

Conditional Router Advertisements for Enterprise PA Multihoming

[draft-linkova-v6ops-conditional-ras-01](#)

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Problems with PA Multihoming

Q: How to send packets to the correct uplink (BCP38)?

Q: How to implement policies?

Q: How to react to links failure/recovery?

WITHOUT NAT!

IETF96, July 2016

"Enterprise Multihoming using Provider-Assigned Addresses without Network Prefix Translation: Requirements and Solution" I-D^(*)

- attempts to define a complete solution to the problem;
- relies on SADR and the default address selection Rule 5.5
 - "Prefer addresses in a prefix advertised by the next-hop."

(*) IETF96 v6ops slides

What Can Be Done Right Now, Right Here?

Q: How to send packets to the correct uplink (BCP38)?

A: ~~Source Address Dependent Routing (SADR)~~

Policy-Based Routing/Filtering

**NO
NAT!**

Q: How to implement policies?

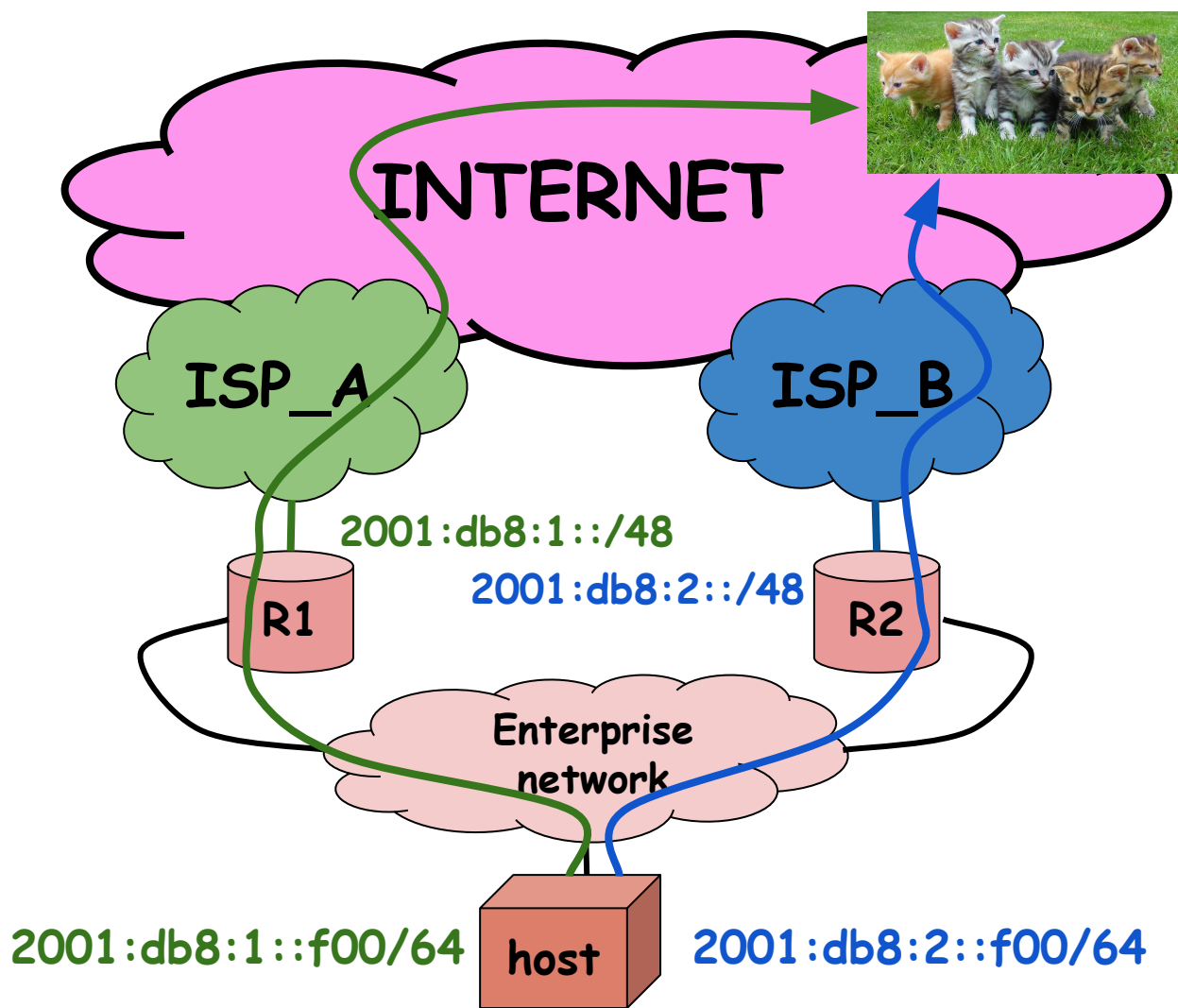
Q: How to react to link failure and recovery?

A: Influence source address & next-hop selection on hosts

w/o Rule 5.5 by deprecating undesirable prefixes

Selecting the Uplink

- Two uplinks used for Internet access (primary/backup or active/active)
- Simple network topology
- Each ISP allocates a prefix
- Packets **SHOULD NOT** be sent to the uplink if
 - It's backup uplink and the primary one is up
 - The packet source address does not belong to that ISP



Influencing the Source Address Selection

If the primary uplink is operational

Address from the backup prefix **SHOULD NOT** be used

If the ISP uplink fails

Addresses from that ISP prefix **SHOULD NOT** be used

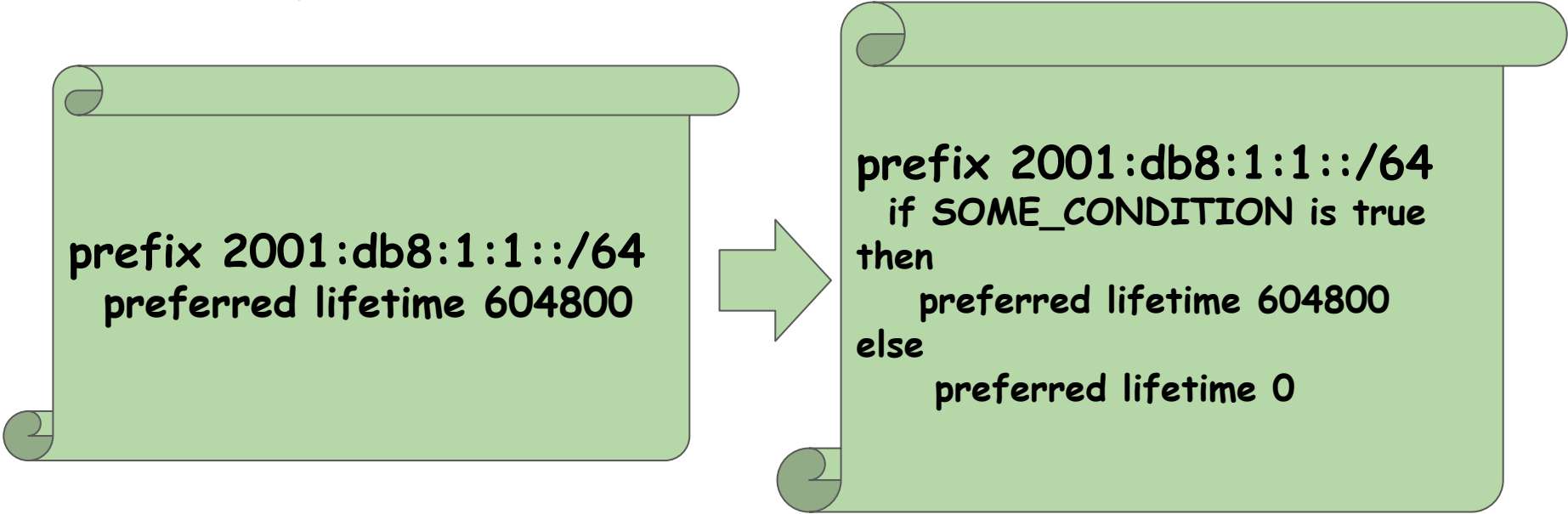
deprecate the address



Proposed Approach

RA fields values are set based on the present network state

("conditionally")



```
prefix 2001:db8:1:1::/64
preferred lifetime 604800
```

```
prefix 2001:db8:1:1::/64
  if SOME_CONDITION is true
  then
    preferred lifetime 604800
  else
    preferred lifetime 0
```


Potential Triggers

- Interface state
- Route presence

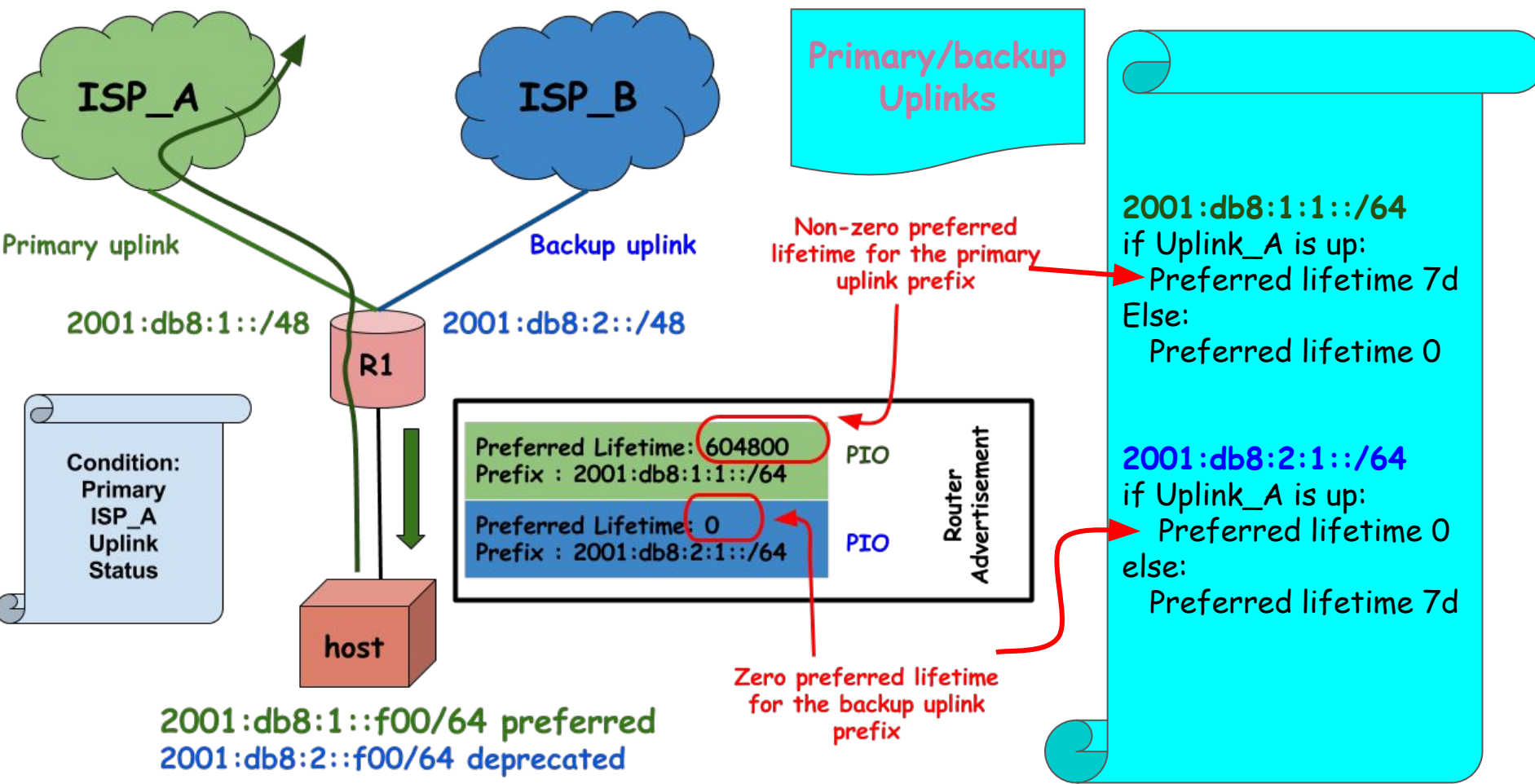
...anything else?

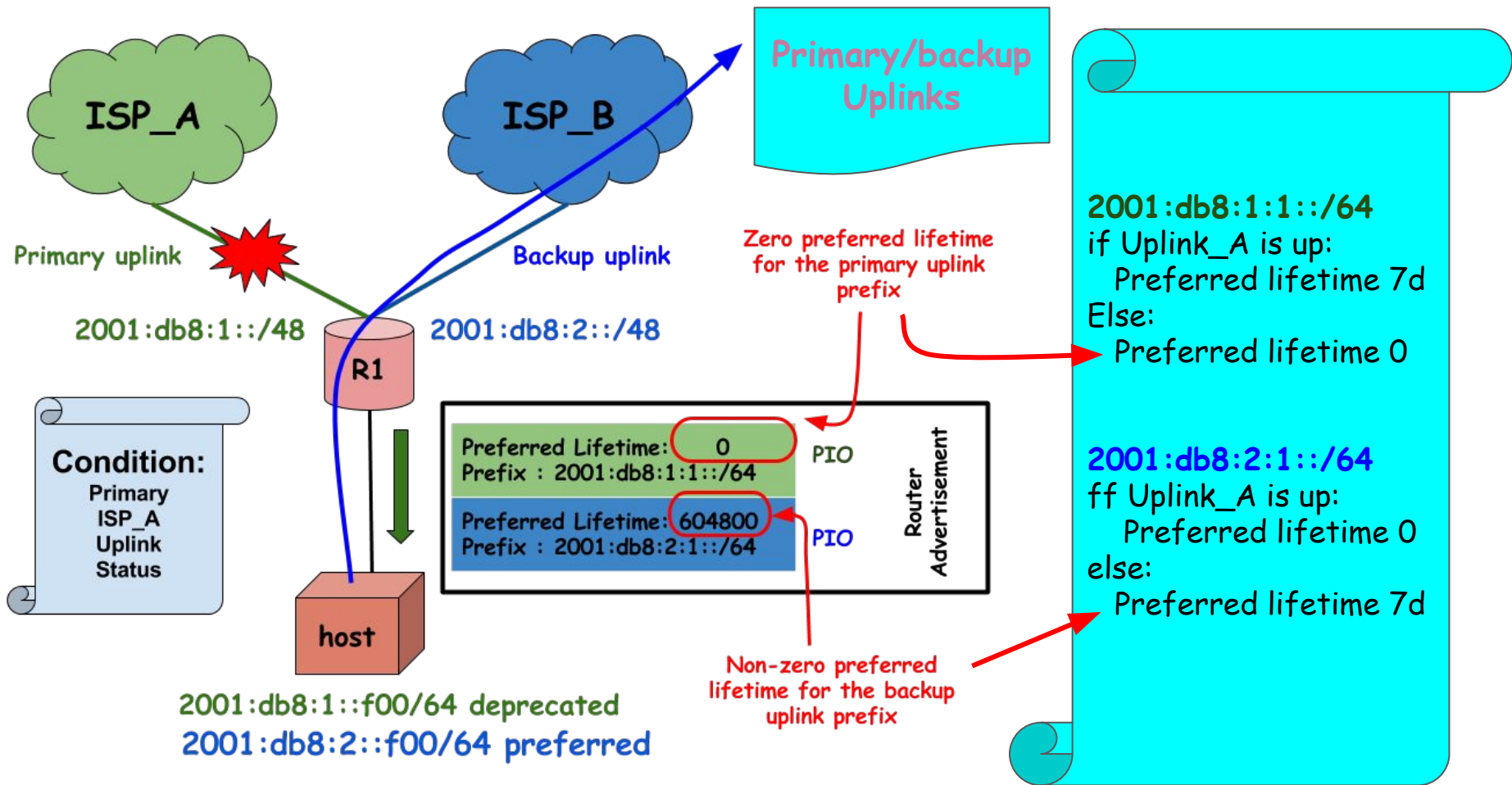
Fields to Be Updated

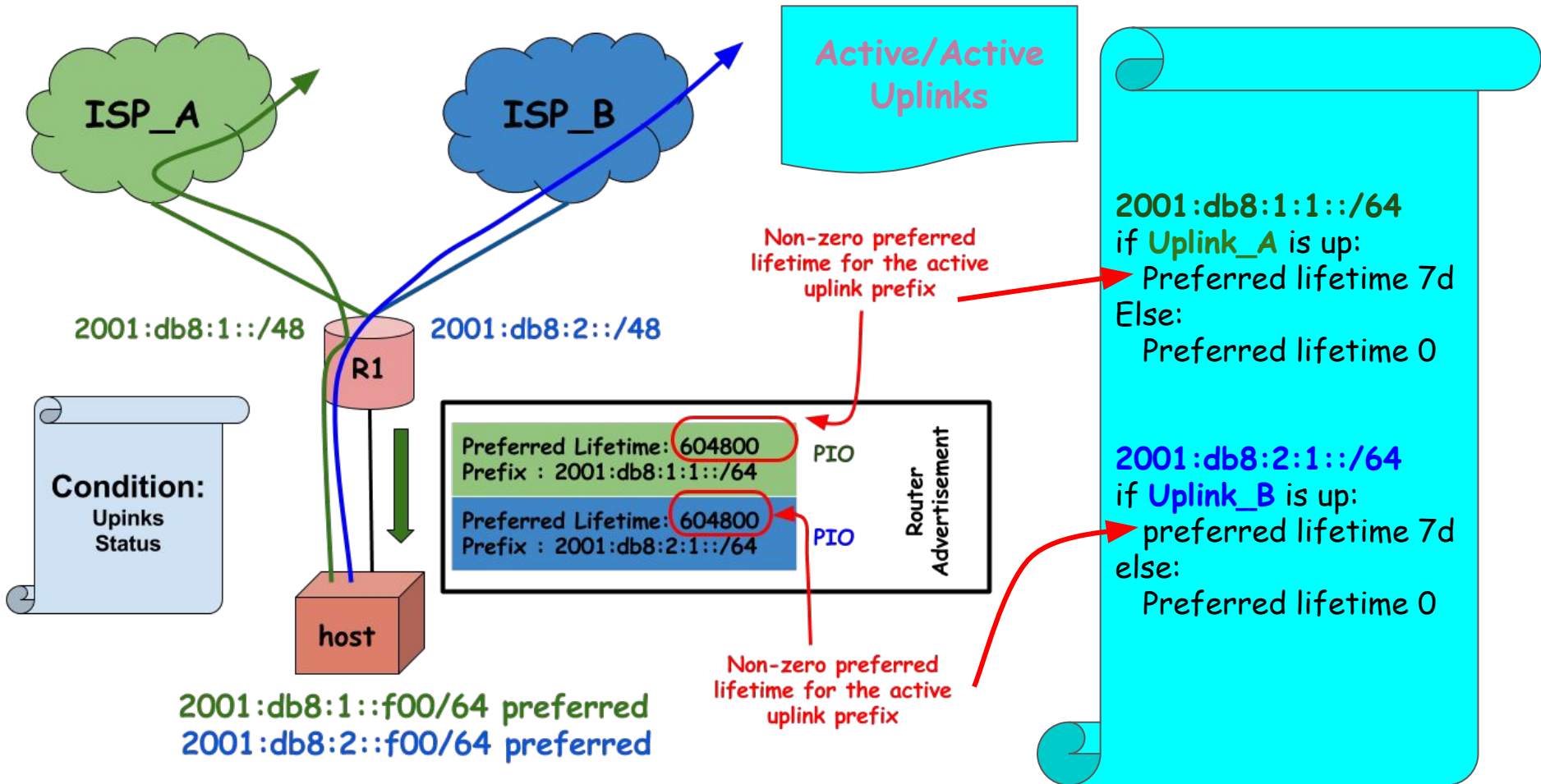
- PIO Preferred
Lifetime
- Router Lifetime

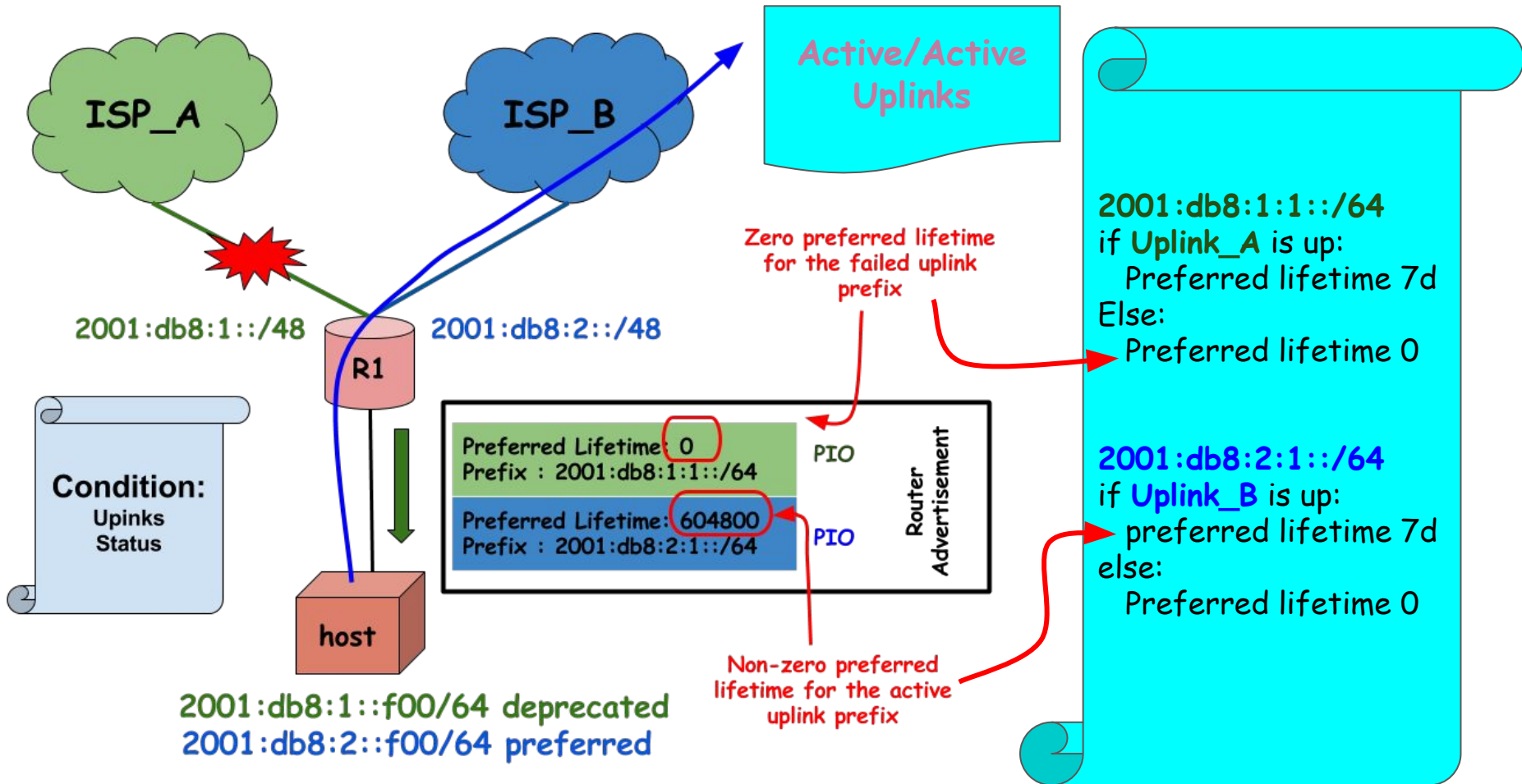
...anything else?

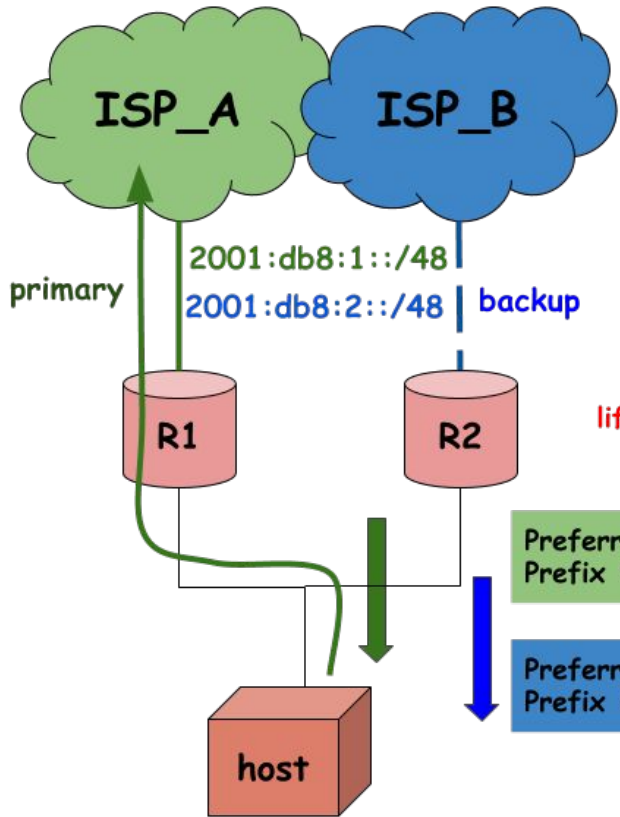
Examples











Primary/Backup Uplinks, Two Routers

Preferred Lifetime: 604800
Prefix : 2001:db8:1:1::/64
R1 PIO

Preferred Lifetime: 0
Prefix : 2001:db8:2:1::/64
R2 PIO

2001:db8:1:1::f00/64 preferred
2001:db8:2:1::f00/64 deprecated

Non-Zero preferred lifetime for the primary uplink prefix

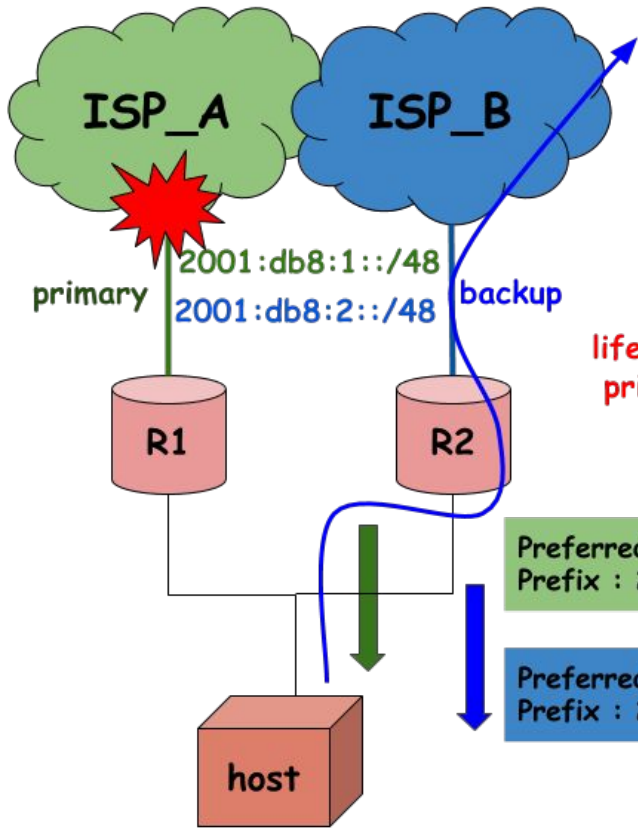
Zero preferred lifetime for the backup uplink prefix

R1 Policy:

2001:db8:1:1::/64
if Uplink_A is up:
Preferred lifetime 7d
Else:
Preferred lifetime 0

R2 Policy:

2001:db8:2:1::/64
if Uplink_A_route::
Preferred lifetime 0
else:
Preferred lifetime 7d



Primary/Backup Uplinks, Two Routers

Zero preferred lifetime for the failed primary uplink prefix

Preferred Lifetime: 0
Prefix : 2001:db8:1:1::/64

R1 PIO

Preferred Lifetime: 604800
Prefix : 2001:db8:2:1::/64

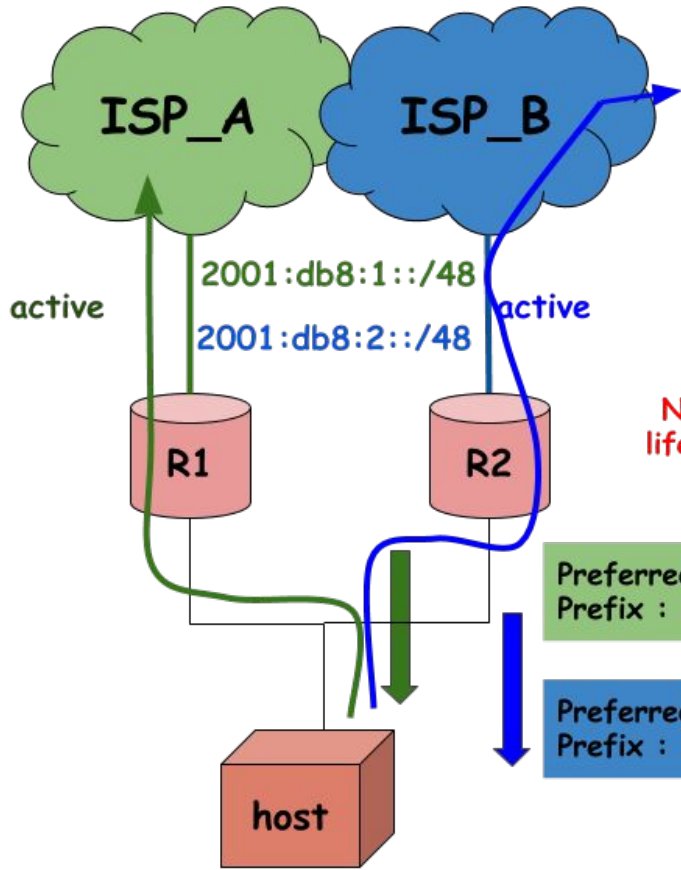
R2 PIO

2001:db8:1:1::f00/64 deprecated
2001:db8:2:1::f00/64 preferred

Non-Zero preferred lifetime for the backup uplink prefix

R1 Policy:
2001:db8:1:1::/64
if Uplink_A is up:
Preferred lifetime 7d
Else:
Preferred lifetime 0

R2 Policy:
2001:db8:2:1::/64
if Uplink_A_route:
Preferred lifetime 0
else:
Preferred lifetime 7d



Active/Active Uplinks,
Two Routers

Non-Zero preferred
lifetime for the active
uplink prefix

Preferred Lifetime: 604800
Prefix : 2001:db8:1:1::/64

R1 PIO

Preferred Lifetime: 604800
Prefix : 2001:db8:2:1::/64

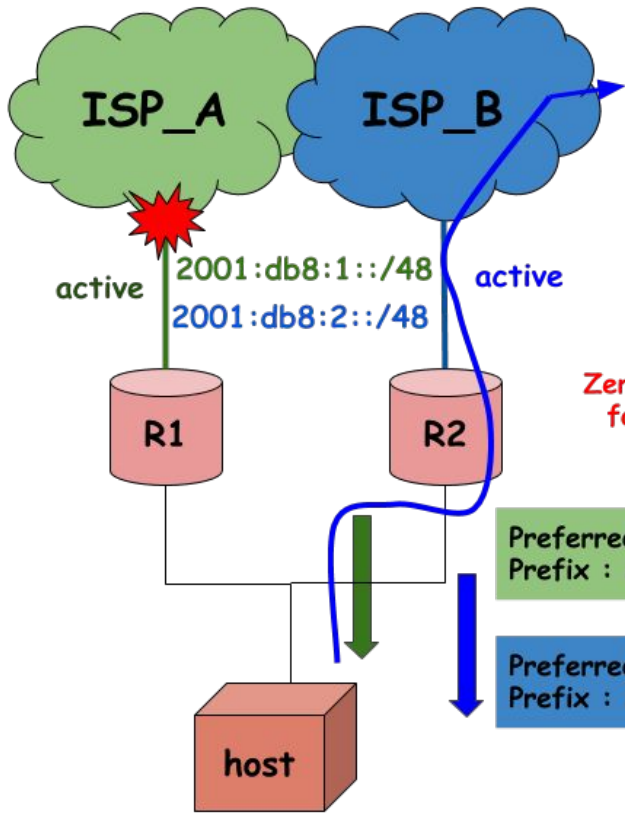
R2 PIO

Non-Zero preferred
lifetime for the active
uplink prefix

2001:db8:1:1::f00/64 preferred
2001:db8:2:1::f00/64 preferred

R1 Policy:
2001:db8:1:1::/64
if Uplink_A is up:
Preferred lifetime 7d
Else:
Preferred lifetime 0

R2 Policy:
2001:db8:2:1::/64
if Uplink_B is up:
preferred lifetime 7d
else:
Preferred lifetime 0



2001:db8:1:1::f00/64 deprecated
 2001:db8:2:1::f00/64 preferred

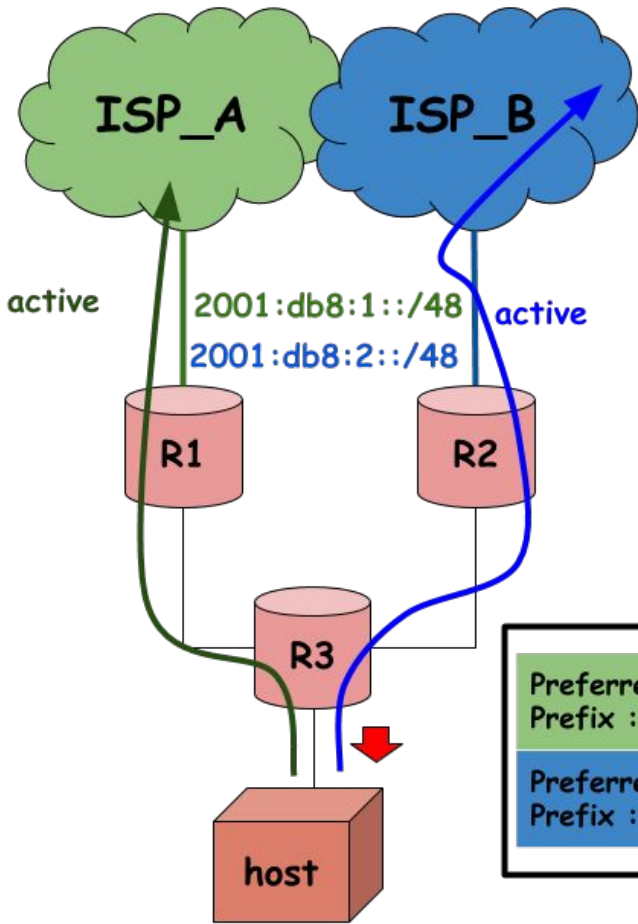
Active/Active Uplinks,
 Two Routers

Zero preferred lifetime
 for the failed uplink
 prefix

Non-Zero preferred
 lifetime for the active
 uplink prefix

R1 Policy:
 2001:db8:1:1::/64
 if Uplink_A is up:
 Preferred lifetime 7d
 Else:
 Preferred lifetime 0

R2 Policy:
 2001:db8:2:1::/64
 if Uplink_B is up:
 preferred lifetime 7d
 else:
 Preferred lifetime 0



Active/Active Uplinks, Dedicated Border Routers

Non-Zero preferred
lifetime for the active
uplink prefix

Preferred Lifetime: 604800	PIO	Router Advertisement
Prefix : 2001:db8:1:1::/64		
Preferred Lifetime: 604800	PIO	
Prefix : 2001:db8:2:1::/64		

Non-Zero preferred lifetime for
the active uplink prefix

R3 Policy:

2001:db8:1:1::/64
if Uplink_A_route:
Preferred lifetime 7d
Else:
Preferred lifetime 0

2001:db8:2:1::/64
if Uplink_B_route:
preferred lifetime 7d
else:
Preferred lifetime 0

2001:db8:1:1::f00/64 preferred
2001:db8:2:1::f00/64 preferred

et cetera, et cetera...