Problem Statement about IPv6 Support for Multiple Routers, Multiple Interfaces, and Multiple Prefixes
(draft-gont-v6ops-multi-ipv6)

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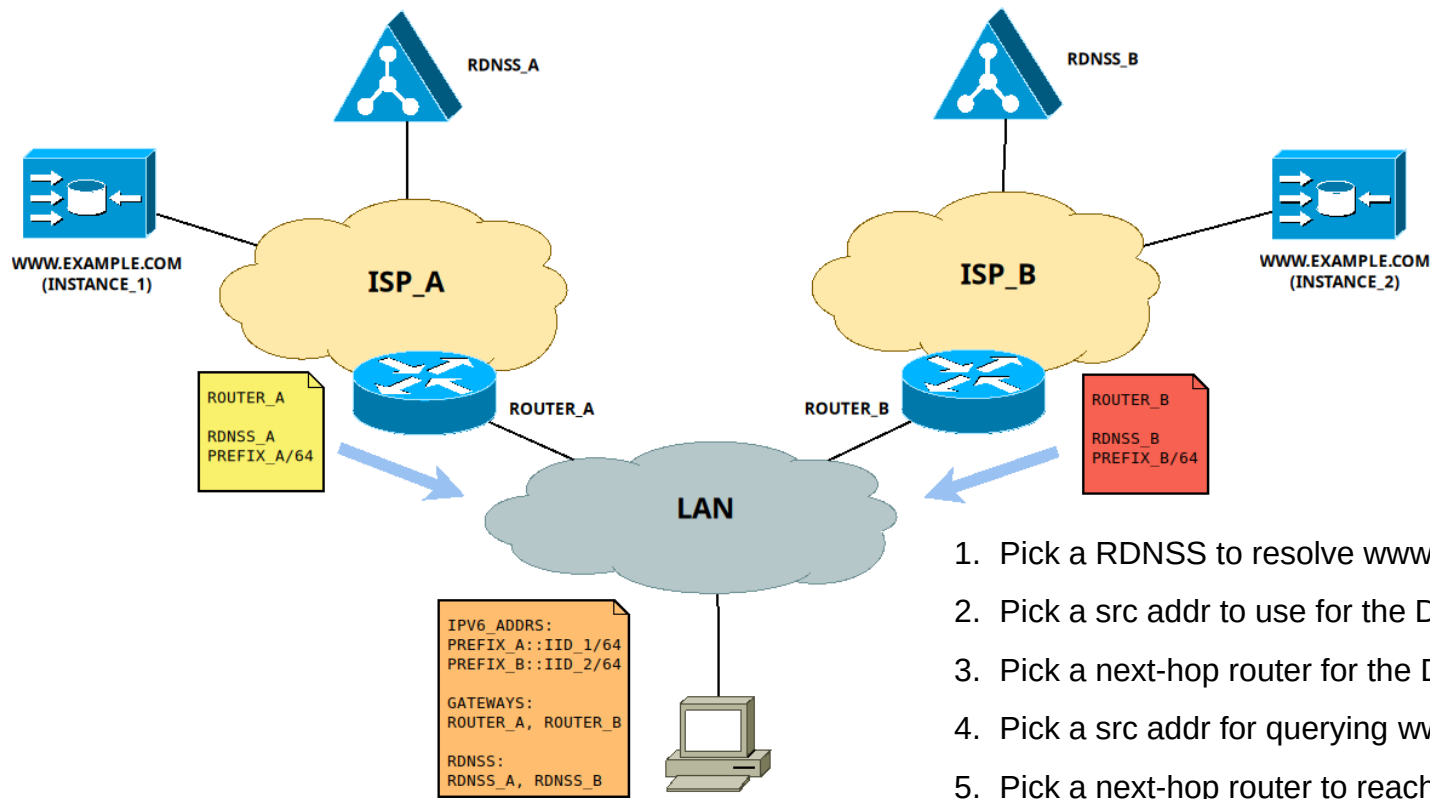Bangkok, Thailand. March 15-21, 2025

Goals of this document

- Define the problem statement for IPv6 support for **simple** Multi-IPv6 -- i.e., acknowledge the problem.

- Define a limited number of **simple scenarios** to be improved, and use them to:

  - Provide advice on what should happen in each case

  - Serve as test cases for any solution in this space

- Trigger protocol specification work (6man), to improve host robustness for these **simple** multi-ipv6 scenarios via:

  - **Host-side (only!)** improvements

  - **No new mechanisms on the router side** (i.e., no SLAAC router changes)

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Problem Statement

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Multi-(Router, Interface, Prefix) (multi-ipv6)

- Scenarios with multiple routers, multiple interfaces, and/or multiple prefixes are quite common. They include:

  - A laptop connects to the Internet via Ethernet & WiFi interfaces

  - SOHO connects to the Internet via two ISPs and associated CPE routers

- Support for these scenarios has been poor (if at all present):

  - Breakage is sometimes avoided by employing only one interface at a time, or,

  - Otherwise things just break badly

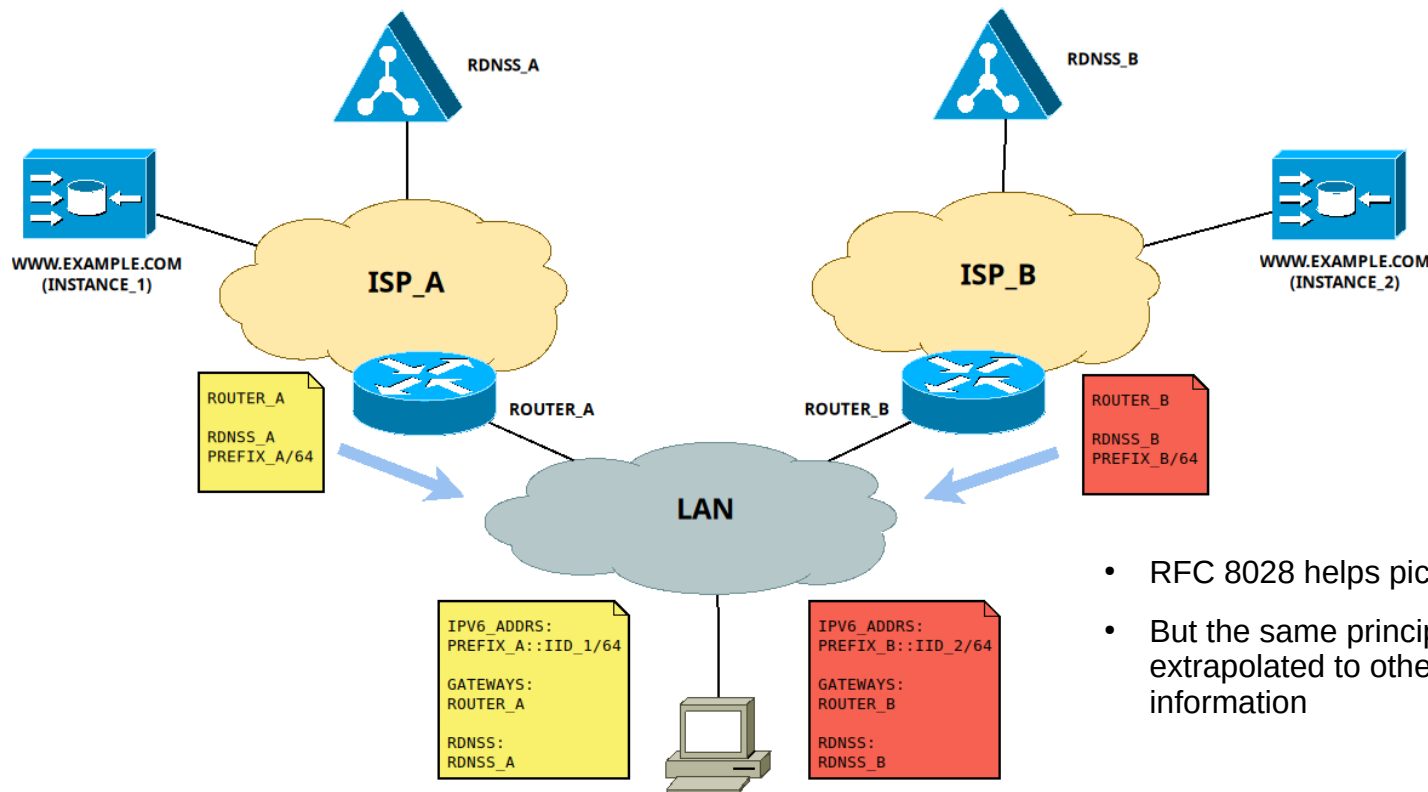- Host robustness should be improved for these simple scenarios.

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Common Multi-ipv6 Scenario

RDNSS_A

RDNSS_B

WWW.EXAMPLE.COM
(INSTANCE_1)

ISP_A

ISP_B

WWW.EXAMPLE.COM
(INSTANCE_2)

ROUTER_A

RDNSS_A
PREFIX_A/64

ROUTER_A

ROUTER_B

ROUTER_B

RDNSS_B
PREFIX_B/64

LAN

IPV6_ADDRS:
PREFIX_A::IID_1/64
PREFIX_B::IID_2/64

GATEWAYS:
ROUTER_A, ROUTER_B

RDNSS:
RDNSS_A, RDNSS_B

1. Pick a RDNSS to resolve www.example.com

2. Pick a src addr to use for the DNS query

3. Pick a next-hop router for the DNS query packets

4. Pick a src addr for querying www.example.com

5. Pick a next-hop router to reach www.example.com

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Multi-IPv6 Scenarios

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Scenario #1: Multi-Router, Multi-Prefix

- RFC 8028 helps pick a next-hop
- But the same principle should be extrapolated to other advertised information

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Scenario #2: Multi-Router, Multi-Prefix Failover
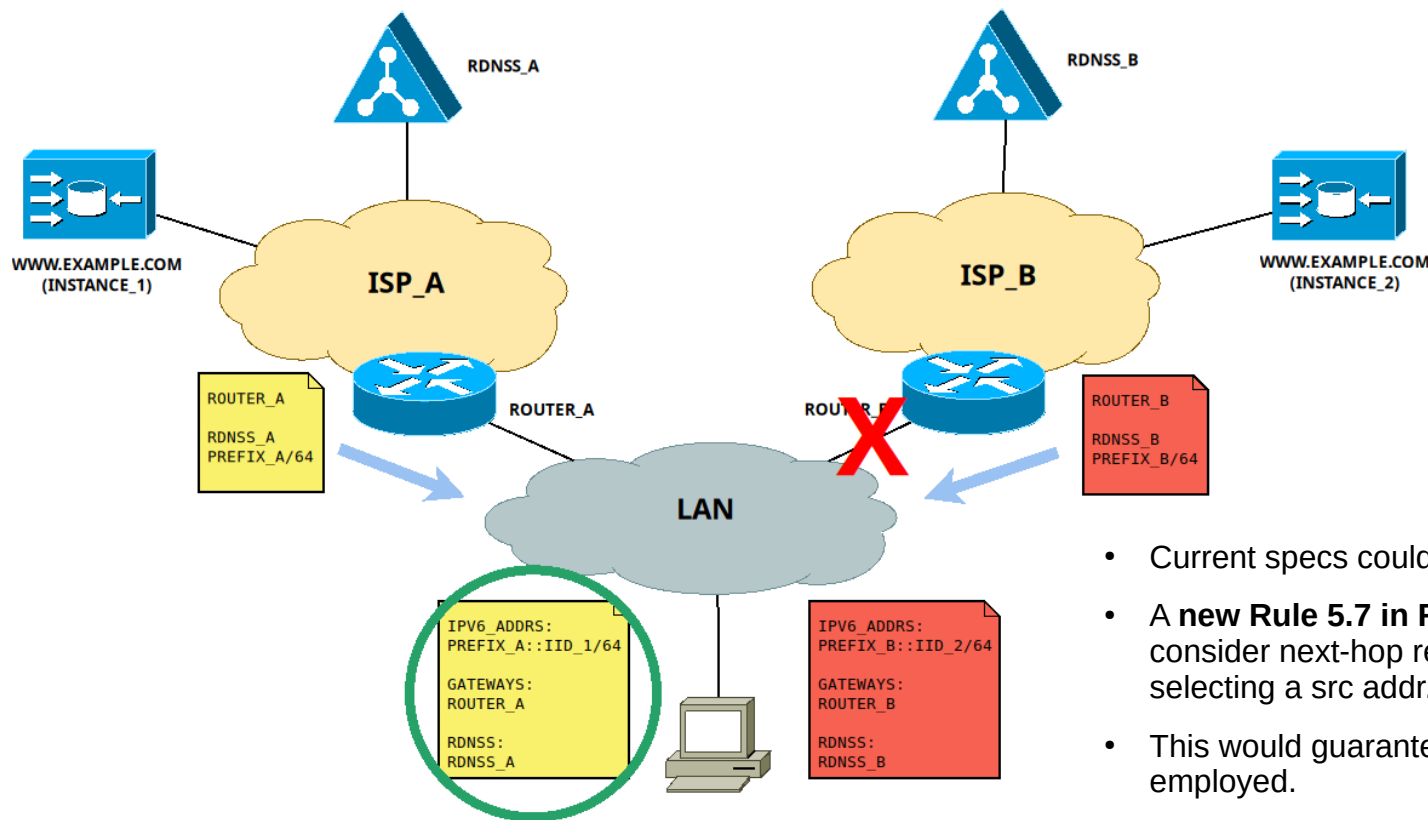
- Current specs could still employ ISP_B

- A **new Rule 5.7 in RFC 6724** could consider next-hop reachability when selecting a src addr.

- This would guarantee that ISP_A is employed.

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Scenario #5: Conflicting information
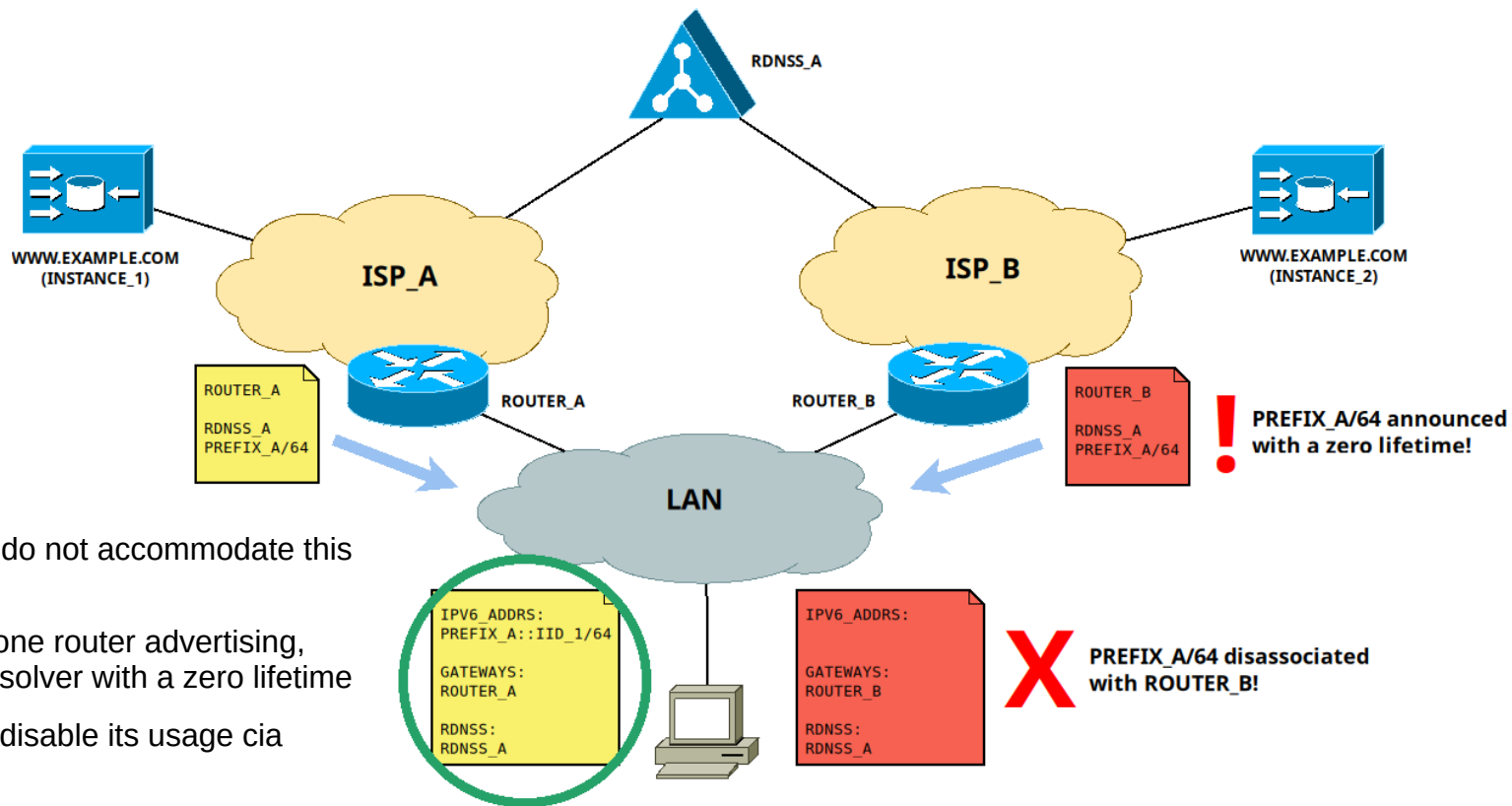
- Current specs do not accommodate this scenario
- Consider e.g. one router advertising, say a public resolver with a zero lifetime
- This shouldn't disable its usage cia other routers

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Next-steps

- Comments/Questions?

- Adopt as wg document?

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