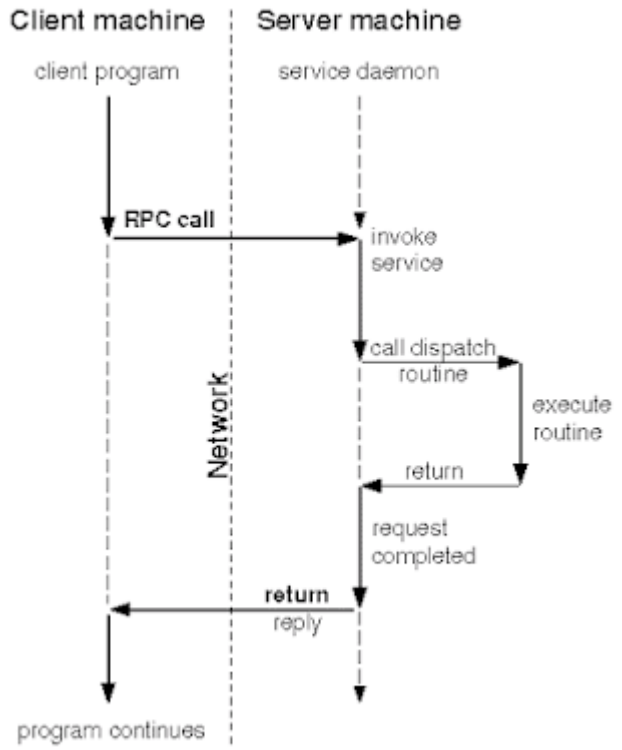
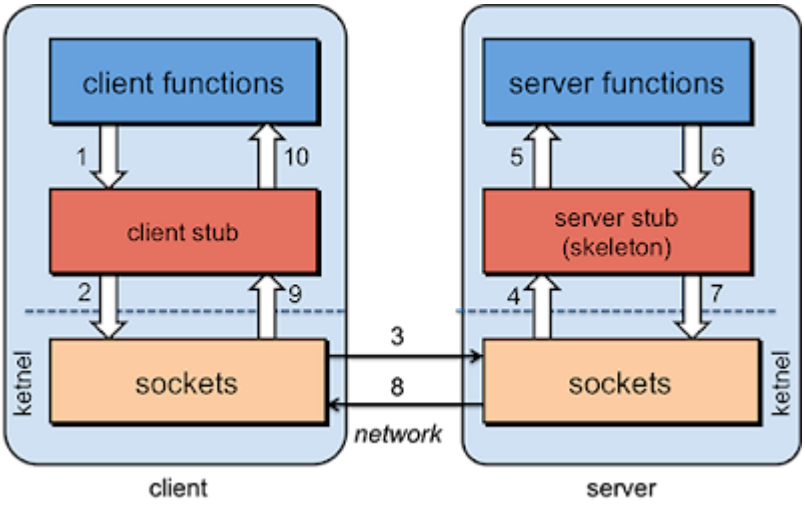
Remote Procedure Call (RPC) Implementation

- An RPC is analogous to a function call. Like a function call, when an RPC is made, the calling arguments are passed to the remote procedure and the caller waits for a response to be returned from the remote procedure.
- Figure 1 shows the flow of activity that takes place during an RPC call between two networked systems.
- The client makes a procedure call that sends a request to the server and waits. The thread is blocked from processing until either a reply is received, or it times out.
- When the request arrives, the server calls a dispatch routine that performs the requested service, and sends the reply to the client.
- After the RPC call is completed, the client program continues. RPC specifically supports network applications.
- The client calls a local procedure, called the client stub. To the client process, this appears to be the actual procedure, because it is a regular local procedure.
- It just does something different since the real procedure is on the server. The client stub packages the parameters to the remote procedure (this may involve converting them to a standard format) and builds one or more network messages.
- The packaging of arguments into a network message is called marshaling and requires serializing all the data elements into a flat array-of-bytes format.
- Network messages are sent by the client stub to the remote system (via a system call to the local kernel using sockets interfaces).
- Network messages are transferred by the kernel to the remote system via some protocol (either connectionless or connection-oriented).
- A server stub, sometimes called the skeleton, receives the messages on the server.
- The server stub calls the server function (which, to the client, is the remote procedure), passing it the arguments that it received from the client.

- When the server function is finished, it returns to the server stub with its return values.
- The server stub converts the return values, if necessary, and marshals them into one or more network messages to send to the client stub.
- Messages get sent back across the network to the client stub.
- The client stub reads the messages from the local kernel.
- The client stub then returns the results to the client function, converting them from the network representation to a local one if necessary.



Remote Procedure Calling Mechanism Implemetation



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