DEVOPS with MULTI-CLOUD
Practice Tasks

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Course **:** DevOps with Multi-Cloud
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TASK-6 : 3-Tier Architecture (Basic).

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Objective :-

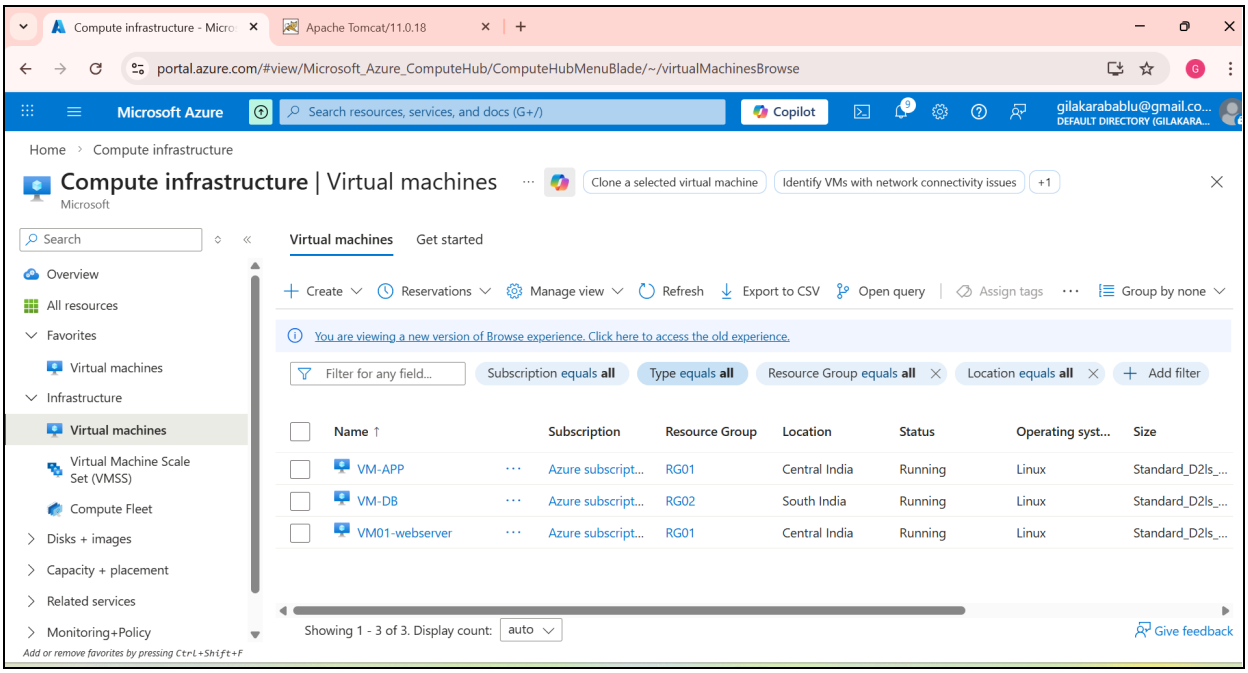
To design and implement a three-tier architecture in Azure that separates the web, application, and database layers, improving security, scalability, and availability by controlling traffic flow between each tier.

3 - Tier Architecture :-

→ In the 3-tier Architecture we will have front end server ,backend server and business & logic server.
→ A 3-tier Architecture divides the application into web server, app and database servers.each has its own role and this improves the security and maintenance.

Implementation of Three-Tier Architecture :-

→ Create the virtual machines VM-WEB and VM-APP under the resource group RG01 and virtual network VN01 with two subnets SN-WEB & SN-APP.
→ also create the virtual machine VM-DB under the resource group RG02 and virtual network VN02 with subnet SN-DB. (since we created db in different regions due to less cpu's, now we need to add vnet peering between both the virtual networks vn01 and vn02.)



fig(1) the three virtual machines are created.

→ Now login to the machine Vm-web and install nginx. And browse the vm web ip address for validation.

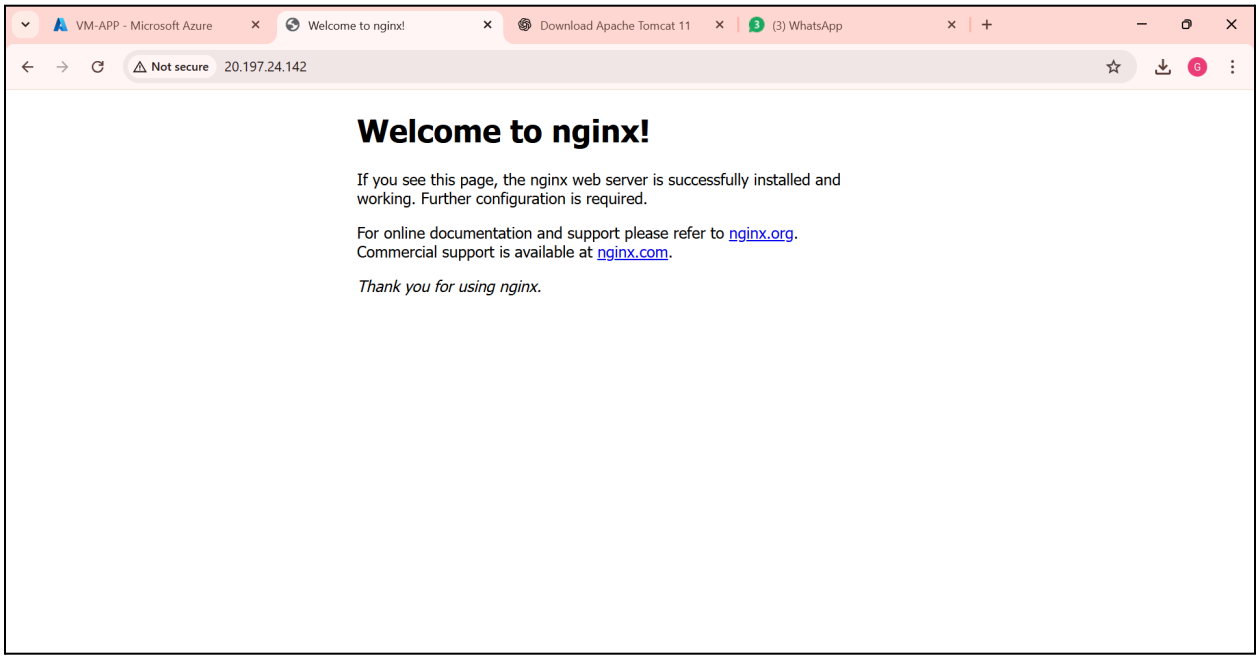
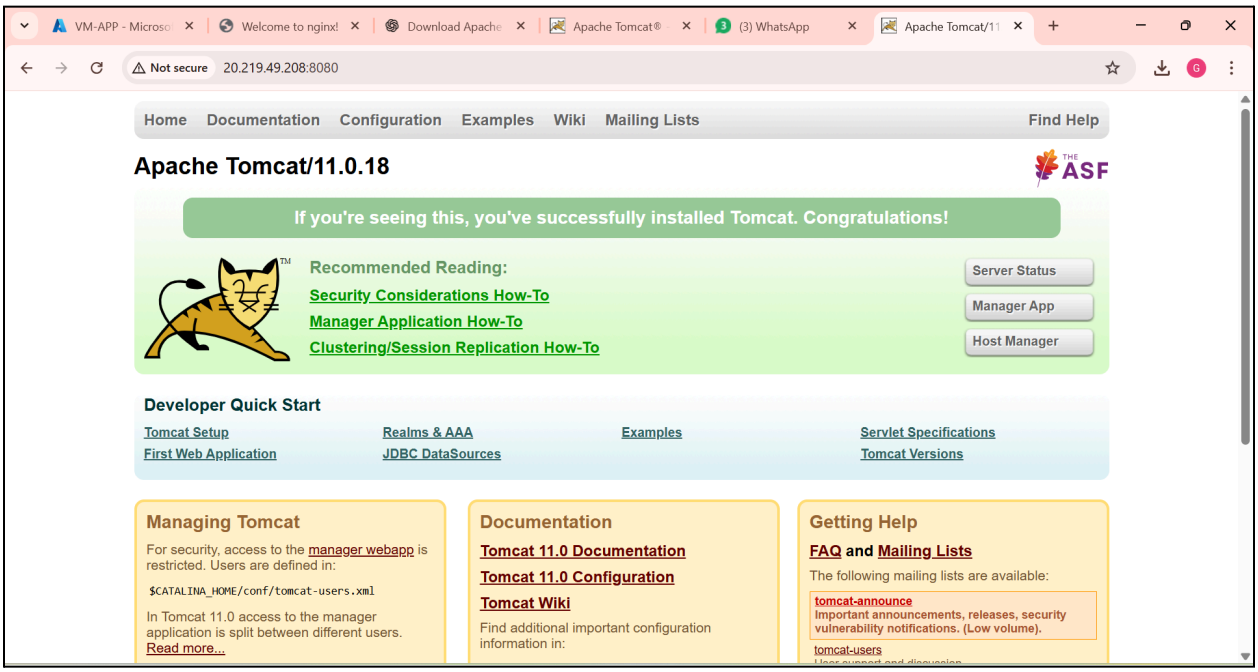


Fig (2) successfully installed nginx in vm-web.

→ Now login to the vm-app and install Apache Tomcat.

- To run Tomcat we need java, so first download java:-
  - apt install default-jdk -y
  - java -version
- To install Tomcat :-
  - Go to the Apache Tomcat official website and get the latest version.
  - wget https://dlcdn.apache.org/tomcat/tomcat-10/v10.1.18/bin/apache-tomcat-10.1.18.tar.gz
  - tar -xvzf apache-tomcat-10.1.18.tar.gz
  - mv apache-tomcat-10.1.18 tomcat
  - cd tomcat/bin
  - ./startup.sh



fig(3) successfully Tomcat installed in vm-app.

→ Now login to the vm-db and install MYSQL.

- apt install mysql-server –y
- mysql_secure_installation
- nano /etc/mysql/mysql.conf.d/mysqld.cnf
- bind-address = 0.0.0.0
- Save and exit (CTRL + X, then Y, then Enter).
- systemctl restart mysql
- systemctl status mysql

→ Now we have installed and configured in all the 3 tiers, since we have already created nsg for login to vm's.

→ Now we will add some new rules.

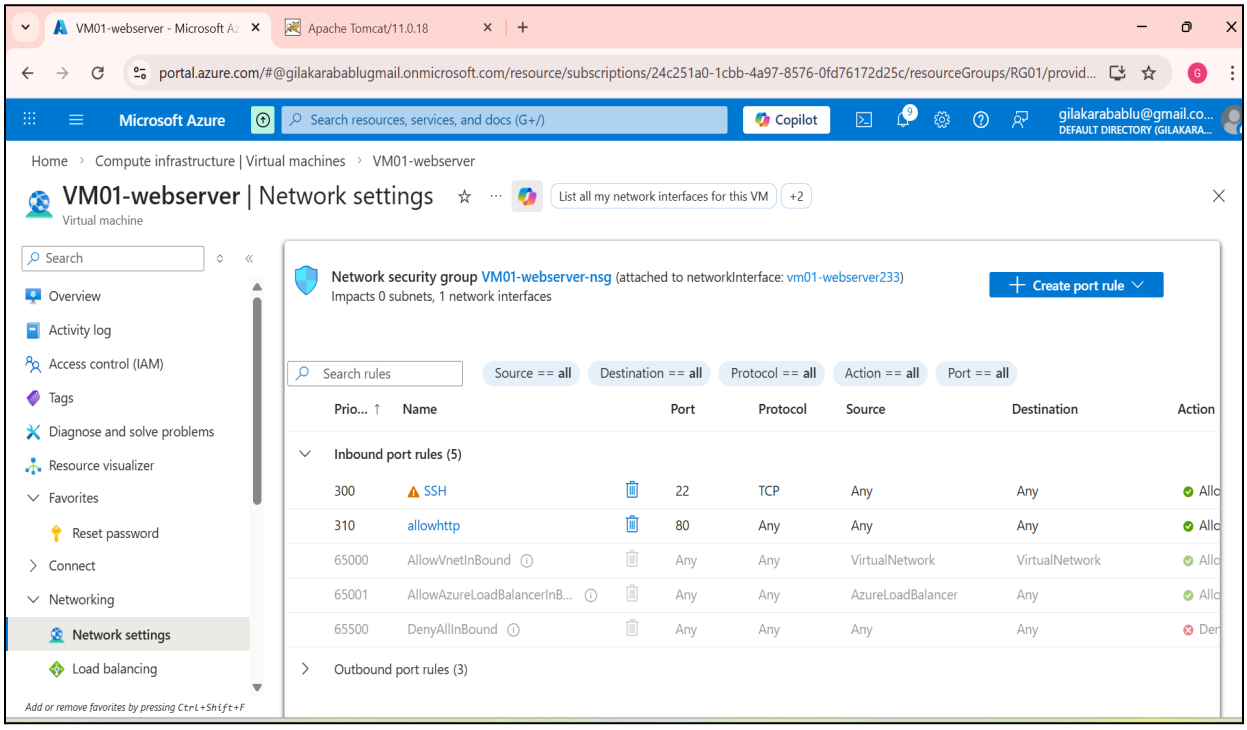


Fig (4) nsg rules for vm-web.

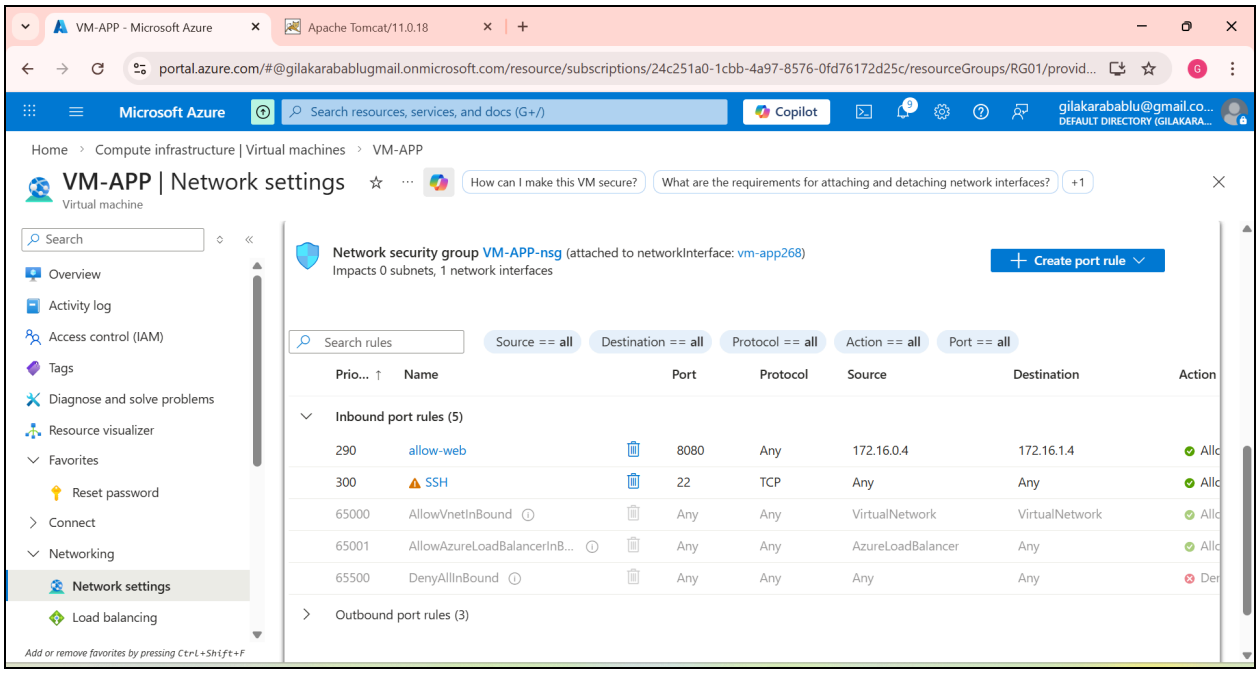


Fig (5) nsg rules for vm-app.

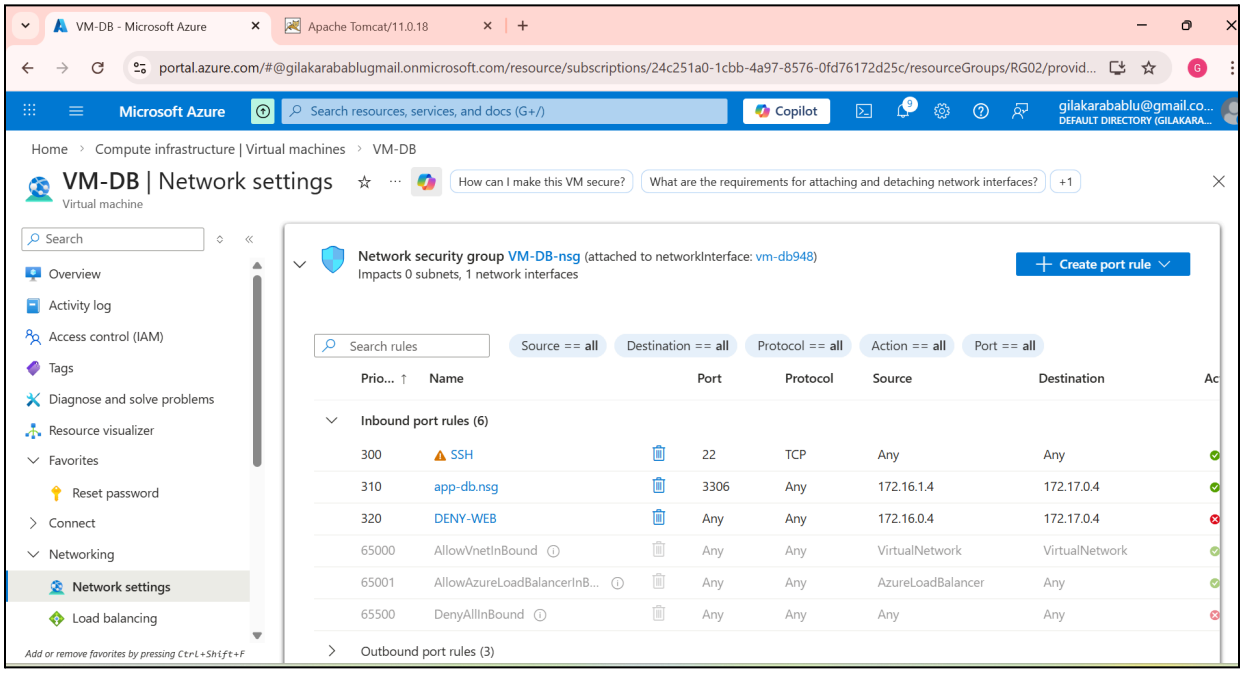


Fig (6) nsg rules for vm-db.

→ now we have configured and installed everything, we need to just connect the 3 tiers.

→ To connect them all first we need to add peering in the virtual network vn01 and vn02, since they are in different regions.

→ Finally to connect them all from one tier to another we will use the telnet command.

- Telnet<pvt-ip address>d port no. (for pvt connection).
- Telnet<pub-ip address>d port no. (for pub connection)

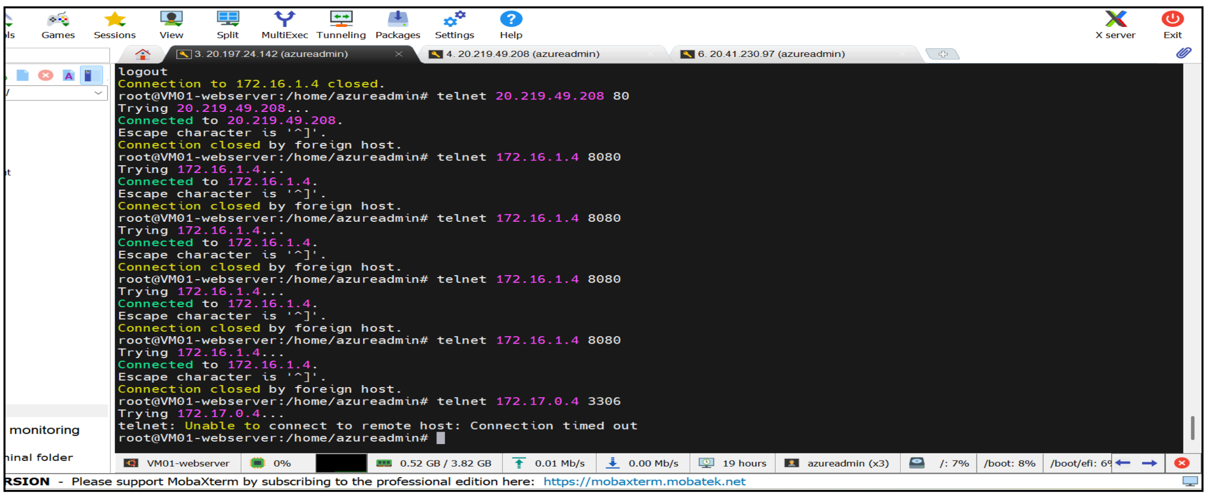


Fig (7) successfully connected from web to app.

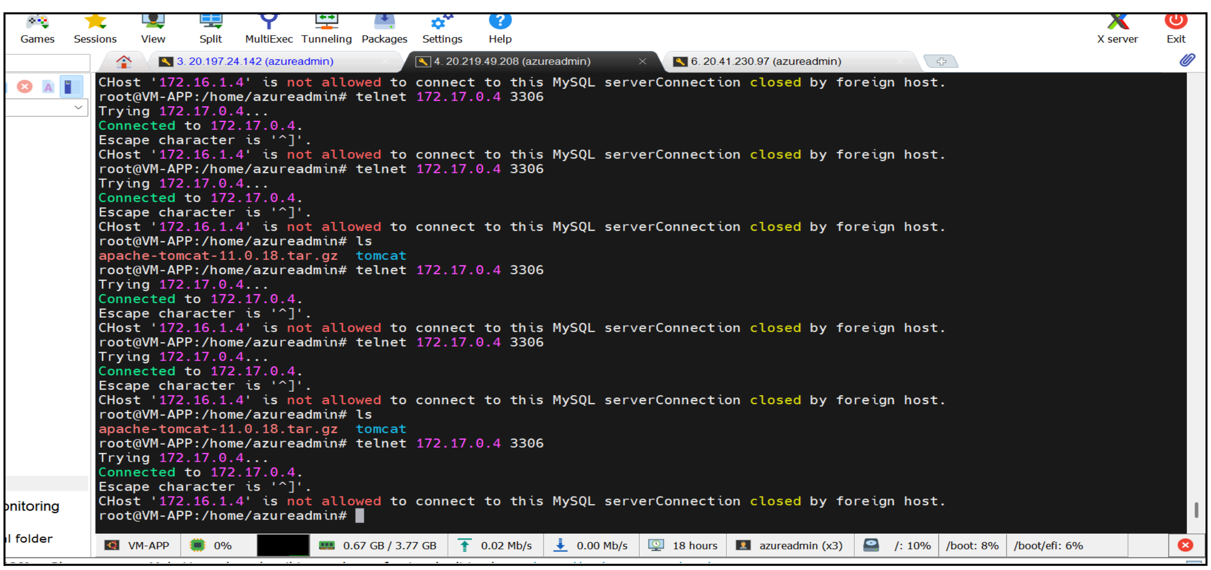


Fig (8) successfully connected from app to db.

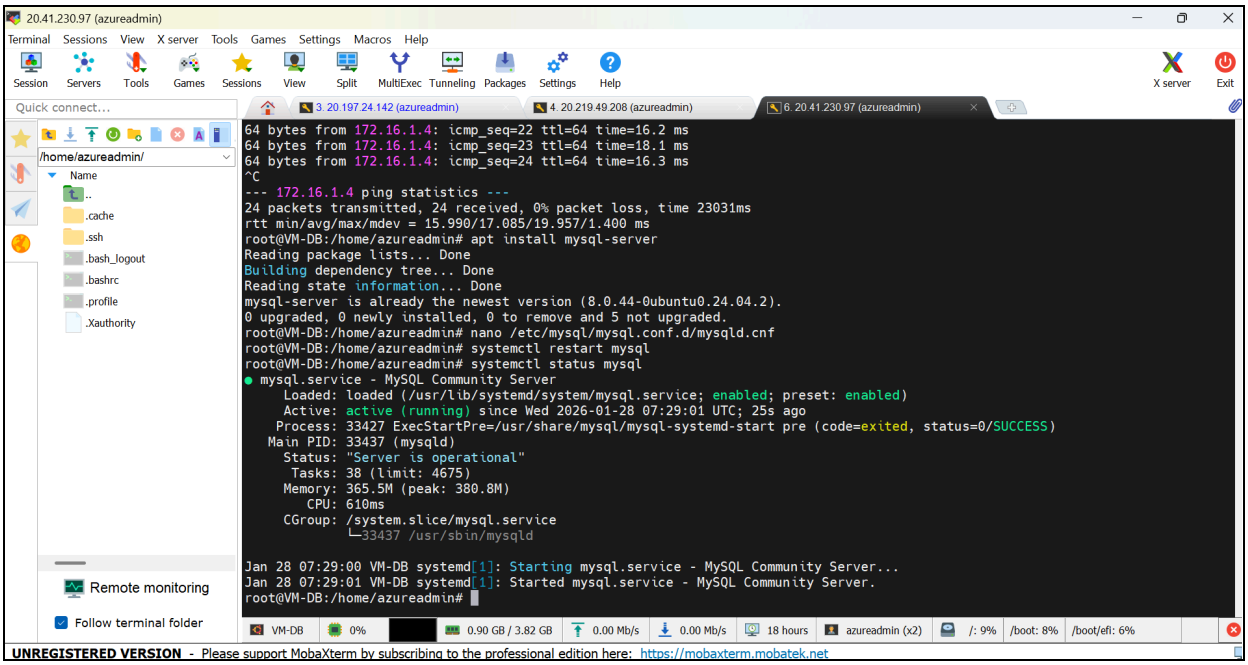


Fig (9) successfully installed mysql.

→ Therefore the 3-Tier Architecture is successfully implemented.