



# Ambientes de Desenvolvimento Avançados

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

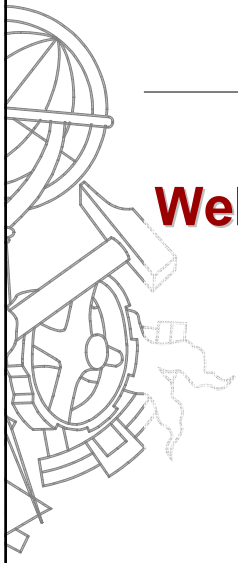
## Aula 19

### Engenharia Informática


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## Web services

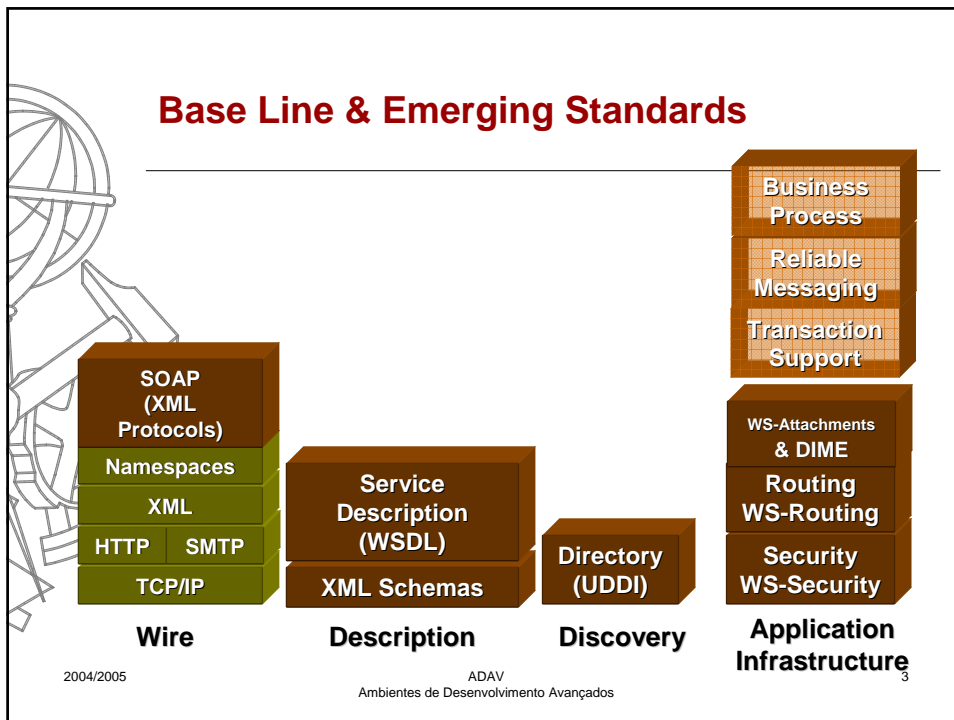


Web Services

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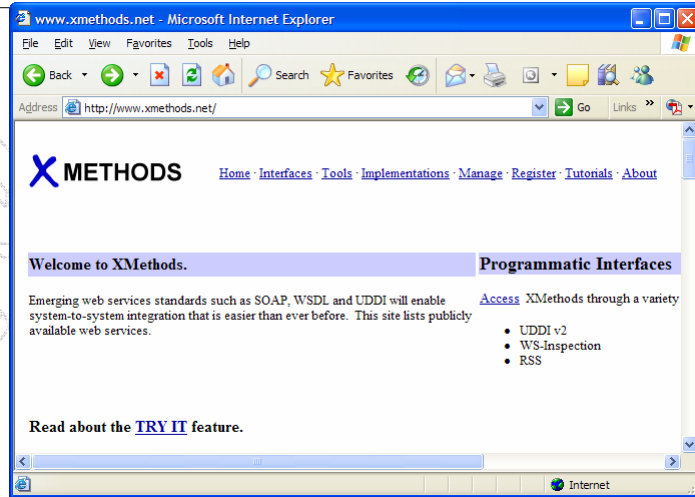


## Web Services Interoperability Group (WS-I)

- Created February 6, 2002
- Industry group formed to help accelerate the development and deployment of XML Web Services
  - Members: BEA, Fujitsu, HP, IBM, Intel, Microsoft, Oracle, and SAP
  - Deliverables:
    - Implementation guidance
    - Implementation tools (conformance testing, etc)
  - <http://www.ws-i.org>

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## Some WEB Services



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## Some WEB Services

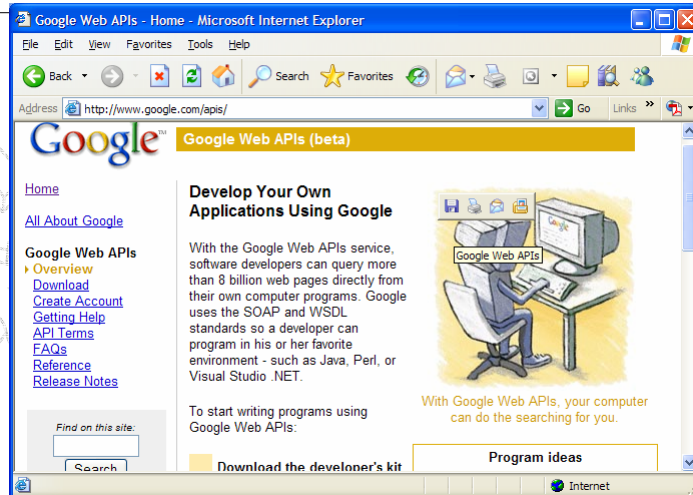


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## Some WEB Services

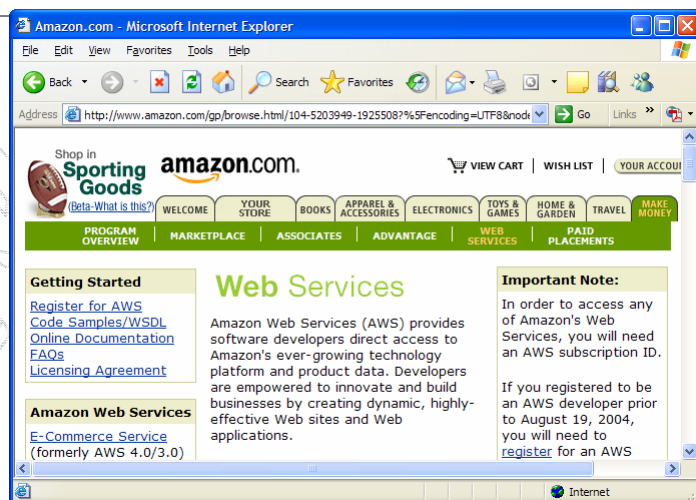


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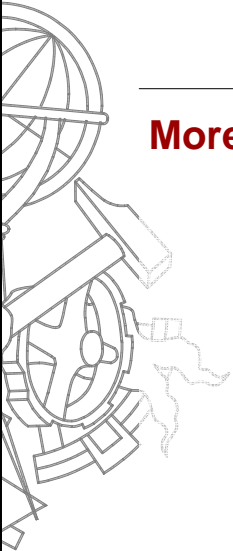
## Some WEB Services



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## More about .NET Framework

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## Cool new C# Language Features

- These are currently only in the spec for 2.0 so they might not become a reality
- See: <http://msdn.microsoft.com/vcsharp/team/language/default.t.aspx> for download of full spec
- Three main new features:
  - Generics
  - Anonymous Methods
  - Partial Types
  - Iterators
  - Other Misc. Improvements

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## New C# Features

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- **Generics**  
a form of C++ templates that makes reusing existing code easier
- **Anonymous Methods**  
an easier way to perform simple tasks using delegates
- **Iterators**  
a construct that makes traversing collections of data significantly faster and easier
- **Partial Types**  
a means for programmers to split code across multiple files
- For more information see:  
<http://www.gotdotnet.com/team/csharp/learn/Future/default.aspx>
- This is also a great URL for a more in-depth coverage
- <http://www.gotdotnet.com/team/csharp/learn/Future/VCS%20Language%20Changes.aspx>

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## Alternatives to Visual Studio

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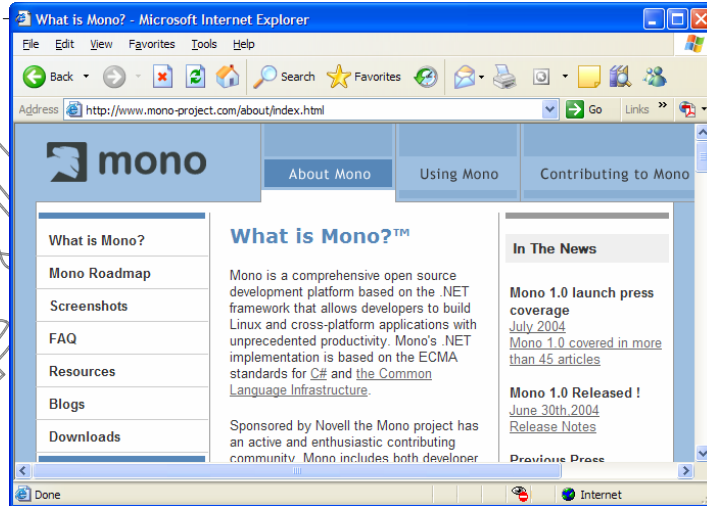
- Free Development Environment called Web Matrix. Can be downloaded from here:
  - <http://www.asp.net/webmatrix/default.aspx?tabIndex=4&tabId=46>
  - [www.asp.net](http://www.asp.net) is a great resource for web developers using .NET
  - The message board is free to use (as a lot of other projects). We use the message board extensively at my company.
- Borland C# Builder for the .NET Platform
  - <http://www.borland.com/csharpbuilder/>
- Others I am forgetting?

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## Mono (www. go-mono. com)



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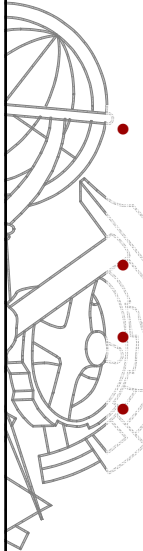
## Mono (www. go-mono. com)

- The Mono project, is an effort to create an Open Source implementation of the .NET Development Framework.
  - [www.go-mono.com](http://www.go-mono.com)
  - Compiler and Libraries

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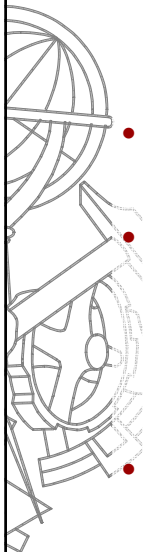
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## Mono ([www.go-mono.com](http://www.go-mono.com))

- Mono is a comprehensive open source development platform based on the .NET framework that allows developers to build Linux and cross-platform applications with unprecedented productivity.
- Mono's .NET implementation is based on the ECMA standards for [C#](#) and [the Common Language Infrastructure](#).
- Sponsored by Novell the Mono project has an active and enthusiastic contributing community.
- Mono includes both developer tools and the infrastructure needed to run .NET client and server applications.

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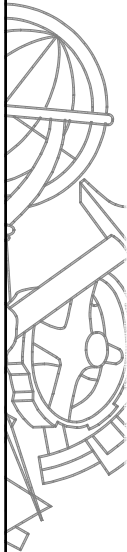


## Mono ([www.go-mono.com](http://www.go-mono.com))

- Mono includes a compiler for the C# language, an ECMA-compatible runtime engine (the Common Language Runtime, or CLR), and class libraries.
- The libraries include Microsoft .NET compatibility libraries (including [ADO.NET](#) and [ASP.NET](#)), Mono's own and third party class libraries. [Gtk#](#), a set of .NET bindings for the gtk+ toolkit and assorted GNOME libraries can be found in the later. This library allows you to build fully native Gnome application using Mono and includes support for user interfaces built with the Glade interface builder.
- Furthermore, Mono's runtime can be embedded into applications for simplified packaging and shipping. In addition, the Mono project offers an IDE, debugger, and documentation browser.

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## **.NET Framework on Linux**

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- **Mono Project**
  - Open Source C# compiler, CLR and Framework Class Library
  - Runs on various platforms and hardware:
    - Linux, Unix, FreeBSD, Windows – JIT-compiler for x86
    - s390, SPARC, PowerPC – interpreter for these hardware architectures
  - Supports also:
    - ADO.NET and XML
    - Windows Forms (not fully)
    - ASP.NET
    - Web Services



## **.NET Framework on Linux (2)**

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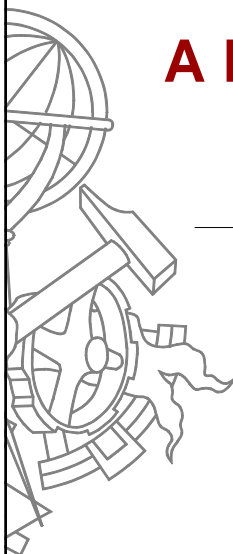
- **Mono Project**
  - Runs .NET portable executables on Linux, e.g.  
`mono myapp.exe`
  - Compiles .NET applications to portable executables, e.g.  
`mcs myapp.cs`
  - The obtained .exe file can taken and run on Windows
- **DotGNU Portable.NET**
  - Build and execute .NET applications on GNU/Linux, Windows, Solaris, NetBSD, FreeBSD, and MacOS X



## Microsoft Opening Up

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- Mono would not be possible if Microsoft had not submitted .NET and C# to Standards Authorities (ECMA )
- See: <http://www.dotnetexperts.com/ecma>
- This is what I consider (Damon) a 'new' Microsoft that is embracing the global development community's concerns about proprietary technology from Microsoft



## A Few Words About J2EE

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## A Tale of Two Technologies

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- J2EE – Java 2, Enterprise Edition
  - Specifies 3-tier thin-client application architecture based on Java and libraries
  - Defined by Sun with guidance by “Java Community Process” participants
- Microsoft .NET
  - Implements broad range of application architecture models, including multi-tier, client-server, desktop, and mobile
  - Defined by Microsoft with guidance by ECMA, W3C, IETF, WS-I, and so on

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## Apples and Oranges

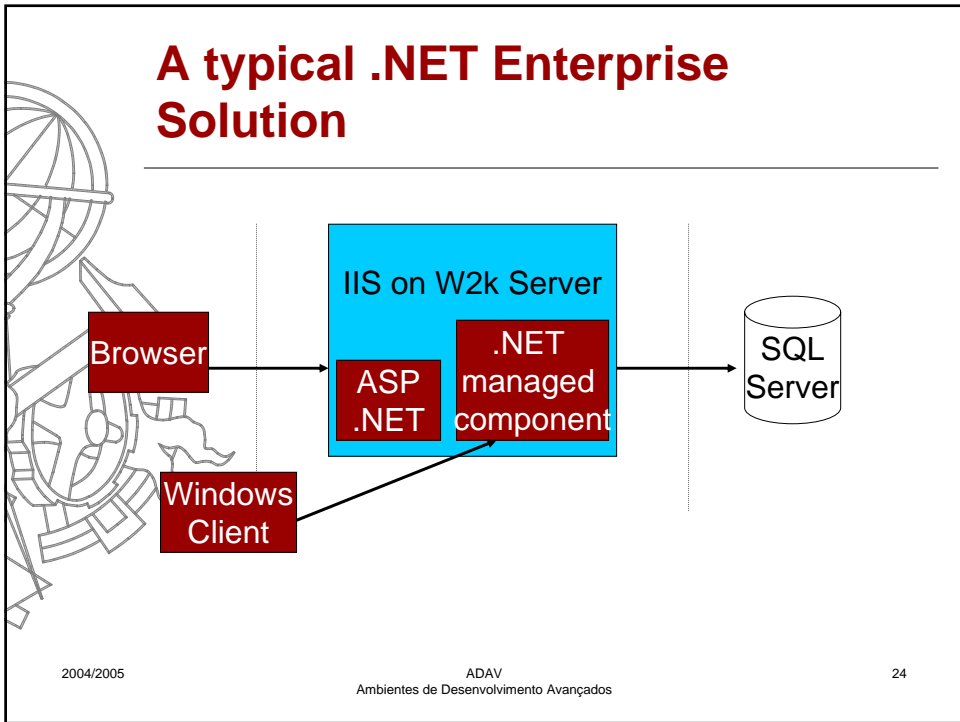
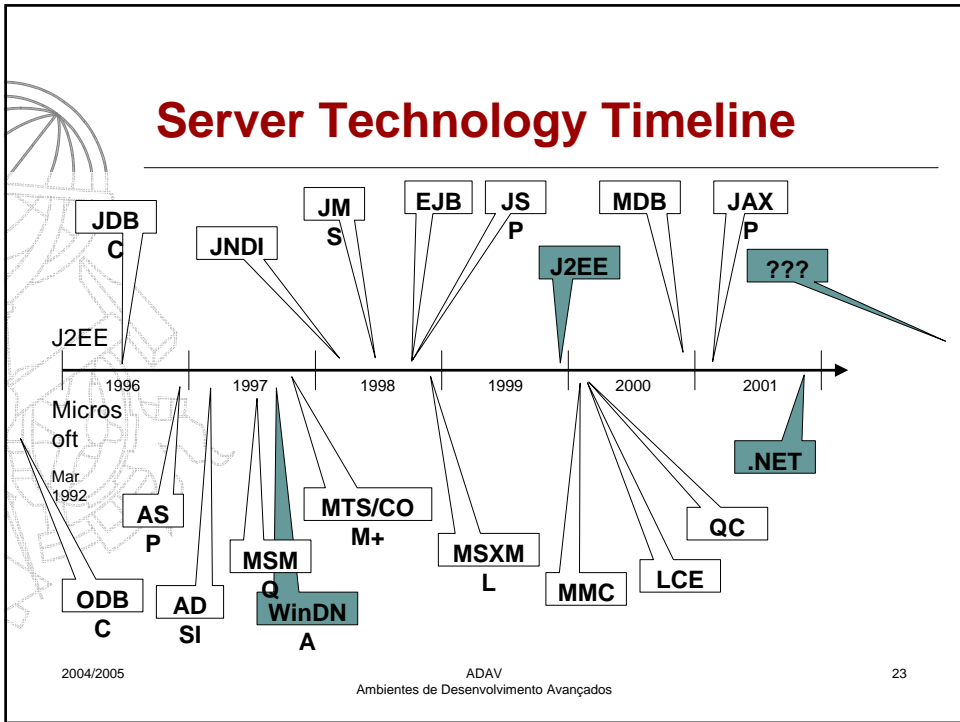
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- J2EE is a specification, while .NET is both a spec and an implementation
- For full comparison, you must look at an actual J2EE implementation
  - IBM WebSphere, BEA WebLogic, ...
  - Difficult to discern where J2EE ends and vendor-specific features begin
- Java specs frequently change
  - Often tracking Microsoft technologies
  - Often as a result of J2EE implementations

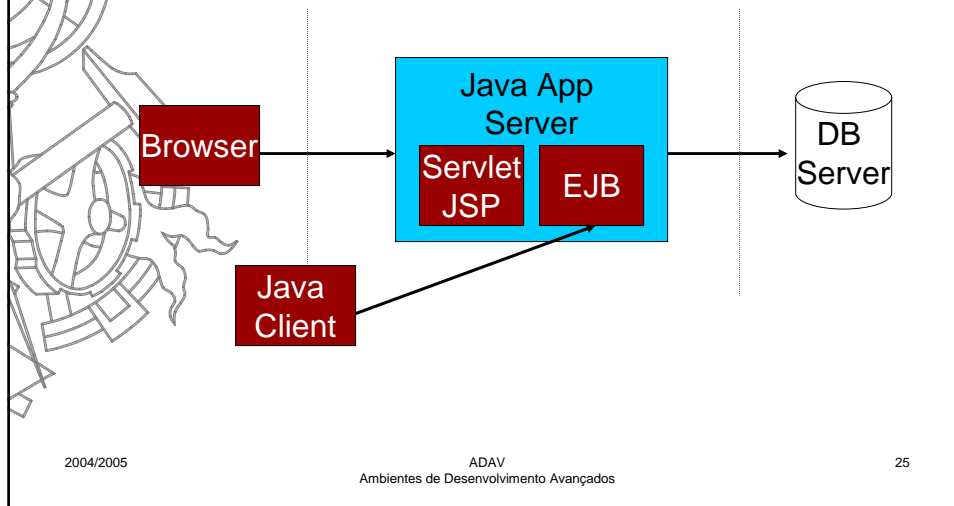
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## A typical J2EE Enterprise Solution



## Java vs .Net Solutions

- Both multi-tiered, similar computing technologies
- Both support “standards”
- Both offer different tools & ways to achieve the same goal.
- A lot of parallelism can be seen.
- Very difficult to compare and qualify the comparison because each has its own advantages & disadvantages.



## Application Servers

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- An integration of the technologies needed to host applications that are entirely or substantially server-based
- Java Application Server...
  - J2EE + J2EE container + OS
  - With appropriate hosted services
- Microsoft .NET Application Server...
  - .NET Framework + Windows Server
  - With appropriate hosted services

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## Microsoft .NET & J2EE

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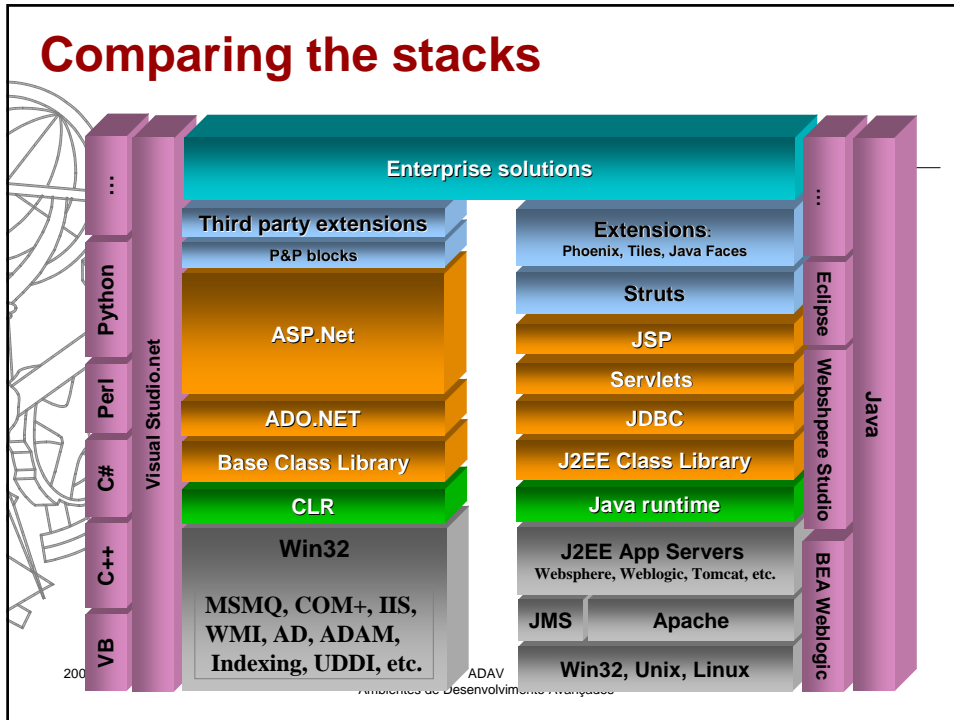
- Many comparisons being made
  - Features, performance, tools, TCO, ...
  - MS wins some, loses some
    - But mostly we win ☺
  - Much comparative code freely available
- Nonetheless...
  - Both .NET and J2EE must co-exist
    - Because of prior commitments
    - Because of cross-platform issues
  - Therefore...
    - MS is investing heavily in J2EE interoperability
    - XML Web Service effort is just one example

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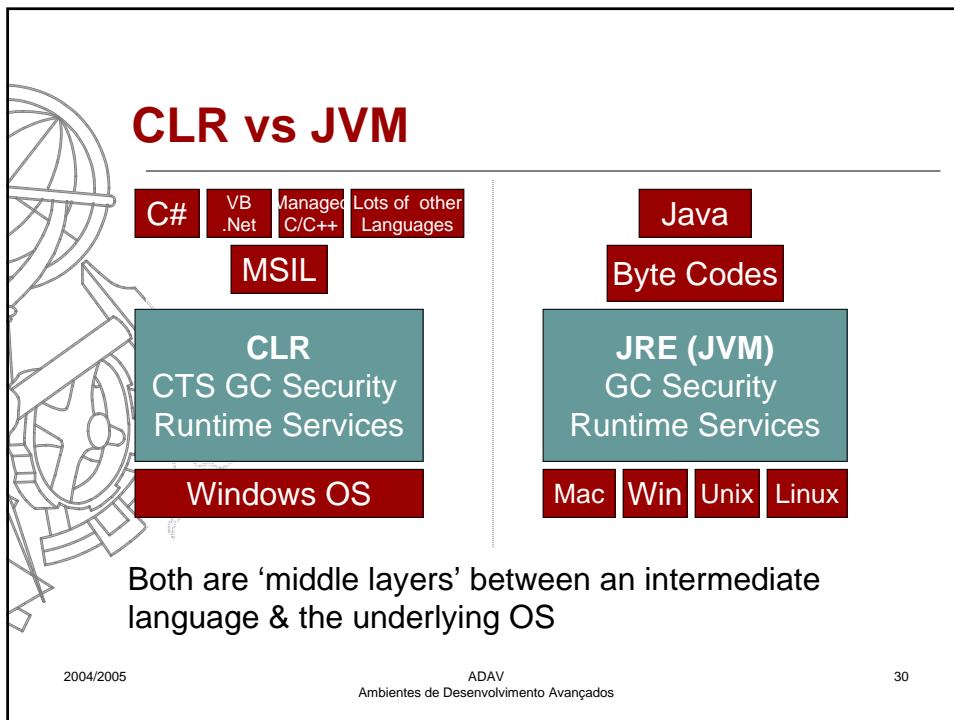
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## Comparing the stacks



## CLR vs JVM



Both are 'middle layers' between an intermediate language & the underlying OS



## Java vs. C#

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- C# is an object oriented language of the C++/Java flavor
- Syntax similar to Java and C/C++.
- Quite an impressive design and care for details
- Java developers will feel comfortable
  - most of the time and frustrated when things are different
- MS says: "C# combines the power of VC++ with the ease of usage of VB"
- Not really true:
  - C# is really powerful BUT
  - It is not easy to learn for non C++/Java programmers
- It is the language to learn if you are serious about .NET!

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## The TMC Petshop Performance Case Study

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- Java Pet Store is Sun's primary blueprint application for J2EE
  - Source: <http://java.sun.com/j2ee/blueprints>
  - Illustrates best coding practices for J2EE
  - Ships as a sample application in IBM Websphere, Oracle Application Server 9i, Sun iPlanet, and BEA WebLogic
- The .NET Petshop is a port of the J2EE Java Pet Store to .NET
  - Source: <http://www.gotdotnet.com/compare>
  - Implements the same functionality as Java Pet Store
  - Illustrates best coding practices for .NET Framework
- In the TMC Petshop Performance Case Study, The Middleware Company implemented both the Java Pet Store and the .Net Petshop.
  - The J2EE version ran on two different application servers
  - All versions used the same hardware and OS

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## Java Pet Store vs. .Net Pet Shop

The image shows two side-by-side screenshots of pet store websites. The left screenshot is for 'Java Pet Store demo' and features a search bar with the text 'What are you looking for?' and a list of categories: Fish (Saltwater, Freshwater), Dogs (Various Breeds), and Reptiles (Lizards, Turtles, Snakes). The right screenshot is for 'THE .NET PET SHOP DEMO' and features a search bar with the text 'What are you looking for?' and a list of categories: Fish (Saltwater, Freshwater) and Dogs (Poodle). Both screenshots include images of a green parrot and a lizard.

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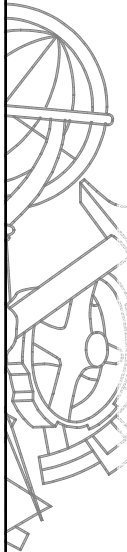
## Choosing between Java and .Net

- You are most likely to be developing in both environments for the foreseeable future
  - Gartner Group: 30+% of all enterprise applications will have both J2EE and .Net code
  - Often IIS in front of J2EE infrastructure
  - Interoperability issues
    - Web Services (often too slow or doesn't support ...)
    - J2EE/.Net bridge (IL -> JBC or JBC ->IL)

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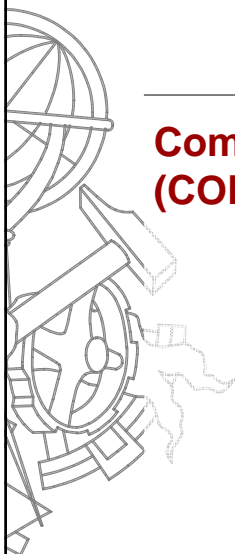
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## Choosing between Java and .Net

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- Look out for “The third way”
  - Linux, Apache, MySQL, PHP, ...
- Look out for disruptive technologies
  - It only takes one guy to get the right idea
  - and a small team to implement a completely new platform
  - and One large company to productise it
  - or a lot of grassroots ...



## Component-oriented programming (COP)

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## Component-oriented programming (COP)

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- recall OOP is 'programming with objects, classes and inheritance' (Wegner)
- COP is 'programming with polymorphism, modular encapsulation, late binding and safety'
- practically all existing programming methodologies work only *within* a component
- still looking for a methodology covering component interactions

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## Markets vs technology

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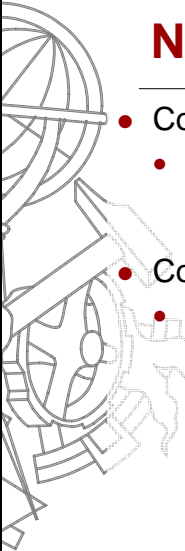
- components are reusable assets; generally more expensive than use-once
- component approach viable only if extra investment is returned
- requires a component market, either in-house or external
- this in turn requires accepted standards
- the problems are not technological ones alone

*imperfect technology in a working market is sustainable;  
perfect technology without a market will vanish*

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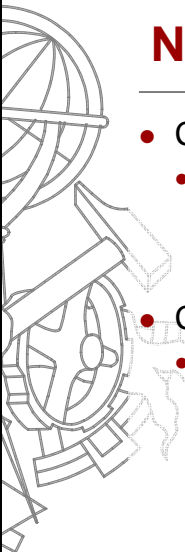
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## New Professions

- **Component system architect**
  - Provides architecture for the architects – the architects of component frameworks. It is what city master planning is to the architects of individual buildings
- **Component framework architect**
  - A component framework is not just a design, but may itself contain implementation parts. The framework implementation is the basis for the interoperation with other frameworks, rules of component interaction, and provision of component default behavior where applicable

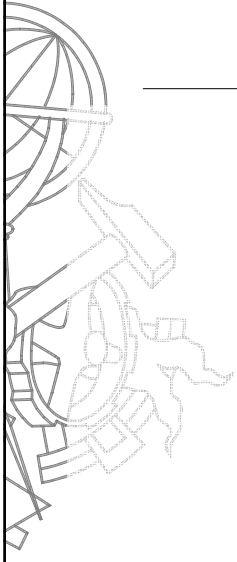
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## New Professions

- **Component developer**
  - Takes component framework specification and specific component requirements and develops, by means of analyses and design, these ideas into implementable components
- **Component assembler**
  - A component assembler (or composer) takes application requirements, selects appropriate components – and perhaps component frameworks – and assembles these.

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**Questões**

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