

BIRD 3

multithreaded routing daemon

BIRD Internet Routing Daemon

since 1998, open-source, free to use

Originally a school project

by Ondřej Filip, Pavel Machek & Martin Mareš

Maintained by CZ.NIC

since 2008

The Core Team

- Ondřej Zajíček (2008)
- Maria Matějka (2015)
- Vojtěch Vilímek (2022)
- Igor Putovný (2022)
- Káťa Kubecová (2023)
- David Petera (2024)

The Two Address Families



Photo by Nothing Ahead: <https://www.pexels.com/photo/cats-in-box-16278340/>

Dec 2017: BIRD 2 released

with integrated IPv6 and IPv4 support

BIRD: Route server in IXPs

also data centers and other use cases

IXPs are growing



Photo by EVGENII TSOI: <https://www.pexels.com/photo/flock-of-seagulls-flying-in-bright-blue-sky-4412158/>

IXPs are growing



Photo by Frank Cone: <https://www.pexels.com/photo/flock-of-seagulls-on-sea-coast-20671429/>

2000+ BGP sessions

are too much for a single thread

Dec 31, 2023: BIRD 1 is EOL

please upgrade

How to upgrade BIRD 1 to BIRD 2

There is a 2 hour lecture at RIPE 87 about this:

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We may also rewrite your config for you.

Dec 2024: BIRD 3 released

multithreaded, 5000+ BGP sessions

Fast convergence in IXP

Clients	Prefixes	BIRD 2.17	BIRD 3.1 (4T)	BIRD 3.1 (28T)
11	99k	7 s	7 s	7 s
648	288k	13 min 8 s	5 min 45 s	1 min 1 s
648	505k	21 min 17 s	6 min 53 s	1 min 43 s
1295	341k	38 min 24 s	9 min 57 s	2 min 13 s
2590	402k	over 1 hour	24 min 31 s	5 min 30 s
5179	472k	over 1 hour	over 1 hour	12 min 37 s

Artificial simulated IXP with exponential distribution of prefix counts among peers, measured on a single probe.

Estimated systematical error up to 10%.

Test bed: BIRD 3.1 with 30k pre-configured BGP sessions as a feeder and probe.

Hardware: Intel Xeon E5-2695 v3 @ 2.30 GHz, 56 threads.

How to upgrade BIRD 2 to BIRD 3

- should be almost drop-in
- minor changes in CLI (**v2 compatibility mode in 3.1**)
- different performance tweaking knobs
- all logs show thread id

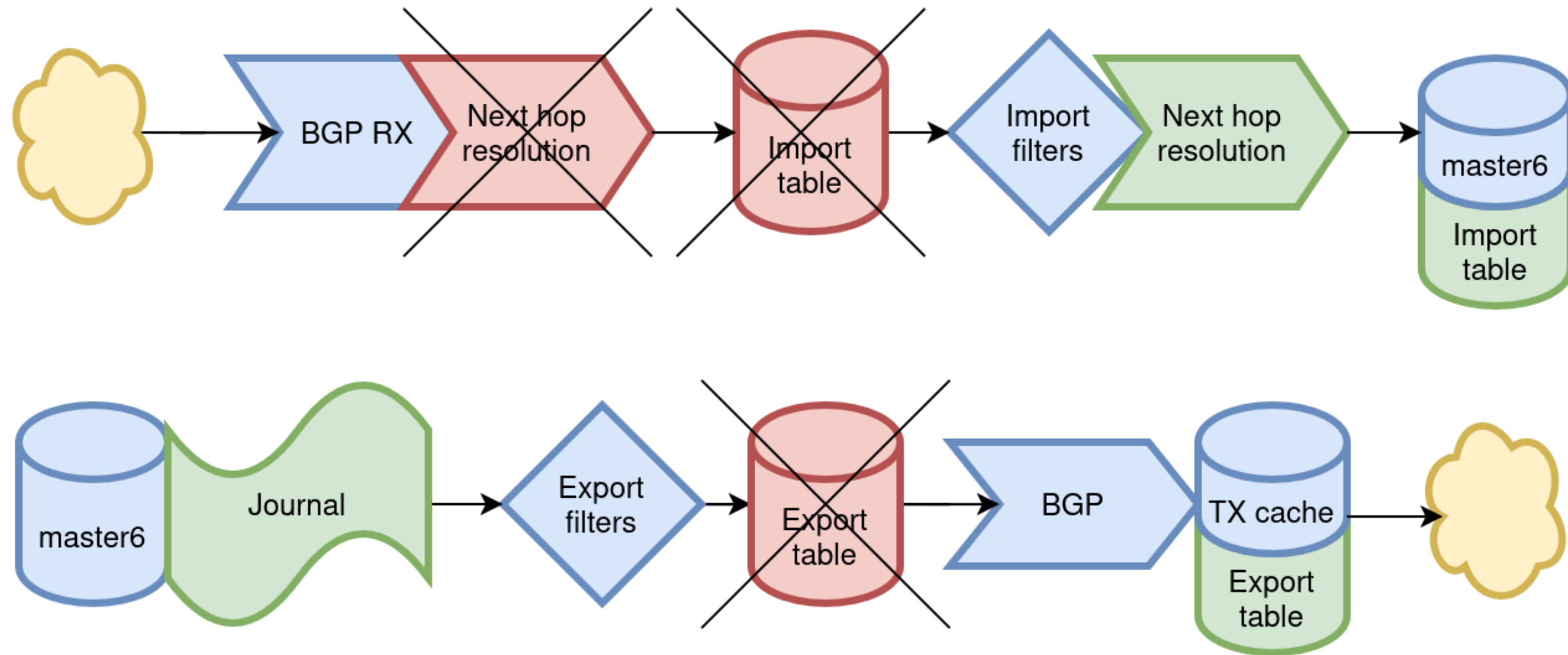
Fedora / RHEL are already shipping BIRD 3.

Visible difference: CLI

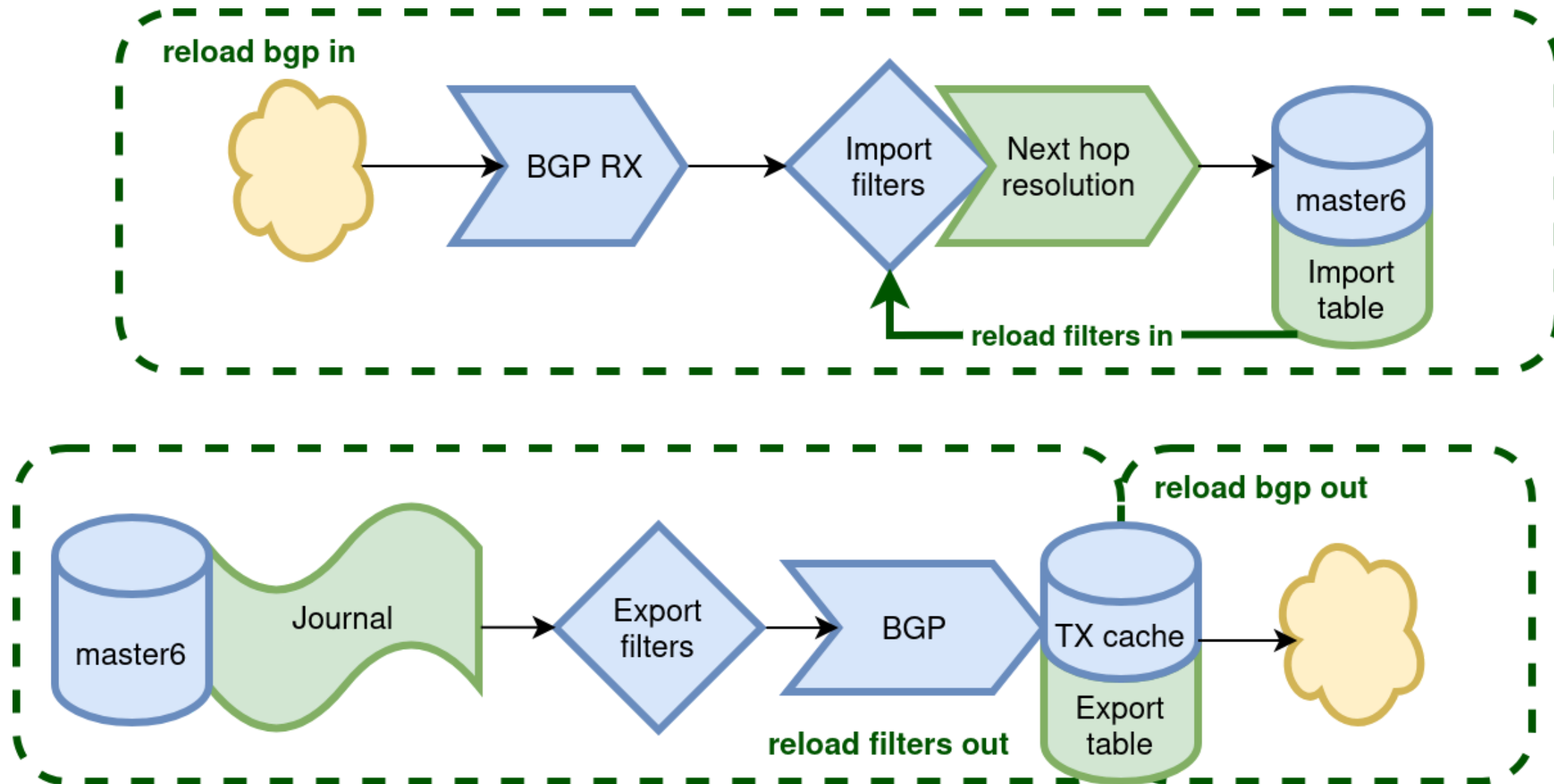
```
2001:db8:1::/48      unicast [ibgp2 ... from 2001:db8:3:4::1] * (100/20) [AS65531i]
via fe80::4825:9eff:fe9d:eb1e on ve1
Type: BGP univ
BGP.origin: IGP
BGP.as_path: 65534 65531
BGP.next_hop: 2001:db8:3:13::2 fe80::58ea:1fff:fe02:569a
BGP.local_pref: 100
```

```
2001:db8:1::/48      unicast [ibgp2 ... from 2001:db8:3:4::1] * (100/20) [AS65531i]
via fe80::4825:9eff:fe9d:eb1e on ve1
hostentry: via 2001:db8:3:13::2 fe80::58ea:1fff:fe02:569a table master6
preference: 100
igp_metric: 20
from: 2001:db8:3:4::1
source: BGP
bgp_origin: IGP
bgp_path: 65534 65531
bgp_next_hop: 2001:db8:3:13::2 fe80::58ea:1fff:fe02:569a
bgp_local_pref: 100
Internal route handling values: ...
```

Internal mechanism changes



Reload semantics



BIRD 3.0.0 was quite unstable

Current versions: 3.0.4 and 3.1.2 LTS

Recent improvements (2.17, 3.1)

- BMP stabilized and optimized
- ASPA route validation (still a draft though!)
- TCP-AO support on Linux

Release expectations

Major.Minor.Patch

- minor versions quarterly → 2.18 and 3.2 expected in July 2025

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- EOL ~6 months after next minor release
30 Sep 2025 for 2.16 and 3.0
- LTS minor version once a year
EOL not before Q3 2027 for 2.17 and 3.1

the actual future may differ

Expected in next versions

- 2.18, 3.2 → better support for BGP over unnumbered links
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- 2.19, 3.3 → first stable EVPN release
- 2.19, 3.3 → MRT file loading (experimental)
- 2.19, 3.3 → prefix aggregator (experimental)

Expected soon: BIRD API

- CBOR (no JSON and definitely no XML)
- probably CORECONF
- Python library (any other langs?)
- full online replication



Photo by Stuart Robinson: <https://www.pexels.com/photo/close-up-of-a-southern-cassowary-in-australia-33777266/>

Expected soon: Contextual information in filters

- read protocol attributes
- set custom protocol attributes
- (maybe) read protocol state info (needs autoreload)
- should make large configurations easier

Long-term outlook

- BIRD 2 will get new features probably until Q2 / 2026
- enhancing BGP EVPN support
- API also for configuration
- IS-IS implementation
- catching up with features

Shall we try BGPsec?

BIRD Support

- provided by e-mail
- no ticket limit
- pricing by deployment scale

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Our goal: The customer is happy and does not need to contact support.



Photo by Maria Matejka © 2025

QED

Questions, Explanations, Discussion