A VIDEO AND AUDIO STANDARD FOR THE DISTANCE LEARNING NETWORKS OF THE STATE OF NEBRASKA

As Recommended by the Standards Work Group of the Technical Panel of the Nebraska Information Technology Commission

Published November 28, 2001

TABLE OF CONTENTS

1.0 Authority

The Nebraska Information Technology Commission is empowered to *"…adopt minimum technical standards, guidelines, and architecture upon recommendation by the technical panel…"* LAW 86-1506 (6). In order to accomplish this, the Technical Panel is empowered to, *"Establish ad hoc technical advisory groups to study and make recommendations on specific topics…"* LAW 86-1506 (7).

This report is to document the recommendations of the Technical Standards Workgroup as authorized by the Technical Panel of the Nebraska Information Technology Commission. This document is to be used by the Education Council and Technical Panel to make comment on for review by the NITC. It is within the authority of the NITC to adopt, amend or reject all or any part of this recommendation.

2.0 Executive Summary

As authorized above, the Technical Panel of the NITC commissioned a standards workgroup to study and make recommendations on synchronous distance learning video and audio standards. The report in hand is a result of that process.

The group met monthly for more than a year. Based on input from the Education Council of the NITC, a list of criteria was developed. The group identified video and audio protocols to be considered. Those that obviously would not in some way be an improvement over what is currently used in the state were eliminated. Next, a study was conducted on the remaining candidates based on the criteria. This process narrowed the field to two protocols: MPEG 2 and H.263. Some confusion has occurred on the part of many because the group at first identified H.263 as H.323. H.323 is a blanket protocol that encompasses several optional video and audio standards to be transported in an IP environment. Later it was decided to only specify the video and audio standard, as the charter directs, and to leave the network environment for the individual systems to decide. In this document, the standard will be referred to as H.263.

A test procedure was developed by the committee with the intent to allow system users to view more than one vendor hardware/software solution to be scrutinized in an apples-to-apples scenario. By using two vendors for each standard, the findings would not be skewed by the quality of a single vendor. The specific of the test is included below. By keeping the network constant a variable could be eliminated so that a true look at the protocol could result and not a test of an uncontrolled network.

This report is the result of all of these efforts. Upon review of this report, it is incumbent on both the Education Council and Technical Panel to recommend or to not recommend the conclusions. They may also make whatever remarks they choose to. Since this document is ultimately the work of the Technical Panel who commissioned the group, they may also choose to make changes to the document. After that process, the NITC will decide what actions to take.

3.0 Recommendation

It is the recommendation of the standards work group by unanimous vote that Nebraska adopt a dual standard. For higher data rate applications intending to use full-motion video MPEG 2 should be adopted. For those applications that do not have a need for full motion, H.263 video with G.722 audio should be adopted.

It was the intent of this group to designate a single standard. It is still the belief of this body that a single standard should be able to suffice. At issue is hardware availability.

MPEG 2 is specifically intended for applications that require high quality video. It minimizes the bandwidth required to achieve that goal. Therefore, its quality drops off rapidly as bandwidth drops below 2Mbps, especially at speeds below 1Mbps. Because of this, manufacturers assume that there is limited demand for low data rate MPEG 2 outside of desktop-to-desktop applications. Since educators have expressed needs beyond the desktop-to-desktop application, MPEG 2 could not be made to fit most of the lower bandwidth needs of the educational community.

In the case of H.263/G.722, most users of this standard do so in a low data rate teleconference application. For this reason, manufacturers have concentrated their efforts in that arena. H.263 CODEC's of high enough data rate to achieve full motion are difficult if not impossible to come by. The highest rate available in the two CODEC's tested was 1.9Mbps (E-1 rate), which is a European data rate not commonly supported in the U.S. This standard does, however, offer a very good solution in bandwidth savings and ubiquity of all educational applications that do not require full motion.

In this scenario, NET would need to continue its role as a gateway. Sites that now connect to both Neb*Sat Network 3 and/or NVCN that also have capacity into a pod would likewise act as a gateway. There is limited capacity on both NVCN and Network 3. This will become less of an issue with time as connectivity is increased around the state through efforts like the Nebraska Network initiative recently begun by the NITC and the NETCOM efforts of the DOC. Even if neither of these efforts offers an increase in connectivity, networks continue to grow on their own.

4.0 Chronology

4.1 From minutes of Tech Panel meeting September 12, 2000

FUTURE DIRECTION OF NEBRASKA TELECOMMUNICATIONS DISCUSSION - DENNIS LINSTER, CIO, WAYNE STATE COLLEGE
Mr. Linster brought several issues for discussion with the Technical Panel:
- The need for leadership in the state for a unified effort and vision for information technology and telecommunications.
- The need for adequate connectivity and equity in distance education, especially for out-state Nebraska communities and institutions. Currently, analogue systems make connectivity difficult and costly.