Helper's cheat sheet

October 4, 2019

Note: All our helpers wear colored bracelets to indictate what they're responsible for. If you need a special expertise for a problem, be sure to ask one of the orange-braced helpers, as those are the Patrol and will be able to find one for you. Please don't waste your time searching other helpers by yourself! The helpers with the yellow-green armbands are responsible for food and other supplies and should not be relevant to you.

Note: Our USB sticks are color-coded too! Each one has a thread with a particular color attached to it. White threads = Ubuntu, red/white threads = openSUSE, blue threads = Kubuntu, green threads = Xubuntu, yellow threads = Ubuntu GNOME

Contents

1   Before installing

1.1   Disable fast boot in Windows 8/8.1/10

- Open the control panel (Win 10: the old-style control panel, not the newish one) and select the power options
- Click on Choose what the power buttons do" on the left bar
- By acquiring admin rights click Change settings that are currently unavailable"
- scroll down and uncheck the box for fast startup

ThinkPad T.40 Serie BIOS Version

- BIOS version should be greater or equal to 1.14. 2.x to be sure not to brick the system

1.2   How to detect 32bit EFI and how to deal with it

- No provided install image will boot
- Windows is installed in 32bit mode
- Some older Macbooks have this config
- To install a 64bit Linux (we never encountered a 32bit CPU with that), manually replace the bootloader with a grub standalone and boot the kernel manually. Reference https://wiki.archlinux.org/index.php/Unified_Extensible_Firmware_Interface#Booting_64-bit_kernel_on_32-bit_UEFI

1.3   Useful Macbook hardware bitwidth table

- http://www.everymac.com/mac-answers/snow-leopard-mac-os-x-faq/mac-os-x-snow-leopard-64-bit-macs-64-bit-efi-boot-in-64-bit-mode.html

1.4   Getting to BIOS in Windows 8/8.1/10

- Get to the power button (metro bar in 8/8.1, start menu in 10)
- Press the shutdown button
- Press and hold SHIFT while selecting Restart
- In the appearing GUI select Extended options" or similar until Go to UEFI firmware"

1.5   Find out boot type, disable hybrid boot mode: UEFI or BIOS?

- MUST do this before booting the Linux live system, otherwise existing systems might be broken!

- In the BIOS, go to the boot options and set either BIOS (often called legacy) XOR UEFI mode! **DO NOT USE HYBRID MODES.**

- If available (e.g. on Lenovo Workstation laptops), disable CSM when using UEFI / enable it when using BIOS mode.

- Save, reboot and check if the existing OS starts

  - If yes, you found the right mode
  - If no, it's the other mode, so switch it and don't forget to attempt to boot the existing OS again, this time it must work or there's a real problem.

1.6   Find out the partition table type: EFI or MBR?

- MUST find this out before installing, can mess up the system otherwise!
- Check for a partition labeled "EFI" and formatted as FAT32 (generally pretty small). Note that this partition might not be visible from Windows.
  If there is such a partition, it's EFI, else it's an MBR table. Remember that type!
- At the last step of installing, double-check that the installer detected partition type correctly.

1.7   Switch from RAID to AHCI (SATA Mode)

- https://triplescomputers.com/blog/uncategorized/solution-switch-windows-10-from-raidide-to-ahci-operation/

2   Partitioning

2.1   Watch for hybrid HDD/SSD systems

- Intel provides an SSD cache (found on a HP laptop). It doesn't even show under Windows. On OpenSuse, it show up as an extra hard disk labeled: Intel Fast Flash.

  DO NOT TOUCH this disk.

- We experienced problems resizing the hard disk on that machine (it said it's inconsistent). To solve this, you have to start up Windows and disable Intel Smart Response in the utility installed on Windows.

2.2   MBR system setup

- make sure system has no EFI! See above: "Find out the partition table type: EFI or MBR?"
- Each HDD can only have max. 4 partitions which are either primary or logical, so I recommend first creating a new logical partition which again can contain 4 partitions, which we can all use for the Linux installation
- If there are already 4 primary partitions on the disk (e.g. old HP laptops), you must delete a partition. We typically choose the ones like HP TOOLS".
- More on this topic can be found here:
  http://wiki.project21.ch/Partitionierung_von_HDs_mit_vier_primären_Partitionen

2.3   EFI system setup

- make sure the system has EFI! See above: "Find out the partition table type: EFI or MBR?"
- Lenovo **40 => BIOS update before proceeding!

- make sure, that the system has booted in EFI mode (check whether /sys/firmware/efi exists)
- make sure the system found the efi partition and it is mounted at /boot/efi (type 'mount' in console, which lists all mounted devices)
- when selecting the partition scheme for installation, check whether the efi partition is recognized and will be mounted at /boot/efi
- If any EFI bugs occur, check the wiki article for EFI, which contains workarounds for many bugs.

2.4   Recommended partitions on a Linux system:

- At least 20 GB for /

- swap partition at least as large as total amount of installed RAM

- optional own partitions for /home, /usr, /var, . . . whatever the clients wish. Note that this is a religious question without clear answer which option is better:

  – Advantage of separate home: More clear to backup (e.g. with dd), more independent of system
  – Advantage of just one partition (/"): The entire space can be used for whatever, no separate and fix space constraint for system and home.

3   Using openSUSE

3.1   Booting openSUSE in BIOS / EFI mode

- To check how the USB key has booted compare the screen to the pictures below
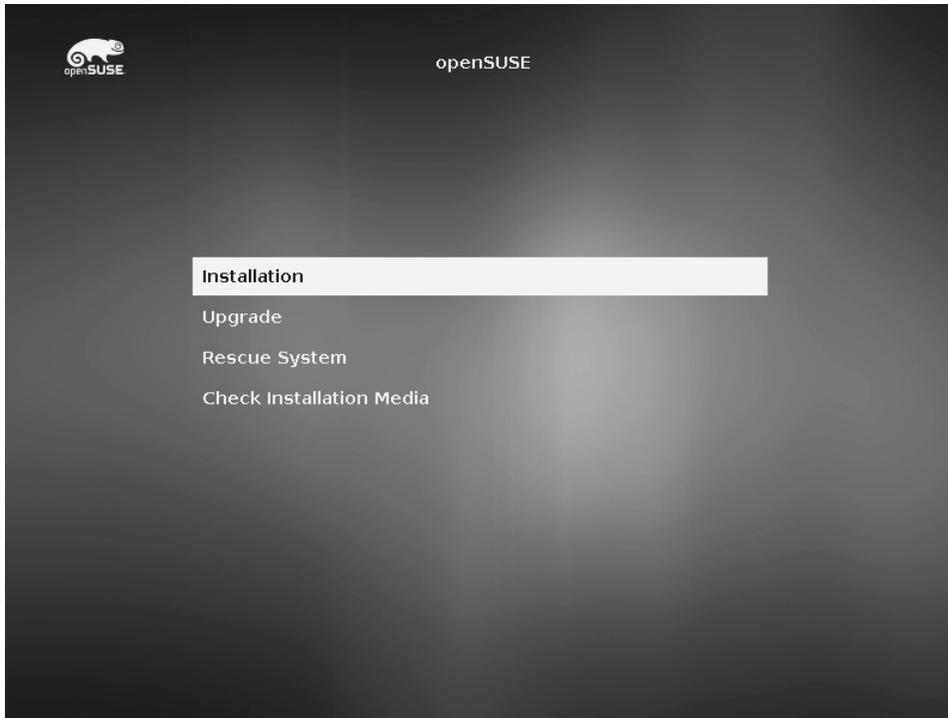
BIOS mode
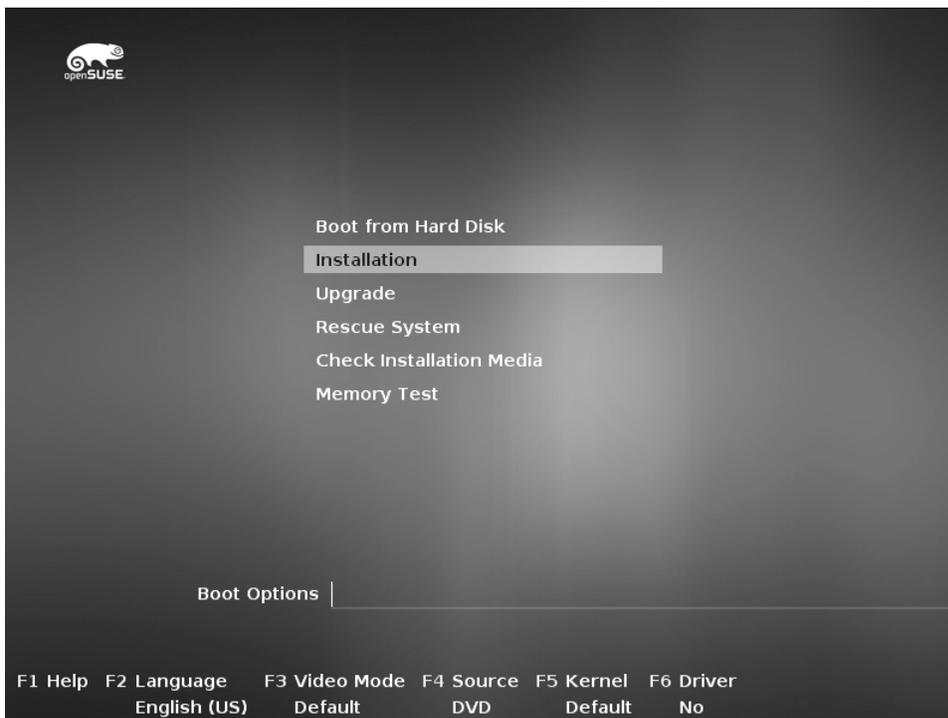
EFI mode

3.2 Installing software in Yast

- Open Yast via start menu settings yast
- Open "Install Software" (or so)
- There you can search for keywords and select packages to install

3.3 Very small zypper HOWTO

- Search for packages: # zypper se <name>
- Get recest versions: # zypper ref
- Install a package: # zypper in <package>
- Update packages: # zypper up
- Upgrade system: # zypper dup
- Remove package: # zypper remove <package>
- Get help: # zypper help
- zypper shell: # zypper sh (so you can drop the "zypper" prefix)
- List repos: # zypper lr
- Add repo: # zypper ar <url> <name>
- Need more help: $ man zypper and Google Fu

3.3.1 Adding the custom repository

- Our custom repo contains kernels for exotic hardware and some other useful stuff.
- Add it via:
  # zypper ar -f http://download.opensuse.org/repositories/home:/maxf:/LD/openSUSE_Leap_42.1/ TheAlt

3.4 Exotic problems

3.4.1 Secure Boot

- The openSUSE kernel maintained by Max cannot be secure booted!

3.4.2 Get rid of graphic driver

- # echo 'blacklist nouveau' | tee /etc/modprobe.d/my_cool_blacklist.conf

- Maybe add nomodeset:

  - Edit /etc/default/grub to add 'nomodeset' to the kernel cmdline
  - # grub2-mkconfig -o /boot/grub2/grub.cfg

3.4.3 Get rid of grub on Macs and set rEFInd to default

- # efibootmgr gives you all boot entries
- # efibootmgr -o XXXX,YYYY,ZZZZ sets the boot order. Put refind first here
- # efibootmgr -b <grub-no> -B deletes the efi entry of grub

3.4.4 Get broadcom-wl

- Add packman repo: YaST Software repos Add, select community repos Next select packman finish
- # zypper ref
- # zypper install broadcom-wl

3.4.5 Installation worked fine, but instead of GRUB only Windows is booting

- Disable secure boot (which would prevent GRUB from chainloading)
- Find /boot/efi/EFI/Microsoft/Boot/bootmgfw.efi (Windows boot loader)
- Rename it such that any Linux expert can still find it!

- Find /boot/efi/EFI/<distro_name>/grubx64.efi (GRUB)
- copy GRUB to the location that was previously owned by the windows boot loader
- open the os_prober file in /etc/grub.d and search for the Windows boot entry
- update the position of the (renamed) windows boot loader and copy the text of the menuentry to /etc/grub.d/40_custom
- remove os_prober
- 'grub-mkconfig -o /boot/grub/grub.cfg'
- Document all changes so a future linux expert helping our client can figure out what you did!
- In case of a problem ask Maximilian or Jan

4 Repair Bootcamp after repartitioning on older Macs (the ones with BIOS emulation)

Disk Utility will delete Hybrid MBR, so we need to fix it *(tested on Macbook Pro 13-inch, Early 2011)* *replace `diskX` with your disk, e.g. `disk0`*

- `sudo fdisk /dev/diskX` to see MBR

- `sudo gpt show/dev/diskX` to see GPT

- Install GPT fdisk from https://sourceforge.net/projects/gptfdisk/ (or use gdisk on linux)

- **ALWAYS BACKUP** current Partition table to an **external location** first:

- `sudo gdisk /dev/diskX` , `p` , `b`, enter backup file

- Create Hybrid MBR:

    - `sudo gdisk /dev/diskX` , `x`, `r`

    - `p`, remember partition number of bootcamp/windows
    - `h`, enter Bootcamp partition number

    - Place EFI GPT (0xEE) partition first in MBR (good for GRUB)? (Y/N): `Y`

    - Enter an MBR hex code [For bootcamp partition]: `07`

    - Set the bootableflag? (Y/N): `Y`
    - Unused partition space(s) found. Use one to protect more partitions? (Y/N): `N`

    - `p`, `o`, check if MBR is correct
    - `w` to write hybrid MBR to disk

- Restore GPT if something goes wrong:

    - `sudo gdisk /dev/diskX`

    - `x`, `r`, `l`, enter backup file, `w`

- If MacOS does not let you modify the MBR:

    - reboot into recovery, open terminal, `csrutil disable`, reboot
    - `csrutil enable` it after you are done

4.1   Install refind

(tested on Macbook Pro 13-inch, Early 2011)

Bei [Install Procedure; 1. Mac OS X] schlägt die Installation von refind unter der neusten Version von Mac OS X (El Capitan, 10.11) fehl Grund dafür ist, dass Apple System Integrity Protection ('rootless') aktiviert hat. Genaueres dazu hier: http://www.rodsbooks.com/refind/sip.html Wenn man die Fehlermeldung (ALERT: SIP ENABLED) ignoriert und trotzdem installiert wird refind auf die EFI Partition kopiert, das MacBook kann davon aber nicht starten. Grund ist, dass der Installer von refind im gebooteten OS keine Rechte hat die efi boot Variablen im nvram zu ändern und der standard Booteintrag deshalb nicht geändert werden kann

Workaround 1: (würd ich vorschlagen)

- siehe: http://www.rodsbooks.com/refind/installing.html#manual_renaming

- SIP error bei refind Installation ignorieren, attempt installation `Y`

- im Terminal: (evtl. mit sudo falls kein Adminaccount, verschieben und umbenennen geht auch von Hand im Finder) - `diskutil list` (EFI partition finden, normalerweise disk0s1) - `diskutil mount /dev/disk0s1` - `cd /Volumes/EFI/EFI` - `mv refind BOOT` - `cd BOOT` - `mv refind_x64.efi bootx64.efi`

- neu starten, Option Key (alt) gedrückt halten, und EFI BOOT auswählen für refind

  Vorteil: mac erkennt refind auf der EFI system partition automatisch, überlebt auch nvram reset, kein reboot in Recovery nötig damit es funktioniert

  möglicher Nachteil: mac bootet nicht automatisch von refind, sondern Mac OS X

  Lösung:

- in recovery booten (Option+R), Utilities, terminal aufmachen,

  - `diskutil mount /dev/disk0s1`
  - `bless --mount /Volumes/EFI --setBoot --file /Volumes/EFI/EFI/BOOT/bootx64.efi --shortform`

  jetzt sollte refind automatisch booten

- Falls keine recovery partition vorhanden geht auch bootable Installer (https://support.apple.com/en-us/HT201372)

Workaround 2: (wie von refind vorgeschlagen)   siehe: http://www.rodsbooks.com/refind/sip.html#disable basically:

- in recovery booten
- refind von dort installieren
- oder `csrutil disable`, reboot in osx, refind installieren, reboot in recovery, `csrutil enable`

  auf neueren MacBooks (mein 2011er hat keinen csr-active-config Eintrag im nvram , `nvram -p` um zu ckecken) ist es auch möglich sip mit refind aus- und wieder einzuschalten, dazu die EFI system Partition mounten, **Workaround 1**, und dann und wie hier http://www.rodsbooks.com/refind/sip.html#refind_manage beschrieben refind.conf editieren oder aber das wie beschrieben per stick oä machen

5   Fixing Broadcom Wireless

If Wireless is not working properly under Ubuntu or openSUSE it might be a firmware problem:

- Under openSUSE:
  #sudo zypper install b43-fwcutter
  #sudo /usr/sbin/install_bcm43xx_firmware

- Under Ubuntu:
  # sudo apt install firmware-b43-installer

For further reference, see:
http://linuxwireless.org/en/users/Drivers/b43/

6   Surface Pro 4

These little things need some special treatment to get the touchscreen to work.
After the installation, add the following repository:
http://download.opensuse.org/repositories/home:/maxf:/LD/openSUSE_Leap_42.1/
From there, install kernel-default-ipts and kernel-firmware-ipts (for intel precose touch support)
After that, you need to copy some hardware descriptor files from the windows partition:

- Descriptor.bin: A HID descriptor file provided by vendor. The HID Driver appends the panels HID descriptor to information.

- iaPreciseTouchDescriptor.bin: A HID descriptor file. A bare minimum HID descriptor descripting the device. The HID Driver appends the panels HID descriptor to information.

- KernelSKL.bin: Touch Vendor provided OpenCL kernel includes touch algorithms.

- SFTConfig.bin: Touch Vendor provided configuration binary.

These files are located in:
%Windir%\inf\PreciseTouch\
Kernel will look for these user space binaries in /itouch folder under specific names.

- /itouch/vendor_kernel_skl.bin

- /itouch/integ_sft_cfg_skl.bin

- /itouch/vendor_descriptor.bin

- /itouch/integ_descriptor.bin

So to be able to try different vendor kernels using softlinks can be used as:

- ln -sf /itouch/KernelSKL.bin /itouch/vendor_kernel_skl.bin

- ln -sf /itouch/SFTConfig.bin /itouch/integ_sft_cfg_skl.bin

- ln -sf /itouch/Descriptor.bin /itouch/vendor_descriptor.bin

- ln -sf /itouch/iaPreciseTouchDescriptor.bin /itouch/integ_descriptor.bin

For further reference, ask Max or Aline or see
https://github.com/ipts-linux-org/ipts-linux/wiki#user-space-components