WiX Toolset

The bees knees of MSI authoring

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Description

A 20 minute crash course on the basics of: Using the WiX Toolset to create your own MSIs. Debugging your MSIs. Creating a UI for your MSIs. Making MSI creation flexible enough for automation.

Speaker Bio

Charles Yost is currently a Security Developer at Binary Defense Systems. He has worked in the IT industry for over 10 years in a wide variety of roles including: Printer Technician, VoIP Systems Administrator, .Net Developer, and Web Developer. Throughout life his number one passion has been learning new skills. He can often be found researching a topic, attempting to keep up with the quickly evolving field of technology. Charles enjoys teaching and talking to others about technology. He is a member of NEOISF, and attends as many InfoSec conferences as he can justify with his wife.

Binary Defense Systems

We are an MSSP providing 24/7/365 Monitoring & Detection, Threat Intelligence, SIEM Management, Incident Response and Consulting Services.

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This Talk:
`https://github.com/Yoshi325/talks-wix-toolset`

Showtime!

Why?

Repackage a product that isn't distributed as one.

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Repackage a product that isn't distributed as one.
Create a pre-configured or pre-seeded install.
Package an exploit or payload disguised as a valid installer.

How?

WiX Toolset @ `http://wixtoolset.org/`

WiX Toolset

What is it?

The WiX toolset lets developers create installers for Windows Installer, the Windows installation engine.

Tools in the Set

Candle

Preprocesses and compiles WiX source files into object files (.wixobj).

Light

Links and binds one or more .wixobj files and creates a Windows Installer database (.msi or .msm).

And Many More!

- Lit
- Dark
- Heat
- Insignia
- Melt
- Torch
- Smoke
- Pyro
- WixCop
- WixUnit
- Lux & Nit

How?

It all starts with a wxs file.

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A wxs file is basically a specially constructed xml file.

The Rules

WiX Schema Reference

Lets Build One!

Starting Out

Xml Declaration

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```
<?xml version="1.0"?>
```

Wix Element

This is the top-level container element for every wxs file.

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```
<?xml version="1.0"?>
<Wix xmlns="http://schemas.microsoft.com/wix/2006/wi">
...
</Wix>
```

Product Element

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When linking, only one Product section can be given to the linker to produce a successful result.
Using this element creates an msi file.

```
<?xml version="1.0"?>
<Wix xmlns="http://schemas.microsoft.com/wix/2006/wi">
  <Product
    Id='*'
    Language='1033'
    Manufacturer='Wash N Go'
    Name='Window Cleaner'
    UpgradeCode='$(var.ProductUpgradeCodeGuid)'
    Version='1.0.0.0'
  >
  </Product>
</Wix>
```

Product Attributes

Id	The product code GUID for the product.
Language	1033 is English/US
Manufacturer	The manufacturer of the product.
Name	The descriptive name of the product.
UpgradeCode	The upgrade code GUID for the product.
Version	The product's version string.

Product Attr. Tips

Id	You can use * to have this auto generated.
UpgradeCode	How you tie different versions together

Package Element

Properties about the package,
which can be seen on the package in Explorer.

```
<?xml version="1.0"?>
<Wix xmlns="http://schemas.microsoft.com/wix/2006/wi">
  <Product
    [...]
  >
    <Package
      Compressed='yes'
      Description='For Cleaning Windows'
      InstallerVersion='200'
      InstallScope='perMachine'
      Platform='x86'
    />
  </Product>
</Wix>
```

Package Attributes

Compressed	Set to ‘yes’ to have compressed files in the source.
Description	The product full name or description.
InstallerVersion	The minimum version of the Windows Installer required to install this package.
InstallScope	Use this attribute to specify the installation scope of this package: per-machine or per-user.
Platform	The platform supported by the package.

Package Attr. Tips

InstallerVersion Unless you know you need something else: 200.

Platform Probably x86, maybe x64.

Directory Element

Directory layout for the product.

```
<?xml version="1.0"?>
<Wix xmlns="http://schemas.microsoft.com/wix/2006/wi">
  <Product [...]>
    <Package [...]/>
    <Directory Id='ProgramFilesFolder'>
      <Directory Id='COMPANYDIRECTORY' Name='WashNGo'>
        <Directory Id='INSTALLDIRECTORY' Name='WindowCleane
        </Directory>
      </Directory>
    </Directory>
  </Product>
</Wix>
```

Directory Attributes

Id This value is the unique identifier of the directory entry.

Directory Attr. Tips

Id Might be a special one like ProgramFilesFolder.
Might be a generic one like COMPANYDIRECTORY or INSTALLDIRECTORY.

Name If Id is a generic one, Name sets the name.

Component Element

Component for parent Directory. Required to group files.

```
<?xml version="1.0"?>
<Wix xmlns="http://schemas.microsoft.com/wix/2006/wi">
  <Product [...]>
    <Package [...]/>
    <Directory Id='ProgramFilesFolder'>
      <Directory Id='COMPANYDIRECTORY' Name='WashNGo'>
        <Directory Id='INSTALLDIRECTORY' Name='WindowCleane
          <Component
            Id='WINDOWCLEANERCOMPONENT'
            Win64='no'>
          </Component>
        </Directory>
      </Directory>
    </Directory>
  </Product>
</Wix>
```

Component Attributes

Id	Component identifier; this is the primary key for identifying components.
Win64	Set this attribute to 'yes' to mark this as a 64-bit component.

File Element

How to add files to your installer.

```
<?xml version="1.0"?>
<Wix xmlns="http://schemas.microsoft.com/wix/2006/wi">
  <Product [...]>
    <Package [...]/>
    <Directory Id='ProgramFilesFolder'>
      <Directory Id='COMPANYDIRECTORY' Name='WashNGo'>
        <Directory Id='INSTALLDIRECTORY' Name='WindowCleane
          <Component [...]>
          <File
              Name='window-cleaner.exe'
              Source='from\window-cleaner.exe'
          />
          </Component>
        </Directory>
      </Directory>
    </Directory>
  </Product>
</Wix>
```

File Attributes

Name	What the file will be installed as.
Source	Where to get the file when packaging.

Feature & ComponentRef Elements

Feature	Minimum to install something.
ComponentRef	Create a reference to a Component element for install.

```
<?xml version="1.0"?>
<Wix xmlns="http://schemas.microsoft.com/wix/2006/wi">
  <Product [...]>
    <Package [...]/>
    <Directory [...]/>
    <Feature Id='Complete' Level='1'>
      <ComponentRef Id='WINDOWCLEANERCOMPONENT'/>
    </Feature>
  </Product>
</Wix>
```

Media Element

Media element describes a disk that makes up the source media for the installation.

```
<?xml version="1.0"?>
<Wix xmlns="http://schemas.microsoft.com/wix/2006/wi">
  <Product [...]>
    <Package [...]/>
    <Directory [...]/>
    <Feature [...]/>
    <Media
      Id='1'
      Cabinet='DiskOne.cab'
      EmbedCab='yes'
    />
  </Product>
</Wix>
```

Media Attributes

Id	Disk identifier.
Cabinet	Cabnet file for the compressed files.
EmbedCab	Instructs the binder to embed the cabinet in the product if ‘yes’.

Media Attr. Tips

Id This number must be equal to or greater than 1.

Now to Compile

Run candle against the wxs file:

```
candle.exe window-cleaner.wxs
```

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Run candle against the wxs file:

```
candle.exe window-cleaner.wxs
```

This will output errors, or a wixobj file.

Next to Link & Bind

Run light against the wixobj file:

```
light.exe -out window-cleaner-1.0.msi window-cleaner.wixobj
```

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Run light against the wixobj file:

```
light.exe -out window-cleaner-1.0.msi window-cleaner.wixobj
```

This will output errors, or a msi file.

What about UI?

WiX Toolset isn't just tools. It comes with some useful dialog sets.

- WixUI_Advanced
- WixUI_FeatureTree
- WixUI_InstallDir
- WixUI_Minimal
- WixUI_Mondo

Debugging Tips

Enable Windows Installer logging:

```
HKLM:\\Software\\Policies\\Microsoft\\Windows\\Installer
```

Debugging Tips

Call the MSI with the logging flags:

```
msiexec /i window-cleaner-1.0.msi /l*v window-cleaner.log
```

Debugging Tips

Under the covers:
Orca from the Windows SDK

The End

Enjoy the rest of BSidesCLE 2016!!