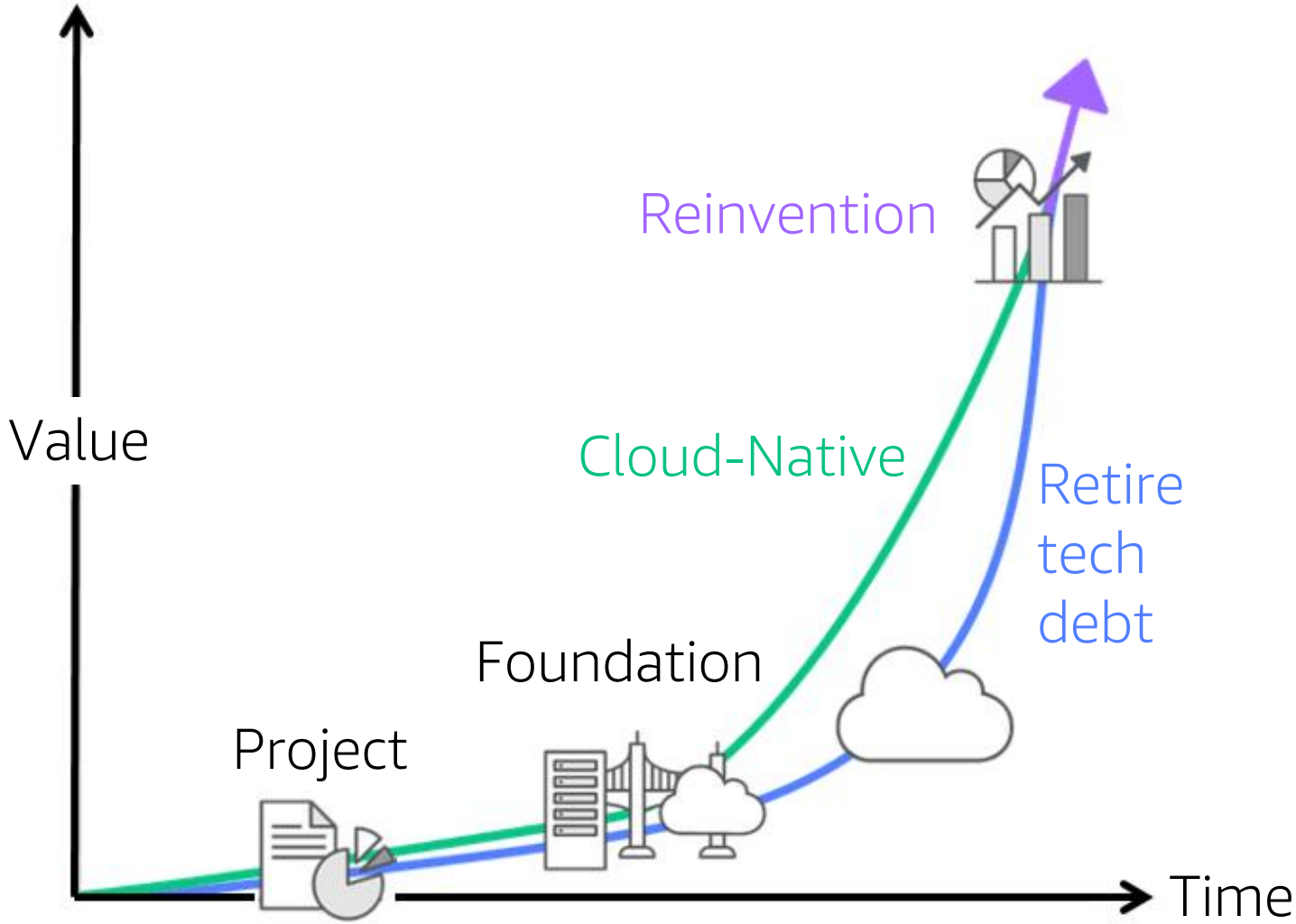
AWSOME DAY
ONLINE CONFERENCE

Module 3: Building in the cloud

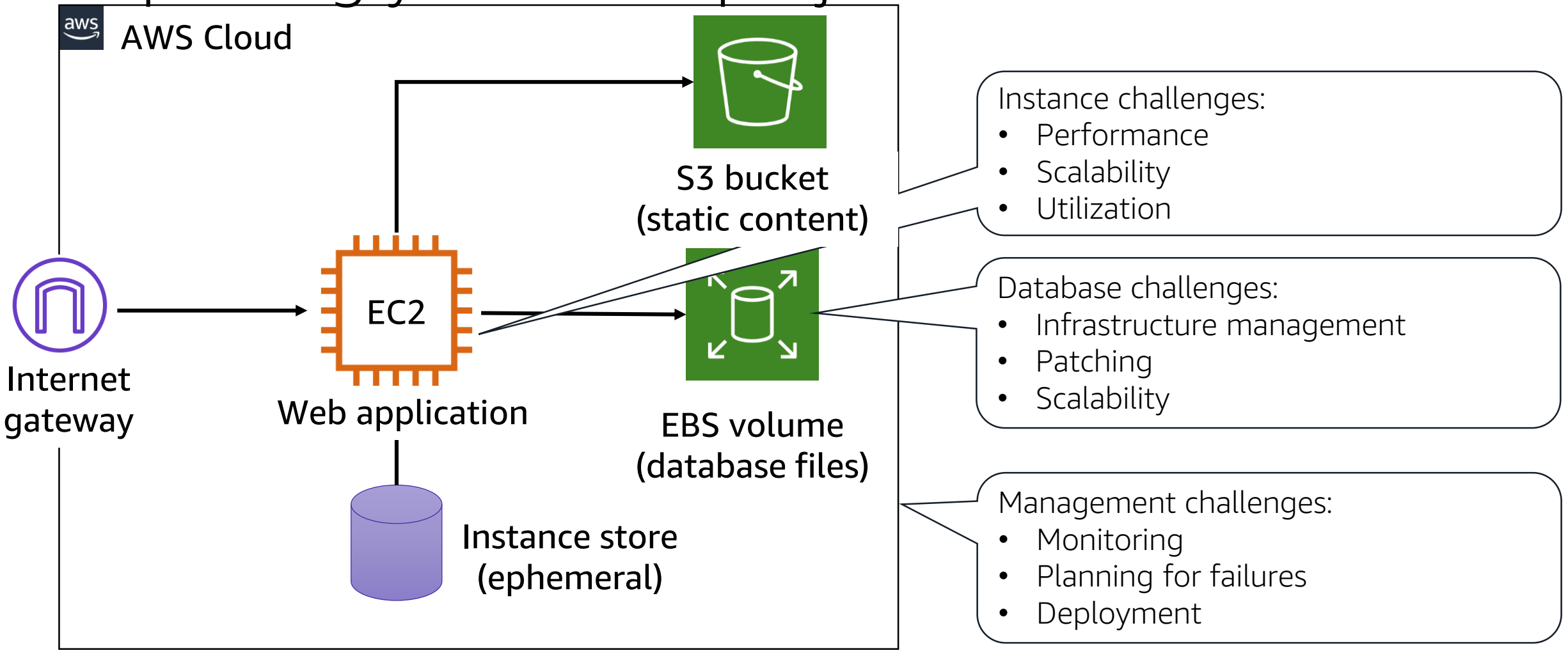
Patrick Do
Technical Trainer
AWS

Go beyond servers and storage

Migration and reinvention

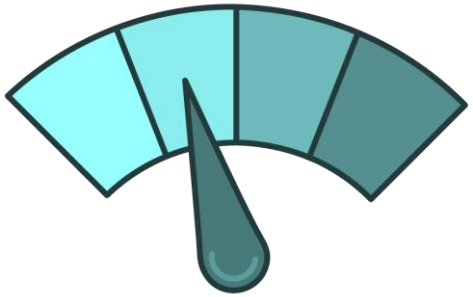


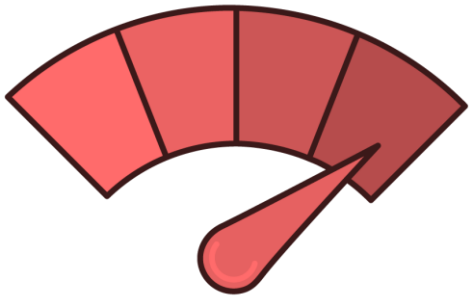
Improving your initial project



Monitor AWS resources

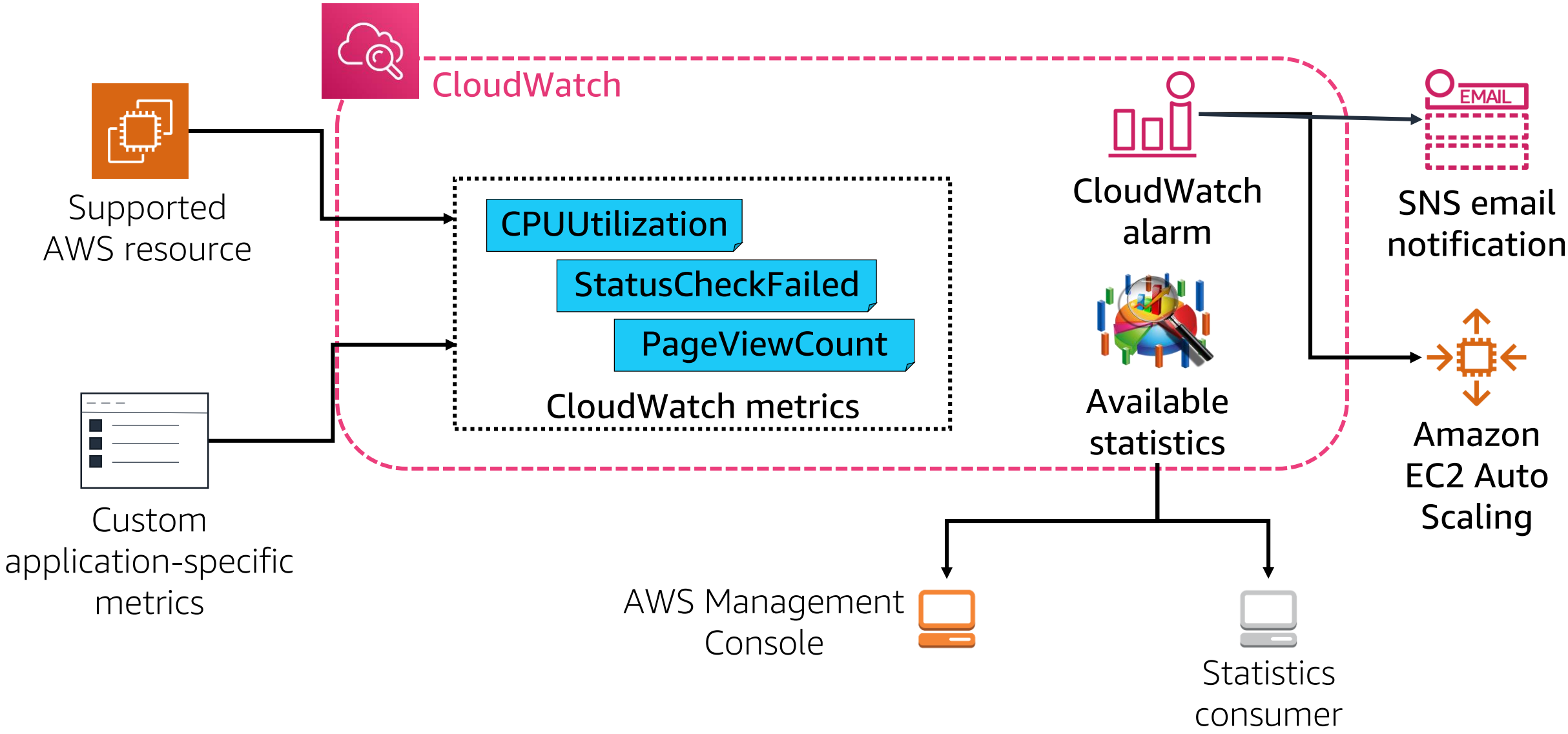
What is Amazon CloudWatch?





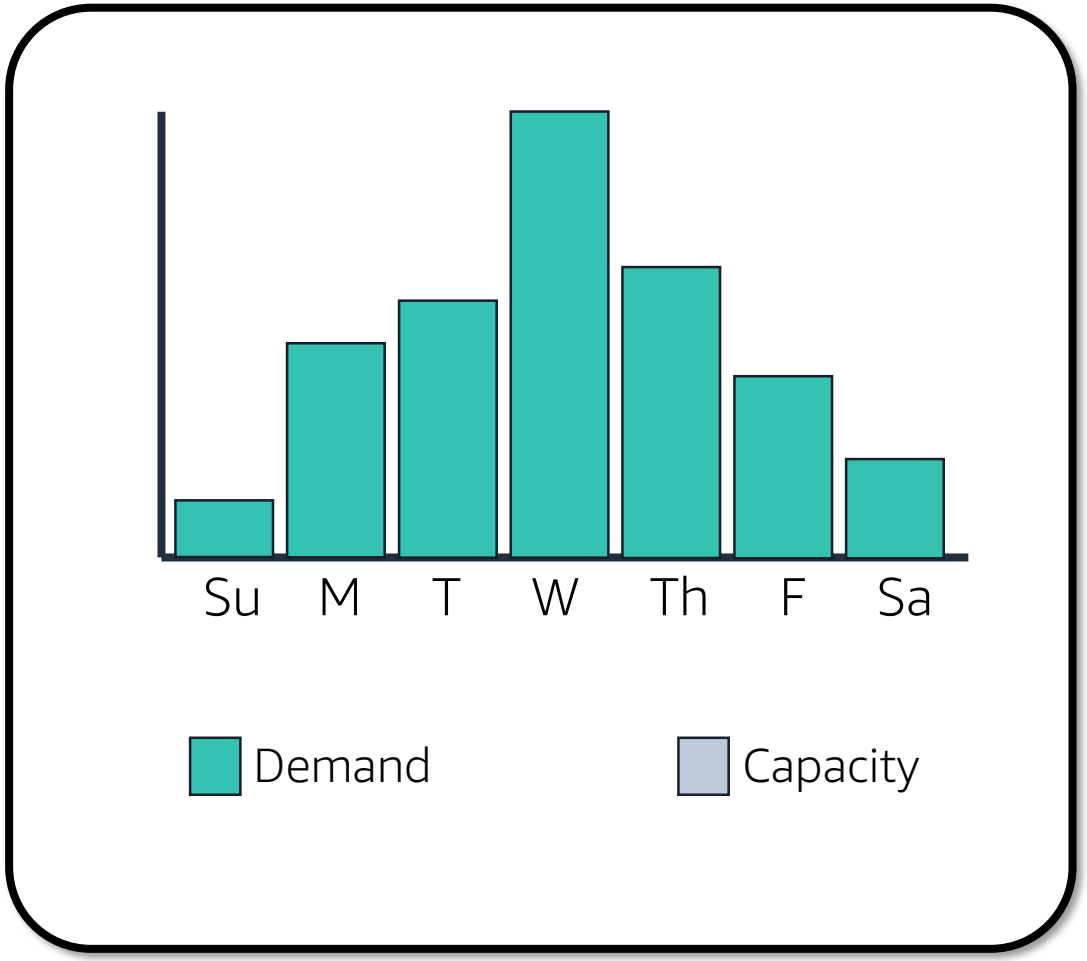
- Monitors:
  - AWS resources
  - Applications running on AWS
- Collects and tracks:
  - Standard metrics
  - Custom metrics
- Alarms:
  - Send notifications
  - Automatically make changes based on rules you define

How CloudWatch works



Manage demand efficiently

Why scaling matters



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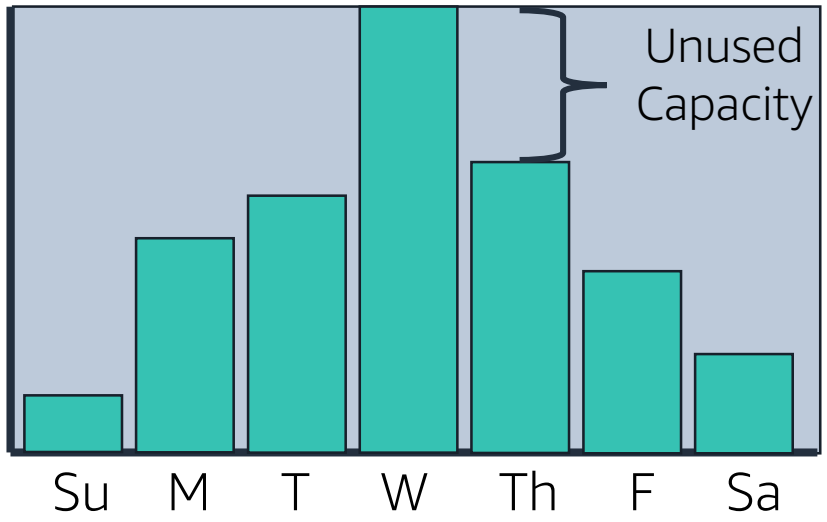

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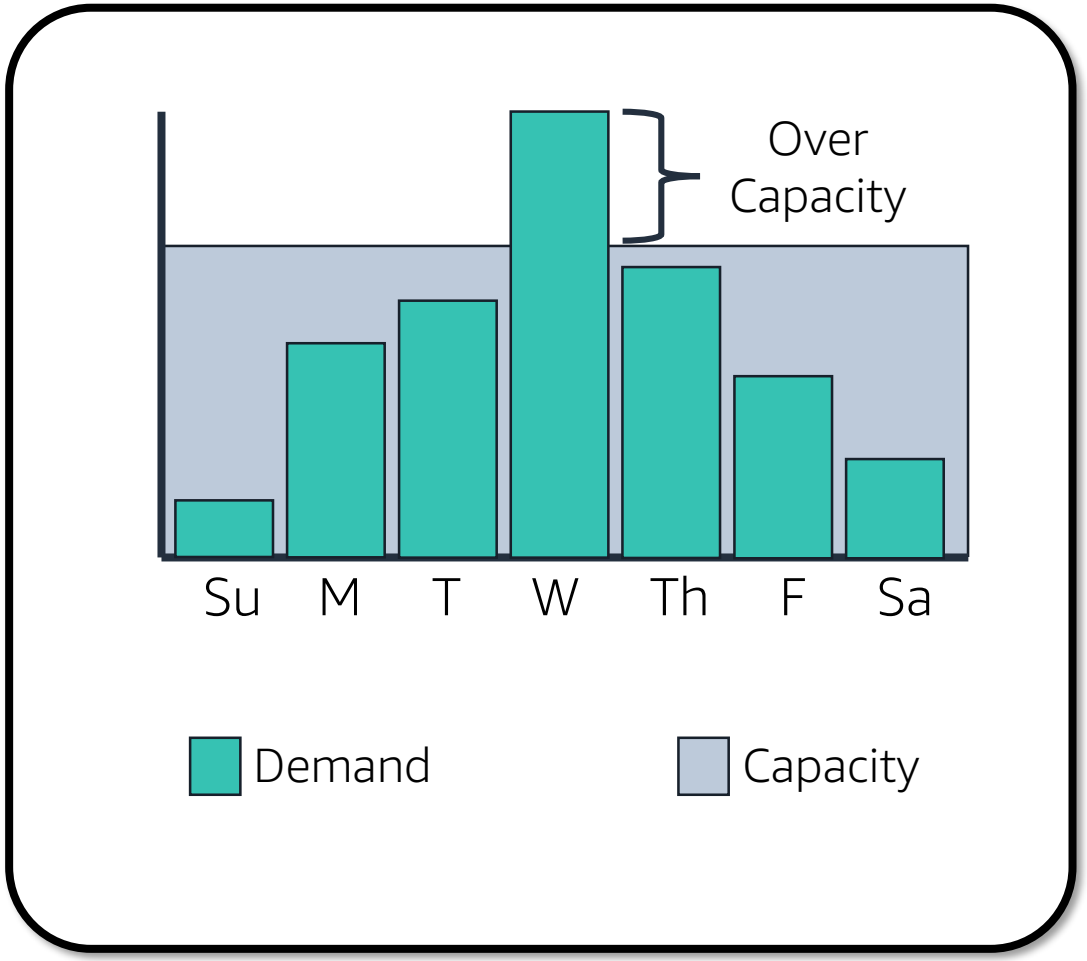

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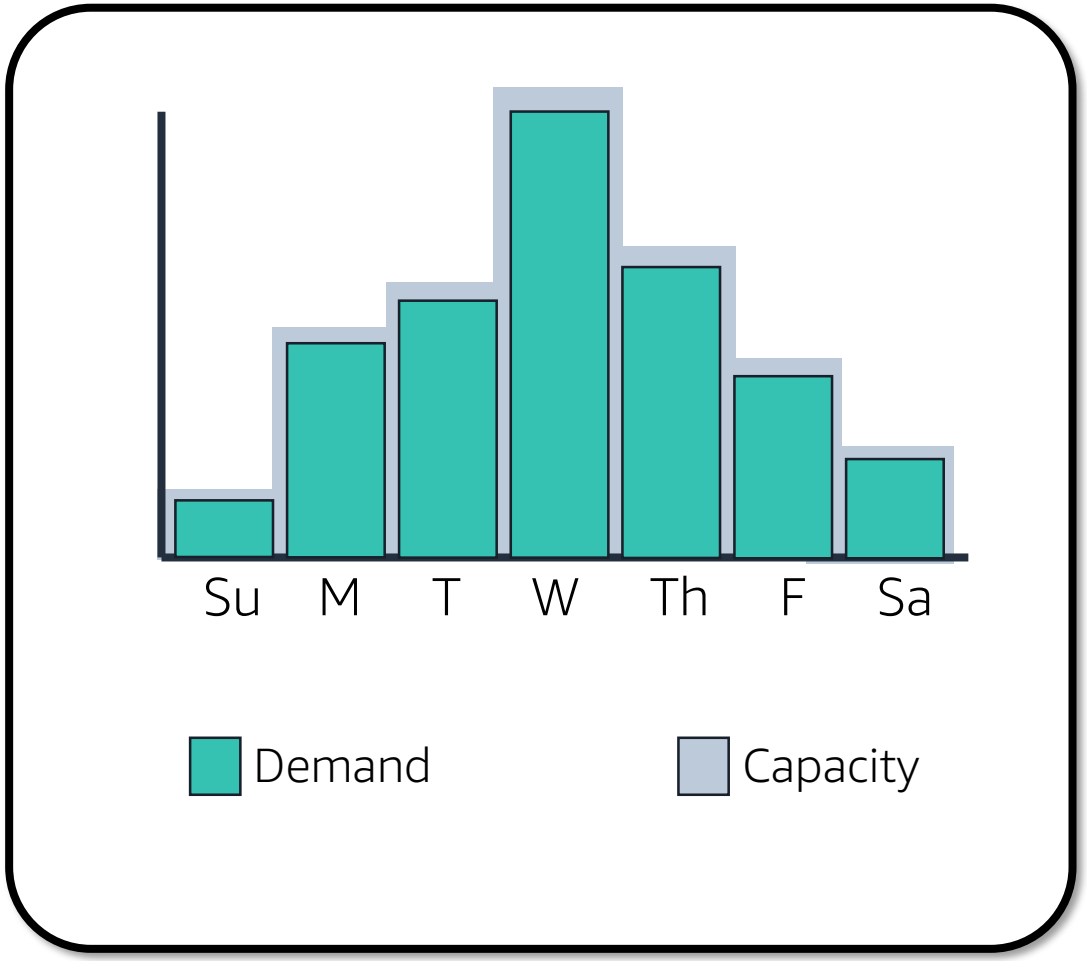


Amazon EC2 Auto Scaling adjusts capacity as needed

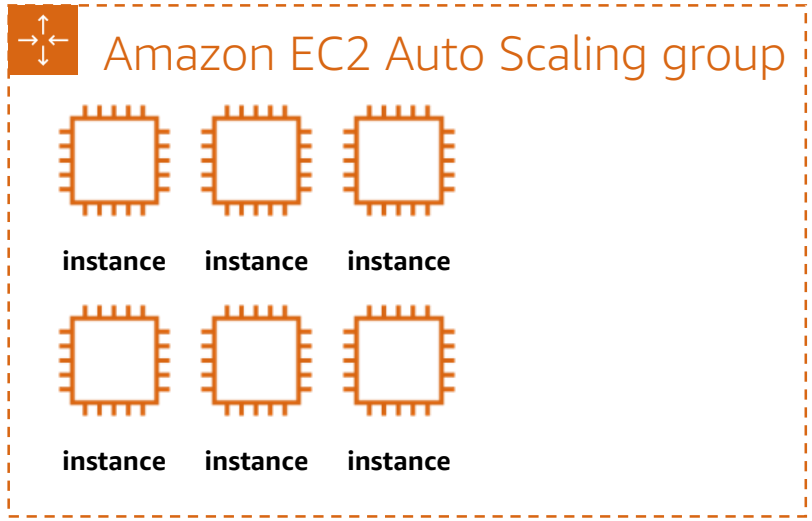
- Scale out for spikes
- Scale in during off-peak
- Replace unhealthy instances
- Pay only for what you use

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



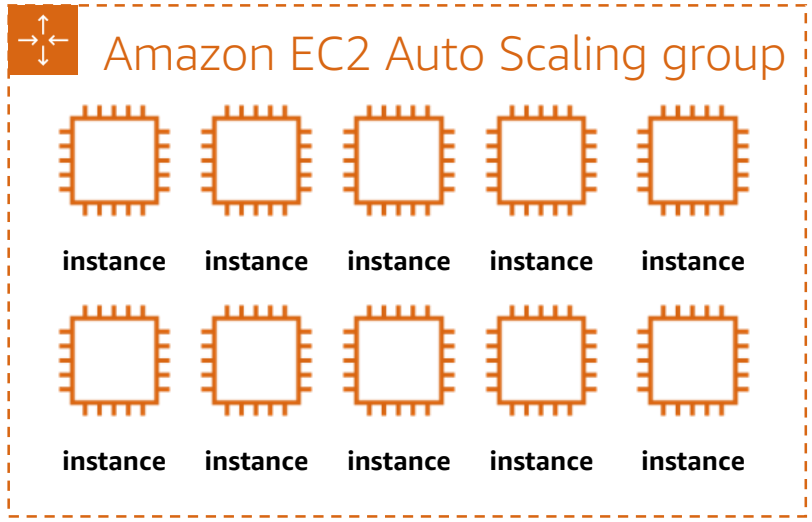
Average Demand

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



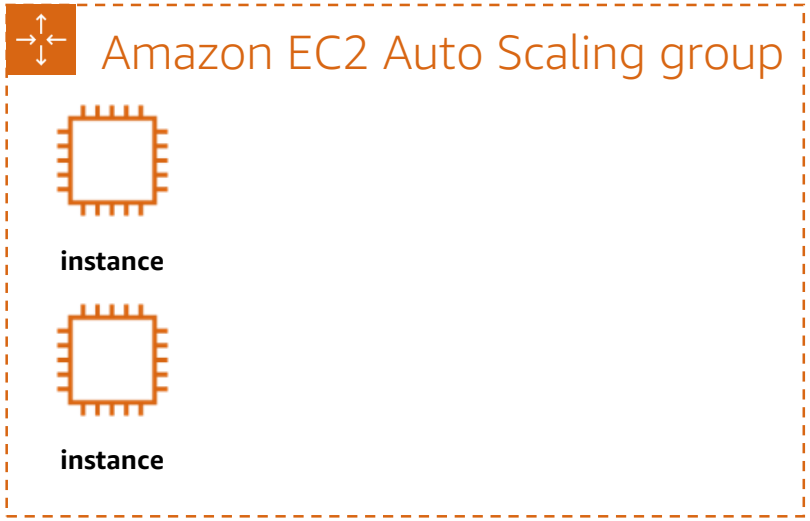
High Demand

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



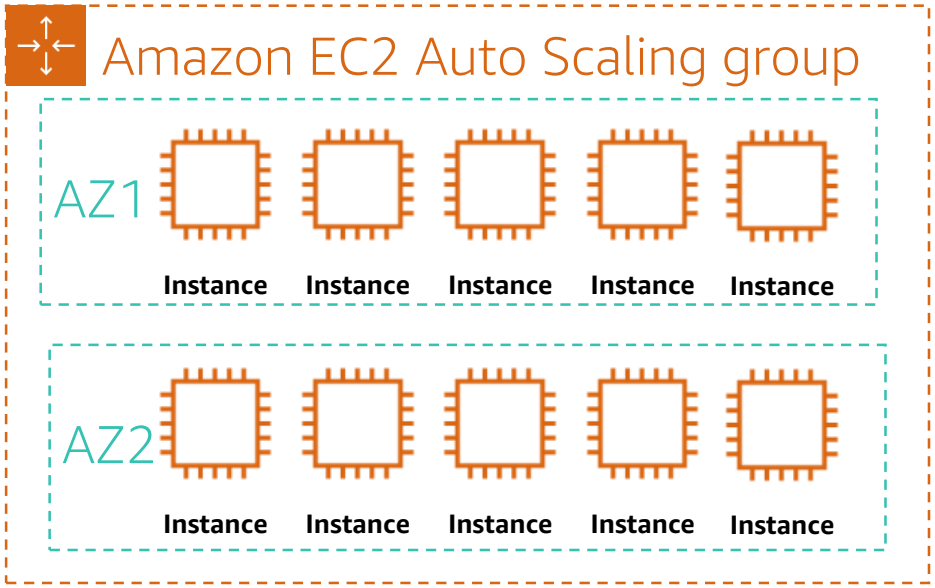
Low Demand

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



Fleet management with Amazon EC2 Auto Scaling

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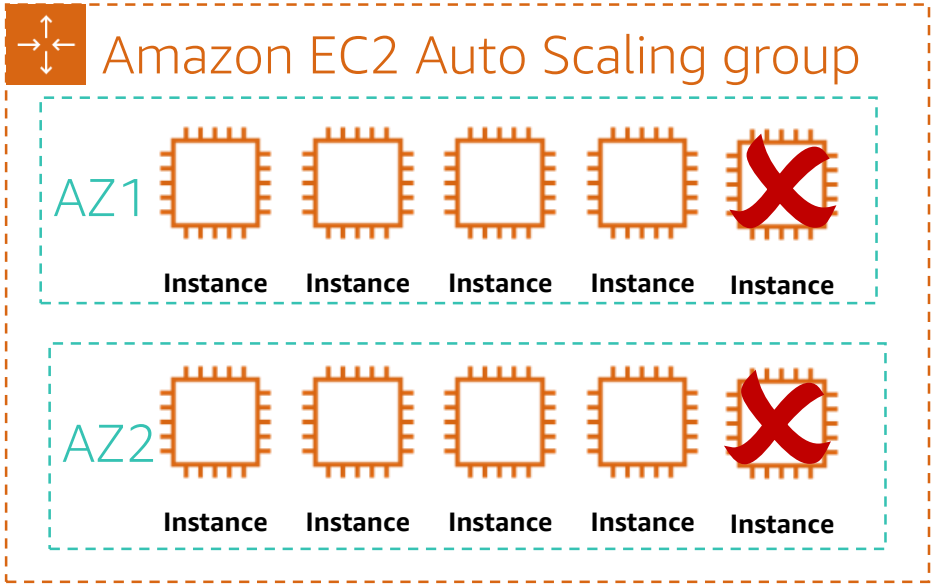

Fleet management with Amazon EC2 Auto Scaling

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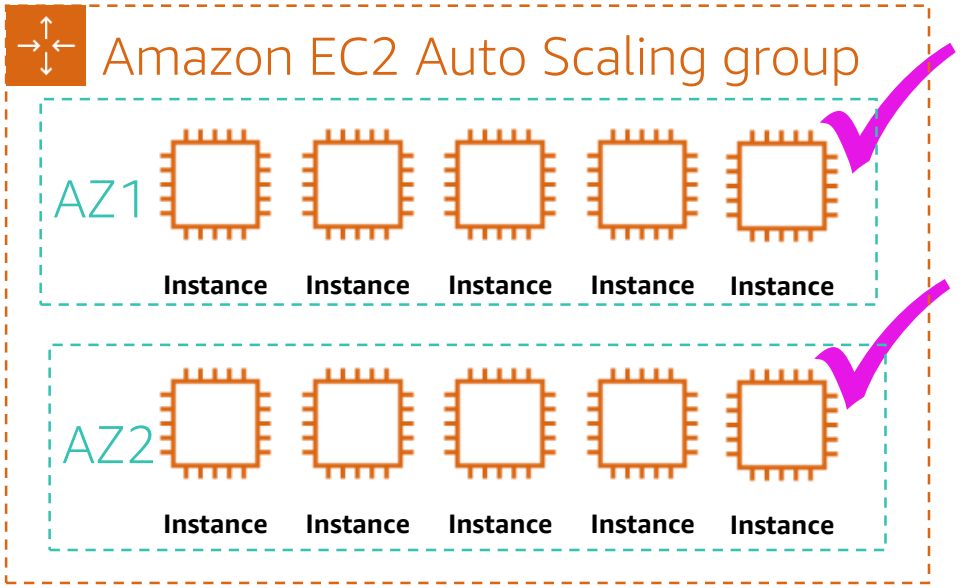
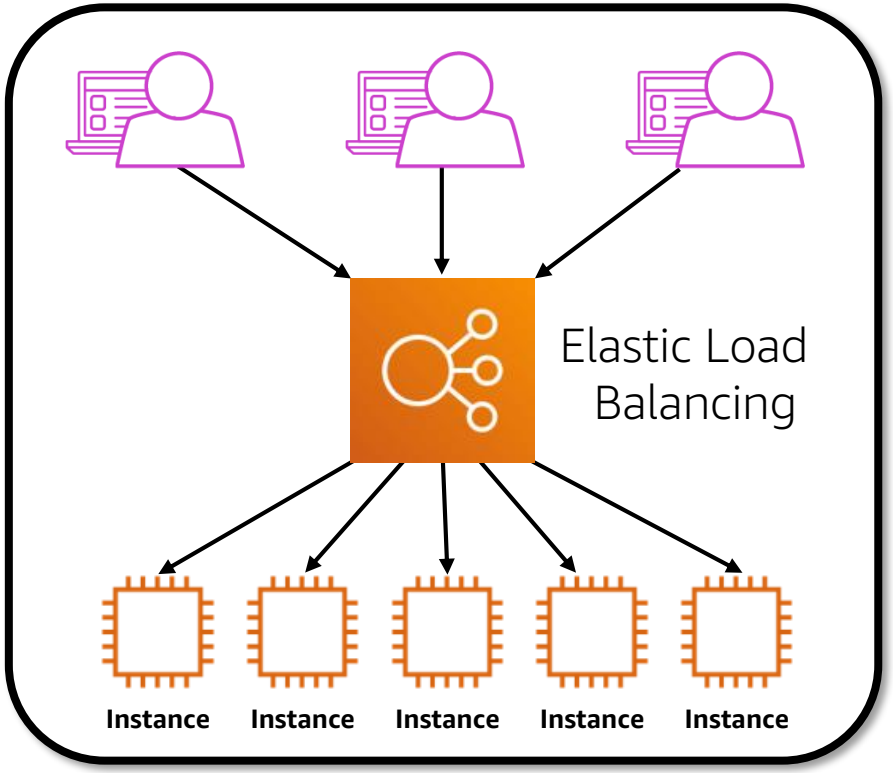


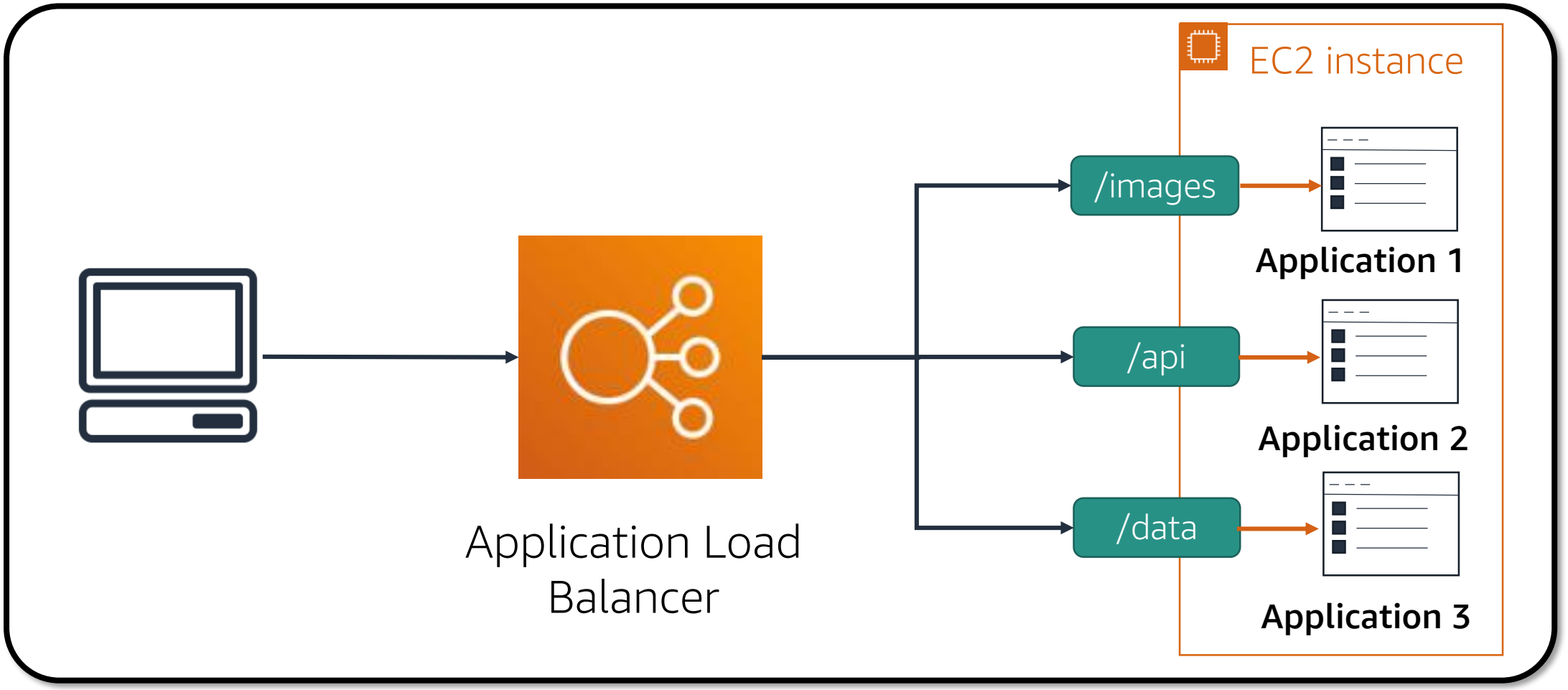
Elastic Load Balancing

Automatically distribute traffic across multiple targets

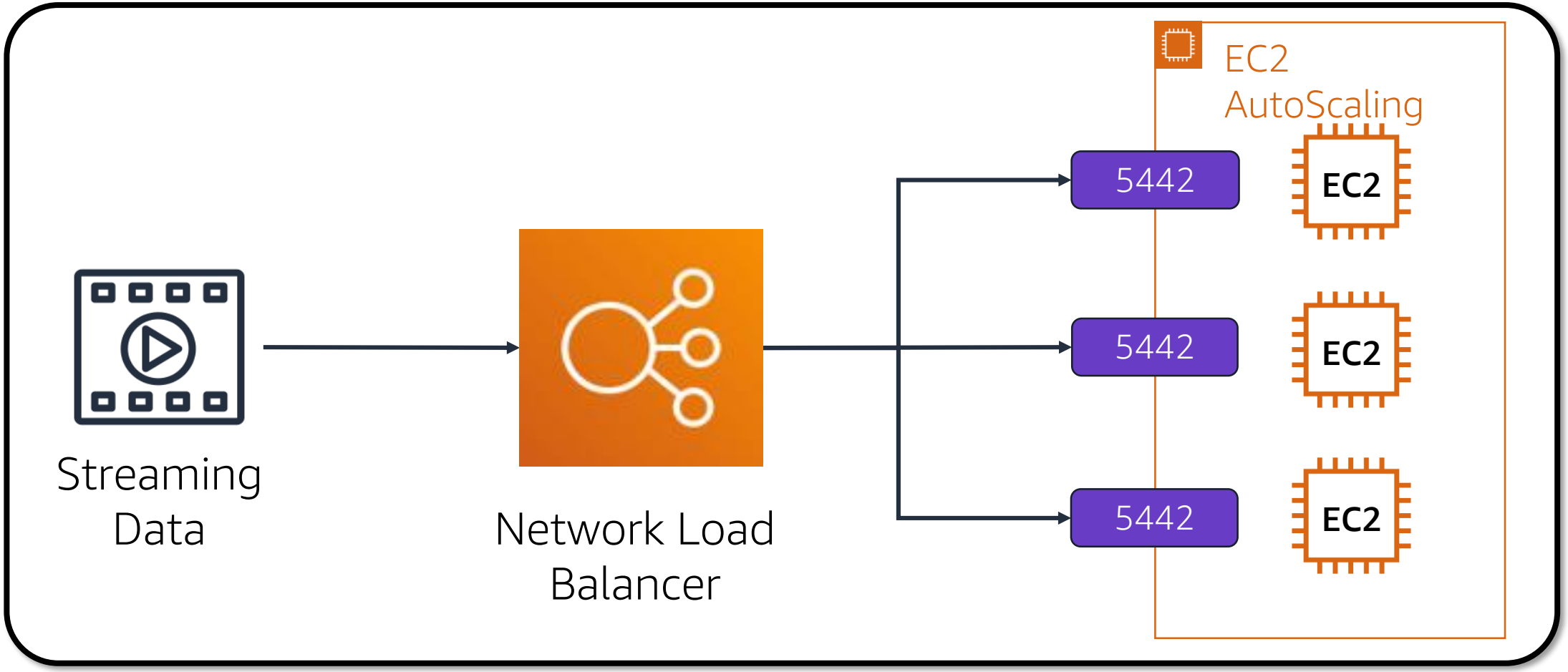
- High availability
- Health checks
- SSL/TLS termination
- Operational monitoring



Application Load Balancer example

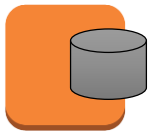


Network Load Balancer example



Deploy database services

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

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

<table>
<tr><th></th><th>Relational (SQL)</th><th>Key-value (NoSQL)</th></tr>
<tr><td>Data storage</td><td>Rows and columns</td><td>Key-value, document, graph</td></tr>
<tr><td>Schemas</td><td>Fixed</td><td>Dynamic</td></tr>
<tr><td>Querying</td><td>Using SQL</td><td>Focused on collection of documents</td></tr>
<tr><td>Scalability</td><td>Vertical</td><td>Horizontal</td></tr>
<tr><td>Example</td><td>
<table>
<tr><th>ISBN</th><th>Title</th><th>Author</th><th>Format</th></tr>
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</td><td>{
ISBN: 3111111223439,
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}</td></tr>
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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

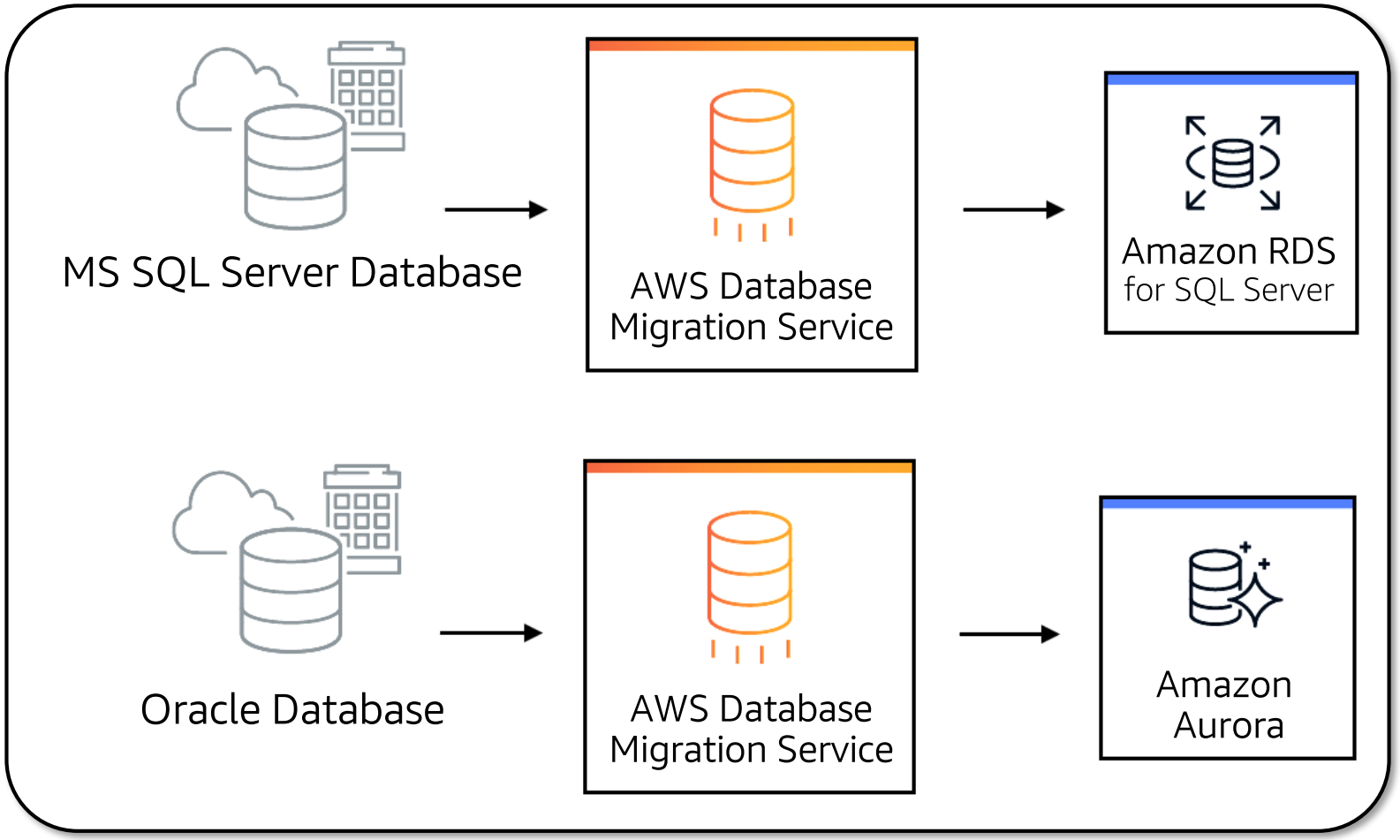
Amazon Redshift
Fast, scalable data warehouse

Amazon DocumentDB
MongoDB-compatible database

Amazon Neptune
Graph database

What is AWS Database Migration Service?

Migrate databases to AWS quickly and securely



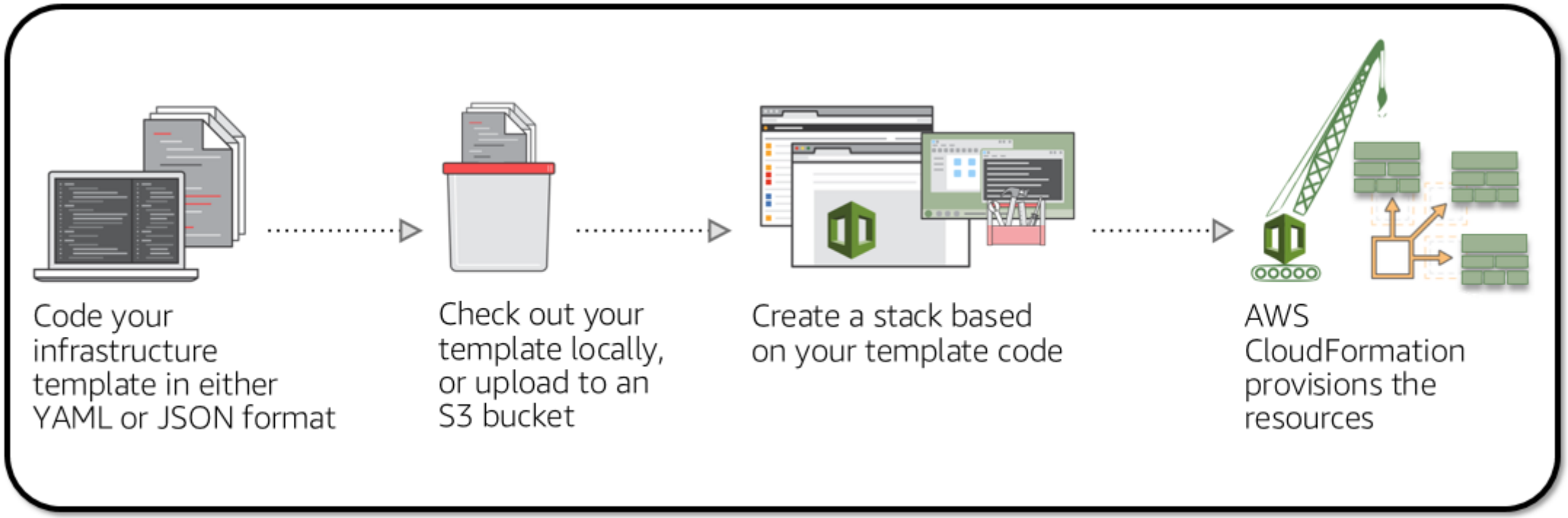
The right tool for the right job

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

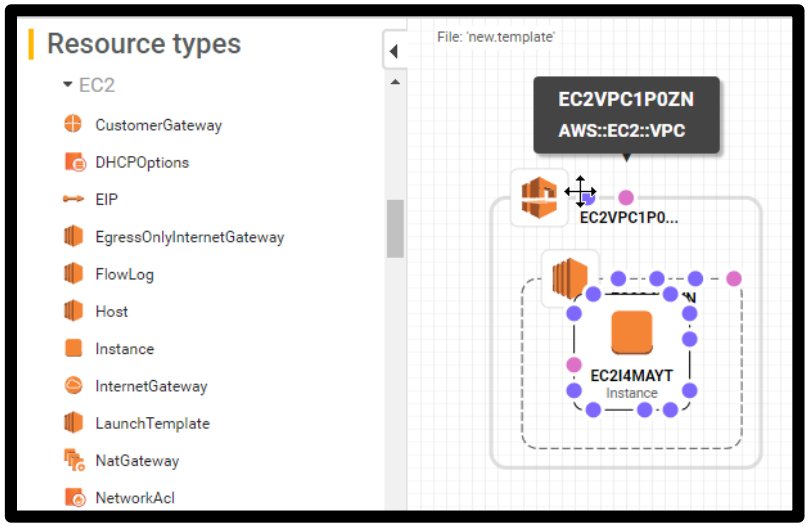
Automate deployment

What is AWS CloudFormation?

Model and provision all your cloud infrastructure resources



AWS CloudFormation example



CloudFormation Designer

Template-file
(YAML/JSON)

VPC (10.1.0.0/16)

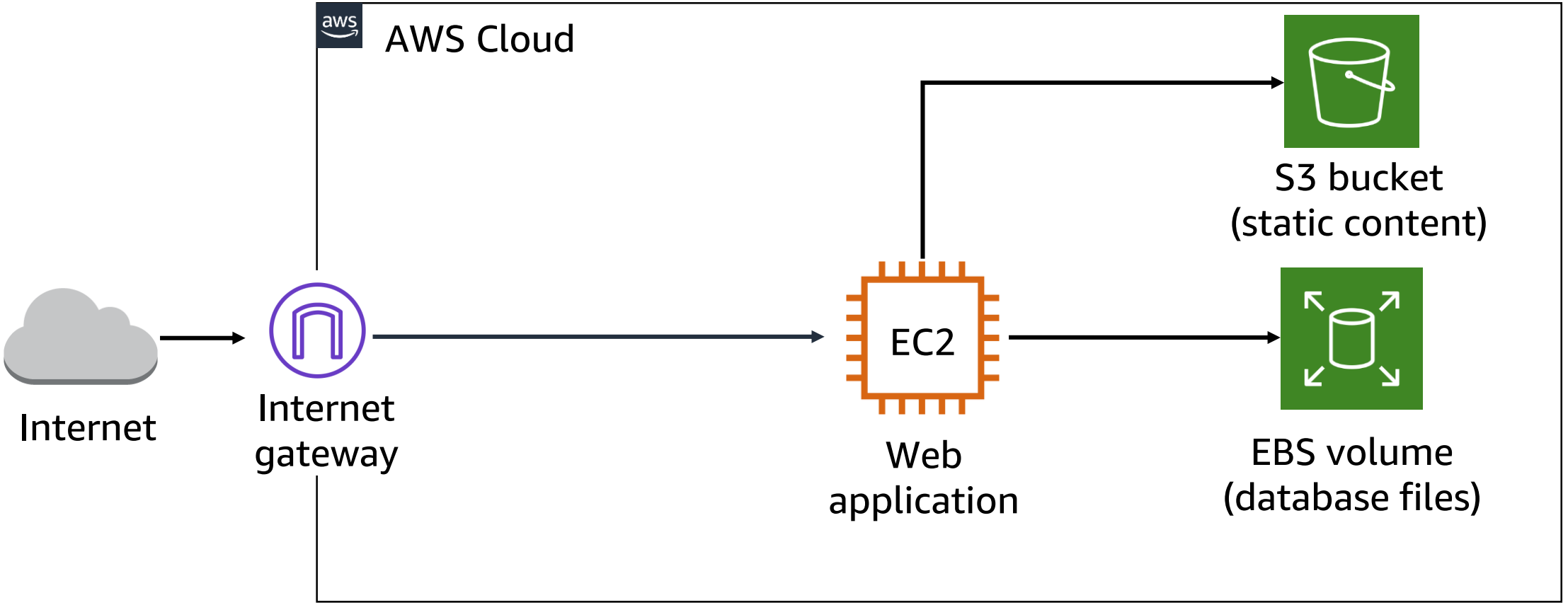
Public Subnet 1
(10.1.11.0/24)

Internet
gateway

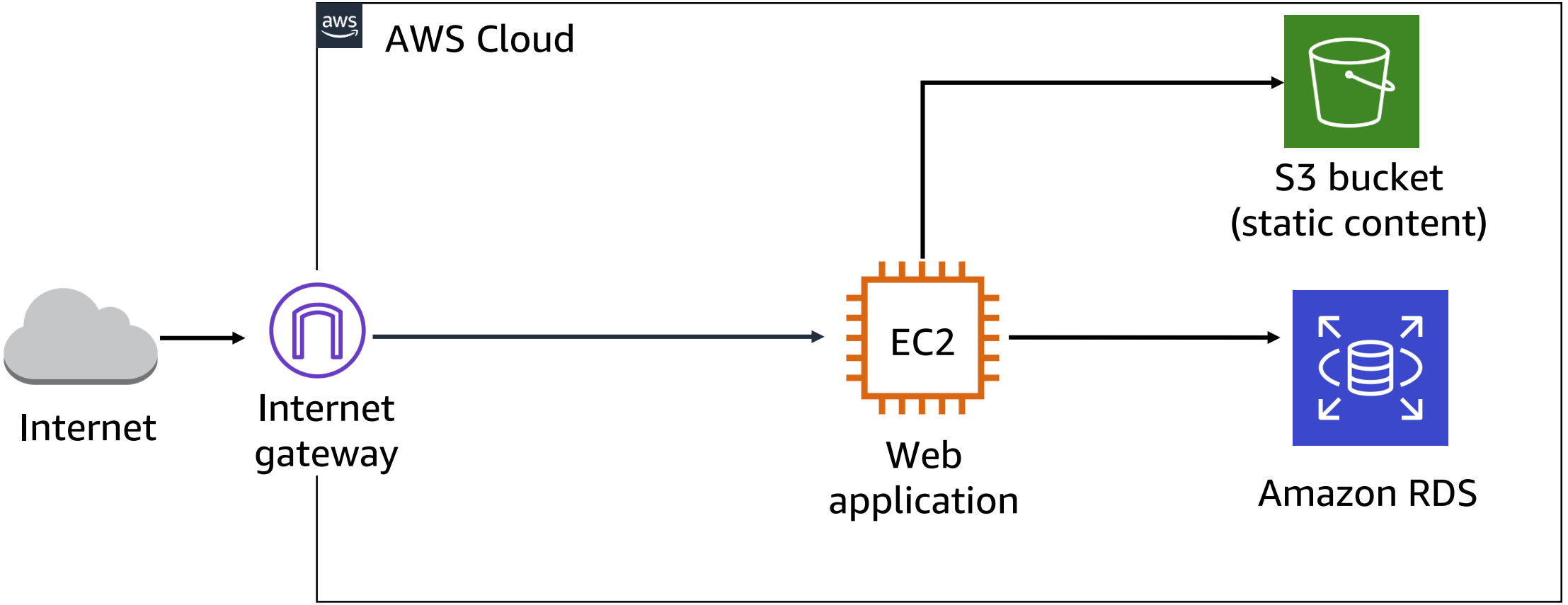
Web
server

Security group

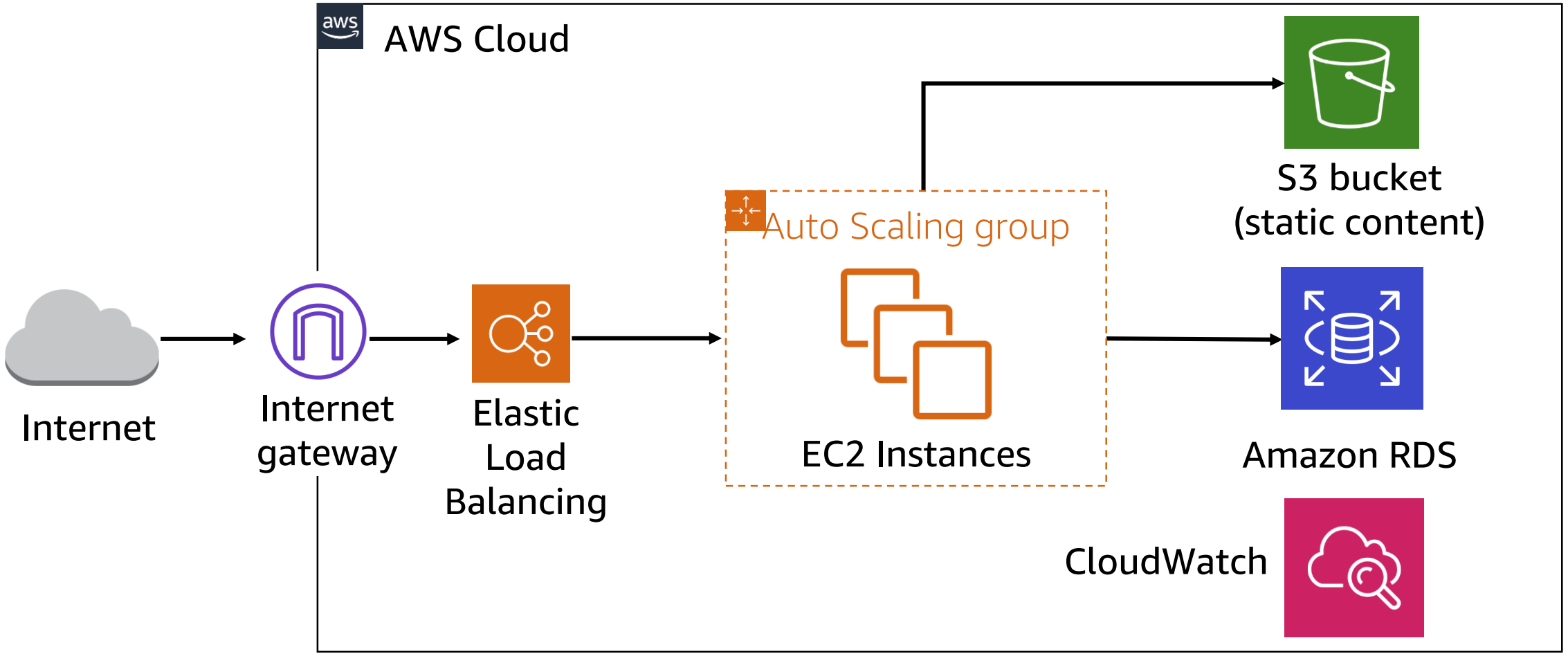
Putting it all together (1 of 4)



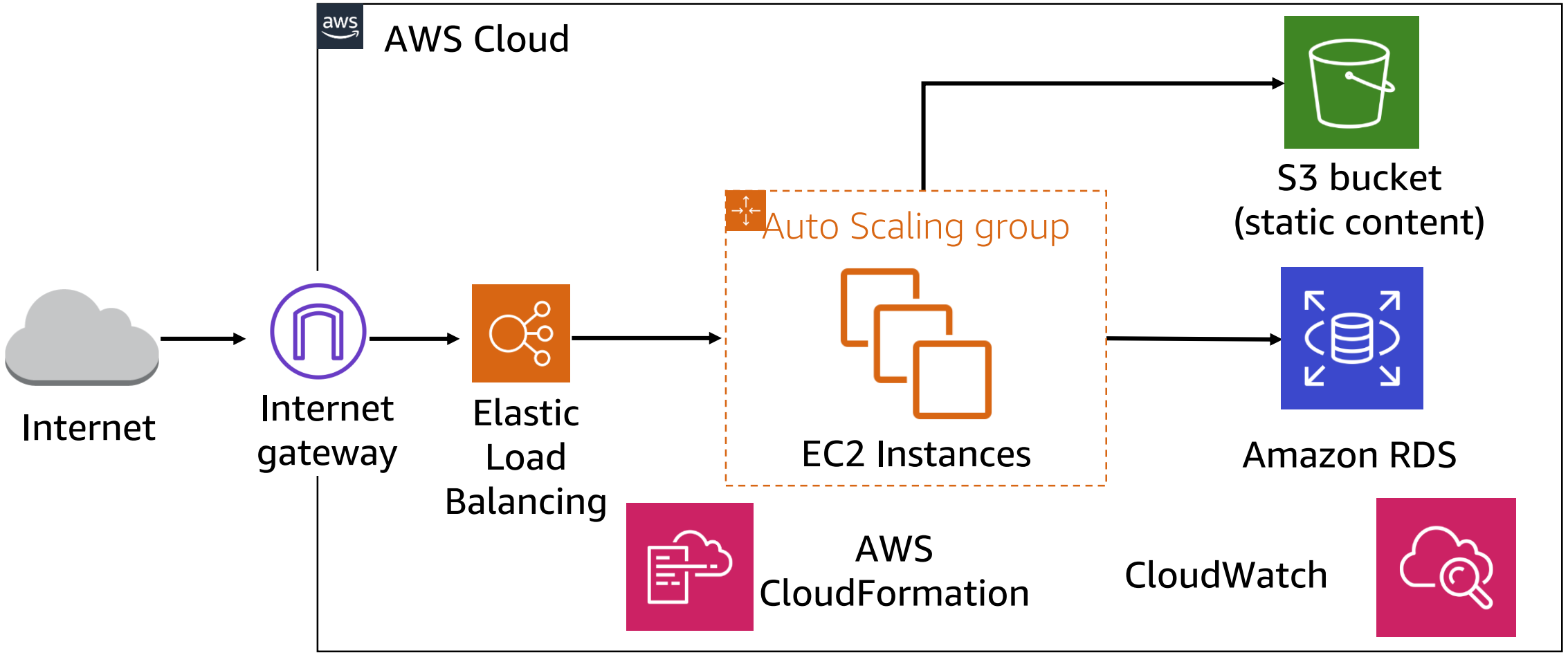
Putting it all together (2 of 4)



Putting it all together (3 of 4)



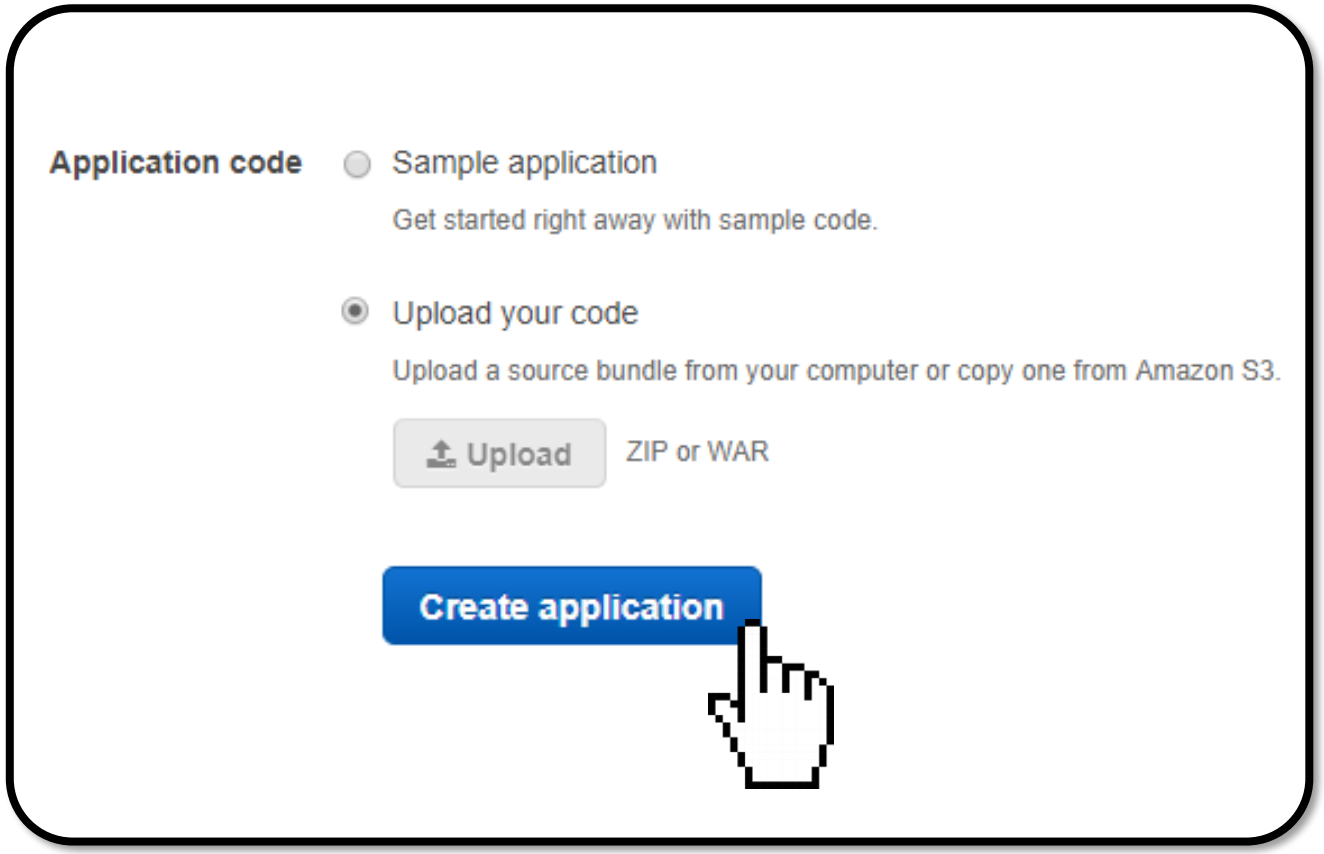
Putting it all together (4 of 4)



How can I deploy without managing infrastructure?

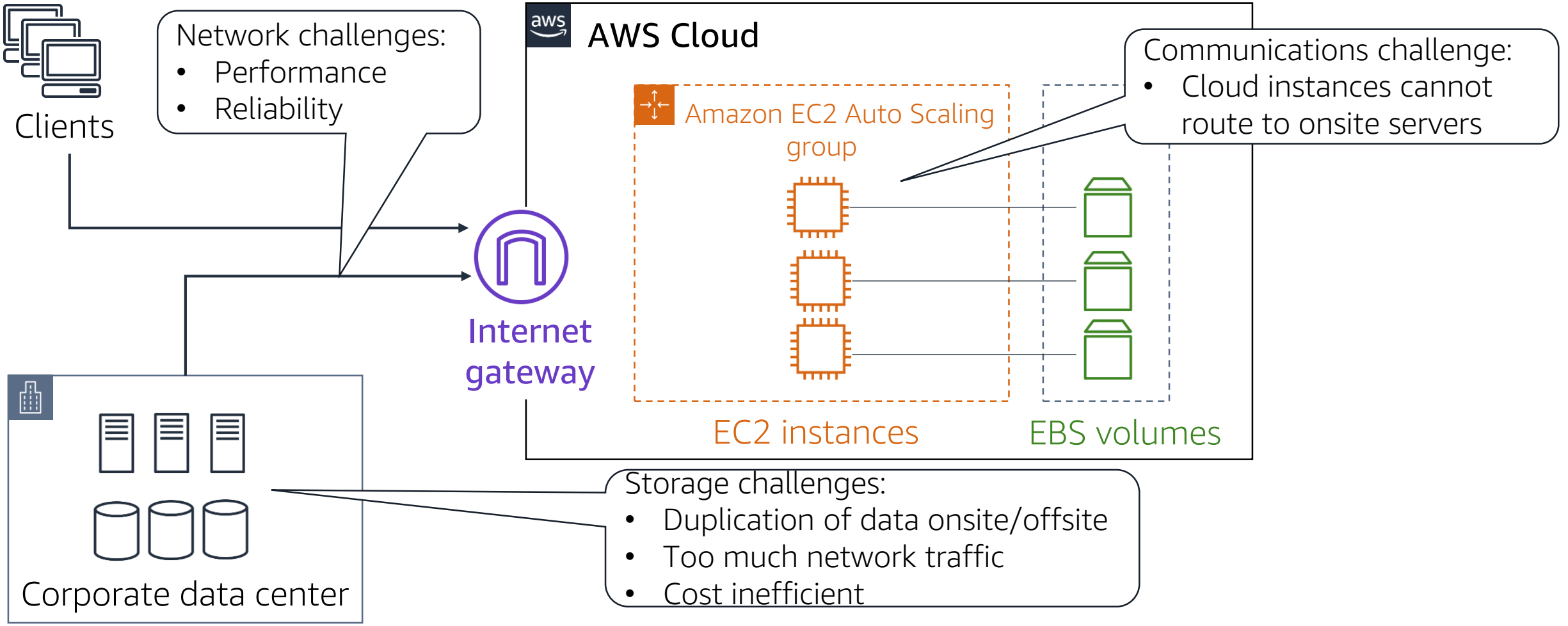
Quickly deploy and manage applications with AWS Elastic Beanstalk

- 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

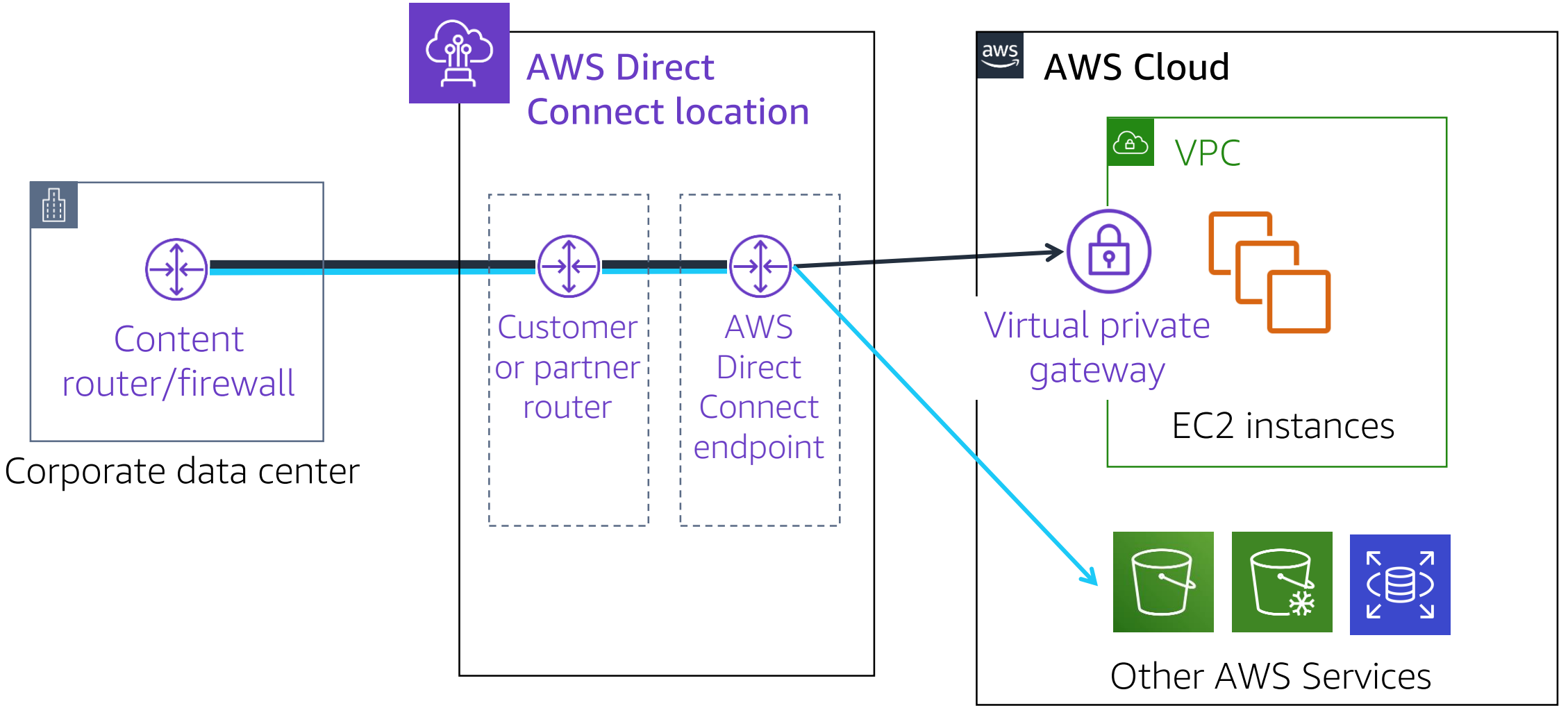
Reduces network costs

Creates consistent network performance

Provides private connectivity to your Amazon VPC

Scales easily

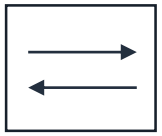
AWS Direct Connect example



What is Amazon Route 53?

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

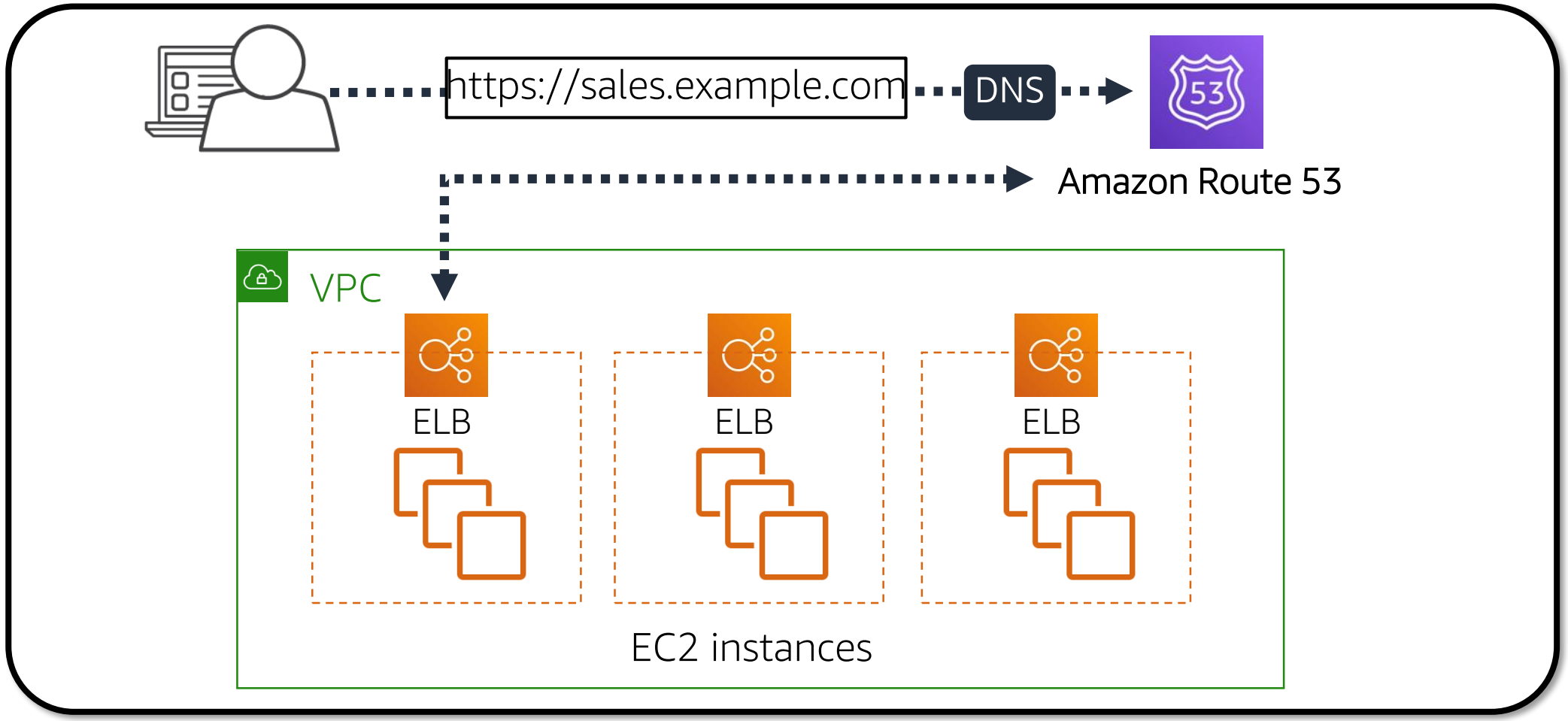
Register domain names



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

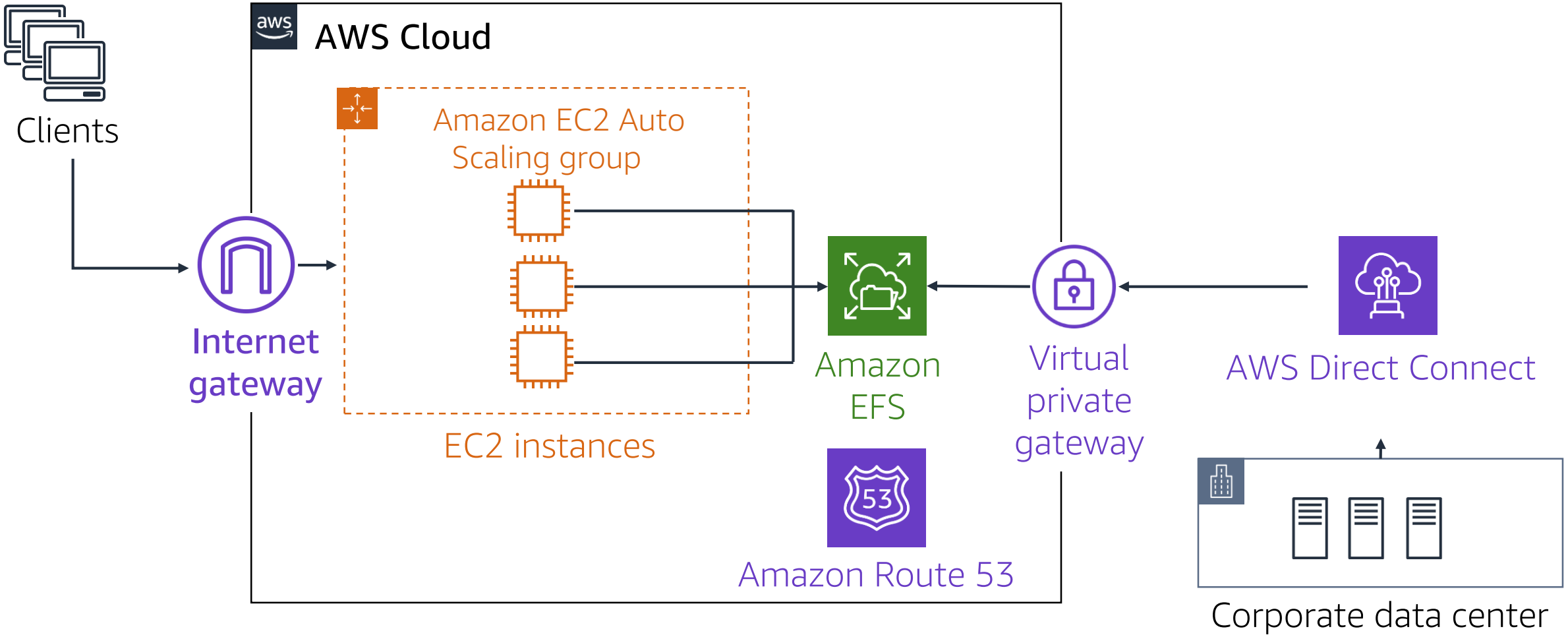
Scalable performance

Shared file storage

Fully managed

Cost-effective

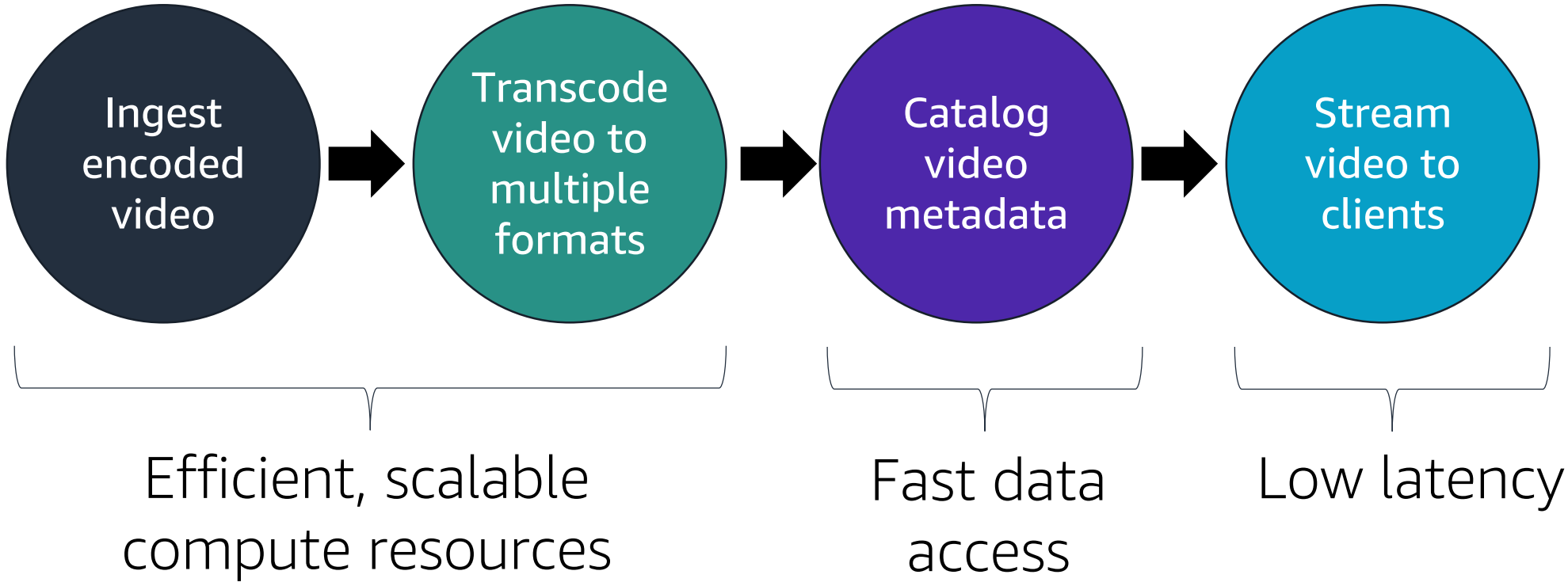
Putting it all together



Deliver content faster

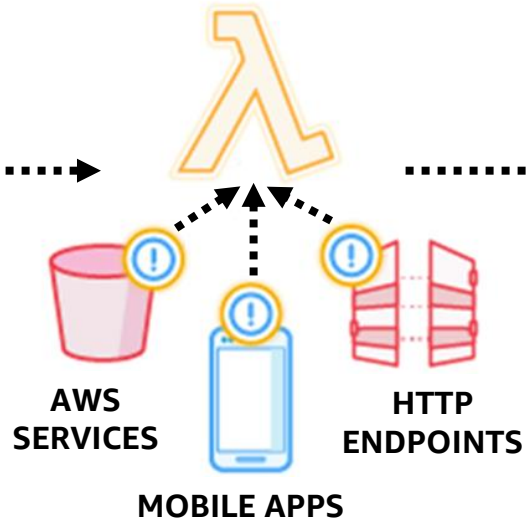
Challenge: Media streaming service

The architecture must meet the following requirements:

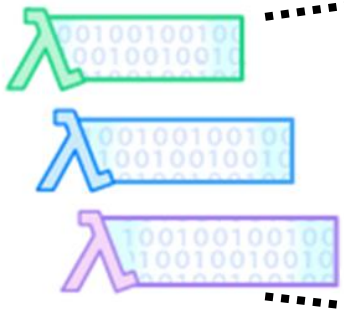


AWS Lambda: Run code without servers

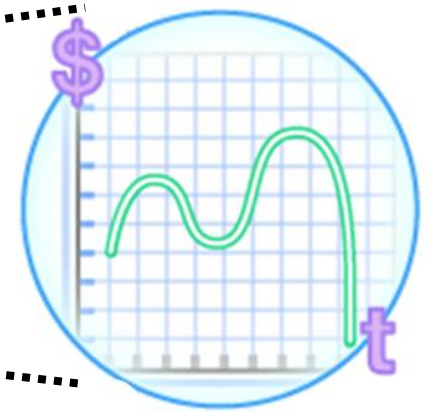
Upload your code to AWS Lambda



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

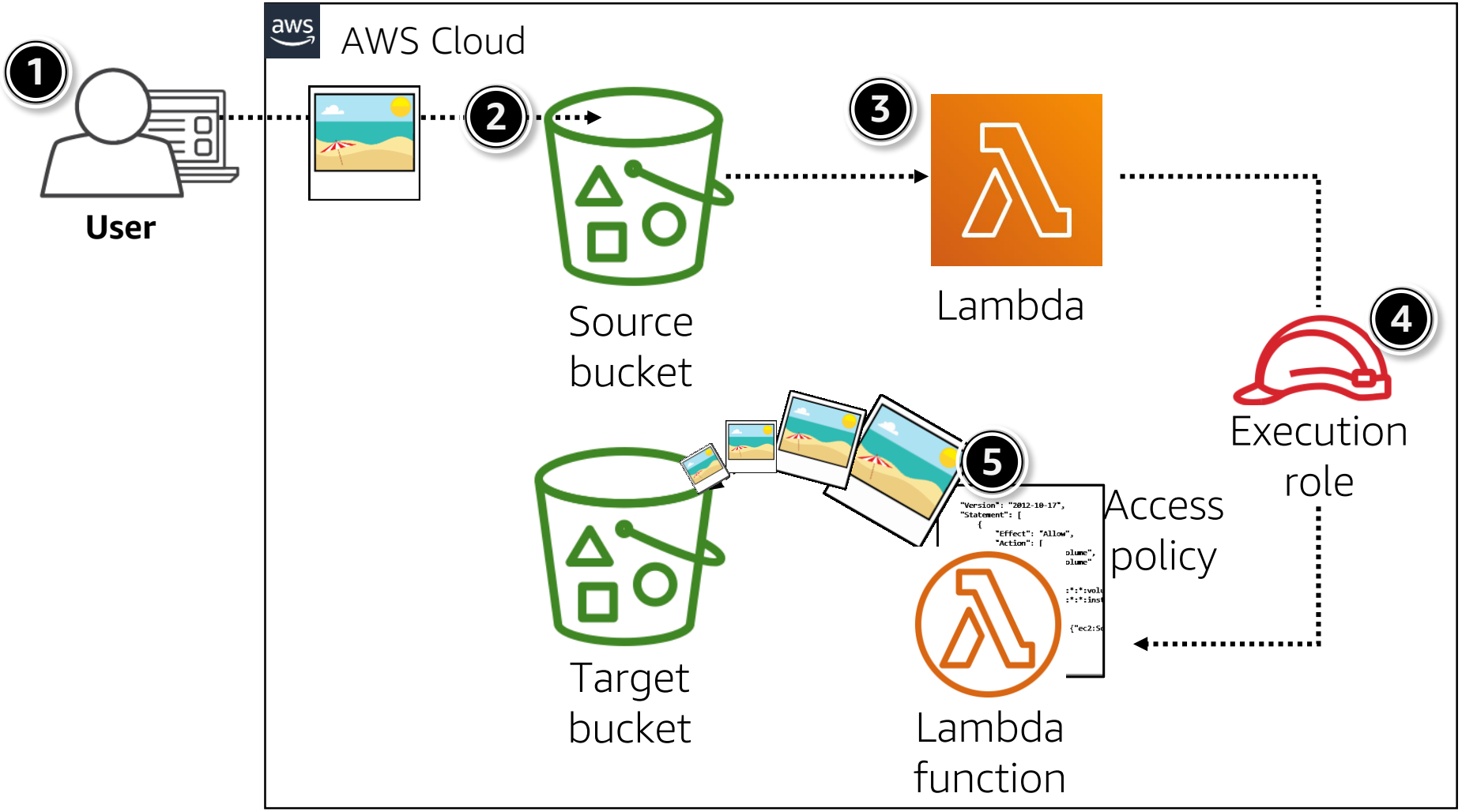
Completely automated administration

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

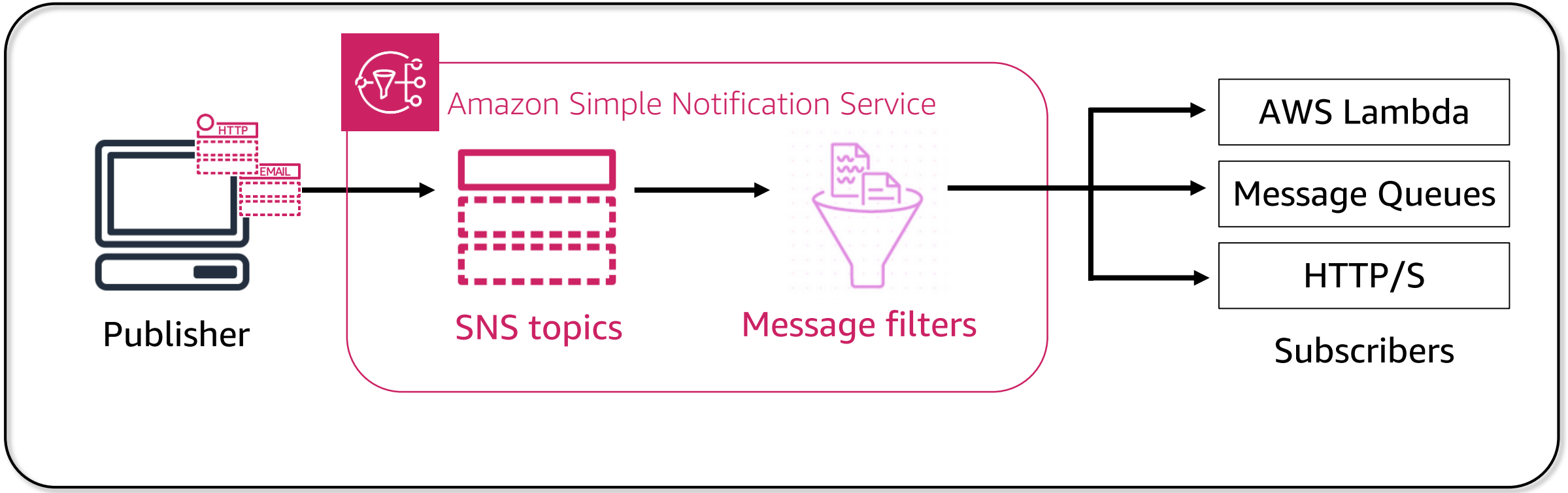
Reliably deliver messages with durability

Automatically scale your workload

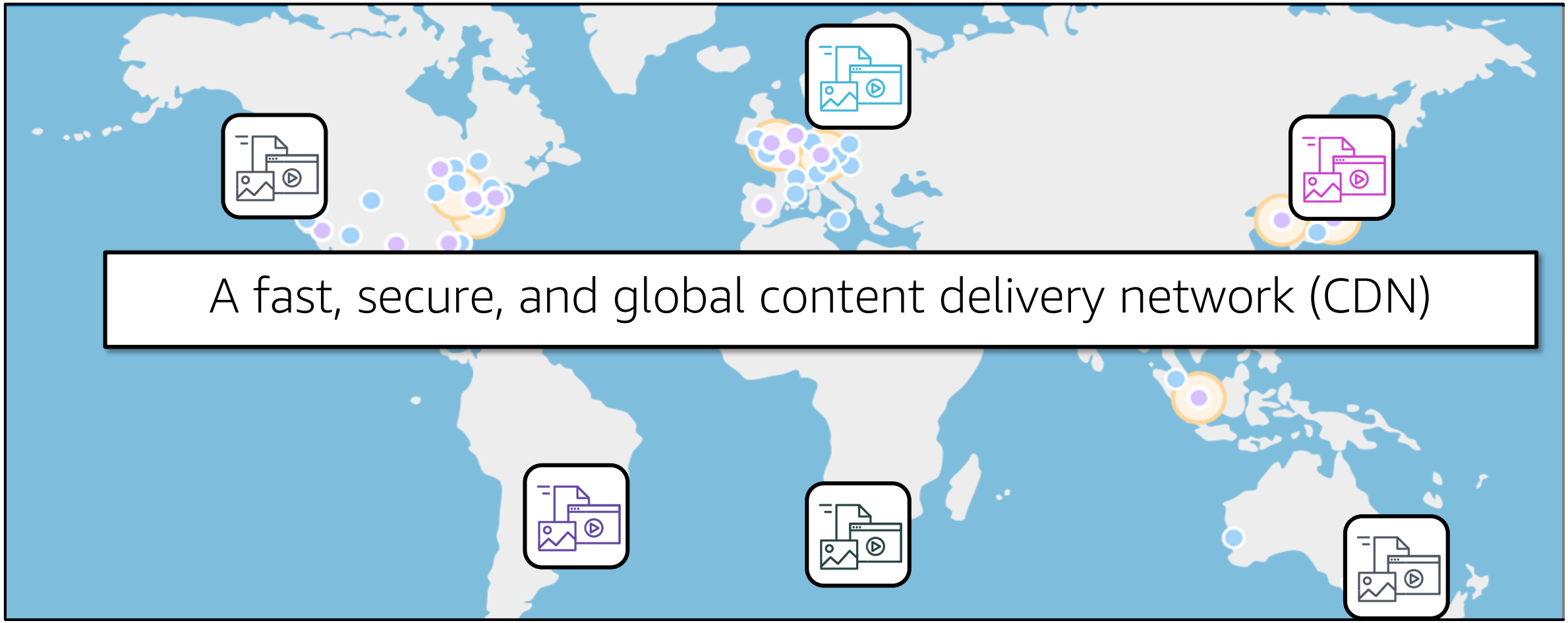
Simplify your architecture

Keep messages private and secure

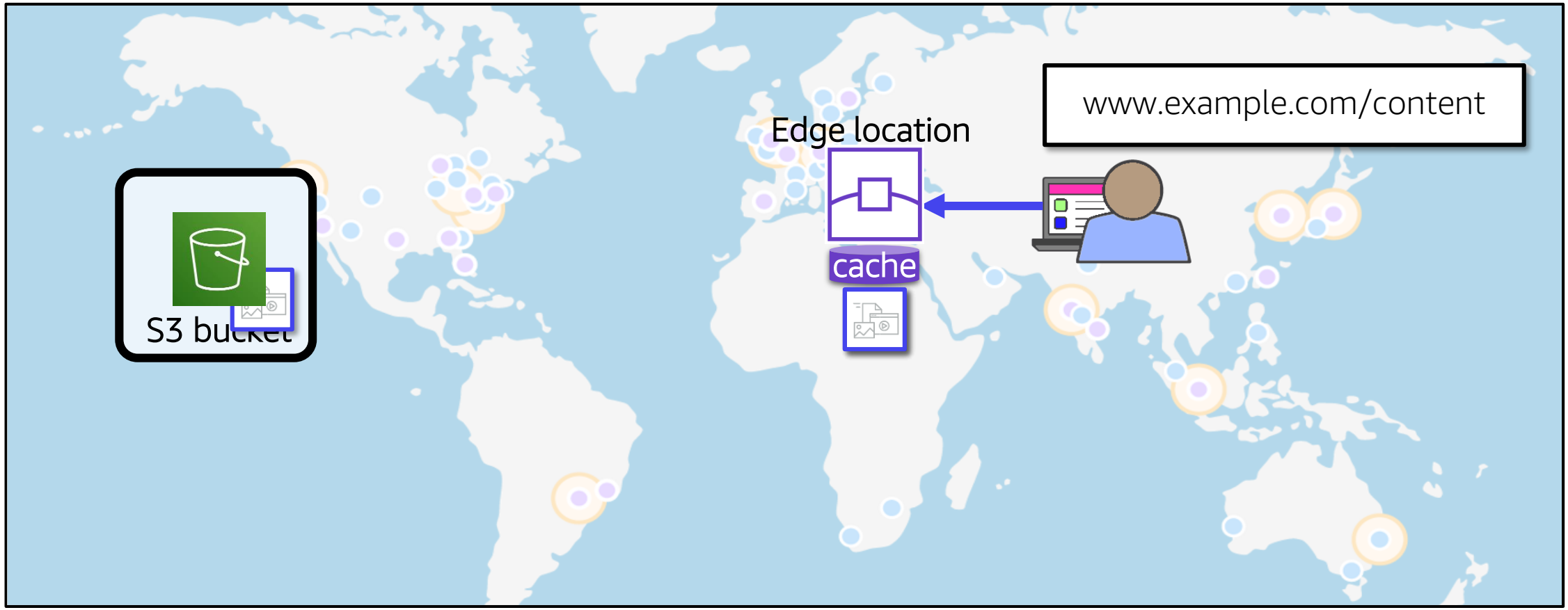
Amazon SNS overview



What is Amazon CloudFront?



How CloudFront delivers content to users



Demo

What is Amazon ElastiCache?

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

Extreme performance

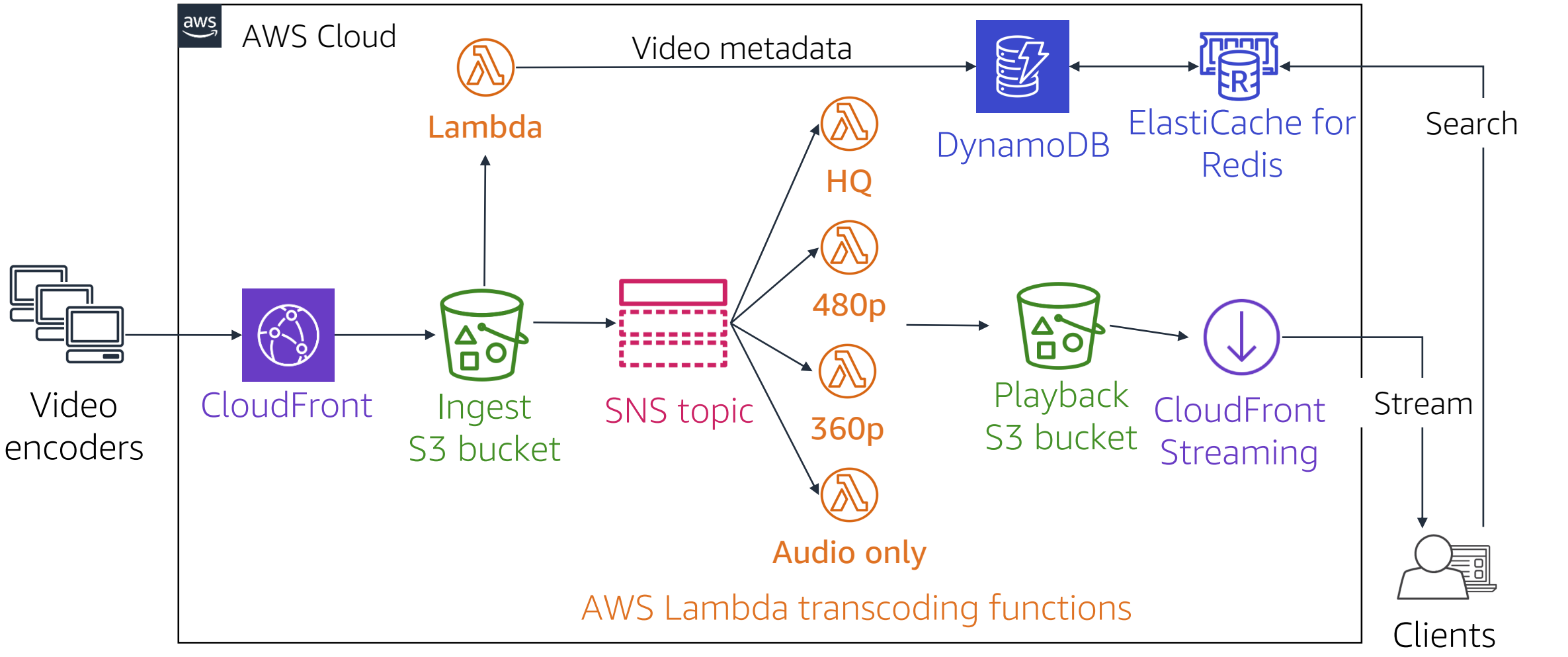
Fully Managed

Scalable

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

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