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HOW CAN START UPS MAKE USE OF CLOUD SERVICES

A Project

Presented to the

Faculty of

California State University,

San Bernardino

In Partial Fulfillment

of the Requirements for the Degree

Master of Science

in

Information Systems and Technology

by

Gauri Rajendra Nade

May 2021

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ABSTRACT

The purpose of this project is to discuss the technical obstacles that small and medium-sized enterprises (SMEs) face, as well as how cloud computing can help to solve these issues. Cloud computing has the ability to radically change competitive environments by offering a new forum for generating and delivering business value and market development. Small and medium-sized enterprises (SMEs) also lack sufficient technological capital. They could either buy expensive software customized by large companies or develop their own low-cost applications with limited functionality. The research questions answered in this project are as follows: 1. How can a startup build a cost-effective website and host it on a cloud platform? 2. How can a startup make a website always available? 3. How can a startup resolve the low latency problem using cloud services? 4. How can a startup make use of different cloud services to reduce the use of infrastructure and technology resources. The methodology used for this project is to understand what cloud computing is, cloud implementation models, cloud computing services, and their benefits. The Implementation Solution is offered by evaluating various cloud vendors such as AWS and Microsoft Azure and the various services they provide. This study provides a realistic demonstration of designing and hosting a website in AWS and Microsoft Azure to support this approach. This study offers insights and suggestions to SMEs for implementing various cloud services to achieve economies of scale. The project concluded that cloud computing is simple to use, inexpensive,

eliminates the need for physical office space, and eliminates the need to transport storage devices. Because of its scalability and faster content delivery, as well as various business models, the cloud is an excellent choice for startups.

TABLE OF CONTENTS

LIST OF FIGURES

CHAPTER ONE

INTRODUCTION

Establishing a successful Startup company is the trend creating buzz amongst emerging entrepreneurs for the last decade in the USA. Many young individuals in and around the USA have showcased their entrepreneurial talents in the most effective manner by establishing their own companies. To be competitive, any business proposal must have the entrepreneurial skills to anticipate business opportunities, collect necessary capital, prepare meticulously, and execute. Along with these, one must understand the complexity and uncertainties associated with the chosen market group (Kurode et al., 2016).

A start-up is often thought of to be having full growth potential however at a similar time it bears risk of complete failure while not correctly designed. Start-ups in the US have been increasing in number since last decade, with several domestic further as international investors focusing absolutely on the American startup industry; it's positioned to grow larger than before (Kurode et al., 2016). However, despite this all, these firms will have issues in areas such as scaling up infrastructure, technology, increasing competition, marketing issues, funding, management, etc.

The early stages of a new company can be both exhilarating and terrifying. One moment, a product is famous and successful. The next, before the company has even found its balance, an emergency strikes and brings the whole effort to a halt (Symantec, “Internet Security Threat Report,” February 2019).

Maintaining an adequate security strategy, delivering a seamless experience for consumers, and maintaining a competitive advantage becomes ever more complex and challenging as emerging businesses continue to expand their operations. Startups can prevent expensive mistakes and create a technology ecosystem that can promote long-term success by partnering with a trusted, third-party vendor.

There are currently 31.7 million small businesses in the United States, which make up 99.9% of all U.S. businesses. (2020-Small-Business-Economic-Profile-US.Pdf, n.d.) Although several small businesses are registered monthly, the failure rate is high. As of 2019, startup failure rates area unit around 90%. 21.5% of startups fail within the initial year, 30% in the second year, 50% in the fifth year, and 70% in their 10th year (2019 Small Business Failure Rate: Startup Statistics by Industry | NBC&S, n.d.)

This project focuses on technology challenges of startup businesses and overcoming those with the help of cloud computing.

Problem Statement

Most startups, regardless of industry, face a certain range of technological challenges. As startups can develop their IT teams from scratch, technology allows them to remain lean, implement new tools and procedures, and differentiate themselves from their more developed rivals. Startup's risk turning technology into a challenge rather than a solution if they run into traditional roadblocks. To contend with technological issues, startup managers should search for reliable and scalable resources and processes. (2018 Global Entrepreneurship Index | Global Entrepreneurship Development Institute, n.d.)

Problem1: Building and hosting an effective Website

Websites have evolved into a virtual front door for a company, an online advertisement, and even a portfolio of goods and services. For certain new companies, the site basically is the business, filling in as a touchpoint gateway for clients to see the available product and/or service offerings, where we can place the order for a particular product or service. As a result, it is critical that a startup's site be carefully planned, effectively secure, advanced for portable clients and consistently accessible. (Symantec, "Internet Security Threat Report," February 2019)

The following are some of the possible threats for startups intending to build and host a website:

- Cyberattacks such as distributed denial-of-service (DDoS) attacks or other causes of technology outages may cause websites hosted on company-owned equipment to go down.
- Since startups also lack dedicated IT personnel, they may need to hire outside contractors to set up, administer, and operate on-premises solutions.
- Many startups don't have enough physical space to devote to IT programs, so they can have to switch from different offices.

Problem 2: Delivering a first service or product

A business is nothing more than a concept before it creates a working product that people want to purchase. Many startups' offerings today, more than ever, have a significant digital aspect, such as a smartphone app. And creating these digital assets often takes more time and money than expected, disrupting product releases and ultimately jeopardizing a startup's profitability. (Symantec, “Internet Security Threat Report,” February 2019)

The following are some of the possible threats for startups to deliver the first service or product.

- Once the product is ready and deploying the product or service i.e. technology infrastructure is a very time-consuming process and always required personnel with advanced knowledge in that area

- The startup may have less need for technology resources that have been used to develop and test the product and services, so it results in the expensive devices sitting idle after the use.

So, this project will be focus on exploring the following research questions:

1. How can a startup build a cost-effective website and host it on a cloud platform?
2. How can a startup make a website always available?
3. How can a startup resolve the low latency problem using cloud services?
4. How can a startup make use of different cloud services to reduce the use of infrastructure and technology resources for product development and test marketing?

Organization of the Project

This project is organized as follows.

Chapter 2 will discuss the concepts and facts of cloud computing of small to medium enterprises. Chapter 3 will discuss the methodology including what is cloud computing, cloud deployment models, cloud computing services and its benefits. Chapter 4 continues to discuss different cloud vendors such as AWS, Microsoft Azure, Google Cloud, IBM and the offerings they have provided followed by website creating and hosting a demo in AWS and Microsoft Azure.

Chapter 5 will discuss the recommendations for SMEs to adapt cloud solutions and Chapter 6 will discuss the findings and conclusion.

CHAPTER TWO

LITERATURE REVIEW

The notion of Cloud computing arose in the 1960s from the thoughts of pioneers such as Joseph Licklider, who envisioned computation as a global network, and John McCarthy (1927-2011), who envisioned computation as a public-service organization (MIT Technology Review, 2011).

The cloud computing concept developed by the National Institute of Standards and Technology (NIST) has achieved widespread adoption in industry, commerce, and science: “a model for facultative present, convenient, on demand network access to a shared pool of configurable computing resources which will be apace provisioned and discharged with lowest management effort or service supplier interaction” (Biswas et al., 2018).

According to Gartner (2011), cloud computing is the most overestimated subject in IT today, and it has expanded dramatically in the last three years. According to the survey (Market research Media, 2012), Bloomberg (Kharif, 2012) forecasts that Cloud Computing will have a growth of 30% over the next 5 years from 2012 to 2020.

At a similar time, according to reports, cloud-related market sales will reach $1.1 trillion by 2015. (McCafferty, 2012). Herlihy (2012,) describes the benefits of cloud computing as a low-cost way for companies to provide the same benefits as a privately approved, internally run package without the consistency

and initial high value. Cloud computing is described by Armbrust et al. (2012,) as “a new term for computing as a utility that has currently become ad reality.”

The bootstrapping stage, seed stage, and development stage are the three major stages in the lifecycle of a startup company. Financial issues, human capital management, support systems, and environmental elements are the four areas of challenges encountered by startup firms. (AidinSalamzadeh and Hiroko KawamoritaKesim January 2015).The most necessary challenges featured by new entrepreneurs embody developing the vision and business plan, raising capital for startup, aggregation a business team, finding the correct business location, finding smart workers, finding smart customers, managing competition, unforeseen business challenges and expenses, maintaining with industrial changes and trends, lack of support, negative mind-set, lack of selling facilities, lack of infrastructural facilities etc. thus it's necessary to beat these challenges so as to conduct Associate in Nursing economical business. (R.S.Kanchana, J.V.Divya and A.AnsalnaBeegom 2014)

Introduction of Cloud Computing

Simply stated, cloud computing is the delivery of computing services such as servers, storage, databases, networking, software, analytics, and intelligence via the Internet (“the cloud”) to enable faster development, more open infrastructure, and economies of scale. You typically only pay for the cloud services you use,

allowing you to lower operating costs, control systems more efficiently, and scale as your business needs shift.

Cloud storage is the on-demand delivery of information technology resources over the Internet with pay-as-you-go pricing. Instead of buying, owning, and maintaining physical data centers and servers, you can access technology services, such as computing power, storage, and databases, on an as-needed basis from a cloud provider like Amazon Web Services (AWS), Microsoft Azure, Google Cloud, Oracle, Rackspace etc.

The use of the cloud (dependent variable) is analogous to a power grid in that services such as hardware, applications, and knowledge are combined and distributed to end users through the internet, which serves as a means of exchange (Li et al., 2011). Users are unaware of the location of their data which is in digital format (McAfee, 2011). Instead of constructing the IT infrastructure from scratch, cloud computing provides a platform in the form of high-quality leased IT services. Thus, the distinction of in-house and cloud infrastructure is similar to the make or buy choice faced by SMBs. Outsourcing data center management is similar to cloud computing (Mahesh et al., 2011). This method often usually entails renting applications over the Internet rather than hiring an internal software development unit (Payton, 2010). Therefore, the in-house IT components of SMEs are small (Li et al., 2011). According to Mahesh et al. (2011), Rath (2012), Sultan (2011), Ojala and Tyrvainen (2011), Li et al. (2011), Durkee (2010), Marston, Li, Bandyopadhyay, Zhang, and Ghalsasi (2011),

Creeger (2009), Truong and Dustdar (2011), Karadsheh (2012), Neves, Marta, Correia, and de Castro (2011), and McAfee (2011), cloud computing includes following services:

1. Software as a Service (SaaS):

Rather than downloading apps on the client's computer and replacing it with routine updates, periodic update changes, and so on, programs such as word processing, ERP and CRM systems are made available on the internet for end-user access, according to Ojala and Tyrvainen (2011). It is capable of achieving economies of scale. This is the largest and most developed cloud model. Gmail, Yahoo Mail, TurboTax, Facebook, Twitter, Microsoft Office Live, Google Apps, Salesforce.com, Cisco WebEx web conferencing, antivirus, SuccessFactors (HRM tool), among others are commercial vendors Neves, Marta, Correia, and de Castro (2011).

2. Platform as a Service (PaaS):

Instead of buying software licenses for applications such as operating systems, databases, and middleware, these platforms, as well as software development kits \ and frameworks (such as Java, .NET, Python, C, C++, and Ruby on Rails), are made accessible via the Internet Sultan (2011). Microsoft Azure Services, Google App Engine platform, Amazon Web Services, IBM Cloudburst,

Salesforce's Force.com, Amazon's relational database services, and Rackspace cloud sites are among the commercial vendors Rath (2012).

3. Infrastructure as a Service (IaaS):

This is true for visible physical machines such as virtual computers, storage systems, servers, and network communication that are physically located in a single central location which is known as a data center and can be reached and used across the network using login identity management and passwords from console or laptop. Mahesh and colleagues (2011). Commercial vendors such as Amazon EC2 (Elastic Compute Cloud), Elastic Block Storage (EBS), and Simple Storage Service (S3), as well as Rackspace cloud servers, Joyent, and Terremark. Marston, Li, Bandyopadhyay, Zhang, and Ghalsasi are all writers (2011).

One of the most important advantages of migrating to cloud computing is the possible cost savings by freeing up any IT administrative time that can now be applied to the economic aspects of growing SMBs' core businesses (Creeger, 2009). Cloud computing promotes innovation by lowering the obstacle to entry. Startups will also use cloud computing, which has resulted in the launch of web apps and social-media platforms including Facebook, YouTube, and Mint (Marston, Li, Bandyopadhyay, Zhang, & Ghalsasi, 2011).

Inside companies, there are four distinct cloud implementation models (Neves et al., 2011; Marston et al., 2011; Rath, 2012):

1. Public Cloud:

   Public cloud is a third-party service provider's Internet-accessible cloud that is very cost competitive for startups to incorporate IT solutions (Neves et al., 2011).

2. Private Cloud:

   Private cloud is done within an organization and is suitable for major corporations. Cloud service provided by the United States government Among others who have contributed to this work are Marston et al. (2011).

3. Community Cloud:

   This type of cloud is used and operated by a consortium of businesses with common interests Rath, 2012. The US federal government, for example, uses community cloud (built on Terremark's Enterprise cloud platform) for forms.gov, flu.gov, cars.gov, USA.gov, and Apps.gov.

4. Hybrid Cloud:

   This type of cloud is a combination of public and private clouds.

CHAPTER THREE

METHODOLOGY

This project attempts to study the available literature and information and It is based on secondary data gathered from a website, books, articles, research papers, newspapers, etc.

The study is based on following objectives:

1) To comprehend the critical technology challenges faced by the start-ups

2) To understand how cloud computing can help to resolve these challenges faced by start-ups.

Cloud Framework

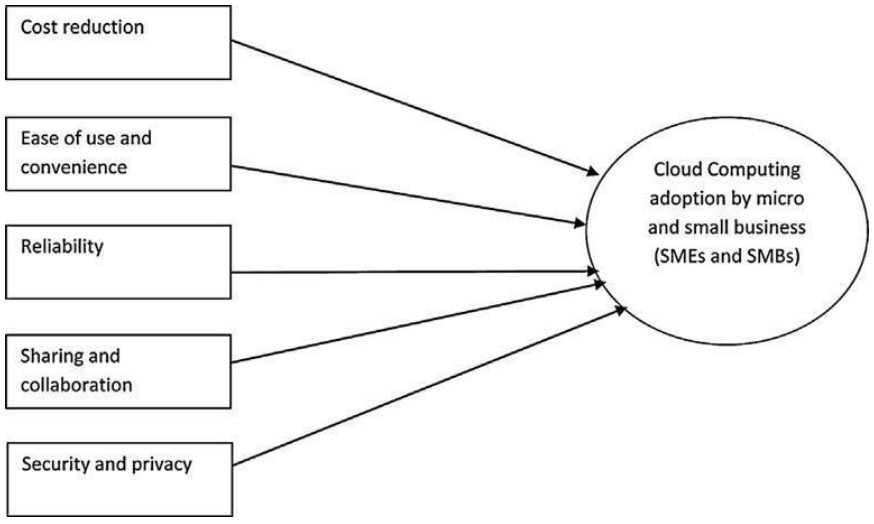


Figure 3-1: Research Cloud Framework

1) Cost Reduction

Small businesses can save a lot of money thanks to the subscription model (Ankeny, 2011). Initial cost for small businesses using market analytics, which requires a lot of computer resources, has been reduced (Marston et al., 2011). After using AWS (Amazon Web Services) as the cloud provider, costs have been reduced by 70%. (CC 2011). Despite a lack of strategic advantages, AWS has reduced their prices several times in the last three years (McAfee, 2011). European SMEs, which is much more averse to risk than US SMEs, value lower fixed IT asset costs as well as lower IT asset management costs, resulting in a lower entry barrier (Etro, 2011).

Startups could afford commercial apps such as Salesforce.com (CRM tool) because of the per customer revenue model (Klie, 2011; Mahesh et al., 2011). This is consistent with the pattern of computing being a commodity (much like hardware) as a result of fierce rivalry and the proliferation of open-source software. As a result of downward market forces, cloud services are now seen as a commodity; thus, large-scale usage of cloud storage must be ensured, close to volume purchases except at a lower price (Durkee, 2010). Computing capacity is now seen as a luxury as a result of the introduction of new entrants who offer it at a reasonable price (Marston et al., 2011).

Scalability of services offered by cloud vendors (operational excellence) becomes a major strategic benefit for risky business models as demand increases rapidly at short notice (Mahesh et al., 2011). A US startup, for

example, has grown from 50 to 3500 Amazon cloud servers. It is now as simple as adding blocks to an existing grid to increase computing capacity. Another example is SmugMug (an online photo website), whose workload more than doubles during the holiday season but is well handled by cloud computing (Marston et al., 2011).

2) Convenience and ease of use

Employees with small businesses often work outside the real office location, so having easy access to this information via mobile apps is a huge benefit (Ankeny, 2011; Jain, 2011). Any prerequisite for remote connectivity for employees, as well as the number of internet transactions, requires the use of a cloud computing solution (Mahesh et al., 2011). Accounting and management practices have been shifted to the cloud, giving small business owners more time to spend on strategic strategies and jobs (Krell, 2011). Canadian SMEs are drifting away from computer-based accounting software and into cloud-based accounting software (Stoller, 2011).

This eliminates the need for a small company to update its devices on a regular basis, while avoiding maintenance headaches associated with the use of various computers (Mahesh et al., 2011). Accountants use cloud services for their SMEs clients in exchange for a reduced monthly fee (Kevany, 2011). It is simple to replace FTP (file transfer protocol) with uploads to a cloud platform for example box.net (Devaki, 2011; Jain, 2011; McAfee, 2011). Cloud computing

also reduces logistical overhead and allows access from either geographical area, system, or entity (McAfee, 2011). Less efficient devices (smartphones, netbooks) can access the company's backend IT systems through a basic web-based GUI, such as the AWS Management console (Marston et al., 2011).

3) Reliability

The cloud is more secure, and it is open 24 hours a day, seven days a week. Employees may also contact the cloud center (if necessary) rather than relying on in-house IT personnel (Ankeny, 2011). Data redundancy is provided by cloud storage services to ensure that files remain available even during power outages and network outages (Devaki, 2011). Despite AWS's demise in 2011, this built-in continuity allowed Netflix to remain operational (McAfee, 2011). Gmail has had a 99.984 percent uptime in 2010, making it 32 times more accurate than the typical daily used email system. On the contrary, while cloud computing dependability is critical for SMEs, it is not as critical for large companies (Sultan, 2011). End-user data portability to another cloud service (in the case of the primary provider's failure) is also important, according to Sultan. Interoperability is a widespread problem in the cloud computing landscape (Rath, 2012). Furthermore, the downtime of various enterprise cloud systems such as Salesforce.com, Amazon, Gmail, and Google Docs influences functionality, necessitating the implementation of failsafe cloud providers. The Federal Trade Commission (FTC) and the Cloud Security Alliance are collaborating to improve the dependability of

these cloud services (Mahesh et al., 2011). Despite the low costs of cloud computing, the required degree of stability must be maintained (Durkee, 2010). Redundancy of n + 1 is needed to have 99.999 percent uptime. He goes on to say that swift phone service is required by commercial enterprises in order to meet guaranteed SLAs. Having automated emergency management and backup in place gives you peace of mind.

4) Sharing and collaboration

With the emergence of social media and cell phones (mobile devices), startups and small enterprises have improved internal communication (Krell, 2011). Cloud file storage allows SMB investors to share information and data (via emails, shared web links, and IM-instant messengers), store, and download data from one another (Devaki, 2011; Jain, 2011). Google Apps, Package, and Jive are great examples of stakeholder collaboration and collaboration (McAfee, 2011; Sultan, 2011). Significant volumes of data are exchanged, and collaboration with other CSE (Computational Science and Engineering) research groups is possible (Truong & Dustdar, 2011). Using the cloud, the very same evaluation case configurations can be quickly replicated. Collaboration is made possible with cloud-enabled IMs (instant messaging) and video conferencing (Payton, 2010). The opportunity for many users to edit the same document at the same time (via Google Docs) and share (via Skype, Google chat) persuades users to support cloud computing (Marston et al., 2011).

5) Security and Privacy

Organizations debating cloud security are probably more concerned about obtaining their own access (such as a private cloud) than any other serious problem (Payton, 2010). Cloud protection is beneficial because authentication and encryption reduce risk (Jain, 2011; Mahesh et al., 2011). Security is improved by, for example, recording habits, detecting transactions, granting users limited access, and using secure passwords. Sultan claims that 75% of the CIOs in his sample are worried about cloud encryption and claims that Google does not encrypt data on their servers (Sultan, 2011). Sultan, on the other hand, claims that 66 percent of USB drives are missing, implying that the cloud is more reliable. Installing security fixes can be skipped, saving time and money. Depending on the cloud solution used, there could be some leeway; for example, Google Apps requires some customers to designate the location of data storage in order to comply with Federal guidelines (Mahesh et al., 2011). Because of economies of scale and the affordability of outstanding defense consultants, enhanced security is possible (Neves et al., 2011). Despite the fact that data protection is the primary concern for SMBs, they continue to use public clouds because they offer standard services at a low cost (Li et al., 2011).

The availability of secure online banking functionality is driving the growth of e-banking since it is now very easy for ordinary consumers to use, enhancing

their ease of doing regular financial duties from home instead of visiting an ATM (Featherman, Miyazaki, & Sprott, 2010; Jahangir & Begum, 2007; Lallmahamood, 2007). Because of its high level of security and simplicity of use, online shopping via the internet is gaining popularity (Islam & Daud, 2011). Global travelers find the internet to be extremely easy to use while flying to different countries, expanding their access to entertainment needs as a result of their faith in protection (Ryan & Rao, 2008). Individual motivation for bringing your own machine (BYOD) into the workplace is rising as a result of questions around data security and privacy. At the same moment, it makes it easier for employees to view office emails on their own devices rather than the cumbersome laptops provided by the organization. As a result, employee productivity increases (Chigona, Robertson, & Mimi, 2012).

Security has a significant impact on device stability. A secure computing framework is one that is dependable. As a result, developing a highly stable cloud infrastructure is critical (Burtescu, 2010; Hanmer, McBride, & Mendiratta, 2007).

CHAPTER FOUR

CLOUD VENDORS

Cloud adoption is increasing as agile growth, fast rollout, and infinite scale become the new standard for consumers of all sizes, sectors, and geographies. Following are some Cloud vendors:

1. Amazon Web Services (AWS)
2. Microsoft Azure
3. Google Cloud
4. Alibaba Cloud
5. IBM Cloud
6. Oracle
7. Salesforce
8. SAP
9. Tencent Cloud
10. Rackspace Cloud
11. VMWare

AWS is classified as a Leader in Gartner's first provider assessment covering all cloud computing and platform resources (IaaS & PaaS, or "CIPS"), with the best ranking in all measuring axes, Ability to Execute and Completeness of Vision.

Discover why Gartner named AWS a Leader, how a Leader in this category is classified, and delve deep into the benefits that public cloud can offer to your company in this article.

Figure 5-1: Gartner 2020 Magic Quadrant

Amazon Web Services

Amazon Web Services (AWS) is the world's most robust and widely used cloud network, with over 200 feature rich services available from data centers around the world. Millions of clients, including the fastest-growing startups, largest businesses, and leading government departments, use AWS to reduce costs, become much more efficient, and innovate more quickly (What Is AWS, n.d.). Some AWS services: Compute services, Storage, Database, Networking.
Some Management Tools: Cloud Watch, Cloud Formation.
Some Developers Tools: AWS CodeBuild.

Compute Services

- Amazon EC2
- Amazon EC2 Auto Scaling
- AWS Elastic Beanstalk
- Amazon Elastic Container Service
- AWS Lambda

Amazon Elastic Compute Cloud (Amazon EC2) is a cloud computing web service that delivers stable, resizable compute power. It is intended to create web-scale computing more accessible to programmers.

The user-friendly web interface of Amazon EC2 makes it simple to attain and customize capability. It gives you total command of your machine means and encourages you to work on Amazon's tried-and-true computing infrastructure. Amazon EC2 decreases the period it takes to acquire and boot original server instances (known as Amazon EC2 instances) to minutes, letting you to rapidly gauge power up and down as the computing needs alteration. Amazon EC2 varies the economics of computing by allowing you to only pay for the power you need. Amazon EC2 provides programmers and application managers with the tools they need to shape fault-tolerant systems and avoid shared failure situations (Amazon Elastic Compute Cloud Documentation, n.d.)

Instance Types: Amazon EC2 transfers Amazon's financial benefits to you. You are paying a very low fee for the processing resources that you need right now. (Amazon EC2 Instance Types - Amazon Web Services, n.d.).

1) On-Demand Instances
2) Reserved Instances
3) Spot Instances

Amazon EC2 Auto Scaling

Amazon EC2 Auto Scaling assists you in maintaining app accessibility by automatically adding and removing EC2 instances based on requirements you

specify. You can use Amazon EC2 Auto Scaling's fleet management features to keep your fleet healthy and accessible. You can also use Amazon EC2 Auto Scaling's dynamic and predictive scaling capabilities to add or delete EC2 instances. Dynamic scaling adjusts to changing demand, while predictive scaling automatically schedules the appropriate number of EC2 instances based on forecast demand. Dynamic scaling and statistical scaling can be used in tandem to accelerate scaling (What Is Amazon EC2 Auto Scaling? - Amazon EC2 Auto Scaling, n.d.).

AWS Elastic Beanstalk

AWS Elastic Beanstalk is a basic service for downloading and scaling Java, .NET, PHP, Node.js, Python, Ruby, Go, and Docker web apps and utilities on well-known platforms such as Apache, Nginx, Passenger, and Internet Information Services (IIS). Just upload the code, and AWS Elastic Beanstalk can take care of the rest, including bandwidth provisioning, load balancing, auto scaling, and system health auditing. Simultaneously, you have full control over the AWS software that power the program, as well as unrestricted access to the underlying infrastructure (AWS Elastic Beanstalk Documentation, n.d.).

AWS Lambda

AWS Lambda enables you to run applications without the need to provision or maintain servers. You just pay for the duration you use—there are no penalties if

the code is not running. You may use Lambda to course code for virtually any kind of backend operation—all while requiring no administration. Simply upload the javascript, and Lambda can handle anything needed to run and gauge it with high obtainability. You can configure the code to be triggered automatically by other AWS utilities, or you can call it straight from either platform or smartphone (AWS Lambda Documentation, n.d.).

Amazon Elastic Container Service

Amazon Elastic Container Service (Amazon ECS) is a container orchestration service that supports Docker containers and helps you to quickly operate and scale containerized applications on AWSYou no longer need to create and maintain your own container orchestration software, handle and scale a cluster of virtual servers, or manage containers on those virtual machines using Amazon ECS. Using easy API calls, you can start and stop Docker-enabled programs, question the entire state of your server, and control some common structures including IAM functions, protection classes, load balancers, Amazon CloudWatch Events, AWS CloudFormation templates, and AWS CloudTrail logs (Amazon Elastic Container Service Documentation, n.d.)

Storage

AWS provides a comprehensive set of resources for storing, accessing, governing, and analyzing data in order to minimize costs, improve agility, and

drive creativity. To lay the groundwork for your cloud IT environment, choose from object storage, file storage, and block storage facilities, as well as backup and data migration options. (Amazon Simple Storage Service Documentation, n.d.).

AWS Storage services

- Object storage
- File storage
- Block storage

Amazon Simple Storage Service: Amazon S3 is an object storage solution that provides industry-leading scalability, data access, reliability, and presentation. Customers of all dimensions and sectors can use it to accumulate and preserve any volume of data for a variety of use cases, including data lakes, portals, smartphone apps, backup and restore, database, business software, IoT tablets, and big data analytics. Amazon S3 offers simple management features that allow you to arrange your data and customize precisely tailored access controls to suit your unique corporate, operational, and enforcement needs. Amazon S3 is optimized for 99.999999999 percent (11 9's) durability and data storage for millions of smartphones used by companies all over the world (What Is Amazon S3? - Amazon Simple Storage Service, n.d.).

Amazon Elastic File System: Amazon Elastic File System (Amazon EFS) is a plain, serverless, set-and-forget elastic file system that permits you to transfer file data with no need to provision or administer storage. It is planned to scale to petabytes on demand with no disruption to applications and can be used by both AWS Cloud storage and on-premises networks. You can use Amazon EFS to dynamically expand and shrink your file systems as you add and delete files, removing the need to provision and maintain space to handle growth (What Is Amazon Elastic File System? - Amazon Elastic File System, n.d.).

Amazon Elastic Block Store: Amazon Elastic Block Store (EBS) is a simple, high-performance block storage service optimized for use with Amazon Elastic Compute Cloud (EC2) for both high-throughput and transaction-intensive workloads at any volume. Amazon EBS can run relational and non-relational databases, enterprise applications, containerized apps, big data processing engines, filetypes, and multimedia workflows. (Amazon Elastic Block Store (Amazon EBS) - Amazon Elastic Compute Cloud, n.d.).

Database

Amazon DynamoDB: Amazon DynamoDB is a crucial and record database with precision of only digit milliseconds at any gauge. It is a fully administered, multi-region, multi-active, long-lasting database with in-built encryption, storage and retrieval, and in-memory saving for web-scale apps.

DynamoDB can hold over 10 trillion requests per day, with peaks exceeding 20 million requests per second. Many of the world's leading companies, such as Lyft, Airbnb, and Redfin, as well as businesses such as Samsung, Toyota, and Capital One, rely on DynamoDB's gauge and reliability to keep mission-critical workloads running (What Is Amazon DynamoDB? - Amazon DynamoDB, n.d.).

Networking and Delivery of Content

- Amazon VPC
- Amazon CloudFront
- Amazon Route 53

Amazon VPC: Amazon Virtual Private Cloud (Amazon VPC) enables you to create a rationally independent unit of the AWS Cloud from which you can operate AWS services in a wireless server of your choice. You have complete control over the virtualized environment, including the ability to create your own IP address collection, subnets, route tables, and network gateways. You could use both IPv4 and IPv6 in your VPC for safe and simple access to services and apps. You will simply modify the system configuration for your VPC. You can, for example, create a public-facing subnet with Internet access for your web servers and a private-facing subnet with no access to the internet for your backend networks like databases or application servers. To help control access to EC2

instances in each subnet, you can use different levels of protection (such as security classes and network access control lists).

You can also provide a hardware virtual private network (VPN) link among your business data center and your VPC and use the AWS Cloud as an expansion of your commercial data center (What Is Amazon VPC? - Amazon Virtual Private Cloud, n.d.).

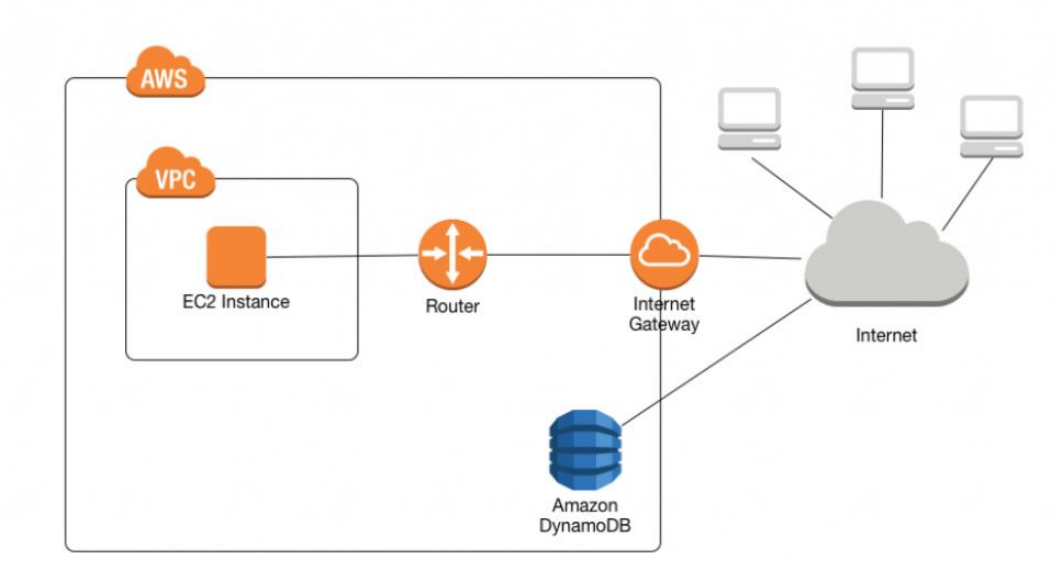


Figure 5-2: Amazon Virtual Private Cloud

Amazon CloudFront: Amazon CloudFront is a quick content delivery network (CDN) system that reliably brings files, images, applications, and APIs to clients worldwide with low latency and tremendous upload speeds, all while being developer friendly. CloudFront is attached to AWS, with all physical sites that are

straight associated to the AWS global networks and other AWS facilities. CloudFront integrates with AWS Shield for DDoS prevention, Amazon S3, Elastic Load Balancing, or Amazon EC2 as device source, and Lambda Edge to run custom code closer to customers' users and optimize the user interface. You will get started with the Content Delivery Network in minutes by using the same AWS resources you already know APIs, AWS Management Console, AWS CloudFormation, CLIs, and SDKs. Amazon's CDN has a straightforward pay-as-you-go business model with no annual costs or long-term commitments, and coverage is included in the current AWS Support package (What Is Amazon CloudFront? - Amazon CloudFront, n.d.).

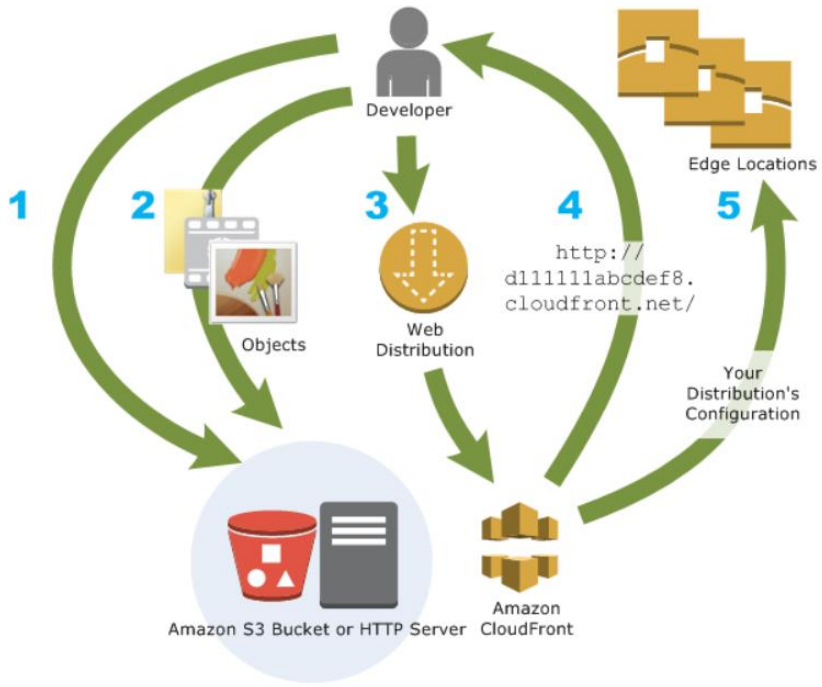


Figure 5-3: Amazon CloudFront

Amazon Route 53: Amazon Route 53 is a cloud Domain Name System (DNS) network service that is highly open and scalable. It is intended to provide developers and companies with an incredibly dependable and cost-effective method of routing end workers to Internet operations by converting human-readable terms, such as www.example.com, into the numeric IP addresses that machines use to communicate to one another. Amazon Route 53 is also completely IPv6 compliant.

Amazon Route 53 links user requests to AWS infrastructure, such as EC2 cases, Elastic Load Balancing load balancers, or Amazon S3 bins, and can also be used to route users to infrastructure that is not hosted by AWS. You can use Amazon Route 53 to configure DNS health tests to guide traffic to healthier end - points or to monitor the health of your application and its end-points separately. Amazon Route 53 traffic flow allows you to manage traffic globally by using a number of routing types, including latency-based routing, Geo DNS, and weighted round robin—all of these can be combined with DNS Failover to allow a range of low-latency, fault-tolerant architectures. Using Amazon Route 53 traffic flow's simple visual editor, you can easily manage how your potential customers are led to your application's endpoints, whether they are in a single AWS Region or distributed across the globe. Amazon Route 53 also has Domain Name Registration, which allows you to buy and maintain domain names like example.com, and Amazon Route 53 can automatically customize DNS settings for the domains. (Amazon Route 53 Documentation, n.d.)

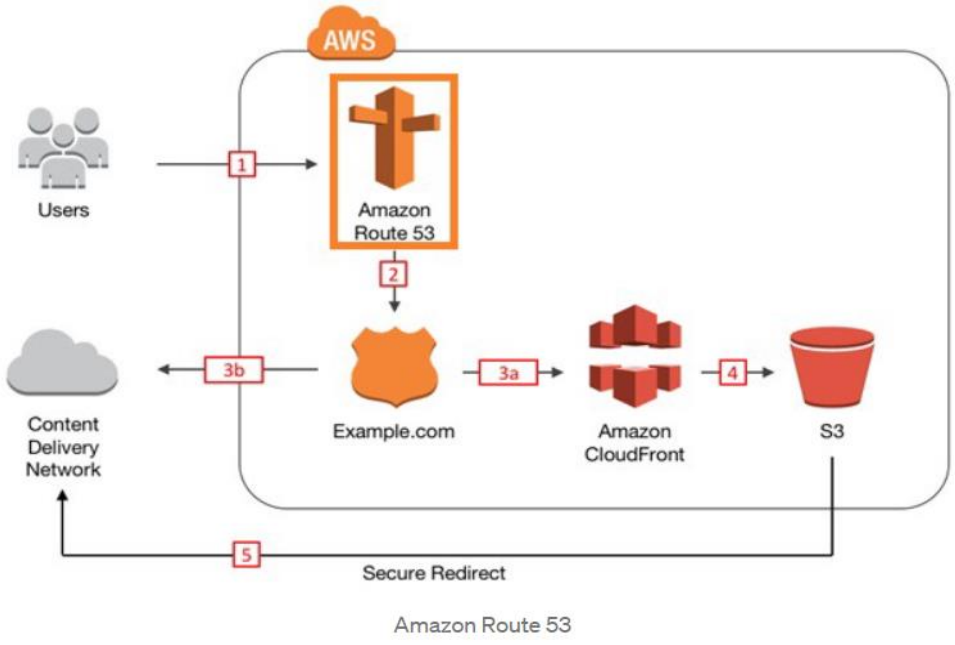


Figure 5-4: Amazon Route 53

Management Tools

Use this service to lower costs, reduce risks, and simplify all services operating on the AWS infrastructure.

Cloud Watch: It is a tool to keep a track for AWS resources and consumer applications operating on the AWS platform.The service allows you to collect and view all of your operating data in the form of logs through a single interface (What Is Amazon CloudWatch? - Amazon CloudWatch, n.d.).

Cloud Formation: With this service, you can access all of your AWS resources in one place, allowing you to spend less time managing those services and more time designing apps. It allows developers to control their cloud infrastructure by text files or models (What Is AWS CloudFormation? - AWS CloudFormation, n.d.).

Developer Tools

It enables a user to automatically create, execute, and run program source code. It also refreshes the server and instance based on the workload.

CodeBuild: Amazon Web Services (AWS) CodeBuild is a professionally managed continuous delivery service that compiles source code, performs reviews, and generates ready-to-deploy software packages. You don't have to provision, maintain, or scale your own build servers with CodeBuild. CodeBuild scales endlessly and processes several builds simultaneously, meaning the builds are never held up in a queue. You can get started easily by using prepackaged build environments, or you can make personalized build environments that use your own build software. CodeBuild charges you by the minute for the compute power you need (What Is AWS CodeBuild? - AWS CodeBuild, n.d.).

AWS Demo: Setting up a static website

For this project I have created a static website named ‘www.gaurinadeprofile.com’ and hosted it on Amazon Web services. In order to host the website (static website) on Amazon S3, I have purchased the domain with Amazon Route 53 service (e.g., gaurinadeprofile.com), and when requested to these http://www.gaurinadeprofile.com and http://gaurinadeprofile.com URLs, it should be served from AWS simple storage service i.e. S3. To increase the performance of website Amazon’s CloudFront service is useful (Web Hosting - Amazon Web Services (AWS), n.d.).

Note: Here in this demo, I am using following services of AWS:

Amazon Route 53: Route 53 is used to register domain name of our choice and to state where to route internet traffic for the registered domain. Here this example shows how to create Route 53 alias records that route traffic for registered domain (gaurinadeprofile.com) and subdomain (www.gaurinadeprofile.com) to an Amazon S3 bucket which has a code in HTML file.

Amazon S3 – Amazon S3 is a storage service in which data is stored in buckets, after creating the buckets, upload a code of website i.e. HTML file, configure permissions so that when users access the website, they can view the content.

Below are the steps which I followed in order to configure a website in AWS:

A. Registering a domain name with Amazon Route 53 Service

B. Creating S3 buckets

C. Root domain bucket configuration for hosting a website

D. Subdomain bucket configuration for redirection of website

E. Website traffic log configuration

F. Uploading index and website content

G. Change S3 Block Public Access settings

H. Attach a bucket policy

I. Domain endpoint testing

J. Testing of the website

A. Registering a domain name with Amazon Route 53 Service

1. In order to access the Route 53 console sign into the AWS account.

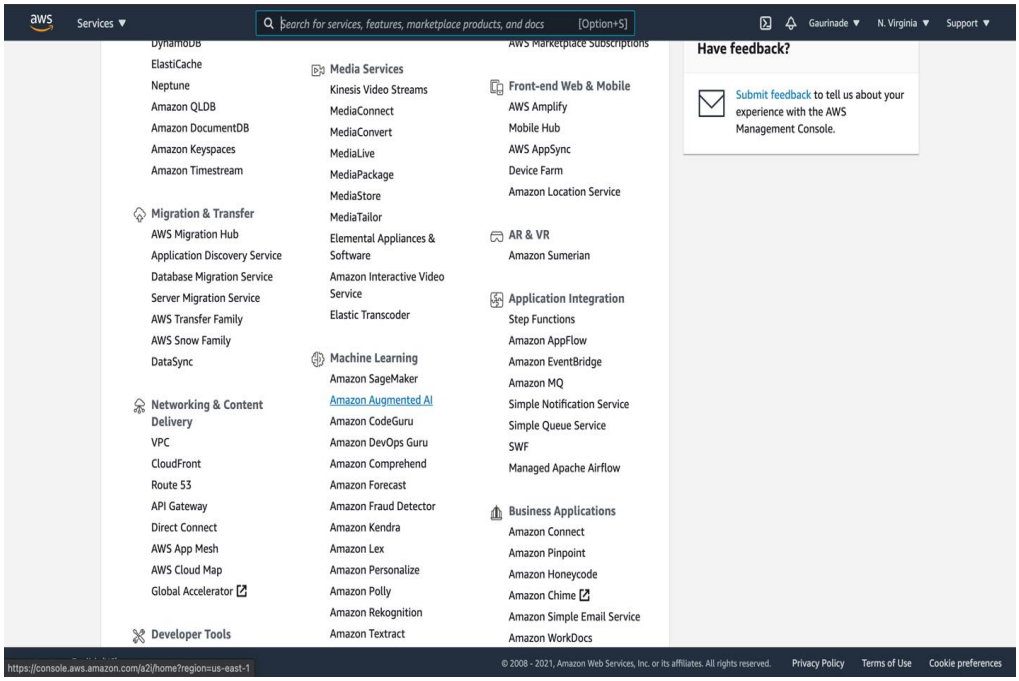


Figure 5-5: Amazon Management Console

2. Select Registered domains from the navigation pane,

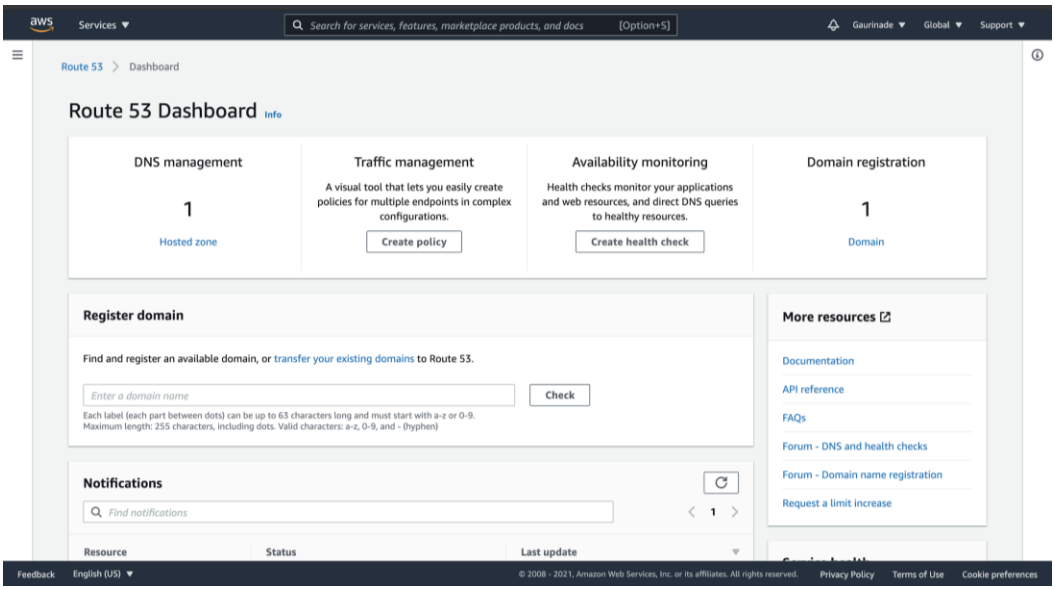


Figure 5-6: Amazon Route 53 Console

3. Select ‘Register domain’, and mention the domain that needs to be register:

   Enter the desire domain name that needs to be register and click on the ‘Check’ button to see the availability of the domain name.

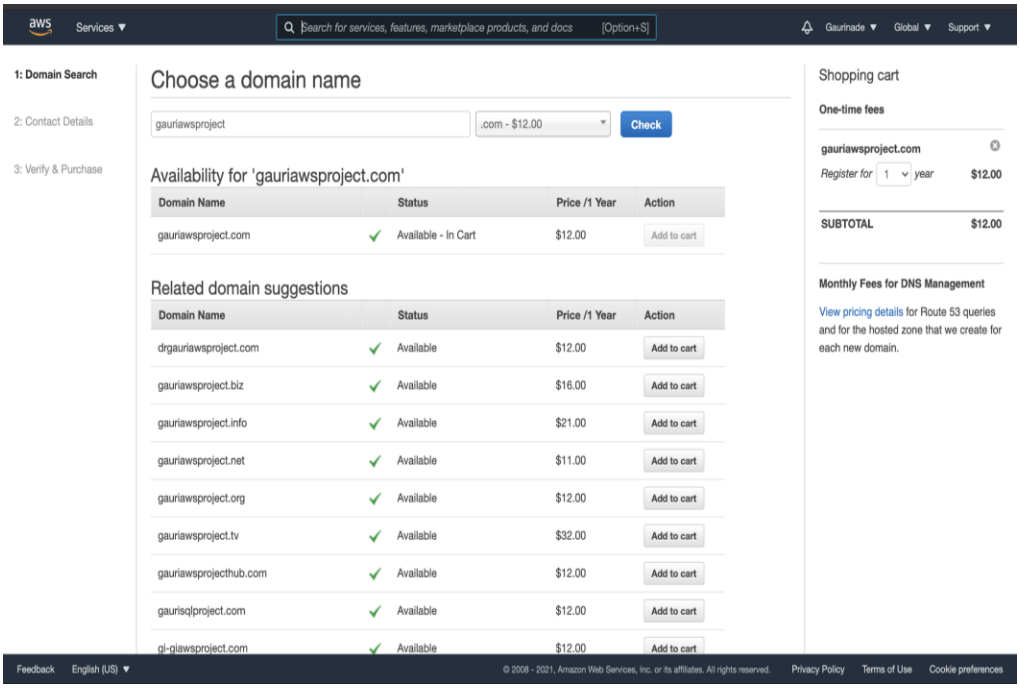


Figure 5-7: Amazon Route 53 Domain Name

Add the domain name in the cart if it is available to use, select the number of years for which the domain name should be available. For this demo I have selected 1 year, so this ‘www.gaurinadeprofile.com’ will be valid only for 1 year.

4. Select Continue.
5. Type all the mentioned contact information.

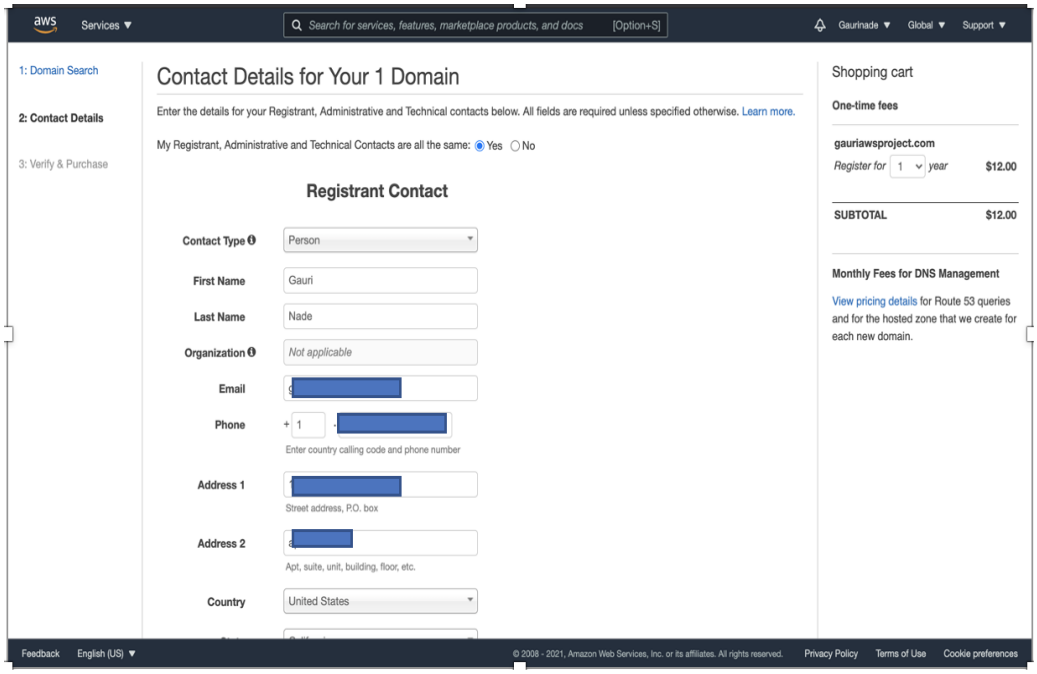


Figure 5-8: Amazon Route 53 Domain Name

6. Select Continue.
7. Some TLDs only – If specified an email address for the registrant contact that has never been used to register a domain with Route 53, some TLD registries require you to verify that the address is valid.
8. Choose whether or not AWS will renew your domain registration before it expires.
9. Examine the entered details, read the terms of service, and check the box to confirm that it.
10. Click on the button for complete the purchase.

11. After the domain has been registered, the next move is to decide if we want to use Route 53 or another DNS service as the domain's DNS service:

    Here we want Route 53 to respond to a query with the IP address of a web server in our data center or with the name of an ELB load balancer when someone types our domain name into a browser and the query is redirected to Route 53?

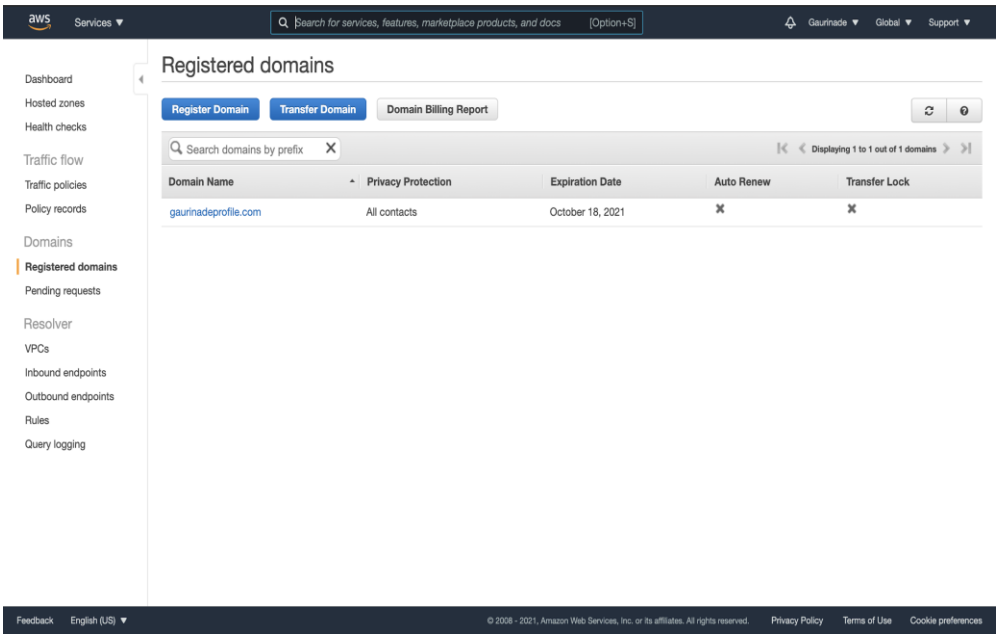


Figure 5-9: Route 53 Domain Console

B. Creating S3 buckets

- Build 2 S3 buckets to serve requests from the root domain and the subdomain.

Domain bucket name – gaurinadeprofile.com

Subdomain bucket name – www.gaurinadeprofile.com

- The names of these buckets should exactly match the domain name. The domain name. Here in this demo gaurinadeprofile.com. The root domain bucket is where we host content (gaurinadeprofile.com).
- For the subdomain bucket, we make a redirect request (www.gaurinadeprofile.com). When anyone types www.gaurinadeprofile.com into their browser, they are taken to gaurinadeprofile.com, where they can view the content stored in the AWS bucket with the same name.

Creating buckets for website hosting

1. Open the Amazon S3 console by logging into the AWS Management Console.

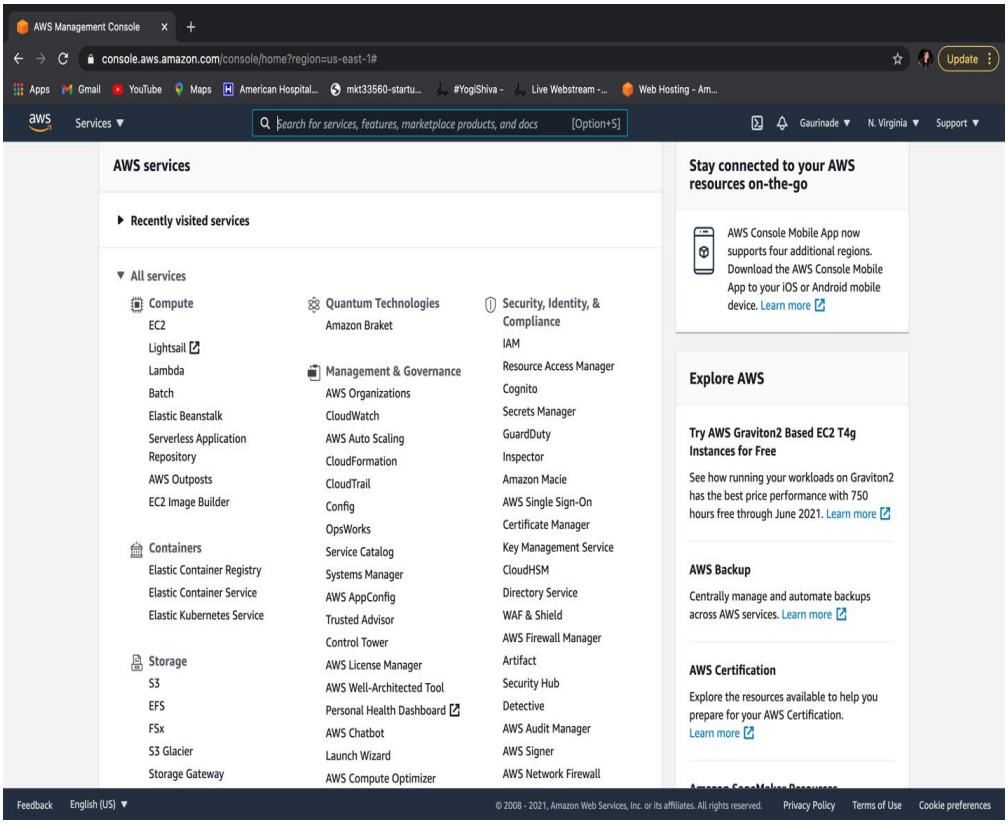


Figure 5-10: Amazon Management Console

2. Create the root domain bucket

    - Select ‘Create bucket’ field.
    - Enter the name of bucket (e.g., gaurinadeprofile.com).
    - Select the region where the bucket will be created.
    - Choose a Region that is close to you in terms of geography to reduce latency and costs, as well as to meet regulatory requirements. AWS S3 website endpoint is determined by the selected region.
    - Click on create field to acknowledge the default settings.

- Create the bucket.

3. Create the subdomain bucket:
    - Select ‘Create bucket’ field.
    - Type the name of bucket (e.g., www.gaurinadeprofile.com).
    - Select the region to create the bucket.
    - Click on create field to acknowledge the default settings.
    - Create the bucket.

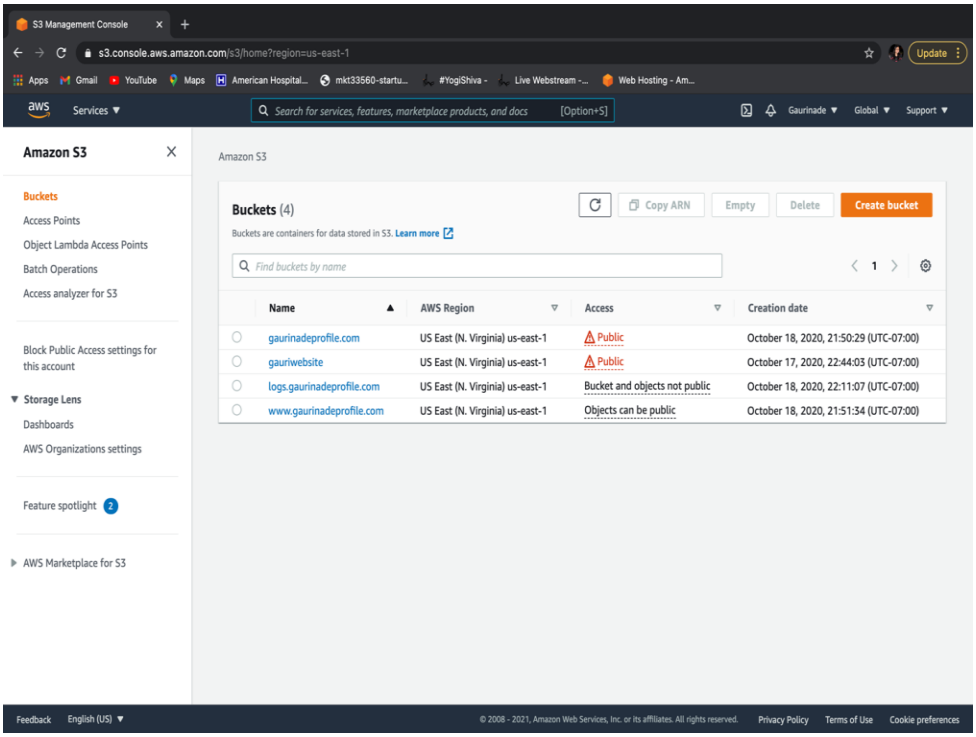


Figure 5-11: Amazon S3 Console

C. Root domain bucket configuration for hosting a website

Configure the root domain bucket as a website (gaurinadeprofile.com). This bucket will be used to store website content. When a bucket is designed for website hosting, users can access the website via website endpoints.

To enable static website hosting:

1. Open the Amazon S3 console by logging into the AWS Management Console.
2. Select a bucket name in order to enable ‘static website hosting’
3. Click on Properties.

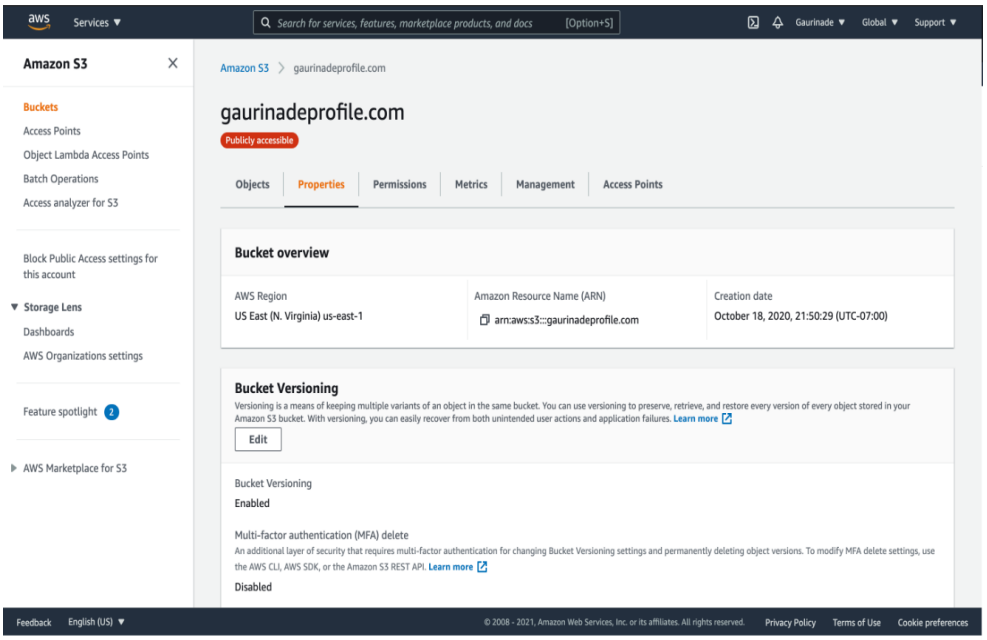


Figure 5-12: Amazon S3 Property Console

4. Below Static website hosting tab, select edit.

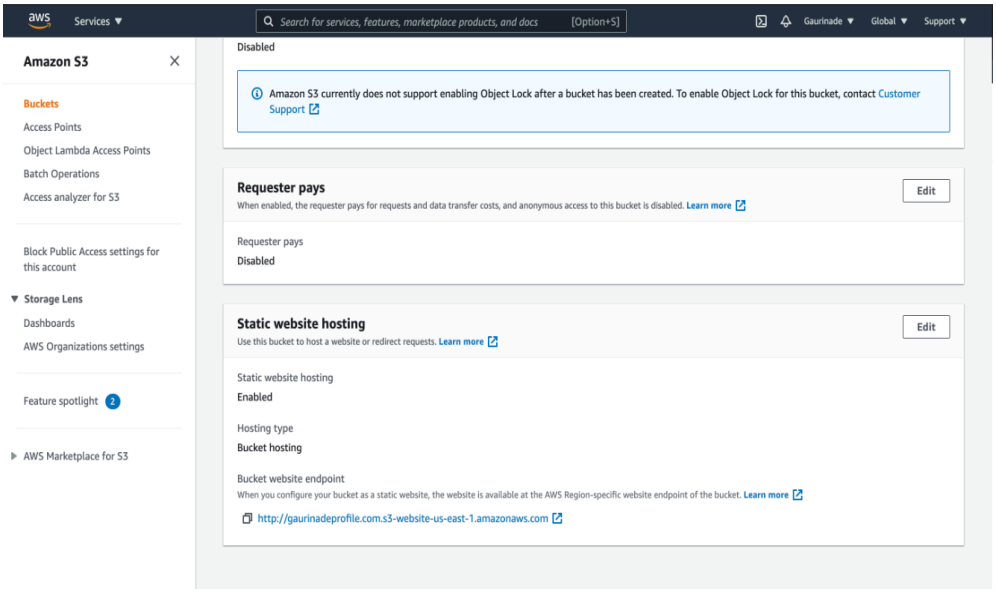


Figure 5-13: Amazon S3 Property Console

5. Select ‘Use this bucket to host a website’.
6. Below ‘Static website hosting’, select ‘enable’ checkbox.
7. Type the index document's file name, which is usually index.html.

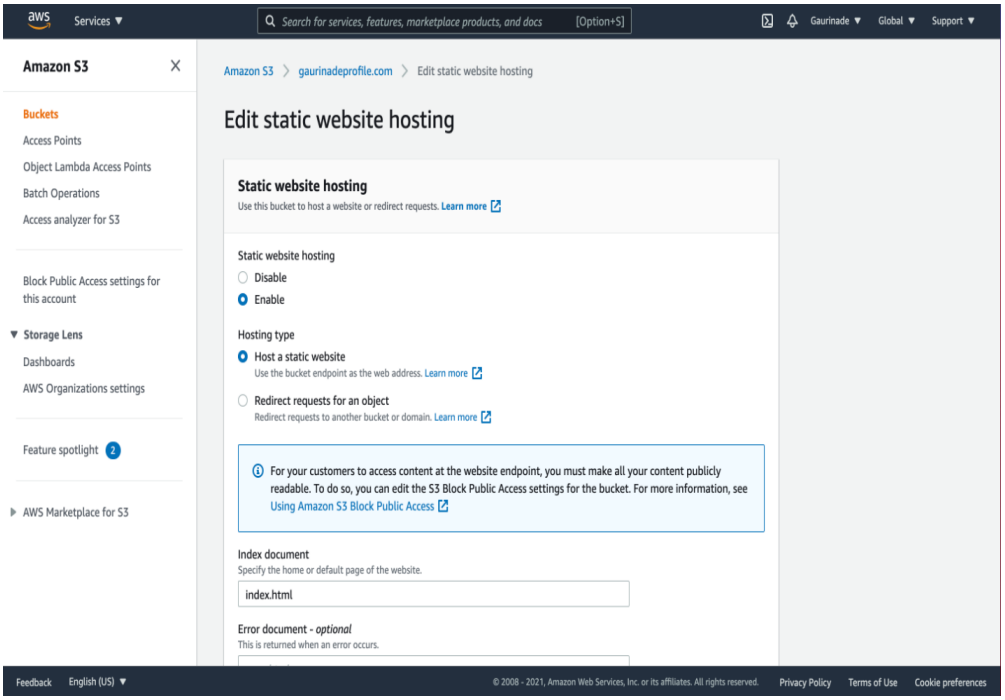


Figure 5-14: Website Hosting Console

8. Click on the ‘Save changes’ field.

bucket's static website can be hosted on AWS S3. The bucket website endpoint is listed at the bottom of the page under Static website hosting.

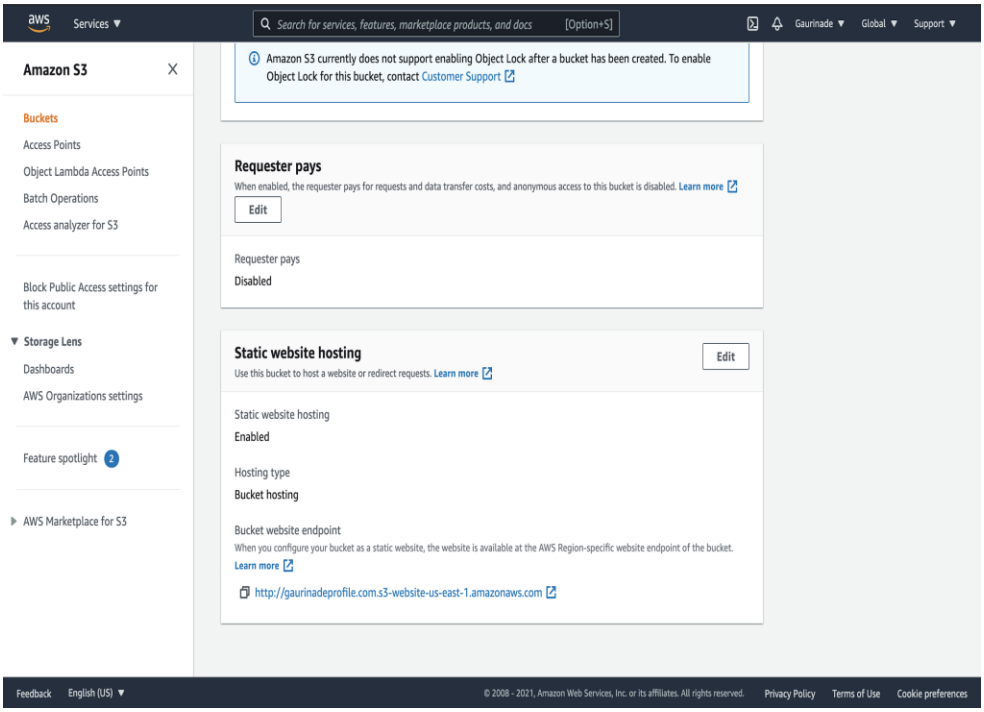


Figure 5-15: Website Hosting Endpoint

9. Note the endpoint, in static website hosting widget

   The Website can be tested with this endpoint, after finishing the configuration of the bucket.

D. Subdomain bucket configuration for redirection of website

Configure the subdomain bucket to redirect all requests to the domain after the configuration of root domain bucket for website hosting.

All requests for www.gaurinadeprofile.com are redirected to gaurinadeprofile.com in this example.

To redirect request

1. Choose the subdomain bucket name from the Buckets list in the Amazon S3 console (www.gaurinadeprofile.com).
2. Click on Properties tab.

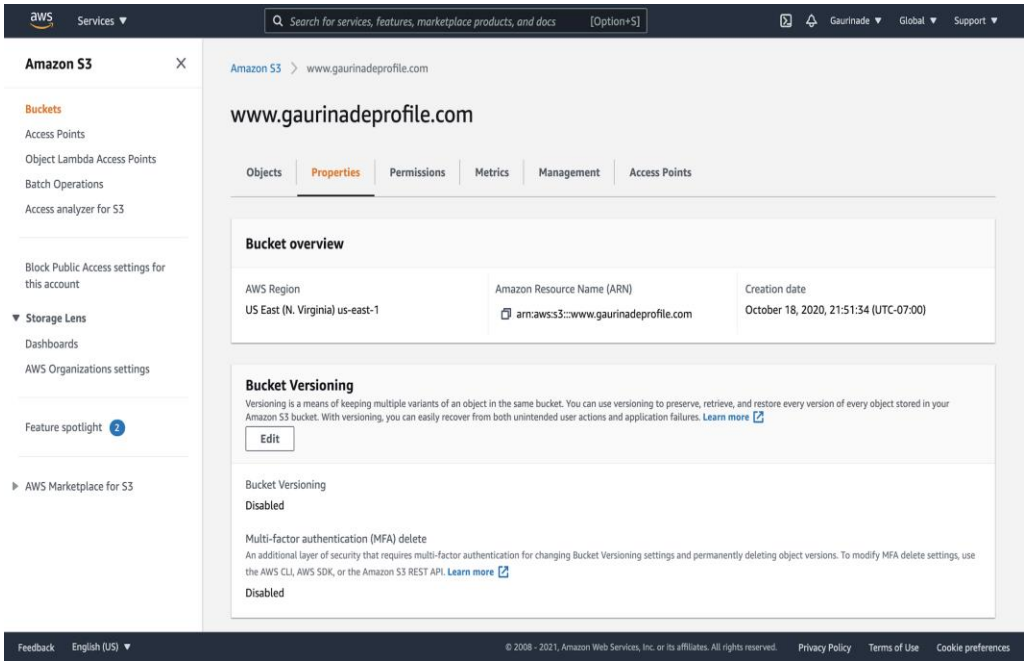


Figure 5-16: Amazon S3 Property Console

3. Below ‘Static website hosting’, select edit field.

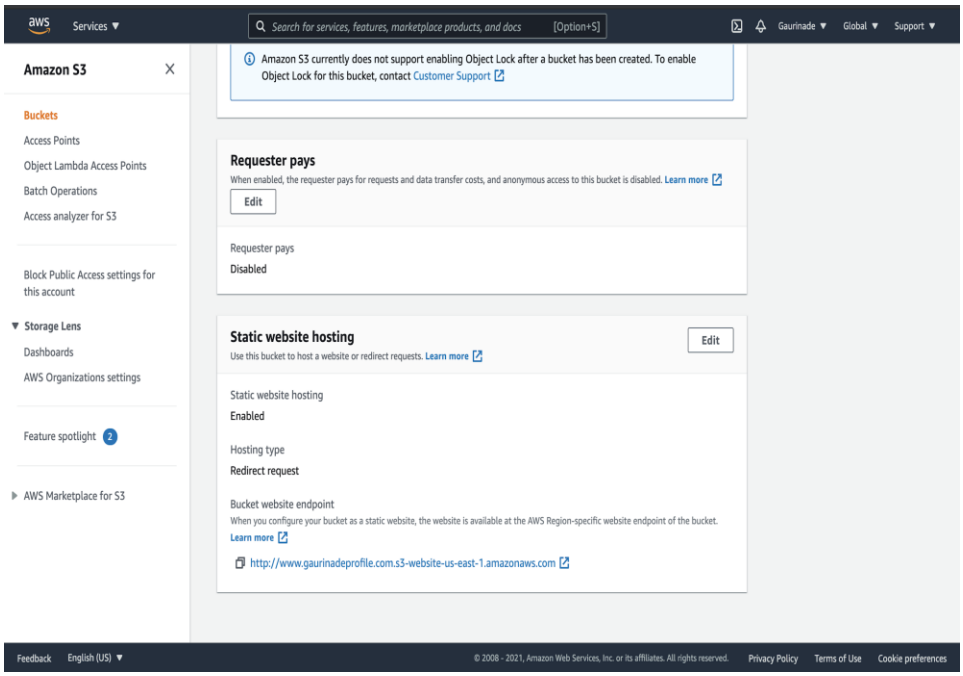


Figure 5-17: Website Hosting Console

4. Select redirect requests.
5. In the target bucket box, type name of root domain.
6. For the Protocol field, select http.

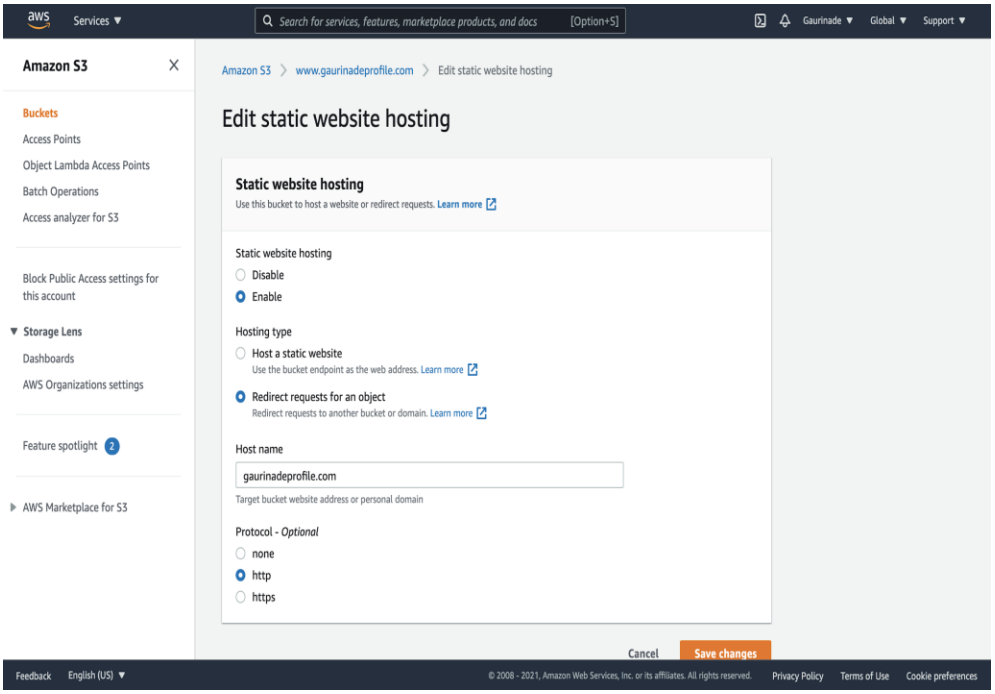


Figure 5-18: Website Hosting Console 1

7. Click on Save changes field.

E. Website traffic log configuration

In order to know the number of users accessing the website, enable logging for root domain bucket. This is an optional step.

To allow logging of server access for the root domain bucket

1. Go to the S3 management console.
2. Create a logging bucket in same region as the bucket which is configured as a static website, e.g. logs.gaurinadeprofile.com.

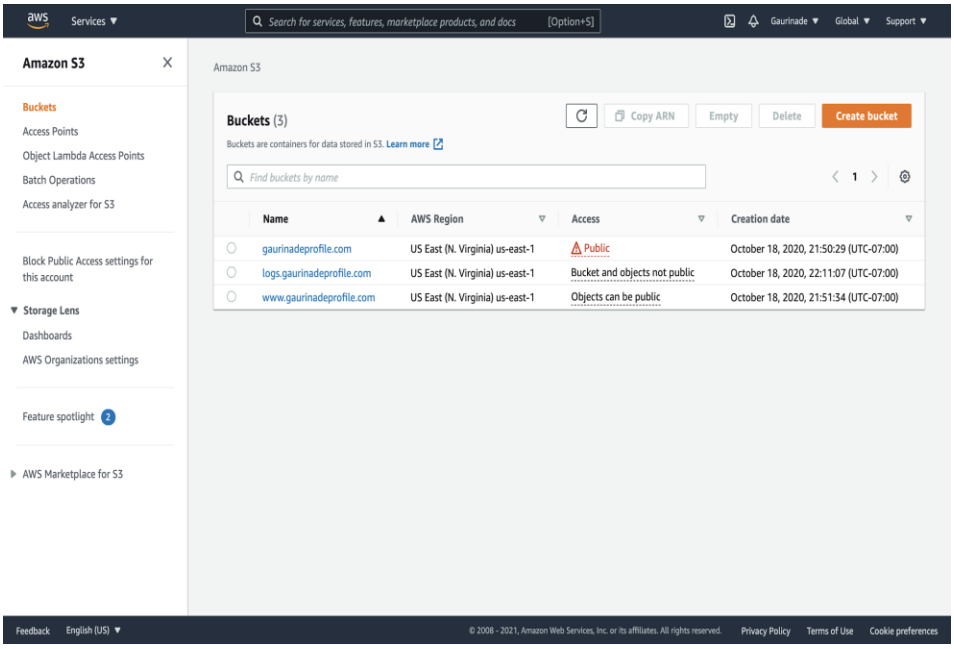


Figure 5-19: Amazon S3 Console

3. Make a folder for the log files (e.g., logs).

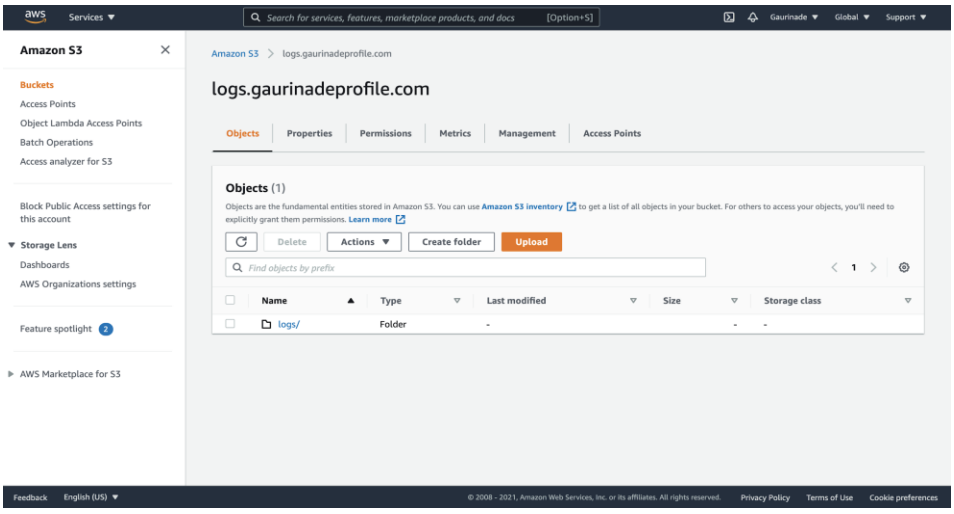


Figure 5-20: Amazon S3 Bucket Console

4. Select root domain bucket, from bucket list
5. Click on Properties tab.
6. Below ‘Server access logging’, select Edit.

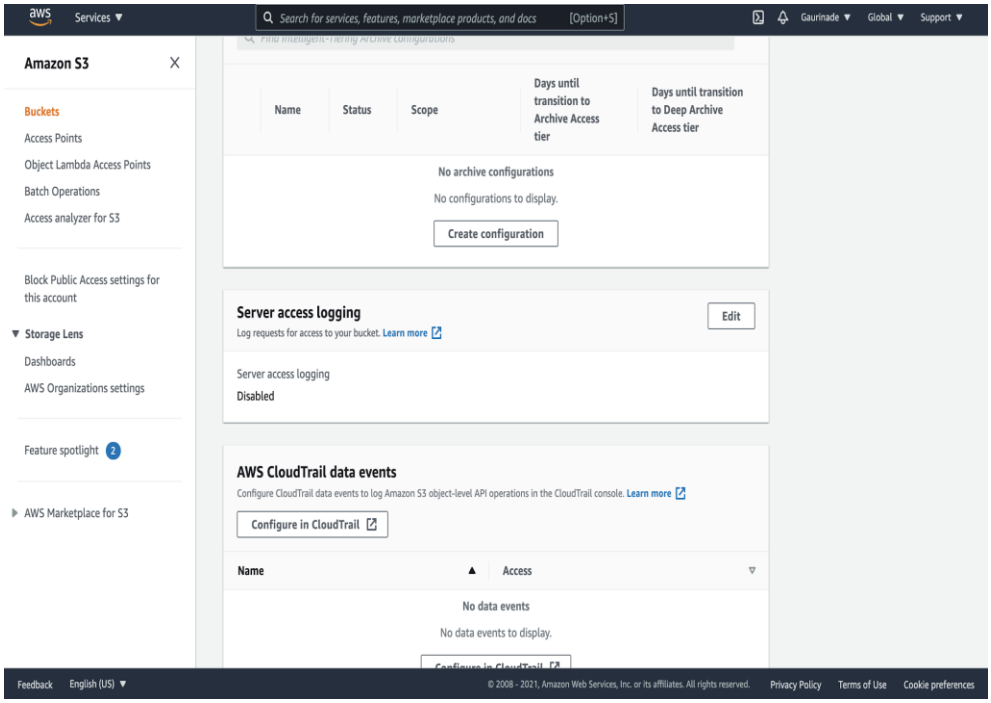


Figure 5-21: Bucket Server Access Login

7. Select Enable.
8. Pick the bucket and folder for the server access logs below the Target bucket:

   a. Go to the location of the folder:

      i. Browse S3 from the drop-down menu.

      ii. Select the bucket name, followed by the logs folder.

iii. Select the choose path.

b. Enter the S3 bucket path,

e.g. s3://logs.gaurinadeprofile.com/logs/.

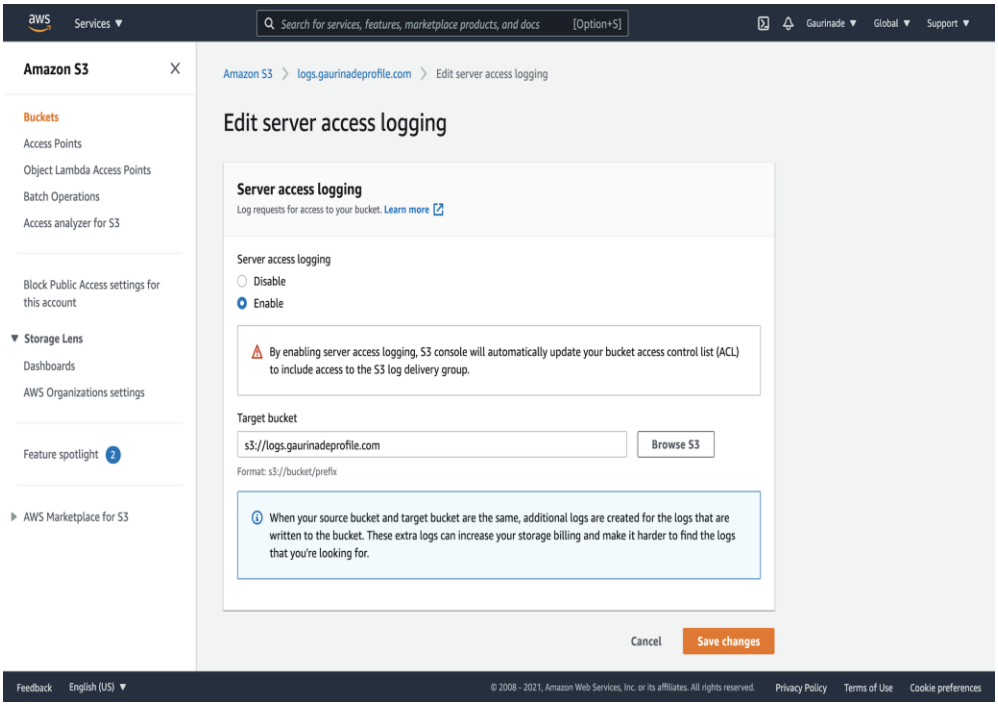


Figure 5-22: Edit Server Access Logging

9. Click on Save changes button.

   We can now browse logs in a log bucket. Every two hours, S3 buckets write access transaction logs of the website to a log bucket.

F. Upload index and website content

Enter the name of the index document when static website is allowed hosting for bucket (e.g. index.html). Once its allowed Upload an HTML file with this index document name to bucket.

To set up the indexing document

1. Make a file called index.html (Website Content)
2. Save the index file on local device.

   The name of the index document file must exactly match with the name of the index document entered in the Static website hosting dialog box.
3. Open Amazon S3 management console.
4. Select name of the bucket to host a static website from the Buckets list.
5. Allow static website hosting for bucket and specify the index document's exact name (e.g. index.html).
6. Select one of the following options to upload the index document to your bucket:
   a. In console bucket listing, copy and paste the index file.
   b. Select Upload and follow the on-screen instructions to select and upload the index file.

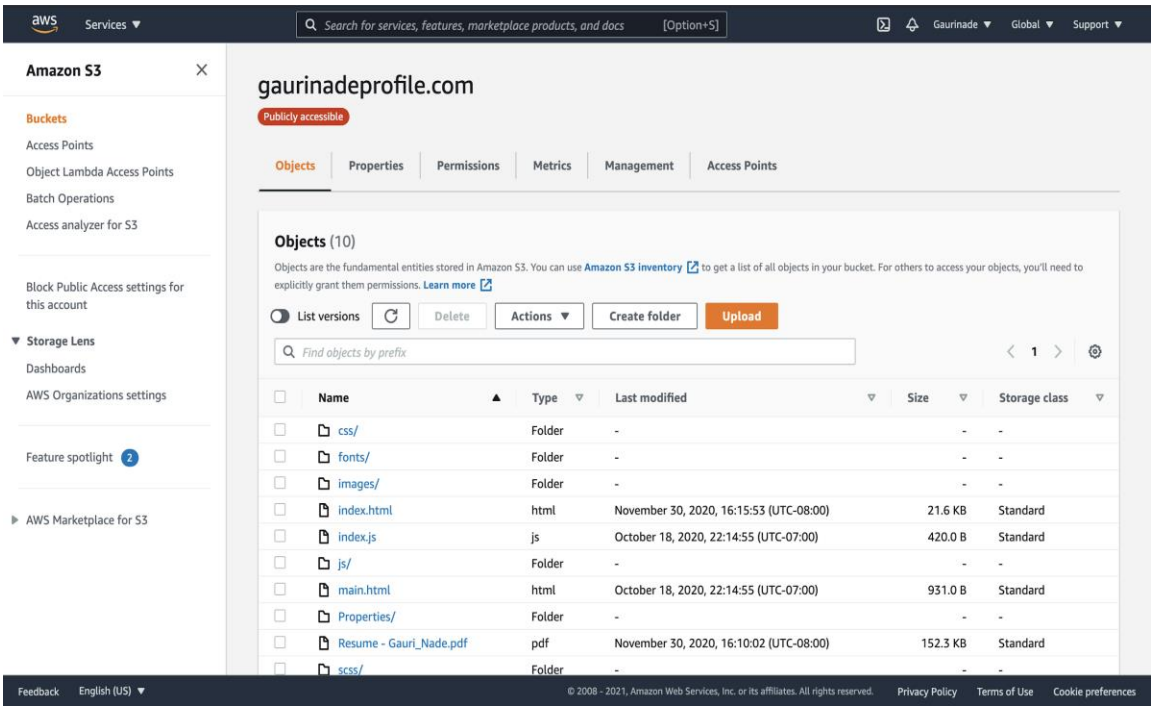


Figure 5-23: S3 Bucket List Console

Your bucket's static website can be hosted on Amazon S3. The website endpoint for our bucket can be found at the bottom of the list, under Static website hosting.

G. Change S3 Block Public Access settings

By default, S3 restricts public access to account and buckets. These measures can be used to edit block public access settings, if we want to use a bucket to host a static website.

1. Go to the Amazon S3 console and log in.
2. Select the name of the bucket which configured as a static website.
3. Select Permissions tab.

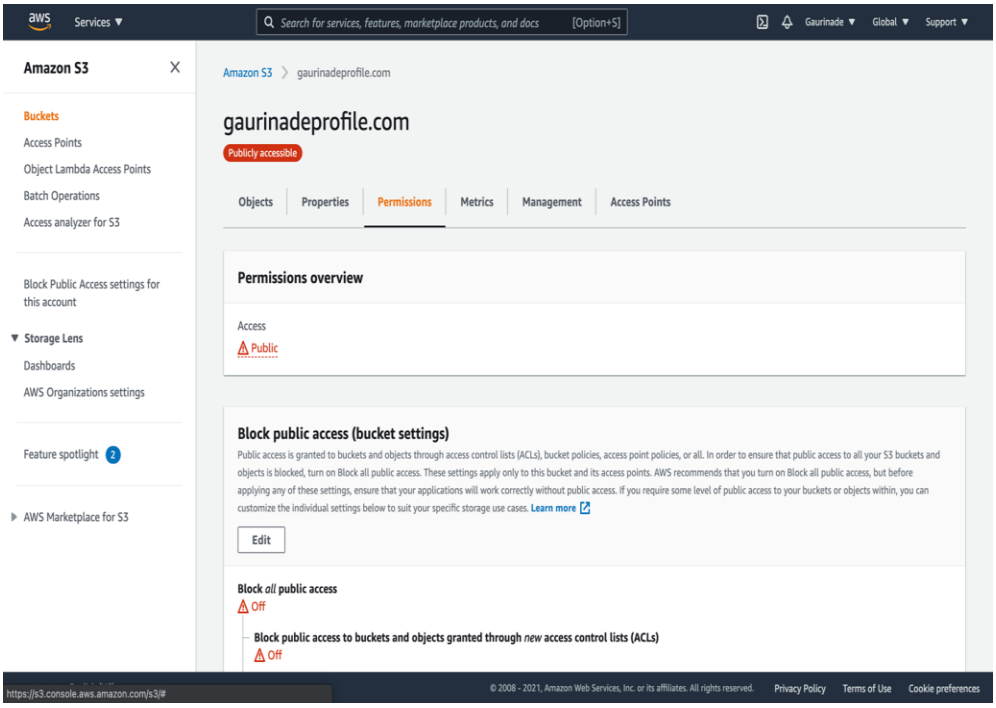


Figure 5-24: Bucket Permission Console

4. Below Block public access (bucket settings), Select Edit.

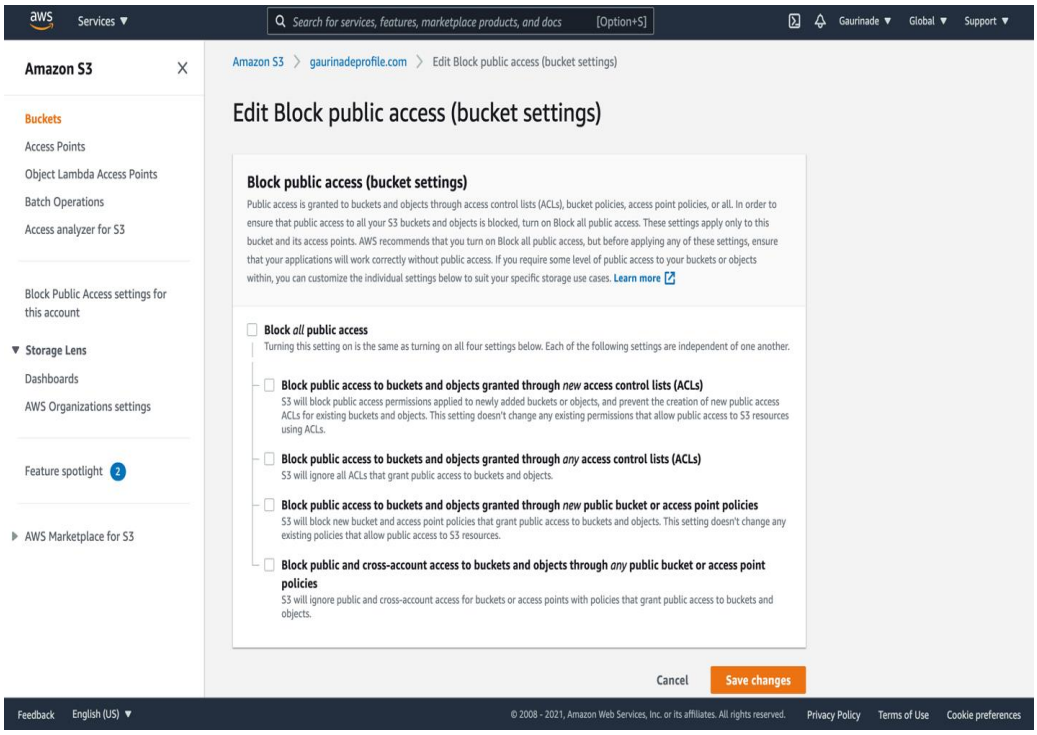


Figure 5-25: Edit Block Public Access

5. Save the changes after select the Clear Block all public access.

H. Add a bucket policy to makes bucket content publicly available

In this example, bucket policy is used to grant public read access to the domain bucket gaurinadeprofile.com.

1. In Buckets, Select the name of created bucket.
2. Select Permissions tab.

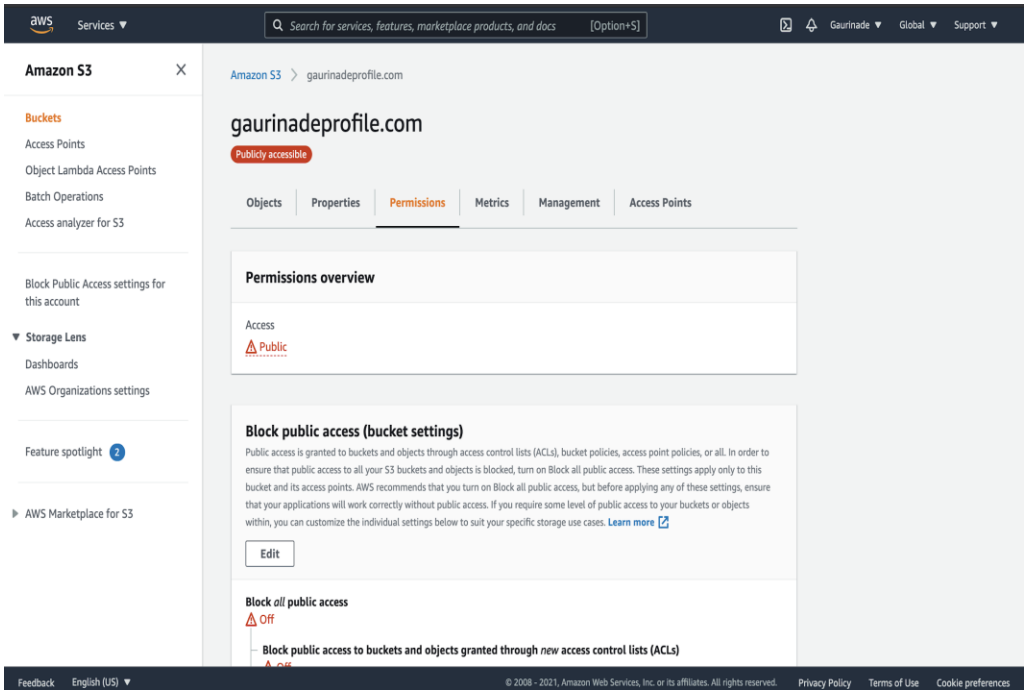


Figure 5-26: Amazon S3 Permissions

3. Below Bucket Policy, click on Edit button.

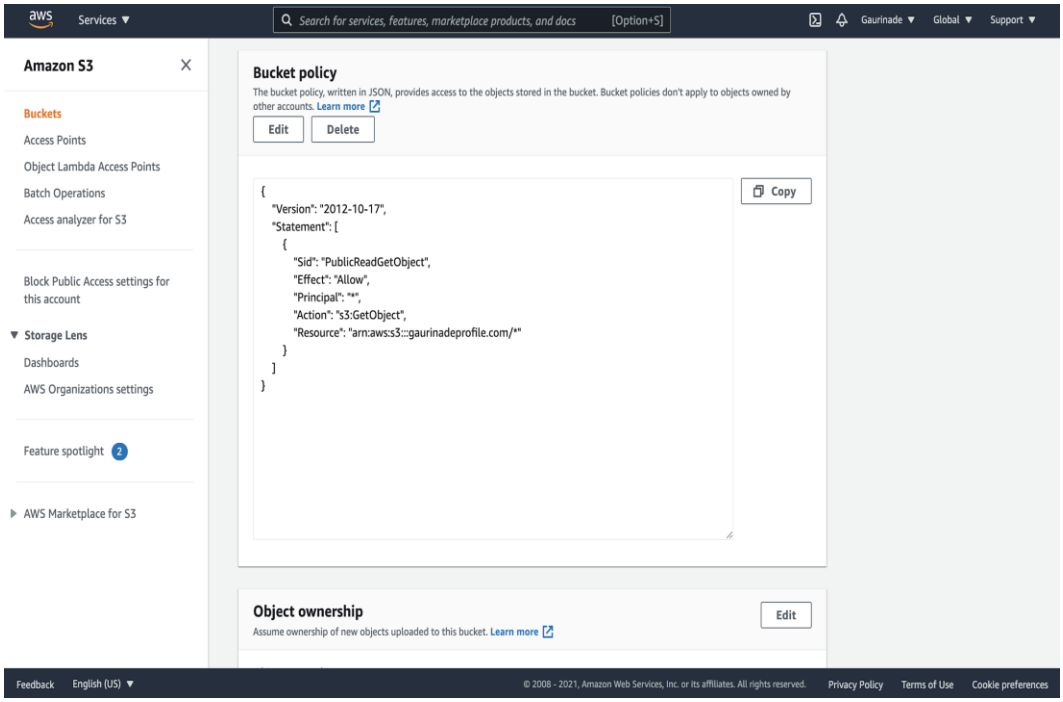


Figure 5-27: Amazon S3 Bucket Policy

4. Copy and paste the following bucket policy into the Bucket policy editor to grant public read access to our website.

```
{
   "Version": "2012-10-17",
   "Statement": [
      {
         "Sid": "PublicReadGetObject",
         "Effect": "Allow",
         "Principal": "*",
        "Action": [
          "s3:GetObject"
```

```
        ],
        "Resource": [
            "arn:aws:s3:::Bucket-Name/*"
        ]
    }
]
}
```

5. Change the Resource to the name of our bucket.

   We must change this name to fit our bucket name in order to use this bucket policy for our own bucket:

```
{
"Version": "2012-10-17",
"Statement": [
 {
        "Sid": "PublicReadGetObject",
        "Effect": "Allow",
        "Principal": "*",
        "Action": "s3:GetObject",
        "Resource": "arn:aws:s3:::gaurinadeprofile.com/*"
    }
  ]
}
```

6. Click on Save changes button.

I. Domain endpoint Testing

We can evaluate endpoint after configuring domain bucket to host a public website. Since subdomain bucket is configured for website redirect rather than static website hosting, we can only evaluate the endpoint for domain bucket.

1. Below the Buckets, enter a name for bucket.
2. Select Properties tab.
3. Choose your Bucket website endpoint at the end of the tab, below Static website hosting.

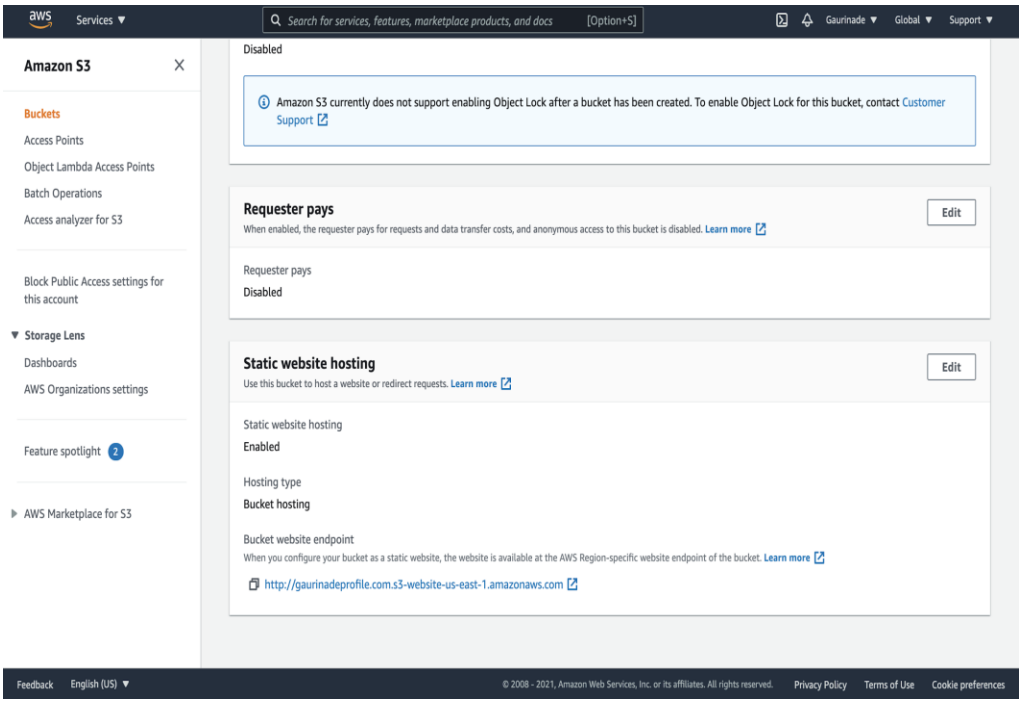


Figure 5-28: Website Endpoint Copying

4. Index file always opens in a new browser window.

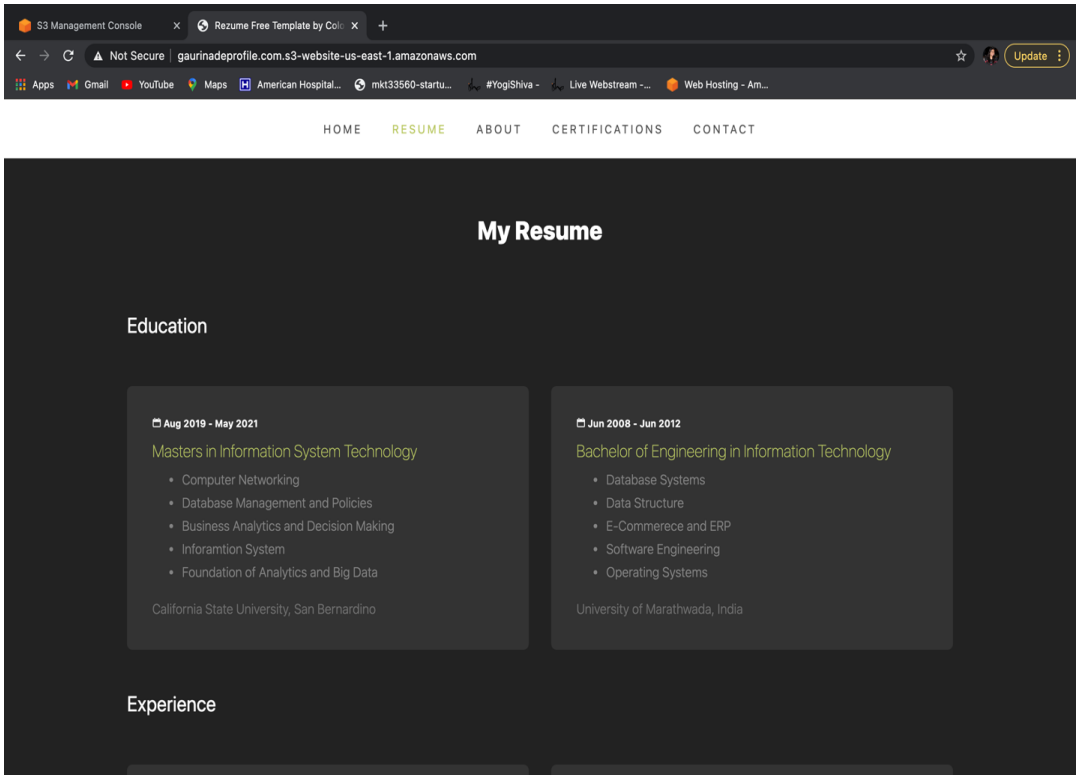


Figure 5-29: Static Website

J. Testing of the website

Check that the website and the redirect are working properly. Enter URLs in the browser. In this case:

Domain (http://gaurinadeprofile.com) – Displays the index document in the gaurinadeprofile.com bucket.

Subdomain (http://www.gaurinadeprofile.com) – Redirect's request to http://gaurinadeprofile.com.

What is Microsoft Azure

Microsoft Azure is a cloud service that provides Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS) applications for analytics, automation, networking, storage and other services. It may be used in addition to or in lieu of on-premises servers.

Azure is a fast, scalable, and low-cost service with the good public cloud product in terms of pricing and capabilities on the market.

Azure is useful for below things:

To Improve and Implement Backup and Disaster Recovery: Microsoft Azure is a backup and disaster retrieval product due to its convenience, automated site retrieval, and built-in integration. Azure, as a cloud-based platform, is adaptable; it can backup data in virtually any language, on any operating system, and from any place. Furthermore, we can state the duration and reach of your backup strategy. Tape backups has its applications, but it is restricted as a backup and disaster retrieval solution on its own.

Offsite duplication, selective onsite maintenance, up to 99 years of record security, little to no capital investment, and low operating costs would complement tape backup. Azure backup stores three copies of the data in three

different locations within the data center, supplemented by three additional versions in a mobile Azure data center.

Host and Develop Web and Mobile Apps: Azure is a useful tool for hosting, creating, or maintaining a web or smartphone app. With patch control, Auto Scale, and integration with on-premises applications, Azure enables those apps to be self-sufficient and adaptive. With automated patch management for virtual servers, we will spend minimun time repairing the system and more time updating the applications. Azure also has support for continuous deployment, which helps us to streamline continuing code changes.

Auto Scale is a feature built into Azure Web Apps that dynamically changes the resources depending on consumer web traffic, ensuring that you have the resources you need while traffic is heavy and saving money when it is not. Using Azure, we can link a smartphone app to an on-premises app. Employees and associates can conveniently access facilities inside the firewall that would otherwise be impossible to access externally by linking apps in both locations.

Innovate with IoT Industry Solutions: The scalability, versatility, and reliability of Microsoft Azure make it a perfect resource for businesses moving for IoT solutions. We will link your computers to the cloud with applications that work with the current technology and begin gathering new company data. We will track

and control billions of devices in the Azure IoT Hub and develop visibility to help to make smarter business decisions, optimize consumer satisfaction, reduce uncertainty, lower costs, and accelerate growth. Azure's enhanced security is a significant advantage for IoT solutions, that have traditionally had security flaws that hackers exploited. Remote tracking, automated management, and analytics are also advantages.

Microsoft Azure Demo: Configuring a static website

Create a static web app

1. To open the Azure extensions window, select the Azure logo in the Activity Bar inside Visual Studio Code.

Figure 5-30: Azure Extensions Window

2. Click the plus sign with your mouse over the Static Web Apps label.

Figure 5-31: Static Web Apps Label

3. At the top of the editor, the command palate appears and prompts you to call the submission. Enter my-first-static-web-app as the URL.

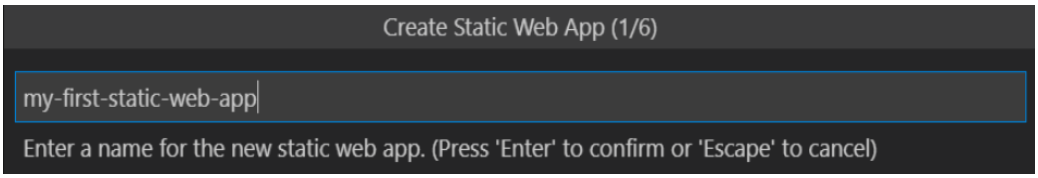


Figure 5-32: Command Palate

4. Select the main branch and press Enter.

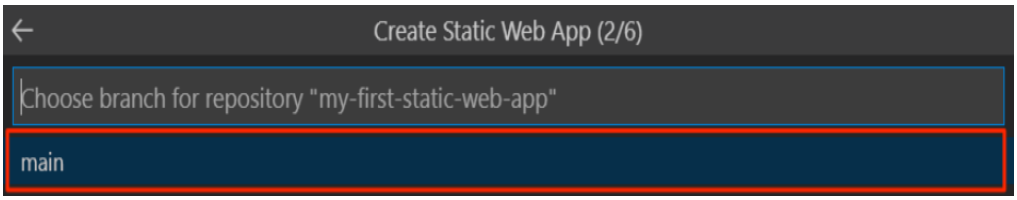


Figure 5-33: Command Palate Main Branch

5. Select / as the application code path and click Enter

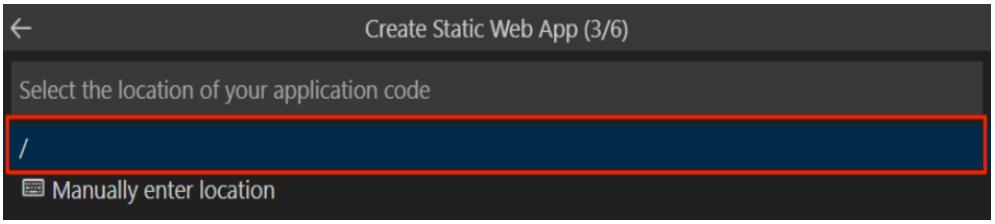


Figure 5-34: Command Palate Location

6. The extension is searching for the API's location in your program. This article does not have an API.

   Select Skip for now and press Enter.

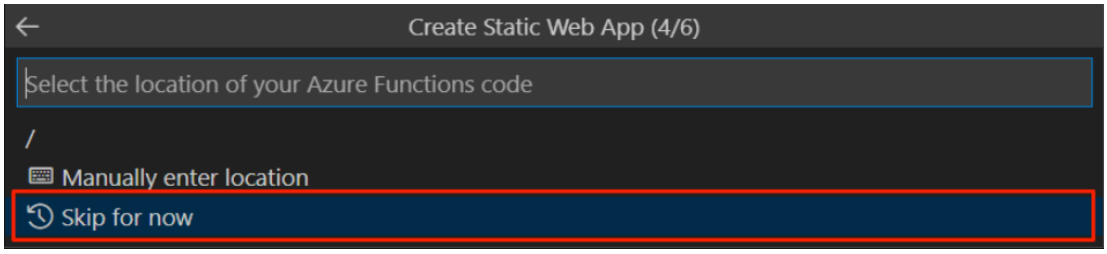


Figure 5-35: Command Palate Skip for Now

7. Choose the location where your app's files are created for processing.

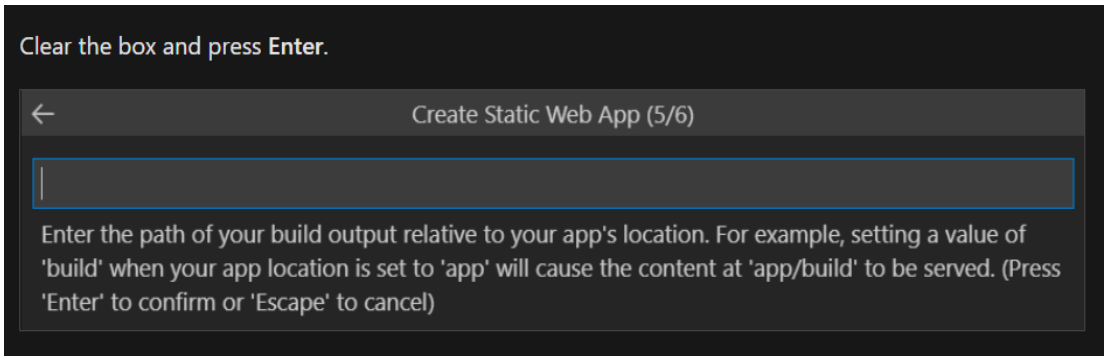


Figure 5-36: Selecting Location

8. Enter the address of the location that is closest to you.

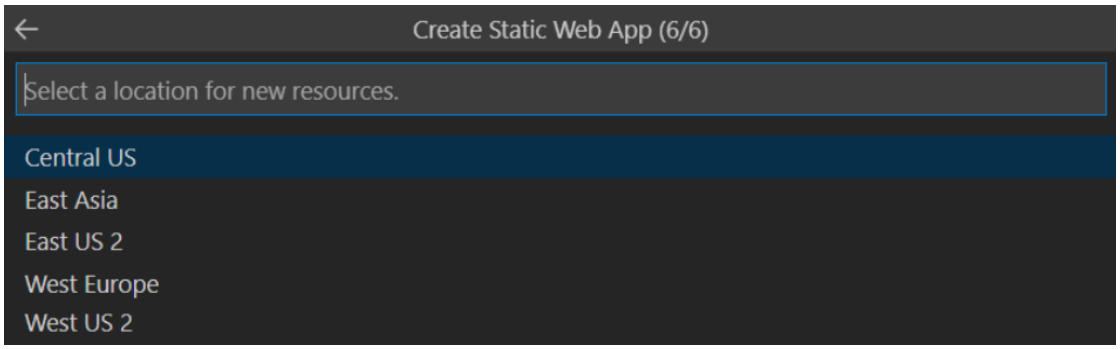


Figure 5-37: Enter Location

9. When the app is finished, a validation message appears in Visual Studio Code.

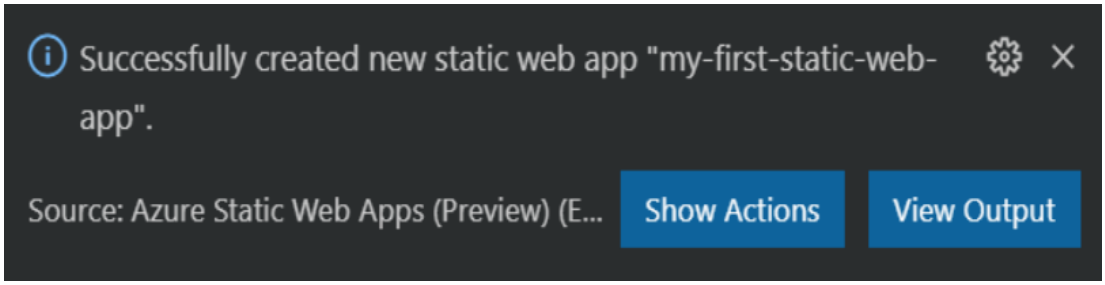


Figure 5-38: Confirmation Notification

10. Expand the node that contains your subscription name in the Visual Studio Code Explorer window. Please keep in mind that the deployment will take a few minutes to complete. Return to the Static Web Apps section and choose the name of your app, then right-click on my-first-static-web-app and choose Open in Portal to access the app in the Azure portal.

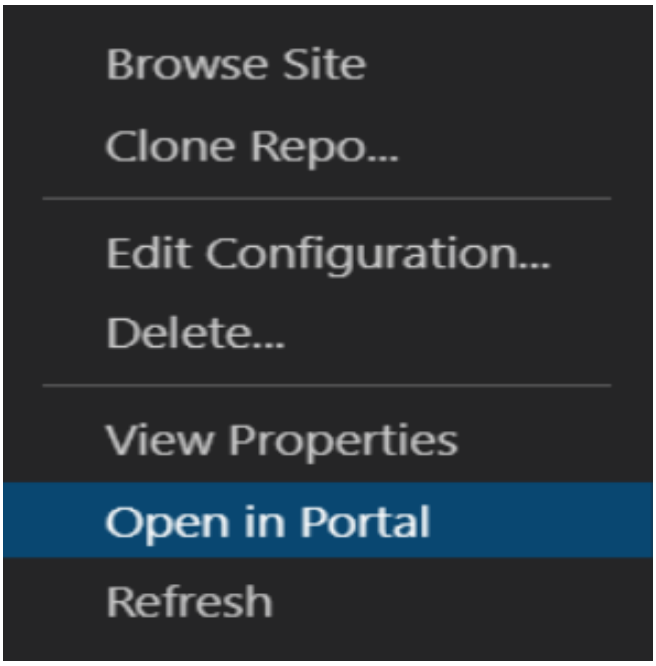


Figure 5-39: Code Explorer Window

Host a static website in Azure Storage

You can serve static content (HTML, CSS, JavaScript, and image files) directly from a container in a general-purpose V2 or BlockBlobStorage account.

Enable static website hosting

Static website hosting is a storage account capability that must be activated.

1. Sign in to the Azure portal to get started.
2. Locate your storage account and display the account overview.
3. Select Static website to display the configuration page for static websites.

4. Select Enabled to enable static website hosting for the storage account.
5. In the Index document name field, specify a default index page (For example: index.html).
6. The default index page is displayed when a user navigates to the root of your static website.
7. In the Error document path field, specify a default error page (For example: 404.html).
8. The default error page is displayed when a user attempts to navigate to a page that does not exist in your static website.
9. Click Save. The Azure portal now displays your static website endpoint.

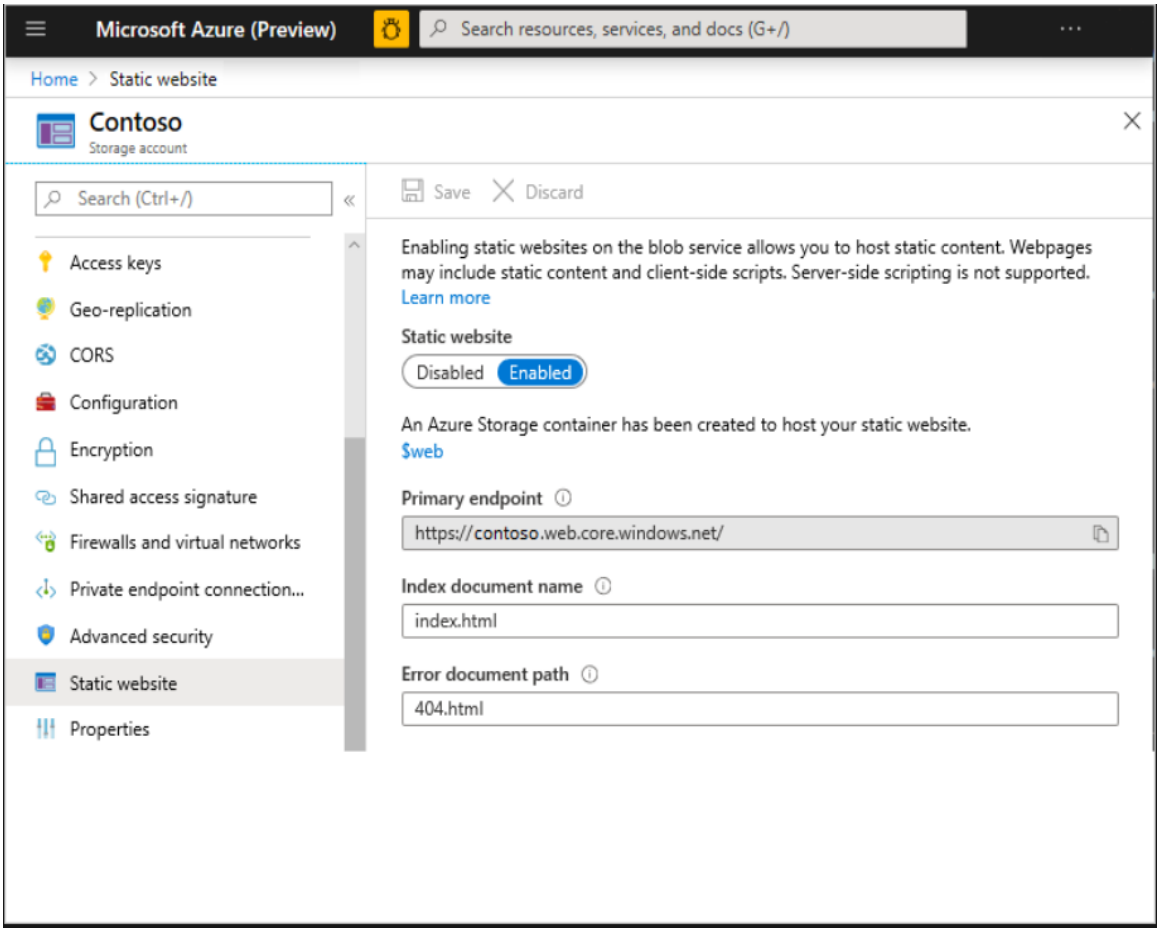


Figure 5-40: Microsoft Azure Preview

Upload files

These instructions show you how to upload files by using the version of Storage Explorer that appears in the Azure portal. However, you can also use the version of Storage Explorer that runs outside of the Azure portal. You could use AzCopy, PowerShell, CLI, or any custom application that can upload files to the $web container of your account.

1. Select Storage Explorer (preview).

2. Expand the BLOB CONTAINERS node, and then select the $web container.
3. Choose the Upload button to upload files.

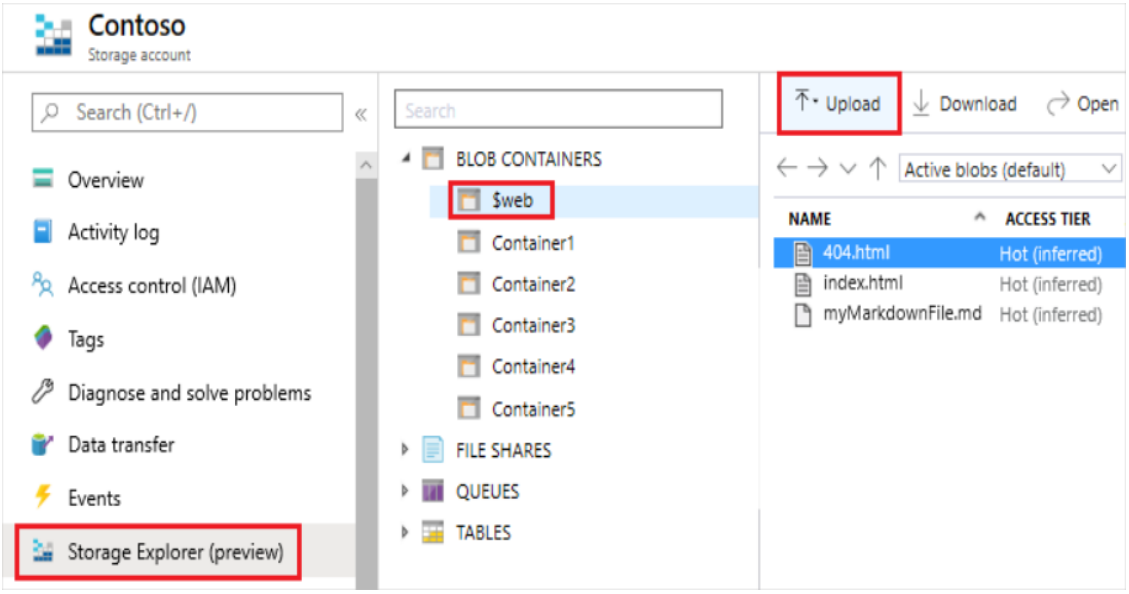


Figure 5-41: Microsoft Azure Preview

4. If you intend for the browser to display the contents of file, make sure that the content type of that file is set to text/html.

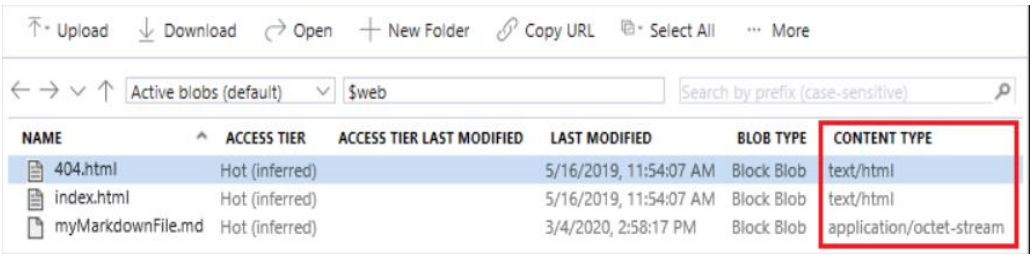


Figure 5-42: Azure Browser

Find the website URL

You can view the pages of your site from a browser by using the public URL of the website.

In the pane that appears beside the account overview page of your storage account, select Static Website. The URL of your site appears in the Primary endpoint field.

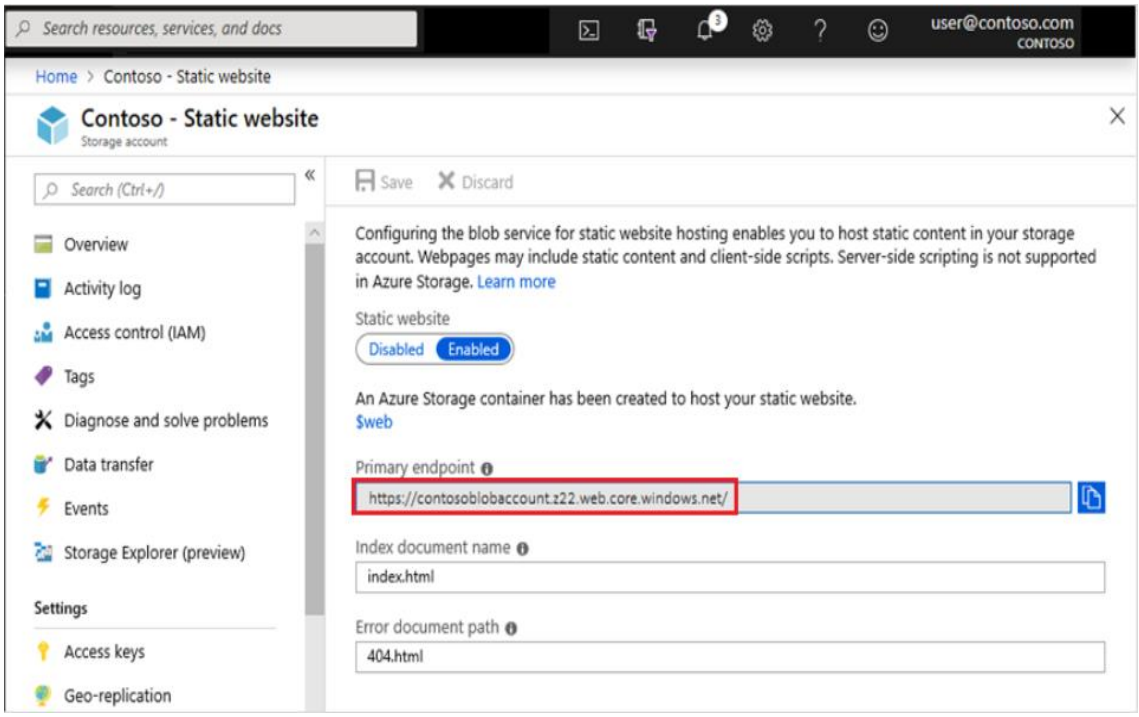


Figure 5-43: Azure Static Website

Enable metrics on static website pages

Once you've enabled metrics, traffic statistics on files in the $web container are reported in the metrics dashboard.

Click Metrics under the Monitor section of the storage account menu.

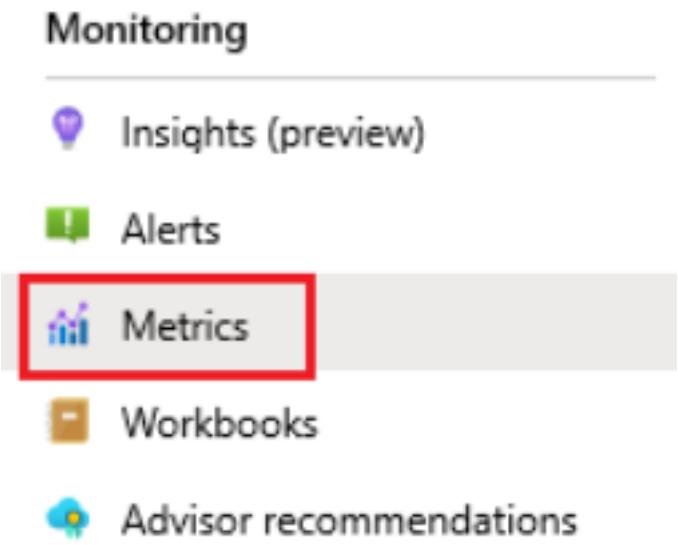


Figure 5-44: Azure Monitoring 1

Figure 5-44: Azure Monitoring

Click on the time frame button, choose a time frame, and then click Apply.

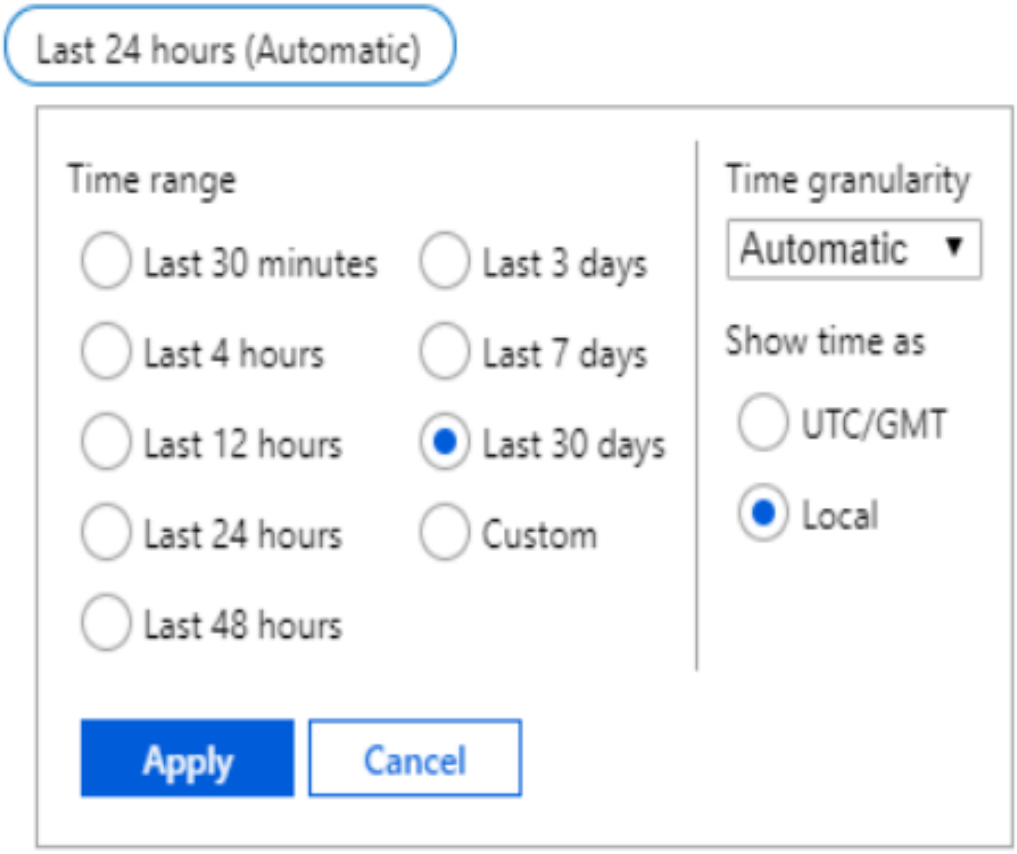


Figure 5-45: Azure Monitoring Time Frame

Select Blob from the Namespace drop down.

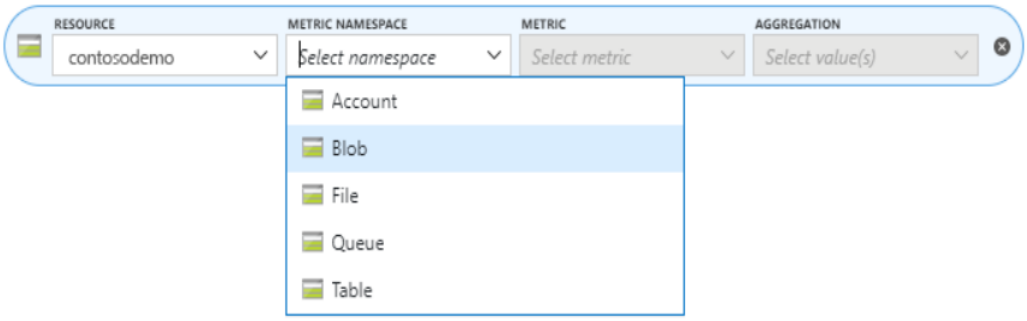


Figure 5-46: Azure Namespace Drop

Then select the Egress metric.

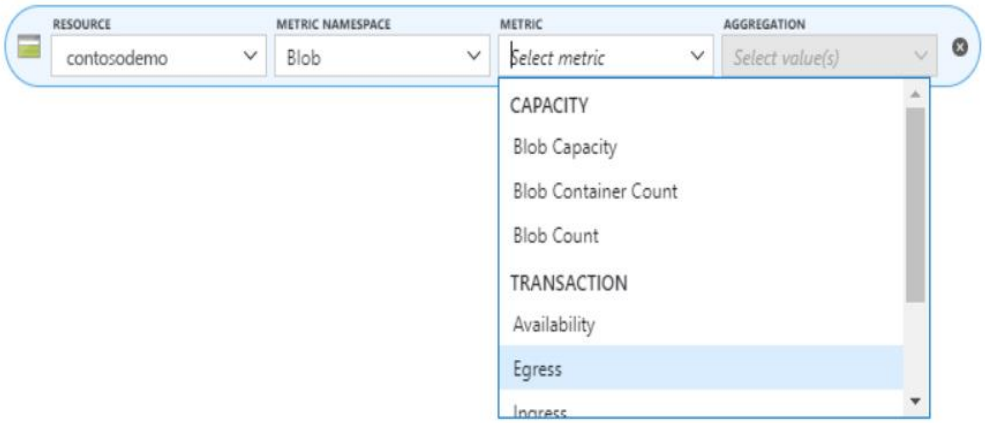


Figure 5-47: Azure Metric

Select Sum from the Aggregation selector.

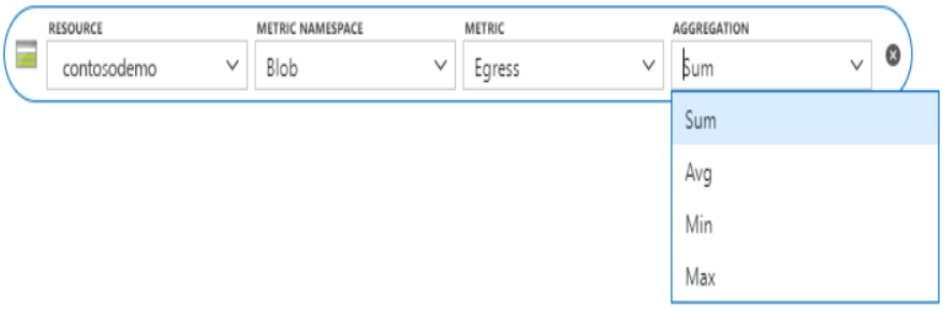


Figure 5-48: Azure Aggregation Selector

Click the Add filter button and choose API name from the *Property* selector.

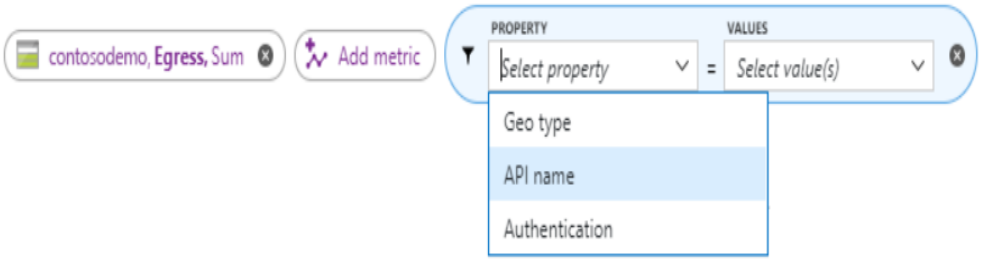


Figure 5-49: Azure Add Filter Screen

Check the box next to GetWebContent in the *Values* selector to populate the metrics report.

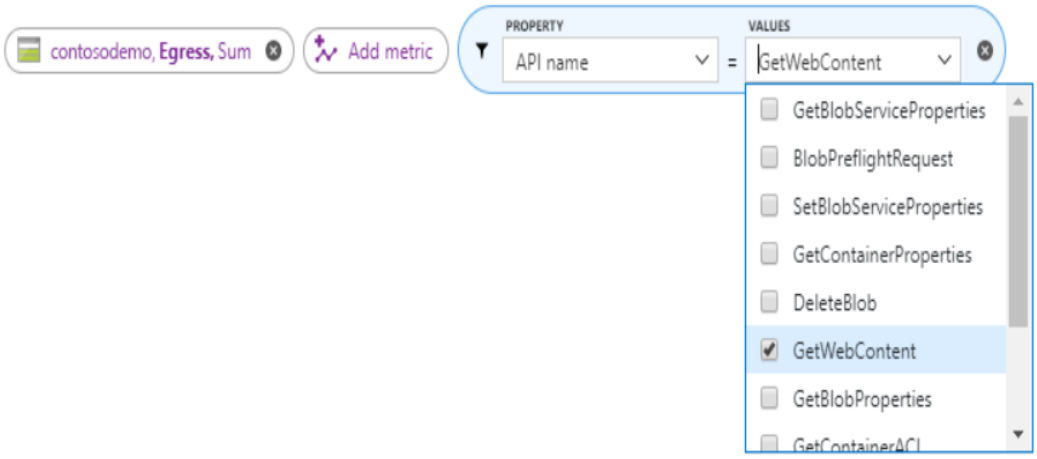


Figure 5-50: Azure to GetWebContent

Note:

The GetWebContent checkbox appears only if that API member was used within a given time frame. The portal only displays API members used within a given time frame in order to only focus on members that return data. If you can't find a specific API member in this list, expand the time frame.

CHAPTER FIVE:

CONCLUSIONS AND RECOMMENDATIONS FOR FUTURE PROJECTS

Recommendations

The project's first research question is, "How can a startup create a cost-effective website and host it on a cloud platform?" As stated in the design and implementation section, any cloud platform such as AWS or Microsoft Azure is the best choice for hosting a website, and to build a website, we can use various tools such as WordPress or, as shown in the demo, we can create an HTML file. The second research question is, ‘How does a startup ensure that its website is always available?' As seen in the website deployment demo, utilizing various cloud providers to keep the website up and running for as long as possible. The following research questions are, ‘How does a startup use cloud services to solve the low latency problem?' and ‘How can a startup use various cloud services to minimize the use of infrastructure and technology resources for product creation and test marketing?' To address technological problems, cloud services like CloudFront, Dockers, and Kubernetes are useful.

Following are some suggestions focused on the study's design and implementation sections:

- Startups and small businesses can use a cloud infrastructure to build and manage their websites. It may also use cloud storage services to cut down on the cost of servers.

- For the greatest advantage, startups and small and medium-sized enterprises must match their business needs with cloud computing services. To mitigate all potential risks, cloud computing implementation must be planned in accordance with technological, operational, and legal considerations.
- SME should make use of AWS CloudFront services to reduce the latency.
- SME should have hosted their website on multiple availability zones to reduce the downtime of the website and make the website highly available.
- After a new product has been developed and tested, a startup/SME have less need for technology resources, resulting in expensive equipment sitting idle so SME should make use of cloud container services such as Dockers and Kubernetes.
- In order to gain a solid security frame, SMEs should evaluate the safety side of provided cloud storage services and build self-training programs for employees.

Conclusion

Despite the few questions posed by industry pundits, SMBs and SMEs are not afraid to integrate cloud into their market strategies. Desmond (2012) claims that the myth that "internet is actually all for SMBs" is false. Different geographies have different views of SMEs. According to this report, the ease of usage and comfort are the most important factors for SMEs to follow cloud. Improved protection and privacy were the second reason to use and implement cloud. The cost reduction is the third factor that influences cloud usage and adoption. This ensures that SMEs find the cloud to be simple to use, safe, and that their company privacy is well covered. Last but not least, the cloud assists SMEs in significantly reducing their costs. This observation is backed by and builds on the assertions of Jain (2011), Mahesh et al. (2011), Krell (2011), Robuck (2011), and Murphy (2012), who all say that their products are easy to use and convenient. This statement coincides with Sultan (2011), Blum (2011a, 2011b), Wenzel (2011), Bennett (2012), and Marks (2012) in terms of protection and privacy, but differs from Karadsheh (2012) exploration of generalized IaaS security threats.

According to Desmond (2012), the notion that "cloud providers aren't stable" is a myth. This has been quantitatively shown, and this project backs it up. It is comparable to cost reductions reported by Voith et al. (2012), Sultan (2011), Mahesh et al. (2011), Harnish (2011), Devaki (2011), and Kevany (2011). (2011), Wang (2011), Shivakumar and Raju (2010), Narayanan (2010), Rash (2011),

Ohlhorst (2012), Savitz and Vogels (2012), Hawser (2009), Coughlin (2011), Lamont (2011).

Other advantages cited by SMEs/SMBs for using and implementing cloud include: Easy to use, low cost, no need for physical office space, and no need to transport storage devices. Cloud is a great option for small apps because of its scalability and quicker content distribution, as well as its outsourcing and various business models. Intangible gains such as consumer and client faith and trust stem from a branding campaign to keep up with technologies. Cloud is unquestionably the infrastructure of the future; the more we adapt and embrace this, the better. Manpower with a lower level of training and no hassles; scalability and trustworthiness. Access is inexpensive and simple from any OS (operating system), any computer, on any continent. When you have a presence in many nations, it takes time to deploy solutions and resolve conflicts. Piloting is critical for winning customer confidence; the cloud's ability to win clients' faith and support by demonstrating the company's effectiveness; Lean entrepreneurship concepts are available in the cloud. Low license fees and the ability to pay in installments – all of which are important for a small IT firm. Piloting is critical for winning customer confidence; the cloud's ability to win clients' faith and support by demonstrating the company's effectiveness. Lean entrepreneurship concepts are available in the cloud. Low license fees and the ability to pay in installments – all of which are important for a small IT firm.

Observations

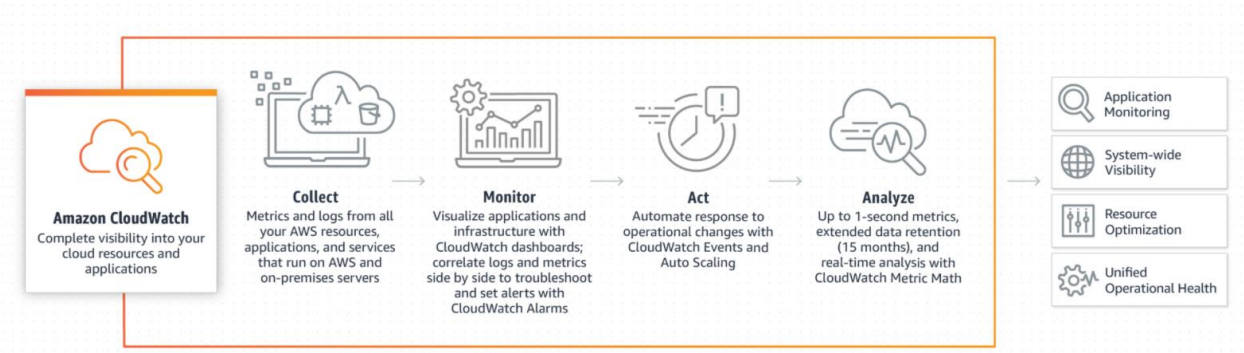
While configuring a static website in AWS and Microsoft azure, I have observed below things,

- The AWS Free Tier offers customers the ability to explore and try out AWS services free of charge up to specified limits for each service. The Free Tier is comprised of three different types of offerings, a 12-month Free Tier, an Always Free offer, and short-term trials. While Microsoft azure provides 3 months of free tier to explore and try out Microsoft services.
- When I subscribed to the AWS free tier account, I never got a call from AWS customer support for asking feedback, but I received a monthly call asking for Microsoft azure feedback.
- Also, I found out creating website in Microsoft azure is very quick and easy while in AWS is little difficult, you need to know bunch of AWS services.

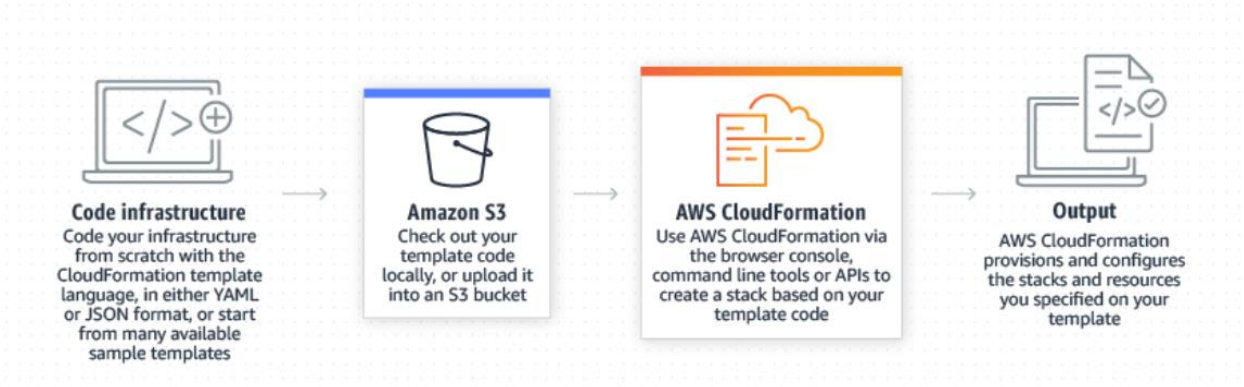
APPENDIX A

HOW IT WORKS

1. Cloud Watch



2. Cloud Formation



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