

Debian packaging of the IXP route servers stack

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Euro-IX Route Servers Workshop 2026 - March 11, 2026



What is this about?

Debian

- A community-developed Linux distribution, the second-oldest since 1993.
- New stable releases every two years.

Marco

- A Debian developer since 1997, also co-manages an IXP for fun.
- Day job is at an italian cloud infrastructure provider.

BGP

- BIRD 2
- BIRD 3
- OpenBGPD

RPKI

- Routinator 3000
- OpenBSD's rpkiclient
- FORT Validator
- stayrtr

(For details about validators you may refer to my older presentation
An opinionated review of RPKI validators).

The software

Debian GNU/Linux is the one stop shop for all your RPKI validation and route servers needs.

My goals

- Packages with sane defaults which just work after being installed.
- Common management of TALs in the `rpki-trust-anchors` package.
- State of the art security with systemd sandboxing.

Issues

- ~~The RPKI ecosystem is still young and fast-moving for a stable distribution.~~
- Routinator cannot be packaged (yet?).

Why use packaged software

The great debate: packages from distributions¹ or the developers?

Why use distribution packages?

- Integration with the OS and high attention to details.
- Ready to use after the installation.
- Automatic security updates².
- Maintained by system administrators, not software developers.

Why use vendor packages?

- Freshness.

¹ Full disclosure: I develop a Linux distribution (Debian).

² Job Snijders estimated in 2022 that over 70% of the clients currently in use are insecure.

The packages in Debian/stable will receive fixes for:

- security bugs, for 2-5 years
- major bug, when practical, for 2 years

Backports to Debian/stable

Backported packages of RPKI-related software, BIRD and OpenBGPD will be maintained in the official Debian backports archive at least until the release of Debian 14.

```
echo 'deb http://deb.debian.org/debian trixie-backports main' \  
> /etc/apt/sources.list.d/trixie-backports.list  
apt update  
apt install rpki-client/trixie-backports stayrtr/trixie-backports
```

I will do the same for Debian 14 after it will be released.

No.

Debian 13 was released almost one year ago.

While Debian 12 it is still supported, I am not aware of practical reasons which require to keep using it at IXPs, so I will not spend my volunteer time on doing backports.

A note about Ubuntu

- Ubuntu is a downstream distribution of Debian.
- It is similar in many aspects, but it is not the same thing.
- Ubuntu LTS releases also happen every two years.
- Ubuntu is a for profit company and they have no revenue from IXPs, so do not expect to see bug fixes backported to stable for these packages.
- Even security fixes are best effort for these specific packages, unless you are a Ubuntu Pro customer.

The issue with Routinator

The Rust development ecosystem is broken and hostile to distributions

- APIs are not stable (and there is no dynamic linking).
- Hence it is common for Rust software to depend on specific versions of libraries.
- General *vendoring* of dependencies is not acceptable to the Debian security team.
- Maintaining multiple versions of libraries in the distribution is too much time consuming (and not appreciated either...).
- Different Rust programs depend on different versions of the same library.
- **Packaging complex Rust projects is difficult.**

The Routinator developers publish a Debian package which is good enough, but it does not use `rpki-trust-anchors`.

What's new in BIRD packaging?

At the end of 2025 I took over maintenance of the `bird2` and `bird3` Debian packages from Jakub Ruika.

- General packaging cleanup and removal of complexity.
- Extensive systemd security sandboxing (in the next uploads).
- Removed the old init scripts.
- Stop installing a pointless `bird.conf`.

In the future...

- Try again to package Routinator!
- Create autopkgtests (debian CI tests) (Using exabgp?)
- What would *you* like to see?

Pro tip for upgrades

If you do not want to restart a daemon on upgrades, then do it the Debian way and create `/usr/sbin/policy-rc.d`:

```
#!/bin/sh -e
if [ "$1" == 'bird' ]; then exit 101; fi
exit 0
```

(This is the standard policy-rc.d interface.)

Usage of validation software

	Oct 2021	May 2022	Apr 2023	Nov 2023	Dec 2024	Mar 2025
Routinator	79%	69.9%	78.9%	79.2%	79.5%	73.5%
rpki-client	8%	19.3%	9.3%	10.4%	10.1%	20.4%
OctoRPKI	6%	3.5%	6.1%	4.5%	4.4%	0.6%
FORT Validator	3%	3.2%	4.2%	3.9%	3.8%	4.9%
RIPE NCC Validator	4%	4.4%	1.3%	1.9%	1.9%	0.2%
rpki-prover	0%	0.5%	0.1%	0.1%	0.1%	0.1%

This is dangerously close to becoming a *software monoculture*.

This data was gathered by NLNet Labs by counting the unique IPs accessing a RRDp web server.

My suggestions

Use two of:

- Routinator
- FORT Validator (?)
- rpki-client + stayrtr

They are all good and have different tradeoffs.

Using software packaged by a Linux distribution significantly reduces the system administration effort and allows to adopt diverse implementations.

Software diversity is important and needs to be encouraged!

Any questions?



`https://www.linux.it/~md/text/ixp-debian-rsWS2026.pdf`
(Google ... Marco d'Itri ... I'm feeling lucky)

