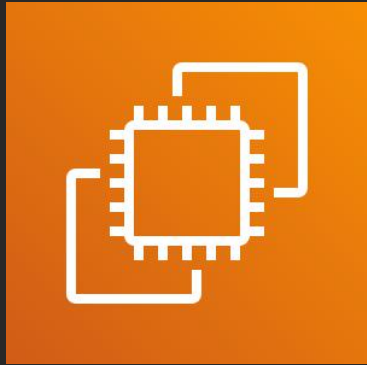# AWSOME DAY
ONLINE CONFERENCE

Introduction to AWS services
Compute, storage & databases

Joel Skepper

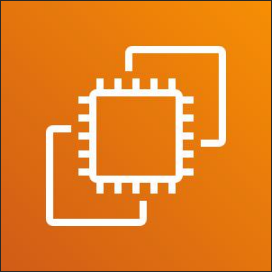Technical Trainer
Amazon Web Services

Compute

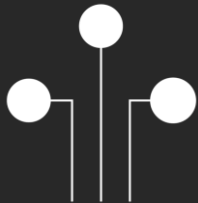# Amazon Elastic Compute Cloud (Amazon EC2)

Amazon
EC2

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

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

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

Your AMI

aws

Instance	Instance	Instance
Instance	Instance	Instance
Instance	Instance	Instance

Template for
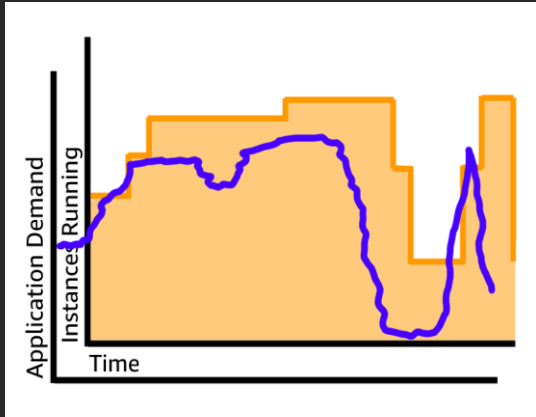- Storage volumes
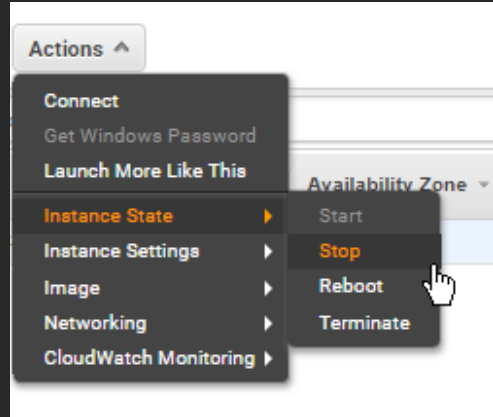- Launch permissions
- A block device mapping
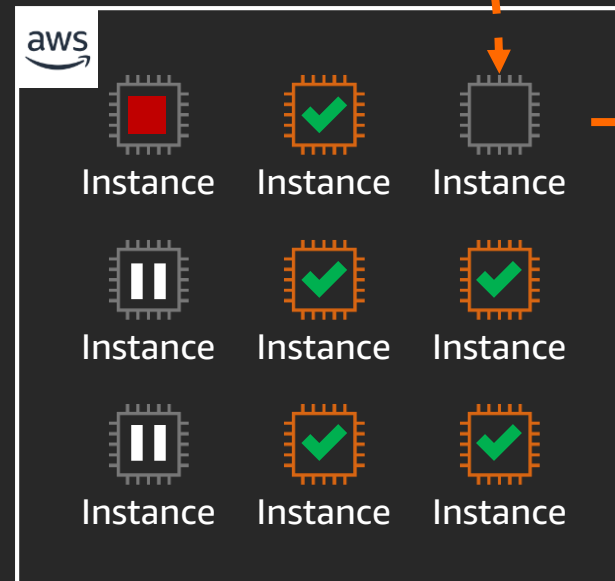
Examples
- ✓ Application server
- ✓ Web server
- ✓ Database server
- ✓ Game server
- ✓ Mail server
- ✓ Media server
- ✓ Catalog server
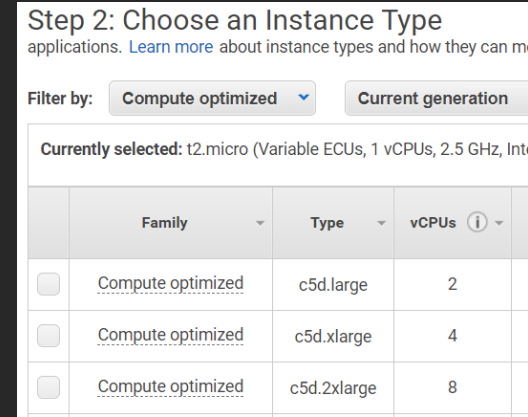- ✓ File server

aws | intel.
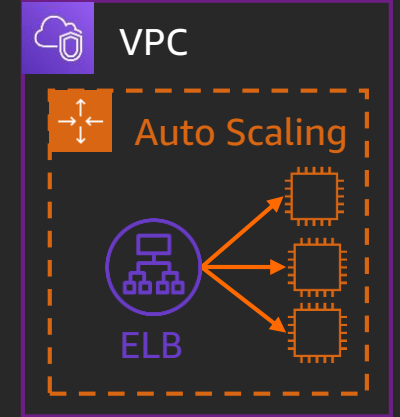
Benefits of Amazon EC2

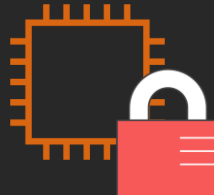

Elasticity

Control

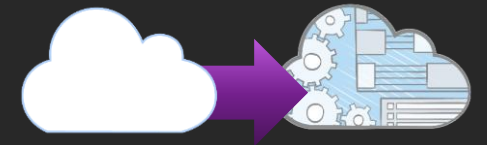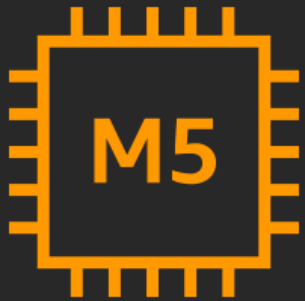Flexibility

Integrated

Reliable

Secure

Inexpensive

Easy

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*	• 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

Amazon EC2 pricing

On-Demand Instances	Reserved Instances	Savings Plans	Spot Instances

- Per-second billing (Amazon Linux and Ubuntu only)
- Per-hour billing (all other OS)

Unmanaged vs. managed services

Unmanaged

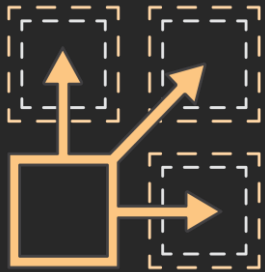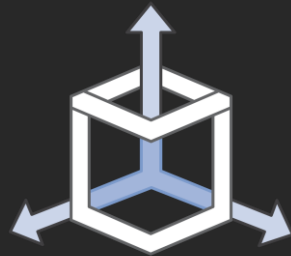You manage scaling, fault tolerance, and availability

Managed

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

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
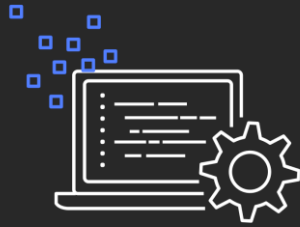
AWS Lambda

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)
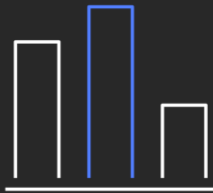
Serverless application use cases

Web applications

Static websites

Complex web applications

Packages for Flask and Express

Backends

Applications and services

Mobile

IoT

Data processing

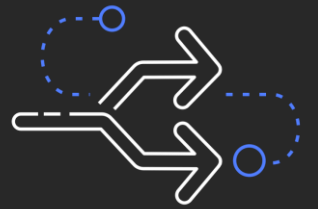Real time

MapReduce

Batch

Machine learning inference

Chatbots

Powering chatbot logic

Amazon Alexa

Powering voice-enabled applications

Alexa Skills Kit

IT automation

Policy engines
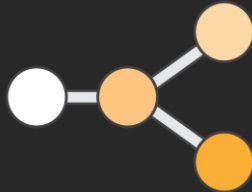
Extending AWS services

Infrastructure management

Amazon Elastic Container Service (Amazon ECS)

Amazon
ECS

Orchestrates the execution of containers
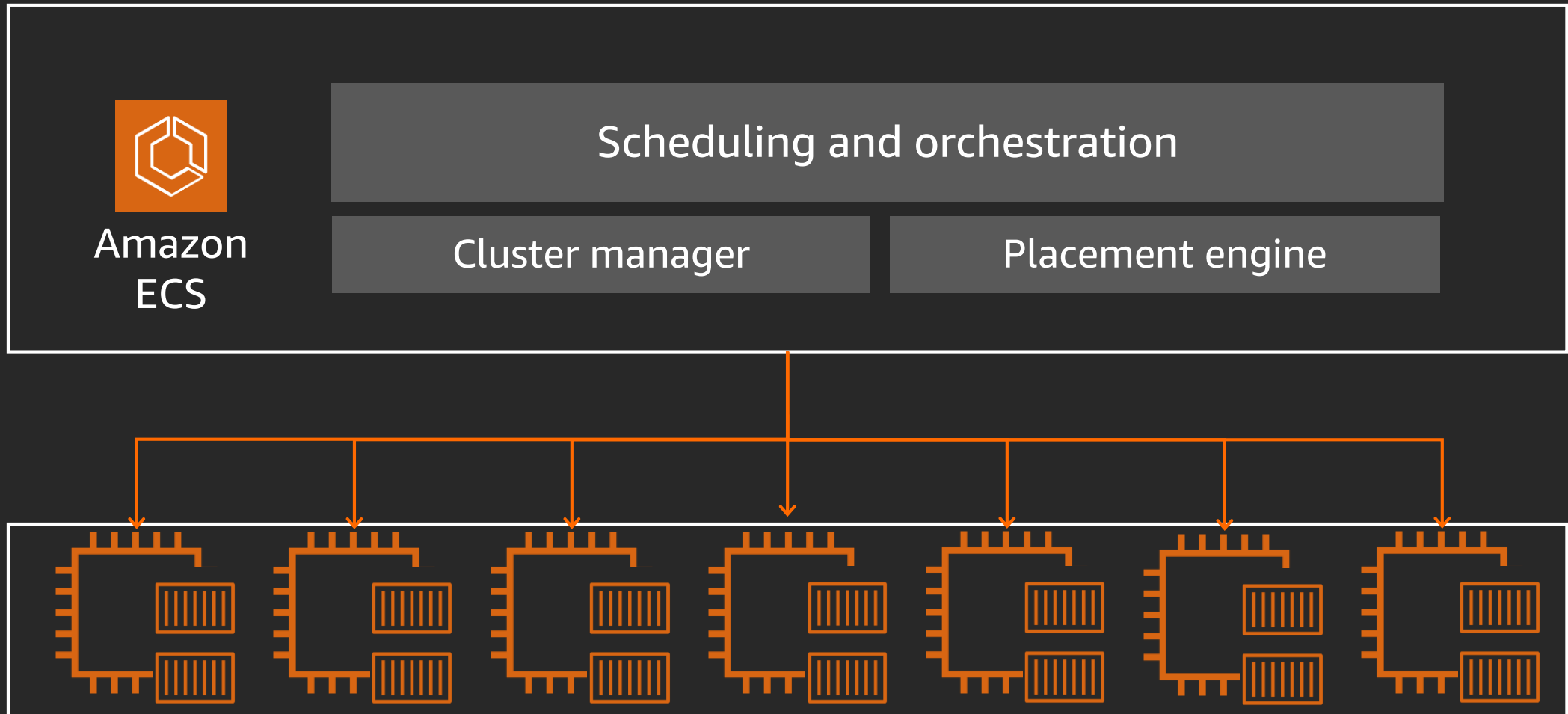
Maintains and scales the fleet of nodes running your containers

Removes the complexity of standing up the infrastructure

Amazon ECS

Amazon ECS

Scheduling and orchestration

Cluster manager

Placement engine

Storage

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
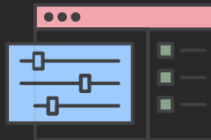
Amazon S3

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

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**

Client

Client sends request to S3 →

Amazon S3 bucket

← Object returned
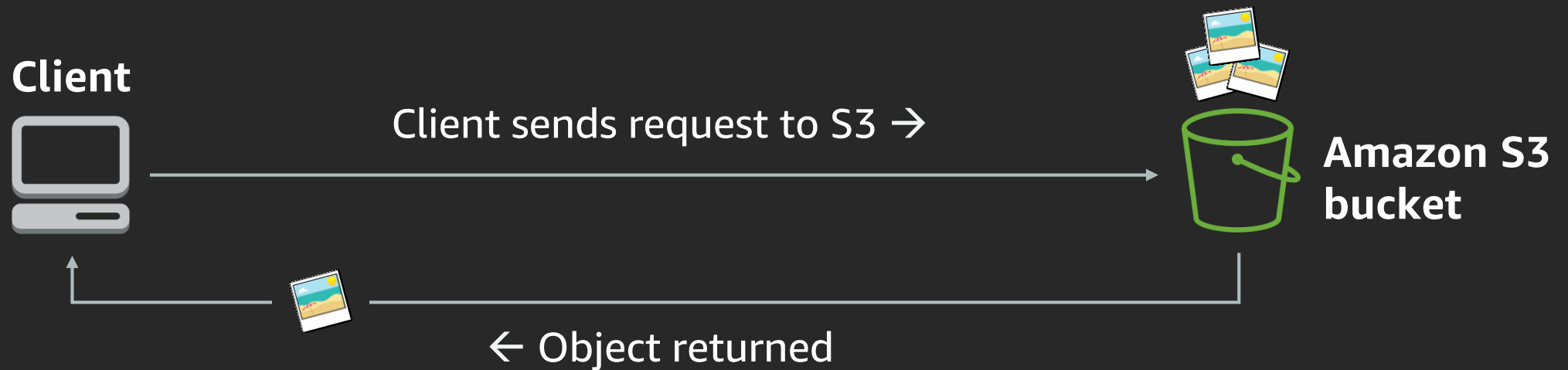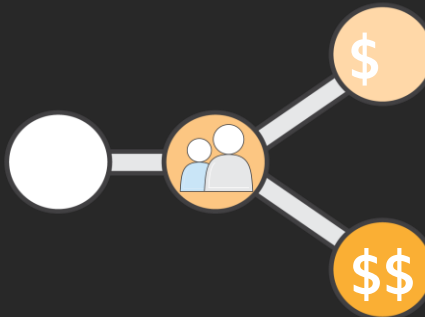
Choosing a Region

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

Amazon S3 Glacier

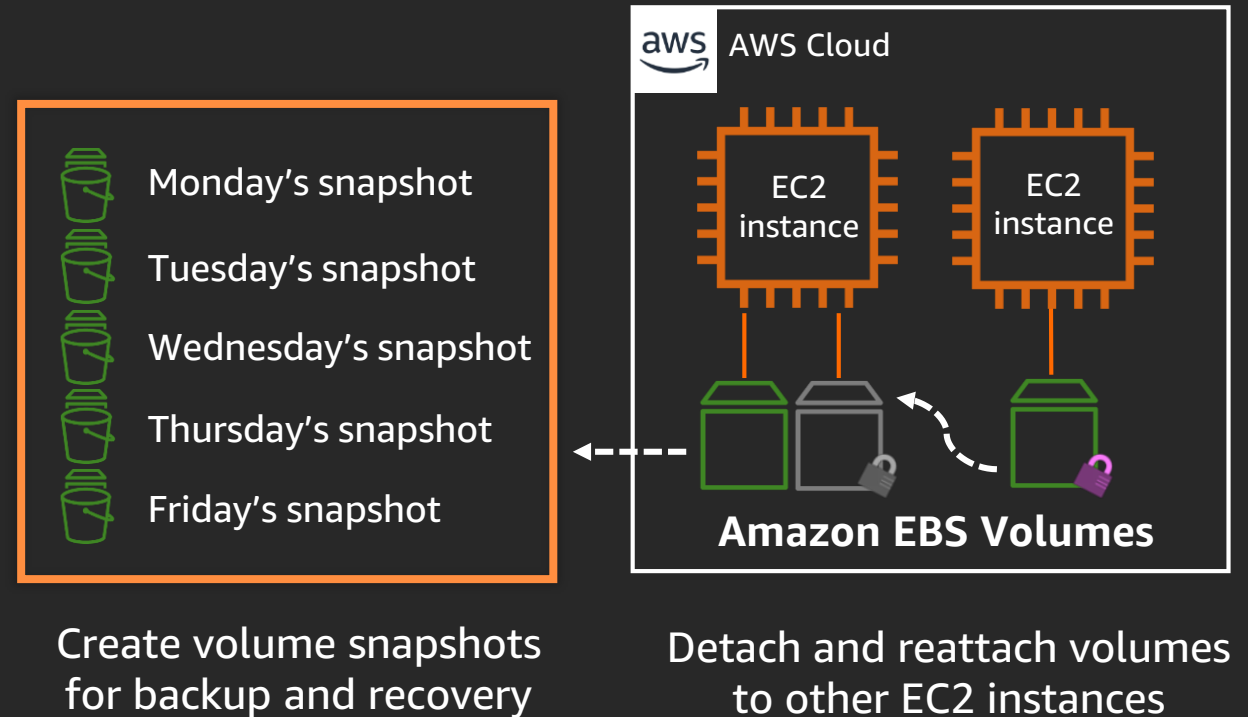Amazon
S3 Glacier

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

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
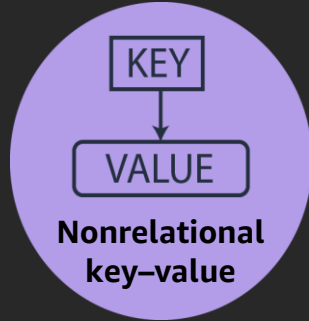- Snapshot functionality
- Encryption available

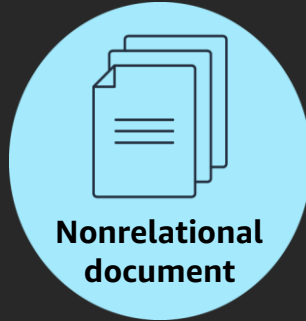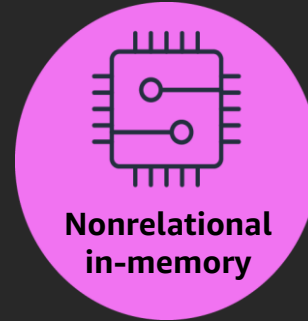Create volume snapshots for backup and recovery

Detach and reattach volumes to other EC2 instances

Databases

Purpose-built databases

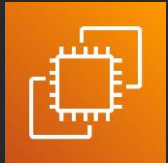| Relational database	Nonrelational key–value	Nonrelational document	Nonrelational in-memory	Nonrelational graph	Nonrelational ledger
Amazon RDS	Amazon DynamoDB	Amazon DocumentDB	Amazon ElastiCache	Amazon Neptune	Amazon QLDB
Amazon Aurora					
Amazon Redshift					
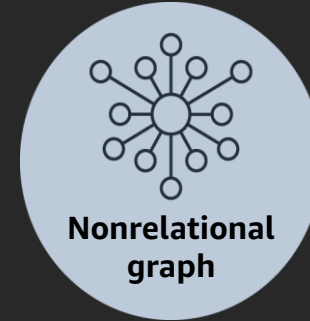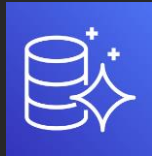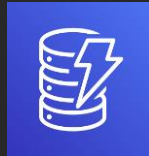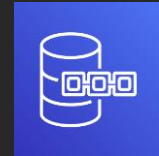
DIY vs. AWS database services

Databases on Amazon EC2

- Operating system access
- Need features of specific application

AWS database services
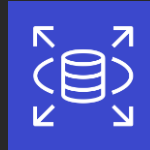
- Easy to set up, manage, maintain
- Push-button high availability
- Focus on performance
- Managed infrastructure

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
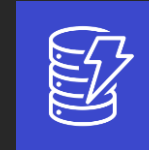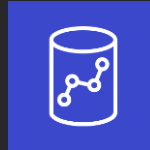
Amazon RDS

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

Amazon Aurora

Microsoft SQL Server

MariaDB Foundation

ORACLE

PostgreSQL

MySQL

Database engines
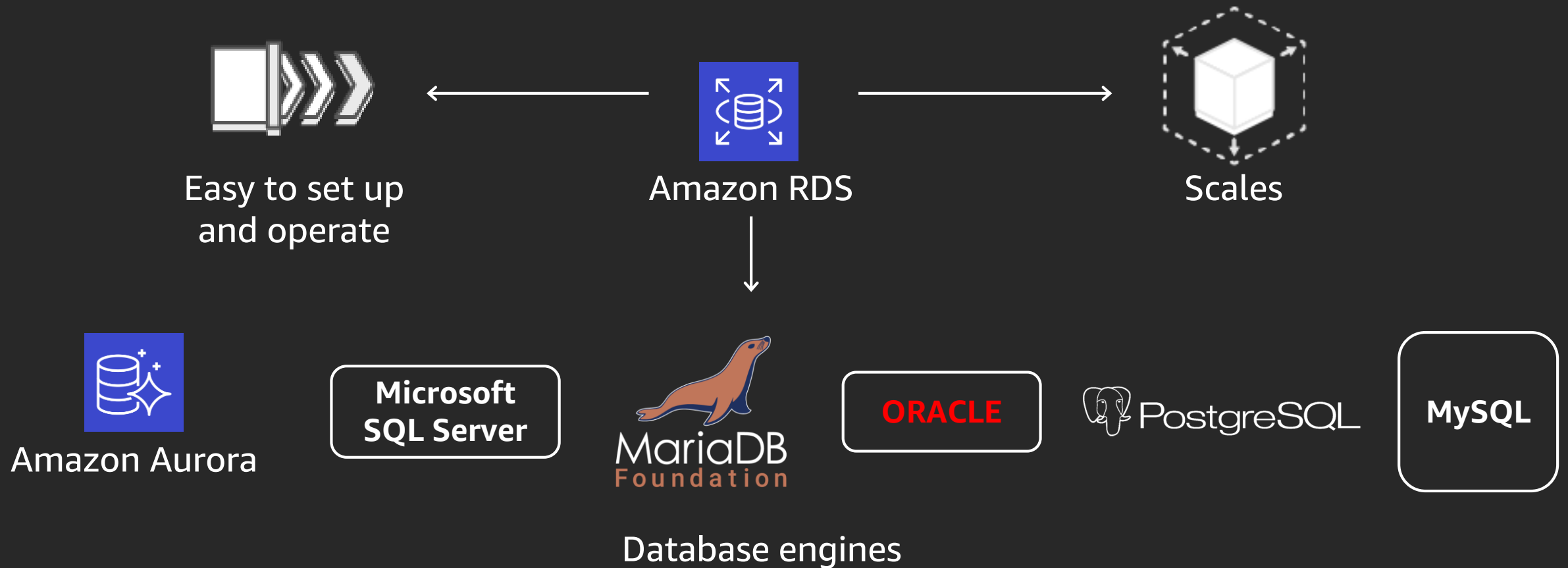
Amazon Aurora

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

High availability and durability

Compatible

High performance

Amazon Aurora

Multi-Region

High scalability
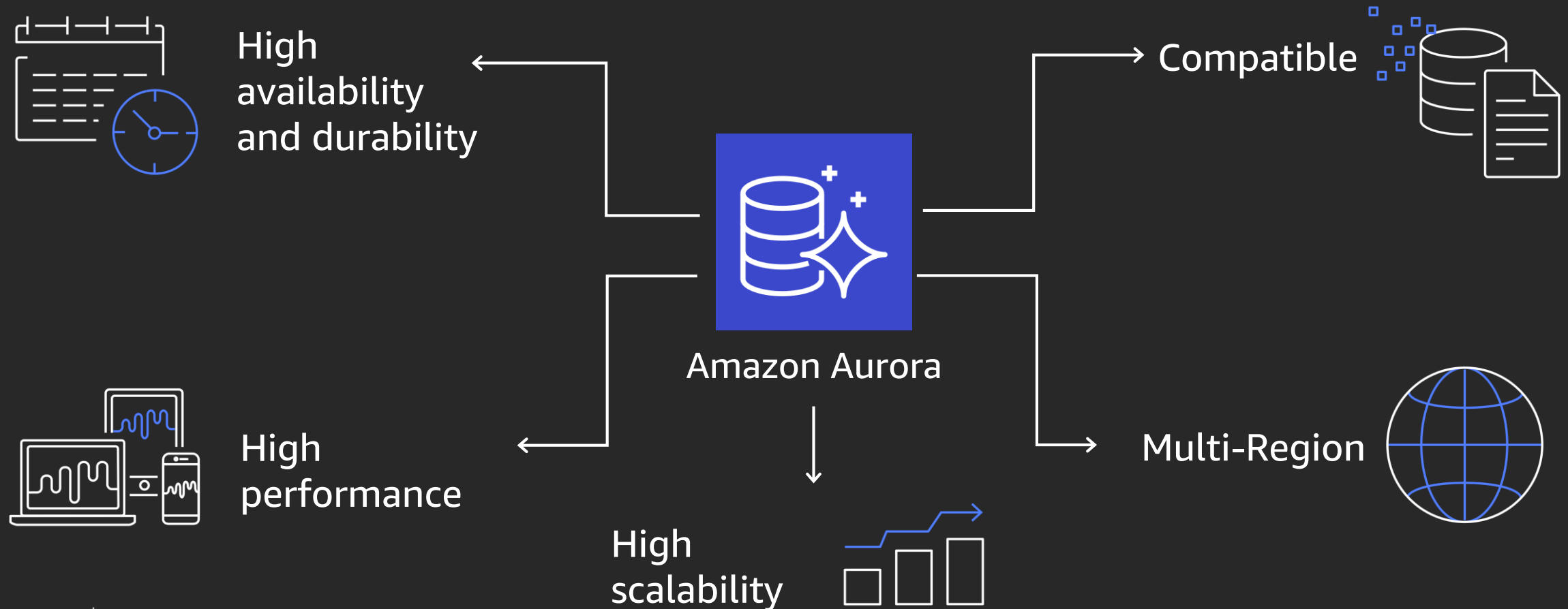
Amazon DynamoDB

Fast and flexible NoSQL database service for any scale

Fully managed

Fine-grained access control

Amazon DynamoDB

Fast, consistent performance

Flexible
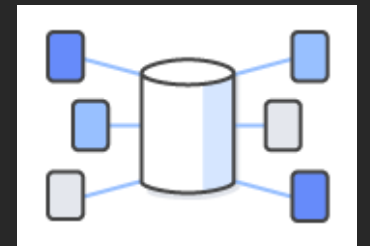
Amazon DynamoDB use cases

Leaderboards and scoring

Players → Game servers ↔ Leaderboard

| 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
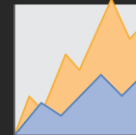
Need to scale quickly and with ease

Don't need complex joins

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Let us know what you thought of today's event and how we can improve the event experience for you in the future.

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twitch.tv/aws

Test your knowledge

Thank you!