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SERIES J: Cable networks and transmission of television, sound programme and other multimedia signals

Supplements to ITU-T J-series Recommendations

Comparison between third-generation HiNoC and second-generation HiNoC

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Supplement 12 to ITU-T J-series Recommendations

Comparison between third-generation HiNoC and second-generation HiNoC

Summary

Supplement 12 to ITU-T J-series Recommendations indicates the main differences between the third-generation HiNoC (HiNoC 3.0) and the second-generation HiNoC (HiNoC 2.0). This supplement is helpful for operators to choose the proper HiNoC for deployment.

History[*]

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Supplement 12 to ITU-T J-series Recommendations

Comparison between third-generation HiNoC and second-generation HiNoC

1 Scope

This supplement indicated the main differences between the third-generation HiNoC (HiNoC 3.0) and the second-generation HiNoC (HiNoC 2.0) in major technical targets, physical (PHY) layer and media access control (MAC) layer.

2 References

[ITU-T J.196.1] Recommendation ITU-T J.196.1 (2016), *Functional requirements for second generation HiNoC*.

[ITU-T J.196.2] Recommendation ITU-T J.196.2 (2016), *Physical layer specification of second generation HiNoC*.

[ITU-T J.196.3] Recommendation ITU-T J.196.3 (2016), *Media access control layer specification of second generation HiNoC*.

[ITU-T J.198.1] Recommendation ITU-T J.198.1 (2022), *Functional requirements for third-generation HiNoC*.

[ITU-T J.198.2] Recommendation ITU-T J.198.2 (2024), *Physical layer specification for third-generation HiNoC*.

[ITU-T J.198.3] Recommendation ITU-T J.198.3 (2024), *MAC layer specification for third-generation HiNoC*.

3 Definitions

3.1 Terms defined elsewhere

None.

3.2 Terms defined in this Supplement

None.

4 Abbreviations and acronyms

This Supplement uses the following abbreviations and acronyms:

HiNoC High Performance Network Over Coax

MAC Media Access Control

MAP Media Access Plan

OFDMA Orthogonal Frequency Division Multiple Access

PHY Physical

QAM Quadrature Amplitude Modulation

QoS Quality of Service

TV Television

5 Conventions

None.

6 Comparison between third-generation HiNoC and second-generation HiNoC

6.1 General comparison

HiNoC 3.0 indicates the third-generation HiNoC defined by [ITU-T J.198.1], [ITU-T J.198.2] and [ITU-T J.198.3]. HiNoC 2.0 indicates the second-generation HiNoC defined by [ITU-T J.196.1], [ITU-T J.196.2] and [ITU-T J.196.3]. HiNoC 3.0 is compatible with HiNoC 2.0, and they have the same logic architecture model and protocol stack.

For HiNoC 3.0, the major technical targets are listed as follows:

a) Transmission rate: The maximum transmission rate is increased to the 10-Gbps level.

b) Latency: The average system latency is 1 ms or lower to guarantee quality of service (QoS) of latency-sensitive services.

c) Multicast transmission: Multicast transmission mode is introduced in HiNoC 3.0 to effectively support multicast services such as 4K/8K high-definition television (TV) and online live broadcast.

While for HiNoC 2.0, the major technical targets are listed as follows:

a) Transmission rate: The maximum transmission rate is 1 Gbps.

b) Latency: The average latency is 2.5 ms.

6.2 Comparison of PHY layers

The comparison between HiNoC 3.0 PHY layer and HiNoC 2.0 PHY layer is listed as follows:

a) Channel bonding mechanism is introduced in HiNoC 3.0, and the bonded channel bandwidth is N*128 MHz, where N is an integer and $1 \leq N \leq 8$.

b) Compared to HiNoC 2.0, two more constellations 8164QAM and 16384QAM are applied in the HiNoC 3.0 PHY layer.

c) Compared to HiNoC 2.0, interleaving scheme is newly applied in data frame process in the HiNoC 3.0 PHY layer.

d) For the HiNoC 3.0 channel, the generation processes of payload A and payload C in the HiNoC 3.0 PHY layer are modified to improve the carrying capacity of media access control (MAC) signalling frames and media access plan (MAP) frame.

6.3 Comparison of MAC layers

The comparison between HiNoC 3.0 MAC layer and HiNoC 2.0 MAC layer is listed as follows:

a) The HIiNoC 3.0 MAC layer specifies the channel bonding mechanism in detail, the key of which is the sequential transmission of data frames carrying the same service flow over different channels.

b) Multicast related frame structure and transmission mechanism are introduced to the HiNoC 3.0 MAC layer to support multicast services.

c) To achieve the design objective of 1 ms average system latency, the length of the MAP cycle which is used as the channel planning and scheduling period is configurable at the HiNoC 3.0 MAC layer, while it is fixed at the HiNoC 2.0 MAC layer.

d) The HiNoC 3.0 MAC layer specifies a mechanism called profile group transmission as a way to reduce average downlink latency.

e) For orthogonal frequency division multiple access (OFDMA) mode, the channel allocation granularity can be configured by HiNoC 3.0 MAC layer while it is fixed in HiNoC 2.0.

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