Destination/Source Routing

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

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Changelog

... is empty

Shu Yang agreed to act as editor

60-second 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 best source prefix match w/ that dst
  - match found? ⇒ stop
  - no source prefix match?
    ⇒ repeat with next less specific destination

refresher/summary (2)

- IPv6 only
- ‘classic’ dst-only route
  ≡ dst-src route with src prefix ::/0

refresher/summary (3)

- intended for single consistent routing domain

  ⇒ destination before source

  ⇒ opposite of typical policy routing

  (this is not intended to represent zones/VRFs!)

- can (should) be implemented without loop
  (use artificial/dummy routes if needed)

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

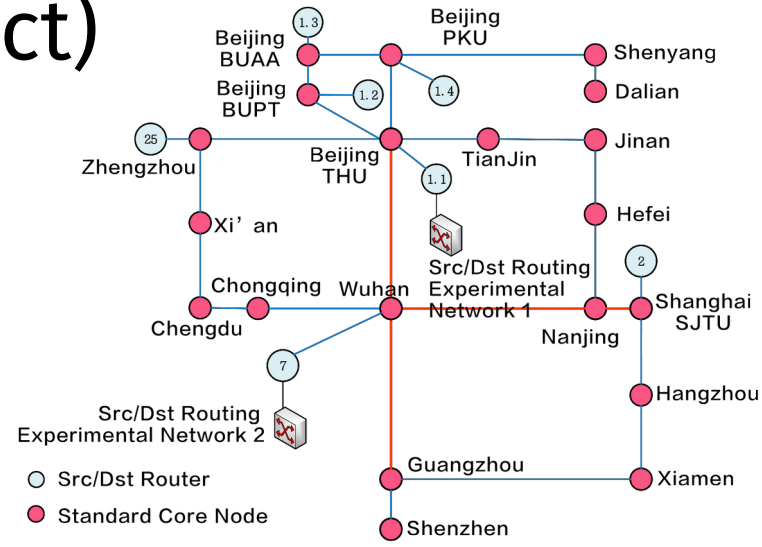
- Control Plane:
  Updated OSPFv3 protocol
- Forwarding Plane:
  Hardware TCAM-based,
  implemented on Barefoot Tofino

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?