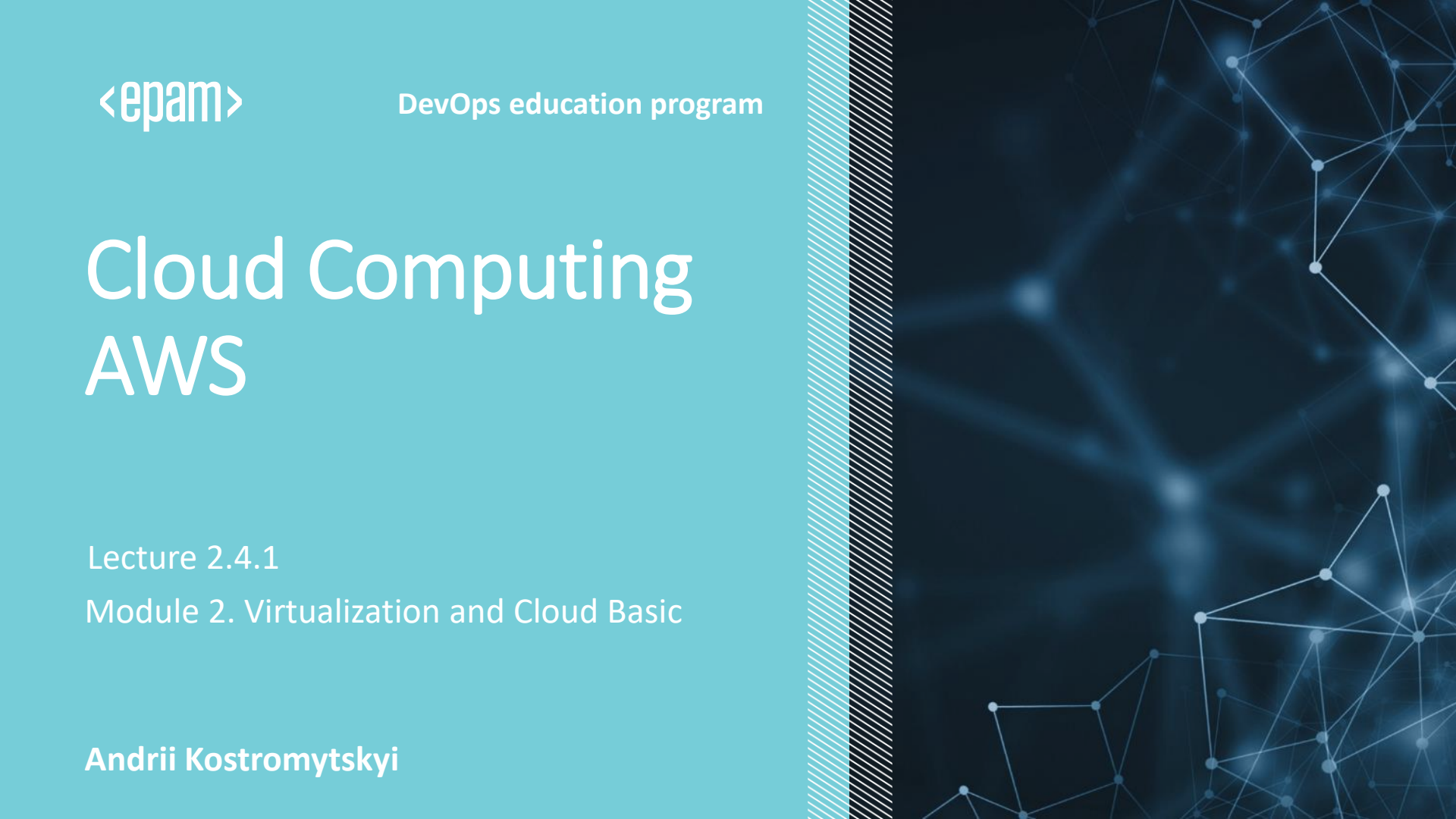

epam
DevOps education program
Cloud Computing
AWS
Lecture 2.4.1
Module 2. Virtualization and Cloud Basic
Andrii Kostromytskyi

Agenda

- AWS Intro
- AWS Free Tier
- AWS Global Infrastructure
- AWS Services
- Q&A

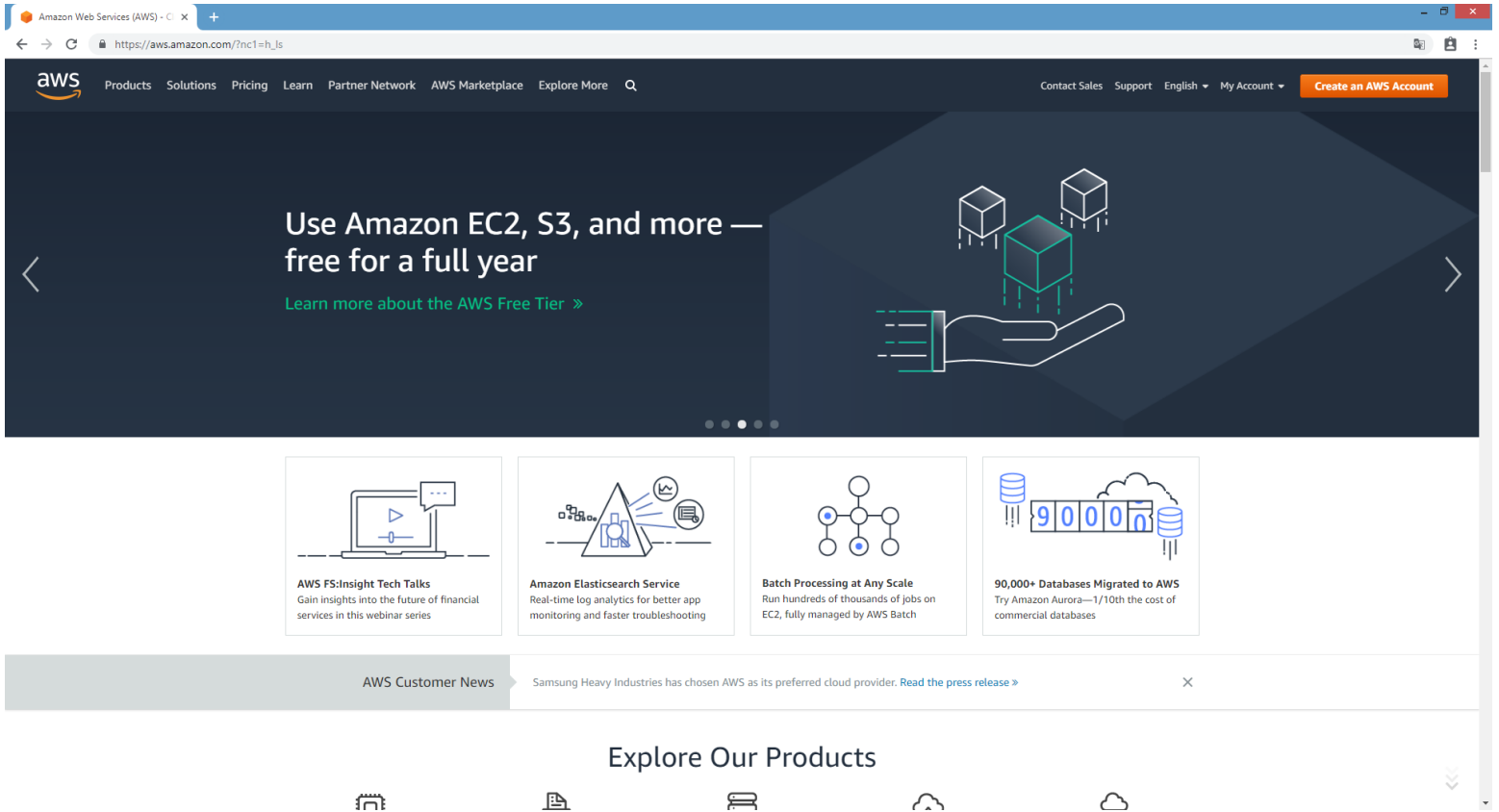
AWS INTRO

Provider selection

When comparing AWS, Azure, and GCP, you must consider their capabilities and cost. Choose a provider based on the specific needs of the project. It can be one provider, or it can be a combination of two or even all. Since costs are relatively comparable, find the right combination of solutions to suit your needs.

Amazon Web Services (AWS)

https://aws.amazon.com/



Amazon Web Services

Compute

- **EC2** — Virtual Servers in the Cloud
- **Lambda** PREVIEW — Run Code in Response to Events

Storage & Content Delivery

- **S3** — Scalable Storage in the Cloud
- **Storage Gateway** — Integrates On-Premises IT Environments with Cloud Storage
- **Glacier** — Archive Storage in the Cloud
- **CloudFront** — Global Content Delivery Network

Database

- **RDS** — MySQL, Postgres, Oracle, SQL Server, and Amazon Aurora
- **DynamoDB** — Predictable and Scalable NoSQL Data Store
- **ElastiCache** — In-Memory Cache
- **Redshift** — Managed Petabyte-Scale Data Warehouse Service

Networking

- **VPC** — Isolated Cloud Resources
- **Direct Connect** — Dedicated Network Connection to AWS
- **Route 53** — Scalable DNS and Domain Name Registration

Administration & Security

- **Directory Service** — Managed Directories in the Cloud
- **Identity & Access Management** — Access Control and Key Management
- **Trusted Advisor** — AWS Cloud Optimization Expert
- **CloudTrail** — User Activity and Change Tracking
- **Config** PREVIEW — Resource Configurations and Inventory
- **CloudWatch** — Resource and Application Monitoring

Deployment & Management

- **Elastic Beanstalk** — AWS Application Container
- **OpsWorks** — DevOps Application Management Service
- **CloudFormation** — Templated AWS Resource Creation
- **CodeDeploy** — Automated Deployments

Analytics

- **EMR** — Managed Hadoop Framework
- **Kinesis** — Real-time Processing of Streaming Big Data
- **Data Pipeline** — Orchestration for Data-Driven Workflows

Application Services

- **SQS** — Message Queue Service
- **SWF** — Workflow Service for Coordinating Application Components
- **AppStream** — Low Latency Application Streaming
- **Elastic Transcoder** — Easy-to-use Scalable Media Transcoding
- **SES** — Email Sending Service
- **CloudSearch** — Managed Search Service

Mobile Services

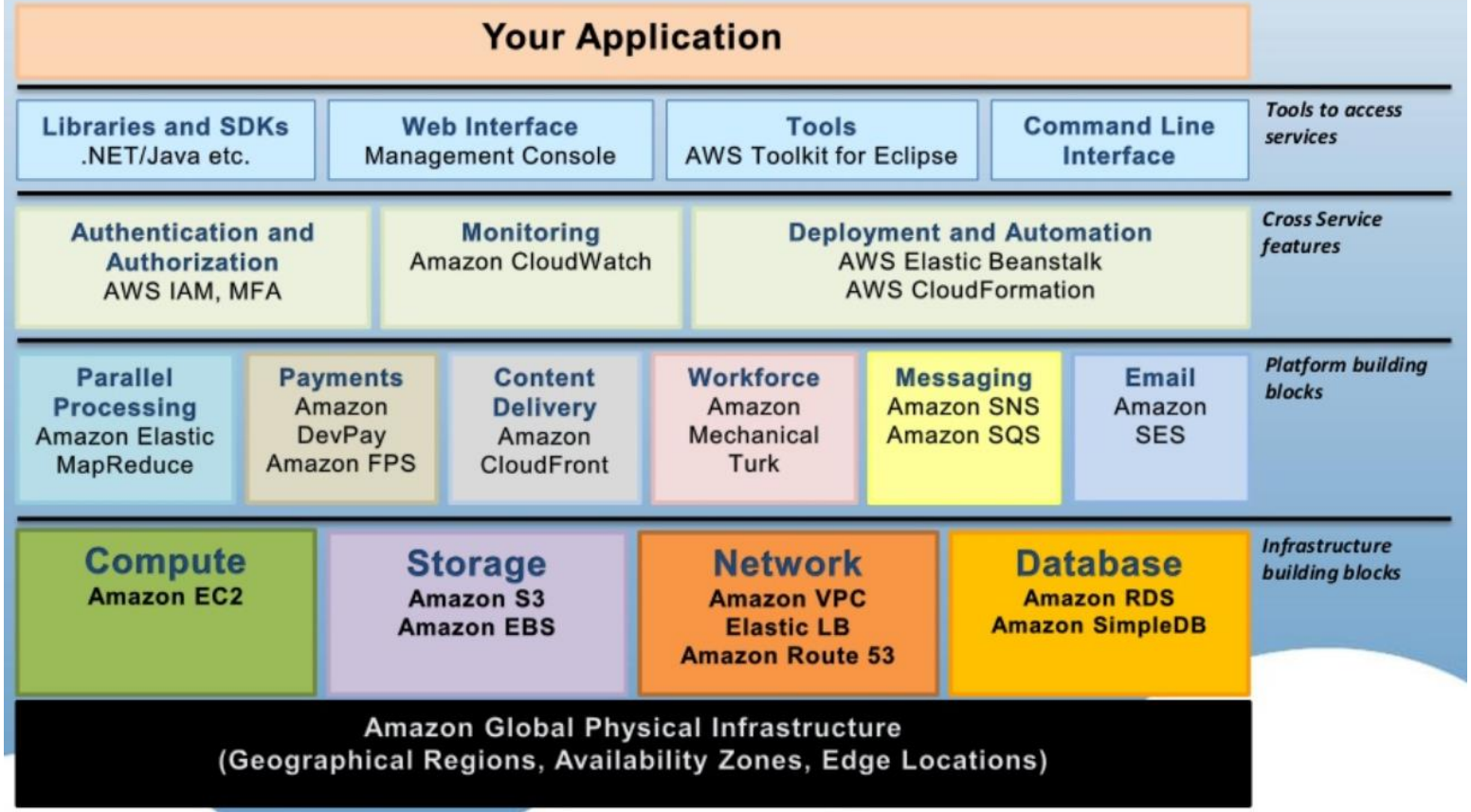
- **Cognito** — User Identity and App Data Synchronization
- **Mobile Analytics** — Understand App Usage Data at Scale
- **SNS** — Push Notification Service

Enterprise Applications

- **WorkSpaces** — Desktops in the Cloud
- **Zocalo** — Secure Enterprise Storage and Sharing Service

175 fully featured services !!

The “Living and Evolving” AWS Cloud



Service breadth and depth

Common Use Cases

- Web site hosting
- Application hosting/SaaS hosting
- Mobile and Social Applications
- Internal IT application hosting
- Content delivery and media distribution
- High performance computing, batch data processing, and large scale analytics
- Storage, backup, and disaster recovery
- Development and test environments

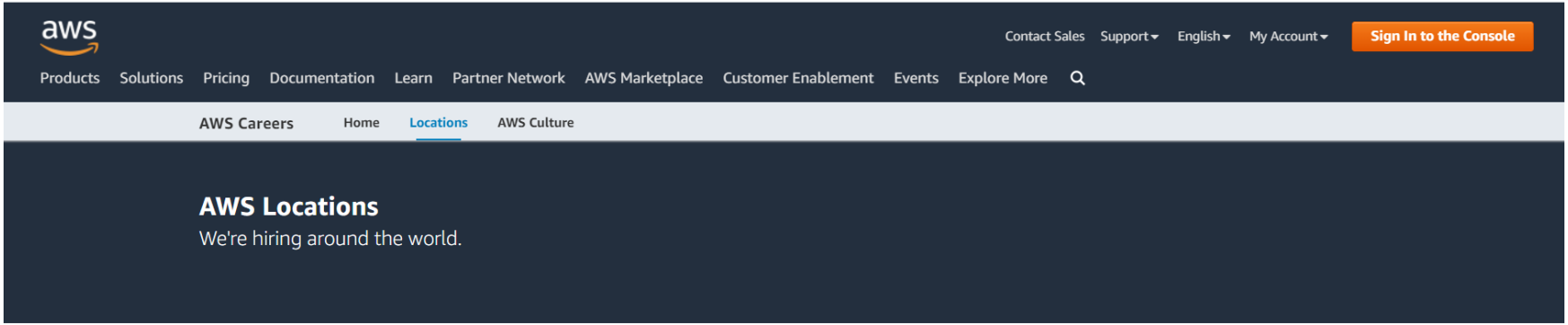
AWS Premium Support

	Bronze	Silver	Gold	Platinum
Access to community forums	✔	✔	✔	✔
Resolution for AWS-owned issues	✔	✔	✔	✔
Local business hours (M-F 8:00a.m. - 6:00p.m., excl. holidays)	✔	✔	✔	✔
One-on-one online support	✔	✔	✔	✔
Client side diagnostic tools	✔	✔	✔	✔
Best practice guidance	✔	✔	✔	✔
Fastest guaranteed response	12 hours	4 hours	1 hour	15 minutes
Your named contacts (what's this?)	1	2	3	unlimited
Always available — any time, any day, 24/7/365			✔	✔
One-on-one phone support			✔	✔
Direct access to Technical Account Manager				✔
White-glove case routing (what's this?)				✔
Management business reviews (what's this?)				✔

AWS Premium Support

	Bronze	Silver	Gold	Platinum
Pricing	$49/month	Greater of $100 - or - 5% of monthly AWS usage Pricing example	Greater of $400 - or - 10% of monthly AWS usage for the first $0-$10K 7% of monthly AWS usage from $10K-$80K 5% of monthly AWS usage from $80K+ Pricing example	Greater of $15K - or - 10% of monthly AWS usage Pricing example

https://aws.amazon.com/careers/locations/



AWS is helping over a million customers in 190 countries leverage the power of cloud computing. Being a global company isn't just about worldwide availability or working with international customers; we also see the value in building global teams.

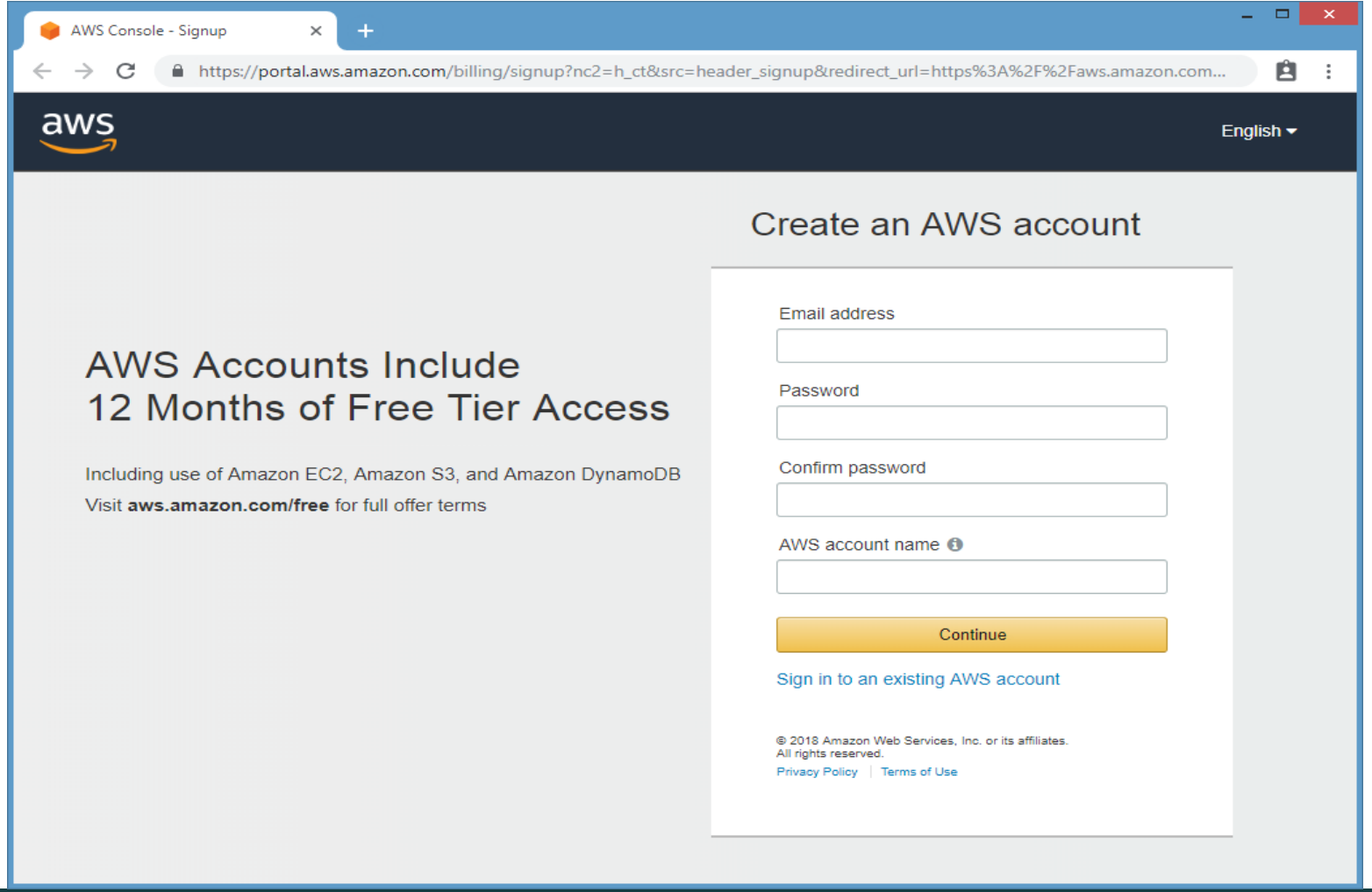
Click below to learn more about some of the featured locations where we are currently hiring for.

We're hiring around the world.

Search all locations

- Bangalore, India
- New York City
- Beijing, China
- San Francisco Bay Area

AWS FREE TIER


AWS Console - Signup
https://portal.aws.amazon.com/billing/signup?nc2=h_ct&src=header_signup&redirect_url=https%3A%2F%2Faws.amazon.com...
aws
English
Create an AWS account
AWS Accounts Include
12 Months of Free Tier Access
Including use of Amazon EC2, Amazon S3, and Amazon DynamoDB
Visit aws.amazon.com/free for full offer terms
Email address
Password
Confirm password
AWS account name
Continue
Sign in to an existing AWS account
© 2018 Amazon Web Services, Inc. or its affiliates.
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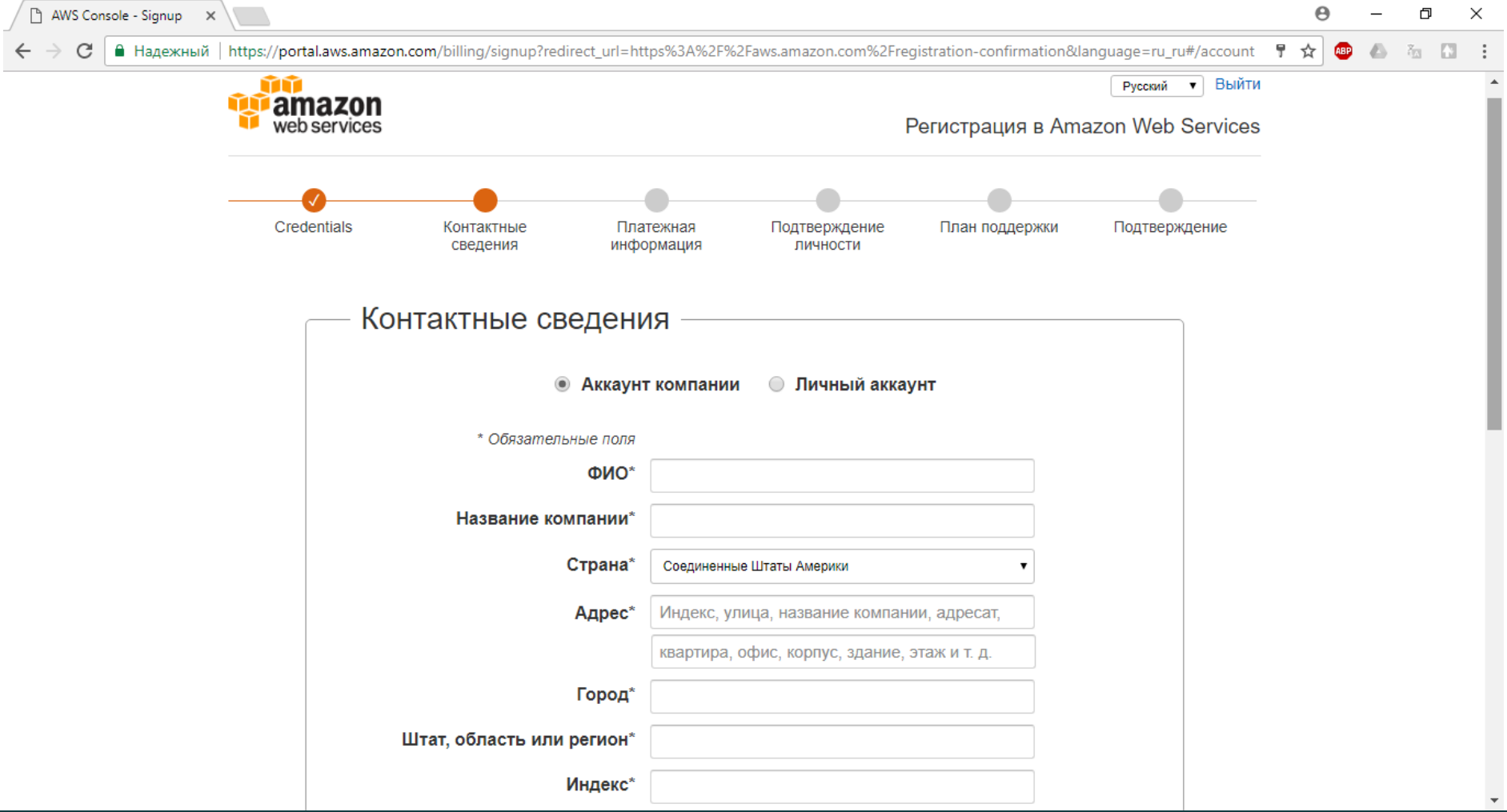
Privacy Policy | Terms of Use


AWS Console - Signup
Надежный
https://portal.aws.amazon.com/billing/signup?redirect_url=https%3A%2F%2Faws.amazon.com%2Fregistration-confirmation&language=ru_ru#/account
amazon web services
Русский
Выйти
Регистрация в Amazon Web Services
Credentials
Контактные сведения
Платежная информация
Подтверждение личности
План поддержки
Подтверждение
Контактные сведения
Аккаунт компании
Личный аккаунт
* Обязательные поля
ФИО*
Название компании*
Страна*
Соединенные Штаты Америки
Адрес*
Индекс, улица, название компании, адресат,
квартира, офис, корпус, здание, этаж и т. д.
Город*
Штат, область или регион*
Индекс*

AWS Free Tier Details

FEATURED | 12 MONTHS FREE | ALWAYS FREE | TRIALS | PRODUCT CATEGORIES | ALL

12 months free and always free products

AWS Free Tier includes offers that expire 12 months following sign up and others that never expire.

Learn more »

DATABASE

Amazon DynamoDB

25 GB

of storage

Fast and flexible NoSQL database with seamless scalability

Learn more about DynamoDB »

EXPAND DETAILS

COMPUTE

Amazon EC2

750 Hours

per month

Resizable compute capacity in the Cloud

Learn more about Amazon EC2 »

EXPAND DETAILS

COMPUTE

Amazon Lightsail

750 Hours

1 Month Free Trial

Virtual Private Servers made easy! Everything you need to jumpstart your

DATABASE

Amazon RDS

750 Hours

per month of db.t2.micro database usage (applicable DB engines)

Managed Relational Database Service for MySQL, PostgreSQL, MariaDB, Oracle BYOL,

STORAGE & CONTENT DELIVERY

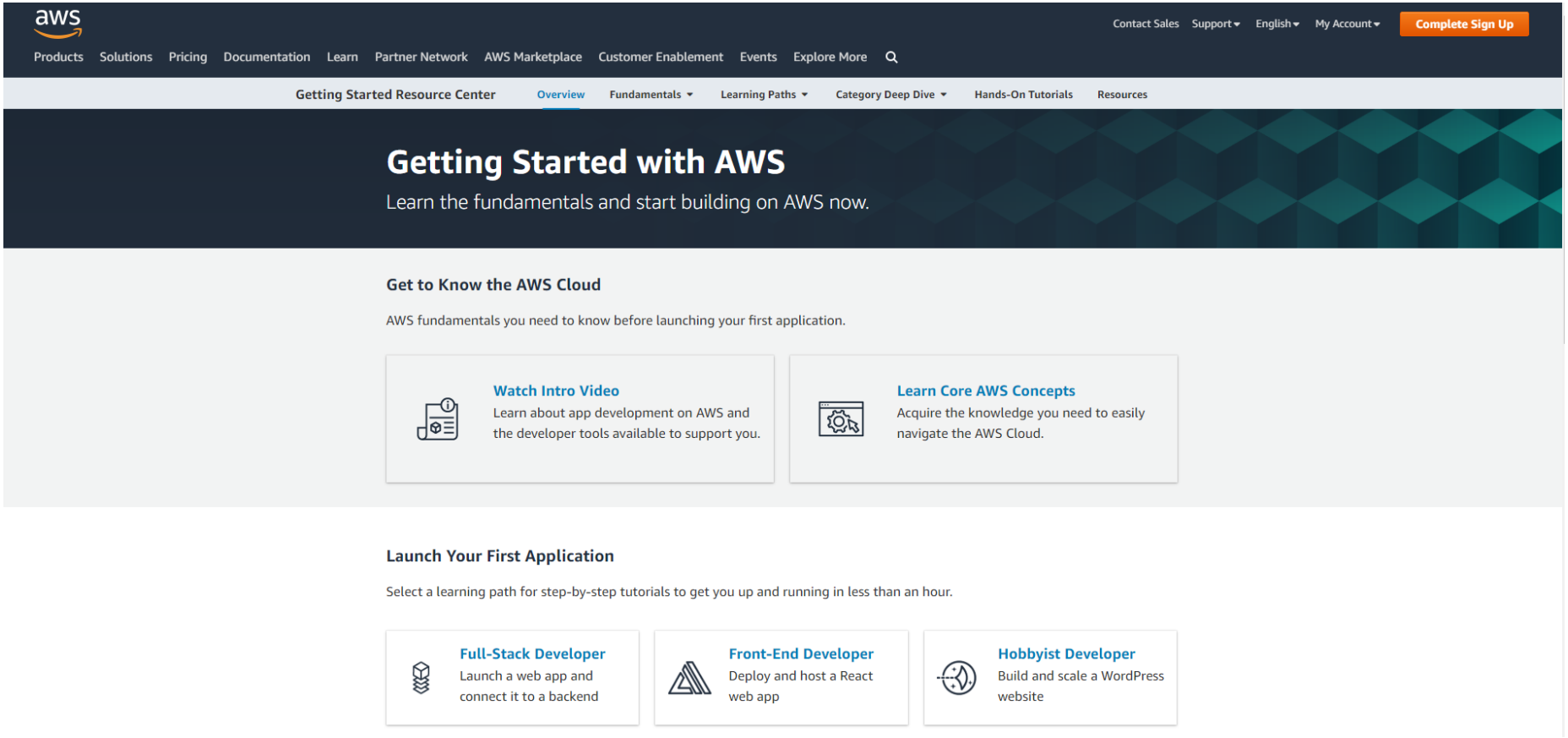
Amazon S3

5 GB

of standard storage

Secure, durable, and scalable object storage infrastructure

https://aws.amazon.com/getting-started/?nc2=h_ql_le_gs



AWS GLOBAL INFRASTRUCTURE

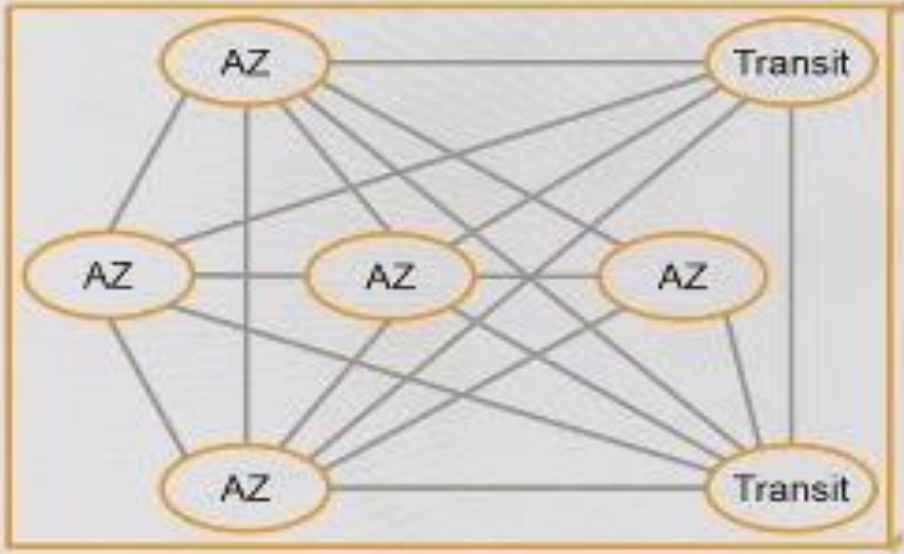
AWS Global Infrastructure Map

https://www.infrastructure.aws/

(2020)
The AWS Cloud spans 76 Availability Zones within 24 geographic Regions around the world,
+216 Point of Presence
with announced plans for nine more Availability Zones and three more AWS Regions in Indonesia, Japan, and Spain.

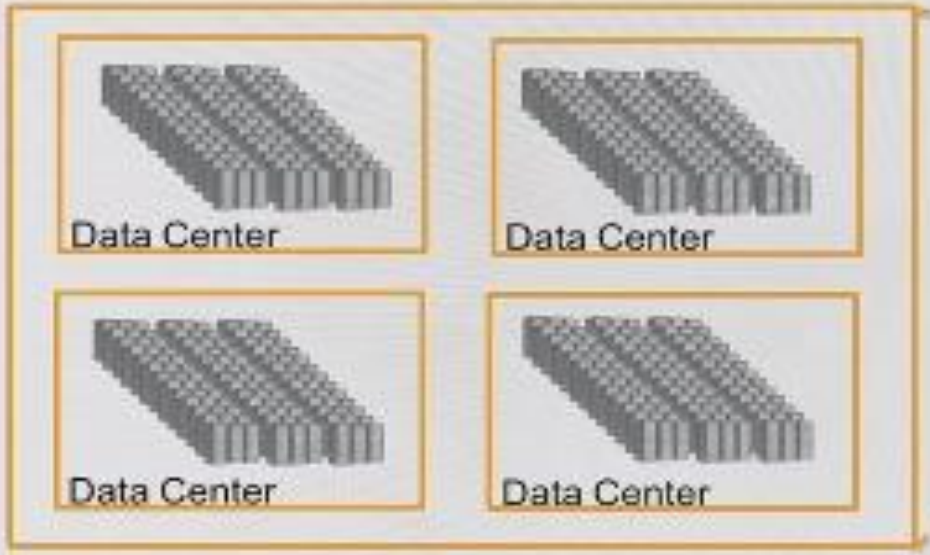
AWS Global Infrastructure Components

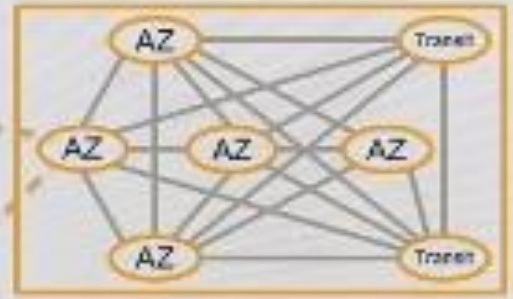
Example AWS Region



- 1 of 11 AWS world-wide AWS regions
- Redundant paths to transit centers
- Transit centers connect to:
  - Private links to other AWS regions
  - Private links to AWS Direct Connect customers
  - Internet through peering & paid transit
- Metro-area DWDM links between AZs
- 82,864 fiber strands in region
- AZs <2ms apart & usually <1ms
- 25Tbps peak inter-AZs traffic

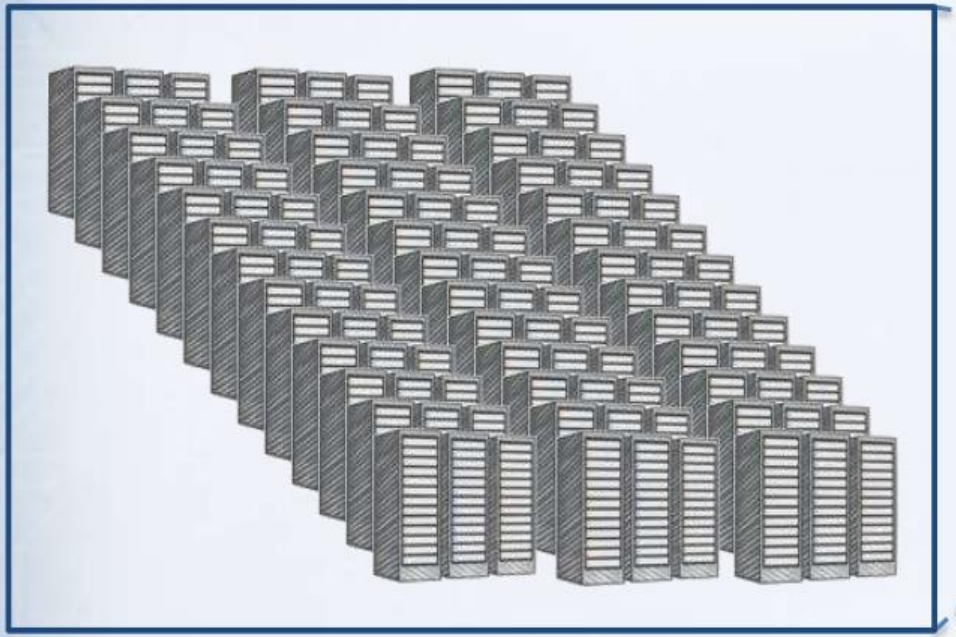
Example AWS Availability Zone

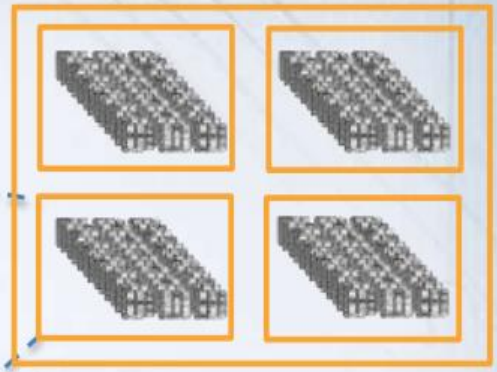




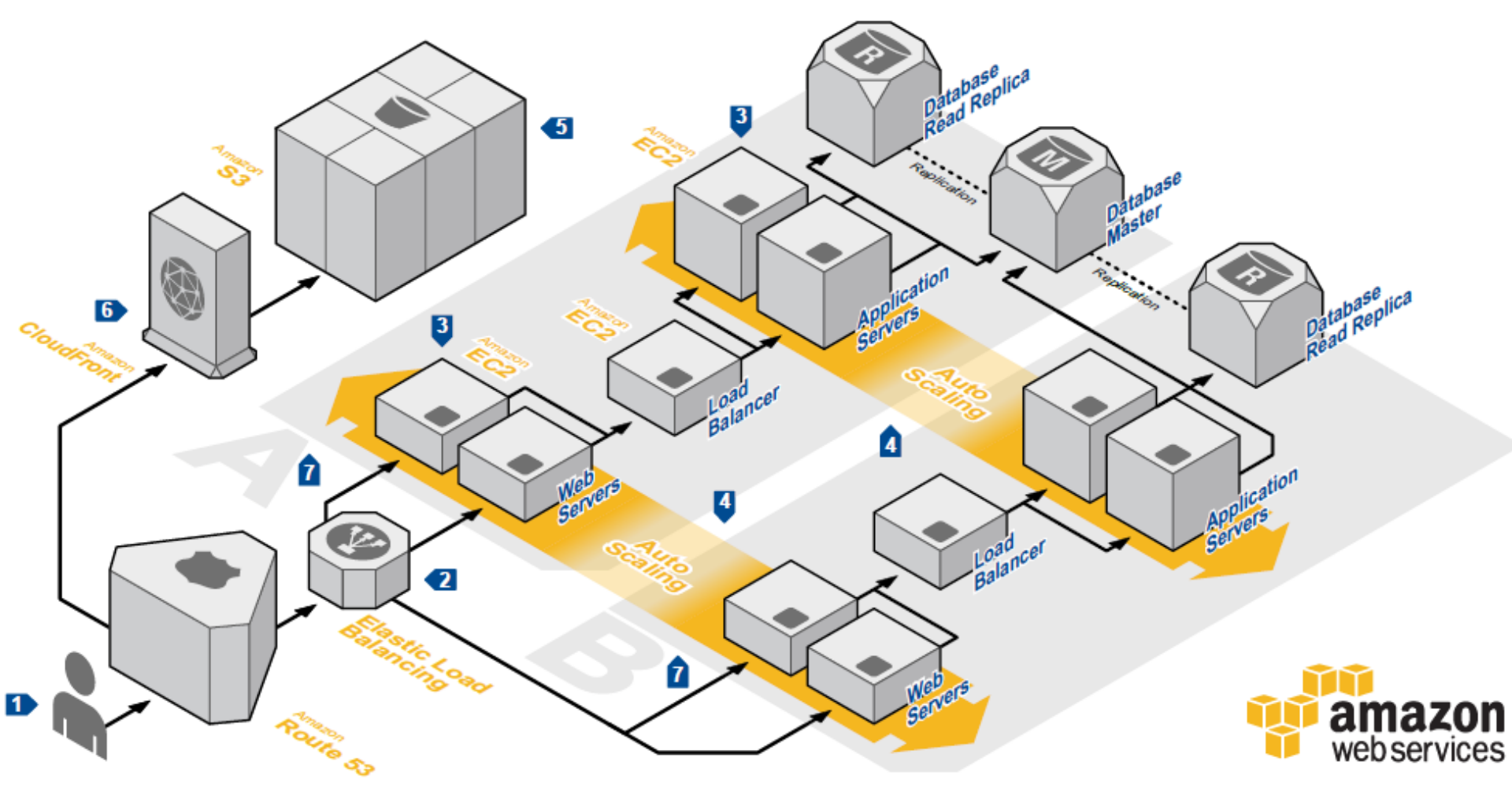
- 1 of 28 AZs world-wide
- All regions have 2 or more AZs
- Each AZ is 1 or more DC
  - No data center is in two AZs
  - Some AZs have as many as 6 DCs
- DCs in AZ less than ¼ ms apart
  - Don't need inter-AZ independence
  - Do require low latency & full B/W

Example AWS data center





- Single data center typically more than 50,000 servers and often more than 80,000
  - Larger data centers undesirable (blast radius)
- Up to 102 Tbps provisioned to a single data center
- AWS custom network equipment:
  - Multi-ODM sourced
  - Amazon custom network protocol stack


Amazon S3
Amazon CloudFront
Amazon EC2
Database Read Replica
Replication
Database Master
Replication
Database Read Replica
Application Servers
Auto Scaling
Load Balancer
Web Servers
Auto Scaling
Load Balancer
Application Servers
Web Servers
Elastic Load Balancing
Amazon Route 53
1
2
3
4
5
6
7
amazon web services

AWS SERVICES

AWS Identity and Access Management (IAM)

- Manage IAM Users and their access
- Manage IAM Roles and their permissions
- Manage federated users and their permissions

A **policy** is an object in AWS that, when associated with an identity or resource, defines their permissions.

Permissions in the policies determine whether the request is allowed or denied.

Most policies are stored in AWS as JSON documents.

IAM policies define permissions for an action regardless of the method that you use to perform the operation

Amazon Elastic Compute Cloud

- Amazon EC2 = Virtual Machine
- Amazon EC2: on-demand compute power
  - Obtain and boot new server instances in minutes
  - Quickly scale capacity up or down
  - Servers from $0.02 (2 cents) per hour
  - On Demand, Reserved, and Spot Pricing
- Key features:
  - Support for Windows, Linux, FreeBSD, and OpenSolaris
  - Supports all major web and application platforms
  - Deploy across Availability Zones for reliability
  - monitors status and usage

amazon web services

Amazon Simple Storage Service (S3)

- In traditional on-premise applications, this type of data would ordinarily be maintained on **SAN** or **NAS**. However, a cloud-based mechanism such as Amazon S3 is far more agile, flexible, and geo-redundant.
- Amazon S3 is a highly scalable, durable and available distributed object store designed for mission-critical and primary data storage with an easy to use web service interface.

Amazon Elastic Block Store (EBS)

- You can use Amazon EBS as you would use a hard drive on a physical server.
- Amazon EBS is particularly well-suited for use as the primary storage for a file system, database or for any applications that require fine granular updates and access to raw, unformatted block-level storage.

Amazon Route 53 provides users with domain management service where users can buy new domains, transfer existing domains and manage queries for the domains they own.

DNS Management

If you already have a domain name, such as example.com, Route 53 can tell the Domain Name System (DNS) where to find web servers, mail servers, and other resources for your domain.
Learn More

Get Started Now

Health Check

Route 53 can monitor the health and performance of your application as well as your web servers and other resources. Route 53 can also redirect traffic to resources where your application is healthy.
Learn More

Get Started Now

Domain Registration

If you need a domain name, you can find an available name and buy it using Route 53. You can also make Route 53 the registrar for existing domains that you bought from other registrars.
Learn More

Get Started Now

Route53 Documentation

Getting Started Guide | Route 53 Documentation

Amazon VPC

Find out more: https://aws.amazon.com/ru/vpc/

AWSOME DAY
ONLINE CONFERENCE

- Private, virtual network in the AWS Cloud
- Similar constructs as on-premises network
  - You choose your own subnet
- Customizable network configurations to meet your needs
  - Its possible to have public and private subnets
  - Control traffic between subnets with NACLs

Amazon VPC

Amazon EC2 Elastic GPUs

Elastic graphics processors in Amazon EC2 make it easy to connect low-cost graphics acceleration to a wide range of EC2 instances on the network. Simply select instances with the required computing power, memory, and storage settings for the program, then use flexible GPUs to add resources to speed up the application's graphics performance, and pay several times less than for special graphics instances.

Elastic GPUs in Amazon EC2 make it easy to connect GPUs to existing Amazon EC2 instance types, just as Amazon EBS volumes are added to them. With flexible GPUs, you can adjust the amount of graphics acceleration required for individual workloads without the restrictions associated with fixed hardware configurations and the limited choice of GPUs. Flexible GPUs support the OpenGL 4.3 standard and offer up to 8 GiB of video memory, making them great for any workload that requires a small amount of graphics acceleration, such as virtual desktops, games, industrial design and high-performance computing visualization.

Amazon Relational Database Service (RDS)

Amazon Relational Database Service (Amazon RDS) allows you to easily configure, use, and scale relational databases in the cloud. The service provides economical and scalable use of resources while automating time-consuming administration tasks, such as hardware allocation, database setup, patch installation, and backup. This allows you to focus on applications to provide them with high performance, high availability, security and compatibility.

Amazon RDS is available as a database instance of several types: optimized for memory, high performance, or I / O - and offers a choice of six well-known database cores, including Amazon Aurora, PostgreSQL, MySQL, MariaDB , Oracle and Microsoft SQL Server. You can use the AWS Database Migration Service to simply migrate or replicate an existing database to Amazon RDS.

AWS Lambda

- AWS Lambda allows you to run program codes without selecting and managing servers. You only pay for the actual calculation time. If the program code is not executed, payment is not required.

- With Lambda you can run almost any type of application and server services, without the need for any administration operations. Just download the code, and Lambda will provide all the resources you need to run, scale, and make it highly accessible. You can configure the program to run automatically from other AWS services or directly from any mobile or web application.

North Virginia

$0.20 PER 1M REQUESTS

$0.00001667 FOR EVERY GB-SECOND

Приклад використання AWS Lambda

You can configure data processing in AWS Lambda immediately after downloading it to Amazon S3. For example, in Lambda you can create image thumbnails, change video encoding, index files, process logs, check content, and aggregate and filter data - all in real time.

Serverless

Find out more: https://aws.amazon.com/serverless/

AWSOME DAY
ONLINE CONFERENCE

Languages

node JS python Java .NET Core GO

+ +

Lambda support for Ruby

Custom Runtimes

Bring any Linux compatible language runtime

- Bring any Linux compatible language runtime;
- Powered by new Runtime API - Codifies the runtime calling conventions and integration points
- Same technology powering Ruby support in AWS Lambda

AWS OPEN SOURCE

PARTNER SUPPORTED

ERLANG

COBOL offered by AWS

N Solid offered by

elixir offered ALERT LOGIC

php offered STACKERY

What is Snowball? Petabyte scale data transport

Ruggedized
case
“8.5G Impact”

50 TB
10GE network

E-ink shipping
label

Rain & dust
resistant

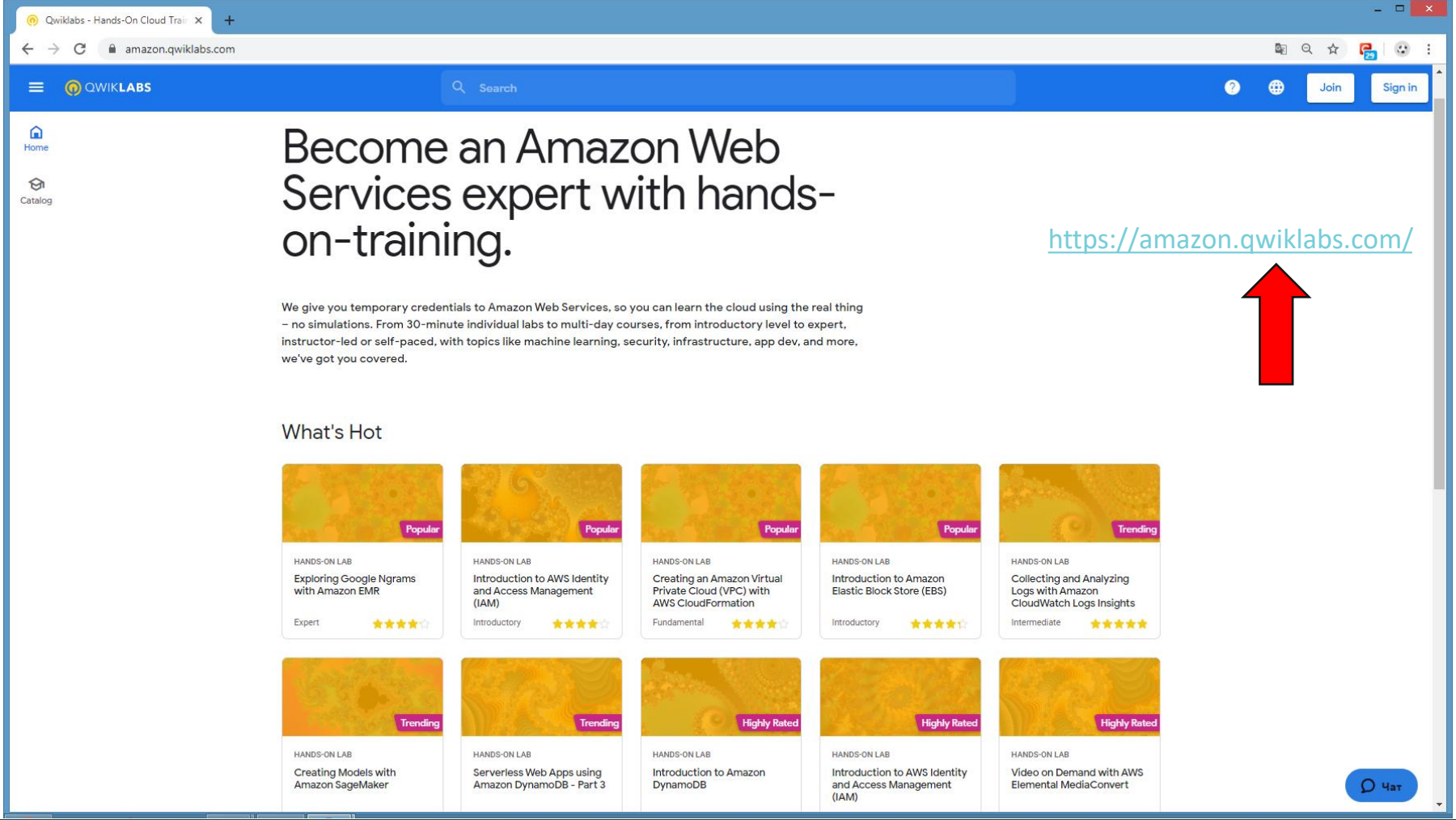
Tamper-resistant
case & electronics

All data encrypted
end-to-end

How fast is Snowball?

- Less than 1 day to transfer 250TB via 5x10G connections with 5 Snowballs, less than 1 week including shipping
- Number of days to transfer 250TB via the Internet at typical utilizations

	Internet Connection Speed			
Utilization	1Gbps	500Mbps	300Mbps	150Mbps
25%	95	190	316	632
50%	47	95	158	316
75%	32	63	105	211


Qwiklabs - Hands-On Cloud Trai
amazon.qwiklabs.com
QWIKLABS
Search
Join
Sign in
Home
Catalog
Become an Amazon Web Services expert with hands-on-training.
https://amazon.qwiklabs.com/
We give you temporary credentials to Amazon Web Services, so you can learn the cloud using the real thing – no simulations. From 30-minute individual labs to multi-day courses, from introductory level to expert, instructor-led or self-paced, with topics like machine learning, security, infrastructure, app dev, and more, we've got you covered.
What's Hot
Popular
HANDS-ON LAB
Exploring Google Ngrams with Amazon EMR
Expert
Popular
HANDS-ON LAB
Introduction to AWS Identity and Access Management (IAM)
Introductory
Popular
HANDS-ON LAB
Creating an Amazon Virtual Private Cloud (VPC) with AWS CloudFormation
Fundamental
Popular
HANDS-ON LAB
Introduction to Amazon Elastic Block Store (EBS)
Introductory
Trending
HANDS-ON LAB
Collecting and Analyzing Logs with Amazon CloudWatch Logs Insights
Intermediate
Trending
HANDS-ON LAB
Creating Models with Amazon SageMaker
Trending
HANDS-ON LAB
Serverless Web Apps using Amazon DynamoDB - Part 3
Highly Rated
HANDS-ON LAB
Introduction to Amazon DynamoDB
Highly Rated
HANDS-ON LAB
Introduction to AWS Identity and Access Management (IAM)
Highly Rated
HANDS-ON LAB
Video on Demand with AWS Elemental MediaConvert
Чат

Q & A

Thank you!

Если требуется...	Чем управляет клиент	Единица развертывания	Рекомендуем использовать
Запускать любые приложения. Контролировать и управлять функциями уровня сервера или кластера, такими как масштабирование и развертывание.	• Клиент выделяет, масштабирует серверные ресурсы и управляет ими. EC2 предлагает широкий выбор конфигураций инстансов, оптимизированных для каждого примера использования. • Клиент управляет сервером, ОС и программным обеспечением для развертывания (при необходимости). • Имеются гибкие способы оплаты, удовлетворяющие бизнес-потребностям клиентов, в том числе с использованием модели с поддержкой собственных лицензий (BYOL)	Виртуальные машины	Amazon EC2
Запускать простые приложения и веб-сайты на одном или нескольких серверах по предсказуемой низкой цене.	• Клиент создает по шаблону типовой инстанс и развертывает предварительно настроенный виртуальный сервер за считаные секунды. Не нужно беспокоиться о группах безопасности или других настройках. • Клиент управляет сервером, ОС и другим программным обеспечением через интуитивно понятную консоль Lightsail. При этом он получает меньше возможностей контроля и вариантов настройки, чем при использовании EC2. • Клиент ежемесячно вносит фиксированную прогнозируемую плату в соответствии с тарифным планом. Стоимость начинается с 5 USD.	Виртуальный частный сервер (инстанс)	Amazon Lightsail
Запуск приложений, упакованных в контейнеры Docker, без сохранения состояния или с фиксацией состояния	• Клиент выделяет и масштабирует ресурсы сервера и управляет его загрузкой и доступностью. • AWS управляет отказоустойчивостью приложения. • AWS управляет состоянием кластера и развертыванием контейнера.	Контейнеры	Amazon ECS
Запускать инициируемые событиями приложения без сохранения состояния, требующие быстрого времени отклика	• AWS выделяет и масштабирует ресурсы сервера и управляет его загрузкой. • AWS управляет доступностью и отказоустойчивостью приложения.	Код	AWS Lambda