.NET Framework 2.0
Visual Studio 2005

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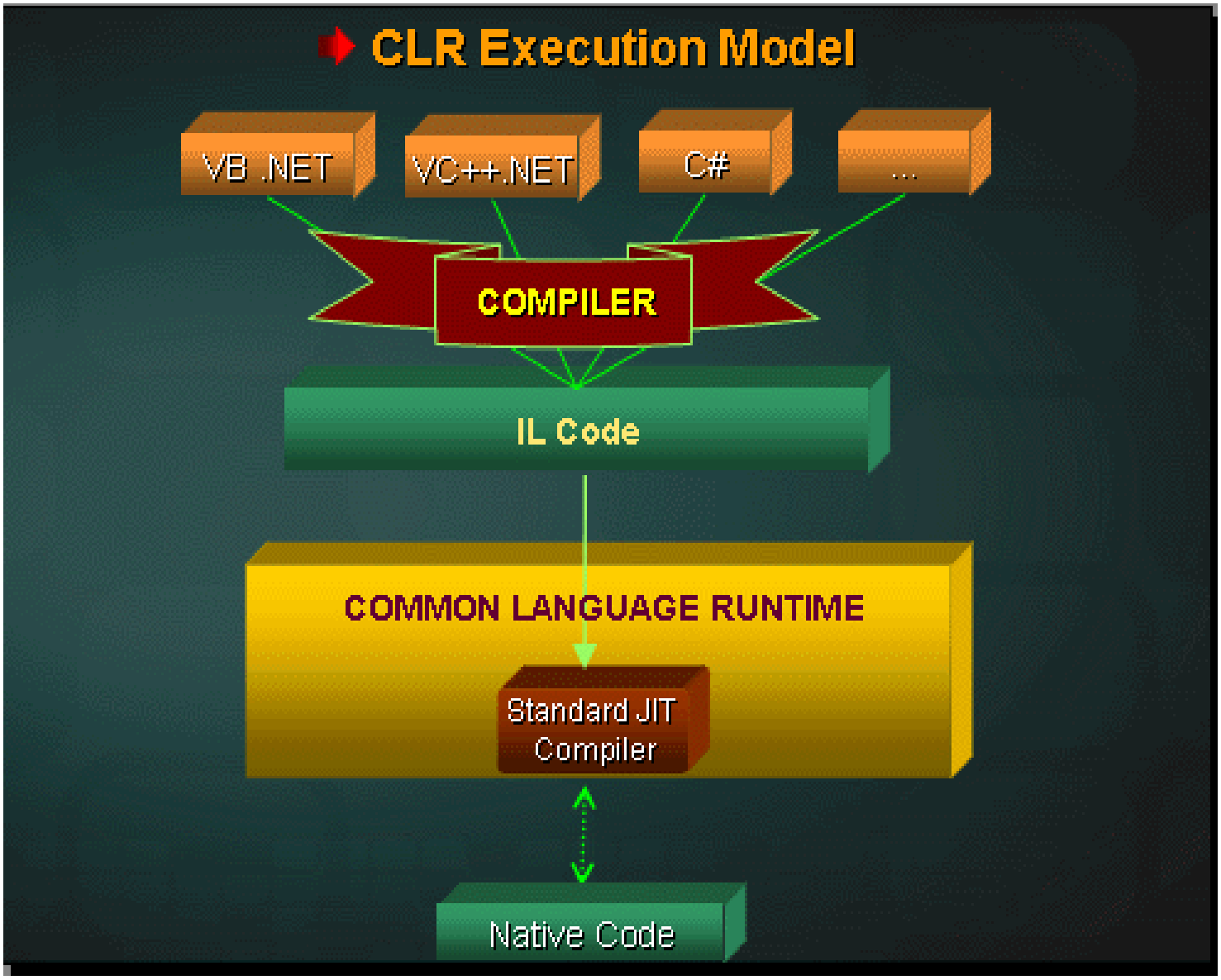
.NET - Java

- .NET Framework
- Visual Studio
- MSIL
- C#, VB

- JRE
- Eclipse
- Bytecode
- Java

```
open System
open System.Windows.Forms

let form = new Form()
do form.Width  <- 400
do form.Height <- 300
do form.Text <- "Hello World Form"

(* Menu bar, menus *)
let mMain = form.Menu <- new MainMenu()
let mFile = form.Menu.MenuItems.Add("&File")
let miQuit  = new MenuItem("&Quit")
let _ = mFile.MenuItems.Add(miQuit)

(* RichTextView *)
let textB = new RichTextBox()
do textB.Dock <- DockStyle.Fill
do textB.Text <- "Hello World\n\nCongratulations!"
do form.Controls.Add(textB)

(* callbacks *)
let opExitForm sender args = form.Close ()
do miQuit .add_Click (new EventHandler(opExitForm))

(* run! *)
do Application.Run(form)
```


CLR Execution Model
VB .NET
VC++.NET
C#
...
COMPILER
IL Code
COMMON LANGUAGE RUNTIME
Standard JIT Compiler
Native Code

Języki

- Ada
- APL
- AsmL
- BrainFuck
- C Standard
- C#
- C++
- Caml
- Cobol
- Delphi
- Eiffel
- Forth

Języki

- Fortran
- Haskell
- Java
- JavaScript
- LOGO
- Lua
- Mercury
- Mondrian
- Oberon
- Pascal
- Perl
- PHP

Języki

- PL/1
- Prolog
- Python
- RPG
- Ruby
- Scala
- Scheme
- Small Talk
- SML (Standard Meta Language)
- Visual Basic


Zmiany w .NET

Partial types

```
public partial class EmployeeInfo
{
        // metoda 1
}

public partial class EmployeeInfo
{
        // metoda 2
}
```

Anonimowe metody

```
// Dotychczas:

public partial class Form1 : Form
{
	public Form1()
	{
		InitializeComponent();
		Button b = new Button();
		b.Click += new EventHandler(b_Click);
		this.Controls.Add(b);
	}

	void b_Click(object sender, EventArgs e)
	{
		this.Close();
	}
}
```

Anonimowe metody

```
// Teraz:

public partial class Form1 : Form
{
	public Form1()
	{
		InitializeComponent();
		Button b = new Button();
		b.Click += delegate(object s, EventArgs e)
		{
			this.Close();
		};
		this.Controls.Add(b);
	}
}
```

Co to delegaty?

```
class Book { /*... */ }
delegate void BookProcessingProc(Book book);

class Library
{
        public event BookProcessingProc BookAdded;
        /* ... */
}

static void Main(string[] args)
{
        Library lib = new Library();
        lib.BookAdded += new BookProcessingProc(lib_BookAdded);
}

static void lib_BookAdded(Book book)
{
        /* ... */
}
```

```
class Book { /*... */ }
delegate void BookProcessingProc(Book book);

class Library
{
        public event BookProcessingProc BookAdded;
        public void OnBookAdded(Book b)
        {
                if (this.BookAdded != null)
                        this.BookAdded(b);
        }
}

static void Main(string[] args)
{
        Library lib = new Library();
        lib.OnBookAdded(new Book());
        lib.BookAdded += new BookProcessingProc(lib_BookAdded);
        lib.BookAdded += delegate(Book b) { Console.WriteLine("X"); };
        lib.OnBookAdded(new Book());
        Console.ReadLine();
}

static void lib_BookAdded(Book book)
{
        Console.WriteLine("obsługa eventa");
}
```

Generics

```
static ArrayList kolekcja = new ArrayList();
static void Main(string[] args)
{
        kolekcja.Add(new System.IO.FileInfo("blablabla"));
        kolekcja.Add(666);
        Console.WriteLine(((System.IO.FileInfo)kolekcja[0]).Length);
}
```

```
static List<System.IO.FileInfo> kolekcja =
         new List<System.IO.FileInfo>();
static void Main(string[] args)
{
         kolekcja.Add(new System.IO.FileInfo("blablabla"));
         // kolekcja.Add(666);   <- błąd kompilacji
         Console.WriteLine(kolekcja[0].Length);
}
```

Generics

```
public class Stack<T>
{
        T[] items;
        int count;
        public void Push(T item)    {...}
        public T Pop() {...}
}

Stack<int> stack = new Stack<int>();
stack.Push(3);
int i = stack.Pop();
```

Generics

```
interface IComparable <T>

struct HashBucket <K,D>

static void Reverse <T> (T[] arr)

delegate void Action <T> (T arg)
```

Templates vs Generics

- Templates are instantiated at compile-time with the source code.
- Templates are type safe.
- Templates allow user-defined specialization.
- Templates allow non-type parameters.
- Templates use "lazy structural constraints".
- Templates support mix-ins.

- Generics are instantiated at run-time by the CLR.
- Generics are also type safe.
- Generics are cross-language.
- Generics do not allow user-defined specialization.
- Generics do not allow non-type parameters.
- Generics use subtype constraints.

Templates vs Generics

```
// static bool CzyMniejsza<T>(T a, T b)
// {
//     return a < b;
// }

static bool CzyMniejsza<T>(T a, T b)
      where T : IComparable
{
      return a.CompareTo(b) < 0;
}

static void Main(string[] args)
{
      bool wynik = CzyMniejsza<int>(3, 6);
}
```

Enumeratory (yield)

```
static IEnumerator<int> Fib()
{
	yield return 1;
	int a = 0;
	int b = 1;
	int t;
	while (true)
	{
		t = b;
		b = b+a;
		a = t;
		yield return b;
	}
}
```

Enumeratory (yield)

```
static IEnumerator<int> Ciąg() {
        for (int i=1; i<7; i++)
        {
                yield return 1;
                yield return 2;
                if (i==3)
                        yield break;
        }
}

static void Main(string[] args)
{
        IEnumerator<int> e = Ciąg();
        while (e.MoveNext())
                Console.Write(e.Current); // „121212”
        Console.ReadLine();
}
```

Nullable value types

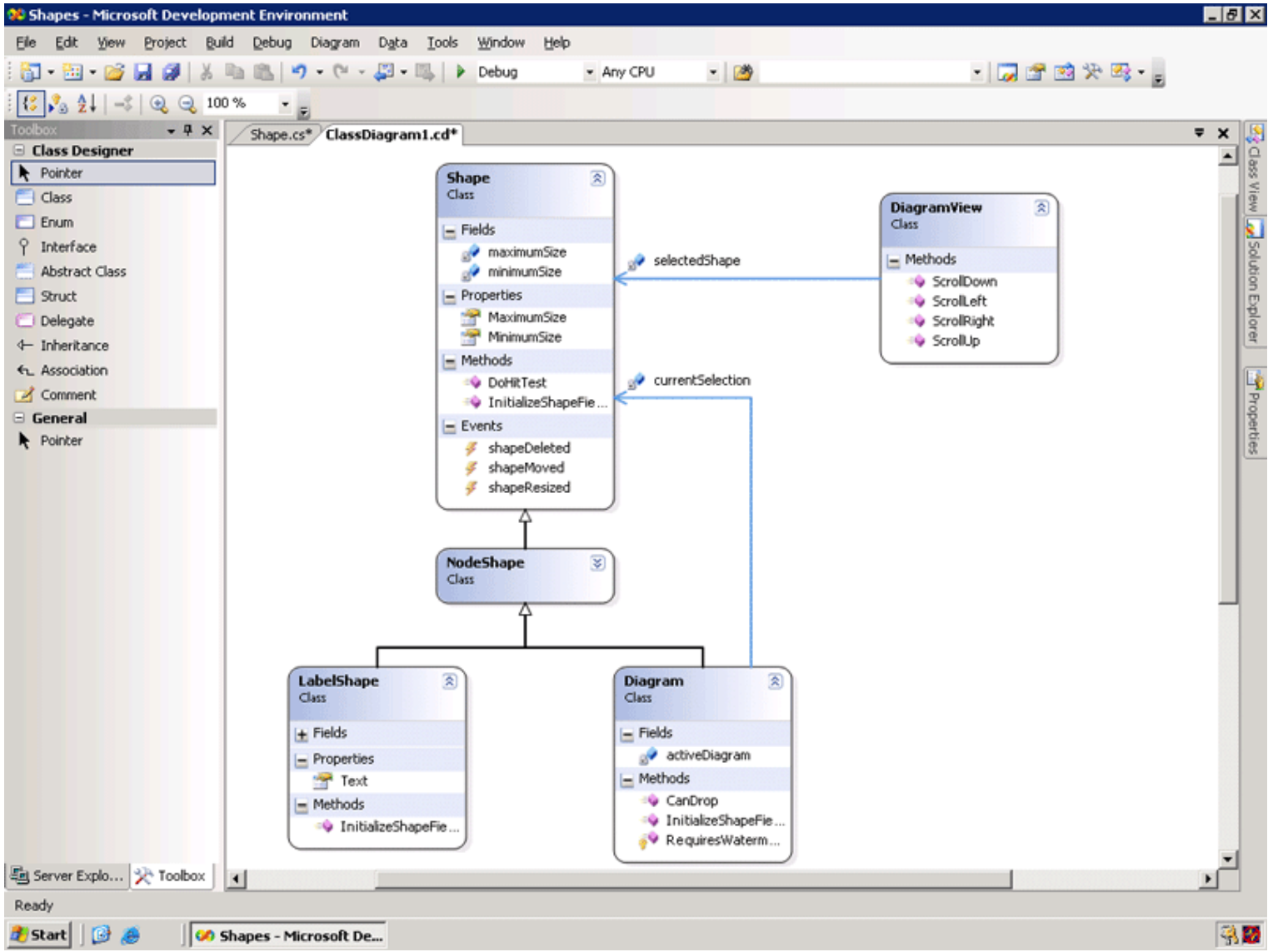
```
static int? DajLiczbe()
{
        return null;
}

static void Main(string[] args)
{
        int? n = DajLiczbe();
        // if (n!=null)
        //     Console.WriteLine(n);
        if (n.HasValue)
                Console.WriteLine(n.Value);
}
```

Nullable value types

```
static int? DajLiczbe()
{
	return 3;
}

static void WypiszLiczbe(int n)
{
	Console.WriteLine(n);
}

static void Main(string[] args)
{
	WypiszLiczbe(DajLiczbe()); // błąd kompilacji
}
```

Nowości w VS

- MenuStrip, ContextMenuStrip, ToolStrip
- TableLayout, FlowLayout
- ClickOnce
- Visualizers
- Class diagram
- Debugging Code at Design Time
- TracePoints


Shapes - Microsoft Development Environment
File Edit View Project Build Debug Diagram Data Tools Window Help
Debug
Any CPU
100 %
Toolbox
Class Designer
Pointer
Class
Enum
Interface
Abstract Class
Struct
Delegate
Inheritance
Association
Comment
General
Pointer
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MaximumSize
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DoHitTest
InitializeShapeFie...
Events
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shapeMoved
shapeResized
selectedShape
currentSelection
DiagramView
Class
Methods
ScrollDown
ScrollLeft
ScrollRight
ScrollUp
NodeShape
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LabelShape
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Fields
Properties
Text
Methods
InitializeShapeFie...
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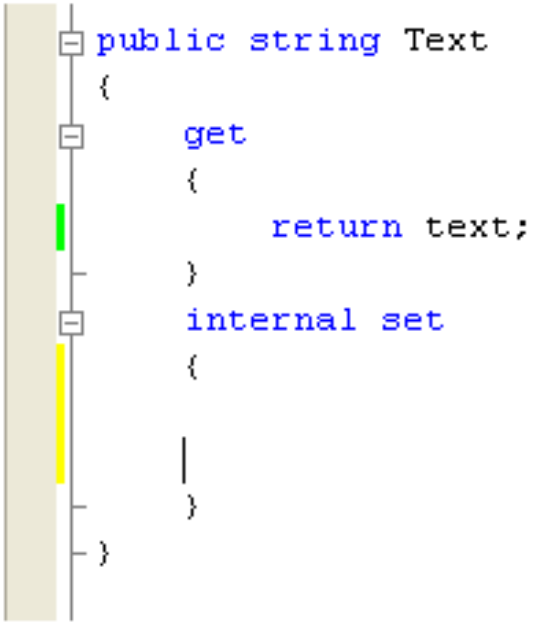
Fields
activeDiagram
Methods
CanDrop
InitializeShapeFie...
RequiresWaterm...
Class View
Solution Explorer
Properties
Server Explo...
Toolbox
Ready
Start
Shapes - Microsoft De...

Snippets

```
<?xml version="1.0" encoding="utf-8" ?>
<CodeSnippet Format="1.0.0">
   <Header>
      <Title>class</Title>
      <Shortcut>class</Shortcut>
      <Description>Expansion snippet for class</Description>
      <SnippetTypes>
         <SnippetType>Expansion</SnippetType>
         <SnippetType>SurroundsWith</SnippetType>
      </SnippetTypes>
   </Header>
   <Snippet>
      <Declarations>
         <Literal default="true">
            <ID>name</ID>
            <ToolTip>Class name</ToolTip>
            <Default>MyClass</Default>
         </Literal>
      </Declarations>
      <Code Language="csharp" Format="CData"><![CDATA[class $name$
   {
      $selected$$end$
   }]]>
   </Code>
   </Snippet>
</CodeSnippet>
```

Refactoring

- Extract Method: This is to split a method into many fine grained methods which are reusable.
- Rename: This is used to rename an identifier i.e. field, variable, method etc.
- Encapsulate Fields: Creating a property to encapsulate a field.
- Extract Interfaces: Creating an interface which is implemented by current class.
- Promote Local Variable to Parameters: Moving a local variable to parameter level.
- Remove Parameters: Removing parameters from methods, indexers, constructors, delegates.
- Reorder Parameters: Changing the order of parameters.
- Generate Method Stub: Automatic code generation based on the consumption of a method.
- Add Using Unbound Types: Automatic inclusion of namespace for an unbound type.


public string Text
{
get
{
return text;
}
internal set
{
}
}


C# 3.0

Language integrated query (LINQ)

```
public void Linq1() {
    int[] numbers = { 5, 4, 1, 3, 9, 8, 6, 7, 2, 0 };

    var lowNums =
        from n in numbers
        where n < 5
        select n;

    Console.WriteLine("Numbers < 5:");
    foreach (var x in lowNums) {
        Console.WriteLine(x);
    }
}
```

- Object initialization:

```
Customer c = new Customer { Name="James" };
```

- Lambda expressions:

```
listOfFoo.Where(x => x.size>10);
Func<int,int> f =  x => x + 1;
```

Źródła

- http://msdn.microsoft.com/
- http://research.microsoft.com/
- http://www.arunmicrosystems.netfirms.com/clr.html