AKS Provisioning using Pulumi

Prerequisites

1. An Azure account.
2. Azure CLI installed and configured with the appropriate Azure User or Service Principal.
3. Pulumi Installed.
4. Kubectl Installed.

Steps

1. Create a Pulumi Project directory.
2. Open the PowerShell.
3. Change the directory to the above-created Pulumi Project.
4. Run the `pulumi new azure-python` command to initialize the *pulumi*.
5. Provide the appropriate values to prompts such as *project-name*, *project-description*, *stack-name*, *toolchain*, *region-name*, etc.
6. This will generate some Pulumi files in this directory.
7. Now we will install predefined Pulumi modules.
8. Activate the `venv` by running `venv\Scripts\activate`.
9. Run `pip install git+https://github.com/sahilphule/pulumi.git` to install the modules.
10. Deactivate the `venv` by running `deactivate`.
11. Now open the directory in the preferred IDE.
12. Create *commons* folder
13. Inside the folder create ***init**.py* file.
14. Import the following in the ***init**.py* file:
    - from inflection_zone_pulumi.modules.azure.resource_group import resource_group
    - from inflection_zone_pulumi.modules.azure.vnet import vnet
    - from inflection_zone_pulumi.modules.azure.acr import acr
    - from inflection_zone_pulumi.modules.azure.mysql_flexible import mysql_flexible
    - from inflection_zone_pulumi.modules.azure.aks import aks
15. Click code for reference.
16. Definition of ***init**.py* is complete.
17. Now create the *values.py* file in the root folder of the above-created project directory.
18. Define the following values:
    - resource_group_properties
    - vnet_properties
    - acr_properties
    - mysql_flexible_properties
    - aks_properties
19. Click code for reference.
20. The definition of *values.py* is complete.
21. Now navigate to the ***main**.py* file present in the root folder of the above-created project directory.
22. Clear the sample code if present.

23. Import the following:
    - from commons import resource_group, vnet, acr, mysql_flexible, aks
    - values
24. Define the following objects and pass the values & dependencies as an argument:
    - RESOURCE_GROUP
    - VNET
    - ACR
    - MYSQL_FLEXIBLE
    - AKS
25. Click code for reference.
26. Definition of ***main**.py* is complete.

Provisioning the Infrastructure

Now we will provision the infrastructure by applying the above-created configuration files.

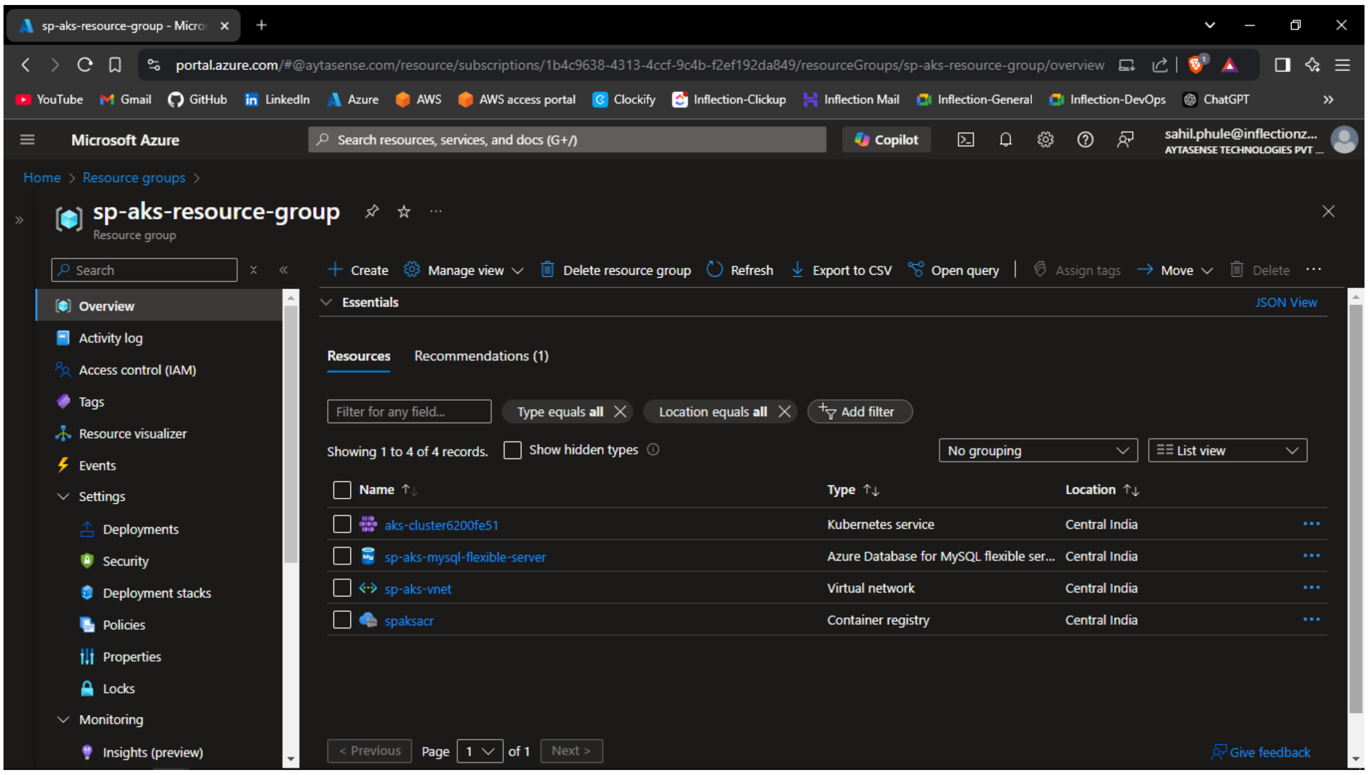
> Ensure Azure CLI is configured with the appropriate Azure User or Service Principal.

Steps:

1. Open the PowerShell.
2. Change the directory to the above-created Pulumi Project.
3. Run the `pulumi up` command and if prompted, select `yes` to provision the infrastructure onto the Azure Cloud.
4. Head to the Azure Console, and verify the created resources.

Screenshots of Provisioned Infrastructure

Resource Group Image



portal.azure.com/#@aytasense.com/resource/subscriptions/1b4c9638-4313-4ccf-9c4b-f2ef192da849/resourceGroups/sp-aks-resource-group/overview

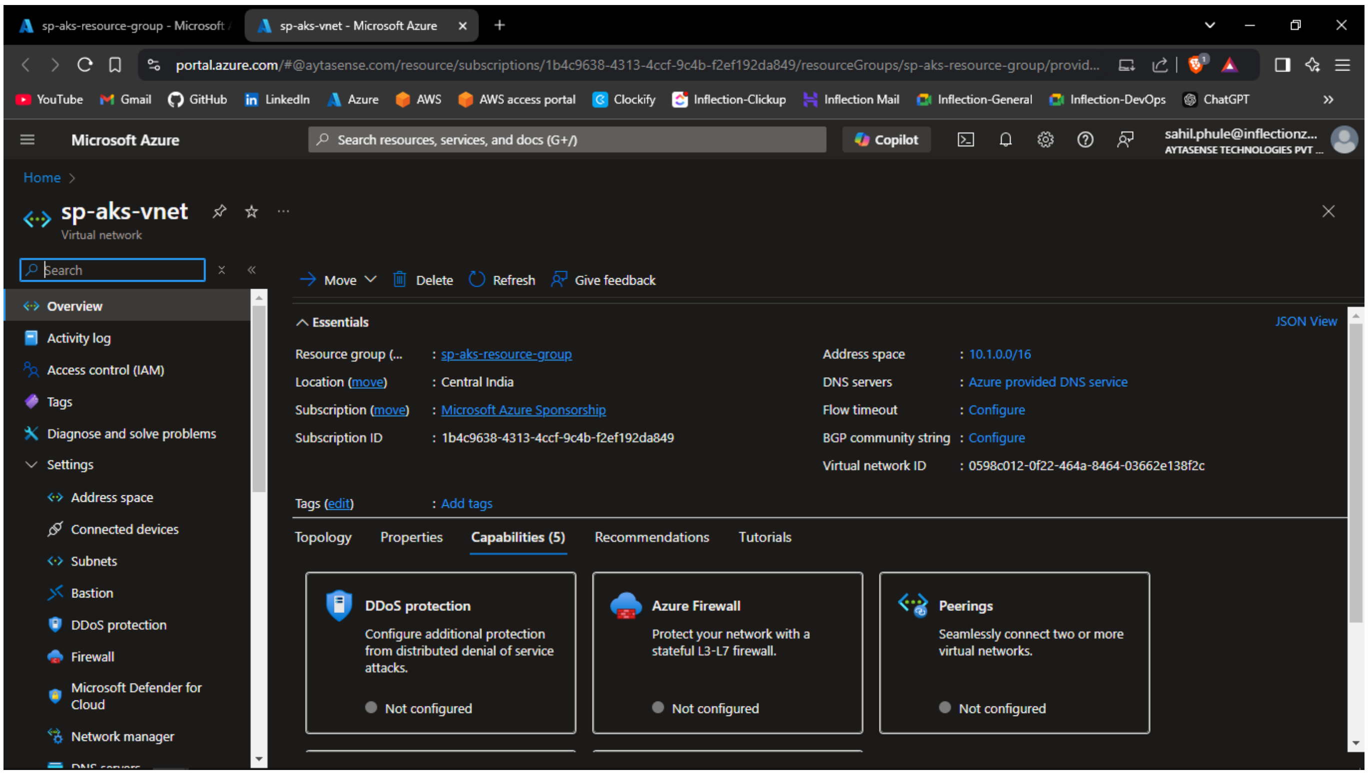
sahil.phule@inflectionz...
AYTASENSE TECHNOLOGIES PVT ...

sp-aks-resource-group

Showing 1 to 4 of 4 records.

Name	Type	Location
aks-cluster6200fe51	Kubernetes service	Central India
sp-aks-mysql-flexible-server	Azure Database for MySQL flexible ser...	Central India
sp-aks-vnet	Virtual network	Central India
spaksacr	Container registry	Central India

VNet Image



portal.azure.com/#@aytasense.com/resource/subscriptions/1b4c9638-4313-4ccf-9c4b-f2ef192da849/resourceGroups/sp-aks-resource-group/provid...

sp-aks-vnet

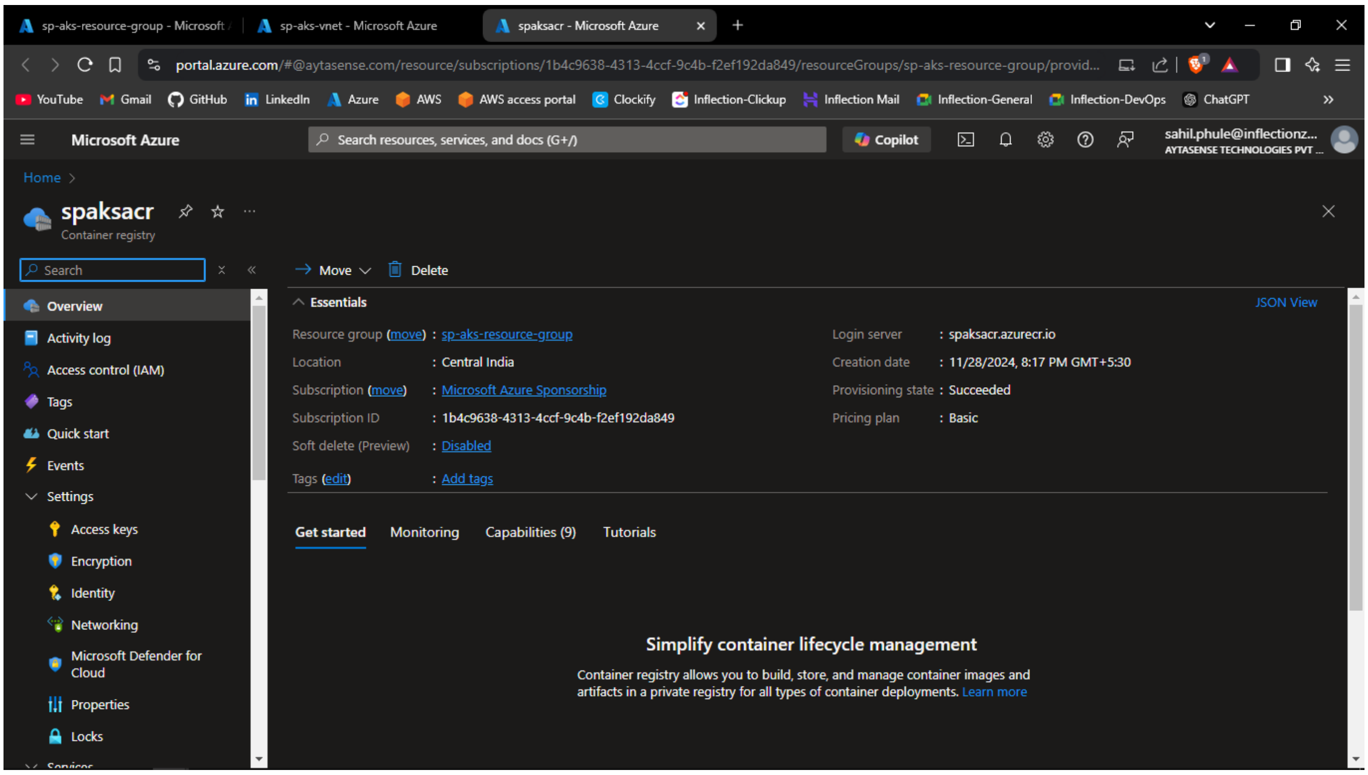
Resource group (...	: sp-aks-resource-group
Location (move)	: Central India
Subscription (move)	: Microsoft Azure Sponsorship
Subscription ID	: 1b4c9638-4313-4ccf-9c4b-f2ef192da849
Address space	: 10.1.0.0/16
DNS servers	: Azure provided DNS service
Flow timeout	: Configure
BGP community string	: Configure
Virtual network ID	: 0598c012-0f22-464a-8464-03662e138f2c
Tags (edit)	: Add tags

DDoS protection
Configure additional protection from distributed denial of service attacks.
● Not configured

Azure Firewall
Protect your network with a stateful L3-L7 firewall.
● Not configured

Peerings
Seamlessly connect two or more virtual networks.
● Not configured

ACR Image



spaksacr
Container registry

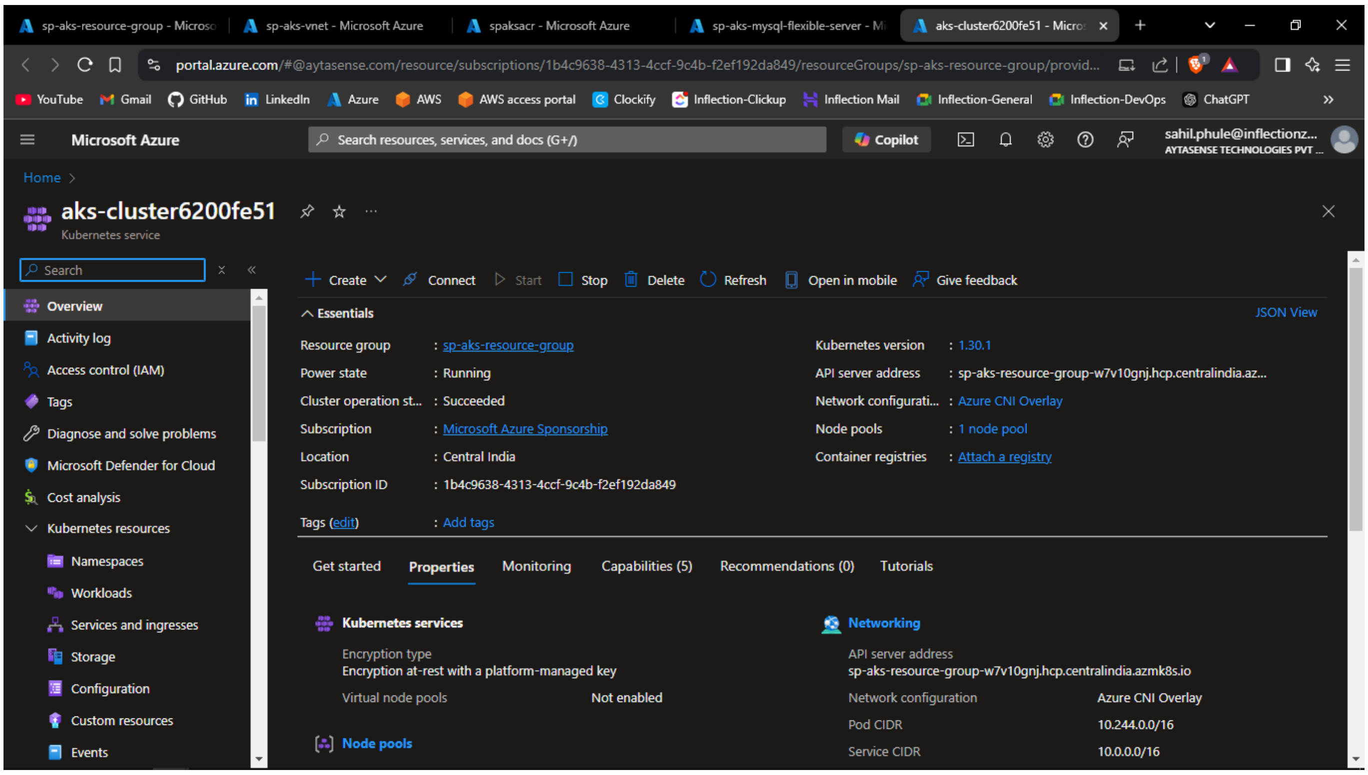
Essentials

Resource group (move)	: sp-aks-resource-group	Login server	: spaksacr.azurecr.io
Location	: Central India	Creation date	: 11/28/2024, 8:17 PM GMT+5:30
Subscription (move)	: Microsoft Azure Sponsorship	Provisioning state	: Succeeded
Subscription ID	: 1b4c9638-4313-4ccf-9c4b-f2ef192da849	Pricing plan	: Basic
Soft delete (Preview)	: Disabled		
Tags (edit)	: Add tags		

Simplify container lifecycle management

Container registry allows you to build, store, and manage container images and artifacts in a private registry for all types of container deployments. Learn more

AKS Cluster Image



aks-cluster6200fe51
Kubernetes service

Essentials

Resource group	: sp-aks-resource-group	Kubernetes version	: 1.30.1
Power state	: Running	API server address	: sp-aks-resource-group-w7v10gnj.hcp.centralindia.az...
Cluster operation st...	: Succeeded	Network configurati...	: Azure CNI Overlay
Subscription	: Microsoft Azure Sponsorship	Node pools	: 1 node pool
Location	: Central India	Container registries	: Attach a registry
Subscription ID	: 1b4c9638-4313-4ccf-9c4b-f2ef192da849		
Tags (edit)	: Add tags		

Kubernetes services

Encryption type	Encryption at-rest with a platform-managed key
Virtual node pools	Not enabled

Networking

API server address	sp-aks-resource-group-w7v10gnj.hcp.centralindia.azmk8s.io
Network configuration	Azure CNI Overlay
Pod CIDR	10.244.0.0/16
Service CIDR	10.0.0.0/16

Node pools

Connect to the AKS Cluster from Powershell

1. Open a new Powershell window.
2. Run the following commands to configure local kubectl with aks cluster:
   - `az login`
   - `az account set --subscription "subscription-id"`
   - `az aks get-credentials --resource-group "resource-group-name" --name "cluster-name" --overwrite-existing`
     Substitute *subscription-id* which can be found by running `az account list` in the *id* field. Also, substitute *resource-group-name* and *cluster-name* with the values defined in the above-created locals.tf file.
3. Now apply the Kubernetes manifest files of the application using the following command:
   - `kubectl apply -f "file-path"`
     Substitute *file-path* with the Kubernetes manifest file path.
4. To list them all, run `kubectl get all`.
5. If a Load Balancer type Service is present then try accessing the External IP of that service in the browser.

Destroy the provisioned infrastructure

1. Firstly, delete all the Kubernetes Deployments using:
   - `kubectl delete -f "file-path"`
     Substitute *file-path* with the Kubernetes manifest file path.
2. To destroy infrastructure, change the directory to the above-created Pulumi Project using `cd` command.
3. Run `pulumi destroy` & if prompted, select `yes`.
4. Infrastructure will be destroyed.
