

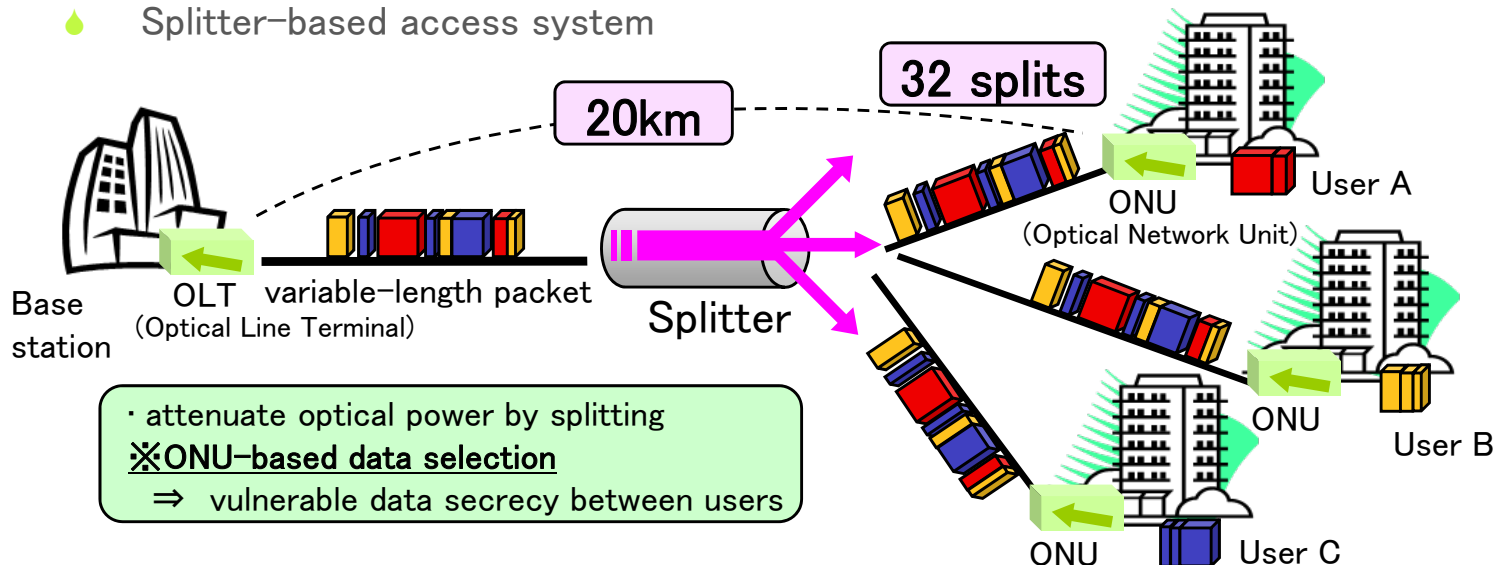
# Scalable Active Optical Access Network using High Speed Optical Switches

Keio University Yamanaka Lab.



## Existing optical access system (PON : Passive Optical Network)

### Splitter-based access system



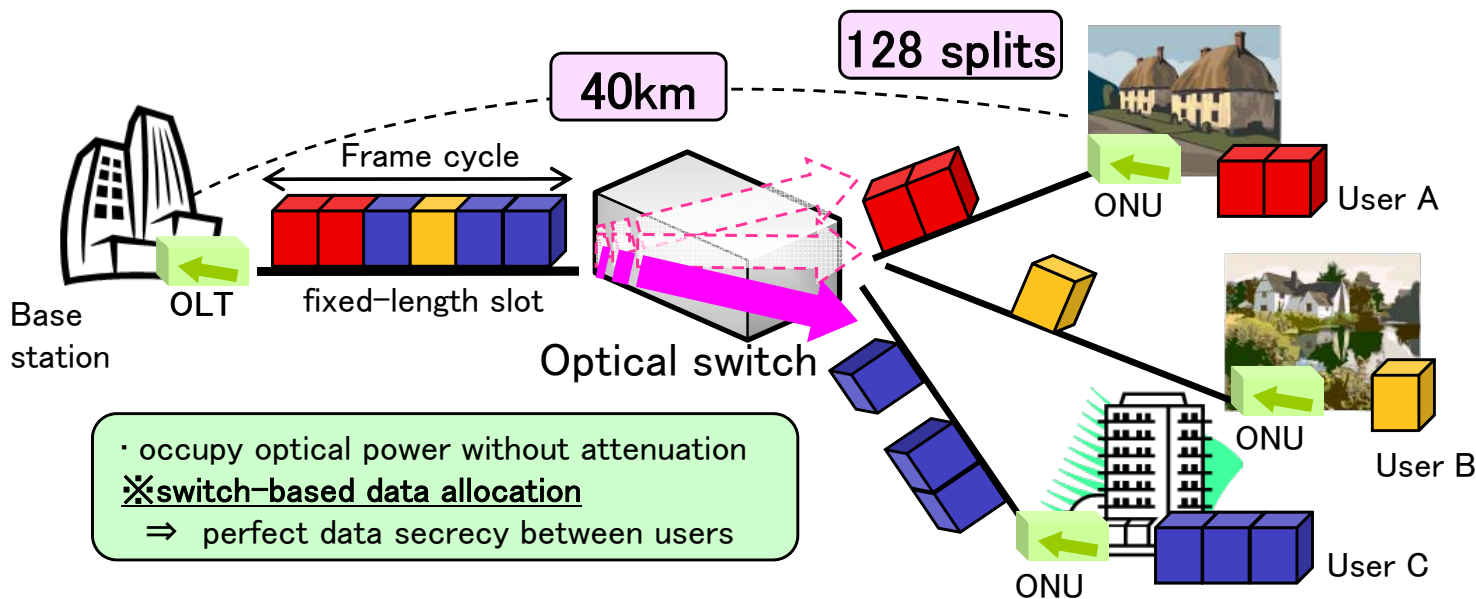
## Proposed ActiON (Active Optical Network) system

### High speed PLZT optical switch-based access system

#### Significant improvement of security

#### Allows extending transmission range & number of users

#### Control protocol compatible with standardizing IEEE802.3av(10GE-PON)

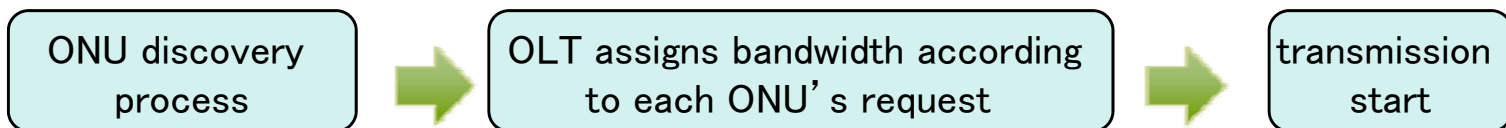


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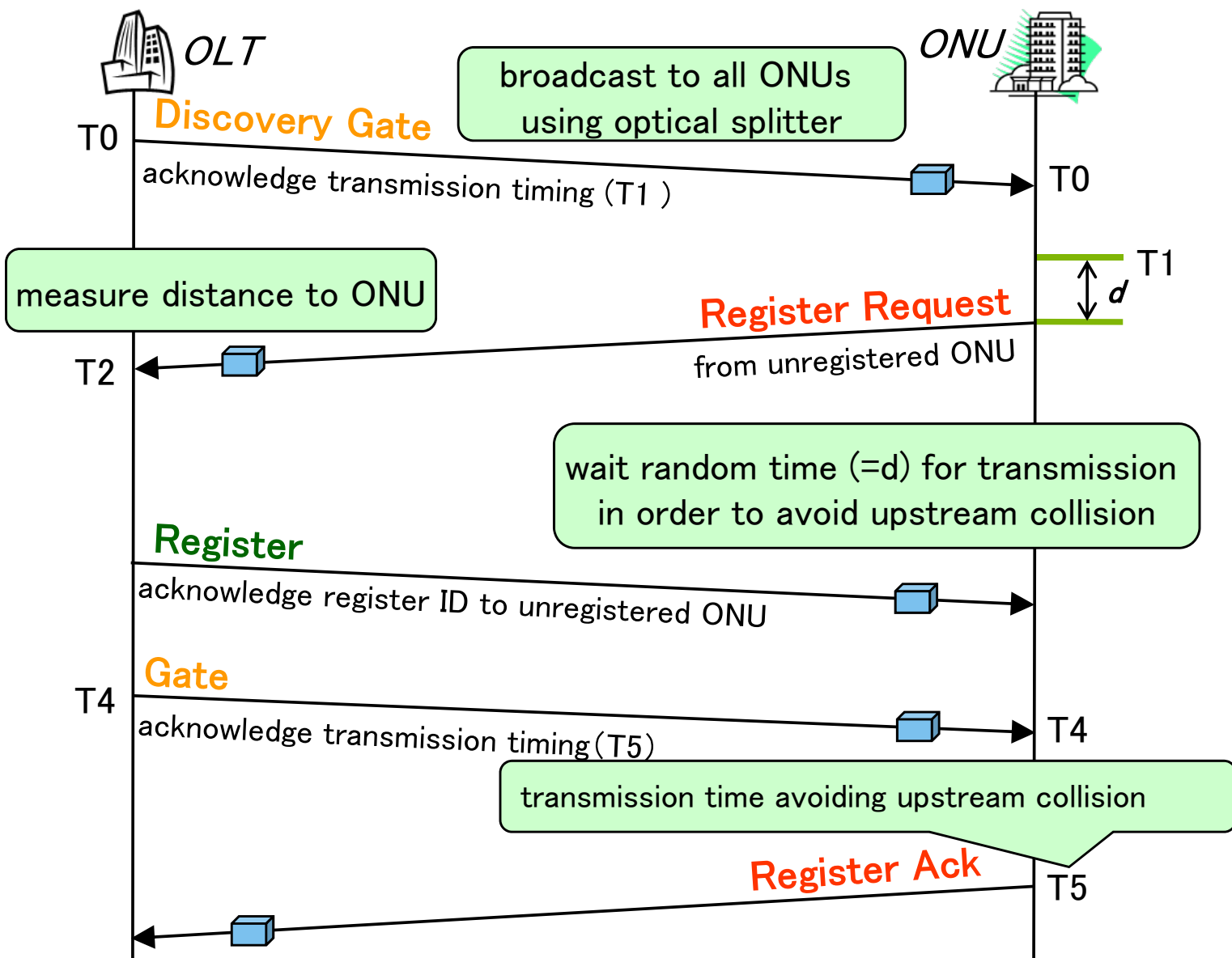
Flows of transmission in existing optical access system(PON)



ONU discovery process

process of discovering powered on ONU and establish communication line

ONU discovery process in PON



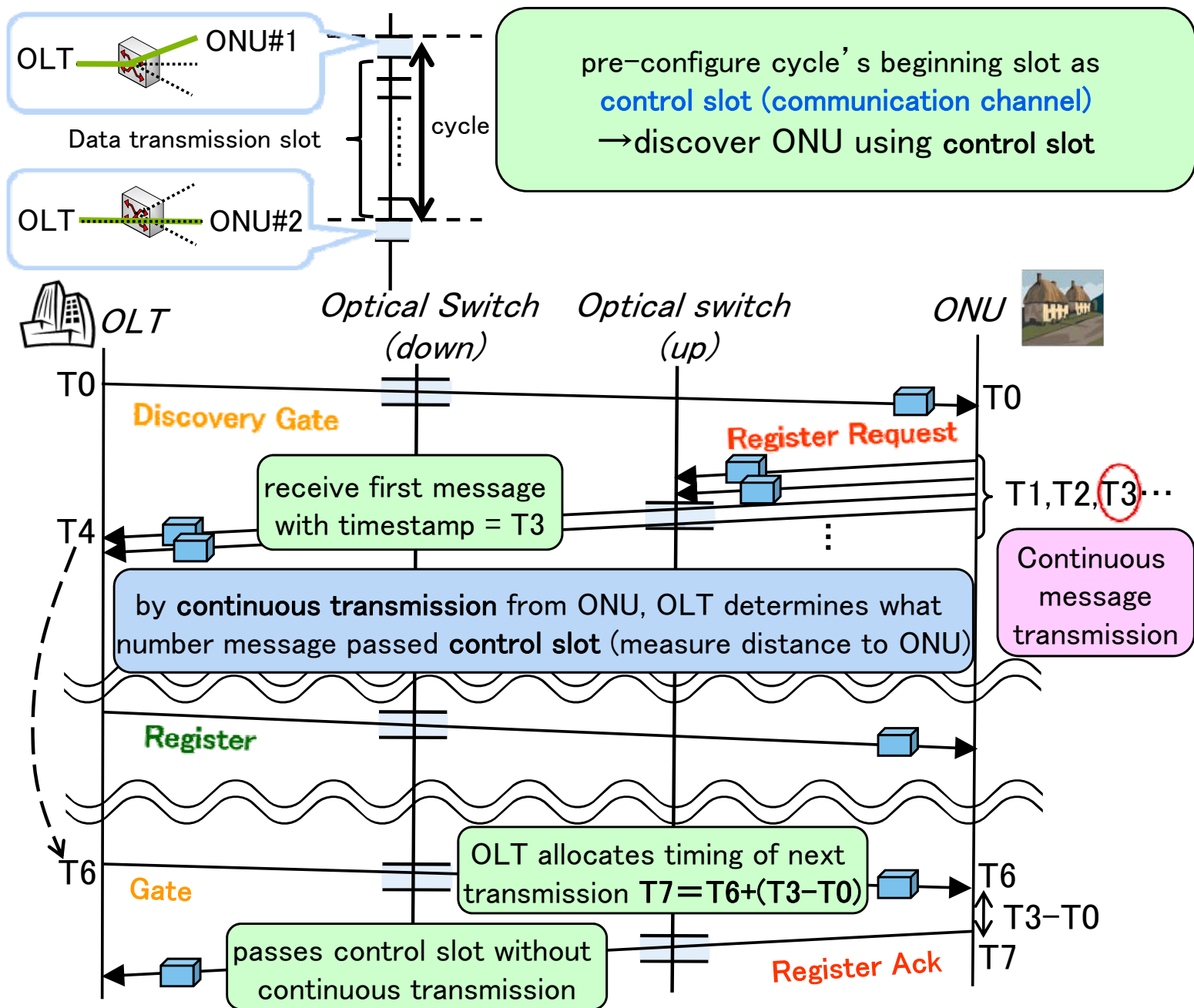
# Scalable Active Optical Access Network using High Speed Optical Switches

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- communication in ActiON
  - broadcast unavailable** due to optical switch
  - transmission system using slot (fixed-length time unit) reservation**
- ONU discovery process in ActiON
  - consider compatibility with standardizing **10GE-PON**

▬ control slot



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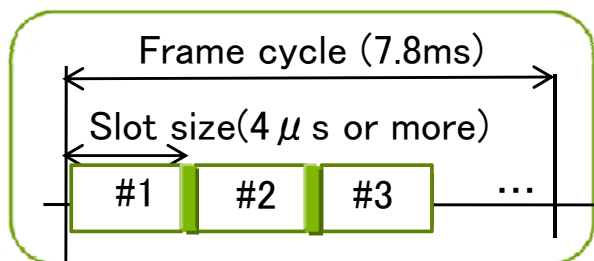
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## ActiON Data Transmission

### Challenge

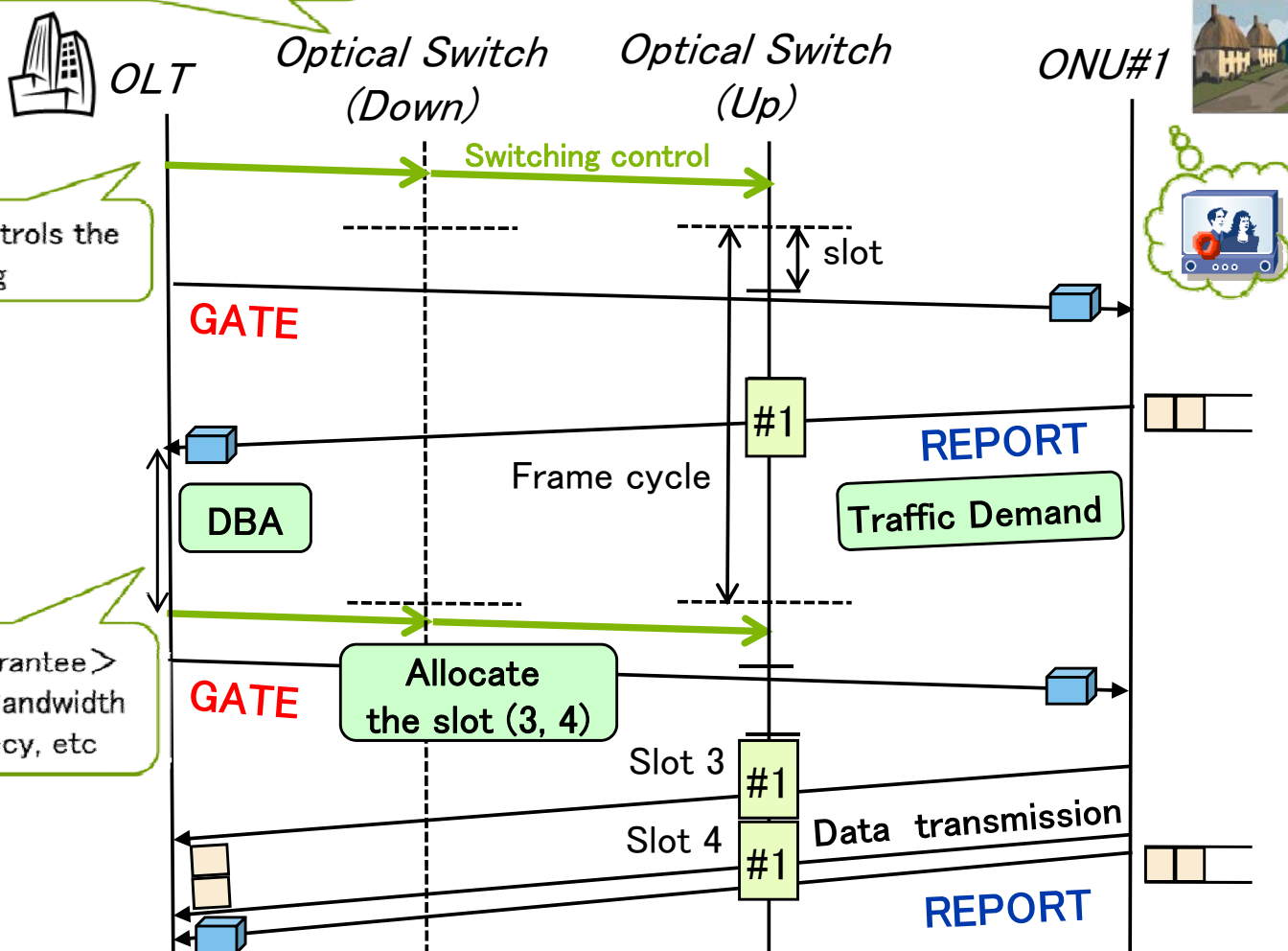
- Parameter design (Frame cycle and Slot size)
- DBA (Dynamic Bandwidth Allocation)
  - OLT allocates bandwidth (slot) according to each ONU's request



<Frame cycle> guarantee TCP throughput considering MPCP protocol

\*MPCP: Multi Point Control Protocol

<Slot size> considering switching guard time



OLT controls the switching

<QoS Guarantee>  
 •Minimum Bandwidth  
 •Low-Latency, etc