MINISTRY OF HEALTH
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Health Information Standards Organisation
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# HISO 10049.1 Videoconferencing Interoperability Standard

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## Document information

*HISO 10049.1 Videoconferencing Interoperability Standard* is a standard for the New Zealand health and disability sector.

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This document carries the Health Information Standards Organisation (HISO) and Connected Health brands of the National Health IT Board.

HISO is the expert advisory group on standards to the National Health IT Board.

This document can be found on our website
http://ithealthboard.health.nz/security-privacy/approved-standards

## Contributors

The following organisations contributed to the development of this standard through representation on HISO or one of its working groups:

IBM New Zealand
Asnet Technologies
Cisco, Australia
Cisco, New Zealand
Bay of Plenty District Health Board
Dimension Data

## Copyright



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We welcome your ideas for improving this standard and will correct any errors you report. Contact us at standards@moh.govt.nz or write to Health Information Standards, Ministry of Health, PO Box 5013, Wellington 6145.

See the HISO website for information about our standards development processes.

## Related Specifications

The documents listed below have been used in the development of this standard. They may provide some further clarity, if required.

### HISO

10029 Health Information Security Framework

10037.1 Connected Health Architectural Framework v2

10037.2 Connected Health Network to Network Interface (NNI) Specifications v2

10037.3 Connected Health User to Network Interface (UNI) Specifications v3

If requires, copies of these documents can be found on the following website:

*http://ithealthboard.health.nz/security-privacy/approved-standards*

### ISO

ISO/IEC 14496-3:2009: AAC-LD – Information Technology- Coding of audio-visual objects- Part 3: Audio. If required, copies of this document can be purchased from:

*http://www.iso.org/iso/home/store/catalogue_ics/catalogue_detail_ics.htm?csnumber=53943*

## New Zealand Legislation

The following Acts of Parliament and Regulations have specific relevance to this standard. Readers should be aware of the need to consider other Acts and Regulations as may be appropriate to their own implementation or use of this standard.

Telecommunications Act 2006

## Updates

| Date | Version | Page Number | Chapter Number | Changes |
|---|---|---|---|---|
| December 2012 | 1 | | | Published |
| October 2013 | 2 | 8 | 2.3 | Removal of text 'Note that the widely used Microsoft Lync instant messaging and video calling product does not currently support H.264 AVC encoding. However, this product can be conferenced with H.264 AVC clients via a video gateway.' |

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# 1 Introduction

## 1.1 Background and purpose

Videoconferencing and telepresence are key technologies to the establishment of telehealth in New Zealand. Telehealth is an important tool for clinical integration under the National Health IT Plan. Telehealth is the term for the use of information and communication technologies to deliver healthcare when patients and care providers are not in the same physical location. It can be of particular value in rural communities, or in the care of older people or people with long term conditions. In New Zealand, telehealth will link multi-disciplinary teams in delivering care into settings such as integrated family health centres and long term care facilities. Opportunities to use telehealth will be enhanced by the introduction of ultrafast broadband and rural broadband. The New Zealand Telehealth Forum has been formed by the National Health IT Board to promote our use of telehealth.

The National Health IT Board and HISO have recognised the need to specify standards that ensure the impending videoconferencing and telepresence solutions are functional, secure and interoperable.

## 1.2 Document purpose and scope

This document will be one of a suite of specifications for videoconferencing and telepresence, in fulfilment of the above requirements for telehealth. This document's particular scope is interoperability of videoconferencing and telepresence equipment. It specifies a set of technology standards as a guide to health sector purchasers of videoconferencing and telepresence equipment.

## 1.3 Context in relation to other standards

This document on interoperability is the first in a suite of videoconferencing and telepresence standards. The other standards will focus on business process protocols and guidelines, and privacy and security. The use of International Standards within this document are only included if they have been ratified. The following HISO Connected Health suite of standards is also applicable as they define the standards for the Connected Health network interconnectivity.

### *10037.1 Connected Health Architectural Framework*

The Architectural Framework provides a single national technical reference for organisations and individuals looking to provide certified telecommunications services to the health sector. It is intended to support a consistent national approach to interoperability and provide the basis of a fully interconnected health and disability sector for New Zealand.

### *10037.2 Connected Health Network and Network Interface Specifications*

This document expands on the design principles listed in the Framework and details the technical specifications for NNI-1, NNI-1a, and NNI-2. It defines a set of minimum

characteristics for each network to network interface in the Framework and forms the baseline requirements for the definition of standardised Connected Health certified interconnection products.

### *10037.3 Connected Health User to Network Interface Specifications*

This document details the technical specifications for the UNI class 0 to 5 interfaces and defines a set of minimum and preferred characteristics for each. It forms the baseline requirements for the definition of a set of standardised Connected Health certified access products.

## 1.4 Intended audience and use

This standard is intended for the information of all health sector organisations as purchasers of videoconferencing and telepresence equipment. It is written for a technical audience. The requirements specified here are necessary inputs to procurement.

*Note: that this standard distinguishes between videoconferencing service providers and videoconferencing service users, and in places has different rules for each.*

## 1.5 Interpretation

Within the text of this document, the words 'shall' and 'will' refer to practices that are mandatory for compliance with this standard. The words 'should' and 'may' refer to practices that are advised or recommended.

# 2. Technical Requirements

Videoconferencing endpoints must be able to interconnect, irrespective of equipment type or the telecommunications networks to which they belong. Internationally, interoperability in videoconferencing has been difficult to achieve because equipment manufacturers have adopted different technology standards or implemented standards incompatibly.

One standard with reasonably wide adoption is the H.323 protocol for session initiation, call signalling and control. This has been the predominant choice within the New Zealand health sector. However, H.323 has certain limitations that will inhibit the further uptake of videoconferencing. For example, H.323 requires E.164 numeric dialling, which suits connections to static IP (internet protocol) addresses or fixed devices, but doesn't lend itself to mobile devices. Expanding the use of videoconferencing, including mobile use, requires an alternative to the H.323 protocol. Manufacturers have responded to this need by adopting particular new signalling and encoding standards, which are the basis for the recommendations and requirements we state here. We also make recommendations on backwards compatibility.

Recommendations and requirements appear under the following headings:

- Session initiation, calling signalling and control
- Audio encoding
- Video encoding
- Data conferencing

## 2.1 Session initiation, call signalling and control

Service providers shall provide bridges/multipoint conferencing services that support both Service Initiation Protocol (SIP) and Telepresence Interoperability Protocol (TIP) for session initiation, call signalling and control. For session initiation, SIP is preferred over H.323 because it supports Uniform Resource Identifier (URI) in addition to E.164 dialling.

Users shall ensure that any newly purchased equipment supports both SIP and TIP.

Service providers shall provide bridges/multipoint conferencing services which are backwardly compatible with existing H.323 and E.164 endpoints. Service providers may choose to support ISDN (Integrated Services Digital Network) dialling for backwards compatibility with older videoconferencing endpoints.

Users shall no longer purchase video endpoints that only support H.323.

*Refer to the 'Referenced Documents' for links to relevant specifications for SIP, TIP, H.323 and E.164.*

## 2.2 Audio encoding

At a minimum, service providers shall support the following audio compression codecs: G.711, G.722 and AAC-LD. In addition, support for G.729 is desirable.

Users will consider purchasing new equipment compatible with at least one of the first three of these standards.

*Refer to the 'Referenced Documents' for links to relevant specifications for G.711, G.722, AAC-LD and G.729.*

## 2.3 Video encoding

Both service providers and users shall support H.264 AVC video encoding as the only common cross manufacturer video compression codec.

*Refer to the 'Referenced Documents' for links to relevant specifications for H.264.*

## 2.4 Data conferencing

The minimum set of data conferencing protocols that a service provider shall support is: H.239 and Binary Floor Control Protocol (BFCP).

When purchasing new equipment, the user shall ensure that the equipment is compatible with both of the above standards.

Data conferencing capability for service providers shall include electronic whiteboard, file exchange and chat.

*Refer to the 'Referenced Documents' for links to relevant specifications for H.239 and BFCP.*

## 2.5 Video resolution

Equipment shall support a minimum video resolution of 720p at 30 frames per second for general use, with 1080p recommended for clinical use.

# Appendix A: Glossary

Terms defined in this glossary apply to this document.

| Term | Definitions |
|---|---|
| AAC-LD | An audio compression format designed to combine the advantages of perceptual audio coding with the low delay necessary for two-way communication. |
| BFCP | Binary Floor Control Protocol is a protocol to coordinate access to shared resources in a conference. |
| Codec | A device or computer programme capable of encoding or decoding a digital data stream or signal. |
| Connected Health/ Connected Health Team | The Ministry of Health programme or business entity that implements and supports improved network inter-connectivity for the health sector, facilitating the delivery of improved network resources to health providers. |
| Connected Health Product | A product or service that has been certified as meeting the Connected Health standards of suitability and general, technical, and procedural compliance. |
| E.164 | An ITU-T recommendation that defines the international public telecommunication numbering plan used in the PSTN and some other data networks. It also defines the format of telephone numbers. |
| G.711 | An ITU-T standard for Pulse Code Modulation. G.711 is a waveform codec. |
| G.722 | An ITU-T standard 7 kHz wideband speech codec operating at 48, 56 and 64 kbit/s. Provides superior audio quality and clarity. |
| G.729 | Is an audio data compression algorithm for voice that compresses digital voice in packets of 10 milliseconds duration. |
| Health Information Standards Organisation (HISO) | HISO is an advisory group to the National Health Information Technology Board (NHITB) which sits under the National Health Board (NHB). |
| H.264 AVC | A standard for video compression, and the most commonly used formats for the recording, compression, and distribution of high definition video. |
| H.239 | An ITU-T recommendation from the H.32x Multimedia Communications' macro family of standards for multimedia communications over various networks. Sets a way to have multiple video channels (e.g., one for conferencing, another for presentation) within a single session (call). |
| H.323 | Visual telephone systems and equipment for local area networks which provide a non-guaranteed quality of service. |

| | |
|---|---|
| IP (Internet Protocol) | A widely adopted and standardised computer communications protocol used to enable computers to be networked and to communicate by transferring information between them. |
| Integrated Services Digital Network (ISDN) | A set of communications standards for simultaneous digital transmission of voice, video, data, and other network services over the traditional circuits of the public switched telephone network. |
| International Multimedia Telecommunications Consortium (IMTC) | An international community of companies working together to enable real-time, rich-media communications between people in multiple locations around the globe. |
| ITU-T | International Telecommunications Union – Telecommunications Standardisation Sector is the United Nations specialized agency for information and communication technologies – ICTs. |
| Manufacturer | An entity that manufactures or produces goods which are, in this case, relating to the use of videoconferencing. |
| Service Provider | An organisation that provides videoconferencing communication service, storage service, or processing services, or any combination of the three. |
| Session Initiation Protocol (SIP) | The Internet Engineering Task Force (IETF) defined signalling protocol widely used for controlling communication sessions such as voice and video calls over Internet Protocol. The protocol can be used for creating, modifying and terminating two-party or multiparty sessions. Sessions may consist of one or several media streams. |
| Telehealth | The delivery of health-related services and information via telecommunications technologies. |
| Telepresence | Refers to a set of technologies which allow a person to feel as if they were present, to give the appearance of being present, or to have an effect, via tele-robotics, at a place other than their true location. |
| Telepresence Interoperability Protocol (TIP) | This protocol describes how to multiplex multiple screens, multiple audio streams, and an auxiliary-data screen into respective Real/Time Transport Protocol flows using a multiplexing technique. |
| Uniform Resource Identifier (URI) | A string of characters used to identify a name or a resource. |
| User | An individual or organisation that subscribes to or pays for videoconferencing products and/or services. |
| Videoconferencing | The conduct of a videoconference (also known as a video conference or videoteleconference) by a set of telecommunication technologies which allow two or more locations to communicate by simultaneous two-way video and audio transmissions.. |

# Appendix B: Referenced Documents

For the following referenced documents from the International Engineering Task Force, refer to: *http://www.ietf.org/* [1] :

- SIP: Session Initiation Protocol July 2002
- Binary Floor Control Protocol (BFCP)1, posted 14 July 2012:

For a copy of the International Multimedia Telecommunications Consortium TIP: Telepresence Interoperability Protocol, refer to *http://www.imtc.org/tip-for-developers/*

For copies of the following recommendations from the International Telecommunication Union, refer to *http://www.itu.int/rec/*

- H.323 (12/09): Packet-based multimedia communications systems
- E.164 (11/10): The international public telecommunication numbering plan
- E.164 (06/11): Revised Annex A: Clarification and explanation of the structure and function of international ITU-T E.164-numbers
- G711 (11/88): Pulse code modulation (PCM) of voice frequencies
- G711 App I (09/1999): A high quality low-complexity algorithm for packet loss concealment with G.711
- G.711 App II (02/00): A comfort noise payload definition for ITU-T G.711 use in packet-based multimedia communication systems
- G.711 (1988) Amendment 1 (08/09): New Annex A on lossless encoding of PCM frames
- G.711 (1988) Amendment 2 (11/09): New Appendix III – Audio quality enhancement toolbox
- G.722 (11/88): 7 kHz audio-coding within 64 kbit / s
- G.722 (1988) Erratum 1 (05/03)
- G.722 Appendix II (03/87): Digital test sequences for the verification of the G.722 64 kbit/s SB-ADPCM 7 kHz codec
- G.722 Annex A (03/93): Testing signal-to-total distortion ratio for 7 kHz audio-codecs at 64 kbit/s Recommendation G.722 connected back-to-back
- G.722 (1988) Appendix III (11/06): A high-quality packet loss concealment algorithm for G.722
- G.722 (1988) Appendix IV (11/09): A low-complexity algorithm for packet-loss concealment with ITU-T G.722
- G.722 (1988) Amendment 1 (11/10): New Annex B with super wideband embedded extension
- G.722 (1988) Amendment 2 (03/11): New Appendix V extending Annex B superwideband for mid-side stereo

[1] As per IETF website: As the internet is a constantly changing technical system, the International Engineering Task Force (IETF) publishes their Internet Standards as a Request for Comment. These documents are updated and ratified accordingly. For more information on IETF's official document process see http://www.ietf.org/newcomers.html.

- H.264 (01/12): Advanced video coding for generic audio-visual services
- H264.1 (01/12): Conformance specification for ITU-T H.264 advanced video coding:
- H.239 (09/05): Role management and additional media channels for H.300-series terminals
- H.239 (2005) Erratum 1 (01/06)

For copies of the following recommendations can be purchased from the International Telecommunication Union, refer to
*http://www.itu.int/en/ITU-T/publications/Pages/recs.aspx*

- G.729 (06/12): Coding of speech at 8 kbit/s using conjugate-structure algebraic-code-excited linear prediction (CS-ACELP):
- H264.2 (01/12): Reference software for ITU-T H.264 advanced video coding:

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