Work items addressed

- SAS ringlet selection (w.r.t. maintaining frame order)
- First pass of rules for pruning of SDB entries on a topology change (versus emptying SDB)

SAS ringlet selection requirements and objectives

- **Requirement: SAS shall not cause packet reordering/duplication of strict-order frames on transition between directed and undirected modes.**
- **Requirement: SAS shall not cause packet reordering/duplication of relaxed-order frames on transition between directed and undirected modes except during periods of topology change when some reordering is tolerated.**
- **Objective: History need not be maintained**
  - Prior transitions
  - Prior ringlet selection choice
  - Prior topology changes
- **Objective: Minimize or eliminate FLUSH**

Ringlet selection method

- **Directed frames shall be sent via the ringlet on which the frame would have been received by the destination station had the frame been undirected.**
- **And one of the following conditions is true:**
  - The cleave point does not change unless there is a change in ring topology.
  - The cleave point may change independent of topology but the station provides a method (e.g. FLUSH) to avoid misorder.
- ***Note: In relaxed mode, is there currently a requirement that cleave point not change (except as a result of topology change) in order to prevent 'excessive' reorder?***

Open ring scenarios

- **Steered open ring**
  - Per Specification – for a open steered ring, the cleave point is the point at which the protection event exists
  - When the ring closes, SDB is flushed and cleave point is recomputed
  - While the ring is open, the rules above will avoid packet reordering/duplication
- **Wrapped open ring**
  - Needs to be further studied

Motivation for SDB Pruning

- **Change in RPR topology or protection need not imply a change in SDB associations**
  - Most of the times this will be due to - Station being added, removed, stations entering and exiting pass-through, fiber cuts, SPAN maintenance (FORCED/MAN switches) etc.
  - All of these do not affect the SDB association
- **It implies change in ringlet/cleave point selection**
- **Advantage is in avoiding un-necessary flooding as entries not affected by the topology change can continue using directed transmissions (and need not be re-learned)**

Pruning Method

- **For TOPO_CHANGE or PROT_ CHANGE, MA_CONTROL_indication primitive makes the topology and status database available to a MAC client (Table 6.7/802.17)**
  - RPR topology database entries are marked – R, V, I
- **Update SDB as follows:**
  - (R) – Valid and reachable RPR stations – Do not prune
    - Should be (R) on at least one ringlet
  - (I) – Invalid entry – Prune
  - (V) – Valid but not reachable – Prune
  - Prune all other SDB entries (for stations that are not “seen” as part of the new topology but were part of the old)
  - Pruned entries are not remembered, SDB entries associated with (V,I) are not remembered
  - As RPR stations become valid & reachable, the associations are relearned
- **Some CR defects such as: Topology inconsistency, instability etc. – should result in SDB purging**

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Example --

- **Include a short section with an example based on Subclause “11.5.4 Topology change sequence” of 802.17-2004 Standard**
- **WRT Subclause 11.5.4 of 802.17-2004 specification – Station S1**
  - Figure 11.27-a – Stable closed ring -- SDB contains entries associated with S2, .., S6
  - Figure 11.27-b – FS opens ring – station across edge is marked (V) – SDB contains entries associated with S2, .., S6
  - Figure 11.27-c – Severed span depopulates open ring -- SDB contains entries associated with S2 and S3
  - Figure 11.27-d – Remote edge reports – S1 sees new stations --SDB contains entries associated with S2, S3 associations but not S7,S9 (marked I) or S8 (marked V)
  - Figure 11.27-e – Preceding edge reports – SDB can contains entries associated with S2,S3,S7,S8.
  - Figure 11.27-f – S1-S9 span restored – SDB can contains entries associated with S2,S3,S7,S8 and S9.

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Downsides

- **Requires looking up SDB by RPR MAC or by Customer MAC**
  - Issues for existing silicon solutions/vendors?
- **Emptying the database coincides closely with 802.1D/Q**
  - This is an advantage if the objective is align SDB with 802.1D/Q Specifications
- **Emptying the entire SDB may be necessary for Support for multicast and secondary MAC**
  - Depends on the results of other action items

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