



Remote Procedure Call

Ghergu Nicolae Marius
Facultatea de Matematica și Informatica,
Universitatea din București



Introduction: RPC

What's RPC?

- RPC allows programs to call a procedure located in other machines

What's actually happening?

- Let's suppose we have 2 machines, A and B. When we call an RPC instruction from machine A to machine B, the process from machine A is suspended and continues on machine B.
- The message is not visible, is just "transported".



Introduction: RPC

Why is so popular?

- Is generic.
- Efficiency.
- Can be used as IPC (Inter-process communication) from the same computer or different computers

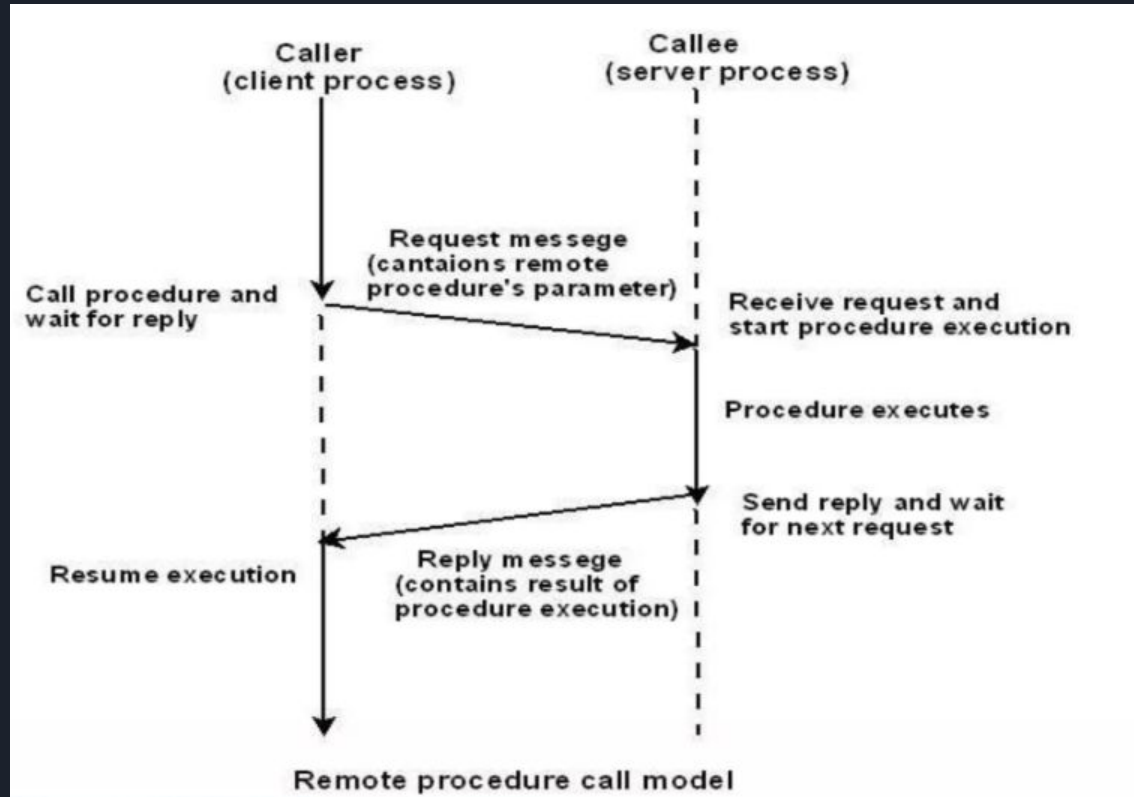


The RPC Model

The RPC Model is the following:

1. In order to do a procedure call, the call places arguments to procedure in some well specified location.
2. Control is then transferred to the sequence of instructions that constitutes the body of the procedure.
3. The procedure body is executed in newly created execution environment that includes copies of the arguments given in the calling instruction.
4. After the procedure execution is over, control returns to the calling point, returning a result.

RPC Model: Schema





Benefits / Ideas

Some approaches could use:

- The RPC could be asynchronous, so client may do useful work while waiting the reply from the server
- Server could create a thread while is doing the request and give the response to the client. That could help in order to do some parallel unit of work from both sides.

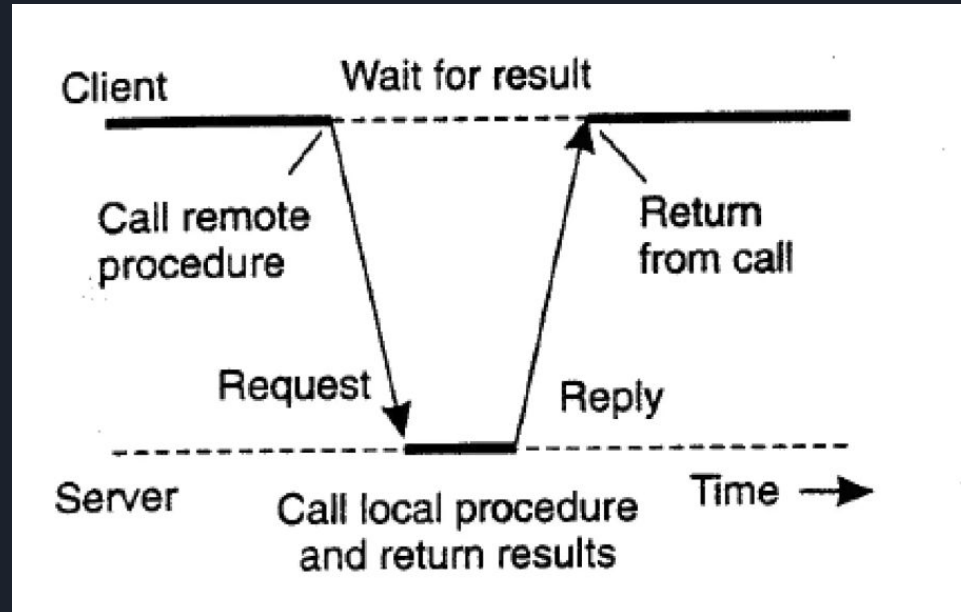


“Disasters”

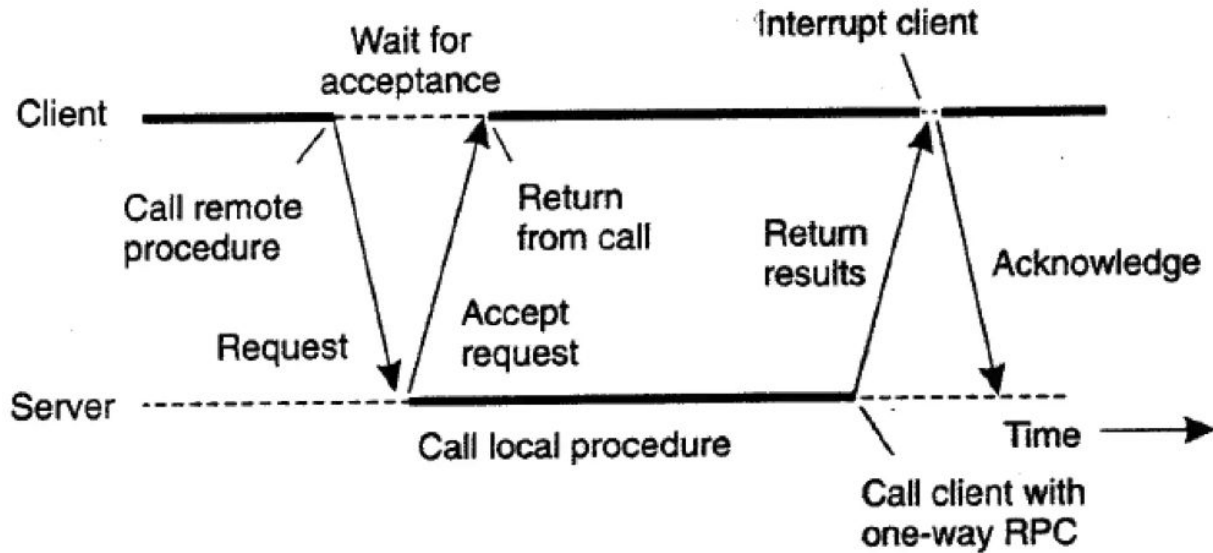
Some “disasters” could appear:

- RPCs are more vulnerable of failure: let's imagine we have a big latency or something could happen and the server/client is dropping.
- RPCs could be more time consuming than LPCs (Local Procedure Calls) - most of them networking problems.

Synchronous RPC



Asynchronous RPC





gRPC

One of the most famous frameworks that implements RPC is gRPC.

- gRPC is a high performance, open source RPC framework developed by Google.
- is widely used in distributed systems that allows communication between systems
- uses proto-files that are used in order to respect the contract