RPC Implementation in Cloud Environment

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Aim

To design and implement a **Remote Method Invocation (RMI) based distributed application** using **Java**, where the **RMI server is hosted in a cloud environment (Microsoft Azure Virtual Machine)** and the **client executes on a local machine**, enabling invocation of remote methods over a network.

Software & Tools Used

Component	Description
Programming Language	Java
Distributed Model	Java RMI
Cloud Platform	Microsoft Azure
Server OS	Ubuntu Linux (Azure VM)
Client OS	Windows 10
JDK Version	OpenJDK 17
Network Port	1009

System Architecture

- RMI Server and Registry run on **Azure VM**
- Client accesses remote object using **public IP**
- Communication occurs over TCP/IP

Remote Methods Implemented

Method Name	Description
multiplyMatrix	Perform Matrix Multiplication
getPrimes	Print prime numbers in a range

Execution Steps

Step 1: Install Java on Azure VM

sudo apt update

sudo apt install openjdk-17-jdk -y

Step 2: Compile RMI Programs

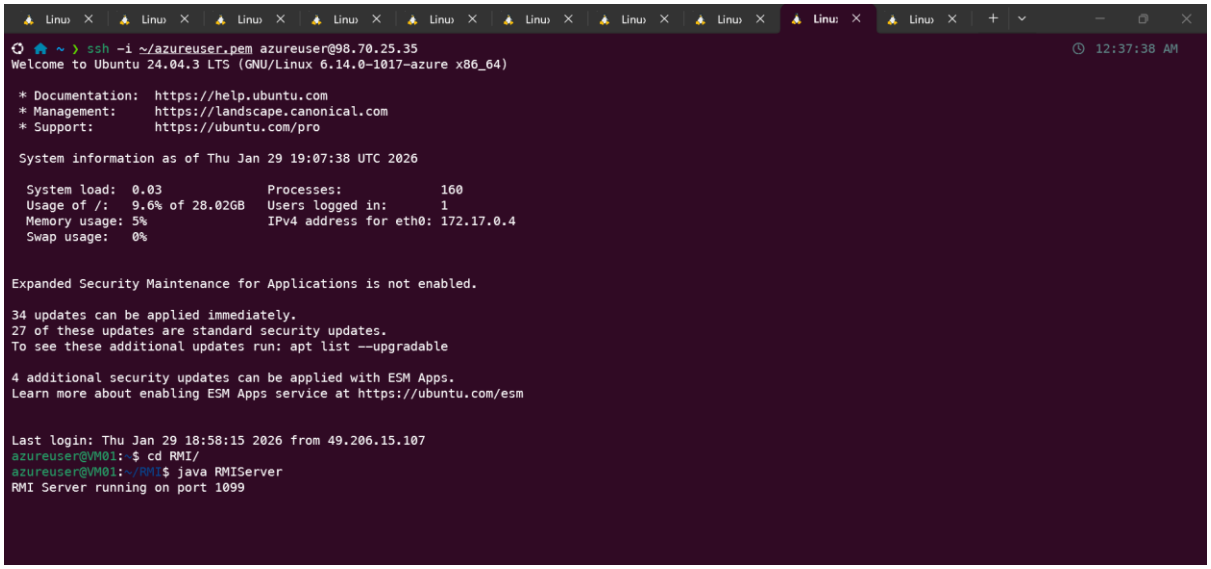
javac *.java

Step 3: Run RMI Server

java RMIServer

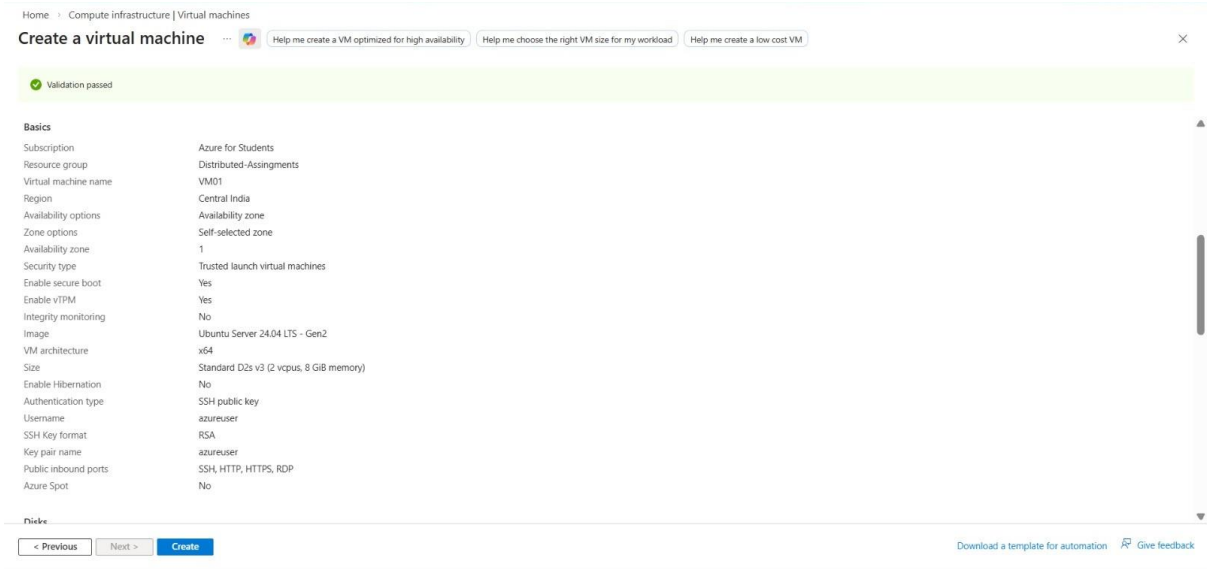
Output:

RMI Server running on Azure VM at port 1099



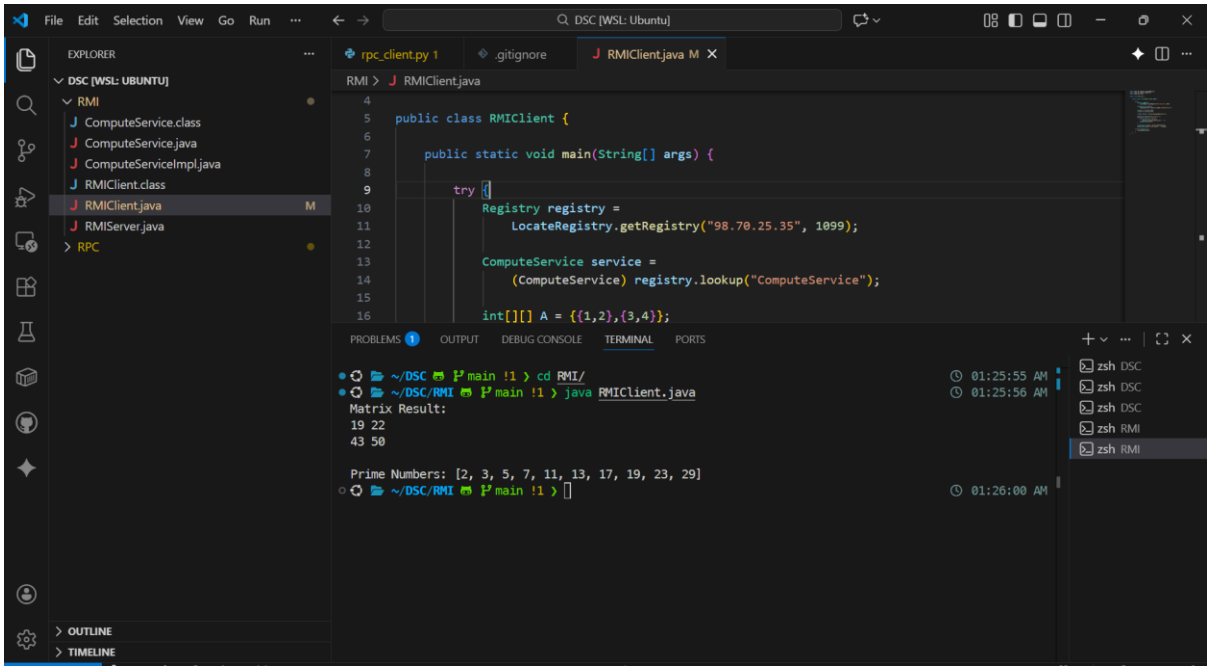
Step 4: Configure Azure NSG

- Allow **Inbound TCP Port 8080**
- Source: Any
- Destination: Any



Step 5: Run Client on Local Machine

java RMIClient



Error Handling

- RemoteException handled in all methods
- Network timeout handled via try–catch
- Registry lookup failure handled

Result

Thus, a **Java RMI-based distributed application** was successfully implemented and executed in a **cloud environment using Microsoft Azure**, allowing a local client to invoke methods on a remote server and receive correct outputs.

Conclusion

Java RMI provides a robust mechanism for building distributed applications by allowing remote method calls with object-oriented abstraction. Hosting the RMI server on Azure ensures scalability and remote accessibility.
