

# Azure Project: Linux VM + Nginx Web Server (Cloud Shell)

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## Objective

The goal of this project is to deploy a Linux Virtual Machine (Ubuntu) on Azure using Azure Cloud Shell (CLI), configure Networking Security Group (NSG) rules, and install Nginx to host a public-facing web page.

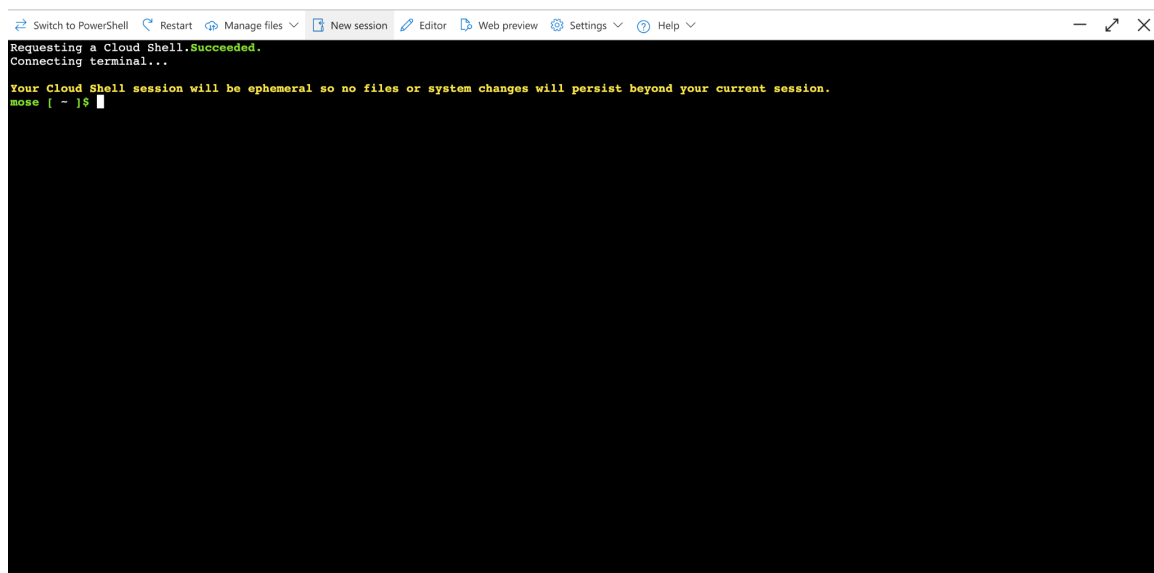
## Tools & Services Used

- Azure Cloud Shell (Bash)
- Azure Resource Group
- Azure Virtual Machine (Ubuntu LTS)
- Network Security Group (NSG)
- Nginx Web Server

## Step-by-Step Implementation

### Step 1: Open Azure Cloud Shell

Go to [portal.azure.com](https://portal.azure.com) → Open Cloud Shell → Select Bash.



The screenshot displays the Azure Cloud Shell web interface. At the top, there is a navigation bar with options: 'Switch to PowerShell', 'Restart', 'Manage files', 'New session', 'Editor', 'Web preview', 'Settings', and 'Help'. Below this, a status message reads 'Requesting a Cloud Shell.succeeded.' followed by 'Connecting terminal...'. A warning message states: 'Your Cloud Shell session will be ephemeral so no files or system changes will persist beyond your current session.' The main area is a black terminal window with the prompt 'mose [ ~ ]\$' and a cursor.

## Step 2: Create a Resource Group

Command:

```
az group create --name rg-web-lab --location eastus
```

Note: I was having issues with the location and deploying the VM. So I added the following Command: `az group show -n rg-web-lab --query location -o tsv`; LOC=eastus. You'll see it on the next screenshot.

```
Switch to PowerShell Restart Manage files New session Editor Web preview Settings Help
Requesting a Cloud Shell.Succeeded.
Connecting terminal...

Your Cloud Shell session will be ephemeral so no files or system changes will persist beyond your current session.
mose [ - ]$ az group create --name rg-web-lab --location eastus
{
  "id": "/subscriptions/a63c3193-6450-4099-95e2-8c41ba85ae57/resourceGroups/rg-web-lab",
  "location": "eastus",
  "managedBy": null,
  "name": "rg-web-lab",
  "properties": {
    "provisioningState": "Succeeded"
  },
  "tags": null,
  "type": "Microsoft.Resources/resourceGroups"
}
```

## Step 3: Create Ubuntu VM

Command:

```
az vm create --resource-group rg-web-lab --name myLinuxVM --image Ubuntu2404 --size
Standard_B2s --location $LOC --admin-username azureuser --generate-ssh-keys
--public-ip-sku Standard --verbose
```

```
mose [ - ]$ az group show -n rg-web-lab --query location -o tsv
eastus
mose [ - ]$ LOC=eastus
mose [ - ]$ az vm create \
--resource-group rg-web-lab \
--name myLinuxVM \
--image Ubuntu2404 \
--size Standard_B2s \
--location $LOC \
--admin-username azureuser \
--generate-ssh-keys \
--public-ip-sku Standard \
--verbose
The default value of '--size' will be changed to 'Standard_D2s_v5' from 'Standard_DS1_v2' in a future release.
SSH key files '/home/mose/.ssh/id_rsa' and '/home/mose/.ssh/id_rsa.pub' have been generated under ~/.ssh to allow SSH access to the VM. If using machines with
out permanent storage, back up your keys to a safe location.
{
  "fqdns": "",
  "id": "/subscriptions/a63c3193-6450-4099-95e2-8c41ba85ae57/resourceGroups/rg-web-lab/providers/Microsoft.Compute/virtualMachines/myLinuxVM",
  "location": "eastus",
  "macAddress": "00-22-48-25-0E-CA",
  "powerState": "VM running",
  "privateIpAddress": "10.0.0.4",
  "publicIpAddress": "52.255.200.247",
  "resourceGroup": "rg-web-lab"
}
Command ran in 70.225 seconds (init: 0.177, invoke: 70.048)
mose [ - ]$ az vm show -d -g rg-web-lab -n myLinuxVM \
--query "{publicIp:publicIps, powerState:powerState}" -o tsv
52.255.200.247 VM running
```

## Step 4: Open Port 80 (HTTP)

Command:

```
az vm open-port --port 80 --resource-group rg-web-lab --name myLinuxVM
```

```
SecurityRules/open-port-80",
  "name": "open-port-80",
  "priority": 900,
  "protocol": "*",
  "provisioningState": "Succeeded",
  "resourceGroup": "rg-web-lab",
  "sourceAddressPrefix": "*",
  "sourceAddressPrefixes": [],
  "sourcePortRange": "*",
  "sourcePortRanges": [],
  "type": "Microsoft.Network/networkSecurityGroups/securityRules"
},
{
  "tags": {},
  "type": "Microsoft.Network/networkSecurityGroups"
}
```

## Step 5: Connect to VM

Command:

```
ssh azureuser@52.255.200.247
```

```
The authenticity of host '52.255.200.247 (52.255.200.247)' can't be established.  
ED25519 key fingerprint is SHA256:uuijTR3jotu2nkm4lVDpCVqi7lV6SgdCSKw/05dcwnA.  
This key is not known by any other names.  
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes  
Warning: Permanently added '52.255.200.247' (ED25519) to the list of known hosts.  
Welcome to Ubuntu 24.04.3 LTS (GNU/Linux 6.11.0-1018-azure x86_64)  
  
* Documentation:  https://help.ubuntu.com  
* Management:    https://landscape.canonical.com  
* Support:        https://ubuntu.com/pro  
  
System information as of Mon Sep 29 10:14:13 UTC 2025  
  
System load:  0.0           Processes:            122  
Usage of /:   5.6% of 28.02GB Users logged in:       0  
Memory usage: 6%           IPv4 address for eth0: 10.0.0.4  
Swap usage:   0%  
  
Expanded Security Maintenance for Applications is not enabled.  
  
0 updates can be applied immediately.  
  
Enable ESM Apps to receive additional future security updates.  
See https://ubuntu.com/esm or run: sudo pro status  
  
The list of available updates is more than a week old.  
To check for new updates run: sudo apt update  
  
The programs included with the Ubuntu system are free software;  
the exact distribution terms for each program are described in the  
individual files in /usr/share/doc/*/copyright.  
  
Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by  
applicable law.  
  
To run a command as administrator (user "root"), use "sudo <command>".  
See "man sudo_root" for details.  
  
azureuser@myLinuxVM:~$
```

## Step 6: Install Nginx

Commands:

```
sudo apt update && sudo apt -y install nginx
```

```
sudo systemctl enable --now nginx
```

```

Suggested packages:
  fcgiwrap nginx-doc ssl-cert
The following NEW packages will be installed:
  nginx nginx-common
0 upgraded, 2 newly installed, 0 to remove and 12 not upgraded.
Need to get 564 kB of archives.
After this operation, 1596 kB of additional disk space will be used.
Get:1 http://azure.archive.ubuntu.com/ubuntu noble-updates/main amd64 nginx-common all 1.24.0-2ubuntu7.5 [43.4 kB]
Get:2 http://azure.archive.ubuntu.com/ubuntu noble-updates/main amd64 nginx amd64 1.24.0-2ubuntu7.5 [520 kB]
Fetched 564 kB in 0s (16.4 MB/s)
Preconfiguring packages ...
Selecting previously unselected package nginx-common.
(Reading database ... 67913 files and directories currently installed.)
Preparing to unpack .../nginx-common_1.24.0-2ubuntu7.5_all.deb ...
Unpacking nginx-common (1.24.0-2ubuntu7.5) ...
Selecting previously unselected package nginx.
Preparing to unpack .../nginx_1.24.0-2ubuntu7.5_amd64.deb ...
Unpacking nginx (1.24.0-2ubuntu7.5) ...
Setting up nginx-common (1.24.0-2ubuntu7.5) ...
Created symlink /etc/systemd/system/multi-user.target.wants/nginx.service → /usr/lib/systemd/system/nginx.service.
Setting up nginx (1.24.0-2ubuntu7.5) ...
* Upgrading binary nginx
Processing triggers for man-db (2.12.0-4build2) ...

Processing triggers for ufw (0.36.2-6) ...
Scanning processes...
Scanning linux images...

Running kernel seems to be up-to-date.

No services need to be restarted.

No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.
azureuser@myLinuxVM:~$ sudo systemctl enable --now nginx
Synchronizing state of nginx.service with SysV service script with /usr/lib/systemd/systemd-sysv-install.
Executing: /usr/lib/systemd/systemd-sysv-install enable nginx
[ OK ]

```

## Step 7: Customize Homepage

Command:

```
echo "Hello from my Azure VM Web Server!" | sudo tee /var/www/html/index.html
```

```

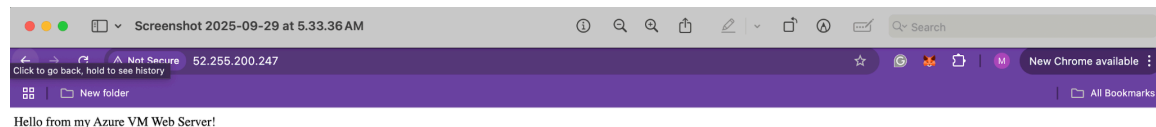
azureuser@myLinuxVM:~$ echo "Hello from my Azure VM Web Server!" | sudo tee /var/www/html/index.html
Hello from my Azure VM Web Server!

```

## Step 8: Test in Browser

Open:

<http://52.255.200.247>



## Results

- Successfully deployed and accessed a Linux VM in Azure.
- Installed and configured Nginx web server.
- Verified webpage is accessible publicly via the VM's Public IP address.