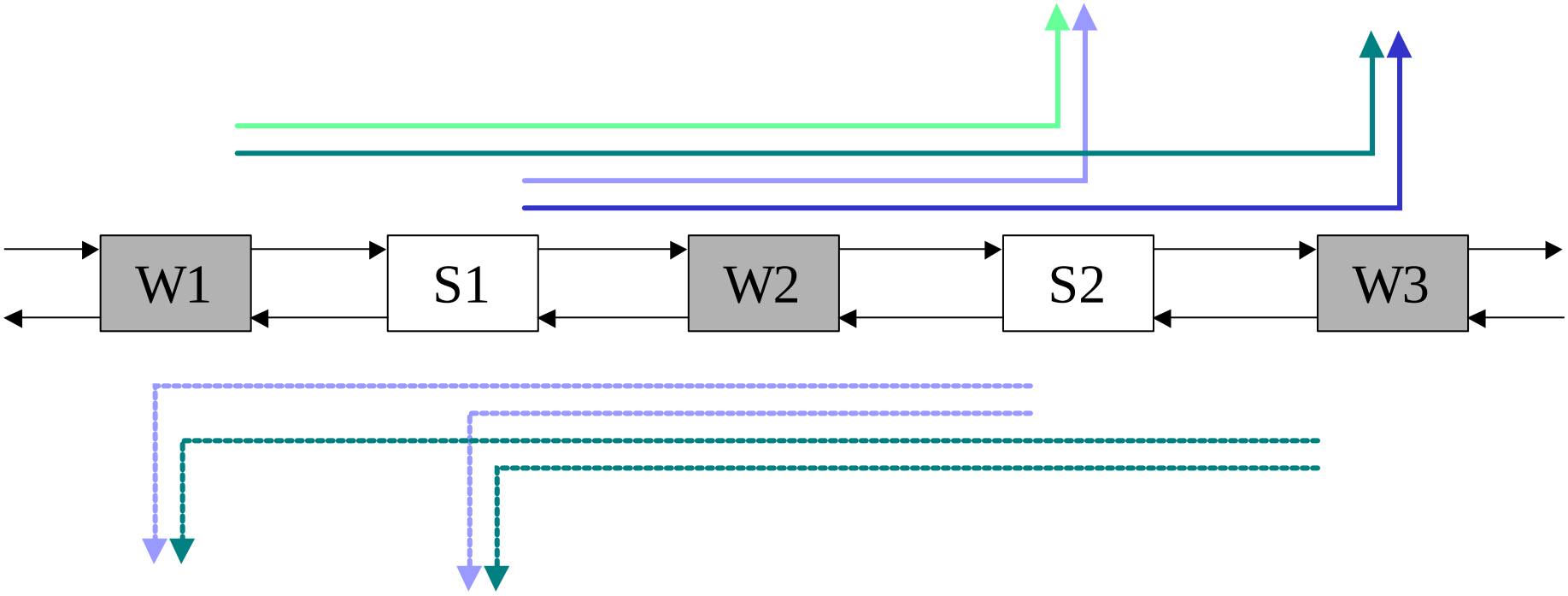
SWIS Advantages

Leon Bruckman
Corrigent Systems
leonb@corrigent.com

SWIS principles

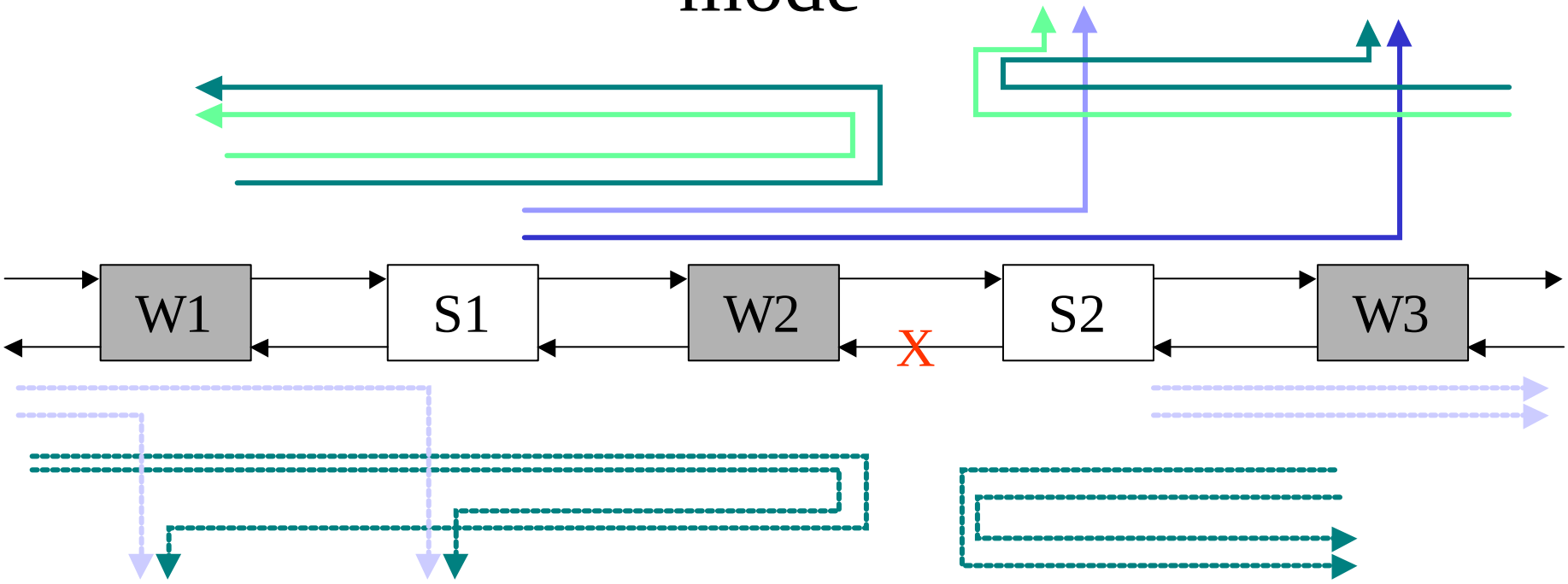
- Define a “wrap” indication in packet header
  - Node detecting failure must wrap all packets with “wrap” indication set
  - Node detecting failure must discard (Bidirectional protection) or pass (Unidirectional protection) all packets with “wrap” indication clear
- Send an alarm indication (upstream and downstream) within TBD msec of detecting failure
- Send alarm indication every TBD sec if alarm persists

Hybrid ring – normal operation



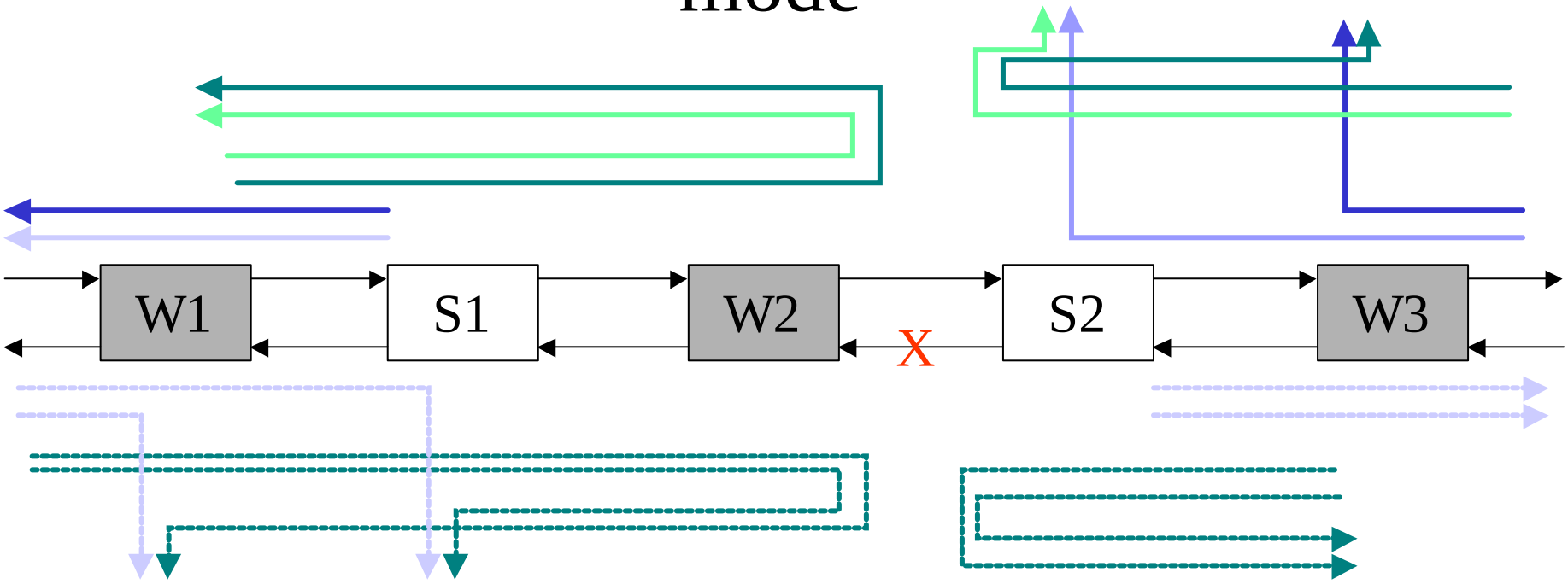
- Wrapping Stations (W1, W2, W3) set wrap indication for all frames
- Steering Stations (S1, S2) clear wrap indication for all frames

Hybrid ring – Failure, Unidirectional mode



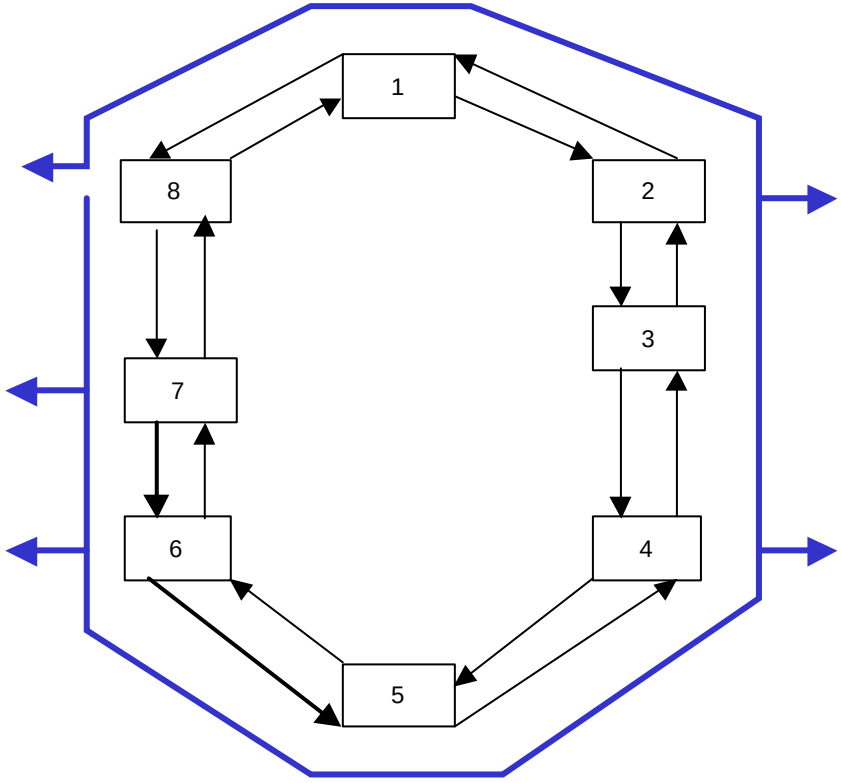
- W2 and S2 wrap frames with wrap indication set
- W2 sends failure indications upstream and downstream

Hybrid ring – Failure, Bidirectional mode



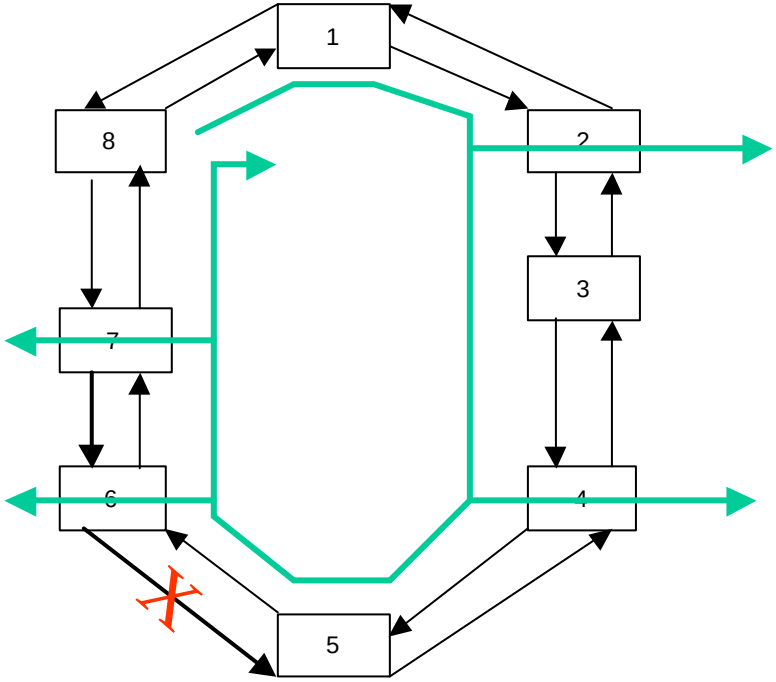
- W2 and S2 wrap frames with wrap indication set and drop others
- W2 sends failure indications upstream and downstream

Multicast – Normal operation



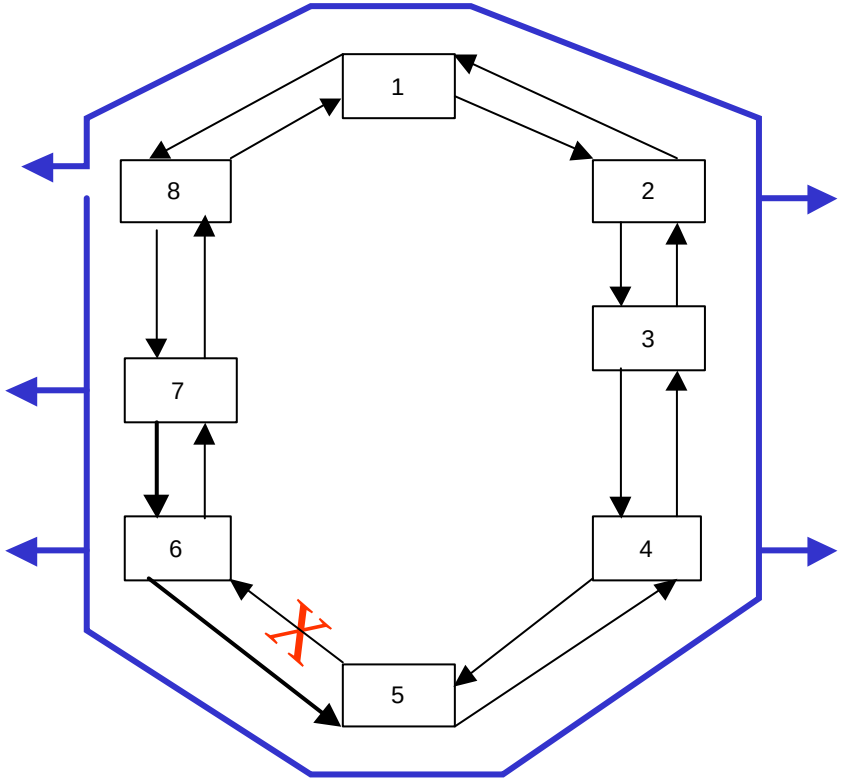
- Station 8 transmits multicast to station 2, 4, 6 and 7 through outer ring

Multicast – Unidirectional Failure, steer



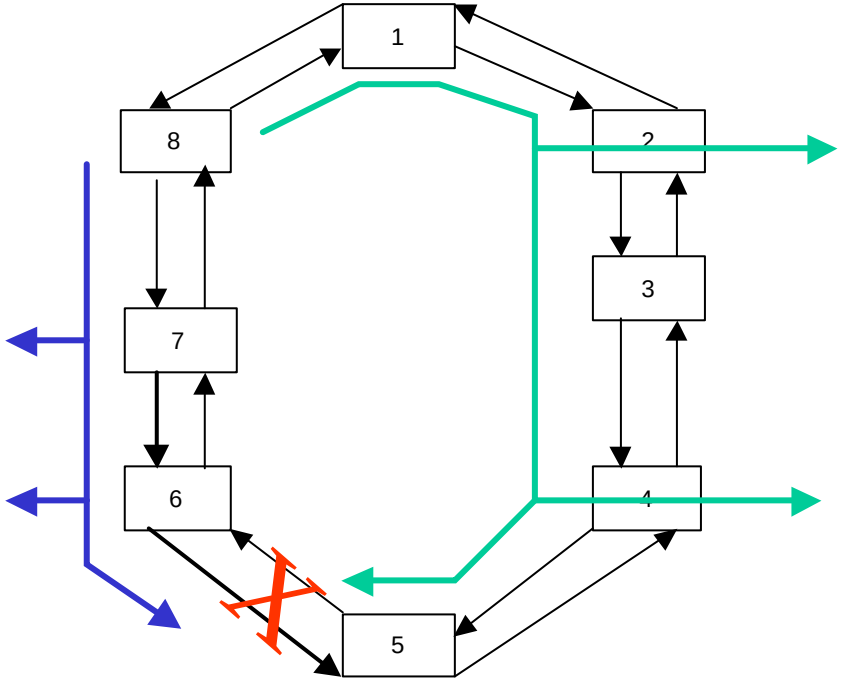
- Station 8 has to transmit the Multicast flow through the inner ring to reach all destinations

Multicast – Unidirectional Failure, steer



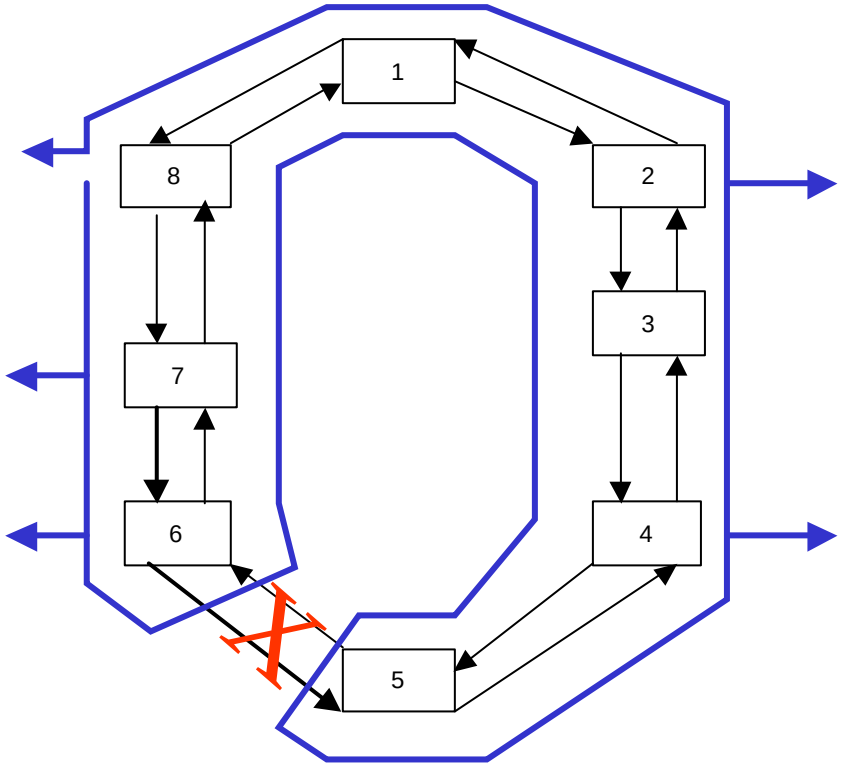
- Station 8 continues to transmit the Multicast flow through the outer ring to reach all destinations

Multicast – Bidirectional Failure, steer



- Station 8 has to transmit the Multicast flow through both rings to reach all destinations
- Packet duplication risk during failure restoration

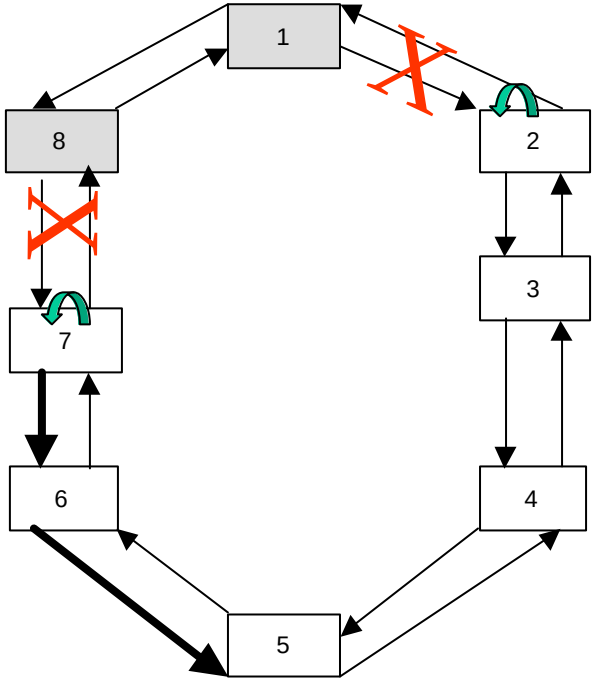
Multicast – Failure, wrap protection



- Station 8 continues normal transmission of Multicast

Multiple ring failures

- Node 5 to Node 1 flow Outer ring.
- Node 1 and 8 isolated from ring
- Node 5 removes flow with SA=5
- Wrapped flow 5-1 competes with flows in segments 7-6 and 6-5
- But, keep in mind that there is less stations in the reduced ring



Multiple ring failures - methods

- CAC based
  - Reserve bandwidth for guaranteed wrapped traffic
  - Easy to implement
  - Guaranteed services are bandwidth limited
  - Wrapped BE traffic competes with normal segment BE traffic
- Alarms based
  - Evaluate alarms to discover isolated nodes
  - Stop transmission to isolated nodes
  - Traffic impaired during evaluation
  - Better bandwidth utilization

Conclusions

- SWIS allows interoperability of steer and wrap Stations
- SWIS simplifies Multicast handling, compared with steer only methods