

# 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?

- ▶ 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! :)

