GPON FTTH VOIP Service Provisioning (MA5800)-SIP

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Objectives

- Upon completion of this course, you will be able to:
  - Describe GPON FTTH VoIP service principle
  - Provision the GPON FTTH VoIP service
  - Know the basic steps to maintain the GPON FTTH VoIP service

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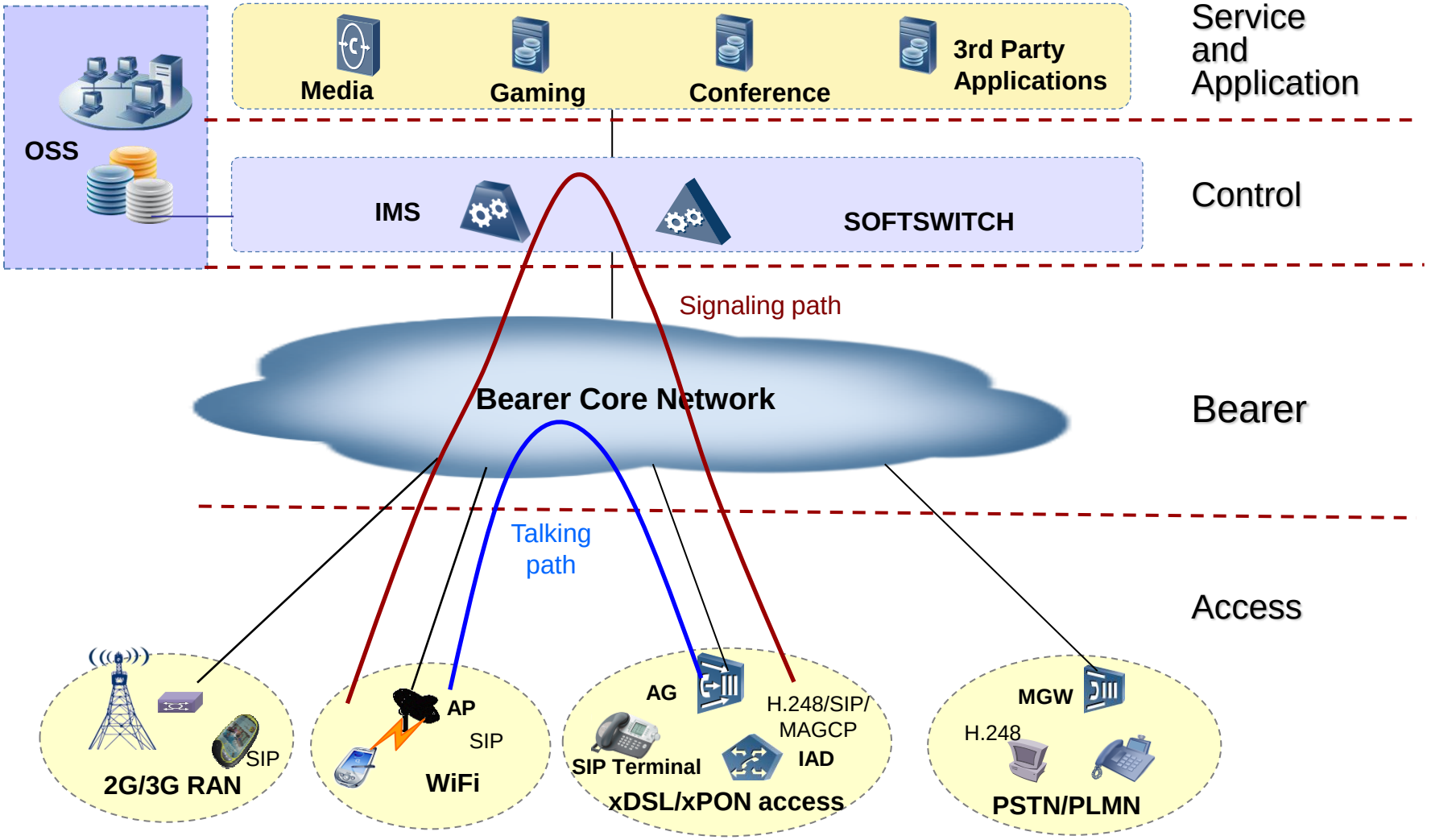
NGN Network Architecture



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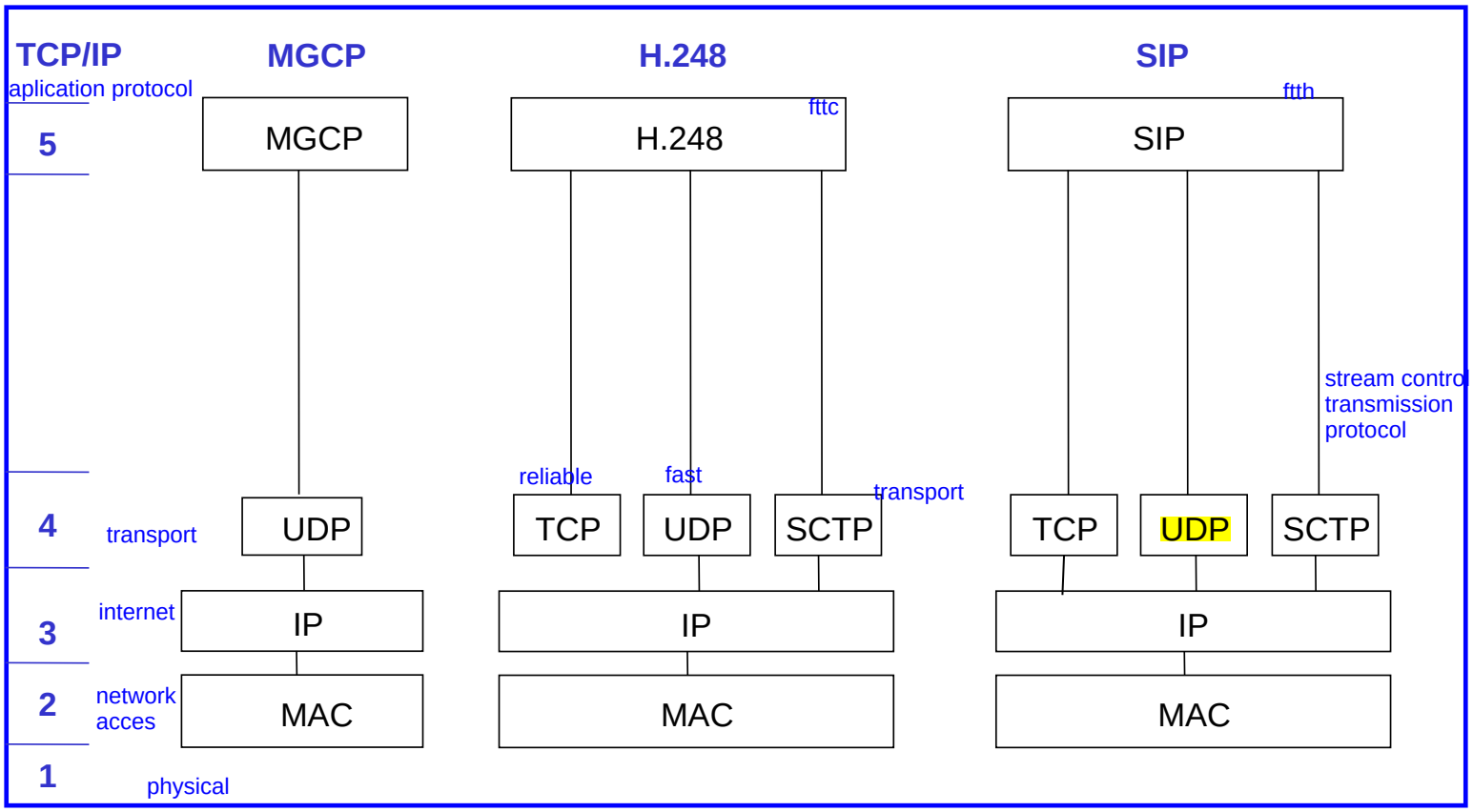
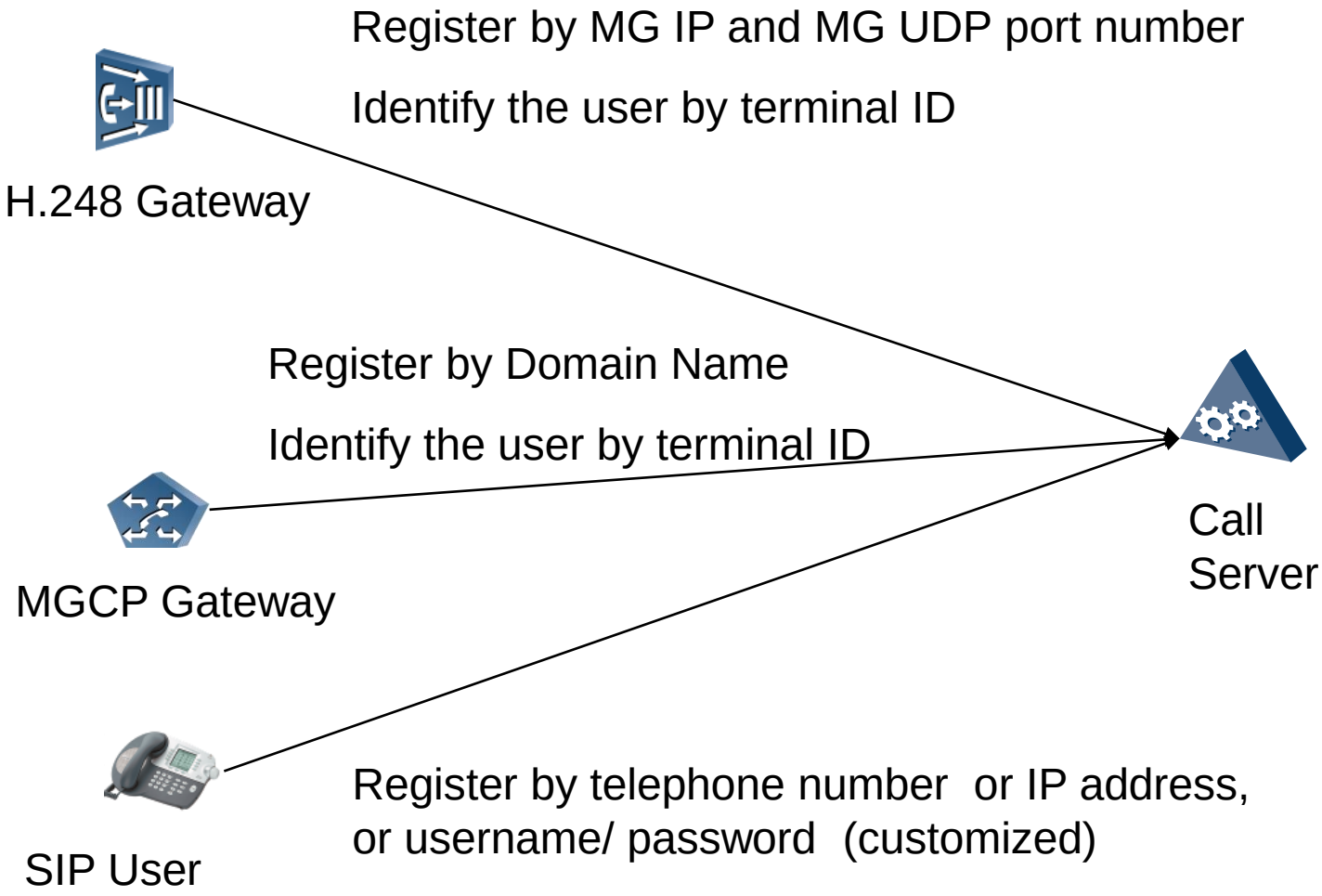
Protocol Introduction

- MGCP: Media Gateway Control Protocol
  - Provide signaling and call control for Media Gateways and Voice over IP (VoIP) terminal devices
  - Used for small gateway
- H.248/Megaco
  - H248 is a successor to MGCP and will finally replace it
  - Provide signaling and call control for Media Gateways and Voice over IP (VoIP) terminal devices
  - Used for large gateway
- SIP : Session Initiation Protocol
  - The core protocol of IETF multimedia data and control architecture.
  - It can be easily expanded, conveniently achieved, and suitable to implement Internet-based multimedia conference system.

VoIP Protocol Stack



Registration and Authentication



Questions

- How many layers are there in NGN?

  4 layers

- Which layer does VoIP protocol work at ?

  application layer
  sip
  mgcp
  h.248

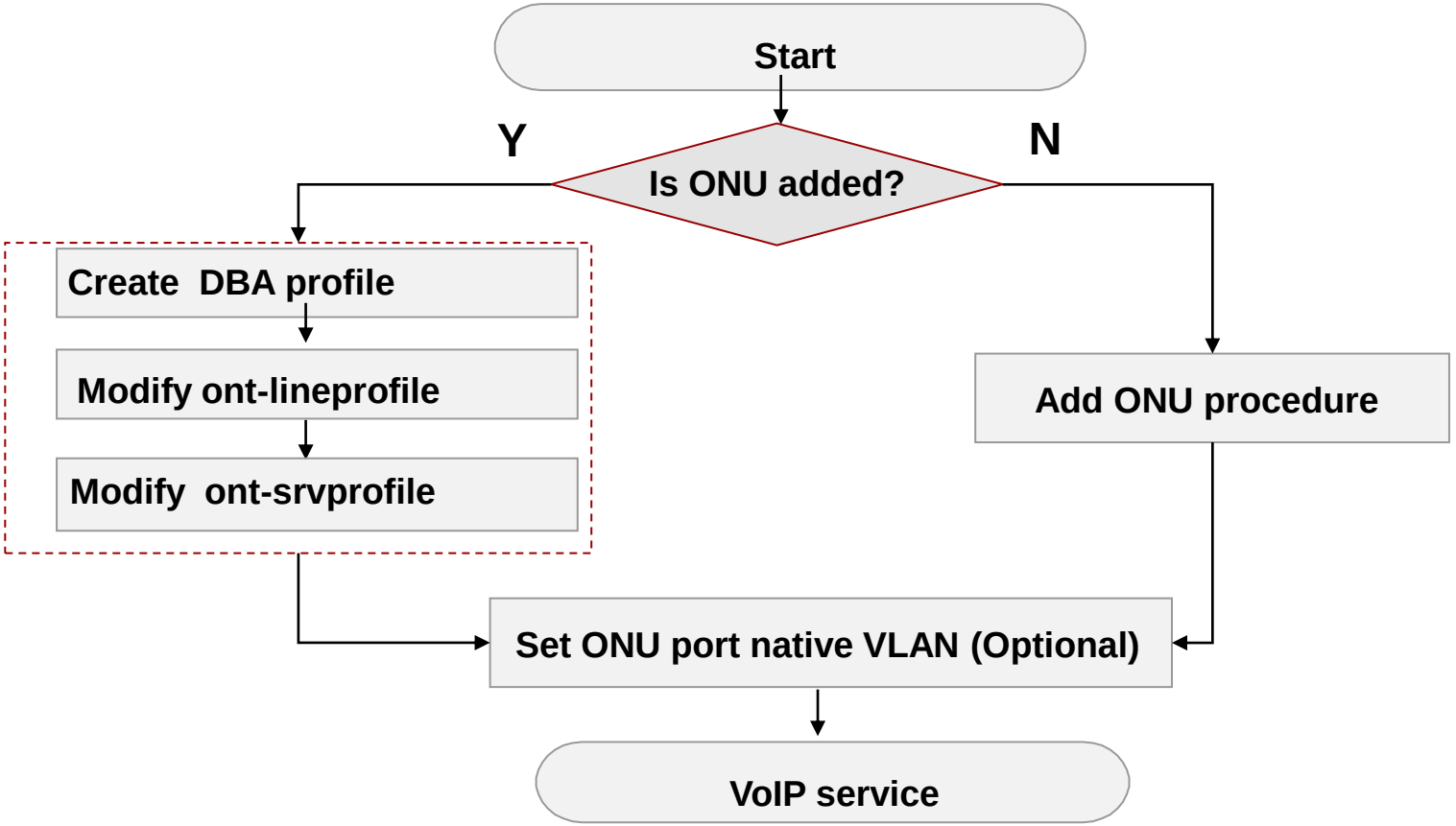
- How to identify SIP user?

- How to register H.248 Gateway to MGC?

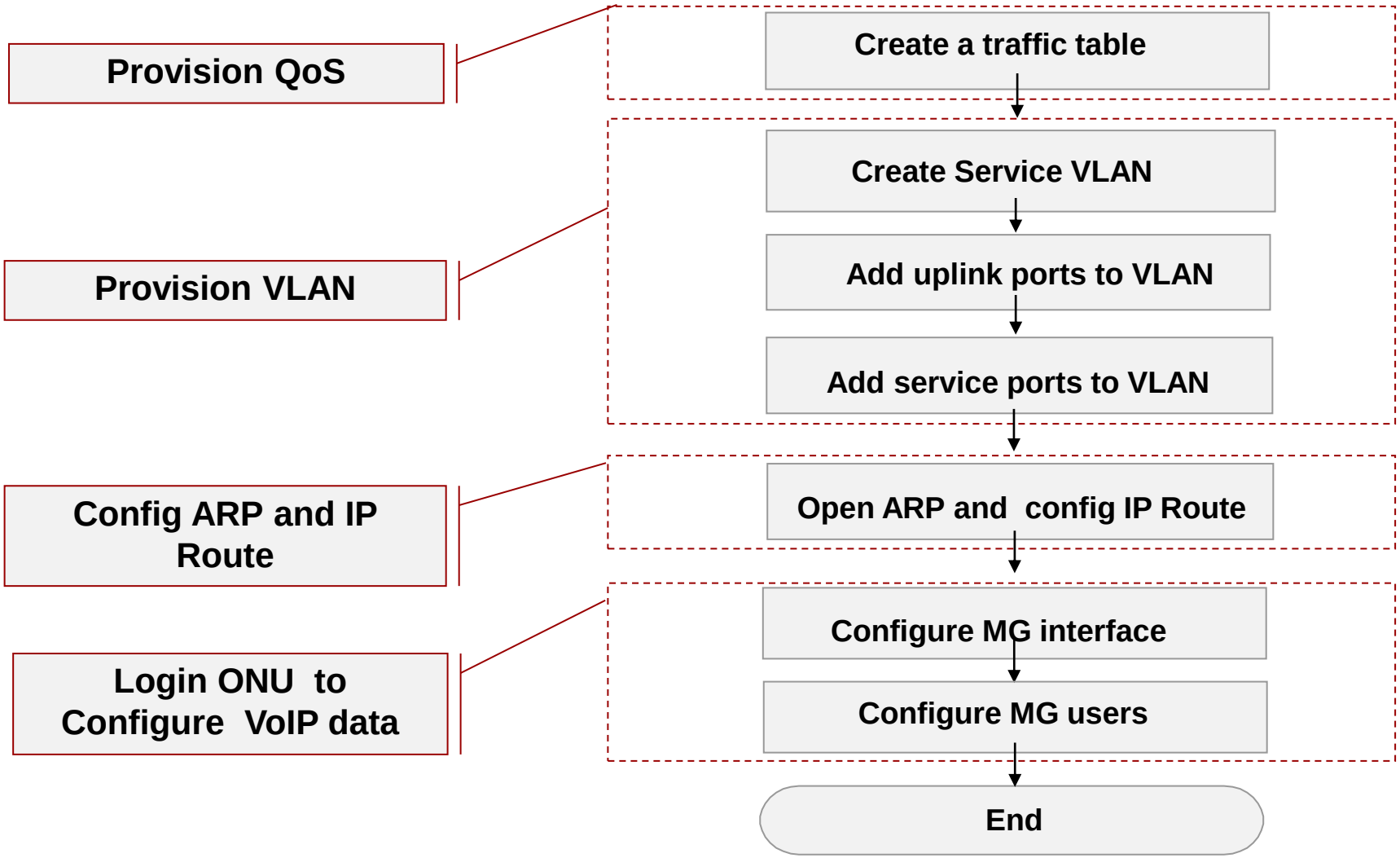
  media gateway control

Contents

Flow Chart-Add ONT



Flow Chart-VoIP Service



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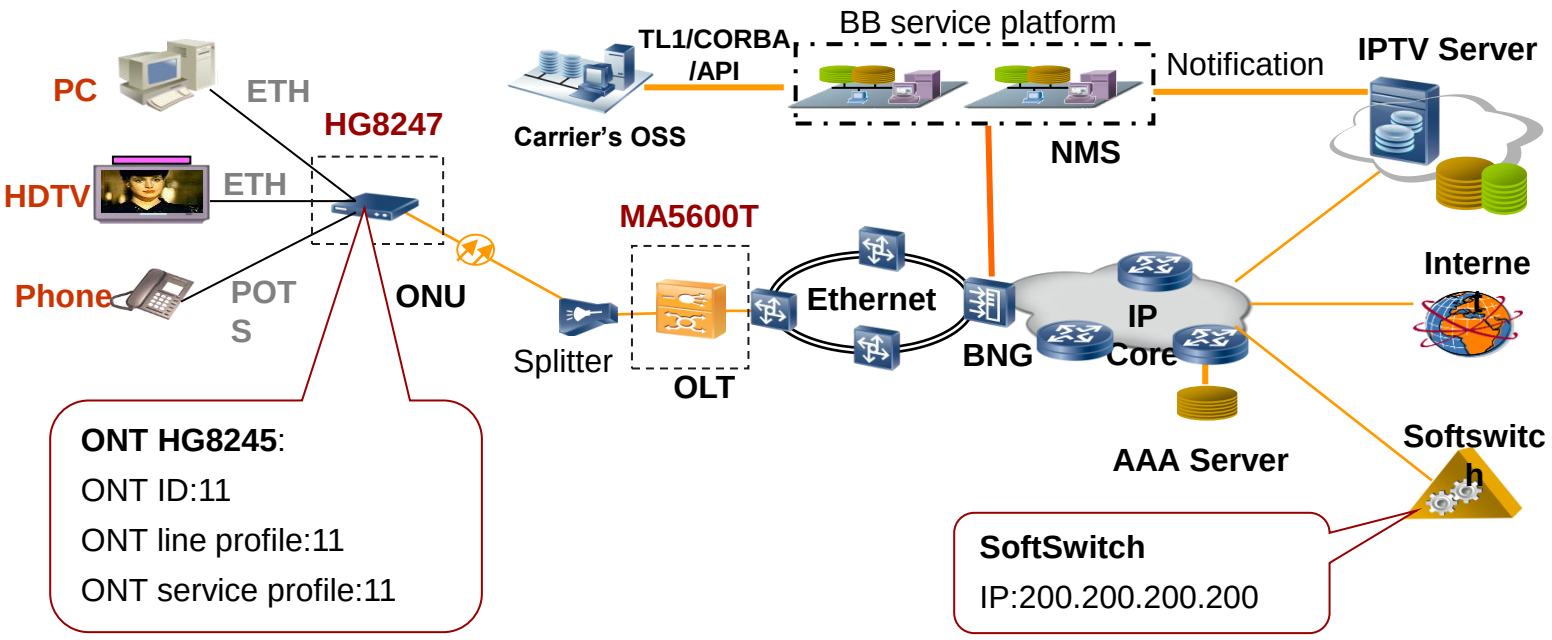
GPON FTTH Case



acc to olt

Type	ONU Port	C-VLAN	GEM	DBA	TCONT	Traffic table	S-VLAN	OLT port
VoIP	Tel1	172	2	21	6	6 (Default): off	172	GPON: 0/2/0 Uplink: 0/9/0

without limit

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OLT Side: Check the ONT Status

```
MA5800-X17(config)#interface gpon 0/2
MA5800-X17(config-if-gpon-0/2)#display ont info
{ portid<U><0,15> }: 0
{ all<K>|ontid<U><0,127> }: 11
{ <cr>||<K> }:

  Command:
          display ont info 0 11
  ------------------------------------------------------------------------------
  F/S/P                    : 0/2/0
  ONT-ID                   : 11
  Control flag             : active
  Run state                : online
  Config state             : normal
  Match state              : match
------------------------------------------------------------------------------
  Line profile ID      : 11
  ......
  ------------------------------------------------------------------------------
  Service profile ID   : 11
  ......
```


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OLT Side: Configure DBA Profile

- Create DBA profile

```
MA5800-X17(config)#dba-profile add
{ profile-id<K>|profile-
name<K>|type1<K>|type2<K>|type3<K>|type4<K>|type5<K> }:profile-id
{ profile-id<U><10,512> }: 21
{ profile-name<K>|type1<K>|type2<K>|type3<K>|type4<K>|type5<K> }: type3
{ assure<K> }: assure
{ assure-bandwidth<U><128,10000000> }: 1024
{ max<K> }: max
{ max-bandwidth<U><128,10000000> }: 2048

  Command:
          dba-profile add profile-id 21 type3 assure 1024 max 2048
  Adding a DBA profile succeeded
  Profile ID  : 21
  Profile name: dba-profile_21
```

OLT Side: Modify ONT-lineprofile (1/4)

- Modify GPON ONT-lineprofile
  - Enter the ONT-lineprofile mode

```
MA5800-X17(config)#ont-lineprofile gpon
{ <cr>|profile-id<K>|profile-name<K> }: profile-id
{ profile-id<U><0,8192> }: 11
{ <cr>|profile-name<K> }:

  Command:
          ont-lineprofile gpon profile-id 11

MA5800-X17(config-gpon-lineprofile-11)#
```

OLT Side: Modify ONT-lineprofile (2/4)

- Modify GPON ONT-lineprofile
  - Create T-CONT for VoIP service

```
MA5800-X17(config-gpon-lineprofile-11)#tcont
{ tcont-list<S><Length 1-13> }: 2
{ <cr>|dba-profile-id<K>|dba-profile-name<K> }: dba-profile-id
{ profile-id<U><0,512> }: 21

  Command:
          tcont 2 dba-profile-id 21
```

OLT Side: Modify ONT-lineprofile (3/4)

- Modify GPON ONT-lineprofile
  - Create GEM port for VoIP service

```
MA5800-X17(config-gpon-lineprofile-11)#gem add
{ gem-index<U><0,1023> }: 2
{ service-type<E><eth,tdm> }: eth
{ tcont<K> }: tcont
{ tcont-id<U><0,127> }: 2
{ <cr>|cascade<K>|downstream-priority-queue<K>|encrypt<K>|gem-
car<K>|priority-queue<K> }:

  Command:
          gem add 2 eth tcont 2
```

OLT Side: Modify ONT-lineprofile (4/4)

- Modify GPON ONT-lineprofile
  - Mapping GEM port to the C-VLAN

```
MA5800-X17(config-gpon-lineprofile-11)#gem mapping
{ gem-index<U><0,1023> }: 2
{ mapping-index<U><0,7> }: 2
{ e1<K>|eth<K>|eth-bundle<K>|flow-
car<K>|iphost<K>|ippath<K>|moca<K>|priority<K>
|tdm-vcl<K>|transparent<K>|vdsl<K>|vlan<K> }: vlan
{ untag<K>|vlan-id<U><0,4095> }: 172
{ <cr>|flow-car<K>|priority<K>|transparent<K> }:

  Command:
          gem mapping 2 2 vlan 172

MA5800-X17(config-gpon-lineprofile-11)#commit
MA5800-X17(config-gpon-lineprofile-11)#quit
```

OLT Side: Modify ONT-srvprofile (1/2)

- Modify GPON ONT-srvprofile
  - Enter the ONT-srvprofile mode

```
MA5800-X17(config)#ont-srvprofile gpon
{ <cr>|profile-id<K>|profile-name<K> }: profile-id
{ profile-id<U><0,8192> }: 11
{ <cr>|profile-name<K> }:

  Command:
          ont-srvprofile gpon profile-id 11
```

OLT Side: Modify ONT-srvprofile (2/2)

- Modify GPON ONT-srvprofile
  - Configure the IPhost interface in ONT

```
MA5800-X17(config-gpon-srvprofile-11)#port vlan
{ eth<K>|iphost<K>|moca<K>|vdsl<K> }: iphost
{ q-in-q<K>|translation<K>|transparent<K>|vlanid<U><0,4095> }: 172
{ <cr>|TLS<K>|priority<K>|prival<U><0,7> }:

  Command:
          port vlan iphost 172
  Set ONT port(s) VLAN configuration, success: 1, failed: 0

MA5800-X17(config-gpon-srvprofile-11)#commit
MA5800-X17(config-gpon-srvprofile-11)#quit
```

OLT Side: Configure Port Native-VLAN

- Set the native-VLAN for IPhost interface

```
MA5800-X17(config)#interface gpon 0/2

MA5800-X17(config-if-gpon-0/2)#ont port native-vlan
{ portid<U><0,15> }: 0
{ ontid<U><0,127> }: 11
{ eth<K>|iphost<K>|moca<K>|vdsl<K> }: iphost
{ priority<K>|vlan<K> }: vlan
{ vlanid<U><0,4095> }: 172
{ <cr>|priority<K> }:

  Command:
          ont port native-vlan 0 11 iphost vlan 172

MA5800-X17(config-if-gpon-0/2)#quit
MA5800-X17(config)#
```

OLT Side: Provision VLAN (1/3)

- Configure service VLAN 172

```
MA5800-X17(config)#vlan 172 smart
```

- Add uplink port 0/9/0 to VLAN 172

```
MA5800-X17(config)#port vlan
{ name<K>|vlan-list<S><Length 1-255>|vlanid<U><1,4093> }: 172
{ frameid/slotid<S><Length 3-15>|inner-vlan-list<K>|to<K> }: 0/9
{ portlist<S><Length 1-255> }: 0

  Command:
          port vlan 172 0/9 0
```

OLT Side: Provision VLAN (2/3)

- (Optional) Enable the intercommunication in VLAN 172
  - Method 1: ARP Proxy
    - Create the L3 interface for VLAN 172

```
MA5800-X17(config)#interface vlanif 172
MA5800-X17(config-if-vlanif172)#ip address 17.0.0.254 8
MA5800-X17(config-if-vlanif172)#quit
```

    - Enable the ARP proxy function

```
MA5800-X17(config)#arp proxy enable
MA5800-X17(config)#interface vlanif 172
MA5800-X17(config-if-vlanif172)#arp proxy enable
MA5800-X17(config-if-vlanif172)#quit
```

OLT Side: Provision VLAN (3/3)

- (Optional) Enable the intercommunication in VLAN 172
  - Method 2: User-bridging
    - Create VLAN service-profile and enable the user-bridging function

```
MA5800-X17(config)#vlan service-profile profile-id 21
MA5800-X17(config-vlan-srvprof-21)#user-bridging enable
MA5800-X17(config-vlan-srvprof-21)#commit
MA5800-X17(config-vlan-srvprof-21)#quit
```

    - Bind the VLAN service-profile to VLAN 172

```
MA5800-X17(config)#vlan bind service-profile
{ vlan-list<S><Length 1-255>|vlan-name<K> }: 172
{ profile-id<K>|profile-name<K> }: profile-id
{ profile-id<U><1,256> }: 21
```

OLT Side: Configure Service-port

- Create service-port

```
MA5800-X17(config)#service-port 21
{ adminstatus<K>|inbound<K>|modify<K>|outbound<K>|source<K>|tag-
transform<K>|uplink-port<K>|vlan<K> }: vlan
{ name<K>|vlanid<U><1,4093> }: 172
{ epon<K>|eth<K>|gpon<K>|port<K> }: gpon
{ frameid/slotid/portid<S><Length 5-18> }: 0/2/0
{ ont<K> }: ont
{ ontid<U><0,127> }: 11
{ eth<K>|gemport<K>|iphost<K>|vdsl<K> }: gemport
{ gemindex<U><0,1023> }: 2
{ <cr>|bundle<K>|inbound<K>|multi-service<K>|rx-cttr<K>|tag-transform<K> }:
multi-service
{ user-8021p<K>|user-encap<K>|user-vlan<K> }: user-vlan
{ other-all<K>|priority-tagged<K>|untagged<K>|user-vlanid<U><1,4095> }: 172
{ <cr>|bundle<K>|inbound<K>|rx-cttr<K>|tag-transform<K>|user-encap<K> }: rx-cttr
{ rx-index<U><0,1023> }: 6
{ tx-cttr<K> }: tx-cttr
{ tx-index<U><0,1023> }: 6
```

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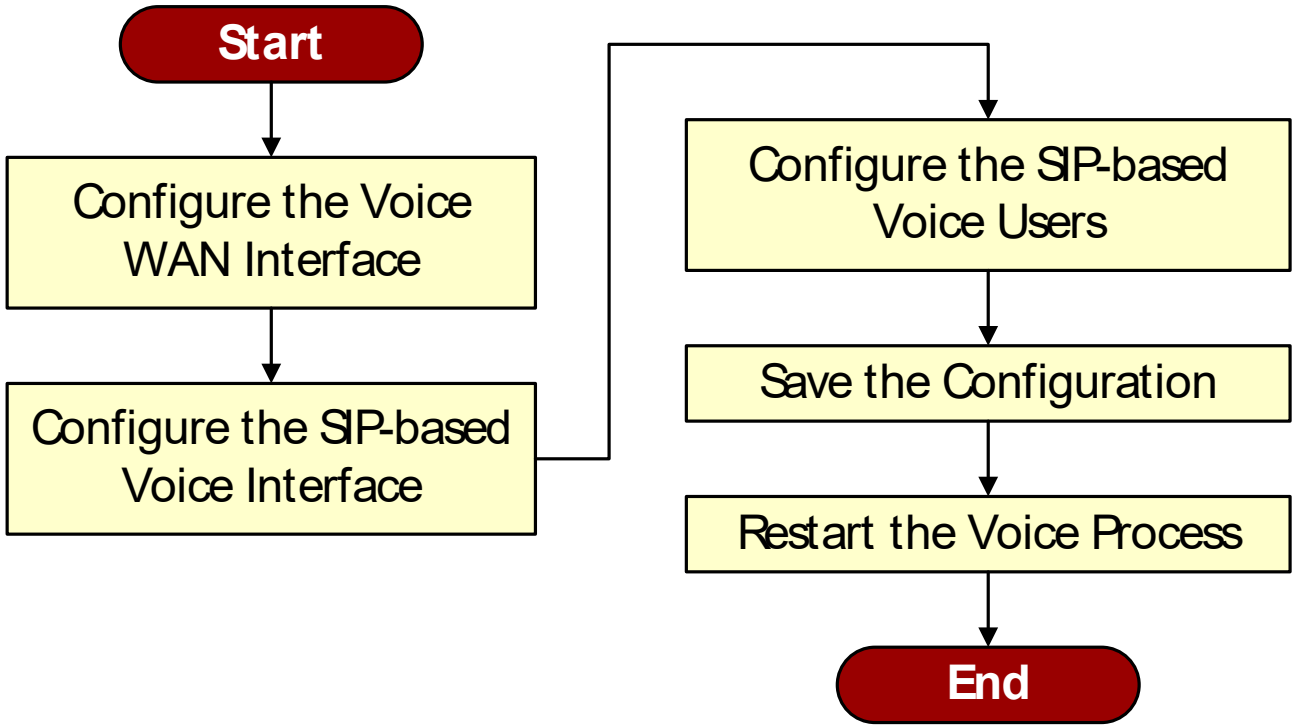
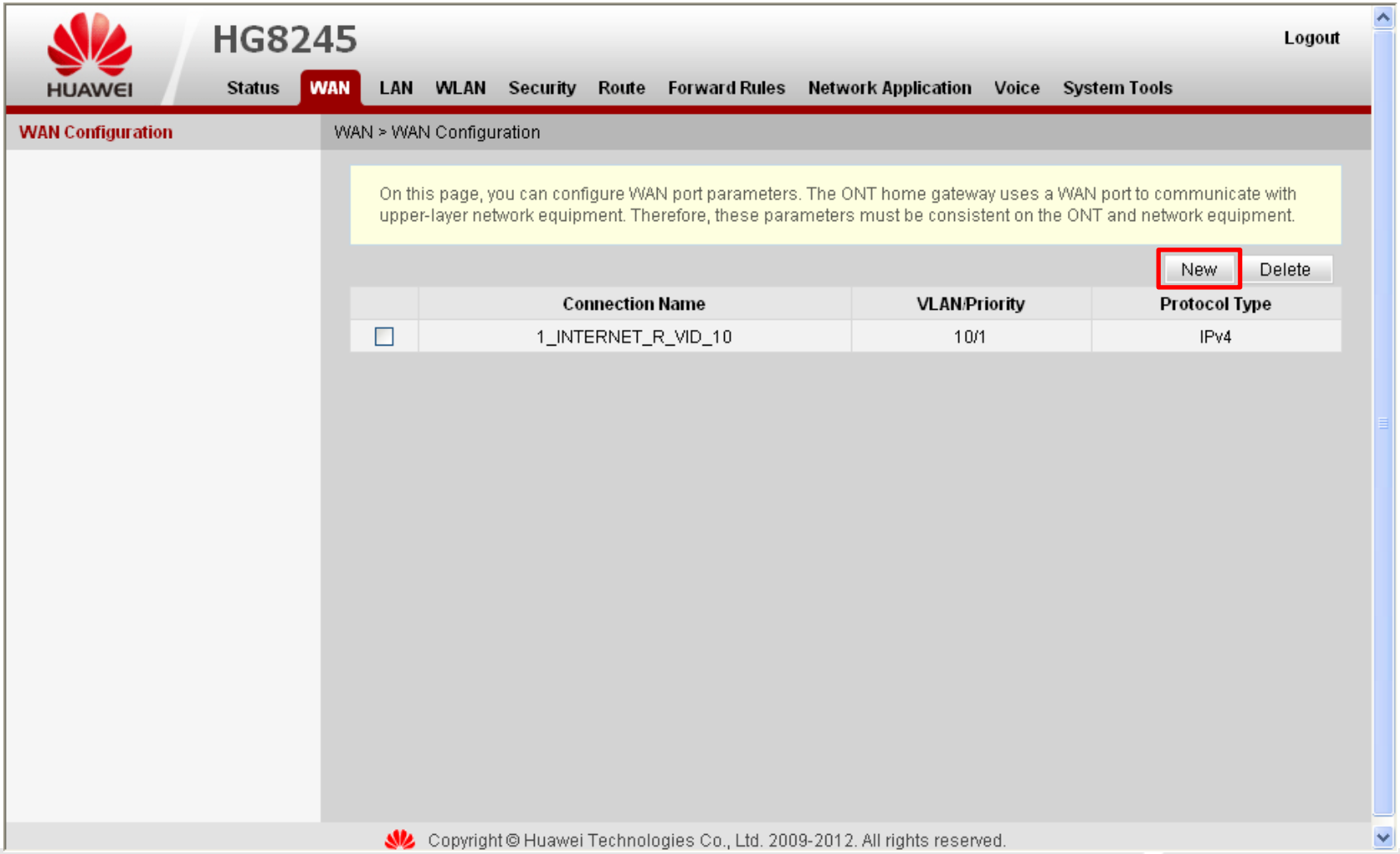
SIP Data Plan

Parameter		Data	
Service type of the WAN interface		VoIP	
Connection mode		Route	
VLAN ID of the WAN interface		172	
Static IP address		IP: 17.1.1.1/8	Gateway: 17.0.0.1
802.1p		6	
Region		China	
Signaling protocol		SIP	
IP & Port of the SIP server		200.200.200.200 : 5061	
Domain name for SIP registration		huawei.com	
SIP users	Telephone number	7727001	7727002
	Username	7727001	7727002
	Password	7727000	7727000

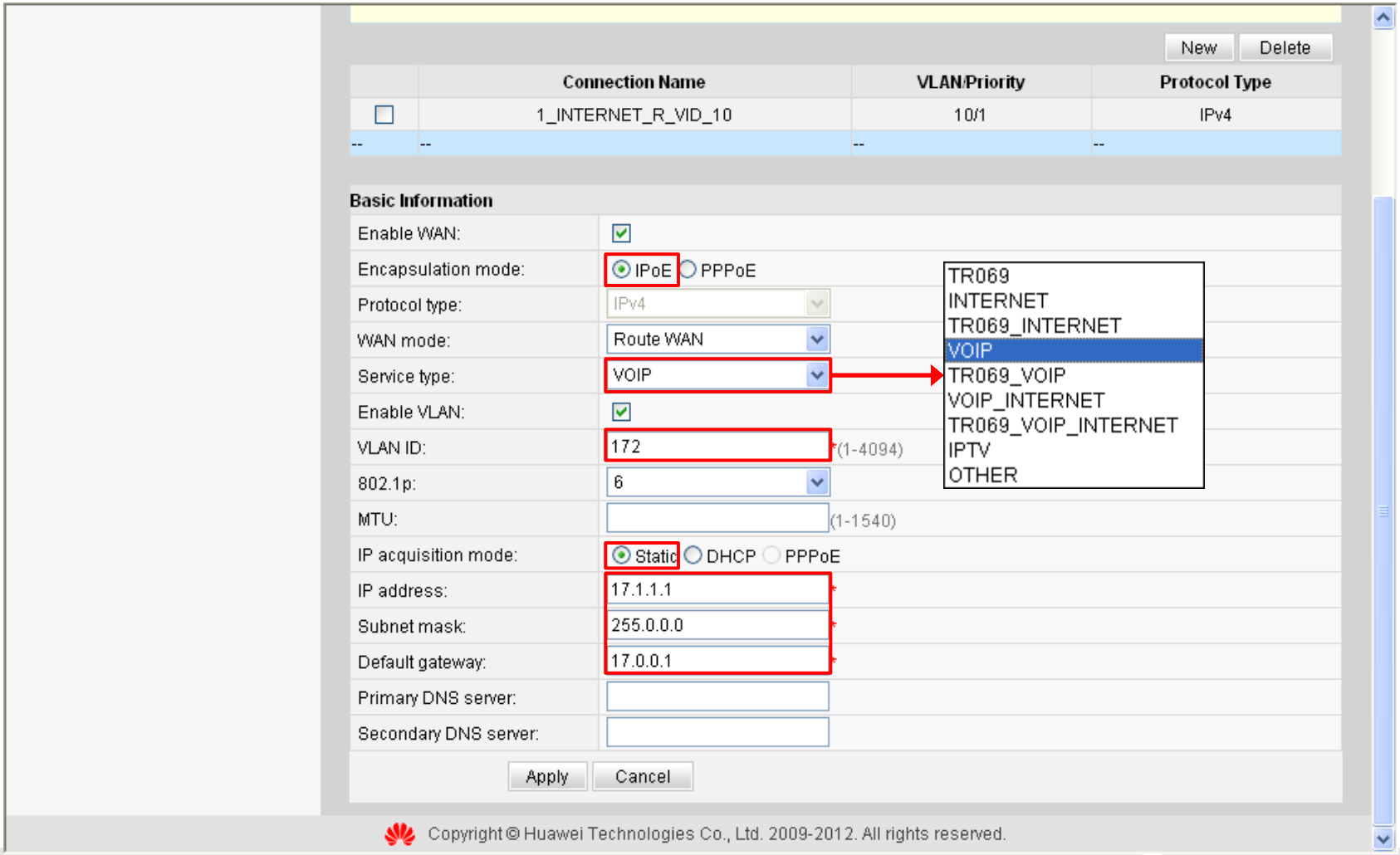
Configuring Flowchart



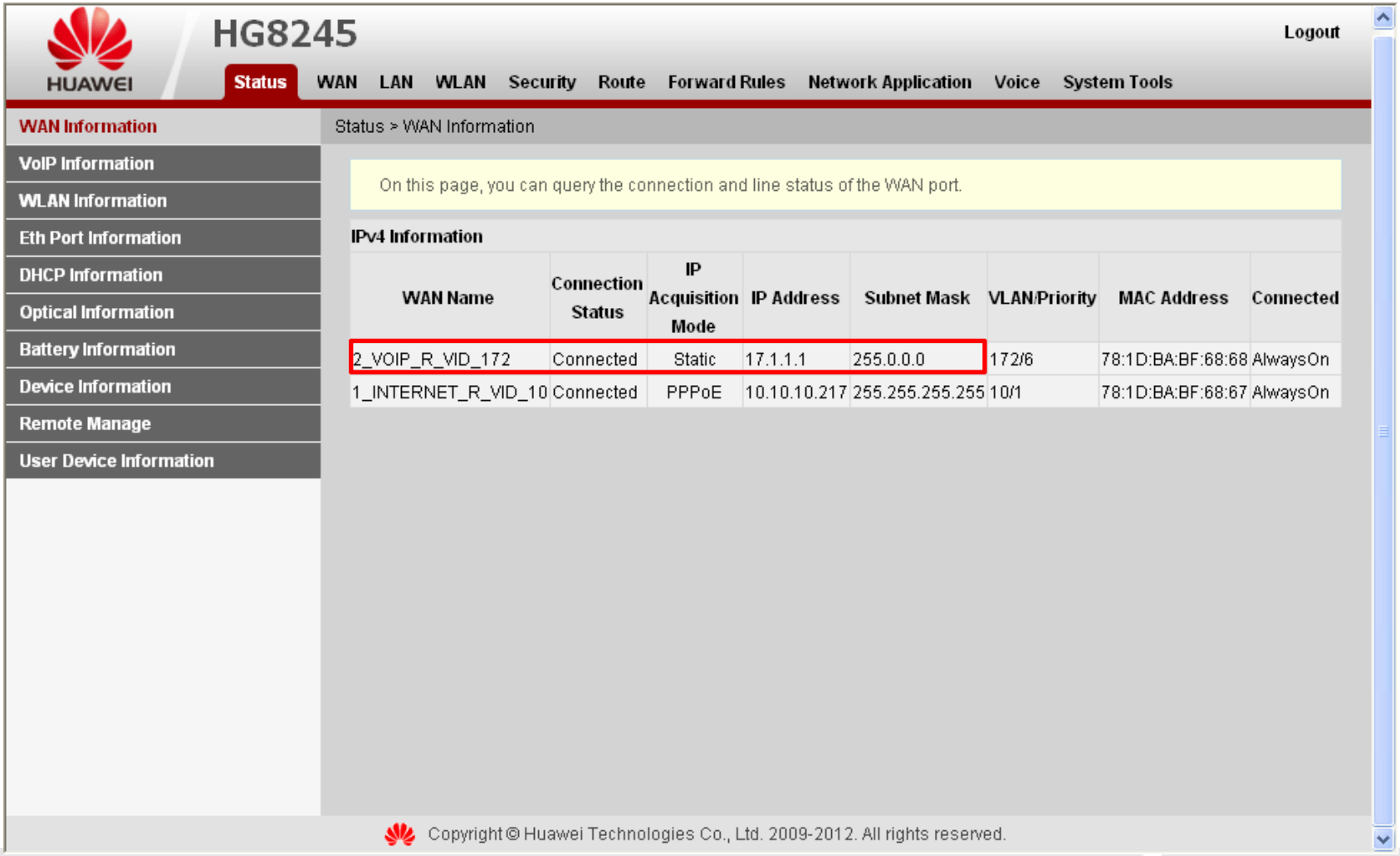
Create the Voice WAN Interface



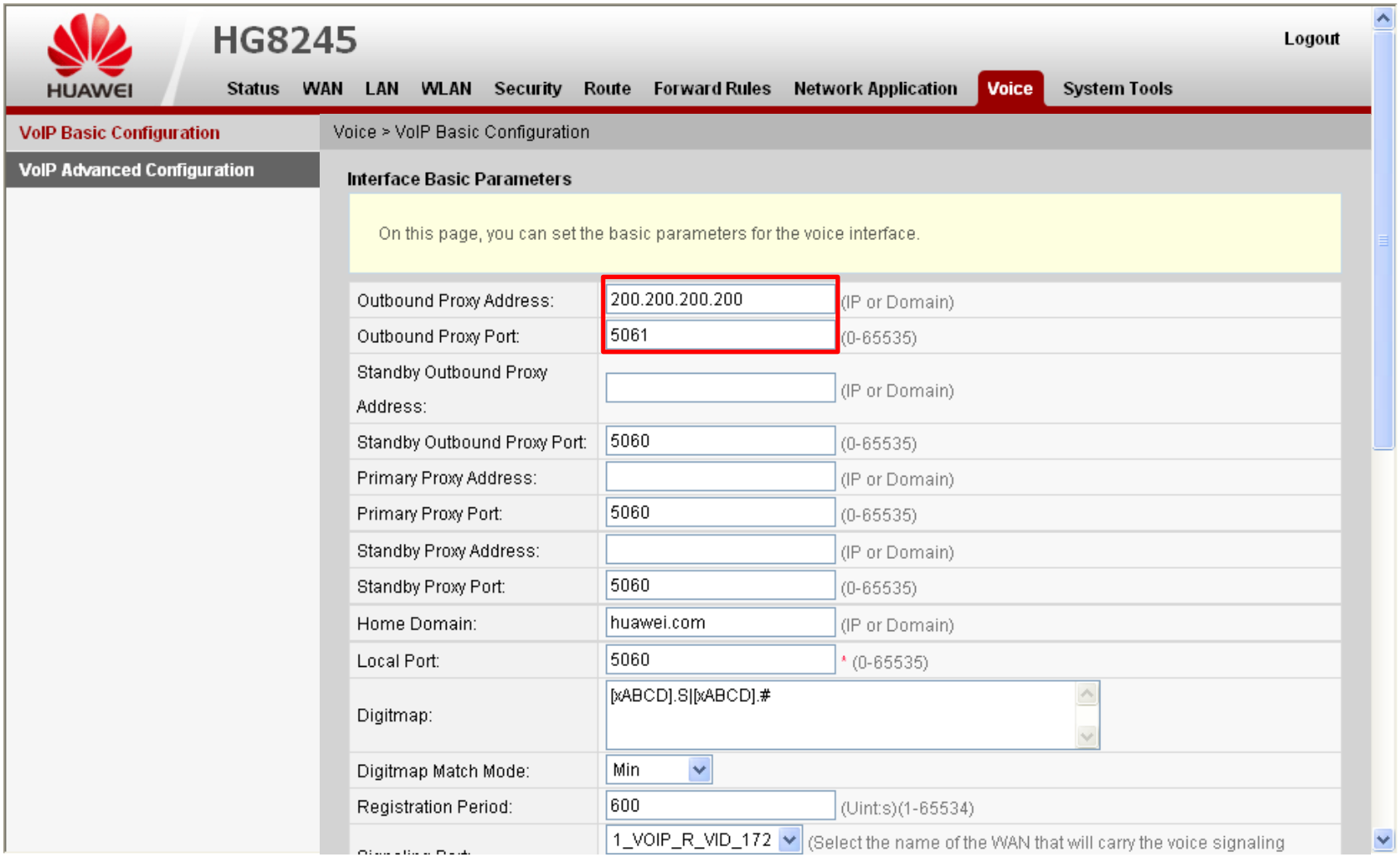
Voice WAN Interface Configuration



Check the Connection Status



SIP Interface Configuration (1/2)



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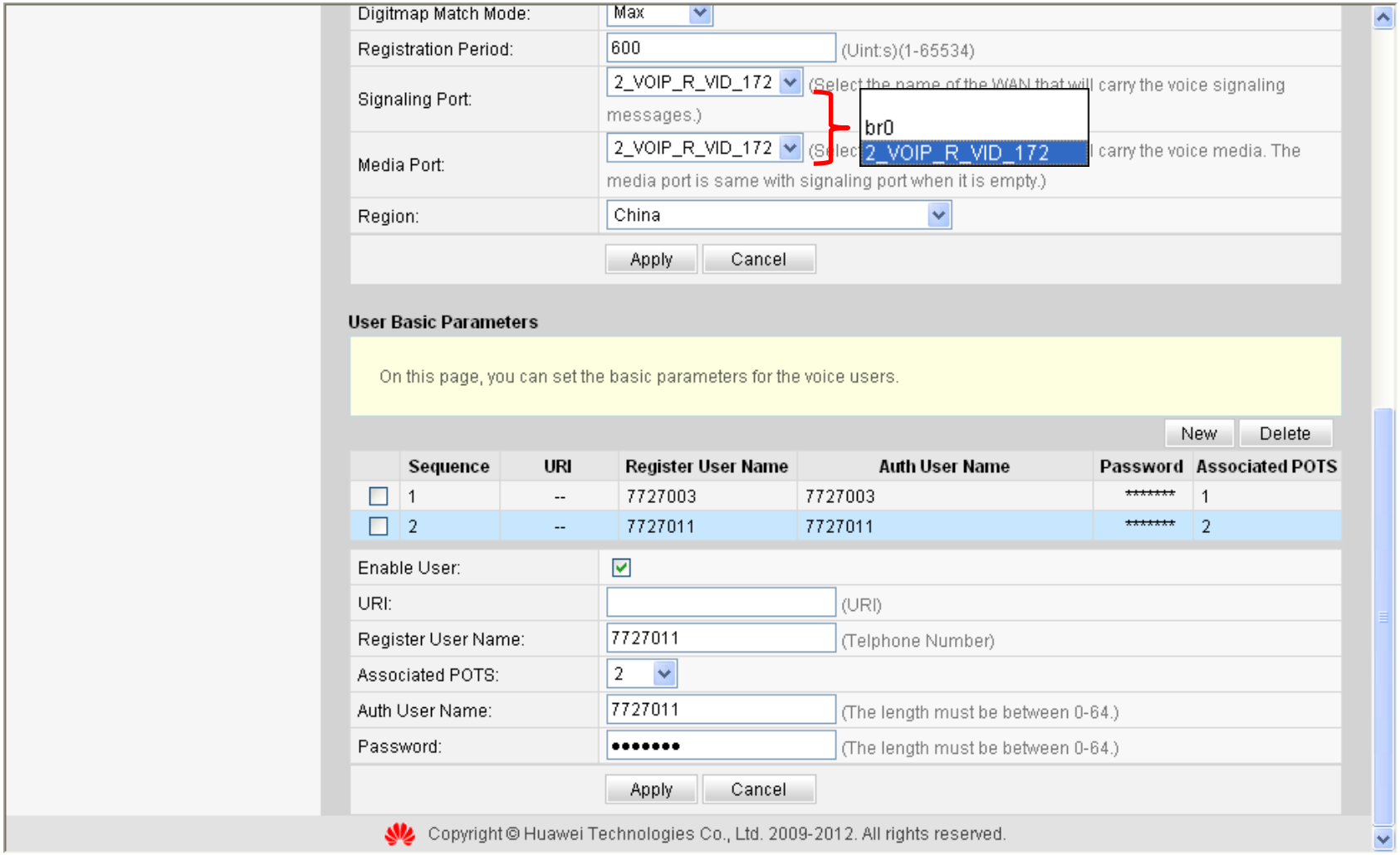
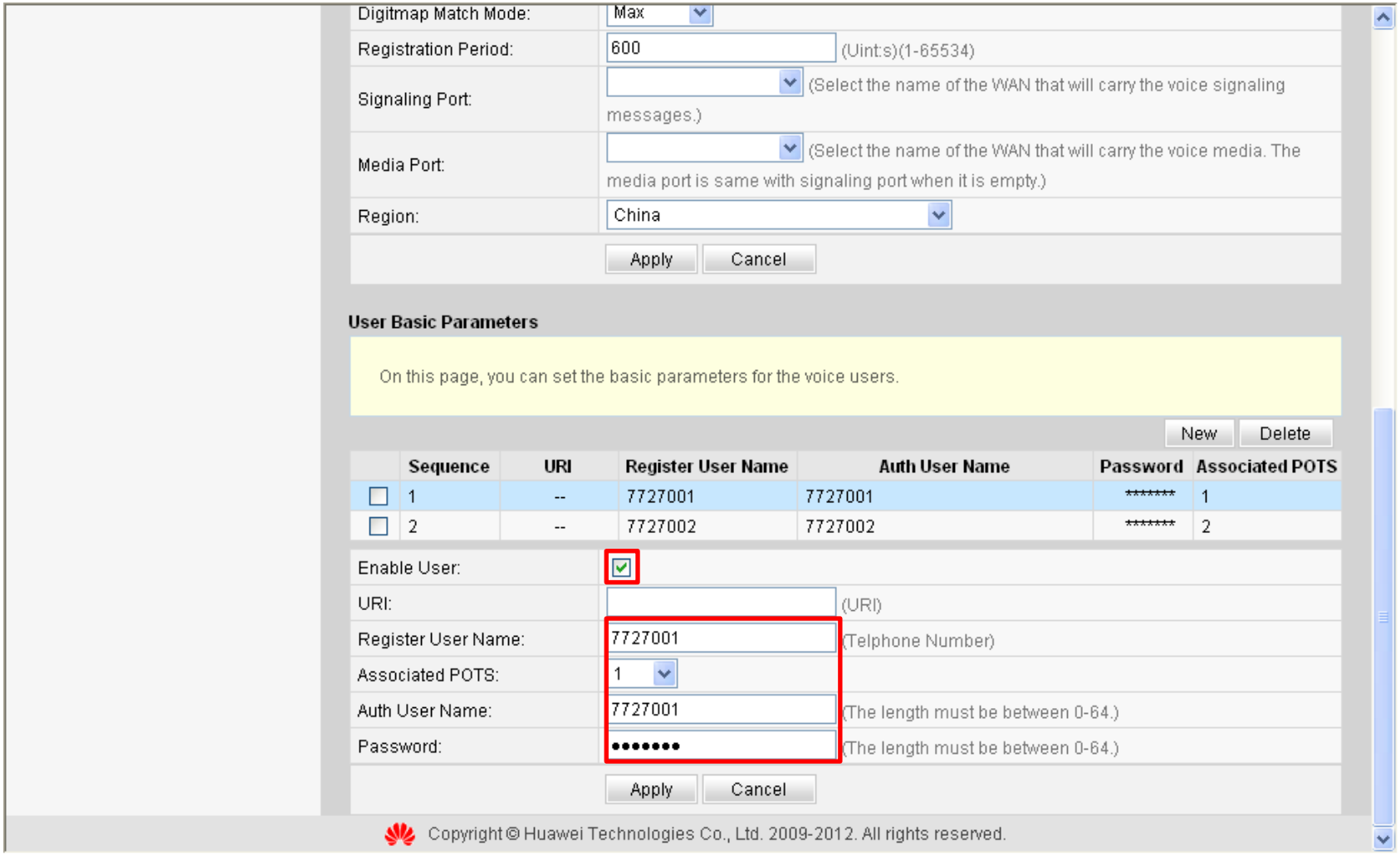
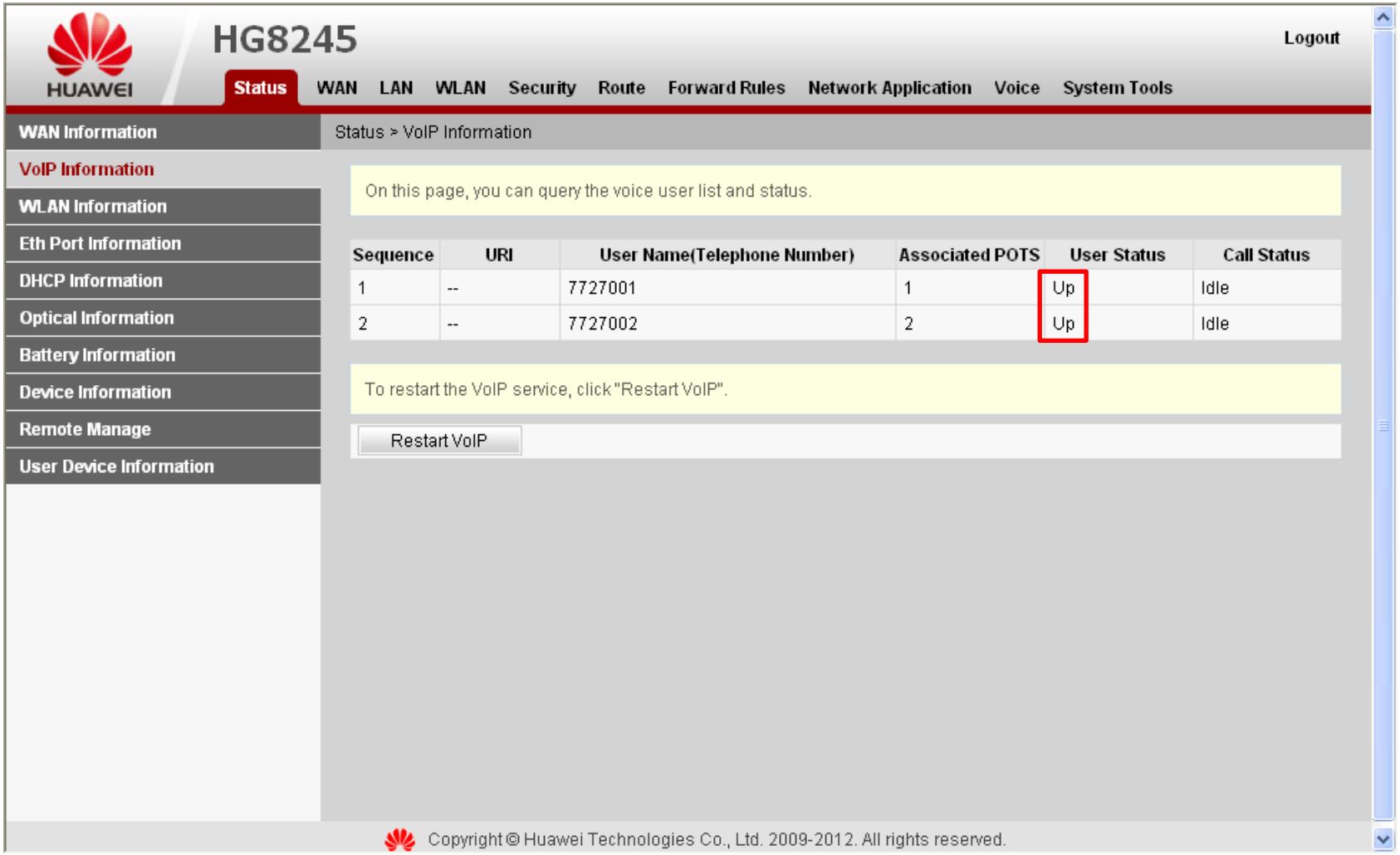
SIP Interface Configuration (2/2)



SIP Users Configuration



Check the Registration Status



Questions

- Which port on the ONU is used to receive VoIP data from OLT?

  A.ETH Port B. IPhost C.GPON Port

- By default, can the two users of the same access device communicate with each other in the L2?

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Query ONT Info

```
MA5800-X17(config)#interface gpon 0/2
MA5800-X17(config-if-gpon-0/2)#display ont info
{ portid<U><0,15> }: 0
{ all<K>|ontid<U><0,127> }: 11
{ <cr>||<K> }:

  Command:
          display ont info 0 11
  ------------------------------------------------------------------------------
  F/S/P                    : 0/2/0
  ONT-ID                   : 11
  Control flag             : active
  Run state                : online
  Config state             : normal
  Match state              : match
  ......
  ------------------------------------------------------------------------------
  Line profile ID      : 11
  ......
  ------------------------------------------------------------------------------
  Service profile ID   : 11
```

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Query the ONT-lineprofile

```
MA5800-X17(config)#display ont-lineprofile gpon
{ all<K>|profile-id<K>|profile-name<K> }:profile-id
{ profile-id<U><0,8192> }:11

  Command:
          display ont-lineprofile gpon profile-id 11
 ------------------------------------------------------------------------------
  Profile-ID          :11
  Profile-name        :line-profile_11
  ......
  <T-CONT   2>          DBA Profile-ID:21
   <Gem Index 2>
   ----------------------------------------------------------------------
   |Serv-Type:ETH |Encrypt:off |Cascade:off |GEM-CAR:-                   |
   |Upstream-priority-queue:0  |Downstream-priority-queue:-              |
   ----------------------------------------------------------------------
    Mapping VLAN  Priority Port    Port  Bundle  Flow  Transparent
    index                  type    ID    ID      CAR
   ----------------------------------------------------------------------
    2       172   -        -       -     -       -     -
  ......
```


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Query the ONT-srvprofile

```
MA5800-X17(config)#display ont-srvprofile gpon profile-id 11
  ------------------------------------------------------------------------------
  Profile-ID  : 11
  Profile-name: srv-profile_11
  Access-type : GPON
  ------------------------------------------------------------------------------
  Port-type     Port-number
  ------------------------------------------------------------------------------
  POTS          2
  ETH           4
  VDSL          0
  TDM           0
  MOCA          0
  ......
  ------------------------------------------------------------------------------
  Port   Port   Service-type Index S-VLAN S-PRI C-VLAN C-PRI ENCAP      S-PRI
  type   ID                                                           POLICY
  ------------------------------------------------------------------------------
  ETH    1      Translation  1     10     -     10     -     -          -
  IPHOST 1      Translation  1     172    -     172    -     -          -
  ......
```

Query Service Ports

- Run the **display service-port** command to query the information about the service ports you have configured

```
MA5800-X17(config)#display service-port all
{ <cr>|e2e<K>|sort-by<K>||<K> }:

  Command:
          display service-port all
  Switch-Oriented Flow List
  ------------------------------------------------------------------------------
   INDEX VLAN VLAN     PORT F/ S/ P VPI  VCI   FLOW  FLOW       RX   TX   STATE
         ID   ATTR     TYPE                    TYPE  PARA
  ------------------------------------------------------------------------------
      11 2000 QinQ     gpon 0/2 /0  11   1     vlan  10         11   11   up
      21  172 common   gpon 0/2 /0  11   2     vlan  172        6    6    up
  ------------------------------------------------------------------------------
```

Summary

- NGN Architecture
  - 4 layers Including: access, bearer ,control , service and application
  - VoIP signaling should pass through control layer
  - VoIP voice should pass through bearer layer
- Current protocols used widely : MGCP/H.248/SIP
- Function of IPhost : provide voice access
- SIP VoIP key parameters
  - Server IP:Port / Local IP:Port / Tel Number / Username&Passowrd

Thank you

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