SOAP-Based vs. RESTful Web Services

A Case Study for Multimedia Conferencing

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Reference:
Jagdeep Singh, Suhib Younis Bani Melhem, Roch H. Glitho, Fatna Belqasmi, "SOAP-Based vs. RESTful Web Services: A Case Study for Multimedia Conferencing", IEEE Internet Computing, vol. 16, no. , pp. 54-63, July-Aug. 2012, doi:10.1109/MIC.2012.62

Web Services?

Application → Web Application

SOAP?

Simple Object Access Protocol

REST?

Representational State Transfer

SOAP: used to exchange messages (commonly exchanged over HTTP)
meets REST principals: RESTful

Service Architectures

- SOAP-based:

a service provider

a service registry

a service requestor

- REST:

a client-server architecture

REST uses a client-server architecture. REST doesn’t restrict client-server communication to a particular protocol, but is most commonly used with HTTP. RESTful Web services are deemed more lightweight because they don’t use SOAP or any other application layer protocol except for HTTP.

SOAP 请求：

```
POST /InStock HTTP/1.1
Host: www.example.org
Content-Type: application/soap+xml; charset=utf-8
Content-Length: nnn

<?xml version="1.0"?>
<soap:Envelope
xmlns:soap="http://www.w3.org/2001/12/soap-envelope"
soap:encodingStyle="http://www.w3.org/2001/12/soap-encoding">

  <soap:Body xmlns:m="http://www.example.org/stock">
    <m:GetStockPrice>
      <m:StockName>IBM</m:StockName>
    </m:GetStockPrice>
  </soap:Body>

</soap:Envelope>
```

SOAP 响应：

```
HTTP/1.1 200 OK
Content-Type: application/soap+xml; charset=utf-8
Content-Length: nnn

<?xml version="1.0"?>
<soap:Envelope
xmlns:soap="http://www.w3.org/2001/12/soap-envelope"
soap:encodingStyle="http://www.w3.org/2001/12/soap-encoding">

  <soap:Body xmlns:m="http://www.example.org/stock">
    <m:GetStockPriceResponse>
      <m:Price>34.5</m:Price>
    </m:GetStockPriceResponse>
  </soap:Body>

</soap:Envelope>
```

SOAP

```
POST /transaction HTTP/1.1
Host: 127.0.0.1

from=1&to=2&amount=500.00
```

REST

GET/POST/PUT/DELETE

SOAP envelope while
RESTful request’s body is empty: URI and 4 methods

A Case Study for Multimedia Conferencing

Here, we offer a case study comparing SOAP-based Web services with their RESTful counterparts for developing multimedia conferencing applications.
Multimedia conferencing applications — such as audio/video conferencing, multiparty online games, and distance learning — are an important category of Web applications. Such applications are rapidly increasing in popularity, and developers are using them in different application areas. Like all Web applications, conferencing applications can be developed using Web services based either on SOAP or on REST principles.

A Case Study for Multimedia Conferencing

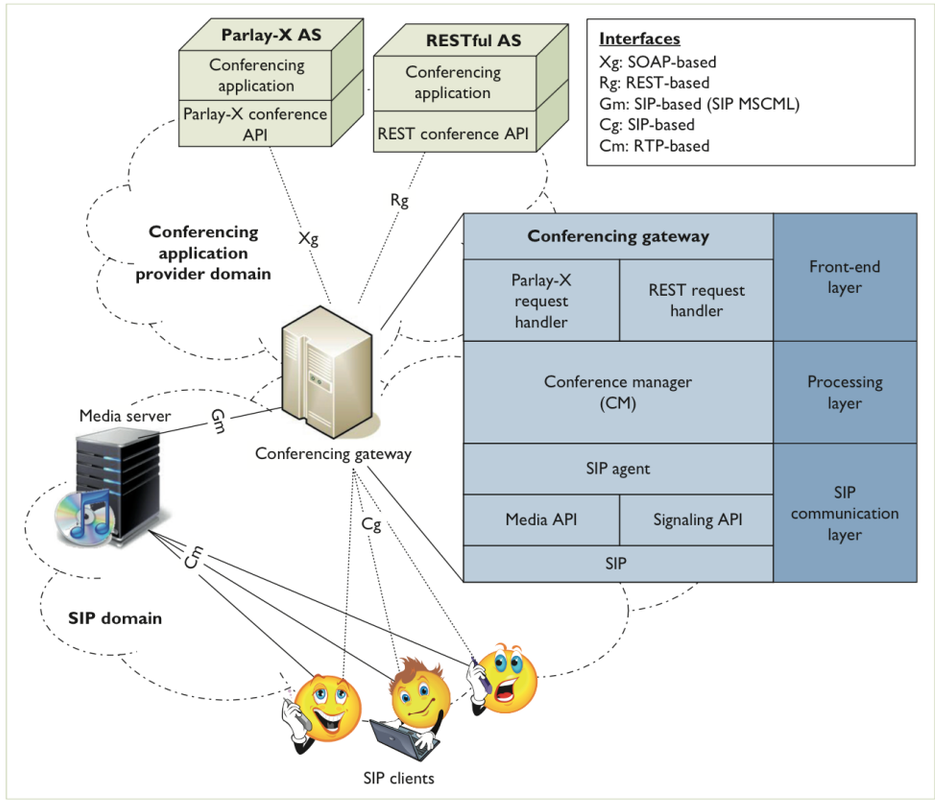
1. SOAP-based: Parlay-X conferencing service

- conference
- participant
- media

2. RESTful: counterpart, the same functionality

The conference is the uniquely identified context, to which participants can be added and removed. The participant is any party that participates in the conference. The media represents the media stream to sup- port a participant’s communication (such as audio, video, or chat) and the stream direction (that is, in, out, or bidirectional).

Case Study Architecture



REST-based Interfaces

Table 1. Conferencing service resources.

Resources	URL	HTTP action
List of conferences	http://conference.com/	**POST**: create a new conference
Individual conference	http://conference.com/{confId}	**GET**: return information about an individual conference
		DELETE: end an individual conference
List of participants	http://conference.com/ {confId}/participants/	**GET**: return the list of individual conference participants
		POST: invite a participant
Individual participant	http://conference.com/{confId}/ participants/ {participantURI}	**GET**: return information about a specific participant
		DELETE: disconnect an individual participant
Participant media	http://conference.com/{confId}/ participants/ {participantURI}/ {media}	**PUT**: Add media for an individual participant
		DELETE: Delete media for an individual participant

- SOAP：rigid body, extra information(e.g. envelope)
- REST：lightweight, no application layer protocol other than HTTP, statelessness

REST: most popular internet software architecture