



NEBRASKA INFORMATION
TECHNOLOGY COMMISSION

STANDARDS AND GUIDELINES

**Video and Audio Compression Standard for Synchronous
Distance Learning and Videoconferencing**

| | |
|----------|-----------------------------------------------------------------------------------------------------|
| Category | Video Architecture |
| Title | Video and Audio Compression Standard for Synchronous Distance Learning and Videoconferencing |
| Number | |

| | |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Applicability | <input checked="" type="checkbox"/> State Government Agencies <input checked="" type="checkbox"/> All..... Standard <input type="checkbox"/> Excluding Not Applicable <input checked="" type="checkbox"/> State Funded Entities - All entities receiving state funding for matters covered by this document..... Standard <input checked="" type="checkbox"/> Other: Entities using state-owned or state-leased communication networks for synchronous video..... Standard Definitions: Standard - Adherence is required. Certain exceptions and conditions may appear in this document, all other deviations from the standard require prior approval of _____. Guideline - Adherence is voluntary. |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| | |
|--------|------------------------------------------------------------------------------------------------------------------|
| Status | <input type="checkbox"/> Adopted <input checked="" type="checkbox"/> Draft <input type="checkbox"/> Other: _____ |
| Dates | Date: July 13, 2004 Date Adopted by NITC: Other: |

1.0 Standard

1.1 Video protocol standard for synchronous distance learning and videoconferencing

| Video Protocol Standard | Comments |
|-------------------------|-------------------------------------|
| H.263 | For data rates above 384 Kbps |
| H.264 (MPEG-4 Part 10) | For data rates at or below 384 Kbps |

The CODECs selected for purchase or use should be capable of accommodating both standards and be capable of manual rate selection and/or automatic rate selection. The interconnecting CODECs should be allowed to automatically negotiate the best data rate.

1.2 Audio protocol standard for synchronous distance learning and videoconferencing

| Audio Protocol Standard | Comments |
|---------------------------|-------------------------------------|
| G.722 | For data rates above 128 Kbps |
| G.722 or G.722.1 or G.728 | For data rates at or below 128 Kbps |

The CODECs selected for purchase or use should have the ability to use G.722 at all speeds and one or both of the other two standards listed for lower speeds. If any two CODECs do not have a common protocol at or below 128Kbps then they should continue to use G.722. The CODECs selected for purchase or use should be capable of accommodating audio standard G.722 and be capable of manual rate selection and/or automatic rate selection. The interconnecting CODECs should be allowed to automatically negotiate the best data rate.

2.0 Purpose and Objectives

The purpose of this document is to establish video and audio protocol standards that will enable all existing and future synchronous distance learning and videoconferencing facilities in Nebraska to achieve interoperability and maintain an acceptable quality of service.

3.0 Definitions

3.1 Bandwidth

In digital applications, this term refers to the speed at which data is transmitted. It is usually expressed in terms of bits per second. It is often used interchangeably with the term data rate.

3.2 CODEC

Stands for Encoder / Decoder or Coder / Decoder. This device changes outbound analog video and audio into data and inbound data into analog video and audio. It is a device that attaches directly to the video and audio source.

3.3 Data Rate

This is the amount of digital information that a system can process and/or transmit. It is usually expressed in terms of bits per second. It is often used interchangeably with the term bandwidth.

3.4 Distance Learning

Distance learning is the delivery of educational experiences where the instructor(s) and student(s) are in different locations and engaging in learning at the same time (synchronously) or at different times (asynchronously). Synchronous distance learning typically involves 2-way interactive video delivered to two or more classrooms.

3.5 G.7xx

A family of audio protocols with varying specifications as developed by the ITU. Examples include:

| Standard | Required Bandwidth | Frequency Response |
|------------|--------------------|--------------------|
| ITU-TG.711 | 56/64Kbps | 50Hz – 3.4KHz |
| ITU-TG.722 | 48/56/64Kbps | 50Hz – 7KHz |
| ITU-TG.728 | 16Kbps | 50Hz – 3.4KHz |

3.6 Gateway

As used in this document, this term refers to a device or system that allows a system using one protocol standard to communicate with a system using a different protocol standard.

3.7 H.2xx

A family of video protocols with varying specifications as developed by the ITU. Examples include H.261 and H.263. They are differentiated by the specific algorithms used to encode and decode video.

3.8 H.3xx

A family of communications protocols with varying specifications as developed by the ITU. Each of these protocols have multiple options of video, audio and data protocols defined within them. Examples include:

H.320 for transportation on an ISDN network

H.321 for transportation on an ATM network

H.323 for transportation on an IP network

3.9 ITU

International Telecommunication Union, headquartered in Geneva, Switzerland is an international organization within the United Nations System where governments and the private sector coordinate global telecom networks and services. Website:

<http://www.itu.int/home/index.html>

3.10 Mbps

Megabits Per Second – Millions of bits per second.

3.11 MPEG

Motion Picture Experts Group – A body that defines protocols for digitally encoding video and audio. Some of the protocols defined by this group include:

MPEG 1 – Designed to compress the data required to pass analog video and audio.

MPEG 2 – An improvement in efficiency over the algorithms of MPEG 1

MPEG 4 – Designed to incorporate voice, video and data as objects that can be transported interchangeably.

4.0 Applicability

These standards apply to synchronous distance learning and videoconferencing facilities as follows:

- If utilizing state-owned or state-leased communications networks:
 - Any synchronous distance learning facility or videoconferencing application which utilizes state-owned or state-leased communications networks must comply with the compression standards listed in Section 1.0; or
 - The entity must provide, or arrange for, the necessary gateway technology to transcode to the adopted standards.
- If using state funding:
 - All **new** facilities or applications receiving state funding must comply with the compression standards listed in Section 1.0.
 - All **existing** facilities or applications receiving state funding for ongoing operations must convert to the standards listed in Section 1.0 as soon as fiscally prudent or upon renewal of any existing communications service contract, whichever comes first.
- These standards **do not apply** to the following entities:
 - University of Nebraska (relating to the university's academic research mission)
 - Legislature
 - Any entity which applies for, and receives, a waiver of these requirements from the Technical Panel of the NITC.

GENERAL STATEMENT ON APPLICABILITY

The Governing board or chief administrative officer of each organization is responsible for compliance with these standards. The NITC will consider adherence to technical standards as part of its evaluation and prioritization of funding requests

5.0 Responsibility

An effective program for video and audio standards compliance involves cooperation of many different entities. Major participants and their responsibilities include:

1. Nebraska Information Technology Commission. The NITC provides strategic direction for state agencies and educational institutions in the area of information technology. The NITC also has statutory responsibility to adopt minimum technical standards and guidelines for acceptable and cost-effective use of information technology. Implicit in these requirements is the responsibility to promote adequate quality of service and uniformity for information systems through adoption of policies, standards, and guidelines.
2. Technical Panel Video Standards Work Group. The NITC Technical Panel, with advice from the Video Standards Work Group, has responsibility for recommending video standard policies and guidelines and making available best practices to operational entities.
3. Agency and Institutional Heads. The highest authority within an agency or institution is responsible for interoperability of information resources that are consistent with this policy. The authority may delegate this responsibility but delegation does not remove the accountability.
4. Information Technology Staff. Technical staff must be aware of the opportunities and responsibility to meet the goals of interoperability of information systems.

6.0 Related Documents