

Debian für Ein- und Umsteiger

Debian GNU/Linux Tipps und Tricks

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Outline

- 1 The Debian Project and Debian GNU/Linux
- 2 Installation
- 3 Firmware
- 4 Backports
- 5 Getting Help and Bug Reporting



Outline

- 1 The Debian Project and Debian GNU/Linux
 - Goals and Formal Constitution
 - Debian Releases and Distributions
- 2 Installation
- 3 Firmware
- 4 Backports
- 5 Getting Help and Bug Reporting



The Debian Project

Wikipedia¹:

*"... a non-commercial distribution and one of the earliest, ...
... maintained by a volunteer developer community ...
... with a strong commitment to free software principles
and democratic project management."*

- founded 1993 by Ian A. Murdock
- Debian Developers (~ 1000 DDs)
- Debian Maintainers (~ 250 DMs)
- and many more contributors



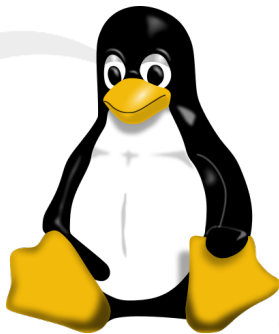
debian

¹https://en.wikipedia.org/wiki/Linux_distribution#Popular_distributions

The Debian Project

A Brief History of Debian Appendix A - The Debian Manifesto (1994)²:

- ... developed openly in the spirit of Linux and GNU
- ... a non-commercial distribution that will be able to effectively compete in the commercial market



²<https://www.debian.org/doc/manuals/project-history/ap-manifesto.html>

Foundational Documents

- "Social Contract" with the Free Software Community
- Debian Free Software Guidelines (DFSG)
- Debian Constitution



"Social Contract" with the Free Software Community³

- 1 Debian will remain 100% free
- 2 We will give back to the free software community
- 3 We will not hide problems
- 4 Our priorities are **our users and free software**
- 5 Works that do not meet our free software standards

³https://www.debian.org/social_contract



Debian Free Software Guidelines (DFSG)

- 1 Free Redistribution
- 2 Source Code
- 3 Derived Works
- 4 Integrity of The Author's Source Code
- 5 No Discrimination Against Persons or Groups
- 6 No Discrimination Against Fields of Endeavor
- 7 Distribution of License
- 8 License Must Not Be Specific to Debian
- 9 License Must Not Contaminate Other Software
- 10 Example Licenses

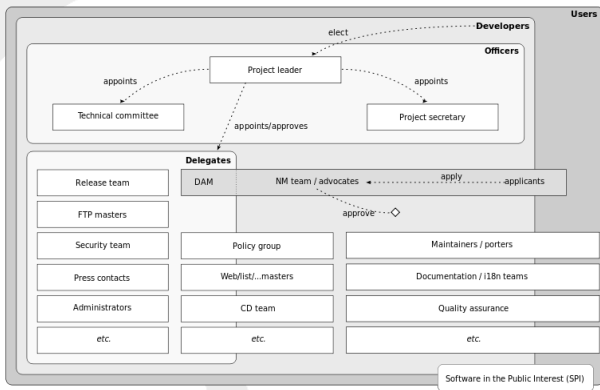
⇒ FSF four freedoms': run, study, redistribute and improve



Debian Constitution⁵

"organisational structure for formal decision-making"

- Developers
- Project Leader
- Technical Committee
- Delegates
- Project Secretary



4

⁴ <https://en.wikipedia.org/wiki/File:Debian-organigram.svg>

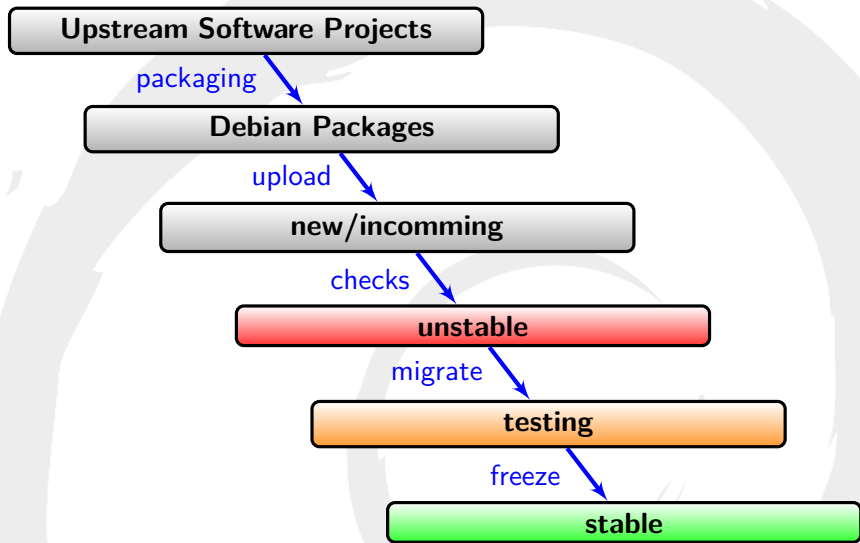
⁵ <https://www.debian.org/devel/constitution>



Es ist Dein Projekt!



Debian Development and Release Process



Debian Releases⁶ ...

- **stable release**

- ▶ released ~ every 2 years
- ▶ currently: **Debian 8 "jessie"** (released April 2015)
- ▶ only security updates and bugfixes

- **testing distribution**

- ▶ currently: **Debian 9 "stretch"** (full freeze February 2017)
- ▶ steady flow of updates and new packages from unstable
- ▶ "rolling release"

- **unstable distribution**

- ▶ codename always **"sid"**
- ▶ unstable with regard to dependencies
- ▶ steady flow of updates and new packages



⁶ <https://www.debian.org/releases/>

... Debian Long Term Support⁷

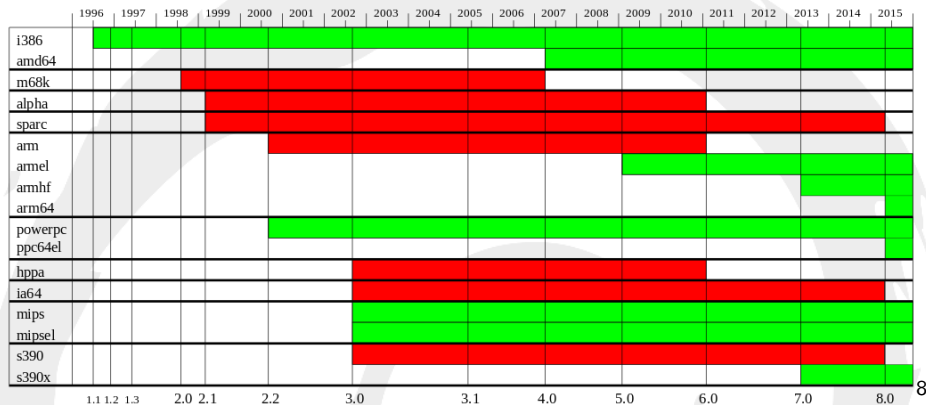
• Debian Long Term Support (LTS)

- ▶ Extends the lifetime of all Debian stable releases to ≥ 5 years
- ▶ Debian LTS team takes over security maintenance
- ▶ Debian 7 “Wheezy” from April 2016 until May 2018
- ▶ Debian 8 “Jessie” from May 2018 until Spring 2020
- ▶ Done by volunteers and companies interested



⁷ <https://wiki.debian.org/LTS>

Architectures and Release Cycle



+ inofficial ports as part of *Unstable*

⁸ <https://de.wikipedia.org/wiki/Datei:Debian-arch.svg>



Outline

1 The Debian Project and Debian GNU/Linux

2 Installation

- Installation Media
- Booting the Installer
- Dual Boot Partitioning
- Taskel
- UEFI Quirks

3 Firmware

4 Backports

5 Getting Help and Bug Reporting



Installation Media

- **stable:**

- ▶ <https://www.debian.org/releases/jessie/debian-installer/>
- ▶ <http://get.debian.org/debian-cd/>

- **testing** daily/weekly images:

- ▶ <https://www.debian.org/devel/debian-installer/>
- ▶ <http://get.debian.org/cdimage/>

- **Images with non-free firmware:**

- ▶ <http://get.debian.org/cdimage/unofficial/non-free/cd-including-firmware/>

...or just click the download link on <https://www.debian.org>:

→ multi-arch netinstall image: `debian-8.3.0-amd64-i386-netinst.iso`



Download and Verify the Image

Download image and checksum file:

```
$ wget http://cdimage.debian.org/debian-cd/8.3.0/multi-arch/iso-cd/  
                                             debian-8.3.0-amd64-i386-netinst.iso  
$ wget http://cdimage.debian.org/debian-cd/8.3.0/multi-arch/iso-cd/MD5SUMS
```

Calculate the checksum:

```
$ md5sum  debian-8.3.0-amd64-i386-netinst.iso  
f67172c4370b3ec36107aeb66207ff39  debian-8.3.0-amd64-i386-netinst.iso
```

Compare with the checksum in the corresponding file:

```
$ cat MD5SUM  
f67172c4370b3ec36107aeb66207ff39  debian-8.3.0-amd64-i386-netinst.iso
```



Experts: Verify the Authenticity of the Downloads

For serious business:

- Verify the signature of the checksum files⁹.
- Check sha1sum, sha256sum, sha512sum too.

```
gpgv -keyring debian-role-keys.gpg MD5SUMS.sign MD5SUMS
```

```
gpgv --keyring /usr/share/keyrings/debian-role-keys.gpg MD5SUMS.sign MD5SUMS
gpgv: Signature made Sun 24 Jan 2016 07:08:47 PM CET using RSA key ID 6294BE9B
gpgv: Good signature from "Debian CD signing key <debian-cd@lists.debian.org>"
```

```
gpgv -keyring debian-role-keys.gpg SHA512SUMS.sign SHA512SUMS
```

```
gpgv --keyring /usr/share/keyrings/debian-role-keys.gpg SHA512SUMS.sign SHA512SUMS
gpgv: Signature made Sun 24 Jan 2016 07:08:46 PM CET using RSA key ID 6294BE9B
gpgv: Good signature from "Debian CD signing key <debian-cd@lists.debian.org>"
```

⁹<https://www.debian.org/CD/verify.en.html>



Create CD/DVD or a Bootable USB Stick

All Debian images are hybrid-images:

- Burn the downloaded CD/DVD image on a CD/DVD.
- Or create a:

Bootable USB stick with CD or DVD image¹⁰:

```
# cp debian-8.3.0-amd64-i386-netinst.iso /dev/sdX
# sync
```

- Replace `/dev/sdX` by your device (consult `dmesg`).
- Make sure the device is not mounted.
- Use `umount /dev/sdX` in case it is.

¹⁰<https://www.debian.org/releases/stable/amd64/ch04s03.html.en>

Note: All data will be destroyed on the stick.



Booting the Installer

- Enable booting from CD/DVD or USB stick in the BIOS/UEFI
 - ▶ Press F2 or F11 or Entf or Esc or ...
 - ▶ UEFI: Disable Secure Boot
 - ▶ Sometimes a boot menu is available: F12
 - ▶ Consult the WWW or the documentation of your machine
- Disable "Fast Startup" aka "Fast Boot":
 - ▶ "Systemsteuerung"->"Energieoptionen"->"Netzschalterverhalten ändern"->"Einige Einstellungen sind nicht verfügbar": → uncheck "Schnellstart aktivieren"
 - ▶ "System Settings"->"power options"->"Choose what the power button does" → uncheck "Turn on fast startup"
- Shut down all other operating systems properly (no hibernation/sleep state)
- In general: Avoid booting any other operating systems accidentally. It might start installing updates on shutdown ... ;-)



Choose Architecture (BIOS, multi-arch installer)

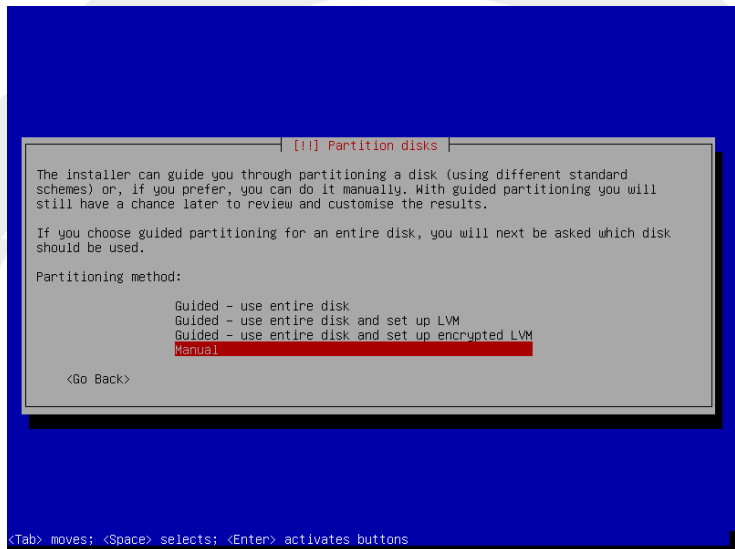


Choose Architecture (UEFI, multi-arch installer)



Dual Boot Partitioning

The critical part of the installation. Choose **"Manual"**:



```
[!] Partition disks

The installer can guide you through partitioning a disk (using different standard
schemes) or, if you prefer, you can do it manually. With guided partitioning you will
still have a chance later to review and customise the results.

If you choose guided partitioning for an entire disk, you will next be asked which disk
should be used.

Partitioning method:

    Guided - use entire disk
    Guided - use entire disk and set up LVM
    Guided - use entire disk and set up encrypted LVM
    Manual

<Go Back>

<Tab> moves; <Space> selects; <Enter> activates buttons
```



Dual Boot Partitioning

Pick the partition to shrink (usually the "C:" in windows):

```
[!!] Partition disks

This is an overview of your currently configured partitions and mount points. Select a
partition to modify its settings (file system, mount point, etc.), a free space to create
partitions, or a device to initialize its partition table.

    Guided partitioning
    Configure software RAID
    Configure the Logical Volume Manager
    Configure encrypted volumes
    Configure iSCSI volumes

Virtual disk 1 (vda) - 8.6 GB Virtio Block Device
#1 primary 8.2 GB B ext4
#5 logical 401.6 MB F swap swap

Undo changes to partitions
Finish partitioning and write changes to disk

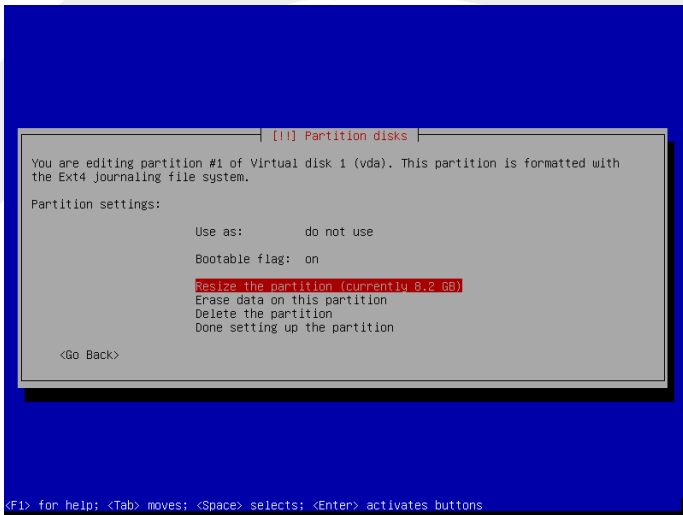
<Go Back>
```

<F1> for help; <Tab> moves; <Space> selects; <Enter> activates buttons



Dual Boot Partitioning

Choose "Resize the partition (...)":



```
[II] Partition disks

You are editing partition #1 of Virtual disk 1 (vda). This partition is formatted with
the Ext4 journaling file system.

Partition settings:

Use as:          do not use
Bootable flag:  on
Resize the partition (currently 8.2 GB)
Erase data on this partition
Delete the partition
Done setting up the partition

<Go Back>

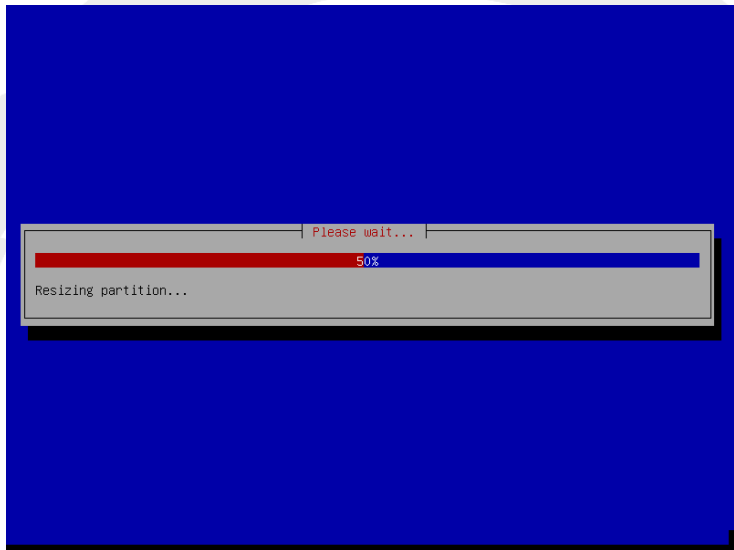
<F1> for help; <Tab> moves; <Space> selects; <Enter> activates buttons
```

... and enter the new size.



Dual Boot Partitioning

Resizing can take a **very long** time – do not panic!



Dual Boot Partitioning

Free space is available now. Choose **"Guided partitioning"**:

```
[!!] Partition disks

This is an overview of your currently configured partitions and mount points. Select a
partition to modify its settings (file system, mount point, etc.), a free space to create
partitions, or a device to initialize its partition table.

Guided partitioning
Configure software RAID
Configure the Logical Volume Manager
Configure encrypted volumes
Configure iSCSI volumes

Virtual disk 1 (vda) - 8.6 GB Virtio Block Device
#1 primary 4.2 GB B ext4
  pri/log 4.0 GB FREE SPACE
#5 logical 401.6 MB F swap swap

Undo changes to partitions
Finish partitioning and write changes to disk

<Go Back>
```

<F1> for help; <Tab> moves; <Space> selects; <Enter> activates buttons



Dual Boot Partitioning

Choose **"Guided – use the largest continuous free space"**:

```
[!!] Partition disks

If you choose guided partitioning for an entire disk, you will next be asked which disk
should be used.

Partitioning method:
  Guided - use the largest continuous free space
  Guided - use entire disk
  Guided - use entire disk and set up LVM
  Guided - use entire disk and set up encrypted LVM
  Manual

<Go Back>
```

<Tab> moves; <Space> selects; <Enter> activates buttons



Dual Boot Partitioning

Final check. A root ("/") and a swap ("swap") partition are available:

```

[!] Partition disks

This is an overview of your currently configured partitions and mount points. Select a
partition to modify its settings (file system, mount point, etc.), a free space to create
partitions, or a device to initialize its partition table.

    Guided partitioning
    Configure software RAID
    Configure the Logical Volume Manager
    Configure encrypted volumes
    Configure iSCSI volumes

Virtual disk 1 (vda) - 8.6 GB Virtio Block Device
#1 primary 4.2 GB B ext4
#6 logical 4.0 GB f ext4 /
#5 logical 401.6 MB F swap swap

Undo changes to partitions
Finish partitioning and write changes to disk

<Go Back>

<F1> for help; <Tab> moves; <Space> selects; <Enter> activates buttons
```



Dual Boot Partitioning (Graphical Installer)

Partition disks

The installer can guide you through partitioning a disk (using different standard schemes) or, if you prefer, you can do it manually. With guided partitioning you will still have a chance later to review and customise the result.

If you choose guided partitioning for an entire disk, you will next be asked which disk should be used.
Partitioning method:

- Guided - use entire disk
- Guided - use entire disk and set up LVM
- Guided - use entire disk and set up encrypted LVM
- Manual**

Screenshot Go Back Continue

Partition disks

You are editing partition #2 of Virtual disk 1 (vda). This partition is formatted with the Ext4 journaling file system.

Partition settings:

Name:

Use as: Ext4 journaling file system

Format the partition: no, keep existing data

Mount point: /

Mount options: defaults

Bootable flag: off

Resize the partition (currently 7.0 GB)

Erase data on this partition

Delete the partition

Done setting up the partition

Screenshot Help Go Back Continue

Partition disks

This is an overview of your currently configured partitions and mount points. Select a partition to modify its settings (file system, mount point, etc.), a free space to create partitions, or a device to initialize its partition table.

Guided partitioning

- Configure software RAID
- Configure the Logical Volume Manager
- Configure encrypted volumes
- Configure iSCSI volumes

Virtual disk 1 (vda) - 8.6 GB Virtio Block Device

>		1.0 MB			FREE SPACE
>	#1	536.9 MB	B	K	ESP
>	#2	7.0 GB	K	ext4	/
>	#3	1.1 GB	K	swap	swap
>		1.0 MB			FREE SPACE

Undo changes to partitions

Finish partitioning and write changes to disk

Screenshot Help Go Back Continue

Partition disks

Resizing partition...

Please wait...

Screenshot Help Go Back Continue

Dual Boot Partitioning (Graphical Installer)

Partition disks

This is an overview of your currently configured partitions and mount points. Select a partition to modify its settings (file system, mount point, etc.), a free space to create partitions, or a device to initialize its partition table.

Guided partitioning

- Configure software RAID
- Configure the Logical Volume Manager
- Configure encrypted volumes
- Configure iSCSI volumes

Virtual disk 1 (vda) - 8.6 GB Virtio Block Device

>	1.0 MB		FREE SPACE	
>	#1	536.9 MB	B K ESP	
>	#2	4.0 GB	K ext4	/
>		3.0 GB	FREE SPACE	
>	#3	1.1 GB	K swap	swap
>		1.0 MB	FREE SPACE	

Undo changes to partitions
Finish partitioning and write changes to disk

Screenshot Help Go Back Continue

Partition disks

If you choose guided partitioning for an entire disk, you will next be asked which disk should be used. Partitioning method:

Guided - use the largest continuous free space

- Guided - use entire disk
- Guided - use entire disk and set up LVM
- Guided - use entire disk and set up encrypted LVM
- Manual

Screenshot Go Back Continue

Partition disks

This is an overview of your currently configured partitions and mount points. Select a partition to modify its settings (file system, mount point, etc.), a free space to create partitions, or a device to initialize its partition table.

Guided partitioning

- Configure software RAID
- Configure the Logical Volume Manager
- Configure encrypted volumes
- Configure iSCSI volumes

Virtual disk 1 (vda) - 8.6 GB Virtio Block Device

>	1.0 MB		FREE SPACE	
>	#1	536.9 MB	B K ESP	
>	#2	4.0 GB	ext4	
>		317.4 kB	FREE SPACE	
>	#4	3.0 GB	f ext4	/
>	#3	1.1 GB	F swap	swap
>		1.0 MB	FREE SPACE	

Undo changes to partitions
Finish partitioning and write changes to disk

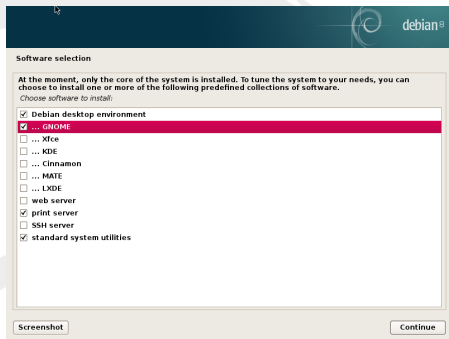
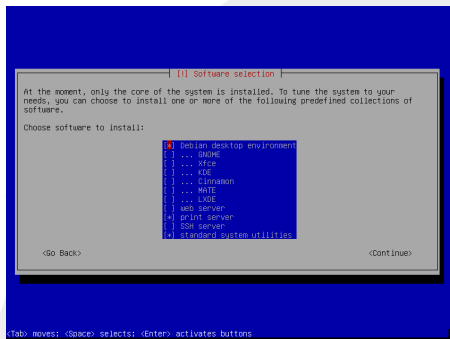
Screenshot Help Go Back Continue

Optional:

- 1 Shrink the partition from within windows.
- 2 Then choose **"Guided – use the largest continuous free space"**.



Taskel: Choose your Desktop Environment(s)



- Debian supports several desktop environments, default is GNOME.
- Support depends on the maintainers of the corresponding packages.
- After installation, other desktops can be added with taskel too.



UEFI Quirks

There are broken UEFI implementations¹¹ around, and after installation only windows is available:

- Try if the boot menu (F12) lists Debian.
- Try to boot Debian or a rescue system and use `efibootmgr` to change the boot order.
- If the modified settings are ignored and still windows is booted directly, find the relevant bootloader (`bootmgfw.efi`, `bootx64.efi` ?), do a backup, and overwrite it with `grubx64.efi`:

From within the system:

```
# cd /boot/efi/EFI/
```

try:

```
# cp Debian/Boot/grubx64.efi Boot/bootx64.efi
```

and/or:

```
# cp -r Microsoft/ MicrosoftOrig
```

```
# cp Debian/Boot/grubx64.efi Microsoft/Boot/bootmgfw.efi
```

¹¹http://wiki.osdev.org/Broken_UEFI_implementations
https://en.wikipedia.org/wiki/Unified_Extensible_Firmware_Interface#Firmware_issues

Outline

- 1 The Debian Project and Debian GNU/Linux
- 2 Installation
- 3 Firmware**
 - The Problem
 - Package Repositories
 - Finding the Firmware Package
- 4 Backports
- 5 Getting Help and Bug Reporting



Non-Free Firmware is a Problem

- Buggy and we can't fix it.
- More and more powerful.
- We are fooled, not only by carmakers.
- We can't control it, perhaps agencies do.
- We are dependent on the ones that have control.



Debian Social Contract:

"Our priorities are **our users and free software**"

¹²CC-BY https://en.wikipedia.org/wiki/File:Internet_of_things_signed_by_the_author.jpg

Firmware Package Repositories

- Non-free firmware is not part of Debian¹³.
- As a service, Debian provides the sections:
 - ▶ contrib free software, but depends on non-free software
 - ▶ non-free software not compliant to the DFSG

To enable¹⁴:

```
$ sudo apt edit-sources
```

```
deb http://httpredir.debian.org/debian/ jessie main contrib non-free
...
deb http://security.debian.org/ jessie/updates main contrib non-free
...
# jessie-updates, previously known as 'volatile'
deb http://httpredir.debian.org/debian/jessie-updates main contrib non-free
```

main → main contrib non-free

¹³<https://www.debian.org/distrib/packages>

¹⁴`sed -i.orig "s/ main/ main contrib non-free/" /etc/apt/sources.list`

Recommended Firmware

CPU microcode:

```
$ sudo apt update
```

```
[...]
```

```
$ sudo apt install firmware-linux
```

```
[...]
```

The following NEW packages will be installed:

```
amd64-microcode firmware-linux firmware-linux-free  
firmware-linux-nonfree intel-microcode iucode-tool
```



Missing Firmware Example 1

Fetch information about missing firmware:

```
$ dmesg | grep firmware
usb 1-12: firmware: failed to load zd1211/zd1211_ub (-2)
usb 1-12: Direct firmware load for zd1211/zd1211_ub
                                     failed with error -2
zd1211rw 1-12:1.0: couldn't load firmware. Error number -2
```

Find missing firmware package:

```
$ apt search zd1211rw
Sorting... Done
Full Text Search... Done
firmware-zd1211/stable 3.0.0.56-3 all
  binary firmware for the zd1211rw wireless driver
```



Missing Firmware Example 2

Fetch information about missing firmware:

```
$ dmesg | grep firmware
ieee80211 phy1: rt2x00lib_request_firmware: Info -
                               Loading firmware file 'rt73.bin'
rt73usb 1-3:1.0: firmware: failed to load rt73.bin (-2)
```

Find missing firmware package:

```
$ apt search rt73usb
[...]
firmware-ralink/stable 0.43 all
  Binary firmware for Ralink wireless cards
```

```
$ apt search rt73.bin
[...]
firmware-ralink/stable 0.43 all
  Binary firmware for Ralink wireless cards
```

Missing Firmware Example 3

Only the missing file is known, apt search finds no package.

Install apt-file:

```
$ sudo apt install apt-file
[...]
$ sudo apt-file update
[...]
```

Search for the package containing the file:

```
$ apt-file search rt73.bin
firmware-misc-nonfree: /lib/firmware/rt73.bin
```

⇒ Install the missing package!



Outline

- 1 The Debian Project and Debian GNU/Linux
- 2 Installation
- 3 Firmware
- 4 Backports**
 - Enable Backport Repositories
 - Install a Backported Version
 - Iceweasel and Icedove
- 5 Getting Help and Bug Reporting



Why Backports?

Problem:

- Brand new hardware is not supported by the Debian-stable kernel.
- A package did not make it into the release. It is not available in *stable* because:
 - ▶ it had (release critical) RC-Bugs,
 - ▶ it did not exist during freeze yet.
- A newer version of a package is needed.

Solution:

⇒ The backports-archive allows to provide newer packages for the stable distribution.



Enable Backport Repositories

To enable¹⁵:

```
$ sudo apt edit-sources
```

```
deb http://httpredir.debian.org/debian/ jessie main
```

```
deb http://httpredir.debian.org/debian/ jessie-backports main
```

```
...
```

```
$ sudo apt update
```

```
...
```

¹⁵<http://backports.debian.org/Instructions/#index2h2>



Install a Backported Version

By default, a package will be installed from stable. To choose the version from backports¹⁶:

```
$ sudo apt -t jessie-backports install <PACKAGE>
```

```
...
```

Brand new hardware, latest kernel needed:

```
$ sudo apt -t jessie-backports install linux-image-amd64
```

```
...
```

The following NEW packages will be installed:

```
irqbalance libnuma1 linux-image-4.3.0-0.bpo.1-amd64
```

The following packages will be upgraded:

```
linux-image-amd64
```

```
...
```

¹⁶<http://backports.debian.org/Instructions/#index3h2>

Iceweasel and Icedove

Debian-stable and -testing only provide ESR-versions (Extended Support Release) for Iceweasel and Icedove. For other versions try:

`http://mozilla.debian.net`



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Getting Help

- Debian Mailing Lists: <https://lists.debian.org/>
 - ▶ <https://lists.debian.org/debian-announce/>
 - ▶ <https://lists.debian.org/debian-backports-announce/>
 - ▶ <https://lists.debian.org/debian-user-german/>
 - ▶ ...
- Debian IRC: <https://wiki.debian.org/IRC>
- Debianforum.de: <https://debianforum.de>
- YOUR RECOMMENDED SOURCE HERE

Other good sites:

- <https://ubuntuusers.de/>
- <https://wiki.archlinux.org/>
- ...



Bug Reporting

Run reportbug:

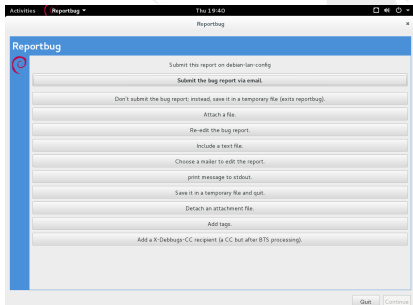
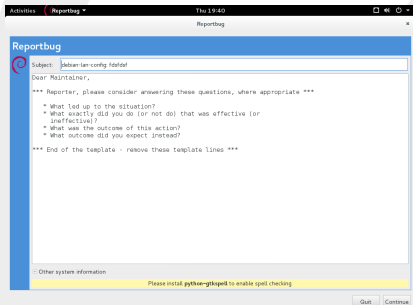
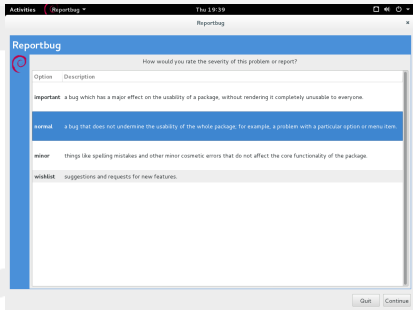
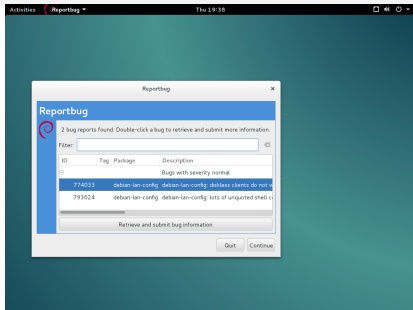
```
$ reportbug
```

```
Welcome to reportbug! Since it looks like this is the first time you have used reportbug, we are configuring its behavior. These settings will be saved to the file "/home/andi/.reportbugrc", which you will be free to edit further. Please choose the default operating mode for reportbug.
```

- 1 novice Offer simple prompts, bypassing technical questions.
- 2 standard Offer more extensive prompts, including asking about things that a moderately sophisticated user would be expected to know about Debian.
- 3 advanced Like standard, but assumes you know a bit more about Debian, including "incoming".
- 4 expert Bypass most handholding measures and preliminary triage routines. This mode should not be used by people unfamiliar with Debian's policies and operating procedures.

```
Select mode: [novice]
```


Bug Reporting (GUI)



Summary

- 1 The Debian Project and Debian GNU/Linux
 - Goals and Formal Constitution
 - Debian Releases and Distributions
- 2 Installation
 - Installation Media
 - Booting the Installer
 - Dual Boot Partitioning
 - Taskel
 - UEFI Quirks
- 3 Firmware
 - The Problem
 - Package Repositories
 - Finding the Firmware Package
- 4 Backports
 - Enable Backport Repositories
 - Install a Backported Version
 - Iceweasel and Icedove
- 5 Getting Help and Bug Reporting



Enjoy Debian!

Vielen Dank.

Slides: <http://people.debian.org/~andi/>

Questions?

Some pictures: <https://openclipart.org/>

