IEC 62379-7

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INTERNATIONAL STANDARD

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Common control interface for networked digital audio and video products – Part 7: Measurements

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Interface de commande commune pour produits audio et vidéo numériques connectés en réseaux – Partie 7: Mesures

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COMMON CONTROL INTERFACE FOR NETWORKED DIGITAL AUDIO AND VIDEO PRODUCTS –

Part 7: Measurements

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International Standard IEC 62379-7 has been prepared by technical area 4: Digital system interfaces and protocols of IEC technical committee 100: Audio, video and multimedia systems and equipment.

The text of this standard is based on the following documents:

CDV	Report on voting
100/2168/CDV	100/2338/RVC

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 62379 series, published under the general title *Common control interface for networked digital audio and video products*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

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INTRODUCTION

IEC 62379 specifies the common control interface, a protocol for managing equipment which conveys audio and/or video across digital networks.

An introduction to the common control interface is given in IEC 62739-1.

This part of IEC 62379 specifies those aspects that are specific for using the block structure as defined in IEC 62379-1, for standardising the collection method of audio and video parameters for use by the European Broadcasting Union Expert Communities Networks – Internet Protocol (IP) Measurements (EBU ECN-IPM) Group.

The collection of network related parameters may be outside the scope of this standard. These are expected to be collected from the standard Internet Engineering Task Force (IETF) Management Information Base (MIBs) that are generally present in most (if not all) networked equipment. Some specific network parameters are included that are not obtainable from existing standard IETF MIBs.

Structure of the family of standards

IEC 62379 specifies the common control interface, a protocol for managing networked audiovisual equipment. It is intended to include the following Parts:

Part 1: General

Part 2: Audio

Part 3: Video

Part 4: Data

Part 5: Transmission over networks

Part 6: Packet transfer service

Part 7: Measurement

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Part 1 specifies aspects which are common to all equipment.

Parts 2 to 4 specify control of internal functions specific to equipment carrying particular types of live media. Part 4 does not refer to packet data such as the control messages themselves.

Part 5 specifies control of transmission of these media over each individual network technology. It includes network specific management interfaces along with network specific control elements that integrate into the control framework.

Part 6 specifies carriage of control and status messages and non-audiovisual data over transports that do not support audio and video, such as RS232 serial links, with (as with Part 5) a separate subpart for each technology.

Part 7 specifies those aspects that are specific to the measurement requirements of the EBU ECN-IPM Group.

An introduction to the common control interface is given in IEC 62739-1.

Description, aims and requirements of the EBU ECN-IPM Group

In recent years, EBU members have been increasingly adopting IP networks for the contribution of audio and video in real-time. It is well known that although IP networks are of lower cost and provide more flexibility compared with circuit switched networks, they suffer

from longer delays and have much larger jitter, while broadcasters' tolerance to these variables is much less than that of normal business IT traffic.

To respond to Members' use of IP, EBU set up two groups, *Expert Communities Networks Audio contribution over IP (ECN-ACIP)* and Expert *Communities Networks – Video contribution over IP (ECN-VCIP)*, with the tasks of drawing up recommended codes of practice[1].

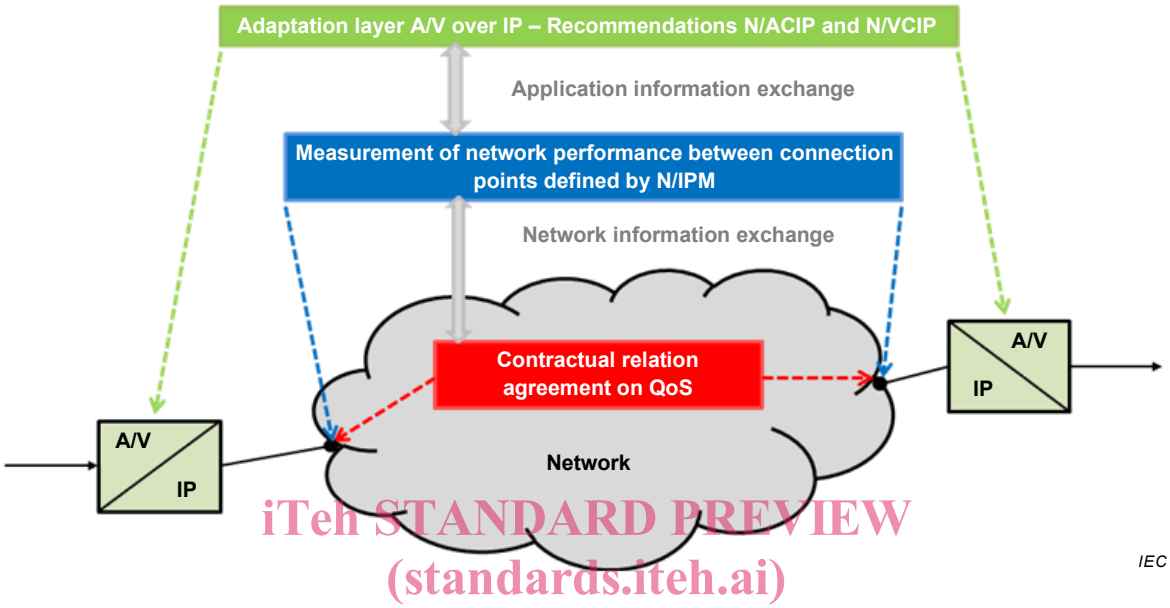

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Figure 1 – Relationships between ECN groups ACIP, VCIP and IPM

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It was also recognised that there would be a strong demand for tools that would enable broadcasters to measure and manage their IP networks properly to suit the many time-critical broadcast applications they would be subjected to. To this end, the ECN-IPM (IP measurement) group was set up. The relationships between these three groups are shown in Figure 1.

The goals of ECN-IPM Group were to

– define a quality of service classification to achieve requested A/V transmission quality for broadcast applications,
– standardise network information exchange between EBU members and Telecom suppliers,
– propose a method of collecting end-to-end performance information for management purposes.

In achieving these goals the ECN-IPM Group has specified a set of parameters that are important for broadcasters when using IP networks for audio and video transmission and has developed a software mechanism to probe a network for device and topology discovery, physical path tracing for both end-to-end communication and multicast streams, with the potential for multilayer monitoring for streams on a multi-vendor network with fully media-specific parameters.

The specified parameters cover both the network layer and application layer (for video and audio). SNMP is employed to collect information on the status of networked devices, such as the transmission rate, error rate, the codec used and multicast streams status.

1 ECN-ACIP and ECN-VCIP were formerly known as N/ACIP and N/VCIP respectively.

To ensure that all the parameters can be recovered from a variety of different manufacturers' IP equipment, the group has designed a Management Information Base (MIB). Although many MIB files have been published over the years, especially on the network side, very little standardisation work has been done on Audio/Video (A/V) codec MIB files. The EBU ECN-IPM Group has therefore proposed a new standard, based upon the IEC 62379 series to address this issue.

Two EBU technical publications have been produced by the ECN-IPM Group.

The parameters and new MIB information may be found in EBU-Tech 3345, End-to-End IP Network Measurement for Broadcast Applications – Parameters & Management Information Base (MIB), Geneva, July 2011.

A description of the software mechanism, EisStream[2], may be found in EBU-Tech 3346, End-to-End IP Network Measurement for Broadcast Applications – EisStream Software package description, Geneva, July 2011. The software is written in Java and it provides physical path tracing for IP traffic using SNMP.

This part of IEC 62379 and other related parts of IEC 62379, constitute the standards upon which Section 3 of EBU-Tech 3345 is based.

If there is any inconsistency between this standard and Section 3 of EBU-Tech 3345, then IEC 62379-7 and other related parts of IEC 62379, take precedence.

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2 EBU Integrated Monitoring Solution for Media Streams on IP Networks, http://eisstream.sourceforge.net/

COMMON CONTROL INTERFACE FOR NETWORKED DIGITAL AUDIO AND VIDEO PRODUCTS –

Part 7: Measurements

1 Scope

This part of IEC 62379 specifies aspects of the common control interface of IEC 62379-1 that are specific to the measurement of the service experienced by audio and video streams and in particular to the requirements of EBU ECN-IPM Measurements Group.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 62379-1, *Common control interface for networked digital audio and video products – Part 1: General*

IEC 62379-2:2008, *Common control interface for networked digital audio and video products – Part 2: Audio*

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IEC 62379-3, *Common control interface for networked audio and video products – Part 3: Video*

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3 Terms, definitions and abbreviations

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 62379-1 and IEC 62379-2 apply.

3.2 Abbreviations

ASI Asynchronous Serial Interface
DF Delay Factor
FEC Forward Error Correction
HD High Definition
IGMP Internet Group Management Protocol
MDI Media Delivery Index
MIB Management Information Base
MLR Media Loss Rate
OID Object IDentifier
PID Programme ID
RTP Real-Time Protocol
SD Standard Definition
SIP Session Initiation Protocol
SNMP Simple Network Management Protocol
TS-DF Time Stamped Delay Factor

4 Audio format definitions

At any point in the audio signal chain, the audio data will be in a particular format. For management purposes, the format shall be identified by an object identifier, either a “Common control interface standard” object identifier as defined and specified in IEC 62379-2 or an object identifier defined elsewhere.

NOTE 1 Permitting audio format identifiers to be defined outside this standard allows use of proprietary formats within the standard protocol and also allows industry standard formats to emerge that may eventually be incorporated into future revisions of this standard.

NOTE 2 The audio signal format definitions specified in IEC 62379-2 are used in a common manner by both audio only units and the one or more audio components associated with a video flow.

5 Video format definitions

At any point in the video signal chain, the video data will be in a particular format. For management purposes, the format should be identified by an object identifier, either a “Common control interface standard” object identifier as defined and specified in IEC 62379-3 or an object identifier defined elsewhere.

NOTE Permitting video format identifiers to be defined outside this standard allows use of proprietary formats within the standard protocol and also allows industry standard formats to emerge that may eventually be incorporated into future revisions of this standard.

6 MIB definitions for measurement information blocks

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6.1 General

This clause defines a set of managed object types for representing measurement information functions in network controlled audio/video equipment for the purposes of standardising the collection method of audio, video and some network parameters for use by the EBU ECN-IPM Group.

The format of the definitions is as specified in IEC 62379-1.

For measurement purposes, a piece of audio/video equipment shall be modelled as a number of discrete measurement blocks, as specified in IEC 62379-1. Each measurement block shall have zero or more inputs and zero or more outputs.

NOTE 1 Information is transferred into these objects internally within the equipment utilising this standard, from existing MIB objects, or elsewhere, within the equipment. A management station can access the measurement information using the standard object identifier (OIDs) defined in this standard independent of the manufacturer.

Each measurement block shall be modelled either by one of the standard measurement block types defined in this standard or by a measurement block type defined elsewhere. Associated with each defined block type shall be a (possibly empty) group of managed object types that represent the control functions for that block. A block type shall be identified by the node in the object identifier tree that is the root node for the group of managed object types associated with that block type.

NOTE 2 Permitting measurement block types to be defined outside this standard allows control of proprietary functions using the standard protocol and also allows industry standard block types to emerge that may eventually be incorporated into future revisions of this standard.

NOTE 3 An empty group of managed object types is permitted to allow for blocks that have no associated control functions.

NOTE 4 Annex C contains a worked example of the use of the measurement block structure.

6.2 Type definitions

6.2.1 General

In addition to the types defined in IEC 62379-1, the following types are used to specify the syntax of the abstract data structures representing managed object values.

6.2.2 Textual conventions

```
NetworkType::= INTEGER {
  ipv4 (1),
  ipv6 (2),
  asi  (3)
} (ipv4..asi)
-- An enumeration identifying a network type of over which the
-- media is flowing.

TransportType::= INTEGER {
  notApplicable (0),
  rtp (1)
} (notApplicable.. rtp)
-- An enumeration identifying a transport type of over which the
-- media is flowing.

-- Note that the values for this textual convention are NOT the same
-- as the numbers used in the protocol field of IPv4 packets
-- and the Next Header field of IPv6 packets.
-- See http://www.iana.org/assignments/protocol-numbers

AudioFECType::= INTEGER {
  none(0),
  rfc2733(1),
  rfc5109(2),
  smpte2022Dash1(3),
  smpte2022Dash5(4),
  proprietary(5)
} (none..proprietary)
-- An enumeration identifying the FEC type applied, if present.

VideoFECType::= INTEGER {
  none (0),
  rfc2733(1),
  rfc5109(2),
  smpte2022Dash1(3),
  smpte2022Dash5(4),
  proprietary(5)
} (none..proprietary)
-- An enumeration identifying the FEC type applied, if present.

BufferSize::= Unsigned32
-- A type to indicate the current total size of the receive buffer
-- in ms.

BufferOcpncyTime::= Gauge32
-- A type to report the amount of data, expressed in ms,
-- occupying the receive buffer.

BufferOcpncyPercent::= INTEGER (1..100)
-- A type to report the amount of data, expressed as a
-- percentage of the total receive buffer size, occupying the
-- receive buffer.

TemperatureLocn::= OCTET STRING (0..80)
```

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```
-- A type to indicate the location where the temperature is measured.

TemperatureTrend::= Gauge32
-- A type to report the current temperature at the measured location.
-- The use of this type will allow changes (either up or down)
-- to be reported.

TemperatureStatus::= INTEGER {
  undetermined   (0),
  other          (1),
  unknown        (2),
  ok             (3),
  warning        (4),
  critical       (5),
  nonRecoverable (6)
} (undetermined.. nonRecoverable)
-- An enumeration identifying the temperature status levels.
-- Semantics are equipment specific.

BitRateType::= INTEGER {
  unspecified (0),
  vbr         (1),
  cbr         (2)
} (unspecified..cbr)
-- An enumeration identifying the video bit rate type applied
--
-- vbr = variable bit rate
-- cbr = constant bit rate
```

iTeh STANDARD PREVIEW
(standards.iteh.ai)

6.2.3 Sequences

IEC 62379-7:2015
https://standards.iteh.ai/catalog/standards/sist/cfd3b196-645c-4fb4-9be4-5755e926b6a3/iec-62379-7-2015

```
nMtEntry::= SEQUENCE {
  nMtBlockId         BlockId,
  nMtIfIndex         InterfaceIndex,
  nMtTxRxPoint       TruthValue,
  nMtNetworkType     NetworkType,
  nMtTransportType   TransportType,
  nMtTxRxAddr        TAddress,
  nMtPortNumber      CardinalNumber,
  nMtIGMPVersion     CardinalNumber,
  nMtSIPServerAddr   TAddress
}

aMtBlockEntry::= SEQUENCE {
  aMtBlockId                BlockId,
  aMtAudioComponentNumber   IndexNumber,
  aMtNetworkBlockId         BlockId,
  aMtAudioStatus            TruthValue,
  aMtAudioSignalFormat      MediaFormat,
  aMtAudioPID               CardinalNumber,
  aMtIfIndex                InterfaceIndex,
  aMtFECType                AudioFECType,
  aMtFECLengthDimension     IntegerNumber
}

vMtEntry::= SEQUENCE {
  vMtBlockId              BlockId,
  vMtAudioBlockId         BlockId,
  vMtNetworkBlockId       BlockId,
  vMtVideoStatus          TruthValue,
  vMtVideoSourceFormat    MediaFormat,
  vMtVideoCodingType      MediaFormat,
  vMtVideoBitRateType     BitRateType,
```