
Release-Notes for Debian 13 (trixie)

Debian Documentation Team

2025-12-02

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The Debian Documentation Project <<https://www.debian.org/doc>>.

Last updated on: 2025-12-02

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KAPITEL 1

Introduktion

Dette dokument informerer brugere af Debian-distributionen om større ændringer i version 13 (kodenavn trixie).

Udgivelsesnoterne har information om, hvordan du sikkert opgraderer fra version 12 (kodenavn bookworm) til den aktuelle udgave og informerer brugere om kendte problemstillinger, som kan opstå under opgraderingen.

Du kan se den seneste version af dette dokument på <https://www.debian.org/releases/trixie/releasenotes>.

Forsigtig: Bemærk at det er umuligt at skrive om alle kendte problemstillinger, og at udvælgelsen er baseret på en kombination af forventet forekomst og omfang.

Bemærk at vi alene understøtter og dokumenterer opgradering fra den forrige version af Debian (i dette tilfælde, opgradering fra bookworm). Hvis du har brug for at opgradere fra en ældre version, foreslår vi, at du læser tidligere udgaver af udgivelsesnoterne og først opgraderer til bookworm.

1.1 Rapporter fejl i dette dokument

Vi har forsøgt at teste alle trin i opgraderingen, som beskrives i det her dokument og at forudse alle de mulige problemstillinger, som en bruger kan møde.

Nevertheless, if you think you have found a bug (incorrect information or information that is missing) in this documentation, please file a bug in the [bug tracking system](#) against the **release-notes** package. You might first want to review the [existing bug reports](#) in case the issue you've found has already been reported. Feel free to add additional information to existing bug reports if you can contribute content for this document.

Vi er taknemlige for og opfordrer til fejlrettelser til dokumentets kilder, som er vedhæftet fejlrapporten. Du kan finde yderligere information, der beskriver hvordan du kan finde kilderne til dette dokument, i [Kilder til dette dokument](#).

1.2 Bidrag med opgraderingsrapporter

Vi er glade for al information fra brugere, som har forbindelse til opgraderinger fra bookworm til trixie. Hvis du vil dele din information med os, så kan du sende denne ind via en fejlrapport i [fejlrapporteringssystemet](#) mod pakken **upgrade-reports** med dine erfaringer. Vi vil bede dig om, at du komprimerer eventuelle bilag som inkluderes (med gzip).

Inkluder følgende information når du indsender din opgraderingsrapport:

- Status på din pakkedatabase før og efter opgraderingen: **dpkg**'s statusdatabase tilgængelig i `/var/lib/dpkg/status` og **apt**'s pakketilstandsinformation, tilgængelig i `/var/lib/apt/extended_states`. Du bør lave en sikkerhedskopi før opgraderingen som beskrevet i [Sikkerhedskopier alle data og konfigurationsinformation](#), men du kan også finde sikkerhedskopier af `/var/lib/dpkg/status` i `/var/backups`.
- Sessionslog fra `script`, læs mere om dette i [Optagelse af sessionen](#).
- Dine apt-logge, tilgængelige i `/var/log/apt/term.log` eller dine aptitude-logge tilgængelige i `/var/log/aptitude`.

Bemærk: Du bør gennemgå og fjerne al personlig og/eller fortrolig information fra logge, før du inkluderer dem i en fejlrapport, da informationen vil blive udgivet i en offentlig database.

1.3 Kilder til dette dokument

The source of this document is in reStructuredText format, using the sphinx converter. The HTML version is generated using `sphinx-build -b html`. The PDF version is generated using `sphinx-build -b latex`. Sources for the Release Notes are available in the Git repository of the *Debian Documentation Project*. You can use the [web interface](#) to access its files individually through the web and see their changes. For more information on how to access Git please consult the [Debian Documentation Project VCS information pages](#).

The [Wiki](#) has more information about this topic.

2.1 Understøttede arkitekturer

Følgende er de officielt understøttede arkitekturer i Debian 13:

- 64-bit PC (`amd64`)
- 64-bit ARM (`arm64`)
- ARM EABI (`armel`)
- ARMv7 (EABI hard-float ABI, `armhf`)
- 64-bit little-endian PowerPC (`ppc64el`)
- 64-bit little-endian RISC-V (`riscv64`)
- IBM System z (`s390x`)

Additionally, on 64-bit PC systems, a partial 32-bit userland (`i386`) is available. Please see *Reduced support for i386* for details.

See *Last release for armel* for limitations on support for the ARM EABI (`armel`) architecture.

Du kan læse mere om porteringsstatus og porteringsspecifik information om din arkitektur på [Debian's websider om porteringer](#).

2.2 Nyt i distributionen

2.2.1 Official support for riscv64

This release for the first time officially supports the riscv64 architecture, allowing users to run Debian on 64-bit RISC-V hardware and benefit from all Debian 13 features.

The [Wiki](#) provides more details about riscv64 support in Debian.

2.2.2 Hardening against ROP and COP/JOP attacks on amd64 and arm64

trixie introduces security features on the amd64 and arm64 architectures designed to mitigate [Return-Oriented Programming \(ROP\)](#) exploits and [Call/Jump-Oriented Programming \(COP/JOP\)](#) attacks.

On amd64 this is based on Intel Control-flow Enforcement Technology (CET) for both ROP and COP/JOP protection, on arm64 it is based on Pointer Authentication (PAC) for ROP protection and Branch Target Identification (BTI) for COP/JOP protection.

The features are enabled automatically if your hardware supports them. For amd64 see the [Linux kernel documentation](#) and the [Intel documentation](#), and for arm64 see the [Wiki](#), and the [Arm documentation](#), which have information on how to check if your processor supports CET and PAC/BTI and how they work.

2.2.3 HTTP Boot Support

The Debian Installer and Debian Live Images can now be booted using »HTTP Boot« on supported UEFI and U-Boot firmware.

On systems using [TianoCore](#) firmware, enter the *Device Manager* menu, then choose *Network Device List*, select the network interface, *HTTP Boot Configuration*, and specify the full URL to the Debian ISO to boot.

For other firmware implementations, please see the documentation for your system's hardware and/or the firmware documentation.

2.2.4 Improved manual pages translations

The *manpages-l10n* project has contributed many improved and new translations for manual pages. Especially Romanian and Polish translations are greatly enhanced since bookworm.

2.2.5 Spell-checking support in Qt WebEngine web browsers

Web browsers based on Qt WebEngine, notably Privacy Browser and Falkon, now support spell-checking using hunspell data. The data is available in the BDIC binary dictionary format shipping in each Hunspell language package for the first time in Trixie.

More information is available in the related [bug report](#).

2.2.6 64-bit `time_t` ABI transition

All architectures other than i386 now use a 64-bit `time_t` ABI, supporting dates beyond 2038.

On 32-bit architectures (`armel` and `armhf`) the ABI of many libraries changed without changing the library »soname«. On these architectures, third-party software and packages will need to be recompiled/rebuilt, and checked for possibly silent data loss.

The i386 architecture did not participate in this transition, since its primary function is to support legacy software.

More details can be found on the [Debian wiki](#).

2.2.7 Debian progress towards reproducible builds

Debian contributors have made significant progress toward ensuring package builds produce byte-for-byte reproducible results. You can check the status for packages installed on your system using the new package **debian-repro-status**, or visit reproduce.debian.net for Debian's overall statistics for trixie and later.

You can contribute to these efforts by joining `#debian-reproducible` on IRC to discuss fixes, or verify the statistics by installing the new **rebuilderd** package and setting up your own instance.

2.2.8 wcurl and HTTP/3 support in curl

Both the curl CLI and libcurl now have support for HTTP/3.

HTTP/3 requests can be made with the flags `--http3` or `--http3-only`.

The **curl** package now ships `wcurl`, a wget alternative that uses curl to perform downloads.

Downloading files is as simple as `wcurl URL`.

2.2.9 BDIC Binary Hunspell Dictionary Support

Trixie ships `.bdic` binary dictionaries compiled from Hunspell source for the first time in Debian. The `.bdic` format was developed by Google for use in Chromium. It can be used by Qt WebEngine, which is derived from Chromium's source. Web browsers based on Qt WebEngine can take advantage of the provided `.bdic` dictionaries if they have appropriate upstream support. More information is available in the related [bug report](#).

2.2.10 Desktops and well known packages

This new release of Debian comes with a lot more software than its predecessor bookworm; the distribution includes over 14116 new packages, for a total of over 69830 packages. Most of the software in the distribution has been updated: over 44326 software packages (this is 63% of all packages in bookworm). Also, a significant number of packages (over 8844, 12% of the packages in bookworm) have for various reasons been removed from the distribution. You will not see any updates for these packages and they will be marked as »obsolete« in package management front-ends; see *Forældede pakker*.

Debian again ships with several desktop applications and environments. Among others it now includes the desktop environments GNOME 48, KDE Plasma 6.3, LXDE 13, LXQt 2.1.0, and Xfce 4.20.

Produktivitetsprogrammer er også blevet opgraderet, inklusive kontorpakkerne:

- LibreOffice is upgraded to version 25;
- GNUMcash is upgraded to 5.10;

Blandt meget andet inkluderer denne udgave følgende opdateringer:

Pakker	Version i 12 (bookworm)	Version i 13 (trixie)
Apache	2.4.62	2.4.65
Bash	5.2.15	5.2.37
BIND DNS Server	9.18	9.20
Cryptsetup	2.6	2.7
curl/libcurl	7.88.1	8.14.1
Emacs	28.2	30.1
Exim (default email server)	4.96	4.98
GCC, the GNU Compiler Collection (default compiler)	12.2	14.2
GIMP	2.10.34	3.0.4
GnuPG	2.2.40	2.4.7
Inkscape	1.2.2	1.4
the GNU C library	2.36	2.41
Linux kernel	6.1-serie	6.12 series
LLVM/Clang toolchain	13.0.1 and 14.0 (default) and 15.0.6	19 (default), 17 and 18 available
MariaDB	10.11	11.8
Nginx	1.22	1.26
OpenJDK	17	21
OpenLDAP	2.5.13	2.6.10
OpenSSH	9.2p1	10.0p1
OpenSSL	3.0	3.5
Perl	5.36	5.40
PHP	8.2	8.4
Postfix	3.7	3.10
PostgreSQL	15	17
Python 3	3.11	3.13
Qt 5	5.15.8	5.15.15
Qt 6	6.4.2	6.8.2
Rustc	1.63	1.85
Samba	4.17	4.22
Systemd	252	257
Vim	9.0	9.1

2.2.11 Plasma 6

Debian 13 will be the first release of Debian shipping Plasma 6. This is a major upgrade from Plasma 5 found in Debian 12 and is built on an entirely new stack based on Qt 6 and KDE Framework 6 libraries.

Debian 13 (trixie) ships:

- Qt 6.8.2 (up from 6.4.2)
- KDE Frameworks 6.13 (new)
- Plasma 6.3.6 (replaces Plasma 5.27.5)
- KDE Gear applications:
 - KDE PIM suite in version 24.12.3
 - Other Gear applications in version 25.04.3 (except Neochat, KDevelop, Partition Manager)

The details of all packages added and removed in the stack between Debian 12 and 13 can be found in the [Trixie Release Plans](#) wiki page of the Qt / KDE Team.

In place upgrades of user profiles are generally supported but some occasional issues have been reported. Issues that could not be fixed in the distribution are being tracked in the [Plasma 6 Upgrade Quirks](#) wiki page alongside their workarounds.

For compatibility with existing applications, Debian 13 also ships:

- Qt 5.15.15 (up from 5.15.8)
- KDE Frameworks 5.116 (up from 5.103)

Krita and a few other applications still depend on KDE Frameworks 5 but KF5 are not developed anymore and are considered deprecated upstream. They will be removed during the fork development cycle.

Installeringsystemet

Debian Installer er Debians officielle installeringsystem. Det tilbyder en række forskellige installeringsmetoder. Hvilke af disse som fungerer på dit system, afhænger af din platform.

Images of the installer for trixie can be found together with the Installation Guide on the Debian website (<https://www.debian.org/releases/trixie/debian-installer/>).

The Installation Guide is also included on the first media of the official Debian DVD (CD/blu-ray) sets, at:

`/doc/install/manual/language/index.html`

You may also want to check the errata for debian-installer at <https://www.debian.org/releases/trixie/debian-installer#errata> for a list of known issues.

3.1 Hvad er nyt i installeringsystemet?

There has been a lot of development on the Debian Installer since its previous official release with Debian 12, resulting in improved hardware support and some exciting new features or improvements.

If you are interested in an overview of the changes since bookworm, please check the release announcements for the trixie beta and RC releases available from the Debian Installer's [news history](#).

3.2 Installing Debian Pure Blends

A selection of Debian Pure Blends, such as Debian Junior, Debian Science, or Debian FreedomBox, can now be accessed directly in the installer - see the [installation-guide](#).

For information about Debian Pure Blends, visit <https://www.debian.org/blends/> or the [wiki](#).

3.3 Cloud installations

The [cloud team](#) publishes Debian trixie for several popular cloud computing services including:

- Amazon Web Services
- Microsoft Azure
- OpenStack
- Plain VM

Cloud images provide automation hooks via `cloud-init` and prioritize fast instance startup using specifically optimized kernel packages and grub configurations. Images supporting different architectures are provided where appropriate and the cloud team endeavors to support all features offered by the cloud service.

The cloud team will provide updated images until the end of the LTS period for trixie. New images are typically released for each point release and after security fixes for critical packages. The cloud team's full support policy is available on the [Cloud Image Lifecycle](#) page.

More details are available at <https://cloud.debian.org/> and on the [wiki](#).

3.4 Container and Virtual Machine images

Multi-architecture Debian trixie container images are available on [Docker Hub](#). In addition to the standard images, a »slim« variant is available that reduces disk usage.

Opgraderinger fra Debian 12 (bookworm)

4.1 Forberedelse af opgraderingen

Du bør læse informationen i *Ting man skal være opmærksom på i forbindelse med trixie*, inden du opgraderer. Det kapitel dækker mulige problemer, som ikke er direkte relateret til opgraderingsprocessen, men som stadig kan være vigtige at kende til, inden du begynder.

4.1.1 Sikkerhedskopier alle data og konfigurationsinformation

Inden opgradering af dit system anbefales det kraftigt, at du foretager en fuldstændig sikkerhedskopiering, eller i det mindste laver en sikkerhedskopi af alle de data og den konfigurationsinformation, som du ikke vil risikere at miste. Opgraderingsværktøjerne og -processen er meget pålidelige, men en maskinel fejl midt i en opgradering kan resultere i et alvorligt skadet system.

The main things you'll want to back up are the contents of `/etc`, `/var/lib/dpkg`, `/var/lib/apt/extended_states` and the output of:

```
$ dpkg --get-selections '*' # (the quotes are important)
```

If you use `aptitude` to manage packages on your system, you will also want to back up `/var/lib/aptitude/pkgstates`.

Selve opgraderingsprocessen ændrer ingenting i mappen `/home`. Dog er det kendt at visse programmer (for eksempel dele af Mozilla-pakken og skrivebordsmiljøerne GNOME og KDE) overskriver eksisterende brugerindstillinger med nye standardværdier, når en ny version af programmet startes for første gang af en bruger. Som en sikkerhedsforanstaltning bør du foretage en sikkerhedskopiering af de skjulte filer og mapper (såkaldte »punktum-filer«) i brugernes hjemmemapper. Denne sikkerhedskopiering kan hjælpe til at gendanne eller genoprette de gamle indstillinger. Du ønsker måske også at informere dine brugere om dette.

Alle pakkeinstallationshandlinger skal køres med superbrugerprivilegier, så log ind som `root` (administrator) eller brug `su` eller `sudo` for at få de nødvendige adgangsrettigheder.

Opgraderingen har nogle få forudsætninger; du bør tjekke dem, før du gennemfører opgraderingen.

4.1.2 Informer brugerne i forvejen

Det er klogt at informere alle brugerne i forvejen om eventuelle opgraderinger, du planlægger, også selv om brugere der tilgår dit system via en ssh-forbindelse ikke vil mærke meget under opgraderingen, og bør kunne fortsætte deres arbejde.

Hvis du vil være ekstra omhyggelig, så lav en sikkerhedskopi af eller afmonter `/home` før opgraderingen.

Du skal udføre en kerneopgradering under opgraderingen til trixie, så en genstart er nødvendig. Typisk vil dette udføres efter opgraderingen er afsluttet.

4.1.3 Forbered nedetid for tjenester

Under opgraderingsprocessen kan der være tjenester, som er tilknyttet pakker, som er en del af opgraderingen. Hvis dette er tilfældet, vil disse tjenester måske stoppe mens pakkerne, som skal opgraderes bliver omplaceret og konfigureret. I dette tidsrum vil disse tjenester ikke være tilgængelige.

Præcis hvor lang nedetiden er for disse tjenester vil afhænge af antallet af pakker, som opgraderes på systemet, og vil også inkludere den tid som systemadministratoren er om at besvare konfigurationsspørgsmål fra forskellige pakkeopgraderinger. Bemærk at hvis opgraderingsprocessen foregår uovervåget og systemet kræver svar under opgraderingen, er der stor sandsynlighed for, at tjenester er utilgængelige¹ i en væsentlig tidsperiode.

If the system being upgraded provides critical services for your users or the network², you can reduce the downtime if you do a minimal system upgrade, as described in *Minimal system upgrade*, followed by a kernel upgrade and reboot, and then upgrade the packages associated with your critical services. Upgrade these packages prior to doing the full upgrade described in *Upgrading the system*. This way you can ensure that these critical services are running and available through the full upgrade process, and their downtime is reduced.

4.1.4 Forbered for gendannelse

Selom Debian forsøger at sikre, at dit system kan startes op på alle tidspunkter, er der en reel risiko for, at du kan opleve problemer efter genstart af dit system, når opgraderingen er færdig. En del kendte problemer er dokumenteret i dette og de næste kapitler af udgivelsesnoterne.

Af den grund er det klogt at sikre sig, at du vil kunne gendanne dit system, såfremt det skulle fejle i at genstarte eller, for eksternt håndterede systemer, ikke kan få netværket til at fungere.

Hvis du fjernopgraderer via en ssh-henvisning, anbefales det kraftigt, at du foretager de nødvendige forholdsregler for at kunne tilgå serveren via en ekstern seriel terminal. Der er en risiko for, at efter opgradering af kernen og en genstart, at du skal rette systemkonfigurationen via en lokal konsol. Hvis systemet ved et uheld genstartes i midten af en opgradering, er der en risiko for, at du vil skulle gendanne via en lokal konsol.

For emergency recovery we generally recommend using the *rescue mode* of the trixie Debian Installer. The advantage of using the installer is that you can choose between its many methods to find one that best suits your situation. For more information, please consult the section »Recovering a Broken System« in chapter 8 of the Installation Guide (at <https://www.debian.org/releases/trixie/installmanual>) and the [Debian Installer FAQ](#).

If that fails, you will need an alternative way to boot your system so you can access and repair it. One option is to use a special rescue or *live install* image. After booting from that, you should be able to mount your root file system and *chroot* into it to investigate and fix the problem.

¹ Hvis `debconf`-prioriteten er sat til et meget højt niveau kan du måske forhindre konfigurationsprompter, men tjenester som afhænger af standard svar som ikke er gældende for dit system vil ikke starte.

² Eksempelvis: DNS- eller DHCP-tjenester, specielt hvis der ikke er nogen redundans eller reserve. I tilfældet med DHCP kan slutbrugere blive frakoblet fra netværket, hvis låneperioden er kortere end tiden, det tager for opgraderingsprocessen at blive færdig.

Fejlsøg skal under opstart med initrd

The **initramfs-tools** package includes a debug shell³ in the initrds it generates. If for example the initrd is unable to mount your root file system, you will be dropped into this debug shell which has basic commands available to help trace the problem and possibly fix it.

Grundlæggende ting der kan kontrolleres: tilstedeværelse af korrekte enhedsfiler i `/dev`; hvilke moduler indlæses (`cat /proc/modules`); resultat af `dmesg` for fejl under indlæsning af drivere. Resultatet af `dmesg` vil også vise hvilke enhedsfiler, der er blevet tildelt til hvilke diske; du bør kontrollere det imod resultatet af `echo $ROOT` for at sikre, at rod-filsystemet er på den forventede enhed.

Hvis du lykkes med at rette problemet, vil indtastning af `exit` afslutte fejlsøgningsskallen og fortsætte opstartsprocessen på det punkt hvor den fejlede. Selvfølgelig skal du også rette det underliggende problem og genoprette initrd'en så den næste opstart ikke fejler igen.

Fejlsøg skal under opstart med systemd

Hvis opstarten fejler under systemd, er det muligt at indhente en fejlsøg root-skål ved at ændre kernens kommando-linje. Hvis standardopstarten lykkes, men nogle tjenester ikke kan starte, så kan det være nyttigt at tilføje `systemd.unit=rescue.target` til kerneparametrene.

Ellers vil kerneparameteren `systemd.unit=emergency.target` tilbyde dig en root-skål på det tidligste mulige punkt. Dette gøres dog før montering af root-filsystemet med læse-skrive rettigheder. Du skal gøre det manuelt med:

```
# mount -o remount,rw /
```

Another approach is to enable the systemd »early debug shell« via the `debug-shell.service`. On the next boot this service opens a root login shell on `tty9` very early in the boot process. It can be enabled with the kernel boot parameter `systemd.debug-shell=1`, or made persistent with `systemctl enable debug-shell` (in which case it should be disabled again when debugging is completed).

More information on debugging a broken boot under systemd can be found in the [Freedesktop.org Diagnosing Boot Problems](https://www.freedesktop.org/wiki/Articles/DebuggingBootProblems/) article.

4.1.5 Forbered et sikkert miljø for opgraderingen

Vigtigt: If you are using some VPN services (such as **tinc**) consider that they might not be available throughout the upgrade process. Please see *[Prepare for downtime on services](#)*.

In order to gain extra safety margin when upgrading remotely, we suggest that you run upgrade processes in a virtual console provided by the `screen` or `tmux` programs, which enables safe reconnection and ensures the upgrade process is not interrupted even if the remote connection process temporarily fails.

In case `tmux` was upgraded to a new major version you may get an error on attach: »open terminal failed: not a terminal«. You can still access the old session with:

```
# /proc/$(pgrep "tmux: server")/exe attach
```

Users of the watchdog daemon provided by the **micro-evtd** package should stop the daemon and disable the watchdog timer before the upgrade, to avoid a spurious reboot in the middle of the upgrade process:

³ Denne funktion kan deaktiveres ved at tilføje parameteren `panic=0` til dine opstartsparemetre.

```
# service micro-evtd stop
# /usr/sbin/microap1 -a system_set_watchdog off
```

4.2 Start from »pure« Debian

The upgrade process described in this chapter has been designed for »pure« Debian stable systems. APT controls what is installed on your system. If your APT configuration mentions additional sources besides bookworm, or if you have installed packages from other releases or from third parties, then to ensure a reliable upgrade process you may wish to begin by removing these complicating factors.

APT is moving to a different format for configuring where it downloads packages from. The files `/etc/apt/sources.list` and `*.list` files in `/etc/apt/sources.list.d/` are replaced by files still in that directory but with names ending in `.sources`, using the new, more readable (deb822 style) format. For details see [sources.list\(5\)](#). Examples of APT configurations in these notes will be given in the new deb822 format.

If your system is using multiple sources files then you will need to ensure they stay consistent.

4.2.1 Upgrade to Debian 12 (bookworm)

Only upgrades from Debian 12 (bookworm) are supported. Display your Debian version with:

```
$ cat /etc/debian_version
```

Please follow the instructions in the Release Notes for Debian 12 at <https://www.debian.org/releases/bookworm/releasenotes> to upgrade to Debian 12 first if needed.

4.2.2 Upgrade to latest point release

This procedure assumes your system has been updated to the latest point release of bookworm. If you have not done this or are unsure, follow the instructions in *Opgradering af dit bookworm-system*.

4.2.3 Debian Backports

Debian Backports allows users of Debian stable to run more up-to-date versions of packages (with some tradeoffs in testing and security support). The Debian Backports Team maintains a subset of packages from the next Debian release, adjusted and recompiled for usage on the current Debian stable release.

Packages from bookworm-backports have version numbers lower than the version in trixie, so they should upgrade normally to trixie in the same way as »pure« bookworm packages during the distribution upgrade. While there are no known potential issues, the upgrade paths from backports are less tested, and correspondingly incur more risk.

Forsigtig: While regular Debian Backports are supported, there is no clean upgrade path from [sloppy](#) backports (which use APT sources entries referencing bookworm-backports-sloppy).

As with *Unofficial sources*, users are advised to remove »bookworm-backports« entries from their APT sources files before the upgrade. After it is completed, they may consider adding »trixie-backports« (see <https://backports.debian.org/Instructions/>).

For more information, consult the [Backports Wiki](#) page.

4.2.4 Prepare the package database

You should make sure the package database is ready before proceeding with the upgrade. If you are a user of another package manager like **aptitude** or **synaptic**, review any pending actions. A package scheduled for installation or removal might interfere with the upgrade procedure. Note that correcting this is only possible if your APT sources files still point to »bookworm« and not to »stable« or »trixie«; see *Checking your APT configuration*.

4.2.5 Remove obsolete packages

It is a good idea to *remove obsolete packages* from your system before upgrading. They may introduce complications during the upgrade process, and can present security risks as they are no longer maintained.

4.2.6 Remove non-Debian packages

Below there are two methods for finding installed packages that did not come from Debian, using either **apt** or **apt-forktracer**. Please note that neither of them are 100% accurate (e.g. the **apt** example will list packages that were once provided by Debian but no longer are, such as old kernel packages).

```
$ apt list '?narrow(?installed, ?not(?origin(Debian)))'
$ apt-forktracer | sort
```

4.2.7 Clean up leftover configuration files

A previous upgrade may have left unused copies of configuration files; *old versions* of configuration files, versions supplied by the package maintainers, etc. Removing leftover files from previous upgrades can avoid confusion. Find such leftover files with:

```
# find /etc -name '*.dpkg-*' -o -name '*.ucf-*' -o -name '*.merge-error'
```

4.2.8 The non-free and non-free-firmware components

If you have non-free firmware installed it is recommended to add **non-free-firmware** to your APT sources.

4.2.9 Afsnittet foreslåede opdateringer (proposed-updates)

If you have listed the **proposed-updates** section in your APT sources files, you should remove it before attempting to upgrade your system. This is a precaution to reduce the likelihood of conflicts.

4.2.10 Uofficielle kilder

If you have any non-Debian packages on your system, you should be aware that these may be removed during the upgrade because of conflicting dependencies. If these packages were installed by adding an extra package archive in your APT sources files, you should check if that archive also offers packages compiled for trixie and change the source item accordingly at the same time as your source items for Debian packages.

Some users may have *unofficial* backported »newer« versions of packages that *are* in Debian installed on their bookworm system. Such packages are most likely to cause problems during an upgrade as they may result in file conflicts⁴. [Possible issues during upgrade](#) has some information on how to deal with file conflicts if they should occur.

4.2.11 Deaktivering af APT-pinning

If you have configured APT to install certain packages from a distribution other than stable (e.g. from testing), you may have to change your APT pinning configuration (stored in `/etc/apt/preferences` and `/etc/apt/preferences.d/`) to allow the upgrade of packages to the versions in the new stable release. Further information on APT pinning can be found in [apt_preferences\(5\)](#).

4.2.12 Check package status

Uanset den anvendte opgraderingsmetode, så anbefales det, at du kontrollerer pakkernes status først, og verificerer at alle pakker er i en opgraderbar tilstand. Den følgende kommando vil vise alle pakker, som har en status som halvt installeret (Half-Installed) eller som ikke kunne konfigureres, (Failed-Config) og dem med en eventuel fejlstatus.

```
$ dpkg --audit
```

Du kan også inspicere tilstanden for alle pakker på dit system med `aptitude`, eller med kommandoer såsom

```
$ dpkg -l
```

eller

```
# dpkg --get-selections '*' > ~/curr-pkgs.txt
```

Alternatively you can also use `apt`.

```
# apt list --installed > ~/curr-pkgs.txt
```

Det er ønskværdigt at fjerne alle pakker på hold før en opgradering. Hvis en pakke - som er essentiel for opgraderingen - er på hold, så vil opgraderingen fejle.

```
$ apt-mark showhold
```

Hvis du ændrede og genkompilede en pakke lokalt, og ikke omdøbte den eller placerede en epoch i versionen, så skal du sætte den på hold for at forhindre at den bliver opgraderet.

The »hold« package state for `apt` can be changed using:

```
# apt-mark hold package_name
```

Replace `hold` with `unhold` to unset the »hold« state.

If there is anything you need to fix, it is best to make sure your APT sources files still refer to bookworm as explained in [Checking your APT configuration](#).

⁴ Debians pakkehåndteringssystem tillader normalt ikke at en pakke fjerner en fil ejet af en anden pakke medmindre, at den er blevet defineret til at erstatte denne pakke.

4.3 Preparing APT sources files

Before starting the upgrade you must reconfigure APT to add sources for trixie and typically remove sources for bookworm.

As mentioned in *Start from »pure« Debian*, we recommend that you use the new deb822-style format, so you would have to replace `/etc/apt/sources.list` and any `*.list` files in `/etc/apt/sources.list.d/` by only one file named `debian.sources` in `/etc/apt/sources.list.d/` (if you haven't done so already). An example is given below of how this file should typically look.

APT will consider all packages that can be found via any configured archive, and install the package with the highest version number, giving priority to the first entry in the files. Thus, if you have multiple mirror locations, list first the ones on local hard disks, then CD-ROMs, and then remote mirrors.

A release can often be referred to both by its codename (e.g. »bookworm«, »trixie«) and by its status name (i.e. »old-stable«, »stable«, »testing«, »unstable«). Referring to a release by its codename has the advantage that you will never be surprised by a new release and for this reason is the approach taken here. It does of course mean that you will have to watch out for release announcements yourself. If you use the status name instead, you will just see loads of updates for packages available as soon as a release has happened.

Debian provides two announcement mailing lists to help you stay up to date on relevant information related to Debian releases:

- By [subscribing to the Debian announcement mailing list](#), you will receive a notification every time Debian makes a new release. Such as when »trixie« changes from e.g. »testing« to »stable«.
- By [subscribing to the Debian security announcement mailing list](#), you will receive a notification every time Debian publishes a security announcement.

4.3.1 Tilføjelse af APT-internetkilder

On new installations the default is for APT to be set up to use the Debian APT CDN service, which should ensure that packages are automatically downloaded from a server near you in network terms. As this is a relatively new service, older installations may have configuration that still points to one of the main Debian Internet servers or one of the mirrors. If you haven't done so yet, it is recommended to switch over to the use of the CDN service in your APT configuration.

To make use of the CDN service, the correct configuration for APT (assuming you are using `main` and `non-free-firmware`) is the following in `/etc/apt/sources.list.d/debian.sources`:

```
Types: deb
URIs: https://deb.debian.org/debian
Suites: trixie trixie-updates
Components: main non-free-firmware
Signed-By: /usr/share/keyrings/debian-archive-keyring.gpg
```

```
Types: deb
URIs: https://security.debian.org/debian-security
Suites: trixie-security
Components: main non-free-firmware
Signed-By: /usr/share/keyrings/debian-archive-keyring.gpg
```

Make sure to remove any of the old sources files.

However, if you get better results using a specific mirror that is close to you in network terms instead of the CDN service, then the mirror URI can be substituted in the URIs line as (for instance) »URIs: <https://mirrors.kernel.org/debian>«.

If you want to use packages from the `contrib` or `non-free` components, you may add these names to all the `Components:` lines.

After adding your new sources, disable the previously existing archive entries in the APT sources files by placing a hash sign (`#`) in front of them.

4.3.2 Tilføjelse af APT-kilder for et lokalt spejl

Instead of using remote package mirrors, you may wish to modify the APT sources files to use a mirror on a local disk (possibly mounted over NFS).

For example, your package mirror may be under `/var/local/debian/`, and have main directories like this:

```
/var/local/debian/dists/trixie/main/...
/var/local/debian/dists/trixie/contrib/...
```

To use this with **apt**, add the following to your `/etc/apt/sources.list.d/debian.sources` file:

```
Types: deb
URIs: file:/var/local/debian
Suites: trixie
Components: main non-free-firmware
Signed-By: /usr/share/keyrings/debian-archive-keyring.gpg
```

Again, after adding your new sources, disable the previously existing archive entries.

4.3.3 Tilføjelse af APT-kilder fra et optisk medie

If you want to use *only* DVDs (or CDs or Blu-ray Discs), comment out the existing entries in all the APT sources files by placing a hash sign (`#`) in front of them.

Make sure there is a line in `/etc/fstab` that enables mounting your CD-ROM drive at the `/media/cdrom` mount point. For example, if `/dev/sr0` is your CD-ROM drive, `/etc/fstab` should contain a line like:

```
/dev/sr0 /media/cdrom auto noauto,ro 0 0
```

Note that there must be *no spaces* between the words `noauto,ro` in the fourth field.

For at verificere, at det virker, så indsæt en cd og prøv igen

```
# mount /media/cdrom # this will mount the CD to the mount point
# ls -alF /media/cdrom # this should show the CD's root directory
# umount /media/cdrom # this will unmount the CD
```

Næste, kørs:

```
# apt-cdrom add
```

for hver Debian binær cd-rom du har, at tilføje dataene om hver cd til APT's database.

4.4 Opgradering af pakker

The recommended way to upgrade from previous Debian releases is to use the package management tool `apt`.

Bemærk: `apt` is meant for interactive use, and should not be used in scripts. In scripts one should use `apt-get`, which has a stable output better suitable for parsing.

Glem ikke at montere alle krævede partitioner (vigtigst partitionerne for `root` og `/usr` som skrivbare med en kommando såsom:

```
# mount -o remount,rw /mountpoint
```

Next you should double-check that the APT sources entries (in files under `/etc/apt/sources.list.d/`) refer either to »trixie« or to »stable«. There should not be any sources entries pointing to bookworm.

Bemærk: Sources lines for a CD-ROM might sometimes refer to »unstable«; although this may be confusing, you should *not* change it.

4.4.1 Optagelse af sessionen

`apt` will log the changed package states in `/var/log/apt/history.log` and the terminal output in `/var/log/apt/term.log`. `dpkg` will, in addition, log all package state changes in `/var/log/dpkg.log`. If you use `aptitude`, it will also log state changes in `/var/log/aptitude`.

If a problem occurs, you will have a log of what happened, and if needed, can provide exact information in a bug report.

The `term.log` will also allow you to review information that has scrolled off-screen. If you are at the system's console, just switch to VT2 (using `Alt+F2`) to review it.

4.4.2 Opdatering af pakkelisten

Først skal listen over tilgængelige pakker for den nye udgivelse hentes. Dette gøres ved at køre:

```
# apt update
```

4.4.3 Sikr dig, at du har tilstrækkelig med plads til opgraderingen

Du skal sikre dig, at du har tilstrækkelig med harddiskplads før du opgraderer med den fulde systemopgradering beskrevet i *Upgrading the system*. Først, alle pakker krævet for installation som hentes fra netværket gemmes i `/var/cache/apt/archives` (og undermappen `partial/`, under overførsel), så du skal sikre dig, at du har nok plads på partitionen for filsystemet, som indeholder `/var/` til midlertidigt at hente pakkerne, som skal installeres på dit system. Efter overførslen skal du sikkert bruge ekstra plads i andre filsystempartitioner for både at installere opgraderede pakker (som kan indeholder større binære filer eller mere data) og nye pakker, som vil blive hentet ned for opgraderingen. Hvis dit system ikke har tilstrækkelig med plads, kan du ende med en ufuldstændig opgradering, som det kan være svært at fortryde.

`apt` can show you detailed information about the disk space needed for the installation. Before executing the upgrade, you can see this estimate by running:

```
# apt -o APT::Get::Trivial-Only=true full-upgrade
[ ... ]
XXX upgraded, XXX newly installed, XXX to remove and XXX not upgraded.
Need to get xx.xMB of archives.
After this operation, AAAMB of additional disk space will be used.
```

Bemærk: Running this command at the beginning of the upgrade process may give an error, for the reasons described in the next sections. In that case you will need to wait until you've done the minimal system upgrade as in *Minimal system upgrade* before running this command to estimate the disk space.

If you do not have enough space for the upgrade, apt will warn you with a message like this:

```
E: You don't have enough free space in /var/cache/apt/archives/.
```

I denne situation, så skab først ledig plads. Du kan:

- Remove packages that have been previously downloaded for installation (at `/var/cache/apt/archives`). Cleaning up the package cache by running `apt clean` will remove all previously downloaded package files.
- Remove forgotten packages. If you have used `aptitude` or `apt` to manually install packages in bookworm it will have kept track of those packages you manually installed, and will be able to mark as redundant those packages pulled in by dependencies alone which are no longer needed due to a package being removed. They will not mark for removal packages that you manually installed. To remove automatically installed packages that are no longer used, run:

```
# apt autoremove
```

You can also use `debfoister` to find redundant packages. Do not blindly remove the packages this tool presents, especially if you are using aggressive non-default options that are prone to false positives. It is highly recommended that you manually review the packages suggested for removal (i.e. their contents, sizes, and descriptions) before you remove them.

- Remove packages that take up too much space and are not currently needed (you can always reinstall them after the upgrade). If you have **popularity-contest** installed, you can use `popcon-largest-unused` to list the packages you do not use that occupy the most space. You can find the packages that just take up the most disk space with `dpigs` (available in the **debian-goodies** package) or with `wajig` (running `wajig size`). They can also be found with **aptitude**. Start `aptitude` in full-terminal mode, select Views > New Flat Package List, press `l` and enter `~i`, then press `S` and enter `~installsize`. This will give you a handy list to work with.
- Fjern oversættelser og sprogfiler fra system hvis de ikke er krævet. Du kan installere pakken **localepurge** og konfigurere den så at kun nogle få udvalgte sprog bevares i systemet. Dette vil reducere den forbrugt diskplads i `/usr/share/locale`.
- Flyt midlertidigt til et andet system, eller fjern permanent, systemlogge under `/var/log/`.
- Use a temporary `/var/cache/apt/archives`: You can use a temporary cache directory from another filesystem (USB storage device, temporary hard disk, filesystem already in use, ...).

Bemærk: Brug ikke en NFS-montering da netværksforbindelsen kan blive afbrudt under opgraderingen.

For eksempel hvis du har et USB-drev monteret på `/media/usbkey`:

1. fjern pakkerne som tidligere er blevet hentet for installation:

```
# apt clean
```

2. kopier mappen `/var/cache/apt/archives` til USB-drevet:

```
# cp -ax /var/cache/apt/archives /media/usbkey/
```

3. monter den midlertidige mappe for mellemlageret på den aktuelle:

```
# mount --bind /media/usbkey/archives /var/cache/apt/archives
```

4. efter opgraderingen, gendan den originale `/var/cache/apt/archives`-mappe:

```
# umount /var/cache/apt/archives
```

5. fjern den tilbageværende `/media/usbkey/archives`.

Du kan oprette den midlertidige mappe for mellemlageret på det filsystem som er monteret på dit system.

- Do a minimal upgrade of the system (see [Minimal system upgrade](#)) or partial upgrades of the system followed by a full upgrade. This will make it possible to upgrade the system partially, and allow you to clean the package cache before the full upgrade.

Note that in order to safely remove packages, it is advisable to switch your APT sources files back to bookworm as described in [Checking your APT configuration](#).

4.4.4 Stop monitoring systems

As `apt` may need to temporarily stop services running on your computer, it's probably a good idea to stop monitoring services that can restart other terminated services during the upgrade. In Debian, **monit** is an example of such a service.

4.4.5 Minimal systemopgradering

In some cases, doing the full upgrade (as described below) directly might remove large numbers of packages that you will want to keep. We therefore recommend a two-part upgrade process: first a minimal upgrade to overcome these conflicts, then a full upgrade as described in [Upgrading the system](#).

For at gøre dette, så kørs først:

```
# apt upgrade --without-new-pkgs
```

Dette medfører en opgradering af de pakker, som kan opgraderes uden at kærve at andre pakker fjernes eller installeres.

Den minimale systemopgradering kan også være nyttig når systemet har lidt ledig plads og en fuld opgradering ikke kan køres på grund af pladsbegrænsninger.

If the **apt-listchanges** package is installed, it will (in its default configuration) show important information about upgraded packages in a pager after downloading the packages. Press `q` after reading to exit the pager and continue the upgrade.

4.4.6 Opgradering af systemet

Når du har udført de tidligere trin, er du nu klar til at fortsætte med hoveddelen af opgraderingen. Kør:

```
# apt full-upgrade
```

Dette vil udføre en fuldstændig opgradering af systemet, dvs. installere de nyeste tilgængelige versioner af alle pakker, og løse alle eventuelle afhængighedsændringer mellem pakker i forskellige udgivelser. Hvis nødvendigt vil den installere nogle nye pakker (normalt nye biblioteksversioner, eller omdøbte pakker), og fjerne alle forældede pakker der er i konflikt med andre pakker.

When upgrading from a set of CDs/DVDs/BDs, you will probably be asked to insert specific discs at several points during the upgrade. You might have to insert the same disc multiple times; this is due to inter-related packages that have been spread out over the discs.

New versions of currently installed packages that cannot be upgraded without changing the install status of another package will be left at their current version (displayed as »held back«). This can be resolved by either using `aptitude` to choose these packages for installation or by trying `apt install package`.

4.5 Mulige problemstillinger under opgradering

The following sections describe known issues that might appear during an upgrade to trixie.

4.5.1 Full-upgrade fails with »Could not perform immediate configuration«

In some cases the `apt full-upgrade` step can fail after downloading packages with:

```
E: Could not perform immediate configuration on 'package'. Please see man 5 apt.conf,
under APT::Immediate-Configure for details.
```

If that happens, running `apt full-upgrade -o APT::Immediate-Configure=0` instead should allow the upgrade to proceed.

Another possible workaround for this problem is to temporarily add both bookworm and trixie sources to your APT sources files and run `apt update`.

4.5.2 Forventede fjernelser

The upgrade process to trixie might ask for the removal of packages on the system. The precise list of packages will vary depending on the set of packages that you have installed. These release notes give general advice on these removals, but if in doubt, it is recommended that you examine the package removals proposed by each method before proceeding. For more information about packages obsoleted in trixie, see [Obsolete packages](#).

4.5.3 Konflikter eller forhåndsafhængige (Pre-Depends) loop

Undertiden er det nødvendigt at aktivere tilvalget `APT::Force-LoopBreak` i ATP for midlertidigt at kunne fjerne en essentiel pakke på grund af en konflikt/forhåndsafhængig loop. `apt` vil påminde dig om dette og afbryde opgraderingen. Du kan omgå dette ved at angive tilvalget `-o APT::Force-LoopBreak=1` på kommandolinjen for `apt`.

It is possible that a system's dependency structure can be so corrupt as to require manual intervention. Usually this means using `apt` or

```
# dpkg --remove package_name
```

for at eliminere nogle af de stridende pakker, eller

```
# apt -f install
# dpkg --configure --pending
```

I ekstreme tilfælde kan det være nødvendigt at fremtvinge reinstallation med en kommando som

```
# dpkg --install /path/to/package_name.deb
```

4.5.4 Filkonflikter

Filkonflikter bør ikke opstå hvis du opgraderer fra et »rent« bookworm-system, men kan opstå hvis du har uofficielle backports installeret. En filkonflikt vil resultere i en fejl såsom:

```
Unpacking <package-foo> (from <package-foo-file>) ...
dpkg: error processing <package-foo> (--install):
trying to overwrite `<some-file-name>',
which is also in package <package-bar>
dpkg-deb: subprocess paste killed by signal (Broken pipe)
Errors were encountered while processing:
<package-foo>
```

Du kan forsøge at løse en filkonflikt ved med tvang at fjerne pakken nævnt på den *sidste* linje i fejlbeskeden:

```
# dpkg -r --force-depends package_name
```

After fixing things up, you should be able to resume the upgrade by repeating the previously described `apt` commands.

4.5.5 Konfigurationsændringer

Under opgraderingen vil du blive stillet nogle spørgsmål angående konfigurationen eller omkonfigurationen af flere pakker. Når du bliver spurgt om en fil i mappen `/etc/init.d` eller filen `/etc/manpath.config` skal erstattes af pakkevedligeholderens version, så er det normalt nødvendigt at svare »ja« for at sikre systemkonsistens. Du kan altid vende tilbage til de ældre versioner, da de bliver gemt med filendelsen `.dpkg-old`.

Hvis du ikke er sikker på, hvad du skal gøre, så skriv navnet på pakken eller filen ned og udred så problemstillingen senere. Du kan søge i typescript-filen for at gennemse informationen på skærmen fra opgraderingen.

4.5.6 Ændring af session til konsol

If you are running the upgrade using the system's local console you might find that at some points during the upgrade the console is shifted over to a different view and you lose visibility of the upgrade process. For example, this may happen in systems with a graphical interface when the display manager is restarted.

To recover the console where the upgrade was running you will have to use `Ctrl+Alt+F1` (if in the graphical startup screen) or `Alt+F1` (if in the local text-mode console) to switch back to the virtual terminal 1. Replace `F1` with the function key with the same number as the virtual terminal the upgrade was running in. You can also use `Alt+Left Arrow` or `Alt+Right Arrow` to switch between the different text-mode terminals.

4.6 Opgradering af din kerne og relaterede pakker

Dette afsnit forklarer hvordan du opgraderer din kerne og identificerer potentielle problemstillinger forbundet med denne opgradering. Du kan enten installere en af **linux-image***-pakkerne tilbudt af Debian, eller kompilere en tilpasset kerne fra kilde.

Bemærk at en masse informaton i dette afsnit er baseret på den antagelse, at du vil bruge en af de modulære Debian-kerner, sammen med **initramfs-tools** og **udev**. Hvis du vælger at bruge en tilpasset kerne, som ikke kræver en `initrd` eller hvis du bruger en anden `initrd`-opretter, kan noget af informationen være urelevant for dig.

4.6.1 Installation af en kernens metapakke

When you full-upgrade from bookworm to trixie, it is strongly recommended that you install a `linux-image`-* meta-package, if you have not done so before. These metapackages will automatically pull in a newer version of the kernel during upgrades. You can verify whether you have one installed by running:

```
$ dpkg -l 'linux-image*' | grep ^ii | grep -i meta
```

Hvis du ikke ser et resultat, så skal du installere en ny pakke for `linux-image` manuelt eller installere en `linux-image`-metapakke. For at se en liste over tilgængelige metapakker for `linux-image`, så kørs:

```
$ apt-cache search linux-image- | grep -i meta | grep -v transition
```

If you are unsure about which package to select, run `uname -r` and look for a package with a similar name. For example, if you see »4.9.0-8-amd64«, it is recommended that you install **linux-image-amd64**. You may also use `apt` to see a long description of each package in order to help choose the best one available. For example:

```
$ apt show linux-image-amd64
```

You should then use `apt install` to install it. Once this new kernel is installed you should reboot at the next available opportunity to get the benefits provided by the new kernel version. However, please have a look at *Things to do before rebooting* before performing the first reboot after the upgrade.

For de mere eventyrlystne er der en nem måde at kompilere din egen tilpasset kerne på Debian. Installer kernekilderne, tilbudt i pakken **linux-source**. Du kan også gøre brug af målet `deb-pkg` tilgængelig i kildernes `makefile` for bygning af en binær pakke. Yderligere information kan findes i *Håndbogen for Debians Linux-kerne*, som også kan findes i pakken **debian-kernel-handbook**.

If possible, it is to your advantage to upgrade the kernel package separately from the main `full-upgrade` to reduce the chances of a temporarily non-bootable system. Note that this should only be done after the minimal upgrade process described in *Minimal system upgrade*.

4.6.2 64-bit little-endian PowerPC (ppc64el) page size

From trixie, the default Linux kernel for the ppc64el architecture (package **linux-image-powerpc64le**) uses a memory page size of 4 kiB instead of the previous 64 kiB. This matches other common architectures and avoids some incompatibilities with the larger page size in the kernel (notably the **nouveau** and **xe** drivers) and user-space applications. In general this is expected to reduce memory usage and slightly increase CPU usage.

An alternate kernel package (**linux-image-powerpc64le-64k**) is provided which uses a page size of 64 kiB. You will need to install this alternate package if:

- You need to run virtual machines with a page size of 64 kiB.

Also see *Problems with VMs on 64-bit little-endian PowerPC (ppc64el)*.

- You need to use PowerPC Nest (NX) compression.
- You are using filesystems with a block size > 4 kiB (4096 bytes). This is likely if you are using Btrfs. You can check this with:

```
- Btrfs: file -s device | grep -o 'sectorsize [0-9]*'
- ext4: tune2fs -l device | grep '^Block size:'
- XFS: xfs_info device | grep -o 'bsize=[0-9]*'
```

For some applications such as database servers, using a page size of 64 kiB can provide better performance, and this alternate kernel package may be preferable to the default.

4.7 Cleanup after the upgrade

Two steps are recommended to clean the upgraded distribution.

- Remove newly redundant or obsolete packages as described in *Make sure you have sufficient space for the upgrade* and *Obsolete packages*. You should review which configuration files they use and consider purging the packages to remove their configuration files. See also *Purging removed packages*.
- Upgrade your APT sources. APT is deprecating the old format used for specifying what repositories to use - see *Preparing APT sources files* and `sources.list(5)`. If you haven't already switched all your configuration files, you can use the new apt feature `apt modernize-sources`.

4.8 Cleaning up automatically installed packages

Some packages may have been only installed on your system as dependencies of other packages. With the new release these dependencies could have changed and apt will propose to remove those automatically installed packages. For this run:

```
# apt autoremove
```

4.9 Forældede pakker

Introducing lots of new packages, trixie also retires and omits quite a few old packages that were in bookworm. It provides no upgrade path for these obsolete packages. While nothing prevents you from continuing to use an obsolete package where desired, the Debian project will usually discontinue security support for it a year after trixie's release⁵, and will not normally provide other support in the meantime. Replacing them with available alternatives, if any, is recommended.

Der kan være mange årsager til at pakker er blevet fjernet fra distributionen: De bliver ikke længere vedligeholdt opstrøms, der er ikke længere en Debianudvikler interesseret i at vedligeholde pakkerne; funktionaliteten de tilbyder er blevet efterfulgt af andre programmer (eller en ny version); eller de anses ikke længere for at være egnet for trixie på grund af fejl i dem. I det sidste tilfælde, kan pakker stadig være til stede i distributionen »unstable«.

»Obsolete and Locally Created Packages« can be listed and purged from the commandline with:

```
$ apt list '?obsolete'
# apt purge '?obsolete'
```

Debians fejlspringssystem tilbyder ofte yderligere information om hvorfor pakkerne blev fjernet. Du bør gennemse både de arkiverede fejlrapporter for selve pakken og de arkiverede fejlrapporter for [ftp.debian.org pseudo-package](http://ftp.debian.org/pseudo-package).

For a list of obsolete packages for trixie, please refer to *Værd at bemærke forældede pakker*.

4.9.1 Fuld fjernelse af afinstallerede pakker

Det er generelt et godt råd at fjerne afinstallerde pakker. Dette gælder specielt hvis de er blevet afinstalleret i en tidligere udgivelsesopgradering f.eks. fra opgraderingen til bookworm) eller de kom fra en tredjeparts leverandør. Specielt gamle init.d-skripter vides at kunne medføre problemer.

Forsigtig: Fuld fjernelse af en pakke vil generelt også fjerne logfilerne, så du vil skulle lave en sikkerhedskopi af dem først.

Den følgende kommando viser en liste over alle fjernede pakker, som kan have konfigurationsfiler tilbage på systemet (hvis nogen):

```
$ apt list '?config-files'
```

The packages can be removed by using `apt purge`. Assuming you want to purge all of them in one go, you can use the following command:

```
# apt purge '?config-files'
```

⁵ Eller i den periode hvor der endnu ikke er en ny udgivelse. Typisk er kun to stabile udgivelser understøttet på samme tidspunkt.

4.9.2 Transitional dummy packages

Some packages from bookworm may have been replaced in trixie by transitional dummy packages, which are empty placeholders designed to simplify upgrades. If for instance an application that was formerly a single package has been split into several, a transitional package may be provided with the same name as the old package and with appropriate dependencies to cause the new ones to be installed. After this has happened the redundant dummy package can be safely removed.

The package descriptions for transitional dummy packages usually indicate their purpose. However, they are not uniform; in particular, some »dummy« packages are designed to be kept installed, in order to pull in a full software suite, or track the current latest version of some program.

Ting man skal være opmærksom på i forbindelse med trixie

Sometimes, changes introduced in a new release have side-effects we cannot reasonably avoid, or they expose bugs somewhere else. This section documents issues we are aware of. Please also read the errata, the relevant packages' documentation, bug reports, and other information mentioned in *Yderligere læsning*.

5.1 Things to be aware of while upgrading to trixie

This section covers items related to the upgrade from bookworm to trixie.

5.1.1 Interrupted remote upgrades

An issue in OpenSSH in bookworm can lead to inaccessible remote systems if an upgrade being supervised over an SSH connection is interrupted. Users may be unable to re-connect to the remote system to resume the upgrade.

Updated packages for bookworm will resolve this issue in Debian 12.12, but this release was still in preparation at the time of releasing trixie. Instead, users planning upgrades to remote systems over an SSH connection are advised to first update OpenSSH to version 1:9.2p1-2+deb12u7 or greater through the [stable-updates](#) mechanism.

5.1.2 Reduced support for i386

From trixie, i386 is no longer supported as a regular architecture: there is no official kernel and no Debian installer for i386 systems. Fewer packages are available for i386 because many projects no longer support it. The architecture's sole remaining purpose is to support running legacy code, for example, by way of [multiarch](#) or a chroot on a 64-bit (amd64) system.

The i386 architecture is now only intended to be used on a 64-bit (amd64) CPU. Its instruction set requirements include SSE2 support, so it will not run successfully on most of the 32-bit CPU types that were supported by Debian 12.

Users running i386 systems should not upgrade to trixie. Instead, Debian recommends either reinstalling them as amd64, where possible, or retiring the hardware. [Cross-grading](#) without a reinstall is a technically possible, but risky, alternative.

5.1.3 Last release for armel

From trixie, armel is no longer supported as a regular architecture: there is no Debian installer for armel systems, and only Raspberry Pi 1, Zero, and Zero W are supported by the kernel packages.

Users running armel systems can upgrade to trixie, provided their hardware is supported by the kernel packages, or they use a third-party kernel.

trixie will be the last release for the armel architecture. Debian recommends, where possible, reinstalling armel systems as armhf or arm64, or retiring the hardware.

5.1.4 MIPS architectures removed

From trixie, the architectures *mipsel* and *mips64el* are no longer supported by Debian. Users of these architectures are advised to switch to different hardware.

5.1.5 Ensure /boot has enough free space

The Linux kernel and firmware packages have increased considerably in size in previous Debian releases and in trixie. As a result your /boot partition might be too small, causing the upgrade to fail. If your system was installed with Debian 10 (buster) or earlier, your system is very likely to be affected.

Before starting the upgrade, make sure your /boot partition is at least 768 MB in size, and has about 300 MB free. If your system does not have a separate /boot partition, there should be nothing to do.

If /boot is in LVM and too small, you can use `lvextend` to [increase the size of an LVM partition](#). If /boot is a separate partition it is likely easier to reinstall the system.

5.1.6 The temporary-files directory /tmp is now stored in a tmpfs

From trixie, the default is for the /tmp/ directory to be stored in memory using a [tmpfs\(5\)](#) filesystem. This should make applications using temporary files faster, but if you put large files there, you may run out of memory.

For systems upgraded from bookworm, the new behavior only starts after a reboot. Files left in /tmp will be hidden after the new *tmpfs* is mounted which will lead to warnings in the system journal or syslog. Such files can be accessed using a bind-mount (see [mount\(1\)](#)): running `mount --bind / /mnt` will make the underlying directory accessible at /mnt/tmp (run `umount /mnt` once you have cleaned up the old files).

The default is to allocate up to 50% of memory to /tmp (this is a maximum: memory is only used when files are actually created in /tmp). You can change the size by running `systemctl edit tmp.mount` as root and setting, for example:

```
[Mount]
Options=mode=1777,nosuid,nodev,size=2G
```

(see [systemd.mount\(5\)](#)).

You can return to /tmp being a regular directory by running `systemctl mask tmp.mount` as root and rebooting.

The new filesystem defaults can also be overridden in /etc/fstab, so systems that already define a separate /tmp partition will be unaffected.

5.1.7 openssh-server no longer reads ~/.pam_environment

The Secure Shell (SSH) daemon provided in the **openssh-server** package, which allows logins from remote systems, no longer reads the user's `~/.pam_environment` file by default; this feature has a [history of security problems](#) and has been deprecated in current versions of the Pluggable Authentication Modules (PAM) library. If you used this feature, you should switch from setting variables in `~/.pam_environment` to setting them in your shell initialization files (e.g. `~/.bash_profile` or `~/.bashrc`) or some other similar mechanism instead.

Existing SSH connections will not be affected, but new connections may behave differently after the upgrade. If you are upgrading remotely, it is normally a good idea to ensure that you have some other way to log into the system before starting the upgrade; see *Forbered for gendannelse*.

5.1.8 OpenSSH no longer supports DSA keys

Digital Signature Algorithm (DSA) keys, as specified in the Secure Shell (SSH) protocol, are inherently weak: they are limited to 160-bit private keys and the SHA-1 digest. The SSH implementation provided by the **openssh-client** and **openssh-server** packages has disabled support for DSA keys by default since OpenSSH 7.0p1 in 2015, released with Debian 9 (»stretch«), although it could still be enabled using the `HostKeyAlgorithms` and `PubkeyAcceptedAlgorithms` configuration options for host and user keys respectively.

The only remaining uses of DSA at this point should be connecting to some very old devices. For all other purposes, the other key types supported by OpenSSH (RSA, ECDSA, and Ed25519) are superior.

As of OpenSSH 9.8p1 in trixie, DSA keys are no longer supported even with the above configuration options. If you have a device that you can only connect to using DSA, then you can use the `ssh1` command provided by the **openssh-client-ssh1** package to do so.

In the unlikely event that you are still using DSA keys to connect to a Debian server (if you are unsure, you can check by adding the `-v` option to the `ssh` command line you use to connect to that server and looking for the »Server accepts key:« line), then you must generate replacement keys before upgrading. For example, to generate a new Ed25519 key and enable logins to a server using it, run this on the client, replacing `username@server` with the appropriate user and host names:

```
$ ssh-keygen -t ed25519
$ ssh-copy-id username@server
```

5.1.9 The last, lastb and lastlog commands have been replaced

The **util-linux** package no longer provides the `last` or `lastb` commands, and the **login** package no longer provides `lastlog`. These commands provided information about previous login attempts using `/var/log/wtmp`, `/var/log/btmp`, `/var/run/utmp` and `/var/log/lastlog`, but these files will not be usable after 2038 because they do not allocate enough space to store the login time (the [Year 2038 Problem](#)), and the upstream developers do not want to change the file formats. Most users will not need to replace these commands with anything, but the **util-linux** package provides a `lslogins` command which can tell you when accounts were last used.

There are two direct replacements available: `last` can be replaced by `wtmpdb` from the **wtmpdb** package (the **libpam-wtmpdb** package also needs to be installed) and `lastlog` can be replaced by `lastlog2` from the **lastlog2** package (**libpam-lastlog2** also needs to be installed). If you want to use these, you will need to install the new packages after the upgrade, see the [util-linux NEWS.Debian](#) for further information. The command `lslogins --failed` provides similar information to `lastb`.

If you do not install **wtmpdb** then we recommend you remove old log files `/var/log/wtmp*`. If you do install **wtmpdb** it will upgrade `/var/log/wtmp` and you can read older `wtmp` files with `wtmpdb import -f <dest>`. There is no tool to read `/var/log/lastlog*` or `/var/log/btmp*` files: they can be deleted after the upgrade.

5.1.10 Encrypted filesystems need systemd-cryptsetup package

Support for automatically discovering and mounting encrypted filesystems has been moved into the new **systemd-cryptsetup** package. This new package is recommended by **systemd** so should be installed automatically on upgrades.

Please make sure the **systemd-cryptsetup** package is installed before rebooting, if you use encrypted filesystems.

5.1.11 Default encryption settings for plain-mode dm-crypt devices changed

The default settings for **dm-crypt** devices created using plain-mode encryption (see [crypttab\(5\)](#)) have changed to improve security. This will cause problems if you did not record the settings used in `/etc/crypttab`. The recommended way to configure plain-mode devices is to record the options `cipher`, `size`, and `hash` in `/etc/crypttab`; otherwise **cryptsetup** will use default values, and the defaults for cipher and hash algorithm have changed in trixie, which will cause such devices to appear as random data until they are properly configured.

This does not apply to LUKS devices because LUKS records the settings in the device itself.

To properly configure your plain-mode devices, assuming they were created with the bookworm defaults, you should add `cipher=aes-cbc-essiv:sha256,size=256,hash=ripemd160` to `/etc/crypttab`.

To access such devices with **cryptsetup** on the command line you can use `--cipher aes-cbc-essiv:sha256 --key-size 256 --hash ripemd160`. Debian recommends that you configure permanent devices with LUKS, or if you do use plain mode, that you explicitly record all the required encryption settings in `/etc/crypttab`. The new defaults are `cipher=aes-xts-plain64` and `hash=sha256`.

5.1.12 RabbitMQ no longer supports HA queues

High-availability (HA) queues are no longer supported by **rabbitmq-server** starting in trixie. To continue with an HA setup, these queues need to be switched to »quorum queues«.

If you have an OpenStack deployment, please switch the queues to quorum before upgrading. Please also note that beginning with OpenStack's »Caracal« release in trixie, OpenStack supports only quorum queues.

5.1.13 RabbitMQ cannot be directly upgraded from bookworm

There is no direct, easy upgrade path for RabbitMQ from bookworm to trixie. Details about this issue can be found in [bug 1100165](#).

The recommended upgrade path is to completely wipe the rabbitmq database and restart the service (after the trixie upgrade). This may be done by deleting `/var/lib/rabbitmq/mnesia` and all of its contents.

5.1.14 MariaDB major version upgrades only work reliably after a clean shutdown

MariaDB does not support error recovery across major versions. For example if a MariaDB 10.11 server experienced an abrupt shutdown due to power loss or software defect, the database needs to be restarted with the same MariaDB 10.11 binaries so it can do successful error recovery and reconcile the data files and log files to roll-forward or revert transactions that got interrupted.

If you attempt to do crash recovery with MariaDB 11.8 using the data directory from a crashed MariaDB 10.11 instance, the newer MariaDB server will refuse to start.

To ensure a MariaDB Server is shut down cleanly before going into major version upgrade, stop the service with

```
# service mariadb stop
```


followed by checking server logs for `Shutdown complete` to confirm that flushing all data and buffers to disk completed successfully.

If it didn't shut down cleanly, restart it to trigger crash recovery, wait, stop again and verify that second stop was clean.

For additional information about how to make backups and other relevant information for system administrators, please see </usr/share/doc/mariadb-server/README.Debian.gz>.

5.1.15 /etc/sysctl.conf is no longer honored

In Debian 13, **systemd-sysctl** no longer reads `/etc/sysctl.conf`. The package **linux-sysctl-defaults** ships `/usr/lib/sysctl.d/50-default.conf` which is intended to replace the former `/etc/sysctl.conf`. This package is recommended by **systemd**, and will thus be installed by default on systems where installation of recommended packages has not been turned off.

Check whether **linux-sysctl-defaults** is installed on your system and whether the contents of `/usr/lib/sysctl.d/50-default.conf` conform to your expectations. Consider putting local configuration into file snippets named `/etc/sysctl.d/*.conf`.

5.1.16 Ping no longer runs with elevated privileges

The default version of ping (provided by **iputils-ping**) is no longer installed with access to the `CAP_NET_RAW` linux capability, but instead uses `ICMP_PROTO` datagram sockets for network communication. Access to these sockets is controlled based on the user's Unix group membership using the `net.ipv4.ping_group_range` sysctl. In normal installations, the **linux-sysctl-defaults** package will set this value to a broadly permissive value, allowing unprivileged users to use ping as expected, but some upgrade scenarios may not automatically install this package. See `/usr/lib/sysctl.d/50-default.conf` and [the kernel documentation](#) for more information on the semantics of this variable.

5.1.17 Network interface names may change

Users of systems without easy out-of-band management are advised to proceed with caution as we're aware of two circumstances where network interface names assigned by trixie systems may be different from bookworm. This can cause broken network connectivity when rebooting to complete the upgrade.

It is difficult to determine if a given system is affected ahead of time without a detailed technical analysis. Configurations known to be problematic are as follows:

- Systems using the Linux **i40e** NIC driver, see [bug #1107187](#).
- Systems where firmware exposes the `_SUN` ACPI table object which was previously ignored by default in bookworm ([systemd.net-naming-scheme](#) v252), but is now used by **systemd** v257 in trixie. See [bug #1092176](#).

You can use the `$ udevadm test-builtin net_setup_link` command to see whether the systemd change alone would yield a different name. This needs to be done just before rebooting to finish the upgrade. For example:

```
# After apt full-upgrade, but before reboot
$ udevadm test-builtin net_setup_link /sys/class/net/enp1s0 2>/dev/null
ID_NET_DRIVER=igb
ID_NET_LINK_FILE=/usr/lib/systemd/network/99-default.link
ID_NET_NAME=ens1 #< Notice the final ID_NET_NAME name is not "enp1s0"!
```

Users that need names to stay stable across the upgrade are advised to create [systemd.link](#) files to »pin« the current name before the upgrade.

5.1.18 Dovecot configuration changes

The **dovecot** email server suite in trixie uses a configuration format that is incompatible with previous versions. Details about the configuration changes are available at docs.dovecot.org.

In order to avoid potentially extended downtime, you are strongly encouraged to port your configuration in a staging environment before beginning the upgrade of a production mail system.

Please also note that some features were removed upstream in v2.4. In particular, the *replicator* is gone. If you depend on that feature, it is advisable not to upgrade to trixie until you have found an alternative.

5.1.19 Significant changes to libvirt packaging

The **libvirt-daemon** package, which provides an API and toolkit for managing virtualization platforms, has been overhauled in trixie. Each driver and storage backend now comes in a separate binary package, which enables much greater flexibility.

Care is taken during upgrades from bookworm to retain the existing set of components, but in some cases functionality might end up being temporarily lost. We recommend that you carefully review the list of installed binary packages after upgrading to ensure that all the expected ones are present; this is also a great time to consider uninstalling unwanted components.

In addition, some conffiles might end up marked as »obsolete« after the upgrade. The `/usr/share/doc/libvirt-common/NEWS.Debian.gz` file contains additional information on how to verify whether your system is affected by this issue and how to address it.

5.1.20 Samba: Active Directory Domain Controller packaging changes

The Active Directory Domain Controller (AD-DC) functionality was split out of **samba**. If you are using this feature, you need to install the **samba-ad-dc** package.

5.1.21 Samba: VFS modules

The **samba-vfs-modules** package was reorganized. Most VFS modules are now included in the **samba** package. However the modules for *ceph* and *glusterfs* have been split off into **samba-vfs-ceph** and **samba-vfs-glusterfs**.

5.1.22 OpenLDAP TLS now provided by OpenSSL

The TLS support in the OpenLDAP client **libldap2** and server **slapd** is now provided by OpenSSL instead of GnuTLS. This affects the available configuration options, as well as the behavior of them.

Details about the changed options can be found in `/usr/share/doc/libldap2/NEWS.Debian.gz`.

If no TLS CA certificates are specified, the system default trust store will now be loaded automatically. If you do not want the default CAs to be used, you must configure the trusted CAs explicitly.

For more information about LDAP client configuration, see the [ldap.conf.5](#) man page. For the LDAP server (**slapd**), see `/usr/share/doc/slapd/README.Debian.gz` and the [slapd-config.5](#) man page.

5.1.23 bacula-director: Database schema update needs large amounts of disk space and time

The Bacula database will undergo a substantial schema change while upgrading to trixie.

Upgrading the database can take many hours or even days, depending on the size of the database and the performance of your database server.

The upgrade temporarily needs around double the currently used disk space on the database server, plus enough space to hold a backup dump of the Bacula database in `/var/cache/dbconfig-common/backups`.

Running out of disk space during the upgrade might corrupt your database and will prevent your Bacula installation from functioning correctly.

5.1.24 dpkg: warning: unable to delete old directory: ...

During the upgrade, dpkg will print warnings like the following, for various packages. This is due to the finalization of the `usrmerge` project, and the warnings can be safely ignored.

```
Unpacking firmware-misc-nonfree (20230625-1) over (20230515-3) ...
dpkg: warning: unable to delete old directory '/lib/firmware/wfx': Directory not empty
dpkg: warning: unable to delete old directory '/lib/firmware/ueagle-atm': Directory not
↳ empty
```

5.1.25 Skip-upgrades are not supported

As with any other Debian release, upgrades must be performed from the previous release. Also all point release updates should be installed. See *Start from »pure« Debian*.

Skipping releases when upgrading is explicitly not supported.

For trixie, the finalization of the `usrmerge` project requires the upgrade to bookworm be completed before starting the trixie upgrade.

5.1.26 WirePlumber has a new configuration system

WirePlumber has a new configuration system. For the default configuration you don't have to do anything; for custom setups see `/usr/share/doc/wireplumber/NEWS.Debian.gz`.

5.1.27 strongSwan migration to a new charon daemon

The strongSwan IKE/IPsec suite is migrating from the legacy **charon-daemon** (using the `ipsec(8)` command and configured in `/etc/ipsec.conf`) to **charon-systemd** (managed with the `swanctl(8)` tools and configured in `/etc/swanctl/conf.d`). The trixie version of the **strongswan** metapackage will pull in the new dependencies, but existing installations are unaffected as long as **charon-daemon** is kept installed. Users are advised to migrate their installation to the new configuration following the [upstream migration page](#).

5.1.28 udev properties from sg3-utils missing

Due to [bug 1109923](#) in **sg3-utils** SCSI devices do not receive all properties in the »udev« database. If your installation relies on properties injected by the **sg3-utils-udev** package, either migrate away from them or be prepared to debug failures after rebooting into trixie.

5.1.29 Timezones split off into tzdata-legacy package

Timezone names not following the current **tzdata** naming rule of geographical region (continent or ocean) and city name were split out into the **tzdata-legacy** package. This includes the US/* timezones. If your installation uses such a timezone, it will be upgraded to use an equivalent timezone. However, SQL databases like PostgreSQL and other services might have copied the name into their configuration or data files. If necessary, you can install the **tzdata-legacy** package.

See [the tzdata-legacy file list](#) for the affected timezones.

5.1.30 Things to do before rebooting

When `apt full-upgrade` has finished, the »formal« upgrade is complete. For the upgrade to trixie, there are no special actions needed before performing a reboot.

5.2 Items not limited to the upgrade process

5.2.1 The directories /tmp and /var/tmp are now regularly cleaned

On new installations, *systemd-tmpfiles* will now regularly delete old files in `/tmp` and `/var/tmp` while the system is running. This change makes Debian consistent with other distributions. Because there is a small risk of data loss, it has been made »opt-in«: the upgrade to trixie will create a file `/etc/tmpfiles.d/tmp.conf` which reinstates the old behavior. This file can be deleted to adopt the new default, or edited to define custom rules. The rest of this section explains the new default and how to customize it.

The new default behavior is for files in `/tmp` to be automatically deleted after 10 days from the time they were last used (as well as after a reboot). Files in `/var/tmp` are deleted after 30 days (but not deleted after a reboot).

Before adopting the new default, you should either adapt any local programs that store data in `/tmp` or `/var/tmp` for long periods to use alternative locations, such as `~/tmp/`, or tell *systemd-tmpfiles* to exempt the data file from deletion by creating a file `local-tmp-files.conf` in `/etc/tmpfiles.d` containing lines such as:

```
x /var/tmp/my-precious-file.pdf
x /tmp/foo
```

Please see [systemd-tmpfiles\(8\)](#) and [tmpfiles.d\(5\)](#) for more information.

5.2.2 systemd message: System is tainted: unmerged-bin

systemd upstream, since version 256, considers systems having separate `/usr/bin` and `/usr/sbin` directories noteworthy. At startup systemd emits a message to record this fact: `System is tainted: unmerged-bin`.

It is recommended to ignore this message. Merging these directories manually is unsupported and will break future upgrades. Further details can be found in [bug #1085370](#).

5.2.3 Begrænsninger i sikkerhedsunderstøttelse

There are some packages where Debian cannot promise to provide minimal backports for security issues. These are covered in the following subsections.

Bemærk: The package **debian-security-support** helps to track the security support status of installed packages.

Security status of web browsers and their rendering engines

Debian 13 includes several browser engines which are affected by a steady stream of security vulnerabilities. The high rate of vulnerabilities and partial lack of upstream support in the form of long term branches make it very difficult to support these browsers and engines with backported security fixes. Additionally, library interdependencies make it extremely difficult to update to newer upstream releases. Applications using the **webkit2gtk** source package (e.g. **epiphany**) are covered by security support, but applications using **qtwebkit** (source package **qtwebkit-opensource-src**) are not.

For general web browser use we recommend Firefox or Chromium. They will be kept up-to-date by rebuilding the current ESR releases for stable. The same strategy will be applied for Thunderbird.

Once a release becomes `oldstable`, officially supported browsers may not continue to receive updates for the standard period of coverage. For example, Chromium will only receive 6 months of security support in `oldstable` rather than the typical 12 months.

Go- and Rust-based packages

The Debian infrastructure currently has problems with rebuilding packages of types that systematically use static linking. With the growth of the Go and Rust ecosystems it means that these packages will be covered by limited security support until the infrastructure is improved to deal with them maintainably.

In most cases if updates are warranted for Go or Rust development libraries, they will only be released via regular point releases.

5.2.4 Problems with VMs on 64-bit little-endian PowerPC (ppc64el)

Currently QEMU always tries to configure PowerPC virtual machines to support 64 kiB memory pages. This does not work for KVM-accelerated virtual machines when using the default kernel package.

- If the guest OS can use a page size of 4 kiB, you should set the machine property `cap-hpt-max-page-size=4096`. For example:

```
$ kvm -machine pseries,cap-hpt-max-page-size=4096 -m 4G -hda guest.img
```

- If the guest OS requires a page size of 64 kiB, you should install the **linux-image-powerpc64le-64k** package; see *64-bit little-endian PowerPC (ppc64el) page size*.

5.3 Obsolescence and deprecation

5.3.1 Værd at bemærke forældede pakker

Den følgende liste viser kendte og værd at bemærke forældede pakker (se *Forældede pakker* for en beskrivelse).

Listen over forældede pakker inkluderer:

- The **libnss-gw-name** package has been removed from trixie. The upstream developer suggests using **libnss-myhostname** instead.
- The **pcregrep** package has been removed from trixie. It can be replaced with `grep -P (--perl-regexp)` or **pcre2grep** (from **pcre2-utils**).
- The **request-tracker4** package has been removed from trixie. Its replacement is **request-tracker5**, which includes instructions on how to migrate your data: you can keep the now obsolete **request-tracker4** package from bookworm installed while migrating.
- The **git-daemon-run** and **git-daemon-sysvinit** packages have been removed from trixie due to security reasons.
- The **nvidia-graphics-drivers-tesla-470** packages are no longer supported upstream and have been removed from trixie.
- The **deborphan** package has been removed from trixie. To remove unnecessary packages, `apt autoremove` should be used, after `apt-mark minimize-manual`. **debfoister** can also be a useful tool.
- The **tldr** package has been removed from trixie. It can be replaced with **tealdeer** or **tldr-py** packages.
- The **tpp** (Text Presentation Program) package has been removed from trixie. It can be replaced with **lookatme** or **patat** packages.

5.3.2 Forældede komponenter for trixie

With the next release of Debian 14 (codenamed forky) some features will be deprecated. Users will need to migrate to other alternatives to prevent trouble when updating to Debian 14.

Dette inkluderer de følgende funktioner:

- The **sudo-ldap** package will be removed in forky. The Debian sudo team has decided to discontinue it due to maintenance difficulties and limited use. New and existing systems should use **libsss-sudo** instead.

Upgrading Debian trixie to forky without completing this migration may result in the loss of intended privilege escalation.

For further details, please refer to [bug 1033728](#) and to the NEWS file in the **sudo** package.

- The **sudo_logsrvd** feature, used for sudo input/output logging, may be removed in Debian forky unless a maintainer steps forward. This component is of limited use within the Debian context, and maintaining it adds unnecessary complexity to the basic sudo package.

For ongoing discussions, see [bug 1101451](#) and the NEWS file in the **sudo** package.

- The **libnss-docker** package is no longer developed upstream and requires version 1.21 of the Docker API. That deprecated API version is still supported by Docker Engine v26 (shipped by Debian trixie) but will be removed in Docker Engine v27+ (shipped by Debian forky). Unless upstream development resumes, the package will be removed in Debian forky.
- The **openssh-client** and **openssh-server** packages currently support **GSS-API** authentication and key exchange, which is usually used to authenticate to **Kerberos** services. This has caused some problems, especially on the server side where it adds new pre-authentication attack surface, and Debian's main OpenSSH packages will therefore stop supporting it starting with forky.

If you are using GSS-API authentication or key exchange (look for options starting with GSSAPI in your OpenSSH configuration files) then you should install the **openssh-client-gssapi** (on clients) or **openssh-server-gssapi** (on servers) package now. On trixie, these are empty packages depending on **openssh-client** and **openssh-server** respectively; on forky, they will be built separately.

- **sbuild-debian-developer-setup** has been deprecated in favor of **sbuild+unshare**

sbuild, the tool to build Debian packages in a minimal environment, has had a major upgrade and should work out of the box now. As a result the package **sbuild-debian-developer-setup** is no longer needed and has been deprecated. You can try the new version with:

```
$ sbuild --chroot-mode=unshare --dist=unstable hello
```

- The **fcitx** packages have been deprecated in favor of **fcitx5**

The **fcitx** input method framework, also known as **fcitx4** or **fcitx 4.x**, is no longer maintained upstream. As a result, all related input method packages are now deprecated. The package **fcitx** and packages with names beginning with **fcitx-** will be removed in Debian forky.

Existing **fcitx** users are encouraged to switch to **fcitx5** following the [fcitx upstream migration guide](#) and [Debian Wiki page](#).

- The **lxd** virtual machine management package is no longer being updated and users should move to **incus**.

After Canonical Ltd changed the license used by LXD and introduced a new copyright assignment requirement, the Incus project was started as a community-maintained fork (see [bug 1058592](#)). Debian recommends that you switch from LXD to Incus. The **incus-extra** package includes tools to migrate containers and virtual machines from LXD.

- The **isc-dhcp** suite is [deprecated upstream](#).

If you are using **NetworkManager** or **systemd-networkd**, you can safely remove the **isc-dhcp-client** package as they both ship their own implementation. If you are using the **ifupdown** package, **dhcpcd-base** provides a replacement. The ISC recommends the **Kea** package as a replacement for DHCP servers.

- **KDE Frameworks 5** development [has stopped](#).

The upstream KDE projects have shifted their development efforts to the Qt 6-based KDE Frameworks 6 libraries, and the Qt 5-based KDE Frameworks 5 are not being maintained anymore.

The Debian Qt / KDE team plans to remove KDE Frameworks 5 from Debian during the forky development cycle.

5.4 Known severe bugs

Although Debian releases when it's ready, that unfortunately doesn't mean there are no known bugs. As part of the release process all the bugs of severity serious or higher are actively tracked by the Release Team, so an [overview of those bugs](#) that were tagged to be ignored in the last part of releasing trixie can be found in the [Debian Bug Tracking System](#). The following bugs were affecting trixie at the time of the release and worth mentioning in this document:

Bug number	Package (source or binary)	Description
1032240	akonadi-backend-mysql	akonadi server not robust against
1078608	apt	apt update silently leaves old in
1108467	artha	Segmentation fault
1109499	bacula-director-sqlite3	bacula-common: preinst intention
1108010	src:e2fsprogs	mc: error while loading shared l

tabel 1 – fortsat fra forrige side

Bug number	Package (source or binary)	Description
1102690	flash-kernel	A higher version (...) is still ins
1109509	gcc-offload-amdgcn	fails to dist-upgrade from bookw
1110119	git-merge-changelog	git-merge-changelog loses or co
1036041	src:grub2	upgrade-reports: Dell XPS 9550
1102160	grub-efi-amd64	upgrade-reports: Bookworm to 7
913916	grub-efi-amd64	UEFI boot option removed after
984760	grub-efi-amd64	upgrade works, boot fails (error:
1099655	kmod	initramfs-tools 146 generates inc
935182	libreoffice-core	Concurrent file open on the sam
1017906	src:librsvg	Contains generated files whose s
1109203	src:linux	linux-image-6.12.35+deb13-amd
1109676	src:linux	Breaks PCI (vfio) passthrough f
1109512	liblldb-dev	fails to dist-upgrade from bookw
1104231	libmlir-17t64	libmlir-17t64 is couninstallable
1084955	src:llvm-toolchain-18	llvm-toolchain-*: assembly code
1104177	libc++-18-dev,libunwind-18-dev,libc++abi-18,libc++abi-18-dev,libunwind-18	libc++-18-dev fails to coinstall
1104336	libmlir-18	libmlir-18 is Multi-Arch: same b
1084954	src:llvm-toolchain-19	llvm-toolchain-*: assembly code
1095866	llvm-19	llvm-toolchain-19: unsoundness
1100981	libmlir-19	libmlir-19 fails to coinstall
1109519	mbox-importer	fails to dist-upgrade from bookw
1110263	openshot-qt	does not start at all – AttributeE
1108039	python3.13	An object referenced only throug
1089432	src:shim	Supporting rootless builds by de
1101956	snapd	core18-based snap apps don't w
1101839	python3-tqdm	segmentation fault in destructor
1017891	src:vala	Ships autogenerated files that ca
1109833	voctomix-gui	cannot import SafeConfigParser
988477	src:xen	xen-hypervisor-4.14-amd64: xen

Yderligere oplysninger om Debian

6.1 Yderligere læsning

Beyond these release notes and the installation guide (at <https://www.debian.org/releases/trixie/installmanual>) further documentation on Debian is available from the Debian Documentation Project (DDP), whose goal is to create high-quality documentation for Debian users and developers, such as the Debian Reference, Debian New Maintainers Guide, the Debian FAQ, and many more. For full details of the existing resources see the [Debian Documentation website](#) and the [Debian Wiki](#).

Dokumentationen for enkelte pakker installeres i `/usr/share/doc/package`. Dette kan omfatte oplysninger om ophavsret, Debian-specifikke detaljer samt dokumentation fra programmets ophavssted.

6.2 Få hjælp

There are many sources of help, advice, and support for Debian users, though these should only be considered after researching the issue in available documentation. This section provides a short introduction to these sources which may be helpful for new Debian users.

6.2.1 E-post-lister

De mest interessante e-post-lister til Debianbrugere er den engelske liste `debian-user` plus listerne `debian-user-sprog` for andre sprog (den danske er *debian-user-danish*). Oplysninger om disse lister og hvordan man abonnerer på dem kan findes på <https://lists.debian.org/>. Se venligst i arkiverne om dit spørgsmål allerede er besvaret, før du skriver, og følg i øvrigt standard-etiketten for e-post-lister.

6.2.2 Internet Relay Chat

Debian has an IRC channel dedicated to support and aid for Debian users, located on the OFTC IRC network. To access the channel, point your favorite IRC client at irc.debian.org and join `#debian`.

Følg kanalens retningslinjer og udvis respekt for andre brugere. Retningslinjerne kan findes på [Debians Wiki](#).

For more information on OFTC please visit the [website](#).

6.3 Fejlrapportering

We strive to make Debian a high-quality operating system; however that does not mean that the packages we provide are totally free of bugs. Consistent with Debian's »open development« philosophy and as a service to our users, we provide all the information on reported bugs at our own Bug Tracking System (BTS). The BTS can be browsed at <https://bugs.debian.org/>.

Hvis du finder en fejl i distributionen eller i de programpakker, som er en del af den, så rapporter dem venligst så de kan blive rettet i fremtidige udgivelser. Fejlrapportering kræver en gyldig e-postadresse. Vi beder om dette for, at vi kan spore fejlrapporterne, og så udviklerne kan kontakte ophavspersonen hvis der kræves flere oplysninger.

Du kan indsende en fejlrapport ved hjælp af programmet `reportbug` eller manuelt via e-post. Du kan læse mere om fejlsporingssystemet og hvordan det bruges ved at læse [referencedokumentationen](#) (som er tilgængelig i `/usr/share/doc/debian`, hvis du har installeret **doc-debian**) eller på nettet via [fejlsporingssystemet](#).

6.4 Bidrag til Debian

You do not need to be an expert to contribute to Debian. By assisting users with problems on the various user support [lists](#) you are contributing to the community. Identifying (and also solving) problems related to the development of the distribution by participating on the development [lists](#) is also extremely helpful. To maintain Debian's high-quality distribution, [submit bugs](#) and help developers track them down and fix them. The tool `how-can-i-help` helps you to find suitable reported bugs to work on. If you have a way with words then you may want to contribute more actively by helping to write [documentation](#) or [translating](#) existing documentation into your own language.

Hvis du kan afsætte mere tid, kan du håndtere et stykke af Debians fri softwaresamling. Det er især en hjælp hvis folk tager ansvaret for eller vedligeholder ting, hvis inklusion i Debian forespørges af andre. Databasen [Work Needing and Prospective Packages database](#) indeholder denne type oplysninger. Hvis du er interesseret i specifikke grupper, vil du måske finde det underholdende at bidrage til nogle af Debians [underprojekter](#), inklusive portering til bestemte arkitekturer og [Debian Pure Blends](#) for specifikke brugergrupper, blandt mange andre.

Under alle omstændigheder: Hvis du på nogen måde arbejder inden for den frie programbevægelse, enten som bruger, programmør, dokumentationsforfatter eller oversætter, hjælper du allerede de frie programmer. At bidrage er både lønsomt og morsomt, lader dig møde nye mennesker, og giver dig en rar fornemmelse indeni.

Håndter dit bookworm-system før opgraderingen

Dette bilag indeholder information om, hvordan du kontrollerer, at du kan installere eller opgradere pakker fra bookworm inden du opgraderer til trixie.

7.1 Opgradering af dit bookworm-system

Basically this is no different from any other upgrade of bookworm you've been doing. The only difference is that you first need to make sure your package list still contains references to bookworm as explained in *Checking your APT source-list files*.

Hvis du opgraderer dit system via et Debianspejl, vil systemet automatisk blive opgraderet til den seneste punktudgave (point release) af bookworm.

7.2 Checking your APT configuration

If any of the lines in your APT sources files (see `sources.list(5)`) contain references to »stable«, this is effectively pointing to trixie already. This might not be what you want if you are not yet ready for the upgrade. If you have already run `apt update`, you can still get back without problems by following the procedure below.

Hvis du allerede har installeret pakker fra trixie, er der ikke længere meget mening i at installere pakker fra bookworm. I dette tilfælde skal du bestemme dig for, om du vil fortsætte eller ej. Det er muligt at nedgradere pakker, men det beskrives ikke her.

As root, open the relevant APT sources file(s) (such as `/etc/apt/sources.list` or any file under `/etc/apt/sources.list.d/`) with your favorite editor, and check all lines beginning with

- `deb http:`
- `deb https:`
- `deb tor+http:`
- `deb tor+https:`

- URIs: `http:`
- URIs: `https:`
- URIs: `tor+http:`
- URIs: `tor+https:`

for a reference to »stable«. If you find any, change »stable« to »bookworm«.

If you have any lines starting with `deb file:` or `URIs: file:`, you will have to check for yourself if the location they refer to contains a bookworm or trixie archive.

Vigtigt: Do not change any lines that begin with `deb cdrom:` or `URIs: cdrom:`. Doing so would invalidate the line and you would have to run `apt-cdrom` again. Do not be alarmed if a `cdrom:` source line refers to »unstable«. Although confusing, this is normal.

Hvis du har foretaget ændringer, så gem filen og kørs

```
# apt update
```

for at opdatere pakkelisten.

7.3 Performing the upgrade to latest bookworm release

To upgrade all packages to the state of the latest point release for bookworm, do

```
# apt full-upgrade
```

7.4 Fjerner forældede konfigurationsfiler

Før du opgraderer dit system til trixie, så anbefales det at fjerne gamle konfigurationsfiler (såsom `*.dpkg-{new,old}`-filer under `/etc` fra systemet.

Bidragydere til udgivelsesnoterne

Mange har hjulpet til med udgivelsesnoterne, blandt andre

- ADAM D. BARRAT (various fixes in 2013),
- ADAM DI CARLO (previous releases),
- ANDREAS BARTH ABA (previous releases: 2005 - 2007),
- ANDREI POPESCU (various contributions),
- ANNE BEZEMER (previous release),
- BOB HILLIARD (previous release),
- CHARLES PLESSY (description of GM965 issue),
- CHRISTIAN PERRIER BUBULLE (Lenny installation),
- CHRISTOPH BERG (PostgreSQL-specific issues),
- DANIEL BAUMANN (Debian Live),
- DAVID PRÉVOT TAFFIT (Wheezy release),
- EDDY PETRIȘOR (various contributions),
- EMMANUEL KASPER (backports),
- ESKO ARAJÄRVI (rework X11 upgrade),
- FRANS POP FJP (previous release Etch),
- GIOVANNI RAPAGNANI (innumerable contributions),
- GORDON FARQUHARSON (ARM port issues),
- HIDEKI YAMANE HENRICH (contributed and contributing since 2006),
- HOLGER WANSING HOLGERW (contributed and contributing since 2009),
- JAVIER FERNÁNDEZ-SANGUINO PEÑA JFS (Etch release, Squeeze release),
- JENS SEIDEL (German translation, innumerable contributions),

- JONAS MEURER (syslog issues),
- JONATHAN NIEDER (Squeeze release, Wheezy release),
- JOOST VAN BAAL-ILIĆ JOOSTVB (Wheezy release, Jessie release),
- JOSIP RODIN (previous releases),
- JULIEN CRISTAU JCRISTAU (Squeeze release, Wheezy release),
- JUSTIN B RYE (English fixes),
- LAMONT JONES (description of NFS issues),
- LUK CLAES (editors motivation manager),
- MARTIN MICHLMAYR (ARM port issues),
- MICHAEL BIEBL (syslog issues),
- MORITZ MÜHLENHOFF (various contributions),
- NIELS THYKIER NTHYKIER (Jessie release),
- NOAH MEYERHANS (innumerable contributions),
- NORITADA KOBAYASHI (Japanese translation (coordination), innumerable contributions),
- OSAMU AOKI (various contributions),
- PAUL GEVERS ELBRUS (buster release),
- PETER GREEN (kernel version note),
- ROB BRADFORD (Etch release),
- SAMUEL THIBAUT (description of d-i Braille support),
- SIMON BIENLEIN (description of d-i Braille support),
- SIMON PAILLARD SPAILLAR-GUEST (innumerable contributions),
- STEFAN FRITSCH (description of Apache issues),
- STEVE LANGASEK (Etch release),
- STEVE MCINTYRE (Debian CDs),
- TOBIAS SCHERER (description of "proposed-update"),
- VICTORY VICTORY-GUEST (markup fixes, contributed and contributing since 2006),
- VINCENT MCINTYRE (description of "proposed-update"),
- W. MARTIN BORGERT (editing Lenny release, switch to DocBook XML).

This document has been translated into many languages. Many thanks to all the translators!