Chapter VII–

SOAP Based - Web Services For Value Added Services (VAS) in NGNs

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Outline

1. Technologies
2. Applications to NGN
Technologies

- UDDI
- UDDI
- WSDL
- SOAP
- HTTP, FTP, SMTP, MQ, IIOP, etc
- Service Publication and Discovery
- Service Description
- XML-Based Messaging
- Network
- Security
- Management
- QoS
Technologies

2. XML (already discussed)
3. HTTP (already discussed)
4. WSDL
5. SOAP
6. UDDI
SOAP

- Introduction
- Message structure
- Bindings
Introduction

SOAP is
- A simple XML based communication protocol between applications
- Platform and language independent

Purpose: Get the XML data from one point to another point over the network
- Provider / UDDI
- Requestor / UDDI
- Provider / Requestor

W3C recommendation
- Effort initiated by IBM and IONA
Introduction

Purpose: Get the data from one point to another point over the network

- One way XML messaging protocol that can be used to build models such as
  - Request / reply
  - Asynchronous messaging
  - Event notification

- Entities
  - Sender
  - Receiver
  - Intermediary
Message structure

Several parts

- **Envelope** (mandatory): Start and end of message
- **Header** (optional): Optional attributes used in the processing
  - May be negotiated
  - Examples: transactions, priority, QoS, security
- **Body** (mandatory): Message being sent
  - Actual message
  - Fault codes
- **Attachment** (optional): Self-explanatory
- **RPC convention** (optional): Requirements for RPC mapping
  - Target URI for the SOAP node, procedure name/signature
- **SOAP Encoding** (optional): How to represent data being transmitted in the message
  - Encoding scheme
Message structure

SOAP Envelope

SOAP Header

- SOAP Header Block
- SOAP Header Block

SOAP Body

- SOAP Body Block
- SOAP Body Block

RPC Convention

SOAP Encoding
Bindings

Purpose: Specification of how SOAP messages may be passed from one node to another node using a concrete lower layer protocol

Existing bindings
- HTTP
- SOAP over email

HTTP binding
- HTTP Request URI used to identify SOAP node
- Commonly used HTTP request for carrying SOAP messages: HTTP Post
Additional information on SOAP ...
Reminder: SOAP message sender and receiver ...

Concepts
- Sender
  - Initial sender
  - Intermediary sender
- Receiver
  - Intermediary receiver
  - Ultimate receiver

Nodes
- Sender
- Intermediary (Intermediary sender + intermediary receiver)
- Ultimate receiver
Why SOAP? Why not just send XML documents in HTTP or via Email ...

Give application level control:
- Priority
- Security
- And other ....

Via header processing by intermediaries:
- Take actions according to headers
- Replace headers
- And others ..

And independently of the binding (e.g. email, HTTP):
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WSDL
WSDL

WSDL is an XML-based language for describing Web services and how to access them

Purpose: XML grammar for describing a Web service
- Formats and protocols
  - Input data to the Web service
  - Operations to be performed on the data
  - Binding to a transport protocol

Initially developed by a handful of companies (e.g. IBM, Microsoft)
Now a W3C recommendation
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UDDI ...

- Introduction
- Content
- Publishing APIs
- Inquiry APIs
Introduction

Purpose: Enable the publication, the discovery and the usage of Web services

- Integral part of the Web services infrastructure
  - Public
  - Semi-public (e.g. circle of trust)
  - Private (e.g. enterprise)
- Data bases accessible via SOAP APIs
  - Publishing API
  - Inquiry APIs
Introduction

UDDI.ORG
- Initiated by a handful of companies (e.g. IBM, Microsoft)
- Now open to all companies
- Produce specifications for UDDI

Initial public UDDI repository
- Operated by founders of UDDI.ORG, later joined by HP and SAP
- Synchronized data bases called operator sites (one at each site)
- Test UDDI
  - Allow requestors and providers to test their UDDI clients
- Production UDDI
  - Allow providers to actually publish Web Services and requestors to actually inquire about Web services
    - Need to register with one of the operators for publishing services (authorization)
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The content ...

White pages
Business address
Contact person / number

Yellow pages
More info about the business
- Type of business
- Industry type
- Products / services

Green pages
Technical information about the services
- Service features/functionality
- Pointer to the WSDL file
The content ...

UDDI data model

Business entity
- Top level structure
- Description of the entity for which information is being registered
- Include the list of Web services provided by the entity

Business services
- Name and description of services being published
- Include binding templates

Binding templates
- Information about the services
- Include entry point for accessing the services

tModel
- Fingerprint, collection of information that uniquely identify the service

Publisher assertion
- Business relationship between business entities (e.g. subsidiary of ..)
Data model …
Publishing APIs

Some examples

- Add Publisher Assertions
- Save/Delete binding
- Save/Delete Business
- Save/Delete Service
- Save/Delete tModel
- Set/Get Publisher assertions
- Delete_Publisher_Assertion
- Get Registered assertions
- Get Assertions status report (used by UDDI operators)
Inquiry APIs

Some examples

- Find binding
- Find business
- Find related business
- Find service
- Find tModel
- Get binding details
- Get business details
- Get tModel details
Putting it together …
Examples of tool kits

- Apache / Axis
- BEA Weblogic
- SunOne
- .Net
- Systinet
- Get tModel details

Usage simplicity depends on:
- Friendly user interface
- Detail level required
To probe further ...

- F. Curbera et al., Unraveling the Web services Web: An Introduction to SOAP, WSDL and UDDI, IEEE Internet Computing, Vol. 6, No2, March-April 2002, pp. 86-93
- E. Newcomer, Understanding Web Services: XML, WSDL, and UDDI, Addison Wesley, 2002
- W3C specifications
- OASIS specifications (UDDI)
- http://www.projectliberty.org/
- http://www.bea.com/
Applying Web services to value added service engineering in NGN

1. Parlay-X
2. OMA Deployment patterns
Parlay-X ...

1. Introduction
2. Architecture
3. The services
Introduction

Application interfaces
- Aim at covering all telecommunication capabilities
  - Stand alone capabilities (e.g. presence, call control)
  - Combined capabilities (presence + call control)
The standardized services

1. Call control
2. Messaging
   - SMS
   - MMS
3. Payment (e.g. volume charging)
4. Account management (e.g. account credit expiration date query)
5. User status (online / offline)
6. Terminal location
Parlay-X Call Control ...

Make a call
Get call information
End call
Cancel call request
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Parlay-X Call Control ...

Handle busy
Handle Not reachable
Handle No answer
Handle off Hook
Parlay-X Conferencing Basics…

Allow the creation of a multimedia conference call and the dynamic management of:

- Conference
- Participants
- Media
Parlay-X Conferencing Basics…

Service model entities
- Conference
  “Context / virtual room” to which participants can be added
- Participants
  Parties involved in the conference
- Media
  audio/video/chat
Parlay-X Conferencing Basics…

- Conference
  “Context / virtual room” to which participants can be added
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  Parties involved in the conference
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  audio/video/chat
Parlay-X Conferencing Basics…

Create conference
- Create a multimedia conference with initially no participant

GetConference Info
- Information on status (e.g. active, terminated)

EndConference

Several possibilities
- Maximum duration has expired
- All participants have left
Parlay-X Conferencing Basics…

inviteParticipant
  - Add a new participant to the conference
disconnectParticipant
  - Disconnects the participant
addMediaForParticipant
  Executed on a single participant
  - Add a media stream to the media set used by participant
Parlay-X Conferencing Basics...

deleteMediaForParticipant
disconnectParticipant
getParticipantInfo
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Parlay-X MMS …

Send Message
Get Message Delivery Status
Get Received messages
Get messages URIs
Notify message reception
Examples of deployment patterns
Deployment patterns

OMA
- Industry association created in 2002
- Focus on mobile services
- Aims at:
  - Consolidating standards for wireless services (e.g. 3GPP/PP2, IETF, W3C)
  - Producing new standards if needed
  - Tackling the two issues
Examples of deployment patterns

The adapter pattern
Examples of deployment patterns

The gateway pattern

Requestor → Gateway → Web service

1 → 2 → 3

4 →
Examples of deployment patterns

The proxy pattern
Examples of deployment patterns

The delegate pattern
Examples of deployment patterns

The orchestrator pattern
Examples of deployment patterns

The filter pattern
Examples of deployment patterns

The workflow pattern
To probe further ...

- F. Curbera et al., Unraveling the Web services Web: An Introduction to SOAP, WSDL and UDDI, IEEE Internet Computing, Vol. 6, No2, March-April 2002, pp. 86-93
- E. Newcomer, Understanding Web Services: XML, WSDL, and UDDI, Addison Wesley, 2002