IPv6 Subnet Model:
the Relationship between
Links and Subnet Prefixes

draft-wbeebee-on-link-and-off-link-determination-02

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Agenda

- Updates since IETF 70 and -01 version
- Recap: IPv4 Subnet Model
- IPv6 Subnet Model
- IPv6 interoperability issues that led to writing this draft

Note that draft doesn't add any new rules – it merely restates what is in RFC 4861

Updates since IETF 70

- Added Erik Nordmark as 3rd author
- Reorganized draft around IPv6 Subnet Model instead of just on-and-off-link determination
- Changed Abstract and Introduction to reflect new title
- Removed detailed sections 2.1-2.3, and sections 3 & 4; folded info from these sections into Introduction section and bullets of section 2
- See more detailed changes in change log of draft

Recap: IPv4 Subnet Model

- On-link determination coupled with address assignment
- As an IPv4 address is assigned to a host, an on-link prefix (the subnet prefix) is set
  - Details differ between implementations
  - Some might first set the old classful mask and then override it with a classless mask

IPv6 Subnet Model

- On-link determination is **separate** from address assignment

- A host can have IPv6 addresses without any related on-link prefixes or have on-link prefixes that are not related to any IPv6 addresses that are assigned to the host

- In IPv6, by default, a host treats only the link-local prefix as on-link

What becomes on-link?

- Initially just the link-local prefix
- Add prefixes from Prefix Information options with the L-bit set and a non-zero valid lifetime
  - They are no longer on-link when the valid lifetime expires
- Add the target of a redirect message
- Implementations may also allow the **explicit** designation of an on-link prefix e.g., when configuring an address
  - But MUST NOT do this by default

Observed IPv6 Interoperability Issues

- Testing of IPv6 hosts behind modems in access concentrator network shows data forwarding confusion due to on- vs. off-link

- Router does not signal on-link to host (no 'L' prefixes). Host not following these rules assumes the prefix is on-link, causing the host to lose network connectivity

  – Host tries to do address resolution (send Neighbor Solicitiation) for addresses in assumed /64 prefix

  – The multicast NS packet only reaches the router

  – Router drops the packet since it is not the target of the NS

Consensus Call

- Since the IPv6 Subnet Model has not been clearly described anywhere, and the consequences of not clearly describing the model can be severe, do we have consensus for the following?
    - draft be added to 6man WG as work item