# COMMUNICATION

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# INTRODUCTION

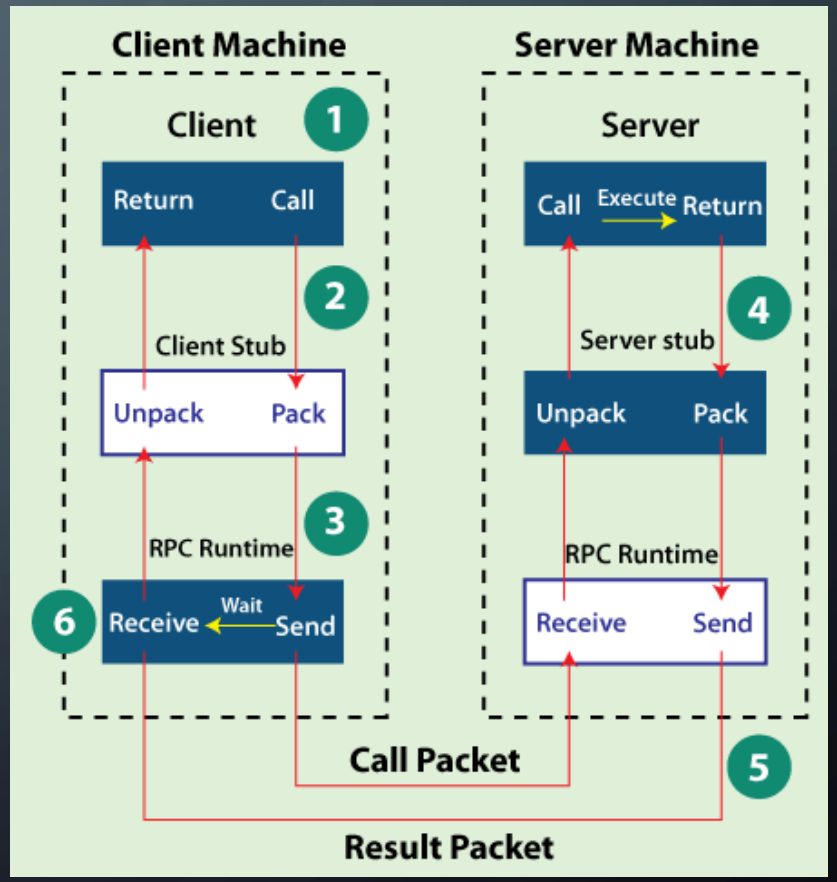
- Interprocess communication is at the heart of all distributed systems.
- One of the most widely used models for communication in distributed systems is the Remote Procedure Call (RPC).

# REMOTE PROCEDURE CALL (RPC): OVERVIEW

- The client makes a request to execute a procedure on the remote server.
- Like a synchronous local call, the client is suspended until the procedure results are back.
- The procedure's parameters are passed over the network to the server-side.
- The procedure executes on the server and, finally, the results are transferred back to the client.

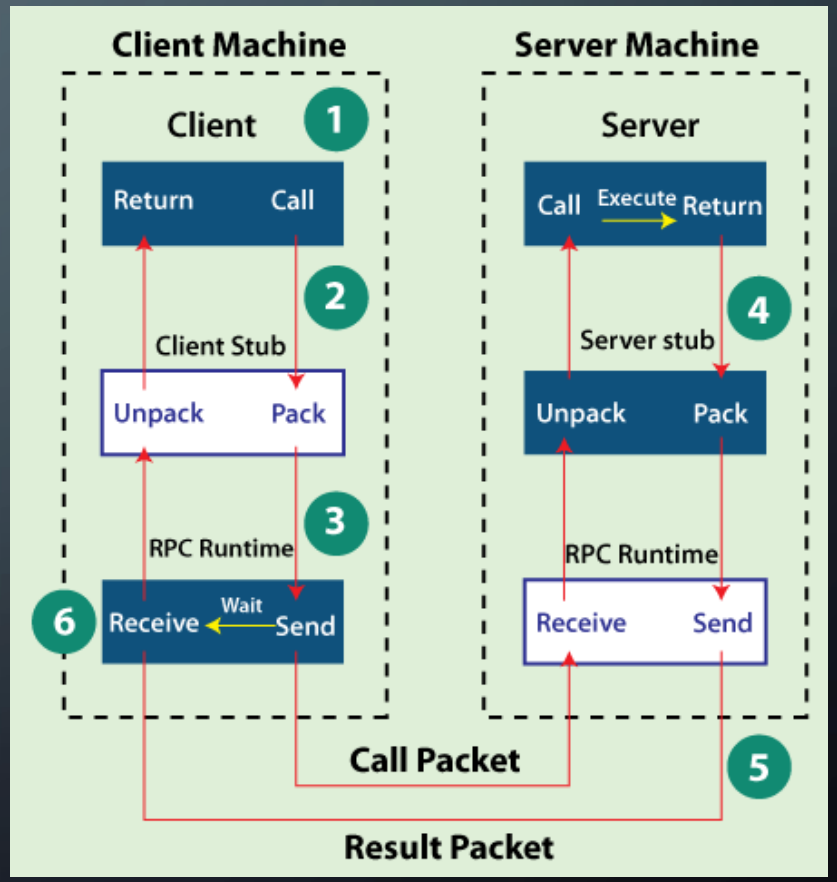
# REMOTE PROCEDURE CALL (RPC)

- The client calls the client stub. The call is a local procedure call with parameters pushed onto the stack in the normal way.
- The client stub packs the procedure parameters into a message and makes a system call to send the message. The packing of the procedure parameters is called marshalling.



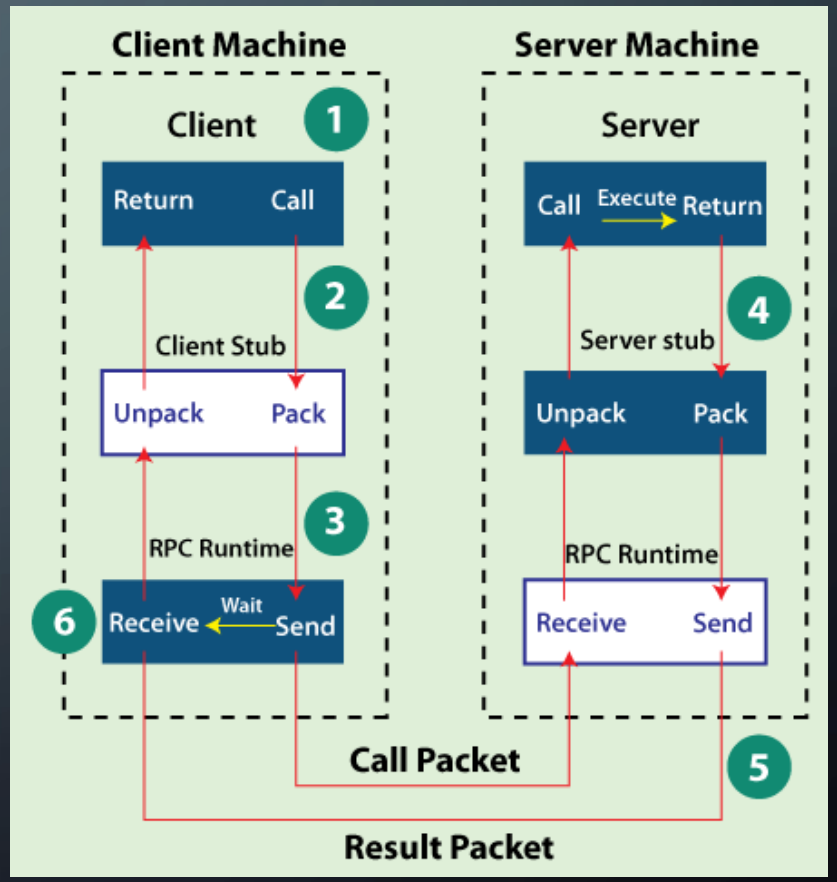
# REMOTE PROCEDURE CALL (RPC).

- The client's local OS sends the message from the client machine to the remote server machine.
- The server OS passes the incoming packets to the server stub.
- The server stub unpacks the parameters -- called unmarshalling -- from the message.



# REMOTE PROCEDURE CALL (RPC).

- When the server procedure is finished, it returns to the server stub, which marshals the return values into a message. The server stub then hands the message to the transport layer.
- The transport layer sends the resulting message back to the client transport layer, which hands the message back to the client stub.
- The client stub unmarshalls the return parameters, and execution returns to the caller.



# ADVANTAGES OF RPC

- Helps clients communicate with servers via the traditional use of procedure calls in high-level languages.
- Hides the internal message-passing mechanism from the user.

# DISADVANTAGES OF RPC

- RPC is highly vulnerable to failure because it involves a communication system, another machine and another process.
- There is no uniform standard for RPC; it can be implemented in a variety of ways.