ICT171 Assignment 2: Cloud Server Project

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Public IP Address: http://52.252.115.85

Website Theme: Freelance Articlehub

Website Link: www.freelancearticlehub.xyz

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1. Introduction

This document provides a step-by-step guide to setting up and configuring a Linux-based IaaS web server hosted on Microsoft Azure. The purpose is to deploy a basic website using Apache2 and demonstrate foundational server administration and scripting skills.

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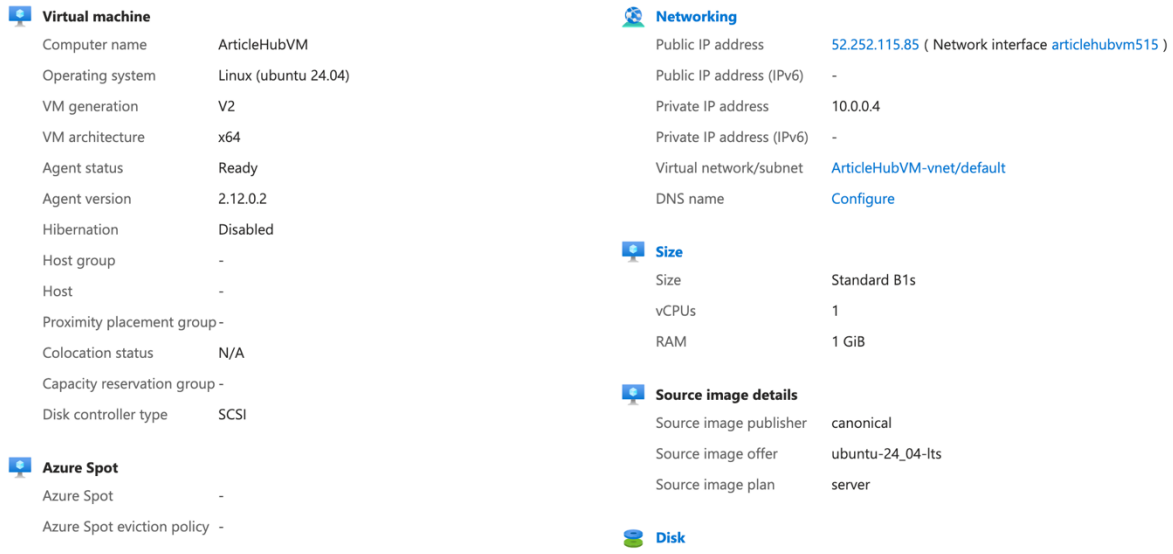
2. Cloud Service Provider and Instance Details

- **Provider:** Microsoft Azure
- **Instance Name:** ArticleHubVM
- **Operating System:** Ubuntu 20.04 LTS
- **Access Method:** SSH (Key-based Authentication)
- **Allocated Resources:**
  - vCPUs: 1
  - RAM: 1 GiB
  - Size: Standard B1s



Virtual machine

Computer name	ArticleHubVM
Operating system	Linux (ubuntu 24.04)
VM generation	V2
VM architecture	x64
Agent status	Ready
Agent version	2.12.0.2
Hibernation	Disabled
Host group	-
Host	-
Proximity placement group	-
Colocation status	N/A
Capacity reservation group	-
Disk controller type	SCSI

Azure Spot

Azure Spot	-
Azure Spot eviction policy	-

Networking

Public IP address	52.252.115.85 (Network interface articlehubvm515)
Public IP address (IPv6)	-
Private IP address	10.0.0.4
Private IP address (IPv6)	-
Virtual network/subnet	ArticleHubVM-vnet/default
DNS name	Configure

Size

Size	Standard B1s
vCPUs	1
RAM	1 GiB

Source image details

Source image publisher	canonical
Source image offer	ubuntu-24_04-lts
Source image plan	server

Disk

Azure Spot eviction policy	-

Availability + scaling

Availability zone (edit)	-
Availability set	-
Scale Set	-

Security

Security type	Trusted launch
Enable secure boot	Enabled
Enable vTPM	Enabled
Integrity monitoring	Disabled

Health monitoring

Health monitoring	Not enabled

Extensions + applications

Extensions	-
Applications	-

Disk

OS disk	ArticleHubVM_disk1_7b30b0d19b7e465da3167aba788eeca4
Encryption at host	Disabled
Azure disk encryption	Not enabled
Ephemeral OS disk	N/A
Data disks	0

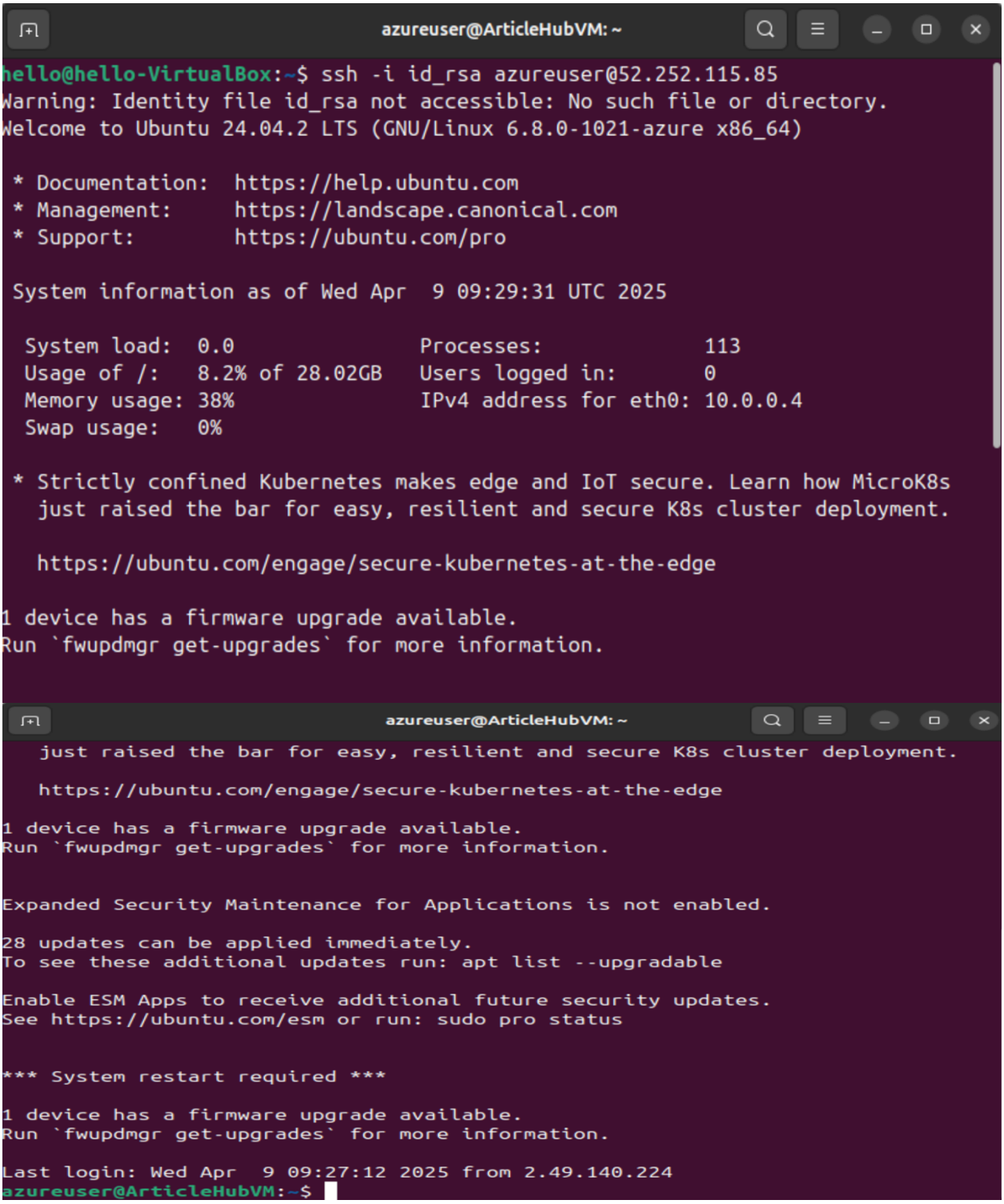
Auto-shutdown

Auto-shutdown	Not enabled
Scheduled shutdown	-

3. Server Setup and Configuration

3.1 Accessing the Server

```
ssh -i id_rsa azureuser@52.252.115.85
```



3.2 Updating the System

```
sudo apt update && sudo apt upgrade -y
```

```
azureuser@ArticleHubVM:~$ sudo apt update && sudo apt upgrade -y
Hit:1 http://azure.archive.ubuntu.com/ubuntu noble InRelease
Get:2 http://azure.archive.ubuntu.com/ubuntu noble-updates InRelease [126 kB]
Hit:3 http://azure.archive.ubuntu.com/ubuntu noble-backports InRelease
Hit:4 http://azure.archive.ubuntu.com/ubuntu noble-security InRelease
Get:5 http://azure.archive.ubuntu.com/ubuntu noble-updates/main amd64 Packages [
991 kB]
Get:6 http://azure.archive.ubuntu.com/ubuntu noble-updates/universe amd64 Packag
es [1052 kB]
Fetched 2169 kB in 1s (2012 kB/s)
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
31 packages can be upgraded. Run 'apt list --upgradable' to see them.
Reading package lists... Done
Restarting the system to load the new kernel will not be handled automatically,
so you should consider rebooting.

Restarting services...
 systemctl restart apache2.service fwupd.service multipathd.service packagekit.s
ervice polkit.service ssh.service udisks2.service walinuxagent.service

Service restarts being deferred:
 systemctl restart ModemManager.service
 /etc/needrestart/restart.d/dbus.service
 systemctl restart networkd-dispatcher.service
 systemctl restart systemd-logind.service
 systemctl restart unattended-upgrades.service

No containers need to be restarted.

User sessions running outdated binaries:
 azureuser @ session #5954: apt[408637], sshd[408230]
 azureuser @ user manager service: systemd[408235]

No VM guests are running outdated hypervisor (qemu) binaries on this host.
azureuser@ArticleHubVM:~$
```

3.3 Installing Apache Web Server

```
sudo apt install apache2 -y
```

```
azureuser@ArticleHubVM:~$ sudo apt install apache2 -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
apache2 is already the newest version (2.4.58-1ubuntu8.6).
0 upgraded, 0 newly installed, 0 to remove and 1 not upgraded.
```

3.4 Firewall Configuration

```
sudo ufw allow 'Apache Full'
sudo ufw enable
```

```
azureuser@ArticleHubVM:~$ sudo ufw allow 'Apache Full'
Rules updated
Rules updated (v6)
azureuser@ArticleHubVM:~$ sudo ufw enable
Command may disrupt existing ssh connections. Proceed with operation (y|n)? y
Firewall is active and enabled on system startup
azureuser@ArticleHubVM:~$
```

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4. Web Server and Website Deployment

4.1 Editing the Index Page

```
sudo nano /var/www/html/articlehub/index.html
```

Custom HTML was added to reflect the project's purpose.

```
  GNU nano 7.2              /var/www/html/articlehub/index.html
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>Freelance ArticleHub</title>
    <script src="https://cdn.tailwindcss.com"></script>
    <link rel="stylesheet" href="https://cdnjs.cloudflare.com/ajax/libs/font-aw>
    <link href="https://fonts.googleapis.com/css2?family=Roboto:wght@400;700&di>
    <style>
        body {
            font-family: 'Roboto', sans-serif;
        }
    </style>
</head>
<body class="bg-gray-900 text-white">
    <!-- Navbar -->
    <nav class="bg-gray-800 shadow-md">
        <div class="container mx-auto px-4 py-4 flex justify-between items-cent>
            <a class="text-2xl font-bold text-white" href="#">
                ArticleHub
```

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5. Script Explanation

disk_usage.sh

```
#!/bin/bash
echo "Disk Usage Report:"
df -h
```

```
chmod +x disk_usage.sh
./disk_usage.sh
```

This script shows the current disk usage on your VM in a human-readable format. It helps monitor available and used space, which is useful for maintenance and diagnostics.

```
azureuser@ArticleHubVM:~$ nano disk_usage.sh
azureuser@ArticleHubVM:~$ chmod +x disk_usage.sh
azureuser@ArticleHubVM:~$ ./disk_usage.sh
Disk Usage Report:
Filesystem      Size  Used Avail Use% Mounted on
/dev/root        29G  2.4G   26G   9% /
tmpfs           422M     0  422M   0% /dev/shm
tmpfs           169M  992K  168M   1% /run
tmpfs           5.0M     0  5.0M   0% /run/lock
efivarfs        128K   35K   89K  29% /sys/firmware/efi/efivars
/dev/sda16      881M  108M  712M  14% /boot
/dev/sda15      105M  6.1M   99M   6% /boot/efi
/dev/sdb1       3.9G   28K  3.7G   1% /mnt
tmpfs            85M   12K   85M   1% /run/user/1000
```

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6. Challenges and Resolutions

- **Apache Default Page Displayed Instead of Custom `index.html`**: Initially, navigating to the public IP displayed the default Apache page. This was resolved by correctly editing the existing `/var/www/html/index.html` file using `sudo`, ensuring Apache served the intended content.

- **Permission Denied on `/var/www/html`**: Received a "Permission Denied" error when trying to edit files in the web directory. This was resolved by using `sudo` privileges with editors like `nano`.

- **Private Key Location Lost**: Couldn't connect to the server at first because the private SSH key path was unknown. Eventually located `id_rsa` and reconnected using the `-i` flag.

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7. References

- Apache Documentation: https://httpd.apache.org/docs/
- Azure Documentation: https://docs.microsoft.com/en-us/azure/
- GNU Bash Manual: https://www.gnu.org/software/bash/manual/
