AWSOME DAY
ONLINE CONFERENCE

Module 2:
Getting started with the cloud

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AWS

AWS products

Cloud journey

Build your infrastructure

What is Amazon Elastic Compute Cloud (EC2)?
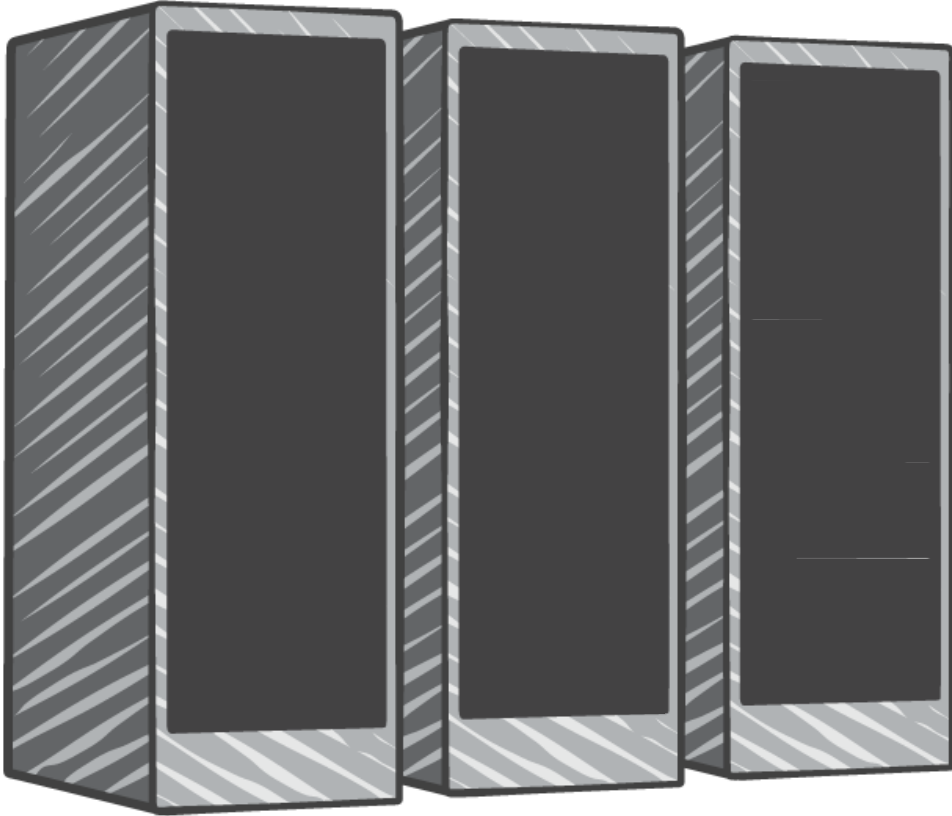
On-premises servers

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

aws

Amazon EC2 instances

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)

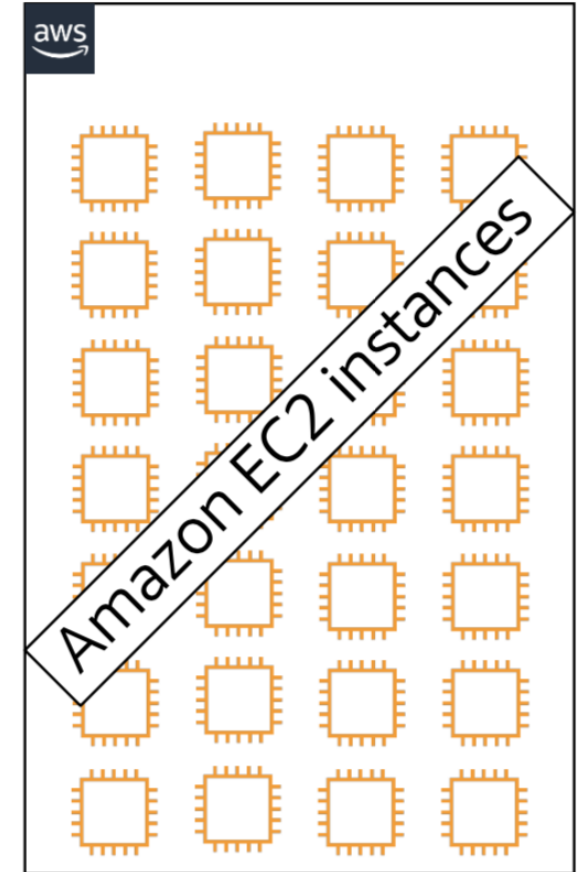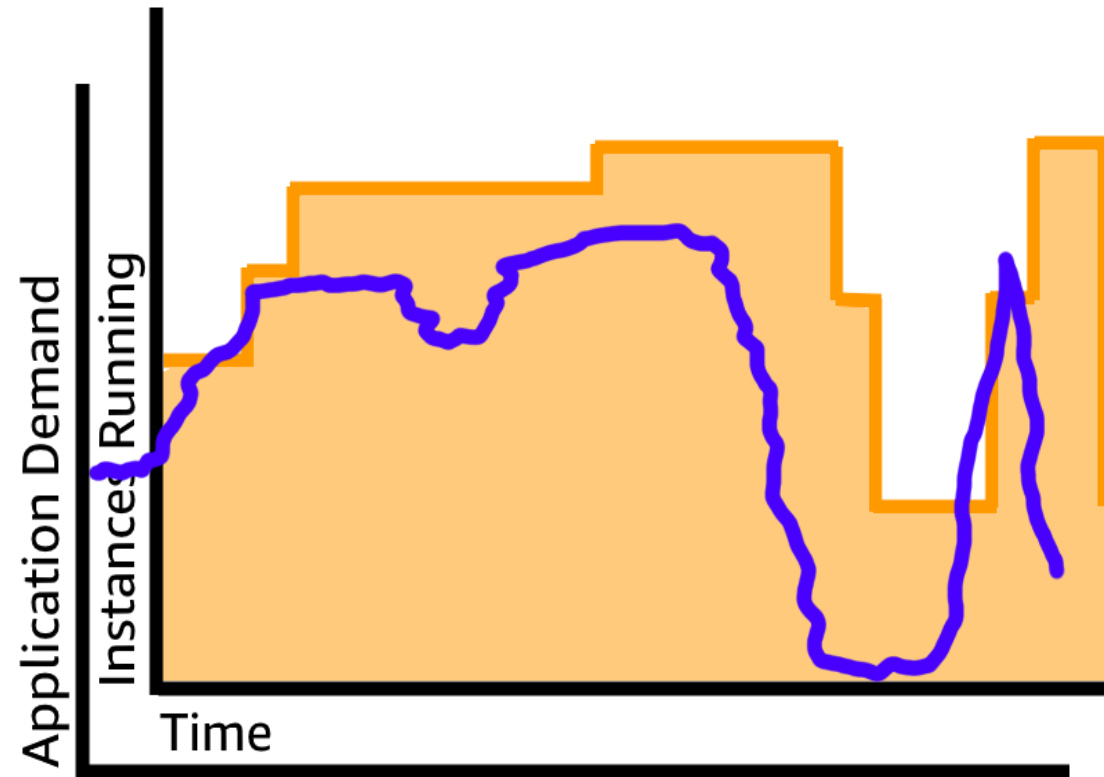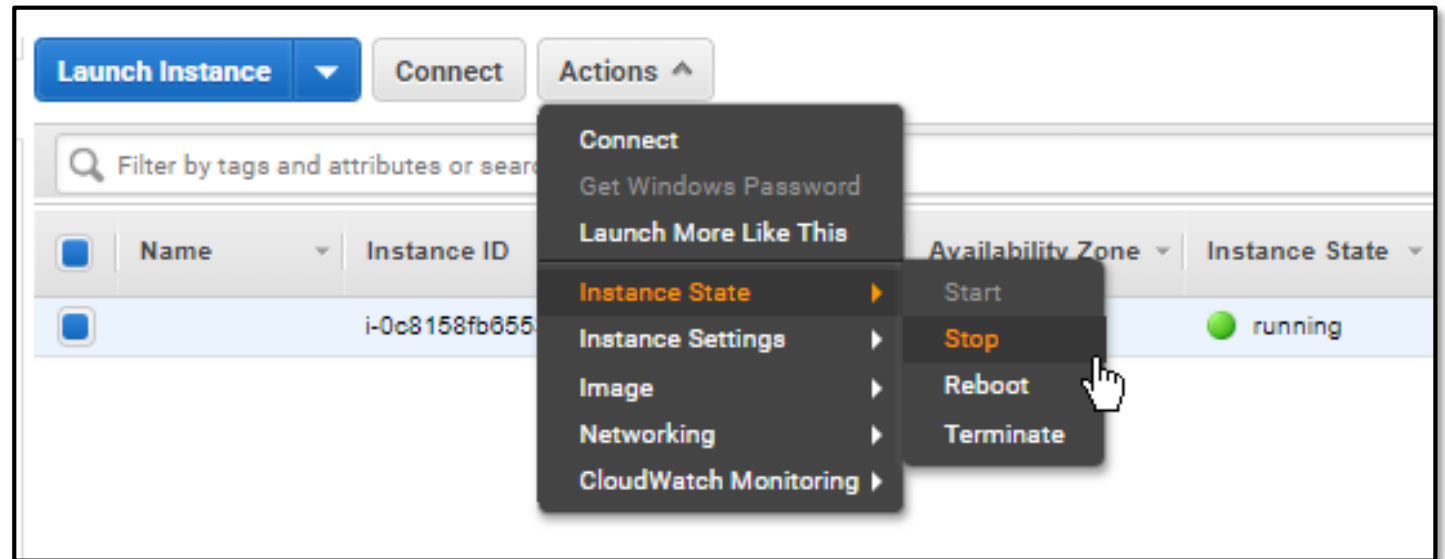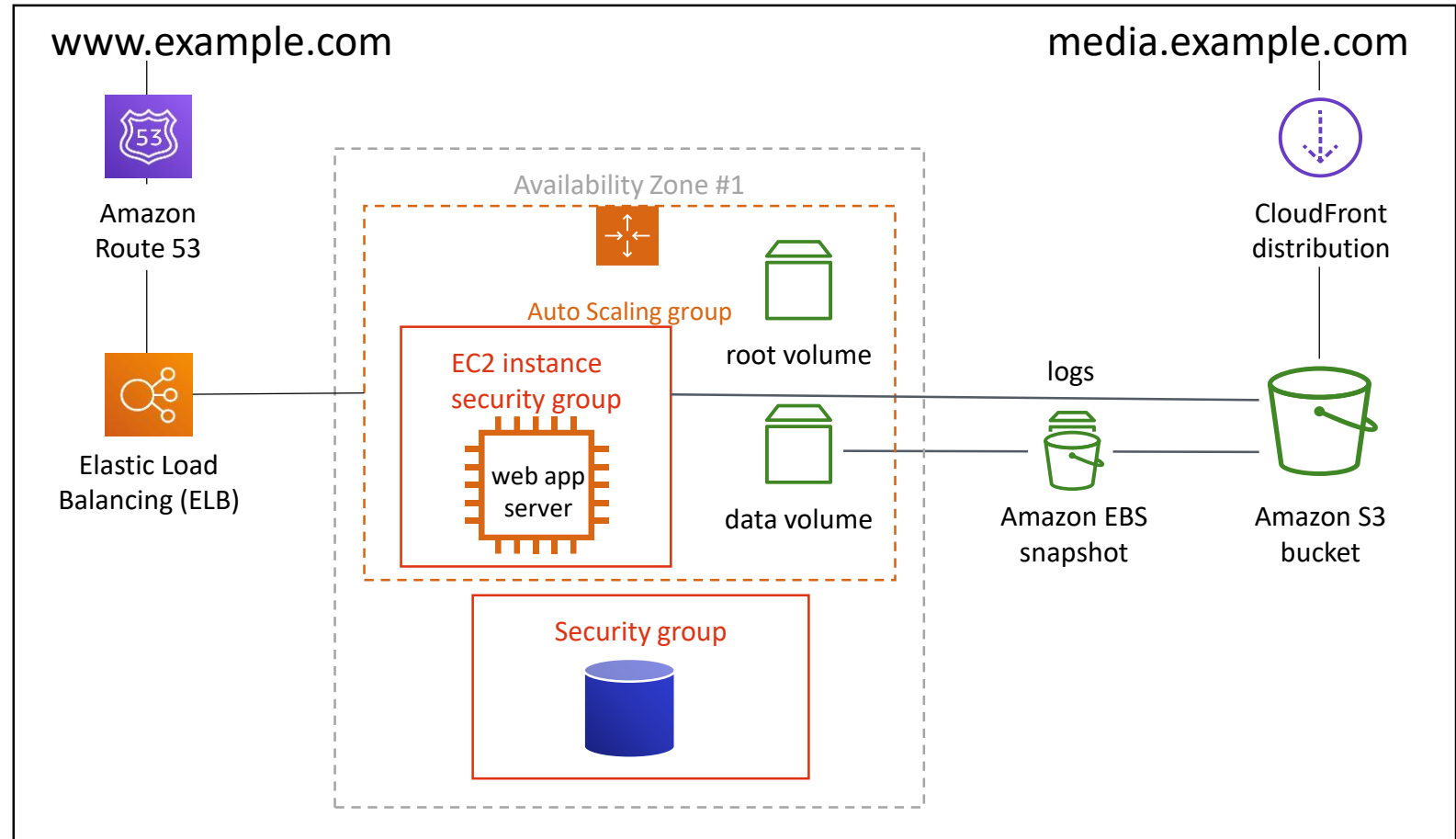|	Family	Type	vCPUs ⓘ	Memory (GiB)	Instance Storage (GB) ⓘ	EBS-Optimized Available ⓘ	Network Performance ⓘ	IPv6 Support ⓘ
☐	Compute optimized	c5d.large	2	4	1 x 50 (SSD)	Yes	Up to 10 Gigabit	Yes
☐	Compute optimized	c5d.xlarge	4	8	1 x 100 (SSD)	Yes	Up to 10 Gigabit	Yes
☐	Compute optimized	c5d.2xlarge	8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

Benefits of Amazon EC2

- Elasticity
- Control
- Flexibility
- Integrated

www.example.com

Amazon Route 53

Elastic Load Balancing (ELB)

Availability Zone #1

Auto Scaling group

EC2 instance security group

web app server

root volume

data volume

Security group

logs

Amazon EBS snapshot

media.example.com

CloudFront distribution

Amazon S3 bucket

Benefits of Amazon EC2

- Elasticity
- Control
- Flexibility
- Integrated
- Reliable

99.99% AVAILABILITY

Benefits of Amazon EC2
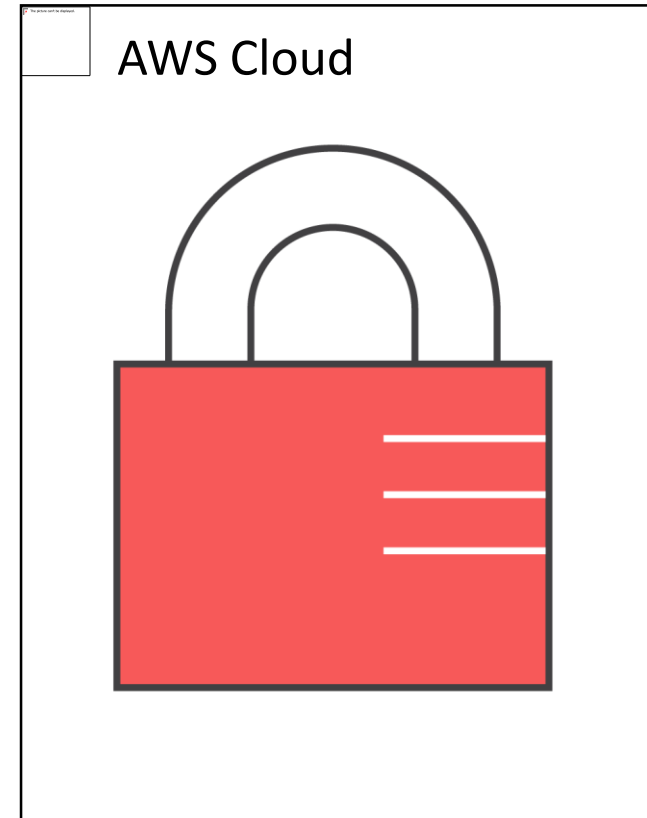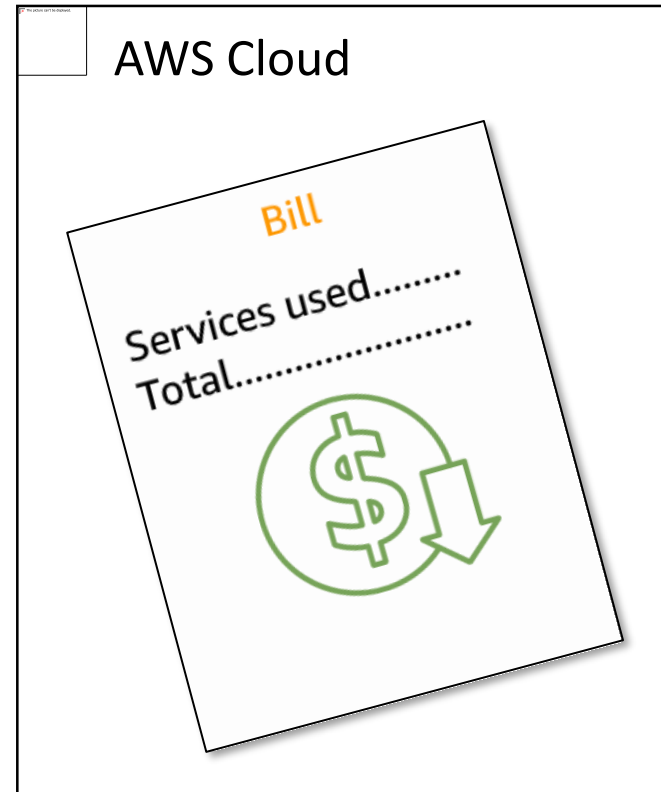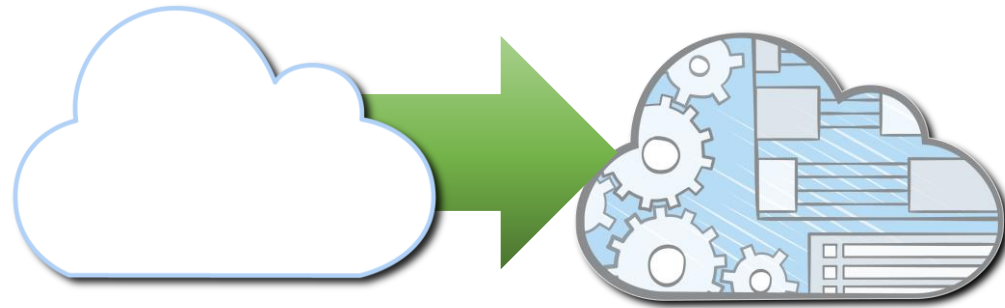
- Elasticity
- Control
- Flexibility
- Integrated
- Reliable
- Secure

AWS Cloud

Benefits of Amazon EC2

- Elasticity

- Control

- Flexibility

- Integrated

- Reliable

- Secure

- Inexpensive

AWS Cloud

Bill

Services used..........

Total....................

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

■ C4 ■ C5
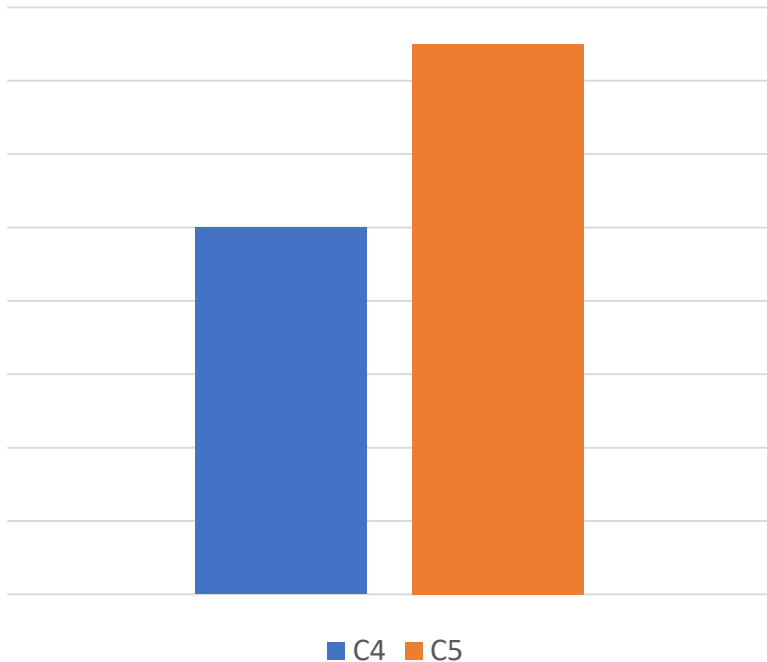
- Based on 3.0 GHz Intel Xeon Scalable Processors (Skylake)

- 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%."

M5: Next-gen general purpose instances

14% price/performance improvement
With M5
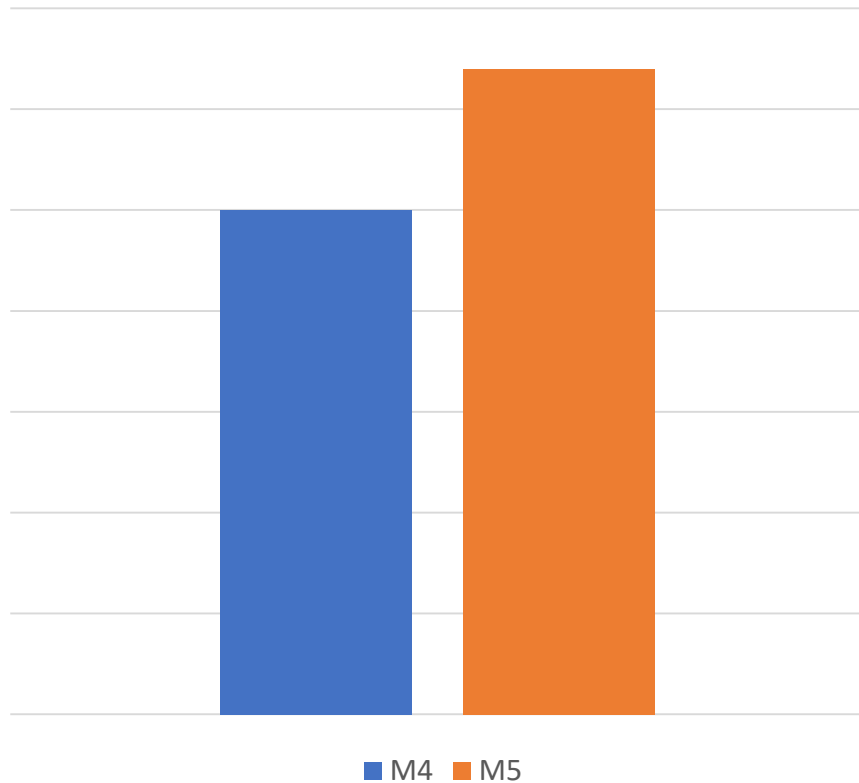
- Powered by 2.5 GHz Intel Xeon Scalable Processors (Skylake)

- 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

What's your platform?

Launching a virtual machine with Amazon EC2

Store your data

Amazon Elastic Block Store (Amazon EBS)
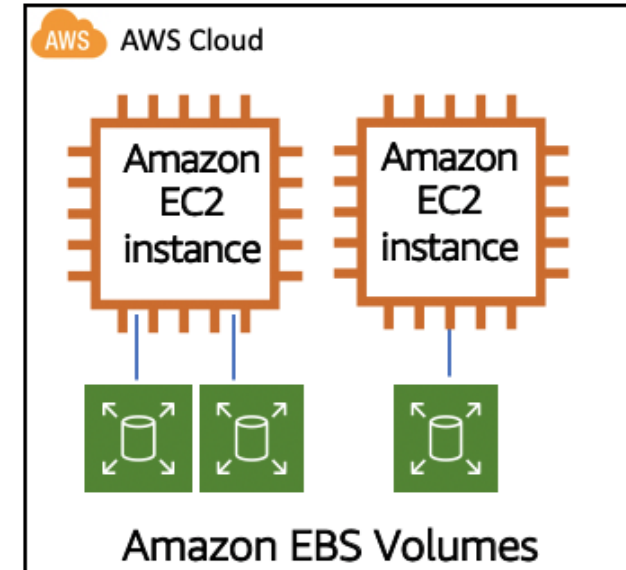
- Persistent block storage for instances

AWS Cloud

Amazon EC2 instance

Amazon EC2 instance

Amazon EBS Volumes

Amazon Elastic Block Store (Amazon EBS)

- Persistent block storage for instances

- Protected through replication

AWS Cloud

Amazon EC2 instance

Amazon EC2 instance

Amazon EBS Volumes

Availability Zone

Amazon Elastic Block Store (Amazon EBS)

- Persistent block storage for instances

- Protected through replication

- Different drive types

AWS Cloud
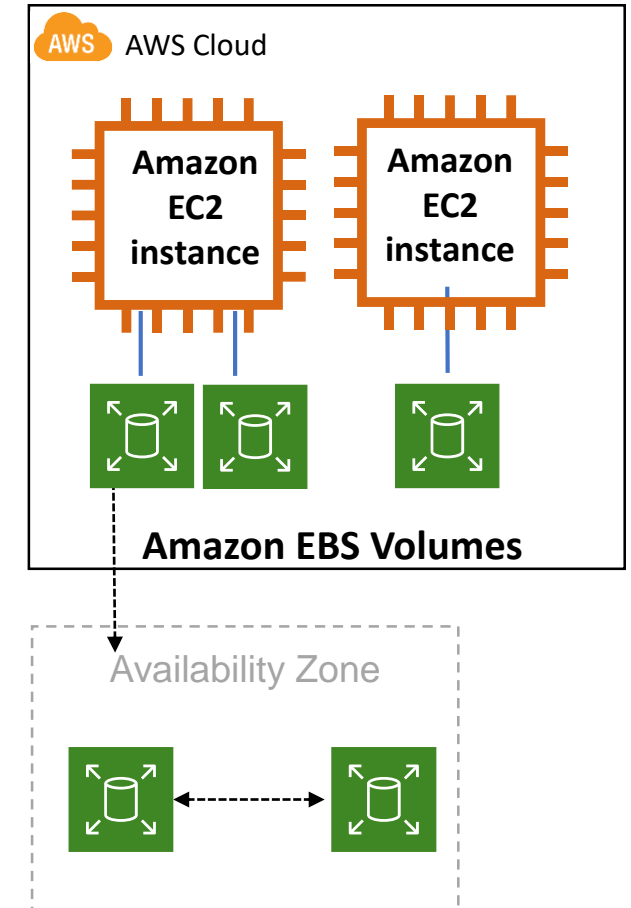
Amazon EC2 instance   Amazon EC2 instance

Amazon EBS Volumes

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

AWS Cloud

Amazon EC2 instance

Amazon EC2 instance

Amazon EBS Volumes
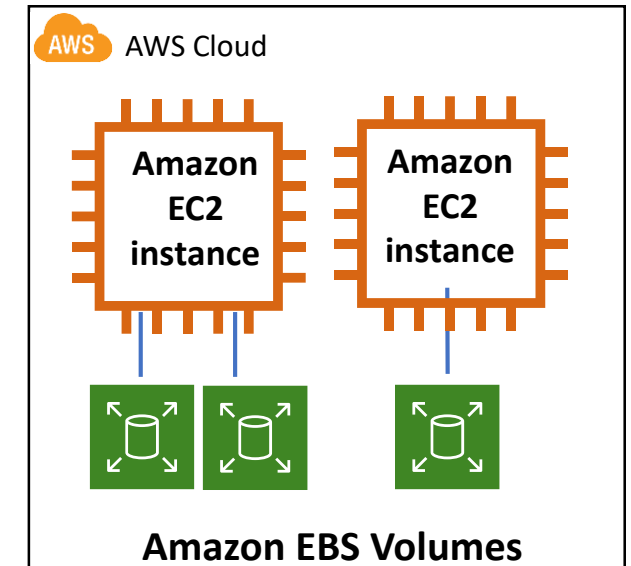
Amazon Elastic Block Store (Amazon EBS)

- Persistent block storage for instances

- Protected through replication

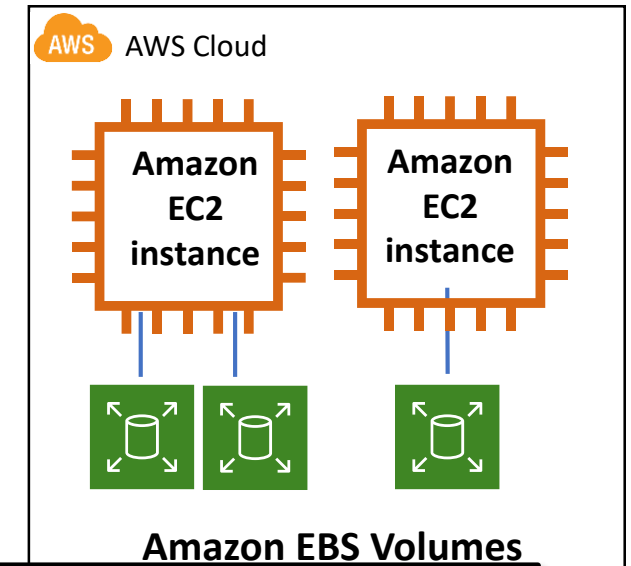- Different drive types

- 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

AWS Cloud

Amazon EC2 instance

Amazon EC2 instance

Amazon EBS Volumes

Monday's snapshot

Tuesday's snapshot

Wednesday's snapshot

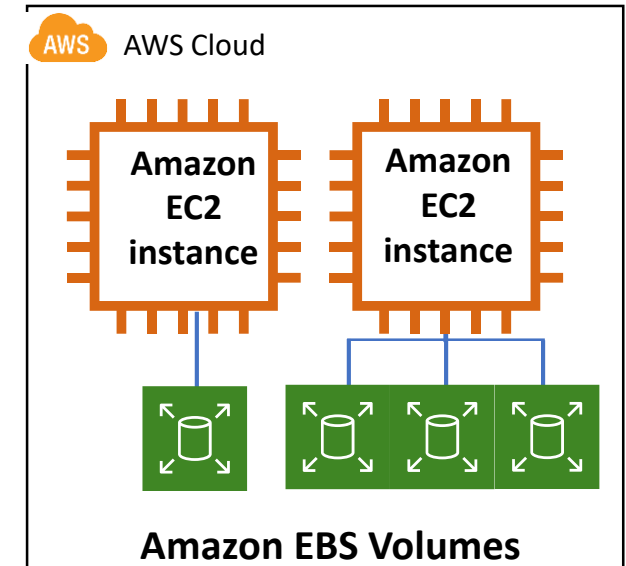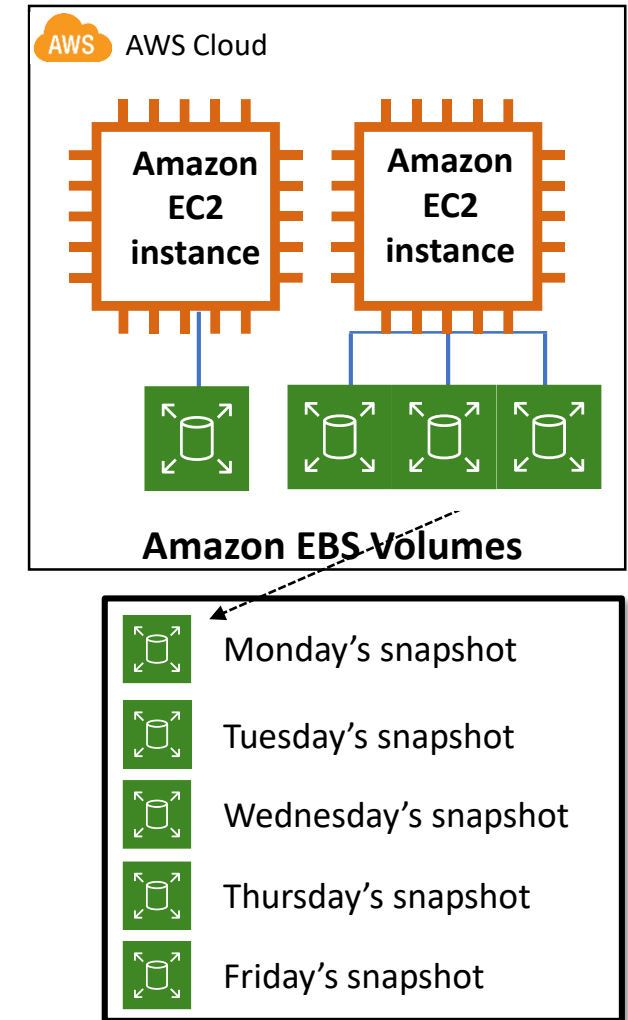Thursday's snapshot

Friday's snapshot
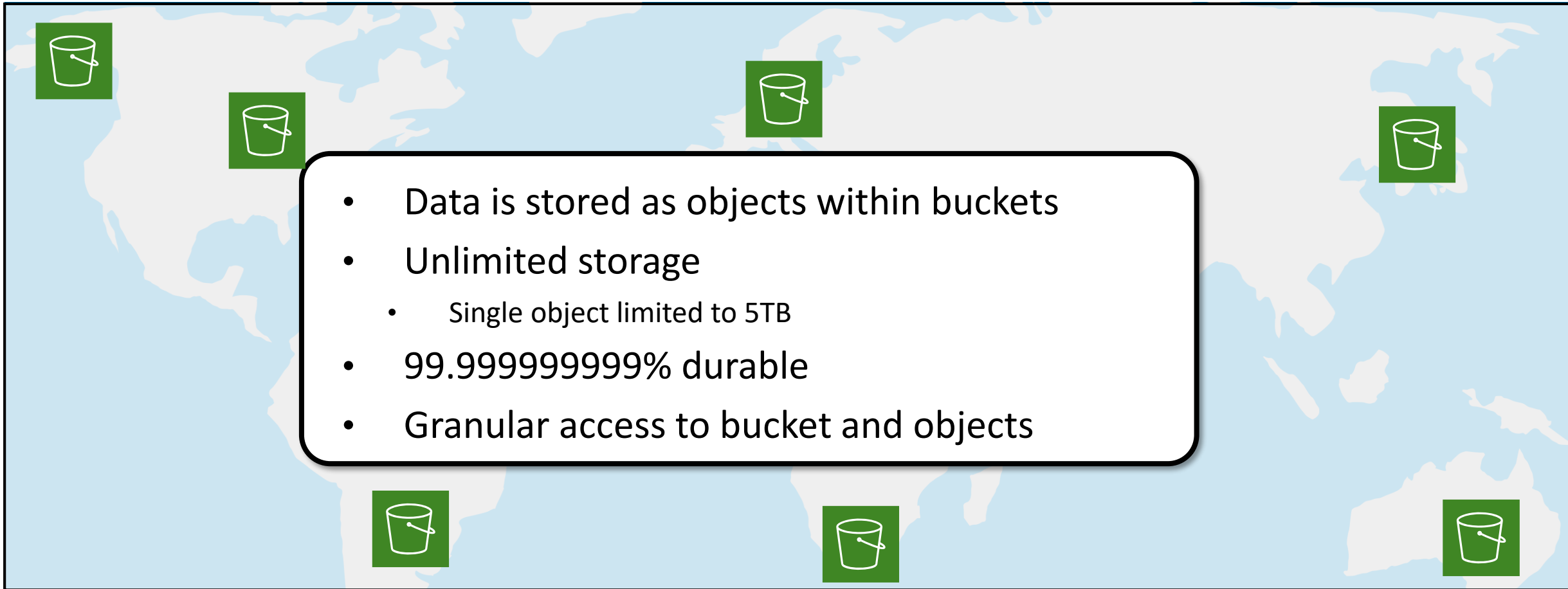
Amazon Elastic Block Store (Amazon EBS)

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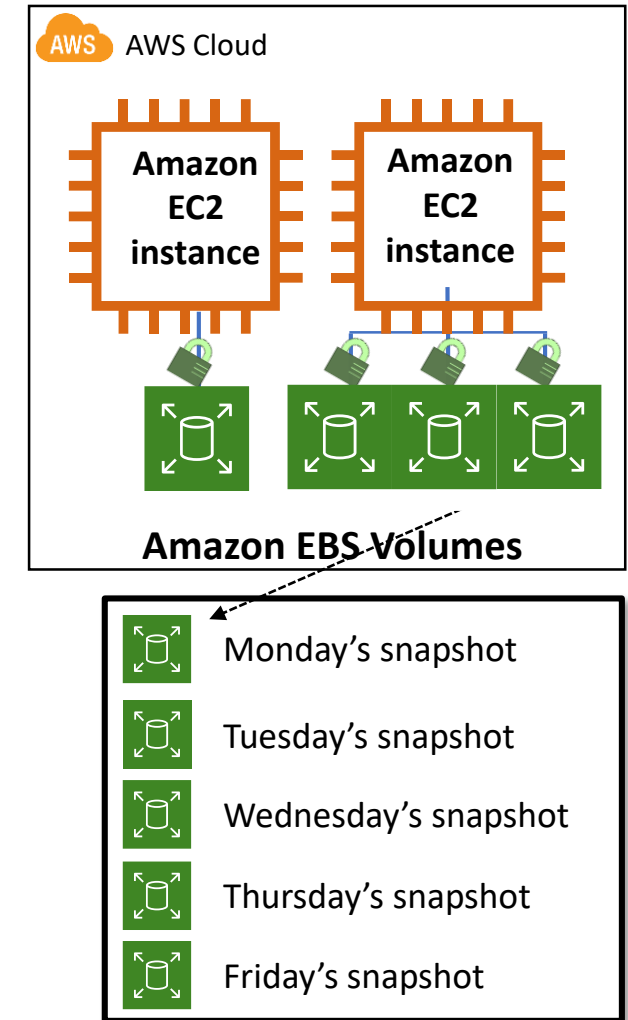- Pay for only what you provision
- Snapshot functionality
- Encryption available

AWS Cloud

Amazon EC2 instance

Amazon EC2 instance

Amazon EBS Volumes

Monday's snapshot

Tuesday's snapshot

Wednesday's snapshot

Thursday's snapshot

Friday's snapshot

What is Amazon S3?

- Data is stored as objects within buckets
- Unlimited storage
  - Single object limited to 5TB
- 99.999999999% 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

Your App

CLI sends GET request via S3 API →

← Object returned
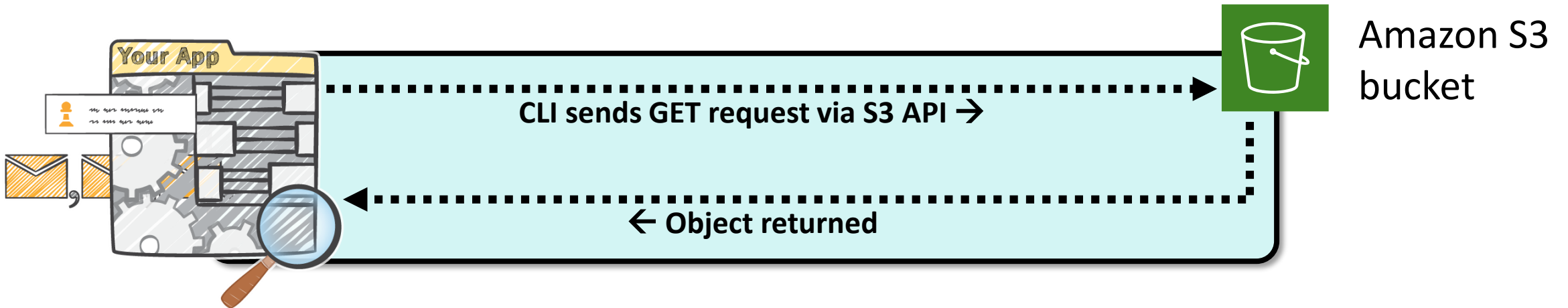
Amazon S3 bucket

Amazon S3 common scenarios

- Backup and storage

- Application hosting

- Media hosting

- Software delivery

Amazon S3 buckets

Amazon EC2 instances

Corporate Datacenter

Your App

APP
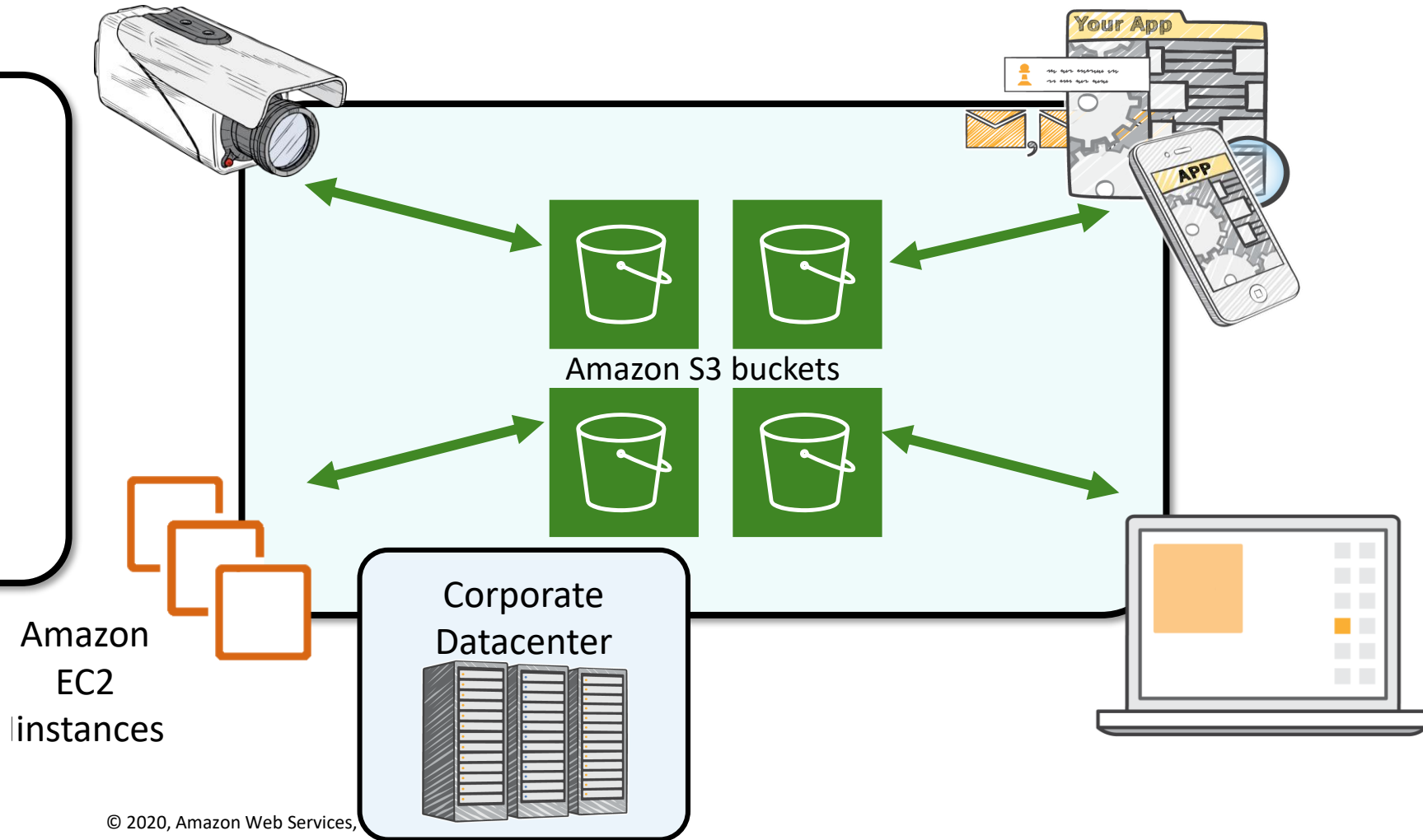
Not just a storage bucket
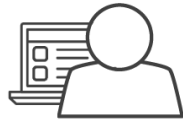
Requester pays

Versioning

Hosting static websites

Object lifecycle management

What is Amazon S3 Glacier and Deep Glacier?

- Low-cost data archiving and long-term backup

- 1-to-5 minutes, 3- to 5-hours or within 12 hours*

- Can configure lifecycle archiving of Amazon S3 content to Amazon Glacier

Archive after 30 days

Delete after 5 years

Amazon S3 bucket
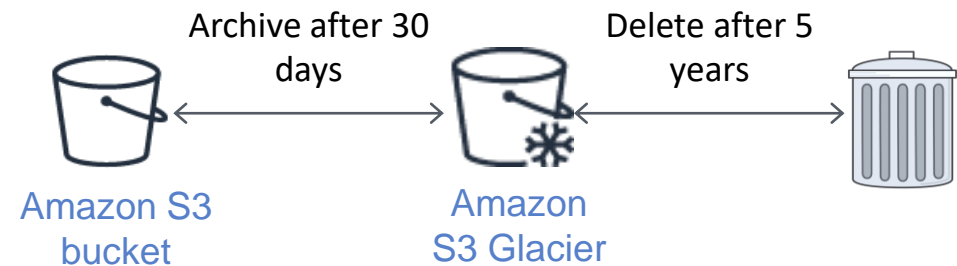
Amazon S3 Glacier

Amazon S3 Glacier use cases

Media asset workflows

Healthcare information archiving

Regulatory and compliance archiving

Scientific data storage

Digital preservation

Magnetic tape replacement

Amazon S3 Glacier vault lock policy

- Deploy and enforce compliance controls on individual Amazon Glacier vaults

- Vault becomes immutable once locked
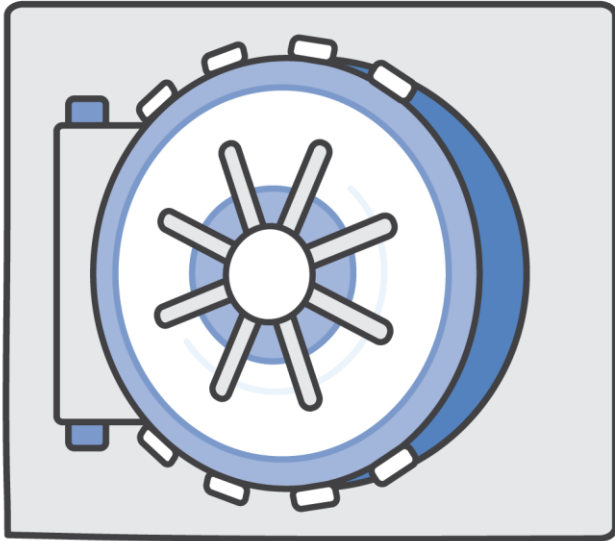
Amazon S3 storage classes

| Storage class	Features
S3 Standard	• ≥3 availability zones
S3 Standard - Infrequent Access (IA)	• Retrieval fee associated with objects • Most suitable for infrequently accessed data
S3 Intelligent- Tiering	• Automatically moves objects between tiers based on access patterns • ≥3 availability zones
S3 One Zone-IA	• 1 availability zone • Costs 20% less than S3 Standard-IA
S3 Glacier	• Not available for real-time access • Must restore objects before you can access them • Restoring objects can take 1 minute - 12 hours
S3 Glacier Deep Archive	• Lowest cost storage for long term retention (7-10 years) • ≥3 availability zones • Retrieval time within 12 hours

Architecture example
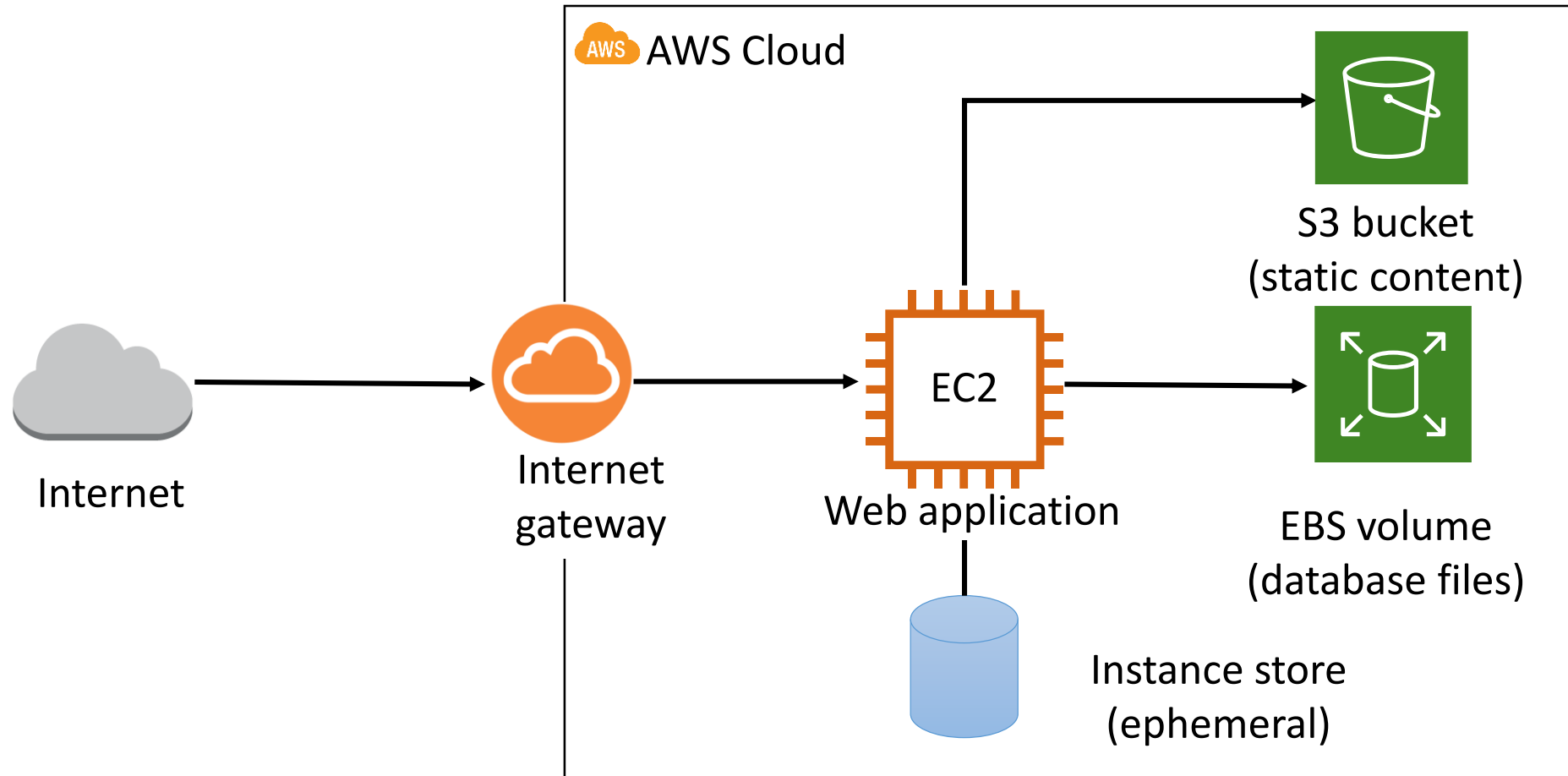
Secure your data

Amazon Virtual Private Cloud (Amazon VPC)
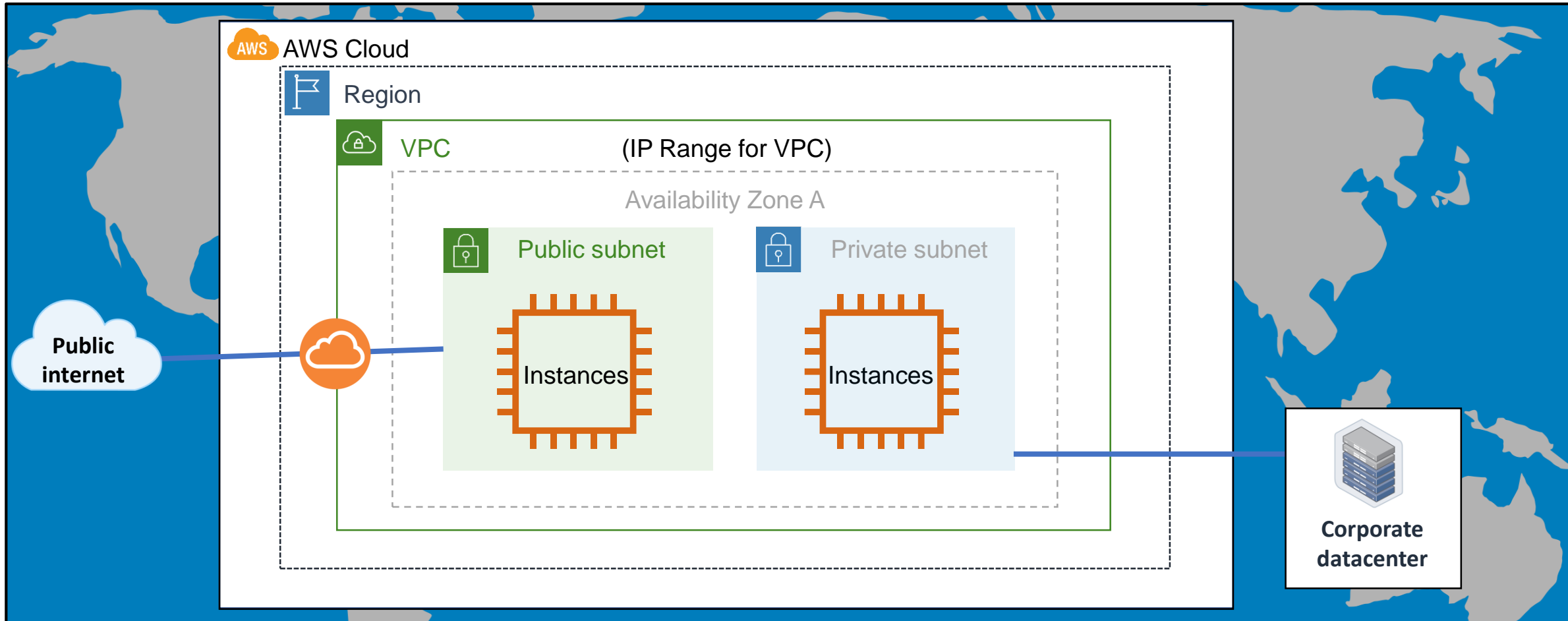
Security groups
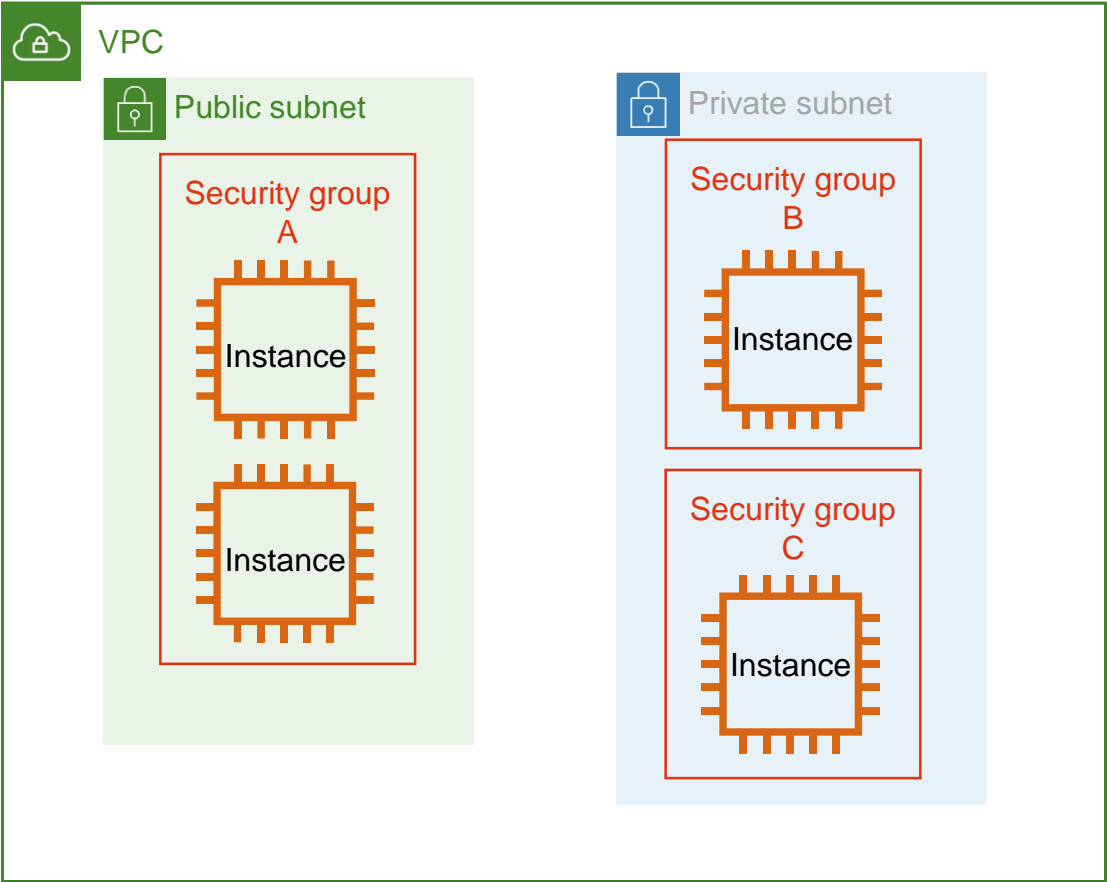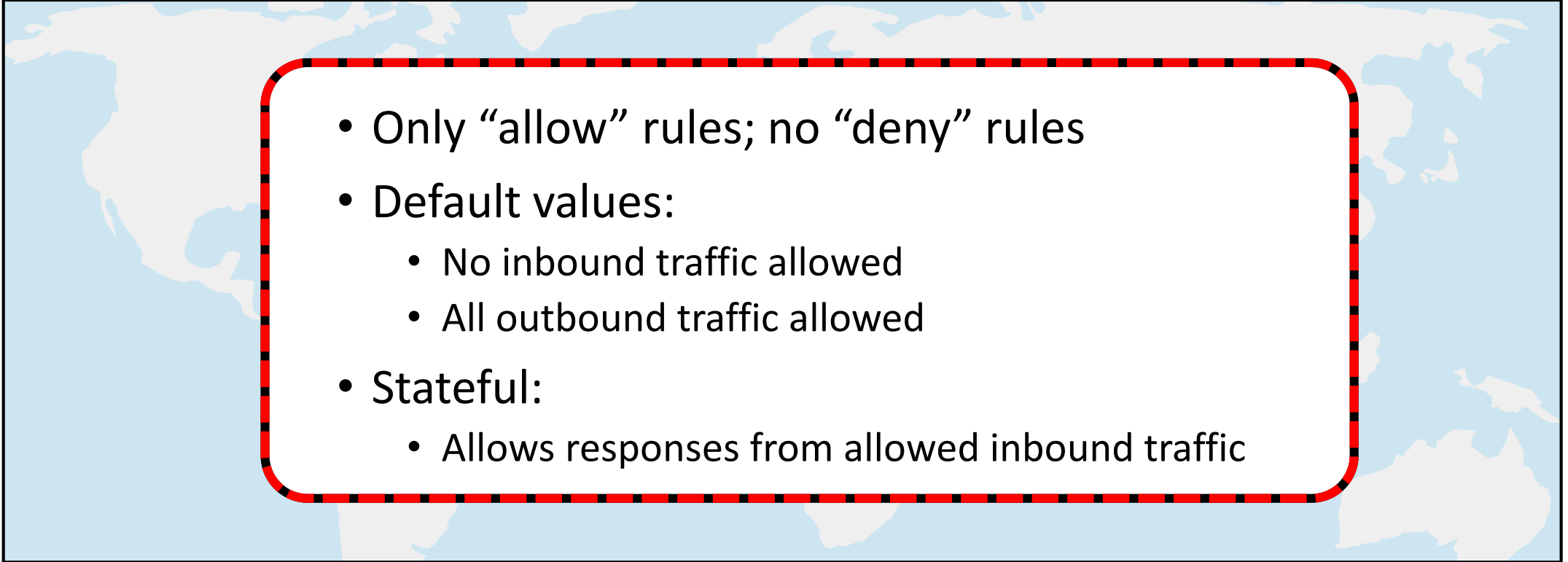
Security Group A		
Inbound		
Source	**Protocol**	**Port Range**
0.0.0.0/0	TCP	80
0.0.0.0/0	TCP	443

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

VPC

MyPublicSubnet (10.0.0.0/24) — SG-Web-Tier — WWW Servers
MyPrivateSubnet (10.0.1.0/24) — SG-App-Tier — App Servers — SG-DB-Tier — DB Servers

Public internet

Corp (10.0.16.0/20)
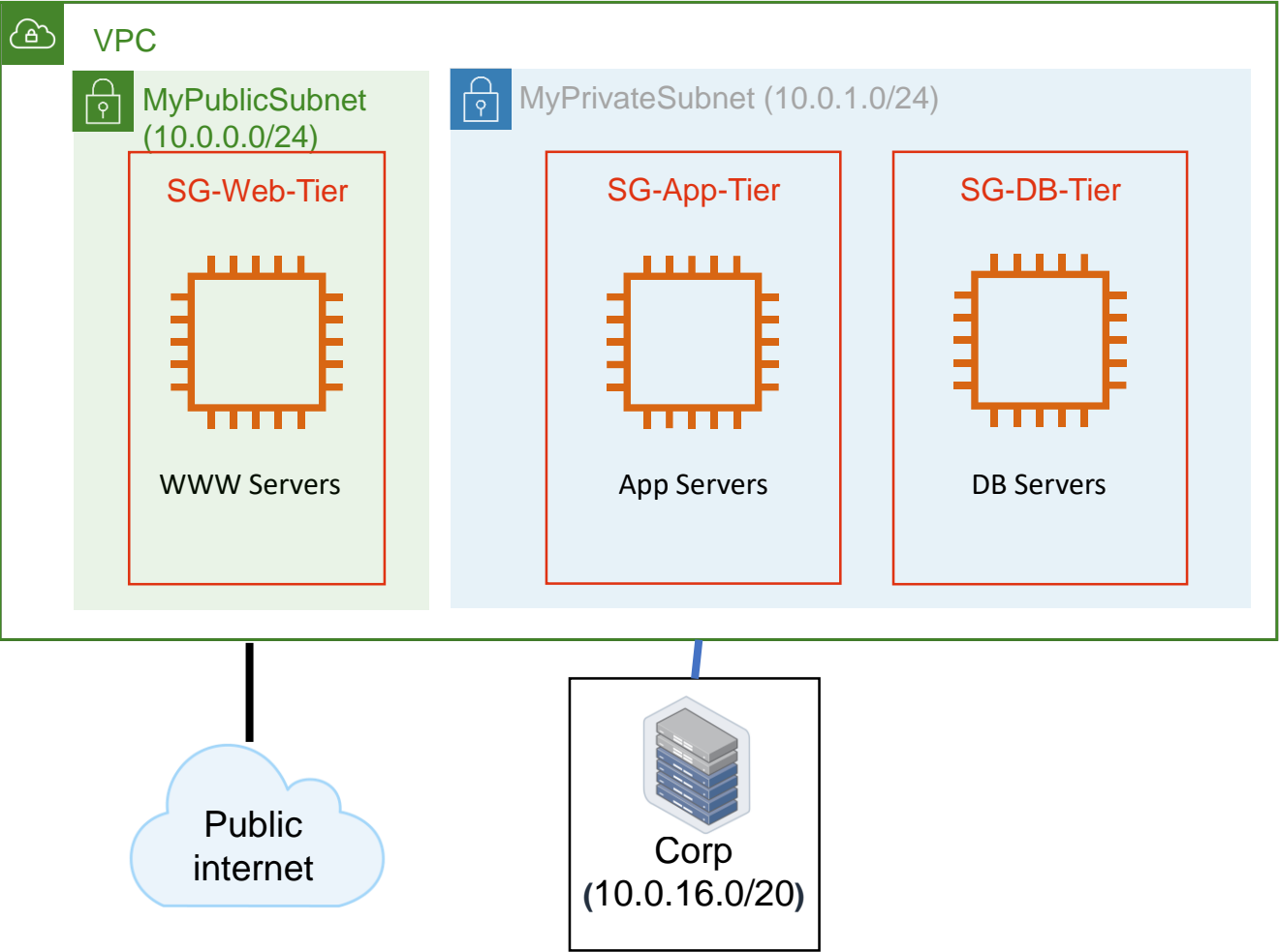
SG-Web-Tier

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-App-Tier

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

SG-DB-Tier

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

Thank you!

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