RPC Implementation in Cloud Environment

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Aim

To design and implement a **Remote Procedure Call (RPC) based distributed application** using **Python**, where the **server is hosted in a cloud environment (Microsoft Azure VM)** and the **client runs on a local machine**, enabling remote procedure invocation over a network.

Software & Tools Used

Component	Description
Programming Language	Python 3
RPC Mechanism	HTTP-based RPC
Cloud Platform	Microsoft Azure
Server OS	Ubuntu Linux (Azure VM)
Client OS	Windows 10

Libraries Used	http.server, json, requests

System Architecture

- The **RPC Server** is deployed on an **Azure Virtual Machine**
- The **Client** runs on a **local Windows system**
- Client sends requests using HTTP POST
- Server processes the request and returns results in JSON format

Client (Windows) → Azure VM (RPC Server)

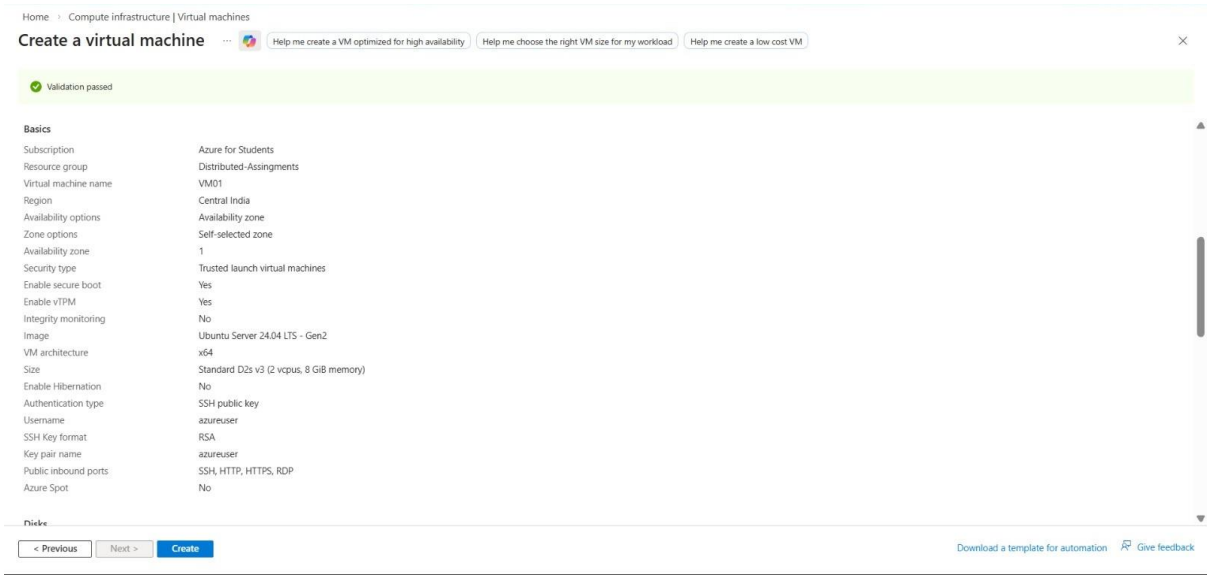
Remote Procedures Implemented

Procedure Name	**Description**
multipleyMatrix	Perform Matrix Multiplication
getPrimes	Print prime numbers in a range

Execution Steps

Step 1: Start Azure VM

- Login to Azure Portal
- Start Ubuntu Virtual Machine
- Enable inbound rule for port **8000**

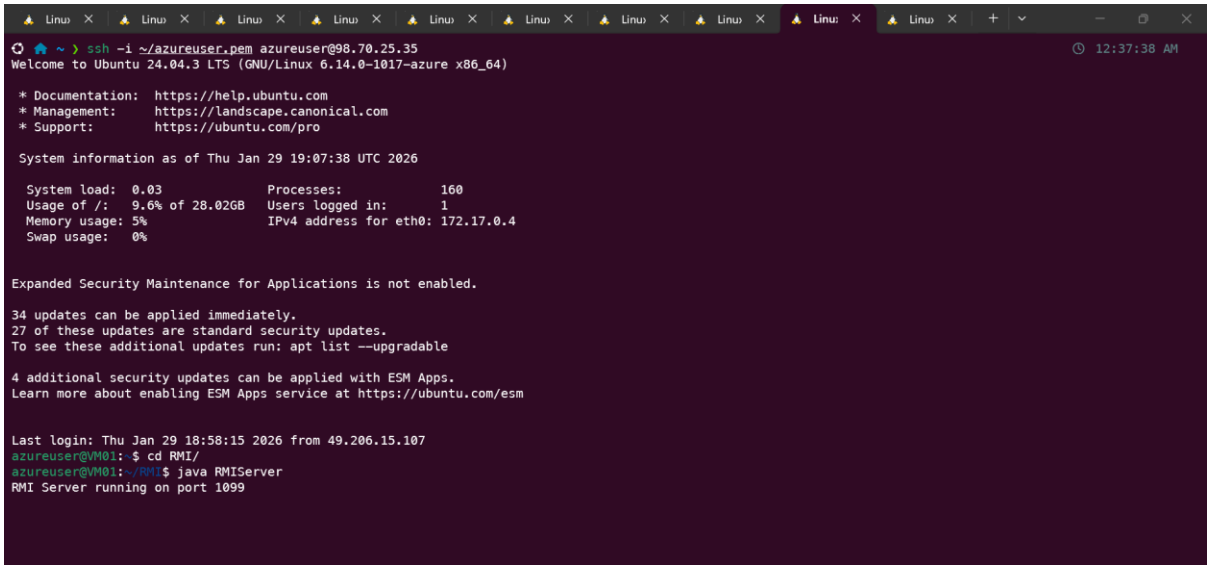


Step 2: Run RPC Server on Azure VM

python3 rpc_server.py

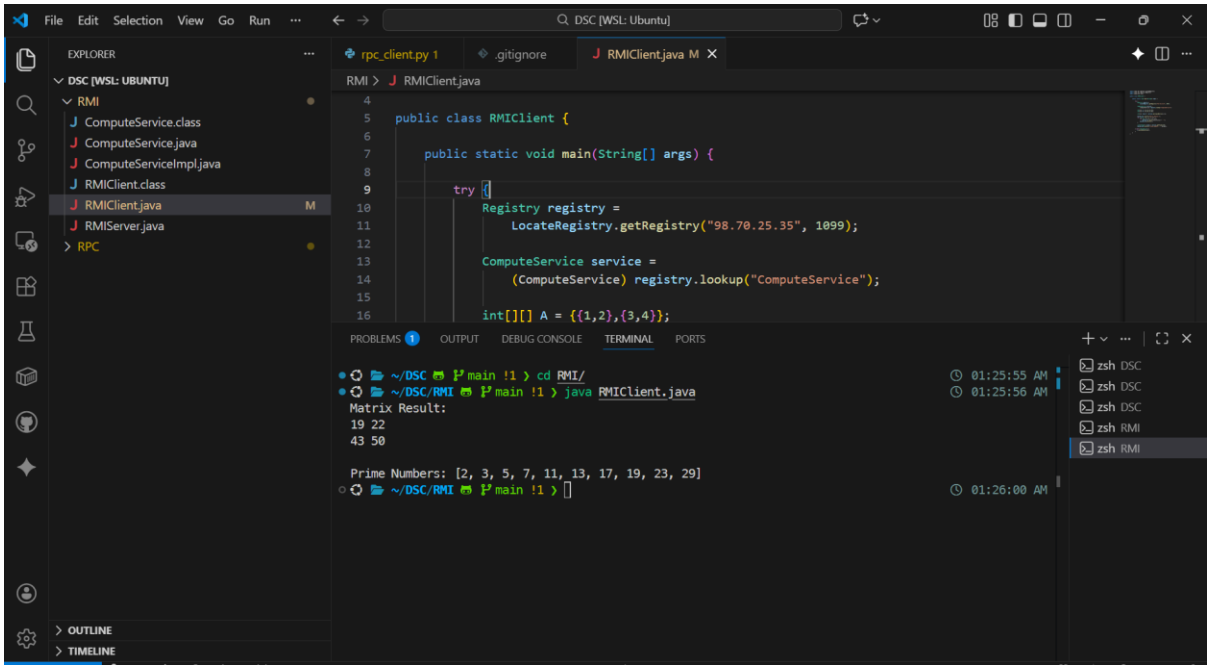
Output:

RPC Server running on Azure VM at port 8000



Step 3: Run Client on Local Machine

python rpc_client.py



Error Handling

- Invalid RPC endpoints return **404 error**
- JSON parsing errors handled by server
- Network connectivity verified using Azure NSG rules

Result

Thus, a **Remote Procedure Call (RPC) based distributed application** was successfully implemented and executed in a **cloud environment using Microsoft Azure**, allowing a remote client to invoke procedures hosted on the server and receive correct results.

Conclusion

The experiment demonstrates how RPC enables transparent communication between distributed systems. Hosting the server in the cloud allows scalability and remote access, making RPC suitable for real-world distributed applications.