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Junos<sup>®</sup> OS

# System Basics: Time Management Configuration Guide

Release  
13.1



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*Junos® OS System Basics: Time Management Configuration Guide*

13.1

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# About the Documentation

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- Supported Platforms on page vii
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## Documentation and Release Notes

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If the information in the latest release notes differs from the information in the documentation, follow the product Release Notes.

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## Supported Platforms

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For the features described in this document, the following platforms are supported:

- M Series
- MX Series
- T Series
- J Series
- EX Series
- PTX Series

## Using the Examples in This Manual

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If you want to use the examples in this manual, you can use the **load merge** or the **load merge relative** command. These commands cause the software to merge the incoming configuration into the current candidate configuration. The example does not become active until you commit the candidate configuration.

If the example configuration contains the top level of the hierarchy (or multiple hierarchies), the example is a *full example*. In this case, use the **load merge** command.

If the example configuration does not start at the top level of the hierarchy, the example is a *snippet*. In this case, use the **load merge relative** command. These procedures are described in the following sections.

### Merging a Full Example

To merge a full example, follow these steps:

1. From the HTML or PDF version of the manual, copy a configuration example into a text file, save the file with a name, and copy the file to a directory on your routing platform.

For example, copy the following configuration to a file and name the file **ex-script.conf**. Copy the **ex-script.conf** file to the **/var/tmp** directory on your routing platform.

```
system {
  scripts {
    commit {
      file ex-script.xml;
    }
  }
}
interfaces {
  fxp0 {
    disable;
    unit 0 {
      family inet {
        address 10.0.0.1/24;
      }
    }
  }
}
```

2. Merge the contents of the file into your routing platform configuration by issuing the **load merge** configuration mode command:

```
[edit]
user@host# load merge /var/tmp/ex-script.conf
load complete
```



## Merging a Snippet

To merge a snippet, follow these steps:

1. From the HTML or PDF version of the manual, copy a configuration snippet into a text file, save the file with a name, and copy the file to a directory on your routing platform.

For example, copy the following snippet to a file and name the file **ex-script-snippet.conf**. Copy the **ex-script-snippet.conf** file to the **/var/tmp** directory on your routing platform.

```
commit {
  file ex-script-snippet.xml; }
```

2. Move to the hierarchy level that is relevant for this snippet by issuing the following configuration mode command:

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

3. Merge the contents of the file into your routing platform configuration by issuing the **load merge relative** configuration mode command:

```
[edit system scripts]
user@host# load merge relative /var/tmp/ex-script-snippet.conf
load complete
```

For more information about the **load** command, see the CLI User Guide.

## Documentation Conventions

Table 1 on page ix defines notice icons used in this guide.

Table 1: Notice Icons





Icon	Meaning	Description
	Informational note	Indicates important features or instructions.
	Caution	Indicates a situation that might result in loss of data or hardware damage.
	Warning	Alerts you to the risk of personal injury or death.
	Laser warning	Alerts you to the risk of personal injury from a laser.

Table 2 on page x defines the text and syntax conventions used in this guide.

Table 2: Text and Syntax Conventions

Convention	Description	Examples
<b>Bold text like this</b>	Represents text that you type.	To enter configuration mode, type the <b>configure</b> command:  user@host> <b>configure</b>
Fixed-width text like this	Represents output that appears on the terminal screen.	user@host> <b>show chassis alarms</b>  No alarms currently active
<i>Italic text like this</i>	<ul style="list-style-type: none"> <li>Introduces or emphasizes important new terms.</li> <li>Identifies book names.</li> <li>Identifies RFC and Internet draft titles.</li> </ul>	<ul style="list-style-type: none"> <li>A policy <i>term</i> is a named structure that defines match conditions and actions.</li> <li><i>Junos OS System Basics Configuration Guide</i></li> <li>RFC 1997, <i>BGP Communities Attribute</i></li> </ul>
<i>Italic text like this</i>	Represents variables (options for which you substitute a value) in commands or configuration statements.	Configure the machine's domain name:  [edit] root@# <b>set system domain-name</b> <i>domain-name</i>
<b>Text like this</b>	Represents names of configuration statements, commands, files, and directories; configuration hierarchy levels; or labels on routing platform components.	<ul style="list-style-type: none"> <li>To configure a stub area, include the <b>stub</b> statement at the [edit protocols <b>ospf area area-id</b>] hierarchy level.</li> <li>The console port is labeled <b>CONSOLE</b>.</li> </ul>
< > (angle brackets)	Enclose optional keywords or variables.	<b>stub</b> <default-metric <i>metric</i> >;
(pipe symbol)	Indicates a choice between the mutually exclusive keywords or variables on either side of the symbol. The set of choices is often enclosed in parentheses for clarity.	<b>broadcast</b>   <b>multicast</b>  ( <i>string1</i>   <i>string2</i>   <i>string3</i> )
# (pound sign)	Indicates a comment specified on the same line as the configuration statement to which it applies.	<b>rsvp { # Required for dynamic MPLS only</b>
[ ] (square brackets)	Enclose a variable for which you can substitute one or more values.	<b>community name members</b> [ <i>community-ids</i> ]
Indentation and braces ( { } )	Identify a level in the configuration hierarchy.	[edit] routing-options { static { route default { nexthop <i>address</i> ; retain; } } }
;(semicolon)	Identifies a leaf statement at a configuration hierarchy level.	

## J-Web GUI Conventions

Table 2: Text and Syntax Conventions (*continued*)

Convention	Description	Examples
<b>Bold text like this</b>	Represents J-Web graphical user interface (GUI) items you click or select.	<ul style="list-style-type: none"> <li>In the Logical Interfaces box, select <b>All Interfaces</b>.</li> <li>To cancel the configuration, click <b>Cancel</b>.</li> </ul>
<b>&gt;</b> (bold right angle bracket)	Separates levels in a hierarchy of J-Web selections.	In the configuration editor hierarchy, select <b>Protocols&gt;Ospf</b> .

## Documentation Feedback

We encourage you to provide feedback, comments, and suggestions so that we can improve the documentation. You can send your comments to [techpubs-comments@juniper.net](mailto:techpubs-comments@juniper.net), or fill out the documentation feedback form at <https://www.juniper.net/cgi-bin/docbugreport/>. If you are using e-mail, be sure to include the following information with your comments:

- Document or topic name
- URL or page number
- Software release version (if applicable)

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- Find product documentation: <http://www.juniper.net/techpubs/>
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- Download the latest versions of software and review release notes: <http://www.juniper.net/customers/csc/software/>
- Search technical bulletins for relevant hardware and software notifications: <https://www.juniper.net/alerts/>
- Join and participate in the Juniper Networks Community Forum: <http://www.juniper.net/company/communities/>
- Open a case online in the CSC Case Management tool: <http://www.juniper.net/cm/>

To verify service entitlement by product serial number, use our Serial Number Entitlement (SNE) Tool: <https://tools.juniper.net/SerialNumberEntitlementSearch/>

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You can open a case with JTAC on the Web or by telephone.

- Use the Case Management tool in the CSC at <http://www.juniper.net/cm/>.
- Call 1-888-314-JTAC (1-888-314-5822 toll-free in the USA, Canada, and Mexico).

For international or direct-dial options in countries without toll-free numbers, see <http://www.juniper.net/support/requesting-support.html>.

## PART 1

# Overview

- [Time Management Overview on page 3](#)



## CHAPTER 1

# Time Management Overview

- [NTP Overview on page 3](#)
- [NTP Time Server and Time Services Overview on page 4](#)

## NTP Overview

---

The Network Time Protocol (NTP) provides the mechanisms to synchronize time and coordinate time distribution in a large, diverse network. NTP uses a returnable-time design in which a distributed subnet of time servers operating in a self-organizing, hierarchical primary-secondary configuration synchronizes local clocks within the subnet and to national time standards by means of wire or radio. The servers also can redistribute reference time using local routing algorithms and time daemons.

NTP is defined in RFC 1305, *Network Time Protocol (Version 3) Specification, Implementation and Analysis*.

For Common Criteria compliance, configure NTP to provide accurate timestamps for system log messages.

In Junos operating system (Junos OS) Release 11.2 or later, NTP supports IPv4 VPN routing and forwarding (VRF) requests. This enables an NTP server running on a provider edge (PE) router to respond to NTP requests from a customer edge (CE) router. As a result, a PE router can process any NTP request packet coming from different routing instances. In Junos OS Release 11.4 and later, NTP also supports IPv6 VRF requests.

When configuring NTP, you do not actively configure time servers. Rather, all clients also are servers. An NTP server is not believed unless it, in turn, is synchronized to another NTP server—which itself must be synchronized to something upstream, eventually terminating in a high-precision clock.

By default, if the time difference between the local router clock and the NTP server clock is more than 128 milliseconds, the clocks are slowly stepped into synchronization. However, if the difference is more than 1000 seconds, the clocks are not synchronized, and a message recommends that you set the time manually. You can use the **set date** command to set the time on the router.

You can configure the system to set the time automatically, by using the **boot-server** statement at the **[edit system ntp]** hierarchy level, specifying the address or hostname of an NTP server. When configured, if the time difference between the local router and

the NTP clock server is greater than 1000 seconds, the NTP process reboots, sets the router time to the current time, and synchronizes with the NTP server clock.

**Related  
Documentation**

- [Synchronizing and Coordinating Time Distribution Using NTP on page 10](#)
- [Example: Configuring NTP as a Single Time Source for Router and Switch Clock Synchronization on page 15](#)

---

## NTP Time Server and Time Services Overview

---

When configuring the Network Time Protocol (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. To do this, you configure the router or switch to operate in one of the following modes:

- Client mode—In this mode, the local router or switch can be synchronized with the remote system, but the remote system can never be synchronized with the local router or switch.
- Symmetric active mode—In this mode, the local router or switch and the remote system can synchronize with each other. You use this mode in a network in which either the local router or switch 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 strongly encourage you to configure authentication to ensure that the local system synchronizes only with known time servers.

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



**NOTE:** In NTP server mode, the Junos OS supports authentication as follows:

- If the NTP request from the client comes with an authentication key (such as a key ID and message digest sent with the packet), the request is processed and answered based on the authentication key match.
- If the NTP request from the client comes without any authentication key, the request is processed and answered without authentication.



- Related Documentation**
- Configuring the NTP Time Server and Time Services
  - [Example: Configuring NTP as a Single Time Source for Router and Switch Clock Synchronization on page 15](#)



## PART 2

# Configuration

- [Configuring Time on page 9](#)
- [Configuration Statements on page 21](#)



## CHAPTER 2

# Configuring Time

- [Modifying the Default Time Zone for a Router or Switch Running Junos OS on page 9](#)
- [Synchronizing and Coordinating Time Distribution Using NTP on page 10](#)
- [Configuring the NTP Time Server and Time Services on page 12](#)
- [Example: Configuring NTP as a Single Time Source for Router and Switch Clock Synchronization on page 15](#)
- [Configuring NTP Authentication Keys on page 16](#)
- [Configuring the Router or Switch to Listen for Broadcast Messages Using NTP on page 17](#)
- [Configuring the Router or Switch to Listen for Multicast Messages Using NTP on page 17](#)
- [Setting a Custom Time Zone on Routers or Switches Running Junos OS on page 18](#)

### Modifying the Default Time Zone for a Router or Switch Running Junos OS

The default local time zone on the router is UTC (Coordinated Universal Time, formerly known as Greenwich Mean Time, or GMT). To modify the local time zone, include the **time-zone** statement at the **[edit system]** hierarchy level:

```
[edit system]  
time-zone (GMThour-offset | time-zone);
```

You can use the **GMT *hour-offset*** option to set the time zone relative to UTC (GMT) time. By default, ***hour-offset*** is 0. You can configure this to be a value in the range from –14 to +12.

You can also specify ***time-zone*** as a string such as PDT (Pacific Daylight Time) or WET (Western European Time), or specify the continent and major city.



**NOTE:** Junos OS complies with the POSIX time-zone standard, which is counter-intuitive to the way time zones are generally indicated relative to UTC. A time zone ahead of UTC (east of the Greenwich meridian) is commonly indicated as GMT +*n*; for example, the Central European Time (CET) zone is indicated as GMT +1. However, this is not true for POSIX time zone designations. POSIX indicates CET as GMT-1. If you include the `set system time-zone GMT+1` statement for a router in the CET zone, your router time will be set to one hour behind GMT, or two hours behind the actual CET time. For this reason, you might find it easier to use the POSIX time-zone strings, which you can list by entering `set system time-zone ?`.

For the time zone change to take effect for all processes running on the router or switch, you must reboot the router or switch.

The following example shows how to change the current time zone to **America/New\_York**:

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

**Related  
Documentation**

- [NTP Overview on page 3](#)
- [Setting a Custom Time Zone on Routers or Switches Running Junos OS on page 18](#)

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## Synchronizing and Coordinating Time Distribution Using NTP

Using NTP to synchronize and coordinate time distribution in a large network involves these tasks:

1. [Configuring NTP on page 10](#)
2. [Configuring the NTP Boot Server on page 11](#)
3. [Specifying a Source Address for an NTP Server on page 11](#)

### Configuring NTP

To configure NTP on the router or switch, include the **ntp** statement at the **[edit system]** hierarchy level:

```
[edit system]
ntp {
    authentication-key number type type value password;
    boot-server (address | hostname);
    broadcast <address> <key key-number> <version value> <ttl value>;
    broadcast-client;
    multicast-client <address>;
    peer address <key key-number> <version value> <prefer>;
```

```
server address <key key-number> <version value> <prefer>;  
source-address source-address;  
trusted-key [ key-numbers ];  
}
```

## Configuring the NTP Boot Server

When you boot the router or switch, it issues an **ntpdate** request, which polls a network server to determine the local date and time. You need to configure a server that the router or switch uses to determine the time when the router or switch boots. Otherwise, NTP will not be able to synchronize to a time server if the server's time appears to be very far off of the local router's or switch's time.

To configure the NTP boot server, include the **boot-server** statement at the **[edit system ntp]** hierarchy level:

```
[edit system ntp]  
boot-server (address | hostname);
```

Specify the address of the network server. You must specify an IP address or a hostname.

## Specifying a Source Address for an NTP Server

For IP version 4 (IPv4), you can specify that if the NTP server configured at the **[edit system ntp]** hierarchy level is contacted on one of the loopback interface addresses, the reply always uses a specific source address. This is useful for controlling which source address NTP will use to access your network when it is either responding to an NTP client request from your network or when it itself is sending NTP requests to your network.

To configure the specific source address that the reply will always use, and the source address that requests initiated by NTP server will use, include the **source-address** statement at the **[edit system ntp]** hierarchy level:

```
[edit system ntp]  
source-address source-address;
```

**source-address** is a valid IP address configured on one of the router or switch interfaces.



**NOTE:** If a firewall filter is applied on the loopback interface, ensure that the source-address specified for the NTP server at the [edit system ntp] hierarchy level is explicitly included as one of the match criteria in the firewall filter. This enables the Junos OS to accept traffic on the loopback interface from the specified source address.

The following example shows a firewall filter with the source address 10.0.10.100 specified in the from statement included at the [edit firewall filter *firewall-filter-name*] hierarchy:

```
[edit firewall filter Loopback-Interface-Firewall-Filter]
term Allow-NTP {
  from {
    source-address {
      172.17.27.46/32; // IP address of the NTP server
      10.0.10.100/32; // Source address specified for the NTP server
    }
  }
  then accept;
}
```

If no source-address is configured for the NTP server, include the primary address of the loopback interface in the firewall filter.

---

**Related  
Documentation**

- [NTP Overview on page 3](#)
- [NTP Time Server and Time Services Overview on page 4](#)
- [Example: Configuring NTP as a Single Time Source for Router and Switch Clock Synchronization on page 15](#)

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## Configuring the NTP Time Server and Time Services

---

When you use NTP, configure the router or switch to operate in one of the following modes:

- Client mode
- Symmetric active mode
- Broadcast mode
- Server mode

The following topics describe how to configure these modes of operation:

1. [Configuring the Router or Switch to Operate in Client Mode on page 13](#)
2. [Configuring the Router or Switch to Operate in Symmetric Active Mode on page 13](#)
3. [Configuring the Router or Switch to Operate in Broadcast Mode on page 14](#)
4. [Configuring the Router or Switch to Operate in Server Mode on page 14](#)



## Configuring the Router or Switch to Operate in Client Mode

To configure the local router or switch to operate in client mode, include the **server** statement and other optional statements at the **[edit system ntp]** hierarchy level:

```
[edit system ntp]
server address <key key-number> <version value> <prefer>;
authentication-key key-number type type value password;
boot-server address;
trusted-key [ key-numbers ];
```

Specify the address of the system acting as the time server. You must specify an address, not a hostname.

To include an authentication key in all messages sent to the time server, include the **key** option. The key corresponds to the key number you specify in the **authentication-key** statement, as described in [“Configuring NTP Authentication Keys” on page 16](#).

By default, the router or switch sends NTP version 4 packets to the time server. To set the NTP version level to 1, 2, or 3, include the **version** option.

If you configure more than one time server, you can mark one server preferred by including the **prefer** option.

For information about how to configure trusted keys, see [“Configuring NTP Authentication Keys” on page 16](#). For information about how to configure an NTP boot server, see [“Configuring the NTP Boot Server” on page 11](#). For information about how to configure the router or switch to operate in server mode, see [“Configuring the Router or Switch to Operate in Server Mode” on page 14](#).

The following example shows how to configure the router or switch to operate in client mode:

```
[edit system ntp]
authentication-key 1 type md5 value "$9$EgfcvX7VY4ZEcwgoHjkP5Q3CuREyv87";
boot-server 10.1.1.1;
server 10.1.1.1 key 1 prefer;
trusted-key 1;
```

## Configuring the Router or Switch to Operate in Symmetric Active Mode

To configure the local router or switch to operate in symmetric active mode, include the **peer** statement at the **[edit system ntp]** hierarchy level:

```
[edit system ntp]
peer address <key key-number> <version value> <prefer>;
```

Specify the address of the remote system. You must specify an address, not a hostname.

To include an authentication key in all messages sent to the remote system, include the **key** option. The key corresponds to the key number you specify in the **authentication-key** statement, as described in [“Configuring NTP Authentication Keys” on page 16](#).

By default, the router or switch sends NTP version 4 packets to the remote system. To set the NTP version level to 1, 2 or 3, include the **version** option.

If you configure more than one remote system, you can mark one system preferred by including the **prefer** option:

```
peer address <key key-number> <version value> prefer;
```

## Configuring the Router or Switch to Operate in Broadcast Mode

To configure the local router or switch to operate in broadcast mode, include the **broadcast** statement at the **[edit system ntp]** hierarchy level:

```
[edit system ntp]  
broadcast address <key key-number> <version value> <ttl value>;
```

Specify the broadcast address on one of the local networks or a multicast address assigned to NTP. You must specify an address, not a hostname. If the multicast address is used, it must be **224.0.1.1**.

To include an authentication key in all messages sent to the remote system, include the **key** option. The key corresponds to the key number you specify in the **authentication-key** statement, as described in [“Configuring NTP Authentication Keys” on page 16](#).

By default, the router or switch sends NTP version 4 packets to the remote system. To set the NTP version level to 1, 2, or 3, include the **version** option.

## Configuring the Router or Switch to Operate in Server Mode

In server mode, the router or switch acts as an NTP server for clients when the clients are configured appropriately. The only prerequisite for “server mode” is that the router or switch must be receiving time from another NTP peer or server. No other configuration is necessary on the router or switch.

To configure the local router or switch to operate as an NTP server, include the following statements at the **[edit system ntp]** hierarchy level:

```
[edit system ntp]  
authentication-key key-number type type value password;  
server address <key key-number> <version value> <prefer>;  
trusted-key [ key-numbers ];
```

Specify the address of the system acting as the time server. You must specify an address, not a hostname.

To include an authentication key in all messages sent to the time server, include the **key** option. The key corresponds to the key number you specify in the **authentication-key** statement, as described in [“Configuring NTP Authentication Keys” on page 16](#).

By default, the router or switch sends NTP version 4 packets to the time server. To set the NTP version level to 1, or 2, or 3, include the **version** option.

If you configure more than one time server, you can mark one server preferred by including the **prefer** option.

For information about how to configure trusted keys, see [“Configuring NTP Authentication Keys” on page 16](#). For information about how to configure the router or switch to operate in client mode, see [“Configuring the Router or Switch to Operate in Client Mode” on page 13](#).

The following example shows how to configure the router or switch to operate in server mode:

```
[edit system ntp]
authentication-key 1 type md5 value "$9$txERuBEreWx-wtuLNdboaUjH.T3AtOESe";
server 172.17.27.46 prefer;
trusted-key 1;
```

**Related  
Documentation**

- [NTP Time Server and Time Services Overview on page 4](#)
- [Example: Configuring NTP as a Single Time Source for Router and Switch Clock Synchronization on page 15](#)

## Example: Configuring NTP as a Single Time Source for Router and Switch Clock Synchronization

Debugging and troubleshooting are much easier when the timestamps in the log files of all the routers or switches are synchronized, because events that span the network can be correlated with synchronous entries in multiple logs. We strongly recommend using the Network Time Protocol (NTP) to synchronize the system clocks of routers, switches, and other network equipment.

By default, NTP operates in an entirely unauthenticated manner. If a malicious attempt to influence the accuracy of a router or switch's clock succeeds, it could have negative effects on system logging, make troubleshooting and intrusion detection more difficult, and impede other management functions.

The following sample configuration synchronizes all the routers or switches in the network to a single time source. We recommend using authentication to make sure that the NTP peer is trusted. The **boot-server** statement identifies the server from which the initial time of day and date is obtained when the router boots. The **server** statement identifies the NTP server used for periodic time synchronization. The **authentication-key** statement specifies that an HMAC-Message Digest 5 (MD5) scheme should be used to hash the key value for authentication, which prevents the router or switch from synchronizing with an attacker's host posing as the time server.

```
[edit]
system {
  ntp {
    authentication-key 2 type md5 value "$9$aHlj8gqQ1gjyjjhgjgiiii"; # SECRET-DATA
    boot-server 10.1.4.1;
    server 10.1.4.2;
  }
}
```

**Related  
Documentation**

- [NTP Overview on page 3](#)

- [NTP Time Server and Time Services Overview on page 4](#)
- authentication-key
- boot-server
- server
- [show ntp associations on page 42](#)
- [show ntp status on page 44](#)

---

## Configuring NTP Authentication Keys

Time synchronization can be authenticated to ensure that the local router or switch obtains its time services only from known sources. By default, network time synchronization is unauthenticated. The system will synchronize to whatever system appears to have the most accurate time. We strongly encourage you to configure authentication of network time services.

To authenticate other time servers, include the **trusted-key** statement at the **[edit system ntp]** hierarchy level. 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 to be synchronized to. Other systems can synchronize to the local router without being authenticated.

```
[edit system ntp]  
trusted-key [ key-numbers ];
```

Each key can be any 32-bit unsigned integer except 0. Include the **key** option in the **peer**, **server**, or **broadcast** statements to transmit 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.

To define the authentication keys, include the **authentication-key** statement at the **[edit system ntp]** hierarchy level:

```
[edit system ntp]  
authentication-key key-number type type value password;
```

**number** is the key number, **type** is the authentication type (only Message Digest 5 [MD5] is supported), and **password** is the password for this key. The key number, type, and password must match on all systems using that particular key for authentication.

### Related Documentation

- [NTP Time Server and Time Services Overview on page 4](#)
- [Example: Configuring NTP as a Single Time Source for Router and Switch Clock Synchronization on page 15](#)

## Configuring the Router or Switch to Listen for Broadcast Messages Using NTP

When you are using NTP, you can configure the local router or switch to listen for broadcast messages on the local network to discover other servers on the same subnet by including the **broadcast-client** statement at the **[edit system ntp]** hierarchy level:

```
[edit system ntp]
broadcast-client;
```

When the router or switch detects 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.

### Related Documentation

- [Configuring the Router or Switch to Listen for Multicast Messages Using NTP on page 17](#)
- [Configuring the NTP Time Server and Time Services on page 12](#)
- [Example: Configuring NTP as a Single Time Source for Router and Switch Clock Synchronization on page 15](#)

## Configuring the Router or Switch to Listen for Multicast Messages Using NTP

When you are using NTP, you can configure the local router or switch to listen for multicast messages on the local network to discover other servers on the same subnet by including the **multicast-client** statement at the **[edit system ntp]** hierarchy level:

```
[edit system ntp]
multicast-client <address>;
```

When the router or switch 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. (You must specify an address, not a hostname.) If you do, the router or switch joins those multicast groups. If you do not specify any addresses, the software uses 224.0.1.1.

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.

### Related Documentation

- [Configuring the Router or Switch to Listen for Broadcast Messages Using NTP on page 17](#)
- [Configuring the NTP Time Server and Time Services on page 12](#)
- [Example: Configuring NTP as a Single Time Source for Router and Switch Clock Synchronization on page 15](#)

## Setting a Custom Time Zone on Routers or Switches Running Junos OS

---

You can update the time zone database information on routers or switches running Junos OS. This feature simplifies time zone management in devices running Junos OS by allowing for future unforeseen time zone database adjustments. You can configure your router or switch to use a custom time zone database file that you create to meet your requirements by editing an existing time zone database file.

Tasks for setting a custom time zone are:

1. [Importing and Installing Time Zone Files on page 18](#)
2. [Configuring a Custom Time Zone on page 19](#)

### Importing and Installing Time Zone Files

To import and install time zone files, follow these steps:

1. Download the time zone files archive and untar them to a temporary directory such as `/var/tmp`:

```
# mkdir -p /var/tmp/tz && cd /var/tmp/tz && rm *  
# wget 'ftp://ftp.iana.org/tz/tzdata-latest.tar.gz'  
# tar xvzf tzdata*.gz  
africa  
antarctica  
asia  
australasia  
europe  
northamerica  
southamerica  
pacificnew  
etcetera  
factory  
backward  
systemv  
solar87  
solar88  
solar89  
iso3166.tab  
zone.tab  
leapseconds  
yearistype.sh
```



**NOTE:** If needed, you can edit the above untarred files to create or modify time zones.

---

2. Select the names of time zone files to compile and feed them to the following script. For example, to generate **northamerica** and **asia** tz files:

```
# /usr/libexec/ui/compile-tz northamerica asia
```

3. Enable the use of the generated tz files using the CLI:

```
[edit]
# set system use-imported-time-zones
[edit]
# set system time-zone ?
```

This should show the newly generated tz files in `/var/db/zoneinfo/`.

4. Set the time zone and commit the configuration:

```
[edit]
# set system time-zone <your-time-zone>
# commit
```

5. Verify that the time zone change has taken effect:

```
[edit]
# run show system uptime
```

## Configuring a Custom Time Zone

To use a custom time zone, follow these steps:

1. Download a time zones archive (from a known or designated source) to the router or switch. Compile the time zone archive using the `zic` time zone compiler, which generates `tz` files.
2. Using the CLI, configure the router or switch to enable the use of the generated `tz` files as follows:

```
[edit]
user@host# set system use-imported-time-zones
```

3. Display the imported time zones (saved in the directory `/var/db/zoneinfo/`):

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

If you do not configure the router to use imported time zones, the Junos OS default time zones are shown (saved in the directory `/usr/share/zoneinfo/`).

### Related Documentation

- [Modifying the Default Time Zone for a Router or Switch Running Junos OS on page 9](#)
- [NTP Overview on page 3](#)
- [NTP Time Server and Time Services Overview on page 4](#)
- [Example: Configuring NTP as a Single Time Source for Router and Switch Clock Synchronization on page 15](#)
- [use-imported-time-zones on page 38](#)





# Configuration Statements

- [System Management Configuration Statements on page 21](#)

## System Management Configuration Statements

---

This topic lists all the configuration statements that you can include at the **[edit system]** hierarchy level to configure system management features:

```
system {
  accounting {
    events [ login change-log interactive-commands ];
    destination {
      radius {
        server {
          server-address {
            accounting-port port-number;
            retry number;
            secret password;
            source-address address;
            timeout seconds;
          }
        }
      }
    }
    tacplus {
      server {
        server-address {
          port port-number;
          secret password;
          single-connection;
          timeout seconds;
        }
      }
    }
  }
  archival {
    configuration {
      archive-sites {
        ftp://<username>:<password>@<host>:<port>/<url-path>;
        ftp://<username>:<password>@<host>:<port>/<url-path>;
      }
      transfer-interval interval;
    }
  }
}
```

```

        transfer-on-commit;
    }
}
allow-v4mapped-packets;
arp {
    aging-timer minutes;
    gratuitous-arp-delay;
    gratuitous-arp-on-ifup;
    interfaces;
    passive-learning;
    purging;
}
authentication-order [ authentication-methods ];
backup-router address <destination destination-address>;
commit synchronize;
(compress-configuration-files | no-compress-configuration-files);
default-address-selection;
dump-device (compact-flash | remove-compact | usb);
diag-port-authentication (encrypted-password "password" | plain-text-password);
dynamic-profile-options {
    versioning;
}
domain-name domain-name;
domain-search [ domain-list ];
host-name hostname;
inet6-backup-router address <destination destination-address>;
internet-options {
    tcp-mss mss-value;
    (gre-path-mtu-discovery | no-gre-path-mtu-discovery);
    icmpv4-rate-limit bucket-size bucket-size packet-rate packet-rate;
    icmpv6-rate-limit bucket-size bucket-size packet-rate packet-rate;
    (ipip-path-mtu-discovery | no-ipip-path-mtu-discovery);
    (ipv6-path-mtu-discovery | no-ipv6-path-mtu-discovery);
    ipv6-path-mtu-discovery-timeout;
    no-tcp-rfc1323-paws;
    no-tcp-rfc1323;
    (path-mtu-discovery | no-path-mtu-discovery);
    source-port upper-limit <upper-limit>;
    (source-quench | no-source-quench);
    tcp-drop-synfin-set;
}
location {
    altitude feet;
    building name;
    country-code code;
    floor number;
    hcoord horizontal-coordinate;
    lata service-area;
    latitude degrees;
    longitude degrees;
    npa-nxx number;
    postal-code postal-code;
    rack number;
    vcoord vertical-coordinate;
}
login {

```

```

announcement text;
class class-name {
    access-end;
    access-start;
    allow-commands "regular-expression";
    ( allow-configuration | allow-configuration-regexps ) "regular expression 1" "regular
        expression 2";
    allowed-days;
    deny-commands "regular-expression";
    ( deny-configuration | deny-configuration-regexps ) "regular expression 1" "regular
        expression 2 ";
    idle-timeout minutes;
    login-script
    login-tip;
    permissions [ permissions ];
}
message text;
password {
    change-type (set-transitions | character-set);
    format (md5 | sha1 | des);
    maximum-length length;
    minimum-changes number;
    minimum-length length;
}
retry-options {
    backoff-threshold number;
    backoff-factor seconds;
    minimum-time seconds;
    tries-before-disconnect number;
}
user username {
    full-name complete-name;
    uid uid-value;
    class class-name;
    authentication {
        (encrypted-password "password" | plain-text-password);
        ssh-rsa "public-key";
        ssh-dsa "public-key";
    }
}
}
login-tip number;
mirror-flash-on-disk;
name-server {
    address;
}
no-multicast-echo;
no-redirects;
no-ping-record-route;
no-ping-time-stamp;
ntp {
    authentication-key key-number type type value password;
    boot-server address;
    broadcast <address> <key key-number> <version value> <ttl value>;
    broadcast-client;
    multicast-client <address>;
}

```

```
peer address <key key-number> <version value> <prefer>;
source-address source-address;
server address <key key-number> <version value> <prefer>;
trusted-key [ key-numbers ];
}
ports {
  auxiliary {
    type terminal-type;
  }
  pic-console-authentication {
    encrypted-password encrypted-password;
    plain-text-password;
    console {
      insecure;
      log-out-on-disconnect;
      type terminal-type;
      disable;
    }
  }
}
processes {
  process--name (enable | disable) failover (alternate-media | other-routing-engine);
  timeout seconds;
}
}
radius-server server-address {
  accounting-port port-number;
  port port-number;
  retry number;
  secret password;
  source-address source-address;
  timeout seconds;
}
radius-options {
  password-protocol mschap-v2;
}
attributes {
  nas-ip-address ip-address;
}
root-authentication {
  (encrypted-password "password" | plain-text-password);
  ssh-rsa "public-key";
  ssh-dsa "public-key";
}
(saved-core-context | no-saved-core-context);
saved-core-files saved-core-files;
scripts {
  commit {
    allow-transients;
    file filename {
      optional;
      refresh;
      refresh-from url;
      source url;
    }
  }
  traceoptions {
    file <filename> <files number> <size size> <world-readable | no-world-readable>;
    flag flag;
  }
}
```

```

        no-remote-trace;
    }
    op {
        file filename {
            arguments {
                argument-name {
                    description descriptive-text;
                }
            }
            command filename-alias;
            description descriptive-text;
            refresh;
            refresh-from url;
            source url;
        }
        refresh;
        refresh-from url;
        traceoptions {
            file <filename> <files number> <size size> <world-readable | no-world-readable>;
            flag flag;
            no-remote-trace;
        }
    }
}
services {
    finger {
        connection-limit limit;
        rate-limit limit;
    }
    flow-tap-dtcp {
        ssh {
            connection-limit limit;
            rate-limit limit;
        }
    }
    ftp {
        connection-limit limit;
        rate-limit limit;
    }
    service-deployment {
        servers server-address {
            port port-number;
        }
        source-address source-address;
    }
    ssh {
        root-login (allow | deny | deny-password);
        protocol-version [v1 v2];
        connection-limit limit;
        rate-limit limit;
    }
    telnet {
        connection-limit limit;
        rate-limit limit;
    }
    web-management {

```

```
http {
    interfaces [ interface-names ];
    port port;
}
https {
    interfaces [ interface-names ];
    local-certificate name;
    port port;
}
session {
    idle-timeout [ minutes ];
    session-limit [ session-limit ];
}
}
xnm-clear-text {
    connection-limit limit;
    rate-limit limit;
}
xnm-ssl {
    connection-limit limit;
    local-certificate name;
    rate-limit limit;
}
}
static-host-mapping {
    hostname {
        alias [ alias ];
        inet [ address ];
        sysid system-identifier;
    }
}
syslog {
    archive <files number> <size size> <world-readable | no-world-readable>;
    console {
        facility severity;
    }
    file filename {
        facility severity;
        archive <archive-sites {ftp-url <password password>}> <files number> <size size>
            <start-time "YYYY-MM-DD.hh:mm"> <transfer-interval minutes> <world-readable |
            no-world-readable>;
        explicit-priority;
        match "regular-expression";
        structured-data {
            brief;
        }
    }
}
host (hostname | other-routing-engine | scc-master) {
    facility severity;
    explicit-priority;
    facility-override facility;
    log-prefix string;
    match "regular-expression";
    source-address source-address;
    structured-data {
        brief;
    }
}
```

```
    }  
  }  
  source-address source-address;  
  time-format (year | millisecond | year millisecond);  
  user (username | *) {  
    facility severity;  
    match "regular-expression";  
  }  
}  
tacplus-options {  
  service-name service-name;  
  (no-cmd-attribute-value | exclude-cmd-attribute);  
}  
tacplus-server server-address {  
  secret password;  
  single-connection;  
  source-address source-address;  
  timeout seconds;  
}  
time-zone (GMThour-offset | time-zone);  
}  
tracing {  
  destination-override {  
    syslog host;  
  }  
}  
use-imported-time-zones;  
}
```

## authentication-key

---

<b>Syntax</b>	<code>authentication-key <i>key-number</i> type <i>type</i> value <i>password</i>;</code>
<b>Hierarchy Level</b>	[edit system <a href="#">ntp</a> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
<b>Description</b>	<p>Configure Network Time Protocol (NTP) authentication keys so that the router or switch can send authenticated packets. If you configure the router or switch to operate in authenticated mode, you must configure a key.</p> <p>Both the keys and the authentication scheme (MD5) must be identical between a set of peers sharing the same key number.</p>
<b>Options</b>	<p><b><i>key-number</i></b>—Positive integer that identifies the key.</p> <p><b><i>type type</i></b>—Authentication type. It can only be <b>md5</b>.</p> <p><b><i>value password</i></b>—The key itself, which can be from 1 through 8 ASCII characters. If the key contains spaces, enclose it in quotation marks.</p>
<b>Required Privilege Level</b>	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• <a href="#">Configuring NTP Authentication Keys on page 16</a></li><li>• <a href="#">broadcast on page 30</a></li><li>• <a href="#">peer on page 33</a></li><li>• <a href="#">server on page 34</a></li><li>• <a href="#">trusted-key</a></li></ul>



---

## boot-server (NTP)

---

<b>Syntax</b>	<code>boot-server (address   hostname);</code>
<b>Hierarchy Level</b>	[edit system <a href="#">ntp</a> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
<b>Description</b>	<p>Configure the server that NTP queries when the router or switch boots to determine the local date and time.</p> <p>When you boot the router or switch, it issues an <b>ntpdate</b> request, which polls a network server to determine the local date and time. You need to configure a server that the router or switch uses to determine the time when the router or switch boots. Otherwise, NTP will not be able to synchronize to a time server if the server's time appears to be very far off of the local router's or switch's time. You can either configure an IP address or a hostname for the boot server. If you configure a hostname instead of an IP address, the <b>ntpdate</b> request resolves the hostname to an IP address when the router or switch boots up.</p>
<b>Options</b>	<ul style="list-style-type: none"><li>• <b>address</b>—The IP address of an NTP boot server.</li><li>• <b>hostname</b>—The hostname of an NTP boot server.</li></ul>
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• <a href="#">Configuring the NTP Boot Server on page 11</a></li></ul>

## broadcast

---

<b>Syntax</b>	<code>broadcast address &lt;key key-number&gt; &lt;version value&gt; &lt;tll value&gt;;</code>
<b>Hierarchy Level</b>	[edit system <a href="#">ntp</a> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
<b>Description</b>	Configure the local router or switch to operate in broadcast mode with the remote system at the specified <b>address</b> . In this mode, the local router or switch sends periodic broadcast messages to a client population at the specified broadcast or multicast <b>address</b> . Normally, you include this statement only when the local router or switch is operating as a transmitter.
<b>Options</b>	<p><b>address</b>—The broadcast address on one of the local networks or a multicast address assigned to NTP. You must specify an address, not a hostname. If the multicast address is used, it must be <b>224.0.1.1</b>.</p> <p><b>key key-number</b>—(Optional) All packets sent to the address include authentication fields that are encrypted using the specified key number. <b>Range:</b> Any unsigned 32-bit integer</p> <p><b>tll value</b>—(Optional) Time-to-live (TTL) value to use. <b>Range:</b> 1 through 255 <b>Default:</b> 1</p> <p><b>version value</b>—(Optional) Specify the version number to be used in outgoing NTP packets. <b>Range:</b> 1 through 4 <b>Default:</b> 4</p>
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• <a href="#">Configuring the NTP Time Server and Time Services on page 12</a></li></ul>

## broadcast-client

---

<b>Syntax</b>	<code>broadcast-client;</code>
<b>Hierarchy Level</b>	[edit system <a href="#">ntp</a> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
<b>Description</b>	Configure the local router or switch to listen for broadcast messages on the local network to discover other servers on the same subnet.
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <a href="#">Configuring the Router or Switch to Listen for Broadcast Messages Using NTP on page 17</a></li> </ul>

## multicast-client

---

<b>Syntax</b>	<code>multicast-client &lt;address&gt;;</code>
<b>Hierarchy Level</b>	[edit system <a href="#">ntp</a> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
<b>Description</b>	For NTP, configure the local router or switch to listen for multicast messages on the local network to discover other servers on the same subnet.
<b>Options</b>	<b>address</b> —(Optional) One or more IP addresses. If you specify addresses, the router or switch joins those multicast groups. <b>Default:</b> 224.0.1.1.
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <a href="#">Configuring the Router or Switch to Listen for Multicast Messages Using NTP on page 17</a></li> </ul>

## ntp

---

<b>Syntax</b>	<pre>ntp {   authentication-key <i>number</i> type <i>type</i> value <i>password</i>;   boot-server <i>address</i>;   broadcast &lt;<i>address</i>&gt; &lt;<i>key key-number</i>&gt; &lt;<i>version value</i>&gt; &lt;<i>ttl value</i>&gt;;   broadcast-client;   multicast-client &lt;<i>address</i>&gt;;   peer <i>address</i> &lt;<i>key key-number</i>&gt; &lt;<i>version value</i>&gt; &lt;<i>prefer</i>&gt;;   server <i>address</i> &lt;<i>key key-number</i>&gt; &lt;<i>version value</i>&gt; &lt;<i>prefer</i>&gt;;   source-address <i>source-address</i>;   trusted-key [ <i>key-numbers</i> ]; }</pre>
<b>Hierarchy Level</b>	[edit system]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
<b>Description</b>	Configure NTP on the router or switch.  The remaining statements are explained separately.
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• <a href="#">Synchronizing and Coordinating Time Distribution Using NTP on page 10</a></li></ul>

## peer (NTP)

<b>Syntax</b>	<code>peer address &lt;key key-number&gt; &lt;version value&gt; &lt;prefer&gt;;</code>
<b>Hierarchy Level</b>	[edit system <a href="#">ntp</a> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
<b>Description</b>	For NTP, configure the local router or switch to operate in symmetric active mode with the remote system at the specified address. In this mode, the local router or switch and the remote system can synchronize with each other. This configuration is useful in a network in which either the local router or switch or the remote system might be a better source of time.
<b>Options</b>	<p><b>address</b>—Address of the remote system. You must specify an address, not a hostname.</p> <p><b>key key-number</b>—(Optional) All packets sent to the address include authentication fields that are encrypted using the specified key number.</p> <p><b>Range:</b> Any unsigned 32-bit integer</p> <p><b>prefer</b>—(Optional) Mark the remote system as the preferred host, which means that if all other factors are equal, this remote system is chosen for synchronization among a set of correctly operating systems.</p> <p><b>version value</b>—(Optional) Specify the NTP version number to be used in outgoing NTP packets.</p> <p><b>Range:</b> 1 through 4</p> <p><b>Default:</b> 4</p>
<b>Required Privilege Level</b>	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <a href="#">Configuring the NTP Time Server and Time Services on page 12</a></li> </ul>

## server (NTP)

---

<b>Syntax</b>	<code>server address &lt;key key-number&gt; &lt;version value&gt; &lt;prefer&gt;;</code>
<b>Hierarchy Level</b>	[edit system <a href="#">ntp</a> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
<b>Description</b>	For NTP, configure the local router or switch to operate in client mode with the remote system at the specified <b>address</b> . In this mode, the local router or switch can be synchronized with the remote system, but the remote system can never be synchronized with the local router or switch.
<b>Options</b>	<p><b>address</b>—Address of the remote system. You must specify an address, not a hostname.</p> <p><b>key key-number</b>—(Optional) Use the specified key number to encrypt authentication fields in all packets sent to the specified address.</p> <p><b>Range:</b> Any unsigned 32-bit integer</p> <p><b>prefer</b>—(Optional) Mark the remote system as preferred host, which means that if all other things are equal, this remote system is chosen for synchronization among a set of correctly operating systems.</p> <p><b>version value</b>—(Optional) Specify the version number to be used in outgoing NTP packets.</p> <p><b>Range:</b> 1 through 4</p> <p><b>Default:</b> 4</p>
<b>Required Privilege Level</b>	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• <a href="#">Configuring the NTP Time Server and Time Services on page 12</a></li></ul>

## source-address (NTP, RADIUS, System Logging, or TACACS+)

<b>Syntax</b>	<code>source-address <i>source-address</i>;</code>
<b>Hierarchy Level</b>	[edit system accounting destination radius server <i>server-address</i> ], [edit system accounting destination tacplus server <i>server-address</i> ], [edit system <i>ntp</i> ], [edit system radius-server <i>server-address</i> ], [edit system syslog], [edit system tacplus-server <i>server-address</i> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
<b>Description</b>	Specify a source address for each configured TACACS+ server, RADIUS server, NTP server, or the source address to record in system log messages that are directed to a remote machine.
<b>Options</b>	<b><i>source-address</i></b> —A valid IP address configured on one of the router or switch interfaces. For system logging, the address is recorded as the message source in messages sent to the remote machines specified in all <b>host <i>hostname</i></b> statements at the <b>[edit system syslog]</b> hierarchy level, but not for messages directed to the other Routing Engine or to the TX Matrix router or TX Matrix Plus router in a routing matrix based on a TX Matrix router or TX Matrix Plus router.
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Configuring RADIUS Authentication</li> <li><a href="#">Specifying a Source Address for an NTP Server on page 11</a></li> <li>Specifying an Alternative Source Address for System Log Messages</li> </ul>

## system

<b>Syntax</b>	<code>system { ... }</code>
<b>Hierarchy Level</b>	[edit]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
<b>Description</b>	Configure system management properties.
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li><a href="#">System Management Configuration Statements on page 21</a></li> </ul>

## time-zone

<b>Syntax</b>	<code>time-zone (GMT <i>hour-offset</i>   <i>time-zone</i>);</code>
<b>Hierarchy Level</b>	[edit system]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches. <b>GMT <i>hour-offset</i></b> option added in Junos OS Release 7.4.
<b>Description</b>	Set the local time zone. To have the time zone change take effect for all processes running on the router or switch, you must reboot the router or switch.
<b>Default</b>	UTC
<b>Options</b>	<p><b>GMT <i>hour-offset</i></b>—Set the time zone relative to UTC time.</p> <p><b>Range:</b> -14 through +12</p> <p><b>Default:</b> 0</p> <p><b><i>time-zone</i></b>—Specify the time zone as <b>UTC</b>, which is the default time zone, or as a string such as PDT (Pacific Daylight Time), or use one of the following continents and major cities:</p> <p>Africa/Abidjan, Africa/Accra, Africa/Addis_Ababa, Africa/Algiers, Africa/Asmera, Africa/Bamako, Africa/Bangui, Africa/Banjul, Africa/Bissau, Africa/Blantyre, Africa/Brazzaville, Africa/Bujumbura, Africa/Cairo, Africa/Casablanca, Africa/Ceuta, Africa/Conakry, Africa/Dakar, Africa/Dar_es_Salaam, Africa/Djibouti, Africa/Douala, Africa/El_Aaiun, Africa/Freetown, Africa/Gaborone, Africa/Harare, Africa/Johannesburg, Africa/Kampala, Africa/Khartoum, Africa/Kigali, Africa/Kinshasa, Africa/Lagos, Africa/Libreville, Africa/Lome, Africa/Luanda, Africa/Lubumbashi, Africa/Lusaka, Africa/Malabo, Africa/Maputo, Africa/Maseru, Africa/Mbabane, Africa/Mogadishu, Africa/Monrovia, Africa/Nairobi, Africa/Ndjamena, Africa/Niamey, Africa/Nouakchott, Africa/Ouagadougou, Africa/Porto-Novo, Africa/Sao_Tome, Africa/Timbuktu, Africa/Tripoli, Africa/Tunis, Africa/Windhoek</p> <p>America/Adak, America/Anchorage, America/Anguilla, America/Antigua, America/Aruba, America/Asuncion, America/Barbados, America/Belize, America/Bogota, America/Boise, America/Buenos_Aires, America/Caracas, America/Catamarca, America/Cayenne, America/Cayman, America/Chicago, America/Cordoba, America/Costa_Rica, America/Cuiaba, America/Curacao, America/Dawson, America/Dawson_Creek, America/Denver, America/Detroit, America/Dominica, America/Edmonton, America/El_Salvador, America/Ensenada, America/Fortaleza, America/Glace_Bay, America/Godthab, America/Goose_Bay, America/Grand_Turk, America/Grenada, America/Guadeloupe, America/Guatemala, America/Guayaquil, America/Guyana, America/Halifax, America/Havana, America/Indiana/Knox, America/Indiana/Marengo, America/Indiana/Vevay, America/Indianapolis, America/Inuvik, America/Iqaluit, America/Jamaica, America/Jujuy, America/Juneau, America/La_Paz, America/Lima, America/Los_Angeles, America/Louisville, America/Maceio, America/Managua, America/Manaus, America/Martinique, America/Mazatlan, America/Mendoza, America/Menominee, America/Mexico_City, America/Miquelon, America/Montevideo, America/Montreal, America/Montserrat, America/Nassau, America/New_York, America/Nipigon, America/Nome, America/Noronha, America/Panama, America/Pangnirtung, America/Paramaribo, America/Phoenix, America/Port-au-Prince,</p>



America/Port\_of\_Spain, America/Porto\_Acre, America/Puerto\_Rico, America/Rainy\_River, America/Rankin\_Inlet, America/Regina, America/Rosario, America/Santiago, America/Santo\_Domingo, America/Sao\_Paulo, America/Scoresbysund, America/Shiprock, America/St\_Johns, America/St\_Kitts, America/St\_Lucia, America/St\_Thomas, America/St\_Vincent, America/Swift\_Current, America/Tegucigalpa, America/Thule, America/Thunder\_Bay, America/Tijuana, America/Tortola, America/Vancouver, America/Whitehorse, America/Winnipeg, America/Yakutat, America/Yellowknife

Antarctica/Casey, Antarctica/DumontDURville, Antarctica/Mawson, Antarctica/McMurdo, Antarctica/Palmer, Antarctica/South\_Pole

Arctic/Longyearbyen

Asia/Aden, Asia/Alma-Ata, Asia/Amman, Asia/Anadyr, Asia/Aqtau, Asia/Aqtobe, Asia/Ashkhabad, Asia/Baghdad, Asia/Bahrain, Asia/Baku, Asia/Bangkok, Asia/Beirut, Asia/Bishkek, Asia/Brunei, Asia/Calcutta, Asia/Chungking, Asia/Colombo, Asia/Dacca, Asia/Damascus, Asia/Dubai, Asia/Dushanbe, Asia/Gaza, Asia/Harbin, Asia/Hong\_Kong, Asia/Irkutsk, Asia/Ishigaki, Asia/Jakarta, Asia/Jayapura, Asia/Jerusalem, Asia/Kabul, Asia/Kamchatka, Asia/Karachi, Asia/Kashgar, Asia/Katmandu, Asia/Krasnoyarsk, Asia/Kuala\_Lumpur, Asia/Kuching, Asia/Kuwait, Asia/Macao, Asia/Magadan, Asia/Manila, Asia/Muscat, Asia/Nicosia, Asia/Novosibirsk, Asia/Omsk, Asia/Phnom\_Penh, Asia/Pyongyang, Asia/Qatar, Asia/Rangoon, Asia/Riyadh, Asia/Saigon, Asia/Seoul, Asia/Shanghai, Asia/Singapore, Asia/Taipei, Asia/Tashkent, Asia/Tbilisi, Asia/Tehran, Asia/Thimbu, Asia/Tokyo, Asia/Ujung\_Pandang, Asia/Ulan\_Bator, Asia/Urumqi, Asia/Vientiane, Asia/Vladivostok, Asia/Yakutsk, Asia/Yekaterinburg, Asia/Yerevan

Atlantic/Azores, Atlantic/Bermuda, Atlantic/Canary, Atlantic/Cape\_Verde, Atlantic/Faeroe, Atlantic/Jan\_Mayen, Atlantic/Madeira, Atlantic/Reykjavik, Atlantic/South\_Georgia, Atlantic/St\_Helena, Atlantic/Stanley

Australia/Adelaide, Australia/Brisbane, Australia/Broken\_Hill, Australia/Darwin, Australia/Hobart, Australia/Lindeman, Australia/Lord\_Howe, Australia/Melbourne, Australia/Perth, Australia/Sydney

Europe/Amsterdam, Europe/Andorra, Europe/Athens, Europe/Belfast, Europe/Belgrade, Europe/Berlin, Europe/Bratislava, Europe/Brussels, Europe/Bucharest, Europe/Budapest, Europe/Chisinau, Europe/Copenhagen, Europe/Dublin, Europe/Gibraltar, Europe/Helsinki, Europe/Istanbul, Europe/Kaliningrad, Europe/Kiev, Europe/Lisbon, Europe/Ljubljana, Europe/London, Europe/Luxembourg, Europe/Madrid, Europe/Malta, Europe/Minsk, Europe/Monaco, Europe/Moscow, Europe/Oslo, Europe/Paris, Europe/Prague, Europe/Riga, Europe/Rome, Europe/Samara, Europe/San\_Marino, Europe/Sarajevo, Europe/Simferopol, Europe/Skopje, Europe/Sofia, Europe/Stockholm, Europe/Tallinn, Europe/Tirane, Europe/Vaduz, Europe/Vatican, Europe/Vienna, Europe/Vilnius, Europe/Warsaw, Europe/Zagreb, Europe/Zurich

Indian/Antananarivo, Indian/Chagos, Indian/Christmas, Indian/Cocos, Indian/Comoro, Indian/Kerguelen, Indian/Mahe, Indian/Maldives, Indian/Mauritius, Indian/Mayotte, Indian/Reunion

Pacific/Apia, Pacific/Auckland, Pacific/Chatham, Pacific/Easter, Pacific/Efate, Pacific/Enderbury, Pacific/Fakaofu, Pacific/Fiji, Pacific/Funafuti, Pacific/Galapagos, Pacific/Gambier, Pacific/Guadalcanal, Pacific/Guam, Pacific/Honolulu, Pacific/Johnston, Pacific/Kiritimati, Pacific/Kosrae, Pacific/Kwajalein, Pacific/Majuro, Pacific/Marquesas, Pacific/Midway, Pacific/Nauru, Pacific/Niue, Pacific/Norfolk, Pacific/Noumea, Pacific/Pago\_Pago, Pacific/Palau, Pacific/Pitcairn, Pacific/Ponape, Pacific/Port\_Moresby, Pacific/Rarotonga, Pacific/Saipan, Pacific/Tahiti, Pacific/Tarawa, Pacific/Tongatapu, Pacific/Truk, Pacific/Wake, Pacific/Wallis, Pacific/Yap

<b>Required Privilege</b>	system—To view this statement in the configuration.
<b>Level</b>	system-control—To add this statement to the configuration.

- Related Documentation**
- [Modifying the Default Time Zone for a Router or Switch Running Junos OS on page 9](#)
  - [System Management Configuration Statements on page 21](#)

---

## use-imported-time-zones

---

<b>Syntax</b>	use-imported-time-zones;
<b>Hierarchy Level</b>	[edit system]
<b>Release Information</b>	Statement introduced in Junos OS Release 9.0.
<b>Description</b>	Configure a custom time zone from a locally generated time-zone database.
<b>Required Privilege Level</b>	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• <a href="#">Setting a Custom Time Zone on Routers or Switches Running Junos OS on page 18</a></li></ul>

## PART 3

# Administration

- [Monitoring Commands on page 41](#)



## CHAPTER 4

# Monitoring Commands

## show ntp associations

<b>Syntax</b>	<code>show ntp associations</code> <code>&lt;no-resolve&gt;</code>
<b>Release Information</b>	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches. Command introduced in Junos OS Release 11.1 for the QFX Series.
<b>Description</b>	Display Network Time Protocol (NTP) peers and their state.
<b>Options</b>	<b>none</b> —Display NTP peers and their state. <b>no-resolve</b> —(Optional) Suppress symbolic addressing.
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li><a href="#">show ntp status on page 44</a></li> </ul>
<b>List of Sample Output</b>	<a href="#">show ntp associations on page 43</a>
<b>Output Fields</b>	<a href="#">Table 3 on page 42</a> describes the output fields for the <b>show ntp associations</b> command. Output fields are listed in the approximate order in which they appear.

**Table 3: show ntp associations Output Fields**

Field Name	Field Description
<b>remote</b>	Address or name of the remote NTP peer.
<b>refid</b>	Reference identifier of the remote peer. If the reference identifier is not known, this field shows a value of <b>0.0.0.0</b> .
<b>st</b>	Stratum of the remote peer.
<b>t</b>	Type of peer: <b>b</b> (broadcast), <b>l</b> (local), <b>m</b> (multicast), or <b>u</b> (unicast).
<b>when</b>	When the last packet from the peer was received.
<b>poll</b>	Polling interval, in seconds.
<b>reach</b>	Reachability register, in octal.
<b>delay</b>	Current estimated delay of the peer, in milliseconds.
<b>offset</b>	Current estimated offset of the peer, in milliseconds.
<b>disp</b>	Current estimated dispersion of the peer, in milliseconds.

Table 3: show ntp associations Output Fields (*continued*)

Field Name	Field Description
<i>peer-name</i>	<p>Peer name and status of the peer in the clock selection process:</p> <ul style="list-style-type: none"> <li>• space—Discarded because of a high stratum value or failed sanity checks.</li> <li>• x—Designated "falseticker" by the intersection algorithm.</li> <li>• .—Culled from the end of the candidate list.</li> <li>• — —Discarded by the clustering algorithm.</li> <li>• +—Included in the final selection set.</li> <li>• #—Selected for synchronization, but the distance exceeds the maximum.</li> <li>• *—Selected for synchronization.</li> <li>• o—Selected for synchronization, but the packets-per-second (pps) signal is in use.</li> </ul>

## Sample Output

```

show ntp associations  user@host> show ntp associations
                      remote          refid      st t when poll reach  delay  offset  disp
=====
*wolfe-gw.junipe tick.ucla.edu      2 u  43   64  377    1.86   0.319   0.08

```

## show ntp status

<b>Syntax</b>	<code>show ntp status</code> <code>&lt;no-resolve&gt;</code>
<b>Release Information</b>	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches. Command introduced in Junos OS Release 11.1 for the QFX Series.
<b>Description</b>	Display the values of internal variables returned by Network Time Protocol (NTP) peers.
<b>Options</b>	<b>none</b> —Display the values of internal variables returned by NTP peers. <b>no-resolve</b> —(Optional) Suppress symbolic addressing.
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <a href="#">show ntp associations on page 42</a></li> </ul>
<b>List of Sample Output</b>	<a href="#">show ntp status on page 45</a>
<b>Output Fields</b>	<a href="#">Table 4 on page 44</a> describes the output fields for the <b>show ntp status</b> command. Output fields are listed in the approximate order in which they appear.

**Table 4: show ntp status Output Fields**

Field Name	Field Description
<b>status</b>	System status word, a code representing the status items listed.
<b>leap_none</b>	Indicates a normal synchronized state with no leap seconds imminent. Other options could be <b>leap_add_sec</b> , <b>leap_del_sec</b> , or <b>leap_alarm</b> , indicating a leap second will be added, deleted, or a leap second requirement is upcoming.
<b>sync_ntp</b>	Indicates the current synchronization source, in this case, an NTP server. Other options include <b>sync_alarm</b> and <b>sync_unspec</b> , both indicating that the router has not been synched.
<b>x events</b>	Indicates the number of events that have occurred since that last code change. An event is often the receipt of an NTP polling message.
<b>event_peer/strat_chg</b>	Describes the most recent event, in this case, the stratum of the peer server changed.
<b>version</b>	A detailed description of the version of NTP being used.
<b>processor</b>	Indicates the current hardware platform and version of the processor.
<b>system</b>	Detailed description of the name and version of the operating system in use.
<b>leap</b>	The number of leap seconds in use.



Table 4: show ntp status Output Fields (*continued*)

Field Name	Field Description
<b>stratum</b>	The stratum of the peer server. Anything greater than 1 is a secondary reference source, and the number roughly represents the number of hops away from the stratum1 server.. Stratum 1 is a primary reference, such as an atomic clock.
<b>precision</b>	The precision of the peer clock, how precisely the frequency and time can be maintained with this particular timekeeping system.
<b>rootdelay</b>	The total roundtrip delay to the primary reference source, in seconds.
<b>rootdispersion</b>	The maximum error relative to the primary reference source, in seconds.
<b>peer</b>	An identification number of the peer in use.
<b>refid</b>	Reference identifier of the remote peer. If the reference identifier is not known, this field shows a value of 0.0.0.0.
<b>reftime</b>	The local time, in timestamp format, when the local clock was last updated. If the local clock has never been synchronized, the value is zero.
<b>poll</b>	The NTP broadcast message polling interval, in seconds.
<b>clock</b>	The current time on the local router clock.
<b>state</b>	The current mode of NTP operation, where 1 is symmetric active, 2 is symmetric passive, 3 is client, 4 is server, and 5 is broadcast.
<b>offset</b>	Current estimated offset of the peer, in milliseconds. Indicates the time difference between the reference clock and the local clock.
<b>frequency</b>	The frequency of the clock.
<b>jitter</b>	Indicates the magnitude of jitter, in milliseconds, between several time queries.
<b>stability</b>	A measure of how well this clock can maintain a constant frequency.

## Sample Output

### show ntp status

```

user@host> show ntp status
assID=0 status=0544 leap_none, sync_local_proto, 4 events, event_peer/strat_chg,
version="ntpd 4.2.2p1@1.1570-o Tue May 19 13:57:55 UTC 2009 (1)",
processor="x86_64", system="Linux/2.6.18-164.el5", leap=00, stratum=4,
precision=-10, rootdelay=0.000, rootdispersion=11.974, peer=59475,
refid=LOCAL(0),
reftime=d495c32c.0e71eaf2 Mon, Jan 7 2013 13:57:00.056, poll=10,
clock=d495c32c.cebd43bd Mon, Jan 7 2013 13:57:00.807, state=4,
offset=0.000, frequency=0.000, jitter=0.977, noise=0.977,
stability=0.000, tai=0

```



## PART 4

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