Bits of Bytes

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

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Meeting Minutes

by Greg Lenihan, P*PCompAS Secretary

Next P*PCompAS meeting: Saturday, 5 February 2022
The planned presentation is about CES 2022

President Cary Quinn opened the 8 January 2022 hybrid membership meeting at 9:15 am. David George provided coffee, however, there were no doughnuts. Cary Quinn offered to get some during the first break. A motion was made to approve the minutes from December as written in the newsletter and they were unanimously approved.

OFFICER REPORTS

Vice-President Jeff Towne was not present, but Cary Quinn said we could have a CES presentation if Joe Nuvolini is willing.

Secretary/Newsletter Editor Greg Lenihan announced the next newsletter deadline as 22 January.

Treasurer Toni Logan stated we received another 12 cents in interest last month. Thanks to three more dollars received in dues, we have $2931.93 in savings, $110.29 in checking, for a total of $3042.22. For the year 2021, we expended $234, and we received an income of $24.73. There are currently two members on the treasurer's account (Toni and Cary).

Membership Chair Ann Titus said if dues are not paid by today, you will be dropped from the rolls. We currently have 23 members paid up for next year.

Librarian Paul Godfrey had nothing to report.

APCUG Rep/Webmaster Joe Nuvolini had nothing to report on our webpage and forwarded an APCUG workshop listing from Judy Taylour. Joe mentioned that he is finding it physically impossible to set up the equipment before the meeting and is asking for someone to take over that responsibility. You should plan on it taking at least 30 minutes, however, with software updates, it may take longer. Joe also plans to file the club's tax return before our next meeting.

BOD Chairperson Ann Titus had nothing to report.

OLD BUSINESS

John Pearce has still been looking at how to fix the Zoom audio issues identified last month, but has not had time over the Christmas/ New Year's timeframe.

NEW BUSINESS: None

ANNOUNCEMENTS

Our next membership meeting is Saturday, 5 February.

The Volunteers Luncheon is scheduled for 12 February.

The next social breakfast meeting will be Saturday, 19 February, at Perkins, starting at 8:00 am.

AROUND THE ROOM

Joe Nuvolini said there was an article in the Gazette on handling spam messages in Comcast e-mail that are not spam. Some messages that Joe sends are tagged as spam by Comcast and you have to log in to your Xfinity account to see them. Even if you tag the messages as "not spam," they still continue to be identified as spam. It seems to be a Comcast problem. Toni Logan said her sister in Texas has been unable to use Comcast e-mail for two years.

Toni Logan received some scam e-mails claiming to have auto-renewed her subscription plan from Geek Squad. Other members claimed to have received the same type of messages and told her to ignore them. Toni got an iRobot for Christmas and it does a nice job vacuuming. She also mentioned a Gazette article about a planned expansion of broadband service throughout the city.

AJ Whelan made the recommendation of going to Fargo's for the Volunteers Luncheon. There was a consensus to go there.

John Pearce made us aware of a Colorado website where all immunizations are registered. You can get a copy of your immunizations there. Go to https://cdphe.colorado.gov and click on **The CIIS Public Portal** link. John also looked at options for free file tax returns and found out that H&R Block and TurboTax have dropped out of the free file industry. Maybe the IRS will do one. Last month, John mentioned that you only had

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In This Issue

Articles

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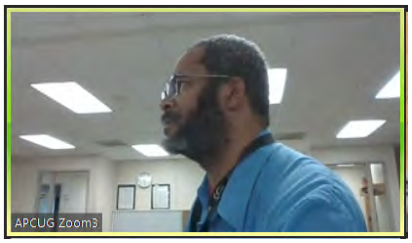

President Cary Quinn starts off the first hybrid meeting of the year 2022.

Zoom attendees at the January 8th meeting.

Perkins encountered a plumbing problem and was closed for breakfast, so some of the hardcore digerati moved across the street to the IHOP.

Wi-Fi Extender vs. Booster vs. Repeater: What's the Difference?

by Albert Bassuki, reprinted with permission from HowToGeek.com
Original article at: https://www.howtogeek.com/774725/wi-fi-extender-vs-booster-vs-repeater-whats-the-difference/

You've probably seen the terms Wi-Fi extender, booster, and repeater all over the place. These devices all improve your Wi-Fi's range, but they work a little differently. Here's what you need to know.

What Is a Wi-Fi Extender?

Much like the name implies, a Wi-Fi extender increases the range of your Wi-Fi but does so through a particular way: a cable. This can either be achieved through a coaxial cable, an ethernet cable, or even Powerline networking. Powerline networking tends to have different standards and names based on the manufacturer.

At this point, you might be thinking: "What's the point of a Wi-Fi router if I have to use a cable anyway?"

The main advantage is that using an Ethernet or coaxial cable doesn't slow down your internet speed or add latency into the mix. Powerline is a bit more of a mixed bag since it varies greatly on the quality of the electrical cabling that you have in your home. Either way, using a physical cable to extend your Wi-Fi means that you will get almost the same quality of internet regardless of how far away the extender is.

You could even put your Wi-Fi extender in another building entirely if you can run a cable—for example, running a cable from your home to a detached building across a yard.

What Is a Wi-Fi Repeater?

A Wi-Fi repeater is essentially the same thing as a Wi-Fi extender. But, instead of using a cable connected to your router, it connects using a Wi-Fi band instead. Since you don't have to rely on a cable to run your internet, there's a lot more freedom of where you can put it.

Of course, there *is* a downside in that you'll likely see a decrease in overall bandwidth, as well as some increased latency. That's unfortunately due to how the technology works, which is that it uses a similar Wi-Fi frequency to transmit your data as it does to provide you with a connection. This tends to muddy the water a bit since there are two competing bands on the same frequency.

Thankfully, there are some solutions, and most modern routers tend to use a specific band and frequency for something called "backchanneling." This backchannel is specifically dedicated to transmitting the internet between router and repeater and often tries not to use the same frequency as your regular Wi-Fi connection.

Ultimately, backchanneling and the use of multiple bands can mitigate some of the issues that come with using a Wi-Fi Repeater.

What Is a Wi-Fi Booster?

For the most part, a Wi-Fi "booster" is a catch-all term for both an extender and a repeater. What makes things even more

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Meeting Minutes (Cont. from page 1)

30 days to roll back Windows 11, but there are workarounds that can give you four months to decide if you like it.

Paul Godfrey asked if there was a dark mode for Windows like he can do on his cell phone and Cary Quinn said there was under System Settings. On a cell phone,dark mode helps cut down on the power needed.

Charles Richards and Harvey McMinn's comments were unintelligible on the Zoom audio and on the recording of the meeting and could not be documented.

Ann Titus said ETech Recyclers on 2854 N. Prospect Street is a place to take your tech waste.

Cary Quinn mentioned that Apple Air Tags are being used to track people and material. There are apps (iOS and Android) that use Bluetooth and can scan for these tags.

PRESENTATION

Greg Lenihan showed us the vast array of courses offered by Udemy.com and how he found free courses. Cary Quinn showed an open-source application called Ventoy (at Ventoy.net) that enables you to create a bootable USB drive. You can load ISO files on a flash drive and boot into that application. ☺

Our club sends condolences to VP Jeff Towne whose wife, Jan, passed away in hospice on January 26th. He will be taking a little time away from club duties, and we hope to see him back at our meetings soon.

Thinking About Ditching Windows?

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

For millions of people running Windows 10, a decision is looming. When Windows 11 was announced, Microsoft made it clear that it would support only certain "newish" computers that have the latest hardware security features. That means the majority of Windows 10 users will soon face a choice: buy a new computer, switch to another operating system, or both. Here are some of the options to consider…

Alternatives to Windows

Microsoft isn't backing down from requirements that a PC must have UEFI, Secure Boot, Trusted Platform Module (TPM) version 2.0, and an approved CPU in order to run Windows 11. You don't need to understand what all those things mean. The Windows 11 PC Health Check App will tell you if your computer meets the minimum system requirements

upgrade to Windows 11. If your PC is more than two years old, there's a good chance it won't. If not, you have until October 2025 to decide if you'll buy a new computer, or try an alternate operating system.

Even if you've got the right specs, for most people, moving to Windows 11 will mean learning something new, and possibly updates to both hardware and software. One may as well consider other operating systems if there's going to be a learning curve anyway. Your options include Linux, Mac OS X, Android, Chrome OS, and others. Here are several alternatives to running Windows on your desktop, laptop or mobile device.

You may have known no other personal computer operating system besides Windows, if you are a typical consumer/home user. But other alternatives are becoming well-established in consumer computing devices such as laptops, smartphones and tablets. People are becoming accustomed to the ways of non-Windows operating systems, and with ease-of-use of alternatives may come the realization that something is actually better than Windows. Or that it just doesn't matter.

Of course, you can always cling to your current version of Windows as long as possible. Microsoft support for Windows 10 will end completely in October 2025; that means no security or vulnerability patches will be provided after that date.

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The Difference (Cont. from page 3)

confusing is that companies will often use the three terms interchangeably. To make things even more confusing, many Wi-Fi repeaters can also function as a Wi-Fi extender if you run a cable to them.

In fact, hardware like the devolo Magic 2 WiFi next Whole Home Powerline Kit is a hybrid system that uses both Powerline *and* a Wi-Fi band as a backchannel to create a mesh network. So as you can see, it's a pretty complicated field to wade into it.

At the end of the day, the most important thing is knowing what exactly you are looking for and how you want to do your networking. The exact terminology can be overlooked if you check the device for the features you need, rather than just relying on the name to give you all the information.

What Is a Wi-Fi Bridge?

While not as common to see this term, you might still run into it from time to time. Essentially, a Wi-Fi bridge is an intermediary between a Wi-Fi-incompatible device and a Wi-Fi network.

For example, if your TV can only connect through Ethernet, you could use a Wi-Fi access point device that connects with Ethernet to your TV. That Wi-Fi access point would then connect to your regular Wi-Fi network, allowing your TV to access the Wi-Fi network even though it doesn't have Wi-Fi.

Of course, given that pretty much everything has Wi-Fi these days, the chances of you needing a Wi-Fi bridge are diminishingly low. ☺

Ditching Windows? (Cont. from page 4)

If mobility is the future of your computing, then your alternatives to Windows are Apple iOS and Google Android. The iPhone and the iPad are Apple's very popular smartphone and tablet offerings. They run the iOS operating system, which is noted for simplicity, but not so much for flexibility. Android smartphones and tablets are available from a myriad of vendors in all sorts of configurations. Some of the most popular now are the Samsung S20/S21 series, and Google's Pixel lineup.

Because Android was designed to be open, flexible, and modifiable, it is typically molded or "skinned" to suit the whims (and business goals) of the vendor or wireless carrier that offers the device. For example, the look and feel of the Android OS running on the Lenovo Yoga tablet is rather different from that of the Samsung Galaxy S20 smartphone. But under the hood, 99% of the code is the same.

"And in This Corner…"

In the compromise range between mobility and comfort lie laptops and Google's Chromebook. The Apple Macbook line runs Mac OS X, the older brother of the mobile iOS mentioned earlier. Macbooks get high marks for quality and usability, but command a higher price than similarly equipped laptops that run Windows. Chromebooks running Google's ChromeOS are designed to be web-centric. They have minimal hard drive storage, relying on the cloud for both apps and file storage. And they're very inexpensive. Check out this Acer Chromebook 311 Chromebook for $149. You can also install ChromeOS on desktop or laptop currently running Windows. See How to Install Chrome OS on PC. Windows still reigns supreme on desktop PCs, excluding Apple machines used primarily by graphic-intensive professionals. And then there are all sorts of Intel-based desktop computer systems running versions of the free Linux operating system, such as Ubuntu, Linux Mint and Fedora. You can bypass the corporate hegemonies, and dive deep into the world of open-source software. You'll find more free software than you can ever use.

I installed Peppermint Linux on a 10-year-old Toshiba laptop that was struggling to run Windows 10. It runs the free Libre Office wordprocessor and spreadsheet very nicely. Peppermint comes with tons of free software - games, media player, calculator, and the Firefox web browser. I downloaded Chromium, an open-source version of Chrome, because it syncs with my Google account for bookmarks. The file manager gave me access to all the documents and photos on my Windows partition, which was another plus.

So don't ever say you have no choice but Windows.

Does Anybody Really Know What Time it Is?

I didn't write this article to convince anyone to switch from Windows to Mac, iOS, Linux, Chrome or Android. I currently have an assemblage of desktop and laptop computers running Windows 10, ChromeOS and Linux. There are also some Apple products and a few Android gadgets in the family. I mention all this to underscore the point that you have choices. And I love the fact that competition fosters innovation.

But ironically, operating systems are starting to matter less, as web-based and cloud-based computing become the norm. Cloud services like Gmail, Outlook, Google Docs, and Office 365 run right inside your browser, and they don't care what OS you have.

The bottom line is this: the operating system doesn't matter so much if all you do is standard computing stuff such as web surfing, email, office apps, video viewing, photo management, and so on. You're only stuck if your work or hobby requires a specific program that only runs under Windows.

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In Memoriam

Ralph Clyde Redinger 1935-2022

Ralph hasn't been associated with our group for a very long time, but one of our members noticed his obituary in the *Gazette*. Ralph was one of the orginal members of the P*PCompAS Board of Directors. He worked for Radio Shack at the time. Our deepest sympathy goes out to his wife, Betty, and his family, along with our appreciation for helping our club become a success.

Solid State Drives—What's New

by Tom Burt, VP, Sun City Summerlin Computer Club, https://www.scscc.club, tomburt89134 (at) cox.net

Solid State Drives (SSDs) have been around for quite a while. However, prices have come down while capacities and performance have gone up. As a result, adding an SSD to an existing system has gone from being a luxury to a practical way to increase the performance of a desktop or laptop significantly.

SSD capacities have grown from 32 GB to 64 GB ten years ago to 256 GB, 512 GB, and 1 TB today. And if you're flush with cash, you can get a 2 TB SSD.

A majority of SSDs are sold as 2.5-inch drives with a SATA controller and power supply. These drives look to PC hardware and software just like a regular hard disk drive. Most SATA SSDs are rated as SATA III, which can deliver data between the drive and the motherboard at 6 billion bits per second.

Sequential read/write speeds are now up in the range of 500 Megabytes per second for top-line SATA III drives. In addition, for random I/O, high-end drives are rated at up to 100,000 input/output operations per second. This makes SATA SSDs about three times faster than hard disk drives.

Two new SSD PCIE card form factors have begun to supplant the SATA format in the past five years. One is a small card that combines flash memory chips and a SATA controller. It plugs into a special M.2 socket on the motherboard. To the PC's CPU, it appears as a secondary SATA controller. These cards are recognizable because they have two notches (B+M) in the connector end. Performance is comparable to a 2.5 inch SSD, but the card takes up much less space and uses less power. As a result, these are now popular in laptop PCs.

The second new form factor is called NVME (Non-volatile Memory Express). An NVME SSD does not include a SATA controller; it is directly connected to the PCIe data bus of the motherboard via a simple memory controller interface. The NVME SSD card also plugs into an M.2 socket on the motherboard. The NVME SSD card only has a single notch (M only) in the connector end.

For more details on the M.2 slot, see the following: https://www.howtogeek.com/320421/what-is-the-m.2-expansion-slot/

Topline NVME SSDs like the Samsung 980 Pro above can read data at up to 7000 megabytes (56 gigabits) per second if installed on a motherboard supporting PCIe 4.0. This is about 12 times faster than a SATA hard drive. The 1TB 980 Pro unit retails for about $200. A mid-range unit like the 1TB Samsung 970EVO retails for about $140 and can read at up to 3500 megabytes (28 gigabits) per second.

The significant performance difference in SSDs is that they can instantly access a block of data anywhere in the drive's memory. By contrast, a hard disk drive must position the read/write heads to the correct track and then wait for the desired block to rotate under the heads. This access time can take up to 10 milliseconds or more – easily 5,000 times longer than the SSD. In addition, the newer NVME SSD cards can transfer data 6 to 12 times faster than a SATA drive can.

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Ditching Window (Cont. from page 5)

Far more important these days is the computing device form factor that best fits your lifestyle. Sedentary or office-bound folks find desktop PCs comfortable, and it's rarely necessary to move them. They'll choose between Windows, Mac OS X or Linux. Power users on the move favor Windows or Mac laptops with plenty of storage space and horsepower. Mobile students, sales people, and others who have to move fast and frequently may opt for lighter, simpler Chromebooks.

And of course, there are hundreds of millions carrying tablets and smartphones running Android or iOS. They may not even be aware that they have an operating system. And that's a good thing. ☺

What is Crypto Mining, and How Does It Work?

by Fergus O'Sullivan, reprinted with permission from HowToGeek.com
Original article at: https://www.howtogeek.com/771391/what-is-crypto-mining-and-how-does-it-work/

With the cryptocurrency craze in full swing, you can't avoid hearing about the people mining these digital currencies—and destabilizing the graphics processor market. Here's what "crypto mining" actually is.

What Is Crypto Mining?

In short, crypto mining is how new units of cryptocurrency—usually called coins—are created. As you can imagine, this type of mining doesn't involve callused hands gripping pickaxe handles. Instead, it's computer processors that do all the hard work, chipping away at complex math problems.

Of course, you may wonder why these digital currencies even need to be mined: after all, it's make-believe money with no backing except what people will pay for it. Real currency, the kind backed up by governments, can be created by turning on a money printer, so it stands to reason that crypto could do the same.

The Blockchain

The fact that supply couldn't be restricted was the main hurdle for cryptocurrency for years: there

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Solid State Drives (Cont. from page 6)

Upgrading a PC to use an SSD can take either of two routes: adding the SSD to an existing desktop PC while keeping the PC's original hard drive installed; the second is to replace the PC's hard drive with an SSD. The second approach is the only practical one; there isn't room in the laptop for two drives. However, the first approach may be more satisfactory for desktops since it combines high performance while not forsaking high storage capacity. For example, you can use the SSD to store the operating system, applications, and very frequently accessed data files and then use the much larger hard disk drive to store all your other documents, photos, music, videos, and such.

Most new motherboards come with at least one M.2 connector, so adding an NVME or SATA M.2 SSD is possible if you're building a PC desktop tower. In the image at the left, there are screw holes for three different lengths of M.2 card. 80 millimeters (the one with the screw) is the commonest. For commercially-made brand-name desktops, you may have to go with a 2.5 inch SATA III drive connecting via a SATA cable to one of the SATA ports on the PC's motherboard. In a laptop, that will also likely be the case; you will replace the laptop's hard drive with a 2.5 inch SATA SSD. However, for a desktop without an M.2 connector, you can also buy a PCIe to M.2 adapter card that has an M.2 connector on the card and plugs into a PCIe slot on the motherboard. These adapters cost $10 to $15.

For a tutorial on installing an M.2 SSD, see the following: https://www.techradar.com/how-to/how-to-install-an-m2-nvmesata-ssd-on-your-pc.

In upgrading to an SSD, you will need to consider whether to reinstall your operating system (Windows, Mac OS, possibly Linux) and applications from scratch or attempt to copy (clone) your existing system to the SSD. If you wish to copy your current hard drive's system, you will need an imaging or cloning tool such as Acronis True Image, Casper, or Macrium Reflect. The challenge is to get the size of your operating system's hard disk partition to be no larger than the size of your new SSD. There are many complications related to this, and details are beyond the scope of this article. However, you might want to stop by our Tuesday Hardware / Software Repair SIG and get some advice before diving into an SSD upgrade.

If you're now convinced, an SSD is the way to go, what's the best size and make to buy? Lower-end SATA drives are often on sale for about 12 cents per gigabyte. These drives are OK but may not be as fast as the top-end drives. Higher-end drives are selling for about 20 cents per gigabyte. The Samsung EVO series drives get very high ratings and have some of the best performance specs at very good prices.

Other brands are good also but read the recent reviews carefully. A few years ago, some vendors got good initial reviews on their solid-state drives and then switched to cheaper, slower memory chips. Check the usual online stores (Amazon.com, NewEgg.com, TigerDirect.com) and watch for sales. A 500 GB drive is very attractive at current prices, and you will most likely not run into capacity issues. ☺

Crypto Mining (Cont. from page 7)

were many ideas on how to create digital coins, but no way to ensure people wouldn't simply duplicate them at will. Without an authority like a central bank—an institution that regulates the flow of currency—it becomes very tricky to manage the supply of any currency.

This issue confounded the creators of digital currencies for decades until Satoshi Nakamoto (most likely a pseudonym) invented something called the blockchain. The full theory of how these work is pretty complicated—we go into more depth in our article on explaining the "blockchain"—but the easiest way to explain it is to picture it as a chain.

In this metaphor, each link is a block, and each block contains a set amount of cryptocurrency. For example, one block has 6.25 Bitcoin in it. To unlock a new block you need to solve a complicated mathematical equation, which validates the block and adds it to the chain. Also, because the blocks are chained in a linear fashion, you have to go from one to the next, you can't pick one at random.

The Ledger

Every time a new coin is unlocked, it's recorded in the cryptocurrency's ledger, a massive file anybody can access at any time to see which coins were mined when and by whom. The ledger also shows when a coin changed hands, and who was involved in the transaction, putting the lie to the claim that Bitcoin is anonymous.

To summarize, the ledger records the creation and movement of coins in the blockchain. Mining is validating new blocks and gaining access to the coins within. Interestingly enough, since the blockchain has to be finite, it also means that most cryptocurrencies have a hard limit to how many can exist: Bitcoin for example has a cap of 21 million.

How Crypto Mining Works

To unlock a block in the chain, you need to validate it by solving a complicated equation, usually in the form of something called a hash. A hash is a random set of characters and numbers which, with the right key, reveals the original message; it's a basic part of cryptography and is where the "crypto" part of "cryptocurrency" comes from.

In a way, crypto mining is really just solving these incredibly complicated mathematical puzzles. Do it fast enough, and the reward is a coin. If you're slower than the competition, you don't get one. This method is called "proof of work."

However, hashes are, by their very nature, incredibly complicated puzzles to solve. The phone or laptop you're most likely reading this article on would probably take millions of years to solve one.

DIY Supercomputers

Of course, if you don't have a supercomputer, you can always build one. Plenty of people interested in making money from cryptocurrency—Bitcoin in particular—have started doing so, often by connecting several devices to each other to create powerful networks that can combine and amplify the processing power of each individual device.

The most powerful single component you can use in this case is a graphics processing unit, or GPU, the part of your computer that gives you the nice shiny graphics—if you're on an advanced computer, that is. They're generally more efficient and powerful than their cousin the central processing unit (CPU), and putting enough of them together gives you some serious computing oomph.

This brings a new kind of equation into play, one where several savvy individuals calculated that the price of GPUs times the cost of electricity came out a lot less than what one Bitcoin would bring in. This created a kind of arms race where these outfits would create bigger and better rigs to beat their competitors.

On top of the competition between these groups, there is also the problem that each next block is more complicated to solve than the last, a failsafe built into the blockchain to prevent it from being all unlocked at once.

As a result, the market for GPUs was practically destroyed, with these groups buying all the units they could get their hands on—even stealing them in some cases—and making it so regular consumers had to pay massive prices even for badly outdated models. Though, as of late 2021, this arms race is quieting down thanks to a number of factors (including a crackdown on miners by China), the GPU market has yet to recover.

Mined vs. Non-Mined Cryptocurrencies

Interestingly enough, though, not all cryptocurrencies are mined. Rather than use proof of work, some currencies—like Cardano and Ripple—use something called "proof of stake." They still operate on blockchain

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What is an All-in-One (AIO) Printer, and Should You Buy One?

by Albert Bassili, reprinted with permission from HowToGeek.com

Original article at: https://www.howtogeek.com/771365/what-is-an-all-in-one-aio-printer-and-should-you-buy-one/

Printers have come a long way from when all they could do was print. They can now often scan and fax documents, too. The question is whether you need the added functionality and whether it's worth the cost.

What Is an All-in-One Printer?

If you've been on the hunt for a new printer recently, you've probably come across the term "all-in-one" (AIO) or multifunction printer. At first glance, the value proposition is clear: You are getting a printer that can do more than just print, but are these extra functions actually useful or even good?

The truth is that you get what you pay for. You're not getting a top-of-the-line scanner built into an all-in-one printer. But that may not be a problem. For example, if you're just scanning some of your documents for safekeeping, you don't need a high-end scanner that can create a large resolution image.

There's also the slight hiccup that, while you might have a specific function available as part of the AIO, it might not work fully without additional equipment. Faxing, for one, might need you to have a computer connected to the AIO for it to function correctly. Then again, once you start looking at higher-end models, they have in-built fax functionality without the need for an external PC.

As you can see, it's not always straightforward.

What to Consider When Buying an AIO Printer

Functionality should always come first and foremost, especially if you *are* looking for these additional functions. Going a step deeper, you should also consider *how* you want to use your AIO and if there are specific features that might make your life easier. For example, do you take a lot of photos stored on an SD card? Look for a multifunction printer with an SD card slot so that you don't have to use a PC as an intermediary.

Secondly, and somewhat obviously, it's important to pick a printer that fits your needs since that's the primary device you're buying. Does it have a good resolution and color profile? Do you need to go for laser or inkjet? How many pages do you need to print, and how much will that cost? All of these should play a big part in how you make your choice.

Finally, you'll want to look at connectivity and compatibility. Some AIO printers can only connect through one cable or to one computer at a time, and if you're in a setting with several computers, that might be a problem. Similarly, if you would like to print off your phone directly, an AIO that can be run off an app is necessary.

Are AIO Printers Worth It?

The biggest issue with AIO printers is cost vs. quality.

As mentioned above, you're ultimately getting a worse set of devices rolled into one for a lower price—unless you are willing to spend money to get a higher-end AIO. At the high end, you're looking at spending another $200 to $300 or more on your printer. At that point, it might be better to just buy dedicated devices for each of the things you want to do rather than buying them as part of a package.

The balance is figuring out how much you are willing to spend and what quality and functions you are ready to settle with. If you can spend $150 and get an AIO that fits your needs and you're okay with the quality, then you should absolutely go for it.

Aside from the cost vs. quality issue, the only other problem is that if one part of the AIO breaks, you will likely be depriving yourself of the other ones as it gets fixed. It's sort of like putting all your eggs in one basket: If one egg breaks, you'll have to stop and clean up the rest of them as well. ☺

Crypto Mining (Cont. from page 8)

for reasons of security, but instead of mining new blocks you "stake " them instead, claiming them for yourself ahead of time.

The more you claim, the bigger the chances you'll be awarded blocks. It's a complicated system, even more so than mining, but it could very well be the future of cryptocurrency.

The Future of Mining

This brings us to an important final point: cryptocurrency does need a future beyond mining. Not only is it costly to mine new coins thanks to the price of electricity and GPUs, it's also bad for the environment, as this article from the Columbia Climate School explains.

What that future will be is hard to say exactly: maybe it's staking, maybe it's any of the dozen other solutions crypto enthusiasts are undoubtedly thinking up as you read this. Time will tell. ☺

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Coming Events:
Next Membership Meeting: 5 February beginning at 9 am (see directions below)
Next Breakfast Meeting: 19 February @ 8:00 am, Perkins, 3295 E. Platte Ave.
Newsletter Deadline: 19 February
Check out our Web page at: http://ppcompas.apcug.org