Introduction of .NET Framework and development tools for it

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JAMK/IT

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Sources: MSDN, Academic Resource KIT materials and Anders Hejlsberg's and Dalibor Kacmar's presentations

Intro of .NET

Europe

Finland

Jyväskylä

Helsinki

Nicosia

Finland Facts

- Independent since 1917, Republic
- EU member since 1995
- population 5,2 million
- area: 338,145 sq km (Cyprus 9,250)
- capital: Helsinki
- languages: finnish, swedish
- currency: Euro
- economy:
  - Finland has a highly industrialized, largely free-market economy, with per capita output roughly that of the UK, Italy etc.
  - Its key economic sector is manufacturing - principally the wood, metals, engineering, telecommunications, and electronics industries.

more facts about Finland: http://www.cia.gov/cia/publications/factbook/geos/fi.html

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About the lecturer Esa Salmikangas, brief CV

e-mail: esa.salmikangas@jypoly.fi you can call me **Esa**

- interest for computers since 1978
- M.Sc., Civil Engineering, University of Oulu 1992 Finland
- work experience in industry since1989
  - special expert area: applied CAD design systems
  - worked in following tasks: developer, trainer, consult, expert
  - programming experience in following languages:
    - Fortran VisualBasic, VBA, VB.NET, LISP, AutoLISP, SQL
  - programming experience in following environments:
    - AutoCAD, Excel, Lotus Notes, Outlook, Exchange Server, dBase, Access, SQLserver etc
  - experience in following operating systems:
    - MacOS, VAX/VMS, Unix (SunOS, HP-UX), DOS, Windows
- work experience in teaching
  - many short courses in companies since 90'
  - part-time teacher 1995-1996 and 1999-2000
  - lecturer since 2000 in IT-institute, interest areas:
    - software engineering, application development tools, .NET

Intro of .NET

.NET Framework

- What Is the .NET Framework?
- The .NET Framework is an integral Windows component for building and running the next generation of software applications and Web services.
- The .NET Framework:
  - Supports over 20 different programming languages.
  - Manages much of the plumbing involved in developing software, enabling developers to focus on the core business logic code.
  - Makes it easier than ever before to build, deploy, and administer secure, robust, and high-performing applications.
  - The .NET Framework is composed of the common language runtime and a unified set of class libraries.

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Software in the past vs nowadays

In the past
- small programs -> from "scratch"
- terminating
- batch processing
- only supports business
- gurus and "heroes"
- custom made
- centralized

Nowadays
- huge systems / big applications -> ready made components
- 24/7/365
- interactivity
- critical for business
- team work
- products
- distibuted systems

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About Application Architectures
A quick history

Monolithic '60-80's	2-tier '80-90's	n-tier (Web) '90-...
➢ Easy to Build	➢ Rich Services	➢ Stateless or Loosely coupled
➢ Difficult to maintain	➢ More open	➢ Protocol level Interop
➢ Poor Interop	➢ Somewhat difficult to scale	➢ Limited functionality
➢ Difficult to scale	➢ Difficult to manage	
➢ Still exist		

- **The Web Affects Everything**
  - ➢ **Application Architecture Continues to Evolve**
    - **More Server Centric And also Distributed => Service Orientated**
    - **Highly scalable and flexible**
    - **Open and discoverable**
  - ➢ **Business Applications Get More Complex**
    - **Business to Business**
    - **Business to Consumer**
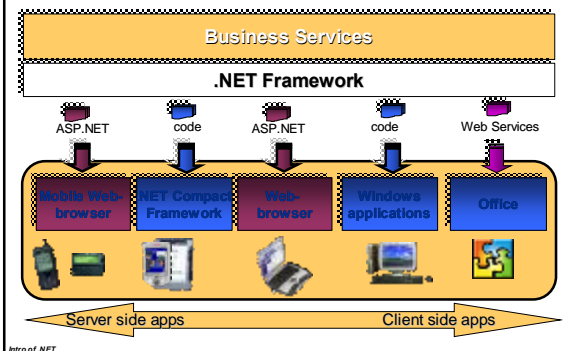
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Q: Why new Framework?
A: technologic demands

- Computing power
  - Has doubled in every 18 month
  - PC-based server scalability
- Networking
  - Easy and cheap access to Internet
  - wireles
- Versatility of equipments
  - PDA, Mobile phone, Smart phone, PC, laptop, TV, embedded systems
- Internet-standards
  - XML

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.NET is for different applications

Business Services

.NET Framework

ASP.NET   code   ASP.NET   code   Web Services

| Mobile Web-browser | .NET Compact Framework | Web-browser | Windows applications | Office |

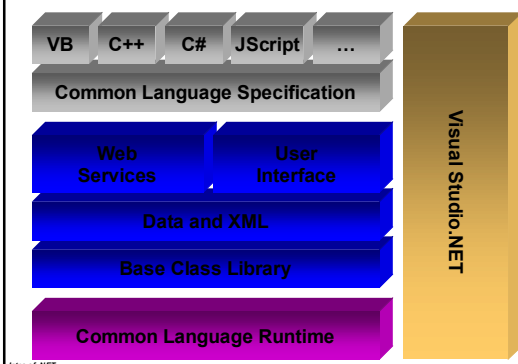Server side apps   Client side apps

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.NET Framework Components

- This is not n-tier architecture
- Base has Common Language Runtime
  - Memory Management
  - Common Data Types
  - Lifecycle Monitoring
- Middle includes Standard System Services
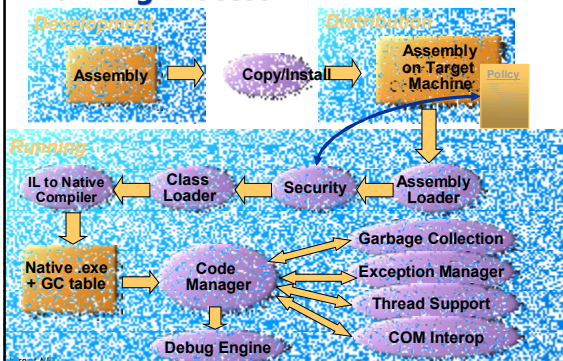- Top covers User and Program Interfaces

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Framework, Languages, And Tools

| VB | C++ | C# | JScript | ... |

Common Language Specification

| Web Services | User Interface |

Data and XML

Base Class Library

Common Language Runtime

Visual Studio.NET

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Common Language Runtime Running Process

Development

Assembly → Copy/Install → Assembly on Target Machine → Policy

Running

IL to Native Compiler ← Class Loader ← Security ← Assembly Loader

Native .exe + GC table → Code Manager

Garbage Collection
Exception Manager
Thread Support
COM Interop

Debug Engine

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How to check is .NET Framework installed?

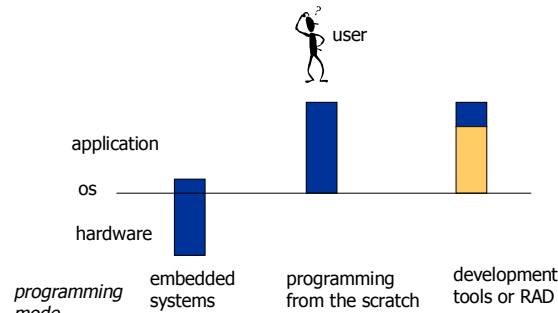- ❑ Where to get it?
  - ▪ www.microsoft.com/downloads
  - ▪ about 23 Mb

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Application Development Tools

Freewares
Commercial Tools

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Why to use development tools?

user

application

os

hardware

programming mode

embedded systems

programming from the scratch

development tools or RAD

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RAD Definition

- ❑ RAD (rapid application development) is a concept that products can be developed faster and of higher quality through:
  - ▪ Gathering requirements using workshops or focus groups
  - ▪ Prototyping and early, reiterative user testing of designs
  - ▪ The re-use of software components
  - ▪ A rigidly paced schedule that defers design improvements to the next product version
  - ▪ Less formality in reviews and other team communication
- ❑ RAD usually embraces object-oriented programming methodology, which inherently fosters software re-use.
- ❑ The most popular object-oriented programming languages, C++, VB and Java, are offered in visual programming packages often described as providing rapid application development.

> But remember:
> "For every complex problem, there is a simple answer, and it's wrong"
> - H.L. Mencken

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RAD tools
Application Development Tools

- ❑ Delphi
- ❑ JavaOne
- ❑ JBuilder
- ❑ Kylix
- ❑ Sun One Studio
- ❑ Visual Studio
- ❑ hundreds more

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C# language

- ❑ Visual C# (pronounced C sharp) is a new programming language introduced in Visual Studio .NET.
- ❑ An evolution of C and C++, C# is simple, modern, type-safe, and object-oriented.
- ❑ It was designed for building a wide range of enterprise applications that run on the .NET Platform.
- ❑ Code that you write with Visual C# is compiled as managed code, which means it benefits from the services of the Common Language Runtime. These services include language interoperability, garbage collection, enhanced security, and improved versioning support.
- ❑ Visual C# is fully supported within Visual Studio .NET by project templates, designers, property pages, code assistants, an object model, and other features of the development environment. The library for Visual C# programming is the .NET Framework.
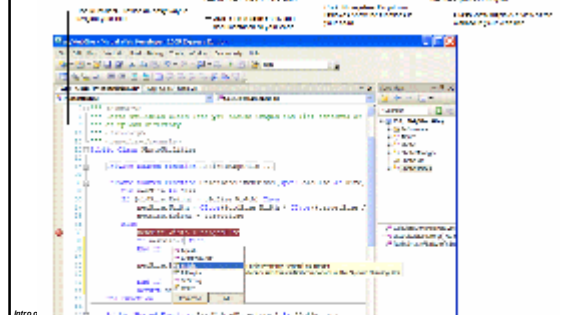
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Visual Studio.NET

- versions:
  - Professional
  - Enterprise
  - Enterprise Architect
  - + special versions
- releases:
  - first release in February 2002
  - version 2003 in May 2003
  - the newest version Visual Studio 2005 released 7th of November
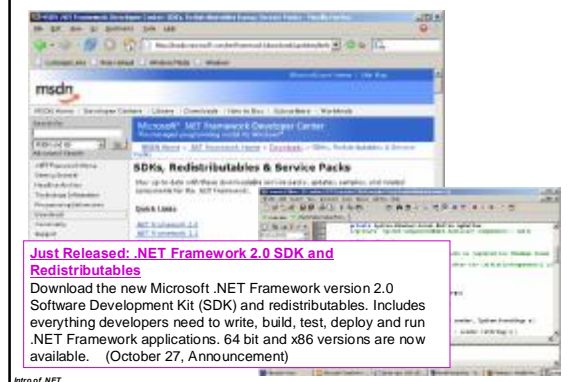- more: http://msdn.microsoft.com/vstudio/

Create fast, scalable Web apps with Visual Studio .NET Professional 2003 Special Edition. Includes Windows Server 2003 Standard Edition, SQL Server 2000 Developer Edition, and training, all for US $549.

Visual Web Developer 2005 Express Edition

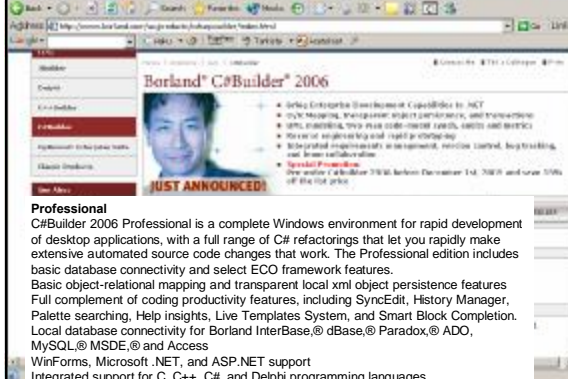## Free alternatives
www.thefreecountry.com
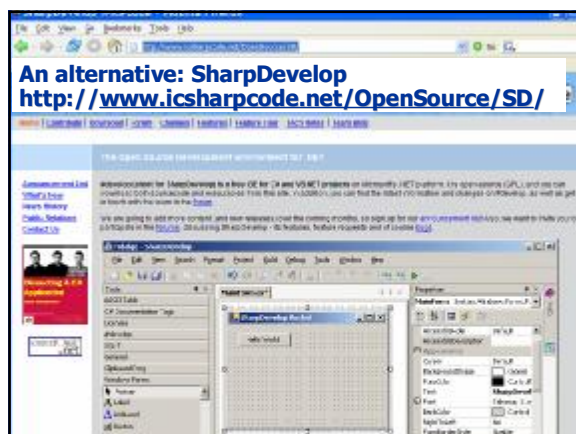
An Alternative: Editor + .NET Framework SDK

Just Released: .NET Framework 2.0 SDK and Redistributables
Download the new Microsoft .NET Framework version 2.0 Software Development Kit (SDK) and redistributables. Includes everything developers need to write, build, test, deploy and run .NET Framework applications. 64 bit and x86 versions are now available.   (October 27, Announcement)

An alternative: Borland C#Builder

Borland® C#Builder® 2006

JUST ANNOUNCED!

Professional
C#Builder 2006 Professional is a complete Windows environment for rapid development of desktop applications, with a full range of C# refactorings that let you rapidly make extensive automated source code changes that work. The Professional edition includes basic database connectivity and select ECO framework features.
Basic object-relational mapping and transparent local xml object persistence features
Full complement of coding productivity features, including SyncEdit, History Manager, Palette searching, Help insights, Live Templates System, and Smart Block Completion.
Local database connectivity for Borland InterBase,® dBase,® Paradox,® ADO, MySQL,® MSDE,® and Access
WinForms, Microsoft .NET, and ASP.NET support
Integrated support for C, C++, C#, and Delphi programming languages .

An alternative: SharpDevelop
http://www.icsharpcode.net/OpenSource/SD/

An alternative: WebMatrix (it is Free!) www.asp.net/webmatrix

An alternative: Borland C#Builder

source: http://community.borland.com/csharp

- ❑ "Accelerate the development and deployment of your .NET solutions with Borland C#Builder, the first independent development environment for the .NET Framework.
- ❑ An integral component of the Borland solution for application lifecycle management, C#Builder accelerates the delivery of .NET Framework solutions with a design-driven approach to development that increases team productivity.
- ❑ C#Builder provides support for direct interoperability between the .NET Framework, the J2EE™ platform, and CORBA® infrastructure, helping to simplify and reduce the cost of integrating .NET solutions with your existing software systems.
- ❑ And for faster, easier, and more flexible database development, C#Builder delivers high-performance native support for major enterprise-class databases."

Some interesting sources: Building an N-Tier Application in .NET

- ❑ http://msdn.microsoft.com/visualc/using/understanding/arch/default.aspx?pull=/library/en-us/dndotnet/html/buildntierapp.asp

One more thing...

Where are you going Microsoft?

- ❑ .NET Framework is one of the biggest new things/products what M$ has published
- ❑ WHY?
  the world of computers has changed, main reasons:
  - – Internet, Internet, Internet
  - – security
  - – mobile, different platforms
  - – SOA

Longhorn/Vista what ever...

- ❑ http://msdn.microsoft.com/longhorn
- ❑ http://msdn.microsoft.com/windowsvista