

Ambientes de Desenvolvimento Avançados

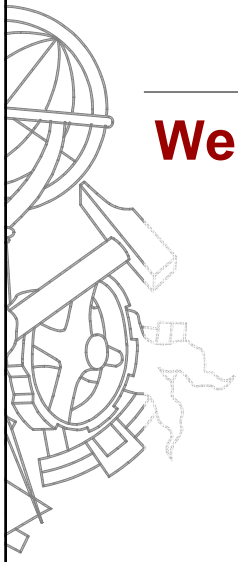
<http://www.dei.isep.ipp.pt/~jtavares/ADAV/ADAV.htm>

Aula 16 Engenharia Informática

2004/2005

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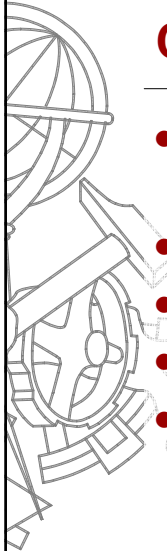
Web Services



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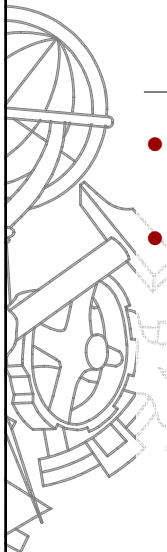
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Conteúdo

- Introdução
 - história da computação distribuída
- Arquitecturas
- SOAP
- WSDL
- UDDI

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Web Services

- A **Web Service** is a method that is callable remotely across a network
- **The Service Web will be the backbone of functionality for the coming generation of distributed applications**

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Web Services

- **Web services** são serviços oferecidos via Web.
- **Web services** são aplicações modulares que são autodescritas e podem ser publicadas, localizadas e invocadas de qualquer local na Web (ou numa LAN).



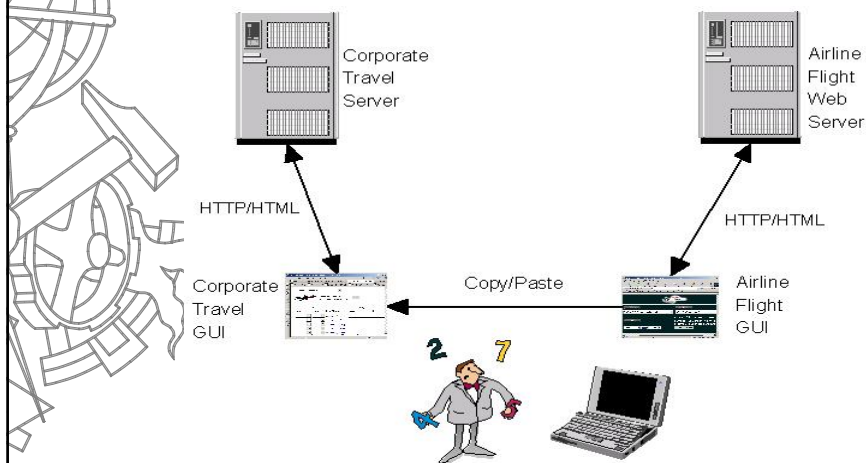
```
let stock_value = apli2.get_stock("IBM")
```

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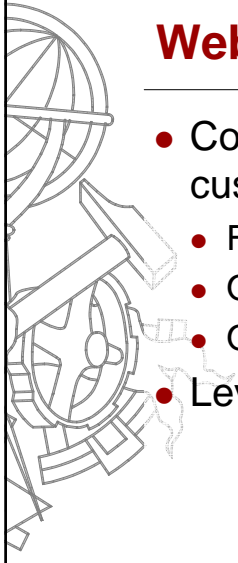
Web Services



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Web Services

- Companies, suppliers, partners, and customers must be able to work together
 - Faster than ever before
 - Over the Internet
 - Or risk “death by isolation”
- Leverage Internet cost structure



Web Services

- **Possible Solutions**
 - Distributed computing
 - Web sites (portals)
 - Web Services



Computação Distribuída

- CORBA/IIOP (OMG) www.corba.org/
 - Common Object Request Broker Architecture
 - Internet Inter-ORB Protocol
- especialização TCP/IP de GIOP (General ...)
 - *Statefull Programming Model*
- Modelo orientado à ligação (*overheads* de sessão)
- COM e DCOM (MS) www.microsoft.com/com/
 - Complexo
 - Orientado à ligação (*overheads* de sessão)
- RMI (SUN) java.sun.com/products/jdk/rmi/
 - Bom desempenho
 - Apenas para a linguagem JAVA

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Comunicação síncrona/assíncrona

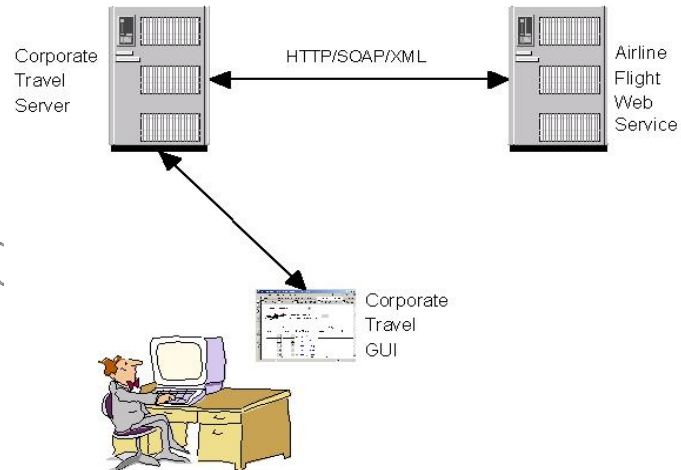
- DCOM e RMI são orientados ao pedido/resposta
 - Síncronos; não permitem envio de mensagens só num sentido
- JMS (Java) java.sun.com/products/jms/
 - *Java Message Service*
 - Suporta filas de mensagens e o modelo editor/subscritor
- MSMQ (MS) www.microsoft.com/msmq/default.htm
 - *Microsoft Message Queueing*
 - Suporta trocas segura e fiável de mensagens, suporte para transacções, etc.

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Web Services

Portal Limitations

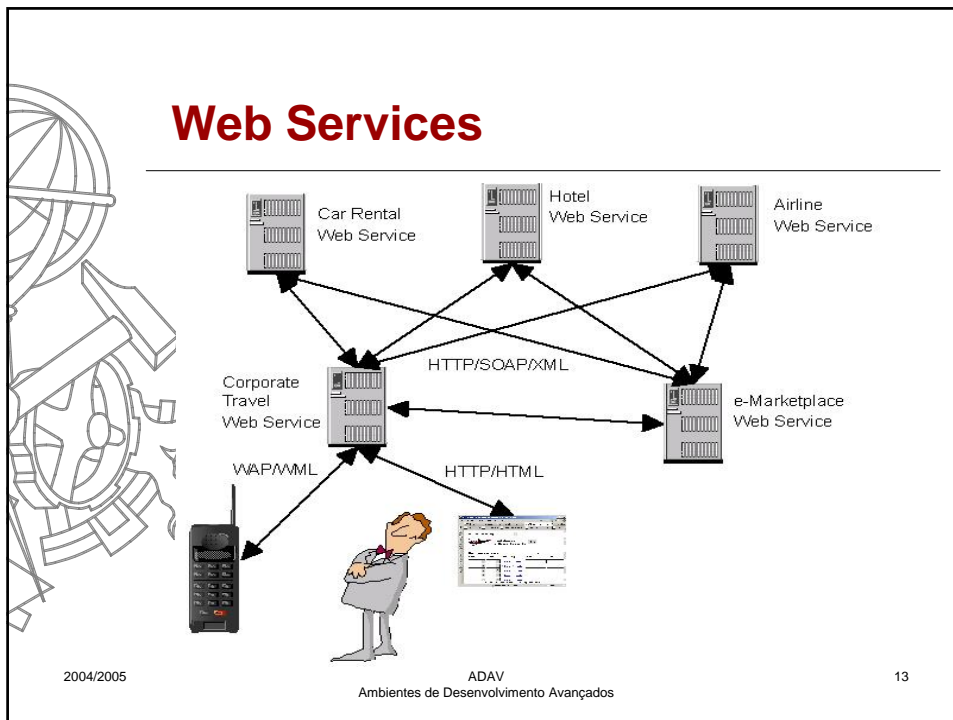
- No standard way to expose functionality
- Integration is expensive and error-prone
- Hard to outsource
- Not designed to be used outside original scope
- The problem?
 - HTML is designed for presentation to people
 - Can't repurpose it in a general, reliable way
 - Don't even think about screen scraping

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Web Services



What Is a Web Service?

- The solution? Web Services!
- A Web Service exposes functionality to a consumer
 - Over the Internet or intranet
 - A programmable URL
 - Functions you can call over the Internet

What Is a Web Service?

- Based on Web standards
 - HTTP, XML, SOAP, WSDL, UDDI, with more to come
- Can be implemented in any language on any platform
- Black boxes
 - Component-like, reusable

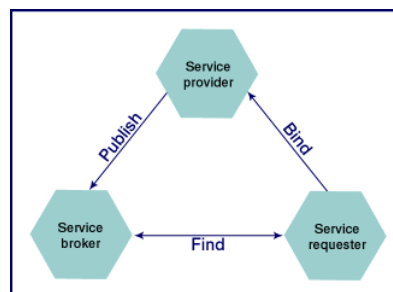
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Web Services Standards

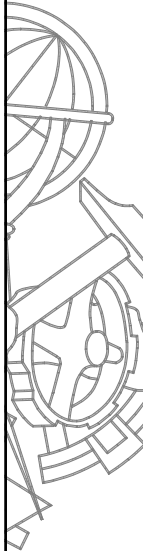
- XML is the “lingua franca”
- SOAP (Message format and protocol)
- WSDL (Web Services Description Language)
- UDDI (Directory)



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What Is a Web Service?

- A Web Service combines the best features of distributed computing and portals and eliminates the worst
 - Provides a mechanism for invoking methods remotely
 - Uses Web standards (e.g. HTTP, XML) to do so

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What Is a Web Service?

- Web Services allow you to interconnect:
 - Different companies
 - Many/any devices
 - Applications
 - Different clients
 - Not just browsers
 - Distribution and integration of application logic
 - Enable the programmable Web
 - Not just the purely interactive Web
 - Web Services are loosely coupled

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What is a Web Service?

- New paradigm for Internet development
- Deliver applications as services
- Richer, customer-driven experience
- Continuous delivery of value/bits
- Third-generation Internet

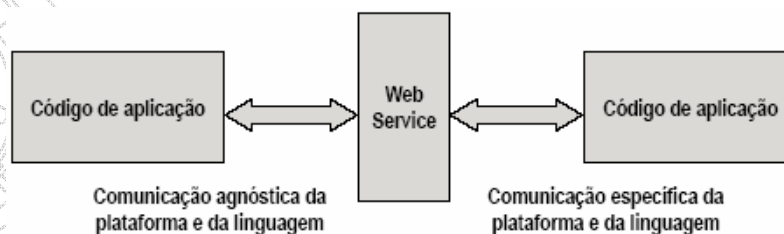
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What is a Web Service?

- *Web Services* fornecem uma abstracção entre o código da aplicação cliente e o código da aplicação servidor



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What Is a Web Service?

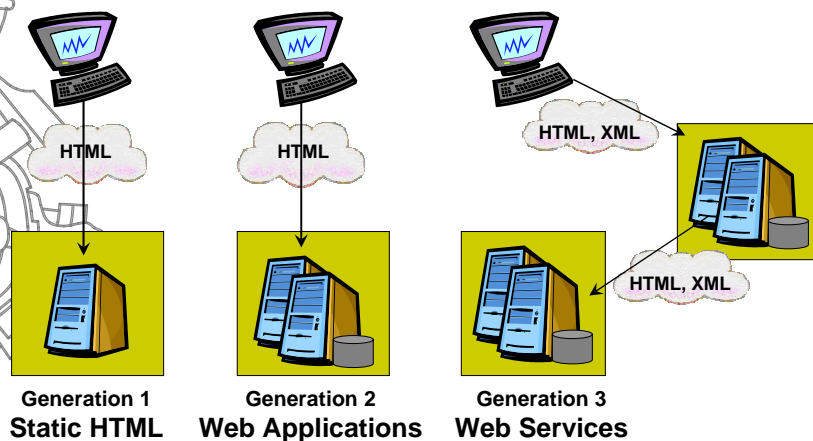
- *"Web services are modular, self-describing applications that can be published, located and invoked from just about anywhere on the Web or a local Network. The provider and the consumer of the XML Web Service do not have to worry about the Operating System, language environment or component model used to create or access the XML Web Service, as they are based on ubiquitous and Open Internet standards, such as XML, HTTP and SMTP."*

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Evolution of the Web



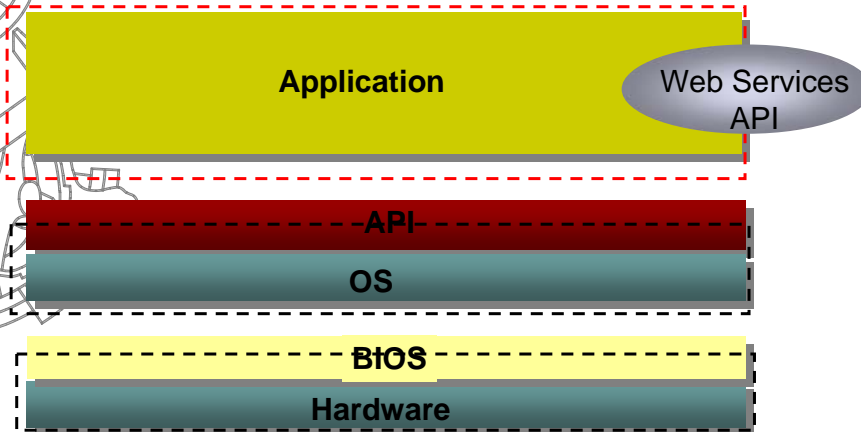
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What is a Web Service?

Web Service as an API



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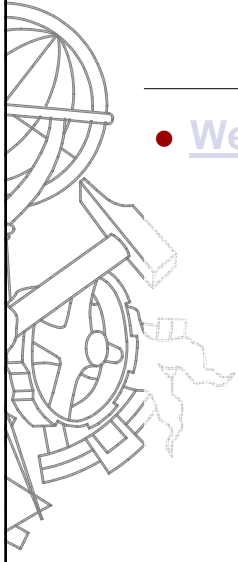
Benefits

- Everyone
 - Leverage existing infrastructure
 - "Build or buy" development decisions
 - Minimize development time/costs
- Enterprises
 - Integration imperative
 - Dynamic, easy B2B relationships
- New Web-based businesses
 - Greater personalization
 - New services/new revenue streams
 - Be "everywhere" vs. single destination

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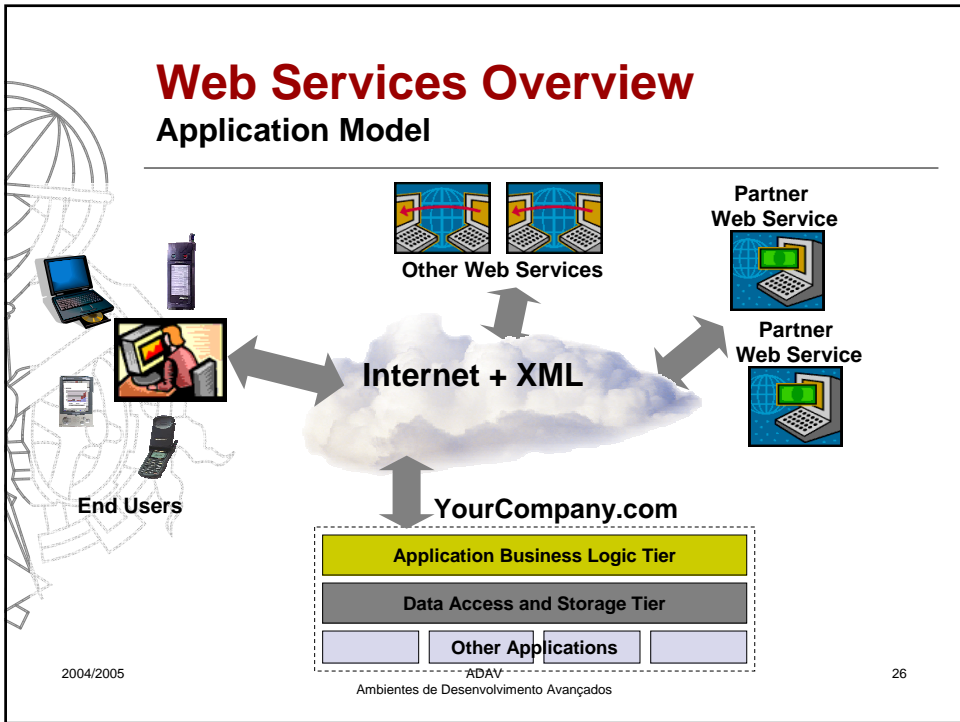
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• Web Services Video

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The Components of Web Services

- Web services are comprised of six fundamental components:
 1. **Delivery medium:** Internet
 2. **Delivery protocol:** HTTP
 3. **Message format/encoding:** SOAP
 4. **Service descriptions:** WSDL
 5. **Web Service Publication:** UDDI
 6. **Web Service Discovery:** WS-Discovery

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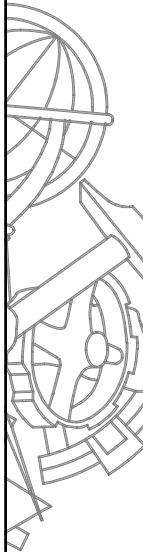
Web Services – Delivery Medium

- Web services use the **Internet** as the medium for service delivery.
- Therefore, only computers connected to the Internet can provide or consume a Web service.
(Of course, what computers *aren't* connected to the Internet nowadays?)

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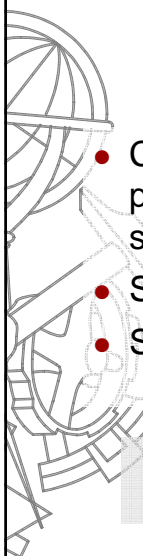
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Web Services – Delivery Protocol

- Web services use **HTTP** – **HyperText Transfer Protocol** – as the delivery protocol.
- HTTP is a well-known, simple, open standard that is supported by Web servers, programming libraries, and common client applications, like Web browsers.



Web Services – Message Format

- Communications to and from a Web service are packaged in messages formatted in **SOAP**, which stands for **Simple Object Access Protocol**.
- SOAP defines a protocol for formatting a message.
- SOAP messages are XML-formatted.

We'll be examining SOAP extensively in future lectures!



Web Services – Service Description

- Web services need to be self-describing. That is, a Web service needs to be able to spell out precisely what services it offers, how the services can be invoked, and the service interface.
- This description is accomplished with **WSDL**, or **Web Service Description Language**.
- **WSDL** is an XML-formatted file that provides this information vital to those who wish to consume the Web service.

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Web Services – Publication

- In order for others to be able to find out about the Web services a company offers, there is a public directory of Web services.
- **UDDI**, or **Universal Description, Discovery, and Integration**, is an online directory of Web services.
- This directory is jointly managed by IBM, SAP, SUN, Microsoft, and other major players.

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Web Services - Discovery

- **WS-Discovery** specifies a protocol for developers to discover the Web services a particular Web site/company offers.
- WS-Discovery is useful for learning about the Web services a particular company or department provides.

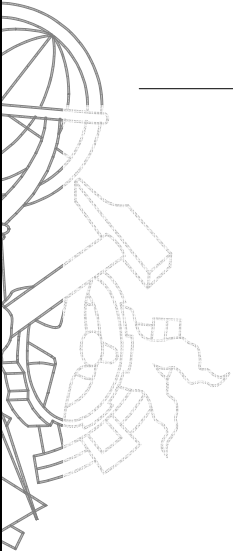
We'll talk about WS-Discovery in more detail in future lectures!



Two Views of Web Services

- Keep in mind that when working with Web services you will be taking one of two approaches:
 - You will be a **producer**. This means you will be creating a Web service for others to utilize.
 - You will be a **consumer**. This means you know of some Web service that you wish to utilize via a desktop application or Web page.

As we will see throughout this class, both producing and consuming Web services with .NET is a breeze!



Questões

?

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