RPC-Based Temperature Conversion System

1. Aim

To implement a Remote Procedure Call (RPC) based temperature conversion system using Python XML-RPC where a client remotely invokes temperature conversion functions hosted on a cloud server.

2. Objective

- To understand RPC communication in distributed systems
- To remotely execute temperature conversion procedures
- To deploy the RPC server on a cloud platform
- To verify remote procedure execution and result transfer

3. System Requirements

Hardware
- Computer with minimum 4 GB RAM
- Internet connection

Software
- Operating System: Ubuntu (Server), Windows (Client)
- Programming Language: Python
- Library Used: XML-RPC
- Cloud Platform: AWS EC2

4. RPC Architecture

RPC follows a client-server model. The client invokes remote functions as if they were local. The server processes the request and returns the result using XML-RPC over HTTP.

5. RPC Implementation Details

5.1 Remote Procedures

- celsius_to_fahrenheit(c)
- fahrenheit_to_celsius(f)

5.2 Working Principle

1. RPC server defines temperature conversion functions
2. Server listens on port 8000
3. Client connects using server public IP

4. Client invokes remote procedures

5. Server processes and returns the converted temperature

6. Cloud Deployment

- RPC server hosted on AWS EC2
- Port 8000 enabled in security group
- Public IP used for client connection

7. Error Handling

- Handles invalid inputs
- Network errors handled using try-except blocks

8. Output

```
Welcome to Ubuntu 24.04.3 LTS (GNU/Linux 6.14.0-1018-aws x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:     https://landscape.canonical.com
 * Support:        https://ubuntu.com/pro

 System information as of Fri Jan 30 18:33:54 UTC 2026

  System load:  0.08              Temperature:           -273.1 C
  Usage of /:   41.9% of 6.71GB   Processes:             109
  Memory usage: 27%               Users logged in:       0
  Swap usage:   0%                IPv4 address for ens5: 172.31.33.81


Expanded Security Maintenance for Applications is not enabled.

31 updates can be applied immediately.
To see these additional updates run: apt list --upgradable

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status


Last login: Thu Jan 29 17:17:21 2026 from 122.164.85.143
```

```
ubuntu@ip-172-31-33-81:~$ python3 rpc_temp_server.py
Temperature RPC Server running on port 8000...
```

```
PS D:\CEG\Study_Material\sem_6\DSC\5305_assignment\RPC> python .\rpc_tem_client.py
Enter temperature in Celsius: 55
Fahrenheit: 131.0
Enter temperature in Fahrenheit: 230
Celsius: 110.0
```

9. Result

The RPC-based temperature conversion system was successfully implemented and deployed on a cloud server.

10. Conclusion

This experiment demonstrated how RPC enables remote execution of functions in distributed systems using XML-RPC.