Online on-demand Project Support

# .NET Core 2.2

## Grundlagen


Thorsten Kansy (tkansy@dotnetconsulting.eu)

# Thorsten Kansy

Freier Consultant, Softwarearchitekt,
Entwickler, Trainer und Fachautor

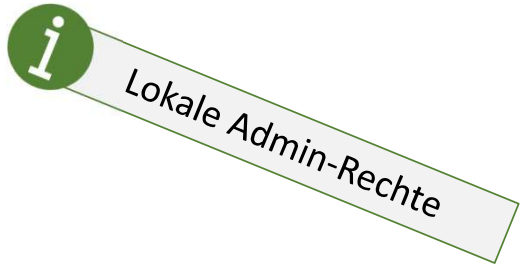

DOTNETCONSULTING
by Thorsten Kansy

# Agenda

- Verwendete Software
- Einführung
- Konfiguration
- Inversion of Control & Dependency Injection
- Logging
- Deployment
- Migration

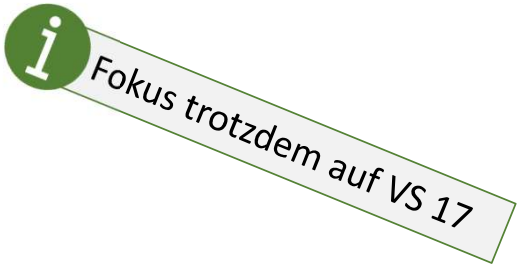
# Verwendete Software

# Verwendete Software .NET Core 2.2




- Visual Studio 2017 15.9.3
- .NET Core 2.2

# Alternative Editoren



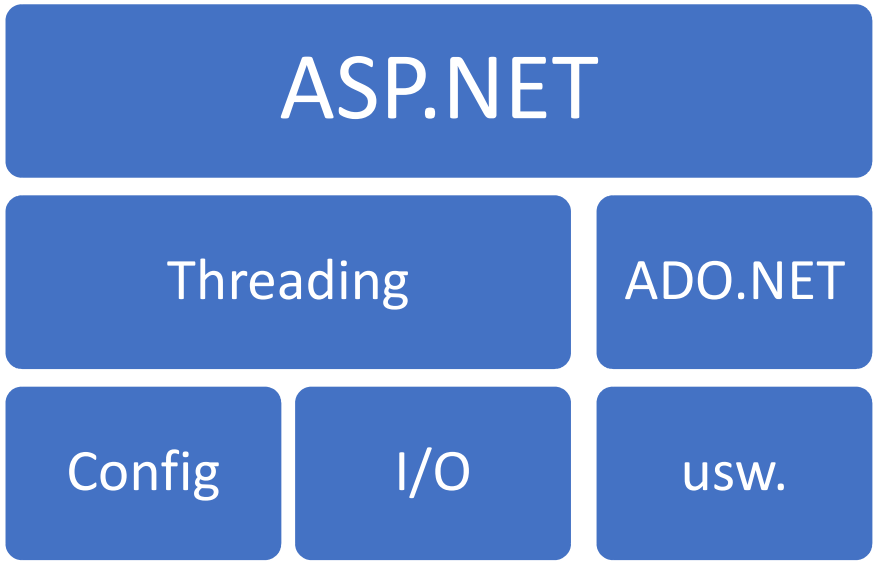

- Windows
  - Visual Studio Code
- MacOS
  - Visual Studio
  - Visual Studio Code
- Linux
  - Visual Studio Code

Und viele mehr, wie z. B. Sublime Text und Notepad

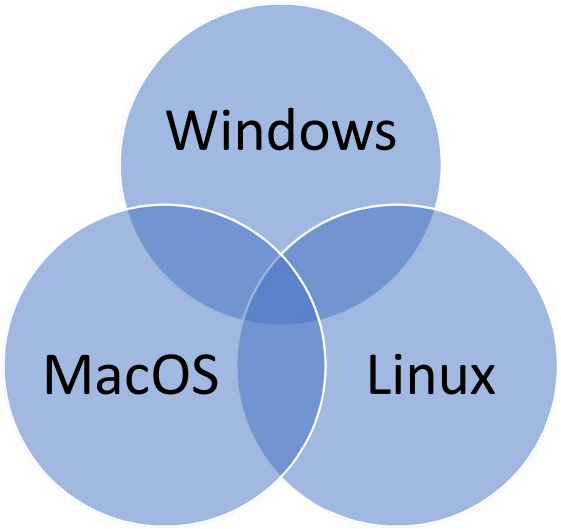
# Einführung

# .NET-Core-Aufbau

## Modular




## Multi Plattform




DOTNETCONSULTING
by Thorsten Kansy

# .NET Core vs. .NET Framework

| .NET Core | .NET Framework |
|---|---|
| Modularer Aufbau (NuGet) | Systemweites, (fast) monolithisches Framework |
| Keine UI (nur Web) | WPF, WinForms, ASP.NET, etc. |
| Unvollständig | Vollständig, aber überfrachtet |
| Native Multiplattform (viele Funktionen) | An Windows gebunden |
| | |

# Was spricht für .NET Core?

- Multiplattform
  - Windows
  - Linux
  - MacOS
- Höhere Performance
  - ASP.NET, z. B. Entkopplung von System.Web.dll
- Geringerer Ressourcenverbrauch
  - Modularität

# Was spricht gegen .NET Core?

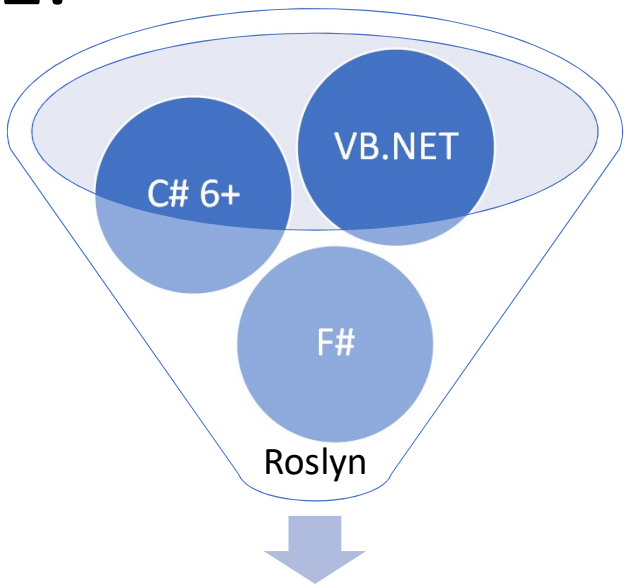
- (Noch) keine Desktop-UI bereitgestellt (zumindest von Microsoft)
  - Electron.NET
  - Avalonia
  - ImGui
  - WPF und Windows Form (.NET Core 3.0, Anfang 2019)
- .NET Core ist nicht vollständig -> wird erweitert entwickelt
  - API Breaks möglich

# Aber was ist mit .NET Standard?

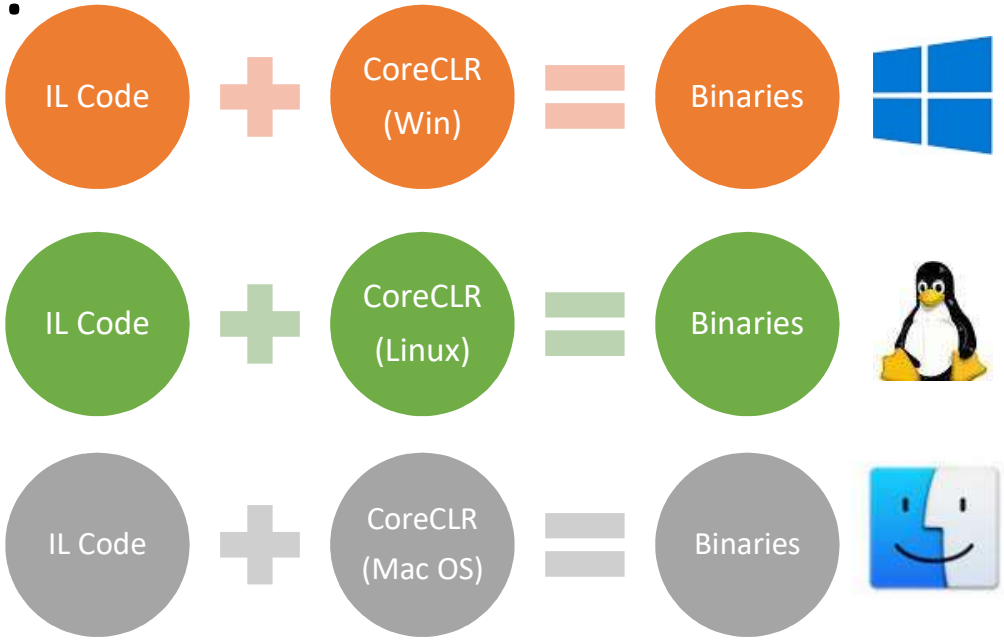
- Gemeinsame Funktionen für alle .NET Branches/Flavors
  - .NET Framework
  - .NET Core
  - Xamarin
- Jeweils in der aktuellen Version
- Erleichtert die Erstellung von Cross-Code

# Compile-Prozess(e)

1.




2.



# .NET Native

Nativer Code für Univeral Window Platform (UWP)

- `ngen.exe` (Native Image Generator)

Vorteile für UWP

- Schnellere Ausführung
- Schnellerer Start
- Optimized app memory usage.

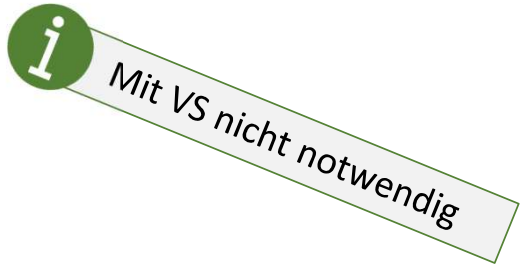
`https://docs.microsoft.com/en-us/dotnet/framework/net-native/`

# Visual Studio in Stellung bringen

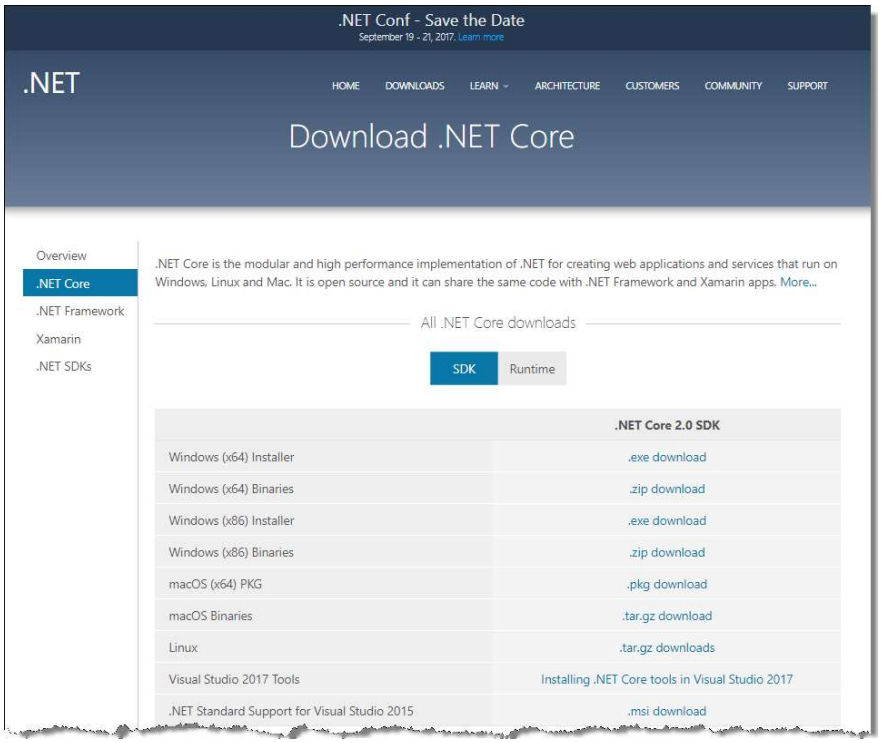

```
https://www.visualstudio.com/de/downloads
```

DOTNETCONSULTING
by Thorsten Kansy

# .NET Core in Stellung bringen




- Windows
- Linux
- MacOS




```
https://www.microsoft.com/net/download/core
```

# .NET Core CLI

- Command Line für .NET Core
  - Entity Framework
  - User Secrets (ASP.NET)
  - …

```
dotnet --info
```

```
dotnet --version
```

```
dotnet exec <prog>.dll
```

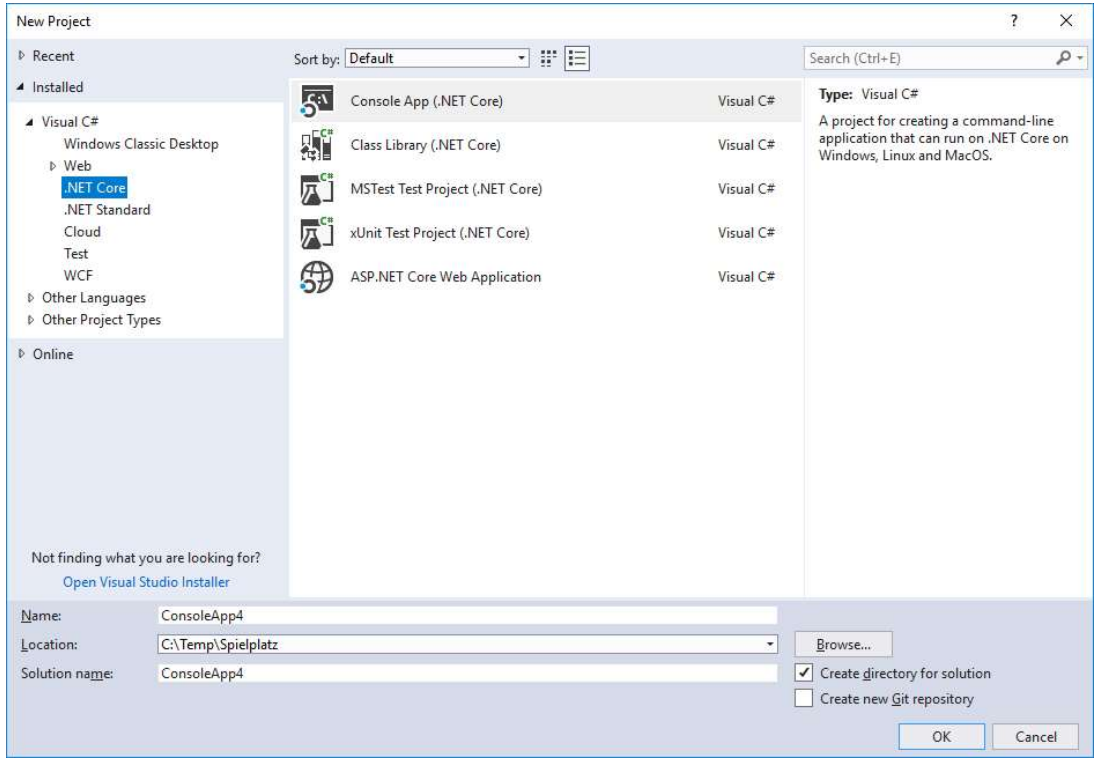
```
dotnet ef
```

# „Hallo Welt“ mit CLI und Notepad

```
dotnet new console -n HelloWorld

cd HelloWorld

notepad program.cs

dotnet run [<proj>.csproj]

dotnet <prog>.dll
```


Demo

# „Hallo Welt“ mit Visual Studio 2017



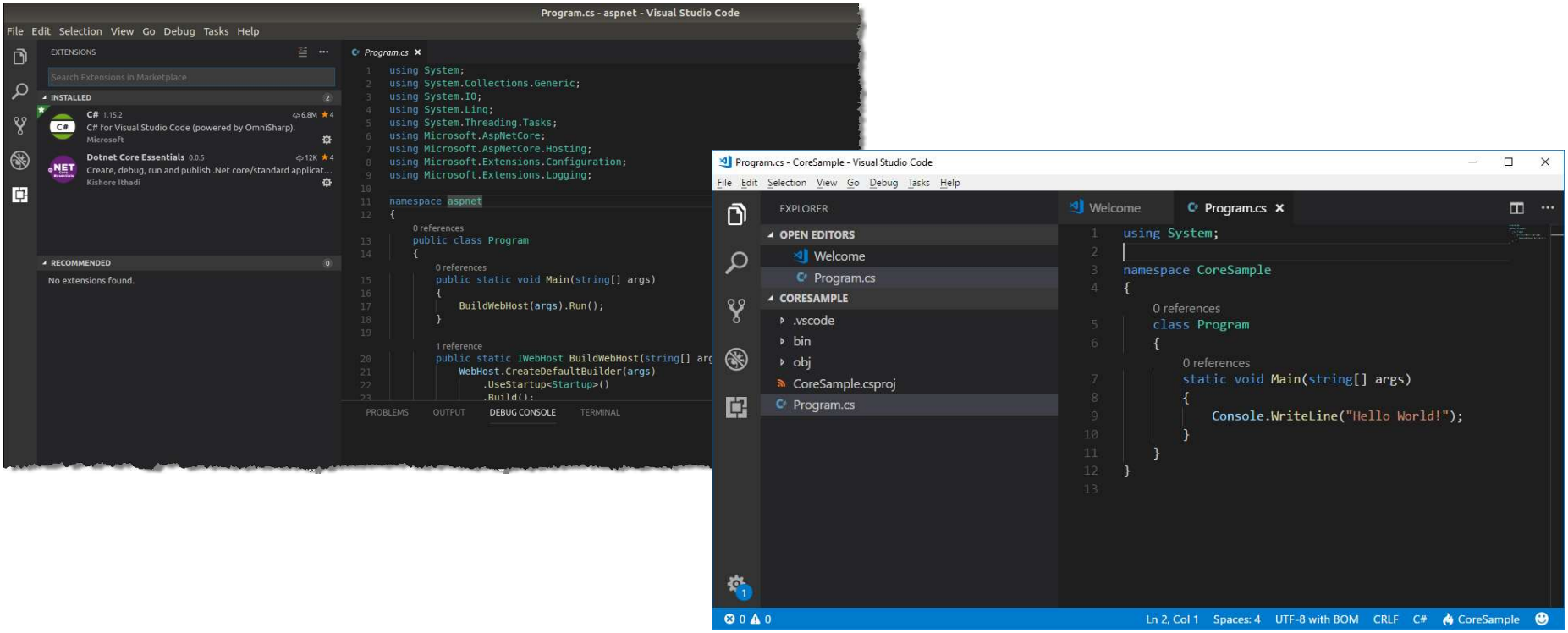

DOTNETCONSULTING
by Thorsten Kansy


Demo

# „Hallo Welt“ mit Visual Studio Code

```
md CoreHW
cd CoreHW
dotnet <prog>.dll
dotnet run <proj>.csproj

code .
```

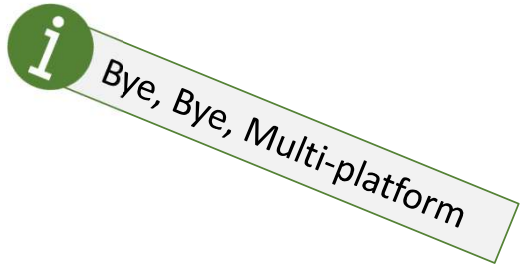
# „Hallo Welt“ mit Visual Studio Code (Ubuntu)




DOTNETCONSULTING
by Thorsten Kansy


Demo

# Windows Compatibility Pack




- Code Pages
- CodeDom
- Configuration
- Directory Services
- Drawing
- ODBC
- Permissions
- Ports
- Windows Access Control Lists (ACL)
- Windows Communication Foundation (WCF)
- Windows Cryptography
- Windows EventLog
- Windows Management Instrumentation (WMI)
- Windows Performance Counters
- Windows Registry
- Windows Runtime Caching
- Windows Services

```
https://docs.microsoft.com/en-us/dotnet/core/porting/windows-compat-pack
```

# Multi-platform-Code

## Einsatz mit Guarding

```
if (RuntimeInformation.IsOSPlatform(OSPlatform.Windows))
{
    // Windows Code, Zugriff auf Registry
    using (RegistryKey key = Registry.CurrentUser.OpenSubKey(@"Software\Fabrikam\AssetManagement"))
    {
        if (key?.GetValue("LoggingDirectoryPath") is string configuredPath)
            Console.WriteLine(configuredPath);
    }
}
else if (RuntimeInformation.IsOSPlatform(OSPlatform.Linux))
{
    // Linux Code
    // ...
```

```
Install-Package Microsoft.Windows.Compatibility
```

```
Install-Package Microsoft.DotNet.Analyzers.Compatibility
```


Demo

# Konfiguration

# Konfigurationsprovider

| Provider | NuGet-Paket |
|---|---|
| JSON-Datei | `Microsoft.Extensions.Configuration.Json` |
| XML-Datei | `Microsoft.Extensions.Configuration.Xml` |
| INI-Datei | `Microsoft.Extensions.Configuration.Ini` |
| Umgebungsvariablen | `Microsoft.Extensions.Configuration.EnvironmentVariables` |
| Programmargumente | `Microsoft.Extensions.Configuration.CommandLine` |
| In-Memory-Collection | – |
| Azure Key Vault | `Microsoft.Extensions.Configuration.AzureKeyVault` |
| User Secrets<br>(nur ASP.NET Core) | `Microsoft.Extensions.Configuration.UserSecrets` |
| Custom | – |

```
Install-Package Microsoft.Extensions.Configuration.Json (s.o.)
```

# Konfiguration verwenden

```
// Konfiguration vorbereiten, Provider nach Bedarf anfügen
IConfigurationBuilder builder = new ConfigurationBuilder()
    // Umgebungsvariablen hinzufügen
    .AddEnvironmentVariables()
    // Json-Datei hinzufügen
    .AddJsonFile("Config.json");

// Konfiguration abschließen, Werte einlesen
IConfigurationRoot config = builder.Build();

// Zugriff
string windowHeight = config["App:Window:Height"];
```


Demo

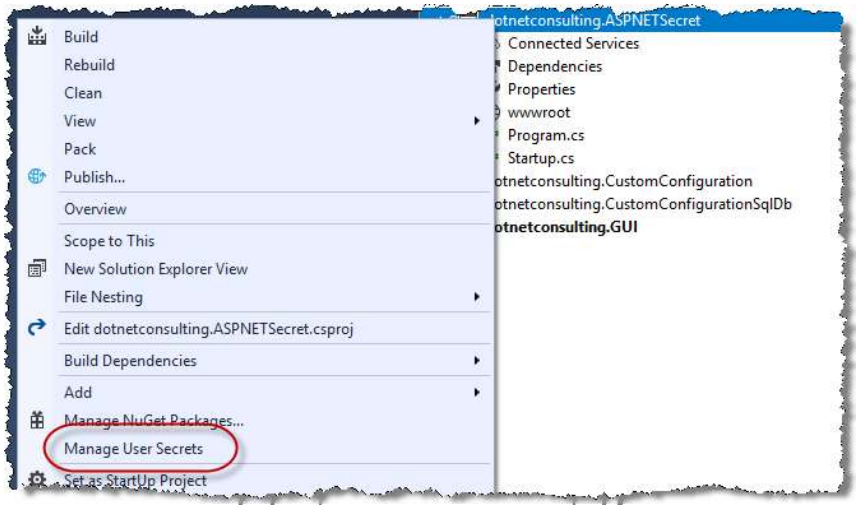
# ASP.NET User Secrets

Sensible Einstellungen auslagern

```
<Project Sdk="Microsoft.NET.Sdk.Web">
  <PropertyGroup>
<UserSecretsId>576504d1-3c17-4fc0-b0a0-23ee841be7e6</UserSecretsId>
  </PropertyGroup>
</Project>
```

| Betriebssystem | Speicherort |
|---|---|
| Windows | `%APPDATA%\microsoft\UserSecrets\<userSecretsId>\secrets.json` |
| Linux | `~/.microsoft/usersecrets/<userSecretsId>/secrets.json` |
| MacOS | `~/.microsoft/usersecrets/<userSecretsId>/secrets.json` |

# User Secrets verwalten




| Aktion | .NET Core CLI |
|---|---|
| User Secret setzen | `dotnet user-secrets set Geheimnis "My Name is Bond"` |
| User Secrets auflisten | `dotnet user-secrets list` |
| User Secret löschen | `dotnet user-secrets remove Geheimnis` |
| Alle User Secrets löschen | `dotnet user-secrets clear` |

DOTNETCONSULTING
by Thorsten Kansy


Demo

# Eigenen Custom Provider schreiben

| Code-Klasse | Aufgabe |
|---|---|
| `SqlConfigurationExtensions` | Erweiterung der Fluent API |
| `SqlDatabaseConfigurationSource` | Implementiert `IConfigurationSource` , um eine Konfiguration mittels Fluent API zu ermöglichen. |
| `SqlDatabaseConfigurationProvider` | Implementiert `IConfigurationProvider` und stellt die eigentliche Programmlogik dar, die die Konfigurationswerte bereitstellt. |
| `SqlDatabaseChangeToken` | Implementiert `IChangeToken` und bietet die Möglichkeit, Veränderungen bei den Konfigurationswerten zu signalisieren. Hier nicht weiter vertieft, da die Änderungen zwischen dem Lesen zwei zusammenhängender Werte auftreten kann. |


Demo

# EntityFramework Core konfigurieren

## Nicht in `DbContext.OnConfiguring(...)`

```
private static IServiceProvider createDependencyInjectionContainer(IConfigurationRoot Configuration)
{
    ...
     // EF Context konfigurieren
     .AddDbContext<SamplesContext1>(
         o => o
         .UseLazyLoadingProxies()
         .UseSqlServer(Configuration["ConnectionStrings:EFConString"])
         .ConfigureWarnings(w => w.Throw(RelationalEventId.QueryClientEvaluationWarning))
         .EnableSensitiveDataLogging(true)
     )
    ...
}
```


Demo

# Eigene Komponenten richtig konfigurieren

Beispiel „SmtpService“

- `SmtpServiceConfig`

  Konfiguration mit konkreten Werten, Quelle beliebig
- `SmtpServiceConfigBuilder`

  Validiert und erzeugt die Konfiguration
- `SmtpServiceCollectionExtensions`

  Stellt `AddSmtpService()`-Methode bereit

# Eigene Komponenten richtig konfigurieren

```
static private void ConfigureServices(IServiceCollection serviceCollection)
{
    …
    // SMTP-Service konfigurieren
    serviceCollection.AddSmtpServer<RealSmtpService>(o =>
    {
        // Konkrete Werte aus Konfigration, Quelle jedoch beliebig und hier unwichtig
        o.SetHostAndPort("192.168.1.1", 25);
        o.Sender = "produktion@dotnetconsultng.eu";
    });
    …
}
```


Demo

# Inversion of Control & Dependency Injection

# Inversion of Control und Dependency Injection

- Überschaubarer Code (Single Responsibility Principle)
- Wiederverwendbarkeit
- Besser testbarer Code

`IServiceCollection` IoC-Container

`IServiceProvider` DI Service

```
Install-Package Microsoft.Extensions.DependencyInjection
```

```
Install-Package Microsoft.Extensions.DependencyInjection.Abstractions
```

# IoC-Konfiguration

```
static private void ConfigureServices(IServiceCollection serviceCollection)
{
    // Instanz pro GetService<>()-Aufruf/ GetRequiredService<>()-Aufruf
    serviceCollection.AddTransient<IOrderService, SnailMailOrderService>();

    // ODER Instanz als Singelton
    serviceCollection.AddSingleton<IOrderService, SnailMailOrderService>();

    // ODER Instanz per (ASP.NET)-Request (siehe CreateScope())
    serviceCollection.AddScoped<IOrderService, SnailMailOrderService>();
}
```

# Lebenszeit von Instanzen

| Variante | Lebenszeit |
|---|---|
| `AddTransient()` | Der IoC-Container liefert jedes Mal eine neu erzeugte Instanz |
| `AddScoped()` | Während einer Anfrage (z. B. an einen ASP.NET-Controller) wird die gleiche Instanz geliefert. Bei der nächsten Anfrage wird wiederum eine neue Instanz geliefert |
| `AddSingleton()` | Der IoC-Container liefert jedes Mal die gleiche Instanz zurück |

# DI Service – Konsole

```
IServiceProvider services = serviceCollection.BuildServiceProvider();

services.GetService<IOrderService>().PlaceOrder("Wattestäbchen", 10);
```

# DI Service – Razor Pages

```
public class IndexModel : PageModel
{
    private readonly IOrderService _orderService;

    public IndexModel(IOrderService OrderService)
    {
        _orderService = OrderService;
    }

    public void OnGet()
    {
        // _orderService verwenden
    }
}
```

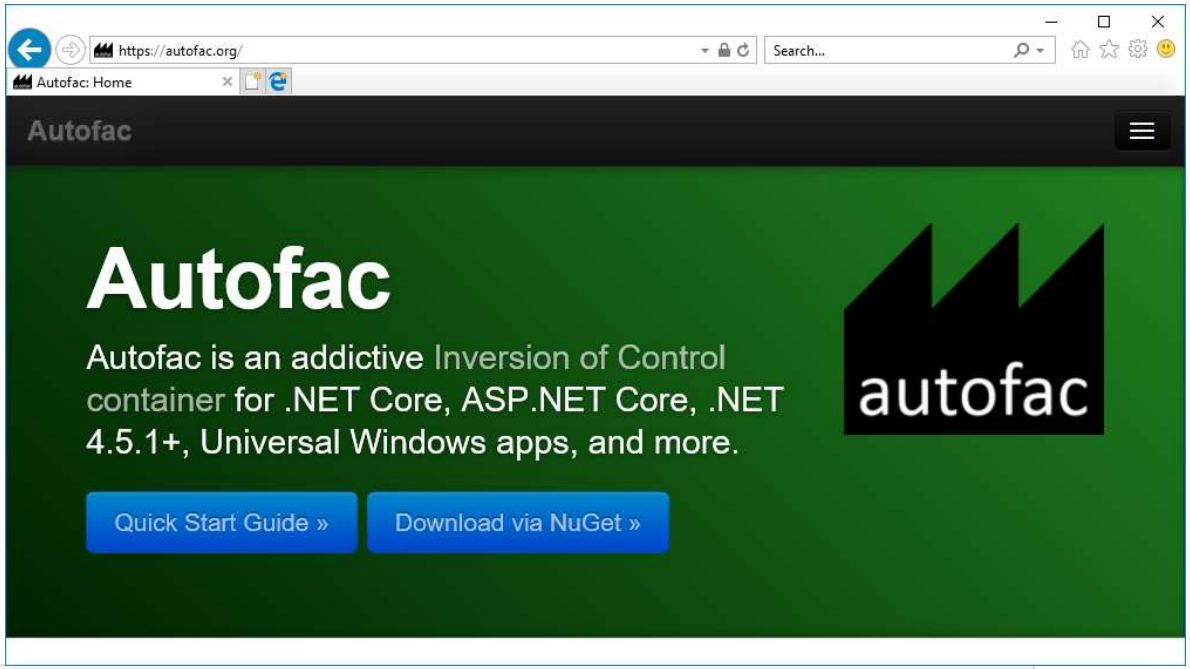
Gilt für: MVC und Web-API

# DI Service – Controller

```
public class HomeController : Controller
{
    private readonly IOrderService _orderService;

    public HomeController(IOrderService OrderService)
    {
        _orderService = OrderService;
    }

    public IActionResult Index()
    {
        // _orderService verwenden
    }
}
```


Demo

# IoC- und DI-Alternative – Autofac




http://autofac.org

```
Install-Package Autofac
```

```
Install-Package Autofac.Extentions.DependencyInjection
```

# Autofac-Setup

```
public IServiceProvider ConfigureServices(IServiceCollection services)
{
    // Andere Framework-Services hinzufügen
    // services.AddMvc();

    // Autofac hinzufügen und konfigurieren
    ContainerBuilder containerBuilder = new ContainerBuilder();
    containerBuilder.RegisterModule<DefaultModule>();
    containerBuilder.Populate(services);
    IContainer container = containerBuilder.Build();

    return new AutofacServiceProvider(container);
}
```

```
Install-Package Autofac
```

```
Install-Package Autofac.Extentions.DependencyInjection
```

# Autofac-Konfiguration

```
public class DefaultModule : Module
{
    protected override void Load(ContainerBuilder builder)
    {
        builder.RegisterType<EMailOrderService>()
            .As<IOrderService>()
            // Konstruktor-Parameter
            .WithParameter("SmtpHost", "127.0.0.1")
            // Eigenschaft
            .WithProperty("Sender", "tkansy@dotnetconsulting.eu");
    }
}
```


Demo

# Logging

# Logging

- Fehlersuche!
- Fehlersuche!
- Fehlersuche!

`ILoggerFactory` Logger Factory

`ILogger` Logger Service

```
Install-Package Microsoft.Extensions.Logging
```

```
Install-Package Microsoft.Extensions.Logging.Abstractions
```

# Logging-Provider

| Level | NuGet-Paket |
|---|---|
| Konsole | `Microsoft.Extensions.Logging.Console` |
| Debugger-Monitor (Output window) | `Microsoft.Extensions.Logging.Debug` |
| Trace Listener (Output window) | `Microsoft.Extensions.Logging.TraceSource` |
| Windows-Ereignisprotokoll | `Microsoft.Extensions.Logging.EventLog` |
| EventSource/EventListener | `Microsoft.Extensions.Logging.EventSource` |
| Azure-App-Dienste „Diagnoseprotokolle“ und „Log Stream“ | `Microsoft.Extensions.Logging.AzureAppServices` |
| Datei, Datenbank, SMTP etc. | `Serilog.* // NLog.* // usw.` |

# Logging konfigurieren

```
static void LoggingDemo1(string scopeName = null)
{
    // Logger Factory konfigurieren
    ILoggerFactory loggerFactory = new LoggerFactory()
        .AddConsole(LogLevel.Trace, true)
        .AddDebug();

    ILogger logger = loggerFactory.CreateLogger<Program>();

    demoLogging(logger, scopeName);
}
```


Demo

# Logging-Level

| Variante | Lebenszeit |
|---|---|
| `Trace (0)` | Ablaufverfolgung, die auch sensible Informationen enthalten kann |
| `Debug (1)` | Technische Debug-Informationen für die Fehlersuche |
| `Information (2)` | Nachverfolgung des allgemeinen Ablaufs der Anwendung |
| `Warning (3)` | Warnungen bei ungewöhnlichen oder unerwarteten Ereignissen |
| `Error (4)` | Fehler und Ausnahmen, die vom Code nicht behandelt werden können |
| `Critical (5)` | Für Fehler, die sofortige Aufmerksamkeit erfordern |

```
...public enum LogLevel
{
    ...Trace = 0,
    ...Debug = 1,
    ...Information = 2,
    ...Warning = 3,
    ...Error = 4,
    ...Critical = 5,
    ...None = 6
}
```


Demo

# Logging-Scopes

Bereich im Logging zwecks besserer Leßbarkeit

```
using (logger.BeginScope($"Scope y = {y}"))
{
    for (int z = 0; z < 2; z++)
    {
        logger.LogDebug($"y = {y}, z = {z}");
    }
}
```


Demo

# Logging in Action I

```
logger.Log(LogLevel.Trace, "Trace");
logger.Log(LogLevel.Debug, "Debug");
logger.Log(LogLevel.Information, "Information");

logger.LogWarning("Warning");
logger.LogError("Error");
logger.LogCritical("Critical");
```

# Logging in Action II

```
// Wenn etwas schief geht
try
{
    throw new Exception("Passierschein A38 nicht gefunden.");
}
catch (Exception ex)
{
    logger.LogError(ex, "Error");
    throw;
}
```

# Logging in Action III

```
// Wenn mal etwas richtig schief geht
try
{
    throw new Exception("Passierschein A38 nicht vorhanden.");
}
catch (Exception ex)
{
    logger.LogCritical(ProgramEventId.PermitNotFound, ex,
                                                "Permit A38 not found ");
    throw;
}
```

# Logging in Action IV

```
// Oder wenn etwas nicht dort ist, wo es sein sollte
string importFilename = @"c:\nix\app.config";
try
{
    string import = File.ReadAllText(importFilename);
}
catch (Exception ex)
{
    logger.LogCritical(ProgramEventId.ImportFileFailed, ex,
                       "Import file '{0}' not ", importFilename);
}
```


Demo

# EventId

```
public static class ProgramEventId
{
     public static readonly EventId CriticalSituation201
            = new EventId(201, "CriticalSituation201");

     public static readonly EventId PermitNotFound
            = new EventId(202, "PermitNotFound");

     public static readonly EventId ImportFileFailed
            = new EventId(203, "ImportFileFailed");
}
```


Demo

# Logging & Dependency Injection

```
// Factory
serviceCollection.AddSingleton<ILoggerFactory, LoggerFactory>();

// Generischen Logger
serviceCollection.AddSingleton(typeof(ILogger<>), typeof(Logger<>));

public class AppController
{
    private readonly ILogger<AppController> _logger;

    public Application(ILogger<AppController> Logger)
    {
        _logger = Logger;
    }
}
```


Demo

# Logging in Datei – Serilog

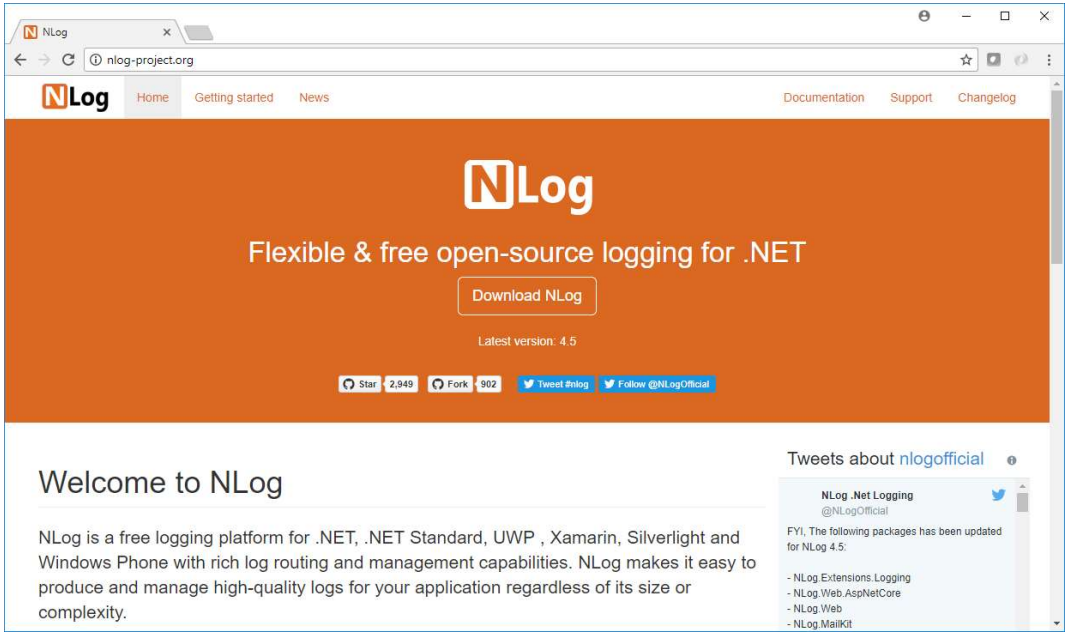
```
// Filename fürs Logging
string fileName = Path.Combine(AppContext.BaseDirectory, "Logging.txt");

// Logger Factory konfigurieren;
ILoggerFactory loggerFactory = new LoggerFactory()
    .AddFile(fileName, LogLevel.Information);

ILogger logger = loggerFactory.CreateLogger<Program>();
```

https://github.com/serilog/

```
Install-Package Serilog.Extensions.Logging.File
```


Demo

# Nlog – Fully-featured Logging Framework




```
http://nlog-project.org
```

```
Install-Package NLog
```

```
Install-Package NLog.Extensions.Logging
```


Demo

# Allgemeines Deployment

# Deployment

- Framework-dependent Deployment (FDD)
- Self-contained Deployment (SCD)

- Visual Studio 2017: Publish
- Visual Studio 2017: Pack
  - Nuget-Paket erstellen
- .NET Core CLI

# Visual Studio 2017: Publish

- FDD
  - Project -> Publish
- SCD
  - Project -> Publish

2.0?

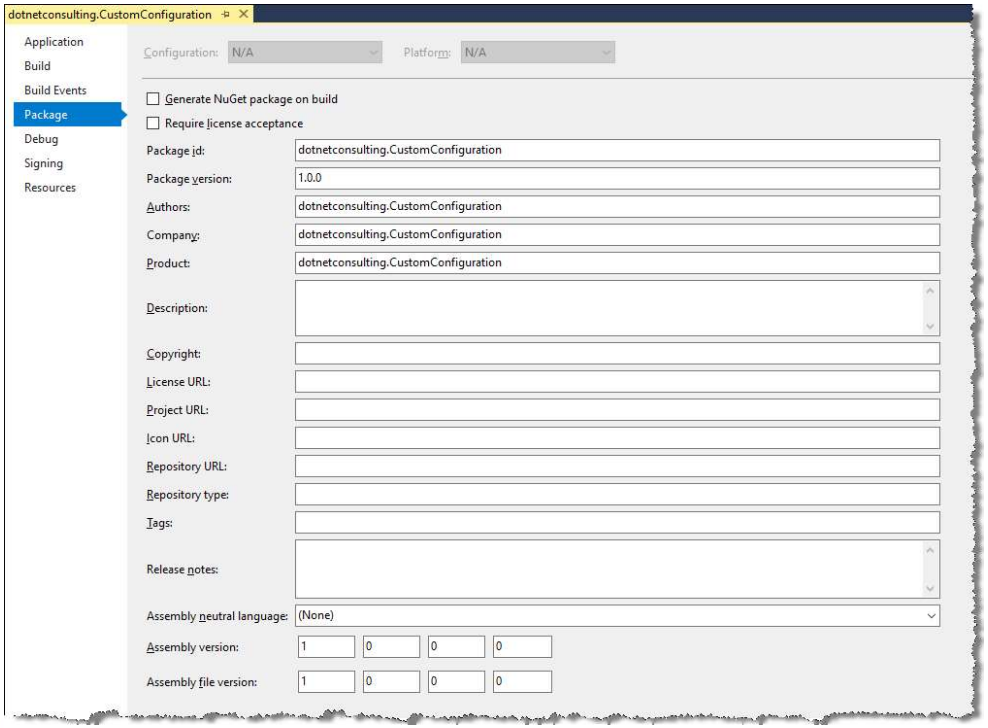
```
== *.csproj-Daten ==
<PropertyGroup>
  <RuntimeIdentifiers>win10-x64;osx.10.11-x64;linux-x64</RuntimeIdentifiers>
</PropertyGroup>
```

https://docs.microsoft.com/en-us/dotnet/core/deploying/deploy-with-vs


Demo

# Visual Studio 2017: Pack

- Erstellt ein NuGet-Paket
  - `nuget.exe` aus VS heraus
- Details:
  - Projekt -> Properties -> Package




DOTNETCONSULTING
by Thorsten Kansy


Demo

# .NET Core CLI

## Framework-dependent Deployment

```
dotnet publish -c Release
```

## Self-contained Deployment

```
dotnet publish -c Release -r win10-x64
dotnet publish -c Release -r ubuntu.16.10-x64
dotnet publish -c Release -r osx.10.11-x64
```


Demo

# Migration

# Migration zu .NET Core

1. Dritthersteller prüfen
2. Projekte auf .NET Framework 4.6.2 umstellen
3. API Portability Analyzer Tool
4. Testportierung
5. …

```
https://github.com/Microsoft/dotnet-apiport/
```

# Fragen?

# Links

https://www.visualstudio.com/de/downloads

https://github.com/ElectronNET/Electron.NET

https://github.com/AvaloniaUI/Avalonia

https://github.com/mellinoe/ImGui.NET