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ITU-T G.8271.2/Y.1366.2

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Packet over Transport aspects – Synchronization, quality and availability targets

SERIES Y: GLOBAL INFORMATION INFRASTRUCTURE, INTERNET PROTOCOL ASPECTS, NEXT-GENERATION NETWORKS, INTERNET OF THINGS AND SMART CITIES

Internet protocol aspects – Transport

Network limits for time synchronization in packet networks with partial timing support from the network

Recommendation ITU-T G.8271.2/Y.1366.2

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Recommendation ITU-T G.8271.2/Y.1366.2

Network limits for time synchronization in packet networks with partial timing support from the network

Summary

Recommendation ITU-T G.8271.2/Y.1366.2 specifies the maximum network limits of phase and time error that shall not be exceeded. It specifies the minimum equipment tolerance to phase and time error that shall be provided at the boundary of these packet networks at phase and time synchronization interfaces. It also outlines the minimum requirements for the synchronization function of network elements.

Recommendation ITU-T G.8271.2/Y.1366.2 addresses the case of time and phase distribution across a network with packet-based method with partial timing support to the protocol level from the network.

History

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Network limits, partial timing support, phase, precision time protocol, synchronization, time.

* 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.

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Recommendation ITU-T G.8271.2/Y.1366.2

Network limits for time synchronization in packet networks with partial timing support from the network

1 Scope

This Recommendation specifies the maximum network limits of phase and time error that shall not be exceeded. It specifies the minimum equipment tolerance to phase and time error that shall be provided at the boundary of these packet networks at phase and time synchronization interfaces. It also outlines the minimum requirements for the synchronization function of network elements.

This Recommendation addresses the distribution of time and phase across a network, using the packet-based method with partial timing support to the protocol level from the network. In particular, it applies to the assisted partial timing support (APTS) and partial timing support (PTS) architectures described in [ITU-T G.8275] and the precision time protocol (PTP) profile defined in [ITU-T G.8275.2].

This Recommendation addresses the following cases.

1) Assisted partial timing support (APTS).

   In the APTS configuration, PTP is used as a backup timing source to a local time reference (e.g., primary reference time clock (PRTC) based on the global navigation satellite system (GNSS)) for durations up to 72 h. It is not intended to use PTP as the primary timing source.

   Network requirements take into consideration the dynamic time error (dTE) generated by the network.

2) Partial timing support from the network (PTS).

   In the PTS configuration, PTP is used as the primary source of time to the end application. In this mode, a local time reference (e.g., GNSS) is not available.

   Network requirements take into consideration the combination of both the constant time error (cTE) and dTE components generated by the network.

A network that is based on the architecture defined in [ITU-T G.8265], and is designed to meet the network limits for frequency defined in [ITU-T G.8261.1], is not designed for the delivery of accurate time or phase, which requires much lower levels of packet delay variation (PDV) and asymmetry. The network limits specified in this document are for small, well-controlled networks (e.g., in-building or last-mile network segments), which can guarantee that the stringent PDV and asymmetry network limits are met. Further guidance can be found in Appendix II.

The necessary clock specifications are for further study.

The packet networks that are in the scope of this Recommendation are currently limited to the following types:

– Ethernet: [IEEE 802.3] and [IEEE 802.1Q]

– Multiprotocol label switching (MPLS): [IETF RFC 3031] and [ITU-T G.8110]

– Internet protocol (IP): [IETF RFC 791] and [IETF RFC 2460]

The use of other network types are for further study.

The physical layer that is relevant to this specification is the Ethernet media types as defined in [IEEE 802.3].

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