

GPON Voice Service Provisioning and Configurations

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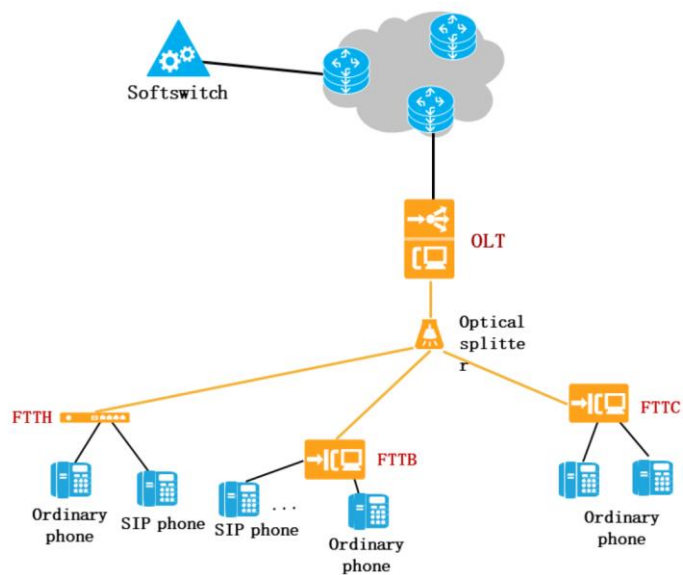
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VoIP Service Networking



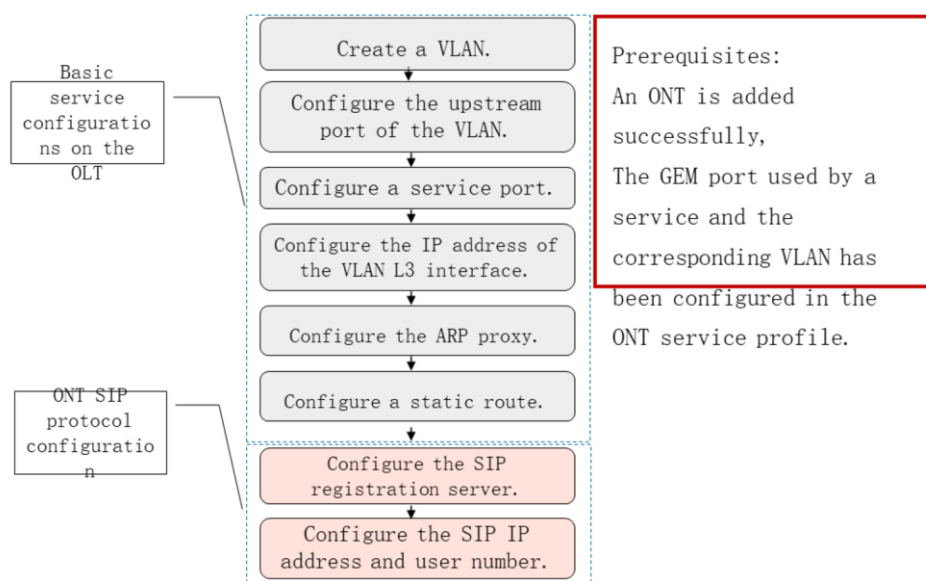
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Data Planning for the VoIP Service

Configuration Item	Data	SIP Service Parameter Planning	
OLT service VLAN	172, Smart	SIP server	200.200.200.200
OLT upstream port	0/19/0	SIP server port number	5061
OLT downstream port	0/3/0	IP address of the SIP local terminal	17.1.1.1/8
ONT ID, SN	1, SN 323031312E396A41	SIP local port number	5060
TCONT, DBA	1, DBA profile ID 2	Voice gateway	17.0.0.1/8
GEM Port	1	Phone number	7727001 7727002
ONT user VLAN	172	User name/password	7727001/ 7727000 7727002/ 7727000
ONT telephone port	TEL 1, TEL 2		

Process of Configuring the FTTH VoIP



OLT Configuration Procedure (1)

- Configure the line profile and service profile.

```
huawei(config)#ont-lineprofile gpon profile-id 91 profile-  
name hg850  
huawei(config-gpon-lineprofile-91)#tcont 1 dba-profile-id  
2  
huawei(config-gpon-lineprofile-91)#gem add 1 eth tcont 1  
huawei(config-gpon-lineprofile-91)#gem mapping 1 1 vlan  
172  
huawei(config-gpon-lineprofile-91)#commit  
huawei(config-gpon-lineprofile-91)#quit  
huawei(config)#ont-srvprofile gpon profile-id 91 profile-  
name hg850  
huawei(config-gpon-srvprofile-91)#ont-port eth 4 pots 2  
huawei(config-gpon-srvprofile-91)#port vlan iphost 172  
huawei(config-gpon-srvprofile-91)#commit  
huawei(config-gpon-srvprofile-91)#quit
```

- Configuring a line profile
 - ▣ Create a GPON ONT line profile with index 91 and bind T-CONT 1 to DBA profile 2.
 - ▣ Add a GEM port with index 1 to carry Ethernet service flows, and bind GEM port 1 to T-CONT 1.
 - ▣ Map the VLAN 172 service flow on the subscriber-side to GEM port 2.
- Configuring a service profile
 - ▣ A service profile must be consistent with the actual ONT type. Here, the HG850 or HG8245 is used as an example. There are 4 ETH ports and 2 POTS ports.
 - ▣ Map the VLAN 172 service flow to iphost port which is used by the ONT to process voice services.

OLT Configuration Procedure (2)

- Add an ONT.

```
huawei(config)#interface gpon 0/3
huawei(config-if-gpon-0/3)#ont confirm 0 ontid 1 sn-auth
323031312E396A41 omci ont-lineprofile-id 91 ont-
srvprofile-id 91
```

- Configure the native VLAN of the iphost Port.

```
huawei(config-if-gpon-0/3)#ont port native-vlan 0 1 iphost
vlan 172
```

- Adding an ONT
 - Connect the ONT whose ID is 1 and serial number is 323031312E396A41 to GPON port 0/3/0. Set the management mode to OMCI. Bind the ONT to the line and service profiles whose IDs are both 91.
- Configuring a Native VLAN
 - Set the native VLAN ID of the iphost port on the ONT to 172. After receiving the packet, the iphost port removes the 172 tag and forwards the packet to a subscriber.

OLT Configuration Procedure (3)

- Step 1 Create a VLAN.

```
huawei(config)#vlan 172 smart
```

- Step 2 Add an upstream port to the VLAN.

```
huawei(config)#port vlan 172 0/19 0
```

- Step 3 Add a service port.

```
huawei(config)#service-port vlan 172 gpon 0/3/0 ont 1  
gempport 1 multi-service user-vlan 172
```

- Creating a service VLAN and configuring the upstream port
 - Set the VLAN ID to 172 and VLAN type to Smart. Add upstream port 0/19/0 to VLAN 172.
- Creating a service flow
 - Set the service VLAN ID to 172, GEM Port ID to 1, and subscriber-side VLAN ID to 172.

OLT Configuration Procedure (4)

- Step 4 Configure a VLAN L3 interface.

```
huawei(config)#interface vlanif 172
huawei(config-if-vlanif172)#ip address 17.1.1.7 8
```

- Step 5 Enable arp proxy.

- Enable arp proxy globally.

```
huawei(config)#arp proxy enable
```

- Enable arp proxy on the L3 interface.

```
huawei(config-if-vlanif172)#arp proxy enable
```

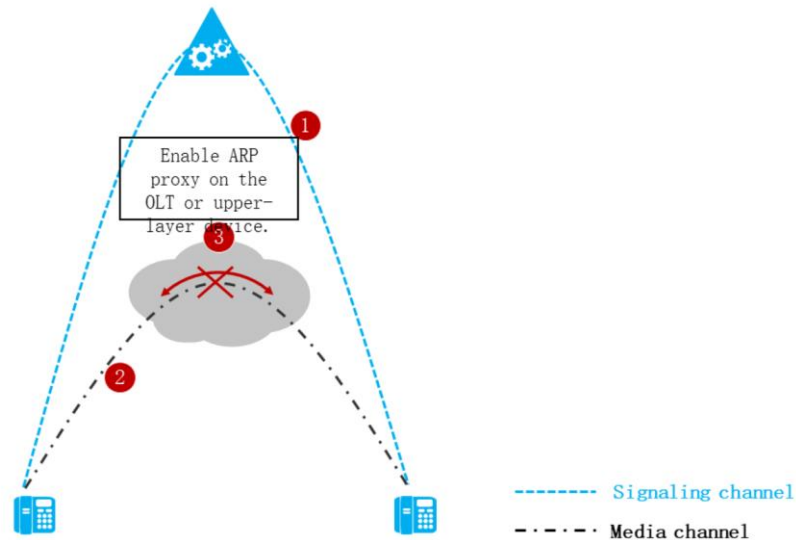
- Step 6 Configure routes.

```
huawei(config)# ip route-static 200.200.200.0 24 17.0.0.1
```

Note: The ARP proxy can be enabled on the OLT or on the upper-layer convergence device.


- Enable the ARP proxy function.
 - For different subscribers in the same service VLAN, the service ports in the smart VLAN are isolated from each other. As a result, voice media streams cannot be exchanged normally, and the ARP proxy function of the OLT must be enabled.
 - ARP proxy must be enabled globally and in interface mode.

Smart VLAN ARP Proxy



- In an NGN network, control and bearing are separated. The signaling is communicated with the softswitch through a route. The signaling is reachable. The subscriber can obtain the dial tone and ring.
- The voice is transmitted through the bearer network. Because the smart VLAN is isolated at L2, different ports in the same VLAN cannot learn the MAC address of each other. As a result, the voice between subscribers cannot be transmitted directly, and the subscriber who picks up the phone after hearing ringing cannot hear the voice of the other party.
- Enable the ARP proxy so that subscribers in the same VLAN can learn the MAC address of each other and the voice can be transmitted.

Creating a Voice WAN Interface

**HG8245**Logout


Status**WAN**LANWLANSecurityRouteForward RulesNetwork ApplicationVoiceSystem Tools

WAN ConfigurationWAN > WAN Configuration

On this page, you can configure WAN port parameters. The ONT home gateway uses a WAN port to communicate with upper-layer network equipment. Therefore, these parameters must be consistent on the ONT and network equipment.

NewDelete

	Connection Name	VLAN Priority	Protocol Type
<input type="checkbox"/>	1_INTERNET_R_VID_10	10/1	IPv4

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Configuring the Voice WAN Interface

Connection Name	VLAN Priority	Protocol Type
1_INTERNET_R_VID_10	10/1	IPv4

Basic Information

Enable WAN: ☒

Encapsulation mode: ☒ IPoE ☐ PPPoE

Protocol type: IPv4

WAN mode: Route WAN

Service type: VOIP

Enable VLAN: ☒

VLAN ID: 172 (1-4094)

802.1p: 6 (1-1540)

MTU: (1-1540)

IP acquisition mode: ☒ Static ☐ DHCP ☐ PPPoE

IP address: 17.1.1.1

Subnet mask: 255.0.0.0

Default gateway: 17.0.0.1

Primary DNS server:


Secondary DNS server:

Apply Cancel

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- In the dialog box that is displayed, configure the parameters of the WAN interface as follows:
 - Select **Enable WAN** to enable the WAN connection that is newly set up.
 - Set **Service Type** to **VOIP**.
 - Set **WAN Mode** to **Route WAN**.
 - Set **VLAN ID** to **172**.
 - Set **IP Acquisition Mode** to **Static**, and input the IP address, subnet mask and default gateway.
- Click **Apply**.

Checking the Connection Status

**HG8245**Logout

Status WAN LAN WLAN Security Route Forward Rules Network Application Voice System Tools

WAN Information Status > WAN Information

On this page, you can query the connection and line status of the WAN port.

IPv4 Information

WAN Name	Connection Status	IP Acquisition Mode	IP Address	Subnet Mask	VLAN Priority	MAC Address	Connected
2_VOIP_R_VID_172	Connected	Static	17.1.1.1	255.0.0.0	172/6	78:1D:BA:BF:68:68	AlwaysOn
1_INTERNET_R_VID_10	Connected	PPPoE	10.10.10.217	255.255.255.255	10/1	78:1D:BA:BF:68:67	AlwaysOn

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Configuring the SIP Interface (1)

The screenshot shows the Huawei HG8245 web interface. The top navigation bar includes tabs for Status, WAN, LAN, WLAN, Security, Route, Forward Rules, Network Application, Voice, and System Tools. The 'Voice' tab is selected. The left sidebar shows 'VoIP Basic Configuration' and 'VoIP Advanced Configuration'. The main content area is titled 'Interface Basic Parameters' and contains a form for configuring the SIP interface. The form includes fields for Outbound Proxy Address (200.200.200.200), Outbound Proxy Port (5061), Standby Outbound Proxy Address, Standby Outbound Proxy Port (5060), Primary Proxy Address, Primary Proxy Port (5060), Standby Proxy Address, Standby Proxy Port (5060), Home Domain (huawei.com), Local Port (5060), Digitmap, Digitmap Match Mode (Min), Registration Period (600), and a dropdown for selecting the WAN interface (1_VOIP_R_VID_172). The 'Outbound Proxy Address' and 'Outbound Proxy Port' fields are highlighted with a red box.

Parameter	Value	Unit/Range
Outbound Proxy Address	200.200.200.200	(IP or Domain)
Outbound Proxy Port	5061	(0-65535)
Standby Outbound Proxy Address		(IP or Domain)
Standby Outbound Proxy Port	5060	(0-65535)
Primary Proxy Address		(IP or Domain)
Primary Proxy Port	5060	(0-65535)
Standby Proxy Address		(IP or Domain)
Standby Proxy Port	5060	(0-65535)
Home Domain	huawei.com	(IP or Domain)
Local Port	5060	(0-65535)
Digitmap	[xABCD]S[xABCD]#	
Digitmap Match Mode	Min	
Registration Period	600	(Unit:s)(1-65534)
WAN	1_VOIP_R_VID_172	(Select the name of the WAN that will carry the voice signaling)

- Create a new WAN interface for voice service.
- Click the **Voice** tab and then choose the **VoIP Basic Configuration** from the navigation tree.
- In the pane on the right, configure the parameters of the SIP-based voice interface as follows:
 - Set **Proxy Server Address** below **Primary Server** to 200.200.200.200.
 - The default value of the **Server Port** is 5061.

Configuring the SIP Interface (2)

Digitmap Match Mode: Max

Registration Period: 600 (Units)(1-85534)

Signaling Port: 2_VOIP_R_VID_172 (Select the name of the VOIP interface that will carry the voice signaling messages.)

Media Port: 2_VOIP_R_VID_172 (Select the name of the VOIP interface that will carry the voice media. The media port is same with signaling port when it is empty.)

Region: China

Apply Cancel

User Basic Parameters

On this page, you can set the basic parameters for the voice users.

Sequence	URI	Register User Name	Auth User Name	Password	Associated POTS
<input type="checkbox"/> 1	--	7727003	7727003	*****	1
<input type="checkbox"/> 2	--	7727011	7727011	*****	2

Enable User: ☒

URI: (URI)

Register User Name: 7727011 (Telephone Number)

Associated POTS: 2

Auth User Name: 7727011 (The length must be between 0-64.)

Password: ***** (The length must be between 0-64.)

Apply Cancel

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- ▣ Set **Region** to **China**.
- ▣ Set **Signaling Port** and **Media Port** to **2_VOIP_R_VID_172**.
- Click **Apply**.

Configuring a SIP User

Digitmap Match Mode: Max

Registration Period: 600 (Units)(1-65534)

Signaling Port: (Select the name of the WAN that will carry the voice signaling messages.)

Media Port: (Select the name of the WAN that will carry the voice media. The media port is same with signaling port when it is empty.)

Region: China

Apply Cancel

User Basic Parameters

On this page, you can set the basic parameters for the voice users.

Sequence	URI	Register User Name	Auth User Name	Password	Associated POTS
<input type="checkbox"/> 1	--	7727001	7727001	*****	1
<input type="checkbox"/> 2	--	7727002	7727002	*****	2

New Delete

Enable User: ☒

URI: (URI)

Register User Name: 7727001 (Telephone Number)

Associated POTS: 1

Auth User Name: 7727001 (The length must be between 0-64.)

Password: ***** (The length must be between 0-64.)

Apply Cancel

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- In the **User Basic Parameters** area, configure the parameters of voice user 1 as follows:
 - Set **Public User Name** to **7727001**.
 - Select **Enable User** to enable the voice user configuration.
 - Set the **Register User Name** and the **Password**.
 - Set **Associated POTS** to 1.
- Click **Apply**.
- Then configure the parameters of voice user 2 as follows:
 - Set **Public User Name** to **7727002**.
 - Select **Enable User** to enable the voice user configuration.
 - Set the **Register User Name** and the **Password**.
 - Set **Associated POTS** to 2.
- Click **Apply**.

Checking the Registration Status

The screenshot shows the Huawei HG8245 web interface. The 'Status' tab is selected, and the 'VoIP Information' section is active. A table displays the registration status of two VoIP users. The 'User Status' column for both users is 'Up', which is highlighted with a red box. Below the table, there is a 'Restart VoIP' button.

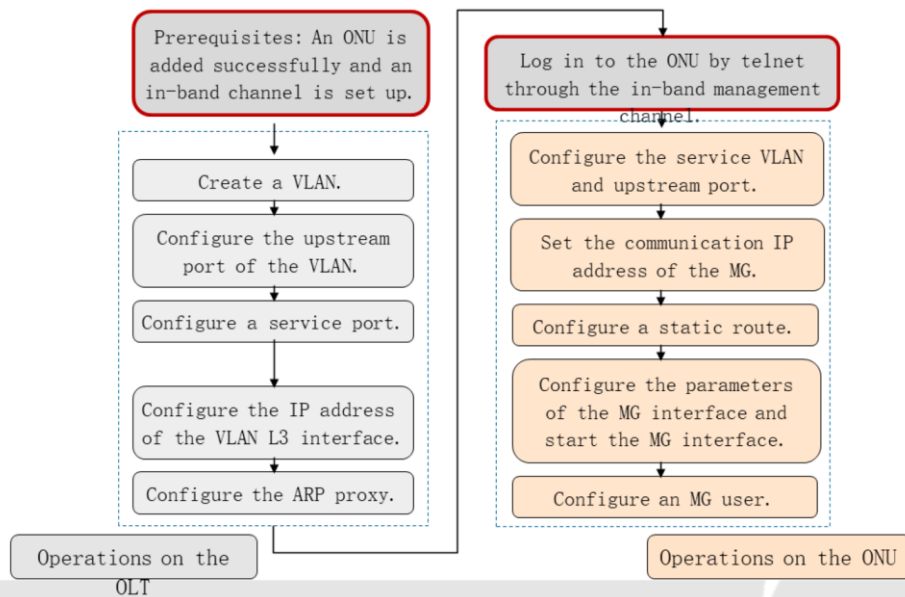
Sequence	URI	User Name(Telephone Number)	Associated POTS	User Status	Call Status
1	--	7727001	1	Up	Idle
2	--	7727002	2	Up	Idle

- Click the **Status** tab and then choose the **Information** from the navigation tree.
 - In the right pane, click **Restart VoIP**.
 - Wait a moment. Then the **User Status** becomes **Up**.

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VoIP Configuration Process on Class B ONU



Configurations on the OLT (1)

- Configure an ONT line profile and add an ONU.

```
huawei(config)#ont-lineprofile gpon profile-id 92 profile-  
name ma5620  
huawei(config-gpon-lineprofile-92)#gem add 0 eth tcont 0  
huawei(config-gpon-lineprofile-92)#gem mapping 0 0 vlan  
4000  
huawei(config-gpon-lineprofile-92)#tcont 1 dba-profile-id  
2  
huawei(config-gpon-lineprofile-92)#gem add 2 eth tcont 1  
huawei(config-gpon-lineprofile-92)#gem mapping 2 2 vlan  
172  
huawei(config-gpon-lineprofile-92)#commit  
huawei(config-gpon-lineprofile-92)#quit  
huawei(config)#interface gpon 0/3  
huawei(config-if-gpon-0/3)# ont confirm 0 ontid 2 sn-auth  
323031319C46B841 snmp ont-lineprofile-id 92
```

- Command description
 - ▣ Add GEM port 0 to carry management traffic flows and GEM port 2 to carry voice service flows.
 - ▣ Map the management service flows (subscriber-side VLAN 4000) to GEM port 0, and map the voice service flows (subscriber-side VLAN 172) to GEM port 2.

Configurations on the OLT (2)

- Configure an in-band management channel.

- Configure an in-band management VLAN on the OLT.

```
huawei(config)#vlan 4000 smart
huawei(config)#port vlan 4000 0/19 0
```

- Configure the in-band management IP address on the OLT.

```
huawei(config)#interface vlanif 4000
huawei(config-if-vlanif4000)#ip address 172.16.246.140 16
```

- Configure the in-band service port of the ONT.

```
huawei(config)#service-port vlan 4000 gpon 0/3/0 ont 2 gempport 0
multi-service user-vlan 4000
```

- Configure the in-band management IP address on the ONT.

```
huawei(config-if-gpon-0/8)#ont ipconfig 0 2 static ip-address
172.16.246.2 mask 255.255.0.0 gateway 172.16.246.140 vlan 4000
```

- Command description

- Set the management VLAN to 4000, add an upstream port to VLAN 4000, and set the in-band management IP address to 172.16.246.140/16.
- Create an in-band service channel, set the management VLAN to 4000, set the GEM Port ID to 0, and set the subscriber-side VLAN to 4000.
- Set the static management IP address of ONU 2 to 172.16.240.2/16, set the gateway to 172.16.246.140, and set the management VLAN to 4000.

Configurations on the OLT (3)

- Step 1 Create a VLAN.

```
huawei(config)#vlan 172 smart
```

- Step 2 Add an upstream port.

```
huawei(config)#port vlan 172 0/19 0
```

- Step 3 Add a service port.

```
huawei(config)# service-port vlan 172 gpon 0/3/0 ont 2  
gempoprt 2 multi-service user-vlan 172
```

- Telnet to the MA5620.

```
huawei(config)#telnet 172.16.246.2  
Connecting to 172.16.246.2...  
The connection to 172.16.246.2... is successful.  
>>User name:root  
>>User password: mduadmin
```

- Command description

- Create a service VLAN and configure its upstream port. Set the service VLAN ID to 172, VLAN type to smart, and add the upstream port 0/19/0 to VLAN 172.
- Create a service flow. Set the service VLAN ID to 172, GEM Port ID to 2, and subscriber-side VLAN to 172.
- The subscriber-side VLAN (172) of the OLT must be the same as the upstream service VLAN of the ONU.

Configuring a Voice Service on the MDU (1)

- Step 1 Create a VLAN.

```
MA5620G(config)# vlan 172
```

- Step 2 Add an upstream port.

```
MA5620G(config)# port vlan 172 0/0 1
```

- Step 3 Configure the IP address of the VLAN L3

```
j MA5620G(config-if-vlanif172)# ip address 17.1.1.200 8
```

- ```
MA5620G(config-voip)# ip address media 17.1.1.200 17.0.0.1
MA5620G(config-voip)# ip address signaling 17.1.1.200
```

- ```
MA5620G(config)# ip route-static 200.200.200.0 24 17.0.0.1
```

- The upstream service VLAN (172) of the ONU must be the same as the downstream subscriber-side VLAN of the OLT.
- Note:
 - You can configure attributes of an MG interface only when the media/signaling IP addresses of the MG interface already exist in the corresponding address pool.
 - The media and signaling IP addresses can be set to different IP addresses according to the actual networking planning.
 - After configuring the IP address and static route of the VLAN interface, you can run the ping command to check the connectivity between the VLAN interface and the MGC. Normally, you can receive the ICMP response messages from the MGC and no packet is lost during a long-period ping operation. If the ping operation fails, check the link between the MA5620 and the gateway and between the gateway and the MGC.

Configuring a Voice Service on the MDU (2)

- Step 6 Configure the SIP interface.

- Add an MG interface.

```
MA5620G(config)#interface sip 35
```

- Configure the attributes of the MG interface.

```
MA5620G(config-if-sip-35)#)#if-sip attribute basic media-ip 17.1.1.200  
signal-ip 1 17.1.1.200 signal-port 5060 transfer udp primary-proxy-ip1  
200.200.200.200 primary-proxy-port 5061 home-domain huawei
```

- Start the MG interface.

```
MA5620G(config-if-sip-35)#reset
```

- Step 7 Configure the PSTN subscriber data in slot 0/2, and add a single subscriber or a batch of subscribers.

```
MA5620G(config)#esl user  
MA5620G(config-esl-user)#sippstnuser add 0/2/1 35 telno 7727035  
MA5620G(config-esl-user)#sippstnuser batadd 0/2/2 0/2/24 35 telno 7727035
```

- For example, when the SIP protocol is used, the IP address of the SIP terminal is 17.1.1.200/8, the gateway is address 17.0.0.1, the subscriber number and subscriber name are 7727082.
- Note:
 - A SIP interface can be registered by IP address (default) or domain name (same as that on the softswitch).
 - You can run the **protocol support** command to implement protocol conversion.
 - #sippstnuser add: The mgid of a subscriber must be unique on the same SIP interface.

Configuring a Voice Service on the MDU (3)

- Configure the SIP PSTN user authentication data

```
MA5620G(config-esl-user)#sippstnuser
{
  add<K>|attribute<K>|auth<K>|batadd<K>|batdel<K>|del<K>|mod
  ify<K>|rightflag<K>|servicedata<K> }:auth
  { set<K> }:set
  { frameid/slotid/portid<S><Length 1-15> }:0/2/2
  { telno<K> }:telno
  { telno-value<S><Length 1-64> }:7727082
  { <cr>|password-mode<K> } password-mode:
  { password-mode-value<E><password,hal> }:password

  User Name(<=64 characters, "-" indicates
  deletion):7727082
  User Password(<=64 characters, "-" indicates deletion):
```

- This command is used to configure the authentication data of a single account of a SIP PSTN user. To configure the authentication data of a single account of a PSTN user, run this command. After this command is executed successfully, the authentication data of the PSTN user is modified to the specified data.

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Checking the VoIP Interface Status

- Check VoIP interface data.
 - Query basic running information about the SIP interface.

```
MA5620G(config)#display if-sip all
```
 - Query the attribute settings of a specified SIP interface.

```
MA5620G(config)#display if-sip attribute
```

- display if-sip all
 - When you run this command, the system displays the brief information about all the interfaces that support the SIP protocol in ascending order by SIP interface ID.
 - Interface attributes not configured are displayed as "-".
 - If no SIP interface is configured in the system, no information is displayed.
 - You can view information such as state, signaling IP/port, and proxy IP/port/domain name.
- display if-sip attribute
 - This command is used to query the attributes of a specified SIP interface, including mandatory and optional attributes. When you need to query the attributes of a SIP interface, run this command.

Query the Subscriber Status

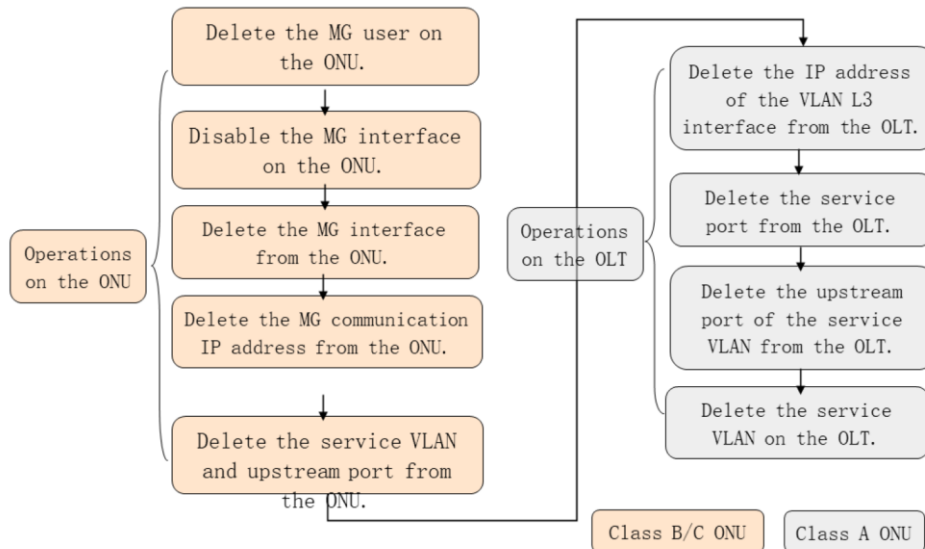
- Query the status of a PSTN subscriber.

```
MA5620G#display pstn state 0/2
```

F	/S	/P	PTPSrvState	PTPAdmState	CTPSrvState	CTPAdmState	LineState
0	/2	/0	Normal	NoLoop,NoTest	-	-	Normal
0	/2	/1	Normal	NoLoop,NoTest	-	-	Normal
0	/2	/2	Normal	NoLoop,NoTest	Idle	StartSvc	Normal
0	/2	/3	Normal	NoLoop,NoTest	-	-	Normal
0	/2	/4	Normal	NoLoop,NoTest	-	-	Normal
0	/2	/5	Normal	NoLoop,NoTest	-	-	Normal
0	/2	/6	Normal	NoLoop,NoTest	-	-	Normal

- F/S/P: Indicates the subrack ID, slot ID, and port ID of a port.
- PTPSrvState: Indicates the running status of the physical layer of a port. The possible query results are as follows: (1) Normal: normal; (2) PowerDeny: low power; and (3) Fault: A fault occurs.
- PTPAdmState: Indicates the physical layer management status of a port. The possible query results are as follows: (1) NoLoop, NoTest: No loopback, not tested; (2) Noloop, Test: No loopback, test in progress; (3) LLoop, NoTest: Local loopback, not tested; (4) LLoop, Test: Local loopback, test in progress; (5) RLoop, NoTest: remote loopback, not tested; and (6) RLoop, Test: remote loopback, test in progress.
- CTPSrvState: Indicates the service running status of a port. The possible query results are as follows: (1) Idle, (2) Offhook; (3) Locked; (4) Ringing; (5) Fault; and (6) - (indicating that no subscriber is configured).
- CTPAdmState: Indicates the service management status of a port. The possible query results are as follows: (1) LBlock: local blocking; (2) RBlock: remote blocking; (3) StartSvc: starting Services; and (4) -: no subscriber is configured.
- LineState: Indicates the subscriber line status.

Deleting a VoIP Service



- Commands on the ONU Side
 - ▣ `mgpstnuser del`
 - ▣ Shutdown
 - ▣ `undo interface h248`
 - ▣ `undo ip address {media | signaling}`
 - ▣ `undo port vlan`
 - ▣ `undo vlan`
- Commands on the OLT side
 - ▣ `undo ip address`
 - ▣ `undo interface vlanif`
 - ▣ `undo service-port`
 - ▣ `undo port vlan`
 - ▣ `undo vlan`

Quiz

1. What are the key parameters for SIP registration?

- Reference answer:
 - ▣ SIP: port number, IP address of the registration server, subscriber name and password, and phone number.

Summary

- Introduction to the SIP protocol
- Voice service configuration
- Voice service maintenance

Thank You

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