Bharath College of Science and Management, Thanjavur-5

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UNIT V

WEB SERVICES - INTRODUCTION

WEB SERVICES

- *A **software system** designed to support interaction over network.*
- *Accessed over a network such as internet and executed on a remote system hosting the requested services.*
- *It refers to client and servers that communicate over the HTTP protocol.*

Two categories

1. Big web services :

- Use XML messages that follow the SOAP standard .

- Machine readable description of the operations offered by the service written in Web Services Description Language (WSDL).

2. Restful Web Services:

- Web services can convert your application into web applications.

- WS published, found and used through web.

What are web services?

- An application components
- Communicate using open protocols
- Self-contained and self-describing
- Discovered using UDDI (**U**niversal **D**escription **D**iscovery and **I**ntegration)
- Used by other applications
- XML basis for web services.

Web services are set of tools can be used in no. of ways.

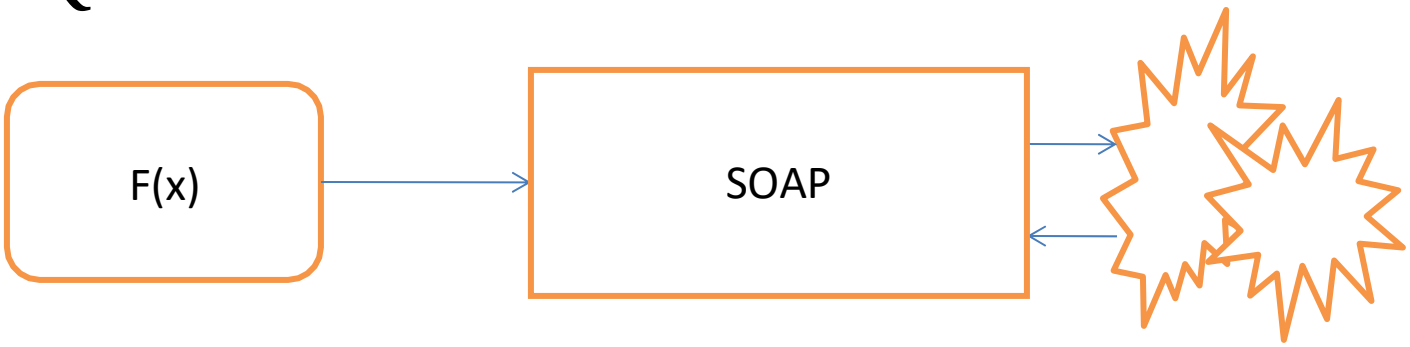
Three common styles

1. RPC (Remote Procedure Call)
2. SOA (Service Oriented Architecture)
3. REST (REpresentational State Transfer)

1. RPC

SERVICE REQUESTER

SERVICE PROVIDER



- Present a distributed function or method .
- All interface that is familiar to many developers
- WSDL operation is the basic unit of RPC
- First web services tools focussed on RPC
- Loosely coupled.

2. SOA

- Basic unit of **communication is message** rather than an **operation.**
- Referred as **“message oriented”** services.
- Supported by most major software vendors and industry analysts.
- Loose coupling .

3. REPRESENTATIONAL STATE TRANSFER

- Attempt to emulate HTTP & similar protocols by constrain the **interface** to a set of well known standard operations.

  (Eg) GET, POST, PUT, DELETE

- Focus is on **interacting with stateful resources**, rather than **message**s or **operations.**
- Use WSDL to describe SOAP messaging over HTTP which defines the operations.

WORKING WITH WEB SERVICES

- ***XML + HTTP*** is the basic web service platform.
- XML provides a language used between different platforms and programming languages
- Also express complex messages and functions.
- **HTTP** protocol is the most used Internet Protocol.

WEB SERVICES PLATFORM ELEMENTS

- **SOAP** (*Simple Object Access Protocol*)
- **UDDI** (*Universal Description Discovery and Integration*)
- **WSDL** (*Web Services Description Language*)

NEED FOR WEB SERVICES

- Previous years WS are not fast enough.
- Interoperability has highest priority.
- Major platforms could access the web using web browsers, different platforms couldn’t interact.
- Built around web browser standards .
- Can be used by any browser on any platform.
- For these platforms work together web applications were developed.
- **Web Applications -** *Simply Applications that run on web.*

- Web services take web applications to the next level.
- Publish its function or message to the rest of the world.
- Web services use XML to code and to decode data and SOAP to transport it.
- **Two types of uses**:

    1) Reusable application component.

    2) Connect existing software.

UDDI

UNIVERSAL DESCRIPTIOIN DISCOVERY & INTEGRATION

- Platform independent.
- XML language protocol that includes registry by which business worldwide can lists themselves on internet.
- It is a directory service where companies can register and search for web services
- It is a directory for storing information about web services

- A directory of storing web services interface described by WSDL.
- It communicates through SOAP.
- Built into the MS.Net platform
- Uses WWW consortium(W3C) and Internet Engineering Task Force(IETF) ,Internet standards such as XML, HTTP & DNS protocol.
- It uses WSDL to describe interfaces to web services.

- Additionally cross platform programming features are addressed by adopting SOAP, known as XML protocol messaging specifications.
- Any sizes of industry or business can benefit from UDDI.
- It is a **registry for businesses** worldwide to list themselves on the internet.

- **Business registry** : *3 components*

1. White pages – Address, contact & known identifiers.

2. Yellow pages - Industrial categorizations based on standard taxonomies.

3. Green pages – Technical information about services

PROBLEMS

- Making it possible to discover the right business from the millions currently online.
- Defining how to enable commerce once the preferred business is discovered.
- Reaching new customers & increasing access to current customers.
- Expanding offerings & extending market reach.

- Solving customer – driven need to remove barriers to allow for rapid participation in the global internet economy.
- Describing services & business processes programmatically in a single, open & secure environment.

WSDL

WSDL

- **W**eb Service **D**escription **L**anguage.
- **Specification defining** how to describe web services in a common XML grammar.

- **Describe 4 pieces of data:**

1. ***Interface Information*** – Describing all publicly available functions.
2. ***Data Type Information*** – For all message request & message responses.
3. ***Binding Information*** – About the transport protocol to be used.
4. ***Address Information*** – For locating the specified service.

- Represents a contract between the service requestor and service provider.
- Java interface represents a contract between client code and active java object.
- Language and platform independent and used to describe SOAP services.
- Using WSDL, client can locate a web service & invoke any of its publicly available functions.
- We can also automate this process, enabling applications to easily integrate new services with little or no manual code.

WSDL SPECIFICATION

- It is an xml grammar for describing web services specifications.
- **Divided into 6 major elements:**
  - definitions
  - types
  - message
  - portType
  - binding
  - service

1. **Definitions:**

   - Root elements of WSDL documents.
   - Defines the name of the web service.
   - Declares multiple namespaces used throughout the remainder of the documents.
   - Contains all the service elements described here.

2. Types:

- Describes all the data types used between the client & the server.
- Not specific typing system, but uses W3C XML schema specification as its default choice.
- Strings & Integers.

3. Messages:

- Describes one-way message, whether it is a single message request or single message response.
- Defines the name of the message & contains zero (or) more message part elements.
- Refers to message parameters or message return values.

4. **Port Type:**

- Combines multiple message elements to form a complete one-way or round trip operation.

- Combine one request or one response message

5. Binding:

- Describes specifics of how the service will be implemented on the wire.

6. Service:

- Defines address for invoking the specified service.

Additionally some of the **utility elements**:

Documentation - Used to provide human-readable documentation & can be included inside any other WSDL element.

Import - Used to import other WSDL document (or) XML schemas.

- Enables more modular WSDL documents.