Applicability of the Babel Routing Protocol

draft-chroboczek-babel-applicability-01

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4 April 2016

Babel applicability

Short version

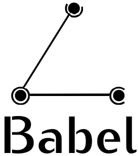
It’s a routing protocol.

It’s useful for routing.

Properties of Babel

Properties of Babel:

- robustness;
- flexibility and extensibility;
- implementability;
- it has a cool logo:



Robustness

Property 1/3

Babel is robust:

- pushes packets in roughly the right direction according to loop-free paths even during reconvergence;
- relies on periodic announcements and timeouts to clear any incorrect data.

A buggy or non-standard implementation will (usually) not break your whole network.

Flexibility and extensibility

Property 2/3

Babel is flexible and extensible:

- implementations with different parameters interoperate (intervals, timeouts, etc.);
- implementations with different algorithms interoperate (as long as you don’t break loop avoidance and starvation avoidance);
- there’s plenty of space in the packet format to carry extension data.

A number of extensions are currently deployed:

- RTT-based routing;
- radio diversity routing;
- source-specific routing (SADR).

Implementability

Property 3/3

Babel is implementable:

- no changes to the data plane:
  ordinary next-hop forwarding;
- small and readable spec:
  less than 40 normative pages in RFC format
  (including extension mechanism);
- two independent reimplementations
  (Markus Stenberg, Toke Høiland-Jørgensen).

The smallest implementation is just 700 lines of Python.
The “large” implementation is 10 000 lines of C.

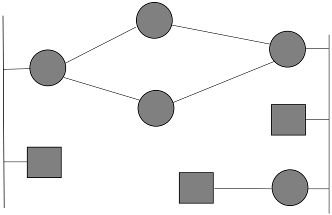
Outline

- Application areas where Babel has been successfully deployed in production;
- applications areas where Babel could be useful;
- applications areas where better protocols exist.

Hybrid networks

Successful deployment 1/4

Babel works well in classical, prefix based networks (supports aggregation, filtering, etc.).
Babel works well in pure mesh networks (non-transitive and unstable links).

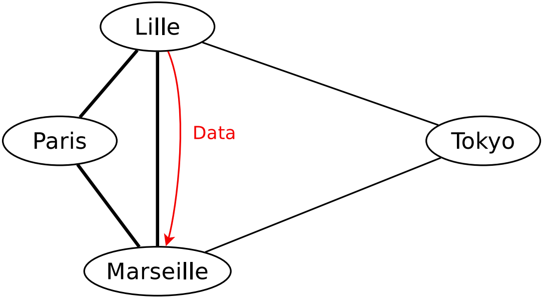


Babel works well in hybrid networks, networks with prefix based parts interconnected through meshy bits.

Global-scale overlay networks

Successful deployment 2/4

The RTT-based routing extension enables non-pessimal routing in global-scale overlay networks:



RTT-based routing may cause persistent oscillations, but Babel remains robust even in the presence of oscillations.

Source-specific routing

Successful deployment 3/4

The source-specific extension to Babel gives:

- full support for source-specific routing (SADR);
- interoperability with plain, unextended Babel.

Babel is useful wherever source-specific routing is needed.

Small, simple networks

Successful deployment 4/4

Babel is a small, simple protocol and requires no configuration in simple cases.

It is often used in trivial networks: a useful RIP replacement.

Pure mesh networks

Potential deployment 1/1

Babel has been repeatedly shown to be competitive with dedicated mesh routing protocols:

- better on some tests;
- worse on others.

However, standardised, well implemented protocols for mesh networks exist:

- OLSR-ETX;
- OLSRv2 with the DAT metric;
- ...

This particular niche is already populated.

Large, stable networks

Non-recommended deployment 1/1

There exist protocols that are finely tuned for large, wired networks:

- OSPF;
- IS-IS;
- EIGRP.

Babel relies on periodic route announcements, and will never be competitive with protocols that only send deltas.

Conclusion

Babel is a routing protocol that is known to be useful in:

- hybrid networks;
- global-scale overlay networks;
- networks with source-specific routing requirements;
- trivial networks (as a RIP replacement).

Other applications may exist.