



An Operational Solution for IPv6 Multihoming

MULTI6@IETF59

Mar. 3, Seoul

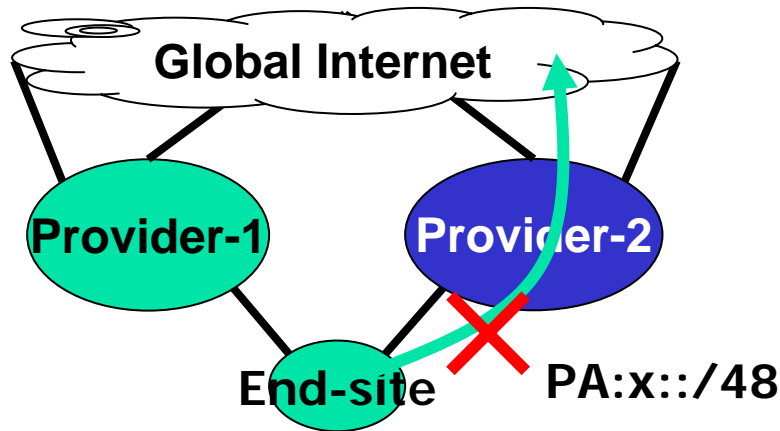
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Issue

- Site multihoming is difficult because routability of end-site with a specific route is not guaranteed
 - Aggregate routes can only be advertised globally.
 - Customer sites are assigned specific routes from a provider, which cannot be advertised through other providers.





Our Approach

- Goal

- No affect on the global routing table
- But end-sites assigned a specific route can be multihomed

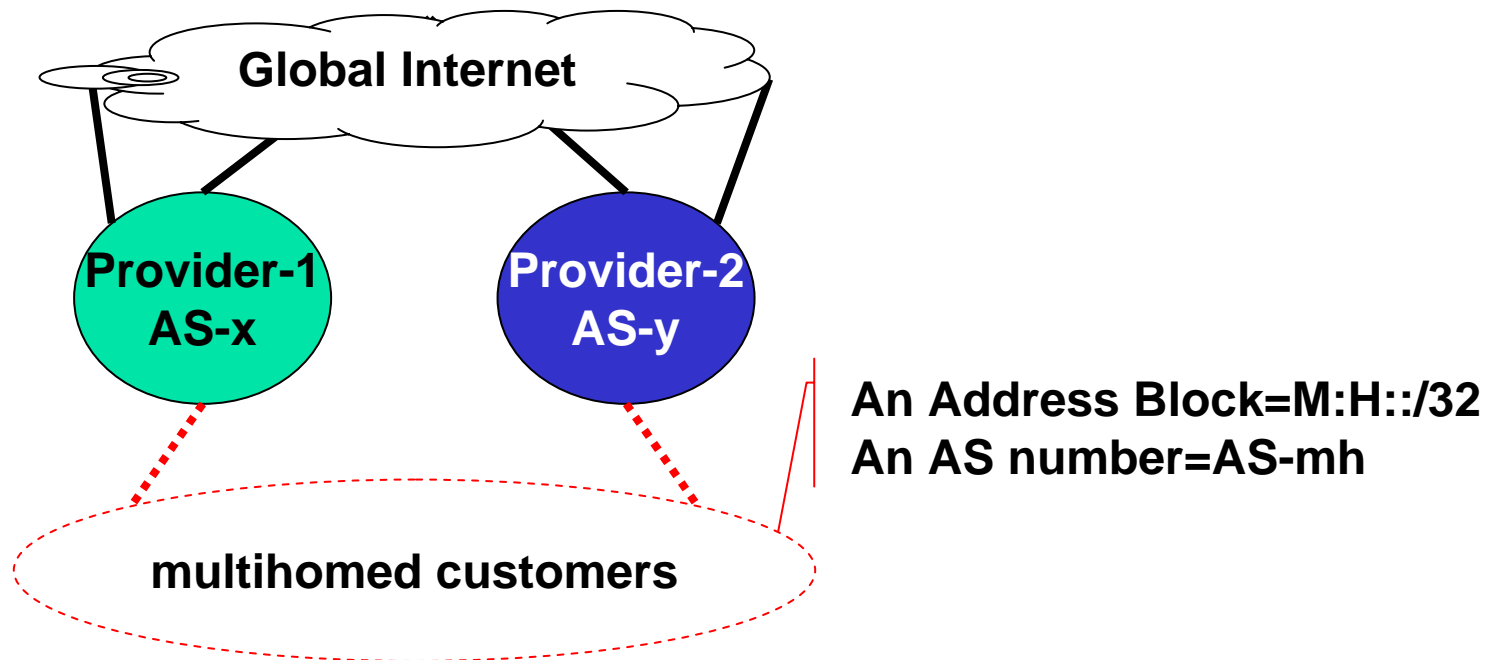
- An Operational Solution

- Based on current routing practices
 - New protocol or system is not required
- Not all the cases are solved
 - Mainly for enterprise customers who need redundancy in some region with at least two upstream providers.

Solution

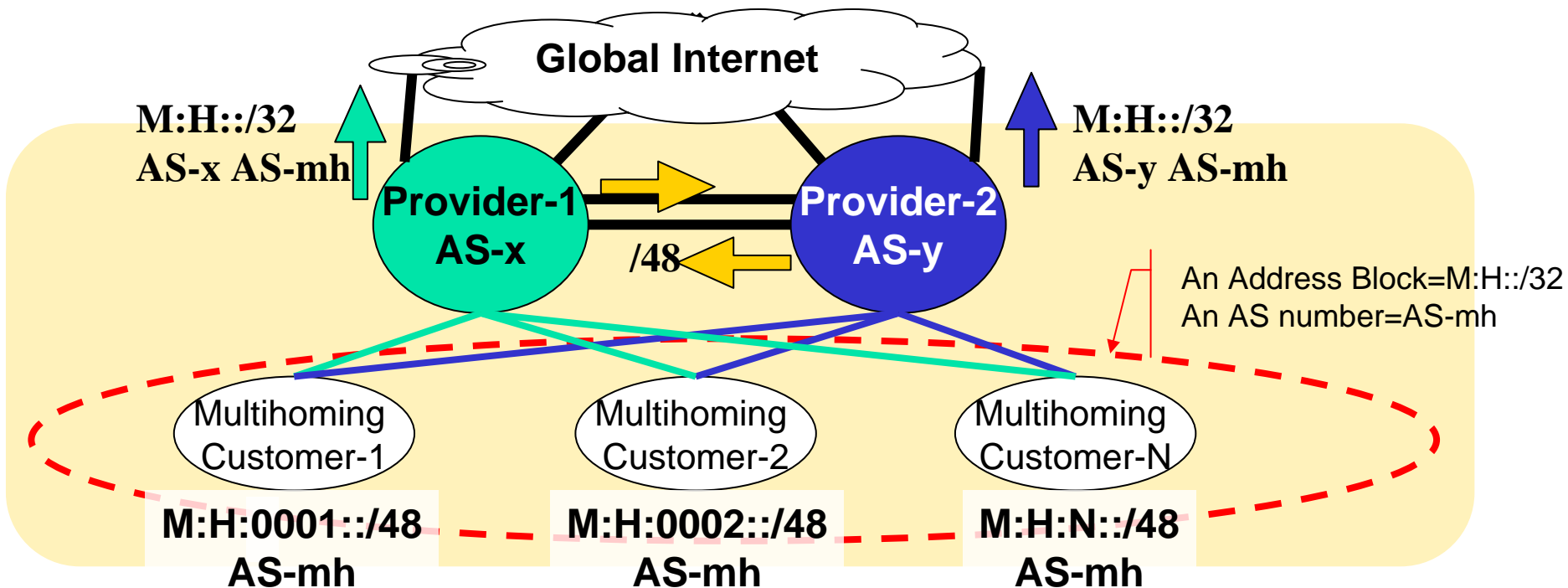
- Prerequisites

- One address block of /32 and one AS number
- Two providers co-operating on multihoming



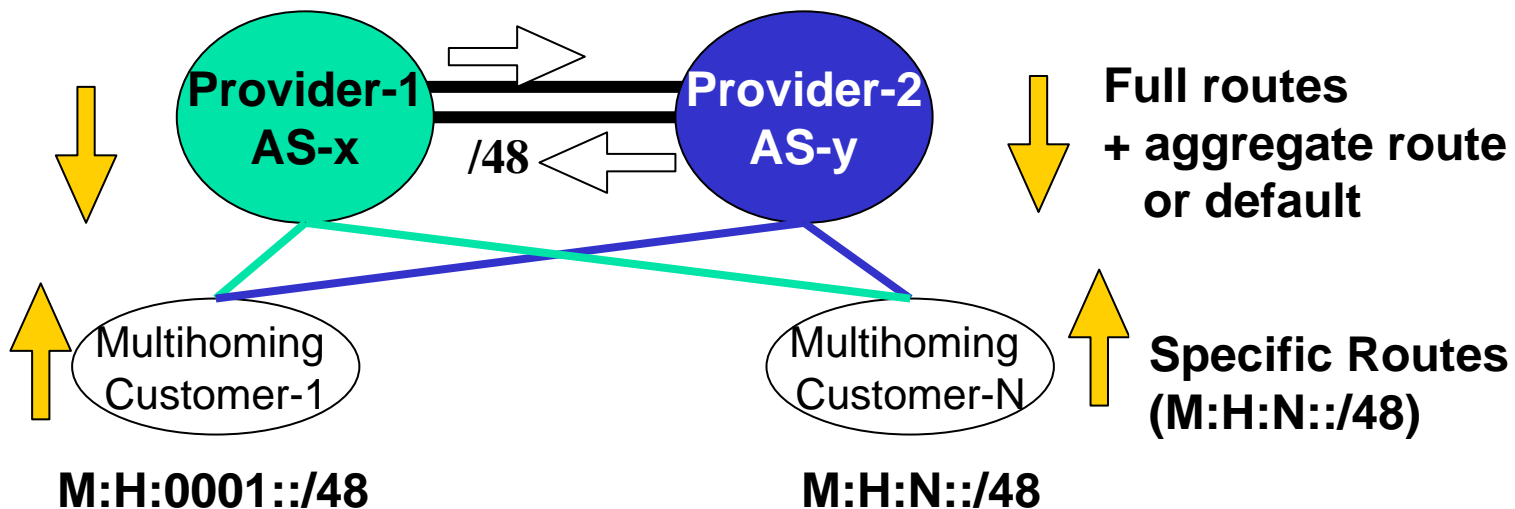
Solution (cont.)

- Assign /48 to multihoming customers
- But advertise only aggregated route /32 to the global Internet
- Localize specific routes in two providers



Solution (cont.)

- One example implementation inside providers
 - Customers advertise assigned /48 to both providers via BGP
 - Providers advertise aggregate route or default route as well as full routes to customers
 - aggregate route or default route is for the reachability to the other multihoming customers





Benefit

- Jump start
 - Current routing practices can be applied
- Resource shared
 - One address block and one AS number can be shared with many multihoming customers if the upstream providers are same
 - up to 2^{16} customers



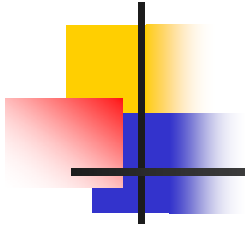
Discussion

- Address and AS number exhaustion?
 - The combination of providers is explosive; however, the combination of providers that can cooperate together with mutual trust is NOT so explosive.
 - RIRs can control the allocation of multihoming address and ASN with some regulations
 - for instance, 200 multihoming customers within two years



Summary

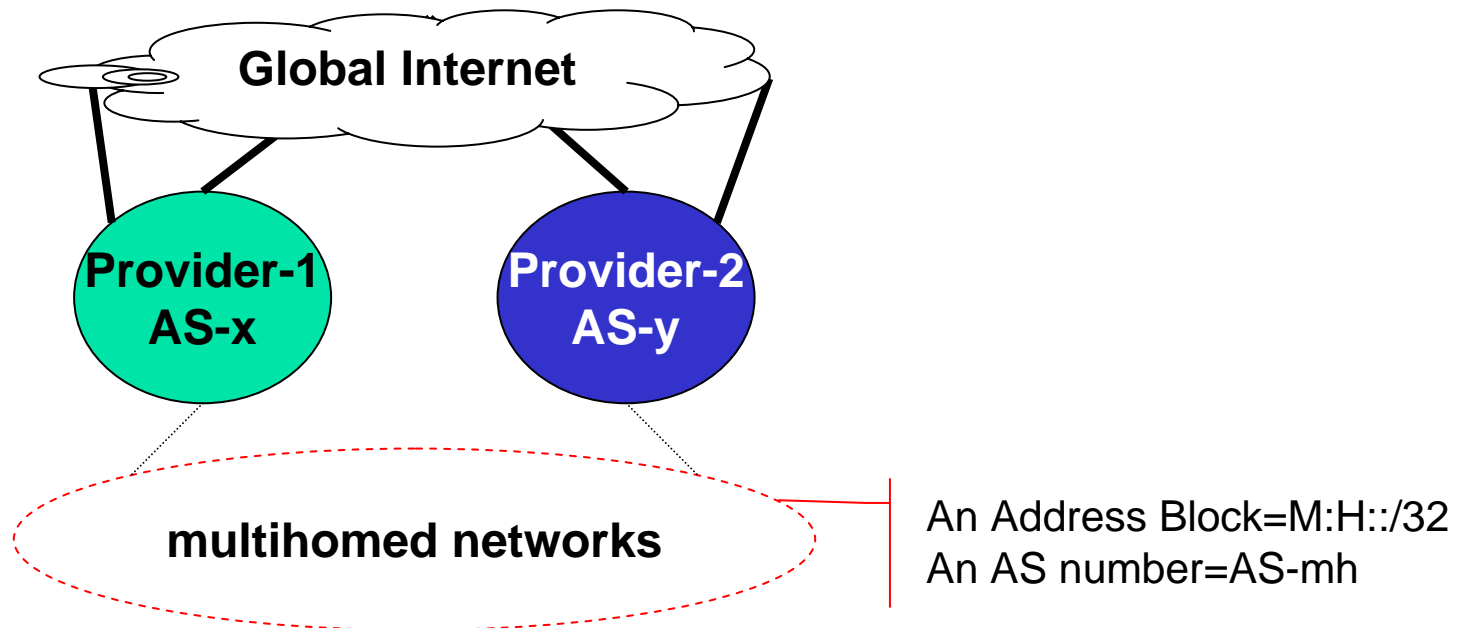
- Target
 - Mainly enterprise customers.
- Approach
 - One address block and one AS number are used for multihoming customers.
 - Two providers cooperate to offer multihoming service.
 - Advertising only aggregate route to the Internet
 - Ensuring redundancy by exchanging specific routes inside
- Request
 - Some rules are made by the RIRs to allocate address blocks and AS numbers for this type of multihoming.



Questions?

Goals are achieved

- Global routing table is not affected
- Even an end-site with a specific route can have redundant network





Comparison to other proposals

- draft-savola-multi6-asn-pi-01
 - Restricted only to ASN holders, maximum 32k
 - our solution enables one address block and AS number to be shared by many multihomed customers if their upstream providers are same.
- draft-kurtis-multihoming-longprefix-00
 - Temporary solution because more specific routes are advertised
 - our solution does not advertise more specific routes.



Questions

- Customers cannot handle BGP easily
- The number of combination of two providers are explosive.
- Routing configuration becomes rather difficult
- Customers do not want locally multihomed network
- Address block and AS number will be exhausted