OTTAWA PC NEWS

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ARTICLE

Exploring Android's File System – Part 1

by Alan German

There is no doubt that Android is a complicated operating system and, in particular, its file system is hard to fathom. For example, many end users on the web want to know why the amount of storage available on their smartphone is so much less that the nominal amount of the phone's disk space. The short answer is that the Android system itself is using up lots of the storage and that the system areas on the disk are not displayed to regular users. However, if you want to know a little more about the system, let's see if we can pull back the curtain somewhat.

Firstly, let's do a quick review of disk partitioning schemes. Early PC's used the Master Boot Record (MBR) system. This allowed a disk to be split into up to four primary partitions. So, for example, a computer manufacturer might establish a factory-recovery partition in the first (usually hidden) disk partition, while Windows (Drive C:) occupies the second partition. I always add a third disk partition that I use as a dedicated data drive (Drive D:). However, if I now wish to install the Linux operating system, and a separate swap area, to run in dual-boot mode, I need two additional partitions. This would appear to be a problem since there is only one primary partition remaining unused on my hard disk. However, MBR has one final trick up its sleeve. I can use the remaining disk space as an extended partition. Both the Linux OS and the swap space can now be installed in this extended disk partition.

The limitation of four primary partitions was not the only downside to the MBR partitioning scheme. It was first introduced with DOS and was limited to disk sizes no greater than 2TB. Now, while the latter limitation was fine when disks were just tens or hundreds of megabytes in size, clearly with today's much larger drives a different approach is preferable. Enter the GPT (GUID Partition Table) partitioning scheme.

Every partition on a GPT disk has a Globally Unique Identifier (GUID) which is a 128-bit integer value. GPT disks may have an almost unlimited number of partitions and a total disk size of 9.4 ZB (Zetabytes – think mega, tera, peta, exa, zeta... i.e. lots and lots of bytes!) The actual number of partitions and the size for any specific disk are contingent on the operating system and file system being used. For example, Windows currently limits a GPT disk to 128 partitions, and the maximum size of a Windows file system is 256 TB. Additional benefits for GPT disks include a much more robust partitioning scheme, with protection against corruption by storing multiple copies of the boot and partition records, and the implementation of redundancy checking.

All we really need to know from the above is that MBR disks support four partitions (four primary partitions or three primary partitions and one extended partition) while GPT disks can support many more partitions.

Now, if four partitions are good, forty partitions must be much better. No, don't laugh. My Motorola Moto G3 smartphone has 42 partitions on its main storage device, an 8 GB eMMC flash (non-volatile) memory chip! But, more on this later.

When Windows boots, we can take a look at the contents of the C: drive using File Explorer. Most users will be familiar with folders such as Program Files and Program Files (x86) as the locations where software is installed. Similarly, the Documents and Pictures "folders" (actually C:\Users\<*username*>\Documents, etc.) may be familiar as the storage locations for user-created files and digital photos. However, we can also view C:\Windows where the various components of the operating system, such as the Boot and System32 folders, are located. Linux users have similar information available to them with folders such as /bin and /sbin (executable files), /home (user files), and /boot (files used to boot Linux).

(Continued on page 4)

Inside this issue:

Next Meeting: WEDNESDAY, November 10th, 2021

Next Meeting

Topic #1: Astronomy
Speaker: Tim Cole, Royal Astronomical Society of Canada.

Tim Cole will discuss some of the software and hardware options available to budding astronomers. He will share information about some excellent planetarium programs and apps that are available as well as numerous options for using computers to run a telescope. For the technically-inclined Tim will also touch on home-brew projects for astronomy. [more…]

Topic #2: Getting started with Astrophotography with a Star tracker
Speaker: Andrea Girones, Royal Astronomical Society of Canada.

Andrea is a long time visual astronomer. She has recently started taking pictures of nebulae and galaxies in her free time from her suburban Ottawa backyard. Recent advances in technology have made astrophotography more accessible to non-professional astronomers than ever before. [more…]

Due to COVID-19 restrictions, this meeting will be via Zoom video conference.

Join us at https://tinyurl.com/opcug-meeting. The Zoom link will be live at 7:15 pm. The meeting will begin at 7:30 pm.

The above link includes the meeting ID and password. However, if you are prompted for the information, use:

Meeting ID: **924 9556 0898**
Password: **opcug**

Until further notice, Q&A sessions are no longer held after regular monthly meetings. Hence, monthly meetings now end 1 hour earlier at 9 pm. Everyone is welcome to join us on all other Wednesdays for weekly Q&A sessions.

Coming Up…

December 8

Topic: Security Layers
Speaker: Tom Trottier, OPCUG

There is no magic security bullet, no single protection against others trying to scam you, ransomware you, or steal your identity. What you can do is what people do in the winter: put on layers. [more…]

2022

January 12

Topic: Encryption 101
Speaker: Stephane Richard, OPCUG

If you are using a computer and the internet, you are using cryptography. This presentation provides a basic introduction to cryptography. It covers the definitions of the terms used in cryptography and basic cryptographic processes. [more…]

February 9

Topic: Getting Started in Genealogical Research
Speakers: Heather Oakley and Mike More, Ottawa branch of the Ontario Genealogical Society

Mike Moore says, "I don't know how many times I have heard somebody say 'I wish I'd known that when I started my genealogy'". There is no RIGHT way to do genealogy but there are better ways. [more…]

March 9

Topic: Microsoft Teams
Speaker: Lawrence Patterson, OPCUG

(details to follow)

April 13

Topic: Office Smackdown
Speakers: Alan German and Chris Taylor, OPCUG

Are there any significant limitations in using LibreOffice instead of Microsoft Office? In this presentation, we will review the features of the major modules of both packages. [more…]

All scheduled regular monthly meetings, weekly Q&A sessions, and a link to OPCUG presentations at the OPL are posted on our website at https://opcug.ca/#upcoming. All events are via video conference until further notice.

2021 CALENDAR

Meetings	Date	Time and Venue
Regular Monthly Meeting	Wednesday, November 10th	7:30 pm via Zoom video conference: **https://tinyurl.com/opcug-meeting** To see all scheduled events, visit https://opcug.ca/#upcoming
Q&A Session	N/A	Until further notice, Q&A sessions are no longer held after regular monthly meetings. Join us on all other Wednesdays for weekly Q&A.
Beer BOF (Wing SIG East)	Wednesday, November 10th	Enjoy a cold brew or other beverage in the comfort of your home during the video conference.

ARTICLE

Updating Windows Defender revisited - part 2

by Chris Taylor

Last month, I showed how to use Windows' task scheduler to automate frequent updates to Windows Defender's anti-virus signature files. I know of another two ways to accomplish this: PowerShell and Group Policy.

PowerShell

Click the Start button and type;

```
powershell
```

In the results, right click on *Windows PowerShell* and choose *Run as Administrator*. When PowerShell opens, type in;

```
Set-MpPreference -SignatureUpdateInterval 1
```

where the number at the end is the frequency in hours you want to check for signature file updates. Close PowerShell and you are done! Wasn't that easy?

Group Policy

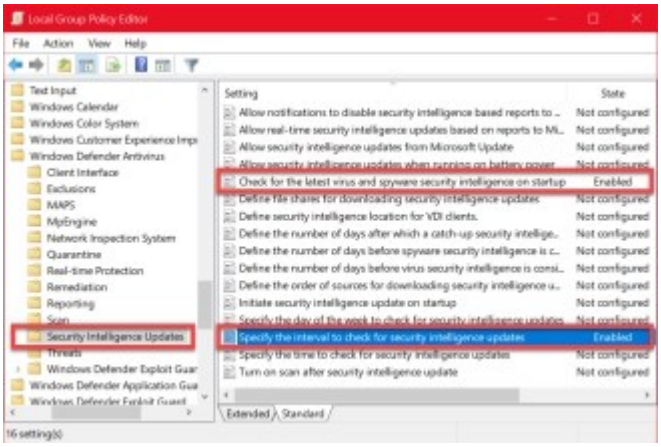
Another option is to use Group Policy. An unfortunate requirement is that you must be running Windows 10 Professional, Enterprise or Education. It is too bad Microsoft removed such a useful tool from Windows Home.

Click the Start button and type;

```
group policy
```

In the results, choose *Edit group policy*.

In the Local Group Policy Editor, drill down in the left pane to *Computer Configuration* | *Administrative Templates* | *Windows Components* | *Windows Defender Antivirus* | *Security Intelligence Updates*. Depending on the build of Windows 10 you are using, *Windows Defender Antivirus* might be *Microsoft Defender Antivirus*. In the right pane, double-click *Check for the latest virus and spyware definitions on startup* and set it to *Enabled*. Double-click *Specify the interval to check for security intelligence update*. Set it to *Enabled* and in the *Options:* section, choose the frequency in hours that you want.



Close the Local Group Policy Editor and you are done.

Group Policy over-rides PowerShell. If you use Group Policy and later decide you want to use PowerShell to configure Windows Defender, first use the Local Group Policy Editor and set the options you changed to *Not configured*.

PowerShell, Group Policy, and Windows Task Scheduler (detailed last month) each have their benefits and drawbacks. Here are the main differences.

Task Scheduler has the most flexibility for frequency; as often as every 5 minutes. It will work on all versions of Windows.

PowerShell is faster and simpler to set up than a scheduled task and will work on all versions of Windows 10. You cannot check for updates more frequently than once per hour.

Group Policy will only work for those using Windows 10 Professional, Enterprise or Education. You cannot check for updates more frequently than once per hour. There are two benefits over PowerShell; it can be configured with just a few mouse clicks, so you don't have to worry about making typing mistakes; and only Group Policy provides for *Check for the latest virus and spyware definitions on startup.*

If you want to verify that updates are working, every time a check for updates is done, the results are written to the text file C:\Windows\Temp\MpCmdRun.log.

♦♦♦

Quick Tip 36: Scrolling the taskbar calendar

by Chris Taylor

If you need to refer to a calendar, a handy one can be found by clicking on the date/time in the taskbar (1 in screenshot). To see a month other than the current one, click on the up or down-chevron near the top-right (2). Use the scroll wheel on the mouse to scroll by the week and more easily see periods that span months.

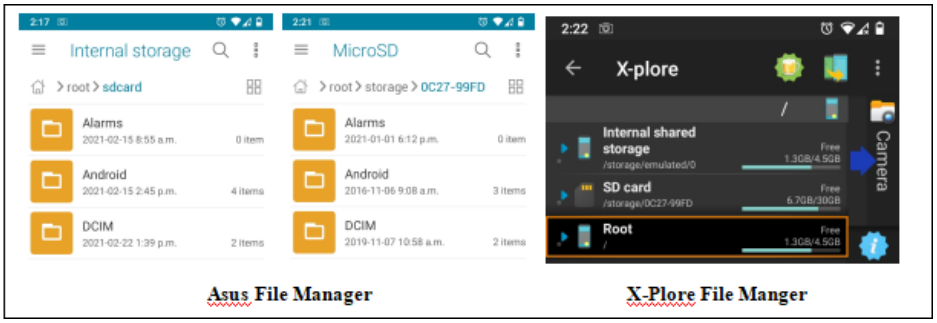
Click where the month/year are shown (3) to show a calendar of the year (below) and quickly jump to any month in the current year. Click the current date/time (4) to jump back to the current month.

Exploring Android *(Continued from page 1)*

In Windows, multiple drives are identified by different letters. For example, a CD or DVD might be displayed as Drive D: and an external USB drive, when plugged in, would then be dis

played as Drive E: Linux takes a different approach. The file system, including all the drives. folders, and files, are part of a single tree directory structure with individual drives having mount points. For example, on the Linux side of my dual-boot computer, my dedicated data drive (Drive D: in Windows) is mounted at /media/DataDisk.

The use of mount points is one of the main reasons that many users find Android's file system so confusing. One problem is that the same storage location can be displayed with different mount points when viewed in different file managers. For example, the Asus File Manager displays my phone's internal storage as being mounted at /sdcard, whereas X-Plore File Manager shows the mount point as /storage/emulated/0.



Asus File Manager X-Plore File Manger

The naming of the sdcard mount point in itself is confusing since the phone's internal storage isn't really an SD Card even though this is what's suggested by the label. Apparently, this reference is merely a historical artefact from the early development of the OS.

But, perhaps worse is the fact that my phone also has a micro-SD Card installed as secondary storage.

Interestingly, the mount point for the external drive is /storage/OC27-99FD, with no indication that this is an actual SD Card! And, both file managers seem to agree on the mount point for the micro-SD card (given that "root" is normally indicated as "/").

So, even identifying the different storage types, the internal or main storage, and the external or secondary storage, installed in an Android device can be challenging, even for Linux users who have some familiarity with mount points and the Linux file system. Then, once we have identified a specific storage area, we have to try to understand the structure of the file system in terms of the multiple folders that are present. For example, looking at the identical names of the first three folders (Alarms, Android, and DCIM) listed for both the internal and external storage systems on my smartphone may well suggest that this too will not be without its challenges!

♦♦♦

Nominations for OPCUG Board for 2022

Once a year, the OPCUG holds elections for the 9-member Board of Directors. We are once again coming up to this annual event.

We encourage all members to consider running for a board position or getting involved in some other manner in the operations of the OPCUG.

If you want more information about what is involved, please talk to me or any current or past Board member. Names are listed on the back page of this newsletter and on the web site at https://opcug.ca/executives/ .

Nominations can be submitted by sending an email to nominations@opcug.ca .

Nominations must be received by midnight, December 31, 2021.

Please get involved. Please help the OPCUG continue in its role of Users Helping Users!

Bob Herres
Election Chair, 2022

THROUGH THE LENS

A guide to digital photography for computer enthusiasts. After the click of your camera, you're only half done!

What gear to pack?

by Lynda Buske

Now that some of us are back to travelling a bit, I thought it was a good time to put together a handy list of what photographic gear you might want to consider for vacation and what to think about for individual outings during the trip.

Camera bag. You may wish to purchase a large bag that would carry every piece of gear you are taking on vacation, especially if you are flying and wish to take it all as carry-on. Once you arrive at your destination, you may prefer a different kind of bag for day outings. I use a backpack for hiking in the woods so I can be hands-free for tricky trails or scrambling over rock. Your bag should be large enough to carry your gear plus a snack, water, maps (don't rely on cell phone coverage), bug spray, sun block, etc. For more sedate walks, I may use a smaller bag that will hold only one camera body or cell phone since the other can stay around my neck for the duration.

Camera bodies. I like to have my DSLR for certain landscape and macro photos but also like my lighter bridge camera, with a good zoom, for nature shots and of course my cell phone primarily for indoor or other low light situations. I find I can cover most circumstances with those cameras.

I have learned it is better to have two bodies set up for my typical needs than to have one body that requires changing lenses. While it doesn't take that much time or effort to change a lens, it is just enough bother that I don't always do it when I should. As well, if there are birds or animals around, you may not have time to shift gears so I always have my bridge set for a fast shutter speed. Then I'm ready for any type of action shot.

Lenses, lens hoods and filters. If you have multiple lenses, think about those you will likely want to have on hand for your trip. Don't forget specialized needs like a neutral density filter for long exposures and a circular polarizer to cut reflections.

Rain protection. Take a micro fibre cloth for wiping light rain drops or sea spray off your camera body. A hotel shower cap is handy for covering your camera during light rain and is easy to remove when you want to take a shot.

Lens wipes for both lens and display screen. Don't forget to clean your cell phone lens!

Charging units, spare **memory cards** and extra **batteries.**

Tripod, including base plate for attaching the camera and a coin to tighten it. Use a tripod for low light situations where a long shutter speed is required. This allows you to lower your ISO and limit graininess in your photo. In some circumstances, a monopod or learning against a tree/car or resting the camera on a solid rock/railing may suffice.

A word of warning with respect to museums. Some permit photography as long as you do not use a flash but if you enter with tripod and bags of gear, they think you are a professional who is going to sell your images. This may not go over well so for these circumstances, I try to look like any other tourist. For more info on tripods, see article I wrote earlier this year. https://opcug.ca/Photography/ShootingWithThreeLegs.pdf

Business card with name and email address. I have home-made business cards which I hand out to people who may be interested in receiving a copy of my photos when I have incorporated them or their boat or their property into my pictures. It can also open the door for more in-depth picture taking since you probably now have their explicit permission.

Penlight for blue hour. There are certain settings on my cameras that cannot be set through the electronic screen and must be adjusted with a button or dial. When I'm shooting before dawn or after the sun goes down, I keep a penlight handy so I can see the settings in the dark. Alternatively, you may prefer a red flashlight that won't disturb your night vision. A small headlamp can help you make your way safely on dark trails and some come with both red and white lights.

External flash unit (if you use one)
Luggage tag for camera and tripod bags
Pen and notepad
Some cash for emergencies like an ice cream, beer, or a taxi home!

For anyone interested is seeing photos from my various trips or day outings, please go to http://lyndasphotos5.shutterfly. The "Photos of the Week" album is a collection of images that I have sent out to a private mailing list each Monday morning for the past few years. There is no fee and I'm happy to add new people to my list. Your email will not be shared with others and you can unsubscribe at any time. Just write me at lbuske@sympatico.ca if you are interested.

*Lynda regularly gives presentations for the OPCUG at the **Ottawa Public Library** (https://opcug.ca/opl-presentations/). This article is also in PDF format on the OPCUG website (https://opcug.ca/digital-photography/).*

OTTAWA PC NEWS

Ottawa PC News is the newsletter of the Ottawa PC Users' Group (OPCUG), and is published monthly except in July and August. The opinions expressed in this newsletter may not necessarily represent the views of the club or its members.

Member participation is encouraged. If you would like to contribute an article to Ottawa PC News, please submit it to the newsletter editor (contact info below). Deadline for submissions is three Sundays before the next General Meeting.

To receive the monthly newsletter by email, send an email to:
opcug-newsletter+subscribe@googlegroups.com (leave subject and body fields blank)
You do **not** need to create a Gmail or Google Groups account.

To subscribe to other OPCUG Google Groups member services, go to:
https://opcug.ca/google-groups-how-to/

Group Meetings

OPCUG meets on the second Wednesday in the month, except July and August, at the Riverside United Church, 3191 Riverside Drive, Ottawa. Parking is free at the church. OCTranspo bus #90 stops nearby. Details at https://opcug.ca/venue/.
(NOTE: Due to COVID-19 safety guidelines, all our events are via video conference until further notice. Details at https://opcug.ca/venue/)

Meetings are 7:30–9:00 p.m. followed by a Q&A Session until 10 p.m.

OPCUG Membership Fees:	$20 per year
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Q&A HAS GONE ON-LINE! WEEKLY!

Because of the pandemic, the OPCUG is holding weekly Q&A sessions in Zoom video-conferences.

Join us every Wednesday (except on regular monthly meeting nights) at 7:30 pm to discuss computer issues. Questions (and answers) on any computer-related issue are welcome. Or, do you have a favourite computer program or topic that you would like to share with the group? Send your questions, answers, or the details of what you would like to share to: SuggestionBox@opcug.ca

Everyone is welcome to attend Q&A sessions and to ask questions about their specific computer-related problems. Join us at: https://tinyurl.com/opcug-meeting (if you use the Zoom client, the meeting ID is **924 9556 0898** and the password is **opcug**).