Web Services, Intro to Web Hosting

Summary of Previous Lecture

- **What is ASP.NET**

- **ASP.NET Web Forms Model**

- **Components of .NET Framework**

- **Setting the Environment**

- **ASP.NET: An Example**

- **Event Handling in ASP.NET**

- **Application and Session Events**

Summary of Previous Lecture

- **Page and Control Events**

- **Event Handling using Controls**

- **Common Control Events**

- **PostBack and NonPostBack Events**

- **Controls with Default Events**

Outline

- **Web Services**
- **History of web services**
- **Model of web services**
- **Components of web services**
- **Web Hosting**
- **Types of Web Hosting**

1. Web Services

- **Web services are XML-based information exchange systems** that use the Internet for direct application-to-application interaction. These systems can include programs, objects, messages, or documents.

- **A web service is any piece of software that makes** itself available over the internet and uses a standardized XML messaging system. XML is used to encode all communications to a web service

1. Web Services

- **Web Service Example:**

- **A client invokes a web service by sending an XML message,** then waits for a corresponding XML response. **As all communication is in XML**, web services are not tied to any one operating system or programming **language--Java can talk with Perl**; Windows applications can talk with Unix applications.

1. Web Services

- **To summarize, a complete web service is, therefore, any service that:**
- **Is available over the** Internet or private (intranet) networks
- **Uses a standardized** XML messaging system
- **Is not tied to any one** operating system or programming language
- **Is self-describing via** a common XML grammar
- **Is discoverable via** a simple find mechanism

1. History of Web Services

- **Web services** evolved from previous technologies that served the same purpose such as **RPC, ORPC** (**DCOM, CORBA and JAVA RMI**).

- **Web Services were intended to solve three main problems**:
  1. Interoperability
  2. Firewall traversal
  3. Complexity

1.1 Interoperability

- **Earlier distributed systems** suffered from interoperability issues because each vendor implemented its own on-wire format for distributed object messaging.

- **Development of DCOM** apps strictly bound to Windows Operating system.

- **Development of RMI** bound to Java programming language.

1.2 Firewall Traversal

- **Collaboration across** corporations was an issue because distributed systems such as CORBA and DCOM used non-standard ports.

- **Web Services use HTTP** as a transport protocol and most of the firewalls allow access though port 80 (HTTP), leading to easier and dynamic collaboration.

1.3 Complexity

- **Web Services is a developer-friendly** service system.

- **Most of the above-mentioned technologies** such as RMI, COM, and CORBA involve a whole learning curve.

- **New technologies and languages** have to be learnt to implement these services.

2. Web Services

- **Web services serves as a component that:**
  - Communicates via open protocols (HTTP, SMTP, etc.)
  - Processes XML messages framed using SOAP
  - Describes its messages using XML Schema
  - Provides an endpoint description using WSDL
  - Can be discovered using UDDI

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2. Web Services

- The basic web services platform is **XML + HTTP**. All the standard web services work using the following components

- **SOAP** (Simple Object Access Protocol)

- **UDDI** (Universal Description, Discovery and Integration)

- **WSDL** (Web Services Description Language)

2. Web Services Advantages

- **Web services has the following advantages**:
  - Open, text-based standards
  - Modular approach
  - Inexpensive to implement (relatively)
  - Reduce the cost of enterprise application integration
  - Incremental implementation
  - Interoperability: Web services allow various applications to talk to each other and share data and services among themselves

2. Web Services

- **How Does a Web Service Work?**
- **A web service enables communication** among various applications by using open standards such as HTML, XML, WSDL, and SOAP. A web service takes the help of:
- **XML to tag the data**
- **SOAP to transfer a message**
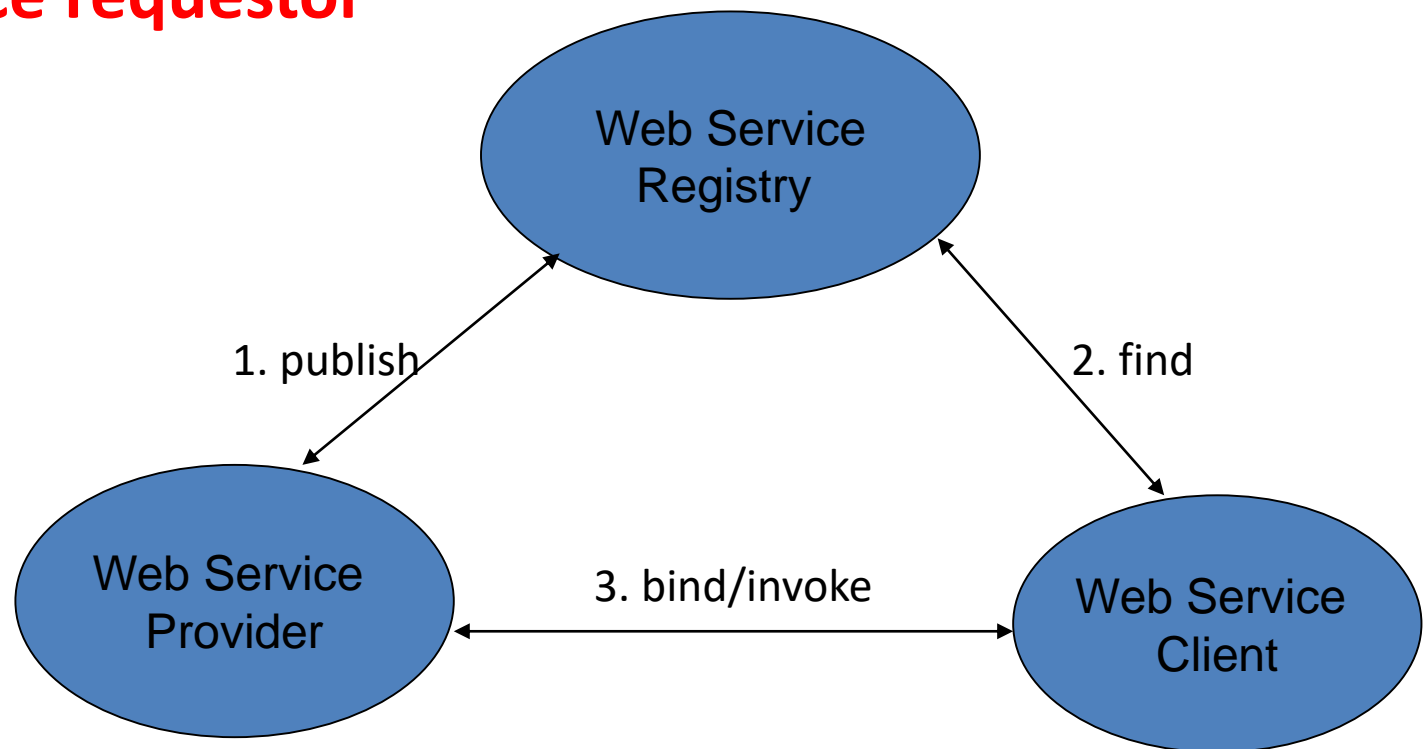- **WSDL to describe the availability of service.**

3. Model of Web Services

- The Web Services architecture is based upon the interactions between three roles:
  - **Service provider**
  - **Service registry**
  - **Service requestor**

- **Service Provider**

- **This is the provider of the web service.** The service provider implements the service and makes it available on the Internet.

3. Model of Web Services

- **Service Requestor**
- **This is any consumer of the web service. The requestor utilizes an existing web service by opening a network connection and sending an XML request.**
- **Service Registry**
- **This is a logically centralized directory of services. The registry provides a central place where developers can publish new services or find existing ones. It therefore serves as a centralized clearing house for companies and their services.**

3. Model of Web Services

- **Service provider**
- **Service registry**
- **Service requestor**

```
              ┌──────────────┐
              │ Web Service  │
              │  Registry    │
              └──────────────┘
            ↗                  ↘
    1. publish              2. find
    ↙                            ↘
┌──────────────┐            ┌──────────────┐
│ Web Service  │ ◄ 3. bind/invoke ► │ Web Service │
│  Provider    │            │   Client     │
└──────────────┘            └──────────────┘
```

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4. Components of Web Services

- **XML** – **eXtensible Markup Language** – A uniform data representation and exchange mechanism.

- **SOAP** – **Simple Object Access Protocol** – A standard way for communication.

- **UDDI** – **Universal Description, Discovery and Integration specification** – A mechanism to register and locate WS based application.

- **WSDL** – **Web Services Description Language** – A standard meta language to described the services offered.

4.1 XML

- **This is the simplest XML-based protocol for exchanging information between computers.**
- **XML-RPC is a simple protocol** that uses XML messages to perform RPCs.
- **Requests are encoded in XML and sent via** HTTP POST.
- XML responses are embedded in the body of the HTTP response.
- **XML-RPC is platform-independent**.
- **XML-RPC allows diverse applications** to communicate.
- **A Java client can speak** XML-RPC to a Perl server.
- **XML-RPC is the easiest way** to get started with web services.

4.1 XML

- **XML stands for** EXtensible Markup Language.
- **XML is a** markup language much like HTML.
- **XML was designed** to describe data.
- **XML tags** are not predefined. You must define your own tags.
- **The prefect choice** for enabling cross-platform data communication in Web Services.

4.1 XML (Example)

- **<?xml version=1.0?>**
- **<contact>**
- ** <name>John Doe</name>**
- ** <address>2 Backroads Lane</address>**
- ** <country>New York</country>**
- ** <phone>045935435</phone>**
- ** <email>john.doe@gmail.com</email>**
- **</contact>**

4.2 SOAP

- **SOAP**
- **SOAP is an XML-based protocol** for exchanging information between computers.
- **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 simple and extensible**.
- **SOAP allows you to get** around firewalls.
- **SOAP will be developed** as a W3C standard.

4.2 SOAP

- SOAP originally stood for "**Simple Object Access Protocol**" .

- **Web Services expose useful functionality** to Web users through a standard Web protocol called SOAP.

- **Soap is an XML vocabulary standard** to enable programs on separate computers to interact across any network. **SOAP is a simple markup language** for describing messages between applications.

- **Soap uses mainly HTTP as a transport protocol**. That is, HTTP message contains a SOAP message as its payload section.

4.2 SOAP

- SOAP has three major characteristics:
    - **Extensibility** – security and WS-routing are among the extensions under development.
    - **Neutrality** - SOAP can be used over any transport protocol such as HTTP, SMTP or even TCP.
    - **Independent** - SOAP allows for any programming model .

4.2 SOAP

A SOAP message is an ordinary XML document containing the following elements:

- **A required Envelope element** that identifies the XML document as a SOAP message.

- **An optional Header element** that contains header information.

- **A required Body element** that contains call and response information.

- **An optional Fault element** that provides information about errors that occurred while processing the message.

4.2 SOAP (A Request)

```
POST /InStock HTTP/1.1
Host: www.stock.org
Content-Type: application/soap+xml; charset=utf-8 Content-Length: 150

<?xml version="1.0"?>
<soap:Envelope
xmlns:soap="http://www.w3.org/2001/12/soap-envelope"
soap:encodingStyle=http://www.w3.org/2001/12/soap-encoding">

   <soap:Body xmlns:m="http://www.stock.org/stock">
       <m:GetStockPrice>
           <m:StockName>IBM</m:StockName>
       </m:GetStockPrice>
   </soap:Body>
</soap:Envelope>
```

4.2 SOAP (A Response)

```
HTTP/1.1 200 OK
Content-Type: application/soap; charset=utf-8
Content-Length: 126

<?xml version="1.0"?>
<soap:Envelope xmlns:soap="http://www.w3.org/2001/12/soap-envelope"
soap:encodingStyle="http://www.w3.org/2001/12/soap-encoding">

    <soap:Body xmlns:m="http://www.stock.org/stock">
        <m:GetStockPriceResponse>
                <m:Price>34.5</m:Price>
        </m:GetStockPriceResponse>
    </soap:Body>
</soap:Envelope>
```

4.2 SOAP (Security Issue)

- **SOAP uses HTTP** as a transport protocol and hence can use HTTP security mainly HTTP over SSL.

- But, **since SOAP** can run over a number of application protocols (**such as SMTP**) security had to be considered.

4.3 WSDL

- **WSDL stands for** Web Services Description Language.
- **WSDL is an XML** vocabulary for describing Web services. It allows developers to describe Web Services and their capabilities, in a standard manner.
- **WSDL specifies what** a request message must contain and what the response message will look like in unambiguous notation. In other words, it is a contract between the XML Web service and the client who wishes to use this service.
- **In addition to describing message contents**, WSDL defines where the service is available and what communications protocol is used to talk to the service.

4.3 WSDL

- **WSDL is pronounced** as 'wiz-dull' and spelled out as 'W-S-D-L'.
- **WSDL stands for** Web Services Description Language.
- **WSDL was developed** jointly by Microsoft and IBM.
- **WSDL is the standard format** for describing a web service.
- **WSDL definition** describes how to access a web service and what operations it will perform.
- **WSDL is an XML based** protocol for information exchange in decentralized and distributed environments.
- **WSDL is a language** for describing how to interface with XML-based services.
- **WSDL is an integral part** of UDDI, an XML-based worldwide business registry.
- **WSDL is the language** that UDDI uses.

4.3 WSDL

- A WSDL document is just a simple XML document.

- **It defines a web service using these major elements:**
  - **port type** - The operations performed by the web service.
  - **message** - The messages used by the web service.
  - **types** - The data types used by the web service.
  - **binding** - The communication protocols used by the web service

4.3 WSDL

```xml
<message name="GetStockPriceRequest">
    <part name="stock" type="xs:string"/>
</message>
<message name="GetStockPriceResponse">
    <part name="value" type="xs:string"/>
</message>

<portType name="StocksRates">
    <operation name="GetStockPrice">
        <input message="GetStockPriceRequest"/>
        <output message="GetStockPriceResponse"/>
    </operation>
</portType>
```

4.4 UDDI

- **UDDI stands for Universal Description**, Discovery and Integration.

- **UDDI is a directory for storing information** about web services , like yellow pages.

- **UDDI is a directory of web service interfaces** described by WSDL.

4.4 UDDI

- **UDDI is platform independent**, open framework.
- **UDDI can communicate** via SOAP, CORBA, and Java RMI Protocol.
- **UDDI uses WSDL** to describe interfaces to web services.
- **UDDI is seen with** SOAP and WSDL as one of the three foundation standards of web services.
- **UDDI is an open industry** initiative enabling businesses to discover each other and define how they interact over the Internet.

5. Introduction to Web Hosting

- **Web hosting** is a service of providing online space for storage of web pages. These web pages are made available via **World Wide Web.** The companies which offer website hosting are known as **Web hosts.**

- **It is not possible to host your website on your local computer**, to do so you would have to leave your **computer on 24 hours a day**. This is not **practical and cheaper as well**. This is where web hosting companies comes in

5. Introduction to Web Hosting

- **The total costs of setting up your own** in-house Web commerce site are expensive.

- **Web hosting services allow businesses to start** electronic commerce inexpensively.

- **Web hosting services provide all the services** that an ISP does.

5. Types of Web Hosting

- **Self-hosting**
- **Shared hosting**
- **Dedicated hosting**
- **Grid Hosting**
- **Collocated hosting**

5.1 Self-Hosting

- **The online business owns** and maintains the server and all its software.

- **It implies full control**, instant hardware access, and complete flexibility.

- **Business must have additional staff**, Web expertise, expensive equipment, and a high-speed direct Internet connection.

5.2 Shared-Hosting

- **Your Web or commerce site resides** on the same physical server as several other sites.

- **It is inexpensive, requires** very little of an online store's time to maintain.

- **It has a very high-speed connection** to the Internet.

- **It may lose direct control** from online stores.

- **Security concerns arise** from unrelated online businesses sharing the same server.

5.3 Dedicated-Hosting

- In this kind of hosting, **single dedicated server is setup** for just one customer

- **A Web host provides** a server for your Web site alone.

- **More Web and commerce software options**, a good high-speed connection, more control to site's design become available.

- **Higher software costs and maintenance** costs can be incurred.

5.4 Grid Hosting

- Instead of utilizing one server, Grid Hosting spreads resources over a large number of servers.

- **It is quite stable and flexible.**

- The servers can be added or taken away from the grid without crashing the system

5.5 Collocated-Hosting

- **The server is owned by the online store** but is located at the Web host's site.

- **The Web host provides maintenance** based on the level of service the online business requires.

- **Maintenance costs are higher** than self-hosting.

- "ValueWeb" is an **example of a Web hosting service.** It provides services of shared hosting, dedicated hosting, and collocation services.

5.2 Web Hosting Companies

These are
 the several
  companies
offering
web hosting
service:

S.N.	Hosting Company
1.	Blue Host
2.	Go Daddy
3.	Host Gator
4.	just Host
5.	Laughing Squid
6.	Hivelocity
7.	liquid Web
8.	Media TempleServInt
9.	Wired Tree
10.	Wild West Domains
11.	Wix
12.	WIPL
13.	Big Rock

6. Selecting a Host

- **Usage limitations**
  - Most hosting plans limit how much data you can transfer to and from their servers in a given month. Once you reach 500MB or 1GB of data transfer, most companies charge you by the megabyte for any additional traffic
- **Script and extension support**
  - **If your Web site uses or will soon use:**
    - SQL databases
    - CGI scripts
    - FrontPage 2000 extensions
    - PHP
    - Active Server Pages.

6. Selecting a Host

- **File-transfer options**
  - **You'll need to upload your site from your local machine to the server** it lives on, and you may want people to be able to download files directly from your site. Look for a host that offers unlimited password-protected FTP uploads to get your site online

- **Mail options**
  - **How much e-mail will you need for your domain**? Estimate the number of mailboxes you'll want. You might pick one for each employee, for example, and add some for functions such as sales, info, complaints, and feedback

6. Selecting a Host

- **Site statistics**
  - **You may not think much about hit rates and browser versions and types** now, but once you get the site off the ground, you might want site statistic tools so that you can evaluate traffic and plan future site development.

Summary

- **Web Services - Introduction**
- **History of Web Services**
- **Web services serves as a component**
- **Web Services Advantages**
- **How Does a Web Service Work?**
- **Web Services architecture**
- **Service provider**
- **Service registry**
- **Service requestor**

Summary

- **Components of Web Services**
    - **XML – eXtensible Markup Language**
    - **SOAP – Simple Object Access Protocol**
    - **UDDI – Universal Description, Discovery and Integration specification**
    - **WSDL – Web Services Description Language**
- **Introduction to Web Hosting**
    - **Types of Web Hosting**
        - **Self-hosting**
        - **Shared hosting**
        - **Dedicated hosting**
        - **Grid Hosting**
        - **Collocated hosting**
- **Web Hosting Companies**
- **Selecting a Host**

THANK YOU