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Introduction

This document provides PTP configuration examples.

Prerequisites

This document is not restricted to specific software or hardware versions.

The configuration examples in this document were created and verified in a lab environment, and all the devices were started with the factory default configuration. When you are working on a live network, make sure you understand the potential impact of every command on your network.

This document assumes that you have basic knowledge of PTP.

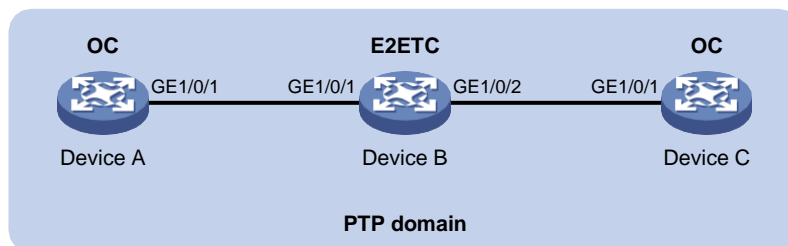
Example: Configuring Layer 2 IEEE 1588v2 PTP

Network configuration

As shown in [Figure 1](#), a PTP domain contains Device A, Device B, and Device C. Configure Layer 2 IEEE 1588v2 PTP as follows for time synchronization:

- Specify the IEEE 1588v2 PTP profile for the devices.
- Specify the OC clock node type for Device A and Device C, and E2ETC clock node type for Device B. These clock nodes elect a GM through BMC based on their respective default GM attributes.
- Use the default Request-Response delay measurement mechanism for Device A and Device C.

Figure 1 Network diagram



Applicable hardware and software versions

The following matrix shows the hardware and software versions to which this configuration example is applicable:

Hardware	Software version
SC 3570 switch series	Not supported
SC 5525 switch series	Release 6615Pxx, Release 6628Pxx
SC 5520 switch series	Release 6615Pxx, Release 6628Pxx
SC 3170 switch series	Not supported
SC 3130 switch series	Not supported

Procedures

Configuring Device A

Specify the IEEE 1588v2 PTP profile.

```
<DeviceA> system-view
```

```
[DeviceA] ptp profile 1588v2
```

Specify the OC clock node type.

```
[DeviceA] ptp mode oc
```

Enable PTP globally.

```
[DeviceA] ptp global enable
```

Specify a PTP domain.

```
[DeviceA] ptp domain 0
```

Specify PTP for obtaining the time.

```
[DeviceA] clock protocol ptp
```

Enable PTP on GigabitEthernet 1/0/1.

```
[DeviceA] interface gigabitethernet 1/0/1
```

```
[DeviceA-GigabitEthernet1/0/1] ptp enable
```

```
[DeviceA-GigabitEthernet1/0/1] quit
```

Configuring Device B

```
# Specify the IEEE 1588v2 PTP profile.
<DeviceB> system-view
[DeviceB] ptp profile 1588v2

# Specify the E2ETC clock node type.
[DeviceB] ptp mode e2etc

# Specify a PTP domain.
[DeviceB] ptp domain 0

# Enable PTP globally.
[DeviceB] ptp global enable

# Specify PTP for obtaining the time.
[DeviceB] clock protocol ptp

# Enable PTP on GigabitEthernet 1/0/1.
[DeviceB] interface gigabitethernet 1/0/1
[DeviceB-GigabitEthernet1/0/1] ptp enable
[DeviceB-GigabitEthernet1/0/1] quit

# Enable PTP on GigabitEthernet 1/0/2.
[DeviceB] interface gigabitethernet 1/0/2
[DeviceB-GigabitEthernet1/0/2] ptp enable
[DeviceB-GigabitEthernet1/0/2] quit
```

Configuring Device C

```
# Specify the IEEE 1588v2 PTP profile.
<DeviceC> system-view
[DeviceC] ptp profile 1588v2

# Specify the OC clock node type.
[DeviceC] ptp mode oc

# Specify a PTP domain.
[DeviceC] ptp domain 0

# Enable PTP globally.
[DeviceC] ptp global enable

# Specify PTP for obtaining the time.
[DeviceC] clock protocol ptp

# Enable PTP on GigabitEthernet 1/0/1.
[DeviceC] interface gigabitethernet 1/0/1
[DeviceC-GigabitEthernet1/0/1] ptp enable
[DeviceC-GigabitEthernet1/0/1] quit
```

Verifying the configuration

When the network topology is stable, perform the following tasks to verify the PTP configuration:

- Use the **display ptp clock** command to display PTP clock information.
- Use the **display ptp interface brief** command to display brief information about PTP interfaces.

Display PTP clock information on Device A.

```
[DeviceA] display ptp clock
PTP global state      : Enabled
PTP profile           : IEEE 1588 Version 2
PTP mode              : OC
Slave only            : No
Lock status           : Unlocked
Clock ID              : 000FE2-FFFE-FF0000
Clock type            : Local
Clock domain         : 0
Number of PTP ports  : 1
Priority1             : 128
Priority2             : 128
Clock quality        :
  Class               : 248
  Accuracy            : 254
  Offset (log variance) : 65535
Offset from master    : 0 (ns)
Mean path delay       : 0 (ns)
Steps removed         : 0
Local clock time      : Sun Jan 15 20:57:29 2019
```

Display brief information about PTP interfaces on Device A.

```
[DeviceA] display ptp interface brief
```

Name	InstID	State	Delay mechanism	Clock step	Asymmetry correction
GE1/0/1	0	Master	E2E	Two	0

Display PTP clock information on Device B.

```
[DeviceB] display ptp clock
PTP global state      : Enabled
PTP profile           : IEEE 1588 Version 2
PTP mode              : E2ETC
Slave only            : No
Lock status           : Unlocked
Clock ID              : 000FE2-FFFE-FF0001
Clock type            : Local
Clock domain         : 0
```

```

Number of PTP ports : 2
Priority1      : 128
Priority2      : 128
Clock quality :
  Class          : 248
  Accuracy       : 254
  Offset (log variance) : 65535
Offset from master : N/A
Mean path delay : N/A
Steps removed   : N/A
Local clock time : Sun Jan 15 20:57:29 2019

# Display brief information about PTP interfaces on Device B.
[DeviceB] display ptp interface brief

```

Name	InstID	State	Delay mechanism	Clock step	Asymmetry correction
GE1/0/1	0	N/A	E2E	Two	0
GE1/0/2	0	N/A	E2E	Two	0

```

# Display PTP clock information on Device C.
[DeviceC] display ptp clock
PTP global state      : Enabled
PTP profile           : IEEE 1588 Version 2
PTP mode              : OC
Slave only            : No
Lock status           : Locked
Clock ID              : 000FE2-FFFE-FF0002
Clock type            : Local
Clock domain          : 0
Number of PTP ports : 2
Priority1      : 128
Priority2      : 128
Clock quality :
  Class          : 248
  Accuracy       : 254
  Offset (log variance) : 65535
Offset from master : 25
Mean path delay   : 323
Steps removed     : 2
Local clock time  : Sun Jan 15 20:57:29 2019

# Display brief information about PTP interfaces on Device C.
[DeviceC] display ptp interface brief

```

Name	InstID	State	Delay mechanism	Clock step	Asymmetry correction
GE1/0/1	0	Slave	E2E	Two	0

The command outputs show that Device A is elected as the GM and GigabitEthernet1/0/1 on Device A is the master port.

Configuration files

- Device A and Device C:
#

```

clock protocol ptp
#
ptp profile 1588v2
ptp mode oc
#
interface GigabitEthernet 1/0/1
ptp enable
#

```

- **Device B:**

```

#
clock protocol ptp
#
ptp profile 1588v2
ptp mode e2etc
#
interface GigabitEthernet 1/0/1
ptp enable
#
interface GigabitEthernet 1/0/2
ptp enable
#

```

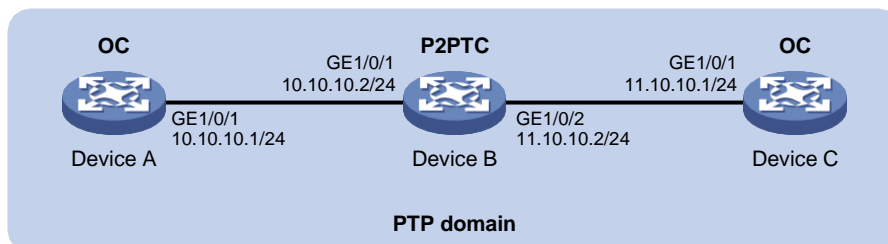
Example: Configuring Layer 3 IEEE 1588v2 PTP in multicast mode

Network configuration

As shown in [Figure 2](#), a PTP domain contains Device A, Device B, and Device C. Configure Layer 3 IEEE 1588v2 PTP in multicast mode as follows for time synchronization:

- Specify the IEEE 1588v2 PTP profile for the devices.
- Specify the OC clock node type for Device A and Device C, and the P2PTC clock node type for Device B. These clock nodes elect a GM through BMC based on their respective default GM attributes.
- Configure the multicast PTP transport mode and UDP (IPv4) transport protocol for the devices.
- Configure the peer delay measurement mechanism (p2p) for Device A and Device C.

Figure 2 Network diagram



Applicable hardware and software versions

The following matrix shows the hardware and software versions to which this configuration example is applicable:

Hardware	Software version
SC 3570 switch series	Not supported
SC 5525 switch series	Release 6615Pxx, Release 6628Pxx
SC 5520 switch series	Release 6615Pxx, Release 6628Pxx
SC 3170 switch series	Not supported
SC 3130 switch series	Not supported

Procedures

Configuring Device A

```
# Specify the IEEE 1588v2 PTP profile.
<DeviceA> system-view
[DeviceA] ptp profile 1588v2

# Specify the OC clock node type.
[DeviceA] ptp mode oc

# Specify a PTP domain.
[DeviceA] ptp domain 0

# Enable PTP globally.
[DeviceA] ptp global enable

# Configure the source IP address for multicast PTP transport.
[DeviceA] ptp source 10.10.10.1

# Specify PTP for obtaining the time.
[DeviceA] clock protocol ptp

# On GigabitEthernet 1/0/1, specify the UDP (IPv4) transport protocol and the peer delay
measurement mechanism (p2p) and enable PTP.
[DeviceA] interface gigabitethernet 1/0/1
[DeviceA-GigabitEthernet1/0/1] ptp transport-protocol udp [DeviceA-GigabitEthernet1/0/1]
ptp delay-mechanism p2p
[DeviceA-GigabitEthernet1/0/1] ptp enable
[DeviceA-GigabitEthernet1/0/1] quit
```

Configuring Device B

```
# Specify the IEEE 1588v2 PTP profile.
<DeviceB> system-view
[DeviceB] ptp profile 1588v2

# Specify the P2PTC clock node type.
[DeviceB] ptp mode p2ptc

# Specify a PTP domain.
[DeviceB] ptp domain 0

# Enable PTP globally.
[DeviceB] ptp global enable

# Configure the source IP address for multicast PTP transport.
[DeviceB] ptp source 10.10.10.2

# Specify PTP for obtaining the time.
[DeviceB] clock protocol ptp

# On GigabitEthernet 1/0/1, specify the UDP (IPv4) transport protocol and enable PTP.
[DeviceB] interface gigabitethernet 1/0/1
[DeviceB-GigabitEthernet1/0/1] ptp transport-protocol udp
[DeviceB-GigabitEthernet1/0/1] ptp enable
[DeviceB-GigabitEthernet1/0/1] quit
```

On GigabitEthernet 1/0/2, specify the UDP transport protocol and enable PTP.

```
[DeviceB] interface gigabitethernet 1/0/2
[DeviceB-GigabitEthernet1/0/2] ptp transport-protocol udp
[DeviceB-GigabitEthernet1/0/2] ptp enable
[DeviceB-GigabitEthernet1/0/2] quit
```

Configuring Device C

Specify the IEEE 1588v2 PTP profile.

```
<DeviceC> system-view
[DeviceC] ptp profile 1588v2
```

Specify the OC clock node type.

```
[DeviceC] ptp mode oc
```

Specify a PTP domain.

```
[DeviceC] ptp domain 0
```

Enable PTP globally.

```
[DeviceC] ptp global enable
```

Configure the source IP address for multicast PTP transport.

```
[DeviceC] ptp source 11.10.10.1
```

Specify PTP for obtaining the time.

```
[DeviceC] clock protocol ptp
```

On GigabitEthernet 1/0/1, specify the UDP (IPv4) transport protocol and the peer delay measurement mechanism (p2p) and enable PTP.

```
[DeviceC] interface gigabitethernet 1/0/1
[DeviceC-GigabitEthernet1/0/1] ptp transport-protocol udp [DeviceC-GigabitEthernet1/0/1]
ptp delay-mechanism p2p
[DeviceC-GigabitEthernet1/0/1] ptp enable
[DeviceC-GigabitEthernet1/0/1] quit
```

Verifying the configuration

⚠ IMPORTANT:

- The **Lock status** field in the output from the **display ptp clock** command is available only for the S6550XE-HI switch series and S6525XE-HI switch series.
- The **InstID** field in the output from the **display ptp interface brief** command is available only for the S6550XE-HI switch series and S6525XE-HI switch series.

When the network topology is stable, perform the following tasks to verify the PTP configuration:

- Use the **display ptp clock** command to display PTP clock information.
- Use the **display ptp interface brief** command to display brief information about PTP interfaces.

Display PTP clock information on Device A.

```
[DeviceA] display ptp clock
PTP global state      : Enabled
PTP profile           : IEEE 1588 Version 2
PTP mode              : OC
Slave only            : No
```

```

Lock status : Unlocked
Clock ID      : 000FE2-FFFE-FF0000
Clock type : Local
Clock domain : 0
Number of PTP ports : 1
Priority1 : 128
Priority2 : 128
Clock quality :
  Class : 248
  Accuracy : 254
  Offset (log variance) : 65535
Offset from master : 0 (ns)
Mean path delay : 0 (ns)
Steps removed : 0
Local clock time : Sun Jan 15 20:57:29 2019

```

Display brief information about PTP interfaces on Device A.

```
[DeviceA] display ptp interface brief
```

Name	InstID	State	Delay mechanism	Clock step	Asymmetry correction
GE1/0/1	0	Master	P2P	Two	0

Display PTP clock information on Device B.

```
[DeviceB] display ptp clock
```

```

PTP global state : Enabled
PTP profile : IEEE 1588 Version 2
PTP mode : P2PTC
Slave only : No
Lock status : Unlocked
Clock ID : 000FE2-FFFE-FF0001
Clock type : Local
Clock domain : 0
Number of PTP ports : 2
Priority1 : 128
Priority2 : 128
Clock quality :
  Class : 248
  Accuracy : 254
  Offset (log variance) : 65535
Offset from master : N/A
Mean path delay : N/A
Steps removed : N/A
Local clock time : Sun Jan 15 20:57:29 2019

```

Display brief information about PTP interfaces on Device B.

```
[DeviceB] display ptp interface brief
```

Name	InstID	State	Delay mechanism	Clock step	Asymmetry correction
GE1/0/1	0	N/A	P2P	Two	0
GE1/0/2	0	N/A	P2P	Two	0

Display PTP clock information on Device C.

```
[DeviceC] display ptp clock
```

```
PTP global state : Enabled
```

```

PTP profile : IEEE 1588 Version 2
PTP mode      : OC
Slave only    : No
Lock status   : Unlocked
Clock ID      : 000FE2-FFFE-FF0002
Clock type    : Local
Clock domain  : 0
Number of PTP ports : 1
Priority1     : 128
Priority2     : 128
Clock quality :
  Class       : 248
  Accuracy    : 254
  Offset (log variance) : 65535
Offset from master : 0 (ns)
Mean path delay : 0 (ns)
Steps removed  : 0
Local clock time : Sun Jan 15 20:57:29 2019

```

Display brief information about PTP interfaces on Device C.

```
[DeviceC] display ptp interface brief
```

Name	InstID	State	Delay mechanism	Clock step	Asymmetry correction
GE1/0/1	0	Slave	P2P	Two	0

The command outputs show that Device A is elected as the GM and GigabitEthernet1/0/1 on Device A is the master port.

Configuration files

- Device A:

```

#
clock protocol ptp
#
ptp profile 1588v2
ptp mode oc
ptp source 10.10.10.1
#
interface GigabitEthernet 1/0/1
ptp delay-mechanism p2p
ptp transport-protocol udp
ptp enable
#

```

- Device B:

```

#
clock protocol ptp
#
ptp profile 1588v2
ptp mode p2ptc
ptp source 10.10.10.2
#

```

```

interface GigabitEthernet 1/0/1
 ptp transport-protocol udp
 ptp enable
#
interface GigabitEthernet 1/0/2
 ptp transport-protocol udp
 ptp enable
#

```

- **Device C:**

```

#
 clock protocol ptp
#
 ptp profile 1588v2
 ptp mode oc
 ptp source 11.10.10.1
#
interface GigabitEthernet 1/0/1
 ptp delay-mechanism p2p
 ptp transport-protocol udp
 ptp enable
#

```

Example: Configuring Layer 3 IEEE 1588v2 PTP in unicast mode

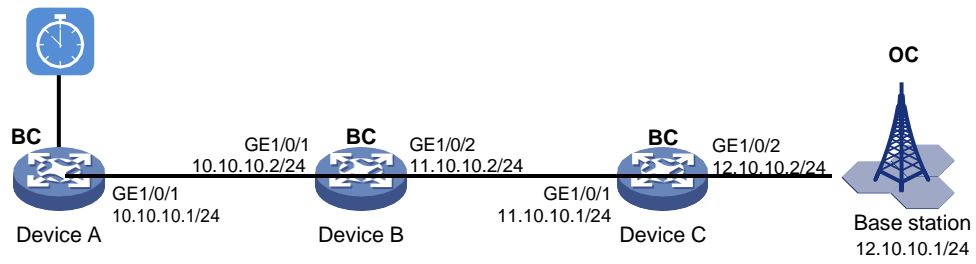
Network configuration

As shown in Figure 3, configure PTP (IEEE 1588 version 2, IPv4 UDP transport, unicast transmission) to enable Device A, Device B, Device C, and the base station to synchronize the time with the ToD clock source.

- Specify the IEEE 1588 version 2 PTP profile and unicast IPv4 UDP transport of PTP messages for Device A, Device B, and Device C.
- Assign Device A, Device B, Device C, and the base station to PTP domain 0. Specify the BC clock node type for Device A, Device B, and Device C.
- Connect Device A to the ToD clock source and Device C to the base station.
- Use the default Request_Response delay measurement mechanism on all clock nodes in the PTP domain.

Figure 3 Network diagram

ToD clock source



Applicable hardware and software versions

The following matrix shows the hardware and software versions to which this configuration example is applicable:

Hardware	Software version
SC 3570 switch series	Not supported
SC 5525 switch series	Release 6615Pxx, Release 6628Pxx
SC 5520 switch series	Release 6615Pxx, Release 6628Pxx
SC 3170 switch series	Not supported
SC 3130 switch series	Not supported

Procedures



IMPORTANT:

The device does not provide ToD interfaces. It can be deployed as Device B or Device C but not Device A.

Before configuration, assign IP addresses to the interfaces, and make sure the devices can reach each other. (Details not shown.)

Configuring Device A

Specify the IEEE 1588 version 2 PTP profile.

```
<DeviceA> system-view
```

```
[DeviceA] ptp profile 1588v2
```

Specify the BC clock node type.

```
[DeviceA] ptp mode bc
```

Create a PTP domain.

```
[DeviceA] ptp domain 0
```

Enable PTP globally.

```
[DeviceA] ptp global enable
```

Configure the device to use ToD 0 to receive clock signals and set the receive delay correction to 1000 nanoseconds.

```
[DeviceA] ptp tod0 input delay 1000
```

Set priority 1 to 0 for the ToD 0 clock.

```
[DeviceA] ptp priority clock-source tod0 priority1 0
```

On GigabitEthernet 1/0/1, specify IPv4 UDP transport of PTP messages, configure the destination IP address for unicast PTP messages, and enable PTP.

```
[DeviceA] interface gigabitethernet 1/0/1
```

```
[DeviceA-GigabitEthernet1/0/1] ptp transport-protocol udp
```

```
[DeviceA-GigabitEthernet1/0/1] ptp unicast-destination 10.10.10.2
```

```
[DeviceA-GigabitEthernet1/0/1] ptp enable
```



```
[DeviceA-GigabitEthernet1/0/1] quit
```

Configuring Device B

Specify the IEEE 1588 version 2 PTP profile.

```
<DeviceB> system-view
```

```
[DeviceB] ptp profile 1588v2
```

Specify the BC clock node type.

```
[DeviceB] ptp mode bc
```

Create a PTP domain.

```
[DeviceB] ptp domain 0

# Enable PTP globally.
[DeviceB] ptp global enable

# Specify PTP for obtaining the time.
[DeviceA] clock protocol ptp

# On GigabitEthernet 1/0/1, specify IPv4 UDP transport of PTP messages, configure the destination
IP address for unicast PTP messages, and enable PTP.
[DeviceB] interface gigabitethernet 1/0/1
[DeviceB-GigabitEthernet1/0/1] ptp transport-protocol udp
[DeviceB-GigabitEthernet1/0/1] ptp unicast-destination 10.10.10.1
[DeviceB-GigabitEthernet1/0/1] ptp enable
[DeviceB-GigabitEthernet1/0/1] quit

# On GigabitEthernet 1/0/2, specify IPv4 UDP transport of PTP messages, configure the destination
IP address for unicast PTP messages, and enable PTP.
[DeviceB] interface gigabitethernet 1/0/2
[DeviceB-GigabitEthernet1/0/2] ptp transport-protocol udp
[DeviceB-GigabitEthernet1/0/2] ptp unicast-destination 11.10.10.1
[DeviceB-GigabitEthernet1/0/2] ptp enable
[DeviceB-GigabitEthernet1/0/2] quit
```

Configuring Device C

```
# Specify the IEEE 1588 version 2 PTP profile.
<DeviceC> system-view
[DeviceC] ptp profile 1588v2

# Specify the BC clock node type.
[DeviceC] ptp mode bc

# Create a PTP domain.
[DeviceC] ptp domain 0

# Enable PTP globally.
[DeviceC] ptp global enable

# Specify PTP for obtaining the time
[DeviceA] clock protocol ptp

# On GigabitEthernet 1/0/1, specify IPv4 UDP transport of PTP messages, configure the destination
IP address for unicast PTP messages, and enable PTP.
[DeviceC] interface gigabitethernet 1/0/1
[DeviceC-GigabitEthernet1/0/1] ptp transport-protocol udp
[DeviceC-GigabitEthernet1/0/1] ptp unicast-destination 11.10.10.2
[DeviceC-GigabitEthernet1/0/1] ptp enable
[DeviceC-GigabitEthernet1/0/1] quit

# On GigabitEthernet1/0/2, specify IPv4 UDP transport of PTP messages, configure the destination
IP address for unicast PTP messages, and enable PTP.
[DeviceC] interface gigabitethernet 1/0/2
[DeviceC-GigabitEthernet1/0/2] ptp transport-protocol udp
[DeviceC-GigabitEthernet1/0/2] ptp unicast-destination 12.10.10.1
[DeviceC-GigabitEthernet1/0/2] ptp enable
[DeviceC-GigabitEthernet1/0/2] quit
```

Configuring the base station

Specify PTP domain 0.

Specify IPv4 UDP transport of PTP messages.

Set the destination IP address of unicast PTP messages to 12.10.10.2.

Specify the Request_Response delay measurement mechanism.

For more information, see the configuration guide for the base station.

Verifying the configuration

! IMPORTANT:

- The **Lock status** field in the output from the **displayptp clock** command is available only for the S6550XE-HI switch series and S6525XE-HI switch series.
- The **InstID** field in the output from the **display ptp interface brief** command is available only for the S6550XE-HI switch series and S6525XE-HI switch series.

When the network is stable, perform the following tasks:

- Use the **display ptp clock** command to display PTP clock information.
- Use the **display ptp interface brief** command to display brief PTP running information for all PTP interfaces.

Display PTP clock information on Device A.

```
[DeviceA] display ptp clock
PTP global state      : Enabled
PTP profile           : IEEE 1588 Version 2
PTP mode              : BC
Slave only            : No
Lock status           : Unlocked
Clock ID              : 000FE2-FFFE-FF0000
Clock type            : ToD0
  ToD direction       : In
  ToD delay time      : 1000 (ns)
Clock domain          : 0
Number of PTP ports   : 1
Priority1              : 0
Priority2              : 128
Clock quality         :
  Class                : 6
  Accuracy              : 32
  Offset (log variance) : 65535
Offset from master    : 0 (ns)
Mean path delay       : 0 (ns)
Steps removed         : 0
Local clock time       : Sun Jan 15 20:57:29 2019
```

Display brief PTP running information for all PTP interfaces on Device A.

```
[DeviceA] display ptp interface brief
Name      InstID    State      Delay mechanism  Clock step  Asymmetry correction
```

GE1/0/1 0 Master E2E Two 0

Display PTP clock information on Device B.

```
[DeviceA] display ptp clock
PTP global state      : Enabled
PTP profile           : IEEE 1588 Version 2
PTP mode              : BC
Slave only            : No
Lock status           : Locked
Clock ID              : 000FE2-FFFE-FF0001
Clock type            : ToD0
  ToD direction       : In
  ToD delay time      : 1000 (ns)
Clock domain          : 0
Number of PTP ports   : 1
Priority1              : 0
Priority2              : 128
Clock quality         :
  Class               : 6
  Accuracy             : 32
  Offset (log variance) : 65535
Offset from master    : 12 (ns)
Mean path delay       : 323 (ns)
Steps removed         : 1
Local clock time      : Sun Jan 15 20:57:29 2019
```

Display brief PTP running information for all PTP interfaces on Device B.

```
[DeviceB] display ptp interface brief
```

Name	InstID	State	Delay mechanism	Clock step	Asymmetry correction
GE1/0/1	0	Slave	E2E	Two	0
GE1/0/2	0	Master	E2E	Two	0

Display PTP clock information on Device C.

```
[DeviceC] display ptp clock
PTP global state      : Enabled
PTP profile           : IEEE 1588 Version 2
PTP mode              : BC
Slave only            : No
Lock status           : Locked
Clock ID              : 000FE2-FFFE-FF0001
Clock type            : Local
Clock domain          : 0
Number of PTP ports   : 2
Priority1              : 128
Priority2              : 128
Clock quality         :
  Class               : 248
  Accuracy             : 254
  Offset (log variance) : 65535
Offset from master    : 25 (ns)
Mean path delay       : 2791000 (ns)
```

Steps removed : 2

Local clock time : Sun Jan 15 20:57:29 2019

Display brief PTP running information for all PTP interfaces on Device C.

[DeviceC] display ptp interface brief

Name	InstID	State	Delay mechanism	Clock step	Asymmetry correction
GE1/0/1	0	Slave	E2E	Two	0
GE1/0/2	0	Master	E2E	Two	0

Configuration files

- Device A

```
#
clock protocol ptp
#
ptp profile IEEE 1588 Version 2
ptp mode bc
ptp domain 0
ptp global enable
ptp tod0 input delay 1000
ptp priority clock-source tod0 priority1 0
#
interface GigabitEthernet 1/0/1
ptp transport-protocol
ptp unicast-destination 10.10.10.2
ptp enable
#
```

- Device B

```
#
clock protocol ptp
#
ptp profile IEEE 1588 Version 2
ptp mode bc
ptp domain 0
ptp global enable
#
interface GigabitEthernet 1/0/1
ptp transport-protocol
ptp unicast-destination 10.10.10.1
ptp enable
#
interface GigabitEthernet 1/0/2
ptp enable
#
```

- Device C

```
#
clock protocol ptp
#
ptp profile IEEE 1588 Version 2
```

```

ptp mode bc
ptp domain 0
ptp global enable
#
interface GigabitEthernet 1/0/1
ptp transport-protocol
ptp unicast-destination 11.10.10.2
ptp enable
#
interface GigabitEthernet 1/0/2
ptp transport-protocol
ptp unicast-destination 12.10.10.1
ptp enable
#

```

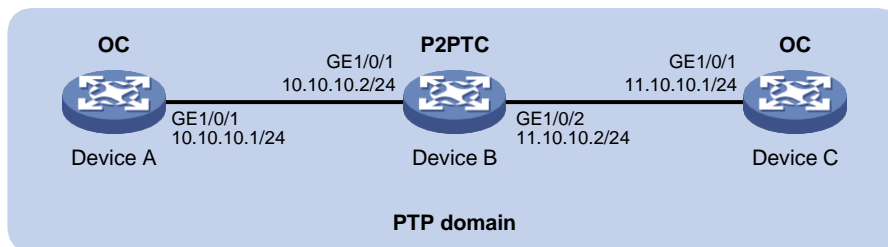
Example: Configuring SMPTE ST 2059-2 PTP in multicast mode

Network configuration

As shown in [Figure 5](#), Device A, Device B, and Device C are in a PTP domain. Configure SMPTE ST 2059-2 PTP in multicast mode as follows for time synchronization:

- Specify the SMPTE ST 2059-2 PTP profile for the devices.
- Configure the multicast PTP transport mode for the devices.
- Specify the OC clock node type for Device A and Device C, and the P2PTC clock node type for Device B. All clock nodes elect a GM through BMC based on their respective default GM attributes.
- Configure the peer delay measurement mechanism (p2p) for Device A and Device C.

Figure 5 Network diagram



Applicable hardware and software versions

The following matrix shows the hardware and software versions to which this configuration example is applicable:

Hardware	Software version
SC 3570 switch series	Not supported
SC 5525 switch series	Release 6615Pxx, Release 6628Pxx
SC 5520 switch series	Release 6615Pxx, Release 6628Pxx
SC 3170 switch series	Not supported
SC 3130 switch series	Not supported

Procedures

Configuring Device A

```
# Specify the SMPTE ST 2059-2 PTP profile.
<DeviceA> system-view
[DeviceA] ptp profile st2059-2

# Specify the OC clock node type.
[DeviceA] ptp mode oc

# Specify a PTP domain.
[DeviceA] ptp domain 0

# Enable PTP globally.
[DeviceA] ptp global enable

# Configure the source IP address for multicast PTP transport.
[DeviceA] ptp source 10.10.10.1

# Specify PTP for obtaining the time.
[DeviceA] clock protocol ptp

# On GigabitEthernet 1/0/1, specify the peer delay measurement mechanism (p2p) and enable PTP.
[DeviceA] interface gigabitethernet 1/0/1
[DeviceA-GigabitEthernet1/0/1] ptp delay-mechanism p2p
[DeviceA-GigabitEthernet1/0/1] ptp enable
[DeviceA-GigabitEthernet1/0/1] quit
```

Configuring Device B

```
# Specify the SMPTE ST 2059-2 PTP profile.
<DeviceB> system-view
[DeviceB] ptp profile st2059-2

# Specify the P2PTC clock node type.
[DeviceB] ptp mode p2ptc

# Specify a PTP domain.
[DeviceB] ptp domain 0

# Enable PTP globally.
[DeviceB] ptp global enable

# Configure the source IP address for multicast PTP transport.
[DeviceB] ptp source 10.10.10.2

# Specify PTP for obtaining the time.
[DeviceB] clock protocol ptp

# Enable PTP on GigabitEthernet 1/0/1.
[DeviceB] interface gigabitethernet 1/0/1
[DeviceB-GigabitEthernet1/0/1] ptp enable
[DeviceB-GigabitEthernet1/0/1] quit

# Enable PTP on GigabitEthernet 1/0/2.
[DeviceB] interface gigabitethernet 1/0/2
[DeviceB-GigabitEthernet1/0/2] ptp enable
```



```
[DeviceB-GigabitEthernet1/0/2] quit
```

Configuring Device C

Specify the SMPTE ST 2059-2 PTP profile.

```
<DeviceC> system-view
```

```
[DeviceC] ptp profile st2059-2
```

Specify the OC clock node type.

```
[DeviceC] ptp mode oc
```

Specify a PTP domain.

```
[DeviceC] ptp domain 0
```

Enable PTP globally.

```
[DeviceC] ptp global enable
```

Configure the source IP address for multicast PTP transport.

```
[DeviceC] ptp source 11.10.10.1
```

Specify PTP for obtaining the time.

```
[DeviceC] clock protocol ptp
```

On GigabitEthernet 1/0/1, specify the peer delay measurement mechanism (p2p) and enable PTP.

```
[DeviceC] interface gigabitethernet 1/0/1
```

```
[DeviceC-GigabitEthernet1/0/1] ptp delay-mechanism p2p
```

```
[DeviceC-GigabitEthernet1/0/1] ptp enable
```

```
[DeviceC-GigabitEthernet1/0/1] quit
```

Verifying the configuration

When the network topology is stable, perform the following tasks to verify the PTP configuration:

- Use the **display ptp clock** command to display PTP clock information.
- Use the **display ptp interface brief** command to display brief information about PTP interfaces.

Display PTP clock information on Device A.

```
[DeviceA] display ptp clock
```

```
PTP global state      : Enabled
```

```
PTP profile           : SMPTE ST 2059-2
```

```
PTP mode              : OC
```

```
Slave only            : No
```

```
Lock status           : Unlocked
```

```
Clock ID              : 000FE2-FFFE-FF0000
```

```
Clock type            : Local
```

```
Clock domain          : 0
```

```
Number of PTP ports   : 1
```

```

Priority1      : 128
Priority2      : 128
Clock quality :
  Class        : 248
  Accuracy     : 254
  Offset (log variance) : 65535
Offset from master : 0 (ns)
Mean path delay  : 0 (ns)
Steps removed    : 0
Local clock time : Sun Jan 15 20:57:29 2019

```

Display brief information about PTP interfaces on Device A.

```
[DeviceA] display ptp interface brief
```

Name	InstID	State	Delay mechanism	Clock step	Asymmetry correction
GE1/0/1	0	Master	P2P	Two	0

Display PTP clock information on Device B.

```
[DeviceB] display ptp clock
```

```

PTP global state      : Enabled
PTP profile           : SMPTE ST 2059-2
PTP mode              : P2PTC
Slave only            : No
Lock status           : Unlocked
Clock ID              : 000FE2-FFFE-FF0001
Clock type : Local
Clock domain         : 0
Number of PTP ports  : 2
Priority1 : 128
Priority2  : 128
Clock quality :
  Class        : 248
  Accuracy     : 254
  Offset (log variance) : 65535
Offset from master : N/A
Mean path delay    : N/A
Steps removed      : N/A
Local clock time   : Sun Jan 15 20:57:29 2019

```

Display brief information about PTP interfaces on Device B.

```
[DeviceB] display ptp interface brief
```

Name	InstID	State	Delay mechanism	Clock step	Asymmetry correction
GE1/0/1	0	N/A	P2P	Two	0
GE1/0/2	0	N/A	P2P	Two	0

Display PTP clock information on Device C.

```
[DeviceC] display ptp clock
```

```

PTP global state : Enabled
PTP profile      : SMPTE ST 2059-2
PTP mode         : OC
Slave only       : No
Lock status      : Locked
Clock ID         : 000FE2-FFFE-FF0002

```

```

Clock type : Local
Clock domain      : 0
Number of PTP ports : 1
Priority1 : 128
Priority2  : 128
Clock quality :
  Class          : 248
  Accuracy       : 254
  Offset (log variance) : 65535
Offset from master : 25 (ns)
Mean path delay    : 0 (ns)
Steps removed      : 2
Local clock time   : Sun Jan 15 20:57:29 2019
# Display brief information about PTP interfaces on Device C.
[DeviceC] display ptp interface brief

```

Name	InstID	State	Delay mechanism	Clock step	Asymmetry correction
GE1/0/1	0	Slave	P2P	Two	0

The output shows that Device A is elected as the GM and GigabitEthernet1/0/1 on Device A is the master port.

Configuration files

- **Device A:**

```

#
clock protocol ptp
#
ptp profile st2059-2
ptp mode oc
ptp domain 0
ptp global enable
ptp source 10.10.10.1
#
interface GigabitEthernet 1/0/1
ptp delay-mechanism p2p
ptp enable
#

```

- **Device B:**

```

#
clock protocol ptp
#
ptp profile st2059-2
ptp mode p2ptc
ptp domain 0
ptp global enable
ptp source 10.10.10.2
#
interface GigabitEthernet 1/0/1
ptp enable

```

- ```
#
interface GigabitEthernet 1/0/2
 ptp enable
#
```
- **Device C:**

```
#
clock protocol ptp
#
ptp profile st2059-2
ptp mode oc
ptp domain 0
ptp global enable
ptp source 11.10.10.1
#
interface GigabitEthernet 1/0/1
 ptp delay-mechanism p2p
 ptp enable
#
```

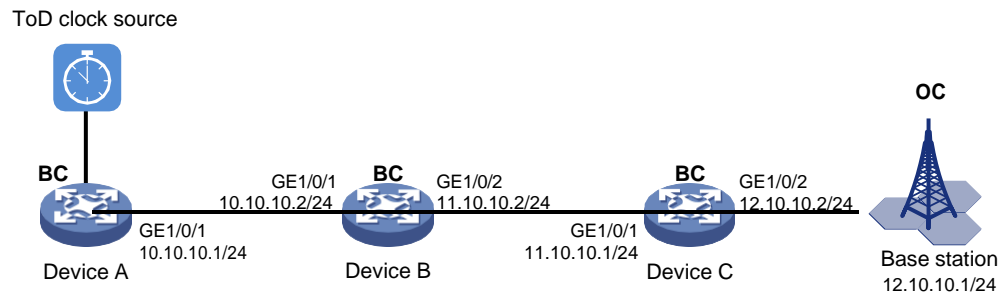
## Example: Configuring PTP (SMPTE ST 2059-2, IPv4 UDP transport, unicast transmission)

### Network configuration

As shown in [Figure 6](#), configure PTP (SMPTE ST 2059-2, IPv4 UDP transport, unicast transmission) to enable Device A, Device B, Device C, and the base station to synchronize time with the ToD clock source.

- Specify the SMPTE ST 2059-2 PTP profile and unicast IPv4 UDP transport of PTP messages for Device A, Device B, and Device C.
- Assign Device A, Device B, Device C, and the base station to PTP domain 0. Specify the BC clock node type for Device A, Device B, and Device C.
- Connect Device A to the ToD clock source and Device C to the base station.
- Use the default Request\_Response delay measurement mechanism on all clock nodes in the PTP domain.

**Figure 6 Network diagram**



# Applicable hardware and software versions

The following matrix shows the hardware and software versions to which this configuration example is applicable:

| Hardware              | Software version                 |
|-----------------------|----------------------------------|
| SC 3570 switch series | Not supported                    |
| SC 5525 switch series | Release 6615Pxx, Release 6628Pxx |
| SC 5520 switch series | Release 6615Pxx, Release 6628Pxx |
| SC 3170 switch series | Not supported                    |
| SC 3130 switch series | Not supported                    |

## Procedures



### IMPORTANT:

The SMPTE ST 2059-2 PTP profile supports IPv4 UDP transport rather than IEEE 802.3/Ethernet transport of PTP messages. It supports both multicast and unicast transmission of PTP messages.



### IMPORTANT:

The device does not provide ToD interfaces. It can be deployed as Device B or Device C but not Device A.

Before configuration, assign IP addresses to the interfaces, and make sure the devices can reach each other. (Details not shown.)

## Configuring Device A

```
Specify the SMPTE ST 2059-2 PTP profile.
<DeviceA> system-view
[DeviceA] ptp profile st2059-2

Specify the BC clock node type.
[DeviceA] ptp mode bc

Create a PTP domain.
[DeviceA] ptp domain 0

Enable PTP globally.
[DeviceA] ptp global enable

Configure the device to use ToD 0 to receive clock signals and set the receive delay correction to 1000 nanoseconds
[DeviceA] ptp tod0 input delay 1000

Set priority 1 to 0 for the ToD 0 clock.
[DeviceA] ptp priority clock-source tod0 priority1 0

On GigabitEthernet 1/0/1, configure the destination IP address for unicast PTP messages and enable PTP. (The SMPTE ST 2059-2 PTP profile transports PTP messages over IPv4 UDP by default.)
[DeviceA] interface gigabitethernet 1/0/1
[DeviceA-GigabitEthernet1/0/1] ptp unicast-destination 10.10.10.2
[DeviceA-GigabitEthernet1/0/1] ptp enable
[DeviceA-GigabitEthernet1/0/1] quit
```

## Configuring Device B

```
Specify the SMPTE ST 2059-2 PTP profile.
<DeviceB> system-view
[DeviceB] ptp profile st2059-2

Specify the BC clock node type.
[DeviceB] ptp mode bc

Create a PTP domain.
[DeviceB] ptp domain 0

Enable PTP globally.
[DeviceB] ptp global enable

Specify PTP for obtaining the time
[DeviceA] clock protocol ptp

On GigabitEthernet 1/0/1, configure the destination IP address for unicast PTP messages and enable PTP. (The SMPTE ST 2059-2 PTP profile transports PTP messages over IPv4 UDP by default.)
```

```
[DeviceB] interface gigabitethernet 1/0/1
[DeviceB-GigabitEthernet1/0/1] ptp unicast-destination 10.10.10.1
[DeviceB-GigabitEthernet1/0/1] ptp enable
[DeviceB-GigabitEthernet1/0/1] quit
```

**# On GigabitEthernet 1/0/2, configure the destination IP address for unicast PTP messages and enable PTP. (The SMPTE ST 2059-2 PTP profile transports PTP messages over IPv4 UDP by default.)**

```
[DeviceB] interface gigabitethernet 1/0/2
[DeviceB-GigabitEthernet1/0/2] ptp unicast-destination 11.10.10.1
[DeviceB-GigabitEthernet1/0/2] ptp enable
[DeviceB-GigabitEthernet1/0/2] quit
```

## Configuring Device C

**# Specify the SMPTE ST 2059-2 PTP profile.**

```
<DeviceC> system-view
[DeviceC] ptp profile st2059-2
```

**# Specify the BC clock node type.**

```
[DeviceC] ptp mode bc
```

**# Create a PTP domain.**

```
[DeviceC] ptp domain 0
```

**# Enable PTP globally.**

```
[DeviceC] ptp global enable
```

**# Specify PTP for obtaining the time**

```
[DeviceA] clock protocol ptp
```

**# On GigabitEthernet 1/0/1, configure the destination IP address for unicast PTP messages and enable PTP.**

```
[DeviceC] interface gigabitethernet 1/0/1
[DeviceC-GigabitEthernet1/0/1] ptp unicast-destination 11.10.10.2
[DeviceC-GigabitEthernet1/0/1] ptp enable
[DeviceC-GigabitEthernet1/0/1] quit
```

**# On GigabitEthernet1/0/2, configure the destination IP address for unicast PTP messages and enable PTP. (The SMPTE ST 2059-2 PTP profile transports PTP messages over IPv4 UDP by default.)**

```
[DeviceC] interface gigabitethernet 1/0/2
[DeviceC-GigabitEthernet1/0/2] ptp unicast-destination 12.10.10.1
[DeviceC-GigabitEthernet1/0/2] ptp enable
[DeviceC-GigabitEthernet1/0/2] quit
```

## Configuring the base station

**# Specify PTP domain 0.**

**# Specify IPv4 UDP transport of PTP messages.**

**# Set the destination IP address of unicast PTP messages to 12.10.10.2.**

**# Specify the Request\_Response delay measurement mechanism.**

For more information, see the configuration guide for the base station.

