

CS 537

Discussion

26 April 2023



RPC Overview

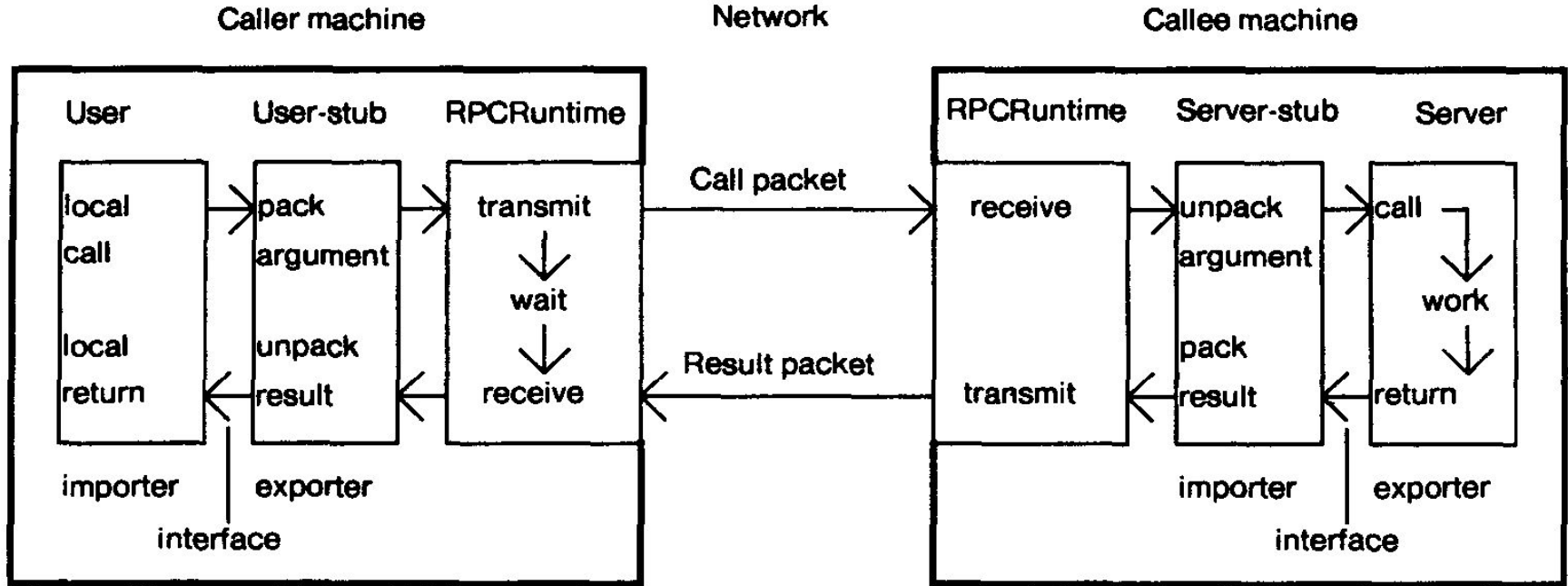
Remote Procedure Call

- A type of client/server communication
- Attempts to make remote procedure calls look like local ones

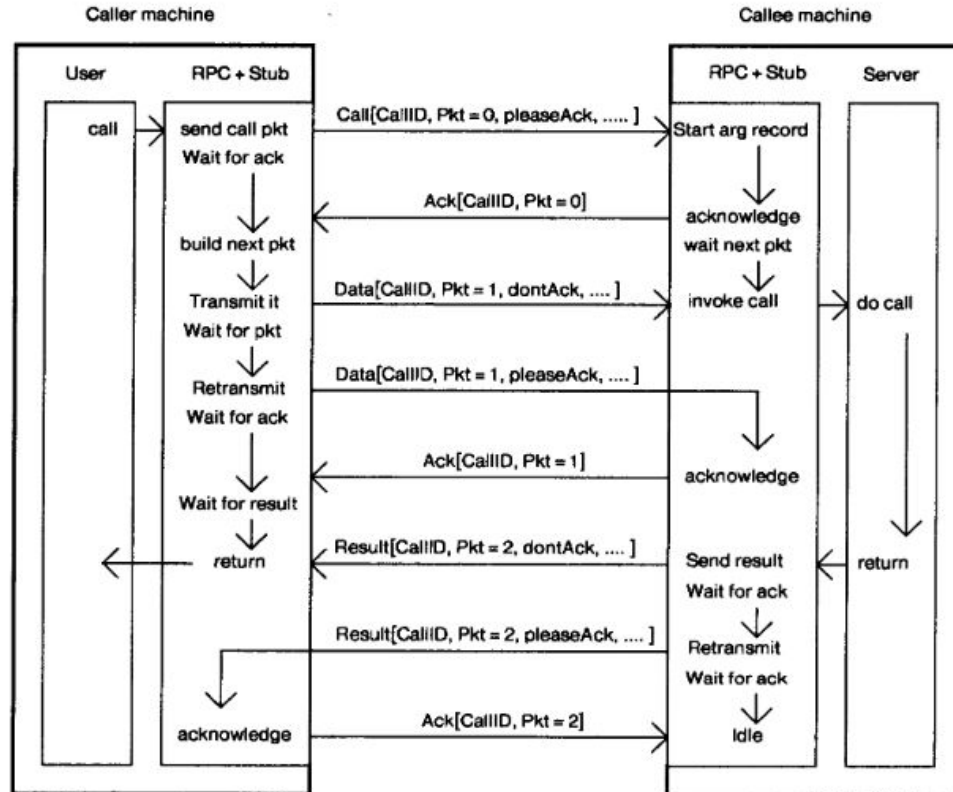
Stubs

- Provide a local call abstraction by concealing the underlying RPC mechanism
- Client stub
 - **Marshals** arguments into machine-independent format
 - Sends request to server
 - Waits for response
 - **Unmarshals** result and returns to caller
- Server stub
 - **Unmarshals** arguments and builds stack frame
 - Calls procedure
 - Server stub **marshals** results and sends reply

RPC Mechanism (simple call)



RPC Mechanism (complex call)



RPC steps

1. The client procedure calls the client stub in the normal way.
2. The client stub builds a message and calls the local operating system.
3. The client's OS sends the message to the remote OS.
4. The remote OS gives the message to the server stub.
5. The server stub unpacks the parameters and calls the server.

RPC steps

6. The server does the work and returns the result to the stub.
7. The server stub packs it in a message and calls its local OS.
8. The server's OS sends the message to the client's OS.
9. The client's OS gives the message to the client stub.
10. The stub unpacks the result and returns to the client.

RPC failures

- Request from client -> server lost
- Reply from server -> client lost
- Server crashes after receiving request
- Client crashes after sending request

Solution

- **At-least-once**: Just keep retrying on client side until you get a response.
 - Server just processes requests as normal, doesn't remember anything. Simple!
- **At-most-once**: Server might get same request twice...
 - Must resend *previous* reply and not process request
 - Must be able to identify requests

Project 8 overview

UDP overview

