Using Prefix-Specific Link-Local Addresses to Improve SLAAC Robustness

draft-link-6man-gulla

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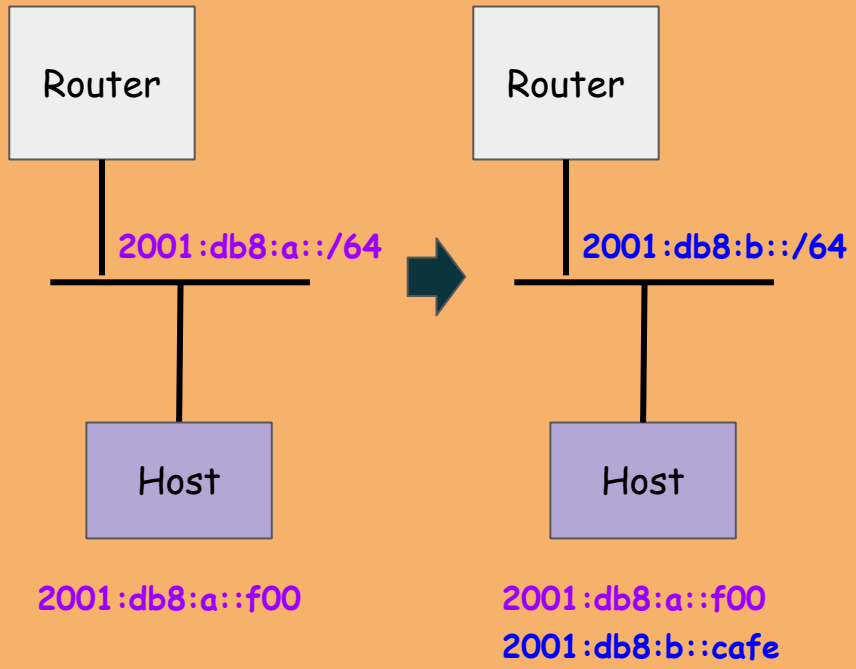
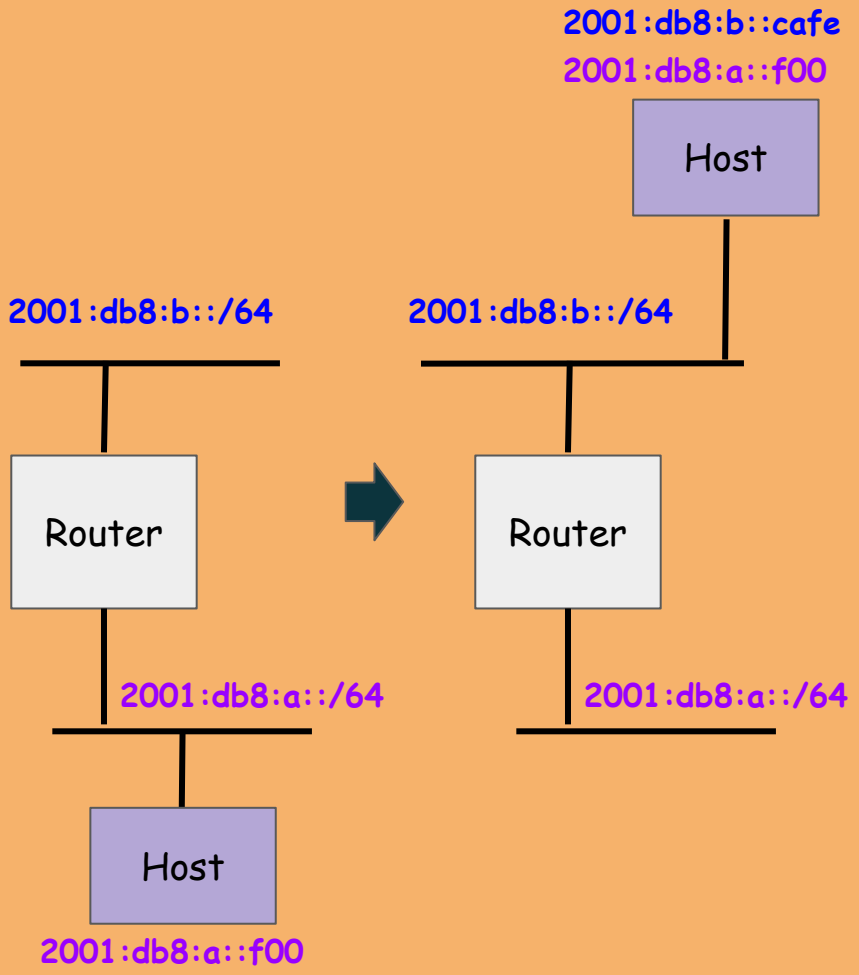
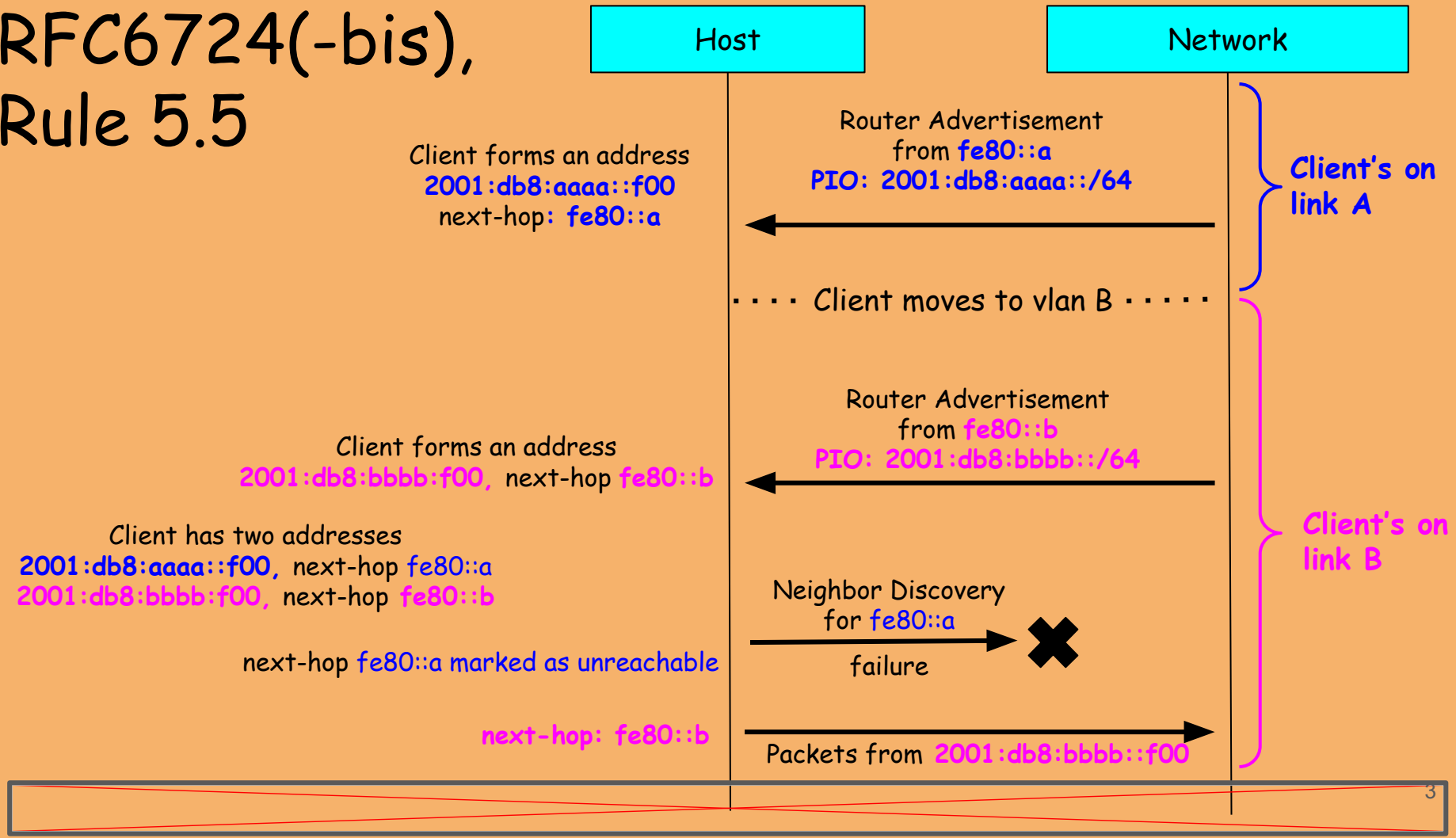
Renumbering Scenarios

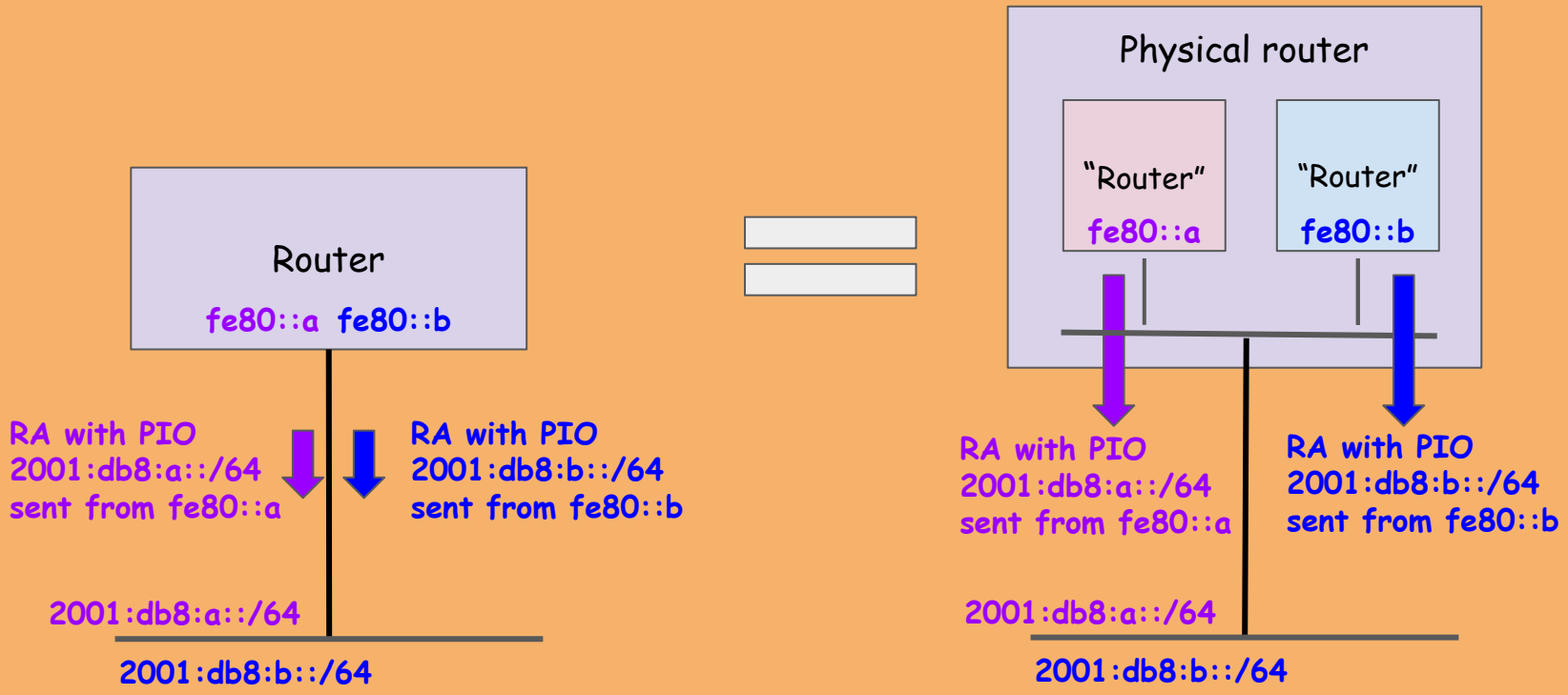




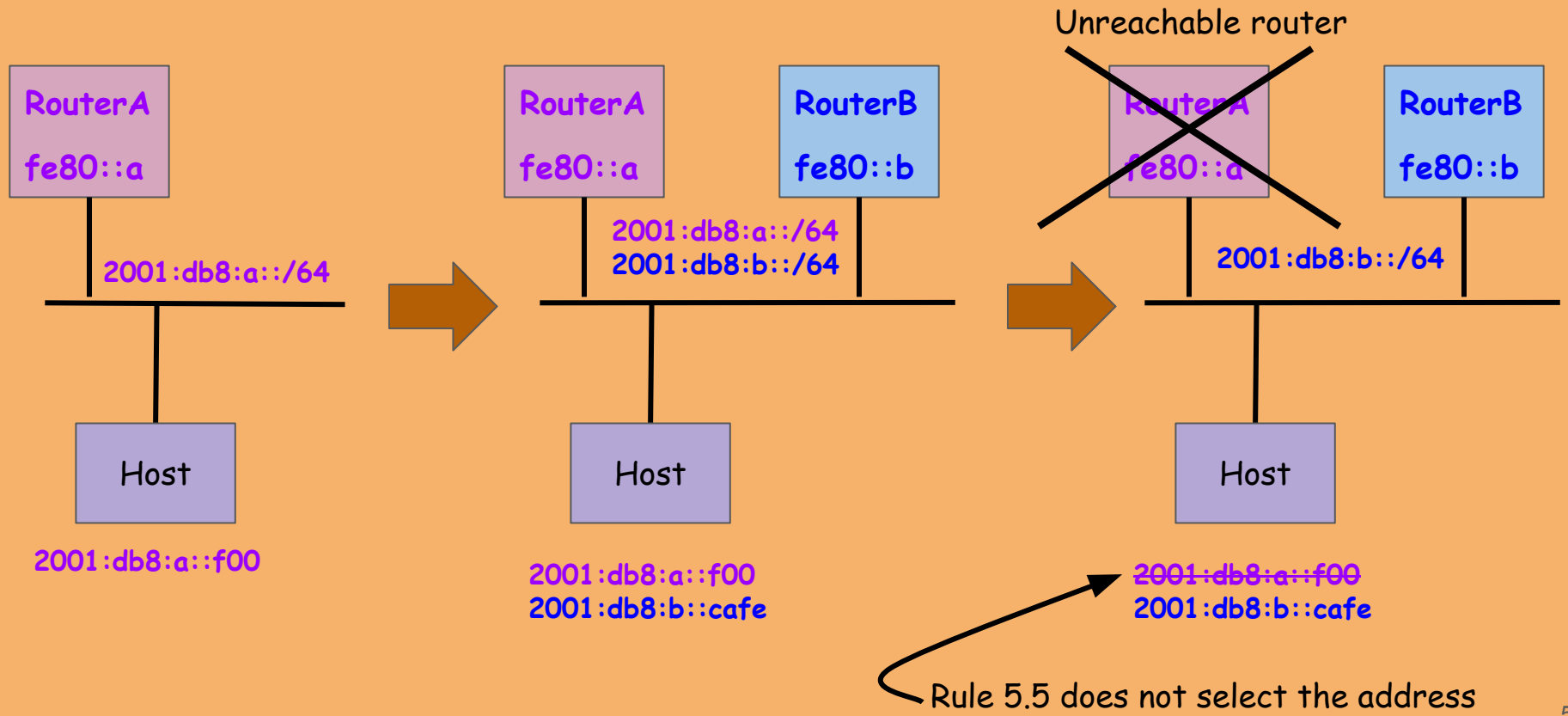
RFC6724(-bis), Rule 5.5



Proposed Solution: Prefix-Specific Link-Local Address



Proposed Solution and Flash Renumbering (Rule 5.5)



Proposed Solution: Details

For each ***$prefix*** in AdvPrefixList:

- Generate an interface ID as per RFC7217 (or it can be configured manually)
  - Using ***$prefix*** as the 'Prefix' parameter
- Assign a new link-local address with the generated ID
- Send RAs as per RFC4861
  - Limiting AdvPrefixList to ***$prefix***
  - Using that link-local as a source

Simplified Case of Managed Devices

```
furry@flatwhite> show configuration interfaces ae1.42
family inet6 {
    address 2001:db8:abc:cafe::2/64 {
        vrrp-inet6-group 101 {
            virtual-inet6-address 2001:db8:abc:cafe::1;
            virtual-link-local-address fe80::2001:db8:abc:cafe;
        }
    }
}
furry@flatwhite>
```

Limitations

- ONLY for routers supporting multiple link-local address
- SHOULD be configurable
- SHOULD be enabled for interfaces susceptible to flash renumbering
  - Prefix received via DHCPv6-PD
- Otherwise SHOULD be disabled by default
  - MAY be enabled by administrator

How Many Link-local addresses per router interface?

```
furry@flatwhite> show interfaces ae1.42 | grep fe80
        Destination: fe80::/64, Local: fe80::2001:db8:abc:cafe
        Destination: fe80::/64, Local: fe80::32b6:4f02:b2e5:cac0

furry@flatwhite>
```

RFC4861 does not limit the number of link-local address

Open question: which one to use?

For RA: "use RFC4861 with the following limitations:

- AdvPrefixList = the given prefix
- Source address: the prefix-specific link-local address

No changes for other packets.

Updates to RFC4861

6.2.8. Link-local Address Change

The link-local address on a router should rarely change, if ever.

Using the link-local address to uniquely identify routers on the link has the benefit that the address a router is known by should not change when a site renumbers.

Using the link-local address to uniquely identify routers on the link has the benefit that the address a router is known by should not change when a site renumbers and the renumbering event is explicitly signalled and properly propagated to all hosts. However, in case of flash renumbering without explicit signalling the router SHOULD be able change the link-local address of an interface following renumbering events, to help hosts detect prefix changes and update their configuration accordingly.

What to Do When a Prefix Changes?

RFC4861, Section 6.2.8

"If a router changes the link-local address for one of its interfaces, it SHOULD inform hosts of this change. The router SHOULD multicast a few Router Advertisements from the old link-local address with the Router Lifetime field set to zero and also multicast a few Router Advertisements from the new link-local address. The overall effect should be the same as if one interface ceases being an advertising interface, and a different one starts being an advertising interface."

No updates needed!

Unreachable Gateway

RFC4861, Section 6.3.6

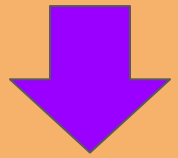
"Routers that are reachable or probably reachable (i.e., in any state other than INCOMPLETE) SHOULD be preferred over routers whose reachability is unknown or suspect (i.e., in the INCOMPLETE state, or for which no Neighbor Cache entry exists)...When no routers on the list are known to be reachable or probably reachable, routers SHOULD be selected in a round-robin fashion"

RFC8028:

"A host SHOULD select default routers for each prefix it is assigned an address in. Routers that have advertised the prefix in their Router Advertisement message SHOULD be preferred over routers that do not advertise the prefix"

Update to RFC8028

"Routers that have advertised the prefix in their Router Advertisement message SHOULD be preferred over routers that do not advertise the prefix"



"Routers that **are reachable or probably reachable (i.e., in any state other than INCOMPLETE) and** have advertised the prefix in their Router Advertisement message SHOULD be preferred over routers that do not advertise the prefix"

Next Steps

- Is it a good idea?
- Comments/suggestions?
- Adoption?
  - Shall it be merged with slaac-renum?