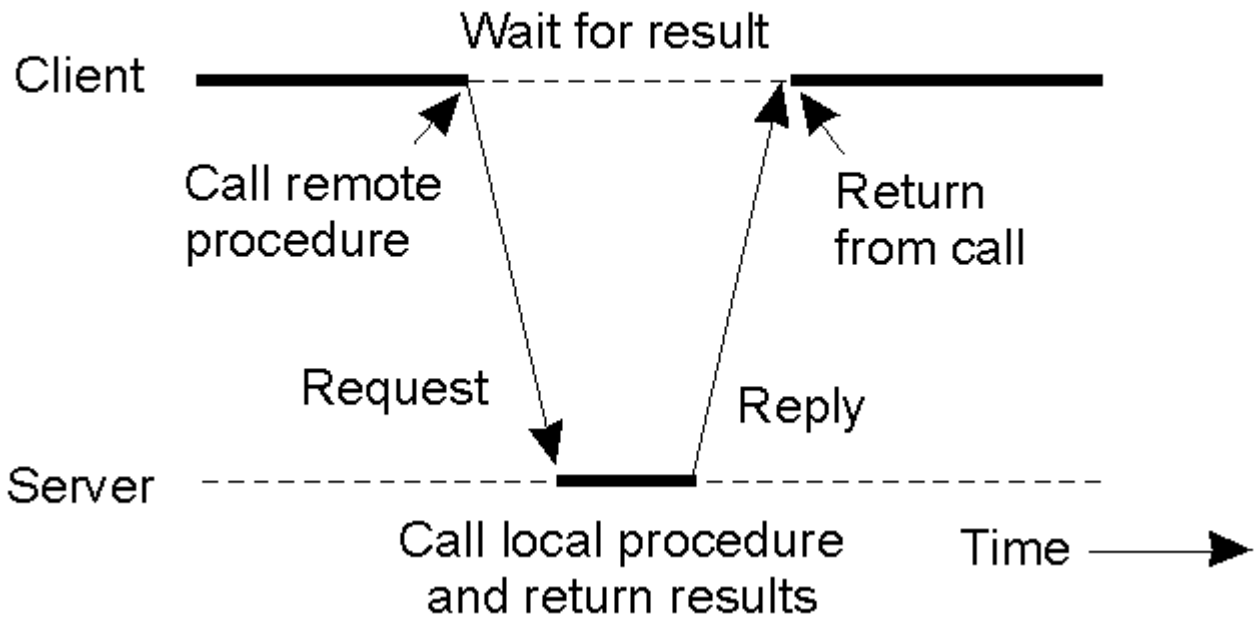
Remote Procedure Call

Remote Procedure Call

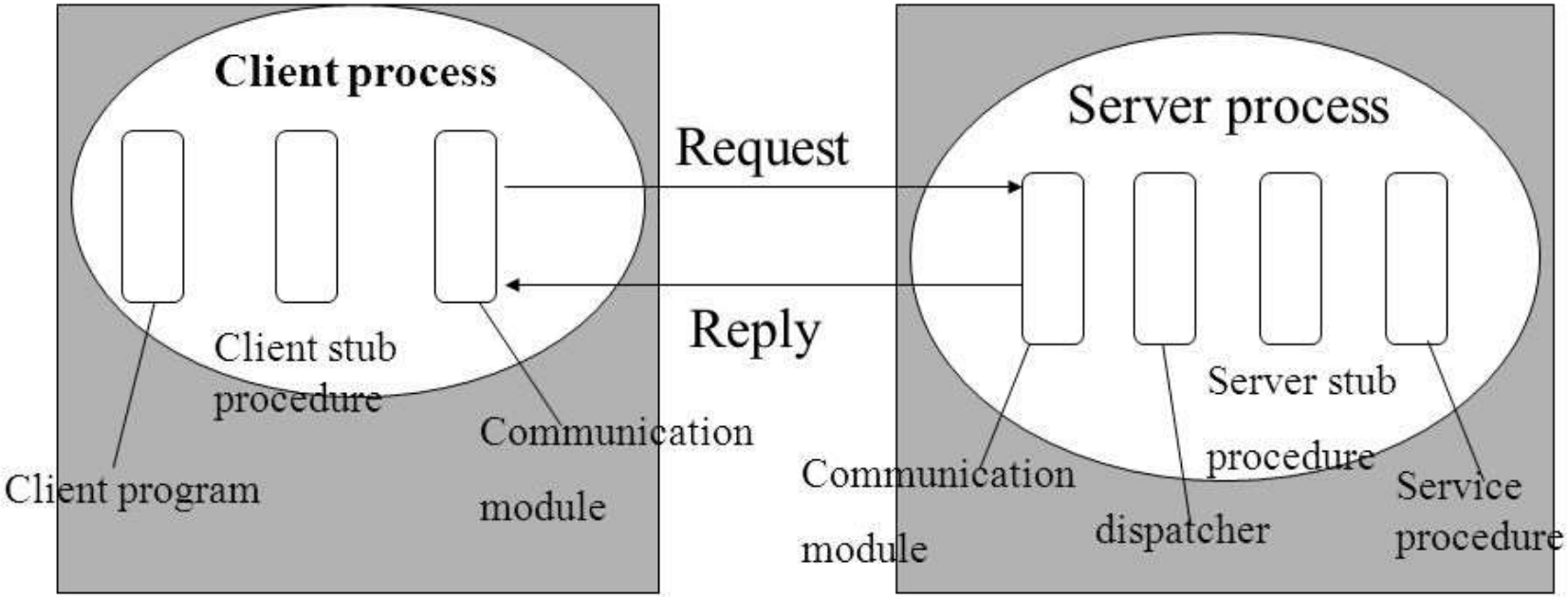
- **Remote Procedure Call (RPC)** is similar to RMI
- Client program calls a procedure that runs in another program running in a server process
- Servers may be clients of other servers to allow chain of RPC's
- Server Process defines Service Interface(contains the list of procedures
- RPC chooses at least once or at most once invocation semantics.
- RPC is implemented over Request-Reply Protocol

Client and Server Stubs



Principle of RPC between a client and server program.

RPC client and server



Implemented over Request-Reply protocol

Steps of a Remote Procedure Call

1. Always there is one client stub procedure for each procedure in the service interface
2. Client stub behaves like a local procedure to the client
3. But instead of executing the call, client stub marshals the procedure ID & arguments into a Request message.
4. Request message is sent to sever via communication module

Steps of a Remote Procedure Call

5. Server contains dispatcher together with one server stub & one service procedure for each procedure in the service interface.
6. Dispatcher uses procedure ID to select one of the server stub procedures
7. Server stub unmarshals the arguments of the Request message
8. Server executes the corresponding Service procedure
9. Server stub Marshals the return values into Reply message & send it to client
10. Client stub receives the Reply message & unmarshals the results

RPC in Practice - DCE RPC

- The Distributed Computing Environment (DCE) RPC is developed by the Open Software Foundation (OSF)/Open Group.
- DCE is a middleware executing as an abstraction layer between (network) operating systems and distributed applications.
- Microsoft derived its version of RPC from DCE RPC (e.g., MIDL compiler, etc.)
- DCE includes a number of services:
  - Distributed file service
  - Directory service
  - Security service
  - Distributed time service