Controlling Traffic Offloading Using Neighbor Discovery Protocol



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- Current default address selection prefers IPv6 over IPv4 (default policy table on RFC3484).
- A Mif host may have IPv6 enabled on a more 'expensive' access (e.g. cellular) and a 'cheaper' access (e.g. Wi-Fi) may only have IPv4.
- There might be a need for a network managed solution to "guide" MIF hosts to prefer IPv4 in communication instead of IPv6 or prefer 'cheaper' accesses over 'expensive' accesses.
- DHCPv6 is not always preferred or available, thus consider also Neighbor Discovery Protocol as a 'command channel'.
- RFC4191 not always usable: e.g. no support for IPv4 traffic.



## Illustration of typical setup



## Solution proposal (experimental)



- A new option to Router Advertisement, which tells the network side address family preferences to the Mif host:
  - Coexists with RFC4191.
  - If present -> set new priorities; if absent -> not used and remove possible previous priorities.
- <u>L</u>ower-than-IPv4 Preference -> prefer any address than IPv6 tied to this interface, if just available..
- <u>D</u>efault IPv4 Gateway Preference -> use other interface for IPv4 traffic, if just available..





## Solution proposal cont'd

- The new option effectively affects/modifies the source address selection Rule 3:
  - The addresses SA and SB have the same scope.
  - If Lower\_than\_IPv4(SA) == true and No\_specific\_routes(D) == true, then mark SA temporarily as "deprecated".
  - If Lower\_than\_IPv4(SB) == true and No\_specific\_routes(D) == true, then mark SB temporarily as "deprecated".
  - If one of the two source addresses is "preferred" and one of them is "deprecated" (in the [RFC4862] sense), then prefer the one that is "preferred."
- Similar modification also concerns the destination address selection Rule 3 when checking whether a candidate source address for a given destination is deprecated.
- Do not modify 'policy table' as those changes are not trivially tied to a specific interfaces..



## Next steps and summary

- There is still verifications to do:
  - Implement and test how well it actually performs, especially against RFC4191. [IPv6 offloading works rather nicely using just RFC4191 – tested already..]
  - Race conditions..
- A lightweight approach for on-demand access and address selection prioritization controlled from the network side:
  - One interface can be 'selected' as the commanding interface..
  - Unfortunately has an end host impact..