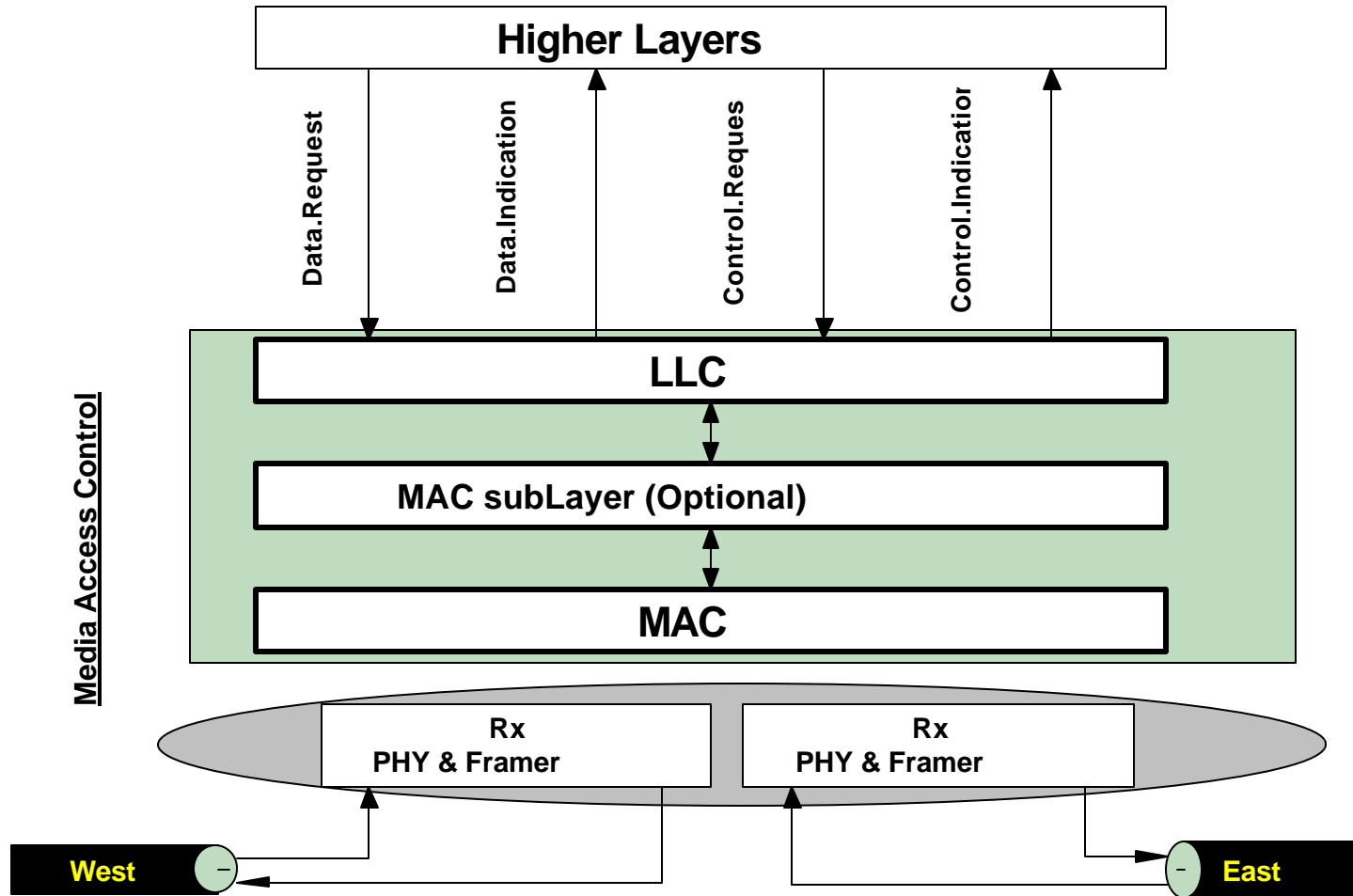


MAC Reference Model for Port Management

Pankaj K Jha
Cypress Semiconductor
pkj@cypress.com

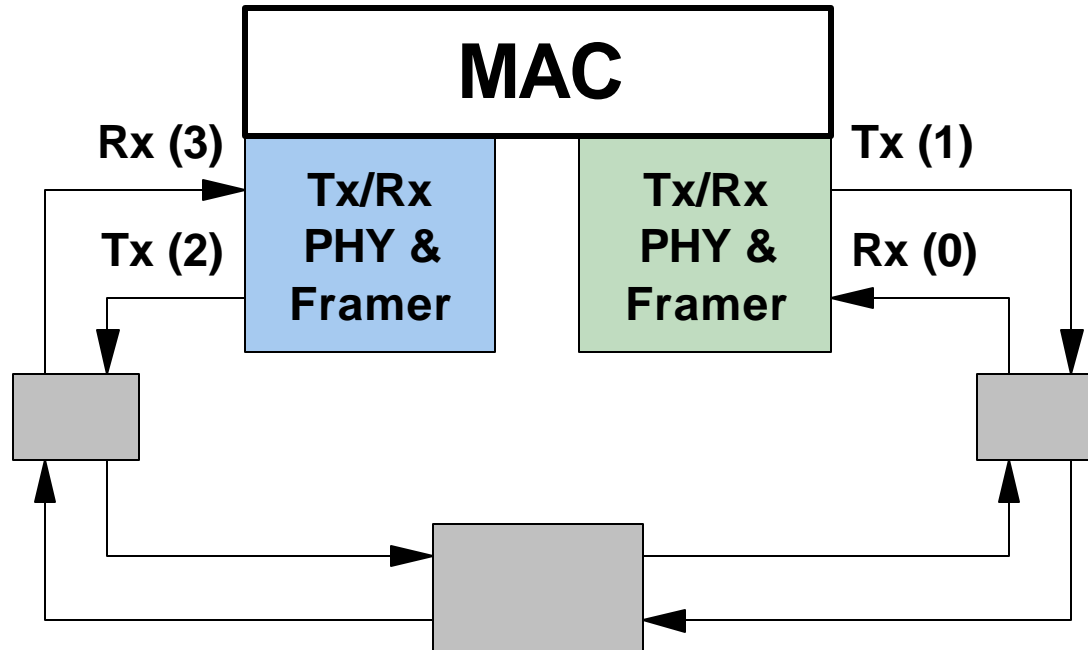
- **Need for a Robust & Scalable MAC Reference Model**
- **Allows Future Expansions and Protocol Changes**
- **The Model allows 1, 2, N+1, N+M, and any other Port Configurations**
- **Support for Traffic Engineering at every Port & Node**
- **A MAC deals with**
 - **Packet Switching across Ports**
 - **Traffic Engineering with CoS**
 - **Transit Buffer Management, etc.**
- **Control Operations from Client & MAC sub-layer Program**
MAC Parameters



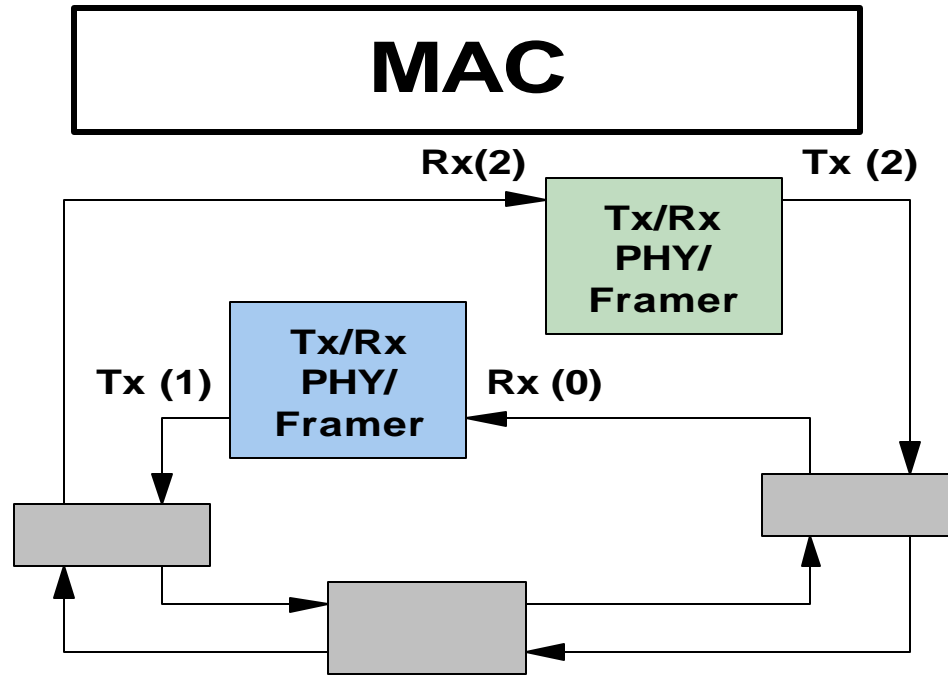
- RPR Packet Switching can be reduced to a Simple **Rx/Tx Port Association** Problem
- Rx/Tx Port Association provided by **MAC sub-layer and/or Client Layers** based on
 - Traffic Engineering
 - Topology
 - User Configuration
 - Any other Parameter(s) based on Future Protocol Developments
- A Clean Port Management & a simple MAC allows quick RPR Standards Development
- Allows unrestricted future Protocol Developments

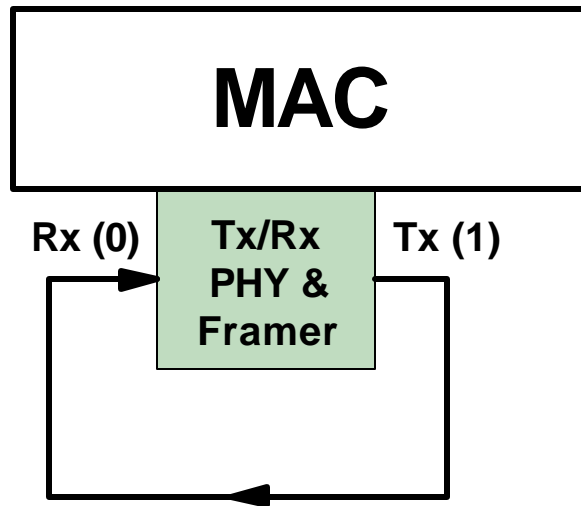
Port Configurations for RPR Rings

Dual Ring with two PHYs per Ring



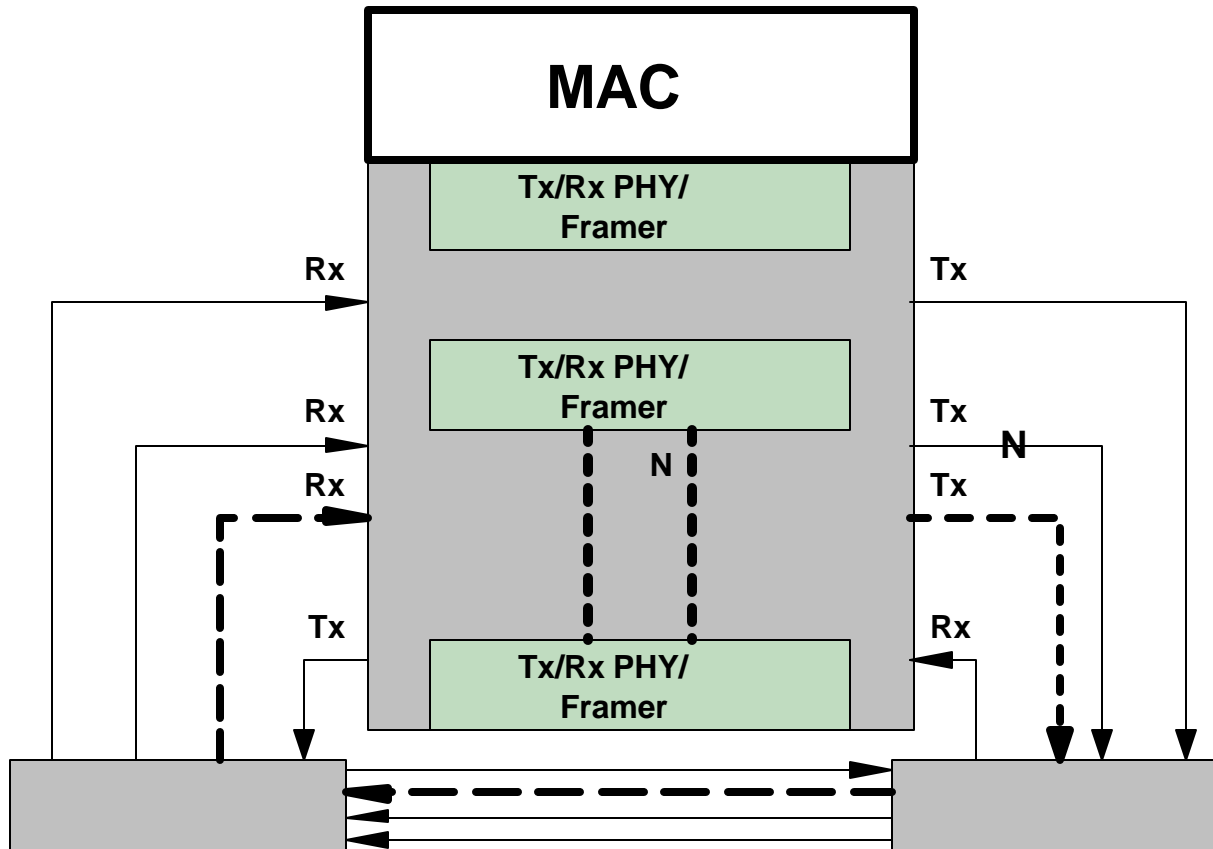
Dual Ring with one PHY per Ring



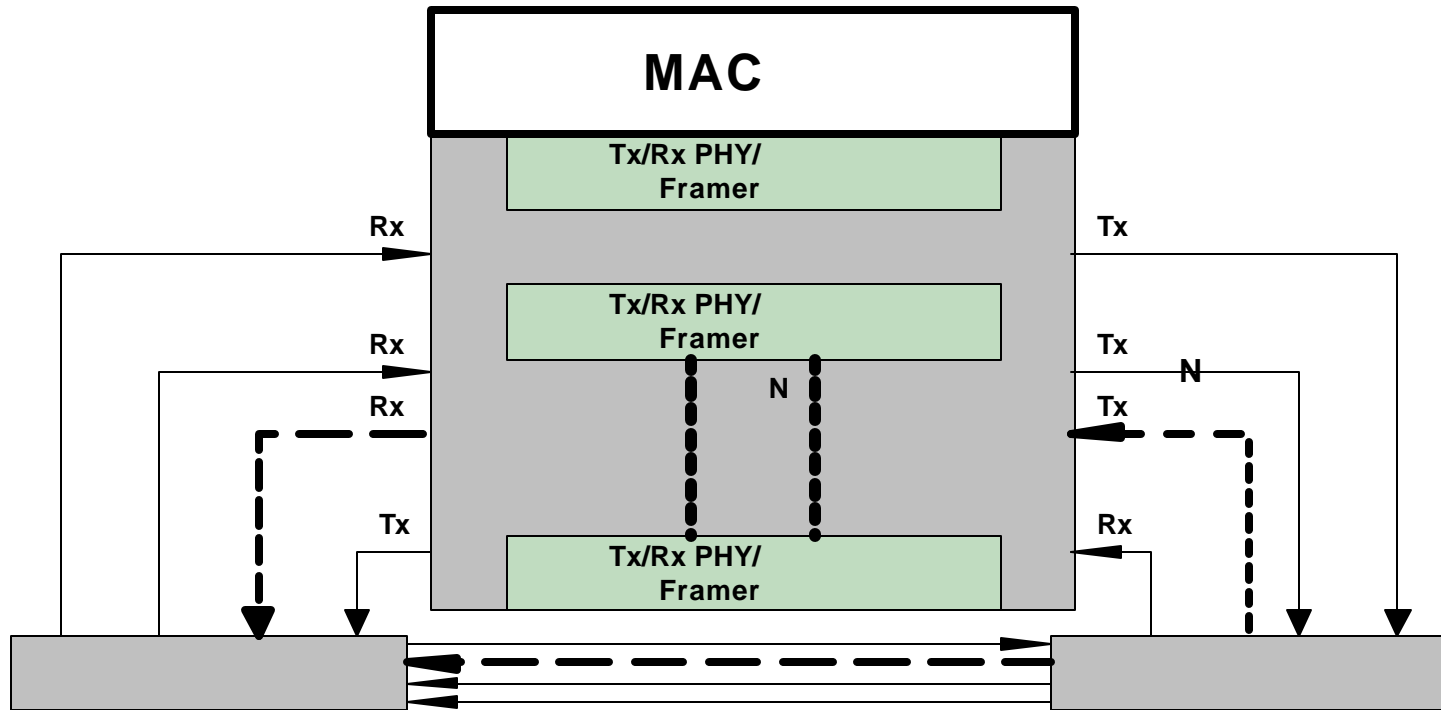


Single ring with a single PHY

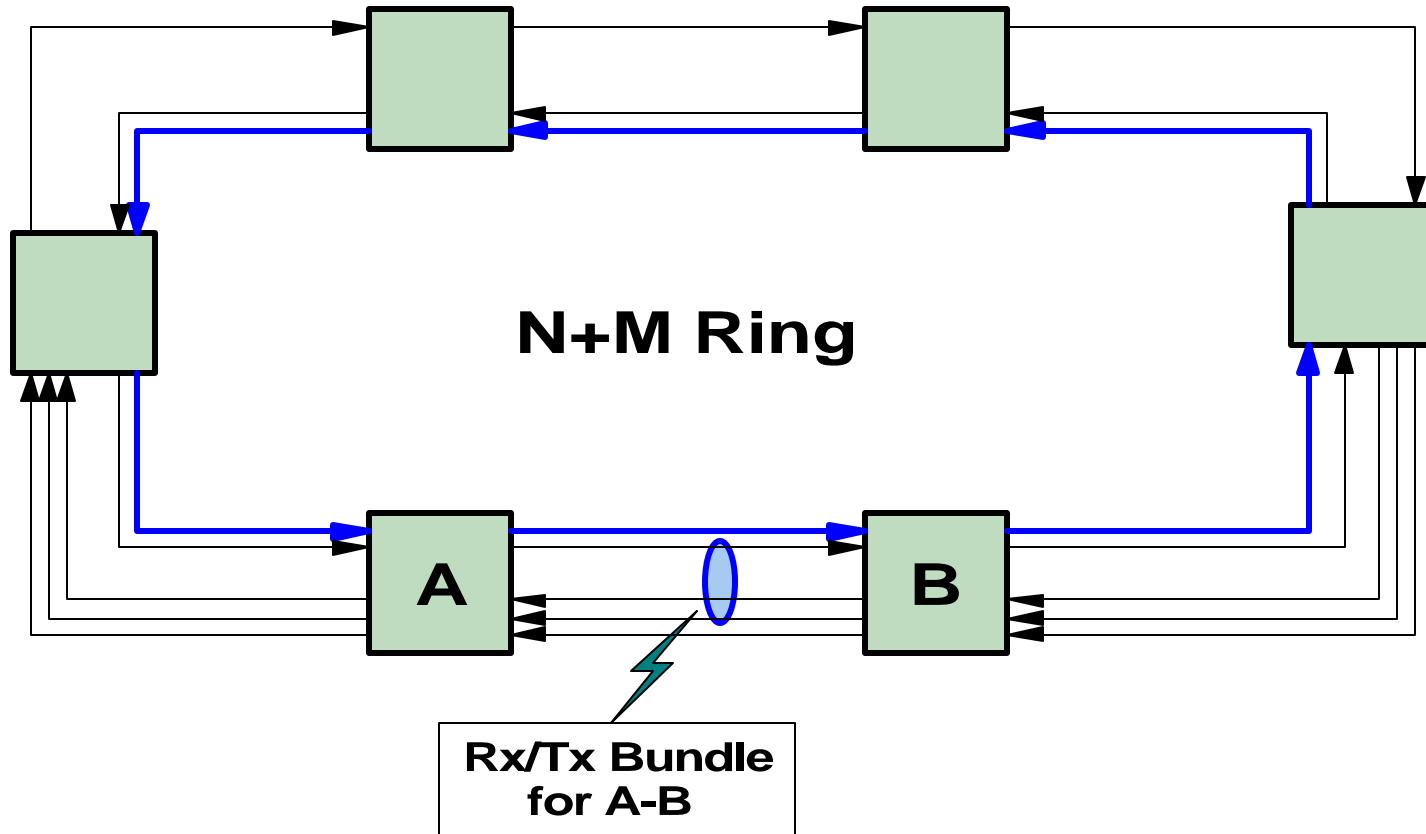
PARAMETER	Rx Port	Tx Port
MAC address (48 bits)	0	1
Priority (3 bits)	0	1



N+1 Configuration



- Packet Bandwidth between nodes in Tx/Rx may need multiple Rings
- N+1 may not provide enough Backup Path

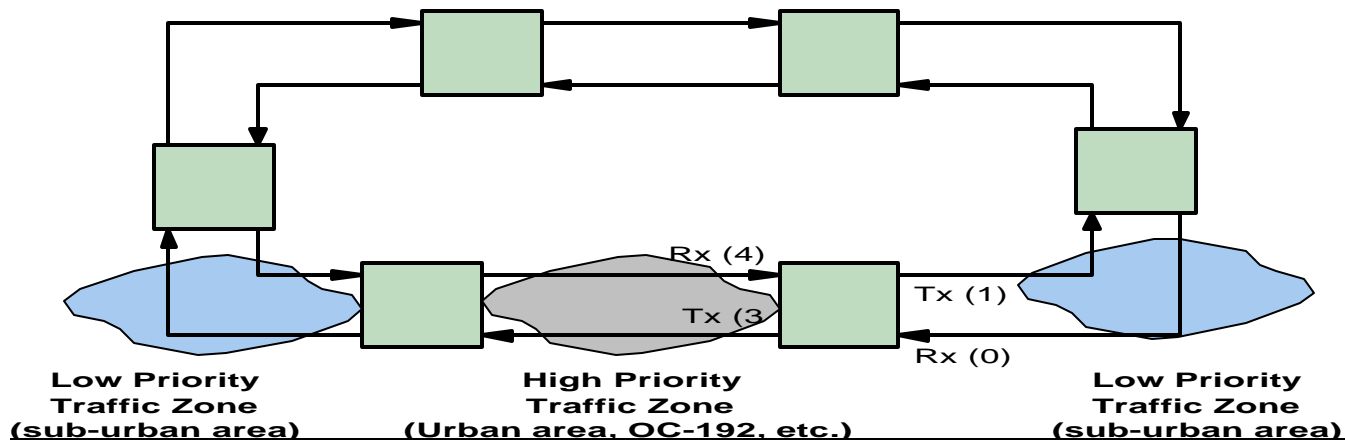


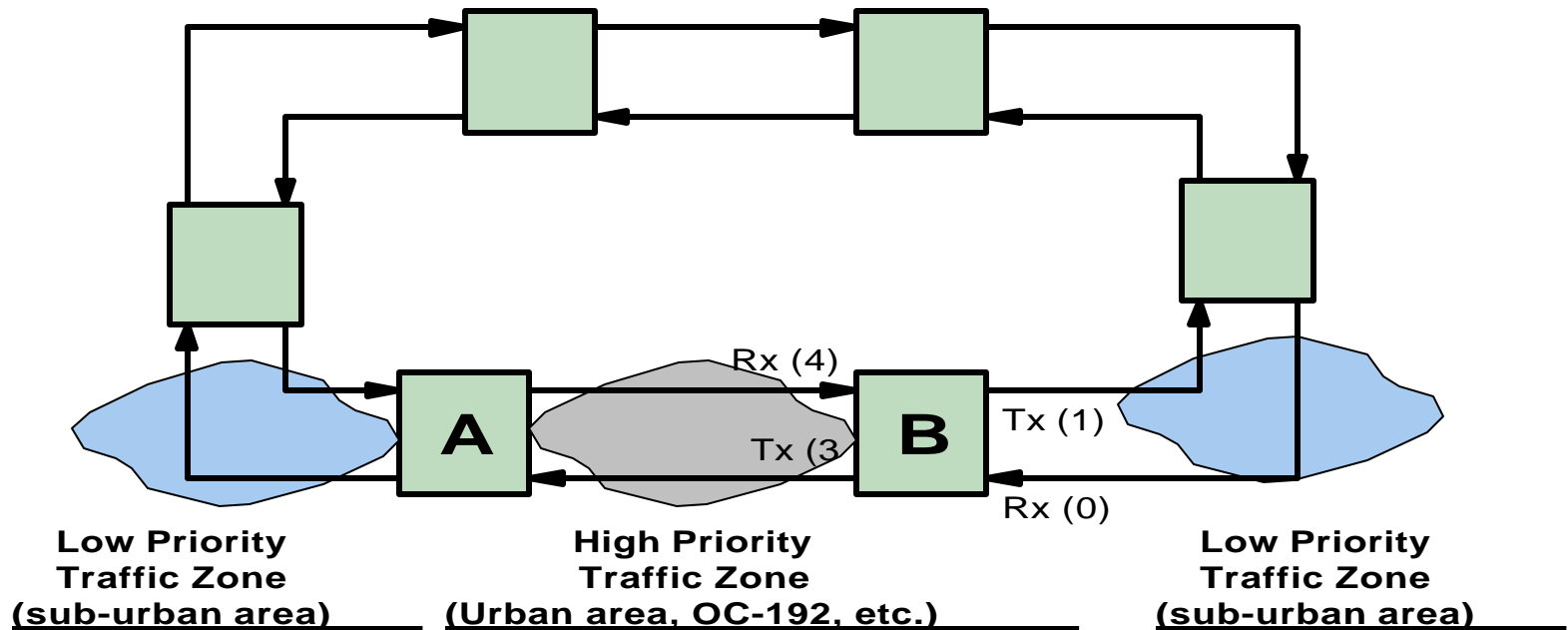
PARAMETER	Rx Port	Tx Port
MAC address (48 bits)	0	3
Priority (3 bits)	0	1

- MAC Lookup Table for Switching

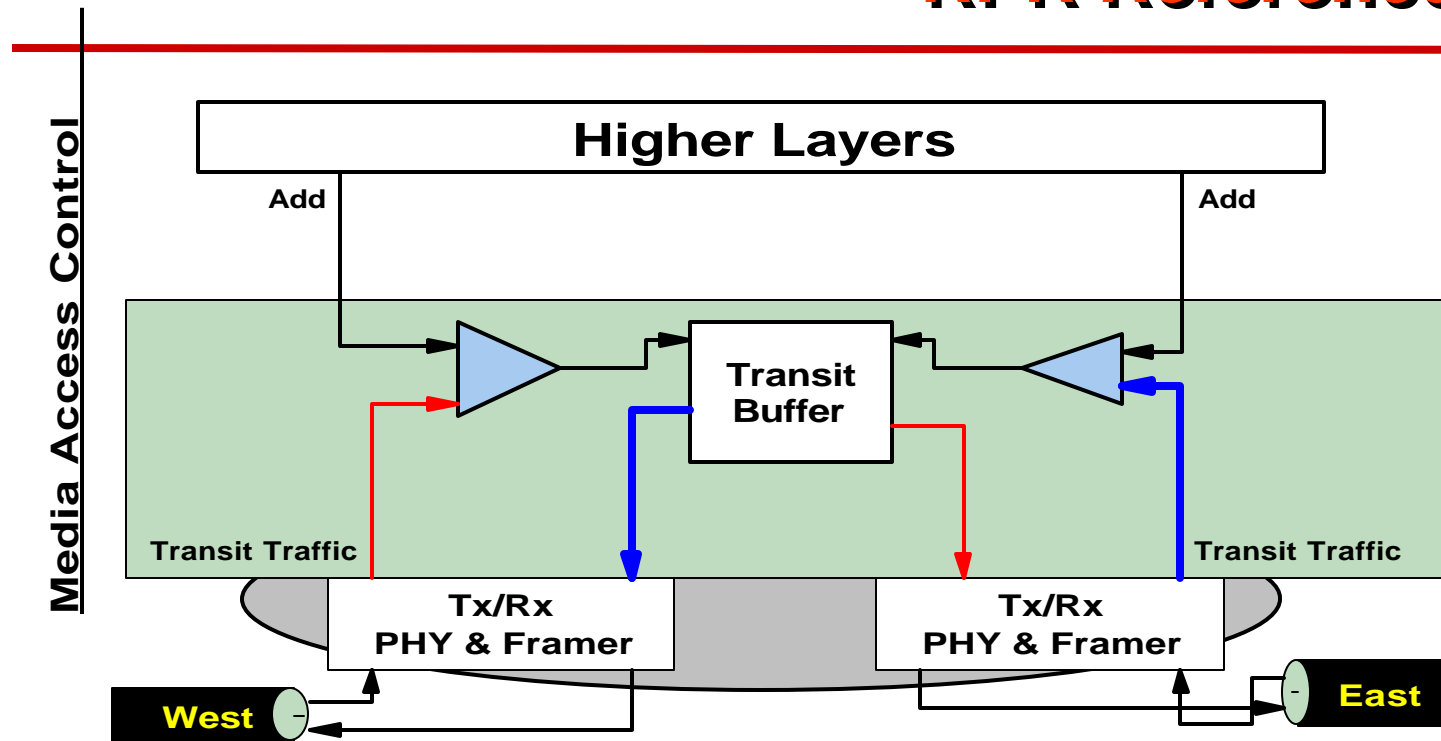
PARAMETER	Rx Port	Tx Port
MAC address (48 bits)	0	3
Priority (3 bits)	0	1

- Association of MAC address & Priority to Tx port done by MAC sub-layer and Client Layers





- Depending on Network Costs & Restrictions, Low Priority Packets may be directed through longer routes
- These Topology Rules may be decided by Client and/or Programmable MAC sub-layer Operations



- RPR MAC Standard should specify Characteristics & behavior for Packets for Transit & Add Traffic
- RPR MAC Standard should NOT specify & standardize Buffer Implementation
- External Behavior of RPR MAC should be common to all MACs.

- **Efficient Queuing Methods and Fast Switching Logic ongoing Areas of Research**
- **Traffic Engineering methods evolving & under continuous Research**
- **In RPR, Companies have different flavors of Transit Buffer Design**
- **Wouldn't be prudent to fix a particular design into RPR Standard for all times to come**
- **Internal Buffer Design Implementation should **NOT** be standardized. May be provided as Guidelines/Examples **ONLY**.**
- **RPR MAC should specify Transit Packet Treatments & Processing Requirements with Latency, Jitter Bounds, etc.**
- **Otherwise - arguments over Internal Buffer Design Methods would never cease, and RPR standard would take a long time.**

Requirements for RPR MAC Standard

- **Clear Reference Points for MAC**
- **Rx/Tx Port Management & Association with**
 - Traffic Engineering
 - Topology
 - User Configuration
 - Allow other Parameter(s) based on Future Protocol Developments
- **Basic RPR MAC should only perform Core Packet Handling**
- **Port Associations & Packet Handling Requirements should be specified**
- **Internal Buffer Design Implementation should **NOT** be specified**
- **RPR MAC Standard should **ONLY** specify Behaviors at different Reference Points, like other standards do.**