



# Introduction to IEEE 802.17

Michael Takefman  
Chair  
IEEE 802.17

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



# Agenda

- Documents provided at this meeting
- Introduction to IEEE 802 Process
- Overview of IEEE 802.17 RPR Features



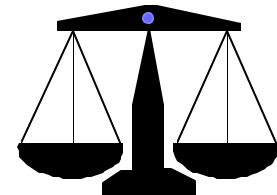
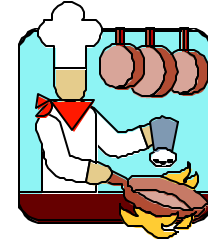
# Documents Provided

- Liason letter from IEEE 802
  - IEEE P802.17/D0.3 attached
- RPR Whitepaper
- RPR Draft Outline
- RPR Fairness Outline

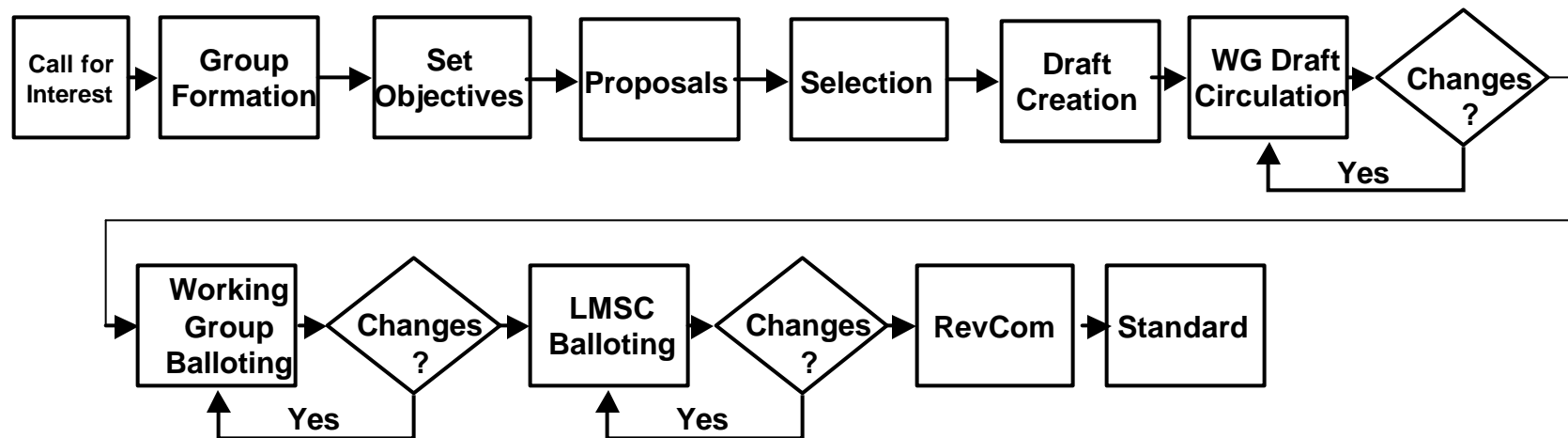


# IEEE 802 Standards Principals

- **Process**
  - Rules and Procedures
- **Consensus**
  - 75% agreement on all technical issues
- **Openness**
  - Everyone has Access to Process
  - Individuals, World-wide
- **Balance**
  - Balloting group must include developers and users
- **Right to Appeal**
  - Both procedural and technical anytime during the process
- <http://www.ieee802.org/rules.pdf>



# IEEE Standardization Process



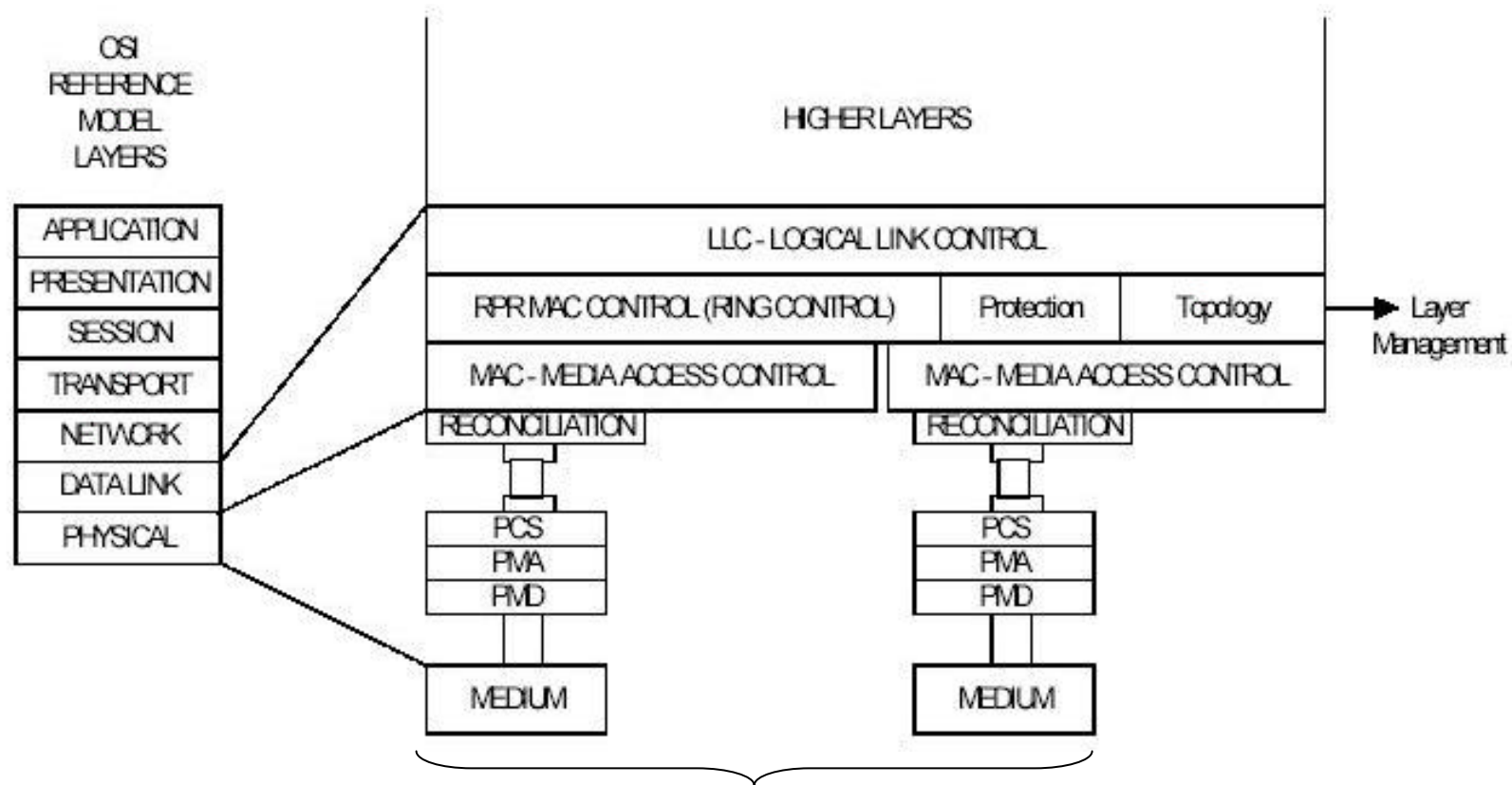
- **153 Individual voting members**
  - **from over 70 companies**



# P802.17 Structure

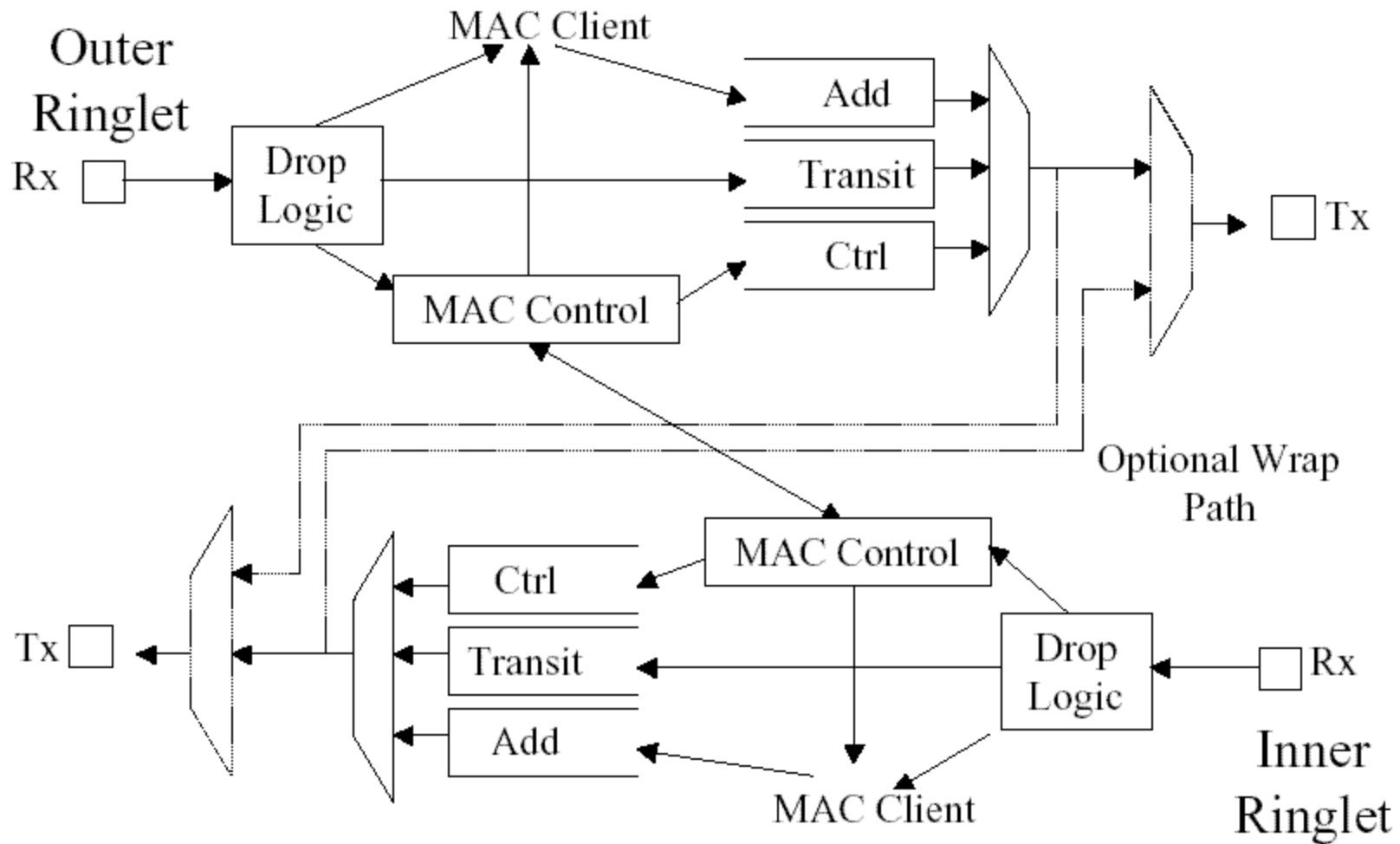
- Clause 1-4: Overview, Normative References, Terms & Definitions, Abbreviations
- Clause 5: MAC Reference Model and Service Interface
- Clause 6: MAC
- Clause 7: MAC-PHY Interface
- Clause 8: Frame Formats
- Clause 9: Fairness
- Clause 10: Topology Discovery
- Clause 11: Protection
- Clause 12: OAM
- Clause 13: Layer Management

# MAC Reference Model



RPR will support multiple physical layer implementations

# MAC model





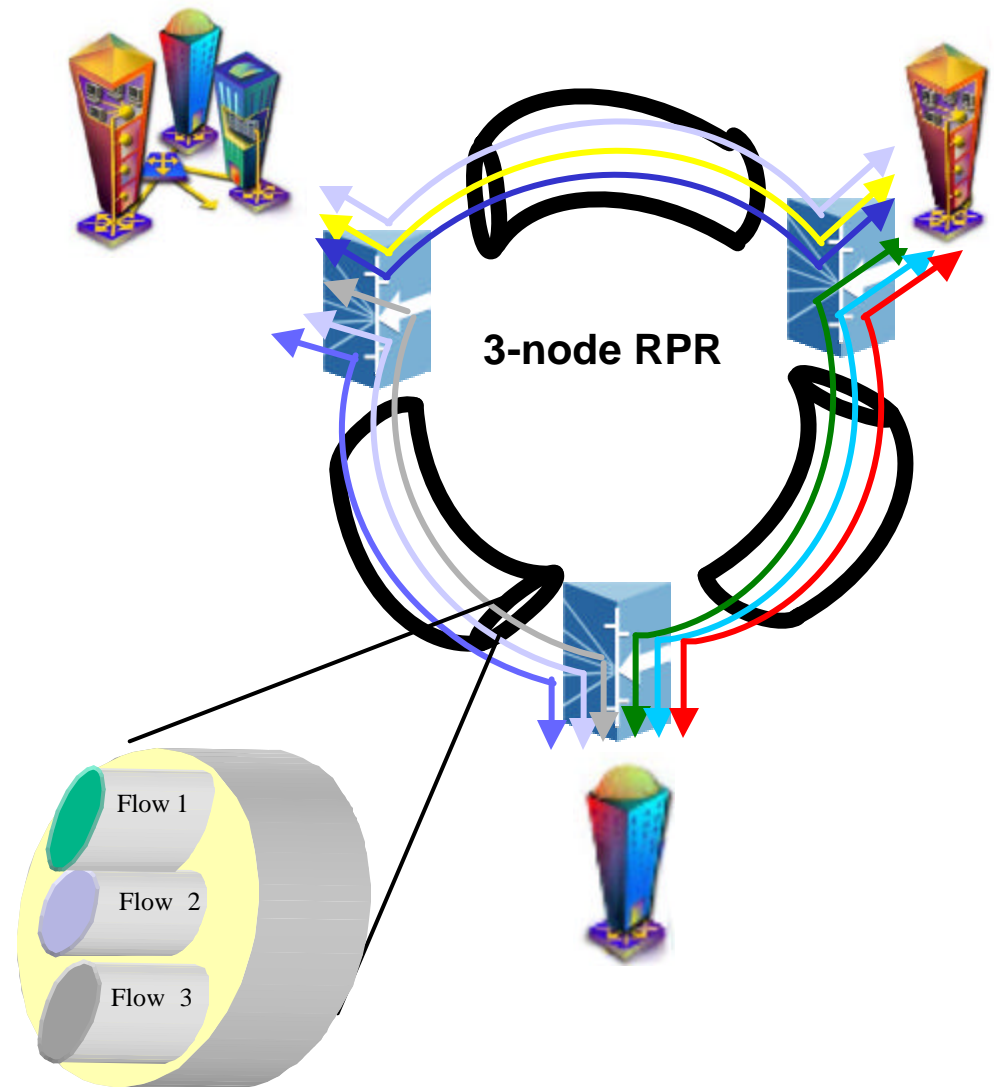


# RPR Features

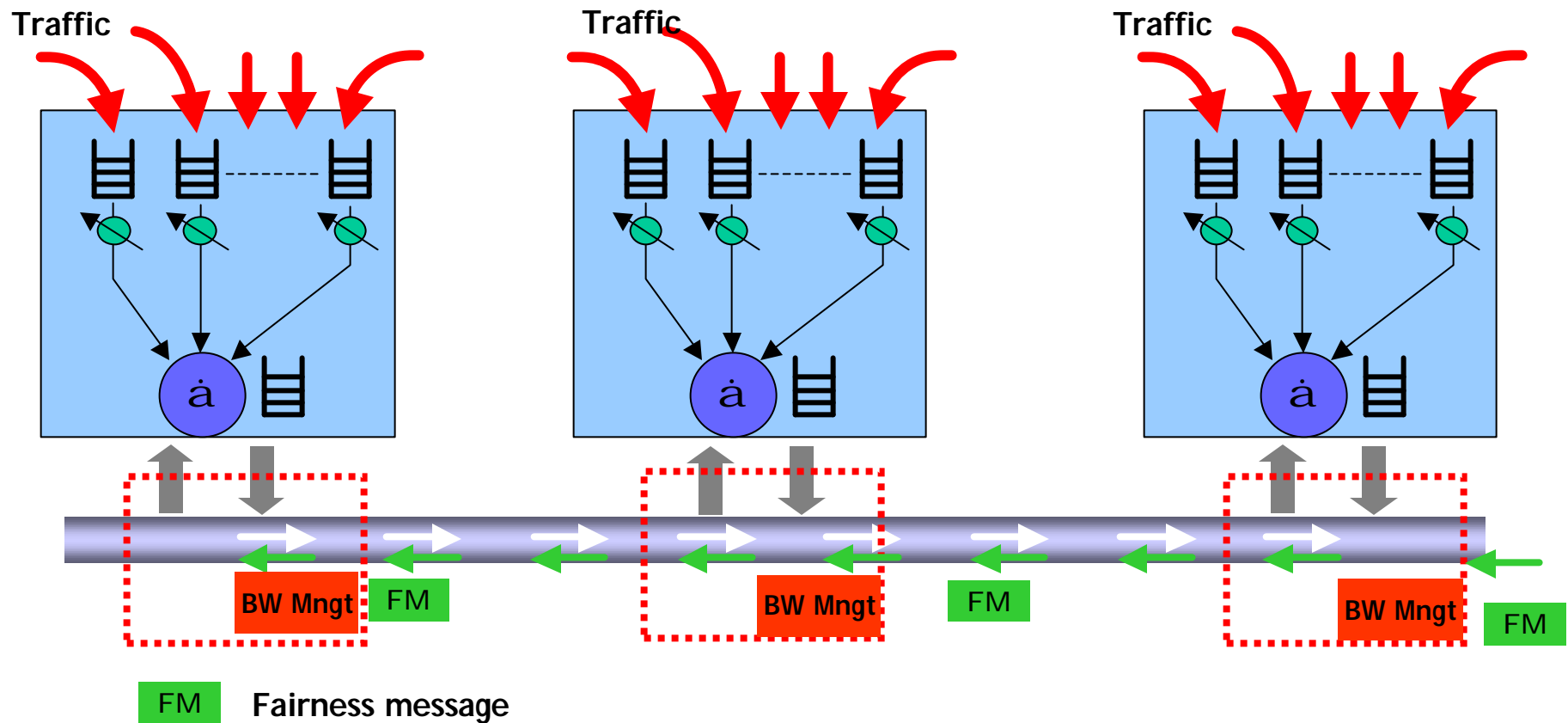
- Frame formats
  - Format:
    - Header:  $\langle \text{RPR header}_2 \rangle \langle \text{DA}_6 \rangle \langle \text{SA}_6 \rangle \langle \text{Type}_2 \rangle \langle \text{HEC}_2 \rangle$
    - Trailer:  $\langle \text{FCS of payload}_4 \rangle$
    - RPR header: Frame type, CoS, TTL, Ring-ID, In-Out profile indicator

# Fairness & Spatial Reuse

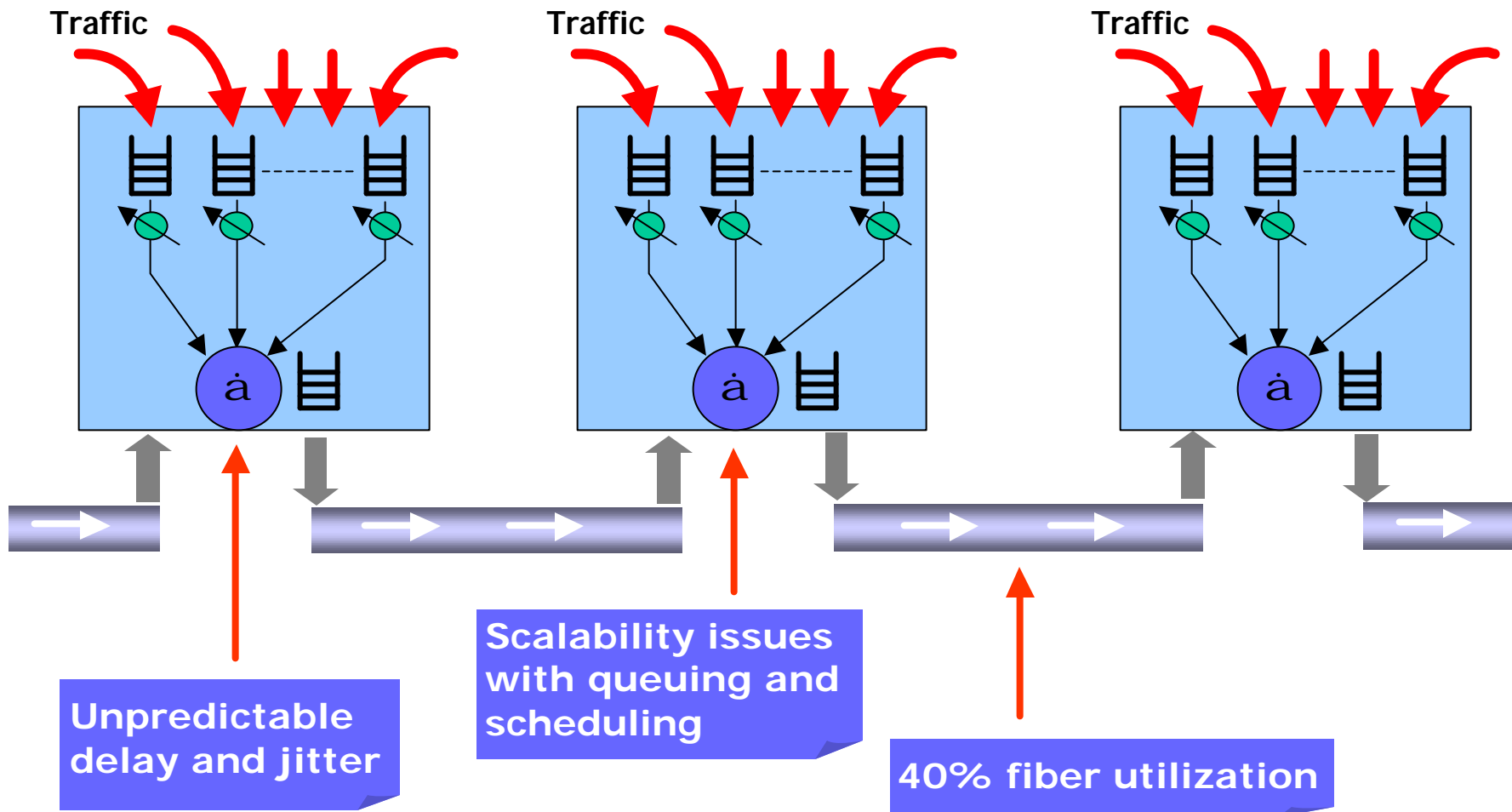
- Increased utilization by re-using bandwidth along ring segments
  - Destination removes traffic
  - Bandwidth consumed only on traversed segments
- Multiple nodes may transmit concurrently
  - Statistical gain in bandwidth utilization
  - Dynamic, per packet bandwidth usage



# Bandwidth Management



# Traditional Packet Switch Architecture



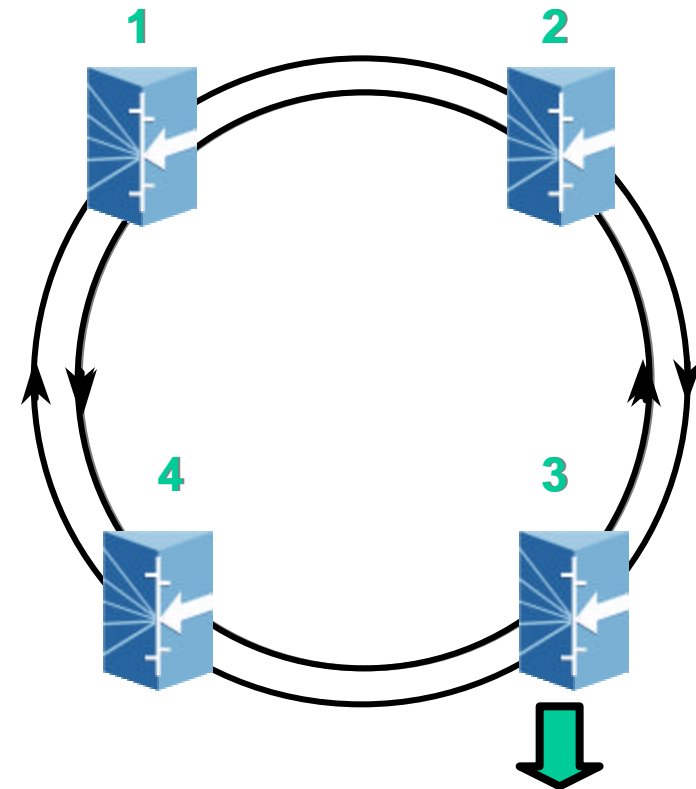


## 802.17



# Automatic Port Discovery

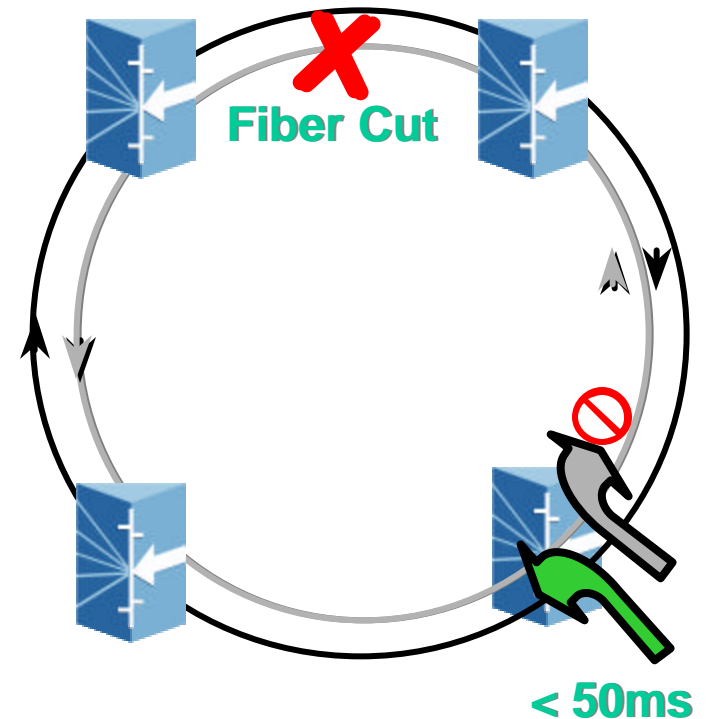
- Initiated anytime ring node map changes
  - New node inserted
  - Node removed
  - Protection event occurs
- Auto-discovery of primary path based on fewest number of hops
  - Use both sides of ring concurrently



Node	East	West	Primary	Secondary
1	2	2	E	W
2	1	3	E	W
3	-	-	-	-
4	3	1	W	E

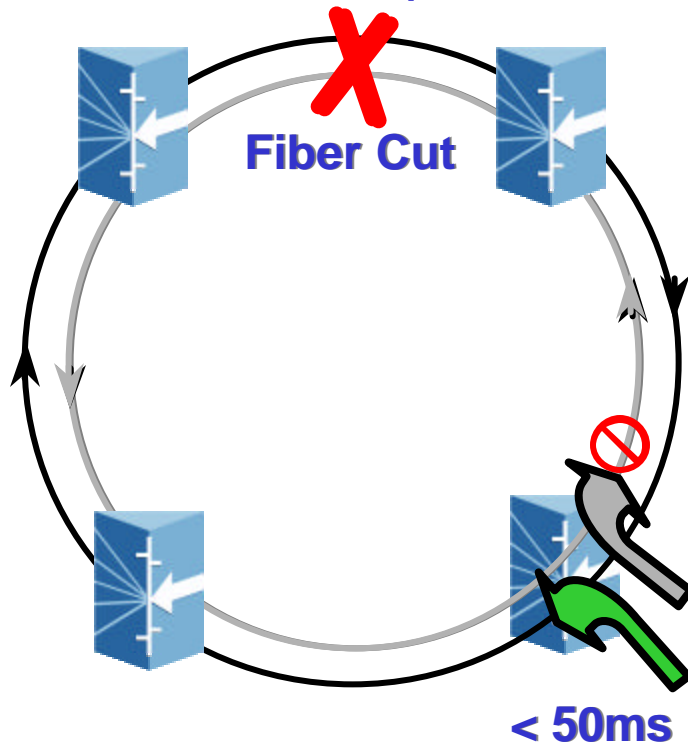
# Protection

- No dedicated protection bandwidth
  - Unlike SONET, both fibers carry working traffic
- Continuous fault detection
  - Fast detection, protection and restoration in under 50 milliseconds
  - Provided within layer 2: client (layer 3) is not aware
- Continuous signaling between neighbors
  - When node/link goes amiss, a protection switch is initiated
  - Hardware interrupt detection mechanism

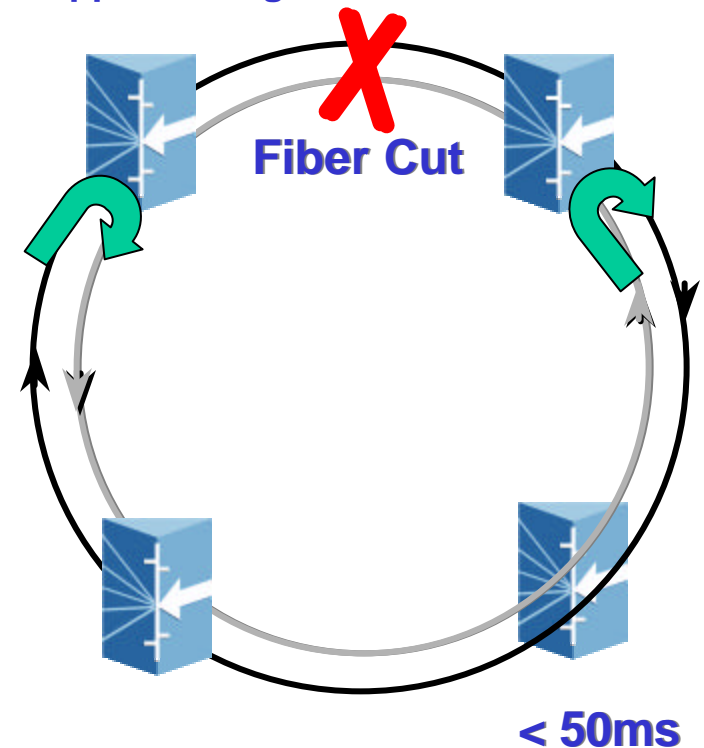


# Steering or Wrapping

**“UPSR-like”:** Each node uses its knowledge of the ring topology to steer packets onto the appropriate ring such that packets reach their destinations without needing to traverse the failure point



**“BLSR like”:** Only nodes adjacent to a fault know about the fault and wrap packets onto the opposite ring







# RPR Features

- MAC
  - Ability to support both simple and VOQ clients
  - Support for buffer-insertion ring and multiple queue transit path implementation of RPR networks
- Fairness
  - Support for 3 traffic types:
    - Provisioned – no BW management
    - Best effort – equal fairness
    - SLA based – weighted fairness



# RPR Features

- Protection
  - Steer or wrap – without mandating wrap
  - Method can selected on per service basis
- Topology
  - Topology discovery will work for steer or wrap
- OAM (for layer 2)
  - On-demand loop-back check
  - Continuous, In-service, continuity check



# RPR Features

- Frame formats
  - Format:
    - Header:  $\langle \text{RPR header}_2 \rangle \langle \text{DA}_6 \rangle \langle \text{SA}_6 \rangle \langle \text{Type}_2 \rangle \langle \text{HEC}_2 \rangle$
    - Trailer:  $\langle \text{FCS of payload}_4 \rangle$
    - RPR header: Frame type, CoS, TTL, Ring-ID, In-Out profile indicator
- Compliance with 802.1
  - Support for transparent bridging with broadcast of unknown unicast addresses

# RPR Design Points

