



# Network Transmission Training

## Configuration Guide



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# 1 Opening Device Command Line Page through Console Port

## 1.1 Purpose

To log in to the device through the console, and go to the command line page.

## 1.2 Required Tools

Console cable, computer, network device, and terminal software.



- We recommend using SecureCRT. You can search for the software and download it online.
- Male power jack is used to connect female power jack. Connect the switch on the other side of the female power jack. Connect the computer on the other side of the male power jack.

Figure 1-1 Console cables



Figure 1-2 SecureCRT

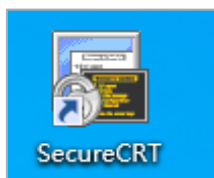
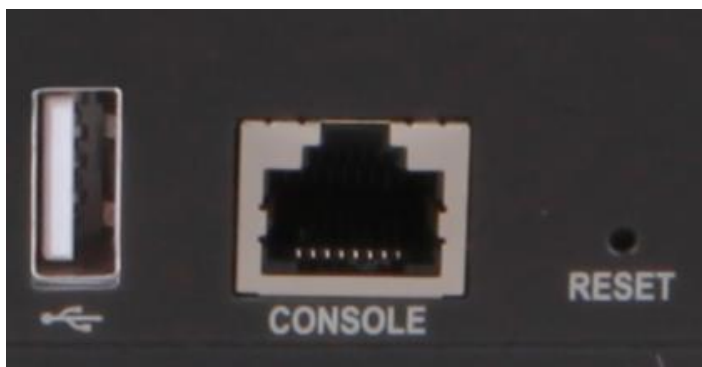
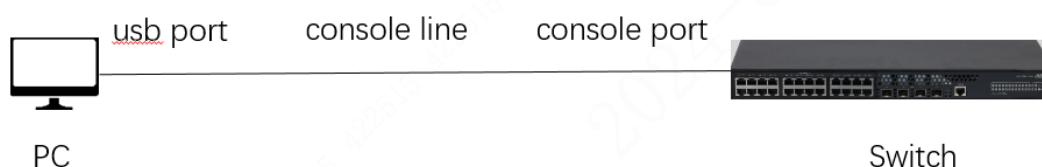


Figure 1-3 Console port on the device



## 1.3 Network Diagram

Figure 1-4 Network diagram

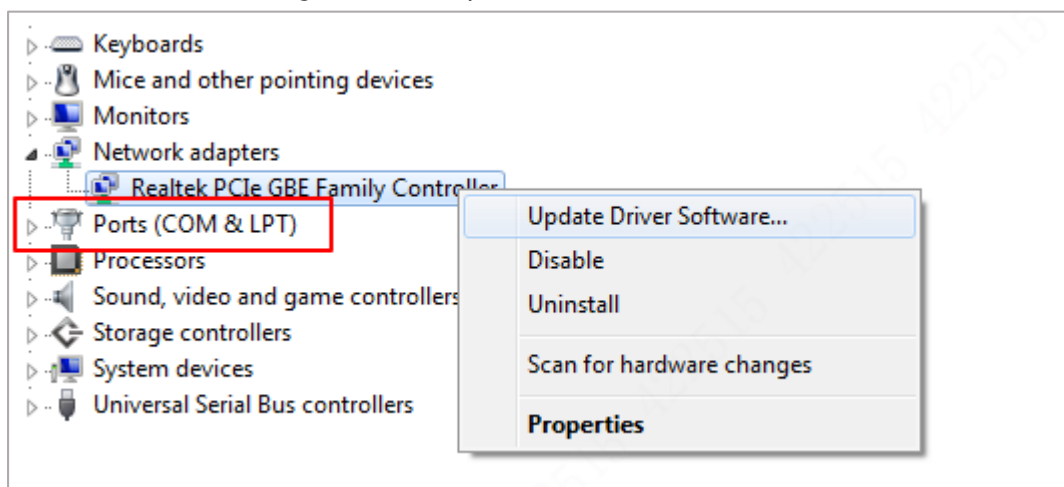


## 1.4 Procedure

**Step 1** Check the COM port number.

Right-click This PC, and select Properties > Device Manager > Ports to check the communication port used on the computer. In this example, COM3 is used.

Figure 1-5 COM port number

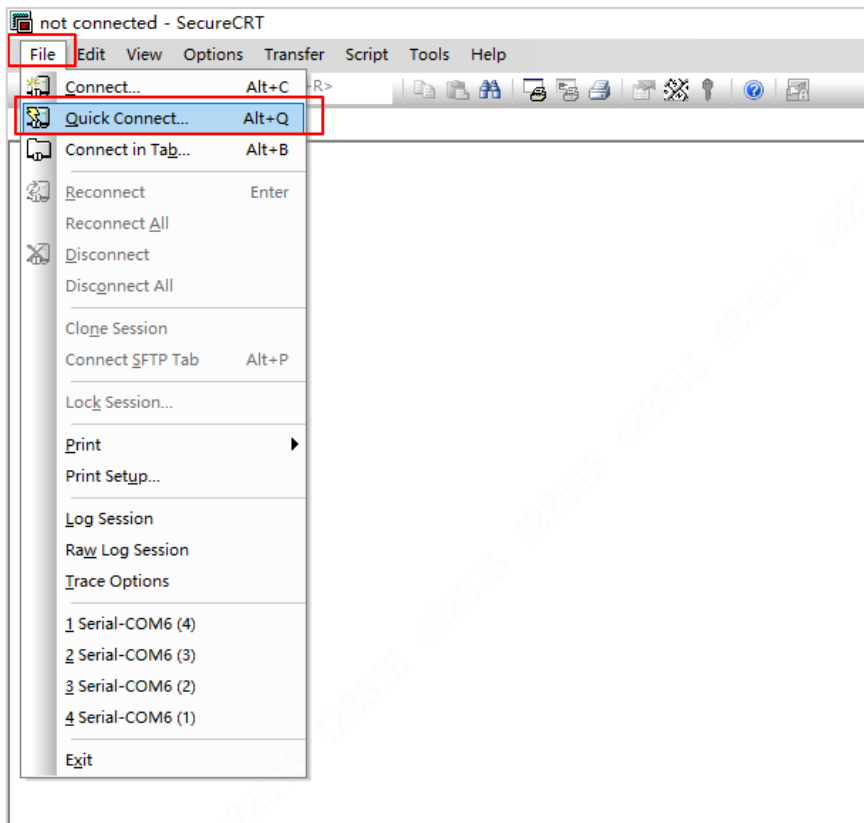


**Step 2** Configure and connect to SecureCRT.

Double-click to run SecureCRT, and then click Quick Connect in the File tab, as shown in the following figure.

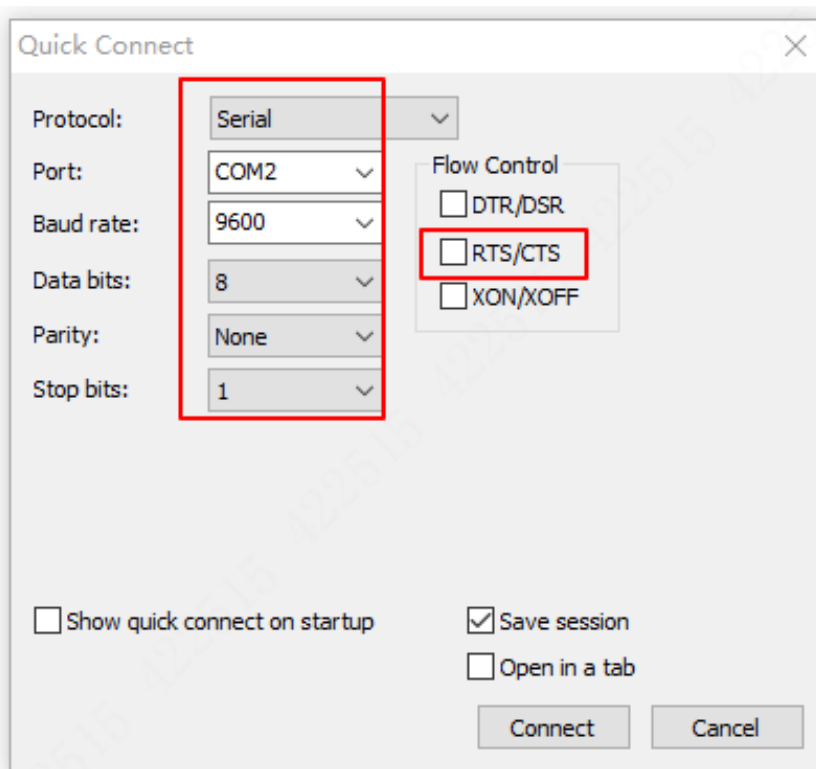
Select Serial as the Protocol, and COM3 as the Port, set Baud rate as 9600, Data bits as 8, Parity as None, and Stop bits as 1, and then click Connect.

Figure 1-6 Connect to SecureCRT



Cancel selecting RTS/CTS in the following figure.

Figure 1-7 Quick connection



The image shows a 'Quick Connect' dialog box with the following settings:

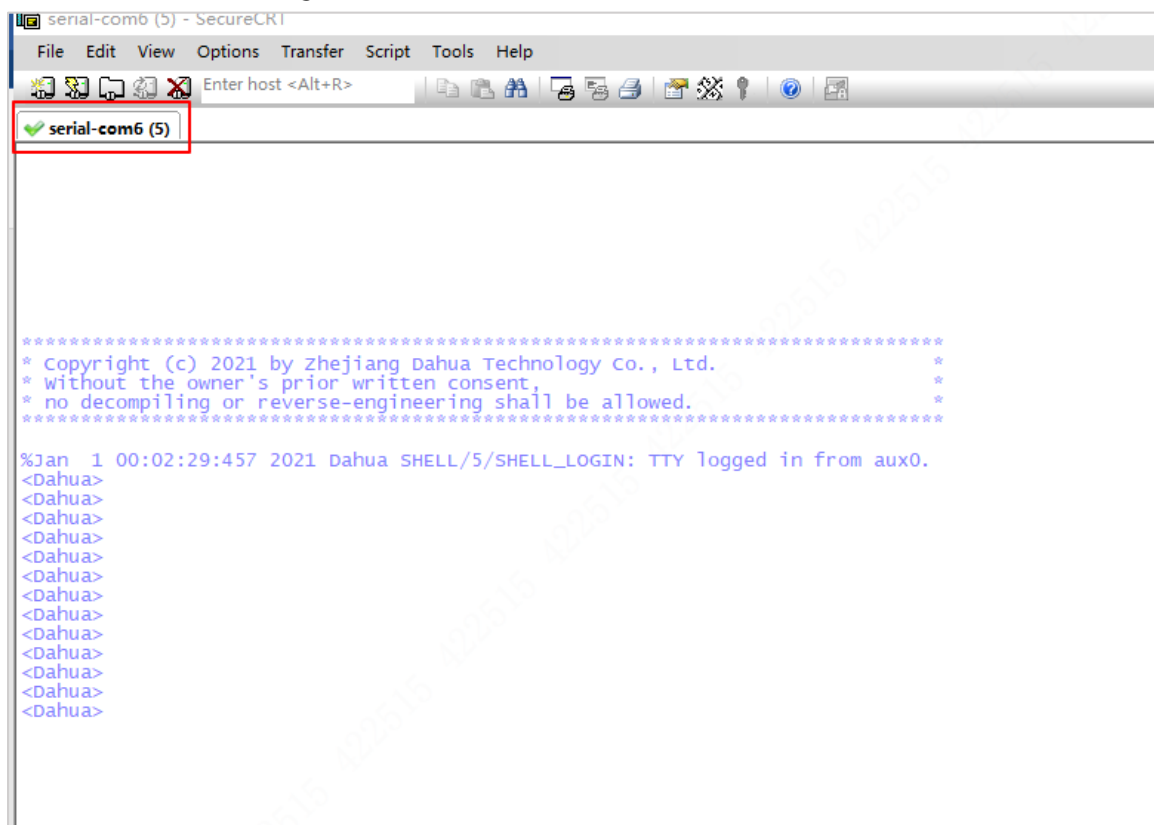
- Protocol: Serial
- Port: COM2
- Baud rate: 9600
- Data bits: 8
- Parity: None
- Stop bits: 1
- Flow Control:
  - ☐ DTR/DSR
  - ☐ RTS/CTS
  - ☐ XON/XOFF
- ☐ Show quick connect on startup
- ☒ Save session
- ☐ Open in a tab
- Buttons: Connect, Cancel

**Step 3** Check whether SecureCRT is successfully connected, and enter the device command line page.

After clicking Connect in the previous step, you will enter the following dialog box. If a green tick is displayed before the label, a character prompt appears after you press the Enter key.

You can enter characters now, which indicates that the computer is connected to the device through SecureCRT and console cables.

Figure 1-8 Check connection



## 2 Logging in to Telnet Remotely

### 2.1 Purpose

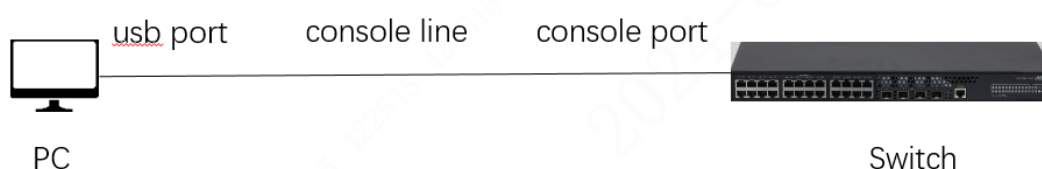
- To learn Telnet configuration commands.
- To learn how to create a user, and configure password, service type and user level.
- To learn how to configure the verification mode for Line VTY.

### 2.2 Required Tools and Software Environment

- Telnet login service is not enabled for the device by default. You need to log in through the Console port to configure and save it.
- Network access: After the configuration is complete, the terminal computer is required to ping the device management IP address. You need to configure the management IP in advance.

### 2.3 Network Diagram

Figure 2-1 Network diagram



### 2.4 Enabling Telnet on the Command Line Page

```
# Enter system view.
<DH> system-view
# Configure the management IP address of the switch. The IP address of VLAN virtual
interface 1 is 192.168.1.110/24.
[DH] interface vlan-interface 1
[DH-VLAN-interface1] ip address 192.168.1.110 255.255.255.0
[DH-VLAN-interface1] quit
# Enable the Telnet service, which is enabled by default.
[DH] telnet server enable
```

```
# Set the VTY interface authentication mode as scheme mode (authenticated by
username and password).
[DH] line vty 0 4
[DH-ui-vty0-4] authentication-mode scheme
[DH-ui-vty0-4] quit
# Create a local account "abc". Set the password as 123456, the permission level as
network-admin, and the account type as Telnet.
[DH] local-user abc class manage
[DH-luser-abc] password simple 123456
[DH-luser-abc] service-type telnet
[DH-luser-abc] authorization-attribute user-role network-admin
[DH-luser-abc] quit
# Save the configuration.
[DH] save force
```

## 3 Logging in to the Webpage

### 3.1 Purpose

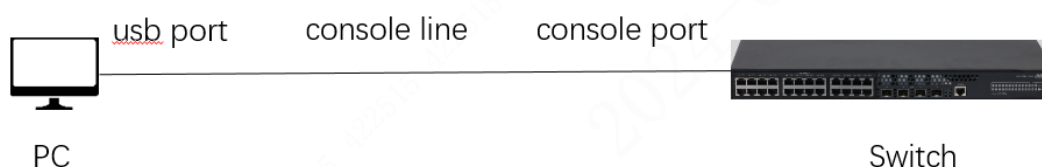
- To learn how to configure the command line to log in to the webpage.
- To learn how to create a user, and set password, service type and user level.
- To learn how to set the verification mode for Line VTY.

### 3.2 Required Tools and Software Environment

- Webpage login service is not enabled for the device by default. You need to log in through the Console port to configure and save it.
- Network access: After the configuration is complete, the terminal computer is required to ping the device management IP address. The switch and computer need to be on the same network segment.

### 3.3 Network Diagram

Figure 3-1 Network diagram



### 3.4 Enabling HTTP on the Command Line Page

```

# Enter system view.
<DH>system-view
# Create a local user admin, and set the login password as admin, the service type as
http and https, and the user level as network-admin level.
[DH] local-user admin
[DH-luser-manage-admin] password simple admin
[DH-luser-manage-admin] service-type http https
[DH-luser-manage-admin] authorization-attribute user-role network-admin
[DH-luser-manage-admin] quit
  
```

```
# Configure the management IP address of the switch. The IP address of VLAN virtual
interface 1 is 192.168.1.50 with a 24-bit mask.
[DH] interface vlan-interface 1
[DH-VLAN-interface1] ip address 192.168.1.50 255.255.255.0
[DH-VLAN-interface1] quit
# Enable http and https services.
[DH]ip http enable
[DH]ip https enable
# Set the VTY interface authentication mode as scheme mode (authenticated by
username and password).
[DH]line vty 0 4
[DH-line-vty0-4] authentication-mode scheme
[DH]quit
# Save the configuration.
[DH]save force
```

## 4 Configuring VLAN

### 4.1 Purpose

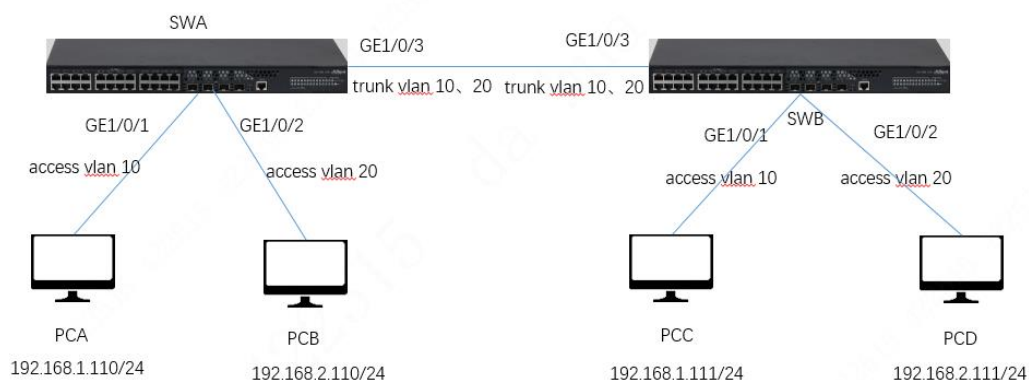
- To know how the switch learns the MAC address.
- To learn the basic working principle of VLAN, the basic configuration of Access link port and Trunk link port.

### 4.2 Configuration and Network Diagram

**Step 1** Divide the VLAN and configure the access port.

**Step 2** Use Trunk to connect computers across switches on the same segment (PCA and PCC, PCB and PCD).

Figure 4-1 Network diagram



### 4.3 Commands

Configure SWA.

# Enter system view with the command line, and create VLAN 10 and VLAN 20.

```
<SWA>system-view
```

```
[SWA]vlan 10
```

```
[SWA-vlan10]quit
```

```
[SWA]vlan 20
```

```
[SWA-vlan20]quit
```

# Set the ports 1/0/1 and 1/0/2 of the switch as access mode, and enable the corresponding VLAN 10 and VLAN 20 respectively.

```
[SWA]interface GigabitEthernet 1/0/1
```

```
[SWA-GigabitEthernet1/0/1]port link-type access
[SWA-GigabitEthernet1/0/1]port access vlan 10
[SWA-GigabitEthernet1/0/1]quit
[SWA]interface GigabitEthernet 1/0/2
[SWA-GigabitEthernet1/0/2]port link-type access
[SWA-GigabitEthernet1/0/2]port access vlan 20
[SWA-GigabitEthernet1/0/2]quit
# Set the port 1/0/3 as trunk mode and enable VLAN 10 and VLAN 20.
[SWA]int GigabitEthernet 1/0/3
[SWA-GigabitEthernet1/0/3]port link-type trunk
[SWA-GigabitEthernet1/0/3]port trunk permit vlan 10 20
[SWA-GigabitEthernet1/0/3]quit
[SWA]
Configure SWB.
# Enter system view with the command line, and create VLAN 10 and VLAN 20.
<SWB>system-view
[SWB]vlan 10
[SWB-vlan10]quit
[SWB]vlan 20
[SWB-vlan20]quit
# Set the ports 1/0/1 and 1/0/2 of the switch as access mode, and enable the
corresponding VLAN 10 and VLAN 20 respectively.
[SWB]interface GigabitEthernet 1/0/1
[SWB-GigabitEthernet1/0/1]port link-type access
[SWB-GigabitEthernet1/0/1]port access vlan 10
[SWB-GigabitEthernet1/0/1]quit
[SWB]interface GigabitEthernet 1/0/2
[SWB-GigabitEthernet1/0/2]port link-type access
[SWB-GigabitEthernet1/0/2]port access vlan 20
[SWB-GigabitEthernet1/0/2]quit
# Set port 1/0/3 as trunk mode and enable VLAN 10 and VLAN 20.
[SWB]int GigabitEthernet 1/0/3
[SWB-GigabitEthernet1/0/3]port link-type trunk
[SWB-GigabitEthernet1/0/3]port trunk permit vlan 10 20
[SWB-GigabitEthernet1/0/3]quit
[SWB]
```

## 4.4 Result Verification

When PCA pings PCC, they can connect because they are on the same network segment.

Figure 4-2 PCA pings PCC

```
[PCA]ping 192.168.1.111
Ping 192.168.1.111 (192.168.1.111): 56 data bytes, press CTRL_C to break
56 bytes from 192.168.1.111: icmp_seq=0 ttl=255 time=1.000 ms
56 bytes from 192.168.1.111: icmp_seq=1 ttl=255 time=0.000 ms
56 bytes from 192.168.1.111: icmp_seq=2 ttl=255 time=1.000 ms
56 bytes from 192.168.1.111: icmp_seq=3 ttl=255 time=0.000 ms
56 bytes from 192.168.1.111: icmp_seq=4 ttl=255 time=1.000 ms

--- Ping statistics for 192.168.1.111 ---
5 packet(s) transmitted, 5 packet(s) received, 0.0% packet loss
round-trip min/avg/max/std-dev = 0.000/0.600/1.000/0.490 ms
```

When PCA pings PCD, they cannot connect because they are on different network segments.

Figure 4-3 PCA pings PCD

```
[PCA]PING 192.168.2.111
Ping 192.168.2.111 (192.168.2.111): 56 data bytes, press CTRL_C to break
Request time out
Request time out
Request time out
Request time out
Request time out

--- Ping statistics for 192.168.2.111 ---
5 packet(s) transmitted, 0 packet(s) received, 100.0% packet loss
[PCA]%Jan 24 21:22:42:139 2024 PCA PING/6/PING_STATISTICS: Ping statistics for 192.168.2.111: 5 packet(s)
```

When PCB pings PCD, they can connect because they are on the same network segment.

Figure 4-4 PCB pings PCD

```
[PCB]ping 192.168.2.111
Ping 192.168.2.111 (192.168.2.111): 56 data bytes, press CTRL_C to break
56 bytes from 192.168.2.111: icmp_seq=0 ttl=255 time=1.000 ms
56 bytes from 192.168.2.111: icmp_seq=1 ttl=255 time=0.000 ms
56 bytes from 192.168.2.111: icmp_seq=2 ttl=255 time=1.000 ms
56 bytes from 192.168.2.111: icmp_seq=3 ttl=255 time=1.000 ms
56 bytes from 192.168.2.111: icmp_seq=4 ttl=255 time=1.000 ms

--- Ping statistics for 192.168.2.111 ---
5 packet(s) transmitted, 5 packet(s) received, 0.0% packet loss
round-trip min/avg/max/std-dev = 0.000/0.800/1.000/0.400 ms
[PCB]%Jan 24 21:24:02:816 2024 PCB PING/6/PING_STATISTICS: Ping statistics for 192.168.2.111: 5 packet(s)
```

When PCB pings PCC, they cannot connect because they are on different network segments.

Figure 4-5 PCB pings PCC

```
[PCB]ping 192.168.1.111
Ping 192.168.1.111 (192.168.1.111): 56 data bytes, press CTRL_C to break
Request time out
Request time out
```

## 5 Configuring Routing between VLANs

### 5.1 Purpose

- To learn the basic principle of routing forwarding.
- To learn the method of configuring routing between VLANs.
- To learn the basic commands for viewing the routing table.

### 5.2 Configuration and Network Diagram

Configure to connect the hosts (PCA and PCB) in two different segments.

Figure 5-1 Network diagram



### 5.3 Configuration Procedure

- Step 1** Create the physical connection and the network plan.  
Perform physical connection and VLAN division, and make interface plan and IP address plan according to the network diagram.

Table 5-1 IP address list

| Device Name | Interface              | IP Address and Mask | Gateway     |
|-------------|------------------------|---------------------|-------------|
| SWA         | VLAN 10                | 192.168.1.1/24      | -           |
| SWA         | VLAN 30                | 192.168.3.1/24      | -           |
| SWB         | VLAN 20                | 192.168.2.1/24      | -           |
| SWB         | VLAN 30                | 192.168.3.2/24      | -           |
| PCA         | Network interface card | 192.168.1.20/24     | 192.168.1.1 |
| PCB         | Network interface card | 192.168.2.20/24     | 192.168.2.1 |

## Step 2 Configure and adjust the switch.

The following is the SWA configuration.

```
# Create VLAN and configure the VLAN to which the interface belongs.
<SWA> system-view
[SWA]vlan 10
[SWA-vlan10]quit
[SWA]vlan 30
[SWA-vlan30]quit
[SWA]interface GigabitEthernet 1/0/1
[SWA-GigabitEthernet1/0/1]port link-type access
[SWA-GigabitEthernet1/0/1]port access vlan 10
[SWA-GigabitEthernet1/0/1]quit
[SWA]interface GigabitEthernet 1/0/2
[SWA-GigabitEthernet1/0/2]port link-type access
[SWA-GigabitEthernet1/0/2]port access vlan 30
[SWA-GigabitEthernet1/0/2]quit
# Create a VLAN virtual interface and configure its address.
[SWA]interface Vlan-interface 10
[SWA-Vlan-interface10]ip address 192.168.1.1 24
[SWA-Vlan-interface10]quit
[SWA]interface Vlan-interface 30
[SWA-Vlan-interface30]ip address 192.168.3.1 24
[SWA-Vlan-interface30]quit
# Check the routing table after the configuration is complete. Two 24-bit
direct routings are generated.
```

Figure 5-2 Configure the switch

```
[SWA]display ip routing-table

Destinations : 16      Routes : 16

Destination/Mask    Proto   Pre  Cost   NextHop         Interface
0.0.0.0/32          Direct  0    0       127.0.0.1       InLoop0
127.0.0.0/8         Direct  0    0       127.0.0.1       InLoop0
127.0.0.0/32        Direct  0    0       127.0.0.1       InLoop0
127.0.0.1/32        Direct  0    0       127.0.0.1       InLoop0
127.255.255.255/32  Direct  0    0       127.0.0.1       InLoop0
192.168.1.0/24      Direct  0    0       192.168.1.1     Vlan10
192.168.1.0/32      Direct  0    0       192.168.1.1     Vlan10
192.168.1.1/32      Direct  0    0       127.0.0.1       InLoop0
192.168.1.255/32    Direct  0    0       192.168.1.1     Vlan10
192.168.3.0/24      Direct  0    0       192.168.3.1     Vlan30
192.168.3.0/32      Direct  0    0       192.168.3.1     Vlan30
192.168.3.1/32      Direct  0    0       127.0.0.1       InLoop0
192.168.3.255/32    Direct  0    0       192.168.3.1     Vlan30
224.0.0.0/4         Direct  0    0       0.0.0.0         NULL0
224.0.0.0/24        Direct  0    0       0.0.0.0         NULL0
255.255.255.255/32  Direct  0    0       127.0.0.1       InLoop0
[SWA]
```

```
# Add one static routing to the PCB-192.168.2.0 segment.
[SWA]ip route-static 192.168.2.0 255.255.255.0 192.168.3.2
# Check the routing table again after the configuration is complete. One static
routing with the static protocol type is generated.
```

Figure 5-3 Add routing to the PCB

```
[SWA]display ip routing-table
```

| Destinations : 17  |        | Routes : 17 |      |             |           |
|--------------------|--------|-------------|------|-------------|-----------|
| Destination/Mask   | Proto  | Pre         | Cost | NextHop     | Interface |
| 0.0.0.0/32         | Direct | 0           | 0    | 127.0.0.1   | InLoop0   |
| 127.0.0.0/8        | Direct | 0           | 0    | 127.0.0.1   | InLoop0   |
| 127.0.0.0/32       | Direct | 0           | 0    | 127.0.0.1   | InLoop0   |
| 127.0.0.1/32       | Direct | 0           | 0    | 127.0.0.1   | InLoop0   |
| 127.255.255.255/32 | Direct | 0           | 0    | 127.0.0.1   | InLoop0   |
| 192.168.1.0/24     | Direct | 0           | 0    | 192.168.1.1 | Vlan10    |
| 192.168.1.0/32     | Direct | 0           | 0    | 192.168.1.1 | Vlan10    |
| 192.168.1.1/32     | Direct | 0           | 0    | 127.0.0.1   | InLoop0   |
| 192.168.1.255/32   | Direct | 0           | 0    | 192.168.1.1 | Vlan10    |
| 192.168.2.0/24     | Static | 60          | 0    | 192.168.3.2 | Vlan30    |
| 192.168.3.0/24     | Direct | 0           | 0    | 192.168.3.1 | Vlan30    |
| 192.168.3.0/32     | Direct | 0           | 0    | 192.168.3.1 | Vlan30    |
| 192.168.3.1/32     | Direct | 0           | 0    | 127.0.0.1   | InLoop0   |
| 192.168.3.255/32   | Direct | 0           | 0    | 192.168.3.1 | Vlan30    |
| 224.0.0.0/4        | Direct | 0           | 0    | 0.0.0.0     | NULL0     |
| 224.0.0.0/24       | Direct | 0           | 0    | 0.0.0.0     | NULL0     |
| 255.255.255.255/32 | Direct | 0           | 0    | 127.0.0.1   | InLoop0   |

```
[SWA]
```

The following is the SWB configuration.

```
# Create VLAN and configure the VLAN to which the interface belongs.
<SWB> system-view
[SWB]vlan 20
[SWB-vlan20]quit
[SWB]vlan 30
[SWB-vlan30]quit
[SWB]interface GigabitEthernet 1/0/1
[SWB-GigabitEthernet1/0/1]port link-type access
[SWB-GigabitEthernet1/0/1]port access vlan 20
[SWB-GigabitEthernet1/0/1]quit
[SWB]interface GigabitEthernet 1/0/2
[SWB-GigabitEthernet1/0/2]port link-type access
[SWB-GigabitEthernet1/0/2]port access vlan 30
[SWB-GigabitEthernet1/0/2]quit
# Create a VLAN virtual interface and configure its address.
[SWB]interface Vlan-interface 20
[SWB-Vlan-interface20]ip address 192.168.2.1 24
[SWB-Vlan-interface20]quit
[SWB]interface Vlan-interface 30
[SWB-Vlan-interface30]ip address 192.168.3.2 24
[SWB-Vlan-interface30]quit
# Add one static routing to the PCB-192.168.2.0 segment.
[SWB]ip route-static 192.168.2.0 255.255.255.0 192.168.3.2
# Check the routing table after the configuration is complete.
```

The information is as follows:

Figure 5-4 SWB configuration

```
[SWB]display ip routing-table
```

| Destinations : 17  | Routes : 17 |     |      |             |           |
|--------------------|-------------|-----|------|-------------|-----------|
| Destination/Mask   | Proto       | Pre | Cost | NextHop     | Interface |
| 0.0.0.0/32         | Direct      | 0   | 0    | 127.0.0.1   | InLoop0   |
| 127.0.0.0/8        | Direct      | 0   | 0    | 127.0.0.1   | InLoop0   |
| 127.0.0.0/32       | Direct      | 0   | 0    | 127.0.0.1   | InLoop0   |
| 127.0.0.1/32       | Direct      | 0   | 0    | 127.0.0.1   | InLoop0   |
| 127.255.255.255/32 | Direct      | 0   | 0    | 127.0.0.1   | InLoop0   |
| 192.168.1.0/24     | Static      | 60  | 0    | 192.168.3.1 | Vlan30    |
| 192.168.2.0/24     | Direct      | 0   | 0    | 192.168.2.1 | Vlan20    |
| 192.168.2.0/32     | Direct      | 0   | 0    | 192.168.2.1 | Vlan20    |
| 192.168.2.1/32     | Direct      | 0   | 0    | 127.0.0.1   | InLoop0   |
| 192.168.2.255/32   | Direct      | 0   | 0    | 192.168.2.1 | Vlan20    |
| 192.168.3.0/24     | Direct      | 0   | 0    | 192.168.3.2 | Vlan30    |
| 192.168.3.0/32     | Direct      | 0   | 0    | 192.168.3.2 | Vlan30    |
| 192.168.3.2/32     | Direct      | 0   | 0    | 127.0.0.1   | InLoop0   |
| 192.168.3.255/32   | Direct      | 0   | 0    | 192.168.3.2 | Vlan30    |
| 224.0.0.0/4        | Direct      | 0   | 0    | 0.0.0.0     | NULL0     |
| 224.0.0.0/24       | Direct      | 0   | 0    | 0.0.0.0     | NULL0     |
| 255.255.255.255/32 | Direct      | 0   | 0    | 127.0.0.1   | InLoop0   |

```
[SWB]
```

## 5.4 Result Verification

When PCA pings PCB, they can connect between different network segments.

Figure 5-5 PCA pings PCB

```
[PCA]ping 192.168.2.20
Ping 192.168.2.20 (192.168.2.20): 56 data bytes, press CTRL_C to break
56 bytes from 192.168.2.20: icmp_seq=0 ttl=255 time=1.000 ms
56 bytes from 192.168.2.20: icmp_seq=1 ttl=255 time=1.000 ms
56 bytes from 192.168.2.20: icmp_seq=2 ttl=255 time=1.000 ms
56 bytes from 192.168.2.20: icmp_seq=3 ttl=255 time=1.000 ms
56 bytes from 192.168.2.20: icmp_seq=4 ttl=255 time=0.000 ms

--- Ping statistics for 192.168.2.20 ---
5 packet(s) transmitted, 5 packet(s) received, 0.0% packet loss
round-trip min/avg/max/std-dev = 0.000/0.800/1.000/0.400 ms
[PCA]%Jan 26 10:04:20:664 2024 PCA PING/6/PING_STATISTICS: Ping statistics for 192.1
```

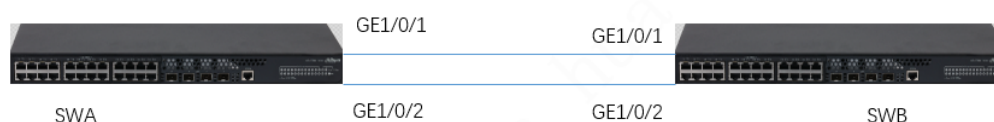
## 6 Configuring Link Aggregation

### 6.1 Purpose

- To learn the basic configuration method of static link aggregation of the Ethernet switch.
- To learn the basic configuration method of dynamic link aggregation of the Ethernet switch.

### 6.2 Configuration Typology

Figure 6-1 Network diagram



### 6.3 Configuration Procedure

#### 6.3.1 Task 1: Configuring the Static Link Aggregation of the Switch

**Step 1** Connect the switches as shown in the figure above, configure the IP address of the host, and check whether the switch configuration is the default setting. Commands might be used:

```
<DH>display current-configuration (check the current configuration)
<DH>reset saved-configuration (reset the configuration)
< DH >reboot
Start to check configuration with next startup configuration file, please
wait.....DONE!
Current configuration may be lost after the reboot, save current configuration?
[Y/N]:N
This command will reboot the device. Continue? [Y/N]:Y
```

**Step 2** Configure the static aggregation.

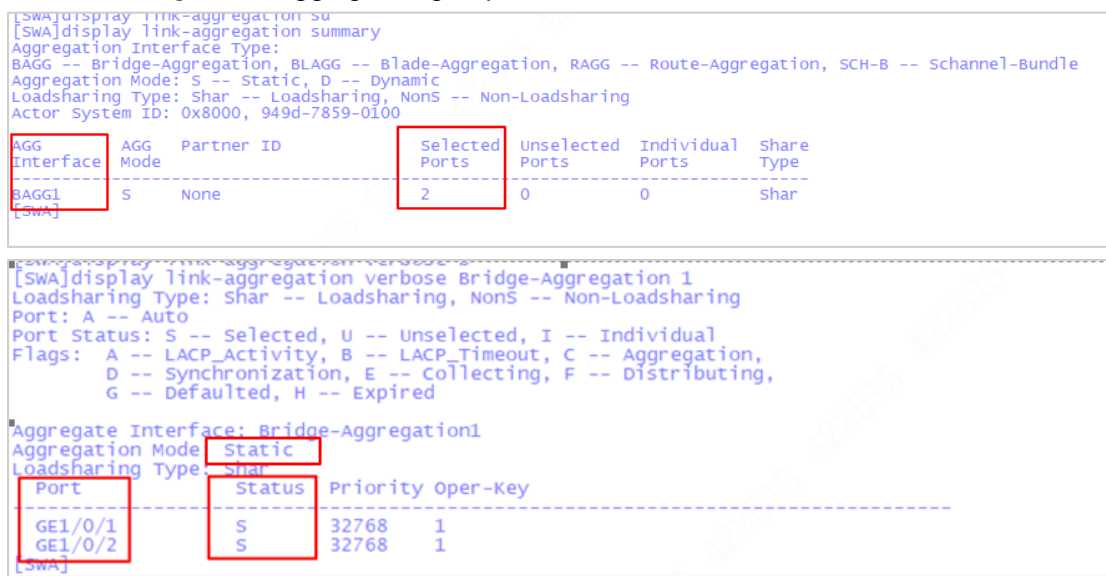
Create an aggregation port in the system view, and then add the physical port to the aggregation group.

```
SWA:
# Create aggregation group port 1 and set the type as static (static by default).
[SWA]interface Bridge-Aggregation 1
[SWA-Bridge-Aggregation1]quit
# Enter the port view and add ports 1/0/1 and 1/0/2 to aggregation port 1.
[SWA]int GigabitEthernet 1/0/1
[SWA-GigabitEthernet1/0/1]port link-aggregation group 1
[SWA-GigabitEthernet1/0/1]quit
[SWA]int GigabitEthernet 1/0/2
[SWA-GigabitEthernet1/0/2]port link-aggregation group 1
[SWA-GigabitEthernet1/0/2]quit
SWB:
# Create aggregation group port 1 and set the type as static (static by default).
[SWB]interface Bridge-Aggregation 1
[SWB-Bridge-Aggregation1]quit
# Enter the port view and add ports 1/0/1 and 1/0/2 to aggregation port 1.
[SWB]int GigabitEthernet 1/0/1
[SWB-GigabitEthernet1/0/1]port link-aggregation group 1
[SWB-GigabitEthernet1/0/1]quit
[SWB]int GigabitEthernet 1/0/2
[SWB-GigabitEthernet1/0/2]port link-aggregation group 1
[SWB-GigabitEthernet1/0/2]quit
```

### Step 3 Check the configuration of the aggregation group.

Check the configured aggregation group information on SWA and SWB respectively. You can see the details of aggregation 1: The mode is static, and the member ports are 1/0/1, 1/0/2, which are selected.

Figure 6-2 Aggregation group information on SWA



```
[SWA]display link-aggregation summary
[SWA]display link-aggregation summary
Aggregation Interface Type:
BAGG -- Bridge-Aggregation, BLAGG -- Blade-Aggregation, RAGG -- Route-Aggregation, SCH-B -- Schannel-Bundle
Aggregation Mode: S -- Static, D -- Dynamic
Loadsharing Type: Shar -- Loadsharing, NonS -- Non-Loadsharing
Actor System ID: 0x8000, 949d-7859-0100
```

| AGG Interface | AGG Mode | Partner ID | Selected Ports | Unselected Ports | Individual Ports | Share Type |
|---------------|----------|------------|----------------|------------------|------------------|------------|
| BAGG1 [SWA]   | S        | None       | 2              | 0                | 0                | Shar       |

```
[SWA]display link-aggregation verbose Bridge-Aggregation 1
Loadsharing Type: Shar -- Loadsharing, NonS -- Non-Loadsharing
Port: A -- Auto
Port Status: S -- Selected, U -- Unselected, I -- Individual
Flags: A -- LACP_Activity, B -- LACP_Timeout, C -- Aggregation,
D -- Synchronization, E -- Collecting, F -- Distributing,
G -- Defaulted, H -- Expired

Aggregate Interface: Bridge-Aggregation1
Aggregation Mode: Static
Loadsharing Type: Shar
Port Status: S -- Selected, U -- Unselected, I -- Individual
Flags: A -- LACP_Activity, B -- LACP_Timeout, C -- Aggregation,
D -- Synchronization, E -- Collecting, F -- Distributing,
G -- Defaulted, H -- Expired
```

| Port    | Status | Priority | Oper-Key |
|---------|--------|----------|----------|
| GE1/0/1 | S      | 32768    | 1        |
| GE1/0/2 | S      | 32768    | 1        |

Figure 6-3 Aggregation group information on SWB

```
[SWB]display link-aggregation verbose Bridge-Aggregation 1
Loadsharing Type: Shar -- Loadsharing, NonS -- Non-Loadsharing
Port: A -- Auto
Port Status: S -- Selected, U -- Unselected, I -- Individual
Flags: A -- LACP_Activity, B -- LACP_Timeout, C -- Aggregation,
       D -- Synchronization, E -- Collecting, F -- Distributing,
       G -- Defaulted, H -- Expired

Aggregate Interface: Bridge-Aggregation1
Aggregation Mode: Static
Loadsharing Type: Shar
Port      Status  Priority Oper-Key
-----
GE1/0/1   S        32768   1
GE1/0/2   S        32768   1
[SWB]11
```

## 6.3.2 Task 2: Configuring the Dynamic Link Aggregation of the Switch

You can learn the configuration commands and checking methods of the dynamic link aggregation by the following steps.

**Step 1** Configure the dynamic aggregation.

```
SWA:
# Create aggregation group port 1 and set the type as dynamic.
[SWA]interface Bridge-Aggregation 1
[SWA-Bridge-Aggregation1]link-aggregation mode dynamic
[SWA-Bridge-Aggregation1]quit
# Enter the port view and add ports 1/0/1 and 1/0/2 to aggregation port 1.
[SWA]int GigabitEthernet 1/0/1
[SWA-GigabitEthernet1/0/1]port link-aggregation group 1
[SWA-GigabitEthernet1/0/1]quit
[SWA]int GigabitEthernet 1/0/2
[SWA-GigabitEthernet1/0/2]port link-aggregation group 1
[SWA-GigabitEthernet1/0/2]quit
SWB:
# Create aggregation group port 1 and set the type as dynamic.
[SWB]interface Bridge-Aggregation 1
[SWB-Bridge-Aggregation1]link-aggregation mode dynamic
[SWB-Bridge-Aggregation1]quit
# Enter the port view and add ports 1/0/1 and 1/0/2 to aggregation port 1.
[SWB]int GigabitEthernet 1/0/1
[SWB-GigabitEthernet1/0/1]port link-aggregation group 1
[SWB-GigabitEthernet1/0/1]quit
[SWB]int GigabitEthernet 1/0/2
[SWB-GigabitEthernet1/0/2]port link-aggregation group 1
[SWB-GigabitEthernet1/0/2]quit
```

**Step 2** Check the aggregation port status.

Check the information on all configured aggregation groups on SWA and SWB respectively.

You can see the port details of aggregation 1: The mode is dynamic, local member ports are 1/0/1 and 1/0/2, and the aggregation group member ports of the peer device are 1/0/1 and 1/0/2. The status of the local member ports is selected, indicating that the dynamic aggregation is successfully negotiated.

Figure 6-4 Configured aggregation groups on SWA

```
[SWA]display link-aggregation verbose Bridge-Aggregation 1
Loadsharing Type: Shar -- Loadsharing, NonS -- Non-Loadsharing
Port: A -- Auto
Port Status: S -- Selected, U -- Unselected, I -- Individual
Flags: A -- LACP_Activity, B -- LACP_Timeout, C -- Aggregation,
D -- Synchronization, E -- Collecting, F -- Distributing,
G -- Defaulted, H -- Expired

Aggregate Interface: Bridge-Aggregation1
Aggregation Mode: Dynamic
Loadsharing Type: Shar
System ID: 0x8000, 949d-7859-0100

Local:
Port
-----
GE1/0/1
GE1/0/2
Remote:
Actor
-----
Partner Priority Oper-Key SystemID Flag
-----
GE1/0/1 2 32768 1 0x8000, 949d-7c85-0200 {ACDEF}
GE1/0/2 3 32768 1 0x8000, 949d-7c85-0200 {ACDEF}
```

Figure 6-5 Configured aggregation groups on SWB

```
[SWB]display link-aggregation verbose Bridge-Aggregation 1
Loadsharing Type: Shar -- Loadsharing, NonS -- Non-Loadsharing
Port: A -- Auto
Port Status: S -- Selected, U -- Unselected, I -- Individual
Flags: A -- LACP_Activity, B -- LACP_Timeout, C -- Aggregation,
D -- Synchronization, E -- Collecting, F -- Distributing,
G -- Defaulted, H -- Expired

Aggregate Interface: Bridge-Aggregation1
Aggregation Mode: Dynamic
Loadsharing Type: Shar
System ID: 0x8000, 949d-7c85-0200

Local:
Port
-----
GE1/0/1
GE1/0/2
Remote:
Actor
-----
Partner Priority Oper-Key SystemID Flag
-----
GE1/0/1 2 32768 1 0x8000, 949d-7859-0100 {ACDEF}
GE1/0/2 3 32768 1 0x8000, 949d-7859-0100 {ACDEF}
```

Table 6-1 Command list

| Command                                                                                                   | Description                                           |
|-----------------------------------------------------------------------------------------------------------|-------------------------------------------------------|
| <b>interface bridge-aggregation interface-number</b>                                                      | Create an aggregation group.                          |
| <b>port link-aggregation group number</b>                                                                 | Add the Ethernet port to the aggregation group.       |
| <b>display link-aggregation summary</b>                                                                   | Check the overview of the link aggregation.           |
| <b>display interface bridge-aggregation interface-number</b>                                              | Check the status of the aggregation group.            |
| <b>link-aggregation load-sharing mode { destination-ip   destination-mac   source-ip   source-mac } *</b> | Configure the load balancing type of the aggregation. |

**display link-aggregation load-sharing  
mode [ interface [ bridge-aggregation  
interface-number ] ]**

Display the load balancing type of the  
aggregation.

## 7 Configuring STP

### 7.1 Purpose

- To learn the basic working principle of STP.
- To learn the basic configuration method of STP.

### 7.2 Configuration and Network Diagram

Check the port status through building a network.

Figure 7-1 Network diagram



### 7.3 Configuration Procedure

Configure STP root bridge and edge ports on the switch to learn its configuration commands and checking methods.

#### Step 1 Configure STP.

Configure the STP root bridge and edge ports. Enable STP and set SWA priority to 0 as the root bridge. Configure the ports through which the switch connects to other devices as edge ports.

Configure SWA:

# Enable global STP.

```
[SWA]stp global enable
```

# Set the STP priority as 0, and configure the device as the root bridge of the spanning tree.

```
[SWA]stp priority 0
```

# Configure the terminal port as the edge port.

```
[SWA]interface GigabitEthernet 1/0/3
```

```
[SWA-GigabitEthernet1/0/3]stp edged-port
Edge port should only be connected to the terminal. It will cause temporary
loops if port GigabitEthernet1/0/3 is connected to bridges. Please use it
carefully.
[SWA-GigabitEthernet1/0/3]quit
Configure SWB:
# Enable global STP.
[SWB]stp global enable
# Set the STP priority as 4096.
[SWB]stp priority 4096
# Configure the terminal port as the edge port.
[SWB]interface GigabitEthernet 1/0/3
[SWB-GigabitEthernet1/0/3]stp edged-port
Edge port should only be connected to the terminal. It will cause temporary
loops if port GigabitEthernet1/0/3 is connected to bridges. Please use it
carefully.
[SWB-GigabitEthernet1/0/3]quit
```

## Step 2 Check the STP information.

SWA is the root bridge, and all its ports are specified and in the forwarding state.

Figure 7-2 Check the STP information

```
<SWA>dis stp brief
MST ID   Port                               Role   STP State   Protection
0        GigabitEthernet1/0/1                DESI   FORWARDING  NONE
0        GigabitEthernet1/0/2                DESI   FORWARDING  NONE
<SWA>dis stp
```

The mode is MSTP, and the bridge ID and root ID of the spanning tree are consistent. Therefore, the device is the root bridge of this spanning tree.

Figure 7-3 MSTP

```
<SWA>dis stp
-----[CIST Global Info][Mode MSTP]-----
Bridge ID       : 0.949d-7859-0100
Bridge times    : Hello 2s MaxAge 20s FwdDelay 15s MaxHops 20
Root ID/ERPC    : 0.949d-7859-0100, 0
RegRoot ID/IRPC : 0.949d-7859-0100, 0
RootPort ID     : 0.0
BPDU-Protection : Disabled
Bridge Config-  :
Digest-Snooping : Disabled
TC or TCN received : 13
Time since last TC : 0 days 0h:26m:56s

----[Port54(FortyGigE1/0/53)][DOWN]----
Port protocol   : Enabled
Port role       : Disabled Port
Port ID         : 128.54
Port cost(Legacy) : Config=auto, Active=200000
Desg.bridge/port : 0.949d-7859-0100, 128.54
Port edged      : Config=disabled, Active=disabled
Point-to-Point  : Config=auto, Active=false
Transmit limit   : 10 packets/hello-time
```

Table 7-1 Command list

| Command               | Description            |
|-----------------------|------------------------|
| stp{enable   disable} | Enable or disable STP. |

|                                    |                                               |
|------------------------------------|-----------------------------------------------|
| <b>stp mode{stp   rstp   mstp}</b> | STP working mode.                             |
| <b>stp priority [priority]</b>     | Set the priority.                             |
| <b>stp edged-port enable</b>       | Configure the edge ports.                     |
| <b>display stp</b>                 | Display the information on the spanning tree. |

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