

ONF Open Broadband Meetup, 20-05-2022

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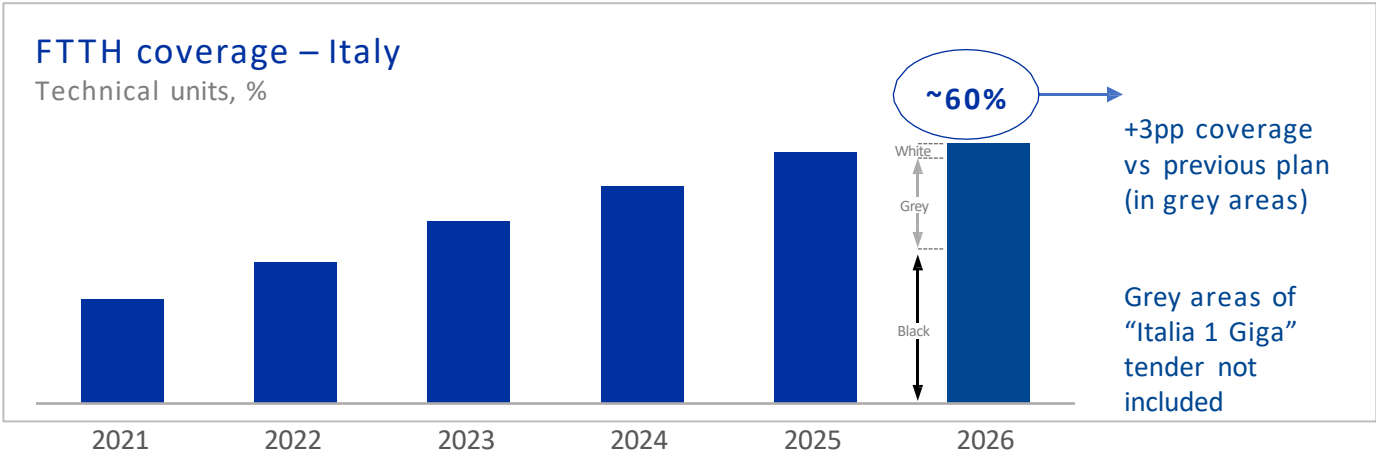
# VOLTHA based TIM dOLT



TIM Innovation

# TIM network evolution trends

**FTTH**  
roll-out  
completed  
by 2026



**FTTH roll-out accelerated**  
leveraging on  
95% FTTC coverage

**Architecture evolution**  
to improve  
performance and  
services

**Associated with a journey**  
to cloud  
based services and  
infrastructure

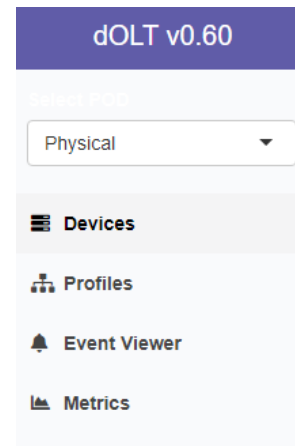
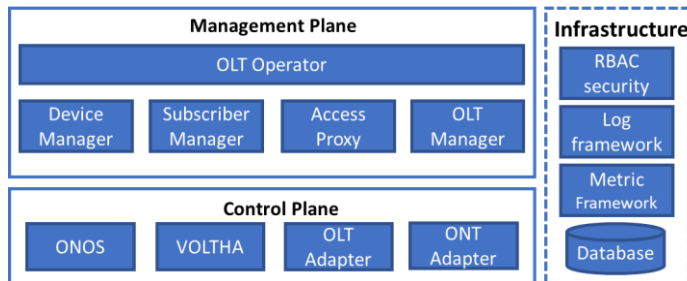
- GPON penetration is already significant, and the market is very mature
- We are mainly focusing on disaggregated OLT approach for XGS-PON deployment on future Telco Edge Clouds nodes

## Disaggregation of access nodes

- TIM is experimenting in its laboratories **access network (fixed and mobile) and local aggregation solutions based on an innovative disaggregated architecture**
- Realization of the functionality of the network nodes using no longer monolithic solutions (large equipment containing many features) provided by traditional vendors, as is currently the case, but a series of distinct and specialized hardware and software components provided by different vendors (concept of disaggregation).
- The **expected benefits** of this approach are mainly:
  - **Increased competition among vendors.** The specialized HW products that make up the disaggregated architecture, being individually simpler, can be made by a greater number of vendors using market chipsets, not proprietary as it is currently.
  - **Greater independence from the vendor with which you started deploying your network.** With a monolithic approach you are obliged to realize HW expansions and SW updates for new features using products from the same vendor; with disaggregation it is possible to use from time to time the products and vendors deemed most appropriate.
  - **Greater uniformity of network management.** Products in disaggregated architecture natively provide for the possibility of being able to install third-party SW, so e.g. operators can use the same management solution even for different HW products. This flexibility also facilitates the implementation of automation scenarios.
- **Main target now is to verify the maturity of the technology and demonstrating possible benefits for TCO reduction**

# TIM dOLT

- Development of a Proof-of-Concept (PoC) demonstrating the **management and control of a programmable OLT (not necessarily whitebox) without the use of proprietary software** but, rather, exploiting the **open source VOLTHA-ONOS** software solution proposed by Open Networking Foundation (ONF) community
- In this solution, the control and management software runs on standard commercial servers with a scalable microservices architecture that allows to benefit from high management flexibility and evolutionary development
- **The solution is designed and developed to be used in an Edge Cloud context** and in particular within the so-called Telco Node in the future network architecture
- The Northbound API of the POC is used to manage and control the system by means of a dedicated GUI or an external SDN controller



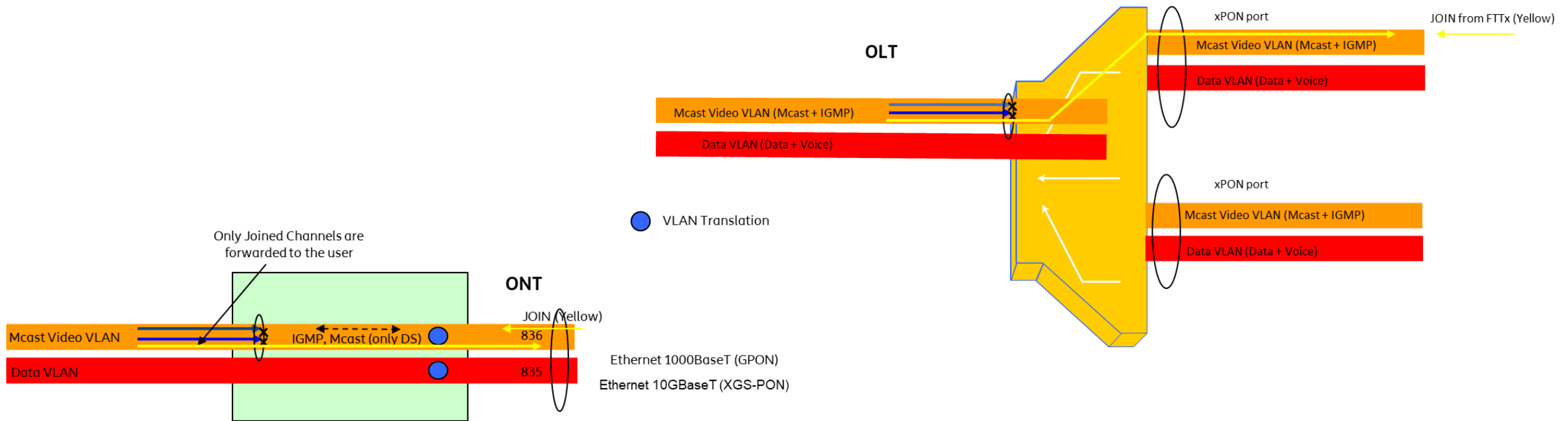
The screenshot shows the "Devices summary" GUI. It has tabs for OLTs, ONTs, and Topology. There is a "+ Add new ONT" button and a search bar. Below the search bar, there is a table of devices with columns for Commands, name, service, serialNo, olt, olt port, Technology Mode, Admin State, Oper Status, and Connect Status. The table shows three entries, all with Admin State "ENABLED", Oper Status "ACTIVE", and Connect Status "REACHABLE".

Commands	name	service	serialNo	olt	olt port	Technology Mode	Admin State	Oper Status	Connect Status
	TIM-ONT-SRC-1	PLATINUM-HSIA	SCOM00028a80	toriital-201	0	gpon	ENABLED	ACTIVE	REACHABLE
	TIM-ONT-ISK-1	PLATINUM-HSIA	ISK71e824c8	toriital-201	1	xgs-pon	ENABLED	ACTIVE	REACHABLE
	TIM_ONT_SRC_2	PLATINUM-HSIA	SCOM00028aa3						



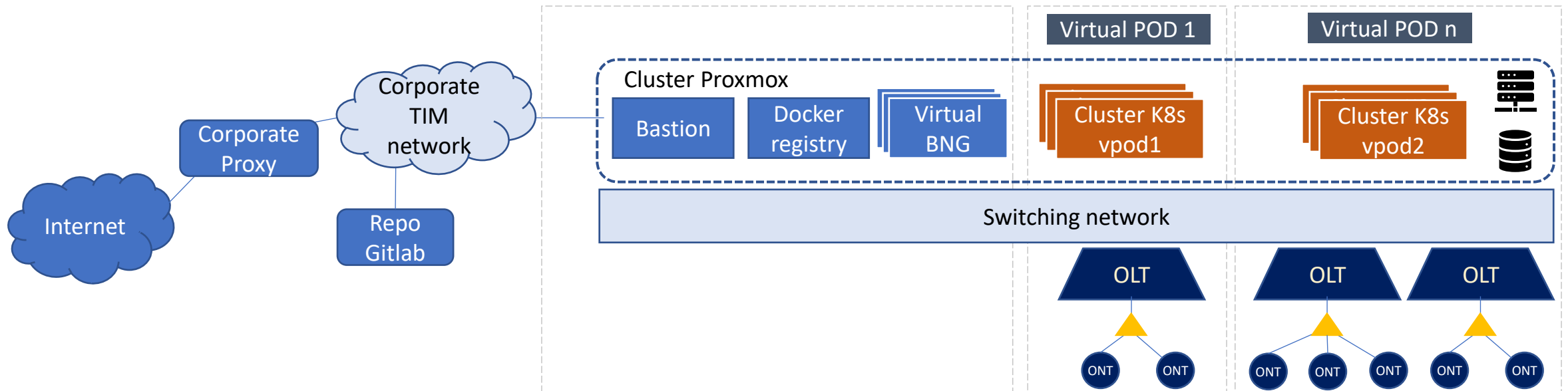
# TIM service model

- TIM service model for FTTH residential customer is quite different from the service models that were supported by older VOLTHA releases
  - TIM is not adopting a double tagged VLAN scheme but a **single VLAN scheme** in which the OLT has to be transparent and the ONT must be able to translate VLAN
  - A **PPPoE IA function** is needed with proprietary configuration
- **Modifications done on VOLTHA 2.8 to support our service model are now part of VOLTHA 2.9**



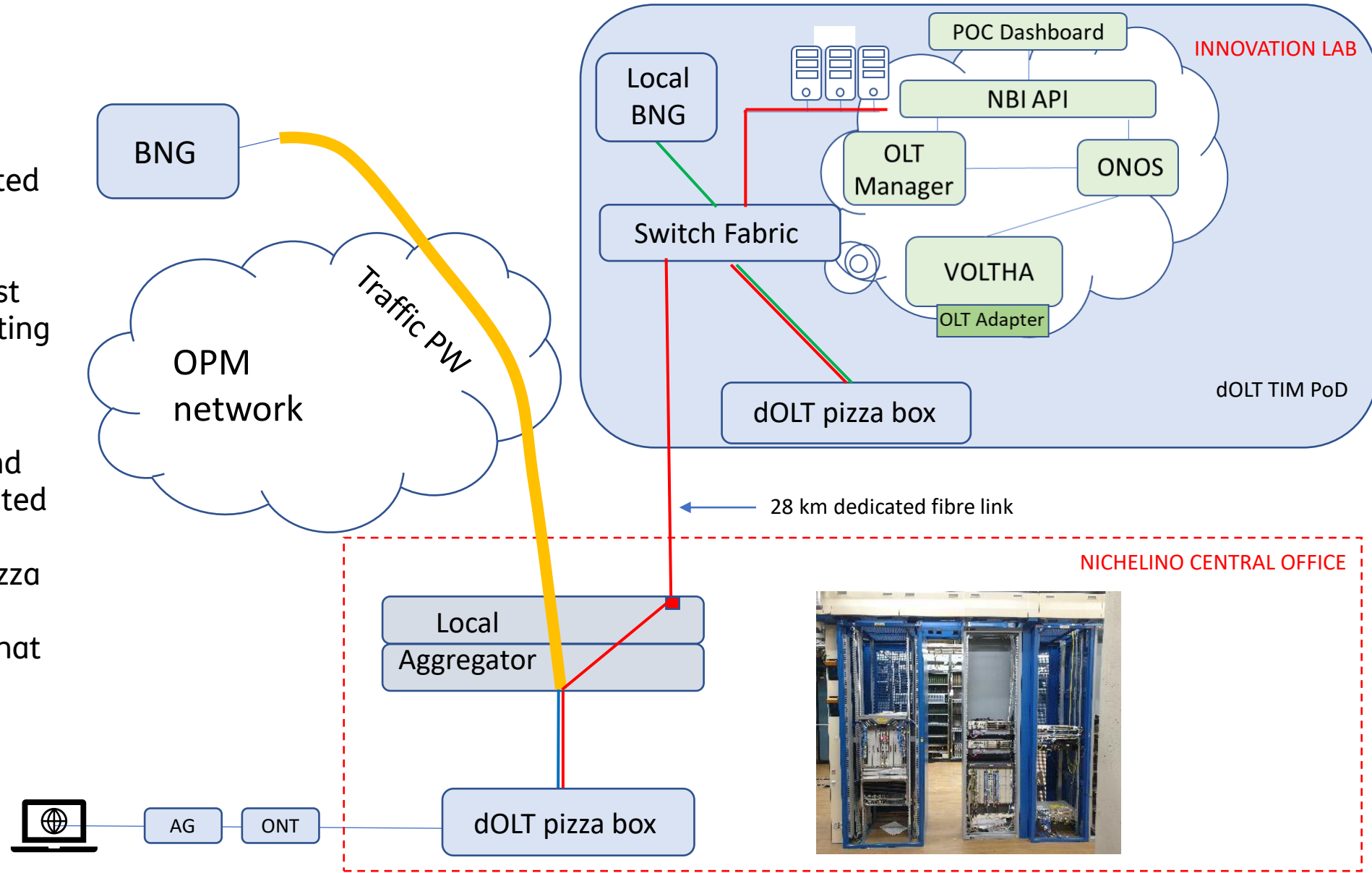
# Lab POD

- Different PODs each of which includes:
  - A Kubernetes cluster on which all the dOLT microservices are running
  - The kubernetes cluster is installed on 3 virtual machines installed in a proxmox virtualization environment
  - **Each POD has at least one HW OLT** with the possibility to easily switch different OLTs and ONTs among the PODs
  - The virtualization environment, the 3 physical servers and the OLTs are connected to each other by a switching infrastructure, partly physical and partly virtualized (on a Proxmox platform). The switching infrastructure hosts the network for the management of all POD resources, the network for control plane traffic and the network for data plane traffic, each on a separate VLAN for each POD
- VOLTHA 2.8 & VOLTHA 2.9



# Field trial

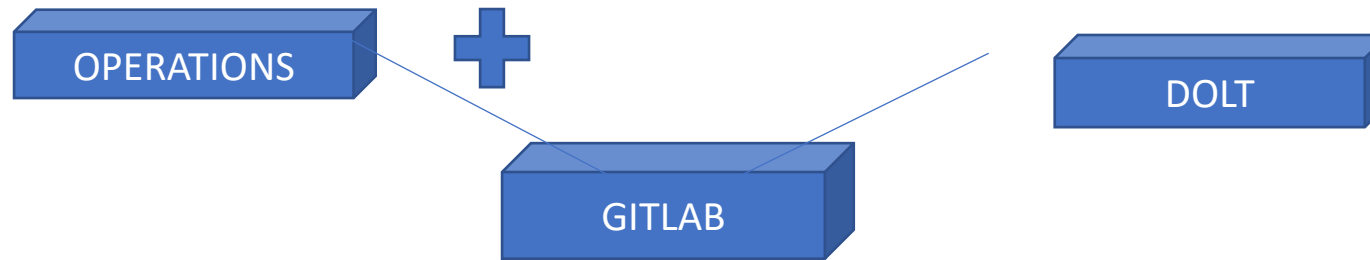
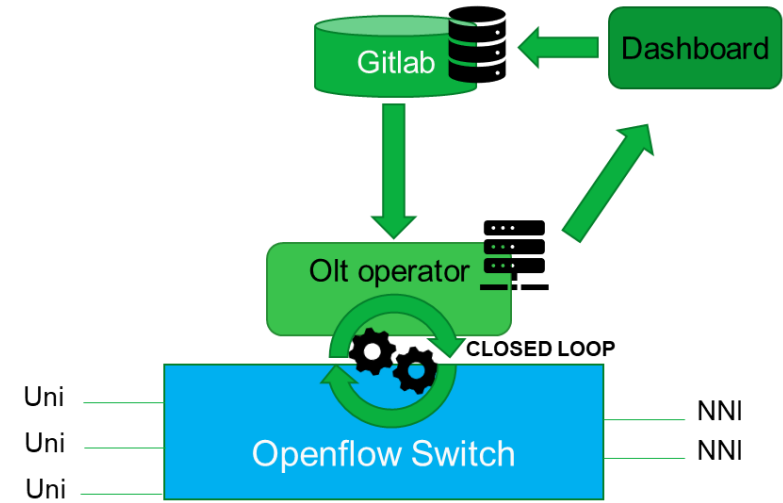
- Flexibility of the disaggregated approach allows to build “distributed OLTs” installing dOLT HW and SW in the best places according to the existing network infrastructure
- In this case the dOLT SW and one dOLT pizza box are located in the Innovation TIM site in Torino and another dOLT pizza box is installed in a remote Central Office in Nichelino that is 28km far away



# TIM dOLT 2022 activities

We are working on the following tasks:

- Migration to [VOLTHA 2.9](#)
- Develop a [Robot Test suite for TIM service model](#)
- Integrate [OLTs from different vendors](#)
- Integration of “not out of production” [XGSPON ONTs](#) or better AGs
- [Development of operational use cases](#)



Demonstrate with some use cases the main advantages (and maybe disadvantages) that occur in daily operations by adopting the GitOps paradigm, made possible by the disaggregation of access nodes



THANKS