



# Session W-16

## Windows 7 Application Compatibility

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# Purpose

- Get introduced to application compatibility in Windows 7
- Main differences compared to Windows XP
- Learn about application compatibility tools

# Speaker intro

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# Agenda

- Moving from Windows XP
- Windows 7 Compatibility Goals
- Application Compatibility Toolkit
- Demo
- Moving Forward

# Windows 7 Builds on Windows Vista



***Few Changes:*** Most software that runs on Windows Vista will run on Windows 7 - exceptions will be low level code (AV, Firewall, Imaging, etc).  
*Hardware that runs Windows Vista well will run Windows 7 well.*



***Few Changes:*** Focus on quality and reliability improvements



***Deep Changes:*** New models for security,  
drivers, deployment, and networking



# Moving from Windows XP

- Revisiting changes made in Windows Vista...

# Top Compatibility Issues in Vista

- Top areas of concern with Windows Vista application compatibility:
  - User Account Control (UAC)
  - Windows Resource Protection (WRP)
  - Internet Explorer® Protected Mode
  - 64-bit Operating Systems
  - Windows Filtering Platform
  - Operating System Version Changes
  - Deprecations/GINA/Session 0 (High Impact/Low Frequency)

# User Account Control (UAC)

- Description
  - Enabling users to run with a standard user account
  - File and registry virtualization – Windows 7 adds virtualization of root C:\
- Issues
  - Custom installers and updaters need administrator privileges
  - Unnecessary administrator checks or administrative actions
  - Writing to file or registry locations that are not virtualized
- Mitigation
  - Some common shims - Virtualization shims, ForceAdminAccess
  - Applications needing to run as administrator should be manifested (if you are the author) or use RunAsAdmin or RunAsHighestAvailable
  - As a last resort, relax ACL's on files and folders



# Windows Resource Protection (WRP)

- Description
  - Increase system reliability by protecting Windows resources (files, folders, registry).
- Issues
  - Application installers that attempt to replace, modify, or delete OS files and/or registry keys that are protected will fail with an access denied error message because the resource could not be updated.
- Mitigation
  - Never repackage Microsoft redistributables (use the Microsoft provided redistributable package instead).
  - Do not write to system files and registry keys.
  - New shim added to Windows 7 to mitigate WRP issues

# Internet Explorer Protected Mode

- Description
  - Internet Explorer 7 and 8 run in Protected Mode, with greatly restricted privileges
- Issues
  - Internet Explorer cannot modify user files, registry keys
  - Applications may need to request user permissions for certain actions
- Mitigation
  - Add the site in question to the trusted sites list.
  - Internet Explorer 8 now removes local Intranet from Protected Mode

# 64-bit Operating Systems

- Description
  - Windows Vista and newer operating systems fully support the 64-bit architecture processors from AMD and Intel.
  - The 64-bit version of Windows Vista can run all 32-bit applications with the help of the WOW64 emulator.
- Issues
  - Applications or components that use 16-bit executables, 16-bit installers or 32-bit kernel drivers will either fail to start or will function improperly on a 64-bit edition of Windows Vista.
- Mitigation
  - Remove all 16-bit components.
  - Port 16-bit installers to 32-bit or 64-bit installers
  - Ensure that all 64-bit drivers are digitally signed

# Windows Filtering Platform

- Description
  - The Windows Filtering Platform (WFP) API allows developers to create code that interacts with the filtering that takes place at several layers in the networking stack and throughout the operating system .
  - Publicly-supported APIs.
- Issues
  - Some network scanning anti-virus and firewall applications will fail
- Mitigations
  - Update to applications that use the new WFP APIs



# Operating System Version Changes

- Description
  - The internal version number for Windows Vista is changed to 6.0 and 6.1 for Windows 7. The GetVersion function will now return these version numbers to applications when queried.
  - dwMajorVersion (6)
  - dwMinorVersion (0 or 1)
- Issues
  - Any application that specifically checks for the OS version may get a higher version number which it may not be designed to handle
  - Application installers may prevent themselves from installing and applications may prevent themselves from starting.
- Mitigation
  - Check for features instead of versions
  - Apply version lie layer or shim
  - Look for OS versions greater than (>) compatible OS version



# Deprecations

- Description
  - Deprecations – removal of APIs or DLLs from Windows Vista that existed in Windows XP
- Issues
  - Applications lose functionality or don't start up correctly
- Mitigations
  - Search MSDN® to look for replacement of API
  - Some of the removals are available as OOB downloads, for example winhelp.

# Graphical Identification and Authentication (GINA)

- Description
  - Windows Vista introduces a new Credential Provider framework
- Issues
  - Users will not be able to logon using Custom logon applications. These may include:
    - Biometric devices (fingerprint reader)
    - Custom UI for logon
    - Virtual private network (VPN) solutions for remote users with custom logon UI
- Mitigations
  - Use applications compliant with the Credential Provider framework
  - In-house developed applications or components that used the GINA technology will need to be re-authored

# Session 0

- Description
  - Services are isolated to run in their own private Session (Session 0)
  - To enhance security and stability, users no longer share this session
- Issues
  - Local namespace objects may fail
  - Window messaging communications may fail
- Mitigations
  - Update services and drivers to ensure you have the latest version.
  - When authoring services and drivers display UI in the user's session
  - When Interactive Service Detection service detects UI in Session 0 it will send a notification to the user and allows them to switch to Session 0 and interact with the UI

Let's talk about Windows 7

# Compatibility Goals

There is nothing new that automatically makes software start working on Windows 7 if it didn't work on Windows Vista

If it works on Windows Vista, it will most likely work on Windows 7...



# Windows 7 Changes

- Windows Vista to Windows 7 compatibility is very high, but some changes were made:
  - Operating System Versioning
  - Security Class Applications
  - Removal of Windows Gallery applications (Windows Mail, Movie Maker, Messenger, Address Book, Photo Gallery)
  - National Language Support (NLS) Sorting Changes
  - Internet Explorer 8
  - File Libraries
  - High DPI Awareness
  - Removal of Windows Registry Reflection
  - Removal of msagent and milcore.dll, revamped CDROM driver stack and biometrics support

# Operating System Version Change

- Description
  - The internal version number for Windows 7 is changed to 6.1.
  - dwMajorVersion still works
  - dwMinorVersion changes
- Issues
  - Any application that specifically checks for the OS version will get a higher version number which it may not be designed to handle
  - Application installers may prevent themselves from installing and applications may prevent themselves from starting.
- Mitigation
  - Check for features instead of versions
  - Apply version lie layer or shim
  - Look for OS versions greater than (>) compatible OS version

# Security Class Applications

- Description
  - Same effect as Windows Filtering Platform
  - Antivirus, firewall and other security class applications often have a hard dependency against the operating system version they are protecting
  - These applications should not be mitigated without ISV testing and approval
- Issues
  - Installation or operation of these applications may be blocked by the application.
- Mitigation
  - Use applications approved for Windows 7
  - <http://www.microsoft.com/windows/antivirus-partners/windows-7.aspx>

# Removal of Windows Gallery Applications

- Description
  - Windows Mail utility (aka Outlook® Express) has been deprecated from Windows 7
  - CoStartOutlookExpress API is disabled
  - Other related removals: Messenger, Address Book, Photo Gallery, Movie Maker
- Issues
  - All entry points to Windows Mail and Contacts (for example, Start Menu, user-created Shortcuts, Start -> Run, etc.) are removed or disabled.
  - File types (.eml, .nws, .contact, .group, .wab, .p7c, .vfc, etc.) will need to be associated with other applications
- Mitigation
  - Install Windows Live™ applications or applications of your choice
  - Remove application calls to API CoStartOutlookExpress or any other API calling Windows Mail



# National Language Support (NLS) Sorting Changes

- Description
  - The National Language Support (NLS) functions help applications support the different language- and locale-specific needs.
  - This change affects collation and sorting, and therefore applications that have persistent indexes.
- Issues
  - Applications (such as databases) with persistent indexes that do not check the NLS version and re-index upon version change will fail to sort correctly or may fail to provide requested results.
  - Some user interfaces, lists (for example, alphabetical, numeric, alphanumeric, symbols, etc.) may sort incorrectly.
- Mitigation
  - Use GetNLSVersionEx (Windows Vista or later) and GetNLSVersion (prior to Windows Vista)
  - Either APIs retrieve both the defined version and the NLS version for a collation table.



# Internet Explorer 8

- Description

- The User Agent String is the Internet Explorer identifier that provides data about its version and other attributes to Web servers.
- Many Websites and applications rely on the User Agent String
- Internet Explorer 8 released prior to Windows 7 release – allowing ecosystem mitigation

- Issues

- Web pages that explicitly check the User Agent String and do not support the Internet Explorer 8 User Agent String may not run properly.
- Applications that host Trident will default to Internet Explorer 7 using the Web Optional Component, but will not have access to Internet Explorer 8 features.

- Mitigation

- Ensure that your applications properly handle the new 'MSIE 8.0' version in the User Agent String.
- Use Internet Explorer 7 Compatibility View for those applications based on Internet Explorer 7. This can be done with meta tags...

# File Libraries

- Description
  - Libraries provide a centralized folder-like experience for file storage, search, and access across multiple locations, both local and remote.
  - The Documents Library is the default location of common file dialogs
- Issues
  - The Library is itself a file, and not a folder. Path manipulations can result in errors.
  - `IFileDialog->GetFolder()` + `IFileDialog->GetFilename()` breaks with libraries
    - `GetFolder()` returns a file
- Mitigation
  - When using `IFileDialog`, you must use `GetResult` method in conjunction with the shell APIs instead of manipulating the folder path directly.

# High DPI Awareness

- Description
  - Goal to use native resolution and use DPI rather than screen resolution to change the size of displayed text and images.
  - Windows 7 has new High DPI features:
    - - Per-user DPI setting (previously per machine)
    - - Change DPI without rebooting (logoff/logon is still required)
- Issues
  - Applications that do not handle the high DPI case are likely to exhibit visual artifacts, including:
    - Clipping of UI or text by other UI elements
    - Inconsistent font sizes
    - Off-screen Uis
    - Blurring of text or UI
    - Broken drag and drop or other inputs
    - Rendering of full screen DX applications partially off screen
- Mitigation
  - Author or obtain applications with high DPI awareness

# Removal of Windows Registry Reflection

- Description
  - The registry reflection process copies registry keys and values between two registry views to keep them in synch. Sometimes there were inconsistencies.
  - Starting with Windows 7, we have removed registry reflection.
- Issues
  - The only known consumer of registry reflection was COM. We have updated COM so that it does not assume that registry reflection occurs.
  - Certain sets of registry keys that previously were reflected, can now have different data in the 32-bit and 64-bit registry views.
- Mitigation
  - Use non-redirected registry keys
  - Explicitly use `KEY_WOW64_64KEY` to access the registry, so that both 32-bit and 64-bit applications will use only the 64-bit key
  - Read the information from a known correct location



# IE DEP Enabled by Default

- Data Execution Prevention (NX) now enabled by default
  - Windows Vista – required elevation of IE to enable
- Plug-ins that have an issue with DEP may cause the browser to crash
- Remediation:
  - Use DEP-compatible versions of frameworks
    - <http://support.microsoft.com/kb/948468>
  - Use the /NXCOMPAT linker option



# A few other things...

- Description
  - Removal of milcore.dll
  - Removal of msagent
  - Revamped CDROM driver stack and biometrics support
- Issues
  - Win32 apps that call the APIs in milcore.dll are affected, these APIs are undocumented
  - Applications calling msagent (example Microsoft Bob and Clippy) may not function normally
  - Some CDROM and biometrics devices (example fingerprint reader and authentication) may experience issues
- Mitigation
  - Use documented .NET Framework 3.5 APIs for milcore.dll issues
  - Obtain supported CDROM and biometrics devices
  - msagent - <http://support.microsoft.com/kb/969168>

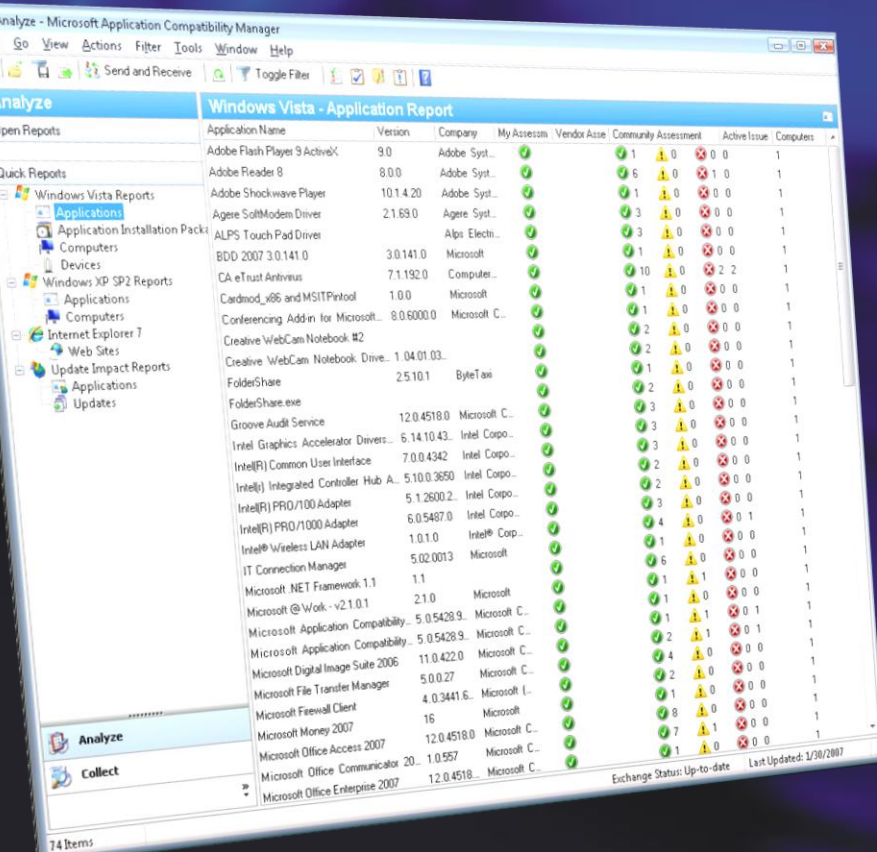
# Application Compatibility Toolkit 5.5

# Planning for Application Compatibility



- Organize your application portfolio to understand the real scope of your application compatibility efforts
  - **Analyze** – Inventory and help eliminate noise (operating system applications, games, etc.)
  - **Rationalize** – Consolidate and rationalize remaining applications.
  - **Prioritize** – Categorize as mission critical, important, departmental, etc., and focus efforts
- Organize and plan your migration scenario

# Application Compatibility Toolkit



- Analyze your application portfolio
- Evaluate impact of deployments and upgrades
- Centrally manage evaluations and settings
- Rationalize and organize information
- Prioritize compatibility efforts
- Manage issues and solutions
- Exchange compatibility information with others



# Application Compatibility Tool Kit 5.5

- Updated version of the ACT 5.5. tool available April 2009
- DCP are now packaged as MSIs
- MSXML dependency eliminated for DCP's
- Windows Live ID functionality dependency eliminated
- Windows 7 Reporting Node (No change to evaluators)
- SUA Tool improvements
  - Ability to rollback applied mitigations
  - Export SUA mitigations in an MSI
  - SUA Mitigation wizard
- Shim documentation improvements
- .NET 2.0 – no longer require .NET 1.1



# Compatibility Evaluators

- Inventory Collector
  - Identifies all of the installed applications and system information within an organization
- User Account Control
  - Identifies potential compatibility issues due to permission restrictions enforced by User Account Control
- Internet Explorer
  - Identifies potential Web application and Web site issues due to the release of a new operating system
- Windows Vista/ Windows 7 Compatibility
  - Detects and reports applications that may experience issues running on Windows Vista or Windows 7:
    - GINA
    - Use of deprecated APIs
    - Session 0 isolation
- Update Impact Analyzer
  - Identifies potential application compatibility issues due to a new Windows Update deployment

# Compatibility Evaluators

## Supported Platforms

| Agent   | Windows 2000  | Windows XP  | Windows Server 2003   | Windows Vista   | Windows 7   |
|---|---|---|---|---|---|
| Inventory Collector                               |    |    |    |    |    |
| UAC Compatibility Evaluator                       |    |    |    |    |    |
| IE Compatibility Evaluator                        |    |    |    |    |    |
| Windows Vista / Windows 7 Compatibility Evaluator |   |   |   |   |   |
| Update Compatibility Evaluator                    |  |  |  |  |  |

# Summary

## Three-Phase Approach

### Inventory



- Inventory applications
- Gather application compatibility data using compatibility evaluators

### Analyze



- Prioritize, categorize, rationalize, and consolidate tracking of applications
- Synchronize with Online Compatibility Exchange

### Test and Mitigate



- Test applications
- Create and package solutions to compatibility issues

# Demo

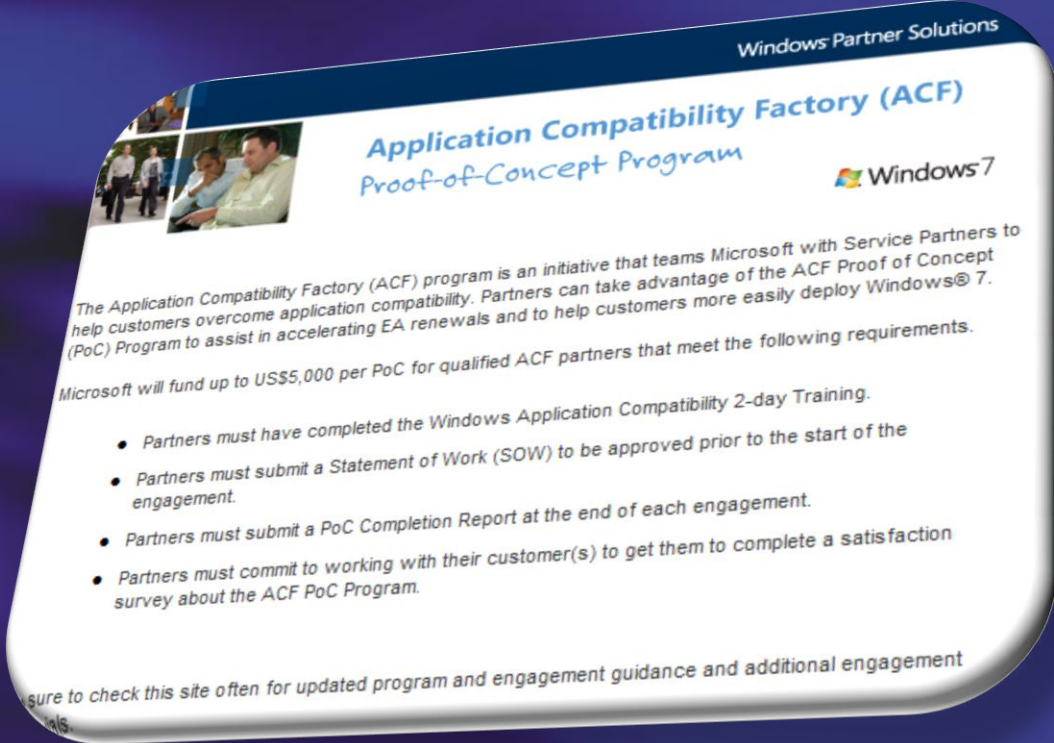


# Moving forward



# Application Compatibility Factory (ACF)

- ACF PoC
- We are Certified Partner
- Funding up to 5000\$
- <https://connect.microsoft.com/ACF>



The screenshot shows a flyer for the 'Application Compatibility Factory (ACF) Proof-of-Concept Program'. At the top right, it says 'Windows Partner Solutions'. Below that, the title 'Application Compatibility Factory (ACF) Proof-of-Concept Program' is displayed in blue and black text, with the 'Windows 7' logo to the right. On the left side of the flyer, there are two small photographs: one showing a group of people in a meeting, and another showing a man and a woman looking at a laptop. The main body of text describes the program as an initiative where Microsoft teams up with Service Partners to help customers overcome application compatibility issues, take advantage of the ACF Proof of Concept (PoC) Program for EA renewals, and help with Windows 7 deployment. It states that Microsoft will fund up to US\$5,000 per PoC for qualified ACF partners. A bulleted list of requirements follows: partners must have completed Windows Application Compatibility 2-day Training, submit a Statement of Work (SOW) for approval, submit a PoC Completion Report at the end of each engagement, and commit to working with customers to complete a satisfaction survey. At the bottom, it advises partners to check the site often for updates and engagement guidance.

Windows Partner Solutions

## Application Compatibility Factory (ACF) Proof-of-Concept Program

Windows 7

The Application Compatibility Factory (ACF) program is an initiative that teams Microsoft with Service Partners to help customers overcome application compatibility. Partners can take advantage of the ACF Proof of Concept (PoC) Program to assist in accelerating EA renewals and to help customers more easily deploy Windows® 7.

Microsoft will fund up to US\$5,000 per PoC for qualified ACF partners that meet the following requirements.

- Partners must have completed the Windows Application Compatibility 2-day Training.
- Partners must submit a Statement of Work (SOW) to be approved prior to the start of the engagement.
- Partners must submit a PoC Completion Report at the end of each engagement.
- Partners must commit to working with their customer(s) to get them to complete a satisfaction survey about the ACF PoC Program.

sure to check this site often for updated program and engagement guidance and additional engagement

# Q & A

# Application Compatibility Resources

- ACT 5.5 Download:
  - <http://www.microsoft.com/downloads/details.aspx?FamilyID=24da89e9-b581-47b0-b45e-492dd6da2971&displaylang=en>
- For IT Professionals:
  - Application Compatibility for Windows 7 – Springboard
    - <http://technet.microsoft.com/appcompat>
  - Chris Jackson Blog (The App Compat Guy)
    - <http://blogs.msdn.com/cjacks/>
- For Developers:
  - Application Quality Cookbook (Windows 7)
    - <http://code.msdn.microsoft.com/Windows7AppQuality>
  - Application Compatibility Cookbook (Windows Vista)
    - <http://msdn.microsoft.com/windowsvista/default.aspx?pull=/library/en-us/dnlong/html/AppComp.asp>
  - Application Compatibility in Internet Explorer 8
    - <http://msdn.microsoft.com/en-us/ie/cc405106.aspx>
  - Application Compatibility Forum
    - <http://social.msdn.microsoft.com/forums/en-US/windowscompatibility/threads/>

# Vi ses i morgen

Campus Days  
14.-16. januar 2010



**THANK YOU!**