Darwin Protection

Gal Mor, Corrigent Systems

Requirements

- Protection within 50msec
- Two protection mechanisms:
  - Steering is mandatory
  - Wrapping is optional
- Each RPR station indicates its protection method in the Topology message
  - If all stations can wrap – operator's selection:
    - Wrap only
    - Steer only
  - Otherwise, Steer only

Requirements (cont)

- In a wrapping protection system, packets can be tagged with “Steer Only” type (SWIS)
  - Steer TDM flows that requires low jitter and non revertive mode
  - Steer reorder-sensitive flows
  - Wrap flows that requires minimum packet loss
  - Wrap multicast packets, avoid the need to duplicate in MAC as in Steering only

Protection Hierarchy

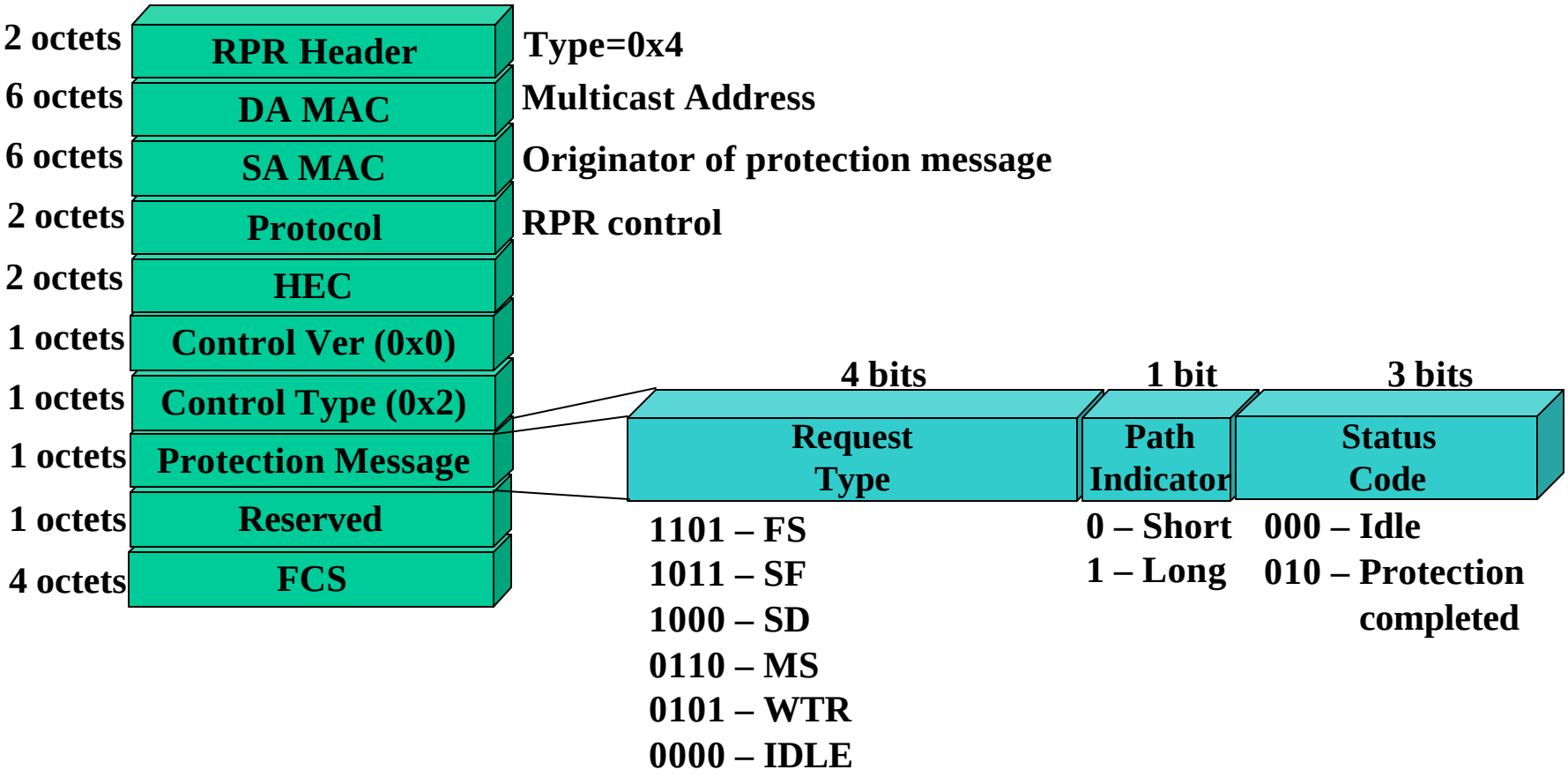
- Forced Switch (FS) – Operator originated
- Signal Fail (SF) – Automatic
  - LOS, LOF, L-AIS, BER above SF threshold (SONET/SDH)
  - RPR keep-alive timeout
- Signal Degrade (SD) – Automatic
  - BER above SD threshold
- Manual Switch (MS) – Operator originated
- Wait to Restore (WTR) – Automatic
- Idle (IDLE)

Protection Rules

- A higher priority protection request preempt a lower priority protection request
- Lower priority request is not allowed if higher priority request is present in the ring
- Multiple SF and FS can coexistence on the same ring

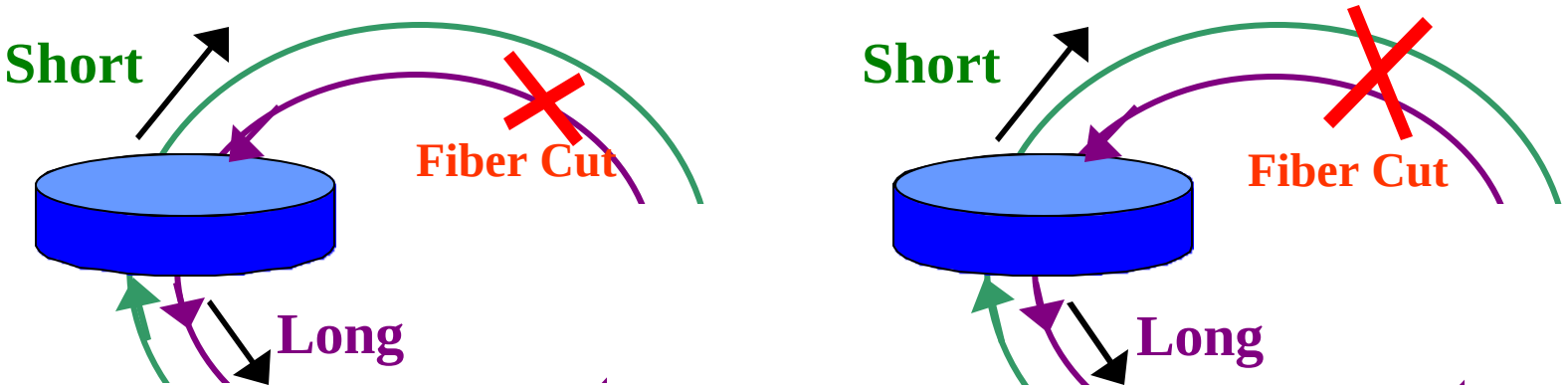
- Protection switches are performed bidirectionally even if a failure is unidirectional

Protection Message Format



Protection Message Path

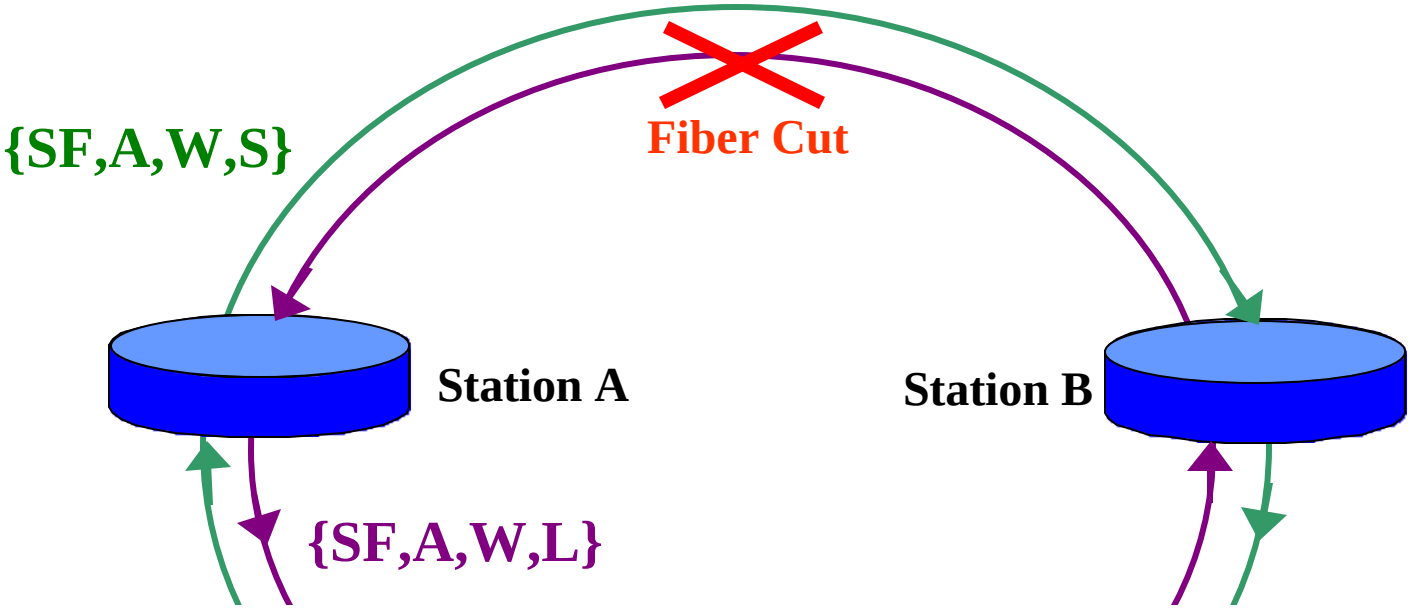
- Two types of protection messages:
  - Short – Sent to the other side of failed span through the opposite ring
  - Long – Sent away from the failed span, on the same ring



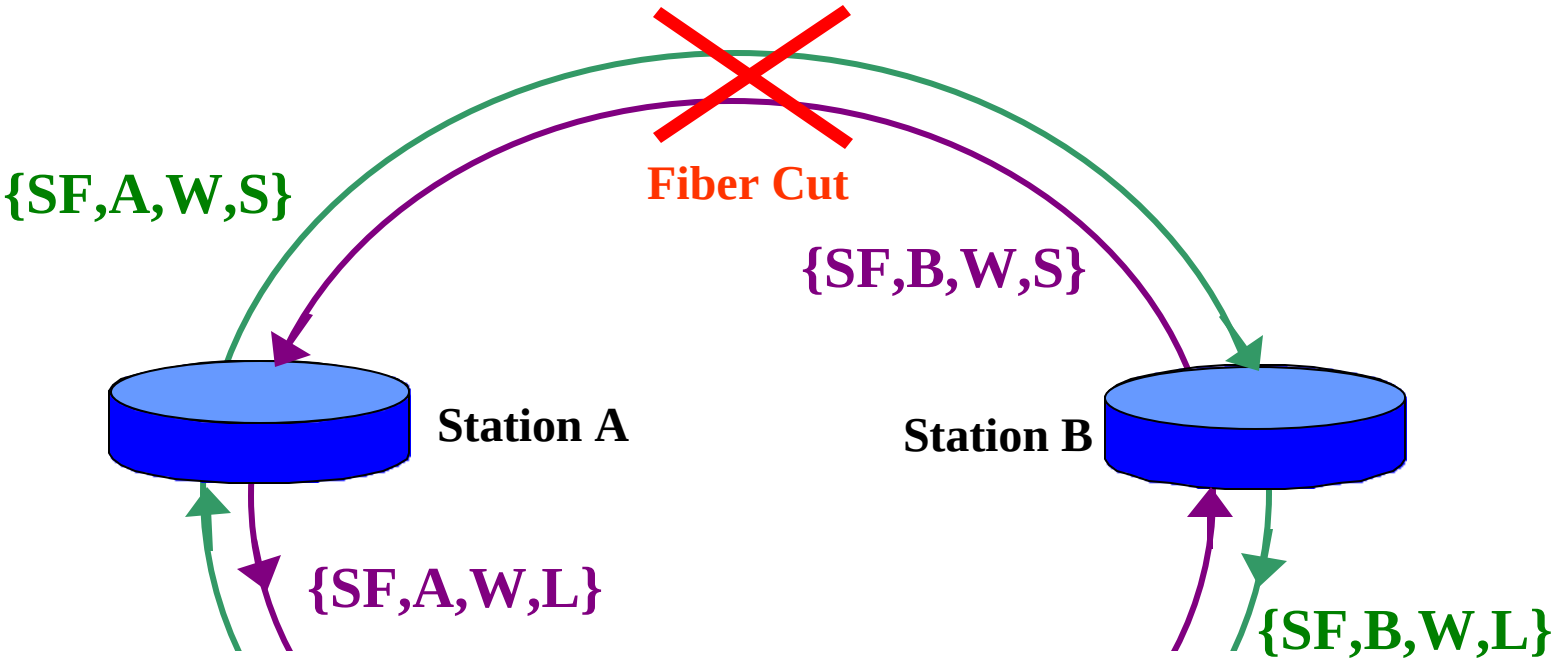
Protection Protocol Rules

- Protection packets are sent in broadcast style
- Protection messages are triggered by:
  - Self detect, or
  - User request
- Station repeats protection message generation every T1 timer, until it receives it back.
- Protection messages are never wrapped
- Station never wraps/unwraps as a result of Long path request. Long messages are used to maintain the protection hierarchy

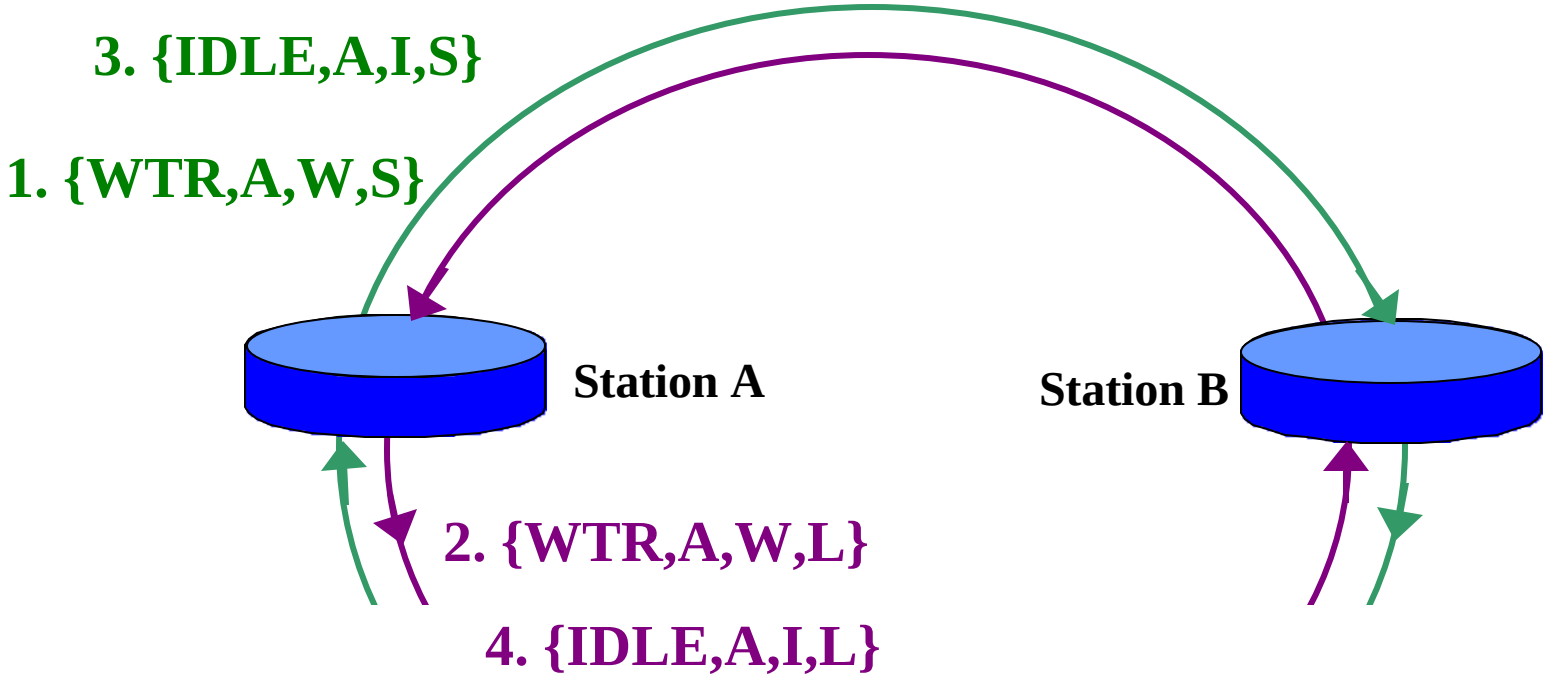
Unidirectional Fiber Failure Detection



Bidirectional Fiber Failure Detection



Unidirectional Fiber Recovery



Bidirectional Fiber Recovery