

Server - Issues #3090

sTm7: improve leap second processing

07/29/2021 09:51 AM - Richard Schimmel

Status: Closed	Due date:
Priority: Normal	
Assignee:	
Category:	
Target version:	
Discuss in Upcoming Meeting: No	Updated Test Document:
Clause Reference:	Test Case ID:
61850 Standard: 7-2	Closed Reason: Test Procedure Update
Triggering Tissue:	Triggering Tissue 2:
Final Decision:	Triggering Tissue 3:
Initial Test Document: Amd1	
Description IEC 61850-90-4 clause 14.2.4.2 specifies that SNTP and PTP protocol do announce the "leap second at midnight" several hours before midnight. PTP at most 12 hours same for SNTP (https://en.wikipedia.org/wiki/Leap_second). As such every IEC 61850 device will know that the leap second will happen even if the connection to the time master is lost. No IEC 61850 device has an hold-over time exceeding such announcement period! Therefor the sTm7 test case is not practical, will never happen in real life and should be removed.	

History

#1 - 07/29/2021 10:04 AM - Thierry Dufaure

I agree with Richard conclusions: the test is not practical. Remove the test from Rev1.1.

#2 - 07/29/2021 11:56 AM - Joel Greene

Thierry Dufaure wrote in [#note-1](#):

I agree with Richard conclusions: the test is not practical. Remove the test from Rev1.1.

Agree.

#3 - 07/30/2021 09:54 AM - Bruce Muschlitz

WIKIPedia article actually says:

Although BIPM announces a leap second 6 months in advance, most time distribution systems (SNTP, IRIG-B, PTP) announce leap seconds **at most 12 hours** in advance.

<https://www.ietf.org/rfc/rfc5905.txt> (SNTP referenced by 61850-8-1:2020 consolidated) does not specify how far in advance of a leap second that LI (Leap indicator) flag need to be set by a time server.

The only relevant statement in RFC 5905 is:

LI Leap Indicator (leap): 2-bit integer warning of an impending leap second to be inserted or deleted in the last minute of the current month with values defined in Figure 9.

Reference to PTP is irrelevant because sTm7 is **only** testing SNTP.

Therefore sTm7 remains relevant and no changes are needed to the test procedure.

#4 - 07/30/2021 10:31 AM - Joel Greene

Bruce Muschlitz wrote in [#note-3](#):

WIKIPedia article actually says:

Although BIPM announces a leap second 6 months in advance, most time distribution systems (SNTP, IRIG-B, PTP) announce leap seconds **at most 12 hours** in advance.

<https://www.ietf.org/rfc/rfc5905.txt> (SNTP referenced by 61850-8-1:2020 consolidated) does not specify how far in advance of a leap second that

LI (Leap indicator) flag need to be set by a time server.

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I believe that the issue here is that the device will indicate Clock Not Synchronized long before the possibility of approaching an unexpected leap second, regardless of the sync protocol. Therefore, the condition is untestable.

#5 - 08/10/2021 08:20 AM - Bruce Muschlitz

Responding to Joel: 61850-7-2 specifies now that Clock-Not-Synchronized is set only when estimated error is greater than 1 second from UTC. For a (bad) 100 PPM oscillator, this would take about 10000 seconds (3 hours). There is no requirement in SNTP to announce an upcoming leap second 3 hours ahead of midnight.

#6 - 08/10/2021 08:46 AM - Thierry Dufaure

This is a system requirement that the announcement has to be done long enough before it occurs, otherwise you go in the unreliable time stamps in case the synchronization is lost before midnight.

If user, on purpose set an hold over time interval, they want to have it working, even around midnight. The time is still valid during the HoldTms - therefore device can assume that LI announcement are present at midnight - LPHD.HoldTms.

7-2 state "if the device is unable to determine if a leap second is occurring at midnight".

An implementation is allowed take the decision that LI fields have to be correctly set 5 min before midnight (LI fields seen before the loss of communication with the time server), and that they can rely on the announcement 5 min before midnight in case the synchronization is lost 4 min before midnight.

sTm7 has been made mandatory is with redmine 635. To increase the reliability of time stamp, user shall programme their clock server so that announcement have to be trustfull a meaningful time before they occur, to avoid that loss of synchronization shortly before midnight lead to a meaningless time stamping in the substation.

#7 - 08/19/2021 04:23 AM - Richard Schimmel

- File Solution to redmine_3090_sTm7.docx added

- Discuss in Upcoming Meeting changed from No to Yes

IEC 61850 part 7-2 table 9 is pretty clear how the leap second shall be processed. It make sense to test the leap second process with or without disconnecting the time server during midnight. To overcome the discussion about holdover time and CNS the test case shall force/ensure that the DUT has received the LI=1 from the time server before midnight. The DUT shall remember the LI and process the leap second by providing 61850 event timestamps as specified in table 9. Please review attached proposal.

#8 - 08/19/2021 04:26 AM - Richard Schimmel

- Subject changed from sTm7: remove because hold-over time does not exceed the SNTP/PTP announce period to sTm7: improve leap second processing

- Status changed from New to In Progress

#9 - 08/24/2021 09:12 AM - Richard Schimmel

- File Solution to redmine_3090_sTm7_20210824.docx added

TPWG August 24; agree to remove the "event during the leap second" part and update the sTm7 abstract description. See attached 20210824

#10 - 09/07/2021 06:15 PM - Bruce Muschlitz

- Status changed from In Progress to Closed

- Closed Reason Test Procedure Update added

- Closed Reason deleted (--Not Set--)

#11 - 06/14/2022 08:32 AM - Bruce Muschlitz

- Discuss in Upcoming Meeting changed from Yes to No

Files

Solution to redmine_3090_sTm7.docx	80.5 KB	08/19/2021	Richard Schimmel
Solution to redmine_3090_sTm7_20210824.docx	80.6 KB	08/24/2021	Richard Schimmel