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SOAP

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Definition
SOAP [1] is an application-level protocol standard used to transport messages in distributed systems. The standard was defined and is maintained by the XML Protocol Working Group of the World Wide Web Consortium. SOAP is commonly used in the context of Web services. SOAP messages are encoded using XML and intended to carry XML encoded application data.

Main Text
SOAP provides a standard to separate infrastructure related data from application data for XML based messages. SOAP messages are known as "envelopes," which contain both a header, for infrastructure data, and a body, for application data. The infrastructure which handles messages for applications is referred to as a "SOAP node." This role is commonly filled by some middleware platform. The SOAP protocol dictates the rules for the proper processing of messages by nodes on behalf of applications; this includes processing of header information and handling of faults.

The header processing rules are designed to make it easy to interpose network intermediaries between the sender and receiver of messages. The SOAP specification mentions that these intermediaries could be used for purposes such as "security services, annotation services, and content manipulation services." The specification of header information used by specific kinds of intermediaries is left to other specifications commonly known as the WS-* proposals.

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The SOAP specification is intended to be extensible so that different rules for message processing can be described in further specifications. These rules are called "message exchange patterns." SOAP provides details of patterns for simple synchronous and asynchronous message exchange, which can be used for the purpose of remote procedure calls. The specification mentions but does not provide details for other more stateful patterns such as conversational exchanges and peer-to-peer message routing.

When a SOAP node is unable to process a message, an error message, called a SOAP fault is issued. Several descriptive fault types are provided by the specification as well as the conditions under which each type should be used.

SOAP provides the foundation of a Web services stack. SOAP messages are commonly layered on top of the Hypertext Transfer Protocol (HTTP). This tends to make SOAP services easier to deploy behind network firewalls; although, some critics have argued this is an abuse of HTTP. Since XML messages tend to be much larger than their binary counterparts, SOAP provides guidelines for using a binary encoding of a SOAP message body.

SOAP was originally intended as the "Simple Object Access Protocol," and its designers intended it to be used with traditional distributed object technologies such as remote method invocation (see RMI). When SOAP became popular for Web services the acronym was dropped because Web service interfaces are agnostic as to whether object-oriented implementations are used.

Cross-references
► Web Services, ► W3C, ► RMI

Reference
1. SOAP Version 1.2, Part 1: Messaging Framework (2nd edn.). W3C Recommendation. http://www.w3.org/TR/soap12-part1/