GPON FTTH IPTV Service Provisioning (MA5800)

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Objectives

- Upon completion of this course, you will be able to :
  - Describe GPON FTTH IPTV solution networking , multicast specification and basic principle
  - Master how to do the GPON FTTH IPTV service configuration
  - Know the basic steps to check the GPON IPTV service

Contents

1. **GPON IPTV Service Implementation Principle**
2. GPON IPTV Service Configuration Basics
3. GPON IPTV Service Configuration Example
4. GPON IPTV Service Maintenance

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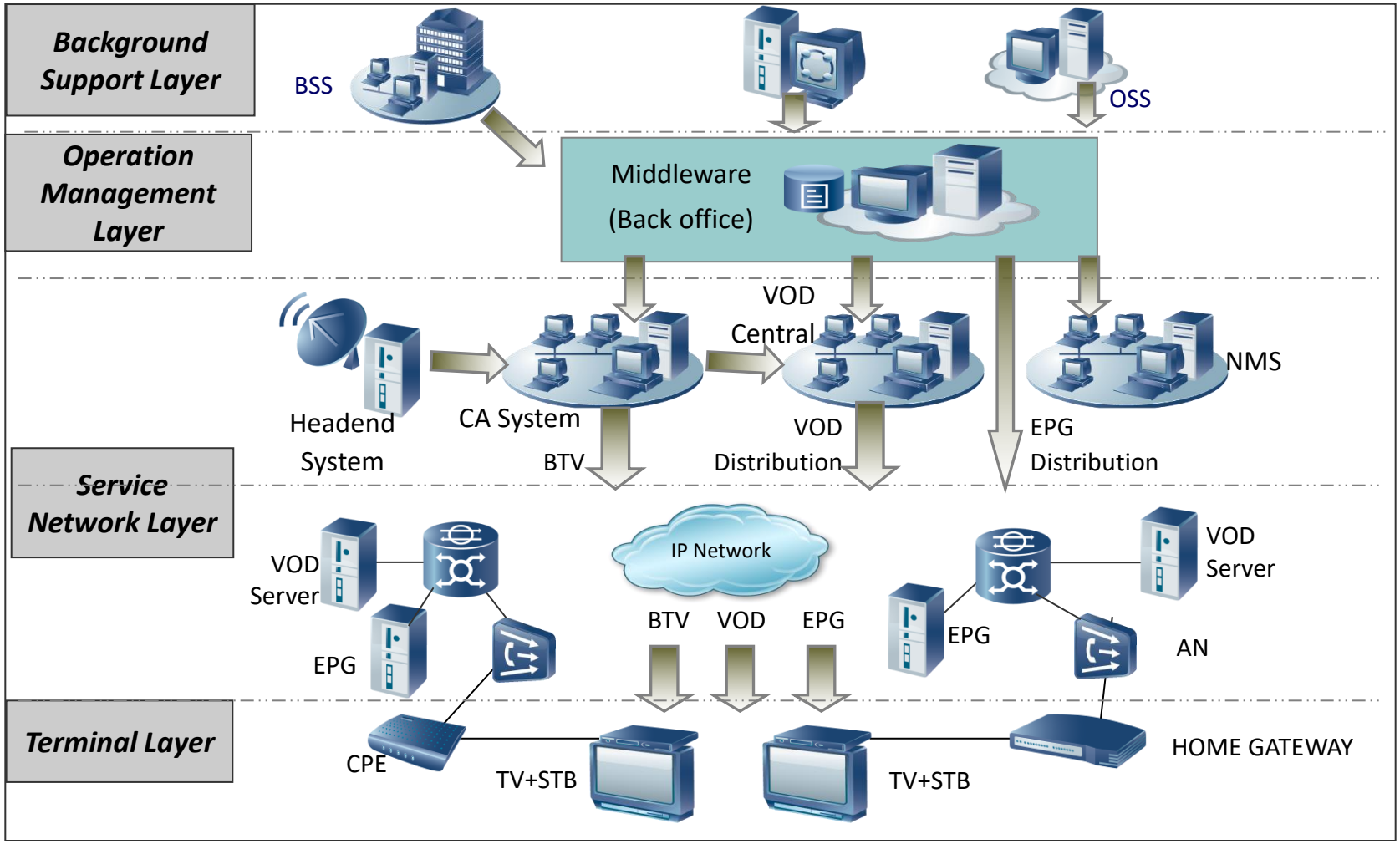
Huawei IPTV Solution Networking



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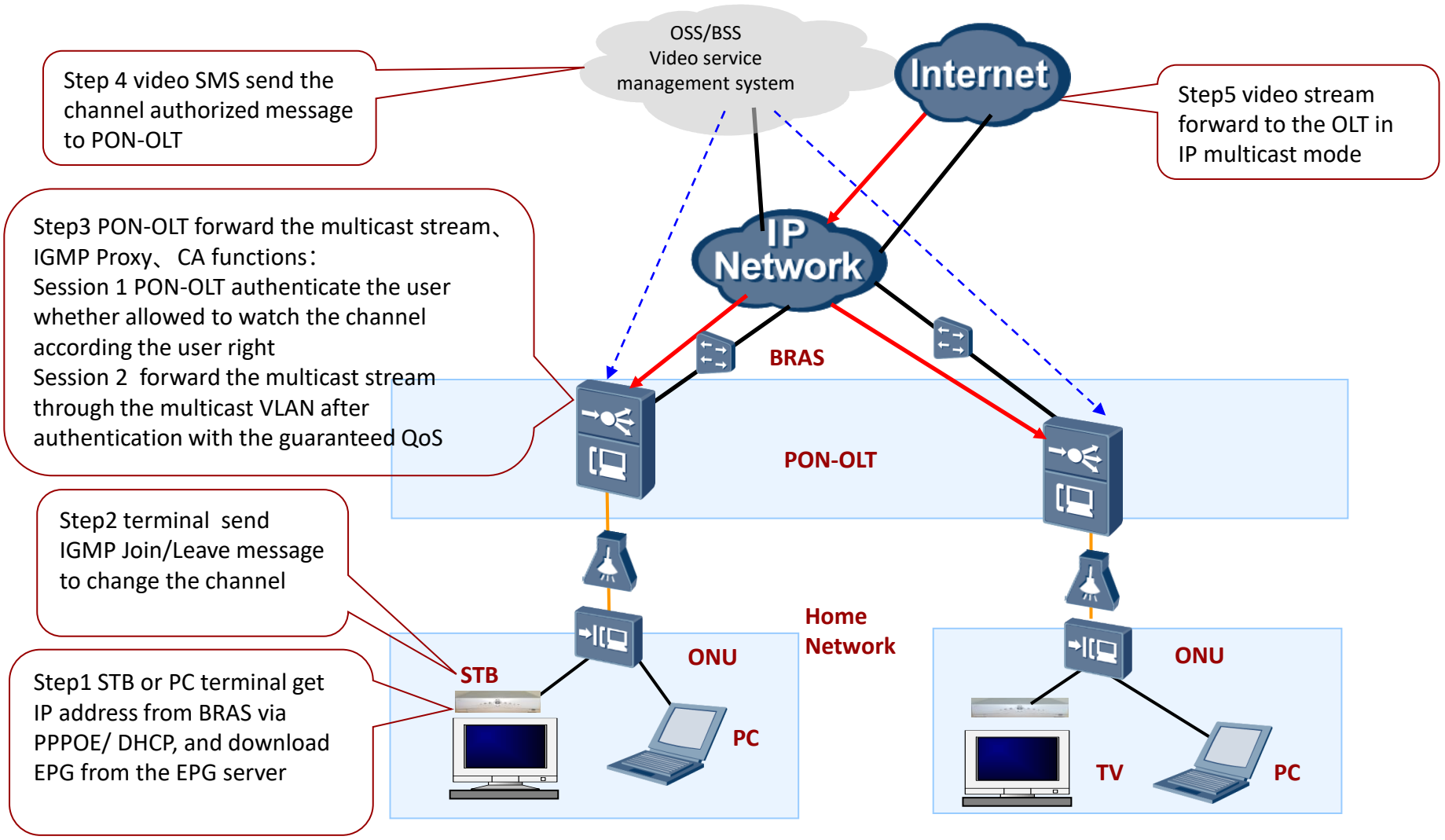
GPON IPTV Service Procedure



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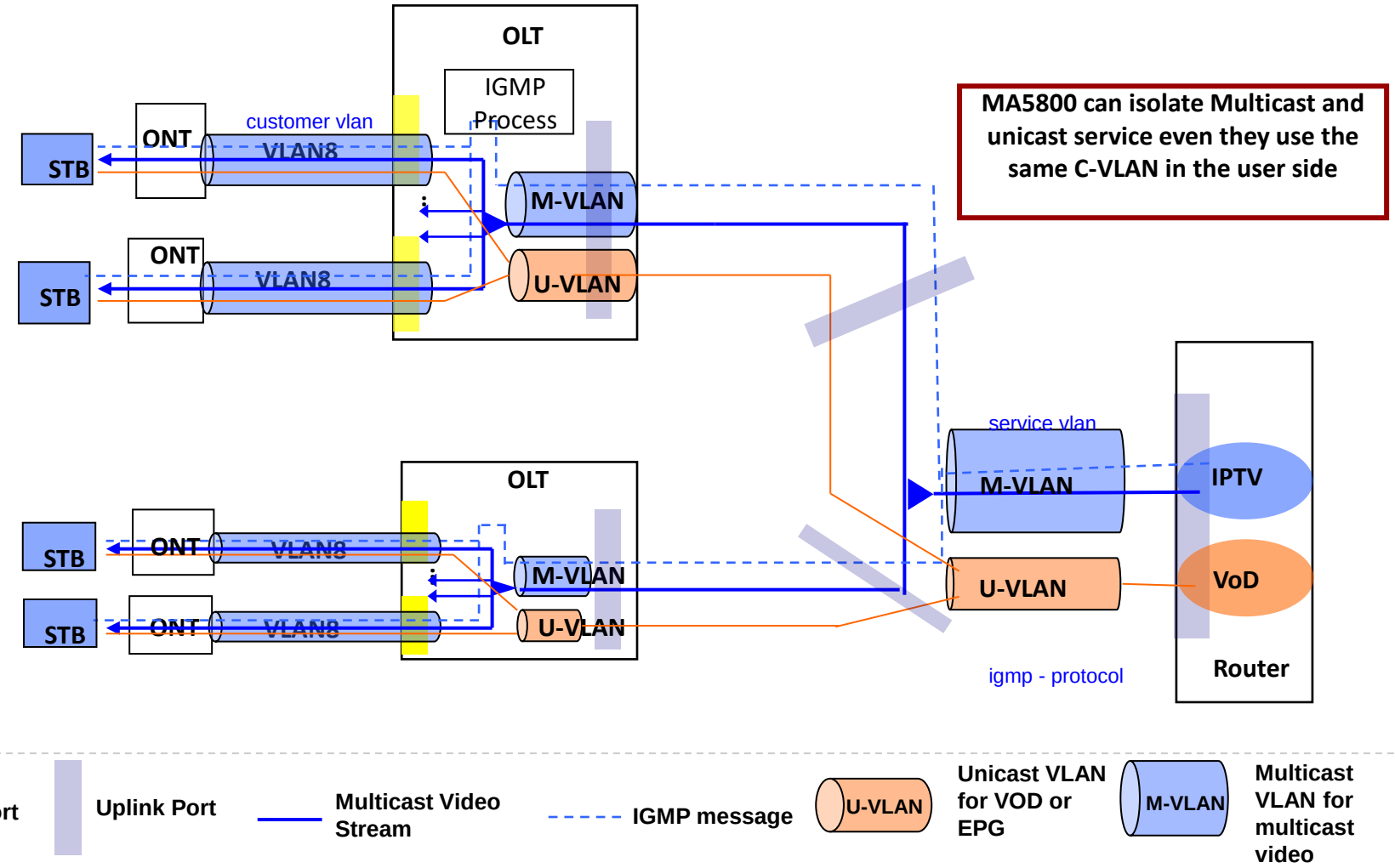
GPON IPTV VLAN Architecture



Multicast Specification

- The system supports up to 256 multicast VLANs. Each multicast VLAN
  - can work in proxy or snooping mode.
  - support IGMP V2 or IGMP V3.
  - support up to 17408 users.
  - support difference program creation modes: static and dynamic.
  - The multicast upstream port can be specified for each multicast VLAN.
- System supports up to 4096 programs, including 4000 concurrently online programs.
- A multicast user can watch up to 64 programs concurrently.

Questions

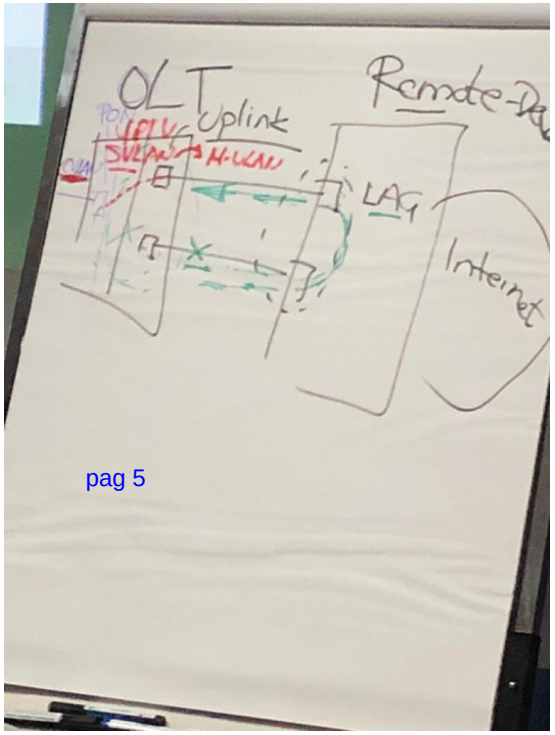
multi service vlan audio vanaf min 20

- What's the function of unicast VLAN and multicast VLAN?
- How many programs does a multicast user can watch concurrently?
  - A.4000 B. 256 C.64
- What are the two IGMP modes?

snooping

min 22-24

iptv overvw conf



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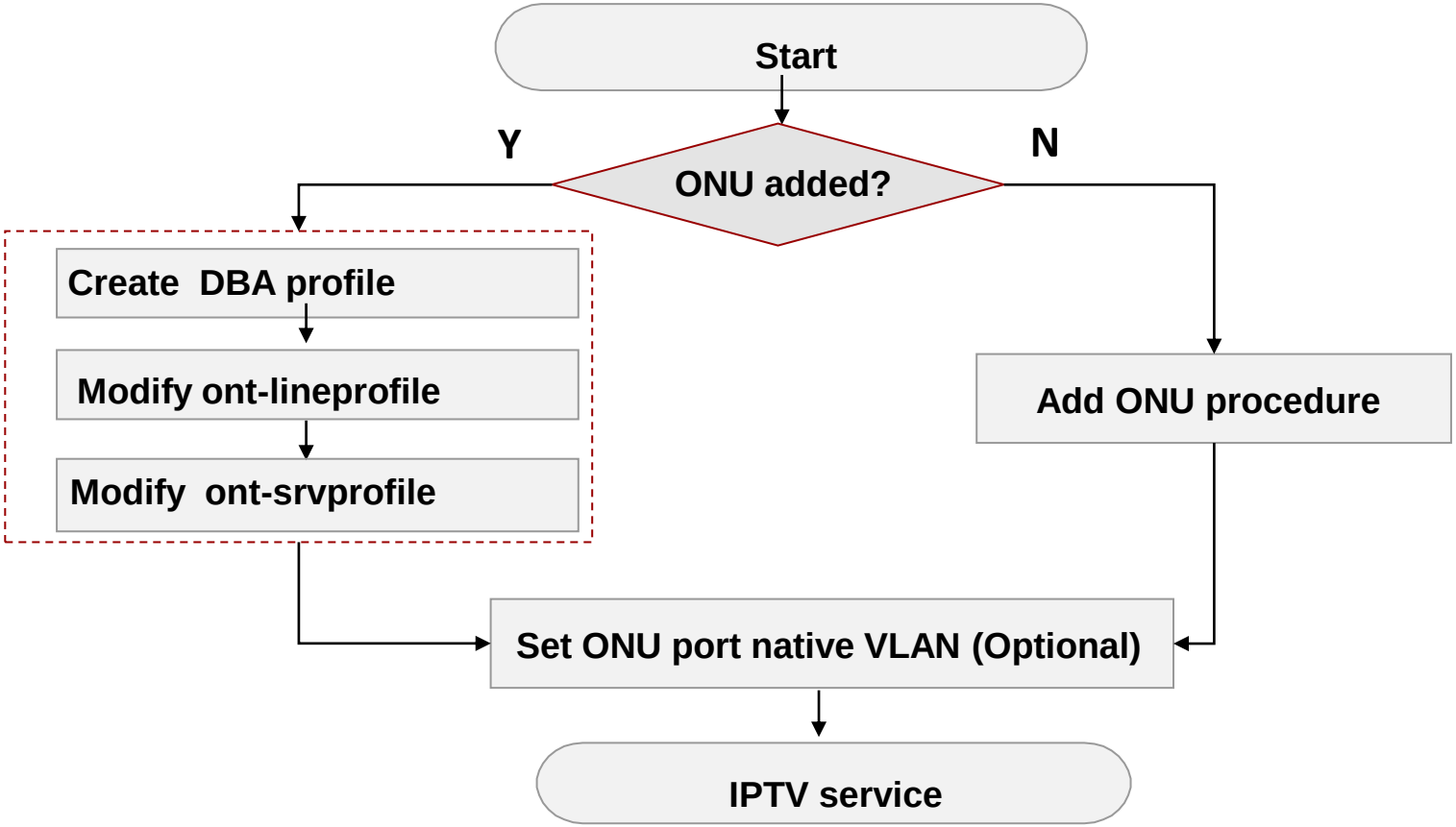
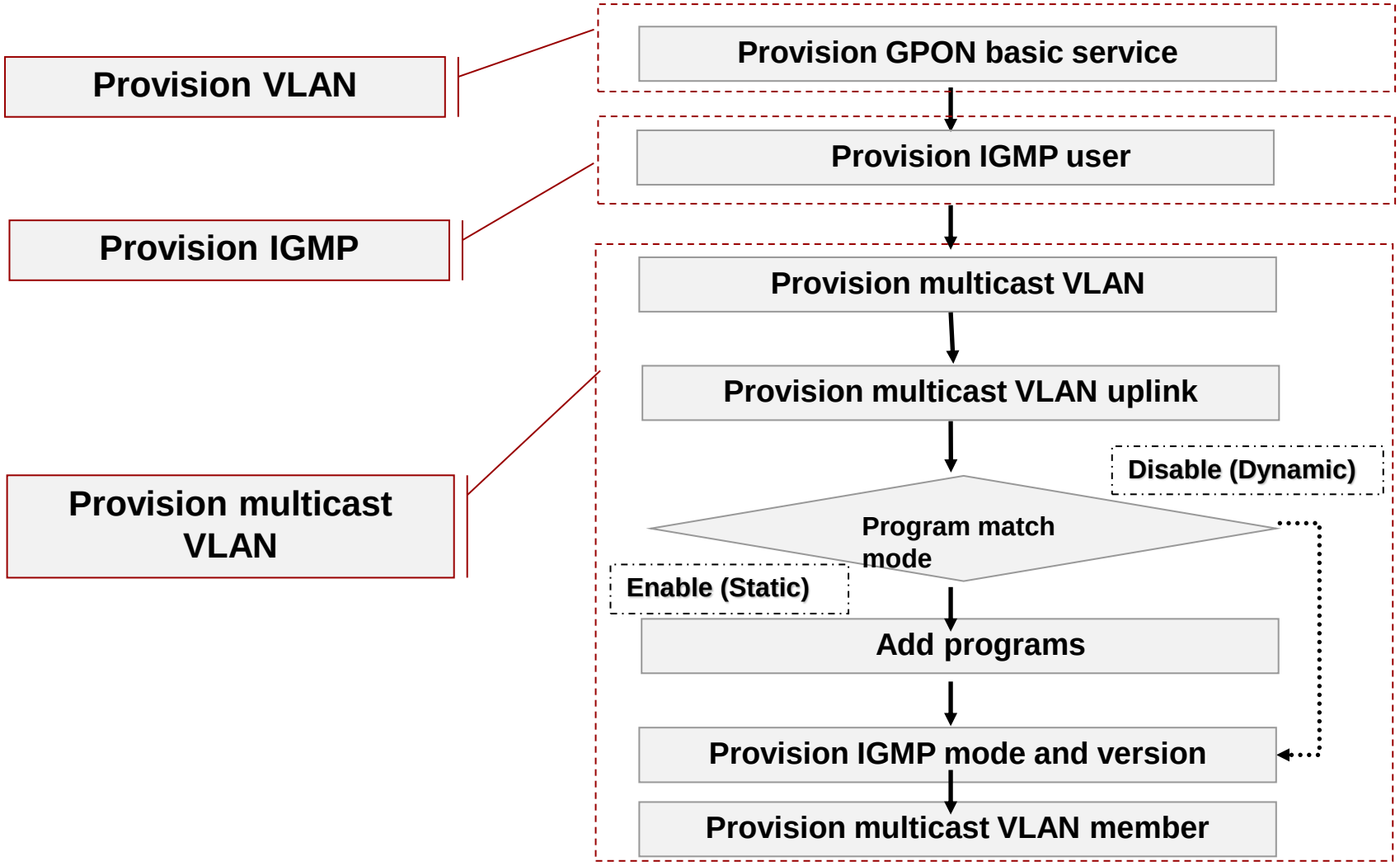
Flow Chart-Add ONT



Flow Chart- IPTV Service



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Add IGMP User

internet group management protocol

- Add igmp user

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- MA5800-X17(config)#**btv**
- MA5800-X17(config-btv)#**igmp user add**
  - { port<K>|service-port<K>|slot<K>|smart-vlan<K> }:**service-port**
  - { index<U><0,139263> }:**10**
  - { <cr>|auth<K>|globalleave<K>|igmp-version<K>|log<K>|max-bandwidth<K>|max-program<K>|no-auth<K>|
  - quickleave<K>|video<K> }:**auth**

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Add IGMP User (*Cont.*)

- { <cr>|globalleave<K>|igmp-version<K>|log<K>|max-bandwidth<K>|max-program<K>|quickleave<K> |video<K>}:**max-program**
- { max-program-num<U><1,64>|no-limit<K> }:**8**
- { <cr>|globalleave<K>|igmp-version<K>|log<K>|max-bandwidth<K>|quickleave<K>|video<K> }:

//Before you add a multicast user, the service port of this user must be existing. You can run the display service-port command to query the information about a service port.

Multicast VLAN Uplink Port

- Create multicast vlan and log into multicast vlan mode

```
MA5800-X17(config-btv)#multicast-vlan 200
MA5800-X17(config-mvlan200)#
```

- Set igmp uplink port in multicast vlan mode

```
MA5800-X17(config-mvlan200)#igmp uplink-port 0/9/0
```

//Specify an upstream port for sending and receiving multicast packets, including protocol and data packets

IGMP Program Match Mode

- Set igmp program match mode
  - `MA5800-X17(config-mvlan200)#`**igmp match mode enable**

When the match mode is set as **enable**, multicast programs need to be pre-configured.
When the match mode is set as **disable**, multicast programs need not to be pre-configured and are automatically generated according to the users' demanding.

Add IGMP Program

- Add IGMP programs
  - MA5800-X17(config-mvlan200)#**igmp program add**
    - { batch<K>|ip<K>|ipv6<K>|name<K> }:**name**
    - { name<S><Length 1-16> }:**program1**
    - { ip<K>}:**ip**
    - { ip-addr<I><X.X.X.X> }:**224.1.1.1**
    - { <cr>|bandwidth<K>|grade<K>|host<K>|hostip<K>|index <K>|log<K>|prejoin<K>|preview-profile<K>|priority<K> |sourceip<K>|unsolicited<K>|video-mode<K>}:

Batch Add IGMP Program

- Batch Add IGMP programs
  - MA5800-X17(config-mvlan200)#**igmp program add**
    - { batch<K>|ip<K>|name<K> }:**batch**
    - { ip<K>}:**ip**
    - { ip-addr<I><X.X.X.X> }:**224.1.1.2**
    - { to-ip<K> }:**to-ip**
    - { ip-addr<I><X.X.X.X> }:**224.1.1.10**
    - { <cr>|bandwidth<K>|hostip<K>|preview-profile<K>|priority<K>|sourceip<K>|video-mode<K> }: **sourceip**
    - { ip-addr<I><X.X.X.X> }: **192.168.46.240**
    - { <cr>|bandwidth<K>|hostip<K>|preview-profile<K>|priority<K>|video-mode<K> }:

Add IGMP Right Profile

- Add IGMP right profile
  - MA5800-X17(config-mvlan200)#**btv**
  - MA5800-X17(config-btv)# **igmp profile add profile-name profile0**
  - MA5800-X17(config-btv)# **igmp profile**
    - { add<K>|delete<K>|profile-index<K>|profile-name<K>|rename<K> }**: profile-name**
    - { profile-name<S><Length 1-16> }**: profile0**
    - { program-list<K>|program-name<K>|vlan<K> }**: program-name**
    - { program-name<S><Length 1-16> }**: program1**
    - { forbidden<K>|idle<K>|preview<K>|watch<K> }**:watch**
  - MA5800-X17(config-btv)#**igmp user bind-profile service-port 31 profile-name profile0**

Set IGMP Version and Mode

- Set IGMP Version and Mode
  - MA5800-X17(config-btv)#**multicast-vlan 200**
  - MA5800-X17(config-mvlan200)#**igmp version**
    - { v2<K>|v3<K> }:**v3**
  - MA5800-X17(config-mvlan200)#**igmp mode**
    - { off<K>|proxy<K>|snooping<K> }:**proxy**
    - Command:

      igmp mode proxy
    - Are you sure to change IGMP mode?(y/n)[n]:**y**

Multicast-VLAN Member

- Add igmp user to multicast vlan

```
MA5800-X17(config-mvlan200)#igmp multicast-vlan
member service-port 31
```

//A multicast user can watch the programs in a multicast VLAN only after it is added to the multicast VLAN

Quick Add Multicast-VLAN Member

- Example
  - `MA5800-X17(config-mvlan200)#`**igmp multicast-vlan quick member service-port 131**

To pre-configure the multicast subscriber to simplify the configuration of the multicast subscriber, run **igmp multicast-vlan quick member**. When a member is added to the MVLAN, the member is added as the multicast subscriber even if the subscriber does not exist. If the subscriber exists, this command functions the same as the command for adding a member to the MVLAN.

Questions

- Why do we need to add igmp user to multicast vlan? min 48

- What's the difference between igmp match mode enable and igmp match mode disable ? min 49

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3. GPON IPTV Service Configuration Example

3.1 Single VLAN Mode

3.2 Separated VLAN Mode

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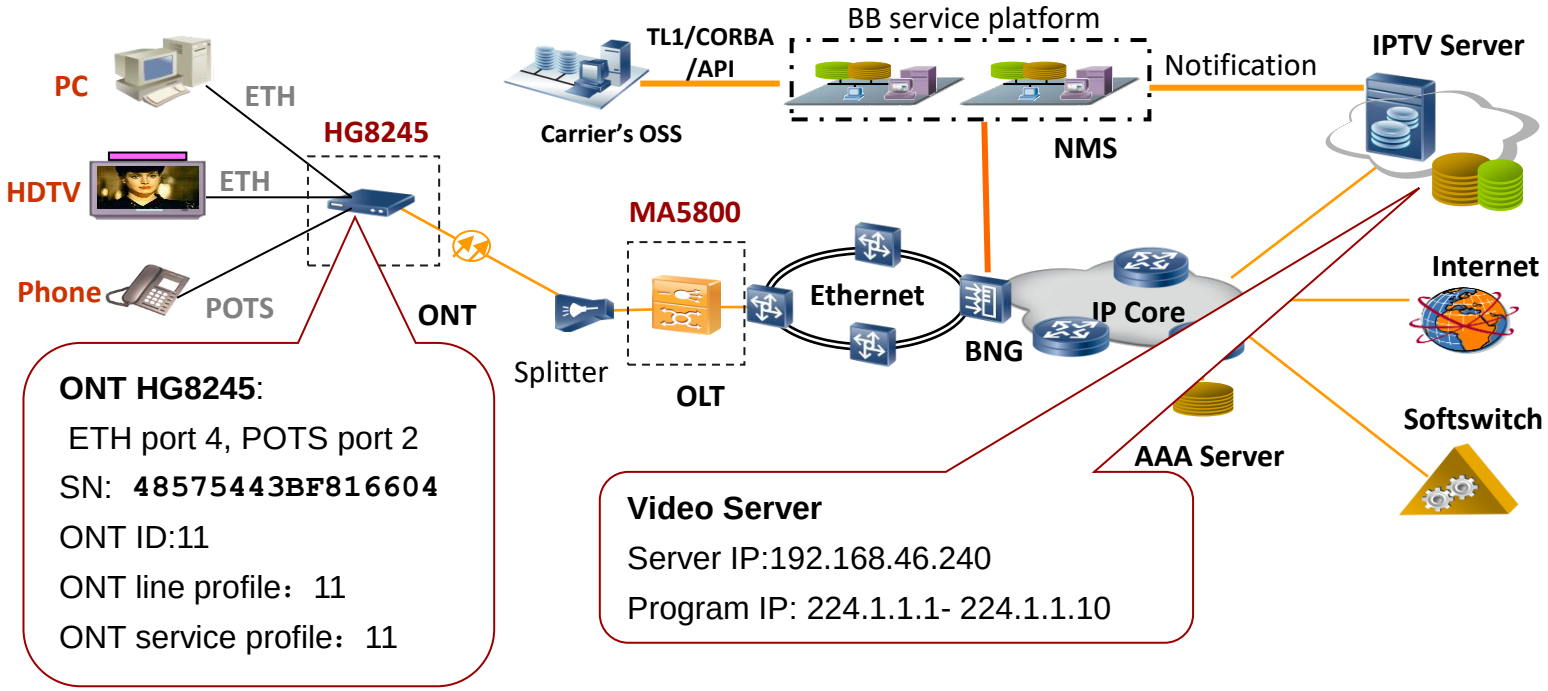
GPON FTTH Case



Type	ONU Port	C-VLAN	GEM	DBA	TCONT	Traffic table	S-VLAN	OLT port
IPTV	ETH3	200	3	31	3	no-limit	200	GPON: 0/2/0 Uplink: 0/9/0

Configure Procedure (1/3)

In this case the ONU is already added

- Configure DBA profile
  - MA5800-X17(config)#**dba-profile add profile-id 31 type3 assure 4096 max 6144**
- Modify ONT line profile
  - MA5800-X17(config)#**ont-lineprofile gpon profile-id 11**
  - MA5800-X17(config-gpon-lineprofile-11)#**tcont 3 dba-profile-id 11**
  - MA5800-X17(config-gpon-lineprofile-11)#**gem add 3 eth tcont 3**
  - MA5800-X17(config-gpon-lineprofile-11)#**gem mapping 3 3 vlan 200**
  - MA5800-X17(config-gpon-lineprofile-11)#**commit**
- Modify ONT service profile
  - MA5800-X17(config)#**ont-srvprofile gpon profile-id 11**
  - MA5800-X17(config-gpon-srvprofile-11)#**ont-port eth 4 pots 2**
  - MA5800-X17(config-gpon-srvprofile-11)#**port vlan eth 3 200**
  - MA5800-X17(config-gpon-srvprofile-11)#**commit**

Configure Procedure (2/3)

- Configure ONT native VLAN (Optional)
  - `MA5800-X17(config)#` **interface gpon 0/2** of 0/1
  - `MA5800-X17(config-if-gpon-0/2)#` **ont port native-vlan 0 11 eth 3 vlan 200** customer vlan
- Provision VLAN
  - `MA5800-X17(config)#` **vlan 200 smart**
  - `MA5800-X17(config)#` **port vlan 200 0/9 0**
  - `MA5800-X17(config)#` **service-port 31 vlan 200 gpon 0/2/0 ont 11 gemport 3 multi-service user-vlan 200 rx-cttr 6 tx-cttr 6**

Configure Procedure (3/3)

- Configure the IGMP and multicast VLAN

  - MA5800-X17(config)#**btv**
  - MA5800-X17(config-btv)#**igmp user add service-port 31 no-auth**
  - MA5800-X17(config-btv)#**multicast-vlan 200**
  - MA5800-X17(config-mvlan200)#**igmp uplink-port 0/9/0**
  - MA5800-X17(config-mvlan200)#**igmp version v3**
  - MA5800-X17(config-mvlan200)#**igmp match mode enable**
  - MA5800-X17(config-mvlan200)#**igmp program add batch ip 224.1.1.1 to-ip 224.1.1.10 sourceip 192.168.46.240**
  - MA5800-X17(config-mvlan200)#**igmp mode proxy**
  - MA5800-X17(config-mvlan200)#**igmp multicast-vlan member service-port 31**

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Query the Program

- Query the program
  - MA5800-X17(config)# **display igmp program all**

```
-------------------------------------------------------------------------------
 Index| Create |     IP      |     Program     |User |VLAN |Prejoin|Priority
      | flag   |   address   |      name       |num | ID   |       |
-------------------------------------------------------------------------------
 0       S       224.1.1.1    PROGRAM-0    0    200   disable   7
 1       S       224.1.1.2    PROGRAM-1    0    200   disable   7
 2       S       224.1.1.3    PROGRAM-2    0    200   disable   7
 3       S       224.1.1.4    PROGRAM-3    0    200   disable   7
 4       S       224.1.1.5    PROGRAM-4    0    200   disable   7
 5       S       224.1.1.6    PROGRAM-5    0    200   disable   7
 6       S       224.1.1.7    PROGRAM-6    0    200   disable   7
 7       S       224.1.1.8    PROGRAM-7    0    200   disable   7
 8       S       224.1.1.9    PROGRAM-8    0    200   disable   7
 9       S       224.1.1.10   PROGRAM-9    0    200   disable   7
-------------------------------------------------------------------------------
```

Query the IGMP User

- Query the IGMP user
  - MA5800-X17(config)# display igmp user all

```
--------------------------------------------------------------------------------
User port  Bind    State  Auth       Quick   IGMP   Video   Log   Available
           profiles                  leave   flow ID flow ID switch programs
--------------------------------------------------------------------------------
0/2/0/31     -   online  no-auth MAC-based  31     31     enable     8
--------------------------------------------------------------------------------
```

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3. GPON IPTV Service Configuration Example

3.1 Single VLAN Mode

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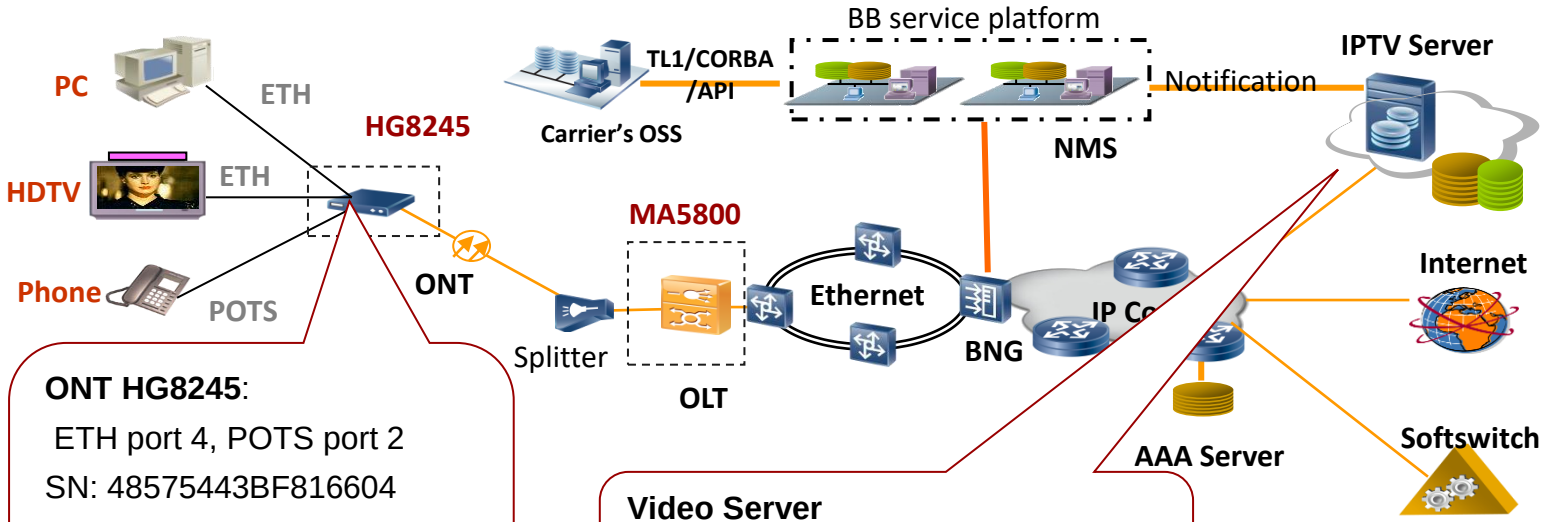
GPON FTTH Case



Type	ONU Port	C-VLAN	GEM	DBA	TCONT	Traffic table	S-VLAN	M-VLAN	OLT port
IPTV	ETH3	8	3	31	3	no-limit	8	200	GPON: 0/2/0 Uplink: 0/9/0

Configure Procedure (1/3)

In this case the ONU is already added

- Configure DBA profile
  - MA5800-X17(config)#**dba-profile add profile-id 31 type3 assure 4096 max 6144**
- Modify ONT line profile
  - MA5800-X17(config)#**ont-lineprofile gpon profile-id 11**
  - MA5800-X17(config-gpon-lineprofile-11)#**tcont 3 dba-profile-id 11**
  - MA5800-X17(config-gpon-lineprofile-11)#**gem add 4 eth tcont 3**
  - MA5800-X17(config-gpon-lineprofile-11)#**gem mapping 4 4 vlan 8**
  - MA5800-X17(config-gpon-lineprofile-11)#**commit**
- Modify ONT service profile
  - MA5800-X17(config)#**ont-srvprofile gpon profile-id 11**
  - MA5800-X17(config-gpon-srvprofile-11)#**ont-port eth 4 pots 2**
  - MA5800-X17(config-gpon-srvprofile-11)#**port vlan eth 3 8**
  - MA5800-X17(config-gpon-srvprofile-11)#**commit**

Configure Procedure (2/3)

- Configure ONT native VLAN (Optional)
  - MA5800-X17(config)# **interface gpon 0/2**
  - MA5800-X17(config-if-gpon-0/2)#**ont port native-vlan 0 11 eth 3 vlan 8**
- Provision VLANs
  - MA5800-X17(config)#**vlan 8 smart** **//Unicast VLAN**
  - MA5800-X17(config)#**port vlan 8 0/9 0**
  - MA5800-X17(config)#**service-port 31 vlan 8 gpon 0/2/0 ont 11 gemport 4 multi-service user-vlan 8 rx-cttr 6 tx-cttr 6**

Configure Procedure (3/3)

- Configure the IGMP and multicast VLAN

```
MA5800-X17(config)#vlan 200 smart          //Multicast VLAN
MA5800-X17(config)#port vlan 200 0/9 0
MA5800-X17(config)#btv
MA5800-X17(config-btv)#igmp user add service-port 31 no-auth
MA5800-X17(config-btv)#multcast-vlan 200
MA5800-X17(config-mvlan200)#igmp uplink-port 0/9/0
MA5800-X17(config-mvlan200)#igmp match mode disable
MA5800-X17(config-mvlan200)#igmp mode proxy
MA5800-X17(config-mvlan200)#igmp multicast-vlan member service-
port 31
```

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Query the IGMP User

- Query the IGMP user
  - MA5800-X17(config)# display igmp user all

```
--------------------------------------------------------------------------------
User port  Bind     State      Auth       Quick    IGMP    Video   Log     Available
           profiles                       leave    flow ID flow ID switch  programs
--------------------------------------------------------------------------------
0/2/0/31   -        online     no-auth    MAC-based 31     31      enable  8
--------------------------------------------------------------------------------
```

Questions

- Is the Multicast VLAN can be different from Unicast VLAN? yes

- Is it necessary to add programs manually?

  no, matchmode enable or disable

- How to add IGMP programs?

  add igmp program add

  display igmp program

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Query ONU Information (1/4)

```
MA5800-X17(config-if-gpon-0/2)#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
  DBA type                : SR
  ONT distance(m)         : 186
  ONT battery state       : support but invalid
  Memory occupation       : 96%
  CPU occupation          : 1%
  Temperature             : 70(C)
  Authentic type          : SN-auth
  SN                      : 48575443BF816604 (HWTC-BF816604)
  Management mode         : OMCI
  Software work mode      : normal
  Isolation state         : normal
  ONT IP 0 address/mask   :
  .........
```


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Query ONU Information (2/4)

```
-  ------------------------------------------------------
-   Line profile ID      : 11
-   Line profile name    : line-profile_11
-   ------------------------------------------------------------
-   FEC upstream switch :Disable
-   OMCC encrypt switch :Off
-   Qos mode            :PQ
-   Mapping mode        :VLAN
-   TR069 management    :Disable
-   TR069 IP index      :0
-   ------------------------------------------------------------
-   Notes: * indicates Discrete TCONT(TCONT Unbound)
-   ------------------------------------------------------------
-   <T-CONT 0>          DBA Profile-ID:1
-   <T-CONT 3>          DBA Profile-ID:31
-   <Gem Index 4>
-   ------------------------------------------------------
- |Serv-Type:ETH |Encrypt:off |Cascade:off |Priority:0 |GEM-CAR:-|
-  ------------------------------------------------------
-  Mapping-index  VLAN Priority Port-type Port-ID Flow-CAR
  Transparent
-  ------------------------------------------------------
-   3           200     -          -          -         -
-   4           8       -          -          -         -
- ------------------------------------------------------
```


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Query ONU Information (3/4)

```
- ------------------------------------------------------------
-   Service profile ID   : 11
-   Service profile name : srv-profile_11
- ------------------------------------------------------------
-  Port-type      Port-number
- ------------------------------------------------------------
-   POTS           2
-   ETH            4
-   VDSL           0
-   TDM            0
-   MOCA           0
-   CATV           0
- ------------------------------------------------------------
-   TDM port type                        : E1
-   TDM service type                     : TDMoGem
-   MAC learning function switch         : Enable
-   ONT transparent function switch      : Disable
-   Ring check switch                    : Disable
-   ......
- ------------------------------------------------------------
```


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Query ONU Information (4/4)

```
  ------------------------------------------------------------
    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     -     -       -
    ETH    3    Translation  1     8      -     8      -     -       -
    ETH    3    Translation  2     200    -     200    -     -       -
    ------------------------------------------------------------------
    Notes: * indicates transparent attribute of the vlan
  ------------------------------------------------------------------
   Port-type  Port-ID    IGMP-mode    IGMP-VLAN  IGMP-PRI  Max-MAC-Count
    ------------------------------------------------------------------
    ETH              1    -              -         -      Unlimited
    ETH              2    -              -         -      Unlimited
    ETH              3    -              -         -      Unlimited
    ETH              4    -              -         -      Unlimited
    ------------------------------------------------------------------
    Alarm policy profile ID      : 0
    Alarm policy profile name    : alarm-policy_0
    ------------------------------------------------------------------
```

Query VLAN

- MA5800-X17(config)#**display vlan all**

```
  ------------------------------------------------------------------------
  VLAN    Type    Attribute   STND-Port NUM    SERV-Port NUM   VLAN-Con NUM
  ------------------------------------------------------------------------
  1       smart       common          2                0                -
  8       smart       common          1                1                -
  10      smart       common          1                1                -
  172     smart       common          1                1                -
  200     smart       common          1                1                -
  ------------------------------------------------------------------------
```

- MA5800-X17(config-if-gpon-0/2)#**display ont port attribute 0 11 eth**

```
  ------------------------------------------------------------------------
  ONT ONT   ONT    Auto-neg Speed   Duplex Port    Flow     Native Priority
      port port-type        (Mbps)         switch control VLAN
  ------------------------------------------------------------------------
    0   1     ETH        enable   auto    auto    on      off      1        0
    0   2     ETH        enable   auto    auto    on      off      1        0
    0   3     ETH        enable   auto    auto    on      off      8        0
    0   4     ETH        enable   auto    auto    on      off      1        0
  ------------------------------------------------------------------------
```


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Query Service VLAN

- MA5800-X17(config)#**disiplay vlan 200**
  - VLAN ID: 200
  - VLAN name: VLAN_0200
  - VLAN type: smart
  - VLAN attribute: common
  - VLAN description:
  - VLAN forwarding mode in control board: VLAN-MAC
  - VLAN forwarding mode: VLAN-MAC
  - VLAN broadcast packet forwarding policy: forward
  - VLAN unknown multicast packet forwarding policy: forward
  - VLAN unknown unicast packet forwarding policy: forward
  - VLAN bind service profile ID: -
  - VLAN bind RAIO profile index: -
  - VLAN priority: -
  - ------------------------------
  - F /S /P Native VLAN State
  - ------------------------------
  - 0 /9 /0 1 up
  - ------------------------------
  - Standard port number: 1
  - --
  - INDEX TYPE STATE F /S /P VPI VCI FLOWTYPE FLOWPARA
  - --
  - 31 gpon down 0 /2 /0 11 4 vlan 200
  - ……

Query IPTV IGMP Global Configuration

- MA5800-X17(config-btv)#**display igmp config global**

```
  ------------------------------------------------------------
  Authorization : enable
  ……
  V3 general query response time(0.1s)    : 100
  Specific query interval(0.1s)           : 10
  V2 specific query response time(0.1s)   : 8
  V3 specific query response time(0.1s)   : 8
  Specific query number                   : 2
  V2 router present timeout(s)            : 400
  User action report switch               : disable
  Preview switch                          : enable
  Recognition time(s)                     : 30
  The time of reset preview-count         : 04:00:00
  Auto create log interval(h)             : 2
  Uplink port mode                        : default
  ……
```


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Query IPTV IGMP VLAN Configuration

```
MA5800-X17(config-mvlan200)#display igmp config vlan 200
  ----------------------------------------------------
  IGMP mode                                : off
  IGMP version                             : IGMPv3
  Log switch                               : enable
  Default uplink port                      : -
  Report proxy switch                      : disable
  Leave proxy switch                       : disable
  Query proxy switch                       : enable
  Unsolicited report interval(s)           : 10
  IGMP priority                            : 6
  Send global leave switch                 : enable
  Program match mode                       : enable
  Program match group                      : -
  ......
  ----------------------------------------------------
```


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Query IGMP Program

- MA5800-X17(config-mvlan200)#**display igmp program all**

```
- ------------------------------------------------------------
- Index| Create | IP       | Program    |User   |VLAN |Prejoin| Priority
-       | Flag   | Address  | name       |num    | ID  |       |
- ------------------------------------------------------------
-  0     S      224.1.1.1    PROGRAM-0     0      200    disable     7
-  1     S      224.1.1.2    PROGRAM-1     0      200    disable     7
-  2     S      224.1.1.3    PROGRAM-2     0      200    disable     7
- ……
-  ------------------------------------------------------------
- Total: 10 program(s) (Static/Dynamic: 10/0)
```


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Query IGMP User and Member

- MA5800-X17(config-btv)#**display igmp user all**

```
-  ---------------------------------------------------------------
-  User Port  Bind State Auth     Quick  IGMP   Video   Log     Available
-         profiles                leave flow ID flow ID switch programs
-  ---------------------------------------------------------------
-  0/2/0/31    - online no-auth MAC-based 31    31      on       8
-
-  ---------------------------------------------------------------
-  Total: 1
```

- MA5800-X17(config-mvlan200#**display igmp multicast-vlan member vlan 200**

```
-   BTV user(s) join the multicast vlan :
-   ---------------------------------------------------
-   0/2/0/31
-   ---------------------------------------------------
-   Total: 1
```

Query IGMP Log Info

- MA5800-X17#**display igmp log all**
  - { <cr>|verbos<K>||<K> }:
  -
  - Command:
  - display igmp log all
  - ---
  - Port Program IP/S VLAN Mode Join time Leave time Cause
  - ---
  - 0/2/0/31 224.1.1.2 200 W 2000-01-10 2000-01-10 1
  - - 14:02:19+08:00 14:02:58+08:00
  - ---
  - Total: 1
  - Note: P(Mode) indicates preview, W(Mode) indicates watch,
  - N(Mode) indicates no authority
  - F(Mode) indicates preview times full out

MA5800 supports the log query based on IP/port/service port.

Query IGMP Message Statistics

```
MA5800-X17(config)#display igmp statistic vlan 200
  The data of multicast-vlan 200 IGMP statistic:
  ------------------------------------------------------------
  Active program number                                  : 3
  Received general query number                          : 0
  Received specific query number                         : 0
  …
  Received V2 join programs number                       : 0
  Received V3 join programs number                       : 10
  Received total join programs number                    : 10
  Received total leaving programs number                 : 6
  Sent general query number                              : 3
  Sent specific query number                             : 0
  Received invalid IGMP packets                          : 0
  ------------------------------------------------------------
  Note: If an IGMP user belongs to multiple MVLANs. The packet
  statistics of the minimum MVLAN (ID) to which this user belongs are
  collected
```

Query IPTV Multicast Stream Bandwidth

- MA5800-X17(config-mvlan200)#**display multicast flow-statistic**
  - {index<K>|uplink-port<K>|vlan<K**>}:vlan**
  - {vlanid<U><1,4093>}**:200**
  - {ip<K>}**:ip 224.1.1.1**
  - { <cr>|sourceip<K>||<K> }**:sourceip 192.168.46.240**
  - { <cr>||<K> }:
  - Command is being executed. Please wait...
  - Multicast flow statistic result: 327(kbps)
- MA5800-X17(config-btv)#**display multicast flow-statistic uplink-port 0/9/0**
  - Command is being executed, please wait...
  - Multicast flow statistic result: 2704(kbps)

MA5800 supports the multicast stream bandwidth query based on program/uplink/VLAN

Query Traffic Statistics

```
MA5800-X17(config)#display statistics gemport
  - { frameid/slotid<S><Length 3-15> }: 0/2
  - { portid<U><0,15> }: 0
  - { ontid<U><0,127> }: 11
  - { gemindex<K> }: gemindex
  - { gem-index<U><0,1023> }: 4
  - { <cr>||<K> }:

  -   Command:
  -         display statistics gemport 0/2 0 11 gemindex 4
  -   ------------------------------------------------------
  -   Upstream frames               : 3
  -   Upstream bytes                : 206
  -   Upstream discarded frames     : 0
  -   Downstream frames             : 2
  -   Downstream bytes              : 128
  -   Downstream discarded frames   : 0
  -   ------------------------------------------------------
```

MA5800 supports the traffic query based on ont/gemport/ont-eth/ ont-line-quality

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Questions

- How to check the IGMP user status?

  display igmp user status

- How to get the IGMP packet statistics?

- How to check the IGMP configure of multicast?

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Summary

- Multicast Vlan
  - Maximum : support 256 MVLANs
- IGMP has two modes
  - Proxy and snooping
  - IGMP program supports static and dynamic modes
- IGMP Version
  - Support the V2/V3 protocol stack
- IGMP User
  - Support up to 17408 multicast users

Thank you

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