# Web services standards

Outline

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# Introduction

A web service is a type of component that is available on the web and can be incorporated in applications or used as a standalone service.

The goal of web services is to achieve universal interoperability between applications by using web standards.

There are three organizations that are key to the evolution of web services standards.

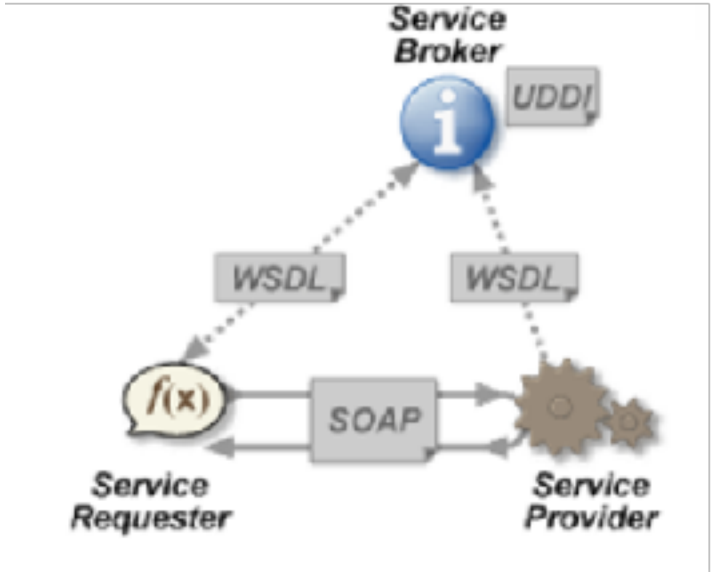
-W3C

_OASIS – Organization for Advancement of Structured Information Standards

-WSI Organization - Written Work instructions

# Basic Web Services Standards

- XML1.1(eXtesible Markup Language)
- SOAP1.2
- WSDL 1.1
- UDDI 3.0.2



# XML 1.1

- Developed by W3C
- Fee-Free open standard
- Its primary purpose is to facilitate the sharing of structured data
- across different information systems, particularly via the internet.
- A subset of SGML (Standard Generalized Markup Language)

# SOAP 1.2

- OASIS Standard
- SOAP version 1.2 is a lightweight protocol
- for exchange of information in a
- decentralized, distributed environment.

# SOAP Security

- No specification
- The SOAP Header provides a flexible mechanism for extending a SOAP message.
- Although the SOAP Header is the best place to add security features to messages, the SOAP specification itself does not specify such header elements.

# Why do we need SOAP Layer Security?

**Don't we already have transport layer security mechanisms such as SSL/TLS and IPSec?**

Secure transport protocols such as SSL/TLS can assure the security of messages during transmission.

However, messages are received and processed by intermediaries.

**Communication links are trusted, but do we trust these intermediaries?**

**Once a message is received and decrypted, how to protect data from illicit access or alteration?**

# WSDL

- It is an XML-based language for describing Web Services and how to access them.
- It specifies the location of the service and the operations the services exposes.
- A WSDL document is simply a set of definitions.

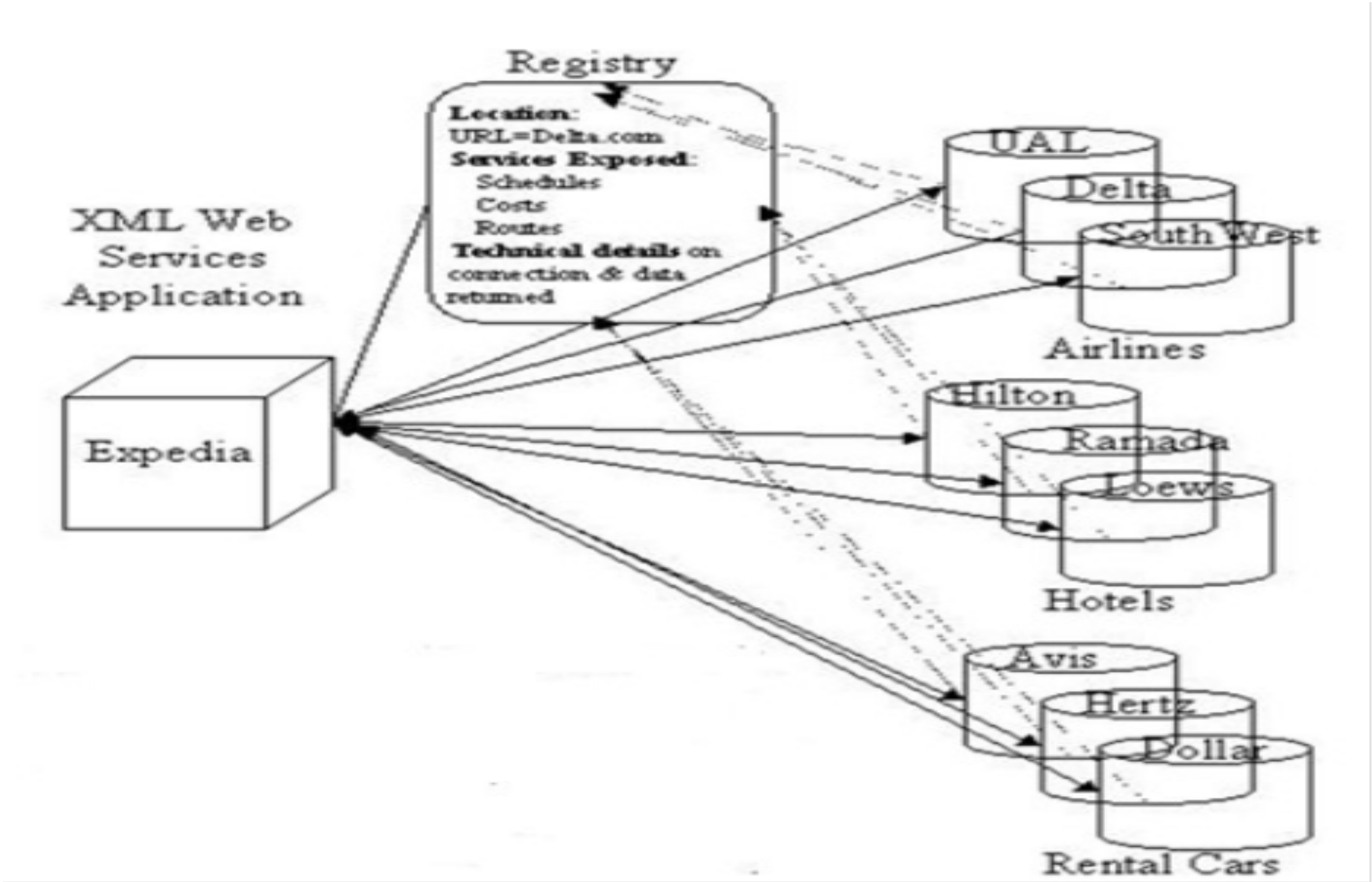
# UDDI

- The Universal Description, Discovery, and Integration specs define a way to publish and discover information about web services.
- The UDDI business registration is an XML file that describes a business entity and its web services.

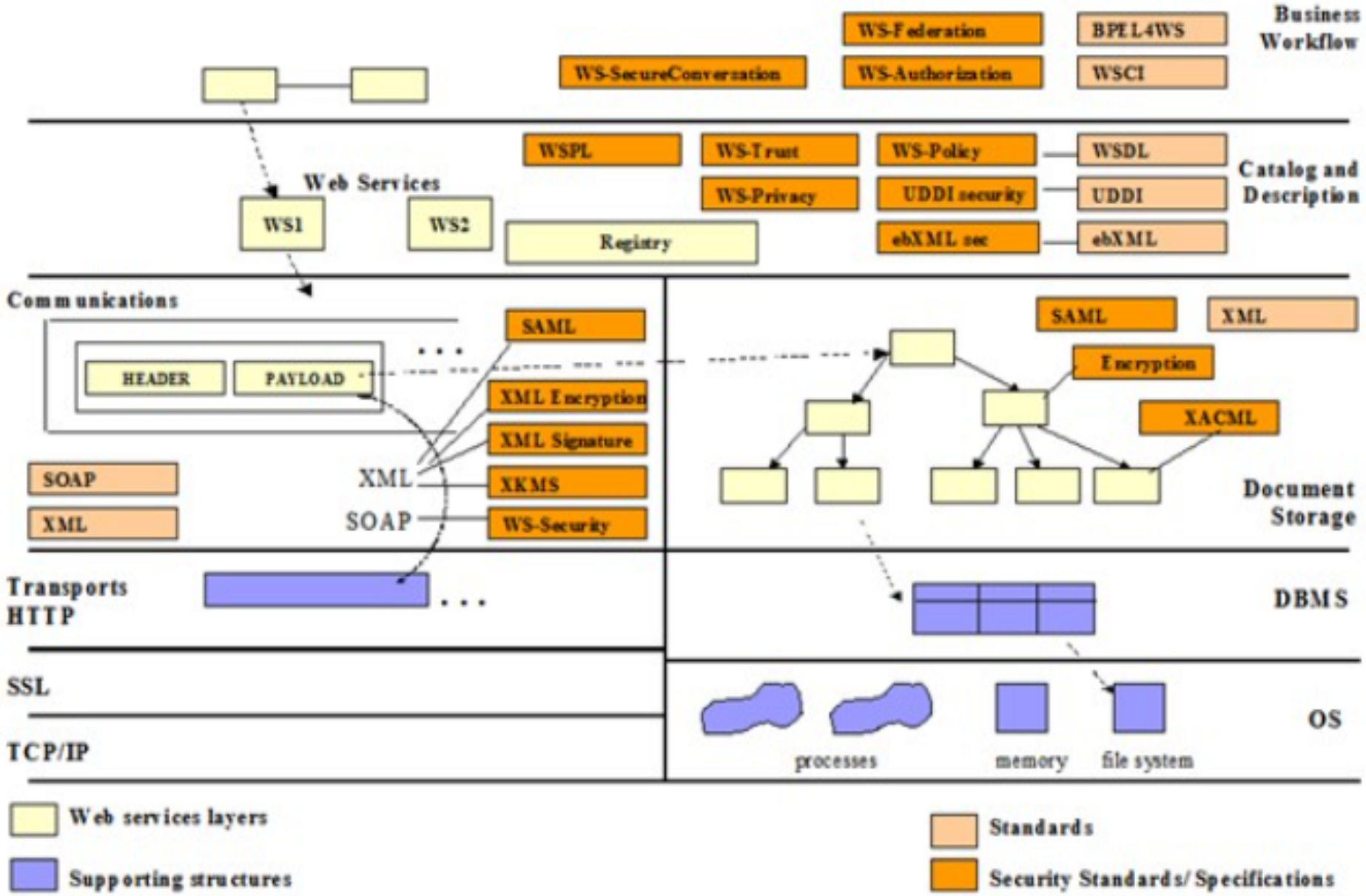
# UDDI Security

- Not specified in detail, only general policies.
- Only authorized individuals can publish or change information in the registry.
- Changes or deletions can only be made by the orginator of the information.
- Each instance of a registry can define its own user authentication mechanism.

# UDDI SCHEMA


Registry
Location:
URL=Delta.com
Services Exposed:
Schedules
Costs
Routes
Technical details on connection & data returned
XML Web Services Application
Expedia
UAL
Delta
South West
Airlines
Hilton
Ramada
Loews
Hotels
Avis
Hertz
Dollar
Rental Cars

# Layers and Web Service Standards



# Web Services Stack

# XML Specifications

These specifications provide all the information necessary to understand XML.

Some XML specifications are:

-XML 1.1

-XML Namespace

-XPath 2.0

# Messaging Standards

These messaging standards are intended to give a framework for exchanging information in a decentralized, distributed environment.

Some standards are:

-SOAP 1.2

-WS-Addressing

-WS-Notification

# Description and Discovery standards

The focus of these standards and specifications is the definition of a set of services supporting the discovery of businesses, the web services they make available and the technical interfaces which may be used to access those services.

Some standards are:

-UDDI 3.0.2

-WSDL 1.1

# Security Standards

Using these security standards, application can engage secure communication designed to work with the general web services framework.

Some security standards are:

-SAML 2.0 (Security Assertion Markup Language)

-SPML 2.0 (Service Provisioning MArkup Language)

-XACML 2.0 (eXtensible Access Control Markup Language)

-WS-Security 1.1

# Reliable Messaging Standards

The objective of these standards is to allow messages to be delivered reliably between distributed applications in the presence of system or network failure.

Some reliable messaging standards are:

-WS-ReliableMessaging 1.1

-WS-Reliability 1.1

-WS-RM Policy Assertion 1.1

# Transaction Standards

These specifications define mechanisms for transactional interoperability between Web services domains and provide a means to compose transactional qualities into Web Services applications.

Some transaction standards are:

-WS-Coordinations

-Ws-Transaction

-WS-Context

# Business Process Standards

These standards specify the potential order of operations from a collection of web services, the data shared between them, which partners are involved and other issues involving how multiple services and organizations participate.

Some Business Process are:

-WS-BPEL 2.0 (Business Process Execution Language)

-WS-Choreography 1.0

# Management Specifications

Management Specifications are defined in order to discover the existence, availability, performance, usage, as well as the control and configuration of a web service.

Some management specifications are:

-WS-Management

-Management Using Web Services 1.1

-Management of Web Services 1.1

# Problem with WS Standards

Several organizations are involved in developing web services standards.
Each organization has different goals and different degrees of power and influence.
Also, there are many vendors who duplicate each other's work.
-An alliance of Microsoft and IBM.
-Others such as CA (Computer Associates), HP, and BEA
As a result, many standards have been created, they may overlap and even conflict.
•Web services standards are not clear which makes it
•difficult for vendors to develop products that comply with standards and for users to decide what product to use.

# Some Solutions

We can describe web services standards as patterns.
Then, compare standards using their UML Class diagram along with their written elements:
1. Compare the problem that they solve.
2. Compare the context in which they solve the problem.
3. Compare the way they solve the problem.
4. In the Class diagram, find some similar components of the solution and some similar architecture that structure these components.

As a result, we can discover potentially overlapping and inconsistent aspects between them.
We wrote several patterns for this purpose but more work is needed.

# Web Services Standard Patterns

- XACML (eXtensible Access Control Markup Language) Policy Language
- XACML Access Control Evaluation.
- WSPL (Web Service Policy Language)
- WS-Policy
- SAML (Security Assertion Markup Language)

# XAML Policy Language

The intent of this pattern is to write all policies in a common language using standard format.

Context:

-This is more general.

•An XACML policy is used by the organization's Reference Monitor to control access to an organization's resource.

•XACML is to be used in a centralized context where the reference Monitor controls access to many web resources.

# WS-POLICY

This pattern extends the WS-Security pattern, by attaching to each web service endpoint a policy.

Context:

-It is intended for securing web services.

AWS-policy is bound to a specific Web Service endpoint.

WS-Policy is to be used in a decentralized context where each service provider has a reference monitor to control access to the web service.

# Conclusion

- There is a large number of standards and it is hard to find the right one.
- We need to develop more patterns for standards.
- A good catalog of patterns is needed.
- We need to compare more standards against each other.
- We need to make a good classification of standards by objectives. Also, make tables to exhibit their common aspects and difference.