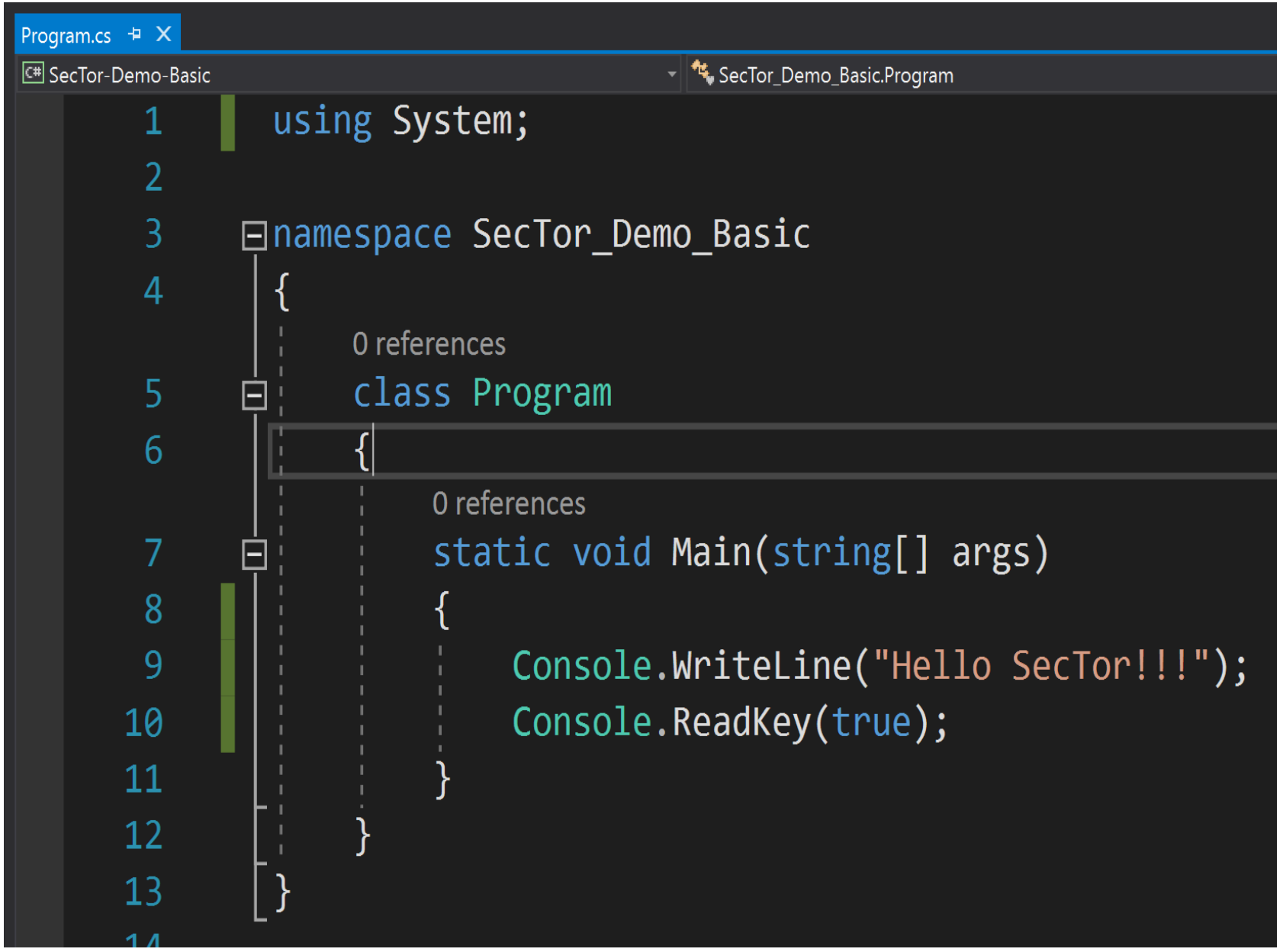



# POWERSHELL IS DEAD… LONG LIVE C SHARP

**SecTor 2019**

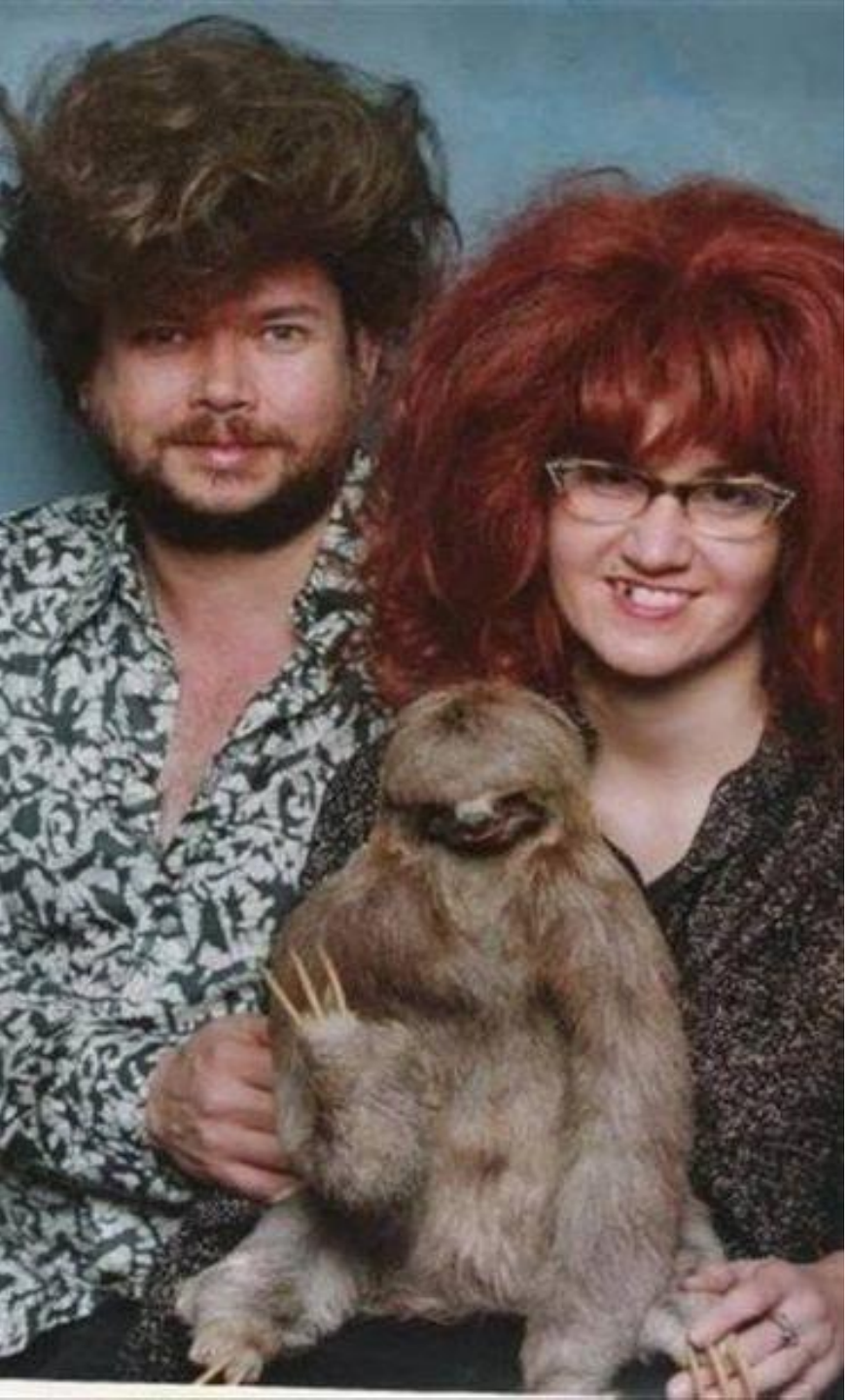
# IN THIS TALK

- What is .NET
- C# for attacking
- Attack demos
- Detecting malicious C#
- Detection demos

FYI…

PowerShell is ***NOT*** dead ;)

It just has such a heavy amount of defensive research



# WHOAMI

- Lee Kagan
- Sr. Principal OffSec R&D @ Symantec
- Co-founder @ RedBlack Security
- Co-founder @ The C3X
- Twitter @InvokeThreatGuy

# WHAT IS .NET?

- Software development framework from Microsoft (v1.0 in 2002)
- Common Language Runtime
  - Runtime environment
- Managed code (when targeting .NET)

# WHAT IS .NET?

- Threading, type-safety, garbage collection ***managed*** for you
- Framework Class Library (FCL)
  - Object-oriented and reusable libraries
  - ***Assemblies*** in .NET speak

# WHAT IS .NET?

- Supports a lot of development languages
  - C#, C++
  - JScript, VBScript
  - PowerShell, IronPython
  - …and soooo much more!

# WHAT IS .NET?

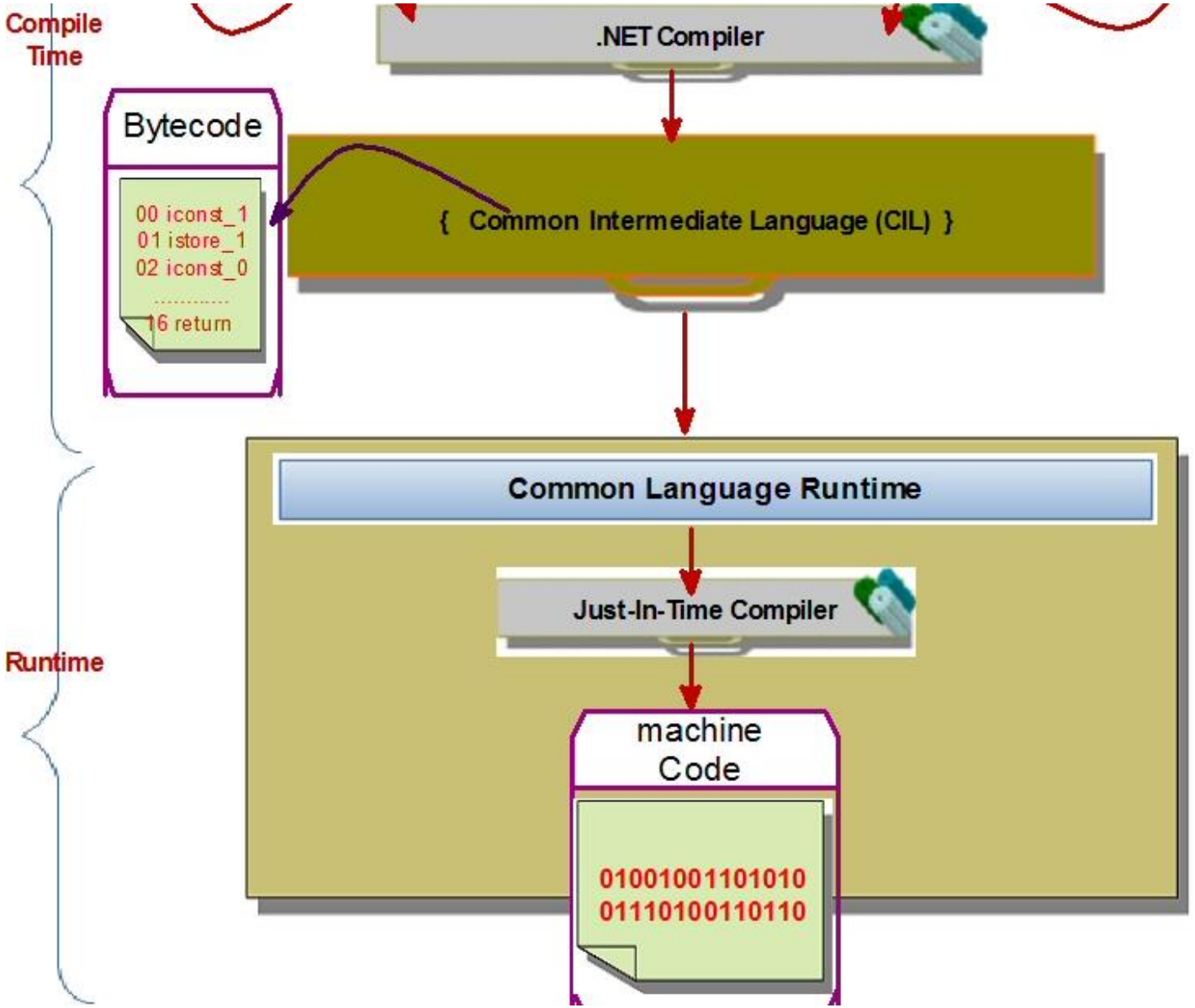
- Not just for Windows
- Mono, Xamarin and .NET Core allow for targeting non-Windows platforms (.NET Standard)

# WHAT IS .NET?

- Lots of terms and acronyms to know (yuck)
- CLR – Common Language Runtime
- CLI – Common Language Infrastructure
- MSIL / CIL – Microsoft Intermediate Language / Common Intermediate Language

# WHAT IS .NET?

- GAC – Global Assembly Cache
- JIT compiler – Just In Time
- FCL – Framework Class Library
- You guessed it…there are more!




# WHAT IS .NET

https://prabirchoudhury.wordpress.com/2008/12/15/common-language-runtime-clr/clr_image21/

# BASIC C# CODE EXAMPLE

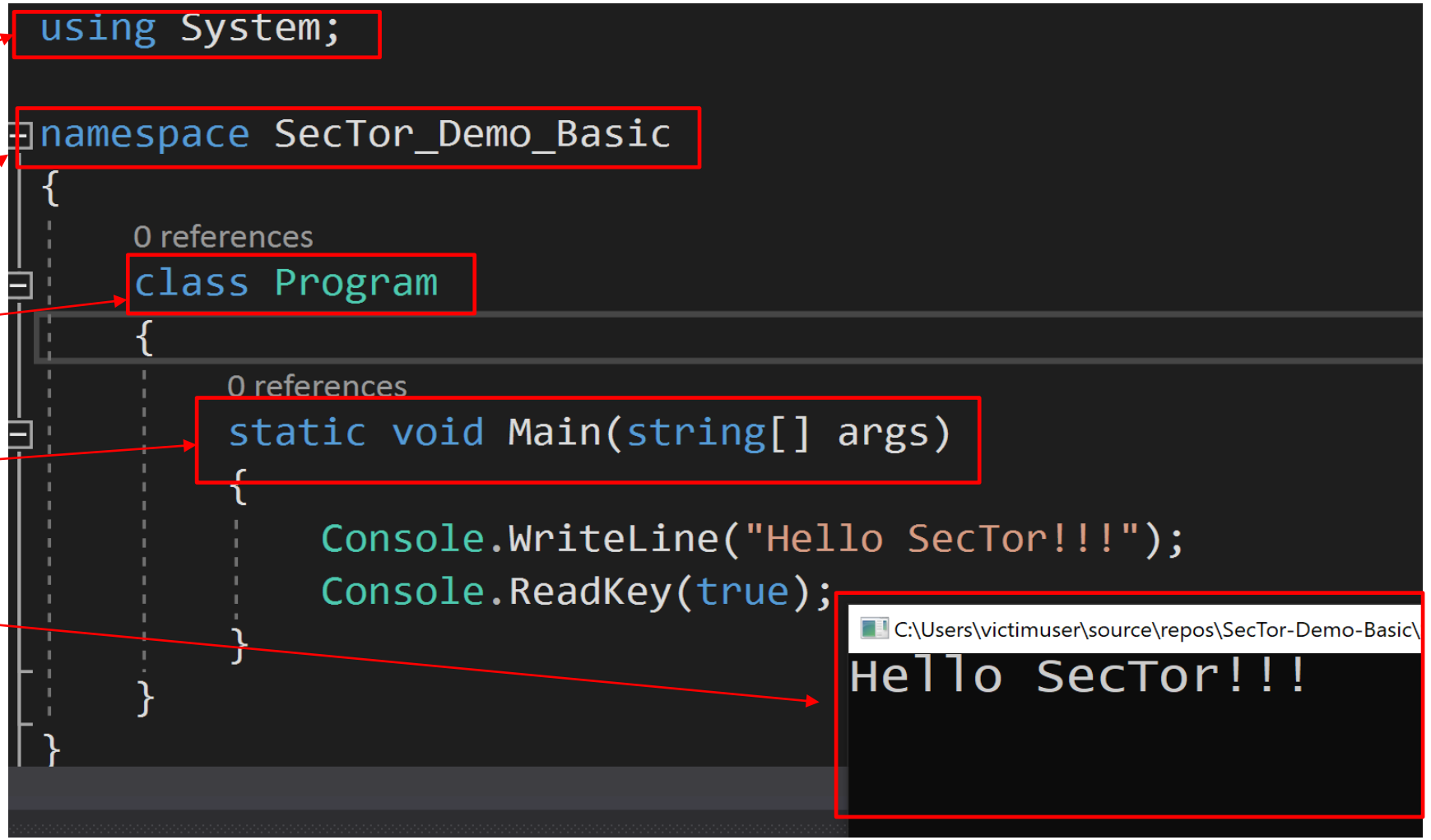
Using statement

Project namespace

A class

Main method

The compiled program



# C# FOR ATTACKING

- PowerShell has been defensively covered very well over the years (still works great though)
- Malicious C# detections are not widely explored territory (just yet)
- Learning entry point to writing in C# is very low

# C# FOR ATTACKING

- Porting PowerShell tools to C# is quite simple
- Like PowerShell, staying very native to Windows
  - Still living off the land ☺
- Can still access Win32 fun stuff (VirtualAlloc, CreateProcess)
  - Commonly called ***pinvoking***

# OFFENSIVE C# TOOLING

- Amazing and rapidly growing public set of C# tools
  - GhostPack – Sorta ports of Mimikatz (SafetyKatz, Rubeus), SharpView, SeatBelt
  - Covenant – An entire C2 framework
  - Cobalt Strike's execute-assembly
    - feature that lets you load a .NET assembly in-memory

# OFFENSIVE C# TOOLING

- A lot of ways to run C# code
  - In PowerShell via AddType
  - Wrapped and LOLbin'd as a .csproj with MSBuild
  - Can dynamically compile raw C# code in memory

# OFFENSIVE C# TOOLING - DEMO

- Going to demonstrate…
  - Malicious .csproj file executed with msbuild
  - C# process injection using QueueUserApc
  - C# embedded in PowerShell via AddType
  - Cobalt Strike's execute-assembly

# DETECTING MALICIOUS C#

- ***No silver bullets***
- AMSI in .NET 4.8
- Managed code running in unmanaged process
- Loading of the CLR and dependent assemblies into a process (similar to above)

# DETECTING MALICIOUS C#

- ETW (Event Tracing for Windows)
- Can still hook API calls like anything else
- C# can be "reverse engineered" very easily
- Can decompile back to source code with minimal effort

# DETECTING MALICIOUS C# - DEMO

- AMSI detecting malicious Assembly.Load() in .NET 4.8
- Detecting ImageLoads via SilkETW
- Detecting CLR reflection via Get-ClrReflection
- Process injection using Get-InjectedThread
- ”Reverse engineering” .NET PE via ILSpy

# KEY TAKEAWAYS

For offensive folks:

- Shift to C# from PowerShell for ‘stealth’
- Can operate in-memory
- Bring your own interpreter (check out Silent Trinity)
- .NET APIs are are super rich
- Interoperability is huge

# KEY TAKEAWAYS

For defensive folks:

- The usual suspects (process creation, image loads, CRT)
- Application baseline and AWL is still really important
- The list/combo of Windows APIs should still be hooked
- AMSI can help a lot (4.8 may take some time)
- Understanding .NET operations artifacts

# THE END

THANK YOU SO MUCH SECTOR!!! ☺