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Secure Erase HDDs/SSDs(SATA/NVMe) using hdparm & nvme-cli on Linux

Discussion in 'Hardware Components and Aftermarket Upgrades' started by Vasudev, Feb 15, 2019.

Tags: [linux livecds](#) [nvme ssd](#) [sata ssd](#) [secure erase ssd](#)

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Vasudev Notebook Nobel Laureate

Reputations:

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Messages:

8,869

Likes Received:

6,297

Trophy Points:

681

Hey everyone, I wanted to post a new thread dedicated for secure wiping SSD/HDDs after I tried hdparm and nvme-cli. I wasn't willing to share it initially, since it maybe dangerous if used incorrectly! Anyway, I posted this guide after searching for many sources and made it as simple as possible! I've linked the sources at the end of the post. For images, I'm using Imgur so if anyone has any issues with images not loading or staying blank, please let me know!

I must warn everyone that incorrect name for example /dev/sdX can wipe out other drives, so backup backup and is recommended to do it to prevent data loss. Don't hold me responsible for lost data.

For newbies, I'd recommend using Ubuntu ISO(I used Xubuntu distro) since it includes all necessary packages without needing to download anything from repos. For people who use other distros Gnome disk utility, gparted and nvme-cli packages are recommended to be installed for ease of use.

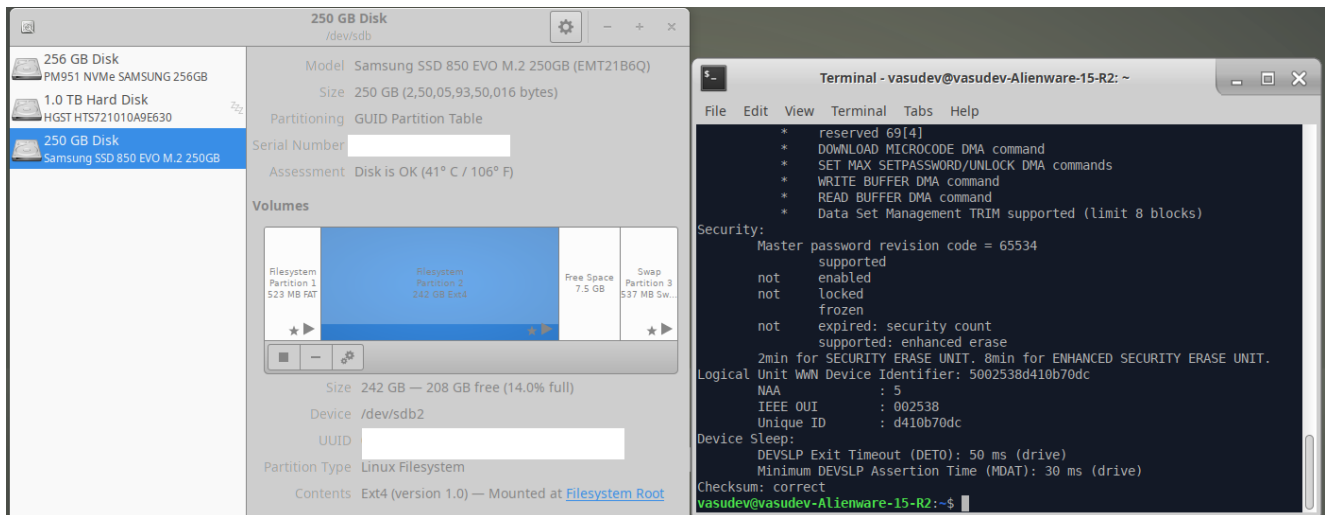
Don't forget to Backup your data before proceeding.

1. Open Gnome disk utility aka Disks and see the Disk name sdX you want to erase. My SSD is sdb, so I'm using /dev/sdb and yours might be different.

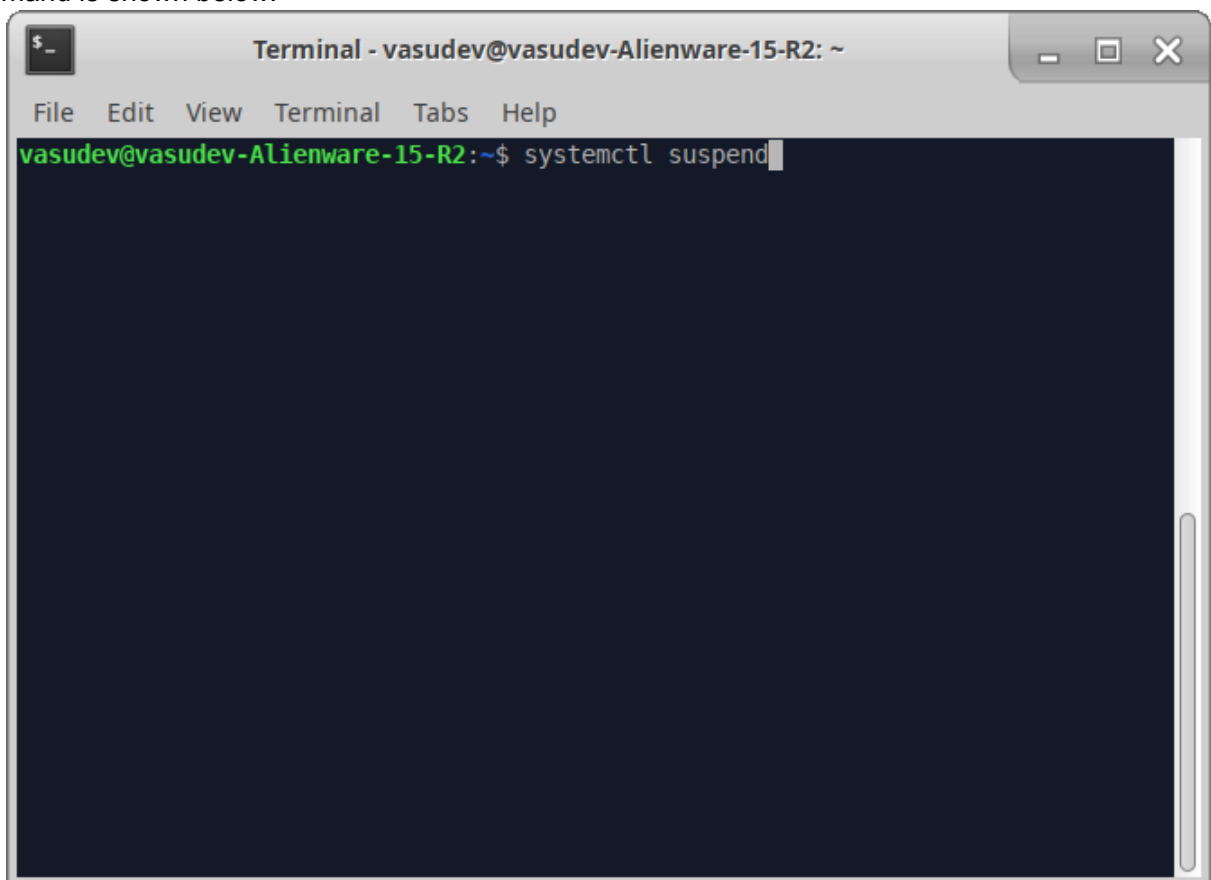
Code:

```
hdparm -I /dev/sdb
```

- The output should look something similar to mine aside from terminal colors and background:



2. If you see Frozen then you can Suspend the PC just to get rid off it when waking from Suspend state. The command is shown below:

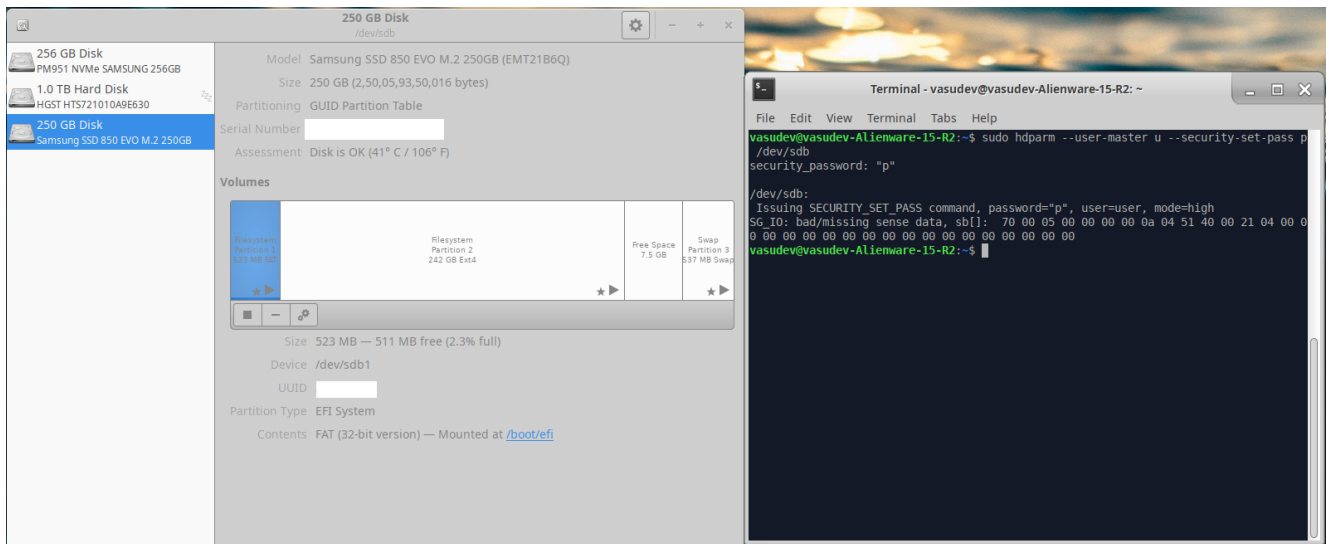


3. Once its woken from suspend/sleep mode you will see Not frozen when running `hdparm -I /dev/sdX`, substitute X with your SSD or disk name.

4. You need to set a Password for Secure erase or Secure Erase enhanced to work. For the sake of simplicity, I'm using 'p' as a password and the command is:

Code:

```
hdparm --user-master u --security-erase p /dev/sdb
```



5. Now let's secure erase SSDs, I'm using Secure SSD Enhanced since my drive supports it. It works for 2.5" SATA and M.2 SATA versions perfectly!

```

Terminal - vasudev@vasudev-Alienware-15-R2: ~
File Edit View Terminal Tabs Help

vasudev@vasudev-Alienware-15-R2:~$ sudo hdparm --user-master u --security-erase-
enhanced p /dev/sdb
[sudo] password for vasudev:
security_password: "p"

/dev/sdb:
Issuing SECURITY_ERASE command, password="p", user=user

```

6. It will take under a minute to secure erase a SSD.

7. I re-initialised the SSD using gparted by using gpt as shown in the link [here](#) (optional step) I used it to create a fresh filesystem table so that HPA and other things are reset to defaults just like a new drive.

For NVMe drives:

8. Assuming nvme-cli package is installed, let's query list of NVMe installed in the system using:

Code:

```
sudo nvme list
```

```

Terminal - vasudev@vasudev-Alienware-15-R2: ~
File Edit View Terminal Tabs Help

vasudev@vasudev-Alienware-15-R2:~$ sudo nvme list
Node          SN              Model              Namespace Usage           Format           FW Rev
-----
/dev/nvme0n1  PM951 NVMe SAMSUNG 256GB 1          37.49 GB / 256.06 GB  512 B + 0 B    BXV7700Q

```

9. Follow Step 2 if you never suspended the Ubuntu or Linux LiveCD environment to un-freeze the disks.

10. Check if the NVMe drives support Secure erase or not: (As always if you've multiple NVMe disks choose appropriate name. If in doubt, check Gnome disk aka Disks or gparted for detailed info.)

Code:

```
nvme id-ctrl -H /dev/nvme0
```

Format NVMe support for basic formatting of NVME disk(s):

```
Terminal - vasud
File Edit View Terminal Tabs Help
cntlid : 1
ver : 0
rtd3r : 0
rtd3e : 0
oaes : 0
[8:8] : 0 Namespace Attribute Changed Event Not Supported
ctratt : 0
[0:0] : 0 128-bit Host Identifier Not Supported
oacs : 0x17
[8:8] : 0 Doorbell Buffer Config Not Supported
[7:7] : 0 Virtualization Management Not Supported
[6:6] : 0 NVMe-MI Send and Receive Not Supported
[5:5] : 0 Directives Not Supported
[4:4] : 0x1 Device Self-test Supported
[3:3] : 0 NS Management and Attachment Not Supported
[2:2] : 0x1 FW Commit and Download Supported
[1:1] : 0x1 Format NVM Supported
[0:0] : 0x1 Security Send and Receive Supported
```

Shows nvme-format is supported by the NVMe drive

Secure erase or crypto erase:

```
Terminal - vas
File Edit View Terminal Tabs Help
mntmt : 0
mxtmt : 0
sanicap : 0
[2:2] : 0 Overwrite Sanitize Operation Not Supported
[1:1] : 0 Block Erase Sanitize Operation Not Supported
[0:0] : 0 Crypto Erase Sanitize Operation Not Supported
hmminds : 0
hmmaxd : 0
sqes : 0x66
[7:4] : 0x6 Max SQ Entry Size (64)
[3:0] : 0x6 Min SQ Entry Size (64)
cques : 0x44
[7:4] : 0x4 Max CQ Entry Size (16)
[3:0] : 0x4 Min CQ Entry Size (16)
maxcmd : 0
nn : 1
oncs : 0x1f
[6:6] : 0 Timestamp Not Supported
[5:5] : 0 Reservations Not Supported
[4:4] : 0x1 Save and Select Supported
[3:3] : 0x1 Write Zeroes Supported
[2:2] : 0x1 Data Set Management Supported
[1:1] : 0x1 Write Uncorrectable Supported
[0:0] : 0x1 Compare Supported
fuses : 0
[0:0] : 0 Fused Compare and Write Not Supported
fna : 0
[2:2] : 0 Crypto Erase Not Supported as part of Secure Erase
[1:1] : 0 Crypto Erase Applies to Single Namespace(s)
[0:0] : 0 Format Applies to Single Namespace(s)
```

If its 1 then, crypto Secure erase is supported or otherwise. My drive doesn't have crypto erase aka secure erase.

11. Format NVMe drive(s) with Secure Erase command:

Code:

```
nvme format /dev/nvme0 --ses=1
```

```
Terminal - vasudev@vasudev-Alienware-15-R2: ~
File Edit View Terminal Tabs Help
vasudev@vasudev-Alienware-15-R2:~$ nvme format /dev/nvme0 --ses=1
```

Format NVMe with secure erase method, if supported.

You will get a Success message or statement once NVMe secure erase is done, it takes a little more time than SATA so be patient! and once complete, follow Step 7 for best results.

@hmescott @Papusan @jclausius @Dennismungai @Mr. Fox @jaybee83 @VICKYGAMEBOY @judal57 Ultra Male @Dr. AMK @tillerofttheearth @GreatD @rinneh @ssj92 and others...

Sources:

Code:

SATA SES:

<https://grok.lsu.edu/article.aspx?articleid=16716>

nvme secure erase:

<http://blog.pythonaro.com/2018/05/how-to-securely-wipe-nvme-drive.html>

<https://tinyapps.org/docs/nvme-secure-erase.html>

<https://github.com/linux-nvme/nvme-cli/blob/master/Documentation/nvme-format.txt>

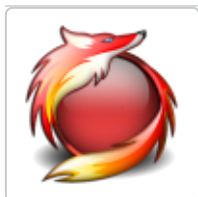
<https://www.mankier.com/1/nvme-format>

Don't forget to Backup your data. Don't say I didn't warn you!

Vasudev, Feb 15, 2019

#1

[jaybee83](#), [jclausius](#), [Dennismungai](#) and 3 others like this.



Mr. Fox Undefined BGA-Hating Elitist

Reputations:

26,103

Messages:

33,742

Likes Received:

51,139

Trophy Points:

931

Nice info, Brother [@Vasudev](#)

Mr. Fox, Feb 15, 2019

#2

[Vasudev](#) and [jclausius](#) like this.



Dennismungai Notebook Deity

Reputations:

560

Messages:

794

Likes Received:

705

Trophy Points:

106

Awesome, thanks!

Dennismungai, Feb 15, 2019

#3

[Vasudev](#), [jclausius](#) and [Mr. Fox](#) like this.



jclausius Notebook Virtuoso

Reputations:

2,405

Messages:

2,907

Likes Received:

1,710

Trophy Points:

181

Agreed. Kudos!!

jclausius, Feb 15, 2019

#4

[Vasudev](#) and [Mr. Fox](#) like this.



Vasudev Notebook Nobel Laureate

Reputations:

5,420

Messages:

8,869

Likes Received:

6,297

Trophy Points:

681

Mr. Fox said: ↑

Nice info, Brother [@Vasudev](#)

[Click to expand...](#)

Thanks everyone. Well, I did try to erase my non-backup'ed drive by copy and pasting the same cmds, you'll see in Step 5 where I accidently hit Enter key and cmd was issued! Fortunately, HDD/SSD were Frozen so those cmds failed. That's why I highlighted Backup important data.

A minor mistake might wipe out the data.
My guide isn't as good looking as Ultra Male's post.

Vasudev, Feb 15, 2019
#5

[jaybee83](#) and [jclausius](#) like this.



Vasudev Notebook Nobel Laureate

Reputations:	5,420
Messages:	8,869
Likes Received:	6,297
Trophy Points:	681

[@Charles P. Jefferies](#) This thread is similar to Ultra Male's SSD erase guide, but involves lot of manual work using the same internal working of Parted Magic and most Linux distros in a freeware.

Vasudev, Feb 15, 2019
#6



Mr. Fox Undefined BGA-Hating Elitist

Reputations:	26,103
Messages:	33,742
Likes Received:	51,139
Trophy Points:	931

Vasudev said: ↑

[@Charles P. Jefferies](#) This thread is similar to Ultra Male's SSD erase guide, but involves lot of manual work using the same internal working of Parted Magic and most Linux distros in a freeware.
Click to expand...

It's good to have your post/thread here because Parted Magic is more of a point and click experience designed for Windows users and you presented how one would do this using Linux with terminal commands. I actually like using a command line interface. It took me a long time to accept using a Windows GUI and I preferred using DOS (and primarily used DOS as much as possible) until about half way through the life cycle of Windows 98. I never actually liked Windows 3.X or Windows 95, and didn't fully embrace it until Windows XP.

Mr. Fox, Feb 15, 2019
#7

[Ionising_Radiation](#), [tillerofttheearth](#), [Vasudev](#) and [2 others](#) like this.



Vasudev Notebook Nobel Laureate

Reputations:	5,420
Messages:	8,869
Likes Received:	6,297
Trophy Points:	681

Mr. Fox said: ↑

It's good to have your post/thread here because Parted Magic is more of a point and click experience designed for Windows users and you presented how one would do this using Linux with terminal commands. I actually like using a command line interface. It took me a long time to accept using a Windows GUI and I preferred using DOS (and primarily used DOS as much as possible) until about half way through the life cycle of Windows 98. I never actually liked Windows 3.X or Windows 95, and didn't fully embrace it until Windows XP.

Click to expand...

Uses the same thing but presented in a nice GUI. Its more bleeding edge than LTS. I always like CMD lines or xterm. I still play dosgames on my PC at ultra pixelated graphics at VGA resolution.

Vasudev, Feb 15, 2019
#8

[jaybee83](#), [Mr. Fox](#) and [tillerofttheearth](#) like this.



Vasudev Notebook Nobel Laureate

Reputations:	5,420
Messages:	8,869
Likes Received:	6,297
Trophy Points:	681

@[Charles P. Jefferies](#) Can you change title of the thread to "

Secure Erase HDDs/SSDs(SATA/NVMe) using hdparm & nvme-cli on Linux"

Vasudev, Feb 18, 2019
#9

[Charles P. Jefferies](#) likes this.



custom90gt Dellerator Super Moderator

Reputations:	3,060
Messages:	2,795

Likes Received:

2,013

Trophy Points:

181



Vasudev said: ↑

@Charles P. Jefferies Can you change title of the thread to "

Secure Erase HDDs/SSDs(SATA/NVMe) using hdparm & nvme-cli on Linux"

Click to expand...

Done, you can always report your post and ask for a title change.

custom90gt, Feb 18, 2019

#10

6.|THE|1|BOSS|.9, toughasnails, Papusan and 3 others like this.

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Vasudev

Feb 12, 2019



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