

IPv6 over Bluetooth(R) Low Energy
Mesh Networks

draft-gomez-6lo-blemesh-00

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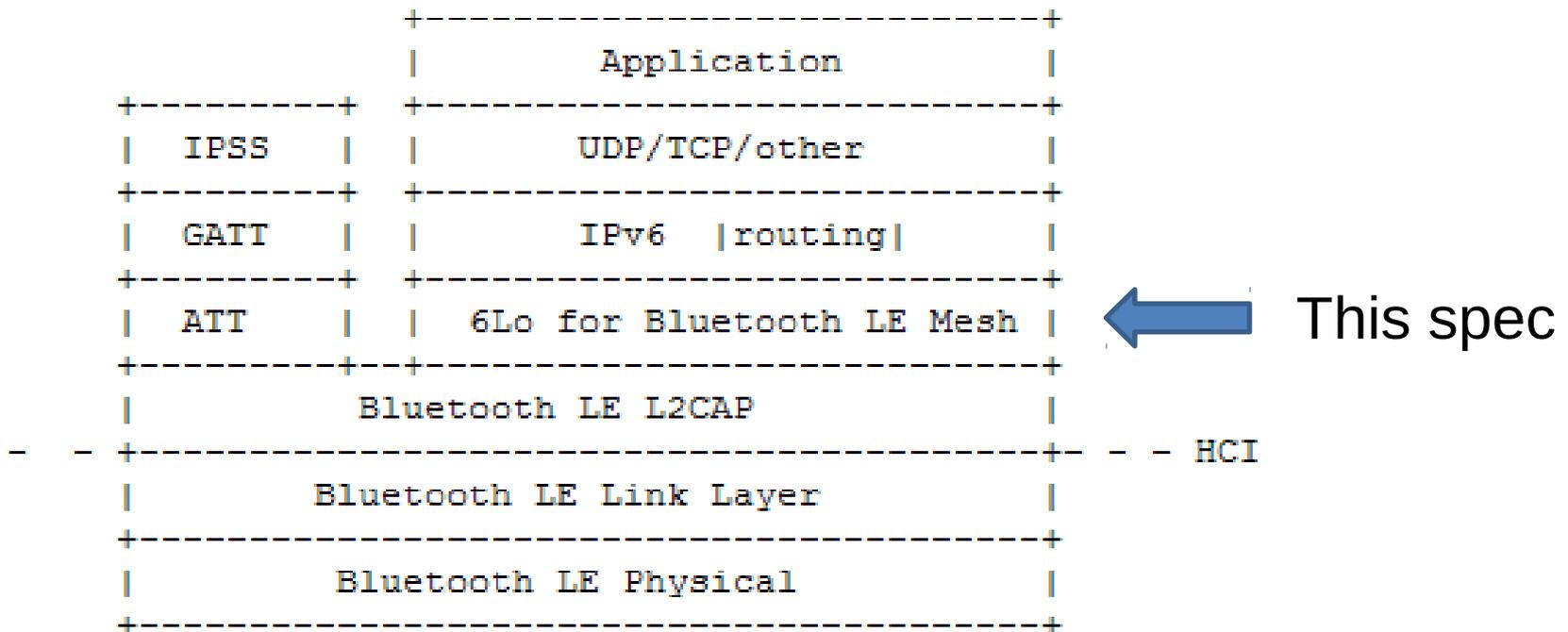
Nokia

Motivation

- High momentum of Bluetooth Low Energy / Bluetooth Smart technology
 - Smartphones, wearables, tablets, notebooks, etc.
- Bluetooth 4.0
 - Star topology network
- Bluetooth 4.1
 - Extended topologies are possible
 - Interest e.g. in the smart home area
- IPv6 over Bluetooth Low Energy
 - RFC 7668
 - Bluetooth 4.1 and IPSP
 - Designed and optimized for a star topology network
 - Would fail to enable IPv6 over a BLE mesh network

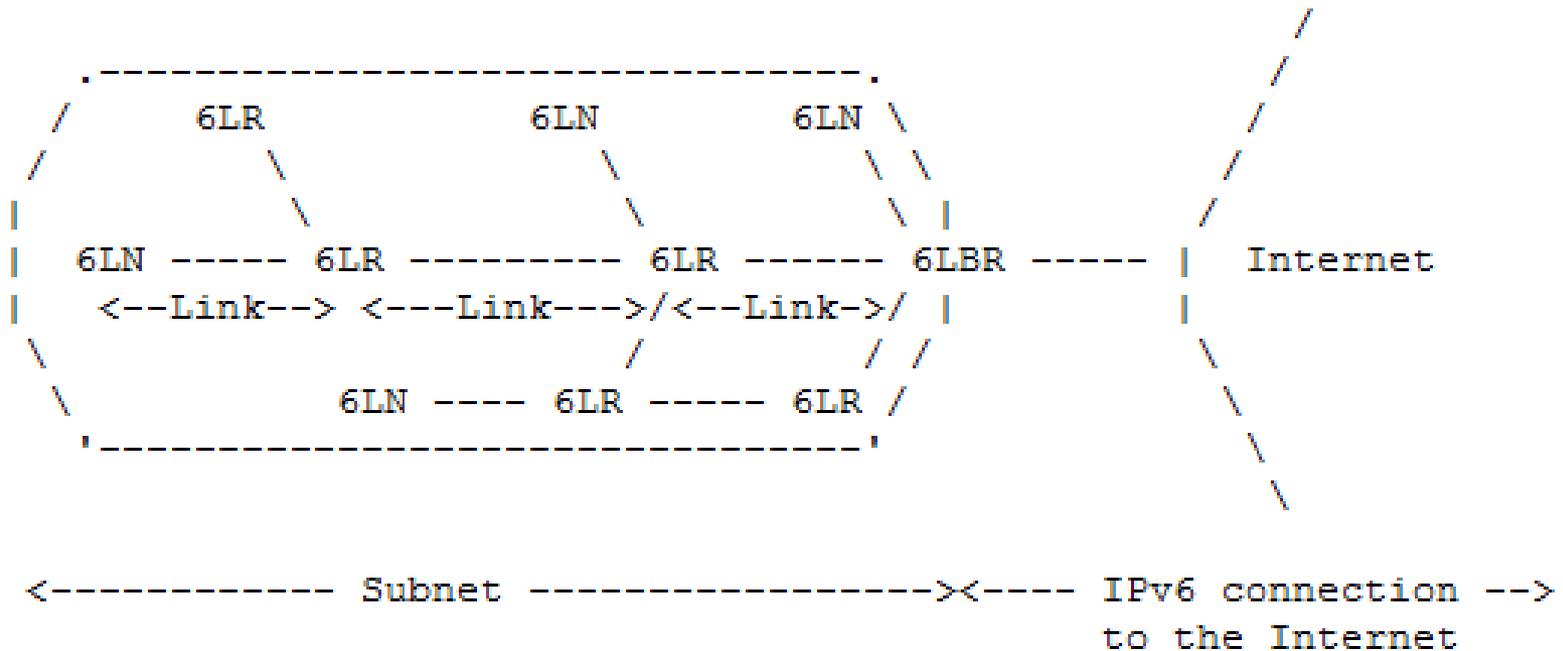
Protocol stack and assumptions

- Network whereby link layer connections have been established between neighbors
 - IPSP for discovery and conn establishment



Subnet model

- Multilink subnet
 - Route over routing
 - Routing protocol: out of the scope of this



Link model

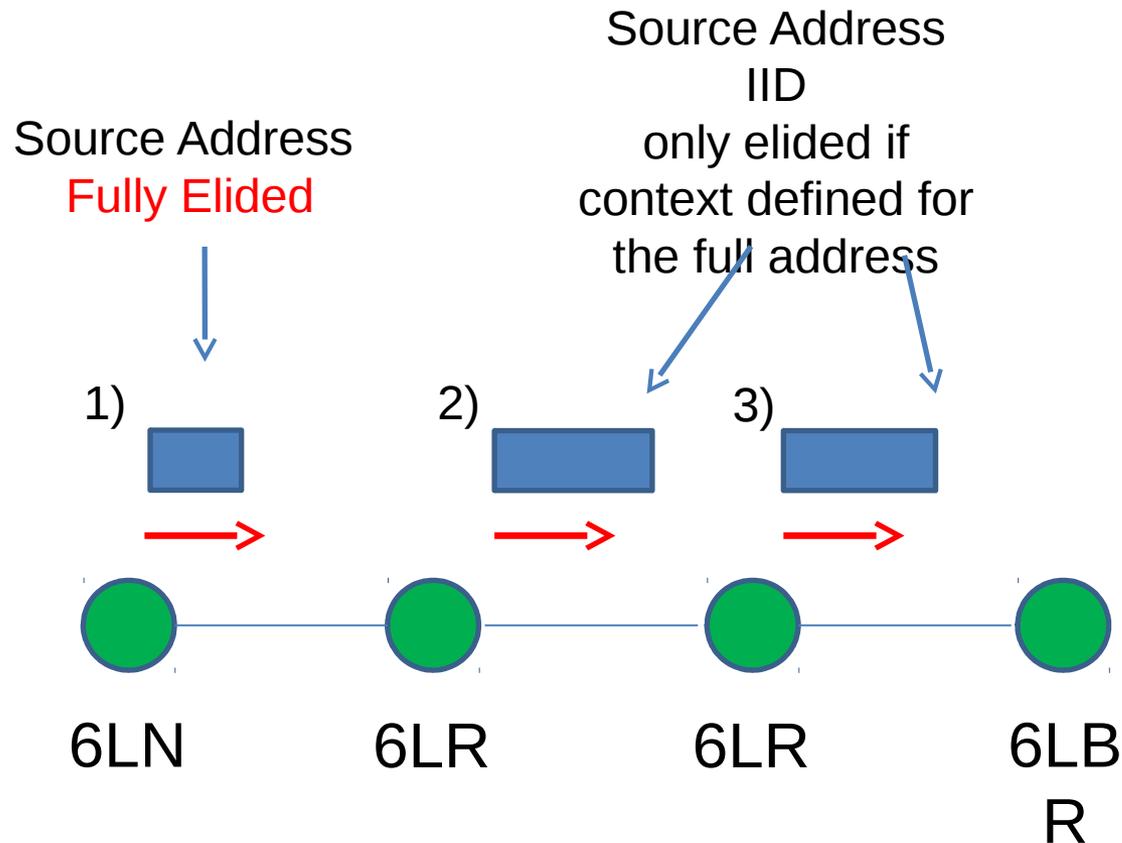
- Address autoconfiguration
 - Now, also 6LRs
 - As per RFC 7668
- Neighbor discovery
 - Now, also 6LRs
 - RFC 6775 functionality for route-over networks
 - Prefix and context distribution
 - Duplicate Address Detection

Header compression (I/III)

- Based on RFC 6282 format
- 6CO included in RAs
 - Matching each address prefix advertised via PIO
- RFC 7668
 - Exploits star topology plus ARO
 - In a BLE mesh, only a subset of the optimizations are possible
 - Link-local interactions
 - Link-local address can be fully elided if based on Bluetooth device addr.
 - Non-link-local transmissions from 6LN
 - Non-link-local transmissions from a 6LN neighbor to a 6LN

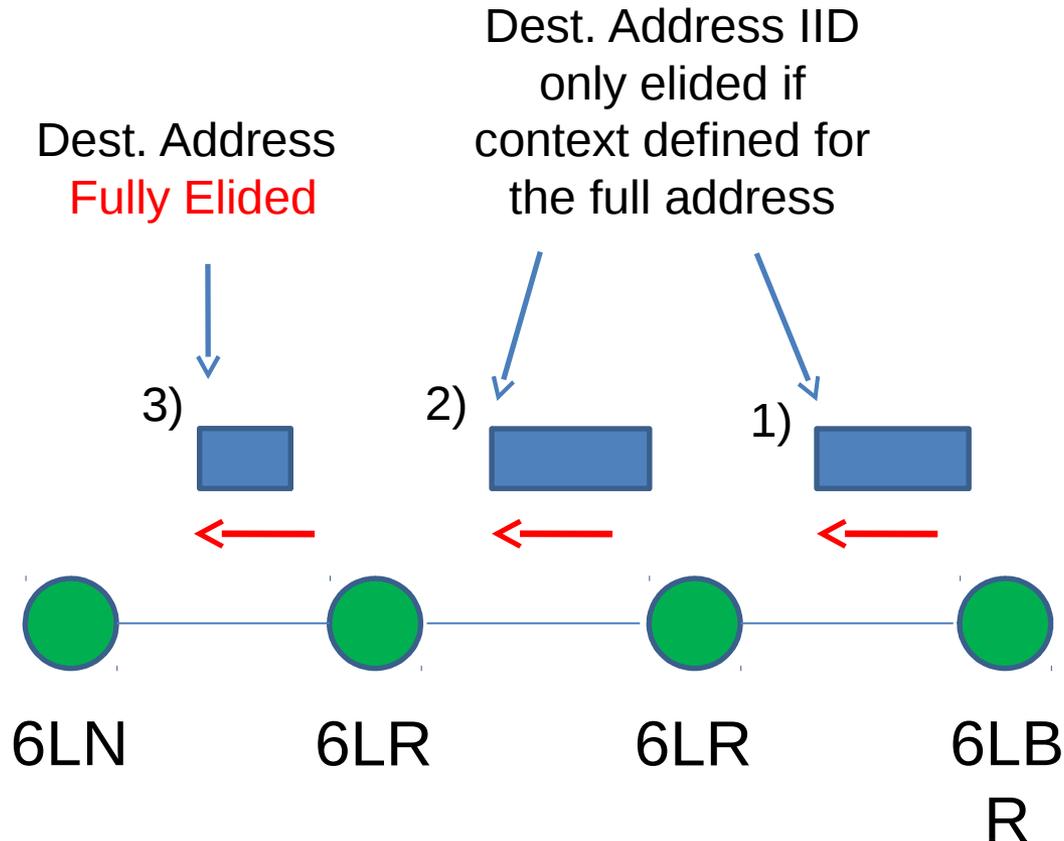
Header Compression (II/III)

- Non-link-local transmissions from a 6LN



Header Compression (III/III)

- Non-link-local transmissions from a 6LN neighbor to a 6LN



Security Considerations

- The security considerations in RFC 7668 apply
- Additional threats due to ad-hoc routing
 - TBD