

# Extending



# Microsoft Visual Studio

in ~~30~~ 340 minutes!

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# About Rishabh Verma

- 13 years in IT Industry, ~11 years @ Microsoft
- Now, @Google
- Areas of interest:
  - .NET Core,
  - .NET Compiler Platform (Roslyn),
  - Visual Studio Extensibility development,
  - Tools and utilities to enhance developer productivity and quality
- Authored books:
  - .NET Core 2.0 by Example
  - Parallel Programming with C# and .NET Core
  - Visual Studio Extensibility Development
- Occasionally, blogs at [www.rishabhverma.net](http://www.rishabhverma.net)
- LinkedIn <https://www.linkedin.com/in/rishabhverma>
- Twitter - [@VermaRishabh](https://twitter.com/VermaRishabh)

**Disclaimer: Speaking in my personal capacity and not on behalf of my employer!**



# Agenda

- Introduction (10 minutes)
  - Visual Studio Extensibility
  - Why should I extend Visual Studio?
  - Anatomy of a Visual Studio extension
- Getting ready for extensibility development (5 minutes)
- Hands on Demo: Extension for Google search (25 minutes)
- Q & A — Please keep posting questions, I will attempt to answer post session also

# Visual Studio Extensibility

1 MenuBar

2 Toolbar

Code

Context  
Menu

Context Menu

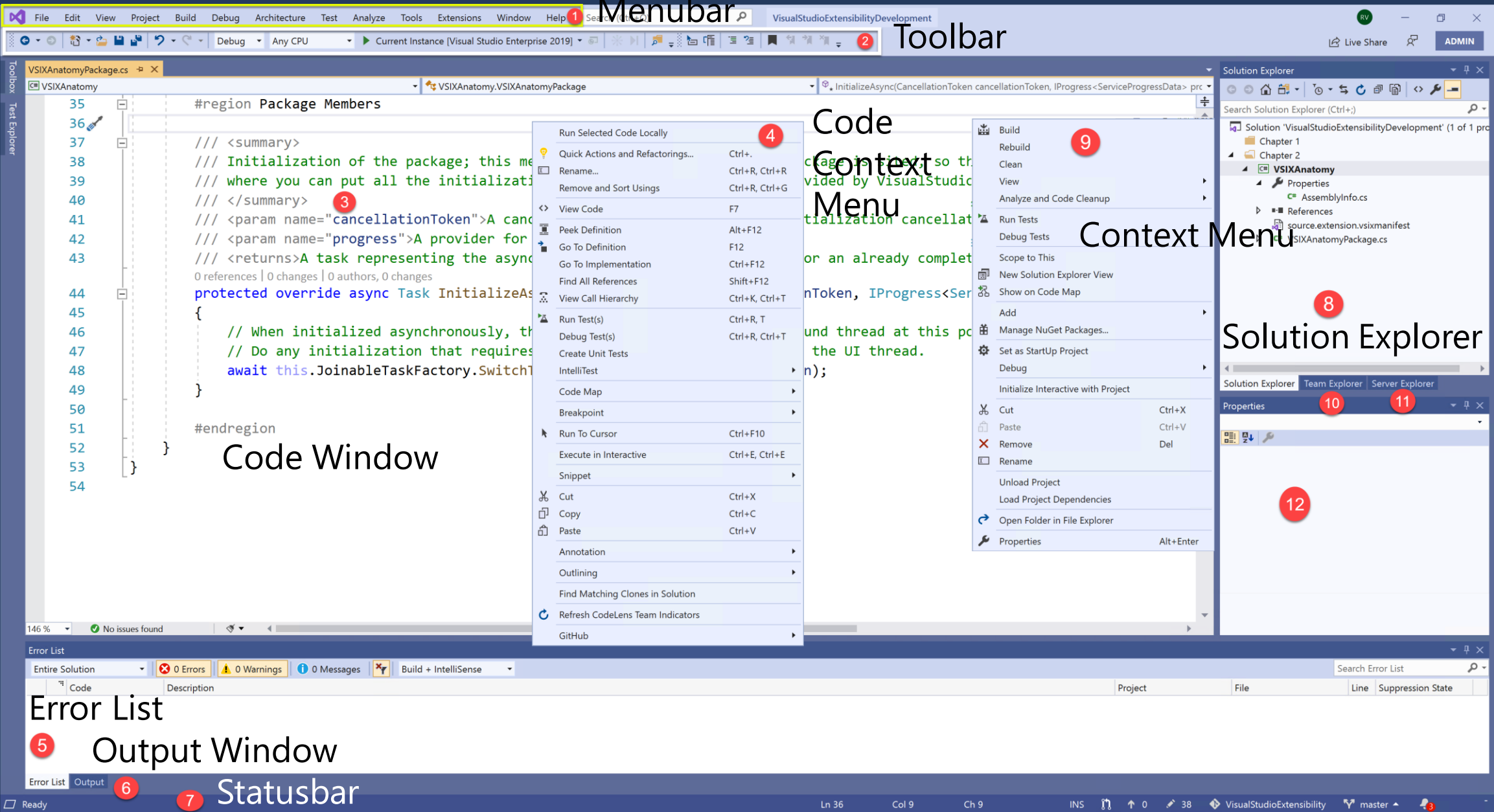
8 Solution Explorer

Code Window

5 Error List

Output Window

7 Statusbar



# What is an Extension?

*A way to add or modify Visual Studio  
functionality*

# What can be extended?

- Project and item templates
- Custom tool windows, commands, dialogs
- Code snippets
- Editor extensions
- Refactoring and code analyzers
- Debugger visualizers, profilers
- Coding standards and policy enforcers
- New language services
- And much more!

# Why should I extend Visual Studio

- Customize Visual Studio to suit your needs
- To avoid a repetitive or tedious work
- Do things faster, something that can increase your productivity
- Higher quality development
- Enforce policies or settings across the teams
- Fame and fortune
- It would be cool if...

# Why should I extend Visual Studio

## Productivity

- JetBrains Resharper
- Web Essentials
- PowerShell Tools

## Cloud and Database Services

- Azure Tools for Visual Studio
- Amazon AWS Toolkit for Visual Studio
- Cloud Explorer
- Add Connected Services

## Application Lifecycle

- AnkhSVN Subversion
- GitHub extension
- Red Gate ANTS Profiler
- InstallShield

## Languages








- Xamarin for Android and iOS
- Python Tools
- Node.js Tools
- Java
- PHP for Visual Studio

## Components


- SAP Crystal Reports
- Telerik controls
- SyncFusion controls




https://marketplace.visualstudio.com

 <https://marketplace.visualstudio.com/search?target=VS&category=All%20categories&vsVersion=&sortBy=Installs>

Visual Studio | Marketplace


Sign in 


Visual Studio | Visual Studio Code | Azure DevOps | Subscriptions | Build your own | Publish extensions

Search Visual Studio extensions 

11596 Results


Showing: All categories ▾ | Version: Any ▾ | Price: Any ▾ | Sort By: Installs ▾





**NuGet Package Manager**  
Microsoft  10.4M

A collection of tools to automate the process of downloading, installing,...


★★★★★ **FREE**




**GitHub Extension for Visual Studio**  
GitHub  github.com  2.4M

A Visual Studio Extension that brings the GitHub Flow into Visual Studio.


★★★★★ **FREE**




**AnkhSVN - Subversion**  
AnkhSVN Team  2.1M

AnkhSVN open source (free) Subversion SourceControl Provider.


★★★★★ **FREE**




**Microsoft Visual Studio Installer**  
Microsoft  2M

This official Microsoft extension provides support for Visual Studio Installer...


★★★★★ **FREE**




**Productivity Power Tools**  
Microsoft DevLabs  1.9M

A set of extensions to Visual Studio Professional (and above) which improves...

★★★★★ **FREE**



**CodeMaid**  
Steve Cadwallader  1.9M

CodeMaid is an open source Visual Studio extension to cleanup and simplify our C#,...

★★★★★ **FREE**



11.5k+  
Visual Studio  
extensions

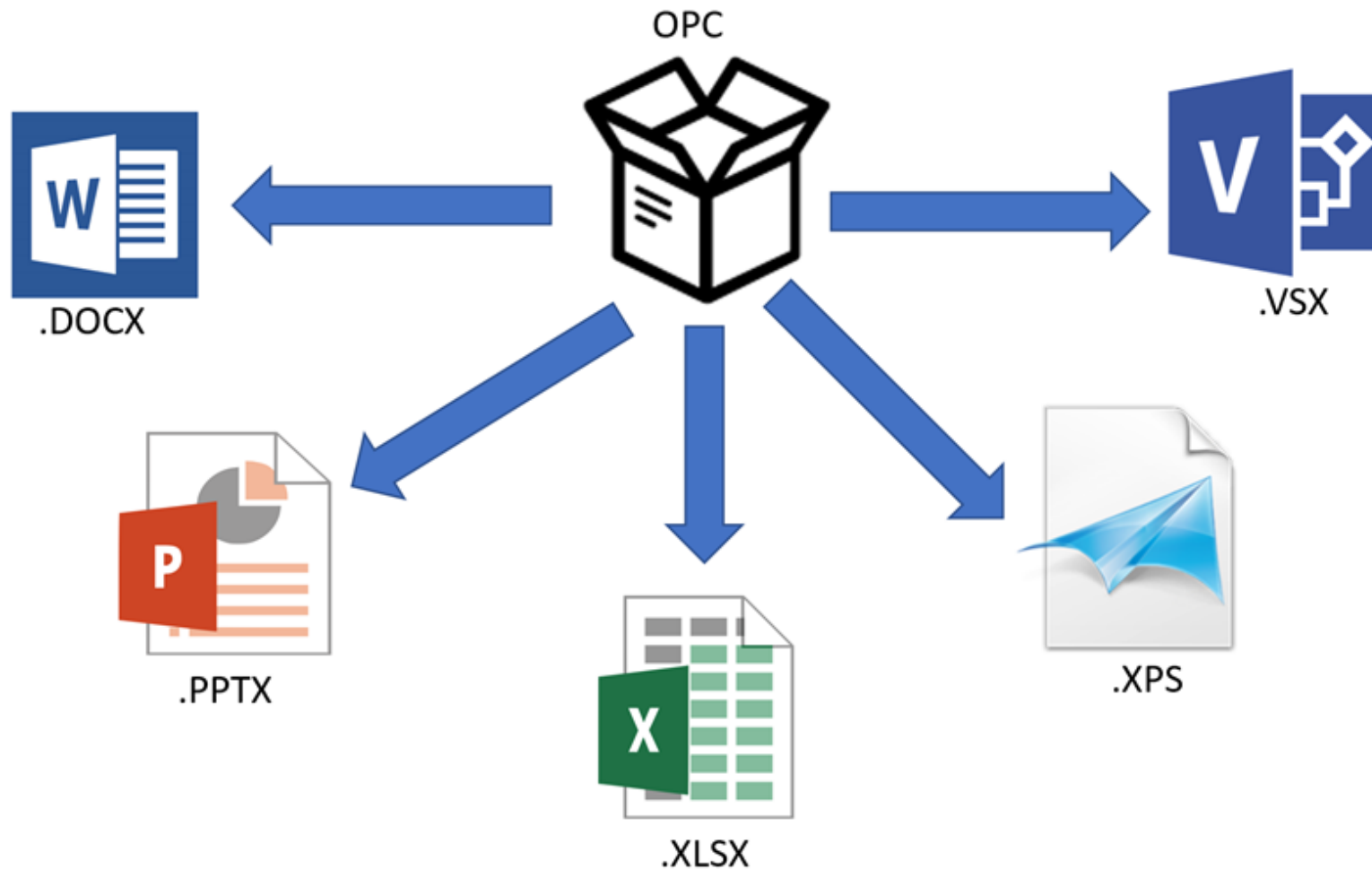
35M+  
Downloads










# Anatomy of a Visual Studio extension

- VSIX – **V**isual **S**tudio **I**nstaller **eX**tension
- Basic unit of deployment for Visual Studio
- Its an Open Package Convention (OPC) package
- Can't have file names containing whitespaces
- ZIP based package
- Visual Studio Installer recognizes this extension and installs it to the location where it can be discovered and loaded by Visual Studio when it starts and loads

# Anatomy of a Visual Studio extension

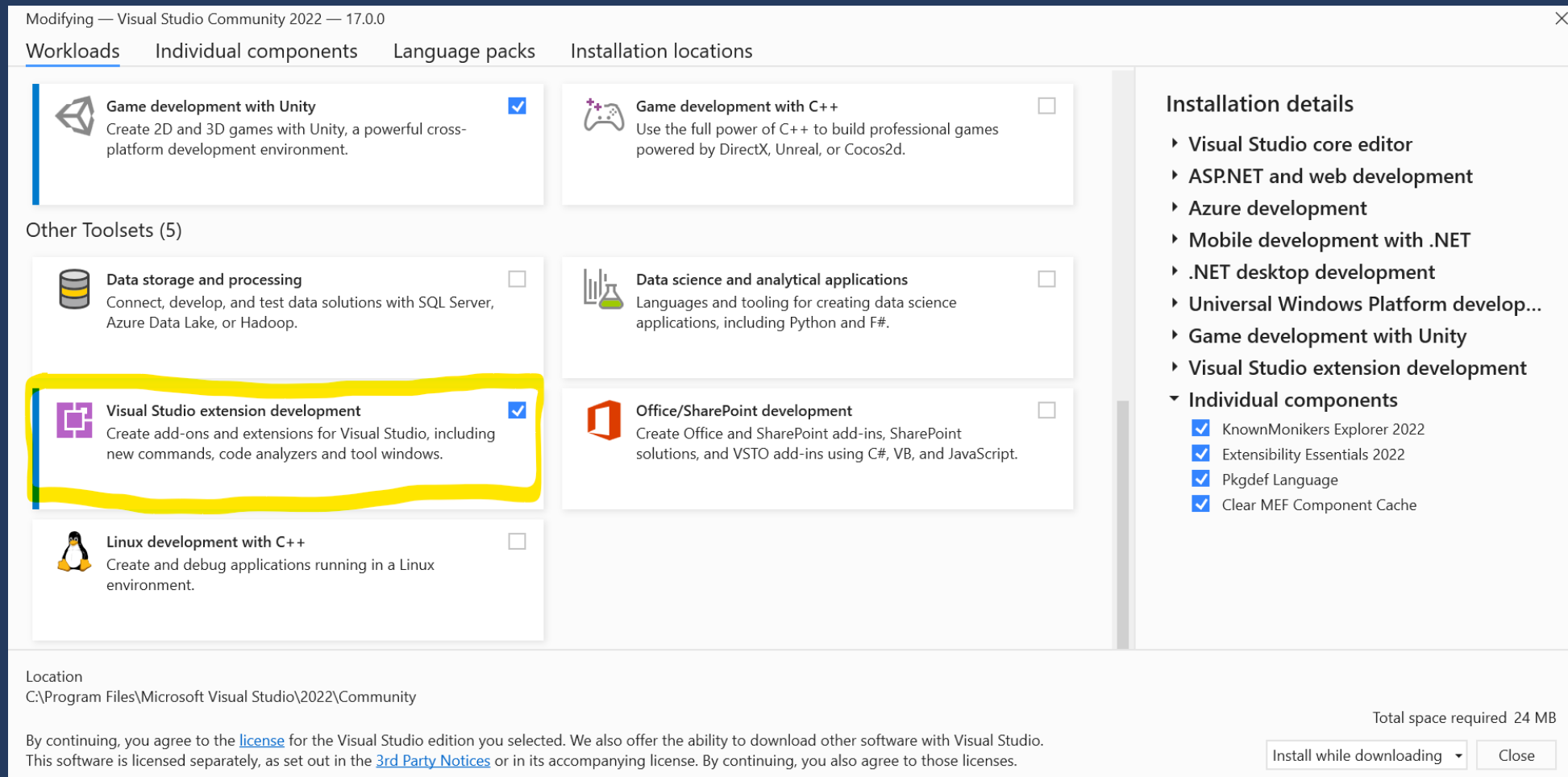


# Anatomy of a Visual Studio extension

/ > source > repos > VSIXAnatomy > VSIXAnatomy > bin > Debug > VSIXAnatomy.vsix		
Name	Type	Size
 [Content_Types].xml	XML Document	
 catalog.json	JSON File	
 DumpExtensions.dll	Application extension	
 extension.vsixmanifest	Extension Manifest	
 manifest.json	JSON File	
 VSIXAnatomy.dll	Application extension	
 VSIXAnatomy.pkgdef	Package Definition Registration File	

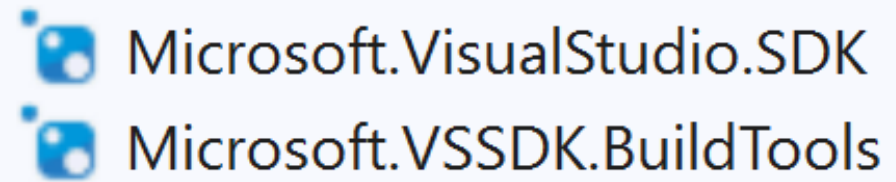
# Getting ready for Visual Studio Extensibility development

- Windows Key → Visual Studio Installer → Workloads → VS development



# Visual Studio Extensibility Model

- Visual Studio SDK (VS SDK)
- Visual Studio Packages:
  - Container for common extensibility objects
  - Unit of deployment and licensing
- VSIX package manifest
  - Identity and versioning
  - Installation targets
  - Dependencies
- Experimental instance
  - Root suffix
  - Isolation at registry and file system



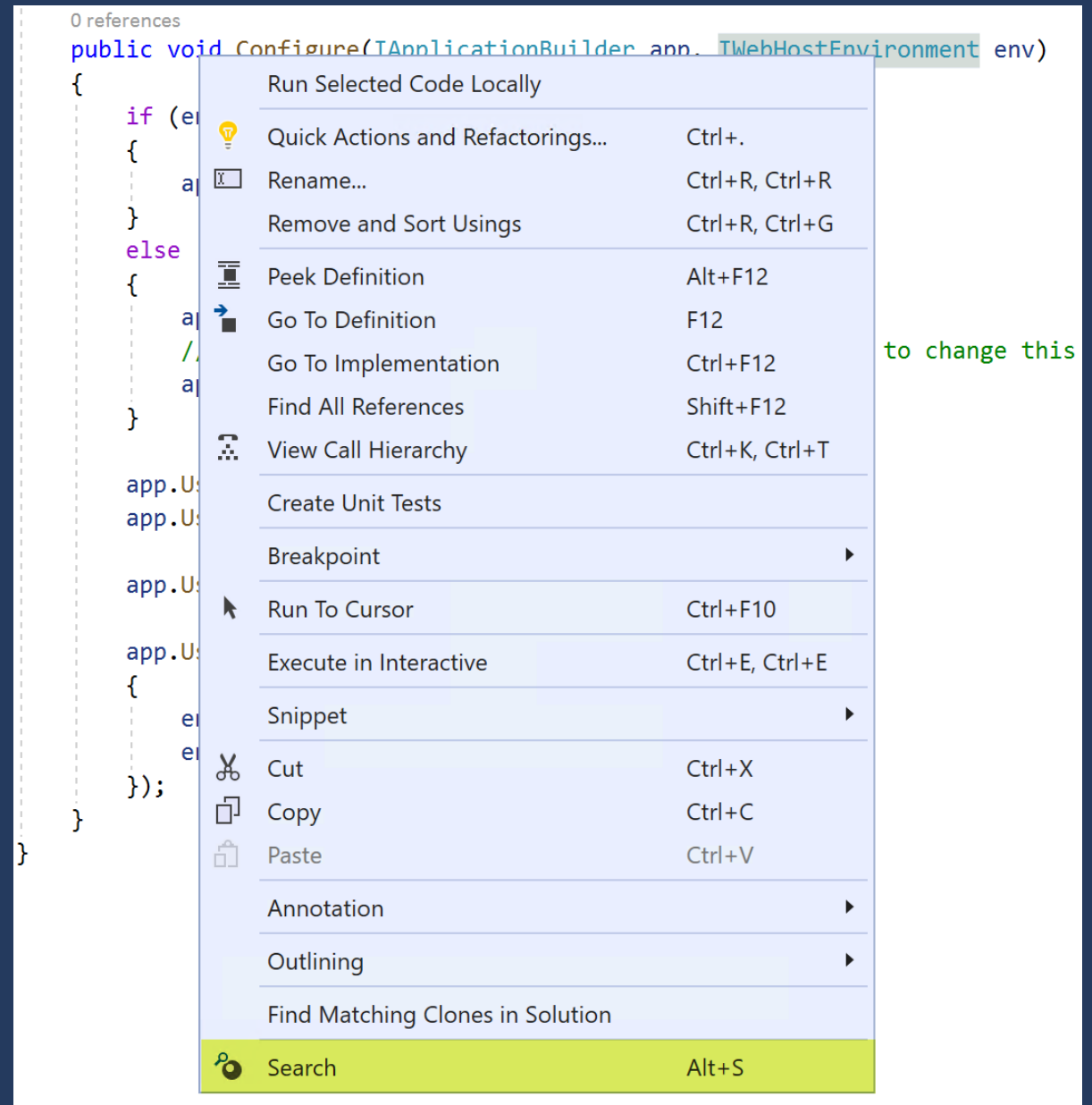
```
[Guid(ExternalSearchPackage.PackageGuidString)]  
[ProvideMenuResource("Menus.ctmenu", 1)]  
[ProvideOptionPage(typeof(ExternalSearchOptionPage), "External Search"  
1 reference  
public sealed class ExternalSearchPackage : AsyncPackage  
{
```

```
<?xml version="1.0" encoding="utf-8"?>  
<PackageManifest Version="2.0.0" xmlns="http://schemas.microsoft.  
  <Metadata>...</Metadata>  
  <Installation InstalledByMsi="true">...</Installation>  
  <Dependencies>...</Dependencies>  
  <Prerequisites>...</Prerequisites>  
  <Assets>...</Assets>  
</PackageManifest>
```

# Hands on Coding Extension



# What will we build today?

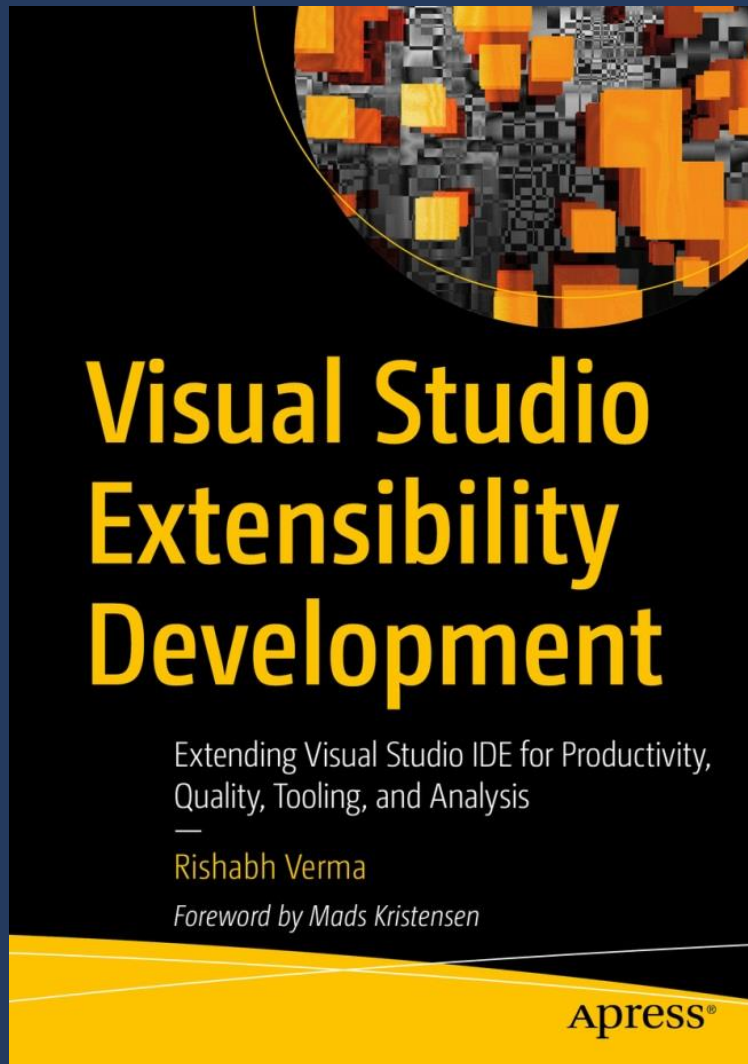


???? Questions ???? ?

# Visual Studio Extensibility Development

## Extending Visual Studio IDE for Productivity, Quality, Tooling, and Analysis

Apress®



- Discover the Visual Studio extensibility and automation model
- Code Visual Studio extensions from scratch
- Customize extensions by developing a tools option page for them
- Create project templates, item templates, and code snippets.
- Work with code generation using T4 templates

TWEET, COMMENT or POST your favorite Visual Studio Tips, Hacks or Extensions and tag #dotnetconfbbsr 2 best tips will get a free copy of my book

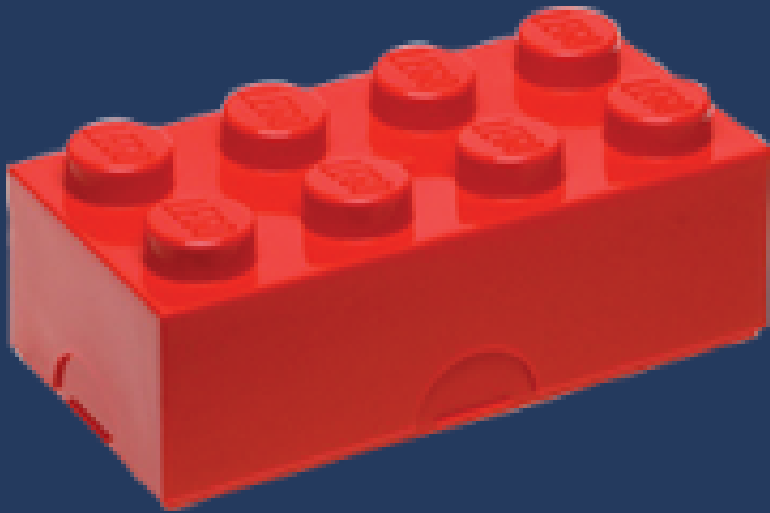
Get your copy at : Amazon, Apress sites

Thank you!

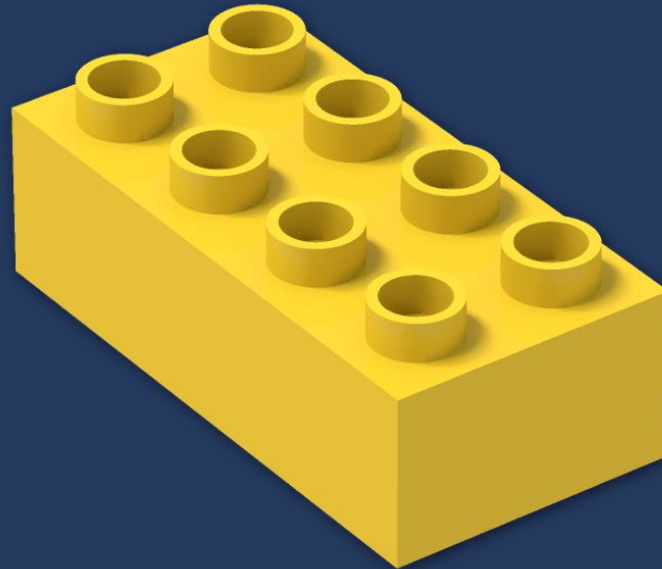
# Visual Studio extensibility model

- How do we make a software extensible?
- Managed Extensibility Framework (MEF)

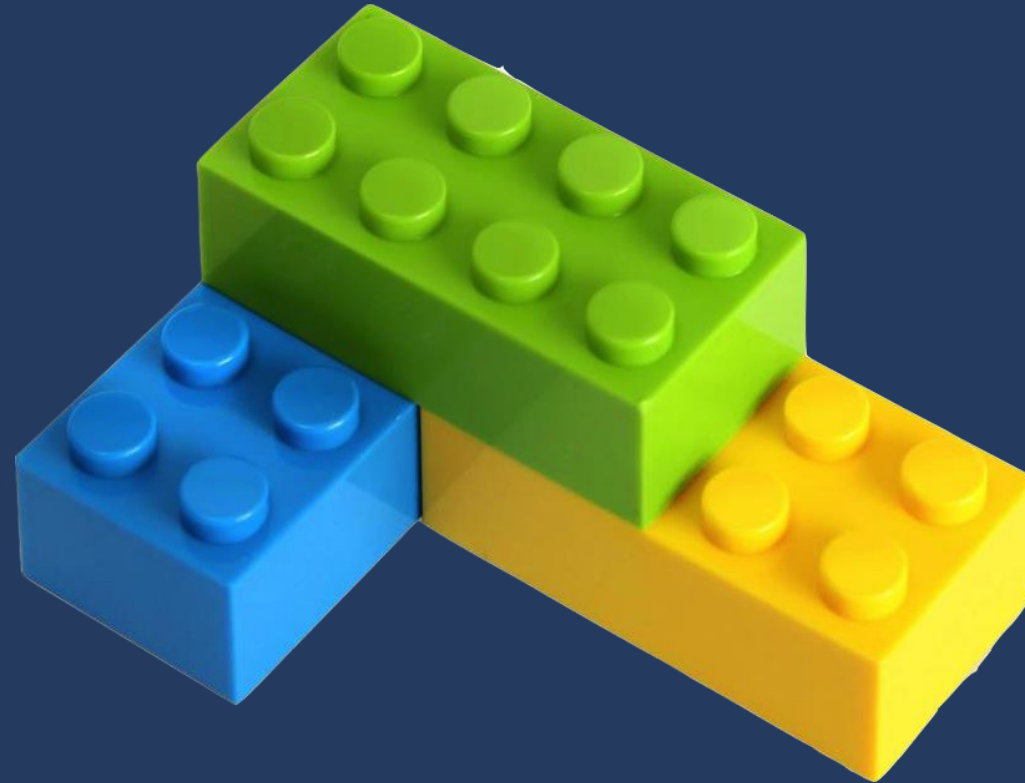
Export a service



Import a service

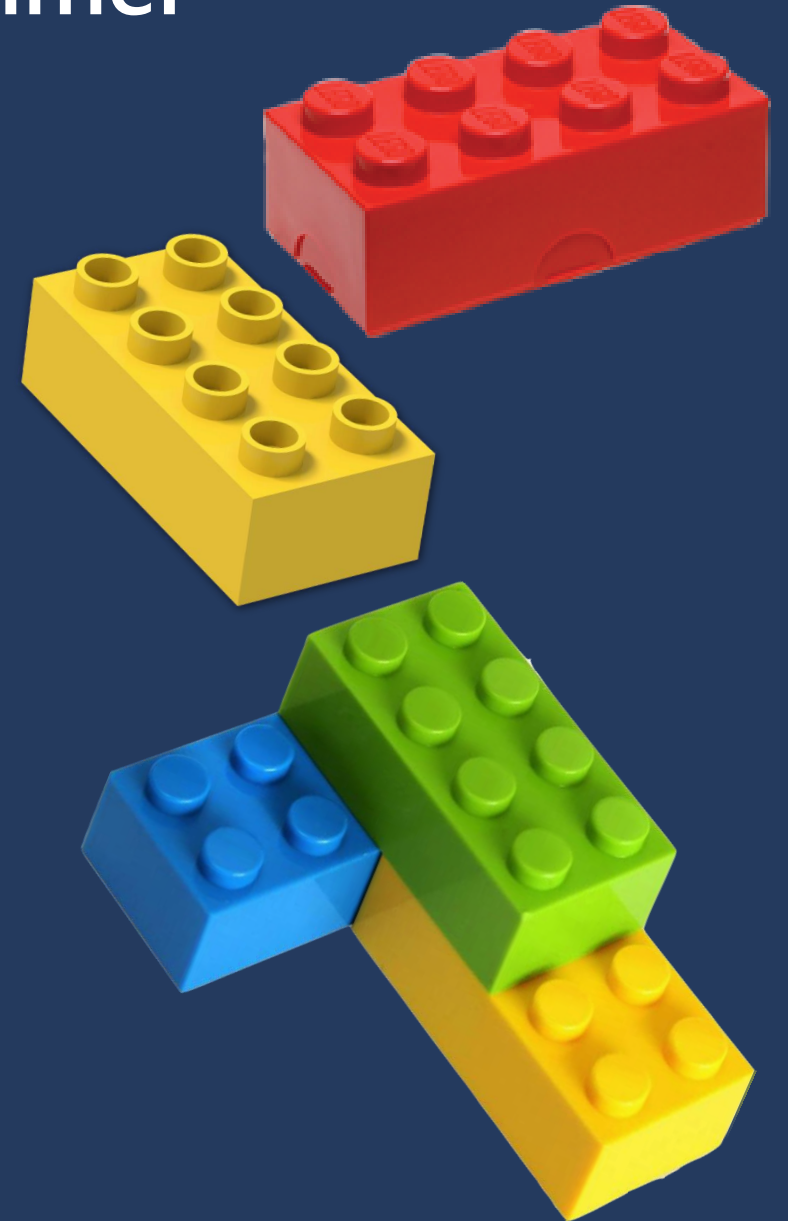


Compose

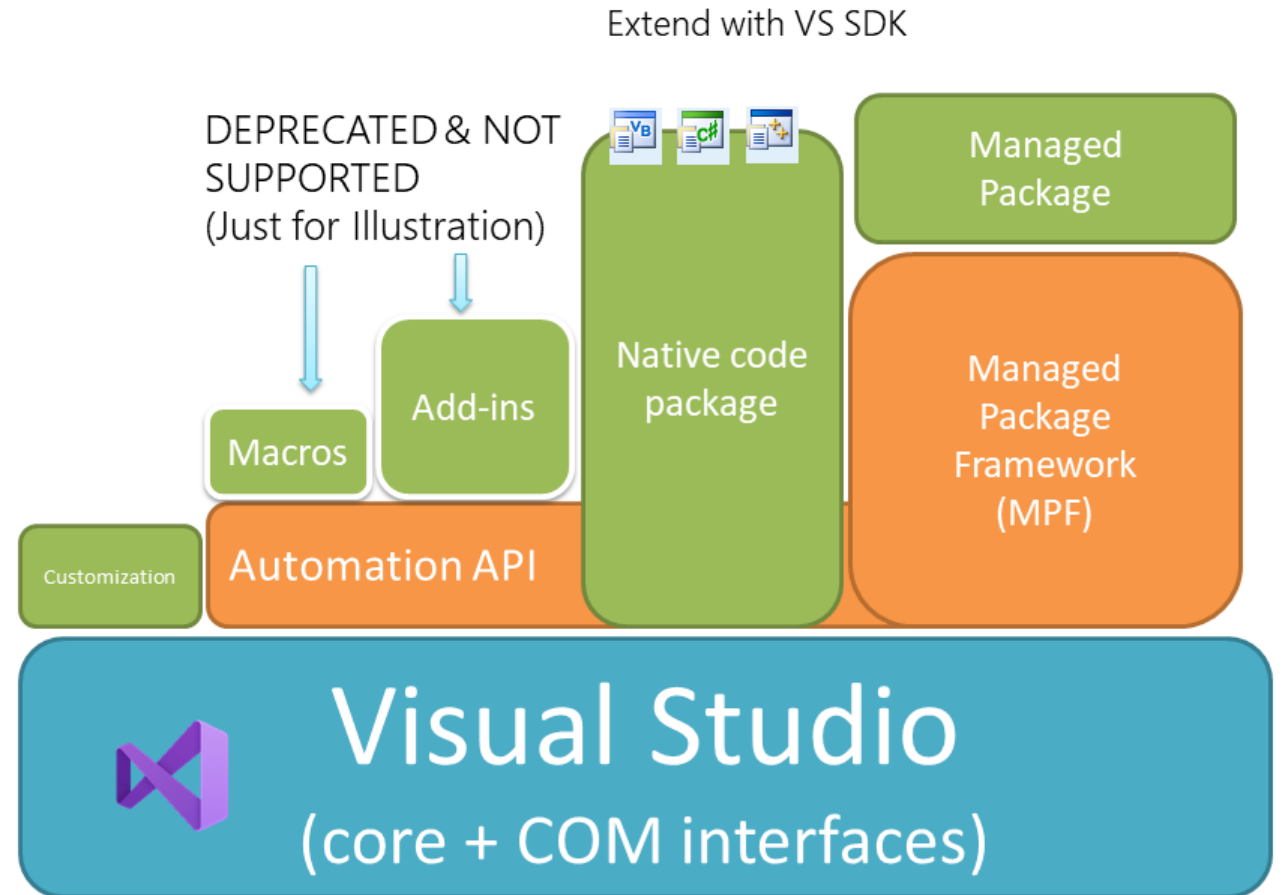


# Managed Extensibility Framework Primer

- System.ComponentModel
- Attribute based, easy to use!
- Parts export or import something
- Compose it:
  - Catalog is the provider
  - Container is the matchmaker
- Types of catalogs:
  - TypeCatalog
  - AssemblyCatalog
  - DirectoryCatalog
  - AggregatingCatalog
- Why MEF?
  - Composability and decoupling
  - Partitioning and modularity
  - Maintainability



# Visual Studio Extensibility Model



# How Visual Studio discovers and loads an extension?

- Master Package Definition File
- MEF

devenv.exe	9340	CloseFile	C:\Program Files (x86)	SUCCESS
devenv.exe	9340	CreateFile	C:\Program Files (x86)\Microsoft Visual Studio	SUCCESS
devenv.exe	9340	QueryDirectory	C:\Program Files (x86)\Microsoft Visual Studio\2019	SUCCESS
devenv.exe	9340	CloseFile	C:\Program Files (x86)\Microsoft Visual Studio	SUCCESS
devenv.exe	9340	CreateFile	C:\Program Files (x86)\Microsoft Visual Studio\2019	SUCCESS
devenv.exe	9340	QueryDirectory	C:\Program Files (x86)\Microsoft Visual Studio\2019\Enterprise	SUCCESS
devenv.exe	9340	CloseFile	C:\Program Files (x86)\Microsoft Visual Studio\2019	SUCCESS
devenv.exe	9340	CreateFile	C:\Program Files (x86)\Microsoft Visual Studio\2019\Enterprise	SUCCESS
devenv.exe	9340	QueryDirectory	C:\Program Files (x86)\Microsoft Visual Studio\2019\Enterprise\Common7	SUCCESS
devenv.exe	9340	CloseFile	C:\Program Files (x86)\Microsoft Visual Studio\2019\Enterprise	SUCCESS
devenv.exe	9340	CreateFile	C:\Program Files (x86)\Microsoft Visual Studio\2019\Enterprise\Common7	SUCCESS
devenv.exe	9340	QueryDirectory	C:\Program Files (x86)\Microsoft Visual Studio\2019\Enterprise\Common7\IDE	SUCCESS
devenv.exe	9340	CloseFile	C:\Program Files (x86)\Microsoft Visual Studio\2019\Enterprise\Common7	SUCCESS
devenv.exe	9340	CreateFile	C:\Program Files (x86)\Microsoft Visual Studio\2019\Enterprise\Common7\IDE	SUCCESS
devenv.exe	9340	QueryDirectory	C:\Program Files (x86)\Microsoft Visual Studio\2019\Enterprise\Common7\IDE\devenv.exe	SUCCESS
devenv.exe	9340	CloseFile	C:\Program Files (x86)\Microsoft Visual Studio\2019\Enterprise\Common7\IDE	SUCCESS
devenv.exe	9340	CreateFile	C:\Program Files (x86)\Microsoft Visual Studio\2019\Enterprise\Common7\IDE\devenv.exe	SUCCESS
devenv.exe	9340	QueryBasicInfo...	C:\Program Files (x86)\Microsoft Visual Studio\2019\Enterprise\Common7\IDE\devenv.exe	SUCCESS
devenv.exe	9340	CloseFile	C:\Program Files (x86)\Microsoft Visual Studio\2019\Enterprise\Common7\IDE\devenv.exe	SUCCESS
devenv.exe	9340	CreateFile	C:\Program Files (x86)\Microsoft Visual Studio\2019\Enterprise\Common7\IDE\devenv.exe	SUCCESS
devenv.exe	9340	QueryBasicInfo...	C:\Program Files (x86)\Microsoft Visual Studio\2019\Enterprise\Common7\IDE\devenv.exe	SUCCESS
devenv.exe	9340	CloseFile	C:\Program Files (x86)\Microsoft Visual Studio\2019\Enterprise\Common7\IDE\devenv.exe	SUCCESS
devenv.exe	9340	CreateFile	C:\Program Files (x86)\Microsoft Visual Studio\2019\Enterprise\Common7\IDE\devenv.exe	SUCCESS
devenv.exe	9340	QueryBasicInfo...	C:\Program Files (x86)\Microsoft Visual Studio\2019\Enterprise\Common7\IDE\devenv.exe	SUCCESS
devenv.exe	9340	CloseFile	C:\Program Files (x86)\Microsoft Visual Studio\2019\Enterprise\Common7\IDE\devenv.exe	SUCCESS
devenv.exe	9340	CreateFile	C:\Program Files (x86)\Microsoft Visual Studio\2019\Enterprise\Common7\IDE\devenv.exe	SUCCESS
devenv.exe	9340	QueryBasicInfo...	C:\Program Files (x86)\Microsoft Visual Studio\2019\Enterprise\Common7\IDE\devenv.exe	SUCCESS
devenv.exe	9340	CloseFile	C:\Program Files (x86)\Microsoft Visual Studio\2019\Enterprise\Common7\IDE\devenv.exe	SUCCESS
devenv.exe	9340	CreateFile	C:\Program Files (x86)\Microsoft Visual Studio\2019\Enterprise\Common7\IDE\devenv.PkgDef	NAME NOT FOUND
devenv.exe	9340	CreateFile	C:\Program Files (x86)\Microsoft Visual Studio\2019\Enterprise\Common7\IDE\master.pkgdef	SUCCESS
devenv.exe	9340	QueryBasicInfo...	C:\Program Files (x86)\Microsoft Visual Studio\2019\Enterprise\Common7\IDE\master.pkgdef	SUCCESS
devenv.exe	9340	CloseFile	C:\Program Files (x86)\Microsoft Visual Studio\2019\Enterprise\Common7\IDE\master.pkgdef	SUCCESS



# Master.pkgdef

```
[$Initialization$]  
"ApplicationExtensionsFolder" = "$RootFolder$\Common7\IDE\Extensions"  
"PkgDefSearchPath"           = "$ApplicationExtensionsFolder$;$RootFolder$\Common7\IDE\CommonExtensions;  
"UserExtensionsRootFolder"   = "$AppDataLocalFolder$\Extensions"  
"RegistryRoot"               = "Software\Microsoft\VisualStudio\16.0"  
"ImageManifestSearchPath"    = "$RootFolder$\Common7\IDE\Extensions;$RootFolder$\Common7\IDE\CommonExten
```

# Top Visual Studio Extensions for Development

- Extensibility essentials 2019,
- Live Share,
- Cloud Explorer
- Resharper/CodeMaid/StyleCop,
- Syntax Visualizer,
- Roslynator 2019,
- Snippet Designer,
- .NET Portability Analyzer,
- ILSpy



**Scott Hanselman** ✓

@shanselman

Hey .NET people, what are your favorite [@VisualStudio](#) extensions? [@mika\\_dumont](#)

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72 Retweets and comments 358 Likes



**Rishabh Verma** @VermaRishabh · Mar 11

Replying to [@shanselman](#) [@VisualStudio](#) and [@mika\\_dumont](#)

Extensibility essentials 2019,  
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from the top of my head!



2

