


# OBJECT-ORIENTED MODELLING (OOM) - 32536 MODULE 10

**Emerging technologies and OO Design**  
(Advanced Topics – POOD Chapter 10)

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## Module Outline



- Basics of Emerging Technologies
- Web Services:
  - HTTP; SOAP; XML; WSDL; UDDI
- Modelling Web Services with UML

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### Modelling Domains for Emerging Technologies

**Emerging Technologies**

- Web Services
- Mobile Technologies
- Bio-Informatics
- Nano-Technologies

Models

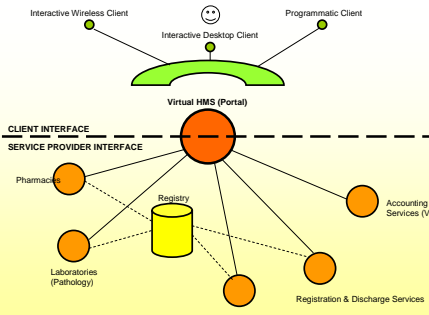
UML  
MDA

**What is Modelled?**

- Applications
- Contents
- Interfaces
- Security
- Networks

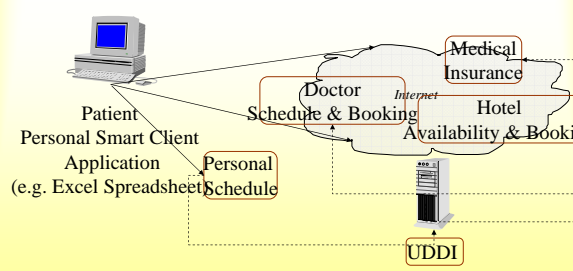
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### Web Services – A Practical Scenario



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**Web Services bring together Data and Information from Various Domains resulting in a Unified View to the Client (Patient) of Web Services**



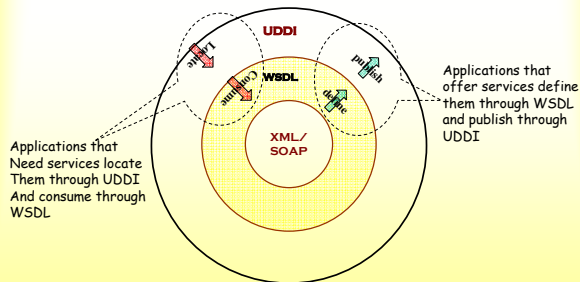
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## Sub-module

### Web Service Technologies and the UML

**HTTP; SOAP; XML; WSDL; UDDI;**

## Technology Layers in Web Services



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## Protocol Layer: HTTP

- Hyper Text Transfer Protocol
- Web browsers (Netscape, Internet Explorer) use protocols like http to access the web
- HTML - Hyper Text Markup Language
  - Provides Document Layout and Hyperlink Specification for WWW browsers
- Business uses the Secure HyperText Transfer Protocol
- Other protocols: ftp:// telnet:// smtp:// mime://

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## Information Layer: XML

- XML = EXtensible Markup Language
  - A subset of SGML (Standard Generalized Markup Language)
  - Independent of Platform, Language or Tool
  - XML facilitates Interchange of Structured Documents over the Net
  - Extensively used in EDI, Multimedia Publishing and Workflow Management
  - Bulky and for Non-Real time B2B applications

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## Packaging Layer: SOAP

- Simple Object Access Protocol (SOAP) provides a framework to invoke services across the Internet, independent of Languages
- SOAP is text-based encoded XML, running over HTTP:
  - Encoding rules that define how messages should be processed
  - An envelope, which provides the framework for packaging message information
  - An RPC representation that defines how to represent remote procedure calls and responses

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## SOAP Overview

- SOAP = Simple Object Access Protocol
- Mechanism to send XML messages
  - Consistent envelope
    - Header and body
  - Consistent data encoding
    - Based on XML Schema type system
  - Protocol binding framework
- Provides the interface to a Web service
  - Document style
  - RPC style

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## Service Layer: WSDL

- WSDL = Web Services Description Language
- Web Services Description Language defines the Interfaces to Web Services
  - What the Web Services do
  - How to communicate with the Web Services
  - Where to find the Web Services
- WSDL is also XML based

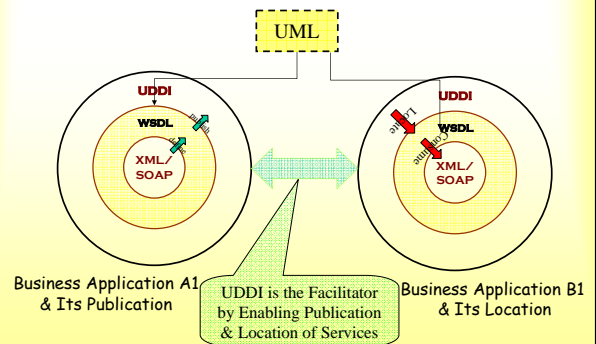
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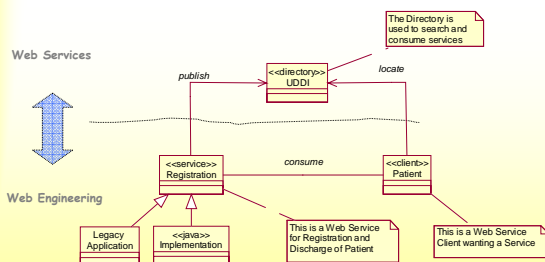
## Discovery Layer: UDDI

- Universal Description, Discovery and Integration (Current Version 3.0; [www.uddi.org](http://www.uddi.org))
- It is a “meta service” for locating web services
- Useful in private as well as public deployments.

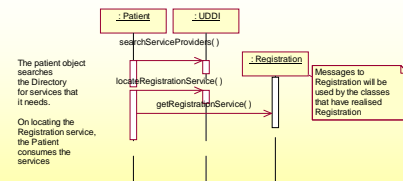
## Web Services – Usage and Modelling



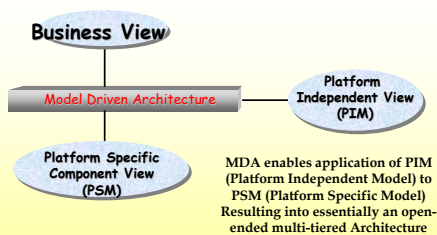
## Web Service Meta Model using the UML (HMS Example)



## Sequence Diagram Explaining Web Services Dynamics



## Understanding OMG's Model Driven Architecture (MDA™) in Application Design

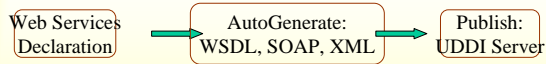


## Sub-Module:

## Using Web Services in Practice

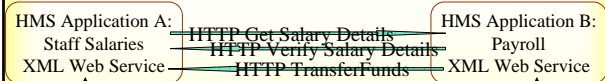
Usage with .NET

## Automating Web Services using .NET



**Visual Studio.net**

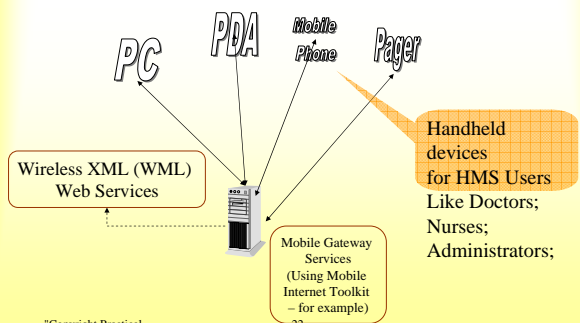
## Enterprise Application Integration (Within an Organization)



## Business to Business (Outside the Organization, with another Organization and its Applications)



## WML - XML Web Services for Mobile Devices



## Conclusions

- Discussed Emerging Technologies
  - ✓ Importance of Modelling Web Services
- ✓ XML/SOAP; WSDL; UDDI;
- Model Driven Architecture
- Applying Web Services in Practice
  - Including Mobile Applications

## PROJECT WORK : (DURING TUTORIALS IN THE LAB);

**Follow the Project Work Requirements given at the End of the Chapter; Discuss Project Work with Team Members and Tutor; Carry Out the Project Work**