
Web Services Overview



Using Eclipse WTP

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Agenda

- Web Services Concepts
- How Web Services are used
- Web Services tools in WTP
- Demo
 - Create a Web Service in Java
 - Call a Web Service
- Q & A



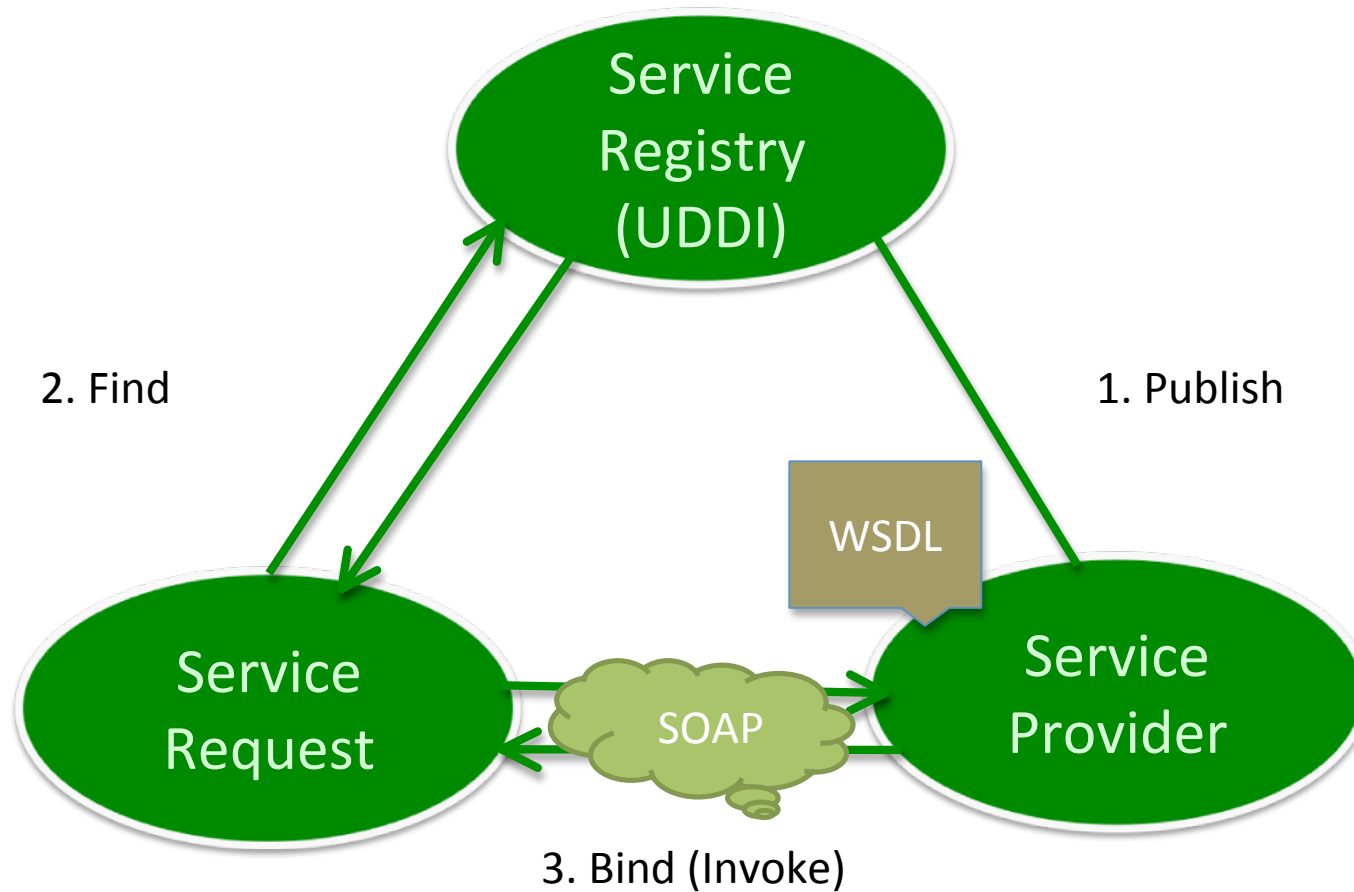
What are Web Services?

- Simple application components callable over the web
- Based on XML
- Building blocks for more complex Web Apps
- Loose coupling between endpoints
- Platform & language independent
- Interoperable

Why Web Services?

- The web is a heterogeneous environment
- Broad service orientation and integration requires loose coupling
- Past distributed technologies are too rigid
 - Corba: Extremely precise and complex
 - DCOM: Windows® platform centric
 - RMI: Java™ technology centric
- Other benefits
 - They are relatively simple (despite many standards)
 - They are interoperable (Thanks to WS-I)
 - They are platform independent
 - They are loosely coupled (over HTTP)
 - They perform quite well
 - They go extremely well with SOA

WSDL, SOAP & UDDI



SOAP

- Simple Object Access Protocol
- Submission to W3C by IBM, Microsoft[®], and others
- XML-based protocol:
 - An envelope and body
 - A set of data encoding rules
 - A message exchange convention
- Usually carried over HTTP but also over JMS and SMTP

Request

```
<?xml version="1.0" encoding="UTF-8"?>
<soapenv:Envelope
  xmlns:soapenv=http://schemas.xmlsoap.org/soap/envelope/
  xmlns:xsd=http://www.w3.org/2001/XMLSchema
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <soapenv:Body>
    <setFirstName xmlns="http://DefaultNamespace">
      <firstName>Greg</firstName>
    </setFirstName>
  </soapenv:Body>
</soapenv:Envelope>
```

Response

```
<?xml version="1.0" encoding="utf-8"?>
<soapenv:Envelope
  xmlns:soapenv=http://schemas.xmlsoap.org/soap/envelope/
  xmlns:xsd=http://www.w3.org/2001/XMLSchema
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <soapenv:Body>
    <setFirstNameResponse xmlns="http://DefaultNamespace"/>
  </soapenv:Body>
</soapenv:Envelope>
```

WSDL

- Web Service Description Language
- Submission to W3C by IBM, Microsoft[®], and others
- Extensible XML grammar describes:
 - Service endpoints (services and ports)
 - Service protocols (bindings)
 - Inputs, outputs and faults (messages and parts)
 - Data types (Schema elements and types)
- Standard extensibility elements for:
 - SOAP
 - HTTP
 - MIME

UDDI

- Universal Description, Discovery and Integration
- A telephone book for Web Services
- A standards-based specification for the publication, categorization, and discovery of products and services
- A consortium of business leaders via uddi.org
- Publication and discovery of businesses and services
- Public registry largely dismantled
- Private registries in use in many enterprises
 - IBM® WebSphere® Service Registry and Repository

- Web Service Interoperability
- An open industry organization chartered to promote Web Services interoperability across platforms, operating systems and programming languages
- The WS-I profiles bring clarity to core Web Service specifications
- The WS-I profiles define rules for interoperability
 - WS-I Basic Profile 1.0 (Aug 2003)
 - WS-I Basic Profile 1.1 (Aug 2004)
 - WS-I Basic Profile 1.2 (Oct 2006)
 - WS-I Simple SOAP Binding Profile 1.0 (Aug 2004)
 - WS-I Attachment Profile 1.0 (Aug 2004)
 - WS-I Basic Security Profile 1.0 Board Approval Draft (Oct 2006)
 - WS-I Basic Security Profile 1.1 Working Group Draft (Oct 2006)



Java Web Services Standards

- JSRs define the expression of Web Services in J2SE / J2EE
- JAX-RPC (JSR-101) 1.1
 - Java API for XML-Based RPC
 - Defines the Java programming model for Web Services and clients
 - Defines the mapping between WSDL + XML Schema and Java
 - Included in J2EE 1.4
- Web Services for J2EE (JSR-109 / 921) 1.1
 - Builds upon JAX-RPC
 - Defines the J2EE deployment model for Web services and clients
 - Included in J2EE 1.4

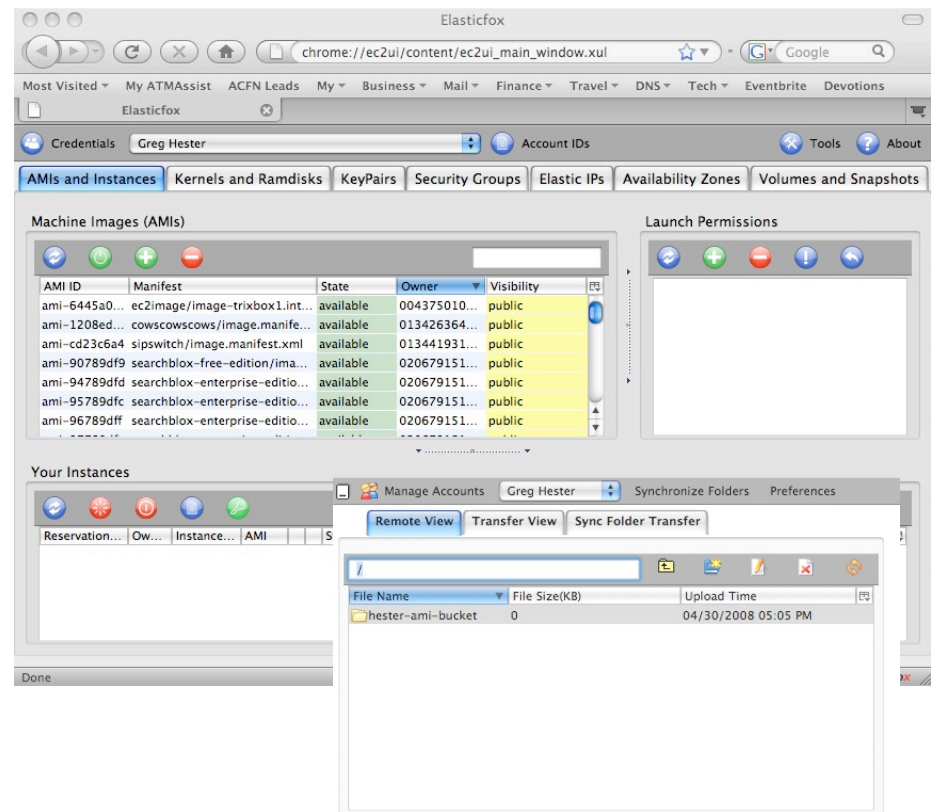
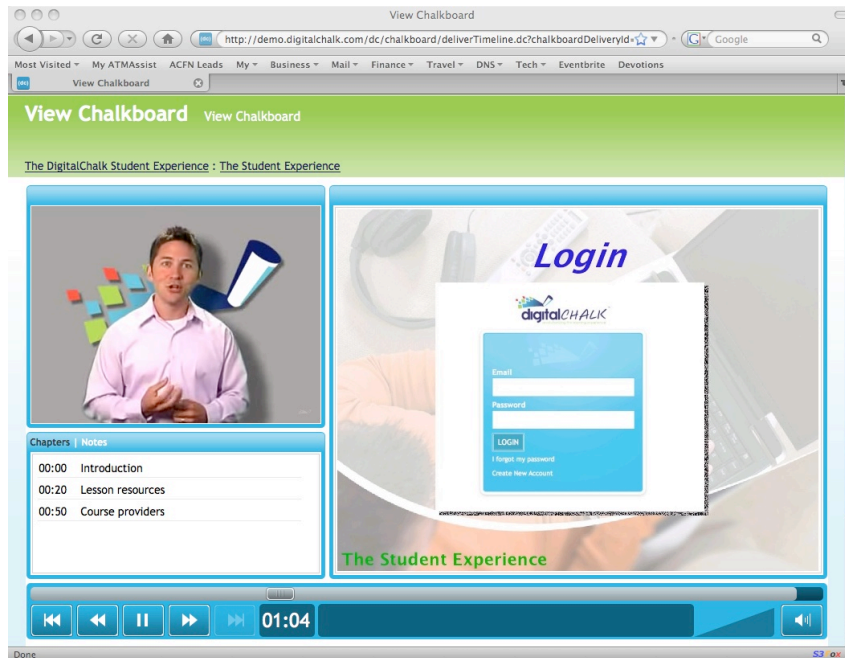
How Web Services are Used

- @ HMSA
 - Mostly VB/.Net - used for Inter-Plan projects
 - Security & auditing
 - Member information access
 - Provider information access
 - Document attachment storage in the ECMS (Documentum)
 - Some in Java
 - Provided by BCBSA
 - Custom built - WebSphere



How Web Services are Used

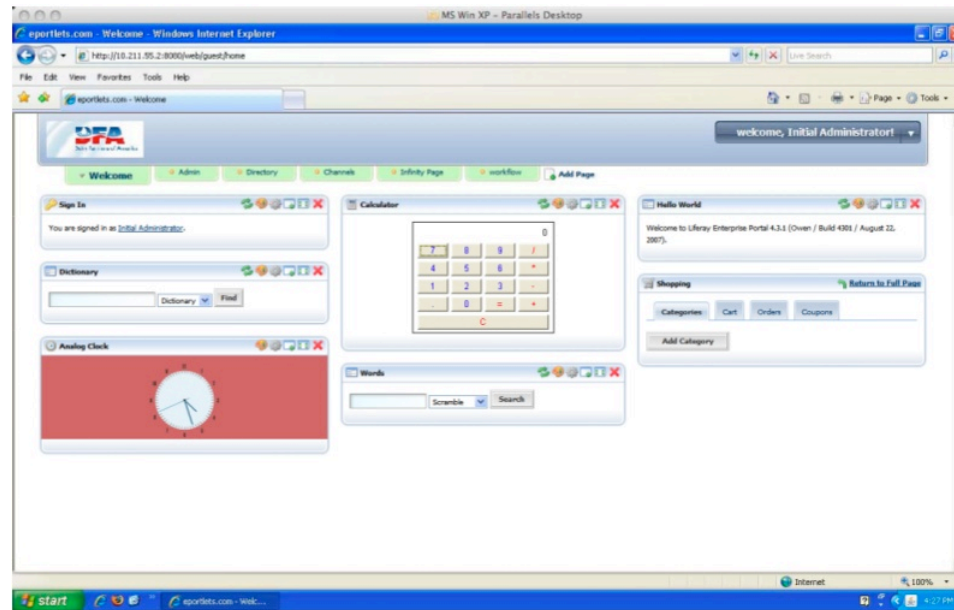
- @ DigitalChalk
 - DigitalChalk Registration and other services
 - IBM Transcription Service
 - Amazon Web Services
 - Moodle Integration
 - BlackBoard Integration
 - Salesforce.com integration





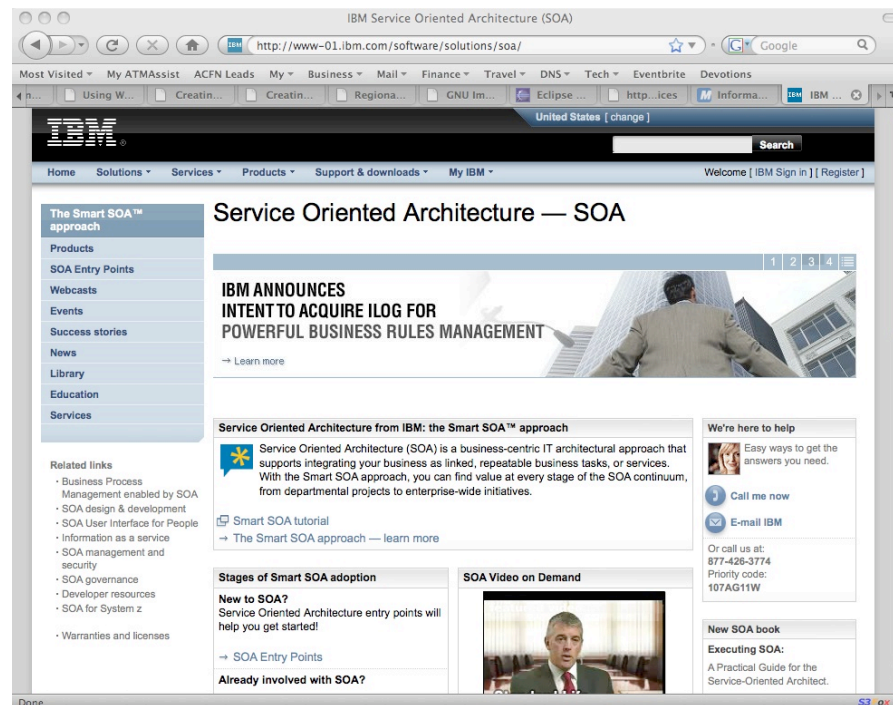
How Web Services are Used

- @ Pacific Hi-Tech
 - DigitalChalk Web Services
 - Infinity / Liferay - Open source Portal
 - User Registry
 - Portal Object Model exported as WS
 - Custom WS built for customers



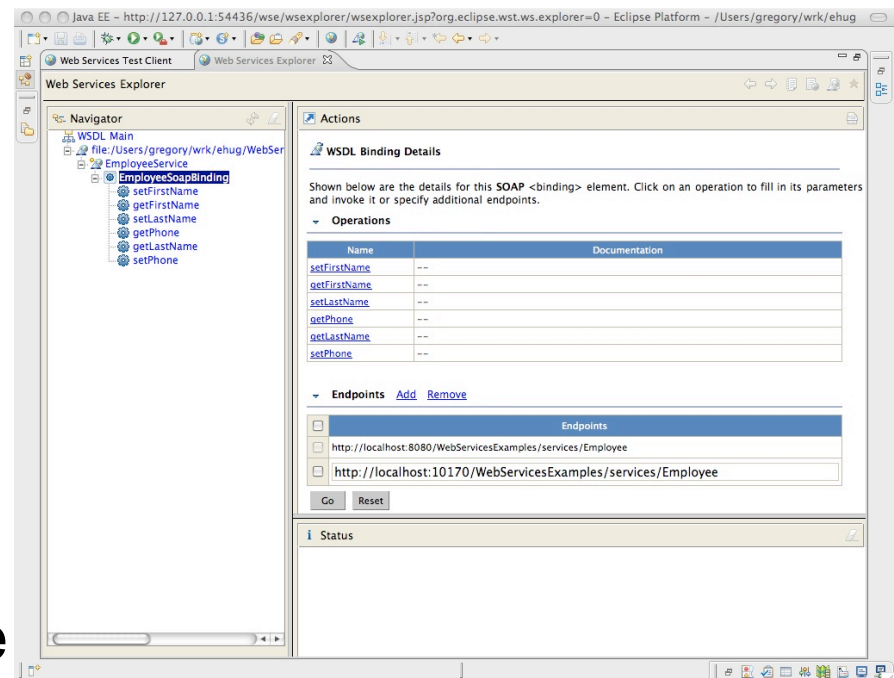
How Web Services are Used

- @ IBM
 - Backbone of IBM SOA
 - Web Service Registry - UDDI
 - IBM Lotus Portal
 - ... almost all products at IBM use WS



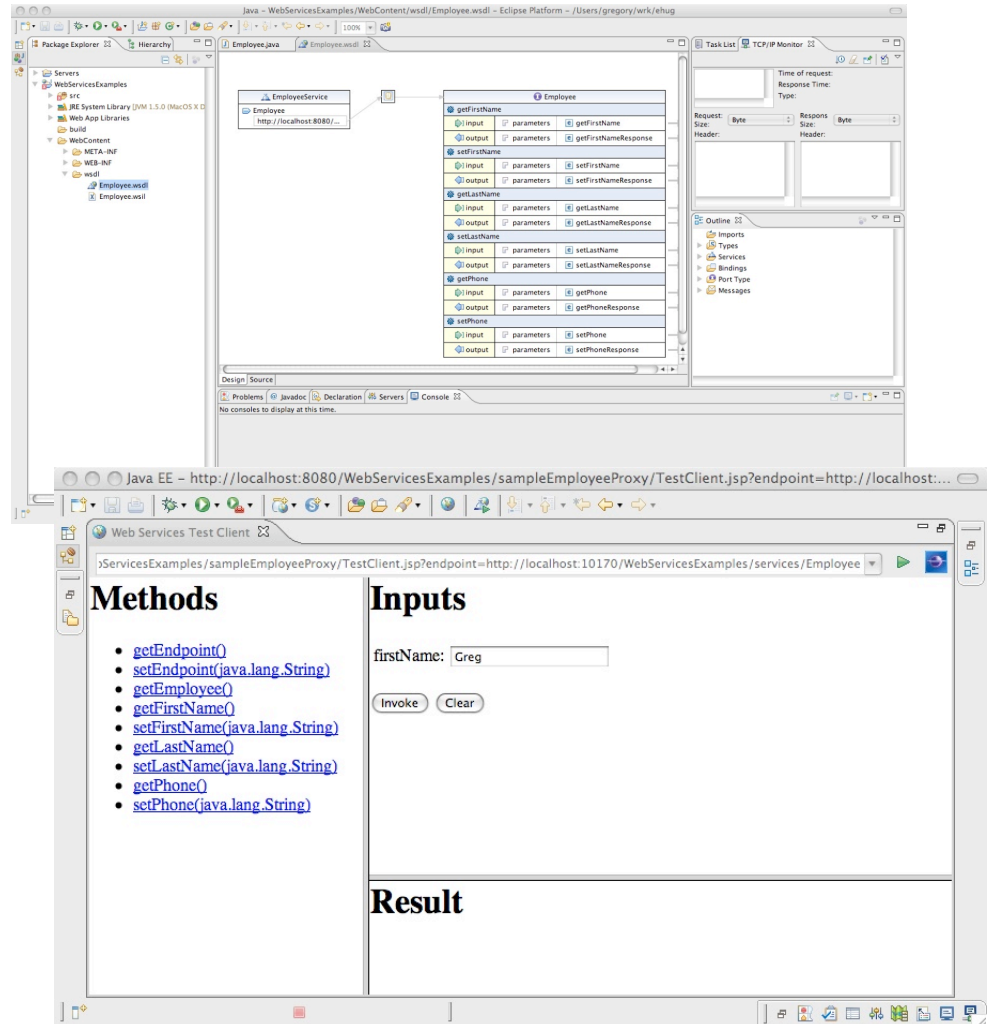
Web Services tools in WTP

- Web Services wizard
- Web Service Client wizard
- Web Service preference page
- Web Services Explorer
- Web Service Ant tasks
- WSDL Editor
- WSDL wizard
- WSDL and SOAP message validator



Demonstration

- Environment
 - Mac OS X 10.5.4
 - Java 1.5.0_13
 - Tomcat 5.5.25
 - Eclipse Ganymede - 3.4.0
 - WTP 3.0
- Demo
 - Bottom-up Java Web Service
 - Java Clients



The image shows two overlapping windows from an Eclipse IDE. The top window is the Eclipse IDE interface, displaying a project named 'Employee.wsdl'. The central editor shows a diagram of the 'Employee' service with its methods: 'getFirstName', 'setFirstName', 'getLastName', 'setLastName', 'getPhone', and 'setPhone'. Each method has input and output parameters listed. The bottom window is a browser titled 'Web Services Test Client' showing a list of methods and an input field for 'firstName' with the value 'Greg'. There are 'Invoke' and 'Clear' buttons. The 'Result' section is currently empty.

References

- WTP website: <http://www.eclipse.org/webtools>
- WTP download: <http://download.eclipse.org/webtools/downloads>
- WTP tutorials:
<http://www.eclipse.org/webtools/community/communityresources.html#tutorials>
- Introduction to Web Services Tools in WTP:
<http://eclipsezilla.eclipsecon.org/php/attachment.php?bugid=3820>
- WTP newsgroups: <news://news.eclipse.org/eclipse.webtools>
- WTP Web Services wiki:
http://wiki.eclipse.org/index.php/Component_document_List:_Web_Services
- Axis2: <http://ws.apache.org/axis2>
- WS-I: <http://www.ws-i.org>
- For more information:
 - Greg Hester - greg.hester@pacifichitech.com



Web Services

Questions?