

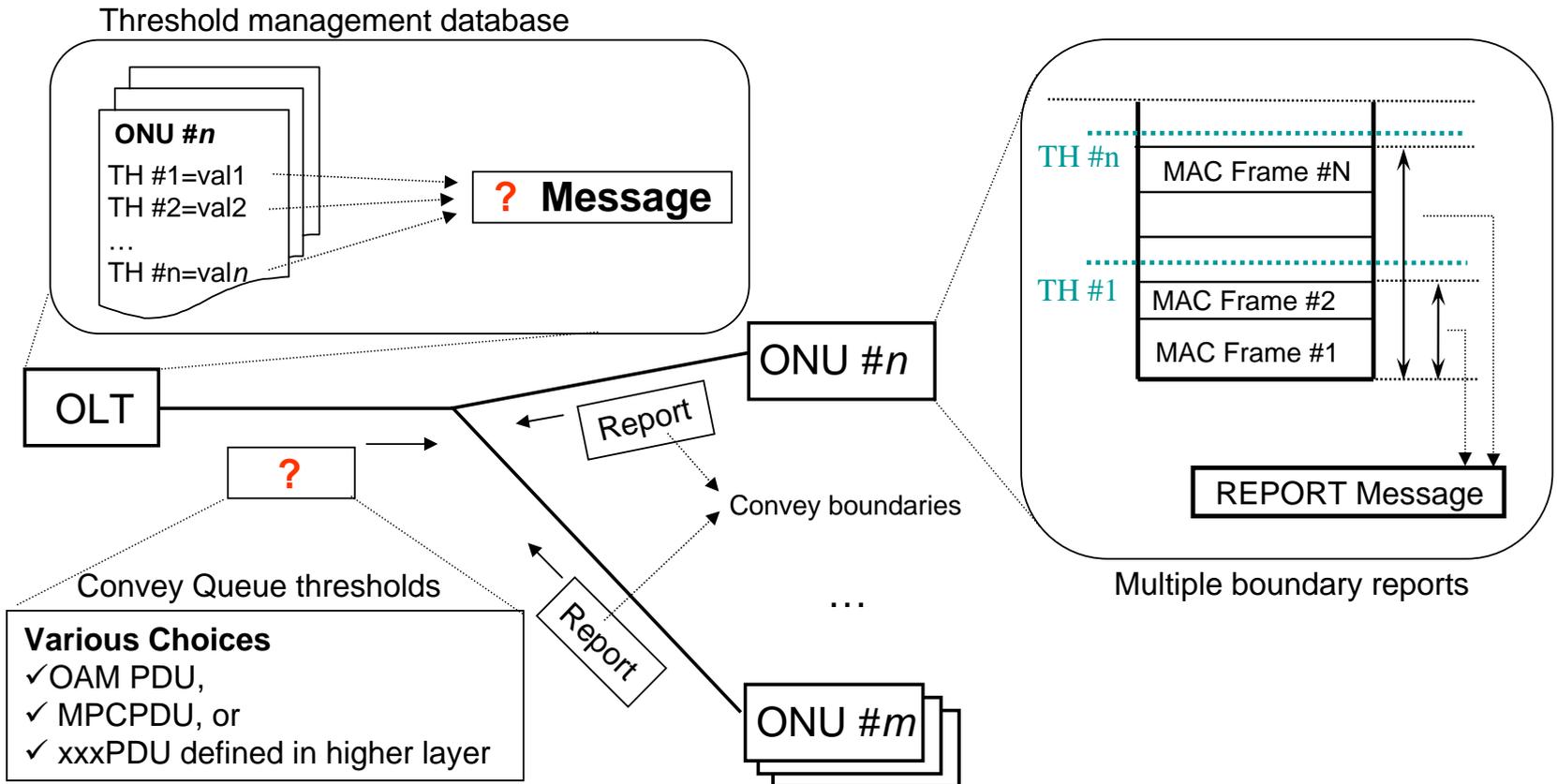
# **EXTENSION OF GATE MESSAGE**

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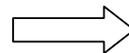
# Motivation

- Bandwidth assignment loss deteriorates upstream utilization. Utilization may drop to 50%.  
(source: yoshihara\_p2mp\_1\_0902.pdf)
- To solve the problem, **multiple boundary reports** was adopted.
- Thresholds should be managed by OLT for better efficiency and DBA policy.
- There is, however, **no standard mechanism** to set (distribute) thresholds from OLT to ONU. This will be an **interoperability issue**.
- This paper discusses possible solutions and proposes a mechanism by extending the gate message.

# Interoperability Issue

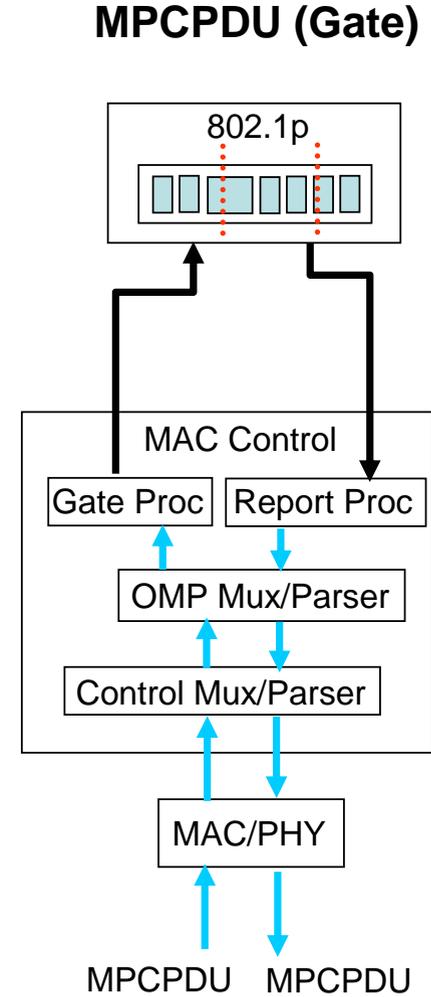
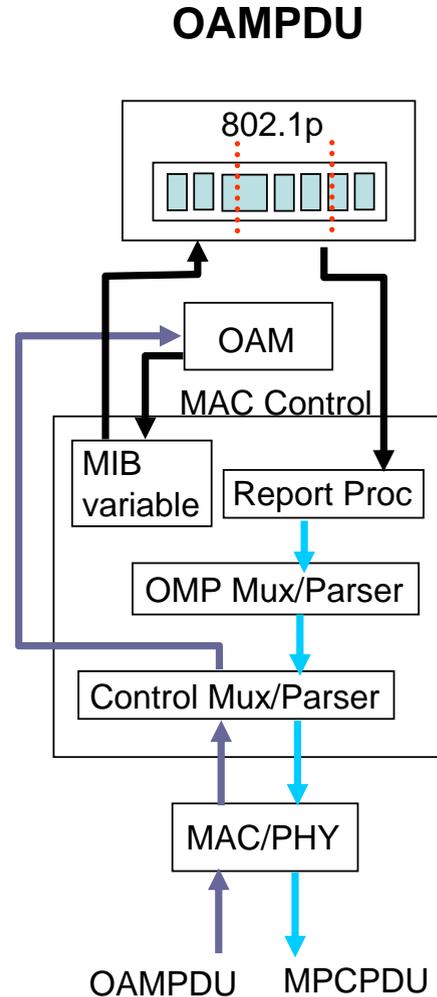
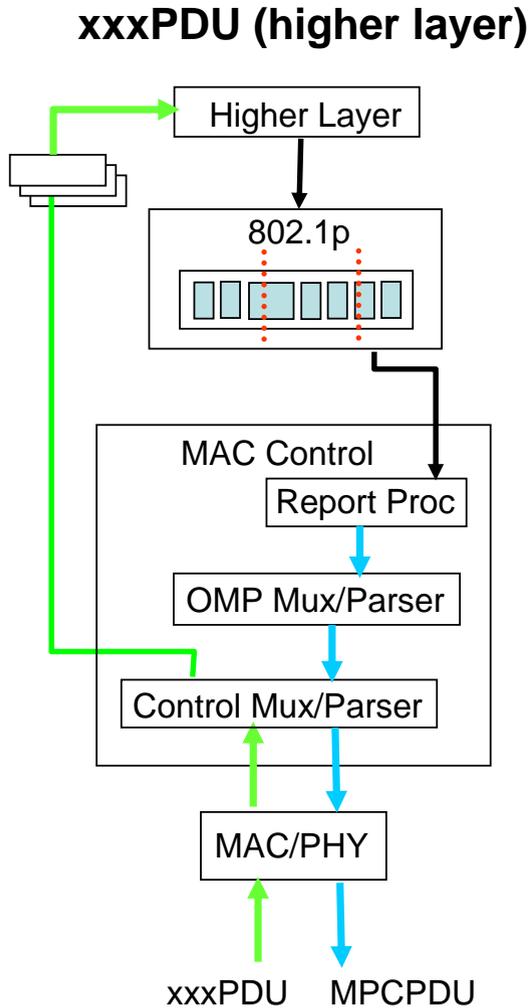


No standard mechanism exists



Interoperability Issue!!!

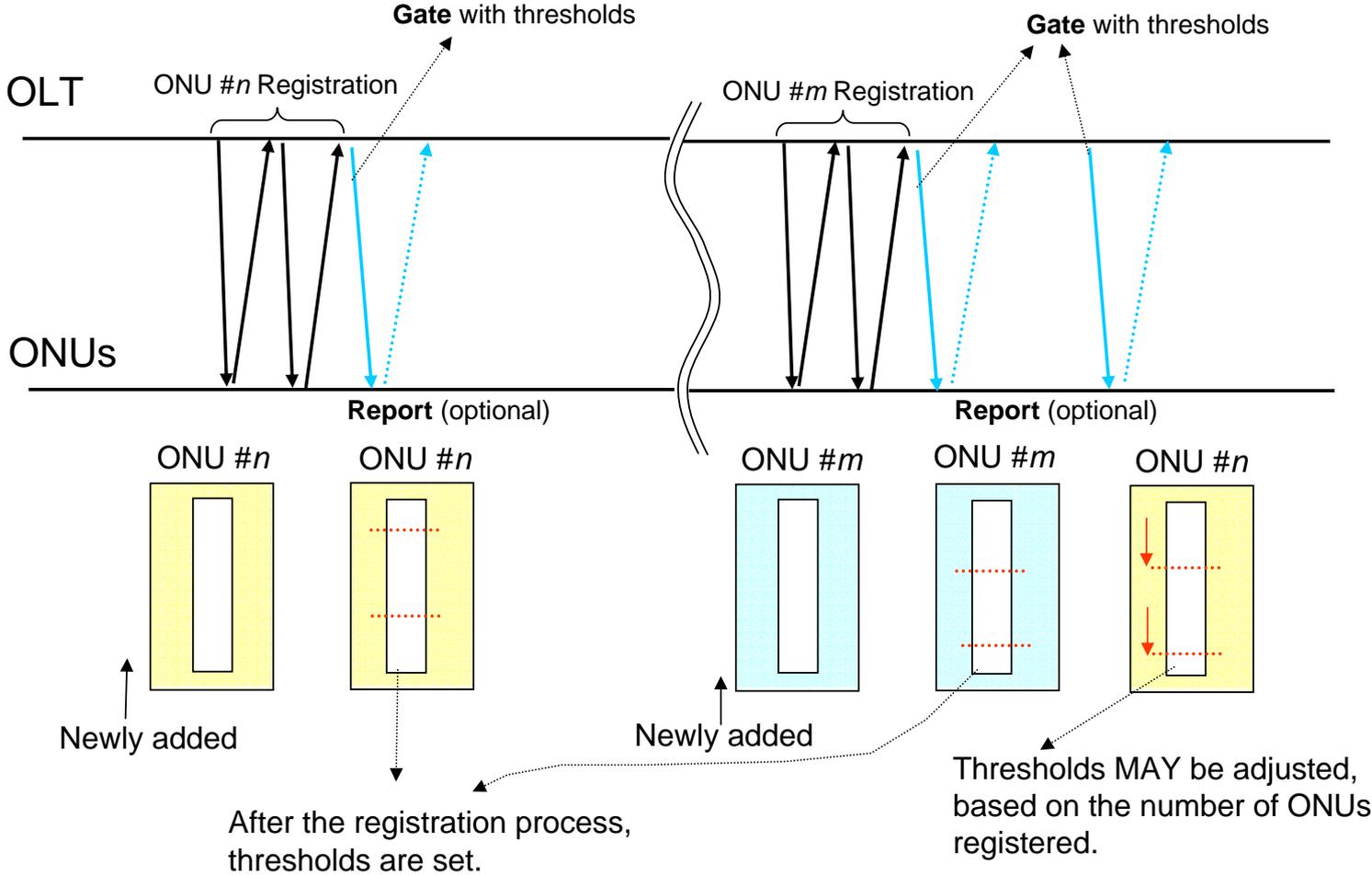
# Possible Solutions: Mechanism



# Possible Solutions: Pros and Cons

	Pros	Cons
<b>Higher Layer PDU</b>	<ul style="list-style-type: none"> <li>✓ Large space for conveying information (&lt;1500B).</li> </ul>	<ul style="list-style-type: none"> <li>✓ <b>No existing protocol.</b></li> <li>✓ Standardization effort outside P2MP STF (where?)</li> <li>✓ <b>Involves various layers</b> including not directly related P2MP.</li> <li>✓ <b>Too many options.</b></li> </ul>
<b>OAMPDU</b>	<ul style="list-style-type: none"> <li>✓ Large space for conveying information (&lt;1500B).</li> </ul>	<ul style="list-style-type: none"> <li>✓ <b>No relationship</b> with queue management under current definition.</li> <li>✓ Need to define MIB variables.</li> <li>✓ Standardization effort outside P2MP STF (OAM STF).</li> </ul>
<b>MPCPDU (register)</b>	<ul style="list-style-type: none"> <li>✓ Simple and Reasonable.</li> <li>✓ Involves only P2MP layer.</li> </ul>	<ul style="list-style-type: none"> <li>✓ <b>Can NOT be used after registration.</b></li> </ul>
<b>MPCPDU (gate)</b>	<ul style="list-style-type: none"> <li>✓ Simple and Reasonable.</li> <li>✓ Involves only P2MP layer.</li> <li>✓ Inherently Ack request function (force report).</li> <li>✓ <b>Works at any time.</b></li> </ul>	

# How MPCPDU (gate) mechanism works



# Proposal: gate message extension

Destination Address	6
Source Address	6
Length/Type=8808	2
Opcode=00-02	2
Timestamp	4
Number of grants/Flags	1
Grant #1 Start time	0/4
Grant #1 Length	0/2
Grant #2 Start time	0/4
Grant #2 Length	0/2
Grant #3 Start time	0/4
Grant #3 Length	0/2
Grant #4 Start time	0/4
Grant #4 Length	0/2
<b>Number of Thresholds</b>	<b>1</b>
<b>Threshold_flag</b>	<b>0/1</b>
<b>Threshold_value</b>	<b>0/2</b>
...	...
Pad/Reserved	...
FCS	4

- Three fields are introduced in the gate message.
- ONU **MAY** ignore these fields.

✓ **Number of thresholds:**

Specify the number of sets of threshold\_flag and threshold\_value fields.

✓ **Threshold\_Flag (optional)**

Bit 0: indicate the action (set or reset).

Bit 1-3: specify queue number (0 through 7).

Bit 4-7: specify threshold id (0 through 15).

✓ **Threshold\_value (optional)**

Convey threshold, the granularity is 2 octets, which is the same as grant length and Queue #n report.

} Repeated *n* times as indicated by number of thresholds

**Gate MPCPDU (normal gate)**

# Summary

- Setting thresholds is an Interoperability issue.
- Three possible solutions were discussed.
- Conveying thresholds via gate message would be the best choice. Simple and reasonable, and other advantages.
- An extension of the gate message format was proposed.

# Appendix: alternative format

Destination Address	6
Source Address	6
Length/Type=8808	2
Opcode=00-02	2
Timestamp	4
Number of grants/Flags	1
Grant #1 Start time	0/4
Grant #1 Length	0/2
Grant #2 Start time	0/4
Grant #2 Length	0/2
Grant #3 Start time	0/4
Grant #3 Length	0/2
Grant #4 Start time	0/4
Grant #4 Length	0/2
<b>Number of Add_info</b>	<b>1</b>
<b>Code&amp;Len</b>	<b>0/1</b>
<b>Additional Data</b>	<b>0/</b>
Pad/Reserved	...
FCS	4

- Additional information field (optional) MAY be defined.
- Optional information including thresholds MAY be conveyed through this field.
- One possible example of this format is as follows.

✓ **Number of Add\_info**

Specify the number of sets of code&len and additional data fields.

✓ **Code(4bit, optional)**

0=Reserved  
1=Threshold  
2-15=Reserved

✓ **Length (4bit, optional)**

Specify the length of the following additional data field in byte.

✓ **Additional Data (Optional)**

Additional data field contents are unique to the particular code.

Threshold_flag	1
Threshold_value	2

**Additional Data field of threshold data type (code=1)**

**Gate MPCPDU (normal gate)**