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9 JUNE 2022 | APAC

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Introduction to AWS services
Compute, storage & databases

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Compute

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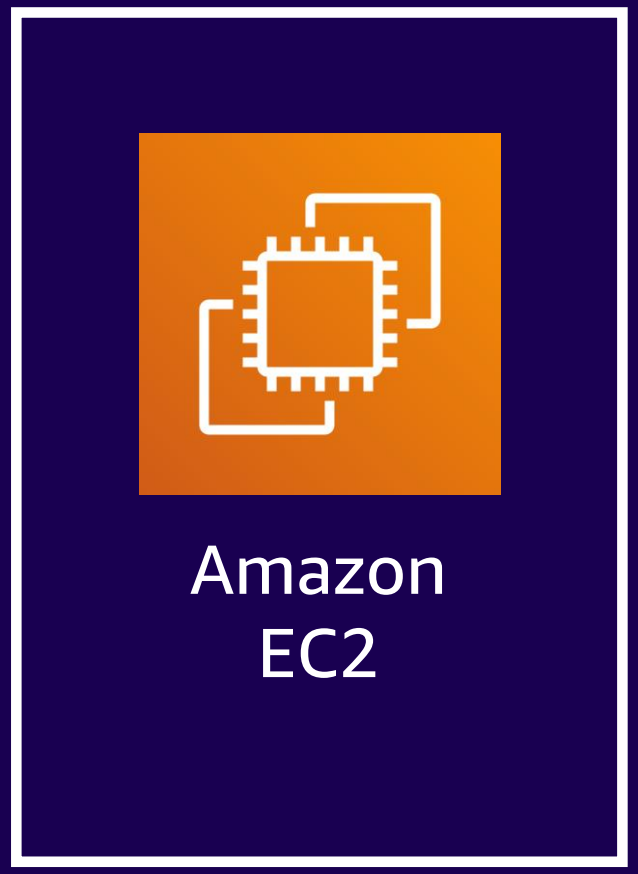
Amazon Elastic Compute Cloud (Amazon EC2)



- Resizable compute capacity
- Complete control of your computing resources
- Reduced time required to obtain and boot new server instances

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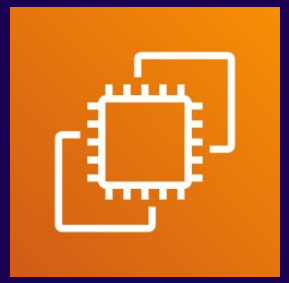
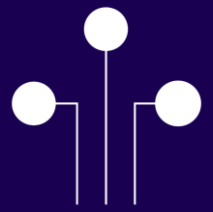
Virtual machines vs. physical servers



Amazon EC2 can solve some problems that are more difficult with an on-premises server

When using disposable resources



Data-driven decisions

Quick iterations

Free to make mistakes

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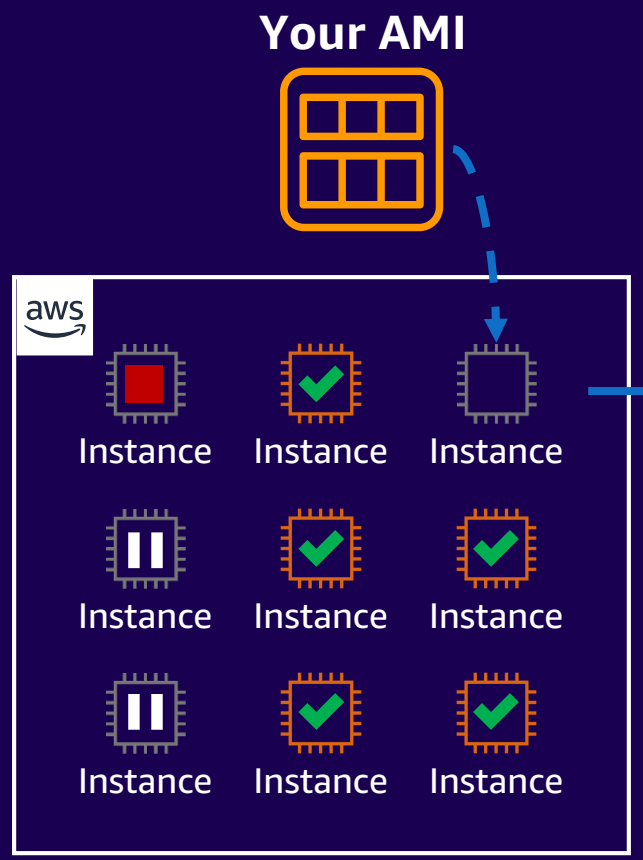
Amazon EC2

Amazon EC2 provides pay-as-you-go pricing and a broad selection of hardware and software

- Use Amazon Machine Images (AMIs)
- Add or terminate instances as needed
- Pause and resume your instances



Template for
- Storage volumes
- Launch permissions
- A block device mapping

Examples
- ✓ Application server
- ✓ Web server
- ✓ Database server
- ✓ Game server
- ✓ Mail server
- ✓ Media server
- ✓ Catalog server
- ✓ File server

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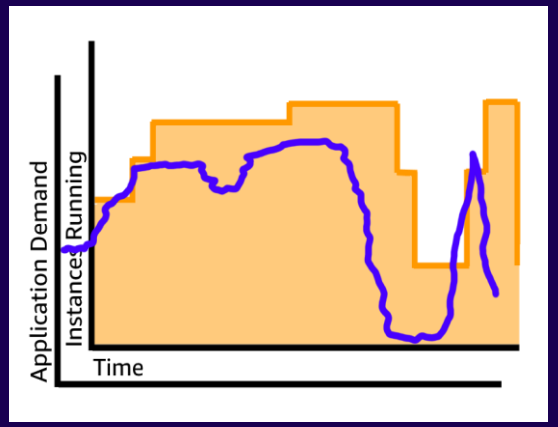
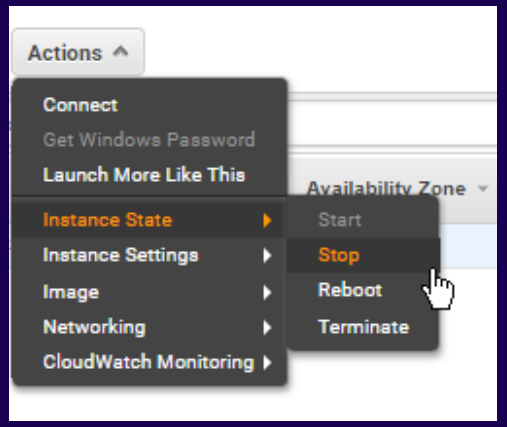
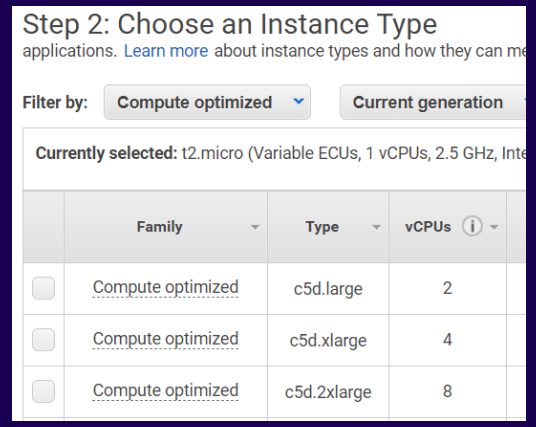
Benefits of Amazon EC2



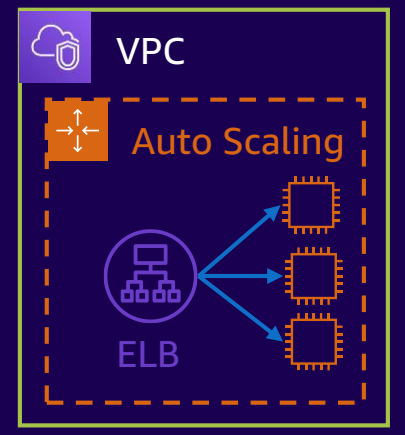
Elasticity



Control

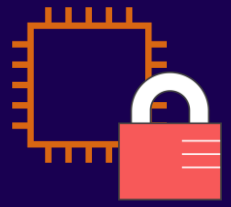


Flexibility



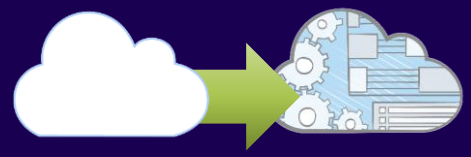
Integrated

Reliable



Secure

Inexpensive



Easy

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Amazon EC2 instance families and names

Choosing the correct type is very important for
efficient use of your instances and cost reduction

Instance family	Use cases
General purpose *e.g., A1, T3, T3a, T2, M6g, M5*	• Low-traffic websites and web applications • Small databases and midsize databases
Compute optimized *e.g., C5, C5n, C4, C7g*	• High-performance web servers • Video encoding
Memory optimized *e.g., R5, R5n, X1e, X1, z1d*	• High-performance databases • Distributed memory caches
Storage optimized *e.g., I3, I3en, D2, H1*	• Data warehousing • Log or data processing applications
Accelerated computing *e.g., P3, P2, Inf1, G4, G3, F1*	• 3D visualizations • Machine learning

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Amazon EC2 pricing

- Per-second billing for supported instances

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Unmanaged vs. managed services

Unmanaged

You manage scaling, fault tolerance, and availability

Managed

Scaling, fault tolerance, and availability are typically built in to the service

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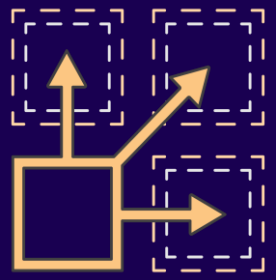
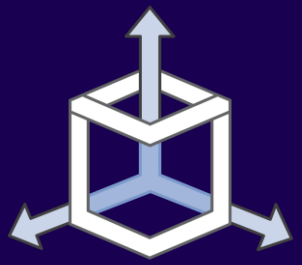
What is serverless computing?

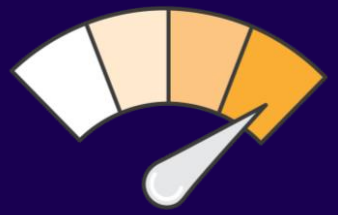
Building and running applications and services without managing servers



No servers to provision or manage



Scales with usage



Never pay for idle

Availability and fault tolerance built in

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AWS Lambda

- Fully managed compute service
- Runs stateless code
- Supports multiple languages
- Runs your code on a schedule or in response to events (e.g., changes to data in an Amazon S3 bucket or Amazon DynamoDB table)

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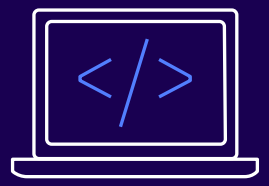
Serverless application use cases

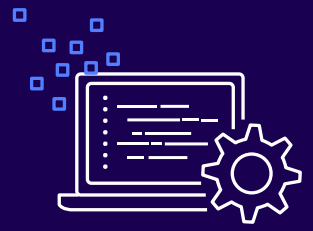


Web applications

Static websites

Complex web applications

Packages for Flask and Express

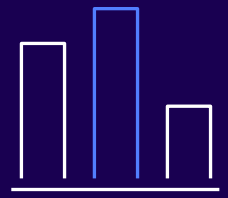


Backends

Applications and services

Mobile

IoT



Data processing

Real time

MapReduce

Batch

Machine learning inference

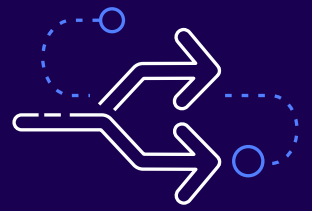
Chatbots

Powering chatbot logic

Amazon Alexa

Powering voice-enabled applications

Alexa Skills Kit



IT automation

Policy engines

Extending AWS services

Infrastructure management

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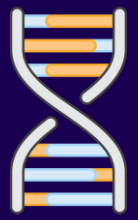
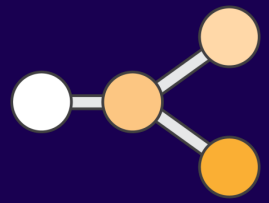
Amazon Elastic Container Service (Amazon ECS)

Amazon
ECS



Orchestrates the execution of containers



Maintains and scales the fleet of nodes running your containers

Removes the complexity of standing up the infrastructure

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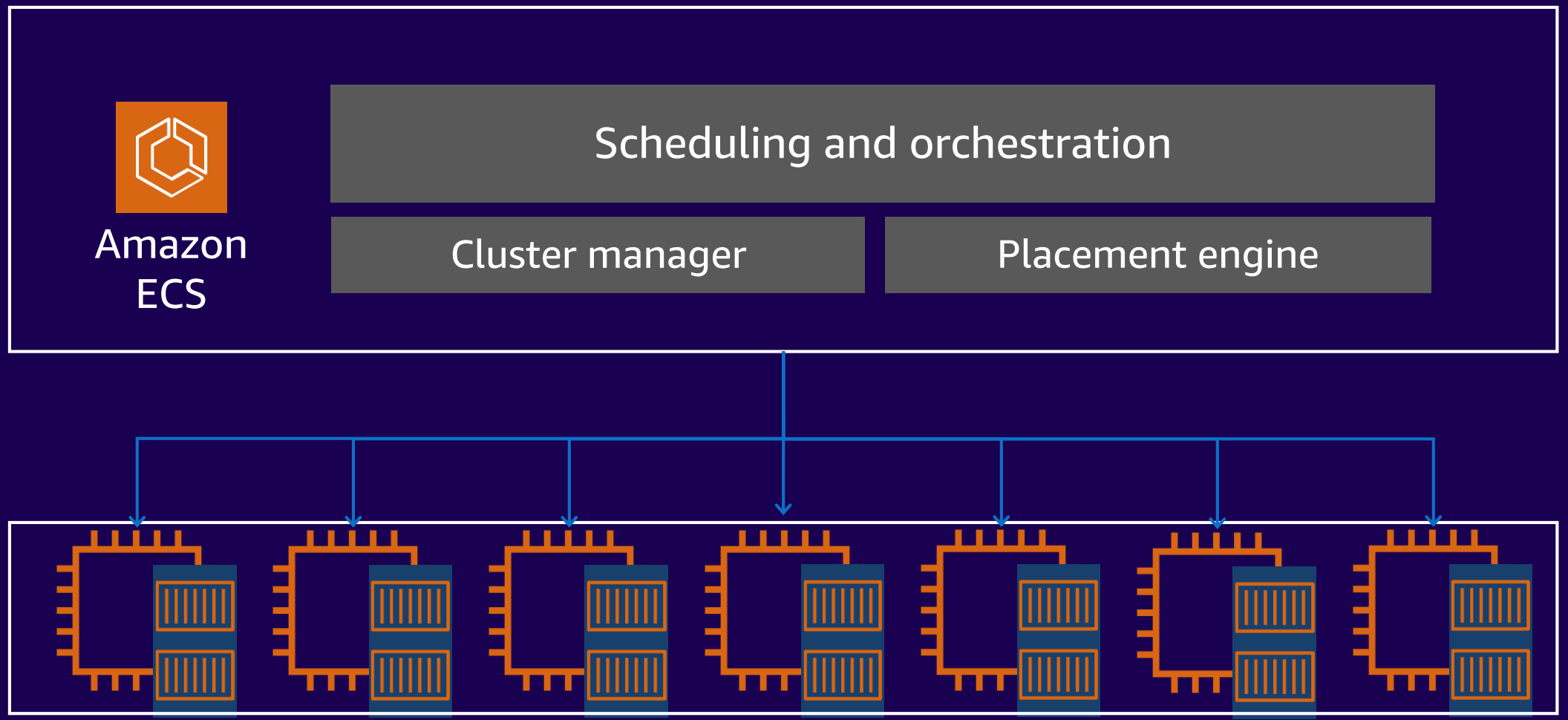
Amazon ECS



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Storage

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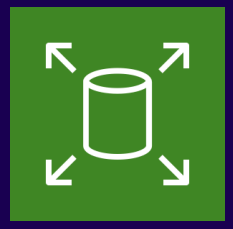
AWS storage options

Amazon S3
Scalable, highly durable object storage in the cloud

Amazon S3 Glacier
Low-cost, highly durable archive storage in the cloud

Amazon EFS
Scalable network file storage for Amazon EC2 instances

AWS Storage Gateway
Hybrid cloud storage service that gives you on-premises access to virtually unlimited cloud storage.



Amazon EBS
Network-attached volumes that provide durable block-level storage for Amazon EC2 instances

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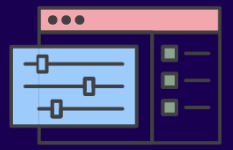
Amazon S3

Amazon S3

Object-level storage

Designed for 99.999999999% durability



Event triggers

Use cases

- Content storage and distribution
- Backup and archiving
- Big data analytics
- Disaster recovery
- Static website hosting

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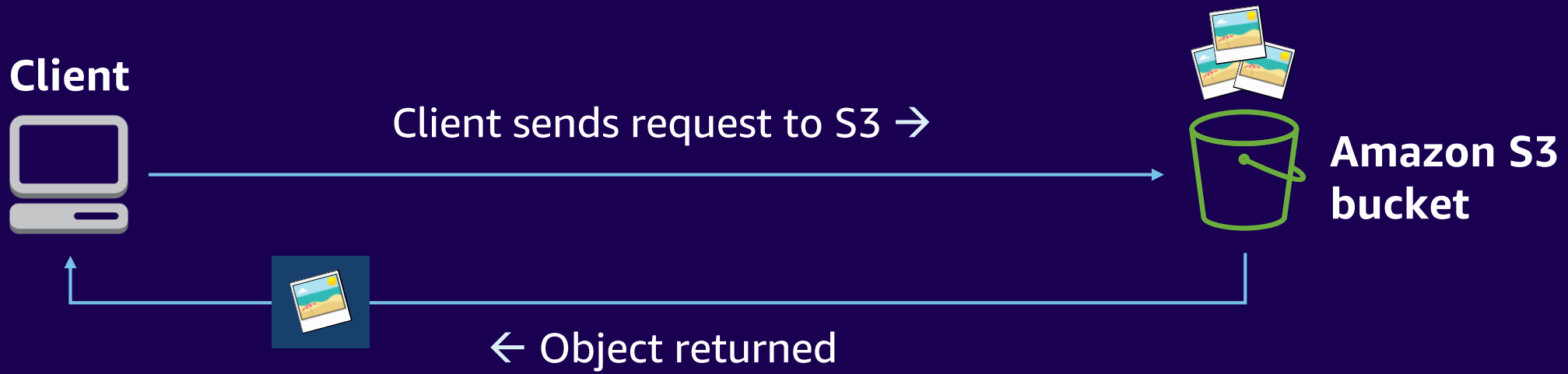
Amazon S3

- Built to **store and retrieve** data
- Fast, durable, **highly available access** to objects
- Can store an **unlimited number of objects** in a bucket
- Store and retrieve data at any time, from **anywhere on the web**



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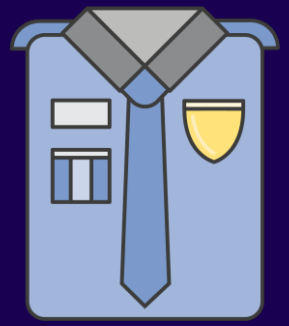
Choosing a Region

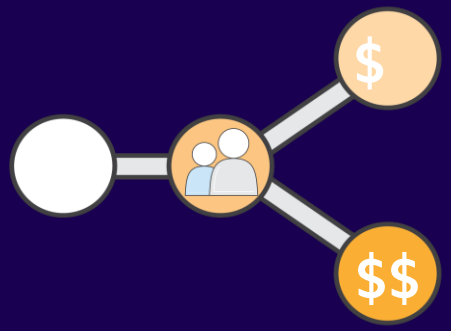
Data residency regulatory compliance



Are there relevant Region data privacy laws?

Can customer data be stored outside the country?

Proximity of users to data



Small differences in latency can impact customer experience

Choose the Region closest to your users

Cost-effectiveness

Costs vary by Region

Evaluate cost-effectiveness of replicating data to another Region

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Amazon S3 Glacier

Amazon
S3 Glacier

Long-term
data storage

Archival &
backup

Very low-cost
storage

Use cases

- Media asset workflows
- Healthcare information archiving
- Regulatory and compliance archiving
- Scientific data storage
- Digital preservation
- Magnetic tape replacement

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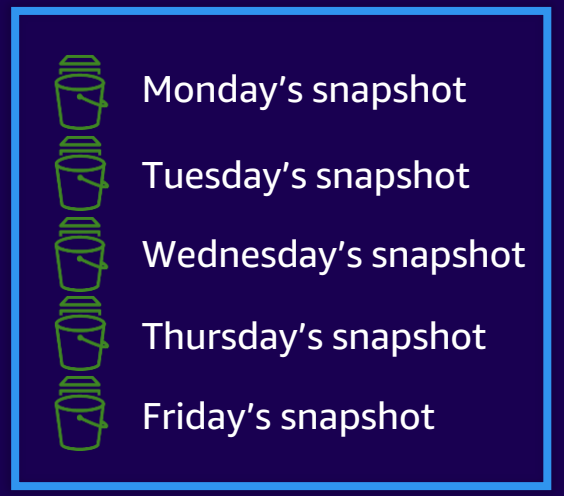
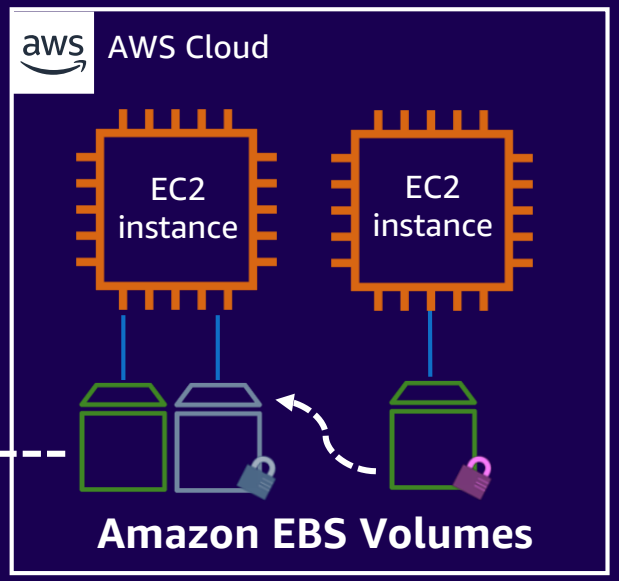
Amazon Elastic Block Store (Amazon EBS)

- 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



Create volume snapshots for backup and recovery



Detach and reattach volumes to other EC2 instances

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Databases

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Purpose-built databases

Relational	Key-value	In-memory	Document	Wide-Column	Graph	Ledger	Time Series
Amazon RDS	Amazon DynamoDB	Amazon ElastiCache	Amazon DocumentDB	Amazon Keyspaces (for Apache Cassandra)	Amazon Neptune	Amazon QLDB	Amazon Timestream
Amazon Aurora		Amazon MemoryDB for Redis					
Amazon Redshift							

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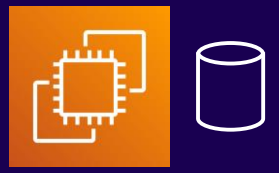
DIY vs. AWS database services



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

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AWS database options

	SQL	NoSQL
Transactional databases	Amazon RDS	Amazon DynamoDB
Data analytics or relationships	Amazon Redshift	Amazon Neptune
In-memory data store and cache		Amazon ElastiCache

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Amazon RDS

Set up, operate, and scale a relational database in the cloud with just a few clicks

Easy to set up and operate

Amazon RDS

Scales

Database engines

- Amazon Aurora
- Microsoft SQL Server
- MariaDB Foundation
- ORACLE
- PostgreSQL
- MySQL

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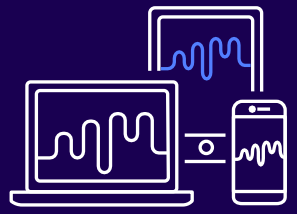
Amazon Aurora

MySQL- and PostgreSQL-compatible relational database built for the cloud

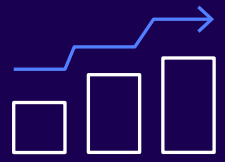
High availability and durability

Amazon Aurora

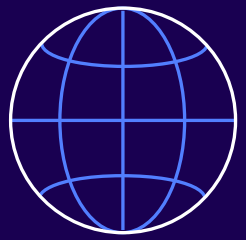
Compatible



High performance



High scalability



Multi-Region

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Amazon DynamoDB

Fast and flexible NoSQL database service for any scale

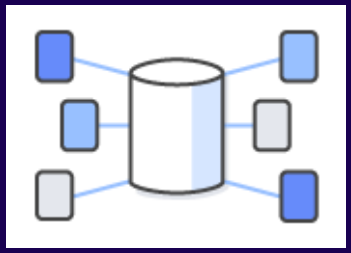
Fully managed

Fine-grained access control

Amazon DynamoDB

Fast, consistent performance

Flexible



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Amazon DynamoDB use cases

Leaderboards and scoring

GameScores

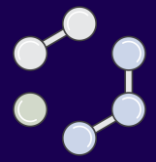
UserId	GameTitle	TopScore	TopScoreDateTime	Wins	Losses	...
"101"	"Galaxy Invaders"	5842	"2015-09-15:17:24:31"	21	72	...
"101"	"Meteor Blasters"	1000	"2015-10-22:23:18:01"	12	3	...
"101"	"Starship X"	24	"2015-08-31:13:14:21"	4	9	...
"102"	"Alien Adventure"	192	"2015-07-12:11:07:56"	32	192	...
"102"	"Galaxy Invaders"	0	"2015-09-18:07:33:42"	0	5	...
"103"	"Attack Ships"	3	"2015-10-19:01:13:24"	1	8	...
"103"	"Galaxy Invaders"	2317	"2015-09-11:06:53:00"	40	3	...
"103"	"Meteor Blasters"	723	"2015-10-19:01:13:24"	22	12	...
"103"	"Starship X"	42	"2015-07-11:06:53:00"	4	19	...
...	...	...	...	...	...	...

Works well for applications that

Need extreme horizontal scaling capability

Have simple high-volume data

Need to scale quickly and with ease



Don't need complex joins

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