

# LOTC Time Synchronization

---

## OPERATING INSTRUCTIONS

**Copyright**

© Ericsson AB 2014–2017. All rights reserved. No part of this document may be reproduced in any form without the written permission of the copyright owner.

**Disclaimer**

The contents of this document are subject to revision without notice due to continued progress in methodology, design and manufacturing. Ericsson shall have no liability for any error or damage of any kind resulting from the use of this document.

**Trademark List**

All trademarks mentioned herein are the property of their respective owners. These are shown in the document Trademark Information.



# Contents

<b>1</b>	<b>Introduction</b>	<b>1</b>
1.1	Alarm Description	1
1.2	Prerequisites	5
<b>2</b>	<b>Procedure</b>	<b>7</b>
2.1	Analyzing Alarm	7
2.2	Actions for Time Difference over Threshold	7
2.3	Actions for Unusable Time Servers	8
2.4	Actions for Rejected Time Servers	8
2.5	Actions for Unreachable Time Servers	9





# 1 Introduction

This instruction concerns alarm handling.

## 1.1 Alarm Description

The alarm is raised in the following situations:

- The time difference within the cluster exceeds tolerance.
- The Managed Element (ME) fails to use the Network Time Protocol (NTP) service.

The possible alarm causes and fault locations are explained in Table 1.

*Table 1 Alarm Causes*

Alarm Cause	Description	Fault Reason	Fault Location	Impact
Time difference within the cluster exceeds tolerance	There are time differences between the hosts in the cluster exceeding the threshold value of 10 seconds	Timing within the cluster is disrupted because of maintenance activities	One or more hosts can be rebooting	Time stamps used in cluster services (such as logging, alarms, or charging records) start to differ from the real time
		A host is rebooting		



Table 1 Alarm Causes

Alarm Cause	Description	Fault Reason	Fault Location	Impact
Failing to use the NTP service	The configured NTP servers do not respond to a request for time synchronization or provide an invalid answer to the ME.  The ME cannot use the NTP service.	One or more NTP servers are down (unreachable NTP servers)	NTP server	If one or more NTP servers are unreachable, the result is a loss in resilience with no service impact.  If all NTP servers are unreachable, then time stamps used in cluster services (such as logging, alarms, or charging records) start to differ from the real time.
		The ME rejected the time offered by the NTP server	NTP server configuration, firewall configuration	
		Loss of connectivity to one or more NTP servers (unreachable NTP server)	Network problems	
		The NTP server is unusable and its Fully Qualified Domain Name (FQDN) cannot be resolved	Domain Name System (DNS) server	
		Faulty network interface	Network interface	

**Note:** This alarm can appear as a result of a maintenance activity.

The alarm attributes are listed and explained in Table 2.

Table 2 Alarm Attributes

Attribute Name	Attribute Value
Major Type	193
Minor Type	3341942785
Source	One of the following: <ul style="list-style-type: none"><li>ManagedElement=&lt;node_name&gt;, HostName=&lt;hostname&gt;, ERIC-LINUX_CONTROL-*</li><li>ManagedElement=&lt;node_name&gt;, HostName=&lt;hostname&gt;, ERIC-LINUX_PAYLOAD-*</li></ul>

*Table 2 Alarm Attributes*

<b>Attribute Name</b>	<b>Attribute Value</b>
Specific Problem	LOTC Time Synchronization
Event Type	environmentalAlarm (6)
Probable Cause	x736UnspecifiedReason (418)



Table 2 Alarm Attributes

Attribute Name	Attribute Value		
Additional Text	Time incorrect (off by <i>&lt;value&gt;</i> seconds)	One of the following: <ul style="list-style-type: none"><li>• Time servers not reachable: <i>&lt;ip_address/name&gt;</i> (unusable)</li><li>• Time servers not reachable: <i>&lt;ip_address/name&gt;</i> (rejected at initial selection)</li><li>• Time servers not reachable: <i>&lt;ip_address/name&gt;</i> (rejected at reselection)</li><li>• Time servers not reachable: <i>&lt;ip_address/name&gt;</i> (unreachable)</li><li>• Could not initialize socket</li><li>• Could not send/receive ntp system status query</li><li>• Could not send/receive ntp peer status query</li><li>• Failed to interpret answer from NTP server</li><li>• Time servers not configured</li><li>• Local time server raised alarm condition</li></ul>	Time servers not reachable: <i>&lt;ip_address/name&gt;</i> (unreachable)
Perceived Severity	critical (3): there are time differences between the hosts in the cluster exceeding the threshold value	major (4): contact with all NTP servers is lost	minor (5): one or more NTP servers cannot be used or reached



## 1.2 Prerequisites

This section provides information on the documents, tools, and conditions that apply to the procedure.

### 1.2.1 Documents

This instruction references the following document:

- *Data Collection Guideline*

### 1.2.2 Tools

No tools are required.

### 1.2.3 Conditions

Before starting this procedure, ensure that the following conditions are met:

- A LOTC Time Synchronization alarm is raised.
- It is known how to map the `HostName` (part of alarm attribute `Source`) to its IP address.
- The user has administrative privileges.





## 2 Procedure

This section describes the procedure to follow when this alarm is received.

### 2.1 Analyzing Alarm

Select the appropriate action:

- If Additional Text contains `Time incorrect`, proceed with Section 2.2 Actions for Time Difference over Threshold on page 7.
- If Additional Text contains `unusable`, proceed with Section 2.3 Actions for Unusable Time Servers on page 8.
- If Additional Text contains `rejected`, proceed with Section 2.4 Actions for Rejected Time Servers on page 8.
- If Additional Text contains `unreachable`, proceed with Section 2.5 Actions for Unreachable Time Servers on page 9.

In all other situations, do the following:

1. Perform data collection, refer to *Data Collection Guideline*.
2. Consult the next level of maintenance support. Further actions are outside the scope of this instruction.

### 2.2 Actions for Time Difference over Threshold

Do the following:

1. Log on to the host to access a Linux® shell, for example:

```
ssh <user>@<hostname> -p 7022
```

The hostname is part of alarm attribute Source.

2. Wait up to 20 minutes until the cluster reaches a stable state (that is, no node is rebooting). Check the state:

```
>cmw-status node
```

```
Status OK
```

3. Is the alarm cleared?

Yes: Proceed with Step 6.

No: Continue with the next step.



4. Perform data collection, refer to *Data Collection Guideline*.
5. Consult the next level of maintenance support. Further actions are outside the scope of this instruction.
6. Job is completed.

## 2.3 Actions for Unusable Time Servers

Do the following:

1. Log on to the host to access a Linux shell, for example:

```
ssh <user>@<hostname> -p 7022
```

The hostname is part of alarm attribute Source.

2. Perform a lookup of the NTP server:

```
>nslookup <ntp_fqdn>
```

**Note:** The NTP server FQDN is pointed at by alarm attribute Additional Text.

3. Does the command return an error?

Yes: The DNS server can have a configuration fault. Request the DNS server administrator to act on the fault. Proceed with Step 6.

No: Continue with the next step.

4. Perform data collection, refer to *Data Collection Guideline*.
5. Consult the next level of maintenance support. Further actions are outside the scope of this instruction.
6. Job is completed.

## 2.4 Actions for Rejected Time Servers

Do the following:

1. Log on to the host to access a Linux shell, for example:

```
ssh <user>@<hostname> -p 7022
```

The hostname is part of alarm attribute Source.

2. Check the NTP status:

```
>ntpq -p
```



The NTP is functional if the output includes an active server, indicated by \*. Backup sources are indicated with + in the output.

The following is an example output:

```
node1-kvm1:~ # ntpq -p
remote refid st t when poll reach delay offset jitter
=====
+ns1.ericsson.se 192.0.2.10 2 u 239 1024 377 1.390 1.099 0.147
*ns2.ericsson.se 192.0.2.11 2 u 287 1024 377 1.260 1.272 0.181
+node2-kvm1 193.180.251.38 3 u 735 1024 377 0.321 0.121 0.142
```

3. Does the output show that an NTP server is active?

Yes: The NTP server can have a configuration fault. Request the NTP server administrator to act on the fault. Proceed with Step 5.

No: Continue with the next step.

4. The network blocking the NTP traffic can have a configuration fault. Request the network administrator to act on the fault. Continue with the next step.
5. Job is completed.

## 2.5 Actions for Unreachable Time Servers

Do the following:

1. Log on to the host to access a Linux shell, for example:

```
ssh <user>@<hostname> -p 7022
```

The hostname is part of alarm attribute Source.

2. Is the affected node a payload node?

Yes: Proceed with Step 11.

No: Continue with the next step.

3. Check the connection to the NTP server using **ping** and **traceroute**.

The NTP server FQDN is pointed at by alarm attribute Additional Text.

4. Can the NTP server be reached with a delay less than 10 seconds?

Yes: Proceed with Step 6.

No: Continue with the next step.

5. The network can have a configuration fault. Request the NTP server administrator or network administrator to act on the fault. Proceed with Step 17.



6. Check the NTP configuration in configuration file `cluster.conf`.
7. Is the NTP server FQDN or IP address correct?  
Yes: Proceed with Step 11.  
No: Continue with the next step.
8. Update the NTP server FQDN or IP address in configuration file `cluster.conf`.
9. Validate the configuration:  

```
>lde-config -v
```
10. Reload the updated configuration:  

```
>lde-config --reload
```
11. Restart the alarm service:  

```
>service lde-alarmd restart
```
12. Wait up to 20 minutes and check if the alarm is cleared. Is the alarm cleared?  
Yes: Proceed with Step 17.  
No: Continue with the next step.
13. Reboot the node.



---

---

### Attention!

Risk of system malfunction or traffic disturbance.

---

---

As a consequence of a reboot, any application may lose sessions or traffic. Therefore, restart only one node at a time and only if the state of the cluster as whole is stable and running.

14. Wait up to 20 minutes and check if the alarm is cleared. Is the alarm cleared?  
Yes: Proceed with Step 17.  
No: Continue with the next step.
15. Perform data collection, refer to *Data Collection Guideline*.



**Note:** Collect the NTP status and ARP tables status.

16. Consult the next level of maintenance support. Further actions are outside the scope of this instruction.
17. Job is completed.