AWS categories and compute services

AWS CLOUD CONCEPTS

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AWS categories

Analytics	Application Integration	Blockchain	Business Applications	Cloud Financial Management
Compute	Containers	Customer Engagement	Database	Developer Tools
End User Computing	Front-End Web & Mobile	Game Tech	Internet of Things	Machine Learning
Management & Governance	Media Services	Migration & Transfer	Networking & Content Delivery	Quantum Technologies
Robotics	Satellite	Security, Identity & Compliance	Serverless	Storage
VR & AR				

AWS categories

|				
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What is AWS EC2?

- Launching **compute capacity** on AWS:
  - EC2 **instances** (virtual machines)

- Provided security layer

- Resizable capacity

- Several **pricing plans:**
  - On-demand

  - Saving plans

  - Reserved instances

  - Spot instances

  - Dedicated hosts
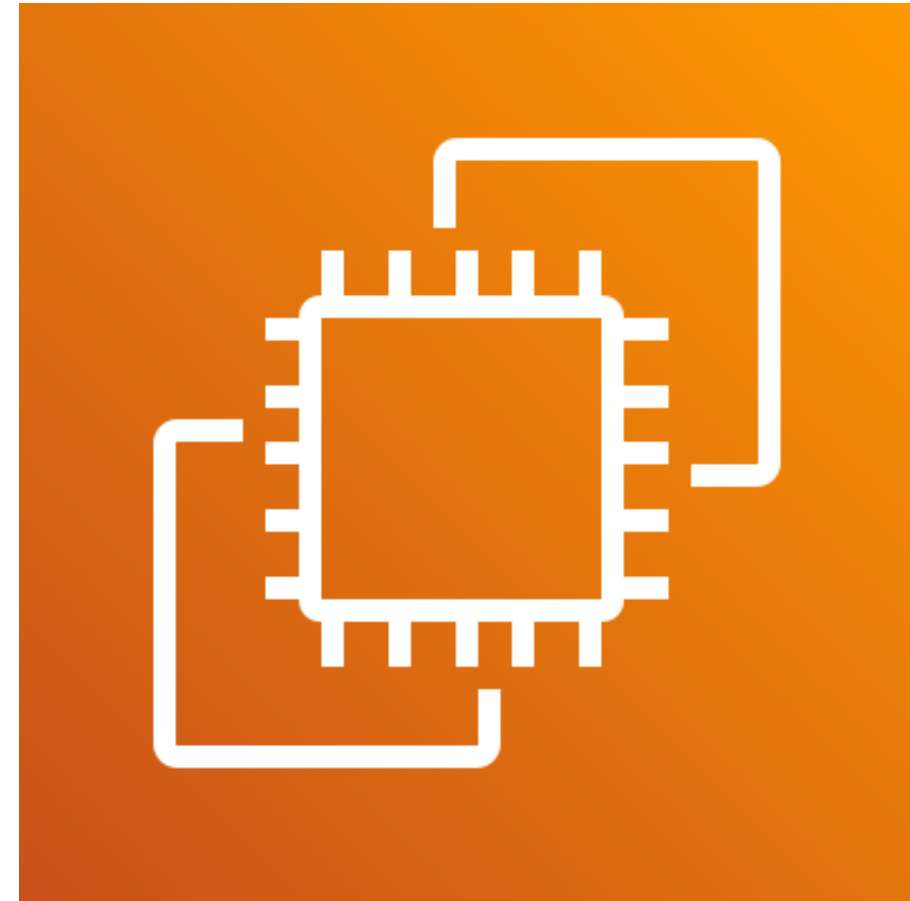
The benefits of EC2

- Flexibility

- Scalability

- Reliability

- Security

- Highly competitive rates

- Rich catalog of machines to **customize:**

  - Memory

  - Processor

  - Storage

  - OS and software packages

EC2 in the industry

What is AWS Lambda?

- **Serverless compute**:
  - Running code without managing servers

- Elastic: automatically **adapts to workloads**

- Supporting several programming languages:
  - Python
  - Node.js
  - Java
  - , etc.

- Can be triggered from AWS services or external applications

The benefits of Lambda

- **Server management** heavy lifting handled by AWS

- Continuous **scaling** to the size of workloads:
  - Increases reliability by eliminating traffic-related downtime

  - Decreases costs by allocating just the necessary resources to handle current traffic

- Pricing: **time of code execution with millisecond metering**

- Rich ecosystem:
  - AWS serverless application repository

  - AWS serverless application model

  - etc.

Lambda in the industry

Let's practice!

AWS CLOUD CONCEPTS

Storage and database

AWS CLOUD CONCEPTS

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What is AWS S3?

- Simple **Storage** Service

- Data stored as **objects**:
  - Similar to traditional files...

  - ...but stored differently

- Use cases:
  - **Data lakes**

  - **Big data** analysis

  - Archives

  - Websites

  - Mobile applications

The case of S3 Glacier

- Well suited for **long term storage** like:
  - Backup

  - Archives

- Several **retrieval delay** options, the longer,
  the cheaper the storage:
  - Expedited retrievals: 1-5 minutes

  - Standard retrievals: 3-5 hours

  - Bulk retrievals: 5-12 hours

- S3 Glacier Deep Archive: 12-48 hours

The benefits of S3

- Data availability

- Performance and scalability

- 99.999999999% durability

- No storage capacity limit

- Security

- Compliance

- Highly competitive pricing

- Optimized pricing for long term storage with S3 Glacier

S3 in the industry

What is AWS RDS?

- **Relational Database** Service

- Installation and management of relational databases on AWS

- Several database engines available:
  - Amazon Aurora
  - PostgreSQL
  - MySQL
  - MariaDB
  - Oracle Database
  - SQL Server

The benefits of RDS

- Several time consuming database management tasks handled by AWS:
  - Database configuration
  - Updates and security patches
  - Backup
- Easy adaptation to traffic evolutions
- Availability and durability
- Performance
- Security
- Cost savings

RDS in the industry

What is AWS DynamoDB?

- **NoSQL database** management service:
  - Key value database
  - Documents

- Fully managed by AWS:
  - Security
  - Backup
  - Restore
  - Caching

- Well suited for **big data** applications

The benefits of DynamoDB

- Database server management handled by AWS

- Performance at scale:
  - Low latency (less than a few milliseconds)

  - Huge amounts of data

  - Caching features

- Availability and durability

- Security

- Cost optimization

DynamoDB in the industry

Let's practice!

AWS CLOUD CONCEPTS

Networking and content delivery

AWS CLOUD CONCEPTS

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What is AWS CloudFront?

- **Content Delivery Network** (CDN)
  - Network of servers in different locations

  - Working together to offer fast content delivery

  - Caching content like HTML files, CSS, etc.

- Programmable through **Lambda@Edge**

Benefits of CloudFront

- Leveraging AWS global infrastructure for **fast content delivery**

- **Security**:
    - Protection against the most frequent DDoS attacks

    - For more complex attacks, security extensions available

- Executing code closer to users through **Lambda@Edge**

- Natively integrated with many other AWS services

- Cost-effective

CloudFront in the industry

What is AWS Route 53?

- **Domain Name System** (DNS):
  - Translating domain names to IP addresses

- **Routing** user requests to:
  - Internal resources in AWS (e.g. EC2 instances)

  - External infrastructures

- Routing **policy configuration**

- Visual tool

- Buying and managing domain names

Benefits of Route 53

- Leveraging AWS global infrastructure for availability and reliability

- Ability to **optimize routing policies**

- Compatibility with other AWS services

- Simplicity

- Scalability

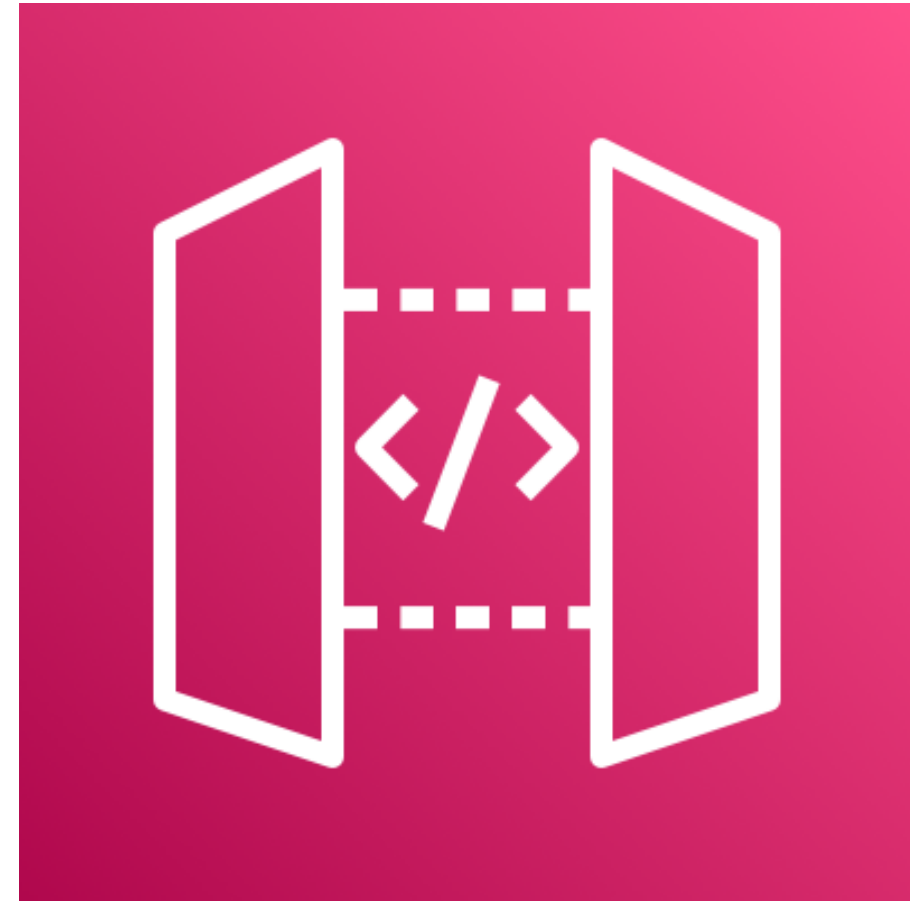- Security

- Cost-efficiency

Route 53 in the industry

What is AWS API Gateway

- Fully managed service for **API:**
  - Creation
  - Publishing
  - Maintaining
  - Monitoring
  - Securing
- **Authorization** and access control
- **Concurrent API calls management** (e.g. throttling)
- API version management

[1] Throttling: limiting the number of processed requests

Advantages of API Gateway

- **Efficient API development cycles**
  - Iterating, testing, versioning, etc.

- Leveraging AWS CloudFront for **low latency** and **protection against DDoS attacks**

- Throttling and authorizing API calls to ensure backend resources can handle traffic spikes

- Monitoring using AWS CloudWatch

- Flexible **security** control:
  - Using other AWS security services

  - Custom security checks using lambda

[1] Throttling: limiting the number of processed requests

API Gateway in the industry

Let's practice!

AWS CLOUD CONCEPTS

Management, security and identity

AWS CLOUD CONCEPTS

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What is AWS CloudWatch?

- **Monitoring** and **observability** tool:
  - Usage metrics for different resources

  - Events

  - Alarms

  - Custom trigger rules

The benefits of CloudWatch

- **Centralized** observability point of the whole infrastructure

- Actionable insights extraction

- Resource usage optimization

- Operational performance improvement

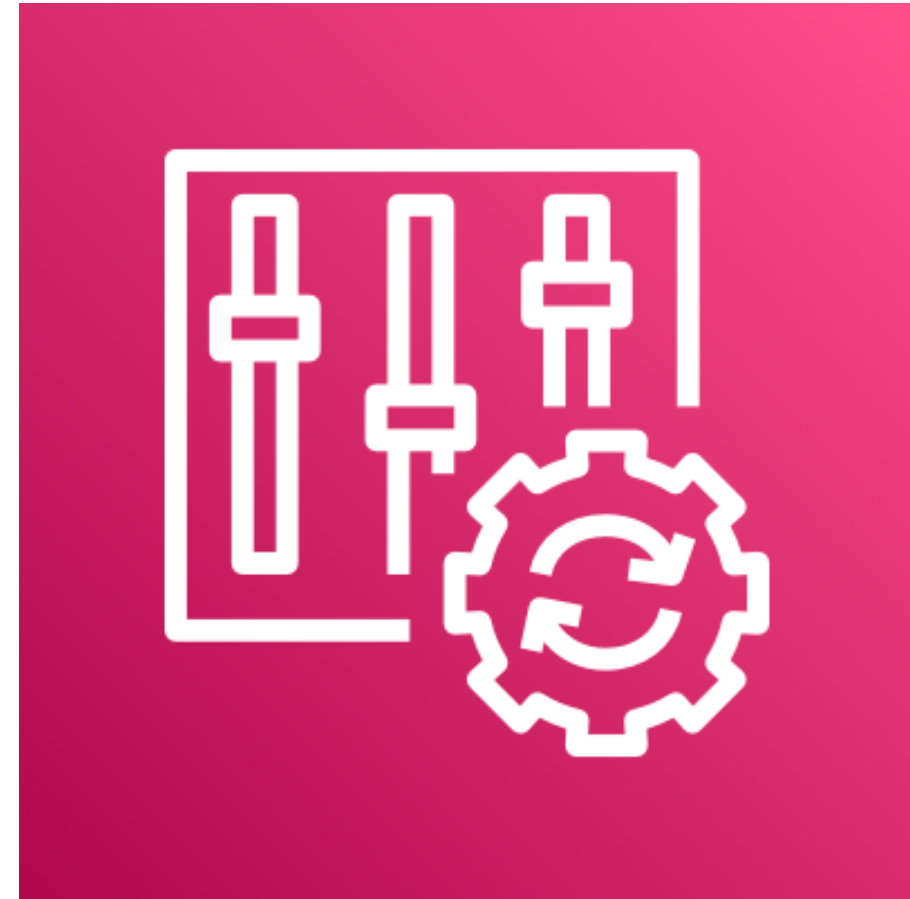- **Easy dashboards, metrics, events and alarms creation**

CloudWatch in the industry

What is AWS CloudTrail?

- Keep track of all account activity

- **Log every action** made

- In which service, when and by whom

The benefits of CloudTrail

- **Compliance** audits

- **Security** audits

- Detect **unusual activity**

- Automate security measures

CloudTrail in the industry

What is AWS CloudFormation?

- **Resource deployment automation**

- Deploy/update/delete resources

- Using a **template file** (JSON/YAML)

- Parameter configuration for each resource

- **Infrastructure as code**

The benefits of CloudFormation

- **Automation** best practices

- Resources managed through **CI/CD pipeline**

- Scaling infrastructure in different regions/accounts

- **Share** compliance and security best practices

CloudFormation in the industry

What is AWS IAM?

- Identity and Access Management

- **Access permissions** management
  - For users

  - For resources

The benefits of IAM

- **Fine-grained access permission management**

- Managing groups of users

- Managing roles for users and resources

- Multi-Factor authentication for users with high privileges

Let's practice!

AWS CLOUD CONCEPTS