**How do we connect the Public AKS cluster**

**📍 On Windows (PowerShell as Administrator)**

Invoke-WebRequest -Uri https://aka.ms/installazurecliwindows -OutFile .\AzureCLI.msi

Start-Process msiexec.exe -Wait -ArgumentList '/I AzureCLI.msi /quiet'

Remove-Item .\AzureCLI.msi

az login

az login --use-device-code

az account show --output table

📍 Set your active subscription:

az account set --subscription "24c4fb07-0fb5-4b37-bc45-5cb7e6e95520"

**📍 Get AKS credentials:**

az aks get-credentials --resource-group internal-training --name aks-training --overwrite-existing

📍 Verify AKS access:

kubectl get deployments --all-namespaces=true

kubectl get pods --all-namespaces=true

**📍 On Linux (VM)**

**Connect it using Powershell**

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

az version

🧰 Step 4: Install Required Tools (Inside VM)

SSH into the VM and run:

# Update system

sudo apt update && sudo apt install -y curl apt-transport-https ca-certificates

# Install Azure CLI

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

# Install kubectl

az aks install-cli

# Optional: Install Helm

curl https://raw.githubusercontent.com/helm/helm/main/scripts/get-helm-3 | bash

**🧰 Section 5: Clone Your Repository and Run Setup Scripts**

**📍 Clone Git Repository:**

sudo su

apt update -y

apt install git -y

git clone https://github.com/Sumanth17-git/APMTrianing.git

cd APMTraining

📍 Make Scripts Executable:

chmod +x \*

📍 Run Setup Scripts:

./setup\_ubuntu.sh

./setup\_kubectl.sh

az login

az login --use-device-code

az account show --output table

📍 Set your active subscription:

az account set --subscription "24c4fb07-0fb5-4b37-bc45-5cb7e6e95520"

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📍 Verify AKS access:

kubectl get deployments --all-namespaces=true

kubectl get pods --all-namespaces=true

**How to Connect Private Cluster**

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**Simpliest way to connect:**

**AKS has a feature where you can run a command from a temporarily created pod:**

az aks **command invoke** (No Need for SSH or Jumpbox)

az aks command invoke \

--resource-group <rg-name> \

--name <aks-cluster-name> \

--command "kubectl get pods -A"

az aks command invoke \

--resource-group <rg-name> \

--name <aks-cluster-name> \

--command "kubectl run nginx --image=nginx"

az aks command invoke \

--resource-group <rg-name> \

--name <aks-cluster-name> \

--command "kubectl get pods"

**Use az aks command invoke with inline content**

az aks command invoke \

--resource-group $AKS\_RESOURCE\_GROUP \

--name $AKS\_CLUSTER\_NAME \

--command "kubectl apply -f - <<EOF

apiVersion: v1

kind: ConfigMap

metadata:

name: nginx-config

data:

welcome-message: \"Hello from configmap\"

---

apiVersion: apps/v1

kind: Deployment

metadata:

name: nginx-demo

spec:

replicas: 1

selector:

matchLabels:

app: nginx-demo

template:

metadata:

labels:

app: nginx-demo

spec:

containers:

- name: nginx

image: nginx:1.21.6

ports:

- containerPort: 80

EOF"

**2: Use Azure Storage to host YAMLs temporarily (recommended for larger files).**

**Option 2: Create Jump Server on same Vnet**

**Why You Need a Jumpbox for Private AKS**

* **Private AKS** has no public IP on its API server.
* You can **only access it from within the same VNet** (or connected networks like via VPN or ExpressRoute).
* A **Jumpbox (or Bastion host)** is a **Linux VM** deployed inside the same VNet/subnet. You SSH into it and use kubectl from there.

**step-by-step documentation** for setting up Azure CLI, SSH access, and connecting to a private AKS cluster on a VM (Linux or Windows):

**Firstly , Find the VNet and subnet range of AKS cluster**

**🧱 Step 1: Get AKS VNet and Subnet Details**

az aks show --resource-group internal-training --name aks-training --query "nodeResourceGroup" -o tsv

az network vnet list --resource-group <nodeResourceGroup> -o table

az network vnet list --resource-group MC\_internal-training\_aks-training\_westus -o table

-

az network vnet subnet list --resource-group MC\_internal-training\_aks-training\_westus --vnet-name aks-vnet-17585922 -o table

**🖥️ Step 2: Create Jumpbox VM in Same VNet/Subnet**

az vm create \

--resource-group MC\_internal-training\_aks-training\_westus \

--name aks-jumpbox \

--image Ubuntu22.04 \

--admin-username azureuser \

--authentication-type ssh \

--generate-ssh-keys \

--vnet-name aks-vnet-17585922 \

--subnet aks-subnet \

--public-ip-address "" \

--nsg "" \

--output table

This creates a **private VM** inside the AKS VNet/subnet.

Enable the Network ports. Allow the port and source IP

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**🌐 Step 3: Enable Azure Bastion (Optional but Recommended)**

If your VM has no public IP, Azure Bastion allows secure browser-based SSH:

az network bastion create \

--name aks-bastion \

--public-ip-address aks-bastion-ip \

--resource-group <nodeResourceGroup> \

--vnet-name <vnet-name-from-step-1> \

--location <region> \

--sku Basic

az network bastion create \

--name aks-bastion \

--resource-group MC\_internal-training\_azurecluster\_westus \

--vnet-name <your-vnet-name> \

--public-ip-address aks-bastion-ip \

--location westus \

--sku Basic

Then go to **VM → Connect → Bastion** in portal and login with azureuser.

**Private VM Machine:**

az vm create \

--resource-group MC\_internal-training\_aks-training\_westus \

--name aks-jumpbox \

--image UbuntuLTS \

--admin-username azureuser \

--authentication-type ssh \

--generate-ssh-keys \

--vnet-name aks-vnet-17585922 \

--subnet aks-subnet \

--public-ip-address "" \

--nsg "" \

--output table

This creates a private VM (no public IP), secured. You’ll access it using Azure Bastion

**📍 Open PowerShell in your SSH key directory:**

cd <path-to-your-key>

**📍 Restrict PEM File Permissions:**

icacls .\azurejump-server\_key.pem /inheritance:r

icacls .\first-vm\_key.pem /grant:r "${env:USERNAME}:R"

# Remove inheritance (if not already done)

icacls "C:\04.Kubernetes\Azure\first-vm\_key.pem" /inheritance:r

# Remove overly permissive groups

icacls "C:\04.Kubernetes\Azure\first-vm\_key.pem" /remove "BUILTIN\Administrators"

icacls "C:\04.Kubernetes\Azure\first-vm\_key.pem" /remove "NT AUTHORITY\SYSTEM"

icacls "C:\04.Kubernetes\Azure\first-vm\_key.pem" /remove "NT AUTHORITY\Authenticated Users"

# Grant read access to only your current user

icacls "vm1\_key.pem" /grant:r "$($env:USERNAME):R"

**✅ This will:**

* Remove inherited permissions
* Allow **only your user account** to read the key file

🚀 Section 3: SSH into the Azure VM

📍 Command (from Windows):

ssh -i .\azurejump-server\_key.pem [azureuser@135.13.13.230](mailto:azureuser@135.13.13.230)

🧰 Step 4: Install Required Tools (Inside VM)

SSH into the VM and run:

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sudo apt update && sudo apt install -y curl apt-transport-https ca-certificates

# Install Azure CLI

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

# Install kubectl

az aks install-cli

# Optional: Install Helm

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📍 Verify AKS access:

kubectl get deployments --all-namespaces=true

kubectl get pods --all-namespaces=true

**==**

**Using an Azure VM**

**Alternatively, we can use an Azure VM to access an AKS private cluster. This VM must reside in the same virtual network that is used by the AKS cluster. So, let’s create a VM.**

**Step-1**

**From the Azure portal, click on ‘Create resource’ and type ‘Virtual machine’ in the search bar. Then, click on ‘Virtual machine.**

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**Step-2**

**Click on the ‘Create’ button.**

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**Step-3**

**In the ‘Basics’ tab select the appropriate ‘Subscription’ and the ‘Resource groups’. Azure sets the username field to ‘azureuser’ by default. This would be required to access the VM by SSH. Provide a name for the VM and select the Ubuntu 20.04 LTS image. Then, click on ‘Next’.**

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**Step-4**

**Leave the default parameters in the ‘Disks’ screen and click ‘Next’.**

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**Step-5**

**In the ‘Networking’ screen, select the virtual network and the subnet that we have just created during the AKS cluster deployment.**

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**Step-6**

**Leave the default parameters in the ‘Management’, ‘Advanced’, and ‘Tags’ screens and click ‘Next’ at each.**

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**Step-7**

**After getting the ‘Validation passed’ message click on ‘Create’.**

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**Step-8**

**Download and store the private key that would be required to set up SSH access to the VM.**

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**Step-9**

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**After the deployment is completed, obtain the public IP address assigned to the VM. Login to the VM via SSH using the private key that we downloaded in the earlier step.**

**Install the Azure CLI in the VM.**

**In the VM, set the credentials for ‘kubectl’ to access the cluster.**

**$ az aks get-credentials --resource-group cloud-qubes --name private-aks**

**Now, we can access our AKS cluster directly from this host.**

**$ kubectl get nodes**