Lecture 20

Web Service Intermediaries (cont’d)

WS-Referral
Announcements

• Lab 6 available from web site
  – Due back December 9th (as are all of the labs)

• Final exam: December 18th
  – Sample questions available in
    D:\VSDev\Public\vijayk\final-sample.pdf
  – Review on December 9th

• Next lecture: Course Recap
  – Web Services Futures
  – Alternatives

• Course evaluations
(Review) WS-Referral

"Web Services Referral Protocol (WS-Referral) is a SOAP-based stateless protocol for inserting, deleting, and querying routing entries in a SOAP router. A SOAP router is a SOAP node that exposes SOAP message relaying as a Web service, either as a standalone service or in combination with other services."
WS-Referral versus WS-Routing

- WS-Routing provides a mechanism for describing the actual route of a message
- WS-Referral provides a mechanism to configure how SOAP routers will build a message path
  - i.e., controls what information is contained in the WS-Routing header
  - Itself realized as special SOAP messages directed towards routers
    - Contain elements called referral statements

Main use
- To delegate responsibility of processing some aspects of a service to a third party in a manner completely transparent to the end user
Referral Statements

Five elements

- **for** Indicates the URIs for which the referral is intended

- **if** A set of conditions the recipient must understand in order to use the referral
  - Two mandatory conditions defined: *invalidates*, *ttl*
  - Extensible

- **go** A set of URIs that defines the “via” element for messages intended for the “for” URI
  - Can choose one of this set

- **desc** Additional information that can be used by the recipient
  - To help make the routing decision (e.g., which of the go URIs to use)

- **refId** Unique identifier to identify referral instance
Example of a WS-Referral Statement

Example of a WS-Referral Statement

For any SOAP actor name matching the SOAP actor "soap://example.org/some.doc" or SOAP actors starting with "soap://example.org/topics/icebergs", if this referral is less than 12 hours (43,200,000 milliseconds) old then go via "soap://example.com/mirror".
Example: Removing the Referral

```xml
<r:ref xmlns:r="http://schemas.xmlsoap.org/ws/2001/10/referral">
  <r:for>
    <r:prefix>soap://example.org/topics/icebergs</r:prefix>
  </r:for>
  <r:if>
    <r:invalidates>
      <r:rid>uuid:09233523-345b-4351-b623-5dsf35sgs5d6</r:rid>
    </r:invalidates>
  </r:if>
  <r:go/>
  <r:refId>uuid:09233523-345b-4351-b623-5dsf35sgs5d6</r:refId>
</r:ref>
```
Referral Messages

Transmission of referral statements through three kinds of messages

• **Register** messages: “Push” mechanism for inserting routing entries
  – Recipient explicitly accepts or rejects the update

• **Query** messages: A SOAP router can be queried for referral statements using this kind of message

• **Referrals header**: Referral statement is piggybacked onto regular SOAP messages
  – Provides a mechanism for a SOAP router to inform its client of a better route to it

• Specification lays out format for request/response messages for each of the above (including fault elements)
Support for WS-Routing in the .NET Framework

- Part of the Web Services Extension (WSE) package
- Referral statements stored in an on-disk XML file, specified to the application using the web.config file
  - Automatic look-up and registration of new referrals into this file

[Code walkthrough]
- Setting up web.config to point to XML file storing referral entries
- Statically adding referral entries to the file
- Dynamically adding referral entries
  - Via context.Referal structure