

Replacing a Laptop Hard Disk On Linux

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The logo for '2bits' features the number '2' in a bright green color and the word 'bits' in a dark grey, stylized font. The entire logo is set against a light grey background and has a subtle reflection effect below it.



About Khalid



- 30 years in software development and software consulting
- First computer: Sinclair ZX Spectrum
- Experience: Mainframe, UNIX
- Open Source: Linux, Web, PHP, MySQL, Drupal
- Full time open source developer, contributor and consultant





About 2bits.com, Inc.



- Founded in 1999 as a partnership, incorporated since 2007
- Drupal since 2003
- Specializes in Drupal scalability and performance
 - Site Performance Assessment
 - Hosting selection, provisioning, tuning and management
 - Custom Drupal module development
- Extensive in depth articles and testimonials at <http://2bits.com>





2bits.com, Inc. Clients



- International clients (USA, Canada, Europe, South America, China, ...)
 - Electronic Arts (EA)
 - Johns Hopkins University
 - Harvard University
 - Cornell University
 - University of Waterloo
 - Vodafone
 - Harper Collins Publishers
 - Lonely Planet
 - The White House (sort a ...)





Need Help?



- If your site has any of these symptoms
 - Site slow?
 - Suffering outages?
 - High resource usage?
- Services
 - Site Performance Assessment
 - Hosting selection, installation, configuration, and optimization





Agenda



- Background
- Partitioning
- Create the Filesystem
- Copy the old disk to the new one
- Some Magic
- Grub2, fstab, and swap
- Replace the disk
- Reboot
- Hibernation





Background



- Laptop Hard disk died
 - Home directory is backed up daily (rsync)
- Replaced it with a disk I had lying around
 - Then smartctl said it is in ill health
- Hence, wanted to replace it before it died
- With an SSD that I had lying around ...
 - OCZ Vertex 4 256GB





Hardware



- Since this is a laptop, you will need a USB enclosure or a eSATA dock





SmartMonTools



- Quick Demo





Partitioning



- The new disk has to be partitioned
- A multitude of options
 - fdisk
 - cfdisk
 - parted
 - gdisk
- Which to use depends on disk size, other operating systems on it, ...etc.





Partitioning (cont'd)



- Tools vary in support:
 - MBR (Master Boot Record), the old format, since the DOS days
 - GPT (GUID Partition Table), the new format, which can accomodate larger disks
- Disks larger than 2TB have to use GPT
 - For example, my 3TB eSATA backup disks





Partitioning (cont'd)



- At a minimum
 - Ext4 partition
 - Swap partition (= RAM size, for hibernating)
- In my case (bad at math, so swap first):
 - Disk /dev/sda: 256.1 GB, 256060514304 bytes
 - 255 heads, 63 sectors/track, 31130 cylinders, total 500118192 sectors
 - Units = sectors of 1 * 512 = 512 bytes
 - Device Boot Start End Blocks Id System
 - /dev/sda1 63 16000739 8000338+ 82 Linux swap / Solaris
 - /dev/sda2 * 16000740 500118191 242058726 83 Linux





Create the filesystem



- Used ext4
 - Most familiar with
 - Reliable
- Command:
 - `mkfs -t ext4 /dev/sdb2`





Mount the filesystem



- Create a temporary mount point
 - `mkdir /mnt/disk2`
- Mount it
 - `mount /dev/sdb2 /mnt/disk2`





Copy old disk to new



- Using `cpio -p` (pass-through)
 - Copies one directory tree to another
 - Like `-o` (copy out)/`-i` (copy-in) combined, but with no intermediate archive
 - Preserves timestamps, ownership, special files, ...etc.
- Commands:
 - `cd /`
 - `find . -xdev -print0 | cpio -pa0V /mnt/disk2`





Some Magic



- Mount virtual filesystems
 - `mount --bind /dev /mnt/disk2/dev`
 - `mount --bind /sys /mnt/disk2/sys`
 - `mount --bind /proc /mnt/disk2/proc`
- Change Root to the new disk
 - `chroot /mnt/disk2`





Grub2



- Using Grub1 is different from Grub2
- Grub2 is the standard in newer Ubuntu releases
- Create new grub2 configuration on the new disk:
 - `grub-mkconfig -o /boot/grub/grub.cfg`
- Ask Grub2 to install a new MBR:
 - `grub-install /dev/sdb`





Change fstab



- Find out the partition UUIDs
 - `ls -l /dev/disk/by-uuid/`
2aca8caa-4ee9-477a-ae1a-7cc0d1f8a6a9
-> ../../sda1
 - 9f491cf9-5e8d-467f-a1ec-244dead0af49
-> ../../sdb2
 - cb79050e-0bd9-49a6-8c4f-a9984dafb1e7
-> ../../sda5
- Note the line for sdb2 (our root partition)
 - Edit `/etc/fstab` and change the UUID in it





Enable Swap



- Turn off all swap
 - `swapoff -a`
- Initialize Swap
 - `mkswap /dev/sdb1`
 - Setting up swapspace version 1, size = 8000332 KiB
 - no label, UUID=b4b6931b-e002-4e93-ab3e-14225b676754
- Edit `/etc/fstab` and change the UUID in it





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Replace Disks



- Remove new disk from USB enclosure/dock
- Open laptop, and replace old disk with new disk
- Reboot ...





Grub2 Rescue?



- If You Are Booted Into Grub2 Rescue, then it did not write a proper MBR.
- Use the following commands:
 - `grub rescue> set prefix=(hd0,1)/boot/grub`
 - `grub rescue> set root=(hd0,1)`
 - `grub rescue> insmod normal`
 - `grub rescue> normal`
- After reboot, login, then use the command:
 - `grub-install /dev/sda`





Hibernation



- Find the UUID for the swap partition
 - **ls -l /dev/disk/by-uuid**
- Edit /etc/default/grub and find:
 - **GRUB_CMDLINE_LINUX=""**
- Change it to:
 - **GRUB_CMDLINE_LINUX="resume=UUID=Z"**
- Replace Z above by the UUID for swap, then run:
 - **update-grub**





Resources



- Main Article (with grub1)
 - <http://bremford.org/tips/MigrateDiskInUbuntu.html>
- My Article (with grub2)
 - <http://baheyeldin.com/node/1398>
- Making Hibernate Work
 - <http://www.jasom.net/how-to-enable-hibernation-in-lubuntu-14-04>





Questions?

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Questions? Comments?

