Web Services

CS 360 Internet Programming

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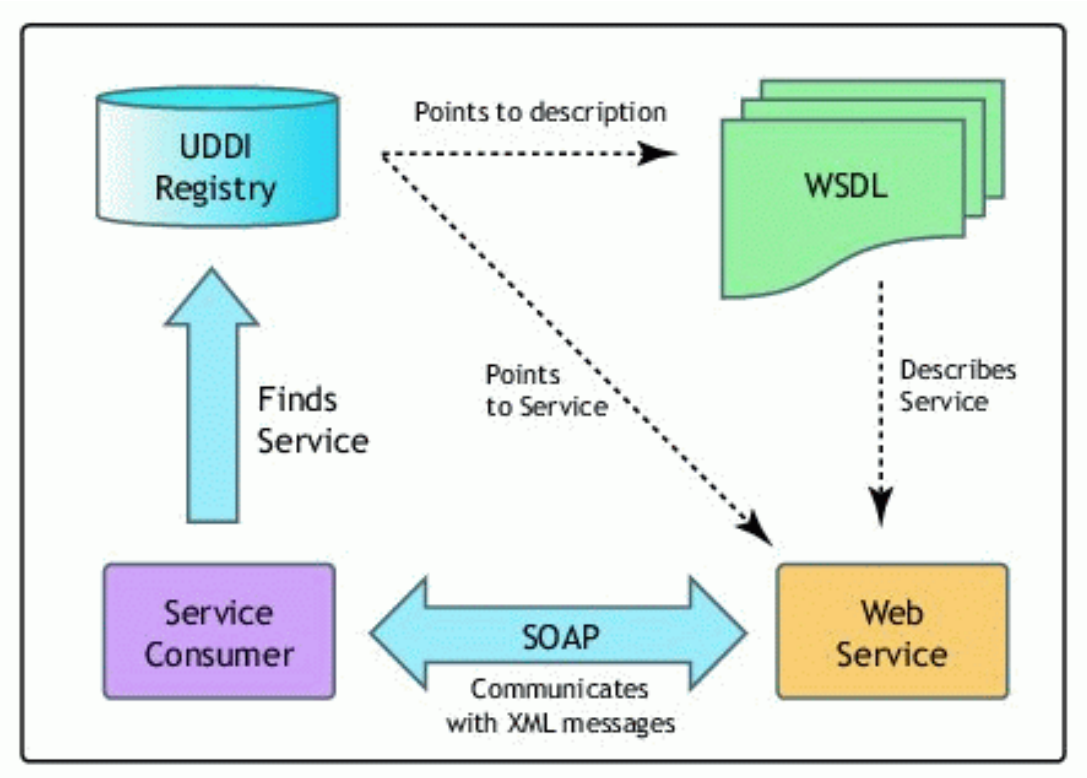
Web Services

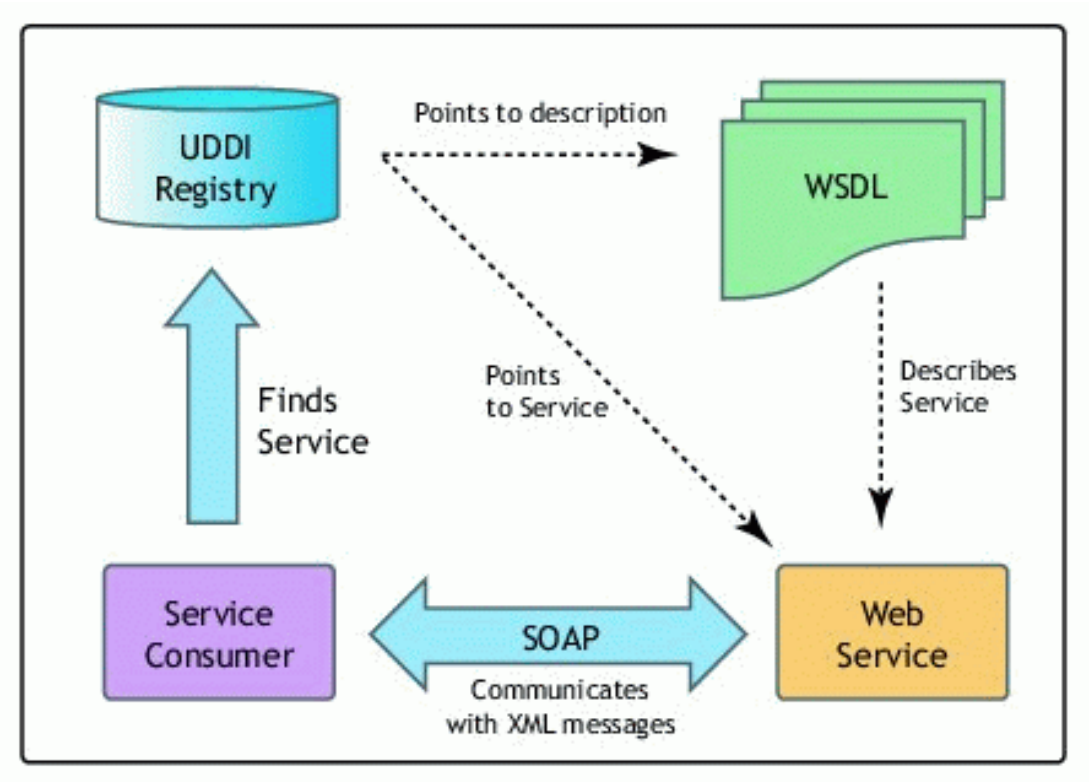
- create a Service Oriented Architecture
- *loose coupling among interacting software agents*
  - agents are generally programs, not users
  - separate data from computing and viewing
- example
  - a company needs to ship some packages overseas, so it uses a program to look up package delivery services, compare prices, purchase the best deal, and schedule pickup
- requires
  - service discovery
  - interfaces
  - standardized and extensible protocols
- XML.com

Web Services Architecture



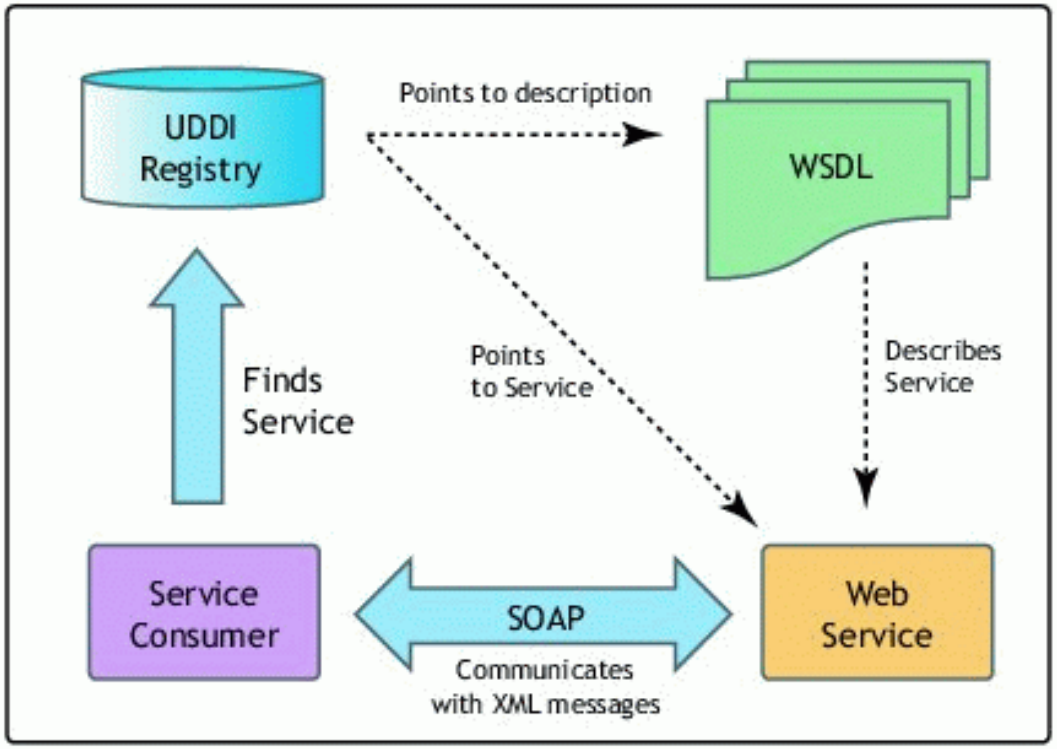
- UDDI: Universal Discovery, Description and Integration
  - platform-independent, XML-based registry listing available web services
  - a place where service providers can advertise available services and do business with partners

Web Services Architecture



- WSDL: Web Services Description Language
  - XML format for describing web services
  - standardized by W3C: Web Services Description Working Group
  - example: see Section 2.1 of the WSDL Version 2.0 Primer

Web Services Architecture



- SOAP: Simple Object Access Protocol
  - protocol for obtaining services using XML messages
  - description of service must be in WSDL

SOAP Example

```
1  <soap:Envelope xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/">
2    <soap:Body>
3      <getProductDetails xmlns="http://warehouse.example.com/ws">
4        <productID>827635</productID>
5      </getProductDetails>
6    </soap:Body>
7  </soap:Envelope>
```

SOAP Example Continued

```
1  <soap:Envelope xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/">
2    <soap:Body>
3      <getProductDetailsResponse xmlns="http://warehouse.example.com/ws">
4        <getProductDetailsResult>
5          <productName>Toptimate 3-Piece Set</productName>
6          <productID>827635</productID>
7          <description>3-Piece luggage set. Black Polyester.</description>
8          <price>96.50</price>
9          <inStock>true</inStock>
10       </getProductDetailsResult>
11     </getProductDetailsResponse>
12   </soap:Body>
13 </soap:Envelope>
```

Representational State Transfer (REST)

- web services using the existing web architecture
  - observation: everything we need to do with web services is already supported in HTTP
  - simply need to add XML or JSON formats for results
- based on the concept of a resources, identified by URIs
- representation: data that encodes information about resource state, e.g. HTML, XML, JSON
  - GET: obtain a representation of a resource
  - DELETE: remove a representation of a resource
  - POST: update or create a representation of a resource
  - PUT: create a representation of a resource

REST Example: FamilySearch

```
https://api.familysearch.org/familytree/v2/person/KW3B-2DB?sessionId={sessionId}

<?xml version='1.0' encoding='utf-8'?>
<familytree xmlns="http://api.familysearch.org/familytree/v2">
  <persons>
    <person id="KW3B-2DB" requestedId="KW3B-2DB" version="25770197004">
      <assertions>
        <names>
          <name>
            <value type="Name">
              <forms>
                <form>
                  <fullText>John Henry Doe</fullText>
                  <pieces>
                    <piece type="Given">
                      <predelimiters></predelimiters>
                      <value>John</value>
                      <postdelimiters></postdelimiters>
                    </piece>
                    <piece type="Given">
                      <predelimiters></predelimiters>
                      <value>Henry</value>
                      <postdelimiters></postdelimiters>
                    </piece>
                    <piece type="Family">
                      <predelimiters></predelimiters>
                      <value>Doe</value>
                      <postdelimiters></postdelimiters>
                    </piece>
                    ...
```