Einführung .NET Framework

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.NET – What Is It?

- Software platform

- Language neutral

- In other words:

  .NET is not a language (Runtime and a library for writing and executing written programs in any compliant language)
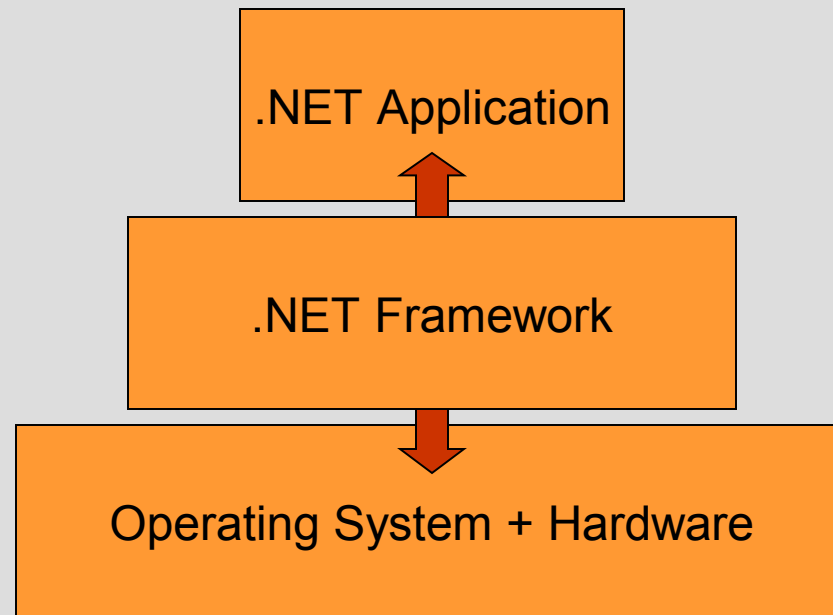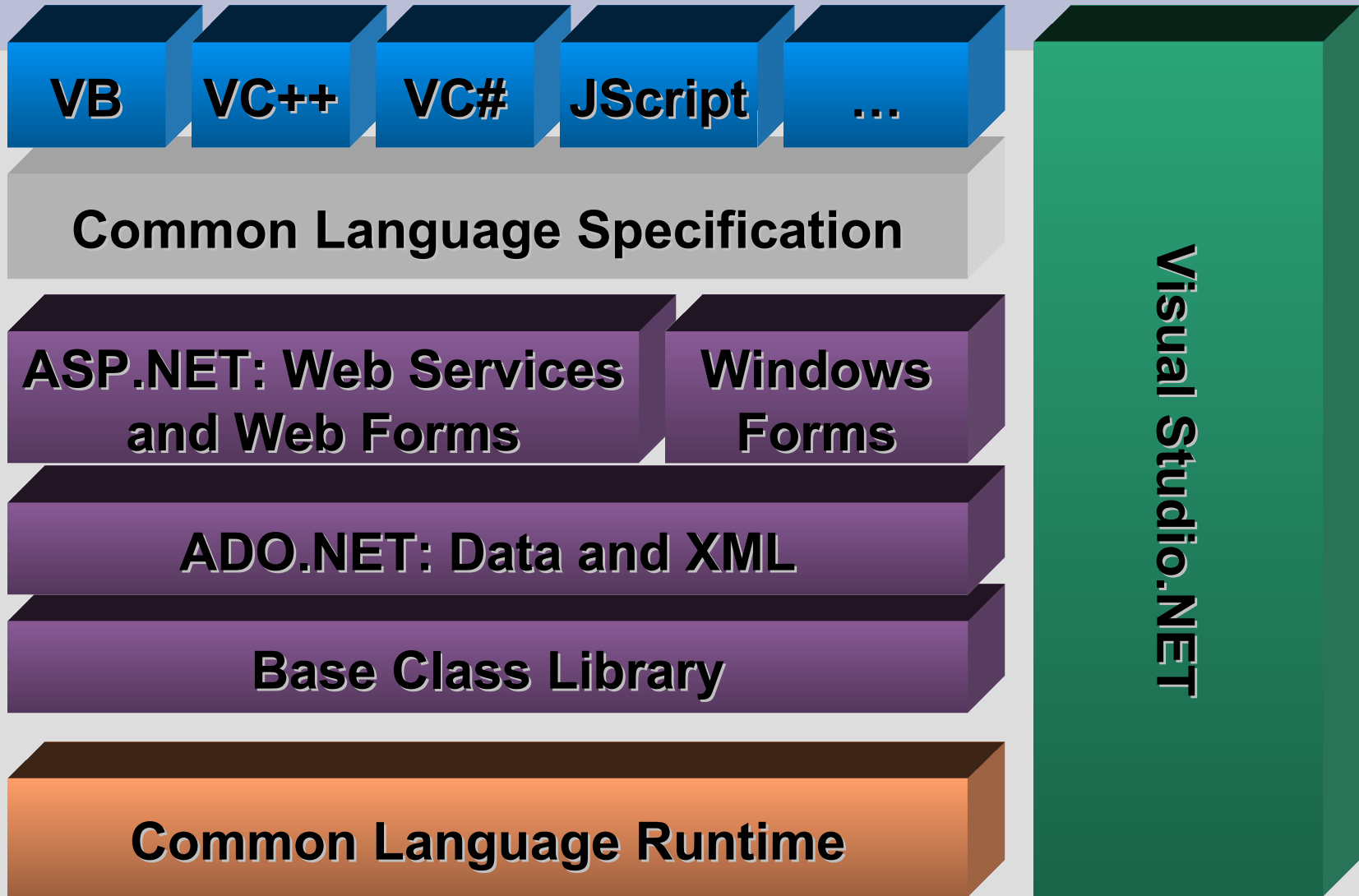
What Is .NET

- .Net is a new framework for developing web-based and windows-based applications within the Microsoft environment.

- The framework offers a fundamental shift in Microsoft strategy: it moves application development from client-centric to server-centric.

.NET – What Is It?

Framework, Languages, And Tools

| VB | VC++ | VC# | JScript | … |

Common Language Specification

ASP.NET: Web Services and Web Forms

Windows Forms

ADO.NET: Data and XML

Base Class Library

Common Language Runtime

Visual Studio.NET

Some Components from .NET

System.Web

Services
- Description
- Discovery
- Protocols

Caching

Configuration

UI
- HtmlControls
- WebControls

Security

SessionState

System.WinForms

Design

ComponentModel

System.Drawing

Drawing2D

Imaging

Printing

Text

System.Data

ADO

Design

SQL

SQLTypes

System.Xml

XSLT

XPath

Serialization

System

Collections

Configuration

Diagnostics

Globalization

IO

Net

Reflection

Resources

Security

ServiceProcess

Text

Threading

Runtime
- InteropServices
- Remoting
- Serialization

The .NET Framework
.NET Framework Services

- Common Language Runtime
- Windows® Forms
- ASP.NET
  - Web Forms
  - Web Services
- ADO.NET, evolution of ADO
- Visual Studio.NET

Common Language Runtime (CLR)

- CLR works like a virtual machine in executing all languages.

- All .NET languages must obey the rules and standards imposed by CLR. Examples:
  - Object declaration, creation and use
  - Data types,language libraries
  - Error and exception handling
  - Interactive Development Environment (IDE)

Common Language Runtime

- Development
  - Mixed language applications
    - Common Language Specification (CLS)
    - Common Type System (CTS)
    - Standard class framework
    - Automatic memory management
  - Consistent error handling and safer execution
  - Potentially multi-platform
- Deployment
  - Removal of registration dependency
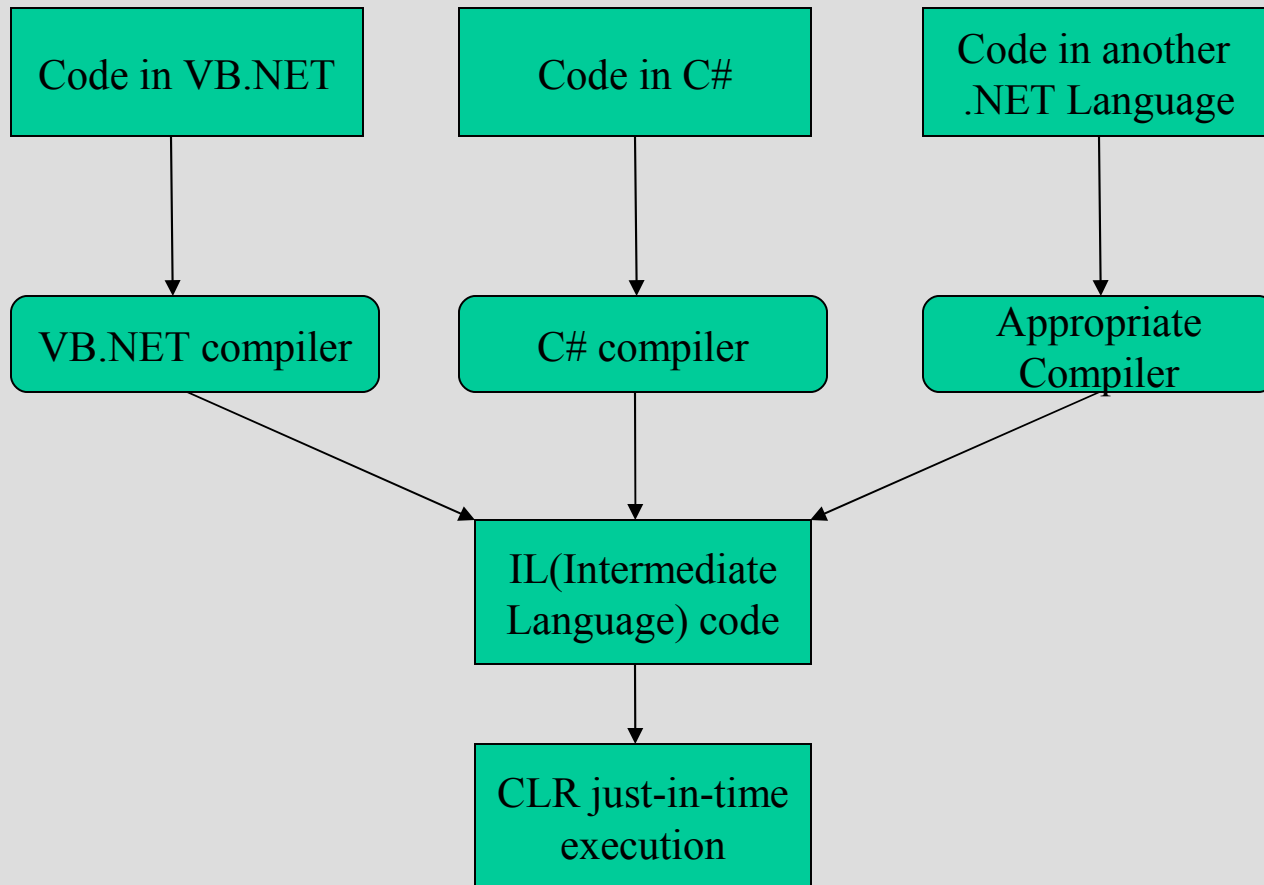 - Safety – fewer versioning problems

Common Language Runtime

Multiple Language Support

- CTS is a rich type system built into the CLR
  - Implements various types (int, double, etc)
  - And operations on those types
- CLS is a set of specifications that language and library designers need to follow
  - This will ensure interoperability between languages

Compilation in .NET

Intermediate Language (IL)

- .NET languages are not compiled to machine code. They are compiled to an Intermediate Language (IL).

- CLR accepts the IL code and recompiles it to machine code. The recompilation is just-in-time (JIT) meaning it is done as soon as a function or subroutine is called.

- The JIT code stays in memory for subsequent calls. In cases where there is not enough memory it is discarded thus making JIT process interpretive.

Languages

- Languages provided by MS
    - VB, C++, C#, J#, JScript
- Third-parties are building
    - APL, COBOL, Pascal, Eiffel, Haskell, ML, Oberon, Perl, Python, Scheme, Smalltalk…

Windows Forms

- Framework for Building Rich Clients
  - RAD (Rapid Application Development)
  - Rich set of controls
  - Data aware
  - ActiveX® Support
  - Licensing
  - Accessibility
  - Printing support
  - Unicode support
  - UI inheritance

ASP.NET

- ASP.NET,the platform services that allow to program Web Applications and Web Services in any .NET language

- ASP.NET Uses .NET languages to generate HTML pages. HTML page is targeted to the capabilities of the requesting Browser

- ASP.NET "Program" is compiled into a .NET class and cached the first time it is called. All subsequent calls use the cached version.

ASP.NET

- Logical Evolution of ASP
  - Supports multiple languages
  - Improved performance
  - Control-based, event-driven execution model
  - More productive
  - Cleanly encapsulated functionality

ASP.NET Web Forms

- Allows clean cut code
  - Code-behind Web Forms
- Easier for tools to generate
- Code within is compiled then executed
- Improved handling of state information
- Support for ASP.NET server controls
  - Data validation
  - Data bound grids

ASP.NET Web Services

- A technical definition
  - "A programmable application component accessible via standard Web protocols"

Web Services

- It is just an application…

- …that exposes its features and capabilities over the network…

- …using XML…

- …to allow for the creation of powerful new applications that are more than the sum of their parts…
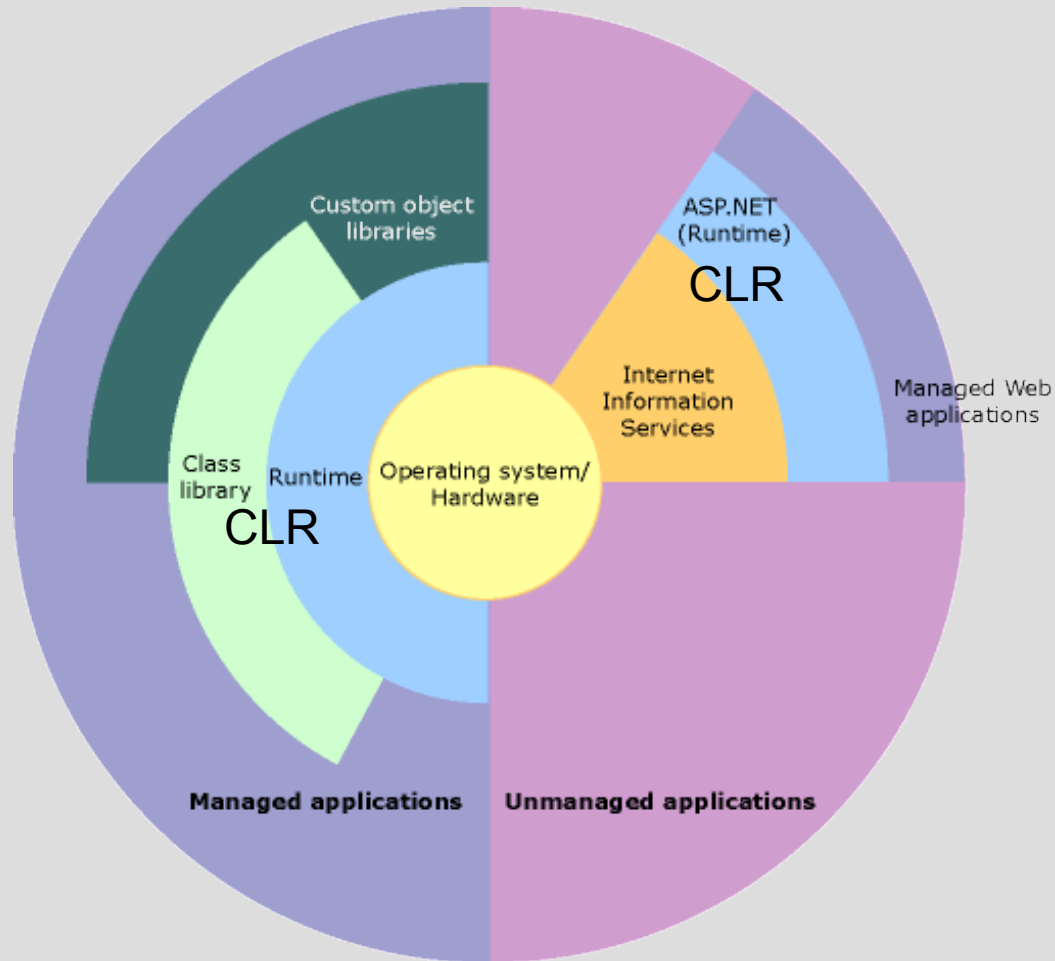
ADO.NET
(Data and XML)

- New objects (e.g., DataSets)
- Separates connected / disconnected issues
- Language neutral data access
- Uses same types as CLR
- Great support for XML

Visual Studio.NET

- Development tool that contains a rich set of productivity and debugging features

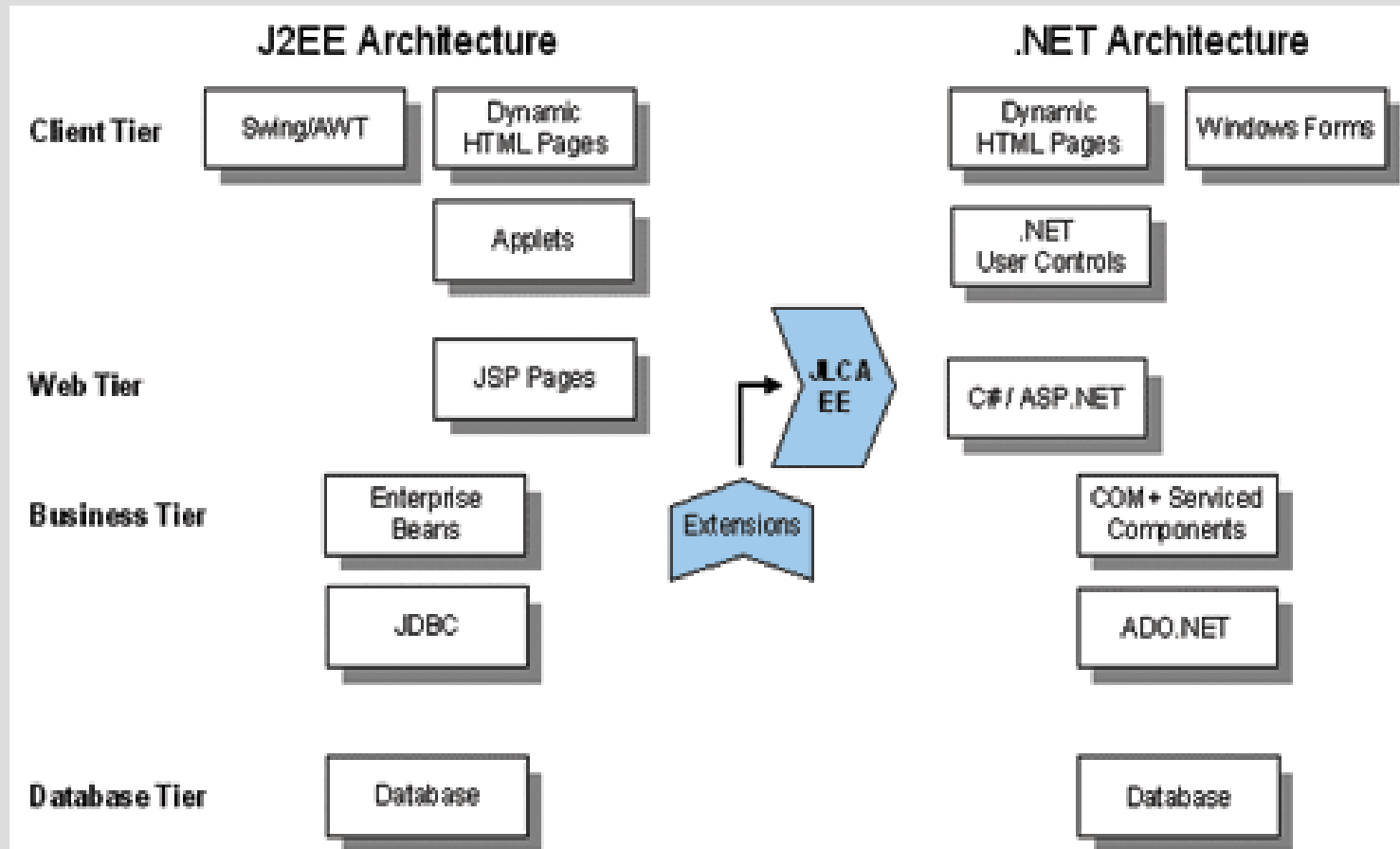# .NET – Hierarchy, Another View

Summary

- The .NET Framework

  - Dramatically simplifies development and deployment

  - Provides robust and secure execution environment

  - Supports multiple programming languages

Comparison between J2EE and .NET

Comparison between J2EE and .NET Architectures

J2EE and .NET

Execution Engine

➢ J2EE

Java source code compiles into machine-independent byte code

Runtime Environment : JVM

➢ .NET

Any compliant language compiles into MSIL

Runtime environment : CLR

Both JVM and CLR ,support services, such as code verification, memory management via garbage collection, and code security

J2EE and .NET

Cross Platform Portability

➢ J2EE

   Platform Independent

   JDK should exist on target machine

➢ .NET

   Supports Windows platform

   CLR should exist on target machine

   Can support other platforms provided it has its own JIT complier

J2EE and .NET

Language Support

➢ J2EE

Tied to Java

Supports other languages via interface technology

➢ .NET

Language independent

Supports any language if mapping exists from that

language to IL

J2EE and .NET

Tools Support

➤ J2EE

    Can employ any number of tools

    Pro   :Developer has a great deal of choice

    Con   :Difficulty in choosing a right tool for a given job

➤ .NET

    Visual Studio.NET, single IDE for building an application

Resources

- http://www.microsoft.com/net
  - Microsoft .NET home
- http://msdn.microsoft.com/net - Microsoft .NET developers home
- http://msdn.microsoft.com/xml
  - Microsoft XML developers home
- http://msdn.microsoft.com/webservices
  – Microsoft Web Services developers home
- http://www.gotdotnet.com
  – Developers .NET resource