

Utah Educational Network

Enhancing the education process by eliminating geographical obstacles

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END USER:

Utah Educational Network

MAJOR VENDORS INVOLVED:

- Video codecs: VBrick Systems
- Ethernet routers and switches: Cisco Systems

NETWORKS EMPLOYED:

- Local Area Networks (LANs): Ethernet — over 100
- Wide Area Networks (WANs): Consist of single and multiple T1s, DS3, and microwave links with native ATM transport

STATEMENT OF PROBLEM:

The intention of the Utah Educational Network (UEN) is to let students at university campuses and high schools view and participate in courses offered around the state. The task is to enhance the education process by tearing down geographic obstacles. For these students to take the classes remotely it requires high-quality interactive video and audio. The solution must let the remote students participate in interactive groups (TV via monitors) and view courses individually from PCs. Moreover, the video must be of sufficient quality and must operate over an IP network so there can be a true learning experience. Lastly, the network must be dynamic to support various forms of traffic such as data, voice, and video simultaneously.

SOLUTION DESCRIPTION:

The UEN has solved this problem with a two-pronged approach. First, it has upgraded its LANs and WANs to be able to handle the multimedia traffic. Specifically, the LANs have been upgraded to switched Ethernet and the WAN has been upgraded from frame relay to asynchronous transfer mode (ATM).

Second, the UEN has placed VBrick Model 3200 MPEG codecs at each location requiring video and audio termination. Each VBrick 3200 provides video and audio MPEG encoding and decoding. These units are placed in classrooms and lecture halls with cameras and TV monitors and are connected to the switched Ethernet network.

Each VBrick 3200 has an IP address assigned to it so that it can be managed remotely through Telnet, SNMP, or via a comprehensive graphical user interface on any Windows PC. The system administrator can easily set up a conference between two or more locations by simply changing the destination and receive IP unicast or multicast addresses. VBricks are managed through the VAdmin software, a user-friendly

Windows-based tool allowing an administrator to schedule conferences, modify video and audio parameters, perform diagnostics, and download new enhancements.

The UEN is using the power of its IP network for distributing multimedia. Any VBrick 3200 attached to a camera or other video and audio source can be viewed by any other person attached to the network. Not only is the output viewed on standard TV monitors using another VBrick to decode, but any student can also view the lecture from their PC by using the VBrick StreamPlayer software. The StreamPlayer is a Windows-based MPEG software decoder with view and capture capability.

MAJOR BENEFITS DERIVED:

The UEN has derived several benefits from the network:

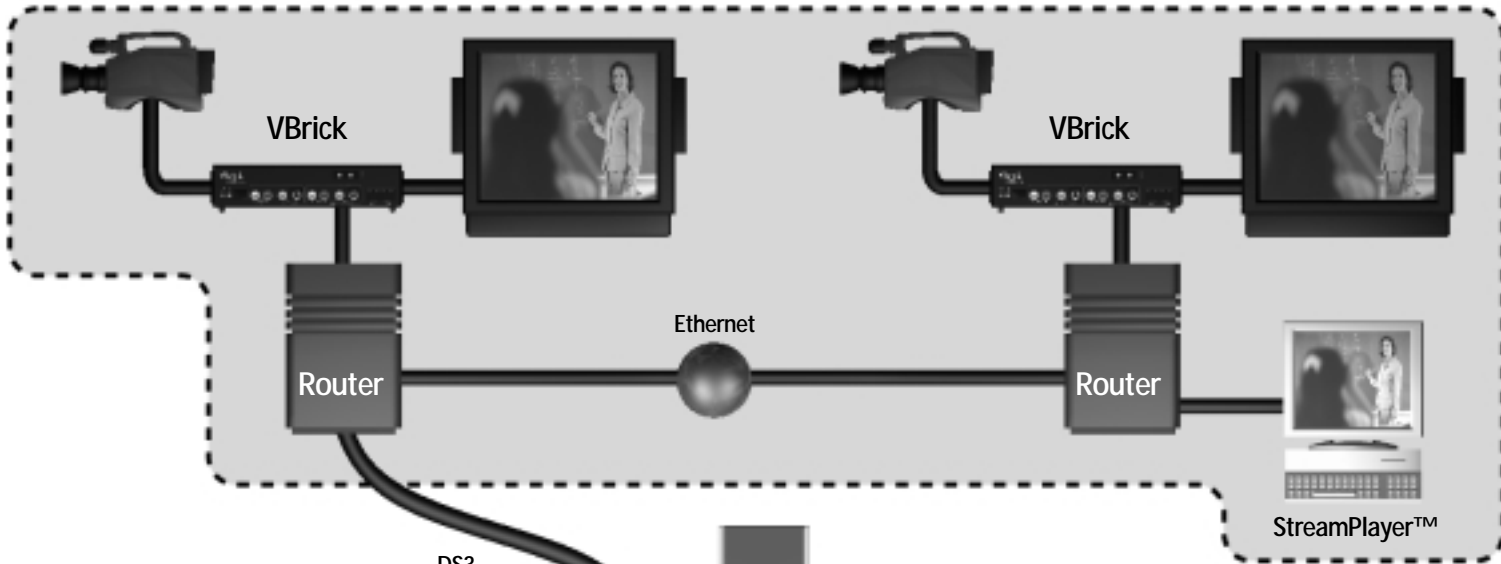
- Increased enrollment at remote campuses by being able to offer a larger variety of courses — many through the distributed learning network;
- Improved quality of existing distributed learning network by replacing frame relay with ATM backbone and upgrading to switched Ethernet on LANs;
- More widespread distribution of courses with the use of IP multicast enabled network and multimedia;
- Increased flexibility — courses can be viewed on standard TV monitors or any network connected PC with VBrick StreamPlayer software;
- Increased coverage — because the cost of the VBrick solution is a fraction of competitive products, more classrooms can be equipped without exceeding the budget; and
- Convergence — data, voice, and video can now use the same network. The use of IP and ATM allow for dynamic bandwidth allocation of the resources available.

CONCLUSION:

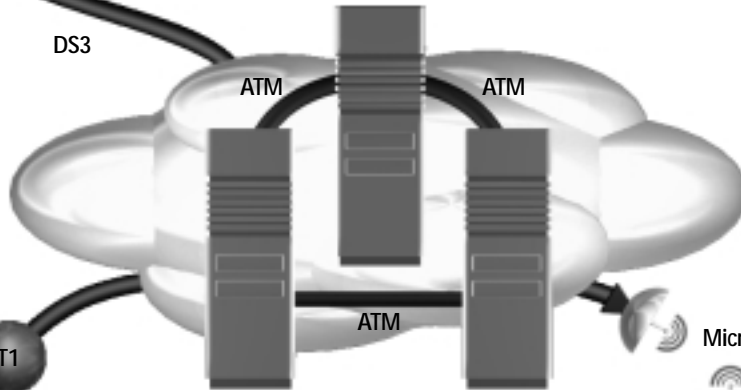
The UEN has prepared itself for the next millennium by upgrading its network and distributed learning equipment to handle high quality video and audio from university campuses to state high schools. By using existing standards such as MPEG for conferencing and IP/ATM for transport it has not boxed itself into a proprietary solution. The low price and ease of use of the VBricks for multimedia has made the new distributed learning network financially and technically attractive. **TCM**

Utah Education Network Network Diagram

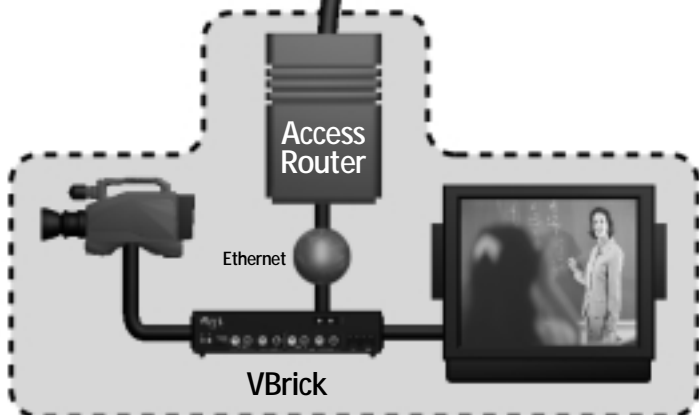
University



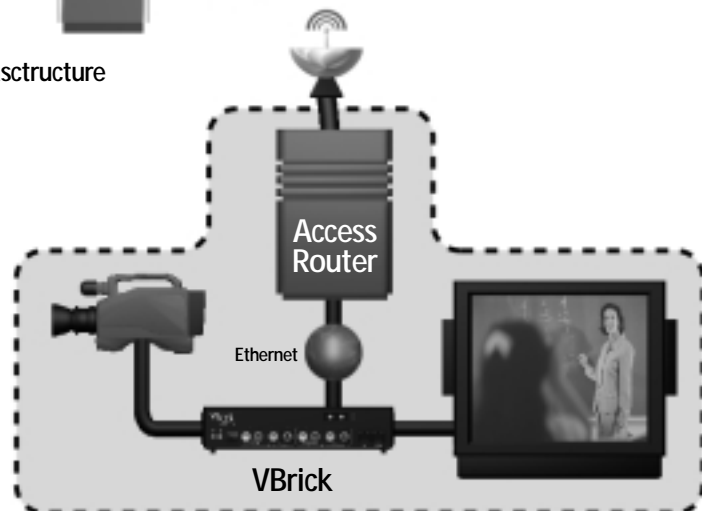
DS3



Backbone Infrastructure



High School



Middle School