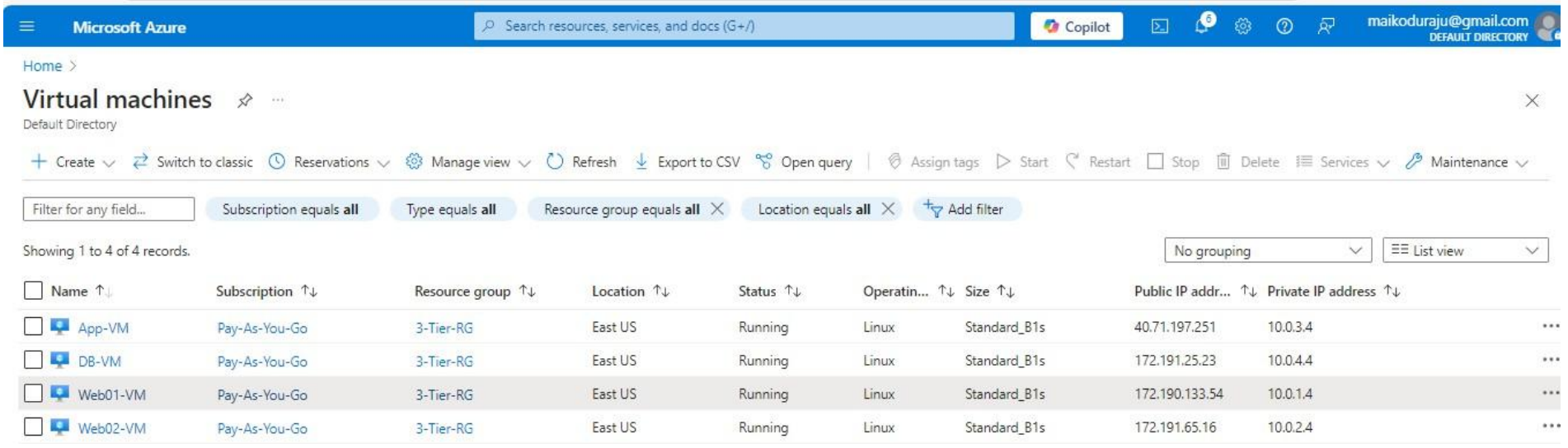
Project Documentation: 3-Tier Architecture using ASG and NSG in Azure

The goal of this project is to design and deploy 3-tier architecture for a web application using Azure. The architecture includes three virtual machines (VMs) placed in three separate subnets within a single virtual network (VNet). Each VM will perform different roles:

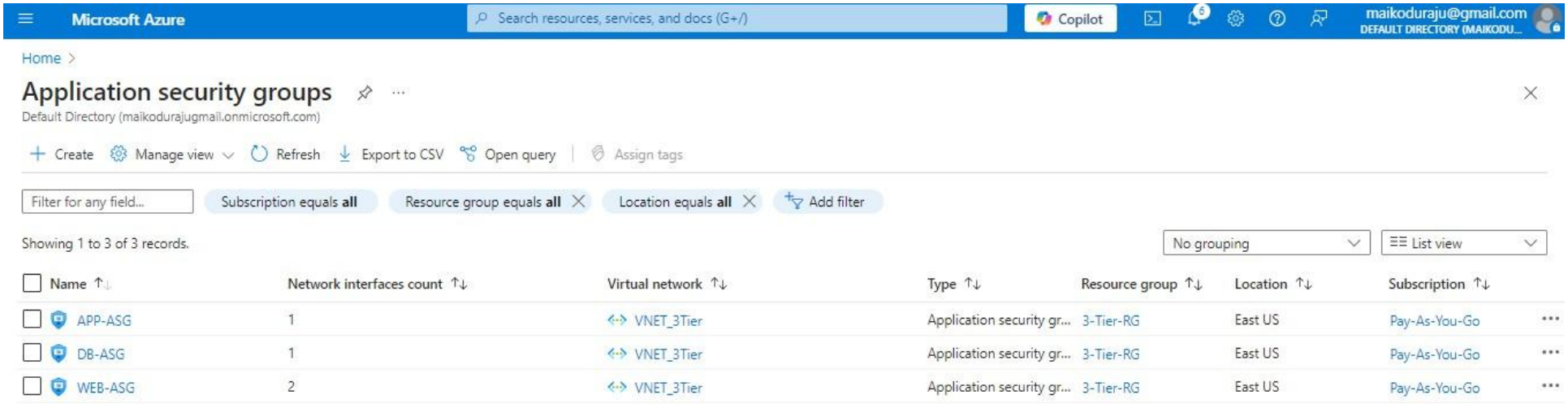
- **Web Tier**: Nginx as the web server
- **App Tier**: Tomcat as the application server
- **DB Tier**: MySQL as the database serve

Step 1. Virtual Machine Creation :-

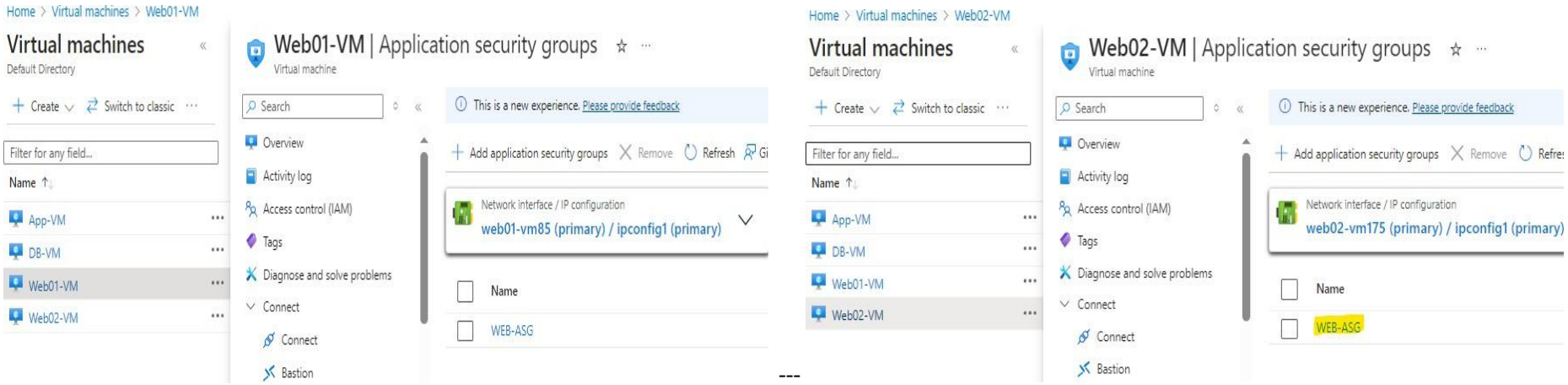
- **Created 4 Virtual Machines in East US region**
- **Image : Ubuntu Server 24.04 LTS - x64 Gen2 (2 WebVM's , 1 App VM & 1 DB VM)**
- **Size :- Standard_B1s - 1 vcpu, 1 GiB memory**

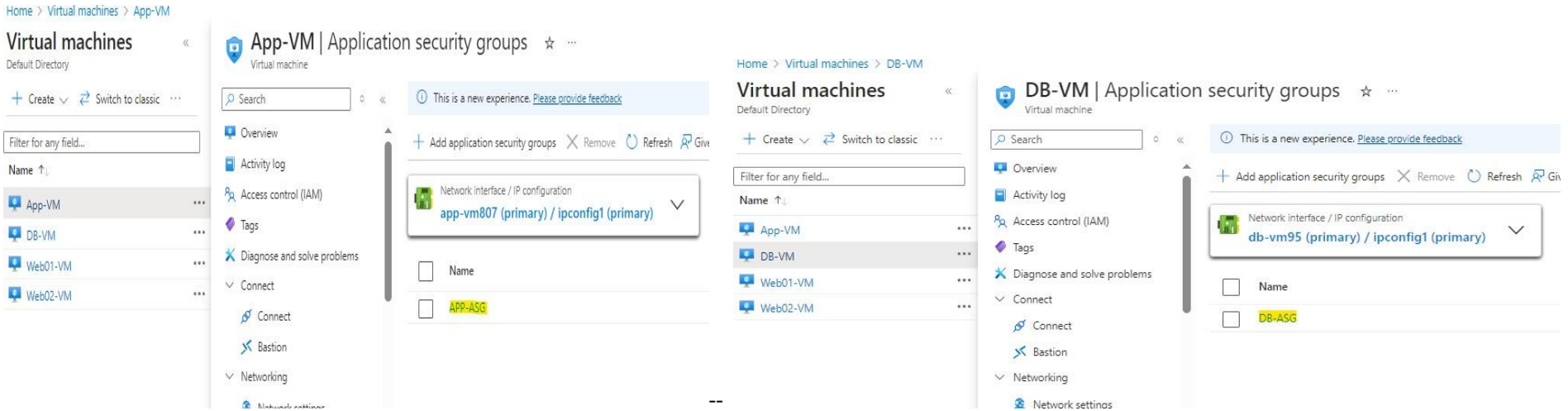


Step 2. Created 3 Application Security groups (ASG's) :-

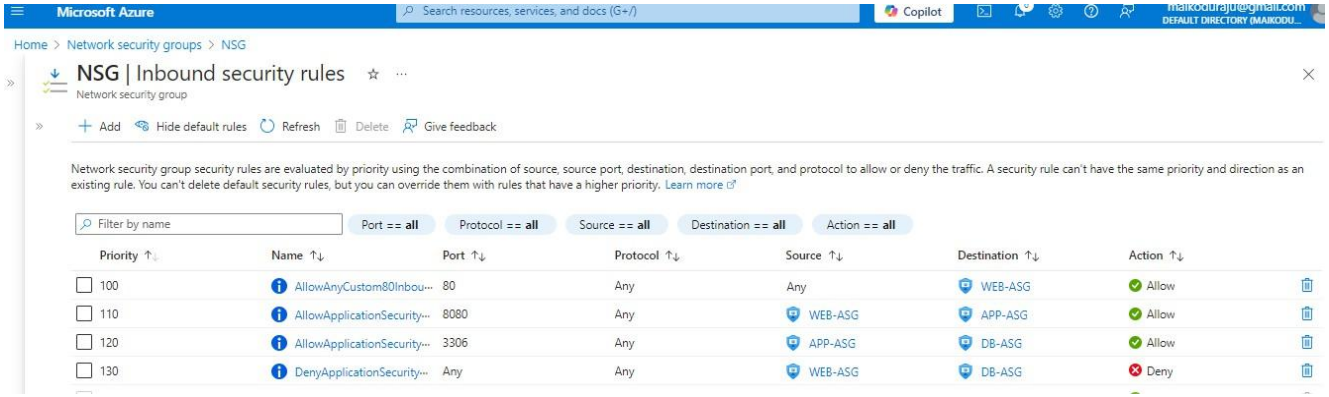


Step 3. Added ASG's to respective VM's [Web01-VM, Web02-VM, APP-VM & DB-VM]



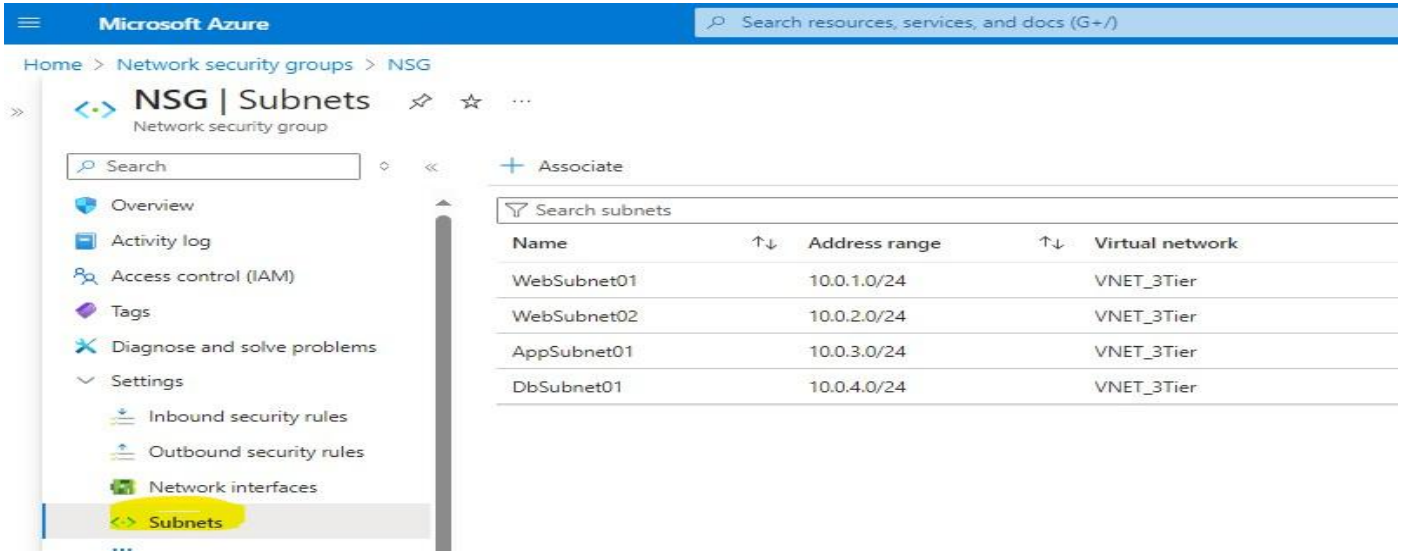


Step 4. Created Network Security Group [NSG] & Added 4 Inbound Rules Based on below scenario



1. From Any Source I need to connect to Web-ASG via port 80, Action =Allow
2. From Source Web ASG – App ASG via port 8080 , Action =Allow
3. From Source App ASG – DB ASG via port 3306 , Action =Allow
4. From source Web ASG – DB ASG trying to connect from any port it should deny connection.

Step 5:- Associated NSG to Subnet's (Web, App , DB Subnets)



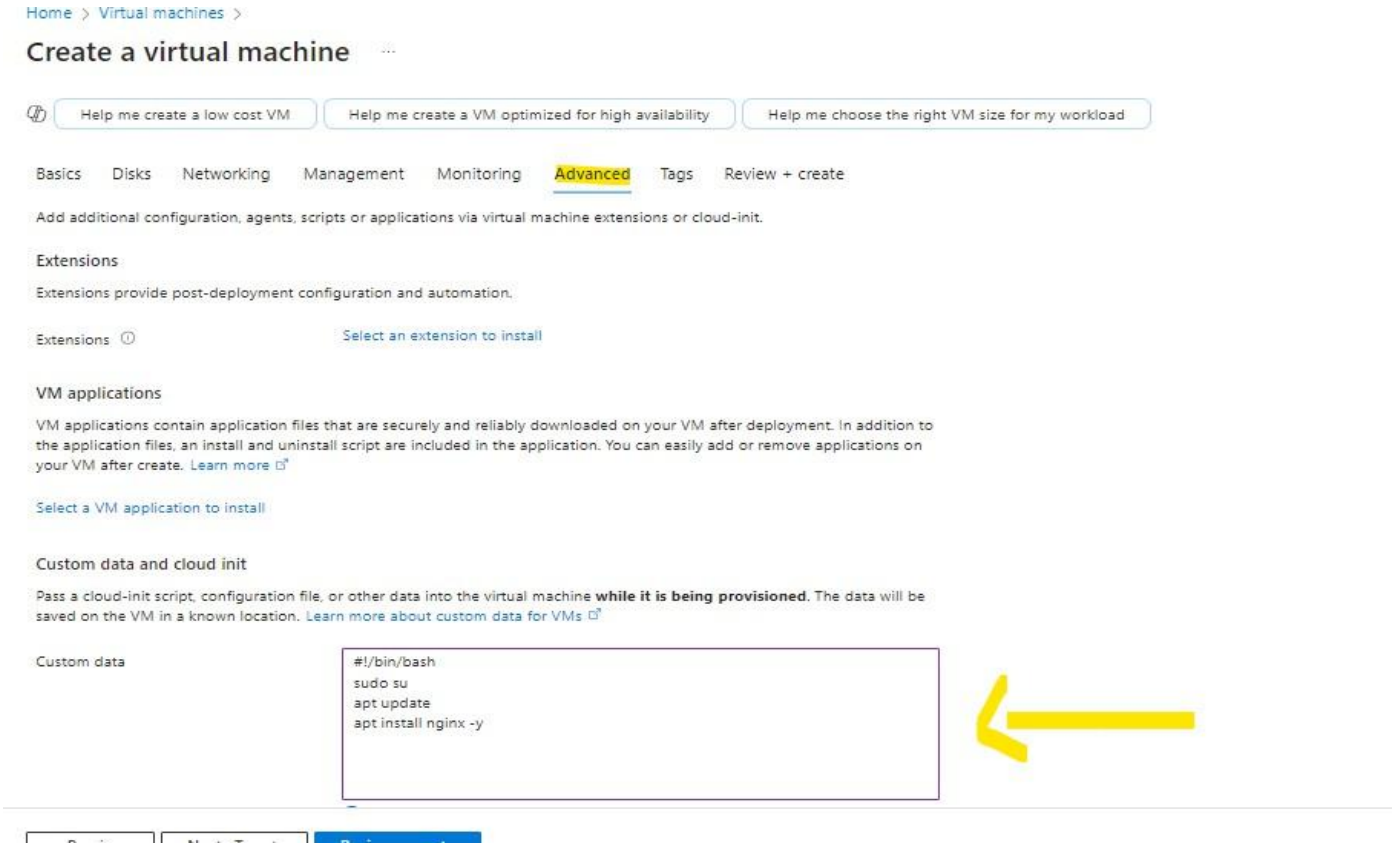
Step 6 :- Installed NGINX in Web01 & Web02 VM with the below commands

#!/bin/bash

sudo su

apt update

apt install nginx –y **Added in Advance Session under Custom Data while creating VM**

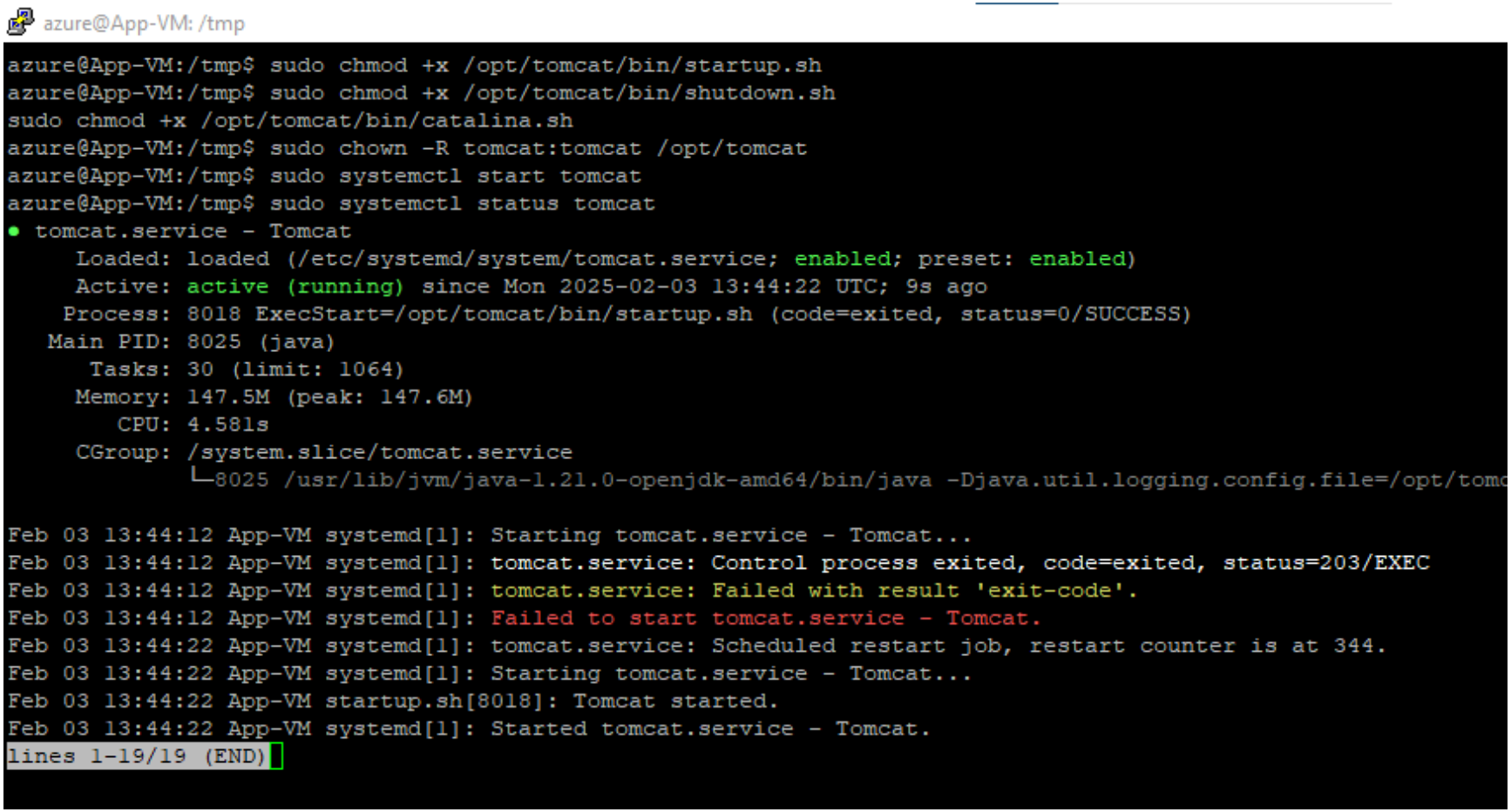


Step 7. Installing Tomcat server in App VM

Tomcat Installation on Ubuntu Link :-

https://drive.google.com/file/d/1aN85dgS4QtfuEQgc7v6Z7V3n8ftFHw2t/view

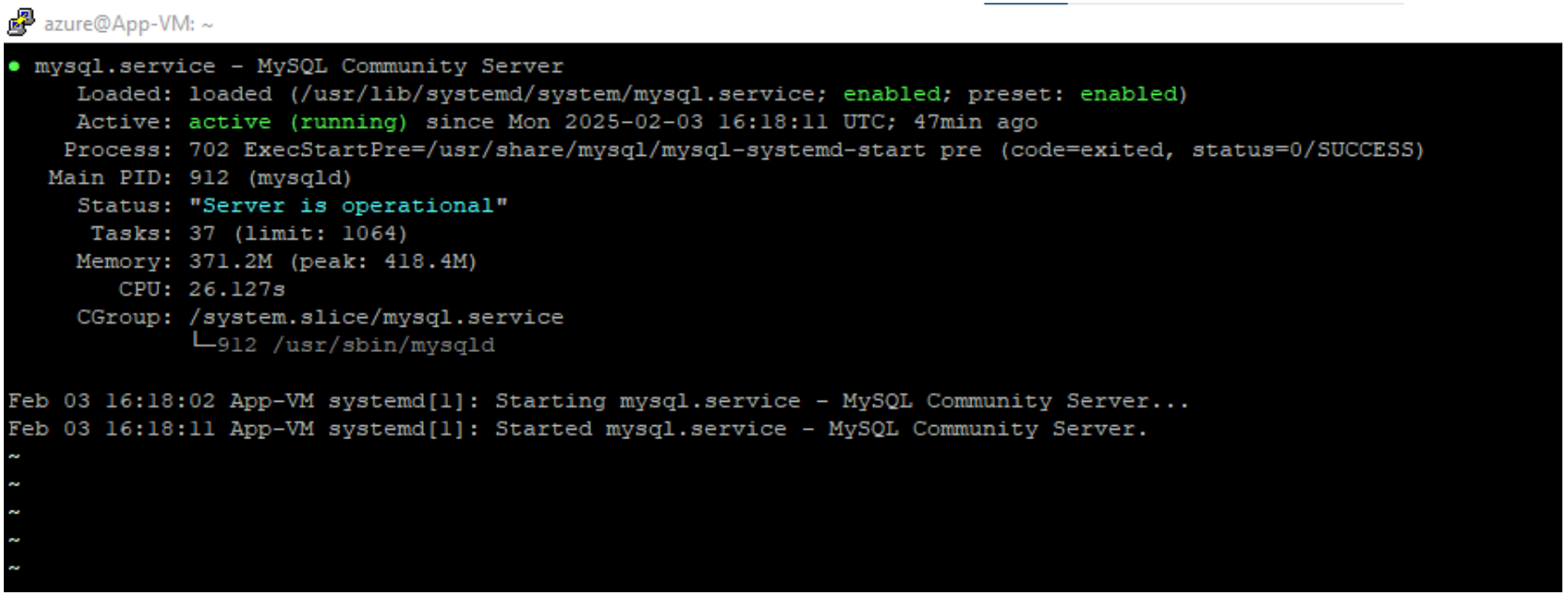
With the steps in above link I have successfully installed Tomcat & I got the below window



Installing MYSQL in APP Server

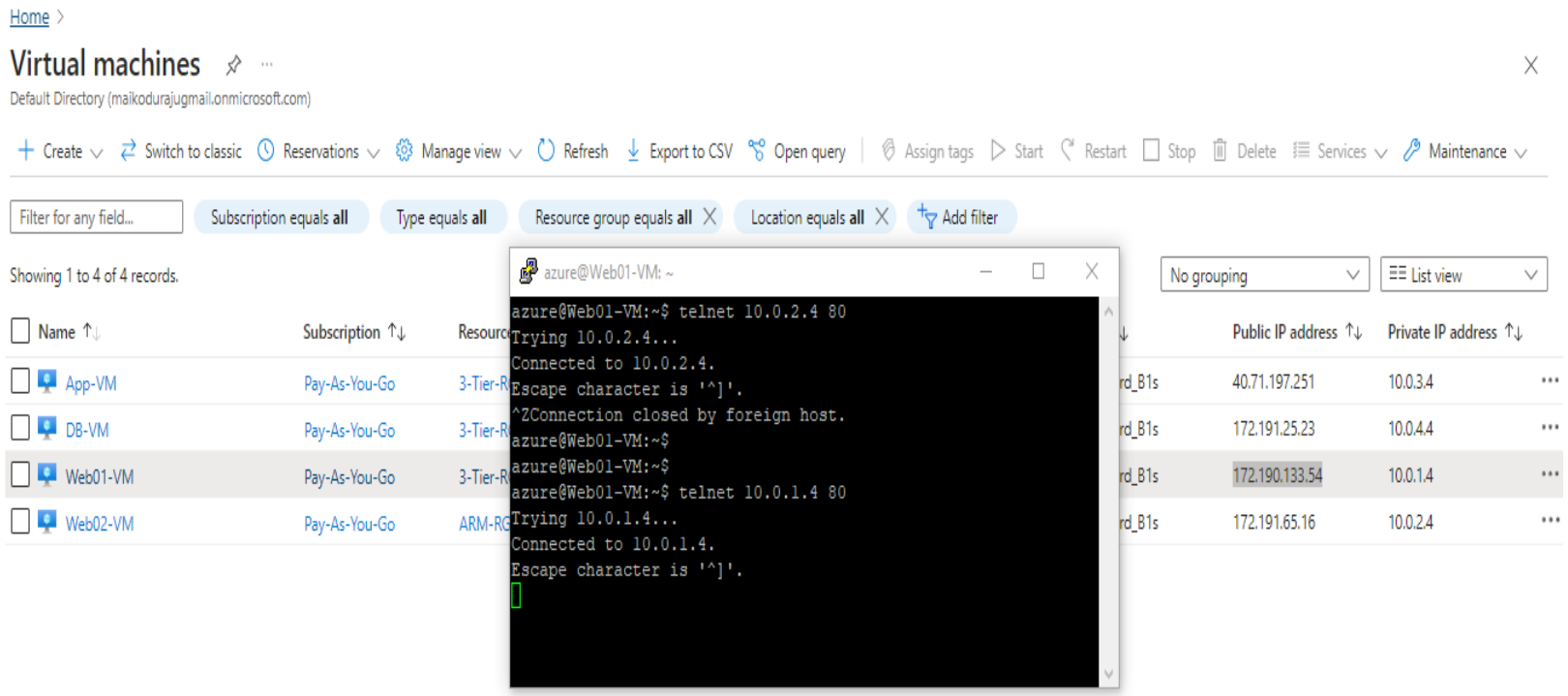
Link :- https://drive.google.com/file/d/1_JUyUKel6Y9mjBFPBpzb_5yRD-zfVOxd/view?usp=sharing

After all the steps I received below results

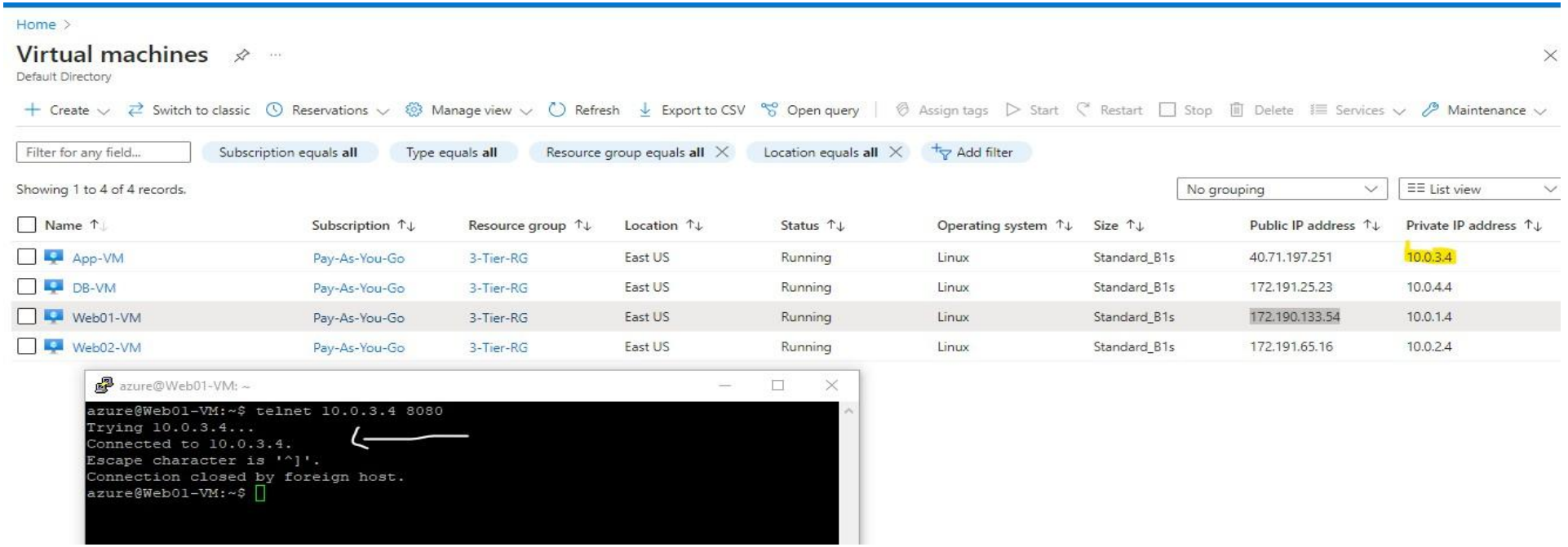


Connection testing

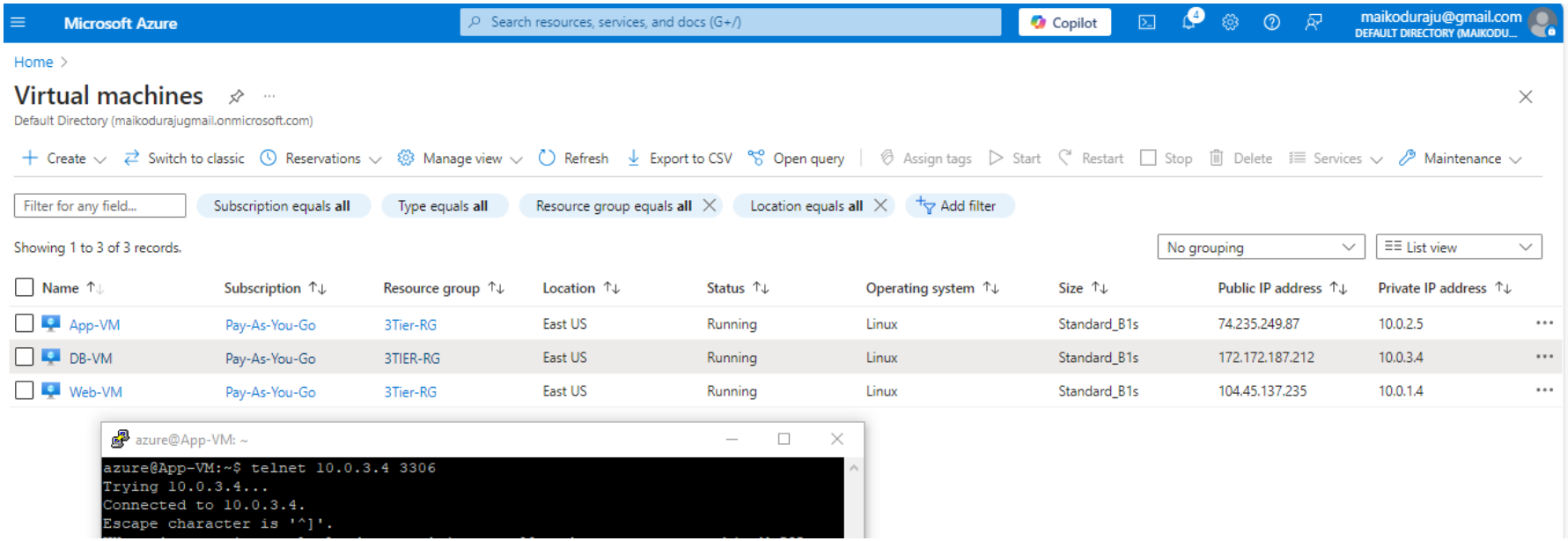
1. From any source to WebASG via port 80



2. **Web to App connection Testing by using Telnet command via 8080 port**



3. **Connection Test – WEB to DB by using Telnet command via port 3306**



4. Web to DB connection