

SAS: Ringlet selection and flooding

Marc Holness, Nortel Networks
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Objectives

- Outline the impacts and issues relating to ringlet selection and strict, relaxed, and permissive modes of operation on the ring
- A continuation of work provided by Nitin Gogate (http://grouper.ieee.org/groups/802/17/documents/presentations/nov2004/ng_SAS_RS_01.pdf)

Terminology and terms (1)

- SAS – Spatially aware sublayer
- Directed transmissions – Refers to a RPR source station transmitting to a designated (unicast) destination address on the ring
- Undirected transmission – Refers to a RPR source station flooding a frame over the ring

Terminology and terms (2)

- Local - implies ring local addresses of RPR station address and/or secondary MAC address associated with local RPR stations
- Remote address – A unicast address not found in the RPR topology DB
- targetAddress - denotes the destination RPR station MAC address associated with the client *da*.

Undirected to directed Tx

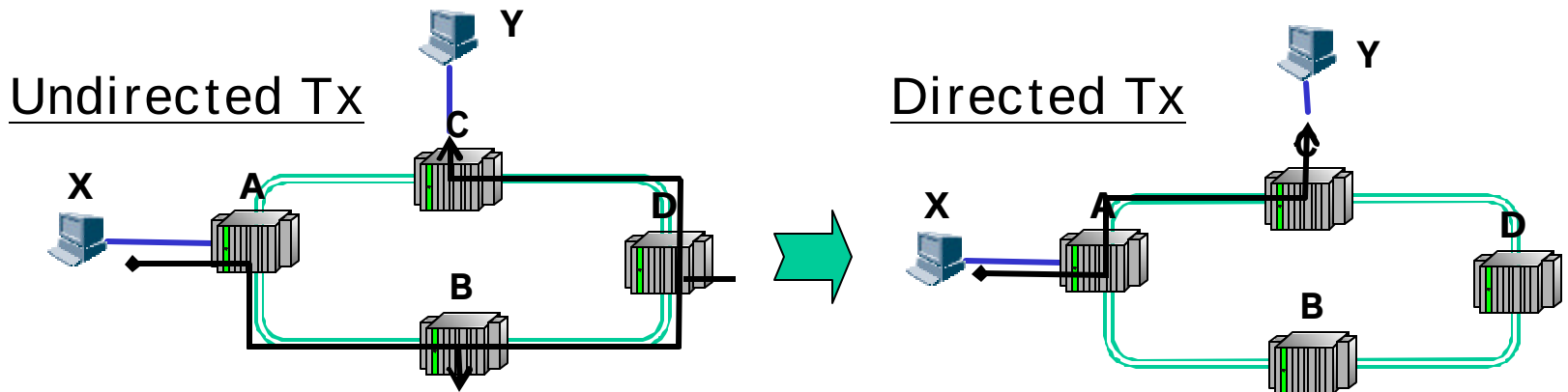
For a given ringlet selection algorithm (e.g., smallest hop count to destination), an undirected transmission followed by a directed transmission have the following results:

Conditions	Result
If the ringlet selected by the undirected Tx differs from the directed Tx	May introduce frame reorder and/or duplication
If the ringlet selected by the undirected Tx is the same as the ringlet selected for the directed Tx	Will <u>not</u> cause frame reorder and/or duplication
If the ringlet selected by the undirected Tx differs from the directed Tx, and directed Tx frames are not transmitted onto the ring until the undirected Tx frames are drained from the ring	Will <u>not</u> cause frame reorder and/or duplication

Note: It is assumed that the cleave point determination is derived by the ringlet selection algorithm for bi-directional flooding.

Reorder scenario

- When moving from an undirected (via unidirectional flood) to directed Tx, the ringlet selected by the undirected Tx may differ from the directed Tx



- Reordering of frames may occur (at station C)

Note: To prevent frame reorder, directed frame transmissions should not occur until all frames on ring dispatched by undirected transmissions are removed from the ring.

SAS and ring protection

- Ring close to open state transition

- Flush SAS DB

The principle is that the FDB needs cleansing (e.g., flushed) if an event takes place to invalidate and association entry in the SDB.

- As per 802.17-2004 specifications (e.g., strict versus relaxed behavior and RPR MAC ringlet selection)

Need to consider open-to-open state transition.

- Ring open to close state transition

- As per 802.17-2004 specifications

- No special SAS interactions

Note: During a close to open state transition, a RPR station MAC address may be removed from the ring. Consequently, entries found in the SDB containing the non-existent RPR MAC address must be purged from the table. A complete SDB wipe will ensure this happens. I do not believe it is necessary to flush the SDB during an open to close transition. Open to close ring transitions can not invalidate any entries in the SDB.

Rules and triggers (1)

- Rules

1. Conditions to trigger SAS DB entry flush:

- ☒ a) If the associated ring station moves from reachable to non-reachable

- ☐ b) If the associated station ringlet selection result changes (e.g. ringlet 0 to ringlet 1)

- Flush trigger

1. Context containment active?

2. Topology valid?

- 1) If SAS preserves ringlet state, then the ringlet state needs to be updated or the entry is flushed
- 2) If SAS does not preserve ringlet state (e.g., perform ringlet selection), then rule 1b may not be necessary

Rules and triggers (2)

Mode	Flush Entry	SDB Flush Entry	Flush Traffic
Strict	• Reachable – no change • Reachable – change • Not reachable	N N Y	Context containment
Relaxed	• Reachable – no change • Reachable – change • Not reachable	N N Y	
Permissive	• Reachable – no change • Reachable – change • Not reachable	N N Y	

Note: Assume SAS does not provide ringlet selection

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