

# 21 Aggregation Management

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## 21.1 Changes in Aggregation Management

| Product Version | Change Description                            |
|-----------------|-----------------------------------------------|
| V100R022C0x     | First version to support this feature.        |
| V100R022C1x     | The MA5800-X2 can be used as a slave OLT.     |
| V100R023C0x     | Modified the slave OLT self-healing function. |

## 21.2 Hardware Version Description for Aggregation Management

| Hardware of Master OLT                  | Hardware of Slave OLT            | Required Version         |
|-----------------------------------------|----------------------------------|--------------------------|
| MA5800-X17,<br>MA5800-X15,<br>MA5800-X7 | MA5801 series and MA5801S series | V100R022C0x<br>and later |

| Hardware of Master OLT                  | Hardware of Slave OLT | Required Version         |
|-----------------------------------------|-----------------------|--------------------------|
| MA5800-X17,<br>MA5800-X15,<br>MA5800-X7 | MA5800-X2             | V100R022C1x<br>and later |

 **NOTE**

- The versions of the master and slave OLTs must match. For details about the version mapping, see the MA5800 Release Notes.
- The fiber distance between the master OLT and the slave OLT is only restricted by the optical module of the master OLT. For details about the transmission distance of an optical module, see MA5800 Optical Module Description.
- After aggregation management is configured successfully, the master and slave OLTs cannot be downgraded to versions earlier than V100R022C0x. If downgraded, the master and slave OLTs do not support aggregated management. As a result, the slave OLTs cannot be managed by the master OLT and services are interrupted. When the MA5800-X2 is used as a slave OLT, the slave OLT cannot be downgraded to a version earlier than V100R022C1x.
- When the MA5800-X2 is used as a slave OLT, the control board of the slave OLT can be only H901MPSG-G or H901MPSD-G, and only the port on the control board can be used as an aggregation management port. The port on an upstream board cannot be used for aggregation management. In addition, it is recommended that active/standby boards be connected to the master OLT in dual-fiber aggregation mode. Otherwise, in single-fiber scenarios, a single control board fault on a slave OLT may cause link disconnection and service interruption.
- Slave OLTs with factory versions of V100R018SPC600 and earlier, V100R019C11SPC300 and earlier patch versions, and V100R021C11SPC200 and earlier patch versions do not support aggregation management. For details about the factory versions, contact local Huawei technical support.

## 21.3 Introduction to the Aggregation Management Solution

### Background

With extensive deployment of all-optical networks, optical line terminals (OLTs) will become more diversified (such as Blade OLTs and Pizza OLTs) and scenario-based. If OLTs are still separately managed by the NMS, the management scale will multiply, and network deployment, upgrade, and maintenance will become more complex.

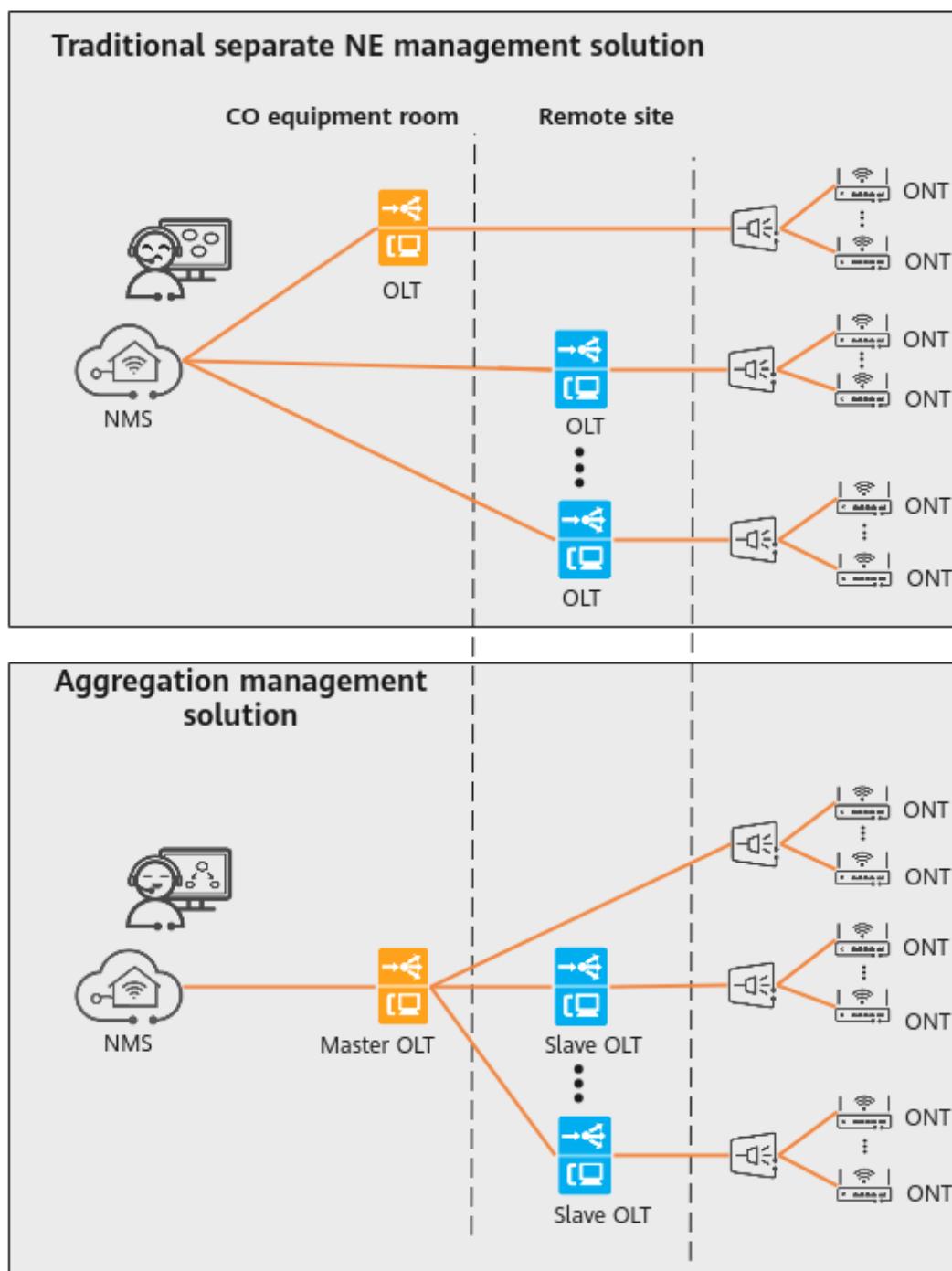
In this context, Huawei launches the aggregation management solution to simplify network management and device deployment, and reduce the operational expenditure (OPEX) and total cost of ownership (TCO) for customers.

### Solution Introduction

In aggregation management, a master OLT with complex functions is deployed in the CO equipment room, and the functions of remote slave OLTs are simplified. In

this way, the device management and deployment are simplified. You only need to manage the master OLT in the CO equipment room on the NMS to manage all OLTs on the entire network.

**Figure 21-1** Comparison between the aggregation management solution and traditional separate NE management solution



## Solution Benefits

### Simplified network management

- All remote slave OLTs are connected to the master OLT in the CO equipment room. The NMS manages OLTs on the entire network as a single NE and issues data to the master OLT. Then, the master OLT issues the data to slave OLTs.
- On slave OLTs, service provisioning interfaces remain unchanged, and the user interfaces are the same as those for a master OLT service board, ensuring consistent user experience.

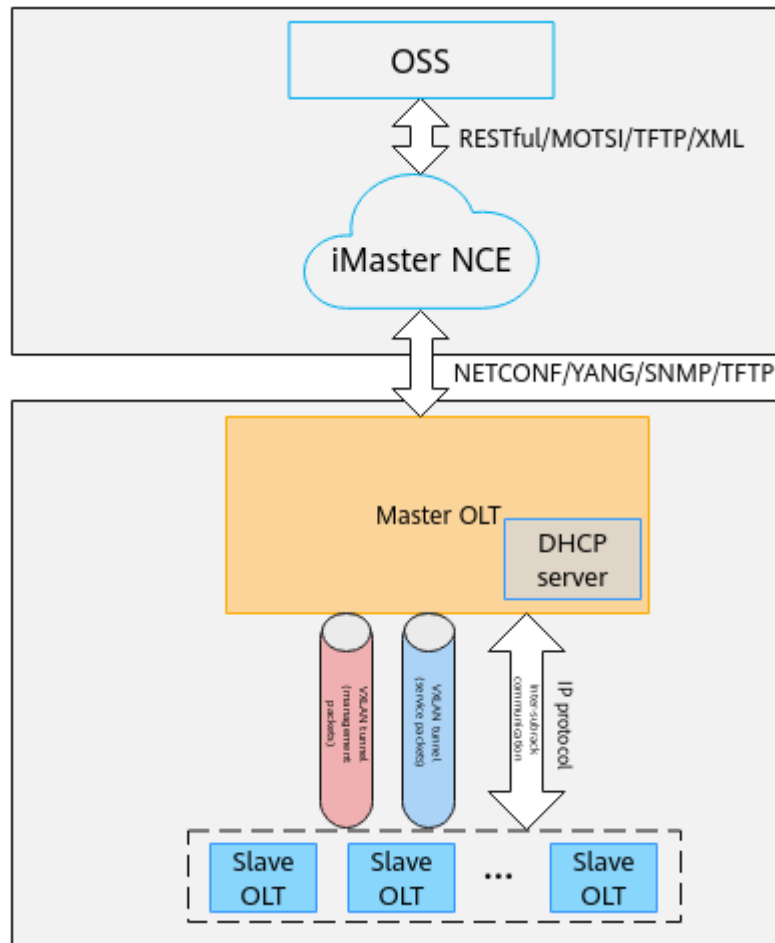
#### **Reducing device deployment and O&M costs**

- Deploying a new remote slave OLT is equivalent to adding a master OLT service board, and no re-interconnection with the upper-layer OSS or NMS is required.
- Software commissioning is not required for a remote slave OLT. You only need to visit the installation site once and power on a slave OLT. Services are automatically provisioned and deployed.
- When upgrading or replacing a remote slave OLT, you do not need to manually load the configurations of the remote slave OLT. The master OLT automatically issues the configurations to the remote slave OLT.
- A maximum of 8 remote slave OLTs can be connected.

## **21.4 Basic Concepts of Aggregation Management**

An aggregation management system is a highly autonomous small network. Externally, only the master OLT in a CO equipment room needs to be managed to manage OLTs on an entire network. A series of protocols must be supported internally, and system security, isolation, and reliability must be considered.

**Figure 21-2** shows the aggregation management system model.

**Figure 21-2** Aggregation management system model

## VXLAN Tunnel

The most significant feature of aggregation management is that a closed autonomous network (underlay network) is automatically created between the master and slave OLTs. The routing domain of the network is limited to only between the master and slave OLTs. The network serves only to connect the master and slave OLTs, and does not involve external interoperation.

In addition, VXLAN tunnels are constructed for the network. All subsequent management and service packets between the master and slave OLTs are carried in different VXLAN tunnels for information exchange and transmission between the master and slave OLTs. A VXLAN tunnel is equivalent to an inter-board communication channel in a single-subrack system.

### NOTE

The underlay network can be a Layer 2 or Layer 3 network. V100R022C0x supports only Layer 2 networks. The master and slave OLTs are directly connected in the same IP network segment. The IP channels between underlay networks are interconnected through ARP learning.

## Aggregation Management Network

An aggregation management network is located at the upper layer of the OLTs, usually on the metro network or SR/BNG. The management data is transmitted from the upstream port of the master OLT to the management network.

- Because the master and slave OLTs are managed in aggregated mode, protocols such as SNMP, CLI, and NETCONF/YANG of the NMS are terminated on the master OLT.
- The management protocol between the master and slave OLTs is the inter-board communication protocol which is an overlay service carried on the underlay network and requires an independent bridge domain (BD).
- An overlay management network is also a Layer 2 network, which uses a reserved VLAN of the system. Similar to the VLAN of the underlay network, the VLAN of the overlay network is an S-VLAN, which occupies VLAN specifications of the system.

## Aggregation Management Channel

After a VXLAN tunnel is created successfully, the IP channel between the master and slave OLTs is set up. Then, a management channel needs to be created.

- The management channel is the key to maintain the communication between the master and slave OLTs. The management IP address is used for inter-subrack communication.
- The management IP address uniquely identifies the master or slave OLTs. Packets can be constructed and sent after the destination IP address (peer management IP address) is obtained.
- The management VLAN is a reserved VLAN of the system, and a Layer 3 interface can be created for a reserved VLAN.

### NOTE

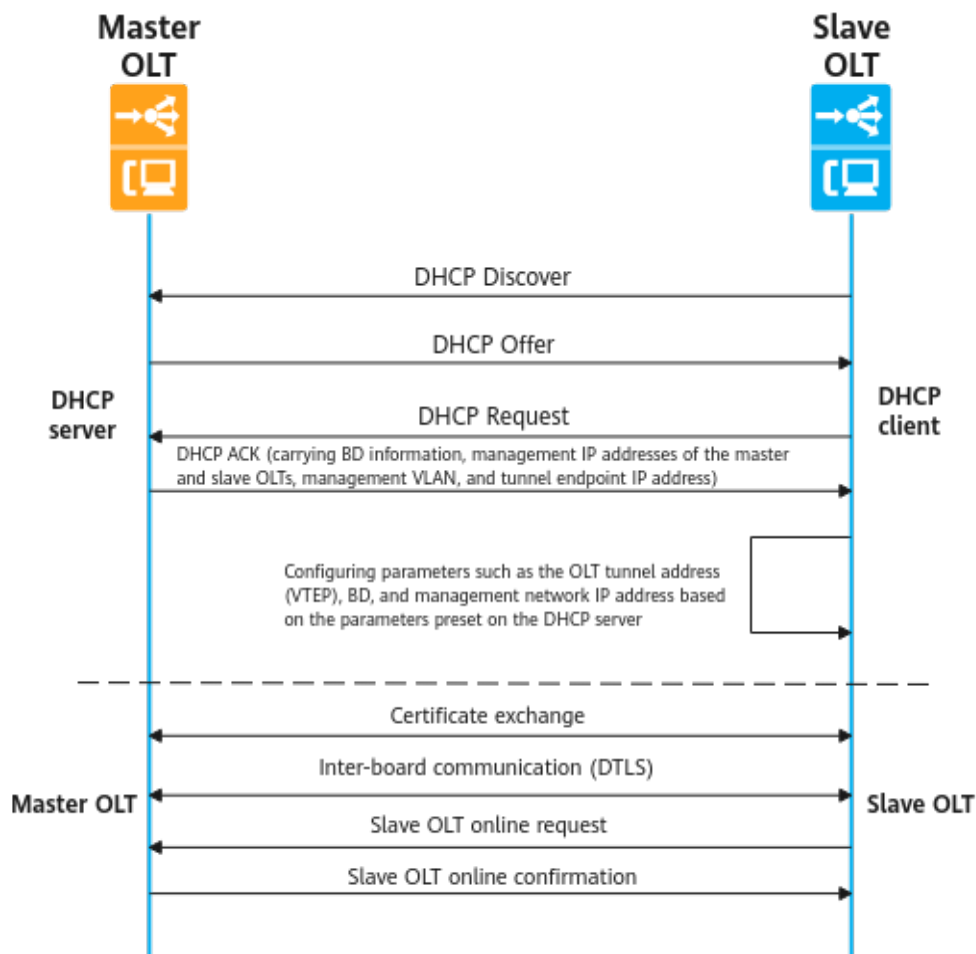
- A reserved VLAN is a VLAN that is reserved in the system to realize potential functions.
- The initial IDs of reserved VLANs of the master OLT cannot be modified.

## 21.5 Implementation Principle of Aggregation Management

In the aggregation management solution, the master OLT and multiple slave OLTs form a network, so that all OLTs are regarded as a single NE on the NMS. Slave OLTs can be automatically deployed and replaced, simplifying network management and enabling elastic capacity expansion.

## Automatic Deployment

Figure 21-3 Automatic deployment process for a remote slave OLT



1. A slave OLT obtains the tunnel IP address through DHCP, and obtains the BD configurations, as well as the ID and management IP address of the slave OLT. The DHCP parameters should include the link aggregation configurations of the upstream ports.

### NOTE

Currently, only one DHCP server can be used for aggregation management. The VLANs of the DHCP server can only be VLANs 1 to 16.

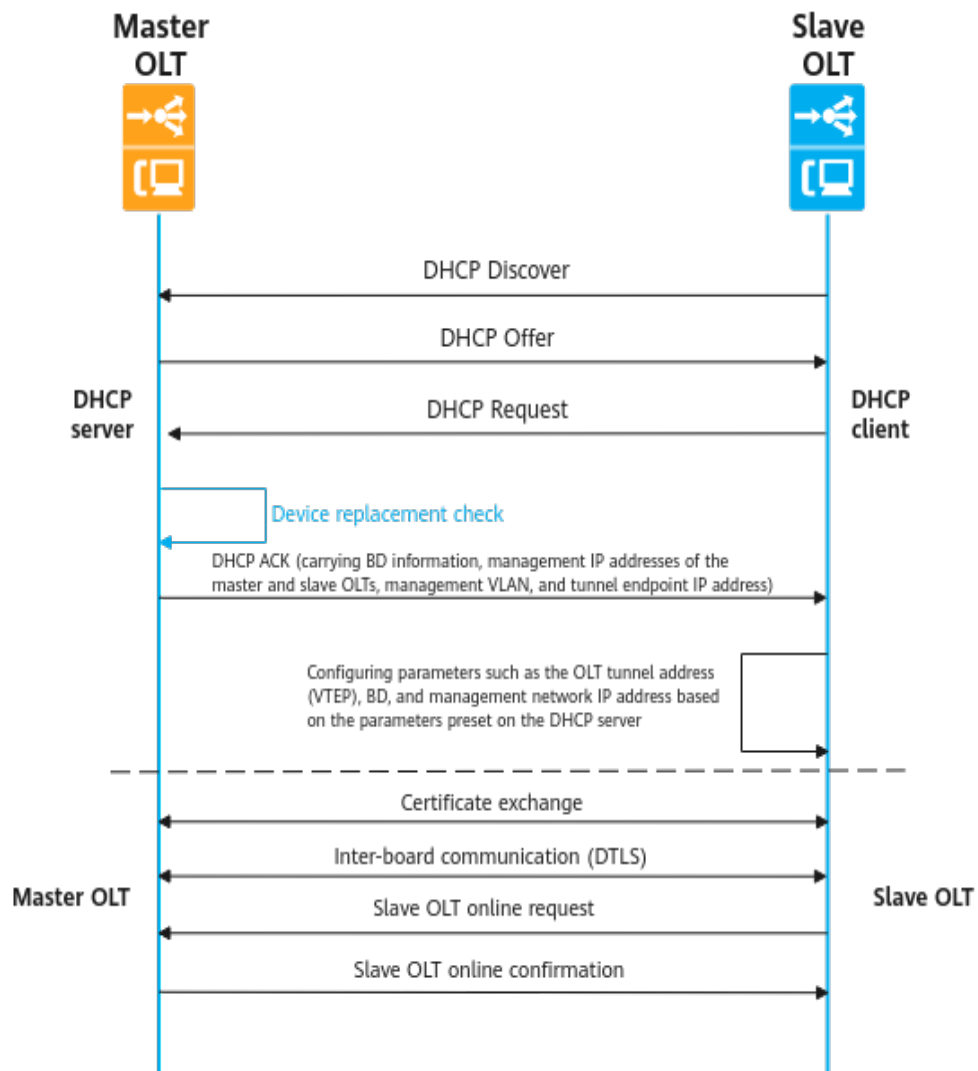
2. Based on the information obtained, the system configures the local tunnel, BD, and IP address of the slave OLT.
3. The system initiates slave OLT registration. Certificate authentication is supported for registration, and DTLS authentication is supported for the inter-board communication protocol.

## NOTE

- When a slave OLT goes online in independent mode, DHCP configurations are required again.
- When a slave OLT goes online for the first time, a mode switching process is triggered, and the OLT restarts one more time. In this process, the master OLT reports a slave OLT auto-find and auto-disappear event.
- It takes 25 to 30 minutes for a slave OLT to go online for the first time. When going online for the first time, a slave OLT needs to discover the master OLT by port and VLAN polling. It is recommended that you plan a management VLAN with a smaller ID and use a port with a smaller ID to connect to a slave OLT so that a minimum time is required for going online.

## Automatic Replacement

Figure 21-4 Automatic replacement process for a remote slave OLT



The automatic replacement process is similar to the automatic deployment process. The main difference is that automatic replacement requires device replacement check. The ESNs of the old and new slave OLTs are input to the

device management module of the aggregation management system in advance so that the master OLT establishes the replacement relationship between the old and new slave OLTs. In this way, when the new slave OLT goes online, the configuration information of the old slave OLT is reused, that is, the new slave OLT inherits the ID of the old slave OLT.

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#### NOTICE

Currently, a slave OLT can be replaced only with a slave OLT of the same model.

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## Self-healing for a Slave OLT

If the link between the master and slave OLTs is disconnected for more than 30s, the slave OLT resets for self-healing. If the link fault is rectified after the reset, the slave OLT goes online again. If a slave OLT needs to be restored to the independent mode, you need to manually switch the mode.

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#### NOTICE

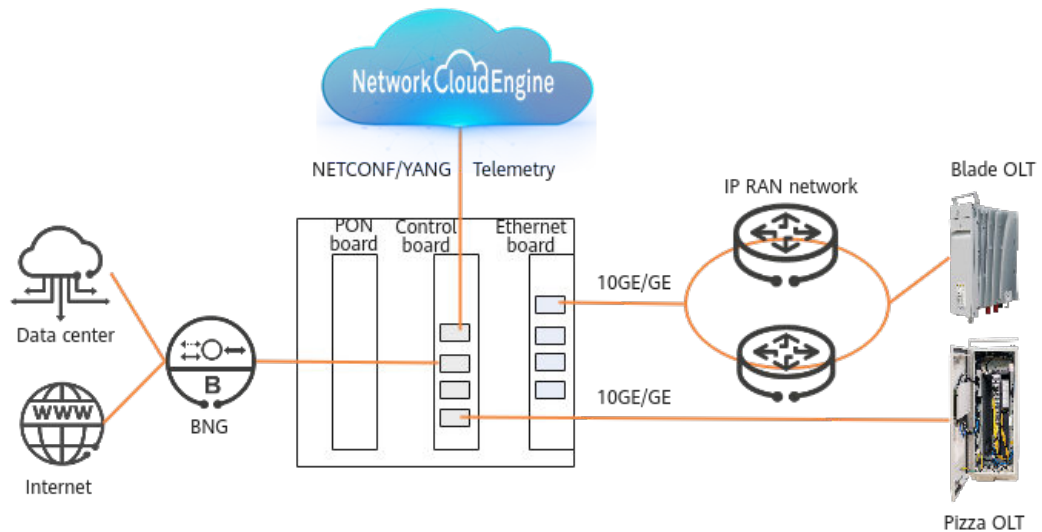
- In V100R022C1xSPH207 and earlier versions, if the link fault is not rectified within 15 minutes after a slave OLT is reset, the slave OLT switches back to the independent mode.
  - In V100R022C1xSPH207 and later versions, if you want to switch from the slave mode to the independent mode, run the **Reboot system Independent mode** command in the local BIOS. If a slave OLT has two control boards, remove the standby control board, switch the active control board to the independent mode, and then insert the standby control board. The standby control board automatically synchronizes the mode of the active control board. The preset password for logging in to the local BIOS of a slave OLT is huawei123.
- 

## 21.6 Application Scenario of Aggregation Management

Aggregation management is mainly used when multiple slave OLTs are deployed in scattered mode. The aggregation management port of the master OLT can be the upstream port on the control board or the 10GE/GE port on the Ethernet interface board.

In the OLT aggregation management system, a slave OLT (Pizza OLT or Blade OLT) can be connected to the master OLT in the CO equipment room in the following two modes:

- Connected through the IP-RAN backhaul network
- Directly connected across a Layer 2 LAN



## 21.7 Aggregation Management Configuration

### 21.7.1 Digital Certificate Loading Process

In the aggregation management security channel scenario, you need to load certificates to master subracks for V100R022C00–V100R022C10 versions. Perform the following steps to load the certificates:

#### NOTE

In the aggregation management scenario, the CA certificates and CRL corresponding to the Huawei-initial identity certificates can be loaded using SFTP, but the identity certificates used in the aggregation management scenario cannot be replaced.

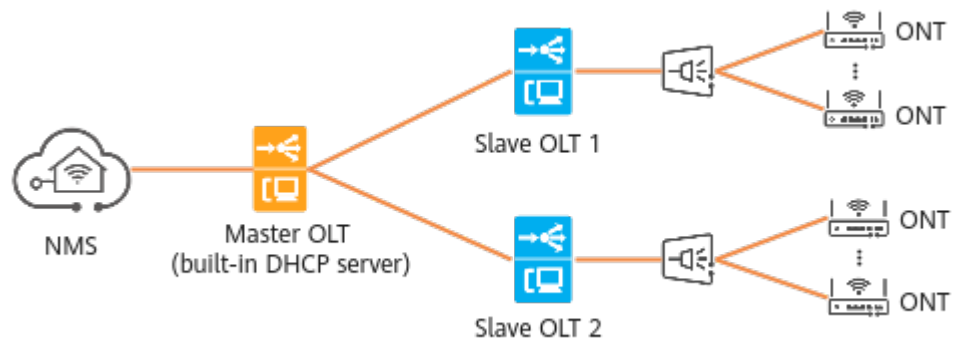
1. You can run the **display pki certificate trusted-ca list board frameid slotid** command to check whether the master subrack has built-in huawei\_equipment\_root\_ca.crt and huawei\_access\_product\_ca.crt certificates. If yes, you do not need to reload the certificates. If no, perform the following steps to load the certificates to the active and standby control boards in the master subrack.
2. Visit <https://support.huawei.com/pki/pkidetail> and download the root certificate file Huawei Equipment Root CA.pem and the level-2 CA certificate file Huawei Fixed Network Product CA.pem.
3. Run the **ssh sftp set** command to set the user name and password of the SFTP server.
4. Run the **load pki certificate trusted-ca pem sftp [ ipv6 ] serverIpAddress filename board frameid slotid** command to load the downloaded CA certificates to the active and standby control boards in the master subrack.
5. Run the **display pki certificate trusted-ca list board frameid slotid** command to check whether the certificates are successfully loaded to the certificate domain for aggregation management.

**In the aggregation management security channel scenario, you do not need to load certificates to master subracks for V100R023C00 and later versions**

Huawei root certificates `huawei_equipment_root_ca.crt` and `huawei_access_product_newroot.crt` are initial in a software package and are automatically imported to the certificate list for aggregation management, so that the master subracks can authenticate the slave subracks. Run the **display pki certificate trusted-ca list board frameid slotid** command to query the certificates.

## 21.7.2 Typical Networking and Configuration Process

### Typical Networking



### Prerequisites

- A slave OLT must support certificate pre-configuration. The master OLT must support certificate pre-configuration or manual digital certificate loading. For details about how to query and load a digital certificate, see [1.7.1 Process of Loading a Digital Certificate](#).
- The software versions of the master and slave OLTs support the aggregation management feature.
- A slave OLT must be started with an empty database and cannot be logged in after the startup. Otherwise, the slave OLT will be restored to the independent mode.
- It is recommended that aggregation management be used with NCE of V100R022C1x and later versions. Currently, third-party OSSs and U2000 do not fully support aggregation management.
- Do not use the centralized management and slicing features at the same time on the master OLT. Otherwise, services on the slave OLTs will be abnormal.
- When configuring aggregation management on the master OLT, ensure that DCN is disabled globally. You can run the **display dcn global** command to check whether DCN is enabled globally. If DCN is enabled globally, run the **undo dcn** command to disable it. If STP has been enabled globally, disable STP on the port connected to a slave OLT to prevent intermittent link disconnection caused by STP calculation. You can run the **stp port disable** command to disable STP.

## Configuration Procedure

### NOTE

- In versions earlier than V100R023C0x, the aggregation group of the ports connecting the master and slave OLTs supports only the manual mode. You can run the **display link-aggregation all** command to check the working mode of the aggregation group on the master OLT. If the working mode is set to LACP, you can run the **undo link-aggregation** command to delete the working mode of the aggregation group and reconfigure the working mode.
- In V100R023C1x and later versions, aggregation management supports ARP attack defense and MAC anti-flapping for slave OLTs. After a slave OLT goes online, the master OLT generates a static ARP entry and static MAC address based on the aggregation management VLAN and saves them to a configuration file. If you run the **active configuration system** command to downgrade the master OLT to an earlier version, residual static ARP entries and static MAC addresses exist. As a result, a slave OLT may fail to go online. You can run the **undo arp** and **undo mac-address static** commands to manually delete the static ARP entries and MAC addresses generated by the master OLT based on the aggregation management VLAN so that the slave OLTs can go online successfully.
- When an aggregation network is configured for the master OLT, it is recommended that you run the **ring check enable** and **ring check role-type detection enable** commands to enable ring network detection on the master OLT; otherwise, looped ports cannot be detected when the master and slave OLTs form a ring network. If ring network detection is enabled, a temporary ring network occurs. In this case, the port cascaded to the master OLT may report a ring network alarm or event which does not need to be handled. You can run the **display ring check config** command to check whether the ring detection function is enabled.
- In the aggregation management scenario, the Ethernet port configurations of a slave OLT for the master/slave connection are subject to the default configurations, the configurations made on the master OLT for a slave OLT do not take effect, and the displayed Ethernet port configurations may be different from the actual configurations that take effect.

### Step 1 Configure the forwarding VLAN and connection ports between the master and slave OLTs.

1. Run the **vlan** command to add a VLAN.

#### NOTE

The VLAN attribute cannot be QinQ or stacking. It is recommended that you use the smart VLAN.

2. Run the **port vlan** command on the master OLT to add ports connected to slave OLTs to the VLAN.

---

#### NOTICE

When configuring or deleting reserved VLANs for aggregation management on the master OLT by running a command, ensure that the number of reserved VLANs for aggregation management is greater than or equal to the total number of non-reserved VLANs after the command is executed. You can run the **display vlan all** command to query the total number of non-reserved VLANs.

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 **NOTE**

Aggregation management can be configured in customized configuration mode (steps 2 to 4) or one-click configuration mode (step 5). The two modes cannot be configured at the same time.

If you want to customize the network plan, you are advised to perform steps 2 to 4. If you want to simplify the configuration, go to step 5.

**Step 2** Configure the service attributes of the forwarding VLANs of the master and slave OLTs.

1. Run the **vlan service-profile** command to create a VLAN service profile.

 **NOTE**

It is used to distinguish the service attributes of underlay VLANs used for aggregation management from those of other VLANs, such as the VLAN forwarding policy and forwarding mode, thereby preventing the global configuration from interfering with aggregation management.

2. Run the **dhcp mode** command to specify the DHCP forwarding mode.
3. Run the **dhcp option82** command to disable the DHCP Option 82 function.

 **NOTE**

The DHCP server cannot coexist with Option 82.

4. Run the **vlan bind service-profile** command to bind the VLAN service profile to a VLAN.

**Step 3** Configure a DHCP server.

1. Run the **interface vlanif** command to create a VLANIF interface and enter the VLANIF mode.
2. Run the **ip address** command to configure the IP address of the DHCP server.
3. Run the **dhcp select interface** command to enable the DHCP server.
4. Run the **dhcp server ip-range** command to configure the address pool range on the DHCP server.

---

**NOTICE**

The IP address of the DHCP server cannot be in the same network segment as the aggregation management IP address.

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**Step 4** Configure reserved resources for aggregation management.

1. Run the **co resource bridge-domain** command to configure the BD resources for aggregation management on the master OLT.
2. Run the **co resource vni** command to configure VXLAN network identifier (VNI) resources for aggregation management on the master OLT.
3. Run the **co resource management-ip** command to configure the IP address for aggregation management on the master OLT.

**Step 5** Configure aggregation management in batches in one-click mode. (If steps 2 to 4 are not performed, perform this step.)

1. Run the **co enable vlan *vlan-id* interface-ip *ip-address* management-ip *ip-address*** command to configure aggregation management in batches in one-click mode. After this command is executed, a VLAN service profile for aggregation management is generated and bound to a VLAN. A Layer 3 interface is generated and configured with an IP address. The DHCP server is enabled, and the reserved resources and management IP address are configured for aggregation management.

 **NOTE**

If a configuration conflict occurs in the system, the command fails to be executed. Delete the conflicting configuration or perform steps 2 to 4 to use the customized configuration mode.

The automatically allocated aggregation management configurations are as follows:

1. VLAN service profile ID: 256; name: srvprof-co-management
2. Reserved BD resources of the master OLT (range: 8192–12255)
3. Reserved VNI resources of the master OLT (range: 32768–36831)

**Step 6** (Optional) Configure aggregation protection for master and slave OLTs.

1. Run the **dhcp server option** command to configure user-defined options for the DHCP server address pool.

 **NOTE**

If the port connecting master and slave OLTs is expected to work in aggregation protection mode, run the **dhcp server option** command on the master OLT to specify the port aggregation mode of a slave OLT.

The port aggregation mode of a slave OLT is as follows:

1. **dhcp server option 226 ascii 01** indicates that ports 0 and 1 on the board connecting a slave OLT to the master OLT are configured as an aggregation group.
2. **dhcp server option 226 ascii 0123** indicates that ports 0, 1, 2, and 3 on the board connecting a slave OLT to the master OLT are configured as an aggregation group.

In V100R023C0x and later versions, the **co resource link-aggregation port { half | full } [ workmode lacp-static ]** command can be used to replace the **dhcp server option** command. The new command supports the LACP aggregation group for slave OLTs. If both of commands are run, the configuration of the **co resource link-aggregation port** command takes effect.

1. **co resource link-aggregation port half** is equivalent to **dhcp server option 226 ascii 01**.
  2. **co resource link-aggregation port full** is equivalent to **dhcp server option 226 ascii 0123**.
2. Run the **port vlan** command to add the ports to be aggregated on the master and slave OLTs to the forwarding VLAN.

 **NOTE**

Skip this configuration if it has been performed in step 1.

3. Run the **link-aggregation** command to create an Ethernet link aggregation group (LAG) and specify the master port of the LAG.
4. Run the **link-aggregation add-member** command to add an Ethernet port to the existing LAG.

 **NOTE**

After the LAG is configured, you can run the **display co current-configuration** command to query the related configurations.

**Step 7** Check the online status of slave OLTs.

1. Run the **display frame info** command to query the online status of slave OLTs.

 **NOTE**

After a slave OLT goes online, the local serial port and Meth Ethernet port are disabled.

----End

## 21.7.3 Configuration Example

### 21.7.3.1 Customized Configuration Example

#### Prerequisites

- The master and slave OLTs have been installed and powered on.
- The software versions of the master and slave OLTs are the same and support the aggregation management feature.
- A slave OLT must support certificate pre-configuration. The master OLT must support certificate pre-configuration or manual digital certificate loading. For details about how to query and load a digital certificate, see [1.7.1 Process of Loading a Digital Certificate](#).
- A slave OLT must be started with an empty database and cannot be logged in after the startup. Otherwise, the slave OLT will be restored to the independent mode.
- It is recommended that aggregation management be used with NCE. Currently, third-party OSSs and U2000 do not fully support aggregation management.
- Do not use the centralized management and slicing features at the same time on the master OLT. Otherwise, services on the slave OLTs will be abnormal.
- When configuring aggregation management on the master OLT, ensure that DCN is disabled globally. You can run the **display dcn global** command to check whether DCN is enabled globally. If DCN is enabled globally, run the **undo dcn** command to disable it. If STP has been enabled globally, disable STP on the port connected to a slave OLT to prevent intermittent link disconnection caused by STP calculation. You can run the **stp port disable** command to disable STP.

 **NOTE**

The master OLT can be interconnected with a slave OLT only through a GE/10GE port. An xPON port cannot be used for interconnection. To ensure bandwidth, it is recommended that at least 10 Gbit/s interface boards be used on the network. If the bandwidth is insufficient, the OLT may be unreachable by the NMS. This is not a mandatory requirement. Customers need to make configurations based on actual requirements.

## Data Planning

| Configuration Item                                  | Configuration on the Master OLT                                                                        |
|-----------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| Aggregation management port                         | Master OLT: 0/9/0, 0/10/0, 0/9/1, and 0/10/1<br>Slave OLT 1: 1/2/0, 1/2/1<br>Slave OLT 2: 2/2/0, 2/2/1 |
| VXLAN tunnel resources of the master OLT            | BD resources: 64–95<br>VNI resources: 64–95                                                            |
| Aggregation management IP address of the master OLT | 10.0.1.1                                                                                               |
| Aggregation management VLAN                         | VLAN ID: 2                                                                                             |
| Service profile of the aggregation management VLAN  | ID: 1<br>Name: co+x                                                                                    |
| IP address of the DHCP server                       | 10.0.0.1/24                                                                                            |
| IP address pool range of the DHCP server            | 10.0.0.1 to 10.0.0.100                                                                                 |

## Configuration Procedure

1. Create a VLAN with the ID of 2.  
huawei(config)#**vlan 2**
2. Create a VLAN service profile named co+x with the ID of 1.  
huawei(config)#**vlan service-profile profile-id 1 profile-name "co+x"**
3. Set the DHCP forwarding mode to Layer 2 forwarding.  
huawei(config-vlan-srvprof-1)#**dhcp mode layer-2**
4. Disable the DHCP Option 82 function.  
huawei (config-vlan-srvprof-1)#**dhcp option82 disable**  
huawei (config-vlan-srvprof-1)#**commit**  
huawei (config-vlan-srvprof-1)#**quit**
5. Bind VLAN service profile 1 to VLAN 2.  
huawei(config)#**vlan bind service-profile 2 profile-id 1**
6. Create VLANIF interface 2 and enter the VLANIF mode.  
huawei(config)#**interface vlanif 2**
7. Set the IP address of the DHCP server to 10.0.0.1.  
huawei(config-if-vlanif2)#**ip address 10.0.0.1 24**
8. Enable the DHCP server function.  
huawei(config-if-vlanif2)#**dhcp select interface**
9. Set the IP address pool range of the DHCP server to 10.0.0.1–10.0.0.100.  
huawei(config-if-vlanif2)#**dhcp server ip-range 10.0.0.1 10.0.0.100**
10. Set Option 226 of the DHCP server to 01.  
huawei(config-if-vlanif2)#**dhcp server option 226 ascii 01**  
huawei(config-if-vlanif2)#**quit**
11. Create aggregation groups for master OLT ports 0/9/0 and 0/9/1 that are connected to slave OLTs, and set the packet distribution mode to distributing packets according to the source MAC address and destination MAC address.

- ```
huawei(config)#link-aggregation 0/9 0 egress-ingress
huawei(config)#link-aggregation 0/9 1 egress-ingress
```
12. Add port 0/10/0 of the master OLT to the aggregation group of port 0/9/0, and add port 0/10/1 to the aggregation group of port 0/9/1.
- ```
huawei(config)#link-aggregation add-member 0/9/0 0/10 0
huawei(config)#link-aggregation add-member 0/9/1 0/10 1
```
13. Configure ports 0/9/0 and 0/9/1 of the master OLT as upstream ports of the aggregation management VLAN.
- ```
huawei(config)#port vlan 2 0/9 0
huawei(config)#port vlan 2 0/9 1
```
14. Set the ID range of reserved BD resources to 64–95 for the master OLT.
- ```
huawei(config)#co resource bridge-domain 64 session-num 1
```
15. Set the ID range of reserved VNI resources to 64–95 for the master OLT.
- ```
huawei(config)#co resource vni 64 session-num 1
```
16. Set the aggregation management IP address to 10.0.1.1 for the master OLT.
- ```
huawei(config)#co resource management-ip 10.0.1.1
huawei(config)#quit
```
17. Check the online status of a slave OLT after aggregation management is configured on the master OLT. If a slave OLT is in the **Normal** state, it is successfully connected with the master OLT.
- ```
huawei(config)#display frame info
{<cr>|bydesc<K>|frameid<U><0,15>||<K> }:
```

Command:

display frame info

| FrameID | FrameType      | FrameState |          |
|---------|----------------|------------|----------|
| Role    |                |            |          |
| 0       | H901BPIB       | Normal     | Active   |
| 1       | MA5801-GP08-H2 | Normal     | Extended |
| 2       | MA5801-GP08-H2 | Normal     | Extended |

Local Config FrameID: 0

Total: 3

## Configuration Script

```
vlan 2
vlan service-profile profile-id 1 profile-name "co+x"
dhcp mode layer-2
dhcp option82 disable
commit
quit
vlan bind service-profile 2 profile-id 1
interface vlanif 2
ip address 10.0.0.1 24
dhcp select interface
dhcp server ip-range 10.0.0.1 10.0.0.100
dhcp server option 226 ascii 01
quit
link-aggregation 0/9 0 egress-ingress
link-aggregation 0/9 1 egress-ingress
link-aggregation add-member 0/9/0 0/10 0
link-aggregation add-member 0/9/1 0/10 1
port vlan 2 0/9 0
port vlan 2 0/9 1
co resource bridge-domain 64 session-num 1
co resource vni 64 session-num 1
co resource management-ip 10.0.1.1
quit
display frame info
```

### 21.7.3.2 Batch Configuration Example

#### Prerequisites

- The master and slave OLTs have been installed and powered on.
- The software versions of the master and slave OLTs are the same and support the aggregation management feature.
- A slave OLT must support certificate pre-configuration. The master OLT must support certificate pre-configuration or manual digital certificate loading. For details about how to query and load a digital certificate, see [1.7.1 Process of Loading a Digital Certificate](#).
- A slave OLT must be started with an empty database and cannot be logged in after the startup. Otherwise, the slave OLT will be restored to the independent mode.
- It is recommended that aggregation management be used with NCE. Currently, third-party OSSs and U2000 do not fully support aggregation management.
- Do not use the centralized management and slicing features at the same time on the master OLT. Otherwise, services on the slave OLTs will be abnormal.
- When configuring aggregation management on the master OLT, ensure that DCN is disabled globally. You can run the **display dcn global** command to check whether DCN is enabled globally. If DCN is enabled globally, run the **undo dcn** command to disable it. If STP has been enabled globally, disable STP on the port connected to a slave OLT to prevent intermittent link disconnection caused by STP calculation. You can run the **stp port disable** command to disable STP.

#### NOTE

The master OLT can be interconnected with a slave OLT only through a GE/10GE port. An xPON port cannot be used for interconnection. To ensure bandwidth, it is recommended that at least 10 Gbit/s interface boards be used on the network. If the bandwidth is insufficient, the OLT may be unreachable by the NMS. This is not a mandatory requirement. Customers need to make configurations based on actual requirements.

#### Data Planning

| Configuration Item                                  | Configuration on the Master OLT                                                                        |
|-----------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| Aggregation management port                         | Master OLT: 0/9/0, 0/10/0, 0/9/1, and 0/10/1<br>Slave OLT 1: 1/2/0, 1/2/1<br>Slave OLT 2: 2/2/0, 2/2/1 |
| Aggregation management IP address of the master OLT | 10.0.1.1                                                                                               |
| Aggregation management VLAN                         | VLAN ID: 2                                                                                             |
| IP address of the DHCP server                       | 10.0.0.1/24                                                                                            |

## Configuration Procedure

1. Create a VLAN with the ID of 2.  
huawei(config)#**vlan 2**
2. Configure ports 0/9/0 and 0/9/1 of the master OLT as upstream ports of the aggregation management VLAN.  
huawei(config)#**port vlan 2 0/9 0**  
huawei(config)#**port vlan 2 0/9 1**
3. Configure a VLAN service profile for aggregation management and bind it to VLAN 2. Create a Layer 3 interface, set the IP address of the DHCP server to 10.0.0.1, enable the DHCP server, and set the aggregation management IP address of the master OLT to 10.0.0.0.  
huawei(config)#**co enable vlan 2 interface ip 10.0.0.1 management ip 10.0.1.1**
4. Create VLANIF interface 2 and enter the VLANIF mode.  
huawei(config)#**interface vlanif 2**
5. Set Option 226 of the DHCP server to 01.  
huawei(config-if-vlanif2)#**dhcp server option 226 ascii 01**  
huawei(config-if-vlanif2)#**quit**
6. Create aggregation groups for master OLT ports 0/9/0 and 0/9/1 that are connected to slave OLTs, and set the packet distribution mode to distributing packets according to the source MAC address and destination MAC address.  
huawei(config)#**link-aggregation 0/9 0 egress-ingress**  
huawei(config)#**link-aggregation 0/9 1 egress-ingress**
7. Add port 0/10/0 of the master OLT to the aggregation group of port 0/9/0, and add port 0/10/1 to the aggregation group of port 0/9/1.  
huawei(config)#**link-aggregation add-member 0/9/0 0/10 0**  
huawei(config)#**link-aggregation add-member 0/9/1 0/10 1**
8. Check the online status of a slave OLT after aggregation management is configured on the master OLT. If a slave OLT is in the **Normal** state, it is successfully connected with the master OLT.  
huawei(config)#**display frame info**  
{<cr>|bydesc<K>|frameid<U><0,15>||<K> }:

Command:

display frame info

| FrameID | FrameType      | FrameState |          |
|---------|----------------|------------|----------|
| Role    |                |            |          |
| 0       | H901BPIB       | Normal     | Active   |
| 1       | MA5801-GP08-H2 | Normal     | Extended |
| 2       | MA5801-GP08-H2 | Normal     | Extended |

Local Config FrameID: 0

Total: 3

## Configuration Script

```
vlan 2
port vlan 2 0/9 0
port vlan 2 0/9 1
co enable vlan 2 interface ip 10.0.0.1 management ip 10.0.1.1
interface vlanif 2
dhcp server option 226 ascii 01
quit
link-aggregation 0/9 0 egress-ingress
link-aggregation 0/9 1 egress-ingress
link-aggregation add-member 0/9/0 0/10 0
```

```
link-aggregation add-member 0/9/1 0/10 1
display frame info
```