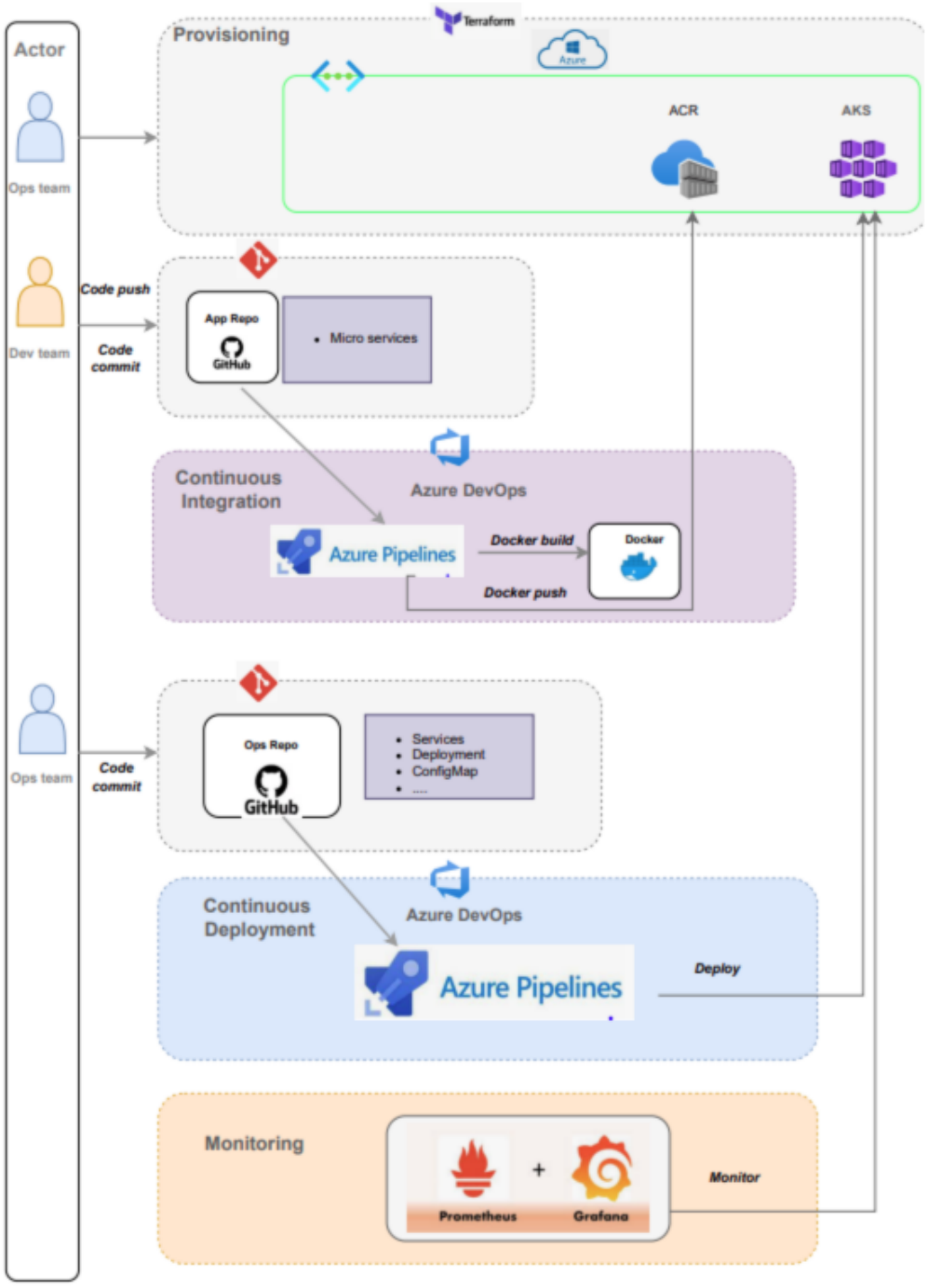
Practical DevOps – CI/CD Pipeline and deploying applications on Azure AKS

Currently, the assignment have the issue at step:

https://www.notion.so/Practical-DevOps-CI-CD-Pipeline-and-deploying-applications-on-Azure-AKS-0b67336301f54688aef62e4b42553dc0?pvs=4#7d220011e5ba48c38619e95904a5b01f

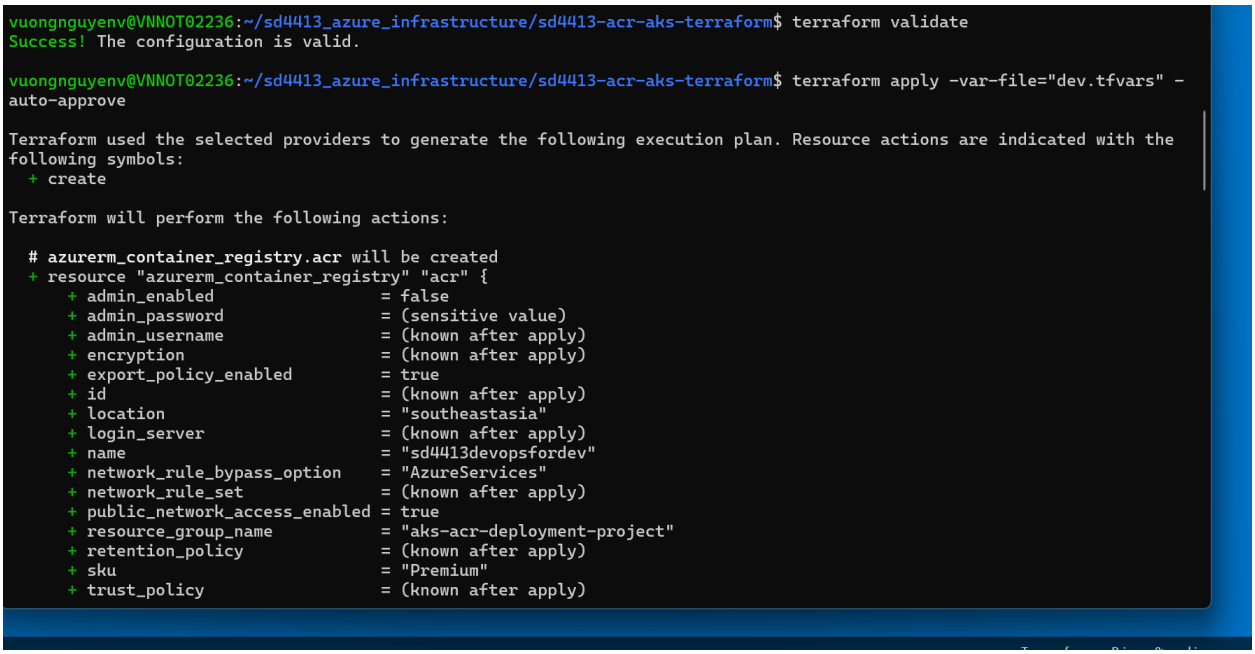


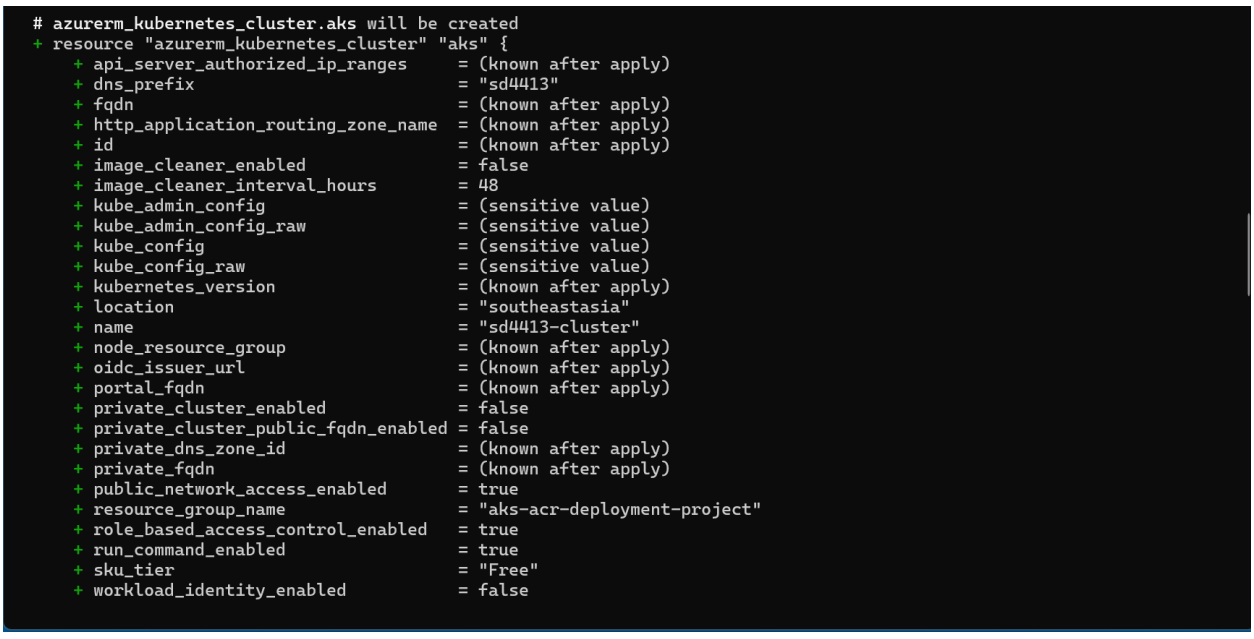
1. **Source Code Management**
   msa application repository:

https://github.com/nvvuong2000/sd4413_msa

aws infrastructure repository:
https://github.com/nvvuong2000/sd4413_azure_infrastructure

2. **Use Terraform to provision Azure Virtual Network, ACR and AKS on Azure.**

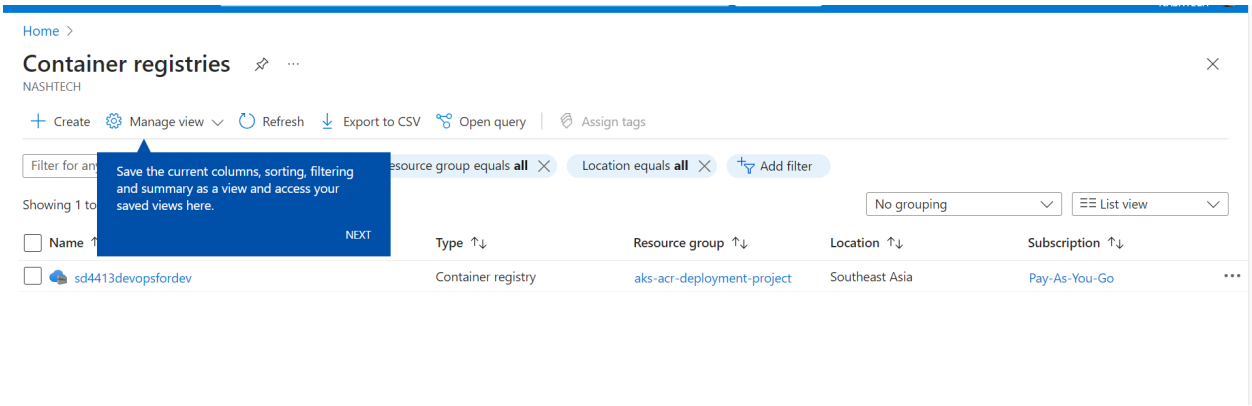


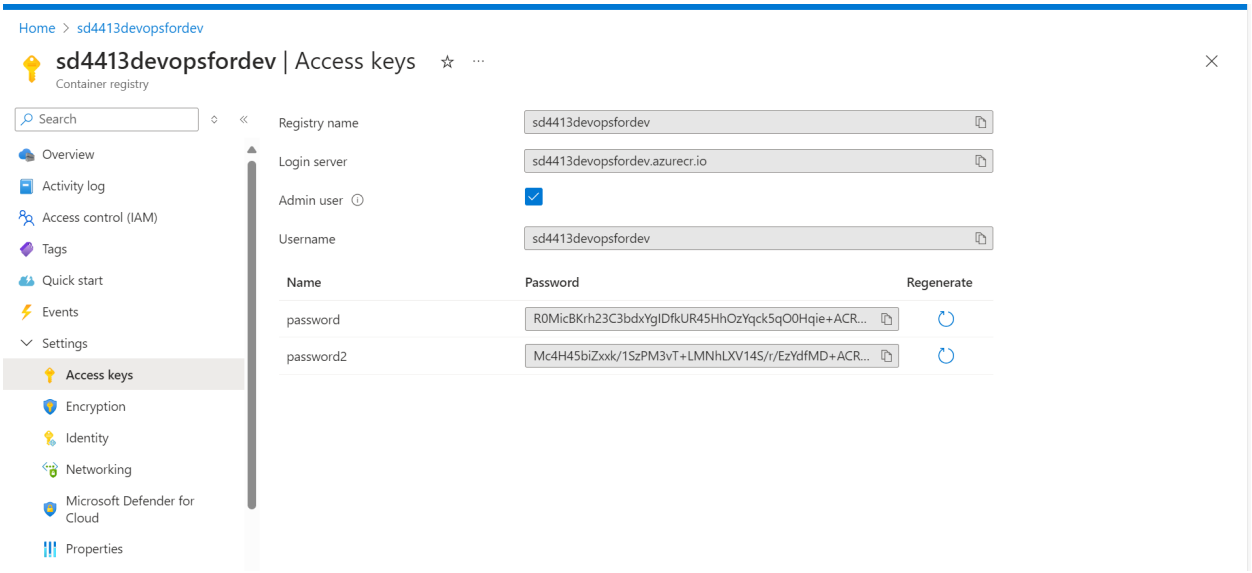


```
  # azurerm_resource_group.rg will be created
  + resource "azurerm_resource_group" "rg" {
      + id       = (known after apply)
      + location = "southeastasia"
      + name     = "aks-acr-deployment-project"
    }

  # azurerm_role_assignment.role_assignment will be created
  + resource "azurerm_role_assignment" "role_assignment" {
      + id                               = (known after apply)
      + name                             = (known after apply)
      + principal_id                     = (known after apply)
      + principal_type                   = (known after apply)
      + role_definition_id               = (known after apply)
      + role_definition_name             = "AcrPull"
      + scope                            = (known after apply)
      + skip_service_principal_aad_check = true
    }

Plan: 4 to add, 0 to change, 0 to destroy.
azurerm_resource_group.rg: Creating...
azurerm_resource_group.rg: Creation complete after 3s [id=/subscriptions/5d26c44e-ce9a-4db3-85a4-aff64acaae5a/resourceGr
oups/aks-acr-deployment-project]
azurerm_container_registry.acr: Creating...
```

```
sourceGroups/aks-acr-deployment-project/providers/Microsoft.ContainerService/managedClusters/sd4413-cluster]
azurerm_role_assignment.role_assignment: Creating...
azurerm_role_assignment.role_assignment: Still creating... [10s elapsed]
azurerm_role_assignment.role_assignment: Still creating... [20s elapsed]
azurerm_role_assignment.role_assignment: Creation complete after 26s [id=/subscriptions/5d26c44e-ce9a-4db3-85a4-aff64aca
ae5a/resourceGroups/aks-acr-deployment-project/providers/Microsoft.ContainerRegistry/registries/sd4413devopsfordev/provi
ders/Microsoft.Authorization/roleAssignments/78b9996f-bb6f-5117-c870-9973ced35e36]

Warning: Value for undeclared variable

The root module does not declare a variable named "admin_enabled" but a value was found in file "dev.tfvars". If you
meant to use this value, add a "variable" block to the configuration.

To silence these warnings, use TF_VAR_... environment variables to provide certain "global" settings to all
configurations in your organization. To reduce the verbosity of these warnings, use the -compact-warnings option.


Warning: Value for undeclared variable

The root module does not declare a variable named "public_network_access_enabled" but a value was found in file
"dev.tfvars". If you meant to use this value, add a "variable" block to the configuration.

To silence these warnings, use TF_VAR_... environment variables to provide certain "global" settings to all
configurations in your organization. To reduce the verbosity of these warnings, use the -compact-warnings option.


Apply complete! Resources: 4 added, 0 changed, 0 destroyed.
vuongnguyenv@VNNOT02236:~/sd4413_azure_infrastructure/sd4413-acr-aks-terraform$
```

Results:





3. Setup Azure DevOps pipeline for CI/CD

- **Use docker to login and push images to Azure Container Registry**

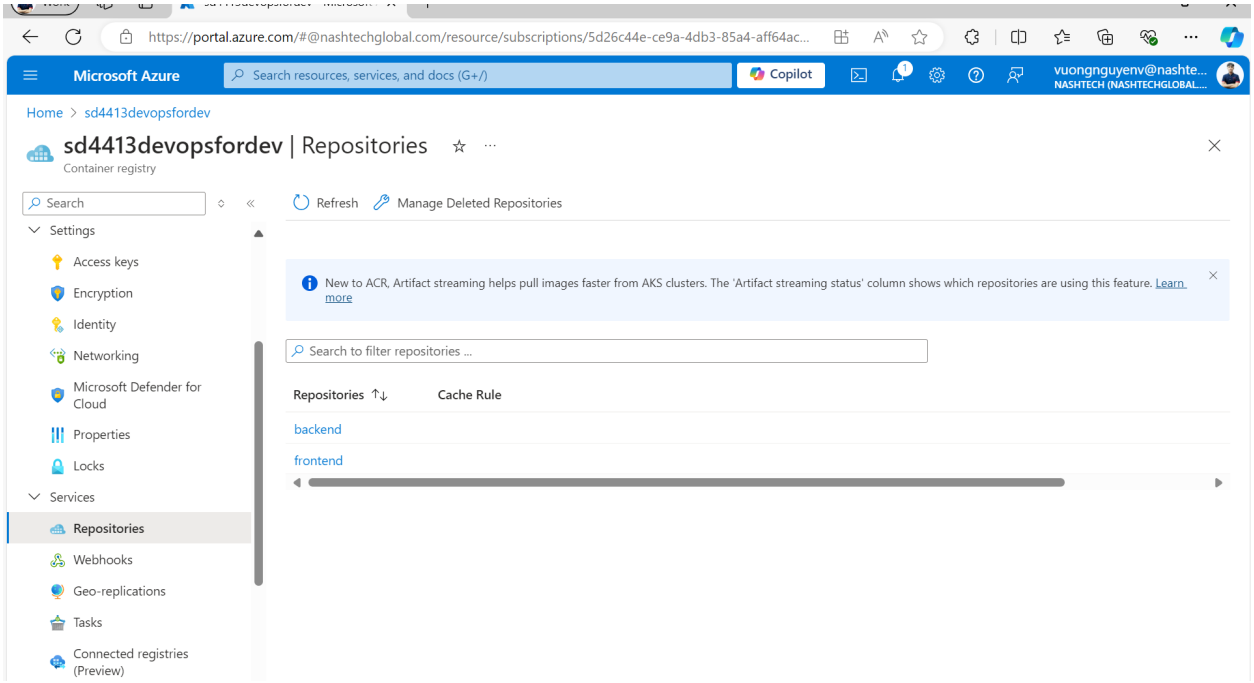
```
vuongnguyenv@VNNOT02236:~/sd4413_msa$ docker login sd4413devopsfordev.azurecr.io
Username: sd4413devopsfordev
Password:
WARNING! Your password will be stored unencrypted in /home/vuongnguyenv/.docker/config.json.
Configure a credential helper to remove this warning. See
https://docs.docker.com/engine/reference/commandline/login/#credential-stores

Login Succeeded
vuongnguyenv@VNNOT02236:~/sd4413_msa$
```

```
vuongnguyenv@VNNOT02236:~/sd4413_msa/src$ docker build ./frontend -t frontend
[+] Building 79.6s (4/10)                                                                                    docker:default
[+] Building 197.1s (11/11) FINISHED                                                                         docker:default
 => [internal] load build definition from Dockerfile                                                                  0.2s
 => => transferring dockerfile: 974B                                                                                  0.0s
 => [internal] load metadata for docker.io/library/node:lts-buster                                                    3.6s
 => [internal] load .dockerignore                                                                                     0.1s
 => => transferring context: 69B                                                                                      0.0s
 => [1/6] FROM docker.io/library/node:lts-buster@sha256:479103df06b40b90f189461b6f824a62906683e26a32c77d7c3e2d855a0e3e9f  131.1s
 => => resolve docker.io/library/node:lts-buster@sha256:479103df06b40b90f189461b6f824a62906683e26a32c77d7c3e2d855a0e3e9f   0.1s
 => => sha256:479103df06b40b90f189461b6f824a62906683e26a32c77d7c3e2d855a0e3e9f 2.62kB / 2.62kB                         0.0s
 => => sha256:210343259138ad1b7bad23cd3be6aa1126f764f887c639749411387c9321c2d5 2.50kB / 2.50kB                         0.0s
 => => sha256:e789c1e41c485bf1ebec54eee06e33c1480fbfb4cfa6c354489e248d35c12fbf 6.59kB / 6.59kB                         0.0s
 => => sha256:2a567eb2264b60aa779a5bc8f8f4dc7a6d3e1e01d8f5d1bcd039ed444d91a408 51.90MB / 51.90MB                      37.0s
 => => sha256:3892befd2c3f36ceb247ba7d906de12601d69b806597e65c4c837cf3d93df119 50.66MB / 50.66MB                      26.9s
 => => sha256:32ab8bed435ee0e35413bb45d14dae2283dc0841644d881be35089debdc88cc3 17.59MB / 17.59MB                      18.5s
 => => sha256:9be81a73cfb7b45f4634965206adaa318a889f15cff6ced0ffd70f7c2d851fe4 191.96MB / 191.96MB                    95.8s
 => => extracting sha256:3892befd2c3f36ceb247ba7d906de12601d69b806597e65c4c837cf3d93df119                              4.3s
 => => sha256:a508c11d72bec9ab7ecb8e2f18f9399603b028f6eb8da53a4411c5f9a15dd921 4.09kB / 4.09kB                        27.3s
 => => sha256:3bcf1cf7cb91fe6b1ebeb2a4113148f94e21b4e399fba8fc08cdee7a0c5104a1 48.02MB / 48.02MB                      62.1s
 => => extracting sha256:32ab8bed435ee0e35413bb45d14dae2283dc0841644d881be35089debdc88cc3                              0.8s
 => => sha256:e20b342eff9190e35ab3c6a9e05cac912ebed6848d3fa4caaa1dc31f28acd6f9 1.25MB / 1.25MB                         39.0s
 => => extracting sha256:2a567eb2264b60aa779a5bc8f8f4dc7a6d3e1e01d8f5d1bcd039ed444d91a408                              4.5s
 => => sha256:ab80d1950cdb44d12f0729d9d9d3f624dd1d347ca142b323742a79ce2e32d8f1 452B / 452B                            39.5s
 => => extracting sha256:9be81a73cfb7b45f4634965206adaa318a889f15cff6ced0ffd70f7c2d851fe4                             27.0s
 => => extracting sha256:a508c11d72bec9ab7ecb8e2f18f9399603b028f6eb8da53a4411c5f9a15dd921                              0.0s
 => => extracting sha256:3bcf1cf7cb91fe6b1ebeb2a4113148f94e21b4e399fba8fc08cdee7a0c5104a1                              5.3s
```

```
vuongnguyenv@VNNOT02236:~/sd4413_msa/src$ docker build ./backend -t backend
[+] Building 25.8s (11/11) FINISHED                                                                  docker:default
 => [internal] load build definition from Dockerfile                                                            0.0s
 => => transferring dockerfile: 632B                                                                            0.0s
 => [internal] load metadata for docker.io/library/node:lts-buster-slim                                         1.8s
 => [internal] load .dockerignore                                                                               0.0s
 => => transferring context: 54B                                                                                0.0s
 => [1/6] FROM docker.io/library/node:lts-buster-slim@sha256:b5c14e85662c43b8c86a3a88259a34f0071474ad0a029ecb4ec  14.3s
 => => resolve docker.io/library/node:lts-buster-slim@sha256:b5c14e85662c43b8c86a3a88259a34f0071474ad0a029ecb4ec3  0.1s
 => => sha256:b5c14e85662c43b8c86a3a88259a34f0071474ad0a029ecb4ec39bbea588b030 2.64kB / 2.64kB                  0.0s
 => => sha256:d2c1a7c2c34c323c91eb403dc5307aa5bf7c8fd85a8c1b65409757ad1175026b 1.92kB / 1.92kB                  0.0s
 => => sha256:cbbef3e9fc4833b5f05a0e274a1f87a078fb3458010b4e8edddf3678a80db9e5 6.88kB / 6.88kB                  0.0s
 => => sha256:b338562f40a7fb7360dfae935da6d7e40d2545db18bc461d9d70ec1b2b657f33 27.34MB / 27.34MB                7.8s
 => => sha256:83e7bff444cbbba7a4525fb9f89eed0fec15f0fee7634be90e605e976e0a2b62 4.08kB / 4.08kB                  0.9s
 => => sha256:91fb5bf3bf5644e732816abba38fa882f8f219b0e5e94721769d22be091d346e 40.56MB / 40.56MB               11.3s
 => => sha256:92fb55bbf58f7d8f1e314d1d57935fe02bc2793dbea1584620ba06774751336b 1.71MB / 1.71MB                  2.7s
 => => sha256:cfc35741f7c213ed8d4fe84fc24fa7276066a6cbb24bc2483349ebc0c4532d41 453B / 453B                      3.1s
 => => extracting sha256:b338562f40a7fb7360dfae935da6d7e40d2545db18bc461d9d70ec1b2b657f33                       2.3s
 => => extracting sha256:83e7bff444cbbba7a4525fb9f89eed0fec15f0fee7634be90e605e976e0a2b62                       0.0s
 => => extracting sha256:91fb5bf3bf5644e732816abba38fa882f8f219b0e5e94721769d22be091d346e                       2.2s
 => => extracting sha256:92fb55bbf58f7d8f1e314d1d57935fe02bc2793dbea1584620ba06774751336b                       0.1s
 => => extracting sha256:cfc35741f7c213ed8d4fe84fc24fa7276066a6cbb24bc2483349ebc0c4532d41                       0.0s
 => [internal] load build context                                                                               0.0s
 => => transferring context: 1.35kB                                                                             0.0s
 => [2/6] WORKDIR /usr/src/app                                                                                  0.7s
 => [3/6] COPY package.json /usr/src/app/package.json                                                           0.1s
 => [4/6] COPY package-lock.json /usr/src/app/package-lock.json                                                 0.1s
 => [5/6] RUN npm ci                                                                                            7.3s
 => [6/6] COPY . /usr/src/app                                                                                   0.2s
 => exporting to image                                                                                          0.9s
```

```
vuongnguyenv@VNNOT02236:~/sd4413_msa/src$ docker push sd4413devopsfordev.azurecr.io/frontend
Using default tag: latest
The push refers to repository [sd4413devopsfordev.azurecr.io/frontend]
tag does not exist: sd4413devopsfordev.azurecr.io/frontend:latest
vuongnguyenv@VNNOT02236:~/sd4413_msa/src$ docker push sd4413devopsfordev.azurecr.io/frontend:lastest
The push refers to repository [sd4413devopsfordev.azurecr.io/frontend]
1619753dbcbf: Pushed
167b7ad2bd8b: Pushed
daccc2a63cfd: Pushed
41ab076a2883: Pushed
f85d9b41e9a8: Pushed
659e539388fc: Pushed
13dbcad4a1a6: Pushed
bb779e5cd086: Pushed
a7fcbdaca839: Pushed
ecff6742845c: Pushed
ee7e2e7202d1: Pushed
55d1b3b58b6c: Pushed
19b1230ac19d: Pushed
lastest: digest: sha256:68d51480e3eb9a79937165eabf6bc86d55bbf6004b4de4cc4d7c40c19d19eb90 size: 3051
```

Results:



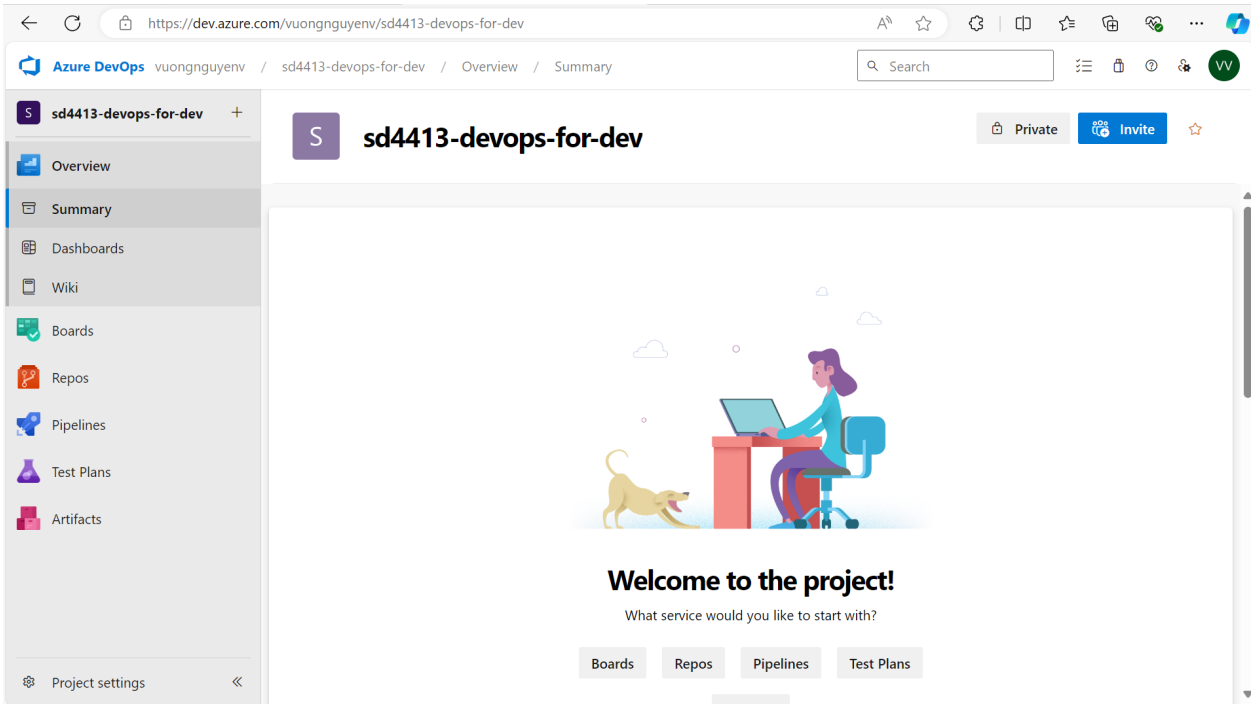
- **Use kubectl**

```
vuongnguyenv@VNNOT02236:~/sd4413_msa/src$ az aks get-credentials --resource-group aks-acr-deployment-project --name sd4413-cluster
Merged "sd4413-cluster" as current context in /home/vuongnguyenv/.kube/config
vuongnguyenv@VNNOT02236:~/sd4413_msa/src$ kubectl config get-contexts
CURRENT   NAME             CLUSTER          AUTHINFO                                                NAMESPACE
*         sd4413-cluster   sd4413-cluster   clusterUser_aks-acr-deployment-project_sd4413-cluster
vuongnguyenv@VNNOT02236:~/sd4413_msa/src$
```

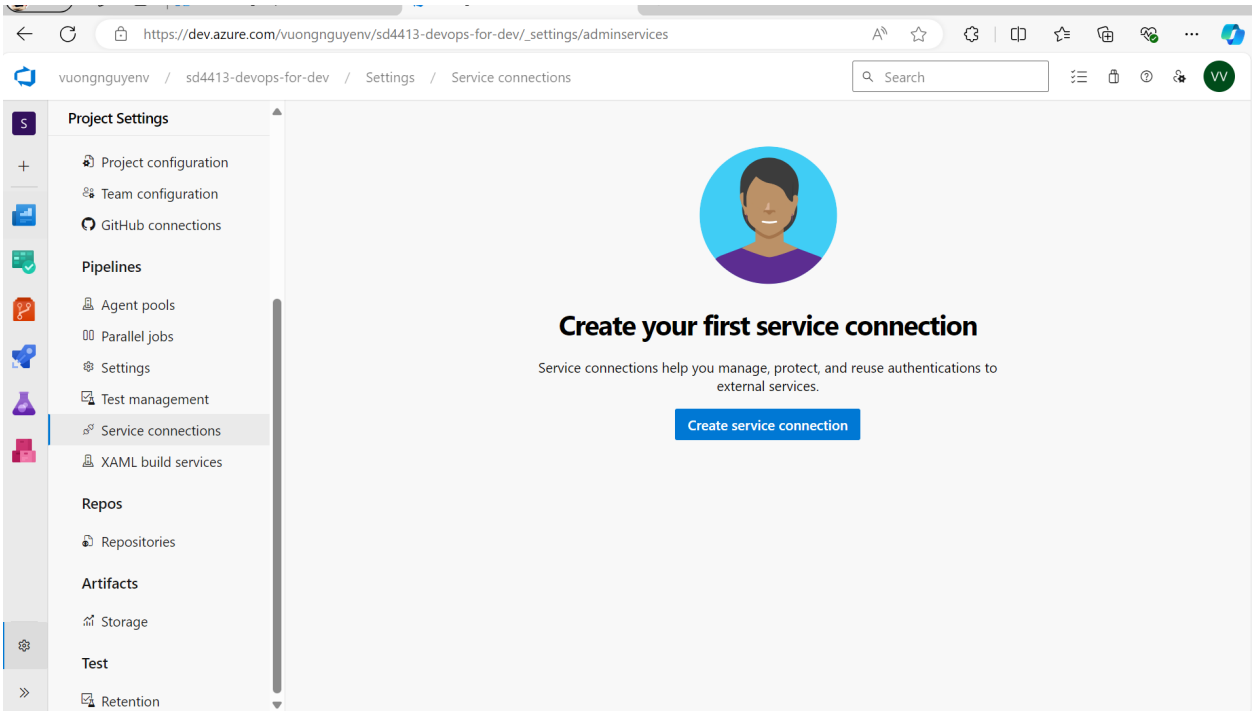
Results:

```
vuongnguyenv@VNNOT02236:~/sd4413_msa/k8s/az$ kubectl apply -f mongodb.yaml
storageclass.storage.k8s.io/mongo-sc created
service/mongo created
configmap/mongo-config created
secret/mongo-secrets created
statefulset.apps/mongo created
vuongnguyenv@VNNOT02236:~/sd4413_msa/k8s/az$ kubectl apply -f ba
ckend.yaml
service/backend created
deployment.apps/backend created
vuongnguyenv@VNNOT02236:~/sd4413_msa/k8s/az$ kubectl apply -f frontend.yaml
service/frontend created
deployment.apps/frontend created
vuongnguyenv@VNNOT02236:~/sd4413_msa/k8s/az$ kubectl get pods
NAME                        READY   STATUS              RESTARTS   AGE
backend-dd69c9856-qnpc4     1/1     Running             0          33s
frontend-55d68fdc7b-hpv4x   0/1     ContainerCreating   0          12s
mongo-0                     1/1     Running             0          46s
vuongnguyenv@VNNOT02236:~/sd4413_msa/k8s/az$ kubectl get service
s
NAME         TYPE        CLUSTER-IP     EXTERNAL-IP   PORT(S)     AGE
backend      ClusterIP   10.0.251.89    <none>        3000/TCP    52s
frontend     ClusterIP   10.0.125.223   <none>        3000/TCP    31s
vuongnguyenv@VNNOT02236:~/sd4413_msa/k8s/az$
mongo        ClusterIP   10.0.238.69    <none>        27017/TCP   65s
vuongnguyenv@VNNOT02236:~/sd4413_msa/k8s/az$
```

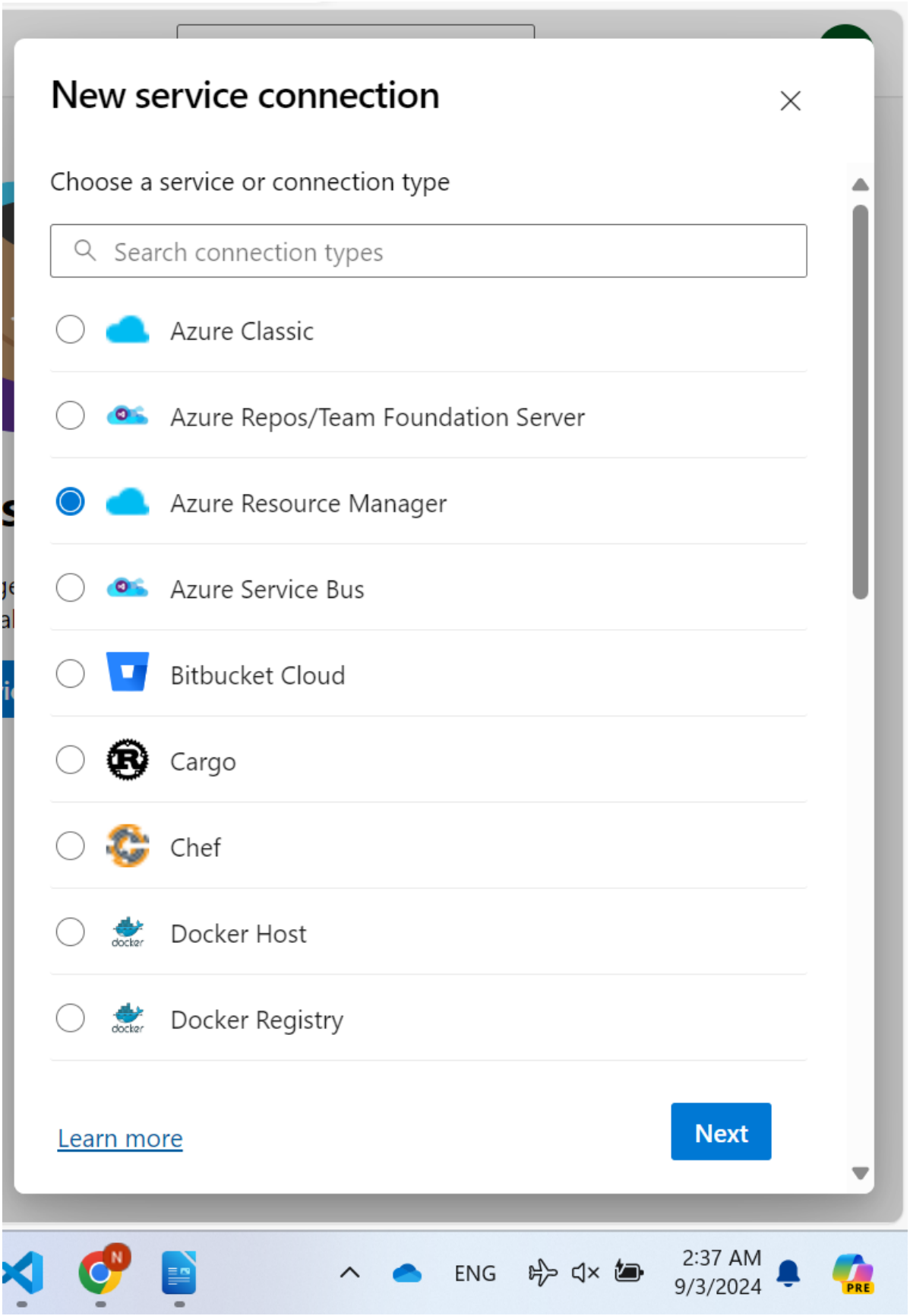
- Create new project



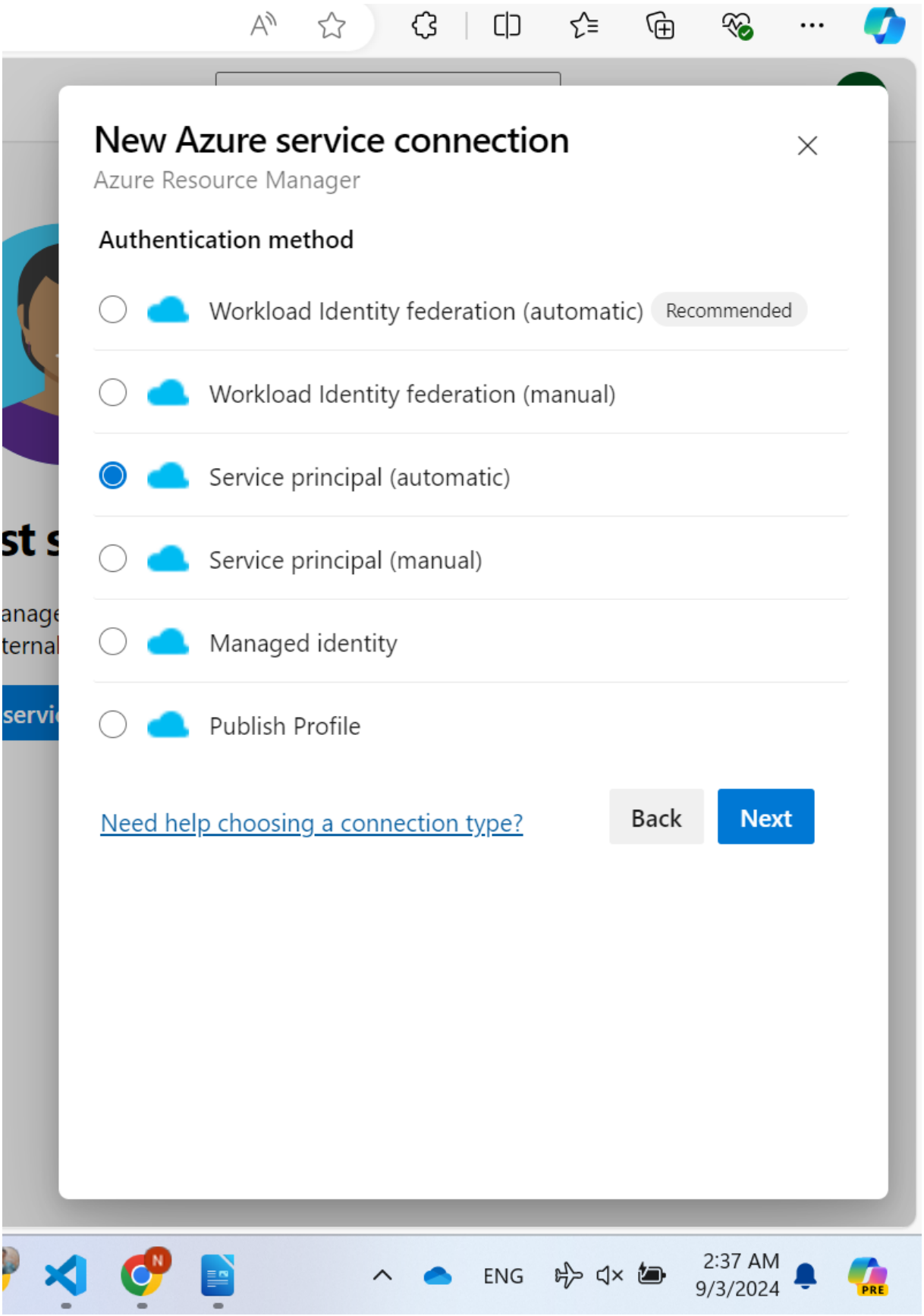
- At left navigation ⇒ Select `service connections` .



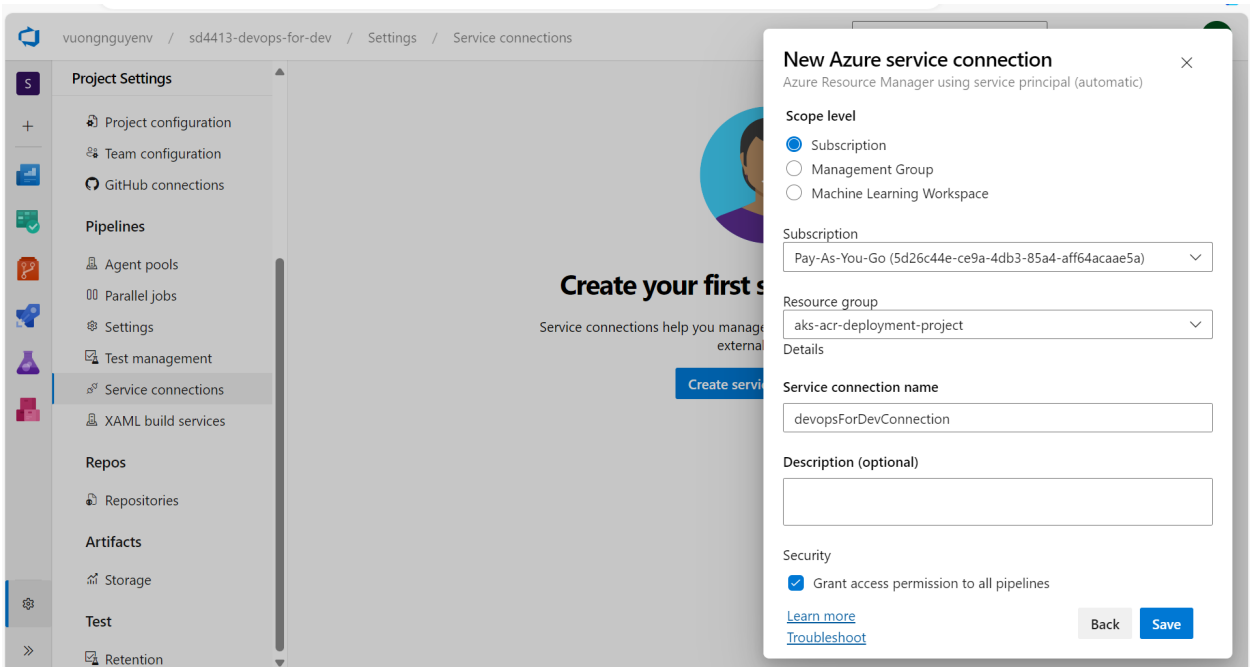
- Choose **Azure Resource Manager**


New service connection
Choose a service or connection type
Search connection types
Azure Classic
Azure Repos/Team Foundation Server
Azure Resource Manager
Azure Service Bus
Bitbucket Cloud
Cargo
Chef
Docker Host
Docker Registry
Learn more
Next
ENG
2:37 AM
9/3/2024

- Choose `Service principal ( automatic)` .

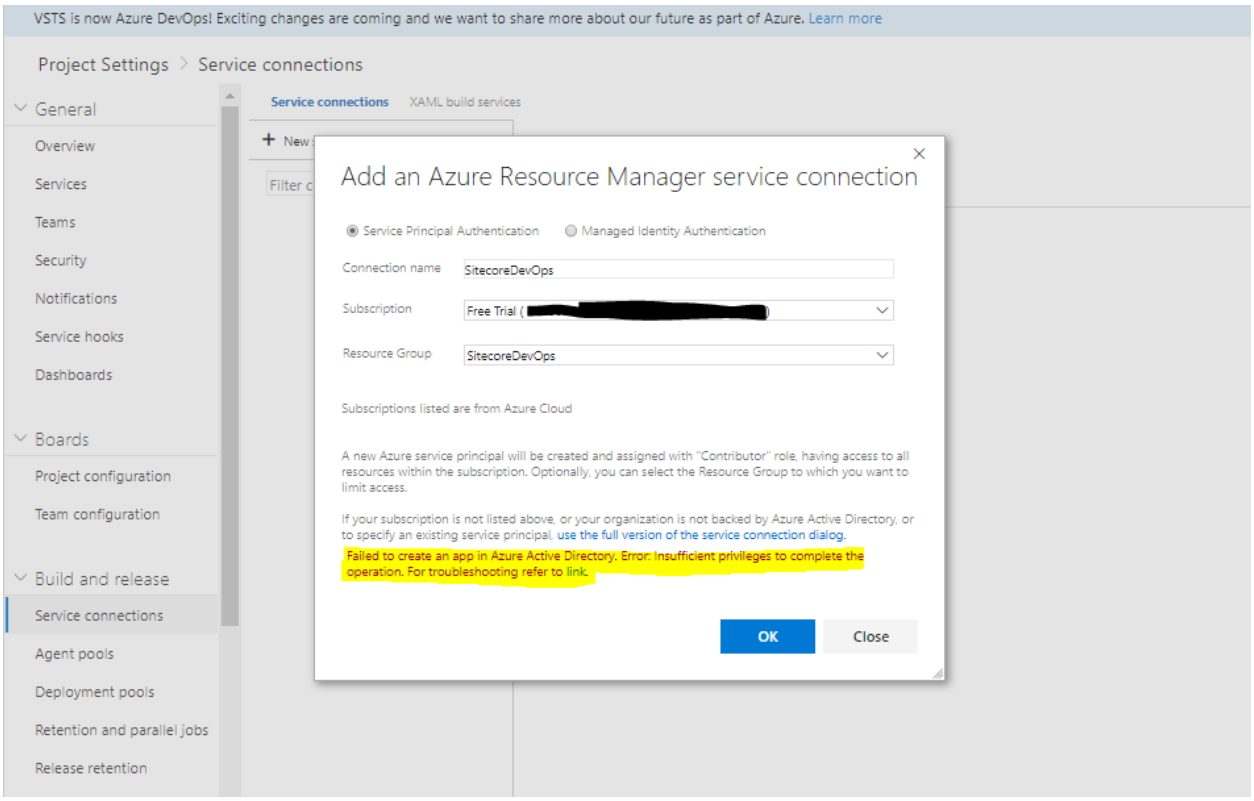

New Azure service connection
Azure Resource Manager
Authentication method
Workload Identity federation (automatic)
Recommended
Workload Identity federation (manual)
Service principal (automatic)
Service principal (manual)
Managed identity
Publish Profile
Need help choosing a connection type?
Back
Next
ENG
2:37 AM
9/3/2024

- **Preview**

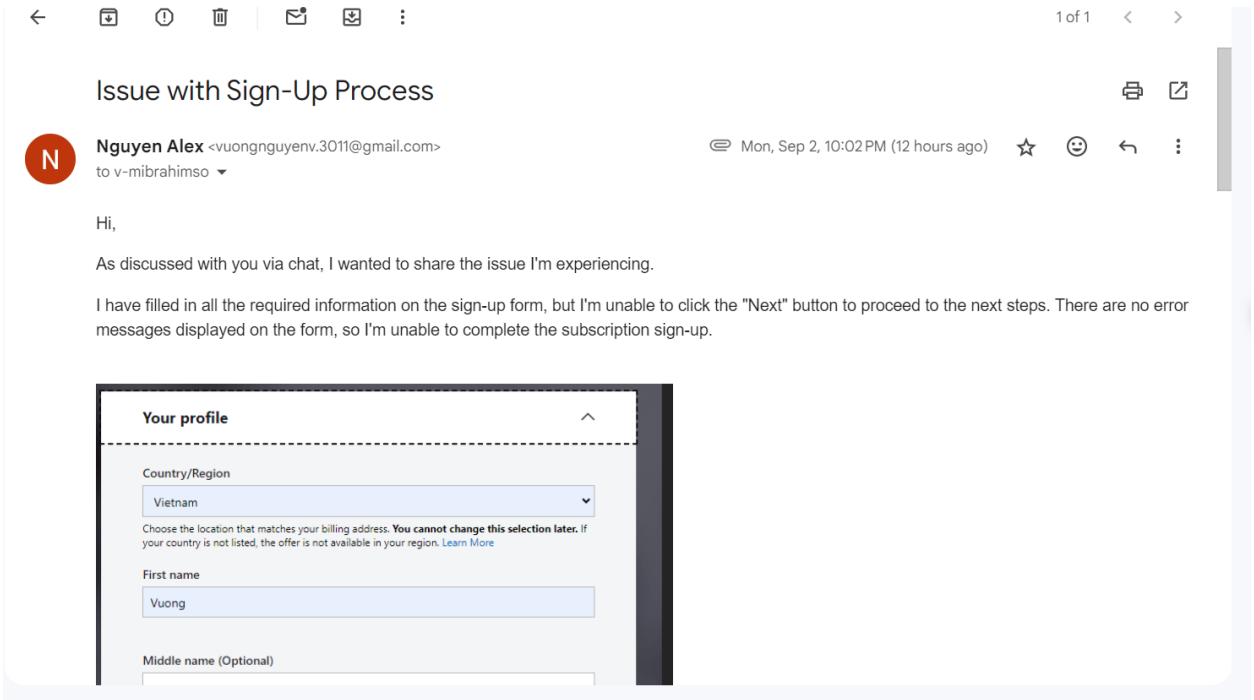


To be continue update

Khi e làm đến đây bị báo lỗi tương tự tấm hình. account e sử dụng không có đủ permission để dùng.



Em tạo mới account khác thì bị lỗi chỗ xác thực number: ngày 02/09



Em sẽ update tiếp evidence khi làm xong assignment. Cảm ơn các anh chị a.