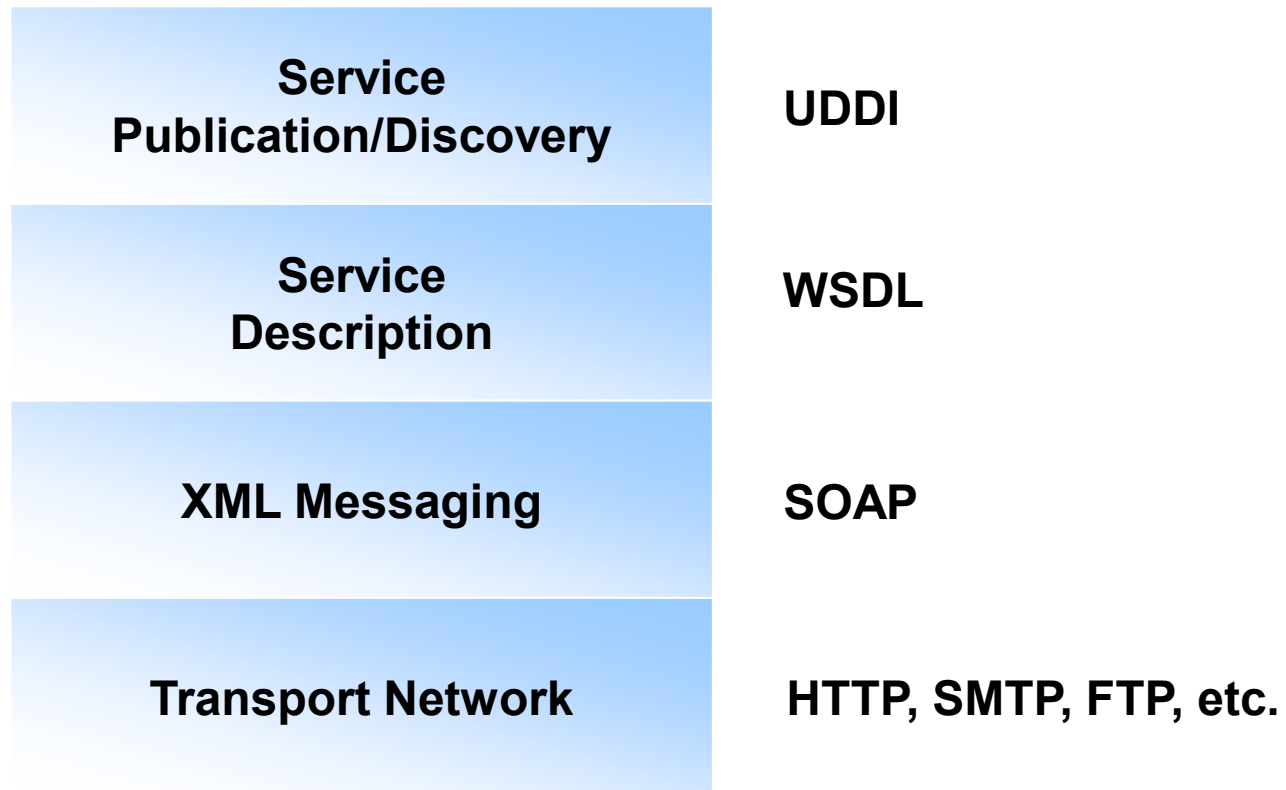


SOAP: Simple Object Access Protocol

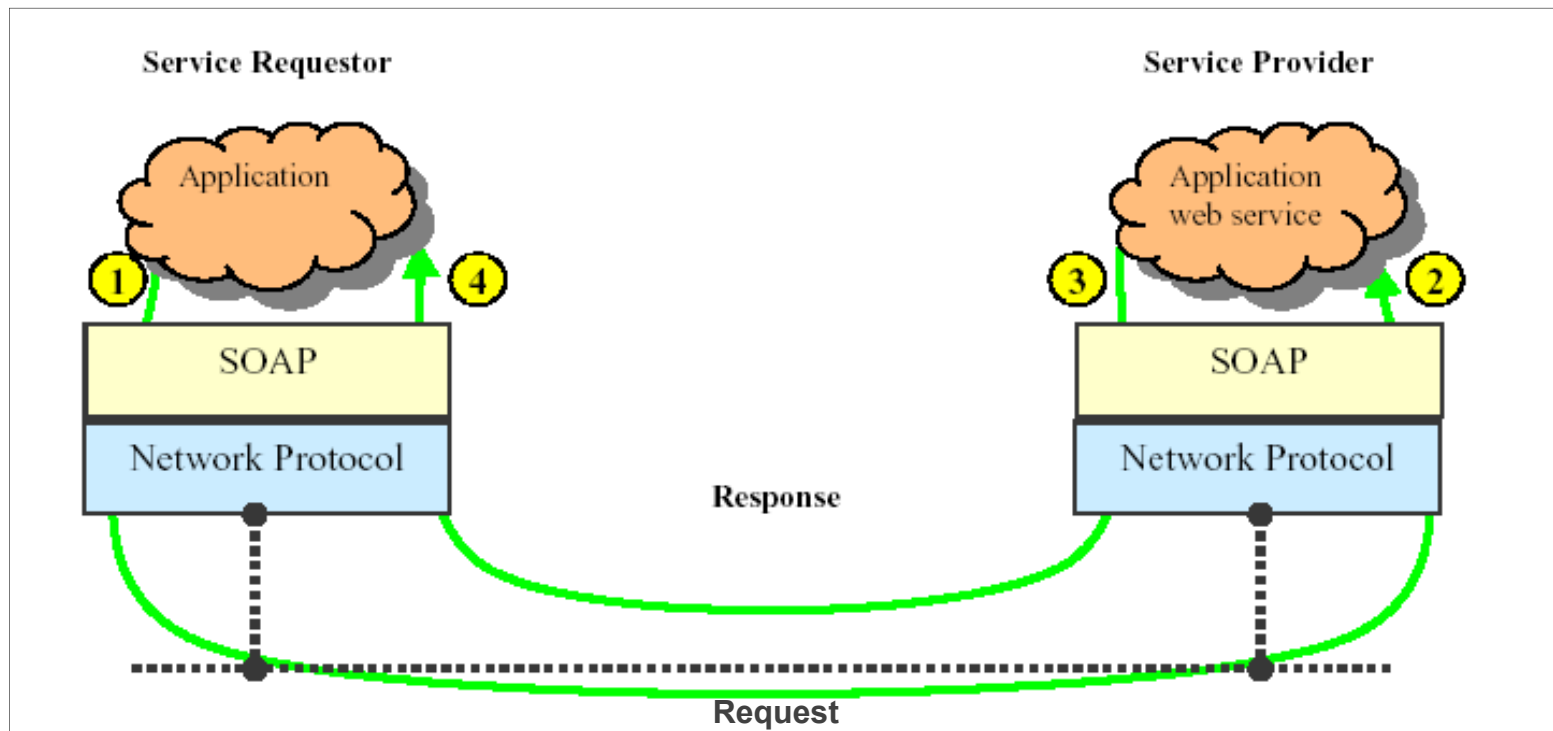
An Overview

The Web Services Stack



SOAP (Simple Object Access Protocol)

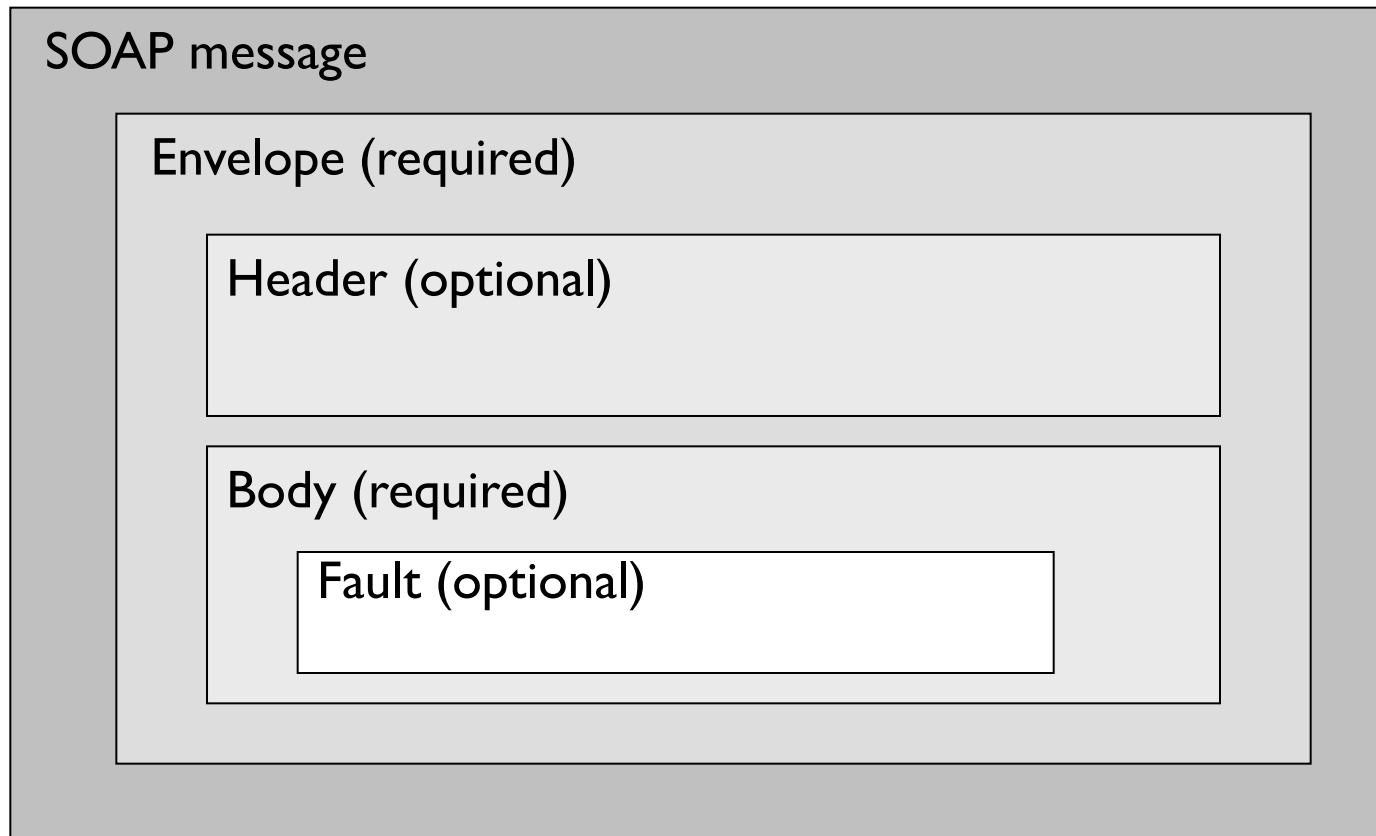
- SOAP is a lightweight protocol for **exchange of information** in a decentralized, distributed environment.



Why SOAP

- Inter-application communication between systems written in arbitrary languages, across the Internet.
- An XML-based protocol for exchanging messages over Internet transport protocols, like HTTP, SMTP, FTP, etc.
- SOAP is platform-independent.
- Generation of SOAP messages available in popular programming languages:
 - C, Java, Perl, ..

Inside SOAP



Sample HTTP Interaction

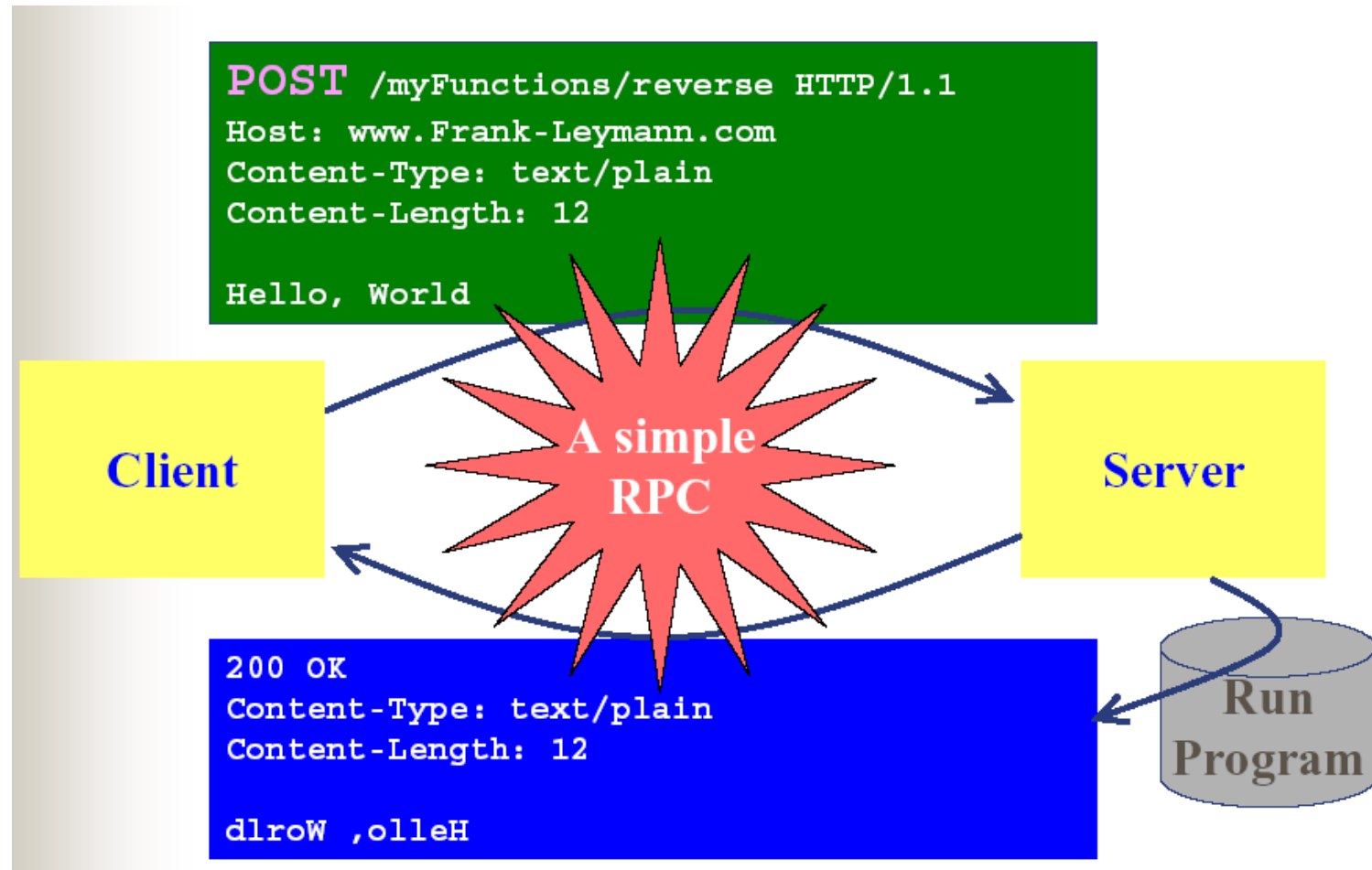
```
GET /MyPath/MyHomePage.html HTTP/1.1  
Host: www.Frank-Leymann.com  
Accept: text/html  
User-Agent: IE 5.5
```

Client

Server

```
HTTP/1.1 200 OK  
Content-Type: text/html  
  
<HEAD>  
    <TITLE>Frank `s Homepage</TITLE>  
</HEAD>
```

HTTP POST: Invoking Code



A Simple SOAP RPC

(SOAP Message Embedded in HTTP Request)

```
POST /StockQuote HTTP/1.1
Host: www.stockquoteserver.com
Content-Type: text/xml; charset="utf-8"
Content-Length: nnnn
SOAPAction: "Some-URI"
```

Object Endpoint

```
<SOAP-ENV:Envelope
  xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"
  SOAP-ENV:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/">
  <SOAP-ENV:Body>
    <m:GetLastTradePrice xmlns:m="Some-URI">
      <symbol>DIS</symbol>
    </m:GetLastTradePrice>
  </SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```

Method name

Input parameter

A simple soap response

(SOAP Message Embedded in HTTP Response)

```
HTTP/1.1 200 OK
```

```
Content-Type: text/xml; charset="utf-8"
```

```
Content-Length: nnnn
```

```
<SOAP-ENV:Envelope
```

```
  xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"
```

```
  SOAP-ENV:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/" />
```

```
  <SOAP-ENV:Body>
```

```
    <m:GetLastTradePriceResponse xmlns:m="Some-URI">
```

```
      <Price>34.5</Price>
```

```
    </m:GetLastTradePriceResponse>
```

```
  </SOAP-ENV:Body>
```

```
</SOAP-ENV:Envelope>
```

SOAP is XML-based

- It is an **XML-based** protocol that consists of three parts:
 - an **envelope** that defines a framework for describing what is in a message and how to process it,
 - a set of **encoding rules** for expressing instances of application-defined data types, and
 - a **convention** or agreement for representing remote procedure calls and responses.

The three standard aspects of SOAP

- ▶ Overall message format

A SOAP message is an **envelope** containing zero or more **headers** and exactly one **body**.

- ▶ The SOAP **encoding rules**

defines a serialization mechanism that can be used to exchange instances of application-defined data types. (based on XSD)

- ▶ The SOAP **RPC** representation

defines a convention that can be used (optional) to represent remote procedure calls and responses (if not, **message-oriented** style)

Working example: A soap request

POST /servlet/rpcrouter HTTP/1.1

Host: www.messages.com

Content-Type: text/xml; charset="utf-8"

Content-Length: nnnn

SOAPAction: ""

<SOAP-ENV:Envelope

xmlns:SOAP-ENV=<http://schemas.xmlsoap.org/soap/envelope/>

<SOAP-ENV:Body>

<ns1:getMessage xmlns:ns1="urn:NextMessage"

SOAP-ENV:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/">

<UserID xsi:type="xsd:string">JDoe</UserID>

<Password xsi:type="xsd:string">0JDOE0</Password>

</ns1:getMessage>

</SOAP-ENV:Body>

</SOAP-ENV:Envelope>

Working example: soap response

HTTP/1.1 200 OK

Content-Type: text/xml; charset="utf-8"

Content-Length: nnnn

<SOAP-ENV:Envelope>

xmlns:SOAP-ENV=<http://schemas.xmlsoap.org/soap/envelope/>

<SOAP-ENV:Body>

<ns1:getMessage xmlns:ns1="urn:NextMessage"

SOAP-ENV:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/">

<return xsi:type="xsd:string">Call helpdesk!</return>

</ns1:getMessage>

</SOAP-ENV:Body>

</SOAP-ENV:Envelope>

SOAP Endpoint Reference

85.34.235.95

80

/servlet/rpcrouter/getMessage

POST /servlet/rpcrouter HTTP/1.1

Host: www.messages.com

Content-Type: text/xml; charset="utf-8"

Content-Length: nnnn

SOAPAction: ""

<SOAP-ENV:Envelope

xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"

<SOAP-ENV:Body>

<ns1:getMessage xmlns:ns1="urn:NextMessage"

SOAP-ENV:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/">

<UserID xsi:type="xsd:string">JDoe</UserID>

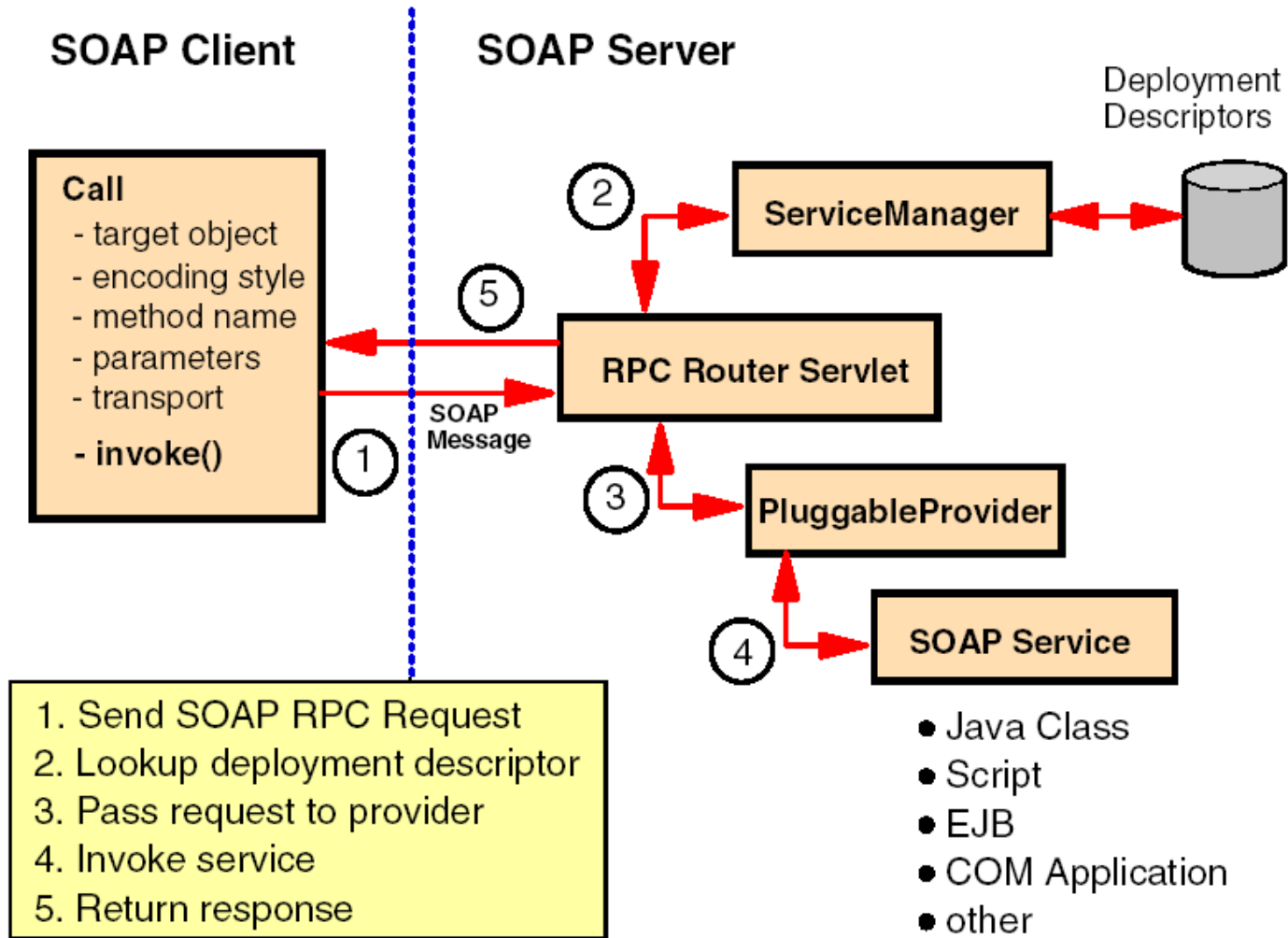
<Password xsi:type="xsd:string">0JDOE0</Password>

</ns1:getMessage>

</SOAP-ENV:Body>

</SOAP-ENV:Envelope>

SOAP client-server interaction



Apache SOAP architecture

