



OAM in Darwin

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OAM Frames

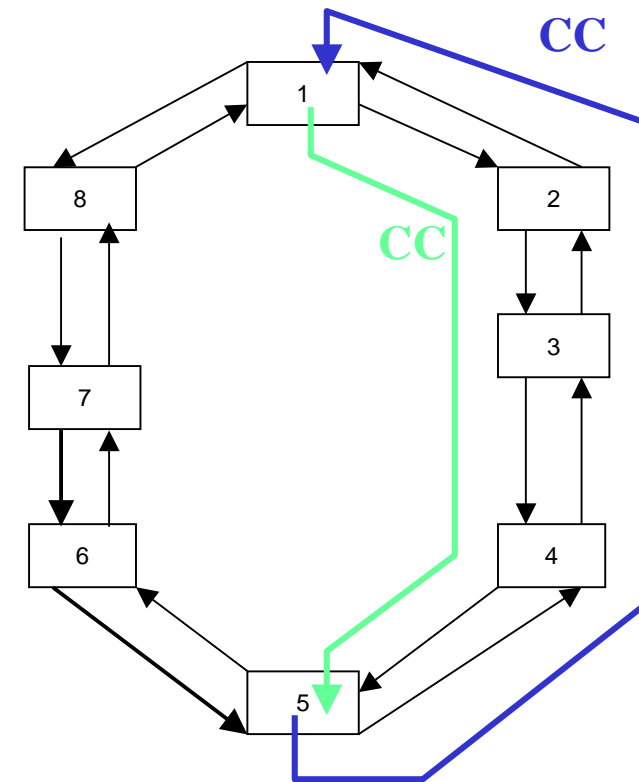
- Fault Management
 - Fault Management frames are used to indicate loss of continuity (LOC defect) and to perform Loopback operations.
- Activation/Deactivation
 - Activation/Deactivation frames are used to Activate or Deactivate the transmission of Continuity Check frames. These frames allow coordinating the transmission and reception to avoid the generation of undesired alarm indications.

Fault Management Mechanisms

- On-demand, in-service, Loopback mechanism
 - Triggered by the operator during service set-up or when a defect is detected
 - No reception indicates defect
- Continuous, in-service, Continuity Check mechanism used to detect RPR defects
 - Activated by management or Activation/Deactivation frames
 - RDI sent back as defect indication

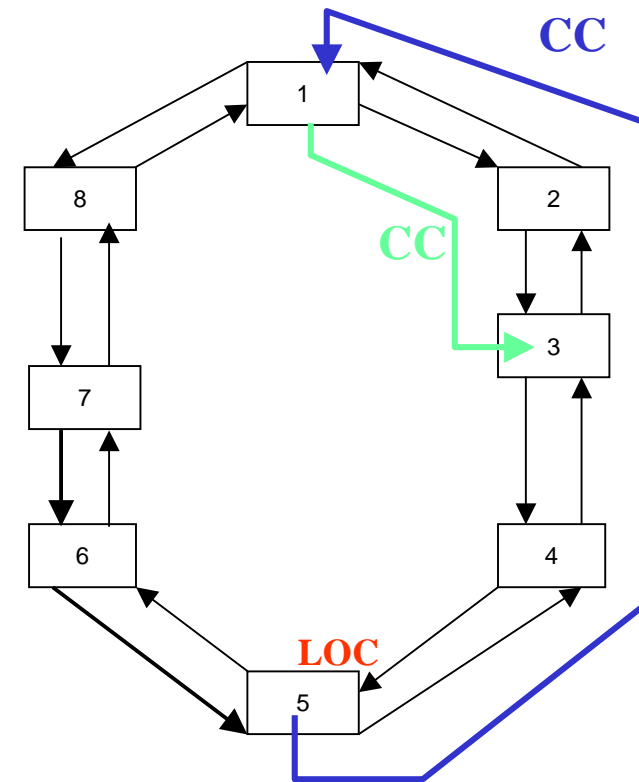
Fault Management - CC

- Continuity Check activated from N1 to N5
- CC activated from N5 to N1



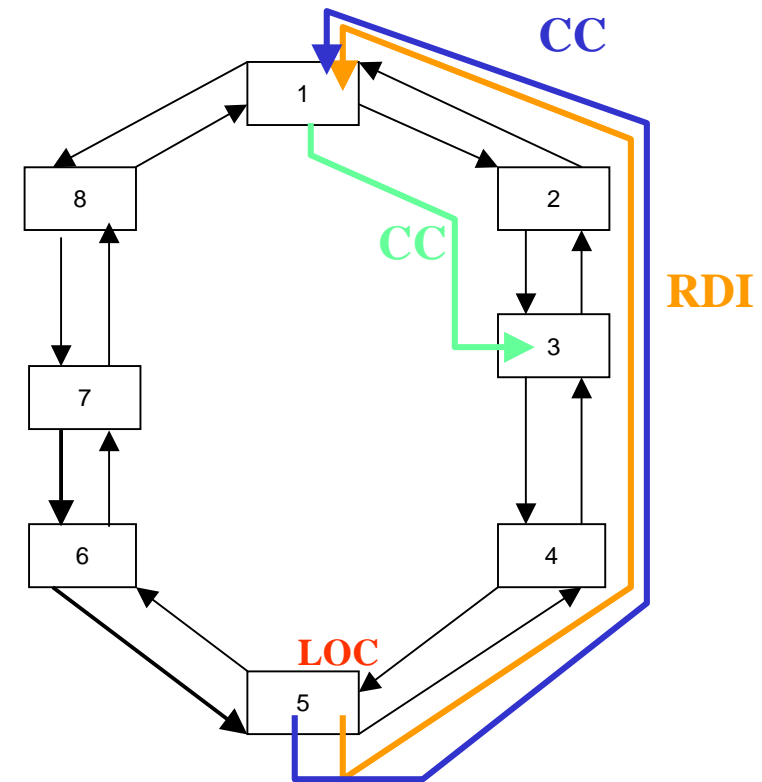
Fault Management – Unidirectional Failure

- N3 “steals” N5 frames in Inner only
- N5 does not receive CC frames
- N5 declares Loss Of Continuity (LOC)



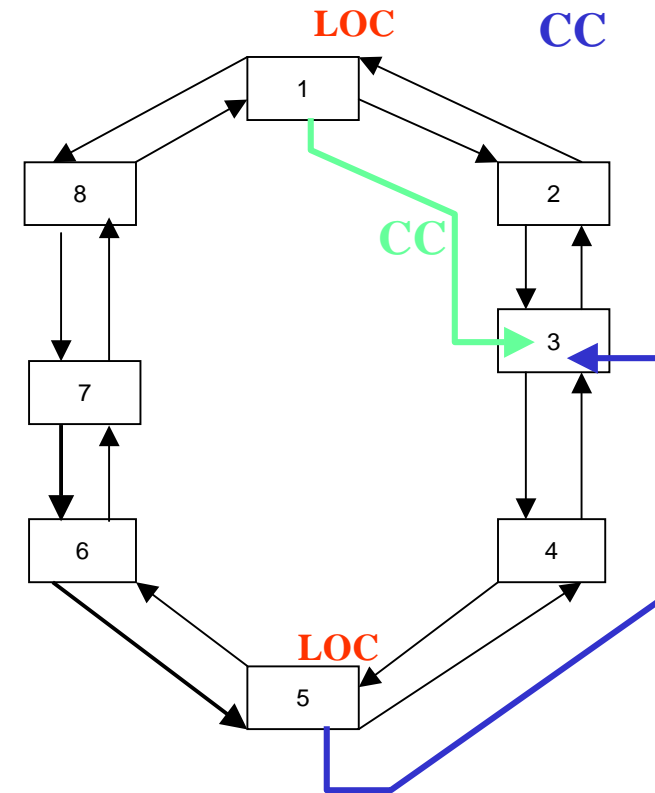
Fault Management – Unidirectional Failure

- N5 sends frames RDI through Outer ringlet
- N1 declares RDI
- N1 may decide to steer N1 to N5 flow



Fault Management – Bidirectional Failure

- N3 “steals” N5 frames in Inner and Outer
- N5 and N1 do not receive CC frames
- N5 and N1 declare Loss Of Continuity (LOC)
- N3 steals also RDI

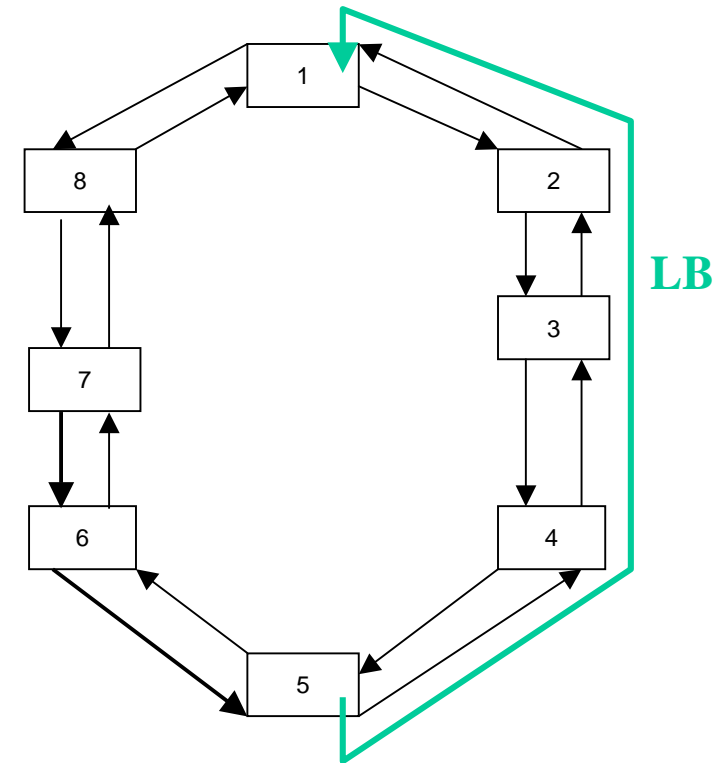


CC during ring Failures

- Protection method Steer:
 - Ringlet specific CC: CC not steered with data flow, LOC declared
 - Ringlet unspecified CC: CC steered with data flow, no LOC
- Protection method Wrap:
 - CC is wrapped, no LOC declared

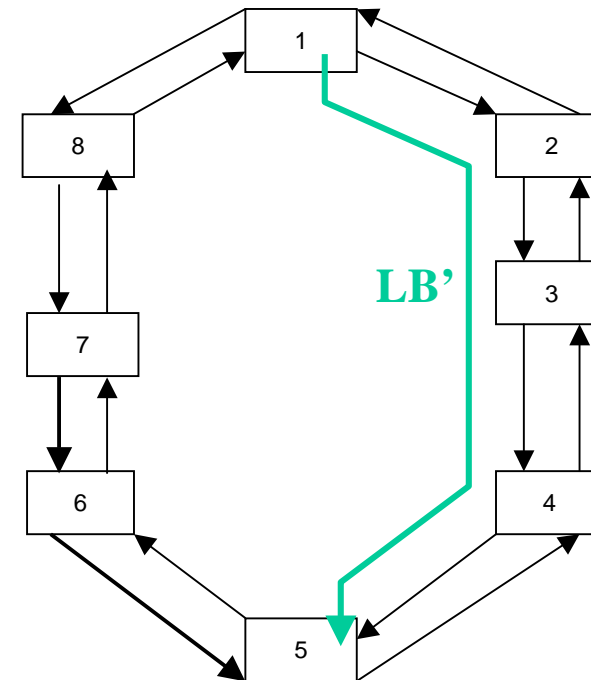
Fault Management - Loopback

- N5 sends Loopback frame to N1 through Outer ringlet
- Loopback frame indicates CoS and return ringlet:
 - Shortest path
 - Inner
 - Outer
 - Same
 - Opposite



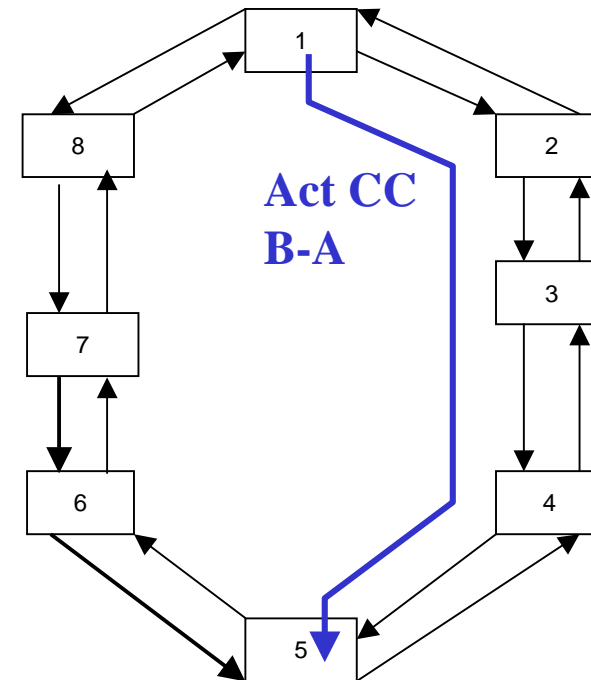
Fault Management - Loopback

- N1 sends back to N5 a modified Loopback frame with requested CoS and through the requested ringlet



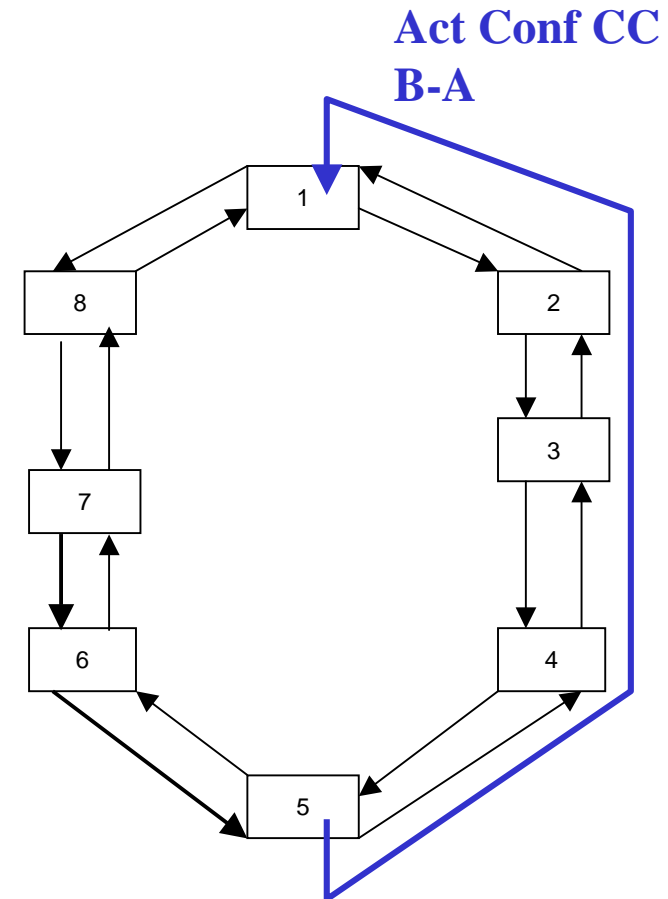
Activation

- Activate East CC sent from N1 to N5



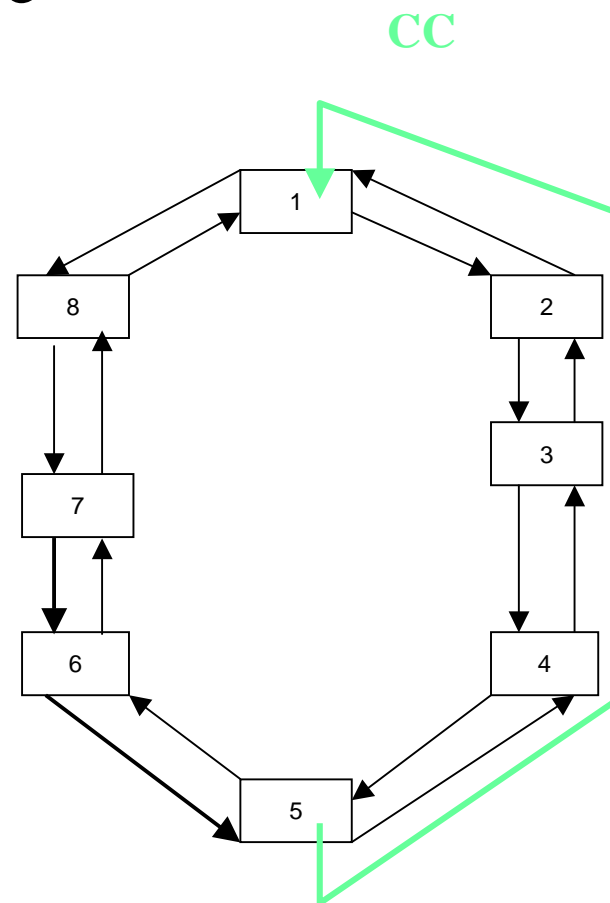
Activation Confirmed

- Activate East CC confirmed by N5



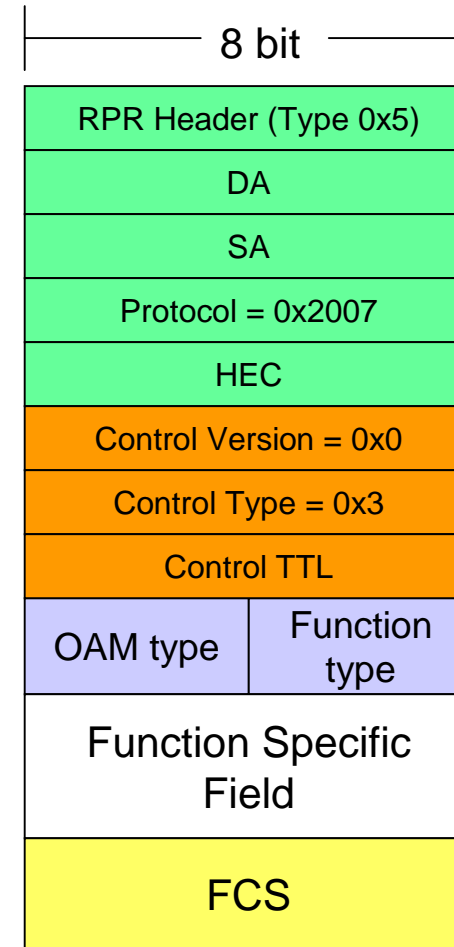
CC Active

- N5 starts sending CC frames towards N1



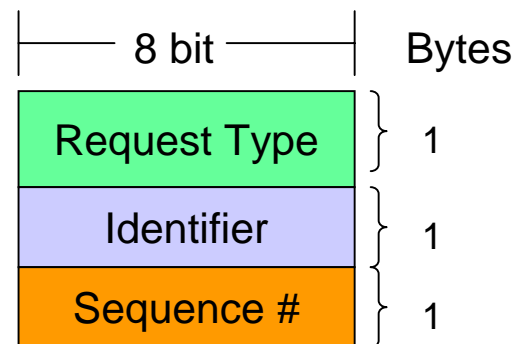
OAM Frame

- Common OAM header
- Specific payload
- FCS



OAM Frame– Function specific field

Loopback

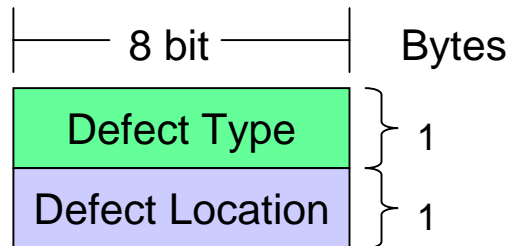


Request	Coding
Reply through shortest path	00000000
Reply through Inner ringlet	00000001
Reply through Outer ringlet	00000010
Reply through same ringlet	00000011
Reply through opposite ringlet	00000100

OAM Frame– Function specific field

RDI

CC



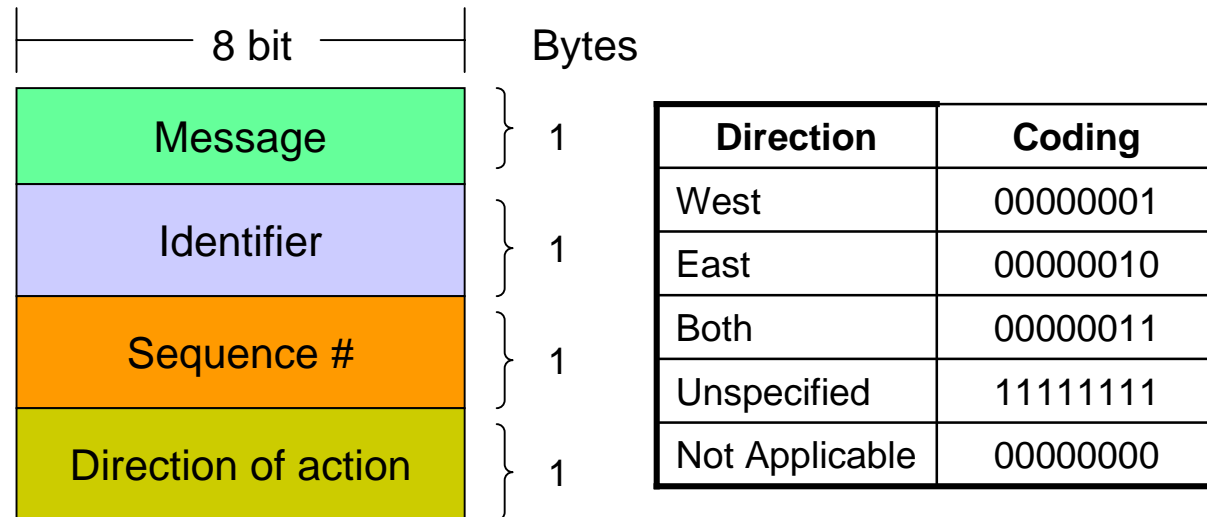
- No payload specific field defined

Defect Type	Coding
Not Specified	11111111
LOC	00000000

Defect Location	Coding
Ringlet 0	00000000
Ringlet 1	00000001
Unspecified	11111111

OAM Frame – Function Specific field

Activation/Deactivation



Message	Type	Coding
Activate	Command	00000001
Activation Confirmed	Response	00000010
Activation Denied	Response	00000011
Deactivate	Command	00000101
Deactivation Confirmed	Response	00000110



OAM Support

- Required:
 - Loopback
- Optional
 - CC
 - RDI
 - Activation/Deactivation