Increasing the size of a Virtualbox VDI File

When you set up an Oracle VirtualBox machine you decide an initial size of the main hard drive that will be available to it. The wizards are usually good enough to suggest a size but just occasionally you find you have muffed it. In my case, I opted to use the suggested 8GB size for a Virtualised Debian 64 bit system, and I came a cropper when I tried to install Microsoft's Visual Studio Code to use as a php editor.

Without warning me in any way, the installation (using "gdebi") of the .deb package downloaded from MicroShyte's website took every last byte of **/dev/sda1**, failed silently, failed to run, and then when I rebooted to see if that was the issue, I was faced with a perpetual login screen !

Fortunately a number of "stack overflow" type postings pointed to the two most common causes for this endless presentation of the login prompt as

(1) "some (hidden) files in the /home/<user> hierarchy are not owned by <user> (for which the fix is to log in to the shell by using "Ctrl-Alt-F1" and then invoke "chown -Rc ..." with terminal prejudice) – this proved **not** to be the problem ...

or (2) there is no space left on the device.

In this case, it said, you **MIGHT** see an error message (if you are lucky and know where to look), I did not. However, judicious use of the "du" and "df" commands quickly found me staring down the barrel of a command line telling me **/dev/sda1** had 0 free blocks and was 100% full.

I pursued various options to reduce the amount of used space, but in the end the only thing that made any significant difference was to apt-get uninstall the "code" package and delete obsolete kernels. I will go into how to prune kernels later.

Having got some free space back and been able to see my system properly again, I resolved to try and increase the hard disk size. After all, it's a VDI file, How hard can it be (?). Oh Man. Hard !!

Extend the VDI file: Using the GUI in Oracle VirtualBox 6

VirtualBox 6: Launch Oracle VirtualBox and select the Virtual Media Manager from the File menu
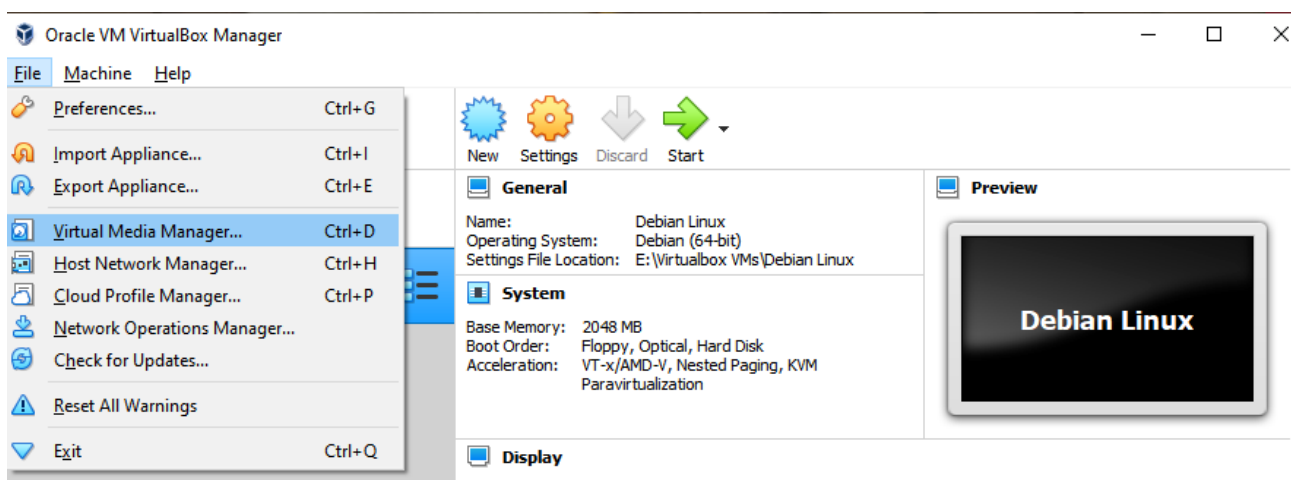
Select this feature and you will see a window similar to the below, listing each of the virtual disks known to the system.
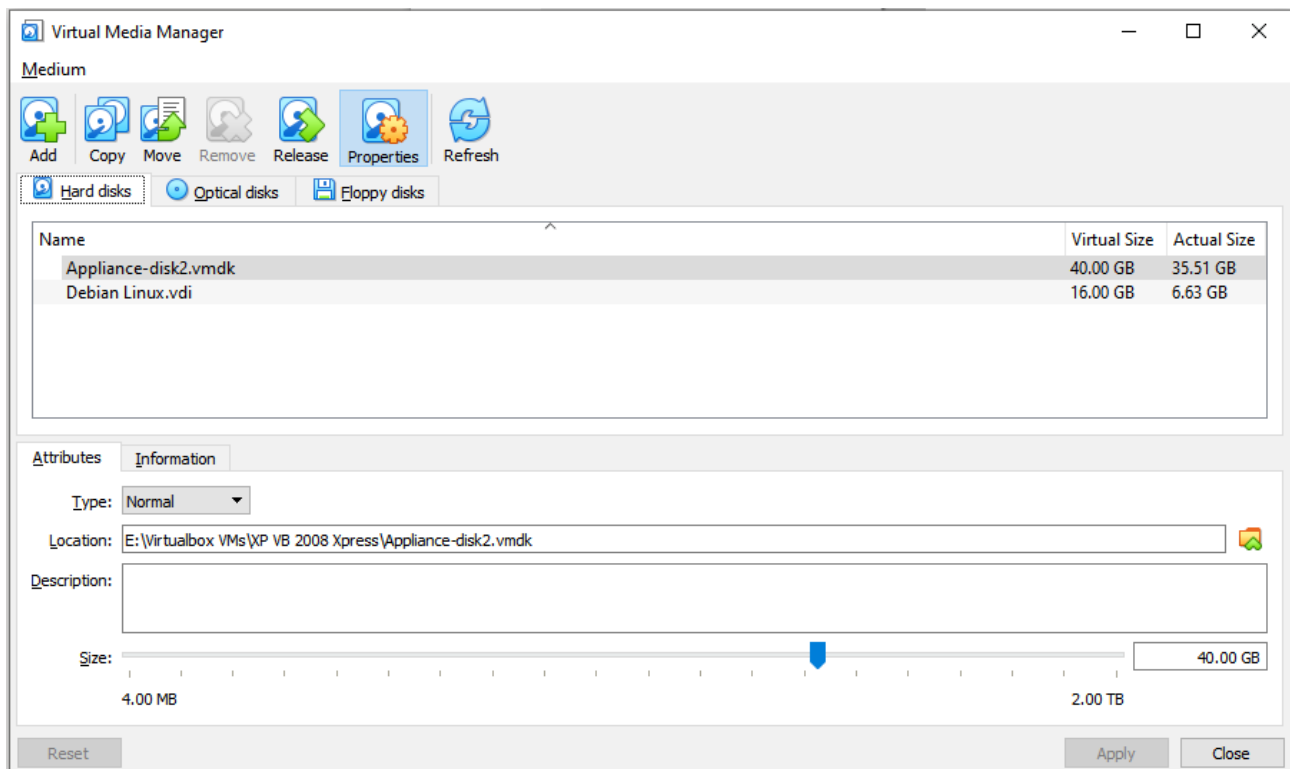
Select the disk of interest, move the slider to set, or manually enter the desired size and Apply.

Extend the VDI file: Using the Command Line

For those who like their work done the hard way or have not got VirtualBox 6 (which may be because you're on a 32 bit machine still) the process is as follows. Make sure your VirtualBox guest system is really "powered off" not Saved of similar, and delete any snapshots you have.

Now open a Command Prompt and navigate to the Oracle VirtualBox directory (mine is **"C:\ Program Files\Oracle\VirtualBox"**). Now determine the exact full physical path of your VDI file (mine was **"E:\VirtualBox VMs\Debian Linux\Debian Linux.vdi"**) and when you have that, run this command at the command prompt:-

> VboxManage modifyhd "full path and file name of your vdi disk" --resize x

where 'x' is the new desired size in Megabytes. So to make a 16GB file, input –resize 16384

If you're really old school and are using the command line on VirtualBox 6 to be cantankerous, then just for you, the command you need is

> VboxManage modifymedium disk "full path and file name of your vdi disk" --resize x

Either way, we're done now, yeah ?

I bloody wish. Hell we haven't even started. All we have done is tell the VirtualBox Exe's system that the VDI file is larger than it was. But when we boot the system, it will still use the subset of it that it did before we expanded it. What we need to do now is change the partition table to make use of the extra area space.

In short, we need to boot the guest machine with a LIVECD of GPARTED, use it to expand the system partitions, change the swap file, and then reboot. This is where it gets to be fun.

Boot your Linux Guest into GPARTED's LIVECD

So, before you go any further, you need a GPARTED LIVECD ISO image. Google is your friend here. When you have saved it away, launch the VirtualBox executable and scrutinise your Linux guest. Make sure the image is "Powered Off" (note it is RUNNING in the image below, I'm using the system while collecting images of how I did things, it must be POWERED OFF to do this)

With the guest OS of interest selected, click 'Machine' and "Settings". You will see a dialog box similar to the below. Select 'Storage' and then select the "Empty" CD-ROM icon under the IDE Controller. At the far right of the screen you will see the optical drive and the blue icon. Click this and a list of recently used ISO images plus some other options appear under "Choose Virtual Optical Drive". As you won't have chosen it (yet) the gparted-live entry you can see in the below won't appear in your entry list (yet). Click the "Choose Virtual Optical Drive" item and at the dialog that opens. Navigate to wherever you saved the ISO image of GPARTED and select it.
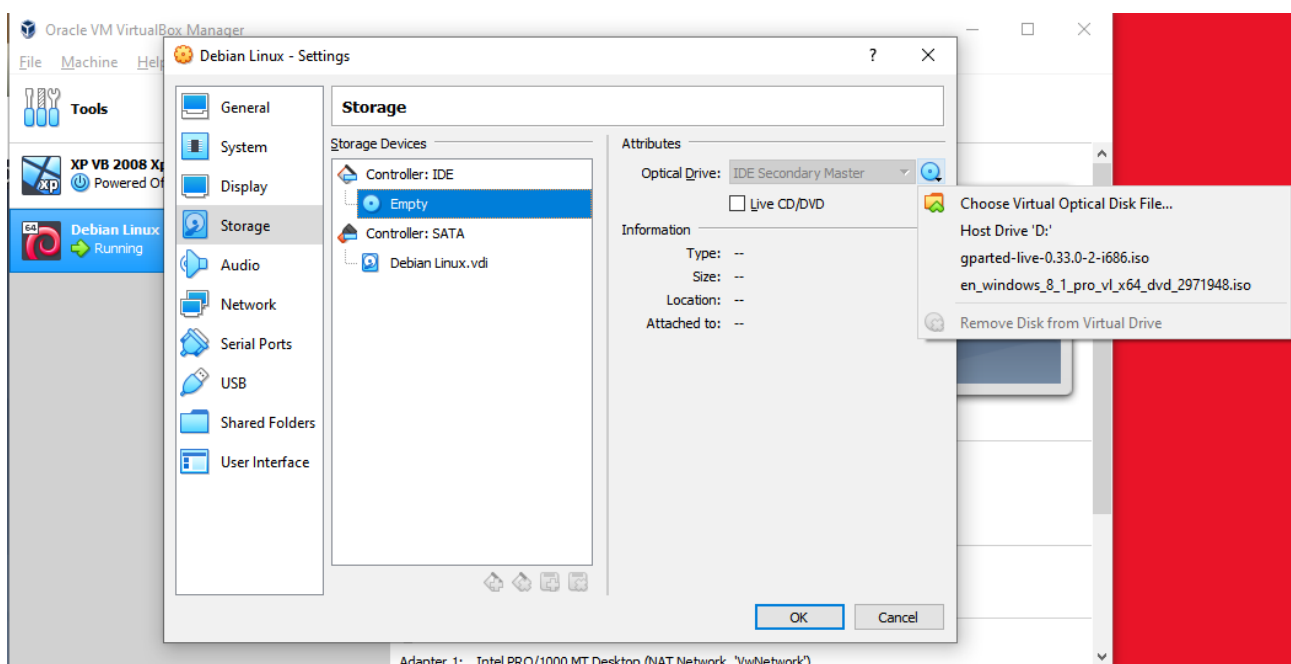
When you have selected the GPARTED ISO, click OK, and close the settings menu

If you now click the Guest OS entry your system will boot but will launch the GPARTED live CD in the same way as if you had inserted the DVD in the drive of a physical PC and used the BIOS settings to boot from it.

What you see when you launch GPARTED in this way will vary. I cannot repeat the steps I took, but I will show you what GPARTED shows now, and explain what I saw originally, and what I did.

When I launched GPARTED it showed me a disk drive **/dev/sda** of size 16GB, of which almost 6GB was allocated to the ext4 physical partition **/dev/sda1** which was almost all yellowed to indicate it was used, a further 2GB was allocated to an unidentified extended partition, all of which was allocated to the extended SWAP partition **/dev/sda5**

The whole area from 8 to 16 GB was marked as "unallocated"

My first action was to select, and then delete, the SWAP partition in /dev/sda5 and I followed this by deleting the entire extended partition area.

I then selected the main ext4 partition **/dev/sda1**and used the Partition => Resize/Move operation to extend the entire **/dev/sda1** partition to 15GB (by adjusting the space before it to 0MB, and the space after it to 1024MB)

That left me 1024MB of unallocated space, in which I created a new PHYSICAL (not extended) partition **/dev/sda2** which I set to type linux-swap. I then applied the changes and sat back.

The finished results are as below.
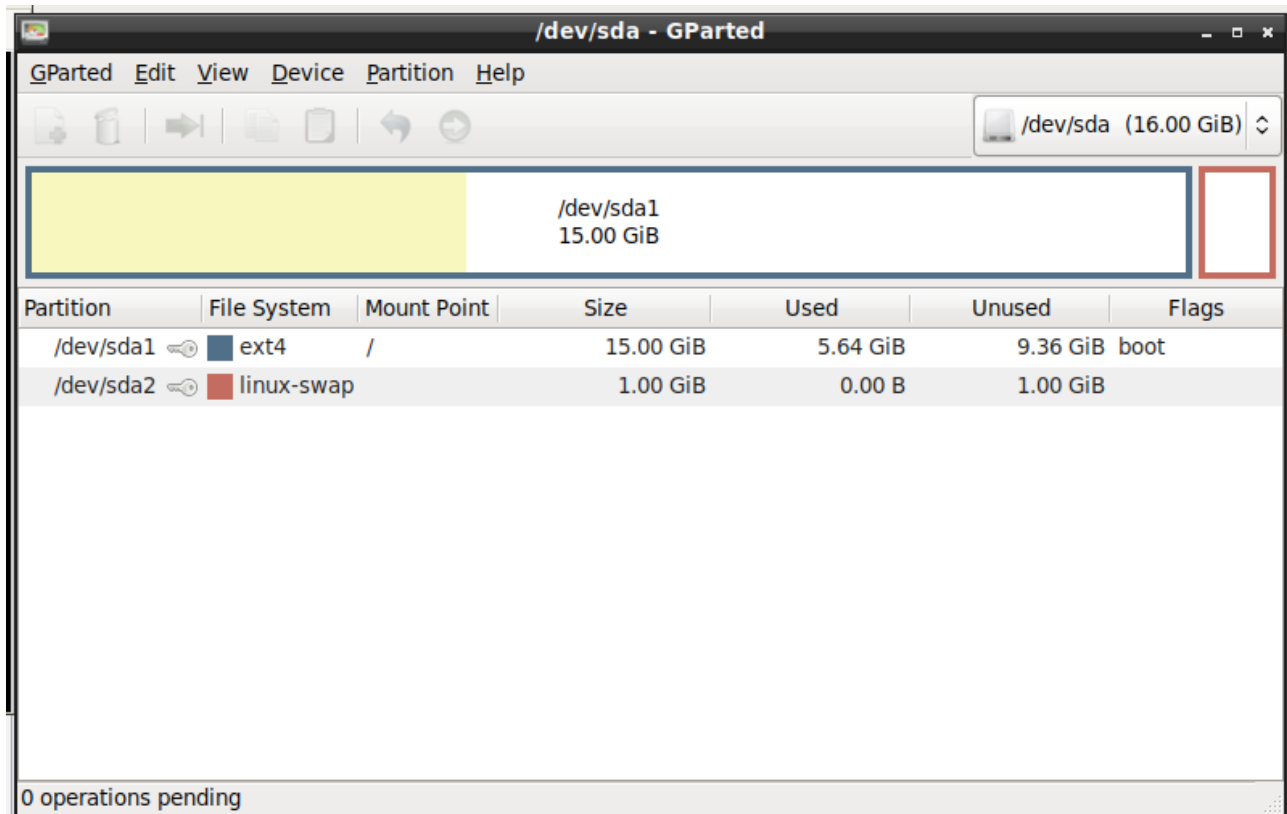
REBOOT and change SWAP

We're not done yet. With this change made, it's cross your fingers time. Exit the GPARTED application and right click and EXIT the live CD, this will reboot the machine. VirtualBox removes the GPARTED entry from the settings on reboot, so you will (after a while) boot to your newly extended Debian system. But there is still more to do. The system expected the SWAP file to be in the extended partition where it was created initially.

Launch a console terminal and enter the commands "mkswap /dev/sda2" and "swapon"

The system will now use the new swap area you configured.

But you're still not totally there. You need to change /etc/fstab

Modify /ETC/FSTAB

Start by opening a console and typing the command "blkid" which will give you the UUIDs of the drives and partitions you NOW have on your system. The result of typing the command on my system **after** the size amendment is shown below

```
/dev/sda1: UUID="00968b1e-321f-4ec5-9607-815598e0ec74" TYPE="ext4" PARTUUID="c95405b6-01"

/dev/sda2: UUID="8f8d4c1e-0322-485e-af55-4fa9b1aa7b35" TYPE="swap" PARTUUID="c95405b6-02"
```

If you run any command to view or edit /etc/fstab you will quickly see the entry for the ext4 partition /dev/sda1 to be mounted as "/" matches the UUID output by "blkid", but the entry for the swap partition has something other than given by blkid. In fact it lists the UUID of the old swap partition on /dev/sda5 which you deleted.

To ensure smooth operation, you need to edit /etc/fstab and change the UUID for the swap partition to the UUID reported by 'blkid' for /dev/sda2

NOW You're Done

That's it. All Done. Save the edit to 'fstab' and reboot the virual machine. You're Good To Go.