ERICSSON

Configuring NTP

SYSTEM ADMINISTRATOR GUIDE

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Contents

1	**Overview**	**1**
2	**Configuration and Operations Tasks**	**2**
2.1	Configure an NTP Server in a Context	3
2.2	Configure an NTP Peer in a Context	4
2.3	Configure slowsync for NTP	4
2.4	Operations Tasks	4
3	**Configuration Examples**	**5**

1 Overview

This document provides an overview of the Network Time Protocol (NTP) features supported by the SmartEdge router and describes the tasks performed to configure, monitor, and administer NTP. This document also provides NTP configuration examples.

This document applies to both the Ericsson SmartEdge® and SM family routers. However, the software that applies to the SM family of systems is a subset of the SmartEdge OS; some of the functionality described in this document may not apply to SM family routers.

For information specific to the SM family chassis, including line cards, refer to the SM family chassis documentation.

For specific information about the differences between the SmartEdge and SM family routers, refer to the Technical Product Description *SM Family of Systems* (part number 5/221 02-CRA 119 1170/1) in the **`Product Overview`** folder of this Customer Product Information library.

The SmartEdge router supports NTP as described in RFC 1305, *Network Time Protocol*. Although the default version is version 3, the SmartEdge router also supports NTP versions 1 and 2. NTP exchanges timekeeping information between servers and clients and among peers to synchronize clocks. NTP makes estimates based on several variables, including network delay, dispersion of packet exchanges, and clock offset. Extremely reliable sources, such as atomic or radio clocks and Global Positioning System (GPS) satellite timing receivers, act as primary servers. Company or campus servers can act as secondary time servers. To reduce overhead, secondary servers distribute time to attached local hosts.

On the SmartEdge® router, you configure NTP at the context level. You can configure multiple contexts as NTP servers and multiple peers and clients in each context, but there is a single NTP process on each router that synchronizes the system clock with the authoritative time source. You can configure each NTP server to broadcast NTP messages on the same subnet as the configured NTP broadcast interface.

Because the SmartEdge OS uses the time synchronized by NTP to set the log file timestamp, NTP poses a security risk. By falsifying NTP information, an attacker could alter timestamp information to obscure evidence of an attack. To protect the NTP server, use IP access control lists (ACLs) applied with an administrative ACL in each context serving as an NTP server or peer .

2 Configuration and Operations Tasks

Note: In this section, the command syntax in the task tables displays only the root command; for the complete command syntax, see *Command List*.

To configure NTP, perform the tasks described in the following sections.

2.1 Configure an NTP Server in a Context

To configure an NTP server in a context, perform the tasks described in Table 1.

Table 1 Configure an NTP Server in a Context

Task	Root Command	Notes
Access the context and context configuration mode.	*context*	Enter this command in global configuration mode.
Access NTP server configuration mode.	*ntp-mode*	Enter this command in context configuration mode.
Enable the NTP server in a context	*server-mode*	Add this command in any context that will use NTP as a server. Use the `no` form of the command to disable the NTP server in the context.
Configure the time source for the NTP server.	*server*	You can identify the time source and NTP version.
Configure the server to broadcast time updates to peers, which must be on a subnet of the server.	*ntp-broadcast*	Enter this command in interface configuration mode in the interface connected to the subnet for the peers.
For server security, configure an ACL.	*ip access-list*	Set up rules to limit the NTP servers that can synchronize local NTP peers.
Apply the IP ACL to the context with an administrative access-group.	*admin-access-group*	Add the ACL for NTP at the beginning of any list of ACL rules so it will run first. For more information, see *Configuring ACLs*.

2.2 Configure an NTP Peer in a Context

To configure an NTP peer in a context, perform the tasks in Table 2.

Table 2 Configure an NTP Peer in a Context

Task	Root Command	Notes
Configure an NTP peer in a context.	*peer*	Enter this command in NTP server configuration mode; see Table 1 for the commands to access this mode.

2.3 Configure slowsync for NTP

To configure an NTP server to gradually adjust to changes in the time source, perform the steps in Table 3.

Table 3 Configure an NTP Server to Gradually Adjust to Time Changes

Task	Root Command	Notes
Configure the NTP server to gradually adjust to time changes.	*slowsync*	Use this command to set NTP to slowly adjust to changes in the time source. Enter this command in NTP server configuration mode.

2.4 Operations Tasks

To monitor, troubleshoot, and administer NTP features, perform the operations tasks described in Table 4. Enter the **`debug`** command in exec mode; enter the **`show`** commands in any mode.

Table 4 NTP Operations Tasks

Task	Command	Notes
Enable the generation of NTP debug messages.	*debug ntp*	You can generate debugging logs of all NTP messages, NTP general, NTP packet, or NTP update messages.
Display the current NTP configuration.	*show configuration ntp*	

Table 4 NTP Operations Tasks

Task	Command	Notes
Display current associations with remote NTP servers and list daemon statistics for those servers.	*show ntp associations*	For more comprehensive information, use the **`detail`** keyword. For information about NTP in all contexts, use the **`all-contexts`** keyword.
Display current NTP parameter settings and synchronization status.	*show ntp status*	

3 Configuration Examples

The following example shows how to configure the NTP server and peers in the `isp202` context.

```
[local]Redback(config)#context isp202
[local]Redback(config-ctx)#ntp-mode
[local]Redback(config-ntp-server)#server-mode
[local]Redback(config-ntp-server)#server 1.1.1.2 prefer source ntp
[local]Redback(config-ntp-server)#peer 1.1.1.7 source ntp
[local]Redback(config-ntp-server)#peer 1.1.1.5 source ntp
[local]Redback(config-ntp-server)#peer 1.1.1.6 source ntp
[local]Redback(config-ntp-server)#exit
[local]Redback(config-ctx)#ip access-list ntp
[local]Redback(config-access-list)#seq 20 permit udp 1.1.1.0 0.0.0.255 host 1.1.1.2 eq ntp
[local]Redback(config-access-list)#seq 30 permit udp 1.1.2.0 0.0.0.255 host 1.1.1.2 eq ntp
[local]Redback(config-access-list)#seq 40 permit udp 1.1.3.0 0.0.0.255 host 1.1.1.2 eq ntp
[local]Redback(config-access-list)#seq 50 deny udp any any eq ntp
[local]Redback(config-access-list)#exit
[local]Redback(config-ctx)#interface ntp
[local]Redback(config-if)#ip address 1.1.1.2/24
 [local]Redback(config-if)#ntp-broadcast
```

The following example shows detailed information about NTP associations for a server and its peers:

```
[local]Redback#show ntp association detail
remote 155.53.12.12, local 10.192.17.246
hmode client, pmode unspec, stratum 4, precision -18
leap 00, refid [130.100.199.242], rootdistance 0.20607, rootdispersion 0.09840
ppoll 6, hpoll 6, keyid 0, version 3, association 1508
valid 7, reach 377, unreach 0, flash 0x0000, boffset 0.00000, ttl/mode 0
timer 0s, flags system_peer, config, bclient
reference time:      cf15e293.0af6a289  Thu, Feb  4 2010 16:19:31.042
originate timestamp: cf15e8eb.30cf72d9  Thu, Feb  4 2010 16:46:35.190
receive timestamp:   cf15e8ea.2e3065f9  Thu, Feb  4 2010 16:46:34.180
transmit timestamp:  cf15e8e9.c66f2e8c  Thu, Feb  4 2010 16:46:33.775
filter delay:  0.40527  0.33043  0.10486  0.11139
               0.17230  0.12062  0.16760  0.15277
filter offset: 1.212877 1.044107 1.050654 0.985800
               0.714899 0.650443 0.531281 0.360664
filter order:  2        3        5        7
               6        4        1        0
offset 1.050654, delay 0.10486, error bound 0.05133, filter error 0.36215
context id: 0x40080001
```