OSPF Area ID TLV
draft-lu-ospf-area-tlv-01

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Road to this Draft

- ## For cross-area LSPs
  - ### CSPF needs ABR whereabouts
    - #### ABR manual configuration
      - works
      - But tedious
      - And error prone
  - ### Need ABR auto discovery
    - #### Consensus seen

Ways of auto-discovery

- First we thought of RFC 4970
  - TE bit -- too coarse
  - Section 2.5
    - `For example, a router may be an area border router but only support traffic engineering (TE) in a subset of its attached areas.`
  - Need per area granularity
    - An area can have multiple neighboring areas (TE minded)
    - Area ID to differentiate them
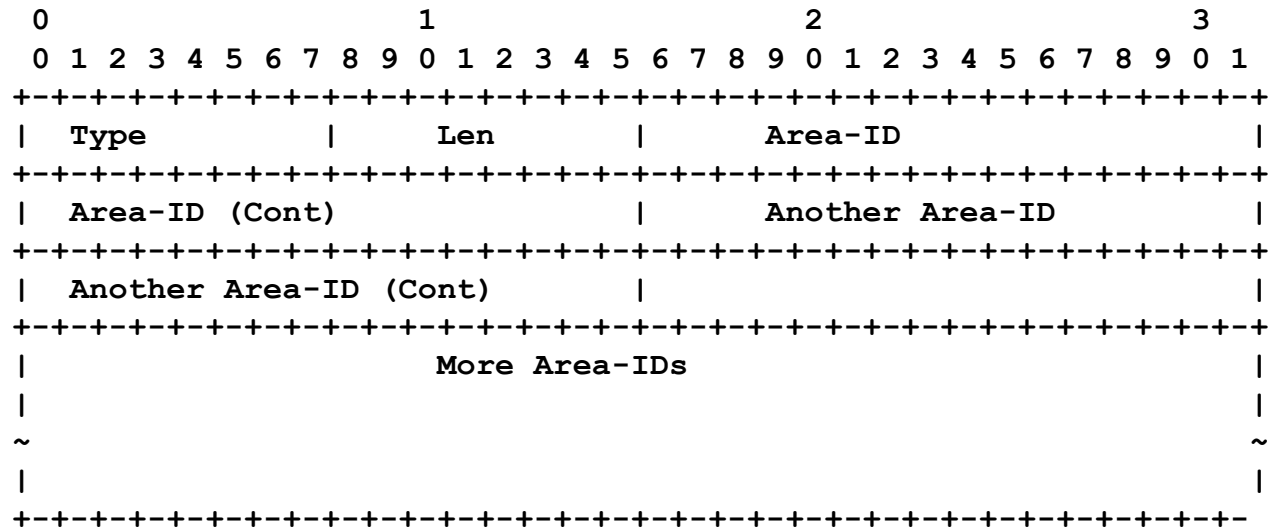
- That is the *OSPF Area ID TLV*

TE Info Exchange Framework

- RFC 3630 *OSPF TE Extensions*
  - Horizontal: OSPF to OSPF (flooding)
  - Vertical: OSPF to TED

- Proprietary approaches
  - Diagonal: IPC(OSPF – PCE)
  - Promiscuous: sniffing (TE & Non-TE LSAs) and filtering

- Design goal
  - Decoupling TE from non-TE
  - Using proven and standardized infrastructure
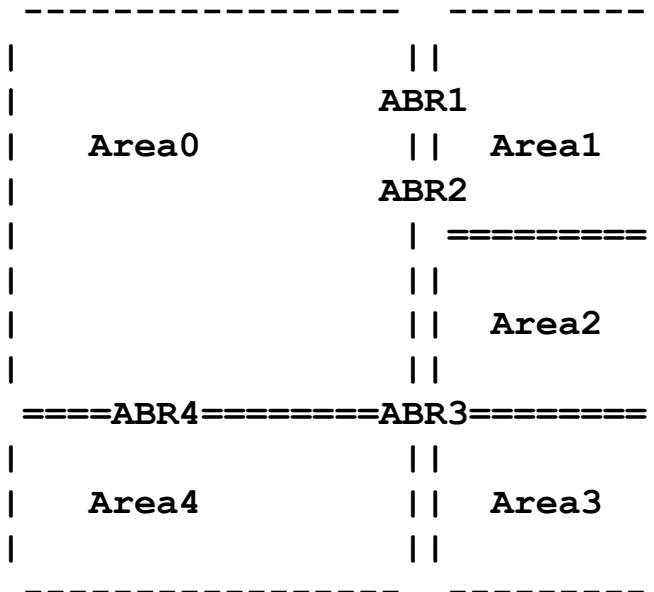   - TE-Extensions to handle TE affairs
    - Framework is maturely available

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Area ID TLV

```
 0                   1                   2                   3
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|   Type          |     Len         |       Area-ID             |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| Area-ID (Cont)                    |     Another Area-ID       |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|  Another Area-ID (Cont)           |                           |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                         More Area-IDs                         |
|                                                               |
~                                                               ~
|                                                               |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-
```

- Code point: OSPF TE LSA / OSPF TE Extensions
- Originating point: OSPF TE functions
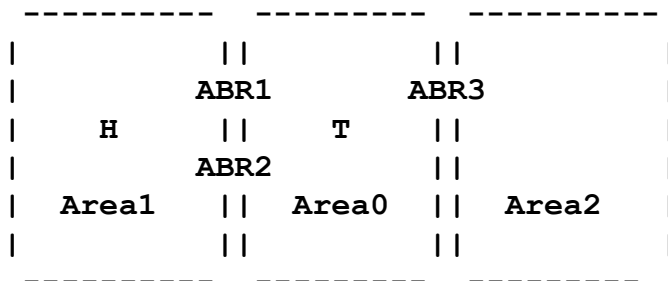- Access point: TE database

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Area IDs for Nbr Areas

```
----------------    ---------
|                |  ||        |
|               ABR1          |
|   Area0        ||   Area1   |
|               ABR2          |
|                |  ========  |
|                |  ||        |
|                |  ||  Area2 |
|                |  ||        |
| ====ABR4=======ABR3=======  |
|                |  ||        |
|   Area4        |  ||  Area3 |
|                |  ||        |
----------------    ---------
```

```
===========================================
|To             |Type|  Len|Area-IDs    ...|
-------------------------------------------
|Area0          |   3|    8|0 0 0 2|0 0 0 3|
|Area2          |   3|    8|0 0 0 0|0 0 0 3|
|Area3          |   3|    8|0 0 0 0|0 0 0 2|
|Area4          |  None                     |
===========================================
```

- ABR3 sits over 4 areas
  - Area4 is not TE enabled
  - Through ABR3
    - Area0 can exit to Area2 and Area3
    - Or Area2 => Area0 & Area3
    - Or Area3 => Area0 & Area2

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Use-Case

```
---------  ---------  ----------
|            ||            ||            |
|         ABR1         ABR3         |
|    H     ||    T     ||            |
|         ABR2         ||            |
|  Area1   ||  Area0   ||   Area2   |
|            ||            ||            |
---------  ---------  ---------
```

- Crankback approach
  - "H" learns **from Area-ID TLV**
    - ABR list: ABR1 & ABR2
    - Used to be manually provisioned

- BRPC Approach
  - VSPT(2) is built from "T" in Area0
    - Assuming area sequence is Area0 -> Area1
    - **From Area-ID TLVs**
      - Candidate exit ABRs ABR1, ABR2 & ABR3
      - ABR3 disqualified
  - PCE in Area1 -> VSPT(1)

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Scope

- Inter-area Path Computation

- Why not cover multi-AS ?
  - Considerably complicated to cover all protocols
  - Don't bundle the complexity to multi-area
    - Do one thing, and do it well.
    - OSPF TE Extensions – area scope
      - Works very well
      - Use it

Questions?