IEEE 802.17
Resilient Packet Ring (RPR)
# Standards Update

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What is a Resilient Packet Ring?…….. An L2 "Network Architecture" that has:

- **Dual counter rotating rings**

- **Spatial re-use of bandwidth**

- **Multiple nodes can transmit on BOTH rings at same time**

- **Control messages carried on opposite ring from data**

- **Option for reserved bandwidth**

- **50 msec recovery in event of fiber/node failure on ring**
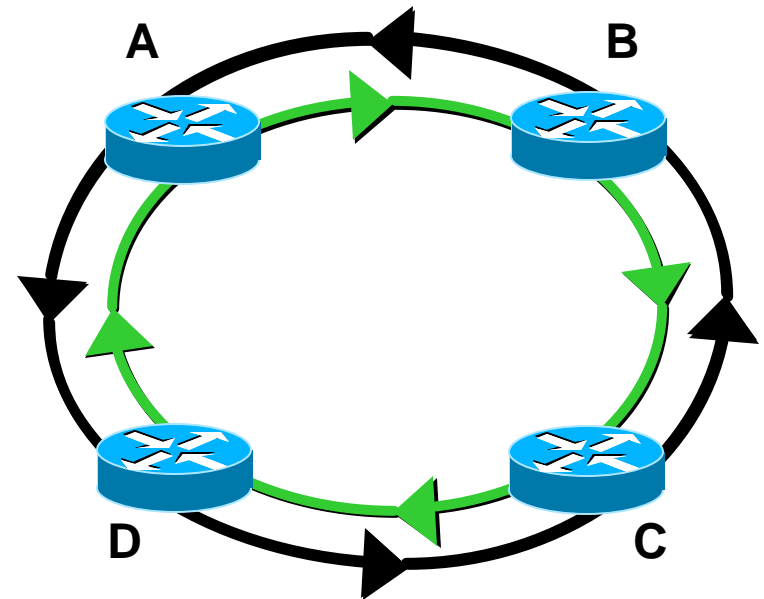
IEEE 802.17 Working Group History

- **802.17 Resilient Packet Rings Working Group was formed in Jan 2001 and first Plenary meeting held in March 2001**

- **Working group mandate:**

  - **Definition of a Resilient Packet Ring Access Protocol for use in Local, Metropolitan and Wide Area Networks for transfer of data packets at rates scalable to many gigabits per second. The new standard will use existing Physical Layer specifications and will develop new PHYs where appropriate.**

http://www.ieee802.org/17/

Feature Comparison 802(.17) and SRP – Physical Layer

- **.17 supports:**
  - **SONET/SDH (155Mbps to 10Gbps)**
  - **Ethernet PHY (1Gbps to 10Gbps)**

- **SRP supports:**
  - **SONET/SDH only (622Mbps to 10Gbps)**
  - **No technical limitations for Ethernet**
  - **SRP Informational RFC available:**
    - **http://www.ietf.org/rfc/rfc2892.txt**

Feature Comparison 802(.17) and SRP – Frame Format

Ring CTL (16)
DA (48)
SA (48)
Protocol Type (16)
Payload
FCS (32)

Ring CTL (16)
DA (48)
SA (48)
Ext Ring CTL (16)
HEC (16)
Payload
FCS (32)

Feature Comparison 802(.17) and SRP – SRP Frame Format Detail
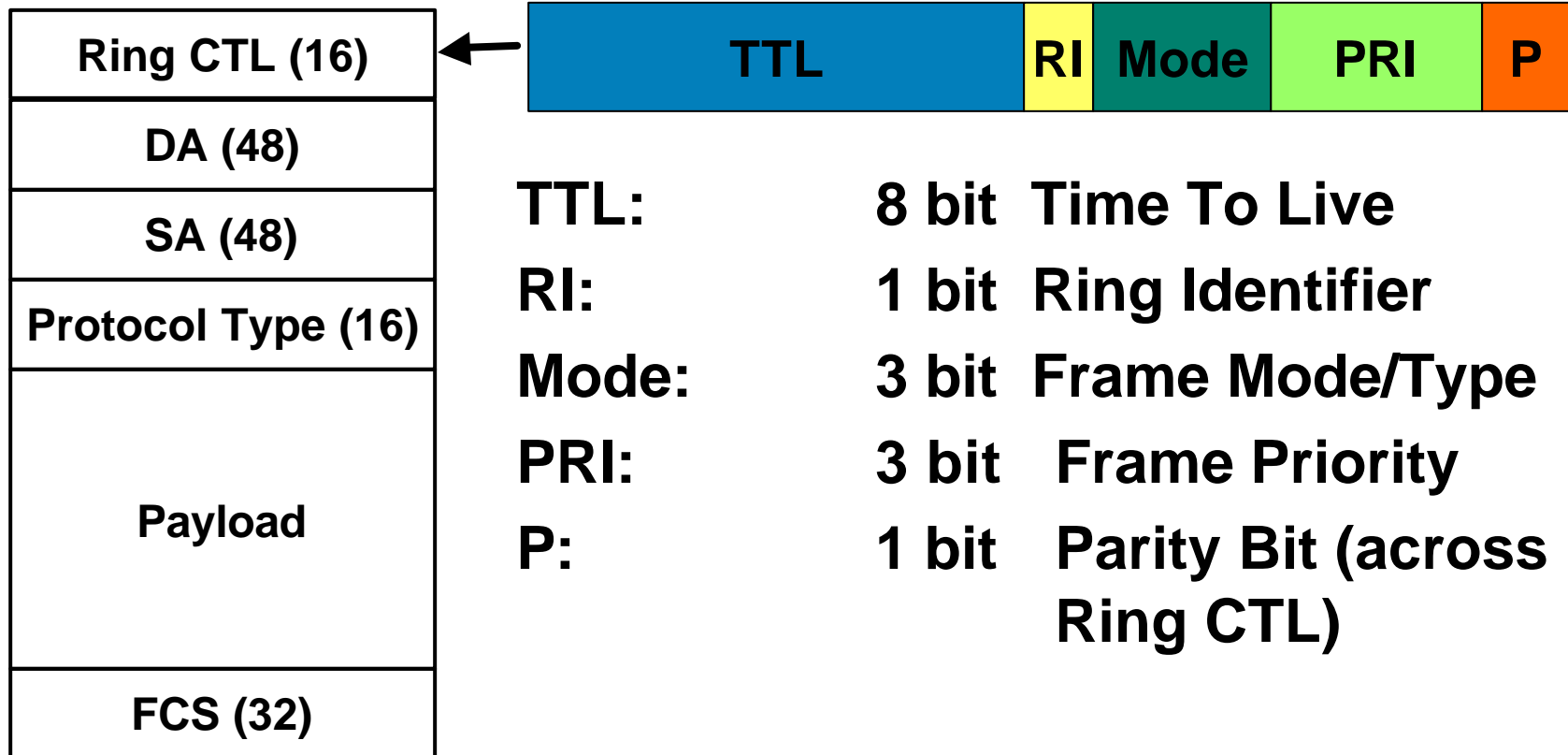
Ring CTL (16)
DA (48)
SA (48)
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FCS (32)

TTL	RI	Mode	PRI	P

TTL: 8 bit   Time To Live

RI: 1 bit   Ring Identifier

Mode: 3 bit   Frame Mode/Type

PRI: 3 bit   Frame Priority

P: 1 bit   Parity Bit (across Ring CTL)

Feature Comparison 802(.17) and SRP – 802.17 Frame Format Detail

Ring CTL (16)
DA (48)
SA (48)
Ext Ring CTL (16)
HEC (16)
Payload
FCS (32)

TTL	RI	FE	FT	SC	WE	P

TTL:	8 bit	Time To Live
RI:	1 bit	Ring Identifier
FE:	1 bit	Fairness Eligible
FT:	2 bit	Frame Type
SC:	2 bit	Service Class
WE:	1 bit	Wrap Eligible
P:	1 bit	Header Parity/Rsvd (Fairness Only)
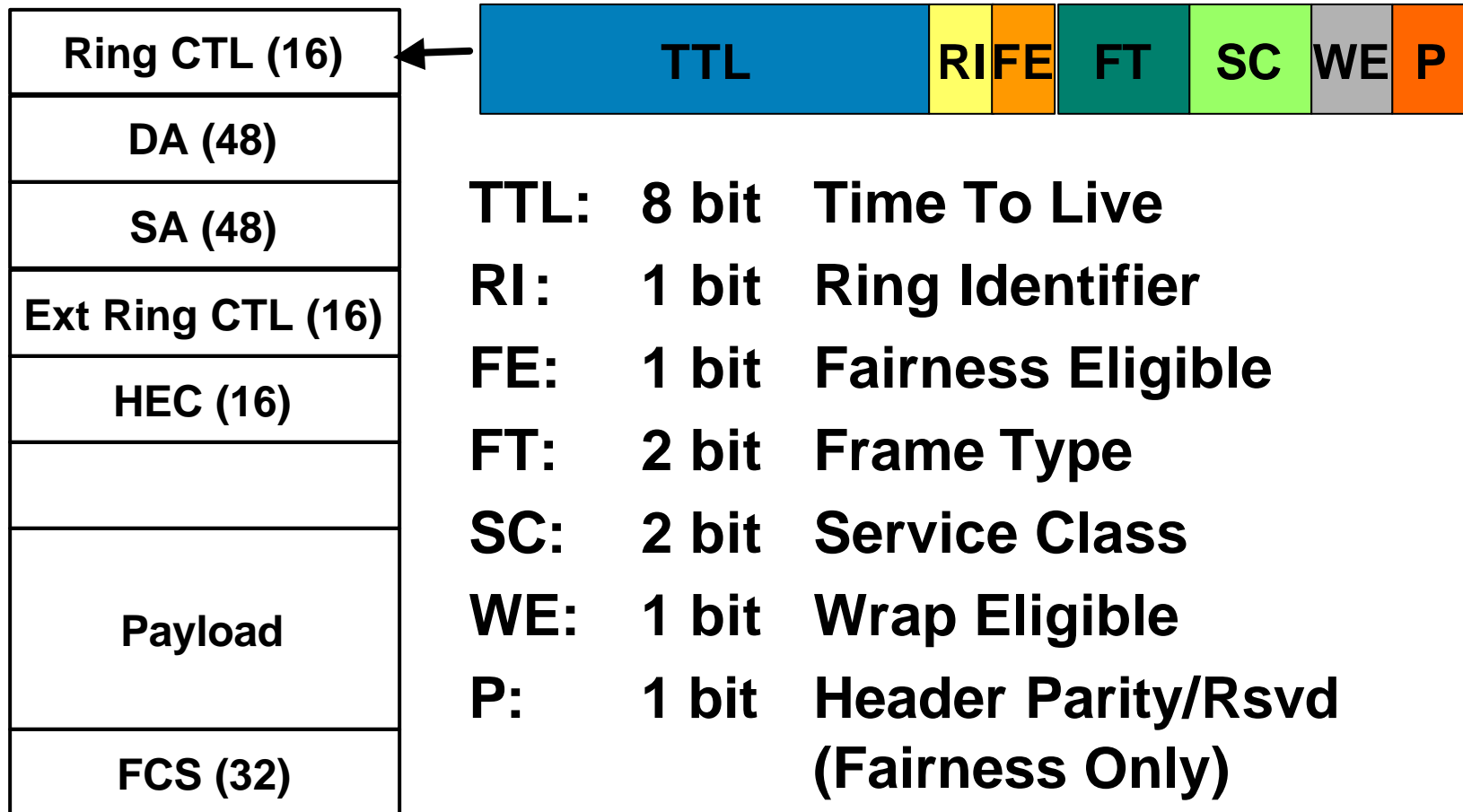
Feature Comparison 802(.17) and SRP – 802.17 Frame Format Detail con't

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ttlBase	EF	FT	PS	SO	RSVD

ttlBase: 8 bit   **Starting TTL**

EF   :   1 bit   **Extended Frame Indicator**

FF   :   2 bit   **Flood Form**

PS   :   1 bit   **Past Source**

SO   :   1 bit   **Strict Order (Mode)**

Rsvd: 3 bit   **Future Expansion**

* Used for Bridging

Feature Comparison 802(.17) and SRP – Bandwidth Control

- .17 fairness algorithm has "SRP-like" behavior. (ie Global fairness per node)

- .17 supports Weighted fairness. Allows nodes to receive un-equal bandwidths on ring

- .17 has 3 priorities of traffic in MAC:

  - Class A: High priority for lowest delay/jitter

  - Class B: Medium priority for CIR

  - Class C: Low priority / best effort

Feature Comparison 802(.17) and SRP – Topology

- .17 supports auto-discovery of steering/wrapping systems

- .17 supports extended Topology Frame, which includes TLV – Type Length Value entries (ie Weight, Jumbo Frame , Neighbour address, Individual Reserved bandwidth etc)

Feature Comparison 802(.17) and SRP – Protection Switching

- **Both SRP and 802.17 will support wrapping**

- **.17 protection algorithm adds steering support.**

- **Steering will be the lowest common denominator when both steering and wrapping nodes are on the ring.**

- **Wrapping requires 2 nodes to perform protection and suffers the least packet loss.**

- **.17 Supports Strict Mode, which eliminates packet reorder and duplication during protection events. It can be configured if the application protocol requires this guarantee.**

Feature Comparison 802(.17) and SRP – Other Stuff

- **OAM**

  - .17 supports echo/response messages for connectivity monitoring on ring

  - .17 supports flush messages to avoid packet re-or

- **Bridging**

  - .17 supports 802.1D and 802.1Q conformance

Comparison of 802.17 and SRP Feature Summary

Features / Benefit	802.17	SRP
Dynamic Fairness Algorithm/ SRP behavior	Y	Y
Dual Transit Buffer (TB)/Best Performance Allows Differentiation of traffic via separate paths	Y	Y
Single Transit Buffer(TB)/Cheaper Silicon High priority can be blocked by lower traffic	Y	N/A
2 priorities on Ring/ High priority performance	Y	Y
3 priorities into MAC/ Adds CIR class SRP supports Hi/Low	Y	N
Protection -Wrapping only / Less packet loss Only nodes at failed span perform protection	Y	Y
Protection - Steering only / All nodes must redirect any packets destined for failed span	Y	N
Delivery of packets with bad Frame CRC	Y	N

IEEE 802.17 Working Group Current Time Line

- **March 2002**   **- Proposal Draft (0.1)**
- **August 2002**   **- First Draft (1.0)**
- **Sep 2002**   **- Last technical change**
- **Nov 2002**   **- Working Group Ballot**
- **December 2002**   **- Draft 2.0 published**
- **January 2003**   **- Draft 2.0 WG Ballot / 2.1 Released**

- **March 2003**   **- Review Draft 2.1**
- **July 2003**   **- Working Group Ballot**
- **September 2003**   **- Sponsor Ballot Start**
- **December 2003**   **- Final Standard**