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Web Services

Sabesan

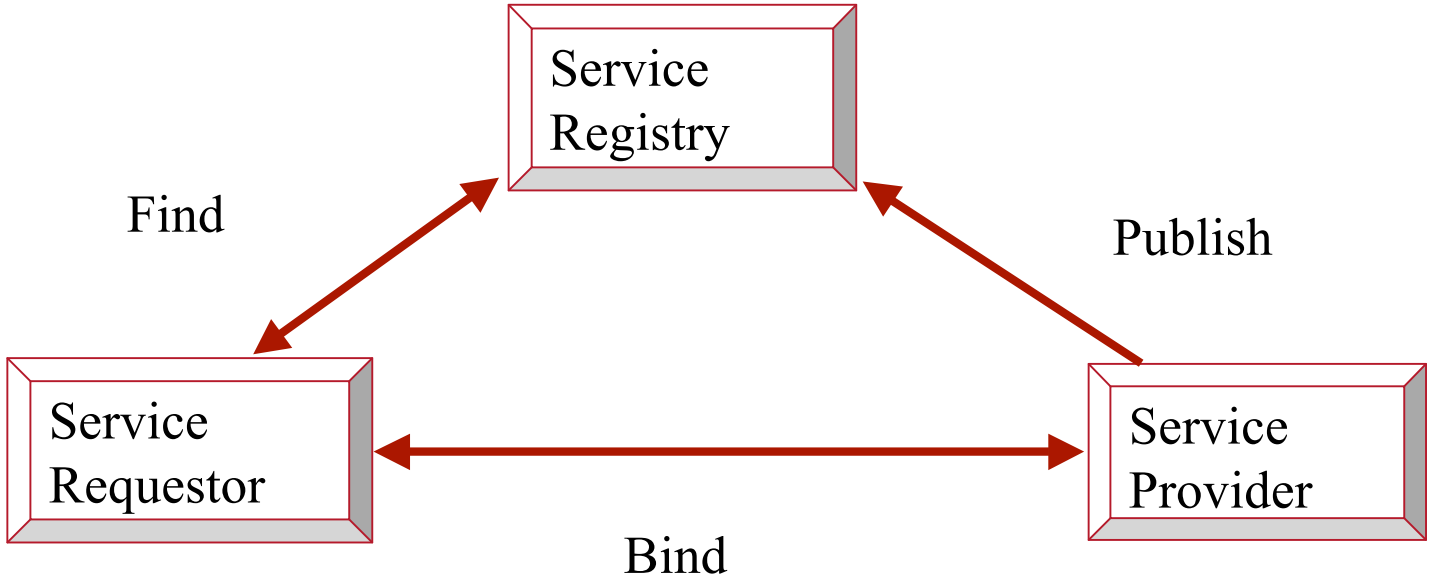
Uppsala Database Laboratory

Dept. of Information Technology

Uppsala University

Sweden

Service Oriented Architecture



- *Service provider*: responsible for creating service description and deploying the service.
- *Service registry*: responsible for publishing the service description
- *Service requetsor* : responsible for finding a service decription to consume the service

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Web Service basics

XML- Extensible Markup Language (XML) is a general-purpose *specification* for creating custom markup languages.

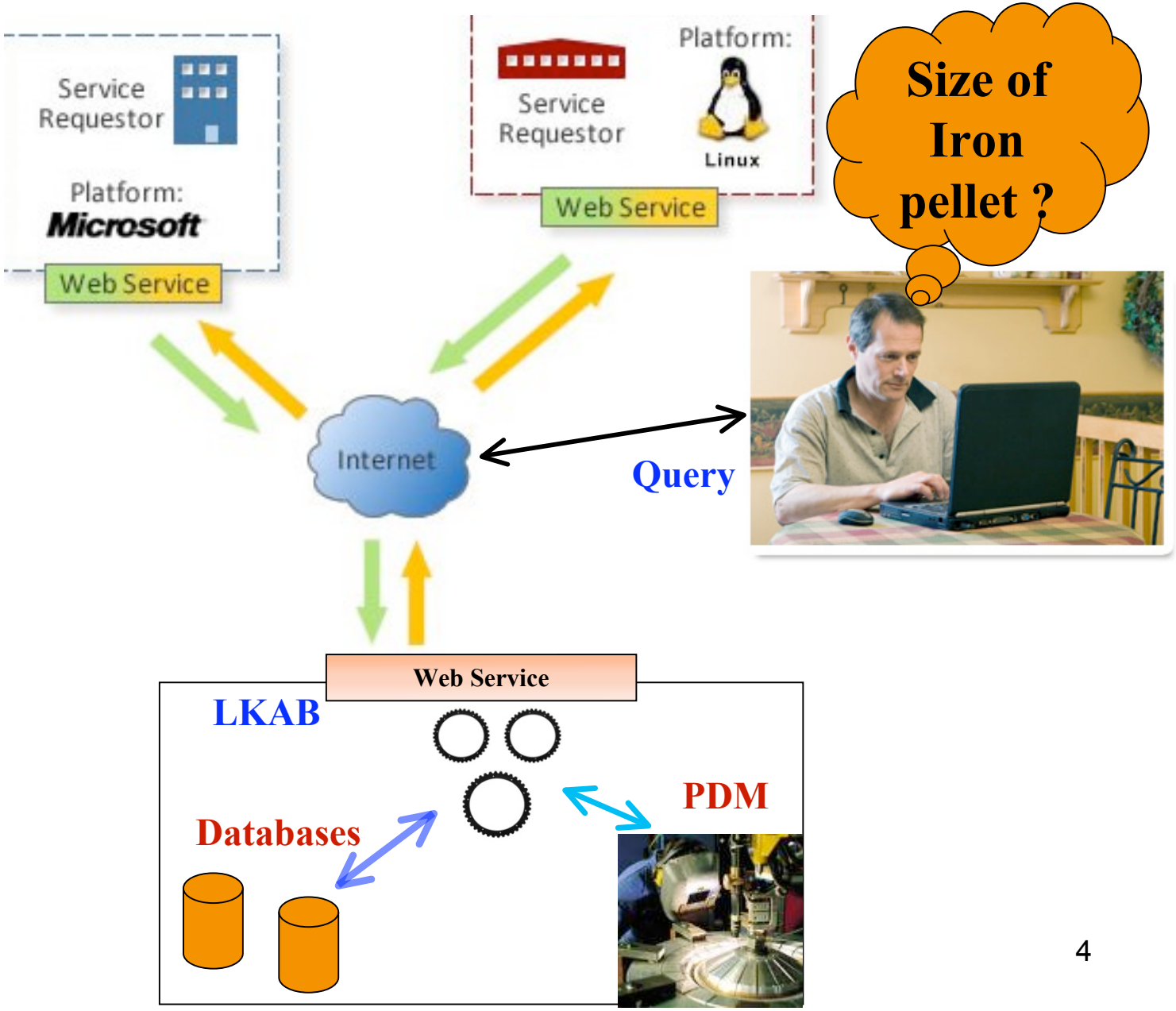
SOAP- Simple Object Access Protocol for exchanging structured information

WSDL- Web Service Description Language is an XML based description language for web services.

UDDI - Universal Description, Discovery and Integration (UDDI) is a platform-independent, XML-based registry for businesses worldwide

- Based upon the open standard technologies such as XML, WSDL, SOAP, UDDI

Web Service Scenario



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Web service is defined by W3C (World Wide Web Consortium) as:

•A Web service is a software system designed to support interoperable machine-to-machine interaction over a network.

• It has an interface described in a machine-processable format (specifically WSDL).

•Other systems interact with the Web service in a manner prescribed by its description using SOAP messages, typically conveyed using HTTP with an XML serialization in conjunction with other Web-related standards

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Publicly available Web services

1. Google web service
2. Amazon web service
3. Terraservice web service – Microsoft

www.xmethods.net – provide information about the publicly available web services

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Key reasons for deploying a web service

1. Scope of problems addressed :- CORBA focused on technical architectures rather than problems of application integration.
   - Support both document centric messaging and remote procedure calls
   - Transport encoded data from both applications and business documents
   - Work with standard internet protocols such as HTTP and SMTP
2. Using existing standard core technologies: XML, SOAP, HTTP
3. Industry Dynamics: Customer needs, market pressure, and the desire to be the partner of the up-to-date trends

Web Service Architecture

Discovery :	**UDDI**
Description:	**WSDL**
Message packaging:	**SOAP**
Communication:	**HTTP**

- **Service discovery:** a dictionary of web services
- **Interface description:** describes how to call operations of a web service
- **Message packaging:** formats the data ready for communication
- **Communication layer:** transports data over network

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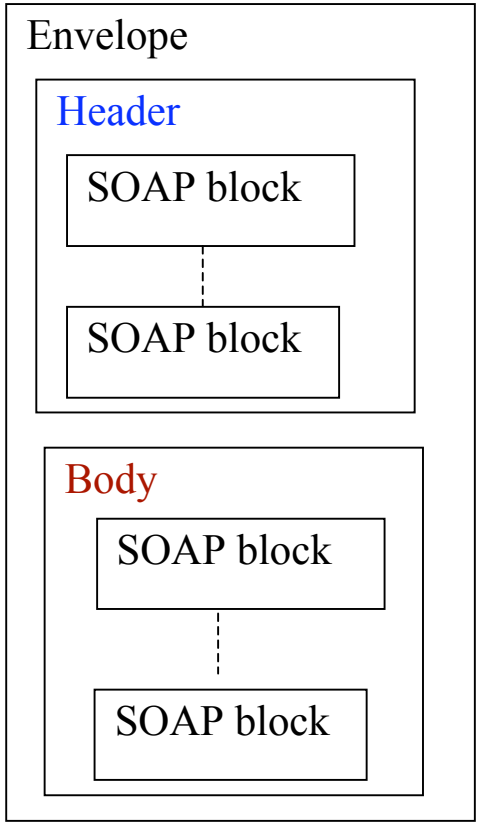
Web Services Description Language(WSDL)

- WSDL uses XML for describing services
- WSDL describes:
  - What operations are provided
  - How operations are accessed
  - Where a service is located

Simple Object Access Protocol (SOAP)



- ***SOAP header*** **provides a mechanism for adding features to the message such as routing and delivery setting, authentication assertions, and transaction contexts**
- ***SOAP body*** **contains the actual message to be delivered and processed**

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Our Problem Area

- It is difficult to find data provided by web services:

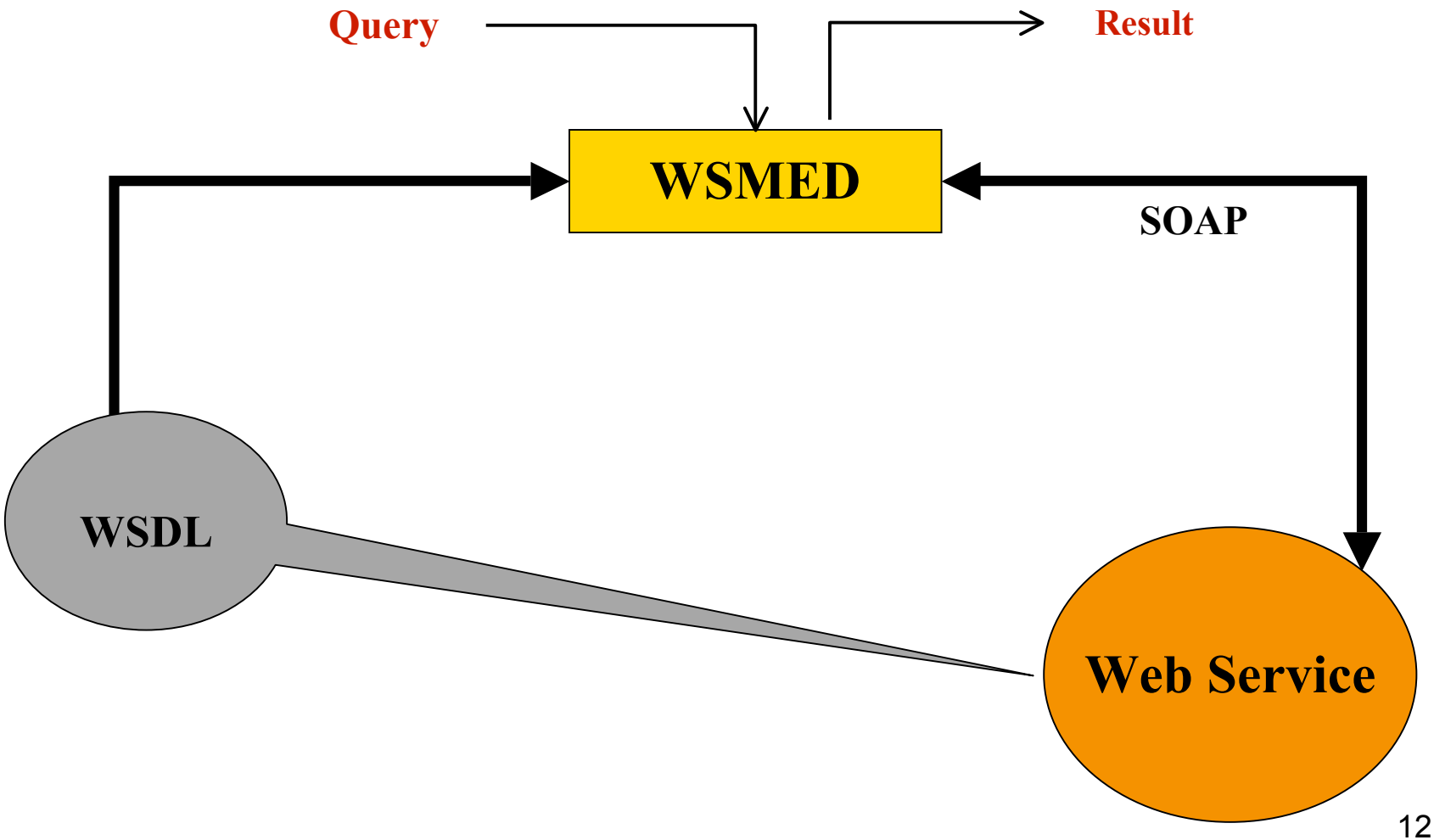
  Current web services applications must be developed using a regular programming language such Java, C# .

- To simplify searching web services data:

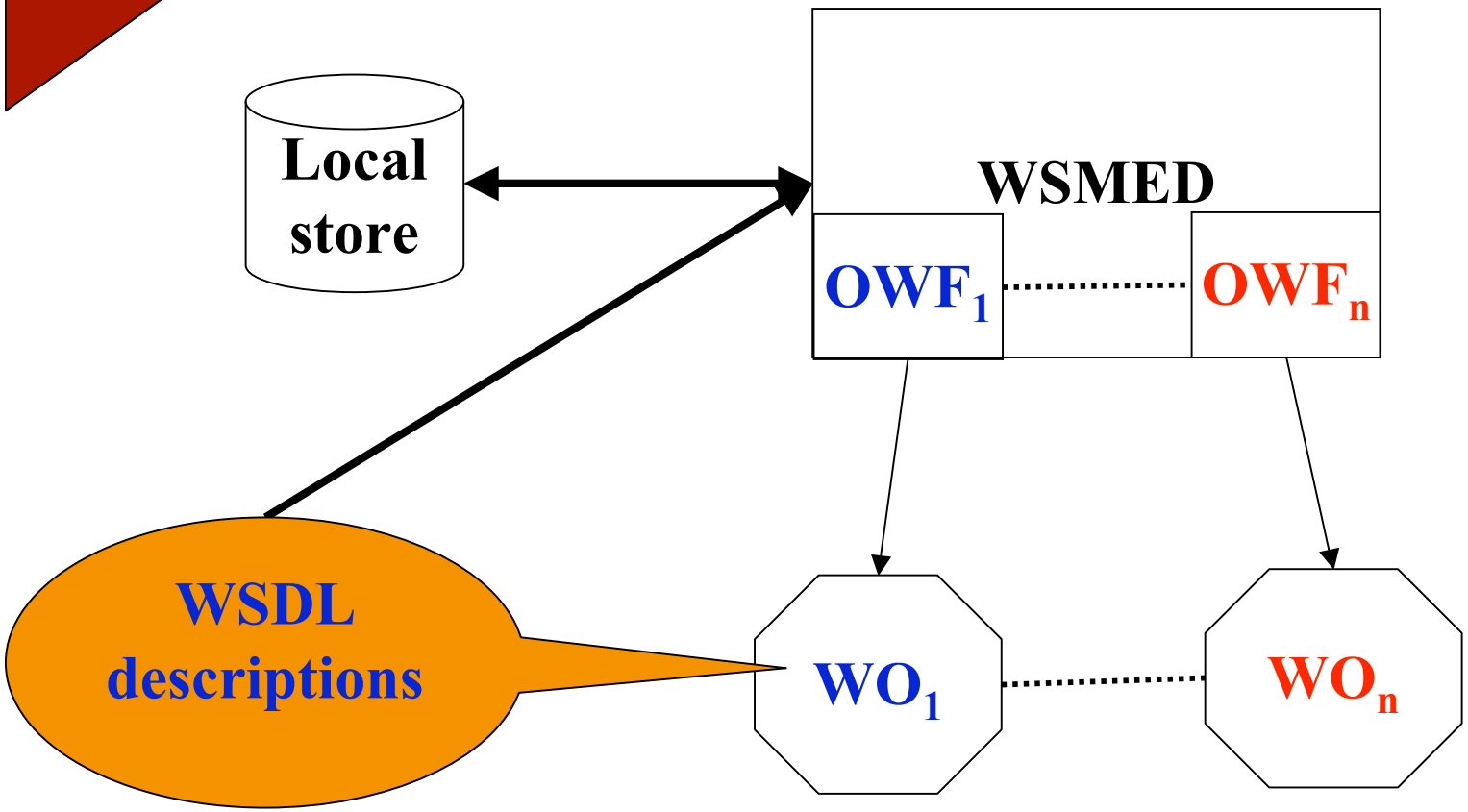
  We propose efficient processing of database queries to views of wrapped web services.

Our Approach- Web Service MEDiator (WSMED) Architecture

Development of WSMED, a web service based mediator prototype :



WSMED System



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Research Issues

1. How can standards, such as WDSL, SOAP, and XML-Schema, be automatically utilized by a mediator engine?

2. How can database views be defined in terms of imported web service descriptions?

3. How can the modern query optimization be used to provide efficient access to wrapped web services?

4. What minimal set of extra semantic enrichment is needed to provide efficient queries ?

5. How speedup the queries with dependent web service calls ?

WSMED View

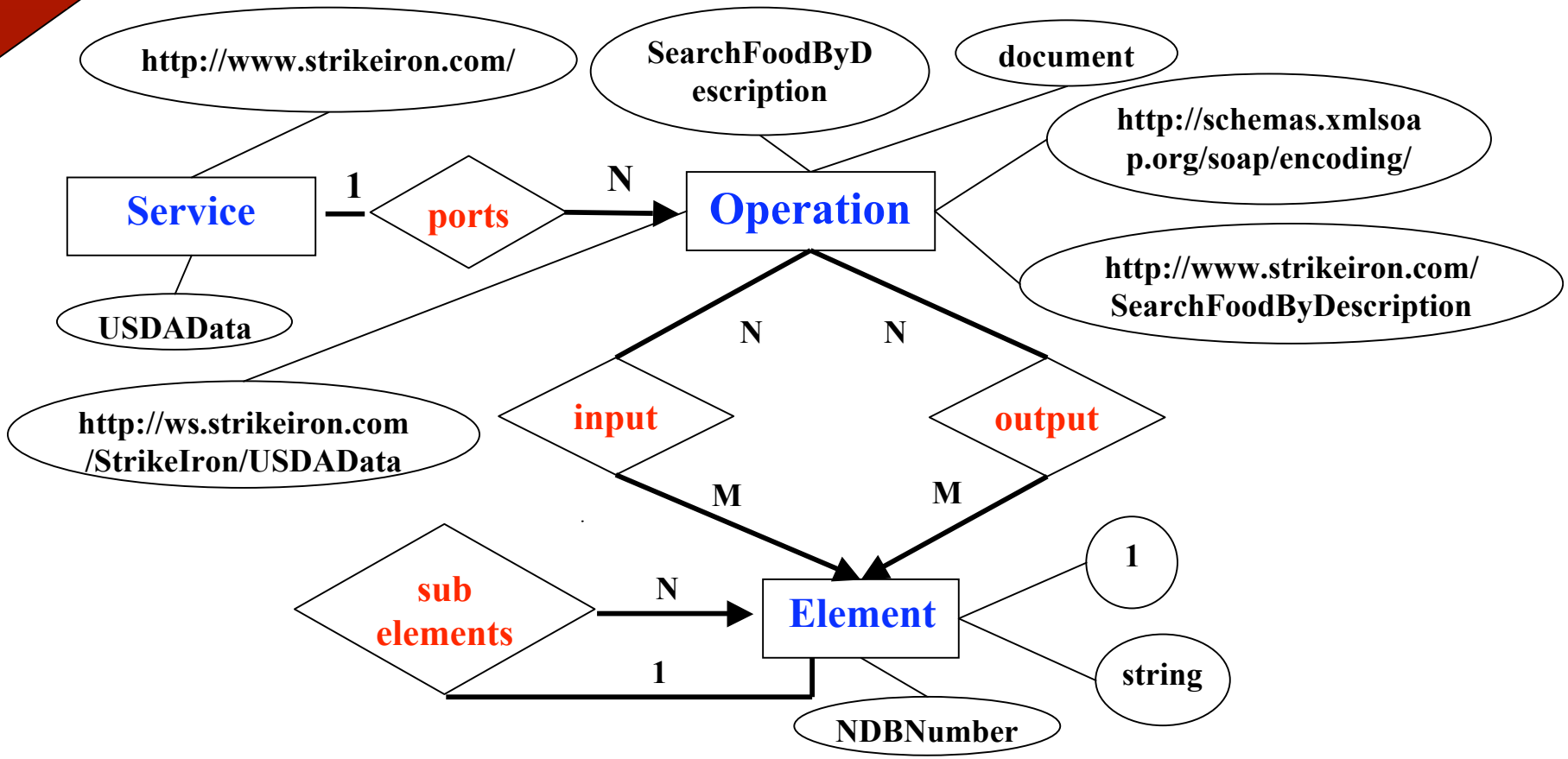
Food

ndb	keyword	descry	gpcode
19080	Sweet	Candies, Sweet chocolate	1900
.....	.....	.....	.....

SQL Query:

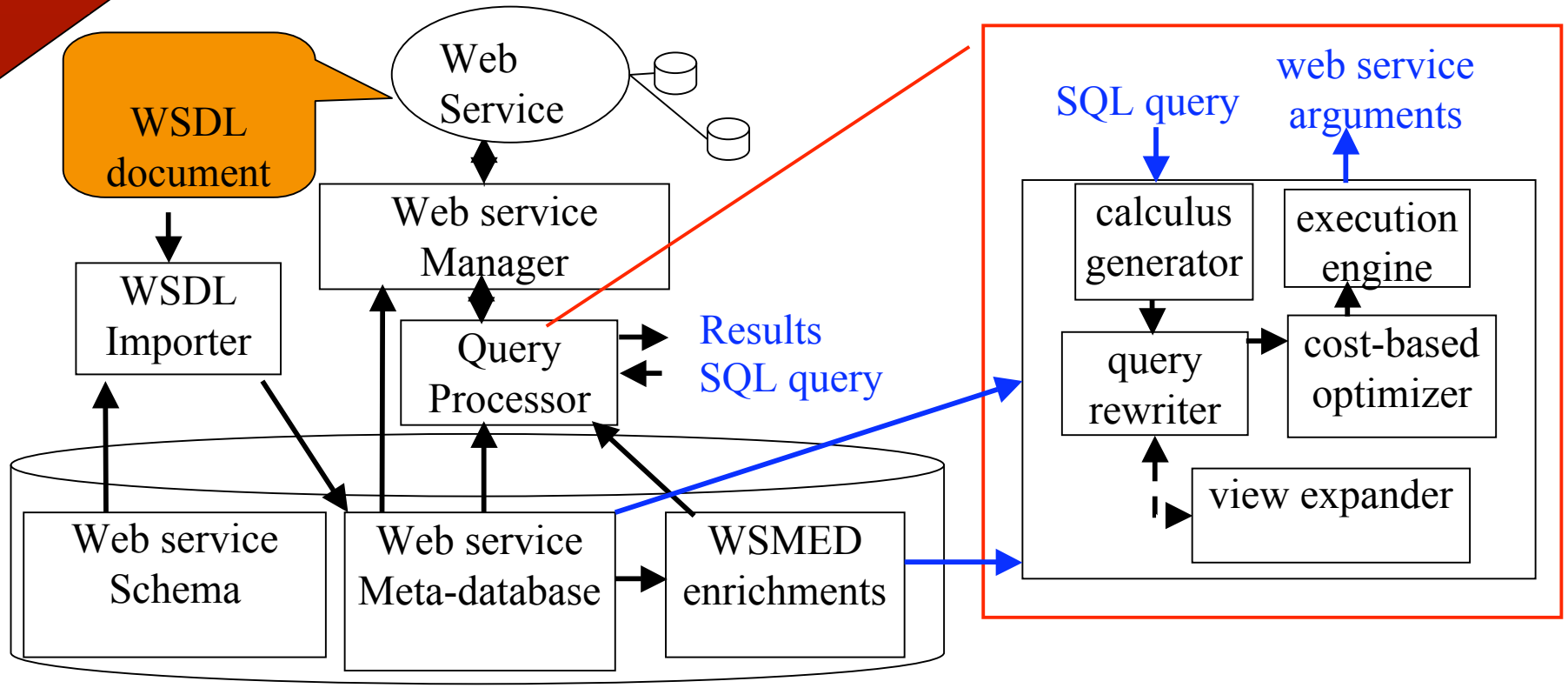
```
select descry
from   food
where  gpcode = '1900' and  keyword = 'Sweet';
```

Web Service Schema



Web service schema can represent *any* WSDL document that describes a web service

Web Service MEDiator System Architecture



- *WSDL importer:* extracts meta data from WSDL document using Web Service Schema and store them in the Web service meta-database
- *Web Service Manager:* invokes the web service operation to retrieve the data
- *WSMED enrichments:* contains the semantic enrichments

M.Sabesan and T.Risch: Web Service Mediation Through Multi-level Views , International Workshop on Web Information Systems Modeling (WISM 2007), Trondheim, Norway, June 12, 2007

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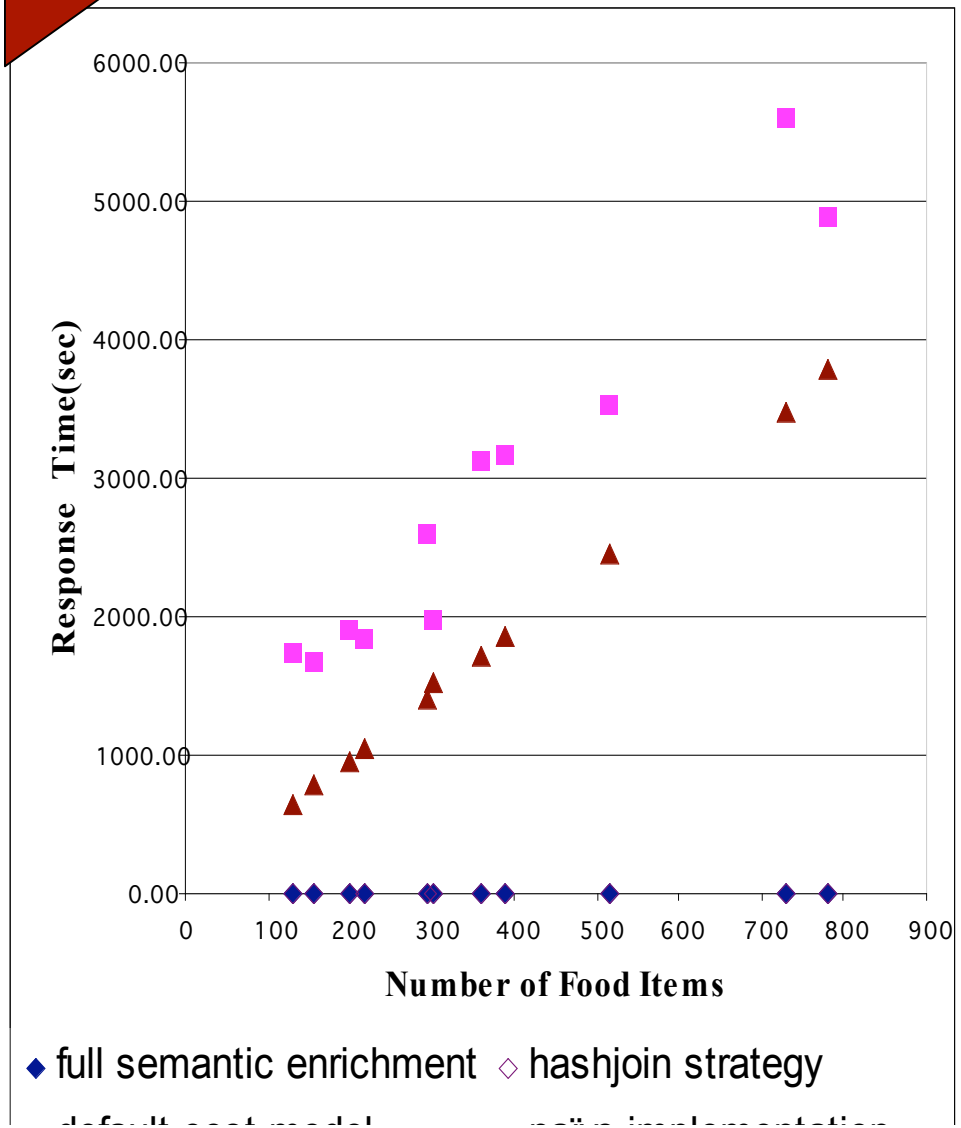
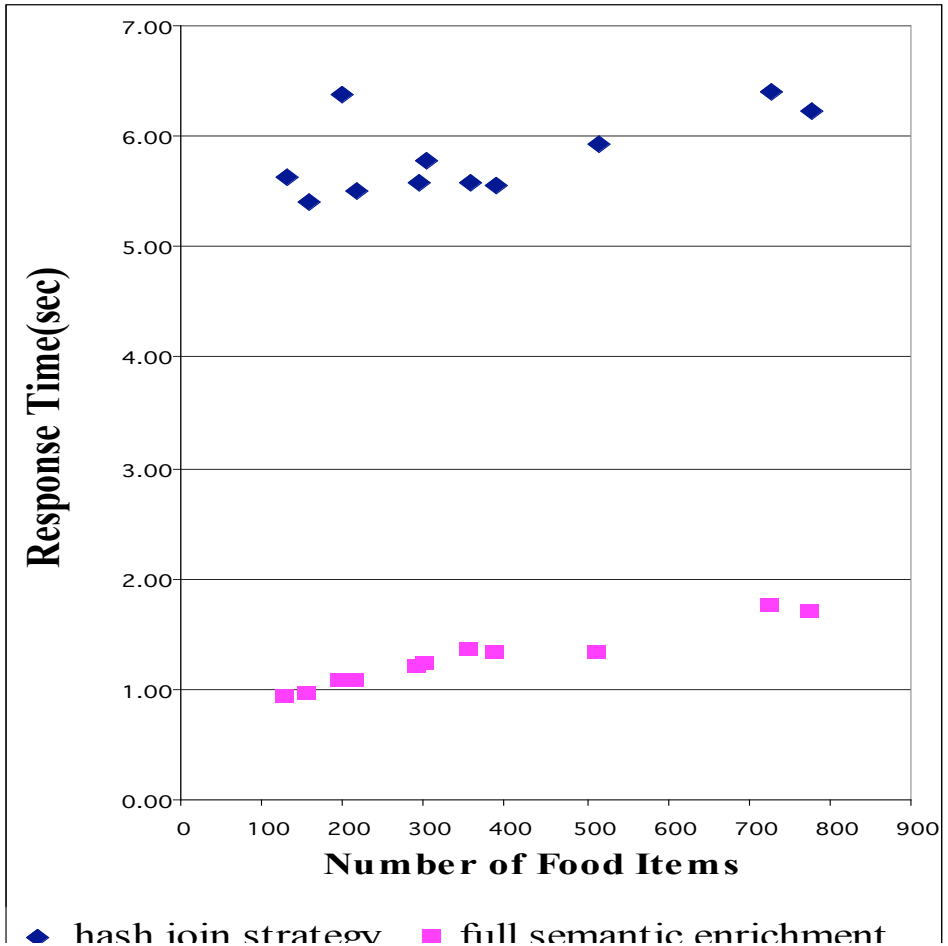
Comparison of query execution strategies





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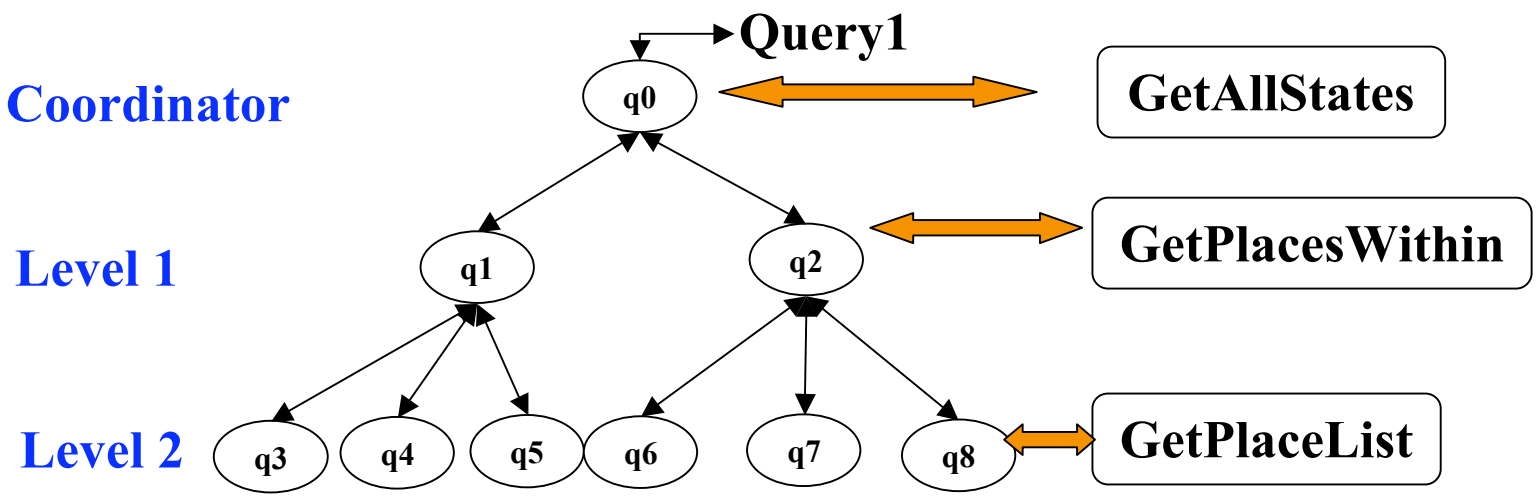
WSMED Process Tree

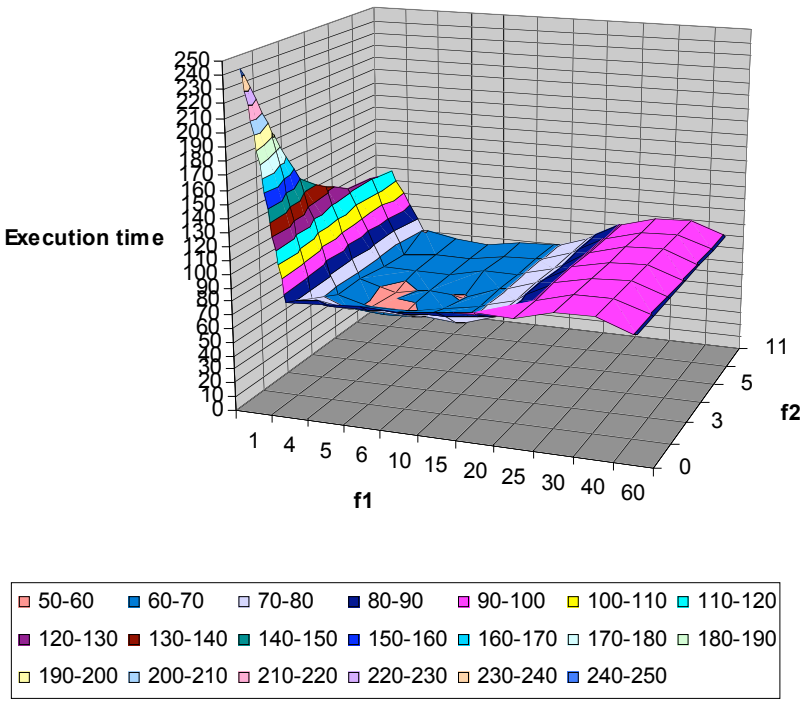
Finds information about places located within 15 km from each city whose name starts with 'Atlanta' in all US states.



q- query processes

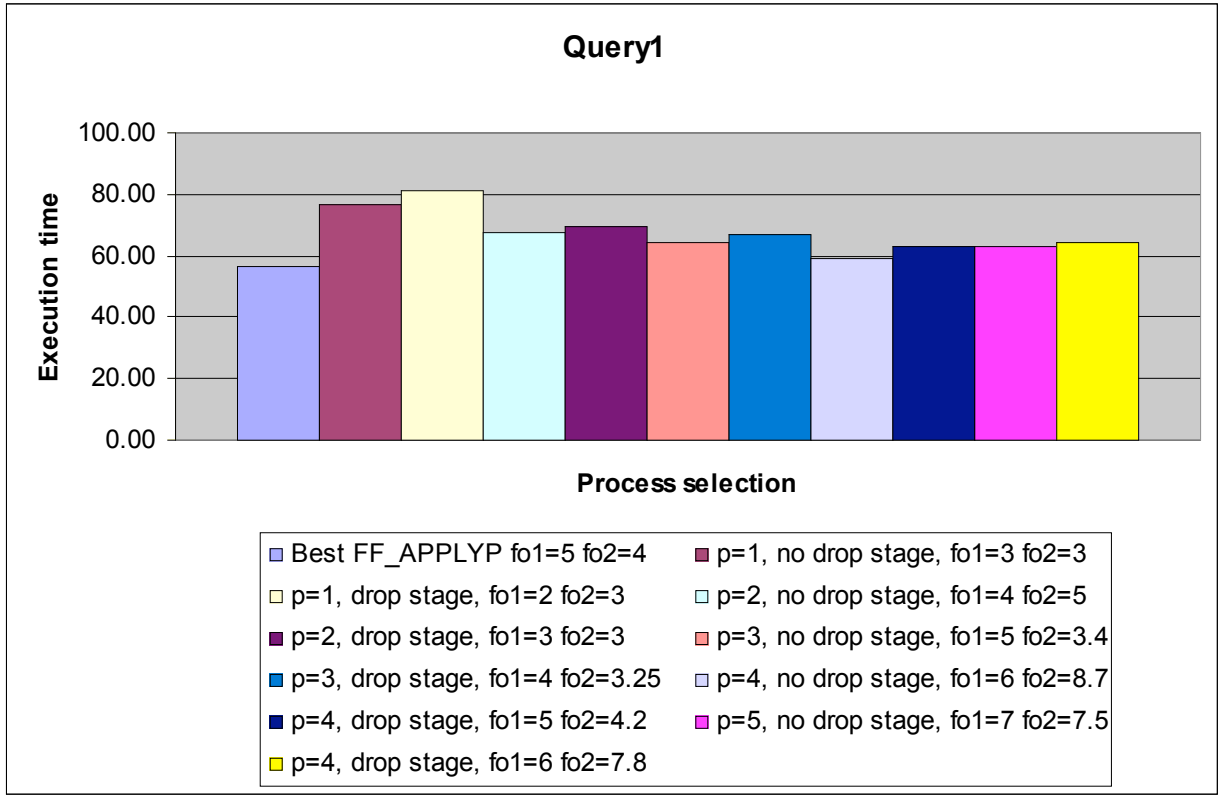
M. Sabesan and T.Risch: Adaptive Parallelization of Queries over Dependent Web Service Calls, to be presented at 1st IEEE Workshop on Information & Software as Services, WISS 2009, Shanghai, China, March 29, 2009.

Observation –Query1



- Lowest execution time region is achieved within the range 50 - 60 sec with the fanout vector *{5,4}*.
- Fastest execution time 56.4 sec outperformed with the speedup of 4.3 the central plan (244.8 sec).

Adaptive Results- Query1



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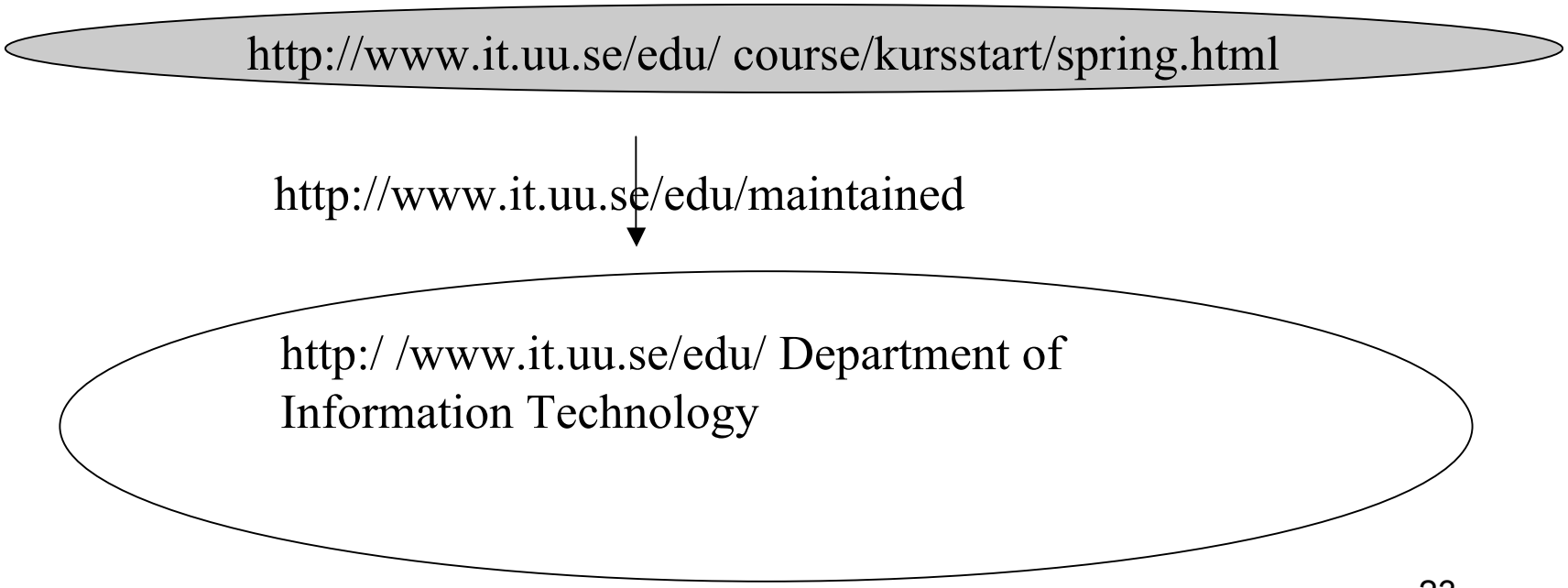
Semantic Web Services

- **An emerging framework that aims at machine-processable information for information sharing.**
- **Defines standards not only for syntactic form of documents, but also for the semantic contents**
- **RDF /RDFSchema to facilitate semantic interoperability**
- **An *ontology* defines a hierarchy of concepts within a domain through an attribute-value means**

Resource Description Framework (RDF)

- **RDF provides a method to decompose any knowledge into small segments, called *triples***
- **Each triple contains *subject*, *object* and *predicate*.**



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Questions ???

Thanking You for the attention

"The un-queried life is not worth living"