

Dokumentasi Teknis
Cloud Fundamental Track
Capstone Project Bidang Pendidikan

Disusun oleh

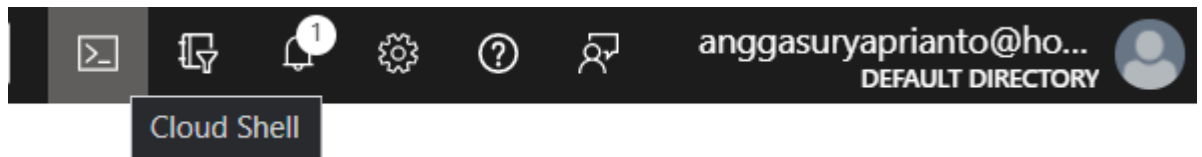
ANGGA SURYA PRIANTO

50418831

Universitas Gunadarma

1. Azure CLI

Masuk ke Azure CLI dengan cara login ke azure portal kemudian pilih Cloud Shell



2. Buat Azure ResourceGroup

Kemudian buat sebuah ResourceGroup untuk menampung project kita

```
anggasuryaprianto@Azure:~$ az group create --name capstoneProject --location southeastasia
{
  "id": "/subscriptions/ca3a0862-80c2-41d3-b6e0-6c938a3ebdf5/resourceGroups/capstoneProject",
  "location": "southeastasia",
  "managedBy": null,
  "name": "capstoneProject",
  "properties": {
    "provisioningState": "Succeeded"
  },
  "tags": null,
  "type": "Microsoft.Resources/resourceGroups"
}
```

3. Buat Cluster Azure Kubernetes Service

Disini saya menggunakan Kubernetes untuk menjalankan moodle berbasis container. Command dibawah untuk membuat sebuah cluster aks yang mempunyai 1 node dan dapat melakukan autoscaling hingga max 3 node.

```
anggasuryaprianto@Azure:~$ az aks create \
> --resource-group capstoneProject \
> --name AKS-Cluster \
> --node-count 1 \
> --vm-set-type VirtualMachineScaleSets \
> --load-balancer-sku standard \
> --enable-cluster-autoscaler \
> --min-count 1 \
> --max-count 3
```

4. Mendapatkan AKS kredensial

Command dibawah untuk Mengkonfigurasi kubectl untuk mendapatkan kredensial pada Cluster Kubernetes yang kita buat sebelumnya.

```
anggasuryaprianto@Azure:~$ az aks get-credentials --name AKS-Cluster --resource-group capstoneProject
Merged "AKS-Cluster" as current context in /home/anggasuryaprianto/.kube/config
```

5. Menambahkan Repository & Mendeploy Moodle menggunakan Helm

Disini saya menggunakan helm yaitu sebuah package manager untuk kubernetes yang akan membantu kita dalam me-manage aplikasi moodle yang akan di deploy ke cluster Kubernetes.

```
anggasuryaprianto@Azure:~$ helm repo add azure-marketplace https://marketplace.azurecr.io/helm/v1/repo
"azure-marketplace" already exists with the same configuration, skipping
anggasuryaprianto@Azure:~$ helm install aks azure-marketplace/moodle
NAME: aks
LAST DEPLOYED: Sat Nov  6 06:36:43 2021
NAMESPACE: default
STATUS: deployed
REVISION: 1
TEST SUITE: None
NOTES:
*****
*** PLEASE BE PATIENT: Moodle may take a few minutes to install ***
*****

1. Get the Moodle URL:

NOTE: It may take a few minutes for the LoadBalancer IP to be available.
      Watch the status with: 'kubectl get svc --namespace default -w aks-moodle'

export SERVICE_IP=$(kubectl get svc --namespace default aks-moodle --template "{{ range (index .status.loadBalancer.ingress 0) }}{{.}}{{ end }}" )
echo "Moodle URL: http://$SERVICE_IP/"

2. Get your Moodle login credentials by running:

echo Username: user
echo Password: $(kubectl get secret --namespace default aks-moodle -o jsonpath="{.data.moodle-password}" | base64 --decode)
```

6. Mengecek Pods Kubernetes

Disini kita mengecek apakah container yang ada didalam pods sudah berjalan, pods merupakan sebuah wadah untuk menampung container apps. Disini terlihat ada 2 buah container yaitu aplikasi Moodle dan Mariadb sebagai database.

```
anggasuryaprianto@Azure:~$ kubectl get pods -w
NAME                                READY   STATUS    RESTARTS   AGE
aks-mariadb-0                       1/1     Running   0           3h21m
aks-moodle-57dd5dd8b6-7zwxg        1/1     Running   0           3h21m
```

7. Mendapatkan IP Public AKS

Command dibawah untuk mendapatkan IP Public dari load balancer di cluster Kubernetes

```
anggasuryaprianto@Azure:~$ export SERVICE_IP=$(kubectl get svc --namespace default aks-moodle --template "{{ range (index .status.loadBalancer.ingress 0) }}{{.}}{{ end }}" )
anggasuryaprianto@Azure:~$ echo "Moodle&trade; URL: http://$SERVICE_IP/"
Moodle&trade; URL: http://20.212.40.144/
```

8. Setting user & password admin Moodle

Command dibawah untuk membuat user dan password untuk akun admin pada moodle.

```
anggasuryaprianto@Azure:~$ echo Username: user
Username: user
anggasuryaprianto@Azure:~$ echo Password: $(kubectl get secret --namespace default aks-moodle -o jsonpath="{.data.moodle-password}" | base64 --decode)
Password: Dsaf7LYS7k
```

9. Membuat DNS pada AKS

Tidak seperti layanan VM, App Service, dan Azure Container Instance yang telah disediakan DNS oleh Azure, AKS ini tidak disediakan layanan DNS jika membuatnya menggunakan Azure Portal. Kita harus mengaktifkan FQDN agar terhubung dengan IP Public. Langkah pertama yaitu membuat script FQDN untuk mendaftarkan IP Public dan DNS Name yang akan dipakai.

```
anggasuryaprianto@Azure:~$ touch fqdn
anggasuryaprianto@Azure:~$ nano fqdn
```

Masuk ke script FQDN kemudian masukan command dibawah

```
#!/bin/bash

# Public IP address
IP=20.212.40.144

# Name to associate with public IP address
DNSNAME=belajarkoding

# Get resource group and public ip name
RESOURCEGROUP=$(az network public-ip list --query "[?ipAddress!=null][?contains(ipAddress, '$IP')].[resourceGroup]" --output tsv)
PIPNAME=$(az network public-ip list --query "[?ipAddress!=null][?contains(ipAddress, '$IP')].[name]" --output tsv)

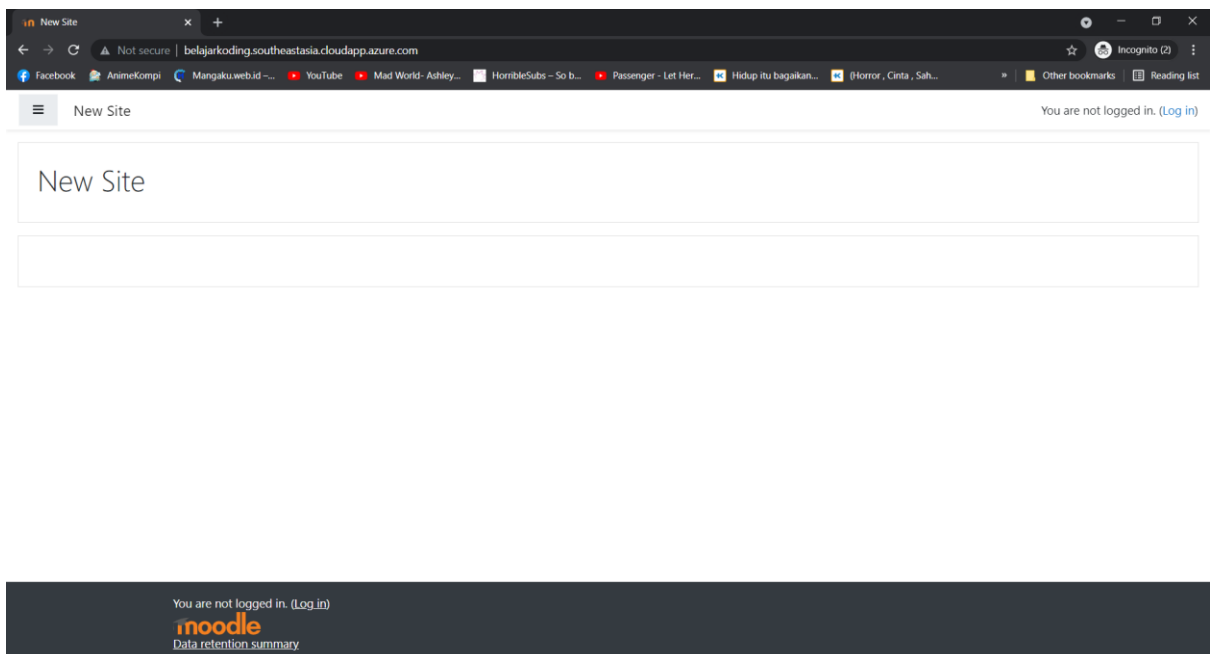
# Update public ip address with dns name
az network public-ip update --resource-group $RESOURCEGROUP --name $PIPNAME --dns-name $DNSNAME
```

Jalankan script FQDN menggunakan perintah bash dan FQDN sudah aktif kita bisa mengakses moodle menggunakan DNS yang sudah kita buat.

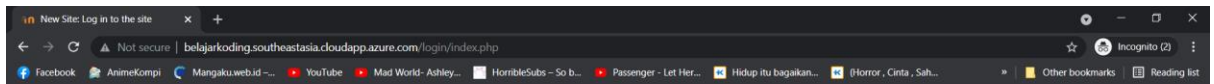
```
anggasuryaprianto@Azure:~$ bash fqdn
{
  "ddosSettings": null,
  "deleteOption": null,
  "dnsSettings": {
    "domainNameLabel": "belajarkoding",
    "fqdn": "belajarkoding.southeastasia.cloudapp.azure.com",
    "reverseFqdn": null
  },
  "etag": "W/\"fcde26a9-f491-48b2-a36c-c62f0424f524\"",
  "extendedLocation": null,
  "id": "/subscriptions/ca3a0862-80c2-41d3-b6e0-6c938a3ebdf5/resourceGroups/mc_capstoneproject_aks-cluster_southeastasia/providers/Microsoft.Network/publicIPAddresses/kubernetes-adf84dcdfc8814919a8884f8fe9f53fe",
  "idleTimeoutInMinutes": 4,
  "ipAddress": "20.212.40.144",
  "ipConfiguration": {
    "etag": null,
    "id": "/subscriptions/ca3a0862-80c2-41d3-b6e0-6c938a3ebdf5/resourceGroups/mc_capstoneproject_aks-cluster_southeastasia/providers/Microsoft.Network/loadBalancers/kubernetes/frontendIPConfigurations/adf84dcdfc8814919a8884f8fe9f53fe",
    "name": null,
    "privateIpAddress": null,
    "privateIpAllocationMethod": null,
    "provisioningState": null,
    "publicIpAddress": null,
    "resourceGroup": "mc_capstoneproject_aks-cluster_southeastasia",
    "subnet": null
  },
}
```

10. Mengakses Moodle

Kita sudah berhasil mengakses website moodle menggunakan DNS.



Kemudian kita coba login menggunakan user & pass yang dibuat sebelumnya.



New Site

Forgotten your username or password?

Cookies must be enabled in your browser

☐ Remember username

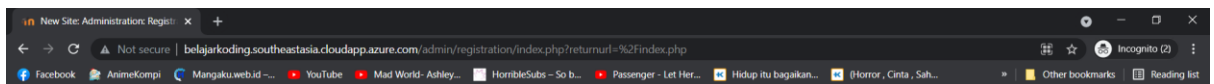
Some courses may allow guest access

Log in

Log in as a guest



Kemudian melakukan registrasi moodle



New Site

Admin User

Dashboard

Site home

Calendar

Private files

Content bank

Site administration

Registration information

Name

Belajar Koding

Site listing

Do not list my site

Description

Moodle powered by Bitnami

Language

English

Country

Indonesia

Admin email address

anggakg@outlook.com

Notifications of new Moodle releases, security alerts and other important news

☐ Yes, notify me of new Moodle releases, security alerts and other important news

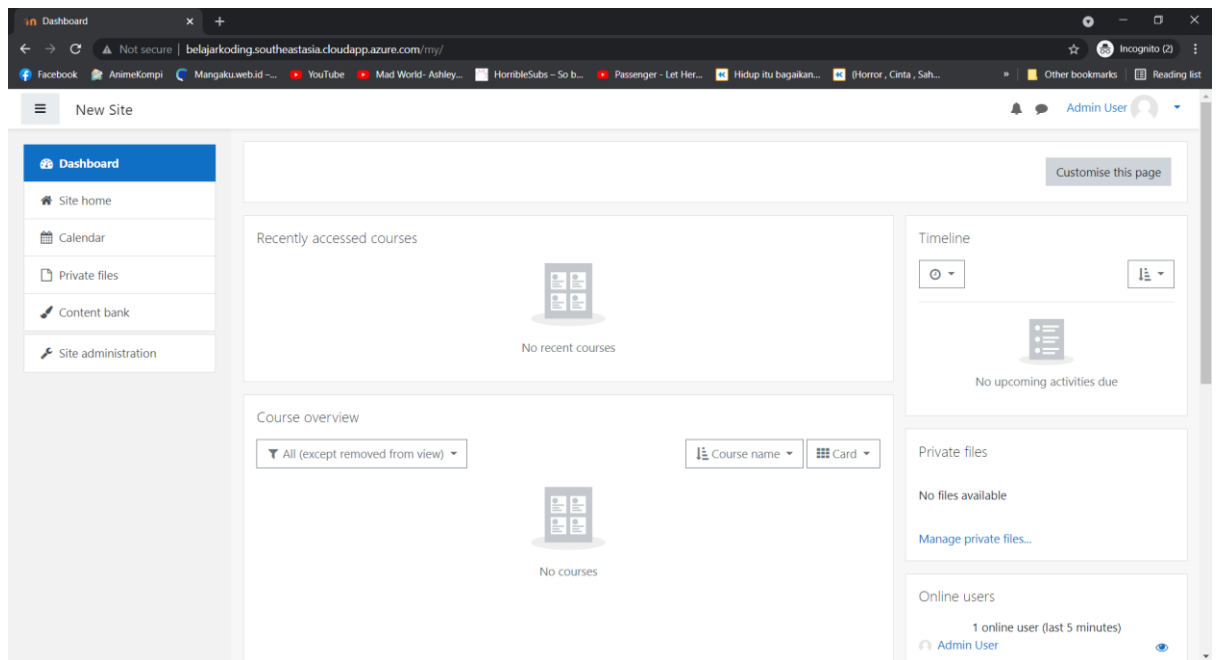
Moodle newsletter

☐ Yes, I would like to receive the Moodle newsletter

Privacy notice and data processing agreement

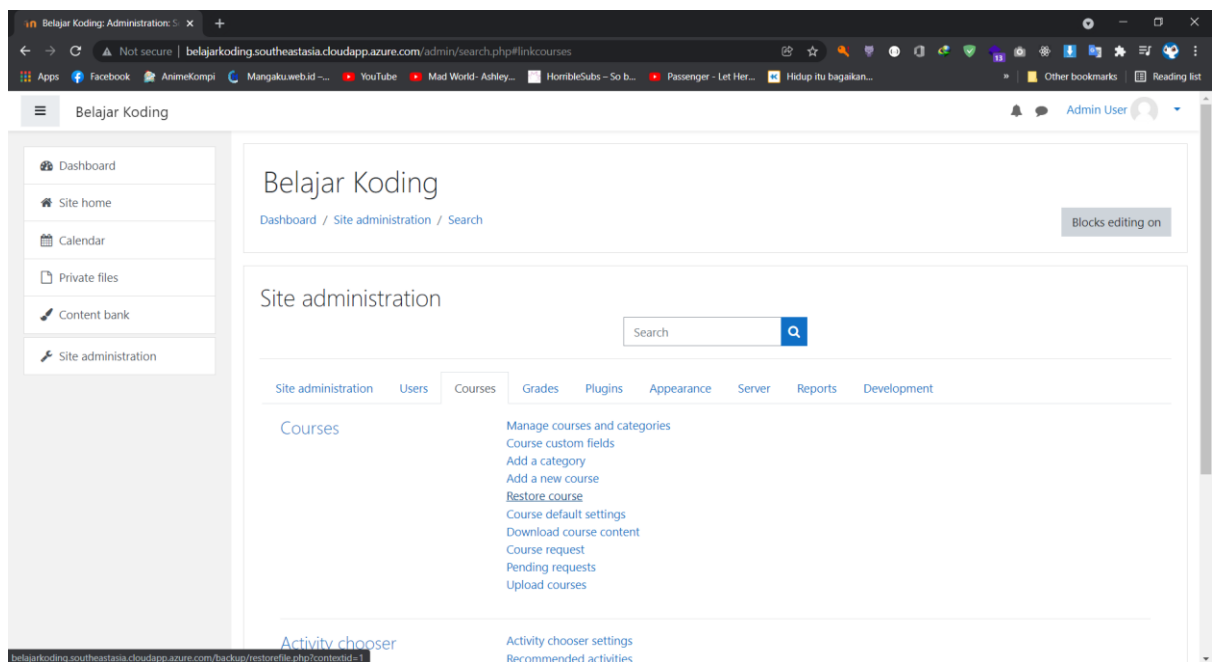
☒ I agree to the Privacy notice and data processing agreement

Ini adalah tampilan awal dari dashboard website elearning Moodle.



11. Membuat Course baru di Moodle

Untuk membuat course baru masuk ke Site administration > Courses > Add a new course

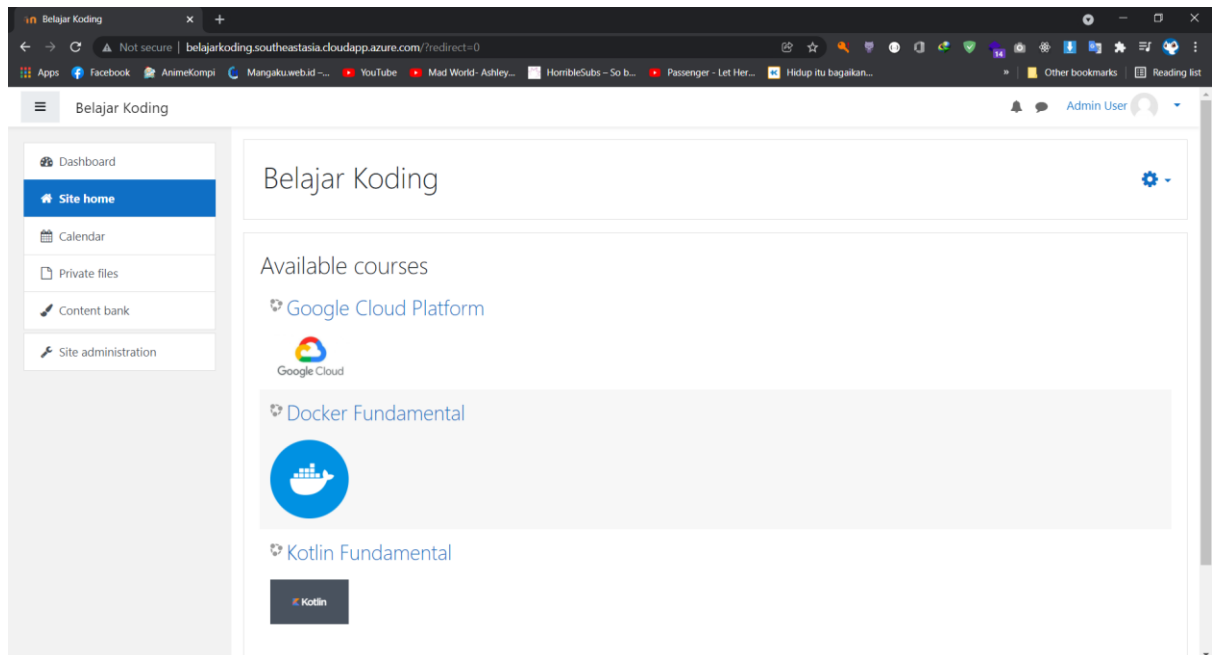


Kemudian mengisi form informasi tentang course tersebut

The screenshot shows the 'Add a new course' form in the Belajar Koding admin interface. The form is titled 'Add a new course' and has a sidebar on the left with navigation links: Dashboard, Site home, Calendar, Private files, Content bank, and Site administration. The form fields are as follows:

- Course full name:** Google Cloud Platform
- Course short name:** GCP
- Course category:** Miscellaneous (selected from a dropdown menu)
- Course visibility:** Show (selected from a dropdown menu)
- Course start date:** 24 November 2021 00:00
- Course end date:** 24 November 2022 00:00 (with an 'Enable' checkbox)

Hasilnya tampilan home akan seperti ini



Sumber :

<https://bitnami.com/stack/moodle/helm>

<https://docs.bitnami.com/azure/get-started-charts-marketplace/>

<https://docs.microsoft.com/en-us/azure/aks/cluster-autoscaler>

<https://dev.to/piyushbagani15/azure-kubernetes-service-aks-in-action-4p5>

<https://docs.microsoft.com/en-us/azure/aks/cluster-autoscaler>

<https://docs.microsoft.com/en-us/learn/modules/intro-to-azure-kubernetes-service/>

<https://docs.microsoft.com/en-us/azure/aks/concepts-clusters-workloads>

<https://docs.microsoft.com/en-us/azure/aks/concepts-identity>

<https://faun.pub/scaling-aks-development-clusters-to-zero-to-save-costs-7e1111cee006>

<https://docs.microsoft.com/en-us/azure/aks/operator-best-practices-multi-region>

<https://github.com/Azure/AKS/issues/611#issuecomment-414832826>

<https://github.com/bitnami/charts/tree/master/bitnami/moodle>