Source Address Selection Policy Distribution for Multihoming

draft-arifumi-multi6-sas-policy-dist-00

draft-arifumi-ipv6-nd-source-address-selection-opt-01

draft-hirotaka-dhc-source-address-selection-opt-00

Arifumi Matsumoto

arifumi@nttv6.net

IP Network Technology Team, NTT

# Source Address Selection Problem -Case 1-

- Two or more Internet connectivity
  - When src and next-hop doesn't match, packets will be dropped by ISP's Ingress Filtering
  - End node never knows which src should be used for which dst.
  - RFC 3484 longest match doesn't solve this problem.

The Internet

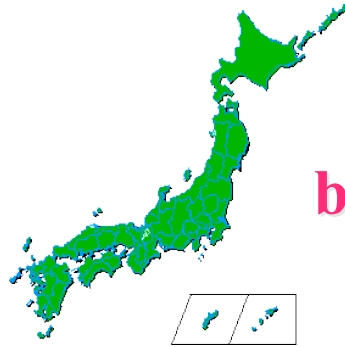ISP-A ISP-B

A::1 B::1

end-node
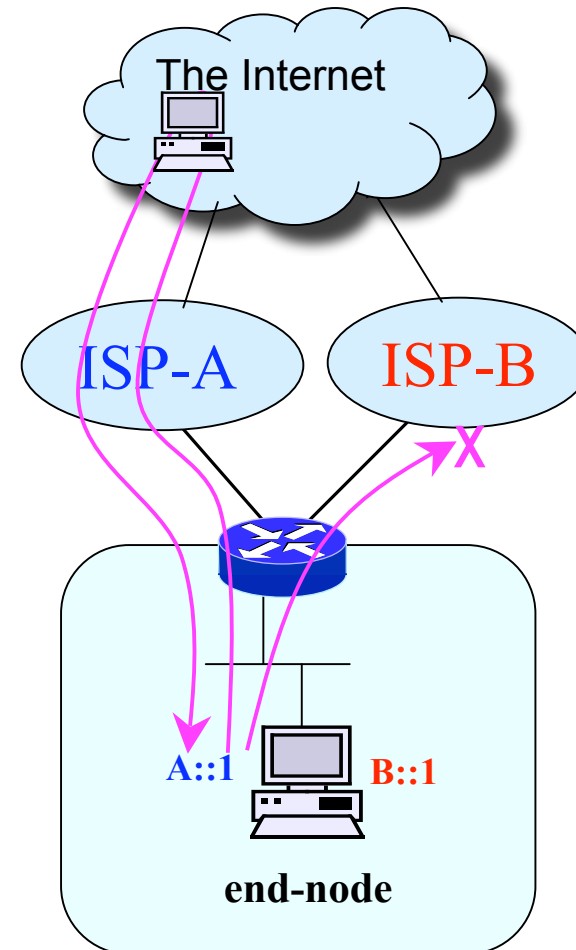
Source Address Selection Problem -Case 2-

- Global-closed mixed connectivity has serious problem.
  - A packet with a wrong src address never returns, regardless of Ingress Filtering
  - It's closed because of …
    - Security (VPN)
    - Service separation for better control (Multicast, QoS)

The Internet
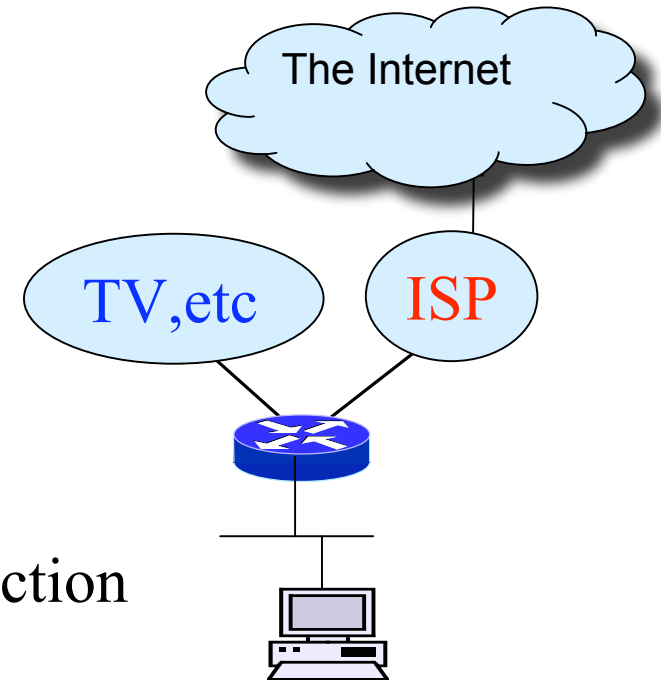
Closed Network

?

WGP-A

ISP-B

A::1   B::1
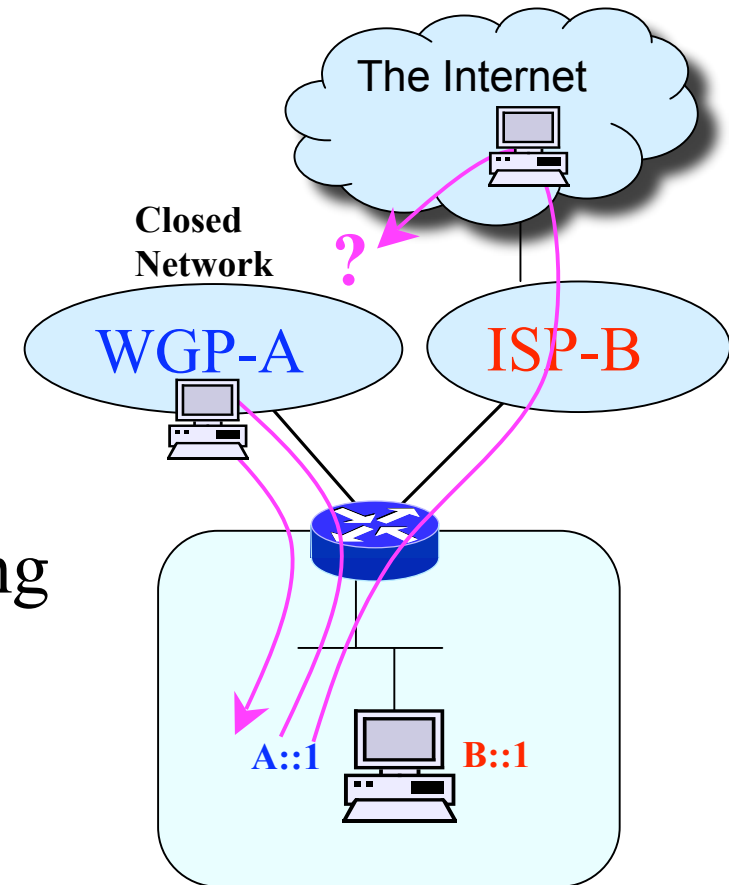
In a country…

**18,000,000
broad-band users !**

- Half of the broad-band users fall into the global-closed mixed case.
- Closed network services are:
  - TV streaming, TV-Phone, File Sharing…
  - on IPv6 already!
- This country is gonna be facing a great difficulty because of source address selection problem.

The Internet

TV,etc   ISP

Our Approach: **Distribute Source Address Selection Policy**

- RFC3484 defines an address selection method
  - Each IPv6 node has Policy Table for address selection
  - Good policy enables an IPv6 node to select an appropriate src address for a given dst prefix
- But, no protocol to distribute the policy
  - Need a mechanism for policy distribution
  - Esp. automatic policy distribution will be important in un-managed networks (residential or SOHO network)

Distribution of Source Address Selection Policy
- Global-closed Mixed -

Internet
::/0

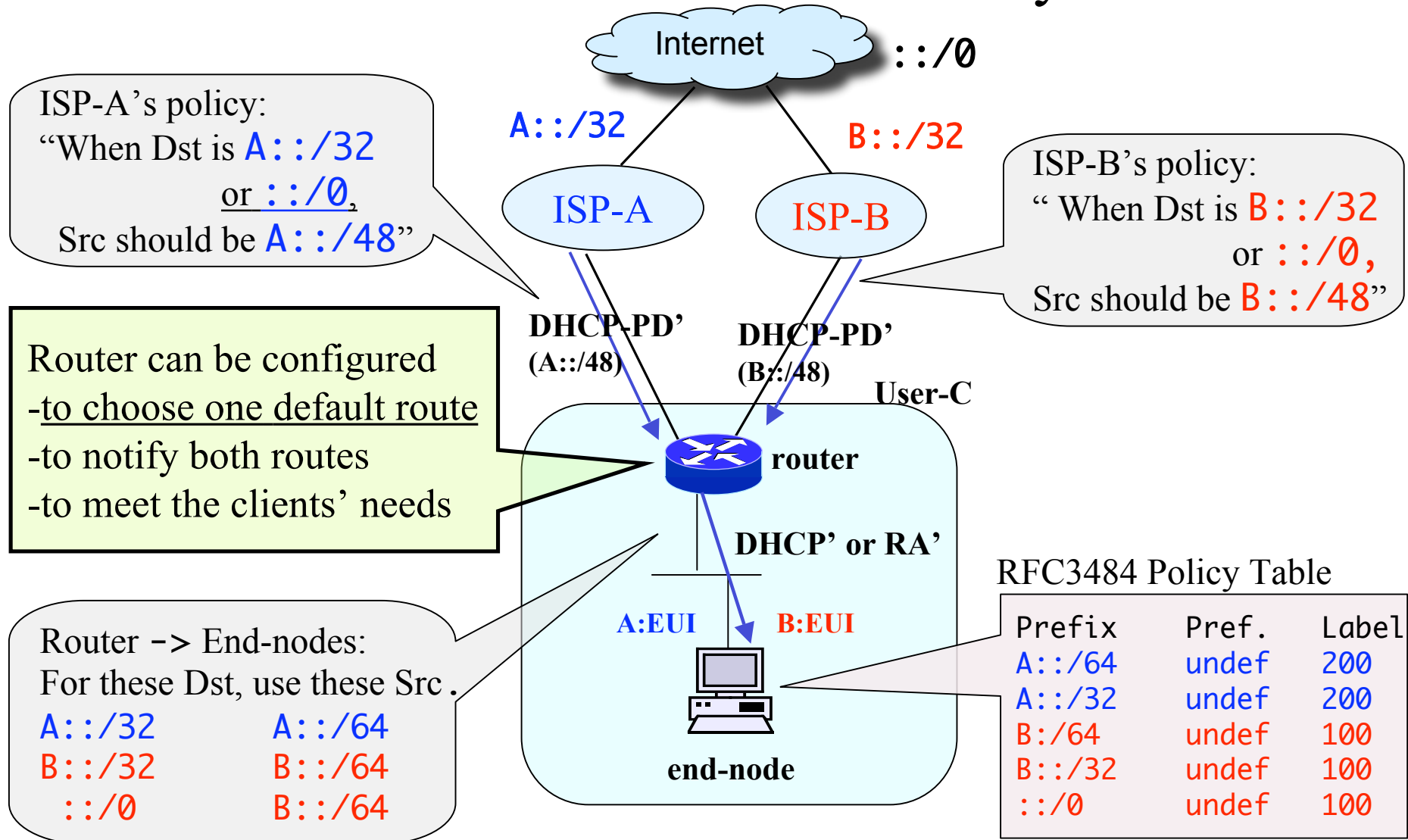Allocated: A::/32
Reachable: A::/32
Delegate user-C: A::/48

A::/32
ISP-A

B::/32
ISP-B

Allocated: B::/32
Reachable: B::/32, ::/0
Delegate user-C: B::/48

ISP-A's policy:
"When Dst is A::/32,
Src should be A::/48"

DHCP-PD'
(A::/48)

DHCP-PD'
(B::/48)

ISP-B's policy:
"When Dst is B::/32
           or ::/0,
Src should be B::/48"

router   User-C

DHCP' or RA'

Router -> End-nodes:
For these Dst, use these Src.
A::/32   A::/64
B::/32   B::/64
 ::/0   B::/64

A::1   B::1

end-node

RFC3484 Policy Table

Prefix	Pref.	Label
A::/64	undef	200
A::/32	undef	200
B:/64	undef	100
B::/32	undef	100
::/0	undef	100

Distribution of Source Address Selection Policy
- Two Global Connectivity -

Internet ::/0

A::/32

B::/32

ISP-A

ISP-B

ISP-A's policy:
"When Dst is A::/32
  or ::/0,
Src should be A::/48"

ISP-B's policy:
" When Dst is B::/32
  or ::/0,
Src should be B::/48"

DHCP-PD'
(A::/48)

DHCP-PD'
(B::/48)

User-C

Router can be configured
- to choose one default route
- to notify both routes
- to meet the clients' needs

router

DHCP' or RA'

Router -> End-nodes:
For these Dst, use these Src.
A::/32   A::/64
B::/32   B::/64
 ::/0   B::/64

A:EUI   B:EUI

end-node

RFC3484 Policy Table

Prefix	Pref.	Label
A::/64	undef	200
A::/32	undef	200
B:/64	undef	100
B::/32	undef	100
::/0	undef	100

Discussions

- Why DHCP-PD, instead of RIPng or OSPF ?
  - The info. itself is same, the usage is different.
  - SAS policy should be more stable than routing info.
  - Routing protocol impl. cannot be adopted as is.
- RA or DHCP ?
  - DHCP is preferable in data length.
  - RA is lightweight and simple.

Summary

- We proposed a method to distribute SAS Policy from ISPs to end-nodes

- With regard to Multi6 WG activity,
  - Our method provides failure avoidance, but not perfect(end-to-end) failure detection nor immediate failure recovery
  - Target time-scale might be different: our method can be used sooner.

- Our method isn't a entire multi-homing solution, but a necessity for a lot of networks.

Questions or Comments ?