PUBLIC SECTOR SUMMIT ONLINE

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ONLINE CONFERENCE

Module 2:
Getting started with the cloud

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Technical Trainer
AWS

Getting started with AWS services

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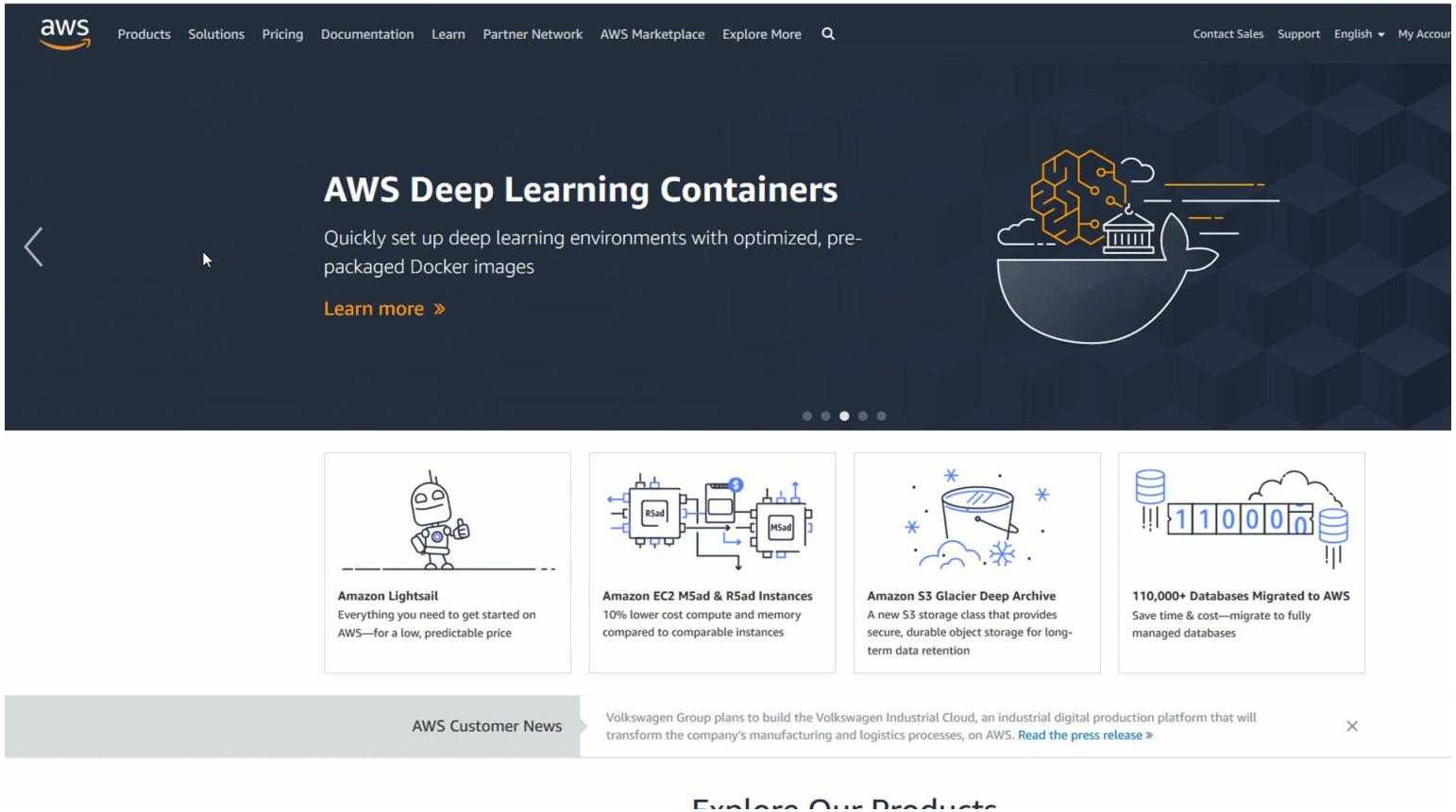
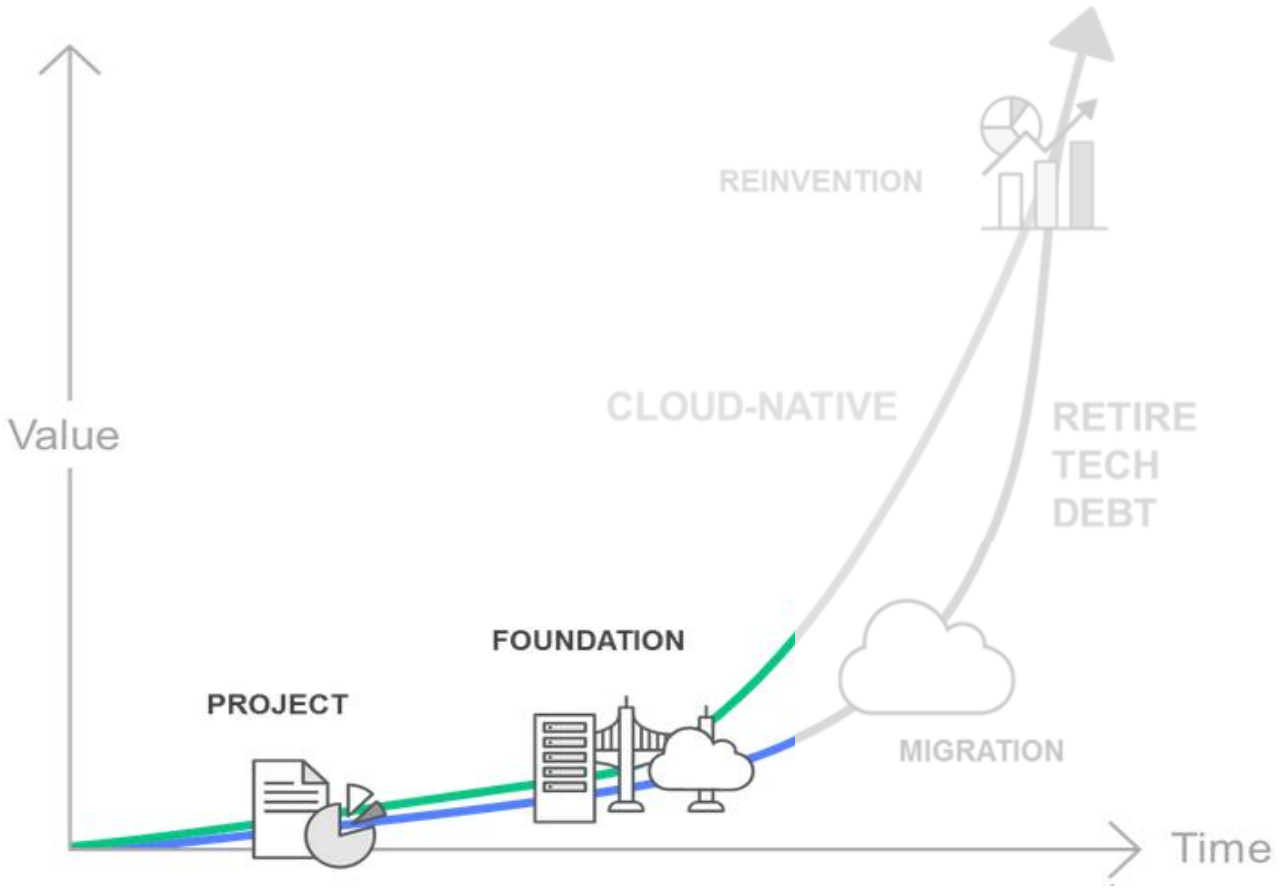
AWS products



Cloud journey



Build your infrastructure

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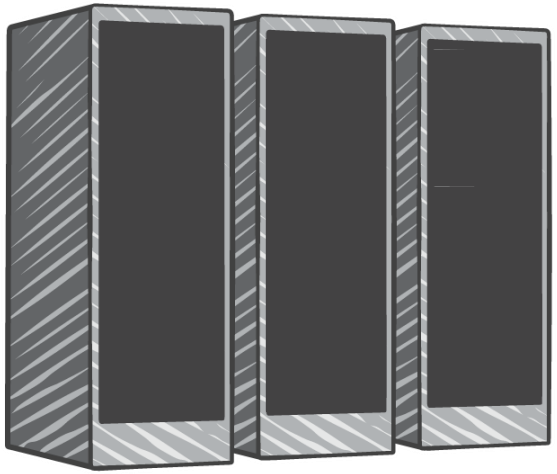
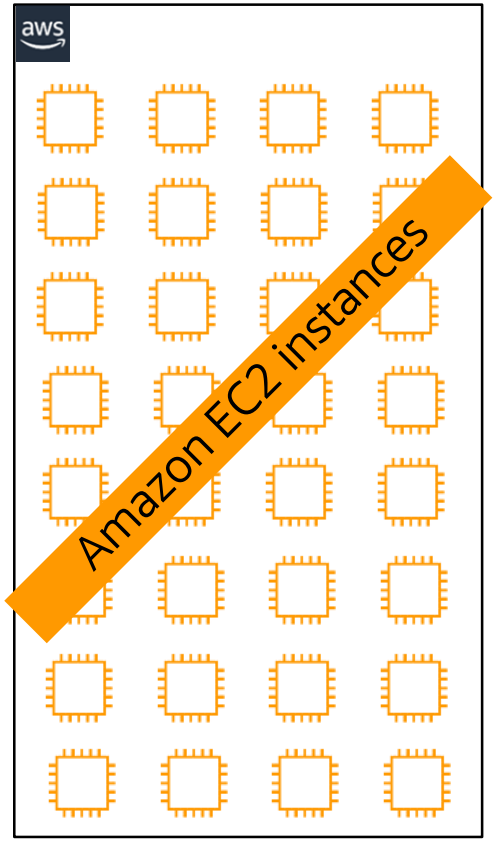
What is Amazon EC2?



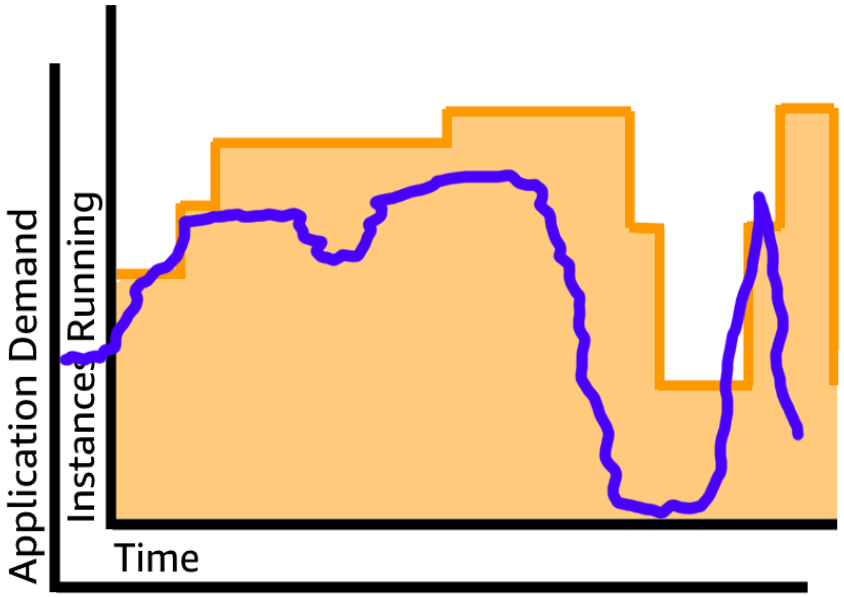
On-premises servers

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



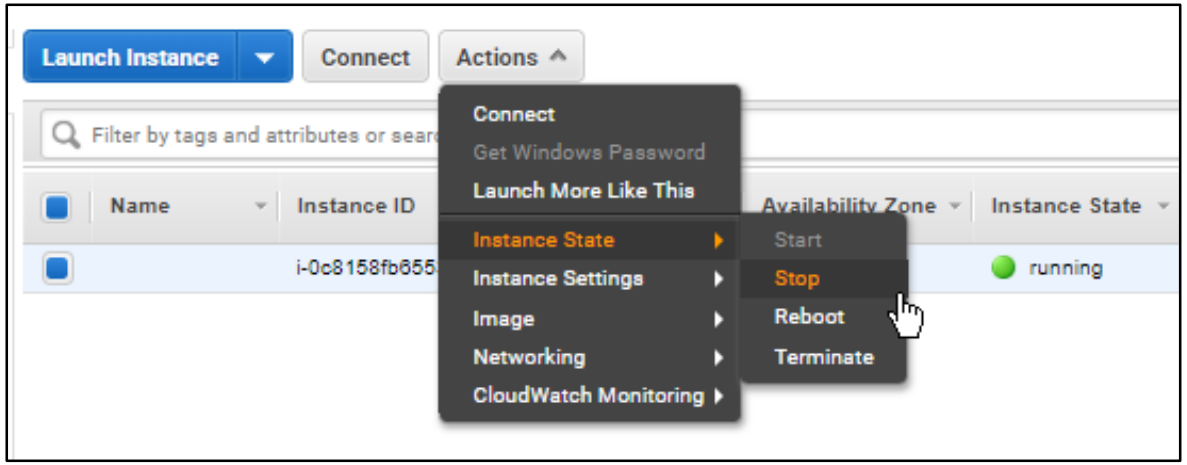
Benefits of Amazon EC2

- Elasticity



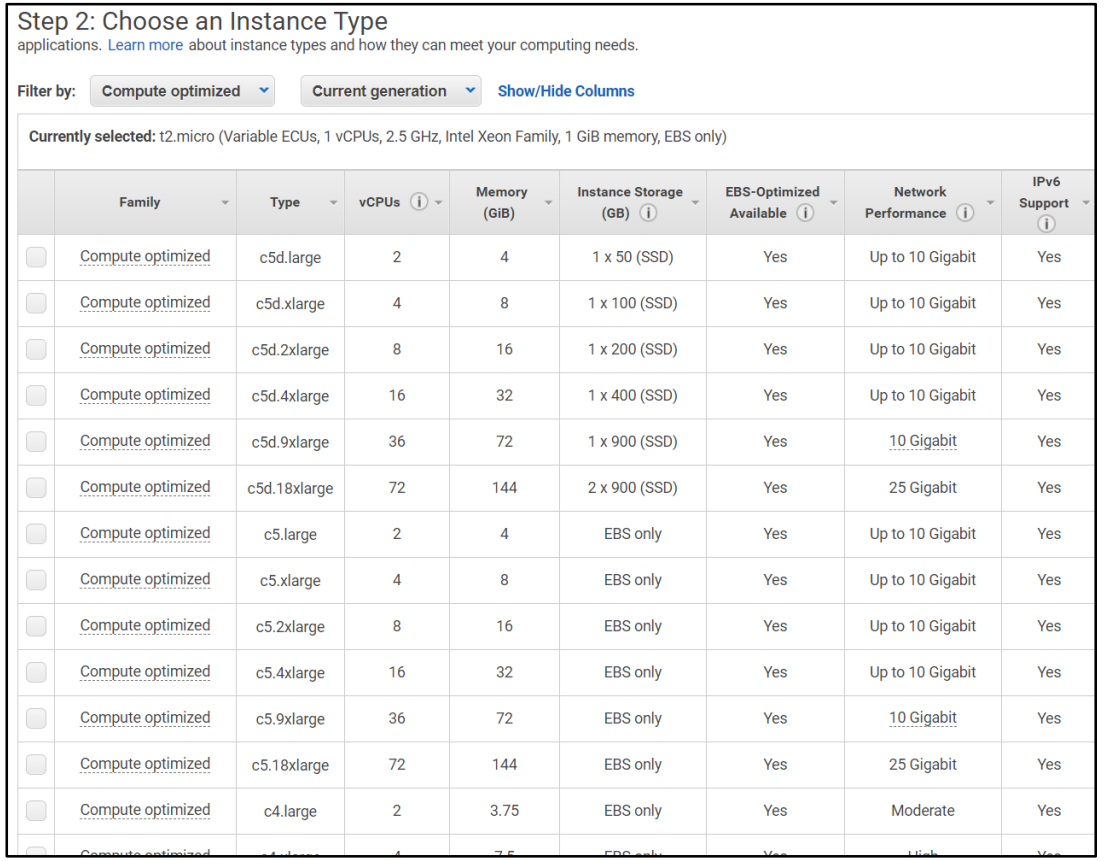
Benefits of Amazon EC2

- 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.

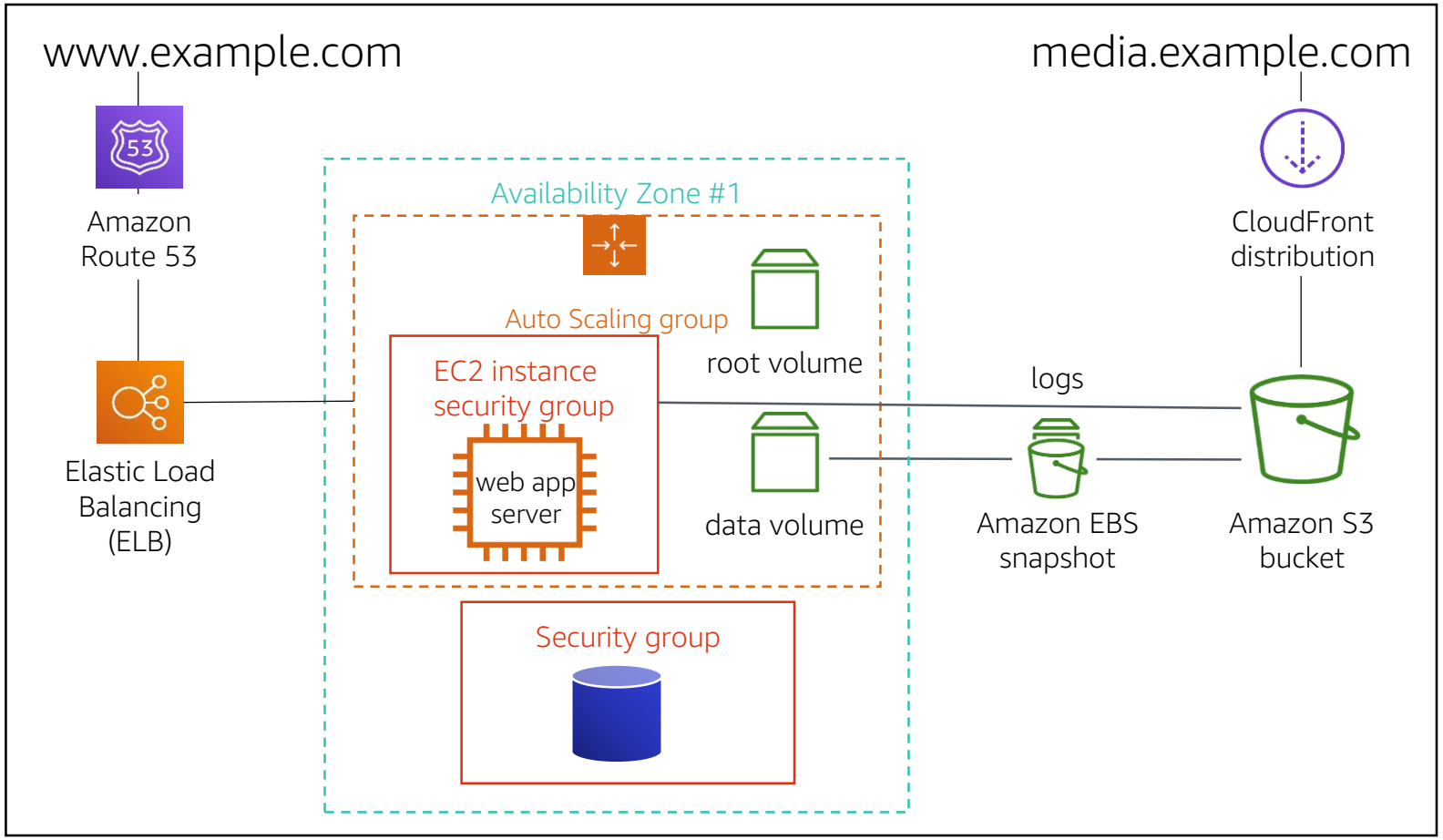
Filter by: Compute optimized | Current generation | Show/Hide Columns

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
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

Benefits of Amazon EC2

- Elasticity
- Control
- Flexibility
- Integrated

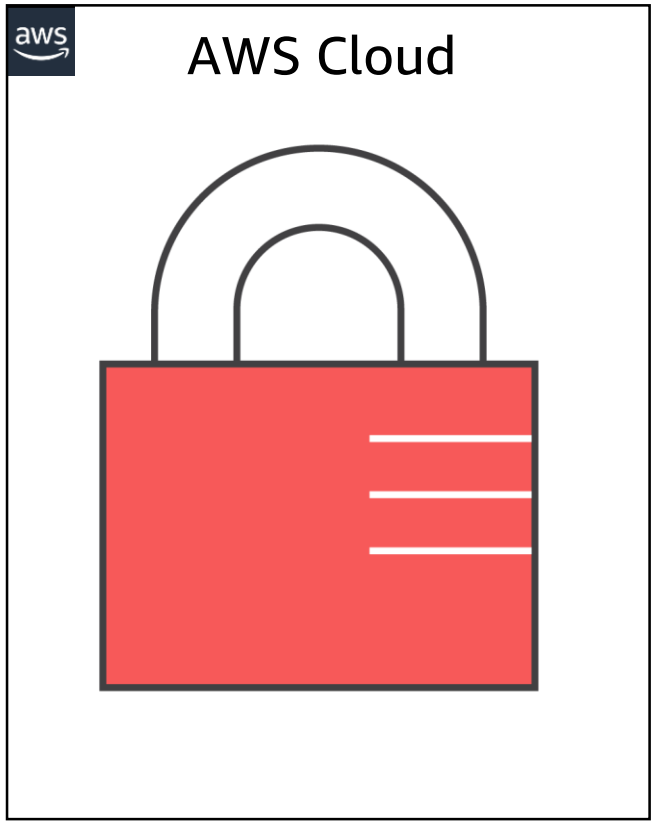


Benefits of Amazon EC2

- Elasticity
- Control
- Flexibility
- Integrated
- Reliable

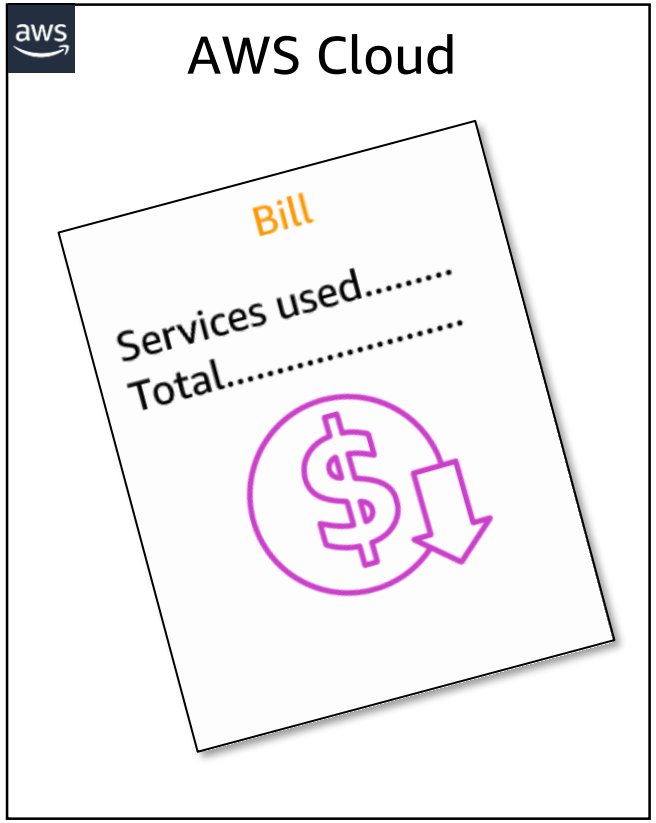
Benefits of Amazon EC2

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



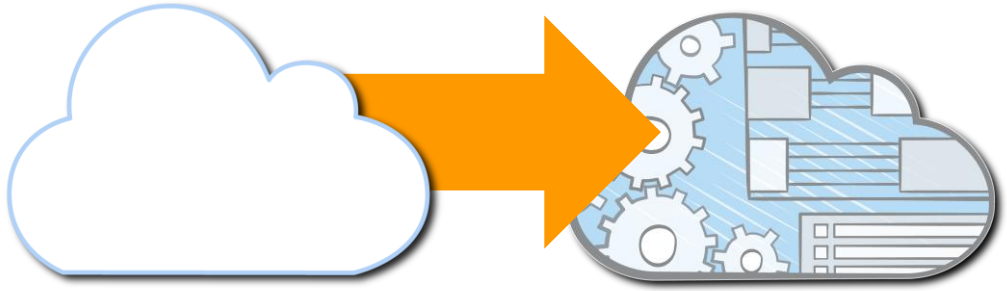
Benefits of Amazon EC2

- 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

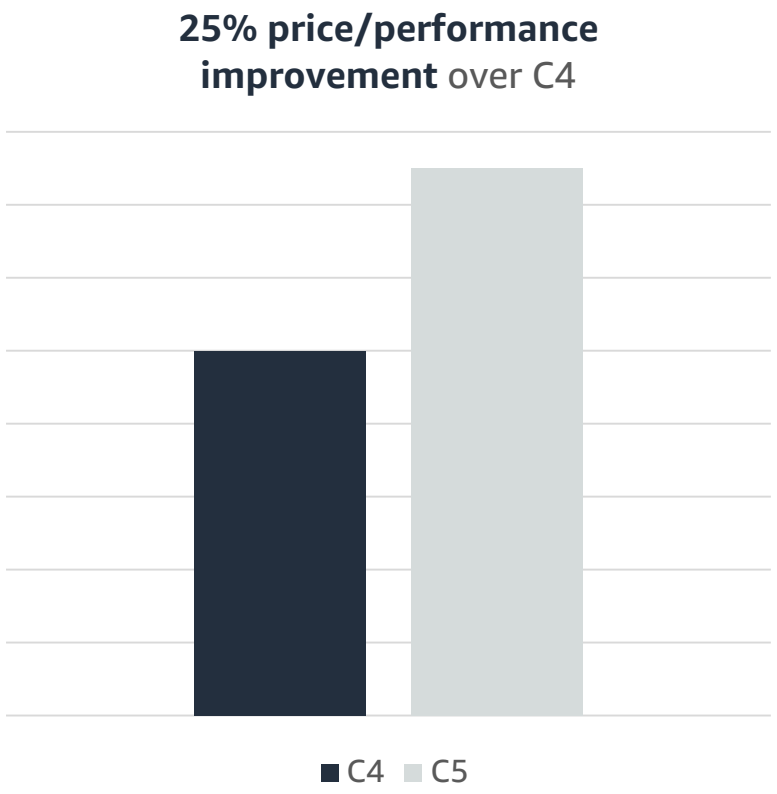
- EC2 Instance types are optimized for different use cases, workloads & come in multiple sizes. This allows you to optimally scale resources to your workload requirements.
- AWS utilizes Intel® Xeon® processors for EC2 Instances providing customers with high performance and value.
- Consider the following 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.

aws | intel

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



- 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

NETFLIX

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

GRAIL

"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

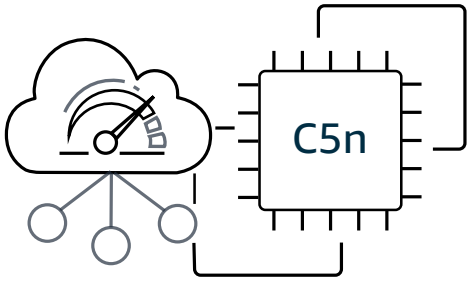
NEW!

Featuring Intel Xeon Scalable processors

100 Gbps
network bandwidth
on largest
instance sizes

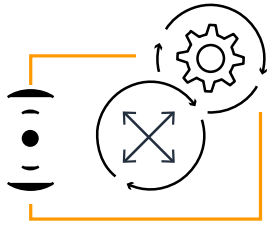
25 Gbps
peak bandwidth
on smaller
instance sizes

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

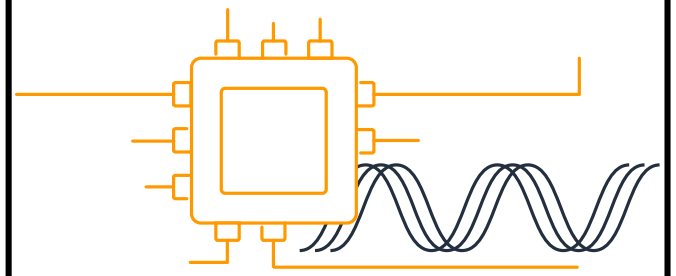
z1d: high frequency for specialized workloads

High Frequency instances with custom Intel Xeon Scalable processors running at sustained 4 GHz all core turbo

8:1 GiB to vCPU ratio

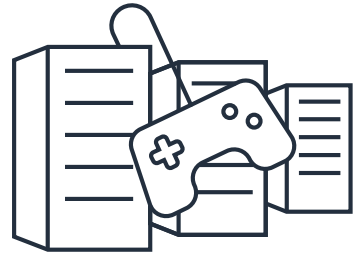
Up to 25 Gbps network bandwidth and up to 1.8 TB of local NVMe storage

z1d.large	6 sizes ● ● ●	**z1d.12xlarge**
16 GiB		384 GiB
2 vCPU		48 vCPU



Electronic Design Automation

Relational databases

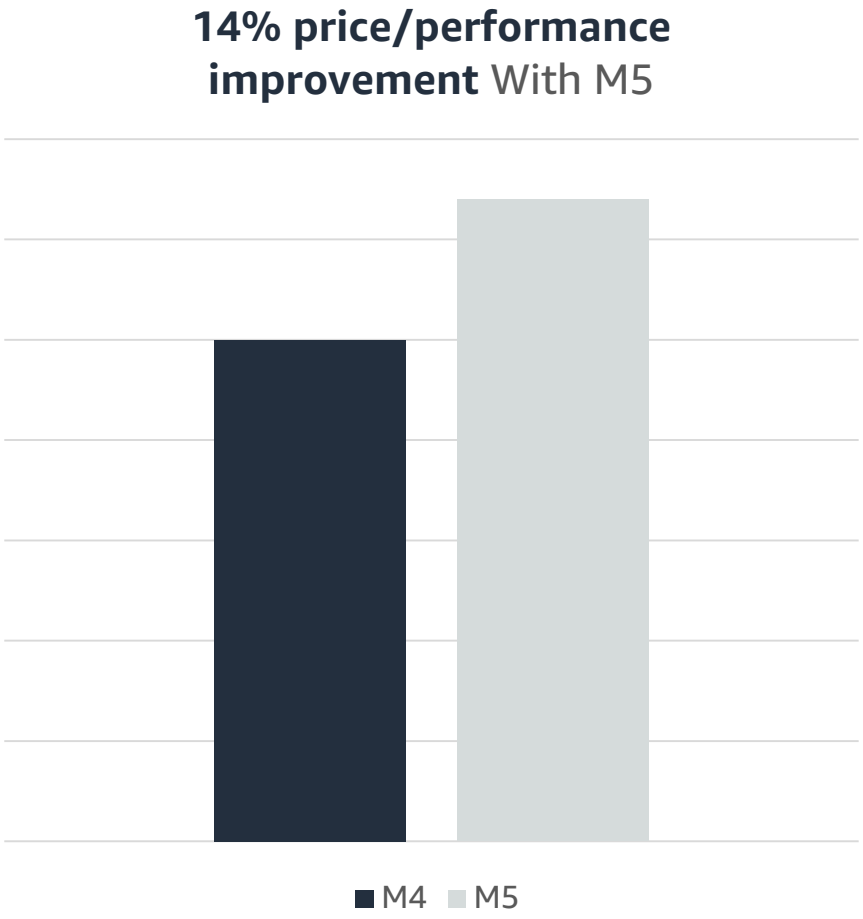


Gaming

z1d.metal Bare Metal instances coming soon

NEW!

M5: Next-gen general purpose instances

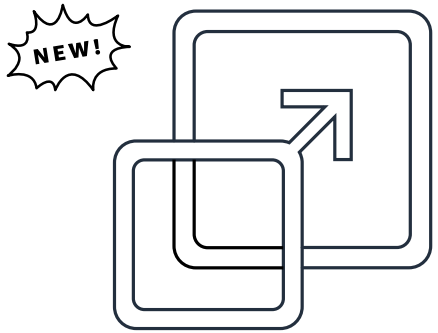


- Powered by 2.5 GHz Intel Xeon Scalable Processors (Skylake)
- New larger instance size—m5.24xlarge with 96 vCPUs and 384 GiB of memory (4:1 Memory:vCPU ratio)
- Improved network and EBS performance on smaller instance sizes
- Support for Intel AVX-512 offering up to twice the performance for vector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

t3.nano	7 sizes	t3.2xlarge
0.5 GiB	● ● ●	32 GiB
2 vCPU		8 vCPU
Base perf 5%		Base perf 40%

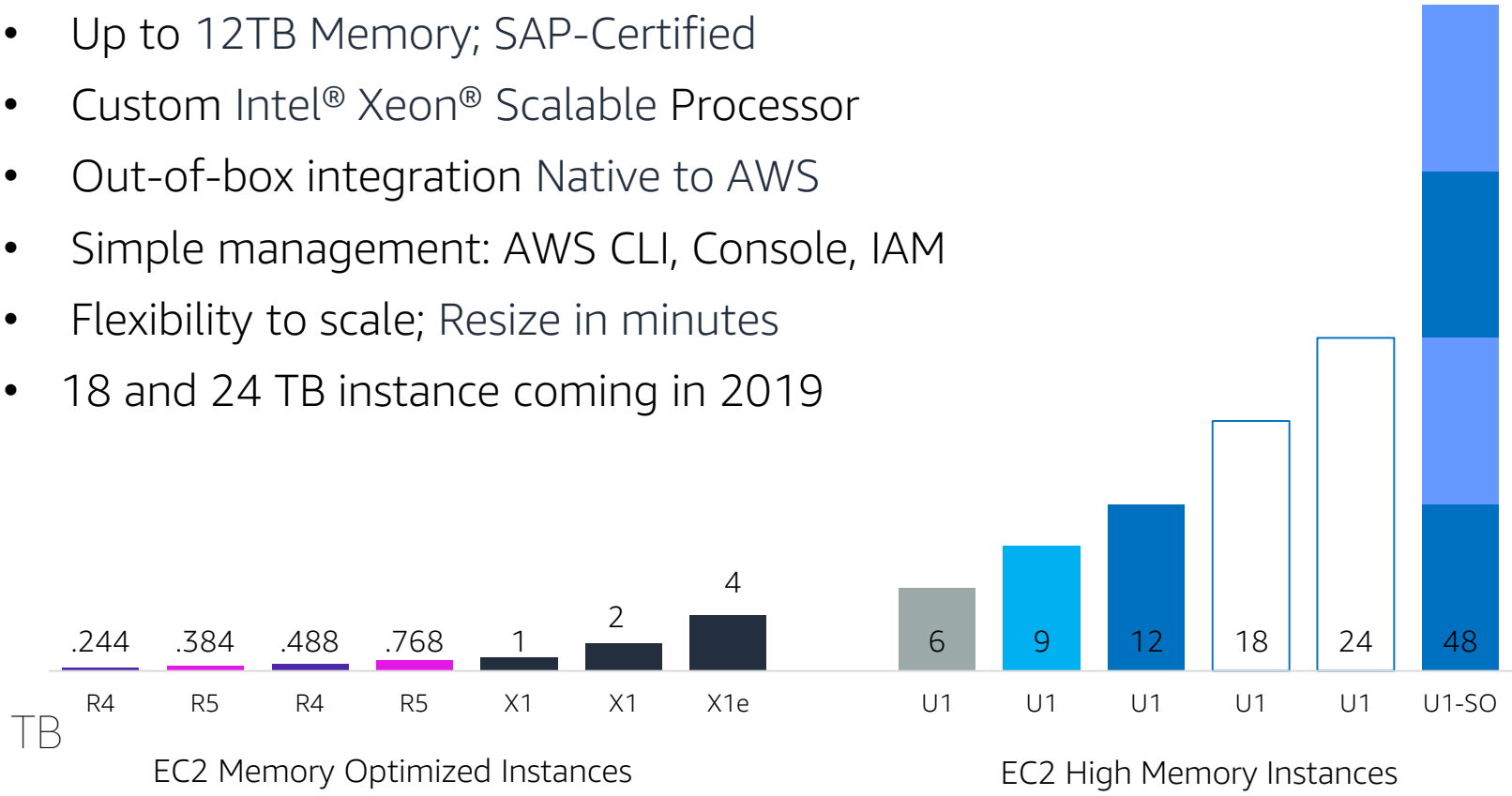


With T3 Unlimited bursting over baseline is only $0.05 per vCPU-hour, averaged over 24 hours

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



Flexibility — Grow-as-you-Go

TCO — Linear Pricing

Breath — Seamless access to all AWS Services

Scale — Near Infinite Elastic Scalability for Mission-Critical Deployments

Secure — AWS owned and operated

Speed — <1 hour provisioning times
100% Software Defined

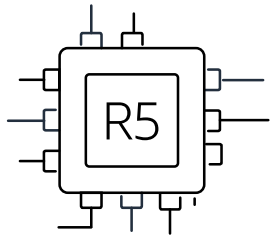
R5: memory-optimized instances

2.5 GHz Intel Xeon Scalable processors (Skylake)

Memory-optimized instances with 8:1 GiB to vCPU

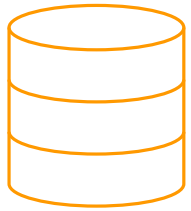
Up to 25 Gbps NW bandwidth

R5d instances include up to 3.6 TB of local NVMe SSD



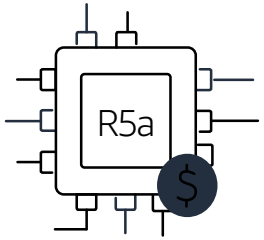
r5.large		r5.24xlarge
16 GiB	6 sizes	768 GiB
2 vCPU		96 vCPU

In-memory caches

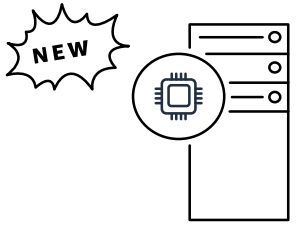


High performance databases

Big data analytics



R5a: Now available with AMD EPYC 7000 processor



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

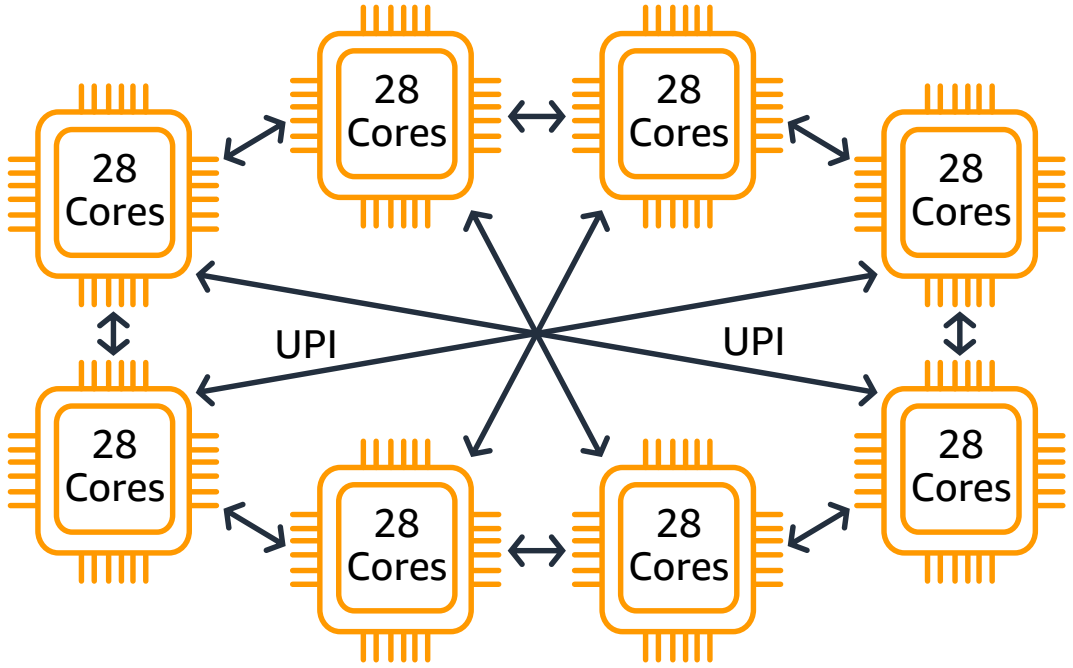
EC2 High Memory Instance architecture

The most memory of any EC2 Instance SAP-certified

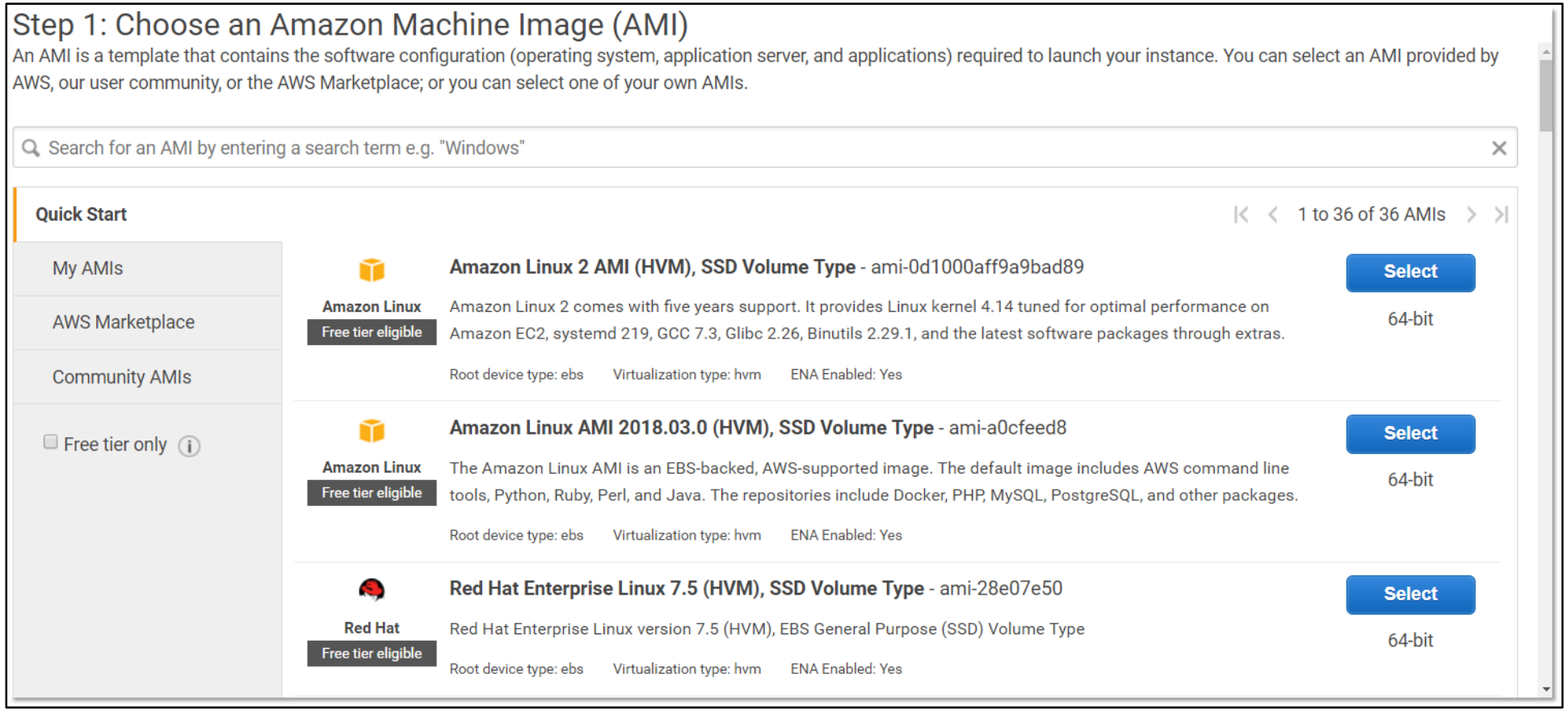
12 TB of memory

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

18TB and 24TB coming in 2019



What's your platform?



Store your data

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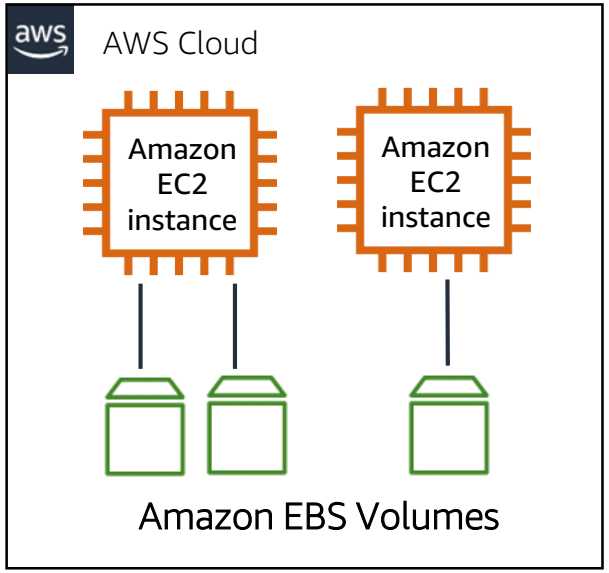
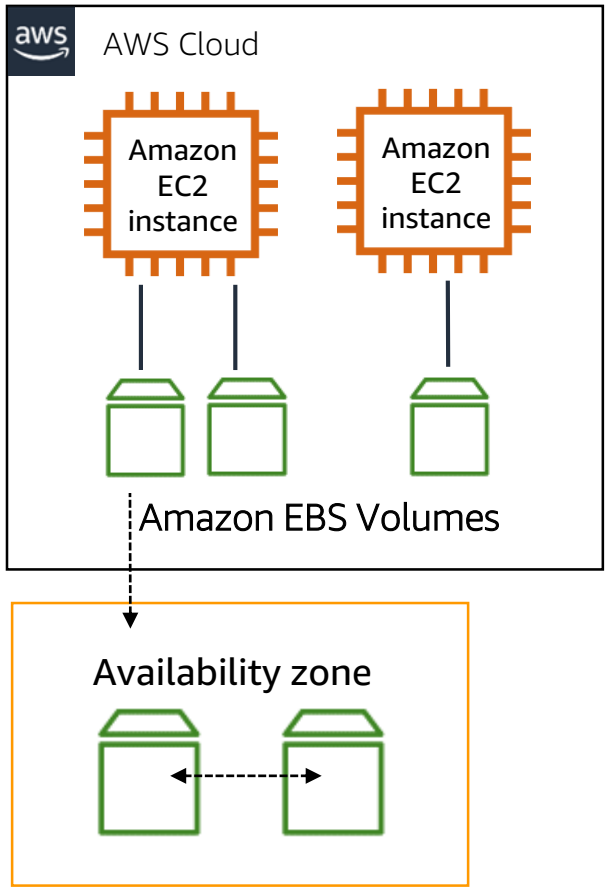
Amazon Elastic Block Store (Amazon EBS)

- Persistent block storage for instances



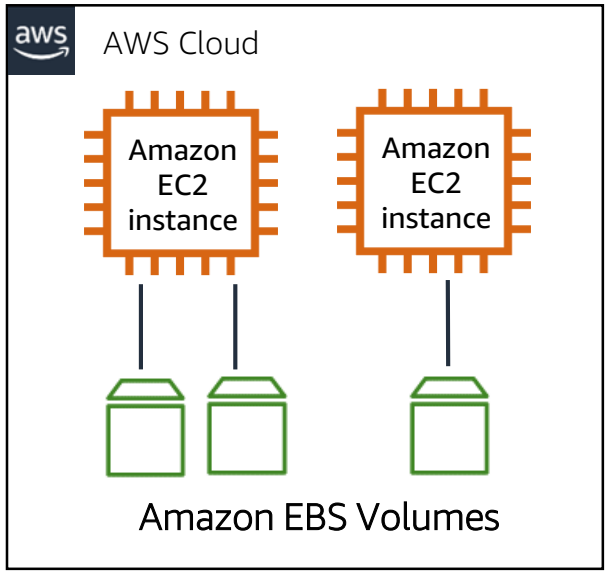
Amazon Elastic Block Store (Amazon EBS)

- 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

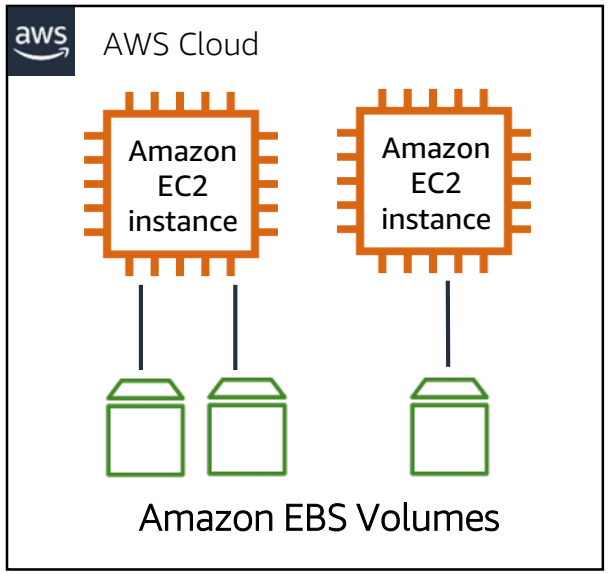


Solid State Drives (SSD)
- Provisioned IOPS SSD (io1) Volumes
- General Purpose SSD (gp2) Volumes

Hard Disk Drives (HDD)
- Throughput Optimized HDD (st1) Volumes
- Cold HDD (sc1) Volumes

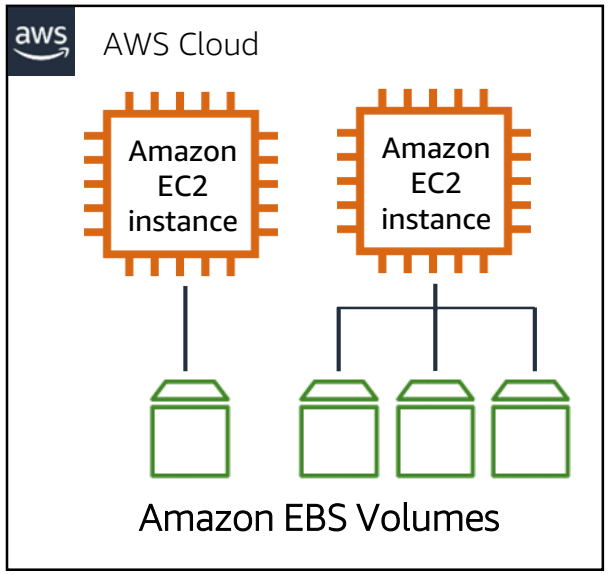
Amazon Elastic Block Store (Amazon EBS)

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



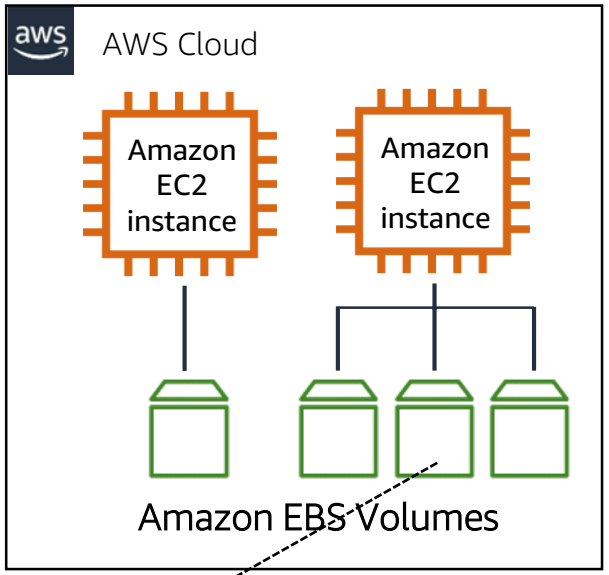
Amazon Elastic Block Store (Amazon EBS)

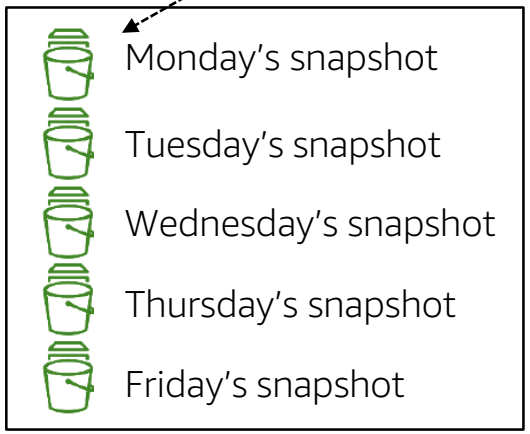
- Persistent block storage for instances
- Protected through replication
- Different drive types
- Scale up or down in minutes
- Pay for only what you provision



Amazon Elastic Block Store (Amazon EBS)

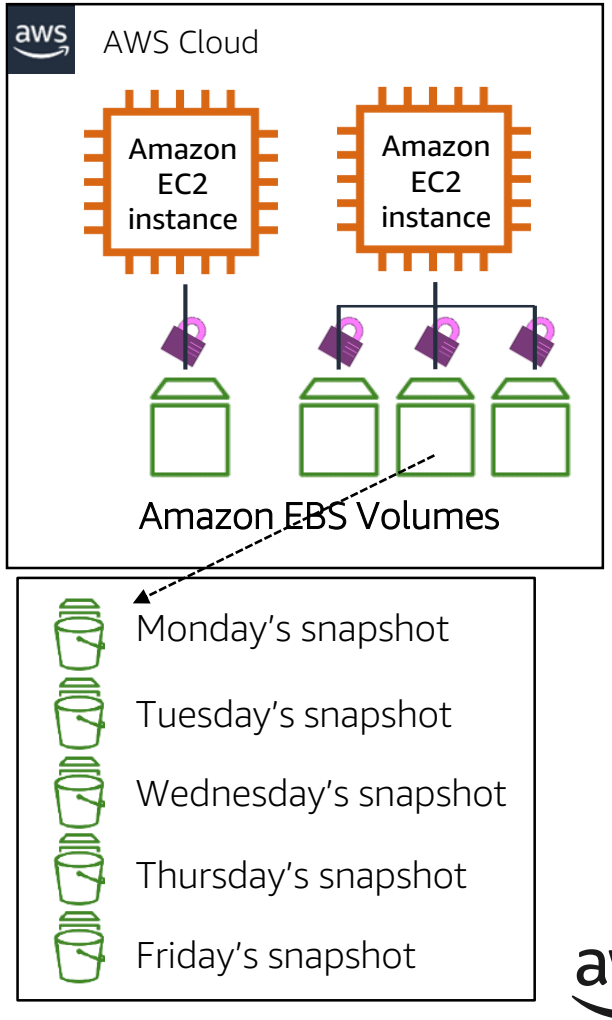
- Persistent block storage for instances
- Protected through replication
- Different drive types
- Scale up or down in minutes
- Pay for only what you provision
- Snapshot functionality



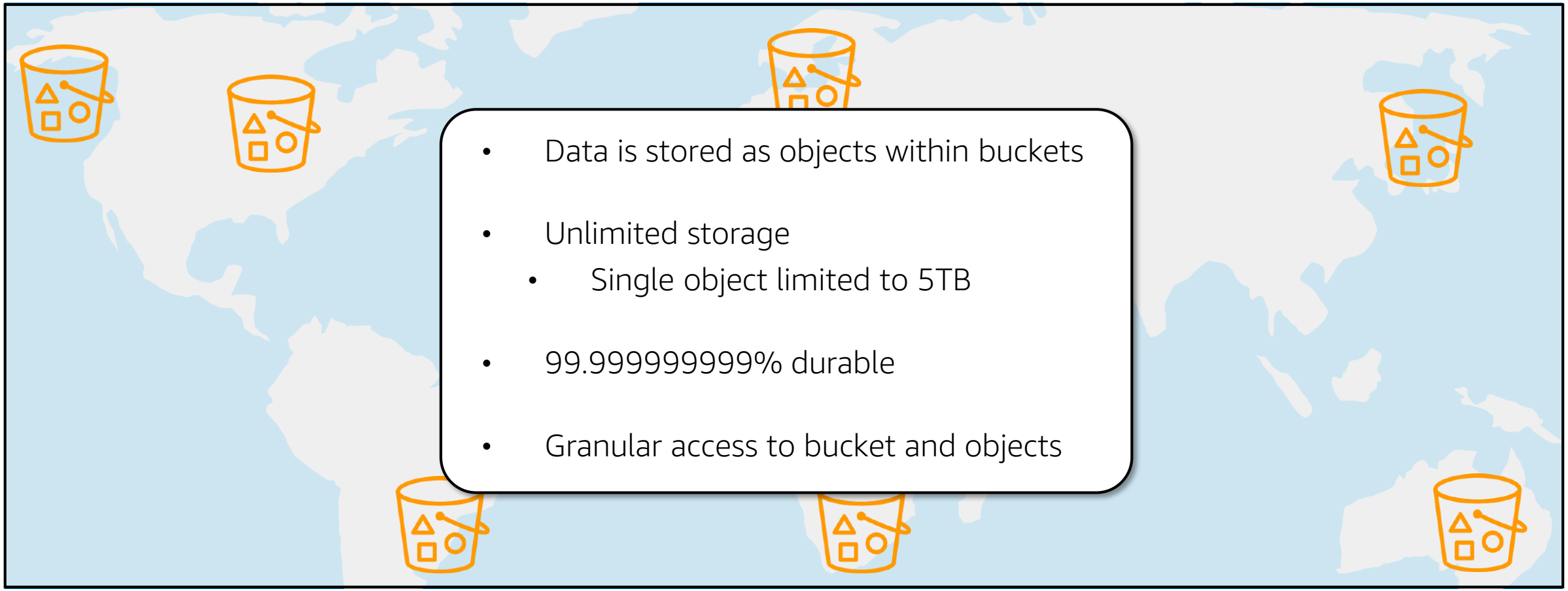


Amazon Elastic Block Store (Amazon EBS)

- 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



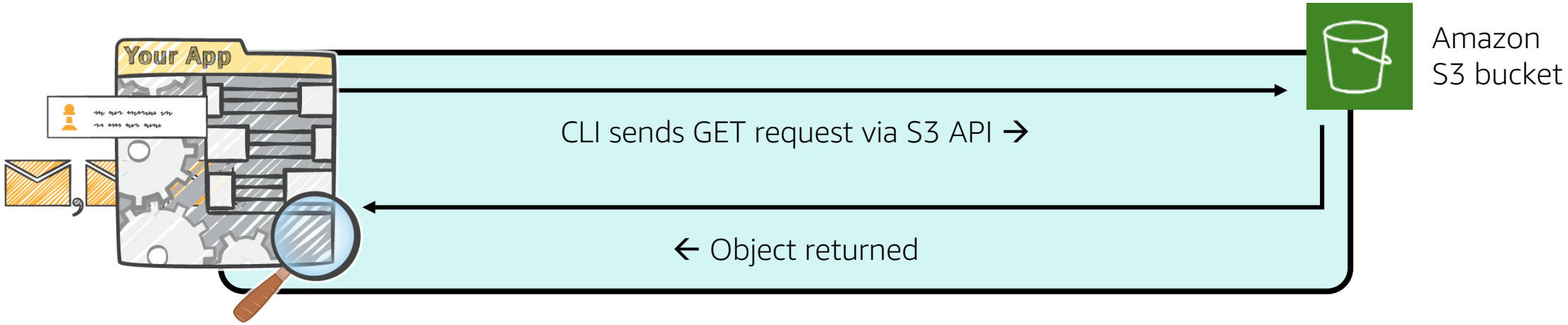
What is Amazon S3?



- Data is stored as objects within buckets
- Unlimited storage
  - Single object limited to 5TB
- 99.999999999% durable
- Granular access to bucket and objects

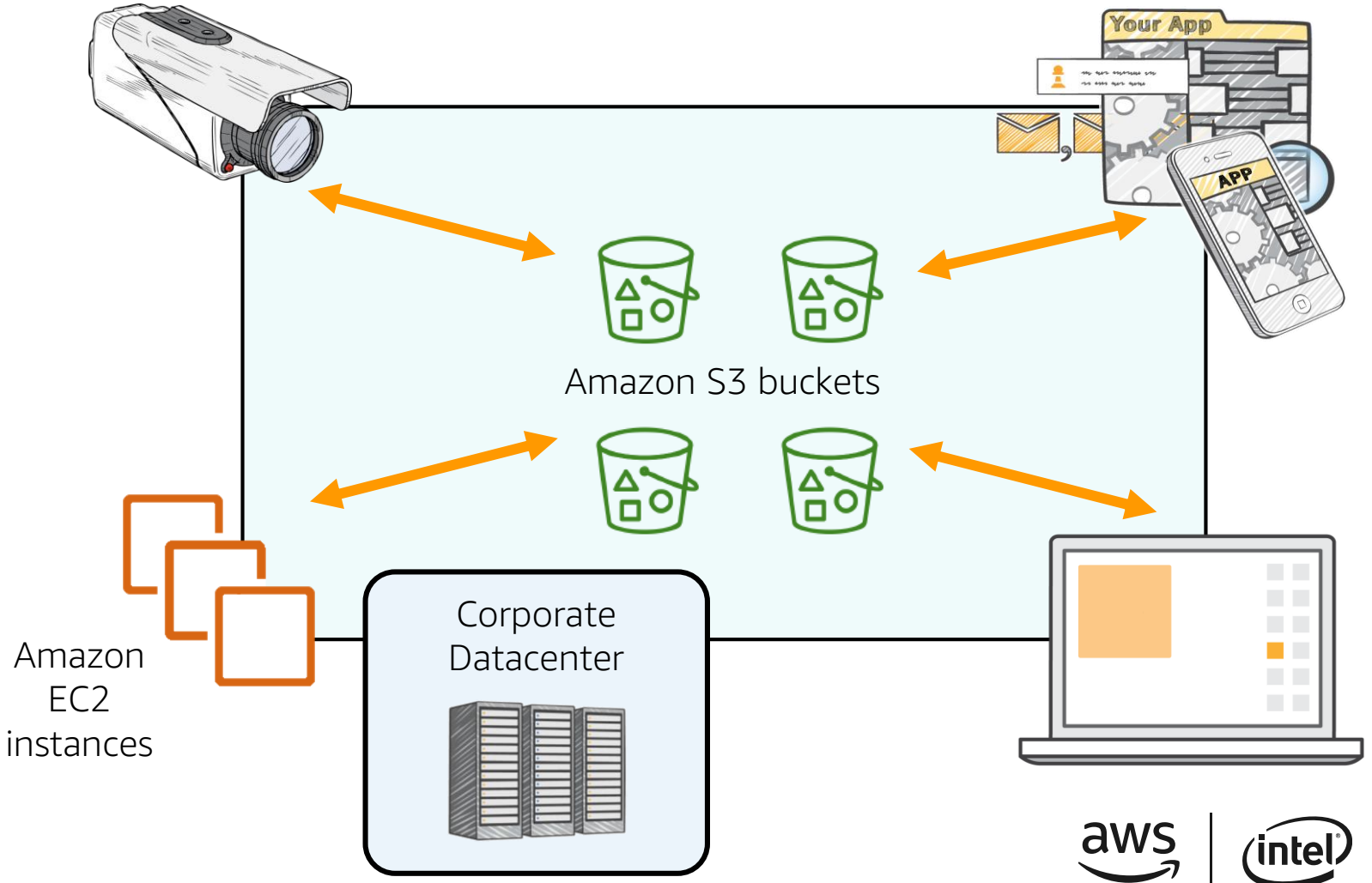
Amazon S3 core functionality

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



Amazon S3 common scenarios

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



Demo

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What is Amazon S3 Glacier?

- Low-cost data archiving and long-term backup
- 3- to 5-hour or within 12 hours*
- Can configure lifecycle archiving of Amazon S3 content to Amazon Glacier

Amazon S3 Glacier use cases

Media asset workflows

Healthcare information archiving

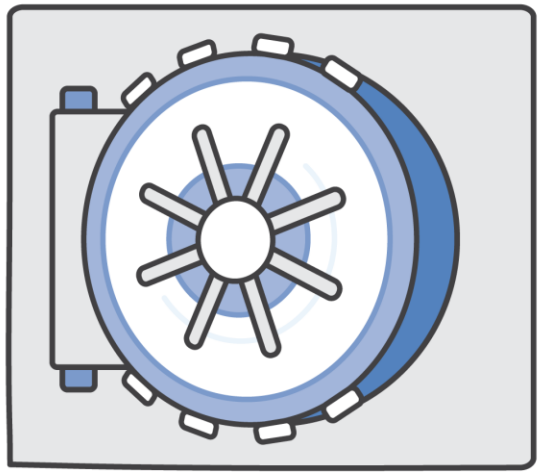
Regulatory and compliance archiving

Scientific data storage

Digital preservation

Magnetic tape replacement

Amazon S3 Glacier vault lock policy

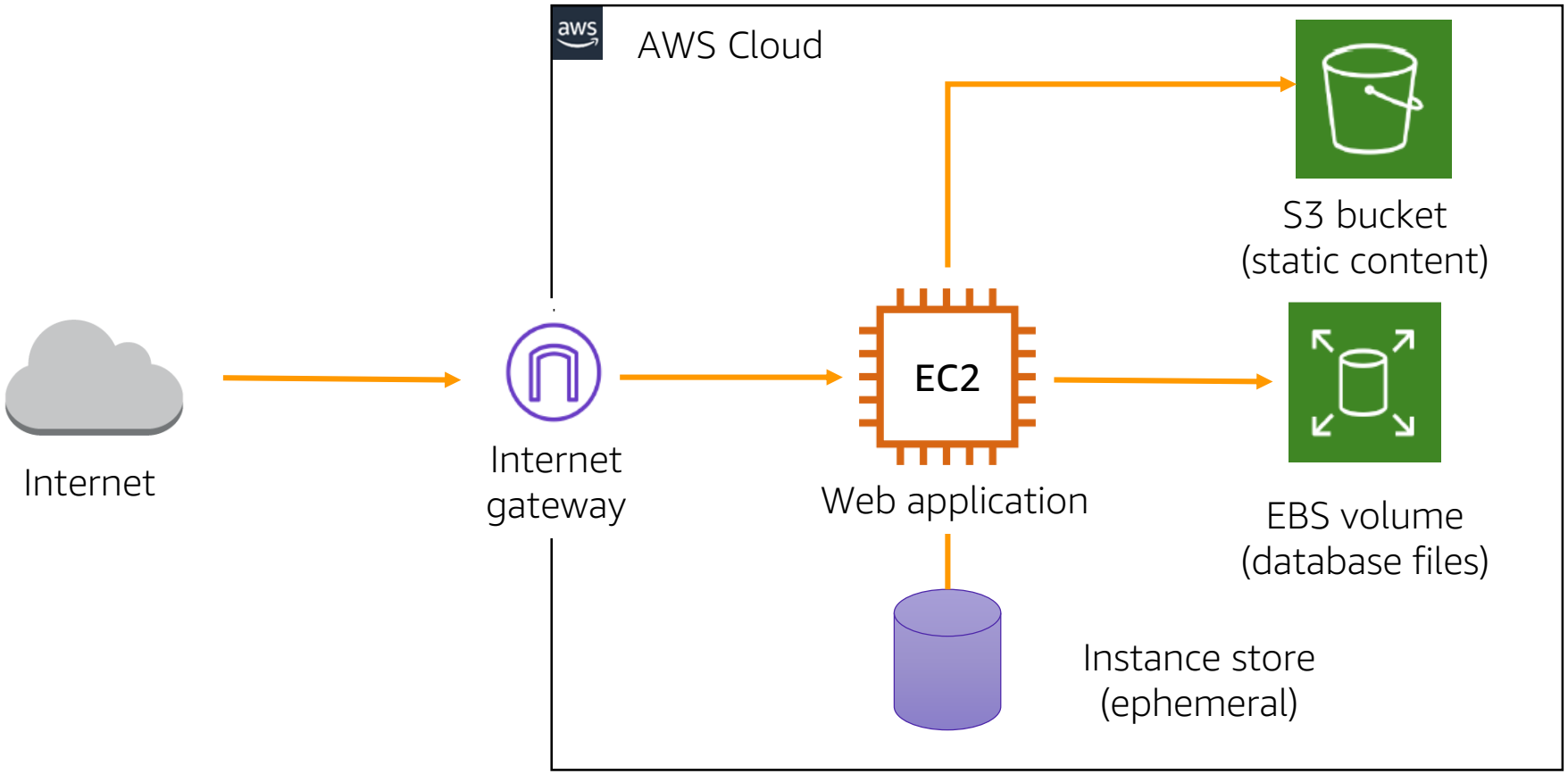


- Deploy and enforce compliance controls on individual Amazon Glacier vaults
- Vault becomes immutable once locked

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

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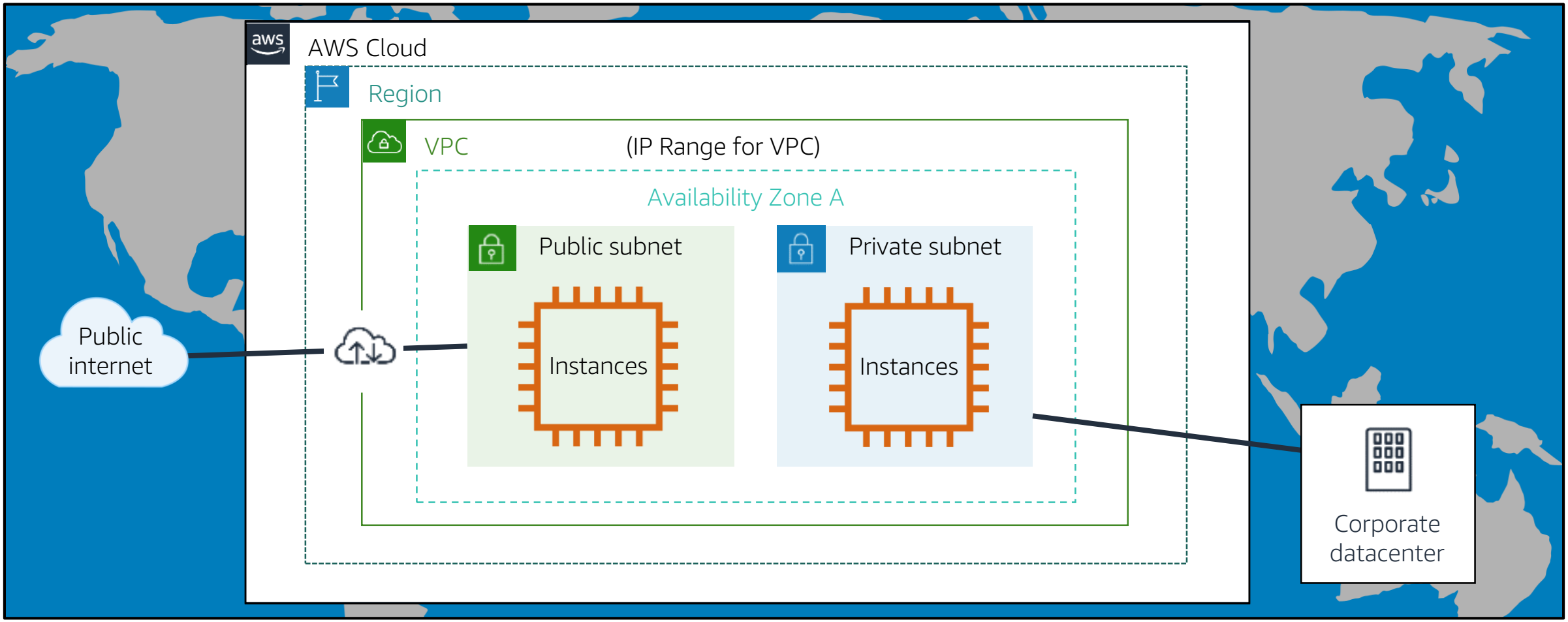
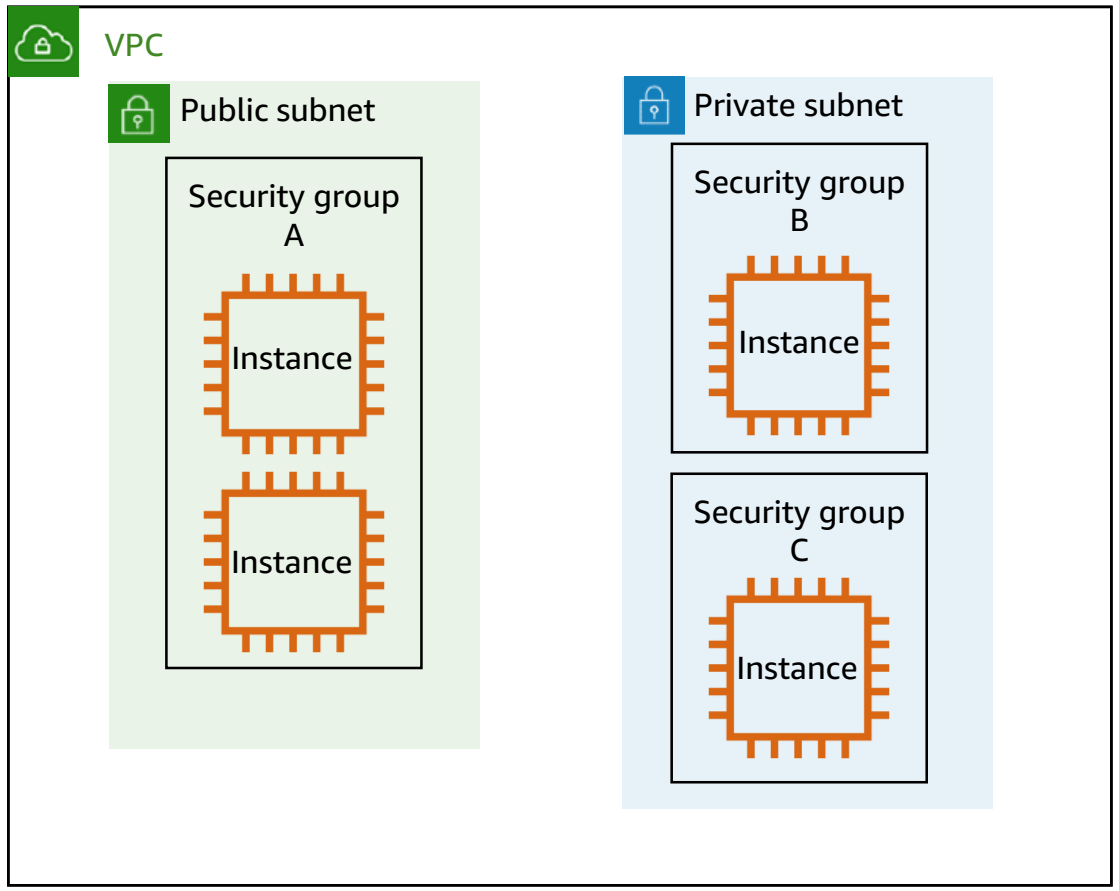
Amazon Virtual Private Cloud (Amazon VPC)



Security groups



Security Group A

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

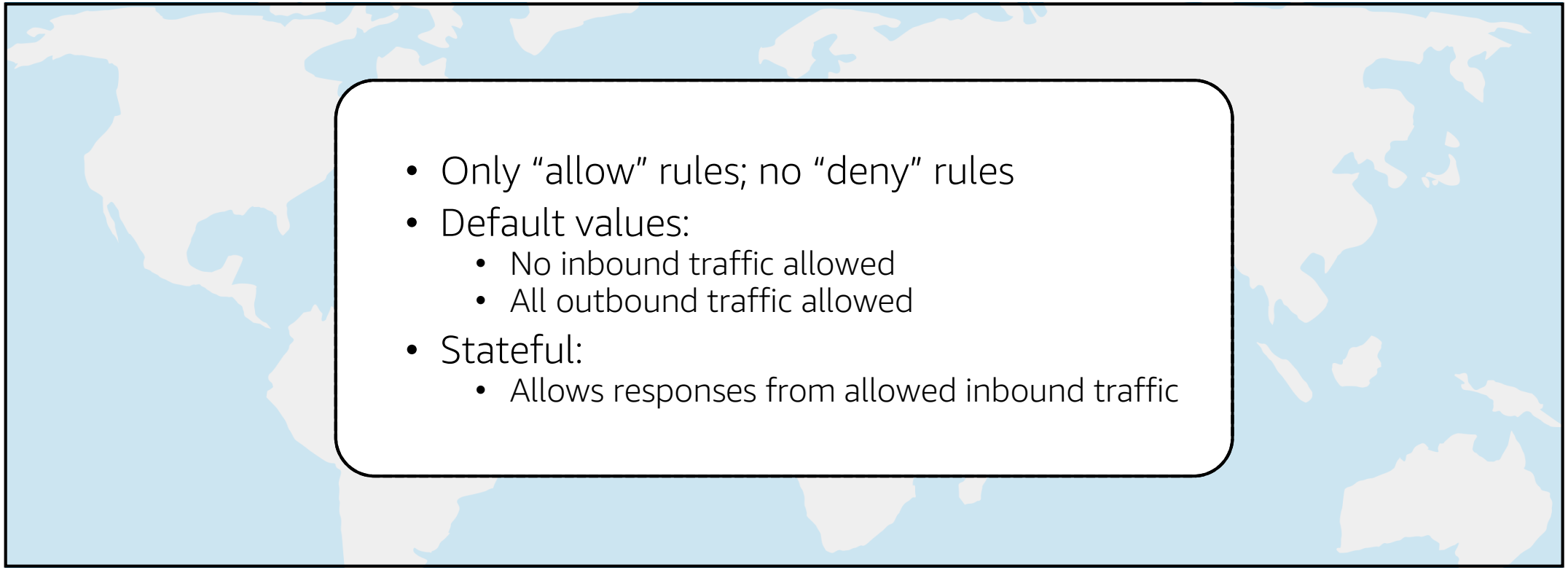
Security Group-B

Inbound		
Source	Protocol	Port Range
10.0.1.0/24	TCP	22

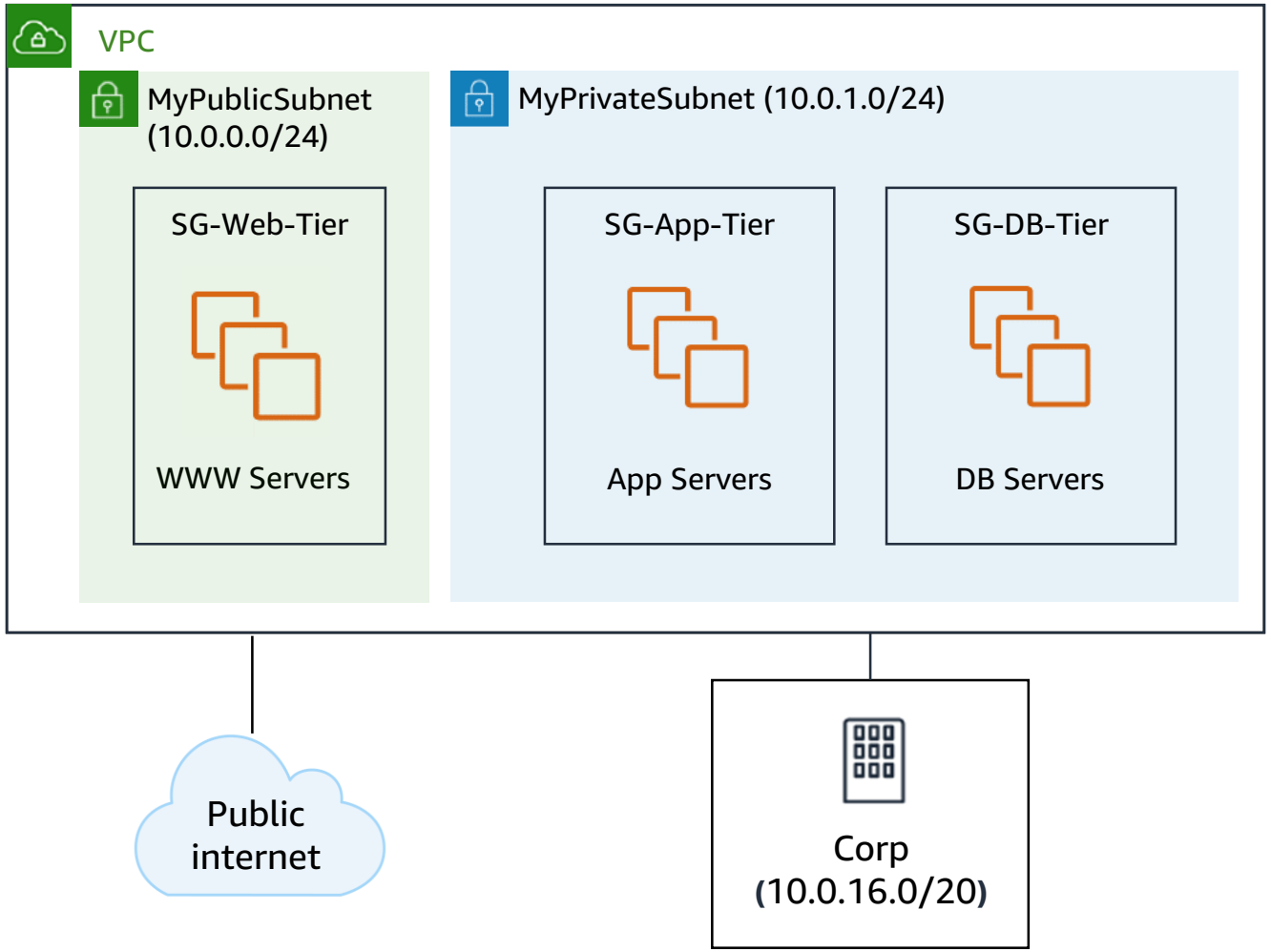
Security Group-C

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

Security group details



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

End of Module 2

Test your knowledge

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Thank you!

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