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Annex B (normative) Interworking 61883 between AVBTP and IEEE 1394 networks

B.1 Introduction

This annex defines the methods and protocols for operation of interworking units (IWUs) used to interconnect 61883 compliant devices between IEEE 1394 and IEEE 802.3 or IEEE 802.11 AVBTP networks

B.2 1394 to/from IEEE 802 AVBTP Interworking scenarios

There are three scenarios defined for interworking by this annex. They are called scenarios A, B and C.

Scenario A is the case where you have a stream originated by a 1394 device using an AVB network to connect with listeners on another 1394 bridged network:

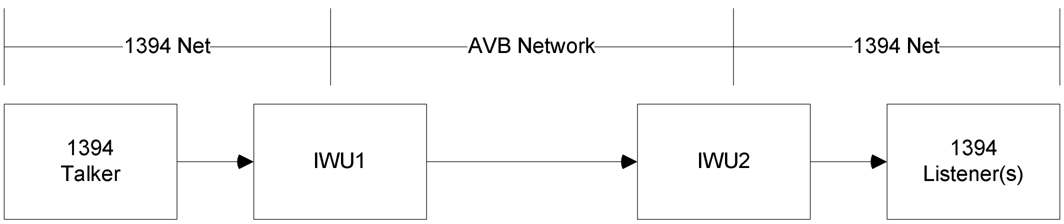

Figure 7.2 IWU Scenario A

Scenario B adds AVBTP listeners to Scenario A so that listeners on both IEEE 802 networks and IEEE 1394 networks can communicate as follows**:**

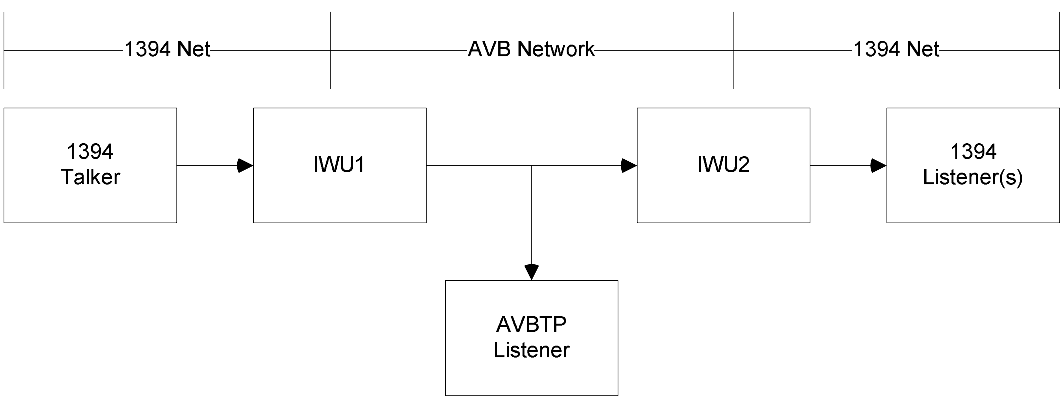

Figure 7.3 IWU Scenario B

Scenario C is where the talker is on an AVB network and needs to interoperate with both AVBTP and 1394 based listeners:

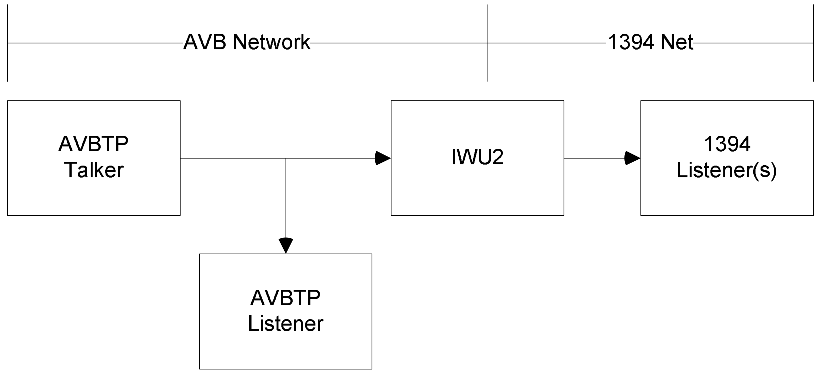

Figure 7.4 IWU Scenario C

The goal of this protocol is to ensure that all of the above scenarios work such that simpler applications of bridging 61883/1394 capable devices over an AVB network using scenario A and also more complex applications of full connectivity of 61883 capable talkers and listeners can communicate via gateways regardless of the underlying network topology.

To support these cases, AVBTP Interworking Units shall handle:

- Conversion and adaptation of timing and synchronization between those required by 1394/61883 and 1722/61883.
- Proper queuing and scheduling of CIP packets on each of the networks based on the requirements of those networks.
- Fragmentation and reassembly of CIP packets between the two networks.

NOTE -This is especially important as 802.3 networks support a maximum of 1500 byte payload frames where as on high speed 1394 networks, the isochronous packets may be much larger than can be support on the Ethernet LAN.

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B.2.1 Encapsulation

IEEE 1394 to AVBTP interworking units shall use the same formats of the AVBTP IIDC/61883 packet as specified in clause 6 above.

IIDC/61883 stream data frames shall use the **gateway_info** field as specified in 5.3.11 above. This section defines how that field is formatted for IEEE 1394 to AVBTP interworking units.

For IEEE 1394 to AVBTP interworking units the gateway_info is formatted into the following fields:

a) **source_seconds**: most significant 7 bits of the quadlet

b) **source_cycle**: 13 bits with a value range of 0-7999 decimal indicating the source 1394 bus cycle of the frame

c) **source_cycle_offset**: 12 bits with a value range of 0-3071 indicating the source 1394 bus cycle offset of the frame

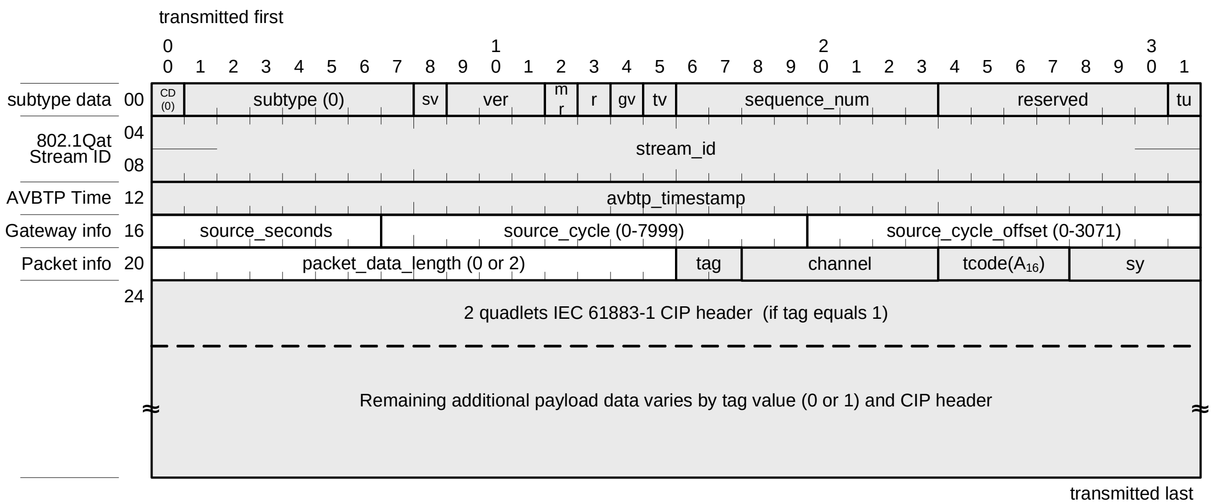

Figure 7.5 Gateway Info Packet Format

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B.2.2 Stream Sequencing, Fragmentation and Reassembly procedures

CIP packets on a 1394 network may be larger than can be accommodated on the AVBTP network which has a maximum AVBTP frame size (header plus payload) of 375 quadlets (1500 bytes).

If a 1394 to Ethernet AVBTP gateway receives a CIP packet that will not fit on the AVBTP network, then the gateway shall break up the large CIP packet into multiple smaller CIP packets prior to sending on the AVBTP network.

If an Ethernet AVBTP to IEEE 1394 gateway receives multiple packets for a given cycle and that 1394 network can support large CIP packets, the 1394 gateway shall reassemble the smaller AVBTP based CIP packets into larger IEEE 1394 based CIP packets as necessary.

B.3 Timing and synchronization

This section is describes any specific requirements of gateways to map timing and synchronization fields from a 1394 network to an AVBTP network (e.g. mapping of SYT fields to and from AVBTP timestamps).

B.3.1 1394 to 1722 conversion

When an audio packet is transitioned from a 1394 Network to an AVBTP network the time represented by the SYT field needs to be converted into 802.1AS time and entered into the AVBTP Timestamp field of the AVBTP packet. The SYT field should then be left intact for use in the scenario A case above. When the packet transitions back to the 1394 network it may be simpler to use the SYT field directly rather than converting the AVBTP Timestamp

B.3.2 1722 to 1394 conversion

When an audio packet is transitioned from an AVBTP network to a 1394 network it can be handled differently if the packet originated on a 1394 network or it originated on the AVBTP network. The SID will be set to 63 if the packet originated on the AVBTP network. In this case the AVBTP timestamp must be converted into an appropriate value and entered into the SYT field.

If the SID is not equal to 63, then the packet originated on a 1394 network. In this case the Gateway info field can be used as a cross time stamp to calculate the differences in the 1394 cycle time between the source and destination networks. The original SYT field can then be either used directly or adjusted if need be to operate properly on the destination 1394 network.

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