# Destination/Source Routing

`draft-ietf-rtgwg-dst-src-routing-revive-02`

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IETF 121 · Dublin, IE · rtgwg · 2024-11-05

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# Changelog

… is empty

Shu Yang agreed to act as editor

# History

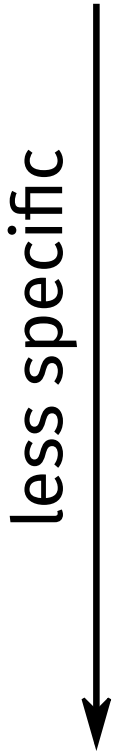
- draft just had 10th birthday 🎉
- originally homenet related
- but keeps popping up in random places

# refresher/summary (1)

- start at most specific destination prefix match
- look for most specific source prefix match having that dst
  - match found?
    ⇒ stop
  - no source prefix match?
    ⇒ move up to next less specific destination prefix
    (may happen multiple times)

packet to 2001:db8:1234:5678::1

from 2001:db8:ef::1




1 dst 2001:db8:1234:5678::/64 src 2001:db8:ab:cd::/64

2 dst 2001:db8:1234:5678::/64 src 2001:db8:cd::/48

↓ *lookup progresses to next dst prefix*

3 dst 2001:db8:1234::/48 src 2001:db8:ab:cd::/64

4 dst 2001:db8:1234::/48 src 2001:db8:ef::/48

dst 2001:db8:1234::/48 src ::/0

# refresher/summary (2)

- IPv6 only
- intended for single consistent routing domain

  ⇒ destination before source
  ⇒ opposite of typical policy routing
  - this is not intended to represent zones/VRFs!
  - local connectivity is “universal” / shows difference

# refresher/summary (2)

- describes behavior, not implementation
- can (should) be implemented without loop
  - use artificial/dummy routes if needed
  - can synthesize tables for each distinct source prefix
- ‘classic’ dst-only route
  ≡ dst-src route with src prefix ::/0

# Protocol cross-refs

- specified for BABEL in RFC9079 (Aug' 2021)
  - originally referenced this doc, dropped to publish
- OSPFv3 & IS-IS drafts expired
  - may revive *(after this)* depending on interest
- doc'ing common bits is main goal of this draft

# Implementations (forwarding)

Linux:

```
commit 4e96c2b4180aff4f080b77314712073c6ca430e7
Author: YOSHIFUJI Hideaki <yoshfuji@linux-ipv6.org>
Date:   Wed Aug 23 17:23:39 2006 -0700

    [IPV6] KCONFIG: Add subtrees support.
```

# Implementations (forwarding)

FITI implementation

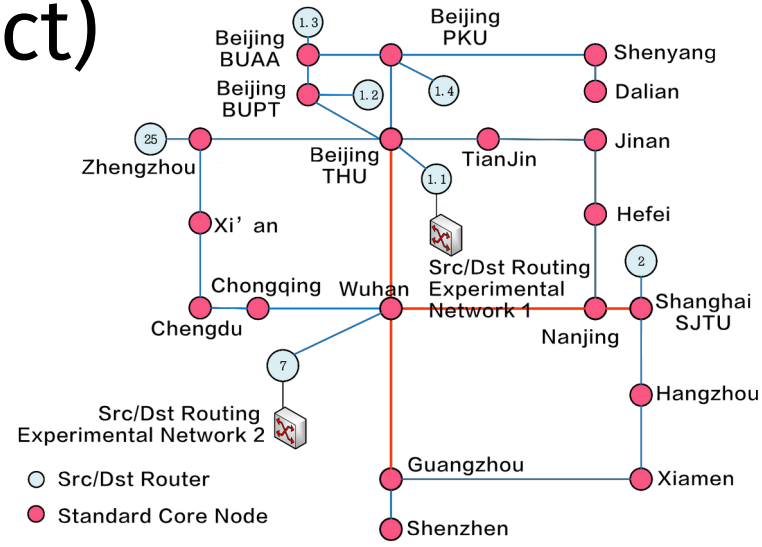
- Control Plane:
  Updated OSPFv3 protocol
- Forwarding Plane:
  Hardware TCAM-based,
  implemented on Barefoot Tofino

# Implementations (control plane)

- BIRD (static, BABEL)
- FRRouting (static)
- babeld

# Deployment (1)

- *Future Internet Infrastructure* (CN research network project)
- 7 dst-src routers deployed & tested; doing load balancing, access control, multi-homing and FRR



# Deployment (2)

- any OpenWRT router/CPE
  - includes a whole bunch of OEMs shipping OpenWRT derivatives
  - kernel/forwarding on by default, control plane support (=included packages) varies

# Source address sel. interactions (1)

- RFC6724 rule 5.5 keeps coming up

```
Rule 5.5: Prefer addresses in a prefix advertised by the next-hop.
If SA or SA's prefix is assigned by the selected next-hop that will
be used to send to D and SB or SB's prefix is assigned by a different
next-hop, then prefer SA. […]
```

# Source address sel. interactions (2)

- selected source address is persistent, happens at connection establishment
- routing choice may or may not be sticky
  - even if it is sticky, routing info can change
  - if done *extra* poorly, chosen source address might flip which gateway is selected from equal options (e.g. part of LB hash) ⇒ self-break
    - have not actually seen this, thankfully (hosts don't ECMP on default routers)

# Source address sel. interactions (3)

- a dst/src routing table on the end host actually makes this work correctly
  - when processing RA/PIO, install additional default routes with source prefix = PIO range
- not described in draft…
  - …yet (should it?)

# Questions?