RPC · Site Reliability Engineer HandBook

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Remote Procedure Call (RPC) definition

Remote Procedure Call (RPC) is a protocol that one program can use to request a service from a program located in another computer in a network without having to understand network details. (A procedure call is also sometimes known as a function call or a subroutine call.) RPC uses the client/server model. The requesting program is a client and the service-providing program is the server. Like a regular or local procedure call, an RPC is a synchronous operation requiring the requesting program to be suspended until the results of the remote procedure are returned. However, the use of lightweight processes or threads that share the same address space allows multiple RPCs to be performed concurrently.

When program statements that use RPC are compiled into an executable program, a stub is included in the compiled code that acts as the representative of the remote procedure code.

When the program is run and the procedure call is issued, the stub receives the request and forwards it to a client runtime program in the local computer. The client runtime program has the knowledge of how to address the remote computer and server application and sends the message across the network that requests the remote procedure. Similarly, the server includes a runtime program and stub that interface with the remote procedure itself. Results are returned the same way.

There are several RPC models and implementations. A popular model and implementation is the Open Software Foundation's Distributed Computing Environment (DCE). The Institute of Electrical and Electronics Engineers defines RPC in its ISO Remote Procedure Call Specification, ISO/IEC CD 11578 N6561, ISO/IEC, November 1991.

RPC spans the Transport layer and the Application layer in the Open Systems Interconnection (OSI) model of network communication. RPC makes it easier to develop an application that includes multiple programs distributed in a network.

Alternative methods for client/server communication include message queueing and IBM's Advanced Program-to-Program Communication (APPC).