



Low Latency Dynamic Bandwidth Allocation for 100km Long Reach 10G-EPON

NTT Access Network Service Systems
Laboratories

Daisuke Murayama

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OUTLINE

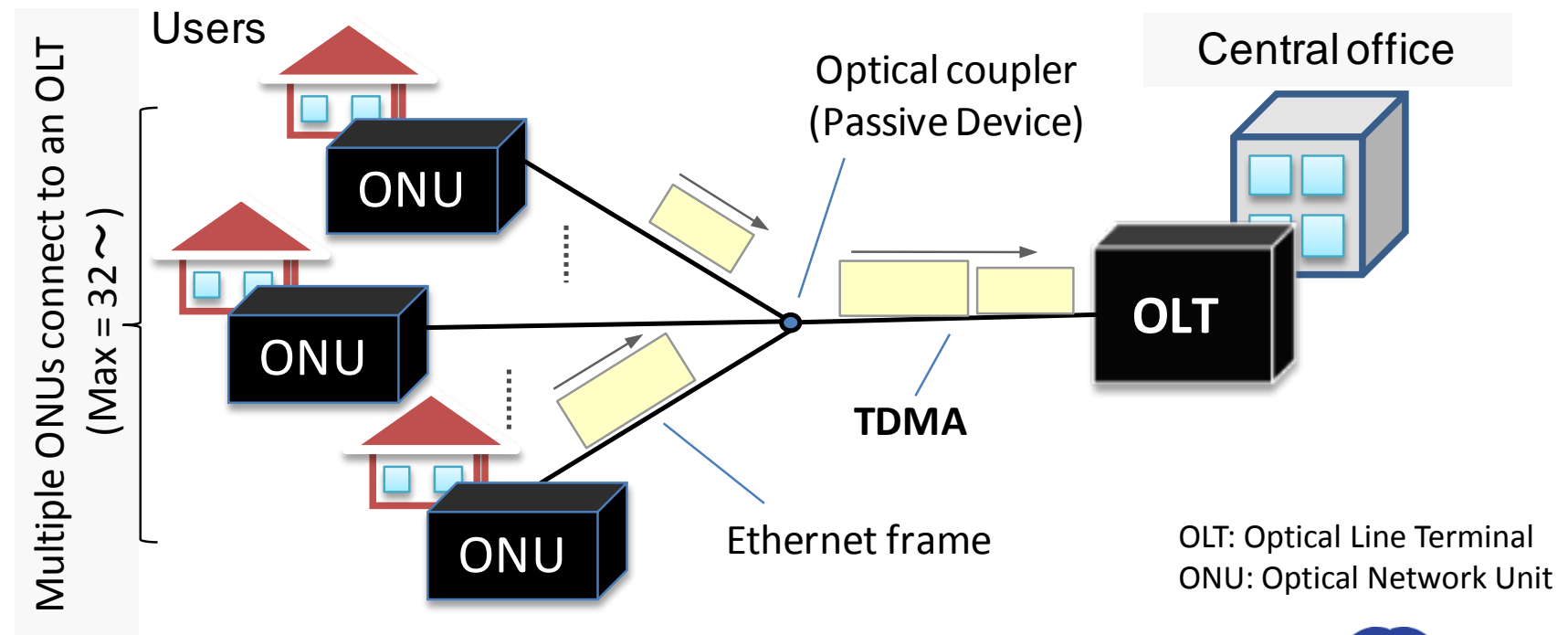
- 1. Introduction**
- 2. Low Latency DBA for Long Reach EPON**
- 3. Performance Assessment of Proposed DBA**
- 4. Summary**

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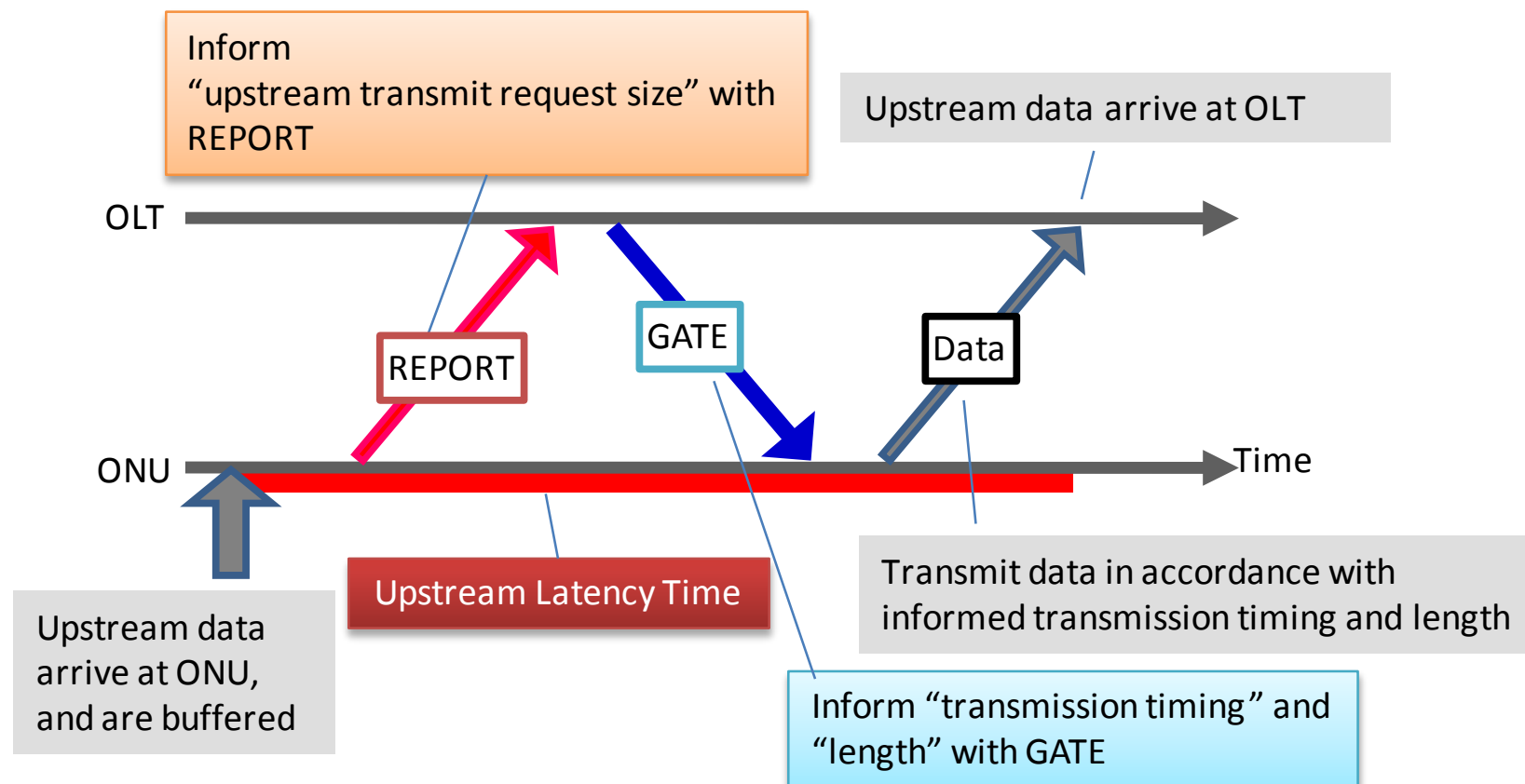
EPON : Ethernet Passive Optical Network

- One of most common access NW systems
- Sharing bandwidth with Dynamic Bandwidth Allocation (DBA)



MPCP: Multi-Point Control Protocol

■ Message exchange for DBA (exactly matching allocation)

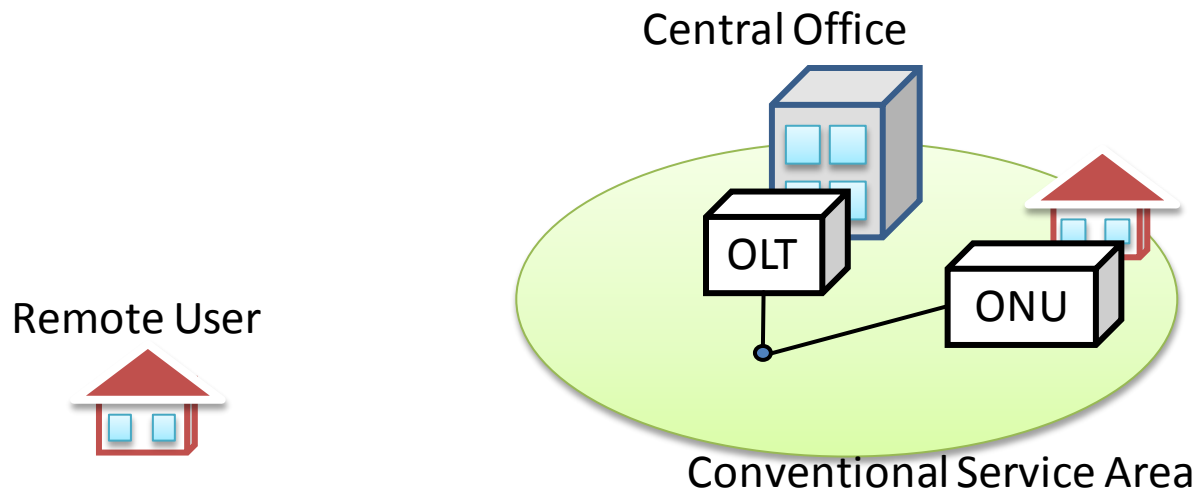


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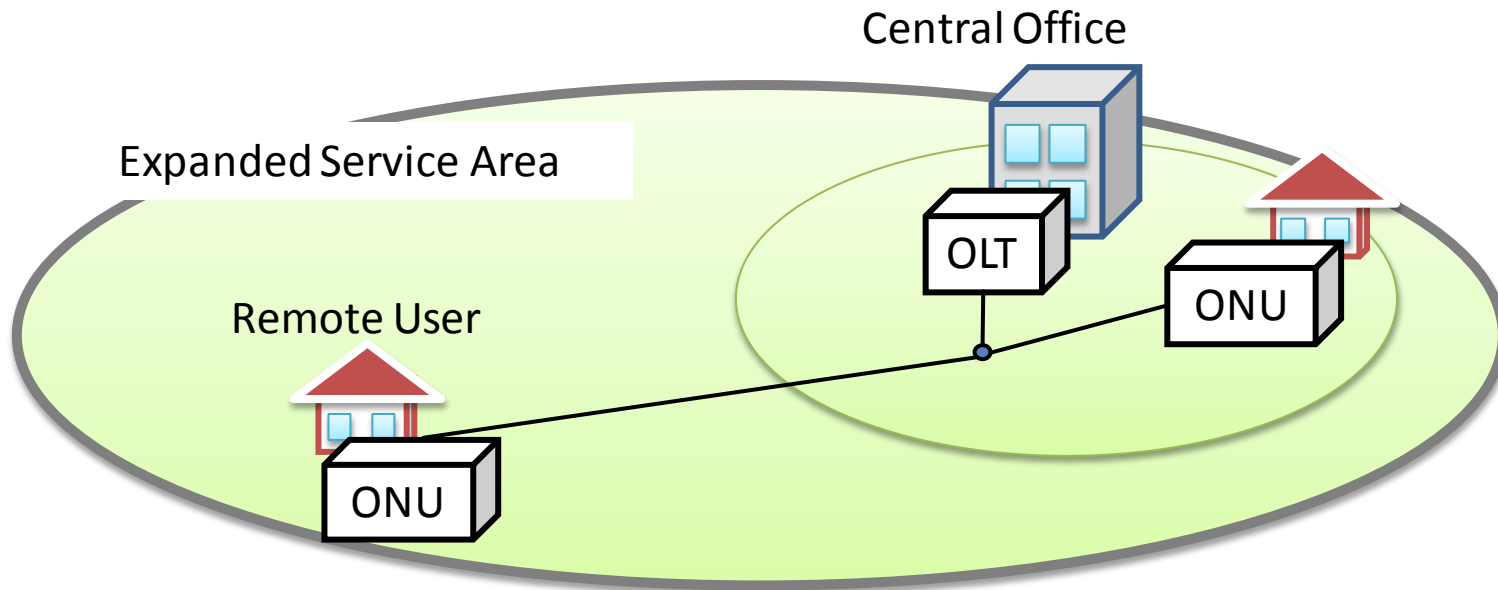
Long reach EPON

- **EPON reach extending with development of optical PON repeater**
 - Expand coverage area
 - Consolidate central offices in urban area



Long reach EPON

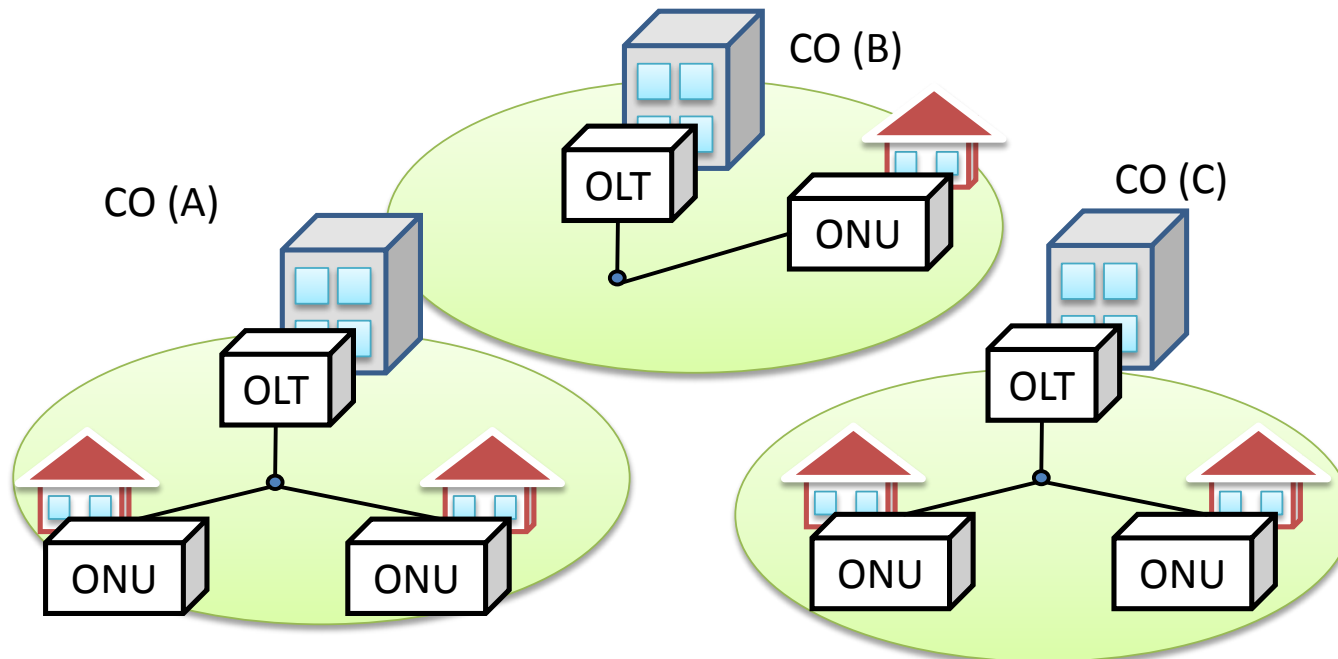
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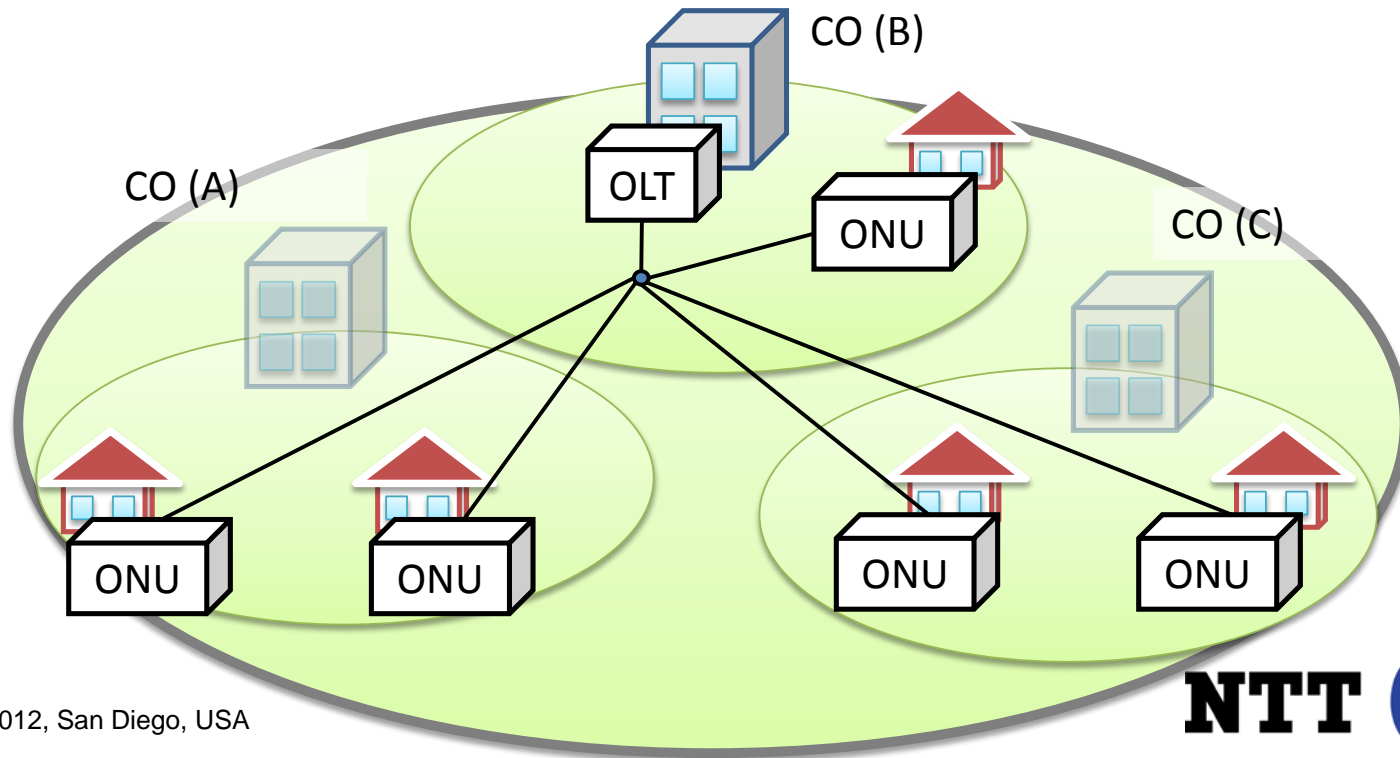
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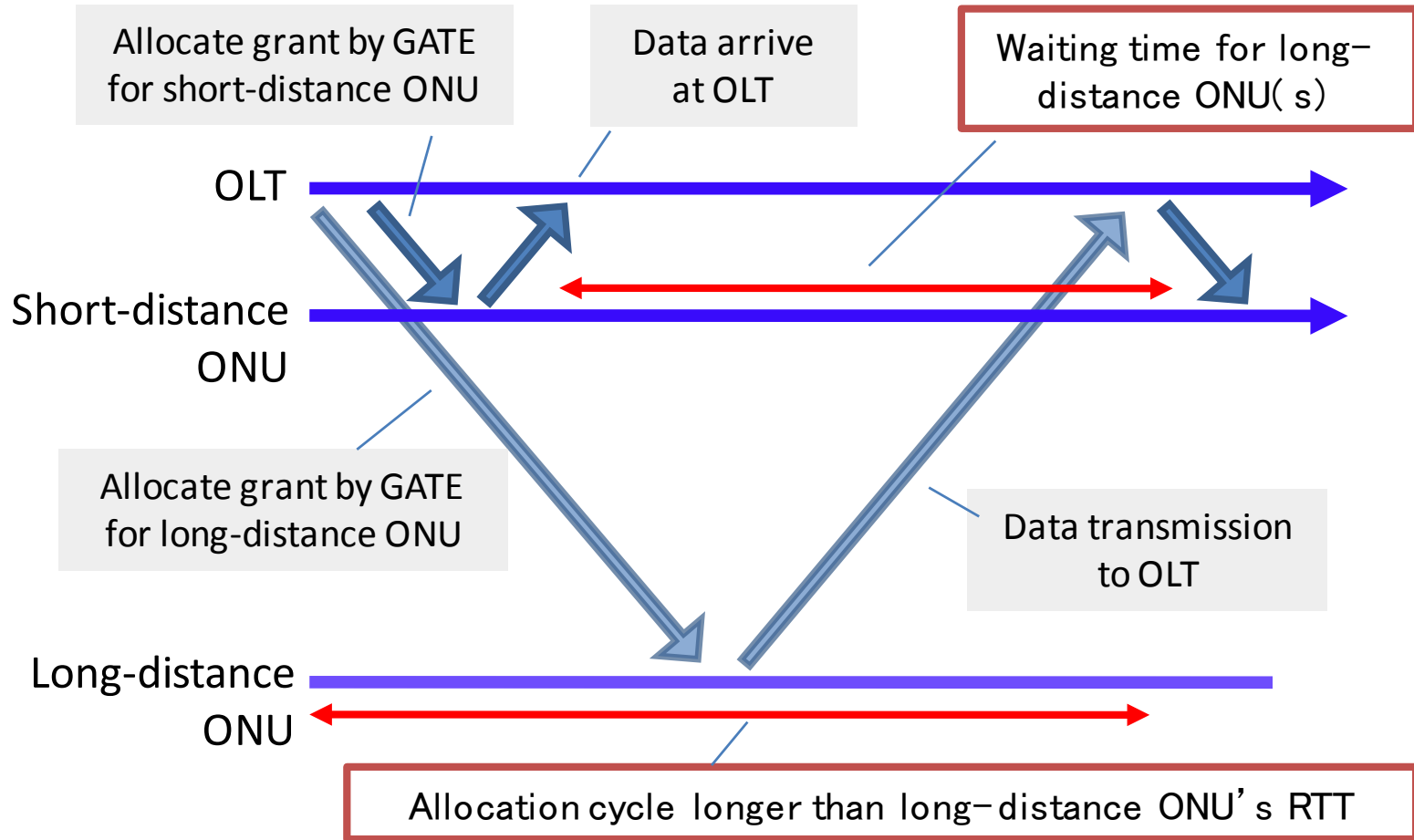
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Latency time increase



Proposal: New DBA for Long Reach EPON

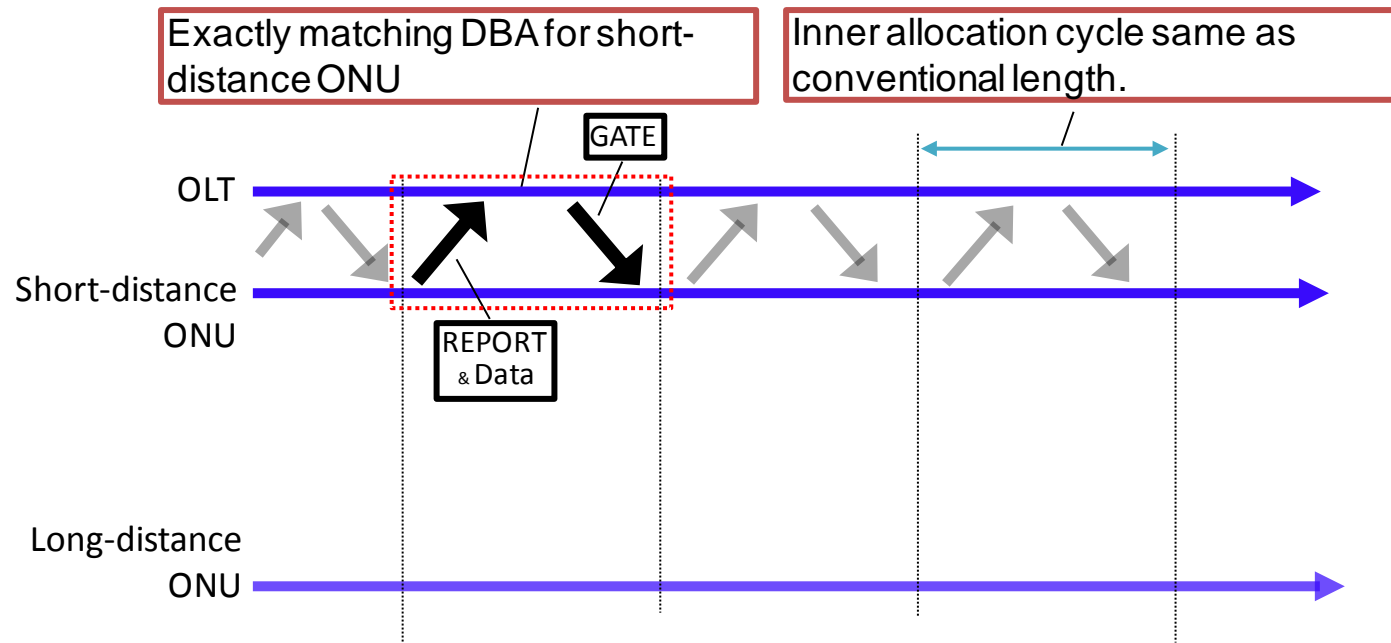
- **Exactly matching and predicting hybrid allocation**
 - Predicting allocation for long-distance ONUs
 - Conventional exactly matching allocation for short-distance ONUs

[Purpose of study]

- ***Reduce latency time of long-distance ONU without affecting short distance ONUs***

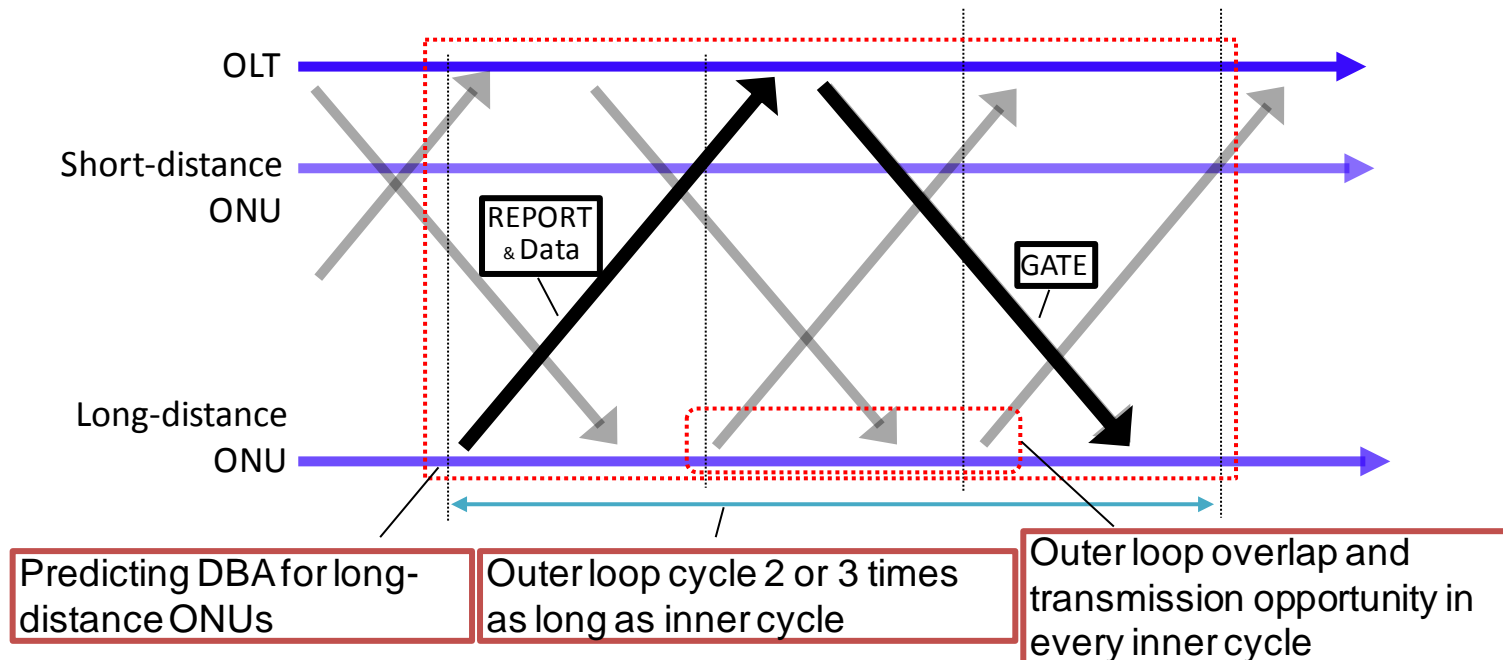
Low Latency DBA for Long Reach EPON

- For short distance ONU, same allocation method and same cycle length



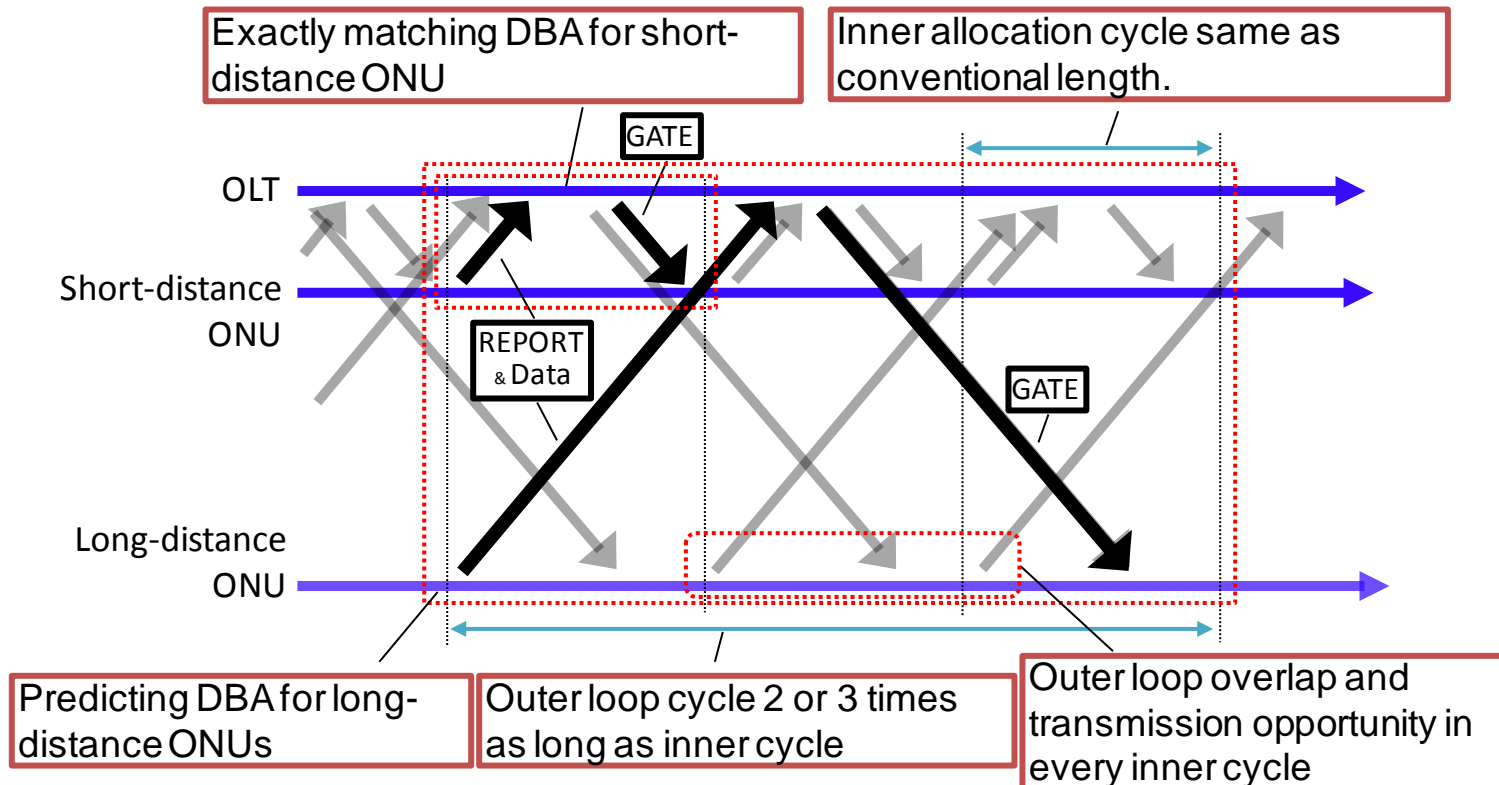
Low Latency DBA for Long Reach EPON

- For long distance ONU, allocation with prediction without affecting cycle length



Low Latency DBA for Long Reach EPON

■ Coexist two types of allocation

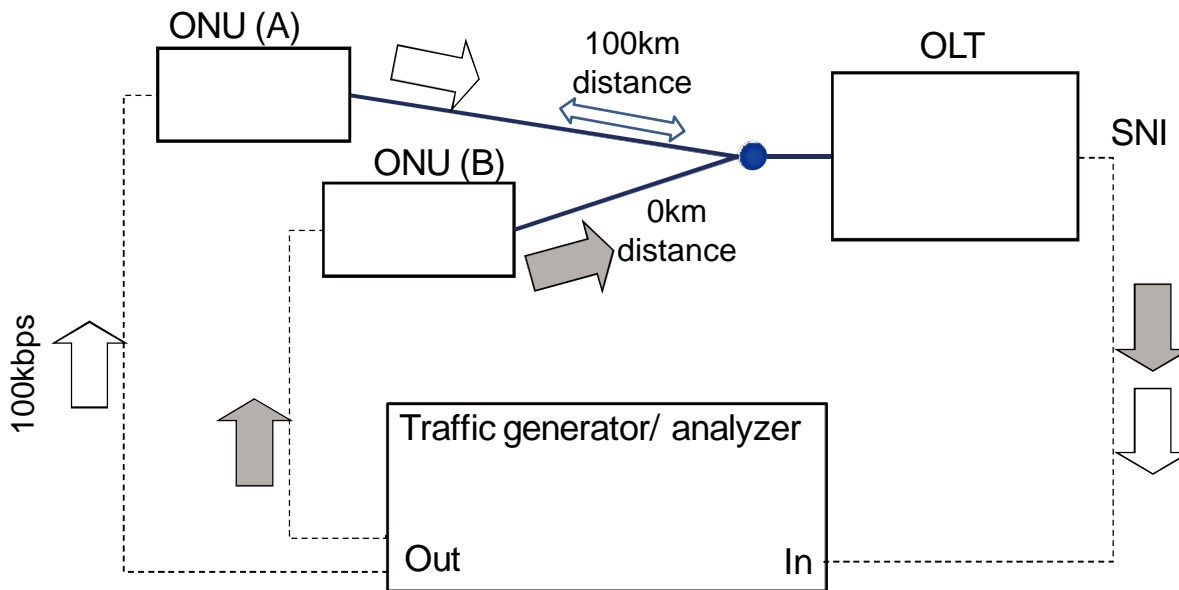


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Experimentation

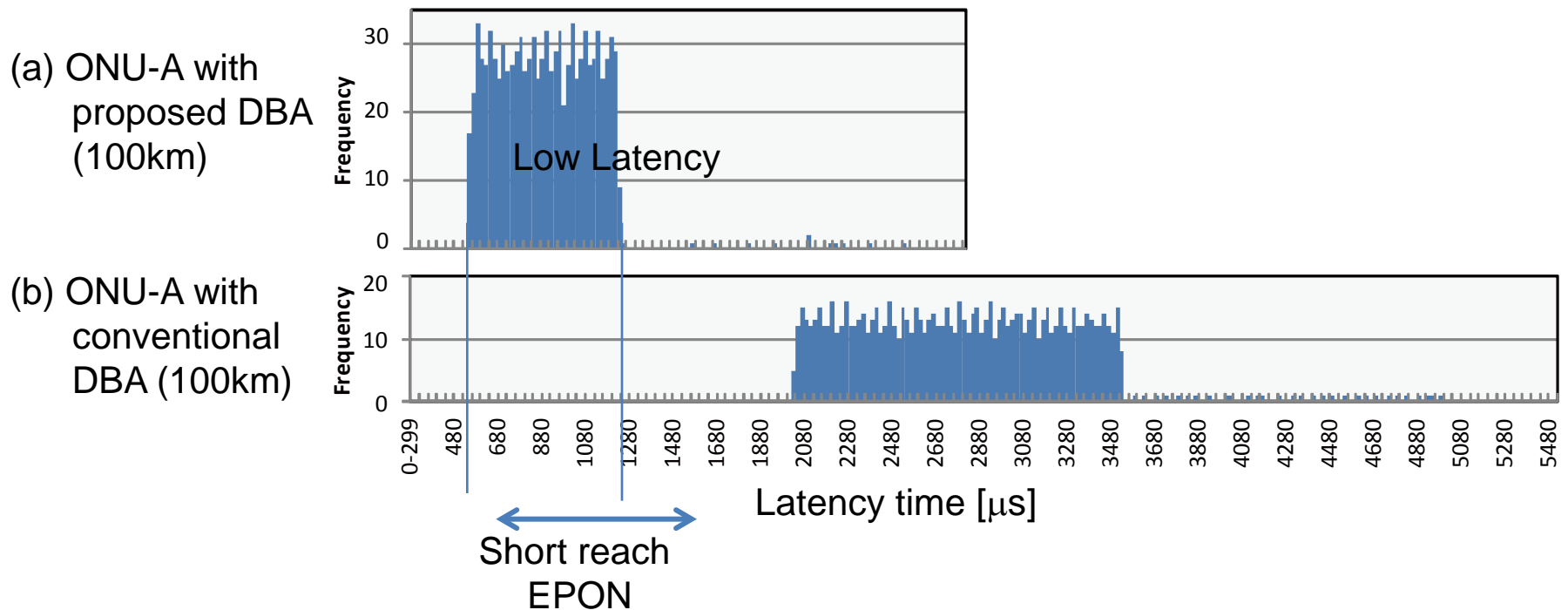
- Transmit 1000 frames and record latency every frame



	Allocation cycle [μ s]
Proposed DBA	700
Conventional DBA (Long reach)	1500
Conventional DBA (Short reach)	700

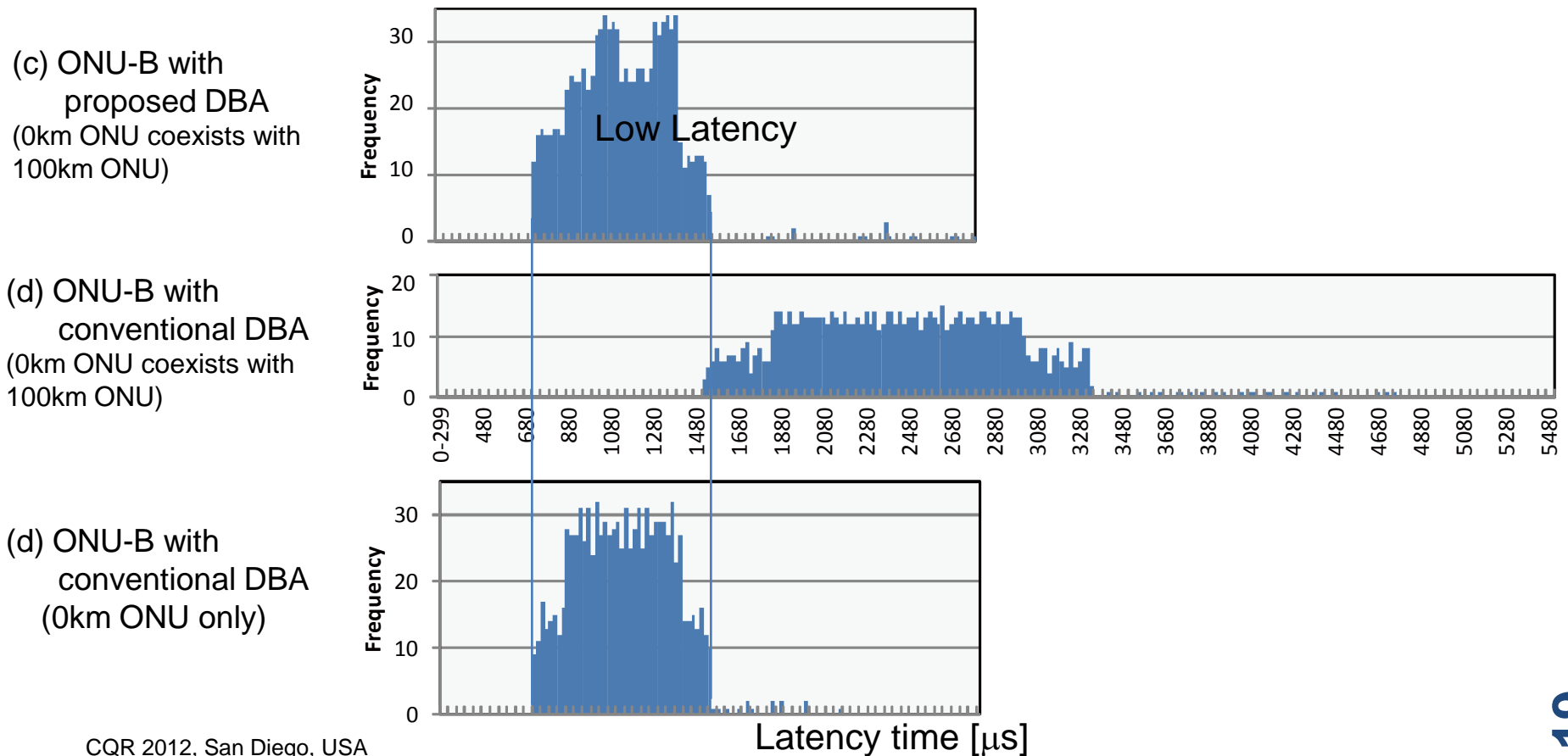
Results -Long-distance ONU-

■ Lower latency time with proposed DBA



Results -Short-distance ONU-

■ No influence on short-distance ONU



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Summary

- **New low latency DBA algorithm for long-reach EPON**
 - Exactly matching and predicting hybrid allocation
 - Keep latency time of 100km long-distance ONUs as long as that of short-reach EPON
 - No influence on short-distance ONUs
 - Effect of proposed DBA experimentally confirmed

Thank you!