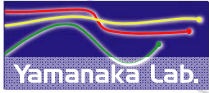


Dynamic Logical OLT Migration in Elastic Lambda Aggregation Network

<http://elan.yamanaka.ics.keio.ac.jp/>



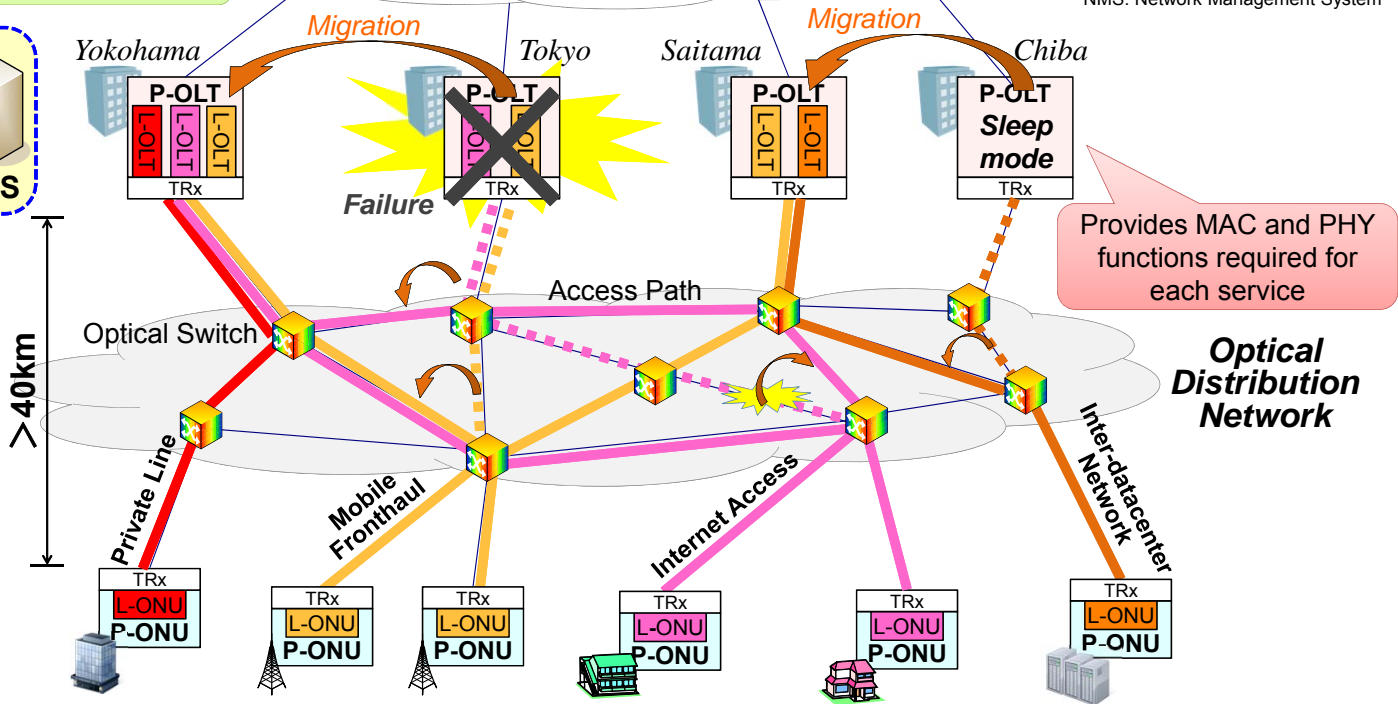
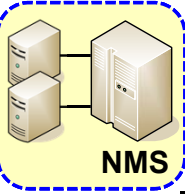
Elastic Lambda Aggregation Network (ELAN)

- Provide several network services that have different protocols and QoS requirements on a single ELAN
- Optical access paths that have flexible bandwidths are set on ODN
- Transmission distance is extended compared to today's access network

Core Networks Private Line Data Center Mobile Internet

OLT: Optical Line Terminal
 ONU: Optical Network Unit
 P-OLT: Programmable OLT
 P-ONU: Programmable ONU
 L-OLT: Logical OLT
 L-ONU: Logical ONU
 TRx: Transceiver
 NMS: Network Management System

Transfer data frame to/from appropriate P-OLTs



Provides MAC and PHY functions required for each service

L-OLT Migration

- Migrate L-OLT from one P-OLT to another (intra/inter central office)
- Reconfigure virtual layer-2 switch and ODN to continue providing same service



Reduction of power consumption

Aggregate L-OLTs to a limited number of P-OLTs and make vacant P-OLTs sleep

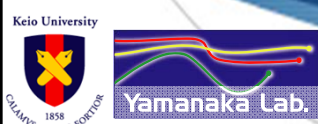
Improvement of disaster tolerance

Recover connectivity of P-ONUs by P-OLT in another area

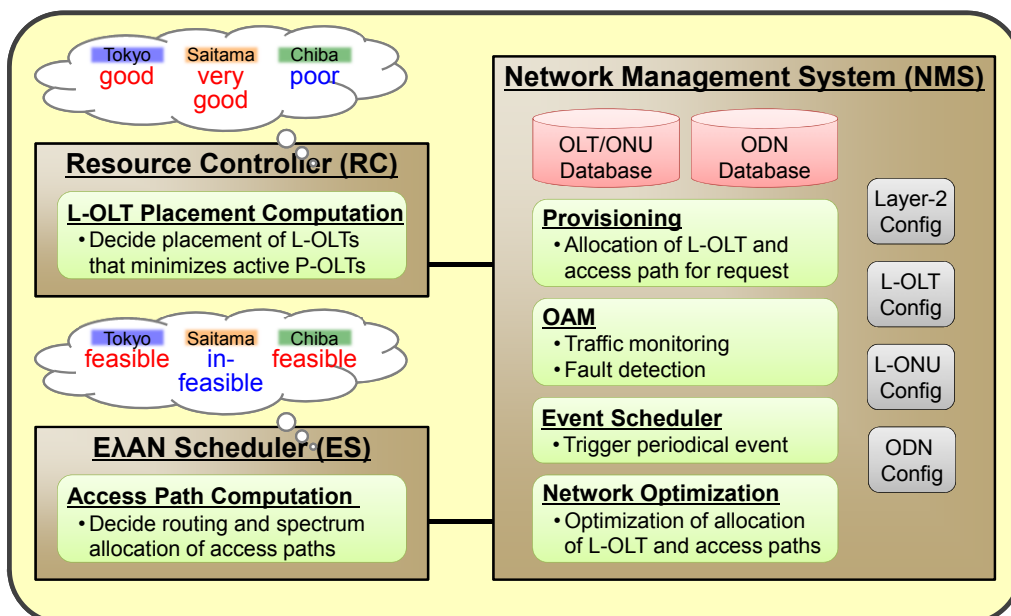
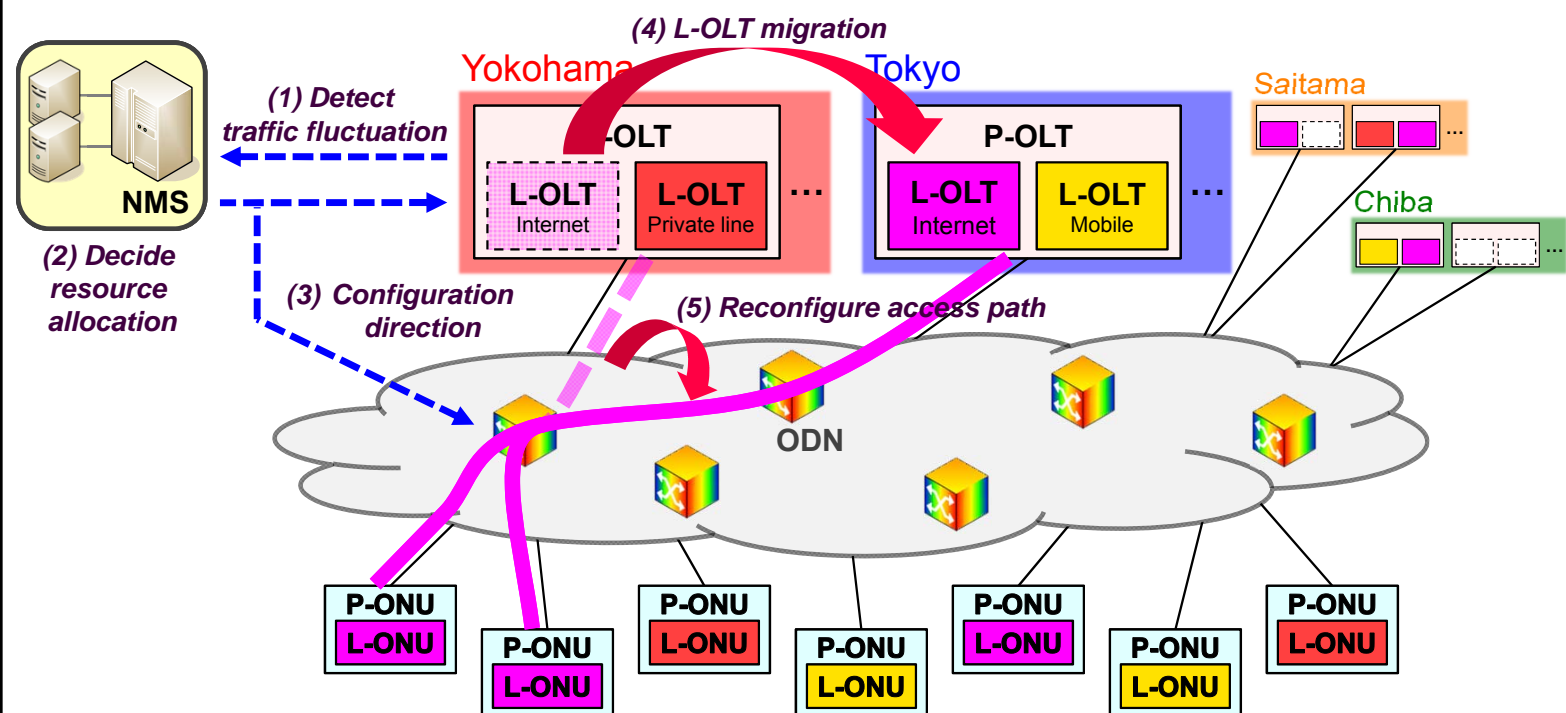
This work is supported by “R&D for Elastic Lambda Aggregation Network”, contract research of National Institute of Information and Communications Technology (NICT) of Japan.

Dynamic Logical OLT Migration in Elastic Lambda Aggregation Network

<http://elan.yamanaka.ics.keio.ac.jp/>



- L-OLT migration is executed according to fluctuation of total traffic amount
- Resource controller (RC) and ELAN scheduler (ES) decide resource allocation
 - RC: Compute placement of L-OLTs that minimizes the number of active P-OLTs
 - ES: Compute routing and spectrum allocation of access paths
- Migrate L-OLTs and reconfigure access paths according to computational result



Cooperation of RC and ES

1. RC computes a candidate of placement of L-OLTs according to the energy-saving policy (minimize active P-OLTs)
2. RC requests ES to compute the routing and spectrum allocation of access paths between L-OLTs and L-ONUs
3. If the feasible route and spectrum allocation is found, the candidate is selected as the solution
4. If there are no feasible solutions, RC computes another placement of L-OLTs

Automatic control of P-OLT and ODN according to traffic fluctuation