

# Bits & Bytes

Arkansas' Premier Computer Club



December 2020

**Bella Vista Computer Club - John Ruehle Center**

Highlands Crossing Center, 1801 Forest Hills Blvd Suite 208 (lower level), Bella Vista, AR 72715

Website: <http://BVComputerClub.org>

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## COVID-19 VIRUS ADJUSTMENTS

During normal times all meetings are on the lower level of the Highlands Crossing Center in Bella Vista. During the COVID-19 pandemic we will continue to suspend in-person meetings and classes and conduct on-line meetings using Zoom over the Internet.

To attend a Zoom meeting or class, you need Internet access and a device with the Zoom application installed.

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## MEETINGS

**(Online) Board Meeting:** December 14, 6pm, using Zoom

**(Online) General Meeting:** December 14, 7pm, "**Battle of the Browsers**", based on a presentation by the Association of PC Users Groups. Zoom meeting access information will be emailed to membership the weekend before. Visitors or Guests may obtain Zoom meeting connection info from our website the weekend before the meeting.

**Genealogy SIG:** **No meeting in December** (3<sup>rd</sup> Saturday).

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## HELP CLINICS

No December Help Clinics at John Ruehle center

Members may request Remote Help on our website at <https://bvcomputerclub.org> at menu path Member Benefits ► Remote Help .

## MEMBERSHIP

Single membership is \$25; \$10 for each additional family member in the same household. Join by mailing an application (from the web site) with check, or complete an application and pay at any meeting.

It is now also possible to Join or Renew membership on line on our website at <https://bvcomputerclub.org> at menu path Get Involved ► Join/Renew . Payment may be by Credit Card, or, if you have a PayPal account, by whatever means you have defined on PayPal.

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## CLASSES

**(Online) "Introduction to the Edge Browser" – Joel Ewing, Thursday, December 17, 10am – noon.**

Advance sign up required for each listed class: Contact Grace: email to [edu@bvcomputerclub.org](mailto:edu@bvcomputerclub.org), text 469-733-8395, call 479-270-1643, or sign up at the General Meeting. Classes are **free to Computer Club members**. Class access information will be emailed to those signed up for the class the day before class.

**Check the monthly calendar and announcements for any last minute schedule changes at <http://bvcomputerclub.org> .**

# PC DISASTER AVERTED

By Joel Ewing, Bella Vista Computer Club  
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One of the things of which we periodically remind our members is that regular computer backups can save much grief: both in preventing the loss of important digital records you would hate to lose and in reducing the time it takes to restore a functional system should a bad incident occur. That incident could be a malware attack that makes your data inaccessible or that compromises your system in some way. It could also be caused by some hardware failure. Safe computing practices can reduce your odds of damage by malware, but there is really no way to predict or control what might cause your hardware to fall on the wrong side of the mean-time-before-failure curve.

I tend to keep using the same desktop PC or laptop PC until something forces me to upgrade. I upgraded my desktop in 2008 when we purchased a house in Bentonville because I needed a desktop in two locations for over a year. That desktop lasted almost 7 years until Fedora Linux support for its older motherboard graphics hardware became unreliable, and the hardware proved inadequate to support Windows 8 and later versions of Windows. The system that replaced it in 2015 lasted 5 ½ years, until the last Friday in November, 2020.

When I tried to unlock and use my always-on Fedora Linux desktop late that Friday evening, I got no response, then finally realized the power light on the PC was off. My first thought was that there had been a power glitch and the UPS had failed (its display is normally blank anyway), but then I realized my monitors were still on, so that couldn't be the problem. Desktop power-up didn't behave as usual: instead of the fans initially revving to high speed, they ran briefly, then the power light went off, and the PC would repeat that pattern over and over with similar results. Obviously something serious was busted.



The computer wasn't even getting up far enough for BIOS boot messages to display on the monitors or any other error indications of any kind. The most likely candidate for the failure seemed to be the power supply, but one also couldn't rule out the possibility that something else like the motherboard or disk drives had failed in some way to create a partial short and make the power supply appear the culprit. One immediately starts thinking of worst case scenarios. If all the data on the two drives in the desktop are toast, what have I potentially lost?

## ***Worse Case Scenario***

Fortunately I didn't have to worry about the absolute worse case of all user data lost. I have backups on external USB drives of all my user data for Linux and embedded Windows virtual machines, but I soon realized the most recent backup was two-weeks old. Some of my more critical data, including my password manager database, Quicken files backups, and on-going records for management of my sisters estate are also in cloud storage, so recent changes to those files were separately covered. However, any emails archived in local folders since the last backup or recently scanned or downloaded documents were not covered. I generally try to retain originals of scanned documents until I know a successful backup has been done; but figuring out which documents need to be

re-scanned would not have been trivial. I conduct most of my communication via email. Losing two weeks of emails in some folders would be an inconvenience, but normally would at least not be a major disaster.

**But, without regular backups, this could have been a major disaster.** My primary desktop contains many digital images, documents, scans of pictures, scans of 1000's of slides which took 6 months to complete, long-term financial records, family genealogical records and other documents – and in many cases the original sources are either no longer available or these are the originals.

Fortunately I have a functional laptop that aided in assessing the extent of the damage. There are SATA to USB adapters that can be used after removing an internal drive from a computer to access data from the drive. A recently acquired version that came with a new SSD drive is shown to the right. Adapters for mechanical hard drives have to also include an AC adapter, because such drives need more power than can be supplied by a USB connection.



I was able to verify that the SSD in the old PC was OK and readable, but my older SATA-to-USB adapter with external power did not work with the other 7200rpm SATA mechanical hard drive. I had seen this failure with another HD recently and the drive subsequently worked when installed internally; so I had reason to hope this drive was also OK and that this was just some compatibility issue with my older USB 2.0 adapter (I have since acquired a faster USB 3.0 adapter, just in case this happens in the future).

### ***Resolution***

A new power supply for the old machine would have been about \$50. If one were available locally and that was indeed the only problem, this could have gotten me a functional machine in less than a day. Unfortunately, my old machine was in a mini-case, and the required small-form-factor power supply of the right dimensions was not available locally. Waiting over a week for a replacement which might not even solve the problem was not an acceptable plan – so this seemed like a good time for a hardware upgrade. By Saturday afternoon I had a new locally-purchased desktop with an i7 processor, 16 GiB of RAM, and a 500 GB SSD and Windows 10 Home (would have preferred Pro, but options were limited locally). My old system had a 1 TB SSD and 1 TB HD, but not all that space was currently used and I figured I could reduce the size of some things and get all that was essential to fit with the smaller SSD after adding the old machine's 1 TB HD.

My biggest initial problem was to get the new machine working with two monitors, as once you get used to having two monitors, that becomes a "must have". The old machine used a DVI interface for one monitor and HDMI for the other. The new machine only supported VGA and HDMI. The salesman assured me it would support two monitors at the same time, but the actual documentation available for the machine didn't have that level of detail. and initially I could only get one monitor to function. It took two hours of fiddling around before I finally realized my problem was not the new machine, but that one of my monitors couldn't auto-detect its input and you had to manually select the correct input using a button on the monitor marked with a non-obvious icon instead of some obvious label like "Input".

My next step was to convert this PC to a Fedora Linux system while preserving a Windows 10 boot option, as a new Windows 10 license can always be useful. I also chose this as an opportune time to upgrade from Fedora 31 to the current Fedora 33 Linux. This was practical because in Linux there is a much stronger and well-documented separation between user-related customization and user files, and the Operating System. The user-owned directory contains all user data and customization related to applications, and is typically upward compatible with later releases of the Operating System and applications. In the Windows environment, applications tend to scatter their customization information in all sorts of undocumented places, like along with the program files or in the Windows registry somewhere; so you can never be sure what needs to be backed up and restored to preserve behavior across a release change, or whether the conventions have changed with the new release so that this approach is unsupported and potentially dangerous.

After getting a bootable version of Fedora 33 on the new machine, the old 1 TB hard drive was installed as a second drive, and I was finally able to prove that the old drive was indeed OK. If it were not, I had another 1 TB HD available that I could have installed; but if that route had been necessary I would have had to restore my user files from a backup, with potential loss of some more-recent data.

It was then just a matter of changing some of the Fedora configuration files to point to data on the second drive and copy some additional files from the old SSD drive. By that point on late Sunday, I had access to all my old files and was able to use basic applications like email and web browsing. By the following Friday I had only a small handful of less-essential things still needing to be tested or resolved; but those kind of issues are typical with any Fedora release upgrade.

### ***Differences in My Backup Philosophies Between Linux and Windows***

For Windows backups, BVCC recommends that our members use [Macrium Reflect Free](#) to create image backups of your Windows partitions on your disks. These image backups seem the best approach for Windows because there is no reliable way to describe all the possible locations user-related data and customization for applications you use might be kept. If your system becomes corrupted, or if the hard drive fails and must be replaced, image backups can be used to restore your disk partitions to a prior state with all applications, user files, and user customization intact as of that point in time. Macrium Reflect also supports mounting an image backup in a way that allows individual files or directories to be restored as well, so these images also could be used to restore specific user files should you lose only a few files or choose or be forced to do a new Windows install on a new hard drive; although in the case of a new install you would also have to re-install any applications that are needed. Restoring images of Windows partition backups created on one machine onto a completely different machine hardware may not work (I'm inclined to suspect it **probably** won't work, but haven't tried it recently), as device drivers and hardware-specific support on the old system may not be compatible with the new hardware.

With Fedora Linux you have some tools that can be used to make image copies of drive partitions, but frankly they are not as user-friendly as Macrium Reflect, are probably not as flexible, require a lot more attention to keeping clear and accurate manual records, and allow a lot more room for user error with bad consequences. I prefer less stressful recovery approaches, even if they take somewhat longer.

With Linux there are fortunately other reasonable alternatives to image backups. All data specific to individual users is under directory `"/home"`. Backing that up protects all user data and user-specific application

customization. System-level customization data is generally isolated to a few specific files and directories under `"/etc"` and those rarely change from default values and then only when you knowingly change them. Keeping a backup of the specific system files and directories that have been customized on the rare occasions you know you have changed them is sufficient. If you run a web server on your system, you need backups of the web server content under `"/var/www"`. If you run a database server (typically done to support a web server), then you need to backup the various database tables contained in `"/var/mysql"`. Since it is easy on Linux to isolate with certainty what specifically needs to be backed up, there are some advantages to only backing up what is necessary.

With no licensing issues to worry about, the Fedora Linux install process is fairly straight forward provided you preserve an install image on a DVD or USB – in fact you can even boot and run Fedora Linux directly from those same media to check out hardware or installation issues on a machine that is not otherwise bootable. Complete recovery is a matter of re-installing Linux, re-integrating that with your saved user directories, and finally merging in any customized system configuration files.

When backing up user directories, Linux provides some interesting features that make it easy to have a "current" backup-directory that is the latest state of all files at the last backup, from which you can then create a dated version copy of that "current" directory structure that points to all the same physical files at that point in time – this is a fast process that requires a small amount of additional space for the directory structure but no additional space for any of the physical files. For each backup cycle there is a utility that will just copy into the "current" backup directory those files or directories that have changed since the previous backup. The additional space used for each backup cycle is just the space for the changed files, plus a minor amount of additional space for a new dated backup directory structure, which initially points to the same physical files as the updated "current" directory. The older dated backup directories still continue to point to the older versions of any changed files, and as long as some older dated directory exists that still points to an older version of a file, that file won't be physically deleted. You have the advantage of dated directories which "contain" (via pointers) all the files present at that date, but if the identical file is present on more than one backup date, there is only one physical copy of that version of the file; so much less space is required for a collection of backups than if each dated directory contained its own physical copy of all files in the directory. Looking at the logical contents of the directories in the example above, it looks like the first three would exceed a 2 TB drive, but all six fit on a 2 TB drive with room to spare.



## **Conclusions**

Remembering to back up your PC on a regular basis is important! I confess to being lax at times on this myself during the COVID-19 pandemic. I used to coordinate this with a trip to the bank to swap out external hard drives. Now that you have to schedule such trips because of the pandemic, that makes it more of a burden.

I have at times gone 3 months in 2020 without a backup. Thank goodness this failure didn't occur after a delay that long or I would have been really worried about all the data I could lose, and there would have been no way to even be sure about what I might have lost.

**Take backups seriously!**