Smart OMCI Configuration Guide

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ZHONE™

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ABOUT THIS GUIDE

This guide is intended for use by technicians, installers, system administrators and network administrators. It explains how to configure Zhone's OMCI based zNIDs using the Smart OMCI Web tool.

This guide is intended only to show GPON provisioning and management using OMCI. The overall GPON provisioning process also includes building bridges and routing interfaces and GPON specific additions which are required for those layer 2 and layer 3 interfaces on Zhone's MSAP such as the MXK are described in the MXK documentation. Information about bridging, routing as well as GPON specific layer 1 (physical layer) and other GPON specific information and commands may be found in the Bridging, IP, and GPON chapters of the *MXK Configuration Guide*. A full example, from connecting power and cabling for the MXK to provisioning the GPON solution is also shown in the *FTTx Application Guide*.

This document shows examples from the MXK Command Line Interface (CLI), version 2.1. At the time of publication of this document it is not expected that the MXK CLI commands will change substantially from the examples given.

For information on installing the MXK chassis and cards, refer to the *MXK Hardware Installation Guide*. *For* greater information about specific configuration procedures for the MXK, please refer to the *MXK Configuration Guide.*

This guide only attempts to introduce technical topics. The idea is not to explain industry standards, but explain the Zhone perspective on the standard and how to implement solutions using Zhone products.

Style and notation conventions

The following conventions are used in this document to alert users to information that is instructional, warns of potential damage to system equipment or data, and warns of potential injury or death. Carefully read and follow the instructions included in this document.

Caution: A caution alerts users to conditions or actions that could damage equipment or data.

Note: A note provides important supplemental or amplified information.

Tip: A tip provides additional information that enables users to more readily complete their tasks.

WARNING! A warning alerts users to conditions or actions that could lead to injury or death.

WARNING! A warning with this icon alerts users to conditions or actions that could lead to injury caused by a laser.

Typographical conventions

The following typographical styles are used in this guide to represent specific types of information.

Bold	Used for names of buttons, dialog boxes, icons, menus, profiles when placed in body text, and property pages (or sheets). Also used for commands, options, parameters in body text, and user input in body text.
`Fixed`	Used in code examples for computer output, file names, path names, and the contents of online files or directories.
`Fixed Bold`	Used in code examples for text typed by users.
`Fixed Bold Italic`	Used in code examples for variable text typed by users.
Italic	Used for book titles, chapter titles, file path names, notes in body text requiring special attention, section titles, emphasized terms, and variables.
PLAIN UPPER CASE	Used for environment variables.
Command Syntax	Brackets [ ] indicate optional syntax. Vertical bar | indicates the OR symbol.

Related documentation

Refer to the following publication for additional information:

MXK Hardware Installation Guide—explains how to install the chassis and cards.

MXK Configuration Guide—describes how to configure the MALC for routing, for bridging and a number of other configurations.

FTTx Application Guide—explains how to configure GPON and Active Ethernet zNIDs in a procedures which encompass commands for both the MXK and the zNIDs as a single total solution.

Zhone CLI Reference Guide—explains how to use the Zhone command line interface (CLI) and describes the system commands and parameters.

Refer to the release notes for software installation information and for changes in features and functionality of the product.

Acronyms

The following acronyms are related to Zhone products and may appear throughout this manual:

Table 1: Acronyms and their descriptions

Acronym	Description
ARP	Address Resolution protocol
EAD	Ethernet Access Devices
GEM	GPON Encapsulation Mode
GPON	Gigabit Passive Optical Network
IAD	Integrated Access Device
ISP	Internet Service Provider
IPTV	Internet Protocol Television
MALC	Multi-Access Line Concentrator
ME	Managed Entity
MIB	Management Information Base
ODN	Optical Distribution Network
OMCI	ONT Management and Control Interface
OLT	Optical Line Terminal
ONT	Optical Network Terminal

Table 1: Acronyms and their descriptions

Acronym	Description
ONU	Optical Network Unit
PON	Passive Optical Network
PWE	PseudoWire
RIP	Routing Information Protocol
SLMS	Single Line Multi-Service
SNMP	Simple Network Management Protocol
TFTP	Trivial File Transfer Protocol
UNI	User Network Interface
VoIP	Voice over Internet Protocol
ZMS	Zhone Management System
zNID	Zhone Network Interface Device

Contacting Global Service and Support

If your product is under warranty (typically one year from date of purchase) or you have a valid service contract, you can contact Global Service and Support (GSS) with questions about your Zhone product or other Zhone products, and for technical support or hardware repairs.

Before contacting GSS, make sure you have the following information:

- Zhone product you are using
- System configuration
- Software version running on the system
- Description of the issue
- Your contact information

If your product is not under warranty or you do not have a valid service contract, please contact GSS or your local sales representative for a quote on a service plan. You can view service plan options on our web site at

http://www.zhone.com/support/services/warranty.

Technical support

The Technical Assistance Center (TAC) is available with experienced support engineers who can answer questions, assist with service requests, and help troubleshoot systems.

Hours of operation	Monday - Friday, 8 a.m. to 5 p.m, Pacific (excluding U.S. holidays)
Telephone (North America)	877-ZHONE20 (877-946-6320)
Telephone (International)	510-777-7133
E-mail	support@zhone.com
The Web is also available 24 x 7 to submit and track Service Requests (SR's)	www.zhone.com/support

If you purchased the product from an authorized dealer, distributor, Value Added Reseller (VAR), or third party, contact that supplier for technical assistance and warranty support.

Hardware repair

If the product malfunctions, all repairs must be authorized by Zhone with a Return Merchandise Authorization (RMA) and performed by the manufacturer or a Zhone-authorized agent. It is the responsibility of users requiring service to report the need for repair to GSS as follows:

- Complete the RMA Request form (http://www.zhone.com/account/sr/submit.cgi) or contact Zhone Support via phone or email:

Hours of operation:	Monday Friday, 6:30am-5:00pm (Pacific Time)
E-mail:	support@zhone.com (preferred)
Phone:	877-946-6320 or 510-777-7133, prompt #3, #2

- Provide the part numbers and serial numbers of the product(s) to be repaired.
- All product lines ship with a minimum one year standard warranty (may vary by contract).
- Zhone will verify the warranty and provide a repair quote for anything not under warranty. Zhone requires a purchase order or credit card for out-of-warranty fees.

TABLE OF CONTENTS

1 SMART OMCI OVERVIEW

Zhone Technologies provides advanced fully integrated standards based network access solutions. Zhone's vision is founded on intelligent access devices capable of quickly and easily deploying multi-play service packages which combine business broadband, Voice over IP (VoIP), Internet Protocol Television (IPTV), and Ethernet access on existing copper and fiber infrastructure with a migration path to an all IP network.

ONT Management and Control Interface (OMCI) is a complex protocol defined by ITU-T G.984.4. From a GPON industry view the OMCI standard is an important step to provide multi-vendor interoperability and resilience to Optical Distribution Networks (ODNs). While many vendors have circumvented the OMCI standard with proprietary approaches to managing Optical Network Units (ONUs), Zhone has devised Smart OMCI, a system which simplifies the deploying and managing of OMCI based ONUs. The Smart OMCI system consists of a web based tool which provides

- per model configuration options
- a system of profiles defined to support Internet Service Providers (ISPs) service options to their customers with varying levels of performance for differentiated service options
- Support ISPs provisioning models, so that each subscriber addition or modification may be completed quickly and easily

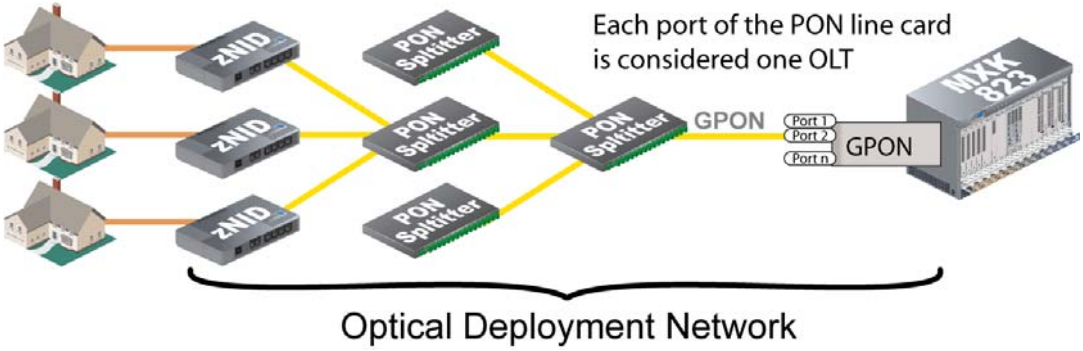
GPON ODN overview

In order to avoid confusion about terminology when describing the components of an Optical Distribution Network, this section describes the industry names and where applicable, names of Zhone products.

Components of Optical Distribution Networks

GPON networks are comprised of a number of components between the MXK and the subscriber. Each port of the GPON line card is an OLT.

Figure 1: Components of an Optical Distribution Network



- OLT

  Optical Line Terminal. This device is considered the head end of the ODN. (Note that each port on a GPON line card is considered an OLT.) Each port supports an ODN.

- Optical fiber

  The optical fiber is the physical cable.

- Splitters

  Optical splitters divide a single optical signal to multiple optical signals.

- Couplers

  Couplers are connectorized means for splicing cables. Because couplers are connectors there is a an optical signal cost for connectors

- ONT or ONU

  Optical Network Terminal (ONT) and Optical Network Unit (ONU) are reasonably similar terms which are both defined in the ITU-T G.984 GPON standards. They both provide an end for the ODN and conversion to some electrical media; However, ONTs usually have multiple subscriber-side services and interfaces, like Ethernet LAN, POTS or coaxial cable for TV services. ONUs would have a GPON interface upstream (just like the ONT), but are a last mile copper access device such as a VDSL2 DSLAM or MSAP which connects to customer premises equipment such as a VDSL2 modem.

Note: Throughout this document the terms ONU, ONT and zNID (Zhone's trademark name for fiber based ONTs) are used to mean the same fiber based customer premises device).

Zhone uses the term zNID (Zhone Network Interface Device) to identify fiber based ONTs.

OMCI overview

OMCI enables the Optical Line Terminal (OLT) to control ONUs:

- Establish and release connections across the ONU.
- Manage the User Network Interfaces (UNIs) at the ONU.
- Request configuration information and performance statistics.
- Autonomously inform the system operator of events such as link failures.

The OMCI protocol runs across the GEM (GPON Encapsulation Mode) connection between the OLT controller and the ONU controller that is established at ONU initialization. The OMCI protocol is asymmetric: the controller in the OLT is the master and the one in the ONU is the slave. A single OLT controller using multiple instances of the protocol over separate control channels may control multiple ONUs.

GEM provides the packaging of the user traffic.

The ONU management and control interface requirements given in the ITU984.4 recommendation supports the management of ONUs in the following areas:

- Configuration management
- Fault management
- Performance management
- Security management

Smart OMCI overview

The OMCI standard defines the Managed Entity (ME) commands that allow an OLT to communicate with an ONU. The ME commands are classified into two categories: Mandatory and Optional. The sequence in which the ME commands are sent from the OLT to the ONU is not always specified by the standard leading to vendor specific implementations of OMCI. With OMCI, service providers can encounter problems with OLT and ONU interoperability. In addition to vendor interoperability, there can also be interoperability of software versions. A new ONU model or software version can require an OLT software upgrade. Upgrading OLT software can cause the inconvenience and expense of a service outage for existing customers.

Zhone's Smart OMCI functionality, on the SLMS software product line, provides the flexibility to add new ONU models without upgrading the software on the OLT. Unlike deployment schemes for modems and routers which require copying master configurations and then altering specific customer information on the unit itself and using TR-069 for upgrading, Smart OMCI includes deployment and upgrade capability.

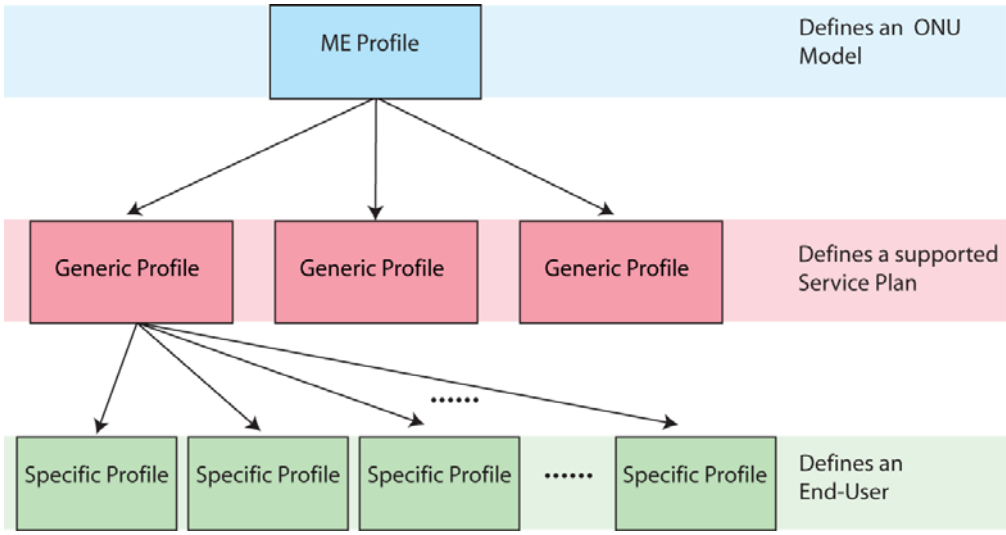
Implementing Smart OMCI

Smart OMCI functionality is implemented on the MXK by using OMCI profiles.

The three types of OMCI profiles defined in the system are ME, Generic, and Specific. Each profile type is synonymous to a task performed in the network deployment phase. As shown in the Figure 2, these three profile types have a hierarchical relationship.

These three OMCI profiles provide a policy based control of OMCI zNIDs.

Figure 2: Smart OMCI Architecture



- The Managed Entity (ME) profile defines what the zNID model can do
  - Select interfaces on the zNID model *and* define how the interface behaves.
  - Not required to select and define all interfaces.

    If the interface is not selected and defined, that interface will not be functional. Interfaces may also be controlled further down in the hierarchy.
  - Multiple ME files may be created for a single model. For example one application of a zNID with four Ethernet interfaces may have one data interface for data and three for video services, while another ME profile is configured for two data and two video services.

The ME profile contains all the information required to support an ONU and defines the OMCI commands which the OLT uses to configure an ONU. If a service provider supports three different ONU models in their network, there will be three ME profiles in the MXK (given that only one ME profile is defined per ONU).

The ME profile is created on the MXK by an ME profile file that is downloaded from Zhone's website.

- The Generic profiles define the differentiated service options for ISP customers
  - Define services on the model to meet service plan requirements

    The Generic profile is one way to throttle down service from the ME profile. The ME profile may have four Ethernet interfaces for data. The Generic profile is intended to support service plan policies by providing a centralized step for service plan based configuration options.

  A Generic profile is always associated with only one ME profile and contains the values for network parameters that define a service plan and the value for infrastructure network elements such as the softswitch IP address. If the service provider supports five different service plans on each of three supported ONU models, there will be a total of fifteen Generic Profiles in the MXK (five Generic profiles for each ME profile).

  The Generic Profile can be created using the CLI, ZMS or WebUI. The ME profile and Generic profile are created at the time of initial network deployment before activating the user.

- The Specific profiles define information which is specific to each ISP customer
  - Which model zNID is deployed on site
  - Which ME profile if multiple ME profiles per zNID model
  - Which service plan (for policy based service plans)
  - Customer specific information such as phone number

  The Specific profile defines the end-user and is created before activating the end-user. The Specific profile is always associated with only one Generic profile. The Specific profile contains value for variables and the variable list in the Specific profile is same as in the Generic profile. At creation, the Specific profile automatically inherits all the values of the parent Generic profile and does not require modification when the same values are used. When there is user specific information, like a telephone number, the values can be overridden by modifying those variables in the Specific profile.

  From the OMCI standpoint (not including the creation of upstream services and adding bridges for subscribers) the specific profile is the last step to tie together all configurable items for an end-user — the ONU model, the ME profile (if multiple per ONU), the service plan and customer specific information.

Smart OMCI summary

To summarize the Smart OMCI system: the variables defined in the Generic and Specific profiles are values used by the OMCI commands in the ME profile.

When activating an end-user the appropriate ME profile and Generic profile are associated with the Specific profile.

ME profiles and Generic profiles are normally created by a network analyst or network architect. The ME profile is the profile of the capabilities of the ONU model. Multiple MEs may be used for a single model, though the more common strategy is to have all attributes for the ONU model configured in the ME profile, then have the Generic profile pick from the available attributes. The Generic profile is intended to define ISP user bundles. If the ME profile has all ports configured, the Generic profile may define which are active for the end user. The specific profile is the end user profile and contains end user specific information, such as the phone number.

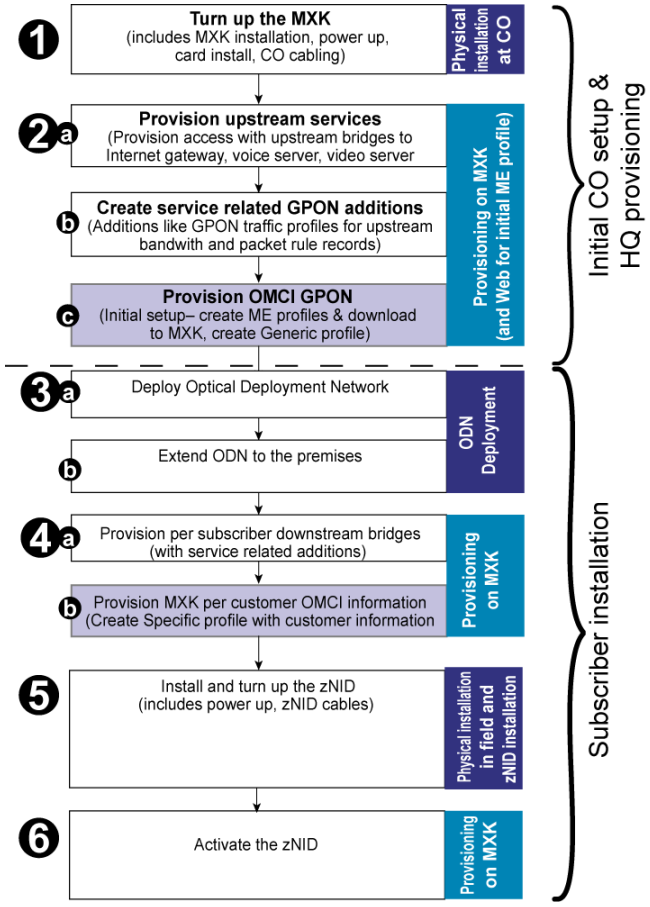
2 BASIC ZNID BRIDGE PROVISIONING WITH OMCI

In this chapter we will provision an OMCI based zNID using the Smart OMCI system. The procedure follows the normal deployment procedure as described below

Where Smart OMCI fits in the overall GPON deployment on the MXK

The standard deployment procedure — described in Figure 3 — has central office turn up and provisioing procedures which are separate from the turn up and provisioning procedures for the addition of subscribers.

Figure 3: Provisioning OMCI based zNIDs with the Smart OMCI system



Note the highlighted boxes which show where OMCI provisioning is accomplished in the procedure.

Figure 3 also shows whether each step takes place in the field (or may be provisioned on the MXK). Normally step 1 will take place only as a new MXK is installed in the field. Step 2 will occur as new upstream services are added or new policy decisions are made regarding throughput differentiation. The ODN usually is constantly being extended to include new areas or subscribers (Step 3). Steps 4, 5 and 6 occur as new subscribers (zNIDs) are added.

Configure OMCI zNIDs with Smart OMCI system

The following steps configure the MXK to manage OMCI based zNIDs with Smart OMCI:

- Creating an ME profile file, page 18
- Downloading ME profile file to MXK, page 30
- Creating ME profile, page 30
- Creating Generic profiles, page 31
- Creating Specific profiles, page 35
- Viewing current variable settings on an ONU, page 38
- Activating an ONU with OMCI profiles, page 41

Creating an ME profile file

Zhone Technologies provides the service provider a Smart OMCI web-interface to create an ME profile. The web interface is used to select the appropriate ONU zNID model and define which services the ONU will support. The ME profile file contains ME structure information which is unique to the ONU hardware model.

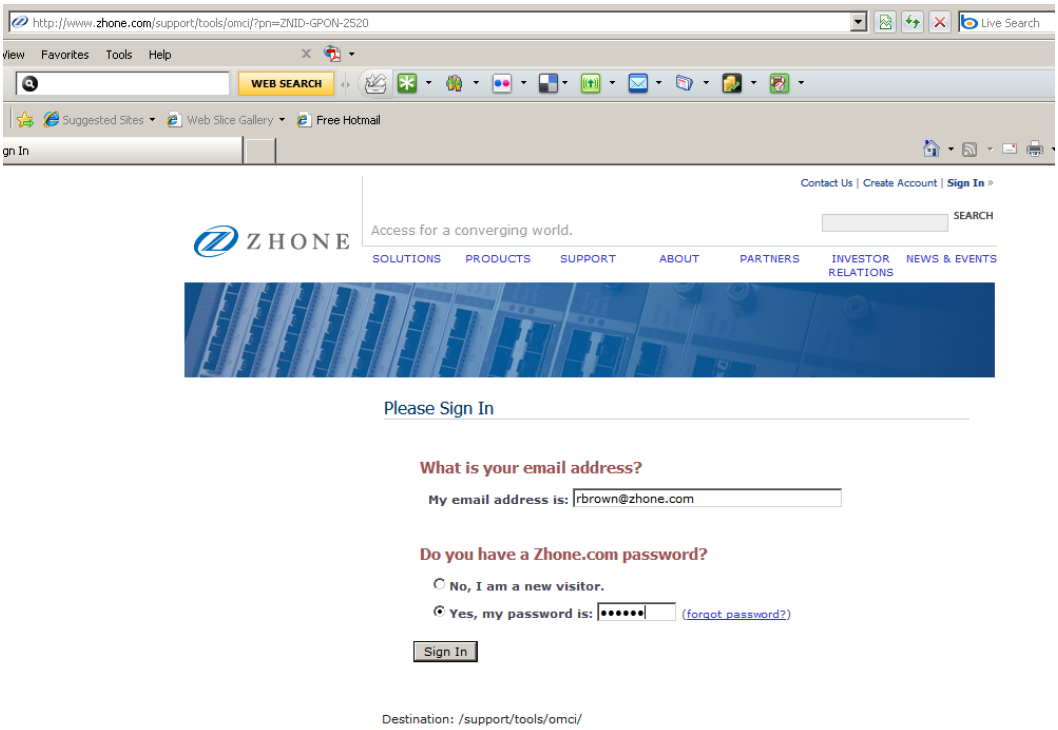
Access the Smart OMCI web-interface can be through Zhone's website.

To create an ME profile file:

1. Navigate to the Zhone website at "http://www.zhone.com/support/tools/omci/".

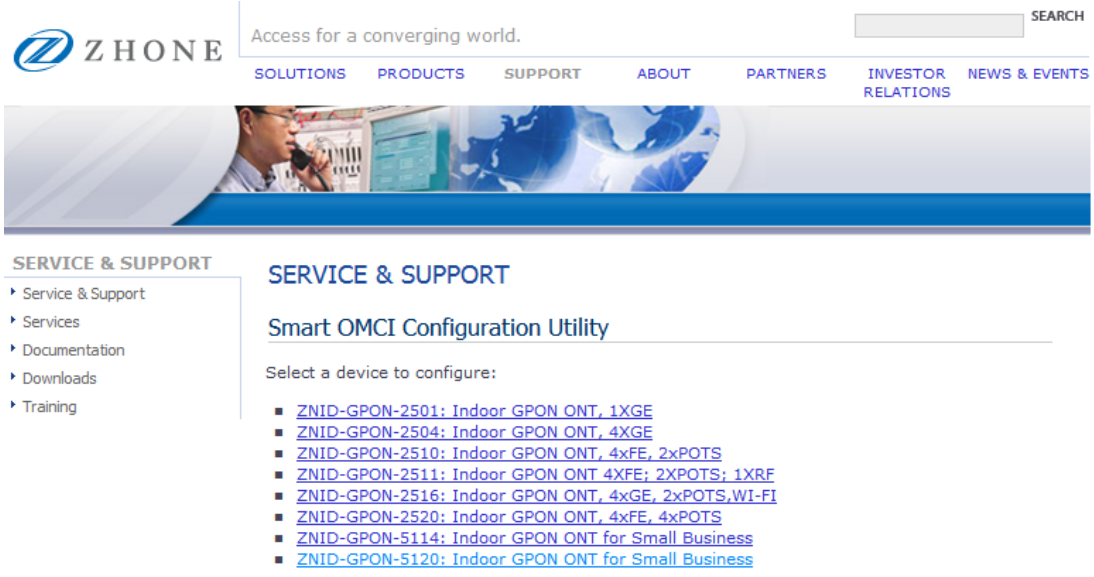
2 Access the website by entering the email address and the password selected at registration.

Note: skip this step if you are already signed in.



3 Select desired ONU model, then click **Continue**.

This example selects ONU model ZNID-GPON-5120.



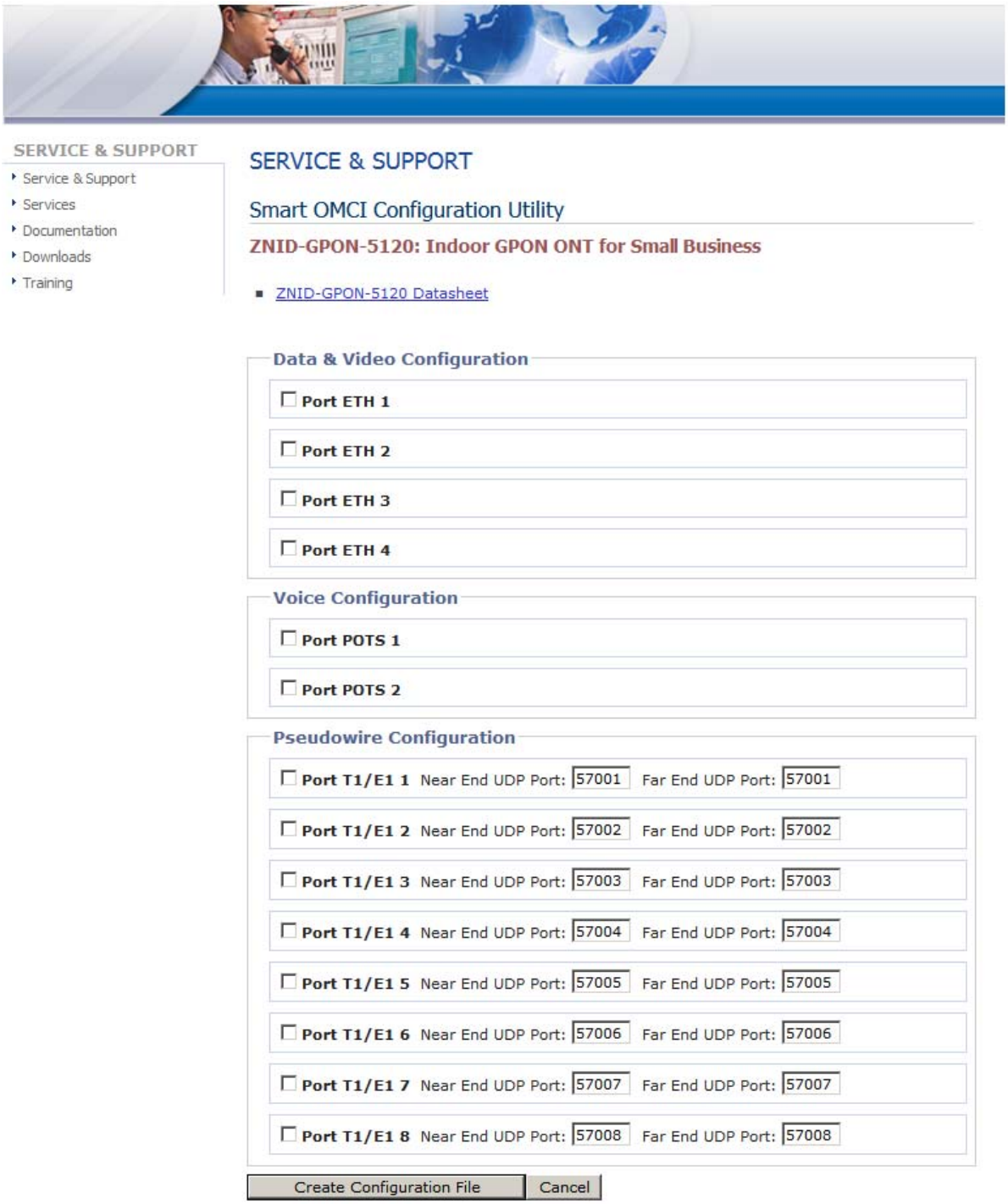
After selecting the ONU model, the Smart OMCI web-interface updates to display the list of services that are supported on this ONU hardware model.

4 Select the desired services for a port (Ethernet port one for data)

For each physical interface, you can select the supported service configuration, GEM Index, and VLAN filtering.

This example will set ports for data, video, voice and pseudowire.

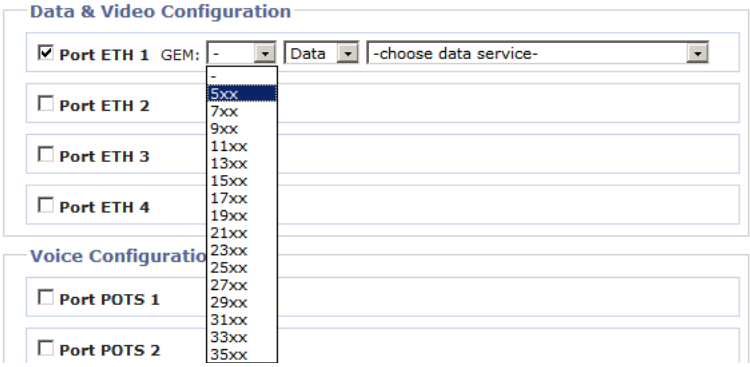
We will set Port ETH 1 to a single tagged data port. For a description of the different types of tagging see *Smart OMCI tagging options* on page 47.



a Select the GEM index.

The GEM index is a means for organizing the service. The GEM index will combine with the ONU ID to define the GEM Port ID for Port ETH1 on the specific zNID when the zNID is activated. For more information about how a GEM port ID is constructed, see *GEM port IDs* on page 45.

Figure 4: Selecting the GEM index



GEM index is in the range of 5xx to 35xx.

This example selects GEM index *5xx* for data service on *Port ETH1*, GEM index *7xx* for voice service on *Port POTS1* and *Port POTS2*, GEM index *9xx* for video service on port *Port ETH3*. The graphic examples also show *Port ETH2* set up for data like *Port ETH1* and *Port ETH4* set up for video like *Port ETH3*.

Note: Take a note of the GEM index you selected for different services. It could be used to calculate the GEM port ID with the following formula:

GEM port ID = GEM index + ONU ID

The GEM port ID is used when you provisioning services on bridges or routers by using the **bridge add** or **host add** commands.

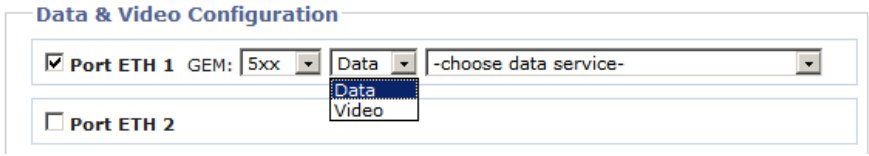
Refer to *GEM port IDs* on page 45 for greater detail.

Note: All of the variables created with the smart OMCI web tool may be modified in the generic or specific profile. However the overall setup of the Ethernet port, such as setting a port for tagged unfiltered traffic cannot be changed by changing a variable in the generic or specific profile.

b Select the data type for the Ethernet port

Since we are configuring **Port ETH 1** for data we will select **Data** from the dropdown.

Figure 5: Selecting the data type for the Ethernet port

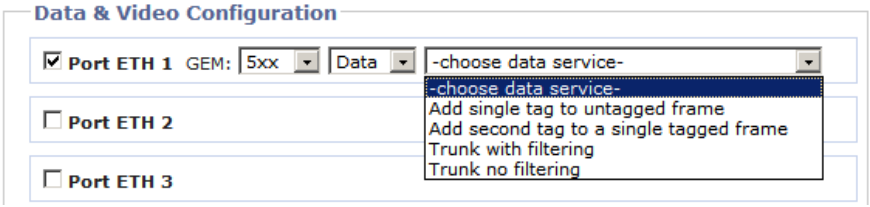


c Select the tagging option

From the dropdown select **Add single tag to untagged frame**.

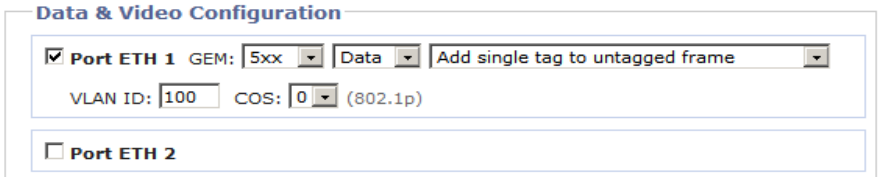
For this example we are adding a tag to the incoming untagged frames from a PC network. Refer to *Smart OMCI tagging options* on page 47 for more information.

Figure 6: Selecting the tagging option



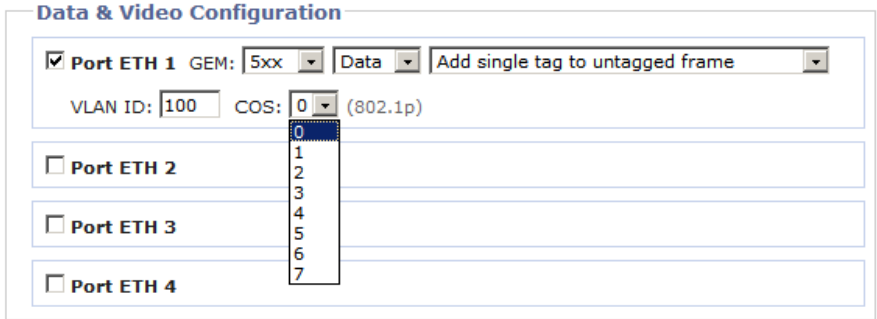
d Set the VLAN ID for the tagging option

In the **VLAN ID** text box for **Port ETH 1** enter **100**.



e Set the CoS for the data port

From the **COS** dropdown for **Port ETH 1** select **0**.

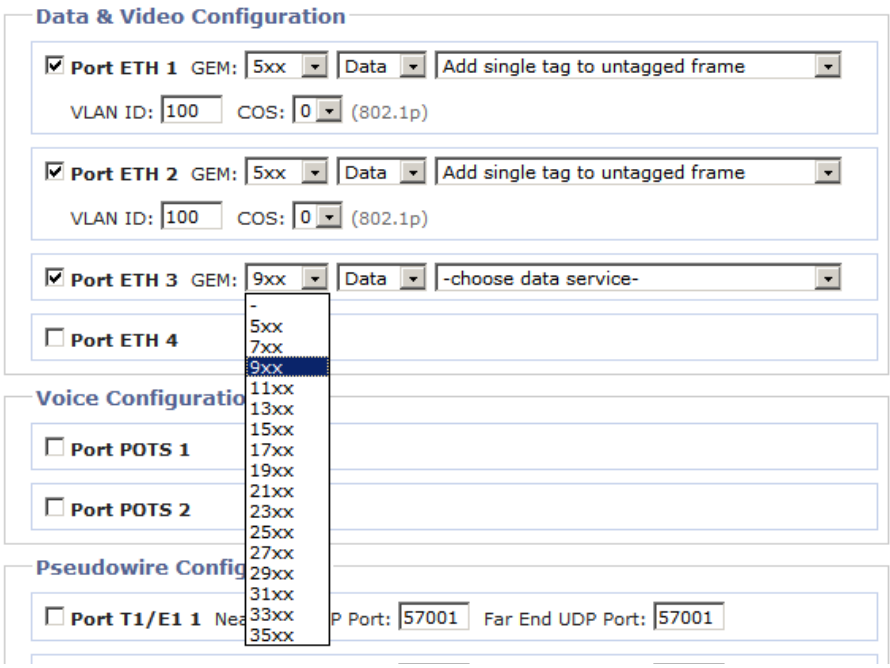


5 Select the desired services for a port (Ethernet 3 for video)

a Select the GEM index.

In this example we will set Port ETH 3 to video on GEM 9xx. For more information about GEM port IDs, see *GEM port IDs* on page 45.

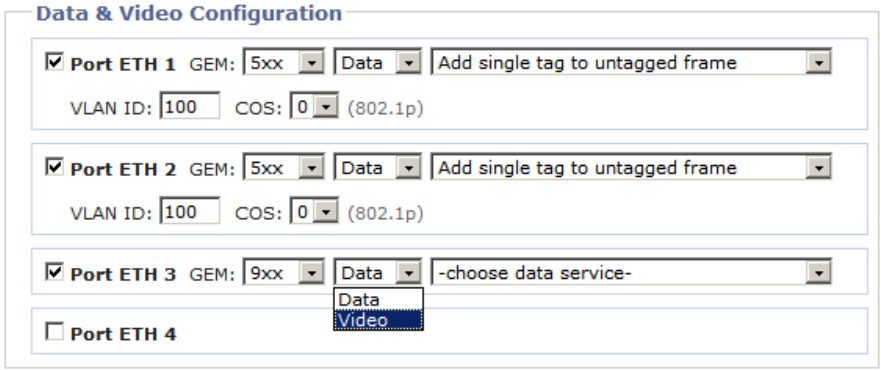
Figure 7: Selecting the GEM index for video



b Select the data type for the Ethernet port

Since we are configuring **Port ETH 3** for video we will select **Video** from the dropdown.

Figure 8: Selecting the data type for the Ethernet port

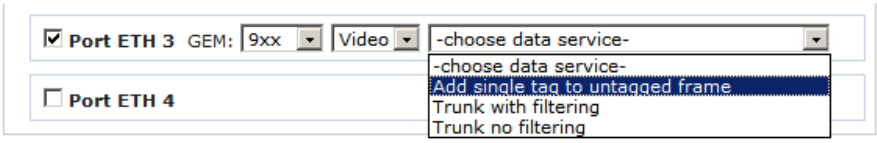


c Select the tagging option

From the dropdown select **Add single tag to untagged frame**.

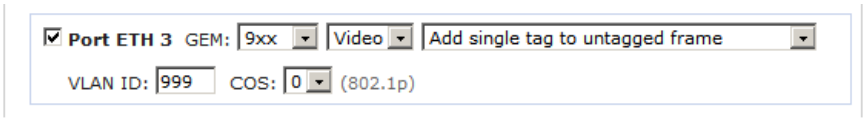
Like the data example we are adding a tag to the incoming untagged frames: this time from a set top box. Refer to *Smart OMCI tagging options* on page 47 for more information.

Figure 9: Selecting the tagging option



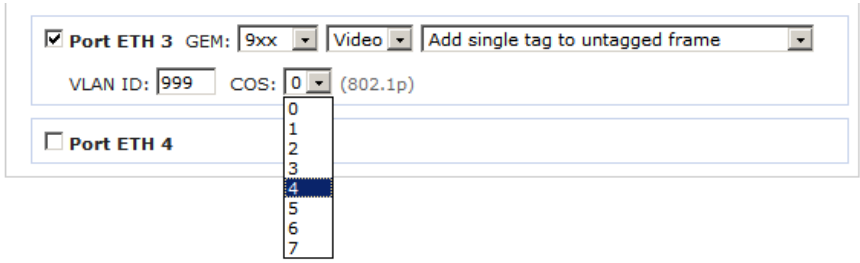
d Set the VLAN ID for the tagging option

In the **VLAN ID** text box for **Port ETH 3** enter **999**.



e Set the CoS for the data port

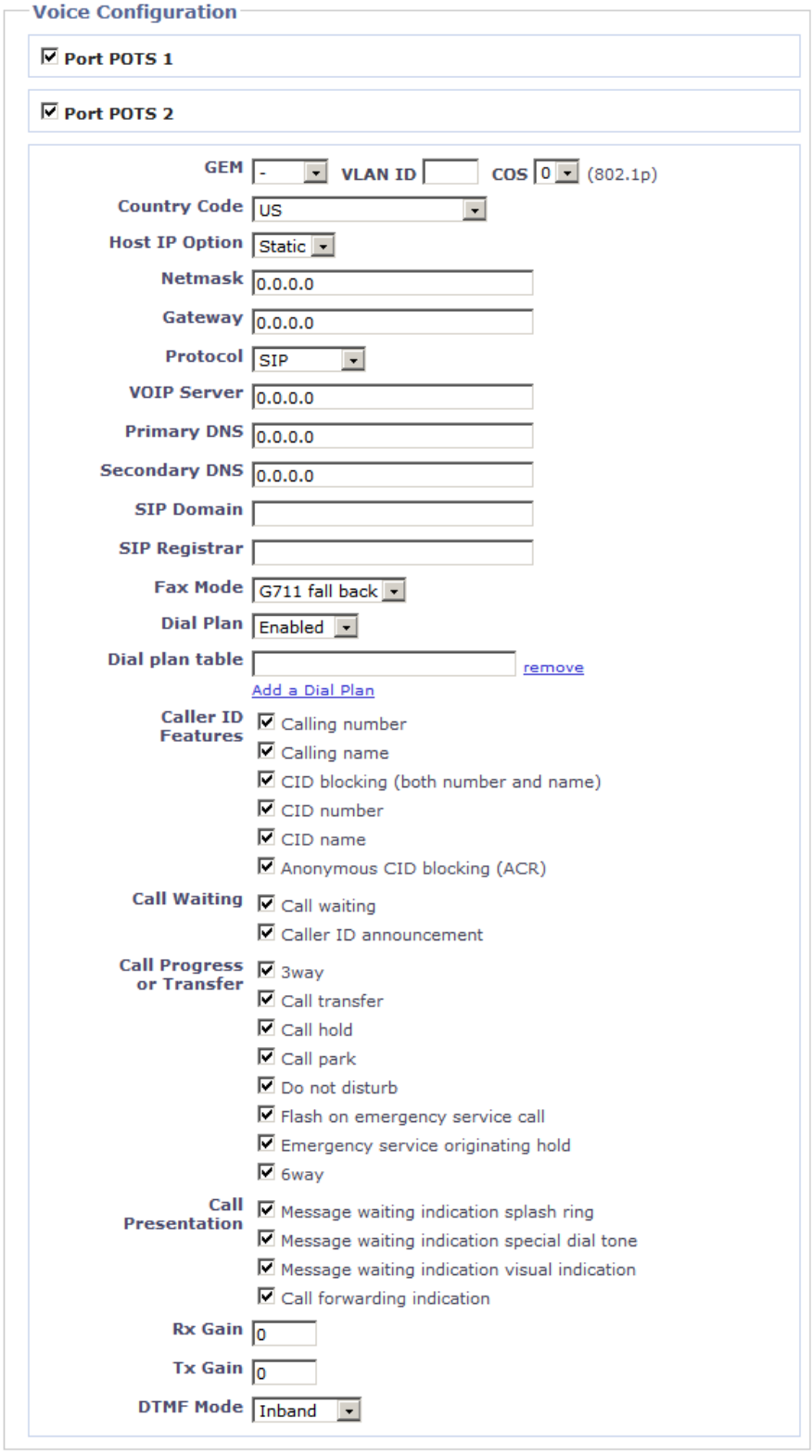
From the **COS** dropdown for **Port ETH 1** select **4**.



6 Configure a POTS port (Port POTS 1 and Port POTS 2)

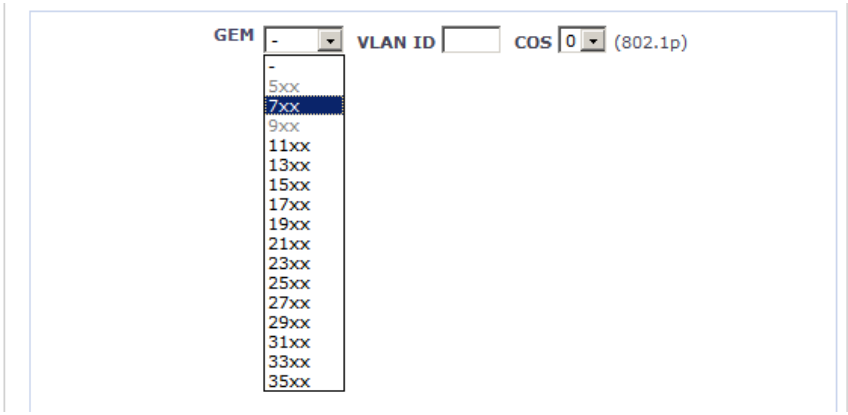
Note that all POTS ports on the zNID will have the same configuration.

a Select **Port POTS 1** and **Port POTS 2**



b Select the GEM index for the POTS ports

From the **GEM** drop down select **7xx**.



c Set the VLAN ID for the POTS ports

Enter **200** in the **VLAN ID** text box.

d Set the CoS for the POTS ports

From the **COS** drop down select **7**.

e Set the other configurable options for the POTS ports

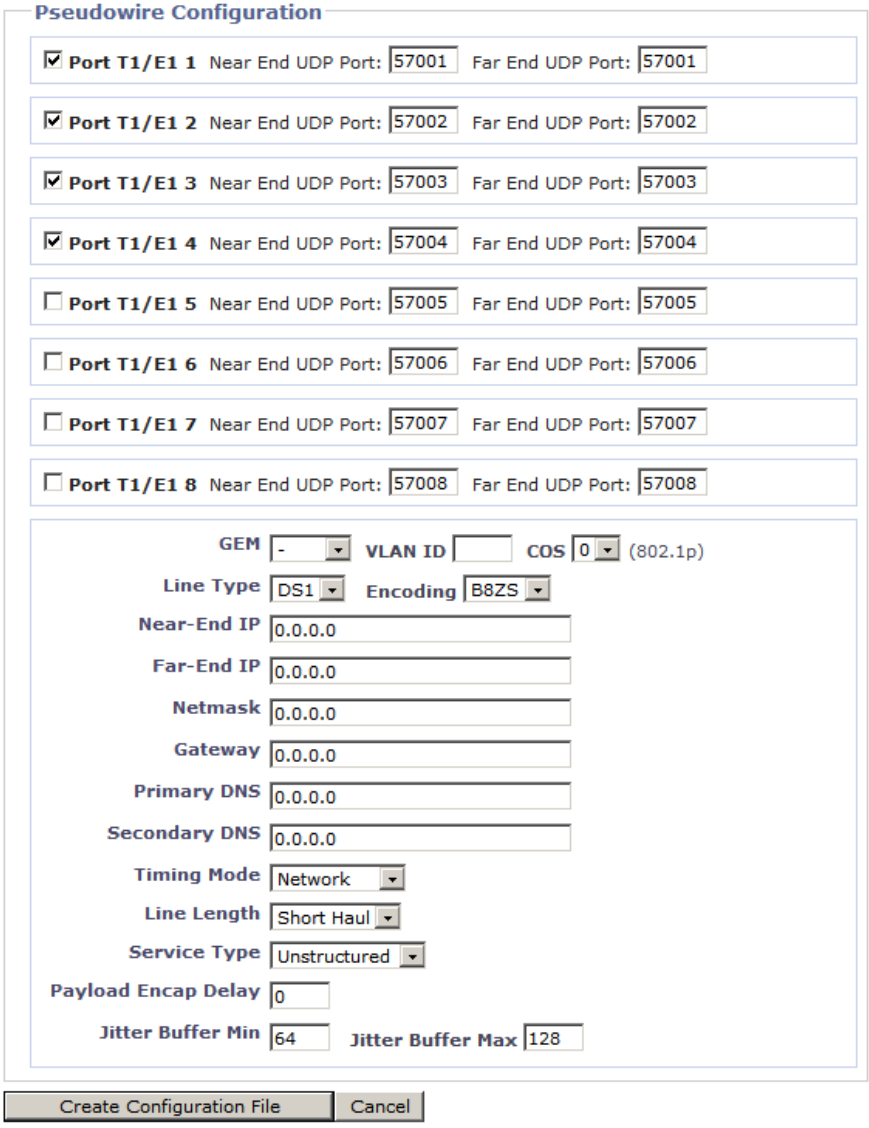
See Voice options with OMCI, page 50 which includes:

- *Voice connection options* on page 50
- *SIP features* on page 51
- *H.248 features* on page 54

7 Configure T1/E1 PsuedoWire (PWE) ports

Note that except for the Near End and Far End UDP Port designation which defines the PWE endpoints all the T1/E1 PWE ports will have the same configuration.

a Select **Port T1/E1 1**, **Port T1/E1 2**, **Port T1/E1 3**, and **Port T1/E1 4**



b Define the near end and far end UDP ports

c Select the GEM index for the T1/E1 ports

From the **GEM** drop down select **11xx**.

d Set the VLAN ID for the POTS ports

Enter **300** in the **VLAN ID** text box.

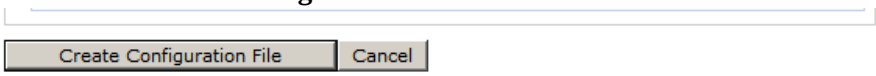
e Set the CoS for the POTS ports

From the **COS** drop down select **6**.

f Set the other configurable options for the T1/E1 ports.

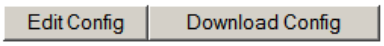
See T1/E1 options with OMCI, page 55.

8 Click the **Create Configuration File** button.



An ME profile file is created and displayed in the ME profile file page.

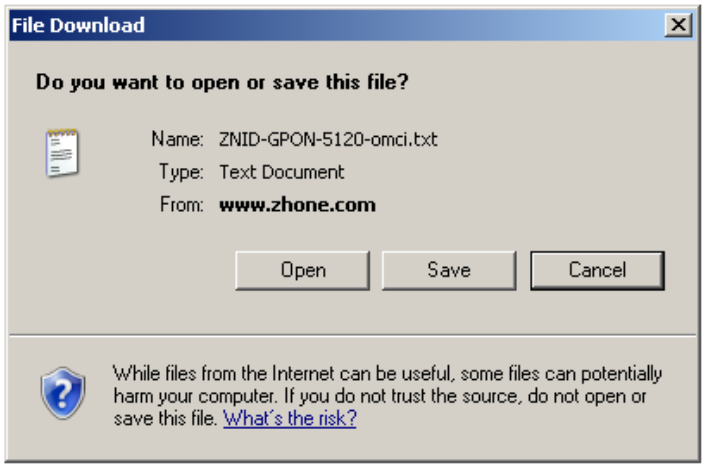
9 Two buttons are displayed on the top of the ME profile file page, **Edit Config** and **Download Config**.




```
[ZHONE_ME_PROFILE]
# OMCI configuration file for ZNID-GPON-5120
# Cambridge ONT with 4 GE, 2 POTS and 8 T1/E1
# Generated by rbrown@zhone.com at Fri Jul 16 15:17:58 2010
# Engine $Revision: 1.17 $ Tmpl $Revision: 1.9 $ Model
#
# Selected configuration:
# ces1 (CES 1): pseudowire over GEM port 11xx
# ces2 (CES 2): pseudowire over GEM port 11xx
# ces3 (CES 3): pseudowire over GEM port 11xx
# ces4 (CES 4): pseudowire over GEM port 11xx
# eth1 (ETH 1): data over GEM port 5xx
# eth2 (ETH 2): data over GEM port 5xx
# eth3 (ETH 3): video, data over GEM port 9xx
# pots1 (POTS 1): voice over GEM port 7xx  using SIP
# pots2 (POTS 2): voice over GEM port 7xx  using SIP
#

#=================================================================
[Variable Definitions]
#=================================================================

$autoDetectConfigEth1("ETH1 Auto Detection",string(32))
$vlEth1V1("ETH 1 Data VLAN 1 (VID or COS,VID)",string(32))
$autoDetectConfigEth2("ETH2 Auto Detection",string(32))
$vlEth2V1("ETH 2 Data VLAN 1 (VID or COS,VID)",string(32))
$autoDetectConfigEth3("ETH3 Auto Detection",string(32))
$vlEth3V1("ETH 3 Video VLAN 1 (VID or COS,VID)",string(32))
$autoDetectConfigEth4("ETH4 Auto Detection",string(32))
$vlEth4V1("ETH4 Data VLAN 1 (VID or COS,VID)",string(32))


$vlanPots("Voice VLAN",string(32))
$voipIpOpt("VOIP Host IP Option: 2-static, 3-DHCP",string(32))
$voipHostIp("VOIP Host IP",string(32))
$voipNetmask("VOIP Netmask",string(32))
$voipGateway("VOIP Gateway",string(32))
$voipServer("VOIP Server IP",string(32))
$voipPriDns("VOIP Primary DNS",string(32))
$voipSecDns("VOIP Secondary DNS",string(32))
$countryCode("Country Code",string(32))
$RxGain("Rx Gain",string(32))
$TxGain("Tx Gain",string(32))
```

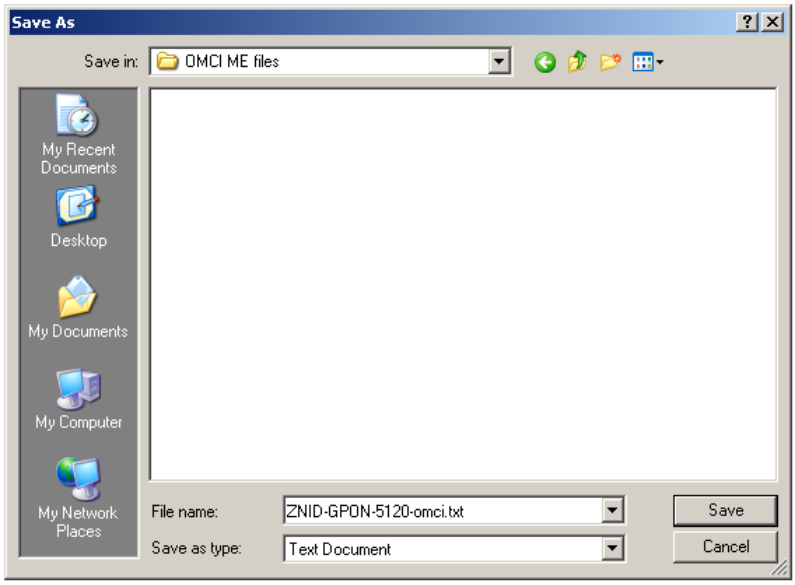
– Clicking on the **Edit Config** button causes the web-interface to return to the service page where you select the ports and configure them. You will return to the service page with the current selection. You can change the configuration, and create a new ME profile file.

– Click **Download Config**; the web-interface displays a File Download window.



Click **Save** to open the **Save As** window.

In the Save As window change the path and choose the appropriate file name to save the newly created ME profile file. The file type must be text (.txt).



Downloading ME profile file to MXK

The service provider needs to download ME profile file from a TFTP/ SFTP server to MXK.

1. Create a directory at the root level, then download the ME profile file.

   In this example the directory is named as *me*.

   There are no restrictions on the directory name.

   ```
   zSH> mkdir /me
   ```

2. Download the ME profile file to the MXK with the **file download** command. This example downloads the ME profile file *ZNID-GPON-5120-omci.txt* from a TFTP server *172.16.80.201* to the MXK */me* directory, and save the ME profile file with the same name.

```
zSH> file download 172.16.80.201 /ZNID-GPON-5120-omci.txt /me/
ZNID-GPON-5120-omci.txt
Bytes copied:     36198
File download successful
```

Creating ME profile

Create an ME profile from the ME profile file. One ME profile is created for each ONU model.

The software supports a text import capability to read the ME profile file and learn the ME structure of the new ONU. The ME profile contains OMCI ME commands.

1. Create an ME profile:

   ```
   zSH> gpononu profiles create me me_example_1 /me/
   ZNID-GPON-5120-omci.txt
   Profile created
   ```

2. To verify the created ME profile name:

   ```
   zSH> gpononu profiles show me
   me_example_1
   ```

Creating Generic profiles

The Generic profile defines the values of variables that define service plans. It also contains values of system variables. The system values, service plan values are entered by the service provider as part of system commissioning.

If the service provider intends to offer three different service plans that are supported on five different ONU hardware models, service provider should create five ME profiles and fifteen Generic profiles in the system.

To create a Generic profile:

1. Create a Generic profile:

```
zSH> gpononu profiles create gen gen_example_1
me_example_1
Profile created
```

2. To verify the created Generic profile name

```
zSH> gpononu profiles show gen
gen_example_1
```

   A Generic profile contains the variables that are typically parameters that associated with the specific service plan. For example, the voice VLAN or Softswitch IP address (i.e. the parameter SIP Proxy IP in the following generic profile example) may be different for different service plans. Even though these variables may be set in the ME profile, they may also be changed here.

3. Assign values to the desired variables in the Generic profile with the **gpononu profiles update gen** command and enter the corresponding variable indexes.

```
zSH> gpononu profiles update gen gen_example_1
Generic Profile: gen_example_1
   1  "ETH1 Auto Detection [0]"
   2  "ETH 1 Data VLAN 1 (VID or COS,VID) [0,100]"
   3  "ETH2 Auto Detection [0]"
   4  "ETH 2 Data VLAN 1 (VID or COS,VID) [0,100]"
   5  "ETH3 Auto Detection [0]"
   6  "ETH 3 Video VLAN 1 (VID or COS,VID) [4,999]"
   7  "ETH4 Auto Detection [0]"
   8  "ETH4 Data VLAN 1 (VID or COS,VID) [4000]"
   9  "Voice VLAN [7,200]"
  10  "VOIP Host IP Option: 2-static, 3-DHCP [2]"
  11  "VOIP Host IP [0.0.0.0]"  0.0.0.0
  12  "VOIP Netmask [0.0.0.0]"  0.0.0.0
  13  "VOIP Gateway [0.0.0.0]"
  14  "VOIP Server IP [0.0.0.0]"
  15  "VOIP Primary DNS [0.0.0.0]"
  16  "VOIP Secondary DNS [0.0.0.0]"
  17  "Country Code [ 1]"
  18  "Rx Gain [0]"
  19  "Tx Gain [0]"
```

```
20  "Out-of-band DTMF [0]"
21  "Echo Cancel: 1-enable, 0-disable [1]"
22  "POTS1 Dial Number [1111]"
23  "POTS1 User Name [11111]"
24  "POTS1 Password [11111]"
25  "POTS2 Dial Number [2222]"
26  "POTS2 User Name [22222]"
27  "POTS2 Password [22222]"
28  "Fax Mode [0]"
29  "CID Features [63]"
30  "Call Waiting Features [3]"
31  "Call Progress or Transfer Features [255]"
32  "Call Present Features [15]"
33  "PW VLAN [6,300]"
34  "PW Near-End IP [0.0.0.0]"
35  "PW Netmask [0.0.0.0]"
36  "PW Gateway [0.0.0.0]"
37  "PW Primary DNS [0.0.0.0]"
38  "PW Secondary DNS [0.0.0.0]"
39  "T1/E1 Line Type, 0-DS1, 1-E1 [0]"
40  "PW Timing, 0-net, 1-diff, 2-adapt, 3-loop [0]"
41  "PW Line Encoding, 0-B8ZS, 1-AMI, 2-HDB3, 3-B3ZS [0]"
42  "PW Svc Type, 0-unstruct, 1-octet aligned, 2-structured [0]"
43  "T1/E1 1 Near-End TCP Port [57001]"
44  "T1/E1 1 Far-End TCP Port [57001]"
45  "T1/E1 1 Far-End IP [0.0.0.0]"
46  "T1/E1 1 Line Length [ 0]"
47  "T1/E1 1 Payload Size [ 250]"
48  "T1/E1 1 Payload Encapsulation Delay [ 0]"
49  "T1/E1 1 Jitter Buffer Max [ 128]"
50  "T1/E1 1 Jitter Buffer Min [ 64]"
51  "T1/E1 2 Near-End TCP Port [57002]"
52  "T1/E1 2 Far-End TCP Port [57002]"
53  "T1/E1 2 Far-End IP [0.0.0.0]"
54  "T1/E1 2 Line Length [ 0]"
55  "T1/E1 2 Payload Size [ 250]"
56  "T1/E1 2 Payload Encapsulation Delay [ 0]"
57  "T1/E1 2 Jitter Buffer Max [ 128]"
58  "T1/E1 2 Jitter Buffer Min [ 64]"
59  "T1/E1 3 Near-End TCP Port [57003]"
60  "T1/E1 3 Far-End TCP Port [57003]"
61  "T1/E1 3 Far-End IP [0.0.0.0]"
62  "T1/E1 3 Line Length [ 0]"
63  "T1/E1 3 Payload Size [ 250]"
64  "T1/E1 3 Payload Encapsulation Delay [ 0]"
65  "T1/E1 3 Jitter Buffer Max [ 128]"
66  "T1/E1 3 Jitter Buffer Min [ 64]"
67  "T1/E1 4 Near-End TCP Port [57004]"
68  "T1/E1 4 Far-End TCP Port [57004]"
69  "T1/E1 4 Far-End IP [0.0.0.0]"
70  "T1/E1 4 Line Length [ 0]"
71  "T1/E1 4 Payload Size [ 250]"
72  "T1/E1 4 Payload Encapsulation Delay [ 0]"
73  "T1/E1 4 Jitter Buffer Max [ 128]"
```

```
  74  "T1/E1 4 Jitter Buffer Min [ 64]"
  75  "T1/E1 5 Near-End TCP Port [57005]"
  76  "T1/E1 5 Far-End TCP Port [57005]"
  77  "T1/E1 5 Far-End IP [0.0.0.0]"
  78  "T1/E1 5 Line Length [ 0]"
  79  "T1/E1 5 Payload Size [ 250]"
  80  "T1/E1 5 Payload Encapsulation Delay [ 0]"
  81  "T1/E1 5 Jitter Buffer Max [ 128]"
  82  "T1/E1 5 Jitter Buffer Min [ 64]"
  83  "T1/E1 6 Near-End TCP Port [57006]"
  84  "T1/E1 6 Far-End TCP Port [57006]"
  85  "T1/E1 6 Far-End IP [0.0.0.0]"
  86  "T1/E1 6 Line Length [ 0]"
  87  "T1/E1 6 Payload Size [ 250]"
  88  "T1/E1 6 Payload Encapsulation Delay [ 0]"
  89  "T1/E1 6 Jitter Buffer Max [ 128]"
  90  "T1/E1 6 Jitter Buffer Min [ 64]"
  91  "T1/E1 7 Near-End TCP Port [57007]"
  92  "T1/E1 7 Far-End TCP Port [57007]"
  93  "T1/E1 7 Far-End IP [0.0.0.0]"
  94  "T1/E1 7 Line Length [ 0]"
  95  "T1/E1 7 Payload Size [ 250]"
  96  "T1/E1 7 Payload Encapsulation Delay [ 0]"
  97  "T1/E1 7 Jitter Buffer Max [ 128]"
  98  "T1/E1 7 Jitter Buffer Min [ 64]"
  99  "T1/E1 8 Near-End TCP Port [57008]"
 100  "T1/E1 8 Far-End TCP Port [57008]"
 101  "T1/E1 8 Far-End IP [0.0.0.0]"
 102  "T1/E1 8 Line Length [ 0]"
 103  "T1/E1 8 Payload Size [ 250]"
 104  "T1/E1 8 Payload Encapsulation Delay [ 0]"
 105  "T1/E1 8 Jitter Buffer Max [ 128]"
 106  "T1/E1 8 Jitter Buffer Min [ 64]"
 107  "T1/E1 1 Admin Status: 0-Up, 1-Down [0]"
 108  "T1/E1 2 Admin Status: 0-Up, 1-Down [0]"
 109  "T1/E1 3 Admin Status: 0-Up, 1-Down [0]"
 110  "T1/E1 4 Admin Status: 0-Up, 1-Down [0]"
 111  "T1/E1 5 Admin Status: 0-Up, 1-Down [1]"
 112  "T1/E1 6 Admin Status: 0-Up, 1-Down [1]"
 113  "T1/E1 7 Admin Status: 0-Up, 1-Down [1]"
 114  "T1/E1 8 Admin Status: 0-Up, 1-Down [1]"
 115  "ETH 1 Admin Status: 0-Up, 1-Down [0]"
 116  "ETH 2 Admin Status: 0-Up, 1-Down [0]"
 117  "ETH 3 Admin Status: 0-Up, 1-Down [0]"
 118  "ETH 4 Admin Status: 0-Up, 1-Down [1]"
 119  "POTS 1 Admin Status: 0-Up, 1-Down [0]"
 120  "POTS 2 Admin Status: 0-Up, 1-Down [0]"
```

Notice that if you enter h you will see the available commands

```
Enter OMCI edit command or [s]ave, [q]uit, [h]elp: h
Available Commands:
   E    - display edit data (short)
   H    - display help
```

```
   L    - display edit data (long)
   Q    - quit without save
   S    - save and exit
   1..n - edit variable #n
```

To edit a parameter enter the line number, then the value. To save enter **s**.

```
Enter OMCI edit command or [s]ave, [q]uit, [h]elp: 11
"VOIP Host IP [0.0.0.0]"  0.0.0.0: 172.160.16.250
Enter OMCI edit command or [s]ave, [q]uit, [h]elp: 12
"VOIP Netmask [0.0.0.0]"  0.0.0.0: 255.255.255.0
Enter OMCI edit command or [s]ave, [q]uit, [h]elp: s
GENERIC profile has been saved
```

4. View additional edit information for the variables in the Generic profile with the **gpononu profiles update gen** command and enter OMCI edit command **L** (not case sensitive).

```
zSH> gpononu profiles update gen gen_example_1
Generic Profile: gen_example_1
   1  "ETH1 Auto Detection [0]"
   2  "ETH 1 Data VLAN 1 (VID or COS,VID) [0,100]"
   3  "ETH2 Auto Detection [0]"
...
 120  "POTS 2 Admin Status: 0-Up, 1-Down [0]"
Enter OMCI edit command or [s]ave, [q]uit, [h]elp: Enter OMCI edit command
or [s]ave, [q]uit, [h]elp: l
ID    Generic Profile: gen_example_1
====  ================================================================
   1  Name         : $autoDetectConfigEth1
      Comment      : ETH1 Auto Detection
      Type         : string(32)
      Gen Value    :
      Default Value: 0

   2  Name         : $vlEth1V1
      Comment      : ETH 1 Data VLAN 1 (VID or COS,VID)
      Type         : string(32)
      Gen Value    :
      Default Value: 0,100

   3  Name         : $autoDetectConfigEth2
      Comment      : ETH2 Auto Detection
      Type         : string(32)
      Gen Value    :
      Default Value: 0
...
```

Creating Specific profiles

For each end-user, the service provider creates a Specific profile. The Specific profile is similar to the Generic profile, it is also a collection of variables that are used by an ME profile.

Every Specific profile is associated with only one ME profile and one Generic profile to define the supported ONU hardware model and service plan. The Specific profile provides values for variables that are specific to the ONU.

1. Create an end-user based Specific profile with the **gpononu profiles create spec** *slot/olt/onu meProfileName genericProfileName* command:

   ```
   zSH> gpononu profiles create spec 4/1/1 me_example_1
   gen_example_1 Profile created
   ```

2. Verify the name of the Specific profile created on ONU 4/1/1.

   ```
   zSH> gpononu profiles show spec 4/1/1
   4/1/1
   ```

3. View the references to the ME profile and Generic profile on ONU 4/1/1:

```
zSH> gpononu show 4/1/1
Slot 4 olt 1
                                  Serial
ONU       Name        Enabled     Number         OMCI files and profiles
=== ================ ======= ============== ================================
  1 1-4-1-1          No                     ME  me_example_1
                                             GEN gen_example_1
```

4. Assign values to the variables that are unique to the end-user, such as user's IP address and telephone number etc.

```
zSH> gpononu profiles update spec 4/1/1
Specific Profile: 4/1/1
   1  "ETH1 Auto Detection [0]"
   2  "ETH 1 Data VLAN 1 (VID or COS,VID) [0,100]"
   3  "ETH2 Auto Detection [0]"
   4  "ETH 2 Data VLAN 1 (VID or COS,VID) [0,100]"
   5  "ETH3 Auto Detection [0]"
   6  "ETH 3 Video VLAN 1 (VID or COS,VID) [4,999]"
   7  "ETH4 Auto Detection [0]"
   8  "ETH4 Data VLAN 1 (VID or COS,VID) [4000]"
   9  "Voice VLAN [7,200]"
  10  "VOIP Host IP Option: 2-static, 3-DHCP [2]"
  11  "VOIP Host IP [172.160.16.250]"
  12  "VOIP Netmask [255.255.255.0]"
  13  "VOIP Gateway [0.0.0.0]"
  14  "VOIP Server IP [0.0.0.0]"
  15  "VOIP Primary DNS [0.0.0.0]"
  16  "VOIP Secondary DNS [0.0.0.0]"
  17  "Country Code [ 1]"
  18  "Rx Gain [0]"
  19  "Tx Gain [0]"
```

```
20  "Out-of-band DTMF [0]"
21  "Echo Cancel: 1-enable, 0-disable [1]"
22  "POTS1 Dial Number [1111]"
23  "POTS1 User Name [11111]"
24  "POTS1 Password [11111]"
25  "POTS2 Dial Number [2222]"
26  "POTS2 User Name [22222]"
27  "POTS2 Password [22222]"
28  "Fax Mode [0]"
29  "CID Features [63]"
30  "Call Waiting Features [3]"
31  "Call Progress or Transfer Features [255]"
32  "Call Present Features [15]"
33  "PW VLAN [6,300]"
34  "PW Near-End IP [0.0.0.0]"
35  "PW Netmask [0.0.0.0]"
36  "PW Gateway [0.0.0.0]"
37  "PW Primary DNS [0.0.0.0]"
38  "PW Secondary DNS [0.0.0.0]"
39  "T1/E1 Line Type, 0-DS1, 1-E1 [0]"
40  "PW Timing, 0-net, 1-diff, 2-adapt, 3-loop [0]"
41  "PW Line Encoding, 0-B8ZS, 1-AMI, 2-HDB3, 3-B3ZS [0]"
42  "PW Svc Type, 0-unstruct, 1-octet aligned, 2-structured [0]"
43  "T1/E1 1 Near-End TCP Port [57001]"
44  "T1/E1 1 Far-End TCP Port [57001]"
45  "T1/E1 1 Far-End IP [0.0.0.0]"
46  "T1/E1 1 Line Length [ 0]"
47  "T1/E1 1 Payload Size [ 250]"
48  "T1/E1 1 Payload Encapsulation Delay [ 0]"
49  "T1/E1 1 Jitter Buffer Max [ 128]"
50  "T1/E1 1 Jitter Buffer Min [ 64]"
51  "T1/E1 2 Near-End TCP Port [57002]"
52  "T1/E1 2 Far-End TCP Port [57002]"
53  "T1/E1 2 Far-End IP [0.0.0.0]"
54  "T1/E1 2 Line Length [ 0]"
55  "T1/E1 2 Payload Size [ 250]"
56  "T1/E1 2 Payload Encapsulation Delay [ 0]"
57  "T1/E1 2 Jitter Buffer Max [ 128]"
58  "T1/E1 2 Jitter Buffer Min [ 64]"
59  "T1/E1 3 Near-End TCP Port [57003]"
60  "T1/E1 3 Far-End TCP Port [57003]"
61  "T1/E1 3 Far-End IP [0.0.0.0]"
62  "T1/E1 3 Line Length [ 0]"
63  "T1/E1 3 Payload Size [ 250]"
64  "T1/E1 3 Payload Encapsulation Delay [ 0]"
65  "T1/E1 3 Jitter Buffer Max [ 128]"
66  "T1/E1 3 Jitter Buffer Min [ 64]"
67  "T1/E1 4 Near-End TCP Port [57004]"
68  "T1/E1 4 Far-End TCP Port [57004]"
69  "T1/E1 4 Far-End IP [0.0.0.0]"
70  "T1/E1 4 Line Length [ 0]"
71  "T1/E1 4 Payload Size [ 250]"
72  "T1/E1 4 Payload Encapsulation Delay [ 0]"
73  "T1/E1 4 Jitter Buffer Max [ 128]"
```

```
  74  "T1/E1 4 Jitter Buffer Min [ 64]"
  75  "T1/E1 5 Near-End TCP Port [57005]"
  76  "T1/E1 5 Far-End TCP Port [57005]"
  77  "T1/E1 5 Far-End IP [0.0.0.0]"
  78  "T1/E1 5 Line Length [ 0]"
  79  "T1/E1 5 Payload Size [ 250]"
  80  "T1/E1 5 Payload Encapsulation Delay [ 0]"
  81  "T1/E1 5 Jitter Buffer Max [ 128]"
  82  "T1/E1 5 Jitter Buffer Min [ 64]"
  83  "T1/E1 6 Near-End TCP Port [57006]"
  84  "T1/E1 6 Far-End TCP Port [57006]"
  85  "T1/E1 6 Far-End IP [0.0.0.0]"
  86  "T1/E1 6 Line Length [ 0]"
  87  "T1/E1 6 Payload Size [ 250]"
  88  "T1/E1 6 Payload Encapsulation Delay [ 0]"
  89  "T1/E1 6 Jitter Buffer Max [ 128]"
  90  "T1/E1 6 Jitter Buffer Min [ 64]"
  91  "T1/E1 7 Near-End TCP Port [57007]"
  92  "T1/E1 7 Far-End TCP Port [57007]"
  93  "T1/E1 7 Far-End IP [0.0.0.0]"
  94  "T1/E1 7 Line Length [ 0]"
  95  "T1/E1 7 Payload Size [ 250]"
  96  "T1/E1 7 Payload Encapsulation Delay [ 0]"
  97  "T1/E1 7 Jitter Buffer Max [ 128]"
  98  "T1/E1 7 Jitter Buffer Min [ 64]"
  99  "T1/E1 8 Near-End TCP Port [57008]"
 100  "T1/E1 8 Far-End TCP Port [57008]"
 101  "T1/E1 8 Far-End IP [0.0.0.0]"
 102  "T1/E1 8 Line Length [ 0]"
 103  "T1/E1 8 Payload Size [ 250]"
 104  "T1/E1 8 Payload Encapsulation Delay [ 0]"
 105  "T1/E1 8 Jitter Buffer Max [ 128]"
 106  "T1/E1 8 Jitter Buffer Min [ 64]"
 107  "T1/E1 1 Admin Status: 0-Up, 1-Down [0]"
 108  "T1/E1 2 Admin Status: 0-Up, 1-Down [0]"
 109  "T1/E1 3 Admin Status: 0-Up, 1-Down [0]"
 110  "T1/E1 4 Admin Status: 0-Up, 1-Down [0]"
 111  "T1/E1 5 Admin Status: 0-Up, 1-Down [1]"
 112  "T1/E1 6 Admin Status: 0-Up, 1-Down [1]"
 113  "T1/E1 7 Admin Status: 0-Up, 1-Down [1]"
 114  "T1/E1 8 Admin Status: 0-Up, 1-Down [1]"
 115  "ETH 1 Admin Status: 0-Up, 1-Down [0]"
 116  "ETH 2 Admin Status: 0-Up, 1-Down [0]"
 117  "ETH 3 Admin Status: 0-Up, 1-Down [0]"
 118  "ETH 4 Admin Status: 0-Up, 1-Down [1]"
 119  "POTS 1 Admin Status: 0-Up, 1-Down [0]"
 120  "POTS 2 Admin Status: 0-Up, 1-Down [0]"
Enter OMCI edit command or [s]ave, [q]uit, [h]elp:
Enter OMCI edit command or [s]ave, [q]uit, [h]elp: 22
"POTS1 Dial Number [1111]"  : 555-555-5555
Enter OMCI edit command or [s]ave, [q]uit, [h]elp: 23
"POTS1 User Name [11111]"  : Example User Name
Enter OMCI edit command or [s]ave, [q]uit, [h]elp: s
SPECIFIC profile has been saved
```

5 View the configured specific profile:

```
zSH> gpononu profiles update spec 4/1/1
Specific Profile: 4/1/1
   1  "ETH1 Auto Detection [0]"
   2  "ETH 1 Data VLAN 1 (VID or COS,VID) [0,100]"
   3  "ETH2 Auto Detection [0]"
   4  "ETH 2 Data VLAN 1 (VID or COS,VID) [0,100]"
   5  "ETH3 Auto Detection [0]"
   6  "ETH 3 Video VLAN 1 (VID or COS,VID) [4,999]"
   7  "ETH4 Auto Detection [0]"
   8  "ETH4 Data VLAN 1 (VID or COS,VID) [4000]"
   9  "Voice VLAN [7,200]"
  10  "VOIP Host IP Option: 2-static, 3-DHCP [2]"
  11  "VOIP Host IP [172.160.16.250]"
  12  "VOIP Netmask [255.255.255.0]"
  13  "VOIP Gateway [0.0.0.0]"
  14  "VOIP Server IP [0.0.0.0]"
  15  "VOIP Primary DNS [0.0.0.0]"
  16  "VOIP Secondary DNS [0.0.0.0]"
  17  "Country Code [ 1]"
  18  "Rx Gain [0]"
...

Enter OMCI edit command or [s]ave, [q]uit, [h]elp:
```

Viewing current variable settings on an ONU

Note: Make sure every configuration variable on the ONU has value assigned. Otherwise configuration fails for this ONU unless you updates the Generic profile or Specific profile to provide a value.

View the current settings of configuration variables on an ONU by using the **gpononu profiles show vars** *slot/olt/onu* | *interfaceName* command. This command lists all variables defined in the ME profile. For each variable, it displays description, value, and source. The description comes from the commands in the ME profile. Value is what currently being used. Source indicates where this value came from (Generic, ME, or Specific profile).

- If the values of all the variables is not available in the Specific profile it checks the Generic profile. The Specific profile can be used to override any values set in the Generic profile. The Generic profile can override any values set in the ME profile.
- If the value is only defined in ME profile, “Default” will be displayed in the Source column.
- If there is no default or other value given, “NONE” will be displayed in the Source column, “NO VALUE ASSIGNED” will be displayed in the Value column. In that case, configuration fails for this ONU unless updates the Generic profile or Specific profile to provide a value.

View current settings of configuration variables on ONU 4/1/1, enter:

```
zSH> gpononu profiles show vars 4/1/1
Variable Description                              Value              Source
-----------------------------------------------   --------------     -------
                      1 ETH1 Auto Detection0 (Auto-sensing)Default
   2   ETH 1 Data VLAN 1 (VID or COS,VID)         0,100              Default
   3   ETH2 Auto Detection                        0 (Auto-sensing)   Default
   4   ETH 2 Data VLAN 1 (VID or COS,VID)         0,100              Default
   5   ETH3 Auto Detection                        0 (Auto-sensing)   Default
   6   ETH 3 Video VLAN 1 (VID or COS,VID)        4,999              Default
   7   ETH4 Auto Detection                        0 (Auto-sensing)   Default
   8   ETH4 Data VLAN 1 (VID or COS,VID)          4000               Default
   9   Voice VLAN                                 7,200              Default
  10   VOIP Host IP Option: 2-static, 3-DHCP      2                  Default
  11   VOIP Host IP                               172.160.16.250     Generic
  12   VOIP Netmask                               255.255.255.0      Generic
  13   VOIP Gateway                               0.0.0.0            Default
  14   VOIP Server IP                             0.0.0.0            Default
  15   VOIP Primary DNS                           0.0.0.0            Default
  16   VOIP Secondary DNS                         0.0.0.0            Default
  17   Country Code                               1                  Default
  18   Rx Gain                                    0                  Default
  19   Tx Gain                                    0                  Default
  20   Out-of-band DTMF                           0                  Default
  21   Echo Cancel: 1-enable, 0-disable           1                  Default
  22   POTS1 Dial Number                          555-555-5555       Specific
  23   POTS1 User Name                            Example User Name  Specific
  24   POTS1 Password                             11111              Default
  25   POTS2 Dial Number                          2222               Default
  26   POTS2 User Name                            22222              Default
  27   POTS2 Password                             22222              Default
  28   Fax Mode                                   0                   Default
  29   CID Features                               63                 Default
  30   Call Waiting Features                      3                  Default
  31   Call Progress or Transfer Features         255                Default
  32   Call Present Features                      15                 Default
  33   PW VLAN                                    6,300              Default
  34   PW Near-End IP                             0.0.0.0            Default
  35   PW Netmask                                 0.0.0.0            Default
  36   PW Gateway                                 0.0.0.0            Default
  37   PW Primary DNS                             0.0.0.0            Default
  38   PW Secondary DNS                           0.0.0.0            Default
  39   T1/E1 Line Type, 0-DS1, 1-E1               0                  Default
  40   PW Timing, 0-net, 1-diff, 2-adapt, 3-loop  0                  Default
  41   PW Line Encoding, 0-B8ZS, 1-AMI, 2-HDB3, 3-B3ZS  0            Default
  42   PW Svc Type, 0-unstruct, 1-octet aligned, 2-structured  0     Default
  43   T1/E1 1 Near-End TCP Port                  57001              Default
  44   T1/E1 1 Far-End TCP Port                   57001              Default
  45   T1/E1 1 Far-End IP                         0.0.0.0            Default
  46   T1/E1 1 Line Length                        0                  Default
  47   T1/E1 1 Payload Size                       250                Default
  48   T1/E1 1 Payload Encapsulation Delay        0                  Default
  49   T1/E1 1 Jitter Buffer Max                  128                Default
  50   T1/E1 1 Jitter Buffer Min                  64                 Default
```

```
 51   T1/E1 2 Near-End TCP Port               57002            Default
 52   T1/E1 2 Far-End TCP Port                57002            Default
 53   T1/E1 2 Far-End IP                      0.0.0.0          Default
 54   T1/E1 2 Line Length                     0                Default
 55   T1/E1 2 Payload Size                    250              Default
 56   T1/E1 2 Payload Encapsulation Delay     0                Default
 57   T1/E1 2 Jitter Buffer Max               128              Default
 58   T1/E1 2 Jitter Buffer Min               64               Default
 59   T1/E1 3 Near-End TCP Port               57003            Default
 60   T1/E1 3 Far-End TCP Port                57003            Default
 61   T1/E1 3 Far-End IP                      0.0.0.0          Default
 62   T1/E1 3 Line Length                     0                Default
 63   T1/E1 3 Payload Size                    250              Default
 64   T1/E1 3 Payload Encapsulation Delay     0                Default
 65   T1/E1 3 Jitter Buffer Max               128              Default
 66   T1/E1 3 Jitter Buffer Min               64               Default
 67   T1/E1 4 Near-End TCP Port               57004            Default
 68   T1/E1 4 Far-End TCP Port                57004            Default
 69   T1/E1 4 Far-End IP                      0.0.0.0          Default
 70   T1/E1 4 Line Length                     0                Default
 71   T1/E1 4 Payload Size                    250              Default
 72   T1/E1 4 Payload Encapsulation Delay     0                Default
 73   T1/E1 4 Jitter Buffer Max               128              Default
 74   T1/E1 4 Jitter Buffer Min               64               Default
 75   T1/E1 5 Near-End TCP Port               57005            Default
 76   T1/E1 5 Far-End TCP Port                57005            Default
 77   T1/E1 5 Far-End IP                      0.0.0.0          Default
 78   T1/E1 5 Line Length                     0                Default
 79   T1/E1 5 Payload Size                    250              Default
 80   T1/E1 5 Payload Encapsulation Delay     0                Default
 81   T1/E1 5 Jitter Buffer Max               128              Default
 82   T1/E1 5 Jitter Buffer Min               64               Default
 83   T1/E1 6 Near-End TCP Port               57006            Default
 84   T1/E1 6 Far-End TCP Port                57006            Default
 85   T1/E1 6 Far-End IP                      0.0.0.0          Default
 86   T1/E1 6 Line Length                     0                Default
 87   T1/E1 6 Payload Size                    250              Default
 88   T1/E1 6 Payload Encapsulation Delay     0                Default
 89   T1/E1 6 Jitter Buffer Max               128              Default
 90   T1/E1 6 Jitter Buffer Min               64               Default
 91   T1/E1 7 Near-End TCP Port               57007            Default
 92   T1/E1 7 Far-End TCP Port                57007            Default
 93   T1/E1 7 Far-End IP                      0.0.0.0          Default
 94   T1/E1 7 Line Length                     0                Default
 95   T1/E1 7 Payload Size                    250              Default
 96   T1/E1 7 Payload Encapsulation Delay     0                Default
 97   T1/E1 7 Jitter Buffer Max               128              Default
 98   T1/E1 7 Jitter Buffer Min               64               Default
 99   T1/E1 8 Near-End TCP Port               57008            Default
100   T1/E1 8 Far-End TCP Port                57008            Default
101   T1/E1 8 Far-End IP                      0.0.0.0          Default
102   T1/E1 8 Line Length                     0                Default
103   T1/E1 8 Payload Size                    250              Default
104   T1/E1 8 Payload Encapsulation Delay     0                Default
```

```
105   T1/E1 8 Jitter Buffer Max                128                Default
106   T1/E1 8 Jitter Buffer Min                64                 Default
107   T1/E1 1 Admin Status: 0-Up, 1-Down       0 (up)             Default
108   T1/E1 2 Admin Status: 0-Up, 1-Down       0 (up)             Default
109   T1/E1 3 Admin Status: 0-Up, 1-Down       0 (up)             Default
110   T1/E1 4 Admin Status: 0-Up, 1-Down       0 (up)             Default
111   T1/E1 5 Admin Status: 0-Up, 1-Down       1 (down)           Default
112   T1/E1 6 Admin Status: 0-Up, 1-Down       1 (down)           Default
113   T1/E1 7 Admin Status: 0-Up, 1-Down       1 (down)           Default
114   T1/E1 8 Admin Status: 0-Up, 1-Down       1 (down)           Default
115   ETH 1 Admin Status: 0-Up, 1-Down         0 (up)             Default
116   ETH 2 Admin Status: 0-Up, 1-Down         0 (up)             Default
117   ETH 3 Admin Status: 0-Up, 1-Down         0 (up)             Default
118   ETH 4 Admin Status: 0-Up, 1-Down         1 (down)           Default
119   POTS 1 Admin Status: 0-Up, 1-Down        0 (up)             Default
120   POTS 2 Admin Status: 0-Up, 1-Down        0 (up)             Default
```

Activating an ONU with OMCI profiles

Note: Make sure to provision the logical connections for data, video, and voice services in the MXK and ONUs before activating the ONUs in order to avoid having to re-sync or reboot the ONUs eventually.

Refer to <<Create GEM port with GTP cross reference>>> to get detail configuration.

Activate an ONU with serial number and OMCI profiles association with this command:

gpononu set <*slot/olt/onu*| *interfaceName*> <*sernoID*| **vendorid** *vendorID*| **serno fsan** *a hex number*| *a decimal number*> **meprof** *meProfileName* **genprof** *genericProfileName*

During activation process, when the OLT communicates with the ONU, the OLT retrieves current variable settings on this ONU.

To activate ONU 1/4/1/1, perform the following tasks:

1 Display the line status on shelf 1, slot 4 with the **showline** *shelfID/slotID* command. OOS (Out of Service) means this ONU is not activated.

```
zSH> showline 1/4
Search in progress .........
------------------------------------------------------------------------
shelf = 1,  slot = 4, port 1, line type = ONU
subport
  1-12    OOS  OOS  OOS  OOS  OOS  OOS  OOS  OOS  OOS  OOS  OOS  OOS
 13-24    OOS  OOS  OOS  OOS  OOS  OOS  OOS  OOS  OOS  OOS  OOS  OOS
 25-36    OOS  OOS  OOS  OOS  OOS  OOS  OOS  OOS
------------------------------------------------------------------------
shelf = 1,  slot = 4, port 2, line type = ONU
subport
  1-12    OOS  OOS  OOS  OOS  OOS  OOS  OOS  OOS  OOS  OOS  OOS  OOS
```

```
 13-24    OOS  OOS  OOS  OOS  OOS  OOS  OOS  OOS  OOS  OOS  OOS  OOS
 25-36    OOS  OOS  OOS  OOS  OOS  OOS  OOS  OOS
------------------------------------------------------------------------
shelf = 1,  slot = 4, port 3, line type = ONU
subport
  1-12    OOS  OOS  OOS  OOS  OOS  OOS  OOS  OOS  OOS  OOS  OOS  OOS
 13-24    OOS  OOS  OOS  OOS  OOS  OOS  OOS  OOS  OOS  OOS  OOS  OOS

25-36    OOS  OOS  OOS  OOS  OOS  OOS  OOS  OOS
------------------------------------------------------------------------
shelf = 1,  slot = 4, port 4, line type = ONU
subport
  1-12    OOS  OOS  OOS  OOS  OOS  OOS  OOS  OOS  OOS  OOS  OOS  OOS
 13-24    OOS  OOS  OOS  OOS  OOS  OOS  OOS  OOS  OOS  OOS  OOS  OOS
 25-36    OOS  OOS  OOS  OOS  OOS  OOS  OOS  OOS
------------------------------------------------------------------------
shelf = 1,  slot = 4, line type = OLT
line
  1-12    ACT  ACT  ACT  ACT
```

2 View all free ONUs and available serial numbers under Slot 4 OLT 1:

```
zSH> gpononu show 4/1
Free ONUs for slot 4 olt 1:
    1   17   18   19   20   21   22   23   24   25   26   27 28 29 30 31 32
Discovered serial numbers for slot 4 olt 1:
sernoID   Vendor  Serial Number     sernoID   Vendor  Serial Number
    1      ZNTS    406
```

3 Assign ONU 4/1/1 with sernoID 1 (the sernoID 1 is associated with serial number 406), ME profile *me_example_1*, and Generic profile *gen_example_1*.

```
zSH> gpononu set 4/1/1 1 meprof me_example_1 genprof gen_example_1
Onu 1 successfully enabled with serial number ZNTS 406
```

Note: If configuring an ONU with flat OMCI (i.e. OMCI file) not with Smart OMCI, assign the available ONU # with *sernoID* and modify the bandwidth on the GEM ports associated with the ONU, then associate an OMCI file with the ONU, enter **gpononu set** *slot/olt/onu sernoID* **bw** *gemport/bwvalue* **omci** *filename*.

The default ONU bandwidth is 1 Mbps. You may want to associate up to three GEM ports with ONU and modify the bandwidth to provide a subscriber with various services requiring different bandwidths such as voice, video, and data.

zSH> **gpononu set 4/2/1 3 bw 501/10 bw 701/2 bw 901/1 omci xavi110p_data_video_data**

```
Bandwidth for 501 is   10 Mbps.
Bandwidth for 701 is    2 Mbps.
Bandwidth for 901 is    1 Mbps.
Onu 1 successfully enabled with serial
number XAVI 2415919203
```

4 Verify ONU 4/1/1 is activated with serial number 406 and OMCI profiles *me1* and *gen1*.

```
zSH> gpononu showall 4/1
Processing list of 64

This command may take several minutes to complete.
Do you want to continue?  (yes or no) [no] yes
                                                Serial
ONU       Name        Enabled     Model #       Number          OMCI files and
                                                              profiles
=== ================ ======= ============== ============== ================
  1          1-4-1-1   Yes             5120     ZNTS 406      ME  me_example_1
                                                               GEN gen_example_1

  2          1-4-1-2    No                                      (none)
<SPACE> for next page, <CR> for next line, A for all, Q to quit
```

If you want to view all the OLTs and ONUs on the MXK, use the **gpononu showall** command. You can also view the status of a specific ONU with the **gpononu showall** *slot/olt/onu* command.

```
zSH> gpononu showall 4/1/1
                                                Serial
ONU       Name        Enabled     Model #       Number          OMCI files and
                                                              profiles
=== ================ ======= ============== ============== ================
  1          1-4-1-1   Yes             5120     ZNTS 406      ME me_example_1
                                                               GEN gen_example_1
```

View all enabled ONUs on an OLT with the **gpononu showall** *slot/olt enabled* command:

```
zSH> gpononu showall 4/1 enabled
Processing list of 64

This command may take several minutes to complete.
Do you want to continue?  (yes or no) [no] yes
                                                Serial
ONU       Name        Enabled     Model #       Number          OMCI files and
                                                                profiles
=== ================ ======= ============== ============== ================
  1           1-4-1-1      Yes             5120       ZNTS 406  ME me_example_1
                                                                GEN gen_example_1
<SPACE> for next page, <CR> for next line, A for all, Q to quit
```

5 Disable an ONU and clear the serial number for this ONU (if necessary), use the **gpononu clear** command.

```
zSH> gpononu clear 4/1/1
Onu1 (previously with serial number ZNT 406) has been cleared
```

To also delete the ME and Generic profile references, and delete the Specific profile on this ONU, use the **gpononu clear** command with option **omci**.

```
zSH> gpononu clear 4/1/1 omci
Onu1 (previously with serial number ZNT 406) has been cleared
```

GEM port IDs

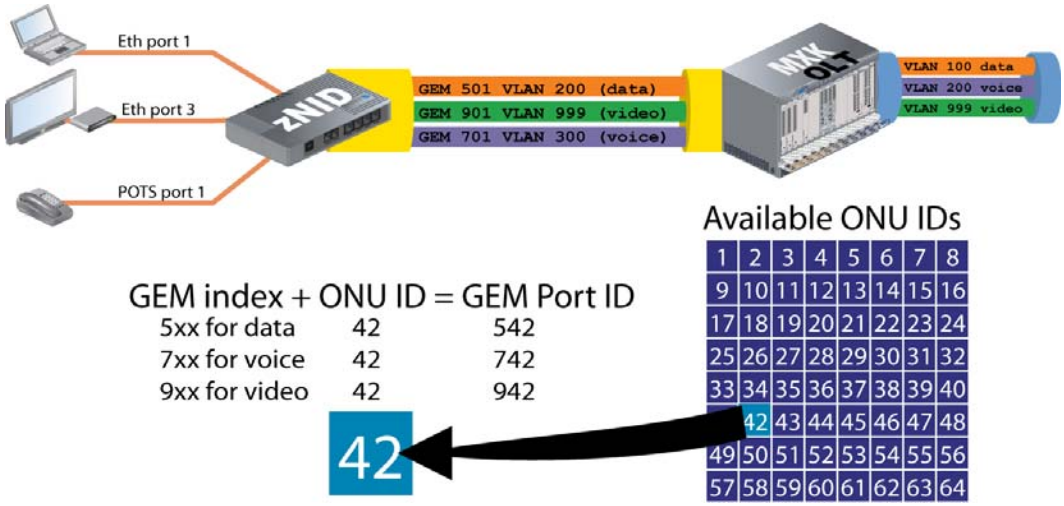
GEM ports are how the zNIDs separate the services from the upstream side of the zNID to the downstream ports. Each of these GEM ports needs to be unique on the ODN for the OLT port.

Each zNID (or for that matter any ONT or ONU) on the ODN will have a unique ID on the ODN. With 64 splits supported per OLT the ID will be from the number 1 to 64.

The organizational scheme which Zhone uses for matching port types to service type is a numbering method from 5xx to 35xx. This number is the GEM index.

To create a unique GEM port ID the GEM indexes (which we select in the ME profile creation) is match with the ONU ID to create a GEM port ID which is unique on the ODN.

Figure 10: GEM port IDs are created from the GEM index and the ONU ID

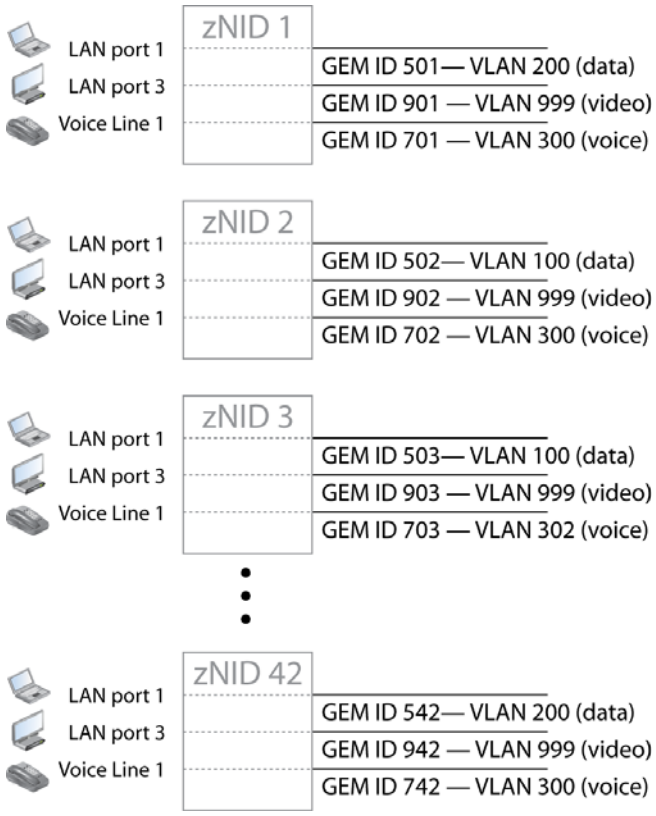


When creating downstream services on the MXK, the subport information in the **bridge add** command would be the same as the GEM port ID.

```
zSH> bridge add 1-4-4-542/gponport gtp 1 downlink vlan 100 tagged
GEM Port 1-4-4-542/gponport has been created on ONU 1-4-4-1/gpononu.
Adding bridge on 1-4-4-542/gponport
Created bridge-interface-record 1-4-4-542-gponport-100/bridge
```

In the above example, the GEM ID, 542, is the sub-port for the **bridge add** command, and it is in the **bridge add** command which defines which VLAN is matched to the GEM port.

Figure 11: zNID 1 and 42 are from the same company. zNID 2 and 3 are from separate residences



Smart OMCI tagging options

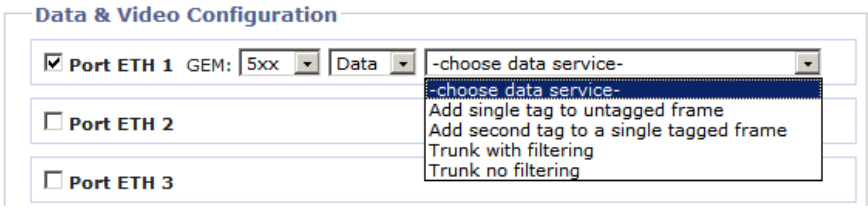
The Smart OMCI Web tool provides a number of options for defining the behavior of interfaces for accepting or adding VLAN/SLAN tags to frames in on the LAN facing ports (or removing tags from upstream frames to the downstream interfaces.

The Smart OMCI Web tool supports:

- Adding a single tag to an untagged frame
- Adding a second tag to a tagged frame
- Filtering frames to an upstream trunk
- Sending frames to an upstream trunk without filtering them

For more information on VLAN tagging, see the bridging chapter of the MXK Configuration Guide.

Figure 12: Selecting the tagging option

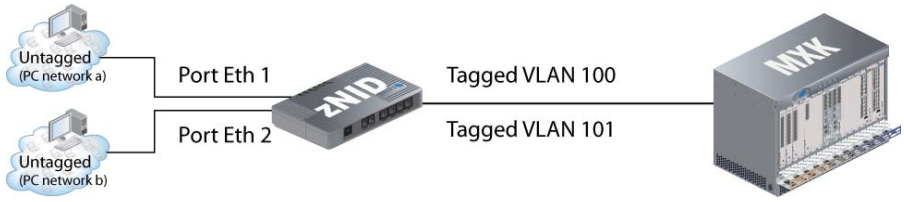


Note: All of the variables created with the smart OMCI web tool may be modified in the generic or specific profile. However the overall setup of the Ethernet port, such as setting a port for tagged unfiltered traffic cannot be changed by changing a variable in the generic or specific profile.

Add a single tag to an untagged frame

Adding a tag to an untagged frame is normally used when a PC network is attached. PC networks are normally untagged. The tag delineates which set of downstream devices from the zNID the frame may be coming from. Typically there will be a VLAN per service. Note that many downstream devices may be using the same VLAN for the same service, for example data for untagged PC networks.

Figure 13: Add tag to untagged frame



Add a second tag to a single tagged frame

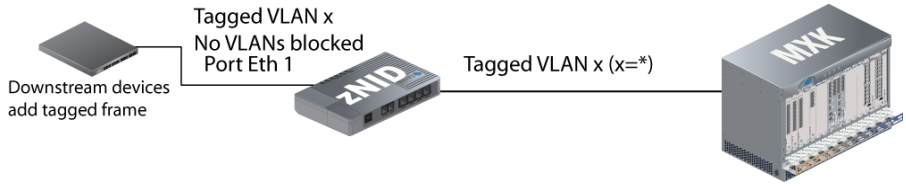
Adding a second tagged frame provides another level of delineation for frames. This option requires that some downstream device from the zNID is adding the tagged frame.

Figure 14: Add a second tag to a single tagged frame

Trunk with no filtering

The trunk with no filtering option allows all frames to pass through, regardless of whether they are tagged.

Figure 15: Trunk with no filtering — all frames allowed through regardless of VLAN

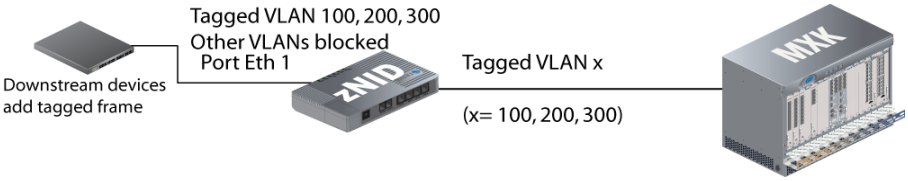


The zNID will pass untagged, single tagged, and double tagged traffic, however the MXK will not accept untagged GPON traffic, so those untagged frames will be discarded. The MXK will accept single tagged and double tagged frames on GPON if the downstream device which is providing the tagging, inserts the tags correctly.

Trunk with filtering

The trunk with filtering option will only allow frames with specific VLAN IDs to be accepted on the interface.

Figure 16: Trunk with filtering only frames with specific VLAN IDs are allowed through



In the Smart OMCI tool, you define a list of VLAN IDs which can be accepted on the downstream interface. In Figure 17 only frames with VLAN

100 are allowed to pass. In Figure 18 frames with either VLAN 100 or VLAN 200 are allowed to pass.

Figure 17: Filtering so that frames with VLAN 100 are allowed to pass

Figure 18: Filtering so that frames with VLAN 100 and 200 are allowed to pass

Voice options with OMCI

The OMCI zNIDs support SIP and H.248 voice configurations.

Voice connection options

The below tables show the option for the two main screens:

- Voice connection options, page 50

  Standard connection information, including identifying the softswitch server and receive and transmit gain.

- SIP features, page 52

  The SIP specific features.

- H.248 features, page 54

  The H.248 specific features.

Table 1: Voice connection options

Option	Description
GEM	The GEM index for the interface. See *GEM port IDs* on page 45 for more information.
VLAN ID	Sets the VLAN ID for the interface. VLANs are used to segregate traffic.
CoS	Sets the Class of Service priority for the interface. Low priority is 0, high priority is 7. Data would normally have low priority, video somewhere in the middle (4), and voice high priority.
Country Code	The country codes are based on ITU E.164
Host IP Option	If **Host IP Option** is *static* then the IP address, Netmask, and Gateway need to be entered. If **Host IP Option** is *dynamic* then the IP address, Netmask, and Gateway will be provided through DHCP.
VOIP Server	The IP address or a host name of the softwitch server providing VoIP services
Rx Gain	Specifies the gain value for the received signal in tenths of a dB. Valid values are -120 (-12.0 dB) to 60 (+6.0 dB). The default value is 0.
Tx Gain	Specifies the gain value for the transmit signal in tenths of a dB. Valid values are -120 (-12.0 dB) to 60 (+6.0 dB). The default value is 0.
DTMF Mode	RFC 2833 or inband

SIP features

Most SIP features, such as Caller ID, Call Waiting, Call Progress or Transfer and Call Presentation are configured on the switch rather than on the subscriber's device.

SIP features are provided for networks which do not provide the configuration on the switch.

Standard connection features are described in Voice connection options, page 50.

Figure 19: SIP voice configuration options

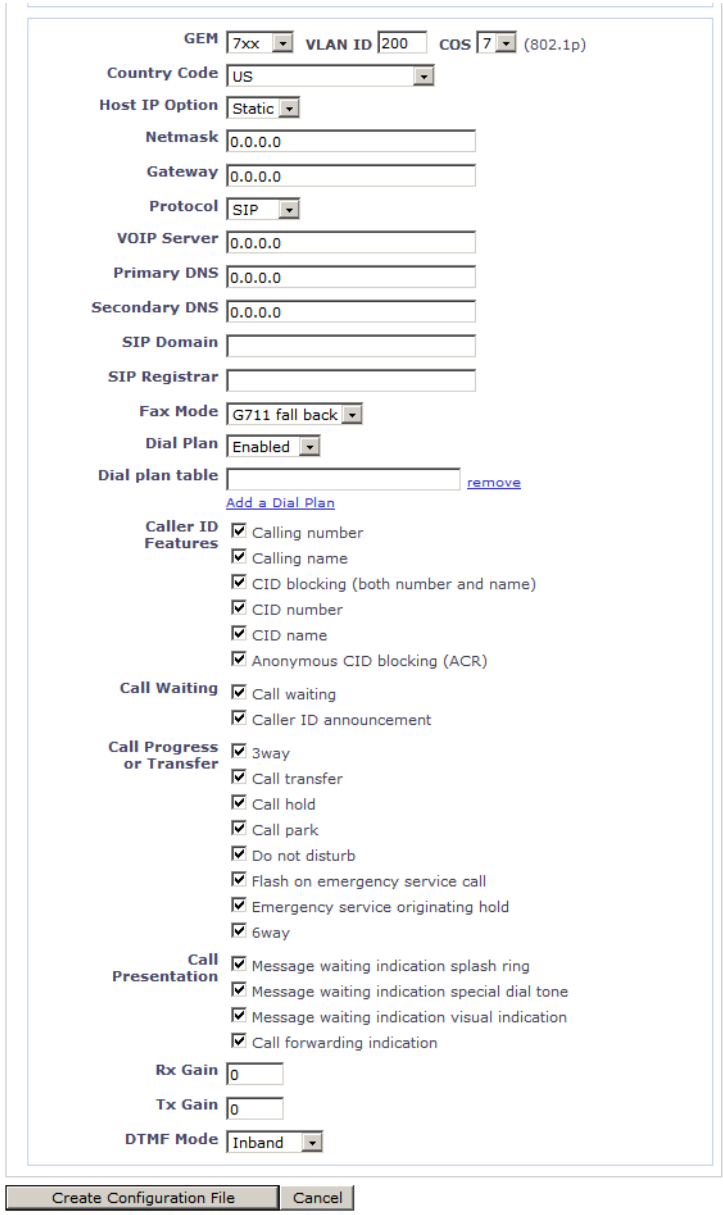


Table 2: SIP features

Option	Description
SIP Domain	Host or domain part of the SIP address of record for users connected to this ONT. This parameter is also known as Host Port URI
SIP Registrar	The domain name or IP address of the registrar server for SIP signalling messages. Example 172.208.90.10 or proxy.sipreg.net
Dial Plan	Dial plans may be enabled or disabled. See *Dial plans* on page 52 for more information.
Dial plan table	
Caller ID Features	Select or deselect call features. In most configurations this control is done at the switch and not at the Analog Telephone Adapter (ATA) — in our case the zNID POTS interface. The switch is normally configured to override the ATA.
Call Waiting	
Call Progress or Transfer	
Call Presentation	
Fax Mode	G711 fall back or T.38

Dial plans

Dial plans are the way to define what happens when a user dials a phone, for example a user may dial '411' on their SIP phone — a dial plan can be configured so that call will go to the appropriate information service is for the area. Another example is adding the local area code to all calls when the VoIP provider is not in the same area code as the dialing phone.

The dial plan follows most MGCP standard functions:

- Valid characters:
  - Numeric: 0,1,2,3,4,5,6,7,8,9
  - Character: *,#,(,), [?]?|
  - Variable (arbitrary number(s): x (x.)

    Note: (case-sensitive) x must be in lower case
  - Timer: T
- The dial plan begins with "(" and ends with ") and each item in the dial plan is delimited by "|".

  For example: (1234|**##|x.T)
- A dial plan completes by integrating several separate Dial Plan Token, that is, a Dial Plan Token is a component of the whole dial plan.

The length of Dial Plan Token is limited to 28 bytes. For example:

Token 1: (***xx|*xx*x.#|*xx*x.*xx#|

Token 2: *xx*x.*x#|*31*xxxxxxxx|

Token 3: *xx#|#xx#|*#xx#|#001|x.T)

The whole dial plan forms:

(***xx|*xx*x.#|*xx*x.*xx#|*xx*x.*x#|*31*xxxxxxxx|*xx#|#xx#|*#xx#|#001|x.T)

- The POTs port of a zNID share one dial plan, if you want to apply a new dial plan it is applied to all the active zNID POTS ports. After resync of the zNID, the new dial plan takes effect.
- Until a custom dial plan is configured the zNID uses a default dial plan. The default dial plan is:
(***xx|*xx*x.#|*xx*x.*xx#|*xx*x.*x#|*31*xxxxxxxx|*xx#|#xx#|*#xx#|#001|x.T)
- An empty dial plan may be added and it can be stored on the zNID, however, the blank dial plan will not be in effect. The default dial plan will be in effect.

The “.” allows the user to repeat the previous character multiple times. “T” means that the digits will be sent on timeout. For example “x.T”. x=[0-9] so the user can enter in as many 0-9 numbers as they want to and after they have done nothing for T time the zNID knows that dialing is finished and the digits are sent to the switch. On the zNID T = 500ms.

MCGP functions for dial plans may be found in RFC 2705 MGCP version 1.0.

H.248 features

This section describes H.248 specific features.

Standard connection features are described in Voice connection options, page 50.

Figure 20: H.248 voice configuration options

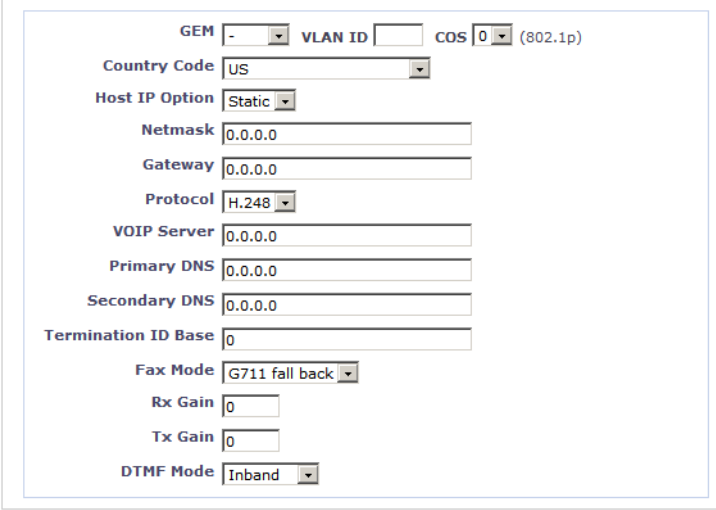


Table 3: H.248 features

Option	Description
Termination ID Base	If the Term ID is "tp/" then voice port one would register itself as "tp/0" and voice port two would register as "tp/1". The voice ports start at 0.
Fax Mode	G711 fall back or T.38

T1/E1 options with OMCI

Figure 21: PWE configuration options

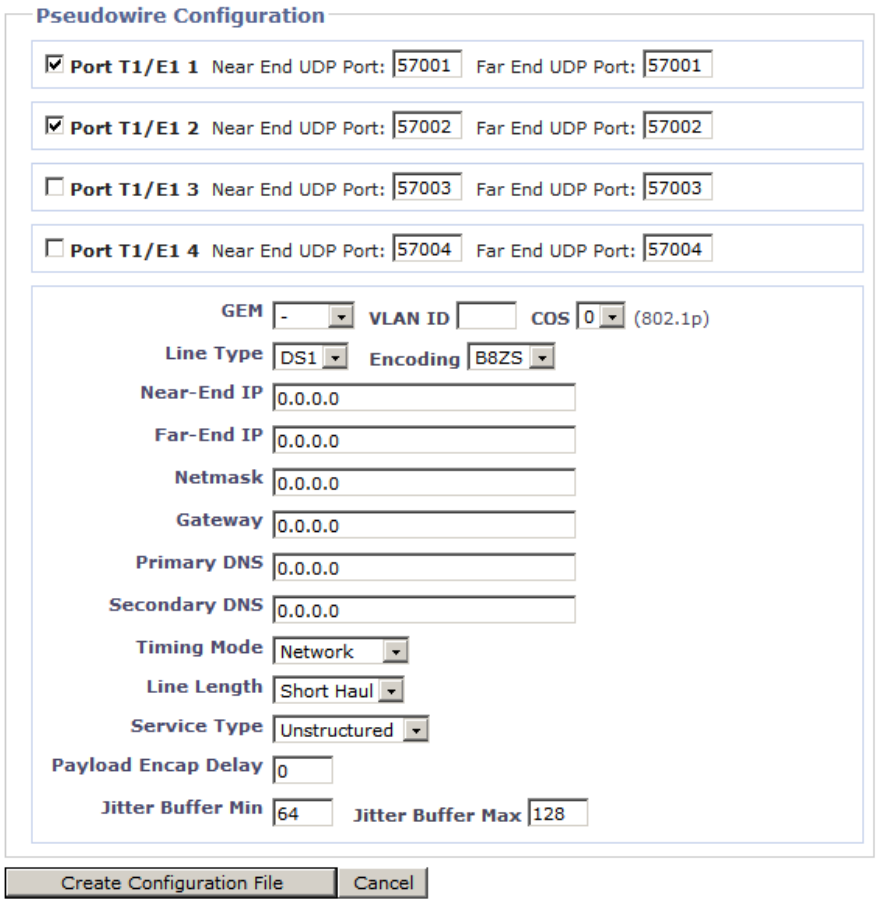


Table 4: PWE configuration options

Option	Description
Near End UDP Port	Sets the UDP port on the zNID
Far End UDP Port	Sets the UDP port for the far end PWE access device.
GEM	The GEM index for the interface. See *GEM port IDs* on page 45 for more information.
VLAN ID	Sets the VLAN ID for the interface. VLANs are used to segregate traffic.
COS	Sets the Class of Service priority for the interface. Low priority is 0, high priority is 7. Data would normally have low priority, video somewhere in the middle (4), and voice high priority.
Line Type	Sets the line type for the interface. Must match the type of line connected

Table 4: PWE configuration options

Option	Description
Encoding	Defines how the clock rate of the incoming T-carrier signal is encoded. B8ZS (Bipolar with eight-Zero Suppression) is commonly used in North America. AMI (Alternate Mark Inversion)
Near-End IP	Provide the IP address with URI of the zNID udp:// 172.68.122.248.5000 or udp://pweserver_x22.net:1000
Far-End IP	Provide the IP address with URI of the far end T1/E1 access device udp://172.68.122.248.5000 or udp:// pweserver_x22.net:1000
Netmask	The network mask for the subnet in which the zNID resides
Gateway	The default gateway for the subnet in which the zNID resides
Primary DNS	The IP address of the primary domain name server. This has a default value of 0 when it is not set.
Secondary DNS	The IP address of the secondary domain name server. This has a default value of 0 when it is not set.
Timing Mode	Selects the TDM service timing mode. **Network** (default) — Also known as synchronous in some sources. Timing is derived off of the PON interface. **Differential** — With differential timing recovery mode, there is an external clock which keeps the T1/E1 access devices synchronized. The source device marks the difference between its clock time and the source clock time. The far end device will use that difference and timing on the PON to derive the clock. **Adaptive** — clock information is recovered from the pseudowire packets. **Loop** — clock is derived from the DS1 interface.
Line Length	Specifies the length of cable from unit to DSX-3 cross connect point. Short Haul Long Haul — greater than 50 feet.
Service Type	Defines whether the service type is structured or unstructured (non aligned) or unstructured with special octet aligned transport mode. If **Unstructured** or **Octet Aligned**, you need to set **Payload Encap Delay**. If **Structured**, you need to set **Payload Size**.

Table 4: PWE configuration options

Option	Description
Payload Encap Delay	Number of 125 microsecond frames to be encapsulated in each pseudowire packet. Recommended settings: — NxDS0, no signalling, N = 1 64 (8 ms) required, 40 (5 ms) desired — NxDS0, no signalling, N = 2..4 32 (4 ms) — NxDS0, no signalling, N > 4 8 (1 ms) — NxDS0 with DS1 CAS 24 (3 ms) — NxDS0 with E1 CAS 16 (2 ms)
Payload Size	Number of bytes in payload per packet. Recommended settings: — DS1 192 — DS1 200, required only if unstructured octet aligned service is supported — E1 256 — DS3 1024 — E3 1024
Jitter Buffer Min	The minimum depth of the playout buffer in multiples of the 125 µs frame rate. default: 0
Jitter Buffer Max	The maximum depth of the playout buffer in multiples of the 125 µs frame rate. default: 0

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