

Advisor: Christopher Shamburg

SNAPSHOT OF NJEDGE.NET
VIDEO SERVICES AND UTILIZATION

Julio A. Velasco

Submitted in partial fulfillment
of the requirements for the degree of
Master of Arts in Educational Technology
New Jersey City University

Spring 2004

Table of Contents

Section 1: Problem and Its Setting1
 Background.....1
 Purpose.....3
 Research Questions.....3
 Need for the Study5
 Definitions5
 Delimitations6
Section 2: Related Literature7

[End of TOC]

Table of Tables

Table 1. Terms used in this paper.

6

[End of TOT]

Section 1: Problem and Its Setting

Background

This study involves members of the recently completed NJEDge.Net network. NJEDge.Net is a state-wide broadband network designed to support the instructional, research and public service objectives of higher educational institutions in New Jersey. The service provides access to the global Internet and the Internet 2 backbone and is intended to reach out to distance learners, K-12 classrooms, corporate classrooms, and local community projects. (NJEDge.Net home page). The system is designed to enhanced communications and encourages new types of collaboration between its members by establishing statewide interoperability standards that facilitate the exchange of ideas and services. Current membership included 45 public and private institutions. (Laskaris, Presidents Council Presentation [PCP]). New Jersey City University (NJCU) is one of the members of this organization.

The project began as a result of the CHE and Presidents Council adopting the “New Jersey’s Plan for Higher Education” in 1996. A statewide Technology Advisory Committee was created in 1997 and a \$50 million bond was established to provide funds for the state institutions of higher education to upgrade their networks in preparation for the state’s intranet and \$5 million was set aside for inter-institutional connectivity. Outside consultants were used to survey the readiness for statewide networking and developed the initial specifications for the project (Laskaris, PCP). Requests for Proposals for the NJEDge.Net network were issued in 1999 and a final Master Service

Agreement was signed by the President's Council on October 23, 2000. Subscription to the service began soon thereafter. (Laskaris, memo to CHE Presidents Council, May 2003).

The network entry points and backbone are managed by Verizon. Qwest provides the inter-LATA connectivity, which bridges the three voice and data transport areas that New Jersey is divided into. (New Jersey Colleges and University Information Technology Managers Association [NJCUITMA] Minutes, September 15, 2000). Rutgers University, an original member of the Internet 2 project, hosts an aggregate connection to this ultra-high bandwidth research network for the NJEDge intranet, bringing these resources to the members. Connected in June 2003, "The NJEDge Video Portal is a large-scale, carrier class statewide videoconferencing system capable of handling a significant number of simultaneous videoconferences with multiple participating sites." (Laskaris, May 2003)

NJEDge.Net was designed to provide advanced video conferencing and distance learning incorporating streaming video. It was also designed to be interoperable with Access New Jersey, the K-12 video portal developed for the New Jersey Network, a broadcast-quality cable network. The Intranet is also linked to a satellite uplink/downlink at William Paterson University, providing access to local and national commercial video networks. The educational objective is to facilitate new technology-enhanced pedagogical methodologies by "creating optimal environments for innovative teaching and learning" (Laskaris, PCP).

The organization promotes utilization of streaming video by hosting several targeted activities for faculty, including development initiatives, an annual Technology in

Education conference, symposiums, colloquiums, and showcases. (NJEDge events page, October 2003). A recent activity collaborative effort by NJEDge.net brought together K-12 students in New Jersey along with students in other states and other countries, on a week-long video research project in the Panamanian Rainforest using videoconferencing. This activity drew resources from three higher educational institutions in New Jersey. (Laskaris, May 2003)

The author is currently the NJEDge.Net Video Resources Group (VRG) representative for New Jersey City University, and was involved in writing the both proposals for NJCU's \$2.5 million original allocation and subsequent allocation of an additional \$500 thousand upon joining the network. The proposed video services offered by NJEDge.Net proved to be a fascinating development, opening a new frontier with some very real opportunities for furthering education in all disciplines.

Purpose

The purpose of the study is to determine the general state of readiness of the members of NJEDge.net for the emerging video services being offered by the state of New Jersey through the Commission of Higher Education. Additionally, the study will disclose how these services are currently being used in the classroom and will attempt to measure the overall readiness of instructors to be able to use these services.

Research Questions

The subject of inquiry for this study focuses on two, inter-related categories, readiness, current utilization and future expectations. Questions regarding readiness are generally about the specific hardware requirements, network configuration, and the mechanics that will enable services. The questions are highly technical in nature and will

be directed to the respective NJEDge.Net VRG representatives. Many of the questions will fall to the Data Resource Group representative for resolution, but ultimately the VRG representative must also be aware of these parameters, such as available bandwidth to plan for the appropriate distribution of resources. These questions are mostly derived from NJEDge.Net's certification checklist.

Once date of general readiness is gathered, the questions will turn to the types of services currently provided. There are three main services in this category, video conferencing, on-demand video streaming and video broadcasting.

However, an important aspect to readiness is the perceived level of commitment these administrators receive from upper management and faculty. Upper management should provide appropriate human and financial resources to ensure that these services are provided to their various communities. As the person responsible for managing and coordinating use of these resources, the VRG representative has a unique view in terms of management's commitment to providing them.

Turning the scope in the other direction, the VRG representative can also offer some basic information about the level of activity from faculty and administration through requests for streaming video services for various campus projects. However, the study will dig a little deeper by surveying faculty as well. It is hoped to see a pattern of discipline-specific utilization and discover the level of integration into the course curriculum. Finally, the study hopes to identify factors that prevent the use of NJEDge.Net services.

Need for the Study

This information would be relevant to the organization and useful in guiding NJEDge in targeting appropriate support in areas that may need attention. The study will also provide a broad look at the level of expertise working on the project and which disciplines are using the services. The members can use this information as a guide to for future projects within their own campuses. On an administrative level, this study can be used as a map to guide future budgeting by indicating the types of hardware required to provide the various services.

As a benefit to NJEDge.Net, this study provides a second, more comprehensive snapshot of the services as the technology is set in place. NJEDge.Net management performed a basic network compliance survey last year, but the environment changes quickly. This survey will update and enhance their records.

Definitions

The reader will encounter many acronyms and terminology specific to networking and video streaming. The follow table provides definitions for most of these terms in context to this study.

Term	Definition
ATM	Asynchronous Transfer Mode. A transmission protocol common to very large data network backbones.
Ethernet	A local hardware protocol to interface with data networks.
H.320	Protocol for transmission of audio/video over ISDN
H.323	Protocol for video conferencing transmission over the Internet.
InteractiveTV	A collection of media sources, such as DVD, VCR, document cameras, and computer applications connected to some form of streaming video hardware
Streaming Video	a.k.a. <i>ipVideo</i> . The transmission of video over a TCP/IP or ATM data network at various bit rates and formats depending on the application. The transmission generally includes audio formats.

MPEG-2	High Bandwidth compression & transmission protocol for audio/video over the Internet. Also used for encoding DVD media. The sub-specification for audio compression (Layer 3) is also a common format for MP3 players.
MPEG-4	Low Bandwidth compression & transmission protocol for audio/video over the Internet.
QOS	“Quality of Service” tag within the ATM protocol. It is emulated in TCP/IP v4 and adopted into the TCP/IP v6 specification. QOS prioritizes ipVideo packets so they move quickly over the Internet.
Remote Classroom	A classroom located in a different geographic location from where the instructor is located. The instructor may be in a classroom with students or at some other location, alone. Interaction could be through a simple videoconferencing system or a more robust system offering various media resources.
Services	Includes Video Conferencing, Video on Demand, and Video Broadcasting; and combined multi-media.
TCP/IP	The Internet’s transmission protocol. It is common for TCT/IP to travel within an ATM network.
Video Broadcast	A scheduled broadcast provided to a general audience, much like commercial video broadcasting, but over a data network, such as the Internet.
Videoconference	A method of video streaming that provides two-way video and audio communications between two or more locations.
LATA	“Local Access & Transport Area” (Acronym Finder, 2003). In this paper, the term represents the three telephone & data communications networks that represent the state of New Jersey.
Intranet	A private network that is part of the Internet.
VPN	<i>Virtual Private Networking</i> . A method of creating a secure private connection between a computer and a private network or between two or more networks. The NJEDge network is an example of the later.

Table 1. Terms used in this paper.

Delimitations

The author acknowledges the limitations set by the NJEDge.Net administration in that all information is devoid of specific member institution identification. The study is limited in scope to the members of NJEDge.net organization. Thus the information presented here may not be indicative of usage by other states and organizations.

Another limiting factor is the availability of faculty who are *not* currently using these services. Therefore, the results may seem to indicate greater activity than is actually present on any given campus.

Section 2: Related Literature

Although video over standard broadcast mediums, **such as...** has been available for many years, transmission over data networks is a fairly new technology.