

Mobile Web Services

Course ID: 582496

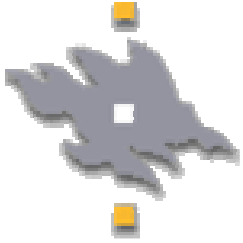
31 October 2005 – 08 December 2005

Monday & Thursday : 16:00-18:00

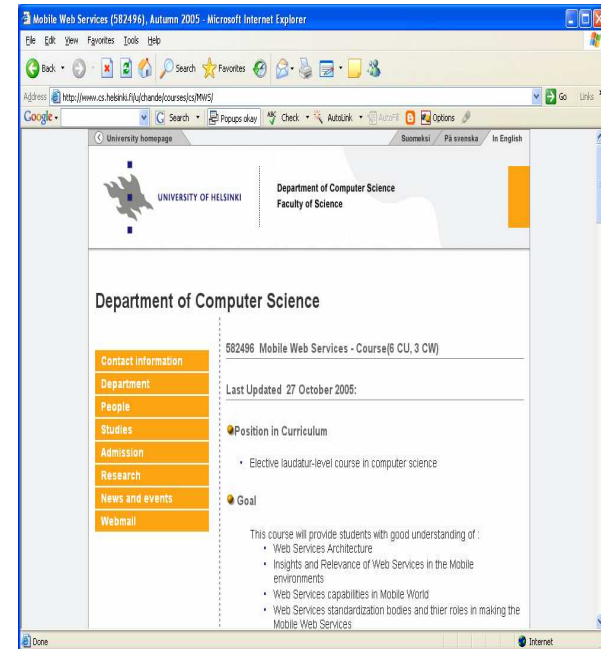
Suresh Chande

Department of Computer Science

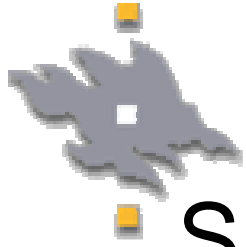
email: chande@cs.helsinki.fi



Course Web Page



<http://www.cs.helsinki.fi/u/chande> -> MWS or
<http://www.cs.helsinki.fi/u/chande/courses/cs/MWS/>



Suresh Chande - Background



I am a part-time PhD researcher at University of Helsinki, under the guidance of Professor: Kimmo Raatikainen, Department of Computer Science, UoH, Finland and external guidance from professor Elizabeth Kendall, Monash University Australia

Full time Working for Nokia Research Center, Ruoholahthi

My Background: Have been living in Finland since 1998,

M.E Information Technology: RMIT, Melbourne, Australia

B.E Computer Science: BMSCE, Bangalore, India

Industry Activities: Mobilizing Enterprise Systems, Mobile Web Services, Web Services, Mobile Services, Mobile Value added services.

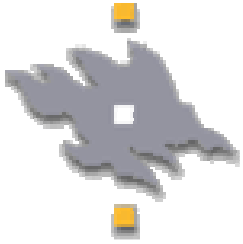
Academic Activities: Web Services, Application Frameworks, Design Pattern, Agent Frameworks

Technical Interests:

- Web Architecture evolution
- Mobile Web Services,
- Web Services Workflows,
- Automated Service Consumption

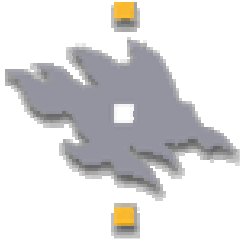
Other areas of interests:

- Distributed Systems,
- Enterprise Systems,
- Software Architectures,
- Multi-Modal Systems,
- Web Services
- Software Agents.
- OOA/D, UML, Design Patterns, Frameworks, & Application Frameworks,



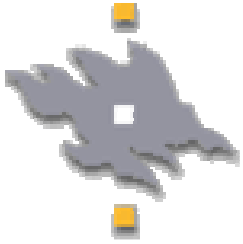
Course Goals

- This course will provide you with good understanding of :
 - Web Evolution towards Web Services
 - Web Services Architecture
 - Insights and relevance of Web Services in the Mobile environments (building blocks of Web Services)
 - Web Services standardization bodies
 - Role of the Web Standards in making the Mobile Web Services
 - Need and usecases why do we need Mobile web services
 - Web Services capabilities in Mobile World
 - Research challenges in the vision of Mobile Web Services



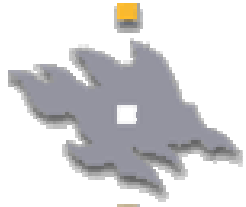
Description

- Web Services are emerging successfully after its initial hype with its introductions and later standardization.
- They are today being deployed in the areas such as Enterprise Integration and provisioning in Service Oriented systems.
- Mobile devices have begun to take advantage of this technology and exploit the available services and existing infrastructure. As Mobile Web Services are emerging they are contributing towards the next generation Web Services Architectures.

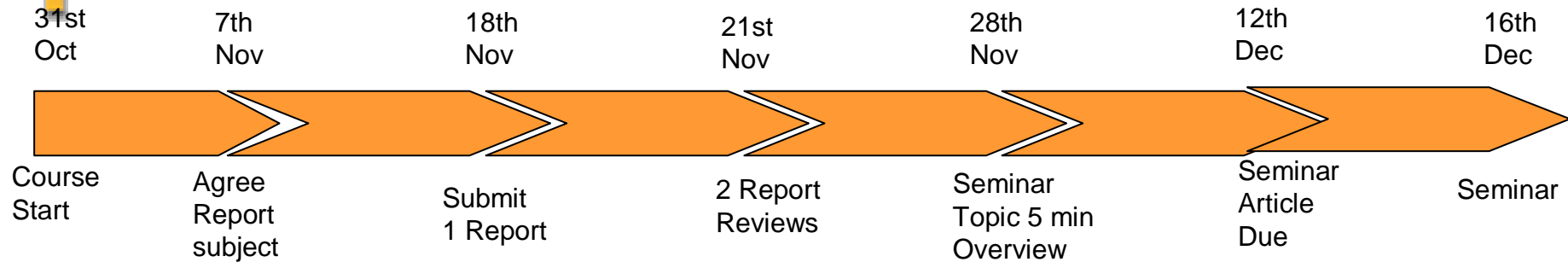


Mobile Web Services

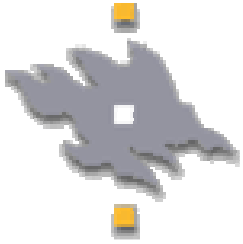
- Mobile devices enabled with web services can be an equal participant of the web services architectures, such as
 - WSC: Web Services Client
 - WSP: Web Services Provider
- The course will lead to a seminar day which will bring out your learnings, specifically focusing to a critical aspects of Mobile Web Services Architectures



Course Schedule



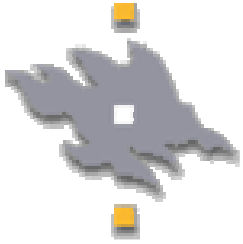
- **Lecture and classes:**
 - 31st October 2005 – 08 December 2005
 - Monday and Thursday @ 16:00 – 18:00 hrs, room B119
- **1 Report (10 A4 Pages):**
 - Agree Subject: 7th November
 - Deadline: 18 November
- **Report Review(2x1 A4 Pages):**
 - Start: 21st November
 - Deadline: 25 November
- **Software Project / Seminar Article 25 A4 Pages):**
 - Title Agreed : 24 November 2005
 - Due Date: 12 December 2005
- **Seminar Presentation or Project Poster**
 - 16 December 2005



Course Requirements

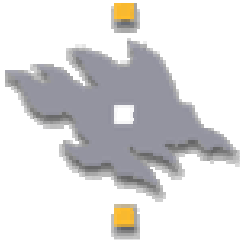
If you haven't yet provided this information kindly make this available to me by email: chande@cs.helsinki.fi

- State the stage of your studies at the UoH.
- What interests you in the topic of this course ?
- What do you expect to take back from this course ?
- Have you taken any previous course dealing with Networks, distributed Computing, Mobile Computing, Web Services ? If so please list the course names you have taken up previously.
- How well do you understand web based architectures and applications ?
- What are the web Services technologies you are familiar with ?



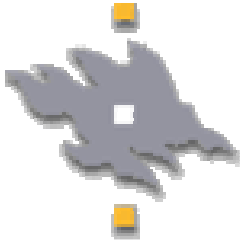
In order to take this course

- To pass the course It is required to:
 - a. Attend the course
 - b. Write Report and review them
 - c. Prepare a Seminar Article (25 Page report + Presentation at the seminar) or Report on a software project carried out to develop a mobile Web Services Project (8 Pages + Demonstration)



Outline

- Lectures - Presented
- **Study Report:** Discussions on a specific set of Web Services specification or standardization, Mobile Web Services (More references will be provided on the course pages by 5th of November).
 - 10 - A4 Pages
 - 2 Review reports to be made: 1 A4
 - Note: You can propose your interested topic as well.
- **Seminar Article:**
 - On identified Mobile Web Services research challenges. Article should give Overview, Defend and Offend the potential strengths and pitfalls of specific approaches in the development of Mobile Web Services technology elements and concepts behind them.
 - 25 - A4 Pages + Presentation



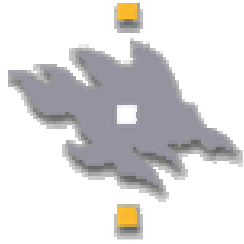
Outline

- Software Project:
 - Make a mobile Web Services Client for a well known public Web Services interface using the available Web Services toolkits for Mobile devices, for example using:
 - Java JSR-172
 - Windows Mobile
 - Nokia Web Services Framework
 - any others..
 - 8 Pages report
 - Presentation + Demonstration



What you expect from this course ?

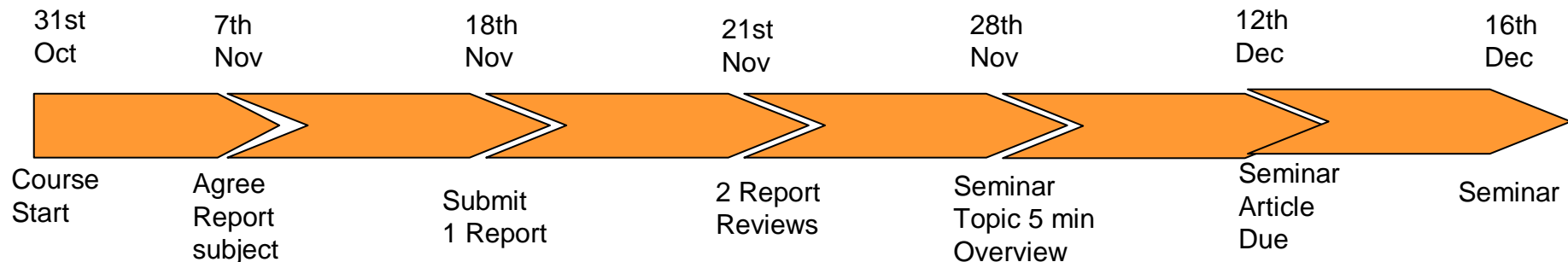
- Mobile web services is a new topic for me
- I expect to have better knowledge about this area.
- Learn about WS basics and their implementation on mobile world.
- A further knowledge on how the different mobile services work.
- Better understanding of integrated web applications (larger entities).
- Latest and cutting edge technology that drives today's mobile industry
- Knowledge of the standardized interfaces to be used to create solutions in mobile environment -Better understanding of the technologies -25 pages of written material to my thesis -3 laudatur level credits
- I take the course during 31Oct - 18Dec 2005, write reports and report software project carried out.
- An overview of meaningful approaches which should help to integrate web services on mobile devices
- I expect to gain knowledge and experience in developing webservices, in particular for mobile devices.
- Hopefully this course would help me in improving my technical skills in web based services.
- I would like to gain knowledge about the current status of the mobile web services in terms of device-accessed/hosted web services and general mobile web services architectures. Also the activities of standardization bodies are of interest to me.
- More knowledge in telecommunication, in special, mobile web communications, in all the aspect that this include, because in this times, almost all the web technology have been development on mobile services
- I expect to get an understanding on how web services can be used to create distributed applications on mobile devices.

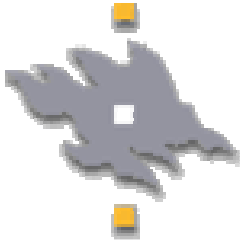


The Course content will be altered during the course

Lectures Outline

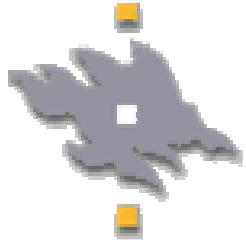
- **Course Introduction & Outline Discussion -> 31st Oct**
- **Web Evolution towards SOA -> 7 Nov**
- **Web Service Architectures -> 10 Nov**
- **Web Service Technologies -> 14 Nov**
- **Web Services standardizations-> 17 Nov,**
- **A Case for Mobile Web Services -> 21 Nov,**
- **Mobile Web Services(MWS): Overview & State of Art -> 24 Nov,**
- **MWS Architecture -> 28 Nov,**
- **MWS Limitations and Application Usecases -> 1 Dec,**
- **MWS Activities, Standardization and Collaboration -> 5 Dec**
- **MWS Research Challenges -> 8 Dec,**
- **MWS relationship to Internet WS Standardss ->12 Dec,**
- **Course Conclusion -> 14 Dec**





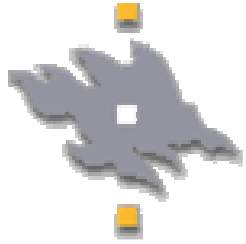
Course Background

- Web Services are here in the enterprise space, enabling and solving the complex enterprise integration issues. The solution provided by Web Services are agnostic to the platform, vendor tools, and development environment and at the same time build on top of the widely utilized basic Web Services technologies (XML, XML Schema, SOAP, WSDL, UDDI).
- Web Services Architectures builds on the success of the Web Architecture and applies the web services technologies to access web in a programmatic manner



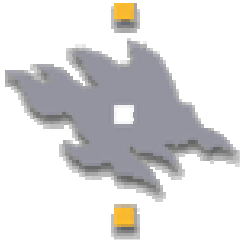
Course Background[Contd..]

- The success and advantages of these technologies are felt and are heading towards the development of Mobile Web Services. The Mobile Web Services are realized in two levels:
- a. Network hosted Mobile Services : The operator and third party mobile services provider have very valuable services that they could offer to the developer and service providers. These services are best provide as WSI interfaces. The services such as Payment, Presence, SMS, MMS interfaces, Locations, Profile, services are few of the services that could be provide by as well as network / operator hosted Mobile Web Services



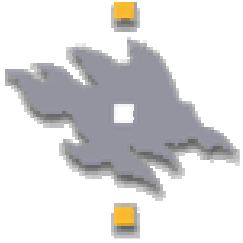
Course Background[Contd..]

- b. Device hosted Web Services : The mobile devices are getting computationally capable, such that they host Web Services on the Mobile devices directly. This is a very interesting development in the mobile world. At the same time also allowing great potential for big innovations for applications and services that can be provided by individual mobile device owners
 - i). Mobile device as a Web Services Client:
 - ii). Mobile Device as a Web Services provider:

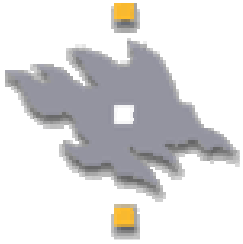


Course pre-requisites

- Requirement: Have previously taken a courses dealing with Distributed Systems, Basic Web Services understanding or has attended the Web Services Architecture course
- Should have understanding of:
- XML Basics (taken the course Meta Language XML)
- XML based transformation techniques (Techniques for Digital Media)
- Basic understanding of how Web works
- understanding of Web Services standards, architectural issues
- Mobile Computing



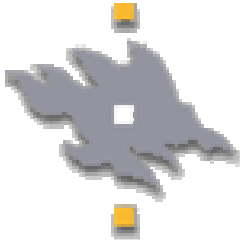
Web Services Introduction



Web Services - Definition

Web Services are the means of exposing services of an organization, enterprise or any sort of service provider to its consumers or partners over the Web utilizing open Web-based standards, which are agnostic to development platform used, vendor tools and the underlying implementation specifics.

"A Web service is a software system identified by a URI, whose public interfaces and bindings are described using XML. Its definition can be discovered by other software systems. These systems may then interact with the Web service in a manner prescribed by its definition, using XML-based messages conveyed by Internet protocols." [W3C]

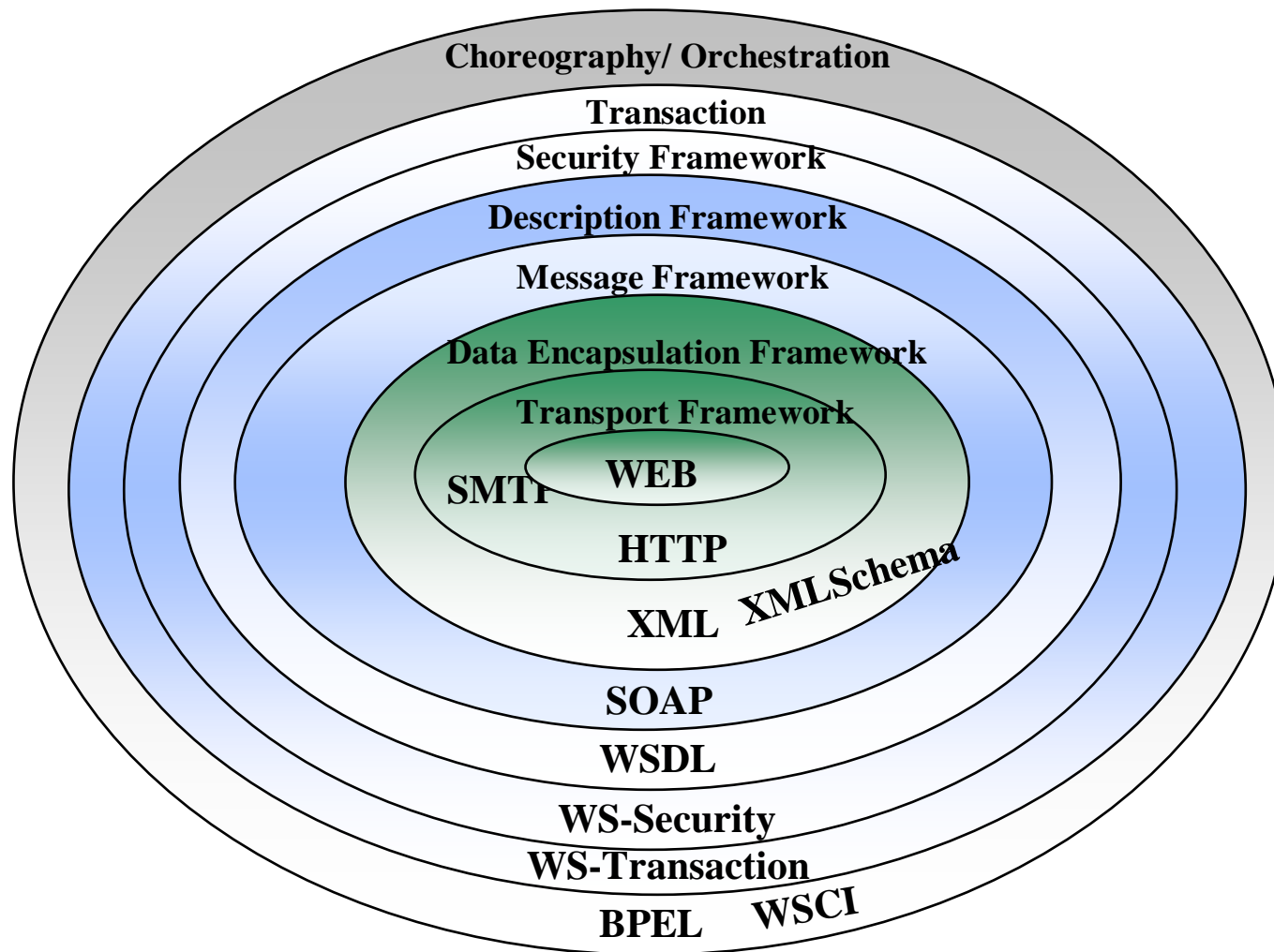


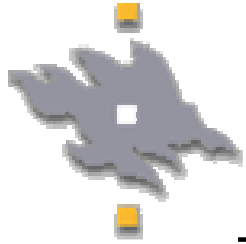
Web Services in a Nutshell

- The next wave of web development – XML based **programmatically access to the services over the Web.**
- Programmatic access enabled via a set of XML related horizontal Frameworks :
 - Data Encapsulation (XML, XML Schemas).
 - Message Framework (SOAP).
 - Description Framework (WSDL).
 - Security Framework (WS-Security).
 - Discovery Framework (UDDI/ Local WSIL).
 - Transaction (WS-Transaction).
 - Assertions & Authorization (SAML).
 - Choreography & Workflows (BPEL4WS, WSCI)
 - Reliability (WS-Reliability)
 - And many more in the list..



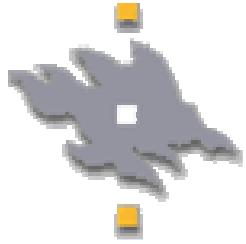
Web Services Basic Technologies



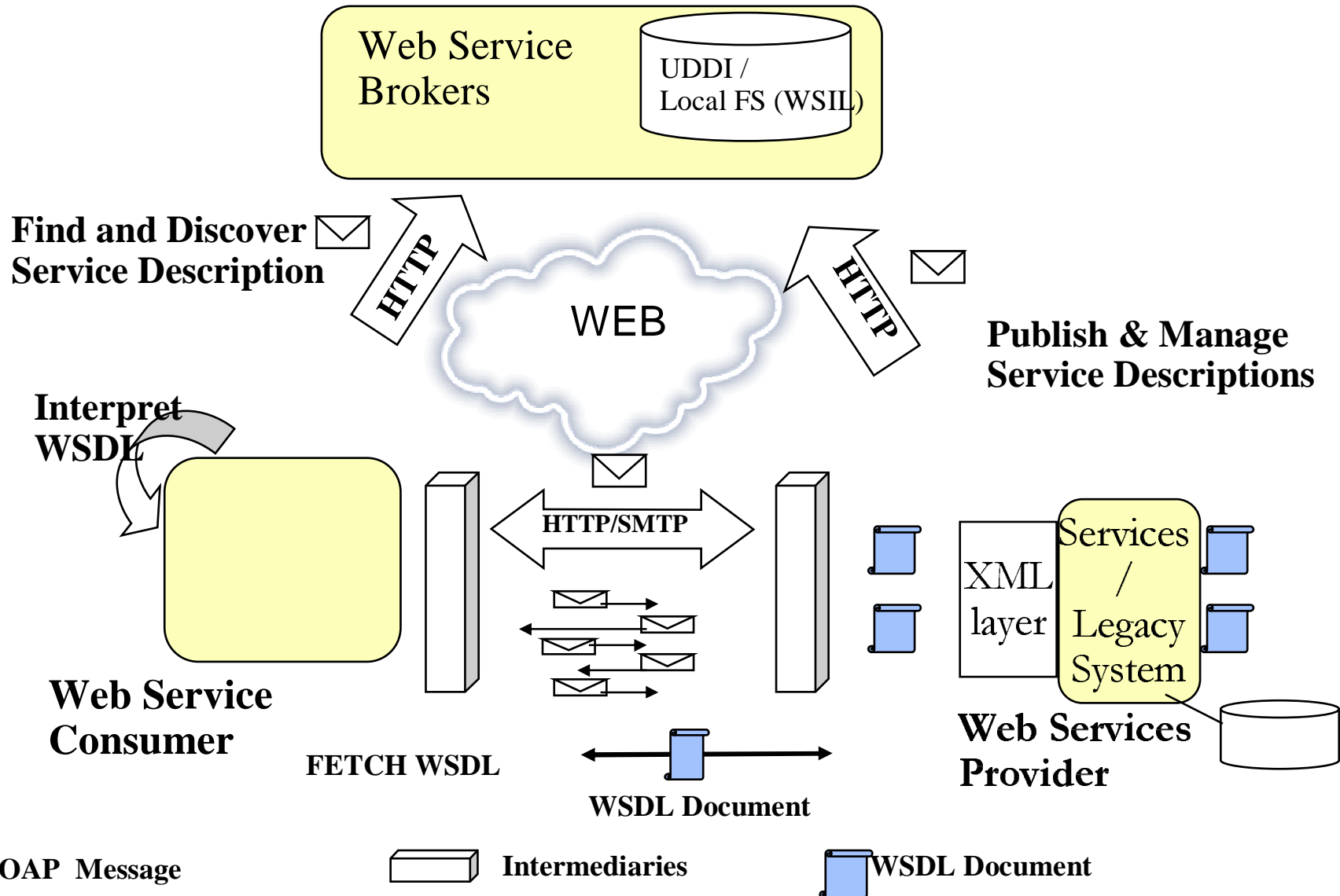


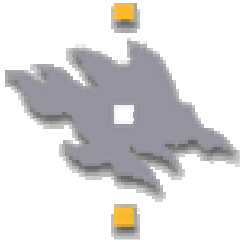
Web Services Architecture

- The basic Web Service Architecture is defined around three main roles for its participants
 - **Web Services Client (WSC):** The Web Service(Ws) consuming client system.
 - **Web Services Providers (WSP):** are participants who desire to publish their service as a Web Service
 - **Web Services Brokers (WSB):** Provide WSC a discovery mechanism to find the required service and at the same time provided WSP means of publish and manage the description about the hosted WS.



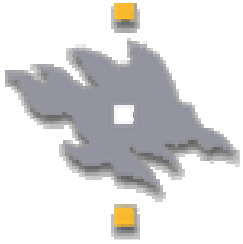
Web Services Architecture





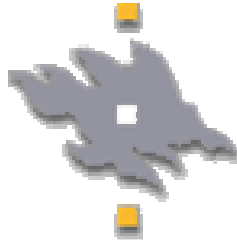
Benefits of Web Services

- Allows **loose coupling** between systems willing to communicate and collaborate.
- Enables agreement on a standard set of protocols
- Open Architecture and applications communications protocols
- **Removes platform dependencies** between the communicating systems
- Introduces **rapid services development**
- **Reduces** Integration **costs** and **speedens** the integration process
- **Low entry barrier**
- Enable **wider utilization** of the services as it does not dictate a platform specific requirements on the consuming clients.
- Continue to **utilize legacy** systems



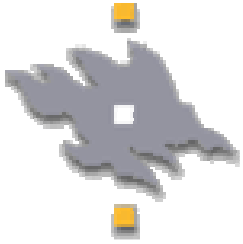
Web Services Hype

- Automatic Business Integration: A Piece of software will automatically discover, access, integrate and invoke new services from unknown companies dynamically without the need for human intervention.
- Seamlessly discover the required services and integrate into existing solutions.
- "Silver bullet", solves all the integration problems that we ever faced in distributed and heterogeneous systems.
- Is ready and available for immediate system development
- Inter-operable and a light weight protocol
- Simple and easy to utilize



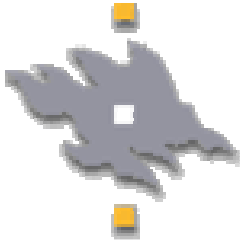
Web Services Hype [Contd..]

- A very low learning curve
- Decreases integration cost drastically
- Easy management of services
- Web Services is disruptive technology
- Web Service technologies is revolutionary in nature



Web Services in Reality

- Simple Set of core specifications
 - Communications
 - Message formats
 - Interface Description
 - Publishing & Discovery
- Complexity left out to be dealt by platforms
- A lot of open issues left to be addressed by the infrastructure hosting the web services
- A race for owning IPRs and and proposing new specifications
 - A very complex set of higher level specifications with potential threat for :
 - Inter-operability
 - Easy of development and learning
 - Web Services Manageability
 - Web Services architectures and hosting environments



Something to read & familiarize during the course

- 2004 Course material on : [Web Services Architecture](#)
 - Reports made by Students: [Web Services Standards](#)
 - Seminar Material produced by Students: [Seminar Material](#)