Darwin Frame Format

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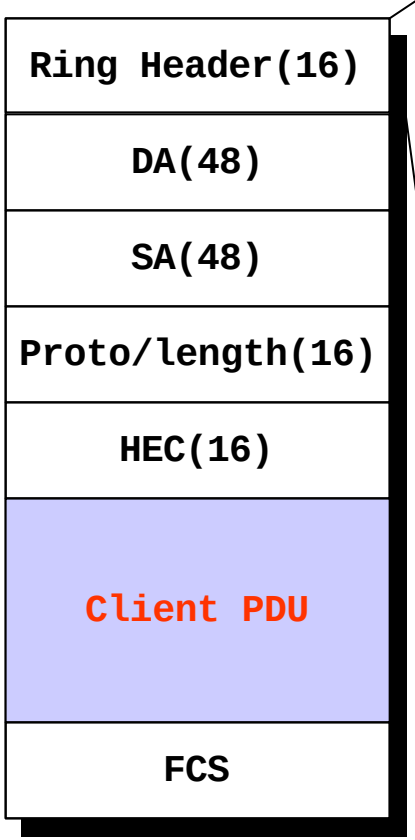
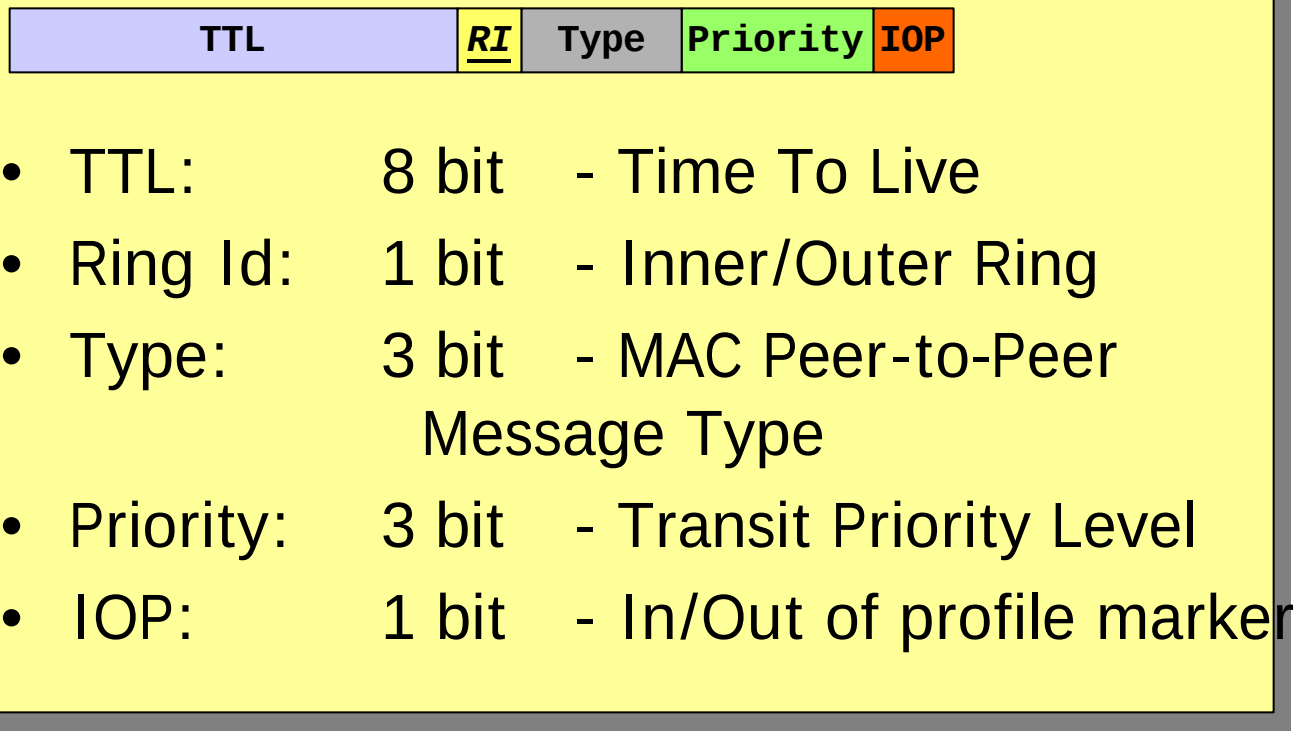
Frame Design Principles

- Fits within 802 LAN Architecture
- Clearly distinct from other 802 LAN frames
- Layered Design approach
  - — Decouples application specific fields from MAC Header
  - — Facilitates future expansion via Type field
- Compatible with LLC type 1, 2 and SNAP
- Ring specific functions placed up front
- MAC and Upper Layer message types decoupled

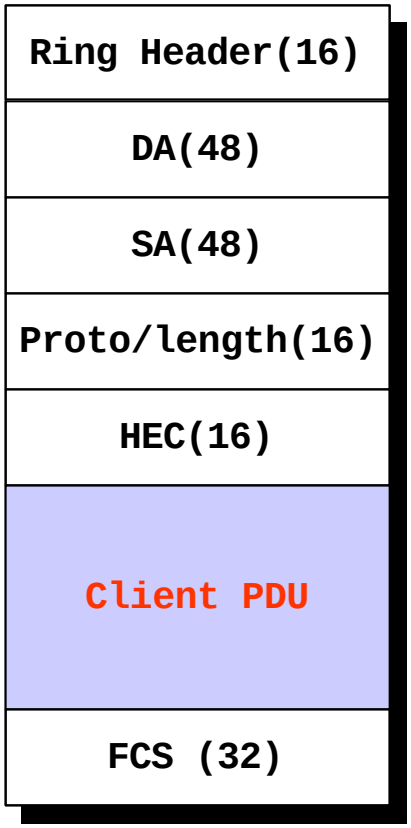
Darwin Frame Format





- TTL: 8 bit - Time To Live
- Ring Id: 1 bit - Inner/Outer Ring
- Type: 3 bit - MAC Peer-to-Peer Message Type
- Priority: 3 bit - Transit Priority Level
- IOP: 1 bit - In/Out of profile marker

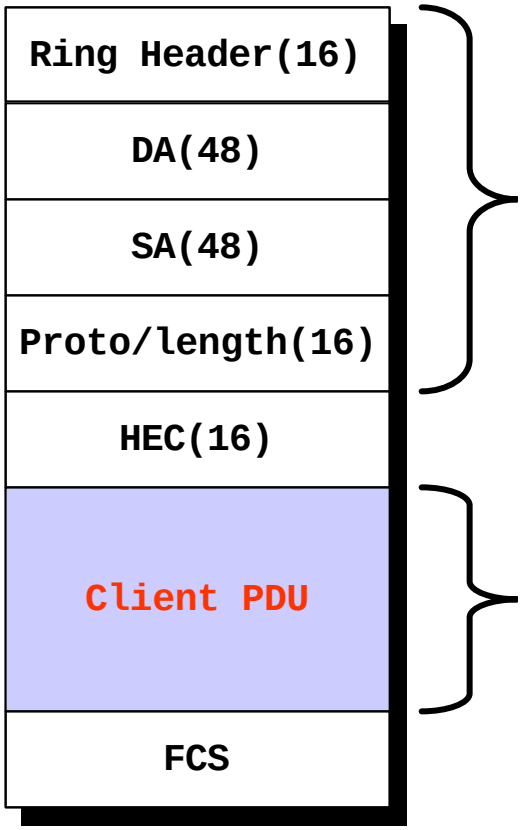
Darwin Frame Format



- DA 48 bit - IEEE Dest. Address
- SA: 48 bit - IEEE Src. Address
- Protocol: 16 bit - Protocol Type/Length
- HEC: 16 bit - Header Error Check
- PDU: var - Client PDU
- FCS: 32 bit - Frame Check

NOTE: PDU length
min: unspecified
max: 1.5k-9k selectable per ring

Darwin Frame Protection



- Protected by HEC -16

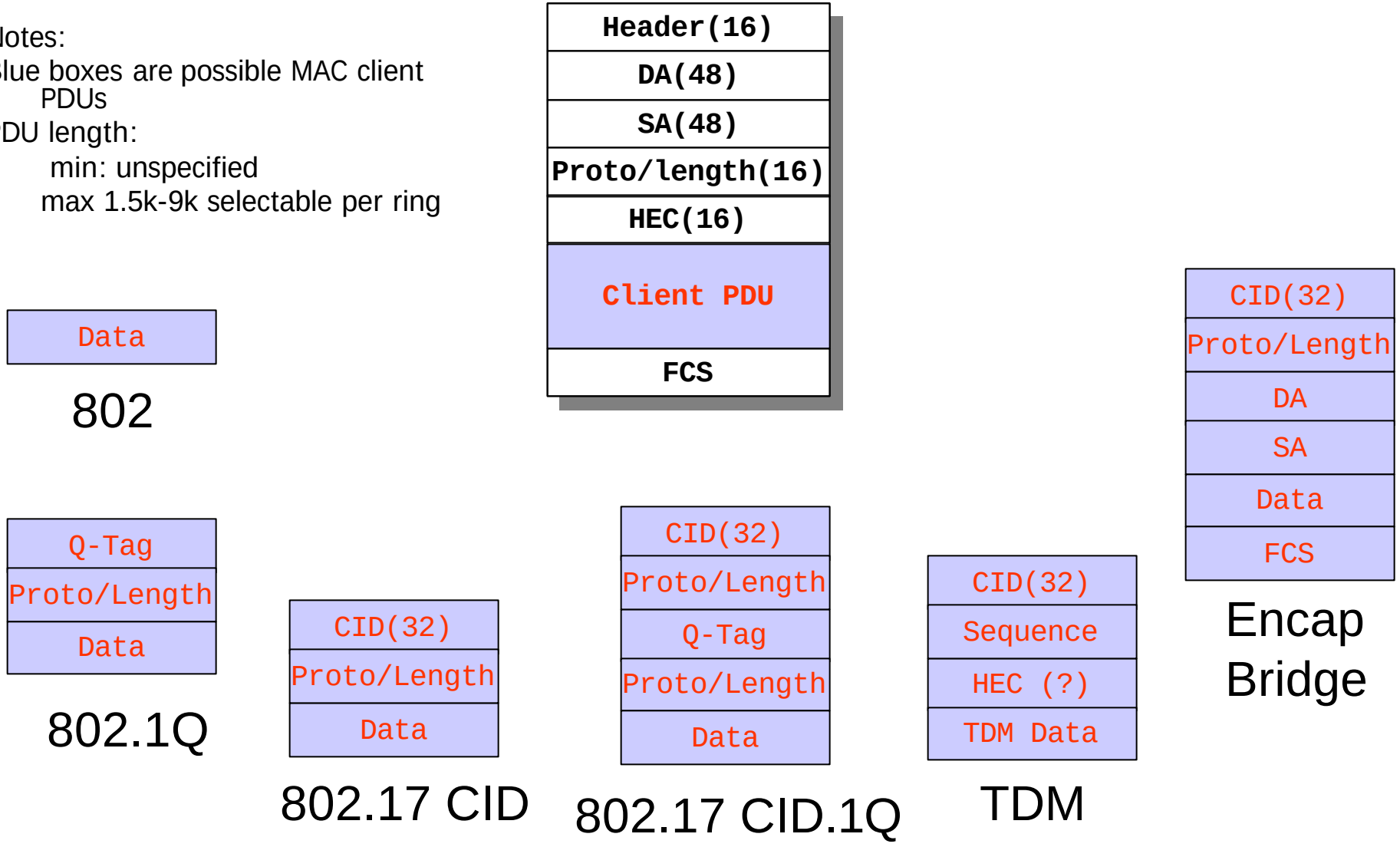
  $= x^{16} + x^{12} + x^{5} + 1$

- Protected by CRC - 32

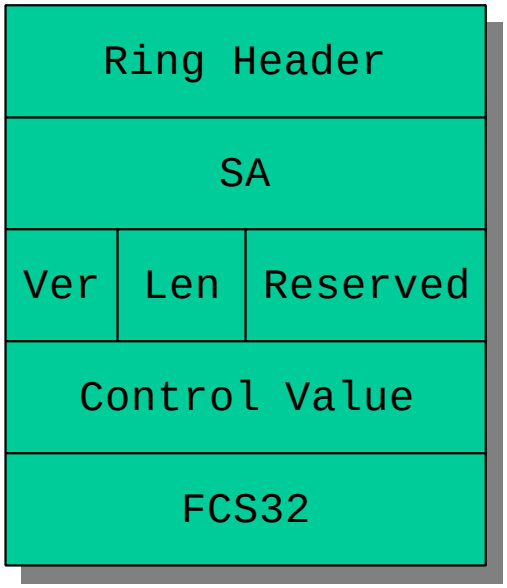
  $= x^{32} + x^{26} + x^{23} + x^{22} + x^{16} + x^{12} + x^{11} + x^{10} + x^{8} + x^{7} + x^{5} + x^{4} + x^{2} + x^{1} + 1$

Darwin Frame: Layered Approach

Notes:
Blue boxes are possible MAC client PDUs
PDU length:
min: unspecified
max 1.5k-9k selectable per ring



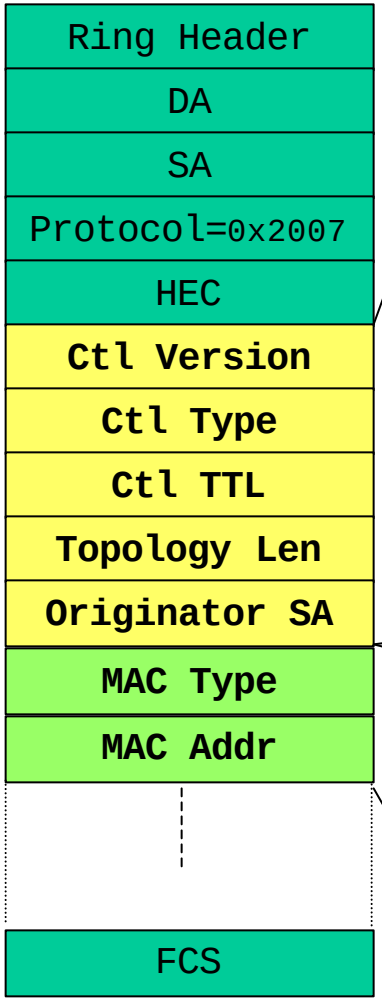
Fairness Message



- Ring Hdr 16 bit - as described
- SA: 48 bit - IEEE Src. Address
- Ver: 3 bit - Message Version
- Len: 8 bit - Message Length
- Reserved: 5 bit - Future Expansion
- Ctl Value: 16 bit - Normalized Fair Rate
- FCS: 32 bit - CRC 32

- Fields are minimized for efficient transmission overhead
- Future expansion for FA advances
- Variable Length Messages possible

Topology Message



Topology Header

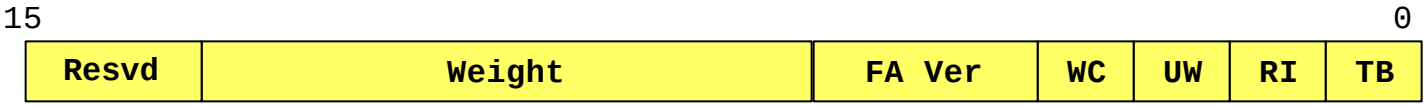
- Ctl Version: 8b - msg version (0x00)
- Ctl Type: 8b - msg type (0x01)
- Ctl TTL: 16b - stops runaway chain
- Len: 16b - message length
- Orig SA: 48b - SA of launching MAC

MAC Binding

- MAC Type: 16b - MAC feature support
- MAC Addr: 48b - SA of binding MAC

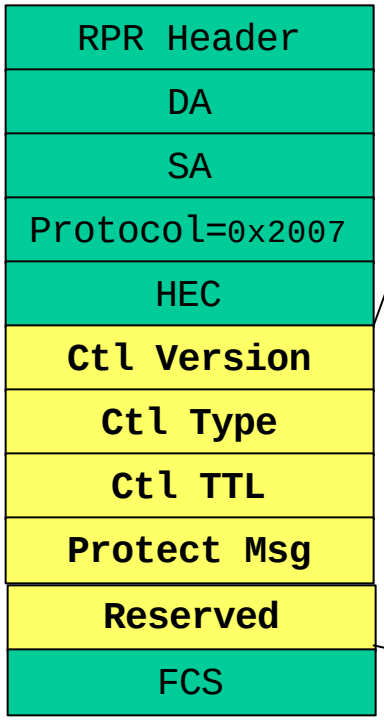
MAC Type Definition

MAC Type Field:



Bit Field	Meaning
0	Transit Path Type: 1'b0 - 1TB, 1'b1 – 2TB
1	Ring Identifier
2	1'b0 – Node Unwrapped, 1'b1 – Node Wrapped
3	Wrap Capable (1'b0=No, 1'b1=Yes)
4-6	Fairness Message Version
7-13	Station Weight
14-15	Reserved

Protection Frame

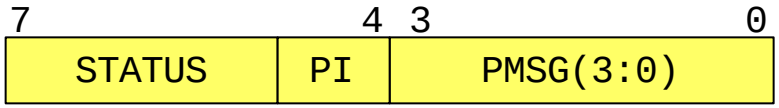


Protection Message

- Ctl Version: 8b - msg version (0x00)
- Ctl Type: 8b - msg type (0x02)
- Ctl TTL: 16b - stops runaway msg
- Protection: 8b - message info field Message
- Reserved: 8b - Future Expansion

Protection Message Format

Protection Message Field:



Func	Bit Field	Value	Meaning
Request Type	0-3	4'b0000	IDLE – No request
		4'b0101	WTR - Wait To Restore
		4'b0110	MS - Manual Switch
		4'b1000	SD - Signal Degrade
		4'b1011	SF - Signal Fail
		4'b1101	FS - Forced Switch
Path Ind.	4	1'b0	Short Path Message
		1'b1	Long Path Message
Status Code	5-7	3'b000	Idle
		3'b010	Protection Switch Completed

Conclusions

- Layered approach compatible with 802 LAN architectures
- Distinct from other 802 LAN frames
- Minimized frame overhead tax
  - Base frame efficiency preserved
  - Complexity nested within client PDU
- Capable of future expansion