draft-li-dynamic-flooding-05

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Changes From Previous Version

- Includes extensions for ISIS, OSPF and OSPFv3

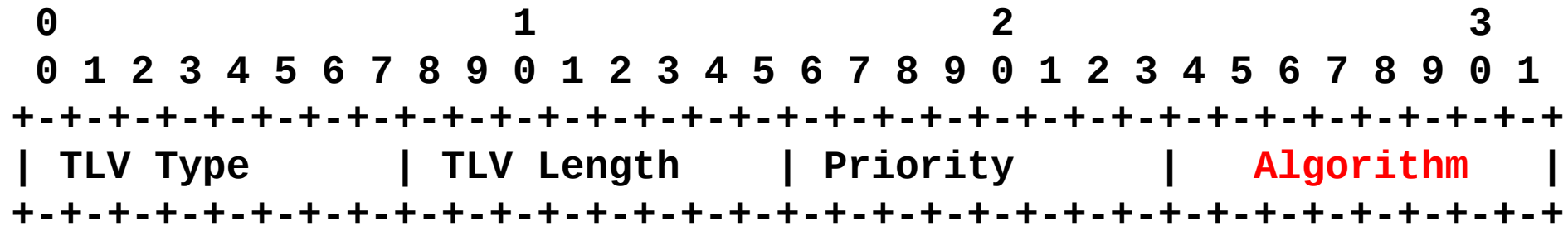- Two modes of operation
  - Centralized
  - Distributed

Area Leader

- Centralized mode
  - Responsible for computing and distributing the flooding topology
- Distributed mode
  - The distributed algorithm advertised by the Area Leader MUST be used by all routers that participate in Dynamic Flooding
- Not every router needs to be a candidate to become an Area Leader
  - Single candidate is sufficient for correct operation
  - Multiple candidates recommended for redundancy
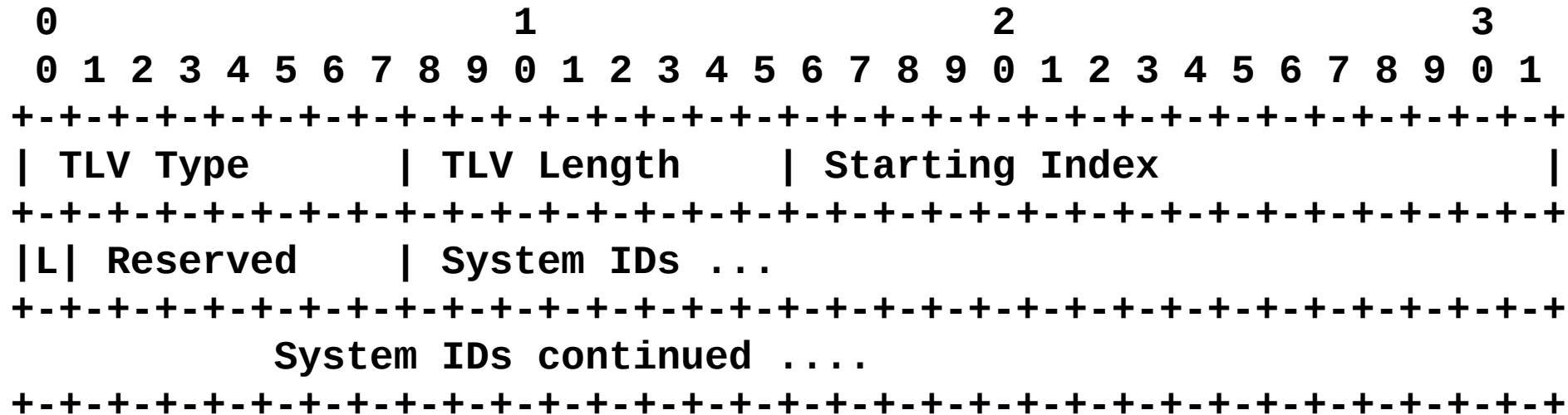
Computation of Flooding Topology

- Centralized mode
  - Exact algorithm does not need to be known and standardized
- Distributed mode
  - All nodes in the IGP area MUST use the same algorithm to compute the flooding topology
  - It is possible to use private algorithms to compute flooding topology, if the all nodes in the area use the same one
    - Responsibility of the operator to make sure that all nodes have a common understanding of what the given algorithm value represents
  - Routers that do not support the value of algorithm advertised by the Area Leader MUST continue to use legacy flooding mechanism.

IS-IS Area Leader Sub-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
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| TLV Type         | TLV Length     | Priority       | Algorithm  |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

- Algorithm - a numeric identifier in the range 0-255 that identifies the algorithm used to calculate the flooding topology.

  - 0: Centralized computation by the Area Leader
  - 1-127: Standardized distributed algorithms
  - 128-254: Private distributed algorithms
  - 255: Reserved

IS-IS Area System IDs 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
   +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
   | TLV Type         | TLV Length    | Starting Index           |
   +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
   |L| Reserved       | System IDs ...
   +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
              System IDs continued ....
   +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

- Only used in centralized mode
- "Ending Index" has been removed – was redundant
  - we have the TLV length
- Handling of multiple IS-IS Area System IDs TLVs with the L bit set

Flooding Behavior

- Link state updates received on one link in the flooding topology MUST be flooded on all other links in the flooding topology

- Link state updates received on a link not in the flooding topology MUST be flooded on all links in the flooding topology

- When the flooding topology changes on a node the node MUST continue to flood on the union of the old and new flooding topology for a limited amount of time.
  - Provide all nodes sufficient time to migrate to the new flooding topology
  - Makes sure that the flooded data will be delivered to all nodes at all times

OSPF Extensions

- OSPF Area Leader Sub-TLV
  - Top level TLV of the Router Information LSA
  - Used by both OSPF and OSPFv3
  - Used in both centralized and distributed modes
- OSPFv2 Dynamic Flooding Opaque LSA
  - New OSPFv2 Opaque LSA
  - Only used in Centralized mode
- OSPFv3 Dynamic Flooding LSA
  - New OSPFv3 LSA
  - Only used in centralized mode
- OSPF Area Router IDs TLV, OSPF Flooding Path TLV
  - Top level TLVs of:
    - OSPFv2 Dynamic Flooding Opaque LSA
    - OSPFv3 Dynamic Flooding LSA

Next Steps ...

- WG adoption

- Continue to evolve the draft

- Define a standardized distributed algorithm(s) for computing flooding topology.

  - Ideas are welcomed

- Work on implementation