WEB SERVICES

Overview

- A WebService is a Consumer_Machine-to-Provider_Machine collaboration schema that operates over a computer network.
- The data exchanges occur independently of the OS, browser, platform, and programming languages used by the provider and the consumers.
- A provider may expose multiple EndPoints (sets of WebServices), each offering any number of typically related functions.
- WebServices expect the computer network to support standard Web protocols such as XML, HTTP, HTTPS, FTP, and SMTP.
- **Example:**
- Weather information, money exchange rates, world news, stock market quotation are examples of applications that can be modeled around the notion of a remote data-services provider surrounded by countless consumers tapping on the server's resources.

Overview

Advantages of Using the WebService Architecture

- Under the WebService strategy the invoked functions are implemented once (in the server) and called many times (by the remote users).
- Some advantages of this organization are:
  - Elimination of redundant code,
  - Ability to transparently make changes on the server to update a particular service function without clients having to be informed.
  - Reduced maintenance and production costs

WebService Architecture

An ideal Webservice provider is designed around four logical layers which define the ways in which data is to be transported, encoded, exposed and discovered by the users

Layers	**Responsibility**
Transport	Move messages through the network, using HTTP, SMTP, FTP, ...
Messaging	Encoding of data to be exchanged (XML)
Description	WSDL (Web Service Desc. Lang) used for describing public methods available from the endpoint
Discovery	UDDI (Universal Description & Discovery Integration) facilitates location and publishing of services through a common registry

Consuming WebServices

Example: Using REST.

The following URL is used to make a call to the Google Search service asking to provide links to the subject “Cleveland State University.

https://www.google.com/search?q=cleveland+state+university

https – transport
www.google.com – provider
search – action
q=cleveland+state+university - arguments

Windows Communication Foundation (WCF)

WCF is a Microsoft technology that provides a framework for writing code to communicate across heterogeneous platforms.

1. An IIS WebServer may host various EndPoints (WebServices).
2. Each of those EndPoints uses WSDL to provide a way of exposing its composition and behavior to clients wishing to find and communicate with the services.
3. Each endpoint includes:

   address (URL - where to send messages),
   binding (how to send messages), and a
   contract (an explanation of what messages contain)

Reading and Demos

- Read the Web Service (pdf)
- Down load the Web Services code examples (zip)
- Run the following applications:
  - Publishing and consuming WelcomeRESTXMLService
  - Publishing and consuming WelcomeRESTJSONService
  - EquationGeneratorServiceXML and MathTutorXML
  - EquationGeneratorServiceJSON and MathTutorJSON