CoderSeries

Understanding Cloud Computing

Coder-C Series

GitHub

Microsoft Azure

amazon web services

www.coderseries.co.uk

What you are about to Learn

By the end of this lessons, you will understand what cloud computing is, its advantages and how we use it everyday.

Course Overview

S/No	Lesson Title	Description
Lesson 1	**Cloud Computing Fundamentals**	In this lesson we will learn the foundation of cloud computing, its advantages and applications
Lesson 2	**Cloud Computing Technologies**	We will be learning how the different cloud computing models and Technologies
Lesson 3	**Cloud Computing Providers**	In this lesson, we would be learning the different Providers of Cloud Computing and how their different offerings such as Microsoft Azure, Amazon Web Service, GitHub and Google Cloud
Lesson 4	**GitHub & Azure Hosting and Collaboration**	In this Lesson, Learners will have a practical hands-on session with deploying their websites on GitHub
Lesson 5	**Azure Overview**	In this Lesson, leaners will get a holistic view on Azure features and how they can be configured

Lesson 1

Cloud Computing Fundamentals

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1.1 Before Cloud Computing?

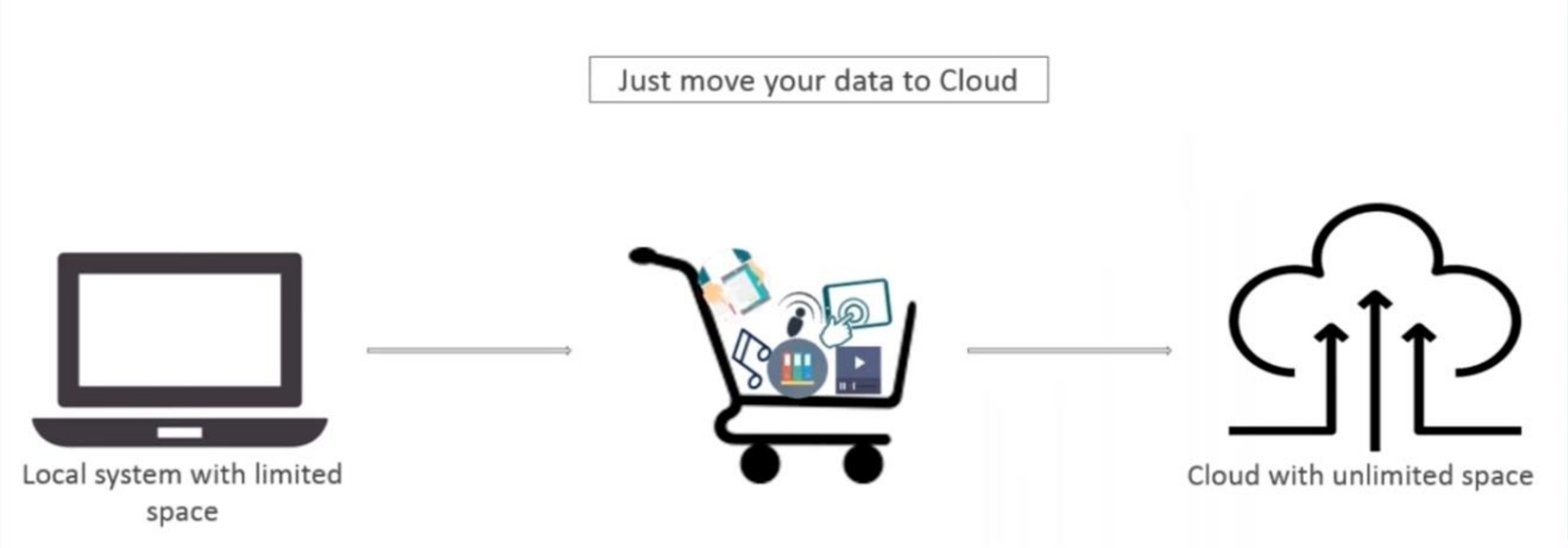
Have our own servers

Add more severs by our self

Monitor traffic to our Servers

1.2. The Cloud?

The term ‘Cloud’ refers to the Internet.

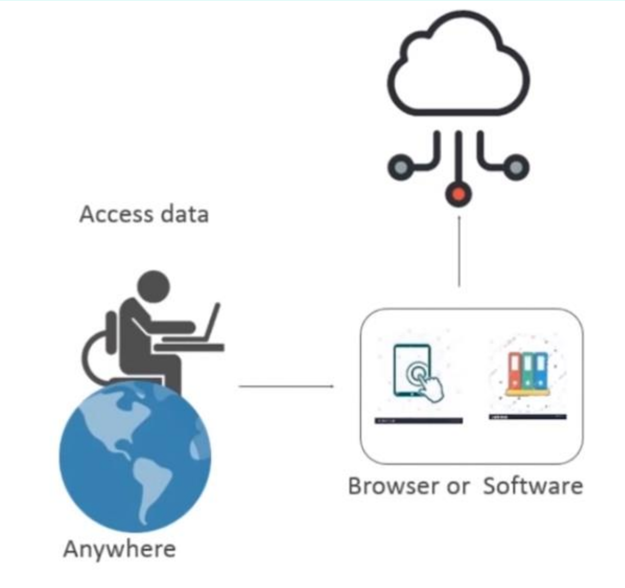


Just move your data to Cloud

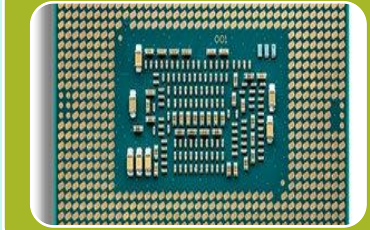
Local system with limited space

Cloud with unlimited space

1.3. What is Cloud Computing?



Storing data on remote servers



Processing data from remote servers

Accessing data from remote servers

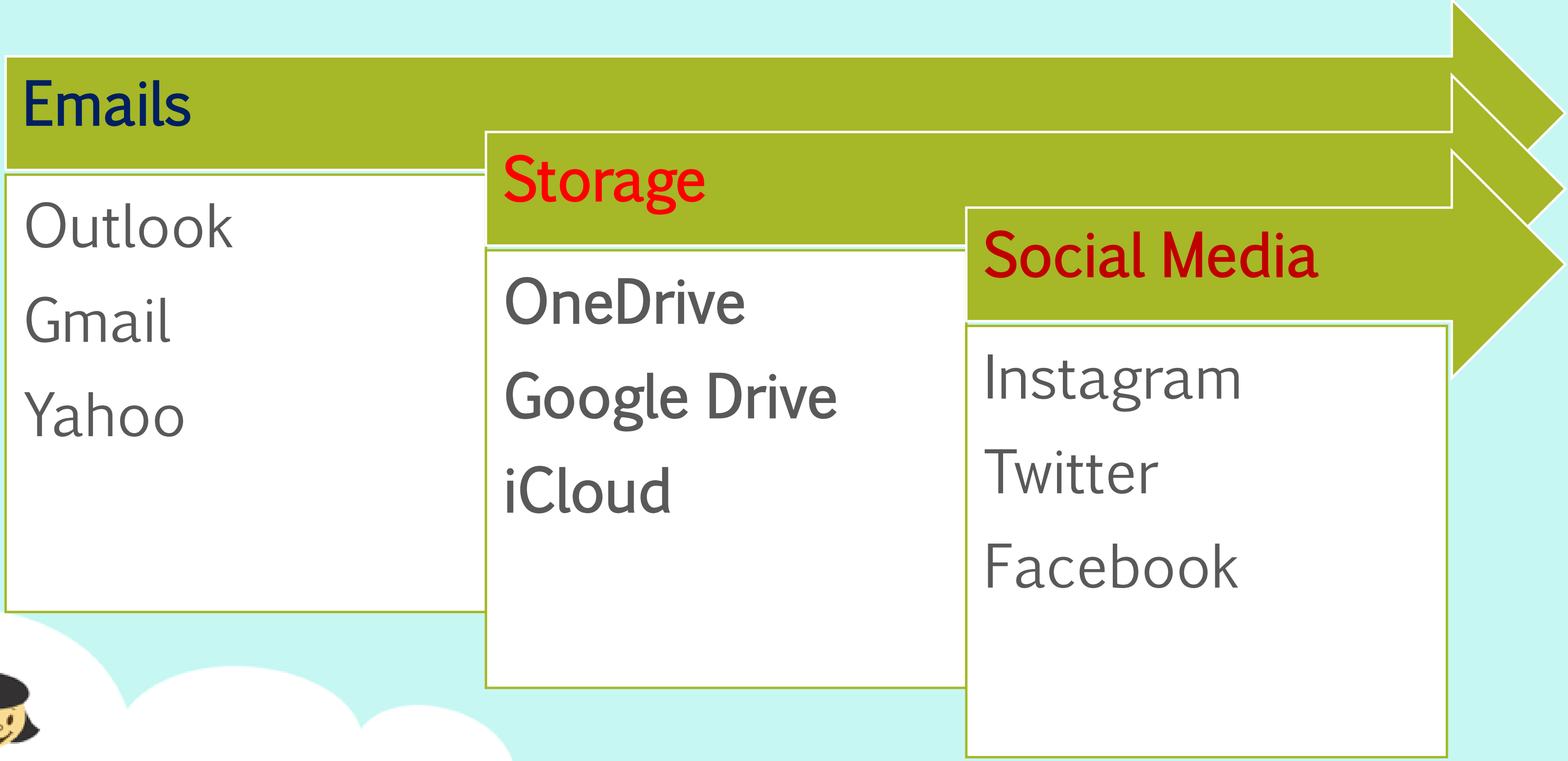
1.4. Why use the Cloud?

Reduction in IT costs.

Flexibility: Anytime, Anywhere

Easy management

1.5. Everyday use of Cloud Computing



Emails

- Outlook
- Gmail
- Yahoo

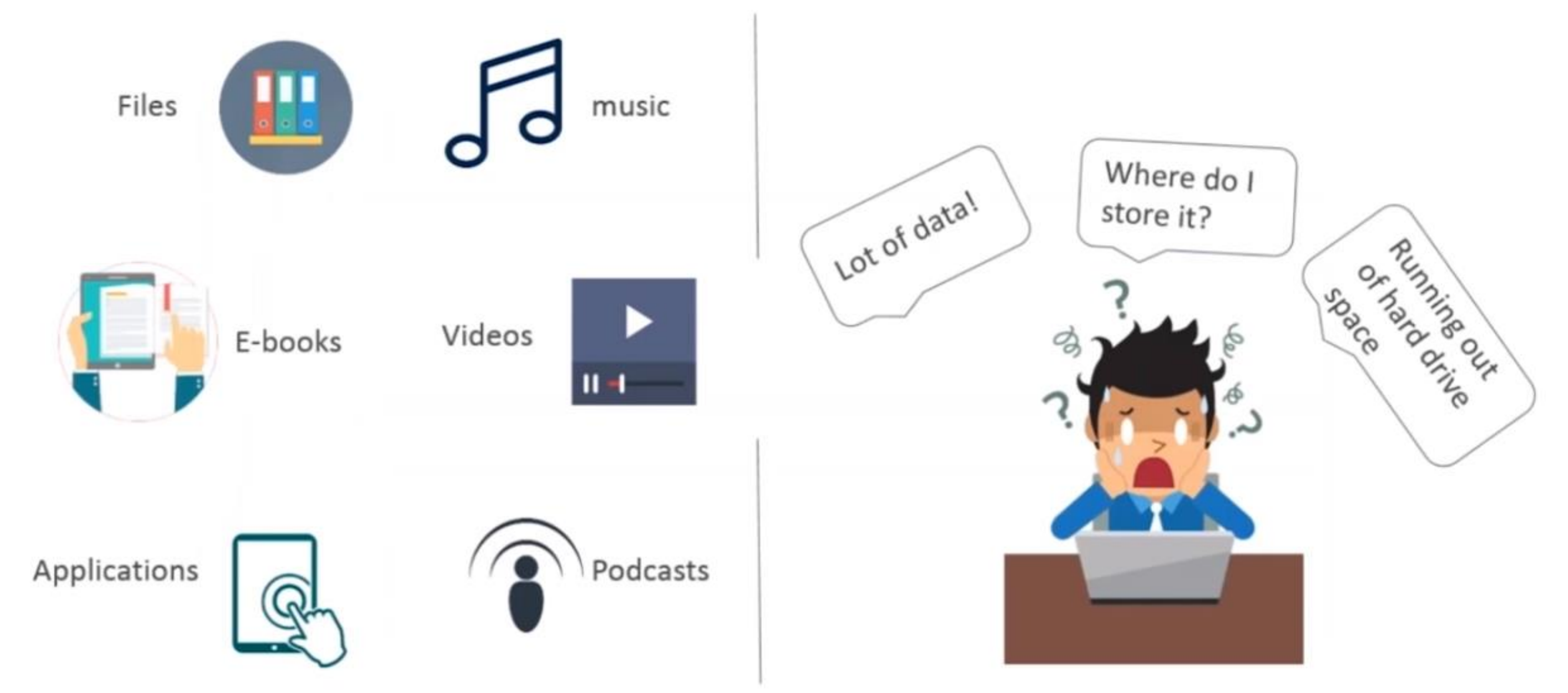
Storage

- OneDrive
- Google Drive
- iCloud

Social Media

- Instagram
- Twitter
- Facebook

1.6.1. So where is all the data stored?

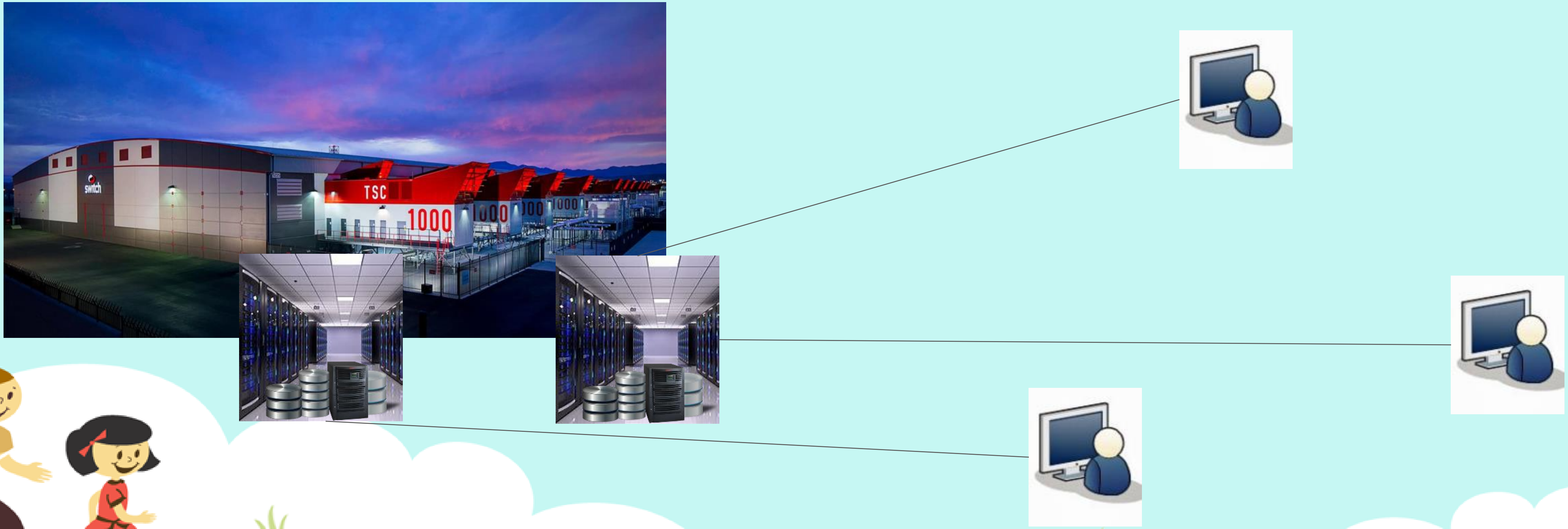


1.6.2. So where is all the data stored?

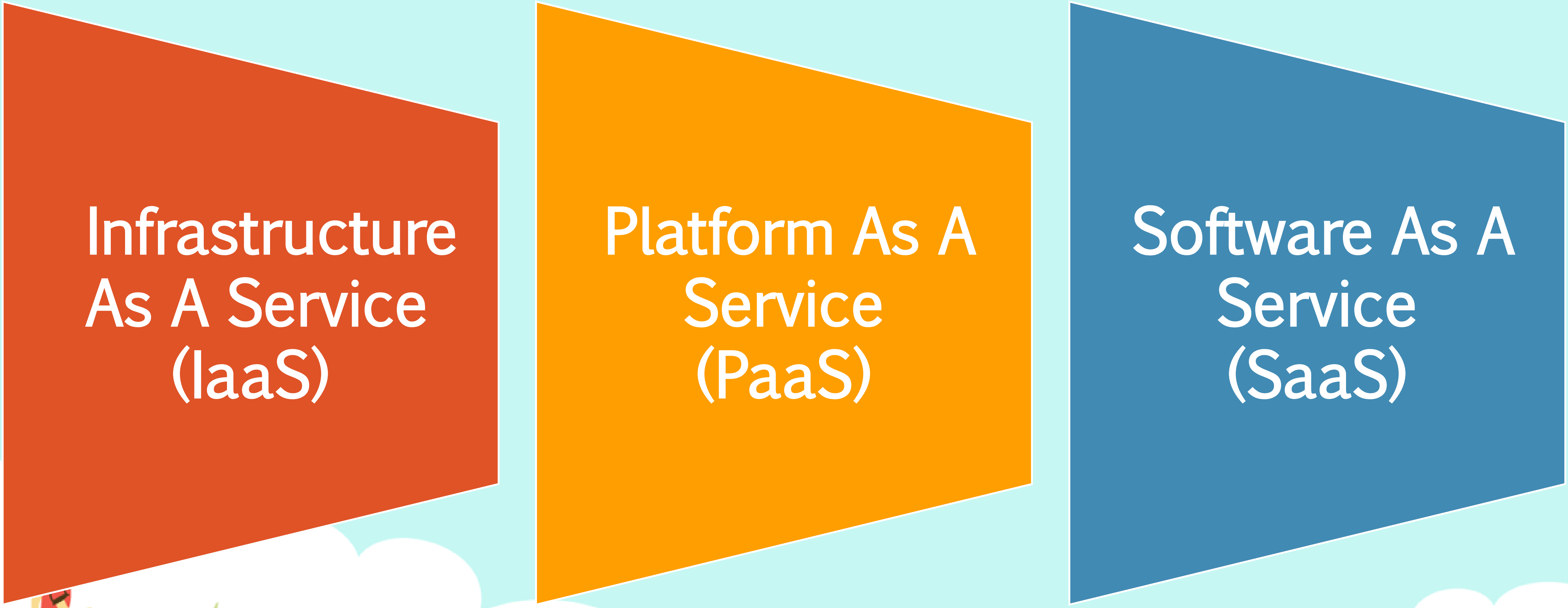
Large tech companies host our data in Datacenters.

1.6.3. So where is all the data stored?

Datacenters typically consist of servers and other networking devices.



1.7.1. Cloud Computing Service Models



Infrastructure As A Service (IaaS)

Platform As A Service (PaaS)

Software As A Service (SaaS)

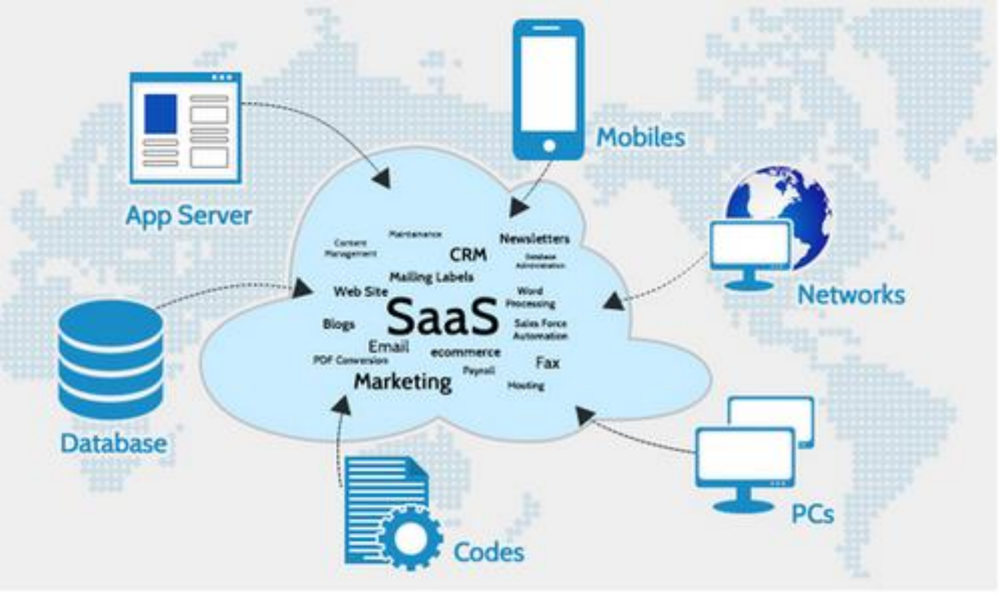
1.7.2. What is SaaS – Software as a Service

- Software as a service (or SaaS) is a way of delivering applications over the Internet—as a service. Instead of installing and maintaining software, you simply access it via the Internet, freeing yourself from complex software and hardware management.

- SaaS applications are sometimes called Web-based software, on-demand software, or hosted software.

- Whatever the name, SaaS applications run on a SaaS provider's servers.

- The provider manages access to the application, including security, availability, and performance.



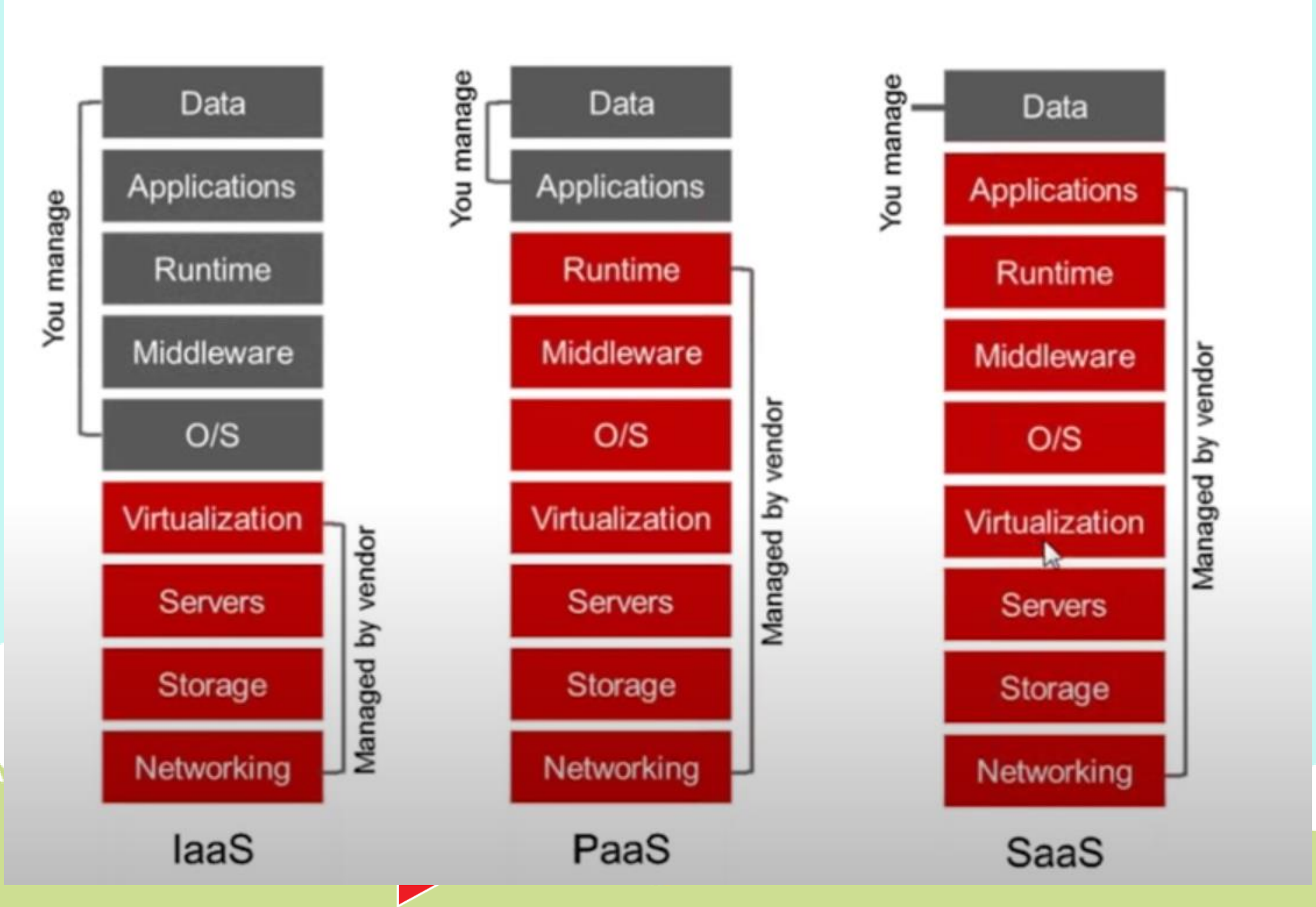
1.7.3. What is PaaS – Platform as a Service

- Platform as a service (PaaS) is a complete development and deployment environment in the cloud, with resources that enable you to deliver everything from simple cloud-based apps to sophisticated, cloud-enabled enterprise applications.
- You purchase the resources you need from a cloud service provider on a pay-as-you-go basis and access them over a secure Internet connection.

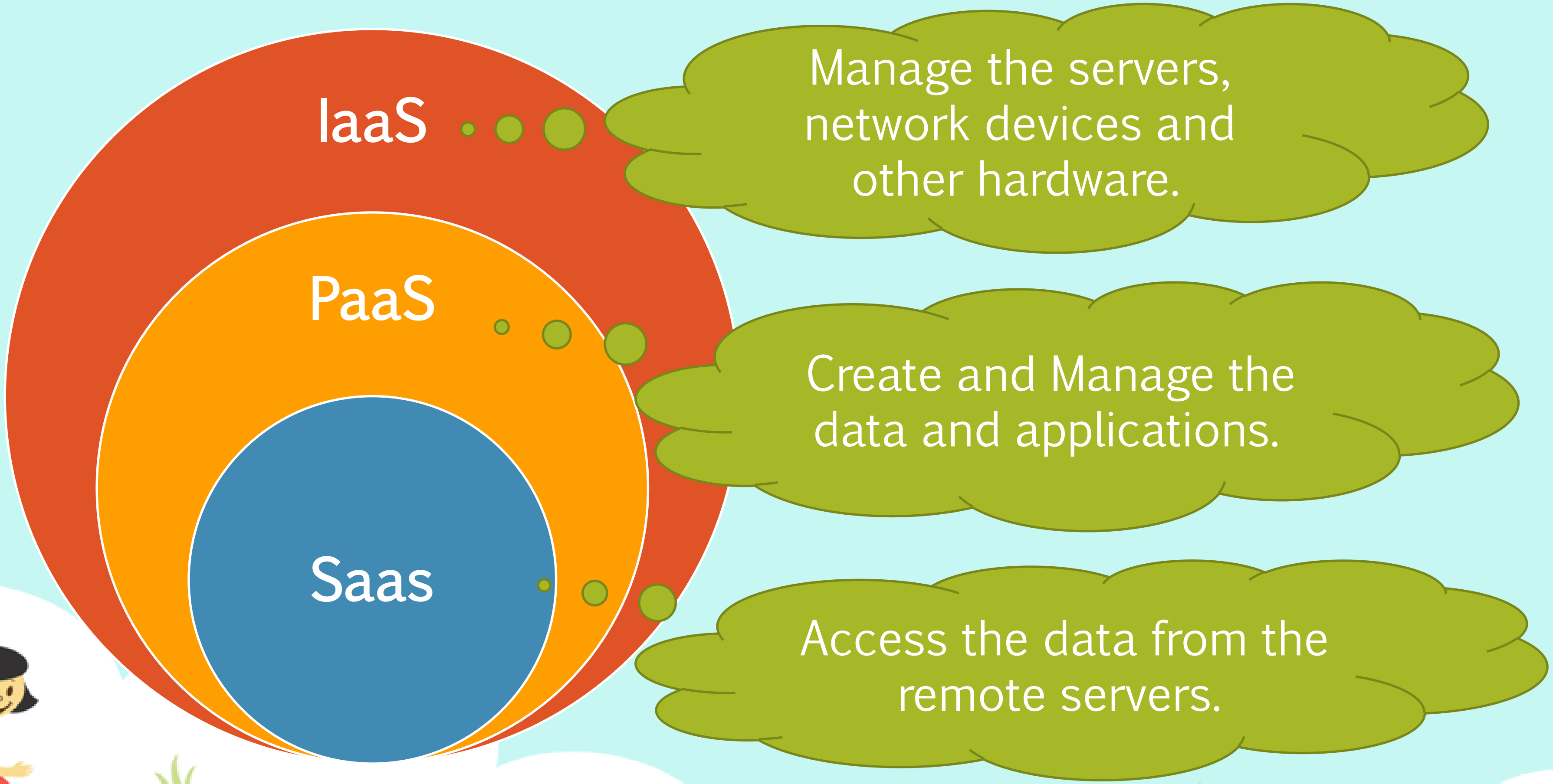
1.7.4. What is IaaS – Infrastructure as a Service

- Infrastructure as a service (IaaS) is an instant computing infrastructure, provisioned and managed over the Internet.
- It’s one of the four types of cloud services, along with software as a service (SaaS), platform as a service (PaaS) and serverless.

1.7.5. Cloud Computing Service Models



1.8.1 Cloud Computing Service Models



IaaS

Manage the servers, network devices and other hardware.

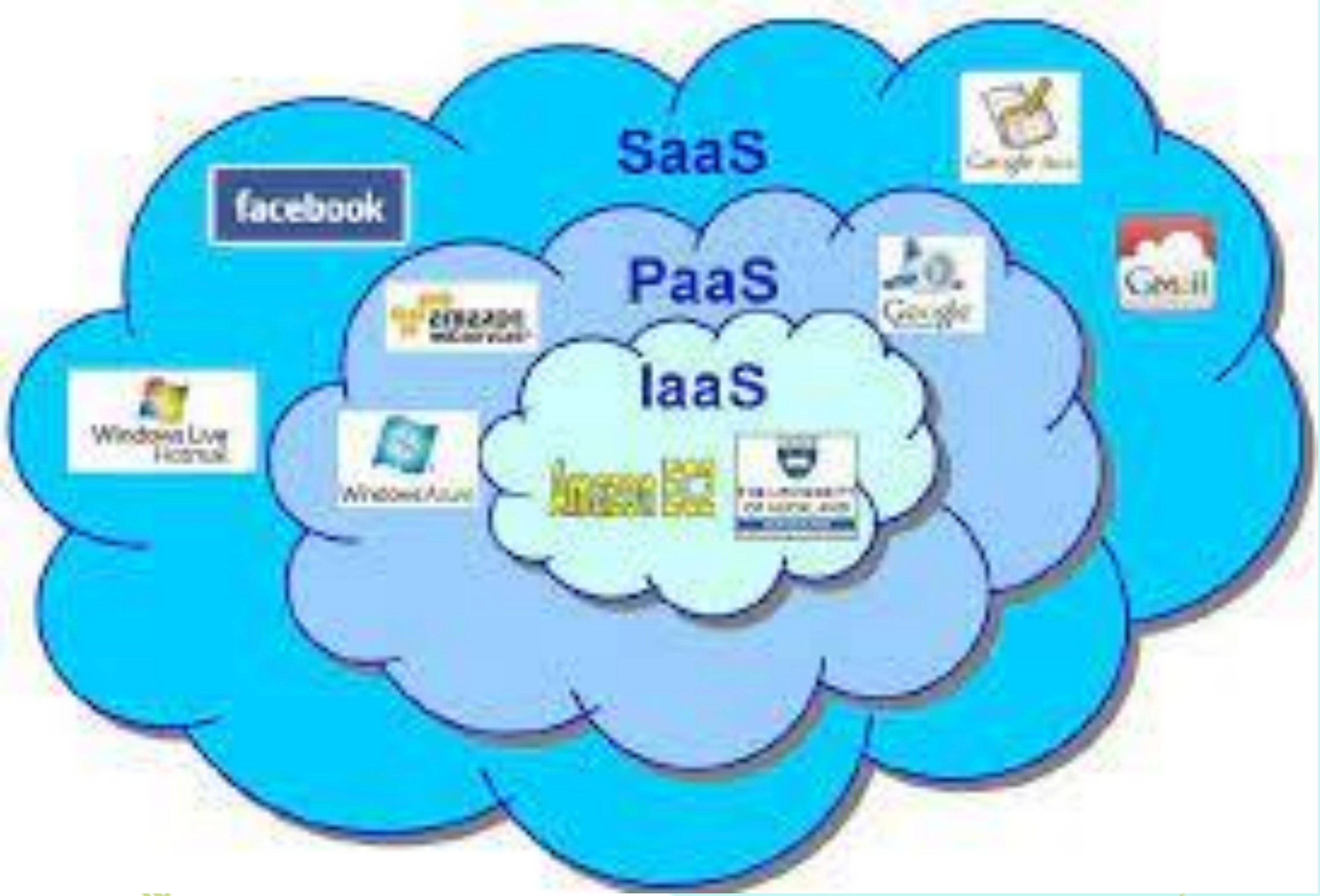
PaaS

Create and Manage the data and applications.

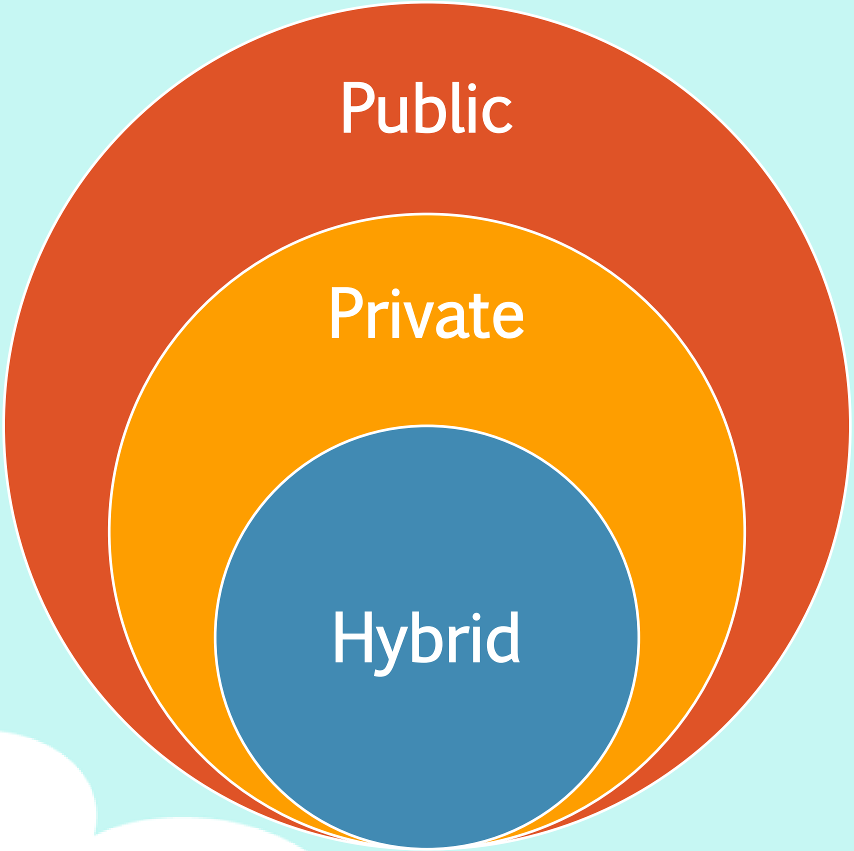
Saas

Access the data from the remote servers.

1.8.2 Cloud Computing Service Models



1.8.3. Cloud Computing Deployment Models

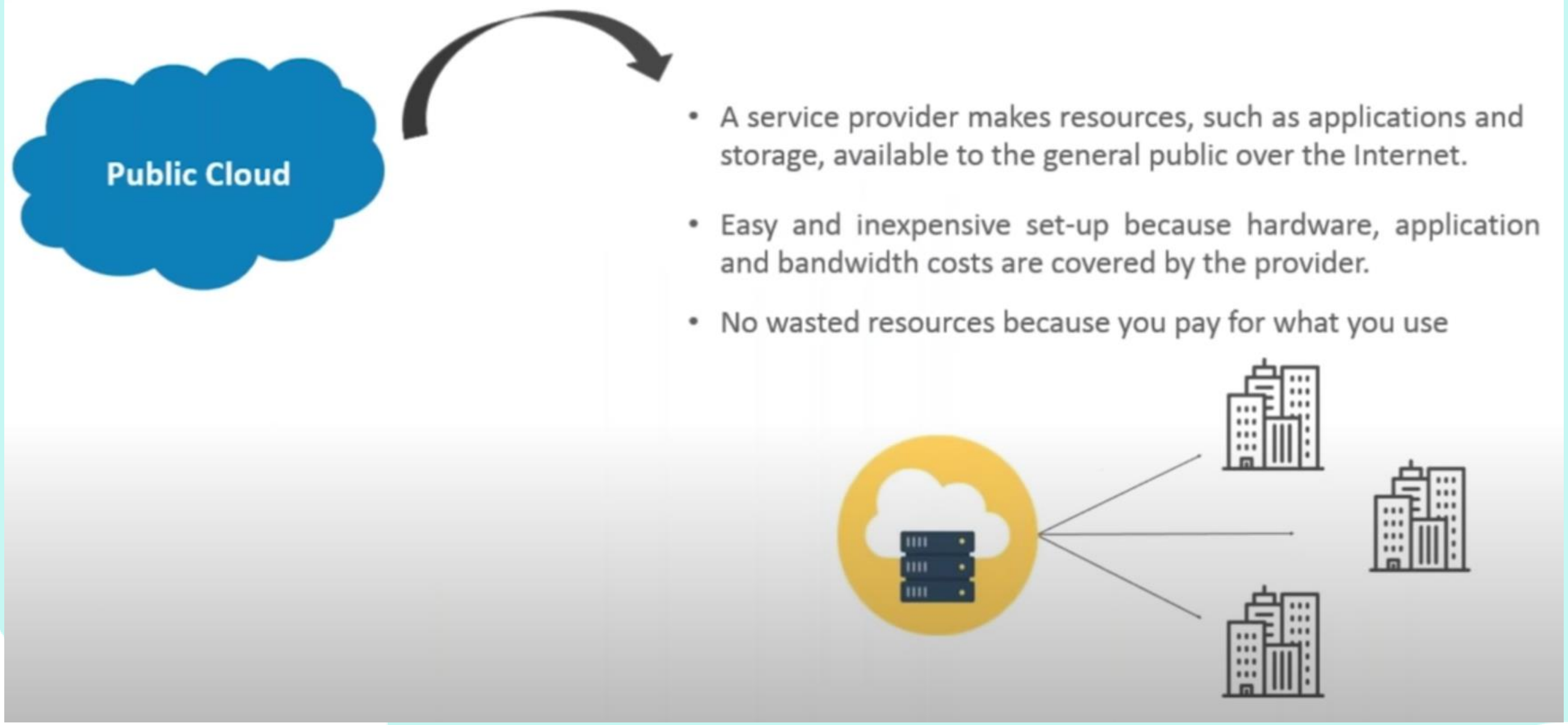


Public

Private

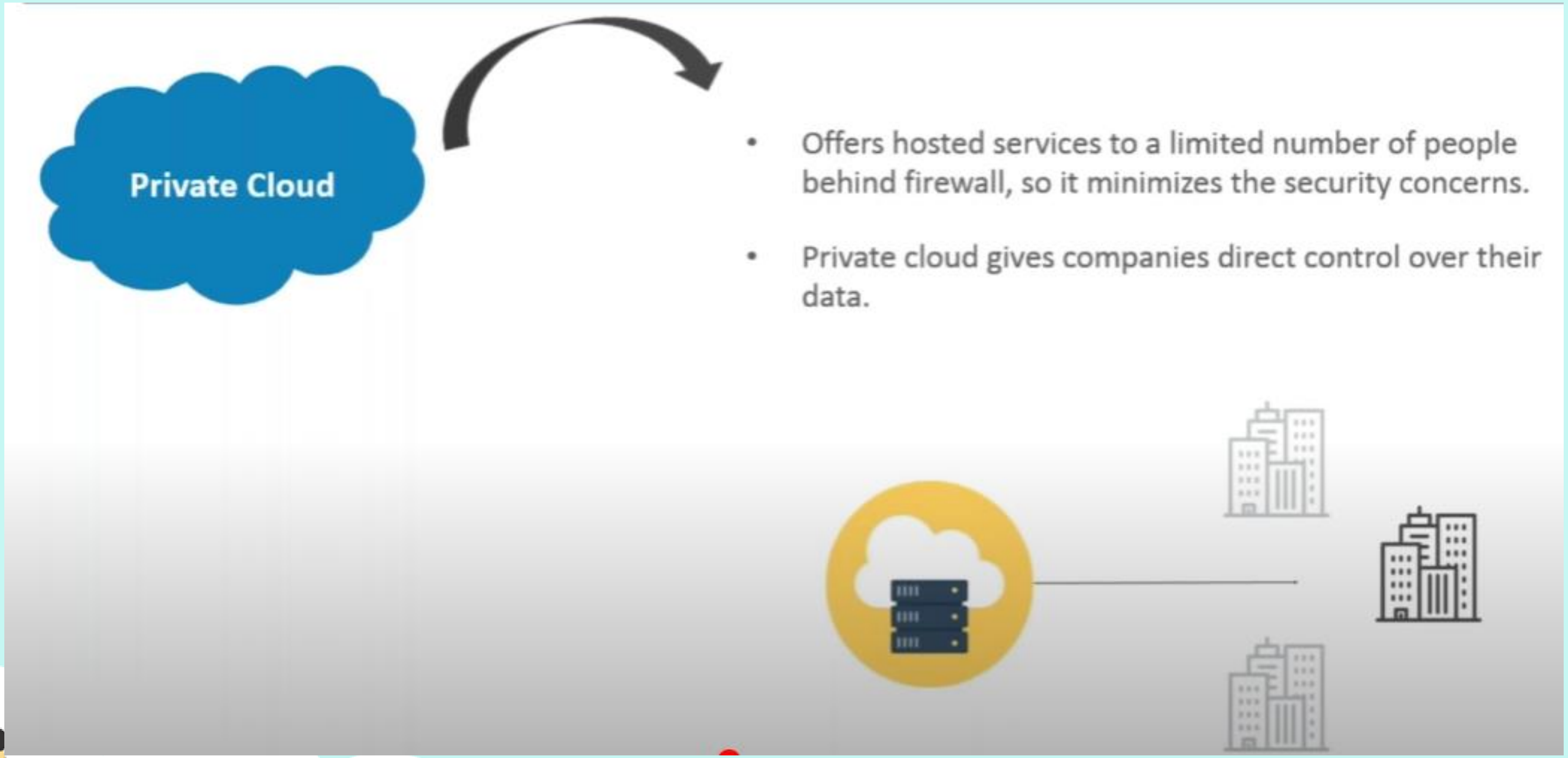
Hybrid

1.8.4. Cloud Computing Deployment Models



- A service provider makes resources, such as applications and storage, available to the general public over the Internet.
- Easy and inexpensive set-up because hardware, application and bandwidth costs are covered by the provider.
- No wasted resources because you pay for what you use

1.8.5. Cloud Computing Deployment Models



Private Cloud

- Offers hosted services to a limited number of people behind firewall, so it minimizes the security concerns.
- Private cloud gives companies direct control over their data.

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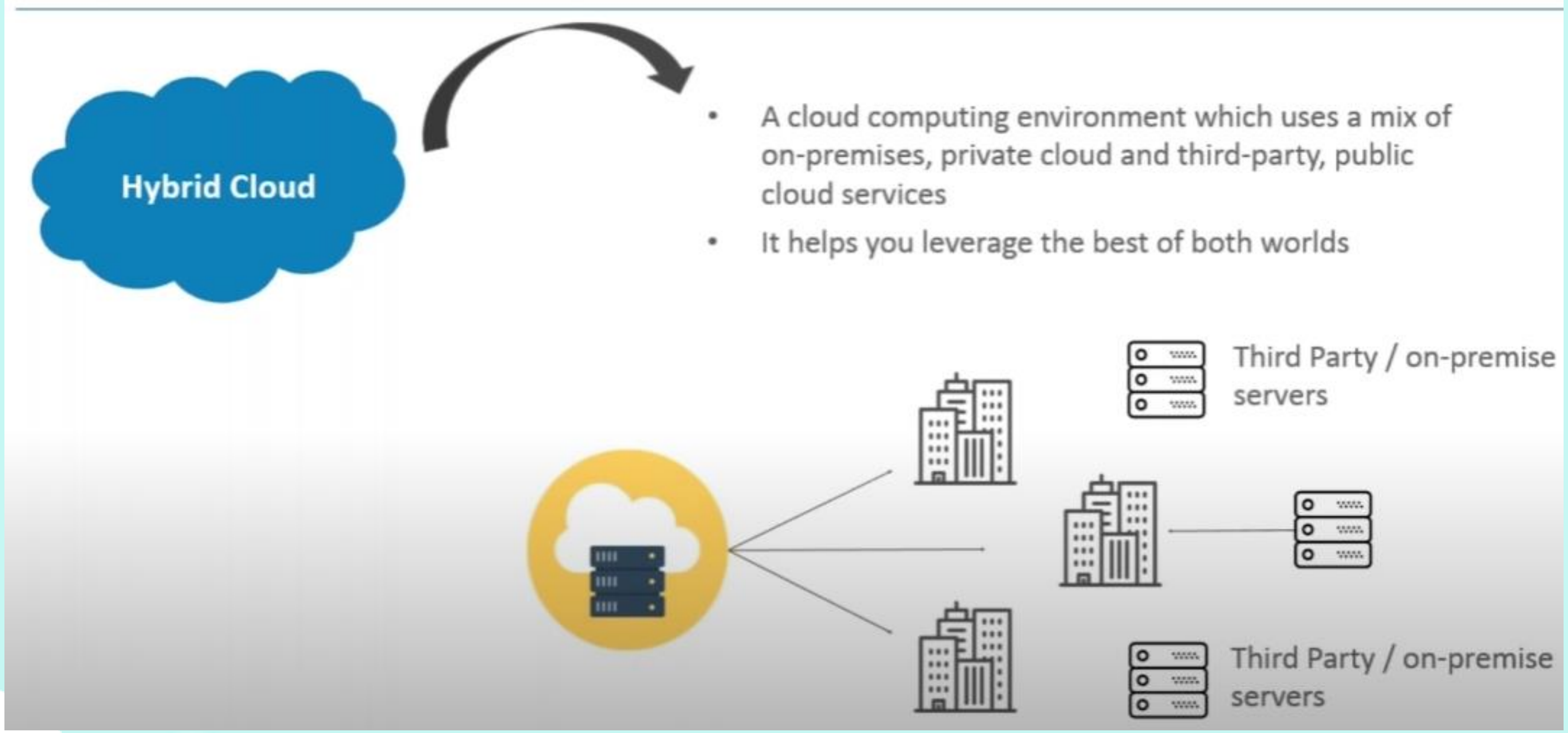
1.8.6. Cloud Computing Deployment Models

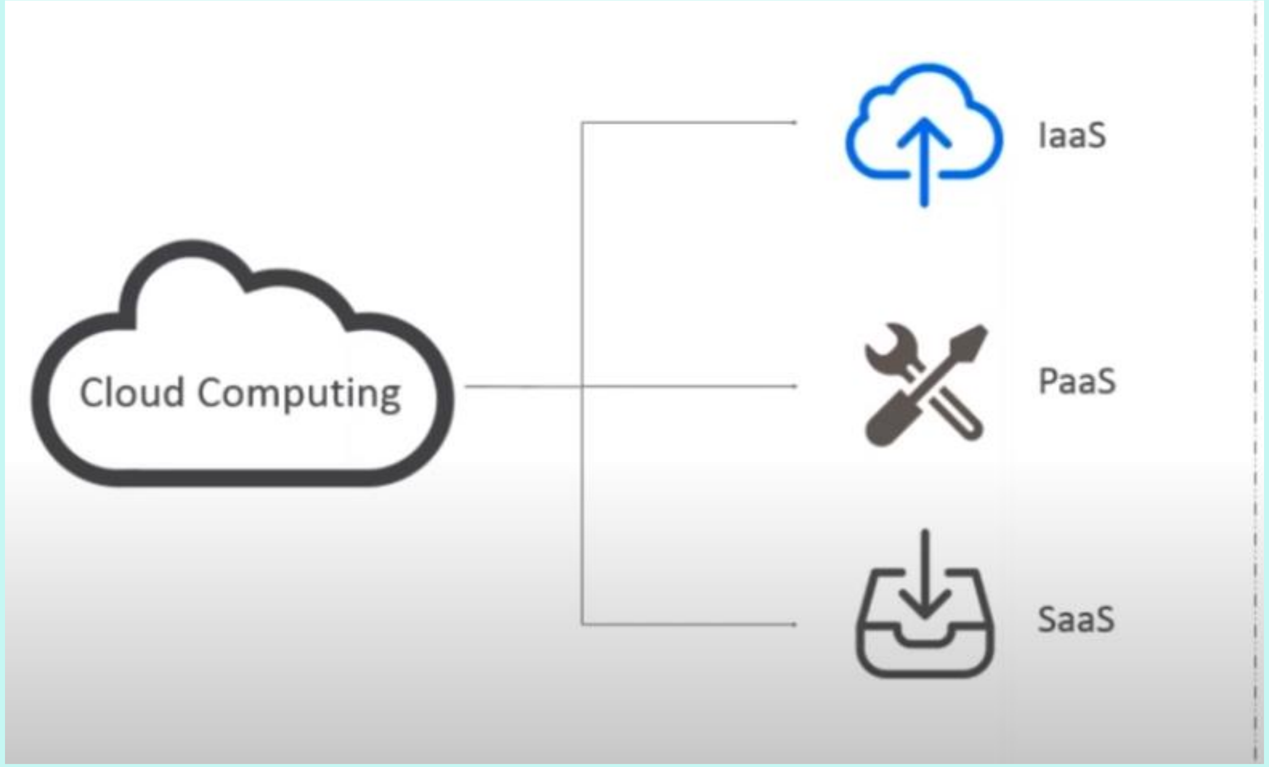


Hybrid Cloud

- A cloud computing environment which uses a mix of on-premises, private cloud and third-party, public cloud services
- It helps you leverage the best of both worlds

Third Party / on-premise servers
Third Party / on-premise servers

1.9. Cloud Computing Service Models



Cloud Computing

IaaS

PaaS

SaaS

aws

Microsoft

IBM

SurveyMonkey

GoDaddy

circleci

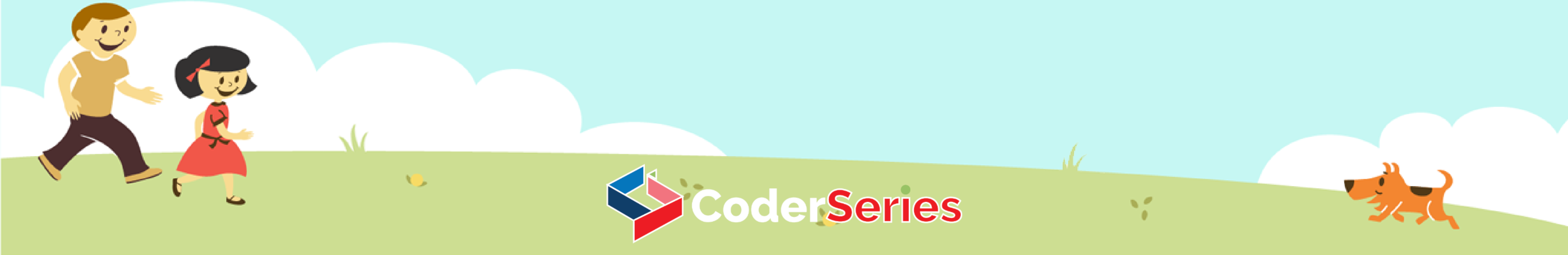
1.10. Cloud Computing Providers

aws

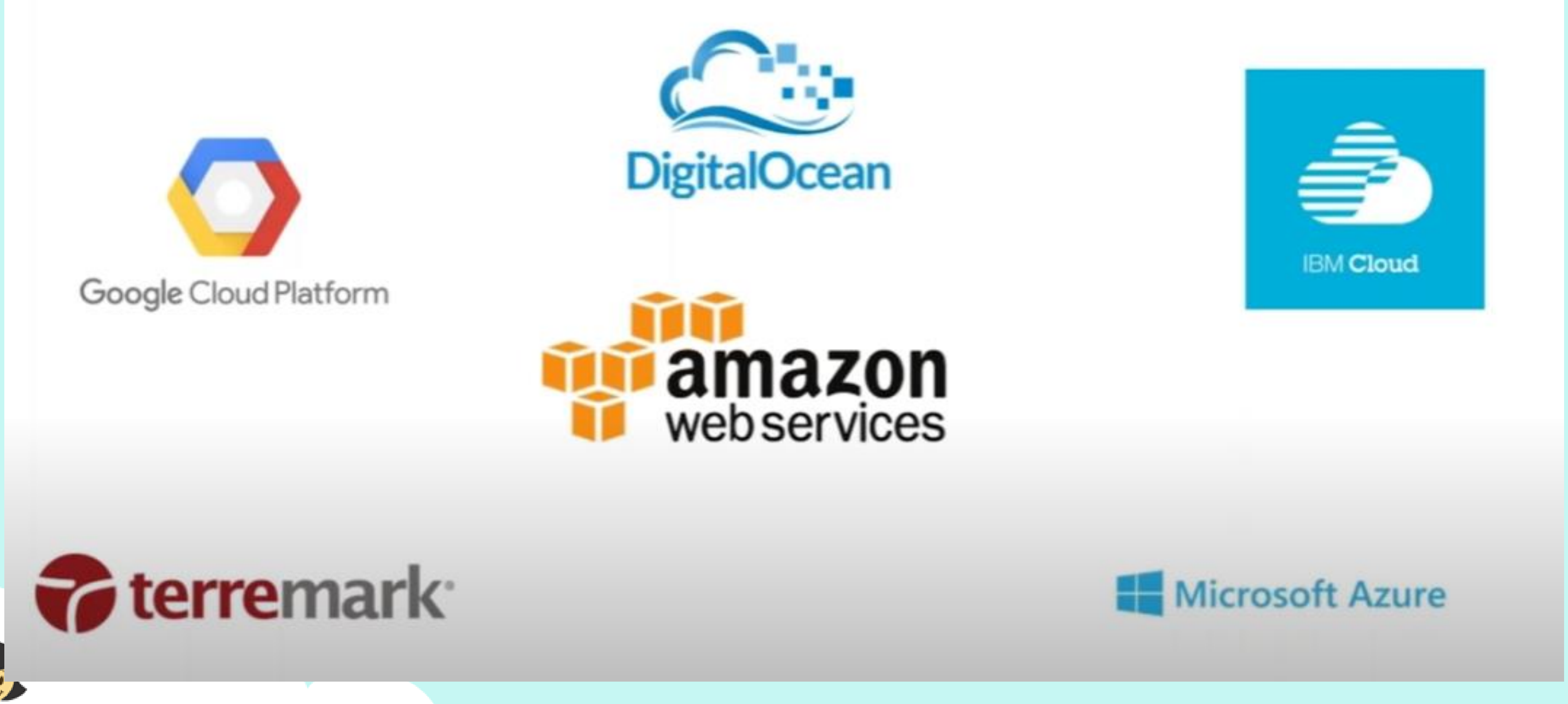
Microsoft

Google

IBM



1.11. Cloud Computing Providers



Lesson 2

Cloud Computing Terminologies

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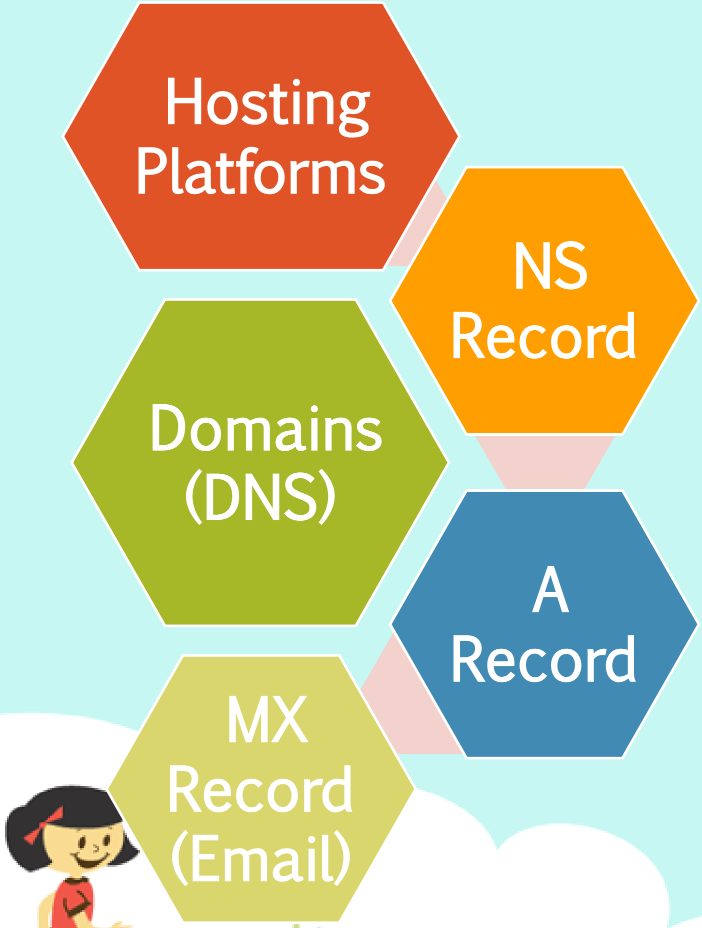
2.1 Cloud Computing Terminologies



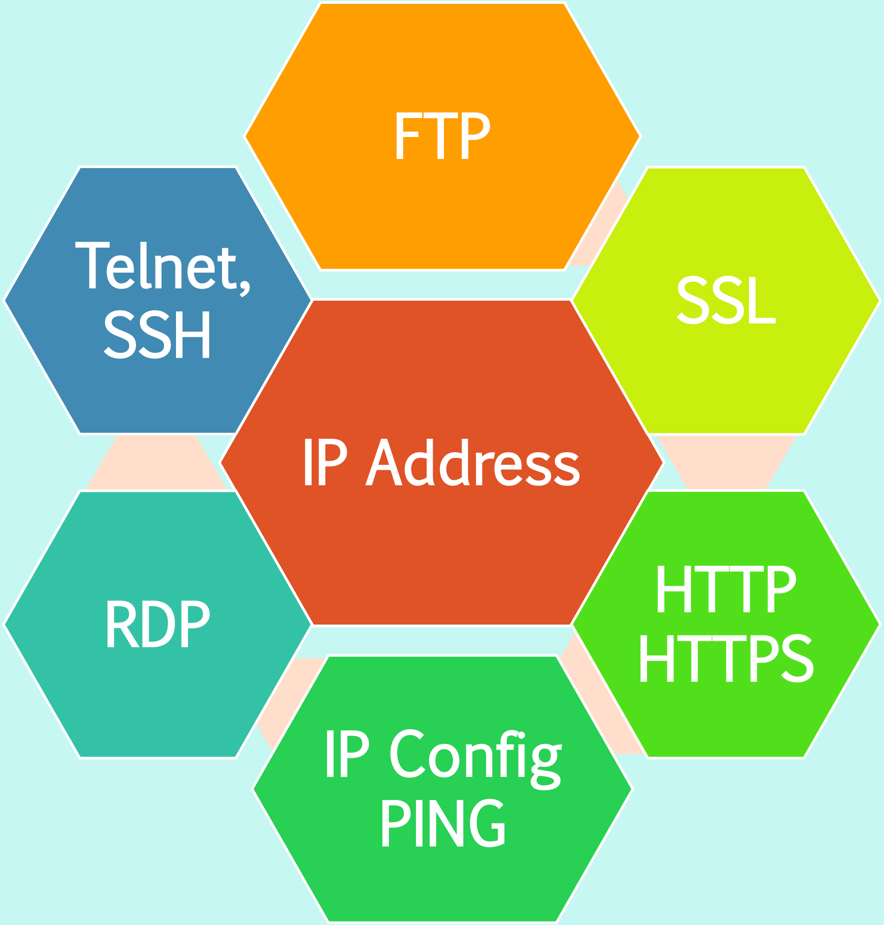
Hosting Platforms

NS Record

Domains (DNS)

A Record

MX Record (Email)



FTP

Telnet, SSH

SSL

IP Address

RDP

HTTP HTTPS

IP Config PING

2.1.2. Domains

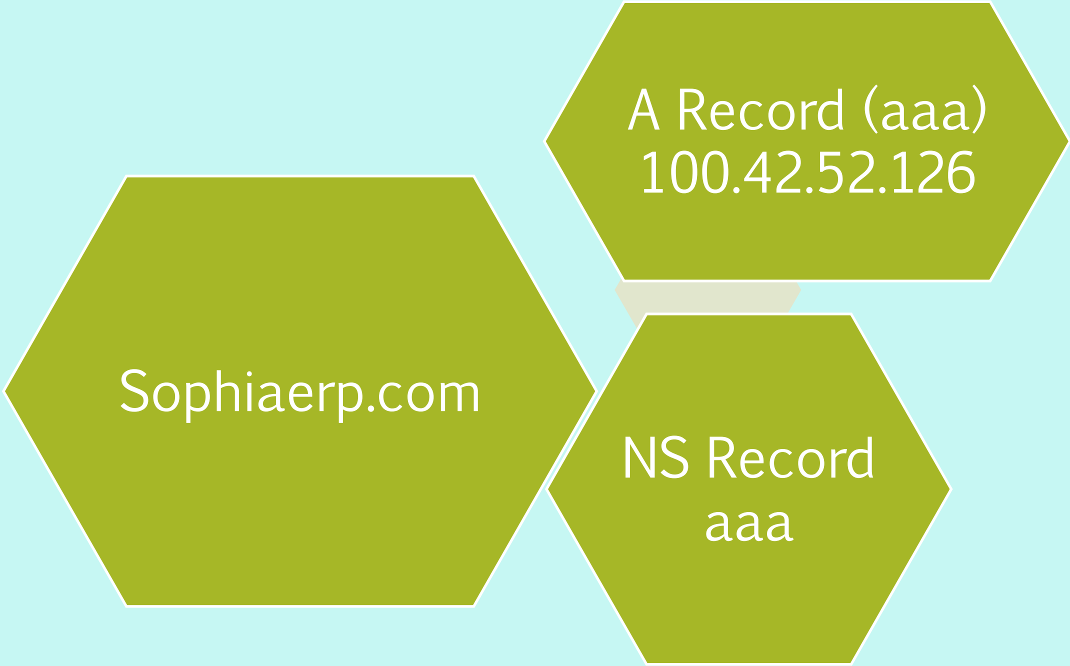
DNS means Domain Name Server

NS Record – Name Server Record – Indicates the server that has details of a domain's IP Address

A Record – Indicates the IP Address of a domain

MX Record (Email) – Indicates the server where your emails would be sent to

Hosting Platforms – GoDaddy, Arvixe



A Record (aaa)
100.42.52.126

Sophiaerp.com

NS Record
aaa

2.1.3. IP Address and networks

So, what is an IP?

IP stands for Internet Protocol, that is the rules guiding the Internet network.

An IP Address is a unique string of characters that identifies each computer on the internet.

IP Config – a tool for getting IP address of your computer

PING – a tool that allows a user to verify that a particular IP address

RDP – Remote Desktop Protocol, e.g. Zoom remote Access

FTP – File Transfer Protocol – a standard for transmitting files between computers on the Internet

Every house on the road 'network' has an Address

2.1.4. IP Address and networks

Telnet – Teletype Network – enables remote communication

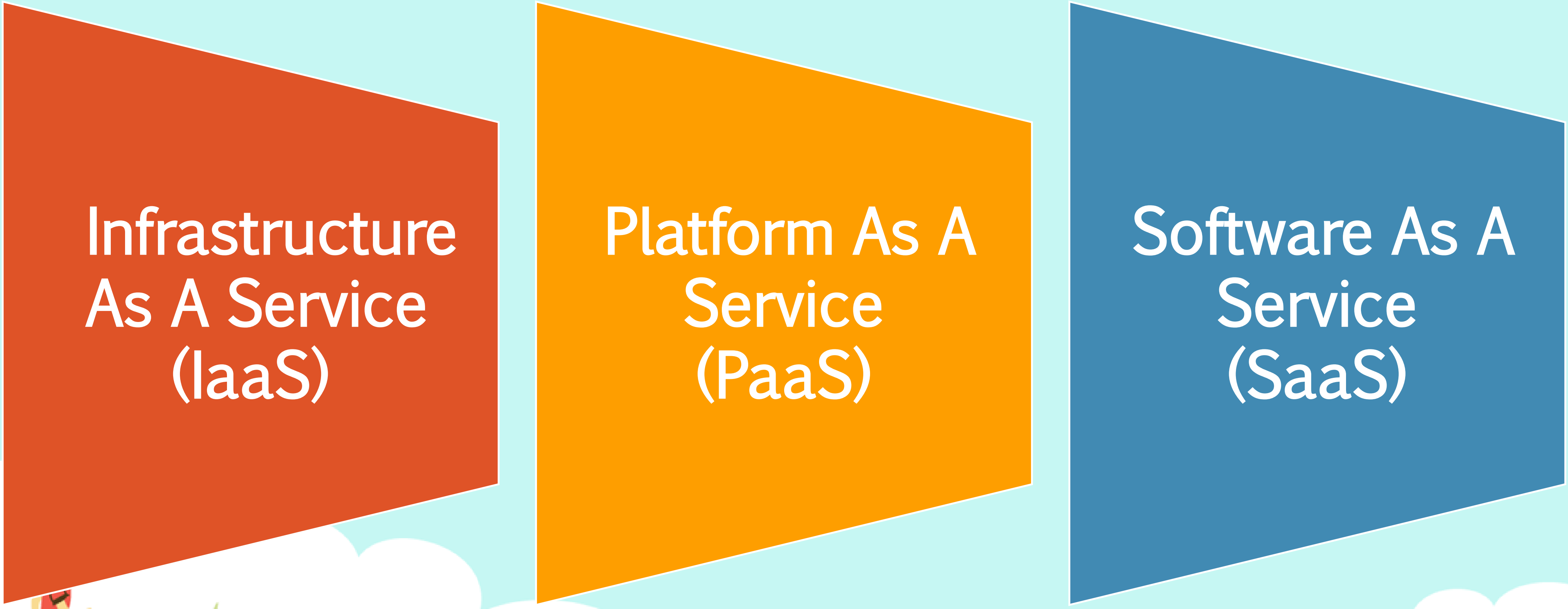
SSH - Secure Shell is a protocol that enables two computers to communicate remotely

SSL - Secure Sockets Layer - is a protocol designed for securing connections between web clients and servers over the internet

HTTP - Hypertext Transfer Protocol - rules for accessing web pages over the internet on the World Wide Web

HTTPS – Secure HTTP – ensures data is encrypted when transferred.

2.2. Cloud Computing Service Models



Infrastructure As A Service (IaaS)

Platform As A Service (PaaS)

Software As A Service (SaaS)

2.2.1. SaaS (Using Sophia ERP Classroom)

Software As A Service (PaaS)

- Gmail, Yahoo Mail, AOL, etc
- Sophia ERP Classroom
- Facebook, Twitter, Instagram

2.2.2. PAAS (Using GitHub)

Platform As A Service (PaaS)

- GitHub Account
- Getting Started
- Creating your Application
- Hosting your Application

Lesson 3

Cloud Computing Providers

- GitHub
- AWS
- GCP
- Azure
- Arvixe
- Godaddy

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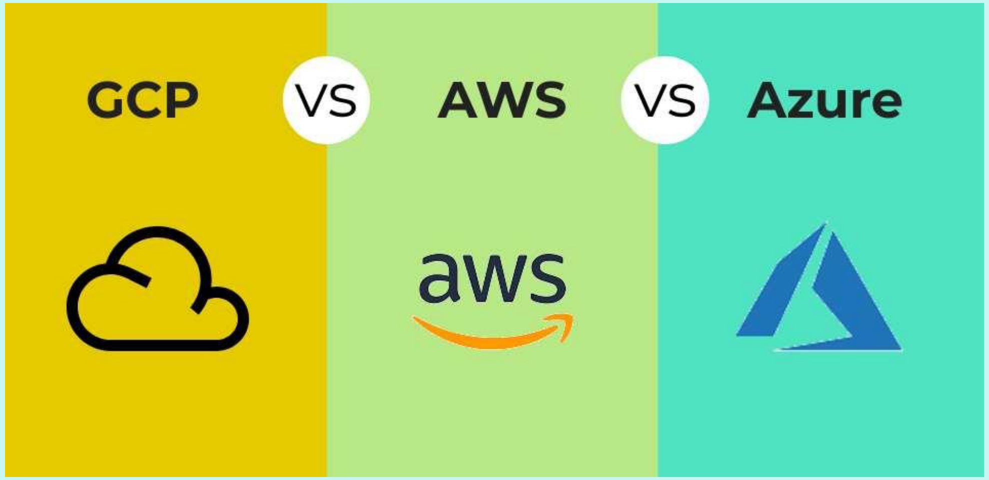
3.1 Comparison of GCP, AWS and Azure

CLOUD WARS



- Compute services
- Storage services
- Availability Zones
- Pricing

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3.2. Compute services

GCP

GCP

- Compute Engine (CE) is the flagship engine for computing services. It supports both Windows and Linux.

AWS

AWS

- Elastic Compute (EC) is the flagship engine for computing services. It also supports Windows and Linux.
- Other Compute services are LightSail, Fargate, etc

Azure

Azure

- Virtual Machines (VM) is the : supports Windows, Linux, Windows Server, etc

3.3. Storage services

GCP

GCP

- Storage services in GCP include Cloud Storage, Cloud Spanner and Cloud Bigtable.

AWS

AWS

- Storage services include Simple Storage Service (S3), Elastic Block Storage (EBS) and DynamoDB.

Azure

Azure

- Storage services in Azure include Blob storage, Queue storage and CosmosDB.
- Azure also offers backup storage for data centers.

3.4. Availability

GCP

GCP

- GCP is only available in 20 regions.

AWS

AWS

- AWS has the largest reach and is available in 66 regions.

Azure

Azure

- Available in 54 regions, spanning 140 countries.

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3.5. Pricing

GCP

GCP

- GCP charges per minute and has no up-front costs or termination fees.
- GCP is the cheapest of the three.

AWS

AWS

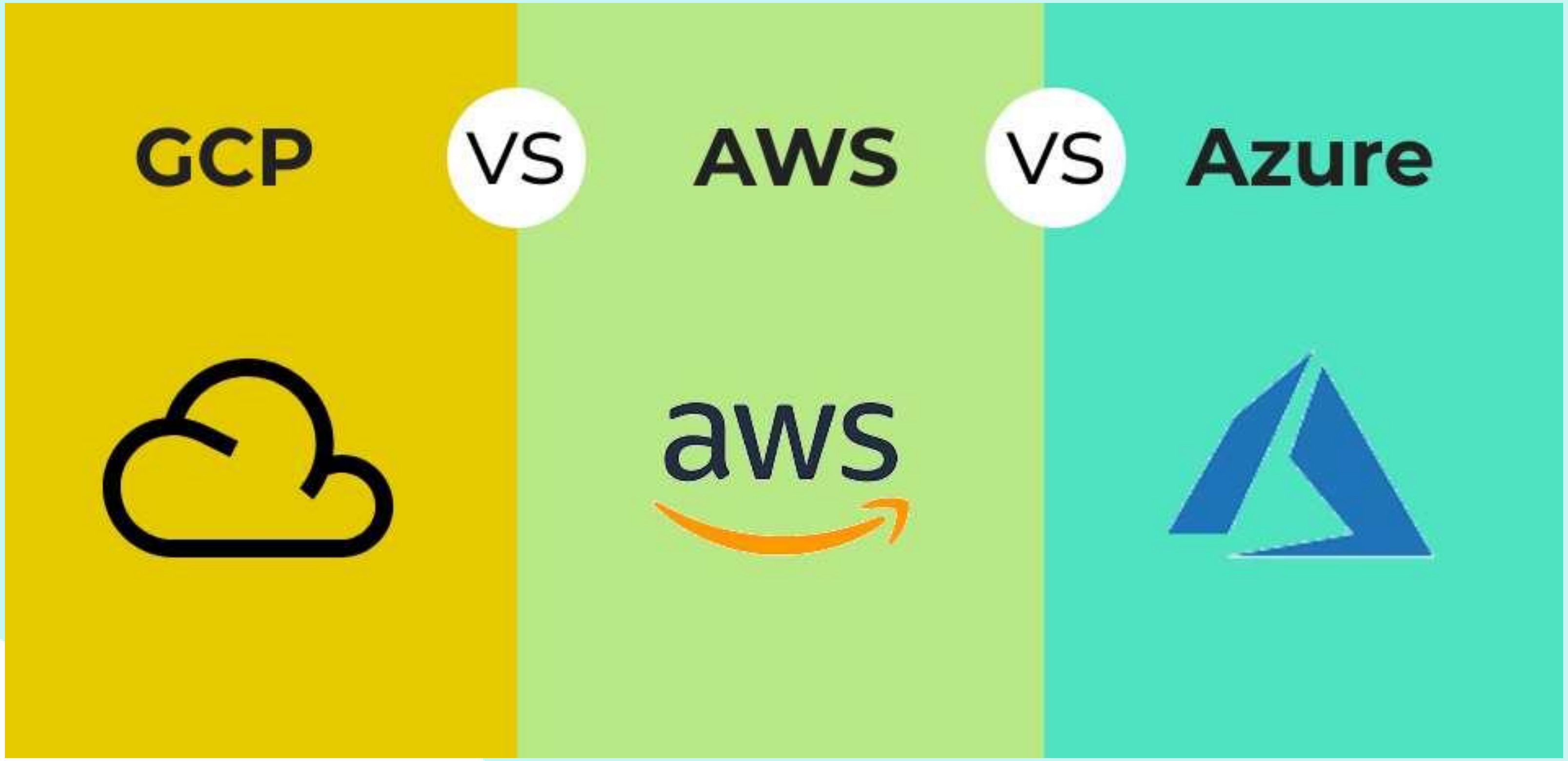
- AWS is the most expensive and not flexible.
- It also offers Pay As You Go.

Azure

Azure

- Azure payment is very flexible payment, as it charges per minute.

3.6. Overview of GCP, AWS and Azure



3.7. Overview of Arvixe and GoDaddy

Study & Reference Materials

1. GCP vs AWS vs Azure | Comparison on Top Cloud Services (educba.com)

2. Comparing Google Cloud Platform, AWS and Azure | by Georgian | Georgian Impact Blog | Medium

3. AWS vs Azure vs Google Cloud - DZone Cloud

4. AWS vs. Azure vs. Google: 2020 Cloud Comparison | Datamation

Lesson 4

GitHub & Azure Hosting & Collaboration

Microsoft Azure

GitHub

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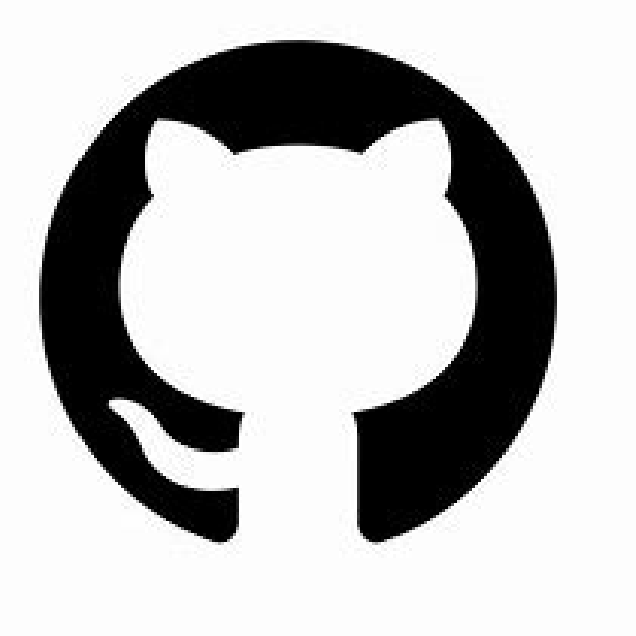
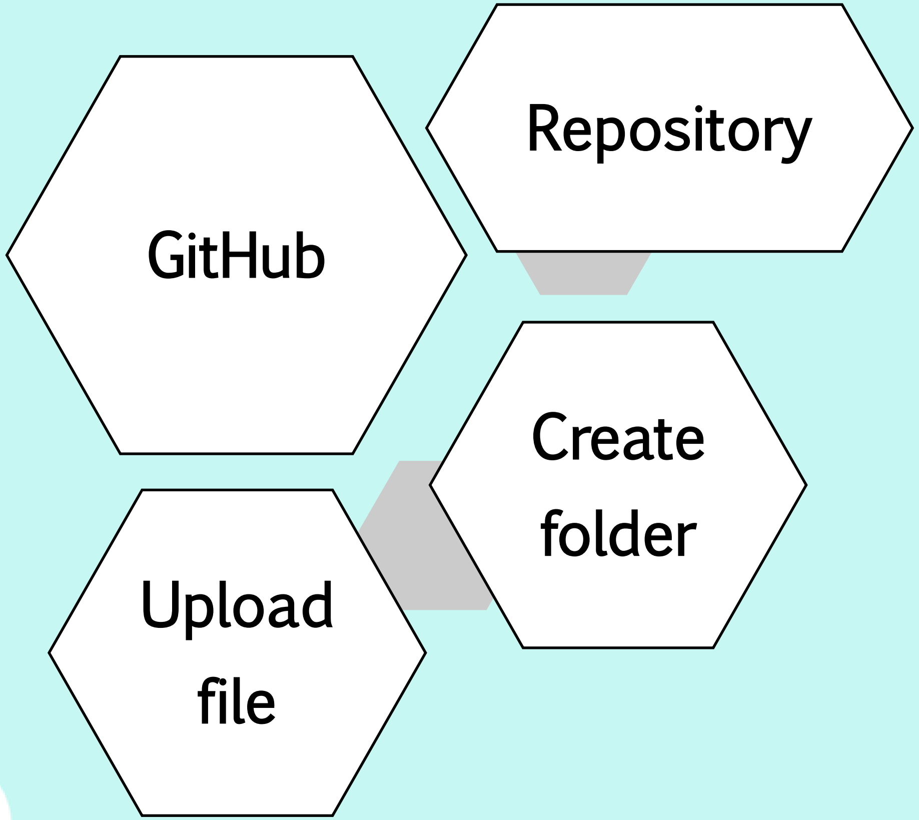
4.1 GitHub Hosting and Collaboration

- Uploading your files and creating folders
- Forks and Branch
- Pull request



4.2 Working with GitHub



GitHub

Repository

Create folder

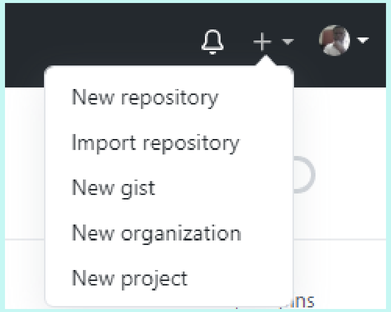
Upload file

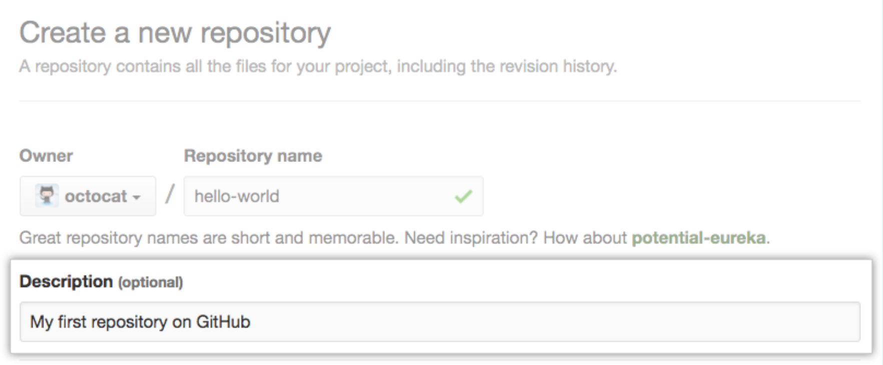
4.3. PAAS (Using GitHub)

GitHub is a Platform as a service cloud computing provider.

GitHub allows us to create and host websites, as well as share files and folders with our team.

GitHub uses a repository to manage your files and folders.




Create a new repository

A repository contains all the files for your project, including the revision history.

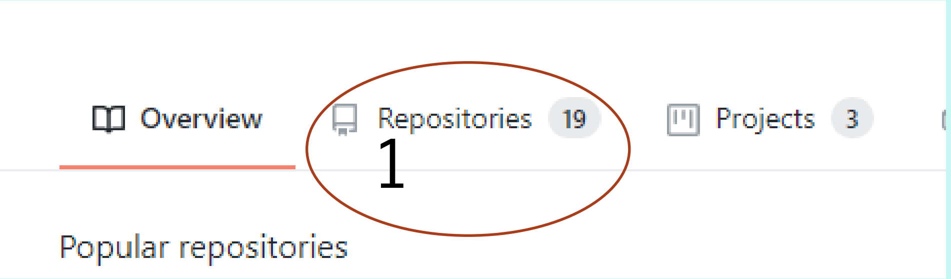
Owner: octocat / Repository name: hello-world ✓

Great repository names are short and memorable. Need inspiration? How about **potential-eureka**.

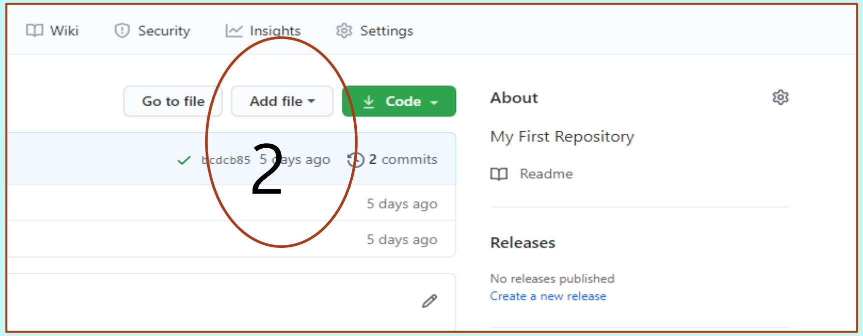
Description (optional)

My first repository on GitHub

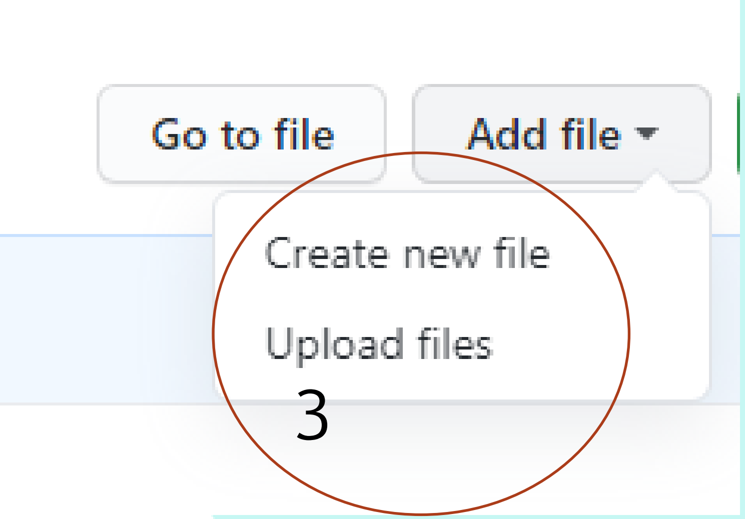
4.3.1. Creating a folder



1. Go to your repository

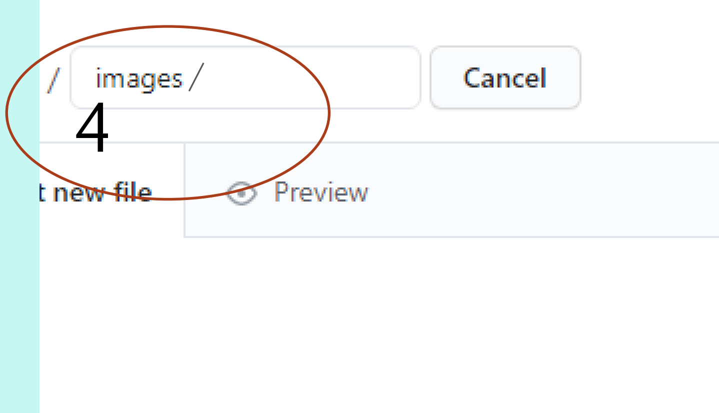


2. Click on Add file at the top right



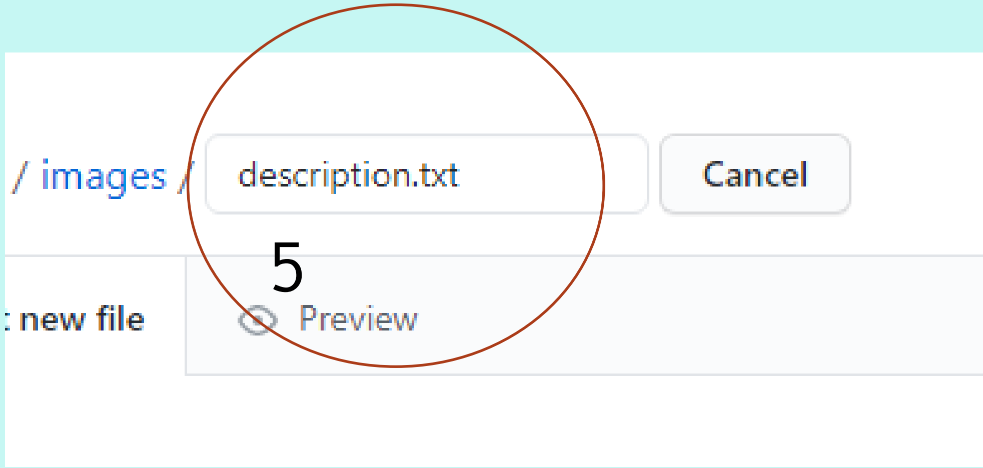
3. Click on Create file

4.3.2. Creating a folder



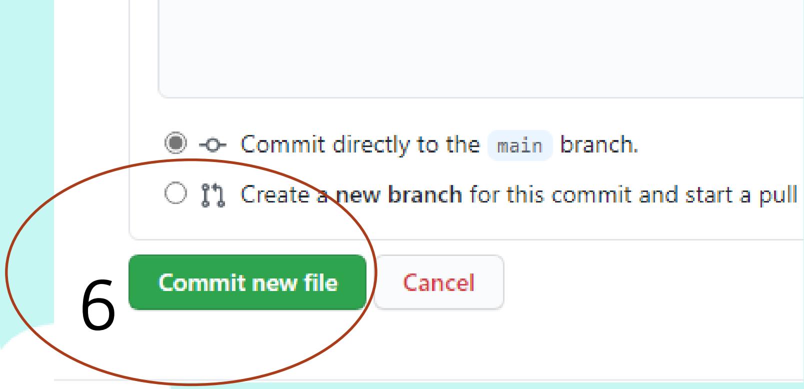
/ images /

4. Type the name of your folder and add a slash: /



/ images / description.txt

5. In the second textbox, type description.txt

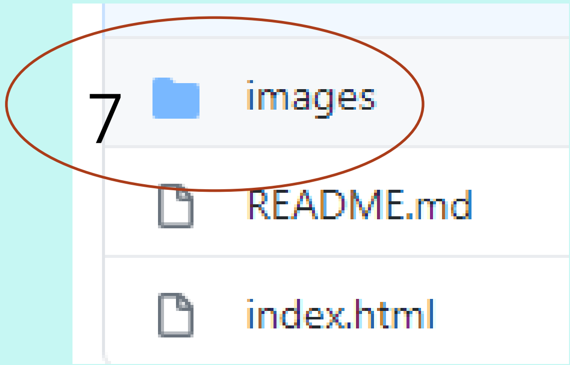


● Commit directly to the `main` branch.

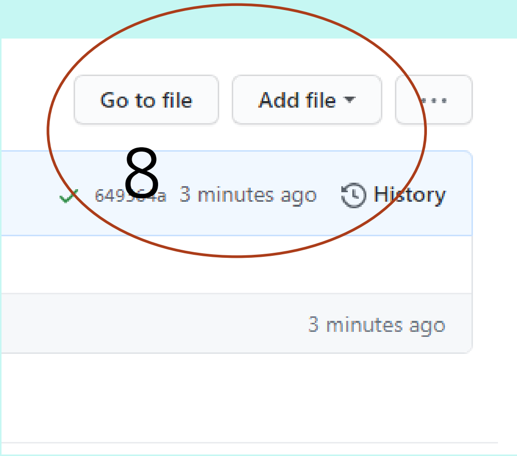
○ Create a **new branch** for this commit and start a pull

6. At the bottom of the page, click on Commit new file

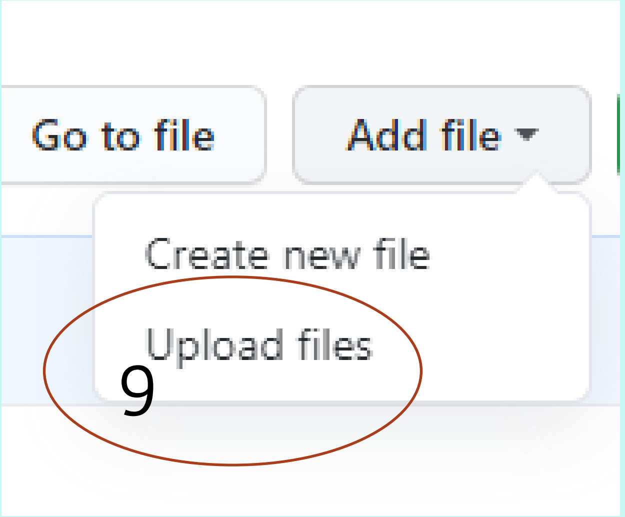
4.3.3. Uploading files



7. Click on your repository name
Then click on your new folder



8. Click on Add file

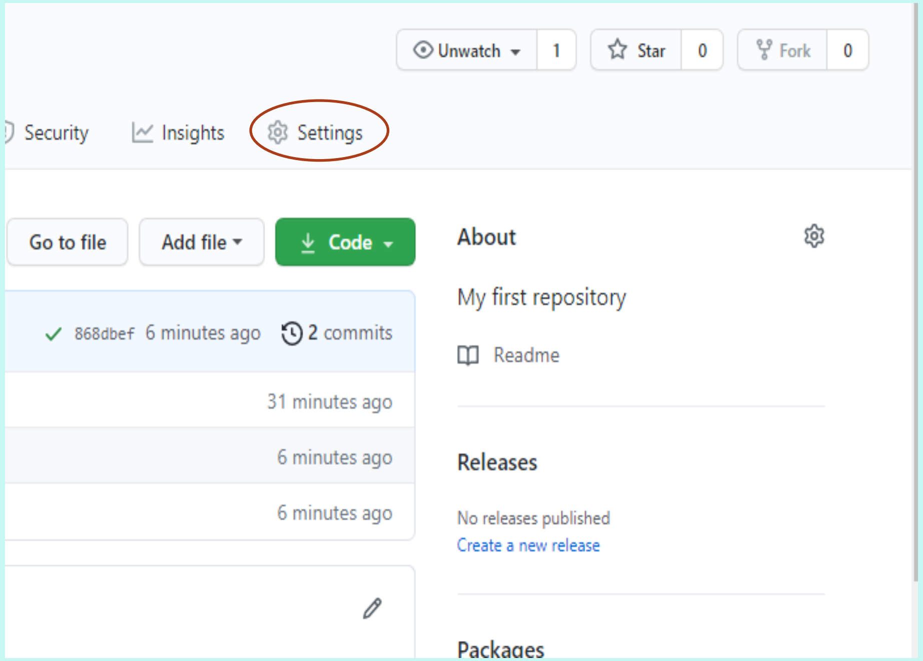


9. Click on Upload file and upload the all your images

4.4. Deploying Your Website

Now your files have been added to your repository. Let's deploy your website.

- Select Settings.
- Scroll down across the menu on the left and click on Pages.

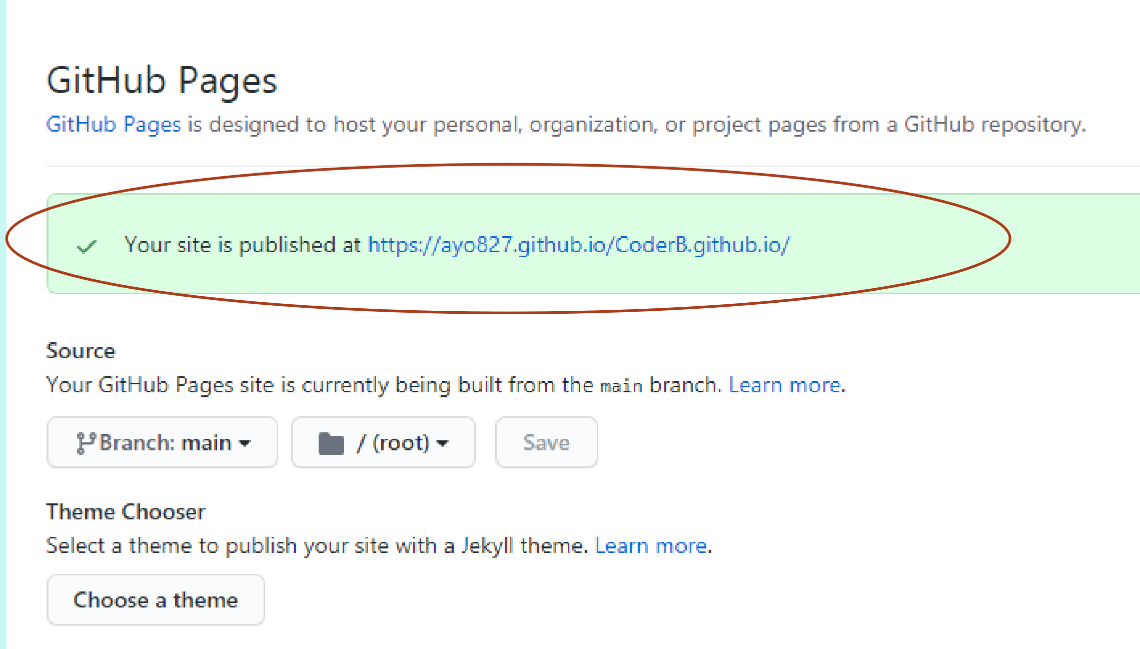


4.5. Finalizing Deployment

- Firstly, change the branch to the one you which to deploy, which is probably **main**

- Click save

Your website is already published. Click on the blue link to see your page



GitHub Pages

GitHub Pages is designed to host your personal, organization, or project pages from a GitHub repository.

✓ Your site is published at https://ayo827.github.io/CoderB.github.io/

Source

Your GitHub Pages site is currently being built from the `main` branch. Learn more.

Theme Chooser

Select a theme to publish your site with a Jekyll theme. Learn more.

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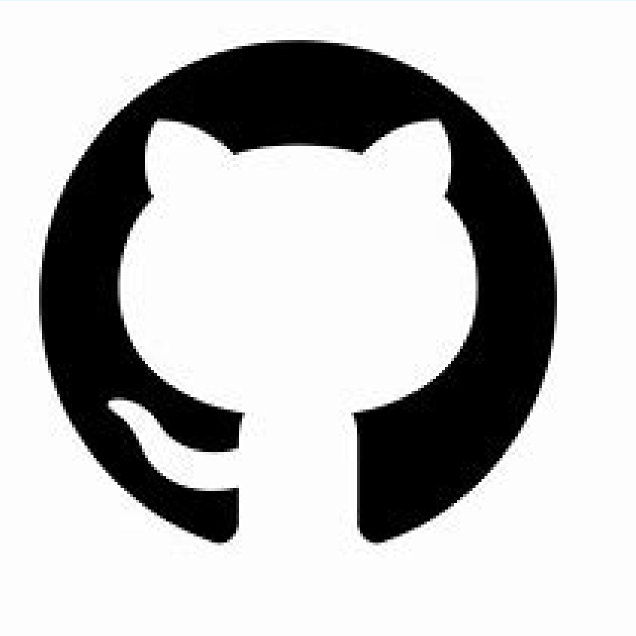
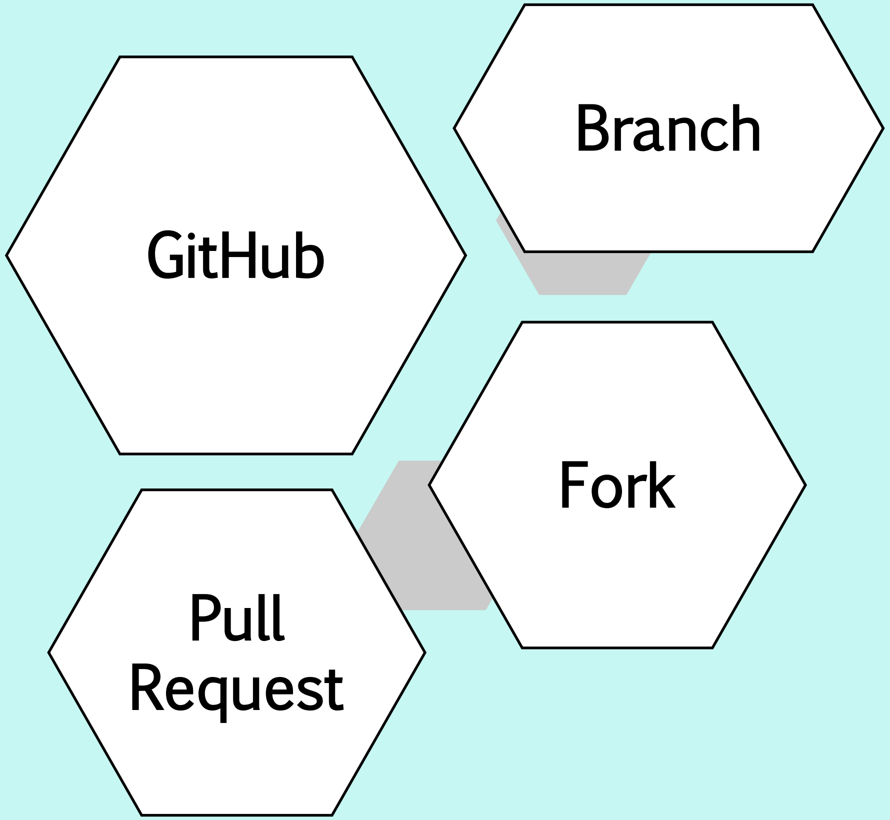
4.6. GitHub Collaboration

- Branch
- Fork
- Pull request and Merge



4.7. GitHub Collaboration



GitHub

Branch

Fork

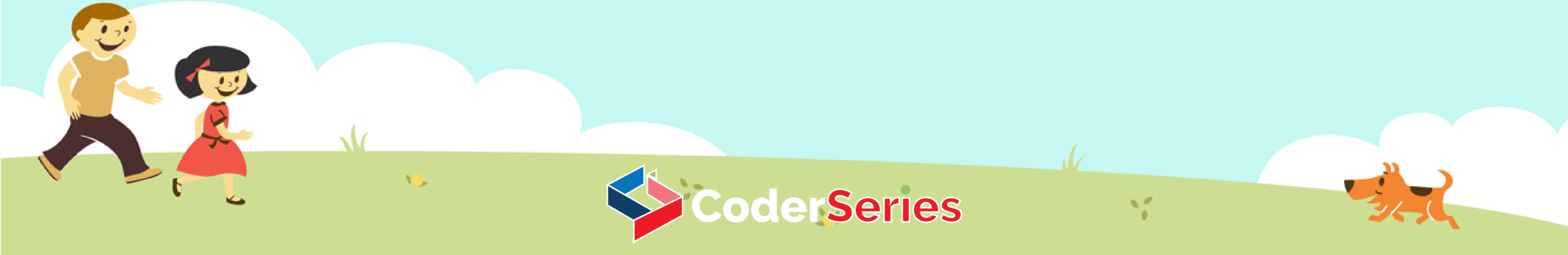
Pull Request

4.8 Branching in GitHub

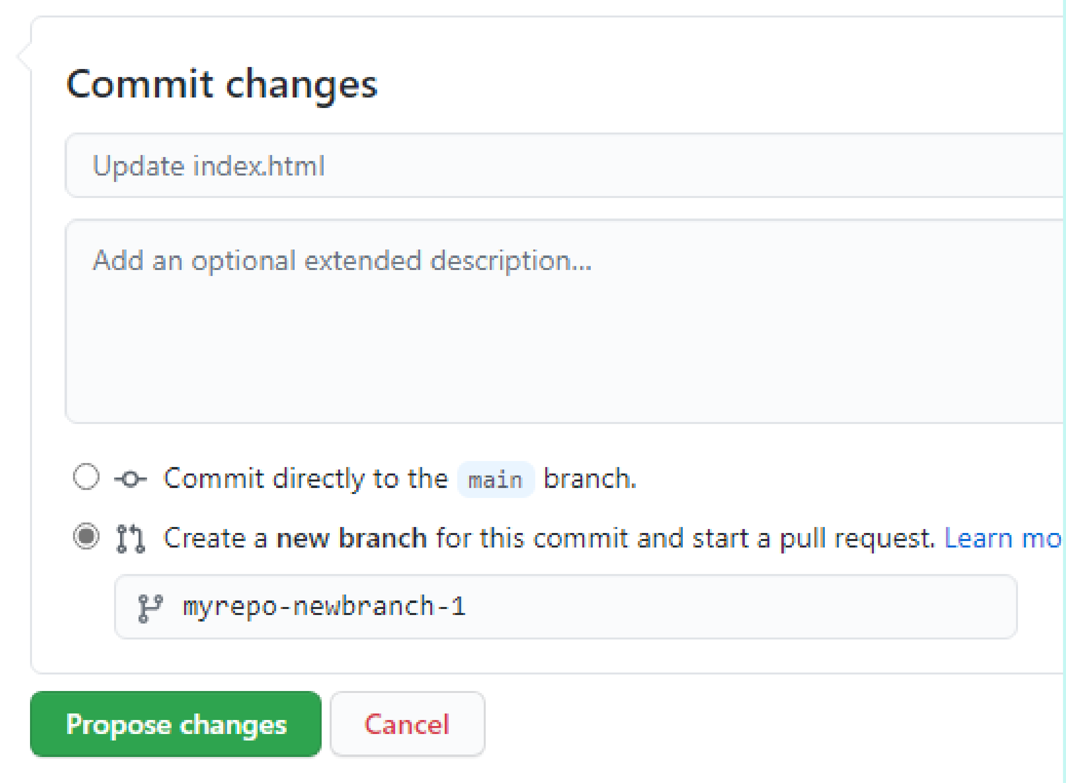
When we want to make a change to our repository, we can create a new branch first, in order to see the result of the change.

Changes to our repository include:

- Creating a file
- Uploading a file
- Editing a file
- Deleting a file



4.8.1 Steps to create a branch in GitHub



Commit changes

Update index.html

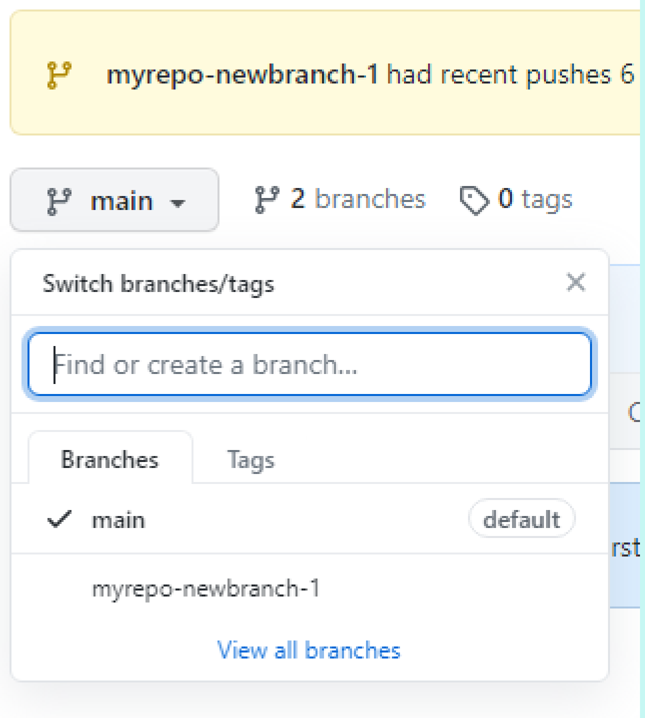
Add an optional extended description...

○ Commit directly to the `main` branch.

● Create a **new branch** for this commit and start a pull request. Learn mo

myrepo-newbranch-1

1. We create a new branch when committing a change



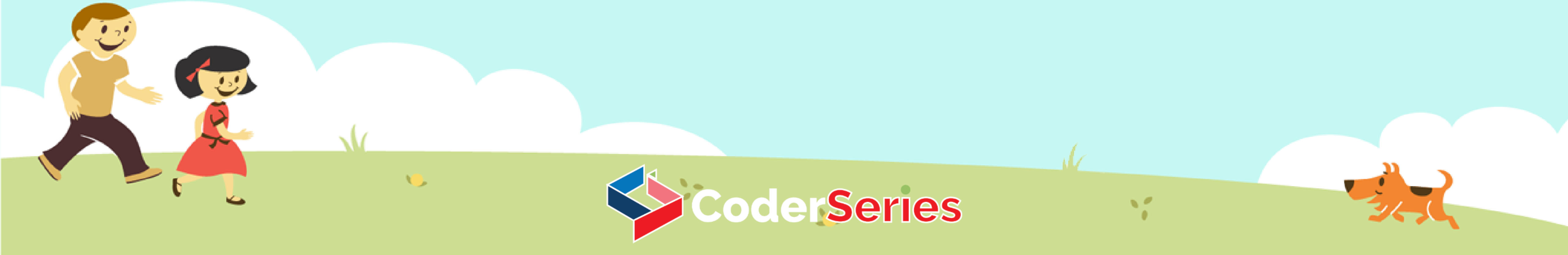
myrepo-newbranch-1 had recent pushes 6

2. Our new branch has been created

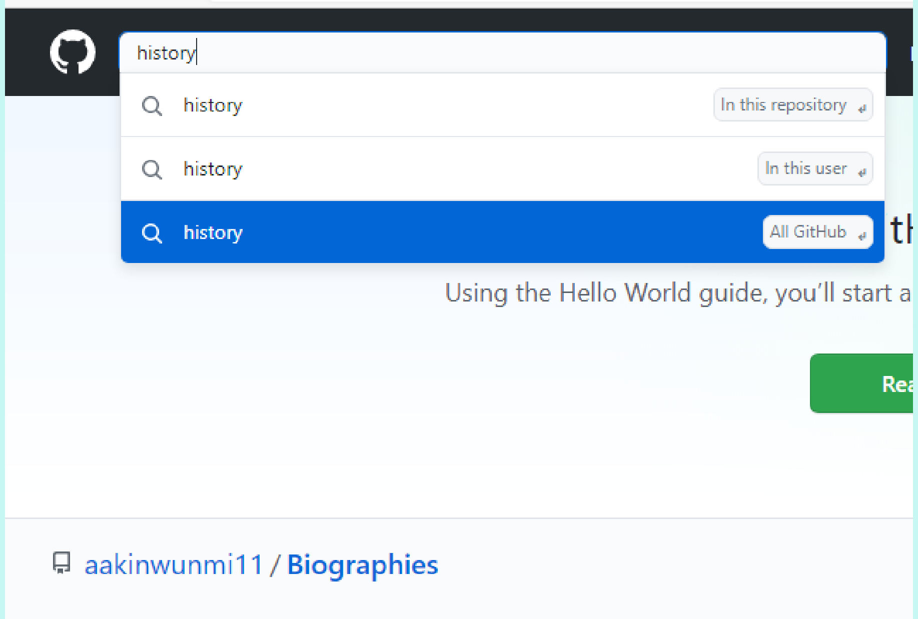
4.9. Forking in GitHub

When we want to make a copy of a repository that is not ours, we create a fork.

The original author of the repository is aware when a fork is created

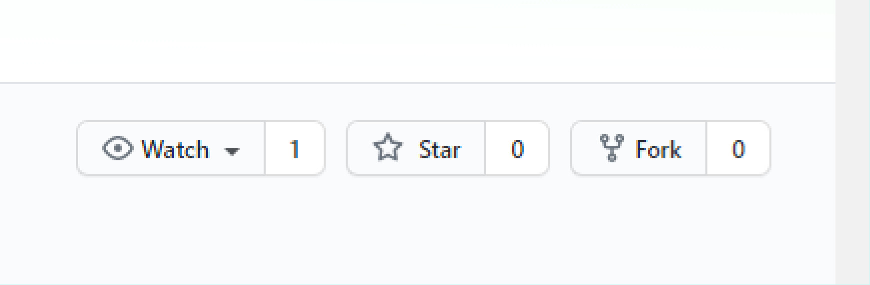


4.9.1. Steps to create a fork in GitHub



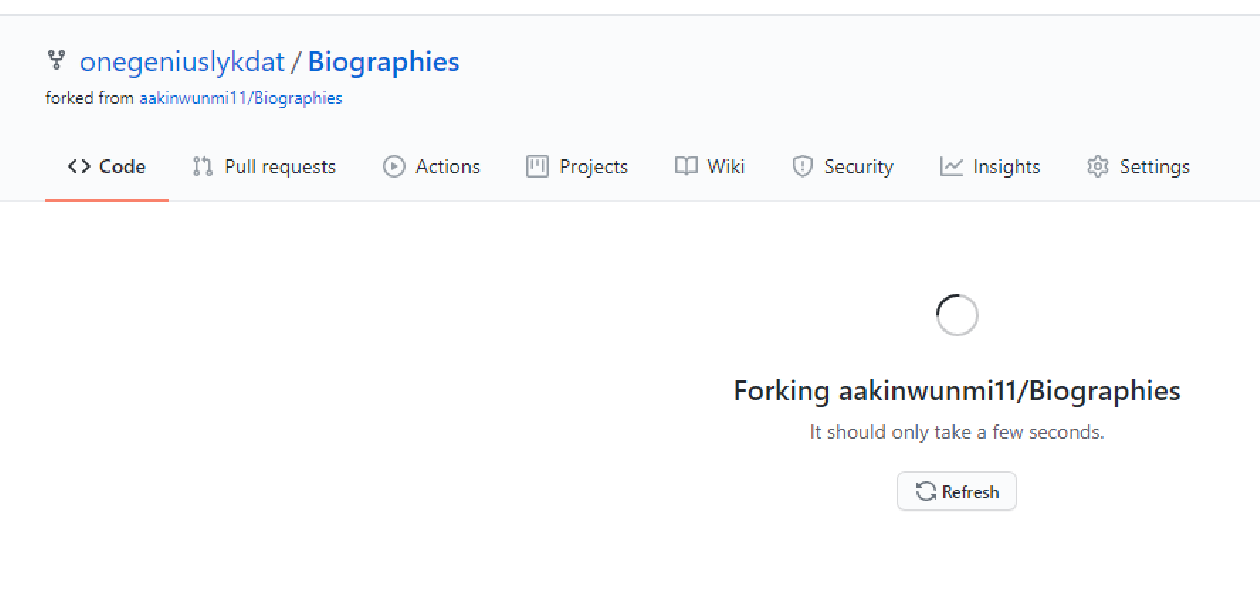
Using the Hello World guide, you'll start a

1. Search for the repository in GitHub



2. Click on fork

4.9.2 Steps to create a fork in GitHub



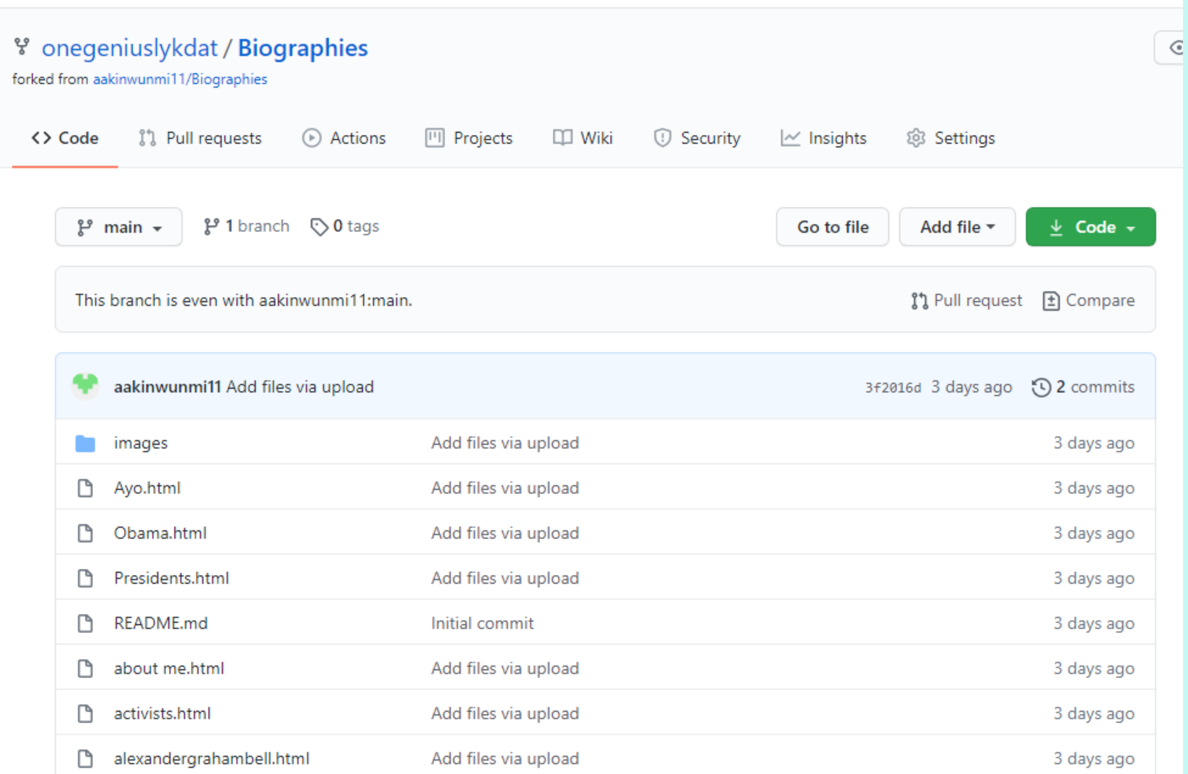
onegeniuslykdat / **Biographies**

forked from aakinwunmi11/Biographies

Forking aakinwunmi11/Biographies

It should only take a few seconds.

3. Wait for a few seconds



onegeniuslykdat / **Biographies**

forked from aakinwunmi11/Biographies

This branch is even with aakinwunmi11:main.

aakinwunmi11 Add files via upload 3f2016d 3 days ago **2** commits

images	Add files via upload	3 days ago
Ayo.html	Add files via upload	3 days ago
Obama.html	Add files via upload	3 days ago
Presidents.html	Add files via upload	3 days ago
README.md	Initial commit	3 days ago
about me.html	Add files via upload	3 days ago
activists.html	Add files via upload	3 days ago
alexandergrahambell.html	Add files via upload	3 days ago

4. You now have your own copy of the repository

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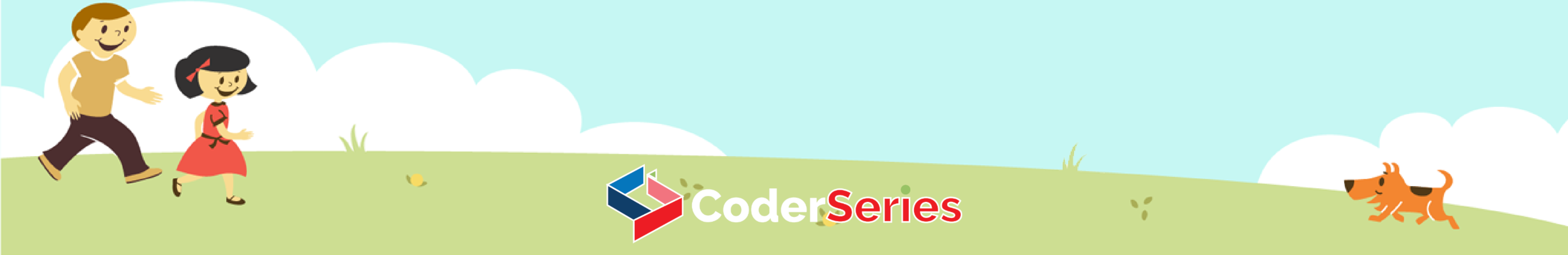
4.10. Pull requests and Merge in GitHub

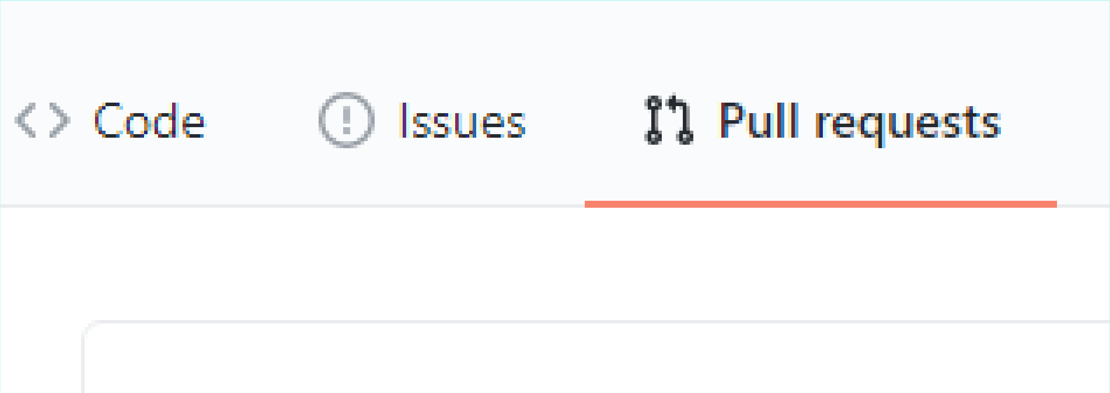
After creating a branch or fork we (or the original author) can merge the branch or fork into the original repository.

Pull requests asks the original author to include the changes we made.

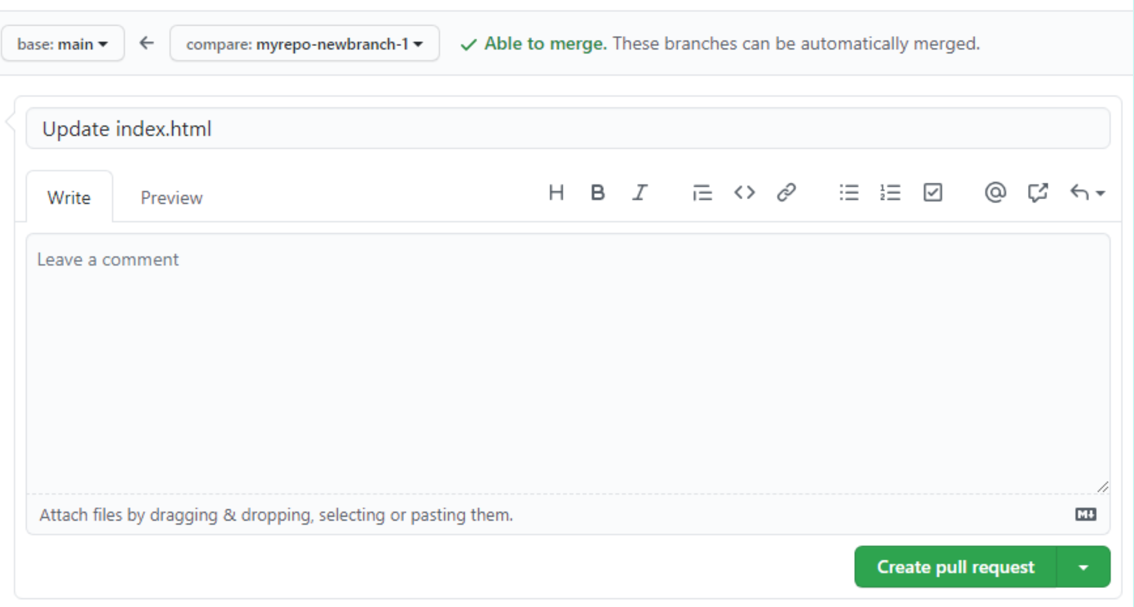
While Merge allows the author to confirm the pull request and effects the change to the repository.



4.10.1 Steps to create a pull request in GitHub



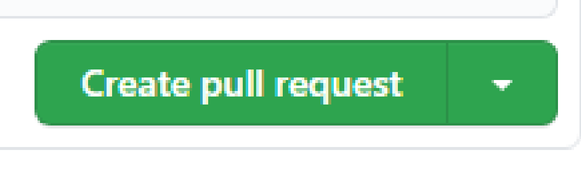
1. Click on the Pull requests tab


base: main
compare: myrepo-newbranch-1
Write
Preview
H
B
I
Leave a comment
Attach files by dragging & dropping, selecting or pasting them.
Create pull request

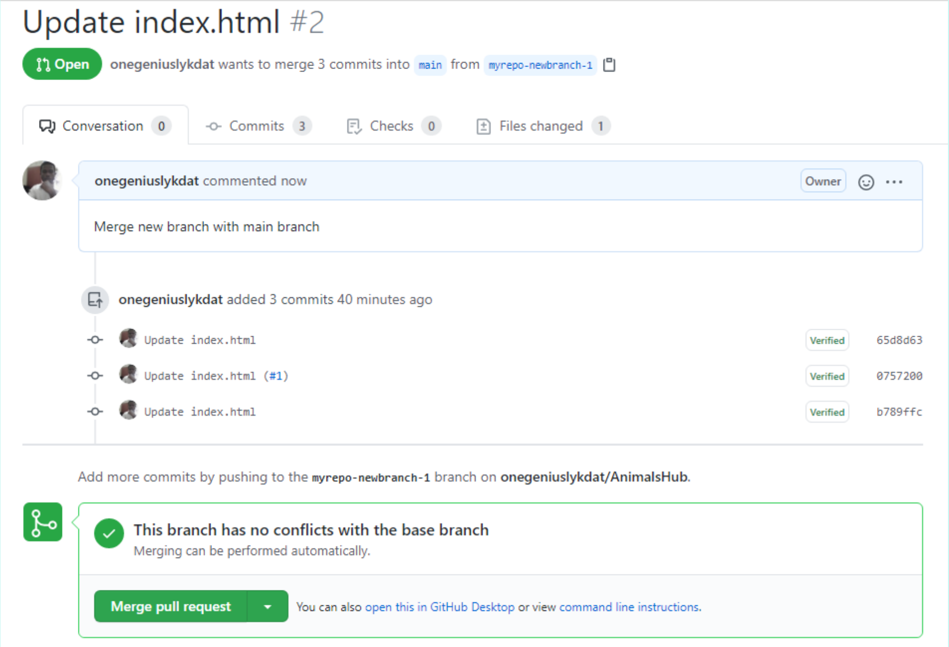
✓ Able to merge. These branches can be automatically merged.

Update index.html

2. You can add a description for the request, then click on the Create pull request button



4.10.2. Steps to merge pull requests in GitHub



Update index.html #2

Open onegeniuslykdat wants to merge 3 commits into main from myrepo-newbranch-1

Conversation 0 · Commits 3 · Checks 0 · Files changed 1

onegeniuslykdat commented now · Owner

Merge new branch with main branch

onegeniuslykdat added 3 commits 40 minutes ago

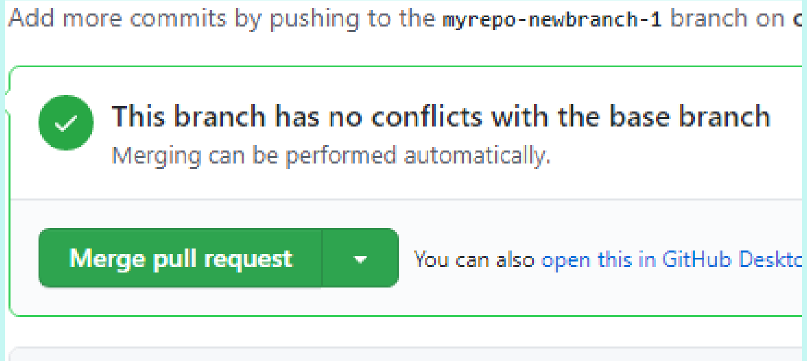
```
Update index.html        Verified  65d8d63
Update index.html (#1)   Verified  0757200
Update index.html        Verified  b789ffc
```

Add more commits by pushing to the myrepo-newbranch-1 branch on onegeniuslykdat/AnimalsHub.

This branch has no conflicts with the base branch
Merging can be performed automatically.

Merge pull request · You can also open this in GitHub Desktop or view command line instructions.

1. In Pull requests tab, you will see the pull request that has been opened (created)

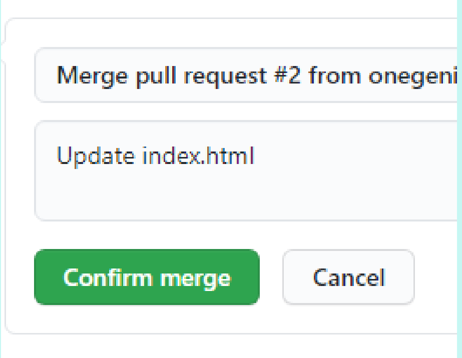


Add more commits by pushing to the myrepo-newbranch-1 branch on c

This branch has no conflicts with the base branch
Merging can be performed automatically.

Merge pull request · You can also open this in GitHub Deskto

2. Click on Merge pull request



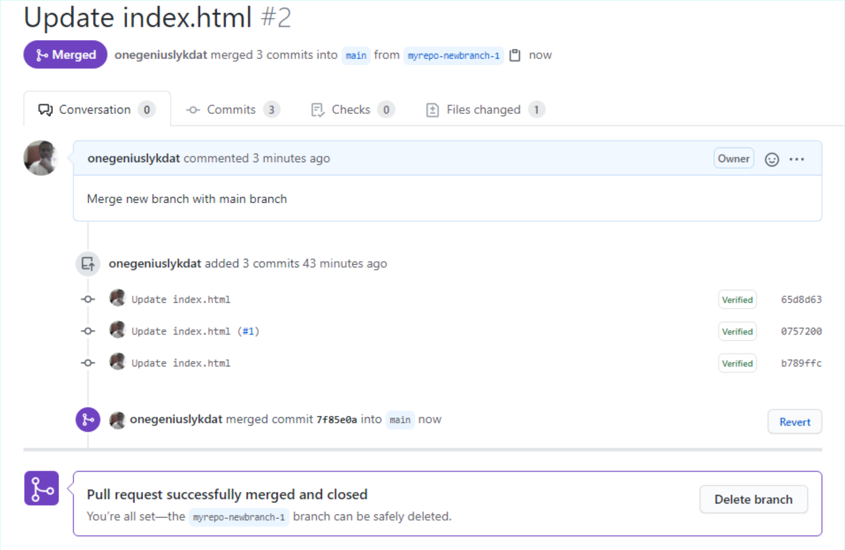
Merge pull request #2 from onegeni

Update index.html

Confirm merge · Cancel

3. Confirm the merge

4.10.3. Steps to merge pull requests in GitHub



Update index.html #2

Merged onegeniuslykdat merged 3 commits into `main` from `myrepo-newbranch-1` now

onegeniuslykdat commented 3 minutes ago

Merge new branch with main branch

onegeniuslykdat added 3 commits 43 minutes ago

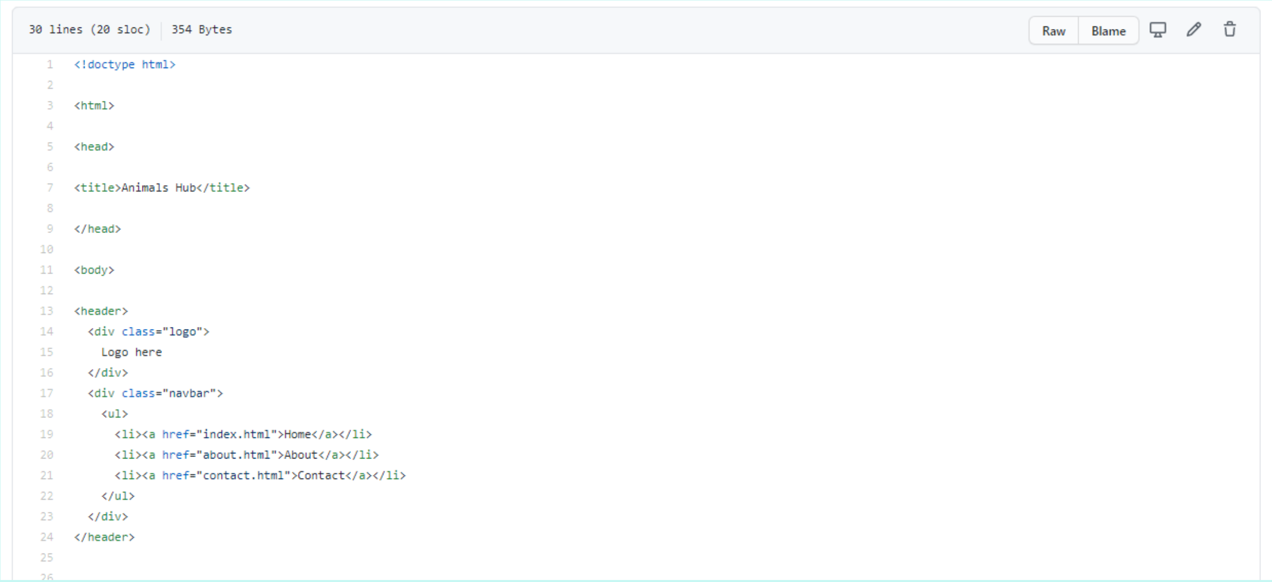
Update index.html	Verified	65d8d63
Update index.html (#1)	Verified	0757200
Update index.html	Verified	b789ffc

onegeniuslykdat merged commit 7f85e0a into `main` now

Pull request successfully merged and closed

You're all set—the `myrepo-newbranch-1` branch can be safely deleted.

4. Once confirmed, the new branch would be merged with the main branch.



30 lines (20 sloc) | 354 Bytes

```html
<!doctype html>

<html>

<head>

<title>Animals Hub</title>

</head>

<body>

<header>
  <div class="logo">
    Logo here
  </div>
  <div class="navbar">
    <ul>
      <li><a href="index.html">Home</a></li>
      <li><a href="about.html">About</a></li>
      <li><a href="contact.html">Contact</a></li>
    </ul>
  </div>
</header>

```

5. In the main branch, the file that was changed now contains the changes.

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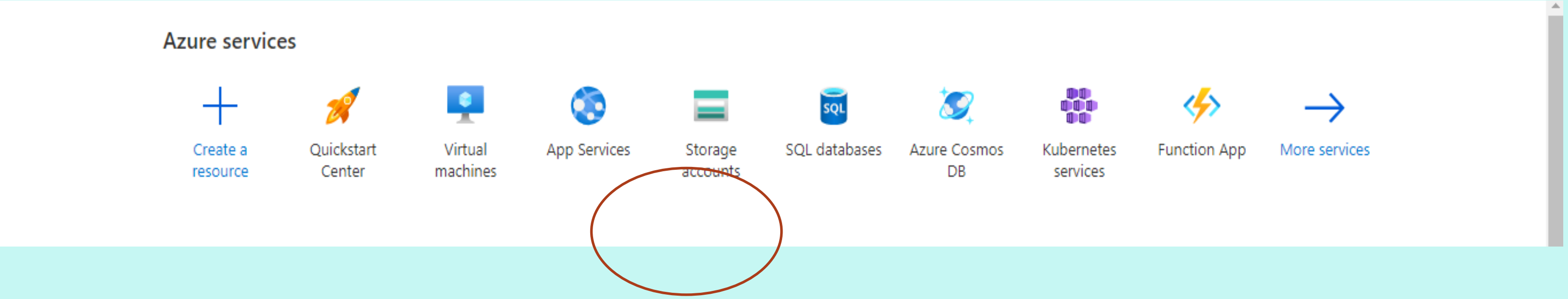
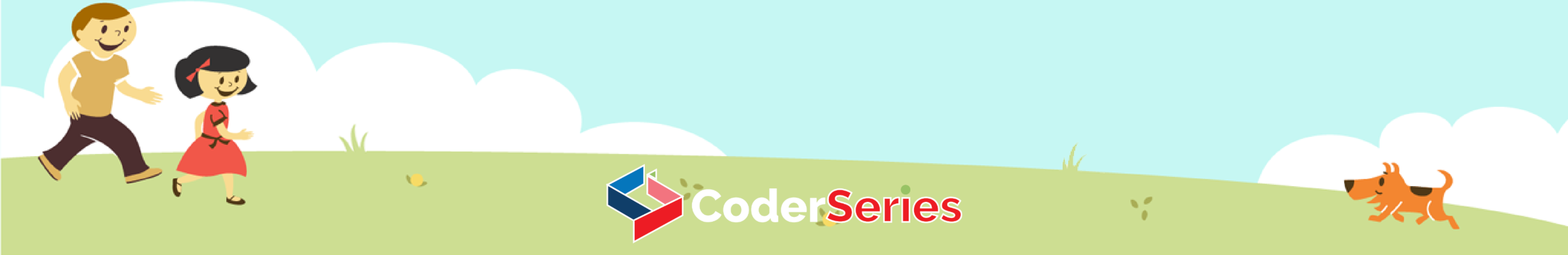
4.11. Deploying On Microsoft Azure

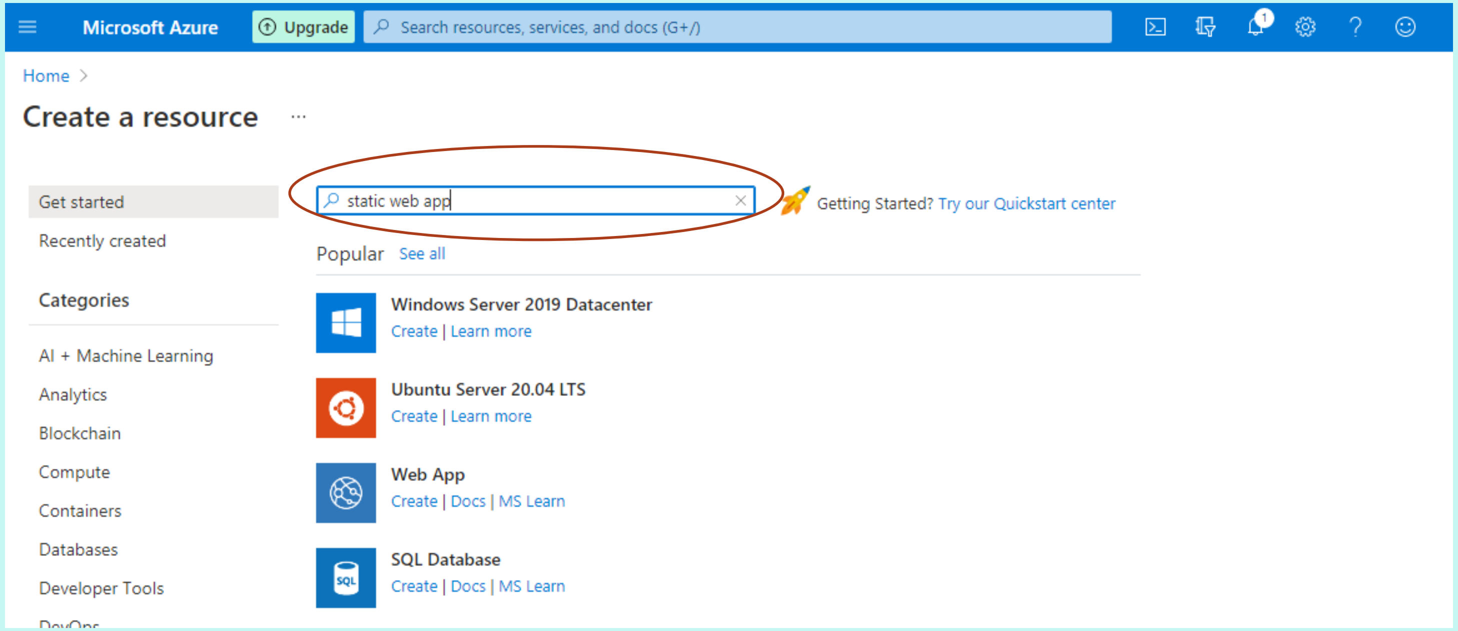


- Log into your Azure account
- In the azure portal, you see some of azure services, select ***create a resource***



4.12. Creating a Resource

In the *create a resource* window, find the search bar and search for ***static web app***



Microsoft Azure | Upgrade | Search resources, services, and docs (G+/)

Home >

Create a resource ···

static web app

Getting Started? Try our Quickstart center

- Get started
- Recently created

Categories

- AI + Machine Learning
- Analytics
- Blockchain
- Compute
- Containers
- Databases
- Developer Tools
- DevOps

Popular See all

- Windows Server 2019 Datacenter
  Create | Learn more
- Ubuntu Server 20.04 LTS
  Create | Learn more
- Web App
  Create | Docs | MS Learn
- SQL Database
  Create | Docs | MS Learn

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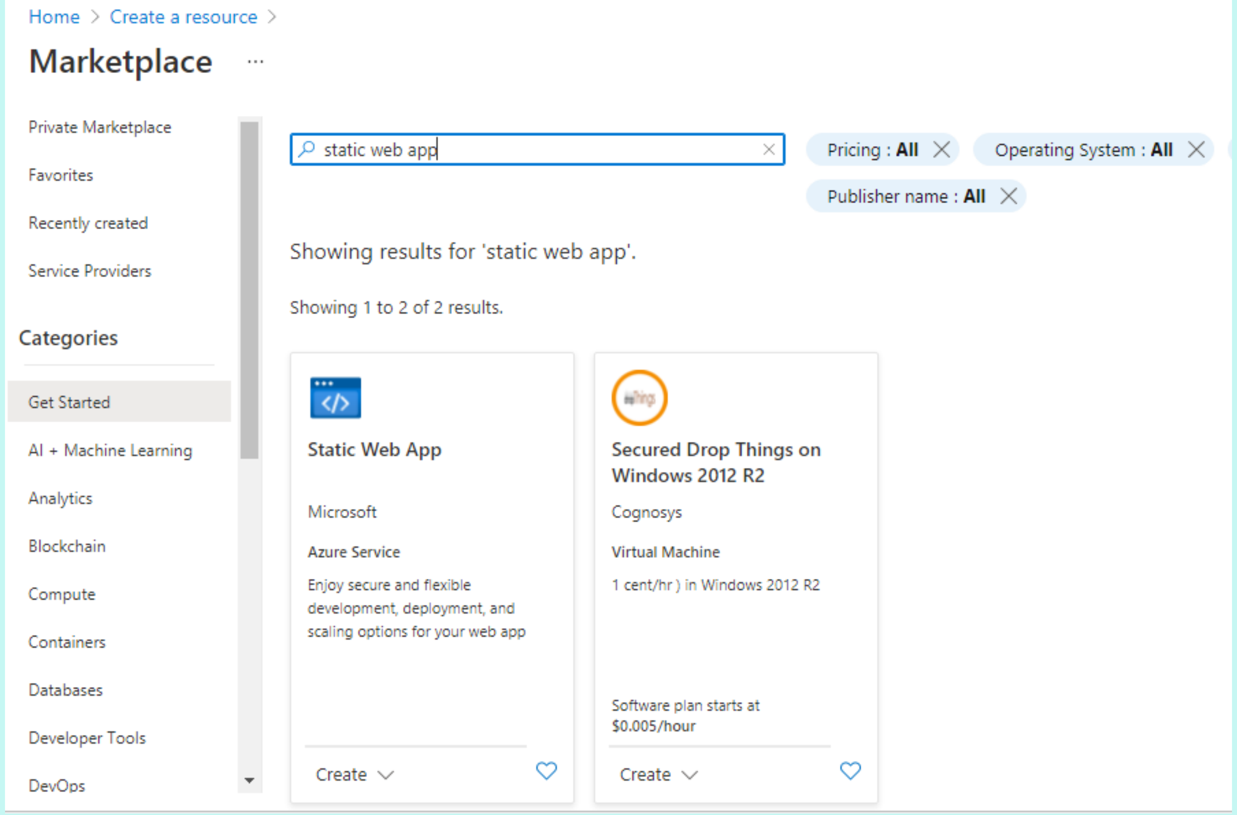
4.13. Creating The Static Web App

Select ***Static Web App*** *and click create*



Home > Create a resource >

Marketplace ...

Private Marketplace

Favorites

Recently created

Service Providers

Categories

Get Started

AI + Machine Learning

Analytics

Blockchain

Compute

Containers

Databases

Developer Tools

DevOps

static web app

Pricing : **All** ✕ Operating System : **All** ✕ Publisher name : **All** ✕

Showing results for 'static web app'.

Showing 1 to 2 of 2 results.

Static Web App

Microsoft

Azure Service

Enjoy secure and flexible development, deployment, and scaling options for your web app

Create ∨

Secured Drop Things on Windows 2012 R2

Cognosys

Virtual Machine

1 cent/hr) in Windows 2012 R2

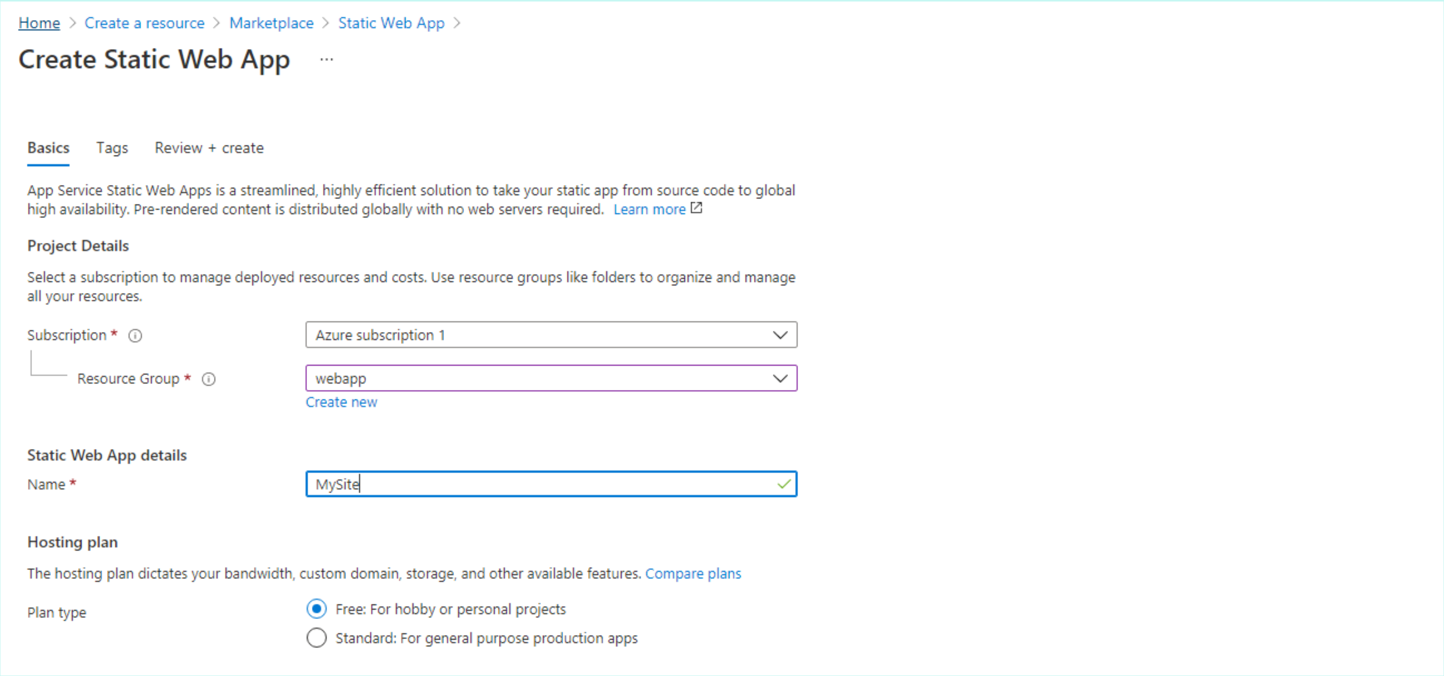
Software plan starts at $0.005/hour

Create ∨

CoderSeries

4.14. Setting Up Your Website Details

- Select your azure subscription, probably azure subscription 1
- In the resource group, create a new resource group. A resource group is a container that holds similar projects
- In name, input the name for your website.



Home > Create a resource > Marketplace > Static Web App >

Create Static Web App ···

App Service Static Web Apps is a streamlined, highly efficient solution to take your static app from source code to global high availability. Pre-rendered content is distributed globally with no web servers required. Learn more

Project Details

Select a subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription * : Azure subscription 1

Resource Group * : webapp

Create new

Static Web App details

Name * : MySite

Hosting plan

The hosting plan dictates your bandwidth, custom domain, storage, and other available features. Compare plans

Plan type

● Free: For hobby or personal projects

○ Standard: For general purpose production apps

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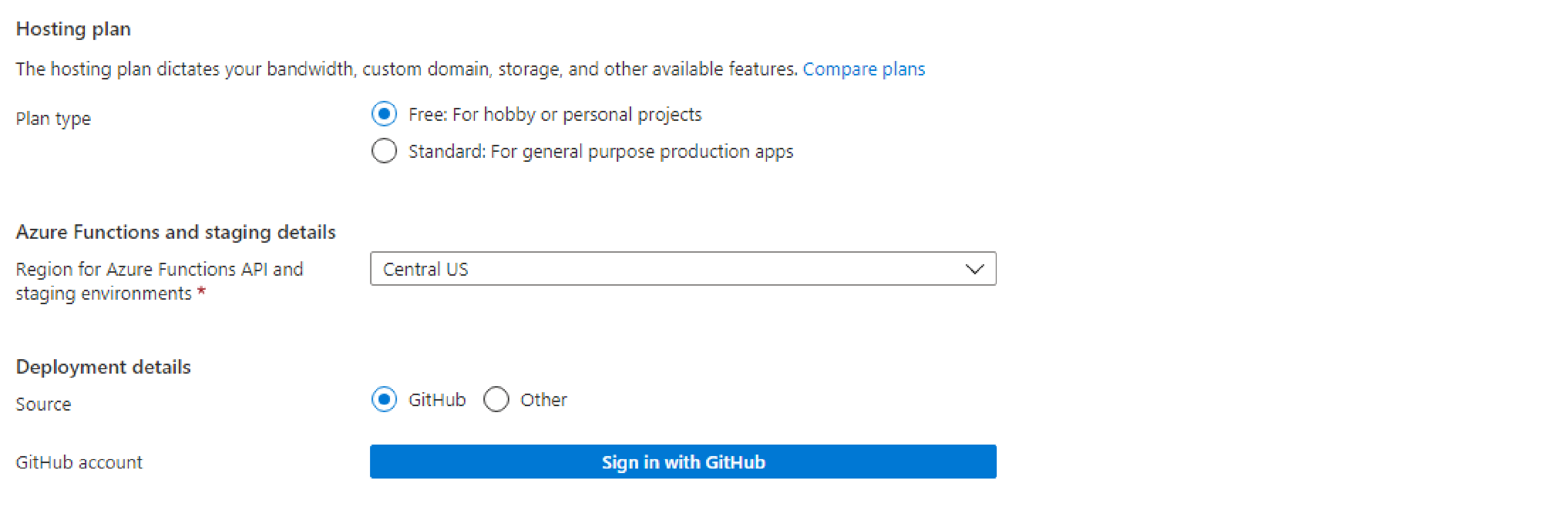
4.15. Setting Up Your Website Details

- Selecting plan type, leave it at default
- Region, leave it at default
- Deployment details, select github
- click on *sign in with github*
- *Allow authorization*



Hosting plan

The hosting plan dictates your bandwidth, custom domain, storage, and other available features. Compare plans

Plan type
● Free: For hobby or personal projects
○ Standard: For general purpose production apps

Azure Functions and staging details

Region for Azure Functions API and staging environments * : Central US

Deployment details

Source: ● GitHub ○ Other

GitHub account: Sign in with GitHub

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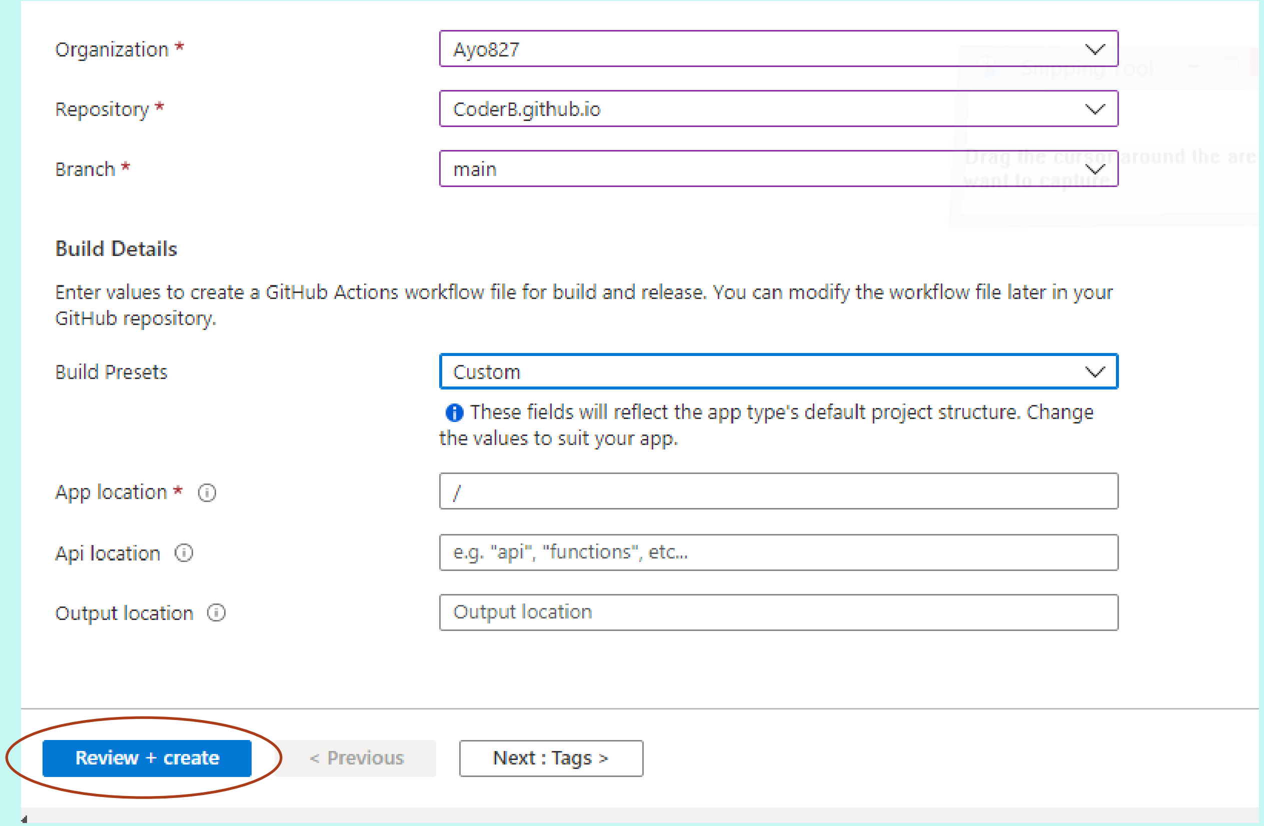
4.16. Setting Up Your Deployment Details

- Organization - Select your github name
- Repository - Select the repository you want to deploy
- Branch - Select the branch you want to deploy.
- Build Presets - Select Custom
- Leave the remaining at default.
- Click on ***Review + Create***



Organization * Ayo827

Repository * CoderB.github.io

Branch * main

Build Details

Enter values to create a GitHub Actions workflow file for build and release. You can modify the workflow file later in your GitHub repository.

Build Presets Custom

ⓘ These fields will reflect the app type's default project structure. Change the values to suit your app.

App location * ⓘ /

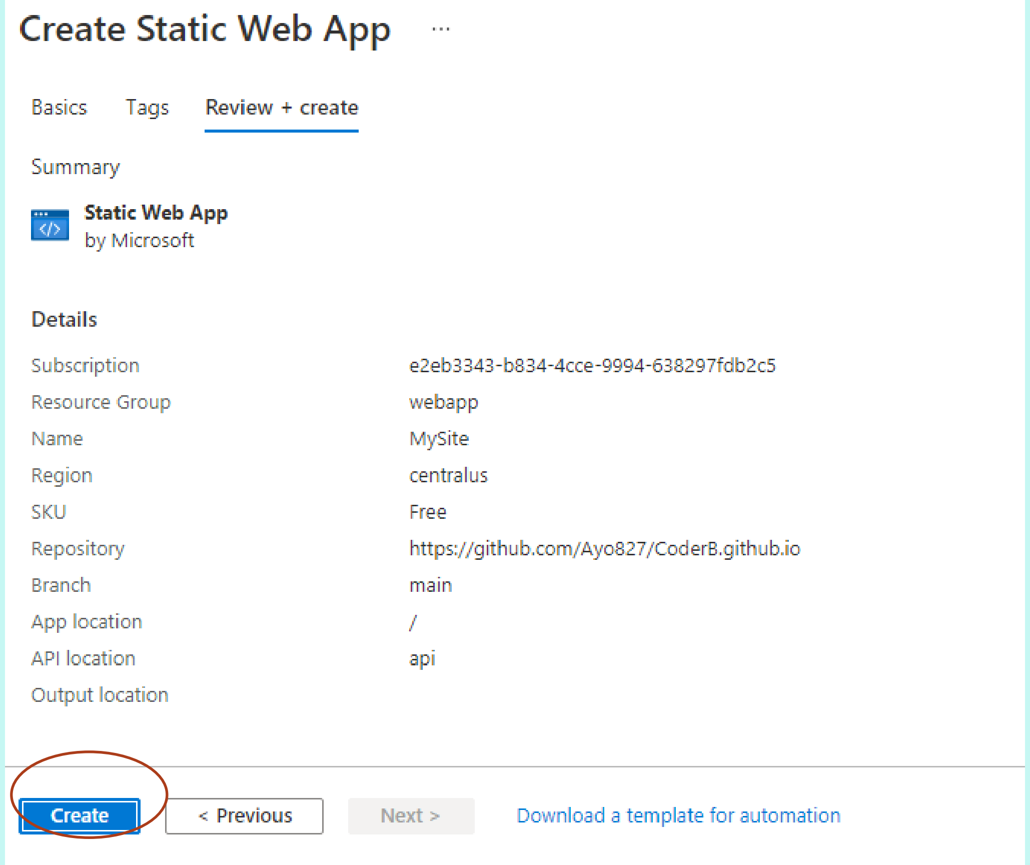
Api location ⓘ e.g. "api", "functions", etc...

Output location ⓘ Output location

CoderSeries

4.17. Review + Create

In this page you see the summary of the information you have filled. If you are okay with it,click on *create*



Create Static Web App ···

Summary

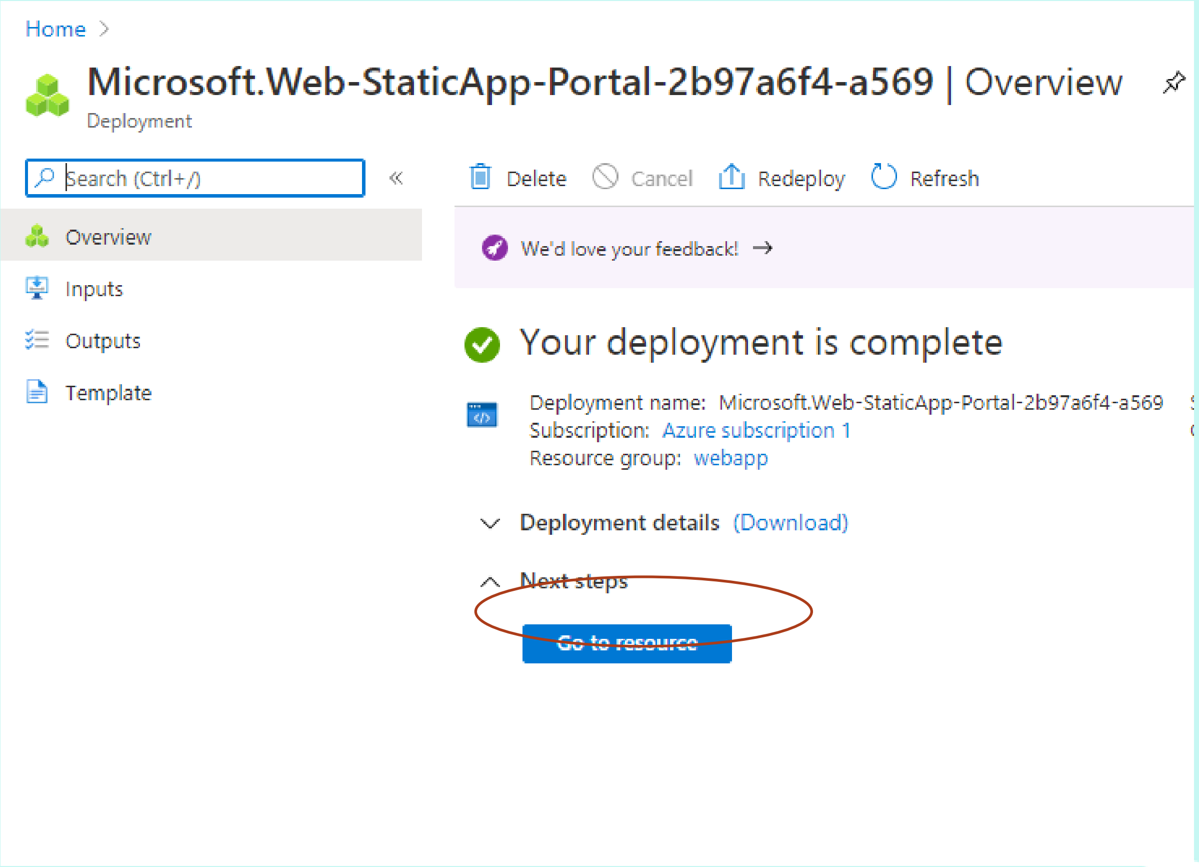
Static Web App
by Microsoft

Details

Subscription	e2eb3343-b834-4cce-9994-638297fdb2c5
Resource Group	webapp
Name	MySite
Region	centralus
SKU	Free
Repository	https://github.com/Ayo827/CoderB.github.io
Branch	main
App location	/
API location	api
Output location	

4.18. Deployment Process I

Wait a little bit for the deployment process to be completed, then click on ***Go to resource***



Home >

Microsoft.Web-StaticApp-Portal-2b97a6f4-a569 | Overview

Deployment

Your deployment is complete

Deployment name: Microsoft.Web-StaticApp-Portal-2b97a6f4-a569
Subscription: Azure subscription 1
Resource group: webapp

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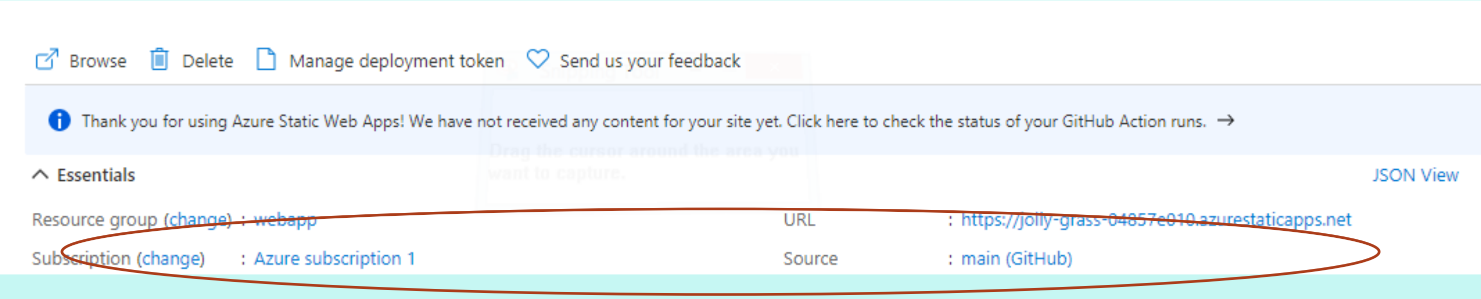
4.19. Deployment Process II

In the Go to resource page, click on the banner that says, ***click here to check the status of your GitHub Actions runs.*** Here you verify if the deployment has been completed. After you have verified your deployment as completed, click on the **URL** to view your site

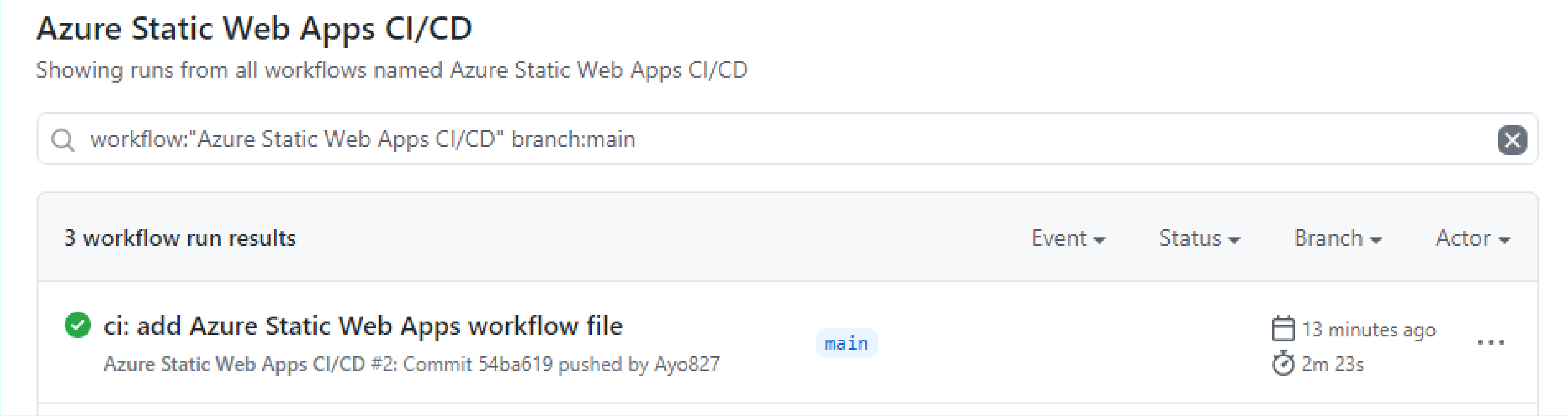


Thank you for using Azure Static Web Apps! We have not received any content for your site yet. Click here to check the status of your GitHub Action runs. →

Resource group (change) : webapp
Subscription (change) : Azure subscription 1
URL : https://jolly-grass-04857e010.azurestaticapps.net
Source : main (GitHub)

4.20. Deployment Process III

The green mark shows that the deployment process has been completed. Now you can view your website, by returning to the ***Go to resource page*** and clicking on the generated url for your website.



Azure Static Web Apps CI/CD

Showing runs from all workflows named Azure Static Web Apps CI/CD

workflow:"Azure Static Web Apps CI/CD" branch:main

3 workflow run results

✓ ci: add Azure Static Web Apps workflow file

Azure Static Web Apps CI/CD #2: Commit 54ba619 pushed by Ayo827

main

13 minutes ago

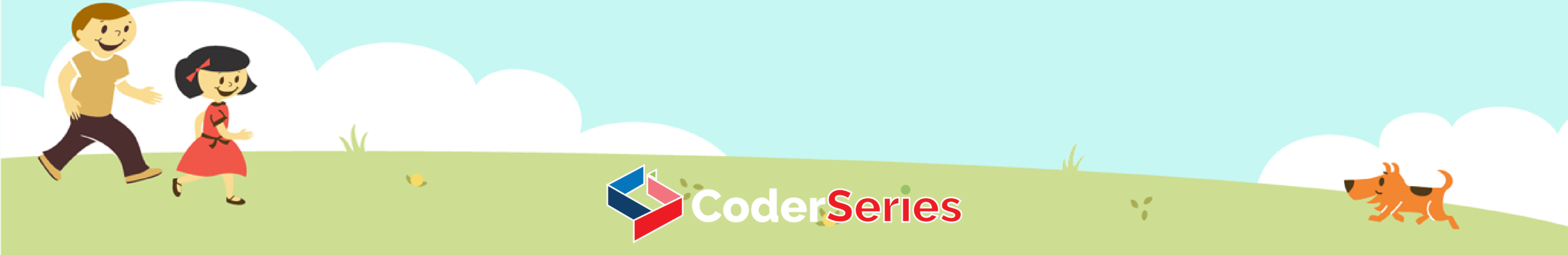
2m 23s

Congratulations on deploying your website on Github and Microsoft azure

Lesson 5

Overview of Microsoft Azure

Microsoft Azure



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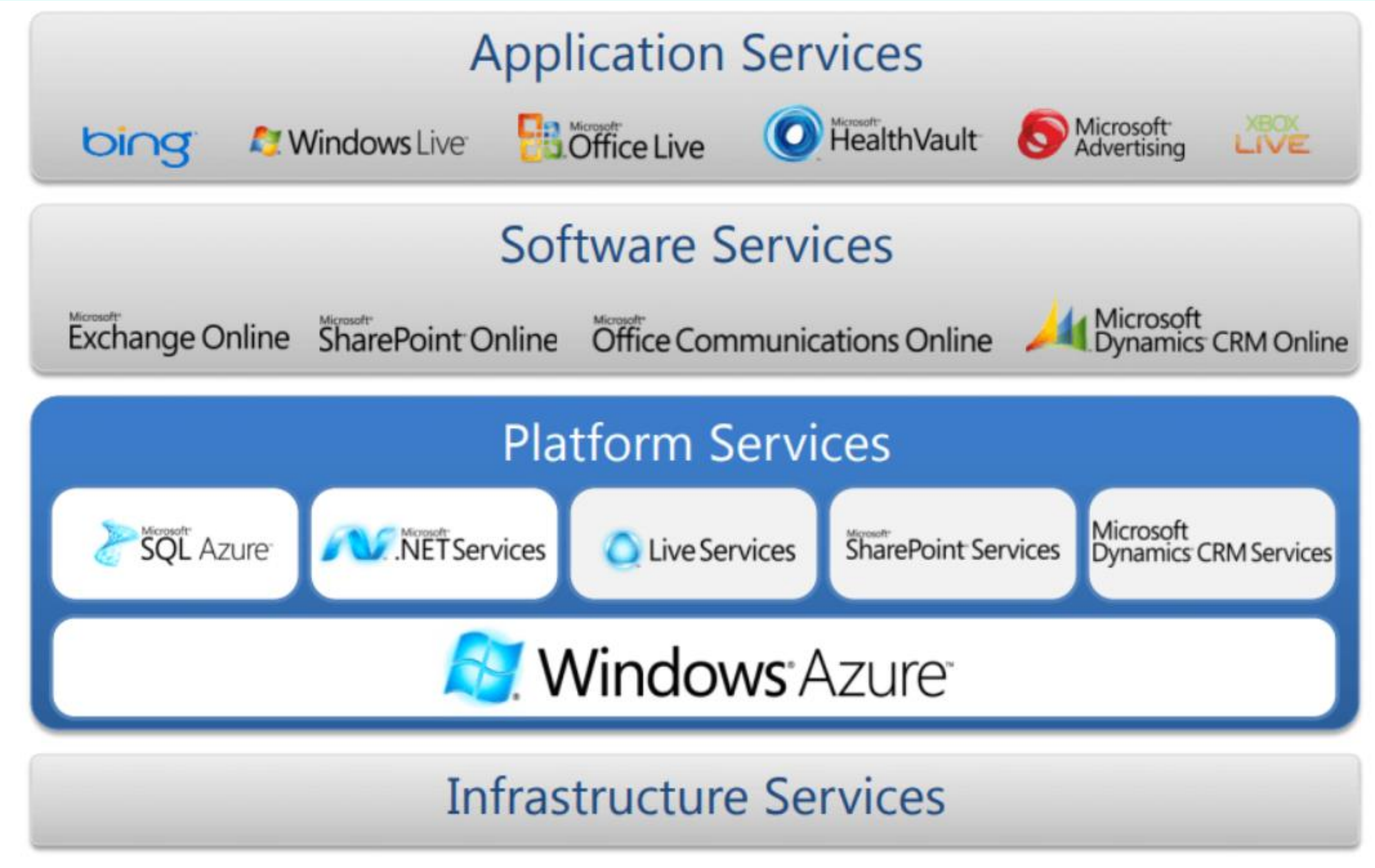
5.1. Microsoft Azure



Application Services

bing | Windows Live | Microsoft Office Live | Microsoft HealthVault | Microsoft Advertising | XBOX LIVE

Software Services

Microsoft Exchange Online | Microsoft SharePoint Online | Microsoft Office Communications Online | Microsoft Dynamics CRM Online

Platform Services

Microsoft SQL Azure | Microsoft .NET Services | Live Services | Microsoft SharePoint Services | Microsoft Dynamics CRM Services

Windows Azure

Infrastructure Services

5.5. Microsoft Azure - IaaS

Azure as IaaS
IaaS(Infrastructure as a Service) is the foundational cloud platform layer. This Azure service is used by IT administrators for processing, storage, networks or any other fundamental computer operations. It is one of the Azure topics to learn that allows users to run arbitrary software.

Advantages:

- It offers efficient design time portability
- It is advisable for the application which needs complete control
- IaaS offers quick transition of services to clouds
- The apparent benefit of laaS is that it frees you from the concerns of setting up many physical or virtual machines.
- Helps you to access, monitor and manage datacenters

Disadvantages of Iaas:

- Plenty of security risks from unpatched servers
- Some companies have defined processes for testing and updating on-premise servers vulnerabilities. This cannot be done with Azure.

5.6. Microsoft Azure - PaaS

PaaS is a computing platform which includes an operating system, programming language execution environment, database or web services. This Azure service is used by developers and application providers.

As its name suggests, this platform is provided to the client to develop and deploy software. It is one of the Azure basic concepts which allows the client to focus on application development instead of worrying about hardware and infrastructure. It also takes care of operating systems, networking and servers issues.

Advantages:

- The total cost is low as the resources are allocated on demand and servers are automatically added or subtracted.
- Azure is less vulnerable because servers are automatically checked for all known security issues
- The entire process is not visible to the developer, so it does not have a risk of a data breach

Disadvantages:

- Portability issues can occur when you use PaaS services
- There may be different environment at Azure, so the application needs to adapt accordingly.

5.7. Microsoft Azure - SaaS

SaaS (Software as a Service) is software which is centrally hosted and managed. It is a single version of the application is used for all customers.

You can scale out to multiple instances. This helps you to ensure the best performance in all locations.

The software is licensed through a monthly or annual subscription. MS Exchange, Office, Dynamics are offered as a SaaS

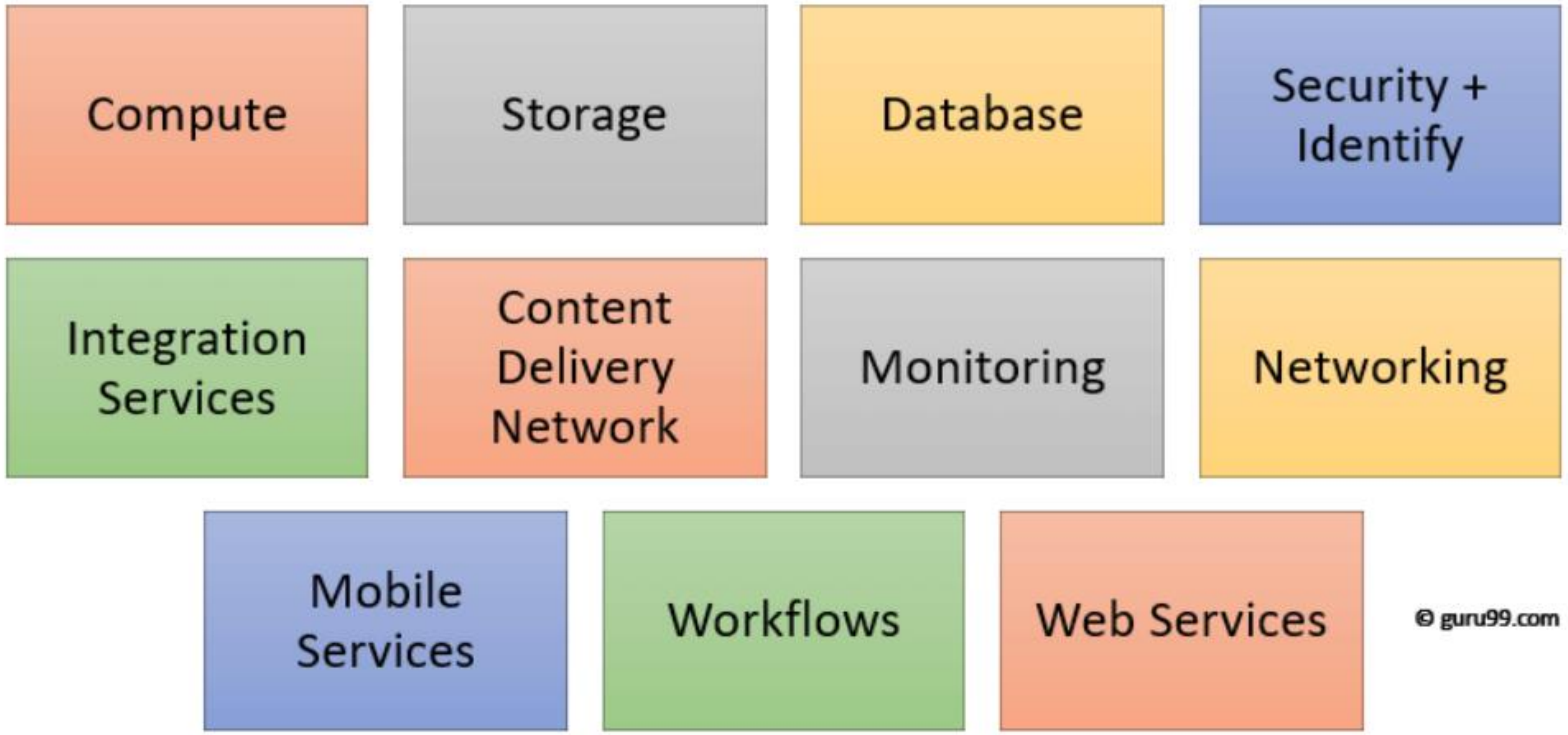
5.8. Microsoft Azure – Key Concepts

Concept Name	Description
Regions	Azure is a global cloud platform which is available across various regions around the world. When you request a service, application, or VM in Azure, you are first asked to specify a region. The selected region represents datacenter where your application runs.
Datacenter	In Azure, you can deploy your applications into a variety of data centers around the globe. So, it is advisable to select a region which is closer to most of your customers. It helps you to reduce latency in network requests.
Azure portal	The Azure portal is a web-based application which can be used to create, manage and remove Azure resource and services. It is located at https://portal.azure.com.
Resources	Azure resource is an individual computer, networking data or app hosting services which charged individually. Some common resources are virtual machines(VM), storage account, or SQL databases.

5.9. Microsoft Azure – Key Concepts

Concept Name	Description
Resource groups	An Azure resource group is a container which holds related resource for an Azure solution. It may include every resource or just resource which you wants to manage.
Resource Manager templates	It is a JSON which defines one or more resource to deploy to a resource group. It also establishes dependencies between deployed resources.
Automation:	Azure allows you to automate the process of creating, managing and deleting resource by using PowerShell or the Azure command-line Interface(CLI).
Azure PowerShell	PowerShell is a set of modules that offer cmdlets to manage Azure. In most cases, you are allowed to use, the cmdlets command for the same tasks which you are performing in the Azure portal.

5.10. Microsoft Azure - Domains



Compute

Storage

Database

Security + Identify

Integration Services

Content Delivery Network

Monitoring

Networking

Mobile Services

Workflows

Web Services

© guru99.com

Key Azure Components

5.11. Microsoft Azure - Compute

It offers computing operations like app hosting, development, and deployment in Azure Platform. It has the following components:

- Virtual Machine: Allows you to deploy any language, workload in any operating system
- Virtual Machine Scale Sets: Allows you to create thousands of similar virtual machines in minutes
- Azure Container Service: Create a container hosting solution which is optimized for Azure. You scale and arrange applications using Kube, DC/OS, Swarm or Docker
- Azure Container Registry: This service store and manage container images across all types of Azure deployments
- Functions: Let's you write code regardless of infrastructure and provisioning of servers. In the situation when your functions call rate scales up.
- Batch: Batch processing helps you scale to tens, hundreds or thousands of virtual machines and execute computer pipelines.
- Service Fabric: Simplify microservice-based application development and lifecycle management. It supports Java, PHP, Node.js, Python, and Ruby.

5.12. Microsoft Azure - Storage

Azure store is a cloud storage solution for modern applications. It is designed to meet the needs of their customer's demand for scalability.

It allows you to store and process hundreds of terabytes of data. It has the following components:

- Blob Storage: Azure Blob storage is a service which stores unstructured data in the cloud as objects/blobs. You can store any type of text or binary data, such as a document, media file, or application installer.

- Queue Storage: It provides cloud messaging between application components. It delivers asynchronous messaging to establish communication between application components.

- File Storage: Using Azure File storage, you can migrate legacy applications. It relies on file shares to Azure quickly and without costly rewrites.

- Table Storage: Azure Table storage stores semi-structured NoSQL data in the cloud. It provides a key/attribute store with a schema-less design

5.13. Microsoft Azure - Database

This category includes Database as a Service (DBaaS) which offers SQL and NoSQL tools. It also includes databases like Azure Cosmos DB and Azure Database for PostgreSQL. It has the following components:

- SQL Database: It is a relational database service in the Microsoft cloud based on the market-leading Microsoft SQL Server engine.
- DocumentDB: It is a fully managed NoSQL database service which is It built for fast and predictable performance and ease of development.
- Redis Cache: It is a secure and highly advanced key-value store. It stores data structures like strings, hashes, lists, etc.

5.14. Microsoft Azure - Content Delivery Network (CDN)

Content Delivery Network (CDN) caches static web content at strategically placed locations. This helps you to offer speed for delivering content to users.

It has the following components:

- VPN Gateway: VPN Gateway sends encrypted traffic across a public connection.
- Traffic Manager: It helps you to control and allows you to do the distribution of user traffic for services like WebApps, VM, Azure, and cloud services in different Datacenters
- Express Route: Helps you to extend your on-premises networks into the Microsoft cloud over a dedicated private connection to Microsoft Azure, Office 365, and CRM Online.

5.15. Microsoft Azure - Security + Identify Services

It provides capabilities to identify and respond to cloud security threats. It also helps you to manage encryption keys and other sensitive assets.

It has the following components:

- Key Vault: Azure Key Vault allows you to safeguard cryptographic keys and helps you to create secrets used by cloud applications and services.

- Azure Active Directory: Azure Active Directory and identity management service. This includes multi-factor authentication, device registration, etc.

- Azure AD B2C: Azure AD B2C is a cloud identity management solution for your consumer-facing web and mobile applications. It allows you to scales hundreds of millions of consumer identities.

5.16. Microsoft Azure – Enterprise Integration Services

- Service Bus: Service Bus is an information delivery service which works on the third-party communication system.
- SQL Server Stretch Database: This service helps you migrates any cold data securely and transparently to the Microsoft Azure cloud
- Azure AD Domain Services: It offers managed domain services like domain join, group policy, LDAP, etc. This authentication which is compatible with Windows Server Active Directory.
- Multi-Factor Authentication: Azure Multi-Factor Authentication (MFA) is two-step verification. It helps you to access data and applications to offers a simple sign-in process

5.17. Microsoft Azure – Monitoring + Management Services

These services allow easy management of Azure deployment.

- Azure Resource Manager: It makes it easy for you to manage and visualize resource in your app. You can even control who is your organization can act on the resources.

- Automation: Microsoft Azure Automation is a way to automate the manual, long-running, error-free, and constantly repeated tasks. These tasks are commonly performed in a cloud and enterprise environment.

5.18. Microsoft Azure – Azure Networking

- Virtual Network: Perform Network isolation and segmentation. It offers filter and Route network traffic.

- Load Balancer: Offers high availability and network performance of any application. Load balance information Internet traffic to Virtual machines.

- Application Gateway: It is a dedicated virtual appliance that offers an Application Delivery Controller (ADC) as a service.

- Azure DNS: Azure DNS hosting service offers name resolution using Microsoft Azure infrastructure.

5.19. Microsoft Azure – Web and Mobile Services

- Web Apps: Web Apps allows you to build and host websites in the programming language of your choice without the need to manage its infrastructure.

- Mobile Apps: Mobile Apps Service offers a highly scalable, globally available mobile app development platform for users.

- API Apps: API apps make it easier to develop, host and consume APIs in the cloud and on-premises.

- Logic Apps: Logic Apps helps you to simplify and implement scalable integration.

5.20. Microsoft Azure – Web and Mobile Services

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5.21. Microsoft Azure – Workflows in the cloud

It provides a visual designer to create and automate your process as a series of steps known as a workflow

- Notification Hubs: Azure Notification Hubs offers an easy-to-use, multi-platform, scaled-out push engine
- Event Hubs: Azure Event Hubs is data streaming platform which can manage millions of events per second. Data sent to an event hub can be transformed and stored using any real-time analytics offers batching/storage adapters.
- Azure Search: It is a cloud search-as-a-service solution which offers server and infrastructure management. It offers ready-to-use service that you can populate with your data. This can be used to add search to your web or mobile application.

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5.23. Microsoft Azure – Migration

Migration tools help an organization estimate workload migration costs. It also helps to perform the migration of workloads from your local data centers to the Azure cloud.

5.24. Microsoft Azure – Traditional vs. Azure Cloud Model

Now in this Azure cloud tutorial, let's learn about difference between Traditional cloud model vs Azure cloud model:

Traditional	Azure Cloud Model
Dedicated infrastructure for each application	Loosely coupled apps and micro-services
Purpose-built hardware	Industry-standard hardware
Distinct infrastructure and operations teams	Service-focused DevOps teams
Customized processes & configurations	Standardized processes & configurations

5.25. Microsoft Azure – Summary

- Cloud computing is a term referred to storing and accessing of data over the internet
- Azure is a cloud computing platform which was launched by Microsoft in February 2010
- There are mainly three types of clouds in Microsoft Azure: 1)PAAS 2) SAAS 3) IASS
- IaaS(Infrastructure as a Service) is the foundational cloud platform layer.
- PaaS is a computing platform which includes an operating system, programming language execution environment, database or web services
- SaaS (Software as a Service) is software which is centrally hosted and managed.
- Datacentres and regions, Azure portal, Resources, Resource groups, Resource Manager templates, Azure PowerShell, Azure command-line interface(CLI) are some of the key terms used in Azure

5.26. Microsoft Azure – Summary

- Important components of Microsoft Azure are Compute, Storage, Database, Monitoring & management services, Content Delivery Network, Azure Networking, Web & Mobile services, etc.
- Traditional model used purpose-built hardware while Azure cloud model uses Industry-standard hardware
- Important applications of Microsoft Azure are: Infrastructure Services, Mobile Apps, Web Applications, Cloud Services, Storage, Backup, and Recovery, Data Management, and Media Services
- The biggest advantage of Microsoft Azure infrastructure is that it will cost-effectively enhance your business continuity strategy
- Web-based applications like Azure can sometimes be slower compared to accessing a similar software program on your desktop PC