

PRESENTATIONS FOR THE ONLINE APCUG SPEAKERS BUREAU

Francis Chao, who is an active member of [Winners Windows Users](#) of California and the [Tucson Computer Society](#) of Arizona, is prepared to present any of the following programs to your computer user group. Clicking on the titles of most of these presentations will open up the actual presentation slides in Adobe Acrobat PDF format:

- **"SKYPE 11" VERSUS SKYPE 7" (B)**

Two versions of Skype are currently available:

Skype version 7.x is the original "Desktop app" that many of us have been using since 2005.

Skype version 11.x is the newfangled "Universal Windows Platform" app that is bundled with all copies of "Windows 10".

- Skype 7.x versus 11.x distinction
- Skype 11.x is a "Universal Windows Platform" app
- Skype 7.x and 11.x can co-exist
- Skype 7.x versus 11.x differences

- **"HOW YOU CAN SILENCE THAT NOISY COMPUTER" (B)**

There are two ways to silence that noisy computer of yours:

Method 1:

Make it quieter or buy a quieter computer

Method 2:

Move the main computer unit

away from your keyboard-monitor-mouse

- Using free software to measure the sound level of a computer
- Buying silent computers.
- Adding in liquid cooling sometimes helps
- Sound-reducing computer parts sometimes help
- Move your computer away from your monitor-keyboard-mouse by using active extension cables

- **MOVING YOUR MONITOR, KEYBOARD, MOUSE, WEBCAM, HEADSET, SPEAKER, AND MICROPHONE FARTHER AWAY FROM YOUR COMPUTER (E)**

Using HDMI cables with Redmere Technology and active "USB 3" extension cables, you can now place flatscreen monitors, mice, keyboards, and some USB devices up to 32 feet away from your computer. These technological advancements make it possible for you to place your computer in the next room by running cables through a hole in a wall:

- Extensions for audio cables
- Moving your keyboard, mouse, monitor, etc. farther from your computer
- Installing conventional HDMI cables

- Installing passive USB 3 extension cables and powered USB 3 hubs
- Installing HDMI cables with Redmere Technology
- Installing active USB 3 extension cables

- **"WANNACRY RANSOMWARE" (B)**

Let's use a safe "virtual machine" to show what a live copy of the actual "WannaCry" ransomware does to a computer. Then we will show you how you can recover from such a nefarious infection. Finally, we will tell you the ways to proactively deal "WannaCry" in specific and ransomware in general

- Our procedure for safely demonstrating a real copy of the "WannaCry" ransomware is described at http://aztcs.org/meeting_notes/winhardsig/malware/WannaCry/WannaCry-demo.pdf
- Our advice on recovering from a "WannaCry" infection is described at http://aztcs.org/meeting_notes/winhardsig/malware/WannaCry/WannaCry-antidotes.pdf
- The proactively plan for "zero day" malware infections, you have to make regular backups of data files and then archive them offline from your computer:
Your options for making offline backups of data files include cloud-based storage, external hard drives, external media, and tricks with "Storage Spaces" and "RAID arrays"

- **"REVO UNINSTALLER PORTABLE" (B)**

"Revo Uninstaller Portable" is a free software program that helps you clean up your hard drive and the Windows "Registry" after it runs the uninstall wizard that is part of all "desktop app" programs that run in "Windows..".

- When you use "Programs and Features" in "Windows.." to remove a program..
- "Revo Uninstaller Portable" cleans up the hard drive and the Windows "Registry"
- "Revo Uninstaller Portable" Is a "portable application"
- Programs that "Revo Uninstaller Portable" can remove
- Programs that "Revo Uninstaller Portable" cannot remove
- Getting "Revo Uninstaller Portable"
- Using "Revo Uninstaller Portable"

- **"WORLD MAPS SHOWING LIGHT AND DARK AREAS IN REAL TIME" (B)**

A real-time world map that shows light, dark, and twilight areas can be handy if you have to communicate with folks in other parts of the world. These "geoclocks" are available in two formats:

As a free-standing software program
and
as a Web page.

- "Geoclock"--The Original World Clock Map
- More Up-To-Date world clock programs
- Web Sites that Provide a World Clock

- **"WINDOWS 10 CREATORS UPDATE" (B)**

The free "Creators Update" for "Windows 10" was released on April 11, 2017. It has resolution and icon improvements in the rendering of the display. The "Creators Update" let's Windows 10 users choose a custom background color for the "Desktops" of their monitor(s). There is a "night light" feature to reduce blue hues from sunset to sunrise or on any schedule of your choosing. There is now improved end-user scheduling for mandatory system reboots. There is a new "Game Mode" to provide high-end games with more CPU cores and threads. "Paint 3D" and "3D Builder" provide you with the ability to create

- History of "Windows 10"
- Free Upgrades up to the "Windows 10 Creators Update" Are Still Available for Windows 7 and 8.1 Computers
- Has The "Creators Update" Been Installed Into Your Computer?
- Three Ways to Get the "Creators Update"
- What a Successful Update Looks Like
- 10 Days To Go Back to the "Anniversary Update"
- Improvements in the "Creators Update"
 - Resolution improvements in the rendering of display(s)
 - Users can now choose a custom background color for

- **BUILDING A CONTROLLED-TEMPERATURE BOX (B)**

Off-the-shelf thermostats are good at maintaining building HVAC (heating ventilating & air conditioning) systems at a controlled ambient temperature of between 50 and 90 degrees Fahrenheit.

Portable cooler/warmer devices generally either cool or heat to about 40 degrees Fahrenheit below or above the ambient temperature. These temperatures are unacceptable for storing many expensive cosmetics and prescription pharmaceuticals. If you **interconnect these two types of devices**, the "mash-up" will result a reliable, energy-efficient means of storing medications and cosmetics that are temperature-sensitive:

- Many expensive prescription medications require a temperature range in the 68 degrees to 77 degree Fahrenheit range
- If you read the specifications for portable cooler/heater devices, small refrigerators, wine coolers, you will find no devices that operate in this "room temperature" range
- Our attempts to retrofit or modify the previously-mentioned devices to operate at the 69 degree to 77 degree Fahrenheit range have all ended up in wide temperature fluctuations with unacceptable amounts of water condensation. These sorts of conditions would ruin many expensive cosmetics and prescription medications.
- We built two temperature control boxes that consisted of a Lux "Programmable Outlet Thermostat", a Honeywell "Vision Pro 8000" Thermostat, a Honeywell "Equipment Interface Module", and a Honeywell "Wireless Indoor Sensor" and a Koolatron P9 Traveler III 9.8-Quart Electric Cooler/Warmer

- **"WINDOWS 10" ACTIVATION (I)**

Windows 10's activation process is different from any previous "Windows.." product.

- There are two ways to activate "Windows 10":
"Digital License" Activation and "Product Key" Activation
- When you get a free upgrade to "Windows 10" from Windows 7, 8, or 8.1, you get a "Digital License" activation
- Both ways to activate "Windows 10" store the Uniquely Universal Identifier (UUID) of your computer's motherboard up in Microsoft's activation servers in the Internet cloud.
- The "Anniversary Update" converts a "Product Key" activation to "Digital License" activation for copies of "Windows 10" that were original activated a "Windows 10 Product Key".
- Two ways to linking Your "Microsoft Account" to a "Digital License" activation
- If you link your Microsoft Account to your Windows account, you get the ability to use the "Activation Troubleshooter" in "Windows 10" to activate after changing out your computer's motherboard. However, you then have to log into "Windows 10" with your "Microsoft Account".
If you go back to logging into "Windows 10" with a "Local Account", you lose your ability to use the "Windows 10 Activation Troubleshooter" to change your computer's motherboard.
- If you activate "Windows 10" with a purchased "Windows 10 Product Key" and then you replace the hard drive but keep the same motherboard, you can do a "fresh install" with an Installation Media DVD or USB thumb drive. During the "fresh install" process, you can either "Skip activation" or enter in your purchased "Windows 10 Product Key". If you enter in your "Windows 10 Product Key", your "fresh install" will have a "Product Key" license. If you "Skip activation", your "fresh install" will have a "Digital License".

- **USING THE FREE "WINDOWS 10 ENTERPRISE EVALUATION" (B)**

There are three ways for you to run the free "Windows 10 Enterprise Evaluation". It is close enough to the other editions of "Windows 10.." so that you can use it to test hardware and compatibility with your existing computer(s).

- What is the "Windows 10 Enterprise Evaluation"?
- System requirements
- Testing an old "Pentium 4" computer to make sure that it can run "Windows 10"
- Ways for you to run the "Windows 10 Enterprise Evaluation":
 - Method 1: Installing it into a real, physical computer.
 - Method 2: Installing it into a virtual machine.
 - Method 3: Using a "Windows To Go" flash drive or external hard drive to boot up a computer

- **ADDING EXTERNAL PARTS TO REPAIR OR IMPROVE A COMPUTER (B)**

You can add external parts to make cost-effective temporary or permanent repairs or improvements to a computer:

- Parts of a computer fail In two ways
- Use "USBTreeView" to troubleshoot
- Disabling failed parts in a computer
- Reasons to add an external part to your computer
- Examples of external parts
- Portable and AC-Powered Monitors
- USB hubs
- External DVD/CD drives
- External hard drives and external hard drive enclosures to boot up a computer
- Gigabit Ethernet wired network adapters
- USB 3-based 802.11ac Wi-Fi wireless network adapters
- External USB mouse
- External USB keyboard
- USB sound card
- USB 3-based "DisplayLink" adapters

- **EXTENDING AND SPEEDING UP A LOCAL AREA NETWORK (LAN)--Part 1: THE BASICS** (E)

There are various technologies that you can use to extend and speed up the network ("LAN") in your home or business:

- Category 5/5e/6/6a cable
- Powerline Networking
- Radio Repeaters for Wi-Fi
- Phone Line Networking
- Coaxial Networking
- Switches, routers, and extenders at the end of the (above) extension techniques
- Additional wireless enhancements to speed up you wireless network. (Many of these improvements for your wireless network are free.)
- Less common options such as wired Ethernet extenders, fiber optic media converters, high-gain antennas such as parabolic dishes, and wireless mesh networks

- **EXTENDING AND SPEEDING UP A LOCAL AREA NETWORK (LAN)--PART 2: USING Wi-Fi RANGE EXTENDERS AND POWERLINE NETWORKING (B)**

You can use powerline networking and/or wireless range extenders to extend your local network:

- Measuring Internet bandwidth
- Measuring local network speed
- Examples of powerline networking equipment
- Examples of wireless range extenders
- Internet speeds and local network speeds at different points in a typical home network
- Using free programs to analyze wireless network
- Using a wireless router at the end of a powerline networking link
- Wireless extender and powerline hybrids

- **EXTENDING AND SPEEDING UP A LOCAL AREA NETWORK (LAN)--PART 3: USING "MULTIMEDIA OVER COAX ALLIANCE" (MoCA) AND POWERLINE NETWORKING (B)**

You can use powerline networking and/or wireless range extenders to extend your local network:

- Measuring Internet bandwidth
- Measuring local network speed
- Examples of powerline networking equipment
- Examples of "Multimedia over Coax Alliance" (MoCA)
- Internet speeds and local network speeds at different points in a typical home network
- Use MoCA 2.1 to get "Gigabit Ethernet" Speeds
- Do not use MoCA version 1.1 equipment
- Disable the MoCA feature of your cable modem if your cable modems bottlenecks your MoCA 2.1 equipment
- You can attach a spare wireless router at the end of a powerline link or a MoCA link

- **WHAT TO DO WHEN YOUR COMPUTER WILL NOT BOOT** (B)

If your computer will not boot up, here are some logical troubleshooting steps for you to follow from the simple and obvious to more complex procedures.

- Basic troubleshooting of any computer
- Change boot order during initial boot up
- Booting with a bootable DVD or CD disc, a bootable USB flash drive, or a bootable HDD
- Troubleshooting a "Windows.." desktop computer
- Troubleshooting a "Windows.." laptop computer
- Troubleshooting a Mac "OS X" computer
- Restore a "Windows.." computer from a "system image backup"

- **USING THE "TASK MANAGER" IN A "WINDOWS.." COMPUTER" (B)**

The "Task Manager" in "Windows.." provides you with an under-the-hood view of the operating system, startup programs, third-party software application programs, hardware utilization, and network bandwidth utilization. In addition to being a useful analysis tool, the "Task Manager" in "Windows.." gives you a powerful way to close down potentially dangerous Web browser tabs and windows and any "drive by" downloads of malware that they might attempt to send into your computer:

- Launching the "Task Manager"
- "Task Manager" Differences Between Windows 7/8/8.1/10
- Using the "Task Manager"
- Using the "Processes" Tab of the "Task Manager"
- Using the "Users" Tab of the "Task Manager"
- Using the "Details" Tab of the "Task Manager"
- Using the "App History" Tab of the "Task Manager"
- Monitoring for a "Memory Leak"
- Using the "Startup" Tab of the "Task Manager"
- Using the "Services" Tab of the "Task Manager"

- **"COMPUTER MANAGEMENT" IN A "WINDOWS.." COMPUTER" (I)**

The Computer Management "Microsoft Management Console" in "Windows.." provides you with access to the "System Tools" submenu, the "Disk Management" applet, and the "Services" window. These applets allow you to perform maintenance, repairs, and modifications to a "Windows.." computer:

- Uses of "Computer Management"
- Starting "Computer Management"
- Submenu Items of "Computer Management"
- **"Task Scheduler"** lets you look at and modify what activities are automatically scheduled by both the "Windows.." operating system and third party applications
- **"Event Viewer"** gives you a user-friendly look at the historical logs of what has happened "under the hood" inside both "Windows.." and third-party applications for problem analysis and resolution
- **"Shared Folders"** shows you what other computers on your local network can "see" in your computer by means of "file sharing" which is called "Server Message Blocks" (= SMG = SAMBA = "conventional file sharing").
"Shared Folders" does not show the files and folders that your "Windows.." computer is sharing by means of Homegroups".

- **USING A WEBCAM TO SPY ON SOMETHING**

(E)

You can use various models of Webcams to spy on your home(s), business(es), and pets. They can alert your cell phone and/or your computer when they detect motion.

In addition to these basic functions, the Internet cloud can now provide you with:

A means of communicating with a Webcam from points unknown and

cloud storage for saving snapshots and video clips either automatically when motion is detected by your Webcam or on-demand.

- Webcam Basics
- History of Webcams
- Legal Issues Regarding Webcams
- Security Issues Regarding Webcams
- Wired USB Webcams
- A Free Motion-Detection Alarm Using a Wired USB Webcam
- Wi-Fi Webcams
- Cloud-based Webcams
- "Netgear Arlo": A Totally-Wireless Cloud-based Webcam •
- Reviews By Others

- **USING THE FREE "VMWARE WORKSTATION PLAYER" TO RUN A FREE, TIME-LIMITED COPY OF "WINDOWS 10" IN A "VIRTUAL MACHINE" (I)**

By using a virtual machine program such as the free "VMware Workstation Player" inside your existing "Windows.." or Linux computer, you can create virtual machines and run free evaluation copies of "Windows 10" inside them:

- Big Step 0:
Learn about virtual machines
- Big Step 100:
Install the free "VMware Workstation Player" program into your existing computer
- Big Step 200:
Use the "VMware Workstation Player" to create a new virtual machine
- Big Step 300:
Download a free, time-limited copy of "Windows 10.." and install it into the new virtual machine
- Big Step 400:
Run "Windows 10.." inside the virtual machine and install the "VMware Tools" program which consists of drivers provided by "VMware Player"

- **INITIAL SETUP OF "WINDOWS 10.." WITH A "LOCAL ACCOUNT"(E)**

Here are the detailed steps for the initial setup of "Windows 10.." with a "local account". This non-default configuration reduces Microsoft's data gathering and makes your computer run more efficiently.

- By default, when you start up a "Windows 10.." computer for the first time or when you create a new "user account" in "Windows 10", it tries to get you to log into your "user account" in the "Windows 10.." computer with a "Microsoft Account" which is an account at Microsoft's server farm system. When you log into "Windows 10.." with a "Microsoft Account", your computer will be in constant communication with Microsoft's server farms which will be constantly gathering and storing data about what you are doing with your computer.
- When you set up "Windows 10.." with a "local account", you greatly reduce the amount of data that Microsoft's server farms can gather about you. You also free up Internet bandwidth, RAM, and CPU processor cycles. These local computer resources become available for the programs that you run on your computer.
- When a "local account" in "Windows 10" is used, you get a reduction in the amount of complexity in "File Explorer" so that the new user of "Windows 10" does not have to deal with the complexities of Microsoft's "OneDrive" cloud storageDefault appearance of "Windows 10

- **SOME WIRELESS TECHNOLOGIES THAT YOU CAN USE WITH YOUR "WINDOWS.." COMPUTER: "WIRELESS HDMI", "WiDi", "CHROMECAST", "EZCAST", AND THE Actiontec "ScreenBeam Kit" (E)**

This is an explanation and a hands-on demonstration of some recently-introduced technologies for wirelessly connecting televisions and monitors to "Windows.." computers, Mac "OS X" computers, "Android" tablets and cell phones, AND iOS tablets and cell phones:

- "WiDi" is Intel's robust technology for connecting "Windows.." computers to television sets and computer monitors. Some current models of laptops have this capability. Some current models of television sets have this capability. If your "Windows.." computer and/or your television set does not have "WiDi" capability, you can install an Actiontec "ScreenBeam USB Transmitter" for your computer and an Actiontec "ScreenBeam Receiver" for your television set or monitor to add in this capability
- "Chromecast" is Google's robust technology for connecting the Chrome Web browser running in a Wi-Fi-capable "Windows.." computer to television sets and computer monitors
- "EZCast" lets you wirelessly stream your entire monitor screen to a TV or extra monitor in the 20 to 40 dollar price range.

- **A DEMONSTRATION AND EXPLANATION OF "CHROMECAST" (E)**

This is an explanation and a hands-on demonstration of "Chromecast":

- "Chromecast" is Google's robust technology for wirelessly streaming all or part of a single "tab" in the "Chrome" browser to television sets and computer monitors
- "Chromecast" works in "Windows.." computers, Mac "OS X" computers, Android tablets and phones, AND iOS tablets and phones
- "Chromecast" cannot communicate with computers in a point-to-point manner: It has to communicate with a wireless router that has "wireless isolation" disabled
- Using "Chromecast"
- Installing "Chromecast"
- Moving "Chromecast" to a different wireless network

- **A DEMONSTRATION AND EXPLANATION OF "EZCAST" (E)**

This is an explanation and a hands-on demonstration of "EZCast":

- "EZCast" is the only technology that can wirelessly connect your computer to a TV or a monitor AND display the entire monitor screen, for less than \$40.
- Using "EZCast"
- Installing "EZCast"
- EZCast has an integral wireless router that is interjected between your computer, tablet, or cell phone when you use "EZCast" to wirelessly send a monitor screen or streaming media content to a television set or a computer monitor
- Reconfiguring EZCast's wireless router
- Moving "EZCast" to a different wireless network

- **A DEMONSTRATION AND EXPLANATION OF ACTIONTEC'S "SCREENBEAM" "TRANSMITTER AND RECEIVER KIT" (E)**

This is an explanation and a hands-on demonstration of Actiontec's "ScreenBeam USB Transmitter:

- If your computer does not have "WiDi" capability and you wish use "WiDi" technology to connect to a TV or a monitor, you have to add an Actiontec "ScreenBeam" transmitter to a USB port at the computer AND you have to install an Actiontec "ScreenBeam" receiver at the TV or computer monitor

- **"WebRTC"--AN EMERGING STANDARD FOR VIDEO CHATTING AND SCREEN SHARING** (E)

The emerging implementations of "WebRTC" will bring browser-based video chatting and screen sharing to the end-user computer activities that are currently done with legacy services such as "Skype", "Face Time", and "Google Hangouts". The current pilot implementations of "WebRTC" demonstrate great improvements over existing legacy services: "WebRTC" is and will be more reliable and can operate well over lower Internet speeds relative to its predecessors.

- "WebRTC" will bring standards-based video chatting and screen sharing to all Web browsers
- Existing video chatting programs such as "Skype" will adopt the "WebRTC" standard in order to become easier to use and more reliable
- Several beta implementations of "WebRTC" are available for you to try out for free:
 - FireFox Hello
 - <http://appear.in>
 - <http://vline.com>
 - <http://talky.io>
- <https://appear.in> is our favorite implementation so we will use it to demonstrate a three-party video chat session with screen sharing by each of three end-user computers:
your computer,
my "Windows 10" computer,
and
my Mac "OS X" computer.

- **SOME SIMPLE TECHNIQUES FOR MAKING A "WINDOWS.." COMPUTER EASIER TO USE** (E)

This is a hands-on demonstration of some simple tricks for making your "Windows.." computer more user friendly and efficient:

- Unhide file extensions
- Pre-pend year-month-day to file and folder names
- Circle trick for checking the aspect ratio of your monitor screen
- Copy-paste or cut-paste to the right pane of "Windows Explorer" or "File Explorer" (instead of to the left pane)
- Drag down or up before copy-paste or cut-paste to avoid inadvertently putting into folders
- Use the paste button to avoid copy-paste or cut-paste into folders
- Use a text file as an intermediate step to strip out formatting
- Right click-rename or f2 and then copy to copy the name of a file instead of the file
- netplwiz or control userpasswords2 to make Windows.. log you in automatically when you power up your computer
- Use Windows' "Preview" for faster previews relative to third-party programs
- USE Ctrl+Shift+Esc or Ctr+Alt+Delete and the "Task Manager" to avoid mousing over or clicking on hazardous URLs
- When sending document files to other computer users, it is best to use the .doc, .xls, and .ppt file formats
- Use printable paper rulers when you need a ruler
- When in doubt, use the right mouse button to click on something
- Ctrl + and Ctrl - to enlarge and reduce the text in most Web pages

- **POWERLINE NETWORKING** (E)

"Powerline networking" has improved greatly in speed and reliability. It is now comparable in speeds to "Gigabit Ethernet" so you can now use it to extend your local network with less of a slowdown relative to "Gigabit Ethernet":

- A live demonstration of a "powerline network" that connects a broadband modem, a router, and an end-user computer
- Extending your existing network with powerline networking transceivers
- Power networking standards: "HomePlug AV2" and "G.hn"
- Reviews of powerline networking devices
- Default "mesh network" configuration
- Setting independent groups of powerline networking transceivers

- **OUR EXPERIENCES WITH POWERLINE NETWORKING** (E)

Let us tell you some of our "war stories" about our experiences with specific models of powerline networking equipment:

- 2011: Trendnet "TPL-304E2K" (= "HomeplugAV 200")
- 2014: D-Link "DHP-601AV" (= "HomeplugAV2 600")
- 2015: Zyxel "Pla5405" (= "HomeplugAV2 1200")
- 2015: D-Link "DHP-701AV" (= "HomeplugAV2 2000")

- **USING ROUTERS WITH "WIRELESS INTERNET SERVICE PROVIDER" (WISP) CAPABILITY** (E)

A router that has "Wireless Internet Service Provider" ("WISP") capability can grab a wireless Wi-Fi signal and repackage the signal in order to provide you with capabilities, cost savings, and security that you otherwise would not have with a wireless Internet service:

- "Wireless Internet Service Provider" (WISP) fundamentals
- "Edimax" routers
- "Tenda" routers
- Additional routers with a "WISP" mode

- **CONFIGURING ROUTERS** (E)

Most modern home routers will have an initial default configuration that will work with your broadband modem and your existing computers, tablets, cell phones, and printers. Here are hints for modifying the initial default configuration for your specific networking environment:

- Test the initial default configuration of your router
- Modifying the configuration of your home router
- USB ports on routers
- Checking for "Network-attached Storage" (NAS)

- **ANALYZING AND RESOLVING Wi-Fi PROBLEMS** (E)

To analyze and resolve Wi-Fi problems, you can install free software utility programs for your "Windows.." or Mac "OS X" computer. These programs give you numerical and graphical information that you can use:

- Free Wi-Fi software for your "Windows.." or Mac "OS X" computer
- Received Signal Strength Indication (RSSI)
- Selecting the right Wi-Fi channel

- **RESOLVE BOTTLENECKS IN YOUR LOCAL AREA NETWORK** (E)

To get the best Internet download and upload speeds for your local network, you can use your computer to measure the actual Internet "bandwidth" at different points in your local network. Then you can bypass or replace the troublemaking network devices:

- A demonstration of a real bottleneck in a typical home network
- Big Step 100:
Measure Internet bandwidth at various locations on your home network
- Big Step 200:
Measure local network speeds at various locations on your home network

- **"USB 3" VERSUS "USB 2" VERSUS "eSATA" (E)**

We have all heard the marketing hype about how "USB 3" is 10 times faster than "USB 2".

We will show you our "real world" measurements:

"USB 3" is about 2 to 3 times faster than "USB 2"

and

"USB3" is just a little bit faster than "eSATA".

We will show you the basic facts about these three connection technologies.

We will also tell you about the backward and forward compatibilities and incompatibilities of "USB 3" and "USB 2".

- **WORKAROUNDS FOR FAILURES OF "USB 2" DEVICES ATTACHED TO THE "USB 3" PORTS OF "WINDOWS", MAC "OS X", OR LINUX COMPUTERS** (E)

USB 2 devices sometimes fail when attached to USB 3 ports in Windows, Mac "OS X", and Linux computers. There are two workarounds for this problem:

- Workaround 1:
Use a cable USB 3 cable that is less than 5 feet in total length.
- Workaround 2:
Use a powered USB 3 hub at the equipment end of the USB 3 cable.

- **TESTING USB PORTS, CABLES, AND DEVICES** (E)

USB 2 Using three free software programs, you can test USB ports, cables, and equipment in order to resolve problems:

- Use the free "USBTTreeView" software program to check for basic functioning and stability
- Use the free "FlashBench" software program to put a "USB 2" or "USB 3" port through a series of real world tests: "Writes" and "Reads" of real files to a USB flash drive, a mechanical hard drive, or a solid state drive
- Use the free "CrystalDiskMark Portable" software program for more extensive comparison testing

- **A COMPARISON OF THREE POPULAR EXTERNAL "USB 3" HARD DRIVE ENCLOSURES** (E)

We compared three popular external "USB 3.0" 3.5-inch harddrive enclosures:

A Thermaltake "Max 5G", Rosewill "RX-358 U3C", and a Sabrent "EC-7F83":

- We used the free "FlashBench" software program to put the three models of hard drive enclosures through "writes" and "reads" of real files to a Seagate "Barracuda" 1-Terabyte mechanical hard drive
- The Thermaltake and Rosewill enclosures had similar "read" and "write" performance benchmarks.
- The Sabrent enclosure performed worst relative to the Thermaltake and Rosewill enclosures.

- **USB ADAPTERS FOR ADDING USB PORTS TO AN EXISTING COMPUTER**(E)

PCIe "USB 3" adapters bring the speed increases of "USB 3" to computers that do not have "USB 3" ports. However, be prepared for a struggle if you attempt to install one into a "Windows.." (or Mac "OS X" or Linux) computer:

- Example of a USB 3 controller
- Installing a USB 3 controller
- Reason for the protracted struggle

• **HARD DRIVE RELIABILITY (B)**

Hard drives, like every other part, of your computer have a 100 percent failure rate. That means that you have to proactively plan ahead in order to avoid the loss of data files and photo files when a hard drive eventually fails:

- There are three surviving hard drive manufacturers:
Seagate, HGST, and Western Digital
- Reliability data gathered by "BackBlaze" company show that HGST hard drives are more reliable than Western Digital hard drives which are more reliable than Seagate hard drives
- Strategies for dealing with the certainty of hard drive failure:
 - Data File/Folder Backups To Internal and External Hard Drives
 - Redundancy using Microsoft's bundled "Storage Spaces", and "RAID" hard drive arrays.
 - Storing Data Files and Photo Files in the Internet "Cloud" with "OneDrive", "Google Drive", "Box", etc.
 - Imaging of Hard Drives with bundled Microsoft software
 - Imaging of Hard Drives with third party software such as "Macrium Reflect Free", "Clonezilla", or "Acronis True Image"
 - Data Recovery Software such as "Recuva"
 - "Fix when broke" using a cleanroom services such as "DriveSavers" or "OnTrack"

- **SOFTWARE PROGRAMS AND WEB SERVICES FOR OPTICAL CHARACTER RECOGNITION (OCR) (B)**

"OCR" stands for "Optical Character Recognition". It means converting the graphical representation of text into text that can be searched, copied, and edited:

- Definition of "OCR":
See http://en.wikipedia.org/wiki/Optical_character_recognition
- Examples of using "OCR"
- Using "OCR" to reduce the size of existing document files
- Using "OCR" to search for keywords and names of people
- "OCR" with "OneNote.." of "Microsoft Office.."
- "OCR" with Web-based services:
The best Web-based service for doing "OCR" is <http://free-online-ocr.com/>
- "OCR" with not-free software computer programs
 - Nuance Omnipage
 - ABBYY FineReader
 - I.R.I.S.'s ReadIRIS

- **USING LOW-COST LAPTOPS (B)**

Back in 2014, laptops became available at the \$200 price point for the first time. This very modest computer is now available through mail order at "amazon.com", "walmart.com", "bestbuy.com", etc.,

Here is some advice for using these low-cost "Windows.." computers:

- If you want very slow but free Internet access and you have a landline phone line from the phone company, you can procure a "USB 2" analog data/fax modem and then run the free dial-up versions of "Netzero Internet" or "Juno Internet".
- However, you should not do the initial setup of the computer with such a slow connection to the Internet. If you do not have broadband Internet service, do your initial setup of the computer at a place that has free Wi-Fi wireless Internet service such as a library, a "Barnes & Noble" store, a "Starbucks", or a "McDonalds".
- If you buy an external USB analog data/fax modem, you can use the free versions of "Netzero Internet" or "Juno Internet" to make a very slow connection to the Internet. However, most Web sites assume that you have a broadband connection so you will have to turn off the display of pictures and multimedia from the settings screens of the Web browsers that you use.

- **USING A FREE VIRTUAL MACHINE TO SIMULATE LOW-END "WINDOWS.. LAPTOP (B)**

From inside your existing computer, you can use a free copy of "Windows.." inside a free virtual machine to simulate a ~\$200 "Windows.." laptop:

- Obtaining the manufacturer's specifications for the low-end laptop
- Using published reviews and users' comments for fine tuning the simulation of the low-end laptop
- Installing a free virtual machine program into your existing computer
- Creating a new virtual machine
- Downloading a free, time-limited copy of "Windows 8.1.." or "Windows 10.." to install into the new virtual machine
- Installing the free, time-limited copy of "Windows 8.1.." or "Windows 10.." into the virtual machine
- Fine tuning the number of virtual processor cores for the virtual machine
- Installing "Desktop" software application programs into the virtual machine
- Installing "Windows Store apps" into the virtual machine
- Monitoring free space on the virtual internal hard drive of the virtual machine

- **USING A FREE VIRTUAL MACHINE TO SIMULATE A SPECIFIC MODEL OF COMPUTER (B)**

From inside your existing computer, you can use a free copy of "Windows.." inside a free virtual machine to simulate a computer that you or someone else plans to buy:

- Advantages of using a virtual machine to simulate a computer that you or some else plans to buy
- Obtaining the manufacturer's specifications for the target computer model.
- Using published reviews and users' comments for fine tuning the simulation of the target computer model
- Installing a free virtual machine program into your existing computer
- Creating a new virtual machine
- Obtaining a free, time-limited copy of "Windows.." to install into the new virtual machine
- Installing the free, time-limited copy of "Windows.."
- Creating a new virtual machine for simulating the target computer model
- Obtaining a free, time-limited copy of "Windows.." for the virtual machine
- Installing the free, time-limited copy of "Windows.." into the virtual machine
- Fine tuning the number of virtual processor cores for the virtual machine
- Installing (desktop) software application programs into the virtual machine
- Installing "Windows Store apps" into the virtual machine
- Monitoring free space on the virtual internal hard drive of the virtual machine

- **MAC "OS X" COMPUTERS AND HOW THEY DIFFER FROM "WINDOWS.." COMPUTERS (B)**

Let's look at the pricing and models AND the user interface of Apple's Mac "OS X" computers and compare them to "Windows.." computers:

- Four Models of Macs
 - "Mac Mini" is a small-form-factor computer
 - "iMac" is an "All in One"
 - "MacBooks" are laptops
 - "Mac Pro" is full-sized tower
- Pricing of Macs
- User Interface of Macs
 - "Menu Bar" is always visible on the top of the screen
 - "Dock" is similar to the "Task Buttons" in the center of the Windows.. "Taskbar".
 - "Finder" icon in the "Dock" is similar to "Windows Explorer" in "Windows.."
 - Keyboard differences
- Running "Windows.." Inside Macs
 - Method 1: Running "Windows.." inside a virtual machine running in "Parallels Desktop", "VMware Fusion", or "Oracle VM VirtualBox".
 - Method 2: Running "Windows.." inside a "Boot Camp" partition

- **MAKING A "MAC MINI" MORE PORTABLE**
(B)

A "Mac mini" is usually used as a desktop computer. However, by adding a few accessories to it, a "Mac mini" can travel well with you. When you travel with it, your "Mac mini" can be used as your main portable computer or as a backup for your existing "MacBook" or "Windows.." laptop computer.:

- "Mac mini in a briefcase" concept
- Models of the "Mac mini" computer
- Add a keyboard and a mouse
- Add a portable monitor
- Add a briefcase
- Add a wrap-around case
- Add a USB sound dongle if you need a microphone jack
- Connecting USB devices to a "Mac mini"
- Connecting more than one monitor to a "Mac mini"
- Appendix: History of the "Mac mini"

- **REMOVING MALWARE FROM A "WINDOWS.." COMPUTER (B)**

Malware removal is a technically frustrating task that can be done with various software tools including free antivirus programs and free bootable rescue CDs/DVDs.

- Malware often hides from view as hidden files and folders so make sure that you can see hidden files and folders by following the procedure at http://aztcs.org/meeting_notes/winhardsig/win/win-easier.pdf
- Our standardized procedure for cleaning a malware-Infected computer is located at http://aztcs.org/meeting_notes/winhardsig/malwarecleanup/malwarecleanup.htm
- Our technical advice on using various free rescue disks to remove malware can be found at http://aztcs.org/meeting_notes/winhardsig/malwarecleanup/rescue_disks.pdf
- To use the various free rescue CDs/DVDs/USB flash drives, you have to configure the BIOS or UEFI of your "Windows.." computer so that it will boot up from one of these devices. See http://aztcs.org/meeting_notes/winhardsig/BIOStoUEFI/BIOStoUEFI.pdf
- If you have a "Windows XP", or a "Windows Vista", or a "Windows 7" computer, "ImgBurn" is a great free software application for burning and copying DVDs and CDs. It can also create *.iso image files of actual CDs, DVDs, and any files/folders on a hard drive
- If you have a "Windows 8" computer or a "Windows 8.1" computer, or a "Windows 10" computer, you do not need "ImgBurn" for burning CDs and DVDs from .ISO files.

- **A COMPARISON OF FREE ANTIVIRUS PROGRAMS (B)**

Free antivirus programs are now good enough to meet the needs of most home computer users, and many businesses, and organizational entities:

- A Comprehensive List of Antivirus Programs
- Free Antivirus Programs Versus Not-Free Antivirus Programs
- Criteria For Selecting Antivirus Programs
- Comparison Reviews of Free Antivirus Programs
- Comparison Tests of Antivirus Programs
- "Report Cards" for the Best Free Antivirus Programs
- "**FortiClient**" Versus "**Avast! Free Antivirus**", the Two Best Free Antivirus Programs for "Windows.." Computers
- "**Avast! Free Antivirus**" versus "**Sophos**", the Two Best Free Antivirus Programs for Mac "OS X" Computers

- **REMOVING "RANSOMWARE" FROM A "WINDOWS.." COMPUTER (B)**

"Ransomware" is malware that takes over your computer or part of your computer and offers to give you back access to it when you pay a ransom fee. The more sophisticated instances of "ransomware" can only be removed by booting up with a bootable "rescue media" CD-R disc, DVD-R disc, or USB flash drive device.

- What is "Ransomware"?
- Proactive Prevention To Prevent "Ransomware" Infections
- Back Up Your Computer and Its Data Files To Avoid The Losses Caused by "Ransomware"
- Reactive Removal of "Ransomware" With "Safe Mode"
- Reactive Removal of "Ransomware" With Bootable Media
- Using Bootable Media For Computers With "UEFI" with "Secure Boot"
- "ICE Cybercrime Center" Ransomware

- **TRANSITIONING BETWEEN "WINDOWS XP", "WINDOWS VISTA", "WINDOWS 7", "WINDOWS 8", "WINDOWS 8.1, AND "WINDOWS 10" (B)**

To help you make your leap from one version of Windows to another, here is a series of relevant topics:

- The five important changes between "Windows XP" and more recent versions of "Windows..".
- Hardware requirements for the various versions of "Windows..".
- "Start Button" and "Start Menu" issues.
- Running old software applications that only run in "Windows XP".
- "Windows Media Center" and how it differs in various versions of "Windows..".
- Microsoft's "End Dates" for "Extended Support" for different versions of "Windows..".
- New features in "Windows 8" and "Windows 8.1".
- New features in "Windows 10".

● **REMOTE DESKTOP CONNECTION (B)**

You can use "Remote Desktop Connection" to operate your "Windows Vista", "Windows 7", "Windows 8" or "Windows 8.1" computer from another computer or tablet.

The "Windows.." computer that is being controlled is usually called the "host computer" or the "remote computer".

The computer that you are using to access the "host computer" is usually called the "client computer".

"Client computer" -----> "Host computer"

- For example, if you have Hauppauge's "WinTV" software and one of their USB television tuners running in your "Windows.." computer, you can use "Remote Desktop Connection" to view "WinTV" from your Android tablet or your iPad. The net result is that your Android tablet or your iPad becomes your wireless television set--a wireless television set that you can take outside to your porch or garden.
- For a Windows laptop, desktop, or tablet, you can start "Remote Desktop Connecton" by running mstsc.exe from inside a "Windows Explorer" window, a "File Explorer" window, or an elevated command prompt window.
- For an iPad or iPhone, you can download and install Microsoft's free "Microsoft Remote Desktop" software from the Apple Store
- For an Android tablet or phone, you can download and Microsoft's free "Remote Desktop Connection" from the "Play Store"
- For a Mac "OS X" computer, you can download and install the free "Microsoft Remote Desktop Connection Client for Mac" program from the Apple Store applet

- **ENERGY MANAGEMENT FOR YOUR "WINDOWS.." COMPUTER: A COMPARISON OF SLEEP, HYBRID SLEEP, AND HIBERNATE (B)**

In addition to helping you control the amount of electricity that your "Windows.." computer uses, the energy management features in your "Windows.." computer let you do partial power-downs of your computer so that you can re-start exactly where you left off in your open and minimized Web browser windows and in all open and minimized windows of your software programs. These energy management features can dramatically reduce the delays that are caused by multi-tasking between your computer and non-computer activities.

- "Sleep" shuts off many parts of your computer but it keeps your RAM and other parts of your motherboard powered up so that you can start up where you left off by clicking a mouse button or a keyboard key. If your computer loses power during "sleep", your minimized and open windows are lost from RAM and the computer cannot restore them for you.
- "Hybrid sleep" does everything that "Sleep" does but it also stores all open and minimized windows in a "hyberfil.sys" file. If your computer loses power during "hybrid sleep", when you restart the computer, it will use the "hyberfil.sys" to restore all minimized and open windows so that you can start where you left off.
- "Hibernate" shuts off all power to your computer after it saves all minimized and open windows to a "hyberfil.sys" file. When you power up your computer again, it reads the

"hyberfil.sys" file to restore all minimized and open windows so that you can start where you left off.

- Some alarm clock programs can wake up your computer from "sleep" but they cannot wake up a computer from "hybrid sleep" or "hibernate". One example of a sleep-proof alarm clock program is "Free Alarm Clock", which can be obtained at <http://freealarmclocksoftware.com/>
- To save even more electricity, set up various brightness profiles for your computer's monitor(s) so that your computer monitor is not overly bright for a given amount of ambient light.

- **FREE SOFTWARE-BASED TIMERS AND ALARM CLOCKS FOR "WINDOWS.." (B)**

You can download and run free software that provides you with virtual timers and alarm clocks for your "Windows.." computer. These virtual timers and alarm clocks will be equivalent to real high-end timers and alarm clocks that cost hundreds of dollars each.

- [PC Chrono](#) is the best virtual clock, timer, and stopwatch that we have tested. It does not have an alarm clock function. "PC Chrono" only runs when your computer is fully powered on.
- [Free Alarm Clock 4](#) is the best virtual alarm clock that we have tested. It does not have timer or stopwatch functions. "Free Alarm Clock 3.1" can trigger an alarm even if your computer is in a sleep state. It can turn up the volume of your computer's speakers, even they are turned off by the sound volume slider of "Windows..".

- **"SKYPE" BASICS (B)**

Here are the absolute basics for using Skype:

- Double-click on the displayed contents to maximize the displayed contents. (This is especially important if you are sending your Skype session to a projector for others to see.)
- You cannot double-click on the black areas above or below the displayed contents to maximize the displayed contents.
- After a while, the Skype "Control Bar" autohides
- To get the Skype "Control Bar" to show up, shake the mouse or click once on the displayed content
- To restore the displayed content to normal, click on the button on the right end of the Skype "Control Bar"
- An occasional problem with "Skype": When you run "Skype for Windows desktop" in Windows 8 or 8.1 and you share your screen, sometimes the other side only sees the upper and leftmost quarter of your shared screen. There are three workarounds for this problem.
- As of May 28, 2014, "Premium Accounts" no longer exist. On that date, the "group calling" feature became free to all Skype accounts. Once you start a "group call" with at least two people, up to 10 people can participate in a "group call". When a Skype user calls any participant in an existing "group call", that participant can add the Skype user to the "group call" by clicking on the "Add to group call" button.

- **INSTALLING AND USING "LINUX MINT 17.3" (B)**

"Linux Mint 17.3" was released on December 4, 2015. "Linux Mint.." is a "fork" of "Ubuntu". "Linux Mint" is currently the most popular distribution of the Linux operating system. This latest version of "Linux Mint.." installs faster, starts up faster, and shuts down faster than any prior version. Like previous versions, we have been able to install the following third-party software programs using only the graphical interface screens inside the bundled "Software Center":

- "Kaffeine" software program for over-the-air and cable television viewer with a USB, PCI, or PCIe television tuner. See http://aztcs.org/meeting_notes/winhardsig/add-ons/karaoke/karaoke-Ubuntu.pdf
- "efax-gtk" program for analog fax transmission and reception with an analog fax/data modem connected to a conventional telephone line. See http://aztcs.org/meeting_notes/winhardsig/add-ons/fax/fax-Ubuntu.pdf
- "PyKaraoke" software program for playing free .KAR, .MID, and .MIDI music files with scrolling lyrics. See http://aztcs.org/meeting_notes/winhardsig/add-ons/karaoke/karaoke-Ubuntu.pdf

- **INSTALLING AND USING "UBUNTU 16.04" LINUX (B)**

"Ubuntu 16.04" was released on April 21, 2016 by the Canonical company. This latest version of "Ubuntu.." installs faster, starts up faster, and shuts down faster than any prior version. Like previous versions, we have been able to install the following third-party software programs using only the graphical interface screens inside the bundled "Ubuntu Software Center":

- "Kaffeine" software program for over-the-air and cable television viewer with a USB, PCI, or PCIe television tuner. See http://aztcs.org/meeting_notes/winhardsig/add-ons/karaoke/karaoke-Ubuntu.pdf
- "efax-gtk" program for analog fax transmission and reception with an analog fax/data modem connected to a conventional telephone line. See http://aztcs.org/meeting_notes/winhardsig/add-ons/fax/fax-Ubuntu.pdf
- "PyKaraoke" software program for playing free .KAR, .MID, and .MIDI music files with scrolling lyrics. See http://aztcs.org/meeting_notes/winhardsig/add-ons/karaoke/karaoke-Ubuntu.pdf

- **PEER-TO-PEER Wi-Fi NETWORKING IN "WINDOWS.." (B)**

If you add an additional Wi-Fi adapter to your "Windows.." computer, you can use it to perform four functions:

- Attaching a wireless printer
- Sharing an Internet connection
- Sharing files between computers
- Creating a "Wireless Access Point" for other wireless devices and computers.

To help you make use of this Wi-Fi networking options, we will explain:

- Wi-Fi standards
- "Infrastructure mode" versus "ad hoc mode" versus "wireless Hosted Network" configuraton for a Wi-Fi adapter
- Configuring "ad hoc mode" for a Wi-Fi adapter in "Windows XP", "Windows Vista", or "Windows 7"
- Command line method for configuring a "wireless Hosted Network" for a Wi-Fi adapter in "Windows 7", "Windows 8", "Windows 8.1", "Windows 10"
- "Wi-Host" program for configuring "wireless Hosted Network" for a Wi-Fi Adapter in "Windows 7", "Windows 8", "Windows 8.1", or "Windows 10"
- "Virtual Router Plus" program for configuring "wireless Hosted Network" for a Wi-Fi Adapter in "Windows 7", "Windows 8", "Windows 8.1", or "Windows 10"
- Third-party software programs for creating a virtual "Wireless Access Point"

USING "wireless HOSTED NETWORK" IN "WINDOWS 7", "WINDOWS 8", "WINDOWS 8.1", or "WINDOWS 10" (B)

If you already have a real Wi-Fi adapter in a Windows 7 or 8 or 8.1 or 10 computer, the bundled "wireless Hosted Network" feature lets you create a virtual Wi-Fi adapter that you can use to perform four functions:

- Attaching a wireless printer
- Sharing an Internet connection
- Sharing files between computers
- Creating a "Wireless Access Point" for other wireless devices and computers to extend the reach of your wireless network.

To help you make use of this Wi-Fi networking option, we will explain:

- Wi-Fi standards
- "Infrastructure mode" versus "ad hoc mode" versus "wireless Hosted Network" configuration for a Wi-Fi adapter
- Configuring "ad hoc mode" for a Wi-Fi adapter in "Windows XP", "Windows Vista", or "Windows 7"
- Command line method for configuring "wireless Hosted Network" for a Wi-Fi adapter in "Windows 7", "Windows 8", "Windows 8.1, or "Windows 10"
- "Wi-Host" program for configuring "wireless Hosted Network" for a Wi-Fi Adapter in "Windows 7", "Windows 8", "Windows 8.1", or "Windows 10"
- "Virtual Router Plus" program for configuring "wireless Hosted Network" for a Wi-Fi Adapter in "Windows 7", "Windows 8", "Windows 8.1", or "Windows 10"

- **OVER-THE-AIR TELEVISION RECEPTION FOR FREE (E)**

You can receive digital television stations “over-the-air” for free. You will get less channels relative to those provided by cable television services and satellite dish services. However, the monthly cost for cable television and satellite dish service has been rising faster than the rate of inflation so this over-the-air technology” can save you lots of money, if it is adequate for your needs:

- Digital television in North America uses the “ATSC” standard. “ATSC” stands for “Advanced Television Systems Committee”. Over-the-air “ATSC” television channels have been available since the first half of 2009.
- Steps for setting up “over-the-air” television reception
 - Step 1: Do an online site survey at <http://antennaweb.org> and <http://copradar.com/dtv/index.html#locator>
 - Step 2: Do a pilot test of television reception at your actual physical location
 - Step 3: Procure equipment: an ATSC television or an ATSC tuner for an existing, old television set, or an ATSC-capable tuner for an existing computer.
 - Step 4: Install and configure equipment.

- **USING THE ~\$30 IVIEW" DIGITAL CONVERTER BOX AS A BARE-BONES TELEVISION SET (E)**

The "iView" digital converter brings usable low-end television to you at the previously unattainable \$30 price point, provided you can provide it with a monitor, speakers, and an over-the-air antenna:

- The current iView model 3200STB "Digital Converter Box" can only accept over-the-air "ATSC" signals
- The current firmware of the 3200STB cannot receive "clear QAM" or "encrypted QAM" cable television signals. (Earlier models were able to receive "clear QAM" cable television signals.)
- The iView model 3200STB not come with a monitor so you have to provide either a computer monitor that has an HDMI jack or a TV set with an "HDMI In" jack
- Does not come with speakers
- Does not come with a headset.
- Only has RCA left and right audio jacks so you might have to buy "RCA plug to 3.5mm jack" cables to connect to a headset or computer speakers.
- Has a television-type remote
- Has a USB 2 jack for attaching a flash drive or an external hard drive for recording television shows

- **TELEVISION SIGNALS FOR YOUR REAL OR VIRTUAL TELEVISION SET (E)**

You can watch television with either a real television set or with a virtual television that resides inside your Windows, Mac, or Linux computer. Your real or virtual television set can get television signals from either a cable television provider or over-to-air for free with an indoor or outdoor antenna.:

- Television Signal Options:
 - ATSC Over-The-Air
 - NTSC Over-The-Air
 - Clear QAM from a cable provider. (Most cable television providers no longer offer "clear QAM" channels to their subscribers.)
 - Encrypted QAM from a cable provider
- Reception Options
 - Television set
 - Tuner and television software inside a computer
- Timeline
 - ✓ 1941 - Black-and-white over-the-air NTSC television
 - ✓ 1949 - Black-and-white cable NTSC television
 - ✓ 1953 - Color NTSC over-the-air television
 - ✓ 2009-06-12 - NTSC to ATSC transition for most NTSC television stations, with an exception for "lowpowered",
 - "translator", and "Class A" stations which were allowed to continue broadcasting with NTSC signals.
 - ✓ 2015-09-01 NTSC to ATSC transition for all NTSC "low-powered", "translators", and "Class A" television stations.
- A Television Tuner For Your Computer
- Steps for setting up your real or virtual television set

- **MAKING "WINDOWS.." EASIER TO USE BY SHOWING FILE EXTENSIONS AND BY PROVIDING LOGICAL NAMES FOR FILES AND FOLDERS (B)**

All versions of "Windows.." from "Windows 95" to "Windows 8.1" suffer from various problems that Microsoft has inadvertently designed into them. Here are some tips and tricks for making "Windows.." easier to use including turning on the display of file extensions, and providing logical names for files and folders:

- Problems caused by the default of "Hide file extensions of known file types"
- Turning off "Hide file extensions of known file types"
- File and folder naming with year-month-day prepended
- Naming of the files that you send to other "Windows.." computer users

- **INSTALLING A USB-TO-VGA ADAPTER FOR YOUR "WINDOWS.." COMPUTER (I)**

If you have having problems with a VGA port on your desktop or laptop "Windows.." computer, you can install a "USB to VGA adapter" to bypass your existing VGA port.

- All of the current USB to VGA adapters use chipsets from one of two manufacturers: "DisplayLink" or "Magic Control Technology" ("MCT").
- "DisplayLink" chip sets can be found in USB # to VGA adapters that are made by Unitek, Kensington, StarTech, Plugable, Targus, SIIG, Accel, HP, HIS, Diamond, IOGear, Sewell, and Winstars.
- "Magic Control Technology" ("MCT") chip sets can be found in USB # to VGA adapters that are made by SIIG, j5create, and Seanet.
- The software and drivers for "DisplayLink" and "Magic Control Technology" ("MCT") are not compatible with each other.
- An Example of a "USB 3 to VGA Adapter" with a "DisplayLink" chip set: StarTech USB32HDDVII
- An Example Of A "USB 3 to VGA Adapter" with a "Magic Control Technology" ("MCT") Chip Set: SIIG JU-VG0211-S1
- If you have a later-model laptop or desktop "Windows.." computer, you can probably also use Honeywell's "HDMI-to-VGA" adapter. It works much better than "DisplayLink" or "Magic Control Technology"-based adapters when your computer has a spare HDMI port

- **HARD DRIVE "SYSTEM IMAGE BACKUPS" AND "BARE-METAL" RESTORES USING BUNDLED PROGRAMS IN "WINDOWS 7", "WINDOWS 8", "WINDOWS 8.1", AND "WINDOWS 10" (I)**

"Windows 7", "Windows 8", "Windows 8.1", and "Windows 10" are all bundled with a Microsoft program that you can use for creating a "system image" of the C: drive partition and the "System Reserved" partition.

When you encounter problems with your computer at a future time, the "system image" can be used for performing a "bare-metal" restore.

- Hard drive "system image" backups and "bare-metal" restores
- Different names but same system imaging program inside "Windows 7", "Windows 8", and "Windows 8.1":
Windows 7's "Backup and Restore" became Windows 8's "Windows 7 File Recovery".
Windows 8's "Windows 7 File Recovery" became "System Image Backup" in "Windows 8.1" and "Windows 10".
All three of these bundled programs do a great job of providing a reliable "bare-metal restore" for a C: hard drive.
- Step-by-step procedure for making an "system image" of your hard drive
- Step-by-step procedure for using the "system image" to perform a bare-metal restore of a hard drive. Hardware constraints can force you to select "Windows 7".
- The "system image backup" capability in "Windows 7", "Windows 8", and "Windows 8.1" can be used as a reliable no-frills alternative to third-party disk imaging programs such

as "Acronis True Image" (not-free) and "Macrium Reflect Free", and "Paragon Backup & Recovery 2013 Free".

- **A COMPARISON OF "WINDOWS 7", "WINDOWS 8.1", AND "WINDOWS 10" (B)**

At the present time, you have a choice between “Windows 10”, “Windows 8”, and “Windows 7”. You can make an informed selection between these three operating systems by considering their differences:

- Hardware constraints can force you to select “Windows 7”.
- Windows 7’s “Backup and Restore” became Windows 8.1’s “Windows 7 File Recovery”. Windows 8.1’s “Windows 7 File Recovery” became Windows 8.1 and 10’s “System Image Backup”. All three of these bundled programs do a great job of providing a reliable “bare-metal restore” for a C: hard drive.
- “Windows 10” and “Windows 8.1” have much better touch screen support relative to the touch screen support in “Windows 7”.
- “Windows 10” and “Windows 8.1” have “Storage Spaces” for mirroring hard drives to help prevent data loss due to hard drive failures. “Windows 7” does not have this capability.
- “Windows 10” and “Windows 8.1” have a “File History” feature which automatically backs up selected data files at designated time intervals. “Windows 7” does not have this capability.
- “Windows 7” has “XP Mode” for running old software applications. “Windows 10” and “Windows 8.1” do not have this capability.
- The “Pro” and “Enterprise” editions of “Windows 10” and “Windows 8.1” have “Hyper-V” for creating fast virtual machines. “Windows 7” does not have this capability.
- “Windows 10” and “Windows 8.1” are faster than “Windows 7”.
- Hardware driver improvements in “Windows 10” and “Windows 8.1” relative to “Windows 7”

- **[RUNNING “ANDROID” INSIDE A VIRTUAL MACHINE IN YOUR COMPUTER \(B\)](#)**

You can install and run a free copy of "Android 4.3" in a virtual machine inside a virtual machine program in your "Windows.." or Mac "OS X" computer. This gives you a chance to learn about the "Android" flavor of Linux without or prior to spending money for an "Android" phone or tablet:

- See <http://www.pcworld.com/article/2048220/hybrid-hijinks-how-toinstall-android-on-your-pc.html> for the hyperlink for downloading the free ISO file that is an image of the installation CD for "Android 4.3".
- You can install “Android 4.3” into a virtual machine inside the free “Oracle VM VirtualBox” program in a “Windows..” computer. See our [step-by-step instructions](#).
- You can install “Android 4.3” into a virtual machine inside the free “VMware Workstation Player” program in “Windows..” computer. See our [step-by-step instructions](#).
- You can install “Android 4.0” into a virtual machine inside the not-free “Parallels Desktop” program in a Mac “OS X” computer. See our [step-by-step instructions](#).

- **USING FREE VIRTUAL PRIVATE NETWORK (VPN) SERVICES AND VIRTUAL MACHINES (VMS) FOR SECURE PUBLIC INTERNET ACCESS (E)**

When commercial companies give remote Local Area Network and Internet access to their "road warrior" employees, they usually provide them with a "virtual private network". As a private, non-commercial computer user, you can take advantage of these security enhancements by using a free account from a virtual private network service. The virtual private network service provides you with an encrypted "tunnel" to their server which provides you with regular access to the Internet. For extra security and redundancy, you can connect to the virtual private network service from inside a virtual machine running inside your laptop computer. You can store clones of the virtual machine on an external USB or eSATA hard drive. If something catastrophic happens to your laptop computer, the cloned copy of your virtual machine on your external hard drive allows to you use another laptop computer to access the Internet securely by means of the virtual private network service:

- Basics of virtual private networks" (VPNs)
- How "virtual private network services" work
- Three "virtual private network services" with free accounts for private, non-commercial computer users
- [Using a two-router Demilitarized Zone \(DMZ\) to isolate a virtual machine for secure Web access in a local network](#)
- [Using a USB Wi-Fi adapter and a virtual machine for secure public Internet access](#)

- **EMAIL BASICS** (E)

A typical email system consists of three servers up in the Internet cloud. Your end-user computer communicates with these three servers in order to send and receive email messages. To help you understand your options for sending and receiving email, let us tell you about how email works:

- Three Cloud-based Servers For The Typical Email Service:
a server for sending email,
a server for receiving email,
and a Web server.
- Protocols For Sending Email
- Protocols For Receiving Email
- Access "Webmail" using a Web browser such as "Internet Explorer"
- Access the sending and receiving servers directly using a local "Email client program" that is installed on the hard drive of your local computer
- Advantages and disadvantages of "Webmail" compared to using an "Email client program"
- Using both "Webmail" and an "Email client program" to for maximum convenience

- **USING THE FREE "WINDOWS 8.1 ENTERPRISE EVALUATION" OR THE FREE "WINDOWS 10 ENTERPRISE EVALUATION" (E)**

There are three ways for you to run the free "Windows 8 Enterprise Evaluation" or the free "Windows 10 Enterprise Evaluation" to learn about the latest Windows.. operating system products:

- Method 1: You can run it inside a real, physical computer.
- Method 2: You can run it inside a virtual machine inside an existing "Windows", "Mac", or "Linux" computer
- Method 3: You can run it by using a bootable "Windows To Go" USB flash drive device or a bootable USB external hard drive to non-destructively boot up an existing computer.

MAKING THE LEGACY "DESKTOP" OF "WINDOWS 8.1" OR WINDOWS 10" EASIER TO USE (E)

To make the legacy "Desktop" of "Windows 8.1" or "Windows 10" easier to use:

- Use the popup "Power User's" Context Menu.
- Use Taskbar-based " Toolbars"
- Make a desktop shortcut to the "Snipping Tool".
- For "Windows 8.1, use our free [Windows 8 and 8.1 Care Package](#) contains useful shortcuts and hacks that make "Windows 8.1" easier to use.
- When you start up a "Windows 8.1" or "Windows 10" computer for the first time, it is fairly insistent that you either create or use an existing online "Microsoft Account" (= "Hotmail" account = "Windows Live" account = "OneDrive" account) to log into "Windows 8.1" or "Windows 10". This is not a good way for a new user of "Windows 8.1" or "Windows 10" to start out so you can [follow a few simple steps to create a "local account" instead](#).
- You can make [custom pop-up toolbars](#) that pop-up from the "Taskbar" of the "Desktop", as a substitute for the missing "Start Menu" that popped up from the "Start Button" in prior versions of "Windows..".
- You can [make custom tiles for the Start screen](#) of "Windows 8.1" for your shortcuts, photos, folders, documents, etc.
- Making "File Explorer" in "Windows 8.1" [Start Up in "Computer" View](#) instead of "Libraries" View.

- **USING THE BUNDLED "HYPER-V" VIRTUAL MACHINE PROGRAM IN "WINDOWS 8, 8.1, or 10 .." (B)**

"Hyper-V" is bundled with the "Pro" and "Enterprise" editions of "Windows 8", "Windows 8.1", and "Windows 10". You can use "Hyper-V" to run "virtual machines" containing "guest operating systems" such as "Windows XP", "Windows 7", "Windows 8", "Windows 8.1", "Puppy Linux", "Ubuntu", "Linux Mint", "Fedora", and "Debian". The net result is that you can put free virtual computers and a free virtual network inside most "Windows 8.1" computers.

- "Hyper-V" is an alternative to other free virtual machine programs such as "VMware Workstation Player" and "Oracle VM VirtualBox".
- "Hyper-V" is a no-cost alternative to non-free virtual machine programs such as "VMware Workstation".
- "Hyper-V" replaces "Windows Virtual PC" which was available in "Windows 7 Professional" and higher computers.
- Similar to "Windows Virtual PC" and "Microsoft Virtual PC 2007", "Hyper-V" has no direct USB, FireWire, or eSATA "support". You have to use home groups, file sharing, or Remote Desktop Connection as a workaround to transfer data files/folders between virtual machines AND external flash drives and external hard disk drives.
- Since "Hyper-V" is bundled with "Windows 8.1", budget-challenged organizations will find it "compelling" relative to non-free alternatives such as "VMWare Workstation".

- **"BIOS" TO "UEFI" WITH "SECURE BOOT" AND "CSM" (B)**

The venerable "BIOS" is now being replaced with a "UEFI" with "Secure Boot", as mandated by Microsoft since August 2012. However, legacy BIOS firmware has found a new life inside the "CSM" in the new-fangled "UEFI".

- "BIOS" = "Basic Input/Output System"
- "UEFI" = "Unified Extensible Firmware Interface"
- "Secure Boot" inside the "UEFI"
- "CSM" = "Compatibility Support Module"
- Inside the "UEFI", the "CSM" and the "Secure Boot" module cannot both be enabled at the same time
- The "Secure Boot" module of the UEFI can be enabled or disabled by the computer user at any time before or after the operating system is installed into the computer.
- At the present time, the only virtual machine program that can provide a virtual machine with a UEFI with Secure Boot enabled is the bundled "Hyper-V" applet in the 64-bit versions of Windows 8, 8.1, or 10
- Does my "Windows.." computer have a "BIOS" or a "UEFI"?
- If my "Windows.." computer has a "UEFI", is "Secure Boot" enabled or disabled?
- Accessing the UEFI configuration screens from a computer that is running "Windows 8", "Windows 8.1", or the previews of "Windows 10"

- **INSTALLING AND RUNNING "WINDOWS.." AND LINUX.. OPERATING SYSTEMS INTO "VIRTUAL MACHINES" THAT HAVE UEFI AND "SECURE BOOT" (B)**

Since August of 2012, Microsoft's "Windows Hardware Certification Program" requires that all "Windows 8" and "Windows 8.1" computers must have an UEFI with Secure Boot enabled. "UEFI" stands for "Unified Extensive Firmware Interface".

This means that all "Windows 8" computers, all "Windows 8.1" computers, and all "Windows 10" computers that are sold at retail AND that display the "Windows 8" logo, or the "Windows 8.1" logo, or the "Windows 10" logo, must boot up with a "UEFI with the "Secure Boot" feature enabled instead of the legacy "Basic input/Output System" ("BIOS") that Gary Kildall invented in 1975.

At the present time, the only virtual machine program that can provide a virtual machine with a UEFI with Secure Boot enabled is the bundled Hyper-V program running in one of the following operating systems:

"Windows 10 Pro",

"Microsoft Hyper-V Server Technical Preview",

and

"Windows Server Technical Preview".

For most of us computer users, only "Windows 10 Pro" is a practical operating system to use for running this latest rendition of Microsoft's "Hyper-V" program, since it takes computers with massive hardware requirements to run the server versions of "Windows..".

- **USING FREE CLOUD STORAGE--AN OVERVIEW** (E)

You can use free cloud storage services to store data files and digital photos for free. The benefits of storing data files are:

- Reduce the chance of losing data files and photos due to hard drive crashes and operator error.
- Facilitates collaboration between multiple people working on the same project
- Provides you with the ability to synchronize data files and digital photo albums between multiple computers, tablets, and cell phones.

- **A COMPARISON OF "ONEDRIVE", "GOOGLE DRIVE", BOX", "DROPBOX", AND "iCLOUD"** (E)

This detailed comparison between the five cloud storage services provides you with the objective information for selecting which ones to use.

- **USING MICROSOFT'S "ONEDRIVE" CLOUD STORAGE** (E)

Microsoft's "OneDrive" provides you with 7 Gigabytes of free storage space. The data files and digital photos that you store on "OneDrive" can be accessed from at Windows, Apple, Linux, and Android computers, tablets, and cell phones but it is especially well-integrated with the "Start" screen and the legacy "Desktop" of "Windows 8" and "Windows 8.1".

- **USING "GOOGLE DRIVE" CLOUD STORAGE** (E)

"Google Drive" gives you 5 Gigabytes of free storage up on Google's server farms. You can upload and download entire folders of data files or digital photos at the same time using most Web browser but uploads and downloads using Google's "Chrome" browser are especially fast, compared to uploads of folders for "OneDrive" and "Box".

- **USING "BOX" CLOUD STORAGE** (E)

"Box" gives you 5 Gigabytes storage up on their server farms. You can upload and download entire folders of data files or digital photos at the same time using most Web browser but uploads and downloads using Google's "Chrome" browser are especially fast, compared to uploads of folders for "OneDrive" and "Box". "Box" has the best online viewing and editing of data files because they over their own viewer, viewing and editing with "Zoho", and viewing and editing with "Google Docs".

- **USING APPLE'S "iCLOUD" CLOUD STORAGE (E)**

"iCloud" gives you an initial 5 Gigabytes storage up on Apple's server farms. To obtain this amount of storage, you have to first obtain an "Apple ID" by either filling in the form at Apple Web site or by using the screens inside the "iTunes" program. Then you can use this "Apple ID" to obtain an "iCloud" account from inside a Mac running "OS X" 10.7 or higher, a recent model "iPad", or a recent model "iPhone".

- **EXTEND THE USEFULNESS OF YOUR "WINDOWS..", MAC "OS X", OR LINUX COMPUTER WITH PERIPHERAL AND VIRTUAL ADD-ONS** (E)

You can use peripheral and/or virtual add-ons to enhance the usefulness of your computer.

- With the addition of real hardware peripherals such as fax modems, TV tuners, and Webcams, your computer can perform the same functions as real fax machines, TV sets, and video surveillance systems.
- You can use free software to create virtualized computer hardware to massively expand the variety of operating systems and software applications that you can operate.
- By combining virtualized computer hardware and real hardware peripherals, you can obtain synergistic benefits such as super secure Web access.

- **VIRTUAL FAX MACHINE INSIDE YOUR COMPUTER** (E)

You can use a fax modem and fax software instead of a real fax machine:

- [Fax transmission and reception from "Windows.."](#)
- [Fax transmission and reception from Mac "OS X"](#)
- [Fax transmission and reception from "Ubuntu" Linux](#)

- **GPS RECEIVER INSIDE YOUR COMPUTER (E)**

You can use a USB GPS device and GPS-capable software instead of a stand-alone GPS device:

- [GPS Reception from "Windows.."](#)
- [GPS Reception from "Ubuntu" Linux](#)

- **KARAOKE MACHINES INSIDE YOUR COMPUTER (E)**

You can play free karaoke song files with free karaoke software inside your computer instead of using a real karaoke machine:

- [Karaoke for "Windows.."-Part 1](#)
- [Karaoke for "Windows.."-Part 2](#)
- [Karaoke for Mac "OS X"](#)
- [Karaoke for "Ubuntu" Linux](#)
- [Non-professional Karaoke File Formats: .KAR and .MIDI / .MID](#)
- [Legal Issues and Guidelines for Karaoke](#)

- **TELEVISION INSIDE YOUR COMPUTER (E)**

You can create a working virtual television set inside your computer by installing a television tuner and running television viewing software such as "Windows Media Center", "WinTV", "EyeTV", "Kaffeine", or "TV Time", using a real karaoke machine:

- [TV Inside Your "Windows.." or Mac "OS X" Computer](#)
- [TV Inside Your "Ubuntu" Linux Computer](#)

- **REMOVING "TRIALWARE" AND UNNEEDED SOFTWARE FROM YOUR "WINDOWS" COMPUTER (E)**

You can use the free "Revo Uninstaller Freeware", "The PC Decrapifier", and "BleachBit" programs to remove the "trialware" and other unneeded software that resides in your "Windows" computer. You can then install a free antivirus program and a free office software suite to replace the "trialware" ("nagware").

- Disadvantages of having "trialware" and unneeded software in your computer.
- The removal of "trialware" and unneeded software is one of several ways that you can speed up your "Windows.." computer.
- Examples of "trialware".
- Examples of "unneeded software".
- Use the free "Revo Uninstaller Freeware" program first because it does a better job of removing all traces of "trialware" than any other free software program.
- Then use "The PC Decrapifier" program because it can remove items that "Revo Uninstaller Freeware" is unable to remove.
- Use the free and open source "BleachBit" program in "Windows.." and "Linux" computers in an organizational or business environment because "Revo Uninstaller Freeware" and "The PC Decrapifier" have "End User License Agreements" ("EULAs") that do not allow use in such environments.

- Then use Windows XP's "Add or Remove Programs" or Windows Vista/Windows 7/Windows 8/Windows 8.1's "Programs and Features" because some "trialware" cannot be removed any other way.
- Install the free "Microsoft Security Essentials" for "Windows XP", "Windows Vista", or "Windows 7" computers. Activate the bundled "Windows Defender" in "Windows 8" computers
- Use the free "Avast Free Antivirus" software program on some of the computers in your local network to improve the overall level of security for your local network.

- **SECURE WEB ACCESS USING A TWO-ROUTER DEMILITARIZED ZONE ("DMZ") AND A "VIRTUAL MACHINE" (B)**

From inside a "VMware" virtual machine that connects with a USB-to-Gigabit Ethernet adapter to a two-router "De-Militarized Zone" (DMZ), you can access the Internet with the maximum amount of protection from malware and intrusion.

This unique virtual machine configuration resolves two problems:

- Problem 1:
When you add a real or virtual "Windows.." computer to an existing local area network, "Windows.." automatically defaults to file sharing and homegroups. File sharing and homegroups provides an "attack vector" for some of the malware that finds its way into your computer by way of the Internet.
- Problem 2:
Even when you proactively turn off file sharing and home groups in various configuration screens in "Windows..", it is easy for the unsuspecting end-user or malware from the Internet to turn it back on.

Our secure Web access solution consists of four parts:

- Solution Part 1:
Disconnect the default virtual network adapter of the virtual machine.
- Solution Part 2:
Provide the virtual machine with a USB-to-Gigabyte Ethernet adapter.
- Solution Part 3:
Add an extra router to your local network in order to create a two-router "De-Militarized Zone" (DMZ).
- Solution Part 4:

Connect the virtual machine to the two-router De-Militarized Zone (DMZ), using the USB-to-Gigabit Ethernet adapter that you installed in "Solution Part 2".

- **MAKING THE FREE "LIBREOFFICE" PROGRAM DEFAULT TO THE .DOC, .XLS, AND .PPT FILE FORMATS OF "MICROSOFT OFFICE.." (B)**

The free "LibreOffice" suite of software programs is a great alternative to not-free "Microsoft Office..". However, you should set the various programs inside "LibreOffice" to default to the most common file formats of .DOC, .XLS, and .PPT in order to have maximum compatibility. Let us show you the steps for making "LibreOffice Writer", "LibreOffice Calc", and "LibreOffice Impress" get along with "Microsoft Word", "Microsoft Excel", and "PowerPoint".

- **TROUBLESHOOTING PRINTER PROBLEMS (B)**

We will show you how to use various screens in the Windows "Control Panel" and the "Services Console" to troubleshoot and resolve problems in the "print spooler", the "print processor", and the "port monitor" to resolve problems that are more complex than the usually-misleading fixes that are suggested by the "Troubleshoot" wizards that "Windows.." provides for your various printers.

- **TRICKS AND WORKAROUNDS FOR INSTALLING PRINTERS (I)**

You can set up printers for end-user computers faster and with fewer problems if you use a few high-tech tricks, including "virtual machine" technology, temporary USB connections, and Local Area Network (LAN) communications:

- Use "virtual machine" computers to avoid permanent computer slow-downs caused by the printer management software that is bundled with most printers.
- Use (temporary) USB cables and plug-and-play automation to "kick start" the installation of printer drivers, if your real or virtual computer does not automatically "see" a printer that is "shared" or "network connected".
- In a totally-"Windows" environment where the printer is "shared" from a "Windows" computer, you can install the printer into additional end-user "Windows" computers by using the "Network" section of "Windows Explorer".
- For any operating system environment, after you install a "shared" or "network-attached" printer successfully, you can use the "create a port" or "new port" feature to "install" the printer into additional computers.

- **AUTOMATIC BACKUP OF DATA FILES IN "WINDOWS 8.1" AND WINDOWS 10" (E)**

"Windows 8.1" and "Windows 10" provides you with some new bundled applications for backing up your data files:

- The "File History" feature of "Windows 8" and "Windows 8.1" automatically store copies of changed data files at designated time intervals.
- "Storage Spaces" is a new feature of "Windows 8.1" that can be used to set up a pair of hard drives that mirror each other in real time. If and when one of the hard drives fail, the other hard drive will still contain a complete set of your data files/folders.

- **USING "STORAGE SPACES" FOR BACKING UP AND/OR MOVING YOUR DATA FILES IN "WINDOWS 8.1" AND "WINDOWS 10" (E)**

"Storage Spaces" is a new feature in "Windows 8.1" and "Windows 10". It provides for real-time mirroring of two hard drives or two hard drive partitions. In addition to not losing data when a single hard drive fails, you can use "Storage Spaces" to back up and move your data files to another "Windows 8.1" or "Windows 10" computer.

- "Storage Spaces" Basics
- Creating A Two-Way-Mirrored "Storage Space"
- Replacing A Hard Drive In A Two-Way-Mirrored "Storage Space"
- Using an extra hard disk drive or two, it is possible to utilize "Storage Spaces" to make periodic "full" data backups that can be stored offline and then viewed in any "Windows 8.1" or "Window 10" computer.
- Using "Storage Spaces" To Move Your Data Files To Another "Windows 8.1" or "Windows 10" Computer
- Special requirements ("gotchas") when using external hard drive enclosures with "Storage Spaces"

- **SUCSESSES AND FAILURES WITH "STORAGE SPACES" IN "WINDOWS 8.1 AND "WINDOWS 10" (E)**

"Storage Spaces" works wonderfully with some hardware configurations and terribly with others. If you use the hardware configurations that work well, you will have a great free way of mirroring hard drives that will save you from paying for not-free third-party alternatives.

- Basic information about "Storage Spaces"
- An "All PCIe USB 3" configuration that causes "Storage Spaces" to fail
- An "All motherboard USB 3" configuration that works reliably with "Storage Spaces"
- A "Hybrid PCIe and Motherboard" configuration that works reliable with "Storage Spaces"
- Special requirements ("gotchas") when using external hard drive enclosures with "Storage Spaces"

- **MIRRORING HARD DRIVES IN REAL TIME WITH SOFTWARE** (E)

You can mirror two or more hard drives in real time using software to avoid data loss due to inevitable hard drive failures. This always-on backup technique can be described as a software-based "RAID 1" configuration. Let us show you three ways to accomplish this automatic backup scheme in an automated manner that is transparent to the computer end-user:

- The bundled "Storage Spaces" program in "Windows 8", "Windows 8.1", and "Windows 10"
- "Drive mirroring" with the "Dynamic Disks" feature that is bundled in "Windows 7", "Windows 8.1, and "Windows 10".
- Third-party non-free software for mirroring hard drives

- **ACCESSIBILITY IN "WINDOWS 10" AND "WINDOWS 8.1" (E)**

Computer users with special needs will find "Windows 10" and "Windows 8.1" easier to use than prior versions of "Windows..":

- "Narrator" can be turned on during the installation or upgrade process in order to help you install or upgrade from your current version of "Windows XP"/"Windows Vista", or "Windows 7" to "Windows 8.1" or "Windows 10".
- "Magnifier" now works for "High Contrast" themes.
- "Narrator" will now speak any text that you put your finger onto (for tablets and touch screen monitors).
- All accessibility settings can be changed from either the login screen or the legacy Desktop of "Windows 8.1" or "Windows 10"

- **MAINTAINING AND REPAIRING HARD DRIVES FOR WINDOWS COMPUTERS (E)**

When confronted with hard drive problems, you should perform low-risk, less invasive procedures first, followed by increasingly aggressive, higher-risk procedures. As you perform these increasingly invasive procedures, you will either repair the hard drive and return it to service or you will decide that it is beyond economical repair:

- [Always Click on "Cancel" when an "Initialize Disk" box pops up\(unless you have just attached an unformatted hard drive or USB flash drive device to your computer\)](#)
- [Maintenance and Repair Strategy](#)
- ["Error-checking" in "Windows.." to Resolve Bad Clusters](#)
- ["Soft Repairs" with Utilities in Linux](#)
- [Data Recovery with Utilities in Linux](#)
- [Radical "Surgery" to Extend the Life of Failed Hard Drives:](#)
If you are unable to recover the data files from a failed hard drive and it's platters are still spinning, you can usually use "Disk Management" in "Windows" to create partitions to "block out" the bad sections of the hard drive, in order to extend the useful life of the hard drive.

- **USING A LOCAL AREA NETWORK (LAN) TO SHARE FILES BETWEEN WINDOWS COMPUTERS, MAC "OS X" COMPUTER, OR LINUX COMPUTERS (I)**

If you have "Windows.." and Mac "OS X" computers OR "Windows.." and Linux computers on your local area network (LAN), you can use a few network tricks to share files between them.

- **USING VIRTUALIZATION OF HARDWARE TO SAVE MONEY, TIME, AND SPACE (E)**

You can save money, space, and time by using the virtual software "devices" to simulate all or part of real, physical equipment:

- "Microsoft Fax" instead of a real fax machine
- A USB TV tuner and "WinTV" or "Windows Media Center" instead of a television set
- The "Virtual CloneDrive" software program instead of a real DVD/CD drive
- Windows' "Internet Connection Sharing" instead of a real router and network switch for sharing the existing network connection of a real Windows computer
- Windows' "Network Bridge" instead of a real network switch or a real network bridge for sharing the existing network connection of a real Windows computer
- Software-based "virtual machines" and "virtual hard drives" instead of real computer hardware and real hard drives.
- Virtual networks and virtual network devices instead of real network devices

- **FREE SOFTWARE TRIALS FROM MICROSOFT (B)**

As a computer user and especially as a member of a budget-challenged user group, you should take advantage of the great free trials that Microsoft offers for their operating systems and applications software:

- "Windows 10 Enterprise Evaluation" is a fully-functional time-limited trial version of "Windows 10"
- "Windows 8.1 Enterprise Evaluation" is a fully-functional time-limited trial version of "Windows 8.1"
- "Microsoft Office 2013" is a fully-functional, time-limited trial that is available for 10 days.
- Microsoft offers free, time-limited virtual machines running "Windows XP, "Windows Vista", Windows 7", "Windows 8", and "Windows 8.1" for any virtual machine program and any host operating system at <http://www.modern.ie/en-us/virtualization-tools> . This means that you can run a free, time-limited copy of "Windows.." inside your existing Windows, Mac, or Linux computer for testing and comparison.

- **CHOOSING A VIRTUAL MACHINE PROGRAM FOR YOUR "WINDOWS.." COMPUTER (B)**

There are three free virtual machine programs that you can run inside your "Windows.." computer: "VMware Workstation Player", "Oracle VM VirtualBox", and "Hyper-V". Each of these programs let you create and clone "virtual machines" which are complete software-based computers. Since they are all free, you can run all of them in your "Windows" computer--but not at the same time. The compelling reasons for picking one of the virtual machine programs are presented to you to help you pick the best one for your needs.

(The presentation slides for all of our presentations on virtual machines are located at

http://aztcs.org/meeting_notes/winhardsig/virtualmachines/virtualmachines-concise.pdf

and

http://aztcs.org/meeting_notes/winhardsig/virtualmachines/comparison-vm-programs.pdf

and

http://aztcs.org/meeting_notes/winhardsig/virtualmachines/virtualmachines-longterm.pdf

and

http://aztcs.org/meeting_notes/winhardsig/win8/win8-Hyper-V.pdf

- **BENEFITS OF USING VIRTUAL MACHINES**

(E)

Let us show you how virtual machines can save you time, money, and space. You can use “virtual machines” to perform activities that you would otherwise have to do with real computers. When you use virtual machines in free "virtual machine programs", it is like getting a pile of computers to use for free with all of them residing inside your existing physical "host" computer. When you run virtual machine programs, you can use fewer real computers because you can create “virtual machines” instead of keeping old computers around or buying additional new computers.

- **INSTALLING A "VIRTUAL MACHINE PROGRAM" INTO YOUR "WINDOWS" COMPUTER** (I)

We have created detailed step-by instructions to help you to install the following two free "virtual machine programs" into your "Windows" computer: "VMware Workstation Player", and "Oracle VM VirtualBox". We will demonstrate the actual installation of one or more these amazing programs into a "Windows 7" computer.

- **CREATING VIRTUAL MACHINES INSIDE YOUR "WINDOWS" COMPUTER (I)**

Let's demonstrate the three ways for you to install virtual machines inside your computer:

- Method 1: Use the installation media provided by the maker of the operating system.
- Method 2: Clone an existing virtual machine so that it runs in the same "virtual machine program".
- Method 3: Clone an existing virtual machine so that it runs in a different "virtual machine program" (= "V2V")

- **USING A REAL COMPUTER TO MAKE A VIRTUAL MACHINE (I)**

In addition to the three ways to create a virtual machine, you can also create a virtual machine from an existing, real "Windows" computer. This process is called "Physical to Virtual". It is also known as "P2V". To use a real, physical computer to create a "virtual machine" (P2V) that can be "played" in any Windows computer that has a "VMware Workstation Player" or "Oracle VM VirtualBox", you can use "VMware vCenter Converter Standalone" or Microsoft's "Disk2vhd". Let's demonstrate the steps for using these two free software programs.

- **USING A VIRTUAL MACHINE TO DO REAL COMPUTING (I)**

After creating some virtual machines, you can start using them to do real computing. Let's start off by looking at the virtual hardware in virtual machines inside "VMware Workstation Player", "Oracle VM VirtualBox", and "Hyper-V". Then let's look at how the mouse cursor and your keyboard works when you are inside a virtual machine. Finally, let's take a look at the virtual networks that are connected to your virtual machine.

- **FREE SOFTWARE VERSUS FREE SERVICES (B)**

For any given computer function, you often have both free software and free Web-based "software as a service" services to choose from. Free software has the advantage of not requiring an Internet connection. Free Web-based services have the advantage of storing automatically on the Web to save you hard drive space. But to run a free Web-based service, your computer has to be connected to the Internet and the Internet connection can act as a bottleneck for the creation and editing of larger data files. Let's compare free software and free online services for doing word processing, spreadsheets, presentation creation, video frame capture, and karaoke music.

- **PREPARING A COMPUTER FOR FREE SOFTWARE AND SERVICES (B)**

Prior to installing free software or free services, you should install the free "Adobe Reader", remove existing unwanted software using "Revo Uninstaller Freeware" or "Revo Uninstaller Pro", and make sure that the Windows registry is as clean as possible with the free "CCleaner" software utility. Let's use a "Windows XP" virtual machine to demonstrate these steps for preparing your computer.

- **FREE ONLINE COMPUTER TRAINING (E)**

Your computer and its Internet connection can provide you with hundreds of hours of free training that you can access in the comfort of your home. The Tucson Computer Society has a collection of categorized hyperlinked shortcuts to Web sites that have free computer training. These shortcuts include free training from the Web sites of Adobe and Microsoft. You also can get free and non-free training from the Web sites of training organizations such as Lynda.com, Hewlett Packard, SeniorNet, Oasis, and various public libraries.

- **DIAL-UP INTERNET ACCESS FOR FREE**

(B)

Let us show you how to access the Internet and the Web for free by using the free versions of "Netzero Internet" and "Juno Internet". You will not set any speed records for upload and download speeds but these two free dial-up "Internet Access Providers" are available in the entire United States including Alaska and Hawaii. Even if you have a broadband Internet, you can use "Juno Free.." and "Netzero Free.." as a backup means of Internet access when your broadband provider is down. When using slow dial-up, you can speed up your Internet experience a bit by 1) speeding up your computer and 2) by tweaking your computer's Web browser software so that it does not attempt to display graphics and multimedia. If you cannot dial the nearest "Netzero.." or "Juno.." dial-up phone number as a "local call", you can use a calling card to avoid "long distance" and "toll calling" charges from your local phone company.

- **KARAOKE MUSIC FOR FREE** (B)

"Karaoke" means displaying the timed lyrics while playing the instrumental "backing tracks" for music that someone (you!) has to sing. Instead of buying karaoke machines and karaoke CD+G discs, you can run karaoke for free in your "Windows" computer. There are two ways for you to do this: you can use your Web browser to visit various karaoke Web sites and you can download and run various free software programs for playing karaoke. Let's demonstrate both ways of doing karaoke for free:

- The karaoke Web sites that we will visit are:
 - "[Divtune's Albums](#)" at the Vimeo.com Web site,
 - [RedKaraoke.com](#),
 - [KaraokeHaven.com](#),
 - and
 - [Cantanding.com](#)
- The free software programs that we will demonstrate are:
 - [GoSing](#),
 - [VanBasco's Karaoke Player](#),
 - and
 - [KaraFun Player](#).

- **WEBCAMS AND RELATED FREE SOFTWARE AND SERVICES** (E)

We will show you how a webcam can be used for:

- Voice and video calling with the free versions of Skype, Windows Live Messenger, or Google Video Chat
- Interactive games that require a Webcam
- Taking still photos using free software and free Web-based services
- Free software for doing frame grabs from video files
- Free Internet-based video recording and surveillance
- Free video motion detection and recording for home and business security

- **CLEANING MALWARE FROM YOUR "WINDOWS" COMPUTER** (E)

The computer techs at a professional computer support company in Tucson, Arizona told us what they do to clean up malware-infected computers. Using their advice, we created this step-by-step cleanup procedure that has successfully disinfected 90+ percent of the infected computers that we have tried it on. This procedure consists of running "Malwarebytes AntiMalware", "SuperAntiSpyware", and "ComboFix" in sequence while the computer is in "Safe Mode". In addition to providing this cleanup procedure as a step-by-step "recipe" for you to download and use, we will show you some screenshots from some of the successful "computer exorcisms" that we have performed.

- **SPEEDING UP "WINDOWS XP" (I)**

We have prepared extensive step-by-step instructions for you to use to speed up your "Windows XP" computer(s). We will use an actual "Windows XP" virtual machine to show you how to use the "System" applet in the control panel to perform various speedup tweaks including "supersizing" the virtual memory "swap file". Then we will show you how to run "services.msc" in "Microsoft Management Console" to turn off and disable unneeded services, which will massively speed up your "Windows XP" computer.

- **SPEEDING UP "WINDOWS 7" (I)**

We have prepared extensive step-by-step instructions for you to use to speed up your "Windows 7" computer(s). We will use an actual "Windows 7" virtual machine to show you how to use the "System" applet in the control panel to perform various speedup tweaks including "supersizing" the virtual memory "swap file". Then we will show you how to run "services.msc" in "Microsoft Management Console" to turn off and disable unneeded services, which will massively speed up your "Windows 7" computer.

- **SPEEDING UP "WINDOWS VISTA" (I)**

We have prepared extensive step-by-step instructions for you to use to speed up your "Windows Vista" computer(s). We will use an actual "Windows Vista" virtual machine to show you how to use the "System" applet in the control panel to perform various speedup tweaks including "supersizing" the virtual memory "swap file". Then we will show you how to run "services.msc" in "Microsoft Management Console" to turn off and disable unneeded services, which will massively speed up your "Windows Vista" computer.

- **SPEEDING UP "WINDOWS 8" AND "WINDOWS 8.1" (I)**

We have prepared extensive step-by-step instructions for you to use to speed up your "Windows 8" and "Windows 8.1" computer(s). We will use an actual "Windows 8" or "Windows 8.1" virtual machine to show you how to use the "System" applet in the control panel to perform various speedup tweaks including "supersizing" the virtual memory "swap file". Then we will show you how to run "services.msc" in "Microsoft Management Console" to turn off and disable unneeded services, which will speed up your "Windows 8" or "Windows 8.1" computer.

- **SPEEDING UP "WINDOWS 10" (I)**

We have prepared extensive step-by-step instructions for you to use to speed up your "Windows 10" computer(s). We will use an actual "Windows 10" virtual machine to show you how to use the "System" applet in the control panel to perform various speedup tweaks including "supersizing" the virtual memory "swap file". Then we will show you how to run "services.msc" in "Microsoft Management Console" to turn off and disable unneeded services, which will speed up your "Windows 10" computer.

- **TURN OFF STARTUP PROGRAMS TO SPEED UP YOUR "WINDOWS" COMPUTER (I)**

To get even more speed out of your "Windows XP", "Windows Vista", "Windows 7", "Windows 8", "Windows 8.1" or "Windows 10" computer, you can to edit the registry to disable some of the "startup programs" that your software programs put into your computer:

- For "Windows 7", "Windows 8", "Windows 8.1", or "Windows 10" computers, you can run "Regedit.exe" to "REM" out the registry keys that start up programs inside the "Run" folders in the registry.
- For "Windows XP" and "Windows Vista" computers, you can also perform these same registry edits using "Regedit.exe".
- For "Windows XP" and "Windows Vista" computers, you can also run the "Software Explorer" inside "Windows Defender", instead of running "Regedit.exe".
- Using various virtual machines running "Windows XP", "Windows Vista", "Windows 7", "Windows 8", "Windows 8.1", or "Windows 10", we will show you how to make these various tweaks. We have prepared extensive step-by-step instructions for you to use for all of these versions of "Windows..".

- **SHARING FILES AND PRINTERS BETWEEN "WINDOWS 10", "WINDOWS 8.1", "WINDOWS 7", "WINDOWS XP", AND "WINDOWS VISTA" COMPUTERS (E)**

When you need to share files and/or printers between "Windows 7" computers and computers running earlier versions of "Windows..", you have to use traditional file/printer sharing instead of "homegroups". You might also have to use IP addresses to "kick start" the sharing process. Using virtual machines running "Windows 10", "Windows 8.1", "Windows 7", "Windows Vista", and "Windows XP", we will show you how file and printer sharing can be done between disparate versions of "Windows..".

- **USING LEGACY FAX MACHINES, FAX MODEMS, AND CREDIT CARD MACHINES ON "VOICE OVER IP"(VOIP) PHONE LINES**

(E)

Legacy fax devices and analog modems including older "point of sale" credit card machines often have massive compatibility issues with "Voice Over IP"(VOIP) phone lines. If you attach these sorts of older devices to a "Voice Over IP" ("VOIP") phone line, you only have a 20 percent chance that the older device will communicate successfully. You can increase your odds for success if you and/or your VOIP provider perform various tweaks on your legacy end-user devices, your network router, and your VOIP connection equipment.

- **USING "UNETBOOTIN" TO MAKE BOOTABLE USB FLASH DRIVES FOR "LINUX" DISTROS (I)**

"UNetbootin" is a great, free portable software program that can be used to make bootable USB flash drives/devices for booting up various distros of Linux

- "UNetbootin" runs in "Windows", "Linux", and "Mac" computers.
- When you are booted up into Ubuntu with the Unetbootin-created USB flash drive, you will be using a "RAM disk" instead of a real hard disk. When you log out of and shut down Ubuntu, the RAM disk disappears and your configuration files AND your Linux "Home" folder files are stored inside a proprietary file called Casper-RW inside the Unetbootin-created USB flash drive.

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