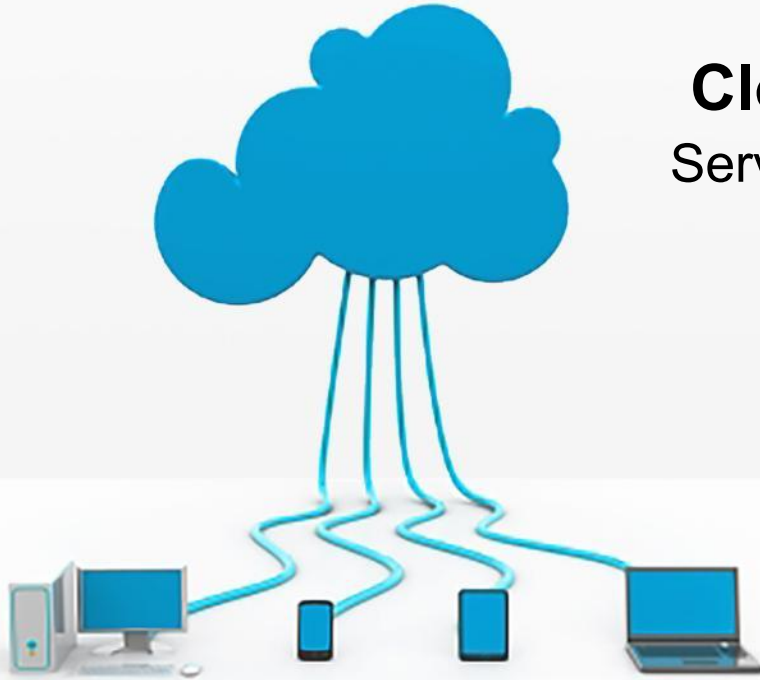


Cloud Computing Project

Serverless Static Website on AWS

(Research Project Blog)



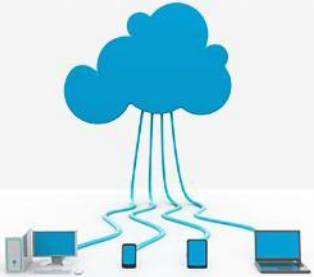
VENKATNARAYAN GNANAGURUPARAN
Roll Number: 174266
Reg Number: 831777
Section: B

Problem Statement

Objective

Deploy a Serverless website using AWS services.

link <https://fakefacedetection.ml>

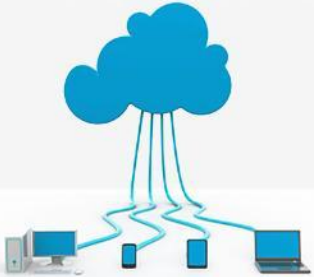


Cloud Hosting

- Cloud hosting enables applications and websites accessible using cloud resources.
- It is different from traditional hosting, where the applications and websites are deployed on a single server.
- Cloud hosting has a network of connected virtual and physical cloud servers that hosts the application or website, ensuring greater flexibility and scalability.

Cloud Servers

- Cloud Servers can be created in seconds, easily scaled up, and deleted at ease. The services are charged only for the Cloud Server utilization.
- This allows users to maintain and configure their set-up without having to request outside help each time minor changes or upgrades if needed.

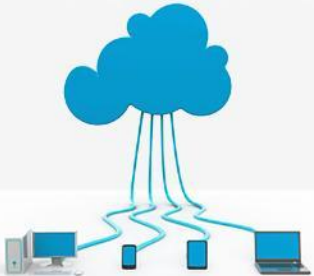


Static Websites

- A Static website reduces complexities and focuses on improving efficiency and performance.
- It does not rely on databases. It mostly involves basic HTML, JavaScript, and CSS to produce light websites.
- These websites have no back-end systems, client-server requests, or database queries which allows these sites to have a faster performance.
- Static websites provide more security than a dynamic website as they do not have any database to exploit.

Serverless Architectures

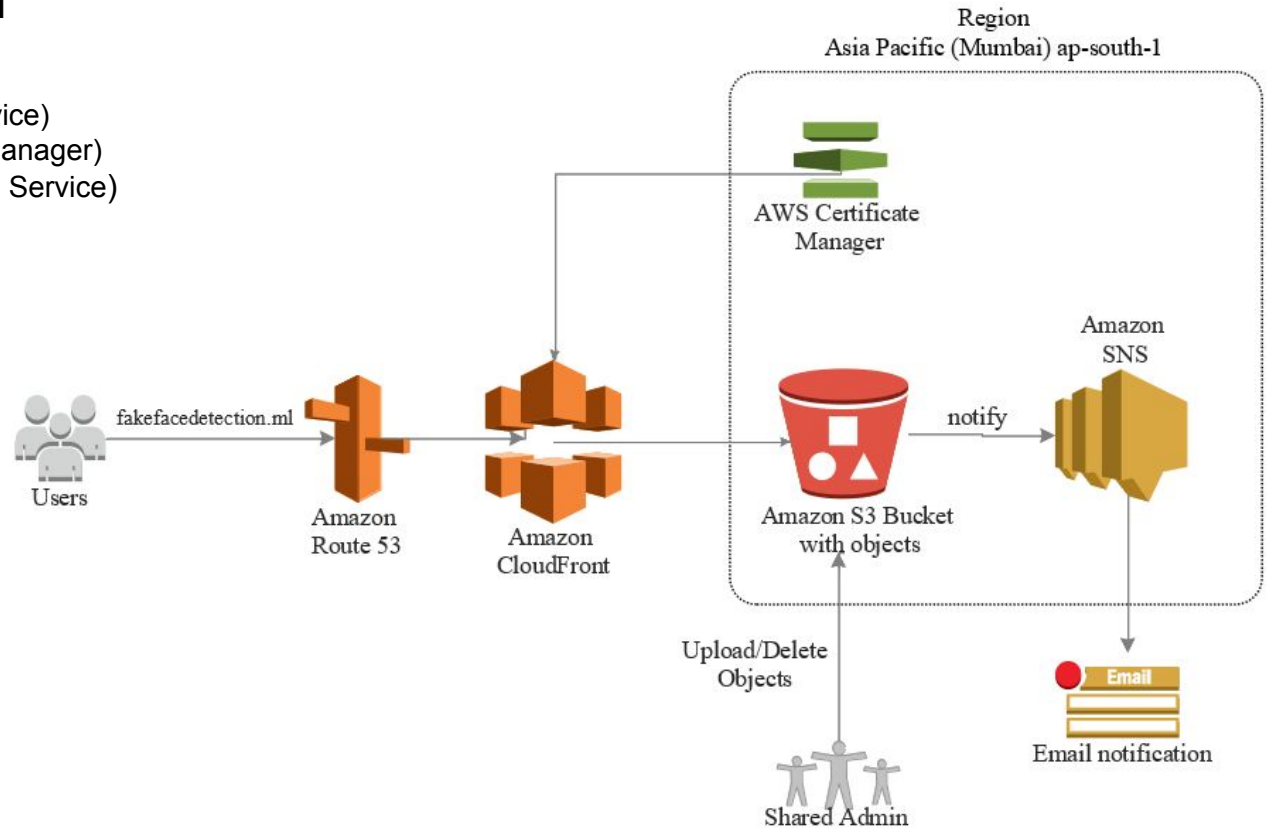
- Serverless architectures usually have access points on a global scale.
- They can handle users from every corner of the world using appropriate load balancers and distribution networks.



Architecture

AWS Services Utilized

- Route 53
- CloudFront
- S3 (Simple Storage Service)
- ACM (AWS Certificate Manager)
- SNS (Simple Notification Service)



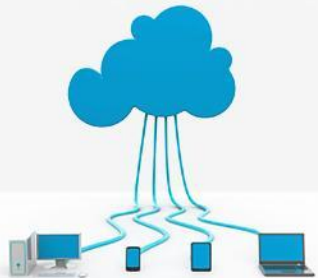
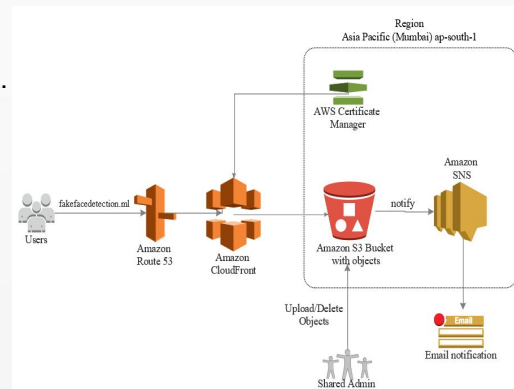
Pipeline

User - Website

1. User accesses the “fakefacedetection.ml” website by typing the domain name.
2. Route 53 will route the user to CloudFront which is a content delivery network service.
3. CloudFront retrieves the content from the S3 bucket and distributes it.
4. ACM provides the SSL certification for the website to CloudFront.
5. The Website content is accessible to the User.

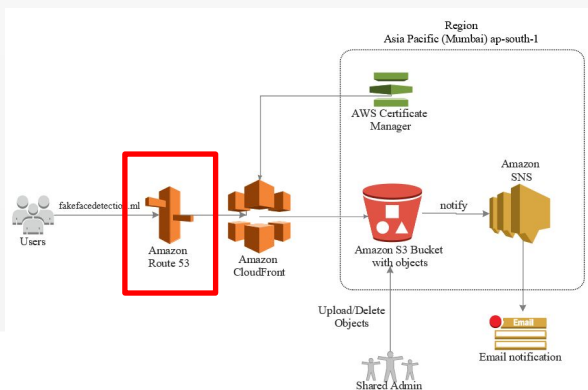
Admin/Developer - Website

1. Any update or Deletion of objects in S3 bucket by the admin/developers.
2. S3 triggers the SNS about update of objects in bucket.
3. SNS sends an E-Mail to the admin regarding the update and deletion of Objects in S3.



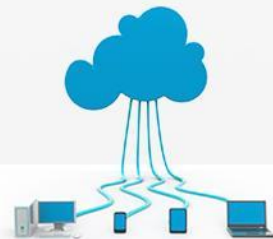
Route 53

- Amazon Route 53 is a highly available and scalable cloud Domain Name System (DNS) web service.
- It effectively connects user requests to infrastructure running in AWS.
- The Domain name (“fakefacedetection.ml”) was registered with Freenom.
- In this Architecture, Route 53 was utilized to connect the Users with CloudFront.
- Route 53 was configured by creating a Hosted zone for DNS management with a suitable domain name.



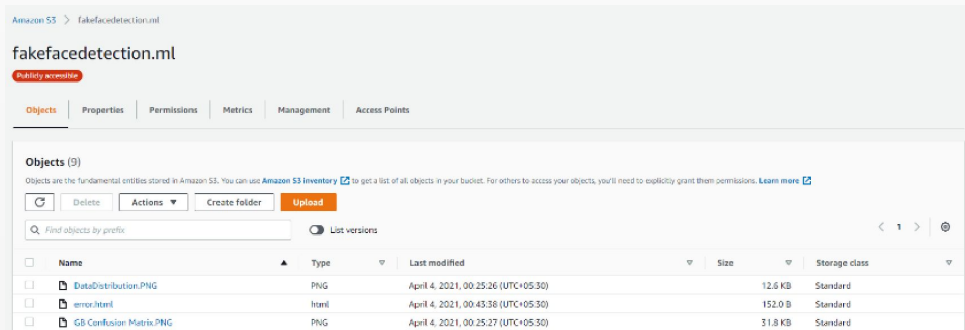
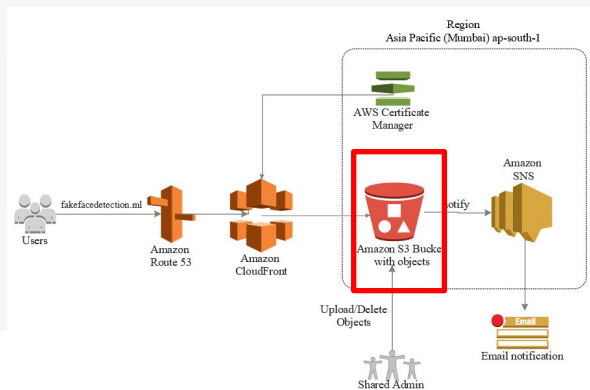
	Domain name	Type	Created by
<input type="radio"/>	fakefacedetection.ml	Public	Route 53

Route 53 was configured

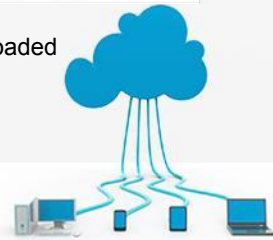


S3 (Simple Storage Service)

- S3 was used in this architecture to host the static HTML website with index document support and error document support.
- “index.html” was the default page that was displayed and “error.html” was used to display in the event of a partially invalid URL.
- All the objects necessary for the static website were uploaded on S3.



S3 was configured and contents for the website were uploaded

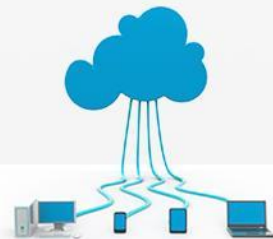
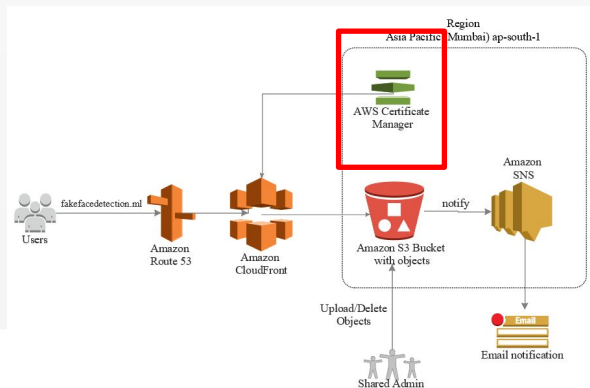


AWS Certificate Manager

- This service allows developers to provision, manage, and deploy public and private Secure Sockets Layer/Transport Layer Security (SSL/TLS) certificates for use with AWS services and internal connected resources.
- SSL protects website from phishing scams, data breaches, and many other threats. It builds a secure environment for both visitors and site developers.
- In this architecture AWS Certificate Manager was used to request a certificate, deploy it on ACM-integrated Amazon CloudFront distribution.
- SSL certificate for the registered domain is obtained from ACM Certificate and a record is created in Route 53.

Domain Name	Record Name	Record Type	Record Value
fakefacedetection.ml	_e19b4f8f	CNAME	.acm-validations.aws.

ACM Validation record created in Route 53



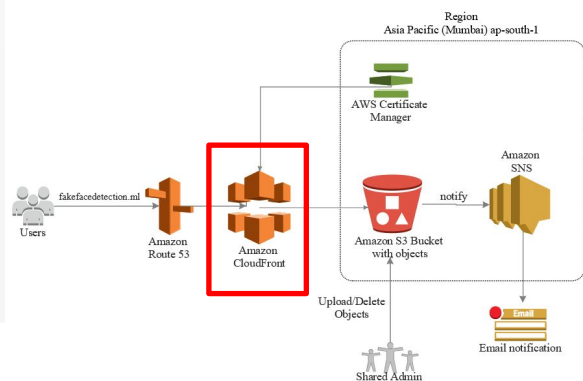
CloudFront

- CloudFront is a content delivery network (CDN) service that securely delivers data to users globally with low latency, high transfer speeds by caching the websites.
- CloudFront was used as it works seamlessly with S3 or with any custom HTTP origin.
- Created a CloudFront distribution and configured it with custom certificate from ACM, URL of the S3 bucket that holds the contents of the website and Route 53 with the domain name.

CloudFront Distributions

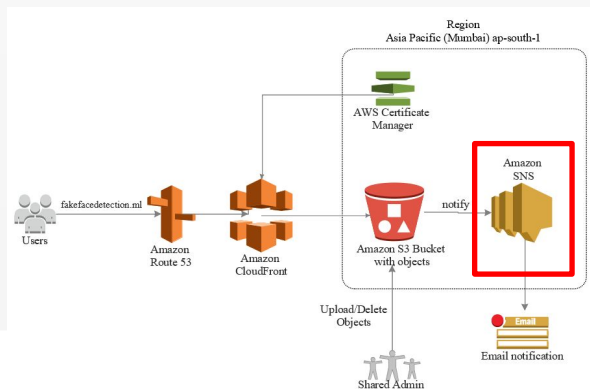
Create Distribution Distribution Settings Delete Enable Disable ↺ ⚙ ? 👤										
Viewing: Any Delivery Method ▾ Any State ▾ ⏪ < Viewing 1 to 1 of 1 Items > ⏩										
	Delivery Method	ID	Domain Name	Comment	Origin	CNAMEs	Status	State	Last Modified	
<input type="checkbox"/>	Web	E2GTDJB6LLVWPE	d1tm6ok0z2tpf.cloud	-	fakelacedetec	fakelacedetectic	Deployed	Enabled	2021-04-04 01:43 UT	

Configured CloudFront Distribution



SNS (Simple Notification Service)

- It is a fully managed messaging service for both application-to-application (A2A) and application-to-person (A2P) communication.
- It notifies the admin through E-Mail if any object was uploaded or deleted from the S3 bucket.
- Create a SNS Topic and subscribe to the SNS Topic with the admin's E-Mail id as the endpoint, select the notifications for events that are necessary.



Amazon SNS > Topics

Topics (2)

Edit

Delete

Publish message

Create topic

Q Search

<1>

Name	Type	ARN
<div><div></div>Blog-Updates</div>	Standard	arn:aws:sns:ap-south-1:190365024273:Blog-Updates

Configured SNS

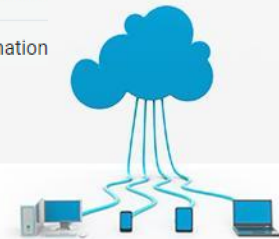
☐ ☆ BlogUpd 3

Amazon S3 Notification - {"Records":[{"eventV

☐ ☆ BlogUpd

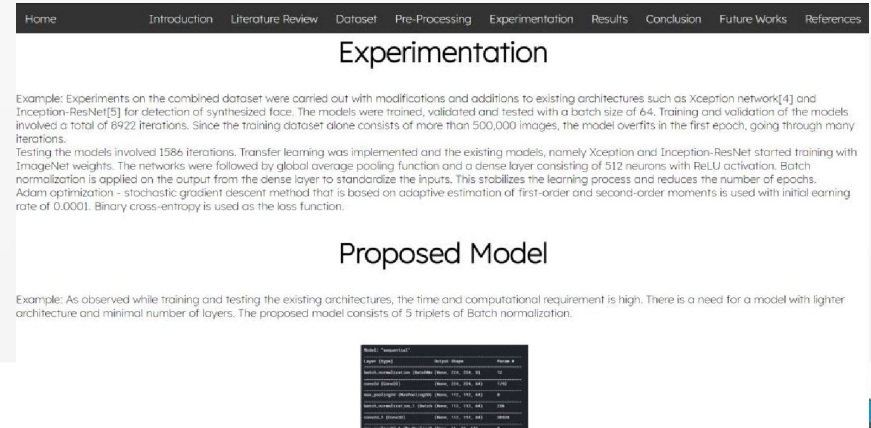
AWS Notification - Subscription Confirmation

E-Mails from SNS



Website

- The website was developed using HTML and CSS.
- It has improved performance for end users compared to sites with multiple pages. Cost of these websites is less as it only utilizes cloud storage, as opposed to a hosted environment.
- This website has a single page design which contributes to an intuitive user journey. With no additional pages, users have a linear navigation flow – which provides information about the project.
- Studies show that having a single page can lead to increased conversions than multi-page sites because users begin the process sooner and move through it more quickly, with nowhere to get distracted by another offer.
- Having a straightforward navigation design is that there is usually only one action to be taken by the user.

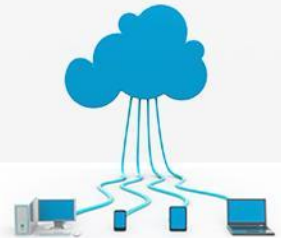


Alternative Methods for Static Web Hosting

WordPress, Amazon EC2 and S3



- WordPress is a popular content management system due to its simplicity and is considered an inexpensive way for businesses to get started online.
- WordPress can be slow at times due to the added plugins, overfully managed hosting for static websites and web apps. Amplify hosting solution uses saturated codebases and other features that can slow down the website.
- For static websites, the cost is reduced by using CloudFront and S3 rather than EC2 which charges on the hours it runs. EC2 instances need to keep running to deliver content for static website.
- On S3, there is no risk of over-provisioning and hence, no need to manage disk utilization.



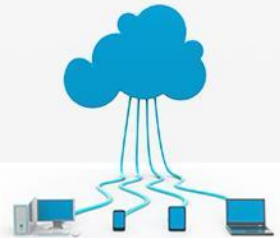
Alternative Methods for Static Web Hosting

AWS Amplify

- AWS Amplify provides fully managed hosting for static websites and web apps. Amplify hosting solution uses CloudFront and S3 to deliver the site contents via the AWS content delivery network (CDN).
- It requires knowledge of APIs and shell scripting.
- However, if any objects in the S3 were created or deleted, it wouldn't notify the admin as it lacks SNS feature and these websites don't have the SSL certification from ACM.



AWS Amplify



Alternative Methods for Static Web Hosting

Amazon LightSail

- Amazon LightSail offers more than 10 images with ready to run popular software.
- The image with the pre-installed Nginx web server, PHP, and MySQL could be used to host a static website on Amazon LightSail.
- However, this would require a server even for a static website unlike the architecture developed in this project.

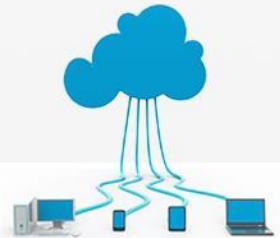


Alternative Methods for Static Web Hosting



Google Cloud Storage and Cloud Load Balancing

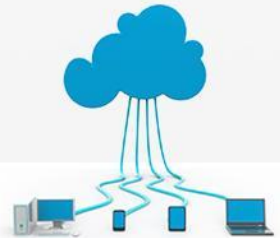
- The hosting environment in the Google cloud is optimized for high-end WordPress and WooCommerce based websites. Its price starts from 25\$/month.
- Support fee is quite hefty, around 150 USD per month for the most basic service.
- Amazon S3 is more durable than cloud storage.



Alternative Methods for Static Web Hosting

Other Services

- Netlify, Surge, Render, GitHub Pages, Firebase and Cloudflare offer web hosting services which are user friendly but are not flexible with architecture.
- The architecture is abstracted in such services and there is a need for additional support and services from providers increasing the cost for hosting a static website.
- It would be relatively expensive and unjustifiable to host a single one page website on these services.



Conclusion

- A Serverless static website was deployed with HTTPS on cloud with a suitable architecture, using services offered by AWS i.e. Route 53, CloudFront, S3 (Simple Storage Service), ACM (AWS Certificate Manager) and SNS (Simple Notification Service).
- Serverless static website that was created for the research project can be accessed using the link <https://fakefacedetection.ml>



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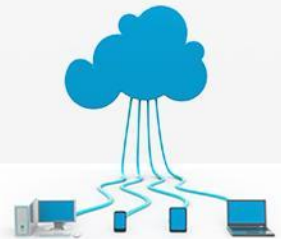
<https://cloud.google.com/storage/docs/hosting-static-website>

- Hosting a Static Website on an Amazon Lightsail Instance

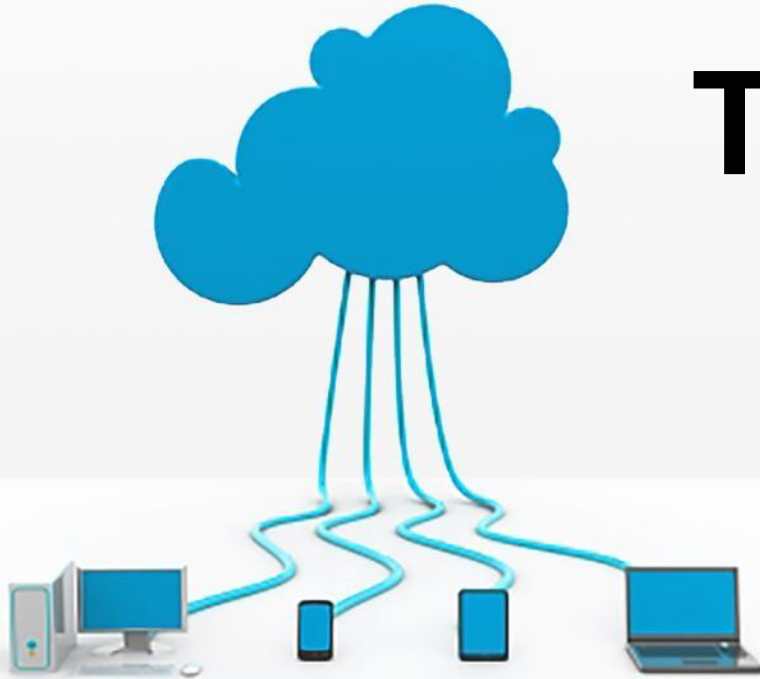
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<https://sanderknape.com/2020/02/building-a-static-serverless-website-using-s3-cloudfront/>



Thank You!



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