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SERIES H: AUDIOVISUAL AND MULTIMEDIA SYSTEMS

Gateway control protocol: Guidelines for synchronized time in ITU-T H.248 domains

ITU-T H-series Recommendations – Supplement 8

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Supplement 8 to ITU-T H-series Recommendations

Gateway control protocol: Guidelines for synchronized time in ITU-T H.248 domains

Summary

Supplement 8 to ITU-T H-series Recommendations defines a time coordination function that may be used by an application process and/or a gateway control protocol in a decentralized gateway environment such as ITU-T H.248 decomposed gateways.

Within the working assumptions defined, this supplement establishes a time coordination function model, addressing the components of a generic time service involving communication between gateway and gateway controller entities that relate the service and generic definitions provided by this function to the user requirements. It also identifies time synchronization protocols. The scope of this supplement is on "time of day" information, not on other elements related to timing. Furthermore, the provision of time information within a local system and implementation aspects are also out of the scope of this supplement.

Source

Supplement 8 to ITU-T H-series Recommendations was agreed on 2 May 2008 by ITU-T Study Group 16 (2005-2008).

FOREWORD

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Supplement 8 to ITU-T H-series Recommendations

Gateway control protocol: Guidelines for synchronized time in ITU-T H.248 domains

1 Scope

This supplement defines a time coordination function that may be used by an application process and/or a gateway control protocol in a decentralized gateway environment such as decomposed gateways according to [ITU-T H.248.1].

This supplement:

- establishes user requirements for this synchronized time in ITU-T H.248 domains;
- establishes a time coordination function model, addressing the components of a generic time service involving communication between gateway and gateway controller entities, that relates the service and generic definitions provided by this function to the user requirements;
- identifies time synchronization protocols.

This supplement does not:

- address the provision of time information within a local system;
- define the nature of any implementation intended to provide the time coordination function.

The scope of this supplement is on "time of day" information, not on other elements related to timing.

1.1 Explicitly out of scope

Synchronized time is typically relevant not only for the gateway control protocol and ITU-T H.248 interfaces. Timing and synchronization aspects for ITU-T H.248 entities may be also required, however subsequent functions and interfaces are out of scope.

1.1.1 Transmission layer

ITU-T H.248 entities are connected to packet and/or circuit networks. Timing, timing distribution and synchronization aspects in packet networks are very different in comparison to circuit-switched networks. Such aspects for transmission layer technologies are addressed, e.g., by ITU-T G-series Recommendations. For instance, [ITU-T G.8261], [ITU-T G.8262], [ITU-T G.8264] could be relevant for particular deployments of ITU-T H.248 entities.

The transmission layer aspects and technologies are out of scope.

1.1.2 User plane

User plane protocols may carry time information. For instance, application-level framing protocols (e.g., IETF RTP, 3GPP-specific framing protocols) for real-time transport require time synchronization elements between source and sink (e.g., synchronization aspects between an RTP end system and an ITU-T H.248 RTP termination).

Synchronization aspects or time alignment procedures of such types of user plane protocols are out of scope.

1.1.3 Management plane

Without synchronized time, accurately correlating information between network elements becomes difficult, if not impossible (Note). Management and management systems for ITU-T H.248 entities are out of scope here.

NOTE – For instance, comparison of log files between network elements requires synchronized times. Particularly when it comes to security issues, reliable information may be only derived on the basis of accurate timing information.

1.1.4 Relation to technologies for high precision time distribution for IP networks

This supplement makes proposals for time distribution technologies that are sufficient to cover the requirements addressed by this supplement. These technologies themselves are evolving and may be relevant for IP networks with higher precision time, but not in this supplement for the considered ITU-T H.248 control association.

NOTE – Such IP-specific technologies will be, e.g., developed by the IETF working group "Transmitting Timing over IP Connections and Transfer of Clock" (TICTOC).

2 References

- [ITU-T G.810] Recommendation ITU-T G.810 (1996), *Definitions and terminology for synchronization networks*.
<<http://www.itu.int/rec/T-REC-G.810>>
- [ITU-T G.8261] Recommendation ITU-T G.8261/Y.1361 (2008), *Timing and synchronization aspects in packet networks*.
<<http://www.itu.int/rec/T-REC-G.8261>>
- [ITU-T G.8262] Recommendation ITU-T G.8262/Y.1362 (2007), *Timing characteristics of synchronous Ethernet equipment slave clock (EEC)*.
<<http://www.itu.int/rec/T-REC-G.8262>>
- [ITU-T G.8264] Recommendation ITU-T G.8264/Y.1364 (2008), *Distribution of timing information through packet networks*.
<<http://www.itu.int/rec/T-REC-G.8264>>
- [ITU-T H.248.1] Recommendation ITU-T H.248.1 v3 (2005), *Gateway control protocol: Version 3*.
<<http://www.itu.int/rec/T-REC-H.248.1>>
- [ITU-T H.248.47] Recommendation ITU-T H.248.47 (2008), *Gateway control protocol: Statistic conditional reporting package*.
<<http://www.itu.int/rec/T-REC-H.248.47>>
- [ITU-T X.743] Recommendation ITU-T X.743 (1998) | ISO/IEC 10164-20:1999, *Information technology – Open Systems Interconnection – Systems Management: Time Management Function*.
<<http://www.itu.int/rec/T-REC-X.743>>
- [ITU-T X.751] Recommendation ITU-T X.751 (1995) | ISO/IEC 10164-17:1996, *Information technology – Open Systems Interconnection – Systems Management: Changeover function*.
<<http://www.itu.int/rec/T-REC-X.751>>
- [ITU-T Y.1540] Recommendation ITU-T Y.1540 (2007), *Internet protocol data communication service – IP packet transfer and availability performance parameters*.
<<http://www.itu.int/rec/T-REC-Y.1540>>
- [ETSI TR 183 025] ETSI TR 183 025 (2007), *Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); H.248 Non-Call Related Procedures and Management System Interaction*.
<http://portal.etsi.org/docbox/TISPAN/Open/NGN_LATEST_DRAFTS/RELEASE2/03193-ngn-r2v230.pdf>