



AGORA-NG User Manual – GPON Service Manager

Version 6.10-1

Last Updated December 2014

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Chapter 1

INTRODUCTION

Goal

The aim of this manual is to describe the operation of the AGORA NG application as it relates to the management of the ME4620-OLT unit. For further information on the use of the AGORA-NG management platform, see the user manual for this platform. This is the document on which this manual is based.

This manual covers the specific management operations for the ME4620-OLT unit.

Unit Description

The ME4620-OLT unit is part of a family units' solution for GPON optical networks. It is based on ITU-T Rec. G.984.x and supports triple-play services, data and video for both residential and business clients. It deploys an Ethernet-based access network that complies with the specifications contained in TR-156 document.

The unit consists of one 14U chassis and four boards. Uplink Line board is a module that interfaces with the Service Provider Network by means of four 10GE. GPON Line board provides sixteen Class B+ or C+ GPON interfaces. Active Ethernet Line board provides 48 bidirectional Active Ethernet ports. Switch Fabric boards provide the Operation and Maintenance function of the system, and it also switches the client traffic between the client and uplink boards.

The OLT system provides the following Ethernet features distributed by the Switching and Client boards:

- VLAN Switching;
- Multicast – IGMP Snooping/Proxy;
- Load Balancing and LACP;
- DHCP Relay Agent;
- QoS.

In client boards it is performed the interworking between the Ethernet and GPON packets. They are also responsible for managing the ONT via OMCI. The main features are:

- Downstream/Upstream bit rate: 2.488/1.244 Gbps;
- Advanced Encryption Standard (AES);
- Forward Error Correction (FEC);
- Up to 64 ONT per PON; (1:128 splitting ratio is hardware ready)
- L2 Manipulation: Transparent, Add/change S-Tag e C-Tag;

- Dynamic Bandwidth Allocation (DBA).

In parallel with the data services, the OLT System allows the transport of analog video services (RF Overlay).

The OLT System is a flexible system that can be adapted to deliver the full pack of broadband services including Ethernet for business/premium customers.

For further details on these characteristics, see the unit's user manual.

Manual Structure

As mentioned above, this manual describes the specific management operations relevant to the ME4620-OLT unit. This description has been organised in the following way:

- “OPERATIONS ON THE MANAGEMENT SYSTEM” chapter, covers the operations carried out at the level of the AGORA-NG application, such as the insertion/removal of the unit and the management of catalogs;
- Equipment level operations are described in “ME4620-OLT UNIT OPERATIONS” chapter;
- “OPERATIONS ON BOARDS AND PORTS” chapter focuses on the configuration and view operations relevant to the interfaces deployed by the unit;
- The management of remote units, ONTs, is explained in “OPERATIONS INVOLVING REMOTE UNITS” chapter;
- The operations involved in updating the information relating both ONTs and ME4620-OLT, unit's backup and restore configurations are described in “INFORMATION LOADING” chapter;
- Unit, boards or ports alarms management are described in “ALARM MANAGEMENT” chapter.

Chapter 2

OPERATIONS ON THE MANAGEMENT SYSTEM

This chapter offers a description of the management operations carried out at the AGORA-NG application level. For further details on the procedures described here, see the AGORA-NG Resource Manager manual.

ME4620-OLT Unit Insertion

The first operation to be carried out is inserting the ME4620-OLT unit into the management system. In order to do this the unit needs to be preconfigured so the management system can access it via IP network. This is achieved using WebTI local management application.

ME4620-OLT Configuration

The unit can be managed through the management dedicated *eth #* interface or inband, via a management VLAN over the uplink interfaces. Figure 1 shows the configuration of the unit's IP layer and the selection of the management method. All necessary IP routes should also be configured to ensure that the management system has access to the ME4620-OLT.

Figure 1. ME4620-OLT IP layer network configurations

Network Configurations - Global Configurations

Networking

<input type="checkbox"/>	Parameter	Value
<input type="checkbox"/>	Management Interface	Eth G1

Select the management interface

IP Interfaces

<input type="checkbox"/>	Interface	Active	Address	Mask	Management vlan
<input type="checkbox"/>	Eth G1	<input checked="" type="checkbox"/>	10 112 42 134	24	
<input type="checkbox"/>	InBand	<input type="checkbox"/>	0 0 0 0	24	0

Configure the management VLAN

InBand Interfaces

<input type="checkbox"/>	Slot	Interface	InBand
<input type="checkbox"/>	6	Eth 1	<input type="checkbox"/>
<input type="checkbox"/>	6	Eth 2	<input type="checkbox"/>
<input type="checkbox"/>	6	Eth 3	<input type="checkbox"/>
<input type="checkbox"/>	6	Eth 4	<input type="checkbox"/>

IP Route

<input type="checkbox"/>	Address	Mask	Gateway/Device
<input type="checkbox"/>	0.0.0.0	0	10.112.42.254

For the unit to be managed via AGORA-NG, the manager's IP address must be configured using the SNMP management method, as shown in Figure 2.

Figure 2. System parameters configuration main page

System Services / SNMP Agent

SNMP Service		Value				details		
<input type="checkbox"/>	Service activation	<input checked="" type="checkbox"/>						
<input checked="" type="checkbox"/>	Management System	active: <input checked="" type="checkbox"/>	IP: 10	112	32	126	Allowed configuration: <input checked="" type="checkbox"/> Send traps: Trap/Ack	view
<input type="checkbox"/>		active: <input type="checkbox"/>	IP: 0	0	0	0	Allowed configuration: <input checked="" type="checkbox"/> Send traps: none	view
<input type="checkbox"/>		active: <input type="checkbox"/>	IP: 0	0	0	0	Allowed configuration: <input checked="" type="checkbox"/> Send traps: none	view

Manager's IP address

Refresh Reset Save

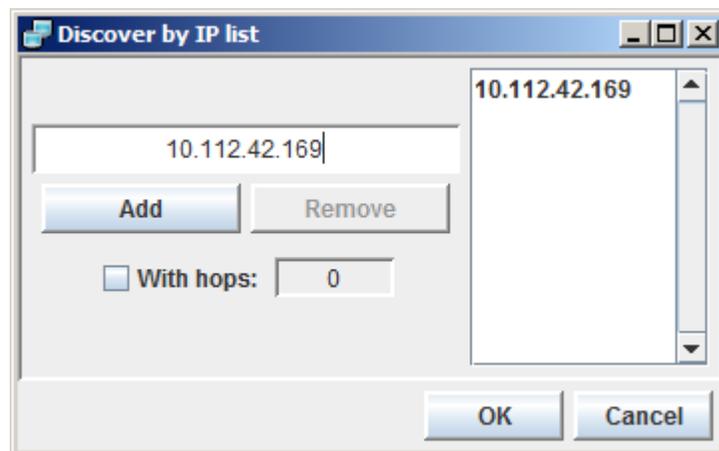
ME4620-OLT Unit Discovery

Before beginning unit discovery, create a Managed Domain and a Site.

In the main application menu, select **Configure** → **NE Discovery** or, from the toolbar, select 'Discover NE by IP address' icon () or select ctrl+D key sequence.

In the discover by IP list window, Figure 3, add to the list the IP addresses that are intended to be discovered. Then select 'OK' to execute the operation.

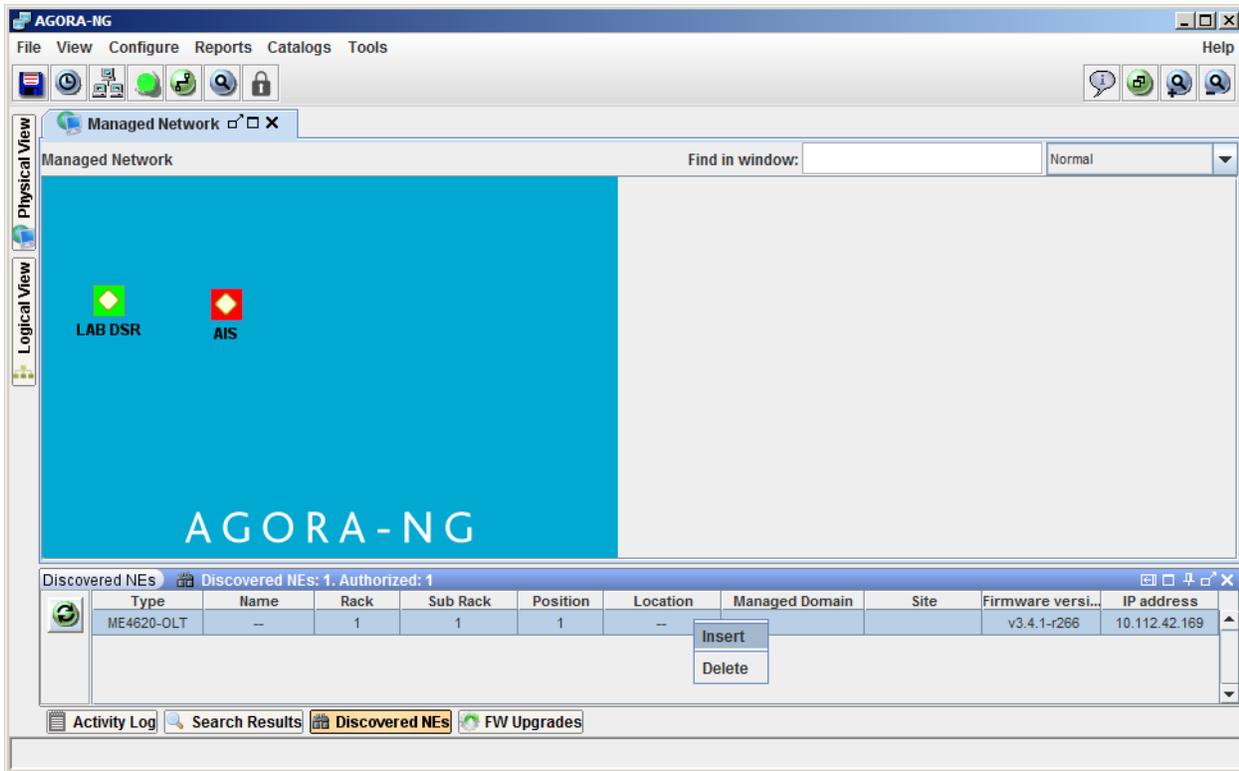
Figure 3. Discovery by IP list



The dialog box titled "Discover by IP list" contains a text input field with the IP address "10.112.42.169". Below the input field are "Add" and "Remove" buttons. A checkbox labeled "With hops:" is followed by a text input field containing the value "0". On the right side, there is a list box containing the IP address "10.112.42.169". At the bottom of the dialog are "OK" and "Cancel" buttons.

Once successfully discovered, the corresponding entry is added to the network element discovery window, Figure 4. Right-select the unit intended to be inserted and chose 'insert'.

Figure 4. Network element discovery



To complete insertion, enter the unit identification information in the insertion window shown in Figure 5 and select 'OK'.

Figure 5. Insert managed elements

Insert Managed Elements

Identification:

Equipment Type: ME4620-OLT

Name: OLT2_OLD

Installation Date: 25-11-2014

Location:

Managed Domain: LAB DSR

Site: LAB DSR

Location: --

Rack: 1

Sub Rack: 1

Position: 1

Site ID:

Features:

Vendor: desconhecido

Model: desconhecido

Brand: desconhecido

Modify

Management:

Access Type: SNMP

IP address: 10.112.42.169

Modify IP

Insert Cancel

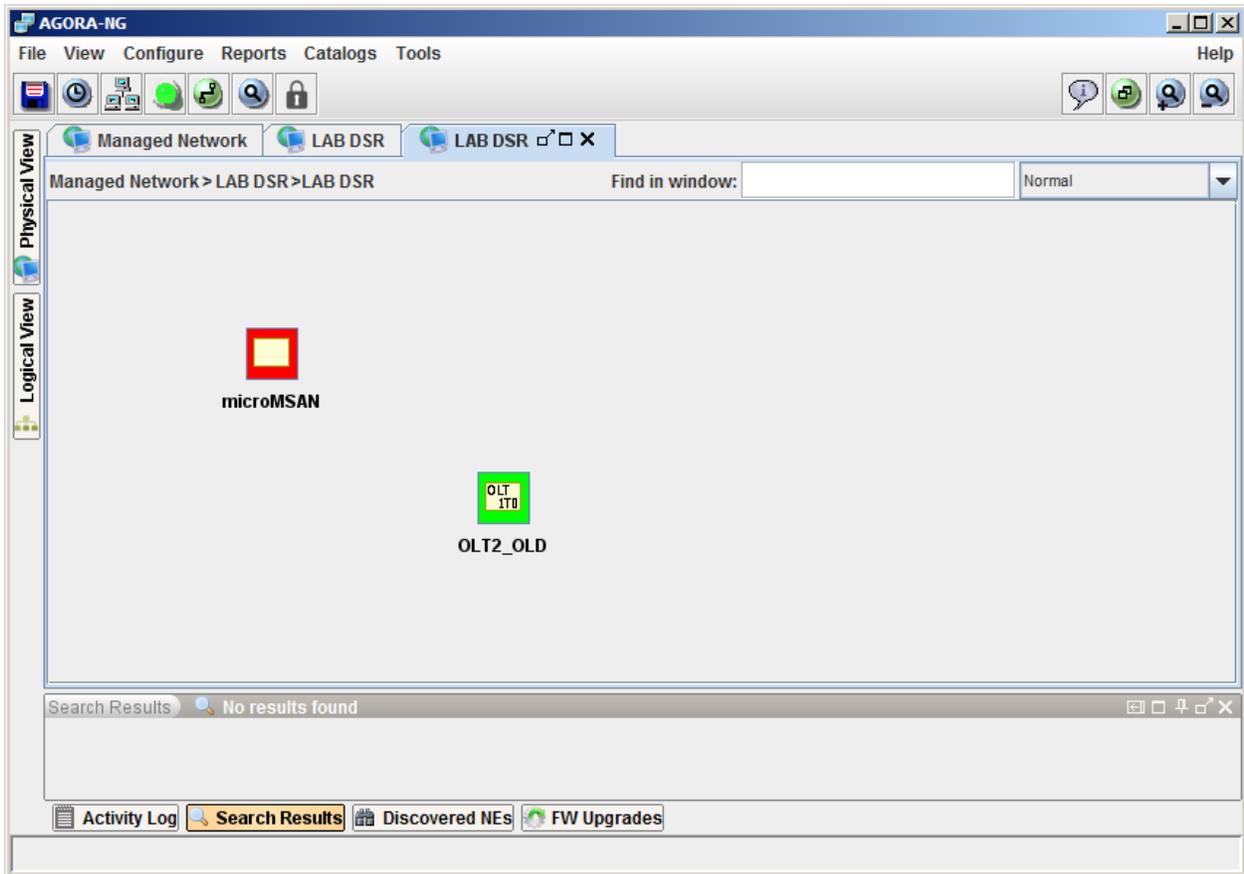
Callout 1: Select previously created exchange area (points to Site field)

Callout 2: Select unit model from catalogue (points to Modify button in Features section)

After the unit has been inserted into the management system, all existing configurations are removed, except the configurations for Ethernet and LAG interfaces, where inband management is being used. The two Ethernet default traffic profiles and the five GPON profiles are not erased, whatever management access form is used.

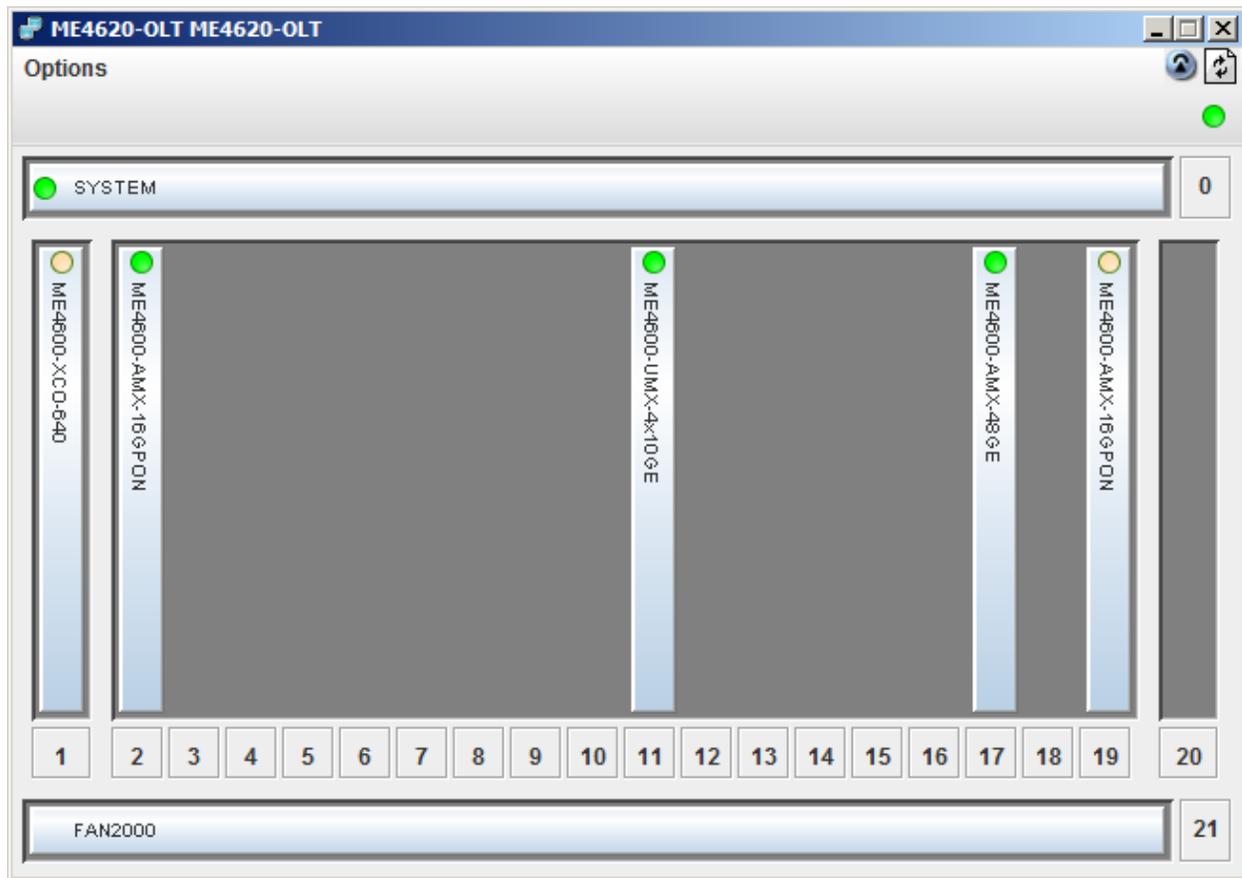
Once the unit has been successfully inserted, it is represented in the management application, in the selected Site area, as shown in Figure 6.

Figure 6. Management system unit graphical representation



The window representing the unit, shown in Figure 7, is accessed double-clicking on the icon shown in Figure 6. This window allows configuration access and view operations for the unit and for any remote unit (ONT).

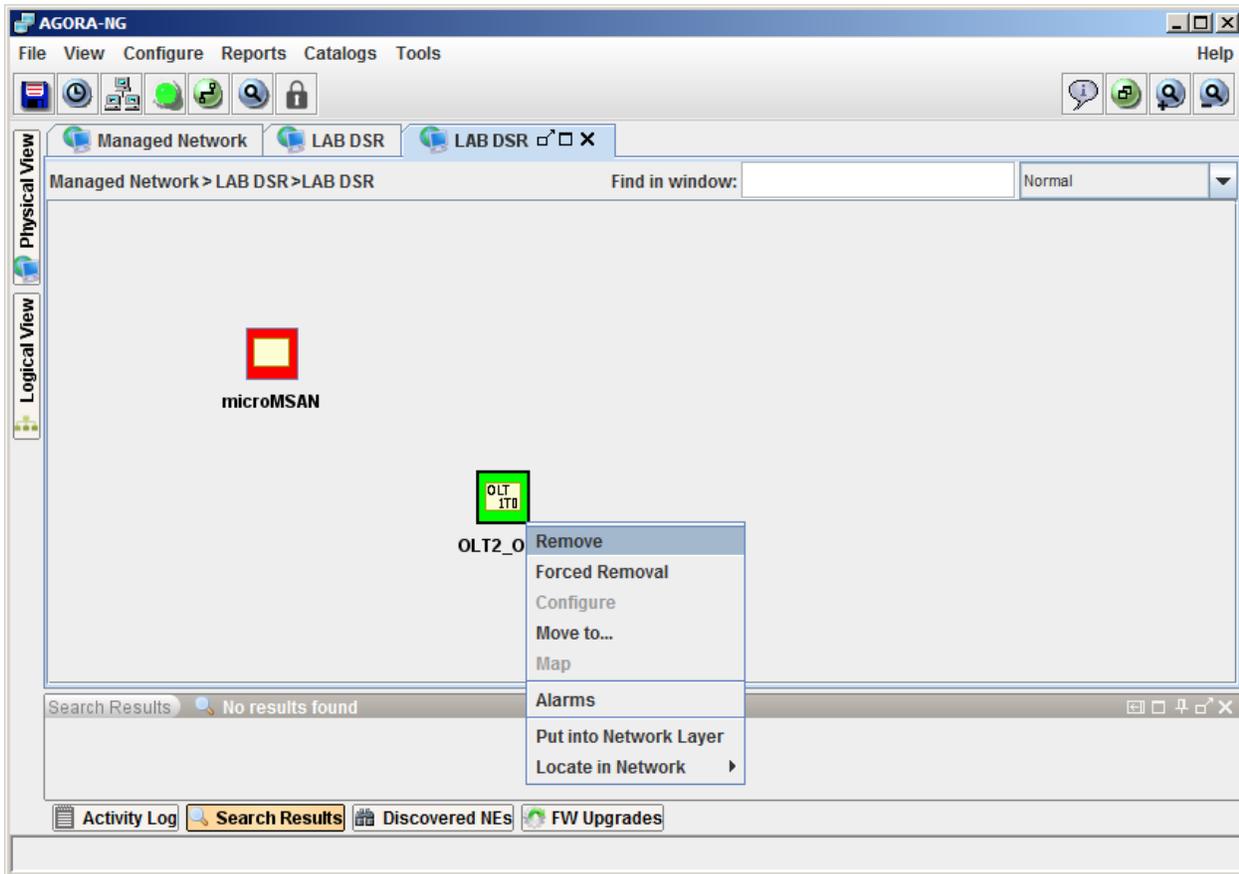
Figure 7. ME4620-OLT unit representation



ME4620-OLT Unit Removal

In order to remove the unit from the management system, right select on the respective icon and select 'Remove' from the menu, as shown in Figure 8. Note that the unit can be removed only if it is not managing any remote unit (ONT).

Figure 8. Network elements removal



For further details on unit’s removal from the management system, see AGORA-NG Resource Manager manual.

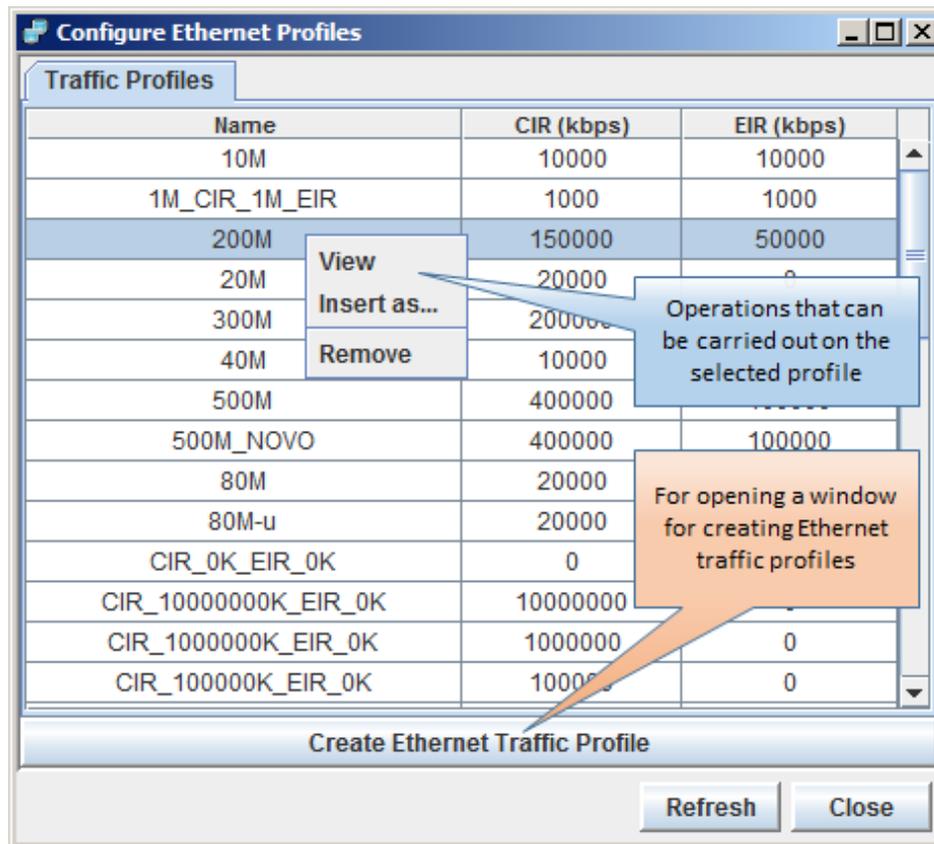
Catalog Management

AGORA-NG application supports catalog management without referencing any specific equipment type. The following subsections cover catalog operations that need to be carried out as part of this unit management.

Ethernet Profiles

To create, view or remove Ethernet traffic profiles, select **Catalogs → Profiles → Ethernet**, from the application’s main menu. This brings up the window shown in Figure 9, listing Ethernet traffic profiles that have already been created.

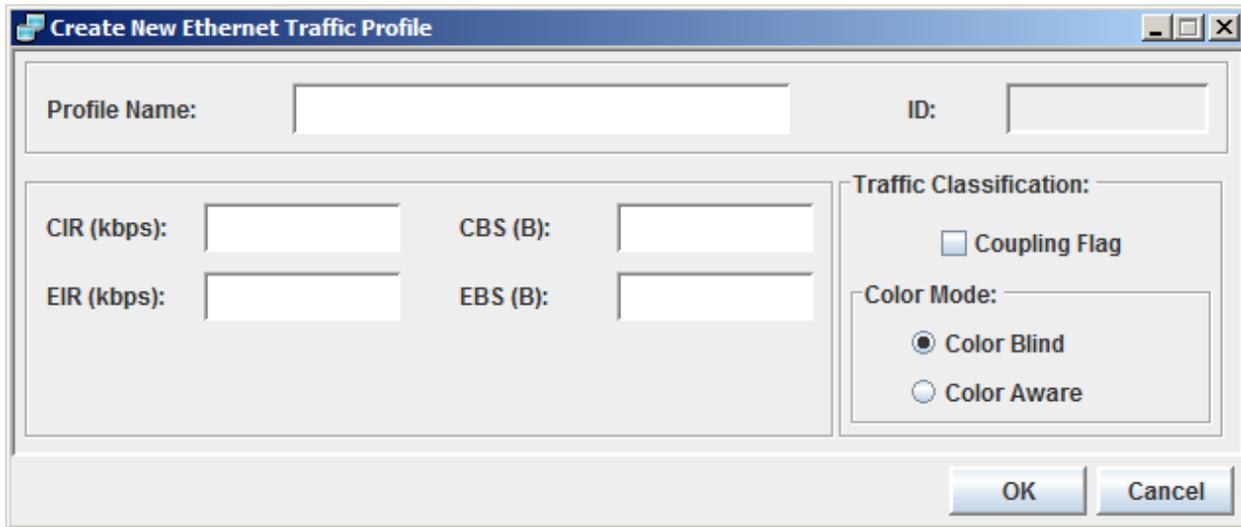
Figure 9. List of cataloged Ethernet traffic profiles



To create a new Ethernet traffic profile, select 'Create Ethernet Traffic Profile' in Figure 9. Then, in Figure 10, insert the profile name and the parameter values for bandwidth definition.

- CIR - **Committed Information Rate** defines the guaranteed average bandwidth;
- CBS - **Committed Burst Size** limits the maximum number of guaranteed bytes for a packet burst;
- EIR - **Excess Information Rate** defines the excess bandwidth the network can offer if there is no traffic congestion;
- EBS - **Excess Burst Size** limits the maximum number of bytes for a packet burst that the network can offer, if there is no traffic congestion.

Figure 10. Creating Ethernet traffic profiles



Right clicking on a profile in the Ethernet traffic profiles (Figure 9), allows access to options for viewing or removing a profile and also 'Insert as...' which allows the creation of a new profile based on the one selected.

GPON Traffic Profiles

To manage existing GPON traffic profiles or create new ones, select **Catalogs → Profiles → GPON Traffic** from the application's main menu.

To view, insert as, change or remove a GPON traffic profile from the list that is displayed right select on the target profile, as shown in Figure 11.

Figure 11. List of cataloged GPON traffic profiles

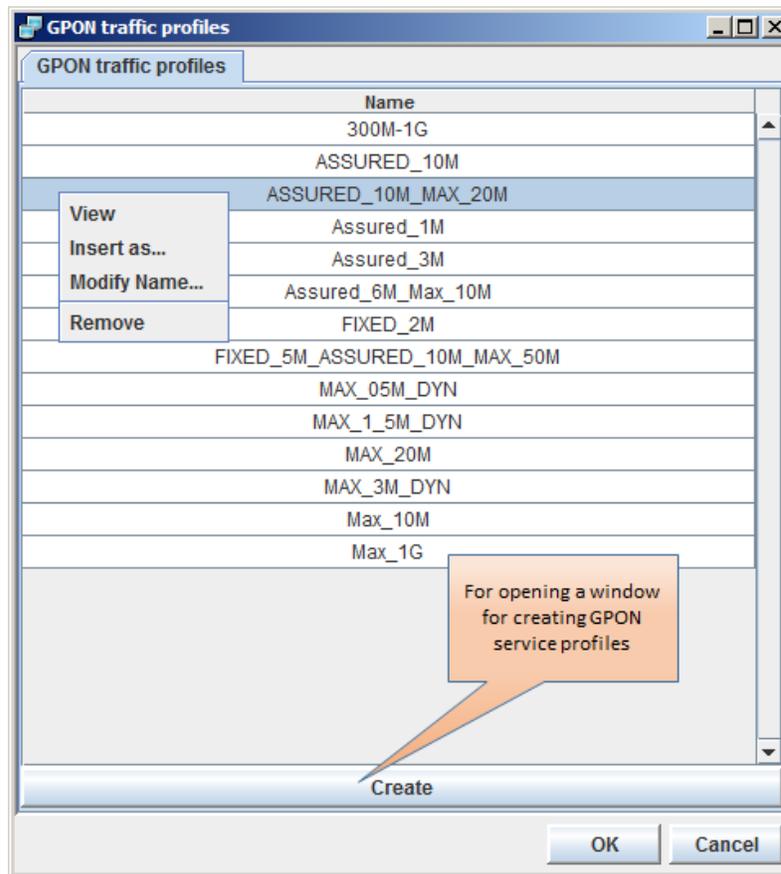
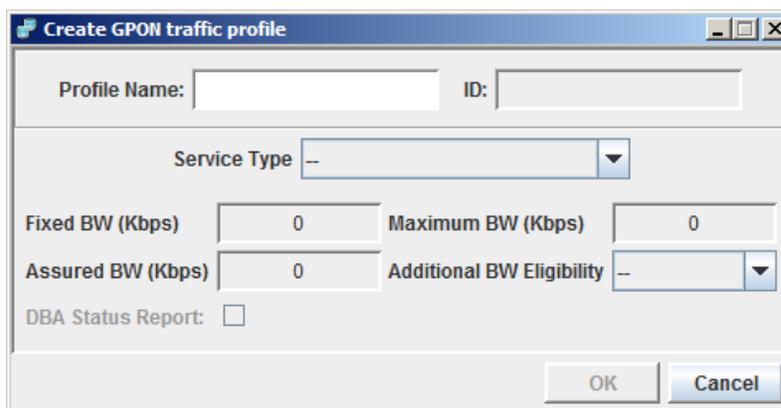


Figure 12. GPON traffic profiles creation



A name and a service type (CBR, UBR or DYNAMIC) must be assigned to the GPON traffic profile.

The configuration of the other parameters depends on the selected service type:

- **Fixed BW** (kbps) – Fixed bandwidth used in CBR and UBR types (used in the fixed and dynamic profiles) with a granularity of 8kbps and a maximum value of 400000kbps and 1200000kbps for CBR and UBR respectively;
- **Assured BW** (kbps) – Assured dynamic (DYN) type bandwidth, with a granularity of 8 kbps and a maximum value of 1200000kbps;
- **Max BW** (kbps) – maximum bandwidth which is the sum of the Fixed BW + Assured BW + Not assured bandwidth, with a granularity of 8 kbps and a maximum value of 1,200,000 kbps;
- **Additional BW Eligibility** – Defines how the not assured bandwidth is handled. This may be Best Effort or Non-Assured, depending on the values set for the other parameters;
- **DBA Status Report** – If selected a status reporting MAC GPON DBA algorithm is used.

Select ‘OK’ to create the GPON traffic profile. Button OK will be enable only if all input values are valid. Table 1 summarizes valid combinations. V1, V2 ...V6 are generic representations of the values to be entered into the corresponding fields.

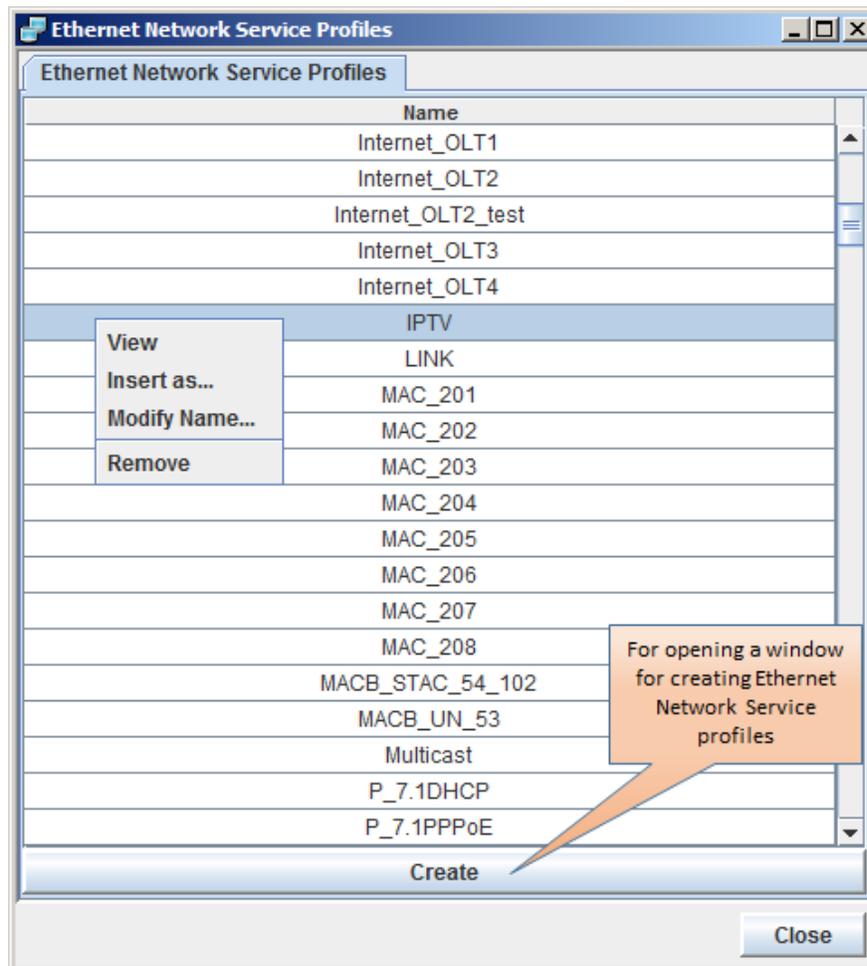
Table 1. Defining GPON traffic profiles

Parameters	Fixed BW	Assured BW	Max BW	Additional BW Eligibility
Type of Service				
CBR	V1	0	V1	--
UBR	V2	0	V2	--
DYNAMIC	0	V3	V3	--
DYNAMIC	0	V4	> V4	Non Assured
DYNAMIC	0	0	> 0	Best Effort
DYNAMIC	V5	V6	>= V5 + V6	Selectable

Ethernet Network Service Profiles

To create Ethernet Network Service Profiles, select **Catalogs → Profiles → Ethernet Network Service** from the application’s main menu.

Figure 13. List of cataloged GPON service profiles

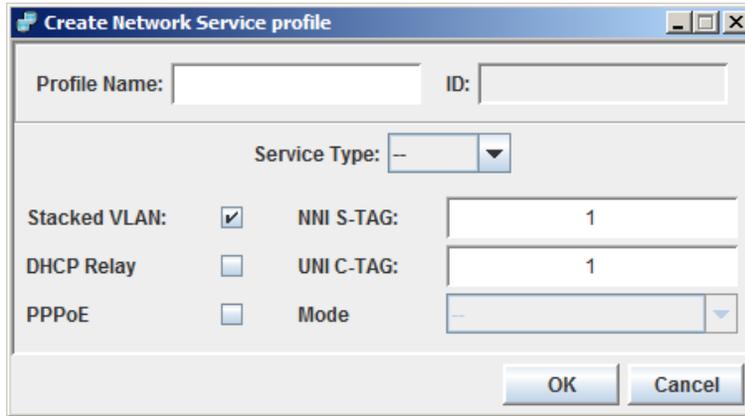


Service profiles are used for creating network services in the unit. The required parameters are:

- Profile name – Profile identifier
- ID – Identification number
- Type of Service – Select from the following:
 - Unicast
 - Multicast
 - UniVoip
 - BitStream
 - MAC Bridge
- Stacked VLAN – Tick if the service uses stacked VLANs, that is, two tags in the uplink port.
- DHCP Relay – Tick if the service operates with DHCP Relay Agent
- PPPoE – Tick if the service operates with PPPoE

- NNI S-TAG – Identifies the network to network interface service tag
- UNI C-TAG – Identifies the user to network interface customer tag

Figure 14. GPON service profiles creation



Equipment Models

To create Equipment Models, select **Catalogs → Equipment Models** from the application’s main menu.

Figure 15. List of cataloged Equipment Models



A list of all managed equipment can be viewed right selecting a model from Equipment Model list.

Some models have an associated prototype that specifies the physical constitution of the equipment, boards and ports.

ONT Profiles

To create ONT profiles, select **Catalogs** → **Profiles** → **ONT** from the application's main menu.

Figure 16. List of ONT profiles

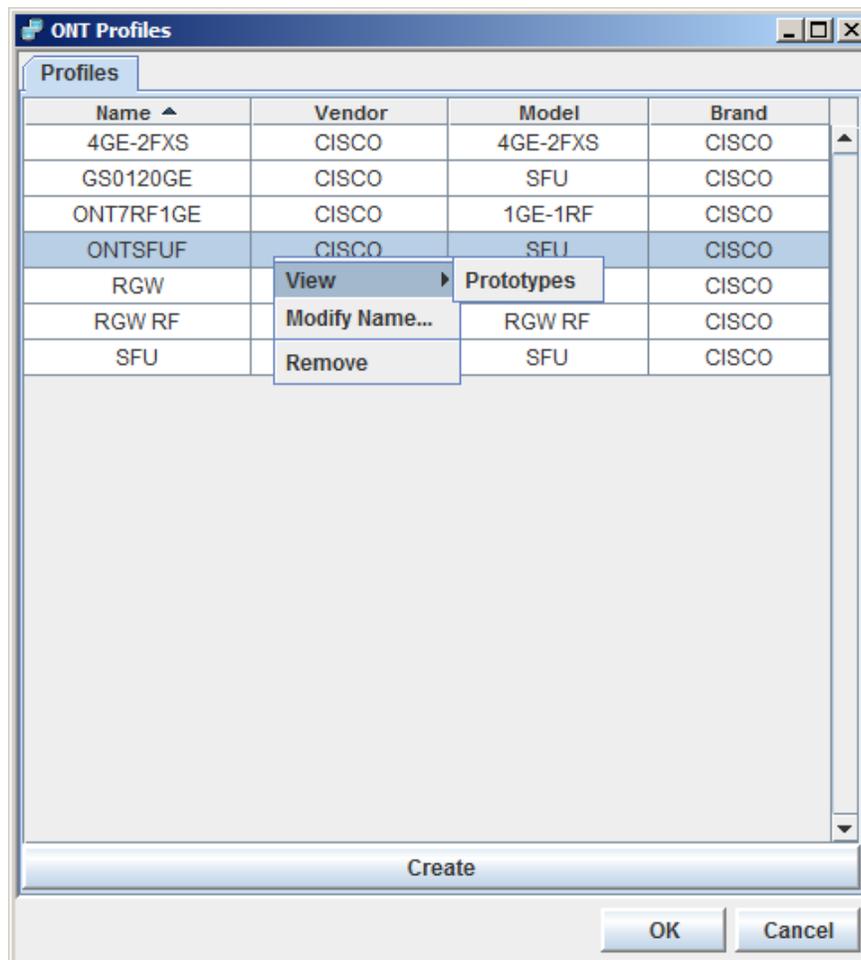
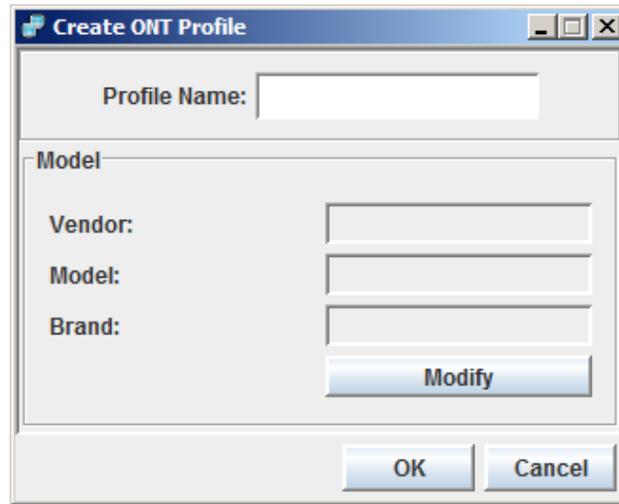


Figure 17. ONT Profile creation



The required parameters are:

- Profile Name
- Vendor
- Brand
- Model

An ONT Model selected from Equipment Models Catalog must be associated by selecting button “Modify”.

Prototypes of an ONT Profile can be viewed (Figure 18) right selecting over the intended ONT profile (shown in Figure 16).

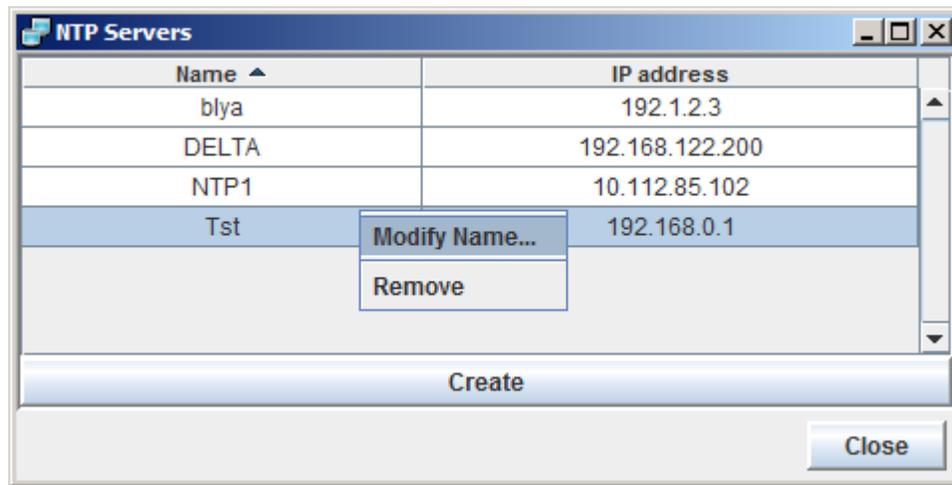
Figure 18. Prototype configuration

Slot	Board	Index	Port Type	Port Name
1	PL_ONT	1	P_PON	--
1	PL_ONT	2	P_GBIT_ETH	--
1	PL_ONT	3	P_GBIT_ETH	--
1	PL_ONT	4	P_GBIT_ETH	--
1	PL_ONT	5	P_GBIT_ETH	--
1	PL_ONT	6	P_RF	--
1	PL_ONT	7	P_VOIP	--
1	PL_ONT	8	P_VOIP	--

NTP Servers

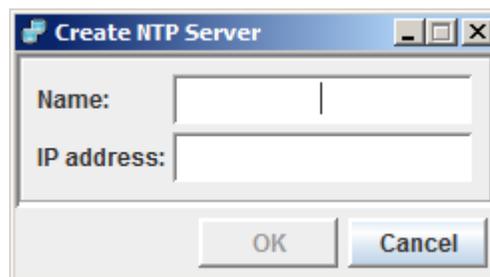
NTP Servers can be cataloged selecting **Catalogs → NTP Servers** from the application’s main menu.

Figure 19. NTP Servers catalog



Name and IP address of the NTP Server are required.

Figure 20. NTP Server creation

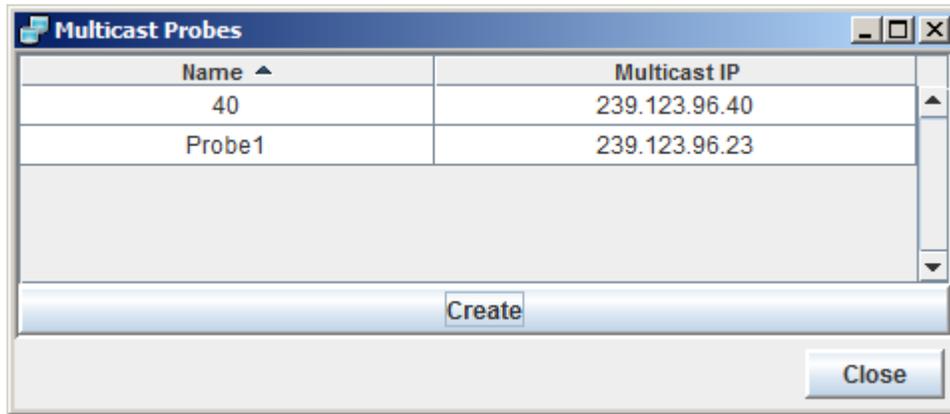


Multicast Probes

A Multicast probe can be pre cataloged and later on applied to a specific network service.

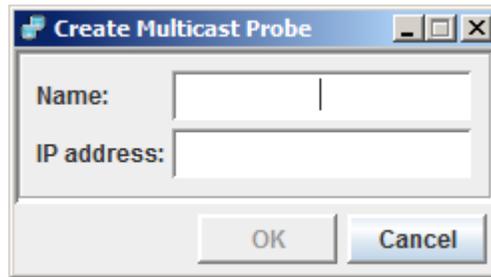
To create a Multicast Probe, select **Catalogs** → **Multicast Probes** from the application's main menu.

Figure 21. Multicast Probes catalog



Multicast probe creation requires an name to identify the probe and an IP address.

Figure 22. Multicast Probe creation

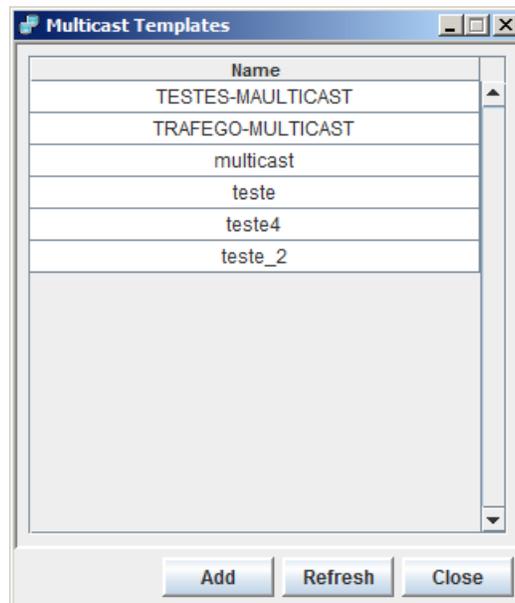


Multicast Templates

Multicast templates are created and can be applied repeatedly and several times in Multicast Groups configuration.

To create a Multicast template, select **Catalogs** → **Templates** → **Multicast** from the application's main menu.

Figure 23. Multicast Templates catalogs



Select button “Add” and fill the required fields:

- Template name – template’s name
- Name – multicast’s group name
- IP version
- Source IP – IP address that identifies the source
- Multicast IP – IP address that identifies the multicast group
- Mask – IP address mask
- Bandwidth (kbps)
- Status

When a multicast group template is created it doesn’t reference any particular unit.

Right selecting a multicast template allows access to options for viewing or removing a template and also ‘Insert as...’ which allows the creation of a new template based on the one selected.

Global ACLs (Access Control Lists)

One of the most important reasons to configure access lists is to provide security for a network. ACLs filter network traffic by controlling whether packets are forwarded or blocked avoiding access to network MAC/IP groups.

ACLs are created at the global catalog management level and further on they can be applied to network services and interfaces of a particular OLT unit (section “OLT Access Control Lists”).

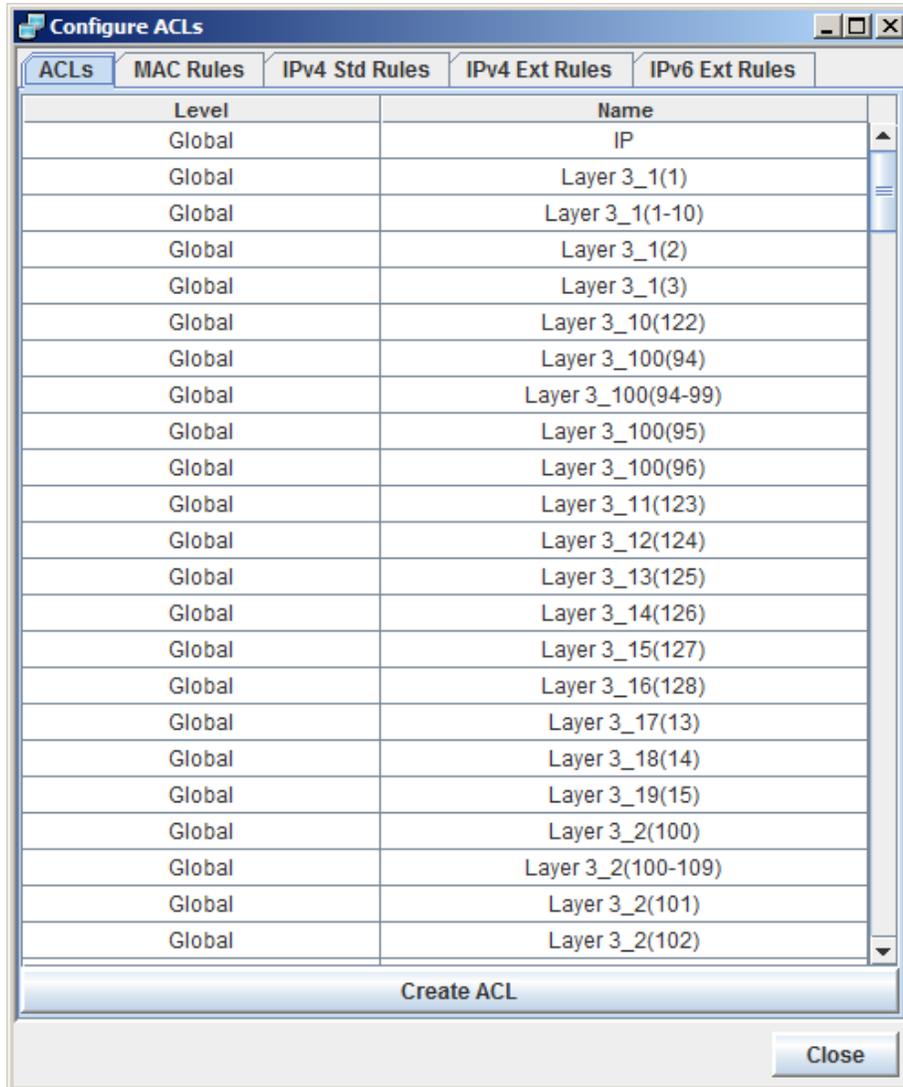
An ACL groups rules composed of permit or deny actions. Before creating the ACL the rules must be configured.

Creating an ACL requires the selection of a name, a type and a set of selected rules.

An ACL can be of type MAC, IPv4 Standard (IPv4 Std), IPv4 Extended (IPv4 Ext) or IPv6 Extended (Ext). All rules aggregated in an ACL must be of the same type as the ACL.

To create an ACL select **Catalogs → ACLs** from the application’s main menu.

Figure 24. Global ACLs



All global cataloged ACLs and rules are listed in the previous window.

Each rule has a name, a type, an action (“deny”, “permit”) and a set of configurable parameters. To view the configuration of an ACL or a rule right select on the corresponding line.

Rules aggregated in an ACL cannot be removed. ACLs that are associated with an ME4620-OLT unit cannot be removed.

Chapter 3

ME4620-OLT UNIT OPERATIONS

Summary

This chapter details the configuration and view operations for the ME4620-OLT unit. In the unit management window, Figure 25, the menu bar offers a single menu – ‘Options’. All unit configuration and view operations can be accessed from this menu.

Figure 25. Options menu items

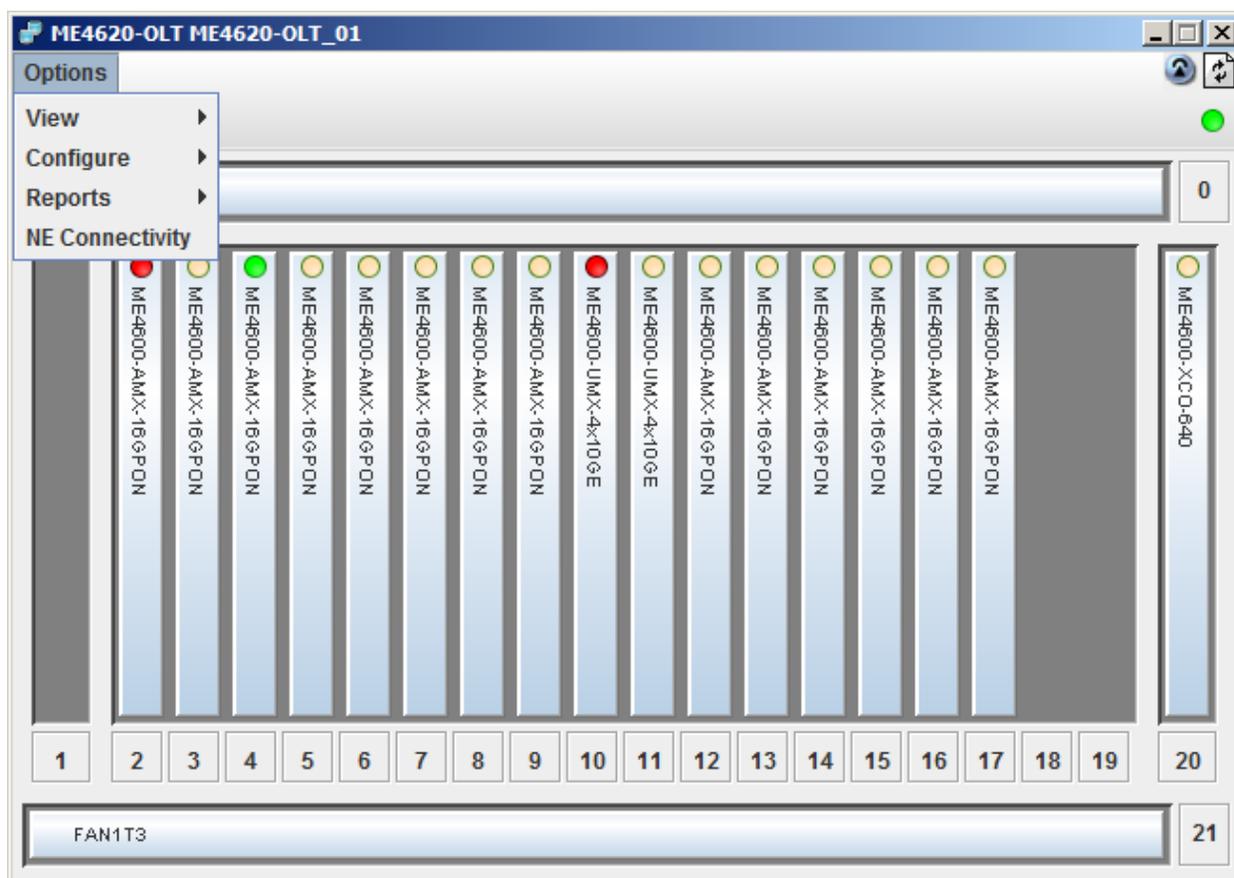


Figure 26 and Figure 27 list respectively all the configuration and view operations for the unit.

Figure 26. Configure menu

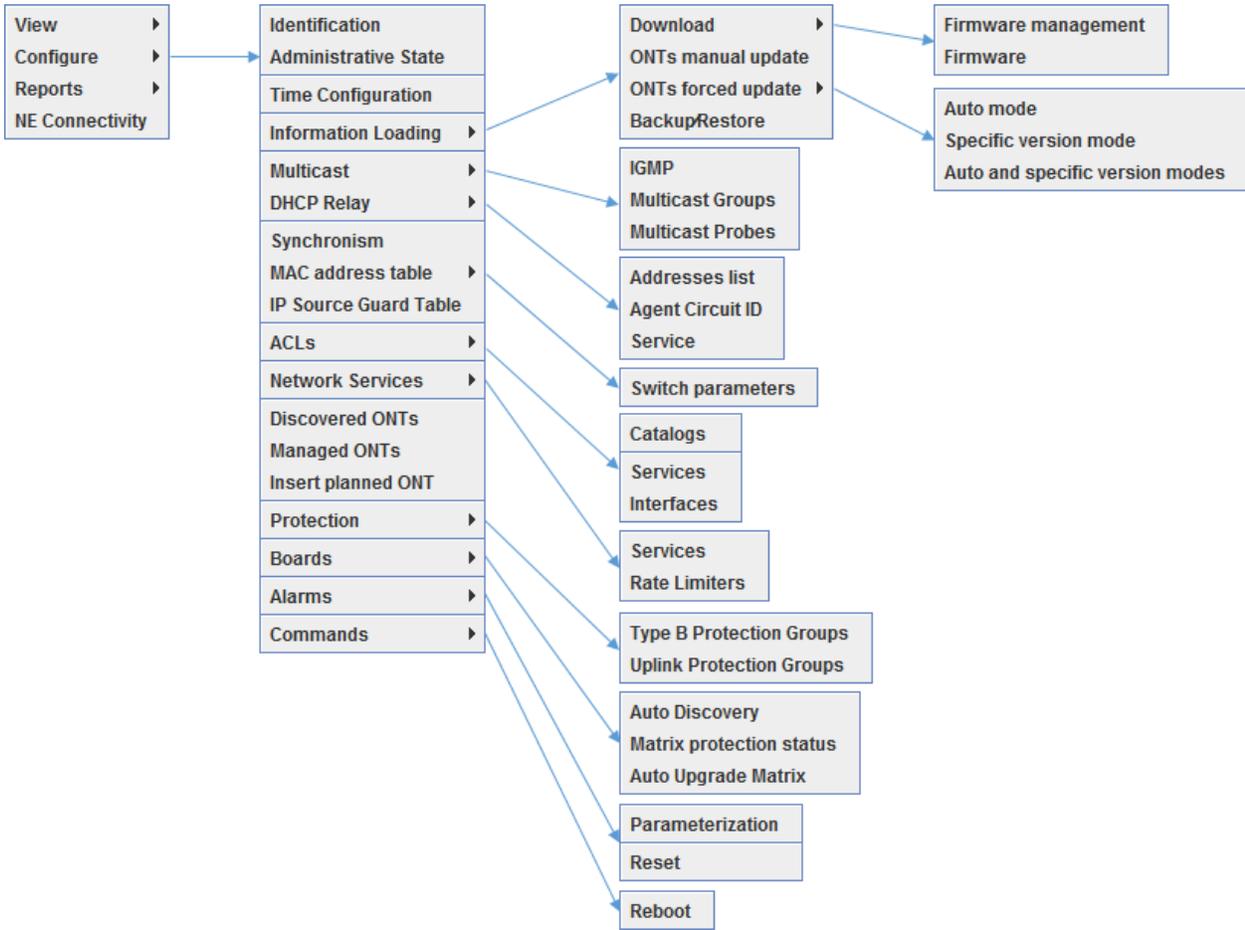
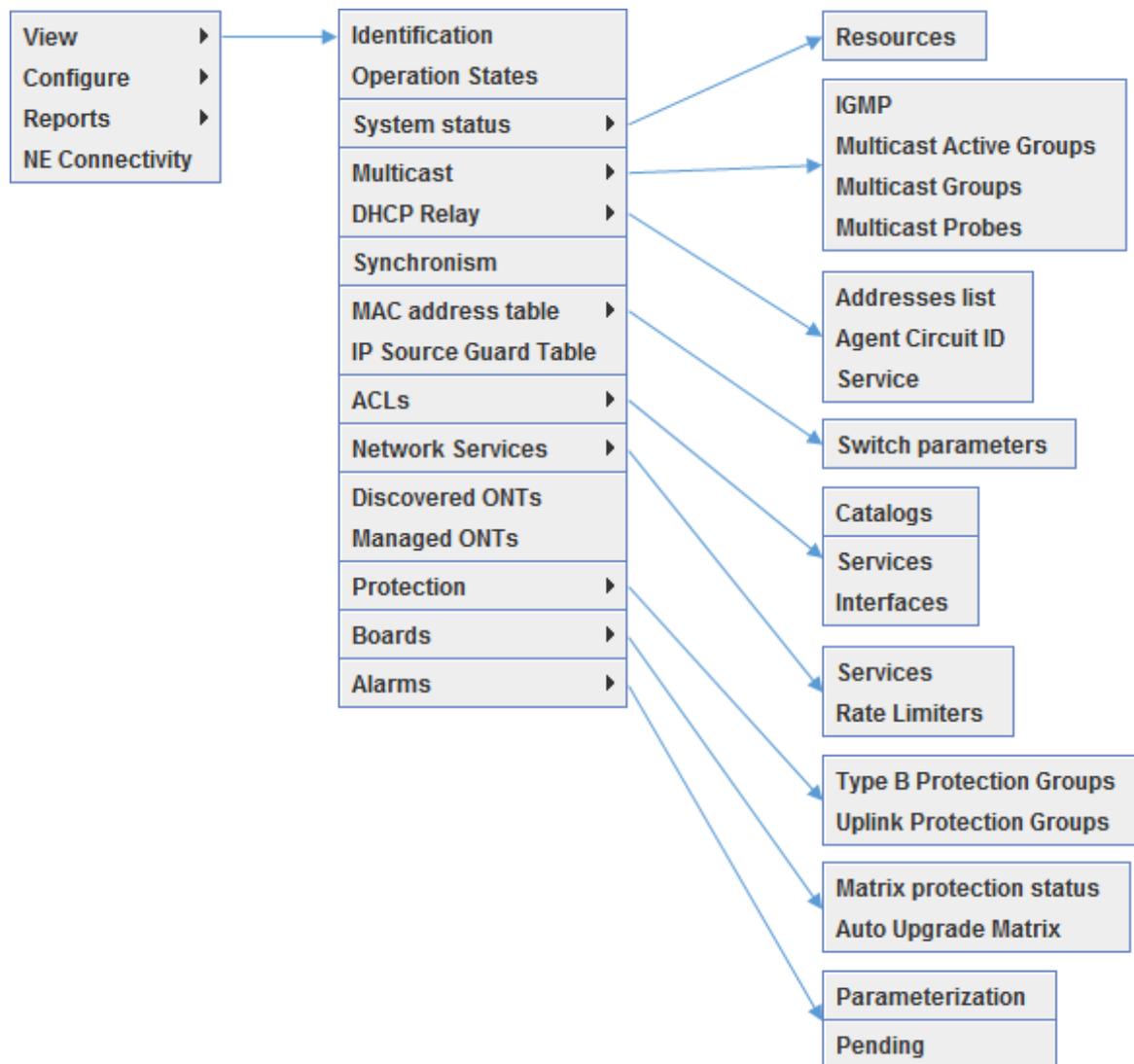


Figure 27. View menu



Items “ONT information loading” and “Alarm Management” are dealt in separate chapters. All other items are covered in this chapter.

Identification

To configure identification, select **Options → Configure → Identification** from the menu in the unit’s window.

Figure 28. ME4620-OLT unit identification

The screenshot shows a configuration window titled "Identification ME4620-OLT ME4620-OLT_01". It is divided into four main sections:

- Identification:**
 - Equipment Type: ME4620-OLT
 - Name: ME4620-OLT_01
 - Installation Date: 20-11-2014
- Location:**
 - Managed Domain: GPON_novo
 - Site: Telecom
 - Modify button
 - Location: --
 - Rack: 1
 - Sub Rack: 1
 - Position: 1
 - Site ID: (empty)
- Features:**
 - Vendor: CISCO
 - Model: ME4620
 - Brand: CISCO
 - Modify button
 - Version: --
 - Serial number: --
 - Firmware Version: v3.4.1-r272
 - Load button
- Management:**
 - Access Type: SNMP
 - IP address: 10.112.106.57
 - Modify IP button
 - VLAN: 106

At the bottom right, there are "OK" and "Cancel" buttons.

The following may be configured:

- Unit name;
- Details, such as vendor, brand and model, are modified selecting “Modify” button;
- IP address;
- Unit’s physical location information.

Version, serial number and firmware version can be updated selecting “Load” button;

Selecting **Options** → **View** → **Identification** from the menu in the unit’s window brings up a window like the one shown in Figure 28, for view only.

Unit Status

Administrative status may be changed in **Options** → **Configure** → **Administrative State**.

- In service - unit working properly
- Blocked - (Not available)
- In maintenance - under management maintenance
- Planned - registered but not inserted in the network

Figure 29. Configuring status

The screenshot shows a configuration window titled "ME4620-OLT ME4620-OLT_01". It contains the following fields and options:

- Entity:** ME4620-OLT ME4620-OLT_01
- Entity Type:** ME4620-OLT
- Administrative State:**
 - In Service
 - Blocked
 - In Maintenance
 - Planned
- Operational State:**
 - Operational
 - Not Operational
 - Degraded
 - Unknown
- Alarm State:**
 - Normal
 - Critical
 - Major
 - Minor

At the bottom right, there are "OK" and "Cancel" buttons.

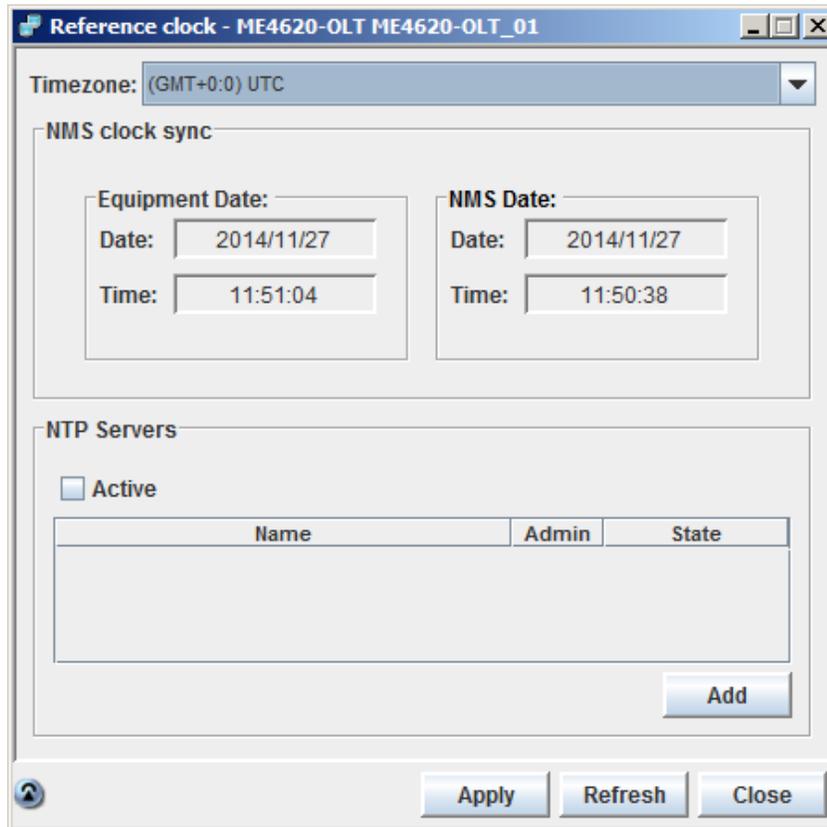
Select **Options** → **View** → **Operation States** for viewing the unit's status.

Setting the Clock

To synchronize the unit's clock with the management system, select 'Apply'.

To access this window, select **Options** → **Configure** → **Time Configuration**.

Figure 30. Setting the unit's clock



System Status

To check the status of the various hardware modules that make up the ME4620-OLT unit, select **Options** → **View** → **System status** → **Resources**, Figure 31.

Figure 31. Unit's hardware modules status

Slot ▲	Temperature (°C)	Resources (%)		
		CPU	Memory	Capacity
2	45	16.57	54.18	74.26
3	49	16.8	54.15	73.96
4	50	19.84	61.57	74.72
5	47	16.77	54.12	73.96
6	45	17.17	54.09	73.95
7	44	18.1	54.11	73.96

This window gives status information on temperature CPU, memory and capacity usage.

The ME4620-OLT unit has built-in temperature sensors. These sensors output their readings, in °C. Sensors are located on the motherboard.

Multicast

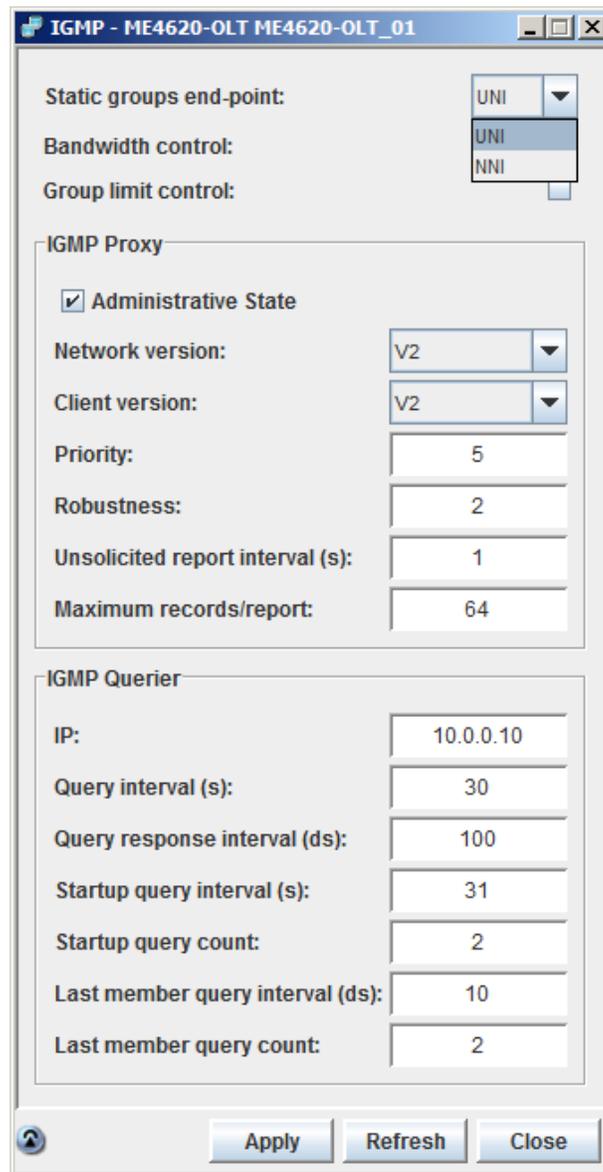
The ME4620-OLT unit offers IP Multicast functions, supporting an IGMP Proxy mechanism and also the configuration of static multicast groups and multicast probes.

IGMP

To set configurations for IGMP, select **Options** → **Configure** → **Multicast** → **IGMP**.

To view configurations for IGMP, select **Options** → **View** → **Multicast** → **IGMP**.

Figure 32. IGMP proxy and querier configuration



The following parameters, shown in Figure 32, may be configured:

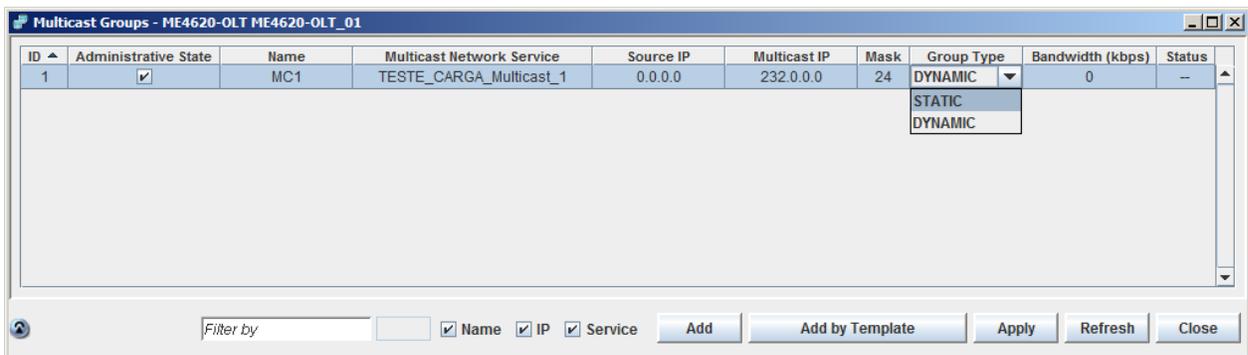
- Static groups end-point: UNI or NNI;
- Bandwidth control;
- Group limit control;
- Administrative state of the IGMP proxy;
- Network version, IGMP version used in network interfaces;
- Client version, IGMP version used in client interfaces;
- Priority and robustness given to the IGMP packets;

- Unsolicited report interval;
- Maximum records/report;
- IP address used by the IGMP proxy to send queries and to reply to network queries;
- Query Interval, time, in seconds, between general queries of clients. This can be between 30 and 1800;
- Query response interval (ds)
- Startup query interval (s) and count;
- Last member query interval(s) and count - Query Membership Interval, the time following reception of the last Membership Report (Join) after which the channel will be removed from the list of active channels. This can be between 13 And 36000 and should be greater than Query Interval + 11;

Multicast Groups

To create multicast groups, select **Options → Configure → Multicast → Multicast Groups**. This opens the window shown in Figure 33. Select 'Add' to add a new line to the table of multicast groups.

Figure 33. Creating multicast groups



Set the following parameters and select 'Apply'.

- Administrative state of the multicast group
- Name – identifies the multicast group
- Multicast Network Service – name of the multicast associated service
- Source IP – source IP address
- Multicast IP – multicast IP address for the multicast group
- Mask – group mask
- Group Type – Static or Dynamic
- Bandwidth (kbps)
- Status

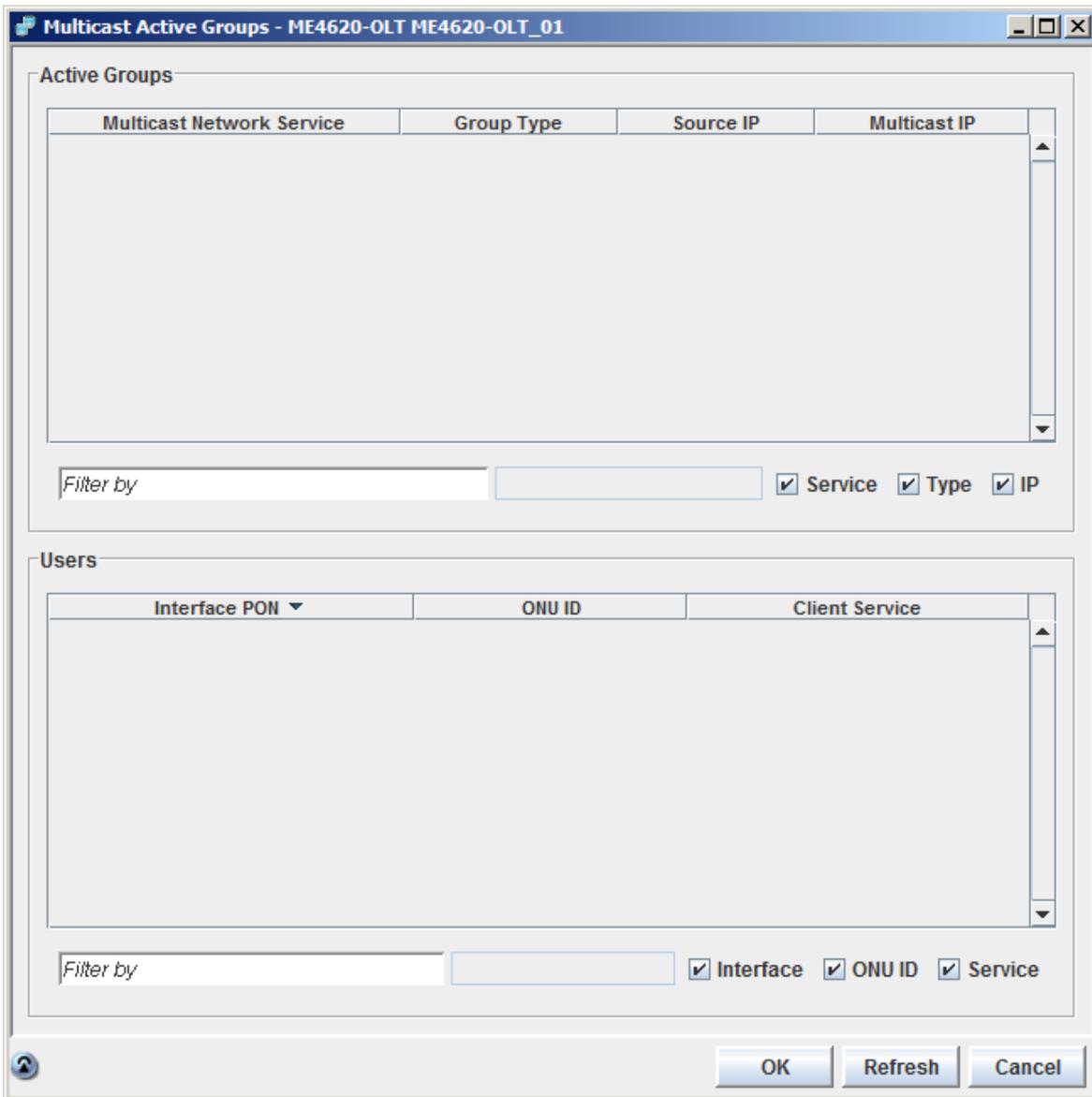
It is also possible to remove and edit information of a specific Multicast Group, in this window. To do this, right select on the target line and select the required option from the menu.

To view multicast groups already configured in the unit, select **Options → View → Multicast → Multicast Groups**.

Viewing Active Multicast Groups

It is possible to view the list of multicast channels active in the unit via **Options → View → Multicast → Multicast Active Groups**.

Figure 34. List of active multicast groups

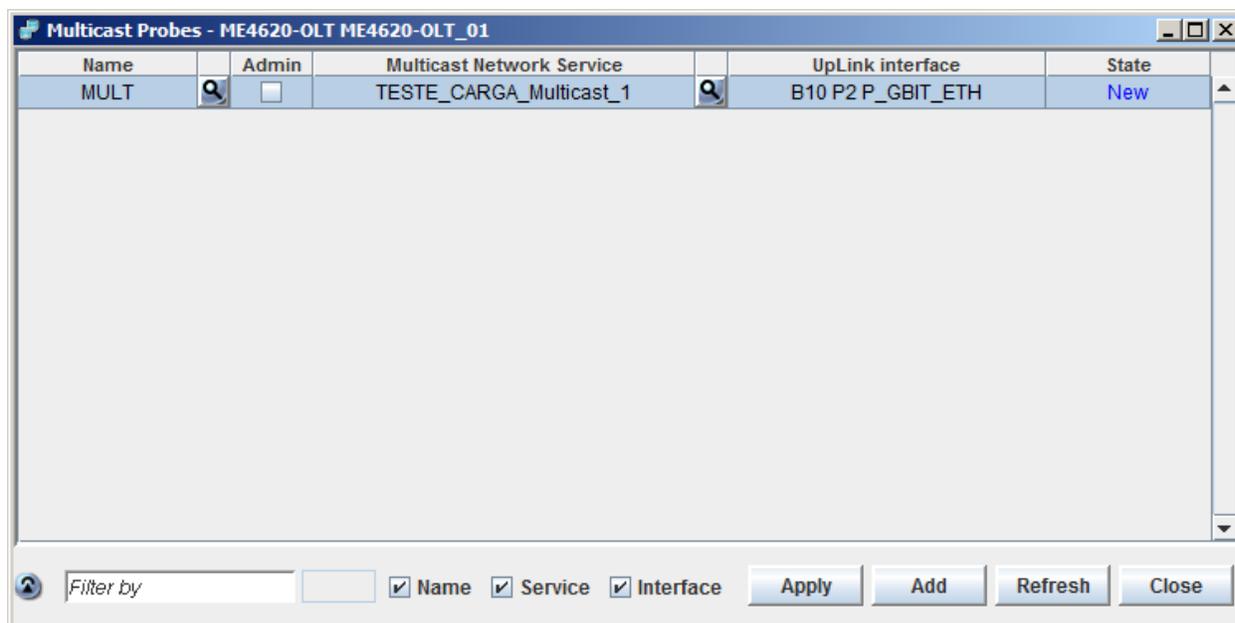


Multicast Probes

Multicast probes are used to measure QoS parameters in order to monitor and diagnose multicast based services.

To create multicast probes, select **Options** → **Configure** → **Multicast** → **Multicast Probes**. This opens the window shown in the next figure. Select ‘Add’ to add a new line to the table of multicast probes.

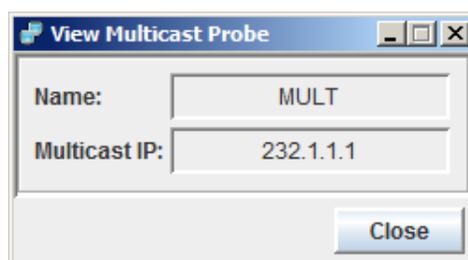
Figure 35. Multicast probes creation



Set the following parameters and select ‘Apply’.

- Name – select a probe (this field is a drop down list and shows all previously cataloged probes); for probe’s detailed information select ;

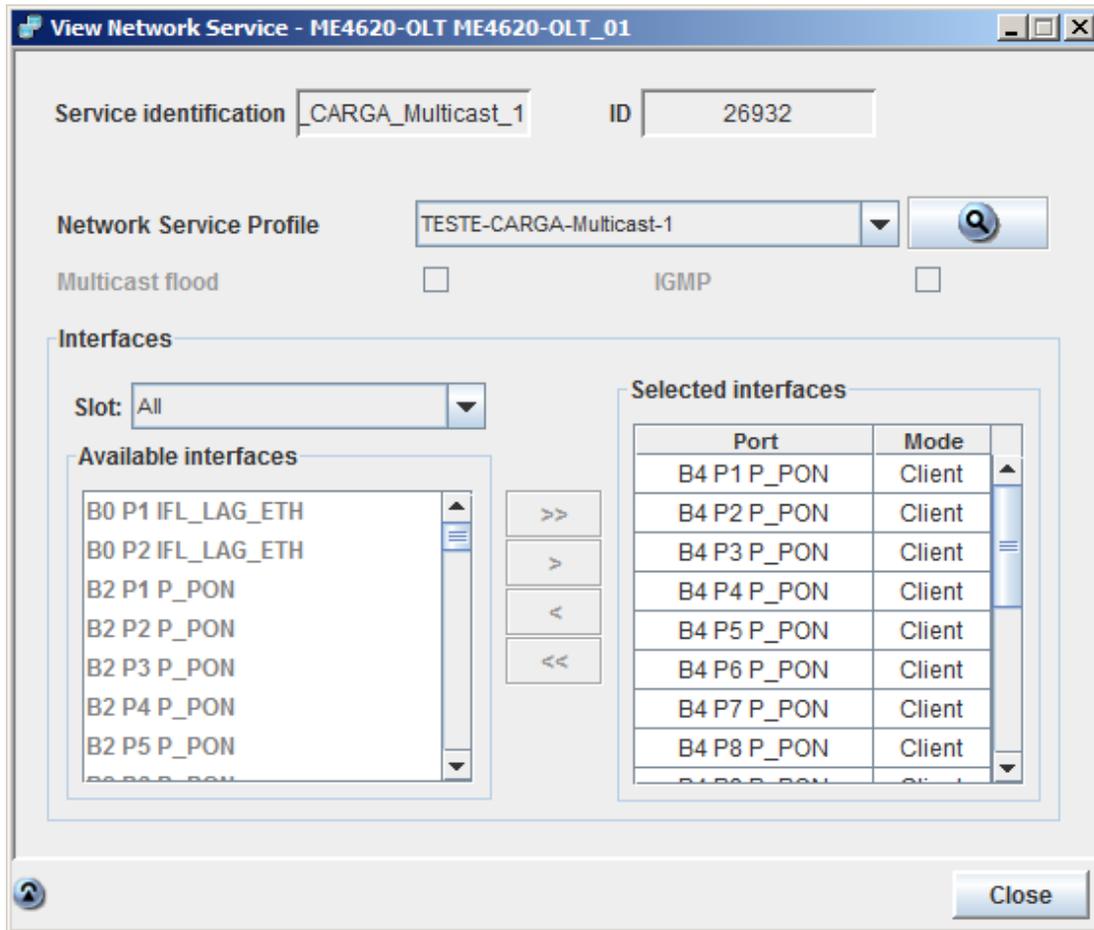
Figure 36. Multicast probe information



- Admin – administrative permissions;

- Multicast Network Service – select a network service (this field is a drop down list and shows all previously cataloged network services); for network service’s detailed information select ;

Figure 37. Multicast probe service details



- Probe Uplink Interface;
- Probe’s administrative status.

It is also possible to remove and edit information relating to existing table entries in this window. To do this, right select on the target line and select the required option from the menu.

To view multicast probes already configured in the unit, select **Options → View → Multicast → Multicast Probes**.

DHCP / DHCPv6 Relay Agent

It is possible to use this function in order to insert Option 82, Option 37, and Option 18 into DHCP packets. These options are used to insert client-specific information into the DHCP requests before they are sent to the DHCP servers. These options are removed from the DHCP packets sent by the servers before the packets are sent on to the clients.

ME4620-OLT unit records information on the exchange of DHCP packets between clients and DHCP servers, but only for those network services for which this function is active.

To view the table created by the DHCP Relay Agent in the unit, select **Options → View → DHCP Relay → Addresses List**. In the resulting window, it is possible to use filters in order to reduce the amount of information that is displayed. These filters may be created using the following fields: Port, ONU ID, Service, IP, MAC, Lease Time and NNI-CTAG.

Figure 38. Table of records created by the DHCP Relay Agent

Port	ONU ID	Service	IP	MAC	Lease Time
B4 P7 P_PON	17	TESTE_CARGA_MAC_Bridge	203.165.0.1	0E:5E:BA:4B:00:00	1h 54m 56s
B4 P7 P_PON	18	TESTE_CARGA_MAC_Bridge	203.165.0.2	0E:5E:BA:4B:00:01	1h 54m 56s
B4 P7 P_PON	19	TESTE_CARGA_MAC_Bridge	203.165.0.3	0E:5E:BA:4B:00:02	1h 54m 57s
B4 P7 P_PON	20	TESTE_CARGA_MAC_Bridge	203.165.0.4	0E:5E:BA:4B:00:03	1h 54m 56s
B4 P7 P_PON	21	TESTE_CARGA_MAC_Bridge	203.165.0.5	0E:5E:BA:4B:00:04	1h 54m 57s
B4 P7 P_PON	22	TESTE_CARGA_MAC_Bridge	203.165.0.6	0E:5E:BA:4B:00:05	1h 54m 57s
B4 P7 P_PON	23	TESTE_CARGA_MAC_Bridge	203.165.0.7	0E:5E:BA:4B:00:06	1h 54m 58s
B4 P7 P_PON	24	TESTE_CARGA_MAC_Bridge	203.165.0.8	0E:5E:BA:4B:00:07	1h 54m 58s
B4 P7 P_PON	25	TESTE_CARGA_MAC_Bridge	203.165.0.9	0E:5E:BA:4B:00:08	1h 54m 58s
B4 P7 P_PON	26	TESTE_CARGA_MAC_Bridge	203.165.0.10	0E:5E:BA:4B:00:09	1h 54m 59s
B4 P7 P_PON	27	TESTE_CARGA_MAC_Bridge	203.165.0.11	0E:5E:BA:4B:00:0A	1h 54m 59s
B4 P7 P_PON	28	TESTE_CARGA_MAC_Bridge	203.165.0.12	0E:5E:BA:4B:00:0B	1h 55m 0s
B4 P7 P_PON	29	TESTE_CARGA_MAC_Bridge	203.165.0.13	0E:5E:BA:4B:00:0C	1h 54m 59s
B4 P7 P_PON	30	TESTE_CARGA_MAC_Bridge	203.165.0.14	0E:5E:BA:4B:00:0D	1h 55m 0s
B4 P7 P_PON	31	TESTE_CARGA_MAC_Bridge	203.165.0.15	0E:5E:BA:4B:00:0E	1h 55m 0s
B4 P7 P_PON	32	TESTE_CARGA_MAC_Bridge	203.165.0.16	0E:5E:BA:4B:00:0F	1h 55m 0s
B4 P14 P_PON	9	TESTE_CARGA_MAC_Bridge	214.165.0.1	12:0C:FC:C1:00:00	1h 54m 58s
B4 P14 P_PON	10	TESTE_CARGA_MAC_Bridge	214.165.0.2	12:0C:FC:C1:00:01	1h 54m 58s
B4 P14 P_PON	11	TESTE_CARGA_MAC_Bridge	214.165.0.3	12:0C:FC:C1:00:02	1h 54m 58s
B4 P14 P_PON	12	TESTE_CARGA_MAC_Bridge	214.165.0.4	12:0C:FC:C1:00:03	1h 54m 58s

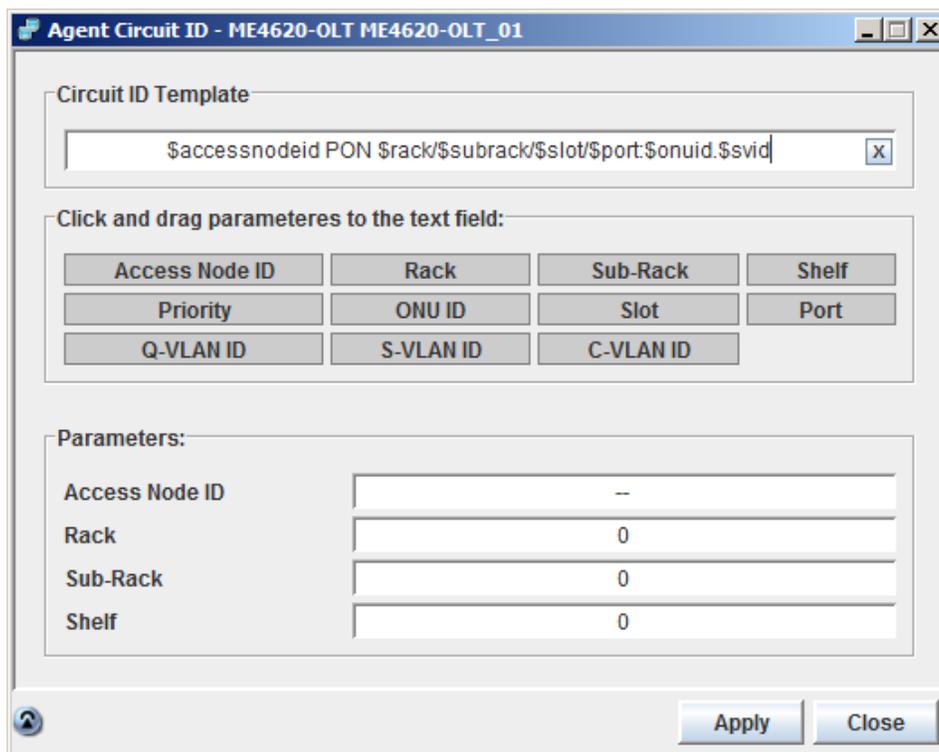
The window accessed through **Options → Configure → DHCP Relay → Addresses List**, is identical to the one shown in Figure 38, with an additional feature that allows deleting table entries.

Agent Circuit ID

This option allows client-specific information to be inserted into the DHCP packets, **Options → Configure → DHCP Relay → Agent Circuit ID**.

The syntax for circuit ID template string is display on the field to help building the string. To complete the information Access Node ID, Rack, Sub-Rack and Shelf must be filled in.

Figure 39. Agent Circuit ID configuration



Select **Options → Configure → DHCP Relay → Service** to configure DHCP network services.

Figure 40. Service DHCP configuration



For each DHCP service configuration, options 18, 37 and 82 can be enabled and the priority (pbit) value in DHCP packet's header can be set.

If “Global” is checked then the Circuit ID configured in Global DHCP configuration window is used. If “Global” is unchecked a specific Circuit ID Template can be redefined.

Figure 41. Circuit ID Template

Service	Options			Priority	Broadcast flag	Global	Circuit - ID
	18	37	82				Template ID
TESTE_CARGA_MAC_Bridge	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5	Transparent	<input type="checkbox"/>	\$accessnodeid PON \$rack/\$subrack/\$slot/\$port.\$sonuid.\$svid

Circuit ID Template:

Click and drag parameteres to the text field:

Access Node ID	Rack	Sub-Rack	Shelf
Priority	ONU ID	Slot	Port
Q-VLAN ID	S-VLAN ID	C-VLAN ID	

Apply Cancel

Refresh Apply Close

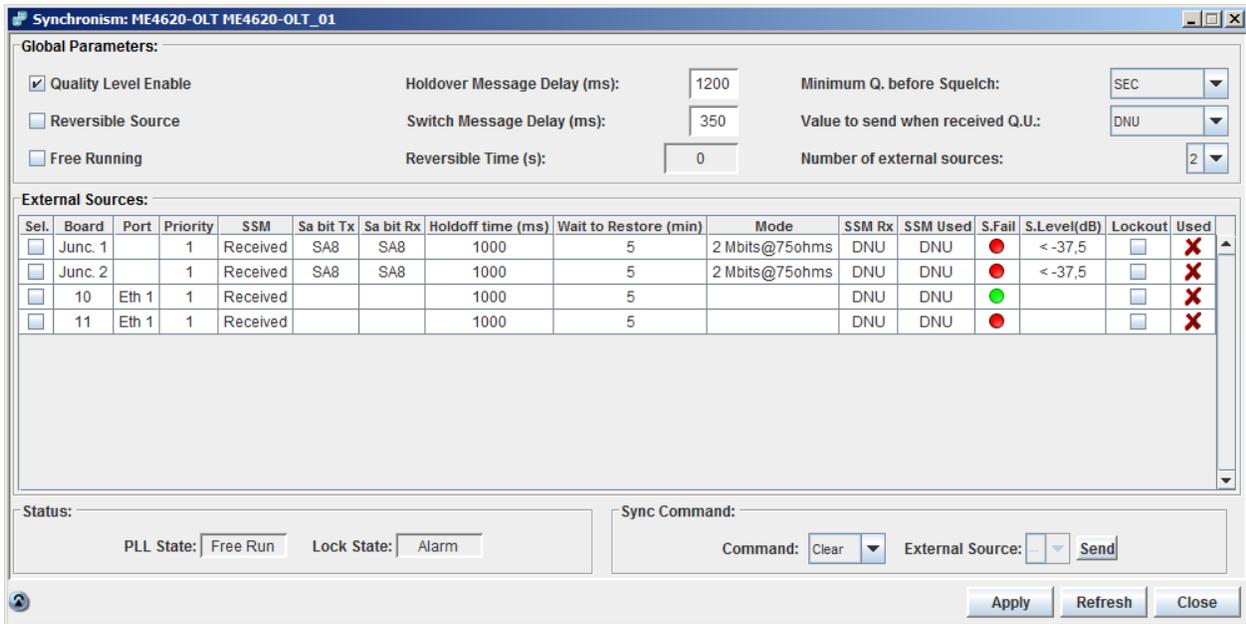
Synchronism

The ME4620-OLT unit may use several synchronism sources and respective configurations, which can be configured selecting **Options → Configure → Synchronism** or viewed using **Options → View → Synchronism**.

The available options allow:

- Global parameters configuration
- External sources selection
- PLL status monitorization
- Sync command configuration for an external source

Figure 42. Synchronism



MAC address table

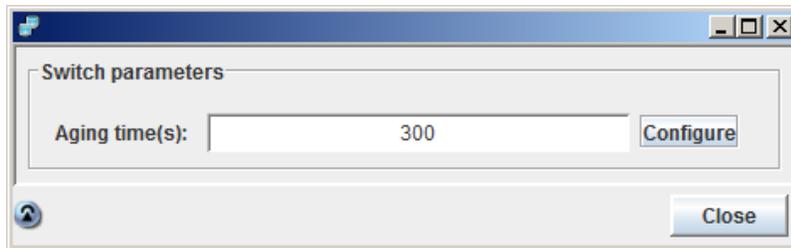
The ME4620-OLT unit maintains MAC address tables, in which it records the MAC addresses captured in the context of network services with MAC learning.

Addresses are removed from the table by an aging mechanism, controlled by the 'Aging Time' parameter. Thus, when a table entry has been inactive for a given number of seconds (aging time), it is removed from the table. These entries may also be removed by configuration.

Switch parameters

To configure the global switch parameters from the menu in the unit's window select **Options → Configure → MAC address table → Switch parameters**.

Figure 43. Switch parameters



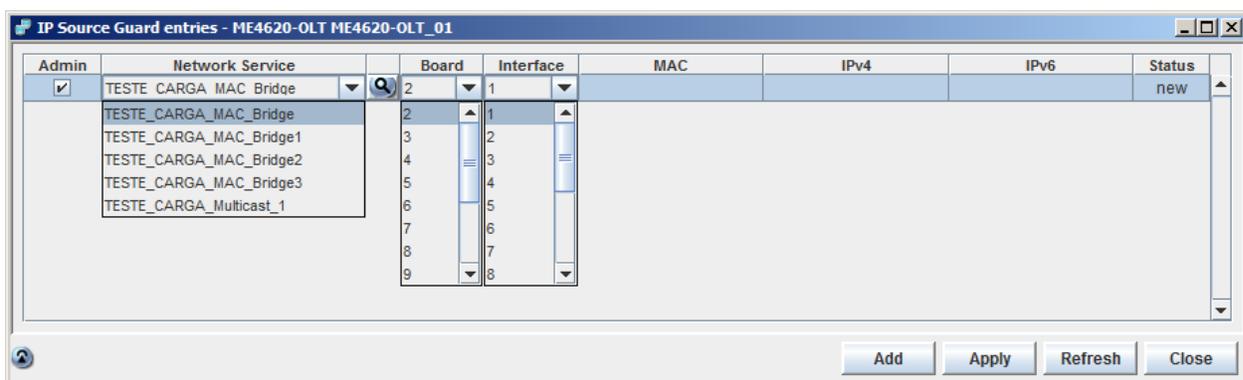
The aging time parameter can be configured. To do this, input the new value and select 'Configure'. It is possible to set values between 10 and 1000000. If values outside this interval are set, the application will automatically substitute the nearest end of range value.

IP Source Guard Table

IP Source Guard provides source IP address filtering on a Layer 2 port to prevent a malicious host from impersonating a legitimate host by assuming the legitimate host's IP address. The feature uses dynamic DHCP snooping and static IP source binding to match IP addresses to hosts on untrusted Layer 2 access ports (source: <http://www.cisco.com/c/en/us/td/docs/switches/lan/catalyst6500/ios/12-2SX/configuration/guide/book/ipsrcgrd.html>).

To configure IP source guard tables in the ME4620-OLT, select **Options → Configure → IP Source Guard Table** (Figure 44).

Figure 44. Switch parameters



To enable an IP Source guard entry, the configurations must be:

- Admin – Network service must be added in administrative mode;
- Network Service – The associated network service can be of any type (unicast, mutlicast etc);
- Board/Interface - IP source guard interface must be:
 - PON or ETH;
 - “IP Source Guard Enabled” on its configurations;
 - Admin up;
 - Belong to the network service downlink list;
 - If the Selected IP Source guard interface is ETH, the respective card slot must belong to the network service downlink card list;
- MAC:
 - selected MAC cannot be full zeros;
 - selected MAC must be a MAC unicast (the least significant bit of the most significant octet must be zero);
- IPv4/IPv6:

- Are mutually exclusive. Cannot have both IPs on the same entry and one entry must have one IP defined. It is allowed to have one entry with IPv4 and another with IPv6 for the same MAC.

Network Services

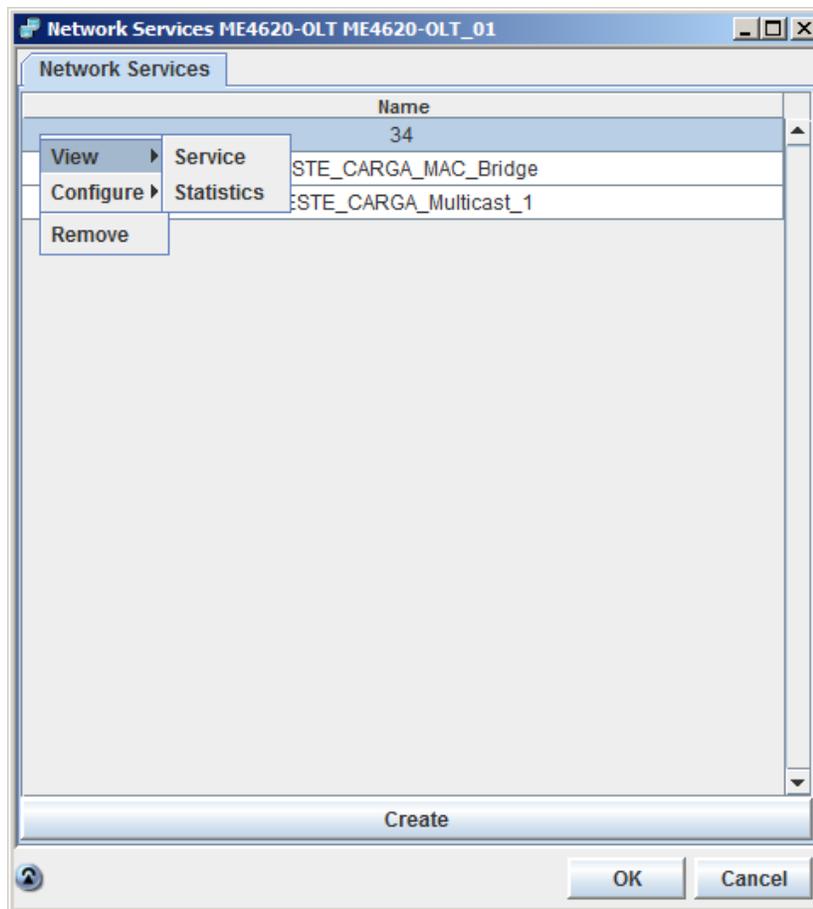
This menu option can be used to manage Network Services at the ME4620-OLT unit level. These are created using Network Service profiles that were previously created in the catalog, at the management system level, and without reference to any particular unit.

To configure Network Services in the unit, select **Options** → **Configure** → **Network Services** → **Services**. This opens a window with a list of services that have already been created and offers options for managing and creating new services, Figure 45.

Right select on a service to bring up the menu for viewing service’s parameters or statistics, removing the service or modifying service’s parameters, as shown in Figure 45.

Use the **View** → **Data** option to view service data in a window. Use the configure option to modify service parameters.

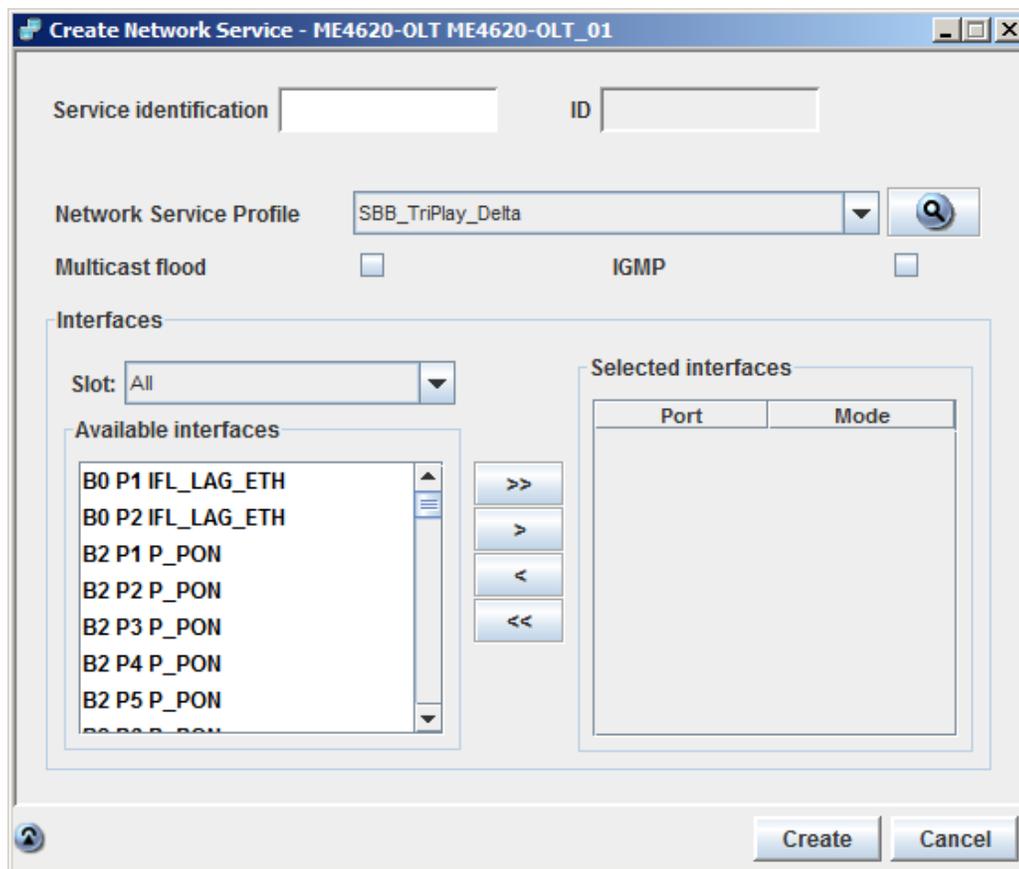
Figure 45. List of Network services



Select ‘Create’ to bring up Network Service creation window, Figure 46.

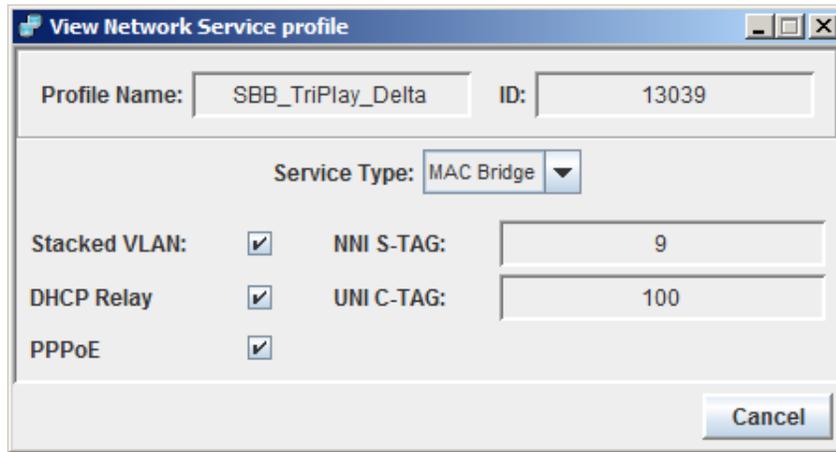
To create a new network service the Service Identification field must be filled in, select the Network service profile from the catalog (see section Ethernet Network Service Profiles) and the uplink and PON interfaces over which it is intended to apply the service.

Figure 46. Creating Network services



After choosing a network service profile from the list, use  to view its details.

Figure 47. Network Service profile



To complete the operation select 'OK'.

To remove Network services right select the service from the service list, to access the menu shown in Figure 43 and select Remove.

Note that it is only possible to remove services which are not in use.

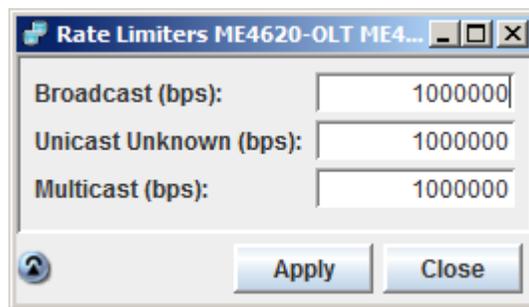
Rate Limiters

It is possible to rate limit Network Services.

To configure Rate Limiters of Network Services, select **Options** → **Configure** → **Network Services** → **Rate Limiters**. A window is opened with configurable Rate Limiters such as:

- Broadcast (bps)
- Unicast Unknown (bps) and
- Multicast (bps)

Figure 48. Rate Limiters



ACL - Access Control Lists

ACLs are created at the global level Catalog Management (see section Global ACLs) and further on, they can be applied to network services and particular interfaces of an OLT unit. Unit specific access control lists and rules are created and visible only in the OLT unit level context.

To configure ACLs of a particular unit select **Options → Configure → ACLs → Catalogs**.

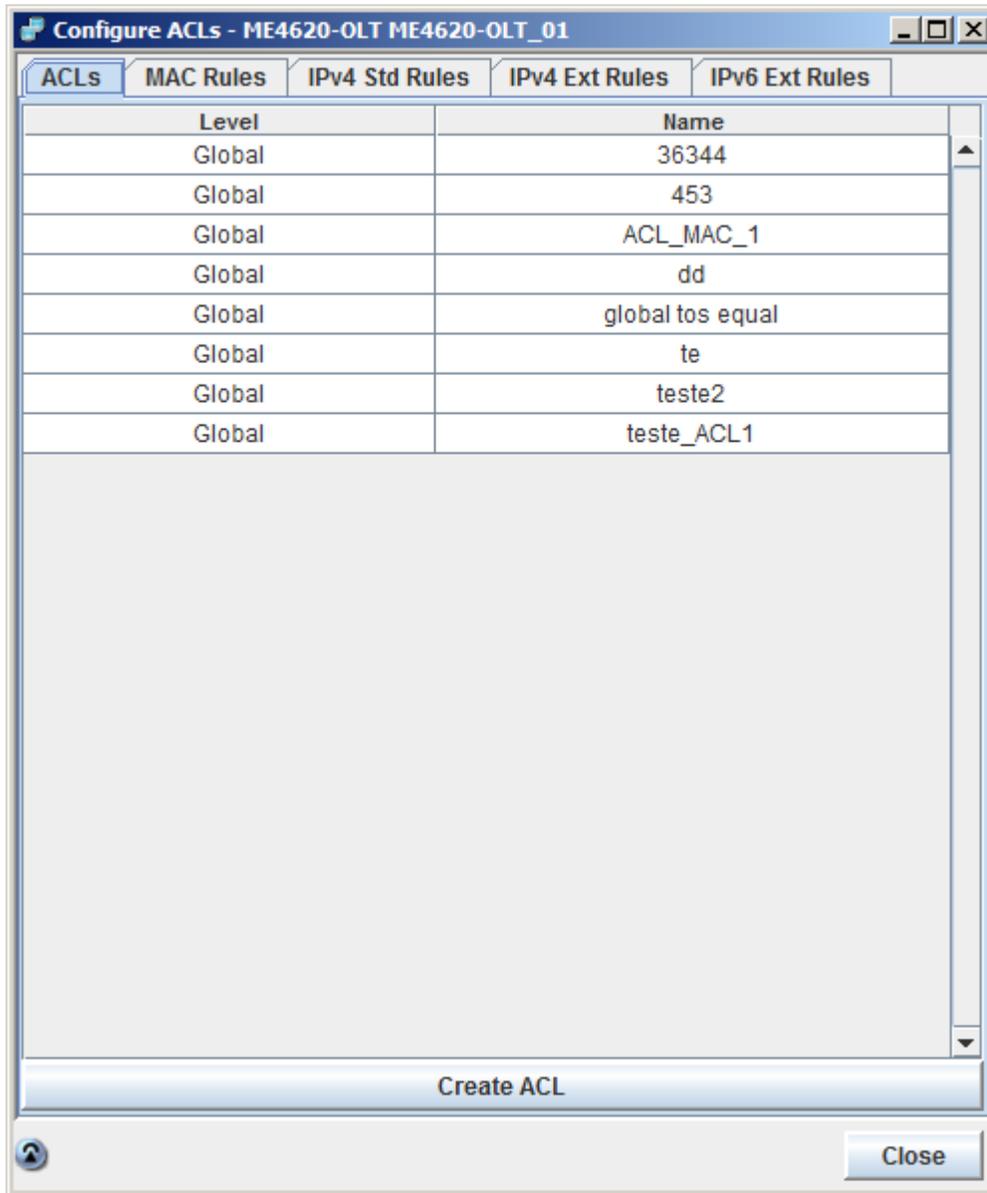
This option allows the creation of a particular ACL Catalog for a specific selected unit. All global ACLs created in the catalog at the management system are listed in Figure 49.

All rules aggregated in an ACL must be of the same type as the ACL.

All global rules created in the catalog at the management system (see section Global ACLs) are listed, and can be aggregated to the ACL. Specific unit rules can be created. Rules can be of 4 different types:

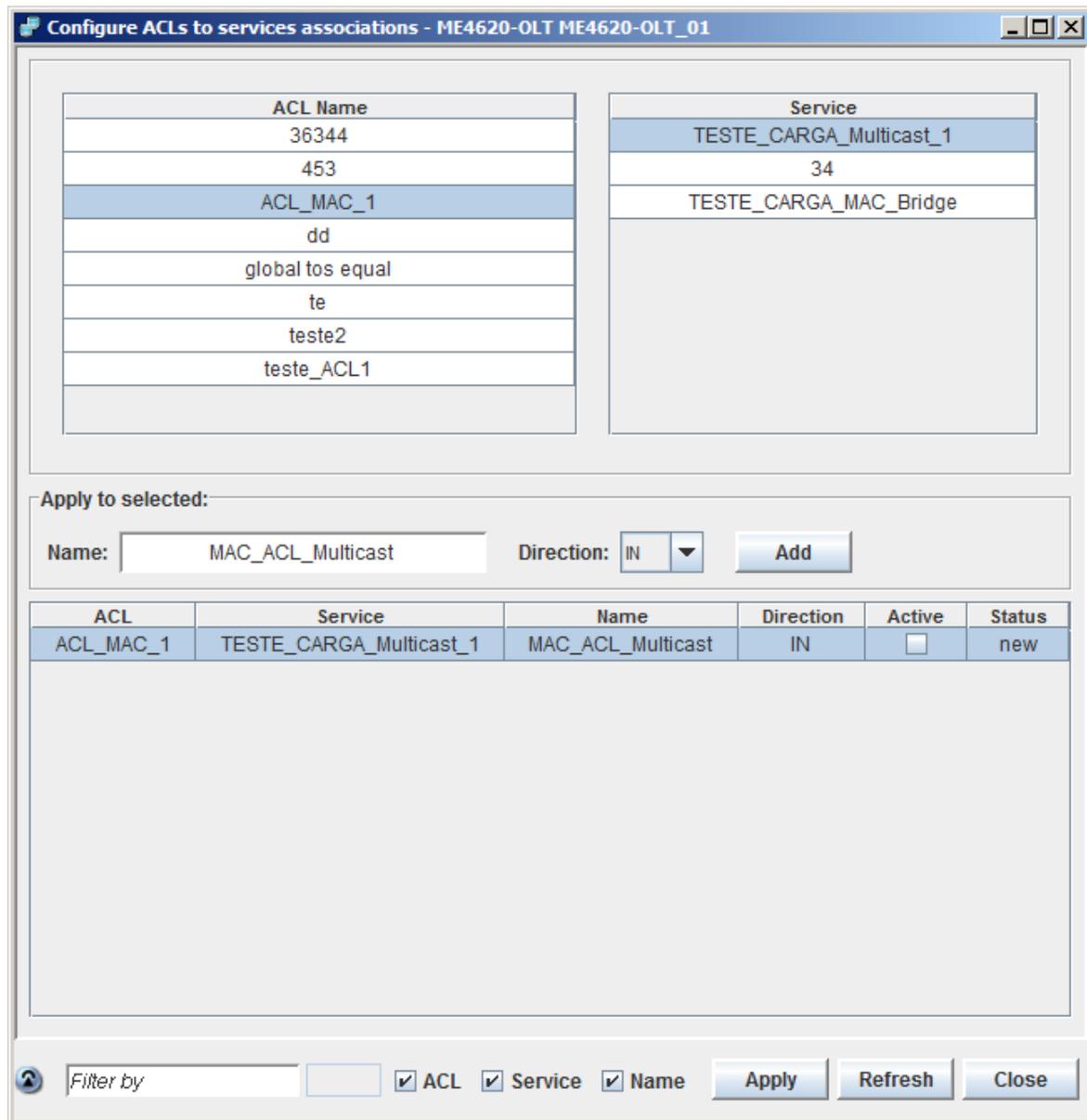
- MAC Rules
- IPv4 Std Rules
- IPv4 Ext Rules
- IPv6 Ext Rules

Figure 49. ACLs configuration



Unit specific cataloged ACLs can be applied to a specific network service selecting **Options** → **Configure** → **ACLs** → **Services**.

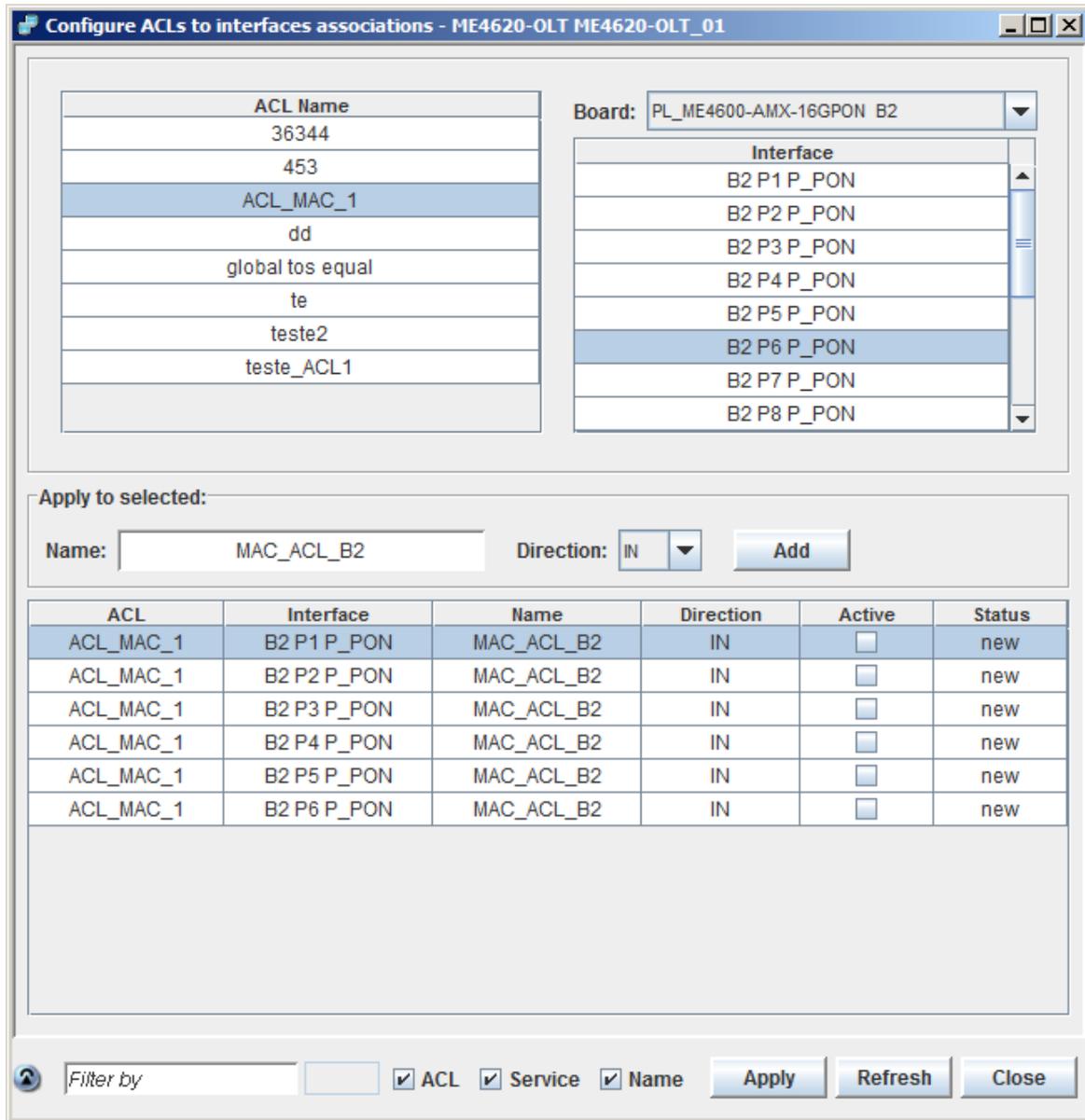
Figure 50. ACLs to services associations configuration



To apply an ACL to a network service the name of the association must be filled in and also the direction of the filtered traffic (IN, OUT or BOTH).

Access control lists can also be applied to a specific interface **Options** → **Configure** → **ACLs** → **Interfaces**.

Figure 51. ACLs to interfaces associations configuration

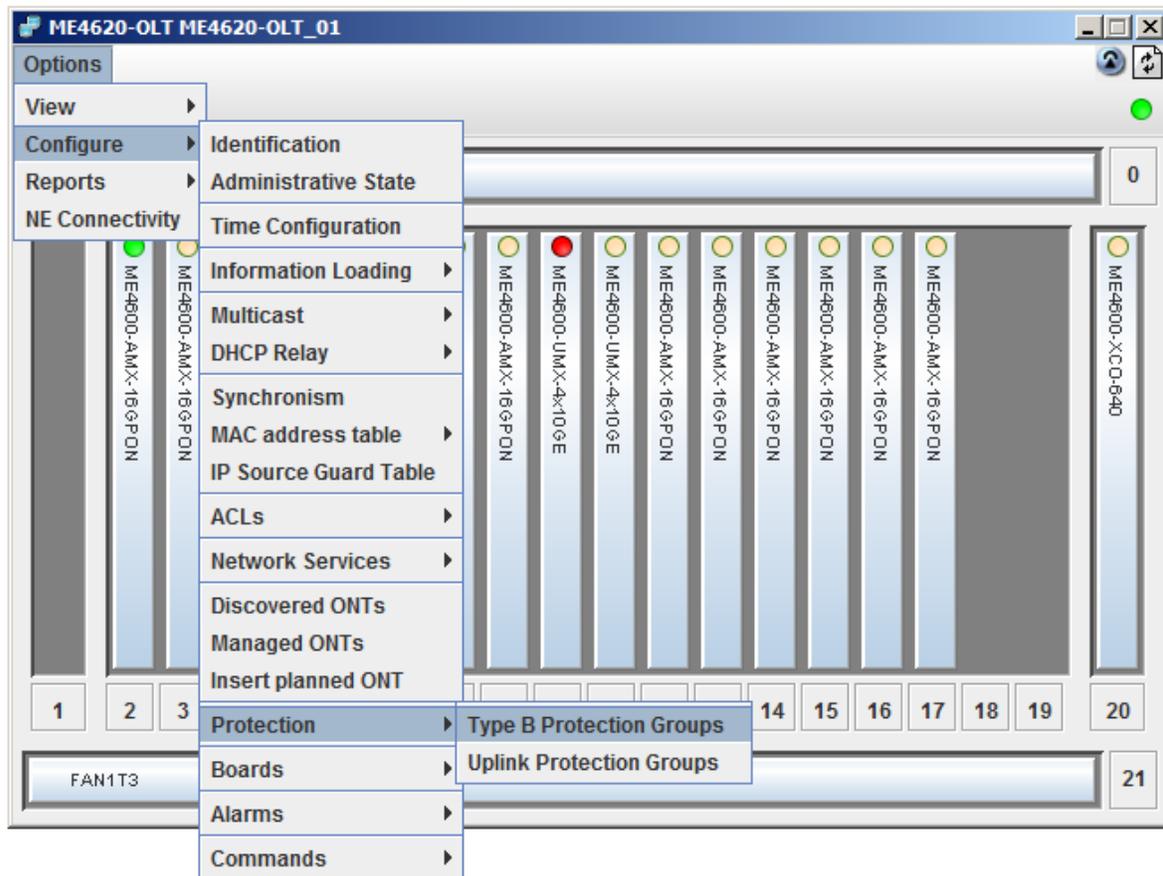


All that has been previously explained for network services can be applied to uplink and GPON line board interfaces.

Type B Protection Groups

Type B 1:1 Protection Groups are available at the OLT unit level. To configure or view type B protection groups select **Options → Configure → Protection → Type B Protection Groups** or **Options → View → Protection → Type B Protection Groups** in the Units menu, respectively.

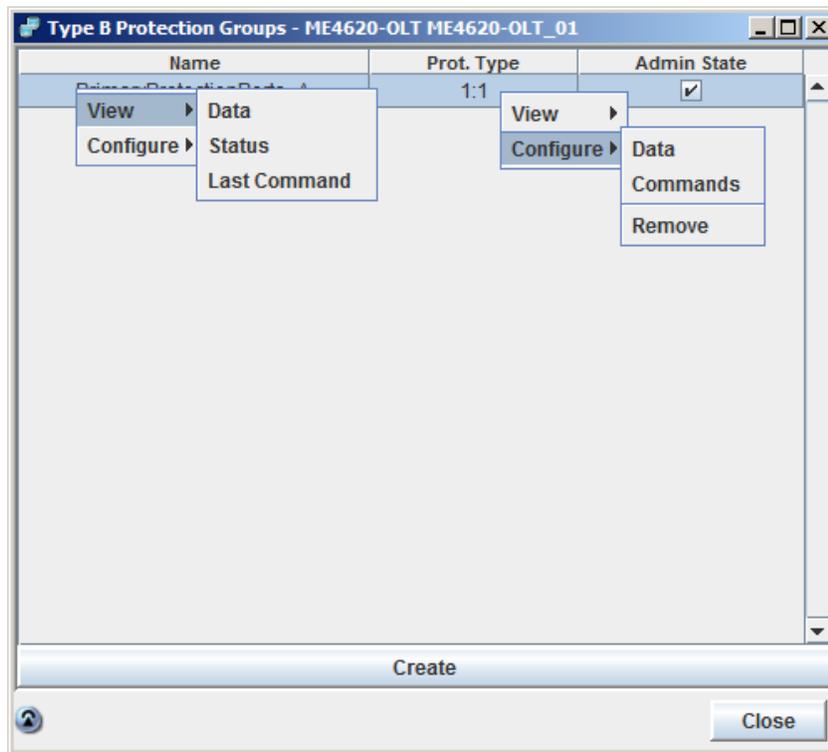
Figure 52. Type B Protection Groups



It is possible to configure or view a specific type B protection group selecting on it with the mouse right button.

The available options are: “Data”, where all the protection group details are available; “Status”, for checking which protection group is active; “Commands” and “Last Command” sent to control the protection groups; and “Remove, for removing a protection group.

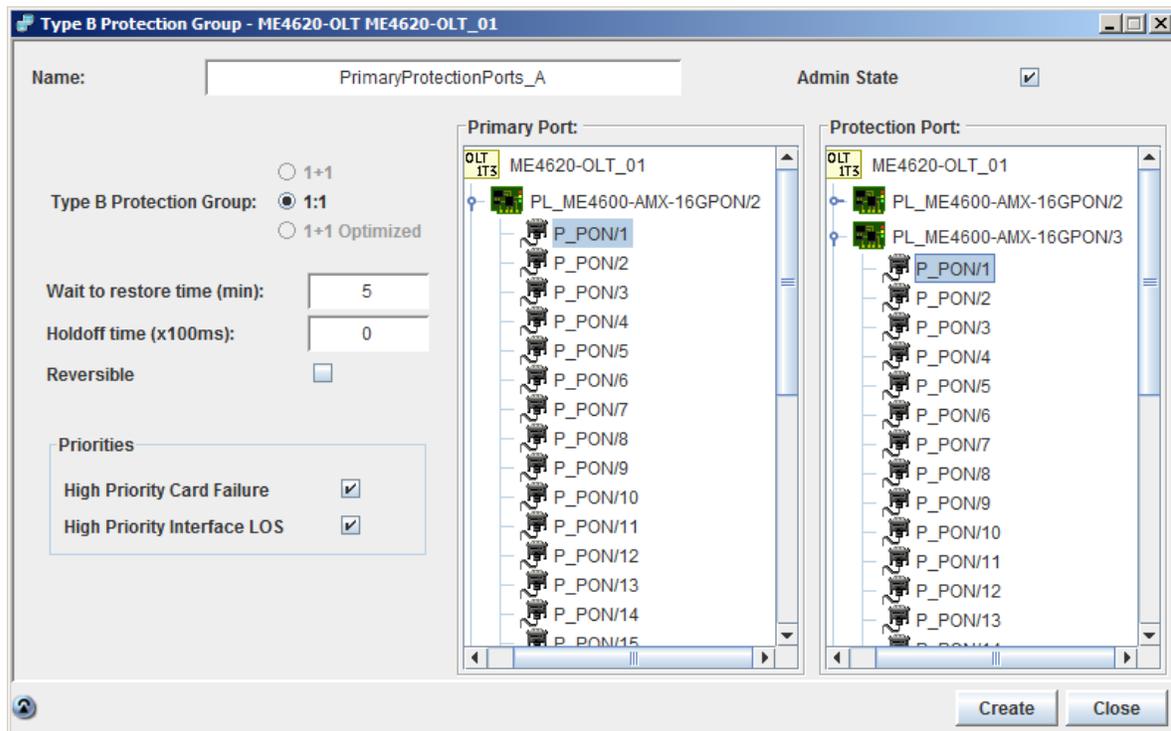
Figure 53. Type B Protection Groups configuration



To create or configure a type B protection group select “Create” button or **Configure → Data** in the later figure. A window is opened with configurable fields such as:

- Name
- Administrative State
- Primary and Protection ports
- Wait to restore time
- Holdoff time
- Reversible
- Priorities
 - High priority card failure
 - High priority interface LOS

Figure 54. Type B Protection Groups details

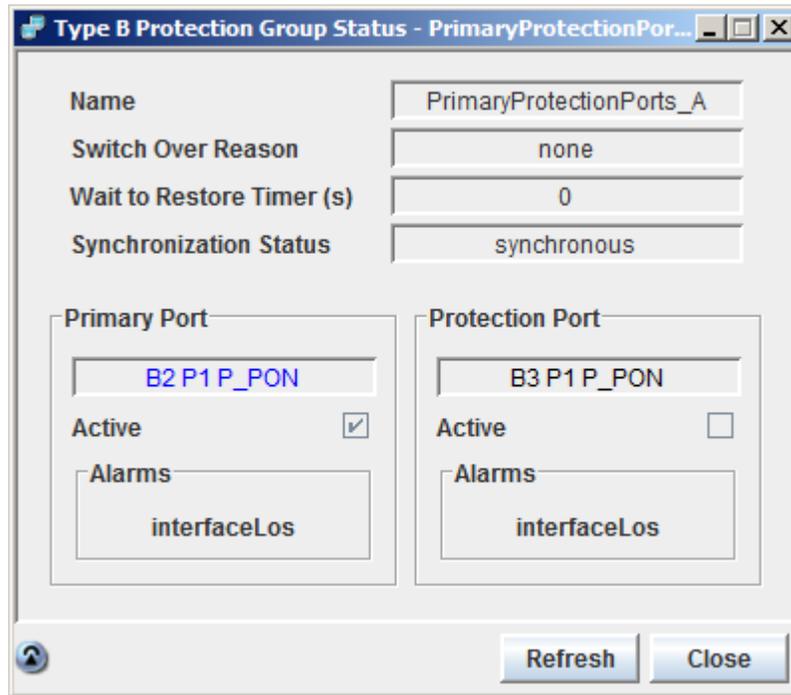


In order to configure a type B protection group, the protection port must be located in a different card from the primary port, and it must have no services configured.

A type B protection group status (**View** → **Status**) has the fields:

- Name
- Switch over reason
- Wait to restore timer
- Synchronization Status
- Primary port
- Protection port
- Active state
- Alarms

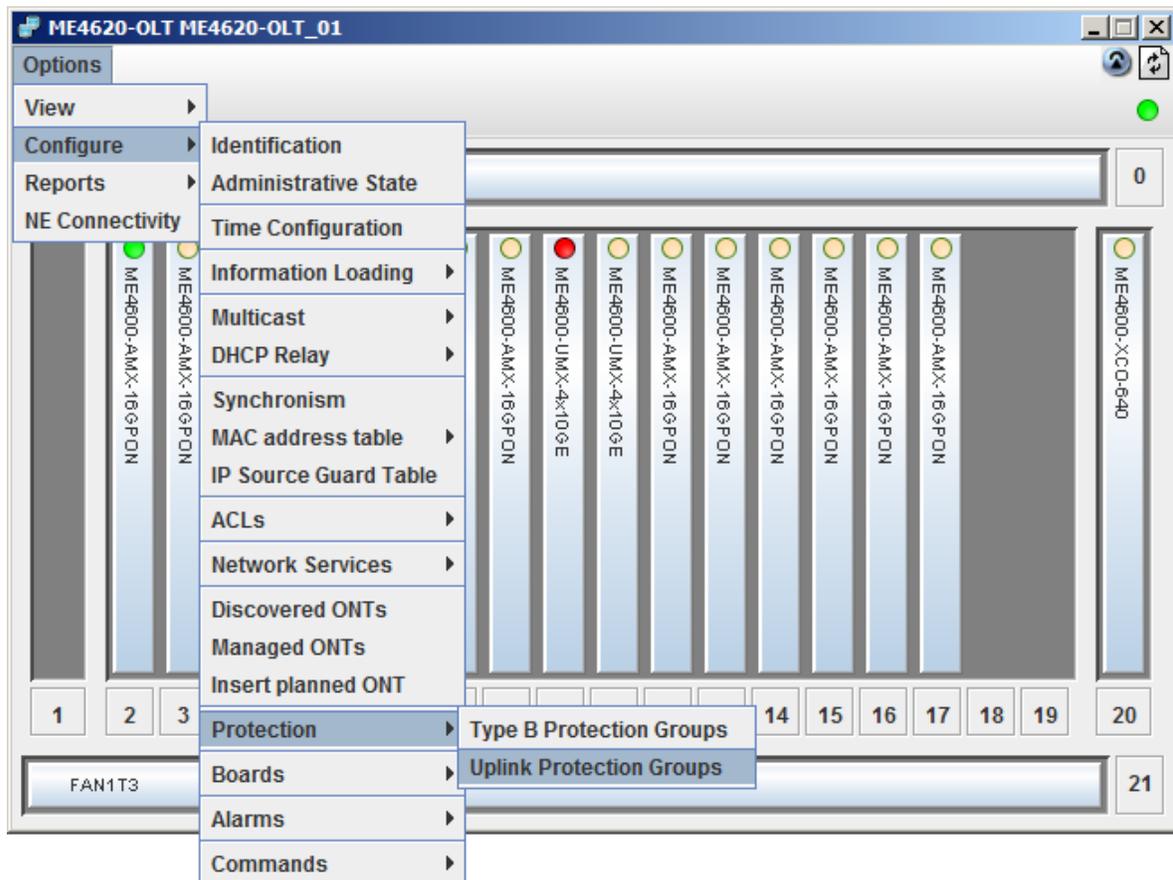
Figure 55. Type B Protection Groups status



Uplink Protection Groups

Uplink Protection Groups are available at the OLT unit level. To configure or view type B protection groups select **Options → Configure → Protection → Uplink Protection Groups** or **Options → View → Protection → Uplink Protection Groups** in the Units menu, respectively.

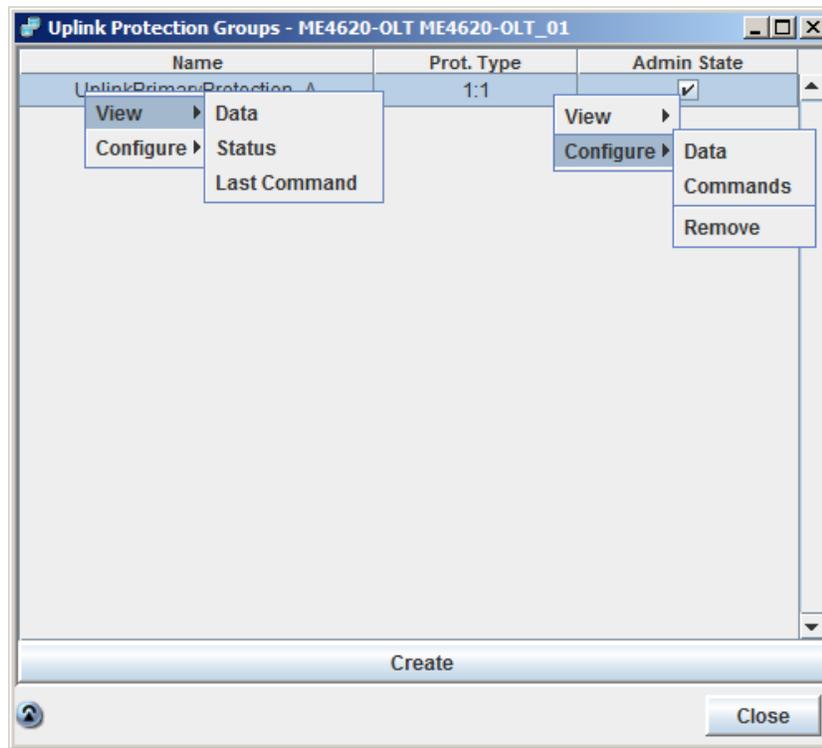
Figure 56. Uplink Protection Groups



It is possible to configure or view a specific uplink protection group selecting on it with the mouse right button.

The available options are: “Data”, where all the protection group details are available; “Status”, for checking which protection group is active; “Commands” and “Last Command” sent to control the protection groups; and “Remove, for removing a protection group.

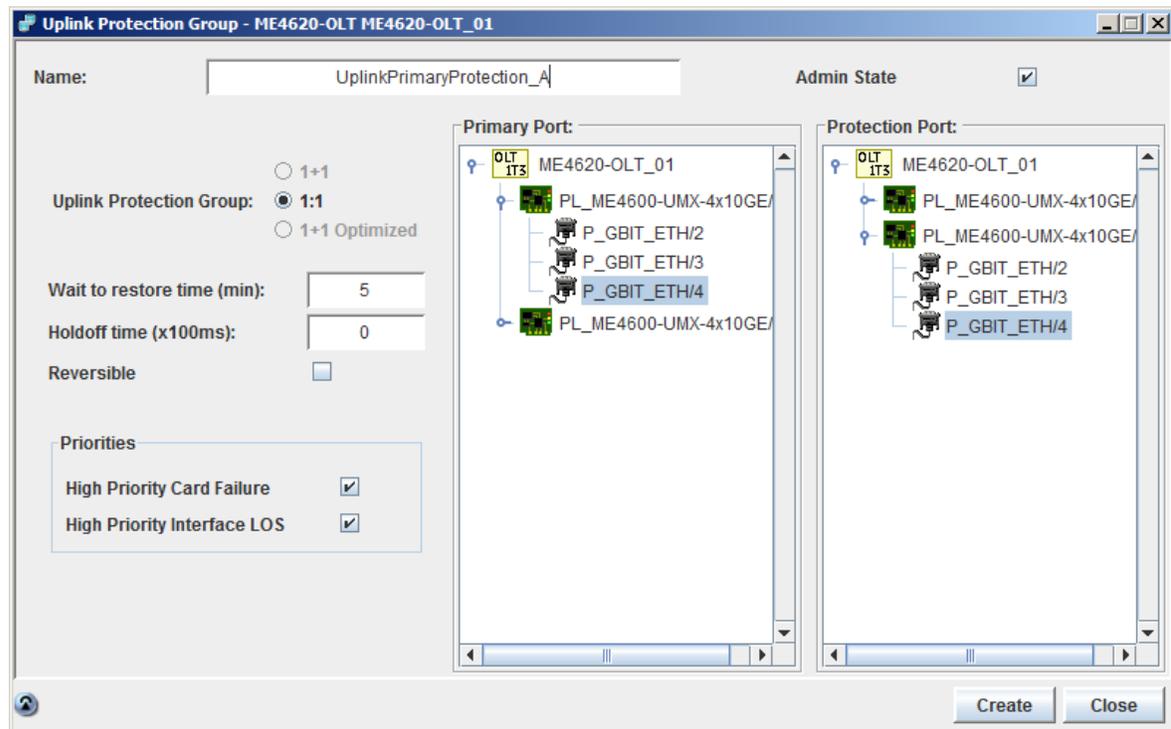
Figure 57. Uplink Protection Groups configuration



To create or configure an uplink protection group select “Create” button or **Configure → Data** in the later figure. A window is opened with configurable fields such as:

- Name
- Administrative State
- Primary and Protection ports
- Wait to restore time
- Holdoff time
- Reversible
- Priorities
 - High priority card failure
 - High priority interface LOS

Figure 58. Uplink Protection Group details

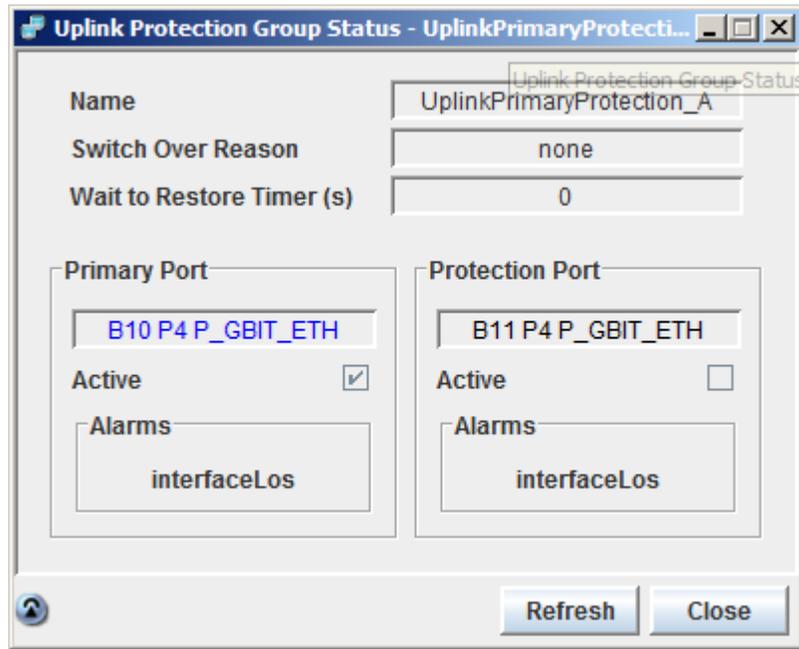


In order to configure an uplink protection group, the protection port must be located in a different card from the primary port, and it must have no services configured.

An uplink protection group status (**View** → **Status**) has the fields:

- Name
- Switch over reason
- Wait to restore timer
- Primary port
- Protection port
- Active state
- Alarms

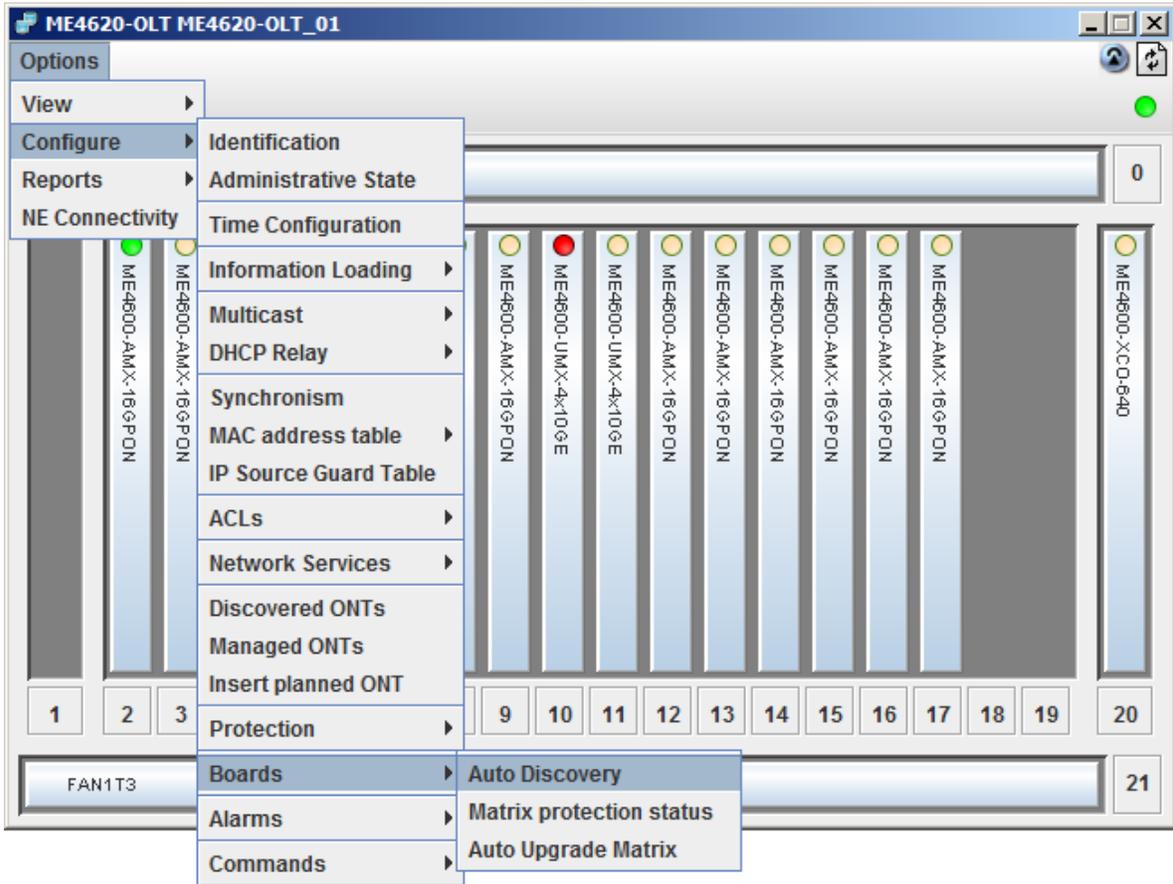
Figure 59. Uplink Protection Group Status



Boards Autodiscovery

After inserting a new board in the OLT unit equipment, it is necessary to update the unit's view selecting **Options** → **Configure** → **Boards** → **Auto Discovery** in the units menu.

Figure 60. Boards Auto Discovery

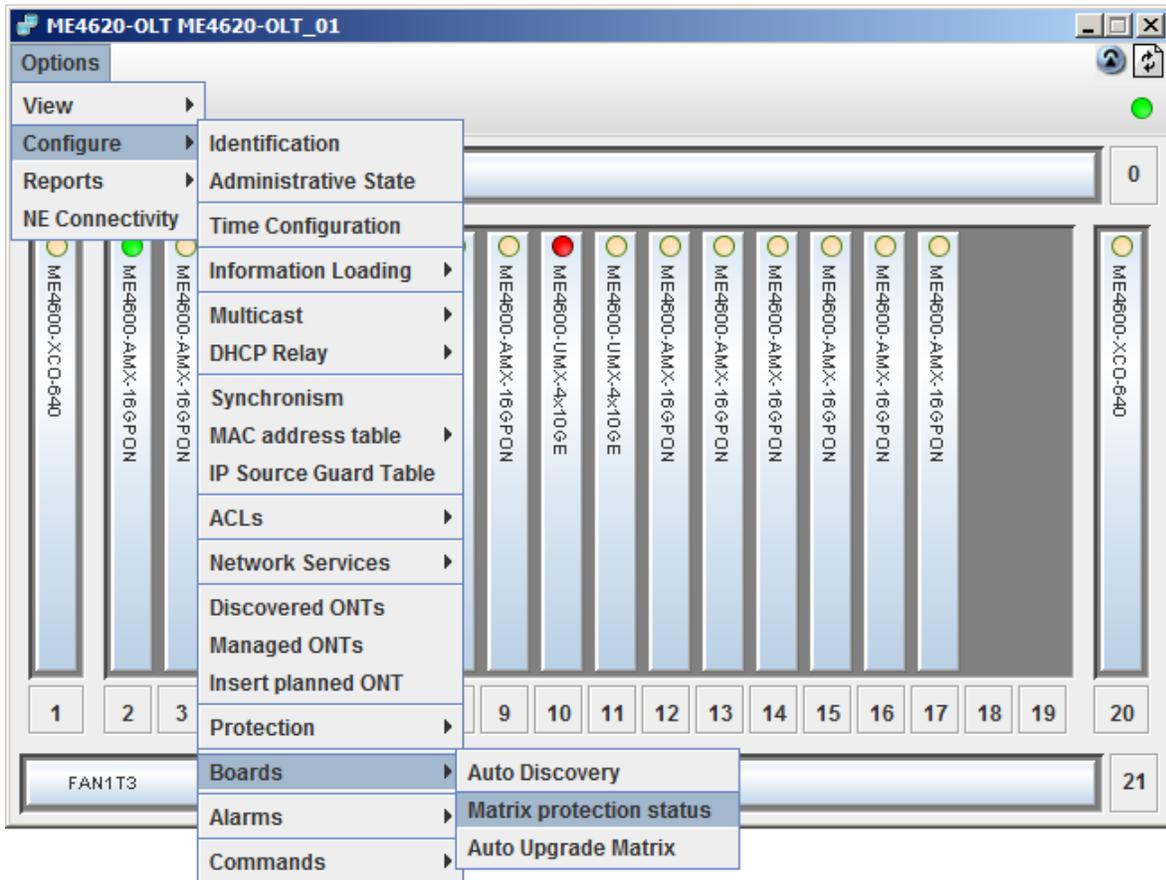


A refresh is made to the unit’s view and the board new view will appear.

Matrix Protection Status

To configure or view the Matrix protection status select **Options → Configure → Boards → Matrix Protection Status** or **Options → View → Boards → Matrix Protection Status** in the Units menu, respectively.

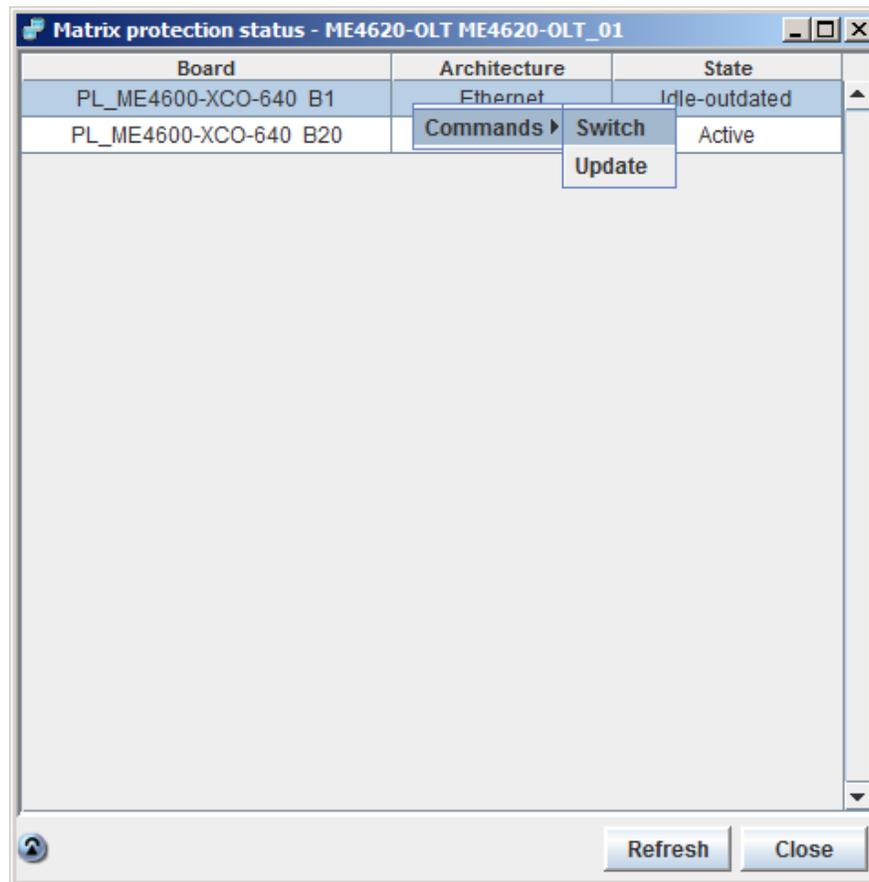
Figure 61. Matrix protection status



This configuration option provides access to the “Switch” command which allows switching system processing features between one and the other Matrix unit.

It also provides access to the “Update” command which allows updating the Matrix unit database if its state is outdated.

Figure 62. Matrix protection status configuration



Auto Upgrade Matrix

For configuration or viewing the Matrix auto upgrade option, select **Options → Configure → Boards → Auto Upgrade Matrix** or **Options → View → Boards → Auto Upgrade Matrix** in the Units menu, respectively.

Figure 63. Auto Upgrade Matrix

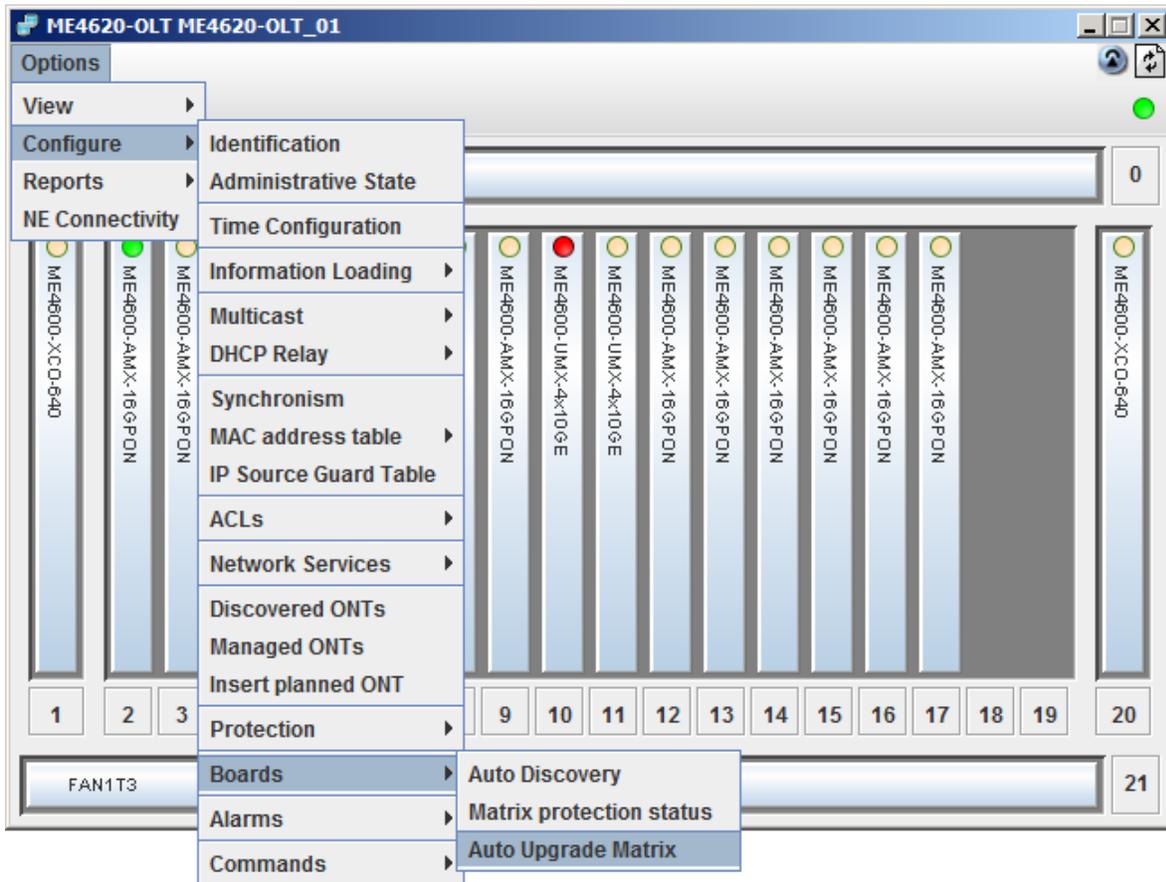


Figure 64. Auto Upgrade Matrix apply



Chapter 4

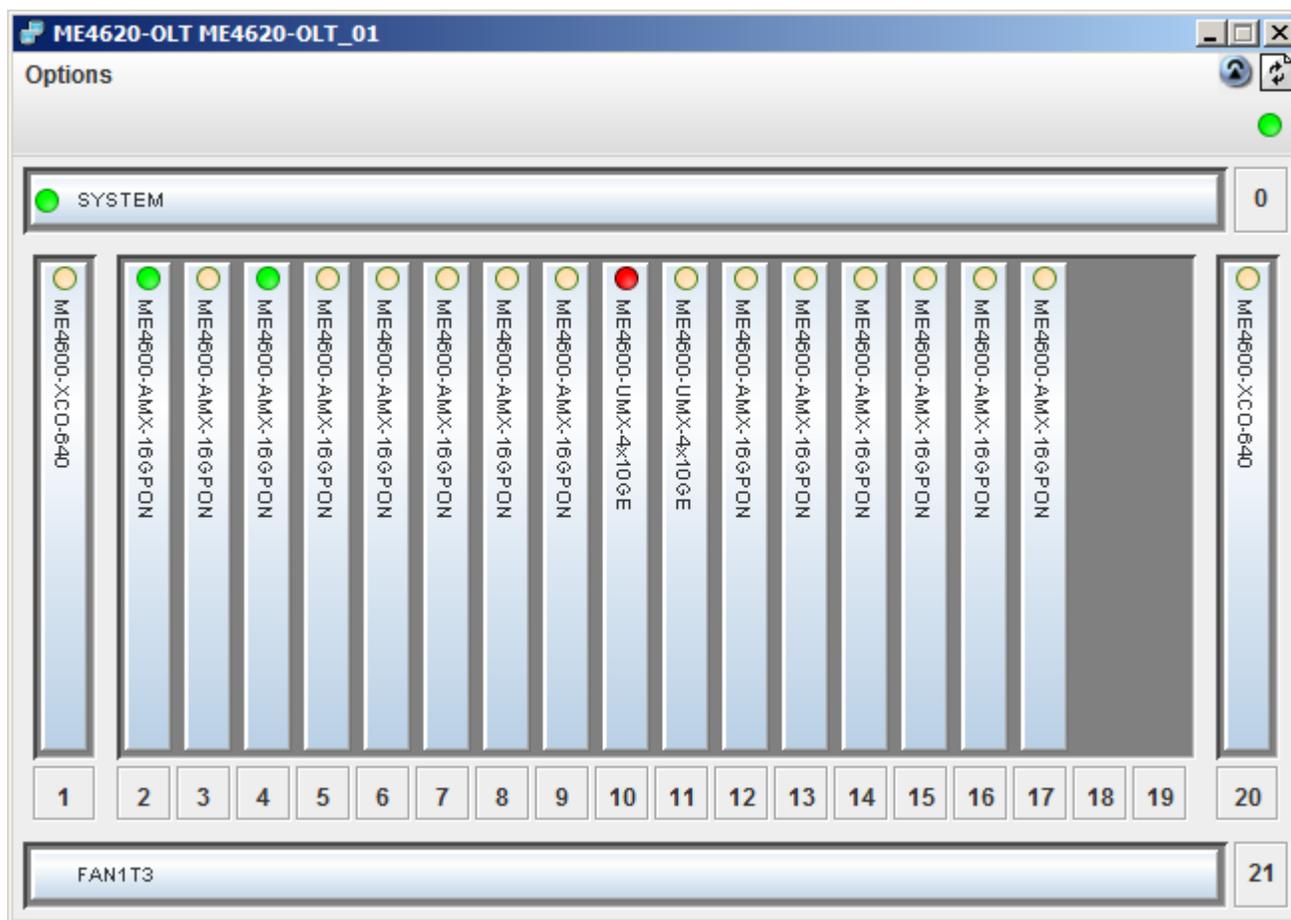
OPERATIONS ON BOARDS AND PORTS

Summary

The window in Figure 65 represents the ME4620-OLT unit in the management system, showing its physical boards constitution.

Right select on boards in Figure 65 to access its view and configuration menus.

Figure 65. Unit representation



Left select on a board in Figure 65 to open a window with its ports list, as shown in Figure 66. Ports are grouped by type.

Figure 66. Ports list

ID	Description	Name	Administrative State	Operacional Status	Alarms	Loop	State
1	Eth 1	--	In Service	Operational			●
2	Eth 2	--	In Service	Operational			●
3	Eth 3	--	In Service	Operational			●
4	Eth 4	--	In Service	Not Operational	SFP_OUT		●

Selecting on the “Administrative State” column of a table entry (Figure 66), brings up a combo box with the options for changing the administrative state of a port (in service, blocked, planned, or in maintenance).

Selecting on the “Alarms” column of a table entry (Figure 66), brings up a combo box with the list of alarms for that port (SFP not inserted, loss of signal, or link down).

Identification

The menu option is common to all port types. It is possible to access it right selecting on the port, **View** → **Identification** or **Configure** → **Identification**.

Figure 67 shows the window for configuring the identification of the selected port. Enter the identification string in this window and select ‘OK’.

Figure 67. Port's identification configuration

ME4620-OLT_01 B10 P3

Identification:

Port Name: --

Port Type: P_GBITH_ETH

Network function: NNI

Close

The window is the same for the view option. It displays the port's identification but does not allow editing it.

Operation States

As with the previous point, the menu option, which is accessed by right selecting on the line for a given port, **View** → **Operation States** or **Configure** → **Administrative States**, opens identical windows. In the configuration window, Figure 68, it is possible to change the administrative states of the port. The look up window displays fixed information that cannot be changed.

Figure 68. Port's administrative states configuration

The screenshot shows a configuration window titled "ME4620-OLT_01 B10 P3". It contains three sections for state configuration:

- Entity:** ME4620-OLT_01 B10 P3
- Entity Type:** P_GBIT_ETH
- Administrative State:**
 - In Service
 - Blocked
 - In Maintenance
 - Planned
- Operational State:**
 - Operational
 - Not Operational
 - Degraded
 - Unknown
- Alarm State:**
 - Normal
 - Critical
 - Major
 - Minor

At the bottom right, there are "OK" and "Cancel" buttons.

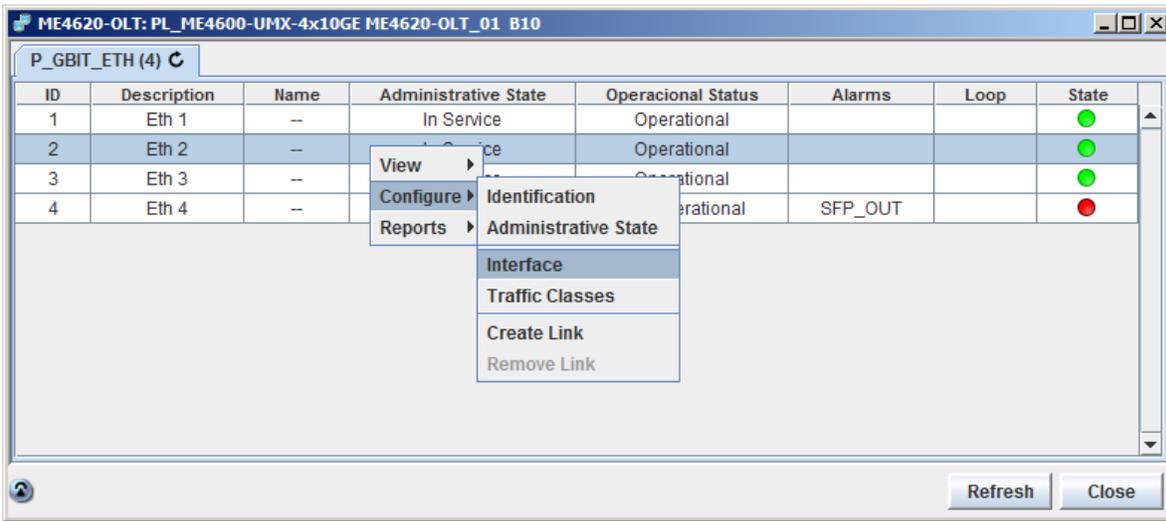
It is possible to change the administrative state as shown in Figure 66.

It is possible to use a single operation to change the administrative states of several ports. To do this, select the list of ports, right select on the highlighted area and select **Configure** → **Administrative State**. The change in states will be applied to all the selected ports.

Ethernet Ports

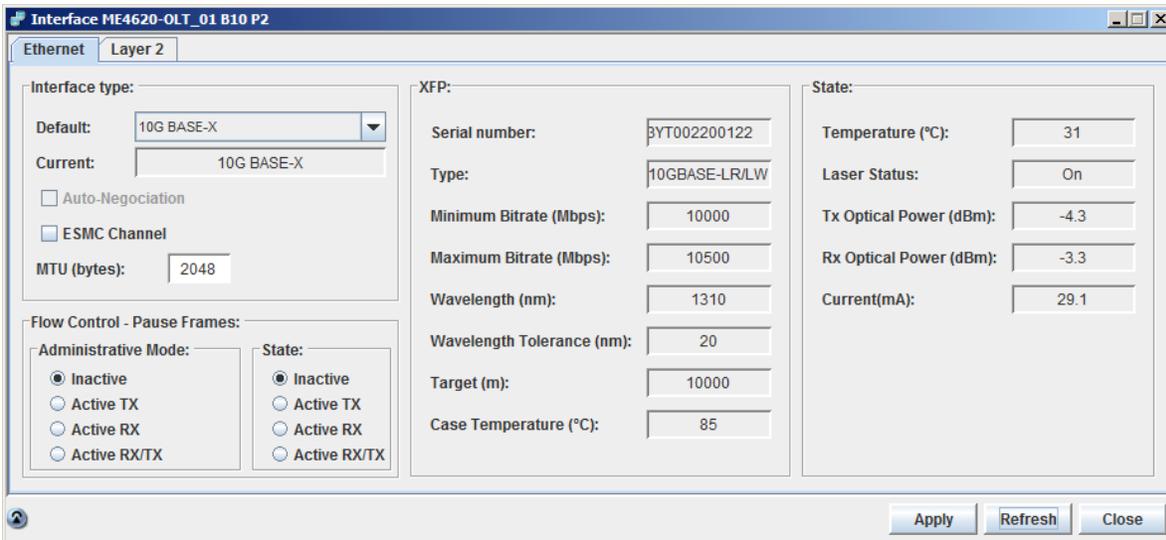
It is possible to use the **Configure** → **Interface** option, from the menu shown in Figure 69, to access the configuration window for the Ethernet interface parameters, as shown in Figure 70. It is possible to do this for interfaces that are administratively 'In Service'.

Figure 69. Configuration operations for Ethernet ports



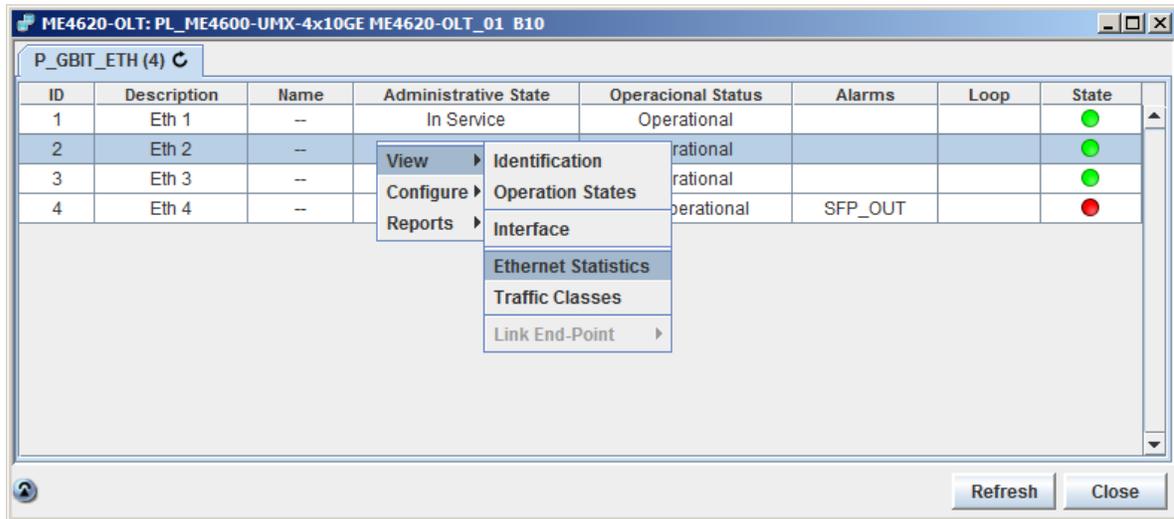
In the configuration window for the Ethernet interface parameters, the SFP/XFP panel on the right hand side is shown only when the interface has an SFP module inserted.

Figure 70. Ethernet interface configuration



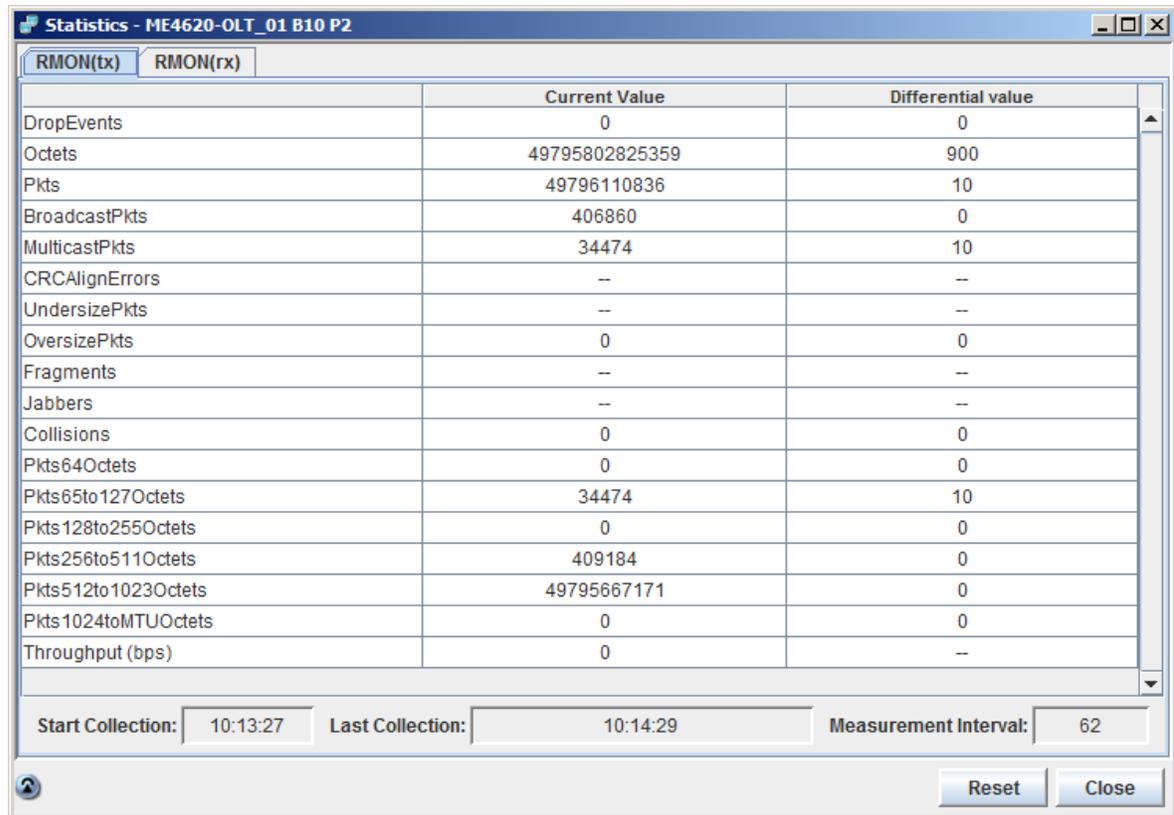
Select **View** → **Interface** option, from the same menu shown in Figure 69 to access the look-up window for Ethernet interface parameters. This window is identical to the one in Figure 70 and is also available for interfaces which are administratively 'In Service'.

Figure 71. View operations for Ethernet ports



Select **View** → **Ethernet Statistics** option, from the menu shown in Figure 71 to access the window in Figure 72, where Tx and Rx counters are displayed, in accordance with RFC 2819 (Remote Network Monitoring Management Information Base).

Figure 72. Ethernet interface statistics



The monitored parameters are as follows:

- Drop Events – Number of dropped packets
- Octets – Number of bytes
- Pkts – Number of packets
- BroadcastPkts – Number of broadcast packets
- MulticastPkts – Number of multicast packets
- CRCAlignErrors – Number of packets with wrong FCS (Frame Check Sequence)
- UndersizePkts – Number of packets with a size of less than 64 bytes
- OversizePkts – Number of packets with a size greater than 1518 bytes
- Fragments – Number of packets with a size less than 64 bytes and with wrong FCS (Frame Check Sequence)
- Jabbers – Number of packets with a size greater than 1518 bytes and with wrong FCS (Frame Check Sequence)
- Collisions – Number of collisions in the Ethernet segment (only in Half Duplex)
- Pkts64Octets – Number of 64 bytes packets
- Pkts65to127Octets – Number of packets with sizes between 65 and 127 bytes
- Pkts128to255Octets – Number of packets with sizes between 128 and 255 bytes
- Pkts256to511Octets – Number of packets with sizes between 256 and 511 bytes
- Pkts512to1023Octets – Number of packets with sizes between 512 and 1023 bytes
- Pkts1024toMTUOctets – Number of packets with size between 1024 to 1518 bytes
- Throughput (bps) – Indicates approximately the received and transmitted bit rate (1Mbit/s Granularity).

These are transmitted or received values, depending on the window visible tab.

In the lower part of the window are shown the start collection and last collection times. The monitored parameters are collected every “Measurement Interval” seconds.

Alarm reports are available through **Reports → Alarms**.

Figure 73. Ethernet interface statistics

Alarms Report

Managed Network

Ports: ME4620-OLT:PL_ME4600-UMX-4x10GE ME4620-OLT_01/10/2

Alarms

Severity: Critical Major Minor Warning

Alarm Status: Pendants Recognized Not Recognized Archived

Between dates

From 2014-11-30 at :00 to 2014-12-1 at :23

All

Arrangement

Order by: Date / Time Equipment / Board / Port

Filters

Save this scene with name:

Reports V6.2.0-R940 | Copyright 2008-2012

Links Configuration

It is possible to use the **Configure → Create Link** option, from the menu shown in Figure 74, in order to access the configuration window for Ethernet Link creation, as shown in Figure 75.

Figure 74. Create Link

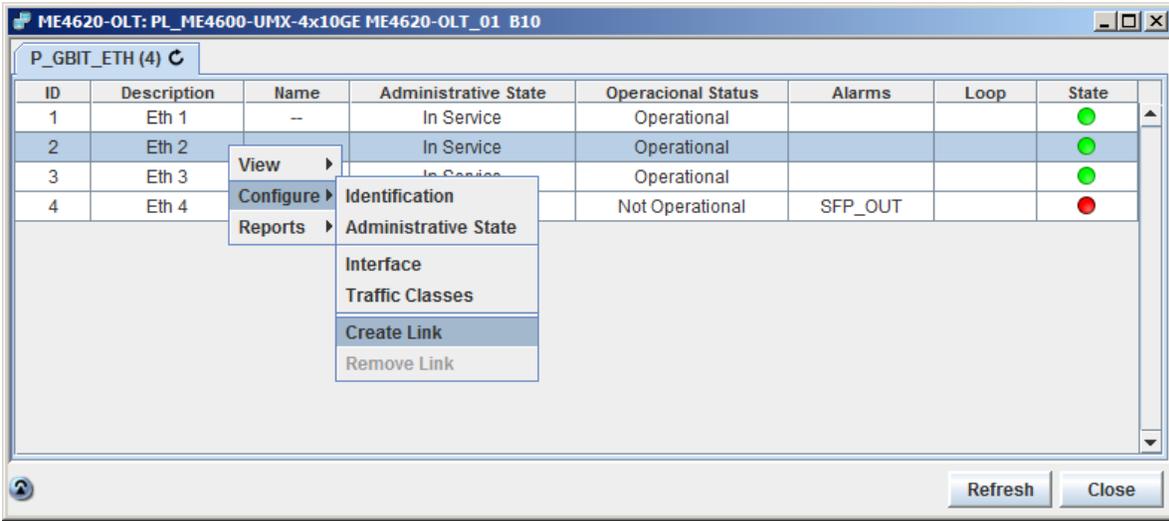
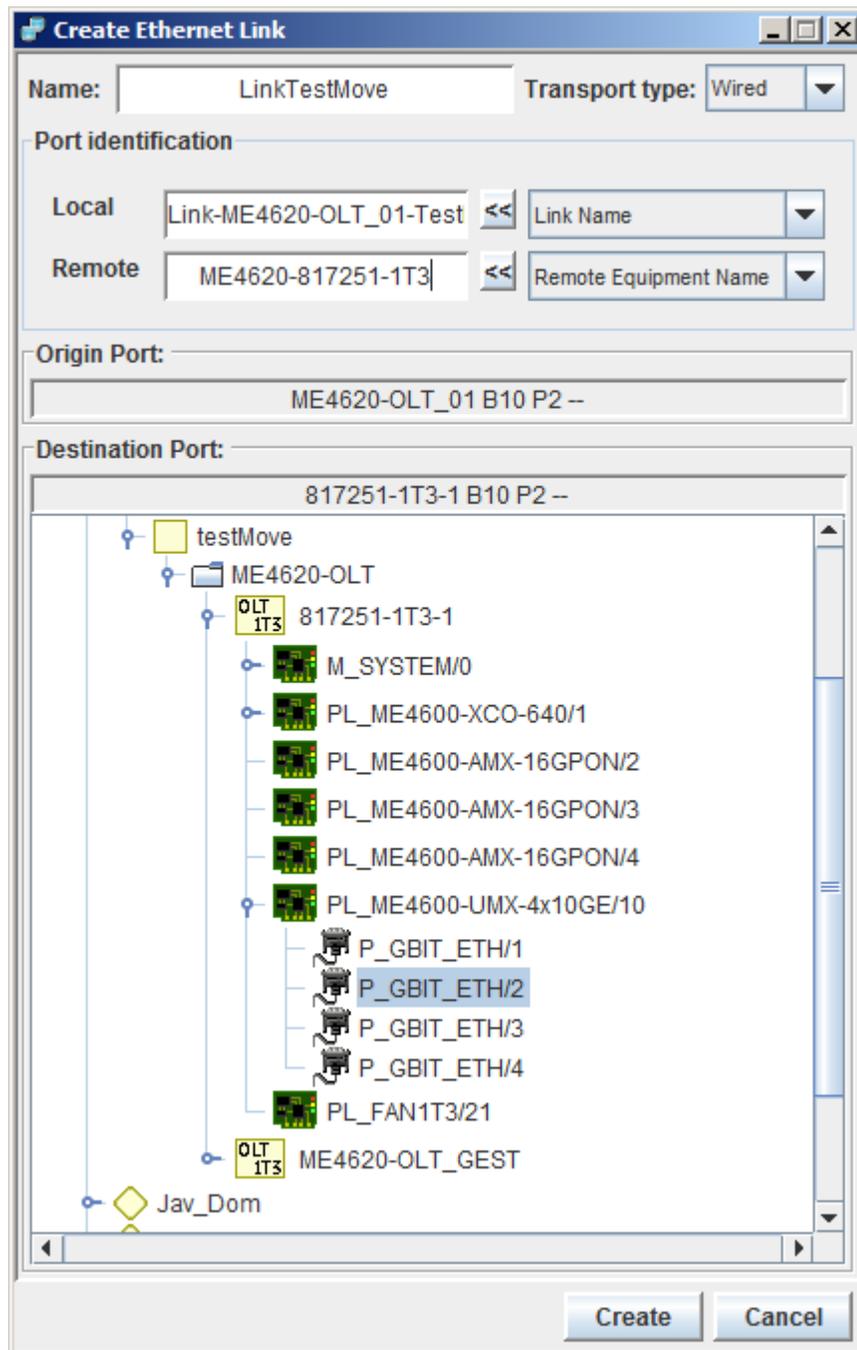
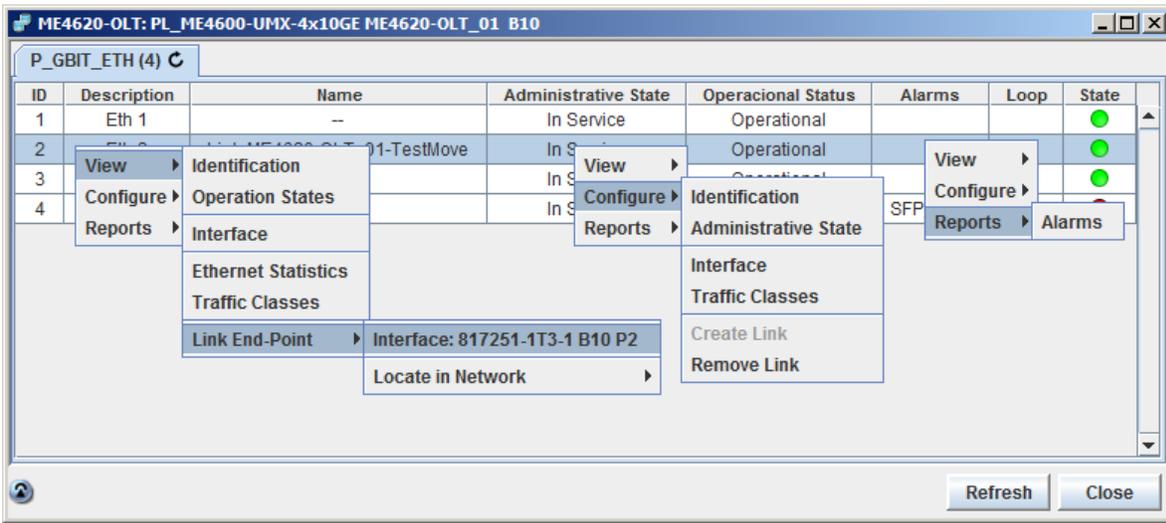


Figure 75. Create Gbit Ethernet Link



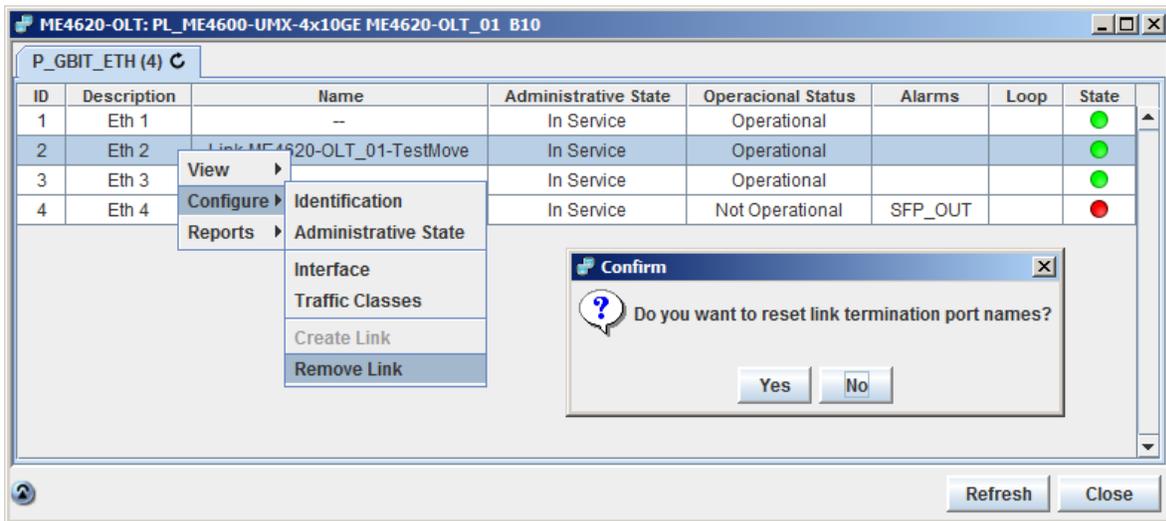
It is possible to “View”, “Configure” and consult “Reports” of an existing Link, as shown in the several pop-up menus of Figure 76.

Figure 76. Links “View”, “Configure” and consult “Reports” menus



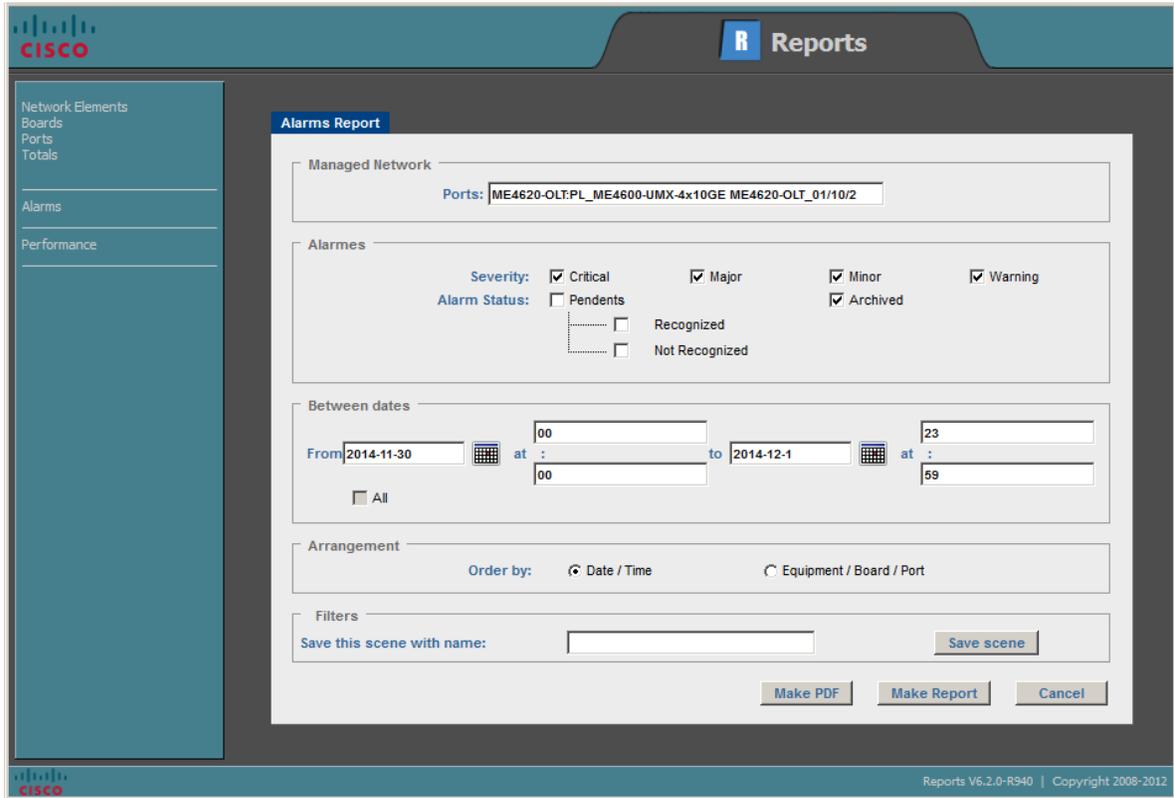
In order to remove a link apply **Configure → Remove Link**.

Figure 77. Remove Link



Link reports are available through **Reports → Alarms**.

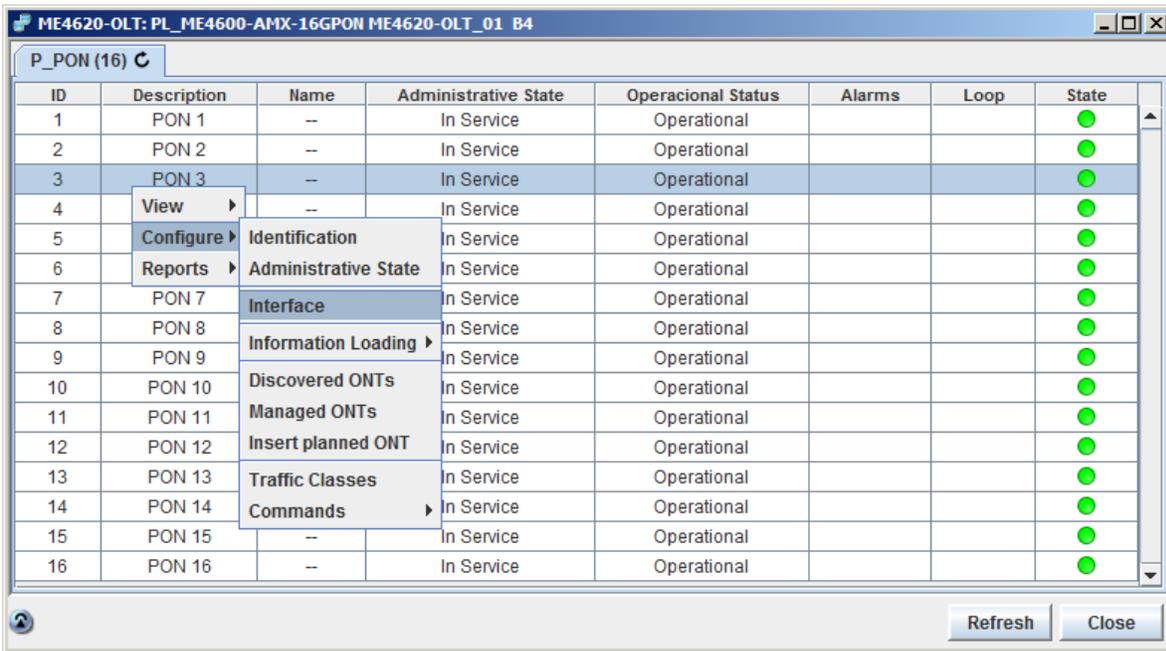
Figure 78. Link reports



PON Ports

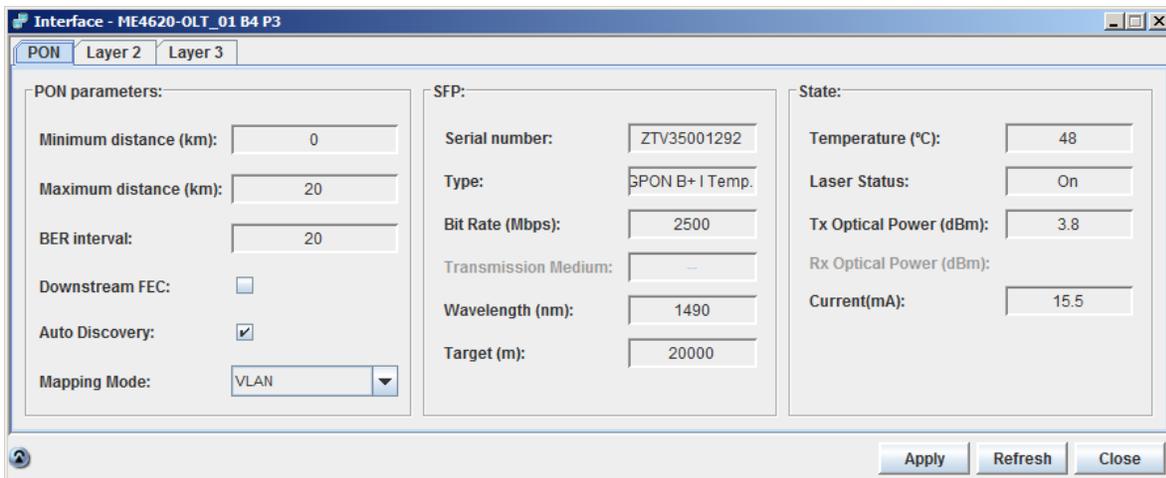
Select **Configure** → **Interface** option, from the menu shown in Figure 79, to access the configuration window for the PON interface parameters, as shown in Figure 80.

Figure 79. Configuration operations for PON ports



In the configuration window for PON interface parameters the time for how long MAC addresses remain in the Ethernet switching table (MAC Aging parameter) and the minimum and maximum distances between ONT and OLT equipment's, can be set. These parameters can be configured with the PON port in 'Blocked' state.

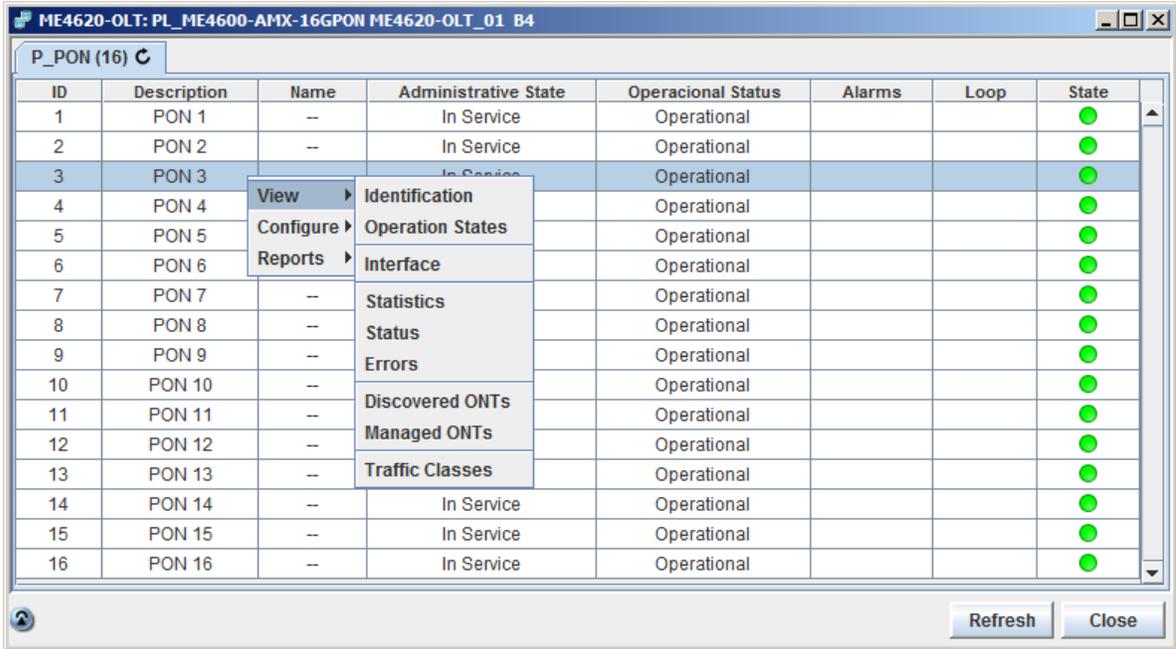
Figure 80. PON port configuration



For this menu (Figure 79), the scope is the selected OLT PON interface. Options Information Loading, Discovered ONTs, Managed ONTs and Insert planned ONT are concerned to all ONTs of the selected PON. The same operations are described, in detail, in chapters “OPERATIONS ON THE MANAGEMENT SYSTEM” and “OPERATIONS INVOLVING REMOTE UNITS, for all ONTs managed by the ME4620-OLT unit.

In terms of view operations, it is possible to use the **View → Interface** option, from the menu shown in Figure 73 to access the view window for the PON interface parameters. This window is identical to the one in Figure 72 and does not allow any parameters changing.

Figure 81. View operations for PON ports



In the view menu shown in Figure 79, use **View → Statistics** option to access the PON port statistics window, Figure 80. This window has three tabs – PON, RMON(tx) and RMON(rx). The last two tabs show the counters for the Ethernet switch port associated with the PON port. Described on Ethernet port statistics section.

The first tab, marked ‘PON’, contains packets counters of the PON port. These counters are subdivided into three groups:

- Network packets – GPON packets counters from/to network
- PON Packets – GPON packets counters from/to GPON
- PLOAM Packets – GPON packets counters from/to network

The following counters are available:

- PacketsNetworkValidRx – Number of valid packets received
- PacketsNetworkValidTx – Number of valid packets transmitted
- PacketsNetworkErrorsRx – Number of packets received with errors
- PacketsNetworkDroppedRx – Number of packets discarded
- PacketsPonValidRx – Number of valid packets received

- PacketsPonValidTx – Number of valid packets transmitted
- PacketsPonErrorsRx – Number of packets received with errors
- PacketsPonDroppedRx – Number of packets discarded
- PLOAMValidRx – Number of valid packets received
- PLOAMValidTx – Number of valid packets transmitted
- PLOAMErrorsRx – Number of packets received with errors
- PLOAMDroppedRx – Number of packets discarded

Figure 82. PON port statistics

	Current Value	Differential value
PacketsNetworkValidRx	211678419	127130
PacketsNetworkValidTx	211607426	127120
PacketsNetworkErrorsRx	0	0
PacketsNetworkDroppedRx	58456	0
PacketsPonValidRx	211607426	127120
PacketsPonValidTx	211619963	127130
PacketsPonErrorsRx	1	0
PacketsPonDroppedRx	0	0
PLOAMValidRx	20826	8
PLOAMValidTx	8863	0
PLOAMErrorsRx	21	0
PLOAMDroppedRx	0	0

Start Collection: 15:03:48 Last Collection: 15:03:55 Measurement Interval: 6

Reset Close

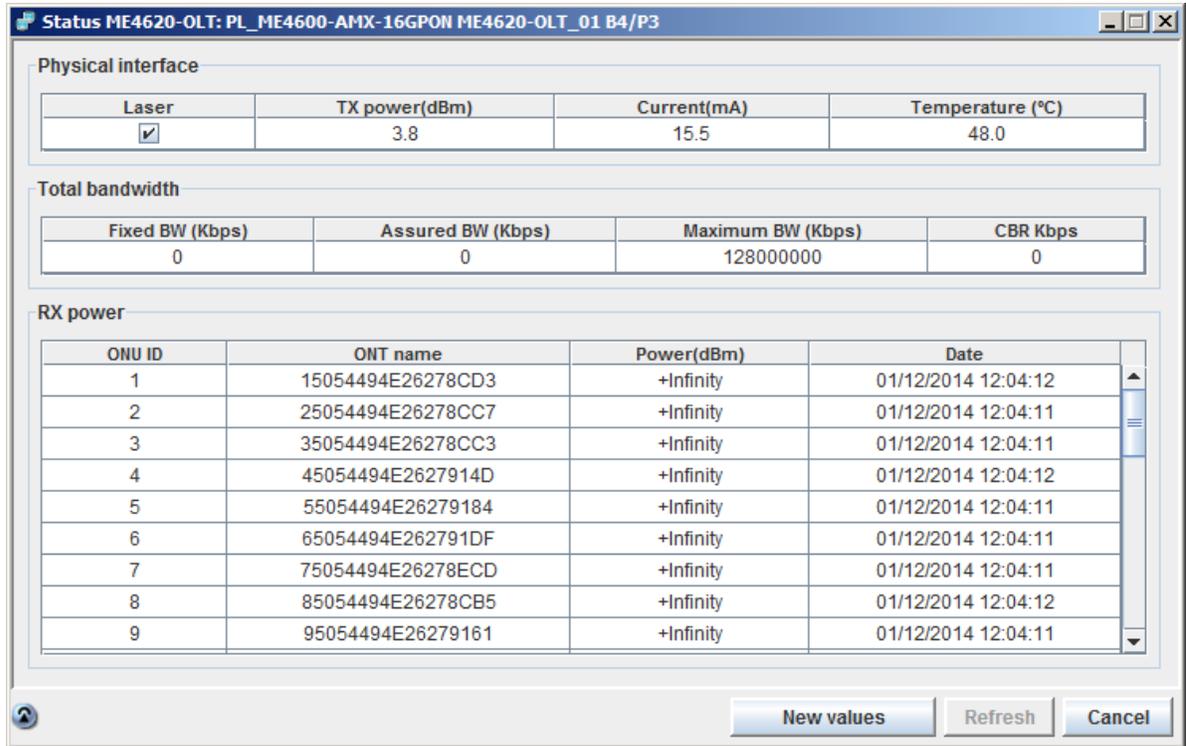
To view a PON port’s status, select **View → Status**, from the menu shown in Figure 79. The resulting window, Figure 81, provides the following parameters:

- Laser – Status of the laser
- TX (dBm) power – Optical power transmitted
- Current (mA) – laser polarisation current
- Temperature (°C) – SFP temperature
- Fixed BW (kbps)
- Assured BW (kbps)
- Maximum BW (kbps)
- CBR (kbps)

The power received in the PON port is shown in the lower panel, by ONT. Thus, for each ONT connected to the selected PON, are available:

- ONU ID
- ONT name
- Power (dBm) – Power read by the OLT, at a given moment
- Date – Time the reading was taken

Figure 83. PON port status



To force a new reading, select ‘New Values’.

Selecting **View** → **Errors**, from the menu in Figure 73, will give access to the window in Figure 76, where the following parameters are displayed by ONT:

- ONU ID
- Name – of the ONT
- BIP8 – Errors received by the OLT, by ONT, upstream direction
- REI – Errors received by the ONT, downstream direction

Figure 84. Error counters by PON port

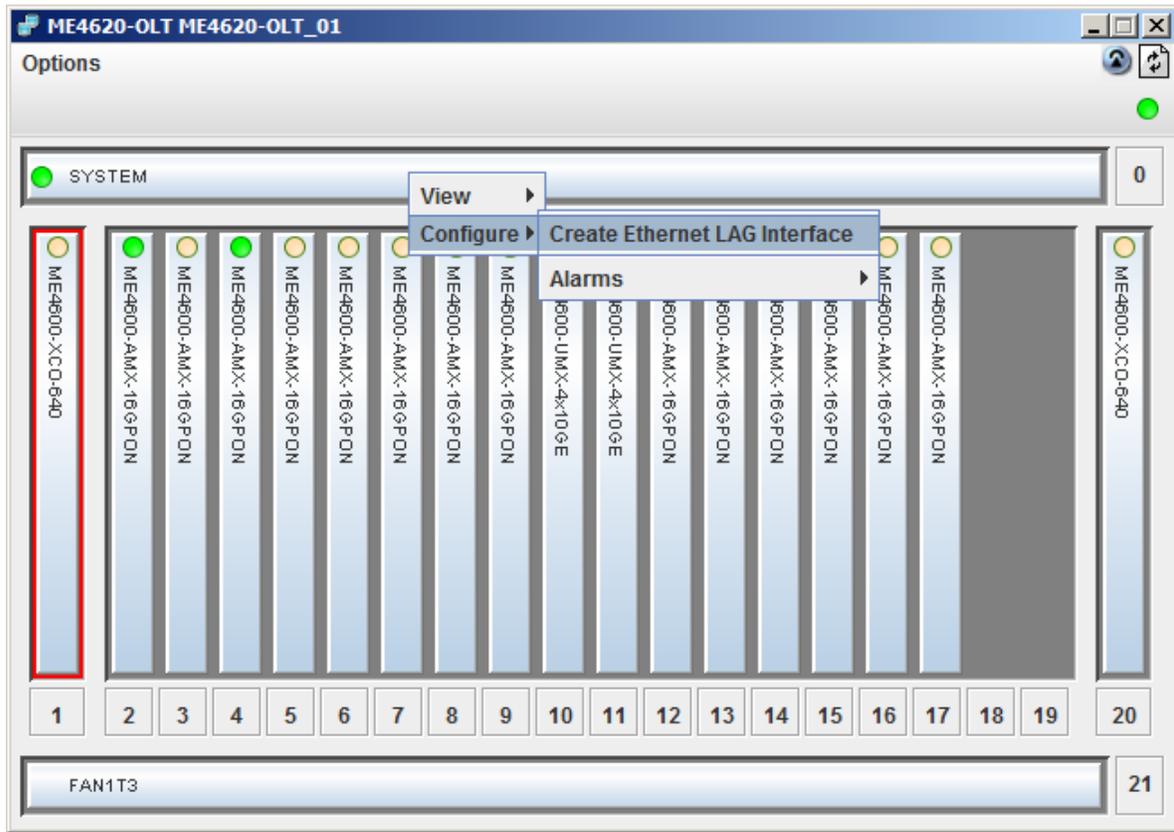
ONU ID	Name	BIP8	REI
1	15054494E26278CD3	0	0
2	25054494E26278CC7	0	0
3	35054494E26278CC3	0	0
4	45054494E2627914D	0	0
5	55054494E26279184	0	0
6	65054494E262791DF	0	0
7	75054494E26278ECD	0	0
8	85054494E26278CB5	0	0
9	95054494E26279161	0	0
10	105054494E26279159	0	0
11	115054494E26279153	0	0
12	125054494E26278CB1	0	0
13	135054494E26279157	0	0
14	145054494E2627915F	0	0
15	155054494E26278CCD	0	0
16	165054494E26279155	0	0
17	175054494E26278CD5	0	0
18	185054494E26278CC9	0	0
19	195054494E26278CD1	0	0
20	205054494E26278EBF	0	0
21	215054494E26278DA9	0	0
22	225054494E2627906A	0	0
23	235054494E26279064	0	0
24	245054494E26278EE7	0	0
25	255054494E26278F5C	0	0
26	265054494E26278EC7	0	0
27	275054494E26279060	0	0
28	285054494E262790A1	0	0
29	295054494E2627905E	0	0
30	305054494E26279062	0	0
31	315054494E262790D0	0	0
32	325054494E262789ED	0	0

LAG Ports

It is possible to create aggregation interfaces over the physical Ethernet interfaces. These are named LAG (Link Aggregation Group) interfaces. This aggregation can be static, in which LACP (LACPDU)s packets are neither transmitted nor processed, or dynamic, in each case LACP packets are transmitted and processed.

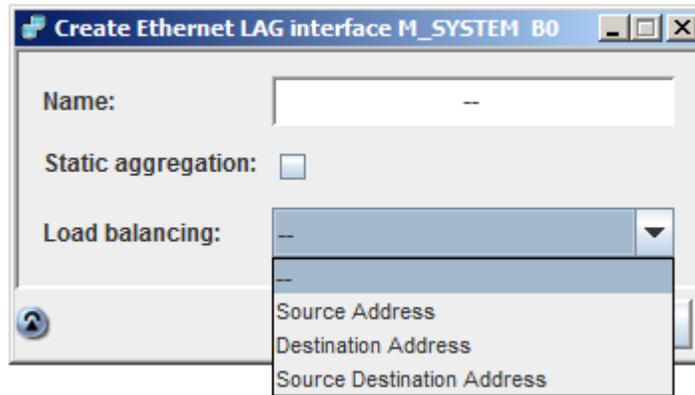
To create an Ethernet LAG interface right select on the ME4620-OLT system board and choose **Configure**→**Create Ethernet LAG Interface** (Figure 83).

Figure 85. Accessing LAG interface creation from the representation of the unit



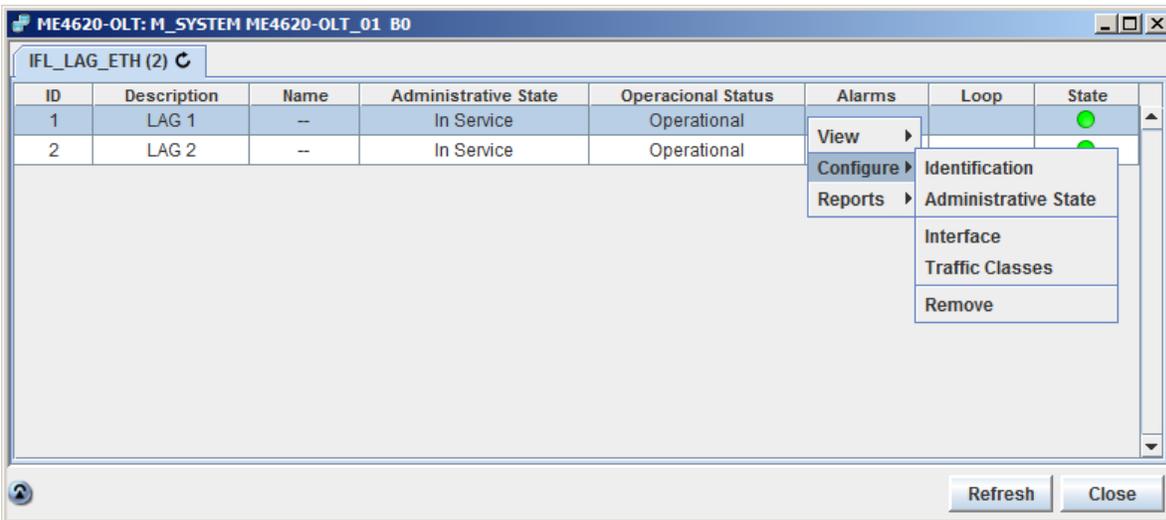
This results in the window shown in Figure 84. Input the interface name and select the load balancing method. Check the 'Static aggregation' parameter if it is intended a static aggregation.

Figure 86. Creating LAG interfaces



LAG interfaces are displayed in a tab called IFL_LAG_ETH. Figure 85 shows the LAG interface menu and the various configuration options for this interface.

Figure 87. Configuration operations for LAG interfaces



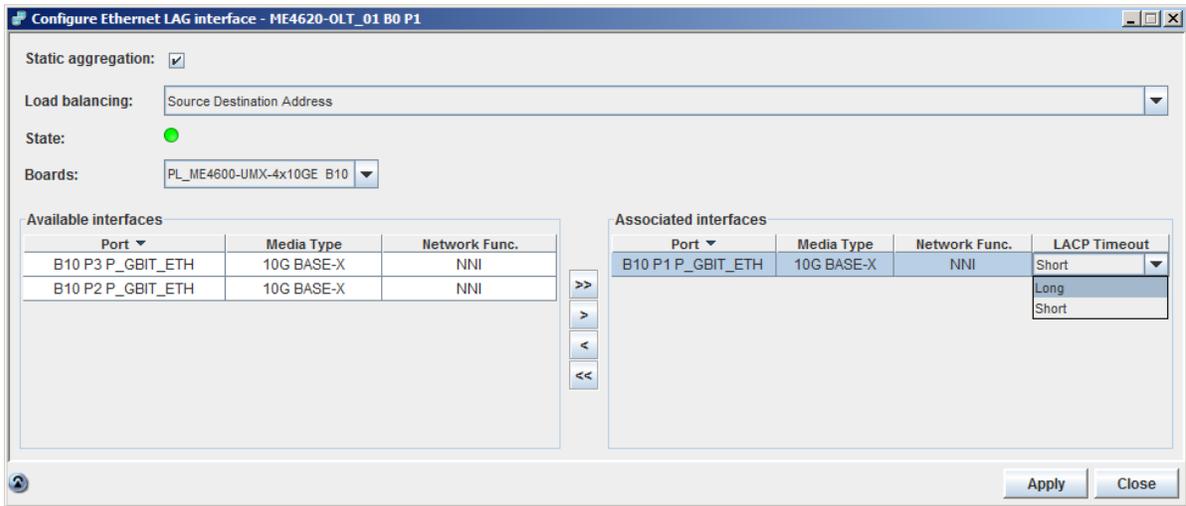
If it is intended to change a LAG interface to ‘In Service’ state, it must be associated with the physical layer, that is, it must have associated Ethernet ports.

To map Ethernet ports on a LAG interface, right select on the LAG and select **Configure → Interface**.

In the LAG interface configuration window, Figure 86, select the interfaces to associate with the LAG from the list of available Ethernet interfaces.

The Ethernet ports to be associated with a LAG interface should be of the same type, GbE or 10GbE, indicated in the window in Figure 86 as Media Type.

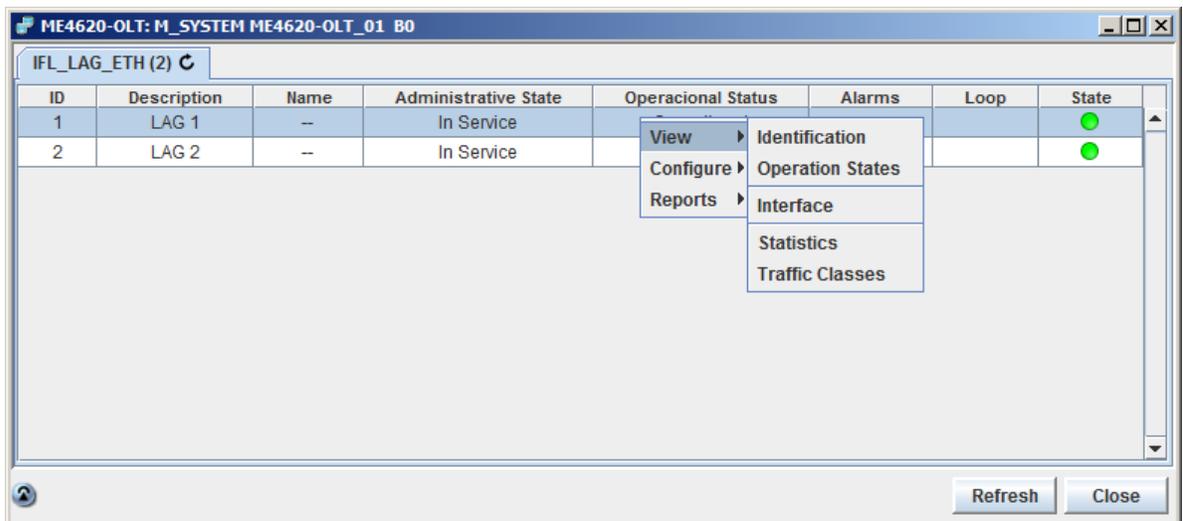
Figure 88. LAG Ethernet interfaces configuration



Ethernet interfaces with different media types that have already been associated with network services cannot be associated in a LAG interface.

Figure 87 shows the menu when right selecting on one of the interfaces in the list and the various view options for that interface.

Figure 89. View operations for LAG interfaces

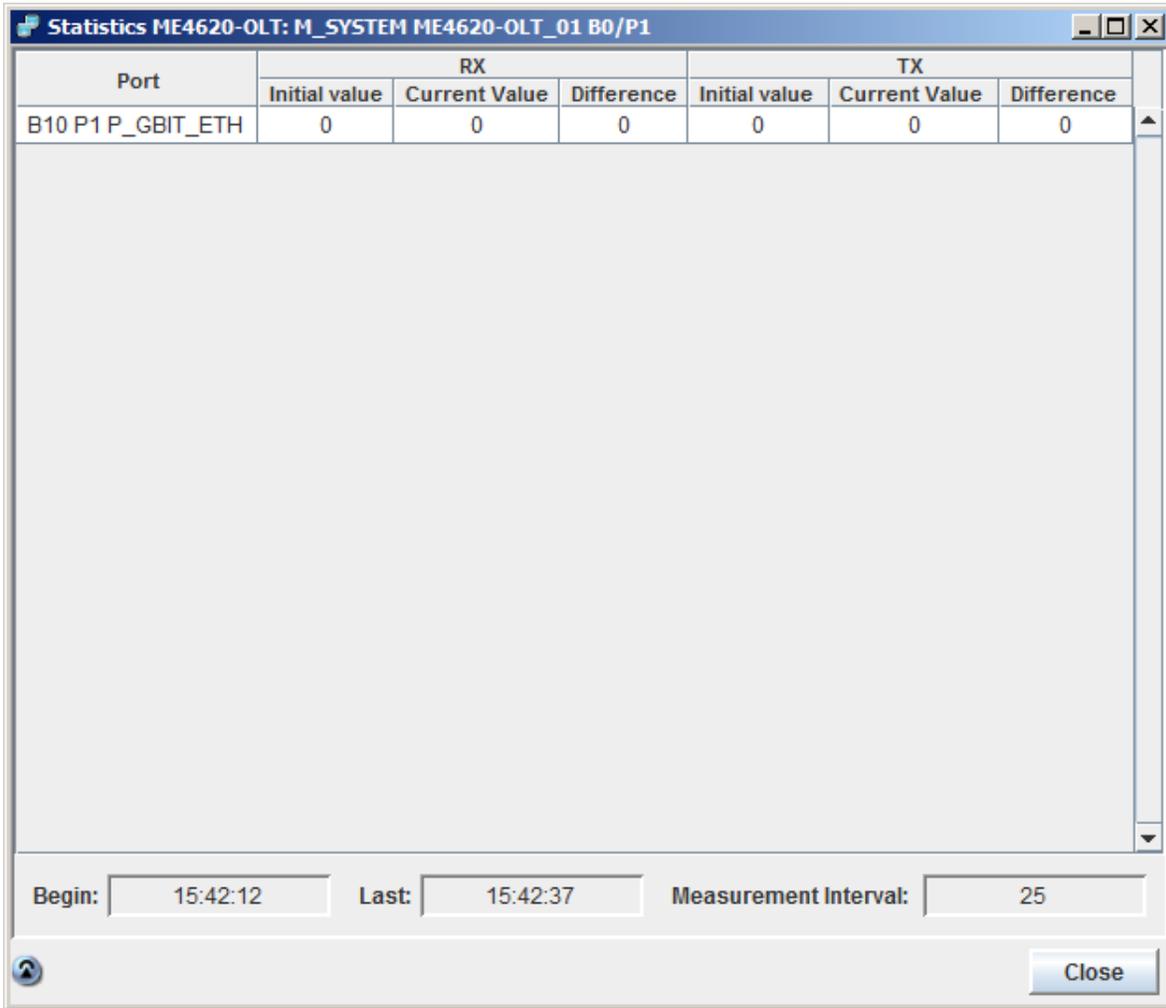


To view LAG interface statistics, from the menu shown in Figure 87, select **View** → **Statistics**. In the resulting window, Figure 88, it is possible to see the values for the number of LACPDU packets received and transmitted at each Ethernet port that is part of the LAG.

The results are presented in three columns, for both received and transmitted packets, with an indication of the initial value, the current value and the difference between these two readings.

The panel at the bottom of the window shows the time at which collection has started, the time of the last collection and a collection interval.

Figure 90. LAG interface statistics

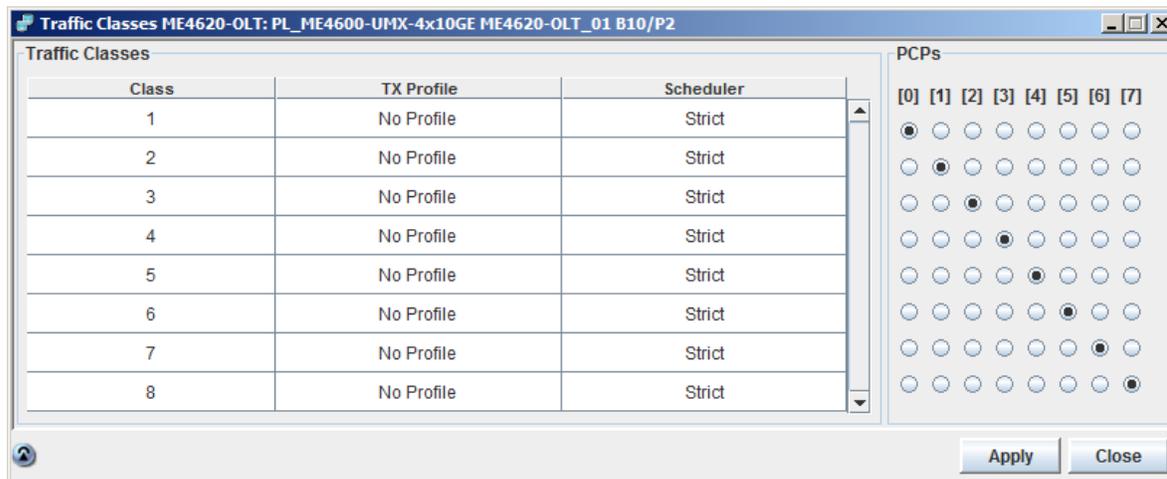


Traffic Classes

Each Ethernet, PON or LAG port on the ME4620-OLT unit has eight associated traffic classes or queues. For each traffic class it is possible to configure the traffic profile to be used in packet transmission, the scheduling algorithm (Strict Priority or Weighted Fair Queuing) and the mapping of the *p-bits* or PCPs (Priority Code Point) that determine the priority of the packets.

To configure the traffic classes associated with a given interface, select this interface in the window listing the ports, right select on the highlighted line and select **Configure** → **Traffic Classes** from the menu. This operation opens the traffic class configuration window, as shown in Figure 89.

Figure 91. Traffic classes configuration



For each service class it is possible to configure:

- Traffic profile, in the 'TX Profile' column. Click on the cell corresponding to the queue to be configured and select the traffic profile from the list. This list consists of the cataloged traffic profiles which are suitable for the selected type of interface.
- Scheduling algorithm, in the 'Scheduler' column. Click on the cell for the class to be configured and then select 'Strict' or 'Weighted' from the list.
- Packets priority, in the 'PCPs' grid, to map the p-bits, 0 to 7, to the queues.

To configure the queues select 'OK'.

The process for viewing the configurations of the service classes associated with an interface is identical to the above, except that it is necessary to select **View** → **Traffic Classes** from the menu. The window that appears is similar to the one in Figure 89, although it will not allow configuration changes.

MAC Address Table

ME4620-OLT unit maintains MAC address tables. In Uplink and Active Ethernet line boards it is possible to configure and view network side dynamic MAC Address entries. In a GPON line board context it is possible to configure and view both network side and client side dynamic MAC entries.

Client Side

To view a client's MAC address table select **View** → **MAC address table** → **Dynamic entries - Client Side**.

Figure 92. ONT dynamic entries – Client Side

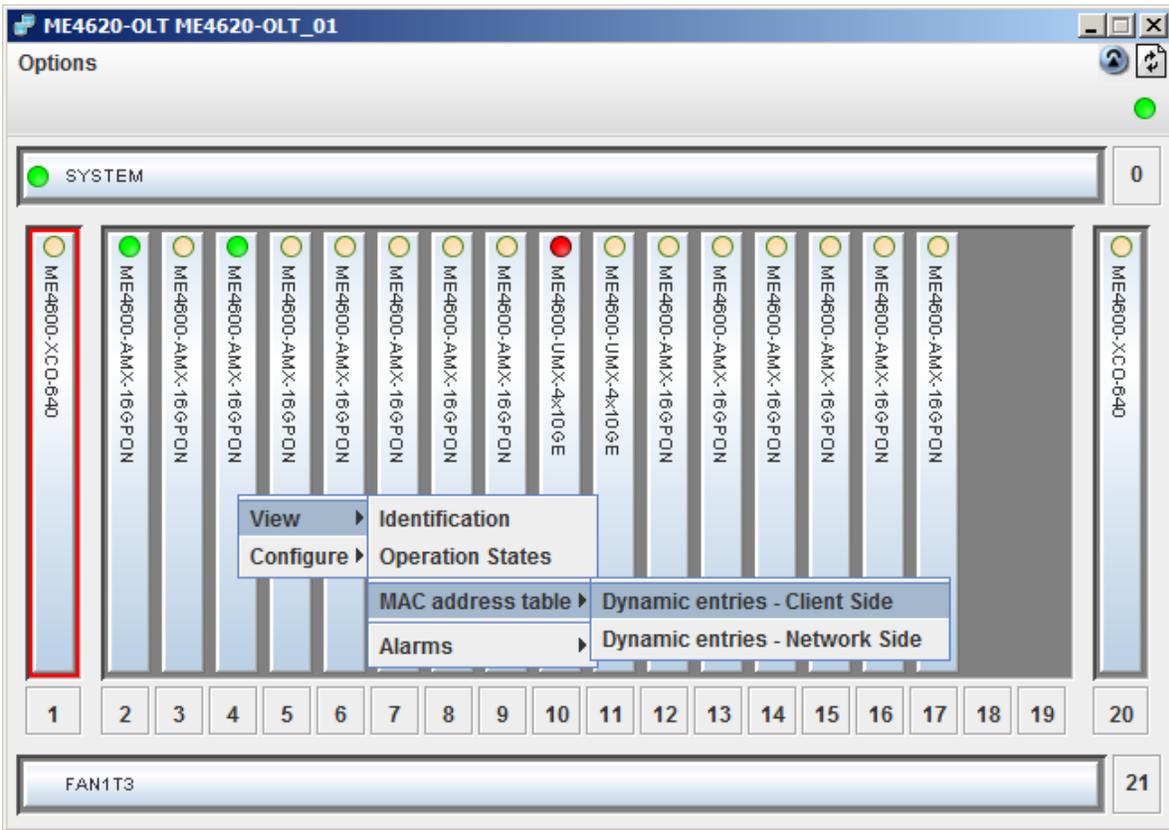
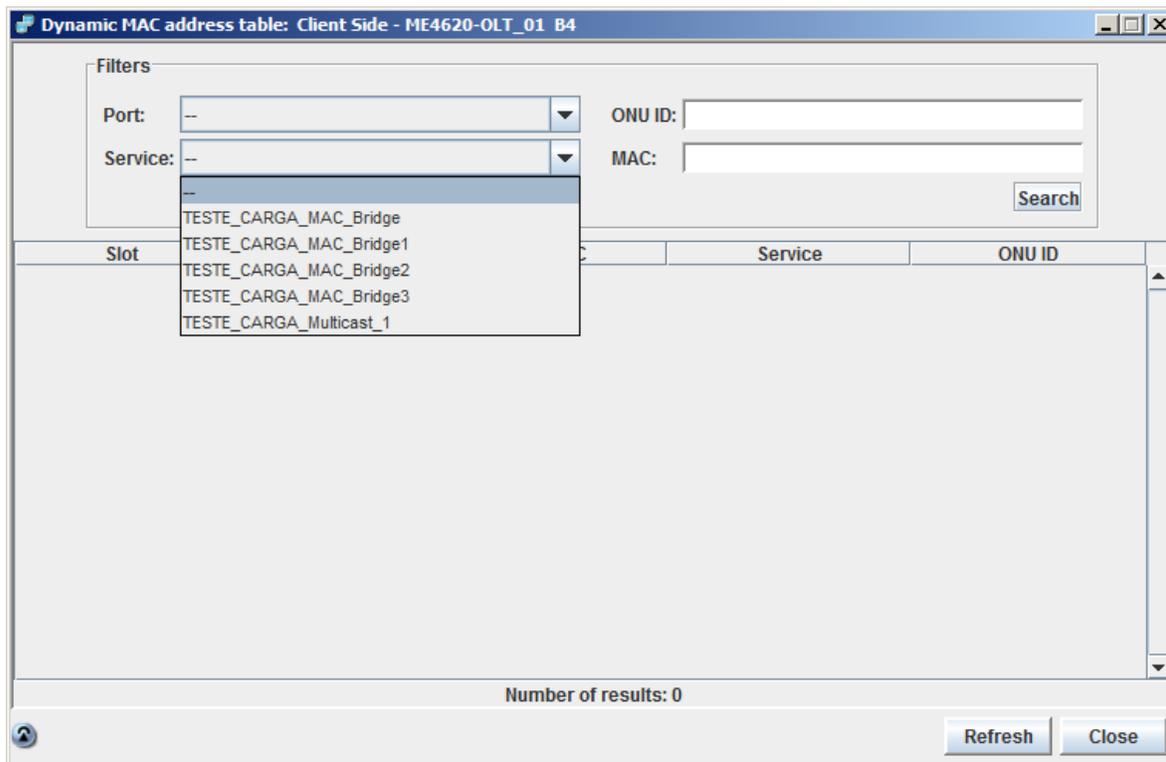


Figure 93. ONT dynamic MAC address table - Client Side



This window offers filters to allow an easy-going view process, for large MAC address tables.

The window accessed through **Configure** → **MAC address table** → **Dynamic entries - Client Side** (Figure 91) has the functionality of allowing entries removal from the MAC table. To do this, select the line in the table, right select and select 'Remove' from the menu.

Network Side

It is possible to access the system's MAC table through **View** → **MAC table** → **Dynamic entries - Network Side**, in the window shown in Figure 86. As with the previous point, filters are provided to facilitate the view.

Chapter 5

OPERATIONS INVOLVING REMOTE UNITS

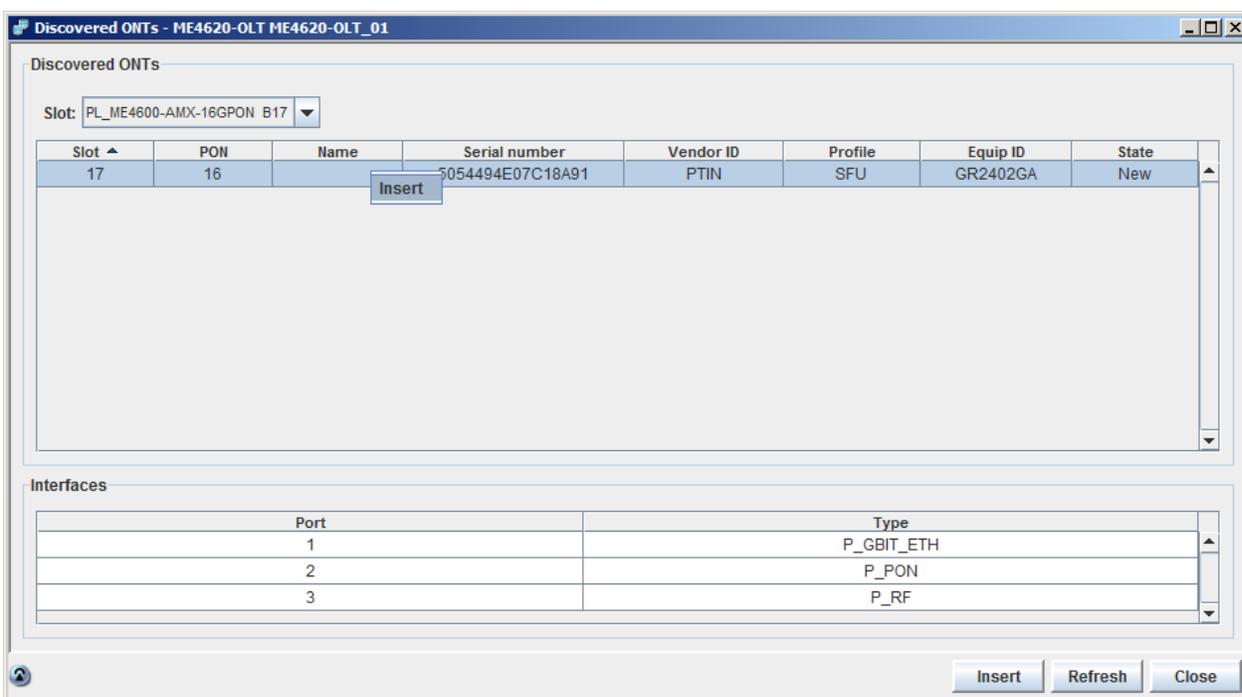
Through OMCI, the ME4620-OLT unit manages ONTs connected to its PONs interfaces. This chapter details the management operations for these remote units.

Discovered ONTs

Selecting **Options** → **Configure** → **Discovered ONTs**, it shows the list of ‘New’ ONTs that have been automatically detected by the ME4620-OLT, but not yet registered.

The window allows inserting managed elements, Figure 96, by right selecting on the intended ONT line and selecting ‘Insert’, as can be seen in Figure 95.

Figure 95. Discovered ONTs



If intended or if the discovered ONT features are not detected select “Modify” button, which brings up a list of ONT models. Choose the corresponding to the inserted ONT.

Figure 96. Inserting managed elements

Fill in the rest editable fields and select 'OK'. Once the insertion operation has been successfully completed, the ONT is removed from the list of discovered ONTs and becomes part of the list of inserted managed ONTs.

Managed ONTs

Selecting **Options → Configure → Managed ONTs**, it shows the managed ONTs window list with all the ONTs already inserted into the management system and allows access for viewing and configuration options for remote units, ONTs.

The ONTs on this list are those detected automatically and inserted by the process described in the previous section, as well as manually inserted ONTs, which are not yet connected to the PON, as described in section Inserting an ONT into the Inventory.

Figure 97. Managed ONTs

The screenshot shows the 'Managed ONTs' window with a table of ONT details. A context menu is open over the selected ONT (Slot 17, PON 16, ONU ID 1, Name ONT_RGW_B17P16).

Slot	PON	ONU ID	Name	Serial number	Vendor ID	Profile	Equip ID	Administrative State	Operacional Status	State
4	16	20	205054494E26278C31	5054494E26278C31	CISCO	SFU	GS0110GG	In Service	Operational	●
4	16	21	215054494E26278C2F	5054494E26278C2F	CISCO	SFU	GS0110GG	In Service	Operational	●
4	16	22	225054494E26278C18	5054494E26278C18	CISCO	SFU	GS0110GG	In Service	Operational	●
4	16	23	235054494E26279047	5054494E26279047	CISCO	SFU	GS0110GG	In Service	Operational	●
4	16	24	245054494E26278EF4	5054494E26278EF4	CISCO	SFU	GS0110GG	In Service	Operational	●
4	16	25	255054494E26278A23	5054494E26278A23	CISCO	SFU	GS0110GG	In Service	Operational	●
4	16	26	265054494E26278A3F	5054494E26278A3F	CISCO	SFU	GS0110GG	In Service	Operational	●
4	16	27	275054494E26278A6A	5054494E26278A6A	CISCO	SFU	GS0110GG	In Service	Operational	●
4	16	28	285054494E262789FB	5054494E262789FB	CISCO	SFU	GS0110GG	In Service	Operational	●
4	16	29	295054494E26278A28	5054494E26278A28	CISCO	SFU	GS0110GG	In Service	Operational	●
4	16	30	305054494E26278A30	5054494E26278A30	CISCO	SFU	GS0110GG	In Service	Operational	●
4	16	31	315054494E26278A25	5054494E26278A25	CISCO	SFU	GS0110GG	In Service	Operational	●
4	16	32	325054494E26278985	5054494E26278985	CISCO	SFU	GS0110GG	In Service	Operational	●
17	16	1	ONT_RGW_B17P16	07C18A91	CISCO	GR2402GA	GR2402GA	In Service	Operational	●

The context menu for the selected ONT includes the following options:

- View
- Configure
 - Identification
 - Administrative State
 - Client Services
 - Firmware details
 - Commands
 - T-CONTs
 - Alarms
 - Remove
 - Forced Removal

The 'Interfaces' table below the main table shows details for the selected ONT:

Port	Type	Description	Administrative State	Operacional Status	Alarms	State
1	P_GBITH_ETH	Eth 1	ervice	Not Operational	LNKDWN	●
2	P_GBITH_ETH	Eth 2	ervice	Not Operational	LNKDWN	●
3	P_GBITH_ETH	Eth 3	ervice	Not Operational	LNKDWN	●
4	P_GBITH_ETH	Eth 4	ervice	Not Operational	LNKDWN	●
5	P_PON	PON 1	ervice	Operational		●
6	P_VEIP	VEIP 1	ervice	Operational		●

It is possible to access the menu of available ONT management operations, Figure 97, by right selecting on the selected ONT. The following points detail these operations.

Identification

In order to change an ONT's identification, select **Configure → Identification**, from the menu shown in Figure 97. The ONT identification window contains the same information as the managed element insertion window, Figure 96, which basically allows changing information input when inserting the ONT.

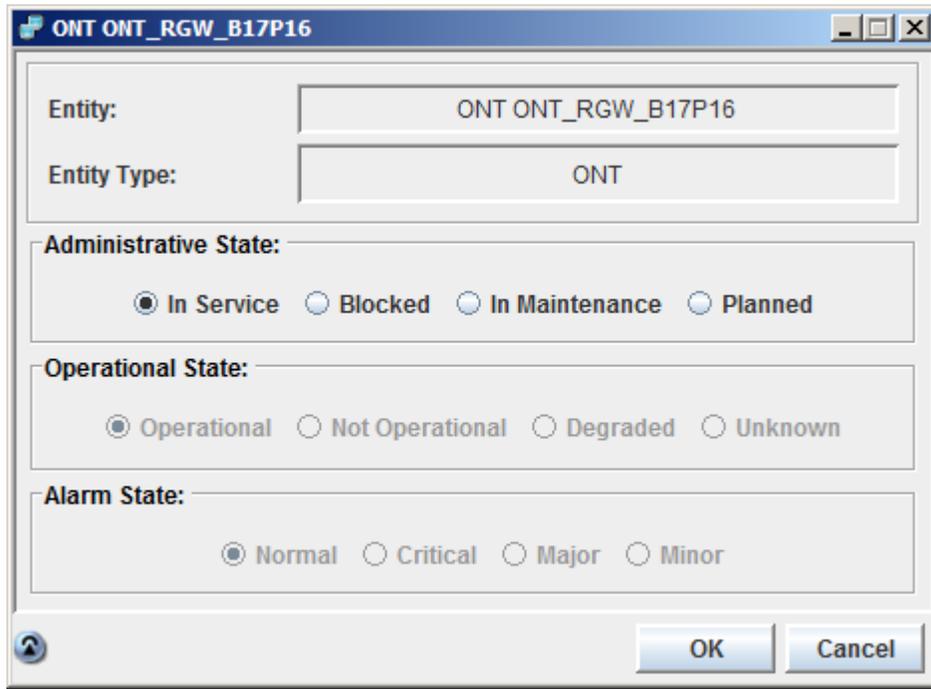
For only read-only information, select **View → Identification**, from the menu shown in Figure 97.

Status

To modify the administrative status of a managed ONT, select **Configure → Administrative State**, from the menu shown in Figure 97, select the required state and select 'OK'.

For read-only information, select **View → Administrative State**. In either case, the information displayed is that shown in Figure 98.

Figure 98. Configuring an ONT's administrative state

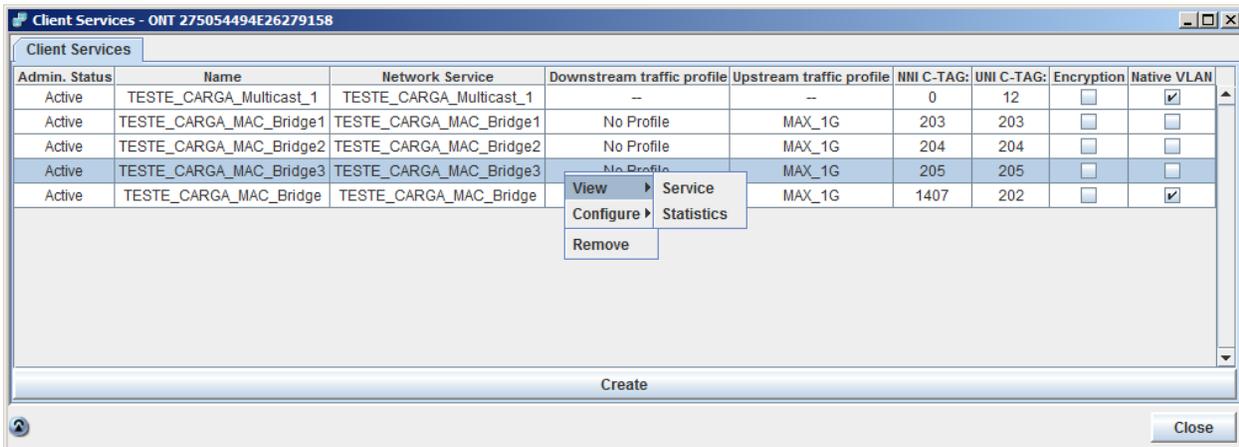


Client Services

To manage a client's GPON service, in the managed ONTs window, Figure 97, select the corresponding ONT, right select from the menu **Configure** → **Client Services**, which opens the window in Figure 99.

Selecting "Create" button in Figure 99, opens the ONT service creation window.

Figure 99. List of GPON services by ONT



This window lists the services that have already been created. For each of these, it is possible to view or change configuration parameters, view statistics or remove the service, using the menu options shown in Figure 99.

Each service is described by the following parameters:

- Name – Name of the Client Service
- Administrative state – Active or Inactive
- Network Service – Name of the network service, already created in ME4620-OLT unit
- GPON traffic profile (upstream/downstream) – Identification of the GPON traffic profile to be used in this service
- NNI C-TAG – Identifies the client's VLAN. If the service is not stacked, this parameter is 0. It can take values between 1 and 4094
- UNI C-TAG – Identifier for the VLAN to be used at the ONT client's gateway. This value is set when the service is created in the catalog but can be changed here if the preset value does not apply
- Native VLAN – Activate this option if the service is untagged at the ONT client's gateway. In this case it is only possible to create a service by ONT
- Encryption – Active the flag to encrypt data
- IP Management
- Maximum MAC learning
- IGMP
- Maximum bandwidth (kbps)
- Maximum number of groups
- DHCP configuration
- Interfaces selection

To create a new service, select 'Create' button, and input the necessary information in the window shown in Figure 100. To complete the operation, select 'OK'.

Figure 100. Creating a multicast GPON service in the ONT

Create Client Service - ONT ONT_RGW_B17P16

Name: ONT_RGW_B17P16_MULTICAST

Administrative State: Active

Network Service: MULTICAST_B17P16

Downstream Traffic Profile: -

Upstream Traffic Profile: -

NNI C-TAG: 0

UNI C-TAG: Switch to: 3002

Native VLAN:

Encryption:

Ip Management:

Maximum MAC Learning: Unlimited 1

Maximum bandwidth (kbps): 0 No limit

Maximum number of groups: 0 No limit

DHCP Relay Config.

Remote ID: []

Global:

op18: op37: op82:

Interfaces

Interface	
B1 P1 P_GBITH_ETH	<input checked="" type="checkbox"/>
B1 P2 P_GBITH_ETH	<input checked="" type="checkbox"/>
B1 P3 P_GBITH_ETH	<input type="checkbox"/>
B1 P4 P_GBITH_ETH	<input type="checkbox"/>

Buttons: Create, Cancel

Figure 101. Creating a unicast GPON service in the ONT

Create Client Service - ONT ONT_RGW_B17P16

Name: ONT_RGW_B17P16_UNICAST

Administrative State: Active

Network Service: UNICAST_B17P16

Downstream Traffic Profile: CIR_10G_Def

Upstream Traffic Profile: ASSURED_10M_MAX_20M

NNI C-TAG: 1

UNI C-TAG: Switch to: 998

Native VLAN:

Encryption:

Ip Management:

Maximum MAC Learning: Unlimited 1

IGMP:

Maximum bandwidth (kbps): 0 No limit

Maximum number of groups: 0 No limit

DHCP Relay Config.

Remote ID: []

Global:

op18: op37: op82:

Interfaces

Interface	
B1 P1 P_GBITH_ETH	<input checked="" type="checkbox"/>
B1 P2 P_GBITH_ETH	<input checked="" type="checkbox"/>
B1 P3 P_GBITH_ETH	<input type="checkbox"/>
B1 P4 P_GBITH_ETH	<input type="checkbox"/>

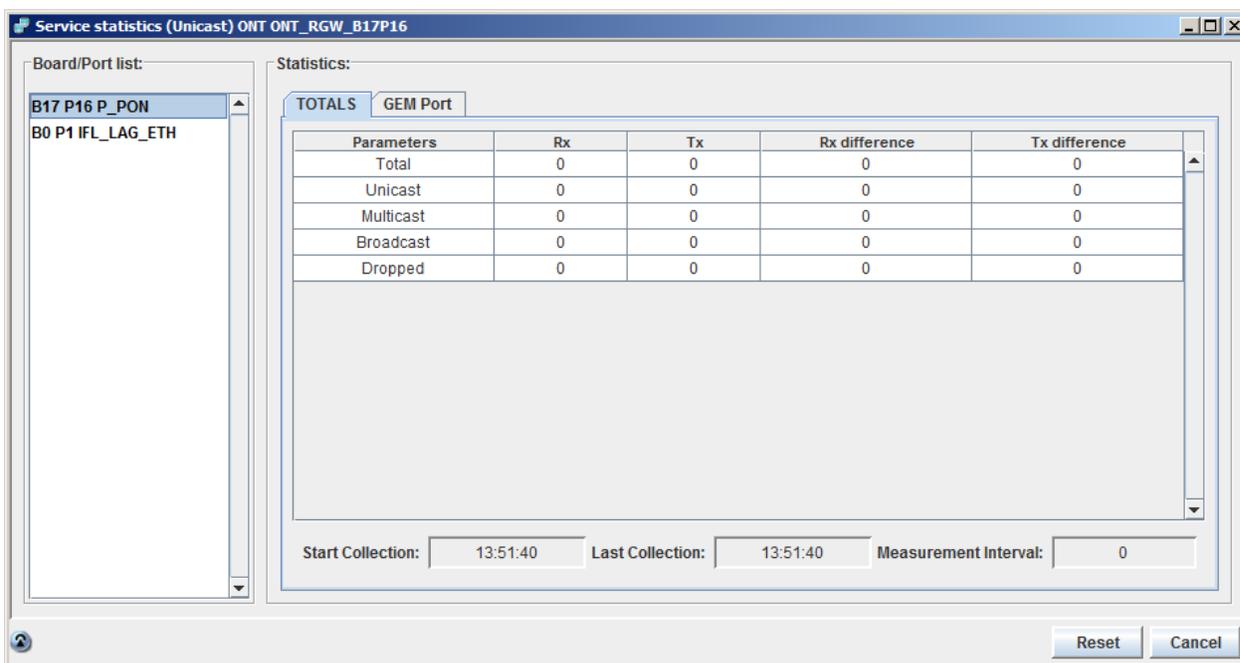
Buttons: Create, Cancel

Client Service Statistics

To view Client service statistics in the ONT, select **View** → **Statistics**, from the menu shown in Figure 99.

Total Packets are available for all type of services (Figure 102).

Figure 102. Client unicast service Total statistics

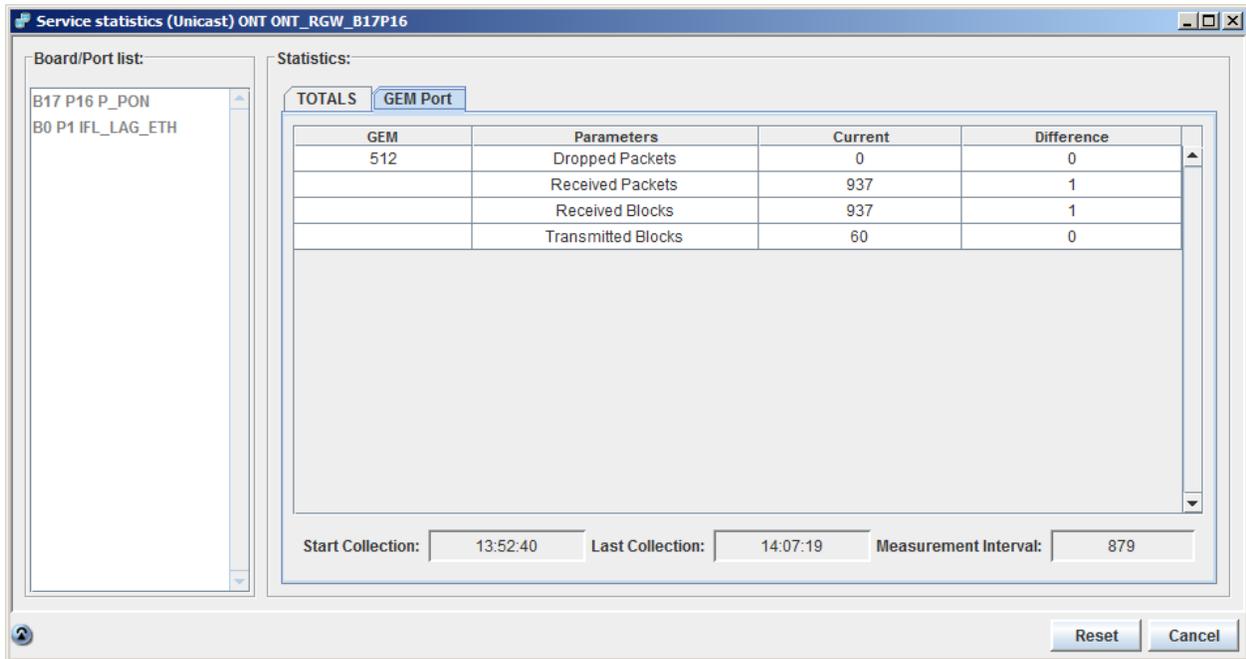


TOTALS counters:

- Total – Total number of packets
- Unicast – Total number of unicast packets
- Multicast – Total number of multicast packets
- Broadcast – Total number of broadcast packets
- Dropped – Total number of discarded packets

GEM Port counters are available for all type of services except multicast services, as shown in next figure.

Figure 103. GEM Port client service statistics



GEM Port counters:

- Dropped Packets – Number of dropped packets
- Received Packets – Number of received packets
- Received Blocks – Number of received blocks
- Transmitted Blocks – Number of transmitted blocks

Only for unicast services with active DHCP op82, op37 and op18, there are DHCP counters.

DHCP counters:

- Valid Packets – Number of valid DHCP packets
- Drop – Number of discarded DHCP packets
- Client requests Without Options
- Client Requests With Op## – Number of packets with DHCP client requests with Op82, Op37, Op18
- Server Replies Without Options
- Server Replies With Op## – Number of packets with DHCP server replies with Op82, Op37, Op18
- Client Pkts Trusted – Number of dropped packets in trusted interfaces
- Client Pkts With Options Untrusted – Number of packets discarded because they were client requests with options received in untrusted interfaces
- Server Pkts Untrusted – Number of packets discarded because they were server reply packets with options received in the untrusted interfaces

- Server Pkts Without Options Trusted – Number of packets discarded because they were server reply packets without options in trusted interfaces

For multicast Services, IGMP v2 and v3 counters and Active Channels can be read.

IGMP counters:

- Packet Dropped – Total number of IGMP packets discarded
- Packet Invalid – Total number of invalid IGMP packets
- Packet Total
- Packet Valid – Total number of valid IGMP packets
- Queries General – Number of general IGMP queries
- Queries Group Source Specific
- Queries Group Specific – Number of specific IGMP queries
- V2 Invalid Join - Number of v2 IGMP invalid joins
- V2 Join - Number of v2 IGMP joins received
- V2 Leave - Number of v2 IGMP leaves
- V3 Allow
- V3 Block
- V3 Invalid Allow
- V3 Invalid Block
- V3 Invalid is Exclude
- V3 Invalid is Include
- V3 Invalid Membership Report
- V3 Invalid To Exclude
- V3 Invalid To Include
- V3 is Exclude
- V3 is Include
- V3 Membership Report
- V3 To Exclude
- V3 To Include

Firmware Details

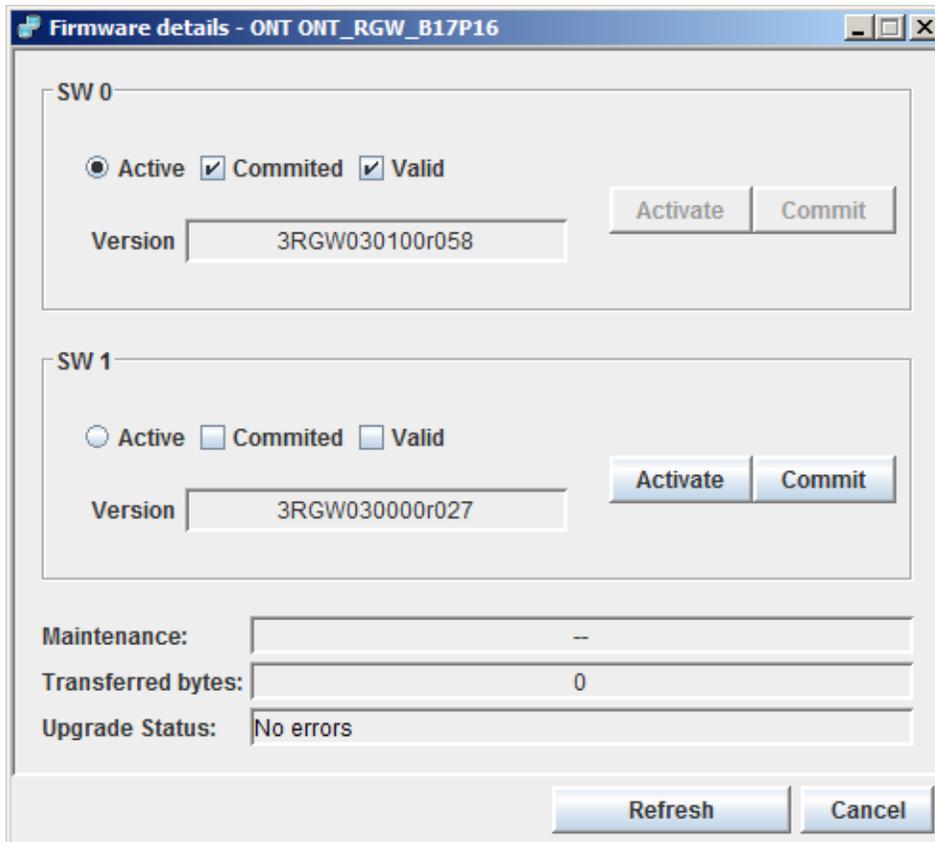
Selecting **Configure** → **Firmware details**, for a given managed ONT, brings up the window shown in Figure 97. This window displays the firmware versions present in the ONT as well as the firmware download status, in the Maintenance field.

Each ONT may have two firmware images, but only one of them is active. Associated with each one are the ‘Active’, ‘Committed’ and ‘Valid’ fields.

- ‘Active’ – Indicates the active version
- ‘Committed’ – Indicates if the version has been recorded
- ‘Valid’ – Indicates if the firmware version is valid

‘Activate’ and ‘Commit’ can be used to switch the active and recorded versions, respectively.

Figure 104. ONT firmware details



Removing ONTs

To remove an ONT from the managed ONT list, select **Configure → Remove**, from the menu shown in Figure 89. If the operation is successful the ONT is removed from the list of managed ONTs.

ONTs for which services have been configured cannot be removed with this option, for force removal choose **Configure → Forced Removal**.

Resetting

To reset an ONT, select **Configure → Commands → Reset**, from the ONT menu.

Enable or Disable ONT by serial number

To enable or disable an ONT register by serial number, select **Configure** → **Commands** → **Enable ONT by serial number** or **Configure** → **Commands** → **Disable ONT by serial number**, from the ONT menu, respectively.

Figure 105. Enable or Disable ONT serial number

The screenshot shows the 'Managed ONTs' window for a specific ONT. A context menu is open over the first row of the table, with the 'Commands' option selected, and the 'Enable ONT by serial number' option highlighted.

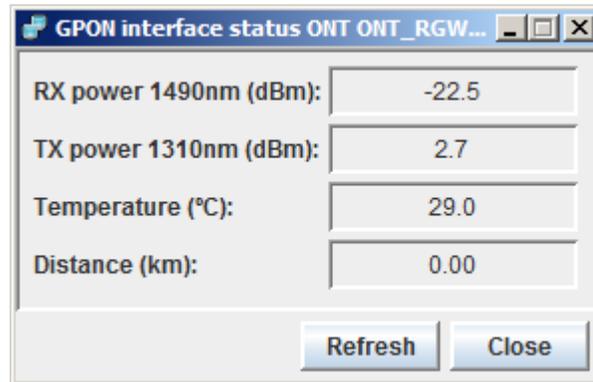
ONU ID	Name	Serial number	Vendor ID	Profile	Equip ID	Administrative State	Operational Status	State
1	ONT_RGW_B17P16	5054494E07C18A91	CISCO	GR2402GA	GR2402GA	In Service	Operational	●

Port	Type	Description	Name	Administrative State	Operational Status	Alarms	State
1	P_GBITH_ETH	Eth 1	--	In Service	Not Operational	LNKDWN	●
2	P_GBITH_ETH	Eth 2	--	In Service	Not Operational	LNKDWN	●
3	P_GBITH_ETH	Eth 3	--	In Service	Not Operational	LNKDWN	●
4	P_GBITH_ETH	Eth 4	--	In Service	Not Operational	LNKDWN	●
5	P_PON	PON 1	--	In Service	Operational		●
6	P_VEIP	VEIP 1	--	In Service	Operational		●

View GPON Interface Status

Select **View** → **GPON interface status**, from the menu shown in Figure 89, for a given ONT. This gives the information on the status of the PON interface, in the form of the parameters shown in Figure 99.

Figure 106. ONT's GPON interface status



- RX power 1490nm (dBm) – Optical power received at 1490nm
- TX power 1310nm (dBm) – Optical power transmitted at 1310nm
- Temperature (°C) – ONT temperature
- Distance (km) – Distance in Km

Configuring Remote Unit Interfaces

In the lower window panel in Figure 97, which lists the managed ONTs, are listed the physical interfaces of the ONT selected in the upper panel.

View and configuration operations are available for each of these interfaces. The specific operations depend on the type of interface.

PON Interface

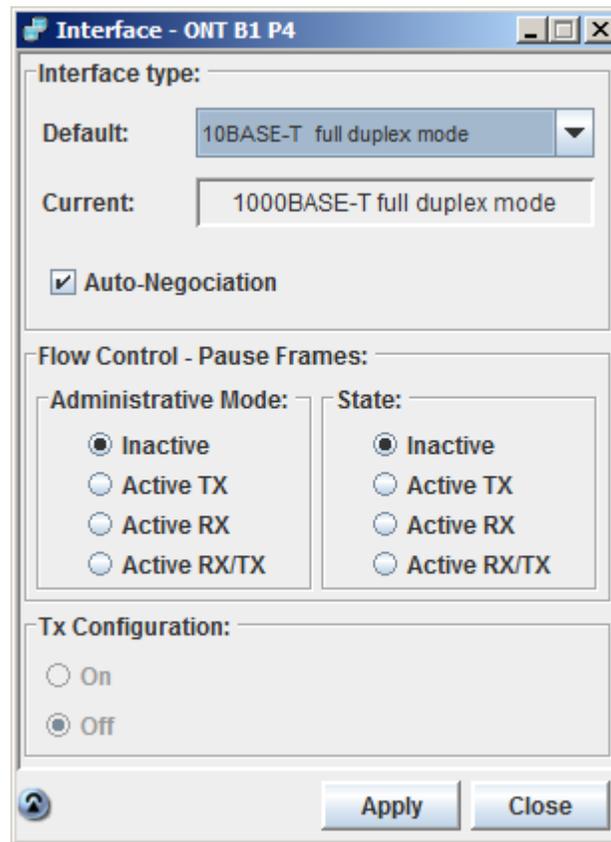
For the PON interface, it is possible to configure the port's identification and its administrative status.

PON port's identification and status can be consulted.

Ethernet Interfaces

In addition to the port's identification and administrative status, it is also possible to configure the interface parameters (**Configure** → **Interface**) for Ethernet interfaces through the window shown in Figure 107.

Figure 107. Configuring the ONT's Ethernet interface



Statistics for the Ethernet port are also available for viewing at this level (**View** → **Ethernet Statistics**).

Figure 108. Statistics for the ONT's Ethernet port

	Current Value	Differential value
DropEvents	0	0
Octets	0	0
Pkts	1985	89
UnicastPkts	1504	78
BroadcastPkts	257	7
MulticastPkts	224	4
CRCAAlignErrors	0	0
UndersizePkts	0	0
OversizePkts	0	0
Fragments	0	0
Jabbers	0	0
Collisions	0	0
BufferOverflows	0	0

Start Collection: 17:04:34 Last Collection: 17:08:56 Measurement Interval: 261

Reset Close

The RMON(tx) parameters monitored are as follows:

- Drop Events – Number of discarded packets
- Octets – Total number of bytes
- Pkts – Total number of packets
- UnicastPkts - Number of unicast packets
- BroadCastPkts – Number of broadcast packets
- MulticastPkts – Number of multicast packets
- BufferOverflows

The RMON(rx) parameters monitored are as follows:

- Drop Events – Number of discarded packets
- Octets – Total number of bytes
- Pkts – Total number of packets
- UnicastPkts - Number of unicast packets
- BroadcastPkts – Number of broadcast packets
- MulticastPkts – Number of multicast packets
- CRCAAlignErrors – Number of packets with wrong FCS (Frame Check Sequence)
- UndersizePkts – Number of packets with a size of less than 64 bytes
- OversizePkts – Number of packets with a size of greater than

- Fragments – Number of packets with a size of less than 64 bytes and with wrong FCS
- Jabbers – Number of packets with a size of greater than 1518 bytes and with wrong FCS
- Collisions – Number of collisions in the Ethernet segment
- BufferOverflows

The RMON(tx+rx) parameters monitored are as follows:

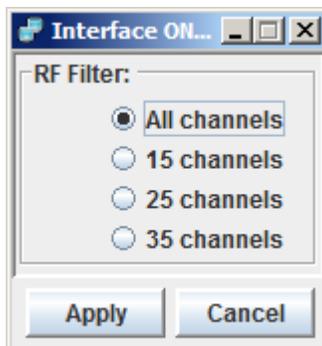
- Pkts64Octets – Number of 64 bytes packets
- Pkts65to127Octets – Number of packets with sizes between 65 and 127 bytes
- Pkts128to255Octets – Number of packets with sizes between 128 and 255 bytes
- Pkts256to511Octets – Number of packets with sizes between 256 and 511 bytes
- Pkts512to1023Octets – Number of packets with sizes between 512 and 1023 bytes
- Pkts1024toMTUOctets – Number of packets with sizes between 1024 and MTU bytes

In the lower part of the window, the collection start time is indicated, as is the time of the last collection and the collection interval. These parameter values are collected every “Measurement Interval” seconds.

RF Interface

For the RF interface, and in addition to the view and configuration options for identification and status, which is similar to those described for the PON interface, there is a further configuration and view option. On the menu, this appears as ‘**Configure → Interface**’.

Figure 109. RF filter



This option can be used to configure the filter to be applied to the RF interface by selecting one of the four options shown in Figure 102.

Inserting an ONT into the Inventory

To add remote units that are not physically connected to the OLT select **Options → Configure → Insert planned ONT**.

Figure 110. Window for inserting a planned managed element

The screenshot shows a software window titled "Insert Planned Managed Elements" with a sub-tab labeled "ONT". The window is divided into several sections for data entry:

- Identification:**
 - Equipment Type: ONT
 - Name: (empty text field)
 - Installation Date: 28-1-2014
- Features:**
 - Profile Name: SFU
 - Vendor: CISCO
 - Model: SFU
 - Brand: CISCO
 - Buttons: Modify, View Prototype
- Version:**
 - Version: (empty text field)
 - Serial number: (empty text field)
 - Firmware Version: (empty text field)
 - Load: (button)
- Location:**
 - Location: (empty text field)
- ONT information:**
 - Slot: All
 - PON interface: --
 - ONU ID: 1
 - Equip ID: (empty text field)
 - FEC:
 - OMCI:
 - Type: Serial Number
 - Password Format: HEXADECIMAL
 - Password: (empty text field)
- Upgrade mode:**
 - Upgrade mode: Off
 - Specific version: --

At the bottom right of the window are "Insert" and "Cancel" buttons.

Once an ONT has been successfully inserted, it will appear on the list of managed ONTs.

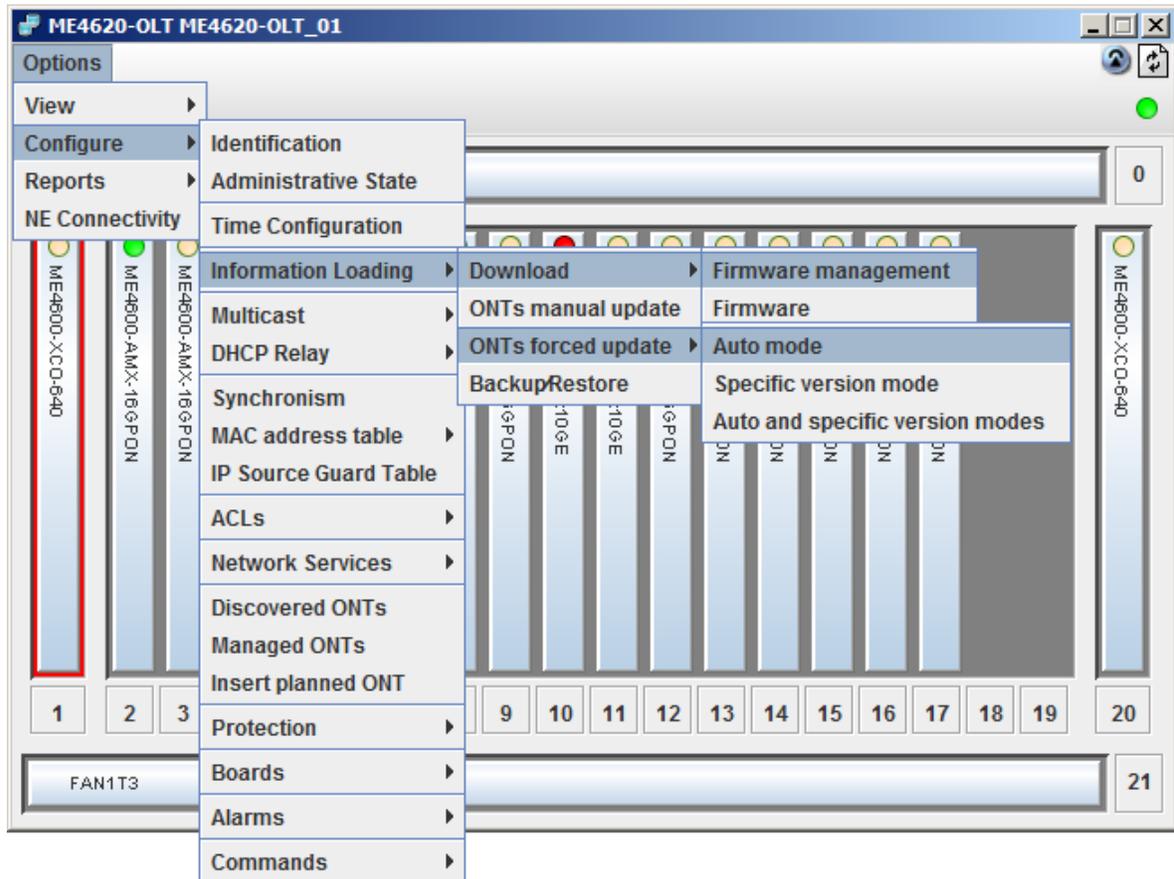
Chapter 6

INFORMATION LOADING

Summary

This chapter's goal is to describe the ME4620-OLT and ONT equipment firmware update process. This process comprises the ME4620-OLT firmware file download and the equipment firmware update functionalities. It also describes the ME4620-OLT configurations backup and restore processes.

Figure 111. Information loading menu



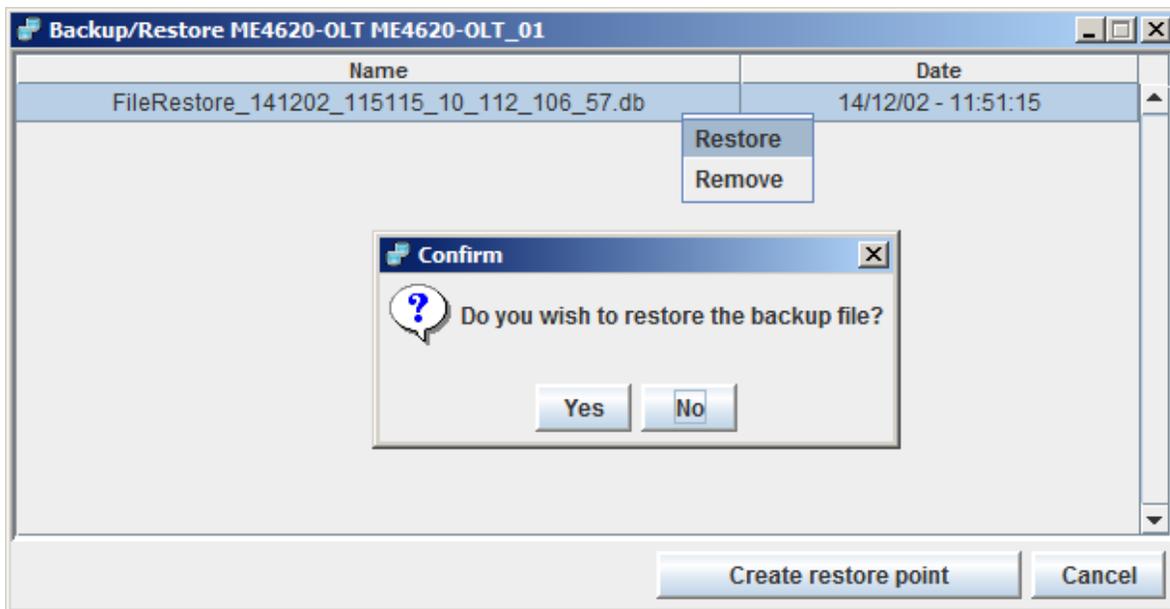
Backup And Restore

Backup and Restore function can be used for ME4620-OLT unit configurations which can also be uploaded remotely in order to create a configuration backup file called 'Restore Point' that later on can be used to restore the system.

To access this function from the unit representation window, select **Options** → **Configure** → **Information Loading** → **BackupRestore**, which brings up the window shown in Figure 111, where all the previously created restore points or backup files for this unit are listed.

The system can be restored with a backup file by selecting **Restore** from the menu shown in Figure 111, right selecting on the target file. Files can also be removed by using the **Remove** option from the same menu. The operation is confirmed through the pop-up window also shown in Figure 111.

Figure 112. Backup and restore operations



In order to create a restore point, select on 'Create restore point' in the lower panel of the window, Figure 112.

Figure 113. Create restore point confirmation



Download

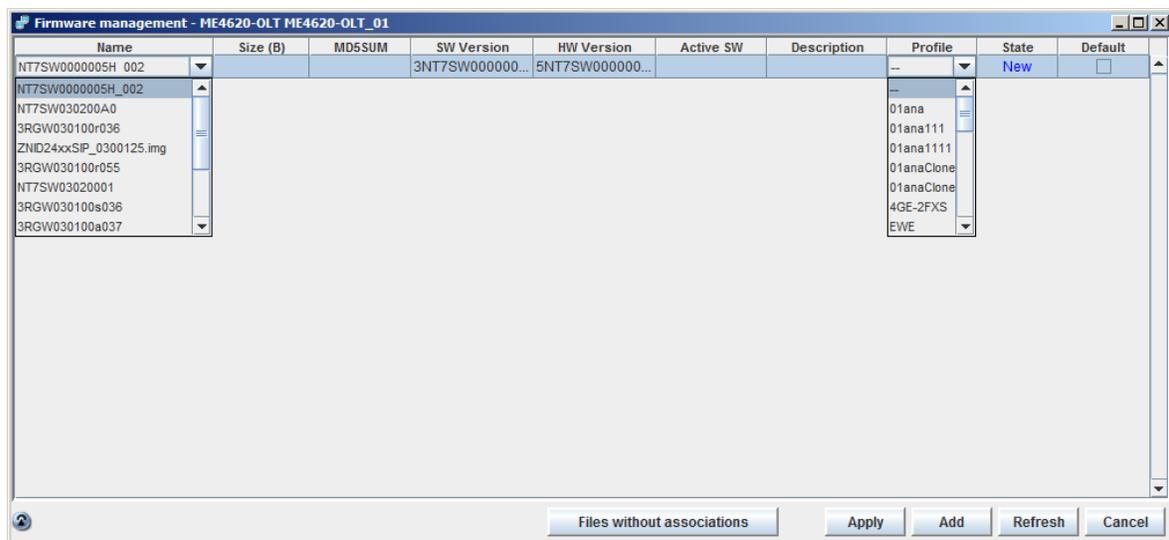
Download option allows the transfer of firmware files, which are available in the central management system repository, to the ME4620-OLT unit. These firmware files can be intended for the OLT unit or for its remote ONT units.

Firmware Management

ONT Firmware management operations are carried out in the window shown in Figure 113, using **Options → Configure → Information Loading → Download → Firmware management**, which allows performing ONT firmware management operations.

The window shown in Figure 113, lists available ONT firmware versions. The fill in configurable fields will specify to which ONTs can be applied each firmware update file. A new entry (new firmware file available for updated) can be added with the “Add” button - Figure 113.

Figure 114. ONT firmware management window



Clicking over the new line in the ‘Name’ column, Figure 113, the available firmware files for download are shown. Select the intended file and fill the other fields.

The ‘Version SW’ field must be filled with the correct software version, this version must be a valid version for the selected file.

The ‘Version HW’ field is not mandatory. If this field is empty the corresponding firmware version will be updated independently of the hardware version.

In order to select the ONT profile, select the ‘Profile’ field and choose the intended profile from the available list.

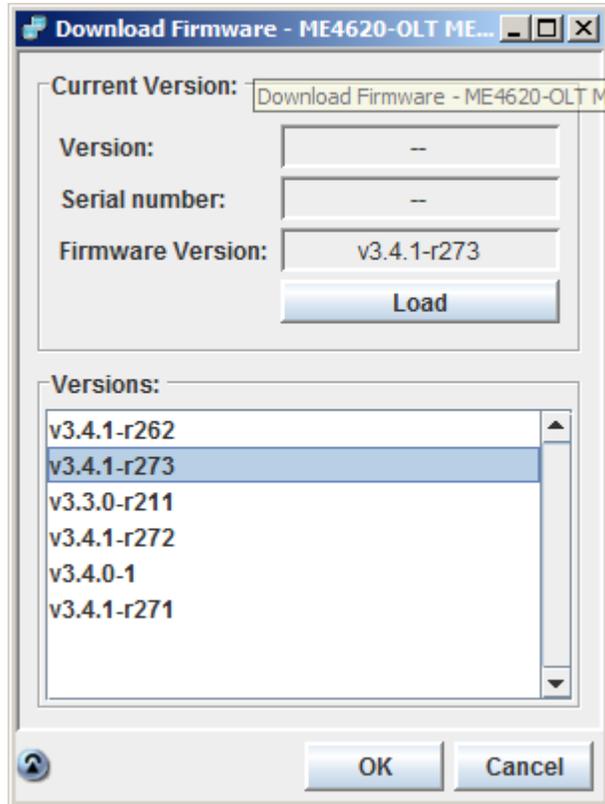
At the time of update, for ONTs that make automatic updates (and if “default” is checked), the system will check out whether the ONT current version is or not, the same as the version indicated as “default”. If it’s not, the specified ONT will be updated with the specified file.

Only one firmware default version per ONT profile and hardware version should exist.

Firmware

In order to transfer a firmware file from the central management system repository to the OLT unit, select **Options** → **Configure** → **Information Loading** → **Download** → **Firmware**. The window shown in Figure 114 lists available firmware versions for the OLT. From the presented list choose the intended version and select 'OK'. This operation performs the transfer of the OLT firmware setup file to the OLT unit.

Figure 115. Firmware versions available for download



In order to monitor the firmware file transfer status open the firmware download details window, Figure 115, from the main application window Configure menu, **Configure** → **Download** → **Firmware**.

Figure 116. Firmware download details monitor window

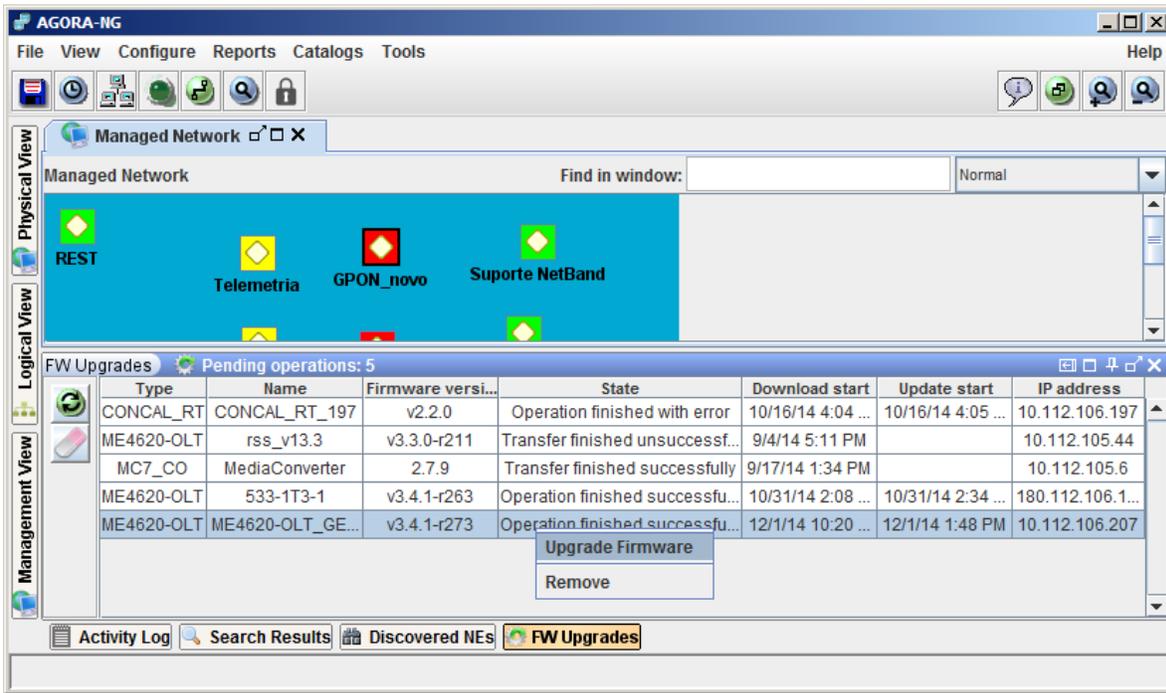


ME4620-OLT Firmware Upgrade

This section describes the equipment upgrade with the downloaded firmware version file.

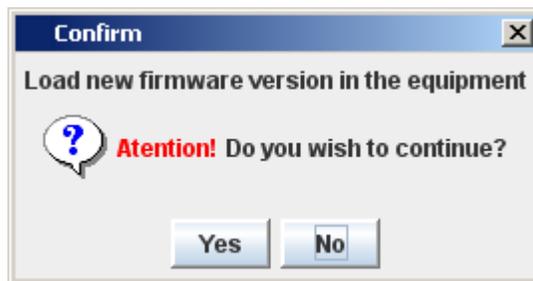
After the transfer is completed successfully, check the state indication in the download detail window, Figure 116. In order to proceed with the equipment upgrade select the line corresponding file, and right-select '**Upgrade Firmware**', Figure 116.

Figure 117. Transferred firmware file operations



To continue with this operation, the user must confirm the ‘Yes’ button in the confirmation window, Figure 117.

Figure 118. Firmware upgrade confirmation



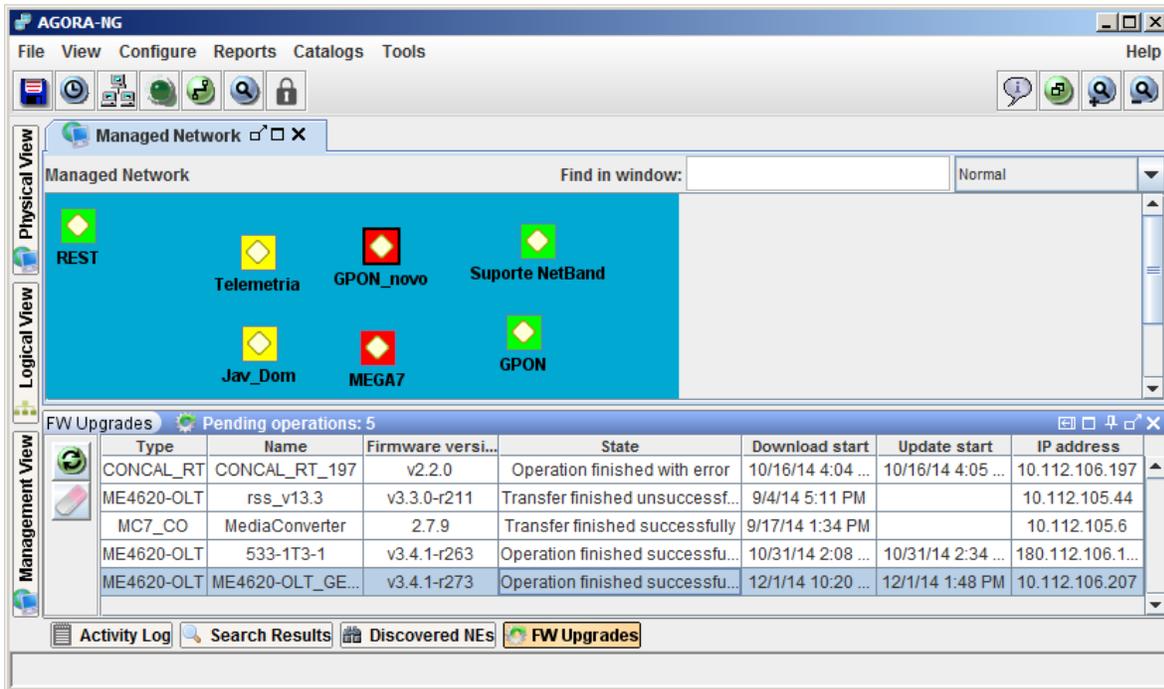
After upgrade confirmation, the firmware download details window indicates the state “Execution in Progress”, as shown in Figure 118. This process may take a few minutes.

Figure 119. Firmware upgrade execution



In the window shown in Figure 119, the 'State' column, indicates that the upgrade completed successfully.

Figure 120. Firmware upgrade finished



Notes on firmware download:

- It is not possible to transfer a firmware file to the machine while, for the same equipment, there is a firmware file being updated. Use 'Remove' from the menu shown in Figure 116, to remove the file before making the transfer.
- It is not allowed to transfer a firmware file with the same version that is already running on the unit.

ONTs Manual Update

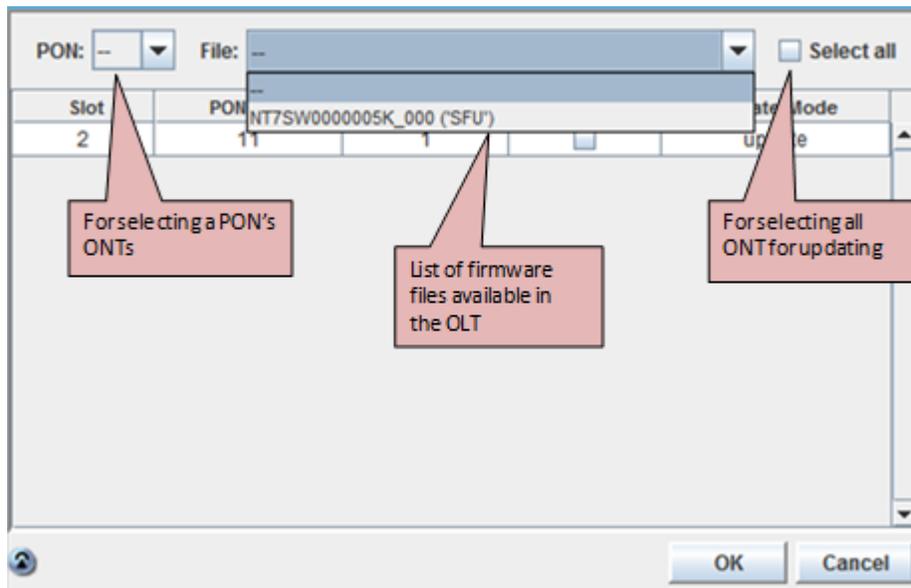
In the process of inserting ONTs, it is necessary to select the firmware update method. The options are 'Off', 'Automatic' and 'Specific version'. These options determine the way in which the ONT firmware is updated.

- Off – Firmware updating is manual and it is necessary to indicate the firmware file;
- Automatic – Automatically installs the firmware version indicated in the "Firmware Management" window as default, in accordance with the hardware profile and version;
- Specific version – Updates with a specific firmware version.

ONTs for which the update method has been configured as 'Off' an update with a given firmware version can be selected. To do this, select **Options** → **Configure** → **Information Loading** → **ONTs manual update**.

Select the required version file from the list of available firmware files.

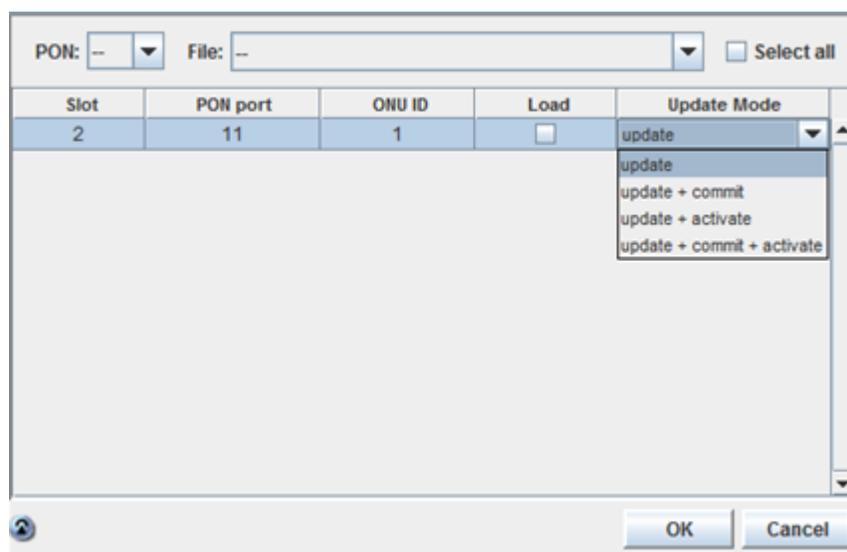
Figure 121. ONT manual update window



The options in the 'Update Method' column in figure below are:

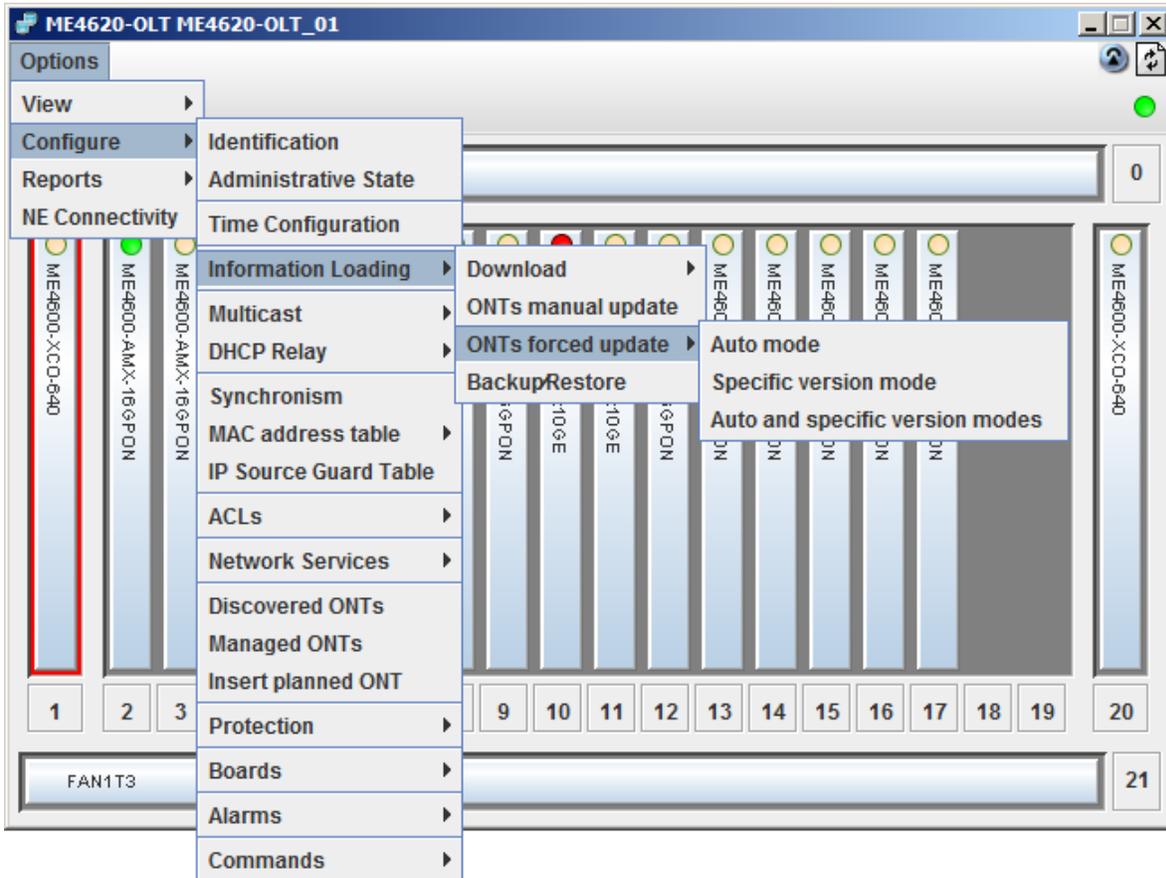
- Update – Transfers the firmware file to the ONT
- Update + commit – Transfers the firmware file to the ONT and changes are committed
- Update + activate – Transfers the file and resets the ONT with the firmware version
- Update + commit + activate – Transfers the file, commits and resets the ONT with this firmware version

Figure 122. Update mode in ONT manual update window



ONTs Forced Update

Figure 123. Auto and specific version modes access from equipment's window

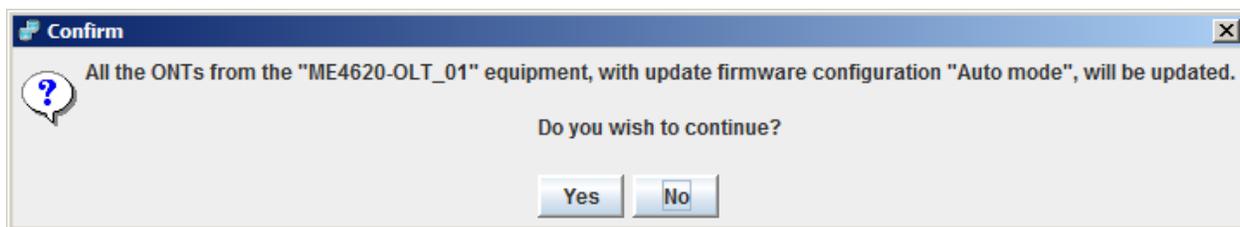


With a reset command ONTs configured with either the 'Auto mode' or 'Specific version mode' firmware will be automatically updated.

'ONTs Forced Update' can be used to force the update of those ONTs which are configured for 'Auto mode', 'Specific version mode' or both modes.

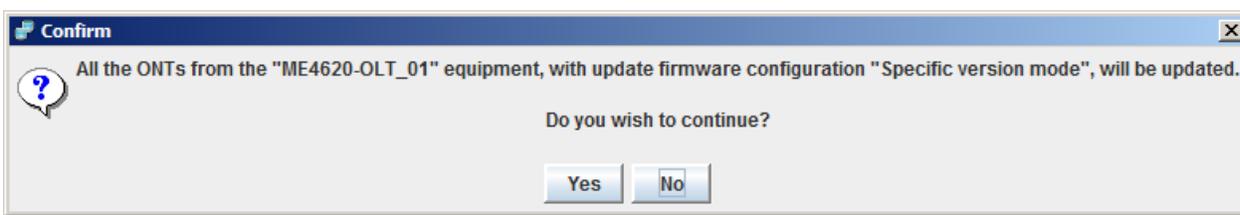
Automatic Only

Figure 124. Confirmation pop up for auto mode ONT forced update



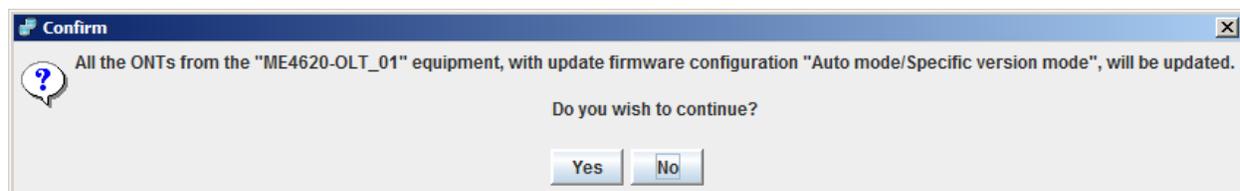
Specific Version Only

Figure 125. Confirmation pop up for specific version mode ONT forced update



Auto Mode/Specific Version Mode

Figure 126. Confirmation pop up for auto mode/specific version mode ONT forced update



Chapter 7

ALARM MANAGEMENT

Summary

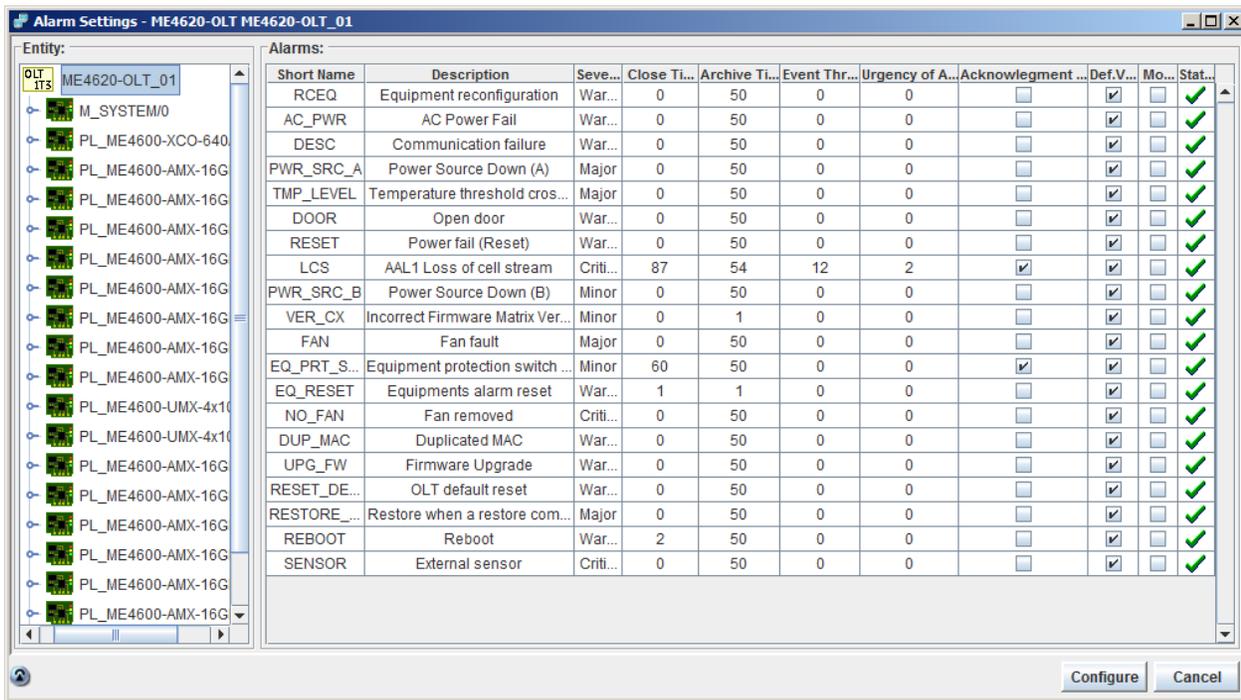
It is possible to manage unit, board or port alarms depending on the entity managed type or the chosen entity.

Alarm Parameterization

The window shown in Figure 126 can be accessed through **Options → Configure → Alarms → Parameterization**. It is possible to set alarms for the unit, boards or ports depending on the type of entity or the entity selected from the left hand side of the window.

The alarm settings window can be viewed through **Options → View → Alarms → Parameterization**.

Figure 127. Alarm Parameterization



For further details on alarm parameterization, see the AGORA-NG Resource Manager Manual.

Resetting Alarms

Unit's alarm table can be reset selecting **Options → Configure → Alarms → Reset**. When this option is selected a confirmation is required, as shown in Figure 127, if a 'Yes' select is chosen resetting will take place immediately.

Figure 128. Alarm reset confirmation



Alarms

Alarm management is carried out in Alarm Monitor module. Besides the general alarm window, accessed in the application's main window through **View → Alarms** or by using the quick access button,  on the application's toolbar, unit based alarm management is also available. For further details on Alarm Monitor module, see the AGORA-NG Alarm Monitor manual.

Unit Based Alarms

Unit's alarms can be accessed from the menu in the unit's window **Options → View → Alarms → Pending** or, selecting **Alarms** over the unit icon (Figure 128). Alarm Monitor's window will be open, Figure 129.

Figure 129. Unit's alarms menu

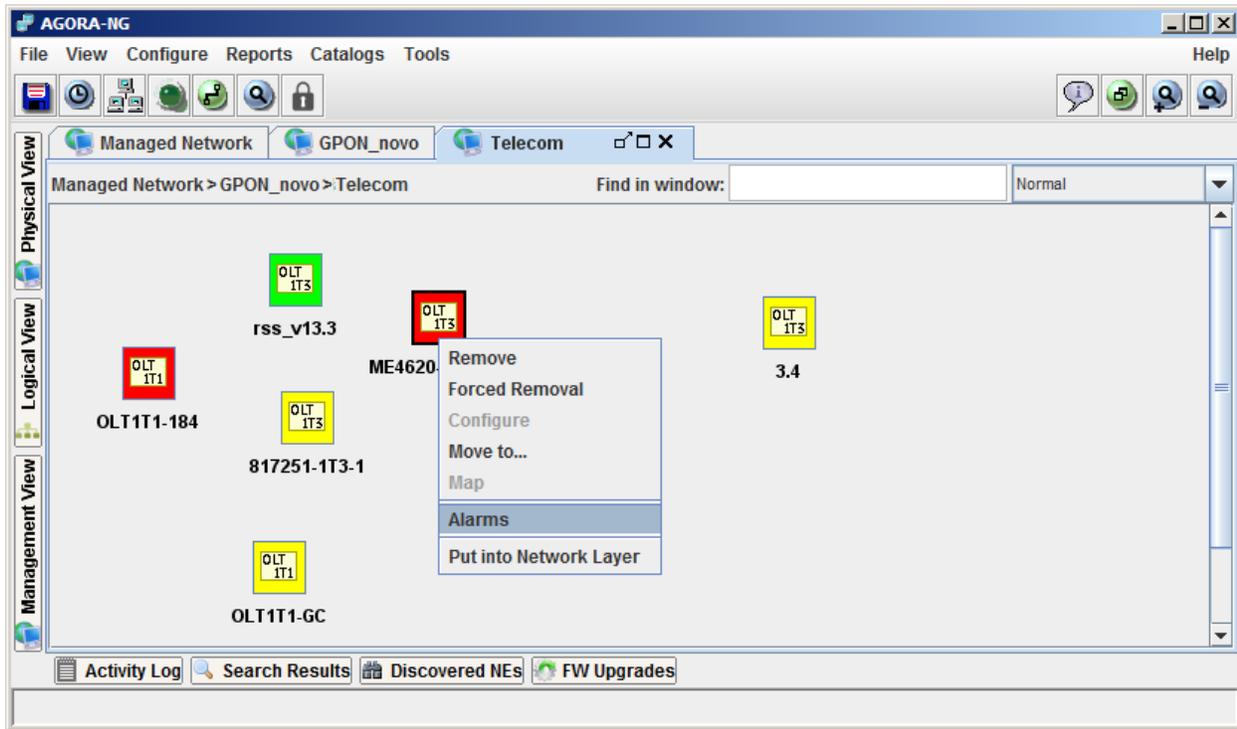


Figure 130. Alarm Monitor with a list of unit based alarms

ALARM MONITOR

counters rules mosorio

detail acknowledge unacknowledge close comment trouble ticket filters

(additionalText: {[neObjId]:~/PTN1542})

Acknowledged Unacknowledged Open Closed Indeterminate Warning Minor Major Critical

7 0 0 0 3 4 --Comments-- --Anomalies-- --Last-- --Administrative-- Search...

all	Events	MO Class	MO Instance	Alarm Type	Probable Cause	Raised Time	Cleared Time	Changed Time	Specific Problem
<input type="checkbox"/>	2	PROTECTION_GROUP_TTYPE	ME4620-OLT ME4620-OLT_01 PROTECTION GROUP#teste_prot_b	CommunicationsAlarm	Indeterminate	2014/11/26 15:15:09	--	2014/11/26 15:34:18	PROT: Protection switch
<input type="checkbox"/>	2	PROTECTION_GROUP_TTYPE	ME4620-OLT ME4620-OLT_01 PROTECTION GROUP#12345678901234567890123456789012	CommunicationsAlarm	Indeterminate	2014/11/26 18:05:35	--	2014/11/26 18:06:18	PROT: Protection switch
<input type="checkbox"/>	2	PROTECTION_GROUP_UPLINK	ME4620-OLT ME4620-OLT_01 PROTECTION GROUP#redfb	CommunicationsAlarm	Indeterminate	2014/11/26 11:42:07	--	2014/11/26 11:42:07	PROT: Protection switch
<input type="checkbox"/>	29	PL_ME4600-XCO-640	ME4620-OLT-PL ME4600-XCO-640 ME4620-OLT_01/1	CommunicationsAlarm	Indeterminate	2014/11/26 19:00:47	--	2014/12/03 11:23:14	BRDWN: Board down
<input type="checkbox"/>	5	P_GBIF_ETH	ME4620-OLT-PL ME4600-JMX-4x10GE ME4620-OLT_01/10/4	CommunicationsAlarm	Indeterminate	2014/12/03 11:12:40	--	2014/12/03 11:23:15	SFP_OUT: SFP not present
<input type="checkbox"/>	6	P_GBIF_ETH	ME4620-OLT-PL ME4600-JMX-4x10GE ME4620-OLT_01/10/4	CommunicationsAlarm	Indeterminate	2014/12/03 11:13:08	--	2014/12/03 11:23:15	LOS: Loss of signal
<input type="checkbox"/>	6	P_GBIF_ETH	ME4620-OLT-PL ME4600-JMX-4x10GE ME4620-OLT_01/10/4	CommunicationsAlarm	Indeterminate	2014/12/03 11:13:08	--	2014/12/03 11:23:15	LNKDNW: Link Down

Remote Unit Alarms

To access alarm window for a specific ONT, from the managed ONT window, Figure 95, select the target ONT, right select on it and choose **View → Alarms → Parameterization**.

Figure 131. ONT Alarms

Managed ONTs - ME4620-OLT ME4620-OLT_01

Managed ONTs

Slot: All

Slot	PON	ONU ID	Name	Serial number	Vendor ID	Profile	Equip ID	Administrative State	Operacional Status	State
4	1	1	15054494E07C27106	5054494E07C27106	CISCO	GR2402GA	GR2402GA	In Service	Operational	●
4	1	2	25054494E07C270DD	5054494E07C270...	CISCO	GR2402GA	GR2402GA	In Service	Operational	●
4	1	3	35054494E07C270DD	5054494E07C270...	CISCO	GR2402GA	GR2402GA	In Service	Operational	●
4	1	4	45054494E07C270DD	5054494E07C270...	CISCO	GR2402GA	GR2402GA	In Service	Operational	●
4	1	5	55054494E07C270DD	5054494E07C270...	CISCO	GR2402GA	GR2402GA	In Service	Operational	●
4	1	6	65054494E07C270DD	5054494E07C270...	CISCO	GR2402GA	GR2402GA	In Service	Operational	●
4	1	7	75054494E07C270DD	5054494E07C270...	CISCO	GR2402GA	GR2402GA	In Service	Operational	●
4	1	8	85054494E07C270DD	5054494E07C270...	CISCO	GR2402GA	GR2402GA	In Service	Operational	●
4	1	9	95054494E07C270DD	5054494E07C270...	CISCO	GR2402GA	GR2402GA	In Service	Operational	●
4	1	10	105054494E07C270DD	5054494E07C270...	CISCO	GR2402GA	GR2402GA	In Service	Operational	●
4	1	11	115054494E07C270DD	5054494E07C270...	CISCO	GR2402GA	GR2402GA	In Service	Operational	●
4	1	12	125054494E07C270DD	5054494E07C270...	CISCO	GR2402GA	GR2402GA	In Service	Operational	●
4	1	13	135054494E07C270ED	5054494E07C270ED	CISCO	GR2402GA	GR2402GA	In Service	Operational	●
4	1	14	145054494E07C270D3	5054494E07C270D3	CISCO	GR2402GA	GR2402GA	In Service	Operational	●

Context menu for selected row (Slot 4, PON 1, ONU ID 3):

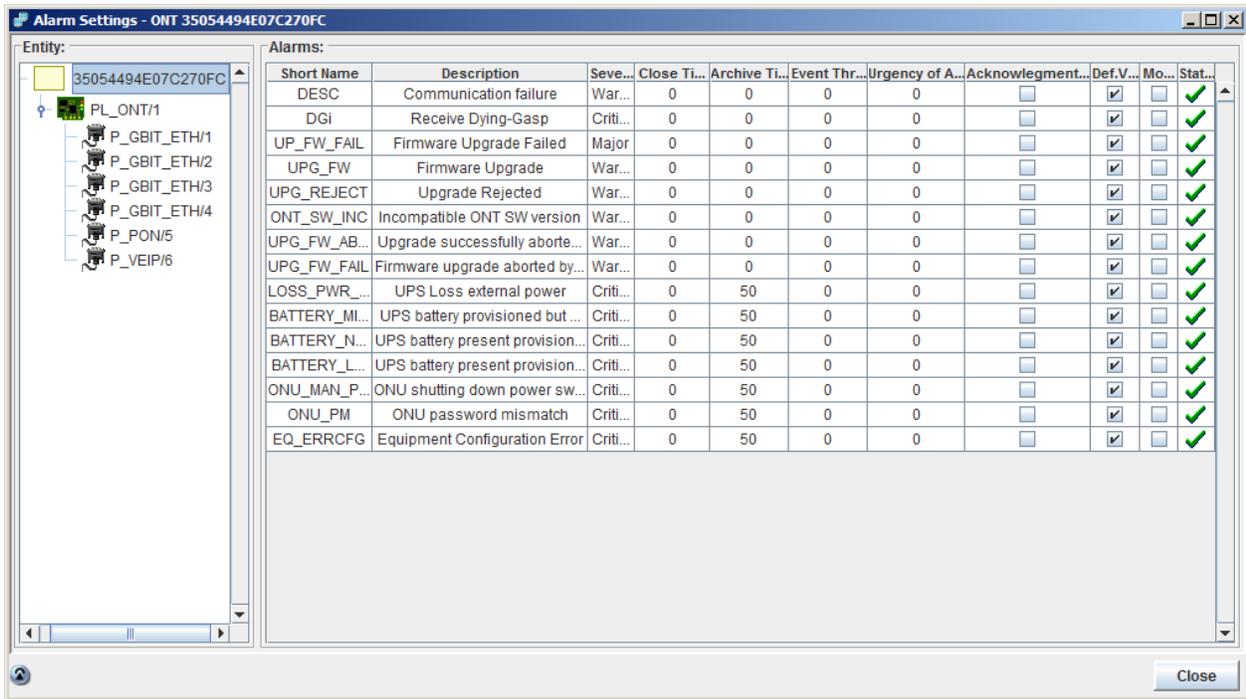
- View
- Configure
- Reports
- Identification
- Operation States
- Client Services
- GPON interface status
- Firmware details
- T-CONTs
- Statistics
- Alarms
 - Pending
 - Parameterization

Interfaces

Port	Type	Description	Name	Administrative State	Operacional Status	Alarms	State
1	P_GBIT_ETH	Eth 1	--	In Service	Operational		●
2	P_GBIT_ETH	Eth 2	--	In Service	Not Operational	LNKDWN	●
3	P_GBIT_ETH	Eth 3	--	In Service	Not Operational	LNKDWN	●
4	P_GBIT_ETH	Eth 4	--	In Service	Not Operational	LNKDWN	●
5	P_PON	PON 1	--	In Service	Operational		●
6	P_VEIP	VEIP 1	--	In Service	Operational		●

Buttons: Insert Refresh Close

Figure 132. ONT Alarm Parameterization



ONT alarms can be accessed from the menu **View** → **Alarms** → **Pending**.

Figure 133. Alarm Monitor with a list of ONT based alarms



Alarm Reports

AGORA-NG application produces global alarm reports, via the **Reports** → **Alarms** menu option, in the main application window. Alarms specific to the ME4620-OLT unit, remote ONTs and unit ports are also available.

For further details on alarm reports, see the AGORA-NG Alarm Monitor manual.

ME4620-OLT Unit Alarm Reports

The window for generating unit alarm reports can be accessed through **Options → Reports → Alarms**, in the unit window, Figure 133.

Figure 134. Unit alarm reports

The screenshot shows the Cisco Reports interface for generating unit alarm reports. The window title is "R Reports". On the left, there is a navigation menu with "Alarms" selected. The main content area is titled "Alarms Report" and contains the following sections:

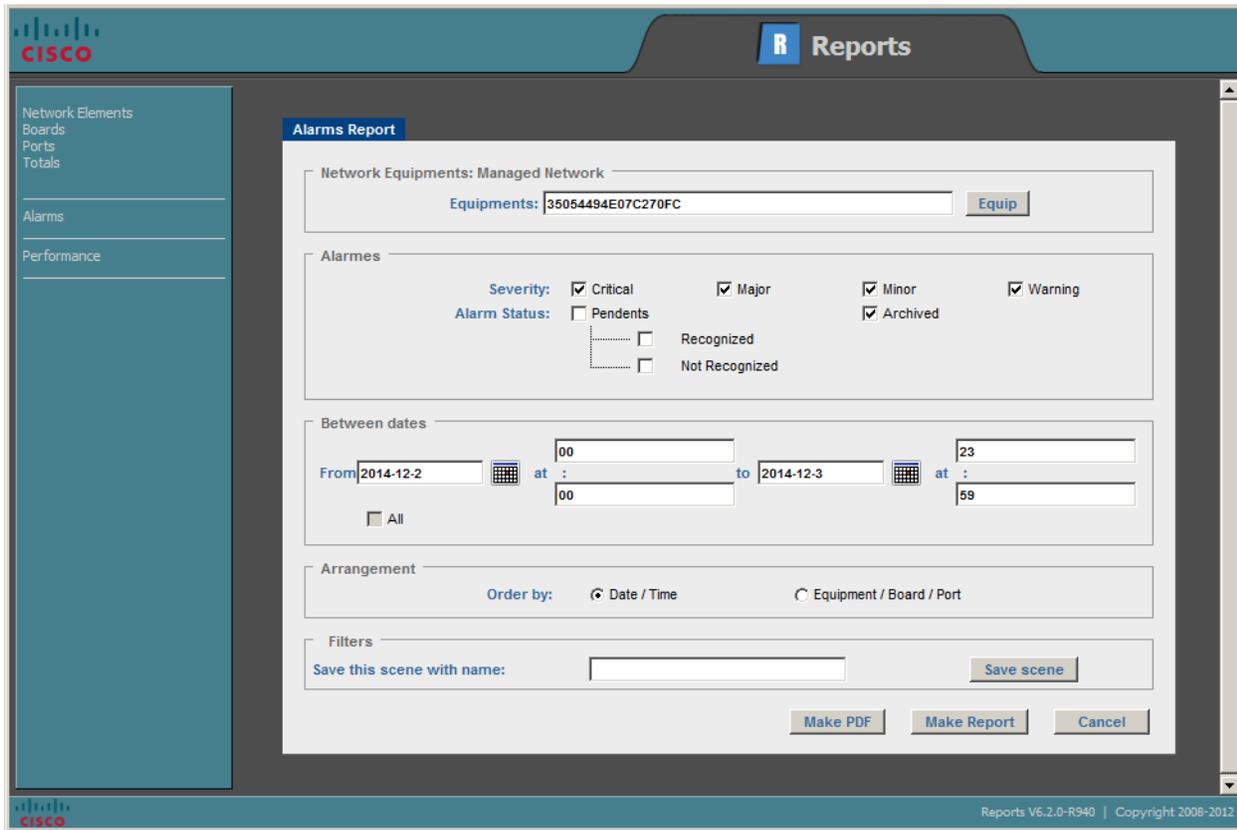
- Network Equipments: Managed Network**: A text field contains "ME4620-OLT_01" and an "Equip" button is to its right.
- Alarms**: A section with "Severity" options: Critical, Major, Minor, and Warning. "Alarm Status" options include Pendants, Recognized, Not Recognized, and Archived.
- Between dates**: A date range selector showing "From 2014-12-2 00" to "2014-12-3 23" with time fields "00" and "59". An "All" checkbox is present.
- Arrangement**: An "Order by:" section with radio buttons for "Date / Time" (selected) and "Equipment / Board / Port".
- Filters**: A "Save this scene with name:" text field and a "Save scene" button.

At the bottom right, there are three buttons: "Make PDF", "Make Report", and "Cancel". The footer of the window displays "Reports V6.2.0-R940 | Copyright 2008-2012".

ONT Alarm Report

To generate an alarm report for a given ONT, in the managed ONT window, Figure 95, select the target ONT, right select on it and choose **Reports → Alarms**. Alarm Monitor's window will be open Figure 134.

Figure 135. ONT alarm reports



Alarm Report by Port

In the list of ports,(for example Figure 64), right select on a port and then choose **Reports** → **Alarms**, from the menu, to bring up the window that will allow the generation of an alarm report for the port in question, Figure 135.

Figure 136. Port alarm reports generator

The screenshot shows the Cisco Alarms Report generator interface. The top navigation bar includes the Cisco logo and a 'Reports' tab. A left sidebar contains menu items: Network Elements, Boards, Ports, Totals, Alarms, and Performance. The main content area is titled 'Alarms Report' and contains the following sections:

- Managed Network:** A text field containing 'Ports: ME4620-OLT:PL_ME4600-UMX-4x10GE CiscoOLT-1'.
- Alarms:** A section with checkboxes for Severity (Critical, Major, Minor, Warning) and Alarm Status (Pendants, Recognized, Not Recognized, Archived).
- Between dates:** A date range selector with 'From' set to '2014-01-28' at '00 : 00' and 'to' set to '2014-01-29' at '23 : 59'. An 'All' checkbox is also present.
- Arrangement:** An 'Order by' section with radio buttons for 'Date / Time' (selected) and 'Equipment / Board / Port'.
- Filters:** A section with a text input field and a 'Save scene' button.

At the bottom of the interface, there are three buttons: 'Make PDF', 'Make Report', and 'Cancel'. The footer of the interface displays 'Reports V6.2.0-R940 | Copyright 2008-2012'.

Chapter 8

INTERFACES AND PUBLIC API

SNMP Northbound Interface

SNMPv1 Traps and SNMPv2 Notifications

Simple Network Management Protocol (SNMP) application layer protocol facilitates the exchange of management information between network devices.

SNMPv1 and SNMP v2 along with the associated AGORA-NG MIBs (PTIN_NOTIF-MIB and PTIN_NOTIF-MIBv2) allow an external system to understand what a trap/notification, sent by AGORA-NG, means and how to interpret the information it carries.

Fault MIBs PTIN_NOTIF-MIB and PTIN_NOTIF-MIBv2 must be loaded.

Table 2. SNMPv1 TRAP general structure

PDU Type	enterprise	Agent Address	Generic Trap Type (fixedvalue 6)	Specific Trap Code (fixedvalue 15)	Time stamp	Variable Bindings
----------	------------	---------------	----------------------------------	------------------------------------	------------	-------------------

Fields enterprise, generic Trap and specific Trap are defined in RFC 1157. This section will focus on the field “Variable Bindings” (AGORA-NG specific).

Table 3. SNMPv2 NOTIFICATION general structure

PDU Type	RequestID	Error Status	Error Index	VarBind1 sysUpTime OID	VarBind1 sysUpTime value	VarBind2 snmpTrapOID	VarBind2 notification value	...
----------	-----------	--------------	-------------	------------------------	--------------------------	----------------------	-----------------------------	-----

The specific AGORA-NG “variable bindings” field is of type PtinNotifEventDom. Each variable of this data field associates a particular MIB object instance with its value and will be detailed described in a further section of this document.

AGORA-NG SNMPv1 Trap Example

This section contains an example of a trap sent by AGORA-NG:

```

13:40:50,326 DEBUG [Thread-2][events.imp.PtinNotifEventDom] TRAP SNMPv1 :
V1 TRAP[requestID=0,timestamp=71days,
5:02:37.25,enterprise=1.3.6.1.4.1.4746.1010.2,genericTrap=6,specificTrap=15,
VBS[1.3.6.1.4.1.4746.1010.1.1.1 = 573901;
1.3.6.1.4.1.4746.1010.1.1.2 = 14/03/2014 13:40:46;
1.3.6.1.4.1.4746.1010.1.1.3 = 2;
1.3.6.1.4.1.4746.1010.1.1.4 = 0;
1.3.6.1.4.1.4746.1010.1.1.5 = 5;
1.3.6.1.4.1.4746.1010.1.1.6 = P_PON
1.3.6.1.4.1.4746.1010.1.1.7 = ME4620-OLT: PL_ME4600-AMX-16GPON 36PG01/4/10;
1.3.6.1.4.1.4746.1010.1.1.8 = objectId=XXX,adminState=SERVICE;
1.3.6.1.4.1.4746.1010.1.1.9 = 573902;
1.3.6.1.4.1.4746.1010.1.1.10 = LOS: Loss of signal;
1.3.6.1.4.1.4746.1010.1.1.11 = 0;
1.3.6.1.4.1.4746.1010.1.1.12 = 18;
1.3.6.1.4.1.4746.1010.1.1.14 = DA_GPON_TECH]]

```

This output log shows the AGORA-NG specific PtinNotifEventDom trap, from PTIN_NOTIF-MIB, which will be described in detail in the next section.

AGORA-NG “PtinNotifEventDom” Definition

This section describes in detail the structure of an AGORA-NG PtinNotifEventDom trap / notification and maps each variable with its corresponding OID value:

Table 4. “PtinNotifEventDom” Structure

[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]
-----	-----	-----	-----	-----	-----	-----	-----	-----	------	------	------	------

Table 5. "PtinNotifEventDom" Definition

Variable	OID
[1] eventSequenceNumber	1.3.6.1.4.1.4746.1010.1.1.1
[2] eventTime	1.3.6.1.4.1.4746.1010.1.1.2
[3] eventType	1.3.6.1.4.1.4746.1010.1.1.3
[4] probableCause	1.3.6.1.4.1.4746.1010.1.1.4
[5] perceivedSeverity	1.3.6.1.4.1.4746.1010.1.1.5
[6] managedObjectClass	1.3.6.1.4.1.4746.1010.1.1.6
[7] managedObjectInstance	1.3.6.1.4.1.4746.1010.1.1.7
[8] additionalText	1.3.6.1.4.1.4746.1010.1.1.8
[9] notificationIdentifier	1.3.6.1.4.1.4746.1010.1.1.9
[10] specificProblem	1.3.6.1.4.1.4746.1010.1.1.10
[11] acknowledge	1.3.6.1.4.1.4746.1010.1.1.11
[12] alarmID	1.3.6.1.4.1.4746.1010.1.1.12
[13] domain	1.3.6.1.4.1.4746.1010.1.1.14

“PtinNotifEventDom” Entry Structure

Table 6. “PtinNotifEventDom” Entry Structure

Variable	Description	Possible Values
eventSequenceNumber	Sequence number of the PDUs/SNMP Traps	INTEGER
eventTime	The time the alarm was emitted	Date format should be DD/MM/YYYY hh:mm:ss"
eventType	The type of alarm sent	2 - communications 3 - environmental 4 - equipment 5 - qualityOfService 6 - processingError
probableCause	The probable cause of the problem	0 - x733Unknown 2 - x733ApplicationSubsystemFailure 4 - x733CallEstablishmentError 5 - x733CommunicationsProtocolError 6 - x733CommunicationsSubsystemFailure 7 - x733ConfigurationOrCustomizationError 8 - x733Congestion 9 - x733CorruptData 10 - x733CpuCyclesLimitExceeded 11 - x733vEnclosureDoorOpen 15 - x733EquipmentMalfunction 17 - x733FileError 21 - x733HeatingOrVentilationOrCoolingSystemProblem 22 - x733HumidityUnacceptable 23 - x733InputOutputDeviceError 24 - x733InputDeviceError 25 - x733LANError 27 - x733LocalNodeTransmissionError 28 - x733LossOfFrame 29 - x733LossOfSignal 31 - x733MultiplexerProblem 32 - x733OutOfMemory 33 - x733OutputDeviceError 34 - x733PerformanceDegraded 35 - x733PowerProblem 37 - x733ProcessorProblem 39 - x733QueueSizeExceeded 40 - x733ReceiveFailure 41 - x733ReceiverFailure 42 - x733RemoteNodeTransmissionError 43 - x733ResourceAtOrNearingCapacity 44 - x733ResponseTimeExcessive 45 - x733RetransmissionRateExcessive 46 - x733SoftwareError 47 - x733SoftwareProgramAbnormallyTerminated 48 - x733SoftwareProgramError

Variable	Description	Possible Values
		49 - x733StorageCapacityProblem 50 - x733TemperatureUnacceptable 51 - x733ThresholdCrossed 52 - x733TimingProblem 54 - x733TransmitFailure 57 - x733VersionMismatch 58 - x733SnmpTrapColdStart 59 - x733SnmpTrapWarmStart 60 - x733SnmpTrapLinkDown 61 - x733SnmpTrapLinkUp 100 - x733UnderlyingResourcesUnavailable 101 - x733FramingError 3001 - m3100aIS 3002 - m3100callSetUpFailure 3003 - m3100degradedSignal 3004 - m3100farEndReceiverFailure 3005 - m3100framingError 3006 - m3100lossOfFrame 3007 - m3100lossOfPointer 3008 - m3100lossOfSignal 3009 - m3100payloadTypeMismatch 3010 - m3100transmissionError 3011 - m3100remoteAlarmInterface 3012 - m3100excessiveBER 3013 - m3100pathTraceMismatch 3014 - m3100unavailable 3015 - m3100signalLabelMismatch 3016 - m3100lossOfMultiFrame 3017 - m3100receiveFailure 3018 - m3100transmitFailure 3019 - m3100modulationFailure 3020 - m3100demodulationFailure 3021 - m3100broadcastChannelFailure 3022 - m3100connectionEstablishmentError 3023 - m3100invalidMessageReceived 3024 - m3100localNodeTransmissionError 3025 - m3100remoteNodeTransmissionError 3026 - m3100routingFailure 3027 - 3050 are reserved for communications alarm related probable causes -- The following are used with equipment alarm. 3051 - m3100backplaneFailure 3052 - m3100dataSetProblem 3053 - m3100equipmentIdentifierDuplication 3054 - m3100externalIFDeviceProblem 3055 - m3100lineCardProblem 3056 - m3100multiplexerProblem 3057 - m3100nEIdentifierDuplication 3058 - m3100powerProblem 3059 - m3100processorProblem 3060 - m3100protectionPathFailure 3061 - m3100receiverFailure 3062 - m3100replaceableUnitMissing

Variable	Description	Possible Values
		3063 - m3100replaceableUnitTypeMismatch 3064 - m3100synchronizationSourceMismatch 3065 - m3100terminalProblem 3066 - m3100timingProblem 3067 - m3100transmitterFailure 3068 - m3100trunkCardProblem 3069 - m3100replaceableUnitProblem 3070 - m3100realTimeClockFailure 3071 - m3100antennaFailure 3072 - m3100batteryChargingFailure 3073 - m3100diskFailure 3074 - m3100frequencyHoppingFailure 3075 - m3100iODeviceError 3076 - m3100lossOfSynchronisation 3077 - m3100lossOfRedundancy 3078 - m3100powerSupplyFailure 3079 - m3100signalQualityEvaluationFailure 3080 - m3100tranceiverFailure -- Values 3081-3100 are reserved for equipment alarm related probable causes -- The following are used with environmental alarm 3101 - m3100airCompressorFailure 3102 - m3100airConditioningFailure 3103 - m3100airDryerFailure 3104 - m3100batteryDischarging 3105 - m3100batteryFailure 3106 - m3100commercialPowerFailure 3107 - m3100coolingFanFailure 3108 - m3100engineFailure 3109 - m3100fireDetectorFailure 3110 - m3100fuseFailure 3111 - m3100generatorFailure 3112 - m3100lowBatteryThreshold 3113 - m3100pumpFailure 3114 - m3100rectifierFailure 3115 - m3100rectifierHighVoltage 3116 - m3100rectifierLowFVoltage 3117 - m3100ventilationsSystemFailure 3118 - m3100enclosureDoorOpen 3119 - m3100explosiveGas 3120 - m3100fire 3121 - m3100flood 3122 - m3100highHumidity 3123 - m3100highTemperature 3124 - m3100highWind 3125 - m3100iceBuildUp 3126 - m3100intrusionDetection 2127 - m3100lowFuel 3128 - m3100lowHumidity 3129 - m3100lowCablePressure 3130 - m3100lowTemperature 3131 - m3100lowWater 3132 - m3100smoke

Variable	Description	Possible Values
		3133 - m3100toxicGas 3134 - m3100coolingSystemFailure 3135 - m3100externalEquipmentFailure 3136 - m3100externalPointFailure -- Values 3137-3150 are reserved for environmental alarm related probable causes -- The following are used with Processing error alarm. 3151 - m3100storageCapacityProblem 3152 - m3100memoryMismatch 3153 - m3100corruptData 3154 - m3100outOfCPUCycles 3155 - m3100sfwrEnvironmentProblem 3156 - m3100sfwrDownloadFailure 3157 - m3100lossOfRealTime 3158 - m3100reinitialized 3159 - m3100applicationSubsystemFailure 3160 - m3100configurationOrCustomisationError 3161 - m3100databaseInconsistency 3162 - m3100fileError 3163 - m3100outOfMemory 3164 - m3100softwareError 3165 - m3100timeoutExpired 3166 - m3100underlyingResourceUnavailable 3167 m3100versionMismatch -- Values 3168-3200 are reserved for processing error alarm related probable causes. 3201 - 3100bandwidthReduced 3202 - m3100congestion 3203 - m3100excessiveErrorRate 3204 - m3100excessiveResponseTime 3205 - m3100excessiveRetransmissionRate 3206 - m3100reducedLoggingCapability 3207 - m3100systemResourcesOverload
perceivedSeverity	The severity of the alarm	0 - indeterminate 1 - critical 2 - major 3 - minor 4 - warning 5 - cleared
managedObjectClass	The class (type) of the entity affected by the problem	<u>Equipment Types:</u> ME4620-OLT (OLT Type) ONT (ONU Type) <u>Board Types</u> PL_ME4600-XCO-640 PL_ME4600-AMX-16GPON PL_ME4600-UMX-4x10GE PL_ME4600-AMX-48GE <u>Port Types</u> P_PON P_FAST_ETH P_GBIT_ETH IFL_LAG_ETH

Variable	Description	Possible Values
		P RF
managedObjectInstance	The entity affected by the problem	<p>External ID Identification of the alarmed entity. SINTAXE: If the alarmed entity is an ME4620-OLT or ONT equipment the syntax is: EquipmentType OLTEquipmentName</p> <p>If the alarmed entity is a board the syntax is: EquipmentType:BoardType OLTEquipmentName/Slot</p> <p>If the alarmed entity is a port the syntax is: EquipmentType:BoardType OLTEquipmentName/Slot/PortNumber</p> <p>Example: ME4620-OLT:PL_ME4600-AMX-16GPON 36PG01/4/10</p>
additionalText	Any other information regarding the trap been sent	<p>Internal string identification of the alarmed entity. objectId=EntityString Id,adminState={ state}</p> <p>SINTAXE: EntityStringId: entity string identifier</p> <p>If the alarmed entity is an ME4620-OLT equipment the syntax is: /PTINxxxx, xxxx - integer</p> <p>If the alarmed entity is an ONU equipment the syntax is: /PTINxxxx/yyyy xxxx – integer, yyyy - integer</p> <p>If the alarmed entity is a ME4620-OLT board the syntax is: /PTINxxxx/zz xxxx – integer, zz – board slot</p> <p>If the alarmed entity is an ONU board the syntax is: /PTINxxxx/yyyy/ww xxxx – integer, yyyy - integer , zz – board slot</p> <p>If the alarmed entity is a ME4620-OLT port (interface) the syntax is: /PTINxxxx/zz/ww xxxx – integer, zz – board slot, ww – port number</p> <p>If the alarmed entity is an ONU port the syntax is: /PTINxxxx/yyyy/ww xxxx – integer, yyyy - integer , zz – board slot ww – port number</p> <p>state: SERVICE or MAINTENANCE This information field is very important; mapping this value</p>

Variable	Description	Possible Values
		with inventory repository information it is possible to identify which is the affected alarmed entity.
notificationIdentifier	This provides an integer value identifier for a notification	Integer
specificProblem	Detailed description of the problem	alarmCode:alarmeDescription Example: LOS: Loss of signal (consult section AGORA-NG for more details)
acknowledge	This field shows if the trap has been acknowledge or not	0 – unacknowledged 1 - acknowledged
alarmID	Alarm ID	Integer (consult section AGORA-NG Alarm List for more details)
domain	Access Domain of the managed system	String Identifier

AGORA-NG Alarm List

This section describes the list of all alarms supported by AGORA-NG and maps the alarm columns with the corresponding OIDs notification fields.

Table 7. AGORA-NG Alarm List

alarm ID	specific Problem(1)	specific Problem(2)	perceived Severity
3	BRDWN	Board down	Critical
5	RCEQ	Equipment reconfiguration	Warning
6	PROT	Protection switch	Major
7	SFP_OUT	SFP not present	Critical
11	DESC	Communication failure	Major
12	PWR_SRC_A	Power Source Down (A)	Major
13	TMP_LEVEL	Temperature threshold crossed	Major
16	RESET	Power fail (Reset)	Warning
18	LOS	Loss of signal	Critical
79	LNKDOWN	Link Down	Critical
228	PWR_SRC_B	Power Source Down (B)	Minor
235	VER_CX	Incorrect Firmware Matrix Version	Minor
296	FAN	Fan fault	Major
372	EQ_PRT_SCH	Equipment protection switch - matrix	Minor
378	EQ_RESET	Equipments alarm reset	Warning
403	LOSi	Loss of signal for ONUi	Critical
404	LOFi	Loss of frame of ONUi	Critical
405	LOAMi	Loss of PLOAM	Critical
406	DOWi	Drift of Window	Critical
407	SFi	Signal Fail	Critical
408	SDi	Signal Degrade	Critical
409	LCDGi	Loss of GEM channel delineation	Critical
410	RDi	Remote defect indication	Critical
411	SUFi	Start-up Failure	Critical
412	LOAi	Loss of Acknowledge	Critical
413	DFi	Deactivate Failure	Critical
414	PEEi	Physical Equipment Error	Critical
415	DGi	Receive Dying-Gasp	Critical
416	TIWi	Transmission interface warning	Critical
417	OOR_LOW	RF output above rated value	Critical
418	OOR_HIGH	RF output above rated value	Critical
419	RX_LOWER	RX GPON optical signal below rated value	Critical
420	RX_UPPER	RX GPON optical signal above rated value	Critical
421	TX_LOWER	TX GPON optical signal below rated value	Critical
422	TX_UPPER	TX GPON optical signal above rated	Critical

alarm ID	specific Problem(1)	specific Problem(2)	perceived Severity
423	LAG_M_DOWN	LAG Active Member Down	Critical
424	NO_FAN	Fan removed	Critical
425	SF	Signal Fail	Major
426	EOL	Laser End of Life pending	Major
428	DUP_MAC	Duplicated MAC	Warning
429	UP_FW_FAIL	Firmware Upgrade Failed	Major
430	UPG_FW	Firmware Upgrade	Warning
435	UPG_REJECT	Upgrade Rejected	Warning
447	BUSY	Busy	Critical
591	ONT_SW_INC	Incompatible ONT SW version	Warning
592	UPG_FW_ABORT	Upgrade successfully aborted by user	Warning
593	UPG_FW_FAIL	Firmware upgrade aborted by user failed	Warning
603	NEW_ONT	New ONT Detected {0}	Critical
604	RESET_DEF_CONF	OLT default reset	Warning
605	RESTORE_CONF	Restore when a restore command is executed	Major
606	SLOT_MODE_MSMCH	Slot Mode mismatch configuration	Major
609	CX_CONF_ERROR	Slave matrix configuration error	Warning
615	LOSS_PWR_EXT	UPS Loss external power	Critical
616	BATTERY_MISSING	UPS battery provisioned but missing	Critical
617	BATTERY_NOTCHAR	UPS battery present provisioned but not charging	Critical
618	BATTERY_LOW	UPS battery present provisioned but voltage too low	Critical
619	ONU_MAN_PWR_OFF	ONU shutting down power switch turned off	Critical

REST API

Introduction

This is the reference document for the AGORA-NG REST Interface. This document is aimed at developers who want to integrate the AGORA-NG functionality with other applications.

The base URL for the API can be found at:

- **http://<server>:<port>/agorang/rest/v1/**

The current API version is 1. This version is integrated with AGORA-NG 6.10 version.

The REST interface uses JSON objects to transport information over the HTTP protocol between the server and the client application. For now, JSON is the only supported media type.

The JSON objects are documented as tables on the Resources chapter. This format allows the documentation to be independent of the output format and therefore, is extensible to other media types that the API may support in the future. This tabular format is also more readable than raw JSON text.

The table title is the name of the JSON object defined. There cannot be two tables with the same name, as the name is used to uniquely identify the JSON object. When needed, the table name may appear in the text meaning that the respective JSON object is being mentioned.

Each table line is a JSON property and the first column is the precise property name. Rules for the definition and naming conventions of all JSON objects can be viewed on the section Rules for the REST API Design.

For example, the Equipment Table converts to the following object in JSON notation:

Table 8. Equipment

Equipment		
Parameter	Type	Description
id	string	The ID that can be used on the URL.
aid	AID	Filled with Equipment IP address only.
name	string	User defined string. (Not used to identify the equipment.)
admin	enum	
type	enum	
swVersion	string	The running software version.
hwVersion	string	The hardware version advertised by the equipment.
location	string	A user defined string to represent the equipment location.
serialNumber	string	Serial number advertised by the equipment.
ip	string	
managedDomain	string	The name of the managed domain that includes the site.
site	string	The name of the site where the equipment is located.
technologicalGroup	string	The name of the technological group where the equipment is located.
rack	string	A user defined string to help locate the equipment.
subrack	string	A user defined string to help locate the equipment.
shelf	string	A user defined string to help locate the equipment.

JSON Example – Equipment

```
{
  "id": "10.112.42.121",
  "aid": {
    "ipAddress": "10.112.42.121"
  },
  "name": "OLT Agora NG",
  "type": 10040,
  "admin": 0,
  "swVersion": "v3.2.1-r166",
  "hwVersion": "--",
  "location": "aveiro",
  "serialNumber": "--",
  "ip": "10.112.42.121",
  "site": "AC",
```

```

    "managedDomain": "main",
    "technologicalGroup": "gpon",
    "rack": "33",
    "subrack": "145",
    "shelf": "167"
}

```

Notes on JSON objects:

- JSON properties that are set as 'null' will not be shown on the output text produced on the response. For example, the AID property of the example above only conveys the IP Address field because for an Equipment, the Access Identifier its IP address only.
- JSON fields are null if they are not supported/allowed on the requested entity. Example: the "fans" field on the card status resource for cards without fans.
- JSON properties not given on any incoming request (e.g: POST or PUT operations) will be considered as 'null' meaning that the property is ignored and no action is performed with it. For example, the user can specify only the properties he wants to modify when executing a PUT operation (explicitly setting all other properties to null, or not including them on the JSON object at all, results in the same behaviour).
- If the user specifies properties on the JSON object that cannot be modified (read-only) they will be ignored by the server and no error will be returned. For example, changing the equipment type or serial number.
- If a specific request has mandatory properties on the JSON input, a specific error message will be displayed with the name of the property missing.
- All JSON properties have Camel Case names starting with lower case
- Enumerations are conveyed in their numeric format, not the equivalent string format (due to internationalization and different names per client's issues)
- All JSON objects have a Access Identifier (AID) field that gives context to the information conveyed. There cannot exist a JSON object where the information can't be traced back to the entity where it was read from.
- All resources that have a name (string) carry a name property. If they can be identified by their name, this name comes repeated in the AID object. This ensures coherence between entities than can be accessed by name and the ones whose name value is just a user configurable string.
- All dates are conveyed in the EPOCH format, in milliseconds.
- All IP addresses are conveyed in their string format.
- JSON fields that represent an array are conveyed empty if they are supported on the requested entity, but have no data at the present moment. Example: the "l2dhcpTable" field on the equipment L2 DHCP resource.

Rules for the REST API Design

When creating and defining API requests, these are the general rules we have followed. We present them here so that the developer can have a better understanding of the basic ideas behind the API design.

1. Keep the base URL simple, short, coherent and intuitive
2. When naming resources always use the singular form of a noun
3. When naming operations on resources (commands) always use the singular form of a verb

- 4. An URL terminated with {id} returns a single entity.
- 5. Maximum of 3 levels deep URL

GET /equipment/123/card – OK

GET /equipment/card/tpgpon/onu/tpethernet -- NOT OK

- 6. Use HTTP verbs to operate on resources

HTTP Verb	GET	POST	PUT	DELETE
Meaning	read	create execute command	update	remove

- 7. Do Not use massive requests. Only allow operation on single entities
 - The massive updates can be done with several REST requests by the client Application
 - Easier to process errors for single requests
- 8. Commands always use the POST method
- 9. Command URLs start with a verb (or at least contain a verb) that identifies the action to be performed
- 10. When defining commands we should sweep all identification parameters under the request body and not on the URL (even if the URL can accommodate them)

Example: use: POST /resource <inputJSON> ; do not use: POST /resource/data/{id} <noJsonNeeded>

Error Handling

We use HTTP status codes and try to map them cleanly to relevant standard-based codes. We limit the status codes used to the following list, that fall within 3 categories:

- **Everything worked – success**
 - 200 - OK. Response to a successful GET, PUT or DELETE. Can also be used for a POST that doesn't result in a creation (ex: command).
 - 201 - Created. Response to a POST that results in a creation.
 - 202 - Accepted. The request has been accepted for processing, but the processing has not been completed. For example reboot an ONU.
 - 204 - No Content. Response to a successful request that won't be returning a body (like a DELETE request).
- **The application did something wrong – client error**
 - 400 - Bad Request. The request is malformed, such as if the body does not parse or the URL parameters are wrong. The error message will list all details.
 - 401 - Unauthorized. When no or invalid authentication details are provided.
 - 403 - Forbidden. When authentication succeeded but authenticated user doesn't have access to the resource.
 - 404 - Not Found. When a non-existent resource is requested.

- 405 - Method Not Allowed. When an HTTP method was used that is not supported on the given resource. For example, using PUT on a read-only resource.
- 406 - Not Acceptable. There is no way to produce the media types listed in the Accept Header (support for JSON media type only, see error 415).
- 408 - Request Timeout. The client did not produce a request within the time that the server was prepared to wait. The client MAY repeat the request without modifications at any later time.
- 415 - Cannot consume Media Type - If incorrect content type was provided as part of the request. (Support for JSON media type only, see error 406).
- 422 - Unprocessable Entity - Used for validation errors, such as the user inserted invalid parameter values or invalid configurations. The error message will list all details. This can also be used to identify mandatory parameters on any JSON object (POST and PUT operations).
- **The API did something wrong – server error**
 - 500 - Internal Server Error. A generic error message, given when an unexpected condition was encountered. The error message will list all details.
 - 501 - Not Implemented - The use case is not implemented on the current version of the API.
 - 502 - Bad Gateway - The server was acting as a gateway or proxy and received an invalid response from the upstream entity. For example, communication problems with network equipments (equipment error, time-out, etc).

Additionally, every error response conveys a JSON object with more details about the specific error. For more information on this behaviour, please refer to the section API Error Codes List.

Version Information

The REST API Version information is always in the beginning of the URL with /v#/.

GET /v1/eml/equipment

Changes that would not require a new REST API version

- New resources
- New HTTP methods on existing resources
- New data formats
- New attributes or elements on existing data types

Change that would require a new REST API version

- Removed or renamed URLs
- Different data returned for same URL (such as JSON properties removed or renamed. New or added properties do not qualify as "different data")
- Removal of support for HTTP methods on existing URLs

Building the ID on the URLs

This section explains how the URL IDs are built.

However, the client application should never perform any string manipulation to get these IDs.

They should always be read from a previous GET operation and used on subsequent operations.

- An ID is a string concatenation with information separated by the delimiter character "-".
- The ID present in an URL always refers to the previous entity. For example: /equipment/{id} the ID must be an equipment-ID and for /card/{id} the ID must be a card-ID.
- All entities whose scope is within a given equipment, have the equipment IP as the begin of their ID string. For example, a network service ID can be "10.112.42.121-HSI"
- For equipments, cards, termination points (TP) and ONUs, the most complete ID format is:
 - IP-card-TP-onuId-onuCard-TP
 - Example: 10.112.42.121-5-1-45-1-2 – identifies the TP ID 2 on card 1 of the ONU ID 45 that is connected to the equipment 10.112.42.121 on the first PON of the fifth slot.
 - A valid ID is any split of the above definition at a delimiter character. For example, a card-id would be: 10.112.42.121-5 and a TP ID would be 10.112.42.121-5-1
- For Entities with user defined names
 - All entities that the user can define a name are identified by that name, instead of a numeric ID.

Resources

Access Identifier (AID)

The access Identifier is not a resource by itself but is a JSON object that is used to identify the resource and give context to it.

The AID structure is common for all the API resources. Some parameters will not be present when they are meaningless. For example, the AID for a card can be:

AID Example for a Card Resource

```
"aid": { "ipAddress": "10.112.42.121", "card": 10 }
```

The full AID description is:

Table 9. AID

AID		
Parameter	Type	Description
ipAddress	IP	Equipment IP address
index	int	A generic ID that can be used to identify the entity (0..N).
card	int	Specify a card ID
tp	int	Specify a tp ID
onuCard	int	Specify a ONU card ID
onuTp	int	Specify a ONU tp ID
onuId	int	Specify a ONU ID
name	string	The name of the entity, that can be used to identify the entity (Names that cannot be used to identify an entity are never conveyed in this field).
multicastIp	IP	Used to identify a multicast active group.

Server Performance Monitoring

/sml/server/system

GET

Read generic parameters about the server running the NMS.

Request body: --

Response body: json with ServerSystem information.

Table 10. ServerSystem

ServerSystem		
Parameters	Type	Description
osMemoryUsage	int	Operating system memory used, in hundredths of percentage
osMemoryTotal	long	Operating system total memory, in Bytes
jvmMemoryUsage	int	Java Virtual Machine memory used, in hundredths of percentage
jvmMemoryTotal	long	Operating system total memory, in Bytes
diskFree	long	Total disk space, in KBytes
diskTotal	long	Total disk space, in KBytes
availableProcessors	int	The number of processor cores the system has.
cpuUsage	int	Hundredths of CPU percentage used (combined from all cores)
uptime	long	System uptime, epoch format in milliseconds.

Managed Domain

Table 11. ManagedDomain

ManagedDomain		
Parameters	Type	Description
id	String	The ID on the URL
name	String	
parentManagedDomain	String	Parent Managed Domain name. Null if it is on root.
accessDomain	String	

/nml/manageddomain

GET

Returns a list of all Managed Domains on the ROOT level.

Request body: --

Response body: json with a list of all ManagedDomain information.

POST

Create a new managed domain. If parent is not provided the MD will be ROOT; if provided will be child of the given MD.

Request body: json with ManagedDomain information.

Response body: json with ManagedDomain information.

/nml/manageddomain/{id}

GET

Returns a specific MD by ID.

Request body: --

Response body: json with ManagedDomain information.

PUT

Change parameters for a given MD specified on the URL ID.

The MD can be moved by configuring a new parent. If no parent is given (null) the parent MD is not changed.

Request body: json with ManagedDomain information.

Response body: json with ManagedDomain information.

DELETE

Deletes an existing managed domain.

Only MD without equipments, child MDs and sites can be deleted.

Request body: --

Response body: --

/nml/manageddomain/{id}/submanageddomain

GET

Returns a list of all the MDs that are child of the MD given on the URL ID.

Request body: --

Response body: json with ManagedDomain information.

Site

Table 12. Site

Site		
Parameters	Type	Description
id	String	The ID on the URL
name	String	
managedDomain	String	Managed Domain name where site is inserted.

`/nml/manageddomain/{id}/site`

GET

Returns a list of all Sites that are child of the MD given on the URL ID.

Request body: --

Response body: json with Site information.

POST

Create a new site on a given MD. The MD is identified by the URL ID instead of the respective JSON property.

Request body: json with Site information.

Response body: json with Site information.

`/nml/manageddomain/{id}/site/{id}`

GET

Returns one Site information by ID.

Request body: --

Response body: json with Site information.

PUT

Updates one Site information by ID.

Request body: json with Site information.

Response body: json with Site information.

DELETE

Delete the specified site by ID. The site can only be deleted if there are no equipments on it.

Request body: --

Response body: --

Network Service Profile

A network service profile is a profile to aggregate network service common parameters between different equipments to ease network provisioning. It is configured on the system.

Table 13. ProfileNetworkService

ProfileNetworkService		
Parameters	Type	Description
id	string	The ID in the URL.
name	string	The Network Service Profile name to uniquely identify the entity.
type	enum	The type of service to be provided.
nmiStag	int	Configuration of NNI S-TAG.
uniCtag	int	Configuration of UNI S-TAG.
isStacked	boolean	If enabled the Ethernet frame contains two VLAN tags. Otherwise, contains only one VLAN tag.
pppoe	boolean	enable or disable PPPoE intermediate agent.
l2dhcprelay	boolean	enabled if the service has L2 DHCP Relay configurations

/nml/profilenetworkservice

GET

Reads all network service profiles configured on the system.

Request body: --

Response body: json with a list of all ProfileNetworkService information.

POST

Creates a network service profile.

Request body: json with ProfileNetworkService information.

Response body: json with ProfileNetworkService created.

/nml/profilenetworkservice/{id}

GET

Reads a specific network service profile.

Request body: --

Response body: json with ProfileNetworkService information.

DELETE

Deletes a specific network service profile.

Request body: --

Response body: --

Ethernet Traffic Profile

An Ethernet traffic profile defines a set of traffic related parameters. Each Ethernet traffic profile can be defined once and reused as many times as needed, in several equipments.

Table 14. ProfileEthernetTraffic

ProfileEthernetTraffic		
Parameters	Type	Description
id	string	The ID in the URL.
name	string	The Ethernet traffic profile name to uniquely identify the entity.
cir	long	Committed Information Rate, defines the guaranteed average bandwidth
cbs	long	Committed Burst Size, limits the maximum number of bytes guaranteed for a packet burst
eir	long	Excess Information Rate, defines the average bandwidth the network can offer if there is no congestion
ebs	long	Excess Burst Size, limits the maximum number of bytes for a packet burst that the network can offer if there is no congestion.
colorMode	enum	0 - Blind; 1 - aware
couplingFlag	enum	1 -On; 2 - Off

/nml/profileethernettraffic

GET

Reads all Ethernet traffic profiles configured in the management system.

Request body: --

Response body: json with a list of all ProfileEthernetTraffic information.

POST

Creates an Ethernet traffic profile in the management system.

Request body: json with ProfileEthernetTraffic information.

Response body: json with ProfileEthernetTraffic information.

/nml/profileethernettraffic/{id}

GET

Reads a specific Ethernet traffic profile.

Request body: --

Response body: json with ProfileEthernetTraffic information.

DELETE

Deletes a specific Ethernet traffic profile.

Request body: --

Response body: --

GPON Traffic Profile

A GPON Traffic profile defines a set of traffic related parameters. Each GPON traffic profile can be defined once and reused as many times as needed, in several equipments.

Table 15. ProfileGponTraffic

ProfileGponTraffic		
Parameters	Type	Description
id	string	The ID in the URL.
name	string	The GPON traffic profile name to uniquely identify the entity.
serviceType	enum	1 - UBR; 2 - CBR, 3 - Dynamic
fixedBw	int	Fixed bandwidth of type CBR or UBR, in kbps
assuredBw	int	Assured bandwidth of type dynamic, in kbps
maxBw	int	Maximum bandwidth which is the sum of the Fixed BW, Assured BW and Non-assured BW
bwEligibility	enum	Defines the way in which non-assured traffic is distributed. This may be, depending on the values set for the other parameters: -1 - Undefined 0 - Non-Assured, 1 - Best Effort
dbaStatusReport	boolean	Enable or disable DBA status reporting

/nml/profilegpontraffic

GET

Reads all GPON traffic profiles configured in the management system.

Request body: --

Response body: json with a list of all ProfileGponTraffic information.

POST

Creates a GPON traffic profile in the management system.

Request body: json with ProfileGponTraffic information.

Response body: json with ProfileGponTraffic information.

/nml/profilegpontraffic/{id}

GET

Reads a specific GPON traffic profile.

Request body: --

Response body: json with profilegpontraffic information.

DELETE

Deletes a specific GPON traffic profile.

Request body: --

Response body: --

Equipment Type

An equipment type is configured in the system and represents a type of equipment supported by the system.

Table 16. EquipmentType

EquipmentType		
Parameter	Type	Description
id	int	The equipment Type integer.
name	string	The name of the equipment. It is unique.
description	string	A text with a brief description of the equipment to help the user identify it.

/nml/equipmenttype

GET

Reads all equipment types supported by the system.

Request body: --

Response body: json with a list of all EquipmentType information.

Equipment Model

An equipment model is configured in the system.

Table 17. EquipmentModel

EquipmentModel		
Parameter	Type	Description
id	int	The ID in the URL.
equipmentTypeName	string	A name of an existing equipment type in the system.
vendor	string	A user defined string that identifies the equipment vendor.
brand	string	A user defined string that identifies the equipment brand.
model	string	A user defined string that identifies the equipment model.
prototype	List<tpOnu>	The prototype is the list of Termination Points that the current equipment model has. Each entry is a new Termination Point. For OLT equipments this is null (not applicable).

Table 18. TpOnu

tpOnu		
Parameter	Type	Description
tpIndex	int	The ID of the TP.
tpType	enum	Identifies the supported TP type.
cardId	int	The ONU card ID where the TP is located (defaults to 1 if not provided).
cardType	enum	Identifies the supported card type.

/nml/equipmentmodel

GET

Reads all equipment models.

Request body: --

Response body: json with a list of all EquipmentModel information.

POST

Creates a new equipment model.

Request body: json with EquipmentModel information.

Response body: json with the created EquipmentModel information.

/nml/equipmentmodel/{id}

GET

Reads a specific equipment model.

Request body: --

Response body: json with a list of all EquipmentModel information.

PUT

Updates a specific equipment model.

Request body: json with the EquipmentModel information to be updated.

Response body: json with the new configuration of the EquipmentModel.

DELETE

Deletes a specific equipment model.

Request body: --

Response body: --

ONU Profile

An ONU profile characterizes types of ONUs, including vendor information and interfaces supported.

Table 19. ProfileOnu

ProfileOnu		
Parameter	Type	Description
id	string	The ID in the URL.
name	string	The Profile name to uniquely identify the Profile entity.
equipmentModel	int	The equipment Model ID to be associated with this profile.

/nml/profileonu

GET

Reads all configured ONU Profiles.

Request body: --

Response body: json with a list of all ProfileOnu information.

POST

Creates a new ONU profile.

Request body: json with the ProfileOnu to be created.

Response body: json with the ProfileOnu created,

/nml/profileonu/{id}

GET

Reads a specific ONU Profile by ID.

Request body: --

Response body: json with the requested ProfileOnu information.

DELETE

Deletes a specific ONU Profile.

Request body: --

Response body: --

DSCP to P-bit Profile

/nml/dscptopbitprofile

GET

Read all DSCP To P-bit Profiles configured on the NMS.

Request body: --

Response body: json with List<DscpToPbitProfile> information.

Table 20. DscpToPbitProfile

DscpToPbitProfile		
Parameter	Type	Description
id	int	The entity ID.
aid	AID	
name	string	The profile Name
mapping	Map<Dscp,P-bit>	A sorted map where each key represents the DSCP and each Value the Pbit assigned. Keys can vary between 0..63 and values between 1..8. Default is all keys map to value 1.

/nml/dscptopbitprofile/{id}

GET

Read one DSCP To P-bit Profile by ID.

Request body: --

Response body: json with DscpToPbitProfile information.

PUT

Updates a specific DSCP To P-bit Profile configuration.

Request body: json with DscpToPbitProfile information to be configured.

Response body: json with the DscpToPbitProfile information configured.

POST

Create a new DSCP To P-bit Profile.

Request body: json with DscpToPbitProfile information to be created.

Response body: json with the DscpToPbitProfile information configured.

Equipment

The equipment resource represents a network element that can be managed by the system.

Table 21. Equipment

Equipment		
Parameter	Type	Description
id	string	The ID that can be used on the URL.
aid	AID	Filled with Equipment IP address only.
name	string	User defined string. (Not used to identify the equipment.)
admin	enum	1-In service; 2-Blocked; 3-Reserved; 4-Maintenace
type	enum	The equipment type. See the Equipment Type section.
equipmentModelId	int	The equipment model ID. See the Equipment Model section.
swVersion	string	The running software version.
hwVersion	string	The hardware version advertised by the equipment.
location	string	A user defined string to represent the equipment location.
serialNumber	string	Serial number advertised by the equipment.
ip	string	
managedDomain	string	The name of the managed domain that includes the site.
site	string	The name of the site where the equipment is located.
rack	string	A user defined string to help locate the equipment.
subrack	string	A user defined string to help locate the equipment.
shelf	string	A user defined string to help locate the equipment.

/eml/equipment**POST**

This operation allows the user to insert a previously discovered equipment that is not yet being managed by the NMS (see POST /eml/discoverequipment).

The parameters needed to insert a equipment are:

- IP
- Name
- Managed Domain
- Site
- location
- equipmentModelId
- Optionally: rack, subrack and shelf

All other Equipment JSON properties are ignored by this operation.

Request body: json with Equipment data.

Response body: json with Equipment data.

GET

This operation allows the user to read all the discovered equipments that are not yet being managed by the NMS.

This operation requires the user to have previously triggered the equipment discover process with POST

/eml/discoverequipment

Request body: --

Response body: json with list of Equipment data.

GET - With URL Parameters

This operation allows the user to search for managed equipments within the network.

For example, we can get the list of all equipments of a given type (ex: all OLTs "GET eml/equipment?type=10023"), or all equipments within a given Managed Domain ("GET eml/equipment?managedDomain=MD").

Request body: --

Response body: json with list of Equipment data.

Table 22. URL parameters

URL Parameters		
Name	Type	Description
ip	string	Filter by IP (no wildcards supported)
type	enum	Filter by equipment type
name	string	Filter by equipment name
managedDomain	string	Filter by Managed Domain
site	string	Filter by site (note that a site only exists within a managed domain, hence, the 'managedDomain' parameter is mandatory while searching by site)
passive	boolean	If set to true the operation returns all equipments (passive and active) If set to false only return active equipments

/eml/equipment/{id}

GET

Reads a specific equipment by ID.

Request body: --

Response body: json with equipment data.

PUT

Updates a specific equipment information.

Request body: json with equipment data.

Response body: json with equipment data.

DELETE

Stop managing the specified equipment from the NMS. All saved data about this equipment will be lost. To manage the equipment again it must be inserted.

Request body: --

Response body: --

/eml/equipment/{id}/card

GET

Reads all cards from a given equipment.

Request body: --

Response body: json with a list of Card of one specific equipment (only main data).

/eml/equipment/{id}/onu

GET

Reads the list of ONUs for a given equipment.

If no query parameters are given, all managed ONUs for all Cards are returned.

If the 'state' query parameter is given, all discovered ONUs for all Cards are returned (instead of managed ONUs).

The 'card' and 'tpGpon' query parameters can be used to further filter the results (with or without the state parameter).

The 'onuId' query parameter is always used to read a single ONU (requires 'card' and 'tpGpon' query parameter to be provided and ignores the value of the 'state' query parameter).

This is useful, for example, to get the URL ONU ID from the IP, card, Interface and ONU-ID information (URL ONU ID can then be used for POST, PUT or DELETE operations on the ONU resource).

Note that for discovered ONUs the data returned is less than for managed ONUs (a subset of the same JSON Object).

This is represented by the table Onu - Discovered, on section ONU.

Request body: --

Response body: json with list of Onu data from a given equipment.

Table 23. URL Parameters

URL Parameters		
Name	Possible Values	Description
state	new	Instead of managed ONUs, read the discovered ONUs data.
card	int	Filter by Card
tpGpon	int	Filter by PON (requires card)
onuId	int	Read a single ONU by ONU-ID (requires card and tpGpon, ignores the state value)

/eml/equipment/{id}/multicastgroup**GET**

Returns the list of multicast groups configured on the equipment.

Request body: --

Response body: json with a list of all MulticastGroup from a given equipment.

/eml/equipment/{id}/networkservice**GET**

Reads all network services configured on a given equipment.

Request body: --

Response body: json with list of NetworkService on a given equipment.

/eml/equipment/{id}/status**GET**

Reads one equipment status information.

Request body: --

Response body: json with EquipmentStatus for a given equipment.

Table 24. EquipmentStatus

EquipmentStatus		
Parameter	Type	Description
id	string	The ID in the URL.
aid	AID	Filled with Equipment IP address only.
operationalState	enum	
admin	enum	

/eml/equipment/{id}/l2dhcprelaybindingtable

GET

Read Layer 2 DHCP Relay binding table information from a given equipment.

Request body: --

Response body: json with L2DhcpRelayBindingTable information.

Table 25. L2DhcpRelayBindingTable

L2DhcpRelayBindingTable		
Parameter	Type	Description
aid	AID	Filled with OLT IP only.
timeStamp	long	Epoch in milliseconds, when the request was executed
l2dhcpTable	List<L2DhcpRelayBindingTableEntry>	

Table 26. L2DhcpRelayBindingTableEntry

L2DhcpRelayBindingTableEntry		
Parameter	Type	Description
card	int	
tp	int	
onuId	int	
networkServiceName	string	
ipv4	IPv4	
ipv6	IPv6	
MAC	MAC	
vlan	int	
leaveTime	int	(s)

/eml/equipment/{id}/globaldhcp

The global DHCP resource allows the user to configure the global DHCP L2 Relay parameters on a given equipment.

Table 27. GlobalDhcp

GlobalDhcp		
Parameter	Type	Description
aid	AID	Filled with Equipment IP address only.
circuitId	string	
accessNodeId	int	
rack	int	
subrack	int	
shelf	int	

GET

Read global DHCP configuration on a given equipment.

Request body: --

Response body: json with GlobalDhcp information.

PUT

Updates the global DHCP configuration on a given equipment.

Request body: json with GlobalDhcp information.

Response body: json with GlobalDhcp information configured.

/eml/equipment/{id}/globaligmp**GET**

Read global IGMP configuration on a given equipment.

Request body: --

Response body: json with a list of GlobalIgmp information.

PUT

Updates the global IGMP configuration on a given equipment.

Request body: json with GlobalIgmp information.

Response body: json with GlobalIgmp information configured.

Table 28. Globaligmp

Globaligmp		
Parameter	Type	Description
aid	AID	Filled with Equipment IP.
maxNumberOfGroups	boolean	Enable or disable the multicast group limit control on the system (true: enabled, false: disabled)
maxBandwidth	boolean	Enable or disable the bandwidth limit control on the system (true: enabled, false: disabled)
staticGroupsEndPoint	int	1- UNI; 2- NNI;

/eml/equipment/{id}/globalratelimiters

This resource represents the network service global rate limiters configured on a given equipment.

Table 29. GlobalRateLimiters

GlobalRateLimiters		
Parameter	Type	Description
aid	AID	Filled with Equipment IP address only.
broadcast	long	bps
multicast	long	bps
unknownUnicast	long	bps

GET

Reads the global rate limiters on a given equipment.

Request body: --

Response body: json with GlobalRateLimiters information.

PUT

Updates global rate limiters on a given equipment.

Request body: json with GlobalRateLimiters information.

Response body: json with GlobalRateLimiters information configured.

/eml/equipment/{id}/clientservices

This resource list all the configured client services on a given equipment.

Table 30. ClientService

ClientService		
Parameter	Type	Description
id	String	The id in the url
name	String	The name of the equipment
ethernetClientServiceList	List<ClientServiceEthernet>	List of ethernet client services configured in the equipment
gponClientServiceList	List<ClientServiceGpon>	List of gpon client services configured in the equipment

GET

Reads all the client services configured in the equipment

Request body: --

Response body: json with the ClientService information.

Firmware Management

Resource that represents a firmware file.

Table 31. FirmwareFileList

FirmwareFileList		
Parameter	Type	Description
id	String	The id in the url
name	String	The name of the equipment
firmwareFileList	List<FirmwareFile>	List of firmware associations
firmwareFilwWithoutAssocList	List<FirmwareFile>	List of firmware files without association

Table 32. FirmwareFile

FirmwareFile		
Paramter	Type	Description
name	String	The name of the firmware file
size	long	The size of the firmware file
md5sum	String	The checksum of the firmware file
swVersion	String	The software version associated with the firmware file
hwVersion	String	The hardware version associated with the firmware file
activeSw	String	
description	String	Description of the firmware file
profile	String	Onu profile associated with the firmware file
defaultFw	int	1- Default; 2- Not default

Table 33. FirmwareAvailableFileList

FirmwareAvailableFileList		
Parameter	Type	Description
id	String	The id in the url
name	String	The name of the equipment
type	int	The type of the firmware being listed
availableFirmwareFileList	Vector<String>	The names of the firmware available for association

/eml/equipment/{id}/firmwareversions**GET**

Lists all the available firmware files in the repository to be associated.

This operation must be done first to list all the available firmware files in the repository

Request body: --

Response body: json with FirmwareAvailableFileList information.

/eml/equipment/{id}/firmware/**GET**

Reads all the firmware files entries on a given equipment

Request body: --

Response body: json with FirmwareFileList information.

POST

Creates a new firmware file association information.

Request body: json with FirmwareFile information to be configured.

Response body: json with FirmwareFile information configured.

/eml/equipment/{id}/firmware/{filename}**GET**

Reads the firmware file association information.

Request body: --

Response body: json with FirmwareFile information.

PUT

Updates the firmware file association information.

Request body: json with FirmwareFile information to be configured.

Response body: json with FirmwareFile information configured.

DELETE

Deletes the given firmware file association.

Request body: --

Response body: --

Card

The card resource that represents a board on a modular equipment.

Table 34. Card

Card		
Parameter	Type	Description
id	string	The ID in the URL.
aid	AID	Filled with Equipment IP address and card.
type	enum	
admin	enum	
operationalState	enum	
serialNumber	string	
version	string	The card firmware and hardware version string.

/eml/card/{id}

GET

Reads a specific card information.

Request body: --

Response body: json with Card information.

/eml/card/{id}/tp

GET

Reads all Termination Points on a given card. Useful to get the IDs and types so that the specific resource can be queried.

Request body: --

Response body: json with TerminationPoint information.

/eml/card/{id}/status

GET

Get the current status of a given card.

Request body: --

Response body: json with CardStatus information.

Table 35. CardStatus

CardStatus		
Parameter	Type	Description
aid	AID	Filled with Equipment IP address, and card.
temperature	int	°C (null if card does not support temperature reading)
cpu	int	in hundredths of percentage (null if the card does not support)
memoryUsed	int	in hundredths of percentage (null if the card does not support)
capacityUsed	int	in hundredths of percentage (null if the card does not support)
fans	List<Fan>	List is null if card has no fans

Table 36. Fan

Fan		
Parameter	Type	Description
id	int	The FAN ID.
rpm	int	The current FAN rotations per minute (RPM)

/eml/card/{id}/mactablegpon

GET

Read a list of MAC entries on a given card.

Request body: --

Response body: json with a list of MacGponList information.

Table 37. MacGponList

MacGponList		
Parameter	Type	Description
aid	AID	Filled with Equipment IP and card.
timeStamp	long	Epoch (milliseconds)
macTable	List<MacGpon>	

Table 38. MacGpon

MacGpon		
Parameter	Type	Description
card	int	
tp	int	
onuId	int	
networkServiceName	string	
mac	MAC	

/eml/card/{id}/mactableswitch

GET

Read a list of MAC entries on a given card.

Request body: --

Response body: json with a list of MacSwitchList information.

Table 39. MacSwitchList

MacSwitchList		
Parameter	Type	Description
aid	AID	Filled with Equipment IP and card.
timeStamp	long	Epoch (milliseconds)
macTable	List<MacSwitch>	

Table 40. MacSwitch

MacSwitch		
Parameter	Type	Description
card	int	
tp	int	
onuId	int	
networkServiceName	string	
mac	MAC	
vlan	int	

Termination Point

A termination point is the common information for any interface or port, either logical or physical.

This entity can only be read and not modified. Every specific Termination Point (ex: TpGpon) inherits these attributes and they can be configured acting upon the specific termination point resource.

Table 41. TerminationPoint

TerminationPoint		
Parameter	Type	Description
id	string	The ID in the URL.
aid	AID	
name	string	The name of the Termination Point. (Read-Only)
description	string	The TP description
type	enum	The type of the Termination Point. Example: Ethernet, LAG, Gpon, etc conveyed in the numeric format. (Read-Only)
admin	enum	The administrative state of the Termination Point.
containedTps	List<string>	Array of the contained TPs IDs. (Read-Only)

/eml/tp/{id}

GET

Reads one specific termination point.

Request body: --

Response body: json with TerminationPoint information.

/eml/tp/{id}/cos

GET

Reads CoS configuration on the given Termination Point.

Request body: --

Response body: json with CoS information.

PUT

Updates CoS configuration on the given Termination Point.

Request body: json with CoS configuration to be enforced.

Response body: json with CoS information configured on the system.

Table 42. CoS

CoS		
Parameters	Type	Description
aid	AID	
tp	string	The termination point ID
cosList	List<cosList>	List of CoS parameters

Table 43. cosList

cosList		
Parameters	Type	Description
scheduler	int	1 - Strict ; 2 - Weighted
ethernetProfileName	string	Name of the ethernet profile associated
cos	int	Traffic class associated (1..8)
pBits	List<Integer>	The P-bits associated with the traffic class

Termination Point - GPON

Represents a GPON interface on any equipment. Information can be read and updated,

Table 44. TpGpon

TpGpon		
Parameters	Type	Description
id	string	The ID in the URL.
aid	AID	Filled with OLT IP, card, tp for a OLT TP Filled with OLT IP, card, tp, onuId, onuCard and onuTp for a ONU TP
name	string	The name of the Termination Point. (Read-Only)
description	string	The TP description
type	enum	(Read-Only)
admin	enum	
macAging	int	
minDistance	int	
maxDistance	int	
berInterval	int	Bit error Rate (BER)
fecDownstream	boolean	Enable or disable Forward Error Correction (FEC) on the downstream direction.
autoDiscoverOnus	boolean	Enable or disable the feature to auto discover ONUs directly connected to the PON interface.
mappingMode	enum	0 - VLAN (default) 1 - VLAN + PBIT Available since OLT-OS 3.4.0

/eml/tpgpon/{id}

GET

Reads one specific GPON termination point by ID.

Request body: --

Response body: json with tpgpon information.

PUT

Updates a specific GPON termination point configuration.

Request body: json with TpGpon information to be configured.

Response body: json with the TpGpon information configured.

/eml/tpgpon/{id}/layer3**GET**

Reads one specific GPON termination point layer 3 configuration.

Request body: --

Response body: json with TpGponLayer3 information.

PUT

Updates a specific GPON termination point layer 3 configuration.

Request body: json with TpGponLayer3 information to be configured.

Response body: json with the TpGponLayer3 information configured.

Table 45. TpGponLayer3

TpGponLayer3		
Parameter	Type	Description
aid	AID	
dhcpMode	enum	1- Trusted 2- Untrusted
maxNumberOfGroups	int	Enable or disable the multicast group limit control on the interface. (-1 disabled or 0 to 16384) Available only for OLT-OS versions equal or above 3.4.0.
maxBandwidth	int	Enable or disable the bandwidth limit control on the interface. (-1 disabled or 0 to 100.000.000 in Kbps) Available only for OLT-OS versions equal or above 3.4.0.

/eml/tpgpon/{id}/status**GET**

Read the PON status information for a given tp. Can be on the OLT or the ONU side.

Request body: --

Response body: json with TpGponStatus information of the requested tpGpon.

Table 46. TpGponStatus

TpGponStatus		
Parameter	Type	Description
aid	AID	
hasXfp	boolean	(Read on OLT side)
admin	enum	(Read on OLT side)
operationalState	int	1 -Operational; 2 - Not Operational;
txPower	int	(Read on OLT side) hundredths of dbm
current	int	(Read on OLT side) hundredths of mA
laserStatus	enum	(Read on OLT side) 1-ON, 0-OFF
alarms	List<TpGponStatusAlarm>	(Read on OLT side)
fixedBw	long	(Read on OLT side) kbps
assuredBw	long	(Read on OLT side) kbps
maxBw	long	(Read on OLT side) kbps
cbrBw	long	(Read on OLT side) kbps
temperature	int	(Read on OLT and ONU side) °C
rxPower1550nm	int	(Read on ONU side) hundredths of dbm
rxPower1490nm	int	(Read on ONU side) hundredths of dbm
txPower1310nm	int	(Read on ONU side) hundredths of dbm
distance	int	(Read on ONU side) meters

Table 47. TpGponStatusAlarm

TpGponStatusAlarm		
Parameter	Type	Description
alarmCode	enum	
alarmDescription	string	

/eml/tpgpon/{id}/onurxpower

GET

Read the power information for all ONUs on a given tpGpon.

Request body: --

Response body: json OnuRxPowerList with the received power information from all ONUs.

Table 48. OnuRxPowerList

OnuRxPowerList		
Parameter	Type	Description
aid	AID	Filled with OLT IP, card, tp
onuList	List<OnuRxPower>	The power information for each ONU.

Table 49. OnuRxPower

OnuRxPower		
Parameter	Type	Description
onuId	int	
rxPower	string	Can be '+inf', '-inf' or a value in dbm

/eml/tpgpon/{id}/counters

GET

Read available counters information for a given OLT Gpon Termination Point.

Request body: --

Response body: json with GponCounters information.

Table 50. GponCounters

GponCounters		
Parameter	Type	Description
aid	AID	Filled with OLT IP, Card and tp
rx	GponCountersPerDirection	
tx	GponCountersPerDirection	
errors	List<Error>	

Table 51. Error

Error		
Parameter	Type	Description
onuId	int	
bip8	long	
rei	long	

Table 52. GponCountersPerDirection

GponCountersPerDirection		
Parameter	Type	Description
pon	Pon	
ethernet	EthernetCounterPerDirection	

Table 53. Pon

Pon		
Parameter	Type	Description
networkPackets	Packet	
ponPackets	Packet	
ploamPackets	Packet	

Table 54. Packet

Packet		
Parameter	Type	Description
valid	long	
error	long	
dropped	long	

Termination Point - Ethernet

Represents an Ethernet interface on any equipment. Information can be read and updated.

Table 55. TpEthernet

TpEthernet		
Parameters	Type	Description
id	string	The ID in the URL.
aid	AID	Filled with OLT IP, card, tp for a OLT TP Filled with OLT IP, card, tp, onuId, onuCard and onuTp for a ONU TP
name	string	The name of the Termination Point. (Read-Only)
description	string	The TP description
type	enum	(Read-Only)
admin	enum	
mediaType	enum	The configured Ethernet media Type. (The effective media Type the interface is using is read on the TpEthernetStatus JSON Object)
mtu	int	(OLT TP) The Ethernet Maximum Transmission Unit
autoNegotiation	boolean	(ONU TP) Enable or disable the Media Type Auto negotiation.

/eml/tpethernet/{id}

GET

Reads a specific Ethernet termination point information.

Request body: --

Response body: json with TpEthernet information.

PUT

Updates a specific Ethernet termination point information.

Request body: json with TpEthernet information to be configured.

Response body: json with the TpEthernet information configured.

/eml/tpethernet/{id}/layer2

GET

Reads one specific Ethernet termination point layer 2 configuration.

Request body: --

Response body: json with TpEthernetLayer2 information.

PUT

Updates a specific Ethernet termination point layer 2 configuration.

Request body: json with TpEthernetLayer2 information to be configured.

Response body: json with the TpEthernetLayer2 information configured.

Table 56. TpEthernetLayer2

TpEthernetLayer2		
Parameter	Type	Description
aid	AID	
acceptableFrameTypes	enum	1- All: untagged and priority tagged frames received on the port will be accepted 2- Tagged: the interface will discard any untagged frames received 3- Untagged: the interface will discard any tagged frames received
defaultVlanId	int	For the untagged frames, it will be assigned the value of the Default VLAN Id and Default priority of the respective interface. (1..4095)
defaultPriority	int	For the untagged frames, it will be assigned the value of the Default VLAN Id and Default priority of the respective interface. (0..7)

/eml/tpethernet/{id}/layer3

GET

Reads one specific Ethernet termination point layer 3 configuration.

Request body: --

Response body: json with TpEthernetLayer3 information.

PUT

Updates a specific Ethernet termination point layer 3 configuration.

Request body: json with TpEthernetLayer3 information to be configured.

Response body: json with the TpEthernetLayer3 information configured.

Table 57. TpEthernetLayer3

TpEthernetLayer3		
Parameter	Type	Description
aid	AID	
dhcpMode	enum	1- Trusted 2- Untrusted
maxNumberOfGroups	int	Enable or disable the multicast group limit control on the interface. (-1 disabled or 0 to 16384) Available only for OLT-OS versions equal or above 3.4.0.
maxBandwidth	int	Enable or disable the bandwidth limit control on the interface. (-1 disabled or 0 to 100.000.000 in Kbps) Available only for OLT-OS versions equal or above 3.4.0.

/eml/tpethernet/{id}/status

GET

Read status information for a given Ethernet Interface.

Table 58. TpEthernetStatus

TpEthernetStatus		
Parameter	Type	Description
aid	AID	
admin	enum	
operationalState	enum	1- Operational; 2- Not Operational;
mediaType	enum	The effective media type the interface is using. (The user configured media type is read on the TpEthernet JSON Object)
hasXfp	boolean	(OLT TP)
txPower	int	(OLT TP) null, if there is no XFP
rxPower	int	(OLT TP) null, if there is no XFP
current	int	(OLT TP) null, if there is no XFP
temperature	int	(OLT TP) null, if there is no XFP
laserStatus	enum	(OLT TP)
autoNegotiation	boolean	(ONU TP) True if auto negotiation of the media type is enabled.

/eml/tpethernet/{id}/counters**GET**

Read the Ethernet Counters on a given OLT or ONT Ethernet Termination Point.

Request body: --

Response body: json with EthernetCounters information.

Table 59. EthernetCounters

EthernetCounters		
Parameter	Type	Description
aid	AID	
rx	EthernetCountersPerDirection	
tx	EthernetCountersPerDirection	
commonRxTx	EthernetCountersCommonRxTx	Filled if Termination Point is an ONT Ethernet Termination Point.

Table 60. EthernetCountersPerDirection

EthernetCountersPerDirection		
Parameter	Type	Description
dropEvents	long	
octets	long	
packets	long	
broadcastPackets	long	
multicastPackets	long	
crcAlignErrors	long	
undersizePackets	long	
oversizePackets	long	
fragments	long	
jabbers	long	
collisions	long	
packetsUnder64Octets	long	
packets65To127Octets	long	
packets128To255Octets	long	
packets256To511Octets	long	
packets512To1023Octets	long	
packetsOver1024Octets	long	
throughput	long	
bufferOverflows	long	

Table 61. EthernetCountersCommonRxTx

EthernetCountersCommonRxTx		
Parameter	Type	Description
packetsUnder64Octets	long	
packets65To127Octets	long	
packets128To255Octets	long	
packets256To511Octets	long	
packets512To1023Octets	long	
packetsOver1024Octets	long	

Termination Point - LAG Ethernet

Represents an Ethernet Link Aggregation Layer (LAG) on any equipment.

Information can be read, updated, created and deleted.

LAG members can be read, created (added to the LAG), updated, or removed from the LAG.

Table 62. TpLag

TpLag		
Parameters	Type	Description
id	string	The ID in the URL.
aid	AID	Filled with equipment IP and card (zero).
name	string	The name of the Termination Point. (Read-Only)
description	string	The TP description (Read-Write)
type	enum	(Read-Only)
admin	enum	
aggregationType	enum	(1-static or 2-dynamic) A Static LAG does not use LACP, so no signalling takes place between the two peers, while a Dynamic LAG uses.
loadBalance	enum	The LAG load balancing mechanism to use. (1-SA, 2-DA, 3-SA and DA)
memberList	List<LagMember>	The list of Ethernet interfaces that compose the LAG.

Table 63. LagMember

LagMember		
Parameter	Type	Description
tpId	string	An ID for a given Ethernet interface
lacpTimeout	enum	The LACP timeout value for this LAG member (1-long, 2-short)

/eml/tplag**POST**

Creates a new LAG on a given equipment. If provided, the member list will be added to the LAG in the same operation.

Request body: json with new TpLag data.

Response body: json with the TpLag created.

/eml/tplag/{id}**GET**

Reads a specific LAG information by ID.

Request body: --

Response body: json with TpLag information.

PUT

Updates a specific LAG parameters, excluding modifying the member list.

The member list can be acted upon on the specific resource (lag member) or all in once with the operation: POST /eml/tplag.

Request body: json with TpLag information to be configured.

Response body: json with TpLag information configured.

DELETE

Deletes a specific LAG (and all its members) by ID.

Request body: --

Response body: --

/eml/tplag/{id}/tplagmember

POST

Attach a new LAG member (tpEthernet) to a specific LAG. Identify the LAG in the URL ID.

Request body: json with TpLagMember information.

Response body: json with the complete TpLag information configured.

/eml/tplag/{id}/tplagmember/{id}

PUT

Update a specific LAG member parameters (ex: LACP timeout). Cannot be used to modify the Lag Member ID. Identify the LAG and the LAG Member in the URL.

Request body: json with one TpLagMember information to be updated.

Response body: json with the complete TpLag information configured.

DELETE

Detach an existing LAG member from a LAG. Identify the LAG and the LAG Member in the URL.

Request body: --

Response body: json with the complete TpLag information configured.

/eml/tplag/{id}/status

GET

Read status information for one LAG entity status.

Table 64. TpLagStatus

TpLagStatus		
Parameter	Type	Description
aid	AID	Filled with OLT IP, card, tp.
admin	enum	
linkStatus	enum	

/eml/tpIag/{id}/Iacpcounters

GET

The LACP Counter contains the statistics information for a lag interface.

Read the given lag statistics (counters) for every member interface.

Table 65. LACPcounter

LACPcounter		
Parameter	Type	Description
id	String	The id in the url
aid	AID	The ipAddress, card, tp
name	String	The name of the lag interface
counterList	List<MemberCounter>	

Table 66. MemberCounter

MemberCounter		
Parameter	Type	Description
tpId	String	The interface id associated with the lag interface
rx	int	The packet counter for rx direction
tx	int	The packet counter for tx direction

Request body: --

Response body: json with the LACPcounter information.

Termination Point - VEIP

This entity represents a Virtual Ethernet Interface Point (VEIP) as defined in G.984.4 Amendment 2 and G.Impl.984.4.

There are no specific parameters to configure other than the admin state. So the table for this entity is the base Termination Point Information.

Table 67. TpVeip

TpVeip		
Parameter	Type	Description
id	string	The ID in the URL.
aid	AID	
name	string	The name of the Termination Point. (Read-Only)
description	string	The TP description (Read-Write)
type	enum	The type of the Termination Point. Example: Ethernet, LAG, Gpon, etc conveyed in the numeric format. (Read-Only)
admin	enum	The administrative state of the Termination Point

/eml/tpveip/{id}

GET

Reads a specific VEIP information by ID.

To list all VEIP interfaces of a ONU use the operation `/eml/onu/{id}/tp` and filter the list by the VEIP Type (30027, as the table Termination Point Type shows on the Enumerations section.)

Request body: --

Response body: json with TpVeip information.

PUT

Updates a specific VEIP parameters (only the admin or description parameters can be configured).

Request body: json with TpVeip information to be configured.

Response body: json with TpVeip information configured.

Termination Point - SFP/XFP

/eml/xsfp/{id}

GET

Reads the sfp/xfp information for the given termination point. A GPON termination point will return a sfp information structure and an Ethernet termination point will return a xfp information structure.

Request body: --

Response body: json with Xsfp information.

Table 68. Xsfp

Xsfp		
Paramter	Type	Description
aid	AID	Filled with the OLT IP, Card id and the TP id
type	enum	1 - GPON, 2 - ETHERNET
sfp	Sfp	The sfp information (if the termination point supports it)
xfp	Xfp	The xfp information (if the termination point supports it)

Table 69. Sfp

Sfp		
Parameter	Type	Description
baseIdFields	SfpBaseId	
extendedIdFields	SfpExtendedId	
adStatusBits	AdStatusBits	

Table 70. SfpBaselId

SfpBaselId		
Parameter	Type	Description
identifier	string	
connector	string	
transceiver	string	
encoding	string	
nominalBitRate	int	Mbits/s
length9umKm	int	km
length9um	int	m
length50um	int	m
length625um	int	m
lengthCopper	int	m
vendorName	string	
vendorOui	string	
vendorSerialNumber	string	
vendorRevision	string	
laserWavelength	int	nm

Table 71. SfpExtendedId

SfpExtendedId		
Parameter	Type	Description
optionsImplemented	List<String>	
maxBaudrate	int	%
minBaudrate	int	%
vendorSerialNumber	string	
dateCode	string	
lotCode	string	
diagnosticMonitoringType	List<String>	
enhancedOptions	List<String>	
sff8472compliance	string	

Table 72. AdStatusBits

AdStatusBits		
Parameter	Type	Description
temperature	int	°C
voltage	int	V
txBias	int	mA
txPower	int	mW
rxPower	int	mW
opStatus	int	

Table 73. Xfp

Xfp		
Parameter	Type	Description
baseIdFields	XfpBaseId	
extendedIdFields	XfpExtendedId	

Table 74. XfpBaselId

XfpBaselId		
Parameter	Type	Description
identifier	String	
extensionIdentifier	List<String>	
connector	String	
transceiver	String	
encoding	String	
minBitRate	int	Mbits/s
maxBitRate	int	Mbits/s
lengthSfm	int	km
length50um	int	m
length625um	int	m
lengthCopper	int	m
deviceTechnology	List<String>	
vendorName	String	
cdrSupport	List<String>	
vendorOui	String	
vendorSerialNumber	String	
vendorRevision	String	
laserWavelength	int	nm
laserWavelengthTolerance	int	nm
maxCaseTemperature	int	°C

Table 75. XfpExtendedId

XfpExtendedId		
Parameter	Type	Description
powerSupplyInfo	List<String>	
vendorSerialNumber	String	
dateCode	String	
diagnosticMonitoringType	List<String>	
enhancedOptions	List<String>	

Termination Point - TP RF

This entity represents the RF information on a given ONU information point. This information can be read or updated, namely the filter mode used.

Table 76. tpRf

tpRf		
Parameters	Type	Description
id	string	The ID in the URL
aid	AID	Filled with OLT IP, Card, tp, ONU ID, ONU tp.
name	string	The name of the Termination Point (Read-Only)
description	string	The TP description
type	enum	(Read-Only)
admin	enum	
filter	enum	1 - VALOR_RF_FILTER_MODE_15_CAN AIS; 2 - VALOR_RF_FILTER_MODE_TODOS_CAN AIS; 25 - VALOR_RF_FILTER_MODE_25_CAN AIS; 35 - VALOR_RF_FILTER_MODE_35_CAN AIS;

/eml/tpRf/{id}

GET

Reads the tpRf information on a given ONU termination point.

Request body: --

Response body: json with tpRf information.

PUT

Updates the tpRf information on a given ONU termination point.

Request body: json with tprf information.

Response body: json with tprf information.

/eml/tprf/{id}/status**GET**

Reads the TpRf linkStatus on a given ONU termination point

Request body: --

Response body: json with tpRfStatus information.

Table 77. tpRfStatus

tpRfStatus		
Parameter	Type	Description
aid	AID	Filled with OLT IP, Card, tp, ONU ID, ONU tp.
operationalState	enum	1- Operational; 2 - Not Operational;

ONU

An ONU is a remote equipment connected to the OLT. It can be managed or discovered. An ONU being managed has more information than a discovered ONU on the network.

Table 78. Onu

Onu		
Parameters	Type	Description
id	string	
aid	AID	Filled with Equipment IP address, card, tp and ONU ID.
state	enum	Conveyed for discovered ONUs (null for managed ONUs).
admin	enum	
operationalState	enum	The ONU operational state.
name	string	The ONU name configured by the user
profileName	string	Name of the ONU profile.
swVersion	string	Software version.
hwVersion	string	Hardware version.
location	string	Indication of ONU location.
serialNumber	string	The Serial Number advertised by the ONU.
password	string	The Password string advertised by the ONU.
registerType	enum	ONU registration type. The ONU can be registered by: 1 - serial number 2 - password 3 - serial number and password
installationDate	long	Then date when the ONU entity was created on the system (epoch in ms)
equipId	string	String provided by the ONU.
swUpgradeMode	enum	The ONU upgrade mode can be: 1 - Off - The firmware upgrade will be manual, by direct action of the user, specifying the firmware file 2 - Auto - Automatic firmware upgrade, to the firmware version indicated as the default version 3 - Specific version - ONU will upgrade to the version specified in 'specificVersion' field
specificVersion	string	Software version to use if swUpgradeMode is 'Specific version'.
fec	boolean	Enable or disable Forward Error Correction (FEC).
omciEncryption	boolean	Enable or disable the OMCI encryption.

The information available for discovered ONUs is less than for Managed ONUs. Therefore, to ease documentation readability, we present a new table with the parameters conveyed for the discovered ONUs.

Note that this table a sub-set of the ONU table, it is not a new JSON entity.

Table 79. Onu-Discovered

Onu - Discovered		
Parameters	Type	Description
id	string	
aid	AID	Filled with Equipment IP address, card, tp and ONU ID.
state	enum	Conveyed for discovered ONUs (null for managed ONUs).
serialNumber	string	The Serial Number advertised by the ONU.
profileName	string	Name of the ONU profile.
equipId	string	String provided by the ONU.

/eml/onu

POST

Creates an ONU in the management system, By default the admin state of the ONU is set to "Blocked".

Request body: json with Onu information.

Response body: json with Onu information.

/eml/onu/{id}

GET

Returns information that characterizes the ONU identified in the request.

Request body: --

Response body: json with Onu information.

PUT

Modifies ONU data from the Onu json representation.

Request body: json with Onu information.

Response body: json with Onu information.

DELETE

Removes the identified ONU instance. If the ONU is physically connected to the OLT it will become part of the discovered ONUs list.

Request body: --

Response body: --

/eml/onu/{id}/tp**GET**

Returns a list with ONU termination points.

Request body: --

Response body: json with TerminationPoint list.

/eml/onu/{id}/clientservicegpon**GET**

Request body: --

Response body: json with list of ClientServiceGpon on a given onu.

/eml/onu/{id}/igmpcounters**GET**

Read IGMP counters on a given ONU.

This operation is only available for equipments running OLT-OS versions after 3.3.0 (inxclusive).

For OLT-OS versions before 3.3.0 (exclusive) see: /eml/clientservicegpon/{id}/igmpcounters operation.

Request body: --

Response body: json with IgmPCounters information. (Same JSON as defined in: /eml/networkservice/{id}/tp/{id}/igmpcounters)

/eml/onu/{id}/feccounters**GET**

Read FEC counters on a given ONU.

FEC counters are available for the upstream direction if the required flag (TpGpon FEC flag) is enabled.

FEC counters are available for the downstream direction if the required flag (Onu FEC flag) is enabled.

Table 80. FecCounters

FecCounters		
Parameter	Type	Description
aid	AID	Filled with OLT IP, Card, tp and ONU ID
upstream	FecCounterPerDirection	
downstream	FecCounterPerDirection	

Table 81. FecCountersPerDirection

FecCountersPerDirection		
Parameter	Type	Description
correctedBytes	long	
correctedWords	long	
wrongWordsNotCorrected	long	
receivedWords	long	

/eml/onu{id}/upgrademode

GET

Reads the current upgrade mode configured in the given onu.

Request body: --

Response body: json with OnuUpgradeMode information

Table 82. OnuUpgradeMode

OnuUpgradeMode		
Paramter	Type	Description
id	String	The id in the url
aid	AID	The ipAddress, card, tp and onu id
firmwareUpgradeMode	enum	Takes the values: "OFF","AUTO" or "SPEC_VERSION"
firmwareSpecificVersion	String	The version to update to (it must exist in the firmware management) It is ignored unless firmwareUpgradeMode enum is "SPEC_VERSION"

PUT

Changes the upgrade mode in the given onu.

Request body: json with OnuUpgradeMode to be configured.

Response body: json with OnuUpgradeMode information configured.

Extended VLAN Tagging

Available since OLT-OS v3.4.0.

Extended VLAN Tagging (EVT) configuration is supported, as described in ITUT-G.988 chapter 9.3.13, for ONU Ethernet or VEIP Interfaces.

The EVT entity can be read and changed using the ID for the intended ONU interface. For EVT Rules, there is a specific resource to allow CRUD operations.

Table 83. ExtendedVlanTagging

ExtendedVlanTagging		
Parameter	Type	Description
id	string	The URL ID. (Matches with the respective ONU TP ID)
aid	AID	Filled with IP, card, tp, onuId, onuCard and onuTp
admin	enum	
inputTpid	int	TPID value for filtering
outputTpid	int	TPID value for tagging
dscpToPbitProfileId	int	The DSCP To P-bit Profile ID.
associationType	enum	Read-only 2 - ONU Ethernet Interface 10 - VEIP
downstreamMode	enum	Read-only 0- Inverse
rules	List<ExtendedVlanTaggingRule>	(Read-Only) The existing rules configured for this entity. Empty if there are no rules.

/eml/onu/{id}/extendedvlantagging

GET

Reads all EVT entities for a given ONU. Returns a list of EVT entities for each Ethernet and VEIP termination point that support the configuration.

Request body: --

Response body: json with List<ExtendedVlanTagging> information.

/eml/extendedvlantagging/{id}

GET

Read one specific EVT entity. The EVT ID is the same as the respective ONU Termination Point ID

Request body: --

Response body: json with the ExtendedVlanTagging information.

PUT

Updates a specific ONU termination point Extended Vlan Tagging configuration. The EVT ID is the same as the respective ONU Termination Point ID.

Request body: json with ExtendedVlanTagging information to be configured.

Response body: json with the ExtendedVlanTagging information configured.

Extended VLAN Tagging Rules

This resource allows the management of Extended VLAN Tagging (EVT) Rules. A Rule can only exist as a child of an EVT entity.

Table 84. ExtendedVlanTaggingRule

ExtendedVlanTaggingRule		
Parameter	Type	Description
id	int	The URL ID.
extensionId	string	The ID of the ONU Interface of the Extended VLAN Tagging entity where the rule belongs. (Read-Only)
clientServiceId	string	The GPON Client Service URL ID.
admin	enum	
priorityFilter	enum	Filter by priority. 0..7 or: 8- Do not filter 14- Default 15- Ignore
innerVidFilter	int	Filter by Inner Vlan ID 0..4094 4096- Do not filter
innerTpidDeiFilter	enum	0- (000) Any 4- (100) 0x8100 5- (101) Input TPID 6- (110) Input TPID, DEI=0 7- (111) Input TPID, DEI=1
ethertypeFilter	enum	0- Any 1- IPoE 2- PPPoE 3- ARP 4- IPv6 IPoE
tagsToRemove	int	0- Don't remove tags 1- remove 1 tag 2- remove 2 tags (not supported) 3- Discard the frame
innerPriorityTreatment	enum	0..7 or 8- Copy inner 9- Copy outer 10- DSCP to P-bit 15- Don't add TAG
innerTpidDeiTreatment	enum	0- (000) Copy inner 1- (001) Copy outer 2- (010) Output TPID, copy inner DEI 3- (011) Output TPID, copy outer DEI 4- (100) 0x8100 5- (110) Output TPID, DEI=0 6- (111) Output TPID, DEI=1

/eml/extendedvlantaggingrule**POST**

Create a new Rule for a given EVT Entity. Identify the respective entity with the extensionId JSON property by conveying the EVT ID on this field.

/eml/extendedvlantaggingrule/{id}**GET**

Reads one specific EVT Rule configuration by ID.

Request body: --

Response body: json with ExtendedVlanTaggingRule information.

PUT

Updated one specific EVT Rule configuration by ID.

Request body: json with ExtendedVlanTaggingRule to be configured.

Response body: json with ExtendedVlanTaggingRule information configured.

DELETE

Remove one specific EVT Rule by ID.

Request body: --

Response body: --

3.25. Network Service

A network service is configured on an equipment.

Table 85. NetworkService

NetworkService		
Parameters	Type	Description
id	string	The id in the URL.
aid	AID	Filled with Equipment IP.
name	string	The Network Service name that uniquely identifies the service.
profileName	string	The network service profile name associated to this service.
uplinkList	List<TargetId>	A list of TP IDs and card IDs for use as uplink interfaces.
downlinkList	List<TargetId>	A list of TP IDs and card IDs for use as downlink interfaces.
multicastFlood	boolean	
igmp	boolean	
l2DhcpRelay	L2DhcpRelayNetworkService	The DHCP Relay configuration for this service. Ignored, if the associated profile does not have the flag DHCP enabled.

Table 86. TargetId

TargetId		
Parameters	Type	Description
card	int	The Card ID. Zero means the tps in the list are LAGs.
tps	List<int>	A list of interface IDs that belong to the card mentioned. Empty list means that the target is a card.

Table 87. L2DhcpRelayNetworkService

L2DhcpRelayNetworkService		
Parameters	Type	Description
op18	boolean	Enable or disable DHCP option 18
op37	boolean	Enable or disable DHCP option 37
op82	boolean	Enable or disable DHCP option 82
priority	int	Configure the DHCP priority field
broadcastFlag	enum	This flag defines the behavior of the server replies (RFC 2131 chapter 4.1). When set, the DHCP Offer and ACK messages are sent to the broadcast MAC address (0xFFFFFFFF). If the flag is not set, the server replies in unicast to the client's MAC address. 1- Transparent: Do not change the flag value (default) 2- Force Set: Enable the broadcast flag 3- Force Clear: Disable the broadcast flag Available since OLT-OS vs 3.4.0.
circuitId	string	The string format is defined by the protocol standard.
useGlobalCircuitId	boolean	If enabled the locally configured circuit ID is ignored and the global circuit ID is used. Otherwise the configured circuit ID is used.

/eml/networkservice

POST

Creates a network service on a given equipment.

Request body: json with NetworkService information.

Response body: json with NetworkService information created.

/eml/networkservice/{id}

GET

Reads a specific network service on a given equipment.

Request body: --

Response body: json with NetworkService information.

PUT

Updates a specific network service on a given equipment.

Request body: json with NetworkService information.

Response body: json with NetworkService information.

DELETE

Deletes a specific network service on a given equipment.

Request body: --

Response body: --

/eml/networkservice/{id}/tp/{id}/totalcounters

GET

Read generic packet counters on a given Network Service. Counters must be started first so that the HW keeps track of the packet information. After use, the counters should be stopped to free the HW resources.

Request body: --

Response body: json with TotalCounters information.

Table 88. TotalCounters

TotalCounters		
Parameter	Type	Description
aid	AID	The AID contains the OLT IP, service name and any combination of the properties card and tp to identify the entity where information is read (either a card or an interface).
rx	TotalCounterPerDirection	
tx	TotalCounterPerDirection	

Table 89. TotalCountersPerDirection

TotalCountersPerDirection		
Parameter	Type	Description
total	long	
unicast	long	
multicast	long	
broadcast	long	
dropped	long	

/eml/networkservice/{id}/tp/{id}/igmpcounters

GET

Read IGMP counters on a given card or Termination Point for a given network service.

Request body: --

Response body: json with IgmPCounters information.

Table 90. IgmpCounters

IgmpCounters		
Parameter	Type	Description
aid	AID	The AID contains the OLT IP, service name and any combination of the properties card and tp to identify the entity where information is read.
rx	IgmpCounterPerDirection	
tx	IgmpCounterPerDirection	

Table 91. IgmpCountersPerDirection

IgmpCountersPerDirection		
Parameter	Type	Description
igmpPackets	IgmpPackets	
igmpV2	IgmpV2	
igmpV3	IgmpV3	
igmpQueries	IgmpQueries	

Table 92. IgmpPackets

IgmpPackets		
Parameter	Type	Description
total	long	
dropped	long	
valid	long	
invalid	long	

Table 93. IgmpV2

IgmpV2		
Parameter	Type	Description
join	long	
invalidJoin	long	
leave	long	

Table 94. IgmpV3

IgmpV3		
Parameter	Type	Description
membershipReport	long	
invalidMembershipReport	long	
toInclude	long	
toExclude	long	
isInclude	long	
isExclude	long	
allow	long	
block	long	
invalidToInclude	long	
invalidToExclude	long	
invalidIsInclude	long	
invalidIsExclude	long	
invalidAllow	long	
invalidBlock	long	

Table 95. IgmpQueries

IgmpQueries		
Parameter	Type	Description
general	long	
groupSpecific	long	
groupAndSourceSpecific	long	

/eml/networkservice/{id}/tp/{id}/dhcpcounters

GET

Read DHCP counters on a given card or tp for a given network service.

Request body: –

Response body: json with DhcpCounters information.

Table 96. DhcpCounters

DhcpCounters		
Parameter	Type	Description
aid	AID	The AID contains the OLT IP, service name and any combination of the properties card and tp to identify the entity where information is read.
rx	DhcpCounterPerDirection	
tx	DhcpCounterPerDirection	

Table 97. DhcpCountersPerDirection

DhcpCountersPerDirection		
Parameter	Type	Description
valid	long	
dropped	long	
clientRequest	DhcpCounterPerOptions	
serverReplies	DhcpCounterPerOptions	
clientPacketsTrusted	long	
clientPacketsOptsUntrusted	long	
serverPacketsUntrusted	long	
serverPacketsWithoutOptsTrusted	long	

Table 98. DhcpCounterdPerOptions

DhcpCountersPerOptions		
Parameter	Type	Description
withoutOptions	long	
withOption82	long	
withOption37	long	
withOption18	long	

Client Service GPON

A client service GPON is configured on an ONU.

Table 99. ClientServiceGpon

ClientServiceGpon		
Parameters	Type	Description
id	string	The id in the URL.
aid	AID	Filled with Equipment IP, card, tp and ONU-ID.
name	string	The GPON Client Service name that uniquely identifies the service.
admin	enum	
networkServiceName	string	The Network Service associated to this client service.
downstreamTrafficProfileName	string	Ethernet traffic profile (name) for use as downstream traffic profile. (NULL for multicast services)
upstreamTrafficProfileName	string	GPON traffic profile (name) for use as upstream traffic profile. (NULL for multicast services)
nniCtag	int	Configuration of NNI C-TAG.
uniCtag	int	Configuration of UNI C-TAG.
nativeVlan	boolean	Enable or disable the use of native VLAN.
encryption	boolean	Enable or disable AES encryption.
ipManagement	boolean	Enable or disable IP management.
maxNumMac	int	Maximum number of MACs that can be learned on the client service. (0 is unlimited, or 1 to 10)
l2DhcpRelay	L2DhcpRelayClientService	The L2 DHCP Relay configuration to use on the client service.
igmpOptions	IgmpClientService	The IGMP configuration to use on the client service. Available only for OLT-OS versions equal or above 3.3.0.

maxNumberOfGroups	int	<p>Enable or disable the multicast group limit control on the client service. (-1 disabled or 0 to 16384)</p> <p>This parameter is mandatory for IGMP enabled services or services whose network service is of the multicast type.</p> <p>Available only for OLT-OS versions equal or above 3.4.0.</p>
maxBandwidth	int	<p>Enable or disable the bandwidth limit control on the client service. (-1 disabled or 0 to 100.000.000 in Kbps)</p> <p>This parameter is mandatory for IGMP enabled services or services whose network service is of the multicast type.</p> <p>Available only for OLT-OS versions equal or above 3.4.0.</p>
tps	List<TargetId>	<p>A list of card and TP IDs where the client service is configured.</p> <p>Only TPs that belong to this ONU are allowed.</p>
pBitsToPQConfiguration	PBitsToPQConfiguration	<p>On create, PBitsToPQConfiguration object must convey the PbitsToPQ profile and T-CONT mapping association. The association is between each priority queue of a given PBitsToPQ priority profile (given as the client service name) and an existing T-CONT (by ID). On update, it is possible to change the PBitsToPQ profile used. In this case it must be passed the new mapping association. It is also possible to change only the mapping association, which will replace the previous one.</p>

Table 100.L2DhcpRelayClientService

L2DhcpRelayClientService		
Parameters	Type	Description
op18	boolean	Enable or disable DHCP option18.
op37	boolean	Enable or disable DHCP option37.
op82	boolean	Enable or disable DHCP option82.
remoteId	string	The remote ID as described by the DHCP protocol.
useGlobalDhcp	boolean	If enabled, use the DHCP configuration from the associated Network Service. Otherwise, the presently configured DHCP information is used (overriding the Network service configuration).

Table 101.IgmpClientService

IgmpClientService		
Parameters	Type	Description
useGlobal	boolean	If enabled, use the IGMP configuration from the associated Network Service. Otherwise, the presently configured IGMP information is used (overriding the Network service configuration). For OLT-OS versions equal or above 3.4.0, this parameter must be set to false.
enable	boolean	Enable (true), disable (false) the IGMP processing on the Client Service.

Table 102.PBitsToPQConfiguration

PBitsToPQConfiguration		
Parameters	Type	Description
pBitstoPQProfileName	String	
prioritiesTContsMapping	List<TContMapping>	

Table 103.TContMapping

TContMapping		
Parameters	Type	Description
priorityQueue	int	The priority queue (0 to 7).
tcontId	long	The T-CONT ID (obtained from the AID index field of the desired T-CONT entity).

/eml/clientservicegpon**POST**

Creates a new Client Service on a given ONU.

Request body: json with ClientServiceGpon information.

Response body: json with ClientServiceGpon information.

/eml/clientservicegpon/{id}**GET**

Reads a specific client service on a given ONU.

Request body: --

Response body: json with ClientServiceGpon information.

PUT

Updates a specific client service on a given ONU.

Request body: json with ClientServiceGpon information.

Response body: json with ClientServiceGpon information.

DELETE

Deletes a specific client service on a given ONU.

Request body: --

Response body: --

/eml/clientservicegpon/{id}/totalcounters**GET**

Read generic packet counters on a given GPON client service. Counters must be started first so that the HW keeps track of the packet information. After use, the counters should be stopped to free the HW resources.

Request body: --

Response body: json with TotalCountersList information.

Table 104.TotalCountersList

TotalCountersList		
Parameter	Type	Description
aid	AID	The AID contains the GPON client service identification (OLT IP, card, TP, onuId and name).
totalCounters	List<TotalCounters>	A list of total counters for each Termination Point where counters are read for the identified GPON client service.

Table 105.TotalCounters

TotalCounters		
Parameter	Type	Description
aid	AID	The AID contains one Termination Point identification where counters are read.
rx	TotalCounterPerDirection	(See operation /eml/networkservice/{id}/tp/{id}/totalcounters)
tx	TotalCounterPerDirection	(See operation /eml/networkservice/{id}/tp/{id}/totalcounters)

/eml/clientservicegpon/{id}/dhcpcounters

GET

Read DHCP counters on a given client service GPON.

Request body: --

Response body: json with DhcpCounters information.

Table 106.DhcpCounters

DhcpCounters		
Parameter	Type	Description
aid	AID	The AID contains the GPON client service identification (OLT IP, card, TP, onuId and client service name).
rx	DhcpCounterPerDirection	(See operation /eml/networkservice/{id}/tp/{id}/dhcpcounters)
tx	DhcpCounterPerDirection	(See operation /eml/networkservice/{id}/tp/{id}/dhcpcounters)

/eml/clientservicegpon/{id}/gemcounters

GET

Read GEM counters for a given client service on an ONU.

For OLT-OS versions prior to 3.4.0 (exclusive) the counters are available per client service but not by GEM ID. Hence, the operation result is a single entry on the list without the GEM ID parameter.

Request body: --

Response body: json with GemCounters information.

Table 107. GemCountersList

GemCountersList		
Parameter	Type	Description
aid	AID	Filled with OLT IP, card, tp, ONU ID and name (GPON client service name)
list	List<GemCounters>	For each GEM ID, the list conveys the respective counters available.

Table 108. GemCounters

GemCounters		
Parameter	Type	Description
gem	int	The GEM ID
packetsReceived	long	
blocksReceived	long	
blocksTransmitted	long	
receivedDropPackets	long	

/eml/clientservicegpon/{id}/igmpcounters

GET

Read IGMP counters on a given card or tp for a given client service GPON.

This operation is only available for equipments running OLT-OS versions before 3.3.0 (exclusive).

For OLT-OS versions after 3.3.0 (inclusive) see: /eml/onu/{id}/igmpcounters operation.

Request body: --

Response body: json with IgmpCountersList information.

Table 109.IgmpCountersList

IgmpCountersList		
Parameter	Type	Description
aid	AID	The AID contains the GPON client service identification (OLT IP, card, TP, onuId and name).
igmpCounters	List<IgmpCounters>	A list of IGMP counters for each Termination Point where counters are read for the identified GPON client service.

Table 110.IgmpCounters

IgmpCounters		
Parameter	Type	Description
aid	AID	The AID contains one Termination Point identification where counters are read.
rx	IgmpCounterPerDirection	(See operation /eml/networkservice/{id}/tp/{id}/igmpcounters)
tx	IgmpCounterPerDirection	(See operation /eml/networkservice/{id}/tp/{id}/igmpcounters)

Client Service Ethernet

A client service Ethernet is configured for Ethernet Interfaces on OLT Cards (the card must allow Client services configuration).

This functionality is only available since OLT-OS v3.4.1.

Table 111. ClientServiceEthernet

ClientServiceEthernet		
Parameters	Type	Description
id	string	The ID in the URL.
aid	AID	Filled with Equipment IP, card and name.
name	string	Client Service Name
admin	enum	
networkServiceName	string	The associated Network Service name.
tp	int	The Index of the interface (Termination Point) where the service is applied.
nmiCtag	int	
uniCtag	int	
upstreamEthernetProfileName	String	The Ethernet Traffic Profile used on the upstream direction. (NULL for multicast services)
l2DhcpRelay	L2DhcpRelayClientService	Null if service does not support DHCP. Object specified in the Client Service GPON section.
maxNumberOfGroups	int	Enable or disable the multicast group limit control on the client service. (-1 disabled or 0 to 16384) This parameter is mandatory for IGMP enabled services or services whose network service is of the multicast type. Available only for OLT-OS versions equal or above 3.4.0.
maxBandwidth	int	Enable or disable the bandwidth limit control on the client service. (-1 disabled or 0 to 100.000.000 in Kbps) This parameter is mandatory for IGMP enabled services or services whose network service is of the multicast type. Available only for OLT-OS versions equal or above 3.4.0.

/eml/card/{id}/clientserviceethernet**GET**

Read all Client Services for a given Card.

Request body: --

Response body: json with list of ClientServiceEthernet on a given card.

/eml/clientserviceethernet**POST**

Create a new Client Service Ethernet on a given card. Specify the OLT and Card with the AID object.

Request body: json with ClientServiceEthernet information.

Response body: json with ClientServiceEthernet information.

/eml/clientserviceethernet/{id}**GET**

Read one client Service information by ID.

Request body: --

Response body: json with ClientServiceEthernet information.

PUT

Update information on a given client service by ID.

Request body: json with ClientServiceEthernet information.

Response body: json with ClientServiceEthernet information.

DELETE

Remove an existing Client Service by ID.

Request body: --

Response body: --

/eml/clientserviceethernet/{id}/totalcounters**GET**

Read generic packet counters on a given service. Counters must be started first so that the HW keeps track of the packet information. After use, the counters should be stopped to free the HW resources.

Request body: --

Response body: json with TotalCountersList information.

Table 112.TotalCountersList

TotalCountersList		
Parameter	Type	Description
aid	AID	The AID contains the ETHERNET client service identification (OLT IP, card and name).
totalCounters	List<TotalCounters>	A list of total counters for each Termination Point where counters are read for the identified ETHERNET client service

Table 113.TotalCounter

TotalCounter		
Parameter	Type	Description
aid	AID	The AID contains one Termination Point identification where counters are read.
rx	TotalCounterPerDirection	(See operation /eml/networkservice/{id}/tp/{id}/totalcounters)
tx	TotalCounterPerDirection	(See operation /eml/networkservice/{id}/tp/{id}/totalcounters)

Multicast Group

Multicast groups can be created on a given equipment, read , deleted and modified. The JSON object that represents one Multicast group is the following:

Table 114. MulticastGroup

MulticastGroup		
Parameters	Type	Description
id	string	The ID in the URL
aid	AID	Filled with Equipment IP, and index.
admin	enum	
name	string	Multicast group name
networkServiceName	string	Name of the associated network service (service type must be multicast).
sourceIpAddress	string	Unicast IP address, in string format, used for source filtering
multicastIpAddress	string	Group multicast IP address, in string format.
ipMaskBits	int	Determines the address range. Default value is 32, single IP. Accepted vaues range from 22 to 32.
channelType	enum	Determines this multicast group is static(1) or dynamic(2)
bandwidth	int	Set the total bandwidth of the Multicast traffic on each interface, VLAN and client. Value in Kbps (Range: 0 to 100.000.000)

/eml/multicastgroup**POST**

Creates a new multicast group on the equipment.

Request body: json with a MulticastGroup information.

Response body: json with MulticastGroup information.

/eml/multicastgroup/{id}**GET**

Reads a specific multicast group.

Request body: --

Response body: json with MulticastGroup information.

PUT

Updates a specific multicast group.

Request body: json with MulticastGroup information.

Response body: json with MulticastGroup information.

DELETE

Deletes a specific multicast group from the equipment.

Request body: --

Response body: --

/eml/equipment/{id}/multicastactivegroup

GET

Read a list of multicast active groups on a given equipment. The multicast active groups are dynamic so they don't have an integer ID. They are identified by the attributes OLT IP, Network Service Name, Source IP and Multicast IP. This comes in the ID field for each entry in the list.

Example: /eml/multicastactivegroup/10.112.42.100-IPTV-10.24.112.12-224.224.10.103

Request body: --

Response body: json with a list of MulticastActiveGroup from a given equipment.

Table 115.MulticastActiveGroups

MulticastActiveGroups		
Parameters	Type	Description
timeStamp	long	Epoch (milliseconds)
activeGroups	List<MulticastActiveGroup>	

Table 116.MulticastActiveGroup

MulticastActiveGroup		
Parameter	Type	Description
id	string	The ID of the Multicast Active group (on the format: OLT IP - NS Name - Source IP - Multicast IP)
aid	AID	Filled with OLT IP and service name, source IP and Multicast IP.
networkserviceName	string	
channelType	enum	
sourceIpAddress	IPv4	
multicastIpAddress	IPv4	

/eml/multicastactivegroup/{id}/client

GET

Read the list of clients receiving the given multicast active group. (See the above use case for information about the ID format)

Request body: --

Response body: json with MulticastActiveGroupClients information.

Table 117. MulticastActiveGroupClients

MulticastActiveGroupClients		
Parameters	Type	Description
timeStamp	long	Epoch (milliseconds)
clients	List<Client>	

Table 118. Client

Client		
Parameters	Type	Description
aid	AID	Filled with IP, card, tp, onu ID
nniCtag	int	
clientServiceName	string	

/eml/clientservicegpon/{id}/multicastactivegroup

GET

Read all multicast active groups on a single GPON client service on a given ONU.

Request body: --

Response body: json with a list of all ClientServiceMulticastActiveGroup from a given ONU GPON Client Service.

Table 119. ClientServiceMulticastActiveGroups

ClientServiceMulticastActiveGroups		
Parameters	Type	Description
aid	AID	Filled with: OLT IP, card, tp, ONU ID, name (GPON client service name)
timeStamp	long	Epoch (milliseconds)
activeGroups	List<ClientServiceMulticastActiveGroup>	

Table 120. ClientServiceMulticastActiveGroup

ClientServiceMulticastActiveGroup		
Parameters	Type	Description
sourceIpAddress	IPv4	
multicastIpAddress	IPv4	

/eml/equipment/{id}/multicastigmpproxy

GET

Request body: --

Response body: json with MulticastIgmpProxy information.

PUT

Request body: json with MulticastIgmpProxy information.

Response body: json with MulticastIgmpProxy information.

Table 121. MulticastIgmpProxy

MulticastIgmpProxy		
Parameter	Type	Description
id	string	
aid	AID	Filled with Equipment IP only.
admin	enum	
priority	int	
networkVersion	int	
clientVersion	int	
robustness	int	
unsolicitedReportInterval	int	seconds
maxRecordsPerReport	int	

/eml/equipment/{id}/multicastigmpquerier

GET

Request body: --

Response body: json with MulticastIgmpQuerier information.

PUT

Request body: json with MulticastIcmpQuerier information.

Response body: json with MulticastIcmpQuerier information.

Table 122. MulticastIcmpQuerier

MulticastIcmpQuerier		
Parameter	Type	Description
id	string	
aid	AID	Filled with Equipment IP only.
querierIp	string	
queryInterval	int	
queryResponseInterval	int	
startupQueryInterval	int	
startupQueryCount	int	
lastMemberQueryInterval	int	
lastMemberQueryCount	int	

Global Switch

/eml/equipment/{id}/switch

GET

Reads the global switch configuration on a given equipment.

Request body: --

Response body: json with Switch information.

PUT

Change the global switch configuration on a given equipment.

Request body: json with Switch information

Response body: json with Switch information configured

Table 123.Switch

Switch		
Parameters	Type	Description
aid	AID	Conveys the equipment IP where information was read.
macAging	int	The global mac aging configured.

NTP

/nml/ntp

GET

Reads all the NTP servers in the catalog.

Request body: --

Response body: json with a List of NtpCatalog information.

Table 124.NtpCatalog

NtpCatalog		
Parameters	Type	Description
id	string	The ID in the URL (NTP server name).
ip	string	Conveys the NTP server IP in a string format.
name	string	The name of the NTP server

POST

Create a new NTP server in the catalog.

Request body: json with NtpServer information.

Response body: json with NtpServer created.

/nml/ntp/{id}

DELETE

Removes one NTP server by ID, from the catalog.

Request body: --

Response body: --

/eml/equipment/{id}/ntp

GET

Reads all the NTP configuration on a single equipment.

Request body: --

Response body: json with NTP information.

PUT

Change the global NTP admin state of a single equipment.

Request body: json with NTP information.

Response body: json with NTP configured

Table 125.NTP

NTP		
Parameters	Type	Description
aid	AID	Conveys the equipment IP where information was read.
admin	enum	Enable or disable the global use of NTP functionality on the equipment.

/eml/equipment/{id}/ntpserver

Table 126.NtpServer

NtpServer		
Parameters	Type	Description
aid	AID	Conveys the equipment IP where information was read.
id	string	The NTP server ID used for PUT and DELETE operations.
name	string	A valid NTP Server name from the NTP Server Catalog.
admin	enum	

GET

Reads all the NTP servers configured on a single equipment.

Request body: --

Response body: json with a list of NtpServer information.

/eml/ntpserver

POST

Add one NTP server to NTP configuration on a single equipment.

Request body: json with NtpServer information.

Response body: json with a list of NtpServer configured on equipment.

/eml/ntpserver/{id}

PUT

Change one NTP server configuration on a single equipment.

Request body: json with NtpServer information

Response body: json with a list of NtpServer configured on equipment.

DELETE

Remove one NTP server from a given equipment by ID.

Request body: --

Response body: --

3.31. Timezone

/nml/timezone

Table 127. TimeZone

TimeZone		
Parameters	Type	Description
id	string	The time zone ID.
name	string	The human readable string representing the time zone.

GET

Lists all available time zone names and respective IDs.

Request body: --

Response body: json with a List of TimeZone information.

/eml/equipment/{id}/time

GET

Read the current equipment time and date in Epoch format, and the configured Time Zone. Also returns the same time information for the NMS.

Request body: --

Response body: json with TimeInformation information.

PUT

Change the current equipment Time Zone by providing the new time zone ID. Cannot modify the NMS time configuration neither the equipment time.

Request body: json with Time information.

Response body: json with Time information configured.

Table 128. TimeInformation

TimeInformation		
Parameters	Type	Description
equipment	Time	The time information for the requested equipment
nms	Time	The time information for the NMS entity.

Table 129. Time

Time		
Parameters	Type	Description
timeZoneId	string	The time zone ID.
timeZoneName	string	The time zone as a human readable string.
time	long	The NMS system time (Epoch in milliseconds)

GPON Type B Protection Groups

`/eml/equipment/{id}/typebprotectiongroup`

Table 130. TypeBProtectionGroup

TypeBProtectionGroup		
Parameters	Type	Description
id	long	The id in the URL.
aid	AID	
admin	enum	
name	string	
primaryPort	string	The ID of the Primary Termination Point
protectionPort	string	The ID of the Protection Termination Point
waitToRestore	int	Wait to Restore Time (WTR) in minutes.
holdOffTime	int	Hold Off Time in hundredths of milliseconds
reversible	boolean	If set to true, after recovering from a fault the primary port is used automatically. Setting this to false, means that the protection port will continue to be used even if the primary port recovers.
type	enum	(1) - One Plus One
highPriorityCardFailure	boolean	Perform port switch based on card failure
highPriorityInterfaceLos	boolean	Perform port switch based on Loss of Signal (LOS)

GET

Read all the GPON Type B Protection groups configured on a given equipment.

Request body: --

Response body: json with a List of TypeBProtectionGroup information.

/eml/typebprotectiongroup

POST

Create a new GPON Type B Protection group on a given equipment.

Request body: json with TypeBProtectionGroup information

Response body: json with TypeBProtectionGroup information configured.

/eml/typebprotectiongroup/{id}

GET

Read a specific GPON Type B Protection group configured on a given equipment.

Request body: --

Response body: json with TypeBProtectionGroup information.

PUT

Change an existing GPON Type B Protection group configuration on a given equipment.

Request body: json with TypeBProtectionGroup information

Response body: json with TypeBProtectionGroup information configured.

DELETE

Remove one GPON Type B Protection group by ID.

Request body: --

Response body: --

/eml/typebprotectiongroup/{id}/status

GET

Read status information for a given GPON Type B Protection entity by ID.

Request body: --

Response body: json with TypeBPGStatus information

Table 131.TypeBPGStatus

TypeBPGStatus		
Parameters	Type	Description
aid	AID	Filled with OLT IP and protection group name.
waitToRestoreTimer	int	
lastSwitchOverReason	enum	
syncStatus	enum	
lastCommand	enum	The last command executed by the user on this entity
primaryPort	TypeBPGPortStatus	
protectionPort	TypeBPGPortStatus	

Table 132.TypeBPGPortStatus

TypeBPGPortStatus		
Parameters	Type	Description
tpId	string	
active	boolean	True if this is the Interface the one being used. False otherwise.
alarms	List<int>	The list of active alarms for this Protection Port. 1- Interface LOS 2- Card Failure

/eml/typebprotectiongroup/command**POST**

Execute a command on a given GPON Type B Protection entity.

Identify the entity with the AID block giving 'ipAddress' with the OLT IP and 'name' with the protection group name.

Request body: json with TypeBPGCommand.

Response body: --

Table 133.TypeBPGCommand

TypeBPGCommand		
Parameters	Type	Description
protectionTypeBGroupId	string	The URL ID for the Protection group where the command will be executed
command	enum	The command code to be executed.

Ethernet Uplink Protection Group

/eml/equipment/{id}/uplinkprotectiongroup

Table 134.UplinkProtectionGroup

UplinkProtectionGroup		
Parameter	Type	Description
id	int	The id in the URL
aid	AID	The IP address of the equipment and the name of the protection group
admin	enum	The state of the protection group
name	string	The name of the Ethernet Uplink Protection Group
primaryPort	string	The ID of the Primary Termination Point
protectionPort	string	The ID of the Protection Termination Point
waitToRestore	int	Wait to Restore Time (WTR) in minutes.
holdOffTime	int	Hold Off Time in hundredths of milliseconds
reversible	boolean	If set to true, after recovering from a fault the primary port is used automatically. Setting this to false, means that the protection port will continue to be used even if the primary port recovers.
type	enum	1 - OnePlusOne; 2 - OneToOne; 4 - OnePlusOneOpt
highPriorityCardFailure	boolean	Perform port switch based on card failure
highPriorityInterfaceLos	boolean	Perform port switch based on Loss of Signal (LOS)

GET

Read all the Ethernet Uplink Protection Groups in the given equipment

Request body: --

Response body: json with a list of UplinkProtectionGroup

/eml/uplinkprotectiongroup**POST**

Create a new Ethernet uplink protection group on a given equipment

Request body: json with the UplinkProtectionGroup

Response body: json with the UplinkProtectionGroup configured

/eml/uplinkprotectiongroup/{id}**GET**

Reads a specific Ethernet Uplink Protection Group configured on a given equipment.

Request body: --

Response body: json with UplinkProtectionGroup information

PUT

Change an existing Ethernet Uplink Protection Group configuration on a given equipment

Request body: json with the UplinkProtectionGroup to be changed

Response body: json with the UplinkProtectionGroup information configured

DELETE

Remove one Ethernet Uplink Protection Group by ID.

Request body: --

Response body: --

/eml/uplinkprotectiongroup/{id}/status

GET

Reads status information for a given Ethernet Uplink Protection entity by ID

Request body: --

Response body: json with the UplinkPGStatus

Table 135.UplinkPGStatus

UplinkPGStatus		
Parameter	Type	Description
aid	AID	Filled with OLT IP and protection group name
waitToRestoreTime	int	Wait to Restore Time (WTR) in minutes.
lastSwitchOverCause	enum	The protection group last reason to switch: 0 - none; 1 - signalFail; 2 - lineCardFailure; 3 - signalDegrade; 4 - signalFailClear; 5 - operatorManualSwitchCommand; 6 - waitToRestoreTimerExpire; 7 - operatorClearCommand; 8 - operatorLockoutOfProtectionCommand; 9 - operatorForceSwitchCommand;
syncStatus	enum	The sync status of the Protection Group: 0 - notSynchronous; 1 - activatingDeactivating; 2 - synchronizing; 3 - synchronous; 4 - error; 5 - activationError;
lastCommand	enum	The last command executed by the user on this entity: 1- No Command; 2 - Clear; 3 - LockOutOfProtection; 4 - forcedSwitchToProtect; 5 - forcedSwitchToWork; 6 - manualSwitchWorkToProtect; 7 - manualSwitchProtectToWork; 8 - exercise;
primaryPort	UplinkPortPGStatus	The primary port status
protectionPort	UplinkPortPGStatus	The protection port status

Table 136.UplinkPortPGStatus

UplinkPortPGStatus		
Parameter	Type	Description
tpId	string	The url id of the termination point
alarms	List<int>	The list of active alarms for this Protection Port. 1- Interface LOS 2- Card Failure

/eml/uplinkprotectiongroup/command

POST

Execute a command on a given Ethernet Uplink Protection Group entity.

Request body: json with UplinkPGCommand

Response body: --

Table 137.UplinkPGCommand

UplinkPGCommand		
Parameter	Type	Description
id	int	The url id of the Ethernet protection Group
command	int	The command ot be executed

PBit to PQ Profile

Table 138. PbitsToPQProfile

PbitsToPQProfile		
Parameters	Type	Description
id	string	The ID in the URL.
name	string	The profile name to uniquely identify the entity.
priorityList	List<Priority>	Conveys the 8 priority queues and respective pBits mapping.

Table 139. Priority

Priority		
Parameters	Type	Description
priority	int	The priority queue (0 to 7)
pBits	List<int>	All the pBits assigned to this priority (0 to 7)

/nml/profilebitstopq**GET**

Reads all catalog PBits profiles configured on the system.

Request body: --

Response body: json with a list of all ProfilePBits information.

POST

Create a new PBits profile on catalog.

Request body: json with PbitsToPQProfile information.

Response body: json with PbitsToPQProfile information created.

/nml/profilebitstopq/{id}**GET**

Reads a single catalog PBits profile by ID.

Request body: --

Response body: json with PbitsToPQProfile information.

DELETE

Delete a given PBits Profile by ID from the catalog.

Request body: --

Response body: --

T-CONTs

Table 140. TCONT

TCONT		
Parameters	Type	Description
id	string	The ID in the URL.
aid	AID	Filled with ONU identification (IP, card, tp, onuId).
admin	enum	The administrative state.
gponTrafficProfileName	string	The profile associated with this T-CONT.

/eml/onu/{id}/tcont

GET

Reads all T-CONTs configured on a given ONU.

Request body: --

Response body: json with a list of all TCONT information.

/eml/tcont/{id}

GET

Reads a given T-CONT configured on a given ONU.

Request body: --

Response body: json with TCONT information.

PUT

Updates the given T-CONT.

Request body: json with TCONT information.

Response body: json with TCONT information.

DELETE

Deletes a given T-CONT.

Request body: --

Response body: --

/eml/tcont

POST

Create a new T-CONT on a given ONU.

Request body: json with TCONT information.

Response body: json with TCONT information created.

/eml/onu/{id}/tcontstatus

GET

Reads the T-CONT status on a given ONU.

Request body: --

Response body: json with TCONTSTATUS information.

Table 141.TCONTSTATUS

TCONTSTATUS		
Parameters	Type	Description
aid	AID	Filled with ONU identification (IP, card, tp, onuId).
status	List<Status>	Conveys information about each T-CONT status

Table 142.Status

Status		
Parameters	Type	Description
hwMeId	string	
tContId	string	Transmission Container Identification
allocId	int	Allocation Identification assigned to the T-CONT
clientServiceAssociation	List<Association>	Conveys the information about each service association

Table 143.IgmpCounters

Association		
Parameters	Type	Description
gem	int	GEM port identification
priorityQueue	int	Service priority in the T-CONT
clientServiceId	string	Client Service Identification
pBit	int	pBits associated with the service

Commands

In this section, we present operations that execute commands on a given managed equipment.

/eml/startcounter

POST

Send a command to the HW to start counting packets for a given TP and Service ID (client or network service).

A limited number of counters can be active at the same time. The counters must be stopped when they are no longer needed to free the HW resources.

After the counter is enabled the read command is available.

For Network services the read command is:

```
GET /eml/networkservice/{nsId}/tp/{tpId}/totalcounters
```

For Client services the read command is:

```
GET /eml/clientservicegpon/{csId}/totalcounters
```

The AID JSON object provided can identify one of the following:

- One Network Service and one TP - with the fields: ipAddress, card, tp and name; Omitting the tp field, counters are enabled on the card.
- One Client Service GPON - with the fields: ipAddress, card, tp, onuId and name•Counters will be started automatically on all relevant interfaces (the ONU uplink interface plus all uplink interfaces of the associated Network Service)

Request body: json with an AID object to identify the counter to be started.

Response body: --

/eml/stopcounter**POST**

Stops the given counter. The same rules apply as for the Start Counters command.

The AID JSON object provided can identify one of the following:

- One Network Service and one TP - with the fields: ipAddress, card, tp and name; Omitting the tp field, counters are stopped on the card. •Counters will be stopped on the given TP, for the given Service only
- One Client Service GPON - with the fields: ipAddress, card, tp, onuId and name •Counters will be stopped automatically on all relevant interfaces (the ONU uplink interface plus all uplink interfaces of the associated Network Service)

Request body: json with an AID object to identify the counter to be stopped.

Response body: --

/eml/discovercard**POST**

Rediscover cards on a given equipment. For modular equipments, such as OLTs, cards can be added to empty slots or removed from the device.

Use this command to trigger the synchronization process between the NMS and the respective equipment to reload the slot information.

Request body: json with an AID object to identify the equipment where to rediscover cards.

Response body: --

/eml/reboot/onu**POST**

Execute the reboot command for:

- One ONU: specified by the input JSON AID object with OLT IP, card, termination point and ONU ID
- All ONUs on a PON Interface: specified by the input JSON AID object with OLT IP, card and PON Termination Point ID
- All ONUs on a Card: specified by the input JSON AID object with OLT IP and card

Request body: json with AID information that identifies an ONU, a PON Interface or a Card

Response body: --

/eml/reboot/card**POST**

Execute the reboot command on a given OLT card. (Available since OLT-OS vs 3.4.0)

Request body: json with AID information that identifies an OLT Card

Response body: --

/eml/onumibresync

POST

Execute the MIB re-synchronization command one or several ONUs, specified by the input JSON AID object.

The AID Object can specify a single ONU (IP, card, tp, onuId); a single interface PON (IP, card, tp) or a single card.

Request body: json with AID information that identifies one or several ONUs

Response body: --

/nml/connectivitycheck/icmp**POST**

Test ICMP connectivity from the NMS to a designated IP address.

The input AID Object can specify a single IP to test connectivity. The returned JSON Object assumes the value 1 upon success and 0 if there is no connectivity.

Request body: json with AID information for a single equipment

Response body: json ConnectivityTestResult with the operation result

Table 144.ConnectivityTestResult

ConnectivityTestResult		
Parameters	Type	Description
result	int	1- success 0- no connectivity to the designated IP

/nml/connectivitycheck/snmp**POST**

Test SNMP connectivity from the NMS to a designated IP address.

The input AID Object can specify a single IP to test connectivity. The returned JSON Object assumes the value 1 upon success and 0 if there is no connectivity.

Request body: json with AID information for a single equipment

Response body: json ConnectivityTestResult with the operation result

/nml/connectivitycheck/http**POST**

Test HTTP connectivity from the NMS to a designated IP address.

The input AID Object can specify a single IP to test connectivity. The returned JSON Object assumes the value 1 upon success and 0 if there is no connectivity.

Request body: json with AID information for a single equipment

Response body: json ConnectivityTestResult with the operation result

/eml/enablebyserialnumber

POST

Execute the command "Enable ONU by Serial Number" on the desired ONU or ONUs. The input AID JSON Object can specify one of three options:

- a single ONU (with parameters: IP, card, tp, onuId)
- a single PON interface – send the command to all ONUs on a given PON – (with parameters: IP, card, tp)
- a single CARD – send the command to all ONUs on all PON interfaces of the given CARD – (with parameters: IP, card)

Request body: json with AID information for a single or several ONUs

Response body: --

/eml/disablebyserialnumber

POST

Execute the command "Disable ONU by Serial Number" on the desired ONU. The input AID JSON Object must specify a single ONU.

Request body: json with AID information for a single ONU

Response body: --

/eml/discoverequipment

POST

Execute the discover operation for one or more equipments by IP address.

Note that this operation only starts the discovery process. To see the information for already discovered equipments use the GET /eml/equipment operation.

Request body: json with DiscoverEquipment information for a single ONU

Response body: --

There is no JSON response. The HTTP Code 200 means OK.

Table 145.DiscoverEquipment

DiscoverEquipment		
Parameters	Type	Description
ipList	List<string>	The list of IP Addresses to be discovered
hops	int	Number of maximum Hops to reach the equipment

/eml/resetfactorydefault - Not yet supported by the core

POST

Resets/Restores one equipment to default configuration. All data configured is lost .

Request body: json with the AID of the equipment to be restored to factory default

Response body: –

Performance Data

Performance data is gathered autonomously by the system in two fixed time intervals: 15 minutes and 24 hours. At each interval, the system queries the equipment for the respective counter information and saves it centrally. This information is made available for reading using the described REST operations. The available Performance data types are the following:

Table 146.PerformanceDataType

Performance Data Type	
Value	Description
ethernet	The RFC 2819 ethernet packet statistics.
gem	

The user should first query the API for the last measurement time.

Afterwards, the user can request one Performance Data Type for one equipment to get all the data available since a given timestamp or for a single timestamp.

Resources

/eml/equipment/{id}/performancedata

GET

Returns one AvailablePerformanceData JSON object with the information when performance metrics have been read from the specified equipment ID.

The latest and the oldest measurement times for all available Performance Data Types for the given equipment are returned.

Request body: --

Response body: json object with AvailablePerformanceData information.

Table 147. AvailablePerformanceData

AvailablePerformanceData		
Parameter	Type	Description
aid	AID	Filled with equipment IP.
intervals	List<Intervals>	

Table 148. Intervals

Intervals		
Parameter	Type	Description
period	int	Number of minutes that this interval refers to. Can be 15 minutes or 1440 minutes (24 hours).
ethernet	PerformanceDataTypeMeasurement	
gem	PerformanceDataTypeMeasurement	

Table 149. PerformanceDataTypeMeasurement

PerformanceDataTypeMeasurement		
Parameter	Type	Description
oldestEntry	long	Epoch, in milliseconds of the oldest entry available.
newestEntry	long	Epoch, in milliseconds of the newest entry available.

/eml/equipment/{id}/performancedata/{period}/ethernet

GET

Returns one PerformanceDataEthernetList JSON object for all available Ethernet records.

Period can be 15 minutes or 1440 minutes (24 hours).

The user can add a query string with a given timestamp or timestamp range, (Epoch, in milliseconds) to get only the desired information.

Example:

GET - /eml/equipment/{id}/performancedata/{period}/ethernet?timestamp=<timestamp>

GET - /eml/equipment/{id}/performancedata/{period}/ethernet?timestamp.gt=<timestamp>

GET - /eml/equipment/{id}/performancedata/{period}/ethernet?timestamp.lt=<timestamp>

GET -

/eml/equipment/{id}/performancedata/{period}/ethernet?timestamp.gt=<timestamp>×tamp.lt=<timestamp>

Request body: --

Response body: json object with PerformanceDataEthernetList information

Table 150. PerformanceDataEthernetList

PerformanceDataEthernetList		
Parameter	Type	Description
aid	AID	Filled with equipment IP.
period	int	Number of minutes that this timestamp refers to. Can be 15 minutes or 1440 minutes (24 hours).
performanceData	List<PerformanceDataEthernet>	

Table 151. PerformanceDataEthernet

PerformanceDataEthernet		
Parameter	Type	Description
timestamp	long	Epoch, in milliseconds representing the time when the counters data was read on the HW.
counters	EthernetCounters	EthernetCounters JSON object, as described in operation: /eml/tpethernet/{id}/counters

/eml/equipment/{id}/performancedata/{period}/gem

GET

Returns one PerformanceDataGemList JSON object for all available GEM records.

As with the Ethernet Performance Data Type, the same filtering rules apply.

Request body: --

Response body: json object with PerformanceDataGemList information

Table 152. PerformanceDataGemList

PerformanceDataGemList		
Parameter	Type	Description
aid	AID	Filled with equipment IP
period	int	Number of minutes that this timestamp refers to. Can be 15 minutes or 1440 minutes (24 hours).
performanceData	List<PerformanceDataGem>	

Table 153. PerformanceDataGem

PerformanceDataGem		
Parameter	Type	Description
timestamp	long	Epoch, in milliseconds representing the time when the counters data was read on the HW.
counters	GemCounters	GemCounters JSON object, as described in operation: /eml/client-service-gpon/{id}/gemcounters

Enumerations

In this section we define all the enumerations used for all JSON objects.

Administrative State

Table 154.Enum Administrative State

Enum Administrative State	
Value	Description
1	In Service: active, enabled.
2	Blocked: not active, disabled by the user.
3	Planned: The logical entity is configured but does exists physically.
4	Maintenance: The equipment is in service, but the user changed the state to Maintenance to signal an intervention on the HW.

Equipment Operational State

Table 155.IgmpCounters

IgmpCounters	
Value	Description
1	Operational
2	Not Operational
3	Degraded
4	Unnkown

Network Service Type

Table 156. Enum Network Service Type

Enum Network Service Type	
Value	Description
0	Unicast
1	Multicast
2	Uni-Voip
3	Bitstream
4	MAC-Bridge

Ethernet Profile Coupling Flag

Table 157. Enum Ethernet Profile Coupling Flag

Enum Ethernet Profile Coupling Flag	
Value	Description
1	Coupling Flag ON
2	Coupling Flag OFF

Ethernet Color Mode

Table 158. Enum Ethernet Profile Color Mode

Enum Ethernet Profile Color Mode	
Value	Description
0	Blind
1	Aware

BW Eligibility

Table 159.Enum BW Eligibility

Enum BW Eligibility	
Value	Description
-1	Undefined, Unused
0	Non-Assured
1	Best Effort

Profile GPON Traffic Type

Table 160.IgmpCounters

Enum Profile GPON Traffic Type	
Value	Description
1	UBR
2	CBR
3	Dynamic

Termination Point Type

Table 161.Enum Termination Point Type

Enum Termination Point Type	
Value	Description
301	E1
303	RS232
358	Ethernet
368	Gigabit Ethernet
30018	GPON
30019	RF
30027	VEIP

Card Type

Table 162.Enum Card Type

Enum Card Type	
Value	Description
20145	ME4601-ONT-SFU-CARD
20193	ME4620-FAN
20187	ME4600-XCO-640
20188	ME4600-AMX-16GPON
20189	ME4600-UMX-4x10GE
20199	ME4600-AMX-48GE
20211	ME4600-XCO-160
20212	ME4605-FAN

Equipment Type

Table 163.Enum Equipment Type

Enum Equipment Type	
Value	Description
10023	ME4601-ONT-SFU
10040	ME4620-OLT
10048	ME4605-OLT

GPON Optical Laser Status

Table 164.Enum GPON Optical Laser Status

Enum GPON Optical Laser Status	
Value	Description
0	OFF
1	ON
2	Failed

LAG Aggregation Type

Table 165.Enum Aggregation Type

Enum Aggregation Type	
Value	Description
1	Static
2	Dynamic

LAG Load Balance Mode

Table 166. Enum LAG Balance Mode

Enum LAG Load Balance Mode	
Value	Description
1	Source Address
2	Destination Address
3	Source and Destination Address

LAG Member LACP Timeout

Table 167. Enum LACP Timeout

Enum LACP Timeout	
Value	Description
1	Long
2	Short

Link Status

Table 168. Enum Link Status

Enum Link Status	
Value	Description
0	Fail
1	OK

ONU Register Type

Table 169.Enum ONU Register Type

Enum ONU Register Type	
Value	Description
1	Serial Number
2	Password
3	Serial Number and Password

Discovered ONU State

Table 170.Enum ONU State

Enum ONU State	
Value	Description
2	New, the ONU is discovered and not being managed
3	ONU was inserted on the OLT and not in the NMS

Software Upgrade Mode

Table 171.Enum ONU SW Upgrade Mode

Enum ONU SW Upgrade Mode	
Value	Description
1	OFF: No automatic upgrade will be performed on this ONU. The firmware upgrade will be manual, by direct action of the user, specifying the firmware file.
2	AUTO: Enable the Automatic firmware upgrade to the firmware version indicated as the default version.
3	Specific Version: ONU will upgrade to the version specified in 'specificVersion' field.

Multicast Group Channel Type

Table 172. Enum Multicast Group Channel Type

Enum Multicast Group Channel Type	
Value	Description
1	Static
2	Dynamic

Ethernet Media Type

Table 173.Enum Ethernet Media Type

Enum Ethernet Media Type	
Value	Description
0	other or unknown
1	AUI
2	10BASE-5
3	FOIRL
4	10BASE-2
5	10BASE-T duplex mode unknown
6	10BASE-FP
7	10BASE-FB
8	10BASE-FL duplex mode unknown
9	10BROAD36
10	10BASE-T half duplex mode
11	10BASE-T full duplex mode
12	10BASE-FL half duplex mode
13	10BASE-FL full duplex mode
14	100BASE-T4
15	100BASE-TX half duplex mode
16	100BASE-TX full duplex mode
17	100BASE-FX half duplex mode
18	100BASE-FX full duplex mode
19	100BASE-T2 half duplex mode
20	100BASE-T2 full duplex mode
21	1000BASE-X half duplex mode
22	1000BASE-X full duplex mode

23	1000BASE-LX half duplex mode
24	1000BASE-LX full duplex mode
25	1000BASE-SX half duplex mode
26	1000BASE-SX full duplex mode
27	1000BASE-CX half duplex mode
28	1000BASE-CX full duplex mode
29	1000BASE-T half duplex mode
30	1000BASE-T full duplex mode
31	10G BASE-X
32	10G BASE-LX4
33	10G BASE-R
34	10G BASE-ER
35	10G BASE-LR
36	10G BASE-SR
37	10G BASE-W
38	10G BASE-EW
39	10G BASE-LW
40	10G BASE-SW
41	10G BASE-CX4
42	2 BASE-TL
43	10 PASS-TS
44	100 BASE-BX10D
45	100 BASE-BX10U
46	100 BASE-LX10
47	1000 BASE-BX10D
48	1000 BASE-BX10U
49	1000 BASE-LX10

50	1000 BASE-PX10D
51	1000 BASE-PX10U
52	1000 BASE-PX20D
53	1000 BASE-PX20U

PON Protection Type B - Last Switch Over Cause

Table 174.Enum Last Switch Over Cause

Enum Last Switch Over Cause	
Value	Description
0	none
1	Signal Fail
2	Card Failure
3	Signal Degraded
4	Signal Fail is Over (recovered)
5	Manual Switch Command
6	Wait To Restore time expired
7	Clear Command
8	Lockout Command
9	Force Switch Command

PON Protection Type B - Synchronization Status

Table 175. Enum Synchronization Status

Enum Synchronization Status	
Value	Description
0	not synchronous
1	activating / disabling
2	synchronizing
3	synchronous
4	error
5	activation error

PON Protection Type B - Command Codes

Table 176. Enum PPTB Command Codes

Enum PPTB Command Codes	
Value	Description
1	none (no command, used on show status operation)
2	clear
3	Lockout of Protection
4	Force switch o Protection Port
5	Force switch o Primary Port
6	Manual switch o Protection Port
7	Manuel switch o Primary Port

PON Protection Type B - Interface alarms

Table 177.Enum PPTB Interface Alarms

Enum PPTB Interface Alarms	
Value	Description
1	interfaceLos
2	cardFailure

API Error Codes

In this section we identify all possible error codes returned by the API.

When an HTTP response is returned with the HTTP error code 500 (Internal server error), a more specific error code will be present on the JSON object returned ('code' property).

This JSON Object is defined as follows:

Table 178.Error Message

Error Message		
Parameter	Type	Description
code	int	AGORA-NG business logic error code
cause	string	Represents the error code returned by the equipment, when applicable (conveyed in hexadecimal format)
message	string	A human readable string to provide feedback on the error

The possible error codes returned by AGORA-NG are shown in the table of section Equipment Error Codes.

If we have an equipment error, the error code is conveyed in the JSON 'cause' property and the respective human readable error message conveyed on the 'message' property.

The equipment errors and respective description can also be found on section AGORA-NG Business Logic Error Codes.

AGORA-NG Business Logic Error Codes

Table 179. Codes

Code	Description
1	Database connection error
2	Internal server error
5	Network element timeout
14	Server connection error
1011	Invalid Managed Domain Name
1012	Invalid Managed Domain Type
1013	Duplicated Managed Domain Name
1016	Managed Domain does not exist
1017	There are references to Manage Domain
1019	Invalid Site Name
1020	Duplicated Site Name
1021	Site ID invalid
1022	Site Name does not exist
1025	Invalid Technological Group Name
1027	Invalid Technological Group Type
1033	Technological Group does not exist
1050	Equipment Type does not exist
1054	Default entities cannot be modified or removed
1059	The entity does not exist
1064	Invalid Profile ID
1065	Profile ID does not exist
1066	Duplicated Profile ID
1069	Profile In use
1079	Prototype does not exist

1085	ACL has rules active
1099	The installed license does not allow the specified equipment type
3014	Not supported
3035	Cannot delete equipment - the equipment has dependencies
3036	Cannot change Admin State
3043	Invalid Admin State
3063	Termination Point type not allowed
3088	Found associated links to the entity
3092	Not supported on current Equipment version
3111	Association already exists (e.g.: termination point already being used)
3146	Maximum number of interfaces reached
3176	Invalid Equipment Admin State
3177	Invalid Card Admin State
3246	Cannot change equipment IP
3247	IP already exists
3250	Equipment returned an error
3251	Duplicated MAC
3296	Invalid Admin State
3338	Duplicated pair S-VLAN C-VLAN
3347	Invalid IP
3392	The given ONU is not connected to a downlink interface of the Network Service provided
3393	NS already in use on the same ONU
3394	Duplicated UniVlan
3396	Duplicated NNI-SVLAN
3397	Cannot remove ONU with services configured
3403	LAG has no members
3410	Service in use

3411	Only one service can be marked as native
3412	Duplicated Service Name
3417	Termination Point Used by a LAG
3424	Duplicated Pair Service Name - Multicast IP
3435	Termination Point used on Client Services
3440	Duplicated SVLAN
3445	Internal server error - invalid data format in client-server communication
3456	Equipment is absent
3458	IP is not a valid Multicast IP
3465	Flag Multicastflood must be active for services with DHCP enabled
3467	Invalid Termination Point Role (interface) (uplink / downlink)
3468	Invalid Termination Point Role (card) (uplink / downlink)
3470	At least one Uplink (root) Termination Point must be configured
3475	Duplicated NNI-STAG
3478	Service in use in a multicast group
3479	Service in use in a Static MAC entry
3480	Service does not exist
3481	Selected card is not a downlink card of the selected Network Service
3482	Selected Interface already has one Client Service configured
3483	Termination Point (card) in use by a service
3493	Password Needed
3494	Serial Number Needed
3495	Invalid Password Format
3496	Password too long (max 20 chars, HEX format)
3498	Counters not available on the requested Termination Point
3502	Network Service Type not allowed
3503	Invalid Client Service IGMP options

3504	NNI-CTAG configuration for one ONU Client Service is not allowed if the associated Network Service is unstacked
3505	NNI-CTAG configuration for one ONU Client Service is mandatory if the associated Network Service is stacked
3518	T-CONT in use
3519	T-CONT does not exist
3520	T-CONT does not exist in equipment
3521	Card has interfaces associated with uplink protection groups
3522	Invalid upstream traffic profile
3523	The same NNI S-TAG and NNI C-TAG can't be associated to the same interface
3524	IP Source Guard entry does not exist
3525	The source IP address is not valid
3526	The multicast IP address is not valid
3527	There is already a rule with the same filter
3528	Invalid Admin State
3529	One IP address must be provided (IPv4 or IPv6)
3530	Cannot use both IP addresses in the same entry (IPv4 or IPv6)
3531	The equipment does not support changing of DHCP Broadcast flag
3532	The selected interface must belong to the network service
3533	An unregistered client service id was found on the equipment specified
3534	It is not possible to complete the operation: Invalid data returned by equipment
3535	Bridge service is not supported
3536	NTP server name duplicated
4011	Invalid Equipment ID
4012	Equipment already inserted in service
4013	Equipment not yet detected
4027	Equipment type does not match
4029	Equipment type not accepted

4032	Invalid Equipment Name
4039	Duplicated equipment Name
4041	Equipment already inserted in Planned state
4042	Another equipment with the same IP address is already being managed
4048	Equipment already exists with another type
4057	Invalid Parameters (generic)
4063	Maximum number of equipments reached
4072	Insufficient Parameters
4103	Given IP address is not the same as the current equipment IP address
4115	Duplicated Serial Number
4116	Duplicated ONU ID
4119	Invalid Location Provided
4120	Already exists another Equipment with the same IP
4121	Duplicated Location Provided
8097	Invalid Interface Admin State
8098	Invalid Name / Invalid Identification
20000	Invalid Service Name
20001	No Counters available for the requested Termination Point

Equipment Error Codes

Common Equipment errors

Table 180.IgmpCounters

Equipment Error Code (Hexadecimal)	Description
0x07XXXXXX	Internal Equipment Error (IPC Error)
0x08XXXXXX 0x69XXXXXX	Equipment firmware error
0xXXXX000A	Resource is free
0xXXXX000B	Resource not available / Not reachable
0xXXXX000C	Wrong Admin state
0xXXXX000D	Duplicated Name
0xXXXX000E	Wrong Operational state
0xXXXX000F	Entity does not allow the operation
0xXXXX0001	Invalid Parameter (generic)
0xXXXX0002	Not Implemented / Not Supported
0xXXXX0003	Parameter unknown
0xXXXX0004	Parameter Read-Only
0xXXXX0005	Wrong number of elements (too few or too many)
0xXXXX0006	Max number reached
0xXXXX0007	Empty Table (no more data)
0xXXXX0008	Permission denied (user has not enough privileges)
0xXXXX0009	Resource is busy
0xXXXX0010	Wrong Context (internal error)
0xXXXX0011	Out of range (value given is not within expected bounds)
0xXXXX0030	A string parameter contains invalid characters
0xXXXX0100	No free memory
(XX means any value)	

Specific Equipment Errors

Table 181. Equipment Error Codes

Equipment Error Code (Hexadecimal)	Description
0x08030001	Unavailable resources for counter activation
0x08030006	Unavailable resources for the service in the OLT
0x08030100	Service has active probe or counter
0x0A03000E	Invalid Operational State
0x0A030113	The proposed serial number already exists.
0x0A030114	ONTs list is updating.
0x0A030115	The serial number is invalid.
0x0A030117	The password is being used by another ONU.
0x0A030118	Register type is invalid.
0x0D030100	The minimum distance is greater than the maximum
0x0D030101	The difference between minimum and maximum distance is greater than allowed
0x0D030102	There are ONTs connected to the PON port which do not allow it to be disabled
0x0D030103	FEC Downstream is not enabled on the PON port
0x0D030104	FEC Upstream is not enabled on the ONT
0x0D030105	The PON port has ONTs with services
0x0D030106	The PON port is used in unstacked services with different MAC Bridge type
0x0D030107	The PON port is in VLAN mapping mode
0x0D030108	The PON port is in VLAN + P-Bit mapping mode
0x0D034320	Invalid protection group administrative state
0x0D034321	Invalid protection group mode
0x0D034322	Invalid protection group reversibility
0x0D034323	Invalid protection group 'wait to restore' value
0x0D034324	Invalid protection group 'hold-off timer' value

Equipment Error Code (Hexadecimal)	Description
0x0D034325	Invalid protection group primary port
0x0D034326	Invalid protection group protection port
0x0D034327	Protection group primary port is not active
0x0D034328	Protection group protection port is active
0x0D034330	The ports of the protection group cannot be the same
0x0D034331	The protection group is active
0x0D034332	The protection group is not active
0x0D034333	The protection group entity ID already exists
0x0D034334	Port in use by a protection group
0x0D034335	Protection port has ONUs
0x0D034336	Protection port has services
0x0D034337	The protection and working ports of the protection group belong to the same card
0x0D034338	The protection is being activated/deactivated or synchronizing
0x0D034339	The protection information is not synchronized
0x0D034340	Interface is being used by at least one ACL
0x0D034341	Interface is used on a GPON Type B Protection Group
0x0D034342	Cannot execute a new command without clearing the previous one
0x0D034343	The working interface has Bitstream services
0x0D034344	The specified working interface has Unicast or UniVoip stacked services, therefore the protection interface cannot be from the same card.
0x0D034891	Service is in use on a Multicast Group
0x0D03489A	There is at least one ACL associated to the service
0x1D030303	Incompatible hardware version
0x1D034880	Invalid ID
0x1D034881	Invalid Admin
0x1D034882	Invalid Type

Equipment Error Code (Hexadecimal)	Description
0x1D034883	Invalid Client Port
0x1D034884	Not enough resources to active ONU counter. Max nbr reached.
0x1D034886	The respective OLT service is not admin enabled
0x1D034890	Only inactive services can be removed
0x1D034891	UNI-C-Tag already in use by another service in this ONU
0x1D034893	Only one multicast service is allowed per ONU
0x1D034894	Network Service already associated with another Client Service (same ONU).
0x1D034895	NNI C-Tag is in use by another ONU
0x1D034896	NNI C-Tag < min
0x1D034897	NNI C-Tag > max
0x1D034898	MAX service num
0x1D034899	(multicast) NNI C-Tag cannot be zero
0x1D03489A	The NNI C-TAG can't be 0 for unicast stacked services
0x1D03489B	service has attached ONU interface(s)
0x1D03489C	OLT service does not include this ONU interface
0x1D03489D	service has attached interfaces(s)
0x1D03489F	Reached Maximum nbr of downstream services for this Slot
0x1D0348B0	max Upstream BW
0x1D0348BA	VoIP services can only have VoIP interfaces
0x1D0348BB	VoIP services must have at least one VoIP interface
0x1D0348BC	The unicast service associated is admin disabled
0x1D0348BD	The multicast service associated is admin enabled
0x1D0348BE	Invalid DHCP configurations
0x1D0348BF	Invalid remote-id string
0x1D0348C0	Unable to configure more than one unicast IGMP service per ONU

Equipment Error Code (Hexadecimal)	Description
0x1D0348C1	No unicast IGMP service for this ONU
0x1D0348C2	No active unicast IGMP service for this ONU
0x1D0348C3	IP Management can only be configured for unicast services
0x1D0348C4	Requested ONU cannot have more than one service with IP Management
0x1D0348C5	Encryption flag cannot be used in multicast services
0x1D0348C6	All multicast services must be deactivated prior to deactivating the unicast IGMP service
0x1D0348C7	Unable to remove service Bridge master until the remaining Bridge services are removed
0x1D0348C8	Unable to configure a downstream traffic profile on unstacked services
0x1D0348C9	NNI C-Tag is used by another Client Service associated with a Network Service with the same NNI S-Tag
0x1D0348CA	The selected ethernet profile does not exist
0x1D0348CB	The selected upstream profile does not exist
0x1D0348CC	The service has no T-CONTs mapping
0x1D0348CD	The service has T-CONTs mapping
0x1D0348CE	Invalid PCP profile
0x1D035010	Duplicated Client Service referencing the same Unstacked Network Service on this Interface
0x1D035011	Requested NNI C-Tag does not match the remaining ONUs associated with the same N:1 Bridge OltService
0x1D035012	EthernetProfileId MUST match for all OntServices that belong to the same ONU and N:1 Bridge OltService
0x1D035013	EthernetProfileId MUST match for all OntServices that belong to the same card and 1:1 Bridge OltService
0x1D035014	Client Service has no interface associated
0x1D035015	Unstacked Services: Duplicated UNI C-TAG Stacked Services: UNI C-TAG cannot duplicate NNI C-TAG
0x1D035016	Duplicated UNI C-TAG for this ONU
0x1D035017	Duplicated UNI C-TAG on the same Interface

Equipment Error Code (Hexadecimal)	Description
0x1D035020	The network service has no IGMP
0x1D035021	IGMP override flag cannot be done on active service
0x1D035030	Maximum number of MACs out of range
0x1D035031	Maximum number of MACs not supported for service type
0x1D035032	Extended VLAN tagging is active in a service port
0x1D035033	The service is referenced by Extended VLAN tagging rules
0x1D035034	An active service must have at least one interface or one active Extended VLAN Tagging Operation rule
0x1D039211	The upstream profile can't be changed with upstream profiles
0x1D039212	The type of the upstream traffic profile is invalid
0x1D039213	Invalid parameter for upstream traffic profile
0x1D039214	Empty String for Profile name
0x1D039215	The specified ONU profile ID does not exist
0x1D039216	The specified ONU profile ID is not ADMIN Enabled
0x1D039230	Invalid T-CONT admin state
0x1D039231	Invalid upstream profile
0x1D039240	The T-CONT is active
0x1D039241	The internal ALLOC ID pool is exhausted
0x1D039242	The T-CONT is being used by a service
0x1D039250	Invalid T-CONT ID
0x1D039251	Invalid client service ID for T-CONT mapping
0x1D039252	Invalid priority for T-CONT mapping
0x1D039260	The specified priority does not exist on the P-Bit profile of the PON
0x1D039261	The Service has an upstream profile
0x1D039262	Invalid T-CONT admin state
0x1D03A400	Invalid rule admin state

Equipment Error Code (Hexadecimal)	Description
0x1D03A401	Invalid outer priority filter
0x1D03A402	Invalid inner priority filter
0x1D03A403	Invalid inner VID filter
0x1D03A404	Invalid outer VID filter
0x1D03A405	Invalid inner TPID filter
0x1D03A406	Invalid outer TPID filter
0x1D03A407	Invalid ethertype filter
0x1D03A408	Invalid number of tags to remove
0x1D03A409	Invalid inner priority action
0x1D03A40A	Invalid outer priority action
0x1D03A40B	Invalid inner VID action
0x1D03A40C	Invalid outer VID action
0x1D03A40D	Invalid inner TPID action
0x1D03A40E	Invalid outer TPID action
0x1D03A40F	Invalid client service
0x1D03A410	The rule is active
0x1D03A411	Duplicate filter
0x1D03A420	Invalid enable value
0x1D03A421	Invalid association type
0x1D03A422	Invalid associated entity ID
0x1D03A423	Invalid input TPID
0x1D03A424	Invalid output TPID
0x1D03A425	Invalid DSCP to P-Bit mapping profile
0x1D03A430	The port has services
0x1E034892	Duplicated NNI-STAG
0x1E034893	For unicast/multicat services the pair service type/uni-vlan has to be

Equipment Error Code (Hexadecimal)	Description
	unique in the OLT
0x1E0348A0	There is at least one probe associated to the service
0x1E0348A0	There is at least one probe associated to the service
0x1E0348DD	Stacked services can only have one uplink port
0x1E034901	UNI C-Tag already in use in the NNI S-Tag of a non-multicast network service
0x1E034902	UNI C-Tag já em uso na NNI S-Tag dum serviço de rede multicastUNI C-Tag already in use in the NNI S-Tag of a multicast network service
0x1E039213	Invalid parameters in the configuration Upstream profile
0x21030300	Static groups end-point value not valid
0x21030301	Cannot change static group end point - there is at least one static active group list entry
0x50034880	Invalid ID value
0x50034881	Invalid ADMIN value
0x50034882	Invalid TYPE value
0x50034883	Invalid IP VERSION value
0x50034884	Invalid destination IP Mask value
0x50034885	Invalid NAME value
0x50034886	Invalid bandwidth value
0x50034890	Only admin down entities can be removed
0x50034891	The Network Service associated must be admin up
0x50034892	The Network Service associated must be multicast
0x50034893	The Network Service associated does not exist
0x50034894	Invalid Admin state
0x50034895	Invalid IP multicast(<224.x.x.x or >239.x.x.x)
0x50034896	Invalid IP Mask for static group (only 32 bits are allowed)
0x50034897	Multicast IP already used

Equipment Error Code (Hexadecimal)	Description
0x50034898	Invalid Configuration for multicast static groups.
0x54030103	There is already an entry with the same service/mac
0x5A030103	Invalid IP address for active probe
0x5D030101	Invalid Downlink interface
0x5D030102	Multicast service interface is not mapped in any of the associated unicast services interfaces
0x5D030103	Unicast service interface is a member of a UC/MC association
0x5D030104	Invalid interface Role
0x5D030105	Invalid Admin State
0x5D030106	Invalid uplink interface
0x5D030107	Invalid downlink interface
0x5D030108	Interface and NNI S-TAG already used in synchronism
0x5D034850	The service must contain at least one uplink interface
0x5D034851	The service must contain at least two interfaces (uplink+downlink)
0x5D034852	Stacked services cannot have multiple uplink interfaces
0x5D034853	Unable add this interface because an active PTP entry with the same NNI S-TAG already exists
0x5D034854	Selected port belongs to an invalid card for this service type
0x5D034860	Stacked services for this service type, must contain only one uplink port
0x5D034861	Selected port belongs to a Static Probe
0x5D034862	Cannot add a Type B protected interface to a Bitstream service
0x5D034863	Cannot configure Unicast or UniVoip stacked services on interfaces configured with Type B Protection, on the same card.
0x60030104	Unknown parameter in the circuit ID string
0x65030101	Invalid ACL id
0x65030102	Invalid ACL administrative state
0x65030103	Invalid ACL type

Equipment Error Code (Hexadecimal)	Description
0x65030104	ACL is used on a rule
0x65030105	ACL is used on an interface
0x65030106	ACL is used on a service
0x65030107	Invalid ACL rule administrative state
0x65030108	Invalid ACL rule action
0x65030109	Invalid ACL rule ethernet type
0x65030110	Invalid ACL rule CoS
0x65030111	Invalid ACL rule IP protocol
0x65030112	Invalid ACL rule port
0x65030113	Invalid ACL rule DSCP
0x65030114	Invalid ACL rule precedence
0x65030115	Invalid ACL rule flow label
0x65030116	Maximum number of rules per ACL reached
0x65030117	Cannot remove/disable the last rule for an ACL with enabled associations
0x65030118	ACL interface association: invalid administrative state
0x65030119	ACL interface association: invalid direction
0x65030120	ACL interface association: invalid interface id
0x65030121	ACL interface association: invalid ACL id
0x65030122	ACL interface association: invalid interface id
0x65030123	ACL interface association: invalid ACL id
0x65030124	ACL service association: invalid administrative state
0x65030125	ACL service association: invalid direction
0x65030126	ACL service association: invalid ACL id
0x65030127	ACL service association: invalid network service id
0x65030128	ACL service association: service is not active
0x66030101	Invalid Interface for IP Source Guard.

Equipment Error Code (Hexadecimal)	Description
0x66030102	Invalid Admin State.
0x66030103	Invalid IP Version.
0x66030104	The associated Network Service must be enabled.
0x66030105	Unknown Network Service.
0x66030106	Cannot change admin enabled entities.
0x66030107	Interface must be active.
0x66030108	Interface must be IP Source Guard Enabled (interface configuration).
0x66030109	Interface must belong the NS downlink port list.
0x6603010A	Interface must belong the NS downlink card list.
0x6603010B	MAC cannot be full zeros.
0x6603010C	Not Unicast MAC: the least significant bit of the most significant octet must be zero.
0x67030402	Unable to perform the requested operation on active routing interfaces
0x67030403	Invalid LAN IP Address
0x6903030C	No more T-CONT resources available

Examples

This section presents REST use cases examples for provisioning an ONU with client services.

Creating an ONU

Create a planned ONU entity on the system.

POST `http://<server>:<port>/agorang/rest/v1/eml/onu`

ONU JSON Object

```
{
  "aid": {
    "ipAddress": "10.112.42.121",
    "card": 7,
    "tp": 1,
    "onuId": 1
  },
  "name": "ONT 7.1.1",
  "profileName": "SFU-C",
  "location": "avr1",
  "serialNumber": "5054494E393B2314",
  "password": "",
  "registerType": 1,
  "admin": 2,
  "swUpgradeMode": 1,
  "specificVersion": "",
  "fec": false,
  "omciEncryption": false
}
```

Response HTTP code 200

```
{
  "id": "10.112.42.121-7-1-1",
  "aid": {
    "ipAddress": "10.112.42.121",
    "card": 7,
    "tp": 1,
    "onuId": 1
  },
  "name": "ONT 7.1.1",
  "profileName": "SFU-C",
  "swVersion": "ONT7SW00000027",
  "hwVersion": "ONT7SFUV000011",
  "location": "avr1",
  "serialNumber": "5054494E393B2314",
  "password": "",
  "registerType": 1,
  "installationDate": 1390608120000,
  "operationalState": 0,
  "admin": 2,
  "equipId": "",
  "swUpgradeMode": 1,
  "specificVersion": "",
  "fec": false,
  "omciEncryption": false
}
```

Provisioning Client Services on an ONU

Create one GPON client service on the recently added ONU.

POST <http://<server>:<port>/agorang/rest/v1/eml/clientservicegpon>

ClientServiceGpon JSON Object

```
{
  "aid": {
    "ipAddress": "10.112.42.121",
    "card": 7,
    "tp": 1,
    "onuId": 1,
    "name": "TR_069"
  },
  "admin": 2,
  "networkServiceName": "TR_069",
  "downstreamTrafficProfileName": "CIR_1G_Def",
  "upstreamTrafficProfileName": "FIX_10M",
  "nniCtag": "12",
  "uniCtag": "12",
  "nativeVlan": false,
  "encryption": false,
  "ipManagement": true,
  "maxNumMac": 0,
  "tps": [
    {
      "card": 1,
      "tps": [
        1
      ]
    }
  ]
}
```

Response HTTP code 200

```
{
  "id": "10.112.42.121-7-1-1-TR-069",
  "aid": {
    "ipAddress": "10.112.42.121",
    "card": 7,
    "tp": 1,
    "onuId": 1,
    "name": "TR-069"
  },
  "name": "TR-069",
  "admin": 2,
  "networkServiceName": "TR-069",
  "downstreamTrafficProfileName": "CIR_1G_Def",
  "upstreamTrafficProfileName": "FIX_10M",
  "nniCtag": "12",
  "uniCtag": "12",
  "nativeVlan": false,
  "encryption": false,
  "ipManagement": true,
  "maxNumMac": 0,
  "tps": [
    {
      "card": 1,
```

```

        "tps": [
            1
        ]
    }
]
}

```

Create another GPON client service.

POST <http://<server>:<port>/agorang/rest/v1/eml/clientservicegpon>

ClientServiceGpon JSON Object

```

{
  "aid": {
    "ipAddress": "10.112.42.121",
    "card": 7,
    "tp": 1,
    "onuId": 1,
    "name": "HSI"
  },
  "admin": 2,
  "networkServiceName": "HSI",
  "downstreamTrafficProfileName": "CIR_1G_Def",
  "upstreamTrafficProfileName": "FIX_10M",
  "nniCtag": "12",
  "uniCtag": "10",
  "nativeVlan": false,
  "encryption": false,
  "ipManagement": false,
  "maxNumMac": 0,
  "tps": [
    {
      "card": 1,
      "tps": [
        1
      ]
    }
  ]
}

```

Response HTTP code 200

```

{
  "id": "10.112.42.121-7-1-1-1-HSI",
  "aid": {
    "ipAddress": "10.112.42.121",
    "card": 7,
    "tp": 1,
    "onuId": 1,
    "name": "HSI"
  },
  "name": "HSI",
}

```

```

    "admin": 2,
    "networkServiceName": "HSI",
    "downstreamTrafficProfileName": "CIR_1G_Def",
    "upstreamTrafficProfileName": "FIX_10M",
    "nniCtag": "12",
    "uniCtag": "10",
    "nativeVlan": false,
    "encryption": false,
    "ipManagement": false,
    "maxNumMac": 0,
    "tps": [
      {
        "card": 1,
        "tps": [
          1
        ]
      }
    ]
  }
}

```

Enable the ONU

The ONU ID for the PUT operation is obtained from the response of the POST operation.

PUT `http://<server>:<port>/agorang/rest/v1/eml/onu/10.112.42.121-7-1-1`

ONU JSON Object

```

{
  "admin": 1
}

```

Response HTTP code 200

```

{
  "id": "10.112.42.121-7-1-1",
  "aid": {
    "ipAddress": "10.112.42.121",
    "card": 7,
    "tp": 1,
    "onuId": 1
  },
  "name": "ONT 7.1.1",
  "profileName": "SFU-C",
  "swVersion": "ONT7SW00000027",
  "hwVersion": "ONT7SFUV000011",
  "location": "avr1",
  "serialNumber": "5054494E393B2314",
  "password": "",
  "registerType": 1,
  "installationDate": 1390608120000,
  "operationalState": 0,
  "admin": 1,
}

```

```
"equipId": "",  
"swUpgradeMode": 1,  
"specificVersion": "",  
"fec": false,  
"omciEncryption": false  
}
```

TL1 API

Introduction

This is the reference document for the AGORA-NG TL1 Interface. This document is aimed at developers who want to integrate the AGORA-NG functionality with other applications using the TL1 interface.

This document describes the TL1 Interface for Agora-NG version 6.10.

TL1 Input message

The format of the TL1 Input messages is as follows:

- `<command_code>:<staging_parameter_blocks>:<message_payload_block>;`

With each field expanded, it becomes:

- `<command_code>:<TID>:<AID>:<correlationtag>:<general block>:<payload>;`

Below, we have a brief explanation of each field:

<command_code>

The command code identifies the action to be performed. It is built according to the following rule:

- `<verb>-<modifier1>-<modifier2>`

It begins with a verb to identify the action. The available action verbs are: **GET, UPDATE, DELETE, CREATE**.

The modifiers are keywords used to identify the entity to be acted upon. An example of a command code would be GET-NETWORKSERVICE.

<staging_parameter_blocks>

This is a series of four data blocks following the command code that provide information to uniquely identify an object entity and to specify certain options as to how the input command should to be executed.

The structure of the staging parameter consists of the following format:

- `:<TID>:<AID>:<correlationtag>:<general block>:`

Each block may have one or more specifically defined parameters.

The parameters within each staging block are always name-defined and not position defined.

Each block is further explained on the next paragraphs.

Target Identifier Block (TID)

Identifies the target where the command is performed. It can either be null (not given, represented by two successive colons ::) or it can be one specific IP address of a managed equipment.

In the first case, the command is performed on the context of the Agora NG system (globally). In the second case, the command will be executed within that equipment's scope.

This field is limited to 20 characters by the TL1 protocol.

Access Identifier Block (AID)

The Access Identifier (AID) block contains one or more parameters that uniquely identify the entity within the target. Typical examples of entities addressed by the AID parameter are network services on a given equipment, ONUs, client services on an ONU, or profiles used globally within the Agora NG system (among many others). When documenting each command, the specific AID parameter names are specified.

Correlation Tag (TAG)

This is a token the user can define to match one specific command with the respective response.

The value the user assigns can be any non-zero alpha numeric string, and it will be copied into the response associated with that input command.

This field can have no more than six characters.

General Block (GB)

This affects the way in which the input command is executed. The presence of General Block in all input commands is a requirement but its value may be null (represented by two successive colons ::).

In the current TL1 agent version we do not support any of the general block parameters and they must always be null.

Payload (PL)

The payload is the input message last field. It is used to convey the information to be set for the given entity. It can be null if no data is needed, or the default values should be assumed.

We define all possible values for the payload field on each command specification. For this purpose we use a table format with the name of the field and the description of its purpose.

The user can create the TL1 command string using the names on the table for the field names using the valid TL1 protocol format. Examples can be viewed at the last chapter of the documentation.

The parameters within the payload are always name-defined and not position defined.

TL1 Response

The TL1 response may return one of the following completion codes:

Table 182. TL1 response

Completion Code	Description
COMPLD	completed, the request was successful
NOK	Not OK. An error occurred. Nothing was configured. A error message may give additional details.
NEEDLOGIN	User needs to login first.
COMMUNICATION_FAILURE	The TL1 agent could not communicate with the AGORA system.
ILLEGAL_AID	The user inserted illegal parameters on the input message. This may happen for missing mandatory parameters or more parameters than expected.
BAD_FORMAT	The User insert invalid format on the input message. This may happen for missing closing ", or missing commas or some other parse issue.

Open TL1 session

To open a TL1 session connect to port 8855 using the telnet protocol.

Login and Logout

To login, open a TL1 session and type:

TL1 Input Command - Login	
1	USER-LOGIN:<userName>::tag0:"PASSWORD=<password>";

This is the response for a successful login:

TL1 Response - tag0	
1	<user> 04-02-14 09:30:28
2	M tag0 COMPLD
3	
4	;

For a failed login the response conveys the **NOK** completion code (example: wrong password).

To logout, type:

TL1 Input Command - Logout	
1	USER-LOGOUT:::tag0::;

This is the response for a successful logout:

TL1 Response - tag0	
1	04-02-14 09:30:28
2	M tag0 COMPLD
3	
4	;

Operations

Access Identifier (AID)

The access Identifier is not a resource by itself but is a object that is used to Identify the resource and give context to it.

The AID structure is common for all the API resources. Some parameters will not be present when they are meaningless. This object is returned on Get or List operations.

The full AID description is:

Table 183.AID

AID		
Parameters	Type	Description
ipAddress	IP	Equipment IP address
index	int	A generic ID that can be used to identify the entity (0..N).
card	int	Specify a card ID
tp	int	Specify a tp ID
onuCard	int	Specify a ONU card ID
onuTp	int	Specify a ONU tp ID
onuId	int	Specify a ONU ID
name	string	The name of the entity, which can be used to identify the entity (Names that cannot be used to identify an entity are never conveyed in this field).
multicastIp	IP	Used to identify a multicast active group.

AGORA-NG version

Table 184.AgoraNgVersion

AgoraNgVersion		
Parameters	Type	Description
version	string	

Get AGORA-NG version

- GET-VERSION::::;

Reads the current version of AGORA-NG.

Network Service Profile

A network service profile is a profile to aggregate network service common parameters between different equipments to ease network provisioning. It is configured on the system.

Table 185.ProfileNetworkService

ProfileNetworkService		
Parameters	Type	Description
aid	AID	Filled with name only.
name	string	The Network Service Profile name to uniquely identify the entity.
type	enum	The type of service to be provided.
nniStag	int	Configuration of NNI S-TAG.
uniCtag	int	Configuration of UNI S-TAG.
isStacked	boolean	If enabled the Ethernet frame contains two VLAN tags. Otherwise, contains only one VLAN tag.
pppoe	boolean	Enable or disable PPPoE intermediate agent.
l2dhcprelay	boolean	Enabled if the service has L2 DHCP Relay configurations.

Get all network service profiles

- LIST-PROFILENETWORKSERVICE::::;

Reads all network service profiles configured on the system.

Create a network service profile

- CREATE-PROFILENETWORKSERVICE::::<payload>;

Creates a network service profile.

Get a network service profile

- GET-PROFILENETWORKSERVICE::"name"=<profileName>:mytag;;

Reads a specific network service profile.

Delete a network service profile

- DELETE-PROFILENETWORKSERVICE::"name"=<profileName>:mytag;;

Deletes a specific network service profile.

Ethernet Traffic Profile

An Ethernet traffic profile defines a set of traffic related parameters. Each Ethernet traffic profile can be defined once and reused as many times as needed, in several equipment.

Table 186.ProfileEthernetTraffic

ProfileEthernetTraffic		
Parameters	Type	Description
aid	AID	Filled with name only.
name	string	The Ethernet traffic profile name to uniquely identify the entity.
cir	long	Committed Information Rate, defines the guaranteed average bandwidth.
cbs	long	Committed Burst Size, limits the maximum number of bytes guaranteed for a packet burst.
eir	long	Excess Information Rate, defines the average bandwidth the network can offer if there is no congestion.
ebs	long	Excess Burst Size, limits the maximum number of bytes for a packet burst that the network can offer if there is no congestion.
colorMode	enum	0 - Blind; 1 - aware
couplingFlag	enum	1 -On; 2 - Off

Get all Ethernet traffic profiles

- LIST-PROFILEETHERNETTRAFFIC:::mytag;;

Reads all Ethernet traffic profiles configured in the management system.

Create an Ethernet traffic profile

- CREATE-PROFILEETHERNETTRAFFIC:::mytag::<payload>;

Creates an Ethernet traffic profile in the management system.

Get one Ethernet traffic profile

- GET-PROFILEETHERNETTRAFFIC::"name"=<profileName>:mytag::;

Reads a specific Ethernet traffic profile.

Delete a Ethernet traffic profile

- DELETE-PROFILEETHERNETTRAFFIC::"name"=<profileName>:mytag::;

Deletes a specific Ethernet traffic profile.

GPON Traffic Profile

A GPON Traffic profile defines a set of traffic related parameters. Each GPON traffic profile can be defined once and reused as many times as needed, in several equipment.

Table 187.ProfileGponTraffic

ProfileGponTraffic		
Parameters	Type	Description
aid	AID	Filled with name only.
name	string	The GPON traffic profile name to uniquely identify the entity.
serviceType	enum	1 - UBR 2 - CBR 3 - Dynamic
fixedBw	int	Fixed bandwidth of type CBR or UBR, in kbps
assuredBw	int	Assured bandwidth of type dynamic, in kbps
maxBw	int	Maximum bandwidth which is the sum of the Fixed BW, Assured BW and Non-assured BW
bwEligibility	enum	Defines the way in which non-assured traffic is distributed. This may be, depending on the values set for the other parameters -1 - Undefined 0 - Non-Assured 1 - Best Effort
dbaStatusReport	boolean	Enable or disable DBA status reporting

Get all GPON traffic profiles

- LIST-PROFILEGPONTRAFFIC:::mytag::;

Reads all GPON traffic profiles configured in the management system.

Create a GPON traffic profile

- CREATE-PROFILEGPONTRAFFIC:::mytag::<payload>;

Creates a GPON traffic profile in the management system.

Get one GPON traffic profile

- GET-PROFILEGPONTRAFFIC::"name"=<profileName>:mytag::;

Reads a specific GPON traffic profile.

Delete a GPON traffic profile

- DELETE-PROFILEGPONTRAFFIC::"name"=<profileName>:mytag::;

Deletes a specific GPON traffic profile.

Equipment Type

An equipment type is configured in the system and represents a type of equipment supported by the system.

Table 188.EquipmentType

EquipmentType		
Parameter	Type	Description
name	string	The name of the equipment. It is unique.
description	string	A text with a brief description of the equipment to help the user identify it.

Get all equipment types supported

- LIST-EQUIPMENTTYPE:::mytag::;

Read all equipment types supported by the system.

Equipment Model

An equipment model is configured in the system.

Table 189. EquipmentModel

EquipmentModel		
Parameter	Type	Description
id	int	The entity ID.
equipmentTypeName	string	A name of an existing equipment type in the system.
vendor	string	A user defined string that identifies the equipment vendor.
brand	string	A user defined string that identifies the equipment brand.
model	string	A user defined string that identifies the equipment model.
prototype	List<tpOnu>	The prototype is the list of Termination Points that the current equipment model has. Each entry is a new Termination Point.

Table 190. tpOnu

tpOnu		
Parameter	Type	Description
tpIndex	int	The ID of the TP.
tpType	enum	Identifies the supported TP type.
cardId	int	The ONU card ID where the TP is located (defaults to 1 if not provided).
cardType	enum	Identifies the supported card type.

Get all equipment models

- LIST-EQUIPMENTMODEL:::mytag::;

Read all equipment models.

Create equipment model

- CREATE-EQUIPMENTMODEL:::mytag::<payload>;

Creates a new equipment model.

Get an equipment model

- GET-EQUIPMENTMODEL::"id"=<modelDbId>:mytag::;

Read an equipment model.

Modify equipment model data

- UPDATE-EQUIPMENTMODEL::"id"=<modelDbId>:mytag::<payload>;

Update a specific equipment model.

Delete an equipment model

- DELETE-EQUIPMENTMODEL::"id"=<modelDbId>:mytag::;

Delete a specific equipment model

ONU Profile

An ONU profile characterizes types of ONUs, including vendor information and interfaces supported.

Table 191.ProfileOnu

ProfileOnu		
Parameter	Type	Description
name	string	The Profile name to uniquely identify the Profile entity.
equipmentModel	int	The equipment Model ID to be associated with this profile.

Get all ONU profiles

- LIST-ONUPROFILE:::mytag::;

Reads all configured ONU Profiles.

Create an ONU profile

- CREATE-ONUPROFILE:::mytag::<payload>;

Creates a new ONU profile.

Get an ONU profile

Reads a specific ONU Profile by ID.

- GET-ONUPROFILE::"name"=<onuProfileName>:mytag::;

Delete an ONU profile

- DELETE-ONUPROFILE::"name"=<onuProfileName>:mytag::;

Deletes a specific ONU Profile.

DSCP to P-bit Profile

Table 192.DscpToPbitProfile

DscpToPbitProfile		
Parameter	Type	Description
id	int	The entity ID.
aid	AID	
name	string	The profile Name
mapping	Map<Dscp,P-bit>	A sorted map where each key represents the DSCP and each Value of the Pbit assigned. Keys can vary between 0..63 and values between 1..8. Default is all keys map to value 1.

List all Profiles

- LIST-DSCPTOPBITPROFILE:::mytag::;

Read all DSCP To P-bit Profiles configured on the NMS.

Get one Profile by ID

- GET-DSCPTOPBITPROFILE::"id"=<profileId>:mytag::;

Read the specified DSCP To P-bit Profile by ID.

Create a new Profile

- CREATE-DSCPTOPBITPROFILE:::mytag::<payload>;

Create a new DSCP To P-bit Profile on the NMS.

Update a Profile

- UPDATE-DSCPTOPBITPROFILE::"id"=<profileId>:mytag::<payload>;

Change one DSCP To P-bit Profile configuration by profile ID.

Delete one Profile

- DELETE-DSCPTOPBITPROFILE::"id"=<profileId>:mytag::;

Remove one DSCP To P-bit Profile configured on the NMS.

Equipment

The equipment resource represents a network element that can be managed by the system.

Table 193.Equipment

Equipment		
Parameter	Type	Description
aid	AID	Filled with Equipment IP address only.
name	string	User defined string. (Not used to identify the equipment.)
admin	enum	
type	enum	
swVersion	string	The running software version.
hwVersion	string	The hardware version advertised by the equipment.
location	string	A user defined string to represent the equipment location.
serialNumber	string	Serial number advertised by the equipment.
ip	string	
managedDomain	string	The name of the managed domain that includes the site.
site	string	The name of the site where the equipment is located.
tecnologicalGroup	string	The name of the technological group where the equipment is located.
rack	string	A user defined string to help locate the equipment.
subrack	string	A user defined string to help locate the equipment.
shelf	string	A user defined string to help locate the equipment.

Read one equipment information

- GET-EQUIPMENT:<IP>::mytag;;

Reads a specific equipment by ID.

Update one equipment

- UPDATE-EQUIPMENT:<IP>::mytag::<payload>;

Updates a specific equipment information.

Get all cards of one equipment

- LIST-EQUIPMENT-CARD:<IP>::mytag;;

Reads all cards from a given equipment.

Get all ONUs configured on one equipment

- LIST-EQUIPMENT-ONU:<IP>::mytag;;

Reads all ONUs configured in the equipment identified in the request.

Get all multicast groups configured on one equipment

- LIST-EQUIPMENT-MULTICASTGROUP:<IP>::mytag;;

Reads all multicast groups configured on the equipment.

Get all network services configured on one equipment

- LIST-EQUIPMENT-NETWORKSERVICE:<IP>::mytag::;

Reads all network services configured on a given equipment.

Global DHCP configuration

The global DHCP resource allows the user to configure the global DHCP L2 Relay parameters on a given equipment.

Table 194.GlobalDhcp

GlobalDhcp		
Parameter	Type	Description
aid	AID	Filled with Equipment IP address only.
circuitId	string	
accessNodeId	int	
rack	int	
subrack	int	
shelf	int	

Get DHCP configurations of one equipment

- GET-DHCP:<IP>::mytag::;

Reads global DHCP configuration on a given equipment.

Update DHCP configuration of one equipment

- UPDATE-DHCP:<IP>::mytag::<payload>;

Updates the global DHCP configuration on a given equipment.

Global IGMP Configuration

Table 195. GlobalIgmP

GlobalIgmP		
Parameter	Type	Description
aid	AID	Filled with Equipment IP.
maxNumberOfGroups	boolean	Enable or disable the multicast group limit control on the system (true: enabled, false: disabled)
maxBandwidth	boolean	Enable or disable the bandwidth limit control on the system (true: enabled, false: disabled)
staticGroupsEndPoint	int	1- UNI; 2- NNI;

Get IGMP configurations of one equipment

- GET-IGMP:<IP>::mytag::;

Read the global IGMP configuration of one equipment.

Update IGMP configurations of one equipment

- UPDATE-IGMP:<IP>::mytag::<payload>;

Update global IGMP configuration on a given equipment.

Global rate limiters

This resource represents the network service global rate limiters configured on a given equipment.

Table 196. GlobalRateLimiters

GlobalRateLimiters		
Parameter	Type	Description
aid	AID	Filled with Equipment IP address only.
broadcast	long	bps
multicast	long	bps
unknownUnicast	long	bps

Get global rate limiters of one equipment

- GET-GLOBALRATELIMITERS:<IP>::mytag::;

Reads the global rate limiters on a given equipment.

Update global rate limiters of one equipment

- UPDATE-GLOBALRATELIMITERS:<IP>::mytag::<payload>;

Updates global rate limiters on a given equipment.

Global Switch

Table 197.Switch

Switch		
Parameter	Type	Description
aid	AID	Conveys the equipment IP where information was read.
macAging	int	The global mac aging configured.

Get equipment global switch

- GET-EQUIPMENT-SWITCH:<IP>::mytag;;

Reads global switch configuration from a given equipment.

Update equipment global switch

- UPDATE-EQUIPMENT-SWITCH:<IP>::mytag::"macAging"=<macAging>;

Update global switch from a given equipment.

Firmware Management

Resource that represents a firmware file.

Table 198.FirmwareFileList

FirmwareFileList		
Parameter	Type	Description
id	String	The id in the url
name	String	The name of the equipment
firmwareFileList	List<FirmwareFile>	List of firmware associations
firmwareFilwWithoutAssocList	List<FirmwareFile>	List of firmware files without association

Table 199.FirmwareFile

FirmwareFile		
Paramter	Type	Description
name	String	The name of the firmware file
size	long	The size of the firmware file
md5sum	String	The checksum of the firmware file
swVersion	String	The software version associated with the firmware file
hwVersion	String	The hardware version associated with the firmware file
activeSw	String	-
description	String	Description of the firmware file
profile	String	Onu profile associated with the firmware file
defaultFw	int	1- Default; 2- Not default

Table 200.FirmwareAvailableFileList

FirmwareAvailableFileList		
Parameter	Type	Description
id	String	The id in the url
name	String	The name of the equipment
type	int	The type of the firmware being listed
availableFirmwareFileList	Vector<String>	The names of the firmware available for association

List available firmware versions

- LIST-AVAILABLEFIRMWARE:<IP>::mytag;;

Reads all the available firmware versions in the repository

List firmware files associated

- LIST-FIRMWAREFILEASSOC:<IP>::mytag;;

Reads all the firmware files associated with an ONU profile

Create a firmware file association

- CREATE-FIRMWAREFILEASSOC:<IP>::mytag::<payload>;

Creates a new firmware file association. The name of the file must be retrieved from the repository before this operation

Change a firmware file association

- UPDATE-FIRMWAREFILEASSOC:~<IP>:"filename"=<filename>;mytag::<payload>;

Changes an existing file association

Read a firmware file association by name

- GET-FIRMWAREFILEASSOC:<IP>:"filename"=<filename>;mytag;;

Reads an existing firmware file by name

Delete a firmware file association by name

- DELETE-FIRMWAREFILEASSOC:<IP>:"filename"=<filename>;mytag;;

Deletes an existing firmware file by name

Card

The card resource represents a board on a modular equipment.

Table 201.Card

Card		
Parameter	Type	Description
aid	AID	Filled with Equipment IP address and card.
type	enum	
admin	enum	
operationalState	enum	
serialNumber	string	
version	string	The card firmware and hardware version string.

Get one card

- GET-CARD:<IP>:"card"=<cardId>:mytag::;

Reads a specific card information.

Get all TPs of one card

- LIST-CARD-TP:<IP>:"card"=<cardId>:mytag::;

Reads all Termination Points on a given card. Useful to get the IDs and types so that the specific resource can be queried.

Get all Client Services Ethernet of one card

- LIST-CLIENTSERVICESEETHERNET:<IP>:"card"=<cardId>:mytag::;

Reads all Client Services Ethernet on a given card. Only supported if the card can have CS ETH configured.

Termination Point

A termination point is the common information for any interface or port, either logical or physical.

This entity can only be read and not modified. Every specific Termination Point (ex: TpGpon) inherits these attributes and they can be configured acting upon the specific termination point resource.

Table 202. TerminationPoint

TerminationPoint		
Parameter	Type	Description
aid	AID	
name	string	The name of the Termination Point. (Read-Only)
description	string	The TP description (Read-Write)
type	enum	The type of the Termination Point. Example: Ethernet, LAG, Gpon, etc conveyed in the numeric format.
admin	enum	The administrative state of the Termination Point
containedTps	List<string>	Array of the contained TPs IDs.

Get one Termination Point

- GET-TP:<IP>:"card"=<cardId>,"tp"=<tpId>:mytag::;

Read a given OLT termination point.

- GET-ONUTP:<IP>:"card"=<cardId>,"tp"=<tpId>,"onuId"=<onuId>,"onuCard"=<onuCardId>,"onuTp"=<onuTpId>:mytag::;

Read a given ONT termination point.

Get CoS parameters

- GET-TP-COS:<IP>:"card"=<cardId>,"tp"=<tpId>:mytag::;

Reads the CoS parameters for the given termination point.

Update CoS parameters

- UPDATE-TP-COS:<IP>:"card"=<cardId>,"tp"=<tpId>:mytag::<payload>;

Updates the CoS parameters for the given termination point.

Table 203. CoS

CoS		
Parameter	Type	Description
aid	AID	
tp	string	The termination point ID
cosList	List<cosList>	List of CoS parameters

Table 204.cosList

cosList		
Parameter	Type	Description
scheduler	int	1- Strict; 2 - Weighed
ethernetProfileName	string	Name of the ethernet profile associated
cos	int	Traffic class associated (1..8)
pBits	List<Integer>	The P-bits associated with the traffic class

Termination Point - GPON

Represents a GPON interface.

Table 205.TpGpon

TpGpon		
Parameters	Type	Description
aid	AID	
name	string	The name of the Termination Point. (Read-Only)
description	string	The TP description (Read-Write)
type	enum	
admin	enum	
macAging	int	The MAC aging in seconds for this GPON interface.
minDistance	int	
maxDistance	int	
berInterval	int	Bit error Rate (BER)
fecDownstream	boolean	Enable or disable Forward Error Correction (FEC) on the downstream direction.
autoDiscoverOnus	boolean	Enable or disable the feature to auto discover ONUs directly connected to the PON interface.
mappingMode	enum	0 - VLAN (default) 1 - VLAN + PBIT Available since OLT-OS 3.4.0

Get one GPON Termination Point

- GET-TPGPON:<IP>:"card"=<cardId>,"tp"=<tpId>:mytag::;

Read a given OLT GPON termination point.

- GET-ONUTPGPON:<IP>:"card"=<cardId>,"tp"=<tpId>,"onuId"=<onuId>,"onuCard"=<onuCardId>,"onuTp"=<onuTpId>:mytag::;

Read a given ONT GPON termination point.

Change parameters for a given GPON TP

- UPDATE-TPGPON:<IP>:"card"=<cardId>,"tp"=<tpId>:mytag::<payload>;

Update a given OLT GPON termination point.

For a ONU GPON termination point no parameter can be configured.

Get GPON TP Layer 3

- GET-TPGPON-L3:<IP>:"card"=<cardId>,"tp"=<tpId>:mytag::;

Read layer 3 information for GPON interfaces.

Update GPON TP Layer 3

- UPDATE-TPGPON-L3:<IP>:"card"=<cardId>,"tp"=<tpId>:mytag::<payload>;

Change layer 3 information for GPON interfaces.

Table 206.TpGponLayer3

TpGponLayer3		
Parameter	Type	Description
aid	AID	
dhcpMode	enum	1- Trusted 2- Untrusted
maxNumberOfGroups	int	Enable or disable the multicast group limit control on the interface. (-1 disabled or 0 to 16384) Available only for OLT-OS versions equal or above 3.4.0.
maxBandwidth	int	Enable or disable the bandwidth limit control on the interface. (-1 disabled or 0 to 100.000.000 in Kbps) Available only for OLT-OS versions equal or above 3.4.0.

Get GPON TP status

- GET-TPGPON-STATUS:<IP>:"card"=<cardId>,"tp"=<tpId>:mytag::;

Read the status information for a given OLT GPON termination point.

- GET-ONUTPGPON-STATUS:<IP>:"card"=<cardId>,"tp"=<tpId>,"onuId"=<onuId>,"onuCard"=<onuCardId>,"onuTp"=<onuTpId>:mytag::;

Read the status information for a given ONT GPON termination point.

Table 207.TpGponStatus

TpGponStatus		
Parameter	Type	Description
aid	AID	Filled with OLT IP, card, tp for a OLT PON tp. Filled with OLT IP, card, tp, ONU ID and ONU tp for a ONU PON tp.
hasXfp	boolean	(Read on OLT side)
admin	int	(Read on OLT side)
txPower	int	(Read on OLT side) hundredths of dbm
current	int	(Read on OLT side) hundredths of mA
temperature	int	(Read on OLT side) °C
laserStatus	enum	(Read on OLT side) OK, fail
alarms	List<TpGponStatusAlarm>	(Read on OLT side)
fixedBw	long	(Read on OLT side) kbps
assuredBw	long	(Read on OLT side) kbps
maxBw	long	(Read on OLT side) kbps
cbrBw	long	(Read on OLT side) kbps
rxPower1550nm	int	(Read on ONU side) dBm
rxPower1490nm	int	(Read on ONU side) dBm
txPower1310nm	int	(Read on ONU side) dBm
distance	int	(Read on ONU side) km

Table 208.TpGponStatusAlarm

TpGponStatusAlarm		
Parameter	Type	Description
alarmCode	enum	
alarmDescription	string	

Get GPON TP counters

- GET-TPGPON-COUNTERS:<IP>:"card"=<cardId>,"tp"=<tpId>:mytag::;

Read available counters information for a given OLT Gpon Termination Point.

Table 209.GponCounters

GponCounters		
Parameter	Type	Description
aid	AID	Filled with OLT IP, Card and tp
rx	GponCountersPerDirection	
tx	GponCountersPerDirection	
errors	List<Error>	

Table 210.Error

Error		
Parameter	Type	Description
onuId	int	
bip8	long	
rei	long	

Table 211.GponCountersPerDirection

GponCountersPerDirection		
Parameter	Type	Description
pon	Pon	
ethernet	EthernetCounterPerDirection	

Table 212.Pon

Pon		
Parameter	Type	Description
networkPackets	Packet	
ponPackets	Packet	
ploamPackets	Packet	

Table 213.Packet

Packet		
Parameter	Type	Description
valid	long	
error	long	
dropped	long	

Get GPON TP ONU RX power

- LIST-TPGPON-ONURXPOWER:<IP>:"card"=<cardId>,"tp"=<tpId>:mytag::;

Reads the power information for all ONUs on a given tpGpon.

Table 214.OnuRxPowerList

OnuRxPowerList		
Parameter	Type	Description
aid	AID	Filled with OLT IP, card, tp
onuList	List<OnuRxPower>	The power information for each ONU.

Table 215.OnuRxPower

OnuRxPower		
Parameter	Type	Description
onuId	int	
rxPower	string	Can be '+inf', '-inf' or a value in dbm

Termination Point - Ethernet

Represents an Ethernet interface.

Table 216. TpEthernet

TpEthernet		
Parameters	Type	Description
aid	AID	
name	string	The name of the Termination Point. (Read-Only)
description	string	The TP description (Read-Write)
type	enum	
admin	enum	
mediaType	enum	The Ethernet media Type supported
flowControl	enum	The Ethernet Flow Control mechanism used
mtu	int	The Ethernet Maximum Transmission Unit

Get one Ethernet Termination Point

- GET-TPETHERNET:<IP>:"card"=<cardId>,"tp"=<tpId>:mytag::;

Read a given OLT Ethernet termination point.

- GET-ONUTPETHERNET:<IP>:"card"=<cardId>,"tp"=<tpId>,"onuId"=<onuId>,"onuCard"=<onuCardId>,"onuTp"=<onuTpId>:mytag::;

Read a given ONT Ethernet termination point.

Update parameters on a given Ethernet TP

- UPDATE-TPETHERNET:<IP>:"card"=<cardId>,"tp"=<tpId>:mytag::<payload>;

Update a given OLT Ethernet termination point.

- UPDATE-ONUTPETHERNET:<IP>:"card"=<cardId>,"tp"=<tpId>,"onuId"=<onuId>,"onuCard"=<onuCardId>,"onuTp"=<onuTpId>:mytag::<payload>;

Update a given ONT Ethernet termination point.

Get Ethernet TP Layer 2

- GET-TPETHERNET-L2:<IP>:"card"=<cardId>,"tp"=<tpId>:mytag::;

Read the layer 2 information for Ethernet interfaces.

Update Ethernet TP Layer 2

- UPDATE-TPETHERNET-L2:<IP>:"card"=<cardId>,"tp"=<tpId>:mytag::<payload>;

Read the layer 2 information for Ethernet interfaces.

Table 217.TpEthernetLayer2

TpEthernetLayer2		
Parameter	Type	Description
aid	AID	
acceptableFrameTypes	enum	1- All: untagged and priority tagged frames received on the port will be accepted 2- Tagged: the interface will discard any untagged frames received 3- Untagged: the interface will discard any tagged frames received
defaultVlanId	int	For the untagged frames, it will be assigned the value of the Default VLAN Id and Default priority of the respective interface. (1..4095)
defaultPriority	int	For the untagged frames, it will be assigned the value of the Default VLAN Id and Default priority of the respective interface. (0..7)

Get Ethernet TP Layer 3

- GET-TPETHERNET-L3:<IP>:"card"=<cardId>,"tp"=<tpId>:mytag::;

Read the layer 3 information for Ethernet interfaces.

Update Ethernet TP Layer 3

- UPDATE-TPETHERNET-L3:<IP>:"card"=<cardId>,"tp"=<tpId>:mytag::<payload>;

Read the layer 3 information for Ethernet interfaces.

Table 218.TpEthernetLayer3

TpEthernetLayer3		
Parameter	Type	Description
aid	AID	
dhcpMode	enum	1- Trusted 2- Untrusted
maxNumberOfGroups	int	Enable or disable the multicast group limit control on the interface. (-1 disabled or 0 to 16384) Available only for OLT-OS versions equal or above 3.4.0.
maxBandwidth	int	Enable or disable the bandwidth limit control on the interface. (-1 disabled or 0 to 100.000.000 in Kbps) Available only for OLT-OS versions equal or above 3.4.0.

Get Ethernet TP status

- GET-TPETHERNET-STATUS:<IP>:"card"=<cardId>,"tp"=<tpId>:mytag::;

Read the status information on a given OLT Ethernet termination point.

- GET-ONUTPETHERNET-STATUS:<IP>:"card"=<cardId>,"tp"=<tpId>,"onuId"=<onuId>,"onuCard"=<onuCardId>,"onuTp"=<onuTpId>:mytag::;

Read the status information on a given ONT Ethernet termination point.

Table 219. TpEthernetStatus

TpEthernetStatus		
Parameter	Type	Description
aid	AID	Filled with OLT IP, card, tp for a OLT PON tp. Filled with OLT IP, card, tp, ONU ID and ONU tp for a ONU PON tp.
admin	enum	
linkStatus	enum	
mediaType	enum	The effective media Type the interface is using. (The user configured media type is read on the TpEthernet JSON Object)
hasXfp	boolean	(OLT TP)
txPower	int	(OLT TP) null, if there is no XFP
rxPower	int	(OLT TP) null, if there is no XFP
current	int	(OLT TP) null, if there is no XFP
temperature	int	(OLT TP) null, if there is no XFP
laserStatus	enum	(OLT TP)
autoNegotiation	boolean	(ONU TP) True if auto negotiation of the media type is enabled.

Get Ethernet TP counters

Counters over an Ethernet TP can be read on a OLT Ethernet TP or on a ONT Ethernet TP.

- GET-TPETHERNET-COUNTERS:<IP>:"card"=<cardId>,"tp"=<tpId>:mytag::;

Read the Ethernet Counters on a given OLT Ethernet termination point.

- GET-ONUTPETHERNET-COUNTERS:<IP>:"card"=<cardId>,"tp"=<tpId>,"onuId"=<onuId>,"onuCard"=<onuCardId>,"onuTp"=<onuTpId>:mytag::;

Read the Ethernet Counters on a given ONT Ethernet termination point.

Table 220.EthernetCounters

EthernetCounters		
Parameter	Type	Description
aid	AID	Filled with OLT IP, Card, TP or OLT IP, Card, TP, ONT id, ONT card, ONT TP
rx	EthernetCountersPerDirection	
tx	EthernetCountersPerDirection	
commonRxTx	EthernetCountersCommonRxTx	Filled if Termination Point is an ONT Ethernet Termination Point.

Table 221.EthernetCountersPerDirection

EthernetCountersPerDirection		
Parameter	Type	Description
dropEvents	long	
octets	long	
packets	long	
broadcastPackets	long	
multicastPackets	long	
crcAlignErrors	long	
undersizePackets	long	
oversizePackets	long	
fragments	long	
jabbers	long	
collisions	long	
packetsUnder64Octets	long	
packets65To127Octets	long	
packets128To255Octets	long	
packets256To511Octets	long	
packets512To1023Octets	long	
packetsOver1024Octets	long	
throughput	long	
bufferOverflows	long	

Table 222.EthernetCountersCommonRxTx

EthernetCountersCommonRxTx		
Parameter	Type	Description
packetsUnder64Octets	long	
packets65To127Octets	long	
packets128To255Octets	long	
packets256To511Octets	long	
packets512To1023Octets	long	
packetsOver1024Octets	long	

Termination Point - LAG Ethernet

Represents an Ethernet Link Aggregation Layer (LAG) on any equipment.

Information can be read, updated, created and deleted.

LAG members can be read, created (added to the LAG), updated, or removed from the LAG.

Table 223.TpLag

TpLag		
Parameters	Type	Description
aid	AID	Filled with equipment IP and card (zero).
name	string	The name of the Termination Point. (Read-Only)
description	string	The TP description (Read-Write)
type	enum	
admin	enum	
aggregationType	enum	(static or dynamic) A Static LAG does not use LACP, so no signalling takes place between the two peers, while a Dynamic LAG uses.
loadBalance	enum	The LAG load balancing mechanism to use.
memberList	List<LagMember>	The list of Ethernet interfaces that compose the LAG.

Table 224.LagMember

LagMember		
Parameter	Type	Description
tpId	string	An ID for a given Ethernet interface
lacpTimeout	enum	The LACP timeout value for this LAG member

Create a new LAG entity on a given equipment

- CREATE-TPLAG:<IP>:"card"="0":mytag::<payload>;

Read complete LAG information for a single LAG Entity

- GET-TPLAG:<IP>:"card"="0","tp"=<tpId>:mytag::;

Change LAG parameters on a given equipment

- UPDATE-TPLAG:<IP>:"card"="0","tp"=<tpId>:mytag::<payload>;

Updates a specific LAG parameters, excluding modifying the member list.

The member list can be acted upon on the specific resource (lag member) or all in once with the CREATE operation.

Delete a LAG

- DELETE-TPLAG:<IP>:"card"="0","tp"=<tpId>:mytag::;

Deletes a specific LAG by ID.

Attach a new LAG Member to an existing LAG

- ATTACH-TPLAG-MEMBER:<IP>:"card"="0","tp"=<tpId>:mytag::<payload>;

Attach a new LAG member (tpEthernet) to a specific LAG.

Update one LAG Member parameters

- UPDATE-TPLAG-MEMBER:<IP>:"card"="0","tp"=<tpId>,"lagMemberId"=<id>:mytag::<payload>;

Update a specific LAG member parameters (ex: LACP timeout). Cannot be used to modify the Lag Member ID.

Detach an existing LAG Member from an existing LAG

- DETACH-TPLAG-MEMBER:<IP>:"card"="0","tp"=<tpId>,"lagMemberId"=<id>:mytag::;

Detach an existing LAG member from an existing LAG.

Get LAG status

- GET-TPLAG-STATUS:<IP>:"card"="0","tp"=<tpId>:mytag::;

Read status information for one LAG entity.

Table 225.TpLagStatus

TpLagStatus		
Parameter	Type	Description
aid	AID	Filled with OLT IP, card, tp.
admin	enum	
linkStatus	enum	

Get Lag LACP counters

- GET-TPLAG-LACPCOUNTERS:<IP>:"card"="0", "tp"=<tpId>:mytag::;

Reads the lacp counters on a given lag interface.

Table 226.LacpCounter

LacpCounter		
Parameter	Type	Description
id	String	The id in the url
aid	AID	The ipAddress, card, tp
name	String	The name of the lag interface
counterList	List<MemberCounter>	

Table 227.MemberCounter

MemberCounter		
Parameter	Type	Description
tpId	String	The interface id associated with the lag interface
rx	int	The packet counter for rx direction
tx	int	The packet counter for tx direction

Termination Point - VEIP

This entity represents a Virtual Ethernet Interface Point (VEIP) as defined in G.984.4 Amendment 2 and G.Impl.984.4.

There are no specific parameters to configure other than the admin state and description. So the table for this entity is the base Termination Point Information.

Table 228.TpVeip

TpVeip		
Parameter	Type	Description
id	string	The ID in the URL.
aid	AID	
name	string	The name of the Termination Point. (Read-Only)
description	string	The TP description
type	enum	The type of the Termination Point. Example: Ethernet, LAG, Gpon, etc conveyed in the numeric format. (Read-Only)
admin	enum	The administrative state of the Termination Point

Get VEIP

- GET-TPVEIP:<IP>:"card"=<cardId>,"tp"=<tpId>,"onuId"=<onuId>,"onuCard"=<onuCardId>,"onuTp"=<onuTpId>:mytag::;

Read a specific VEIP parameters.

Update VEIP

- UPDATE-TPVEIP:<IP>:"card"=<cardId>,"tp"=<tpId>,"onuId"=<onuId>,"onuCard"=<onuCardId>,"onuTp"=<onuTpId>:mytag::;

Change a specific VEIP parameters. Only admin and description are configurable.

Termination Point - SFP/XFP

This entity represents a Transceiver (either a GPON SFP or an ETHERNET XFP) on a given termination point.

Table 229.Xsfp

Xsfp		
Parameter	Type	Description
aid	AID	Filled with the OLT IP, Card id and the TP id
type	enum	1 - GPON, 2 - ETHERNET
sfp	Sfp	The sfp information (if the termination point supports it)
xfp	Xfp	The xfp information (if the termination point supports it)

Table 230.Sfp

Sfp		
Parameter	Type	Description
baseIdFields	SfpBaseId	
extendedIdFields	SfpExtendedId	
adStatusBits	AdStatusBits	

Table 231.SfpBaseId

SfpBaseId		
Parameter	Type	Description
identifier	string	
connector	string	
transceiver	string	
encoding	string	
nominalBitRate	int	Mbits/s
length9umKm	int	km
length9um	int	m
length50um	int	m
length625um	int	m
lengthCopper	int	m
vendorName	string	
vendorOui	string	
vendorSerialNumber	string	
vendorRevision	string	
laserWavelength	int	nm

Table 232.SfpExtendedId

SfpExtendedId		
Parameter	Type	Description
optionsImplemented	List<String>	
maxBaudrate	int	%
minBaudrate	int	%
vendorSerialNumber	string	
dateCode	string	
lotCode	string	
diagnosticMonitoringType	List<String>	
enhancedOptions	List<String>	
sff8472compliance	string	

Table 233.AdStatusBits

AdStatusBits		
Parameter	Type	Description
temperature	int	°C
voltage	int	V
txBias	int	mA
txPower	int	mW
rxPower	int	mW
opStatus	int	

Table 234.Xfp

Xfp		
Parameter	Type	Description
baseIdFields	XfpBaseId	
extendedIdFields	XfpExtendedId	

Table 235.XfpBaseId

XfpBaseId		
Parameter	Type	Description
identifier	String	
extensionIdentifier	List<String>	
connector	String	
transceiver	String	
encoding	String	
minBitRate	int	Mbits/s
maxBitRate	int	Mbits/s
lengthSfm	int	km
length50um	int	m
length625um	int	m
lengthCopper	int	m
deviceTechnology	List<String>	
vendorName	String	
cdrSupport	List<String>	
vendorOui	String	
vendorSerialNumber	String	
vendorRevision	String	
laserWavelength	int	nm
laserWavelengthTolerance	int	nm
maxCaseTemperature	int	°C

Table 236.XfpExtendedId

XfpExtendedId		
Parameter	Type	Description
powerSupplyInfo	List<String>	
vendorSerialNumber	String	
dateCode	String	
diagnosticMonitoringType	List<String>	
enhancedOptions	List<String>	

Get XSFP

- GET-XSFP:<IP>:"card"=<cardId>,"tp"=<tpId>:mytag::;

Read the SFP/XFP information on a given termination point.

Termination Point - TP RF

This entity represents the RF information on a given ONU information point. This information can be read or updated, namely the filter mode used.

Table 237.tpRf

tpRf		
Parameter	Type	Description
aid	AID	Filled with OLT IP, Card, tp, ONU ID, ONU tp.
filter	enum	1 - VALOR_RF_FILTER_MODE_15_CANAIS; 2 - VALOR_RF_FILTER_MODE_TODOS_CANAIS; 25 - VALOR_RF_FILTER_MODE_25_CANAIS; 35 - VALOR_RF_FILTER_MODE_35_CANAIS;

GET-TPRF

- GET-TPRF:<IP>:"card"=<cardId>,"tp"=<tpId>,"onuId"=<onuId>,"onuCard"=<onuCardId>,"onuTp"=<onuTpId>:mytag::;

Reads the tpRf information on a given ONU termination point.

UPDATE-TPRF

- UPDATE-TPRF:<IP>:"card"=<cardId>,"tp"=<tpId>,"onuId"=<onuId>,"onuCard"=<onuCardId>,"onuTp"=<onuTpId>:mytag::<payload>;

Updates the tpRf information on a given ONU termination point.

GET-TPRF-STATUS

- GET-TPRF-STATUS:<IP>:"card"=<cardId>,"tp"=<tpId>,"onuId"=<onuId>,"onuCard"=<onuCardId>,"onuTp"=<onuTpId>:mytag::;

Reads the TpRfStatus on a given ONU termination point.

Table 238.tpRfStatus

tpRfStatus		
Parameter	Type	Description
aid	AID	Filled with OLT IP, Card, tp, ONU ID, ONU tp.
linkStatus	enum	0 - Not Operational; 1- Operational

ONU

An ONU is a remote equipment managed through the OLT.

Table 239.Onu

Onu		
Parameters	Type	Description
aid	AID	Filled with Equipment IP address, card, tp and ONU ID.
admin	enum	
operationalStatus	enum	The ONU operational state.
name	string	ONU name
profileName	string	Name of the ONU profile
swVersion	string	Software version
hwVersion	string	Hardware version
location	string	Indication of ONU location
serialNumber	string	The Serial Number advertised by the ONU.
password	string	The Password string advertised by the ONU.
registerType	enum	ONU registration type. The ONU can be registered by: 1 - serial number 2 - password 3 - serial number and password
installationDate	long	Then date when the ONU entity was created on the system (epoch in ms)
equipId	string	Provided by the ONU
swUpgradeMode	enum	To specify the ONU upgrade mode. Options: 1 - Off - The firmware upgrade will be manual, by direct action of the user, specifying the firmware file 2 - Auto - Automatic firmware upgrade, to the firmware version indicated as the default version 3 - Specific version - ONU will upgrade to the version specified in 'specificVersion' field
specificVersion	string	Software version to use if swUpgradeMode is 'Specific version'
fec	boolean	Enable or disable FEC fuction
omciEncryption	boolean	Enable or disable OMCI encryption.

Create one planned ONU

- CREATE-ONU:<IP>:"card"=<cardId>,"tp"=<tpId>,"onuId"=<onuId>:mytag::<payload>;

Creates an ONU in the management system, By default the admin state of the ONU is set to "Blocked".

Read ONU data

- GET-ONU:<IP>:"card"=<cardId>,"tp"=<tpId>,"onuId"=<onuId>:mytag::;

Returns information that characterizes the ONU identified in the request.

Modify ONU data

- UPDATE-ONU:<IP>:"card"=<cardId>,"tp"=<tpId>,"onuId"=<onuId>:mytag::<payload>;

Modifies ONU parameters.

Delete ONU

- DELETE-ONU:<IP>:"card"=<cardId>,"tp"=<tpId>,"onuId"=<onuId>:mytag::;

Removes the identified ONU instance. If the ONU is physically connected to the OLT it will become part of the discovered ONUs list.

Read all TPs from an ONU

- LIST-ONU-TP:<IP>:"card"=<cardId>,"tp"=<tpId>,"onuId"=<onuId>:mytag::;

Returns a list with ONU termination points.

Get all client services from an ONU

- LIST-ONU-CLIENTSERVICES:<IP>:"card"=<cardId>,"tp"=<tpId>,"onuId"=<onuId>:mytag::;

Returns a list with ONU Client services configured.

Get ONU IGMP counters

- GET-ONU-IGMPCOUNTERS:<IP>:"card"=<cardId>,"tp"=<tpId>,"onuId"=<onuId>:mytag::;

Read IGMP counters on a given ONU.

This operation is only available for equipments running OLT-OS versions after 3.3.0 (inclusive).

To see the returning object see operation GET-NETWORKSERVICE-IGMPCOUNTERS.

Get ONU FECCounters

- GET-ONU-FECCOUNTERS:<IP>:"card"=<cardId>,"tp"=<tpId>,"onuId"=<onuId>:mytag::;

Read FEC counters on a given ONU.

FEC counters are available for the upstream direction if the required flag (TpGpon FEC flag) is enabled.

FEC counters are available for the downstream direction if the required flag (Onu FEC flag) is enabled.

Table 240.FecCounters

FecCounters		
Parameter	Type	Description
aid	AID	Filled with OLT IP, Card, tp and ONU ID
upstream	FecCounterPerDirection	
downstream	FecCounterPerDirection	

Table 241.FecCountersPerDirection

FecCountersPerDirection		
Parameter	Type	Description
correctedBytes	long	
correctedWords	long	
wrongWordsNotCorrected	long	
receivedWords	long	

Get Onu Upgrade Mode

- GET-ONU-UPGRADEMODE:<IP>:"card"=<card>,"tp"=<tp>,"onuId"=<onuId>:mytag::;

Reads the current onu upgrade mode on the given onu

Table 242.OnuUpgradeMode

OnuUpgradeMode		
Paramter	Type	Description
id	String	The id in the url
aid	AID	The ipAddress, card, tp and onu id
firmwareUpgradeMode	enum	Takes the values: "OFF", "AUTO" or "SPEC_VERSION"
firmwareSpecificVersion	String	The version to update to (it must exist in the firmware management) It is ignored unless firmwareUpgradeMode enum is "SPEC_VERSION"

Update Onu Upgrade Mode

- UPDATE-ONU-UPGRADEMODE:<IP>:"card"=<card>,"tp"=<tp>,"onuId"=<onuId>:mytag::<payload>;

Updates the onu upgrade mode configuration on the given onu.

Extended VLAN Tagging

Available since OLT-OS v3.4.0.

Extended VLAN Tagging (EVT) configuration is supported, as described in ITUT-G.988 chapter 9.3.13, for ONU Ethernet or VEIP Interfaces.

The EVT entity can be read and changed using ID for the intended ONU interface. For EVT Rules, there is a specific resource to allow CRUD operations.

Table 243. ExtendedVlanTagging

ExtendedVlanTagging		
Parameter	Type	Description
id	string	The URL ID. (Matches with the respective ONU TP ID)
aid	AID	Filled with IP, card, tp, onuId, onuCard and onuTp
admin	enum	
inputTpid	int	TPID value for filtering
outputTpid	int	TPID value for tagging
dscpToPbitProfileId	int	The DSCP To P-bit Profile ID.
associationType	enum	Read-only 2 - ONU Ethernet Interface 10 - VEIP
downstreamMode	enum	Read-only 0- Inverse
rules	List<ExtendedVlanTaggingRule>	(Read-Only) The existing rules configured for this entity. Empty if there are no rules.

List all EVT for a given ONU

Reads all EVT entities for a given ONU. Returns a list of EVT entities for each Ethernet and VEIP termination point that support the configuration.

- LIST-EVT:<IP>:"card"=<cardId>,"tp"=<tpId>,"onuId"=<onuId>:mytag;;
-

Read one EVT for a given ONU Ethernet or VEIP Interface

Reads one specific EVT information for a given ONU Ethernet or VEIP termination point.

- GET-
EVT:<IP>:"card"=<cardId>,"tp"=<tpId>,"onuId"=<onuId>,"onuCardId"=<onuCardId>,"onuTpId"=<onuTpId>:mytag::;

-

Update EVT for ONU Ethernet Interface

Updates a specific EVT configuration for a given ONU Ethernet or VEIP termination point.

- UPDATE-
EVT:<IP>:"card"=<cardId>,"tp"=<tpId>,"onuId"=<onuId>,"onuCardId"=<onuCardId>,"onuTpId"=<onuTpId>:mytag::<payload>;

Extended VLAN Tagging Rules

This entity allows the management of Extended VLAN Tagging (EVT) Rules. A Rule can only exist as a child of an EVT entity.

The Rule Payload conveys the ID of ONU Interface where the rule belongs.

Note that the Client Service associated with the rule must be one created without ONU interfaces.

Table 244.ExtendedVlanTaggingRule

ExtendedVlanTaggingRule		
Parameter	Type	Description
id	int	The URL ID.
extensionId	string	The ID of the ONU Interface of the Extended VLAN Tagging entity where the rule belongs. (Read-Only)
clientServiceId	string	The GPON Client Service URL ID.
admin	enum	
priorityFilter	enum	Filter by priority. 0..7 or: 8- Do not filter 14- Default 15- Ignore
innerVidFilter	int	Filter by Inner Vlan ID 0..4094 4096- Do not filter
innerTpidDeiFilter	enum	0- (000) Any 4- (100) 0x8100 5- (101) Input TPID 6- (110) Input TPID, DEI=0 7- (111) Input TPID, DEI=1
ethertypeFilter	enum	0- Any 1- IPoE 2- PPPoE 3- ARP 4- IPv6 IPoE
tagsToRemove	int	0- Don't remove tags 1- remove 1 tag 2- remove 2 tags (not supported) 3- Discard the frame
innerPriorityTreatment	enum	0..7 or 8- Copy inner 9- Copy outer 10- DSCP to P-bit 15- Don't add TAG
innerTpidDeiTreatment	enum	0- (000) Copy inner 1- (001) Copy outer 2- (010) Output TPID, copy inner DEI 3- (011) Output TPID, copy outer DEI 4- (100) 0x8100 5- (110) Output TPID, DEI=0 6- (111) Output TPID, DEI=1

Create a new EVT Rule

Create a new Rule for a given EVT Entity. Identify the respective EVT entity using the extensionId property with the desired ONU TP ID. This must be either an ONU Ethernet or VEIP interface.

- CREATE-EVT-RULE:<IP>::mytag::<payload>;

Read one Rule

Read a single rule information by Rule ID.

- GET-EVT-RULE:<IP>:"index"=<evtRuleId>:mytag::;

Update one Rule

Update a single rule information by Rule ID.

- UPDATE-EVT-RULE:<IP>:"index"=<evtRuleId>:mytag::<payload>;

Delete one Rule

Delete a single rule information by Rule ID.

- DELETE-EVT-RULE:<IP>:"index"=<evtRuleId>:mytag::;

Network Service

A network service is configured on an equipment.

Table 245. NetworkService

NetworkService		
Parameters	Type	Description
aid	AID	Filled with Equipment IP.
name	string	The Network Service name that uniquely identifies the service.
profileName	string	The network service profile name associated to this service.
uplinkList	List<TargetId>	A list of TP IDs and card IDs for use as uplink interfaces.
downlinkList	List<TargetId>	A list of TP IDs and card IDs for use as downlink interfaces.
multicastFlood	boolean	
igmp	boolean	
l2DhcpRelay	L2DhcpRelayNetworkService	The DHCP Relay configuration for this service. Ignored, if the associated profile does not have the flag DHCP enabled.

Table 246.TargetId

TargetId		
Parameters	Type	Description
card	int	The Card ID. Zero means the tps in the list are LAGs.
tps	List<int>	A list of interface IDs that belong to the card mentioned. Empty list means that the target is a card.

Table 247.L2DhcpRelayNetworkService

L2DhcpRelayNetworkService		
Parameters	Type	Description
Parameters	Type	Description
op18	boolean	Enable or disable DHCP option 18
op37	boolean	Enable or disable DHCP option 37
op82	boolean	Enable or disable DHCP option 82
priority	int	Configure the DHCP priority field
broadcastFlag	enum	This flag defines the behavior of the server replies (RFC 2131 chapter 4.1). When set, the DHCP Offer and ACK messages are sent to the broadcast MAC address (0xFFFFFFFF). If the flag is not set, the server replies in unicast to the client's MAC address. 1- Transparent: Do not change the flag value (default) 2- Force Set: Enable the broadcast flag 3- Force Clear: Disable the broadcast flag Available since OLT-OS vs 3.4.0.
circuitId	string	The string format is defined by the protocol standard.
useGlobalCircuitId	boolean	If enabled the locally configured circuit ID is ignored and the global circuit ID is used. Otherwise the configured circuit ID is used

Create a network service

- CREATE-NETWORKSERVICE:<IP>::mytag::<payload>;

Creates a network service on a given equipment.

Get one network service

- GET-NETWORKSERVICE:<IP>:"name"=<serviceName>:mytag::;

Reads a specific network service on a given equipment.

Update a network service

- UPDATE-NETWORKSERVICE:<IP>:"name"=<serviceName>:mytag::<payload>;

Updates a specific network service on a given equipment.

Delete a network service

- DELETE-NETWORKSERVICE:<IP>:"name"=<serviceName>:mytag;;

Deletes a specific network service on a given equipment.

Get network service total counters

- GET-NETWORKSERVICE-TOTALCOUNTERS:<IP>:"name"=<serviceName>,"card"=<cardId>,"tp"=<tpId>:mytag;;

Reads generic packet counters on a given Network Service. Counters must be started first so that the HW keeps track of the packet information. After use, the counters should be stopped to free the HW resources.

Table 248. TotalCounters

TotalCounters		
Parameter	Type	Description
aid	AID	The AID contains the OLT IP, service name and any combination of the properties card and tp to identify the entity where information is read (either a card or an interface).
rx	TotalCounterPerDirection	
tx	TotalCounterPerDirection	

Table 249. TotalCountersPerDirection

TotalCountersPerDirection		
Parameter	Type	Description
total	long	
unicast	long	
multicast	long	
broadcast	long	
dropped	long	

Get network service IGMP counters

- GET-NETWORKSERVICE-IGMPCOUNTERS:<IP>:"name"=<serviceName>,"card"=<cardId>,"tp"=<tpId>:mytag;;

Reads IGMP counters on a given card or Termination Point for a given network service.

Table 250.IgmpCounters

IgmpCounters		
Parameter	Type	Description
aid	AID	The AID contains the OLT IP, service name and any combination of the properties card and tp to identify the entity where information is read.
rx	IgmpCounterPerDirection	
tx	IgmpCounterPerDirection	

Table 251.IgmpCountersPerDirection

IgmpCountersPerDirection		
Parameter	Type	Description
igmpPackets	IgmpPackets	
igmpV2	IgmpV2	
igmpV3	IgmpV3	
igmpQueries	IgmpQueries	

Table 252.IgmpPackets

IgmpPackets		
Parameter	Type	Description
total	long	
dropped	long	
valid	long	
invalid	long	

Table 253.IgmpV2

IgmpV2		
Parameter	Type	Description
join	long	
invalidJoin	long	
leave	long	

Table 254.IgmpV3

IgmpV3		
Parameter	Type	Description
membershipReport	long	
invalidMembershipReport	long	
toInclude	long	
toExclude	long	
isInclude	long	
isExclude	long	
allow	long	
block	long	
invalidToInclude	long	
invalidToExclude	long	
invalidIsInclude	long	
invalidIsExclude	long	
invalidAllow	long	
invalidBlock	long	

Table 255.IgmpQueries

IgmpQueries		
Parameter	Type	Description
general	long	
groupSpecific	long	
groupAndSourceSpecific	long	

Get network service DHCP counters

- GET-NETWORKSERVICE-DHCP-COUNTERS:<IP>:"name"=<serviceName>,"card"=<cardId>,"tp"=<tpId>:mytag::;

Table 256.DhcpCounters

DhcpCounters		
Parameter	Type	Description
aid	AID	The AID contains the OLT IP, service name and any combination of the properties card and tp to identify the entity where information is read.

rx	DhcpCounterPerDirection	
tx	DhcpCounterPerDirection	

Table 257.DhcpCountersPerDirection

DhcpCountersPerDirection		
Parameter	Type	Description
valid	long	
dropped	long	
clientRequest	DhcpCounterPerOptions	
serverReplies	DhcpCounterPerOptions	
clientPacketsTrusted	long	
clientPacketsOptsUntrusted	long	
serverPacketsUntrusted	long	
serverPacketsWithoutOptsTrusted	long	

Table 258.DhcpCountersPerOptions

DhcpCountersPerOptions		
Parameter	Type	Description
withoutOptions	long	
withOption82	long	
withOption37	long	
withOption18	long	

Client Service GPON

A client service GPON is configured on an ONU.

Table 259.ClientServiceGpon

ClientServiceGpon		
Parameters	Type	Description
aid	AID	Filled with Equipment IP, card, tp and ONU-ID.
name	string	The GPON Client Service name that uniquely identifies the service.
admin	enum	

networkServiceName	string	The Network Service associated to this client service.
downstreamTrafficProfileName	string	Ethernet traffic profile (name) for use as downstream traffic profile
upstreamTrafficProfileName	string	GPON traffic profile (name) for use as upstream traffic profile
nniCtag	int	Configuration of NNI C-TAG.
uniCtag	int	Configuration of UNI C-TAG.
nativeVlan	boolean	Enable or disable the use of native VLAN.
encryption	boolean	Enable or disable AES encryption.
ipManagement	boolean	Enable or disable IP management.
maxNumMac	int	Maximum number of MACs that can be learned on the client service. (0 is unlimited, or 1 to 10)
l2DhcpRelay	L2DhcpRelayClientService	The L2 DHCP Relay configuration to use on the client service.
igmpOptions	IgmpClientService	The IGMP configuration to use on the client service. Available only for OLT-OS versions equal or above 3.3.0.
maxNumberOfGroups	int	<p>Enable or disable the multicast group limit control on the system. (-1 disabled or 0 to 16384)</p> <p>This parameter is mandatory for IGMP enabled services or services whose network service is of the multicast type.</p> <p>Available only for OLT-OS versions equal or above 3.4.0.</p>
maxBandwidth	int	<p>Enable or disable the bandwidth limit control on the system. (-1 disabled or 0 to 100.000.000 in Kbps)</p> <p>This parameter is mandatory for IGMP enabled services or services whose network service is of the multicast type.</p> <p>Available only for OLT-OS versions equal or above 3.4.0.</p>
tps	List<TargetId>	A list of card and TP IDs where the client service is configured. Only TPs that belong to this ONU are allowed.
pcpConfiguration	PcpConfiguration	On create, PcpConfiguration object must convey the PCP profile and T-CONT mapping association. The association is between each priority queue of a given PCP priority profile (given as the client service name) and an existing T-CONT (by ID). On

		update, it is possible to change the PCP profile used. In this case it must be passed the new mapping association. It is also possible to change only the mapping association, which will replace the previous one.
--	--	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Table 260. IgmpClientService

IgmpClientService		
Parameters	Type	Description
useGlobal	boolean	If enabled, use the IGMP configuration from the associated Network Service. Otherwise, the presently configured IGMP information is used (overriding the Network service configuration). For OLT-OS versions equal or above 3.4.0, this parameter must be set to false.
enable	boolean	Enable (true), disable (false) the IGMP processing on the Client Service.

Table 261. L2 L2DhcpRelayClientService

L2DhcpRelayClientService		
Parameters	Type	Description
op18	boolean	Enable or disable DHCP option18.
op37	boolean	Enable or disable DHCP option37.
op82	boolean	Enable or disable DHCP option82.
remoteId	string	The remote ID as described by the DHCP protocol.
useGlobalDhcp	boolean	If enabled, the DHCP configuration from the associated Network Service is used. Otherwise, the presently configured DHCP information is used (overriding the Network service configuration).

Create a client service GPON

- CREATE-CLIENTSERVICEGPON:<IP>:"card"=<cardId>,"tp"=<tpId>,"onuId"=<onuId>:mytag::<payload>;

Creates a new Client Service on a given ONU (card, tp, onuId). When creating, the 'name' parameter goes in the payload instead of the AID.

Get a client service GPON

- GET-CLIENTSERVICEGPON:<IP>:"card"=<cardId>,"tp"=<tpId>,"onuId"=<onuId>,"name"=<serviceName>:mytag::;

Reads a specific client service on a given ONU.

Update a client service GPON

- UPDATE-CLIENTSERVICEGPON:<IP>:"card"=<cardId>,"tp"=<tpId>,"onuId"=<onuId>,"name"=<serviceName>:mytag::<payload>;

Updates a specific client service on a given ONU.

Delete a client service GPON

- DELETE-CLIENTSERVICEGPON:<IP>:"card"=<cardId>,"tp"=<tpId>,"onuId"=<onuId>,"name"=<serviceName>:mytag;;

Deletes a specific client service on a given ONU.

Get GPON client service total counters

- GET-CLIENTSERVICEGPON-TOTALCOUNTERS:<IP>:"card"=<cardId>,"tp"=<tpId>,"onuId"=<onuId>,"name"=<serviceName>:mytag;;

Read generic packet counters on a given GPON client service. Counters must be started first so that the HW keeps track of the packet information. After use, the counters should be stopped to free the HW resources.

Table 262.TotalCountersList

TotalCountersList		
Parameter	Type	Description
aid	AID	The AID contains the GPON client service identification (OLT IP, card, TP, onuId and name).
totalCounters	List<TotalCounters>	A list of total counters for each Termination Point where counters are read for the identified GPON client service.

Table 263.TotalCounters

TotalCounters		
Parameter	Type	Description
aid	AID	The AID contains one Termination Point identification where counters are read.
rx	TotalCounterPerDirection	(See operation GET-NETWORKSERVICE-TOTALCOUNTERS)
tx	TotalCounterPerDirection	(See operation GET-NETWORKSERVICE-TOTALCOUNTERS)

Get GPON client service IGMP counters

- GET-CLIENTSERVICEGPON-IGMPCOUNTERS:<IP>:"card"=<cardId>,"tp"=<tpId>,"onuId"=<onuId>,"name"=<serviceName>:mytag::;

Read IGMP counters on a given card or tp for a given client service GPON.

This operation is only available for equipments running OLT-OS versions before 3.3.0 (exclusive).

For OLT-OS versions after 3.3.0 (inclusive) see: **GET-ONU-IGMPCOUNTERS** operation.

Table 264.IgmpCountersList

IgmpCountersList		
Parameter	Type	Description
aid	AID	The AID contains the GPON client service identification (OLT IP, card, TP, onuId and name).
igmpCounters	List<IgmpCounters>	A list of IGMP counters for each Termination Point where counters are read for the identified GPON client service.

Table 265.IgmpCounters

IgmpCounters		
Parameter	Type	Description
aid	AID	The AID contains one Termination Point identification where counters are read.
rx	IgmpCounterPerDirection	(See operation GET-ONU-IGMPCOUNTERS)
tx	IgmpCounterPerDirection	(See operation GET-ONU-IGMPCOUNTERS)

Get GPON client service DHCP counters

- GET-CLIENTSERVICEGPON-DHPCOUNTERS:<IP>:"card"=<cardId>,"tp"=<tpId>,"onuId"=<onuId>,"name"=<serviceName>:mytag::;

Read DHCP counters on a given card or tp for a given client service GPON.

Table 266.DhcpCountersList

DhcpCountersList		
Parameter	Type	Description
aid	AID	The AID contains the GPON client service identification (OLT IP, card, TP, onuId and name).
dhcpCounters	List<DhcpCounters>	A list of DHCP counters for each Termination Point where counters are read for the identified GPON client service.

Table 267.DhcpCounters

DhcpCounters		
Parameter	Type	Description
aid	AID	The AID contains one Termination Point identification where counters are read.
rx	DhcpCounterPerDirection	(See operation GET-NETWORKSERVICE-DHPCOUNTERS)
tx	DhcpCounterPerDirection	(See operation GET-NETWORKSERVICE-DHPCOUNTERS)

Get GPON client service GEM counters

- GET-CLIENTSERVICEGPON-GEMCOUNTERS:<IP>:"card"=<cardId>,"tp"=<tpId>,"onuId"=<onuId>,"name"=<serviceName>:mytag::;

Read GEM counters for a given client service on an ONU.

Table 268.GemCounters

GemCounters		
Parameter	Type	Description
aid	AID	Filled with OLT IP, card, tp, ONU ID and name (GPON client service name)
packetsReceived	long	
blocksReceived	long	
blocksTransmitted	long	

Client Services Ethernet

A client service Ethernet is configured for Ethernet Interfaces on OLT Cards (the card must allow Client services configuration).

To list all CS ETH on a given card, see the CARD entity section.

Table 269.ClientServiceEthernet

ClientServiceEthernet		
Parameters	Type	Description
aid	AID	Filled with Equipment IP, card and name.
name	string	Client Service Name
admin	enum	
networkServiceName	string	The associated Network Service name.

tp	int	The Index of the interface (Termination Point) where the service is applied.
nniCtag	int	
uniCtag	int	
downstreamTrafficProfileName	int	The Traffic Profile associated with the service. (Not supported for multicast services)
l2DhcpRelay	L2DhcpRelayClientService	Null if service does not support DHCP. Object specified in the Client Service GPON section.
maxNumberOfGroups	int	Enable or disable the multicast group limit control on the client service. (-1 disabled or 0 to 16384) This parameter is mandatory for IGMP enabled services or services whose network service is of the multicast type. Available only for OLT-OS versions equal or above 3.4.0.
maxBandwidth	int	Enable or disable the bandwidth limit control on the client service. (-1 disabled or 0 to 100.000.000 in Kbps) This parameter is mandatory for IGMP enabled services or services whose network service is of the multicast type. Available only for OLT-OS versions equal or above 3.4.0.

Get one CS ETH

- GET-CLIENTSERVICEETHERNET:<IP>:"card"=<cardId>,"name"=<serviceName>:mytag::;

Create a new CS ETH

- CREATE-CLIENTSERVICEETHERNET:<IP>:"card"=<cardId>:mytag:<payload>;

Update one CS ETH

- UPDATE-CLIENTSERVICEETHERNET:<IP>:"card"=<cardId>,"name"=<serviceName>:mytag:<payload>;

Delete one CS ETH

- DELETE-CLIENTSERVICEETHERNET:<IP>:"card"=<cardId>,"name"=<serviceName>:mytag::;

Get ETHERNET client service total counters

- GET-CLIENTSERVICEETHERNET-TOTALCOUNTERS:<IP>:"card"=<cardId>,"name"=<serviceName>:mytag::;

Read generic packet counters on a given ETHERNET client service. Counters must be started first so that the HW keeps track of the packet information. After use, the counters should be stopped to free the HW resources.

Table 270.TotalCountersList

TotalCountersList		
Parameter	Type	Description
aid	AID	The AID contains the ETHERNET client service identification (OLT IP, card and name).
totalCounters	List<TotalCounters>	A list of total counters for each Termination Point where counters are read for the identified ETHERNET client service.

Table 271.TotalCounters

TotalCounters		
Parameter	Type	Description
aid	AID	The AID contains one Termination Point identification where counters are read.
rx	TotalCounterPerDirection	(See operation GET-NETWORKSERVICE-TOTALCOUNTERS)
tx	TotalCounterPerDirection	(See operation GET-NETWORKSERVICE-TOTALCOUNTERS)

Multicast Groups

Multicast groups are created on a given equipment.

Table 272.MulticastGroup

MulticastGroup		
Parameters	Type	Description
aid	AID	Filled with Equipment IP. Index field is only for GET operations.
admin	enum	
name	string	Multicast group name
networkServiceName	string	Name of the associated network service. This must be of type multicast
sourceIpAddress	string	Unicast IP address, in string format, used for source filtering
multicastIpAddress	string	Group multicast IP address, in string format.

ipMaskBits	int	Determines the address range. Default value is 32, single IP. Accepted vaues range from 22 to 32.
channelType	enum	Determines this multicast group is static or dynamic
bandwidth	int	Set the total bandwidth of the Multicast traffic on each interface, VLAN and client. Value in Kbps (Range: 0 to 100.000.000)

Table 273.MulticastIcmpProxy

MulticastIcmpProxy		
Parameter	Type	Description
id	string	
aid	AID	Filled with Equipment IP only.
admin	enum	
priority	int	
networkVersion	int	
clientVersion	int	
robustness	int	
unsolicitedReportInterval	int	seconds
maxRecordsPerReport	int	

Table 274.MulticastIcmpQuerier

MulticastIcmpQuerier		
Parameter	Type	Description
id	string	
aid	AID	Filled with Equipment IP only.
querierIp	string	
queryInterval	int	
queryResponseInterval	int	
startupQueryInterval	int	
startupQueryCount	int	
lastMemberQueryInterval	int	
lastMemberQueryCount	int	

Read all Multicast Groups

See the Equipment resource.

Create a multicast group

- CREATE-MULTICASTGROUP:<IP>::mytag::<payload>;

Creates a new multicast group on a given equipment.

Read multicast group data

- GET-MULTICASTGROUP:<IP>:"index"=<grpindex>;mytag::;

Reads a specific multicast group.

The index value is conveyed in the AID JSON filed upon executing the read all operation. The index value is what identifies each multicast group entity.

Modify multicast group parameters

- UPDATE-MULTICASTGROUP:<IP>:"index"=<grpindex>;mytag::<payload>;

Updates a specific multicast group.

Delete a multicast group

- DELETE-MULTICASTGROUP:<IP>:"index"=<grpindex>;mytag::;

Deletes a specific multicast group from the equipment.

Get equipment multicast IGMP Proxy

- GET-MULTICASTIGMPPROXY:<IP>::mytag::;

Reads multicast IGMP proxy information from a given equipment.

Get equipment multicast IGMP Querier

- GET-MULTICASTIGMPQUERIER:<IP>::mytag::;

Reads multicast IGMP querier information from a given equipment.

Update equipment multicast IGMP Proxy

- UPDATE-MULTICASTIGMPPROXY:<IP>::mytag::<payload>;

Updates multicast IGMP proxy information from a given equipment.

Update equipment multicast IGMP Querier

- UPDATE-MULTICASTIGMPQUERIER:<IP>::mytag::<payload>;

Updates multicast IGMP proxy information from a given equipment.

Table 275.MulticastActiveGroups

MulticastActiveGroups		
Parameters	Type	Description
timeStamp	long	Epoch (milliseconds)
activeGroups	List<MulticastActiveGroup>	

Table 276.MulticastActiveGroup

MulticastActiveGroup		
Parameter	Type	Description
id	string	The ID of the Multicast Active group (on the format: OLT IP - NS Name - Source IP - Multicast IP)
aid	AID	Filled with OLT IP and service name, source IP and Multicast IP.
networkserviceName	string	
channelType	enum	
sourceIpAddress	IPv4	
multicastIpAddress	IPv4	

Get Equipment Multicast Active Groups

- LIST-EQUIPMENT-MULTICASTACTIVEGROUP:<IP>::mytag;;

Reads all multicast active groups on a given equipment.

Get GPON Client Service Multicast Active Groups

- LIST-CLIENTSERVICEGPON-MULTICASTACTIVEGROUP:<IP>:"card"=<cardId>,"tp"=<tpId>,"onuId"=<onuId>,"name"=<serviceName>::mytag;;

Reads all multicast active groups on a given GPON client service.

Get Multicast Active Groups Clients

- LIST-MULTICASTACTIVEGROUP-CLIENT:<IP>:"name"=<serviceName>,"multicastIp"=<multicastIpAddress>:mytag;;

Reads all clients of multicast active group.

Table 277.MulticastActiveGroupClients

MulticastActiveGroupClients		
Parameters	Type	Description
timeStamp	long	Epoch (milliseconds)

clients	List<Client>	
---------	--------------	--

Table 278.Client

Client		
Parameters	Type	Description
aid	AID	Filled with IP, card, tp, onu ID
nniCtag	int	
clientServiceName	string	

Catalog NTP

Table 279.NtpCatalog

NtpCatalog		
Parameters	Type	Description
id	int	The ID in the URL.
ip	string	Conveys the NTP server IP in a string format.
name	string	The name of the NTP server

Read all NTP servers

- LIST-CATALOG-NTPSERVER::::;

Reads all NTP servers on system catalog.

Read specific NTP server

- GET-CATALOG-NTPSERVER::"name"=<ntpServerName>:mytag::;

Reads a specific NTP server on system cataog.

Create NTP server

- CREATE-CATALOG-NTPSERVER::::<payload>;

Creates a new NTP server on system catalog.

Delete specific NTP server

- DELETE-CATALOG-NTPSERVER::"name"=<ntpServerName>:mytag::;

Deletes a specific NTP server from system catalog.

Equipment NTP

Table 280.NTP

NTP		
Parameters	Type	Description
aid	AID	Conveys the equipment IP where information was read.
admin	enum	Enable or disable the global use of NTP functionality on the equipment.

Table 281.NtpServer

NtpServer		
Parameters	Type	Description
aid	AID	Conveys the equipment IP where information was read.
id	string	The NTP server ID used for PUT and DELETE operations.
name	string	A valid NTP Server name from the NTP Server Catalog.
admin	enum	

Read equipment NTP configuration

- GET-EQUIPMENT-NTP:<IP>::mytag;;

Reads NTP configuration from a given equipment.

Read equipment NTP configuration

- UPDATE-EQUIPMENT-NTP:<IP>::mytag:"admin"=<adminState>;
-

Read all NTP servers on equipment

- LIST-EQUIPMENT-NTPSERVER:<IP>::mytag;;

Reads all NTP servers configured on a given equipment.

Add NTP server to equipment

- CREATE-EQUIPMENT-NTPSERVER:<IP>::mytag:<payload>;

Add a NTP server to equipment NTP configuration.

Update NTP server on equipment

- UPDATE-EQUIPMENT-NTPSERVER:<IP>:"name"=<ntpServerName>:mytag:"admin"=<adminState>;

Modify a NTP server on a given equipment NTP configuration.

Delete NTP server from equipment

- DELETE-EQUIPMENT-NTPSERVER:<IP>:"name"=<ntpServerName>.mytag::;

Deletes NTP server from a given equipment NTP configuration.

Timezones

Table 282.TimeZone

TimeZone		
Parameters	Type	Description
id	string	The time zone ID.
name	string	The human readable string representing the time zone.

Read all Timezones

- LIST-CATALOG-TIMEZONE:::mytag::;

Lists all available time zone names and respective IDs.

Equipment Time configuration

Table 283.TimeInformation

TimeInformation		
Parameters	Type	Description
equipment	Time	The time information for the requested equipment
nms	Time	The time information for the NMS entity.

Table 284.Time

Time		
Parameters	Type	Description
timeZoneId	string	The time zone ID.
timeZoneName	string	The time zone as a human readable string.
time	long	The NMS system time (Epoch in milliseconds).

Read Time configuration on equipment

- GET-EQUIPMENT-TIME:<IP>::mytag::;

Read the current equipment time and date in Epoch format, and the configured Time Zone. Also returns the same time information for the NMS.

Update Time configuration on equipment

- UPDATE-EQUIPMENT-TIME:<IP>::mytag::"timeZoneId"=<timeZoneId>;

Change the current equipment Time Zone by providing the new time zone ID. Cannot modify the NMS time configuration neither the equipment time.

Type B protection groups

Type B protection groups are configured on equipment.

Table 285.TypeBProtectionGroup

TypeBProtectionGroup		
Parameters	Type	Description
id	long	The id in the URL.
aid	AID	
admin	enum	
name	string	
primaryPort	string	The ID of the Primary Termination Point
protectionPort	string	The ID of the Protection Termination Point
waitToRestore	int	Wait to Restore Time (WTR) in minutes.
holdOffTime	int	Hold Off Time in hundredths of milliseconds
reversible	boolean	If set to true, after recovering from a fault the primary port is used automatically. Setting this to false, means that the protection port will continue to be used even if the primary port recovers.
type	enum	(1) - One Plus One
highPriorityCardFailure	boolean	Perform port switch based on card failure
highPriorityInterfaceLos	boolean	Perform port switch based on Loss of Signal (LOS)

Read all Type B protection groups

- LIST-EQUIPMENT-TYBEBPROTECTIONGROUP:<IP>::mytag::;

Reads all the GPON Type B Protection groups configured on a given equipment.

Read specific Type B protection group

- GET-TYBEBPROTECTIONGROUP:<IP>:"name"=<groupName>:mytag::;

Reads a specific GPON Type B Protection group configured on a given equipment.

Create Type B protection group

- CREATE-TYBEBPROTECTIONGROUP:<IP>:mytag:<payload>;

Creates a new GPON Type B Protection group on a given equipment.

Update Type B protection group

- UPDATE-TYBEBPROTECTIONGROUP:<IP>:"name"=<groupName>:mytag:"admin"=<adminState>;

Change an existing GPON Type B Protection group configuration on a given equipment.

Delete Type B protection group

- DELETE-TYBEBPROTECTIONGROUP:<IP>:"name"=<groupName>:mytag::;

Remove specific GPON Type B Protection group.

Read Type B protection group status

Table 286.TypeBPGStatus

TypeBPGStatus		
Parameters	Type	Description
aid	AID	Filled with OLT IP and protection group name.
waitToRestoreTimer	int	
lastSwitchOverReason	enum	
syncStatus	enum	
lastCommand	enum	The last command executed by the user on this entity
primaryPort	TypeBPGPortStatus	
protectionPort	TypeBPGPortStatus	

Table 287.TypeBPGPortStatus

TypeBPGPortStatus		
Parameters	Type	Description
tpId	string	
active	boolean	True if this is the Interface the one being used. False otherwise.
alarms	List<int>	The list of active alarms for this Protection Port. 1- Interface LOS 2- Card Failure

- GET-TYBEBPROTECTIONGROUP-STATUS:<IP>:"name"=<groupName>:mytag::;

Read status information for a given GPON Type B Protection group.

Execute Type B protection group command

Table 288.TypeBPGCommand

TypeBPGCommand		
Parameters	Type	Description
protectionTypeBGroupId	string	The URL ID for the Protection group where the command will be executed
command	enum	The command code to be executed.

- `COMMAND-TYBEBPROTECTIONGROUP:::mytag:::payload>;`

Execute a command on a given GPON Type B Protection group.

Ethernet Uplink Protection Group

Ethernet Protection Groups are configured on equipment.

Table 289.UplinkProtectionGroup

UplinkProtectionGroup		
Parameter	Type	Description
id	int	The id in the URL
aid	AID	The IP address of the equipment and the name of the protection group
admin	boolean	The state of the protection group
name	string	The name of the Ethernet Uplink Protection Group
primaryPort	string	The ID of the Primary Termination Point
protectionPort	string	The ID of the Protection Termination Point
waitToRestore	int	Wait to Restore Time (WTR) in minutes.
holdOffTime	int	Hold Off Time in hundredths of milliseconds
reversible	boolean	If set to true, after recovering from a fault the primary port is used automatically. Setting this to false, means that the protection port will continue to be used even if the primary port recovers.
type	enum	1 - OnePlusOne; 2 - OneToOne; 4 - OnePlusOneOpt
highPriorityCardFailure	boolean	Perform port switch based on card failure

highPriorityInterfaceLos	boolean	Perform port switch based on Loss of Signal (LOS)
--------------------------	---------	---------------------------------------------------

Read all Uplink protection groups

- LIST-EQUIPMENT-UPLINKPROTECTIONGROUP:<IP>::mytag::;

Reads all the Ethernet Uplink Protection groups configured on a given equipment.

Read specific Uplink protection group

- GET-UPLINKPROTECTIONGROUP:<IP>:"name"=<groupName>:mytag::;

Reads a specific Ethernet Uplink Protection group configured on a given equipment.

Create Uplink protection group

- CREATE-UPLINKPROTECTIONGROUP:<IP>::mytag::<payload>;

Creates a new Ethernet Uplink Protection group on a given equipment.

Update Uplink protection group

- UPDATE-UPLINKPROTECTIONGROUP:<IP>:"name"=<groupName>:mytag::<payload>;

Change an existing Ethernet Uplink Protection group configuration on a given equipment.

Delete Uplink protection group

- DELETE-UPLINKPROTECTIONGROUP:<IP>:"name"=<groupName>:mytag::;

Remove specific Ethernet Uplink Protection group.

Read Uplink protection group status

Table 290.UplinkPGStatus

UplinkPGStatus		
Parameter	Type	Description
aid	AID	Filled with OLT IP and protection group name
waitToRestoreTime	int	Wait to Restore Time (WTR) in minutes.

lastSwitchOverCause	enum	The protection group last reason to switch: 0 - none; 1 - signalFail; 2 - lineCardFailure; 3 - signalDegrade; 4 - signalFailClear; 5 - operatorManualSwitchCommand; 6 - waitToRestoreTimerExpire; 7 - operatorClearCommand; 8 - operatorLockoutOfProtectionCommand; 9 - operatorForceSwitchCommand;
syncStatus	enum	The sync status of the Protection Group: 0 - notSynchronous; 1 - activatingDeactivating; 2 - synchronizing; 3 - synchronous; 4 - error; 5 - activationError;
lastCommand	enum	The last command executed by the user on this entity: 1- No Command; 2 - Clear; 3 - LockOutOfProtection; 4 - forcedSwitchToProtect; 5 - forcedSwitchToWork; 6 - manualSwitchWorkToProtect; 7 - manualSwitchProtectToWork; 8 - exercise;
primaryPort	UplinkPortPGStatus	The primary port status
protectionPort	UplinkPortPGStatus	The protection port status

Table 291.UplinkPortPGStatus

UplinkPortPGStatus		
Parameter	Type	Description
tpId	string	The url id of the termination point
alarms	List<int>	The list of active alarms for this Protection Port. 1- Interface LOS 2- Card Failure

- GET-UPLINKPROTECTIONGROUP-STATUS:<IP>:"name"=<groupName>:mytag::;

Read status information for a given Ethernet Uplink Protection group.

Execute Uplink protection group command

Table 292.UplinkPGCommand

UplinkPGCommand		
Parameter	Type	Description
id	int	The url id of the Ethernet protection Group
command	int	The command ot be executed

- `COMMAND-UPLINKPROTECTIONGROUP:::mytag::<payload>;`

Execute a command on a given Ethernet Uplink Protection group.

PBitsToPQ Profile

Get all PBitsToPQ profiles

- `LIST-PBITSTOPQPROFILE:::mytag;;`

Reads all PBitsToPQ profiles configured on the system.

Create a PBitsToPQ profile

- `CREATE-PBITSTOPQPROFILE:::mytag::<payload>;`

Creates a PBitsToPQ profile.

Get a PBitsToPQ profile

- `GET-PBITSTOPQPROFILE ::"name"=<profileName>:mytag;;`

Reads a specific PBitsToPQ profile.

Delete a PBitsToPQ profile

- `DELETE-PBITSTOPQPROFILE ::"name"=<profileName>:mytag;;`

Deletes a specific PBitsToPQ profile.

T-CONTs

Get all T-CONTs from an ONU

- `LIST-ONU-TCONT:<IP>:"card"=<cardId>,"tp"=<tpId>,"onuId"=<onuId>:mytag;;`

Returns a list with ONU T-CONTs configured.

Create a T-CONT

- `CREATE-TCONT:<IP>:"card"=<cardId>,"tp"=<tpId>,"onuId"=<onuId>:mytag::<payload>;`

Creates a new T-CONT on a given ONU.

Get a T-CONT

- GET-TCONT::"id"=<tcontId>:mytag::;

Read a specific T-CONT.

Update a T-CONT

- UPDATE-TCONT::"id"=<tcontId>:mytag::<payload>;

Updates a given T-CONT.

Delete a T-CONT

- DELETE-TCONT::"id"=<tcontId>:mytag::;

Deletes a given T-CONT.

Get all T-CONT Status from an ONU

- LIST-ONU-TCONTSTATUS:<IP>:"card"=<cardId>,"tp"=<tpId>,"onuId"=<onuId>:mytag::;

Returns a list with ONU T-CONT status information.

Commands**Rediscover Cards**

- DISCOVERCARD:::mytag::"ipAddress"=<IP>;

Execute a command to rediscover cards on a given equipment.

Start Counters

- STARTCOUNTER:::mytag::"ipAddress"=<IP>,"name"=<serviceName>,"card"=<cardId>,"tp"=<tpId>;

Send a command to the HW to start counting packets for a given TP and Service ID (client or network). A limited number of counters can be active at the same time. After the counter is enabled the read command is available. The counters must be stopped when they are no longer needed to free the HW resources.

Stop Counters

- STOPCOUNTER:::mytag::"ipAddress"=<IP>,"name"=<serviceName>,"card"=<cardId>,"tp"=<tpId>;

Stops the given counter.

Reboot

- REBOOT-ONU:::mytag::"ipAddress"=<IP>,"card"=<cardId>,"tp"=<tpId>,"onuId"=<onuId>;

Executes the reboot operation for a given ONU.

Reset Factory Default - Not yet supported by the core

- RESETFACTORYDEFAULT-OLT::mytag::ipAddress"=<IP>;

Executes the reset to factory default operation for a given OLT.

Examples

This section presents TL1 command examples for provisioning an ONU with client services.

Creating an ONU

TL1 Input Command - Create ONU

1	CREATE-ONU:10.112.42.121:"card"=7,"tp"=1,"onuId"=1:tag1:"name"=ONU 7.1.1,"registerType"=1,"serialNumber"=5054494E393B2314,"location"=avr1,"profileName"=SFU- C,"swUpgradeMode"=1,"fec"=true,"omciEncryption"=true;
---	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

TL1 Response - tag1

1	10.112.42.121 04-02-14 09:37:41
2	M tag1 COMPLD
3	"aid"={"ipAddress"=10.112.42.121,"card"=7,"tp"=1,"onuId"=1},"name"=ONT
4	7.1.1,"profileName"=SFU- C,"swVersion"=ONT7SW0000027,"hwVersion"=ONT7SFUV000011,"location"=avr1,"serialNumb er"=5054494E393B2314,"password"="",registerType=1,"installationDate"=1390608120000,"admin"=2 ,equipId="",swUpgradeMode=1,"plannedVersion"="",fec=false,"omciEncryption"=true} ;

Provisioning Client Services on an ONU

TL1 Input Command - Create a Client service on an ONU

1	CREATE-CLIENTSERVICEGPON:10.112.42.121:"card"=7,"tp"=1,"onuId"=1:tag2:"name"=TR- 069,"networkServiceName"=TR- 069,"nniCtag"=12,"uniCtag"=12,"upstreamTrafficProfileName"=FIX_10M,"downstreamTrafficProfileN ame"=CIR_1G_Def,"ipManagement"=true,"nativeVlan"=false,"tps"=[{"card"=1,"tps"=["1"]}];
---	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

TL1 Response - tag2

1	10.112.42.121 04-02-14 09:43:14
2	M tag2 COMPLD
3	"aid"={"ipAddress"=10.112.42.121,"card"=7,"tp"=1,"onuId"=1,"name"=TR-069},"name"=TR-
4	069,"admin"=2,"networkServiceName"=TR- 069,"nniCtag"=12,"uniCtag"=12,"upstreamTrafficProfileName"=FIX_10M,"downstreamTrafficProfileN ame"=CIR_1G_Def,"ipManagement"=true,"nativeVlan"=false,"tps"=[{"card"=1,"tps"=["1"]}],"maxNu

```
mMac="0", "encryption"="false"
;
```

TL1 Input Command - Create a Client service for an ONU

```
1 CREATE-
CLIENTSERVICEGPON:10.112.42.121:"card"="7","tp"="1","onuId"="1":tag3::"name"="HSI","networkServiceName"="HSI","nniCtag"="12","uniCtag"="10","upstreamTrafficProfileName"="FIX_10M","downstreamTrafficProfileName"="CIR_1G_Def","nativeVlan"="false","tps"=[{"card"="1","tps"=["1"]}];
```

TL1 Response - tag3

```
1 10.112.42.121 04-02-14 09:58:12
2 M tag3 COMPLD
3 "aid"="{""=
4 {"ipAddress"="10.112.42.121","card"=7,"tp"=1,"onuId"=1,"name"="HSI"}, {"name"="HSI","admin"="2","networkServiceName"="HSI","nniCtag"="12","uniCtag"="10","upstreamTrafficProfileName"="FIX_10M","downstreamTrafficProfileName"="CIR_1G_Def",
5 "ipManagement"="true","nativeVlan"="false","tps"=[{"card"="1","tps"=["1"]}],"maxNumMac"="0","encryption"="false"
```

Enable the ONU

TL1 Input Command - Set ONU Admin state to "In Service"

```
1 UPDATE-ONU:10.112.42.121:"card"="7","tp"="1","onuId"="1":tag4::"admin"="1";
```

TL1 Response - tag4

```
1 10.112.42.121 04-02-14 10:01:55
2 M tag4 COMPLD
3 ;
```

List of Enumerations

In this section we define all the enumerations used.

Administrative State

Table 293. Administrative State

Enum Administrative State	
Value	Description
1	In Service: active, enabled.
2	Blocked: not active, disabled by the user.
3	Planned: The logical entity is configured but does not exist physically.
4	Maintenance: The equipment is in service, but the user changed the state to Maintenance to signal an intervention on the HW.

Equipment Operational State

Table 294. Operational State

Enum Operational State	
Value	Description
1	Operational
2	Not Operational
3	Degraded
4	Unknown

Network Service Type

Table 295. Network Service Type

Enum Network Service Type	
Value	Description
0	Unicast
1	Multicast
2	Uni-Voip
3	Bitstream
4	MAC-Bridge

Ethernet Profile Coupling Flag

Table 296. Ethernet Profile Coupling Flag

Enum Ethernet Profile Coupling Flag	
Value	Description
1	Coupling Flag ON
2	Coupling Flag OFF

Ethernet Color Mode

Table 297. Ethernet Profile Color Mode

Enum Ethernet Profile Color Mode	
Value	Description
0	Blind
1	Aware

BW Eligibility

Table 298. BW Eligibility

Enum BW Eligibility	
Value	Description
-1	Undefined, Unused
0	Non-Assured
1	Best Effort

Profile GPON Traffic Type

Table 299. Profile GPON Traffic Type

Enum Profile GPON Traffic Type	
Value	Description
1	UBR
2	CBR
3	Dynamic

Termination Point Type

Table 300. Termination Point Type

Enum Termination Point Type	
Value	Description
301	E1
303	RS232
358	Ethernet
368	Gigabit Ethernet
30018	GPON
30019	RF
30027	VEIP

Card Type

Table 301. Card Type

Enum Card Type	
Value	Description
20145	ME4601-ONT-SFU-CARD
20193	ME4620-FAN
20187	ME4600-XCO-640
20188	ME4600-AMX-16GPON
20189	ME4600-UMX-4x10GE
20199	ME4600-AMX-48GE
20211	ME4600-XCO-160
20212	ME4605-FAN

Equipment Type

Table 302. Equipment Type

Enum Equipment Type	
Value	Description
10023	ME4601-ONT-SFU
10040	ME4620-OLT
10048	ME4605-OLT

GPON Optical Laser Status

Table 303.GPON Optical Laser Status

Enum GPON Optical Laser Status	
Value	Description
0	OFF
1	ON
2	Failed

LAG Aggregation Type

Table 304.Aggregation Type

Enum Aggregation Type	
Value	Description
1	Static
2	Dynamic

LAG Load Balance Mode

Table 305.LAG Load Balance Mode

Enum LAG Load Balance Mode	
Value	Description
1	Source Address
2	Destination Address
3	Source and Destination Address

LAG Member LACP Timeout

Table 306.LACP Timeout

Enum LACP Timeout	
Value	Description
1	Long
2	Short

Link Status

Table 307.Link Status

Enum Link Status	
Value	Description
0	Fail
1	OK

ONU Register Type

Table 308.ONU Register Type

Enum ONU Register Type	
Value	Description
1	Serial Number
2	Password
3	Serial Number and Password

Discovered ONU State

Table 309.ONU State

Enum ONU State	
Value	Description
2	New, the ONU is discovered and not being managed
3	ONU was inserted on the OLT and not in the NMS

Software Upgrade Mode

Table 310.ONU SW Upgrade Mode

Enum ONU SW Upgrade Mode	
Value	Description
1	OFF: No automatic upgrade will be performed on this ONU. The firmware upgrade will be manual, by direct action of the user, specifying the firmware file.
2	AUTO: Enable the Automatic firmware upgrade to the firmware version indicated as the default version.
3	Specific Version: ONU will upgrade to the version specified in 'specificVersion' field.

Multicast Group Channel Type

Table 311. Multicast Group Channel Type

Enum Multicast Group Channel Type	
Value	Description
1	Static
2	Dynamic

Ethernet Media Type

Table 312. Ethernet Media Type

Enum Ethernet Media Type	
Value	Description
0	other or unknown
1	AUI
2	10BASE-5
3	FOIRL
4	10BASE-2
5	10BASE-T duplex mode unknown
6	10BASE-FP
7	10BASE-FB
8	10BASE-FL duplex mode unknown
9	10BROAD36
10	10BASE-T half duplex mode
11	10BASE-T full duplex mode
12	10BASE-FL half duplex mode
13	10BASE-FL full duplex mode
14	100BASE-T4
15	100BASE-TX half duplex mode
16	100BASE-TX full duplex mode
17	100BASE-FX half duplex mode
18	100BASE-FX full duplex mode
19	100BASE-T2 half duplex mode
20	100BASE-T2 full duplex mode
21	1000BASE-X half duplex mode
22	1000BASE-X full duplex mode

23	1000BASE-LX half duplex mode
24	1000BASE-LX full duplex mode
25	1000BASE-SX half duplex mode
26	1000BASE-SX full duplex mode
27	1000BASE-CX half duplex mode
28	1000BASE-CX full duplex mode
29	1000BASE-T half duplex mode
30	1000BASE-T full duplex mode
31	10G BASE-X
32	10G BASE-LX4
33	10G BASE-R
34	10G BASE-ER
35	10G BASE-LR
36	10G BASE-SR
37	10G BASE-W
38	10G BASE-EW
39	10G BASE-LW
40	10G BASE-SW
41	10G BASE-CX4
42	2 BASE-TL
43	10 PASS-TS
44	100 BASE-BX10D
45	100 BASE-BX10U
46	100 BASE-LX10
47	1000 BASE-BX10D
48	1000 BASE-BX10U
49	1000 BASE-LX10
50	1000 BASE-PX10D
51	1000 BASE-PX10U
52	1000 BASE-PX20D
53	1000 BASE-PX20U

PON Protection Type B - Last Switch Over Cause

Table 313.Last Switch Over Cause

Enum Last Switch Over Cause	
Value	Description
0	none
1	Signal Fail
2	Card Failure
3	Signal Degraded
4	Signal Fail is Over (recovered)
5	Manual Switch Command
6	Wait To Restore time expired
7	Clear Command
8	Lockout Command
9	Force Switch Command

PON Protection Type B - Synchronization Status

Table 314.Synchronization Status

Enum Synchronization Status	
Value	Description
0	not synchronous
1	activating / disabling
2	synchronizing
3	synchronous
4	error
5	activation error

PON Protection Type B - Command Codes

Table 315.PPTB Command Codes

Enum PPTB Command Codes	
Value	Description
1	none (no command, used on show status operation)
2	clear
3	Lockout of Protection

4	Force switch o Protection Port
5	Force switch o Primary Port
6	Manual switch o Protection Port
7	Manuel switch o Primary Port

PON Protection Type B - Interface alarms

Table 316.PPTB Interface Alarms

Enum PPTB Interface Alarms	
Value	Description
1	interfaceLos
2	cardFailure

List of Error Codes

In this section we identify all possible error codes returned by the API.

When an error occurs the following Payload is returned by the TL1 agent:

Table 317.Error Message

Error Message		
Parameter	Type	Description
code	int	AGORA-NG business logic error code
cause	string	Represents the error code returned by the equipment, when applicable (conveyed in hexadecimal format)
message	string	A human readable string to provide feedback on the error

The possible error codes returned by AGORA-NG are shown in the table of section **Equipment Error Codes**.

If we have an equipment error, the error code is conveyed in the 'cause' field and the respective human readable error message conveyed on the 'message' field.

The equipment errors and respective description can also be found on section **AGORA-NG Business Logic Error Codes**.

AGORA-NG Business Logic Error Codes

Table 318. Business Logic Error Codes

Code	Description
1	Database connection error
2	Internal server error
5	Network element timeout
14	Server connection error
3347	Invalid IP
3445	Internal server error - invalid data format in client-server communication
3458	IP is not a valid Multicast IP
4011	Invalid Equipment ID
4012	Equipment already inserted in service
4013	Equipment not yet detected
4027	Equipment type does not match
4029	Equipment type not accepted
4032	Invalid Equipment Name
4039	Duplicated equipment Name
4041	Equipment already inserted in Planned state
4042	Another equipment with the same IP address is already being managed
4048	Equipment already exists with another type
4057	Invalid Parameters (generic)
4063	Maximum number of equipments reached
4072	Insufficient Parameters
4103	Given IP address is not the same as the current equipment IP address
4115	Duplicated Serial Number
4116	Duplicated ONU ID
4119	Invalid Location Provided
4120	Already exists another Equipment with the same IP
4121	Duplicated Location Provided
20000	Invalid Service Name
20001	No Counters available for the requested Termination Point
1011	Invalid Managed Domain Name

1012	Invalid Managed Domain Type
1013	Duplicated Managed Domain Name
1016	Managed Domain does not exist
1017	There are references to Manage Domain
1019	Invalid Site Name
1020	Duplicated Site Name
1021	Site ID invalid
1022	Site Name does not exist
1025	Invalid Technological Group Name
1027	Invalid Technological Group Type
1033	Technological Group does not exist
1050	Equipment Type does not exist
1054	Default entities cannot be modified or removed
1059	The entity does not exist
1079	Prototype does not exist
1064	Invalid Profile ID
1065	Profile ID does not exist
1066	Duplicated Profile ID
1069	Profile In use
1085	ACL has rules active
1099	The installed license does not allow the specified equipment type
3111	Association already exists (e.g.: termination point already being used)
3246	Cannot change equipment IP
3247	IP already exists
3250	Equipment returned an error
3251	Duplicated MAC
3296	Invalid Admin State
8097	Invalid Interface Admin State
8098	Invalid Name / Invalid Identification
3014	Not supported
3035	Cannot delete equipment - the equipment has dependencies
3036	Cannot change Admin State
3063	Termination Point type not allowed
3092	Not supported on current Equipment version

3146	Maximum number of interfaces reached
3338	Duplicated pair S-VLAN C-VLAN
3392	The given ONU is not connected to a downlink interface of the Network Service provided
3393	NS already in use on the same ONU
3394	Duplicated UniVlan
3396	Duplicated NNI-SVLAN
3397	Cannot remove ONU with services configured
3403	LAG has no members
3410	Service in use
3411	Only one service can be marked as native
3412	Duplicated Service Name
3417	Termination Point Used by a LAG
3424	Duplicated Pair Service Name - Multicast IP
3435	Termination Point used on Client Services
3440	Duplicated SVLAN
3475	Duplicated NNI-STAG
3465	Flag Multicastflood must be active for services with DHCP enabled
3043	Invalid Admin State
3176	Invalid Equipment Admin State
3177	Invalid Card Admin State
3456	Equipment is absent
3467	Invalid Termination Point Role (interface) (uplink / downlink)
3468	Invalid Termination Point Role (card) (uplink / downlink)
3470	At least one Uplink (root) Termination Point must be configured
3478	Service in use in a multicast group
3479	Service in use in a Static MAC entry
3480	Service does not exist
3481	Selected card is not a downlink card of the selected Network Service
3482	Selected Interface already has one Client Service configured
3483	Termination Point (card) in use by a service
3493	Password Needed
3494	Serial Number Needed
3495	Invalid Password Format
3496	Password too long (max 20 chars, HEX format)
3498	Counters not available on the requested Termination Point

3502	Network Service Type not allowed
3503	Invalid Client Service IGMP options
3504	NNI-CTAG configuration for one ONU Client Service is not allowed if the associated Network Service is unstacked
3505	NNI-CTAG configuration for one ONU Client Service is mandatory if the associated Network Service is stacked
3518	T-CONT in use
3519	T-CONT does not exist
3520	T-CONT does not exist in equipment
3521	Card has interfaces associated with uplink protection groups
3522	Invalid upstream traffic profile
3523	The same NNI S-TAG and NNI C-TAG can't be associated to the same interface
3524	IP Source Guard entry does not exist
3525	The source IP address is not valid
3526	The multicast IP address is not valid
3527	There is already a rule with the same filter
3528	Invalid Admin State
3529	One IP address must be provided (IPv4 or IPv6)
3530	Cannot use both IP addresses in the same entry (IPv4 or IPv6)
3531	The equipment does not support changing of DHCP Broadcast flag
3532	The selected interface must belong to the network service
3533	An unregistered client service id was found on the equipment specified
3534	It is not possible to complete the operation: Invalid data returned by equipment
3535	Bridge service is not supported
3536	NTP server name duplicated
3088	Found associated links to the entity

Equipment Error Codes

Common Equipment Errors

Table 319.Common Equipment Errors

Equipment Error Code (Hexadecimal)	Description
(XX means any value)	
0x08XXXXXX 0x69XXXXXX	Equipment firmware error
0x07XXXXXX	Internal Equipment Error (IPC Error)
0xXXXX0001	Invalid Parameter (generic)
0xXXXX0002	Not Implemented / Not Supported
0xXXXX0003	Parameter unknown
0xXXXX0004	Parameter Read-Only
0xXXXX0005	Wrong number of elements (too few or too many)
0xXXXX0006	Max number reached
0xXXXX0007	Empty Table (no more data)
0xXXXX0008	Permission denied (user has not enough privileges)
0xXXXX0009	Resource is busy
0xXXXX000A	Resource is free
0xXXXX000B	Resource not available / Not reachable
0xXXXX000C	Wrong Admin state
0xXXXX000D	Duplicated Name
0xXXXX000E	Wrong Operational state
0xXXXX000F	Entity does not allow the operation
0xXXXX0010	Wrong Context (internal error)
0xXXXX0011	Out of range (value given is not within expected bounds)
0xXXXX0030	A string parameter contains invalid characters
0xXXXX0100	No free memory

Specific Equipment Errors

Table 320.Specific Equipment Errors

Equipment Error Code (Hexadecimal)	Description
0x08030001	Unavailable resources for counter activation
0x08030006	Unavailable resources for the service in the OLT
0x08030100	Service has active probe or counter

0x1E0348A0	There is at least one probe associated to the service
0x0A03000E	Invalid Operational State
0x0A030113	The proposed serial number already exists.
0x0A030114	ONTs list is updating.
0x0A030115	The serial number is invalid.
0x0A030117	The password is being used by another ONU.
0x0A030118	Register type is invalid.
0x0D030100	The minimum distance is greater than the maximum
0x0D030101	The difference between minimum and maximum distance is greater than allowed
0x0D030102	There are ONTs connected to the PON port which do not allow it to be disabled
0x0D030103	FEC Downstream is not enabled on the PON port
0x0D030104	FEC Upstream is not enabled on the ONT
0x0D030105	The PON port has ONTs with services
0x0D030106	The PON port is used in unstacked services with different MAC Bridge type
0x0D030107	The PON port is in VLAN mapping mode
0x0D030108	The PON port is in VLAN + P-Bit mapping mode
0x0D034320	Invalid protection group administrative state
0x0D034321	Invalid protection group mode
0x0D034322	Invalid protection group reversibility
0x0D034323	Invalid protection group 'wait to restore' value
0x0D034324	Invalid protection group 'hold-off timer' value
0x0D034325	Invalid protection group primary port
0x0D034326	Invalid protection group protection port
0x0D034327	Protection group primary port is not active
0x0D034328	Protection group protection port is active
0x0D034330	The ports of the protection group cannot be the same
0x0D034331	The protection group is active
0x0D034332	The protection group is not active
0x0D034333	The protection group entity ID already exists
0x0D034334	Port in use by a protection group
0x0D034335	Protection port has ONUs
0x0D034336	Protection port has services
0x0D034337	The protection and working ports of the protection group belong to the same card

0x0D034338	The protection is being activated/deactivated or synchronizing
0x0D034339	The protection information is not synchronized
0x0D034340	Interface is being used by at least one ACL
0x0D034341	Interface is used on a GPON Type B Protection Group
0x0D034342	Cannot execute a new command without clearing the previous one
0x0D034343	The working interface has Bitstream services
0x0D034344	The specified working interface has Unicast or UniVoip stacked services, therefore the protection interface cannot be from the same card.
0x0D034891	Service is in use on a Multicast Group
0x0D03489A	There is at least one ACL associated to the service
0x1D030303	Incompatible hardware version
0x1D034880	Invalid ID
0x1D034881	Invalid Admin
0x1D034882	Invalid Type
0x1D034883	Invalid Client Port
0x1D034884	Not enough resources to active ONU counter. Max nbr reached.
0x1D034886	The respective OLT service is not admin enabled
0x1D034890	Only inactive services can be removed
0x1D034891	UNI-C-Tag already in use by another service in this ONU
0x1D034893	Only one multicast service is allowed per ONU
0x1D034894	Network Service already associated with another Client Service (same ONU).
0x1D034895	NNI C-Tag is in use by another ONU
0x1D034896	NNI C-Tag < min
0x1D034897	NNI C-Tag > max
0x1D034898	MAX service num
0x1D034899	(multicast) NNI C-Tag cannot be zero
0x1D03489A	The NNI C-TAG can't be 0 for unicast stacked services
0x1D03489B	service has attached ONU interface(s)
0x1D03489C	OLT service does not include this ONU interface
0x1D03489D	service has attached interfaces(s)
0x1D03489F	Reached Maximum nbr of downstream services for this Slot
0x1D0348B0	max Upstream BW
0x1D0348BA	VoIP services can only have VoIP interfaces
0x1D0348BB	VoIP services must have at least one VoIP interface

0x1D0348BC	The unicast service associated is admin disabled
0x1D0348BD	The multicast service associated is admin enabled
0x1D0348BE	Invalid DHCP configurations
0x1D0348BF	Invalid remote-id string
0x1D0348C0	Unable to configure more than one unicast IGMP service per ONU
0x1D0348C1	No unicast IGMP service for this ONU
0x1D0348C2	No active unicast IGMP service for this ONU
0x1D0348C3	IP Management can only be configured for unicast services
0x1D0348C4	Requested ONU cannot have more than one service with IP Management
0x1D0348C5	Encryption flag cannot be used in multicast services
0x1D0348C6	All multicast services must be deactivated prior to deactivating the unicast IGMP service
0x1D0348C7	Unable to remove service Bridge master until the remaining Bridge services are removed
0x1D0348C8	Unable to configure a downstream traffic profile on unstacked services
0x1D0348C9	NNI C-Tag is used by another Client Service associated with a Network Service with the same NNI S-Tag
0x1D0348CA	The selected ethernet profile does not exist
0x1D0348CB	The selected upstream profile does not exist
0x1D0348CC	The service has no T-CONTs mapping
0x1D0348CD	The service has T-CONTs mapping
0x1D0348CE	Invalid PCP profile
0x1D035010	Duplicated Client Service referencing the same Unstacked Network Service on this Interface
0x1D035011	Requested NNI C-Tag does not match the remaining ONUs associated with the same N:1 Bridge OltService
0x1D035012	EthernetProfileId MUST match for all OntServices that belong to the same ONU and N:1 Bridge OltService
0x1D035013	EthernetProfileId MUST match for all OntServices that belong to the same card and 1:1 Bridge OltService
0x1D035014	Client Service has no interface associated
0x1D035015	Unstacked Services: Duplicated UNI C-TAG Stacked Services: UNI C-TAG cannot duplicate
0x1D035016	Duplicated UNI C-TAG for this ONU
0x1D035017	Duplicated UNI C-TAG on the same Interface
0x1D035020	The network service has no IGMP

0x1D035021	IGMP override flag cannot be done on active service
0x1D035030	Maximum number of MACs out of range
0x1D035031	Maximum number of MACs not supported for service type
0x1D035032	Extended VLAN tagging is active in a service port
0x1D035033	The service is referenced by Extended VLAN tagging rules
0x1D035034	An active service must have at least one interface or one active Extended VLAN Tagging Operation rule
0x1D039211	The upstream profile can't be changed with upstream profiles
0x1D039212	The type of the upstream traffic profile is invalid
0x1D039213	Invalid parameter for upstream traffic profile
0x1D039214	Empty String for Profile name
0x1D039215	The specified ONU profile ID does not exist
0x1D039216	The specified ONU profile ID is not ADMIN Enabled
0x1D039230	Invalid T-CONT admin state
0x1D039231	Invalid upstream profile
0x1D039240	The T-CONT is active
0x1D039241	The internal ALLOC ID pool is exhausted
0x1D039242	The T-CONT is being used by a service
0x1D039250	Invalid T-CONT ID
0x1D039251	Invalid client service ID for T-CONT mapping
0x1D039252	Invalid priority for T-CONT mapping
0x1D039260	The specified priority does not exist on the P-Bit profile of the PON
0x1D039261	The Service has an upstream profile
0x1D039262	Invalid T-CONT admin state
0x1D03A400	Invalid rule admin state
0x1D03A401	Invalid outer priority filter
0x1D03A402	Invalid inner priority filter
0x1D03A403	Invalid inner VID filter
0x1D03A404	Invalid outer VID filter
0x1D03A405	Invalid inner TPID filter
0x1D03A406	Invalid outer TPID filter
0x1D03A407	Invalid ethertype filter
0x1D03A408	Invalid number of tags to remove
0x1D03A409	Invalid inner priority action
0x1D03A40A	Invalid outer priority action

0x1D03A40B	Invalid inner VID action
0x1D03A40C	Invalid outer VID action
0x1D03A40D	Invalid inner TPID action
0x1D03A40E	Invalid outer TPID action
0x1D03A40F	Invalid client service
0x1D03A410	The rule is active
0x1D03A411	Duplicate filter
0x1D03A420	Invalid enable value
0x1D03A421	Invalid association type
0x1D03A422	Invalid associated entity ID
0x1D03A423	Invalid input TPID
0x1D03A424	Invalid output TPID
0x1D03A425	Invalid DSCP to P-Bit mapping profile
0x1D03A430	The port has services
0x1E034893	For unicast/multicat services the pair service type/uni-vlan has to be unique in the OLT
0x1E0348DD	Stacked services can only have one uplink port
0x1E034901	UNI C-Tag already in use in the NNI S-Tag of a non-multicast network service
0x1E034902	UNI C-Tag já em uso na NNI S-Tag dum serviço de rede multicast UNI C-Tag already in use in the NNI S-Tag of a multicast network service
0x1E039213	Invalid parameters in the configuration Upstream profile
0x1E034892	Duplicated NNI-STAG
0x1E0348A0	There is at least one probe associated to the service
0x21030300	Static groups end-point value not valid
0x21030301	Cannot change static group end point - there is at least one static active group list entry
0x50034880	Invalid ID value
0x50034881	Invalid ADMIN value
0x50034882	Invalid TYPE value
0x50034883	Invalid IP VERSION value
0x50034884	Invalid destination IP Mask value
0x50034885	Invalid NAME value

0x50034886	Invalid bandwidth value
0x50034890	Only admin down entities can be removed
0x50034891	The Network Service associated must be admin up
0x50034892	The Network Service associated must be multicast
0x50034893	The Network Service associated does not exist
0x50034894	Invalid Admin state
0x50034895	Invalid IP multicast(<224.x.x.x or >239.x.x.x)
0x50034896	Invalid IP Mask for static group (only 32 bits are allowed)
0x50034897	Multicast IP already used
0x50034898	Invalid Configuration for multicast static groups.
0x5D030101	Invalid Downlink interface
0x5D030102	Multicast service interface is not mapped in any of the associated unicast services interfaces
0x5D030103	Unicast service interface is a member of a UC/MC association
0x5D030104	Invalid interface Role
0x5D030105	Invalid Admin State
0x5D030106	Invalid uplink interface
0x5D030107	Invalid downlink interface
0x5D030108	Interface and NNI S-TAG already used in synchronism
0x5D034850	The service must contain at least one uplink interface
0x5D034851	The service must contain at least two interfaces (uplink+downlink)
0x5D034852	Stacked services cannot have multiple uplink interfaces
0x5D034853	Unable add this interface because an active PTP entry with the same NNI S-TAG already exists
0x5D034854	Selected port belongs to an invalid card for this service type
0x5D034860	Stacked services for this service type, must contain only one uplink port
0x5D034861	Selected port belongs to a Static Probe
0x5D034862	Cannot add a Type B protected interface to a Bitstream service
0x5D034863	Cannot configure Unicast or UniVoip stacked services on interfaces configured with Type B Protection, on the same card.
0x54030103	There is already an entry with the same service/mac
0x5A030103	Invalid IP address for active probe
0x60030104	Unknown parameter in the circuit ID string
0x65030101	Invalid ACL id
0x65030102	Invalid ACL administrative state

0x65030103	Invalid ACL type
0x65030104	ACL is used on a rule
0x65030105	ACL is used on an interface
0x65030106	ACL is used on a service
0x65030107	Invalid ACL rule administrative state
0x65030108	Invalid ACL rule action
0x65030109	Invalid ACL rule ethernet type
0x65030110	Invalid ACL rule CoS
0x65030111	Invalid ACL rule IP protocol
0x65030112	Invalid ACL rule port
0x65030113	Invalid ACL rule DSCP
0x65030114	Invalid ACL rule precedence
0x65030115	Invalid ACL rule flow label
0x65030116	Maximum number of rules per ACL reached
0x65030117	Cannot remove/disable the last rule for an ACL with enabled associations
0x65030118	ACL interface association: invalid administrative state
0x65030119	ACL interface association: invalid direction
0x65030120	ACL interface association: invalid interface id
0x65030121	ACL interface association: invalid ACL id
0x65030122	ACL interface association: invalid interface id
0x65030123	ACL interface association: invalid ACL id
0x65030124	ACL service association: invalid administrative state
0x65030125	ACL service association: invalid direction
0x65030126	ACL service association: invalid ACL id
0x65030127	ACL service association: invalid network service id
0x65030128	ACL service association: service is not active
0x66030101	Invalid Interface for IP Source Guard.
0x66030102	Invalid Admin State.
0x66030103	Invalid IP Version.
0x66030104	The associated Network Service must be enabled.
0x66030105	Unknown Network Service.
0x66030106	Cannot change admin enabled entities.
0x66030107	Interface must be active.
0x66030108	Interface must be IP Source Guard Enabled (interface configuration).

0x66030109	Interface must belong the NS downlink port list.
0x6603010A	Interface must belong the NS downlink card list.
0x6603010B	MAC cannot be full zeros.
0x6603010C	Not Unicast MAC: the least significant bit of the most significant octet must be zero.
0x67030402	Unable to perform the requested operation on active routing interfaces
0x67030403	Invalid LAN IP Address
0x6903030C	No more T-CONT resources available

Chapter 9

ABBREVIATIONS

10GbE	10 Giga bit per second Ethernet
BIP8	Bit-Interleaved Parity 8
BW	Bandwidth
CBR	Constant Bit Rate encoding
CBS	Committed Burst Size
CIR	Committed Information Rate
CRC	Cyclic Redundancy Check
CVLAN	Customer network VLAN
DBA	Dynamic Bandwidth Allocation
DHCP	Dynamic Host Configuration Protocol
EBS	Excess Burst Size
EIR	Excess Information Rate
FCS	Frame Check Sequence
FEC	Forward Error Correction
FW	Firmware
GbE	Giga bit per second Ethernet
GEM	GPON Encapsulation Method
GPON	Gigabit-capable Passive Optical Networks
ID	Identification
IEEE	Institute of Electrical and Electronics Engineers
IGMP	Internet Group Management Protocol
IP	Internet Protocol
ITU-T	Telecommunications International Telecommunication Union
LACP	Link Aggregation Control Protocol
LAG	Link Aggregation Group
MAC	Media Access Control
MD	Managed Domain
NE	Network Equipment
ODU	Optical Distribution Unit
OLT	optical line terminal
OMCI	ONT management and control interface
ONT	Optical Network Terminal
ONU	Optical Network Unit
PCP	Priority Code Point
PLOAM	Physical Layer Operations and Maintenance
PON	Passive Optical Network

QoS	Quality of Service
REI	Remote Error Indication
RF	Radio Frequency
RFC	Request for Comments
RMON	Remote Network Monitoring
RPM	Rotations Per Minute
RS232	Recommended Standard 232 (computer serial interface, IEEE)
SFP	Small Form-factor Pluggable transceiver
SNMP	Simple Network Management Protocol
SVLAN	Stacked VLAN
SW	Software
UBR	Unspecified Bit Rate
UNI	User-Network Interface
VLAN	Virtual Local Area Network
XFP	10 Gigabit Small Form Factor Pluggable transceiver