

IETF 117 – MANET WG

Sloppy Topology Updates for ad-hoc Routing Protocols (STURP)

draft-lou-manet-sturp-00

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Motivation

- ❖ A generic mechanism to improve the efficiency of topology update for MANET
- ❖ It aims to integrate into various ad-hoc routing protocols, e.g. OLSRv2, BABEL, RPL, etc.
- ❖ The topology update is triggered in response to the change of ongoing communication relations, i.s.o. alter of topology (e.g. nodes joining or leaving)
- ❖ The topology might be updated partially rather than globally

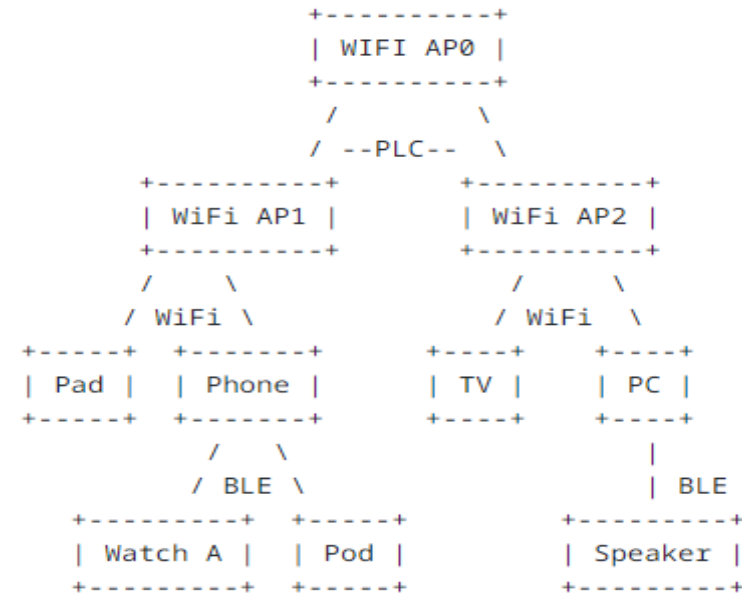
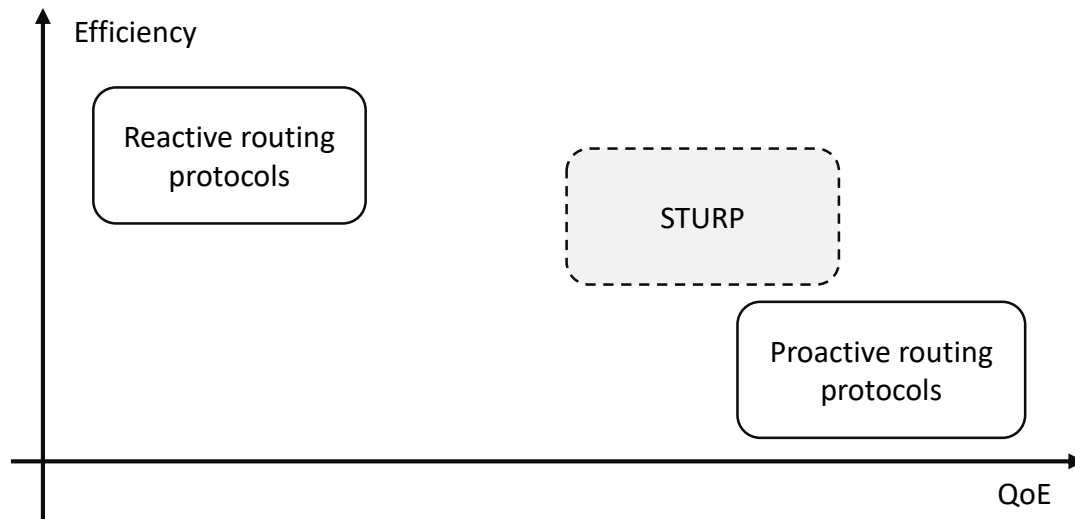
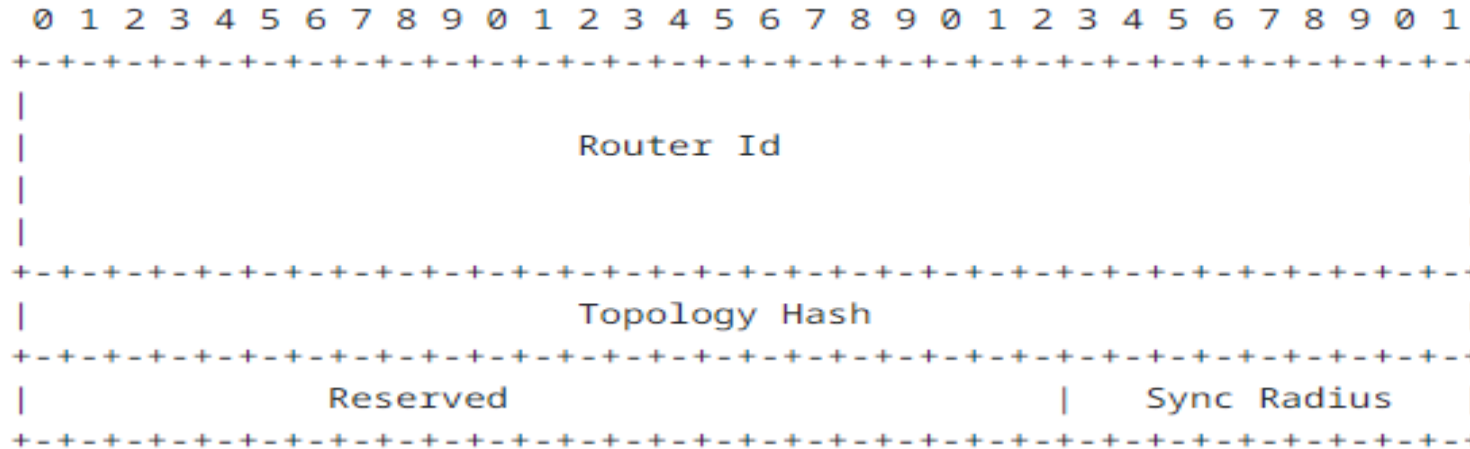


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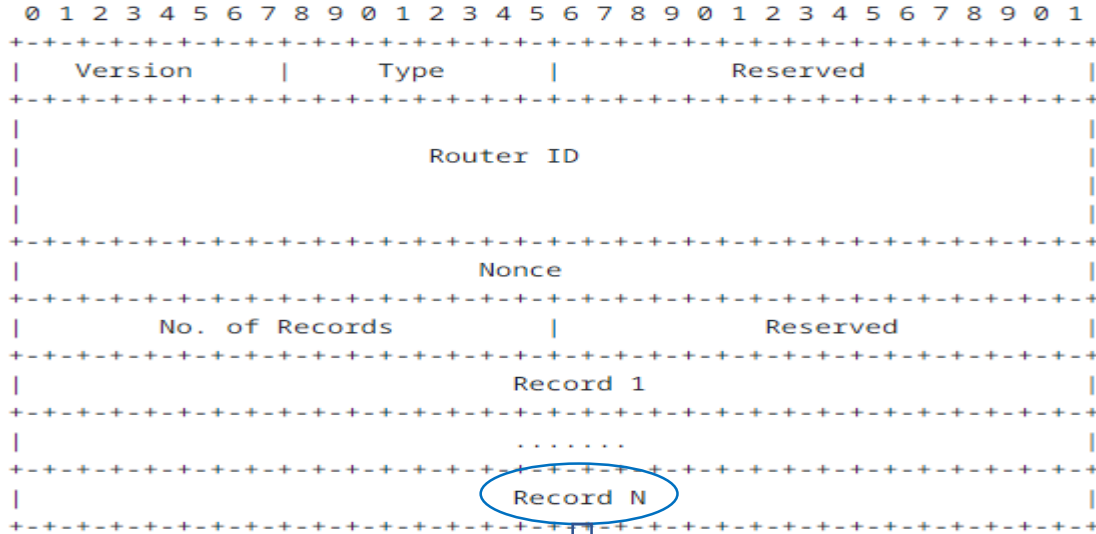
- ❖ Encoding **Topology Hash** in the HELLO message to indicate whether the topology information is update to date or not
- ❖ Encoding **Sync Radius** in the HELLO message to indicate how far a network can reach
- ❖ **Topology Refreshing** is triggered in response to the change of **communication relations**
- ❖ **Sync Radius** will be **updated** during the topology refreshing

HELLO Message

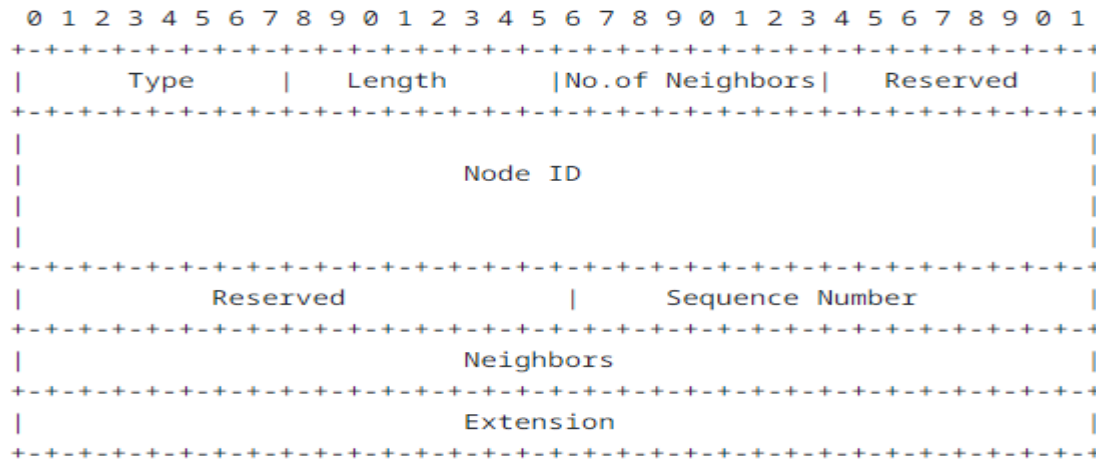


- ❖ **Router ID:** Unique router identifier. Could be the address of the node.
- ❖ **Topology Hash:** It is a 32-bit hash value of the topology comprising of all NITs stored locally.
- ❖ **Reserved:** Field reserved for future use. MUST be set to zero on transmission and MUST be ignored on reception.
- ❖ **Sync Radius:** The 1-byte sync radius N indicates that all nodes within N hops share the same topology information at the moment. The sync radius of a node changes as the network topology alters.

Topology Synchronization Message

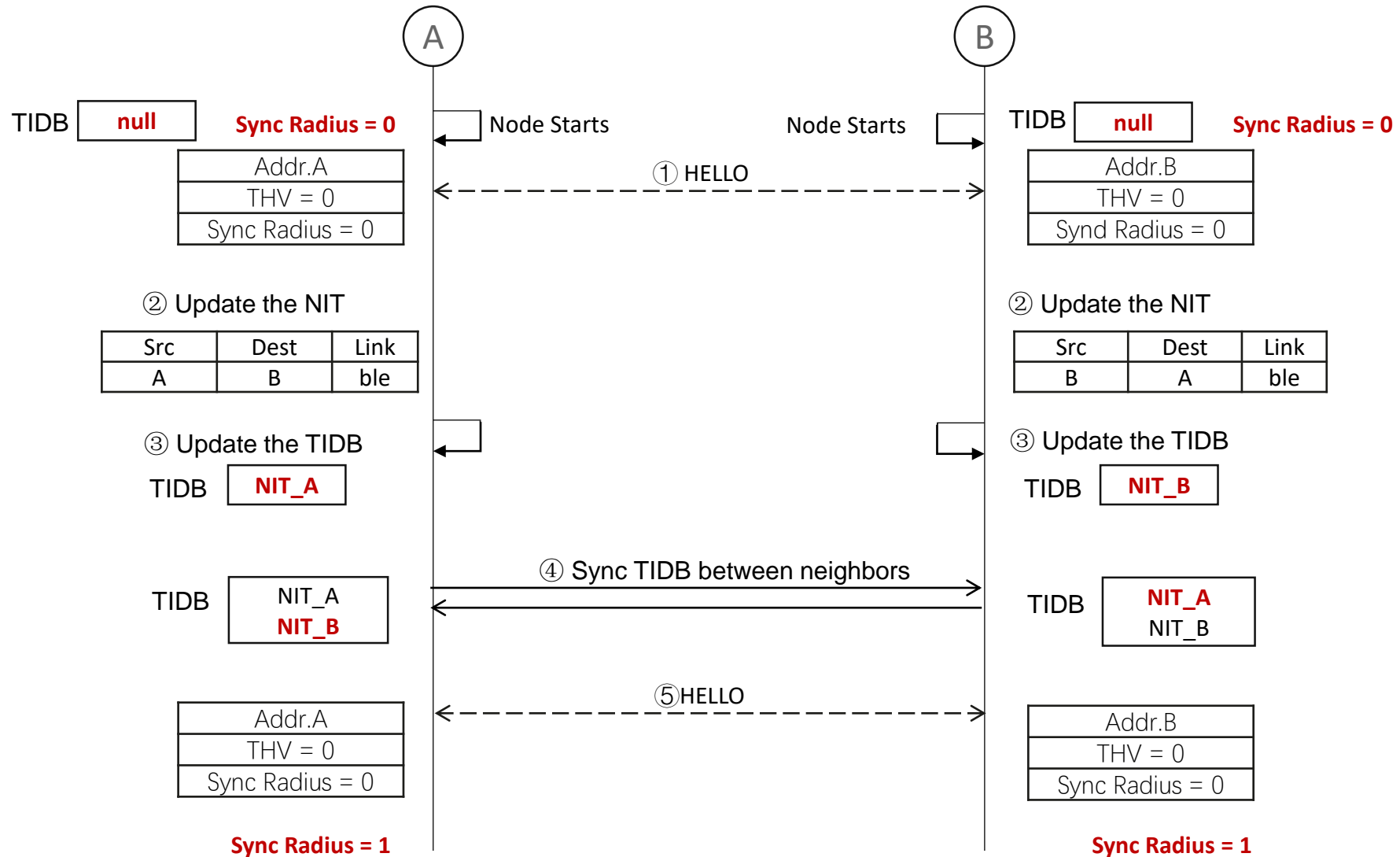


- ❖ **Version:** This 8-bit field is assigned to the version of this protocol.
- ❖ **Type:** This 8-bit field shows the type of the message (1 = Request; 2 = Response).
- ❖ **Router ID:** Unique router identifier. Could be the address of the node.
- ❖ **Nonce:** This is an 4-octet random value created by the sender of the request. The nonce MUST be generated by a properly seeded pseudo-random source; for example, see [RFC4086].
- ❖ **No. of Records:** It shows the number of records in the TIDB attached to this message.
- ❖ **Record 1..N:** The appended records from the TIDB. Each records represents a neighbor information advertisement message.

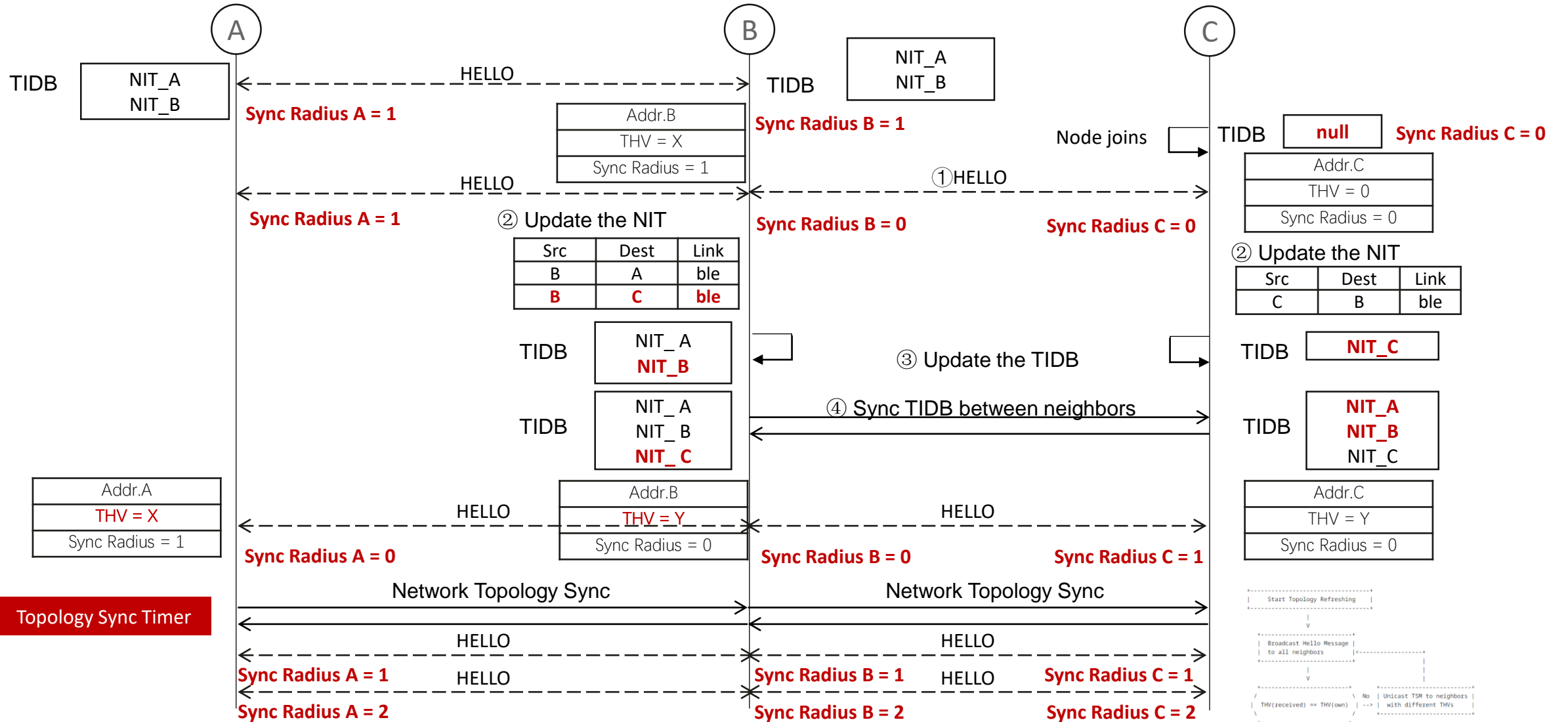


- ❖ **Type:** This 8-bit field indicates the type of NITA.
- ❖ **Length:** It indicates the length of this NITA message in bytes.
- ❖ **No. of Neighbors:** It indicates the number of neighbors of the node.
- ❖ **Node ID:** The unique identifier of the node, could be the address of the node.
- ❖ **Sequence Number:** It is a self-incremental value, starting from a random number. A bigger number indicates a more recent version of the NIT.
- ❖ **Neighbors:** The neighbor information message.
- ❖ **Extension:** The extension field can be filled with additional application layer node information so that it can be spread throughout the network along with the routing information.

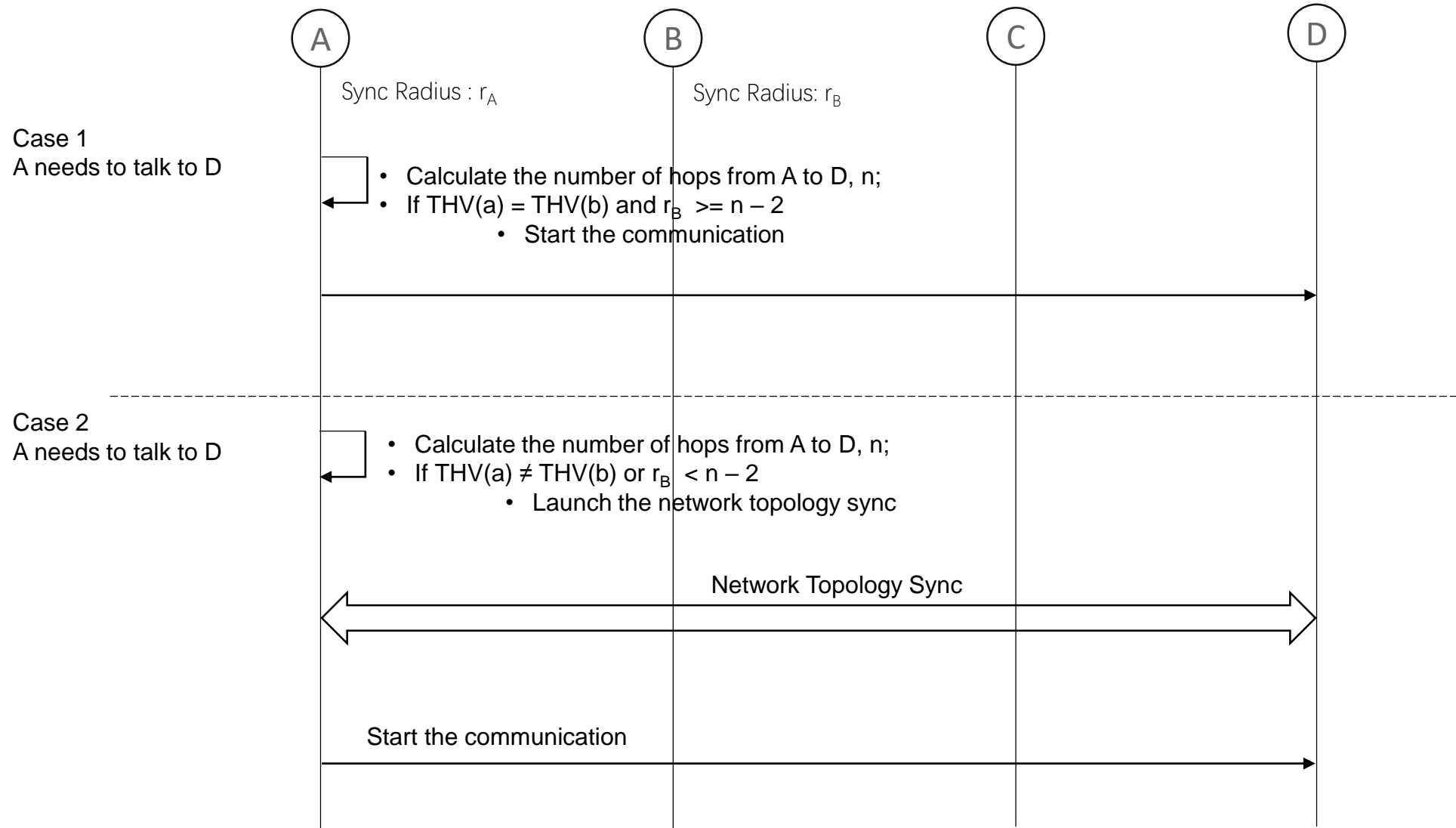
Neighbor Detection



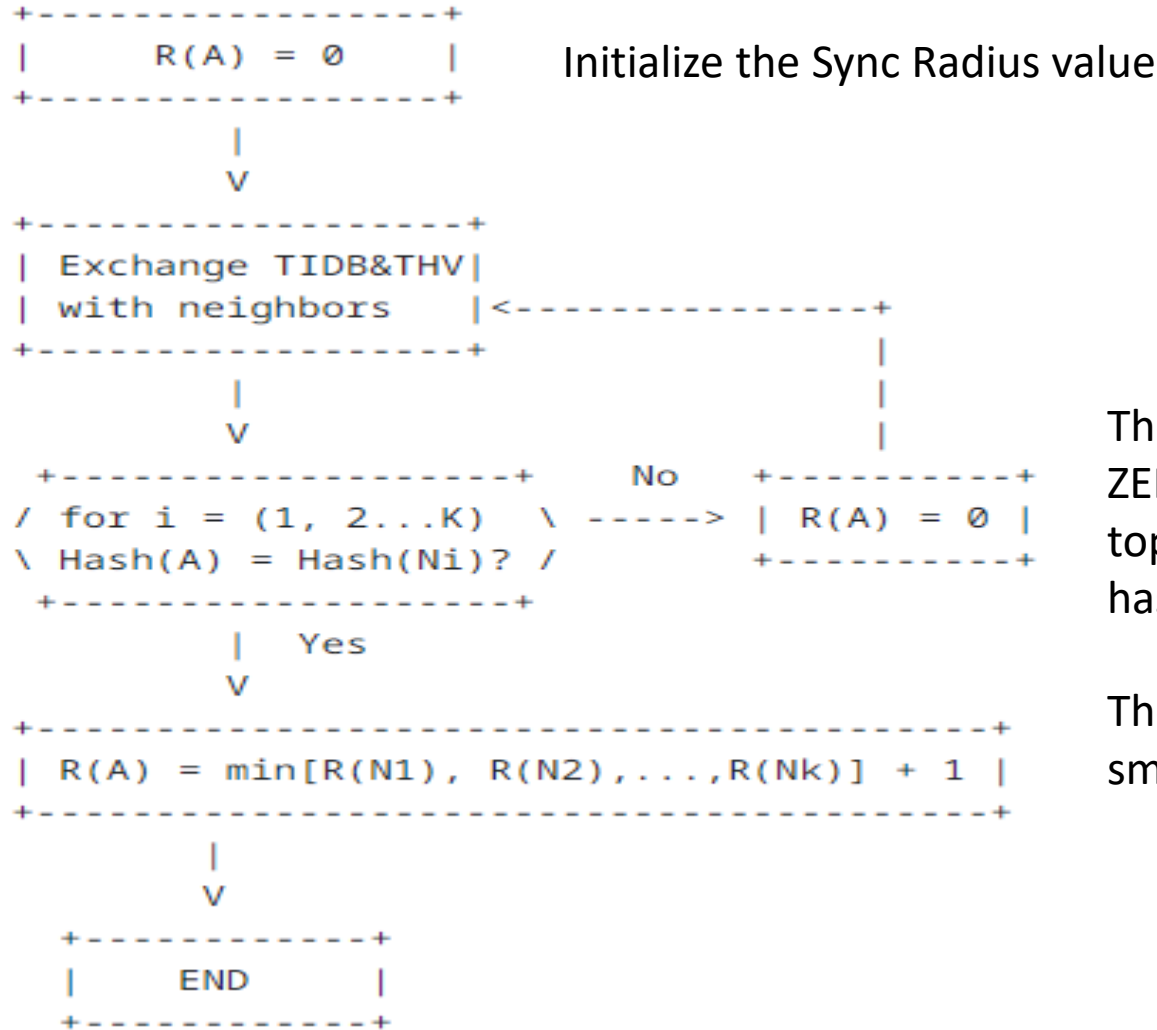
Topology Synchronization



Launch Application



Sync Radius Calculation



The Sync Radius value of the node will be reset to ZERO if there is any 1-hop neighbor whose topology hash value is different from the one it has.

The Sync Radius value of the node should be smaller than or equal to the network diameter.

Next Steps

- Encourage discussion on the mailing lists of the MANET WG
- Should we develop a solution for a specific ad routing protocol e.g. OLSRv2?
- Welcome to contributions and co-authors

THANKS!