

DEBIAN 13 TRIxie · APT · GNOME

Debian Handbook

Installation guide

Install Debian step by step. Downloading the ISO and preparing a USB drive, firmware settings, installing alongside Windows, the Debian Installer screens, first boot and common installation problems.

CONTENTS

- | | |
|---|--|
| 1. Preparation | 5. Installation steps (Debian Installer) |
| 2. Making the install USB | 6. Right after installing |
| 3. Booting from USB and firmware settings | 7. Installation problems |
| 4. Installing alongside Windows | |

Yellow italic text (like *<package>*) marks the parts you fill in. In the terminal, paste is Ctrl+Shift+V and copy is Ctrl+Shift+C. Commands that start with `sudo` change the system; read what they do before running them.

Preparation

Set aside half an hour for preparation before installing; most installation problems come from skipping these steps.

TIP System requirements. 64-bit processor, at least 2 GB RAM (4 GB recommended for a desktop), at least 20 GB of disk (60 GB or more recommended).

TIP Back up. Installation can wipe the disk. Copy your documents, photos and browser bookmarks to an external drive or the cloud, and check once that the backup opens.

TIP Download the ISO: the “netinst” image (amd64) at debian.org/download is the right choice for most computers. To try Debian first, get a GNOME or KDE live image from debian.org/CD/live.

```
$ sha256sum <file>.iso
```

Computes the ISO's checksum on Linux. It must match the CHECKSUM/SHA256 value on the download page.

```
Get-FileHash <file>.iso -Algorithm SHA256
```

The same check in Windows PowerShell.

```
$ shasum -a 256 <file>.iso
```

The same check on macOS.

TIP Get a **USB drive of 8 GB or more**. Everything on it will be erased.

TIP If you are coming from Windows, note your BitLocker recovery key (in an admin Terminal: `manage-bde -protectors -get C:`) and write down your Wi-Fi password; the installer will need it.

Making the install USB

An ISO file isn't copied to the USB like a normal file; it's written with a dedicated tool.

```
winget install --id Rufus.Rufus -e
```

Rufus on Windows: choose the device and the ISO, partition scheme GPT, target system UEFI, Start. If it asks for a write mode, take the recommended one; if the USB won't boot, rewrite it in "DD image mode".

TIP **balenaEtcher** works the same on Windows, macOS and Linux: choose the ISO, choose the USB, Flash.

TIP With **Ventoy** you prepare the USB once, then just copy several ISO files onto it and choose between them at boot. Handy for trying several systems.

```
$ lsblk
```

On Linux, find the USB's name (e.g. /dev/sdb). Use the disk itself, not a partition (sdb1).

```
$ sudo dd if=<file>.iso of=/dev/<sdX> bs=4M  
status=progress oflag=sync
```

Writes the ISO straight to the USB on Linux.

WARNING `dd` and Rufus erase the selected disk completely without asking. Make sure your external backup drive or system disk isn't selected.

Booting from USB and firmware settings

To boot from USB you open the boot menu while the computer starts. The key depends on the brand; press it repeatedly while the logo is showing.

Boot menu key	Dell F12 · HP F9 or Esc · Lenovo F12 (Novo button on some models) · ASUS F8 or Esc · Acer F12 · MSI F11 · Gigabyte F12
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Firmware setup key	Usually F2 or Delete; F10 on HP, F1 or F2 on Lenovo.
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TIP You can also boot the USB from Windows: hold Shift and choose Start > Restart > Use a device > USB.

TIP Secure Boot. Debian installs with Secure Boot on; you don't need to turn it off. Drivers built separately, such as NVIDIA's, need an extra signing step (covered in the Advanced tab).

TIP UEFI mode. Use UEFI on modern computers. If the USB shows up twice in the boot menu, pick the one starting with "UEFI:". The old "Legacy/CSM" mode is only for very old hardware.

WARNING Intel RST / VMD. Some laptops ship with the disk in "RAID" or "Intel VMD" mode and the installer can't see it. Set SATA mode to AHCI or turn off VMD in the firmware. If Windows is on the same disk, prepare Windows first (booting once into Safe Mode is enough), or Windows won't boot.

Installing alongside Windows

You can install both Windows and Debian on the same disk and choose which one to start at boot. Make room on the Windows side first.

1 Turn off Fast Startup

When it's on, Windows leaves the disk half shut down, and files written from Linux can get corrupted. Control Panel > Power Options > Choose what the power buttons do > untick "Turn on fast startup". Or in an admin Terminal:

```
$ powercfg /h off
```

2 Write down the BitLocker key, suspend it if needed

Boot changes can make BitLocker ask for the recovery key.

```
$ manage-bde -protectors -get C:
```

```
$ Suspend-BitLocker -MountPoint C: -RebootCount 3
```

3 Make room in Windows

In Disk Management, right-click the C: partition > Shrink Volume. Set aside at least 50 GB, 100 GB or more for comfortable use. Leave the new space "Unallocated"; don't format it.

```
$ diskmgmt.msc
```

4 Choose the free space in the installer

Pick the option that uses the free space, not the one that erases the disk: "Guided - use the largest continuous free space". Windows' EFI partition is shared.

5 Check the boot menu

After installing, Windows should appear in the boot menu too. If the computer boots straight into Windows, change the boot order in the firmware.

TIP If the clock is off between the two systems (Windows shows the wrong hour), run this in an admin Terminal on Windows: `reg add HKLM\SYSTEM\CurrentControlSet\Control\TimeZoneInformation /v RealTimeIsUniversal /t REG_DWORD /d 1 /f .`

Installation steps (Debian Installer)

Debian has two kinds of install images: **netinst** (small; downloads packages during installation) and **live images** (GNOME, KDE...; you try first and install with Calamares). The steps below are for "Graphical install" on netinst.

1 Language, location, keyboard

Pick your language, country and keyboard layout.

2 Network

Type a hostname (e.g. debian-laptop). Leave the domain empty. If you have Wi-Fi it asks for the network and password.

3 Users and passwords

Leave the root password empty. The root account is then locked and the user you create gets sudo rights. If you enter a root password, your user is not added to the sudo group and you'll have to add it later. Then enter your name, user name and password.

4 Partitioning

Guided - use entire disk is the simplest. On a laptop pick the version with **encrypted LVM**. If you're installing next to Windows, choose **use the largest continuous free space**. Then "All files in one partition (recommended for new users)" and "Write the changes to disks: Yes".

5 Package manager

Pick a mirror country near you and `deb.debian.org`. Leave the proxy field empty.

6 Software selection

Tick **Debian desktop environment** and **only one** desktop such as GNOME, KDE Plasma or Xfce; keep “standard system utilities”. For a server, add “SSH server”.

7 GRUB boot loader

Say “Yes” and pick the system disk (e.g. `/dev/nvme0n1`). When installation finishes, remove the USB and restart.

TIP The Calamares installer on the live images is shorter: language, location, keyboard, partitioning (“Erase disk” or “Install alongside”), user, summary. The first user created in Calamares gets sudo rights.

Right after installing

Once the system boots, update it first. Then continue with the “After installing” list in the Beginner tab.

```
$ sudo apt update && sudo apt upgrade
```

Installs all pending updates.

```
$ sudo reboot
```

Restart if the kernel was updated.

```
$ lsblk -f && df -h /
```

Check that the partitions and free space look as expected.

```
$ ls /sys/firmware/efi
```

If the folder exists, the system was installed in UEFI mode.

Installation problems

TIP The USB doesn't show up in the boot menu. Plug it into another port (preferably one directly on the motherboard), check that USB boot is enabled in the firmware, and rewrite the USB with Rufus or Etcher.

TIP Black screen or freeze (especially NVIDIA). Highlight the entry in the boot menu, press `e`, add `nomodeset` to the end of the line starting with `linux`, and boot with `Ctrl+X` (or `F10`). Install the graphics driver after installation; the parameter isn't permanent.

TIP The installer can't see the disk. Intel RST/VMD may be on in the firmware (see the firmware section).

TIP Secure Boot or signature error. The ISO may be corrupted; check its checksum and write the USB again. On very old firmware, turning Secure Boot off temporarily also helps.

TIP No Wi-Fi in the installer. Use an Ethernet cable or USB tethering from your phone; install the missing Wi-Fi driver after installation.

TIP Windows boots straight after installing. In the firmware boot order, move Debian (or "GRUB", "Linux Boot Manager") to the top.

TIP "Missing firmware" warning. Debian 12 and later images include most of the firmware you need; if the warning appears, continue and install the matching firmware package afterwards.

Commands are written for Debian 13 "trixie" (APT 3, GNOME); most work unchanged on Debian 12. Menu names follow the English interface. Commands that start with `sudo` change the system; read what they do before running them.