

Day_1

Azure Workshop Day 1

- We need to satisfy the basic requirements for running the program i.e. the hardware, OS, NIC. We can avoid all this upfront cost without actually buying the hardware. We don't know what is our future needs and how we need to scale our infrastructure. We can use some other model like **Cloud** with *pay-as-you-go* model. Here, we only need to pay how much we use over a time.
- Cloud have data centres on acres of land and they have invested a lot on infrastructure and providing you as a service.
- Portal(WebUI) is used to access the resources and from which you can ask for new resources.
- Data centre which provides the resources or from which the public cloud originates are known as availability zone.
- Availability zone have multiple data centres.
- A region is geographical area in which multiple AZ resides.
- Instead of service(AWS), here we use a resource in Azure.
- There is one agreement (SLA - service level agreement) which provides the guarantee of 99.99% availability.

Nobody can claim 100% guarantee for availability because there can be any natural catastrophe, power outage or anything which is not predicted.

- Different AZ in a region have different power supply, security teams, internet connection which is physically distant from other AZ. So, it increases the availability even if one of the AZ goes down.
- 99.99% provides only a downtime of 4 sec.
- Azure have 60+ regions available in the world which is the most in the world.
- More the regions in different geographical areas, it will reduce the delay/latency.
- Some countries have data compliance policy which ensures the sensitive data to be handled carefully and to be stored in their own country. So, here we can use the region available in that country to launch the resources.

Resource Group

- Root user can create many users and user can only use the role assigned to them only which is also known as RBAC(Role based access control).
- You need to make a box to control access on the resources, set the budget or anything. This box is known as resource group which is like namespace in Kubernetes. AWS don't have anything like resource group by default. It is also known as organization in some of the clouds.

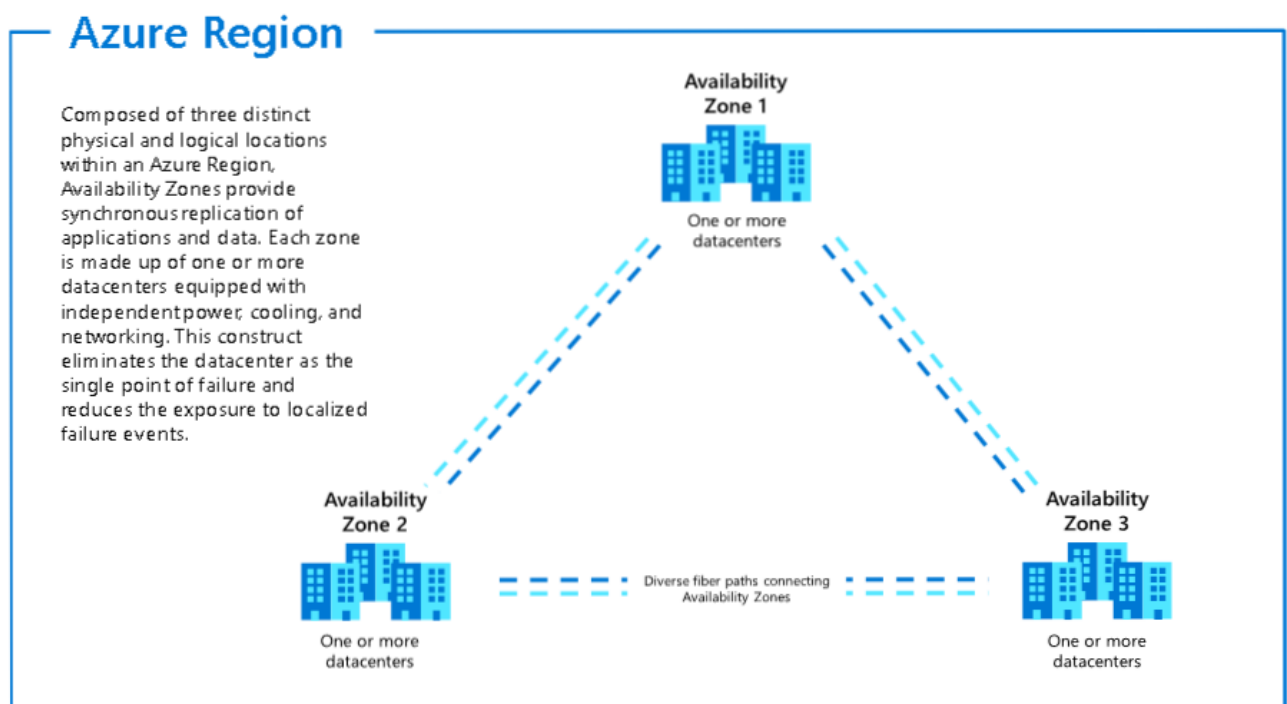
- Resource group has their own subscription type. You can even switch between the resource groups.
- It is about the management how the Azure manages the resources.

Create resource group.

- *ActivityLogs* shows the activities you have done in the Azure.

Virtual Machines

- Virtual Machine is one of the computing resource which provides hardware for running an OS.
- Select the resource group and then launch the virtual machine using the compute service.
- Availability options shows the availability zone, distribute options while launching the VM.



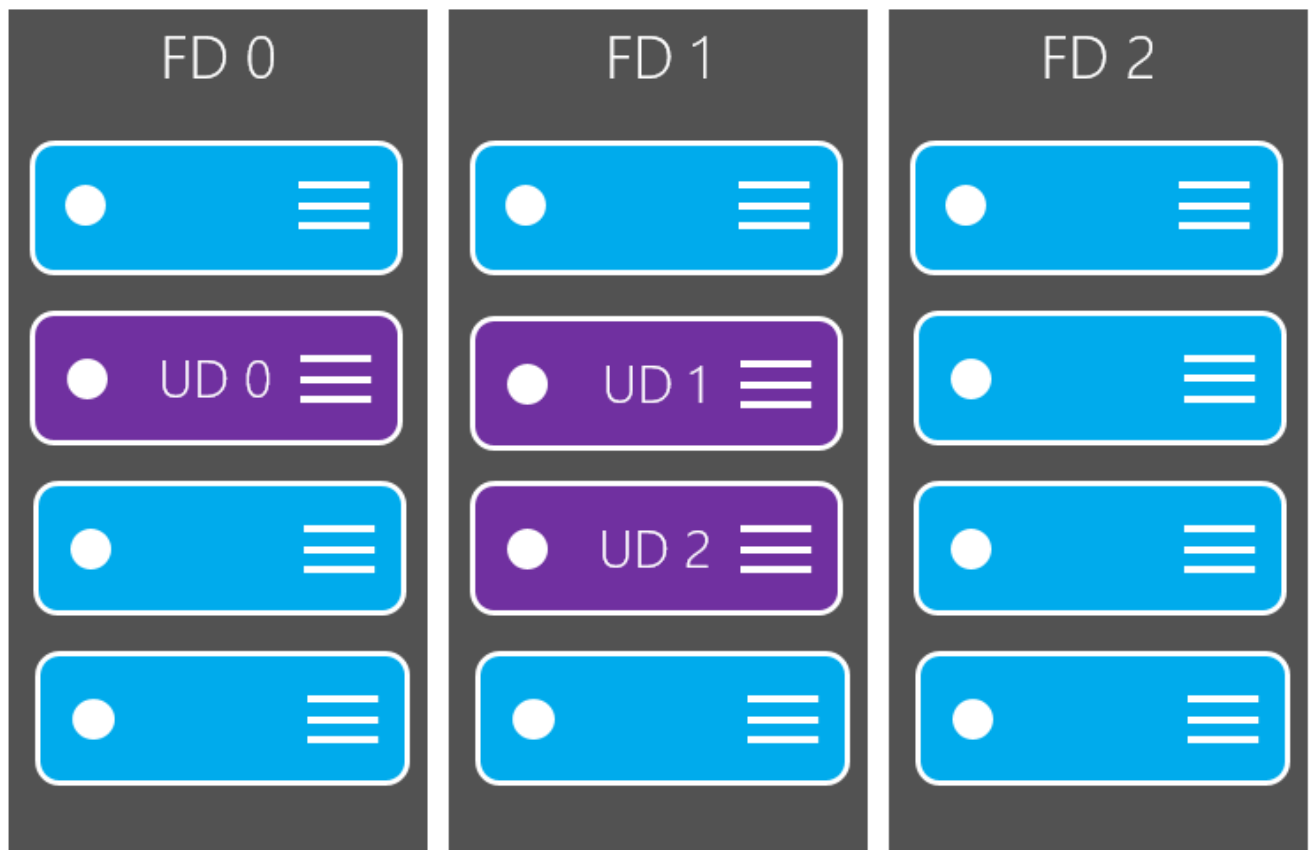
- Azure provides 99.99% guarantee only when you deploy your code on more than one availability zones.
- No infrastructure redundancy provide guarantee only for catastrophe.
- At last, the OS will be launched on the hardware boxes like in the below picture.



- In order to clean the server rack, during maintenance, dedicated power supply or network failure that will lead to down time for the rack and if you think the application is very critical then launch the app in one more rack with redundant infrastructure. So, here comes the concept of availability sets
- Fault domain defines the group of virtual machines sharing the same electricity supply, network, cooling etc. In availability set, vms are launched in different fault domains. Maximum 3 fault domains can be allocated.



- Update domain defines the group of vms which will be updated in any form like system updates, software updates and can be set 5 to 20 on Azure.



- Then, you need an image to launch the OS over the VM. Here, we are using RHEL8. You can add your own subscription. So, that cost will be deducted.
OS is installed on the ephemeral storage. On terminated, the data will be wiped.
- AWS have only public key based login only. But, Azure have password and public key based authentication.
- Set inbound ports to port 22 for SSH.
- Encryption helps to secure the VM from cloud people.
- DHCP server present on router/modem gives the IP addresses to the devices in the network.

NaaS: Network as a Service

- There are different labs which have their own switch and router and all the labs have connection to the router for the outer world. This is the Public connectivity while any of the lab has only lab to lab connectivity. This is private connectivity. The whole bigger room containing all the labs is known as virtual network (vnet) and labs are known as subnet.
- Whole cloud is the Infrastructure as a service.
- 11.11.0.0/16 - means first two octets are the network name and are fixed. The range will be 11.11.0.0 to 11.11.255.255 (65536 IP addresses).
- SNAT (Source NAT) you can go anywhere and is enabled by default.
- DNAT (Destination NAT) anyone can connect/access your system. It is not by default. You have to configure this yourself.
- They also provide Public Address but nothing can be accessed due to Firewall rules.

- Firewall is provided by default and doesn't allow anything to come in. This is known as Security Group.
- Trying to come in - inbound rules.
- You can also use auto shutdown feature to save the cost.
- After provisioning, you want to configure the OS for anything. You can do using Custom data input using cloud init.
- Rack Awareness
If the rack goes down then also the VM keeping going in the other rack. Fault domain is the concept which isolates the fault by launching the resource in the different racks. Fault domain is maximum upto 3 in azure.

Availability == Data Centre

- Launching VM in different rack but in the same VNet. Launching this in the same region with same availability set.
- Availability set is enabled so the VMs are launched in different racks using fault and update domains.

Load Balancer

- **Load Balancer** is the program which helps to distribute the traffic over a set of systems which will make the high availability for the user. It can divert traffic when the system goes down to the other system.
- They keep checking the health and if it's having more traffic then it give access to the other system.
- It is one of the major advantage as it provides the one IP address to the DNS. All the nodes are known as backend while the load balancer node is the frontend.
- You can create the load balancer using Azure. Use zone-redundant availability zone while creating load balancer.
- Add Backend systems for vnet we created earlier and **add to backend pool**.
- Before this you to create the SKU to add the virtual network systems to the backend pool.

Methods to access the Azure

- Command line (az cli install)
- API for development
- Web UI

Azure gives you an extra VM (cloud shell) which has az program by default and CLI based tool for all the resources.

Day_2

All the services/resources provided by the Azure or any of the cloud are the managed services.

OS can be provisioned using two ways:

- Virtualization
- Containerization

Azure CLI

- Download and install the Azure CLI on Linux using a single command

```
curl -sL https://aka.ms/InstallAzureCLIDeb | sudo bash.
```

- Login using the command `az login`. It will redirect to the webUI for authentication.

```
(base) launchpad5682@pop-os:~$ az login
The default web browser has been opened at https://login.microsoftonline.com/common/oauth2/authorize. Please continue the login in the web browser. If no web browser is available or if the web browser fails to open, use device code flow with 'az login --use-device-code'.
You have logged in. Now let us find all the subscriptions to which you have access...
The following tenants don't contain accessible subscriptions. Use 'az login --allow-no-subscriptions' to have tenant level access.
a1608842-8390-4bfb-90af-89ae3ab30761 'Manipal Global Education Services Pvt Ltd'
[
  {
    "cloudName": "AzureCloud",
    "homeTenantId": "a1608842-8390-4bfb-90af-89ae3ab30761",
    "id": "a1608842-8390-4bfb-90af-89ae3ab30761",
    "isDefault": true,
    "managedByTenants": [],
    "name": "Free Trial",
    "state": "Enabled",
    "tenantId": "a1608842-8390-4bfb-90af-89ae3ab30761",
    "user": {
      "name": "Launchpad5682",
      "type": "user"
    }
  }
]
```

- `az -h` shows all the options available in az.
-h option helps in finding any of the options.
- Kubernetes is the tool which is used to manage the containers.

Can I manually install Kubernetes on the Azure? Yes

Do you have managed services for Kubernetes? Yes, We have AKS which is Azure managed Kubernetes Cluster.

- list output table `az list --output table`
- Adding the resource group using `az group -l region-name -n namespace-name`
- Use -h with az command and you'll get help from the module.
- SLA provides 99.95% guarantee for API Server in Azure.
- VMS- virtual machine set is used in autoscaling.
- Redis is used for storing session data.

- Overlay network is done by Azure using CNI.

AKS - Azure Kubernetes Service

Creating resource group using CLI:

- Using help to know what group can do

```
(base) launchpad5682@pop-os:~/projects/arth-ws/AZappServer$ az group -h
Group
  az group : Manage resource groups and template deployments.

Subgroups:
  lock    : Manage Azure resource group locks.

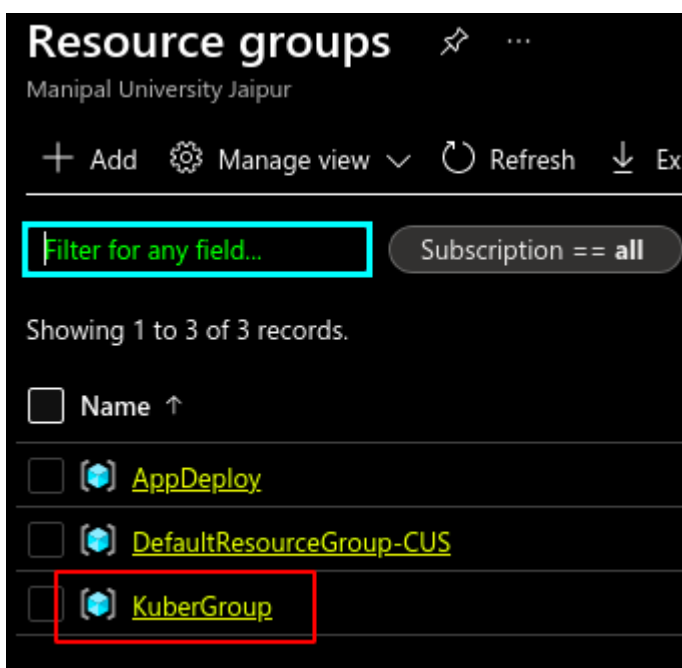
Commands:
  create  : Create a new resource group.
  delete  : Delete a resource group.
  exists  : Check if a resource group exists.
  export  : Captures a resource group as a template.
  list    : List resource groups.
  show    : Gets a resource group.
  update  : Update a resource group.
  wait    : Place the CLI in a waiting state until a condition of the resource group is met.

For more specific examples, use: az find "az group"

Please let us know how we are doing: https://aka.ms/azureclihats
```

- Creating a new resource group for KuberNetes

```
(base) launchpad5682@pop-os:~/projects/arth-ws/AZappServer$ az group create -l centralus -n KuberGroup
{
  "id": "/subscriptions/3786078e-57e9-478a-a5ef-f9d2f26be6c2/resourceGroups/KuberGroup",
  "location": "centralus",
  "managedBy": null,
  "name": "KuberGroup",
  "properties": {
    "provisioningState": "Succeeded"
  },
  "tags": null,
  "type": "Microsoft.Resources/resourceGroups"
}
```



New resource group is successfully created.

Steps to configure the AKS

- 'az aks -h' shows the option for Kubernetes cluster

•

1

```
(base) launchpad56923@pc: /projects/auth-up/47app5convert --ake get-credentials --name kubec1uster1 --resource-group lwnn1
```

•

```
Merged "MyKubeCluster" as current context in /home/launchpad5682/.kube/config
```

●

```
(base) launchpad56022@ip-172-31-18-10: ~$ ssh -o StrictHostKeyChecking=no ubuntu@172.31.18.10
```

•

```
ex-6987c4f5cd-45kbz 1/1 Running 0 23s
```

●

hex-6987c4f5cd-ggs47	1/1	Running	0	33
hex-6987c4f5cd-ux762	0/1	ContainerCreating	0	50

- Scaling down the deployment

```
(base) launchpad5682@pop-os:~/projects/arth-ws/AZappServer$ kubectl scale deployment hex --replicas=2
deployment.apps/hex scaled
(base) launchpad5682@pop-os:~/projects/arth-ws/AZappServer$ kubectl get pods
```

NAME	READY	STATUS	RESTARTS	AGE
hex-6987c4f5cd-45kbz	0/1	Terminating	0	2m51s
hex-6987c4f5cd-4dvdK	1/1	Running	0	109s
hex-6987c4f5cd-dqg8f	0/1	Terminating	0	109s
hex-6987c4f5cd-ggs47	0/1	Terminating	0	109s
hex-6987c4f5cd-vv768	1/1	Running	0	109s

- You can use external load balancer using the `--type=LoadBalancer` while exposing the service while launching deployment.

HELP

Using YAML file to launch the app on the Cluster.

https://raw.githubusercontent.com/vimallinuxworld13/aks_web_kube_yaml_code/master/aksweb.yml

- Launching deployment using script.

```
(base) launchpad5682@pop-os:~/projects/arth-ws/AZappServer$ kubectl apply -f ex.yml
deployment.apps/azure-vote-back created
service/azure-vote-back created
deployment.apps/azure-vote-front created
service/azure-vote-front created
```

- Looking for deployment.

```
(base) launchpad5682@pop-os:~/projects/arth-ws/AZappServer$ kubectl get deployment
```

NAME	READY	UP-TO-DATE	AVAILABLE	AGE
azure-vote-back	1/1	1	1	54s
azure-vote-front	1/1	1	1	53s

```
(base) launchpad5682@pop-os:~/projects/arth-ws/AZappServer$ kubectl get pods
```

NAME	READY	STATUS	RESTARTS	AGE
azure-vote-back-798985f86b-9m5n8	1/1	Running	0	59s
azure-vote-front-84c8bf64fc-djktX	1/1	Running	0	58s

```
(base) launchpad5682@pop-os:~/projects/arth-ws/AZappServer$ kubectl get svc
```

NAME	TYPE	CLUSTER-IP	EXTERNAL-IP	PORT(S)	AGE
azure-vote-back	ClusterIP	10.0.53.117	<none>	6379/TCP	70s
azure-vote-front	LoadBalancer	10.0.143.98	52.154.252.15	80:31576/TCP	69s
kubernetes	ClusterIP	10.0.0.1	<none>	443/TCP	2m49s

- You can access the webapp using the external IP.

Not secure | 52.154.252.15

enCV Python

IOT

Android

Flutter

Blockchain

HACK2.0

Cryptography

C

DialogFlow

Ethical Hacking

Open-Source

operating system

Azure Voting App

Cats

Dogs

Reset


Cats - 2 | Dogs - 3

In order to remove the configuration of the AKS Kubernetes cluster client just remove the file path you specified and corresponding config file from ~/.kube/ directory.

PaaS: Platform as a service

- You only have to upload the code/application to the cloud and everything is managed by the cloud. Azure gives this resource with a name **App Service / Web App**.
- We can attach Github repo to the App Server using the workflow on the Github and will deploy our thing on the App Server.
- We can roll back on the App Server and use any of the strategy like canary, a/b testing.
- After my code is pushed on Github and automatically updates the code on the App Server.
- Create Web App, resource group.
- Select runtime stack and Region.

Create Web App ...

any platform. Meet rigorous performance, scalability, security and compliance requirements while using a fully managed platform to perform infrastructure maintenance. [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 * 

Free Trial 



Resource Group * 

AppDeploy 

[Create new](#)

Instance Details

Name *

web-app-test-hello 

.azurewebsites.net

Publish *

☒ Code ☐ Docker Container

Runtime stack *

Python 3.6 

Operating System *

☒ Linux ☐ Windows

Region *

Central US 

 Not finding your App Service Plan? Try a different region.

App Service Plan

App Service plan pricing tier determines the location, features, cost and compute resources associated with your app.

[Learn more](#) 

Linux Plan (Central US) * 

(New) ASP-AppDeploy-888d 

[Create new](#)

Sku and size *

Free F1
1 GB memory

- SKU is stock keeping unit which keeps the track of resources.

- Application monitoring helps you monitor the code.

Create Web App ...


Basics **Monitoring** Tags Review + create

Application Insights is a code-less attach to provide detailed observability in to your application. [Learn more](#) 

Application Insights

Enable Application Insights  ☒ No ☐ Yes



Application Insights code-less monitoring isn't supported with your selections of subscription, runtime stack, operating system, publish type, region, or resource group. If you want to keep these selections, you can use the Application Insights SDK to monitor your app. 

It will take some time to create the web app service.

Your deployment is complete



Deployment name: Microsoft.Web-WebApp-Portal-b79fc12d-9f77
Subscription: [Free Trial](#)
Resource group: [AppDeploy](#)

Start time: 2/28/2021, 12:50:34 PM

Correlation ID: d93f9077-dd78-4064-861c-38d9cc7211df

▼ **Deployment details** [\(Download\)](#)

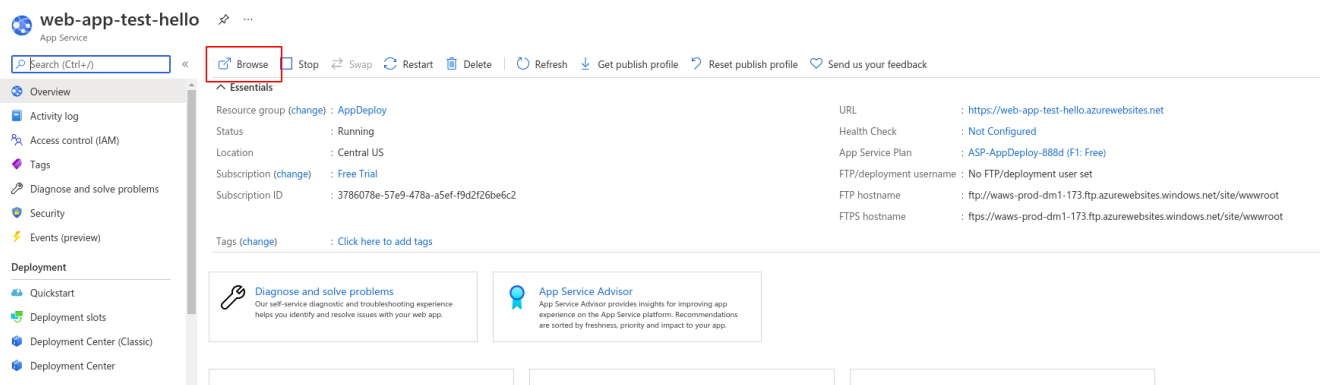
▲ **Next steps**

[Manage deployments for your app.](#) Recommended

[Protect your app with authentication.](#) Recommended

[Go to resource](#)

- After the creation, they will give you the URL.



web-app-test-hello App Service

Search (Ctrl+F) **Browse** Stop Swap Restart Delete Refresh Get publish profile Reset publish profile Send us your feedback

Overview

Essentials

Resource group (change) : AppDeploy
Status : Running
Location : Central US
Subscription (change) : Free Trial
Subscription ID : 3786078e-57e9-478a-a5ef-f9d2f26be6c2

Tags (change) : [Click here to add tags](#)

URL : <https://web-app-test-hello.azurewebsites.net>
Health Check : Not Configured
App Service Plan : ASP-AppDeploy-888d (F1: Free)
FTP/deployment username : No FTP/deployment user set
FTP hostname : ftp://waws-prod-dm1-173.ftp.azurewebsites.windows.net/site/wwwroot
FTPS hostname : ftps://waws-prod-dm1-173.ftp.azurewebsites.windows.net/site/wwwroot

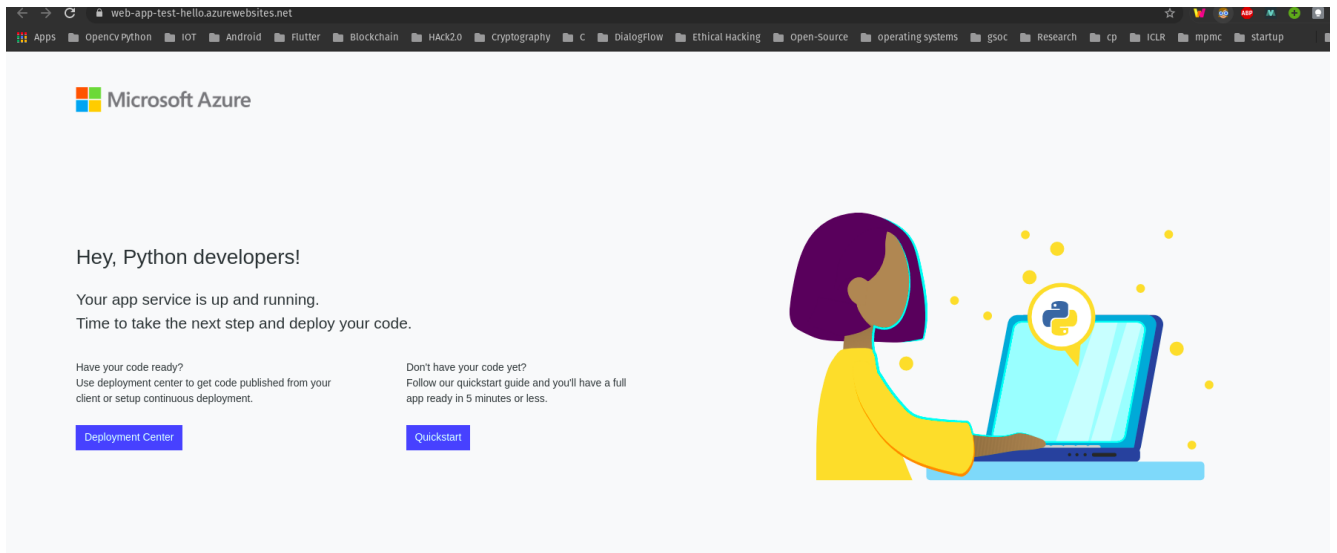
Deployment

Quickstart
Deployment slots
Deployment Center (Classic)
Deployment Center

Diagnose and solve problems
Our self-service diagnostic and troubleshooting experience helps you identify and resolve issues with your web app.

App Service Advisor
App Service Advisor provides insights for improving app experience on the App Service platform. Recommendations are sorted by freshness, priority and impact to your app.

Browse the deployed site using the browse button.



As a developer, you write code in the laptop and then push the code on the Github and configure the Github to the Web App which will continuously deploy the code on App Server. When any of the event occurs they will automatically start the workflow.

Deployment Centre on the Azure monitors the change in code and updates when changed. Add the repository to the Deployment Centre. Actions will be added by the github.

- Create the deployment centre resource.




CI/CD is not configured

To start, go to Settings tab and set up CI/CD.

[Go to Settings](#)

- Create a resource group

Basics Tags Review + create

Resource group - A container that holds related resources for an Azure solution. The resource group can include all the resources for the solution, or only those resources that you want to manage as a group. You decide how you want to allocate resources to resource groups based on what makes the most sense for your organization. [Learn more](#) 

Project details

Subscription * ⓘ

Free Trial



Resource group * ⓘ

AppDeploy



Resource details

Region * ⓘ

(US) East US



 Validation passed.

Basics Tags Review + create

Basics

Subscription

Free Trial

Resource group

AppDeploy

Region

East US

Tags

None

- Create WebApp

Web App

Microsoft



Web App

Microsoft

★★★★★ 4.3 (2339 ratings)

Create

Overview

Plans

Usage Information + Support

Reviews

App Service Web Apps lets you quickly build, deploy, and scale enterprise-grade web, mobile, and API apps running on any platform. Meet rigorous performance, scalability, security and compliance requirements while using a fully managed platform to perform infrastructure maintenance. Leverage existing tools to deploy and automatically scale your apps without the hassle of managing infrastructure.

App Service supports:

- Applications written in: Node.js, Python, PHP, Java, Ruby, .NET Core, and ASP.NET.
- Run your apps on Linux or Windows.
- Bring your own Code or Bring your own Docker containers.
- Hosting at any scale, from simple websites to cloud scale applications.

App Service provides:

- Integrated tooling support for Eclipse, Visual Studio Code, and Visual Studio.
- CI/CD integration with GitHub, Docker Hub, Azure Pipelines, Azure Container Registry, Bitbucket, and others.
- Extensive diagnostics, monitoring and alerting features with Application Insights and Azure Monitor.

- Select Github and repository

Source *

GitHub

Building with GitHub Actions. [Change provider.](#)

GitHub

If you can't find an organization or repository, you may need to enable additional permissions on Git

Signed in as

Launchpad5682 [Change Account](#)

Organization *

Launchpad5682

Repository *

AZappServerTest

Branch *

main

Build

Runtime stack *

Python

Version *

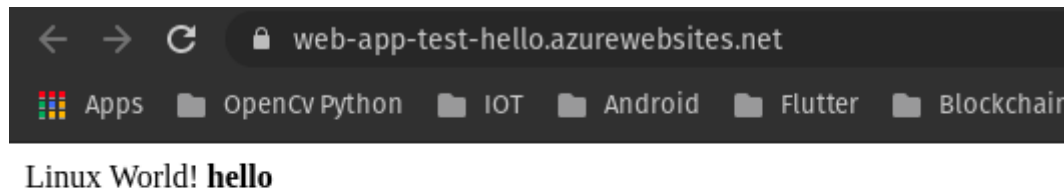
Python 3.6

Workflow Configuration

File with the workflow configuration defined by the settings above.

[Preview file](#)

and save the configuration.



Storage as a Service

I don't want to keep the static information like images, videos in the code. So, we use something like SaaS using the **storage account** resource.

Use RA-GRS and blobStorage which is blockstorage.Bucket is known as container which means the folder. You need to create a container in order to store something.

- Create Storage

Storage account

Microsoft



Storage account

[Add to Favorites](#)

Microsoft

★★★★☆ 4.2 (1735 ratings)

Create

Overview

Plans

Usage Information + Support

Reviews

Microsoft Azure provides scalable, durable cloud storage, backup, and recovery solutions for any data, big or small. It works with the infrastructure you already have to cost-effectively enhance your existing applications and business continuity strategy, and provide the storage required by your cloud applications, including unstructured text or binary data such as video, audio, and images.

- Create blob storage

Create storage account ...

Basics Networking Data protection Advanced Tags Review + create

Azure Storage is a Microsoft-managed service providing cloud storage that is highly available, secure, durable, scalable, and redundant. Azure Storage includes Azure Blobs (objects), Azure Data Lake Storage Gen2, Azure Files, Azure Queues, and Azure Tables. The cost of your storage account depends on the usage and the options you choose below.

[Learn more about Azure storage accounts](#)

Project details

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

Subscription *

Resource group *

[Create new](#)

Instance details

The default deployment model is Resource Manager, which supports the latest Azure features. You may choose to deploy using the classic deployment model instead. [Choose classic deployment model](#)

Storage account name *

Location *

Performance ☒ Standard ☐ Premium

Account kind

Replication

i Accounts with the selected kind, replication and performance type only support block and append blobs. Page blobs, file shares, tables, and queues will not be available.

- Add a container, it is like a bucket in S3 or folder in normal file system.

+ Container
Change access level
Restore containers
Refresh
Delete

Search containers by prefix

Name	Last modified	Public access level
You don't have any containers yet. Click '+ Container' to get started.		

Name *










Public access level

All container and blob data can be read by anonymous request. Clients can enumerate blobs within the container by anonymous request, but cannot enumerate containers within the storage account.

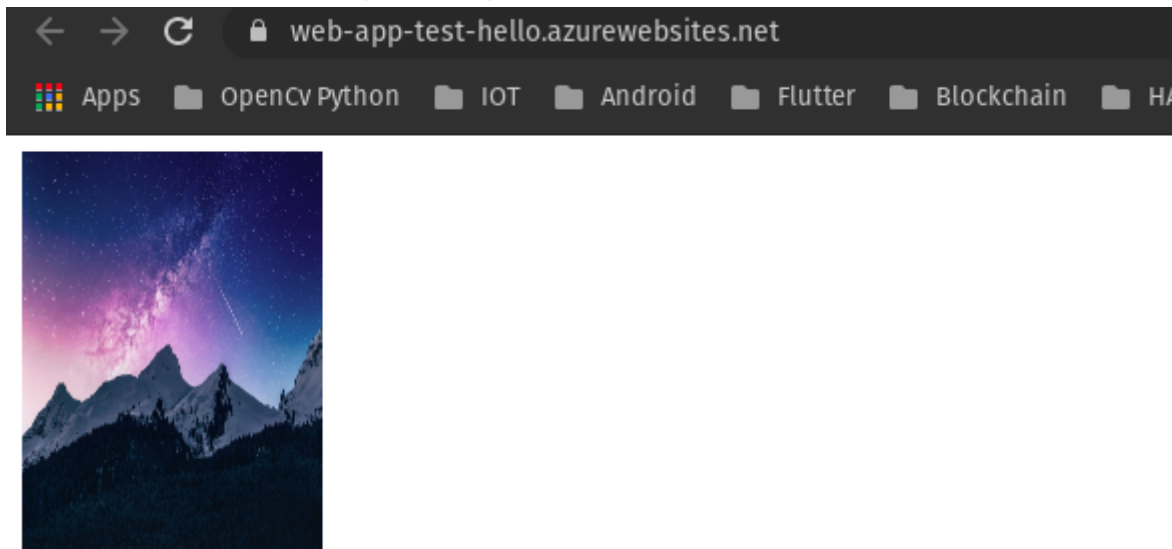
Advanced

- Upload the files.
- Changed the python code and included the url of the object in the code. Pushed the code and changes will automatically take place. Action section looks like this while the code is update on the

storage account.

 images added s	Build and deploy Python app to Azure Web App - web-app-test-hello #3: main Commit 865626c pushed by Launchpad5682	 1 minute ago  In progress	...
 images added	Build and deploy Python app to Azure Web App - web-app-test-hello #2: main Commit db26722 pushed by Launchpad5682	 21 minutes ago  1m 52s	...
 Add or update the App Service deployment workflo...	Build and deploy Python app to Azure Web App - web-app-test-hello #1: main Commit c8442aa pushed by Launchpad5682	 2 hours ago  1m 42s	...

- I've added url of blob storage of image in the code.



Active Directory

- Using Azure active directory, you can create the new user with custom permissions.

active direc

Services

- Azure AD Privileged Identity Management
- Azure Active Directory**
- Activity log
- Security
- ExpressRoute Direct
- Administrative units
- Automanage – Azure machine best practices

Resources

No results were found.

Marketplace

[See all](#)

- Active Directory Domain Deployment IaaS
- Active Directory Certificate Services 2016 PKI
- Active Directory Domain Controller 2016
- Active Directory Domain Controller on Windows 2016

Documentation

[See all](#)

- [Plan an Azure Active Directory Conditional Access ...](#)
- [What is Azure AD Connect and Connect Health. | Microsoft Docs](#)
- [Azure Information Protection documentation | Microsoft Docs](#)
- [Requirements for Azure Information Protection - AIP ...](#)

Resource Groups

No results were found.

Didn't find what you were looking for?

- Try searching in Activity Log
- Try searching in Azure Active Directory

Searching all subscriptions. [Change](#)

\$0.025/hour

\$0.036/hour

\$0.036/hour

Bring your own license