PTP Mainly in Japanese and East Asian Markets

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SEIKO SOLUTIONS INC.

Company profile (our division's profile)

SEIKO

We provide customers with safety and satisfaction based on "reliable quality"

Our division is manufacturing NTP and PTP products

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- SEIKO INSTRUMENTS INC.
- SEIKO PRECISION INC.
- SEIKO NPC CORPORATION.
- SEIKO SOLUTIONS INC.
- SEIKO CLOCK INC.
- SEIKO OPTICALPRODUCTS CO.,LTD.
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- SEIKO SERVICE CENTER CO.,LTD.

PTP Interoperability challenges

Interop Tokyo
7 – 9 JUNE 2017 | MAKUHARI MESSE | JAPAN
SHOWNET
INHERIT THE INTENTION

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- Panasonic
- Sony
- Spirent
- Tektronix
- Tekron

(in alphabetical order)

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We will talking about...

Agenda

- The problems encountered until ensuring protocol communication.
- The problems encountered in the measurement phase.
- Summary

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Is it easy to construct a PTP network? (1)

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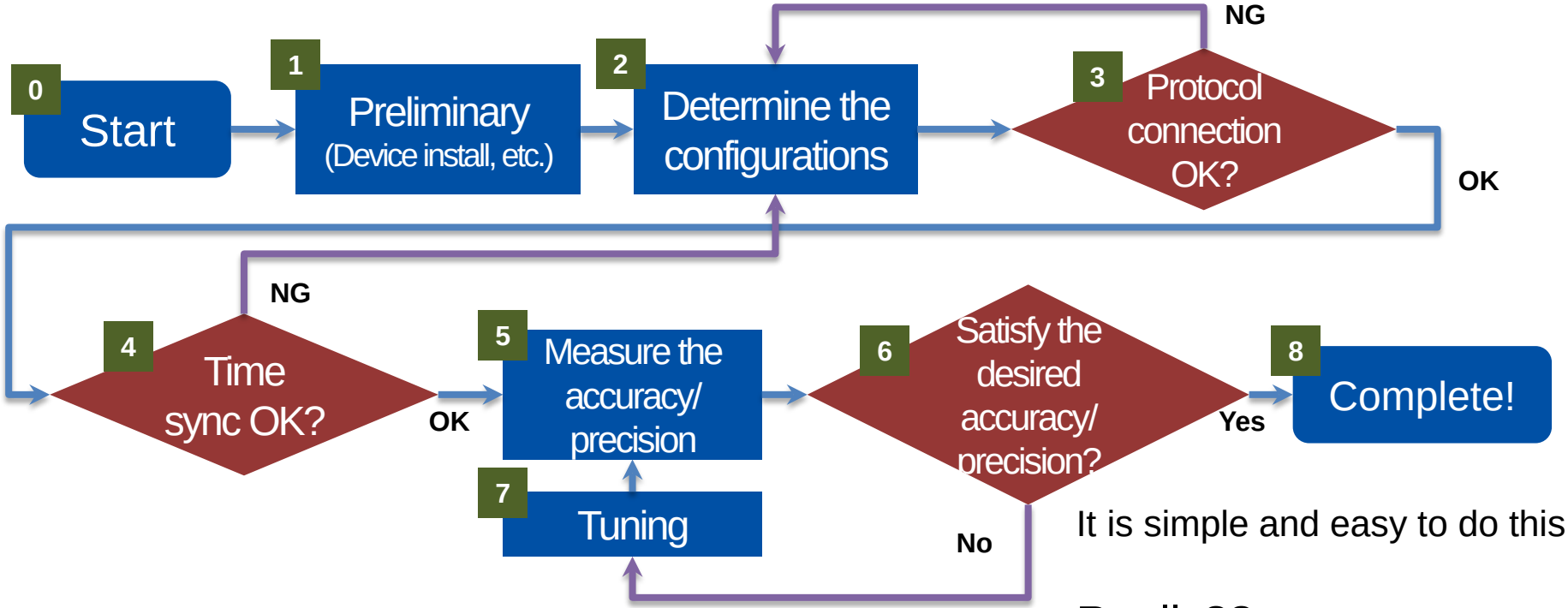
PTP Network Construction: Step by Step



It is simple and easy to do this!

Really??

We want to spend most of our time in proc. 5 to 7.

But we have often wasted our time in proc. 2 to 4.

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It is time consuming to check communication.

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1. At a Mobile Operator in Asia...

- What is the details of “Telecom Profile”?
  - We haven’t communicated very well in the past discussion.
  - G.8265.1 or Annex A.9 in IEEE1588-2008.

- Couldn’t connect a BBU(slave)...
  - A BBU engineer is not always a PTP engineer.
- Bugs are sometimes found in the test with another manufacture’s devices.
  - A simple solution is to survive many interoperability tests.

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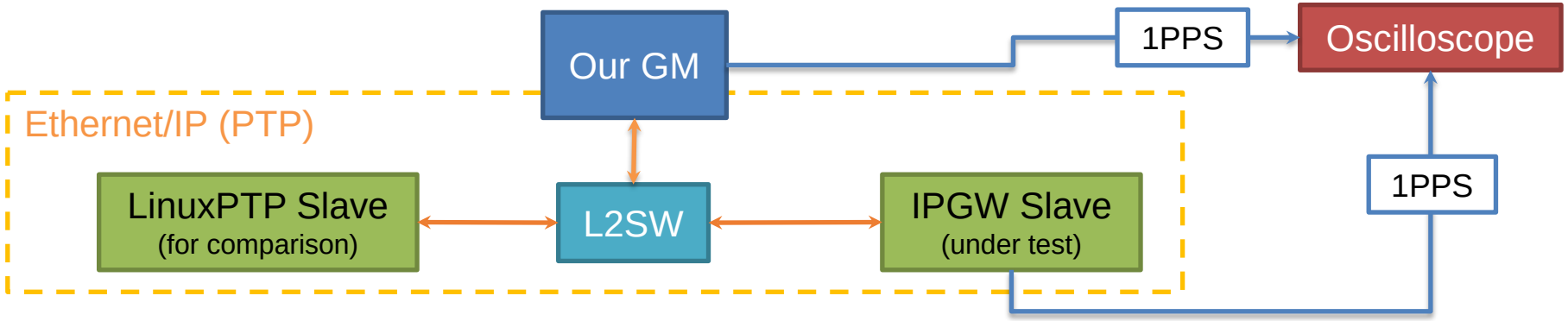
2. At a Connection Test of SMPTE ST 2059-2



- Can't communicate each other, even though we agreed protocol config before test.
  - Not all of the devices necessarily have been confirmed with the agreement.
- Can't communicate with our device only.
  But communication with the particular device is good.
  - The cause of the problem was Announce interval and logMinDelayReqInterval.
  - If the cause lies outside of engineer's wisdom, more time consuming.

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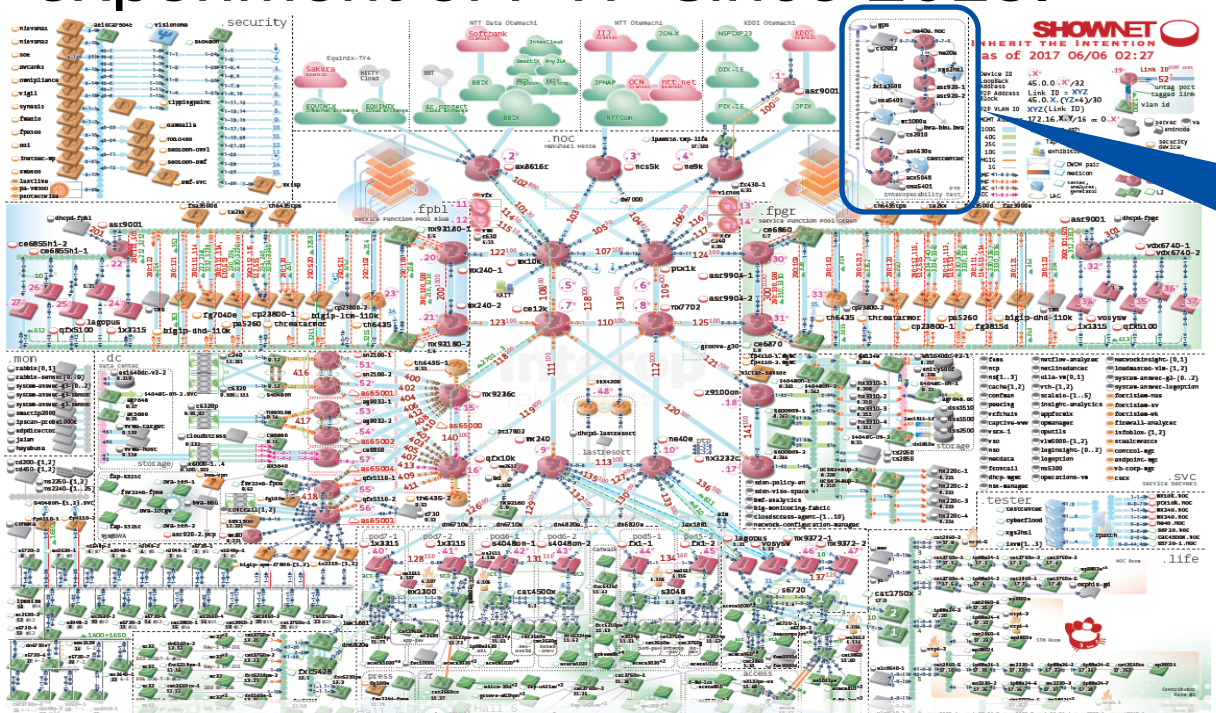
3. At the Large-scale Interoperability Test (1)

- We are challenging multi-vendor interoperability experiment of PTP since 2015.



PTP interoperability challenge in 2017

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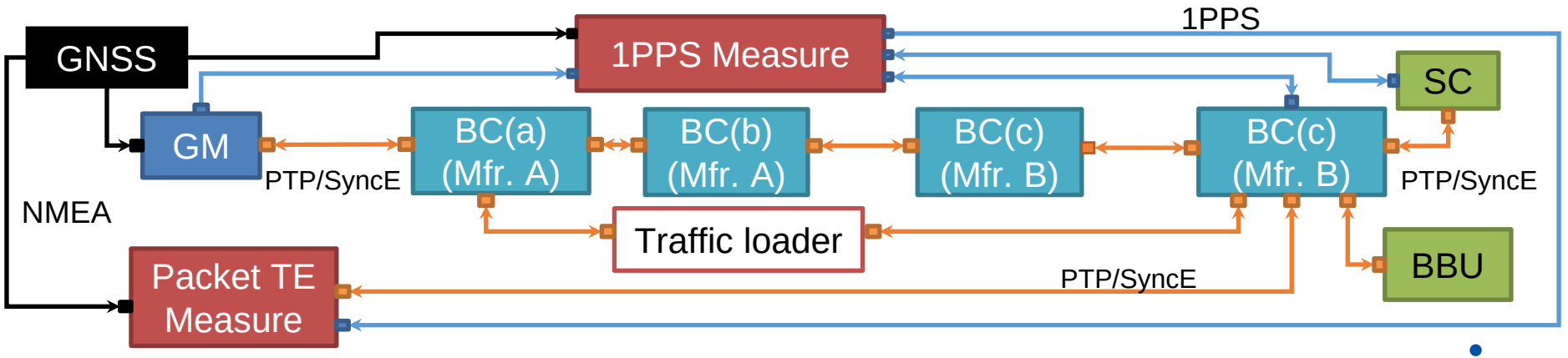
3. At the Large-scale Interoperability Test (2)



- The time allocation until the production topology is completed is as follows:

Total time	72 hours (roughly 12h x 6d = 72h)
The time for measuring	24 hours (33%)
The time for configuring	**48 hours (67%)**

The production topology (G.8275.1)

- The message transmission rate is key point.
- SyncE **drastically reduced** the waiting time until the clock of the devices synchronizes with a master.

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Tips

- **Clarify the service requirements to determine the appropriate configuration.**
  - Integrate PTP into the existing network system?
  - Improve the PTP accuracy/precision even if replace the existing network system?
  - Balance the cost and the PTP accuracy/precision?
- **Share the configuration of the profile among the test engineers.**
  - Port address, routing information, etc.
  - Domain number, 1step/2step, Sync rate, Delay-req/resp (Pdelay-req/resp) rate, timescale, clockClass, etc.
- **The config value should have been tested for each device.**
  - It probably works correctly!
  - However there exist a case in which it does not work unfortunately.
- **When you can’t get hints for the problem...**
  - Suitable values are obtained by trial and error.
  - Should dump and check the exchanged messages.

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Is it easy to construct a PTP network? (2)

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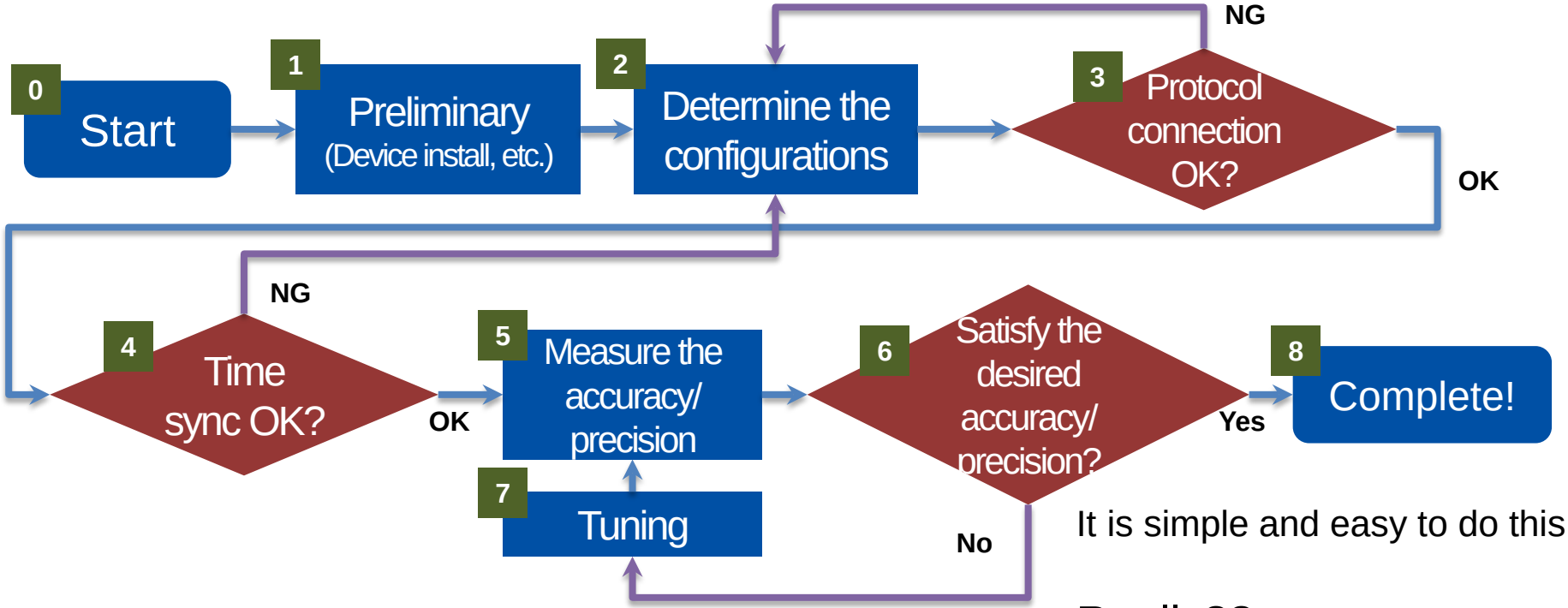
PTP Network Construction: Step by Step



It is simple and easy to do this!

Really??

Of course there are many pitfall in proc. 5 to 7.

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We also have difficulty measuring accuracy.

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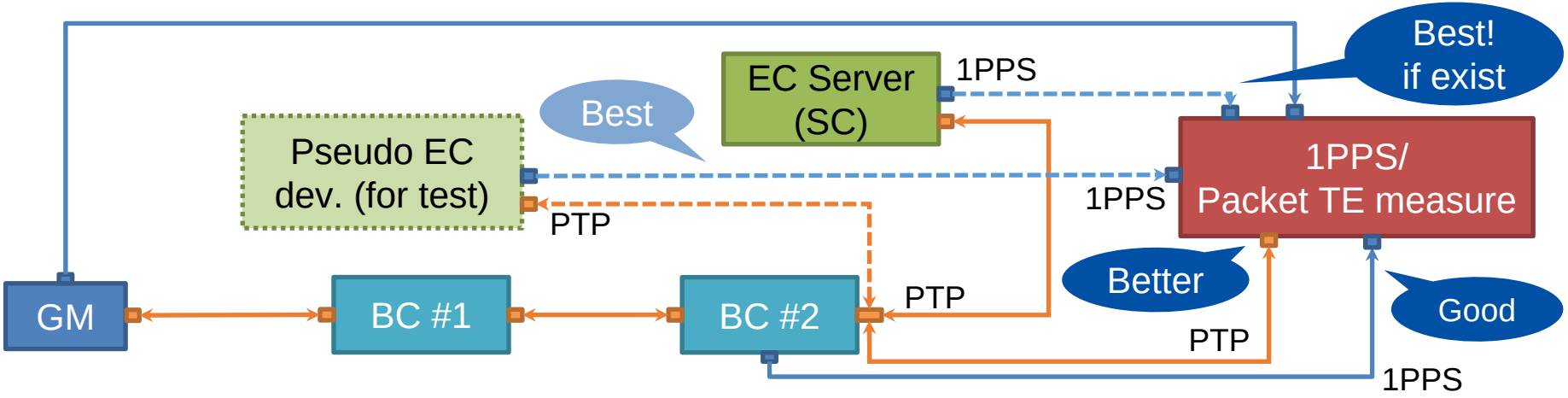
1. At a Finance Customer in Japan.



- The customer hasn't known measurement metrics well. (ex. dTE and cTE)
- The customer has intended to use offsetFromMaster to evaluate the accuracy of the BCs.
  - BC/SC adjust own clock so that offsetFromMaster tend to 0.

- Should measure accuracy/precision of the time in the commercial service, or...
  - Measure 1PPS TE of the pseudo commercial service device for testing if it exist.
  - Measure Packet TE of the master of commercial service device.
  - Measure 1PPS TE of the master of commercial service device.

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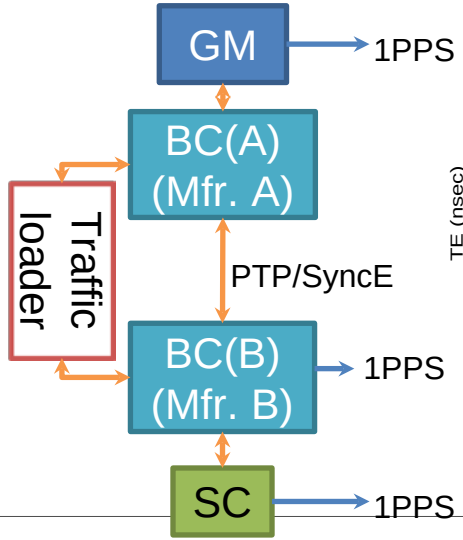
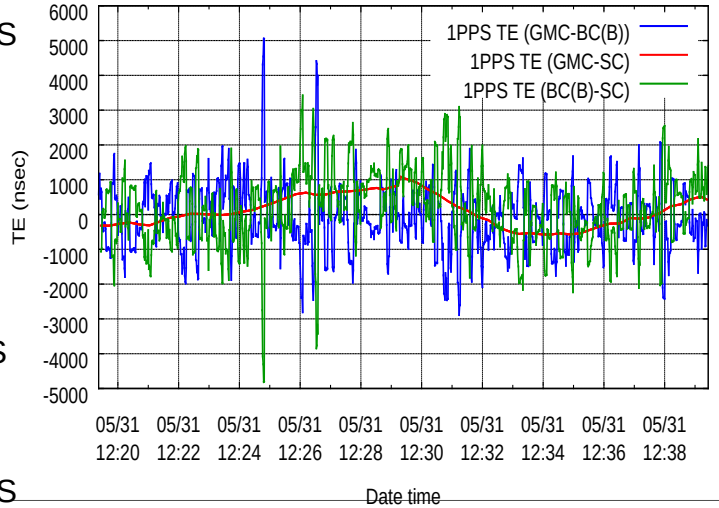
2. At the Large-scale Interoperability Test

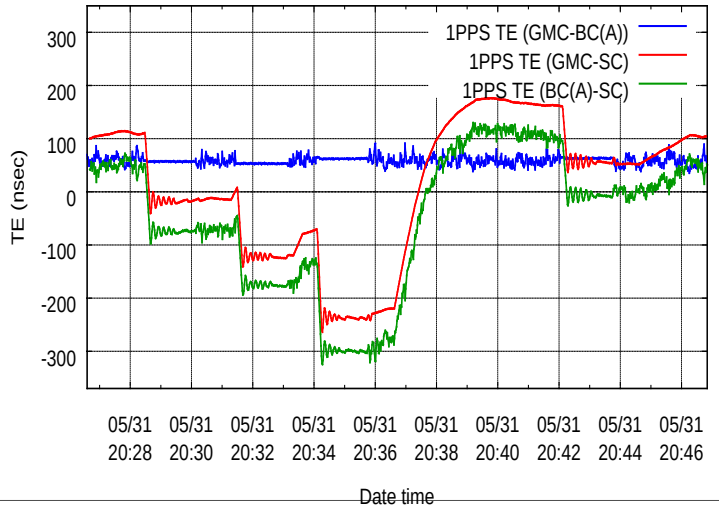
- Low accuracy/precision has occurred in the multi-mfr. BC connection. (G.8275.1)
  - **9µs 1PPS dTE occurs** when connecting from BC(Mfr. A) to BC(Mfr. B) in order.
  - **A step-wise 1PPS dTE occurs** when connecting from BC(Mfr. B) to BC(Mfr. A) in order.
  - **No occurrence under the single manufacturer's BCs**
- TDEV and MTIE are important to compare results that are measured in different length of times.



BC(Mfr. A) to BC(Mfr. B)



BC(Mfr. B) to BC(Mfr. A)



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Tips

- **Clarify the accuracy/precision requirements.**
  - Mainly intend to reduce the cTE or dTE?
- **The longer measurement time, the better.**
  - Take care of the amount of time for synchronizing of downstream devices.
  - However it can’t be extended as much as you like.
  - TDEV/MTIE should be used to eliminate the difference of measurement times.
- **Take care of the connection with the multi-vendor downstream devices.**
  - There exist a case that it is not easy to comply with desired accuracy/precision.

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Summary

- **Few PTP engineers or operators at construction fields.**
  - We had struggled to communicate among engineers at the stages before measurement.
  - The interoperability test takes more time due to the fact that few PTP experts.

- **There are not so many PTP engineers familiar with measurement metrics.**
  - Some engineers don’t appreciate the difference between cTE and dTE.
  - Especially, the handling of TDEV and MTIE are not well known.
    - Should be used not only for masks of ITU-T rec. but also to compare the results of measurement.

- **Improvement of PTP connectivity of multi-mfr. devices is now ongoing.**
  - Sometimes the accuracy/precision can’t satisfy the requirement even if no problem in protocol communications
  - Should try to test the interoperability as many manufactures/devices as possible.
  - Interoperability is better for devices equipped with flexible configurations beyond the scope of the profile.

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