



Web Services

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Mike Bixby is the President of Bixby Consulting Inc., which provides consulting, data integration and data translation services. In 1997, he was contracted to design and develop a Business-To-Business Server framework for INFO1, now one of the nation's top four credit providers. This framework allows INFO1 to seamlessly transact business with lenders using any of the dozens of public and proprietary credit data formats in use today.

In 1999, Mike created one of the first XML Credit Reporting specifications. When MISMO was formed in January 2000, this specification evolved into the MISMO Credit Reporting specification that is widely used today. Mike has represented INFO1 on the MISMO Governance committee since MISMO was formed. He also serves as co-chair of the Credit Reporting Work Group, and participates actively in the Architecture, Schema, Core Data and Enveloping Work Groups. He is the author of the MISMO XML General Information and Credit Reporting Implementation Guides.

In 2002, Bixby Consulting introduced the www.eherenow.com web site, which provides Web Services that validate MISMO SMART Docs and MISMO data files, and translate mortgage data files from any data format, to any data format.

Information Technology – a Changing Landscape

Internet

The last ten years has seen a dramatic transformation in how Information Technology has become infused in business. With the emerging of the Internet, nearly every business now has a web presence. The adoption of email and instant messaging has made basic changes to how we communicate within our companies, and with our vendors and customers. More and more people are using the Internet for day-to-day banking, travel reservations, shopping, and investing.

XML

As more and more data was exchanged over the Internet the need for standardization of data became more obvious. In 1999 the Extensible Markup Language (XML) 1.0 Specification was introduced. XML provided a standard framework for defining and organizing electronic data. Industry groups, including MISMO, were started world-wide to develop data standards using the XML standard. Software tools that are able to read XML formats, and write XML formats have evolved quickly.

Web Services

Over the last couple of years several new XML-based specifications have been introduced under the umbrella name -Web Services. Web Services have evolved from the need for standardized access to business functions across a variety of software platforms. Tools for Web Services are evolving quickly and are beginning to affect all aspects of business.

This presentation will give examples of Web Services in use today, how Web Services can be used in the Mortgage Industry, and then describe how Web Services are built, implemented, and put to practical use.

Web Services Examples

General Industry:

Google Search Engine

Incorporate the Google search engine into your application using Google Web Services.

Weather Information

Retrieve weather info around U.S. by 5 digit zip code.

Maps

Create directional maps using MapPoint's .NET Web Services

Stock Quotes

Get a stock quote for a company symbol.

Currency Converter

Get conversion rate from one currency to another.

ABA Lookup

Allows user to validate U.S. bank routing (ABA) numbers, or search for an ABA by the bank phone number or bank name, city, state.

Traffic Reports

Retrieve traffic reports around the U.S. by city.

Mortgage Industry:

Origination Services

Web Services finally provide a standardized software interface for origination services such as appraisals, credit reports, flood services, title services, mortgage insurance, hazard insurance, automated underwriting, etc.

Live Loan Product Rate/Pricing

Web Services could provide a standardized method for requesting live rates and prices for loan product catalogs.

Document Preparation, Settlement, Closing and Recording Services

With the advent of e-Mortgages and the MISMO SMART Docs, Web Services allows for a standard to provide electronic documents to closing agents, lenders, attorneys, wherever they are. Web Services are also a natural for use in the electronic recording of mortgages.

Definition of Web Services

“Web Services is not the next big thing. It’s simply the thing that makes the last three big things work.”

-- Daryl Plummer, Gartner Group

Expressed as simply as possible,

Web Services are self-contained business functions that can be accessed in a standard manner within a company or over the Internet.

Web Services can be shared, combined, used and re-used within a company or between companies. Applications can be built using multiple Web Services from various sources, internal and external. Through Web services, companies can encapsulate existing business processes, publish them as services, search for and subscribe to other services, and exchange information throughout and beyond the enterprise.

Web Services consist of three XML-based building blocks.

UDDI (Universal Description, Discovery and Integration)

This is the XML-based service registry that contains a list of businesses and the services they provide. UDDI is the Yellow Pages used to locate Web Services.

WSDL (Web Services Description Language)

WSDL is the language used to describe the Web Service functions, and the location (URL) and name of the service provider.

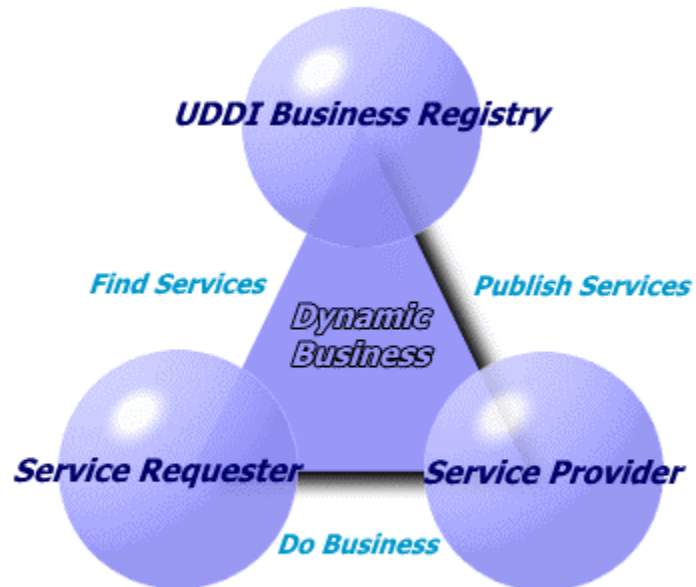
SOAP (Simple Object Access Protocol)

SOAP is the mechanism used to exchange information between the service requester, service provider and the service registry. It is an XML-based technology used to exchange data between applications and is also used to activate an application.

Using Web Services

The following diagram is from the Japan UDDI web site and depicts the relationship between the Service Requester, Service Provider and the UDDI Registry.

- The Service Providers publishes services to the UDDI Registry.
- The Service Requester finds services on the UDDI Registry.
- The Service Requester does business with the Service Provider.
 - Locate the WSDL Service Description
 - Use SOAP to Request the Service
 - Use SOAP to Retrieve the Service Response



Implementing Web Services – For the Service Requester

Locate the Web Service and Service Description (UDDI)

Today the most common way of obtaining the Service Description information is directly from the service provider's web site. Current UDDI directories are very incomplete and contain a lot of outdated or test-only entries. Eventually the mortgage industry may setup its own UDDI directory under the MBA or MISMO organizations.

For example, the INFO1 Credit Reporting Web Service URL is at:

<https://www.info1online.com/b2b/mismo/I1gateway.asmx>, and displays the following:

INFO1 Gateway

The following operations are supported. For a formal definition, review the [Service Description](#).

- [I1OrderRequest](#)

Examine the Interface (WSDL)

When you go to the URL listed for the Web Service you will normally see a link for each operation that is supported, plus a link for the Service Description (WSDL) document. Clicking the [I1OrderRequest](#) operation link will display a sample SOAP request as shown below.

SOAP Request

The following is a sample SOAP request. The **placeholders** shown need to be replaced with actual values.

```
POST /b2b/mismo/I1gateway.asmx HTTP/1.1
Host: www.info1online.com
Content-Type: text/xml; charset=utf-8
Content-Length: length
SOAPAction: "http://tempuri.org/I1OrderRequest"

<?xml version="1.0" encoding="utf-8"?>
<soap:Envelope xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:xsd="http://www.w3.org/2001/XMLSchema"
xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/">
  <soap:Body>
    <I1OrderRequest xmlns="http://tempuri.org/">
      <BranchID>int</BranchID>
      <ClientCode>string</ClientCode>
      <UserName>string</UserName>
      <Password>string</Password>
      <Format>string</Format>
      <Document>string</Document>
    </I1OrderRequest>
  </soap:Body>
</soap:Envelope>
```

The service option link will also show a sample SOAP response that will be returned by the Service Provider. In this example, the response is being returned in a **base64binary** format.

SOAP Response

The following is a sample SOAP response. The **placeholders** shown need to be replaced with actual values.

```
HTTP/1.1 200 OK
Content-Type: text/xml; charset=utf-8
Content-Length: length

<?xml version="1.0" encoding="utf-8"?>
<soap:Envelope xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:xsd="http://www.w3.org/2001/XMLSchema"
xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/">
  <soap:Body>
    <I1OrderRequestResponse xmlns="http://tempuri.org/">
      <I1OrderRequestResult>base64Binary</I1OrderRequestResult>
    </I1OrderRequestResponse>
  </soap:Body>
</soap:Envelope>
```

Request the Service (SOAP)

In the simplest terms, after an account has been established with the service provider and a User Name and Password have been assigned, you are ready to go. Once the placeholders are substituted with the real values the request is ready to be posted and transmitted to the Service Provider. The Service Provider processes the request and returns the response data in the SOAP response.

Sound easy? Depending on the Service Requester's software environment it really can be that easy. For example, if the Service Requester uses the **.NET Framework**, any of the **J2EE** (Java 2 Enterprise Edition) Frameworks such as **IBM WebSphere**, or most of the newer database or **EAI** (Enterprise Application Integration) platforms, implementing a SOAP request and response is just a matter of selecting those options from a menu.

For MS-Windows environments Microsoft provides a free download of their **SOAP Toolkit 3.0** (<http://www.microsoft.com/downloads>). The SOAP Toolkit can be used to add XML Web Service functionality to COM components and applications.

There is also an **Office XP Web Services Toolkit** that is used to request Web Services from Office XP (<http://www.microsoft.com/office/developer/webservices/toolkit.asp>).

IBM has its own Web Services Toolkit (WSTK) that can be used to add Web Services to IBM environments (<http://www.alphaworks.ibm.com/tech/webservicestoolkit>).

Web Services support is maturing so quickly that you can find tool kits for almost any software environment. Check your provider's web site or search the Internet.

Implementing Web Services – For the Service Provider

Create the Web Service Interface (WSDL)

For the Service Provider, there is a little more work involved to create the Web Service Interface, but not much. The **.NET Framework** and **J2EE Framework** have options for automatically creating the Web Service Interface documents, including the web page that displays the sample SOAP transactions, and the WSDL document itself. In these environments, this can literally be done in a manner of minutes.

Shown below is the Web Services web page produced by the **.NET Framework** for the data conversion services deployed on www.eherenow.com. The Service Description link displays the WSDL document, and the other links show the SOAP request and response.



Morphing Labs

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The following operations are supported. For a formal definition, please review the [Service Description](#).

- [BinaryTransform](#)
Request data is sent in with BASE64 binary encoding and the result is returned as BASE64 binary encoding. This is ideal if the request or the response can contain binary data.
- [BasicTransform](#)
Request data is sent in as a string and the result is returned as a string. This is ideal if no binary data is expected for request or the response.

Publish the Service Description to a Directory (UDDI)

You use the UDDI Business Registry to describe and list the guidelines for your business partners to integrate with you. This will make your company visible and accessible in searches by potential buyers and marketplaces worldwide. Registering in the UDDI Business Registry will also make your business integration significantly easier and more dynamic for those companies with which you choose to transact business.

Once you register, your registry information is shared with the various registry nodes. Currently, the major UDDI Business Registry Nodes are operated by IBM, Microsoft, SAP, and NTT Com (Japan). Each registry node will replicate to the other registry nodes daily so that all registries remain current.

Process Service Requests (SOAP)

This step is not optional (or at least not optional for Service Providers who want to maintain that role). The Service Provider processes the SOAP requests and then, for most services, a SOAP response is generated immediately. Samples of the SOAP request and response formats were shown in the previous section.

Web Service Security

As Web Services are built on a set of standards, a standard has also been developed for providing security for Web Services – **WS-Security**. In April 2002, participants from IBM, Microsoft and VeriSign published the first 1.0 draft standards for WS-Security.

As Web Service implementations moved onto the Internet, three security-related needs became obvious:

1. The communication between the Service Requester and the Service Provider should not be able to be viewed by a third party as it travels on the Internet.
2. The Service Requester needed to be able to determine from whom the message was coming and be able to verify that the sender was who the sender claimed to be. The Service Provider also needed to determine that the message was coming from the Service Requester.
3. The Service Requester and Service Provider needed to be able to ensure that the data being transmitted was not tampered with.

Item 1 is normally handled by implementing HTTPS/SSL transport security. All or part of the SOAP messages can also be encrypted, further protecting the data. Items 2 and 3 can be addressed using digital signatures and digital certificates. How much security is implemented depends on the value of the data content.

The WS-Security specification defines and recommends the use of **XML Signature** and **XML Encryption** in the SOAP messages. All of these topics are being covered in more detail in another session of this eMortgage Workshop.

Interoperability Issues

“In Web Services, as in any distributed processing system, the uptime and security of your system is the worst possible combination of all your vendors (and their vendors).”

-- The Unknown CTO

No matter how explicitly a standard is defined, when implementation time comes there will always be slight differences in how the specification documents are interpreted. And when any two entities attempt to implement the standard there will be differences between the two implementations that could cause difficulties in interoperability between their implementations.

The creators of the Web Services standards recognized this from the beginning and formed the **Web Services Interoperability Organization (WS-I)** in February 2002 to resolve these issues. The founding companies of WS-I include the major Web Services players – Accenture, BEA Systems, Fujitsu, Hewlett-Packard, IBM, Intel, Microsoft, and SAP.

WS-I has defined “Interoperable” as – **suitable for and capable of being implemented in a neutral manner on multiple operating systems and in multiple programming languages.** The organization works across the industry and standards organizations to provide guidance and resources for developing Web Services solutions

Basic Profile 1.0

On March 28, 2003, WS-I released a draft (not final) copy its first significant work product – Basic Profile Version 1.0. (<http://www.ws-i.org/Profiles/Basic/2003-03/BasicProfile-1.0-BdAD.html>). The document lists over one hundred recommendations that will help maintain interoperability between systems. Some are obvious and some the result of the real world experiences of the contributing participants.

WS-I Testing Tools

A beta version of testing tools has also been posted to the WS-I web site (<http://www.ws-i.org/implementation.aspx>). These tools were designed to test Web Services for compatibility and compliance with the Basic Profile 1.0 guidelines. Other tools will be posted as they are released.

WS-I Security Interoperability

In late March 2003, WS-I formed the Basic Security Working Group. They will be looking at the technologies that relate to securing Web Services and make sure they work well together.

Summary

Because they answer the need to standardize access to business software assets, Web Services are here to stay. A Gartner Dataquest survey released April 24 2003 showed that Web Services usage has matured beyond the first stage of use for in-house integration and is progressing into use for business-to-business solutions. We are in the early stages of their acceptance and adoption, and the tools and support for Web Services will continue to evolve and improve.

The commitment to interoperability made by the key Web Service participants – IBM and Microsoft, help reinforce the viability of Web Services as an industry standard for providing business services within and between companies.

Useful Links

- *e here now* (Web Site)
 - <http://www.eherenow.com>
- *e here now* Morphing Labs (Web Service Description)
 - <https://www.eherenow.net/engine/transformhere.aspx>
- Gartner Dataquest Web Services Survey (Article)
 - http://www3.gartner.com/DisplayDocument?doc_cd=114570
- General Web Services (Web Site)
 - <http://www.webservicex.net>
- Google Web Services (Web Service Info)
 - <http://www.google.com/apis/>
- IBM Web Services (Web Site)
 - <http://www-3.ibm.com/software/solutions/webservices/>
- Implementing WS-Security (Article)
 - <http://www-106.ibm.com/developerworks/webservices/library/ws-security.html>
- INFO1 Credit Reporting (Web Site)
 - <http://www.info1credit.com>
- INFO1 Credit Reporting (Web Service Description)
 - <https://www.info1online.com/b2b/mismo/l1gateway.aspx>
- Java Technology and Web Services (Web Site)
 - <http://java.sun.com/webservices>
- Microsoft Web Services (Web Site)
 - <http://msdn.microsoft.com/webservices/default.aspx>
- .NET versus J2EE Web Services (Article)
 - <http://www.webservicesarchitect.com/content/articles/hanson01.asp>
- SearchWebServices.com (Web Site)
 - <http://searchwebservices.techtarget.com>
- UDDI.Org (Web Site)
 - <http://www.uddi.org/>
- UDDI and ebXML Registry: A Co-Existence Paradigm (Article)
 - <http://www.webservices.org/index.php/article/view/984/>
- Web Services Architect (Web Site)
 - <http://www.webservicesarchitect.com>
- Web Services Interoperability Organization (Web Site)
 - <http://www.ws-i.org/>
- WebServices.Org (Web Site)
 - <http://www.webservices.org>
- WS-I Basic Profile Version 1.0 (Document)
 - <http://www.ws-i.org/Profiles/Basic/2003-03/BasicProfile-1.0-BdAD.html>
- WS-I Implementation Tools (Software Download)
 - <http://www.ws-i.org/implementation.aspx>
- WS-Security – A Developer’s View (Article)
 - <http://idevnews.com/IntegrationNews.asp?ID=62>