Unicast Lookup for WiND

draft-thubert-6lo-unicast-lookup

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Unmet expectations

- An IPv6 subnet should scale (like above 10K Nodes)
  - Required in case of IOT and overlays serving VMs
  - Already works in route-over mesh (deployed e.g., in Smartgrid applications)
  - Impaired by broadcast storms in case of broadcast emulation
  - Need to eliminate per node broadcast (as used in DAD and AR)
- Overlays need a Map resolver for the tunnel endpoints
  - Problems with snooping (silent node, missed packets, rapid movements…)
  - Need a solid state (contract with lifetime and maintenance), not a cache
  - Need a standard way to populate the resolver, a natural side effect of ND
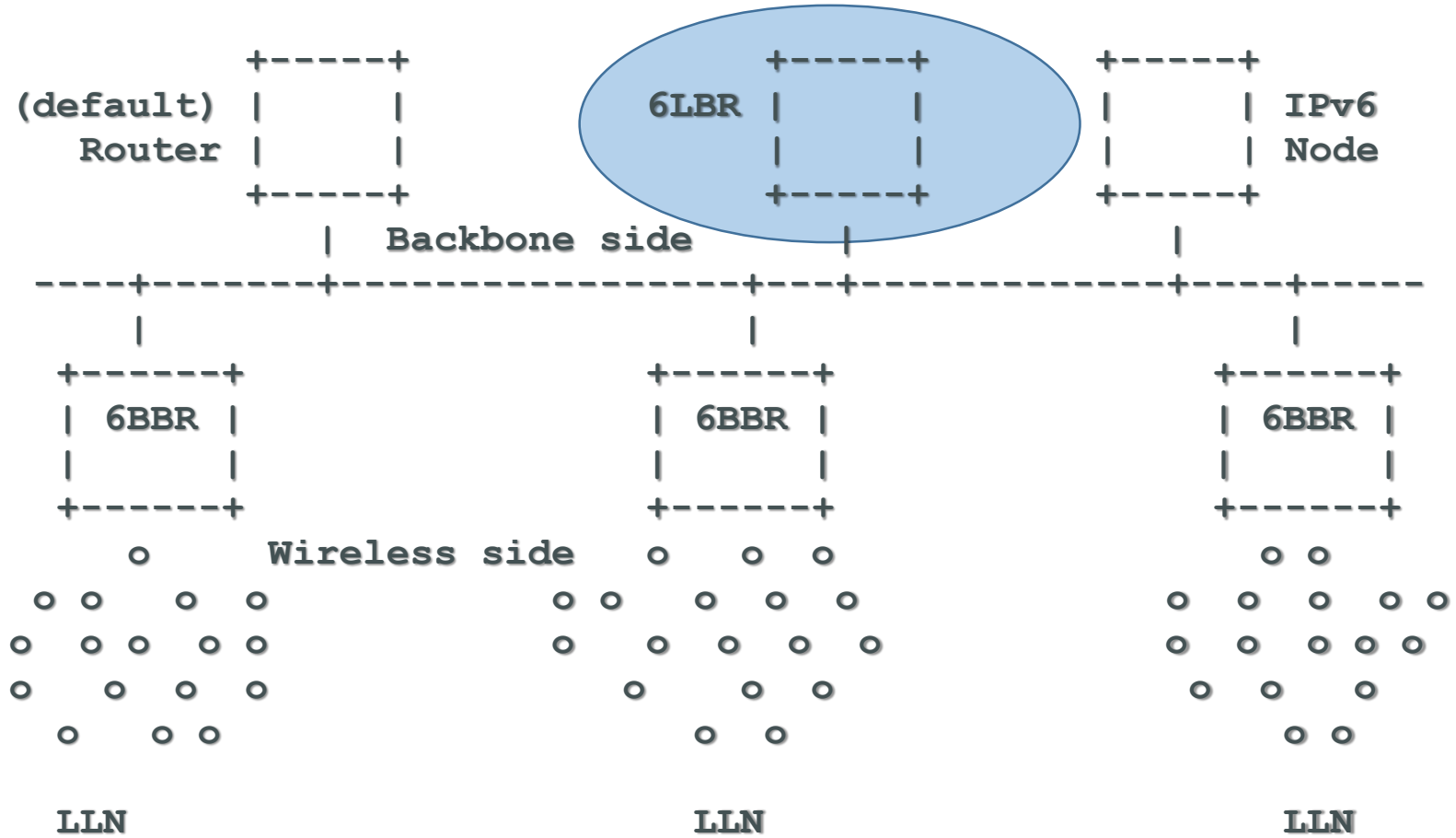
6lo standard work

A proactive setting of proxy/routing state to avoid multicast due to reactive Duplicate address detection and lookup in IPv6 ND

- **RFC 8505** (Issued 11/2018)
  - The registration mechanism for proxy and routing services
  - Analogous to a Wi-Fi association but at Layer 3
- **draft-ietf-6lo-backbone-router** (WGLC complete 1/25)
  - Federates 6lo meshes over a high-speed backbone
  - ND proxy analogous to Wi-Fi bridging but at Layer 3
- **draft-ietf-6lo-ap-nd** (WGLC complete 3/26)
  - Protects addresses against theft (Crypto ID in registration)
- **draft-thubert-6lo-unicast-lookup**
  - Provides a 6LBR on the backbone to speed up DAD and lookup
- **draft-thubert-6man-ipv6-over-wireless** (new draft)
  - IPv6 ND vs. WiND applicability to wireless networks

NEW DRAFT

General Design

```
                      +------+           +------+          +------+
          (default) |      |     6LBR |      |        |      | IPv6
          Router    |      |          |      |        |      | Node
                      +------+           +------+          +------+
                         |     Backbone side    |              |
        ---+--------+---------------------+---+-------------+----+-----
           |                              |                 |
        +------+                       +------+          +------+
        | 6BBR |                       | 6BBR |          | 6BBR |
        |      |                       |      |          |      |
        +------+                       +------+          +------+
           o      Wireless side  o   o  o            o  o
         o  o    o   o            o  o   o  o  o        o  o   o  o  o
        o    o  o   o  o         o    o   o   o  o     o   o   o  o o
          o    o  o                o    o              o   o    o
         LLN                          LLN                  LLN
```

Place a 6LBR (RFC 6775 / RFC 8505) on the backbone (designed for DAD not AR)

Centralizes the registrations for all nodes in the subnet that register

Additions to use 6LBR for Address Resolution as a unicast request

Address Mapping Messages

Code Prefix	Meaning	Reference
0	Duplicate Address Detection	RFC 6775
1	Address Mapping	This RFC
2...15	Unassigned	

Table 2: New Code Prefixes for ICMP type 157 DAR message

Code Prefix	Meaning	Reference
0	Duplicate Address Detection	RFC 6775
1	Address Mapping	This RFC
2...15	Unassigned	

Table 3: New Code Prefixes for ICMP type 158 DAC message

No new ICMP type, extend existing 157/158 used for DAR / DAC (RFC 6775)

Use different ICMP Code – which is split in code prefix and suffix (RFC 8505)

Also support for unicast NS(Lookup) which requires the 6LBR to be on link

Status

- https://tools.ietf.org/html/draft-thubert-6lo-unicast-lookup-00

- Address Mapping messages derived from EDAR / EDAC

- A new Status "Not Found" in the Address Mapping Confirm

- 6LBR signals itself by new "B" bit in 6CIO (RFC 7400) in RA msgs

- (Other) Routers use Authoritative Border Router Option (RFC 6775)

Questions to the group

- Transfer to 6MAN?

- Standardize an Anycast Address for 6LBR?