



Week 2 – 14-May-2022

We will be  
starting at  
8 AM  
GMT





# Agenda

1. Service Models
2. Accessing AWS Services
3. Storage Services
4. Getting Started with AWS
5. Let's hear from SAs (last 30 mins)

Jamila Jamilova

- Using Amazon S3 for IoT

Alex Paramonov

- Amazon S3 – Reference Architectures

# Introduction - Program and Team

- What?
  - [BeSA Website](#) and FAQ page
- Who?
  - Core Team
    - Alex Paramonov, Ashish Prajapati, Christelle Vinot, Jamila Jamilova and Prasad Rao
  - Extended Team
    - Andy Taylor, James Eastham
- Why?
  - We are passionate about mentoring
  - Giving back to community
- When?
  - Every Saturday 10 AM CEST
    - 8 AM GMT / 9 AM UK / 1.30 PM IST
- Where?
  - Live Session – Twitch
  - Recorded Videos – YouTube
  - Resources – BeSA Website
  - Communication – LinkedIn Group
- How?
  - Stage 1 – Technical Track
    - Open to everyone
  - Stage 2 – Behavioural Track
    - Up to 20 people for 1:1 mentoring
- How much?
  - No cost
    - You manage cost of your AWS account if you use it for practice



# Intended Target Audience

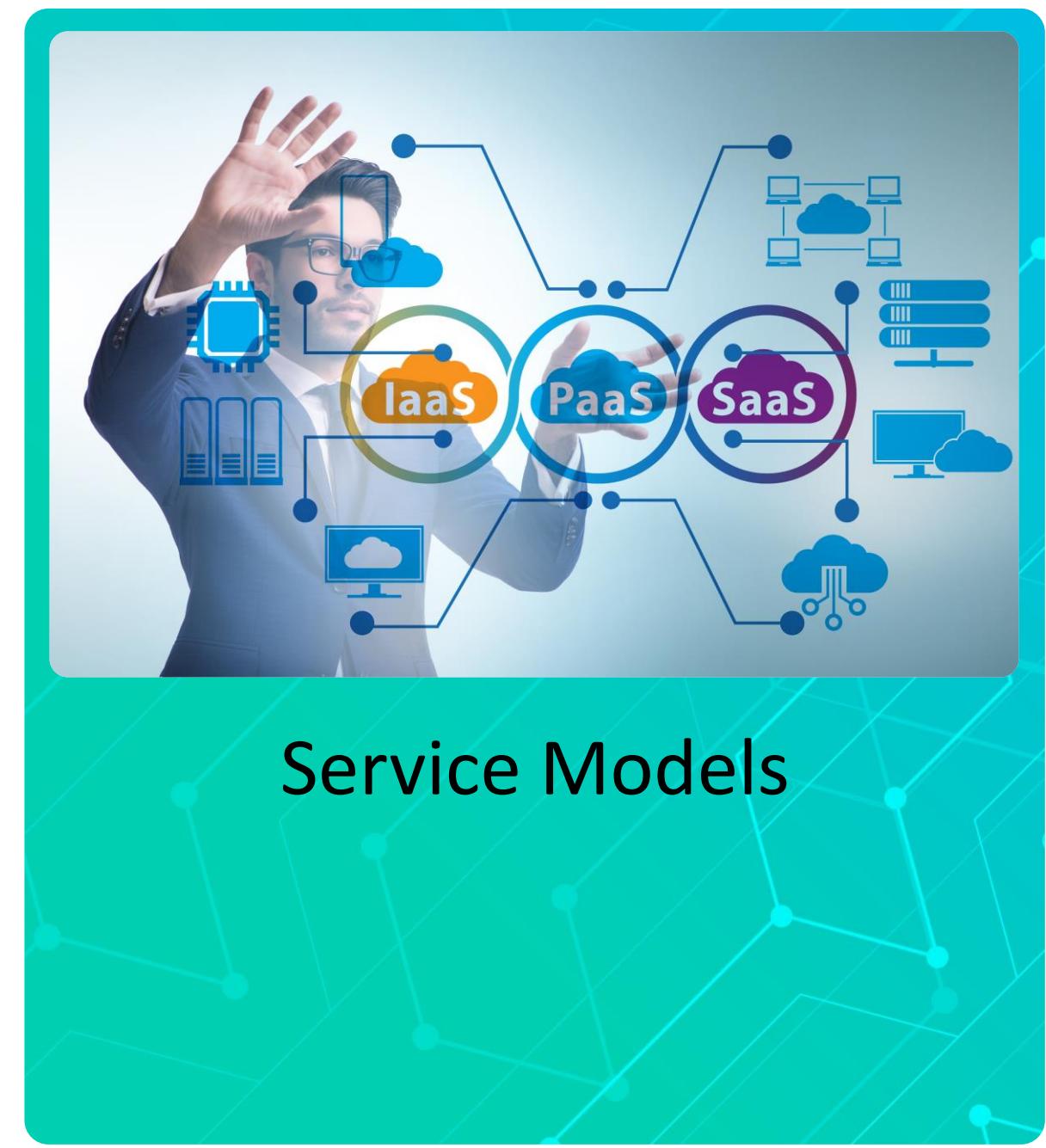


- Focused toward IT professionals who wants to become Solutions Architect
  - Focus on technical and behavioural concepts (Stage 1)
  - Help you upskill for certifications (Stage 1)
  - Provide interview coaching (Stage 2)

## Disclaimers

- This is not a job guarantee program.
- This program is not affiliated with AWS. It is created by volunteers who work at AWS.
- Views shared by us are our own and do not represent our employer.
- In case of any conflicting information always refer to the official AWS Documentation.
- Program is run on best effort basis.





## Service Models

# What is a Service?

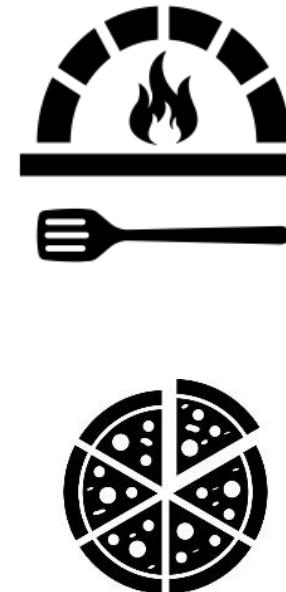
Something that  
helps you to do  
something



# Service Models - Cloud Offering – An Example – Pizza as a Service



Make at home



Take & Bake



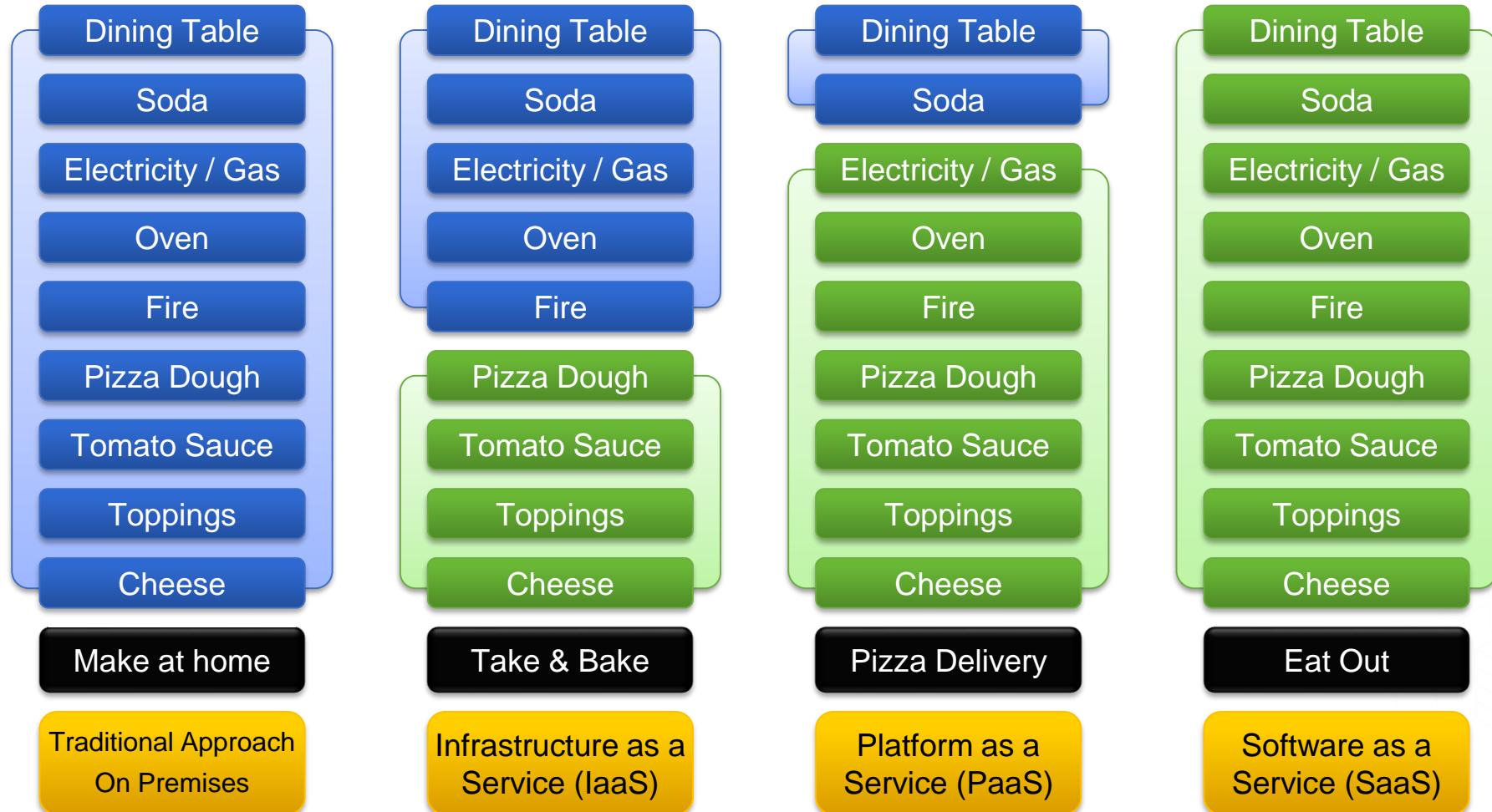
Pizza Delivery



Eat Out

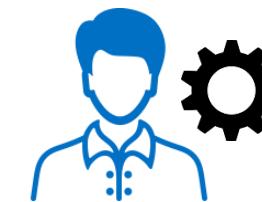
# Service Models - Cloud Offering – An Example – Pizza as a Service

- You Manage
- Vendor Manage

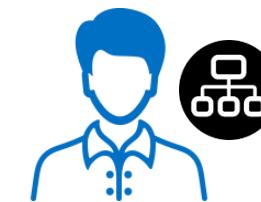


# Service Models - Cloud Offering – IaaS vs PaaS vs SaaS

- You Manage
- Vendor Manage



Administrators



Developers



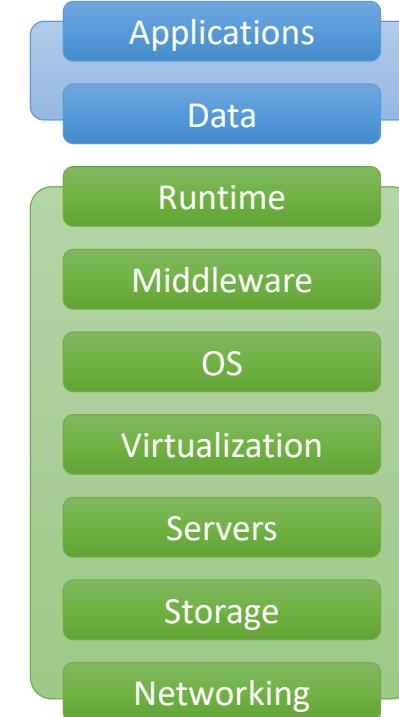
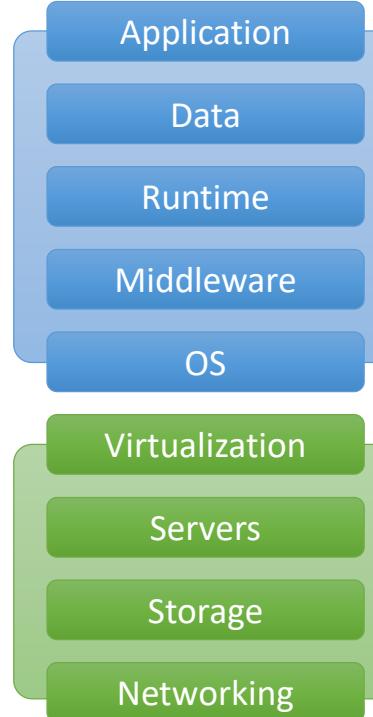
End Users

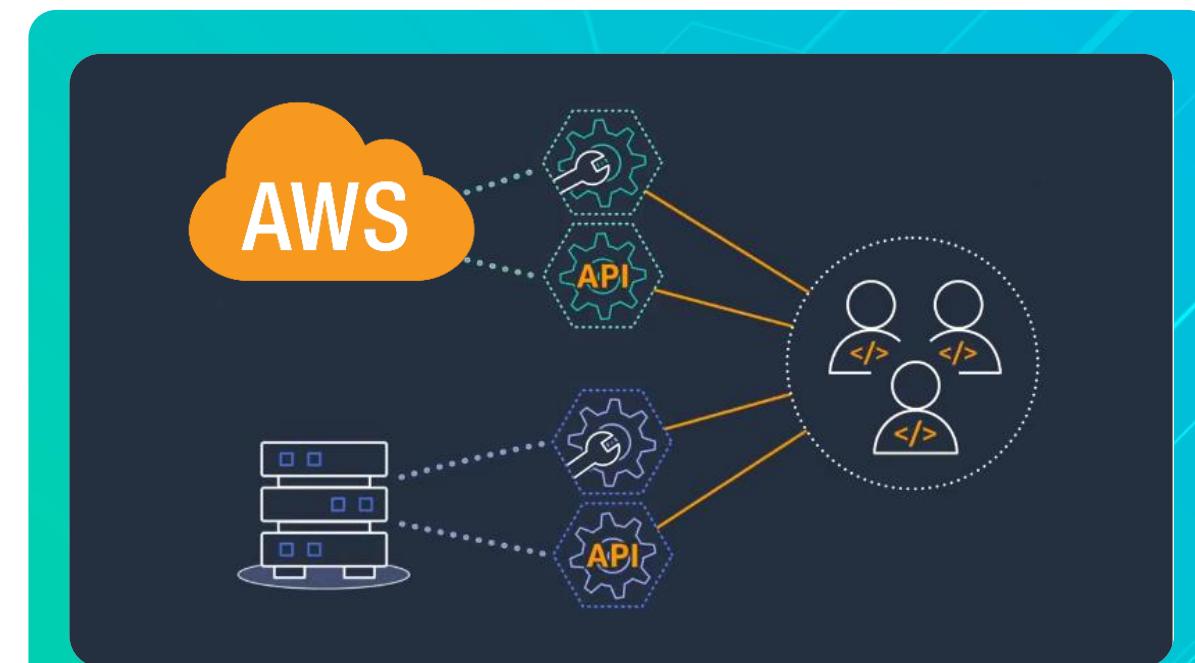
Traditional  
Approach  
On Premises

Infrastructure as a  
Service  
IaaS

Platform as a  
Service  
PaaS

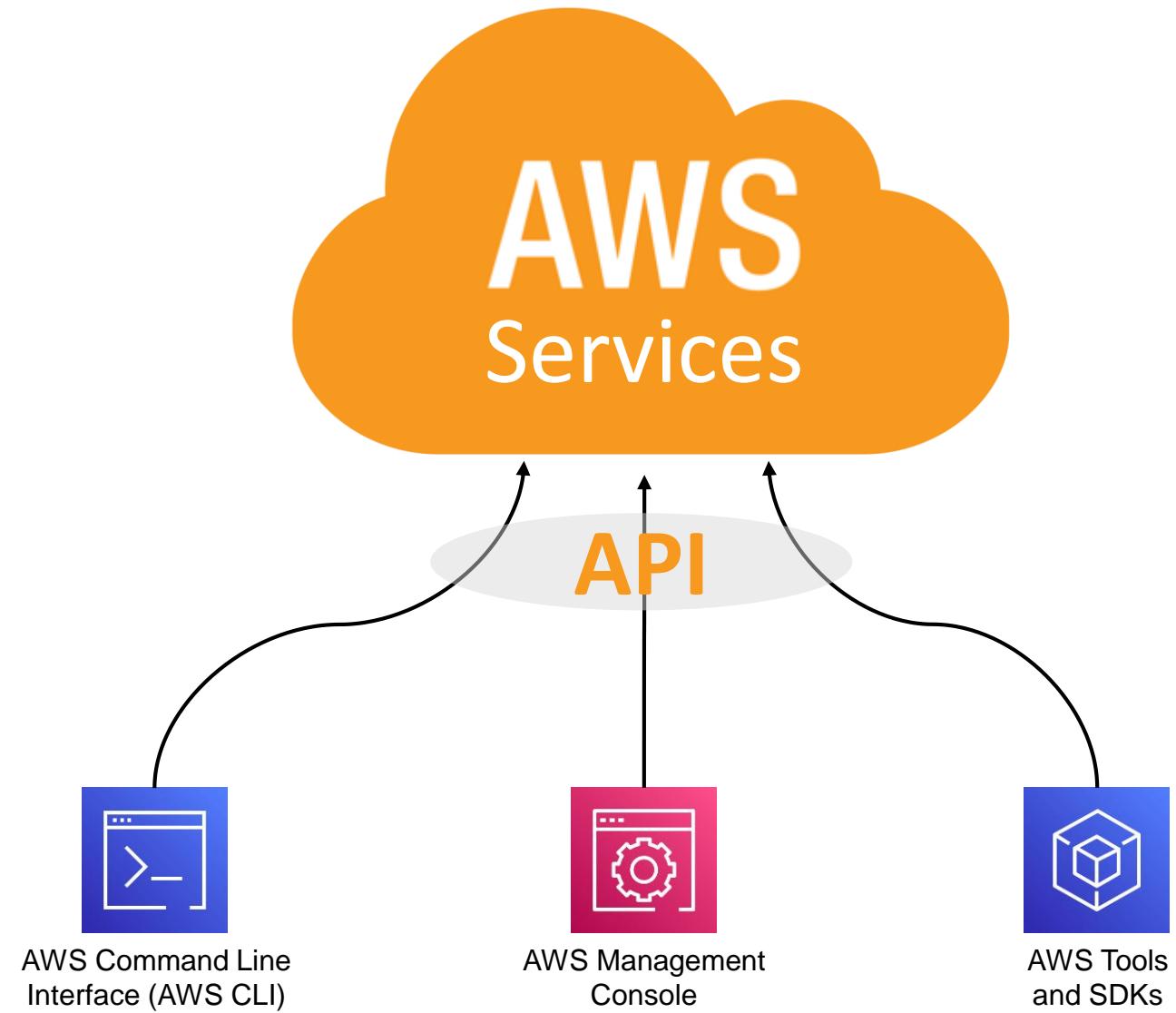
Software as a  
Service  
SaaS





## Accessing AWS Services

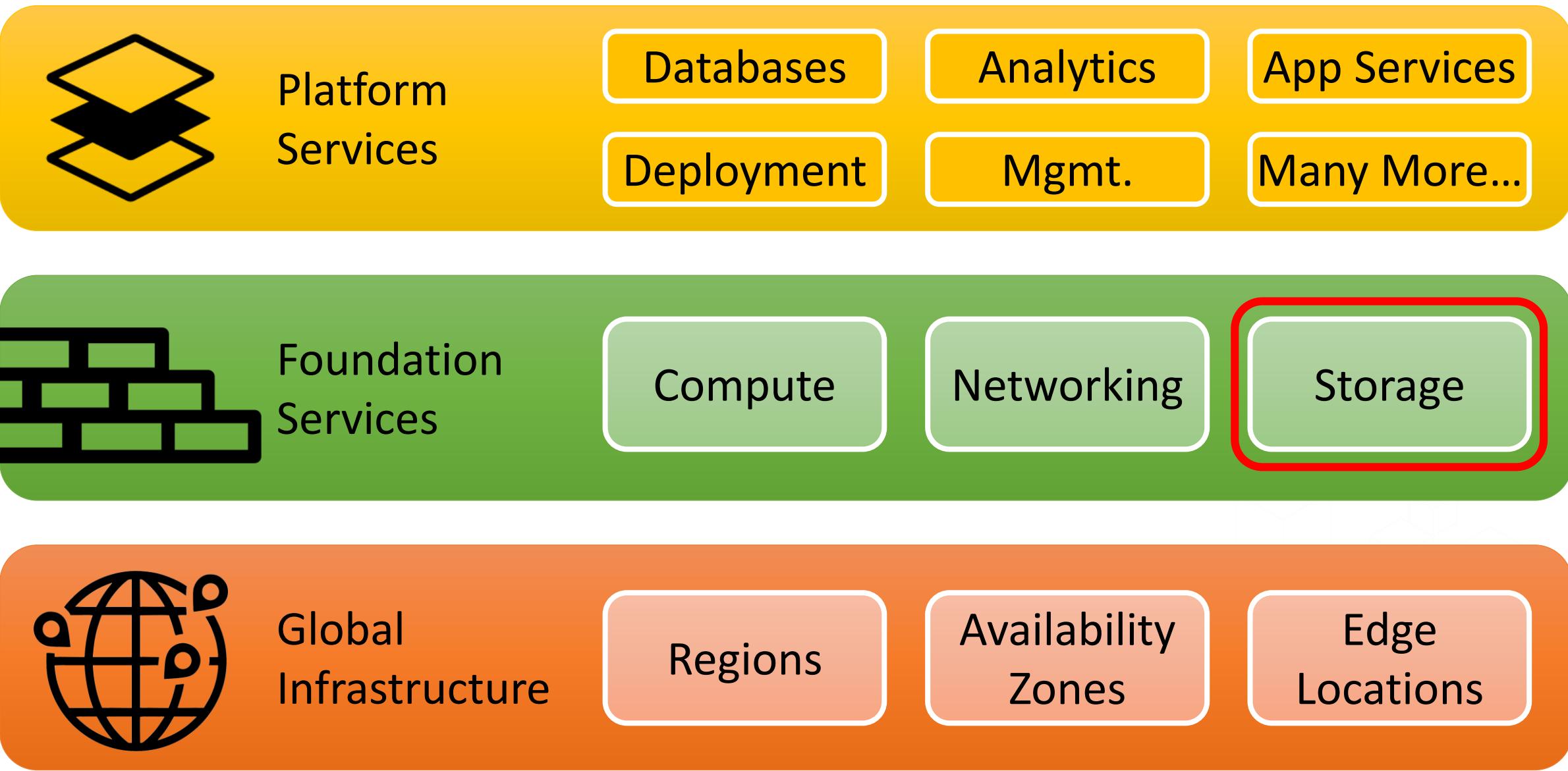
# Accessing AWS Services





## AWS Global Infrastructure

# AWS Services Stack





Become a Solutions Architect



Amazon Simple  
Storage Service (S3)

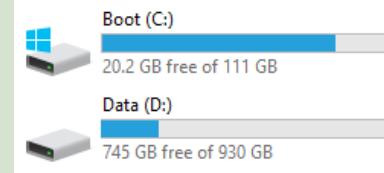
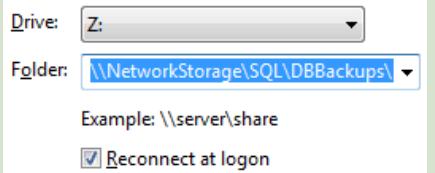
# Storage in AWS Cloud



# Storage Types

Block Storage	File Storage	Object Storage
<p>A Piece of Land</p> <p>The diagram illustrates Block Storage as a physical piece of land, divided into distinct functional areas: a green garden, a yellow building, orange open space, and blue parking.</p>	<p>An Apartment</p> <p>The diagram illustrates File Storage as a collection of files organized within a specific physical space, such as an apartment, where different rooms (Living, Dining, Kitchen, Bath) serve as storage units for different types of data.</p>	<p>Storage Unit</p> <p>The diagram illustrates Object Storage as individual objects or files stored in a centralized location, represented by a stack of three labeled storage boxes and a photograph of a self-storage unit containing bicycles and other items.</p>

# Storage Types

	Block Storage	File Storage	Object Storage
Unit of Transaction	Blocks	Files	Objects (files with metadata)
Example	<p>Laptop Disk</p> 	<p>Windows Share</p> 	<p>OneDrive / Google Drive / Dropbox</p> 
How can you update?	You can directly update the file	You can directly update the file	<p>You cannot update the object directly.</p> <p>You create a new version of the object and replace the existing one or keep multiple versions of the same object.</p>
Protocols	SCSI, Fiber Channel, SATA	SMB, CIFS, NFS	REST/SOAP over HTTP/HTTPs
Support for metadata	No metadata support it stores only file system attributes	No metadata support it stores only file system attributes	Supports custom metadata
AWS Services	Amazon EBS Amazon Instance Store	Amazon EFS Amazon FSX	Amazon S3 Amazon Glacier



Amazon Simple  
Storage Service (S3)

# Bucket and Objects

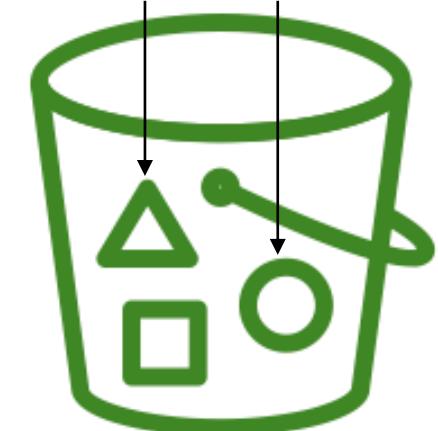
- S3 Name Space – Global
- Bucket – Regional
- Durability – 99.999999999 %
- Availability – 99.9x %
- Max object size 5 terabytes
- Can host a static website

Files (Objects)



Folder  
(Bucket)

Objects



Bucket

## S3 Pricing

Compute	Number of requests
Storage	Capacity used
Network	Data transfer out

## S3 Features



Versioning

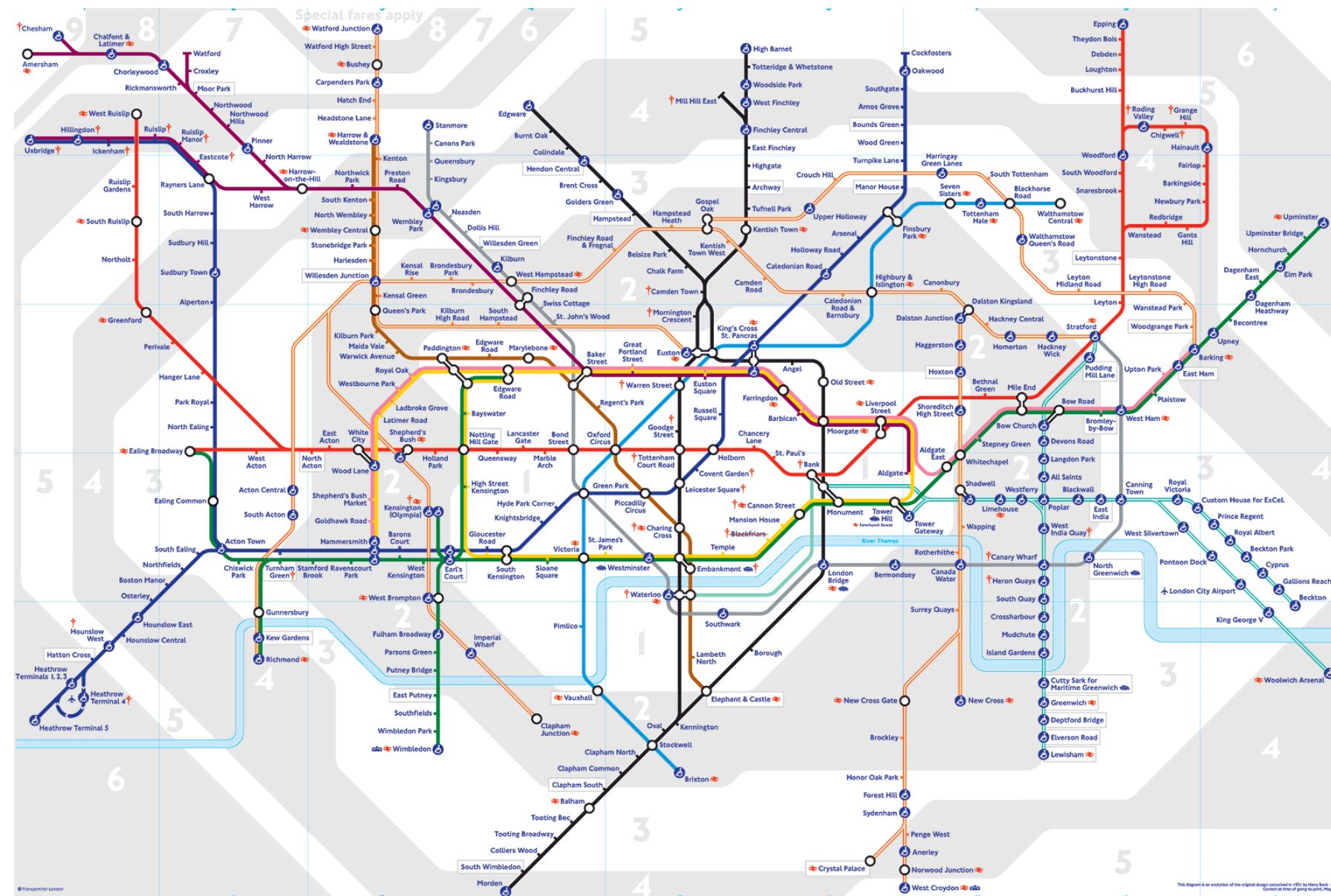


Replication



Transfer Acceleration

# London Transport Zones



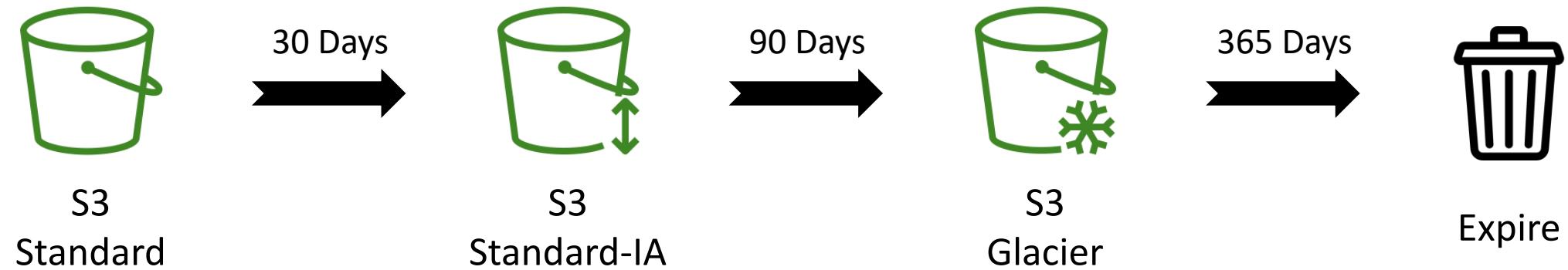
# S3 Storage Class

- Amazon S3 offers a range of storage classes designed for different use cases.
  - <https://aws.amazon.com/s3/storage-classes/>



# S3 Life Cycle Policies

- Storing objects cost effectively throughout their lifecycle



# AWS Snow Family

- Physical Device for Data Transfer



Snowcone

8 TB



Snowcone



Snowball

50/80 TB

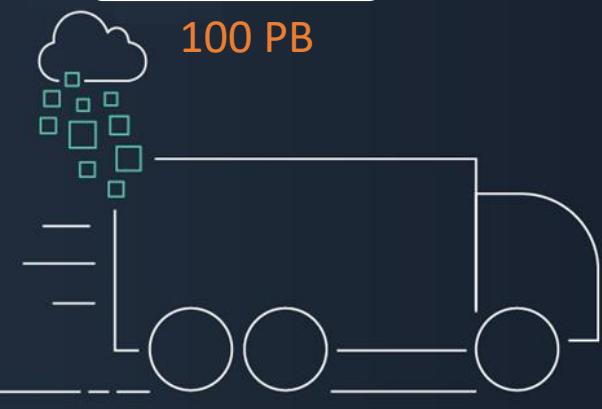


Snowball



Snowmobile

100 PB



Snowmobile



## Reference:

### FAQs

#### What?

- Amazon S3 is a simple key-based object storage built to store and retrieve any amount of data from anywhere.
- Data is stored as objects within resources called “buckets”, and a single object can be up to 5 terabytes in size.
- It is designed to provide 99.999999999% (11 9's) of data durability.

## Category:

Storage

#### Why?

- You can use a simple web service interface to store and retrieve virtually any amount of data in any format.
- Highly scalable, highly available, fast, inexpensive data storage infrastructure and you only pay for what you use.
- It offers a range of storage classes to choose from based on the data access, resiliency, and cost requirements of workloads.

#### When?

- You want to store static content, storage backups, want to build data lakes.
- You require version controlled object storage, Multi-Factor Authentication (MFA) Delete capability and selectively grant permissions to users and groups of users.

#### Where?

- Amazon S3 stores data as objects within buckets. A bucket is created in a Region and requires a globally unique name.
- S3 storage classes provide multi-Availability Zone (AZ) resiliency by redundantly storing data on multiple devices and physically separated AWS Availability Zones in an AWS Region (except S3 One Zone-IA storage class).

#### Who?

- Upon creation, only you have access to Amazon S3 buckets that you create, and you have complete control over who has access to your data.
- You can use the Amazon S3 Management Console, the AWS SDKs, or the Amazon S3 APIs to interact with it.

#### How?

- You can get started by creating a bucket in a specific Region and can defining access controls and management options.
- To store an object in Amazon S3, upload the file into a bucket. An object is composed of a file and any metadata that describes that file. When you store data, you assign a unique object key that can later be used to retrieve the data.

#### How much?

- There are six Amazon S3 cost components to consider when storing and managing your data— storage pricing, request and data retrieval pricing, data transfer and transfer acceleration pricing, data management and analytics pricing, replication pricing, and the price to process your data with S3 Object Lambda.

## Created by:

Ashish Prajapati



## Reference:

[Overview](#)

What?

- Amazon S3 Glacier is a storage service optimized for infrequently used data, or "cold data". The service provides durable and extremely low-cost storage with security features for data archiving and backup.
- S3 Glacier is one of the many different storage classes for Amazon S3.

## Category:

Storage

Why?

- Amazon S3 Glacier enables you to offload the administrative burdens of operating and scaling storage to AWS, so you don't have to worry about capacity planning, hardware provisioning, data replication, hardware failure detection and recovery, or time-consuming hardware migrations.

When?

- You want to store your data cost effectively for months, years, or even decades.
- You need to use query-in-place functionality, allowing you to run powerful analytics directly on your archived data at rest.



Where?

- Amazon S3 Glacier is a regional service.
- Your data such as a photo, video, or document (called Archive) is stored in a Vault in your selected region.
- Data is redundantly stored across multiple Availability Zones that are physically separated within an AWS Region.

Who?

- You can choose from three storage classes optimized for different access patterns and storage duration - S3 Glacier Instant Retrieval (milliseconds retrieval), S3 Glacier Flexible Retrieval (retrieval in minutes or free bulk retrievals in 5-12 hours), S3 Glacier Deep Archive (retrieval within twelve hours).

How?

- S3 Glacier provides a management console. You can use the console to create and delete vaults. However, all other interactions with S3 Glacier require that you use the AWS CLI or write code.
- You can initiate a S3 Glacier job to perform a select query on an archive, retrieve an archive, or get an inventory of a vault.

## Created by:

[Ashish Prajapati](#)



How much?

- S3 Glacier charges are calculated based on monthly storage (GB-Month), number of requests (based on the request type), and data retrievals (per GB). Incoming transfers are free.
- Amazon S3 Glacier has minimum capacity charges for objects depending on the storage class you use.

# Let's hear from Solutions Architects @ AWS

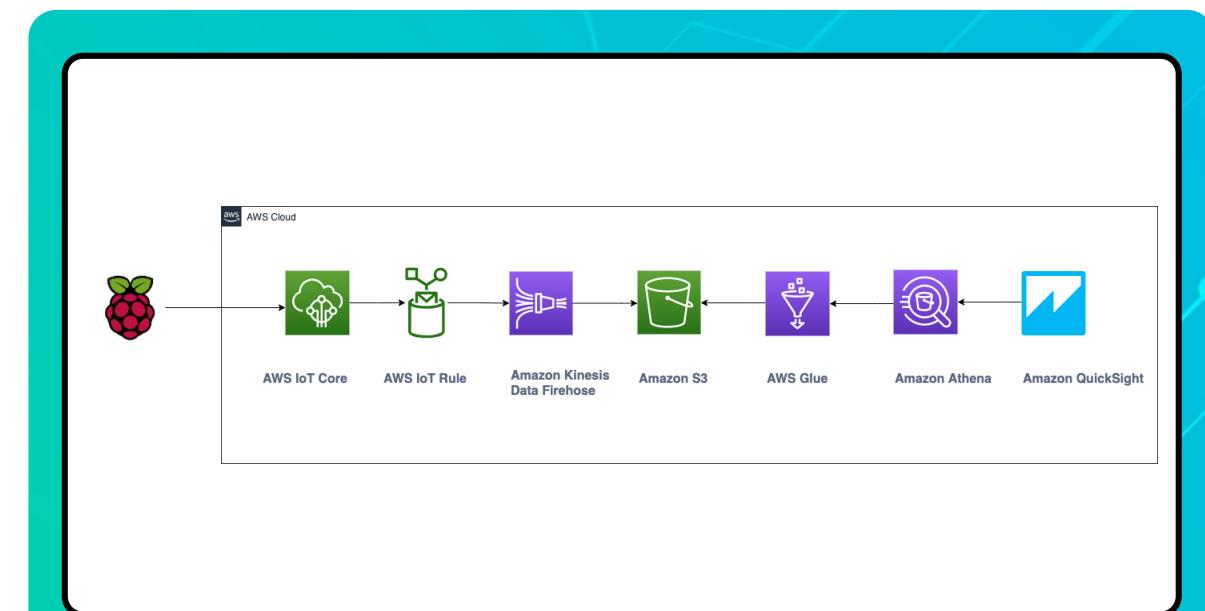
## Jamila Jamilova

- Using Amazon S3 for IoT

## Alex Paramonov

- Amazon S3 – Reference Architectures





## Using Amazon S3 for IoT

# Using Amazon S3 for IoT

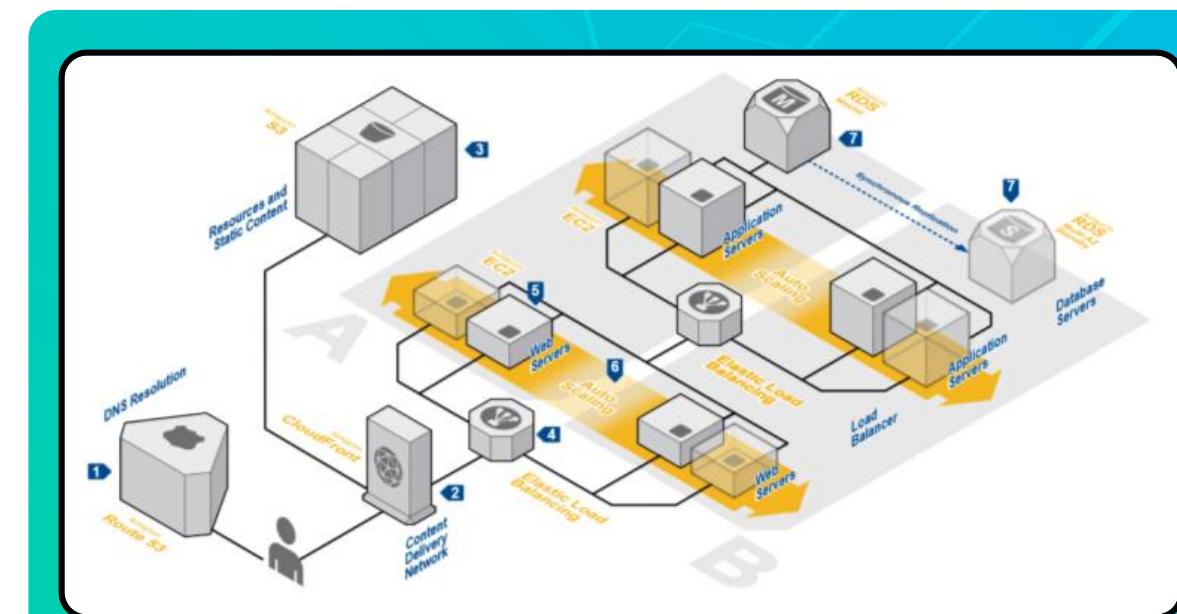
- Blog - Monitor and visualise building occupancy with AWS IoT Core, Amazon QuickSight and Raspberry Pi

by Jamila Jamilova



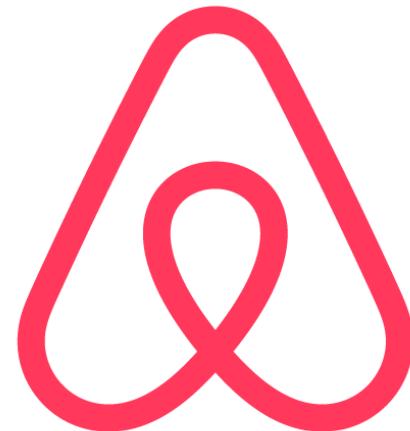
<https://aws.amazon.com/blogs/iot/monitor-and-visualise-building-occupancy-with-aws-iot-core-amazon-quicksight-and-raspberry-pi/>





## Reference Architecture

## Amazon S3 – Reference Architecture



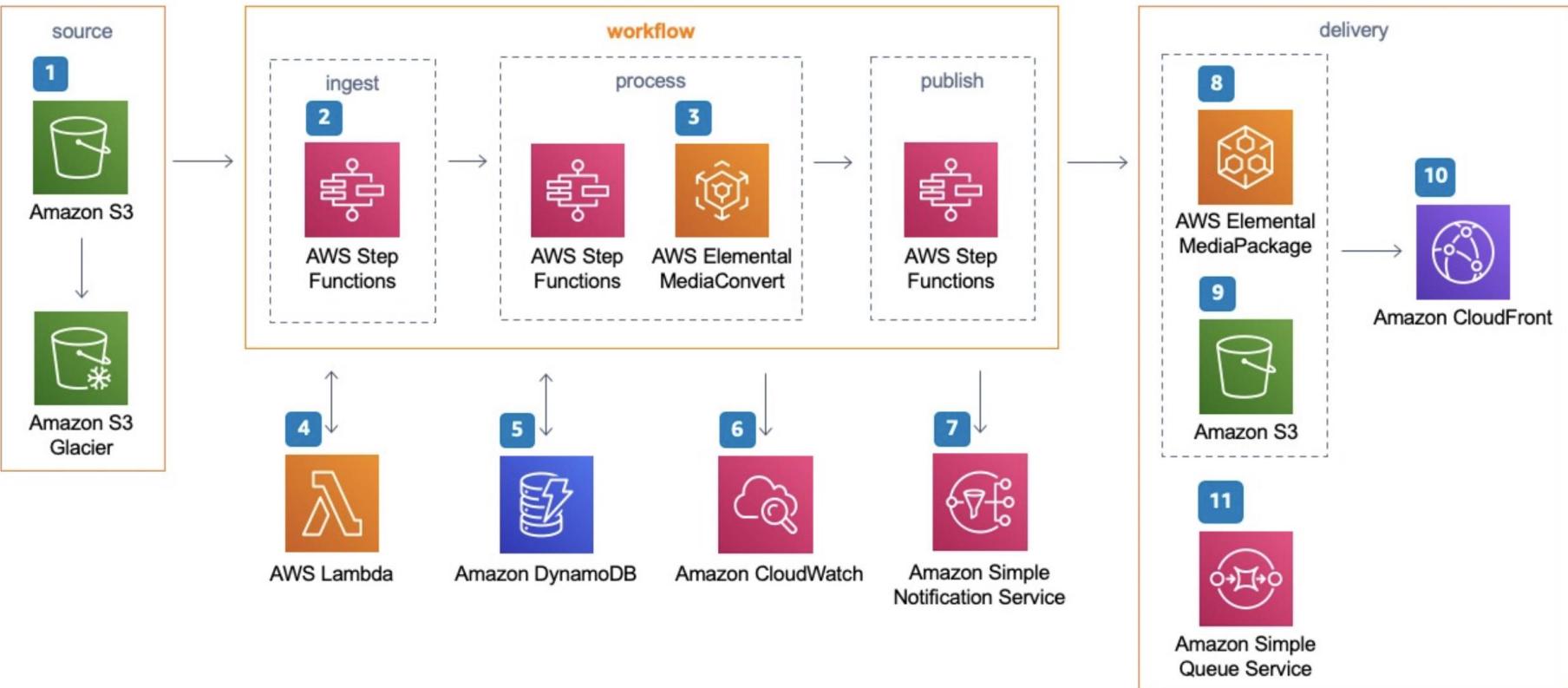
**airbnb**

**coursera**

**NETFLIX**

# Video on Demand on AWS

This solution provision the AWS services necessary to build a scalable, distributed architecture that ingests, stores, processes, and delivers video content. It extends the Video on Demand on AWS Foundation solution with additional features and several options that can be customized. To deploy this solution using the available AWS CloudFormation template, select **Deploy with AWS**.

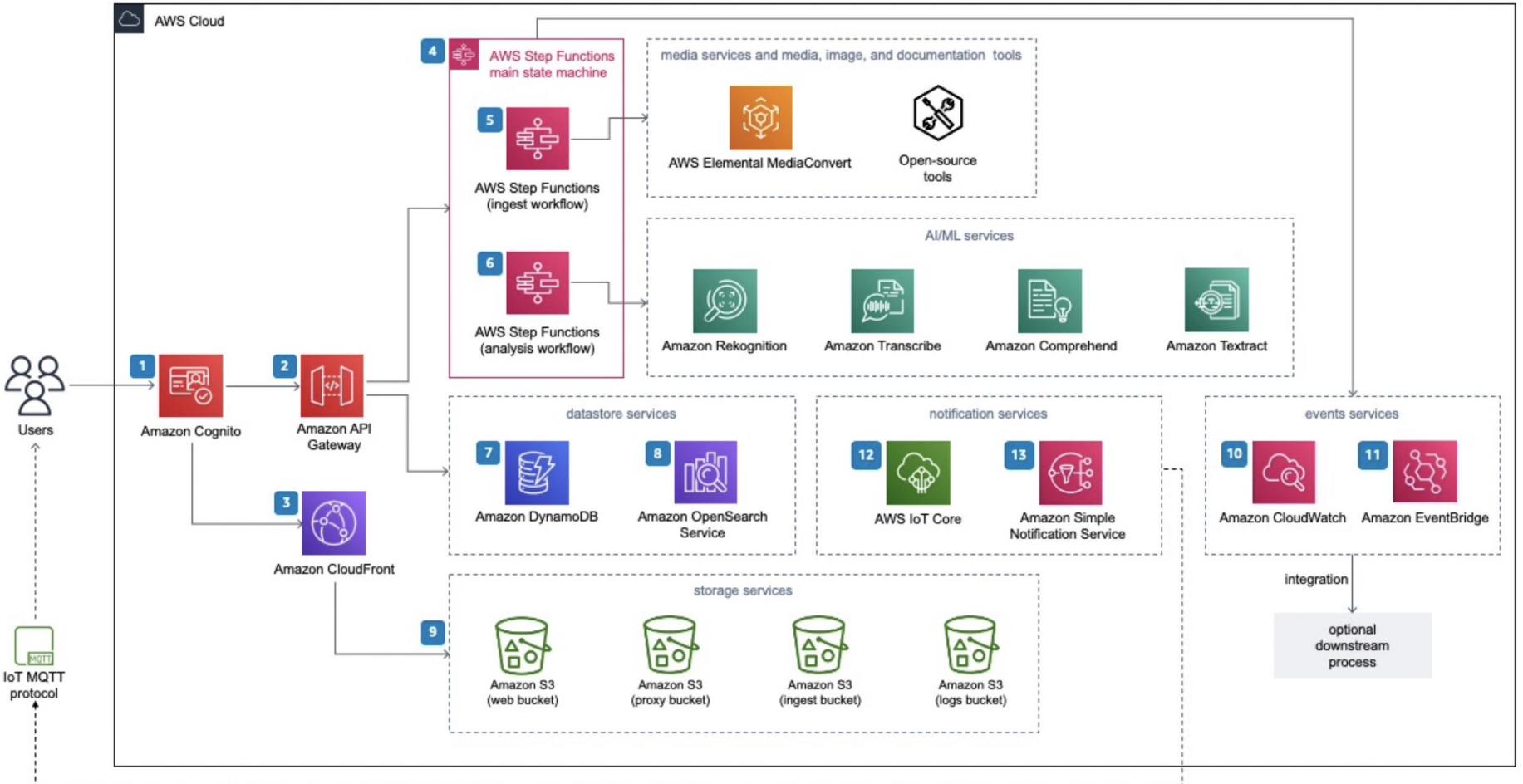


- 1 An Amazon Simple Storage Service (Amazon S3) bucket for source media files.
- 2 AWS Step Functions, which creates ingest, processing, and publishing step functions.
- 3 AWS Elemental MediaConvert to transcode media files from their source format.
- 4 AWS Lambda functions to perform the work of each step and process error messages.
- 5 An Amazon DynamoDB table stores data captured through the workflow.
- 6 Amazon CloudWatch for logging and Amazon CloudWatch Events rules for AWS Elemental MediaConvert notifications.
- 7 Amazon Simple Notification Service (Amazon SNS) topics to send encoding, publishing, and error notifications.
- 8 AWS Elemental MediaPackage (optional) to create video streams formatted to play on several devices from a single video input.
- 9 An Amazon S3 bucket for storing destination media files.
- 10 An Amazon CloudFront distribution to deliver your video content to end users.
- 11 An Amazon Simple Queue Service (Amazon SQS) queue to capture the workflow outputs.

# Media2Cloud

The Media2Cloud solution helps streamline and automate the content ingestion process when you migrate your digital assets to the cloud. To deploy this solution using the available AWS CloudFormation template, select

**Deploy with AWS.**

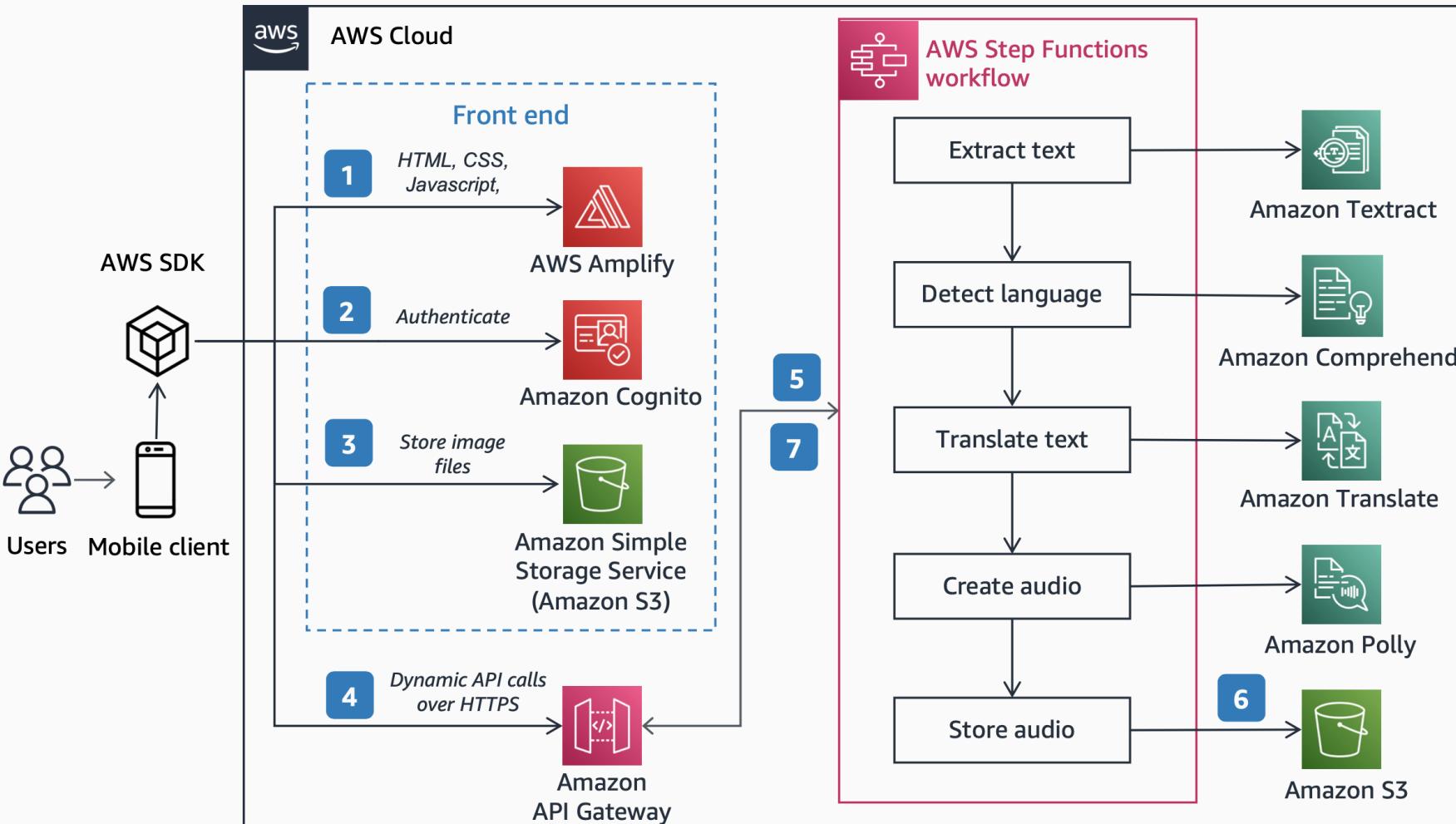


- 1 An Amazon Cognito user pool to provide a user directory.
- 2 An Amazon API Gateway RESTful API endpoint.
- 3 An Amazon CloudFront distribution that hosts the web application artifacts.
- 4 An AWS Step Functions main state machine, which serves as the entry point to the solution's backend ingestion and analysis workflows.
- 5 An AWS Step Functions ingestion sub-state machine. It uses AWS Elemental MediaConvert for video and audio files and open-source tools for image files and documents.
- 6 An AWS Step Functions analysis sub-state machine for the analysis process. It runs analysis jobs with Amazon Rekognition, Amazon Transcribe, Amazon Comprehend, and Amazon Textract.
- 7 Amazon DynamoDB tables to store artifacts generated during the ingestion and analysis processes.
- 8 An Amazon OpenSearch Service cluster.
- 9 Four Amazon Simple Storage Service (Amazon S3) buckets for storage.
- 10 Amazon CloudWatch event rules.
- 11 Amazon EventBridge for queue management.
- 12 An AWS IoT Core topic that allows the ingestion and analysis workflows to communicate with the front-end web application.
- 13 Amazon Simple Notification Service (Amazon SNS) topics to allow Amazon Rekognition to publish job status in the video analysis workflow, and to support custom integrations.

# ReadForMe

<https://d1.awsstatic.com/architecture-diagrams/ArchitectureDiagrams/readforme-ra.pdf>

The ReadForMe web app utilizes the AWS Cloud to enable the visually-impaired to hear paper documents using an event-driven serverless architecture using AI services.



- 1 AWS Amplify distributes the ReadForMe web app, consisting of HTML, JavaScript, and CSS, to end users' mobile devices.
- 2 The Amazon Cognito identity pool grants temporary access to the Amazon S3 bucket.
- 3 The user uploads an image file to the Amazon S3 bucket using AWS SDK through the web app.
- 4 The ReadForMe web app invokes the backend AI services by sending the Amazon S3 object key in the payload to Amazon API Gateway.
- 5 API Gateway instantiates an AWS Step Functions workflow. The state machine orchestrates the Artificial Intelligence /Machine Learning (AI/ML) services Amazon Textract, Amazon Comprehend, Amazon Translate, and Amazon Polly, using AWS Lambda functions.
- 6 The AWS Step Functions workflow creates an audio file as output and stores it in Amazon S3 in MP3 format.
- 7 A pre-signed URL with the location of the audio file stored in Amazon S3 is sent back to the user's browser through API Gateway. The user's mobile device plays the audio file using the pre-signed URL.



Reviewed for technical accuracy January 25, 2022

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AWS Reference Architecture

Thank you for attending. See you next Saturday (21-May-2022)



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