

MPCP – Messages Format

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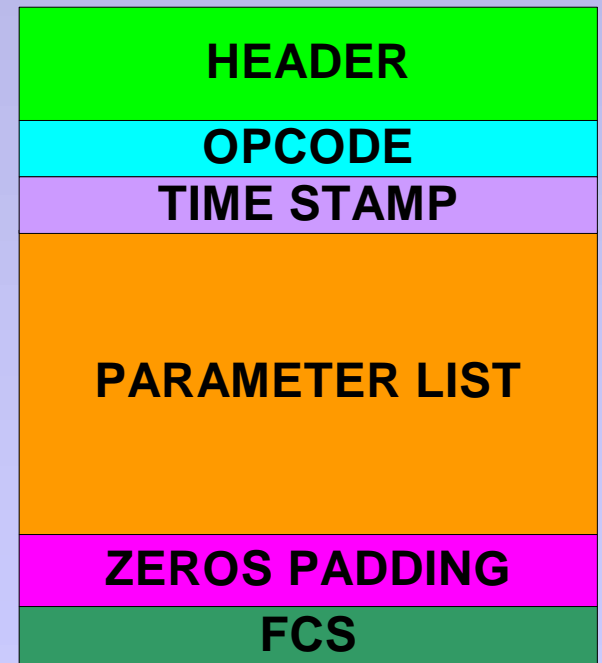
Richard Brand, Glen Algie – Nortel

Message Structure

- ❑ **MAC Control is layer responsible for message generation and termination**
- ❑ **MAC Control imposes known EtherType**
 - Demultiplexing is performed through opcode field that is defined for each message type
- ❑ **Constant length of 64 bytes imposed by MAC Control**
 - Content when using a 64 bytes MAC control packet is:
 $64 - 6(\text{DA}) - 6(\text{SA}) - 2(\text{EtherType}) - 2(\text{MAC control opcode}) - 4(\text{FCS}) = 44$

Frame Structure

- ❑ Opcode field is used to distinguish message types
- ❑ A timestamp is prepended to all messages
- ❑ All messages have fixed mandatory parameters
- ❑ Optional parameters **may** follow for some messages
- ❑ Optional fields appear in frames based on context and circumstances
- ❑ All defined fields **must** be supported

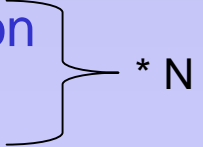


Time Stamp Field

- ❑ All messages contain a 32-bit time stamp field
- ❑ The time stamp is the value of PON counter at the moment MAC control passed the frame to the MAC
- ❑ ONU must update its local PON counter when receiving any valid message
- ❑ Timestamp granularity is 16 bit-times, 32 bit resolution

GATE Message

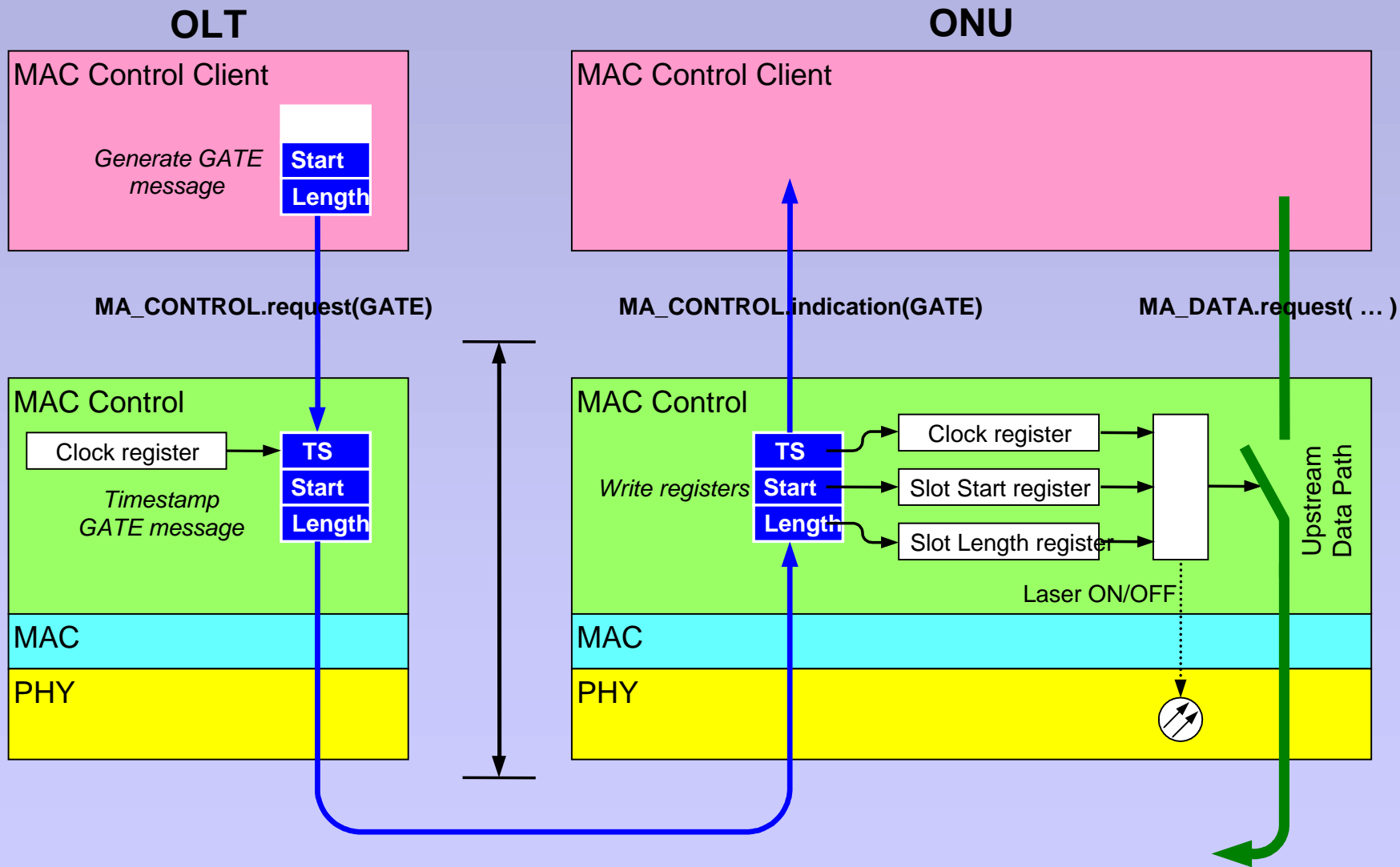
Fields:

- 6 octets: Destination address
 - 6 octets: Source address
 - 2 octets: Type 88-08
 - 2 octets: Opcode 02
 - 4 octets: Timestamp
 - 1 octet: Number of grants –
MSB is grant type (0 – regular / 1 – discovery)
 - 4 octets: Grant start time - time laser **should** be turned on
 - 2 octets: Grant length - time laser **must** be off
 - Additional fields to be discussed
 - 4 octets: CRC
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GATE Operation

- ❑ Grant mechanism gates MAC-client delivery of frames.
- ❑ ONU transmits only during the time indicated in the grant
- ❑ ONU MAC-control enables PHY transmission at the start of a grant duration and disables it at the end of the grant duration
- ❑ Multiple grants may be outstanding – up to a limit
- ❑ ONU is free to use granted period to it's best ability
- ❑ GATE messages can be used with timestamps only

GATE Operation Illustrated



REPORT Message

□ Fields

- 6 octets: Destination address
- 6 octets: Source address
- 2 octets: Type 88-08
- 2 octets: Opcode 03
- 4 octets: Timestamp
- 1 octets: Report bitmap – 1 for each queue reported
- 4*8 octets: Queue report * 8
- Optional fields to be discussed
- Zero padding
- 4 octets: CRC

REPORT Message

- ❑ A reported element contains the number of bytes requested per 802.1Q priority queue
- ❑ A bit mask specifies the queues reported
- ❑ A REPORT message **may** contain queue reports
- ❑ The OLT **must** process REPORT messages
- ❑ The OLT **may** consider the REPORT when allocating bandwidth
- ❑ The ONU **must** issue REPORTS periodically
- ❑ REPORT messages can be used with timestamps only

REPORT BIT MASK [1BYTE]

Bit #n is 0: No report for queue #n

Bit #n is 1: Queue #n report exists

REPORT #0[4BYTE]

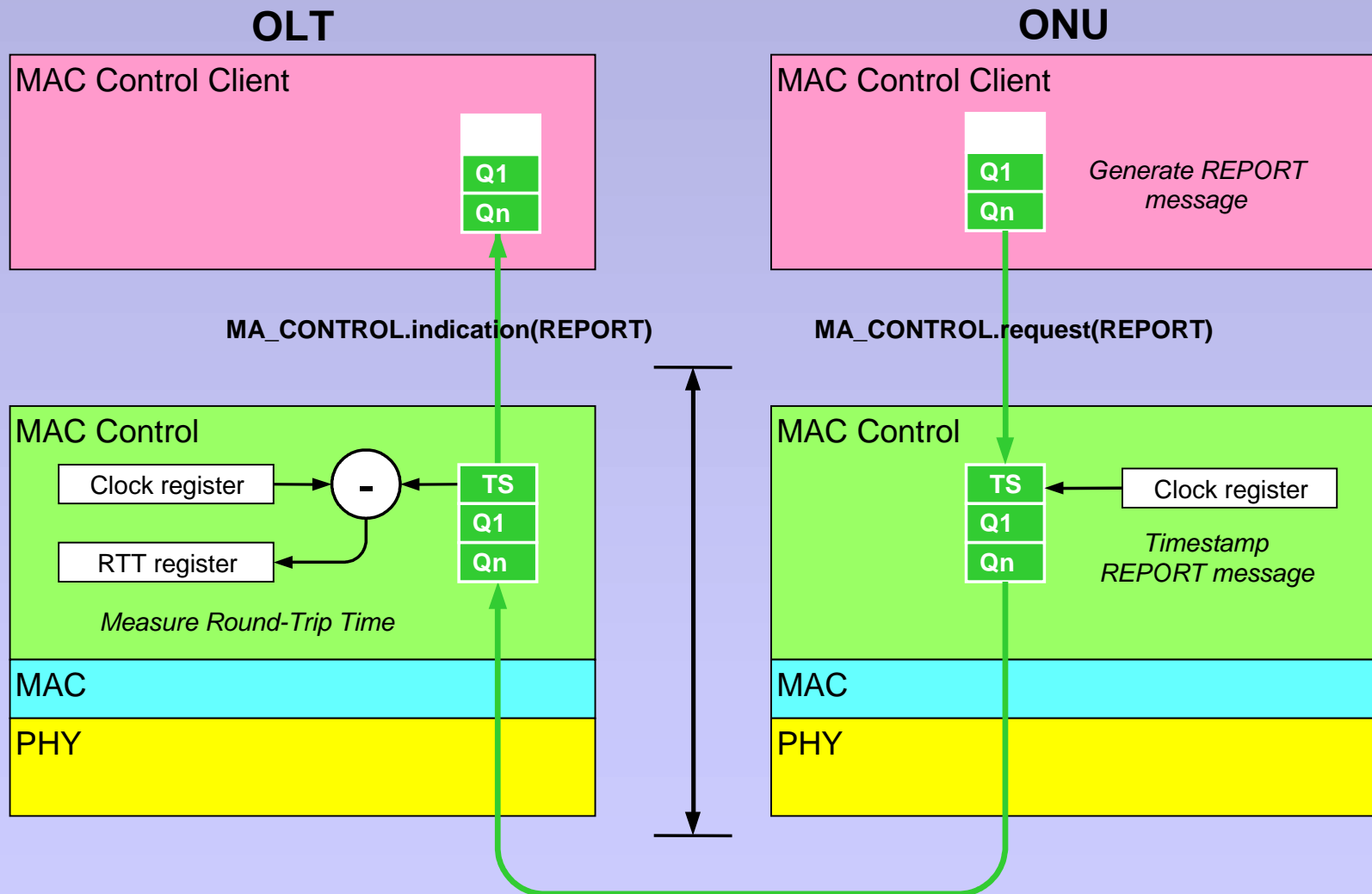
Number of bytes reported for queue #n

.....

REPORT #X[4BYTE]

Number of bytes reported for queue #m

REPORT Operation Illustrated



REGISTER_REQUEST Message

□ Fields

- 6 octets: Destination address
- 6 octets: Source address
- 2 octets: Type 88-08
- 2 octets: Opcode 04
- 4 octets: Timestamp
- 1 octets: P2PE request - Number of P2PE ports requested
- Optional ONU capabilities report: PMD performance, queue depth, maximal number of pending grants, support single copy broadcast
- Zero padding
- 4 octets: CRC

REGISTER Message

□ Fields

- 6 octets: Destination address
- 6 octets: Source address
- 2 octets: Type 88-08
- 2 octets: Opcode 05
- 4 octets: Timestamp
- 1 octets: P2PE ports - Number of P2PE ports assigned
- 2N octets: P2PE PHY IDs – List of assigned IDs
- Optional OLT capabilities report: CDR lock time, GRANT generation delay
- Optional echo of understood ONU capabilities
- Zero padding
- 4 octets: CRC

REGISTER_ACK Message

- Fields
 - 6 octets: Destination address
 - 6 octets: Source address
 - 2 octets: Type 88-08
 - 2 octets: Opcode 06
 - 4 octets: Timestamp
 - Optional echo of understood OLT capabilities
 - Zero padding
 - 4 octets: CRC