Additional fields in REPORT frame

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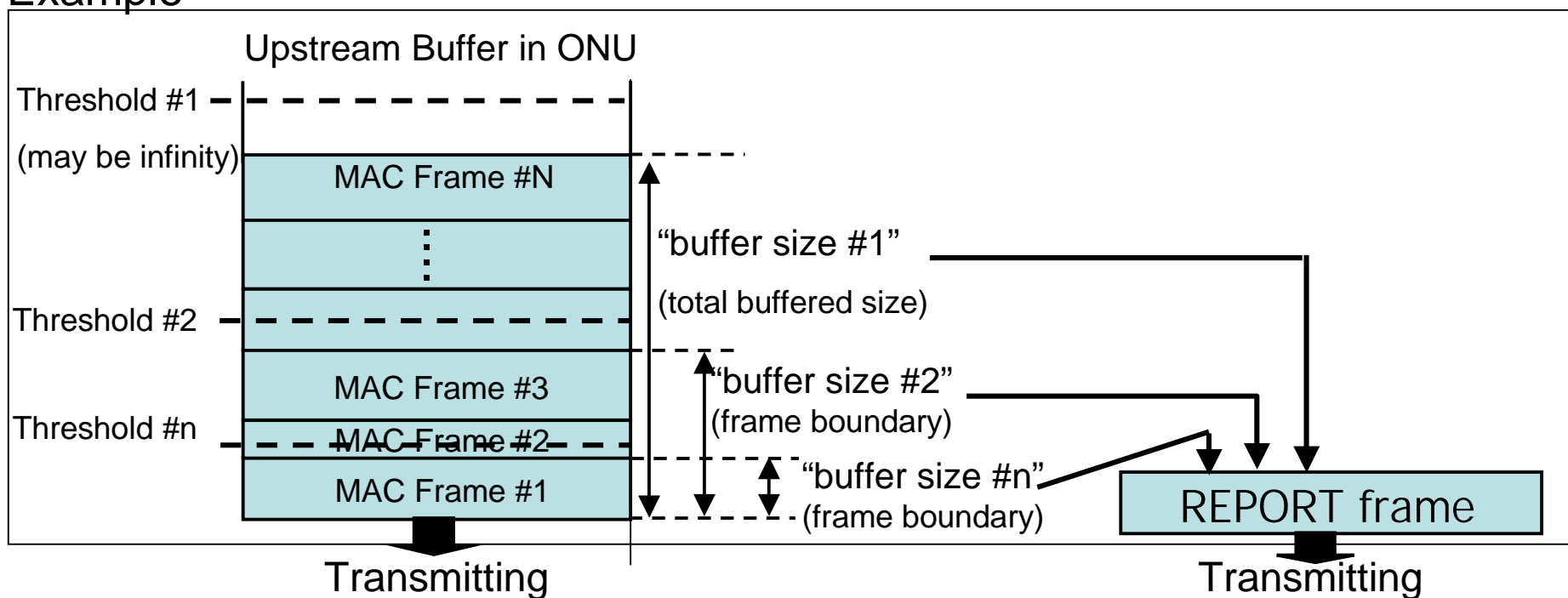
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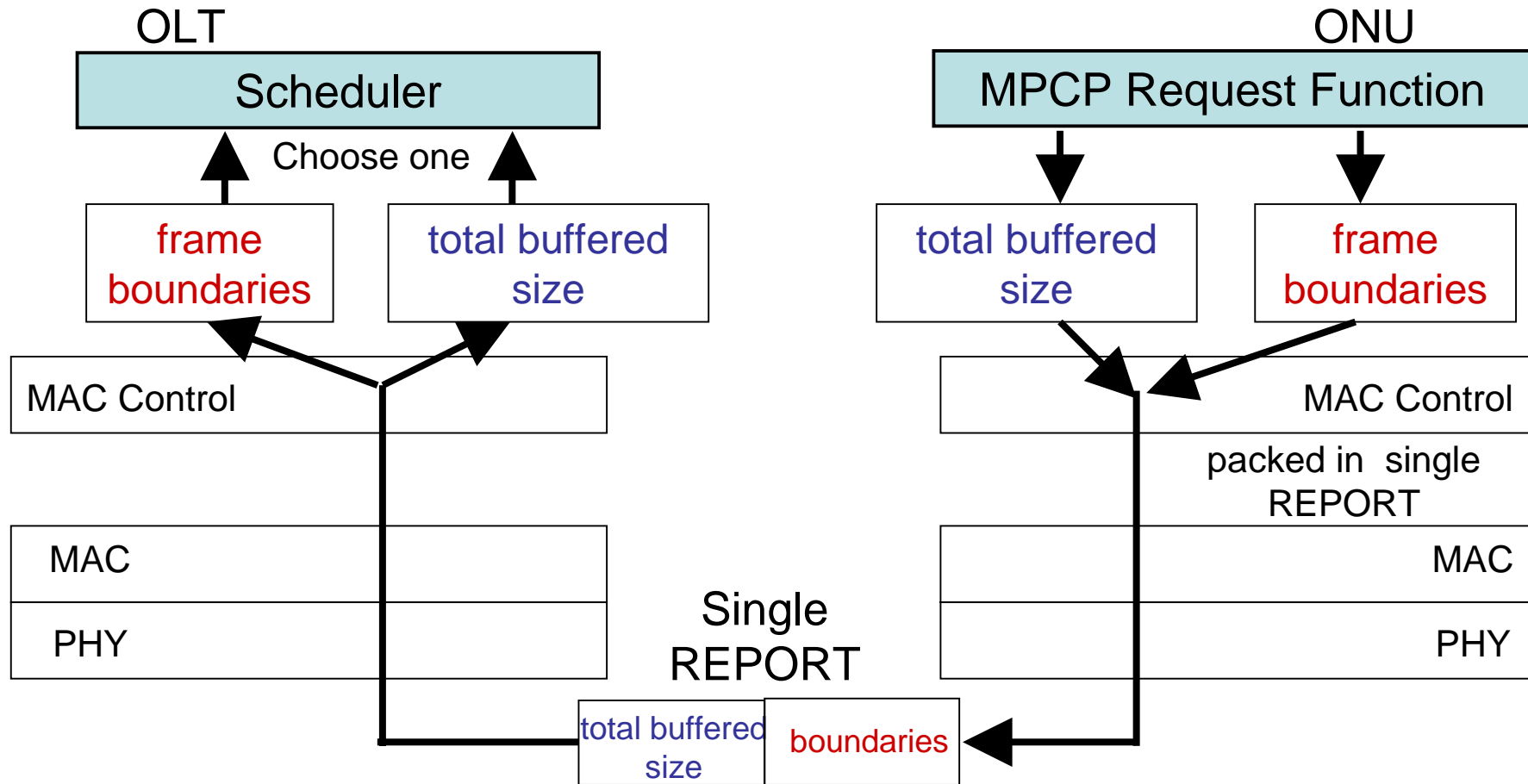Ryan Hirth, Terawave

Proposal

- In the current specification, one REPORT frame hold a single set of bitmap and queue reports.
- I'd like to propose a modification of REPORT format to be able to hold multiple information on buffering status. (yoshihara_1_1101.pdf)

  for example,
  - total buffered size.
  - frame boundaries (buffered size below threshold).

Example

Upstream Buffer in ONU

Threshold #1 (may be infinity)

MAC Frame #N

MAC Frame #3

Threshold #2

Threshold #n — MAC Frame #2

MAC Frame #1

"buffer size #1" (total buffered size)

"buffer size #2" (frame boundary)

"buffer size #n" (frame boundary)

REPORT frame

Transmitting   Transmitting

How does it work?

■ Scheduler may choose one as a request according to an allocation policy.

OLT

Scheduler

Choose one

frame boundaries	total buffered size

MAC Control	

MAC	
PHY	

Single REPORT

total buffered size	boundaries

ONU

MPCP Request Function

total buffered size	frame boundaries

	MAC Control

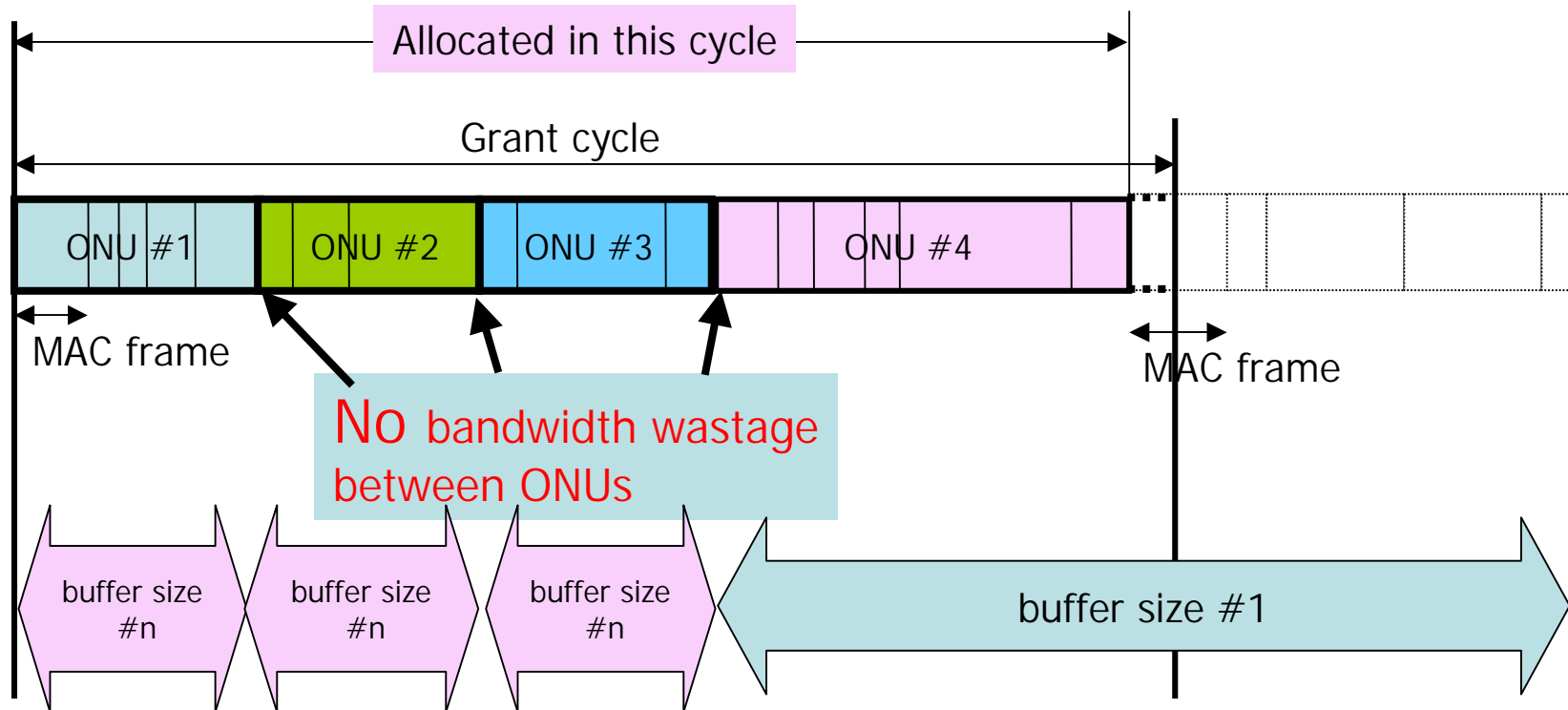packed in single REPORT

	MAC
	PHY

Example of bandwidth allocation – Single queue report

- When "Single queue report" is used, OLT doesn't know the size of frames that will be transmitted.

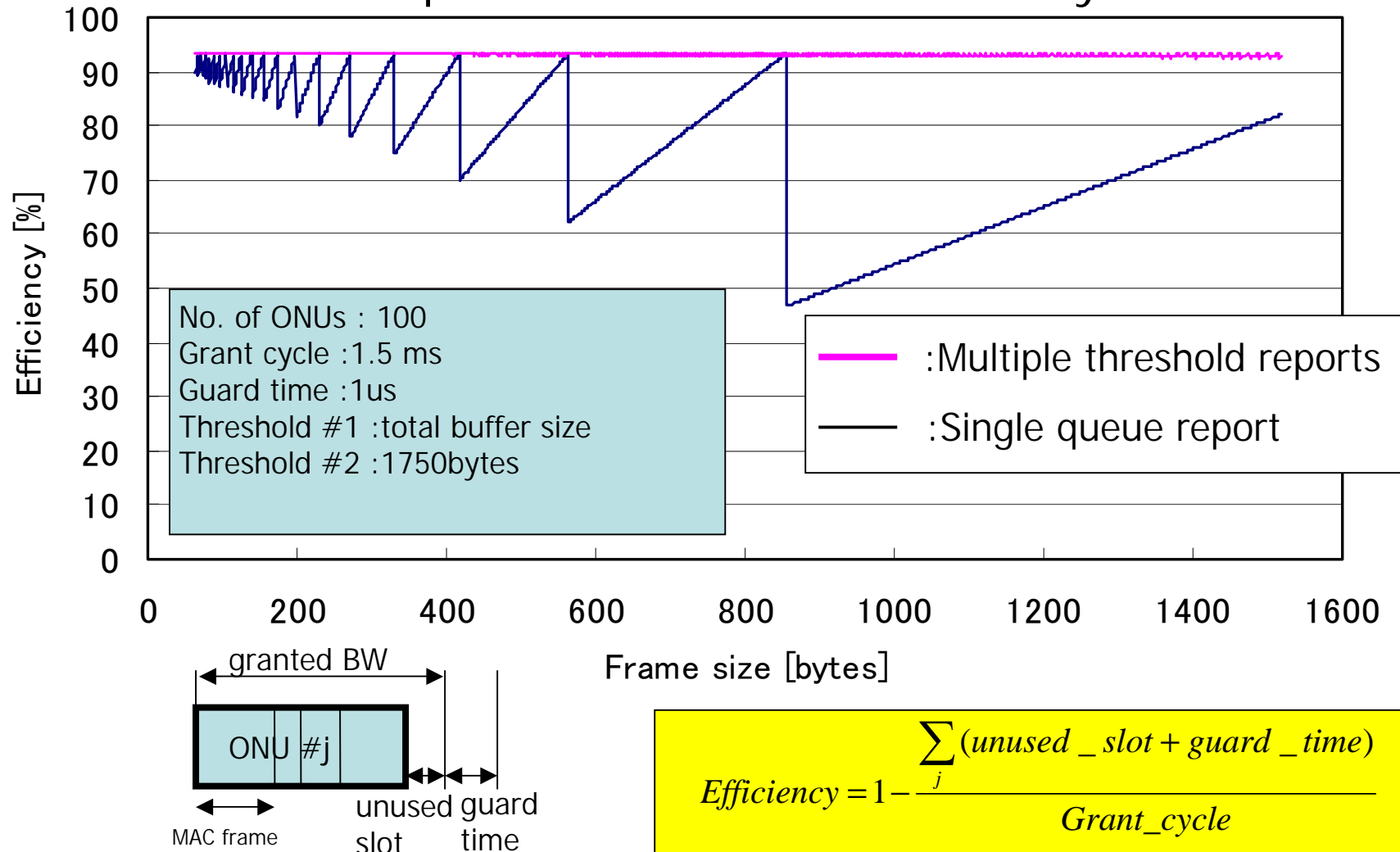   → There are unused slots in the grant.
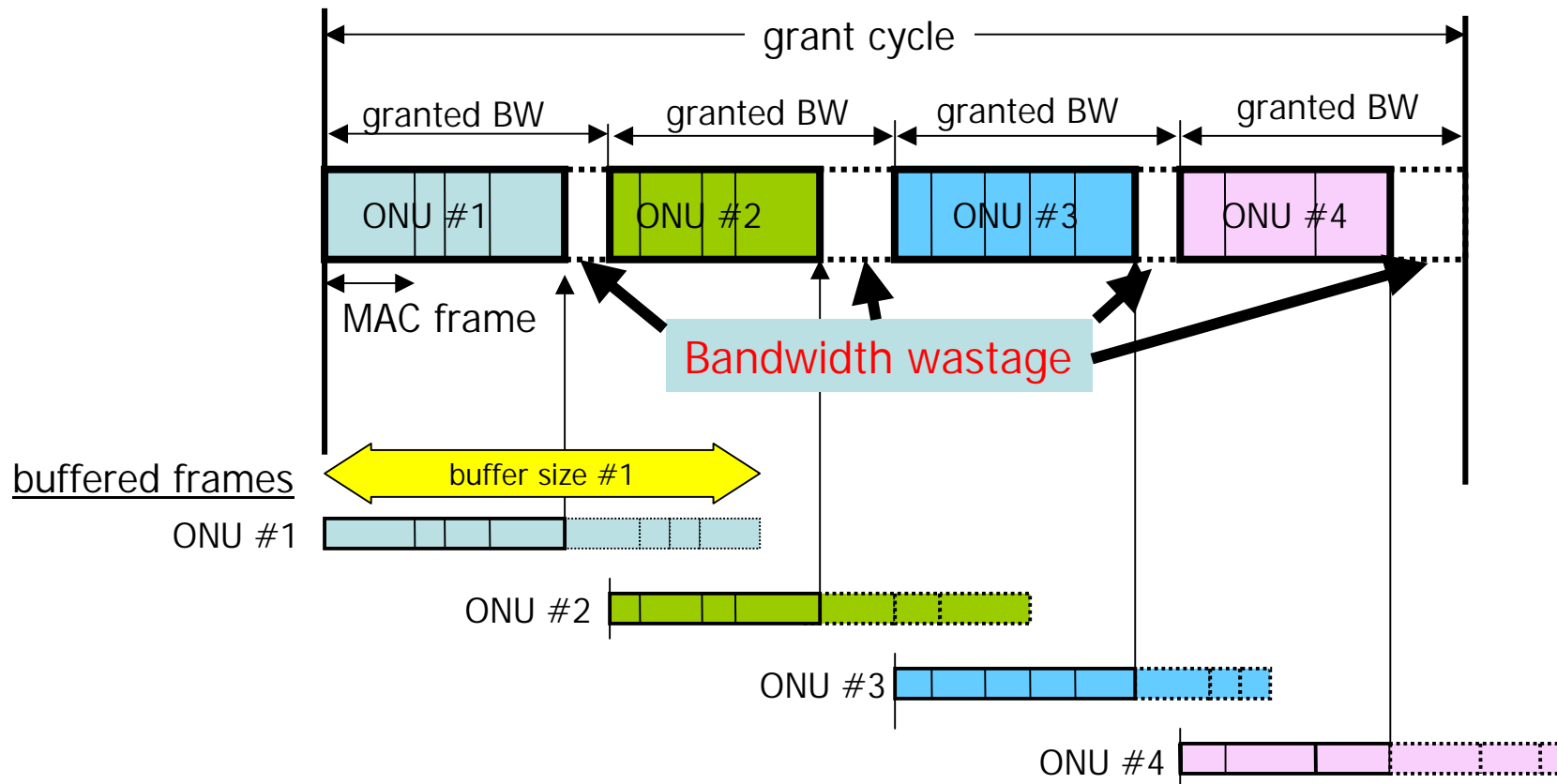
Example of bandwidth allocation – Multiple threshold reports

- OLT knows the size of frames that will be transmitted as "buffer size #n".
  → No bandwidth wastage between ONUs.

Allocated in this cycle

Grant cycle

ONU #1 ONU #2 ONU #3 ONU #4

MAC frame

MAC frame

No bandwidth wastage between ONUs

buffer size #n   buffer size #n   buffer size #n   buffer size #1

Efficiency Comparison

Upstream bandwidth efficiency

No. of ONUs : 100
Grant cycle :1.5 ms
Guard time :1us
Threshold #1 :total buffer size
Threshold #2 :1750bytes

— :Multiple threshold reports

— :Single queue report

granted BW

ONU #j

MAC frame

unused slot

guard time

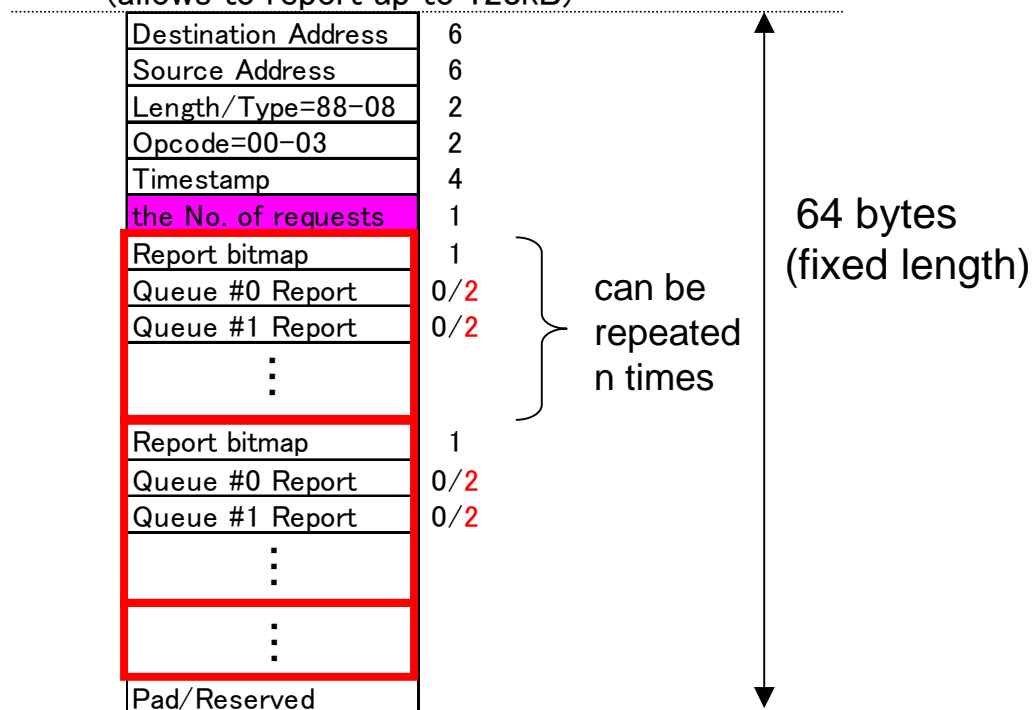$$Efficiency = 1 - \frac{\sum_{j}(unused\_slot + guard\_time)}{Grant\_cycle}$$

High efficiency can be achieved by "Multiple threshold reports"

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Proposed REPORT message format

- A REPORT message **MAY** hold multiple sets of bitmaps and queue reports.

- The number of requests in a Report frame is decided by the ONU.

- OLT passes the requests according to "the number of requests" fields.

- Queue report field is an **16 bit field**, **2 octets granularity** which is the same as the grant. (allows to report up to128KB)

Queue report fields: **16bits**
 2 octets guranularity
（allows to report up to 128kB）

Destination Address	6
Source Address	6
Length/Type=88-08	2
Opcode=00-03	2
Timestamp	4
the No. of requests	1
Report bitmap	1
Queue #0 Report	0/2
Queue #1 Report	0/2
⋮	
Report bitmap	1
Queue #0 Report	0/2
Queue #1 Report	0/2
⋮	
⋮	
Pad/Reserved	

can be repeated n times

64 bytes (fixed length)

Proposed modification Ⅰ

- ## Clause 56 Sub Clause 56.3.4.1
  - Add the following statement in Line 42, page122
    - (c) The granularity of Queue #n report is 2 octets.
    - (d) Add "the number of requests" field to specify the number of requests in the Report message.
    - (e) A Report frame may hold multiple sets of Report bitmap and Queue #n as specified in "the number of requests" field.
  - Change the statement from "7 to 39" to "0 to 39" in Line 46, page122
  - Change the Queue #n Report fields from 0/4 octets to 0/2 octets in Figure 56-20, page123

Proposed modification II

- ## Clause 56 Sub clause 56.2.6.1.5 page112
  - Change "MA_CONTROL.request(report,valid[8],status[8]) to "MA_CONTROL.request(report,report_list)".
  - Add the following statement in Line34,

    "The list of queue status reports issued by ONU are passed in the parameter *report_list* . A queue status report has two members, *valid[8]* and *status[8]* "
  - Change "MA_CONTROL.indication(report,valid[8],status[8]) to "MA_CONTROL.indication(report,report_list)".
  - Add the following statement in Line42,

    "The list of queue status reports issued by ONU are passed in the parameter *report_list*. A queue status report has two members, *valid[8]* and *status[8]*."