IPv6 Mesh over Bluetooth(R) Low Energy using IPSP

draft-ietf-6lo-blemesh-03

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Status (I)

• draft-ietf-6lo-blemesh-03
  – Last revision, July 2018

• Not updated between Sept 2017 – July 2018
  – -02 was considered stable
  – Need to validate the draft by means of running code before requesting WGLC
  – Slow progress since then
    • Several reasons
Status (II)

• Two paths for implementing the draft
  • 1. Using Raspberry PIs, BlueZ (Linux BLE stack) as basis
     – RFC 7668: One master (6LBR), single slave (6LN) running
     – RFC 7668: One master (6LBR), several slaves (6LNs) not working
       » BlueZ issue
  • 2. Using BLEeach as basis
     • RFC 7668 open source implementation for Contiki
     • One master (6LBR) and several slaves (6LNs) running!
Status (III)

- BLEach RFC 7668 scenario

- CC2650 devices, Contiki OS
- Basis for our implementation work
Updates in -03 (I/VIII)

• New author
  – Michael Spörk, Graz University of Technology (Austria)
  – Main author of BLEach

• New contributor
  – Carlo Alberto Boano, Graz University of Technology (Austria)

• In -02, we assumed already established BLE connections

• In -03, we detail relationship between 6LoWPAN roles and IPSP roles for connection establishment
  – Added text in 3.3.2 (Neighbor Discovery)
  – Added Appendix
    • Example of 3.3.2
Updates in -03 (II/VIII)

• 3.3.2. Neighbor Discovery, item 3.b)
  – Section 6.2 of RFC 6775, for dynamic config. scenarios
    • 6LR comes up as a non-router
    • 6LR waits for an RA to configure its own interface address first, and turns to a router
  – In order to support the same operation:
    • 6LR starts by using the IPSP Node role only
    • A previously existing IPSP Router establishes a BLE connection with the 6LR, which receives an RA from that router
    • The 6LR configures its interface address, it turns into a router, and runs as an IPSP Router
    • 6LBR runs as an IPSP Router from the beginning
Updates in -03 (III/VIII)

• Appendix: example
  – Step 1

6LBR
(IPSP: Router)

6LR
(not initialized)  6LR
(not initialized)

6LN
(not initialized)  6LN
(not initialized)  6LN
(not initialized)
Updates in -03 (IV/VIII)

- Appendix: example
  - Step 2

6LBR
(IPSP: Router)

6LR
(IPSP: Node)

6LR
(IPSP: Node)

6LN
(not initialized)

6LN
(not initialized)

6LN
(not initialized)
Updates in -03 (V/VIII)

- Appendix: example
  - Step 3

```
Bluetooth LE connection --
  6LBR
  (IPSP: Router)
  /   \
 /     /
6LR   6LR
 (IPSP: Node) (IPSP: Node)

6LN
 (not initialized)
```

6LN
 (not initialized)

6LN
 (not initialized)
Updates in -03 (VI/VIII)

• Appendix: example
  – Step 4
Updates in -03 (VII/VIII)

• Appendix: example
  – Step 5
Updates in -03 (VIII/VIII)

- Appendix: example
  - Step 6
Related work: Bluetooth SIG

• “Bluetooth Mesh” specification
  – Published in July 2017
  – BLE Mesh networking
  – (Controlled) Flooding over advertising channels
  • Note: RFC 7668 assumes link-layer connections over data channels for IPv6 over BLE