

# Sengamala Thayaar Educational Trust Women’s College

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SUBJECT NAME : DISTRIBUTED TECHNOLOGIES

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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)

## RPC

SERVICE SERVICE

REQUESTER PROVIDER

F(x)

SOAP

* 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.

## 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 .

#### 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 ofuses**:

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 theright 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.

#### 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.

#### 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.

#### Port Type:

* + Combines multiple message elements to form a complete one-way or round trip operation.
  + Combine one request or one response message

#### Binding:

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

#### 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.