Remote Procedure Call (RPC) – Cloud-Based Calculator Application

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1. Aim

To implement a **Remote Procedure Call (RPC)** based calculator application where the server is hosted on a **cloud platform (AWS EC2)** and the client remotely invokes arithmetic procedures.

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2. Objective

- To understand RPC-based communication in distributed systems
- To implement client–server interaction using RPC
- To deploy the RPC server on a cloud environment
- To verify remote procedure execution and result transfer

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3. System Requirements

Hardware

- Computer with minimum 4 GB RAM
- Internet connection

Software

- Operating System: Ubuntu (Server), Windows / Kali Linux (Client)
- Programming Language: Python
- Cloud Platform: AWS EC2

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4. RPC Architecture

- RPC follows a **procedure-oriented client–server model**
- The client invokes remote procedures as normal function calls
- The server executes the procedure and returns the result
- Communication is handled transparently over the network

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5. RPC Implementation Details

5.1 Remote Procedures

The server provides the following remote procedures:

- Addition
- Subtraction
- Multiplication
- Division

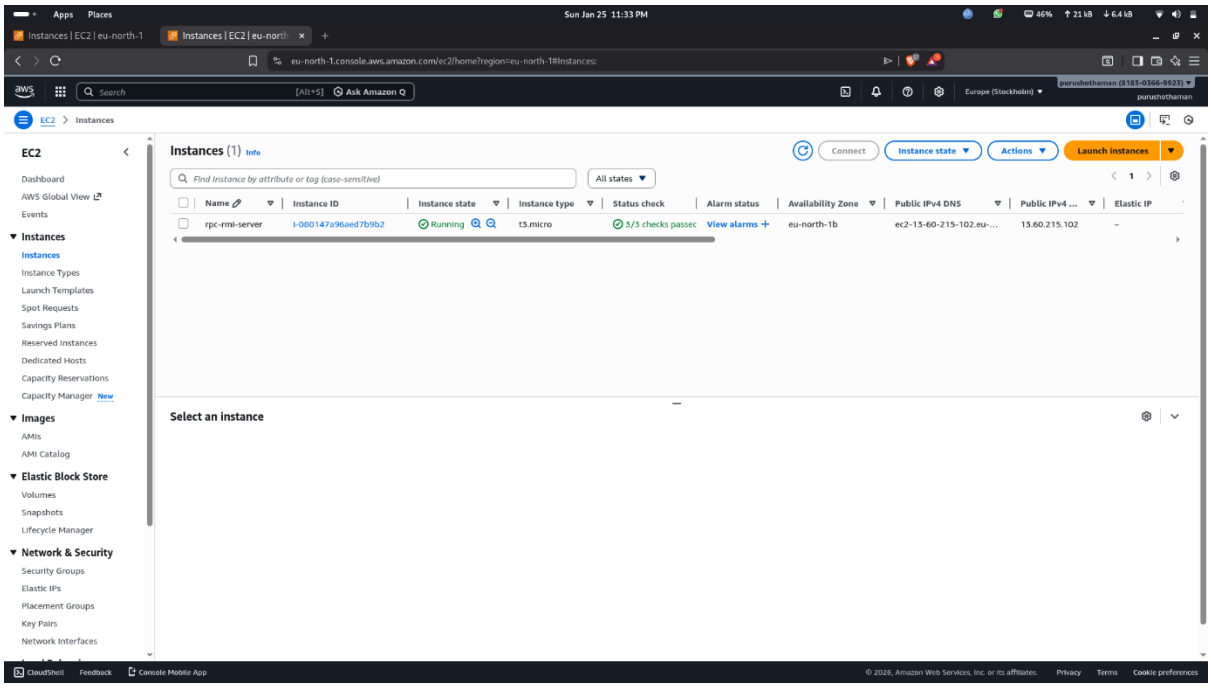
5.2 Working Principle

1. RPC server defines arithmetic procedures
2. Server listens on a specific port
3. Client connects using server IP address and port number
4. Client invokes procedures remotely
5. Server processes the request and returns the result

6. Cloud Deployment

- RPC server is hosted on **AWS EC2**
- Public IP address is used for client access
- Required ports are enabled in the EC2 security group

Attach the following screenshots:

- AWS EC2 instance running
- Security group inbound rule configuration
- 

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7. Error Handling

- Invalid inputs are handled safely
- Division by zero is checked and prevented
- Network-related exceptions are handled gracefully

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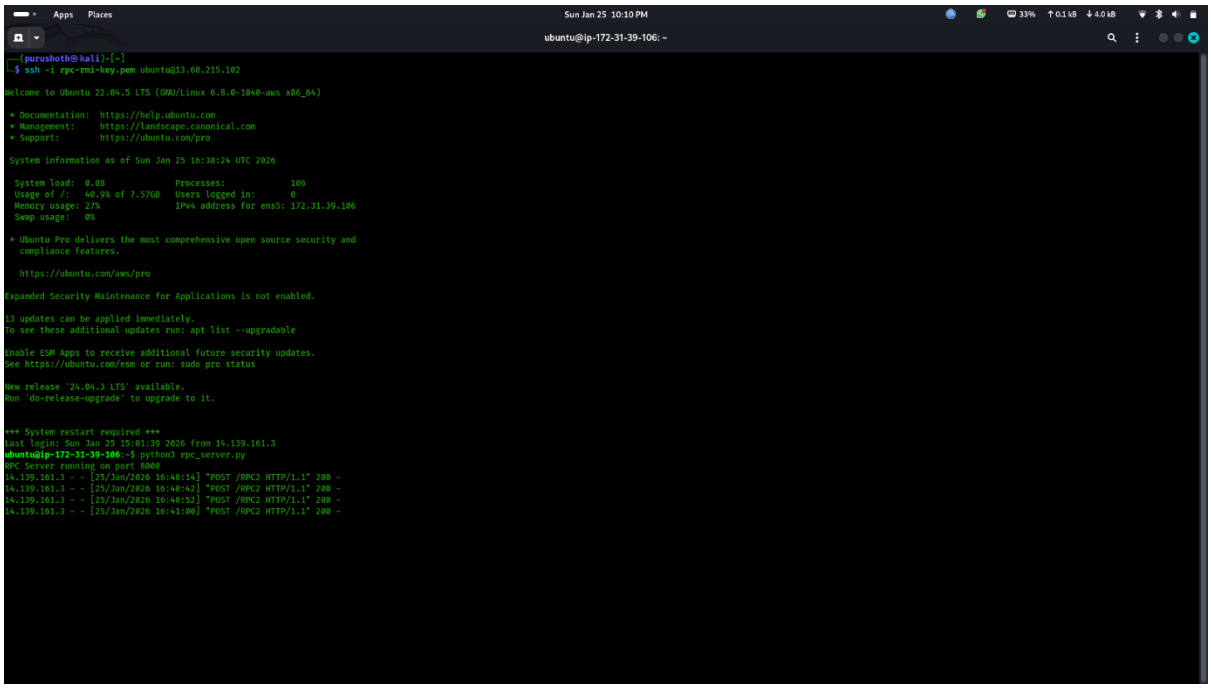
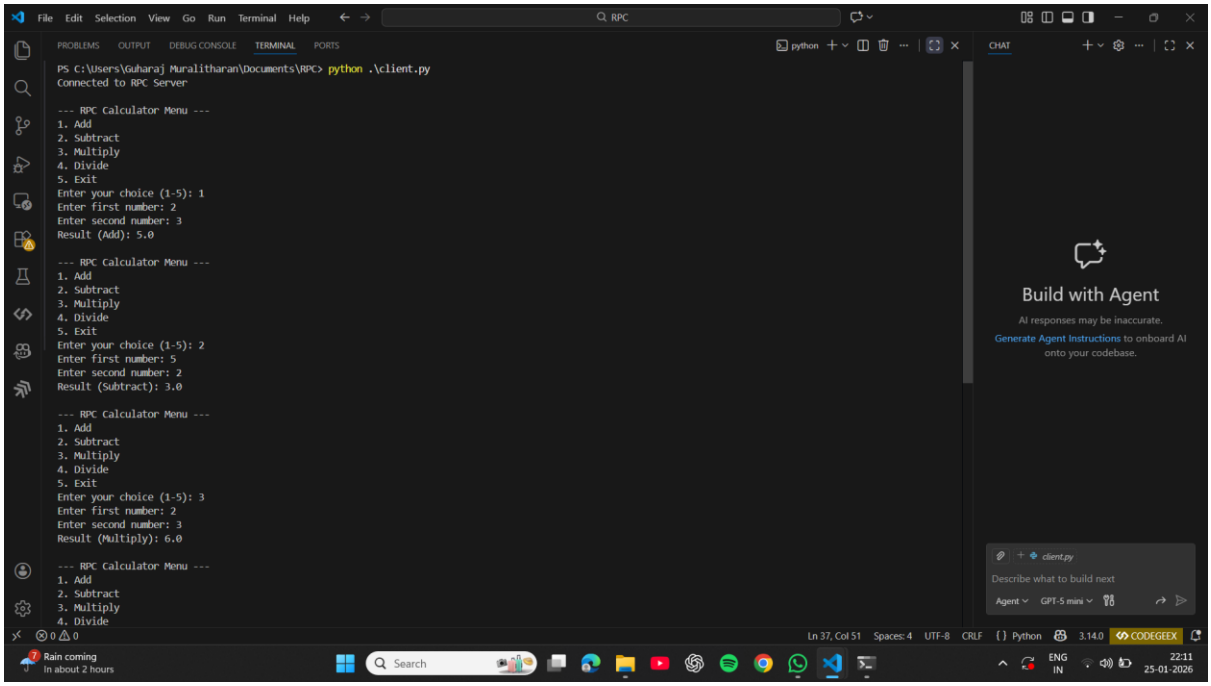
8. Output

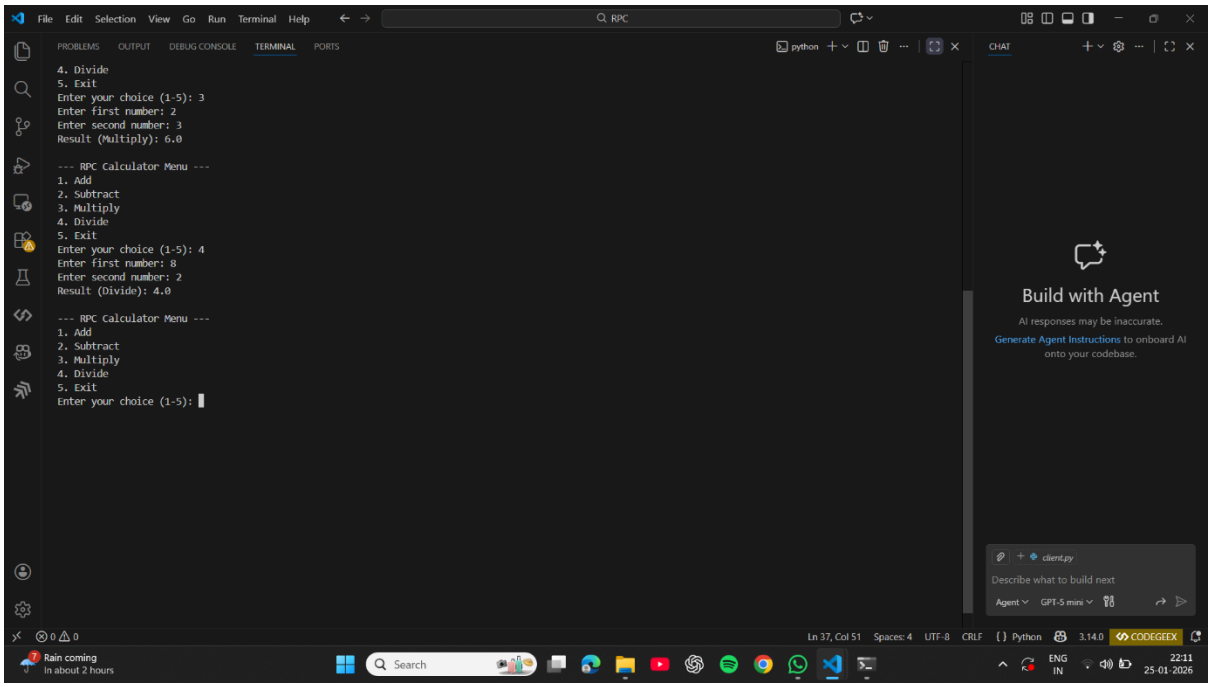
- **RPC server running on AWS EC2**



- **Client invoking remote procedures**

- **Correct arithmetic results displayed**





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9. Result

The RPC-based calculator application was successfully implemented. The client remotely invoked procedures hosted on the cloud server and received correct computation results.

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10. Conclusion

This experiment demonstrated how RPC simplifies distributed computing by allowing remote functions to be invoked as local procedures. Deploying the server on AWS EC2 provided practical experience with cloud-based distributed systems