

Chapter 13

Configuring System Time with the SRC CLI

This chapter discusses how to configure the system time zone and the system date from the CLI and how to configure the Network Time Protocol (NTP) for a C-series platform. Topics include:

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Setting the Time Zone

You can set the time zone on a Solaris platform or on a C-series platform with the SRC CLI. Use one of the following formats:

- (Recommended) Continent or nation with major city or province.

To see a list of entries in this format, use the ? help at the CLI:

```
[edit system]
user@host# set time-zone ?
Possible completions:
  Africa/Abidjan
  Africa/Accra
  Africa/Addis_Ababa
  Africa/Algiers
  Africa/Asmera
  Africa/Bamako
  Africa/Bangui
  Africa/Banjul
  . . .
```

- GMT offset to set the time zone relative to UTC (GMT) time in the format */Etc/GMToffset*. Time zone files are stored in the */Etc* directory.
- A common zone such as UTC, MET, or EST.

To modify the local time zone:

1. In configuration mode at the [edit system] hierarchy level, set the time zone.

```
[edit system]
user@host# set time-zone time-zone
```

For example, to set the time zone for New York:

```
[edit system]
user@host# set system time-zone America/New_York
```

2. Verify the configuration. For example:

```
[edit system]
user@host# show
time-zone America/New_York;
```

3. For the time zone change to take effect for all processes running on the system, reboot the system.

Setting the System Date

If you need to set the date and time on the system and NTP is not configured, you can use the **set date** command. This command is available only if NTP is not running on the system.

To set the system date and time:

- In operational mode, set the date and time in the format YYYYMMDDhhmm.ss.

```
user@host> set date date
```

For example, to set the date and time to 1:05 PM on February 21, 2006:

```
user@host> set date 200702211305:00
```

Overview of NTP Support on a C-series Platform

NTP synchronizes and coordinates time among NTP clients and servers. It uses a returnable-time design in which a distributed subnet of time servers operate in a self-organizing, hierarchical, master-slave configuration. NTP synchronizes time for local clocks within a subnet and to another server or other time source such as a high-precision clock or satellite receiver. NTP clients are also servers that distribute a time synchronized to another NTP server.

NTP is defined in RFC 1305—Network Time Protocol (Version 3) Specification Implementation and Analysis (March 1992).



NOTE: We highly recommend that you use NTP to set the system time to ensure that the SRC software operates correctly.

For NTP servers on C-series platforms, if the time difference between the local NTP server and the servers with which it synchronizes time is more than 1000 seconds, the local NTP server stops running. Configure a boot server for NTP so that the software obtains the initial time from the boot server before the NTP server starts.

When you configure NTP, you can specify which system on the network is the authoritative time source, or time server, and how time is synchronized between systems on the network. You can configure NTP to operate in one or more of the following modes:

- Client mode—The local system can be synchronized with the remote system, but the remote system cannot be synchronized with the local system.

- Symmetric active (peer) mode—The local system and the remote system can synchronize with each other. You use this mode in a network in which either the local system or the remote system might be a better source of time.



NOTE: Symmetric active mode can be initiated by either the local or the remote system. Only one system needs to be configured to do so. This means that the local system can synchronize with any system that offers symmetric active mode without any configuration whatsoever. However, we highly recommend that you configure authentication to ensure that the local system synchronizes only with known time servers.

- Broadcast mode—The local system sends periodic broadcast messages to a client population at the specified broadcast or multicast address. Typically, you include this statement only when the local system is operating as a transmitter.
- Server mode—The local system operates as an NTP server.

You can also configure NTP to operate as a broadcast client or a multicast client.

Configuration Statements for NTP

Use the following configuration statements to configure NTP on a C-series platform at the [edit] hierarchy level.

```
system ntp {
    boot-server boot-server;
    broadcast-client;
    trusted-key [trusted-key...];
}

system ntp authentication-key key-number {
    value value;
}

system ntp broadcast address {
    key key;
    ttl tll;
    version version;
}

system ntp multicast-client {
    address;
}

system ntp peer address {
    key key;
    version version;
    prefer;
}
```

```

system ntp server address {
    key key;
    version version;
    prefer;
}

```

For detailed information about each configuration statement, see the *SRC-PE CLI Command Reference*.

Configuring NTP on a C-series Platform

To configure NTP on a C-series platform:

1. (Recommended) Configure NTP to automatically set the time when it starts.
 See *Configuring the NTP Boot Server* on page 118.
2. Specify the time source and the manner in which time is synchronized between systems on the network. Configure NTP to operate in one or more of the following modes:
 - Client mode—See *Configuring NTP to Operate in Client Mode* on page 118.
 - Symmetric active mode—See *Configuring NTP to Operate in Symmetric Active Mode* on page 119.
 - Broadcast mode—See *Configuring NTP to Operate in Broadcast Mode* on page 120.
 - Server mode—See *Configuring NTP Authentication* on page 121.
3. (Recommended) Configure NTP authentication.
 See *Configuring NTP Authentication* on page 121.
4. (Optional) Configure NTP to listen for broadcast messages.
 See *Configuring NTP to Listen for Broadcast Messages* on page 123.
5. (Optional) Configure NTP to listen for multicast messages.
 See *Configuring NTP to Listen for Multicast Messages* on page 124.

Configuring the NTP Boot Server

When you boot a C-series platform, it issues an `ntpdate` request, which polls a network server to determine the local date and time. Configure a server that the system uses to determine the time when the system boots. Otherwise, NTP cannot synchronize to a time server if the server's time is very far off the local system's time.

To configure the NTP boot server:

1. From configuration mode, access the configuration statement that configures NTP.

```
[edit]
user@host# edit system ntp
```

2. Specify the address or hostname of the network NTP server.

```
[edit system ntp]
user@host# set boot-server address
```

For example:

```
[edit system ntp]
user@host# set boot-server 192.0.2.20
```

Configuring NTP to Operate in Client Mode

Use the following configuration statements to configure NTP on a C-series platform to operate in client mode:

```
system ntp server address{
    version version;
    prefer;
}
```

To configure NTP to operate in client mode:

1. From configuration mode, access the configuration statement that configures an NTP server and specify the IP address or hostname of an NTP server.

```
[edit system ntp]
user@host# edit server address
```

For example, to specify an NTP server that has as IP address of 192.0.2.30:

```
[edit system ntp]
user@host# edit server 192.0.2.30
```

```
[edit system ntp server 192.0.2.30]
user@host#
```

2. (Optional) Specify the version of NTP to be used for outgoing packets.

```
[edit system ntp server address]
user@host# set version version
```

3. (Optional) If you configure more than one time server, specify whether this server is to be contacted first for synchronization.

```
[edit system ntp server address]
user@host# set prefer
```

Configuring NTP to Operate in Symmetric Active Mode

Use the following configuration statements to configure NTP on a C-series platform to operate in symmetric active mode:

```
edit system ntp peer address {
    version version;
    prefer;
}
```

To configure NTP to operate in symmetric active mode:

1. From configuration mode, access the configuration statement that configures an NTP peer, and specify the IP address or hostname of an NTP peer.

```
[edit system ntp]
user@host# edit peer address
```

For example, to specify an NTP peer that has as IP address of 192.0.2.40:

```
[edit system ntp]
user@host# edit peer 192.0.2.40
```

```
[edit system ntp peer 192.0.2.40]
user@host#
```

2. (Optional) Specify the version of NTP to be used for outgoing packets.

```
[edit system ntp server address]
user@host# set version version
```

3. (Optional) If you configure more than one peer, specify whether this server is to be contacted first for synchronization.

```
[edit system ntp server address]
user@host# set prefer
```

Configuring NTP to Operate in Broadcast Mode

Use the following configuration statements to configure NTP on a C-series platform to operate in broadcast mode:

```
system ntp broadcast address {
    ttl ttl;
    version version;
}
```

To configure NTP to operate in broadcast mode:

1. From configuration mode, access the configuration statement that configures NTP broadcast and specify the broadcast address on one of the local networks or a multicast address assigned to NTP. You can specify an IP address or a hostname.

We recommend that you use the multicast address 224.0.1.1 because the Internet Assigned Numbers Authority (IANA) assigns this address for NTP; however, you can use a different address for local deployments.

```
[edit system ntp]
user@host# edit broadcast address
```

For example, to specify the broadcast address of 244.0.1.1:

```
[edit system ntp]
user@host# edit broadcast 224.0.1.1
```

```
[edit system ntp broadcast 224.0.1.1]
user@host#
```

2. (Optional) Specify the version of NTP to be used for outgoing packets.

```
[edit system ntp broadcast address]
user@host# set version version
```

3. (Optional) Specify the time-to-live value to transmit.

```
[edit system ntp server address]
user@host# set ttl ttl
```


Configuring NTP Authentication

You can authenticate time synchronization to ensure that a C-series platform obtains its time services only from known sources. By default, network time synchronization is unauthenticated; the system synchronizes to whatever system appears to have the most accurate time. We highly recommend that you configure authentication of network time services.

Use the following configuration mode statements to configure authentication for NTP on a C-series platform:

```
system ntp {
    trusted-key [trusted-key...];
}

system ntp authentication-key key-number {
    value value;
}

system ntp broadcast address {
    key key;
}

system ntp peer address {
    key key;
}

system ntp server address {
    key key;
}
```

To configure NTP authentication:

1. Specify authentication for other time servers.

Only time servers transmitting network time packets that contain one of the specified key numbers and whose key matches the value configured for that key number are eligible for synchronization. Other systems can synchronize to the local system without being authenticated.

```
[edit system ntp]
user@host# set trusted-key [trusted-key...]
```

where *trusted-key* is a positive signed 32-bit integer (0–2147483647).

For example:

```
[edit system ntp]
user@host# set trusted-key 1
```

- Depending on the mode configured for NTP, specify a key value at the [edit system ntp server], [edit system ntp peer], or [edit system ntp broadcast] hierarchy level. For example:

```
[edit system ntp server address]
user@host# set key key
```

For example:

```
[edit system ntp server 192.0.2.30]
user@host# set key key1
```

The system transmits the specified authentication key when transmitting packets. The key is necessary if the remote system has authentication enabled so that it can synchronize to the local system.

- Define the authentication keys by assigning a number to the key and configuring its value.

```
[edit system ntp]
user@host# edit authentication-key key-number
```

```
[edit system ntp authentication-key key-number]
user@host# set value value
```

The *key-number* is the key number for the key. The key number must match on all systems using that particular key for authentication.

For example:

```
[edit system ntp]
user@host# edit authentication-key 1
```

```
edit system ntp authentication-key 1]
user@host# set value X7VY4ZE
```

- Verify the configuration.

```
[edit system ntp]
user@host# show
trusted-key 1;
server 192.0.2.30 key 1;
authentication-key 1 {
    value *****;
}
```

Configuring NTP to Listen for Broadcast Messages

You can configure NTP on a C-series platform to listen for broadcast messages on the local network to discover other servers on the same subnet. When NTP receives a broadcast message for the first time, it measures the nominal network delay using a brief client-server exchange with the remote server. It then enters *broadcast client* mode, in which it listens for, and synchronizes to, succeeding broadcast messages.

To avoid accidental or malicious disruption in this mode, both the local and remote systems must use authentication and the same trusted key and key identifier.

To configure NTP to listen for broadcast messages:

1. From the [edit system ntp] hierarch level, specify that NTP listen for broadcast messages.

```
[edit system ntp]
user@host# set broadcast-client
```

2. Authenticate time synchronization to ensure that the local system obtains its time only from known sources.

See *Configuring NTP Authentication* on page 121.

3. Verify the configuration. For example:

```
[edit system ntp]
user@host# show
broadcast-client;
trusted-key 1;
server 192.0.2.30 key 1;
authentication-key 1 {
  value *****;
}
```

Configuring NTP to Listen for Multicast Messages

You can configure NTP on a C-series platform to listen for multicast messages on the local network to discover other servers on the same subnet. When NTP receives a multicast message for the first time, it measures the nominal network delay using a brief client-server exchange with the remote server. It then enters *multicast client* mode, in which it listens for, and synchronizes to, succeeding multicast messages.

You can specify one or more IP addresses or hostnames. The hosts then join those multicast groups.

To avoid accidental or malicious disruption in this mode, both the local and remote systems must use authentication and the same trusted key and key identifier.

To configure NTP to listen for multicast messages:

1. From the [edit system ntp] hierarchy level, specify that NTP listen for broadcast messages.

```
edit system ntp]
user@host# set multicast-client address
```

For example:

```
[edit system ntp]
user@host# set multicast-client 224.0.1.1
```

2. Authenticate time synchronization to ensure that the local system obtains its time only from known sources.

See *Configuring NTP Authentication* on page 121.

3. Verify the configuration. For example:

```
[edit system ntp]
user@host# show
multicast-client 224.0.1.1;
trusted-key 1;
server 192.0.2.30 key 1;
authentication-key 1 {
    value *****;
}
```

Verifying Configuration for NTP

To verify the configuration for NTP:

- At the [edit system ntp] hierarchy level, enter the **show** command. For example:

```
[edit system ntp]
user@host# show
boot-server 192.0.2.20;
multicast-client 192.0.2.15;
trusted-key 1;
server 192.0.2.30 key 1;
server 192.0.2.25;
authentication-key 1 {
    value *****;
}
```

