



# Past, Present and Future of Networking in Debian

[BoF] Debian Networking

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# BoF description

As the upstream maintainer of Netplan, I want to discuss the current state of networking in Debian [...] and collect ideas of how we could improve and homogenize that landscape going forward.

Ifupdown (/etc/network/interfaces) is the tried and trusted way to do networking on Debian, but many customize their installations to use alternative networking daemons such as NetworkManager or systemd-networkd instead (e.g. Bookworm cloud-images). Netplan has been the control interface for networking on Ubuntu since many years. It's not a networking daemon in itself, but drives NetworkManager and systemd-networkd (besides others) underneath, combining the best of both worlds, while providing a common interface for network configuration.

Let's get together, discuss the alternatives and approaches to network configuration and find a path to Debian's networking future.

- Slides: <https://people.ubuntu.com/~slyon/slides/debconf24/debian-networking.pdf>
- Etherpad: <https://pad.dc24.debconf.org/p/10-past-present-and-future-of-networking-in-debi>

# Past: netbase

```
ifupdown (0.5.5-1) unstable; urgency=low
```

```
* Split from netbase.
```

```
-- Anthony Towns <ajt@debian.org> Mon, 17 Jul 2000 08:24:56 +1000
```

- Custom networking scripts for Debian, called **ifupdown**
- Became its own project right after the **Debian “Potato”** release
- Configuration in **/etc/network/interfaces** and hooks in **/etc/network/if-`{up,down}`.d/**
- Tried and trusted way to do networking on Debian

# Present: ifupdown x4

- |   |   |
|---|---|
| <ul style="list-style-type: none"><li>• ifupdown</li><li>• ifupdown2</li><li>• ifupdown-ng</li><li>• Busybox ifupdown</li></ul> | <ul style="list-style-type: none"><li>• NetworkManager</li><li>• Systemd-networkd</li><li>• Netplan</li></ul> |
|---|---|

- Plenty of discussions about the network stack(s)
  - [Network Configuration on Debian Systems](#) *Marc Haber*
  - [dhcpcd-base as standard DHCP client starting with Trixie](#) *Martin-Éric Racine*
  - [A declarative approach to Linux networking with Netplan](#) *Lukas Märdian*
  - [ifupdown maintenance](#) *Daniel Gröber*
  - [what about Netplan?](#) *Philip Hands*

## NetworkConfiguration

Translation(s): [English](#) - [Español](#) - [Français](#) - [Italiano](#) - [Português \(Brasil\)](#) - [简体](#)

### 4 ways to configure the network

- The interfaces configuration file at `/etc/network/interfaces` (this page)
- [NetworkManager](#): This is the default for Laptop configuration
- Systemd: [Debian reference Doc Chapter 5](#)
- [Netplan](#): [Debian reference Doc Chapter 5](#)

# Present: ifupdown x4 (cont.)

- Why? (issues with classic ifupdown)
  - **Dependencies** between interfaces need to be considered (no race conditions)
  - **Imperative** config/hooks makes it hard to assume the expected network state
  - **Portability** of configuration across devices vs static /e/n/interfaces definitions
  - **Reloading** network configuration at runtime (ifreload)
  - **Test coverage** (autopkgtests)
  - **Maintenance** burden of native package (legacy codebase)
- Combined **ifupdown\*** efforts?
  - Ifupdown2, uses different architecture & Python
  - “hitting some design issues, [...] focus all the efforts in just one of the implementations” -- *Santiago RR*
  - Maybe transition towards **ifupdown-ng**?

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# Problem statement



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## Edition

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## Distribution quote of the week

[Posted July 17, 2024 by jzb]

If we have to tell our users and sysadmins to do "X" on Debian server systems (using ifupdown or potentially sd-networkd), while doing "Y" on Debian desktop systems (using NetworkManager), while doing "Z" on Debian cloud systems (using Netplan), while doing something totally different on RaspberryPi (or alike) boards that run a Debian server setup, but using WiFi as their primary network interface, that's just a really bad user experience.

Using Debian should NOT feel like using different distros. And we really need a common way to do network configuration. With Netplan we can tell people to just use use the "dhcp4: true" setting (for example), which will work on all Debian systems and is automatically translated to the corresponding backend for server/desktop/cloud/embedded usecases.

All while giving sysadmins the [flexibility] to fully utilize the underlying network daemon directly, if they feel like writing native configuration for it (or don't like Netplan).

— [Lukas Märdian](#)

# Future: "How to do networking on Debian?"

- Look outside the Debian bubble (relief to our maintainers)
  - **Supported** by companies, vetted by **adoption** outside of Debian
  - **Active** development, open to community **contributions**
  - High **test coverage**
- Utilize packages that we already use today
  - Netplan
  - NetworkManager
  - Systemd-networkd
- Common Issues
  - Dependency on **Python**
  - **Compatibility** with ifupdown
  - Doesn't cover all **use cases** (server, desktop, cloud)



# Scenario A: Status Quo++

- Keep using `/etc/network/interfaces`
- Transition to **ifupdown-ng**
- What's left to do?
  - **[done]** Debian-Installer
  - **[done]** Autopkgtest support, 3rd party installers
  - **[todo]** Switch to [dhcpcd-base](#) in favour of ISC **dhclient**, [Bug#1038882](#)
  - **[todo]** ifupdown-ng **compat**, [github.com/ifupdown-ng #247](#)
  - **[todo]** Ask ftpmasters to switch **Priority** from ifupdown to **ifupdown-ng**

# Scenario B: Minimized

- Enable **systemd-networkd** in base & server images, already pre-installed
- Keep using **NetworkManager** in desktop/laptop images
- Drop ifupdown, **gaining ~200 kB**
- What's left to do?
  - **[todo]** Debian-Installer, [MR#11](#)
  - **[todo]** Autopkgtest support, 3rd party installers
  - **[todo]** Migrate ifupdown configs
  - **[done]** important if-{up,down}.d [hooks](#)
  - **[todo]** Ask ftpmasters to drop **Priority** of **ifupdown**

```
$ apt remove ifupdown
[...]
Summary:
  Upgrading: 0, Installing: 0, Removing: 1
  Freed space: 207 kB
```

# Scenario C: Universal

- Keep **ifupdown[-ng]** in the base installation (for Trixie at least)
- Keep **NetworkManager** on desktop, enable **systemd-networkd** on server
- Add **Netplan** on top, as a common configuration interface across variants
  - Well-known, **declarative** configuration allows for easier introspection
  - Additional **test coverage** for sd-networkd and NetworkManager backends
  - Full **flexibility** to fall back to native ifupdown, sd-networkd or NetworkManager
- What's left to do?
  - **[done]** Calamares, [PR#2284](#), FAI [v5.8.1](#)
  - **[done]** Debian-installer, [MR#9](#)
  - **[done]** Autopkgtest support, [MR#322](#)
  - **[done]** important if-{up,down}.d hooks, [LP#1718227](#)
  - **[todo]** Ask ftpmasters to raise **Priority** of **netplan-generator** (+ ~5 MB)

# Next Steps

- Find **consensus** within a few weeks/months time
- Ask ftpmasters to add/change/drop **Priority overrides** (standard / important)
- Test new default network stack
- Improve **documentation**

# Appendix: Some facts about Netplan

- Black Duck [OpenHub](#) on Netplan:
  - Mature, well-established codebase
  - Increasing Y-O-Y development activity
  - Very well-commented source code
  - Large, active development team
- [\[DebConf 23\] A declarative approach to Linux networking with Netplan](#)
- Celebrating the release of [Netplan 1.0](#)
- [\[Debian-Reference\] Chapter 5. Network setup](#)
- [Netplan and systemd-networkd on Debian Bookworm](#)
- [Converting Debian 10/11/12 to Netplan.io | Pedro Rodrigues](#)
- [Creating a Netplan enabled system through Debian-Installer](#)



# Thank you!

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