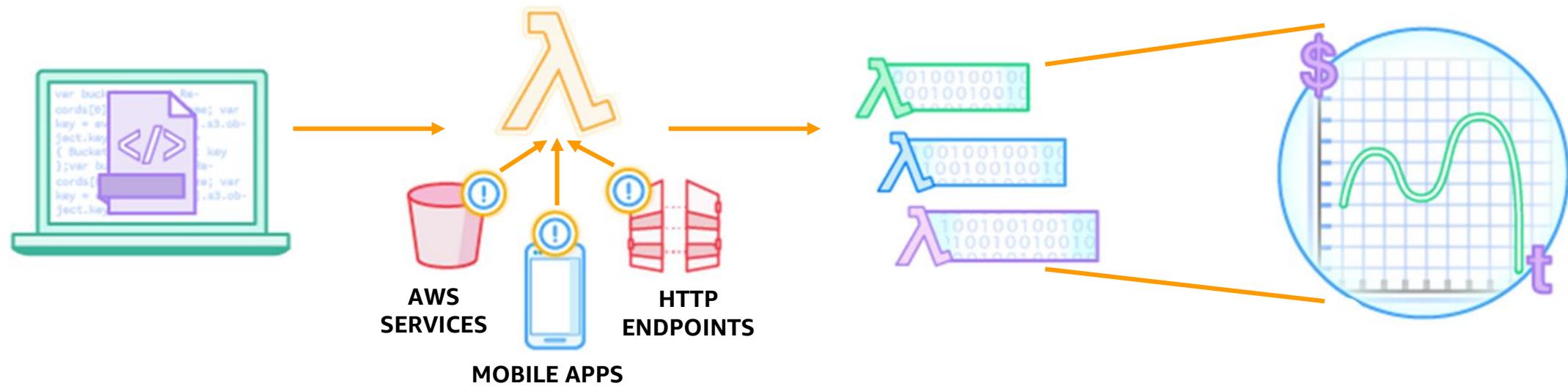
Deliver content faster

Challenge: media streaming service

The architecture must meet the following requirements:



AWS Lambda: run code without servers



Upload your code
to AWS Lambda

Set your code to trigger
from an event source

Lambda runs your code
only when triggered

Pay only for the
compute time you use

Benefits of Lambda



Supports multiple programming languages



Completely automated administration



Built-in fault tolerance

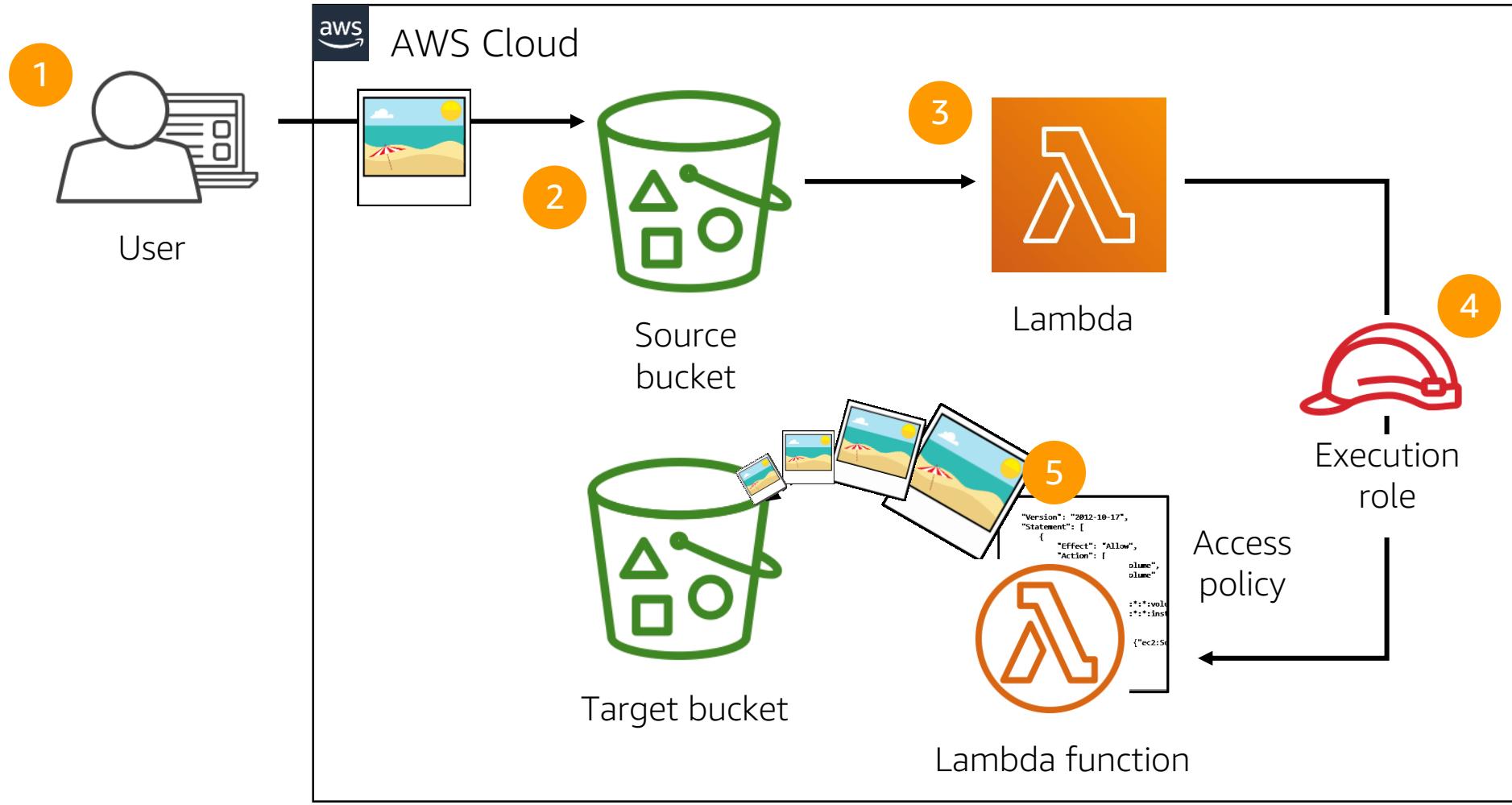


Supports orchestration of multiple functions



Pay per use pricing

Lambda example: create thumbnails



What is Amazon Simple Notification Service (Amazon SNS)?

Fully managed pub/sub messaging for distributed or serverless applications



Reliably deliver messages with durability



Automatically scale your workload

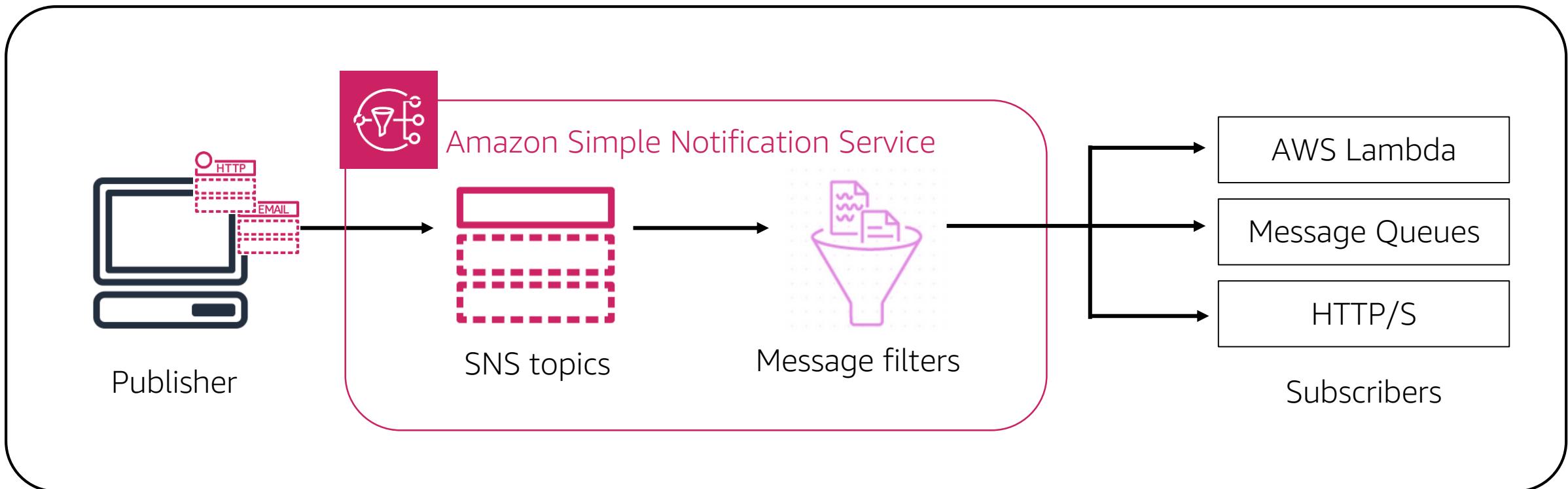


Simplify your architecture

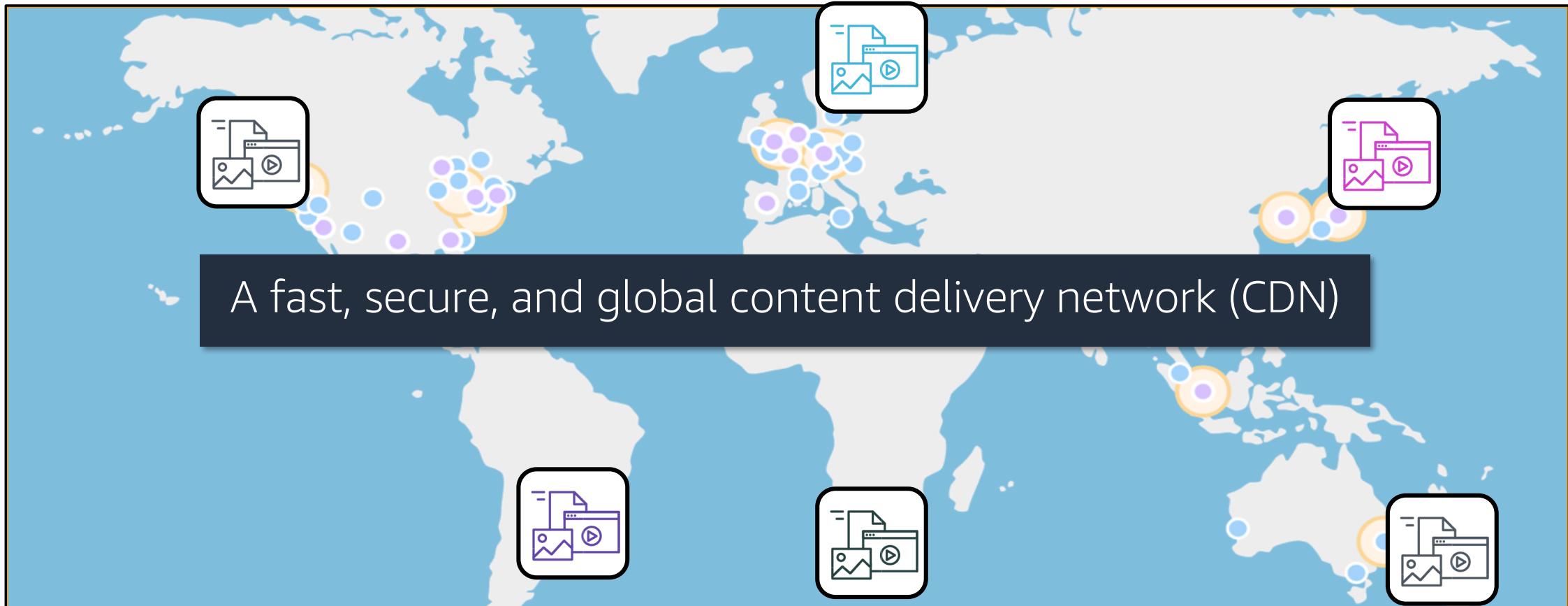


Keep messages private and secure

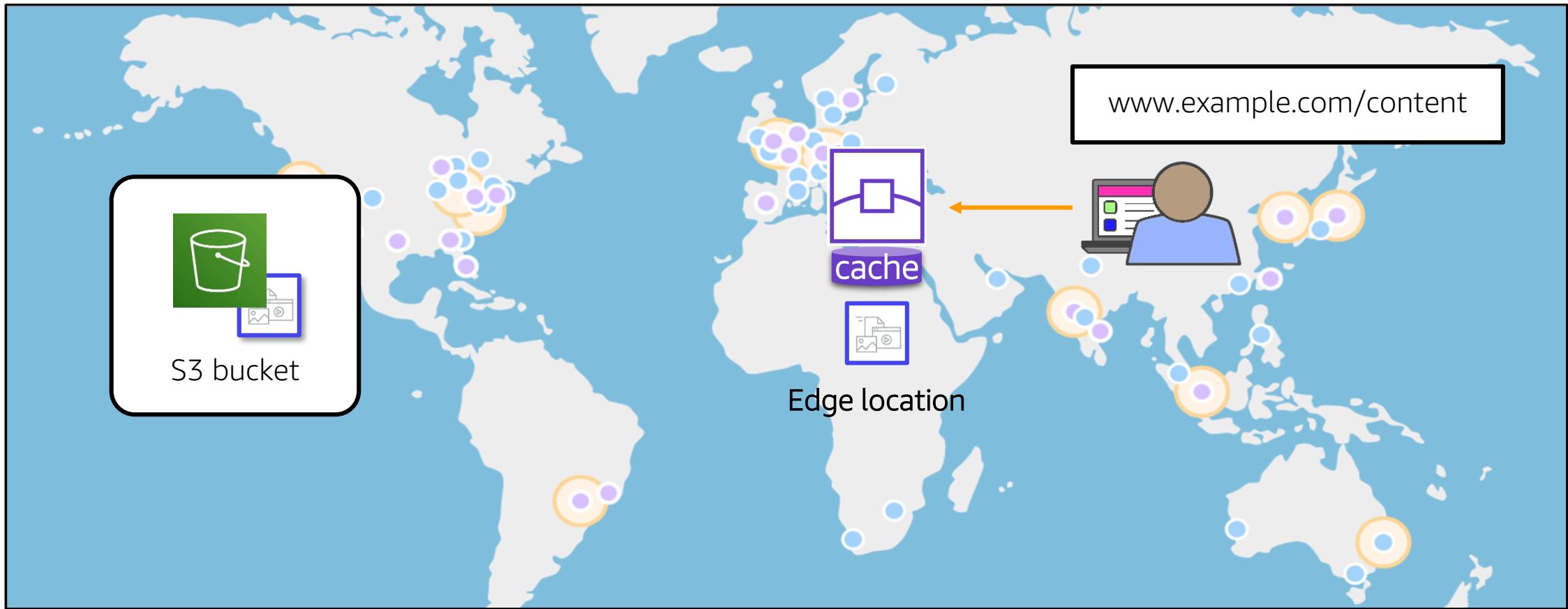
Amazon SNS overview



What is Amazon CloudFront?

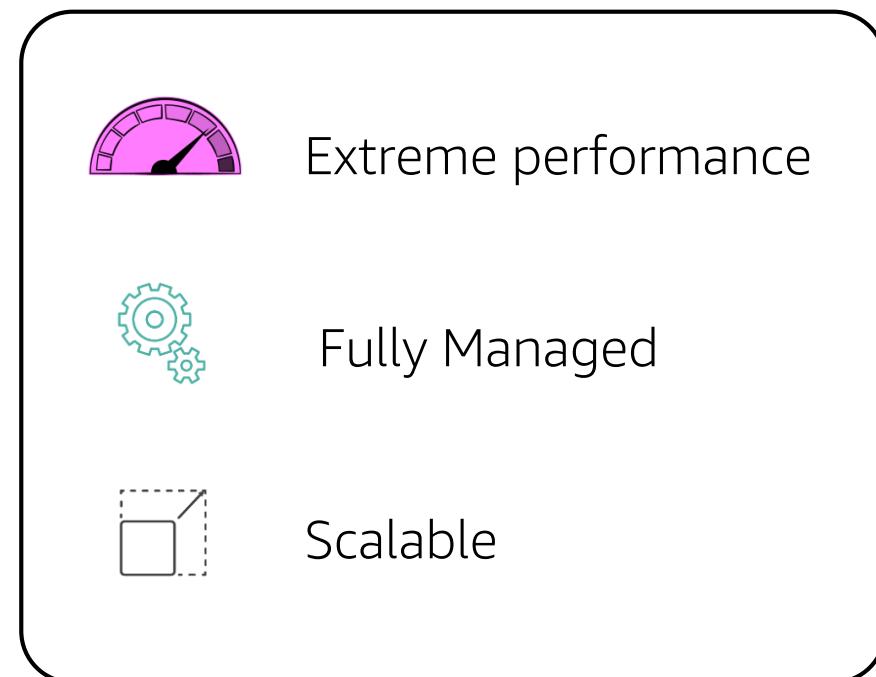


How CloudFront delivers content to users



What is Amazon ElastiCache?

Fully managed Redis or Memcached-compatible in-memory data store

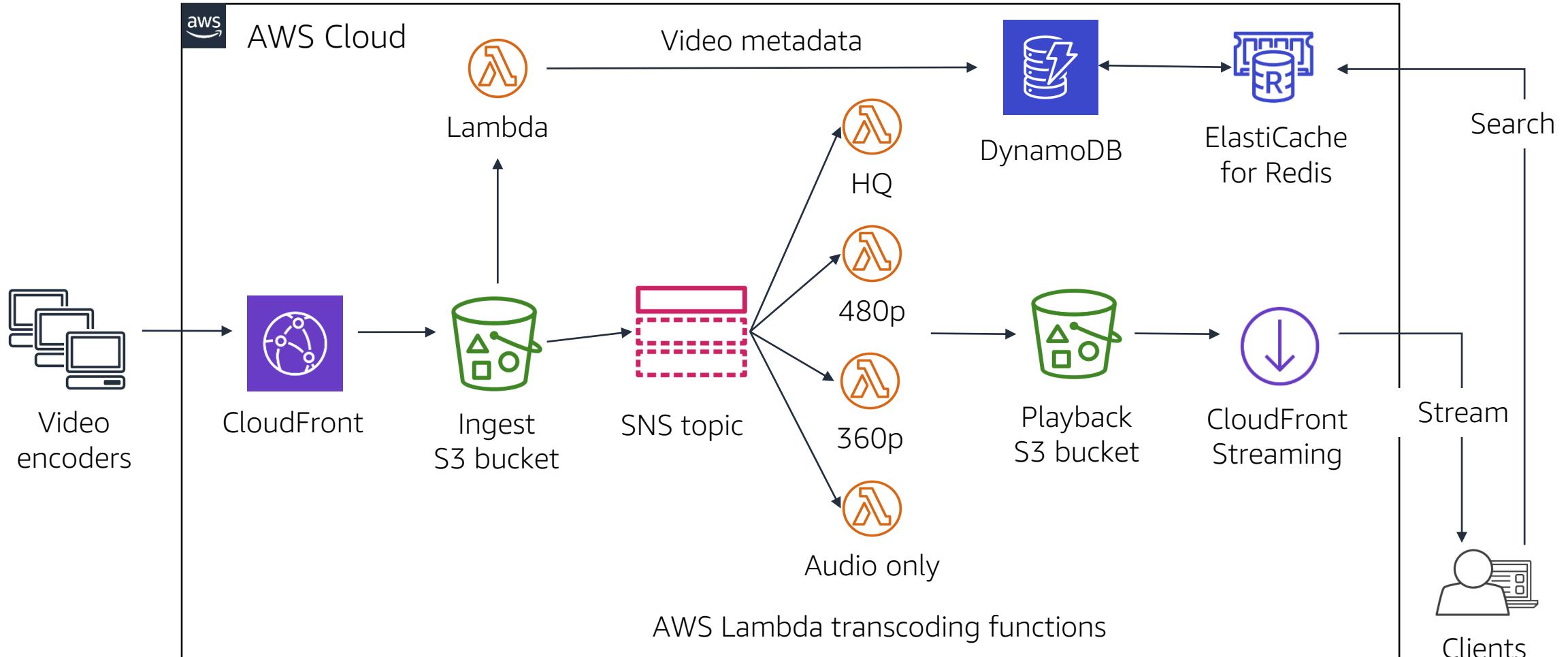


**Amazon ElastiCache
for Redis**
Versatile in-memory data store



**Amazon ElastiCache
for Memcached**
Scalable caching tier
for data-intensive apps

Challenge: Media streaming service



Key Takeaways

Amazon CloudWatch	Have complete visibility of your cloud resources and applications
Elastic Load Balancing Application Auto Scaling	Deploy highly available applications that scale with demand
AWS Database Services	Run SQL or NoSQL databases without the management overhead
AWS CloudFormation	Programmatically deploy repeatable infrastructure
AWS Elastic Beanstalk	Deploy your application in the simplest way possible
AWS Direct Connect	Provision a dedicated network connection from your premises to AWS
Amazon Route 53	Run a highly available and scalable Domain Name System (DNS) web service
AWS Lambda	Run code without managing servers
Amazon CloudFront	Deliver your content across a massively scaled and globally available network



End of Module 3

Test Your Knowledge