

# **New and Little-known Features in Windows 7 and Server 2008 R2**

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# Agenda

- Enhanced Storage
- NTFS Changes

# Enhanced Storage

- What is Enhanced Storage?
- Why Do We Need This?
- Architectural Overview
- What This Provides
- References

# What is Enhanced Storage?

- **Extensible Platform for Storage Value-Add**
  - Also known as “Smart Storage Devices”
- **IEEE 1667 Standard**
  - Standard Protocol for Authentication in Host Attachments of Transient Storage Devices
- **Bus and Protocol Neutral**
  - Currently implemented for USB devices
- **Built into Windows 7 & Server 2008 R2**
  - Limited release for Windows Vista

# Why Do We Need This?

- Have you, or anybody you know, ever lost or misplaced a removable USB drive?
  - May have photos, tax files, medical records, banking information, travel details, etc.
- It would be great to have a standard, extensible and manageable way to secure removable storage devices, such as USB drives.

# Architectural Overview

- IEEE 1667 Storage Device Model
- Four “silos”
  - Probe
  - Certification Authentication
  - Password Authentication
  - Other
- Has an extensible API

# What This Provides

- Provides a way for a removable device to authenticate to a computer, and a computer to authenticate to a removable device.
- Group policy exists today that can block all non-1667 devices. (IT-Pro link for details)
- Enterprise use: Certificates
  - If a certificate device is put into a non-certificate machine, it won't work.
- Consumer use: Passwords

# Enhanced Storage References

- **IEEE 1667:**  
<http://www.ieee1667.com/>
- **IT Pros:**  
[http://technet.microsoft.com/en-us/library/dd560657\(WS.10\).aspx](http://technet.microsoft.com/en-us/library/dd560657(WS.10).aspx)
- **Developers:**  
[http://msdn.microsoft.com/en-us/library/dd430344\(VS.85\).aspx](http://msdn.microsoft.com/en-us/library/dd430344(VS.85).aspx)
- **Microsoft Enhanced Storage Program**  
[Enh\\_stor@microsoft.com](mailto:Enh_stor@microsoft.com)  
Enhanced Storage Microsoft Connect Site



# NTFS Changes

- **Filesystem Improvements**
- **Flash Media Enhancements**
  - TRIM support for SATA interface flash devices
- **Enhanced Oplock Semantics**
- **Chkdsk Improvements**
- **Native VHD Support**

# File System Improvements

- **Improved Defragging**
  - File System metadata defragging (reparse points, EFS streams, resident files, etc...)
- **Volume Shrink**
  - Optimized placement of immovable system files at format time (2<sup>nd</sup> MFT is closer to front).
  - Greater amount of disk space can be reclaimed.

# Flash Media Enhancements

- Flash media has limited number of write cycles
- TRIM function
  - NTFS sends notifications about freed clusters when files are deleted
  - Supports ATA port (IDE, SATA) on NTFS
    - Future support for Storport (SCSI, SAS) and FAT/exFAT
- Scheduled defrag automatically disabled on flash storage media

# Oplocks

- **Problem: Some applications break their own oplocks due to multi-threading, networking, etc.**
- **Oplocks are now applied per client rather than per handle.**
  - Improves caching
  - Optimizes SMB network traffic

# Chkdsk Improvements

- Improved cache usage across Chkdsk passes
- Chkdsk performance scales with amount of system memory
  - Will back down if system is low on memory
  - Performance improved compared to Server 2008
    - 2GB RAM – slight
    - 4GB RAM – about 50%
    - 8GB+ RAM – about 80%-90%
    - Highly dependent on number of files and hardware

# Native VHD Support

- Instance mobility: migrate an O.S. to a different computer without reconfiguring
- Multiple-Instance VHD Management
  - Single computer can maintain multiple instances of O.S.'s without changing disk partitioning
- Centralized deployment – boot from 1 image
- Offline servicing – patch while offline
- Backup – boot from a backup image

# Other Changes

- **8.3 naming improvements**
- **Bitlocker enabled OS Volumes**
- **Multi-threaded Robocopy**
  - **/MT option, default of 8 threads**
- **Local file copy scenarios improved**
  - **New optimizations in memory and cache manager**

# NTFS References

- **New in Windows 7 and Server 2008 R2**

[http://technet.microsoft.com/en-us/library/ff383236\(WS.10\).aspx](http://technet.microsoft.com/en-us/library/ff383236(WS.10).aspx)



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