Web Services Based Architectures II

INSE 7110 – Winter 2006
Value Added Services Engineering in Next Generation Networks
Week #12
Application areas

Any area that requires program to program interactions over a network

Examples
- Value added service engineering in NGN
- Digital imagery
- Geographical information systems
Outline

- Web services for value added service engineering in NGN
- A digression on digital imagery
Applying Web services to value added service engineering in NGN

1. Parlay-X
2. OMA
Two issues ...

1. Define Web services for making telecommunications capabilities available to applications in same or foreign domain
   - Call control
   - Presence
   - Location
   - Messaging
Two issues …

2 - Enable the use of Web services in telecommunications by providing common / supporting functions such as:

   Billing
   Security -
      - Authentication
      - Authorization
      - Non repudiation
      - Others
   Service management
      - registration
      - Discovery
      - Others
1. Introduction
2. Architecture
3. The services
Introduction

1. **Specifications available in their first version**
   - White paper + actual specifications
   - Last version released in 2005

2. **Application interfaces**
   - Focus: First issue
   - Aim at covering all telecommunication capabilities
     - Stand alone capabilities (e.g. presence, call control)
     - Combined capabilities (presence + call control)

3. **Use the reference Web service principles (e.g. coarse grained) technologies (e.g. WSDL)**
Architecture

Parlay Applications

Parlay X Applications

Parlay X Web Services

Parlay X APIs

Parlay Gateway

Parlay APIs

Network Protocols (e.g. SIP, INAP etc)

Increasing abstraction

Network Elements
The 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
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
- Participants
  Parties involved in the conference
- Media
  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
Parlay-X MMS …

Send Message
Get Message Delivery Status
Get Received messages
Get messages URIs
Notify message reception
1. Introduction
2. Architecture (ARCH)
3. OMA Web Service Enabler (OWSER)
Introduction

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
Architecture

Aim at providing a general architecture for mobile services

- Requirements
- Principles
- Functional entities
- Common framework
Principles

- Signalling protocol neutrality and independence from programming languages, operating systems and so on
- Leverage existing standards
- Interoperability, scalability
- Service adaptability
- Consistency with Internet models
OMA Web service enabler (OWSER)

Aim at providing solutions to common problems faced by designers when using Web services in an OMA environment

- Practical deployment patterns
- Common functions (e.g. charging, security)
- Network Identity specifications (i.e. specific aspects of security – Based on Liberty alliance specifications)
- WSDL Style guidelines
- Test requirements
Examples of deployment patterns

The adapter pattern

1. Requestor → Adapter
2. Adapter → Legacy
3. Legacy → Adapter
4. Adapter → Requestor
Examples of deployment patterns

The gateway pattern

Requestor → Gateway → Web service
Examples of deployment patterns

The proxy pattern

1. Legacy
2. Proxy (Requestor)
3. Web service
4. Legacy
Examples of deployment patterns

The delegate pattern

Legend:
- **Legacy**
- **Web service**
- **Delegate (WS1)**

Diagrams:
1. Legacy to Web service
2. Web service to Delegate (WS1)
3. Delegate (WS1) to Web service
4. Web service to Legacy
Examples of deployment patterns

The orchestrator pattern

1. Requestor
2. Orchestrator
3. Web Service 1
4. Web Service 2
5. Web Service 3

1. Requestor to Orchestrator
2. Orchestrator to Web Service 1
3. Orchestrator to Web Service 2
4. Orchestrator to Web Service 3
5. Orchestrator to Requestor
Examples of deployment patterns

The filter pattern

Requestor -> Filter -> Web Service 1

1 -> 2 -> 3
Examples of deployment patterns

The workflow pattern

1. Requestor 1/ Web service 4
2. Requestor 2/ Web service 1
3. Requestor 3/ Web service 2
4. Requestor 4/ Web service 3
Common functions

Common functions are key to interoperability

Common supporting technologies

- XML 1.0
- SOAP 1.0
- WSDL 1.1
- HTTP 1.1
- UDDI 2.0X
- Use of WS-I profile
Common functions

Common functions are key to interoperability

Security (Identification of relevant standards and normative security technologies)
- Authentication
- Data integrity
- Confidentiality
- Key management
- Access control / authorization
- Non repudiation
Common functions

Common functions are key to interoperability

Service management (Identification of specific versions of UDDI)
- Registration
- Publication
- Discovery
A quick assessment

1. Parlay-X Web services
   - True Web services
     - Coarse grained approach (unlike WSDL version of Parlay specifications)
   - Work done “independently” of OMA
     - Situation is evolving (e.g. joint meetings are planned)

2. OMA
   - Tackle critical issues such as common functions
   - Integration of existing standards may take longer than planned
A Digression on Digital Imagery

1. Introduction
2. Business model
3. Examples of interactions
Introduction …

Common Picture Exchange (CPXe)

Purpose
- Automation of manipulation, printing and sharing digital images

Involved companies
- Most companies active in the digital imaging industry (e.g. Kodak, HP, Konica, Olympus and others)
Changes to the original Web service model

- Motivation:
  - UDDI does not provide the level of fine granularity required by the industry
    - Where to get poster size glossy print in a given city
    - Located at a given distance from an hotel
    - With given opening hours

- Changes
  - Possibility to give much more low level granularity about services
  - Possibility for searching such type of information
**Business model**

Broker (Human + Agent)
Two types of broker:
- UDDI
- Service locator

Requestor (Human + agent)

Provider (Human + agent)
Note: Provider keeps Information accessible By service locator
Business model …

Service locators
- Interact (on behalf of service requestor with UDDI and/or catalogues to find service(s) meeting specific criteria
- May be deployed by providers to direct to her/his services
- May be deployed by an independent party
- Accessible via a standardized API

- Catalogues
  - Standardized way for service providers to provide more details about their services (e.g. closing hours of an outlet)
  - Kept in service provider domain
  - Accessible via a standardized API by:
    - Service requestors
    - Service locators
Business model ...

Catalogues (Examples of info)
- Service property list
- Store list
  - Street address
  - Hours of operations
- Product list
- Price list
- Category list
Examples of interactions ...

<table>
<thead>
<tr>
<th>Requestor</th>
<th>Locator</th>
<th>UDDI</th>
<th>Provider 1</th>
<th>Provider 2</th>
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<tbody>
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</table>

Search

Bind
Examples of interactions ...

Requestor | UDDI | Provider 1 | Provider 2

Search

Bind
Examples of interactions ...

Requestor  Provider 1

Search

Bind
To probe further ...

- Parlay-X
  - Parlay-X Web services white paper
  - Parlay-X Web services specifications including the one on conferencing
    http://www.parlay.org/specs/index.asp

- OMA
  - http://www.openmobilealliance.org/

Digital Imagery
T. Thomson et al., CPXe: Web services for Internet Imaging, IEEE Computer Magazine, October 2003