

TATA TRUSTS

GPON Network for WiFi based Internet Access


Powered by



PRODUCTS

Mini-OLT : TJ1400-1 8P OLT : FIXED 1RU

- Compact 1RU platform having 8 x2.5 GPON Ports.
- In 1RU, 1000 terminal connections possible using 1:128 split.
- Integrated with backhaul to reduce equipment footprint and reduce TCO.
- Redundant AC/DC Power Supply.
- 4x1GE (SFP)+2x10GE (SFP+) SNI port for 8Ports.

| | |
|----------------------------|---|
| Product |  |
| Functionality | GPON 8xOLT with L2 switch – 2x10G SNI |
| Redundancy | PSU(AC + AC or DC+DC) |
| Uplink (SNI) | 2x10GE+4xGE |
| PON Ports (Max) | 8x2.5 |
| GE Ports (Max) | 2 (xSFP+)+4xSFP |
| Temperature range | 0 to 65 degC |
| Power | Maximum = 70 W |
| Physical Dimensions | 44x414x204 (mm) (1RU) |

TJ2100-20PS4 Industrial ONT



TJ2100N-20PSW (Variant of ONT 20PS)

- Supports **Wi-Fi** with 802.11a/b/g/n/AC (20/40/80 Mhz).
- Supports enhanced Wi-Fi coverage in the premises supported by intelligent **mobile app** (for field force).
- Beam forming
 - Helps high-quality video streaming.
- Power : -48V for 4xPoE/PoE+ for Wi-Fi, Kiosks.
- 65oC Support.
- Packaging for rugged industrial applications (DIN Rail mounting).
- Reverse PoE (RPoE) for corridor/basement installations (Ports 1 to 4), where power points could be scarce. Using RPoE, ONTs can be powered from Subscriber power supply.
- Up to 256 GEM Ports.
- Mixed mode Support (RGW/SFU).
- Sweet spotted for supporting 4xANPR Cameras powered by PoE ports for Video Surveillance & IoT.

Ruckus Access Point - T310 SERIES

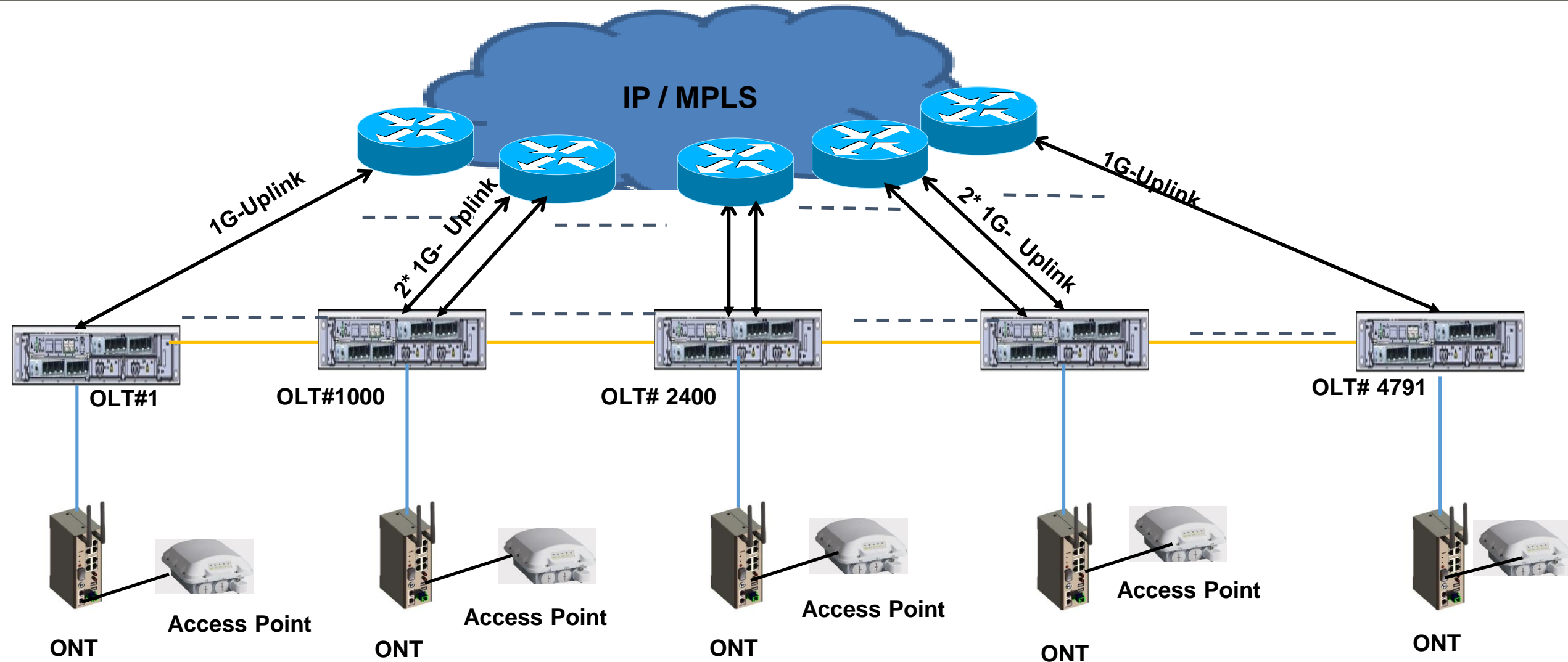
| | |
|---------------------------------|--|
| Wi-Fi Standards | <ul style="list-style-type: none">• IEEE 802.11a/b/g/n/ac Wave 2 |
| Supported Rates | <ul style="list-style-type: none">• 802.11ac: 6.5 to 867 Mbps (MCS0 to MCS9, NSS=1to2 for VHT20/40/80)• 802.11n: 6.5 Mbps to 300Mbps (MCS0 to MCS15)• 802.11a/g: 54, 48, 36, 24, 18, 12, 9, 6Mbps• 802.11b: 11, 5.5, 2 and 1 Mbps |
| Supported Channels | <ul style="list-style-type: none">• 2.4GHz: 1-13• 5GHz: 36-64, 100-144, 149-165 |
| MIMO | <ul style="list-style-type: none">• 2x2 SU-MIMO• 2x2 MU-MIMO |
| Spatial Streams | <ul style="list-style-type: none">• 2 SU-MIMO• 2 MU-MIMO |
| Radio Chains and Streams | <ul style="list-style-type: none">• 2x2:2 |
| Channelization | <ul style="list-style-type: none">• 20, 40, 80MHz |
| Security | <ul style="list-style-type: none">• WPA-PSK, WPA-TKIP, WPA2 AES, 802.11i, Dynamic PSK• WIPS/WIDS |
| Other Wi-Fi Features | <ul style="list-style-type: none">• WMM, Power Save, Tx Beamforming, LDPC, STBC, 802.11r/k/v• Hotspot, Hotspot 2.0• Captive Portal• WISPr |



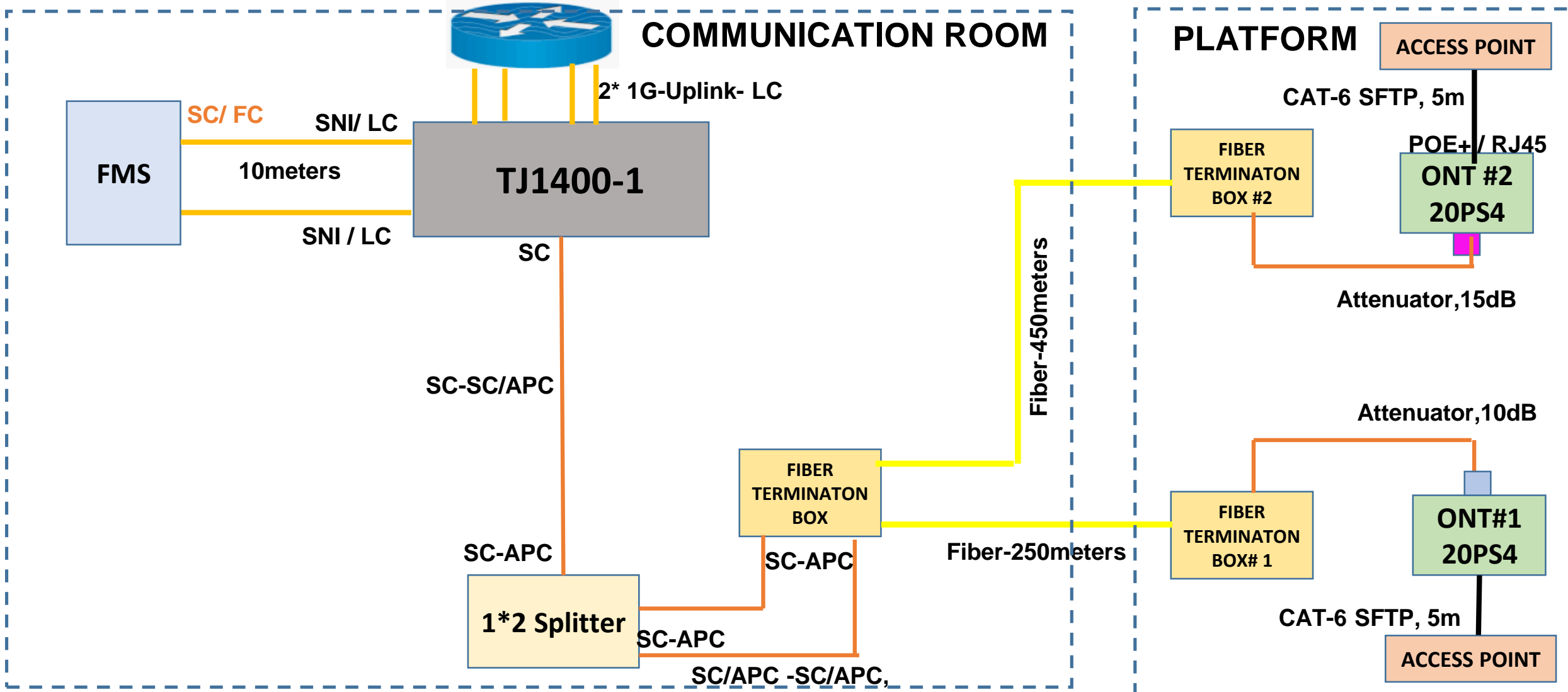
**Includes Cloud-based
Wireless Link Controller**

NETWORK ARCHITECTURE

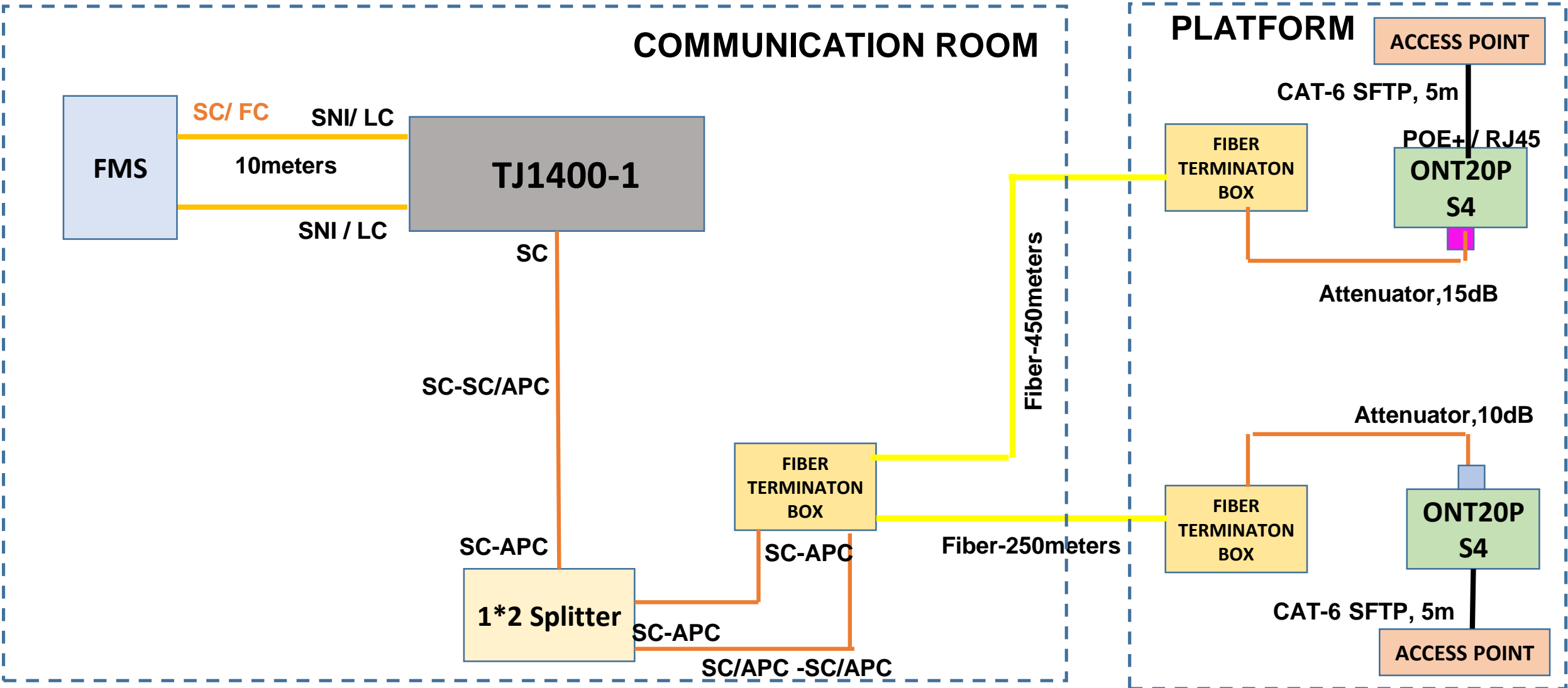
GPON –OLT –ONT NETWORK.



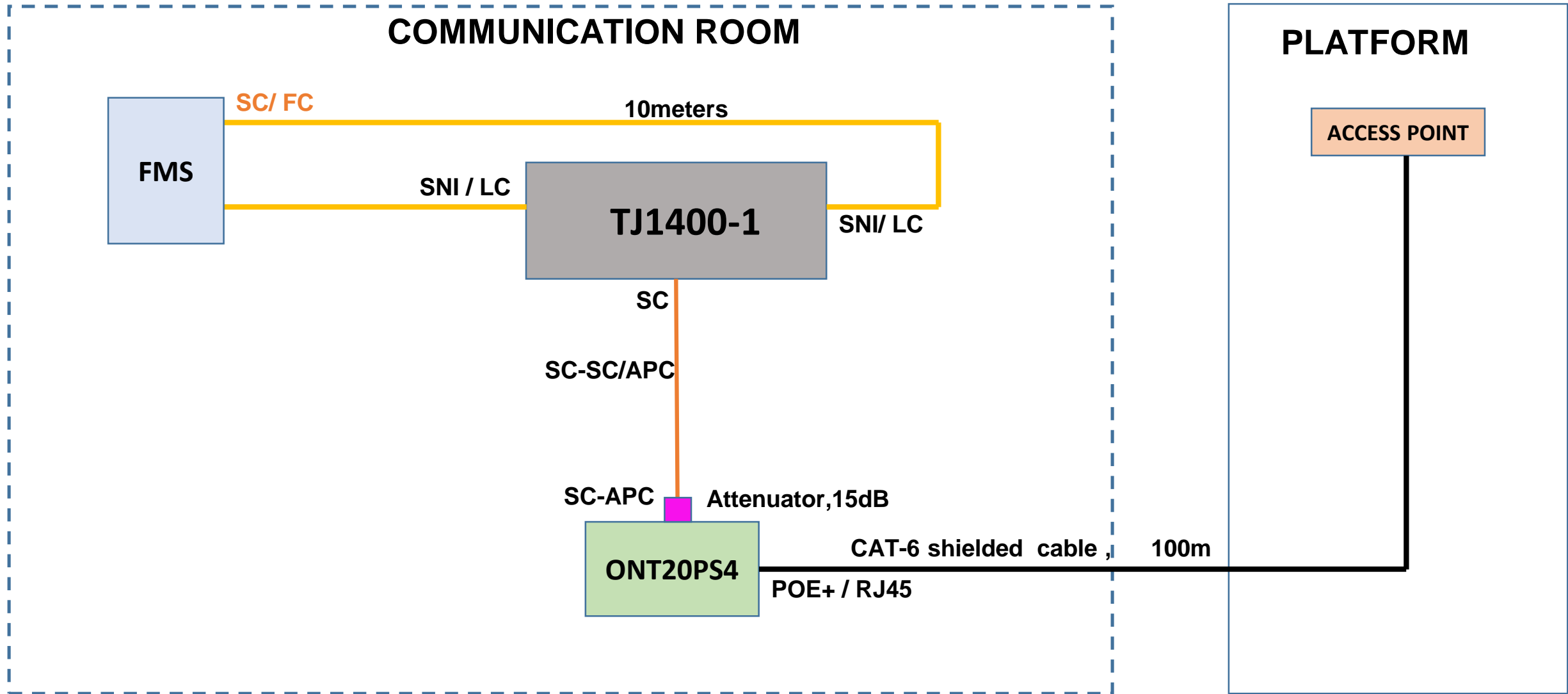
CATEGORY -B & C-POP STATIONS -TOTAL -201



CATEGORY –B & C-NON -POP STATIONS -TOTAL -430



SCENARIO -3 : CATEGORY -D & E STATIONS -TOTAL -4160



NETWORK PROTECTION SCHEME

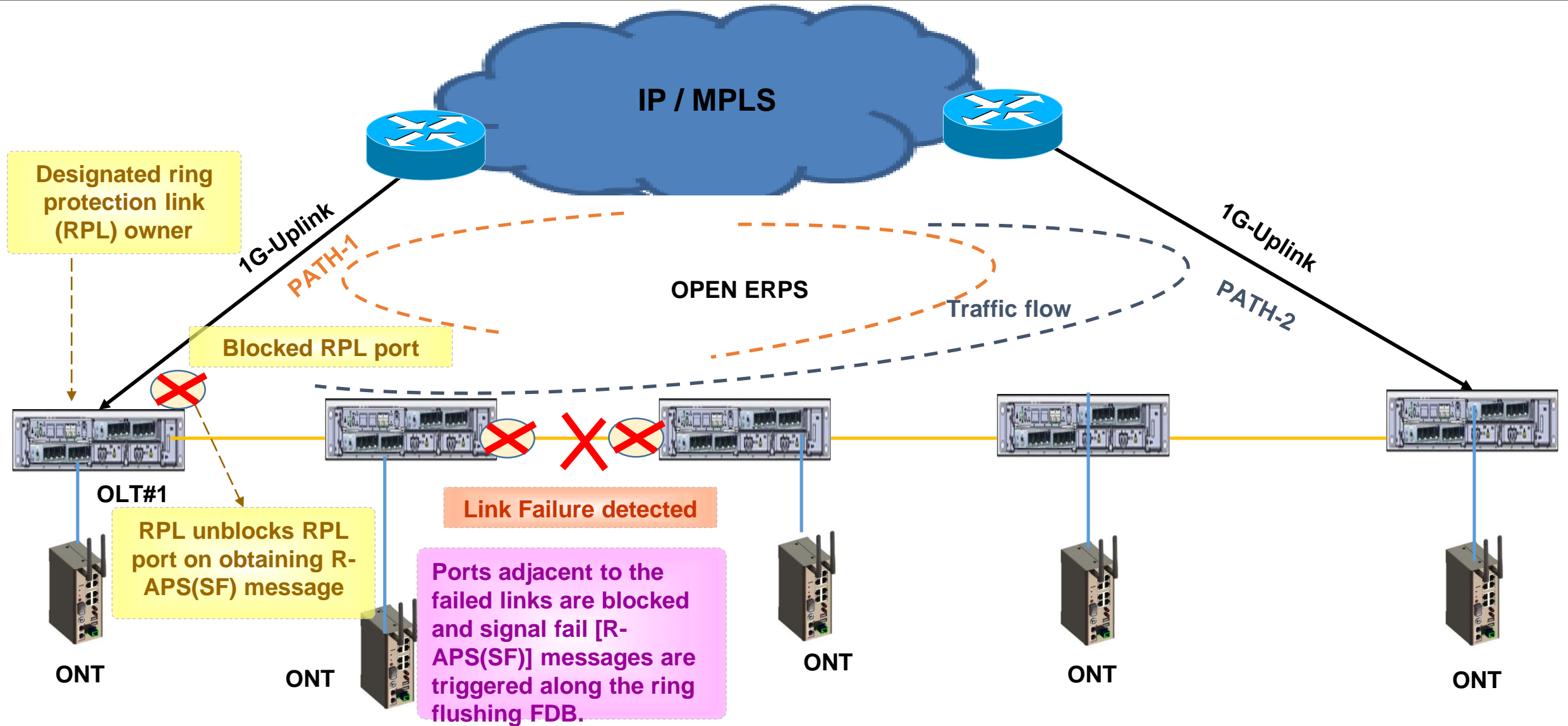
NETWORK -SNI PROTECTION SCHEME

- 1) OLT-OLT- layer: OLT –OLT –Service Network Interface(SNI) layer is protected by using OPEN ERPS.
- 2) Ethernet Ring Protection Switching(ERPS): ERPS-G.8032 - Provides fast protection switching and recovery for Ethernet traffic , at the same time ensuring that there are no loops formed at the Ethernet.
- 3) Open ERPS ensures switching in OLT layer is not depended on
- core IP/MPLS domain.
- 4) From an operational perspective, the maximum number of nodes supported should be in the range of 16 to 255 nodes.

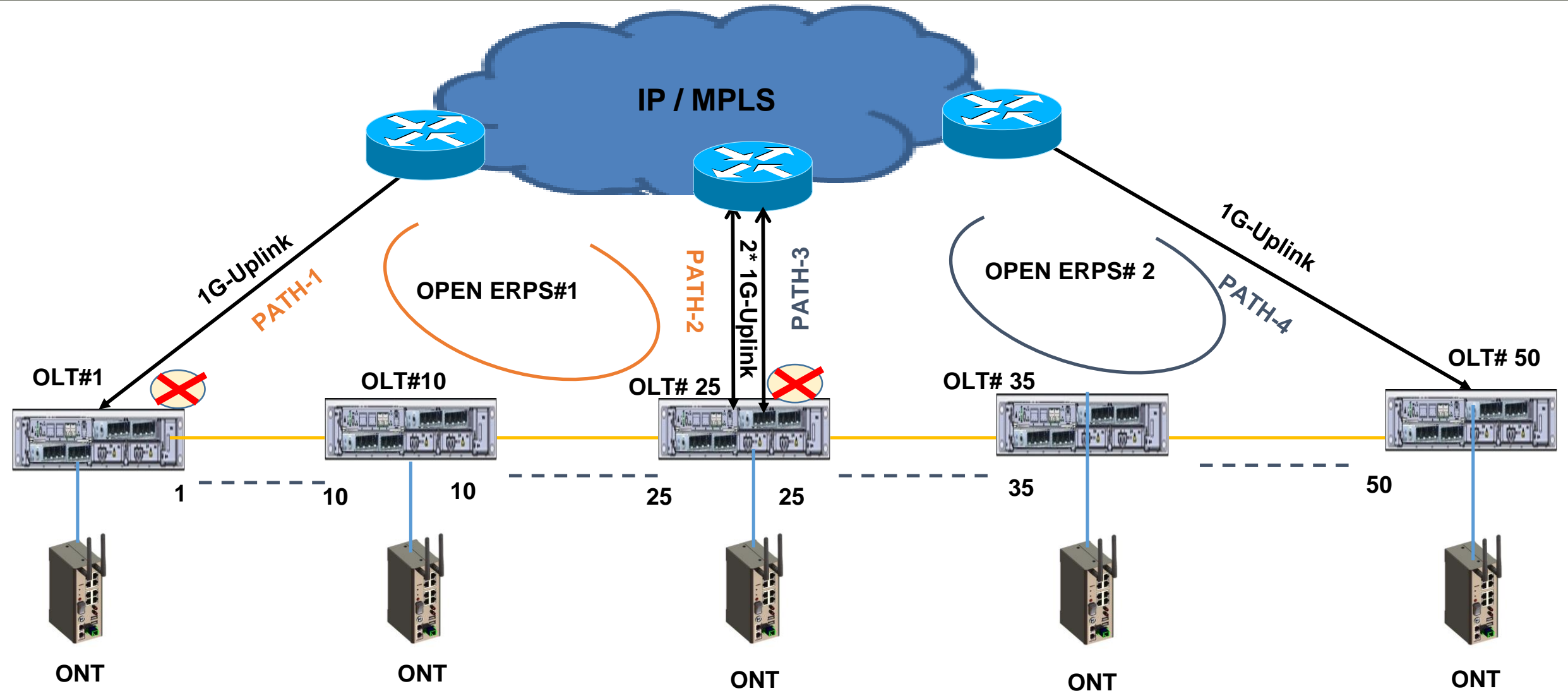
OPEN ERPS RING

- ERP guarantees lack of loop by blocking the RPL
- Each link is monitored by its two adjacent nodes using ETH OAM messages-CCM
- Signal Failure is trigger to ring protection:
 - Loss of Continuity
 - Fiber cut.
- Link/node failure is detected by the nodes adjacent to the failure
- The nodes adjacent to the failure, block the failed link and report this failure to the ring using R-APS (SF) message
- R-APS (SF) message triggers:
 - RPL Owner unblocks the RPL
 - All nodes perform FDB flushing

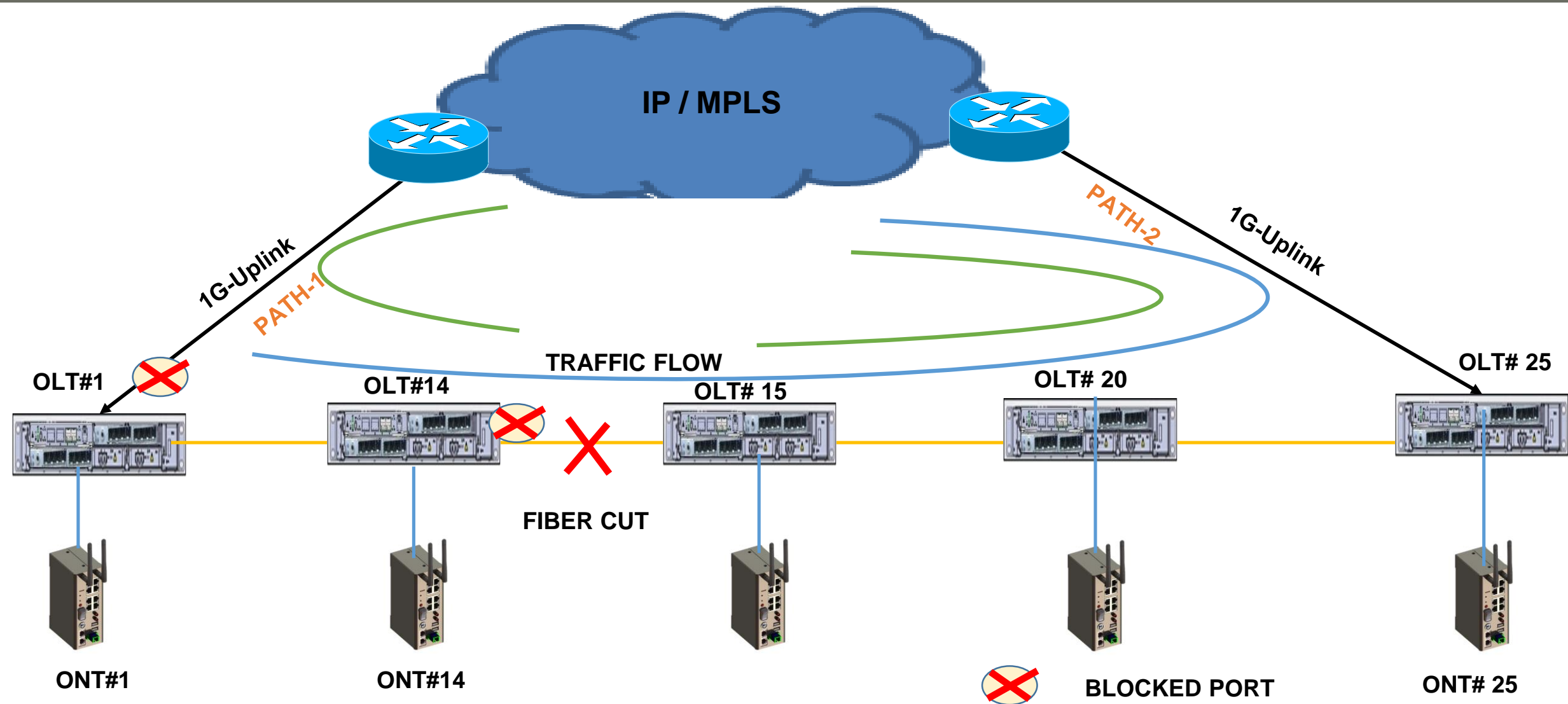
OPEN ERPS OPERATION



GPON -OLT -ONT NETWORK.



SAMPLE SEGMENT



PROTECTION MECHANISM

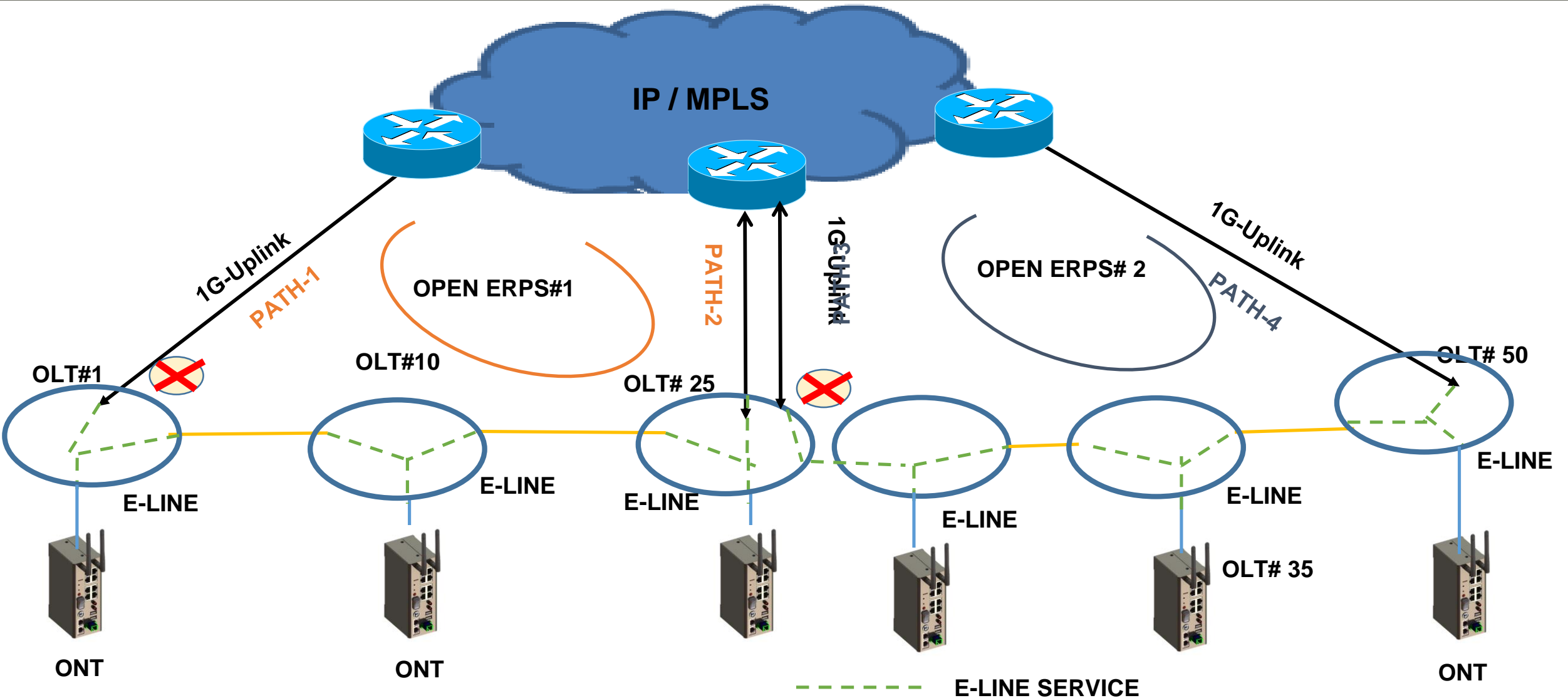
- 1) Path -1 is blocked while Path-2 is active path after defining Open Ethernet Ring Protection Scheme(ERPS) between the OLTs say OLT #1 & OLT #25 in a chain.
- 2) When there is a LOS between say OLT#14 & OLT#15, Path-1 blocked port gets unblocked while OLT#14 port gets Blocked as per ERPS.
- 3) OLT#1 to OLT#14 will be served through PATH-1 while OLT#15 to OLT#25 will be served through PATH-2.
- 4) Fast switching is observed.
- 5) Isolation between OLTs & IP/MPLS domains.
- 6) No inter-Op issues between OLTs & IP/MPLS domains.
- 7) CCM to be configured for detecting failures.

PAN INDIA GPON –OLT –ONT NETWORK

Multiple OPEN ERPS segments to be configured for **201** –Uplink Paths with roughly 20-35 OLTs per ERPS segment.

SERVICE CONFIGURATION

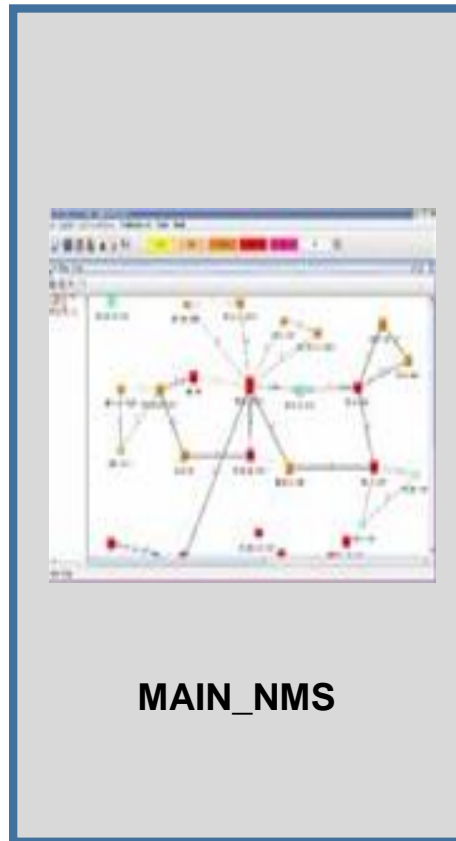
ELINE SERVICES TO BE CONFIGURED OVER VLANs.



TEJAS EMS-NMS

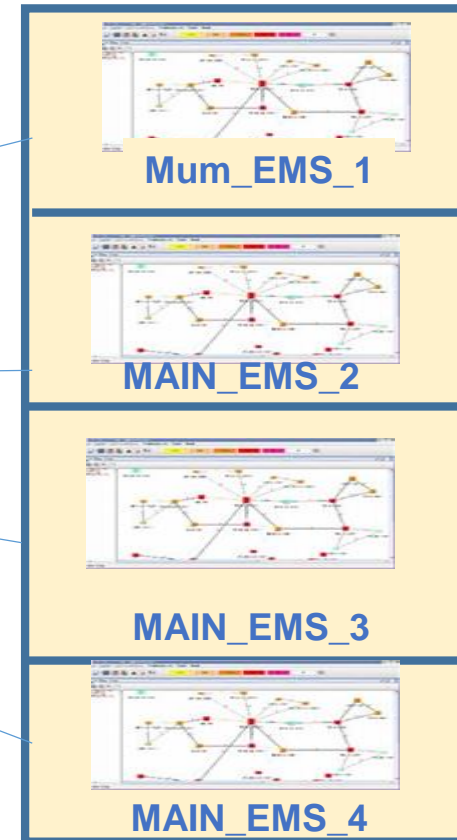
MAIN LOCATION : NMS + EMS(4*Instances)

NMS # MAIN LOCATION



Lenovo SR650

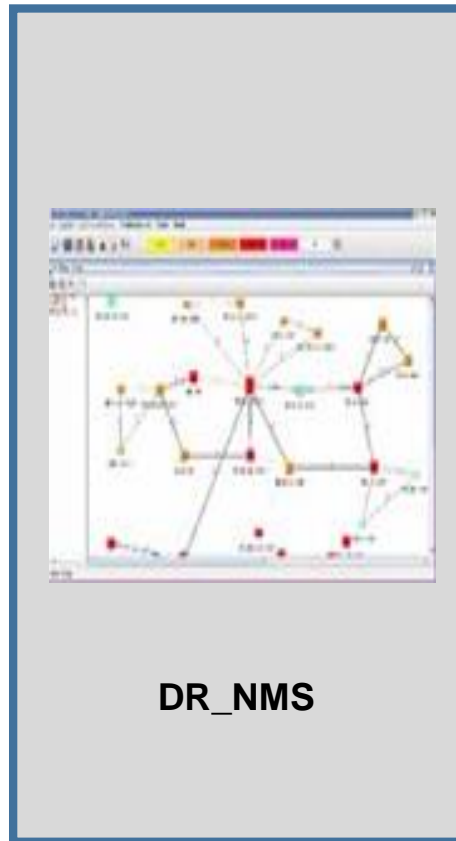
EMS # MAIN LOCATION



Lenovo SR650

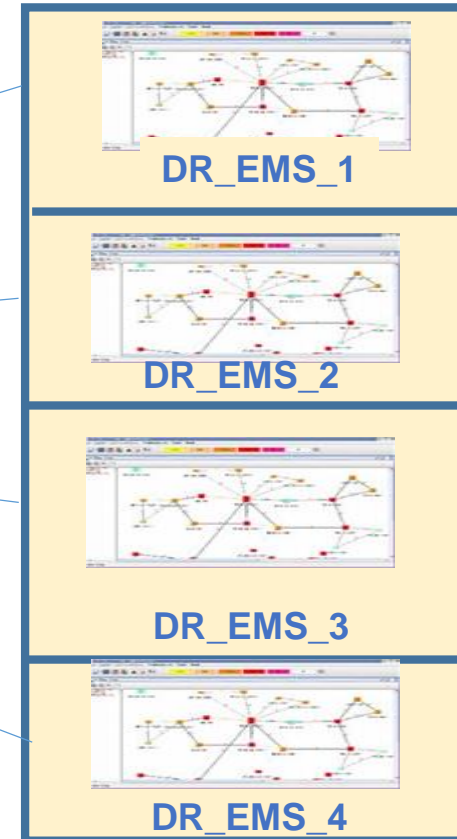
DR LOCATION : NMS + EMS(4*Instances)

NMS # DR LOCATION



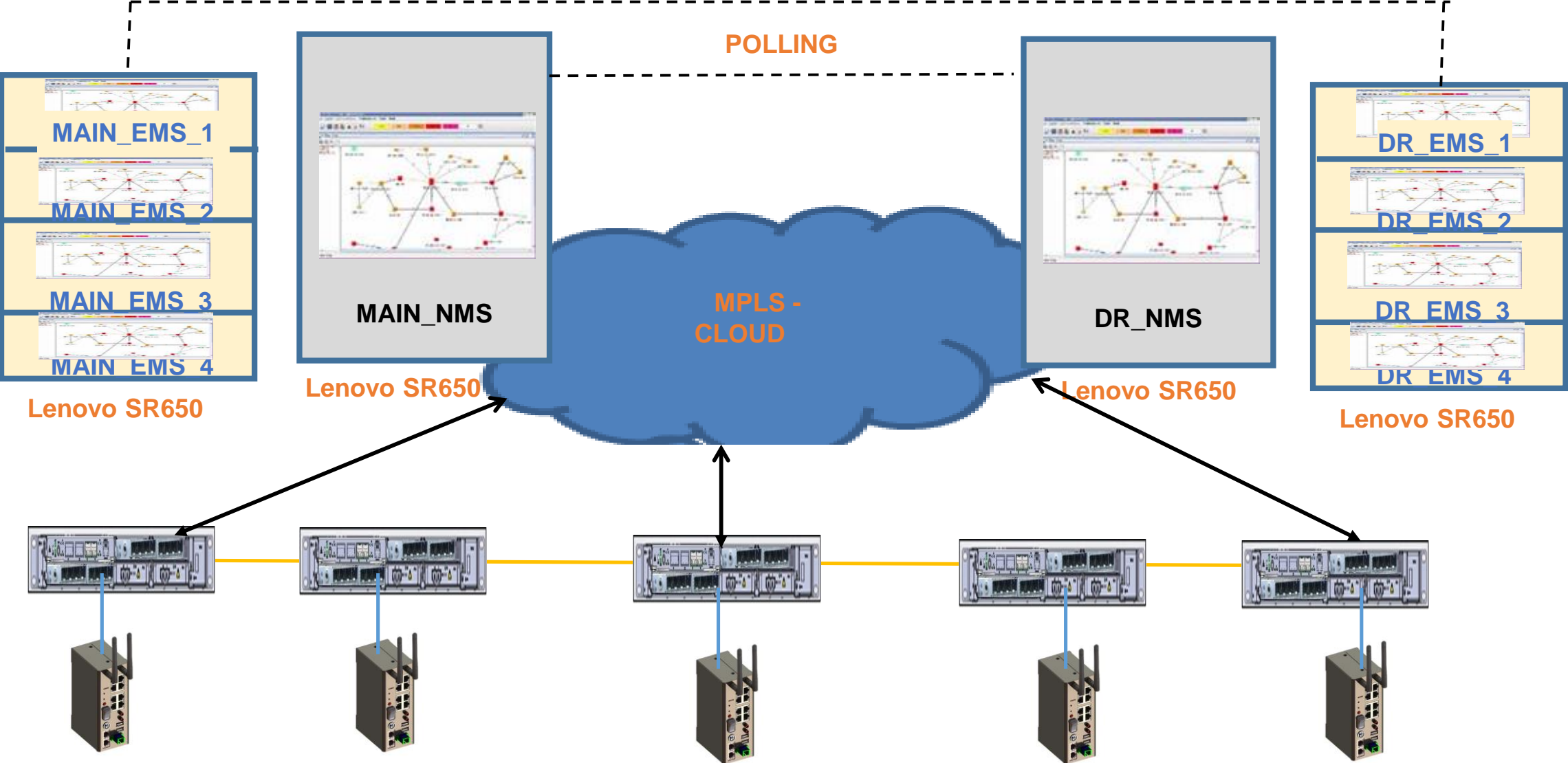
Lenovo SR650

EMS # DR LOCATION



Lenovo SR650

NMS + EMS



PRE-REQUISITES FROM RAILWAYS/RAILTEL

- 250 POPs with 2*1G Uplink per POP Site.
- FMS Interface –LC or SC details for all 4791 Sites.
- IP Pool allocation for EMS,NMS, OLTs & Access Points.
- Management VLANs for OLT management.
- Data VLANs for ERPS Rings.
- List of additional POPs Required : 70
- ISP agreement between Google and RailTel for AAA and allied services - critical



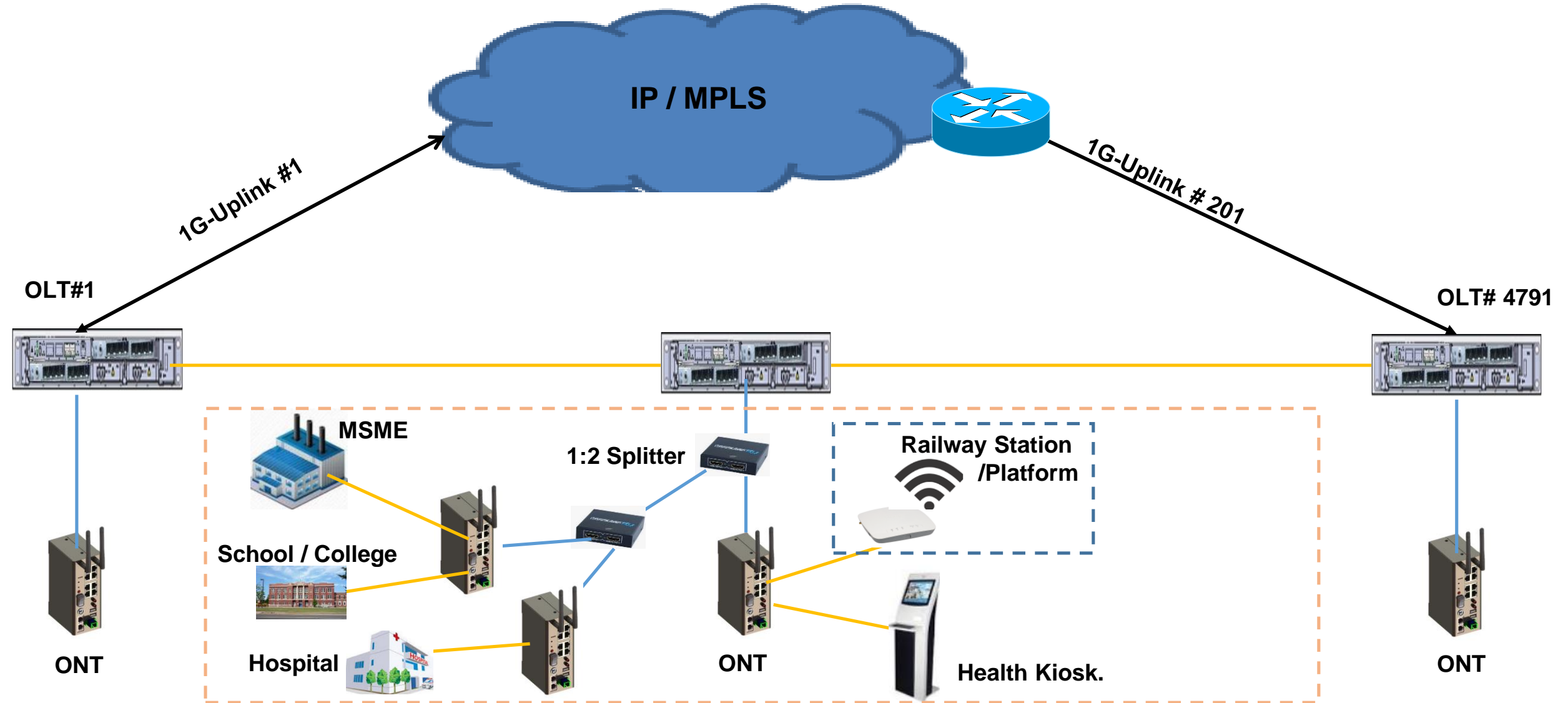
STATION_POP_LI
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FUTURE POSSIBILITIES

SALIENT FEATURES OF THE NETWORK

- Robust protected GPON infrastructure
- ~12Tbps of access network capacity would be available on completion of the project in 4791 stations
- The installed equipment (across 4791 stations) is capable of cumulatively supporting ~84Tbps capacity by adding appropriate interfaces
- Any G.984 compliant make OLT may be used to extend the network
- Each station can serve as a hub for Internet services in underserved areas

EXTENDED BACKBONE NETWORK



THANK YOU

