

A Reference Model for 802.17

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Motivation

- We need a reference model for standardization
- The model should not simply be a block diagram of an implementation
- It should be possible for multiple implementations to conform to the model

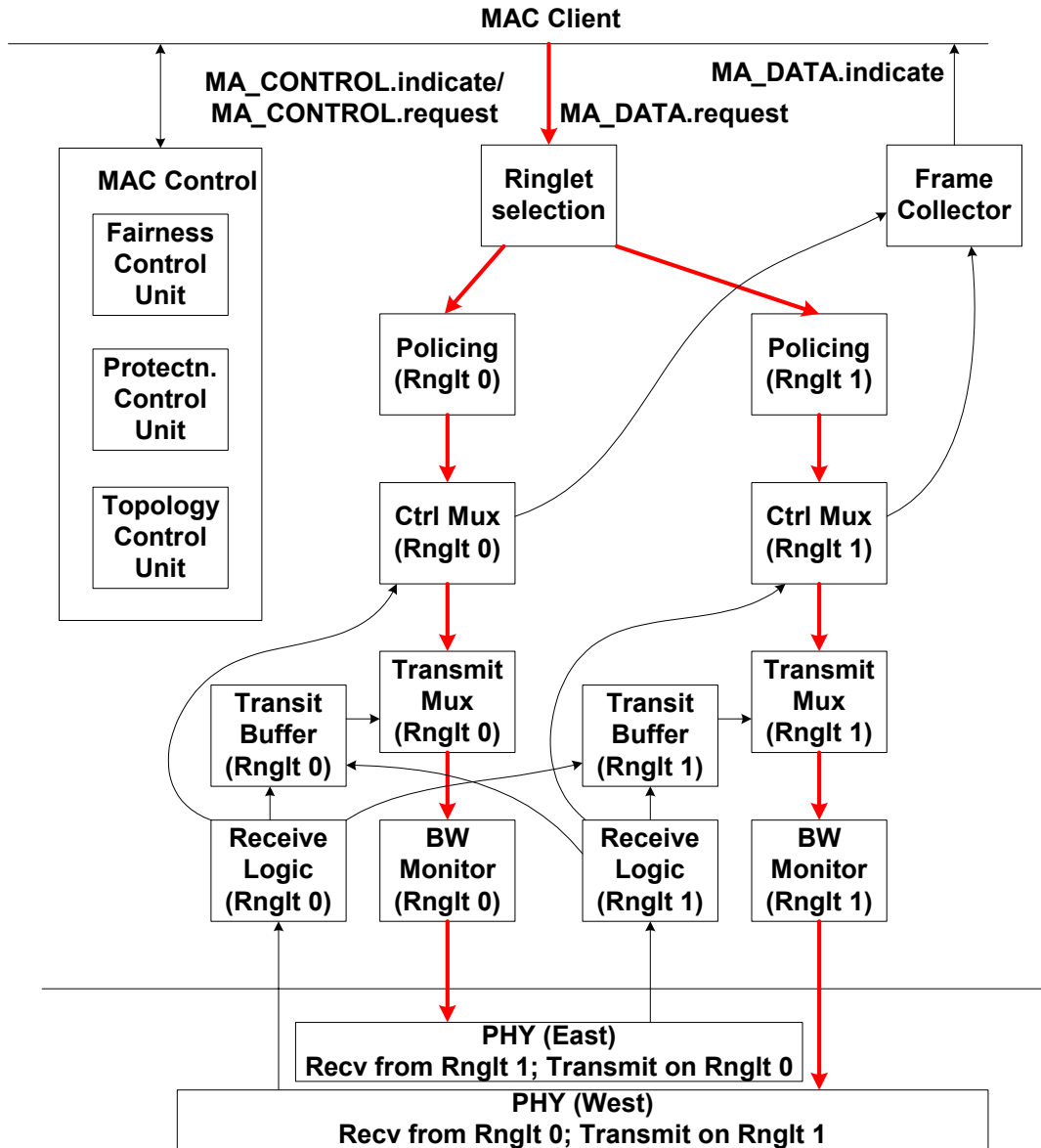
Purpose of a Reference Model

- Provides a reference for developing state machines
- All features that are part of the standard must be explicable using the block diagram
- Provides a clear, consistent picture to guide us through the development of the standard
 - What we have now is inadequate, and often inconsistent
- Provides a “big picture” view of the standard
- Not necessarily representative of how things are implemented

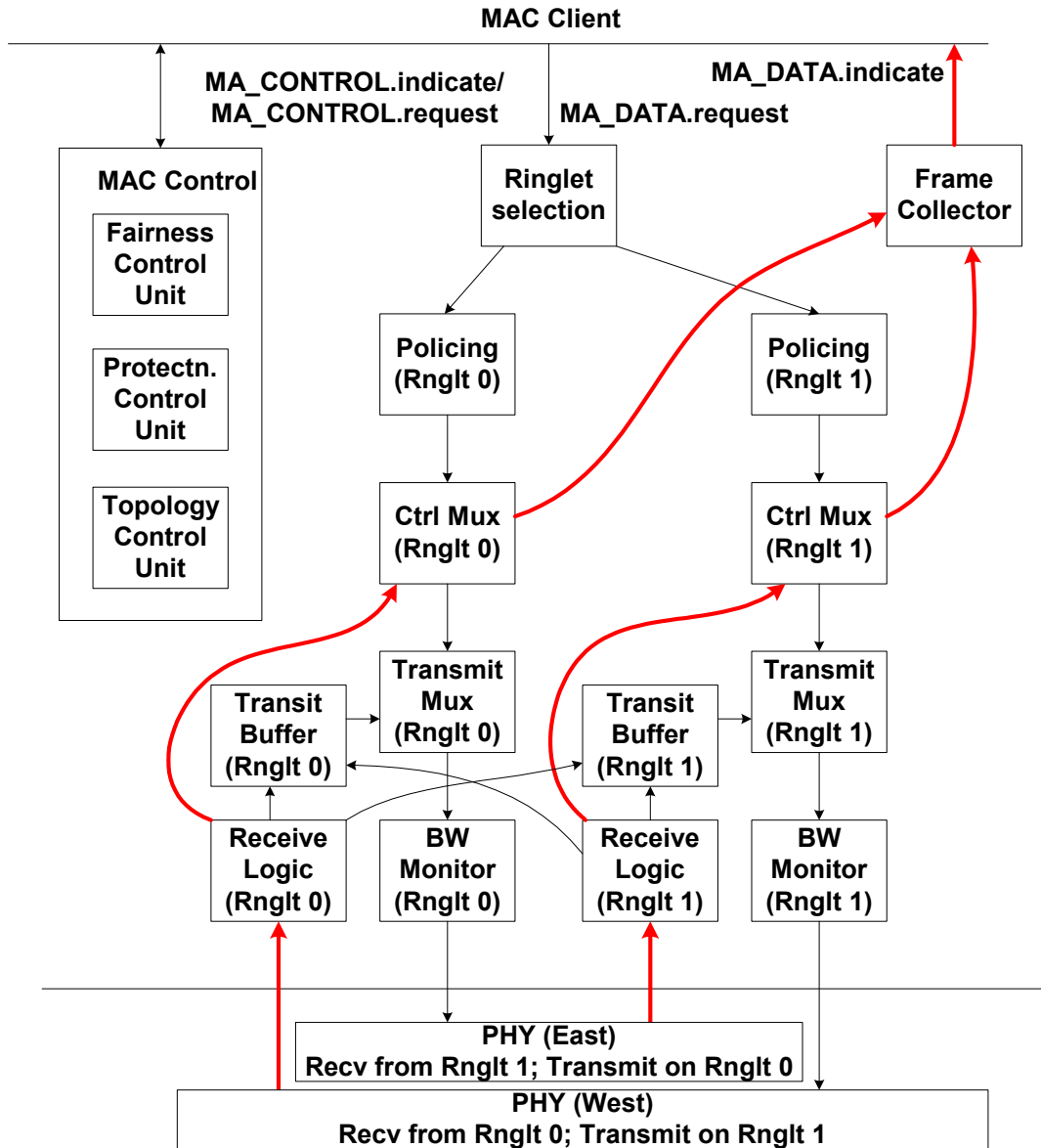
Reference Model Requirements

- The RPR MAC is a fairly complex MAC (fairness, protection, topology, etc.)
- The reference model must capture all of the features and their interworking
 - 2 PHYs
 - Dual ringlets
 - Protection using steering and wrapping
 - Topology
 - Ringlet selection for data sourced at the node
 - Bandwidth management and media access control

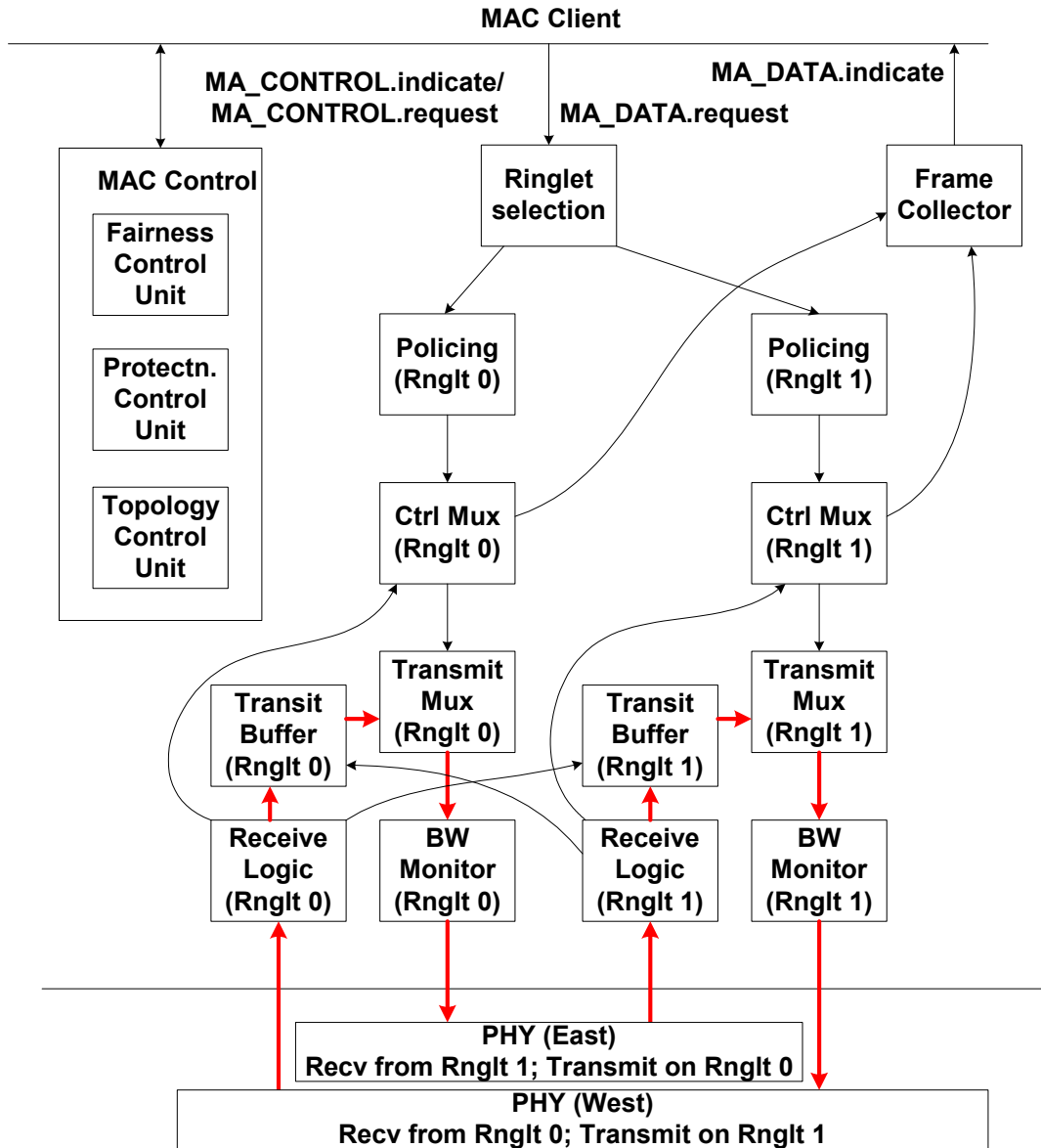
Reference Model – Transmit Data Path



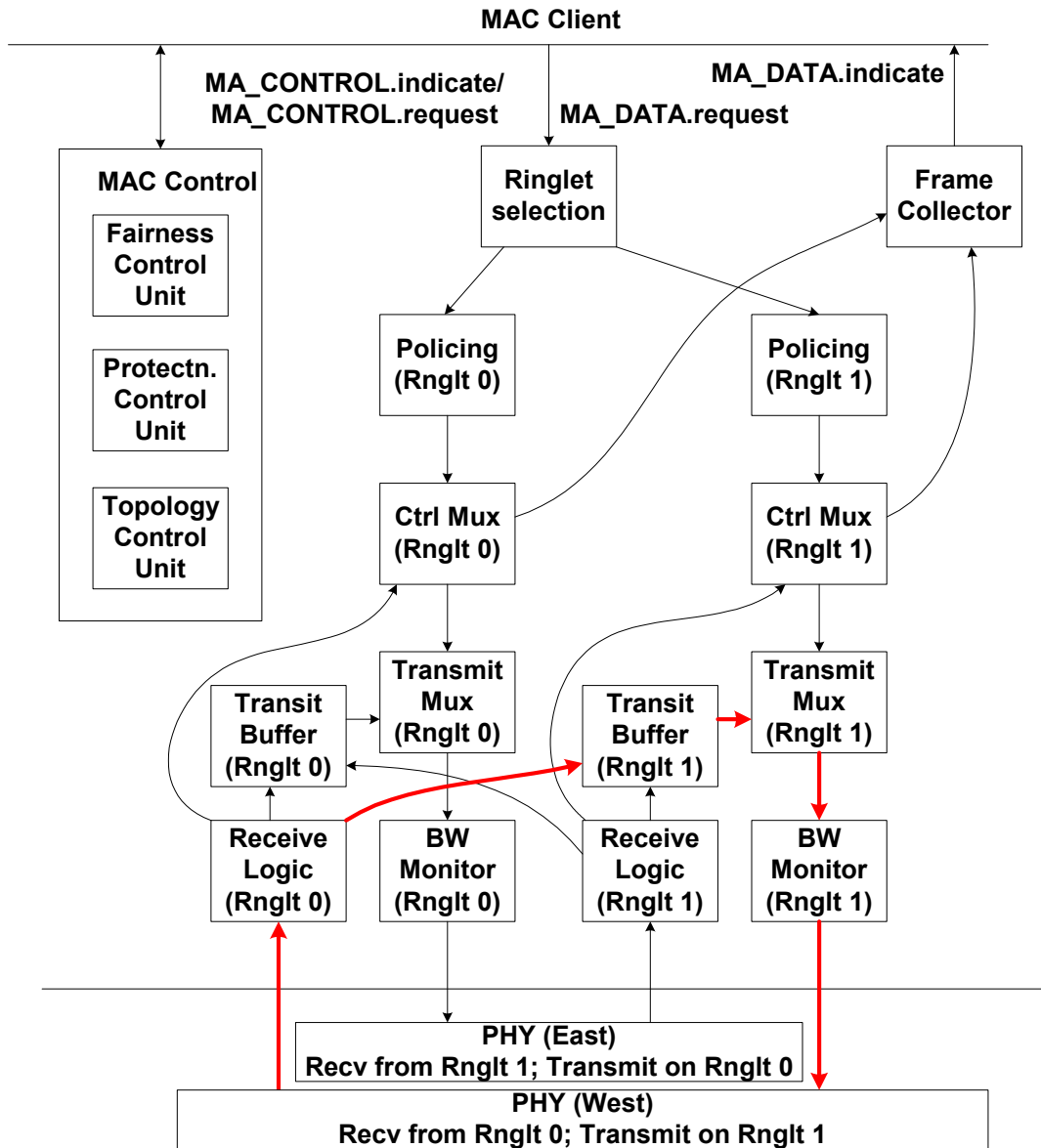
Reference Model – Receive Data Path



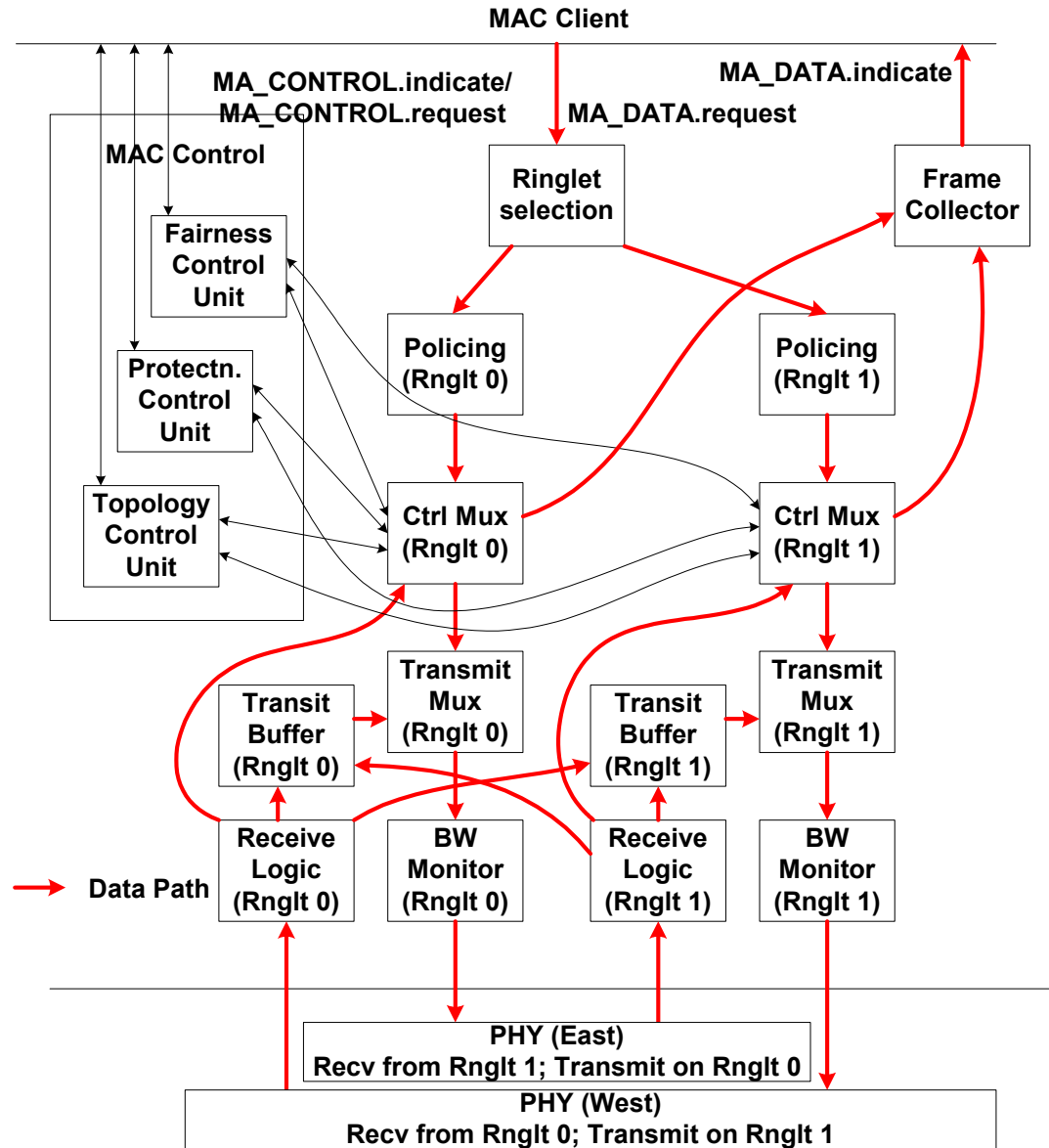
Reference Model – Transit Data Path



Reference Model – Transit Data Path With Wrapping



Reference Model for the RPR MAC



Reference Model Description (1) – Transmit Data Path

- Ringlet Selection: Either uses data from the client and/or information from topology and protection components
- Policing: Simple or VDQ policing
- Control Mux: Multiplexes control and data packets
- Transmit Mux: Multiplexes/schedules packets from the node and transit packets
- Bandwidth Monitor: Monitors activity on the output link

Reference Model Description (2) – Receive/Transit Data Path

- Receive Logic: Decides whether to receive, receive and transit, strip the frame, etc.
- Ctrl Mux: Sends control packets to appropriate module
- Frame collector: Gathers frames from both ringlets and passes them up to the client
- Transit buffer: Holds transit frames as they wait to be scheduled for transmission by the Transmit Mux.

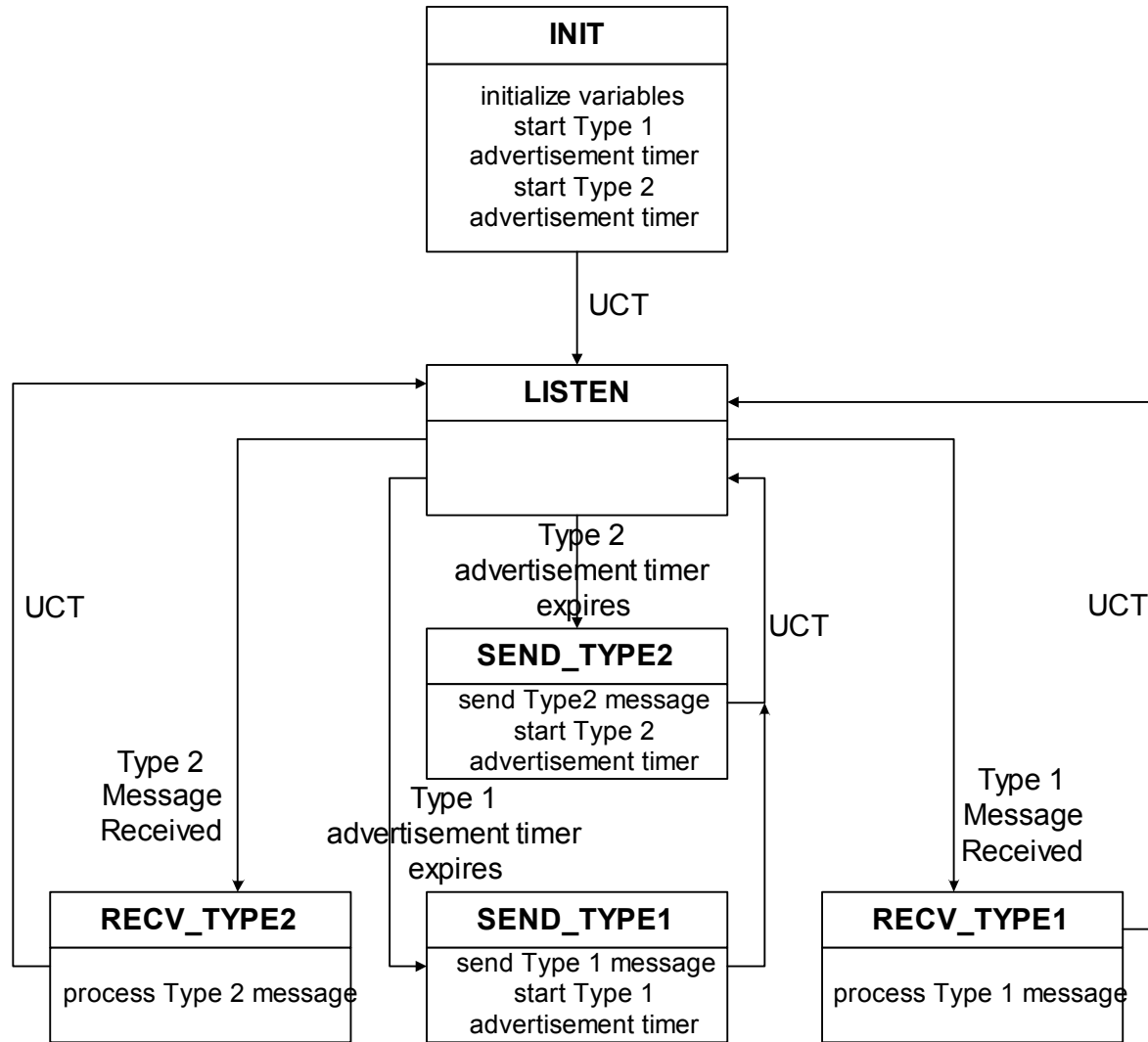
Reference Model Description (3) – Control Entities

- Fairness Control Unit: Performs the computations, consumes received messages and schedules fairness messages
- Protection Control Unit: Consumes/transmits protection messages and communicates with entities within the MAC to implement protection
- Topology Control Unit: Participates in the topology discovery and provides the necessary information to other components
- MAC Control

State Machines

- Need to have state machines describing each block in the reference model
- The state machine:
 - Shows the states that each block can be in
 - Describes the transitions between the states
- Also need to have a diagram that shows the relationship between related state machines

State Machine for the Fairness Message Processing in the Fairness Control Unit



Conclusions

- Need a reference model for 802.17
- The model should be able to cover all features that the standard discusses
- We should use the model to develop state machines for the standard