

User Account Control Overview

Windows Application Quality Team
Microsoft Corporation

User Account Control Goals

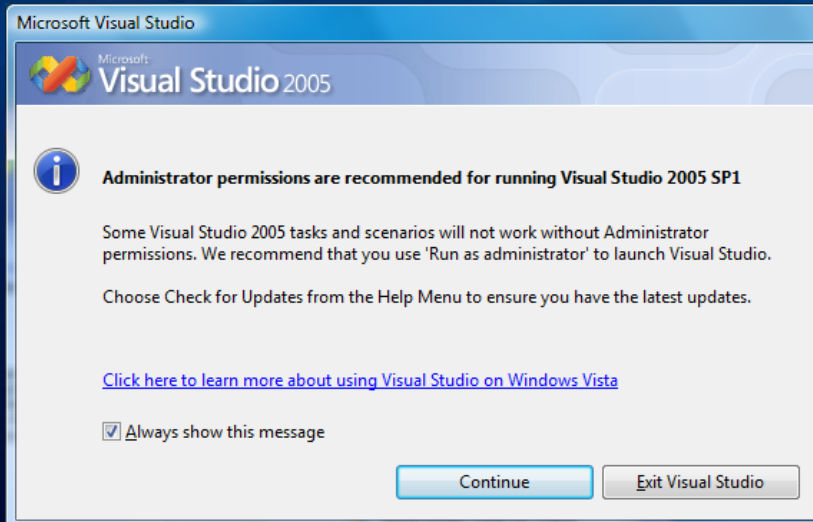
- Enable users to run with standard user rights
 - Defend against system changes
 - Reduce impact of malware
 - Defend against compromise of information
- Keep applications working

The Standard User Problem



I am a
developer,
not a
STANDARD
user!

Too many apps
break as standard
user. It's not worth
the trouble.



The UAC Solution

- Make it possible for most apps to run
- Remove excuses for running as administrator
- Encourage ISVs to develop for non-admins

UAC for Standard Users

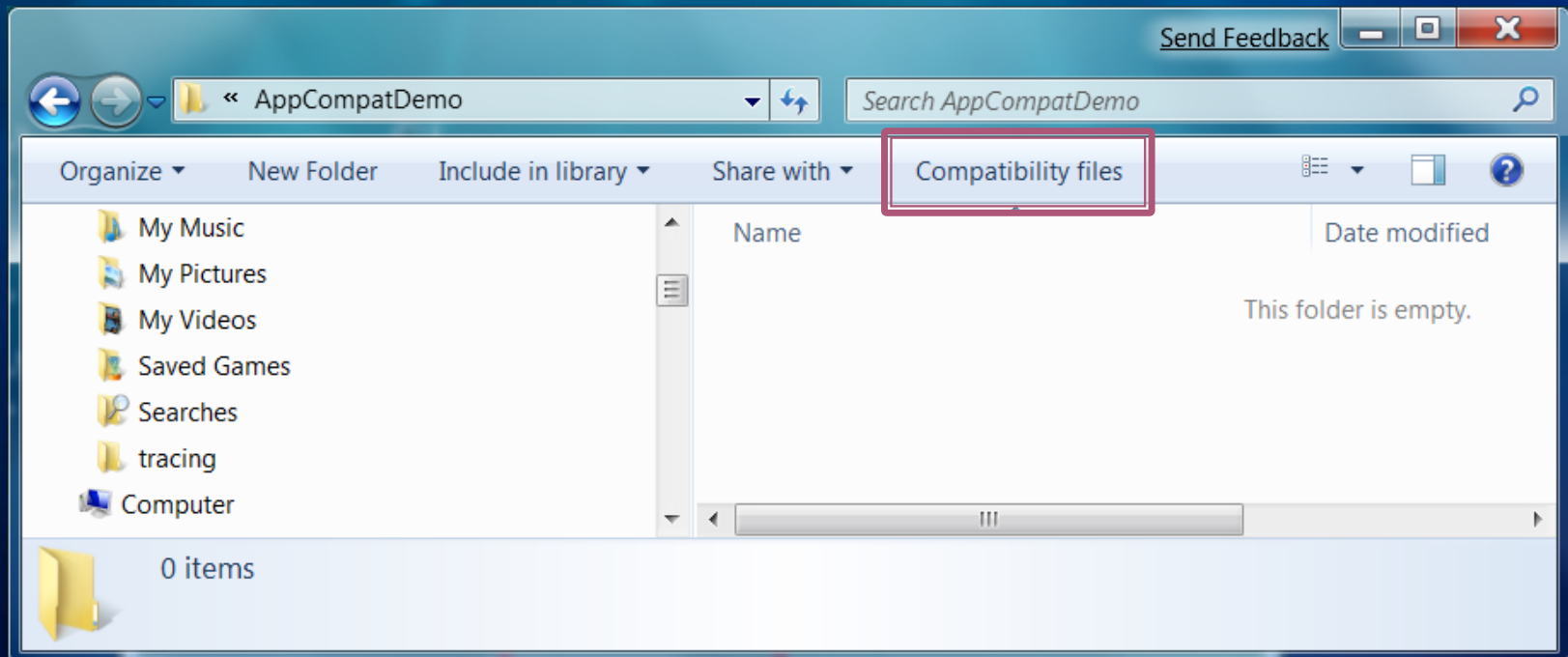
- We fix things
- We allow you to elevate to admin

File and Registry Virtualization

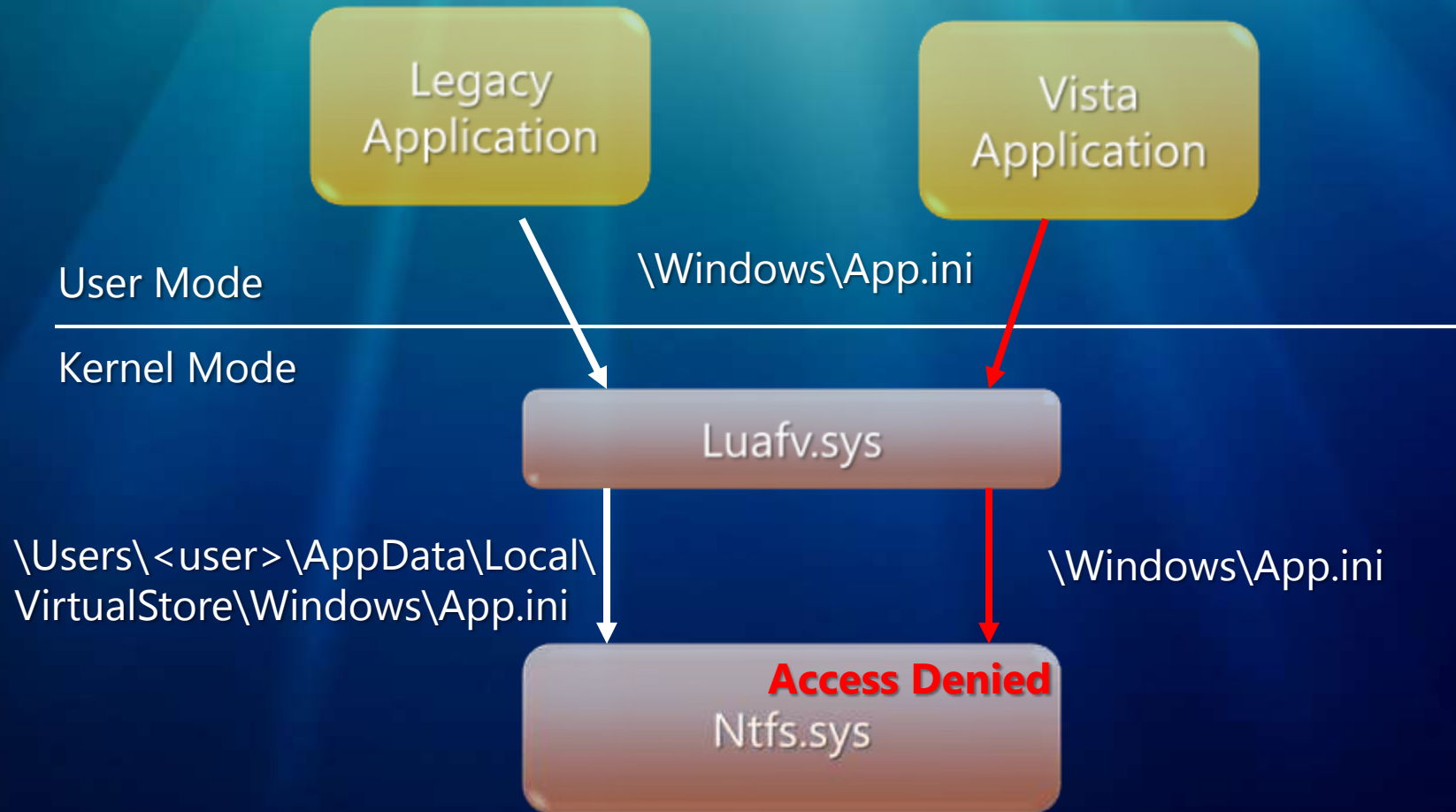
- Client only
- Legacy applications only
- 32-bit applications only
- "Sticky"
- Non-elevated apps only
- Multiple copies of files
- Doesn't apply to executable files

File Virtualization

- c:\program files
- c:\programdata
- c:\windows



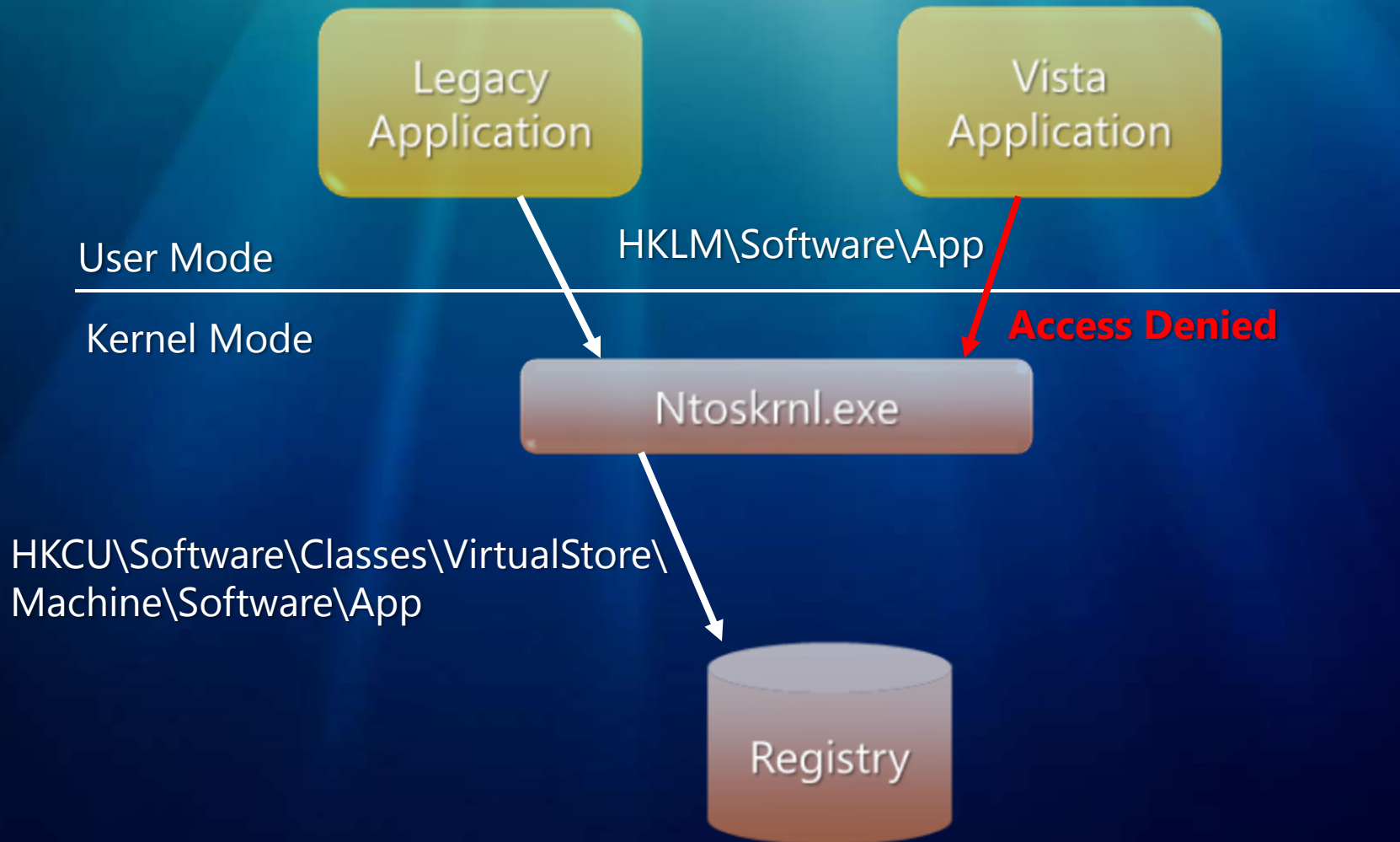
File Virtualization



Registry Virtualization

- HKEY_LOCAL_MACHINE\Software

Registry Virtualization



File Virtualization

demo

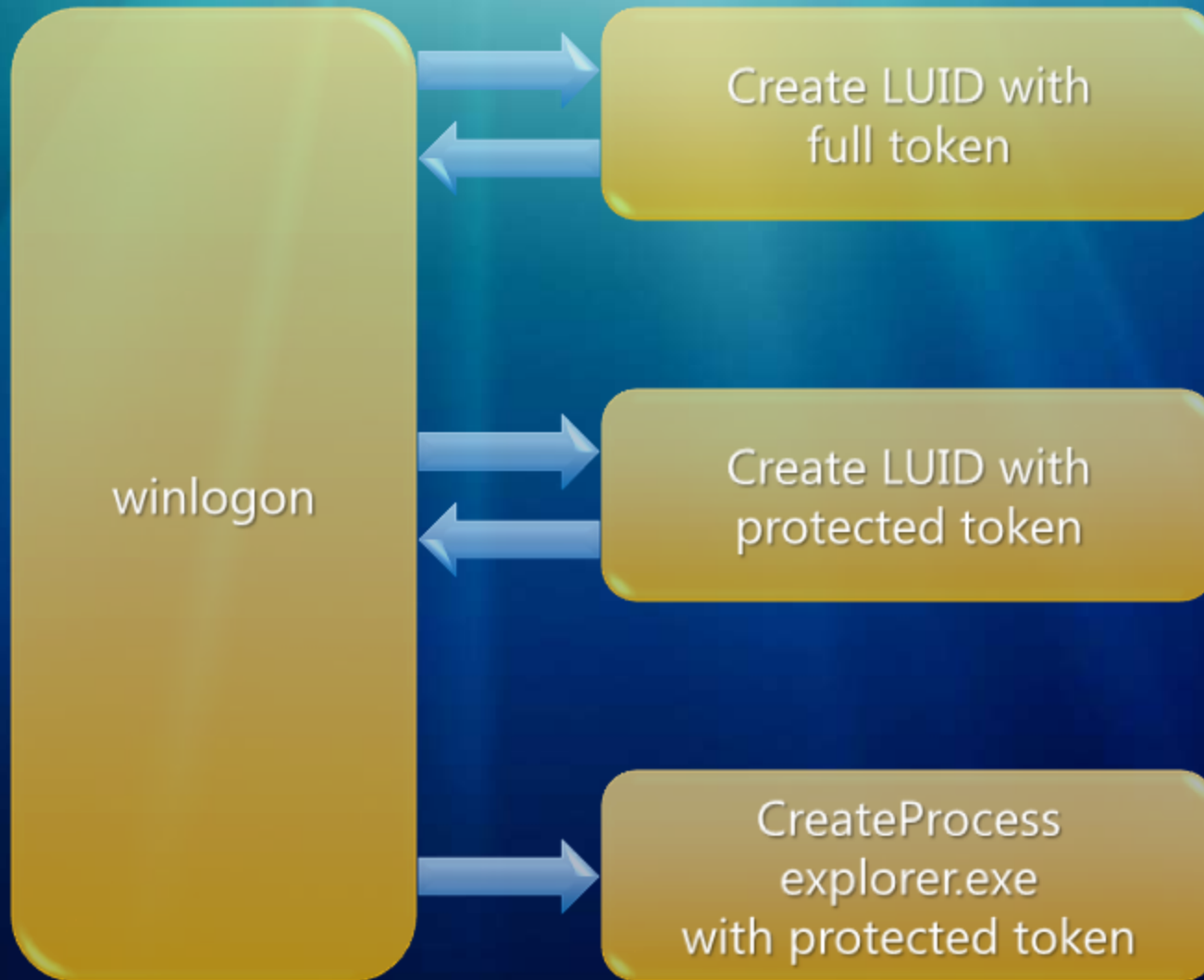
UAC for Administrators

- We fix things
- We let you run with fewer rights
- We let you elevate to full rights

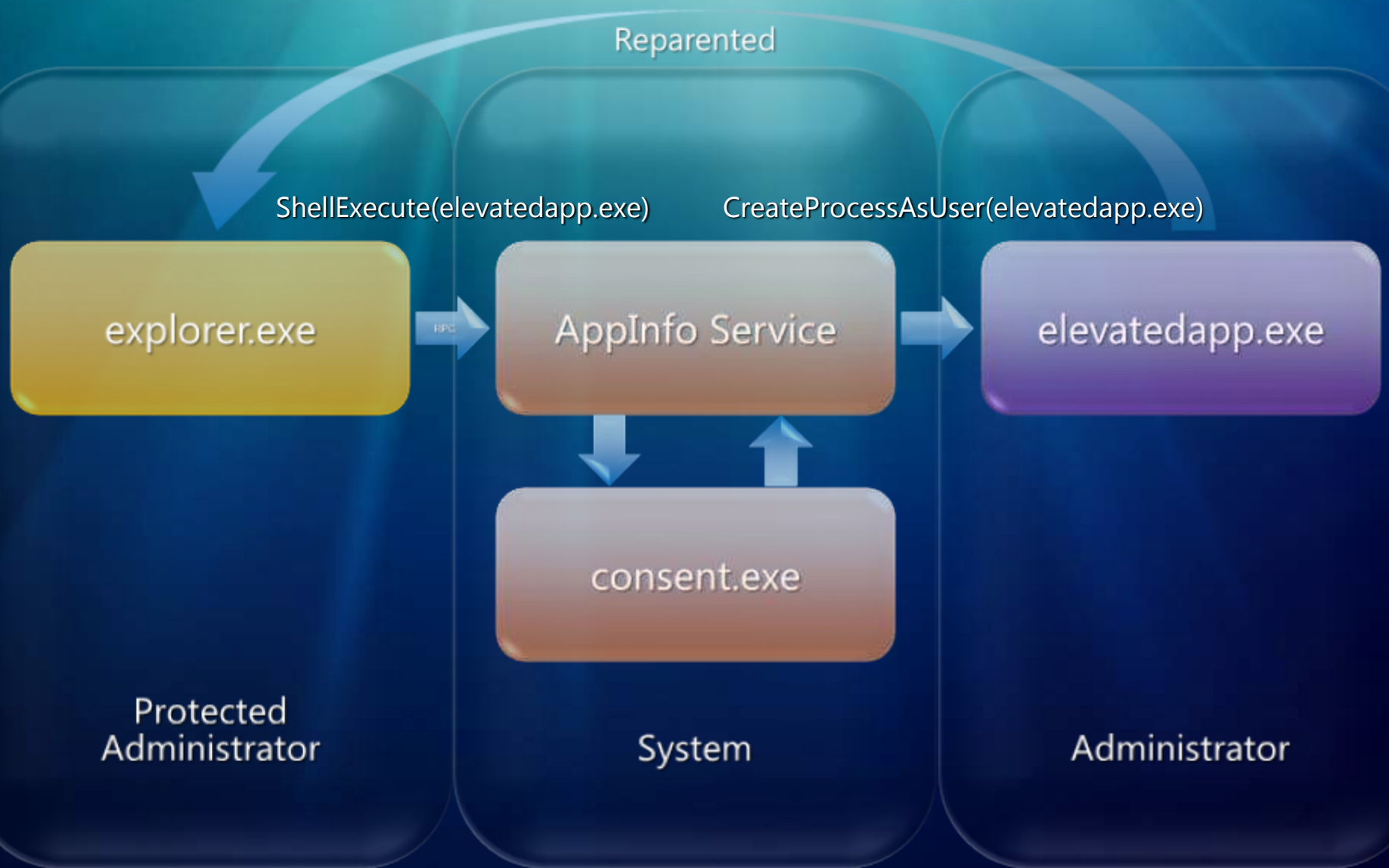
The Split Token

- Run with fewer rights most of the time
- Conveniently elevate when you need rights
- Applies to interactive logons only

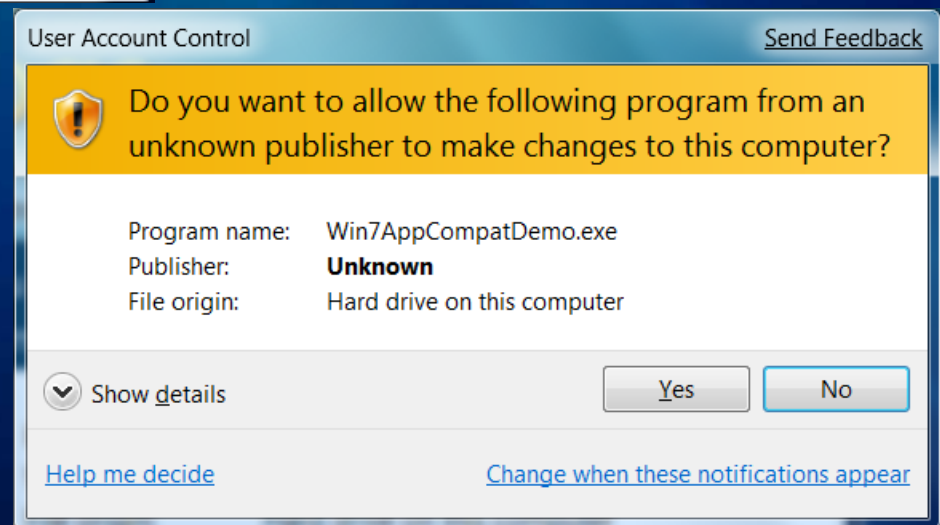
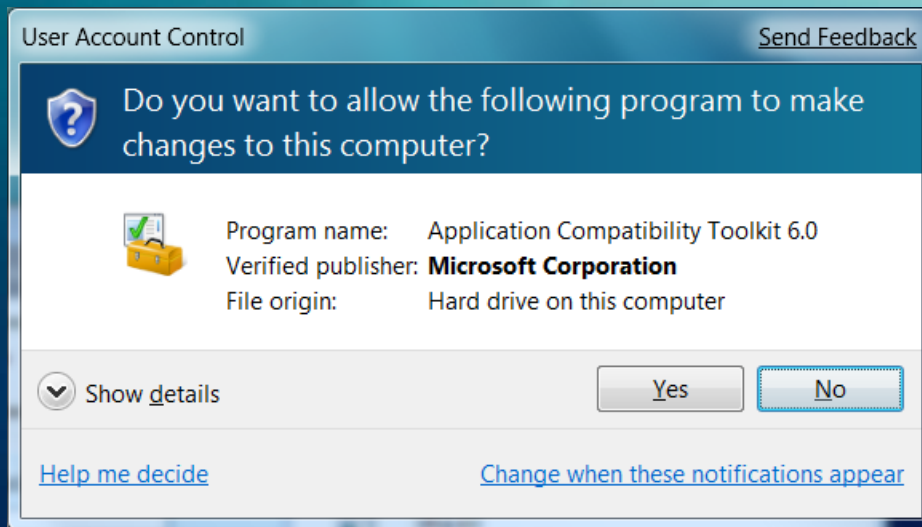
Creating the Split Token



UAC OTS Elevation



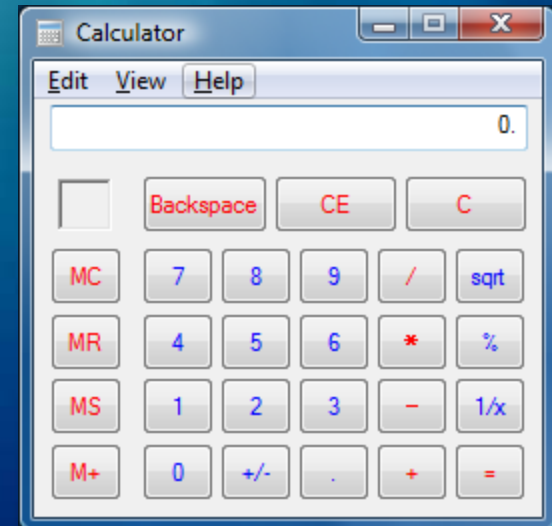
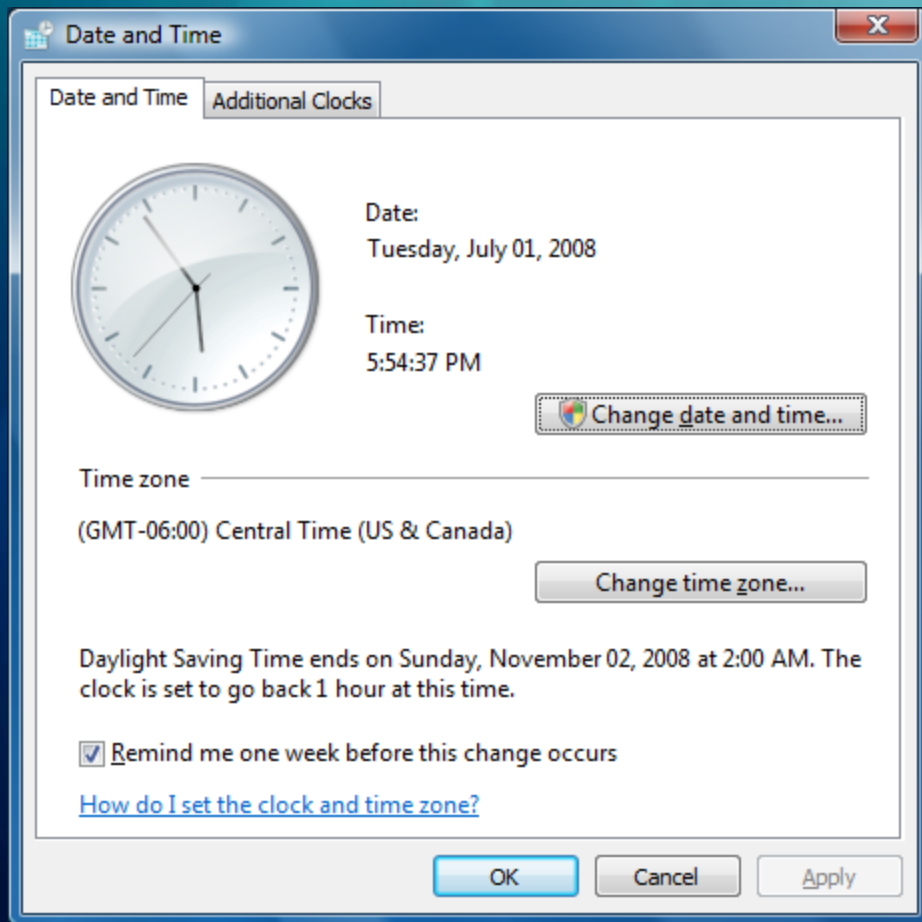
UAC: OTS Dialogs



UAC Split Tokens

demo

Standard User Platform Fixes



Setup Detection

- Why is my app running elevated?
 - We think it's an installer!
- Specific Installer
- Generic Installer
- Specific Noninstaller

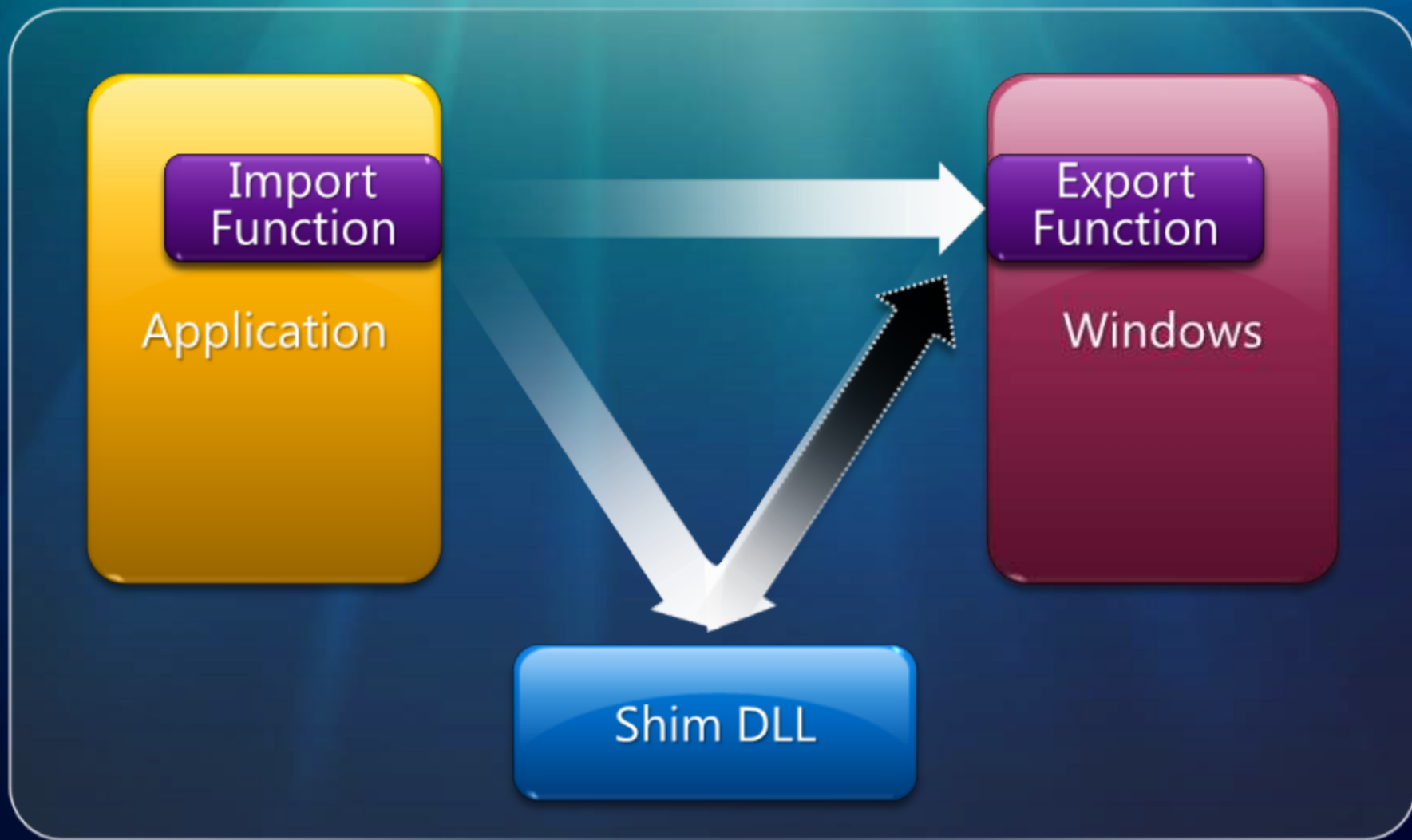
Setup Detection

demo

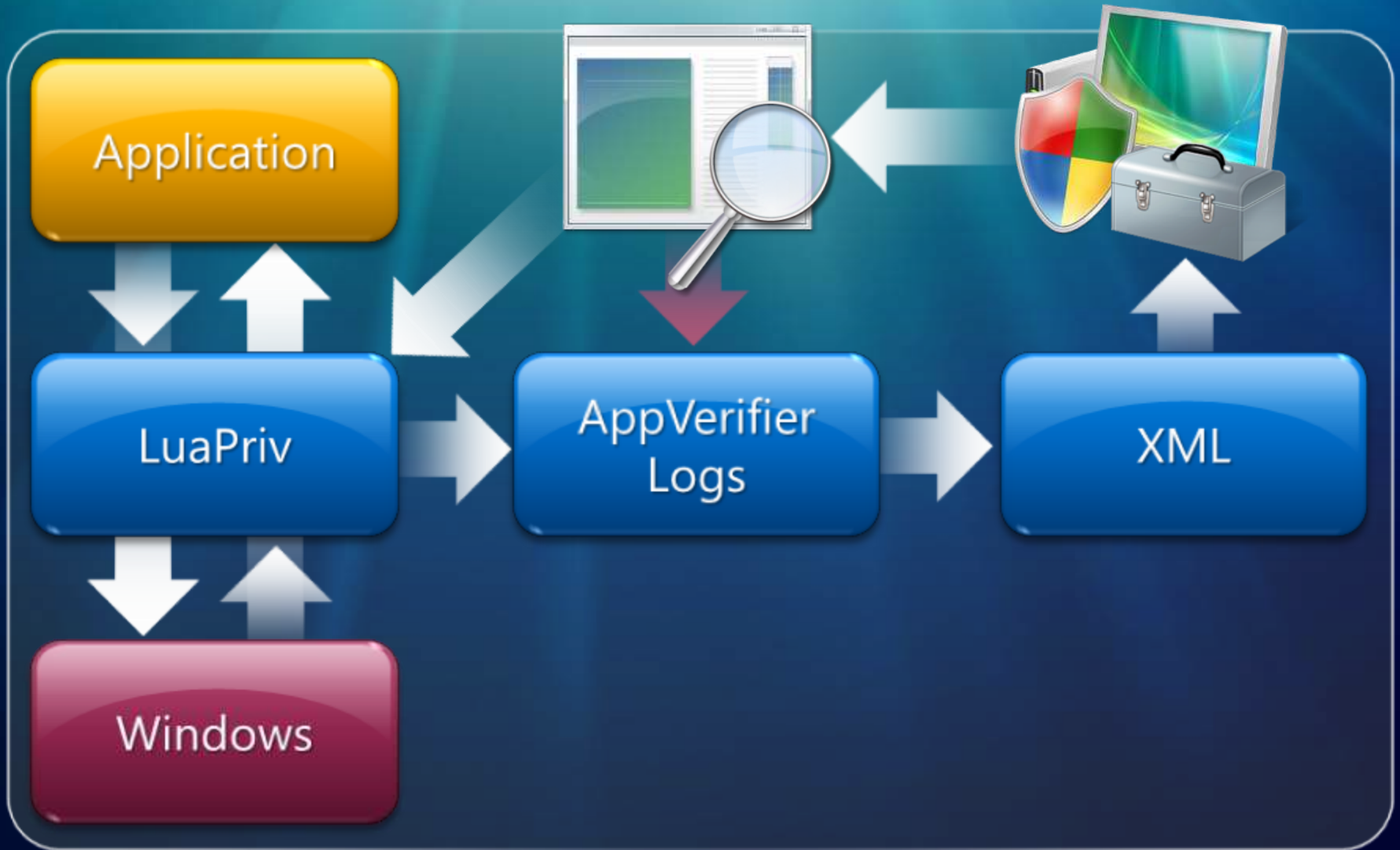
The "Standard User Quick Test"

- Run it elevated – does it work?
 - If so, investigate

How Shims Work



Standard User Analyzer



SUA Mitigations

- SUA can recommend:
 - ElevateCreateProcess
 - ForceAdminAccess
 - LocalMappedObject
 - VirtualizeDeleteFile
 - VirtualizeHKCRLite
 - CorrectFilePaths
 - VirtualRegistry

ElevateCreateProcess



Symptoms

ERROR_ELEVATION_REQUIRED

Fix description

Tries again, requesting elevation

ForceAdminAccess



Symptoms

Fails explicit administrator check

Fix description

Lies

ForceAdminAccess Shim for IsUserAnAdmin:

```
return TRUE;
```

LocalMappedObject



Symptoms

Can't create in Global namespace

Fix description

Creates in Local namespace

VirtualizeDeleteFile



Symptoms

Can't delete files

Fix description

Pretends to delete files

VirtualizeHKCRLite



Symptoms

Can't register COM components

Fix description

Registers them per-user

VirtualizeRegisterTypeLib



Symptoms

Registering type library fails

Fix description

Registers type library per-user

SUA Mitigations

demo

UAC Manifests

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<assembly xmlns="urn:schemas-microsoft-com:asm.v1"
manifestVersion="1.0">
  <assemblyIdentity type="win32" processorArchitecture="*"
    version="1.0.0.0" name="MyApplication.exe"/>
  <description>My totally sweet Vista application</description>
  <ms_asmv2:trustInfo xmlns:ms_asmv2="urn:schemas-microsoft-
    com:asm.v2">
    <ms_asmv2:security>
      <ms_asmv2:requestedPrivileges>
        <ms_asmv2:requestedExecutionLevel level="asInvoker ||
          highestAvailable || requireAdministrator"/>
      </ms_asmv2:requestedPrivileges>
    </ms_asmv2:security>
  </ms_asmv2:trustInfo>
</assembly>
```

UAC Manifests

- Windows Vista: internal > external
- You didn't write code -> don't manifest
- Removes compatibility features / shims
- mt.exe
- Visual Studio 2008 native support

Checking for Admin in Code

- IsUserAnAdmin?
- GetTokenInformation?
 - TokenElevationType:
 - Default
 - Full
 - Limited
- Best solution: factor and manifest

Run Levels

- RequireAdministrator
- HighestAvailable
- AsInvoker

RunAsAdmin



Symptoms

Requires admin

Fix description

Prompts for elevation

RunAsHighest



Symptoms

Had both admin and standard user views

Fix description

Provides most powerful token

RunAsInvoker



Symptoms

Prompting unnecessarily

Fix description

No more prompt

SpecificInstaller



Symptoms

Not fixed as a legacy setup

Fix description

Flags it as a legacy setup

SpecificNonInstaller



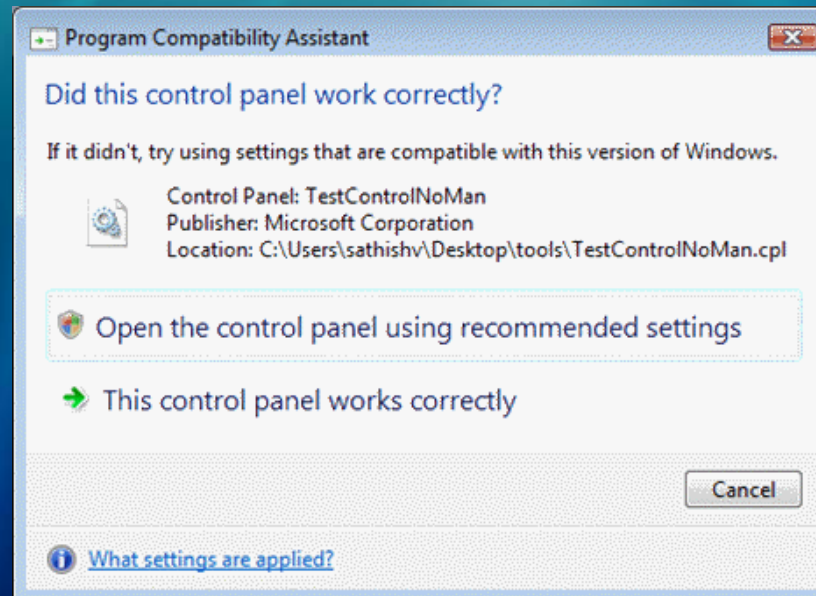
Symptoms

Flagged as a legacy setup inappropriately

Fix description

No longer flagged as a legacy setup

Don't Forget Legacy CPL...



Run Level Specification

demo

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