



RAJKIYA ENGINEERING COLLEGE

BANDA



Internship on Cloud Computing INFORMATION TECHNOLOGY

2021-2022 (15/09/2021 - 14/10/2021)

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Submitted To –
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(ASSISTANT PROFESSOR
REC BANDA)

Abstract

Problem

- As we all know that to setup a good hardware is very expensive and also we need a place to setup and good engineers to access the hardware. For a small as well as a big company this is very tremendous task.
- Nowadays, there a lot of user access the websites/apps at same time due to this huge amount users websites/apps get crashed and unable to give the access to all the users.

Solution

- We can use cloud technologies to solve these type of problems.
- Cloud is virtual server which provide a platform to perform our computations according to our need. It is available in very affordable price compare to physical servers.

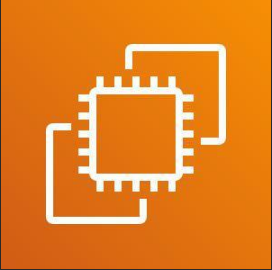
Used tools

- Amazon Web Services
- Windows 10
- Linux
- HTML, CSS, JAVASCRIPT
- MariaDB

TOPIC

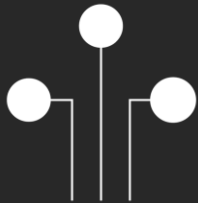
1. VIRTUAL MACHINES VS PHYSICAL SERVERS
2. AMAZON VIRTUAL PRIVATE CLOUD(AMAZON VPC)
3. SHARED RESPONSIBILITY MODEL
4. WHAT IS SERVERLESS COMPUTING
5. SERVERLESS APPLICATION USE CASES
6. AMAZON ELASTIC COMPUTE CLOUD(AMAZON EC2)
7. BENEFITS OF EC2
8. AMAZON EC2 PRICING
9. ELASTIC LOAD BALANCING(ELB)
10. AWS LAMBDA
11. AMAZON S3
12. CHOOSING A REGION
13. AMAZON S3 GLACIER
14. AMAZON ELASTIC BLOCK STORE(AMAZON EBS)
15. AWS IDENTITY AND ACCESS MANAGEMENT(IAM)
16. AMAZON S3 ACCESS CONTROL : GENERAL
17. AWS DATABASE OPTIONS

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

Creating virtual server in Linux

Creating virtual server in Windows

```
root@ip-172-31-23-235:/var/www/html
102 ls
103 cd /var/www/html
104 cat>index.html
105 ls
106 service httpd start
107 ls
108 mv index.html ashwani.html
109 ls
110 history
[root@ip-172-31-23-235 html]# ls
ashwani.html
[root@ip-172-31-23-235 html]#
[root@ip-172-31-23-235 html]#
[root@ip-172-31-23-235 html]# ls
ashwani.html
[root@ip-172-31-23-235 html]# vi /etc/httpd/conf/httpd.conf
[root@ip-172-31-23-235 html]# service httpd restart
Redirecting to /bin/systemctl restart httpd.service
[root@ip-172-31-23-235 html]# ls
ashwani.html
[root@ip-172-31-23-235 html]# cat>aman.html
this is my Second Web Site
[root@ip-172-31-23-235 html]# cat>cloud.html
this is my Third Web Site
[root@ip-172-31-23-235 html]# ls
aman.html ashwani.html cloud.html
[root@ip-172-31-23-235 html]# service httpd restart
Redirecting to /bin/systemctl restart httpd.service
[root@ip-172-31-23-235 html]#
```

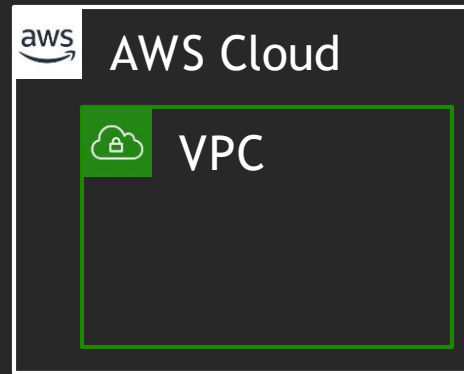
Windows Desktop Environment:

- Taskbar: Type here to search, Task View, Edge, File Explorer, Firefox, Chrome, VLC, and a folder icon.
- Desktop Icons: Recycle Bin, EC2 feedback, EC2 Microsoft...
- Browser Window: ec2-3-0-85-240.ap-southeast-1.compute.amazonaws.com

Amazon Virtual Private Cloud (Amazon VPC)



Amazon
VPC



Your private
network space in
the AWS Cloud

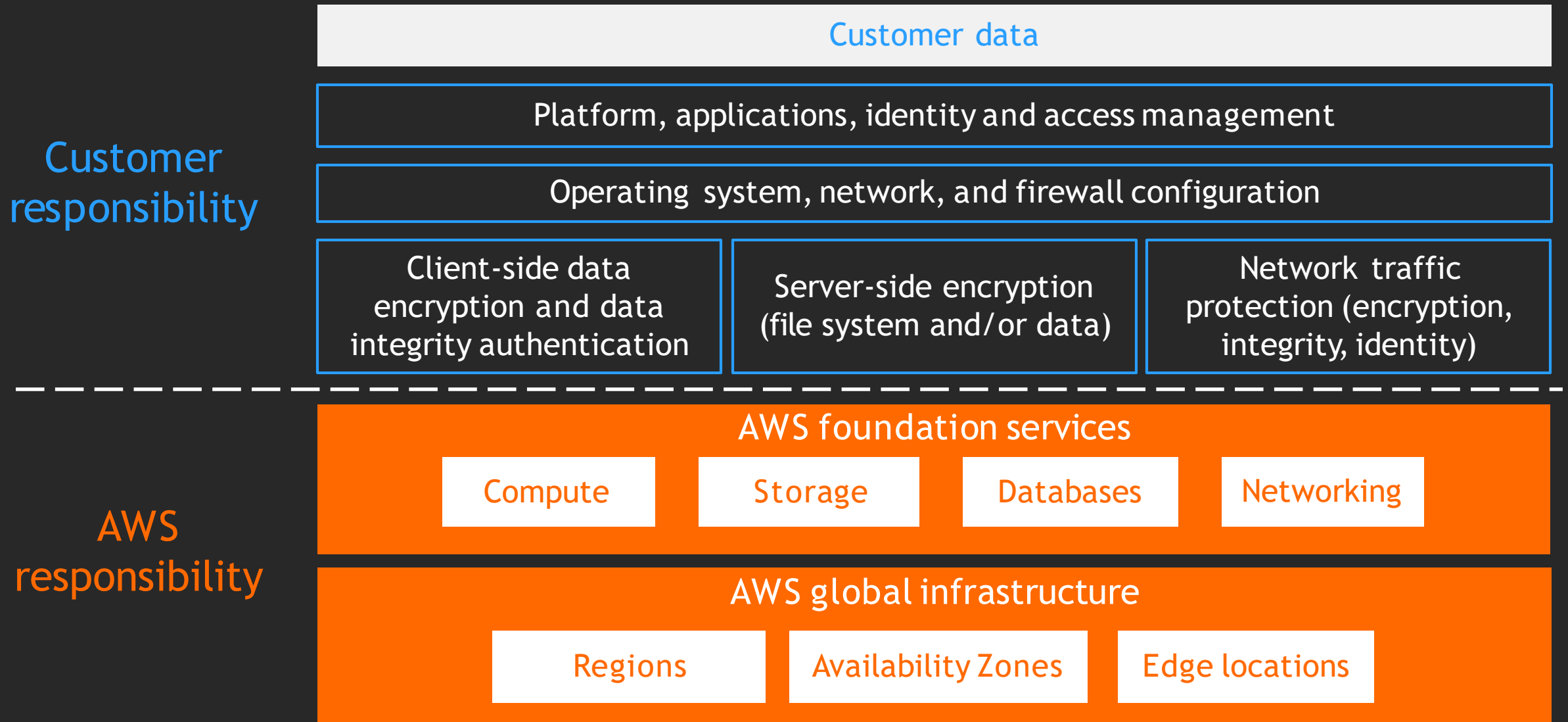


Provides logical
isolation for
your workloads



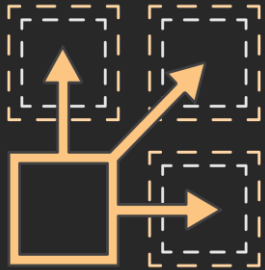
Allows custom access
controls and security
settings for your resources

Shared responsibility model

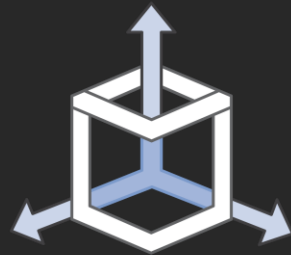


What is serverless computing?

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

Serverless application use cases



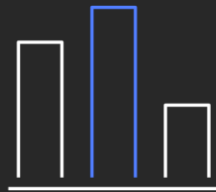
Web applications

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

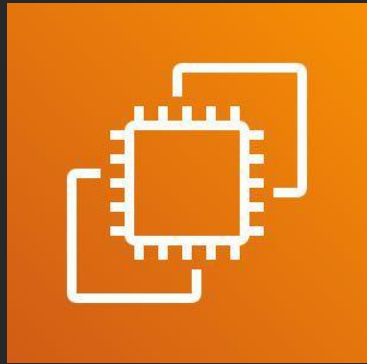
Powering voice-enabled applications
Alexa Skills Kit



IT automation

Policy engines
Extending AWS services
Infrastructure management

Amazon Elastic Compute Cloud (Amazon EC2)



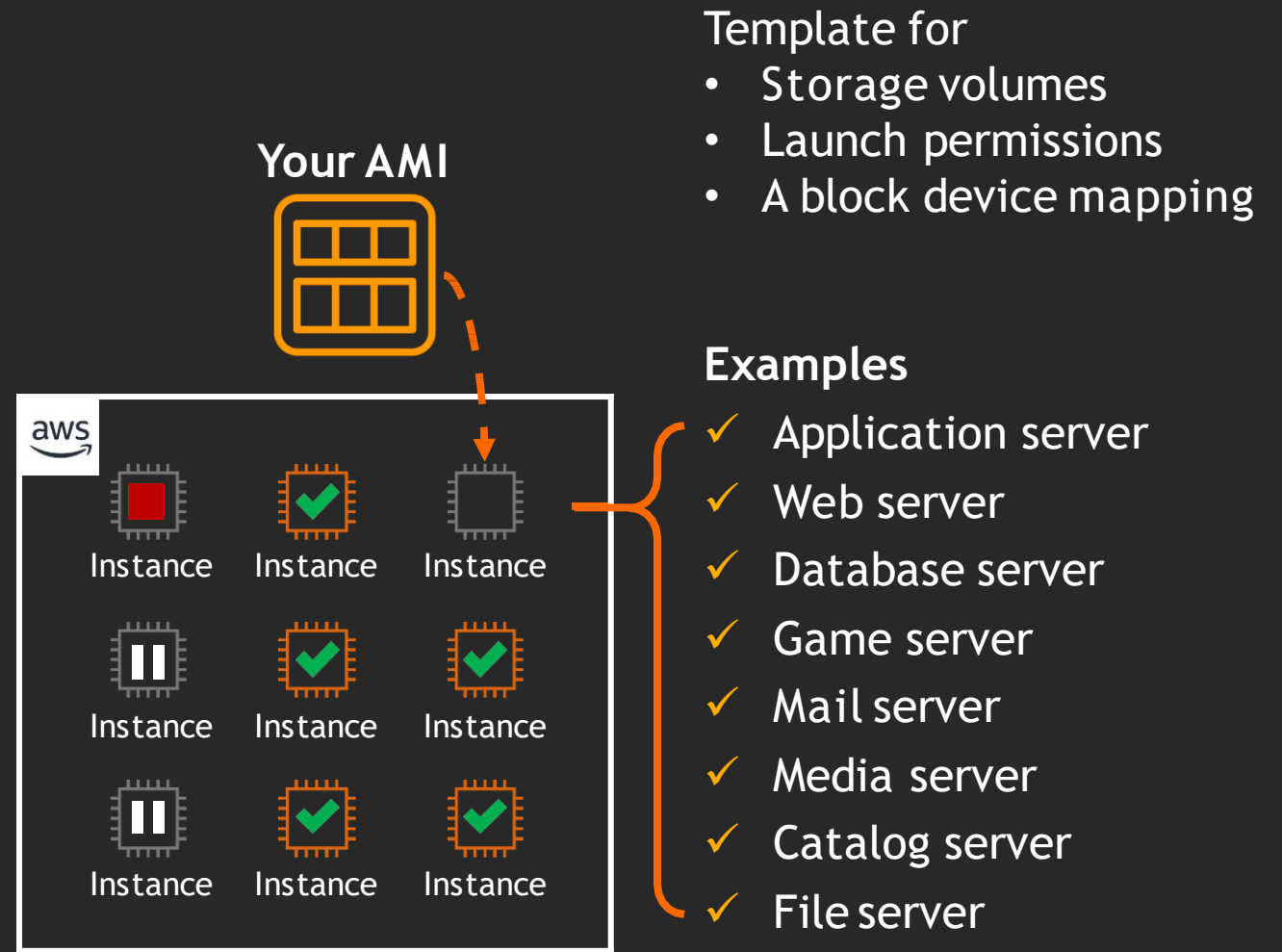
Amazon
EC2

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

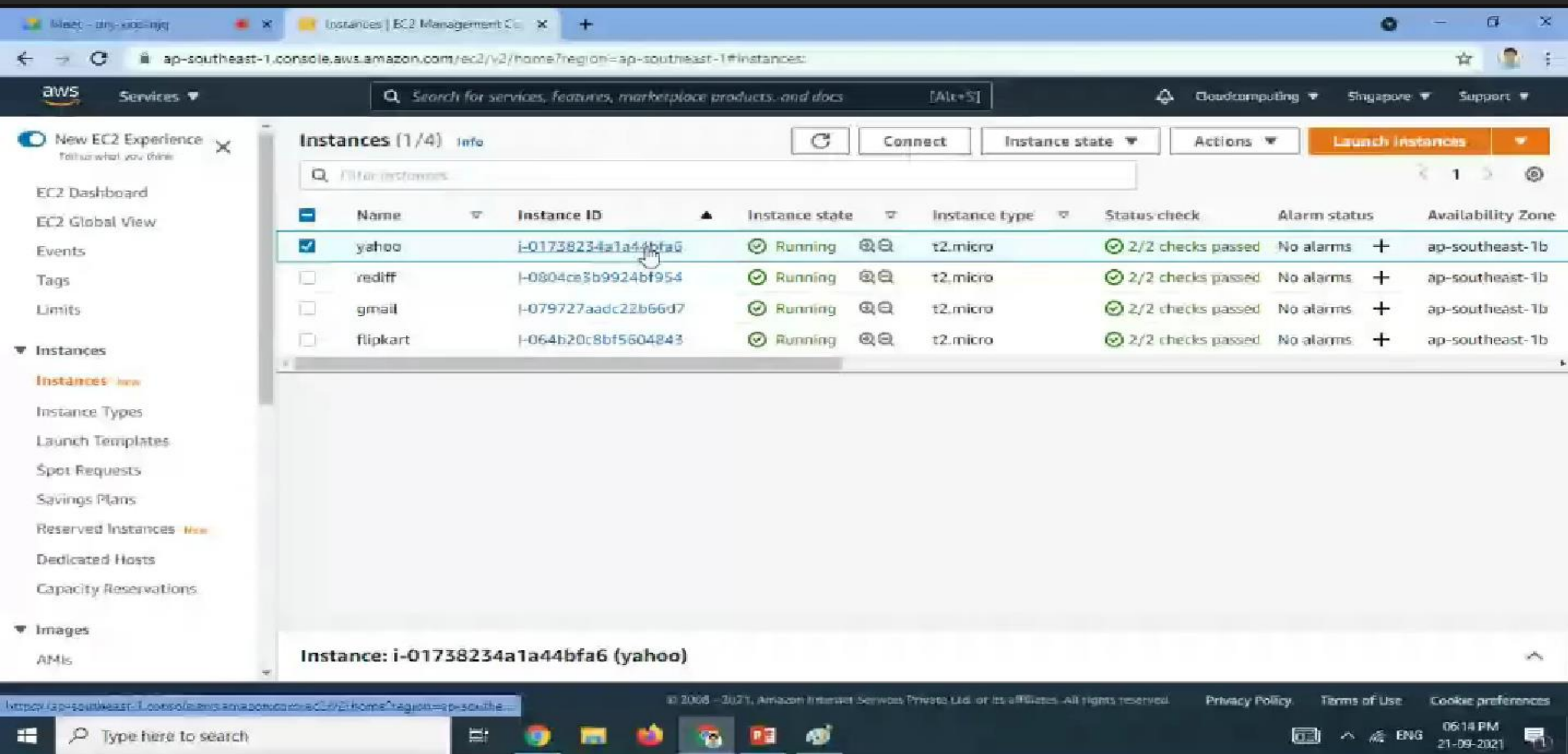
Amazon EC2

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



Creating different instances



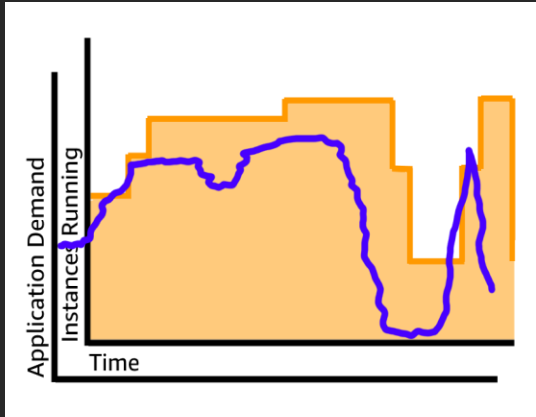
The screenshot displays the AWS Management Console interface for the 'Instances' page in the 'ap-southeast-1' region. The left sidebar shows navigation options like 'EC2 Dashboard', 'Events', 'Tags', 'Limits', and 'Instances'. The main content area shows a table of four running EC2 instances, all of type 't2.micro' and in the 'ap-southeast-1b' availability zone. The instances are named 'yahoo', 'rediff', 'gmail', and 'flipkart'. The 'yahoo' instance is selected, and its details are shown at the bottom of the console.

Instances (1/4)

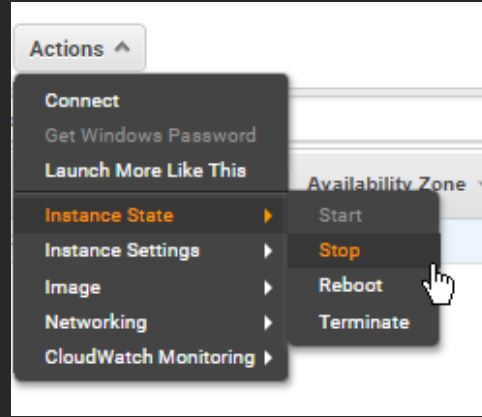
	Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone
<input checked="" type="checkbox"/>	yahoo	i-01738234a1a44bfa6	Running	t2.micro	2/2 checks passed	No alarms	ap-southeast-1b
<input type="checkbox"/>	rediff	i-0804ce3b9924bf954	Running	t2.micro	2/2 checks passed	No alarms	ap-southeast-1b
<input type="checkbox"/>	gmail	i-079727aad22b66d7	Running	t2.micro	2/2 checks passed	No alarms	ap-southeast-1b
<input type="checkbox"/>	flipkart	i-064b20c8bf5604843	Running	t2.micro	2/2 checks passed	No alarms	ap-southeast-1b

Instance: i-01738234a1a44bfa6 (yahoo)

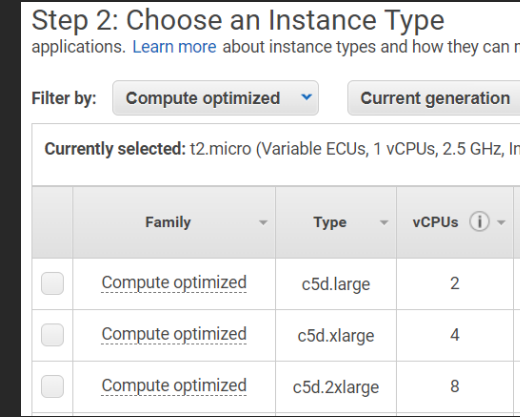
Benefits of Amazon EC2



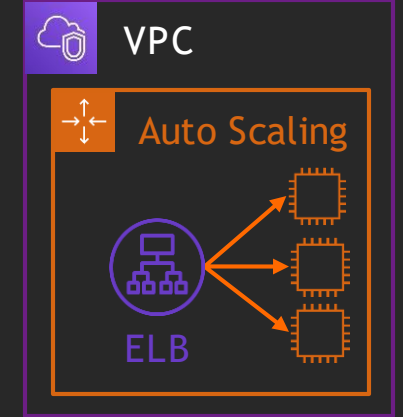
Elasticity



Control



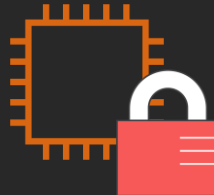
Flexibility



Integrated



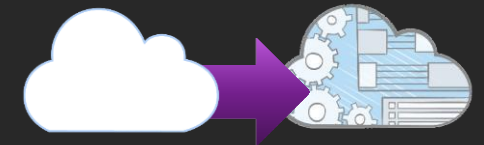
Reliable



Secure



Inexpensive



Easy

Choosing instances according our need

Meet - dnj-xioz-njq x Launch instance wizard | EC2 Ma x What Is My IP Address - See You x +

← → ↺ ap-southeast-1.console.aws.amazon.com/ec2/v2/home?region=ap-southeast-1#LaunchInstanceWizard: ☆ [Alt+S]

aws Services ▾ Search for services, features, marketplace products, and docs [Alt+S] Cloudcomputing ▾ Singapore ▾ Support ▾

1. Choose AMI 2. Choose Instance Type 3. Configure Instance 4. Add Storage 5. Add Tags 6. Configure Security Group 7. Review

Step 1: Choose an Amazon Machine Image (AMI)

[Cancel and Exit](#)


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

Search by Systems Manager parameter

Quick Start

- My AMIs
- AWS Marketplace
- Community AMIs
- ☐ Free tier only ⓘ



Amazon Linux
Free tier eligible

Amazon Linux 2 AMI (HVM), SSD Volume Type - ami-082105f875acab993 (64-bit x86) / ami-0674db352b457179a (64-bit Arm)

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. This AMI is the successor of the Amazon Linux AMI that is approaching end of life on December 31, 2020 and has been removed from this wizard.

Root device type: ebs Virtualization type: hvm ENA Enabled: Yes

[Select](#)
☒ 64-bit (x86)
☐ 64-bit (Arm)



macOS Big Sur 11.5.2 - ami-0003ceeb534e54a1e

The macOS Big Sur AMI is an EBS-backed, AWS-supported image. This AMI includes the AWS Command Line Interface, Command Line Tools for Xcode, Amazon SSM Agent, and Homebrew. The AWS Homebrew Tap includes the latest versions of multiple AWS packages included in the AMI.

[Select](#)
64-bit (Mac)

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)

We can buy instance type according to our need

2: Choose an Instance Type

Currently selected: t3.micro (- ECUs, 2 vCPUs, 2.5 GHz, -, 1 GiB memory, EBS only)

Family	Type	vCPUs	Memory (GiB)	Instance Storage (GB)	EBS-Optimized Available	Network Performance	IPv6 Support
t2	t2.nano	1	0.5	EBS only	-	Low to Moderate	Yes
t2	t2.micro Free tier eligible	1	1	EBS only	-	Low to Moderate	Yes
t2	t2.small	1	2	EBS only	-	Low to Moderate	Yes
t2	t2.medium	2	4	EBS only	-	Low to Moderate	Yes
t2	t2.large	2	8	EBS only	-	Low to Moderate	Yes
t2	t2.xlarge	4	16	EBS only	-	Moderate	Yes
t2	t2.2xlarge	8	32	EBS only	-	Moderate	Yes

Billing And Cost Management Dashboard

EC2 Elastic Beanstalk S3 DynamoDB AWS Auto Scaling Amazon WorkMail Amazon WorkDocs Route 53

Billing & Cost Management Dashboard



Spend Summary

[Cost Explorer](#)

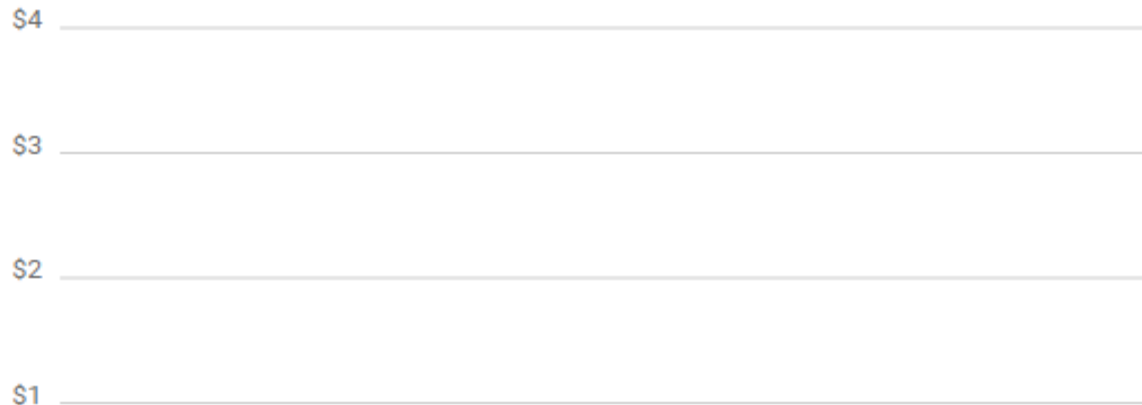
Welcome to the AWS Account Billing console. Your last month and month-to-date costs appear below.

Current month-to-date balance for December 2021, the exchange rate for the Payment Currency is estimated.

0.00 USD which converts to

0.00 INR

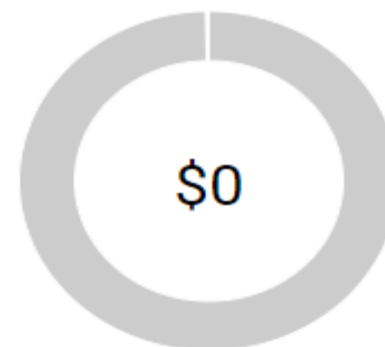
at today's exchange rate of 76.19



Month-to-Date Spend by Service

[Bill Details](#)

The chart below shows the proportion of costs spent for each service you use.



Elastic Load Balancing (ELB)



Elastic Load
Balancing



High
availability



Health
checks



Security
features

A managed load balancing service that distributes incoming application traffic across multiple Amazon EC2 instances, containers, and IP addresses.



User
traffic



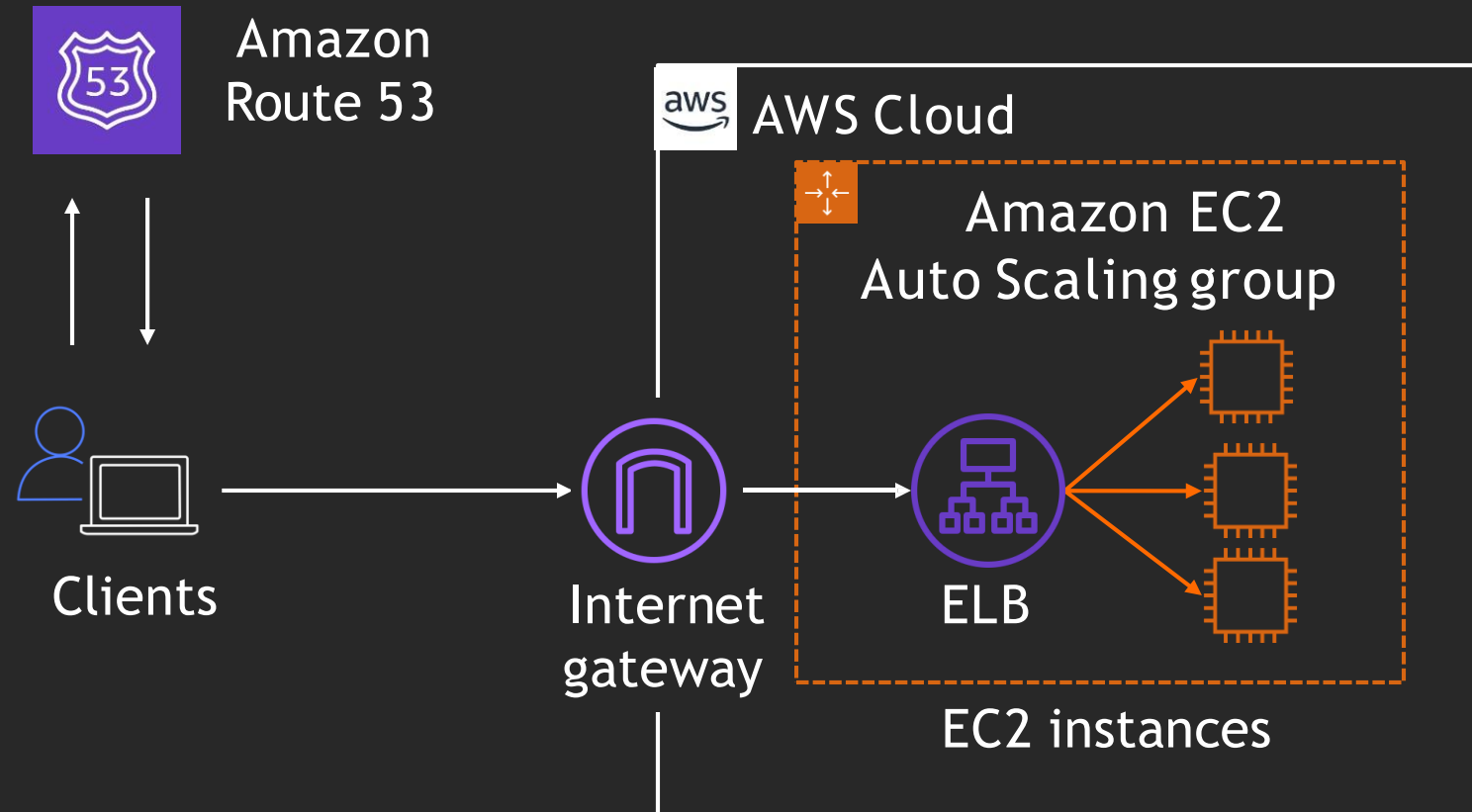
ELB

App

App

App

Putting it all together



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)

Amazon S3



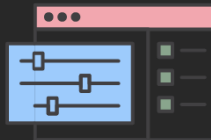
Amazon
S3



Object-level
storage



Designed for
99.999999999%
durability



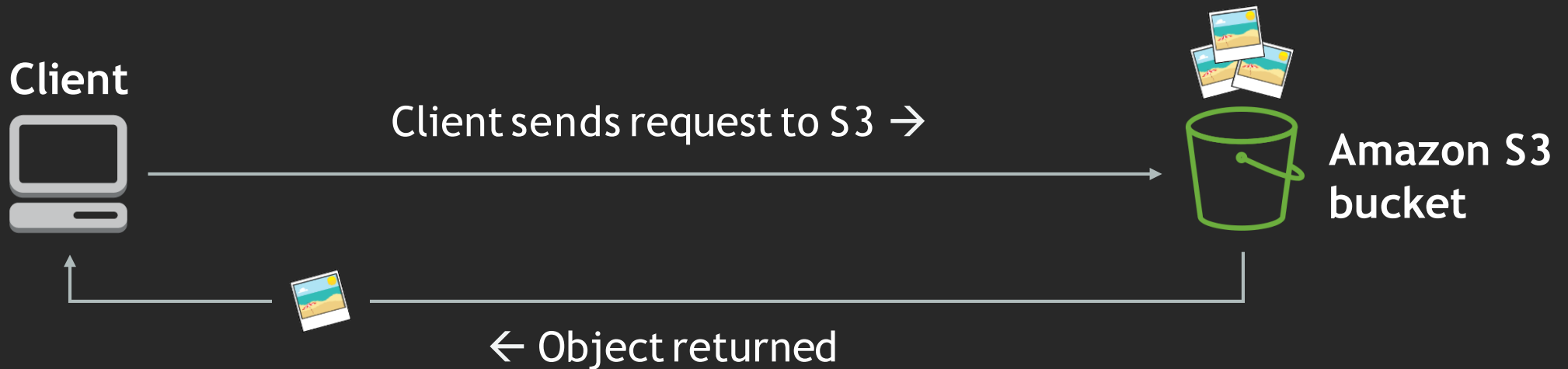
Event triggers

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**



Creating S3 storage

Amazon S3

Buckets

Access Points

Object Lambda Access Points

Multi-Region Access Points

Batch Operations

Access analyzer for S3

Block Public Access settings for this account

Storage Lens

Dashboards

AWS Organizations settings

Feature spotlight 3

Amazon S3

Account snapshot

View Storage Lens dashboard

Buckets (0) Info

Refresh

Copy ARN

Empty

Delete

Create bucket

Buckets are containers for data stored in S3. Learn more

Find buckets by name

< 1 >

Settings

Name	AWS Region	Access	Creation date
No buckets			
You don't have any buckets.			
Create bucket			

Choosing a Region

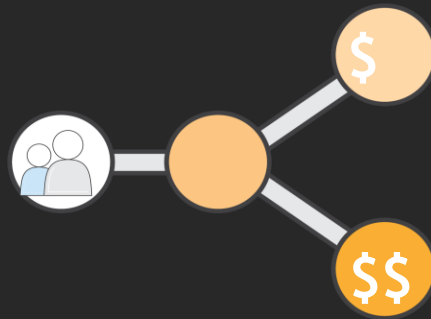
Data residency regulatory compliance



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

Region	Region ID
US East (N. Virginia)	us-east-1
US East (Ohio)	us-east-2
US West (N. California)	us-west-1
US West (Oregon)	us-west-2
Africa (Cape Town)	af-south-1
Asia Pacific (Hong Kong)	ap-east-1
Asia Pacific (Mumbai)	ap-south-1
Asia Pacific (Osaka)	ap-northeast-3
Asia Pacific (Seoul)	ap-northeast-2
Asia Pacific (Singapore)	ap-southeast-1
Asia Pacific (Sydney)	ap-southeast-2
Asia Pacific (Tokyo)	ap-northeast-1

Amazon S3 Glacier



Amazon
S3 Glacier



Long-term
data storage



Archival &
backup



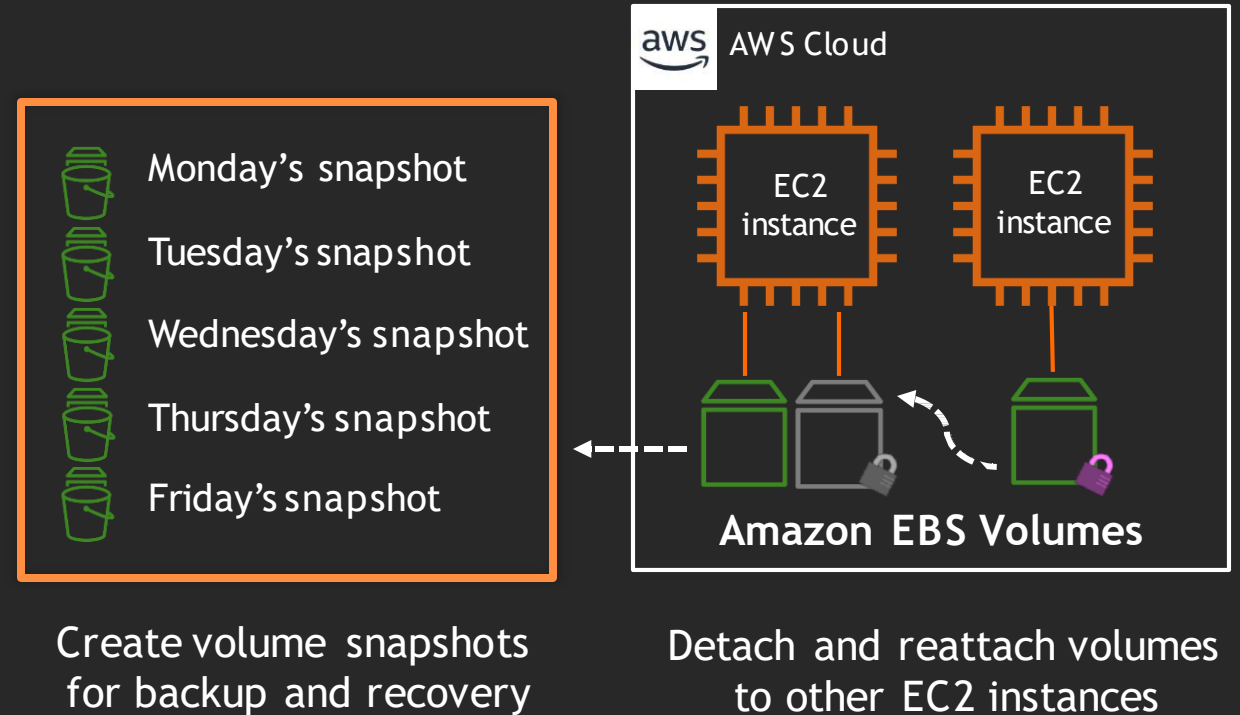
Very low-cost
storage

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



AWS Identity and Access Management (IAM)



IAM

- Securely control access to your AWS resources
- Assign granular permissions to users, groups, or roles
- Share temporary access to your AWS account
- Federate users in your corporate network or with an internet identity provider

IAM components

Create



Users

A person or application that interacts with AWS



Groups

Collection of users with identical permissions

Roles

Temporary privileges that an entity can assume



Permissions

Policies



IAM

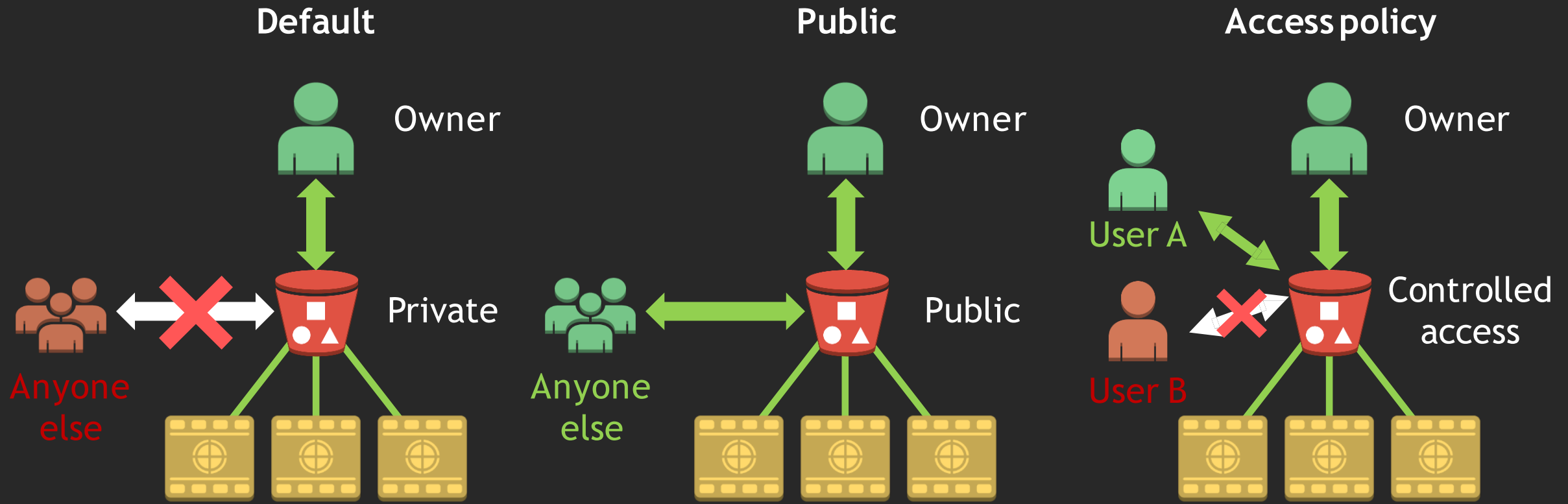
Defines permissions to control which AWS resources users can access

Helps you to meet identity and access control standards

- Authentication
- Authorization

Amazon S3 access control: General

Some services support resource-based policies, such as S3 bucket policies

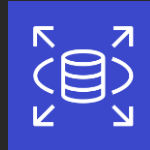


AWS database options

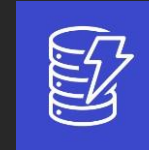
SQL

NoSQL

Transactional
databases

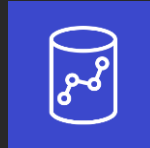


Amazon RDS



Amazon DynamoDB

Data analytics
or relationships



Amazon Redshift



Amazon Neptune

In-memory data
store and cache



Amazon ElastiCache

Creating Database using MariaDB

root@ip-172-31-21-179:/var/www/html

Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A

Database changed

MariaDB [employee]> select * from emp_info;

emp_id	emp_name	emp_username	emp_password	emp_email	emp_phone
1212	advait prakash	advait	qwerty	advait@gmail.com	9999999999
0	Aman Verma	Aman	1234	amanverma3519@gmail.com	6393227209
2323	Munendra Kumar	munendra	Richa@1234	munedrakumar202134@gmail.com	9528245097
64938	Arvind kumar	Verma	2227	arvindkumarverma2289@gmail.com	8795470006
2	Ashwani	Ashwani	123	ash1imaurya@gmail.com	9119943010

5 rows in set (0.000 sec)

MariaDB [employee]> select * from emp_info;

emp_id	emp_name	emp_username	emp_password	emp_email	emp_phone
1212	advait prakash	advait	qwerty	advait@gmail.com	9999999999
0	Aman Verma	Aman	1234	amanverma3519@gmail.com	6393227209
2323	Munendra Kumar	munendra	Richa@1234	munedrakumar202134@gmail.com	9528245097
64938	Arvind kumar	Verma	2227	arvindkumarverma2289@gmail.com	8795470006
2	Ashwani	Ashwani	123	ash1imaurya@gmail.com	9119943010

5 rows in set (0.000 sec)

MariaDB [employee]> _



Thank you!