

OAM Control

R0-2

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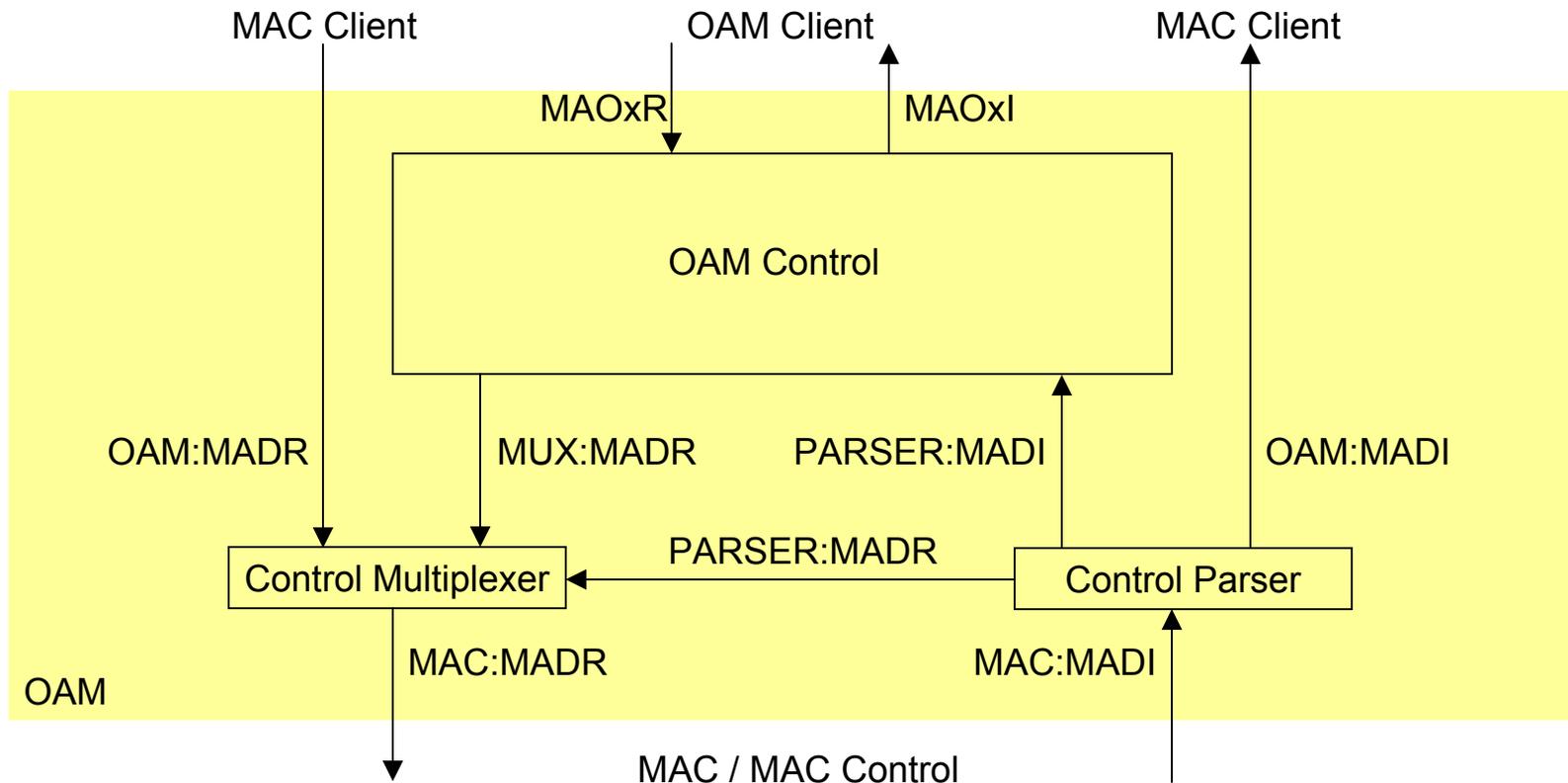
Kevin Daines – World Wide Packets

Overview

- **OAM Control is too distributed**
- **This presentation suggests a different organization**
- **Replaces “attributes” with “primitives”**

Loopback

- Make a new path in Figure 55-2 to send loopback data directly from the Control Parser to the Control Multiplexer
- This takes loopback out of OAM Control, except for States



Discovery

- **Changes from another comment separate this into 2 state machines**

Discovery

Loopback

- **Discovery progress is controlled by OAM Client**
- **Discovery state controls OAM Control transmit rules**

OAM Control

- Add an OAM Client to Figure 55-2, interacting directly with OAM Control
- All received OAMPDUs go to OAM Client
- All transmitted OAMPDUs come from OAM Client
 - Except Information OAMPDUs at min rate for Discovery or keeping the link alive
- Implementations can decide where the boundary between hardware and software exists
- How the OAM Client interacts with management is implementation dependent

OAM Control Primitives & Variables

- Primitive: **MA_OAM.indicate(version, flags, code, data)** – indication that new OAMPDU has arrived along with the content of that OAMPDU
- Primitive: **MA_OAM_LL.indicate** – indication that the link_lost_timer has expired
- Primitive: **MA_OAM_STATE.indicate(local_stable,local_loopback)** – indication to the OAM Client the local state of the Discovery and Loopback state machines
- Primitive: **MA_OAM_DG.request** – request to immediately transmit an OAMPDU with the dying_gasp bit set (Information or whatever's pending)
- Primitive: **MA_OAM.request(version, flags, code, data)** – request to queue an OAMPDU for transmit upon expiration of the max_rate_timer or upon MA_OAM_DG.request

OAM Control Primitives & Variables (cont.)

- Primitive: MA_OAM_STATE.request(oam_local_state, oam_remote_state, oam_remote_state_valid, oam_satisfied, link_status, oam_ok_to_tx, oam_unidirectional) – updated anytime these parameters change

oam_local_state – local_state info used in Information OAMPDUs for Discovery or to keep the link alive

oam_remote_state – remote_state info used in Information OAMPDUs for Discovery or to keep the link alive

oam_remote_state_valid – indication that oam_remote_state is valid

oam_satisfied – result of comparing local_state with most recently received local_state and remote_state values

link_status – as captured by OAM Client from station management

oam_ok_to_tx – indication that device is active or that device is passive and remote device has begun Discovery

oam_unidirectional – indication that the PCS is provisioned to enable unidirectional transmissions

OAM Control

Receive & Response Rules

- No State Diagram – list of rules only!
- All PARSE:MADI primitives indicate an OAMPDU and in turn generate an MA_OAM.indicate
- Link_lost_timer is reset upon reception of any OAMPDU
- The response rules come from the definition of the frames in 55.6 and are handled by the OAM Client
- All requests have a maximum response time requirement
- Variable Request requires a Variable Response

Even if variable isn't supported, remote device still responds

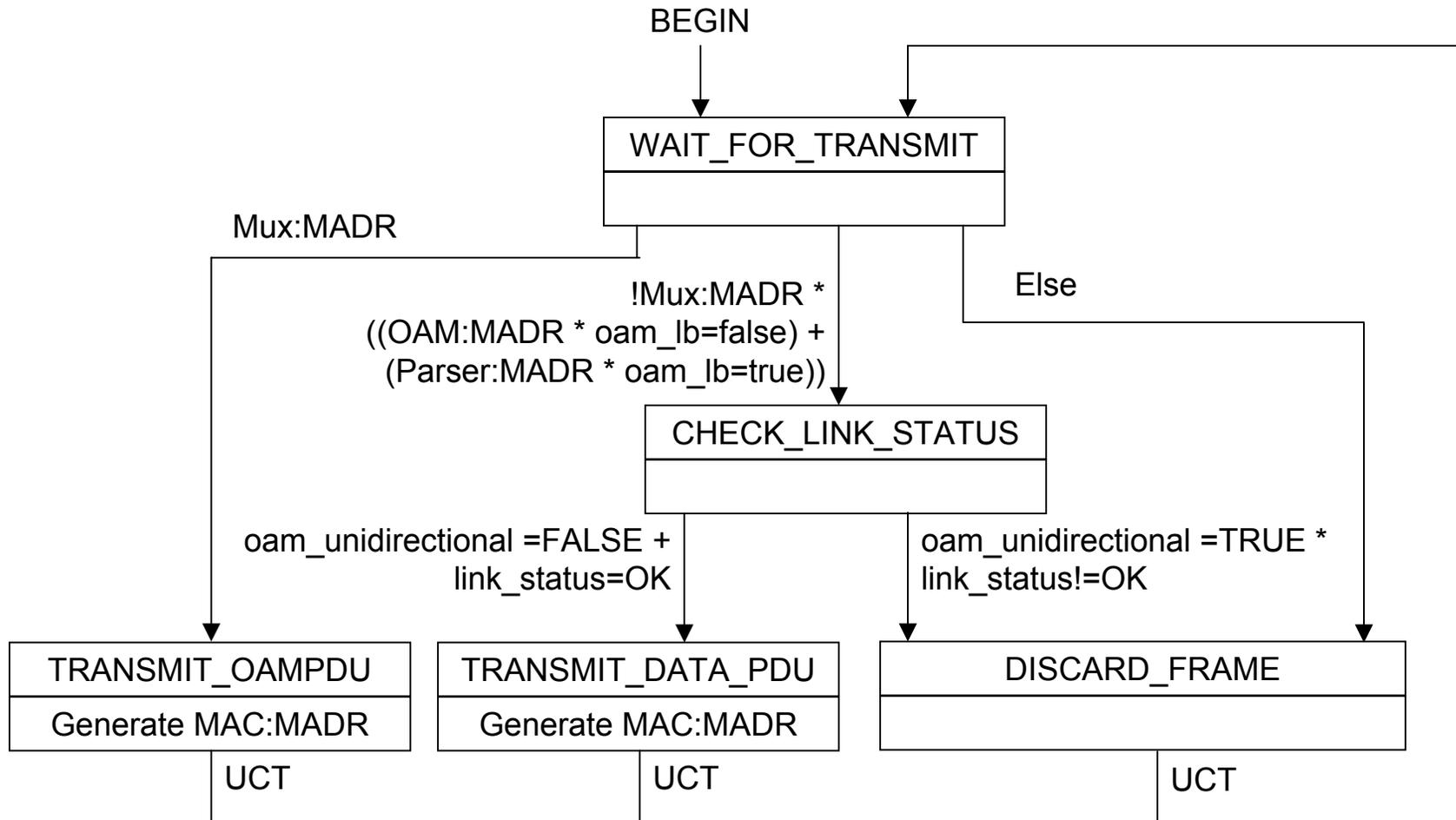
OAM Control Transmit Rules

- No State Diagram – list of rules only!
- Transmits are only allowed when `oam_ok_to_tx` is set
- While the OAM Discovery process is in the `SEND_LOCAL_*` states:
 - Transmit Information OAMPDU whenever the `min_rate_timer` or `max_rate_timer` expires, as an implementation chooses
 - Build this OAMPDU using `oam_dying_gasp`, `link_status`, `oam_local_state` and `oam_remote_state`
- While the OAM Discovery process is in any of the other states:
 - `MA_OAM_DG.request` enables immediate transmission of queued OAMPDU or Information OAMPDU with the `dying_gasp` bit set in the Flags field
 - `MA_OAM.request` requests the transmission of an OAMPDU, transmission begins when `max_rate_timer` expires
 - In absence of both `MA_OAM_DG.request` and `MA_OAM.request`, transmit Information OAMPDU when `min_rate_timer` expires
- Both `min_rate_timer` and `max_rate_timer` are reset upon transmission of any OAMPDU

Link Status Inhibits OAM:MADR

- Hooks have been added to Clauses 24 & 36 to enable unidirectional transmissions
- This function is enabled when “Enabled Unidirectional OAM” is enabled in these clauses
- Tie this to new OAM Client parameter `oam_unidirectional`
- When does this parameter get set?
- Recommend that it only occurs when Discovery is in `send_any_oam` state (and the PCS supports this capability)
- Add capability to Control Multiplexer state diagram to discard OAM:MADR primitives when `oam_unidirectional` is TRUE and `link_status` is not OK – MUX:MADR primitives are still transmitted
- When `oam_unidirectional` is FALSE or `link_status` is OK, Control Multiplexer transmits all MADR primitives

Control Multiplexer State Diagram



Control Parser State Diagram

