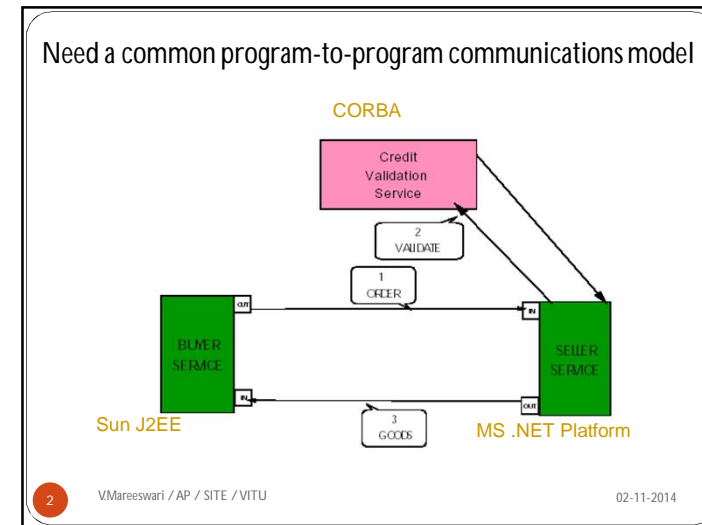


# Web Service

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## Introduction

- The term *Web services* describes a standardized way of integrating Web-based applications using the XML, SOAP, WSDL and UDDI open standards over an Internet protocol backbone.
- XML is used to tag the data, SOAP is used to transfer the data, WSDL is used for describing the services available and UDDI is used for listing what services are available.
- Used primarily as a means for businesses to communicate with each other and with clients, Web services allow organizations to communicate data without intimate knowledge of each other's IT systems behind the firewall.

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- Unlike traditional client/server models, such as a Web server/Web page system, **Web services do not provide the user with a GUI**. Web services instead share business logic, data and processes through a programmatic interface across a network. The applications interface, not the users. Developers can then add the Web service to a GUI (such as a Web page or an executable program) to offer specific functionality to users.
- Web services allow different applications from different sources to communicate with each other without time-consuming custom coding, and because all communication is in XML, **Web services are not tied to any one operating system or programming language**. For example, Java can talk with Perl, Windows applications can talk with UNIX applications.

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## W3C Definition

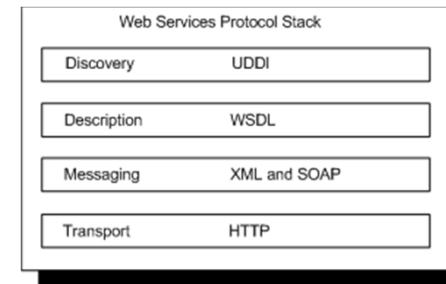
A Web service is a software system designed to support interoperable machine-to-machine interaction over a network. It has an interface described in a machine-processable format (specifically WSDL). Other systems interact with the Web service in a manner prescribed by its description using SOAP messages, typically conveyed using HTTP with an XML serialization in conjunction with other Web-related standards.

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## WS Protocol Stack



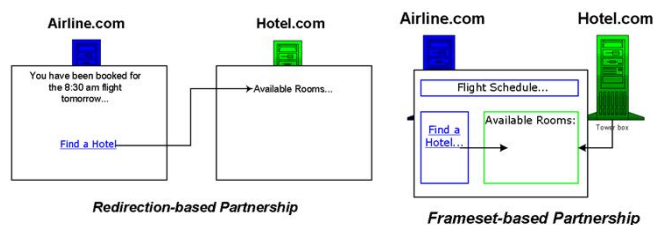
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## Sharing Applications

- Common Approaches via the Web
  - Hyper-links
  - Frames



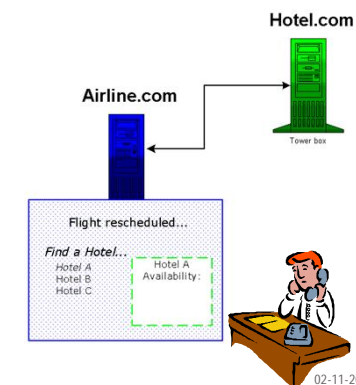
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## Web Service Based Integration

- Applications consuming processes on external systems
- Presenting one view to users



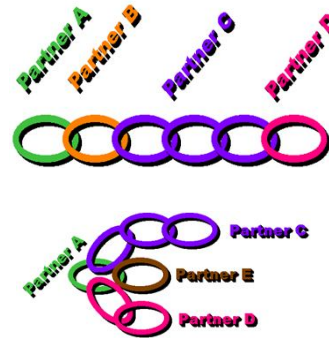
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## Web Service Aggregation

- Partners working together
- Service Aggregation / Composition
- **Can work together in different ways**
- Support workflow/business processes



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## Order Placement



Order Placement

Discount Calculation

Tax Calculation

Shipping Calculation

Supporting services may reside somewhere else, provided by someone else

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## Traditional RPC vs Web Services

### Traditional RPC

- Within enterprise
- Tied to a set of programming languages
- Procedural
- Usually bound to a particular transport
- Tightly-coupled
- Firewall-unfriendly
- Efficient processing

### Web Services

- Between enterprises
- Program language independent
- Message-driven
- Easily bound to different transports
- Loosely-coupled
- Firewall-friendly
- Relatively not efficient processing

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## Web Applications vs Web Services

### Web Application

- User-to-program interaction
- Static integration of components
- Monolithic service
- Ad hoc or proprietary protocol

### Web Services

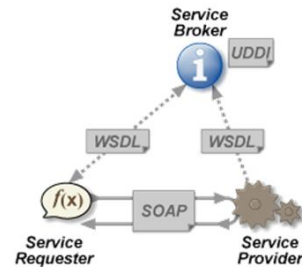
- Program-to-program interaction
- Dynamic integration of components
- Service aggregation
- Interoperability

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## Web Services Architecture



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## Roles in Web Service architecture

- Service provider
  - Owner of the service
  - Platform that hosts access to the service
- Service requestor
  - Business that requires certain functions to be satisfied
  - Application looking for and invoking an interaction with a service
- Service registry
  - Searchable registry of service descriptions where service providers publish their service descriptions

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## Operations in a Web Service Architecture

- Publish
  - Service descriptions need to be published in order for service requestor to find them
- Find
  - Service requestor retrieves a service description directly or queries the service registry for the service required
- Bind
  - Service requestor invokes or initiates an interaction with the service at runtime

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## SOAP: Simple Object Access Protocol

- SOAP is a **communication protocol**
- SOAP is for communication **between applications**
- SOAP is a format for **sending messages**
- SOAP is designed to communicate **via Internet**
- SOAP is **platform independent**
- SOAP is **language independent**
- SOAP is **based on XML**
- SOAP is **simple and extensible**
- SOAP will be developed as a **W3C standard**

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## Why SOAP?

- Other distributed technologies failed on the Internet
  - Unix RPC – requires binary-compatible Unix implementations at each endpoint
  - CORBA – requires compatible ORBs
  - RMI – requires Java at each endpoint
  - DCOM – requires Windows at each endpoint
- SOAP is the platform-neutral choice
  - Simply an XML wire format
  - Places no restrictions on the endpoint implementation technology choices

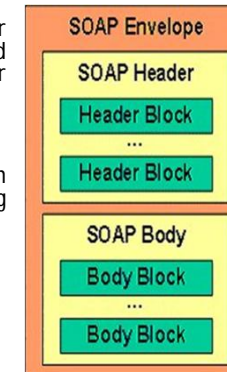
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## Soap Message Structure

- Envelope - defines an overall framework for expressing **what** is in a message; **who** should deal with it, and **whether** it is optional or mandatory
- Header (optional)
- Body - contains call and response information
- Fault element in body - provides information about errors that occurred while processing the message



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## Web Service Definition Language (WSDL)

WSDL is an XML document and used to describe Web services

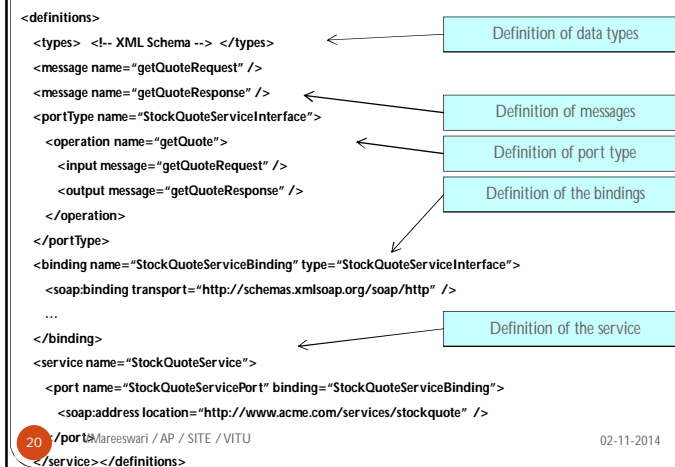
- Describes three fundamental properties
  - What a service does
    - Operations (methods) provided by the service
  - How a service is accessed
    - Data format and protocol details
  - Where a service is located
    - Address (URL) details

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## WSDL Elements – An Example



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## UDDI: Universal Description, Discovery and Integration

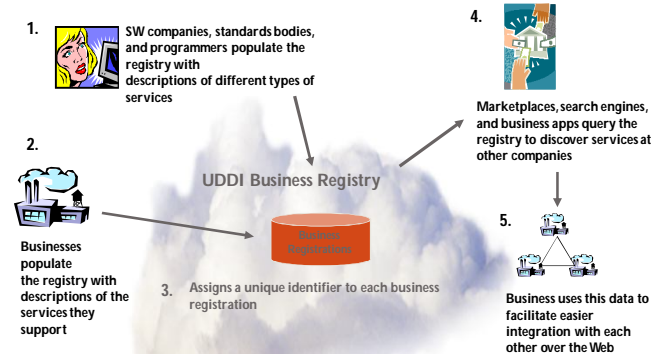
- Registry for Web services
- A registry where you find a Web service and its description (WSDL)
  - Search by business
  - Search by service type

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## How UDDI Works



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## UDDI Business Registration



- Businesses register public information about themselves
- “White pages”
  - including address, contact and known identifiers (IBM, HP, ...)
- “Yellow pages”
  - including industry categories, based on standard taxonomies (NAICS, UN/SPSC)
- “Green pages”
  - technical information about the services exposed by the business

White Pages

Yellow Pages

Green Pages

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**WELCOME TO XMETHODS.**

Emerging standards such as SOAP will enable a new generation of “web services” that allow systems to make remote procedure calls to other systems over the Internet. For example, a corporate inventory management system might publish a service that allows a customer system to check real-time inventory levels. This site lists publicly accessible web services.

**Updates**

Date	Update	Read
2002-01-30	Configuring SOAP calls with the WSDL Analyzer	<a href="#">Read</a>
2002-01-15	SITE UPGRADED	<a href="#">Read</a>
2002-01-14	All WSDL on the site has been validated	<a href="#">Read</a>
2001-01-14	Sign up to be notified of new services	<a href="#">Read</a>

**SOAP Services**

Owner	Service Name	Description	Implementation
esynaps	<a href="#">c5mapiFred</a>	Daily Articles, Coding Tips and .NET Code samples	MS .NET
mytable.com	<a href="#">Company Profile</a>	Provides company profile for a given stock ticker	Apache SOAP
mytable.com	<a href="#">Current News for a Stock</a>	Provides current news of a company for a given stock ticker	Apache SOAP
mytable.com	<a href="#">Stock Quotes</a>	Provides current quotes and additional info. for a given stock ticker	Apache SOAP
myezconnect	<a href="#">Loan Term Worksheet</a>	Loan Term Worksheet	OLUE
myezconnect	<a href="#">Extra Payment Worksheet</a>	Extra Payment Worksheet	OLUE
myezconnect	<a href="#">Financial Calculator</a>	Monthly Payment Worksheet	OLUE
geographynetwork.com	<a href="#">Place Finder</a>	Returns the x,y location for a place name in any part of the world.	OLUE
dsawil	<a href="#">Chess</a>	Play Chess with a WebService	Delphi
esynaps	<a href="#">NFL Headline News</a>	Get the NFL Headline News	MS .NET
esynaps	<a href="#">Who Is</a>	The Web Service form of “Who’s” Domain Registry service	MS .NET
esynaps	<a href="#">Daily Dailbert</a>	Returns a binary stream of Today’s Dailbert comic strip	MS .NET
elegas.com	<a href="#">Monthly Mortgage Payment</a>	Calculates your monthly mortgage payment	EXADEL
jono	<a href="#">Location Information</a>	Info about a location from zip code, area code, city, or state	MS .NET
csaymen	<a href="#">Temperature Conversion Service</a>	Converts Fahrenheit to Centigrade and vice versa	Delphi
csaymen	<a href="#">SendEmail</a>	Sends a simple e-mail	AlyssaWebDTP
stall	<a href="#">A SOAP version of the standard whois service</a>	Country Location and Projection Transformation of Geographic Points using isoveGIS objects	Delphi

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