

1 NTP Commands

Command	Function
no ntp	Disable the NTP synchronization with the time server, and clear all NTP configurations.
ntp access-group	Configure the NTP access control rights.
ntp authenticate	Configure the NTP global authentication mechanism.
ntp authentication-key	Configure an NTP global authentication key for the NTP service.
ntp disable	Disable the function of receiving NTP packets on an interface.
ntp discard	Configure the minimum packet request interval and average packet request interval allowed by NTP. The actual effective value is a power of 2.
ntp interval	Configure the interval for clock synchronization between the NTP client and NTP server.
ntp master	Configure the local clock as the NTP master clock to provide synchronization time for other devices.
ntp server	Specify an NTP server for an NTP client.
ntp service disable	Disable the NTP time synchronization service provided for other devices.
ntp trusted-key	Configure a key corresponding to an ID as a globally trusted key.
ntp update-calendar	Enable the NTP client to periodically update the hardware clock of the device using the clock synchronized from an external clock source.
show ntp server	Display the NTP server information.
show ntp status	Display the NTP information.
show ntp packets	Display information about the received and sent NTP packets.

1.1 no ntp

Function

Run the **no ntp** command to disable the NTP synchronization with the time server, and clear all NTP configurations.

The NTP service is disabled by default.

Syntax

```
no ntp
```

Parameter Description

N/A

Command Modes

Global configuration mode

Default Level

14

Usage Guidelines

The NTP service is disabled by default. It is enabled only when the NTP server or NTP master clock is configured.

Examples

The following example disables the NTP service.

```
Hostname> enable
Hostname# configure terminal
Hostname(config)# no ntp
```

Notifications

N/A

Common Errors

N/A

Platform Description

N/A

Related Commands

N/A

1.2 ntp access-group

Note

Whether a device supports this command depends on the ACL configuration.

Function

Run the **ntp access-group** command to configure the NTP access control rights.

Run the **no** form of this command to remove this configuration.

No NTP access control rule is configured by default.

Syntax

```
ntp access-group { limited | peer | query-only | serve | serve-only } acl-number | acl-name [ kod ]
```

```
no ntp access-group { limited | peer | query-only | serve | serve-only } acl-number | acl-name
```

Parameter Description

limited: Allows time request and control query for local NTP services, but limits the sending interval of request packets.

peer: Allows time request and control query for local NTP services, and allows a local device to synchronize time with a remote system (full access rights).

query-only: Allows only control query for local NTP services.

serve: Allows time request and control query for local NTP services, but does not allow a local device to synchronize time with a remote system.

serve-only: Allows only time request for local NTP services.

acl-number: Number of an IP ACL. The value range is from 1 to 99 and from 1300 to 1999.

acl-name: Name of an IP ACL.

kod: If the KoD function is enabled in **limited** mode, the NTP server sends the corresponding KoD packet to the client.

Command Modes

Global configuration mode

Default Level

14

Usage Guidelines

- This command is used to configure the NTP access control rights of the local device. Access control provides a minimum security measure. A more secure method is to use the NTP authentication mechanism.
- When an access request arrives, the NTP service matches rules in the sequence from the minimum access restriction to the maximum access restriction and uses the first matched rule. The matching sequence is limited, peer, serve, serve-only, and query-only.
- If no access control rule is configured, all accesses are allowed. If any access control rule is configured, only accesses allowed by the rule can be implemented.
- The system currently does not support the access control query function. Though rule matching is implemented in the preceding sequence, no request related to control query is supported.

Examples

The following example allows only the device with the IP address 192.168.1.1 to send a time request to a local device.

```
Hostname> enable
Hostname# configure terminal
Hostname(config)# access-list 1 permit 192.168.1.1
Hostname(config)# ntp access-group serve-only 1
```

The following example configures the NTP server, limits the request packet interval of the client, and sends KoD packets.

```
Hostname(config)# ip access-list standard limited 1
Hostname(config-std-nacl)# 10 permit any
Hostname(config-std-nacl)# exit
Hostname(config)# ntp access-group limited limited1 kod
Hostname(config)# ntp discard min-spacing 5 avg-spacing 5
Hostname(config)# ntp master
```

Notifications

N/A

Common Errors

N/A

Platform Description

N/A

Related Commands

N/A

1.3 ntp authenticate

Function

Run the **ntp authenticate** command to configure the NTP global authentication mechanism.

Run the **no** form of this command to remove this configuration.

The NTP global authentication mechanism is disabled by default.

Syntax

ntp authenticate

no ntp authenticate

Parameter Description

N/A

Command Modes

Global configuration mode

Default Level

14

Usage Guidelines

If no global security authentication mechanism is configured, synchronization communication is not encrypted. Encrypted communication with the server is initiated only when the global security authentication mechanism is enabled and the global key is configured.

Examples

The following example configures a global authentication key with the ID set to 6 and MD5 set to woooooop, specifies it as a globally entrusted key, and then enables the global authentication mechanism.

```
Hostname> enable
Hostname# configure terminal
Hostname(config)# ntp authentication-key 6 md5 woooooop
Hostname(config)# ntp trusted-key 6
Hostname(config)# ntp authenticate
```

Notifications

N/A

Common Errors

N/A

Platform Description

N/A

1.4 ntp authentication-key

Function

Run the **ntp authentication-key** command to configure an NTP global authentication key for the NTP service.

Run the **no** form of this command to remove this configuration.

No authentication key is configured by default.

Syntax

```
ntp authentication-key authentication-key-id md5 authentication-key-string [ 0 | 7 ]
```

```
no ntp authentication-key key-id
```

Parameter Description

authentication-key-id: ID of the key. The value range is from 1 to 4294967295.

authentication-key-string: Key string in text format. The maximum length of the key string is 31 bytes when the key is not encrypted, and 64 bytes when the key is encrypted.

0 | **7**: Indicates whether the key is encrypted. Here, **0** indicates no encryption, and **7** indicates simple encryption. The default value is **0**.

Command Modes

Global configuration mode

Default Level

14

Usage Guidelines

- This command is used to configure a global authentication key and use MD5 for encryption. Each key has a unique key-id. You can run the **ntp trusted-key** command to configure a key corresponding to key-id as a globally trusted key.
- You can configure up to 1024 keys, but a server supports only one key.

Examples

The following example configures an authentication key with the ID set to 6 and MD5 set to woooooop.

```
Hostname> enable
Hostname# configure terminal
Hostname(config)# ntp authentication-key 6 md5 woooooop
```

Notifications

N/A

Common Errors

N/A

Platform Description

N/A

Related Commands

N/A

1.5 ntp disable

Function

Run the **ntp disable** command to disable the function of receiving NTP packets on an interface.

The function of receiving NTP packets on an interface is enabled by default.

Syntax

```
ntp disable
```

Parameter Description

N/A

Command Modes

Interface configuration mode

Default Level

14

Usage Guidelines

- By default, NTP packets received on any interface can be provided for the client for clock adjustment. By configuring this command, you can disable the function of receiving NTP packets on the related interface to shield these packets.
- You can configure this command only on an interface that can be configured with an IP address.

Examples

The following example enables the function of receiving NTP packets on the interface GigabitEthernet 0/1.

```
Hostname> enable
Hostname# configure terminal
Hostname(config)# interface gigabitEthernet 0/1
Hostname(config-if-GigabitEthernet 0/1)# no ntp disable
```

Notifications

N/A

Common Errors

N/A

Platform Description

N/A

Related Commands

N/A

1.6 ntp discard

Function

Run the **ntp discard** command to configure the minimum packet request interval and average packet request interval allowed by NTP. The actual effective value is a power of 2.

Run the **no** form of this command to remove this configuration.

By default, the minimum packet request interval allowed by NTP is 2s, and the average packet request interval is 8s.

Syntax

```
ntp discard min-spacing discard-min-spacing-interval avg-spacing avg-spacing-interval
no ntp discard
```

Parameter Description

discard-min-spacing-interval: Minimum interval at which the NTP client is allowed to send the request packet, in seconds. The actual interval is 2 to the power of *discard-min-spacing-interval*. The value range is from 1 to 8. The default value is 1.

avg-spacing-interval: Average interval at which the NTP client is allowed to send the request packet, in seconds. The actual interval is 2 to the power of *avg-spacing-interval*. The value range is from 3 to 10. The default value is 3.

Command Modes

Global configuration mode

Default Level

14

Usage Guidelines

- This command must be used together with the **ntp access-group { limited | peer | serve | serve-only | query-only } acl-number | acl-name [kod]** command.
- The configured *discard-min-spacing-interval* and *avg-spacing-interval* are a power of 2, in seconds. For example, if *avg-spacing-interval* is set to 5, the actual average interval is 2 to the 5th power, that is, 32 seconds, instead of 5 seconds.
- When a KoD-enabled NTP device acts as a client, it reduces the rate after receiving a KoD packet. A KoD-disabled device does not reduce the rate.
- KoD cannot be triggered by specifying the interval in the **ntp interval** command.

Examples

The following example sets the minimum packet request interval allowed by NTP to 32s, and the average packet request interval to 32s.

```
Hostname> enable
Hostname# configure terminal
Hostname(config)# ntp discard min-spacing 5 avg-spacing 5
```

Notifications

N/A

Common Errors

N/A

Platform Description

N/A

Related Commands

N/A

1.7 ntp interval

Function

Run the **ntp interval** command to configure the interval for clock synchronization between the NTP client and NTP server.

Run the **no** form of this command to remove this configuration.

The interval for clock synchronization between the NTP client and NTP server is 64s by default.

Syntax

ntp interval *synchronization-interval-time*

no ntp interval

Parameter Description

synchronization-interval-time: Interval for clock synchronization, in seconds. The value range is from 10 to 2592000.

Command Modes

Global configuration mode

Default Level

14

Usage Guidelines

- The interval configured by this command does not take effect immediately. If you need this configuration to take effect immediately, enable NTP before configuring the interval.
- If the NTP client has not successfully synchronized the time, it quickly synchronizes the time at an interval of 5s. After the successful synchronization, the NTP server synchronizes the time at the configured interval.

Examples

The following example sets the interval for clock synchronization between the NTP client and NTP server to 1 hour.

```
Hostname> enable
Hostname# configure terminal
Hostname(config)# ntp interval 3600
```

Notifications

N/A

Common Errors

N/A

Platform Description

N/A

Related Commands

N/A

1.8 ntp master

Caution

Use this command with caution. After a local clock is configured as the master clock (especially when a clock with a lower stratum is specified), a real effective clock source may be overwritten. If this command is used for

multiple devices in a network, the clock difference between the devices may cause unstable time synchronization of the network.

Function

Run the **ntp master** command to configure the local clock as the NTP master clock to provide synchronization time for other devices.

Run the **no** form of this command to remove this configuration.

The NTP master clock is disabled by default.

Syntax

ntp master [*stratum*]

no ntp master

Parameter Description

stratum: Stratum of the local clock. The value range is from 1 to 15. The default value is 8.

Command Modes

Global configuration mode

Default Level

14

Usage Guidelines

- Before this command is configured, if this system never synchronizes time with an external clock source, you may need to manually calibrate the system clock to ensure that there is no excessive difference.
- When the local system cannot synchronize time with the external clock source due to a network connection failure or other reasons, you can use this command to configure the local clock as the NTP master clock to provide synchronization time for other devices.
- After this command is executed, the system does not synchronize with a clock source with a higher stratum.

Examples

The following example configures the local clock as the NTP master clock and sets its stratum to 12.

```
Hostname> enable
Hostname# configure terminal
Hostname(config)# ntp master 12
```

Notifications

N/A

Common Errors

N/A

Platform Description

N/A

Related Commands

N/A

1.9 ntp server

Function

Run the **ntp server** command to specify an NTP server for an NTP client.

Run the **no** form of this command to remove this configuration.

No NTP server is configured by default.

Syntax

```
ntp server [ oob | vrf vrf-name ] { ipv4-address | ipv6-address | peer-hostname | ip domain | ipv6 domain } [ key keyid ] [ prefer ] [ source interface-type interface-number ] [ version version ] [ via mgmt-name ]  
no ntp server [ oob | vrf vrf-name ] { ipv4-address | ipv6-address | ip domain | ipv6 domain }
```

Parameter Description

oob: Accesses the NTP server through the MGMT port. By default, the local device does not access the NTP server through the MGMT port.

vrf *vrf-name*: Specifies the name of the VRF instance used to access the NTP server. By default, the VRF is not used to access the NTP server.

ipv4-address: IPv4 address of the NTP server.

ipv6-address: IPv6 address of the NTP server.

peer-hostname: Name of the server.

ip *domain*: Specifies the IPv4 domain name of the NTP server.

ipv6 *domain*: Specifies the IPv6 domain name of the NTP server.

key *keyid*: Specifies the key used for encrypted communication with the peer. The value range is from 1 to 4294967295. By default, the communication is not encrypted.

prefer: Specifies a server as the preferred server. No server is configured as the preferred server by default.

source *interface-type interface-number*: Specifies the type and number of the source interface (L3 interface) for sending the NTP packets. By default, a route is selected by the forwarding plane.

version *version*: Specifies the NTP version. The value range is from 1 to 4. By default, NTPv4 is used.

via *mgmt-name*: Specifies the egress port of packets in **oob** mode as the MGMT port.

Command Modes

Global configuration mode

Default Level

14

Usage Guidelines

- The device supports up to 20 synchronization servers.
- You need to first configure a global encryption key and a globally trusted key, and then specify the keys as the server trusted keys before the local device can initiate encrypted communication with the server. To implement encrypted communication with the server, ensure that the server has the same global encryption key and globally trusted key as the local device.
- If the precision is the same, the clock of the preferred server is selected for synchronization.
- When configuring the source interface for sending NTP packets, ensure that this interface is already configured with an IP address and can communicate with the corresponding NTP server.

Examples

The following example configures a device with the IP address 192.168.210.222 in the network as the NTP server.

```
Hostname> enable
Hostname# configure terminal
Hostname(config)# ntp server 192.168.210.222
```

Notifications

N/A

Common Errors

N/A

Platform Description

N/A

Related Commands

N/A

1.10 ntp service disable

Function

Run the **ntp service disable** command to disable the NTP time synchronization service provided for other devices.

Run the **no** form of this command to remove this configuration.

The NTP time synchronization service is enabled by default.

Syntax

ntp service disable

no ntp service disable

Parameter Description

N/A

Command Modes

Global configuration mode

Default Level

14

Usage Guidelines

- If NTP works in client/server mode, after the NTP device synchronizes time from an external reliable clock source, the device acts as the time server to provide the time synchronization service for other devices. If you want the NTP device to act simply as a client, configure this command to disable the NTP time synchronization service.
- This command is mutually exclusive with the **ntp master** command. If the **ntp master** command is configured, the device acts as the server and the NTP time synchronization service cannot be disabled. If this command is configured, the **ntp master** command cannot be executed to configure the local clock as the NTP master clock.

Examples

The following example disables the NTP time synchronization provided for other devices.

```
Hostname> enable
Hostname# configure terminal
Hostname(config)# ntp service disable
```

Notifications

N/A

Common Errors

N/A

Platform Description

N/A

Related Commands

N/A

1.11 ntp trusted-key

Function

Run the **ntp trusted-key** command to configure a key corresponding to an ID as a globally trusted key.

Run the **no** form of this command to remove this configuration.

No globally trusted key is configured by default.

Syntax

```
ntp trusted-key trusted-key-id
```

```
no ntp trusted-key trusted-key-id
```

Parameter Description

trusted-key-id: ID of a globally trusted key. The value range is from 1 to 4294967295.

Command Modes

Global configuration mode

Default Level

14

Usage Guidelines

During NTP communication, two parties must use the same trusted key. To improve security, the key itself is not transmitted. Therefore, it is necessary to find the key based on the ID of the globally trusted key.

Examples

The following example configures an authentication key 6 as the key trusted by the corresponding server.

```
Hostname(config)# ntp authentication-key 6 md5 woooooop
Hostname(config)# ntp trusted-key 6
Hostname(config)# ntp server 192.168.210.222 key 6
```

Notifications

N/A

Common Errors

N/A

Platform Description

N/A

Related Commands

N/A

1.12 ntp update-calendar

Function

Run the **ntp update-calendar** command to enable the NTP client to periodically update the hardware clock of the device using the clock synchronized from an external clock source.

Run the **no** form of this command to remove this configuration.

By default, automatic update of the hardware clock is not configured on the NTP client.

Syntax

ntp update-calendar

no ntp update-calendar

Parameter Description

N/A

Command Modes

Global configuration mode

Default Level

14

Usage Guidelines

The hardware clock of the device can continue to work even when the device is shut down or reset.

Examples

The following example configures automatic update of the hardware clock by the NTP client.

```
Hostname> enable
Hostname# configure terminal
Hostname(config)# ntp update-calendar
```

Notifications

N/A

Common Errors

N/A

Platform Description

N/A

Related Commands

N/A

1.13 show ntp server

Function

Run the **show ntp server** command to display the NTP server information.

Syntax

```
show ntp server
```

Parameter Description

N/A

Command Modes

All modes except the user EXEC mode

Default Level

14

Usage Guidelines

If the NTP service is configured, the current NTP server information is displayed; otherwise, the command does not print any information.

Examples

The following example displays the NTP server information of the current system.

```

Hostname> enable
Hostname# show ntp server
ntp-server          source    keyid     prefer   version
status
10::2              None     None     FALSE   4
candidate
192.168.210.222    None     None     FALSE   4
select

```

Table 1-1 Output Fields of the show ntp server Command

Field	Description
ntp-server	IP address or domain name of the NTP server
source	Source interface of the NTP server
keyid	Key used for encrypted communication with the corresponding server
prefer	Whether the corresponding server is the preferred server
version	NTP version. The value range is from 1 to 4.
status	Status of the NTP server: <ul style="list-style-type: none"> ● select: status in which an optimal clock is finally selected ● candidate ● backup ● falseticker ● outlier ● excess ● reject

Notifications

N/A

Common Errors

N/A

Platform Description

N/A

Related Commands

N/A

1.14 show ntp status**Function**

Run the **show ntp status** command to display the NTP information.

Syntax

```
show ntp status
```

Parameter Description

N/A

Command Modes

All modes except the user EXEC mode

Default Level

14

Usage Guidelines

This command does not print any information before the synchronization server is added for the first time.

Examples

The following example displays the NTP information of the current system.

```

Hostname> enable
Hostname# show ntp status
Clock is synchronized, stratum 8, reference is 127.127.1.1
nominal freq is 250.000 Hz, actual freq is 250.000 Hz, precision is 2**23
reference time is E00DFF79.87EEFAD7 (02:29:13.000 UTC Wed, Feb 13, 2019)
clock offset is 0.00000 sec, root delay is 0.00000 sec
root dispersion is 0.19760 msec, peer dispersion is 0.18751 msec
system poll interval is 64, last update was 6 sec ago
system time is E00DFF7F.E1BCFD4B (02:29:19.000 UTC Wed, Feb 13, 2019)

```

Table 1-1 Output Fields of the show ntp status Command

Field	Description
stratum	Stratum of the current clock
reference	Address of the synchronization server
freq	Clock frequency of the current system
precision	Clock precision of the current system
reference time	UTC time of the reference clock of the synchronization server

Field	Description
clock offset	Offset of the current clock
root delay	Delay of the current clock
root dispersion	Time precision of the root server
peer dispersion	Time precision of the synchronization server

Notifications

N/A

Common Errors

N/A

Platform Description

N/A

Related Commands

N/A

1.15 show ntp packets

Function

Run the **show ntp packets** command to display information about the received and sent NTP packets.

Syntax

```
show ntp packets
```

Parameter Description

N/A

Command Modes

All modes except the user EXEC mode

Default Level

14

Usage Guidelines

N/A

Examples

The following example displays the NTP information of the current system.

```
Hostname> enable
Hostname# show ntp packets
```

```

NTP Packet Statistical Information
Sent                               : 10
  Sent success                     : 10
  Sent failures                    : 0
Received                           : 10
  Recv processed                   : 10
  Recv dropped                     : 0
    Authentication failures       : 0
    Invalid packets               : 0
    Access denied                 : 0
    Interface disabled            : 0
    Service disabled              : 0
    Other reasons                 : 0

```

Table 1-1Output Fields of the show ntp packets Command

Field	Description
Sent success	Number of packets that are sent successfully
Sent failures	Number of packets that fail to be sent
Recv processed	Number of packets that are received and processed successfully
Recv dropped	Number of packets that are received but dropped
Authentication failures	Number of packets that are received but dropped due to authentication failures
Invalid packets	Number of packets that are received but dropped because the packets are invalid
Access denied	Number of packets that are received but dropped because these packets cannot be processed
Interface disabled	Number of packets that are received but dropped because processing of these packets is disabled on the interface
Service disabled	Number of packets that are dropped because the NTP service is disabled
Other reasons	Number of packets that are dropped due to other reasons

Notifications

N/A

Common Errors

N/A

Platform Description

N/A

Related Commands

N/A