



AWS for Hydrosat DAP

Abdallah Ibrahim
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

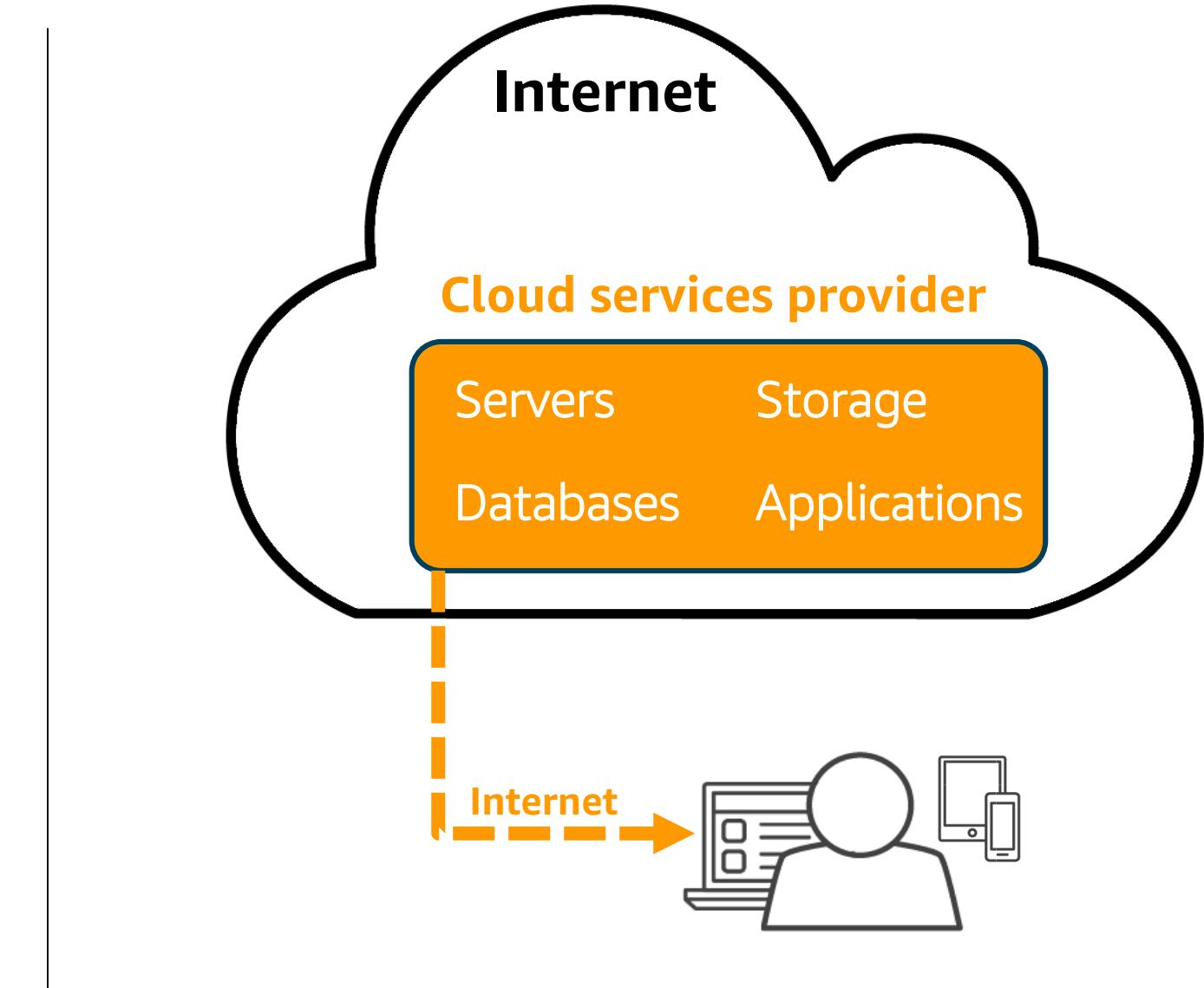
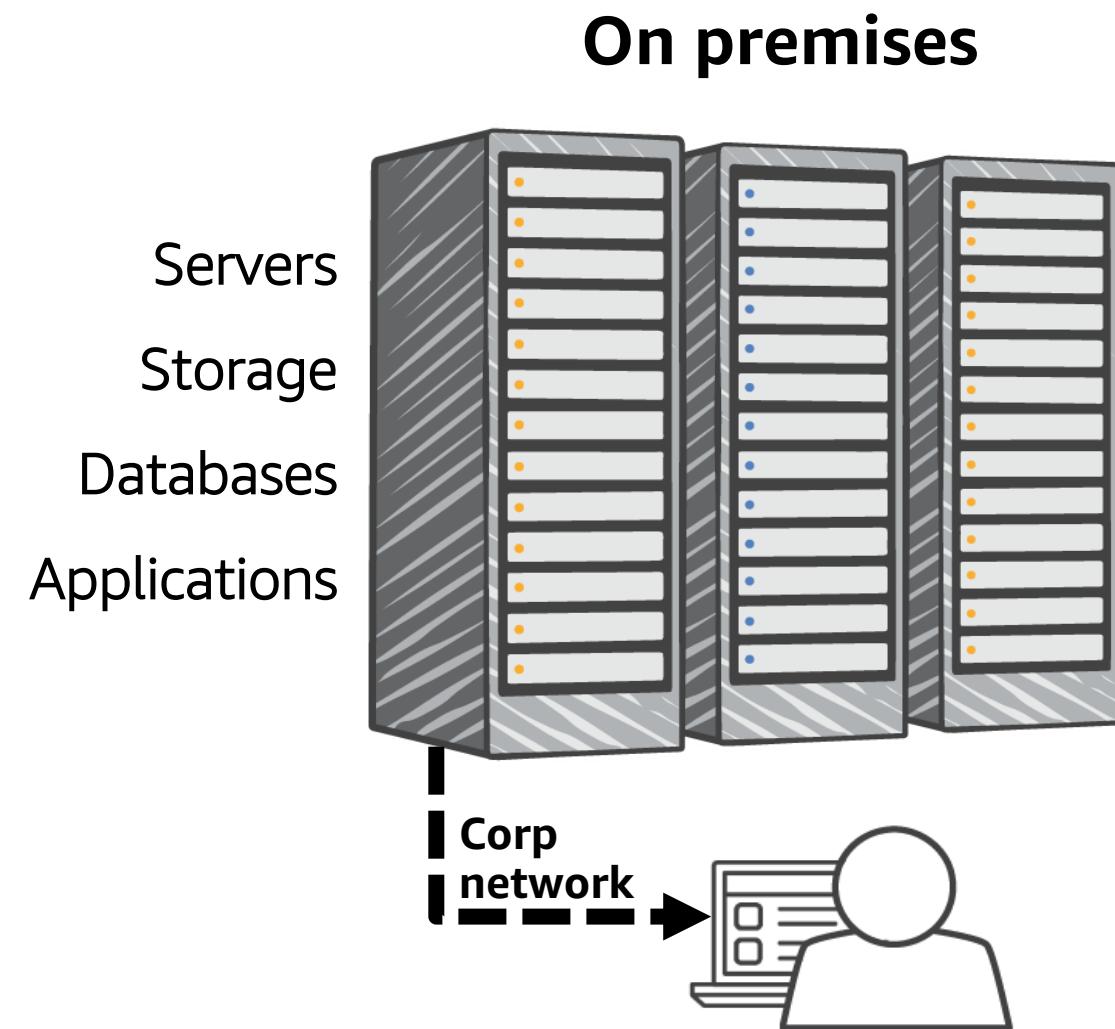


Module 1:

Introduction to the AWS Cloud

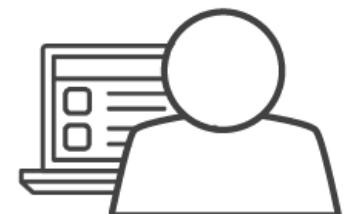
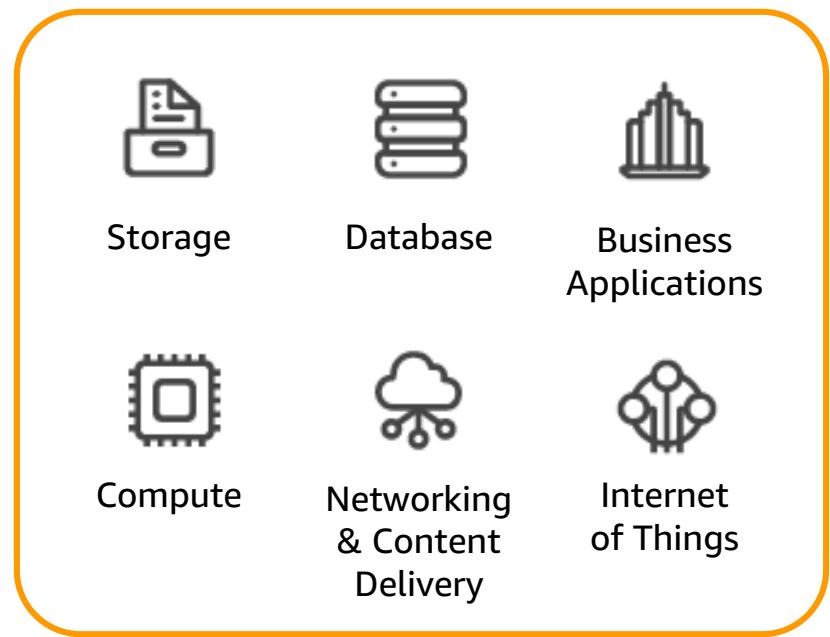
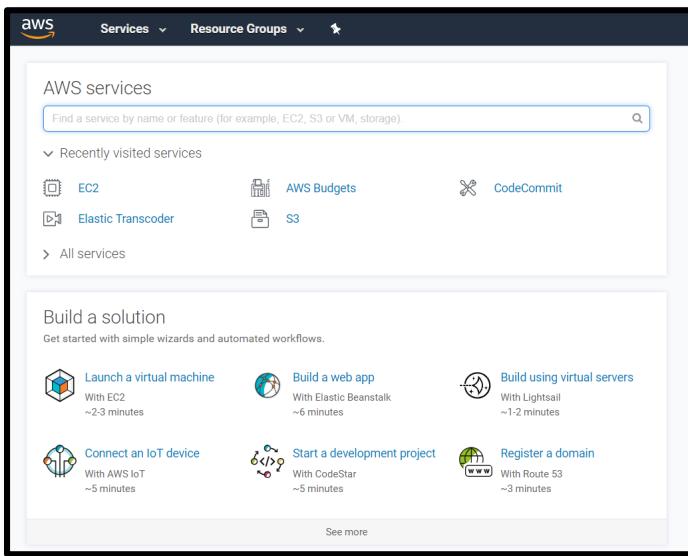
What is the AWS Cloud?

What is the cloud?

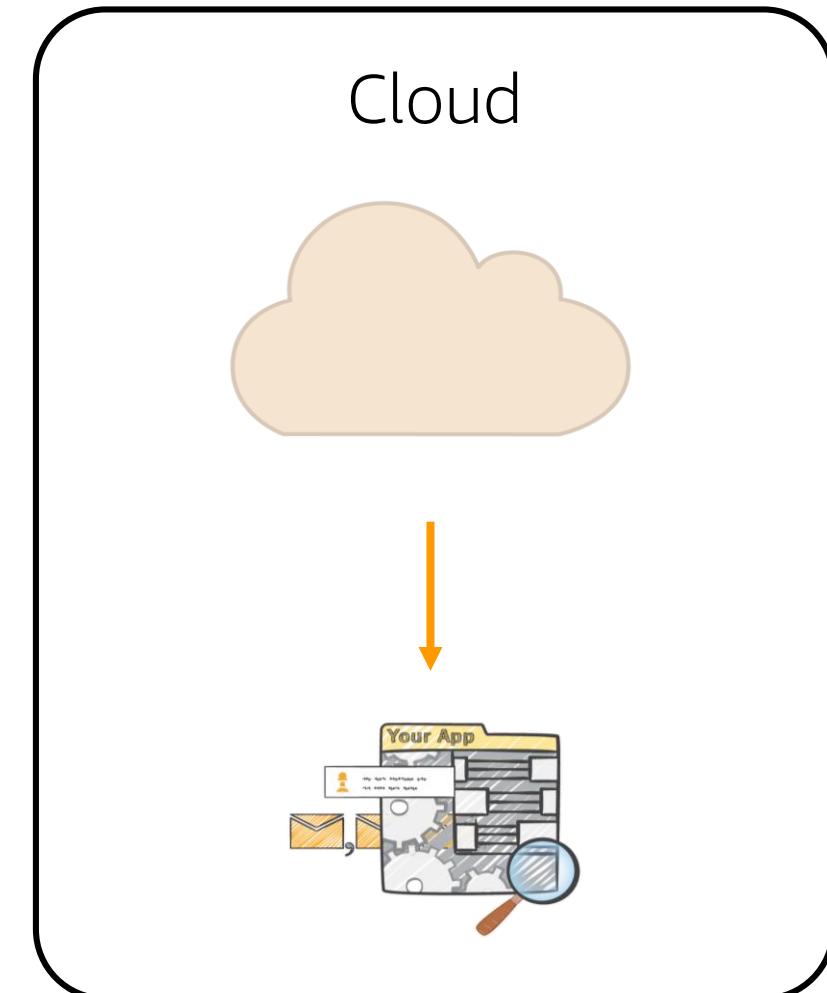
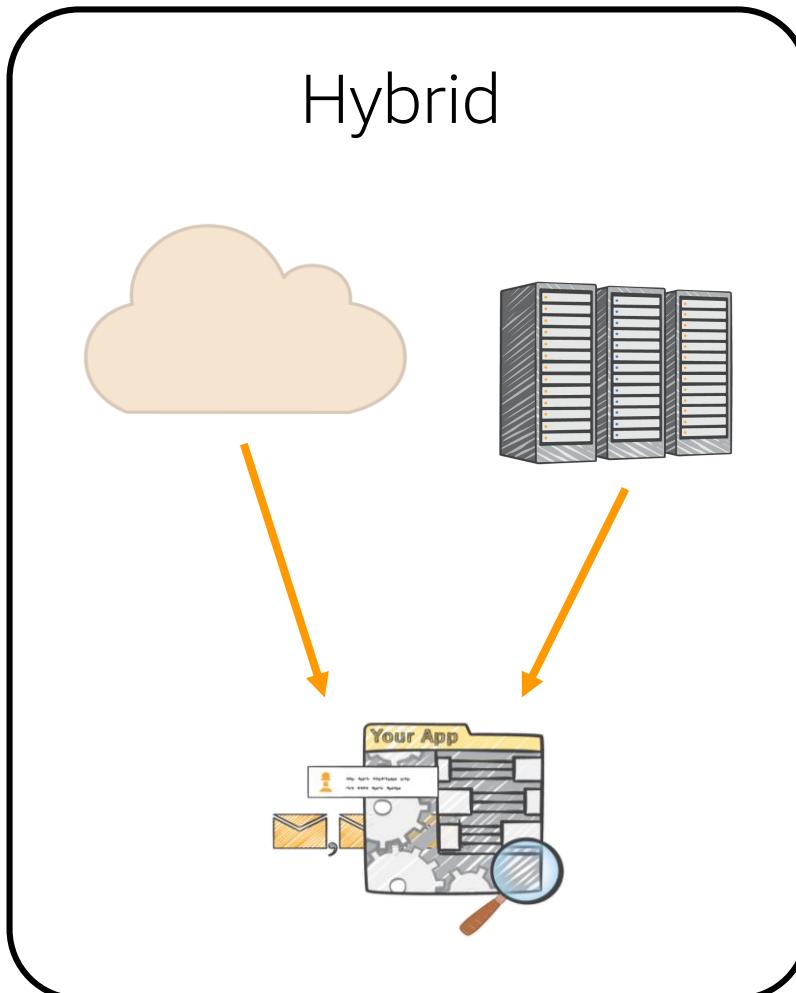
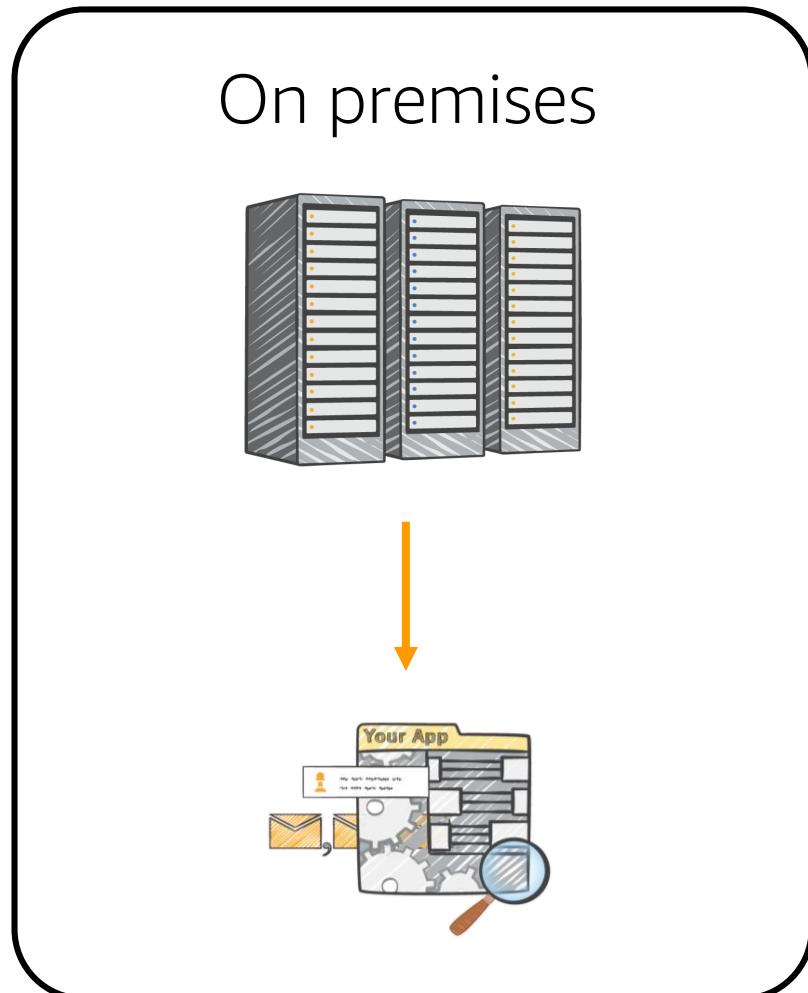


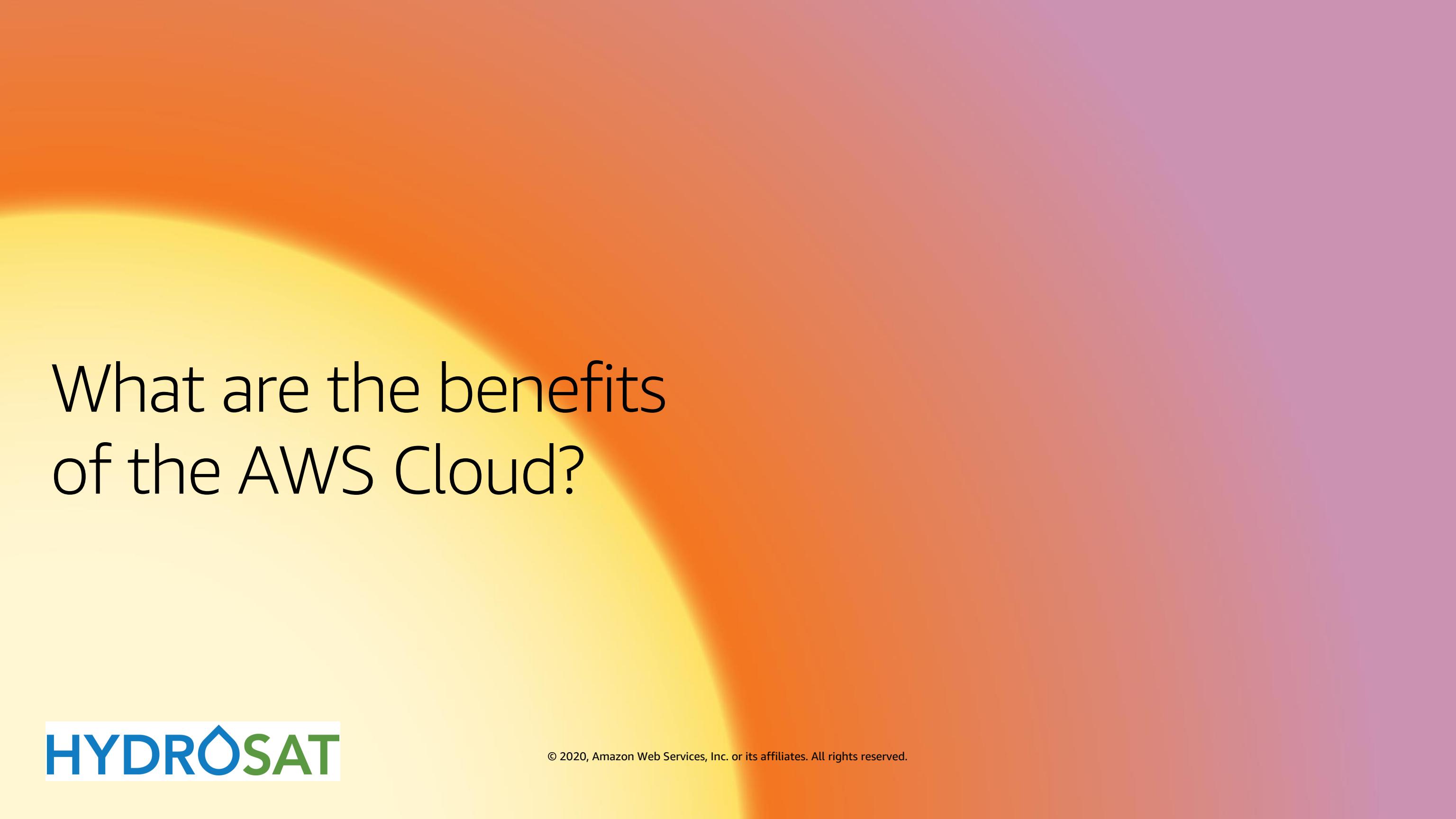
How does it work?

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



Cloud deployment models



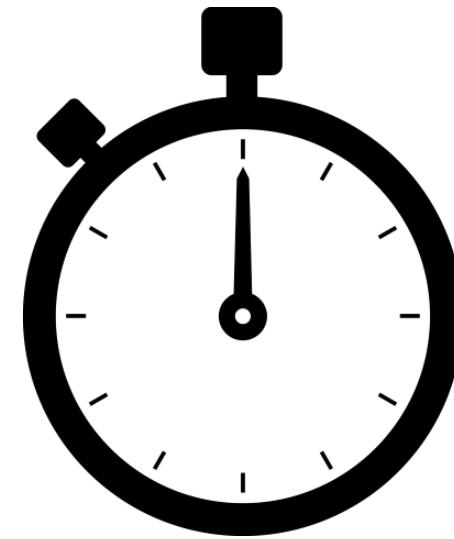


What are the benefits of the AWS Cloud?

Trade capital expense for variable expense



Data center investment
based upon forecast



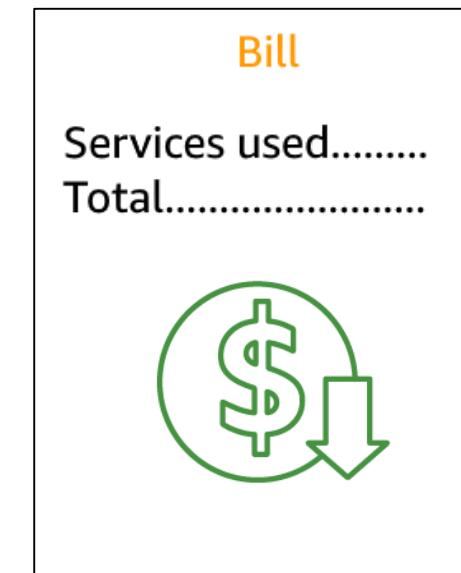
Pay only for the amount
you consume

Massive economies of scale

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



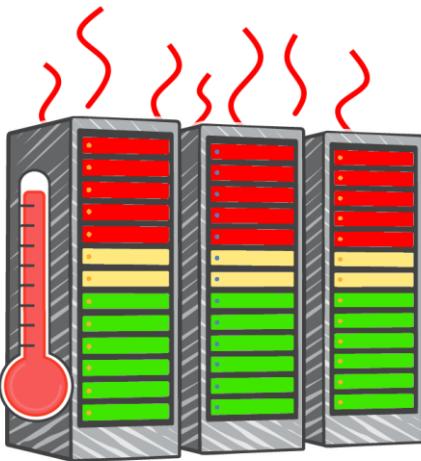
Economies of scale



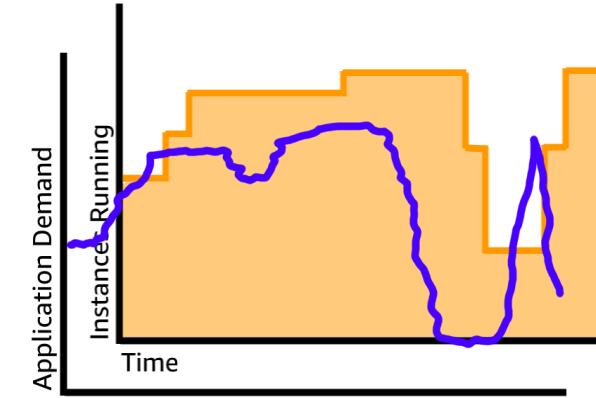
Stop guessing capacity



Overestimated
server capacity



Underestimated
server capacity



Scaling
on demand

Increase speed and agility



Weeks between wanting
resources and having resources

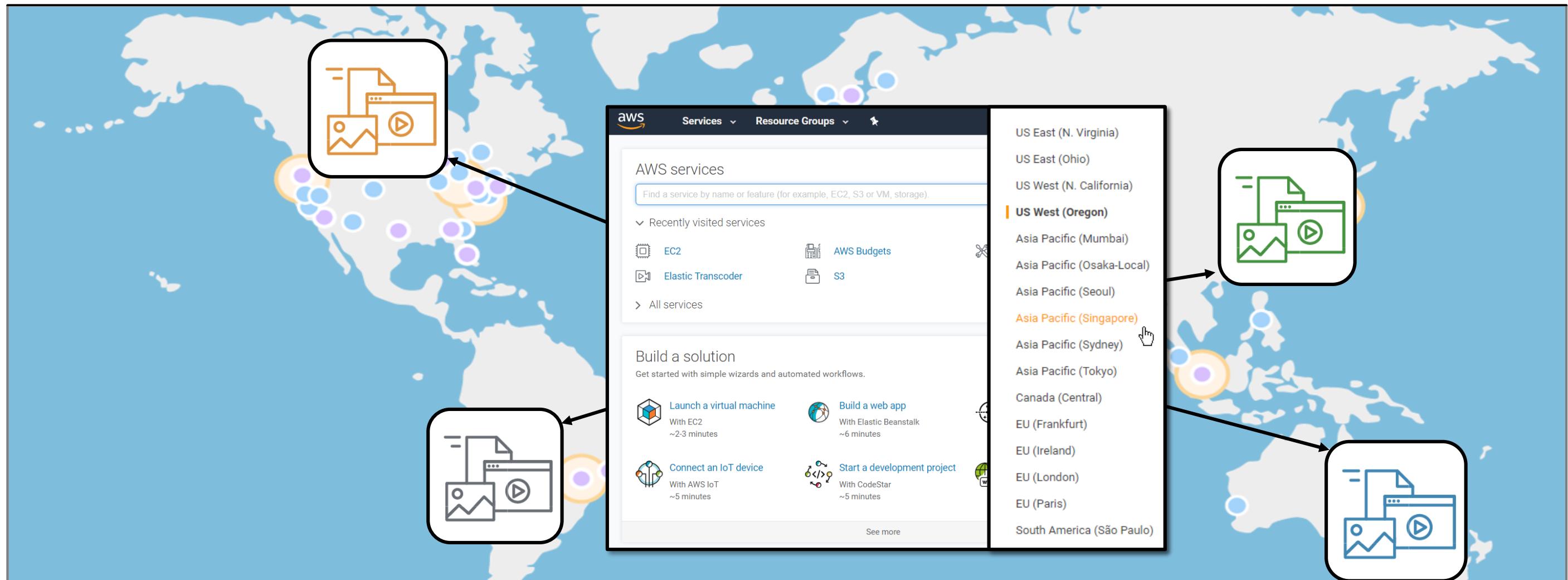


Minutes between wanting
resources and having resources

Stop spending money on running and maintaining datacenters



Go global in minutes



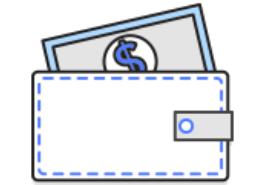
AWS security



Keep your data safe



Meet compliance requirements



Save money



Scale quickly

AWS service categories



Analytics



Application Integration



AR & VR



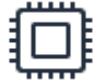
AWS Cost Management



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

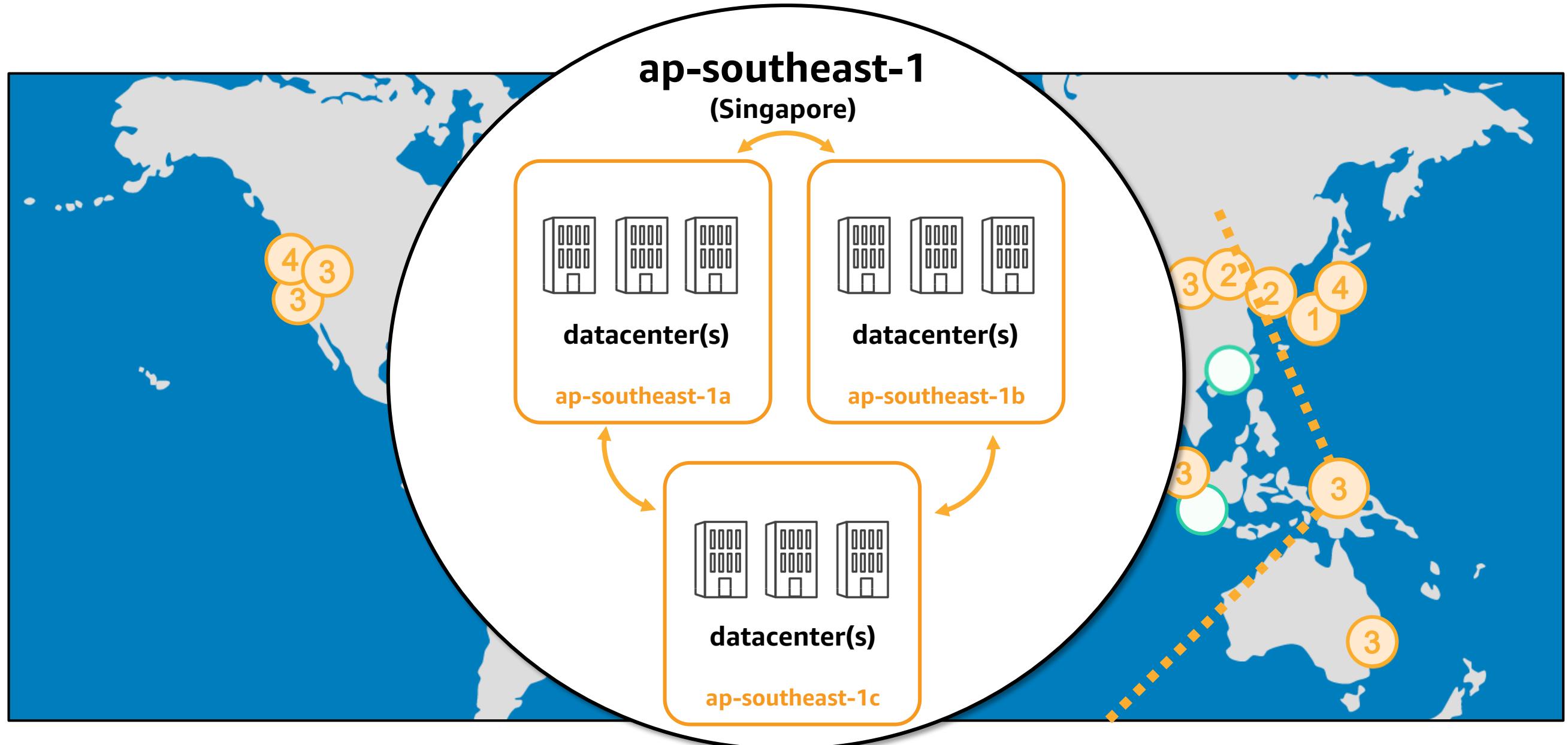
Demo



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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)

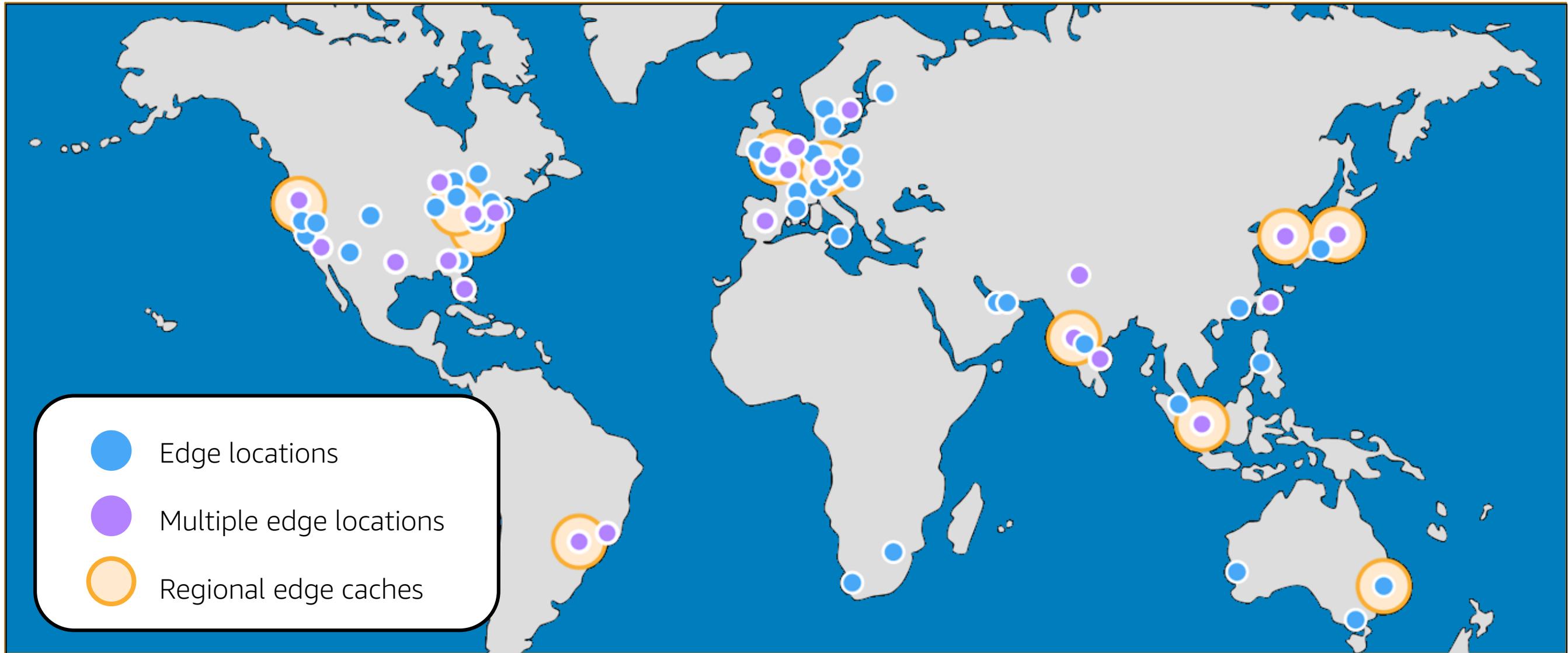


Services available
within the region



Costs
(vary by region)

Edge locations: reaching distant customers



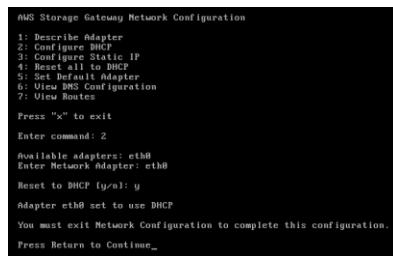
AWS management interfaces

Three ways to interact with AWS



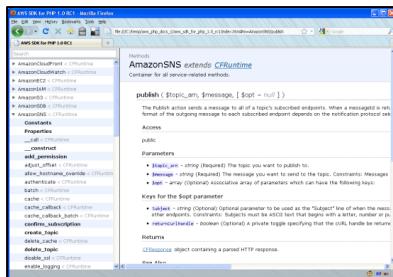
AWS Management Console

Easy-to-use graphical interface



Command Line Interface (AWS CLI)

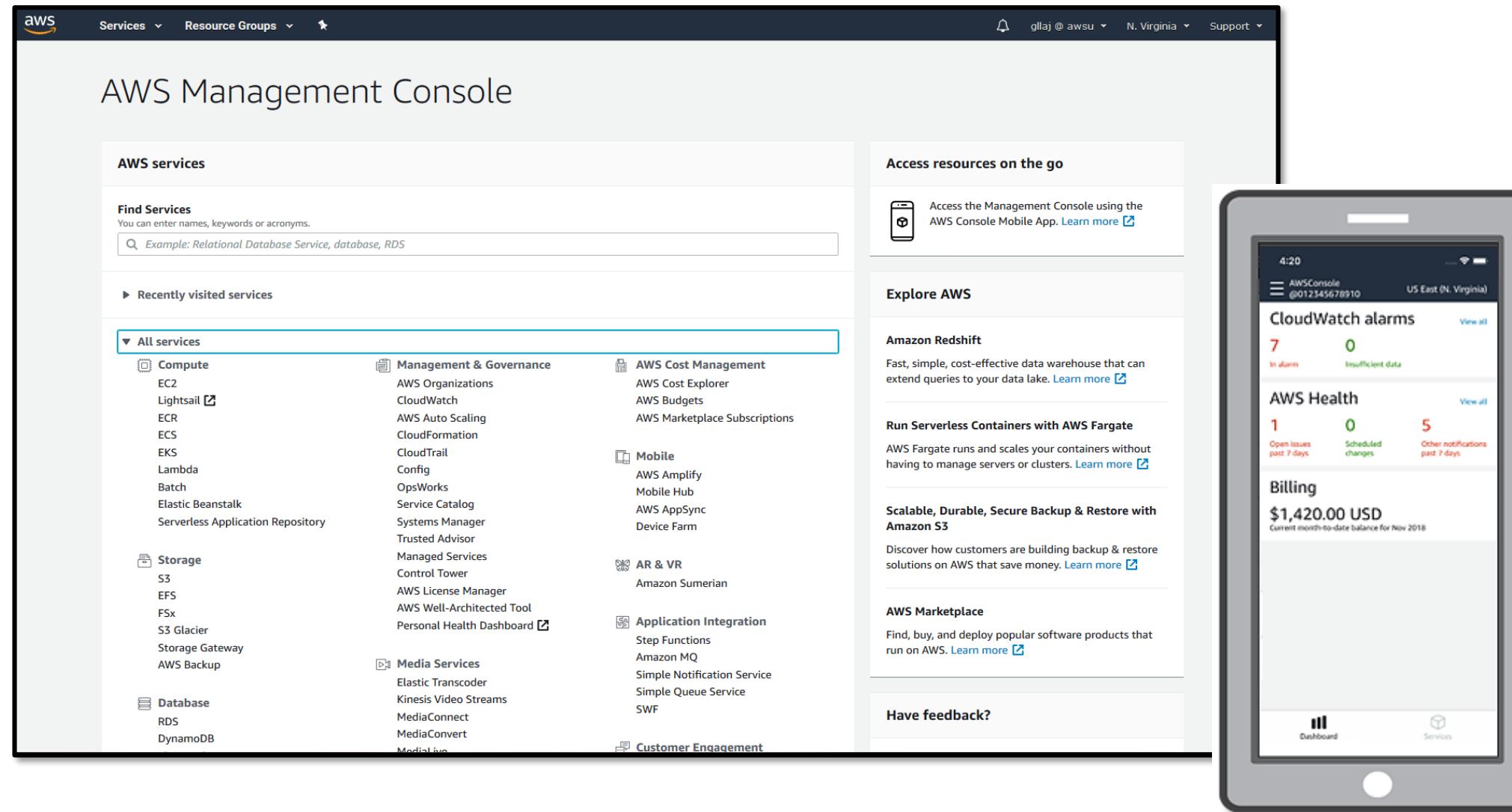
Access to services by discrete command



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, recently visited services, and a categorized list of all AWS services under 'AWS services'. The mobile app preview shows a dashboard with CloudWatch alarms, AWS Health, Billing information (\$1,420.00 USD), and other metrics.

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
- Media Services
 - Elastic Transcoder
 - Kinesis Video Streams
 - MediaConnect
 - MediaConvert
 - MediaLive
- 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
- 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)

4:20

CloudWatch alarms
7 In alarm 0 Insufficient data [View all](#)

AWS Health
1 Open issues past 7 days 0 Scheduled changes 5 Other notifications past 7 days [View all](#)

Billing
\$1,420.00 USD Current month-to-date balance for Nov 2018

Dashboard Services

AWS CLI

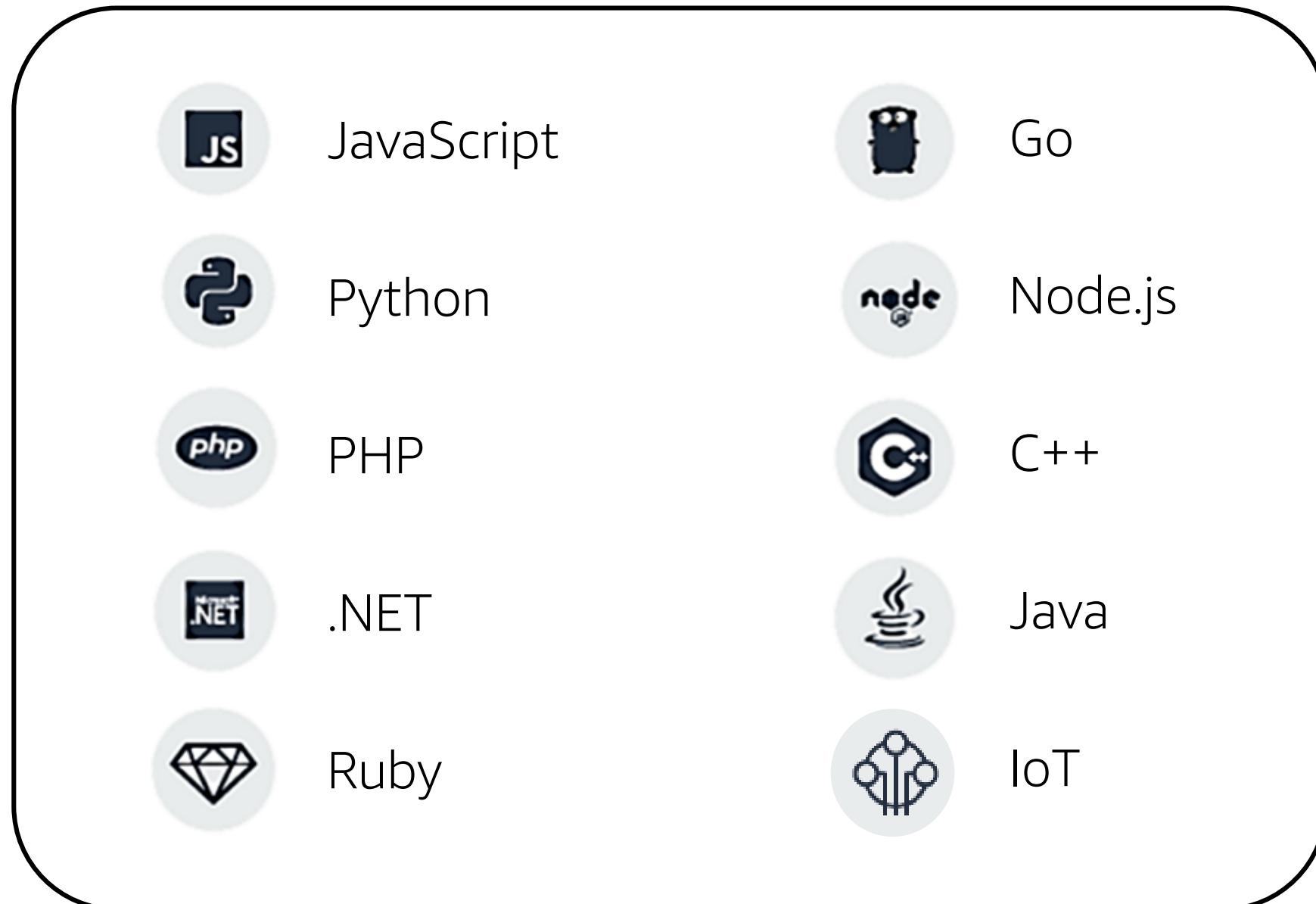
Open source tool for interacting with AWS services

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



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AWS products

The screenshot shows the AWS Deep Learning Containers landing page. At the top, the AWS logo is followed by navigation links: Products, Solutions, Pricing, Documentation, Learn, Partner Network, AWS Marketplace, Explore More, and a search bar. On the right, there are links for Contact Sales, Support, English, and My Account. The main title "AWS Deep Learning Containers" is displayed in large white font, with a subtitle below it: "Quickly set up deep learning environments with optimized, pre-packaged Docker images". A "Learn more" button is present. To the right is a stylized illustration of a whale breaching, with a brain-like structure above it. Below the main title are four cards: "Amazon Lightsail" (a robot icon), "Amazon EC2 M5ad & R5ad Instances" (two server icons connected by arrows), "Amazon S3 Glacier Deep Archive" (an icon of a bucket with snowflakes), and "110,000+ Databases Migrated to AWS" (an icon of a database with binary code). At the bottom, a grey bar contains the text "AWS Customer News" and a news snippet about Volkswagen Group's plans to build the Volkswagen Industrial Cloud.

AWS Deep Learning Containers

Quickly set up deep learning environments with optimized, pre-packaged Docker images

[Learn more »](#)

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

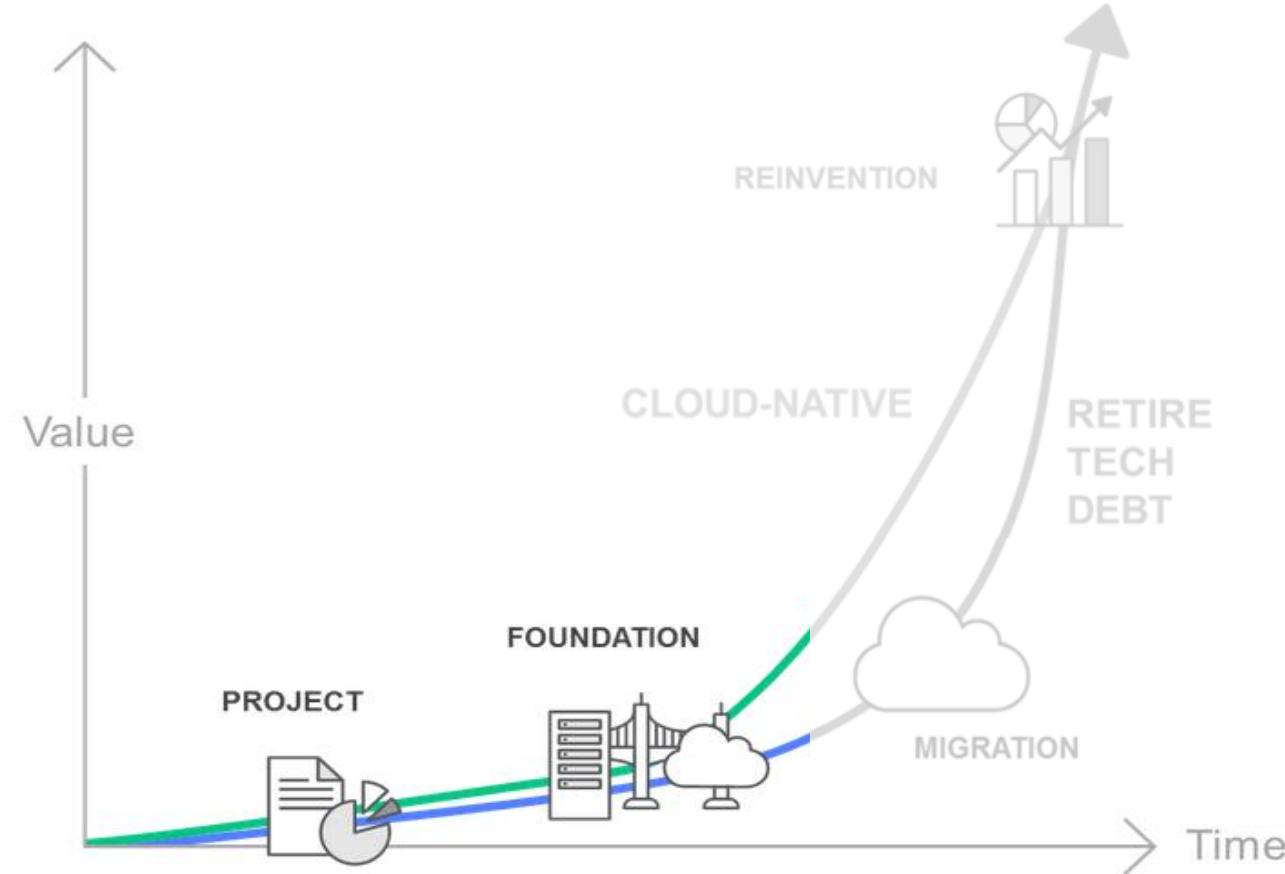
Amazon S3 Glacier Deep Archive
A new S3 storage class that provides secure, durable object storage for long-term data retention

110,000+ Databases Migrated to AWS
Save time & cost—migrate to fully managed databases

AWS Customer News

Volkswagen Group plans to build the Volkswagen Industrial Cloud, an industrial digital production platform that will transform the company's manufacturing and logistics processes, on AWS. [Read the press release »](#)

Cloud journey

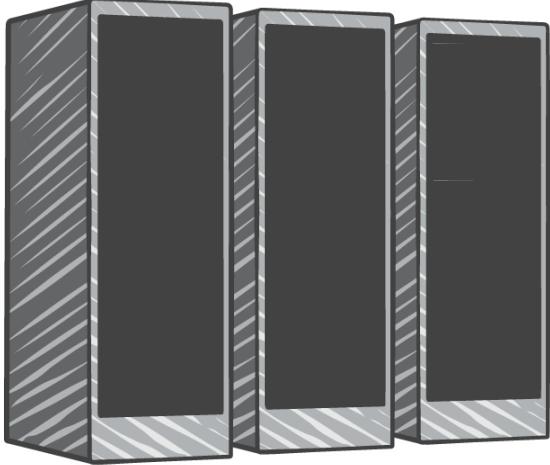


Build your infrastructure



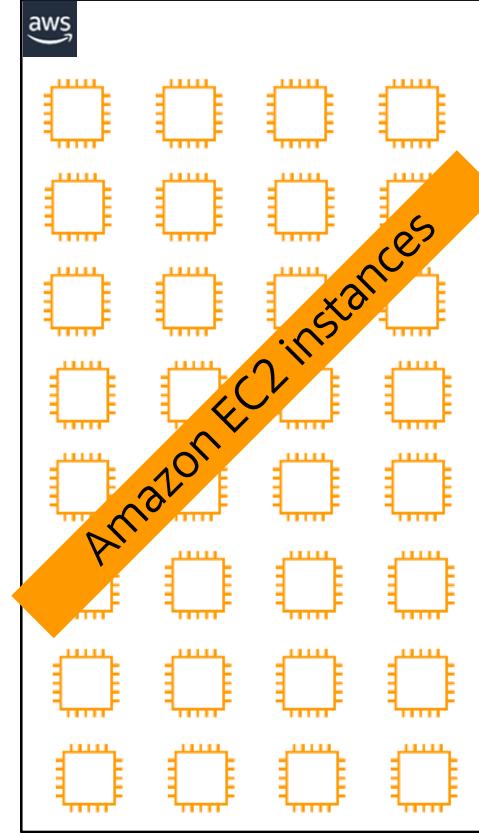
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What is Amazon EC2?



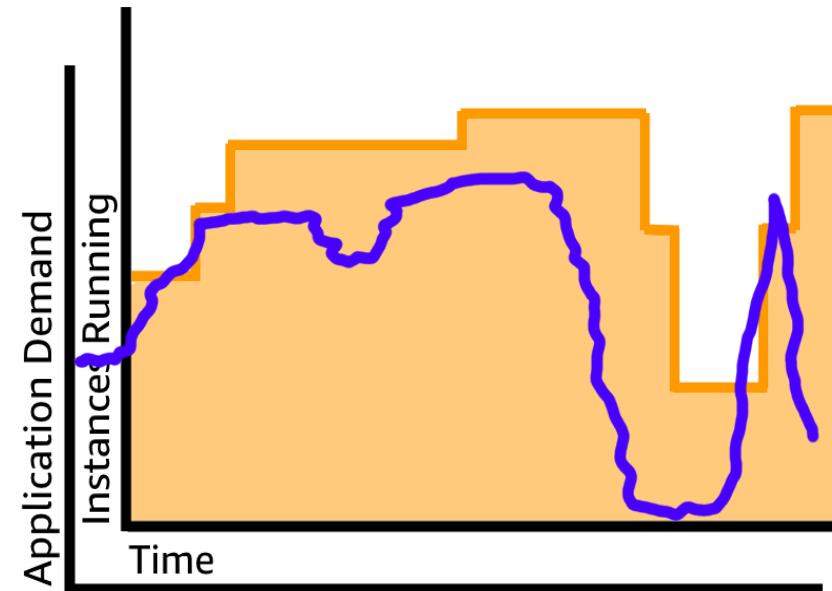
On-premises servers

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



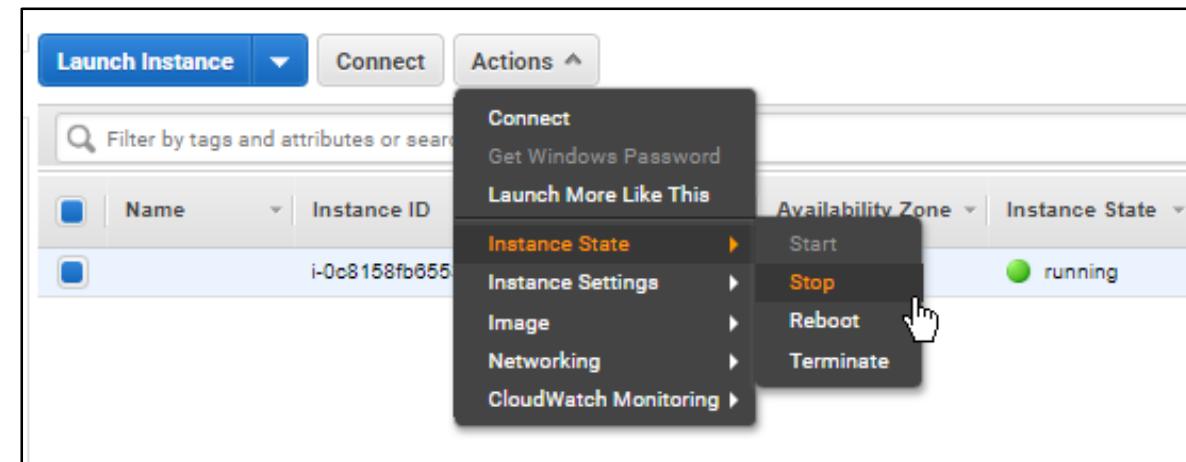
Benefits of Amazon EC2

- 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.

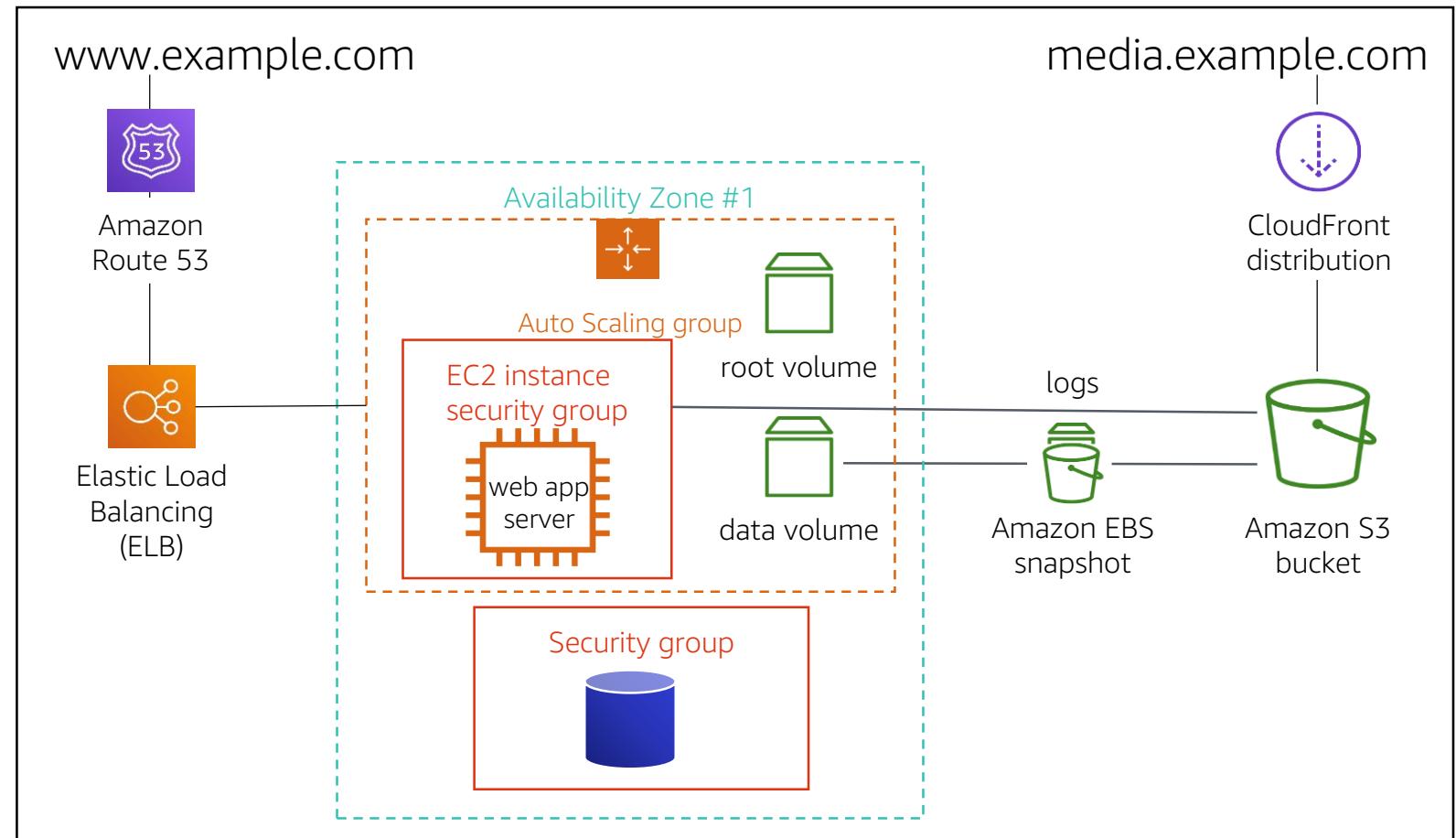
Filter by: [Compute optimized](#) [Current generation](#) [Show/Hide Columns](#)

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
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



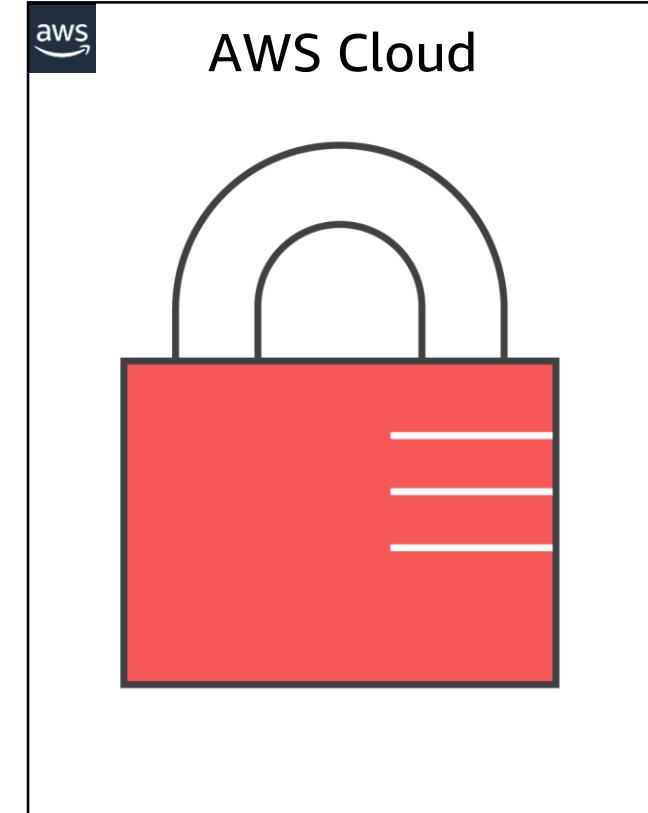
Benefits of Amazon EC2

- Elasticity
- Control
- Flexibility
- Integrated
- Reliable



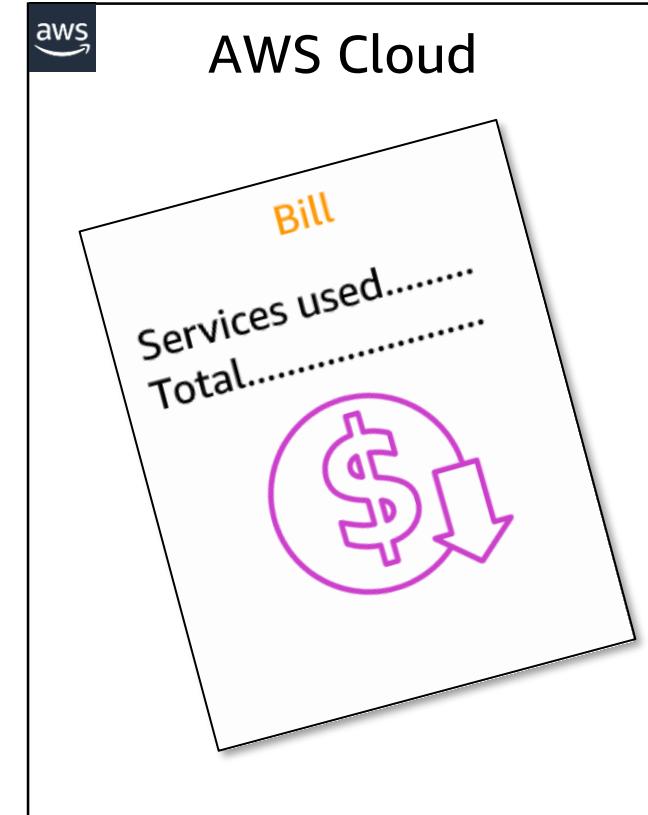
Benefits of Amazon EC2

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



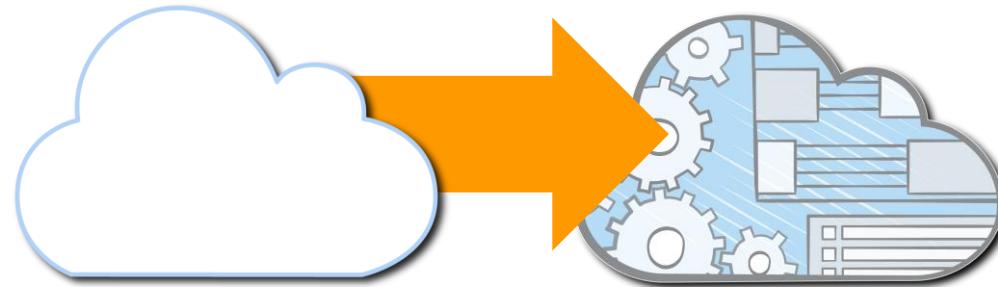
Benefits of Amazon EC2

- 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

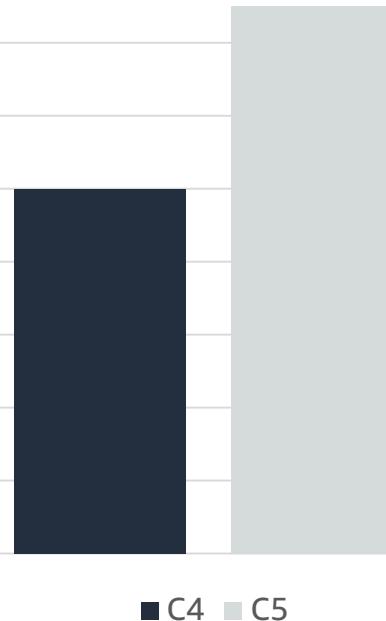


EC2 instance type	Compute optimized		General purpose			Memory optimized			Storage optimized		
	C5	C4	M5	M4	T2	X1	X1e	R4	H1	I3	D2
Intel processor	Xeon Platinum 8175M	Xeon E5 2666 v3	Xeon Platinum 8175M	Xeon E5 2686 v4 2676 v3	Xeon Family	Xeon E7 8880 v3	Xeon E7 8880 v3	Xeon E5 2686 v4	Xeon E5 2686 v4	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

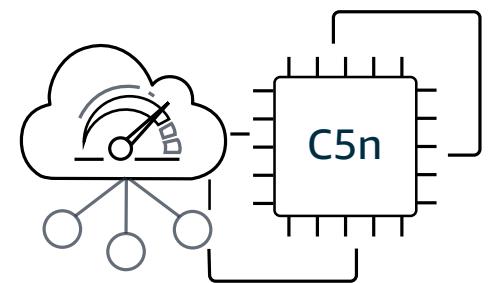


Featuring Intel Xeon Scalable processors

100 Gbps
network bandwidth
on largest
instance sizes

25 Gbps
peak bandwidth
on smaller
instance sizes

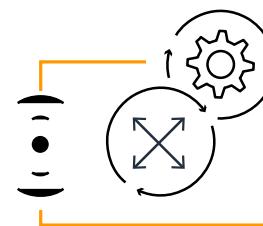
33%
Increased memory
footprint over
C5 instances



Faster analytics and
big data workloads



Lower costs for
network-bound workloads



All of the elasticity, security,
and scalability of AWS

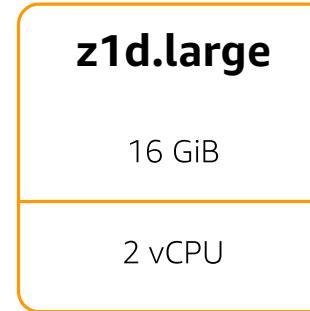
z1d: high frequency for specialized workloads



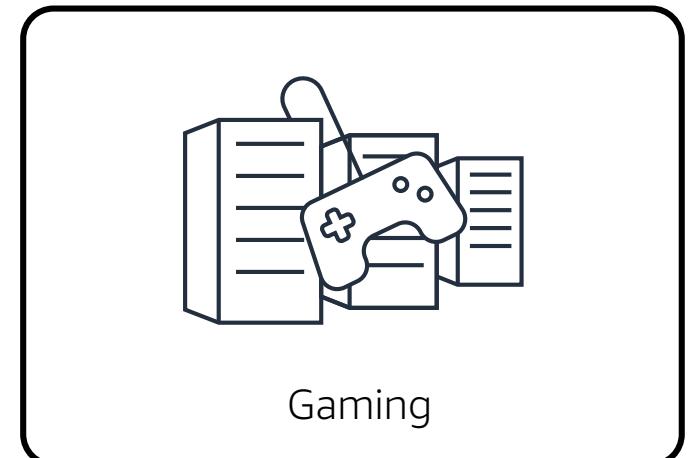
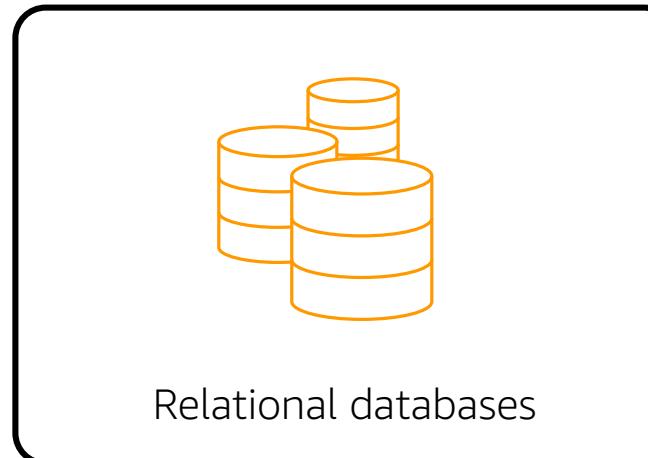
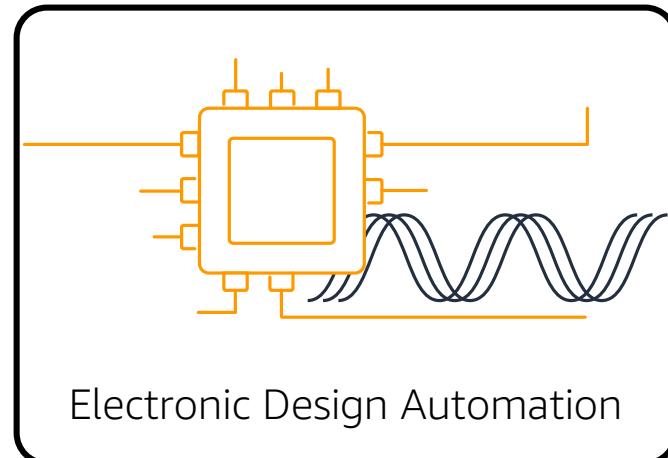
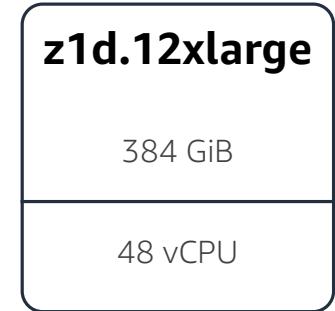
High Frequency instances with custom Intel Xeon Scalable processors running at sustained 4 GHz all core turbo

8:1 GiB to vCPU ratio

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



6 sizes
• • •



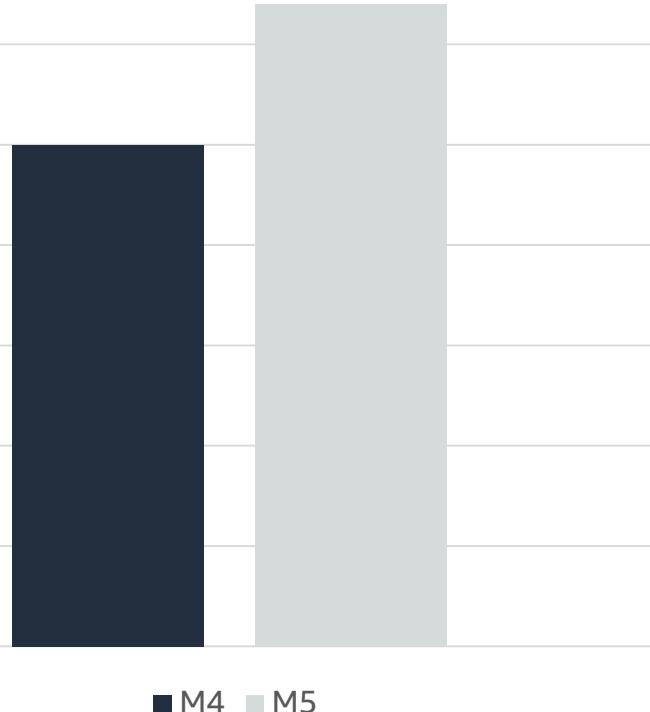
z1d.metal Bare Metal instances coming soon



M5: Next-gen general purpose instances



14% price/performance improvement With M5

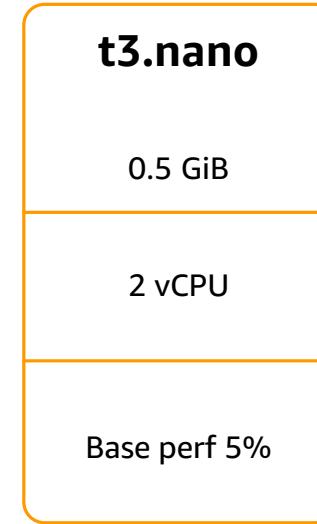


- Powered by 2.5 GHz Intel Xeon Scalable Processors (Skylake)
- New larger instance size—m5.24xlarge with 96 vCPUs and 384 GiB of memory (4:1 Memory:vCPU ratio)
- Improved network and EBS performance on smaller instance sizes
- Support for Intel AVX-512 offering up to twice the performance for vector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

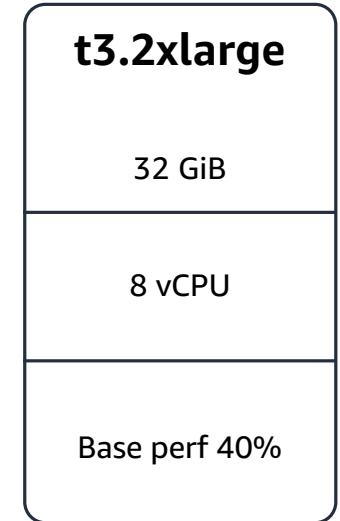
T3: burstable general-purpose instances



- 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
● ● ●



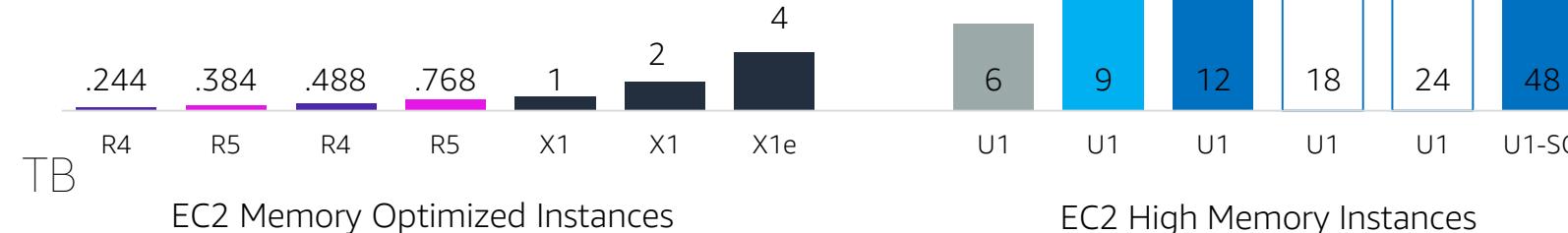
With T3 Unlimited bursting over baseline is only \$0.05 per vCPU-hour, averaged over 24 hours

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

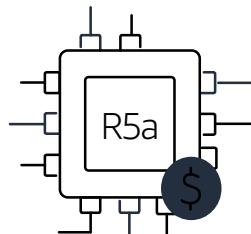
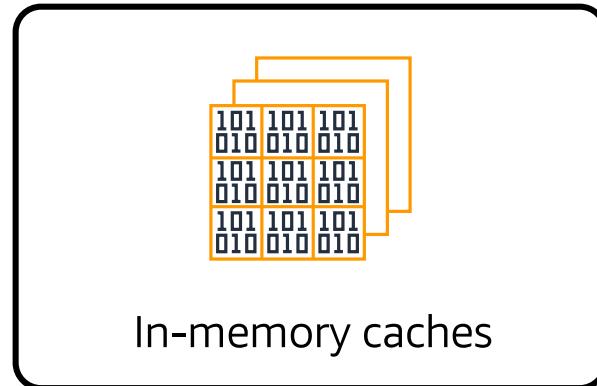
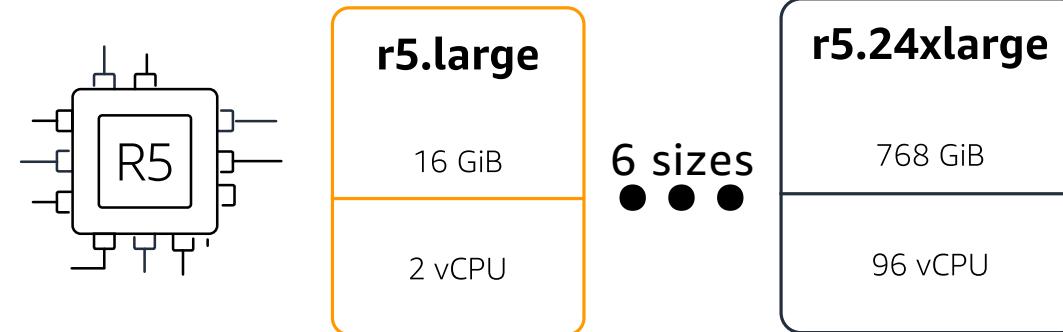


- Grow-as-you-Go
- Linear Pricing
- Seamless access to all AWS Services
- Near Infinite Elastic Scalability for Mission-Critical Deployments
- AWS owned and operated
- <1 hour provisioning times
100% Software Defined
- Scale
- Secure
- Speed
- Flexibility
- TCO
- Breath

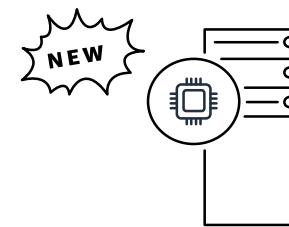
R5: memory-optimized instances



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

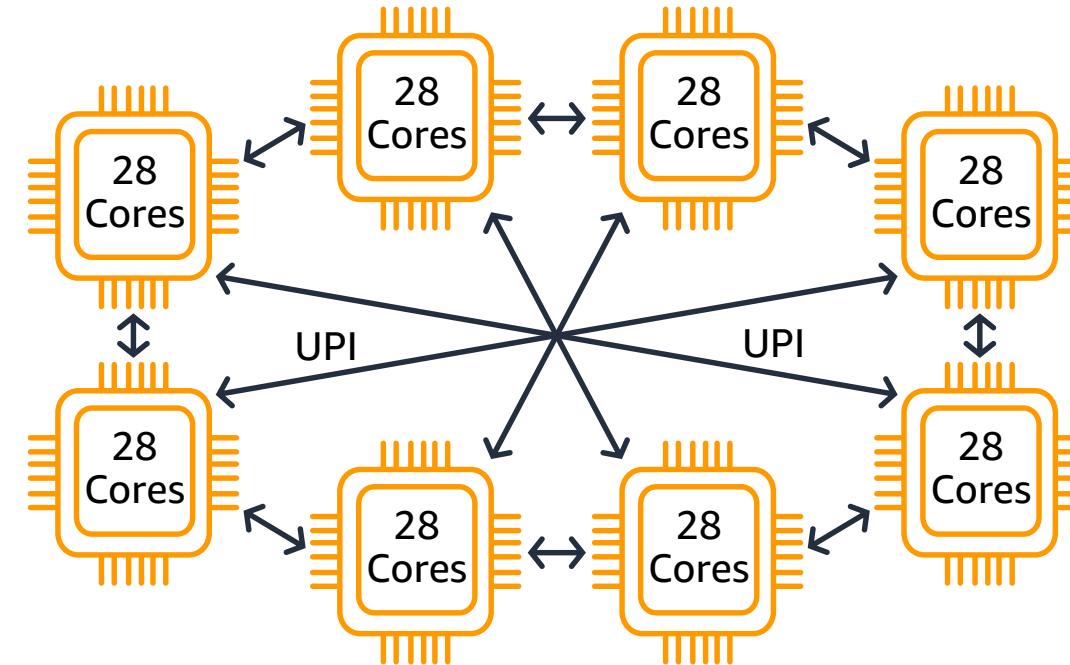


The most memory of any
EC2 Instance SAP-certified

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" X

Quick Start

My AMIs

AWS Marketplace

Community AMIs

Free tier only (i)

1 to 36 of 36 AMIs < < > >

 Amazon Linux 2 AMI (HVM), SSD Volume Type - ami-0d1000aff9a9bad89 <small>Free tier eligible</small>	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	Select	64-bit
 Amazon Linux AMI 2018.03.0 (HVM), SSD Volume Type - ami-a0cfeed8 <small>Free tier eligible</small>	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	Select	64-bit
 Red Hat Enterprise Linux 7.5 (HVM), SSD Volume Type - ami-28e07e50 <small>Free tier eligible</small>	Red Hat Enterprise Linux version 7.5 (HVM), EBS General Purpose (SSD) Volume Type Root device type: ebs Virtualization type: hvm ENA Enabled: Yes	Select	64-bit

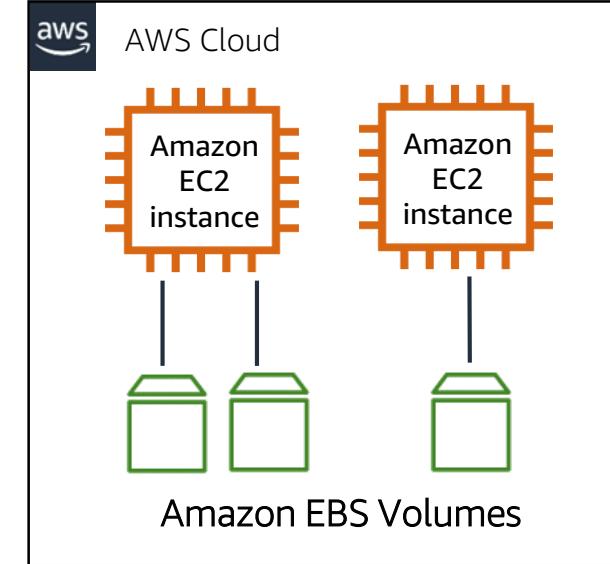
Store your data



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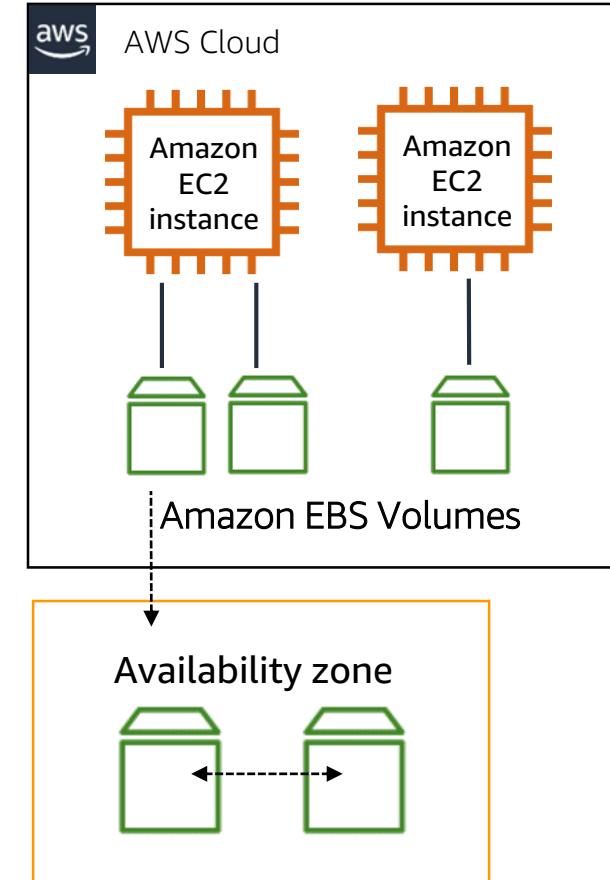
Amazon Elastic Block Store (Amazon EBS)

- Persistent block storage for instances



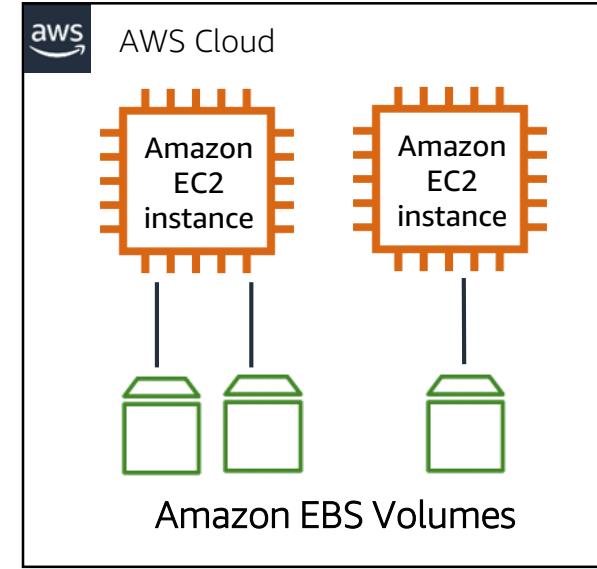
Amazon Elastic Block Store (Amazon EBS)

- 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)

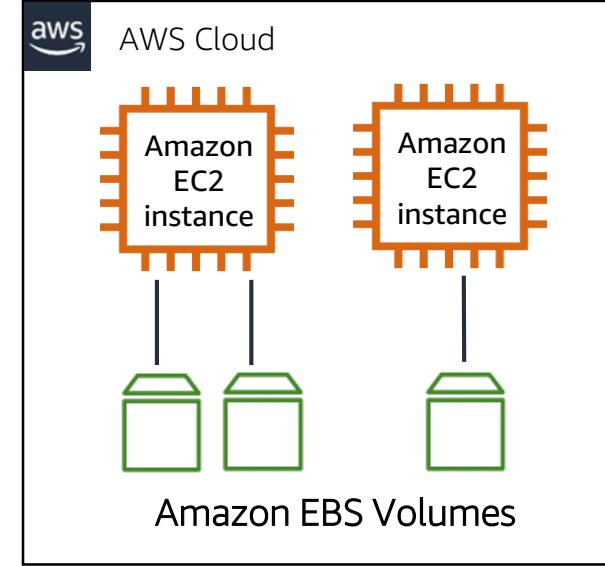
- Provisioned IOPS SSD (io1) Volumes
- General Purpose SSD (gp2) Volumes

Hard Disk Drives (HDD)

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

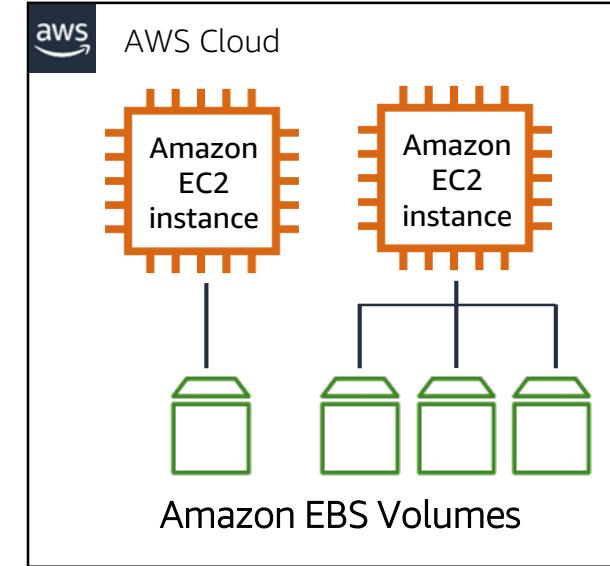
Amazon Elastic Block Store (Amazon EBS)

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



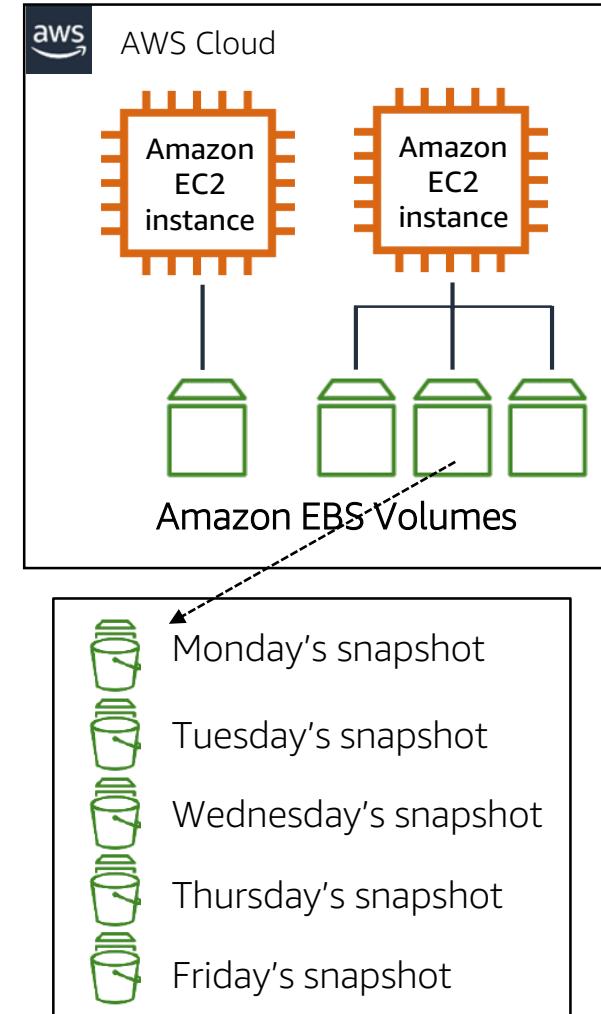
Amazon Elastic Block Store (Amazon EBS)

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



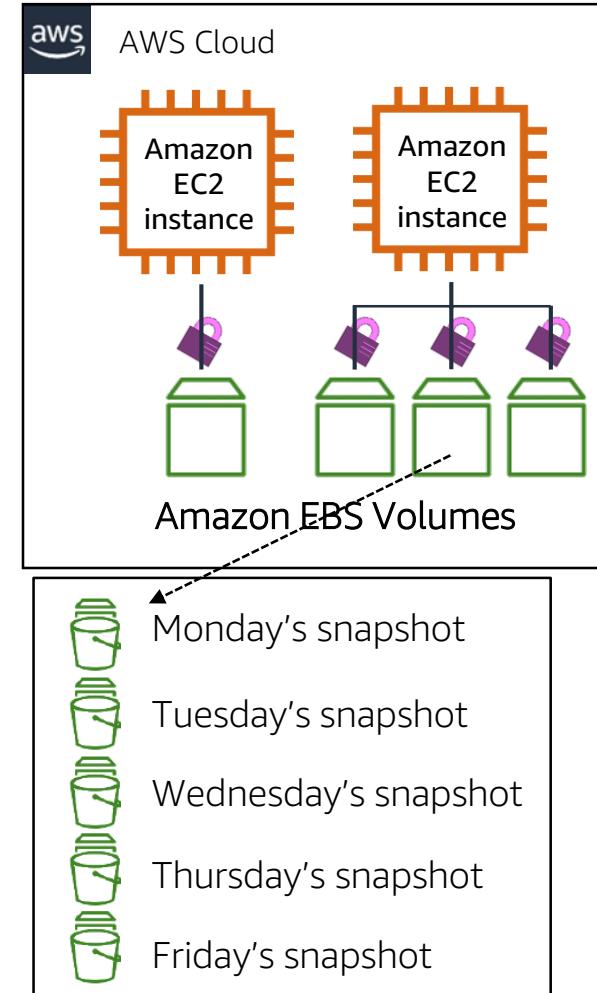
Amazon Elastic Block Store (Amazon EBS)

- 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



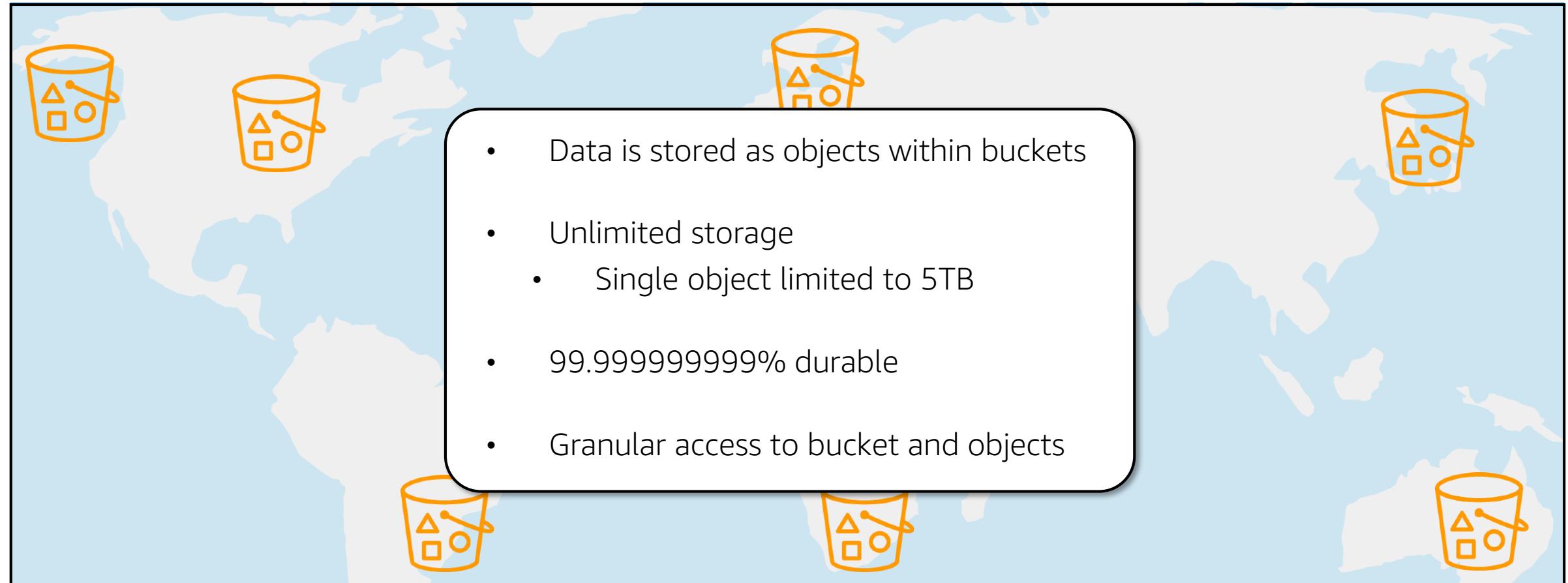
Amazon Elastic Block Store (Amazon EBS)

- 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



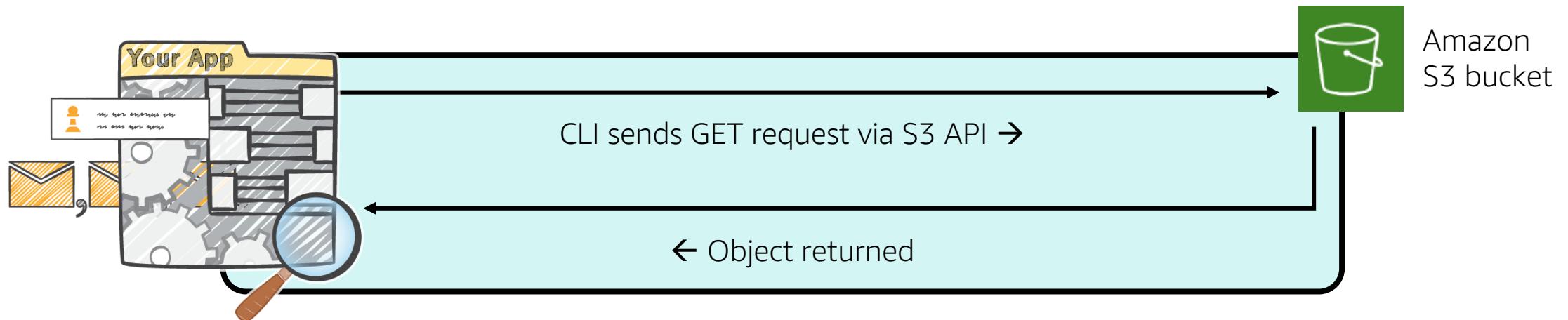
What is Amazon S3?

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



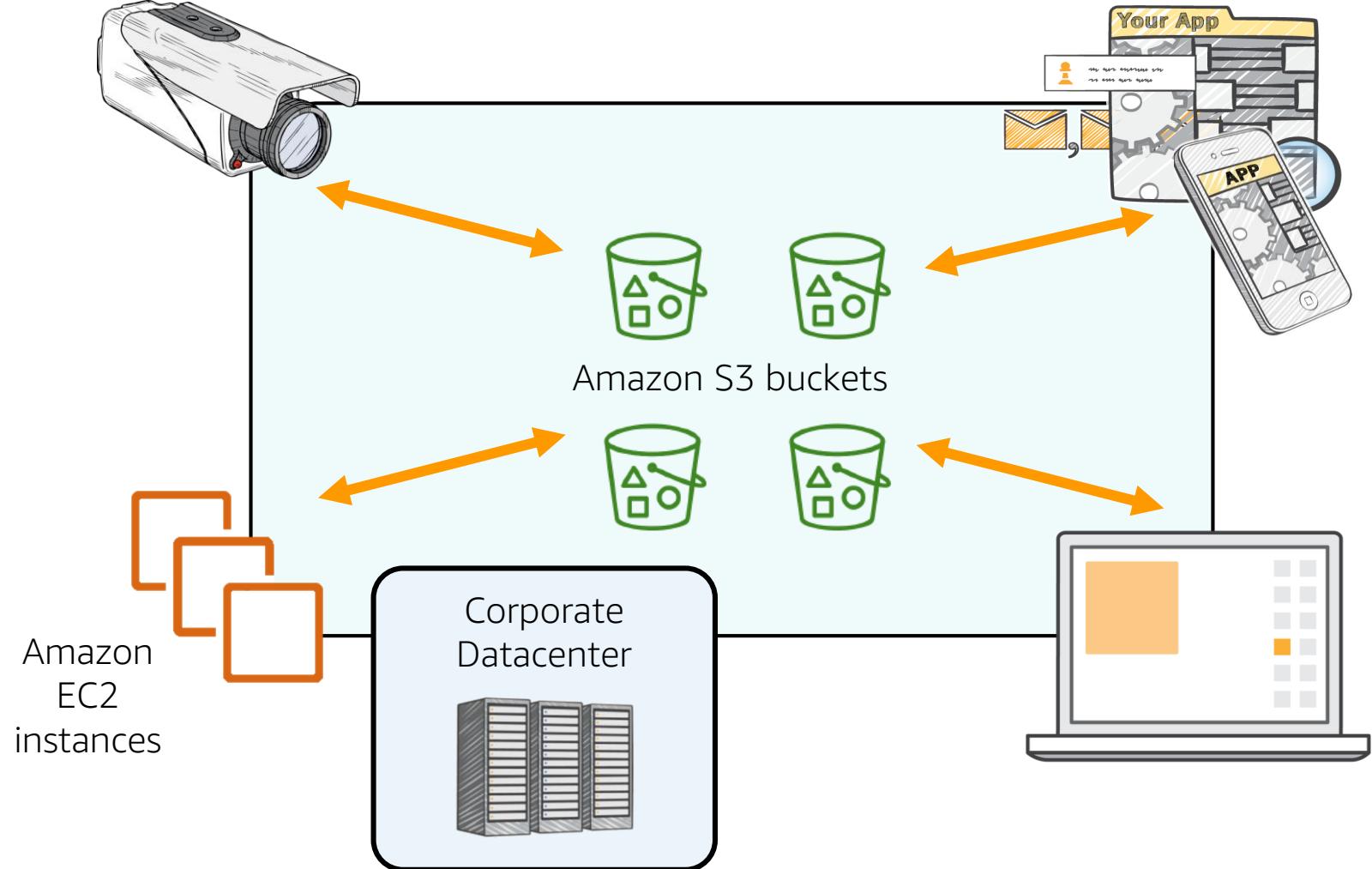
Amazon S3 core functionality

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

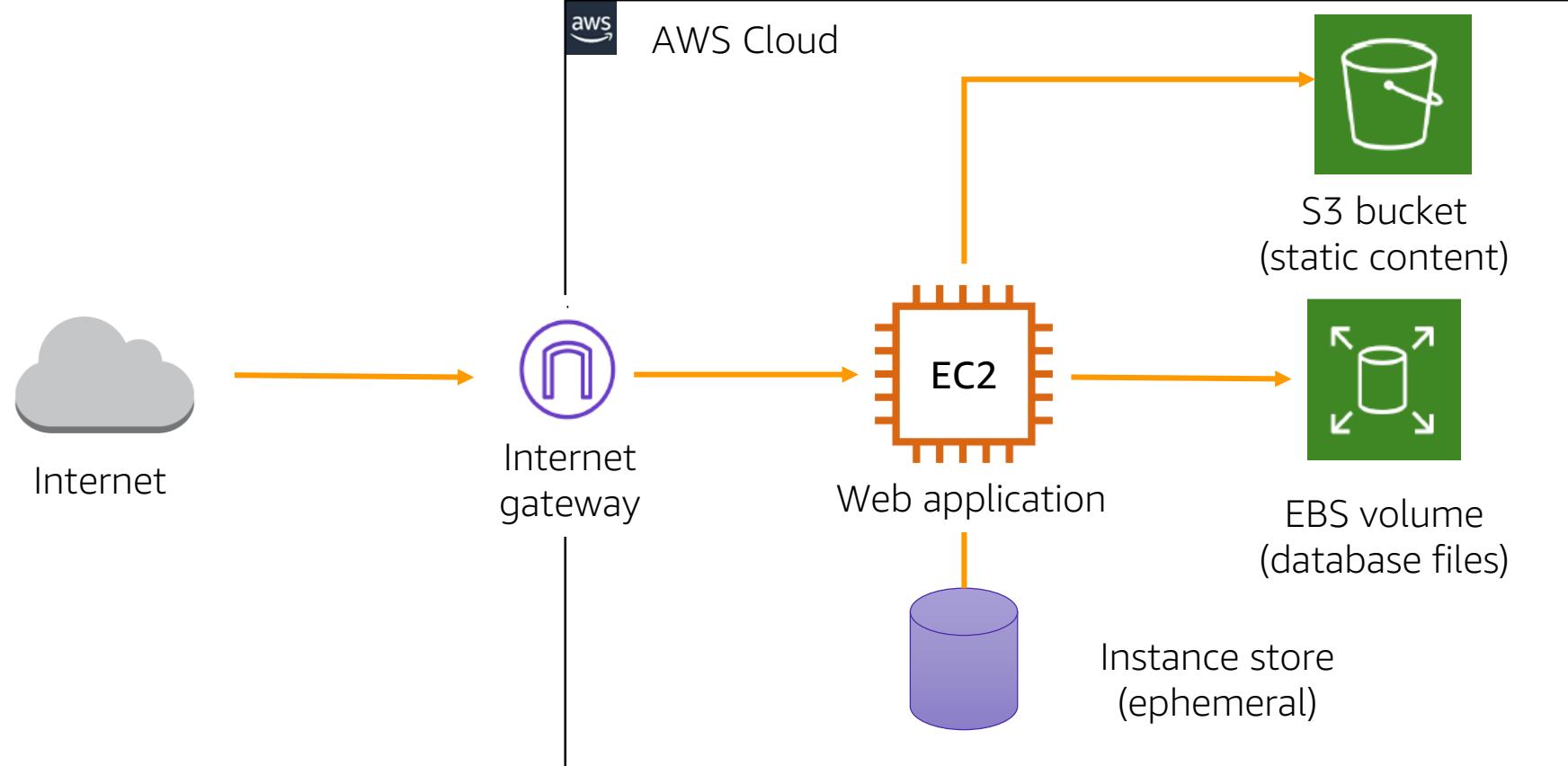


Amazon S3 common scenarios

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



Architecture example



Demo



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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" }
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What is Amazon DynamoDB?

Fast and flexible NoSQL database service for any scale

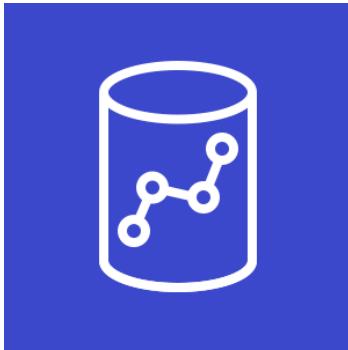
- Fully managed
- Low-latency queries
- Fine-grained access control
- Regional and global options



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

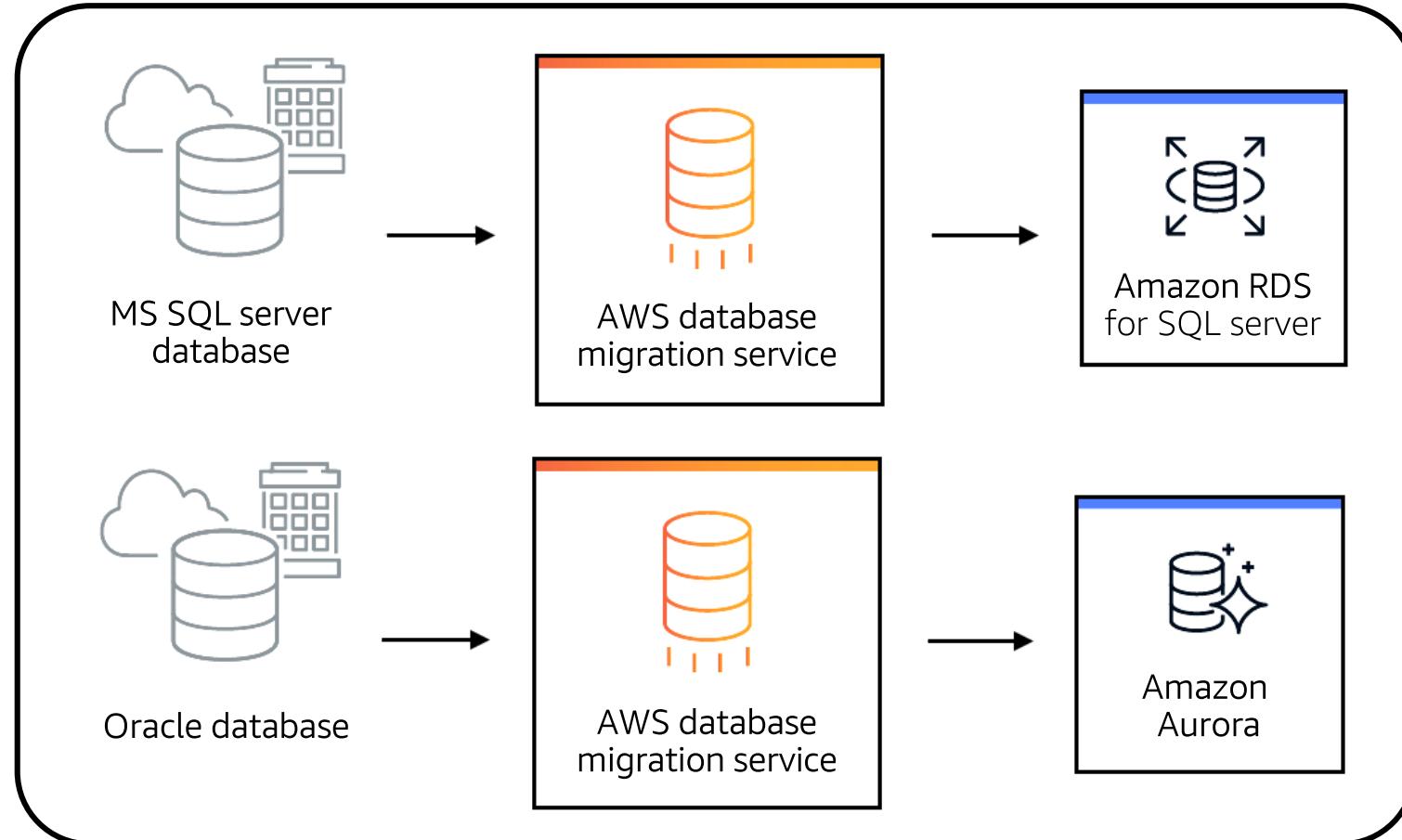


Amazon Neptune

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

Demo



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End of Module 2

Test your knowledge