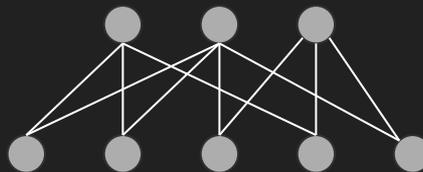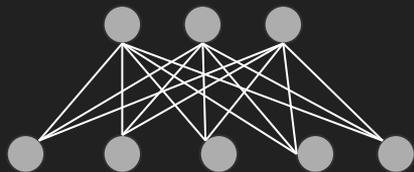# Dynamic Flooding On Dense Graphs

draft-li-lsr-dynamic-flooding-01
(from draft-li-dynamic-flooding-05)

Review: Dynamic Flooding

- Decouple flooding topology (FT) from physical topology

- Centralized vs. distributed mode
- Not to discuss algorithms for computing the FT
- IS-IS and OSPF TLVs:
  - Area Leader Sub-TLV (preference for becoming an AL)
  - Area System IDs TLV (all systems in the flooding topology)
  - Flooding Path TLV (adjacency matrix for the flooding topology)
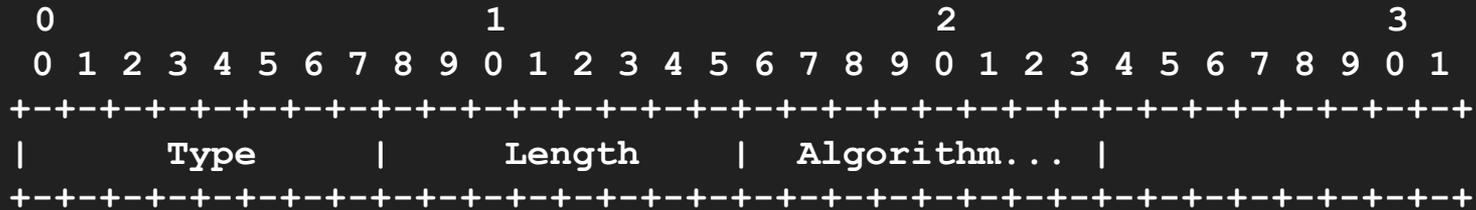
Changes from Previous Version

- New Protocol Elements
  - IS-IS Dynamic Flooding Sub-TLV
  - IS-IS Flooding Request TLV
  - OSPF Dynamic Flooding Sub-TLV
  - OSPF Flooding Request Bit
- Treatment of Topology Events
  - Temporary Flooding

Protocol Elements: IS-IS TLVs

- Dynamic Flooding Sub-TLV
  - Used for
    - Optimizing the flooding topology
    - Selecting optimal algorithm in distributed mode
  - Indicates
    - Whether the node supports dynamic flooding
    - What algorithms are supported in distributed mode
- Flooding Request TLV
  - Used for
    - Requesting temporary flooding from the adjacent node
  - Indicates
    - Which circuit type and flooding scope for temporary flooding

IS-IS Dynamic Flooding Sub-TLV

- Sub-TLV of the IS-IS Router Capability TLV (242)

```
   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        |      Length     |  Algorithm... |
  +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

- ❏ Type: TBD
- ❏ Length: 0-255; number of Algorithms
- ❏ Algorithm: zero or more numeric identifiers in the range 0-255 that identifies the algorithm used to calculate the flooding topology

IS-IS Flooding Request TLV

- MAY be included in IIH PDUs

```
     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      |    Length     | Circuit Type  |R|  Scope      |
    +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
    |R|    ...      |
    +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```
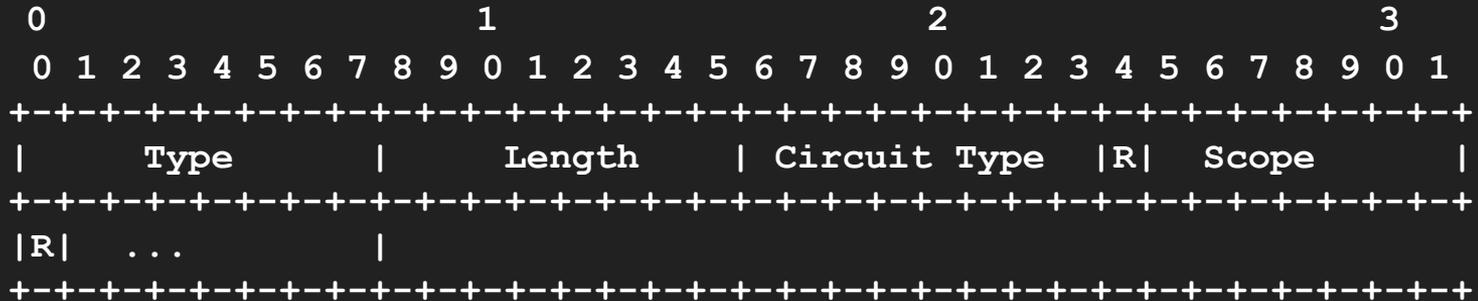
- ❏ Type: TBD
- ❏ Length: 1 + number of advertised Flooding Scopes
- ❏ Circuit Type: as specified in [ISO10589]. Needed in P2P.
- ❏ R: Must be 0 and ignored on receipt
- ❏ Scope: LSP Flooding Scope Identifier Registry defined by [RFC7356]

Protocol Elements: OSPF TLVs

- Dynamic Flooding Sub-TLV
    - Both v2 and v3
    - In the Router Information LSA [RFC7770]

- Flooding Request Bit
    - Both v2 and v3
    - Option bit in the LLS Type 1 Extended Options and Flags field [RFC2328]

OSPF Dynamic Flooding 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
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|               Type            |              Length           |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| Algorithm ... |                                               |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

- ❏ Type: TBD
- ❏ Length: 0-255; number of Algorithms
- ❏ Algorithm: zero or more numeric identifiers in the range 0-255 that identifies the algorithm used to calculate the flooding topology

Temporary Flooding

- Nodes supporting dynamic flooding MUST use flooding topology (FT) for flooding.
- Cases to temporarily add a link to the FT:
  - A new link is added and one of the adjacent nodes is not in current FT
  - A local link fails and the node has one or no connection to the FT
- Adjacency up: existing mechanism for link state database resync
- Start temporary flooding on a link:
  - Enable flooding on local
  - Request flooding from the neighbor (using the flooding request TLV)
- Stop temporary flooding:
  - When both adjacent nodes are on the FT

A Tradeoff

- Stability vs. Fast convergence
  - Excessive flooding: may lead to instability
  - Less flooding: may lead to slow convergence
- To be considered in both flooding topology and enabling temporary flooding