



Lotus Expeditor 6.1 Education

IBM® Lotus® Expeditor 6.1 Client for Desktop Web Services

Lotus software



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This presentation explains the Web Services capabilities in IBM Lotus Expeditor 6.1 Client for Desktop.

Goals

- Understand the Web Services support provided by IBM Lotus Expeditor 6.1 Client for Desktop

The goal of this presentation is to understand the Web Services support provided by IBM Lotus Expeditor 6.1 Client for Desktop.

Agenda

- Key Concepts
- Web Services Support
- Mobile Web Services JSR 172
- Apache Axis 1.3 Web Services
- Web Services Resource Framework (WSRF)

The agenda of this presentation is to explain key concepts and describe the Web Services support provided by the client.

Section

Key concepts

This presentation will start with an overview of key Web Services concepts.

Mobile Web Services Web Services 101

Web Services

- **Web Services Description Language (WSDL)**
 - ▶ Describes the Web Services interface
 - ▶ Top-down approach - Generate code from WSDL, typically used to develop Web Services clients
 - ▶ Bottom-up approach - Generate WSDL from code, typically used to develop Web Services providers
- **Simple Object Access Protocol (SOAP)**
 - ▶ Message format of a Web Services transaction
- **Java™ API for XML-based Remote Procedure Call (JAX-RPC)**
 - ▶ Build Web Services using XML-based RPC function
- **Lightweight Web Services**
 - ▶ Similar to JSR 172 (Web Services for J2ME)

5

Web Services

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Mobile Web Services enable you to develop applications that consume and provide Web Services. Before we explain the details of Mobile Web Services, let's review some basic concepts.

A Web Services Description Language (or WSDL) document provides the description of the Web Services interface. Web Services can be created using a top-down or bottom-up approach. A top-down approach is used to generate code from a WSDL (typically used for developing Web services clients), whereas a bottom-up approach is used to generate a WSDL from code (typically used for developing Web Services providers). However, the IBM WebSphere® Everyplace Client Toolkit Version 6 Web Services plug-in currently supports only the top-down approach. For more information about WSDL, visit the URL <http://www.w3.org/TR/wsdl>.

Simple Object Access Protocol (SOAP) SOAP is the message format of the transaction that takes place when a Web Services client communicates with a Web Services provider. The WSDL defines the restrictions on the format of these messages. For more information about SOAP, see <http://www.w3.org/TR/soap>.

JAX-RPC The Java API for XML-Based Remote Procedure Call (JAX-RPC) enables developers to build Web Services using XML-based RPC functionality according to the SOAP 1.1 specification. For more information about JAX-RPC, please visit <http://java.sun.com/xml/jaxrpc>.

Mobile Web Services is a light weight implementation that provides functionality similar to libraries that implement the Java 2 Micro Edition Web Services Specification (JSR-172).

Section

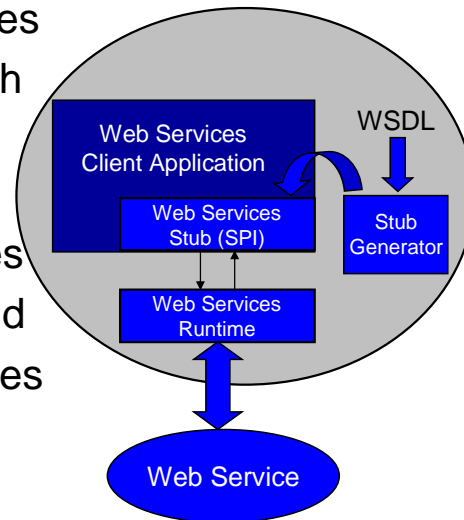
Web Services Support JSR 172

Next, let's explore the Web Services support provided by the client platform.

Mobile Web Services Similar to JSR 172

Web Services

- Defines a standard interface for client to access Web Services
- Supports top-down approach
 - ▶ For clients only
- Minimizes memory footprint
- Supports primitive data types (as defined by JSR-172) and additional complex data types (not defined by JSR-172)



JSR 172 defines a standard interface for a client application to access Web Services. Consistent with JSR 172, the Mobile Web Services Client wizard generates a static client stub class using the WSDL that is exported from the Web Services provider as its input. The stub is then used by a Web Services client application to invoke the Web Services provider. JSR 172 specifies support for primitive and complex data types, for example, Boolean, byte, short, int, long, float, double, String, complex types (a type that allows elements in its content and may carry attributes), and arrays of primitive and complex types.

Mobile Web Services - IBM extensions

Web Services


- **Web Services Client**
 - ▶ Dynamic stub (Static stub also provided)
 - Provides Java interface to build applications
 - Creates Web Services stub at runtime
 - Allows support for custom serialization
- **Web Services Provider**
 - ▶ Publishes an OSGi service as a Web Service
 - Must implement a Java interface
 - Generation of WSDL occurs at runtime
 - Allows support for custom serialization
- **Custom serialization (marshalling)**
 - ▶ Required to handle non-bean classes and types not supported by JSR-172
 - ▶ Developers must provide and register custom marshallers

A dynamic stub allows you to decide to use web services at runtime rather than build time, that is, dynamic stub allows web services to be configured and deployed in the field without involving a build team. A dynamic stub also allows a Web Services client to create and use custom marshallers for WSDL types that are non-bean classes or incompatible with JSR-172.

For a Web Services Provider, any OSGi service can be exposed as a Web Services provider using the toolkit, provided that the service implements a Java interface. Generation of a WSDL-document occurs at runtime using Java reflection into the OSGi service class.

For custom serialization, if Web Services needs to handle non-bean classes or types that are incompatible with JSR-172, then you can provide and register custom marshallers to handle these classes or types.

Mobile Web Services - IBM Extensions

- **Web Services Security (WS-Security)** 
- ▶ Based on the WS-Security Minimalist Profile spec by OASIS
- ▶ Protects Web Services messages for clients and providers through support of the following OASIS Web Services Security Scenarios
 - Signing and encryption
 - Signing only
 - Encryption only
 - Basic authentication only
 - Signing and basic authentication
 - Encryption and basic authentication
 - Signing, encryption, and basic authentication
- ▶ Works with WebSphere Application Server 5.1 and 6.0

Web Services security is based on the WS-Security Minimalist Profile specification from OASIS (or Organization for the Advancement of Structured Information Standards), which is used to secure SOAP messages. Web Services protects messages through support of 4 key OASIS Web Services scenarios, which will be explained on the next slide.

Web Services security works with WebSphere Application Server 5.1 and 6.0.

Web Services security scenarios

Web Services

- **Scenario #1: Basic Authentication** - The request header contains a Username and Password. The response does not contain a security header.
- **Scenario #2: Basic Authentication with Encryption** - The request header contains a Username and Password that have been encrypted using a public key provided out-of-band. The response does not contain a security header.
- **Scenario #3: Sign and Encrypt** - The request body contains data that has been signed and encrypted. The certificate used to verify the signature is provided in the header. The certificate associated with the encryption is provided out-of-band. The response body is also signed and encrypted, reversing the roles of the key pairs identified by the certificates.
- **Scenario #6: Encrypt and Sign** - The request body contains data that has been encrypted and signed. The certificate associated with the encryption is provided out-of-band. The certificate used to verify the signature is provided in the header. The response body is also encrypted and signed, reversing the roles of the key pairs identified by the certificates.

This slide explains the four Web Services Security scenarios from OASIS that are supported by Mobile Web Services.

SSL support

Web Services

- Support on the client side
 - ▶ You can specify the following properties for the client:
 - Djavax.net.ssl.keyStore=<path_to_keystore_file>
 - Djavax.net.ssl.keyStoreType=<keystore_type>
 - Djavax.net.ssl.keyStorePassword=<keystore_password>
 - Djavax.net.ssl.trustStore=<path_to_truststore_file>
 - Djavax.net.ssl.trustStoreType=<truststore_type>
 - Djavax.net.ssl.trustStorePassword=<truststore_password>
 - ▶ Specified in the [rpcinstall.properties](#) file
 - ▶ See System Administration Guide or Developer's Guide for additional information
- Support on the provider side
 - ▶ SSL connection managed by web container
 - ▶ Configure the web container

This slide explains how SSL support is available for Web Services clients and providers.

Section

Axis Web Services

Next, let's explore the Web Services support provided by the client platform.

Apache Axis 1.3 Web Services

Web Services

- The JAX-RPC (JSR-101) support is enabled using the Apache Axis 1.3.
- The role for using the Apache Axis runtime is strictly for Client-Side only.
- Also there is very minimal security supported. If the security is needed, SSL & Basic Authentication must be used.
- A minimal support from the WS-Security specifications (User name Token) is provided when locating the static stub object using the JNDI. You can find more information on Client-Side Axis support on the Apache Axis web site at <http://ws.apache.org/axis/java/client-side-axis.html>.

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A minimal support from the WS-Security specifications (User name Token) is provided when locating the static stub object using the JNDI. You can find more information on Client-Side Axis support on the Apache Axis web site at the URL provided on this slide.

Web Services – Accounts and Axis

Web Services

- **Programmatically creating accounts for Apache Axis Web Services clients**
- One can create an account programmatically that will be used by Axis.
- Here is an example that shows an account creation and setting the values of various account attributes:

```
AccountsManager manager = AccountsManagerFactory.getAccountsManager();
Account account = manager.newAccount(AccountsManager.DEFAULT_ACCOUNT);
account.setName( Echo Service Account);
account.setType( HTTP);
account.setAuthType( HTTP);
account.setProperty( AuthProperties.SERVER,
    http://localhost:9082/EchoService/services/EchoService);
//This can be set programmatically or
//If not set, the Accounts framework will prompt at runtime
account.setProperty(Account.USER_NAME, "user1");
account.getLoginContext().setPassword("password");
```

You can programmatically create accounts for Apache Axis Web Services clients.

You can create an account programmatically that will be used by Axis. Here is an example that shows an account creation and setting the values of various account attributes.

Section

Web Services Resource Framework

Next let's cover key concepts of Web Services Resource Framework (or WSRF).

WSRF - Web Services Resource Framework

- The Web Services Resource Framework (WSRF) is a family of specifications introduced in January 2004, with the intention to provide a way to access stateful resources using a standard set of message exchange patterns, fronted by web services.
- The WSRF family specifications include the following:
 - ▶ WS-Resource
 - ▶ WS-ResourceProperties
 - ▶ WS-ResourceLifetime
 - ▶ WS-BaseFaults

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WS-Resource

WS-ResourceProperties

WS-ResourceLifetime

WS-BaseFaults

WSRF - Web Services Resource

WSRF

- The key concept in WSRF is the WS-Resource, which is composed of a Web service and a stateful resource.
- A stateful resource can be the files in a file-system or rows in a relational database, an encapsulated object in an OSGi Service, etc.

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WSRF - Runtime

WSRF

- The WSRF implementation provides an environment to host WS-Resources in an OSGi environment.
- These WS-Resources by definition can be accessed through web services in a stateful manner.
- The programming model supported by the WSRF implementation allows for exposing varied constructs, like an OSGi Service, a Java™ Bean, a physical file system, or a database as a WS-Resource.
- The WSRF implementation also provides a client runtime environment, where WS-Resource clients and applications can run and access WS-Resources.

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The WSRF implementation also provides a client runtime environment, where WS-Resource clients and applications can run and access WS-Resources.

WSRF - Web Services Resource Framework

- The WS-Resource Framework (WSRF) is a set of Web services specifications that define what is termed the *WS-Resource approach* to modeling and managing state in a Web services context.
- WSRF Plugins for OSGi (WSRF4OSGi) is a lightweight implementation of the following WS-Resource Framework (WSRF) set of specifications in the OSGi environment:
 - ▶ WS-Resource
 - ▶ WS-ResourceProperties
 - ▶ WS-ResourceLifeTime
 - ▶ WS-BaseFaults
 - ▶ WS-Addressing
- The documents can be downloaded from following location: http://www.oasis-open.org/committees/tc_home.php?wg_ab
- API: see specification
- Extension Points: none
- Target feature: Web Services WSRF
- Reference: Web Services Resource Framework

The WSRF component of Web services runtime extends the applicability of the Web in other application domains like system management, and autonomic computing.

The Web Services Resource Framework defines a family of specifications for accessing stateful resources using Web services.

The WS-Resource Framework (WSRF) is a set of six Web services specifications that define what is termed the *WS-Resource approach* to modeling and managing state in a Web services context.

It is a set of specifications that include:

- WS-Resource
- WS-ResourceProperties
- WS-ResourceLifeTime
- WS-BaseFaults
- WS-Renewable References
- WS-ServiceGroup.

The following WSRF specifications are currently not supported by WSRF4OSGi implementation:

- WS-Renewable References
- WS-Service Group

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