

Bits of Bytes

Newsletter of the Pikes Peak Computer Application Society, Colorado Springs, CO

Volume XL

November 2020

Issue 11



The Prez Sez

by John Pearce,
President, P*PCompAS

I enjoyed Bob Gostischa's presentation at the October meeting. There were several utilities in his presentation that caught my attention.

I could not convince someone to take on the nominating committee responsibility. Even though it may not be proper, I am working on a slate of officers that I will present at the November meeting. The election will be at the December meeting.

The option to meet at the church is suspended until there are more people interested in meeting there.

The number of COVID-19 infections have risen dramatically in El Paso County during the last few weeks and flu season just around the corner. If you have not yet gotten a flu shot, please do it now. And please do the things necessary to stay safe and in good health. ☺

Meeting Minutes

by Greg Lenihan,
for the P*PCompAS Secretary

President John Pearce began the 3 October 2020 Membership Meeting via Zoom at 9 am. Besides our members, Bob Gostischa and Mike Smith (APCUG) were on the call. A motion was made to approve the September meeting minutes and the minutes were approved.

Next P*PCompAS meeting: Saturday, 7 November 2020

Cary Quinn mentioned he may show an APCUG video.

OFFICER REPORTS

Vice-President Cary Quinn said Bob Gostischa from APCUG was today's presentation.

Treasurer Chuck Harris showed some 2020 currency and reported we have \$3224.41 in savings and \$71.29 in checking.

Membership Chair Ann Titus had nothing to report.

Newsletter Editor Greg Lenihan announced the next deadline as 24 October.

Librarian Paul Godfrey had nothing to report.

Hospitality Chair Ilene Steinkruger had nothing to report.

APCUG Rep Joe Nuvolini was not present for a report.

Board of Directors Chair was not present. Ann Titus was asked if there was anything to report and she said no.

OLD BUSINESS:

John Pearce is still looking for someone to assume the duties for the Nominating Committee to solicit for officers next year.

NEW BUSINESS:

Cary Quinn stated a new restaurant opened on North Nevada that might be considered for the Volunteer's Luncheon. Others announced that Old Chicago's is open and had not closed.

ANNOUNCEMENTS

The next social breakfast Zoom meeting will be 17 October at 9 am.

Our next membership meeting is on 7 October.

PRESENTATION

Bob Gostischa was a previous presenter a few years ago. Today's presentation was about "Staying Safe." Bob showed multiple products, many from Avast, that allow you to navigate online with relative safety. Ann Titus mentioned that she enjoys listening to Bob every week on his show "Tech for Seniors." ☺

Play the Chrome dinosaur game

In the last week, I must have read about the dinosaur game at least three times. Whenever you open the Chrome browser when offline, you see a screen with a dinosaur with the words "No Internet." Pressing the spacebar starts the game. You continue to press the spacebar or up arrow to jump over objects in your path. You get points the longer you can keep going. You can play the game

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Membership: Ann Titus

Committees

Audio: A.J. Whelen

Hospitality: Ilene Steinkruger

Programs: Cary Quinn

Publicity: Cary Quinn

Nominating: Vacant

Board of Directors

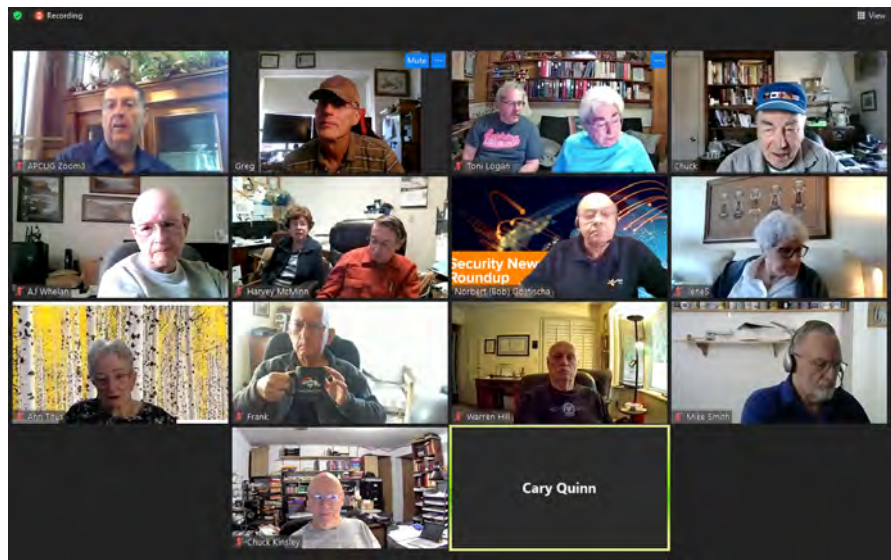
Peter Rallis

Paul Godfrey

Ann Titus

Harvey McMinn

Jeff Towne



Zoom screenshot of the 3 October membership meeting with APCUG presenter Bob Gostischa.



Zoom screenshot of the 17 October breakfast meeting.

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The CDs You Burned Are Going Bad: Here's What You Need To Do

By Ben J Edwards, reprinted with permission from [HowToGeek.com](https://www.howtogeek.com)

Original article at: <https://www.howtogeek.com/682807/the-cds-you-burned-are-going-bad-heres-what-you-need-to-do/>

If you used a computer between 1997 and 2005, you probably burned valuable data to at least one [recordable CD](#) (CD-R) or DVD-R. Unfortunately, these have a limited lifespan, and many have already become unreadable. That's why it's important to back up your recordable discs before it's too late—here's how to do it.

The Problem: Optical Disc Data Rots

CD-Rs and DVD-Rs store data on a layer of dye that is melted by the laser when the data is written. This dye layer isn't completely stable and can chemically break down over time, causing data loss. Also, the reflective layer on the top of the disc can oxidize, making the data difficult to read.

As a result, many CD-R and DVD-Rs burned in the late '90s and early '00s are now unreadable in modern optical disc drives. And for those that remain, the clock is ticking.



Estimates on the lifespan of CD- and DVD-Rs vary wildly, from between [two](#) and [100 years](#). In 2004, the U.S. Library of Congress sponsored a study that [estimated the shelf life of recordable discs](#) available at that time. It simulated the aging of CD- and DVD-Rs stored in perfect environmental conditions (that is, a room temperature of 50 percent humidity with no sunlight, and no rough handling).

The study concluded that most recordable discs stored in ideal conditions would last at least 30 years, but the results varied wildly by brand. However, it also stated that “discs exposed to more severe conditions of temperature and humidity would be expected to experience a shorter life.”

So, if you store your CD- or DVD-Rs in a hot attic, you might find a higher portion of them have gone bad. From our anecdotal experience, if you

have a batch of 30 vintage consumer-grade CD-Rs, you might expect a few of them to be unreadable. However, it depends on the quality of the disc, the type of dye used, the speed at which they were recorded, and how they were stored.

In 2010, the Canadian Conservation Institute published a [detailed analysis of CD-R and DVD-R longevity](#) that broke down estimated lifespans based on the dye and reflective layer composition. Like the Library of Congress report, the estimates varied wildly, from between five and 100 years, depending on disc composition. Unfortunately, the 100-year-minimum lifespan estimate only applies to expensive, high-end gold-backed CD-Rs that very few people used.

Even under ideal conditions, there's still cause for alarm. Even if a consumer-quality recordable disc has been stored in the perfect place, it might last (on average) about 30 years. Many recordable discs are already 15-25 years old, which means it's time to back them up now.

How to Back Up CD-Rs and DVD-Rs



To back up your old CD-Rs or DVD-Rs, you'll need a computer and a compatible CD or DVD optical drive to read the discs. Some people have had more success using older drives, claiming they tend to read older discs better than modern ones. This is anecdotal evidence, though.

Plus, older drives can be hard to get, unless you [find one on eBay](#). If you decide to look for an older model, focus on the big-name brands. Sony, for example, was known for making high-quality drives. Of course, whether a vintage drive will work with a modern computer is another issue, entirely.

If you'd like to try a newer drive to read your discs, you can easily purchase one online. Most new optical drives should work just fine, as long as a CD- or DVD-R hasn't begun to degrade.

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Windows 10 Feature Update Version 20H2 is Slowly Rolling Out

By Hewie Poplock, Tech for Seniors

The past week the latest Windows 10 feature update for October 2020 was available for my computer. I clicked on “download & install.” Since I was up to date with Windows 10 v2004, it only took about 2 minutes and a reboot to have Windows 10 20H2 installed.

Here are a few of the new features in the October 2020 Windows update.

Edge Browser Updates

A new feature in Edge is support for Alt-tab. The key combination now works with websites just as it's always worked on applications: hit the combo and it takes you through your open browser tabs.

Some other Edge updates involve pinning sites and shopping. Now, when you pin a site to the Taskbar, hover the mouse cursor over its icon which shows all the open tabs for the site. New for the Collections feature is Price Comparison, which automatically

lists other shopping options for an item you added.

A Redesigned Start Menu

This is a fairly superficial change, but the redesign lets the quick-access tiles in the Start Menu take on the color mode you've chosen in Personalization. There is a light mode version and there is a dark-mode version. The new design does have a more consistent appearance and adds a bit of transparency to the menu so you have an idea of what lies beneath it.

Better Notifications

The Action Center right-side panel provides a great way to access basic computer settings and also shows notifications from apps you've set up for them. Now a redesign makes them clearer by placing the app from which the notifications come in the upper left corner of the notification – also known as the toast.

Setting improvements

Microsoft continues to slowly migrate detailed settings from the legacy Control Panel to the newer Settings app. With 20H2 you can change the refresh rate for your display – something gamers will appreciate. You can now copy system info from the Settings page too.

Reset PC from the Cloud

This is huge for anyone who's had to do a clean install on a PC but didn't have the requisite disks. You can simply choose “Cloud download” to save yourself from having to hunt down that installation media for Windows

If you have not updated Windows 10 to version 2004 and still have version 1909 or earlier, it will be a major update. As I always caution users, be sure to make a backup and verify it before updating Windows! 😊

CDs Going Bad (Cont. from page 3)

We recommend the following drives:

For Windows PCs: A brand-name optical USB drive, like [this well-reviewed one by Dell](#) would be a good bet.

For Macs: A good bet would be the [Apple USB SuperDrive](#).

There are several ways in which you can copy the data from your CD- and DVD-Rs.

Option 1: Copy the Data Directly

If your PC or Mac recognizes the data on your CD- and DVD-Rs, the easiest way to back it up is to just manually copy the files over to your hard drive or SSD. To do this, just place the CD- or DVD-R in the optical media drive, and then open it on your computer.

It's best to do this with some kind of organizational structure if you're backing up a lot of discs. For example, you could create a

separate folder for the contents of each disc. Name the folder something that will identify its contents, such as “CD-R – Photos from Tom's 2002 Wedding.”

Option 2: Create Disk Images

Sometimes, a CD-R or DVD-R might be from a platform you don't use anymore, and you might not be able to read it properly. For example, say you burned a CD-R for a game console development kit, but Windows can't read it. In cases like those, [consider making a disk image of the disc, instead](#).

A disk image captures the entire structure of an optical disc, including all the file data and the file system (if there is one), in a way that can be replicated later on another disc, if necessary. Good utilities for making disk images include [WinImage](#) for Windows and macOS's built-in [Disk Utility](#) app.

RELATED: [How to Create ISO Files From Discs on Windows, Mac, and Linux](#)

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Which Printer is Best: Inkjet, Laser, or All-in-One?

By Bob Rankin, <http://askbobrankin.com>, published through the APCUG

Shopping for a new printer? You might be wondering if you should look for an inkjet or a laser. Or how about a plain old printer versus an all-in-one (AIO) printer, scanner, copier, fax, and toaster? The choice—inkjet vs. laser, and dedicated printer vs all-in-one—depends on what you print and how often you print it. Here's a look at the tradeoffs, and factors to consider when buying a printer...

Buying Your Next Printer

So you're in the market for a new printer. Here are some tips to help you decide. An all-in-one printer seems to be the de facto standard for all but the tightest budgets these days. But it's not the right choice for everyone.

Laser technology is ideal for black text or graphics. It uses heat

to fuse tiny dots of black toner to paper, creating a crisp and fade-resistant image of an all-black document or greyscale picture. There's no "bleeding" as there can be with ink. High-volume print jobs are handled better by laser printers. Laser technology is inherently faster than inkjet, and a laser toner cartridge prints ten times more pages than an inkjet cartridge.

If you print a lot, if speed is important to you, and you don't need color capability, a monochrome laser printer may be your best choice. Color lasers are an option, but tend to be rather pricey. (More on cost considerations later.)

On the other hand, some bleeding is desirable when printing high-quality color images, like family photos. In nature, liquids

blend together to form new colors; they do not just trick the eye by juxtapositioning dots of primary colors, as color laser printers do. Inkjet printers also lay down primary colors only, but they bleed and blend just enough to produce more natural-looking colors. Glossy photo paper is designed for ink; color laser prints don't look as good as inkjet even on the expensive, glossy paper.

That brings us to cost, both upfront and over the printer's entire lifecycle. A low-end inkjet printer may cost under \$60 on sale. Consumer-grade color laser printers run between \$250 and \$350; the fastest inkjet printers are in the \$200 to \$300 range. As you can see, the difference in upfront cost is

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CDs Going Bad (Cont. from page 4)

Back Up Your Optical Disc Backups



All consumer-grade digital storage media has a finite lifespan. It's only a matter of time before plastics chemically break down, metals oxidize, or magnetic signals fade. This means digital preservation takes active maintenance.

So, after you're done backing up your CD- or DVD-Rs, make sure the data you just copied over will be backed up continuously in the future. You can do this via a [cloud backup](#), an external disk or [NAS drive](#), and more.

One of the best ways to preserve your data at home is to keep your files on redundant storage (such as a RAID array). Then, just keep

migrating the data onto new hardware, as necessary (all drives wear out eventually) and onto new platforms as they emerge.

RELATED: [What's the Best Online Backup Service?](#)

What If I Find a Bad Disc?

If you're backing up CD-Rs or DVD-Rs, and find a disc that can't be read or has errors, your best bet is to copy as much data as you can, and then try to open the disc on a different optical drive. If the second drive fails, try a third.

Sometimes, CD- and DVD-Rs were burned at high speeds with high error rates that were normally fixed on the fly by error-correcting code. This can make it more difficult for modern optical disc drives to read them, so try them on an older drive, if possible.

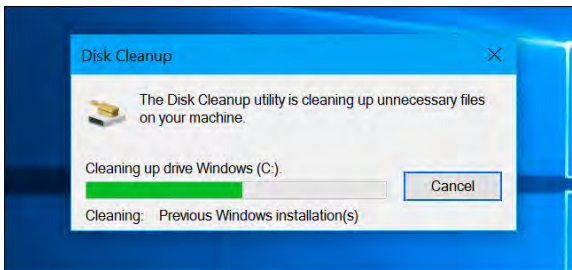
There's also some software that claims to aid in the recovery of data from optical media, such as [IsoBuster](#) (for Windows). If that doesn't work, though, you might just have to call it a loss and hope you saved the data elsewhere.

If the data is incredibly important and irreplaceable, you can hire a forensic data recovery service to extract whatever's left of it for you. Unfortunately, finding a reliable data recovery service isn't easy, so you'll have to do some research. Happy digging! ☺

Is It Safe to Delete Everything in Windows' Disk Cleanup?

By Chris Hoffman, reprinted with permission from [HowToGeek.com](https://www.howtogeek.com)

Original article at: <https://www.howtogeek.com/266337/what-should-i-remove-in-disk-cleanup-on-windows/>



The Disk Cleanup tool included with Windows can quickly erase various system files and [free up disk space](#). But some things—like “Windows ESD Installation Files” on Windows 10—probably shouldn’t be removed.

For the most part, the items in Disk Cleanup are safe to delete. But, if your computer isn’t running properly, deleting some of these things

may prevent you from uninstalling updates, rolling back your operating system, or just troubleshooting a problem, so they’re handy to keep around if you have the space.

Disk Cleanup 101

RELATED: [7 Ways To Free Up Hard Disk Space On Windows](#)

You can launch Disk Cleanup from the Start menu—just search for “Disk Cleanup.” It will immediately scan for files it can delete and display a list to you. However, this just shows files you can delete with your current user account’s permissions.

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Best Printer (Cont. from page 5)

not that great, but it’s easily made up in the long-term costs of supplies and maintenance. (I’ve noted that printer prices have risen during the pandemic, and this trend may continue as more people work and study from home.)

Don’t Forget To Factor in Supply Costs

An HP-branded black inkjet cartridge for an HP OfficeJet Pro 9025 All-in-One Printer costs about \$45 and yields about 2000 printed pages (about 2.2 cents/page). The color cartridges cost \$35 each and yield 1600 pages (2.2 cents/page). But this \$110 Brother TN-850 Black Toner Cartridge prints 8,000 pages (about 1.3 cent/page). So over time, your cost for inkjet printing will be almost twice as much as laser.

The price gap between toner and ink narrows when you look at remanufactured cartridges, which can cost 25% to 70% less than OEM cartridges. It’s hard to compare cost-per-page in the remanufactured market because prices vary a lot from one recycler

to another, and so does the amount of ink or toner supplied. See my article [Should You Buy Discount Inkjet Cartridges?](#) for my recommendations on suppliers for discount ink cartridges. And whether you go with laser or inkjet, always look for high capacity cartridges available because that will drive cost per page even lower.

Some printer vendors unfairly try to prevent you from buying third-party or refilled inkjet cartridges. In my article [HP Playing Dirty Tricks?](#) I tell the story of my HP printer suddenly telling me that all of my inkjet cartridges appeared to be “damaged,” and how I found a solution.

So to summarize the laser vs. inkjet decision:

- Fast printing of black text and grayscale images: go monochrome laser
- Lots of black and occasional, mid-quality color: go color laser
- Low volume printing, upfront cost a major factor: go inkjet

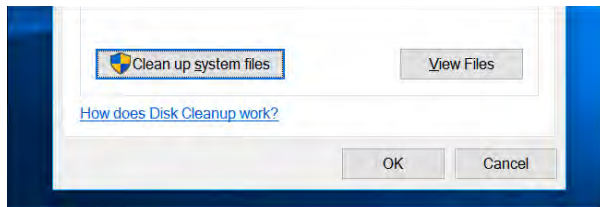
- Printing color documents or high-quality photos: go inkjet

A few caveats, though... If you live in a very dry area, or you print only on rare occasions, an inkjet may not be a good choice. Ink can dry up in dry, hot climates, and print heads may clog if the printer is not used on a regular basis. Laser toner is powder, so it fares well in a dry place. But in high humidity, pages printed on a laser can stick together. If you manage temperature and humidity in your home or office, these problems will most likely not be an issue.

So what about a single-function printer version an all-in-one? As I said, the decision to buy an all-in-one version of a given printer model is really a no-brainer. Who wants to run to the office store to scan a document, make a few photocopies or send a fax? The price difference is minor, and the joy of digitizing all your paper clutter is immense. You’ll save money by not buying filing cabinets, folders, labels, and hours of time as well. ☺

Windows Disk Cleanup (Cont. from page 6)

Assuming you have administrator access to the computer, you'll want to click "Clean Up System Files" to view a complete list of files you can delete.



To remove a group of files, check it. To keep a group of files, ensure it's unchecked. You'll see the maximum amount of data you can delete at the top of the window, and how much space you'll actually save at the bottom. Click "OK" after you're done selecting data and Disk Cleanup will delete the types of data you want to remove.

Windows ESD Installation Files Are Important

RELATED: [Everything You Need to Know About "Reset This PC" in Windows 8 and 10](#)

On Windows 10, there's now a "Windows ESD installation files" option here. Deleting it can free a few gigabytes of hard disk space. This is probably the most important option on the list, as deleting it could cause you problems.



These ESD files are used for "[resetting your PC](#)" to its factory default settings. If you delete these files, you'll have more disk space—but you won't have the files necessary to reset your PC. You may need to download Windows 10 installation media if you ever want to reset it.

We recommend not deleting this, unless you desperately need the few gigabytes in hard disk space. Deleting this will make your life harder if you ever want to use the "reset your PC" feature in the future.

Everything Else Disk Cleanup Can Delete

RELATED: [How to Reduce the Size of Your WinSXS Folder on Windows 7 or 8](#)

So what do all the other options do? We went through Disk Cleanup and made a list. Note that we used Disk Cleanup on a PC running Windows 10 with the Anniversary Update installed. Older versions of Windows may have slightly fewer options. Some options may only appear if you have certain types of system files on your hard drive.

- **Windows Update Cleanup:** When you install updates from Windows Update, Windows keeps older versions of the system files around. This allows you to [uninstall the updates](#) later. However, if you don't plan on ever uninstalling any Windows updates, this is a waste of space. This is safe to delete as long as your computer is working properly and you don't plan on uninstalling any updates.
- **Windows Defender:** This option deletes "non critical files used by [Windows Defender](#)," according to the Disk Cleanup tool. Microsoft doesn't explain what these files are anywhere, but it's likely they're just temporary files. You can select this option to free up some space and Windows 10's built-in antivirus will continue running normally.
- **Windows upgrade log files:** When you upgrade Windows—for example, upgrade from Windows 7 to 10, or upgrade from [Windows 10's November update](#) to [Windows 10's Anniversary update](#)—Windows creates log files. These log files can "Help identify and troubleshoot problems that occur." If you don't have any upgrade-related problems, feel free to delete these.
- **Downloaded Program Files:** This folder contains ActiveX controls and Java applets that are downloaded from the Internet when you view certain web pages in Internet Explorer. Feel free to delete these. They'll be automatically downloaded again when you visit a website that requires them, if you need them.

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Windows Disk Cleanup (Cont. from page 7)

- **Temporary Internet Files:** This contains your “browser cache” for Internet Explorer and Microsoft Edge. The cache includes bits and pieces of websites that are stored on your hard drive so you can load them faster in the future. You can clear this to free up space, but your browser cache will eventually fill up again. Note also that this only affects Microsoft’s browsers. Other browsers like Google Chrome and Mozilla Firefox have their own browser caches you would need to clear from within Chrome or Firefox themselves. Just remember: [regularly erasing your browser cache slows down your web browsing](#).
- **System error mem dump files:** When Windows crashes—known as a “[blue screen of death](#)”—the system creates a memory dump file. This file can help identify exactly what went wrong. However, these files can use a large amount of space. If you don’t plan on trying to troubleshoot any blue screens of death (or you’ve already fixed them), you can remove these files.
- **System archived Windows Error Reporting:** When a program crashes, Windows creates an error report and sends it to Microsoft. These error reports can help you [identify and fix problems](#). Archived error reports have been sent to Microsoft. You can choose to delete these, but you won’t be able to view reports about program crashes. If you’re not attempting to solve a problem, they’re probably not important.
- **System queued Windows Error Reporting:** This is the same as “System archived Windows Error Reporting,” except it contains queued error reports that have not yet been sent to Microsoft.
- **Windows ESD installation files:** This one is **important!** As described above, these files are stored on your PC and used to “Reset your PC” to its factory default settings. You can remove them to free up space, but then you’ll need to create and provide Windows installation media if you ever want to reset your PC.
- **Delivery Optimization Files:** The “Windows Update Delivery Optimization Service” is the part of Windows 10 that [uses your computer’s bandwidth to upload app and Windows updates to other computers](#). This option allows

you to remove data that’s no longer needed, except for uploading to other PCs.

- **Device driver packages:** Windows keeps old versions of device drivers, whether they were installed from Windows Update or elsewhere. This option will delete those old device driver versions and keep only the most recent one. You can remove these files if your PC and its devices seem to be working properly.

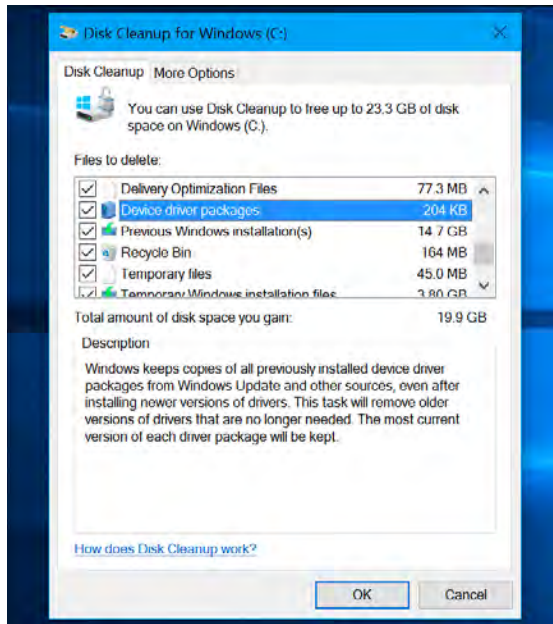
RELATED: [How to Free Over 10GB of Disk Space After Installing Windows 10’s May 2019 Update](#)

- **Previous Windows installation(s):** When you upgrade to a new version of Windows, Windows keeps the old Windows system files around for 10 days. You can then downgrade within those 10 days. After the 10 days, Windows will delete the files to free up disk space—but [you can delete them from here immediately](#). On Windows 10, installing a big update like the Anniversary Update or November Update is treated basically the same as upgrading to an entirely new version of Windows. So, if you recently installed the Anniversary Update, the files here will allow you to downgrade to the November Update.
- **Recycle Bin:** Check this option and the Disk Cleanup tool will also empty your computer’s Recycle Bin when it runs.
- **Temporary Files:** Programs frequently store data in a temporary folder. Check this option and Disk Cleanup will delete temporary files that haven’t been modified in over a week. This ensures that it should only delete temporary files programs aren’t using.
- **Temporary Windows installation files:** These files are used by the Windows Setup process when installing a new version of Windows or a major update. If you’re not in the middle of a Windows installation, you can delete them to free up space.
- **Thumbnails:** Windows creates thumbnail images for pictures, videos, and document files and stores them on your hard drive so they can be displayed quickly when you view that folder again. This option will delete those cached thumbnails. If you access a folder containing these types of files again, Windows

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Windows Disk Cleanup (Cont. from page 8)

will recreate the thumbnail cache for that folder.



We've also seen various other options here. Some only appear on previous versions of Windows, like Windows 7, and some only appear if your computer has certain types of files on its hard drive:

- **Temporary Setup Files:** Programs sometimes create setup files when you're installing them and don't automatically clean them up. This option will delete setup files that are no longer being used for anything.
- **Offline Webpages:** You can save web pages for "offline" browsing in Internet Explorer. Your "Offline Webpages" are web pages that have specifically been saved for offline use, and checking this will delete them.
- **Debug Dump Files:** These are debugging files created after a crash to help pin down the cause of the crash. If you're not trying to troubleshoot a problem, you can delete them.
- **Per User Archived Error Reporting:** These are the same as "System archived Windows Error Reporting" files, but stored under a user account instead of system-wide.

- **Per User Queued Windows Error Reporting:** These are the same as "System queued Windows Error Reporting" files, but stored under a user account instead of system-wide.
- **Old Chkdsk Files:** The [chkdsk tool](#) runs when there's file system corruption on your hard drive. If you see any "old chkdsk files," these are fragments of corrupted files. You can safely remove them unless you're trying to recover important, irreplaceable data.
- **Game Statistics Files:** On Windows 7, these include your score information for included games like Solitaire and Minesweeper. Delete them and the game will forget your scores and other statistics.
- **Setup Log Files:** These log files are created while software is installing. If a problem occurs, the log files can help identify the problem. If you're not trying to troubleshoot a software installation, you can remove them.
- **System Error Minidump Files:** These are smaller [memory dump files](#) created when Windows crashes in a blue screen. They take less space than larger memory dump files, but can still provide helpful information that identifies the problem. You can delete these if you're not trying to troubleshoot system problems.
- **Files Discarded by Windows Upgrade:** These are system files that weren't migrated to your new PC during a Windows Upgrade process. Assuming your computer is working properly, you can delete them to free up space.

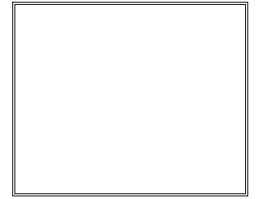
Overall, you can safely delete almost everything in Disk Cleanup as long as you don't plan on rolling back a device driver, uninstalling an update, or troubleshooting a system problem. But you should probably steer clear of those "Windows ESD Installation files" unless you're really hurting for space. ☺

Dinosaur game (Cont. from page 1)

even if you are online by typing [chrome://dino](#) in the address bar. The game even keeps track of your high score.



P*PCompAS Newsletter
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Coming Events:

Next Membership Meeting: 7 November @ 9 am, via Zoom

Next Breakfast Meeting: 21 November via Zoom

Newsletter Deadline: 21 November

Check out our Web page at: <http://ppcompas.apcug.org>

