

# ND Deployment Guidelines

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# Why & What

- Why

- ND (Neighbor Discovery) important protocol of IPv6 first-hop
- Depending on the L2 media, ND can have multiple issues & solutions
  - Issues: multicast, DAD unreliable, on-demand NCE installation, security
  - Solutions: SeND, CGA, SAVI, RA Guard, RA Guard+, GRAND, WiND, UPPH
- No deployment guideline → difficult to pick solutions

- What

- Summary of ND issues and solutions in 20+ RFCs → easy reference
- Insight: isolating hosts in L2 and in subnet effective in preventing ND issues → no need for corresponding solutions and thus simpler deployment
- Guidelines
  - Where to use apply isolation, considering ND and other first-hop protocols like mDNS
  - How to select solutions for remaining issues
- Result: simpler first-hop deployment

# Key Contribution: Host Isolation & Its Applicability

- Many IPv6 first-hop issues come from multicast & trust worthiness of other hosts in the same link. When hosts are isolated, these issues go away
- Host isolation idea came from RFC 8273 “Unique Prefix Per Host” (a.k.a “subnet isolation”). It was controversial
  - Some corner cases not clearly considered, e.g. link local address DAD issue
  - Routers become stateful
  - Require too many prefixes
- We propose combining subnet isolation with L2 isolation
  - Corner cases eliminated
  - Stateful router is a good price to pay for simplified hosts & first-hop
  - Requiring too many prefixes not an issue for IPv6: operators get /29 from RIR. It contains 32 billion /64 prefixes
- We explicitly discuss host isolation’s applicability
  - Useful for public access networks where a host cannot trust other hosts, or wireless environment where multicast should be avoided
    - Fixed/mobile broadband, public Wi-Fi
  - Not useful for private and wired environment

# Change from Previous Version

- Changed “L3 isolation” to “subnet isolation”, to reflect more accurately what we mean
- Added a paragraph (Section 3.2) on IPv6/6man WG’s concern about multi-link subnet (MLSN) ; Added RFC4903 "Multi-Link Subnet Issues" as a reference
  - To address Dave Thaler & Erik Kline’s comment in IETF112
- Added “More interfaces or sub-interfaces are needed on the router” as an disadvantage for host isolation, and an paragraph in Section 4 about its impact to the IPv6 first-hop
  - To address Jen Linkova’s comment in IETF 112.
- Fixed some minor English problems
- We believe this is a useful document for the community. Your review will be appreciated!