

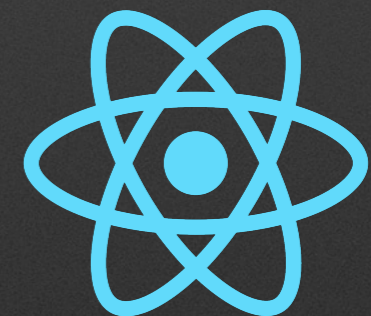
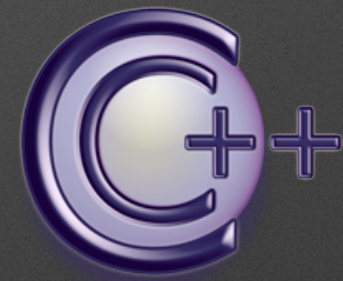
Platformy / technologie

Jaroslav Žáček

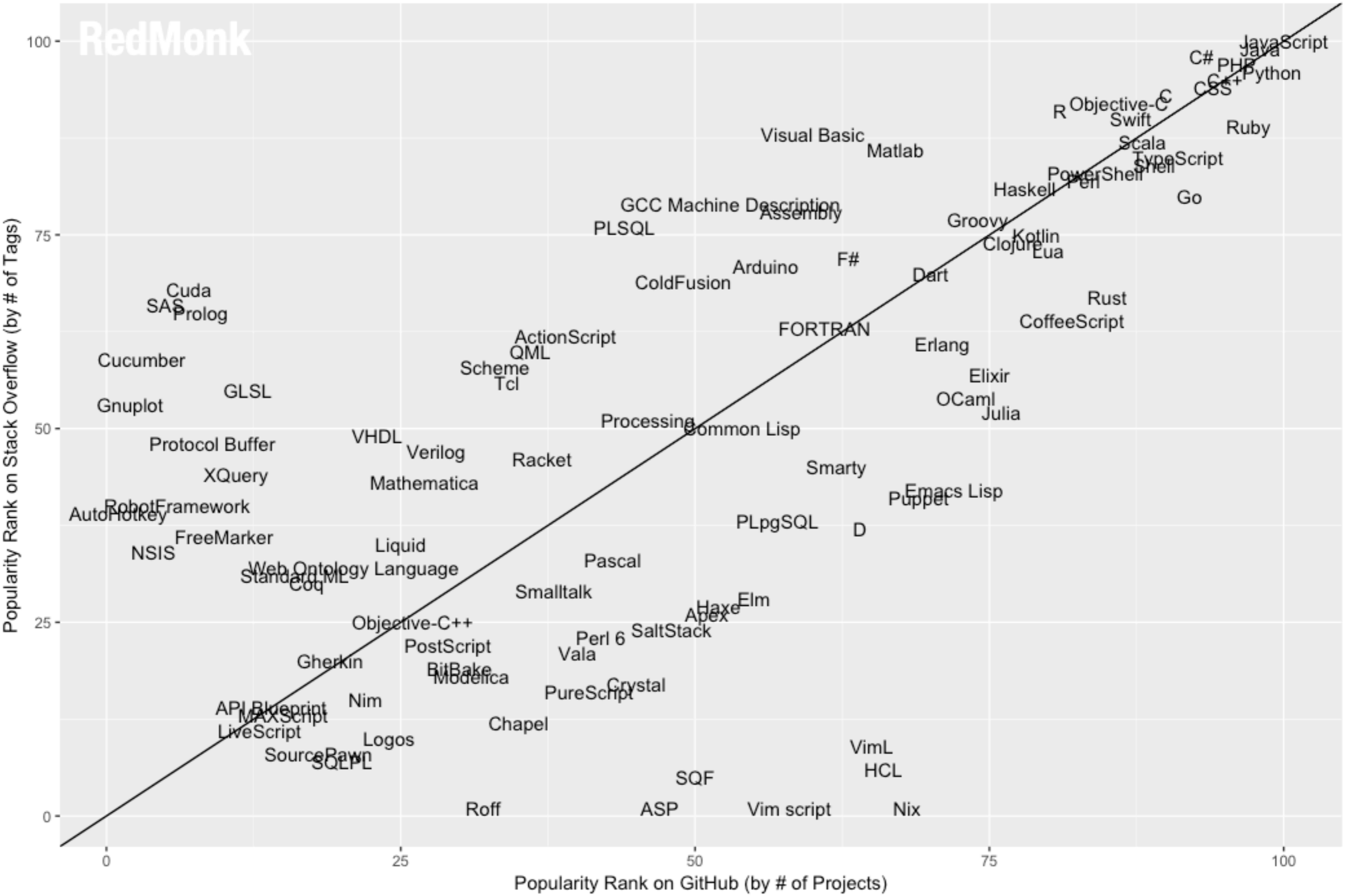
jaroslav.zacek@osu.cz

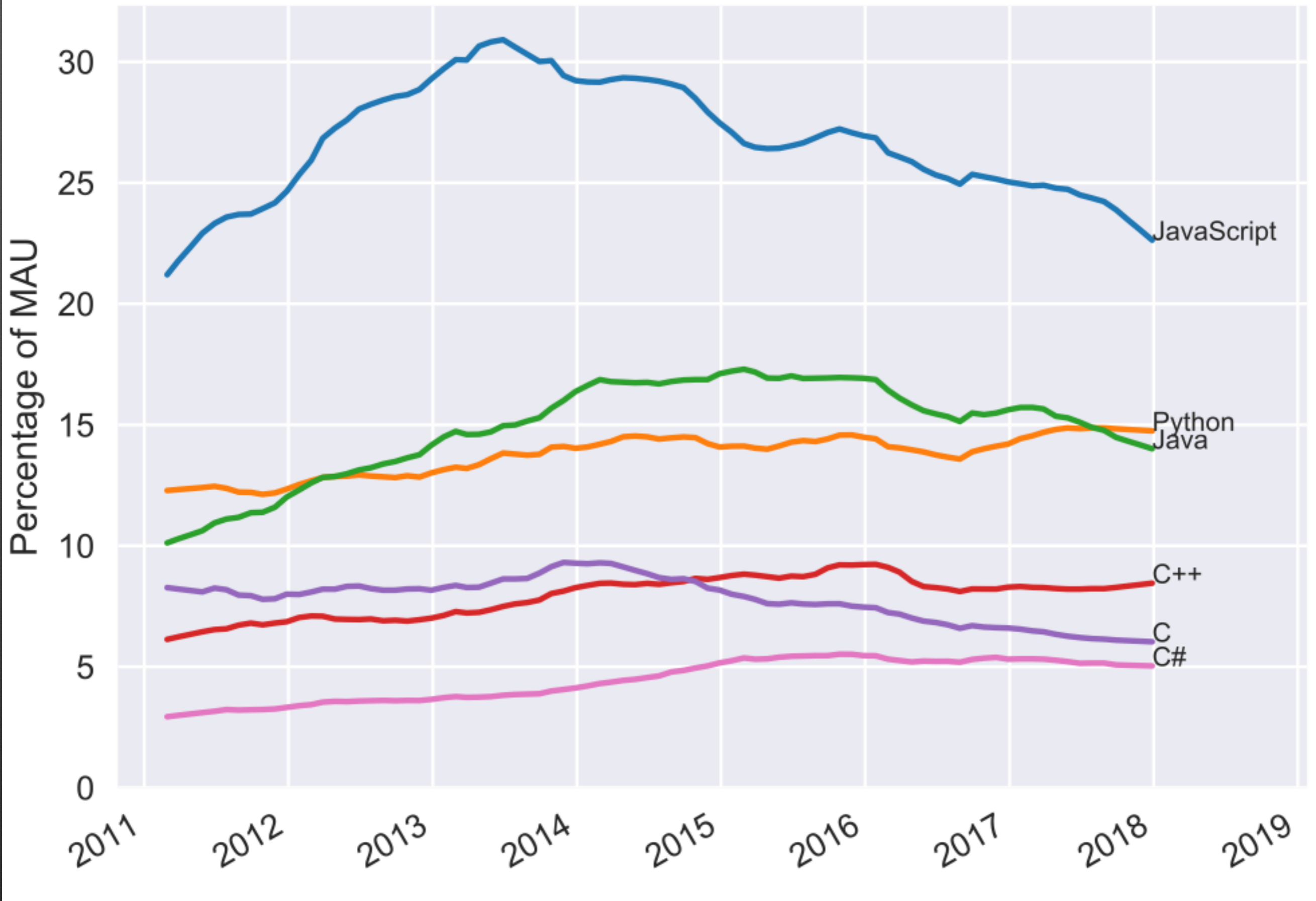
<http://www1.osu.cz/~zacek/infs1/>

Které platformy / technologie znáte



RedMonk Q119 Programming Language Rankings





Co je potřeba znát



Web Applications

Frontend

 AngularJS

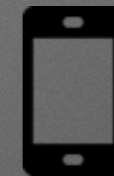
 React

Backend

 Java

 .NET

 Google Go



Mobile Applications



Android (Java)



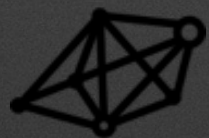
Xamarin (C#)



React Native



Ionic



DevOps

CI, Jenkins, TeamCity, TFS



Embedded Devices

RTOS, Linux

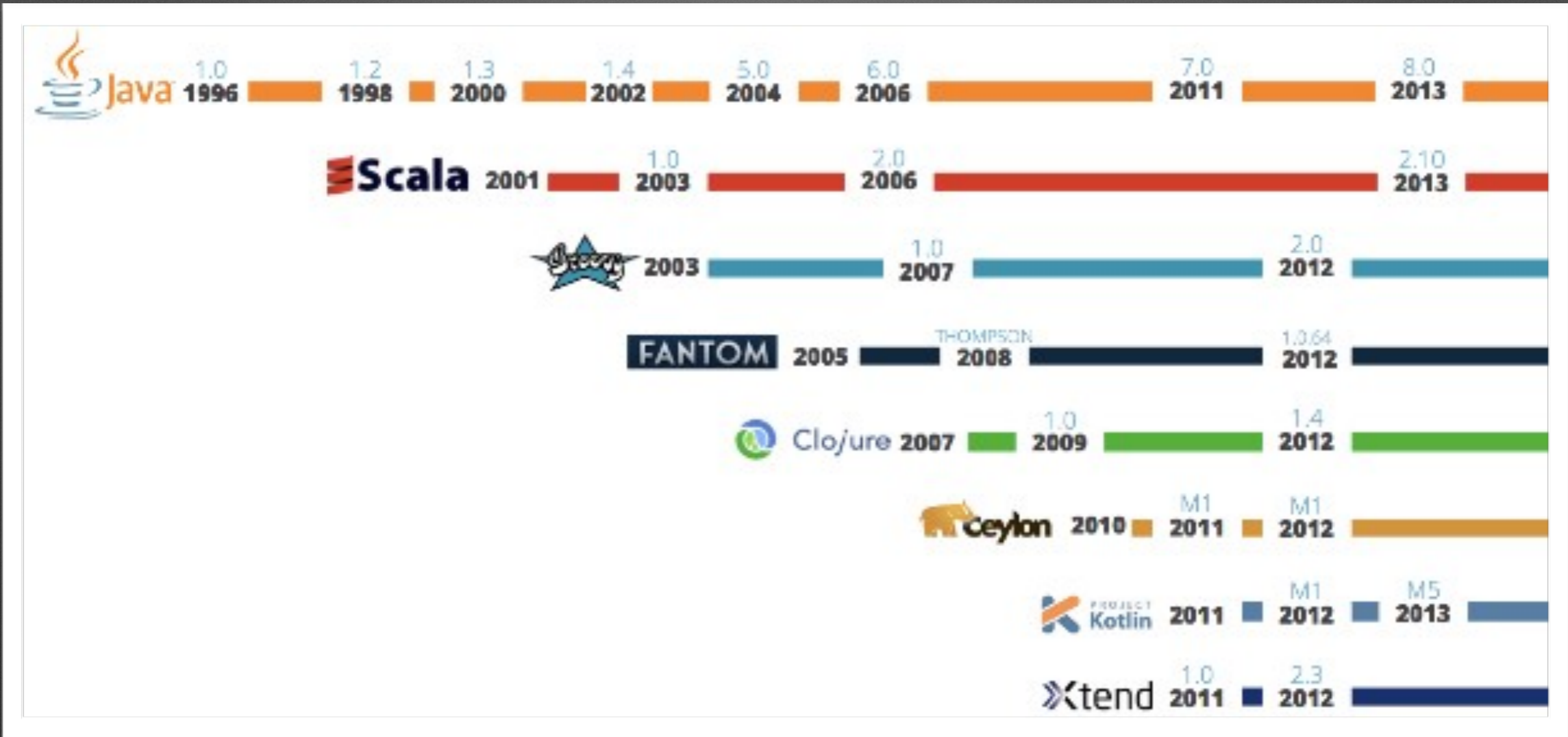


Quality Assurance (QA)

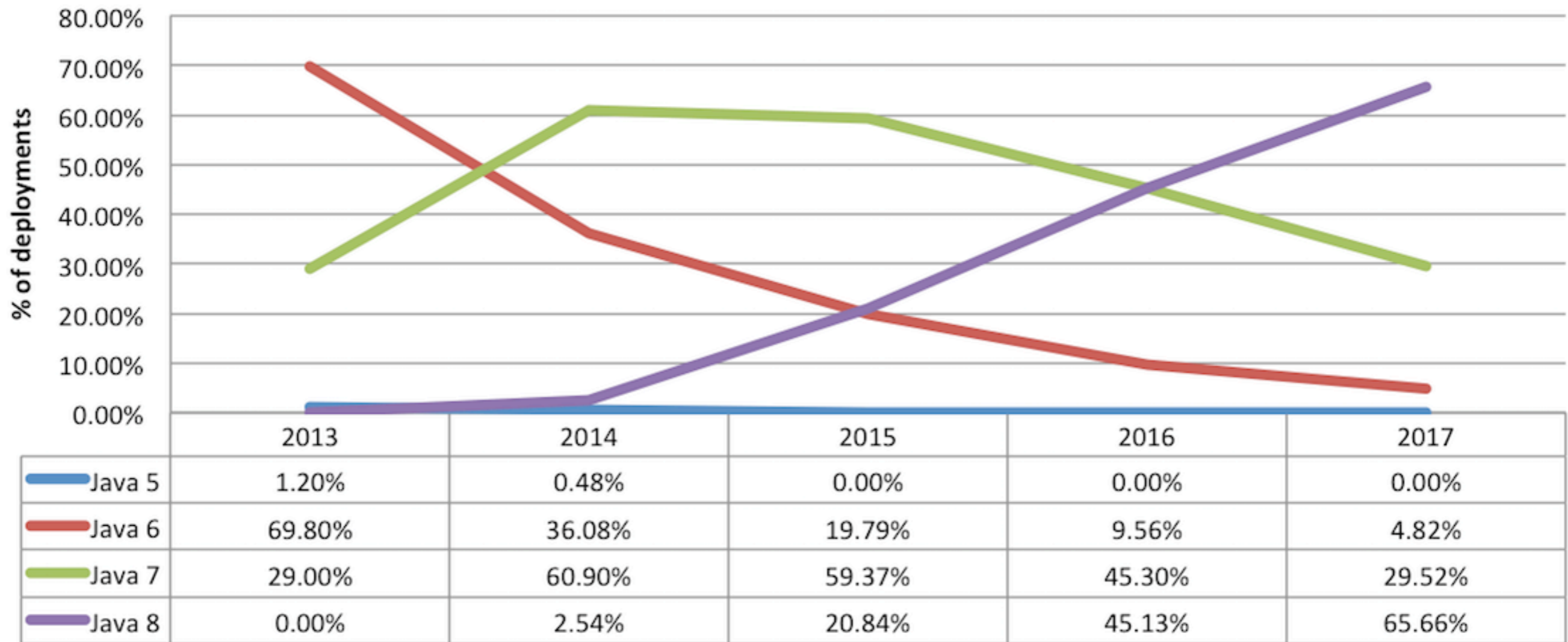
Manual Testing, Automated Testing

Java

Trocha historie



Java versions used 2013 - 2017



Developer Ecosystem 2019

Java EE

J2EE 1.2

Servlet, JSP,
EJB, JMS,
RMI

J2EE 1.3

CMP,
Connector
Architecture

J2EE 1.4

Web
Services
Mgmt,
Deployment,
Async
Connector

Java EE 5

Ease of
Development,
EJB 3.0, JPA,
JSF, JAXB,
JAX-WS,
StAX, SAAJ

Java EE 6

Pruning,
Extensibility
Ease of Dev,
CDI, JAX-RS

Web Profile

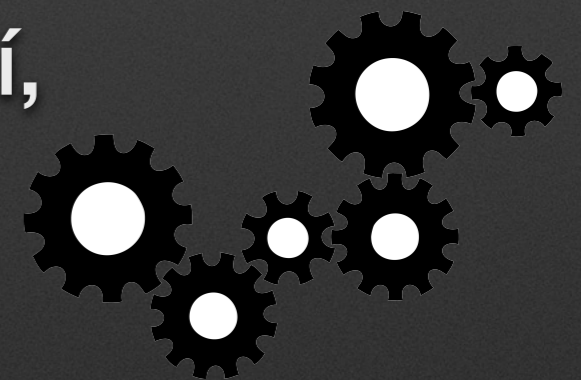
Servlet 3.0,
EJB 3.1 Lite

Java EE 7

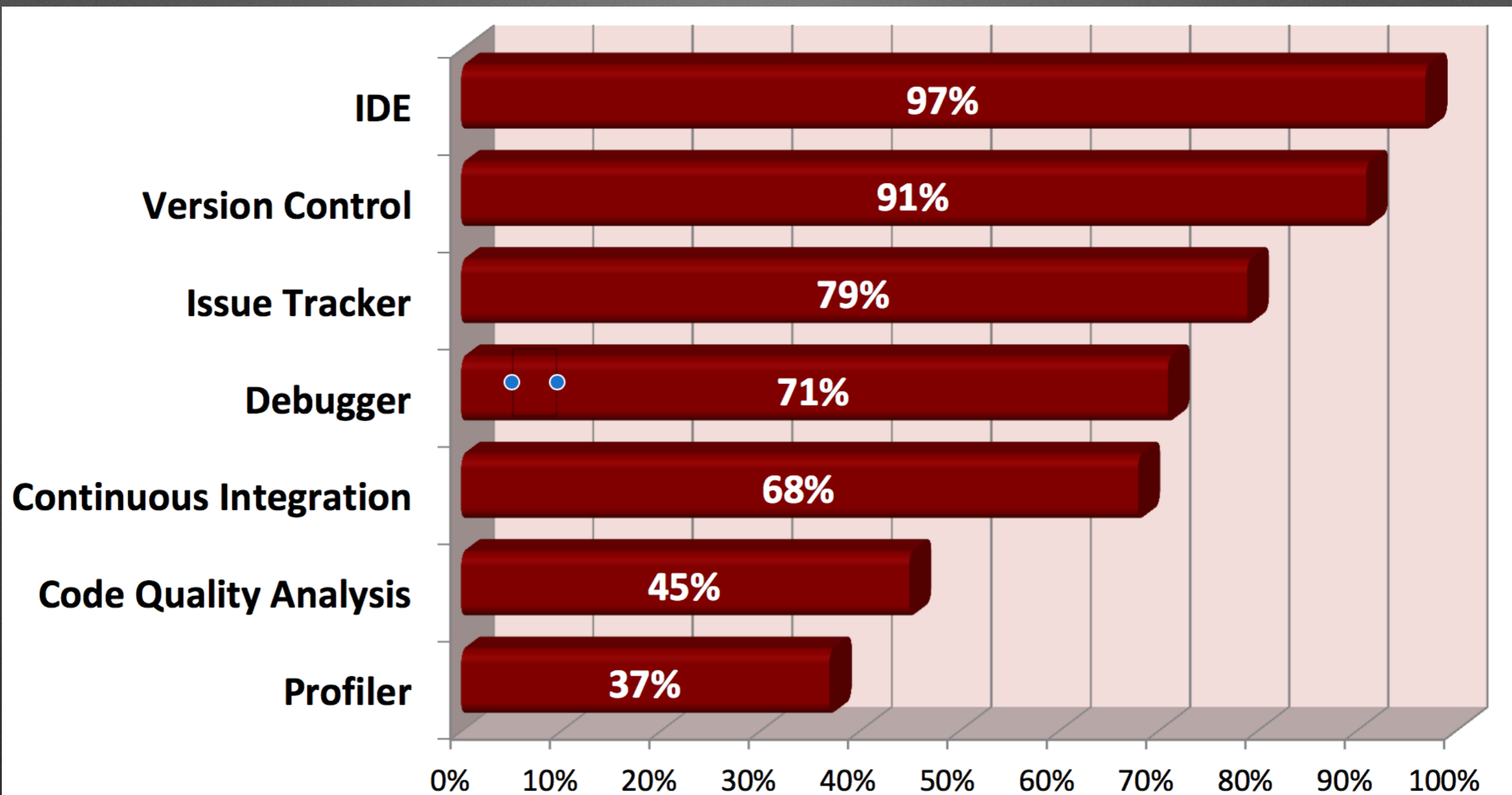
JMS 2,
Batch,
Concurrency,
JSON, TX
Interceptor,
WebSocket

Co možná znáte z Java EE 7

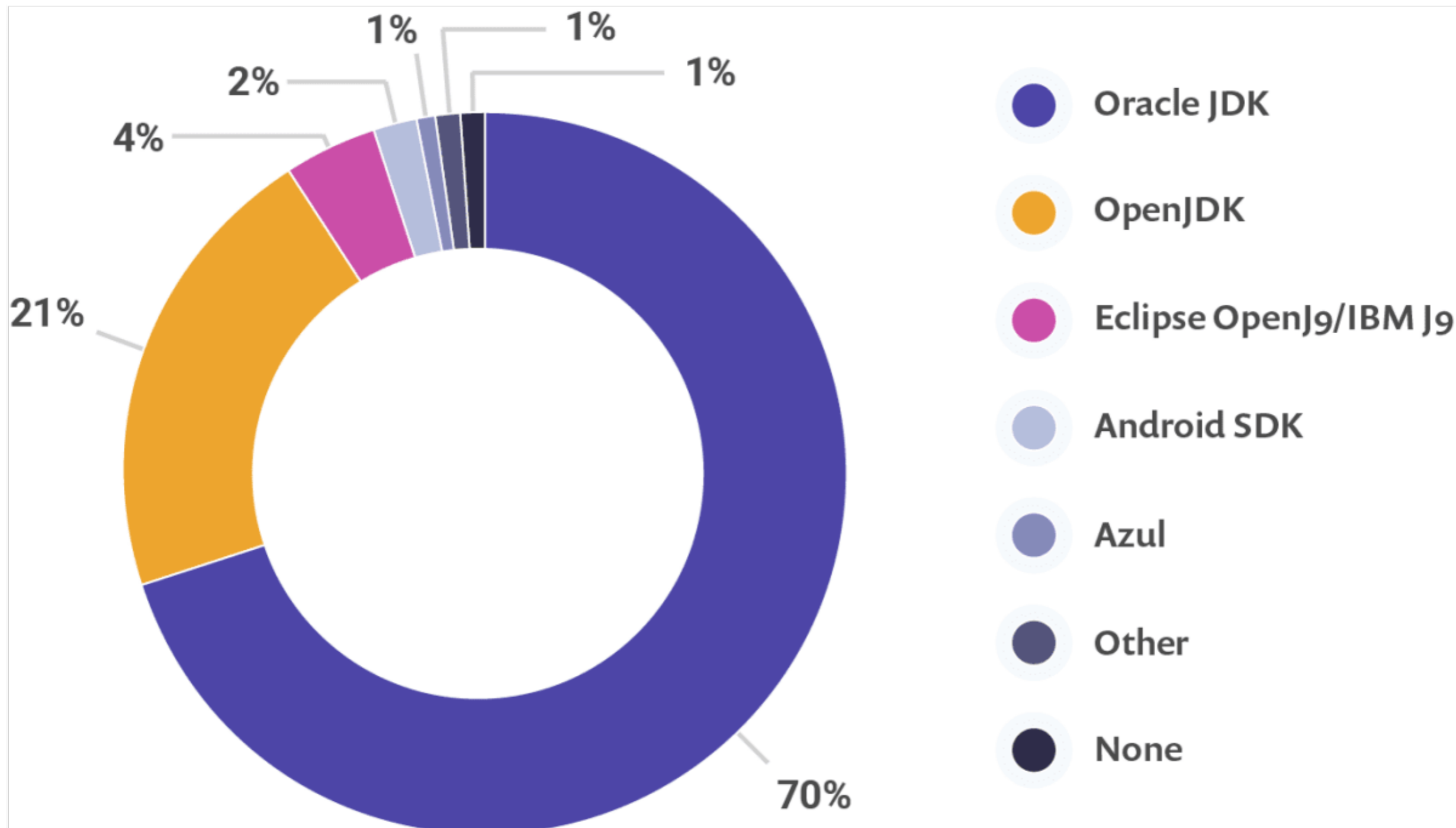
- Anotace v POJO
- Lepší podpora vícevláknových aplikací, asynchronní API (Servlet, EJB, JAX-RS)
- Příprava na HTML5 - JSON, WebSocket, JAX-RS (API pro REST)
- Java Message Service, dávkové zpracování, distribuované transakce



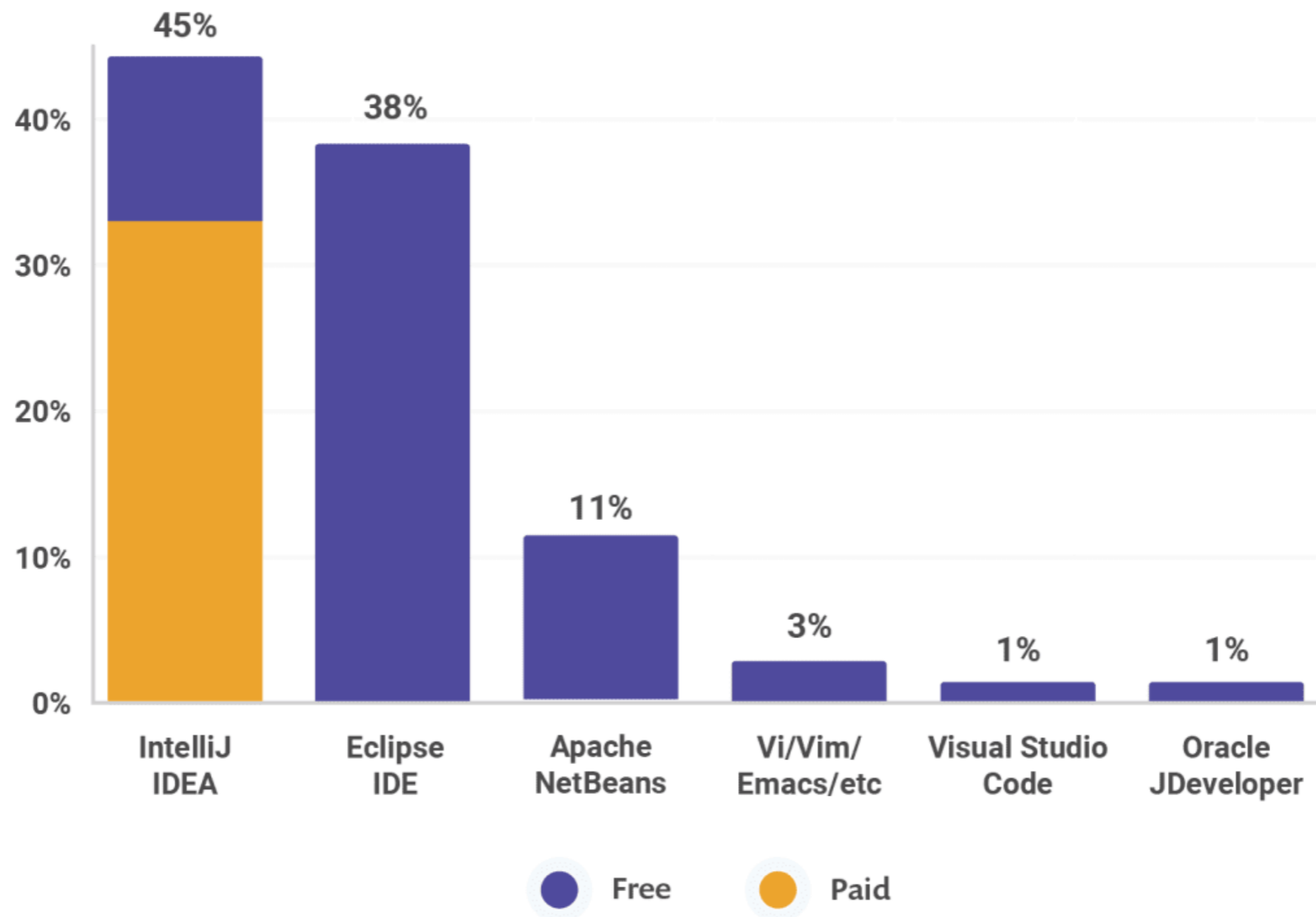
Co se běžně používá



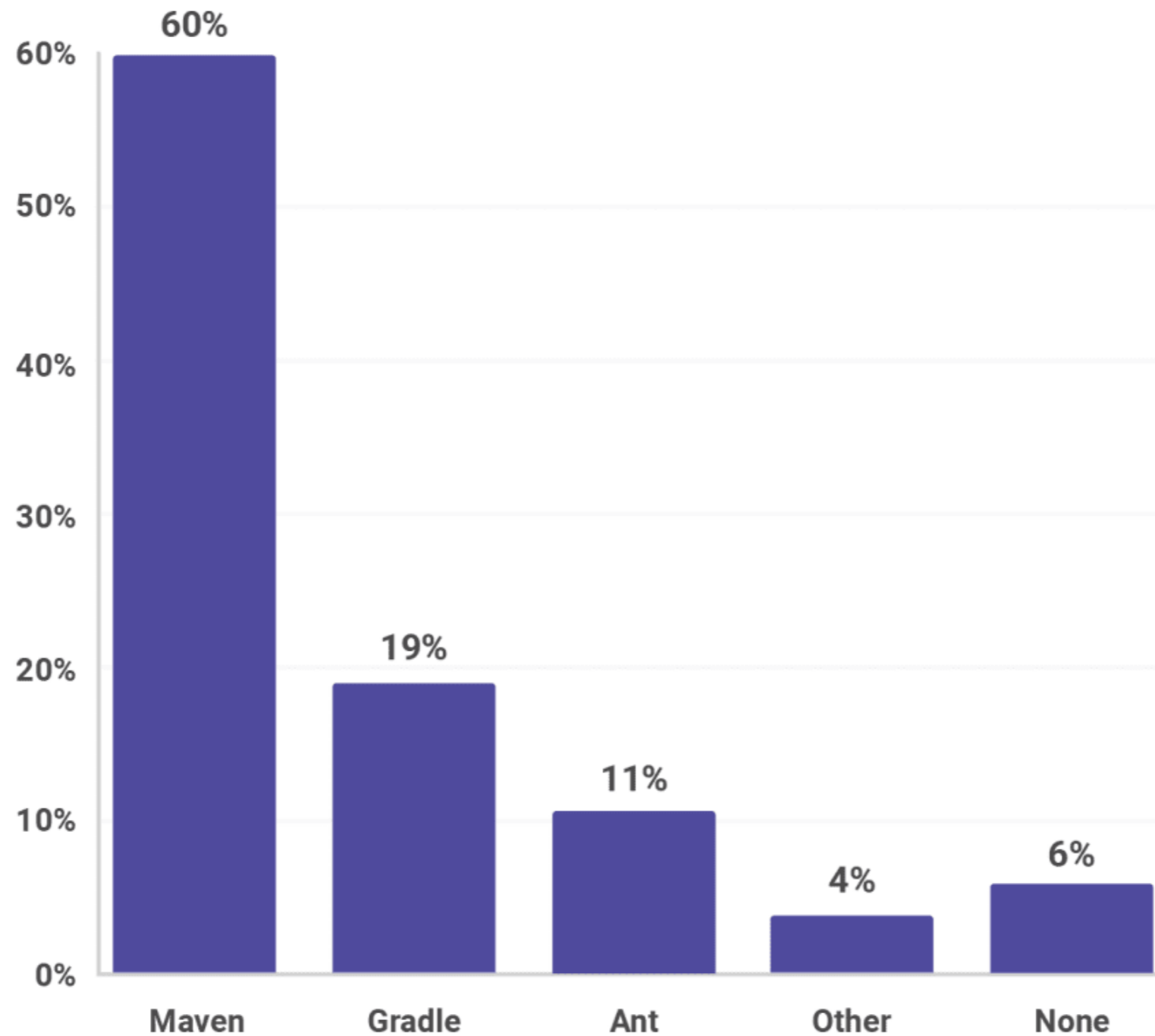
Jaké JVM použít?



Jaké IDE použít?



Jaký buildovací nástroj



Java 8



Innovation

- Lambda aka Closures
- Language Interop
- Nashorn



Core Libraries

- Parallel operations for core collections APIs
- Improvements in functionality
- Improved type inference



Security

- Limited doPrivilege
- NSA Suite B algorithm support
- SNI Server Side support
- DSA updated to FIPS186-3
- AEAD JSSE CipherSuites



Java for Everyone

- Profiles for constrained devices
- JSR 310-Date & Time APIs
- Non-Gregorian calendars
- Unicode 6.1
- ResourceBundle
- BCP47 locale matching
- Globalization & Accessibility



Client

- Deployment enhancements
- JavaFX 8
- Public UI Control API
- Java SE Embedded support
- Enhanced HTML5 support
- 3D shapes and attributes
- Printing



Tools

- Compiler control & logging
- JSR 308-Annotations on Java Type
- Native app bundling
- App Store Bundling tools



General Goodness

- JVM enhancements
- No PermGen limitations
- Performance improvements



Enterprise

- Mission Control
- Flight Recorder
- Usage Tracker
- Advanced Management Console
- MSI Enterprise JRE Installer

Java 8

- Lambda expressions,
- Method references,
- Functional interfaces,
- Stream API,
- Default methods,
- Base64 Encode Decode,
- Static methods in interface,
- Optional class
- Collectors class,
- ForEach() method,
- Parallel array sorting,
- Nashorn JavaScript Engine,
- Parallel Array Sorting,
- Type and Repating Annotations,
- IO Enhancements,
- Concurrency Enhancements,
- JDBC Enhancements etc.

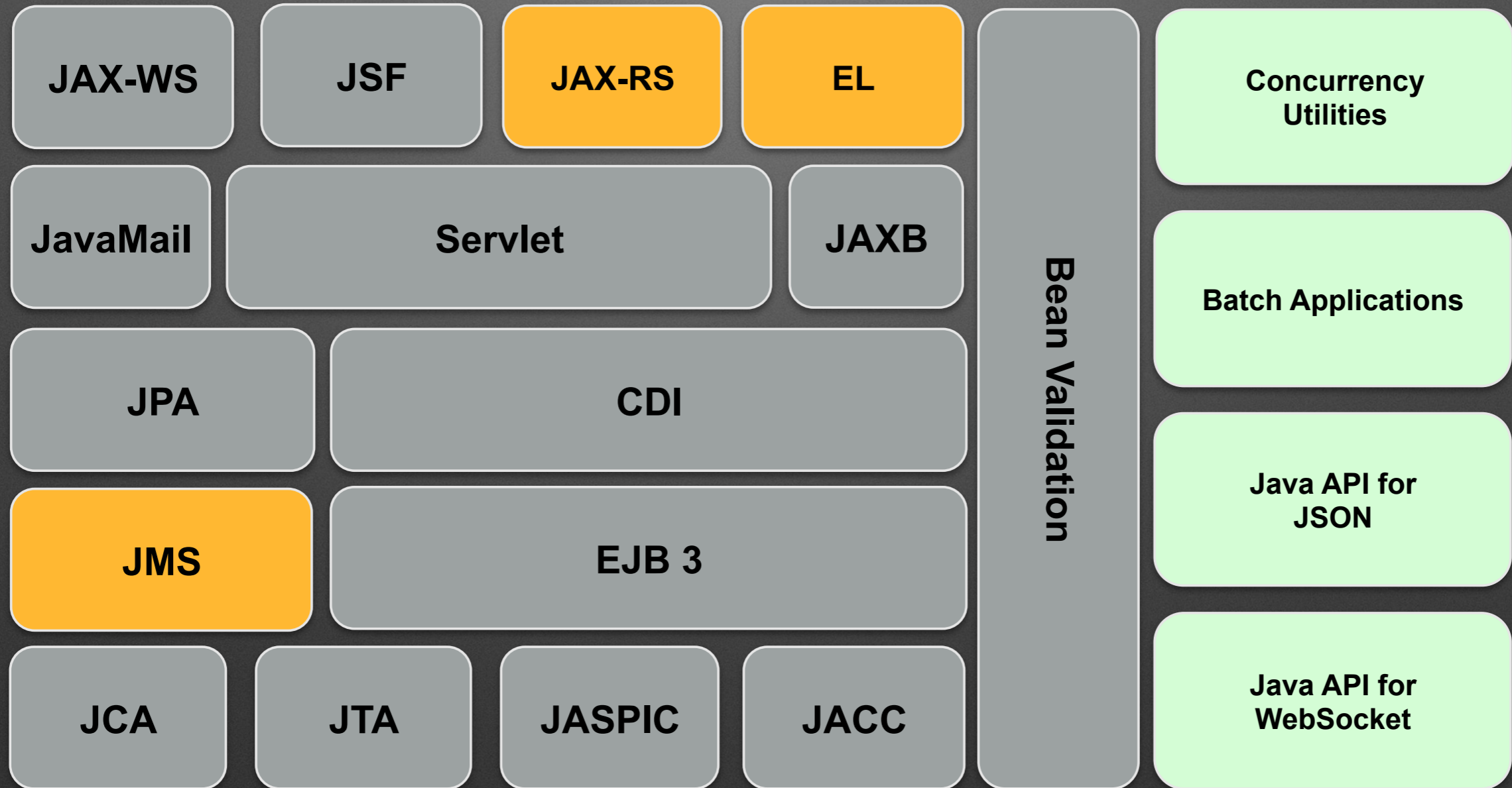
Základní idea

- Otevřené standardy
- Stabilní jádro nad živým ekosystémem
- Plně integrované běhové prostředí
- Dobře strukturované API
- Striktně prosazovány pravidla jazyka Java - silné statické typování, Objektově-orientovaný, zpětně kompatibilní

Co se Java snaží potlačit

- XML hell
- Složitá konfigurace
- Problémy se závislostmi (jar hell)
- Zbytečná funkcionality
- Složitý deploy
- Proprietární řešení

Jednotlivé části platformy Java EE



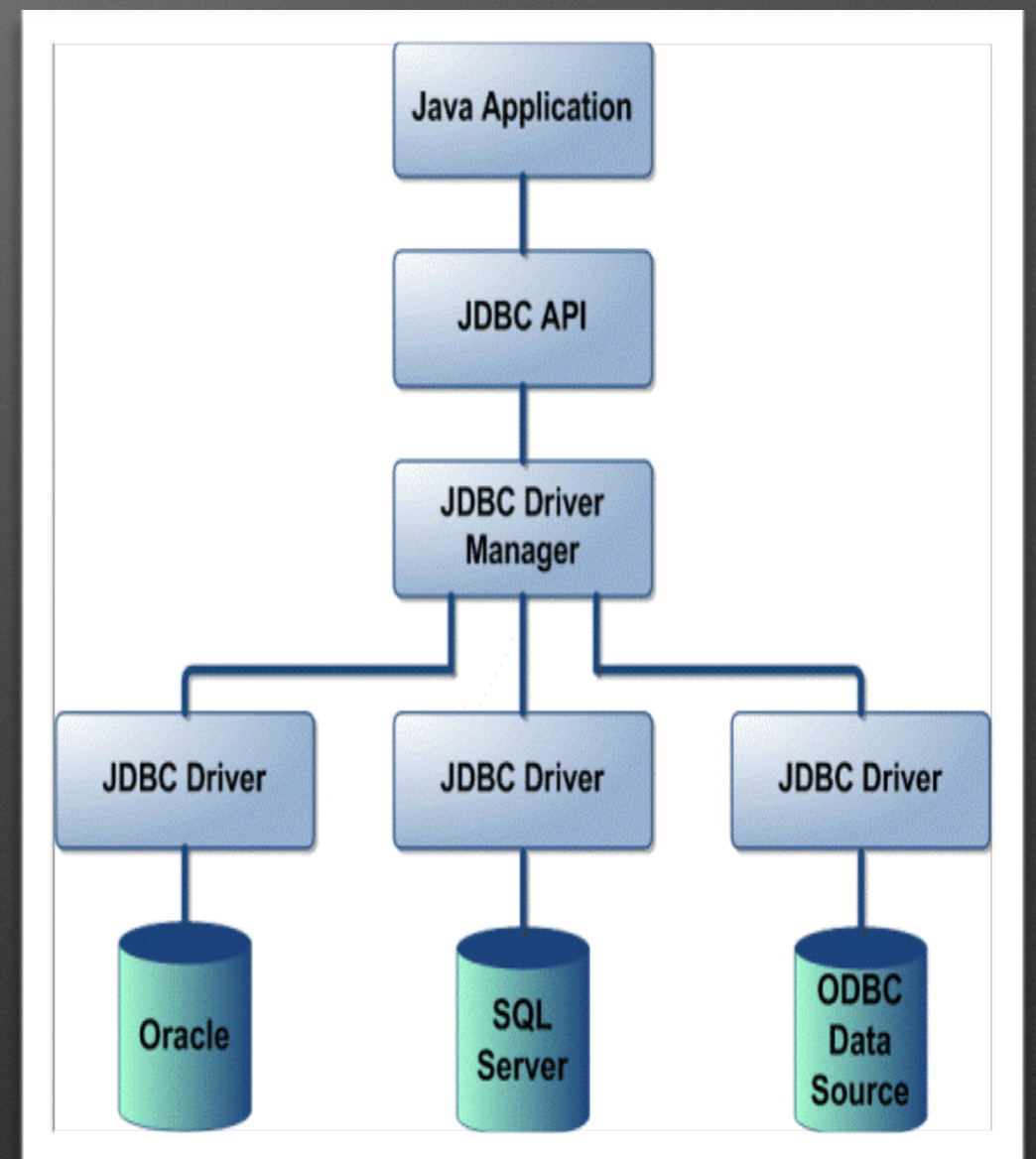
Nové

Major Release

Aktualizováno

Základní stavební kameny

- Java Database Connectivity
- Jednotné rozhraní k relačním databázím
- Pro využití je potřeba driver, který poskytuje tvůrce SŘBD
- Aplikace je nezávislá na databázovém stroji
- Využívá se u JPA



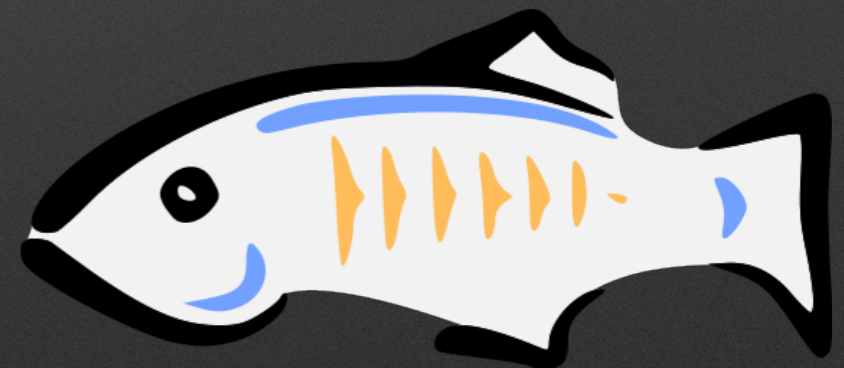
Základní stavební kameny

- Servlet
- Zachytává HTTP požadavek a nabízí ho vývojáři jako objekt
- Generuje výstup pro uživatele (zpravidla HTML)
- V současné době se používá hlavně u webových frameworků



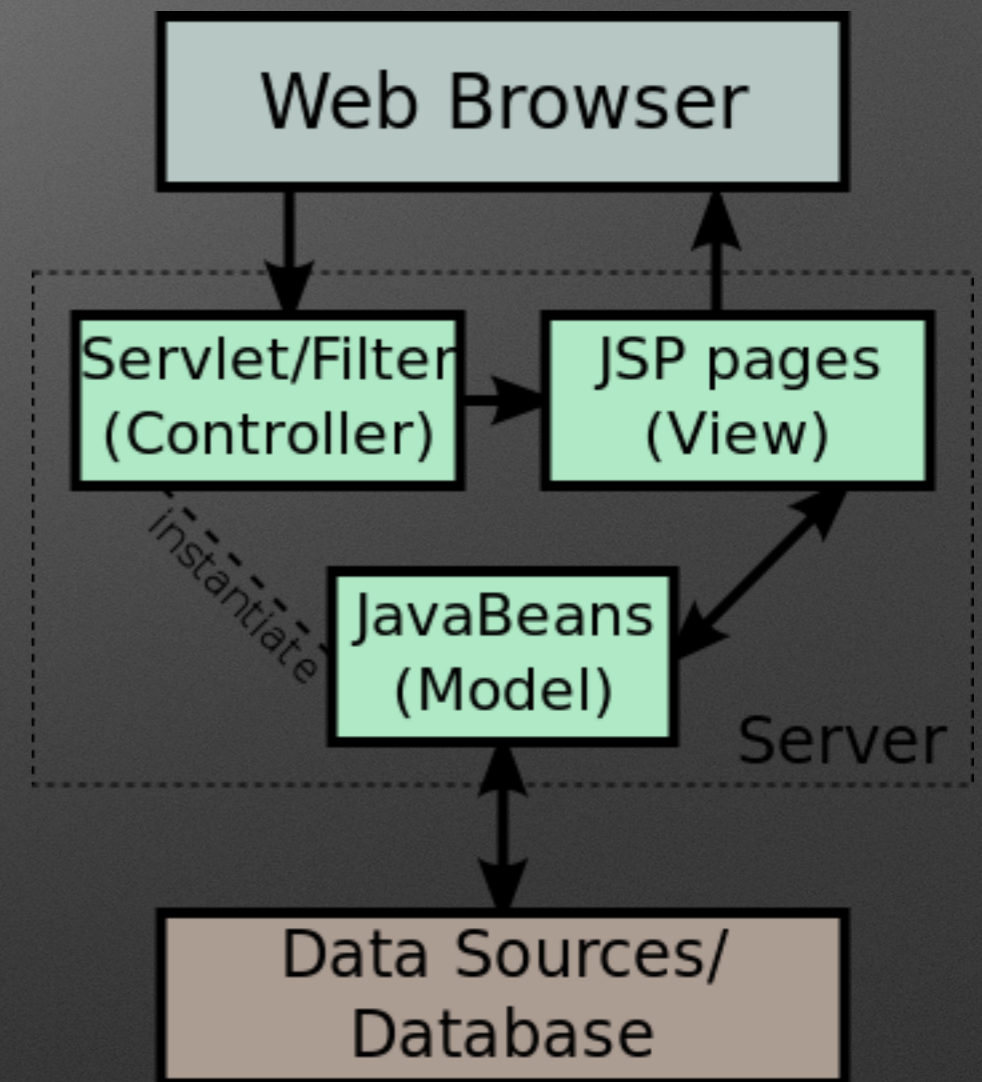
Běhové prostředí pro Servlet

- Servletový kontejner



Základní stavební kameny

- JavaServer Pages
- Na pozadí funguje Servlet
- Slouží pro psaní dynamických HTML stránek
- Lepší, než generovat výstup servletem
- Výstup generuje v HTML, nebo v XML
- Nutné minimum pro MVC

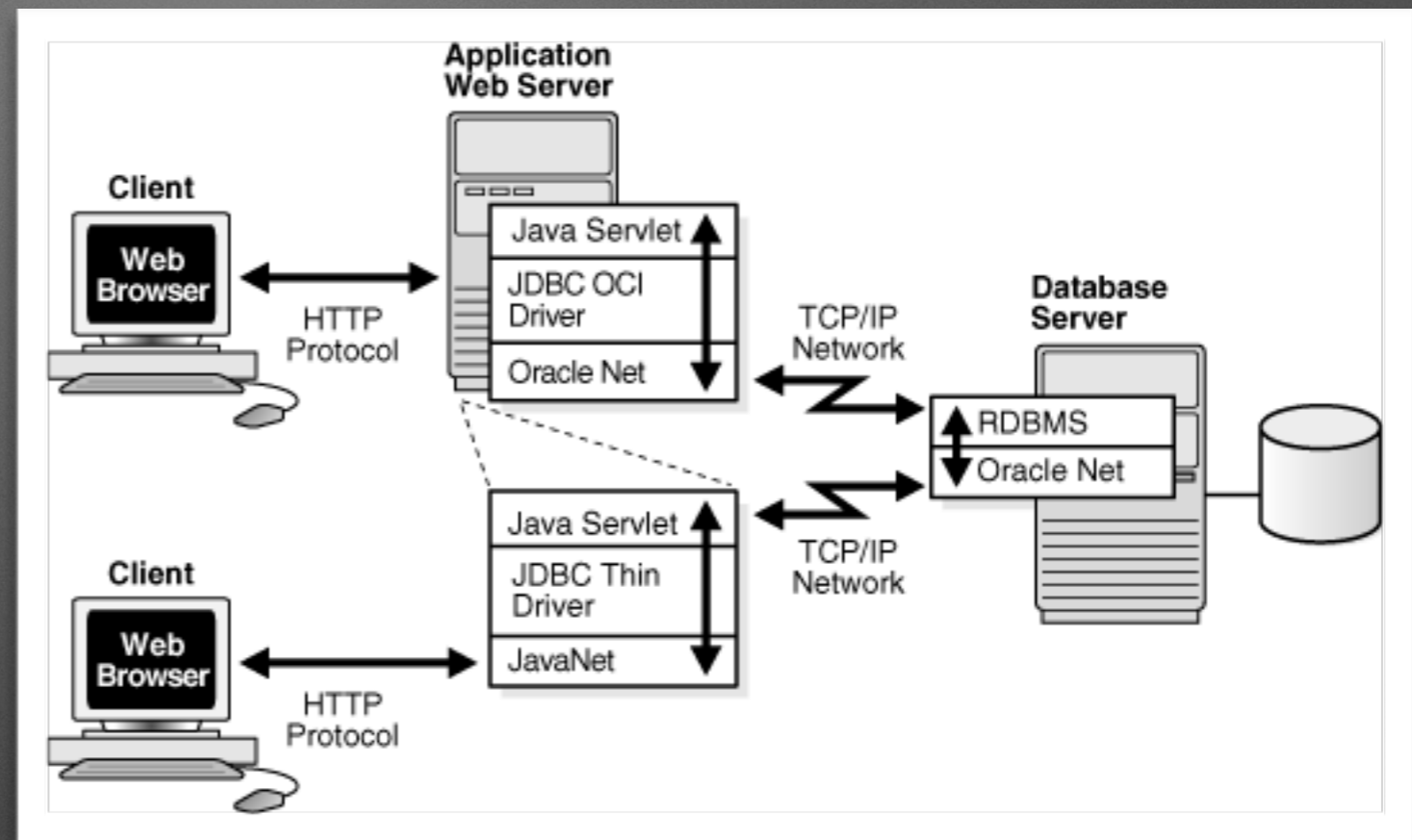


Základní stavební kameny

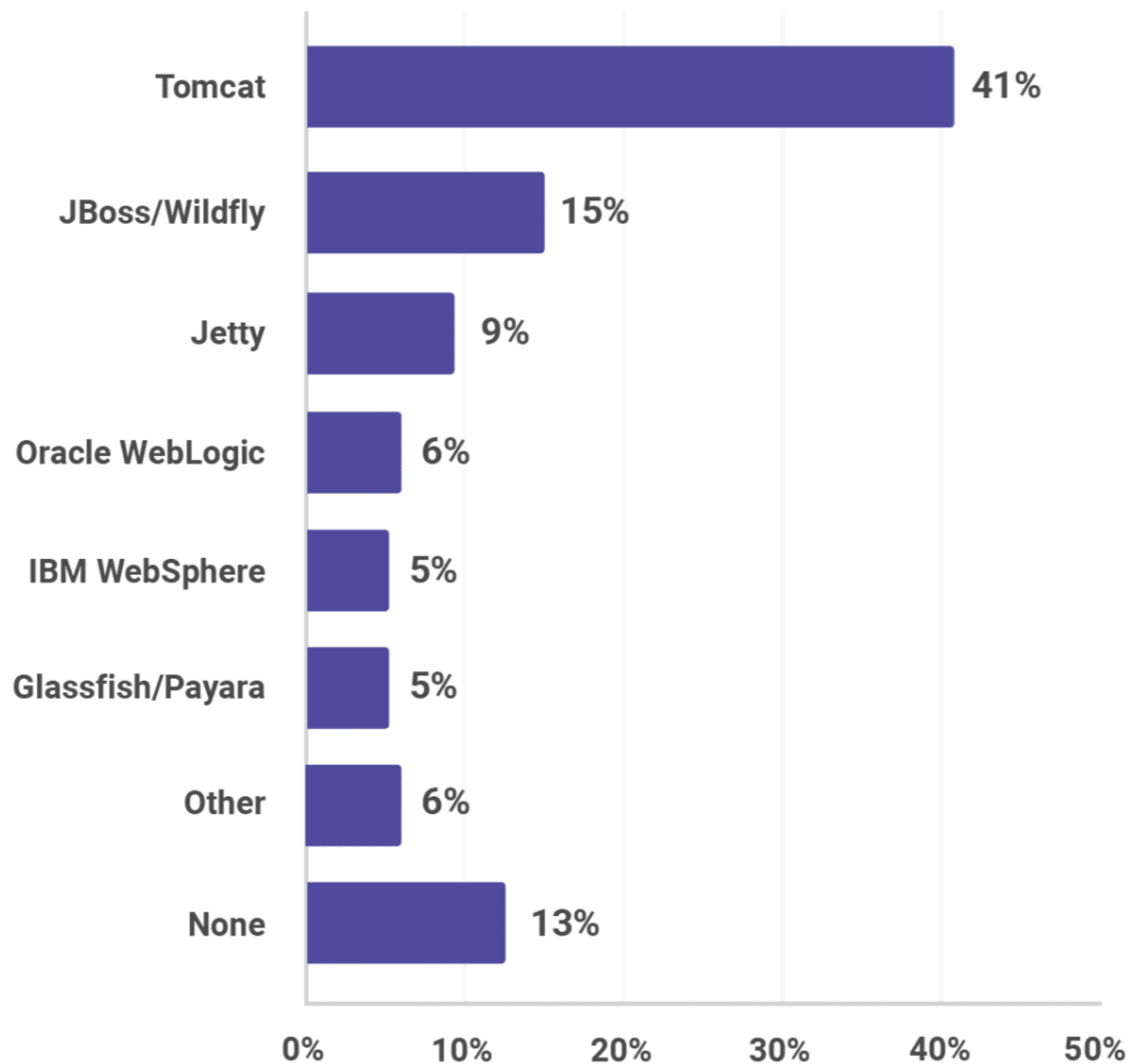
- Enterprise Java Beans (EJB)
- Aplikační logika
- Distribuované aplikace (RPC)
- Objektově-relační mapování
- Existuje více typů
 - Entity
 - Session
 - Message-driven

Běhové prostředí pro EJB

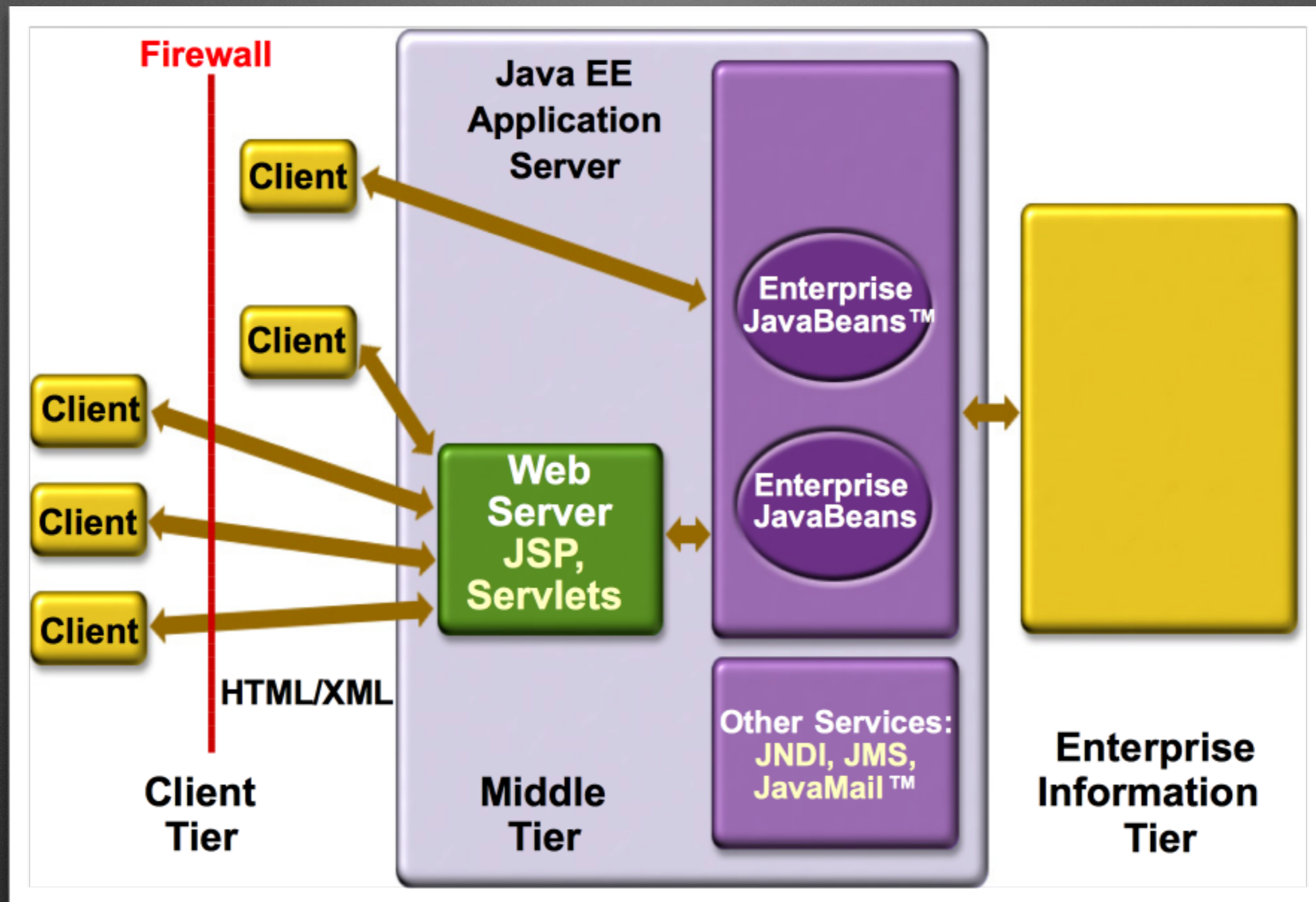
- JBoss AS
- GlassFish
- WebSphere
- WebLogic
- TomEE+ (OpenEJB)
- Spring Boot



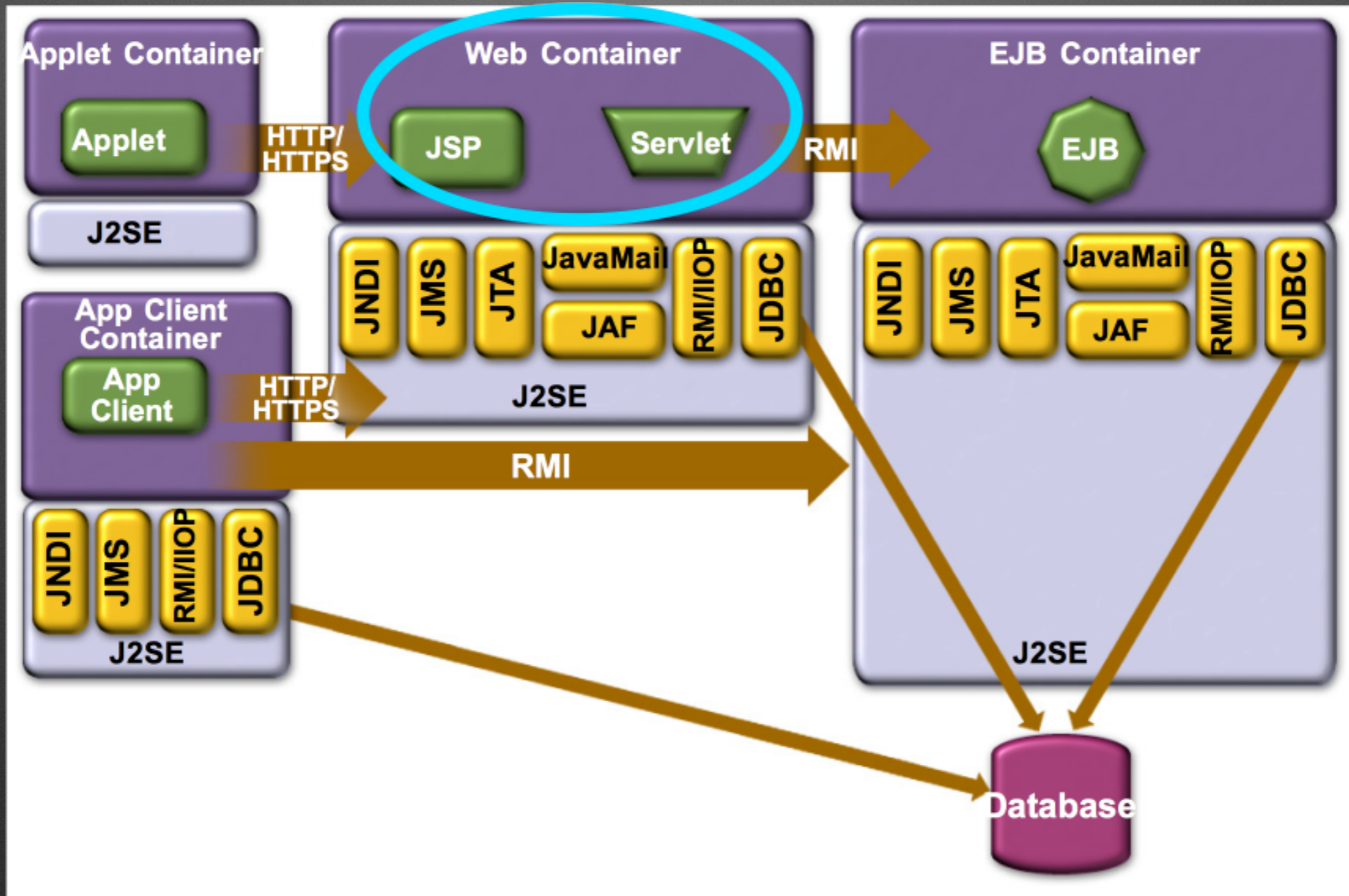
Oblíbené aplikační servery



Webová aplikace

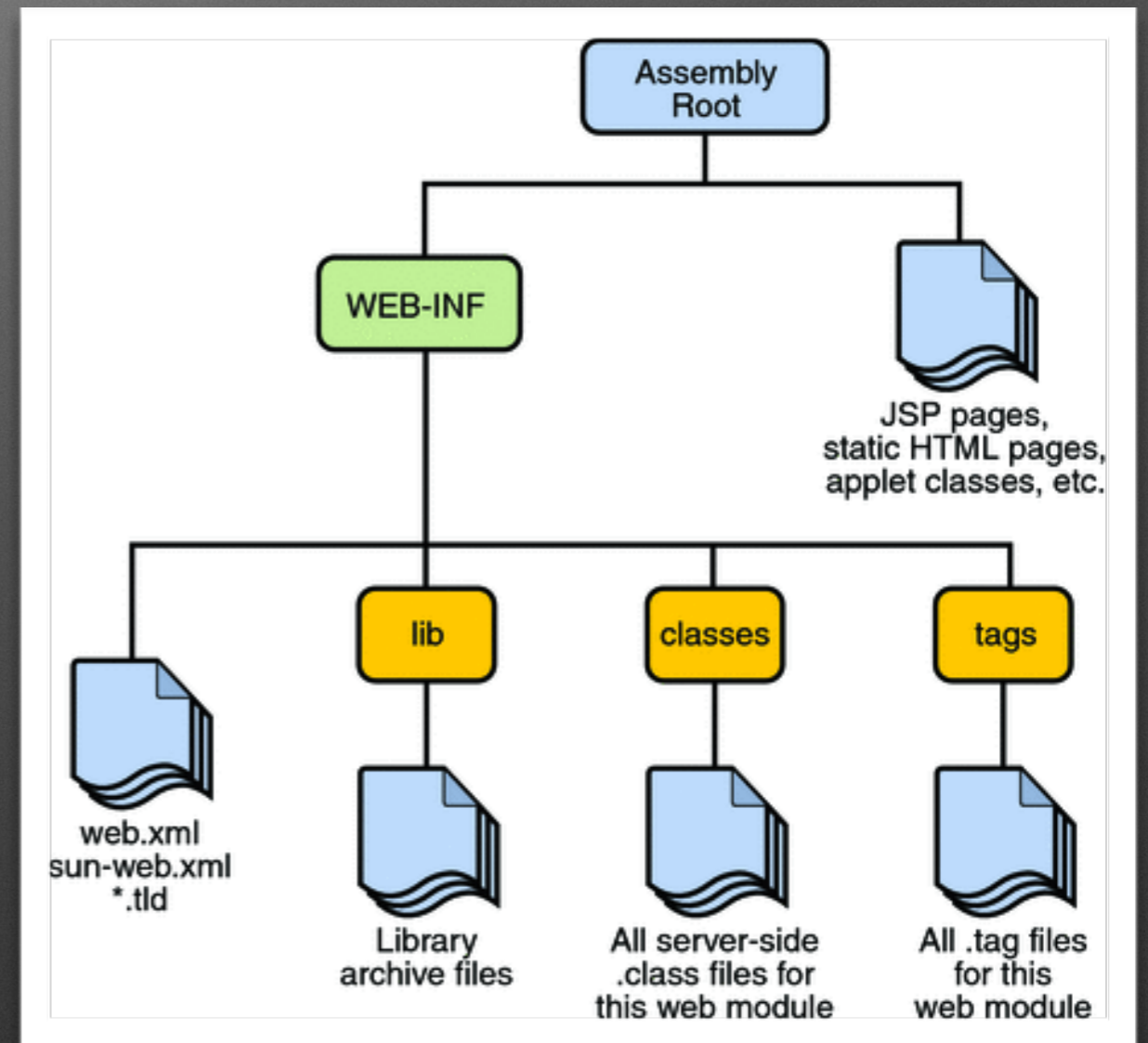


Webová aplikace



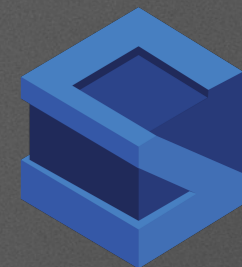
Webová aplikace

- Má přesně definovanou strukturu
- Na server se umísťuje (deploy) v souboru WAR (Web ARchiv), případně v EAR (Enterprise ARchiv)
- Základní parametry aplikace ve web.xml





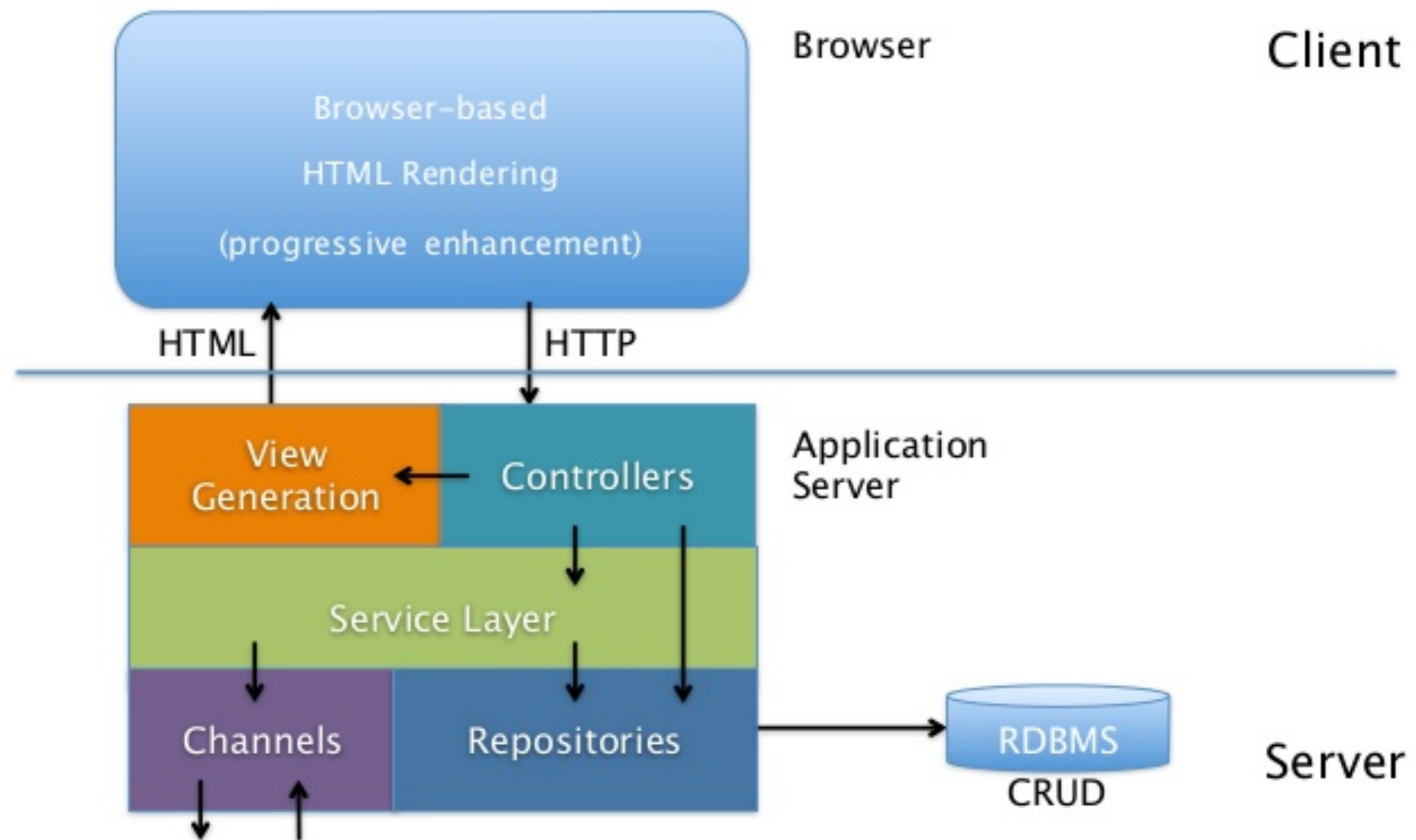
A co frameworky?



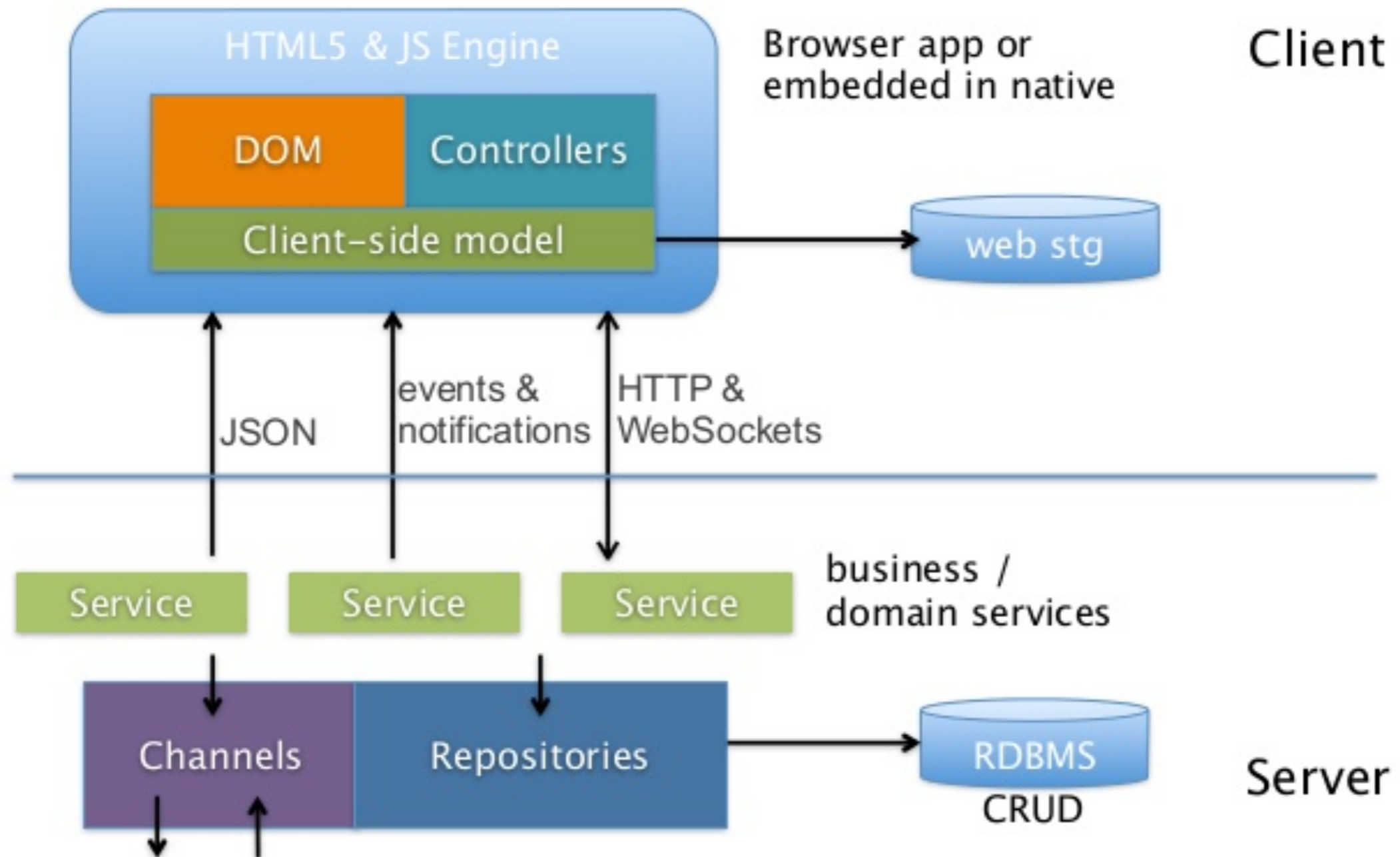
- Web-like
 - Spring
 - Grails
 - Struts
 - Play
 - Vert.x - reaktivní aplikace (asynchronní)
 - Hibernate
 - Frontend
 - AngularJS/ Angular 2+
 - ReactJS
 - Vue.js
- Desktop-like
 - Wicket
 - Vaadin
 - GWT



From server-side app to smart clients and services

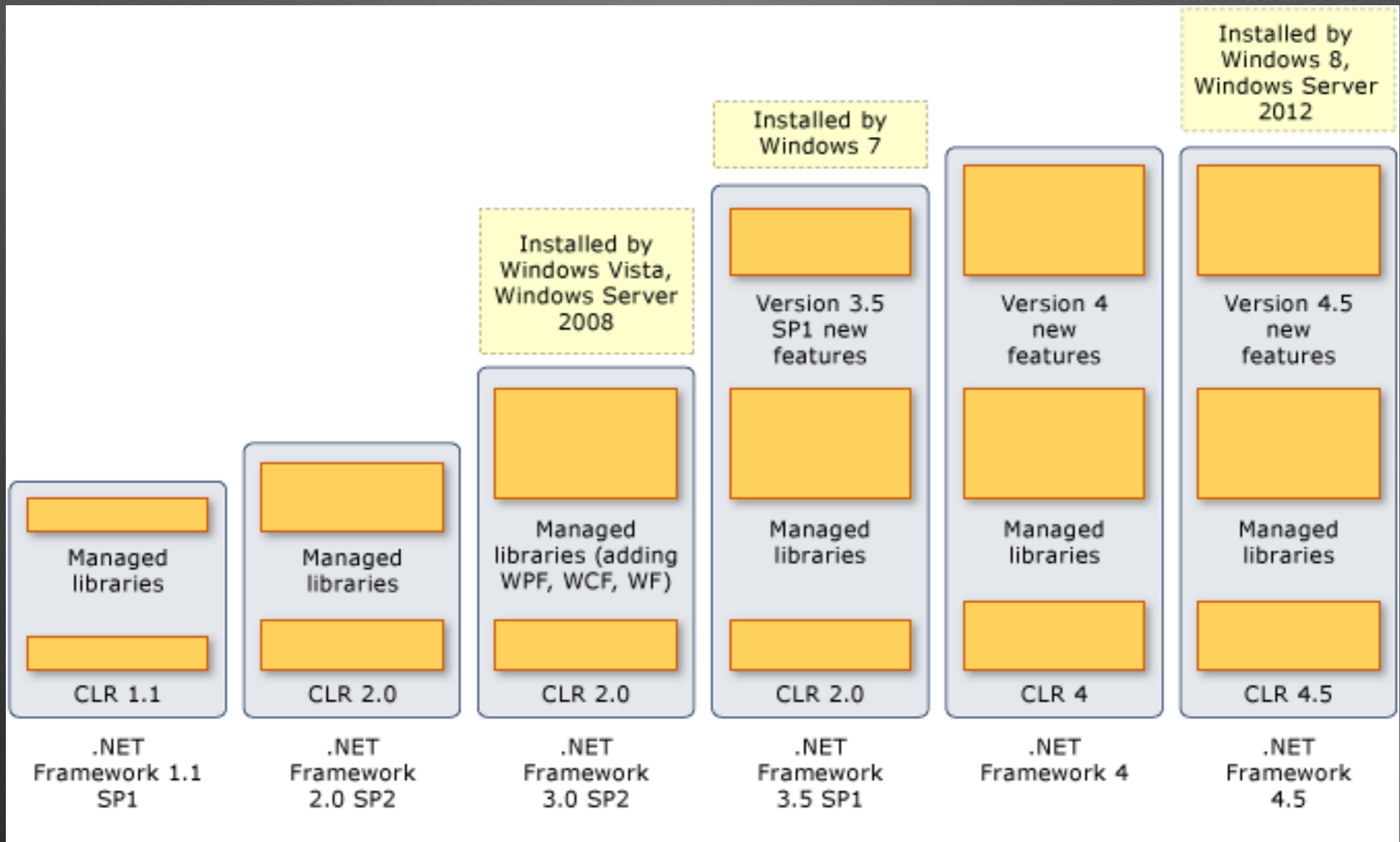


From server-side app to smart clients and services



.NET

.NET



What's new in .NET Framework 4.5?

Windows Presentation Foundation

- Built-in Ribbon controls ★
- Databinding improvements
- Ability to add breakpoints to databindings
- Data source change aware views (Live Shaping) ★
- Validation improvements A
- Improved legacy UI integration
- Dispatcher improvements A
- Speed-up of large data sets P

Windows 8 support ★

Support for Windows Runtime (WinRT)

.NET Profile for Metro-style apps

Improved support for sharing DLLs between .NET profiles

ASP.NET

ASP.NET Web API - a new framework for REST endpoints ★

Support for implementing WebSocket receivers ★

Built-in JavaScript + CSS combining and minification ★

ASP.NET MVC 4

- Async controllers A
- Built-in mobile templates + jQuery.Mobile support
- Alternate views (e.g. print version, mobile site)
- Support for Recipes: intelligent codegen ★

ASP.NET Web Pages 2

- New site templates
- Versatile validation support
- Support for OAuth and OpenID ★
- Built-in map embedding tools; supports Google, Bing and others
- Did you know? ASP.NET Web Pages is yet another way to work the web besides Web Forms and MVC. WP sites use Razor and are typically developed with WebMatrix.

Web Forms

- Strongly typed data binding
- MVC-like support for Models ★
- HTML encoded binding expressions
- HTML5 support ★**
- Control support for new semantic elements
- Validator and UpdatePanel now support new HTML5 elements
- Multifile support for FileUpload control

Tooling

- Markup editors improved (a lot)
- IIS Express used by default
- Page Inspector ★
- New templates and snippets

Asynchronous pipeline support A (Response, Request, HttpHandlers)

Performance improvements: Multicore JIT, 35 % faster startup, memory optimizations, assembly sharing between sites, pre-fetch support P

Request validation improvements: AntiXSS built-in, validation usable per field

Windows Communication Foundation

- New channels (UDP multicast, WebSockets, ...) ★
- Simplified configuration, VS config validation
- Support for contract-first development ★
- Multiple auth modes for HTTP endpoints
- Asynchronous operations A
- New, simple HttpClient class
- Streaming improvements

Windows Workflow Foundation

- C# Expressions
- Code-first activity design
- State machine workflows are back! ★
- Faster execution P
- Workflow versioning ★
- Designer usability improvements

Managed Extensibility Framework 2.0

- Support for generic parts ★
- Debugging improvements
- Support for explicit and convention-based bindings between objects ★
- Support for binding POCOs: no more attribute requirements

ADO.NET

- Sparse columns support improved (SQL Server)
- Passwords are now stored encrypted
- Asynchronous operations A

SQL Express LocalDB

New light version of SQL Express for developer use. Supported in .NET 4.5, separate patch for 4.0 is coming.

SQL Server 2012 ("Denali") Support

- High Availability support on connection string level
- Fast failover across multiple subnets
- Support for new spatial data types (polygons, arcs etc.) ★

Entity Framework 4.5

- Enumeration support
- Migrations for schema changes ★
- Designer improvements

- Spatial data type support ★
- Table-valued function support ★
- Multi-result spoc support

- Multiple diagrams per model
- Code-first support ★
- Auto-compiled LINQ queries P

Base Class Library

- Networking improvements (IPv6 enhanced, IDN, EAI etc.)
- Key interfaces (e.g. file IO) now support async A
- New ArraySegment and ReadOnlyDictionary classes
- Support for CLR objects over 2 GB in size
- Resource file management performance improved P
- Unicode improvements (v6, console support)
- Background JIT on multicore platforms P

Task Parallel Library A

Task thread controls improved: Task.WaitAll/.WaitAny, various timeout primitives available

TPL Dataflow: Tools for parallel data flow processing ★

C# 5.0

- Support for async programming: async and await keywords A
- Methods can access call site info as parameters (CallerInfo)

Visual Basic 11

- Iterator implementations (Yield)
- Async and Await equal to C# A
- "Global" keyword for namespace referencing
- Call Hierarchy view available
- CallerInfo attributes (as in C#)

F# 3.0

- Type providers ★
- Query expressions (LINQ) ★
- Auto-implemented properties

Visual C++ 11

- C++11 standard support improved
- Auto-vectorization and parallelization of loops A P
- GPU-driven processing (C++ AMP)
- Intellisense for C++/CLI

Legend:

- A = Asynchrony support
- P = Performance improvement
- ★ = Significant new feature

Microsoft
tech·days
Helsinki 2012

SANKO

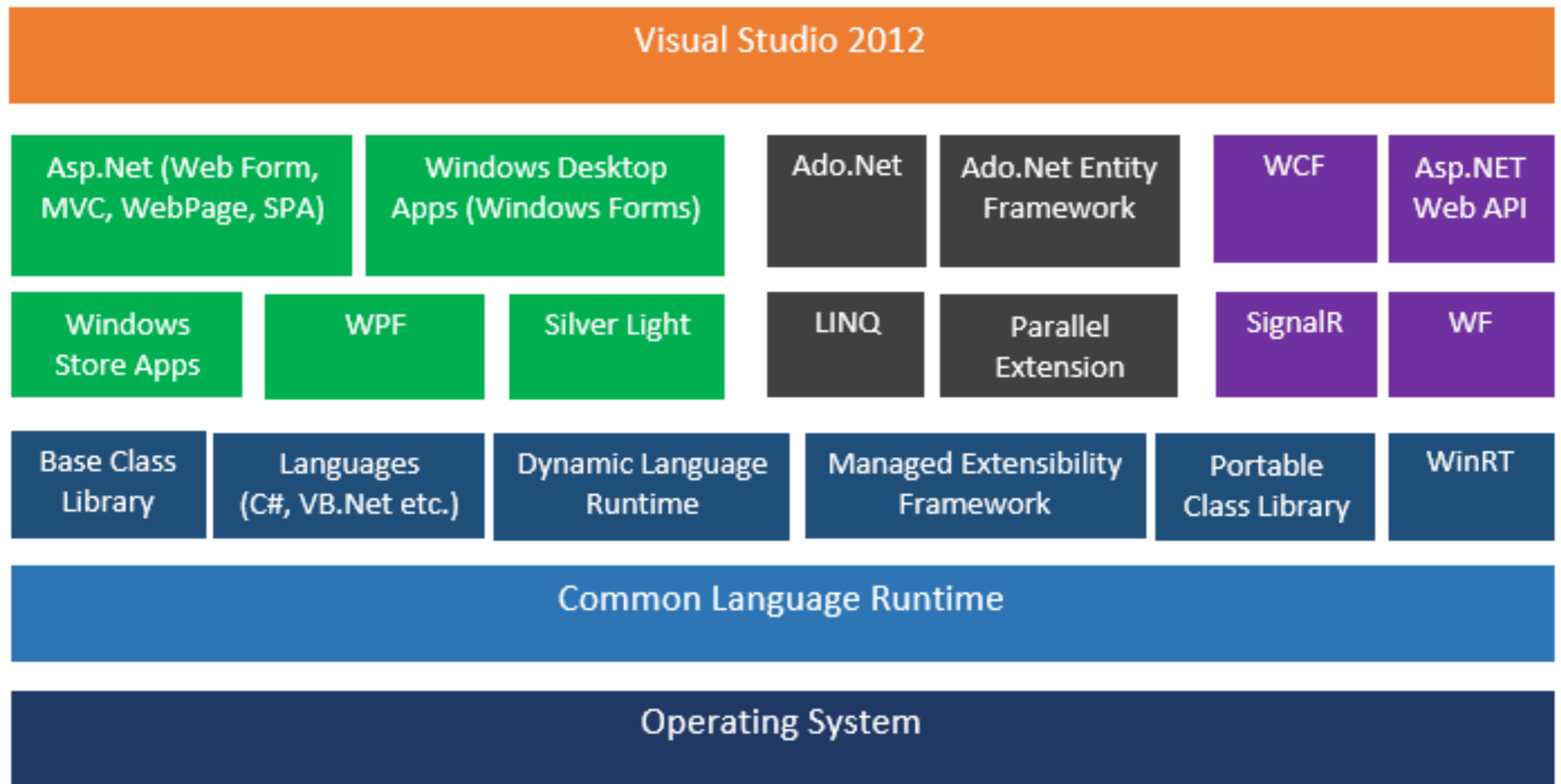
Suomen Aktiivisten .NET-kehittäjien Kerho
www.facebook.com/sanko.net

offbeat
solutions
www.offbeat.fi

Information based on public sources available updated on 1st March 2012 (.NET 4.5 beta).

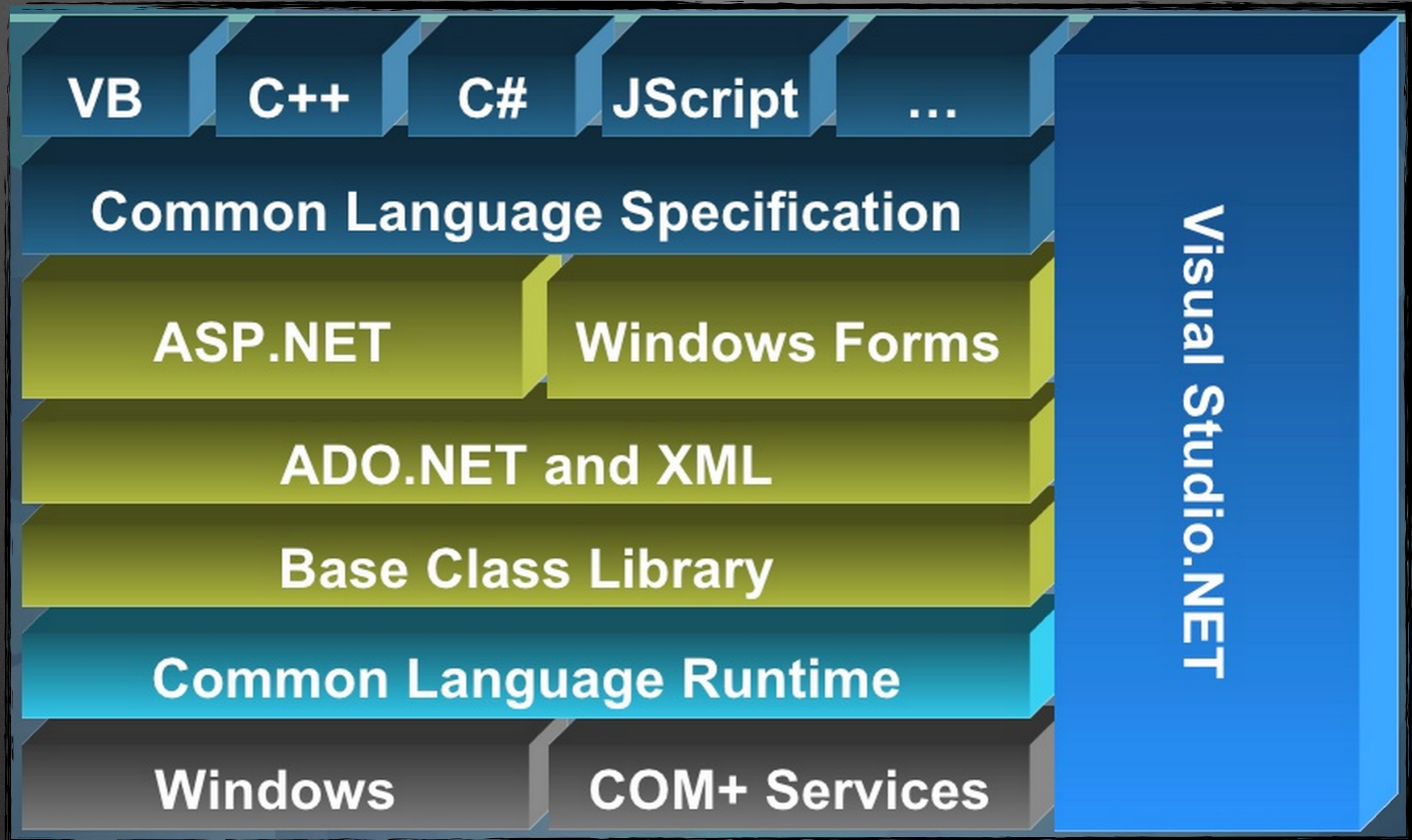
Composed by Jouni Heikniemi.
Original with updates available @
www.heikniemi.net/hardcoded

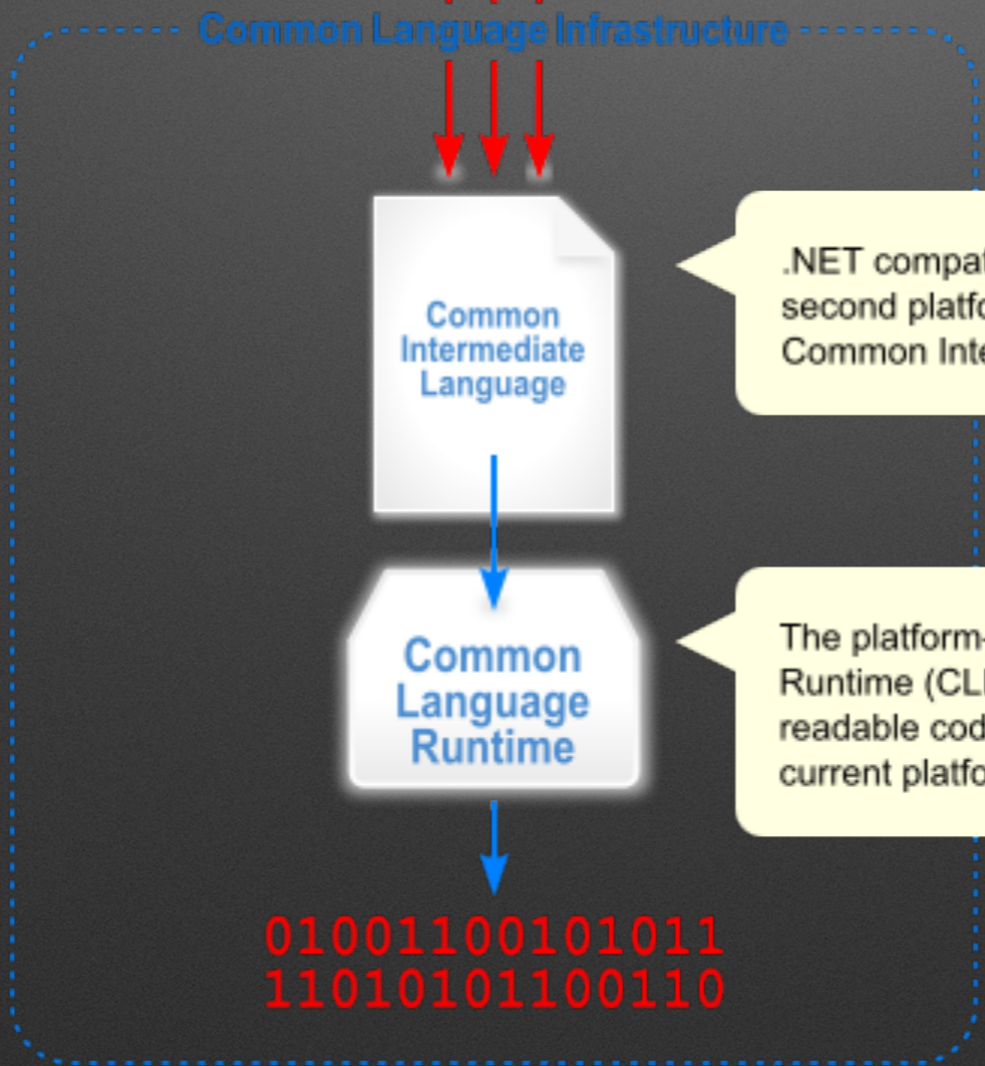
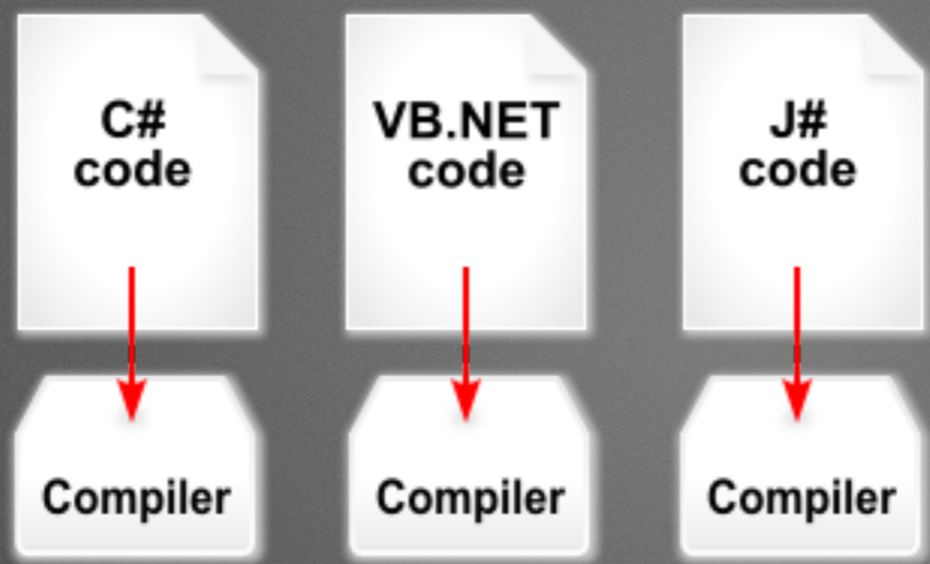
Jednotlivé části platformy .NET



.NET Framework 4.5 Architecture

Architektura





.NET compatible languages compile to a second platform-neutral language called Common Intermediate Language (CIL).

The platform-specific Common Language Runtime (CLR) compiles CIL to machine-readable code that can be executed on the current platform.

Základní idea

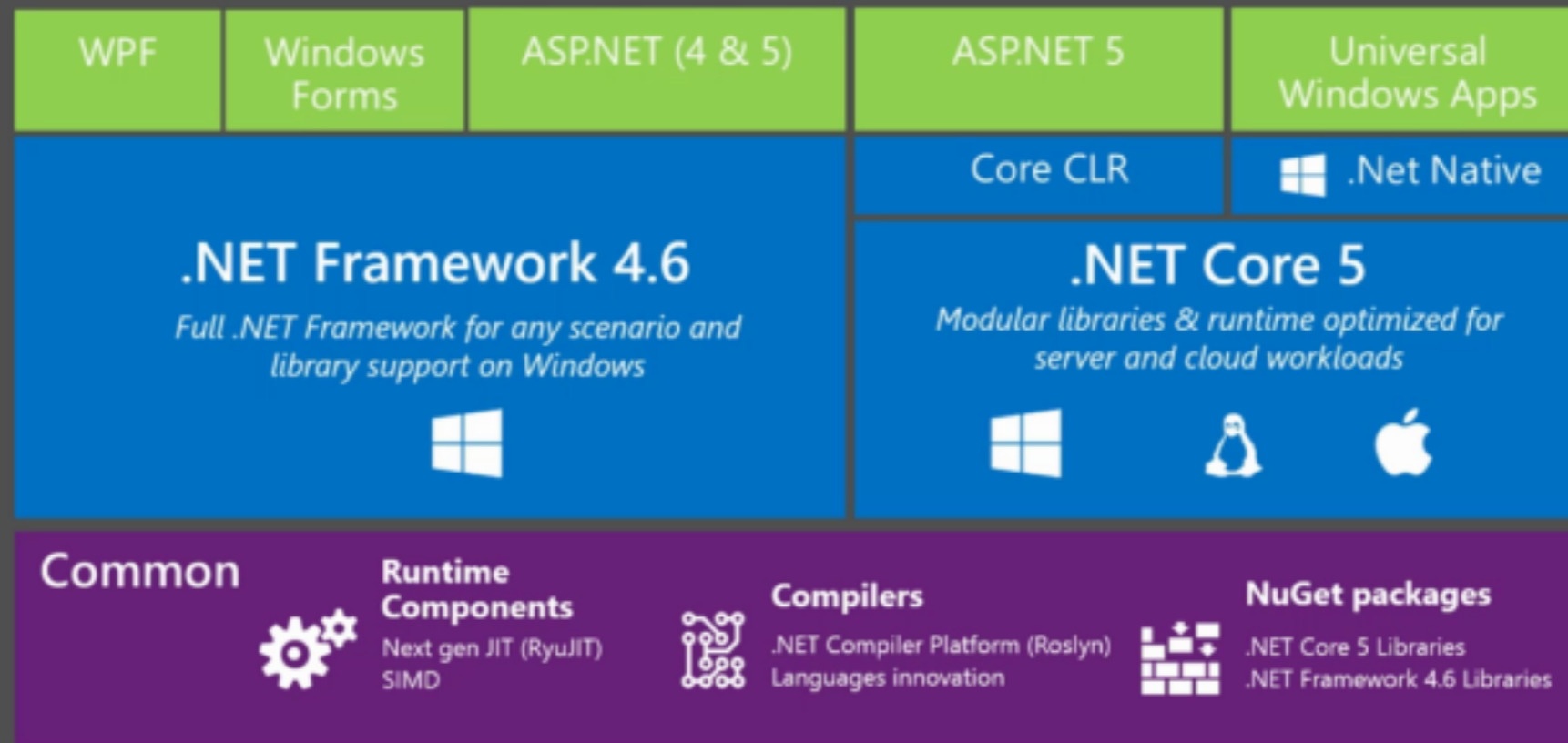
- Common Language Specification (CLS)
 - podporováno více programovacích jazyků, které jsou ovšem mezi sebou kompatibilní (rozhraní MSIL)
- Velmi dobře integrovatelný pro OS Windows
- Výborná podpora Office aplikací
- Databáze MSSQL
- Velmi dobré možnosti ladění aplikace (debug)
- Všechny frameworky od jedné společnosti -> nemusím je jako programátor integrovat (až na NuGet)

.Net Framework Version Roadmap



| | | | | | |
|---------------|-----------|-----------------------|-----------------------|------------------------|-------------|
| Winforms | WPF | LINQ | Parallel LINQ | Morden UI Runtime | ASP.net 5 |
| ASP.net | WCF | Entity Frame work | Task Parallel Library | Task based Async Model | 64 Bit JIT |
| ADO.net | WF | Extendibility | | | Open Source |
| CLR | CardSpace | NET Compact Framework | | | .Net Native |
| Class Library | | | | | |

.NET 2015 – 10K foot view



How .NET platforms proliferate

SITUATION:

There are
14 competing
stacks.

14? Ridiculous!
We need to develop
one universal stack
that covers everyone's
use cases.

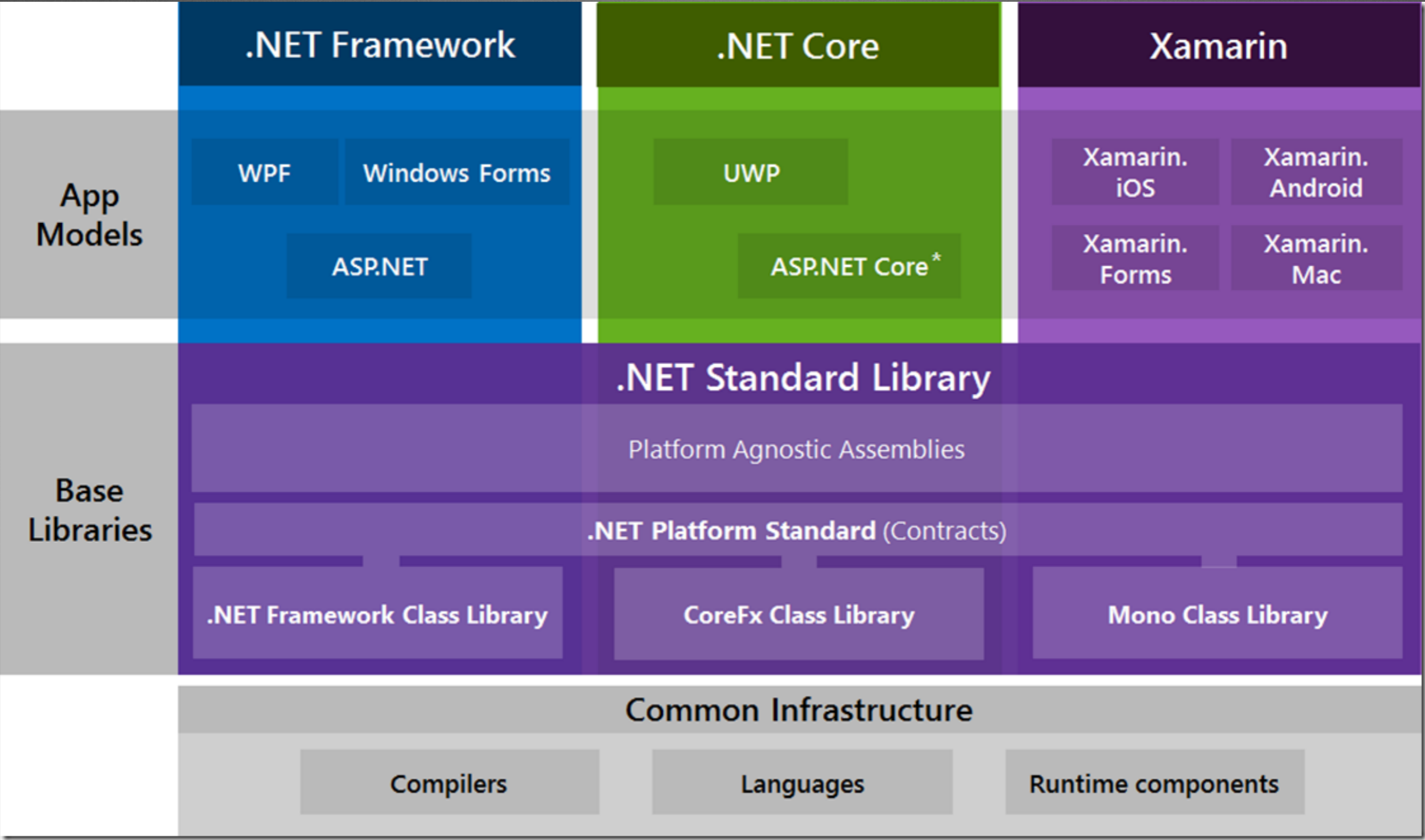


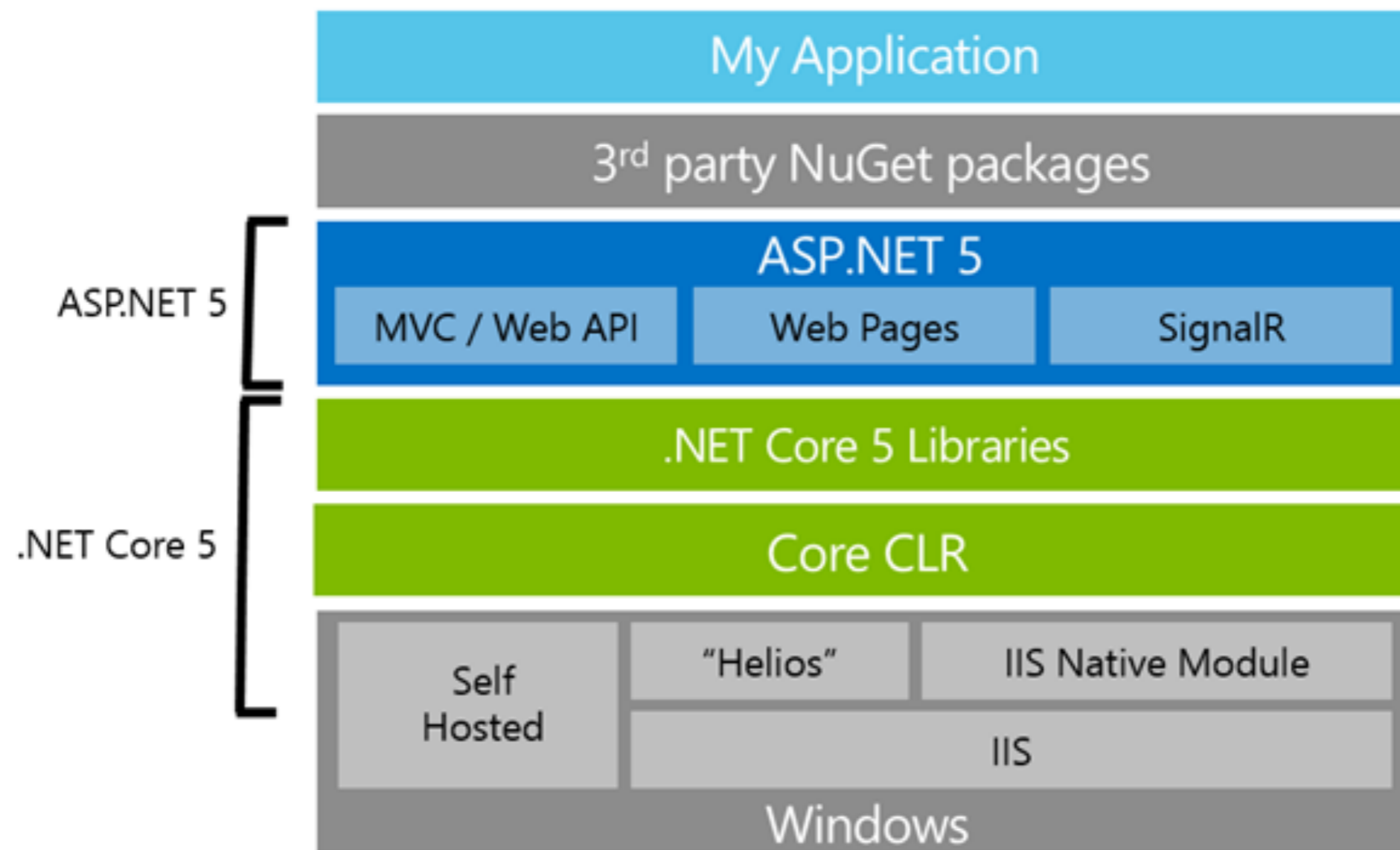
Yeah!

SOON:

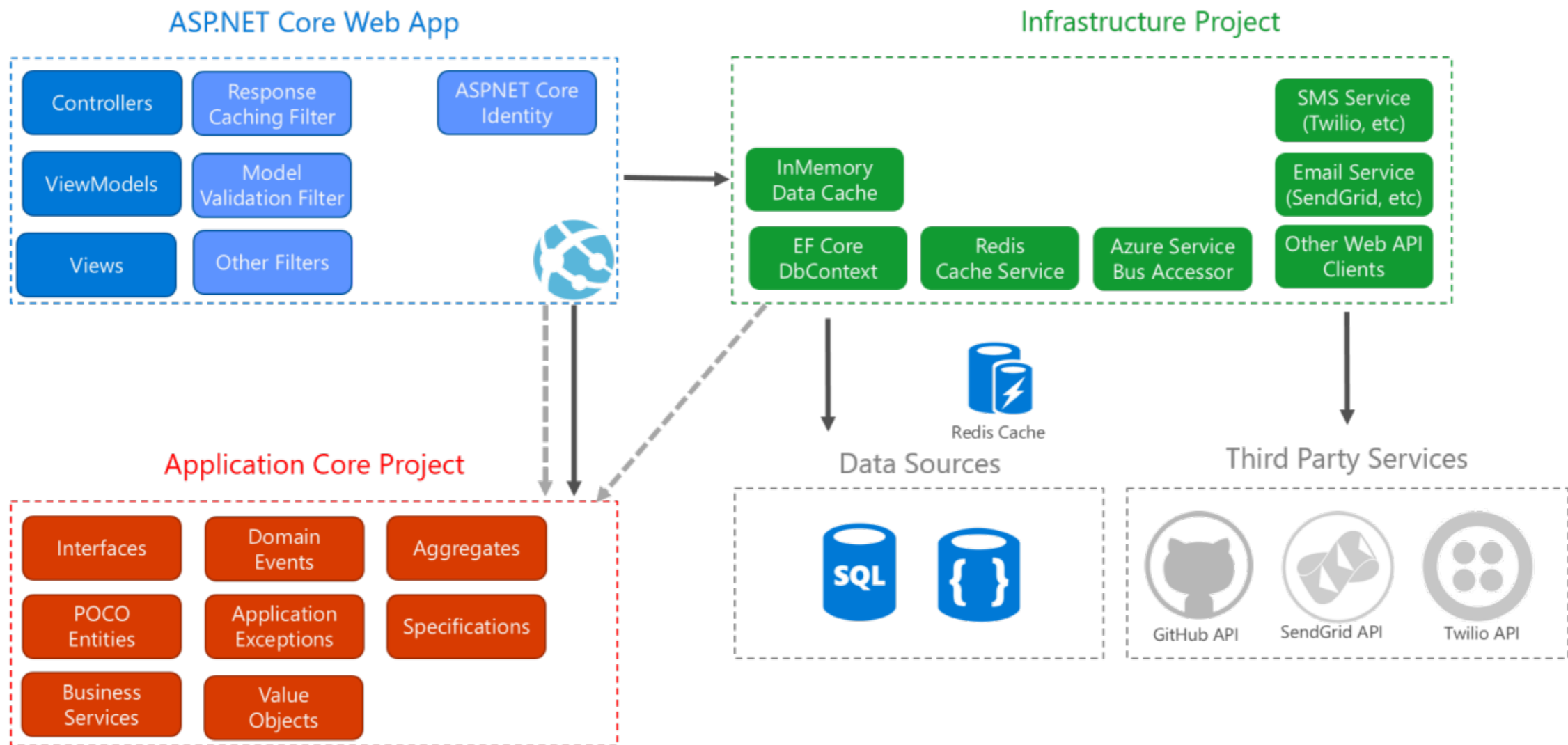
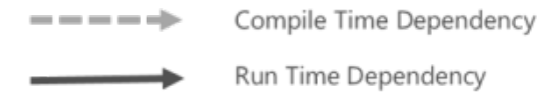
SITUATION:

There are
15 competing
stacks.



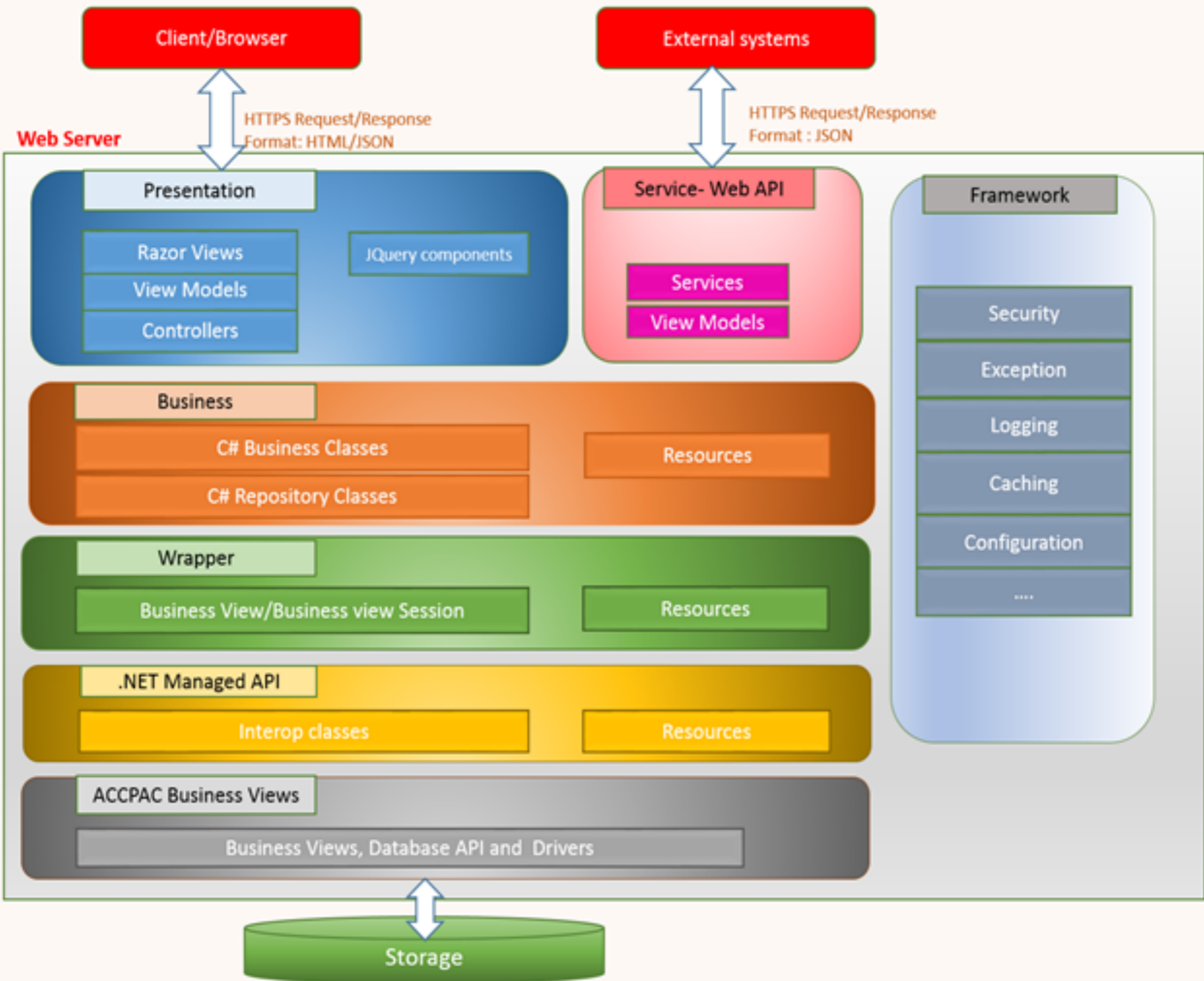


ASP.NET Core Architecture

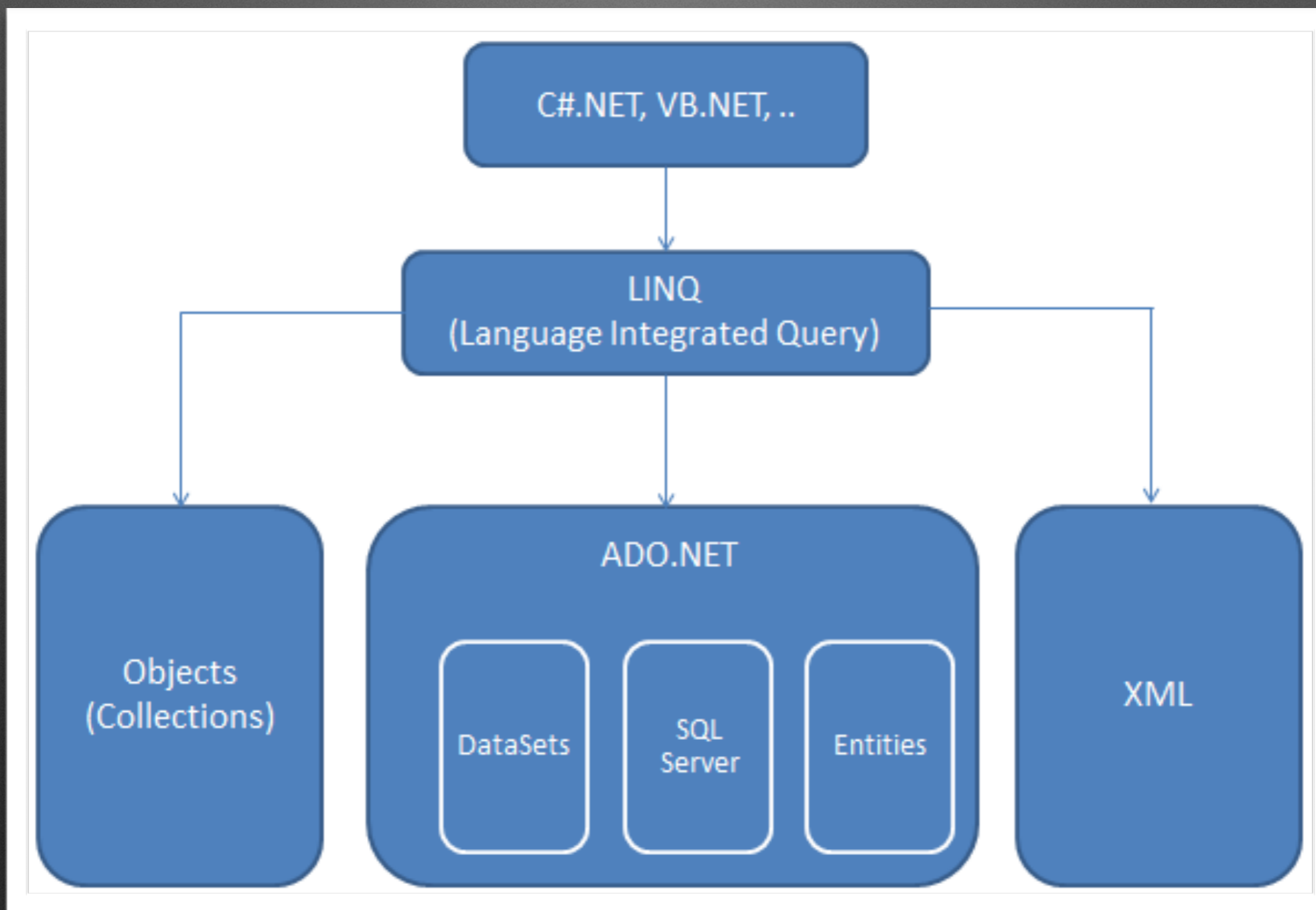


Základní stavební kameny

- ASP.NET
- Slouží pro tvorbu dynamických stránek
 - WebForms - snaží se dosáhnout desktop-like aplikace
 - MVC - framework pro oblíbené paradigma tvorby webových aplikací, alternativa k WebForms
- Dělí se na šablonu a “logiku”

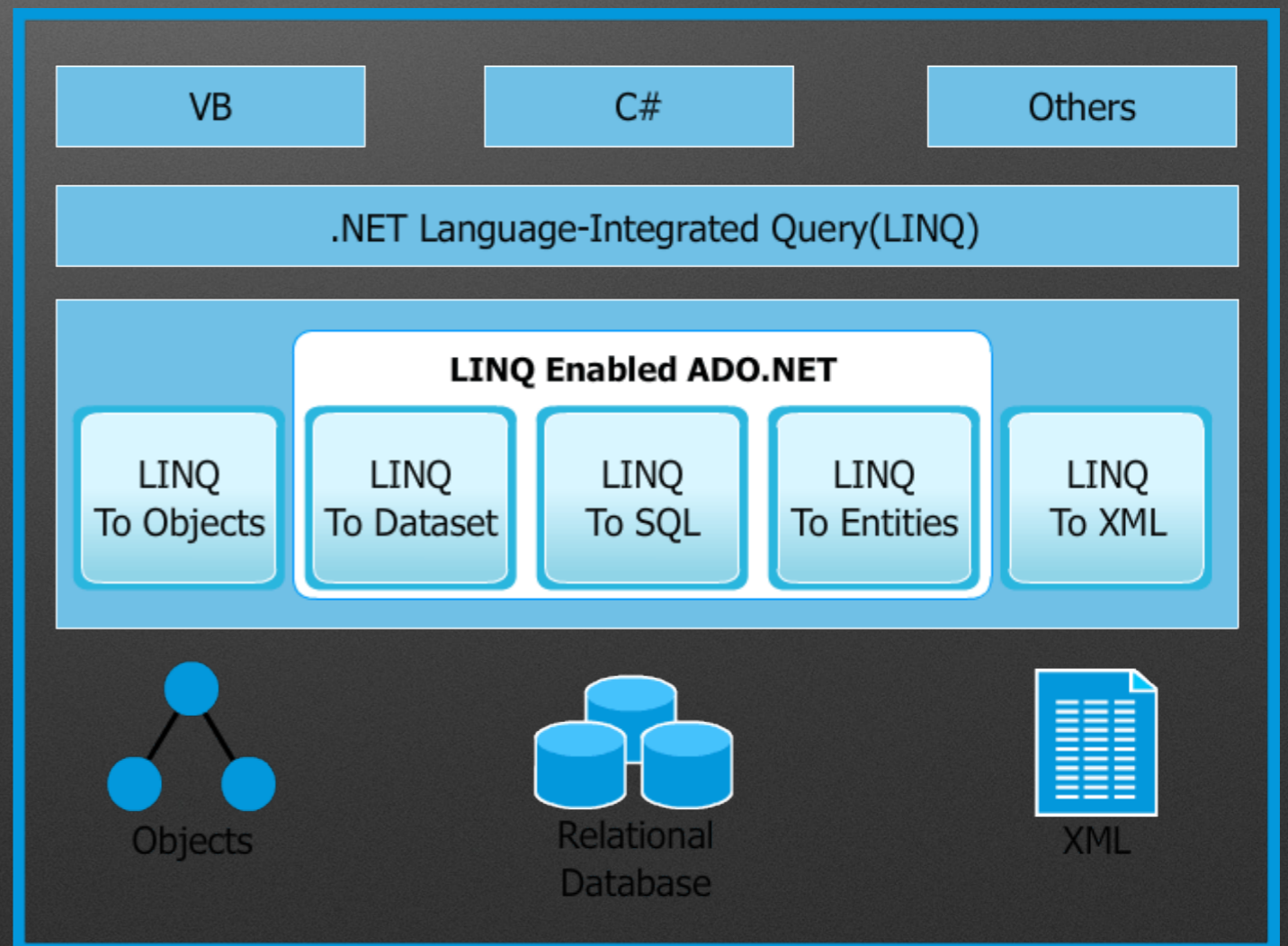


Práce s daty



Language Integrated Query

- Univerzální jazyk (nástroj) pro manipulaci s daty
- Při použití se vám bude hodit:
 - Lambda výrazy
 - Anonymní třídy - klíčové slovo var
 - Stromy výrazů, delegáti
- Možnosti použití
 - LINQ to Objects
 - LINQ to XML
 - LINQ to SQL
 - LINQ to DataSets



Práce s daty

- ADO.NET
- Pro přístup k datovým službám (dataset, XML)
 - nejen k databázi
- Dělí se na konzumenta a poskytovatele
- Pracuje na podobném konceptu jako JPA
- Dokáže spolupracovat s LINQ a Entity SQL (transformuje dotazy na příslušné SQL)

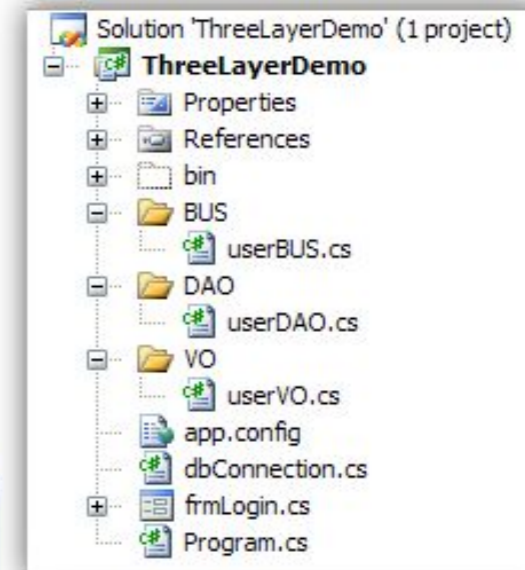
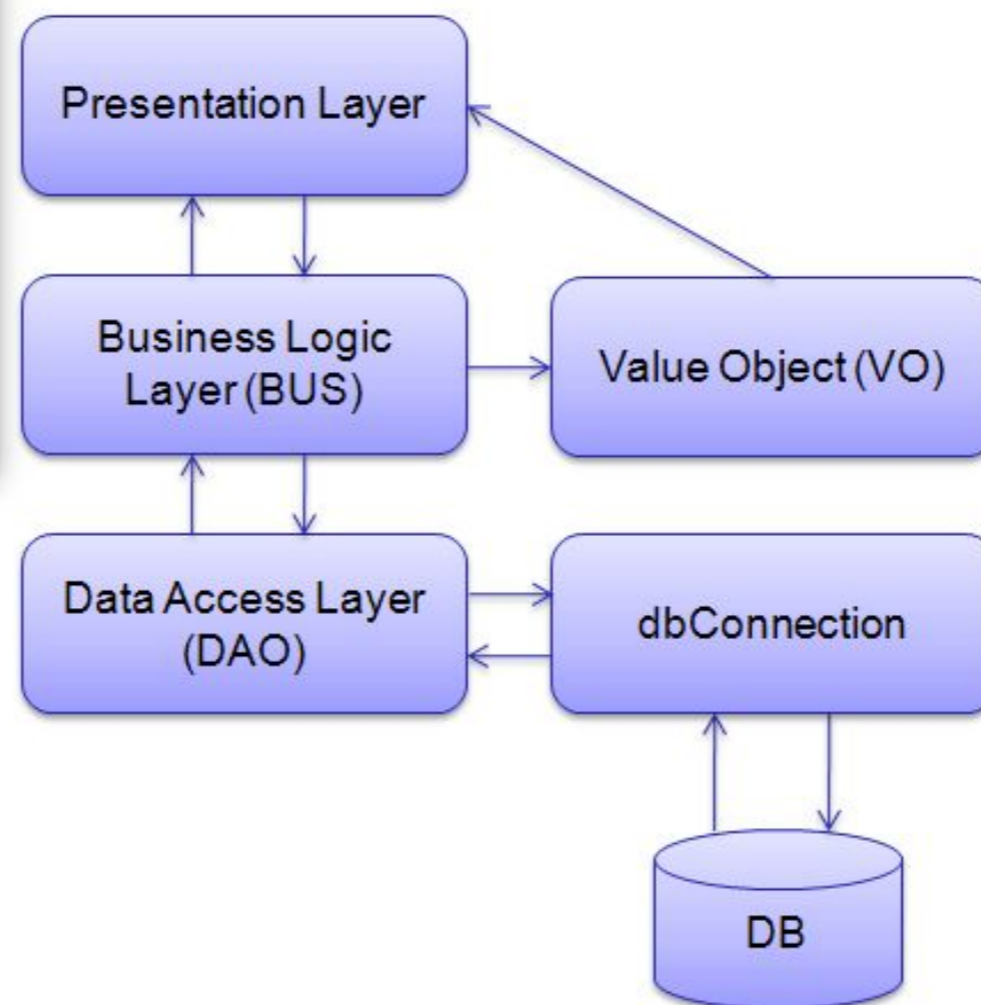
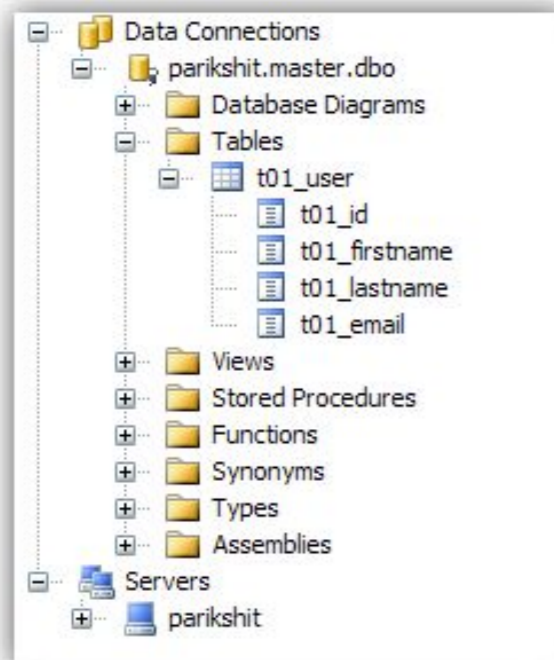
Základní stavební kameny

- Windows Communication Foundation (WCF)
- Podporuje tvorbu servisně-orientované architektury
- Vhodnou formou zpřístupňuje webové služby (tvoří endpoint).
- Dokáže ovšem pracovat i s jmennými rourami
- Díky použití webových služeb se dokáže bavit multiplatformně

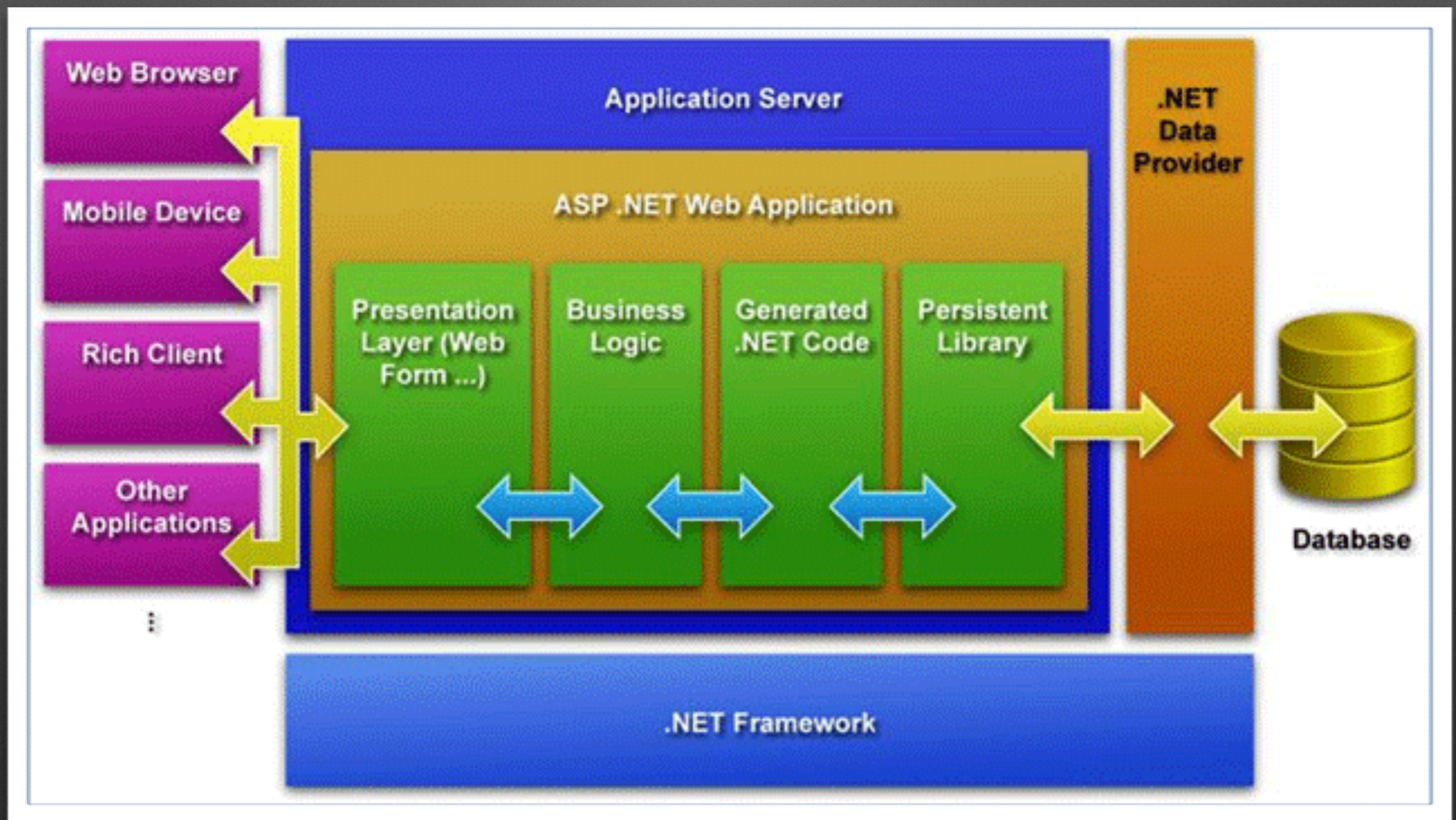
Základní stavební kameny

- Windows Presentation Foundation (WPF)
- Framework pro podporu vykreslení GUI
- Používá DirectX (hardwarové urychlení)
- Základem je XAML
- Podporován prohlížeči (Firefox)
- Modern UI
- A co Silverlight?

Webová aplikace

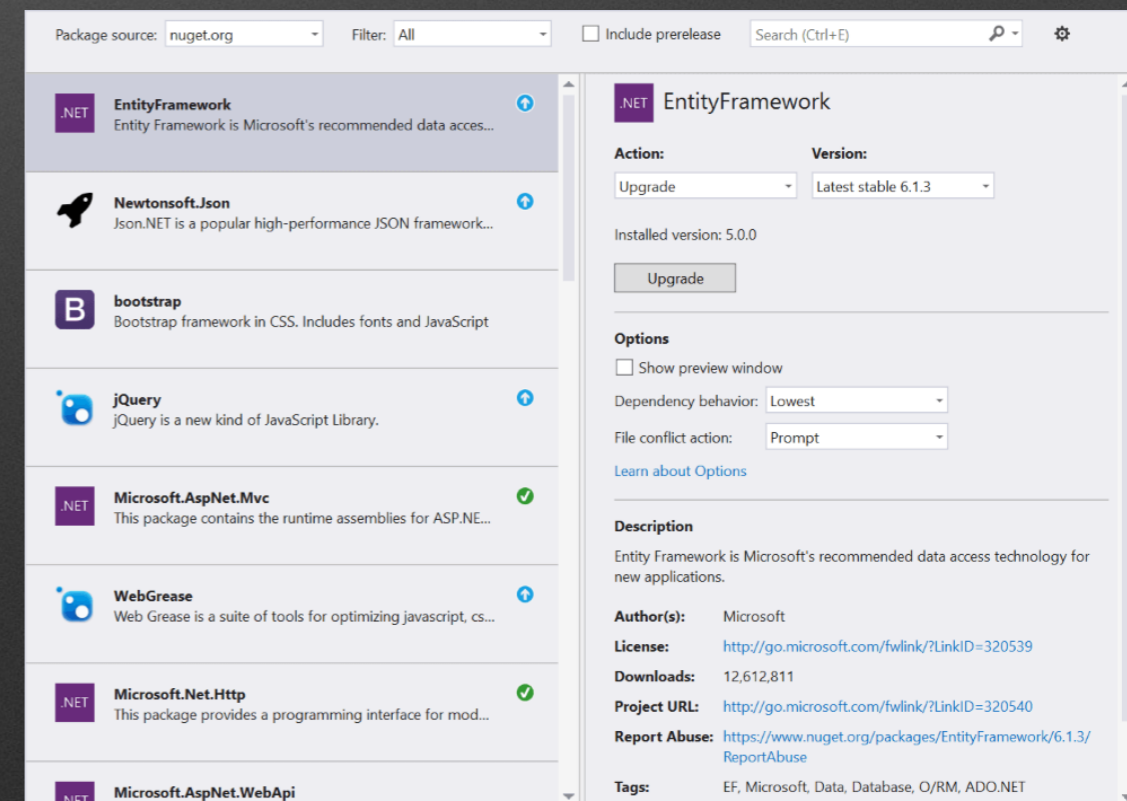


Webová aplikace

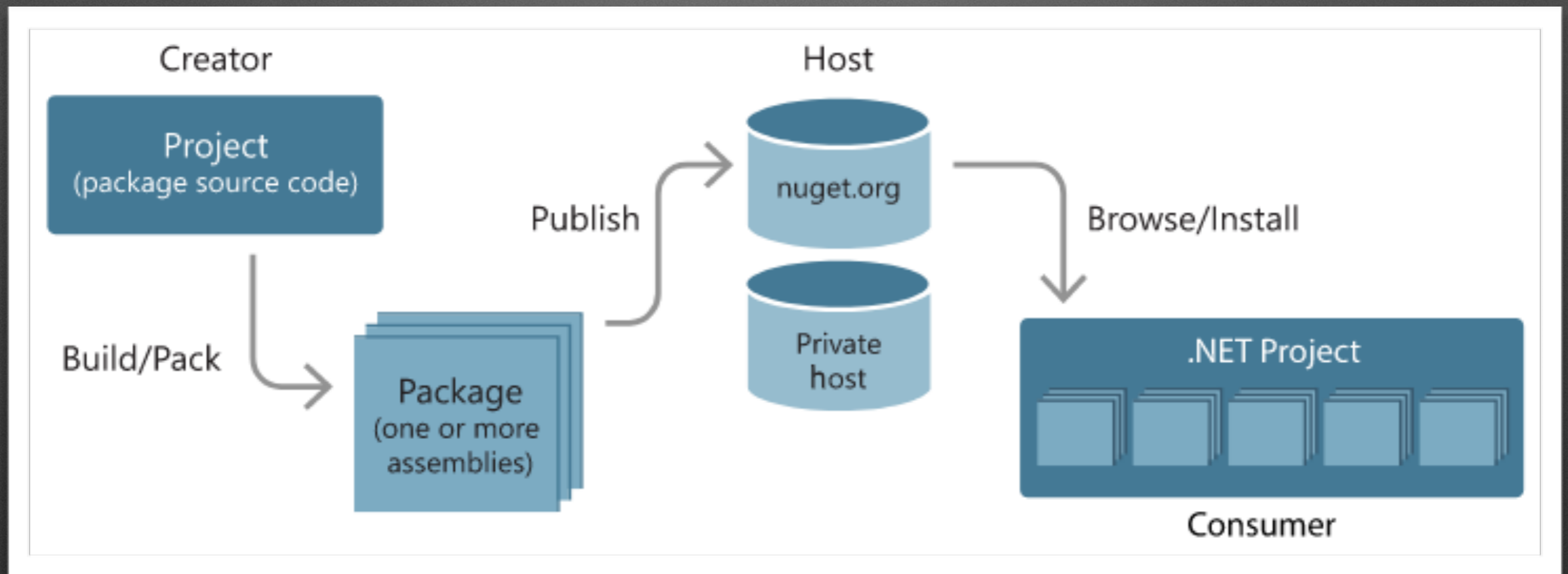


NuGet

- Balíčkovací nástroj
- Json.NET, EntityFramework, NUnit, BootstrapCSS, jQuery, AutoMapper, log4net, Angular JS
- <https://www.nuget.org/stats>



NuGet



A co aplikační server?

A co aplikační server?



Connections

- Kodyaz-PC (Kodyaz-PC)

Kodyaz-PC Home

Group by: Area

ASP.NET

- .NET Compilation
- .NET Globalization
- .NET Trust Levels
- Application Settings
- Connection Strings
- Pages and Controls
- Providers
- Session State
- SMTP E-mail

IIS

- ASP
- Authentic...
- Authorizat... Rules
- Default Document
- Directory Browsing
- Error Pages
- Failed Request Tra...
- Handler Mappings
- ISAPI and CGI Restri...
- ISAPI Filters
- Modules
- Server Certificates
- Worker Processes

Management

- Feature Delegation

Actions

- Manage Server**
 - Restart
 - Start
 - Stop
- View Application Pools
- View Web Sites
- Help

Deploy webové aplikace

The image shows the 'Package/Publish Web' settings dialog in Visual Studio. The left sidebar contains a tree view with the following items: Application, Build, Web, Package/Publish Web (highlighted), Package/Publish SQL, Silverlight Applications, Build Events, Resources, Settings, Reference Paths, Signing, and Code Analysis. The main area is titled 'Package/Publish Web' and contains the following settings:

- Configuration: Active (Release) (dropdown)
- Platform: Active (Any CPU) (dropdown)
- Package/Publish enables you to deploy your Web application to Web servers. [Learn more about Package/Publish Web](#)
- Items to deploy (applies to all deployment methods):
 - Only files needed to run this application (dropdown)
 - Exclude generated debug symbols
 - Exclude files from the App_Data folder
- Items to deploy (applies to Web Deploy only):
 - Include all Databases configured in Package/Publish SQL tab [Open Settings](#)
 - Include all the IIS settings as configured in IIS Manager (used only for IIS ...)
 - Include application pool settings used by this Web project
- Web Deployment Package Settings:
 - Create deployment package as a zip file
 - Location where package will be created:
obj\Release\Package\WebApplication1.zip
 - IIS Web site/application name to use on the destination server:
Default Web Site/WebApplication1_deploy
 - Physical path of Web application on destination server (used only when...):
D:/Documents and Settings\username\My Documents\Visual St...
 - Password used to encrypt secure IIS settings:
Encryption password is used only if any deployment setting is mar...