Wireless ND

Stateful Address Identification and Location

draft-thubert-6man-wind-sail

6MAN @ IETF 88, Vancouver

pthubert, elevyabe
@cisco.com
Draft status: -00 just published

- Extends RFC 6775, companion to
  - `draft-chakrabarti-nordmark-6man-efficient-nd`
  - `draft-thubert-6lowpan-backbone-router`

- Defines SAIL Binding
  - (location, owner, MAC@, ...) to IPv6 address
  - Available for lookup, pub/sub, syslog, source address validation

- Defines SAIL Mapping System
  - based on distributed registrar
  - Registrar hierarchy for lookups and policy enforcement
The problem: mcast flooding hinders wireless ops

VM, NFV, Wireless or IoT device moves:

1. MAC address reachability flooded over L2 switch fabric
2. Device sends multiple multicasts for IPv6 ND
3. L2 fabric handles as broadcast (to all nodes)
4. Broadcast clogs the wireless access at low access speed
5. Broadcast self interferes on attached wireless mesh and drains the batteries
Wireless ND Multicast Avoidance

Registration based
- **Extending RFC 6775**: ARO option, DAR and DAC messages
  - Generalized abstraction of MIPv6 registration, RPL DAO, SAVI

**SAIL Binding**
- (location, owner, MAC@) to IPv6 address
- SAIL state maintenance and conflict resolution
- Available for lookup, pub/sub, syslog, source address validation

**SAIL Mapping System**
- Registrar hierarchy for lookups and policy enforcement
Next generation Backbone

Authoritative Registrar(s)
- MIPv6 HA, 6LBR,
- interface to external services

Intermediate Registrars
- 6LR, NEAR,
- Optionally ND proxy

Backbone Routers
- RPL root, ND proxy

Legacy IPv6 devices
Wireless ND operation

L2 routing (IS-IS) + proxy-ND in the backbone
Optional MAC address proxy avoiding MAC@ floods

L3 Routing in attached networks
  e.g. RPL/6TISCH Multi-link subnet

New ND methods and interfaces
  between nodes and intermediate registrars (RIF)
  between intermediate registrars and authoritative registrars (VIF)
  between authoritative registrars and other services (DIF)
Interface definition
WiND Address Registration Option

Used to resolve conflicts
Need In ND: TID to detect movement -> extending ARO
Need In RPL: Object Unique ID if we use RPL for DAD
Stateful Address Identification and Location Option

Used in complement to the ARO option to propagate a registration to AR
Provides additional data about SAIL state
e.g. trust level and age of the last update

```
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|     Type      |   Length = 2  |R| rsrv |origin | trust |+
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|T|N| rsrv | TID | Registration age (10 sec) |+
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                        ALI                             |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```