DTN IP Neighbor Discovery

draft-irtf-dtnrg-ipnd-03

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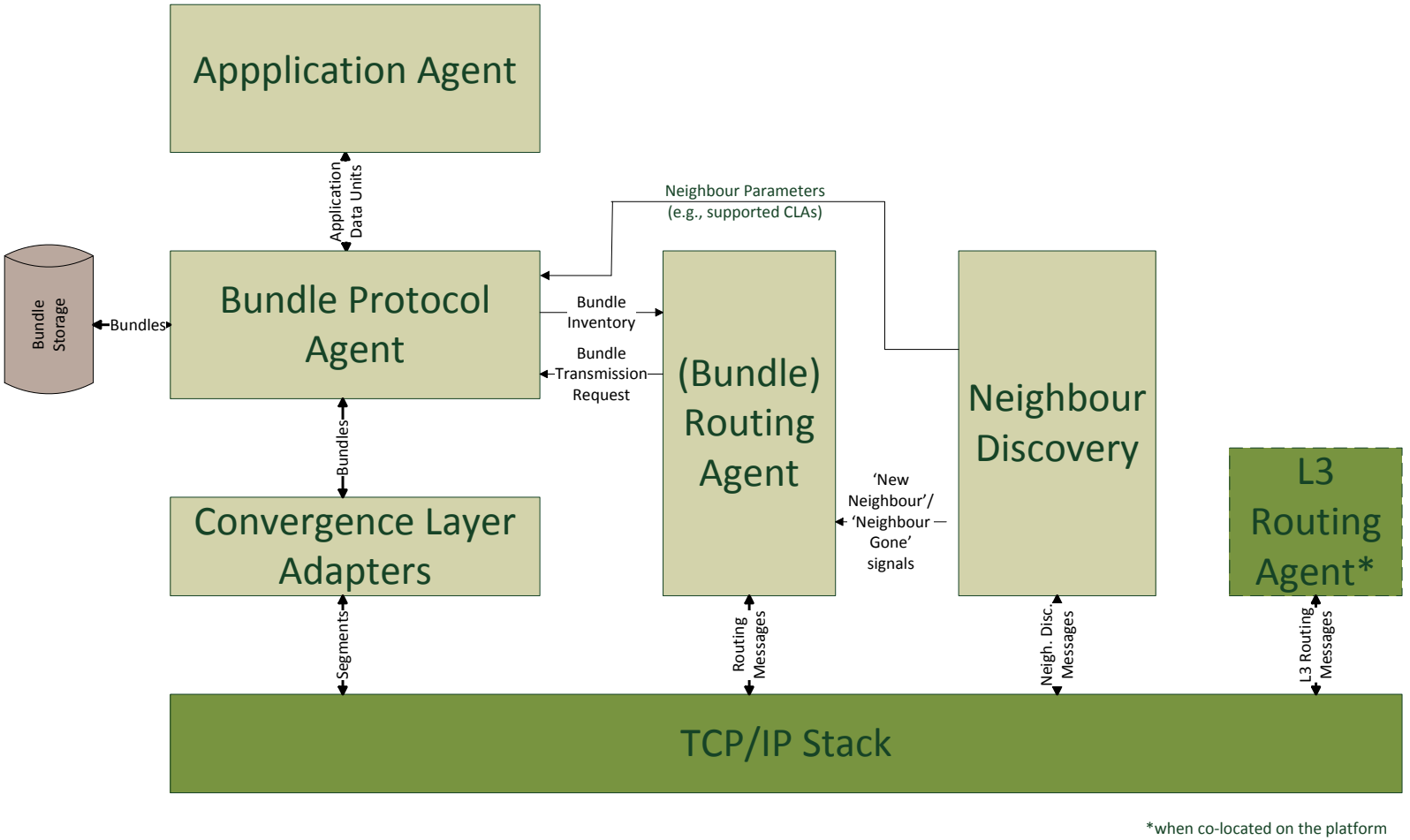
IPND History

- IRTF DTNRG-adopted I-D
  - Aiming for Experimental RFC
- Original authors:
  - D. Ellard, R. Altman (Raytheon BBN)
  - A. Gladd (with Raytheon BBN at the time)
  - D. Brown (with Bit9 at the time)
- Can be considered unfinished business of the DTNRG
  - Mentioned as such in last DTNRG meeting at IETF-87
  - DTNRG is about to be closed down….
- Implemented in DTN2, IBR-DTN (-01)

IPND Motivation

- Making use of opportunistic connectivity requires neighbor discovery
- Neighbor Discovery is included in the list of initial WG work items (https://datatracker.ietf.org/doc/slides-92-dtn-0)
- Neighbor Discovery external to Bundle Protocol avoids chicken-and-egg problem w.r.t. supported Convergence Layers
  - Expanded on next slide
- draft-irtf-dtnrg considered fairly mature
  - In the spirit of the WG charter to not start from scratch, but leverage work from DTNRG
  - Work still to be done listed on a later slide

Neighbor Discovery external to BPA



Layer architecture example, partially derived from RFC 6693 (PRoPHET)

Alternative approach: Bundle-based ND

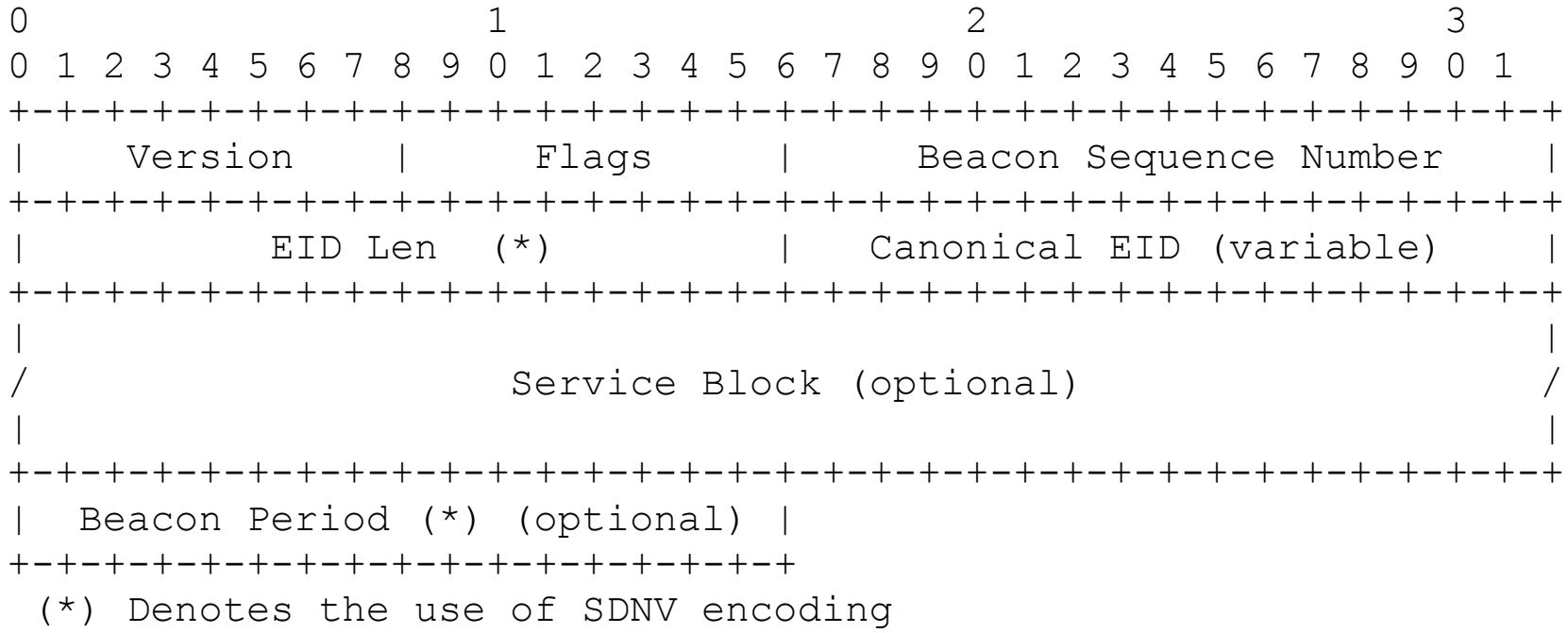
Alex Mc Mahon, Kevin Fall: ‘The Delay Tolerant Networking Endpoint Discovery Protocol’

- draft-mcmahon-dtnrg-dtn-edp-00 (expired)
- Bundles with EDP payload sent to dtn:EDPv1
- Bundles with EDP payload sent over all CLAs
  - Unclear how this works over unicast CLAs, e.g. TCP CLA
- Relies on notion of ‘CLA EID’
- Relies heavily on dictionary in primary block, as per RFC 5050.

Neighbor Discovery over UDP/IP

- Periodical ‘beacons’
  - Advertizing source node EID
- Node IP address gleaned from packet header
  - In case of minimum size ‘beacon’ without options
- Sent to broadcast (IPv4), multicast or unicast destination address
  - Unicast for testing availability of enumerated node IP addresses

IPND Beacon format



Canonical EID: the EID of a bundle processing entity … that is capable of receiving bundles addressed to that EID from other DTN nodes. Every DTN node is expected to possess a canonical EID. (P. Basu *et al*., draft-pbasu-dtnrg-naming-00)

- i.e., similar to ‘Node ID’ in BPbis

Optional Service Block

- Sequence of TLVs preceded by a count
- Service types currently include:
  - Various CLA types (TCP, UDP, DCCP) for both IPv6 and IPv4 (specifying address and port)
  - Neighborhood Bloom Filter (NBF) Hash Function index and NBF bit array, for bi-directionality detection of links
  - Private type range (128 – 255)

Work to be done

- Define a suitable set of hash functions for NBF
- Add a Service Definition for BP Representation Types?
- SDNV no longer fashionable: replace by CBOR?
- Beef up Security Considerations
- IANA related:
  - Request IPv6 and IPv4 multicast addresses
  - Registry for NBF Hash Function identifiers

Questions to the WG

- Is Neighbor Discovery external to the BP the way to go?
- Is standardizing Neighbor Discovery over IP worthwhile?
  - As opposed to going for a generic (underlay-agnostic) ND solution, which will likely require much more effort
- If yes to the above: is draft-irtf-dtnrg-ipnd a good basis for ND over IP?
- Can draft-irtf-dtnrg-ipnd be adopted as a WG draft?