Bluetooth 4.0 update to 4.1 and what it means for IPv6 over Bluetooth Low-Energy

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Bluetooth 4.1

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"Bluetooth 4.1 is an important evolutionary update to the wireless specification, which experienced a revolutionary update in July 2010 with Bluetooth Smart, the intelligent, low-energy technology enabling the Internet of Things (IoT). The updates will improve consumer usability with increased co-existence support for LTE, bulk data exchange rates, and aid developer innovation by allowing devices to support multiple roles simultaneously. **The new release also lays the groundwork for IP-based connections, extending Bluetooth technology's role as the essential wireless link for the IoT.**"
New major features in Bluetooth 4.1

- BR/EDR Secure Connections
- Train Nudging
- Generalized Interlaced Scan
- Low Duty Cycle Directed Advertising
- 32-bit UUID Support in LE
- LE Dual Mode Topology
- Piconet Clock Adjustment
- LE L2CAP Connection Oriented Channel Support
- LE Privacy v1.1
- LE Link Layer Topology
- LE Ping
L2CAP Connection Oriented Channels

- **Credit Based Flow Control Mode** for credit-based scheme for L2CAP data (not for signaling).
  - Helps multiplexing data send on one channel with data possibly sent on different channels at the same time
  - Helps constrained nodes to throttle incoming data flows (causing buffering on previous node, though).

- **Segmentation and Reassembly** (SAR) scheme is used for fragmentation – this allows multiplexing of parallel data flows

- **Negotiated up using LE Protocol/Service Multiplexer** (LE_PSM) code point (which can be static or discovered separately). Following values are communicated by both parties (*values for up- and downlink are independent from each other*)
  - MTU and Maximum PDU Size – from 23 up to 65533 octets
  - Dynamic L2CAP Channel Identifier
  - Number of initial credits – from 0 to 65535 credits
Dual-mode and Link-layer topology changes

Figure 4.2: Example of Bluetooth LE topology

Figure from Bluetooth Core v4.1 specification
Next steps

- Work is ongoing in BT SIG’s Internet WG to finalize additional documentation required for IPv6 functionality

- Next I-D revision, draf-ietf-6lo-btle-01, will be published once the required additional references are available from BT SIG