



*An Overview  
of the .NET Technology*

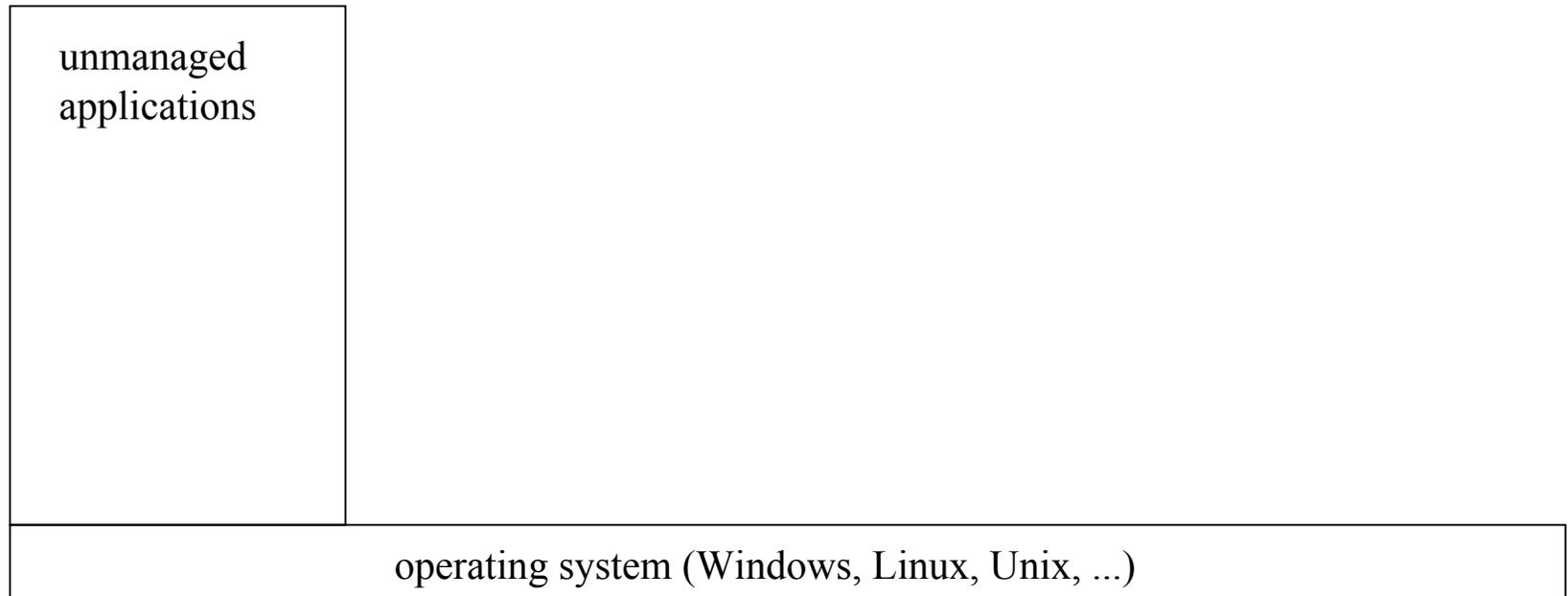
*Hanspeter Mössenböck*





# *What is .NET?*

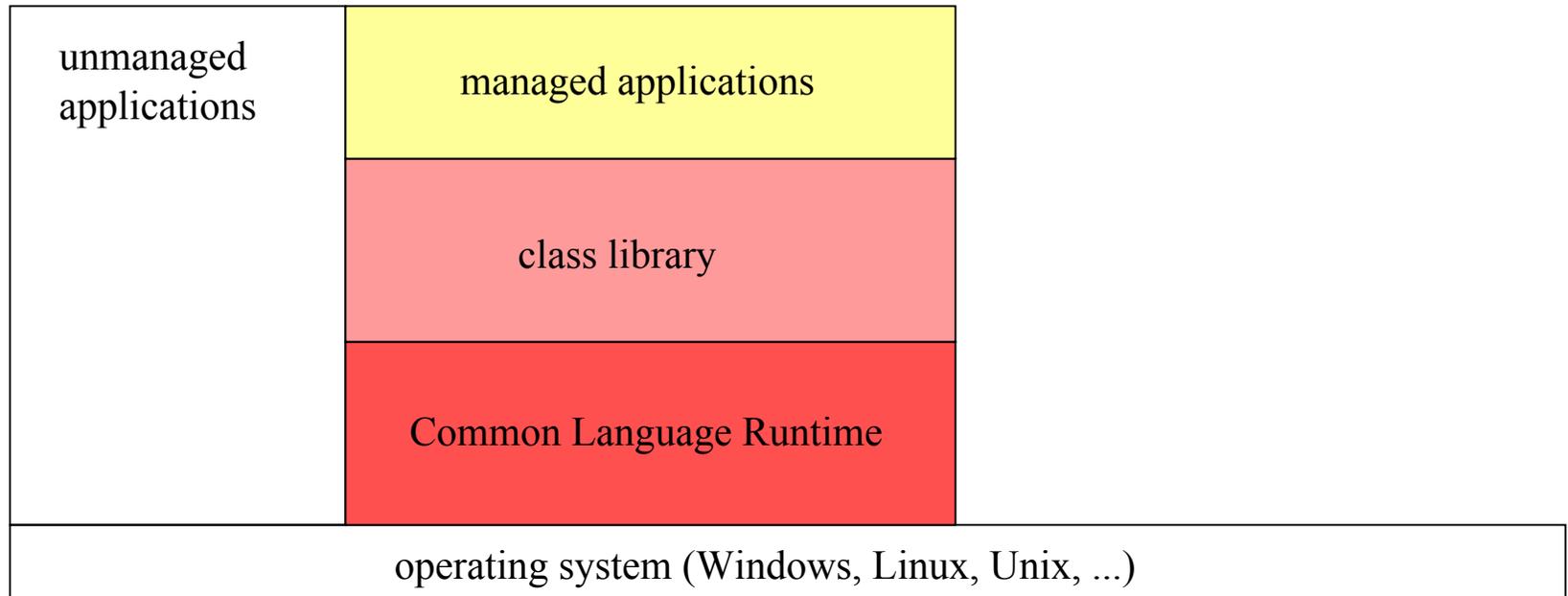
A new software platform for the desktop and the Web





# What is .NET?

A new software platform for the desktop and the Web



Common Language Runtime

interoperability, security, garbage collection, versioning, ...

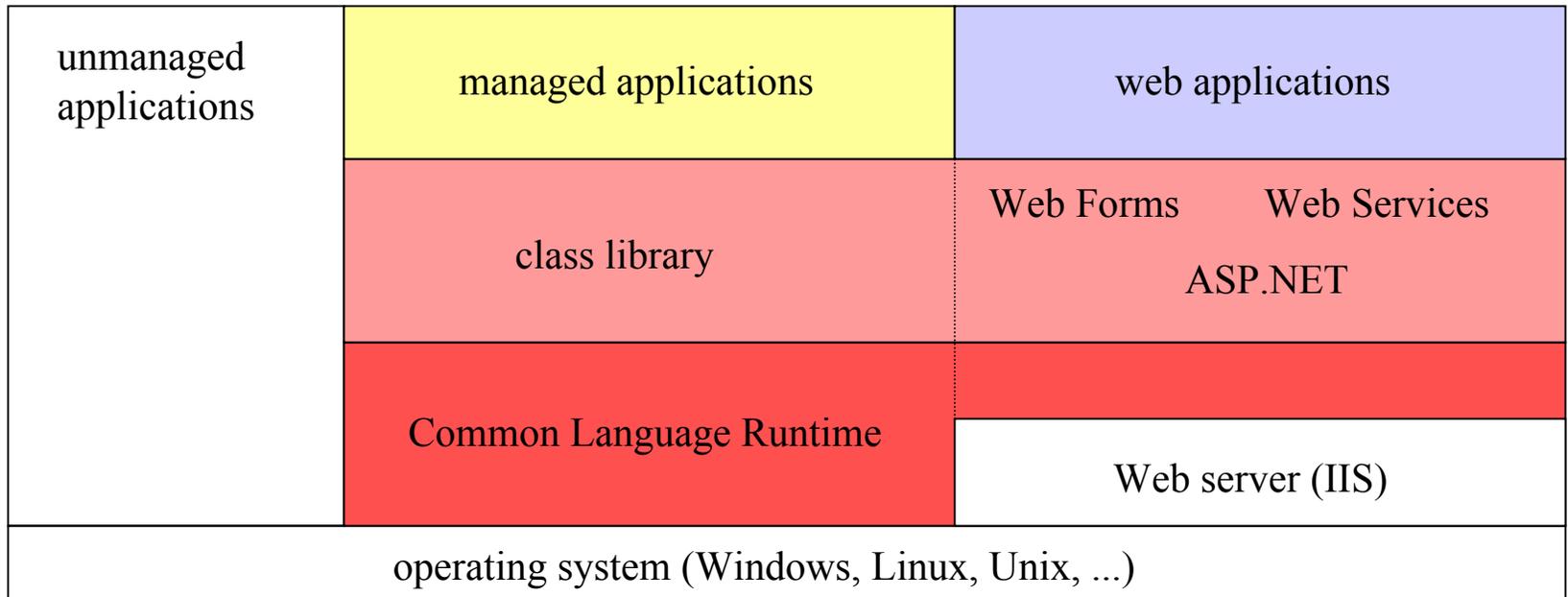
class library

GUI, collections, threads, network, reflection, XML, ...

# What is .NET?



A new software platform for the desktop and the Web



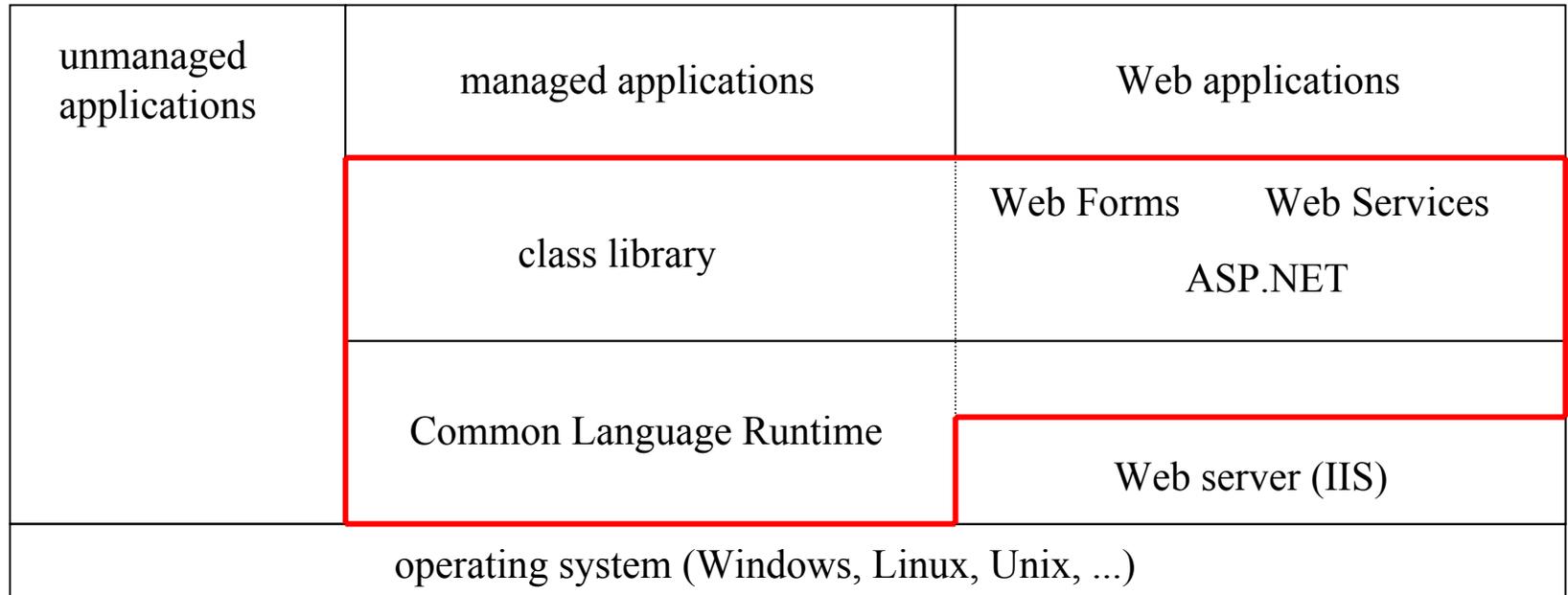
ASP.NET,  
Web Forms  
Web Services

Web GUI (object-oriented, event-based, browser-independent)  
distributed services over RPC (SOAP, HTTP)

# What is .NET?



A framework and more ...



## **.NET Framework**

- + **tools** (Visual Studio .NET, ildasm, gacutil, ...)
- + **servers** (SQL server, BizTalk server, Exchange server, ...)
- + **services** (My Services, Passport service, ...)



# *Goals of .NET*

To unify desktop and Web programming

*So far*

## **Desktop programming**

object-oriented  
compiled (C/C++, Fortran, ...)  
class library

## **Web programming**

ASP (not object-oriented)  
interpreted (VBScript, Javascript, PHP, ...)  
special library



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special library

*Under .NET*

## Desktop and Web programming

object-oriented (ASP.NET)  
compiled (C#, C++, VB.NET, Fortran, ...)  
uniform class library



## *Goals of .NET*

Interoperability between programming languages

*So far*

- millions of lines of code in C++, Fortran, Visual Basic, ...
- very limited interoperability

# Goals of .NET

## Interoperability between programming languages

### *So far*

- millions of lines of code in C++, Fortran, Visual Basic, ...
- very limited interoperability

### *Under .NET*

- binary compatibility between more than 20 languages (C#, C++, VB.NET, Java, Eiffel, Fortran, Cobol, ML, Haskell, Pascal, Oberon, Perl, Python, ...)

#### *Class in VB.NET*

```
Public Class A
    Public x As Integer
    Public Sub Foo() ...
End Class
```

#### *Subclass in C#*

```
class B : A {
    public string s;
    public void Bar() {...}
}
```

#### *Used in Eiffel*

```
class Client feature
    obj: B;
    ...
    create obj;
    obj.Bar;
    ...
end
```



## *Goals of .NET*

Web Services: distributed applications on the Internet

*Usage of the Internet so far*

- Email
- Web browsers (show information for human users)

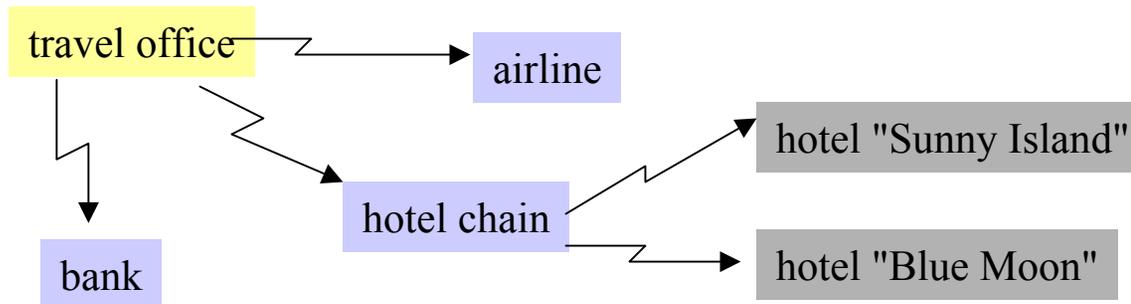
# Goals of .NET

Web Services: distributed applications on the Internet

*Usage of the Internet so far*

- Email
- Web browsers (show information for human users)

*Under .NET: B2B applications without a Web browser*



Based on simple standards

- HTTP
- SOAP (XML)
- Remote Procedure Calls



## *Goals of .NET*

Simpler dynamic Web pages

*So far*

- ASP (mixture of HTML and VBScript or Javascript)

# Goals of .NET

Simpler dynamic Web pages

*So far*

- ASP (mixture of HTML and VBScript or Javascript)

*Under .NET*

- ASP.NET (clear separation of HTML and script code)



object-oriented  
 event-based  
 interactively composable (RAD)  
 custom GUI elements possible  
 efficient (compiled server code)  
 state management  
 authorisation / authentication

...

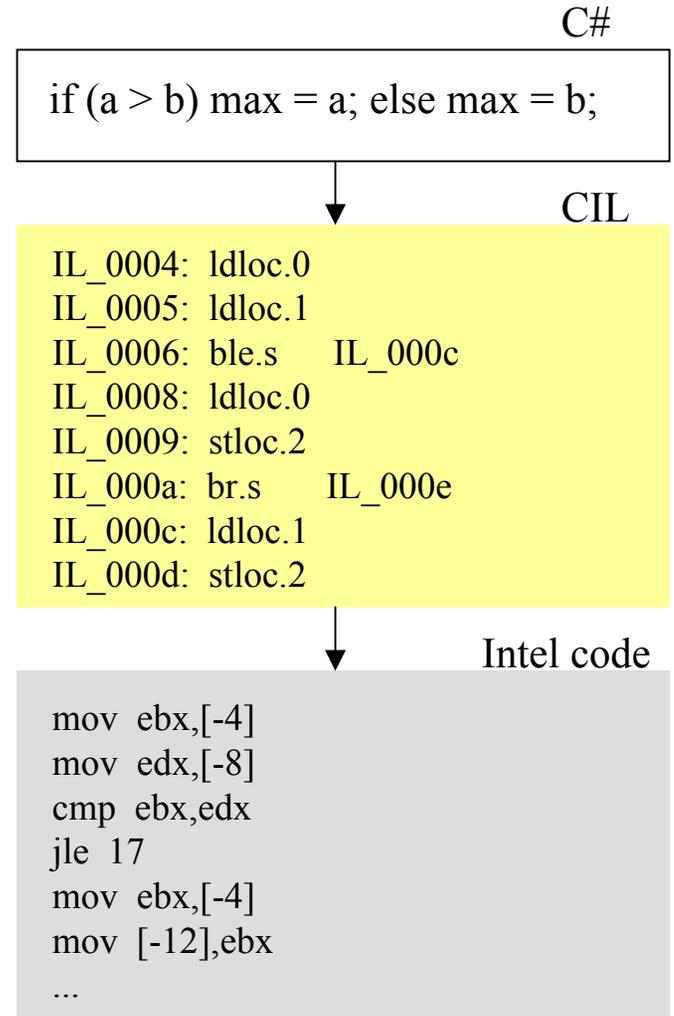
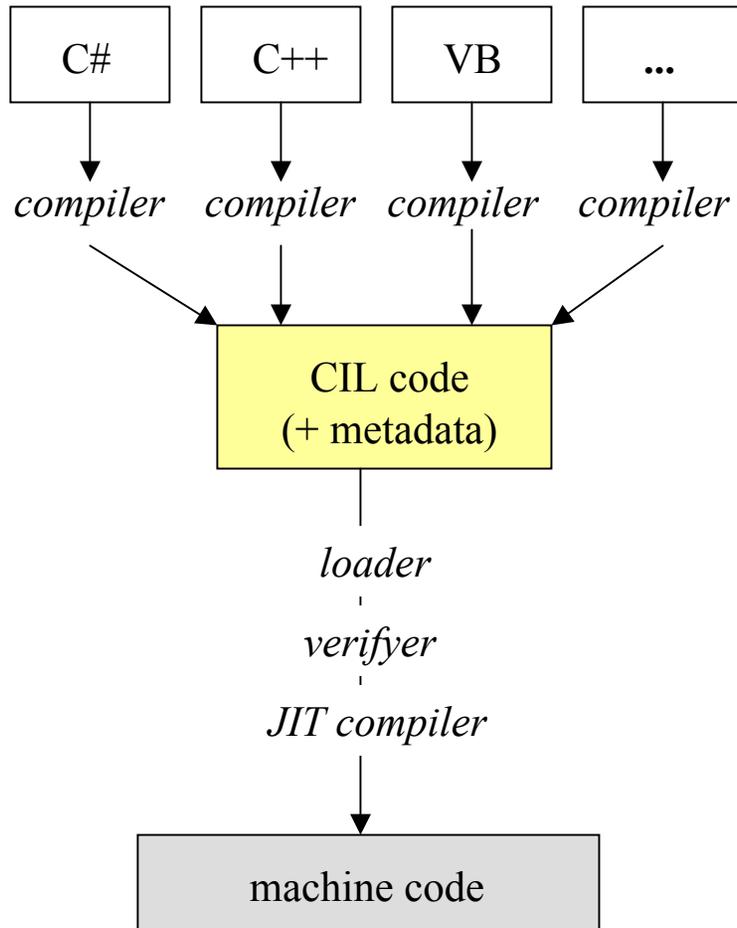


## *Goals .NET*

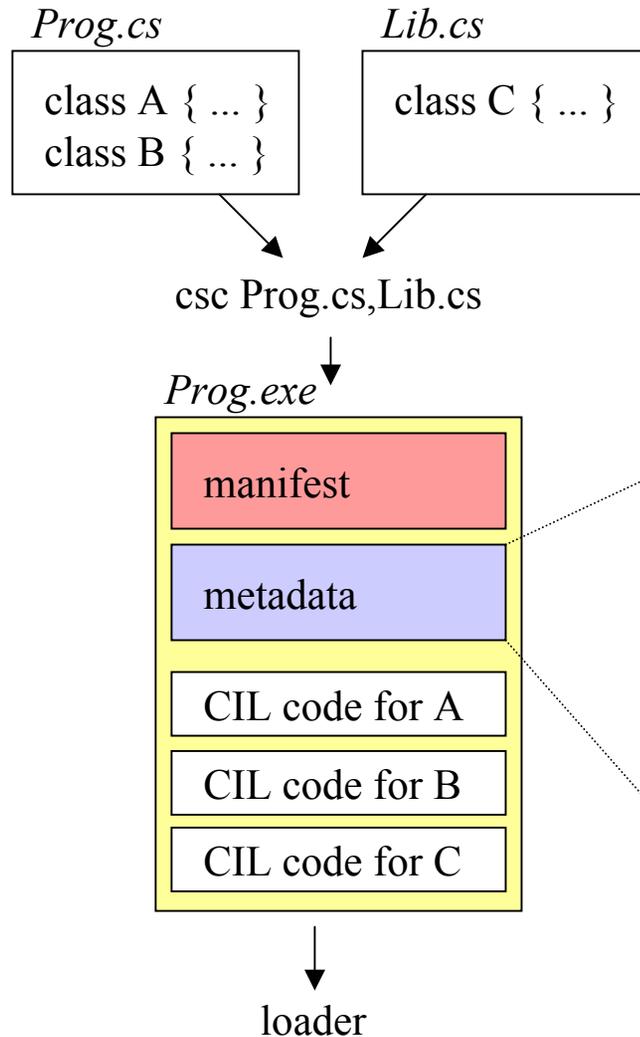
### More quality and convenience

- Security
  - public key signatures
  - code-based access rights
- Side by side execution
  - end of "DLL hell"
  - versioning
- Zero-impact installation
  - no Registry entries necessary
  - clean deinstallation
- Different clients
  - PCs, mobiles, embedded systems

# Interoperability



# Assemblies



**Assemblies are the smallest units for**

- deployment
- versioning
- loading

allows:

- dynamic loading
- version checking
- reflection

version number  
 public key  
 interface description  
 - classes  
 - methods  
 - fields  
 - parameters  
 - types  
 - ...

# Literature



## Web

- [www.microsoft.com/net/](http://www.microsoft.com/net/)
- [msdn.microsoft.com/net/](http://msdn.microsoft.com/net/)
- [www.gotdotnet.com](http://www.gotdotnet.com)
- [www.devhood.com](http://www.devhood.com)
- [www.go-mono.com](http://www.go-mono.com)
- [dotnet.jku.at](http://dotnet.jku.at)

## Books

- Beer, Birngruber, Mössenböck, Wöß: **Die .NET-Technologie**. dpunkt.verlag, 2003
- Albahari, Drayton, Merrill: **C# Essentials**, O'Reilly, 2001
- Robinson et al.: **Professional C#**, Wrox Press, 2001
- Richter: **Applied Microsoft .NET Framework Programming**, Microsoft Press, 2002
- Watkins et al.: **Programming in the .NET Environment**, Addison Wesley, 2002
- Box: **Essential .NET**, Addison Wesley, 2002