



INTRODUCTION TO WEB SERVICES

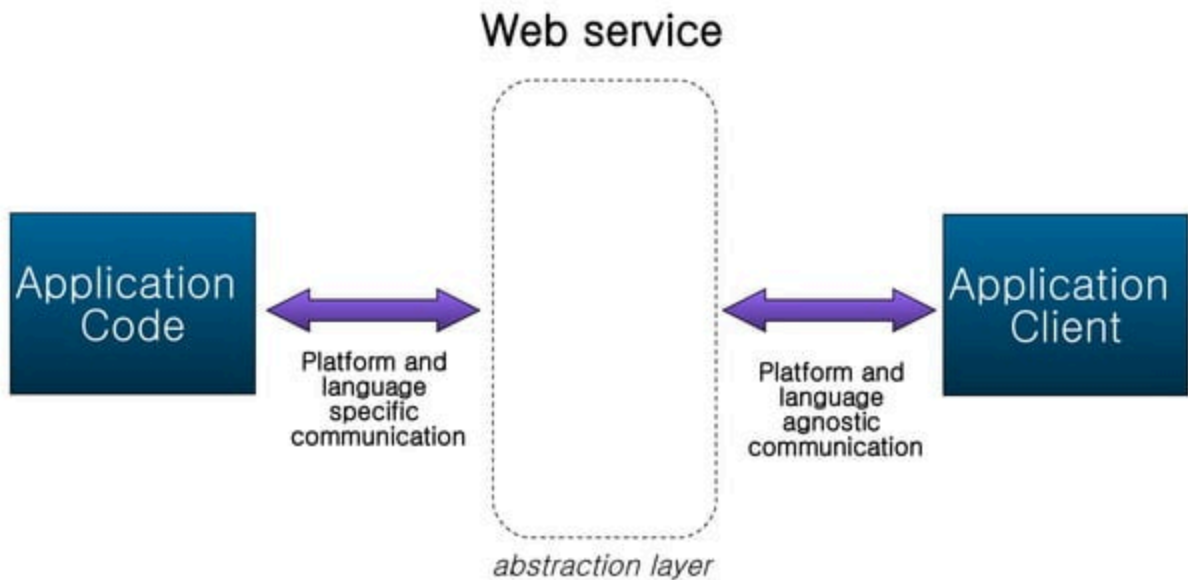


Gerard Sylvester

Web Service

- ◆ A *Web Service* is a network accessible interface to application functionality, built using standard Internet protocols
- ◆ A Web Service exposes functionality to a consumer
 - Over the Internet or intranet
 - A programmable URL
 - Functions you can call over the Internet

Web service simplified



Web Service

Based on Web standards

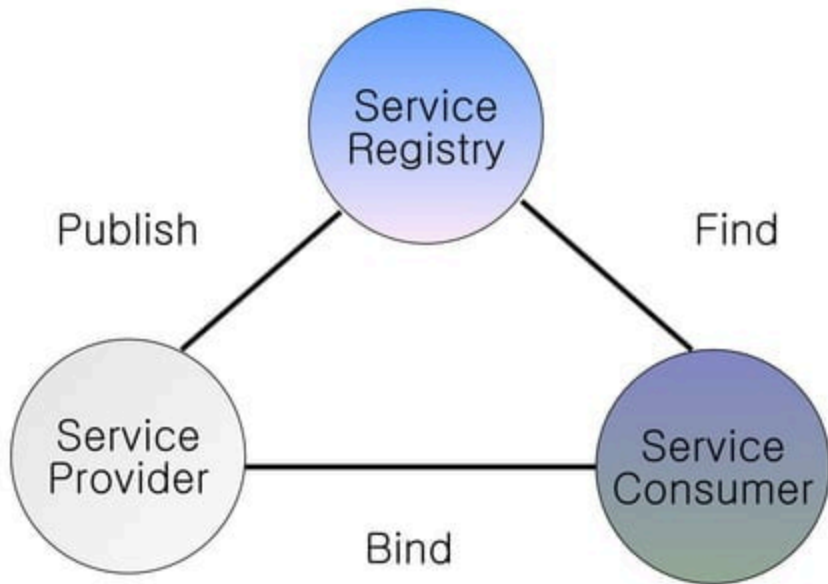
- ⊕ HTTP/(S), XML, SOAP, WSDL, UDDI
- ⊕ Can be implemented in any language on any platform
- ⊕ Component-like, reusable
- ⊕ Not tied to any platform / languages



Components of a Web Service

- A standard way for communication (**SOAP**)
- A uniform data representation and exchange mechanism (**XML**)
- A standard meta language to describe the services offered (**WSDL**)
- A mechanism to register and locate WS based applications (**UDDI**)

The Web Service architecture



Underlying Technology

Web Service Stack

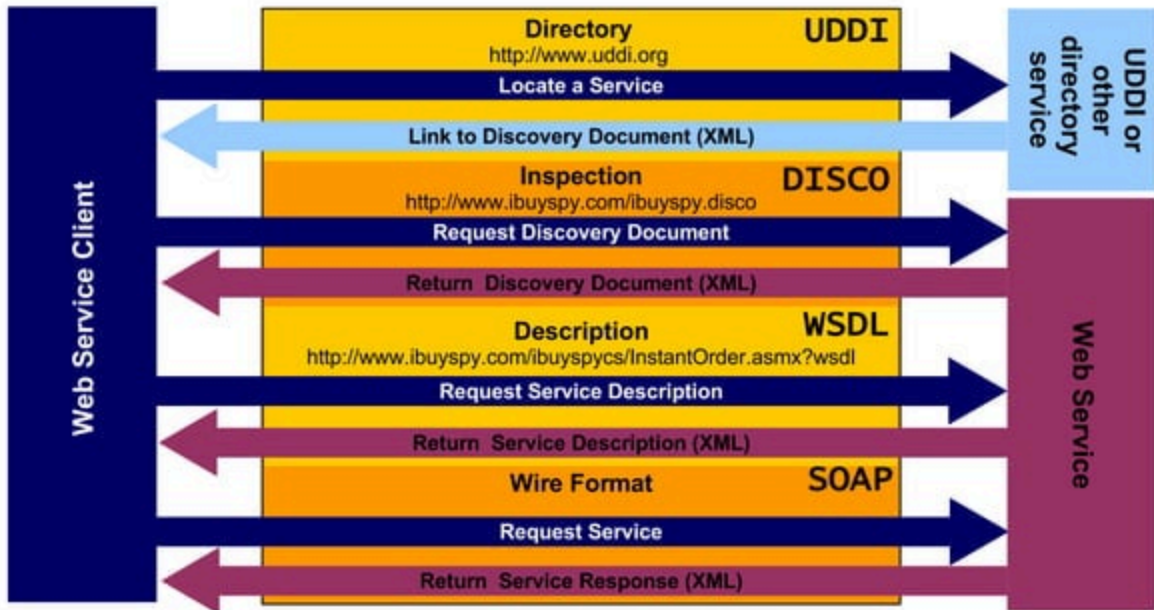
Directory: Publish & Find Services:	UDDI
Inspection: Find Services on server:	DISCO
Description: Formal Service Descriptions:	WSDL
Wire Format: Service Interactions:	SOAP
Universal Data Format:	XML
Ubiquitous Communications:	Internet

Simple, Open, Broad Industry Support



Underlying Technology

Web Service Stack



Universal Description, Discovery and Integration (UDDI) Protocol

- ▶ Enables enterprises to quickly and dynamically discover and invoke Web Services both internally and externally
- ▶ Yellow pages of Web services

Examples

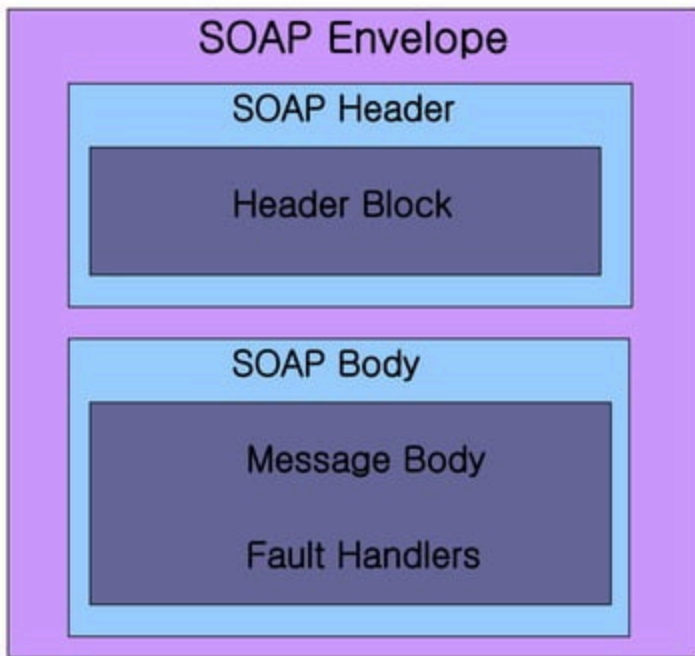
- www.uddi.org
- www.biomoby.org
- www.xmethods.com

Simple Object Access Protocol (SOAP)

- SOAP is a lightweight (XML-based) protocol for exchange of information in a decentralized, distributed environment. It consists of mainly of:
 - an envelope that defines a framework for describing what is in a message and how to process it
 - relies heavily on XML standards (schemas & name spaces)



The SOAP message structure



Web Service Definition Language (WSDL)

- ▶ WSDL is an XML format for describing network services operating on messages containing either document-oriented or procedure-oriented information.
- ▶ It defines Web Service as collection of network endpoints or ports.

- The following is a list of **Web service markup languages**.
- **BEEP** - Blocks Extensible Exchange Protocol
- **BPEL** - Business Process Execution Language
- **E-Business XML**
- **REST** - Representational State Transfer
- **SOAP** - outgrowth of **XML-RPC**, originally an acronym for Simple Object Access Protocol
- **UDDI** - Universal Description, Discovery, and Integration
- **WSDL** - Web Services Description Language
- **WSFL** - Web Services Flow Language (superseded by **BPEL**)
- **WSCL**
- **XML-RPC** - XML Remote Procedure Call



XML

- Stands for “Extensible Markup Language”
- Language specification for describing data
 - Syntax rules
 - Syntax & Grammar for creating Document Type Definitions
- Widely used and open standard
 - Defined by the World Wide Web Consortium (W3C)
 - <http://www.w3.org/TR/2000/REC-xml-20001006>



Advantages of WebServices

- ◆ Allow programs written in different languages on different platforms to distribute an application in a standards-based manner.
- ◆ Adapt the loosely coupled Web programming model for use in applications that are not browser based.
- ◆ The goal is to provide a platform for building distributed applications using software
 - running on different operating systems and devices,
 - written using different programming languages and tools from multiple vendors,
 - all potentially developed and deployed independently.



Footer

- Web Service security
 - Web Service Security Model Principles
 - WS-Security
 - WS-Policy
 - WS-Trust
 - WS-Privacy
 - *WS-SecureConversation*
 - *WS-Federation*
 - *WS-Authorization*

Microsoft Passport Service – Single click sign-on!



Future....

- Semantic Web Services
 - Extension of the current web – information is given well-defined meaning
 - Contains machine readable instructions and metadata expressed in RDF.

Leads to intelligent web.





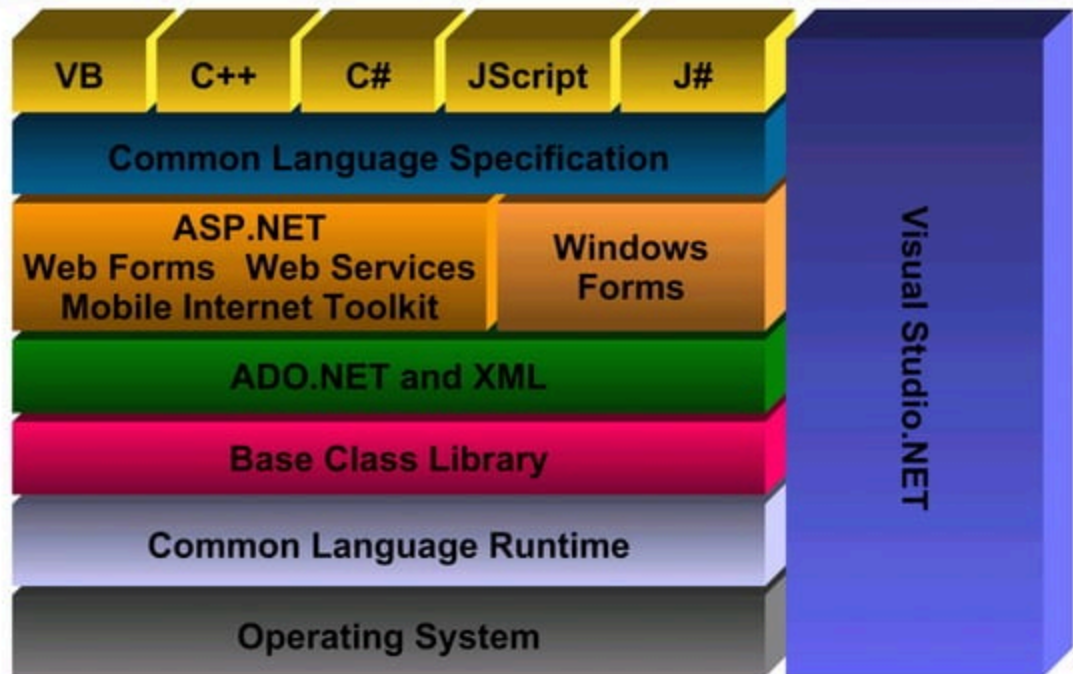
Microsoft .NET

What is .NET

- It is the combination of:
 - .NET Framework
 - Web Services
 - .NET Enterprise Servers
- The .NET Framework consists of:
 - The common language runtime
 - Class libraries, organized into easily comprehensible namespaces
 - ASP.NET



.NET Framework



C# (pronounced as C Sharp)

- C# is a strongly typed object-oriented language from Microsoft.
- designed to give the optimum blend of simplicity, expressiveness, and performance.
- Released by June 2000.
- The C# language was built with the hindsight of many languages, but most notably Java and C++.
- It was co-authored by Anders Hejlsberg and Scott Wiltamuth

Hello World

```
using System;  
class Hello  
{  
    public static void Main()  
    {  
        Console.WriteLine("Hello, world!");  
    }  
}
```



The Common Language Runtime

Compilation and Execution

