

# IST 615 – Cloud Management

LAB #1 – VIRTUAL MACHINES IN AZURE

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## Part 1:

### 1. VM Overview Screenshot:

The screenshot shows the Azure portal interface for the resource group 'IST615lab01'. The left sidebar contains navigation links for Overview, Activity log, Access control (IAM), Tags, Resource visualizer, Events, Settings, Cost Management, Monitoring, Automation, and Help. The main content area displays the 'Overview' tab for the resource group. It shows a list of resources with columns for Name, Type, and Location. The resources listed are:

Name	Type	Location
lab01vm-nsg	Network security group	West US 2
lab01vm-vnet	Virtual network	West US 2
lab01vmS10	Network interface	West US 2
lab01vm_disk1_8a2cd6592b964b00897d11b066e9af3	Disk	West US 2
lab01vm_key	SSH key	West US 2

Below the list, there is a 'Resources' section with a table showing details for the selected resource 'lab01vm'.

Property	Value
Subscription ID	7b2e263c-89cb-4373-8437-6171972f651
Subscription	Azure for Students
Location	East US
Deployments	1 Succeeded

This screenshot shows the Azure VM overview page, confirming that the virtual machine is running with the public IP address assigned.

### 2. SSH Connection Screenshot:

The screenshot shows the Azure portal interface for the virtual machine 'lab01vm'. The left sidebar contains navigation links for Overview, Activity log, Access control (IAM), Tags, Diagnose and solve problems, Connect, Networking, Settings, Availability + scale, Security, Backup + disaster recovery, Operations, Monitoring, Automation, and Help. The main content area displays the 'Overview' tab for the virtual machine. It shows a list of properties with columns for Name, Type, and Location. The properties listed are:

Property	Value
Operating system	Linux (ubuntu 24.04)
Size	Standard D2s v3 (2 vcpus, 8 GiB memory)
Public IP address	52.148.131.240
Virtual network/subnet	lab01vm-vnet/default
DNS name	host.configured
Health state	-
Time created	9/17/2024, 3:13 AM UTC

Below the list, there is a 'Properties' section with a table showing details for the selected resource 'lab01vm'.

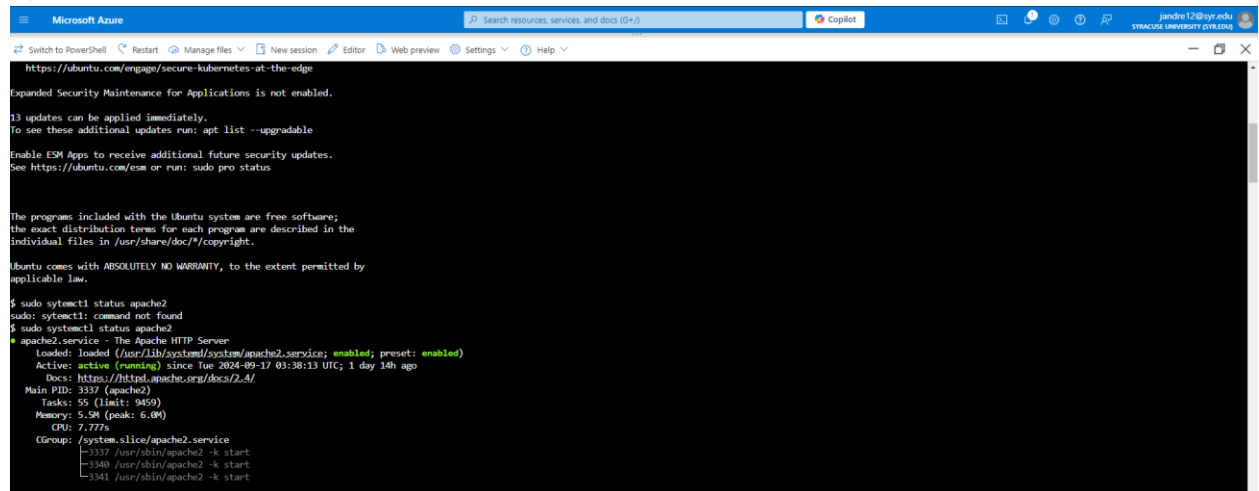
Property	Value
Computer name	lab01vm
Operating system	Linux (ubuntu 24.04)
VM generation	V2
VM architecture	x64
Agent status	Ready
Agent version	2.11.1.12
Hibernation	Disabled
Host group	-
Host	-
Proximity placement group	-
Colocation status	N/A
Capacity reservation group	-

This screenshot captures the successful SSH connection to the virtual machine using the private key and the public IP address.

### 3. Apache Installation:

This screenshot allows the terminal output during the installation of Apache, verifying that the web server was installed correctly.

## Apache Status:



```
Microsoft Azure
Search resources, services, and docs (Ctrl+J)
Copilot
jandre12@syn.mdu
STRACOLE UNIVERSITY (DYNLENG)

Switch to PowerShell Restart Manage files New session Editor Web preview Settings Help
https://ubuntu.com/enpage/secure-kubernetes-at-the-edge
Expanded Security Maintenance for Applications is not enabled.
13 updates can be applied immediately.
To see these additional updates run: apt list --upgradable

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

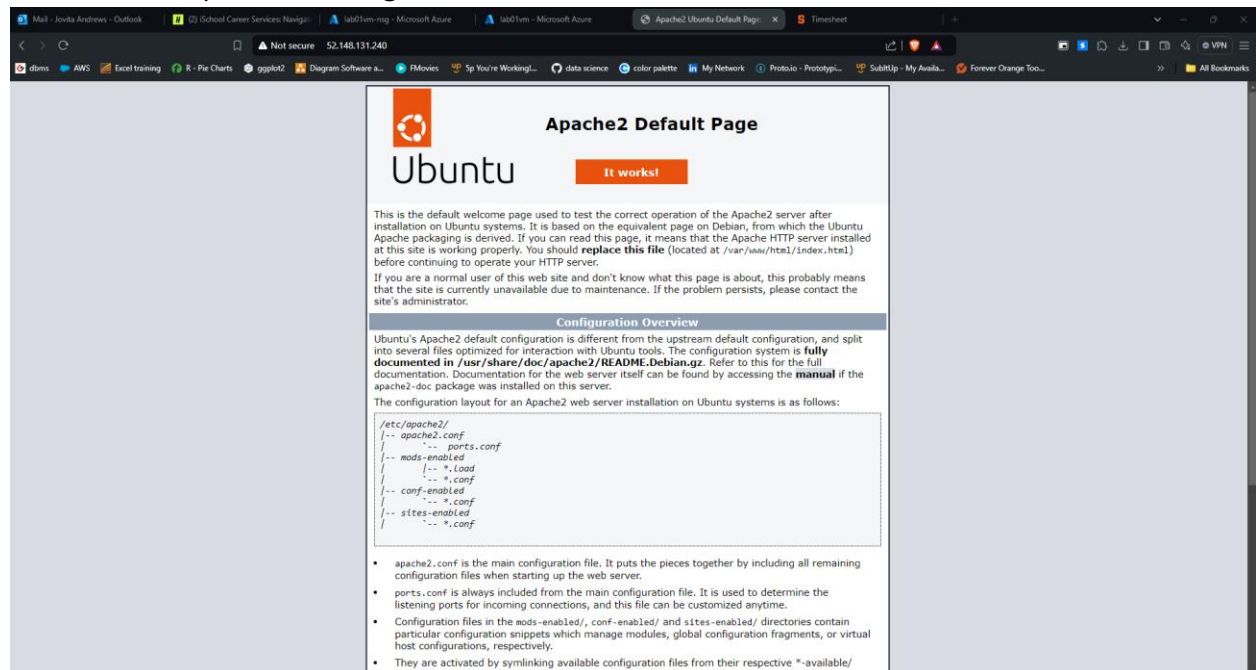
The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

$ sudo systemctl status apache2
sudo: systemctl: command not found
$ sudo systemctl status apache2
● apache2.service - The Apache HTTP Server
   Loaded: loaded (/usr/lib/systemd/system/apache2.service; enabled; preset: enabled)
   Active: active (running) since Tue 2024-09-17 03:38:13 UTC; 1 day 14h ago
     Docs: https://httpd.apache.org/docs/2.4/
   Main PID: 3337 (apache2)
    Tasks: 55 (limit: 9459)
   Memory: 5.5M (peak: 6.0M)
      CPU: 7.77%
   CGroup: /system.slice/apache2.service
           └─3337 /usr/sbin/apache2 -k start
             └─3340 /usr/sbin/apache2 -k start
               └─3341 /usr/sbin/apache2 -k start
```

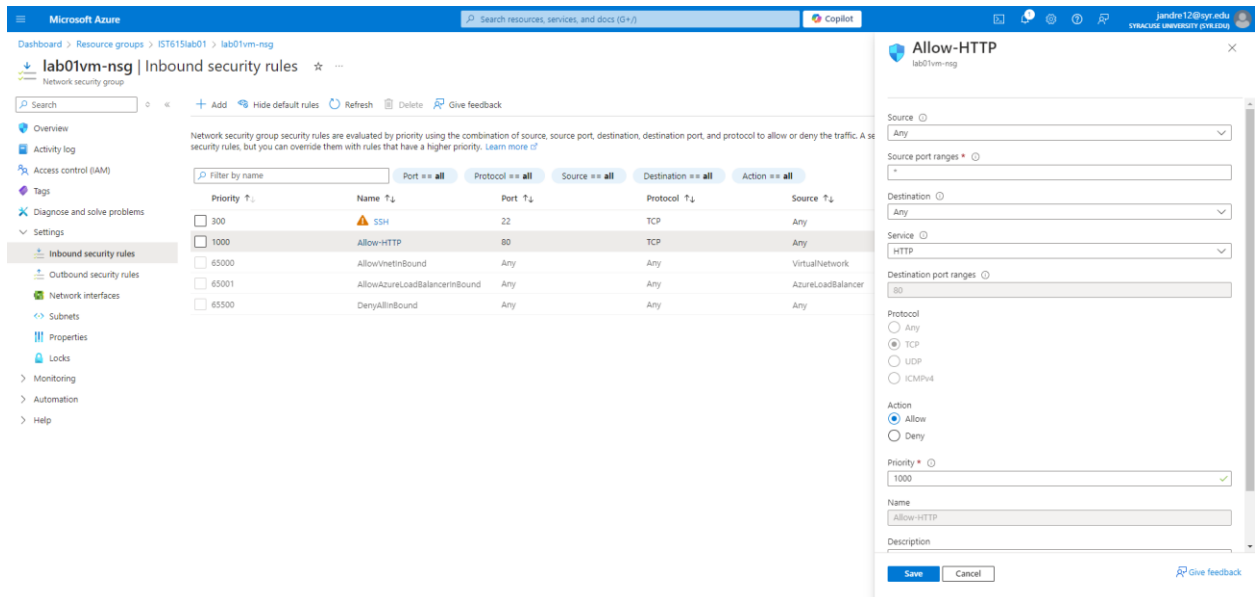
This status of Apache after installation. The service is running and active, confirming that the web server is functioning properly.

## 4. Public IP with Apache Web Page:



This screenshot shows the default Apache web page accessed through the Vm's public IP, indicating that the server is accessible from the internet.

## 5. Network Security Group Rule:



This screenshot captures the configuration of the Network Security Group, showing that port 80 (HTTP) is open to allow web traffic.

## Part 2:

1. What is a key pair and what is it used for?

**Solution:** A key pair consists of a public key and a private key, which are used for encrypting and decrypting data. In the context of SSH, key pairs are used for authentication. The public key is stored on the server, the server uses the public key to verify that the user has the correct private key.

2. Who stores the public portion of the key pair? Who stores the private portion of the key pair?

**Solution:** The public key is stored on the server. The private key is stored securely by the user, usually on their local machine. The private key should never be shared, as it is used to authenticate the user to the server.

3. What is SSH? What is it used for?

**Solution:** SSH (Secure Shell) is a cryptographic network protocol used to securely connect to a remote machine or server over an unsecured network. It is commonly used to manage servers and network devices remotely. SSH ensures that data exchanged between the client and server is encrypted and secure.

4. When you make a change to a network security group rule, does the change affect only the instance you're currently working on or other instances, too? Explain.

Solution: A change to a Network Security Group (NSG) rule affects all resources associated with that specific NSG. If multiple virtual machines or instances are attached to the same NSG, they will all be affected by the rule changes. If you want to limit the changes to a specific VM, you will need to create and assign a unique NSG to that instance.

5. What is the effect of the default network security settings for a new virtual machine?
- a) Neither outbound nor inbound requests are allowed.
  - b) Outbound requests are allowed. Inbound traffic is only allowed from within the virtual network.
  - c) There are no restrictions: all outbound and inbound requests are allowed.

Solution: **b) Outbound requests are allowed. Inbound traffic is only allowed from within the virtual network.**

This means that the VM can send outbound traffic, but inbound traffic is restricted unless explicitly allowed by security group rules.

5. Suppose you have several Linux virtual machines hosted in Azure. You will administer these VMs remotely over SSH from three dedicated machines in your corporate headquarters. Which of the following authentication methods would typically be considered best-practice for this situation?
- a) Username and password
  - b) Private key
  - c) Private key with passphrase

Solution: **c) Private key with passphrase**

This is considered the best practice because the private key provides a secure way to authenticate, and the passphrase adds an additional layer of security in case the private key is compromised.