## **Experiences** implementing Babel

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# Outline

- ► Who?
- ► What?
- ► Why?
- ► When?
- ► How?





# Who?

- I'm a PhD student at Karlstad University, Sweden
- Involved in the Bufferbloat and CeroWrt projects
- Prior experience: Running Babeld
- Been following Homenet on/off for a couple of years



## What?

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- I added Babel support to the Bird routing daemon
- IPv6 only, no extensions
- Based on reading RFC6126
  - I also saw Juliusz' presentation in Prague



# Why?

- Why not?
- Better understanding of routing (and Babel)
- To see if an independent implementation was feasible
- Much needed practice of my C





# When?

- Initial implementation: ~2 weeks last summer
- Partial rewrite over the autumn
  - Memory alignment? What's that? biggest issue
- A few remaining issues fixed last week
- Hopefully going to be in Bird 1.6



# How did it go?

- The base spec is very readable
  - Section 2 background, section 3+4 implementation
- The protocol is easy to understand
- Having the Bird framework to work from helped
- Some subtleties did need clarification...
  - But all issues resolved on the mailing lists and during patch submission.



#### Clarifications

The needed clarifications<sup>1</sup> fall in three groups:

- Errors
- Omissions
- Things that are unclear

<sup>1</sup>Markus Stenberg has supplied notes on his Python implementation effort, which is incorporated in the following lists.

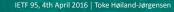






#### **Errors in the spec**

Port number (we both missed the errata)





#### **Omissions in the spec**

- Local metric functions (in appendix)
- How to handle sequence number space
- Error handling on validation failure
- Router IDs
  - How to map from IPv4 address?
  - How to handle collisions?



# Things that were unclear

- Why is blackhole routing needed?
- Extra space is allowed at the end of TLVs
- Some language too informal (esp concerning IDs)
- Router ID==0 is valid



#### In summary

- Two weeks to implement Babel without any prior experience.
- No errors and only a few omissions in the spec
- It's fun, you should try! :)

