International Telecommunication Union

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

G.8260

Amendment 2

(05/2014)

SERIES G: TRANSMISSION SYSTEMS AND MEDIA, DIGITAL SYSTEMS AND NETWORKS

Packet over Transport aspects – Synchronization, quality and availability targets

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Definitions and terminology for synchronization in packet networks

Amendment 2: Amendment to the definition of time error

Recommendation ITU-T G.8260 (2012) – Amendment 2

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Recommendation ITU-T G.8260

Definitions and terminology for synchronization in packet networks

Amendment 2

Amendment to the definition of time error

Summary

Amendment 2 to Recommendation ITU-T G.8260 (2012) augments definition 3.1.20, "time error".

History

Edition	Recommendation	Approval	Study Group	Unique ID*
1.0	ITU-T G.8260	2010-08-12	15	11.1002/1000/10907
2.0	ITU-T G.8260	2012-02-13	15	11.1002/1000/11521
2.1	ITU-T G.8260 (2012) Amd. 1	2013-08-29	15	11.1002/1000/12016
2.2	ITU-T G.8260 (2012) Amd. 2	2014-05-14	15	11.1002/1000/12189

* To access the Recommendation, type the URL http://handle.itu.int/ in the address field of your web browser, followed by the Recommendation's unique ID. For example, http://handle.itu.int/11.1002/1000/11830-en.

FOREWORD

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The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

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As of the date of approval of this Recommendation, ITU had received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementers are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database at http://www.itu.int/ITU-T/ipr/.

Recommendation ITU-T G.8260

Definitions and terminology for synchronization in packet networks

Amendment 2

Amendment to the definition of time error

Replace definition 3.1.20, which currently reads:

3.1.20 time error (Based on [ITU-T G.810]):

- **Constant time error**: With reference to the time error model provided in [ITU-T G.810], the constant time error is the term x_0.
- **Constant time error estimate**: Given a time error sequence $\{x(n);\ n = 0,1,\ldots,(N–1)\}$, an estimate of the constant time error is the average of the first M samples of the time error sequence. M is obtained from the observation interval providing the least value for TDEV as computed for the given time error sequence. If a frequency offset is present then a linear regression method in accordance with Appendix II of [ITU-T G.823] can be applied. Considerations for measurement data containing transients is for further study.

  NOTE – In some cases due to the frequency components of the noise of the signal being measured it might be difficult to identify a stable, consistent observation interval. These cases must be addressed case by case.

With the following new definition:

3.1.20 time error: The time error of a clock with respect to a time standard is the difference between the time of that clock and the time indicated by the time standard. A model for expressing the time error of a clock is described in clause I.3 of [ITU-T G.810].

- **Constant time error**: With reference to the time error model provided in clause I.3 of [ITU-T G.810], the constant time error (cTE) of a synchronized clock is the term x_0.
- **Constant time error estimate**: Given a time error sequence $\{x(n);\ n = 0,1,\ldots,(N–1)\}$, an estimate of the constant time error is the average of the first M samples of the time error sequence. M is obtained from the observation interval providing the least value for TDEV as computed for the given time error sequence. If a frequency offset is present then a linear regression method in accordance with Appendix II of [ITU-T G.823] can be applied. Considerations for measurement data containing transients is for further study.

  NOTE – In some cases due to the frequency components of the noise of the signal being measured it might be difficult to identify a stable, consistent observation interval. These cases must be addressed case by case.
- **Dynamic time error**: With reference to the time error model provided in clause I.3 of [ITU-T G.810], the dynamic time error (dTE) of a synchronized clock is the random noise component, i.e., $\frac{\varphi(t)-\varphi_{ref}(t)}{2\pi\nu_{nom}}$.

  The shape of the dTE component may be expressed using the time interval error function TIE(t, τ), and characterized using the related metrics MTIE and TDEV, although the offset from zero of the TIE function may vary depending on the time t when the measurement starts.
- **Maximum absolute time error**: The maximum absolute time error (max|TE|) of a synchronized clock is the maximum absolute value of the time error function.

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