Contents

1 Configuring SNTP

1.1 Introduction

1.1.1 Overview

NTP uses a complex algorithm for time synchronization, and raises high requirements for the system. As a simplified version of NTP, Simple Network Time Protocol (SNTP), inherits the protocol specification and implementation process of NTP, and adopts the same packet format and interaction mode as NTP. By setting some fields in the packet to predetermined values, SNTP simplifies the time synchronization algorithm and lowers the requirements for system performance. Although the precision of SNTP time synchronization is compromised while the algorithm is simplified, SNTP can generally achieve a precision of about 1s. Therefore, when the time precision requirements are not very high, you can choose to use SNTP. SNTP packets are the same as NTP packets, and therefore the SNTP client is fully compatible with the NTP server.

1.1.2 Principles

Like NTP, SNTP also uses the client/server mode for SNTP/NTP message interaction. The client sends a time synchronization packet to the server at a certain interval (half an hour by default). After receiving a response packet from the server, the client synchronizes time.

As shown in Figure 1-2, device B (B for short) acts as an NTP reference clock source, device A (A for short) acts as an SNTP client that synchronizes time with B. At a time point, the local clock of A is 19:00:00 and the local clock of B is 19:30:20.

(1) A sends an SNTP/NTP request packet. The local time (T0) when the packet leaves from A is 19:00:00 and is filled in Originate Timestamp.

(2) After a network delay of 2s, the local time (T1) when B receives the request packet is 19:30:23 and is filled in Receive Timestamp.

(3) B processes the NTP request and sends an NTP response packet one second later. The local time (T2) when the response packet leaves from B is 19:30:24 and is filled in Transmit Timestamp.

(4) After a network delay of 2s, A receives the response packet. The local time (T3) when the response packet arrives at A is 19:00:06.

The specific calculations for time synchronization are as follows:

a   A obtains the time difference of 30 minutes and 20 seconds between B and A by using the formula ((T1-T0)+(T2-T3))/2.

b   A obtains the packet round-trip delay of 4 seconds between A and B by using the formula (T3-T0)-(T2-T1).

Figure 1-2   SNTP Principles
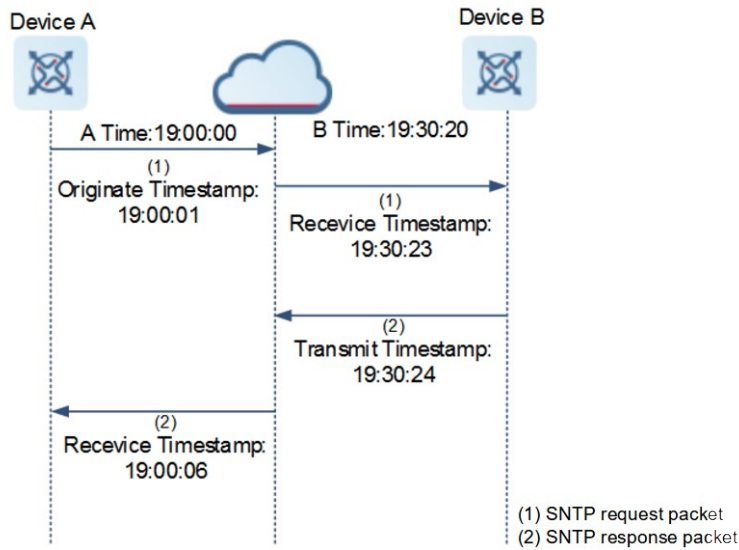
1.1.3 Protocols and Standards

- RFC 2030: Simple Network Time Protocol (SNTP) Version 4 for IPv4, IPv6 and OSI

1.2 Restrictions and Guidelines

You cannot configure both the NTP and SNTP functions on the same device.

1.3 Configuring SNTP

1.3.1 Overview

An SNTP client accesses an NTP server regularly to calibrate the clock.

1.3.2 Restrictions and Guidelines

All time obtained through SNTP communication is Greenwich Mean Time (GMT). To obtain precise local time, you need to set the local time zone for alignment with GMT.

1.3.3 Procedure

(1) Enter the privileged EXEC mode.

enable

(2) Enter the global configuration mode.

configure terminal

(3) Enable SNTP.

sntp enable

The SNTP function is disabled by default.

(4) Configure the IP address of an SNTP server.

sntp server [**oob**] { *ipv4-address* | *domain* } [**via** *mgmt-name*] [**source** *source-ipv4-address*]

No SNTP server is configured by default.

(5) (Optional) Configure the SNTP time synchronization interval.

sntp interval *synchronization-interval-time*

The default interval for clock synchronization between an SNTP client and SNTP/NTP server is 1800s.

1.4 Monitoring

Run the **show** commands to check the running status of a configured function to verify the configuration effect.

Run the **debug** command to output debugging information.

⚠ **Caution**

The output debugging information occupies system resources. Therefore, disable the debugging function immediately after use.

Table 1-1   SNTP Monitoring

Command	Purpose
show sntp	Displays SNTP-related parameters.
debug sntp	Debugs the DNS function.

1.5 Configuration Examples

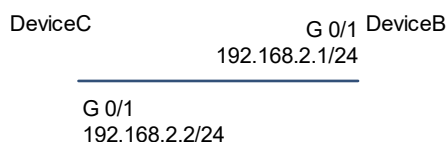## 1.5.1 Configuring Basic Functions of SNTP

1.   Requirements

- Use the local clock of device B as the NTP reference clock source to provide time synchronization for device C.

- Use device C as an SNTP client to synchronize time from device B.

2.   Topology

Figure 1-1   Topology for Implementing SNTP Basic Functions

DeviceC   G 0/1   DeviceB
                                            192.168.2.1/24

G 0/1
192.168.2.2/24

3.   Notes

- Configure device B as the SNTP server of device C.

- Enable the SNTP function on device C.

4. Procedure

Set the IP address of GigabitEthernet 0/1 on device B to 192.168.2.1/24.

```
DeviceB> enble
DeviceB# configure terminal
DeviceB(config)# interface gigabitEthernet 0/1
DeviceB(config-if-GigabitEthernet 0/1)# ip address 192.168.2.1 255.255.255.0
DeviceB(config-if-GigabitEthernet 0/1)# exit
```

Set the IP address of GigabitEthernet 0/1 on device C to 192.168.2.2/24.

```
DeviceC> enble
DeviceC# configure terminal
DeviceC(config)# interface gigabitEthernet 0/1
DeviceC(config-if-GigabitEthernet 0/1)# ip address 192.168.2.2 255.255.255.0
DeviceC(config-if-GigabitEthernet 0/1)# exit
```

Configure device B as the NTP server.

```
DeviceB(config)# ntp master
```

Enable the SNTP function on device C.

```
DeviceC(config)# sntp server 192.168.2.1
DeviceC(config)# sntp enable
```

5. Verification

On device B, run the **ping** command to verify L3 reachability between device B and device C.

```
DeviceB# ping 192.168.2.2
Sending 5, 100-byte ICMP Echoes to 192.168.2.2, timeout is 2 seconds:
  < press Ctrl+C to break >
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/1 ms.
```

On device C, run the **show sntp** command to display the SNTP status and check whether the server is successfully configured.

```
DeviceC# show sntp
 SNTP state          : Enable
 SNTP oob mode       : Enable
 SNTP server         : 192.168.2.1
 SNTP sync interval  : 1800
 Time zone           : -0
```

Run the **clock set** command to modify the time on device B.

```
DeviceB# clock set 11:00:00
Set system clock: 11:00:00 UTC Fri, Feb 26, 2021
```

Run the **show clock** command on device C to check whether time synchronization is successful.

```
DeviceC# show clock
11:00:01 UTC Fri, Feb 26, 2021
```

6. Configuration Files

- Device B configuration file

```
DeviceB# show running-config
hostname DeviceB
!
interface GigabitEthernet 0/1
 ip address 192.168.2.1 255.255.255.0
ntp master
!
end
```

- Device C configuration file

```
DeviceC# show running-config
hostname DeviceC
!
sntp server 192.168.2.2
sntp enable
!
interface GigabitEthernet 0/1
 ip address 192.168.2.2 255.255.255.0
!
end
```