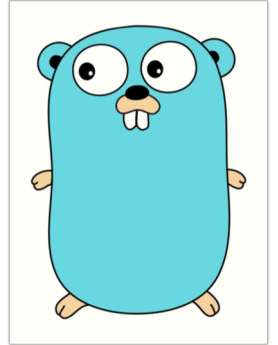




a versatile, fast and reliable routing daemon in golang

# What is BIO routing?

- Routing daemon (library) written in golang
- Open source (<https://github.com/bio-routing/bio-rd>)
- Founded by takt in 2017
- Initial commit in April 2018
- 6 contributors
- Nearly 700 commits since April
- Implementations using BIO already in production at EXARING (AS51324) and Mauve Mailorder Software (AS48821)



# Why another routing daemon? #1

- IPFIX/Netflow/sFlow collector tflow2 developed in 2016/2017
- Certain routers are lacking ASN / Prefix information in Netflow data
- BGP feed needed as source
- BIRD via socket: Too slow and fragile
- GoBGP: Tried to load 1 full table in <1GB RAM: Swapping
- Solution: Write your own

# Why another routing daemon? #2

- We love BIRD routing daemon, but no mono cultures
- General lacking of multi core support
- Linux is primary platform for BIO
- OpenBGPd is a great project but targets mainly the BSD world
- All big projects written in C

# Key concepts and focus of BIO

- Open source (Apache 2.0)
- Focus on performance and memory efficiency
- BIO as library (integrate directly in your app, e.g. route injector, SDN controller)
- BIO as full featured routing daemon
- Fast, type safe, binary APIs (gRPC)
- Native Prometheus integration



# Current features of BIO (BGP)

- ADD-PATH
- Communities / Large Communities
- 32 bit ASN support
- Multi Protocol (IPv4/IPv6 unicast)
- Route Reflection
- Route Server
- BGP Monitoring Protocol (BMP) Receiver
- Linux Kernel support via Netlink

# Using BIO as library

- RTBH Route Injection at AS48821 (Mauve)

- Source code available:

<https://github.com/czerwonk/bioject>

- Injecting routes via gRPC API
- Persists RIB state in SQLite DB
- Metrics and distributed tracing via OpenCensus (<https://opencensus.io/>)

# What did we learn?

- Reading RFCs can be fun, but also confusing
- Properly implementing observer pattern
- 100% test coverage is not enough
- Finding deadlocks
- Terms Send/Receive are depending on the view



# Roadmap

- IS-IS (in progress, L2 support nearly there)
- Flow spec (planned)
- OSPF (planned)
- CLI tool (via gRPC) like birdc

# Source Code and Contribution

Source Code is available at:

<https://github.com/bio-routing/bio-rd>

We appreciate contribution! :-)

# Thanks for your attention!



Daniel Czerwonk  
[@dan\\_nrw](#)

Oliver Herms (takt)  
[@taktv6](#)

